

Docket 70-36  
Project S-8  
March 19, 1964

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UNITED NUCLEAR CORPORATION, CHEMICALS DIVISION - SHIPPING CONTAINERS  
AND PROCEDURES - DOCKET NO. 70-36, JULY 15 AND DECEMBER 19, 1963, and  
FEBRUARY 24, 1964

SYMBOL: DLR:RHO

In your letter to UNC dated December 13, 1963, you stated that the review of UNC's shipping containers and procedures had not been completed and if additional information will be required they will be notified. As a result of several licensing actions and conversations with Hematite, New Haven and Wood River Junction, Messrs. Lou Swallow and Robert Shearer of UNC are aware of our requirements for additional structural integrity information.

Yesterday, Lou Swallow telephoned Dick Odegarden concerning a  $UO_2-ThO_2$  license amendment that UNC is submitting for approval (they requested this approval prior to April 13, 1964). Swallow indicated that their answers to your letter of December 13, 1963, would not include any additional information concerning shipping. Therefore, we recommend the questions listed below be sent UNC. We have revised our questions since our memorandum to you of October 22, 1963.

- 549, 1111 and also 1483 submitted for calculations
- "1. A structural integrity analysis and/or test results should be submitted for your shipping containers identified as BE Permit 318, 342, 549, 740, 911, 1001, and 1111 which includes a drop from 30 feet on any side including top and bottom on an unyielding flat horizontal surface; the drop should be made on the surface having the least structural integrity (between supports). If the maximum loss of spacing exceeds 10% of the distance between the inner container and the side of the birdcage, the maximum number of containers in one shipment should be determined on the basis of the reduced dimensions of the damaged shipping containers. The damaged dimensions of a cylindrical birdcage should be used, viz., diameter =  $d-x$ , height =  $h-y$ . For damaged cubical birdcages, the dimensions would be  $(a-x)(b-y)(c-z)$ .  $x$ ,  $y$  and  $z$  are reductions in dimensions due to the 30' drop on concrete, and to the first ten minutes of the standard one-hour fire test, if required because of combustible structural materials.  $x$ ,  $y$  and  $z$  may be assumed the same and equal to the reduced dimension resulting from a drop on the weakest structural point of the birdcage.

spacing from inside container to the nearest surface of the birdcage

(and take into consideration both gross displacement of the inner container and damage to the birdcage)

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- "2. When solutions or soluble compounds are shipped in geometry controlled inner containers, we require that safe geometry be maintained and no material will leak from the inner container as a result of a 30-foot drop, a full one-hour fire test and 24-hour submersion under 3 feet of water. We request that you submit demonstration that your containers identified as BE Permit 549, 1111, and 1483 will survive the drop, fire and submersion tests without inleakage of water or loss of contents.
- "3. Please confirm that no more than 10 kg U-235 in the form of metal biscuits will be placed in each shipping container identified as BE Permit 549. It must be emphasized that Figure 12, page P-17, K-1380, is applicable only to fully enriched, undiluted, unalloyed uranium metal; Figure 12 is not applicable to metal of lower enrichment nor to alloys or compounds of any enrichment. For compounds and solutions having uranium densities greater than 3.2 g/cc, you propose that the basis for shipment is safe volume. Describe how the density correction will be made and how the inner container will be constructed to insure a safe container capacity.
- "4. We are unable to confirm that the 5.75" I.D. by 35" high inner container of shipping container identified as BE Permit 1111 is geometrically safe. We do not consider a 5-inch I.D. polyethylene bottle or a light weight metal can as providing a sufficient degree of containment (for either moderation control or geometry) during shipment when nuclear safety depends on geometry control. Nuclear safety must be based upon the inside dimensions of the Schedule 40 pipe.
- "5. Please confirm that the Class III shipments will be made in accordance with one of the procedures stated in Section VI-B, of the enclosed Renewal Application Guide, dated February 1964. If your proposed shipment involves intermediate unloading and loading or transshipment at a terminal, we require as a part of the application and for our approval in advance of each shipment, a further delineation of certified arrangements with all carriers involved and with terminal authorities, in order to assure against commingling of your shipment with other special nuclear material at all points of transfer."

cc: Christian Beck, DLR

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