



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

AUG 4 1982

Note to Bea Kosla

SUBJECT: SEATTLE UNIVERSITY, NUCLEAR CRITICALITY SAFETY REVIEW  
FOR LICENSE RENEWAL 70-600

Nuclear Criticality Safety

The fuel consists of aluminum clad, hollow uranium metal slugs. The aluminum clad dimensions are 6.64" long, 1.43" OD and 0.349" ID. Each slug has uranium dimensions of 6.053" long, 1.356" OD and 0.423" ID. The uranium enrichment is 0.947% U-235. The licensee possesses 900 slugs for a total of 4,824 pounds of uranium containing 20.721 kg U-235.

The slugs are used in a subcritical pool assembly for students participating in Fermi Age, Diffusion Area, Buckling and Multiplication Constant experiments. The experiments are done using one of four Pu-Be sources (155g Pu total). Prior to certain experiments, the assembly is unloaded by placing the slugs on shelves in the room.

The subcritical assembly is located in a concrete pool on a concrete pedestal. Seven slugs are loaded into a plastic cylinder. The cylinders are positioned by spacer grids above and below the fuel. A total of 896 slugs can be loaded into the plastic cylinders. The subcritical assembly is shown in the attached Seattle University drawing. When experiments are not being performed, water is drained from the pool.

The combination of U-235 and one Pu source is subcritical for all foreseeable water-fuel mixtures. This has been independently confirmed by the staff by plotting data in DP-1014<sup>1</sup> and limited data in HW-65552.<sup>2</sup> In addition, Hans Toffer, UNS Nuclear Industries, confirmed by phone on July 20, 1982, that the critical mass is 9,150 pounds per HW-70233. Only one Pu source is used in the subcritical assembly.

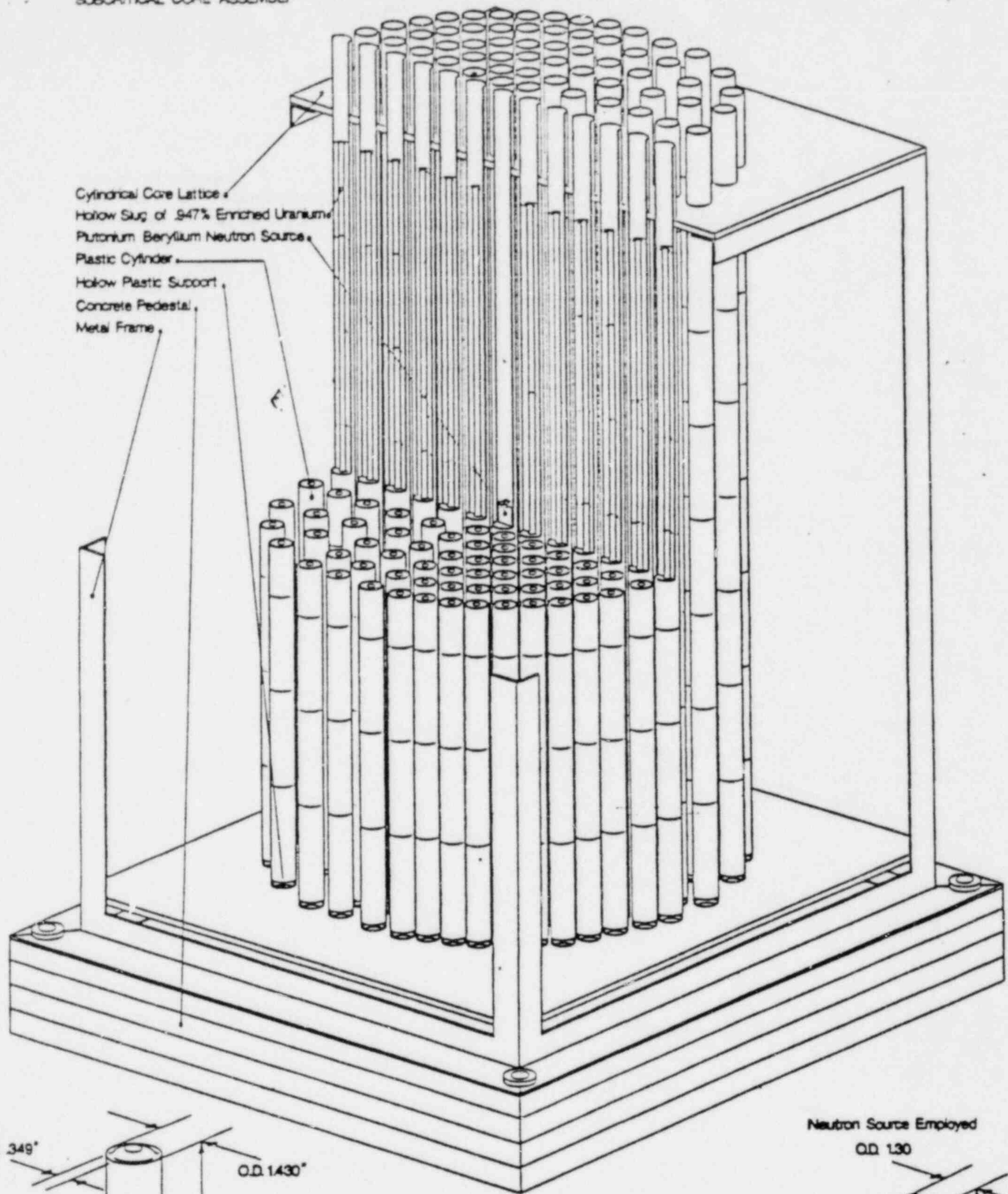
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<sup>1</sup>H.K. Clark, "Critical and Safe Masses and Dimensions of Lattices of U and UO<sub>2</sub> Rods in Water," DP-1014, February 1966.

<sup>2</sup>R. C. Lloyd, Summary Listing of Subcritical Measurements of Heterogeneous Water - Uranium Lattices Made at Hanford, HW-65552, June 1980.

*GHB*  
G. H. Bidinger

SUBCRITICAL CORE ASSEMBLY



- Cylindrical Core Lattice
- Hollow Slug of 94.7% Enriched Uranium
- Plutonium Beryllium Neutron Source
- Plastic Cylinder
- Hollow Plastic Support
- Concrete Pedestal
- Metal Frame

