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NUCLEAR SAFETY SPECIFICATIONS FOR N-REACTOR FUEL
FOR 2.4 W/O ENRICHED URANIUM OXIDE FUEL

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B. R. BLACK

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NUCLEAR SAFETY SPECIFICATIONS FOR N-REACTOR FUELS
FOR 2.4 W/O ENRICHED-URANIUM OXIDE FUEL

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AUGUST 16, 1965

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NUCLEAR SAFETY SPECIFICATIONS FOR N-REACTOR FUELS
FOR 2.4 W/O ENRICHED URANIUM OXIDE FUEL

This specification covers the processing of a pilot lot of 2.4 w/o uranium oxide fuel in the N-Reactor Fuels facilities for the period from August 16, 1965, through March 1, 1966. A maximum of 180 fuel pieces will be processed. The fuel will be processed or stored in 306, 333, and 3715 Buildings. Processing steps will include end closure welding, support and locking clip welding, final etching, autoclaving, final inspection, and assembly. Shipment to 100-N Area and from 325 Building are also covered.

FUEL COVERED

This specification covers uranium oxide fuel only with a maximum weight of 11.355 lbs of uranium per foot of tube and enriched to 2.4 w/o U²³⁵. The nominal fuel dimensions, including the clad and end caps, are:

Length	24.5"
O.D.	2.345"
I.D.	1.364"

FUEL IDENTIFICATION

All of the fuel pieces must be identified as to their enrichment at all times except while they are in process and attended. Each truck, shipping box, autoclave, or other fuel container must be posted with the proper enrichment signs.

NUCLEAR SAFETY RULES FOR 2.4 W/O OXIDE FUEL

A. General Handling, End Closure Welding, and Support and Locking Clip Welding

1. Fuels may be stored or transferred on two-shelf carts described in Section 500 of HW-80313, "Nuclear Safety Specifications for N-Reactor Fuels Operation." Fuels on the carts shall be horizontal with twelve pieces in a single layer array or vertical with a maximum of four pieces per cart. If vertical positioning is used, the carts shall be modified to adequately support the fuel. 24-0 must be stamped on the tail end cap of each piece.
2. At each work station not covered by another rule a maximum of two fuels may be removed from the truck for processing or inspection.
3. If oxide is accidentally spilled from a fuel it must be cleaned up immediately and then stored three feet from all other uranium. The maximum batch size for loose oxide shall be 23 pounds, or that amount contained in one piece.
4. A maximum of eight pieces may be pre-support weld degreased at one time in one basket. Basket design shall be approved by the Nuclear Safety Engineer, N-Fuels. There shall be no other uranium in the degreaser.

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B. Final Etch

1. Baskets shall hold a maximum of eight fuels. Basket design shall be approved by the Nuclear Safety Engineer, N-Fuels.
2. A maximum of two baskets shall be used on the line, including the tables and floor at the end of the line. A maximum of one basket shall be in a tank. There shall be no other uranium in the line.
3. Baskets on tables or the floor shall be one basket high.
4. If accidental dumping of pieces occurs, the fuel pieces shall be removed from the tank before normal processing is resumed.
5. There shall be no uranium in solution in the line.
6. No other uranium shall be processed in the line while 2.4 w/o fuel is in process. The line shall be identified by placing a 2.4 w/o enriched uranium sign on each tank while this material is being processed.
7. The number of loaded autoclave baskets in water on carts in the chemical processing area shall not exceed four. There shall be no loaded autoclave baskets containing uranium of other enrichments in water in the area. Only autoclave baskets modified to hold a maximum of five fuels shall be used for 2.4 w/o uranium.

C. Autoclaving

1. The standard outer-piece autoclave basket must be used, but modified as follows: The inner ring of five holes and alternate holes on the outer ring shall be blanked out so that fuel pieces can only be loaded into 5 holes.
2. Autoclave baskets as modified in (1) may contain 5 uranium fuel pieces or 5 assemblies of uranium pieces and targets.
3. Other enrichments shall not be processed in the same autoclave with the 2.4 w/o fuels.
4. A maximum of 2 autoclave baskets may be processed in each autoclave or pre-load station.
5. The number of loaded baskets, including other enrichments, in portable containers in the area and in transit to the area shall not exceed two.
6. Loaded baskets that are not in water containers may be stored on the floor in any number or arrangement.
7. There are no other special limitations on baskets hoisted over the area.

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D. Final Assembly

1. Fuel pieces in the final assembly and storage area shall be in a single layer array on carts or the work tables.
2. Dry autoclave baskets containing a maximum of 5 pieces each may be in the area with no special controls.

E. Storage

1. Each finished fuel shipping box may contain 18 pieces in two layers only.
2. Boxes containing 2.4 w/o fuel must not be stacked.

F. Shipping to 100-N Area

1. Fuels shall be shipped to 100-N Area as specified in a, or b.
 - a. A maximum of 13 fuel element shipping boxes in a single layer array may be shipped in either of the two trailers normally used for fuel shipping. The boxes shall not be stacked in the truck. A patrol escort shall be used to insure that if the truck is wrecked and the boxes broken up, the only water used to fight a fire is fog.
 - b. A maximum of ten fuel pieces may be shipped in a finished fuel shipping box in any truck with no other uranium with no additional restrictions.

G. Shipping from 325 Building to 306 or 333 Building

1. Fuels may be shipped as specified under F, Shipping to 100-N Area, or as described below.
2. A maximum of four fuels on a truck may be shipped either horizontally or vertically with no special controls. There shall be no other uranium on the truck.

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