ENCLOSURE 10

(12)

MAR 11 1975

Note to W. Reinmuth

REACTOR SPENT FUEL SHIPPING CASKS - ACTION PLAN

The following are responses to the items listed in your note to me dated 2/18/75 and indicate the progress (by March 7, 1975) to date in obtaining the requested information.

I. Determine who must get a license and the types of licenses to own, manufacture or use a spent fuel shipping cask.

a. To own a spent fuel shipping cask (SFSC), the owner does not get a license for the cask. He is issued a "Certificate of Compliance for Radioactive Materials Packages" by the Chief, Transportation Branch, Directorate of Licensing, Division of Materials and Fuel Cycle Facility Licensing, Office of Nuclear Material Safety & Safeguards.

b. To manufacture a SFSC:

No authorization is required and no license or C of C is required to manufacture a SFSC.

c. To use a SFSC

License issued pursuant to Act; 10 CFR 30, 70 and 71.

d. To ship spent fuel

Special permit from DOT. No participation by NRC.

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2. Determine the NRC Offices, Branches, key personnel involved in regulation of this activity.

NRC Offices	Branches	Key Personnel
Nuclear Materials Safety & Safeguards	Transportation	Chls. E. MacDonald, Chief
Division of Materials Fuel Cycle and Facility Licensing	Fuel, Fabrication & Reprocess	Leland C. Rouse, Chief (QA)
	BR. No. 1	
	BR. No. 2	James R. Miller, (Reprocessing)
IE	LCVIP	D. Whitesell, Sect Leader
	Field Support & Enforc.	G. H. Smith
	APD	J. I. Riesland
Stds. Development	Product Stds.	Donald R. Hopkins, Chief Robert F. Barker

3. Determine the timing and sequence of cask licensing actions of NMSS.

a. Transportation Branch has a goal to process each application for a license within one year from the submitted date. This goal applies to review and certification of cask (C of C) included with the issuance of a license to a combined owner and user. The application is docketed upon receipt by the Transportation Branch.

b. If the cask owner has a C of C and leases the cask to a user, the user must submit an application for a license. The application should include the C of C and a QA Program compliying with proposed Appendix E to 10 CFR 71. The user is responsible to verify that the cask has been properly maintained in accordance with the QA Program.

c. Timing for cask certification is broken down into three equal periods of review, allowing the applicant 60 days each for responses to the initial and second review.

d. The receiver must have a license for receipt of the spent fuel.

5. Determine the bases used by NMSS in evaluating and approving applications for cask licenses, specifically:

a. The design criteria applied:

The design criteria are established by 10 CFR 71.22 a and b for structural, mechanical, radiation, chemical and heat transfer requirements. Table S-4 of 10 CFR 51 lists the criteria relating to environmental impact considerations.

b. Applicable Regulations
10 CFR 71 and 49 CFR 173.
10 CFR 70 (being phased out for cask licenses).
Proposed 10 CFR 71; Appendix E (QA Requirements).
46 CFR 146.19-10a and 49 CFR 173.393a
(FR 2/14/73 pp4095-4098).

c. Commercial Codes and Standards

None required.
Proposed ANSI N14.8 "Shielded Shipping Casks for Irradiated Reactor Fuel Elements" presently is under review by members of ANSI N14.8. This standard specifies the following:

ASME Section II, "Material Specifications"
ASME Section III, "Nuclear Vessels"
ASME Section VIII, "Unfired Pressure Vessels"
ASME Section IX, "Welding Qualifications"
ASTM Standards
QQ-L-201 (Lead)
AISI
OSHA (lifting & rigging)

d. Other —

Regulations for the Safe Transport of Radioactive Materials, Safety Series No. 6, IAEA, Vienna.

6. What requirements are placed upon the cask buyer (owner) and the cask user is other than the owner?

   a. Cask owner:

      (1) Submit application for certificate of Compliance (C of C).

      (2) Include a cask SAR.

   b. Cask User: In accordance with 10 CFR 71 Subpart B, submit an application for a license or license amendment including:

      (1) Package description as required by Part 71.22;

      (2) Package evaluation as required by Part 71.23;

      (3) Description of proposed procedural controls as required by Part 71.24.

      Submittal at any time of additional information as required by the Commission.

7. What requirements (codes, standards, regulations) must the manufacturer meet?

   The manufacturer is only required to construct in accordance with the owner's design specifications (including design drawings). These design specifications will have been approved and a cask certificate of compliance issued by the Transportation Branch, MFCFL, NMSS. However, NRC approval is not required before the cask is fabricated. The manufacturer can fabricate a cask which has no C of C.

8. Attempt to determine:

   a. The current population of spent fuel shipping casks;

   b. The number of different designs or classes which have been licensed (or certified);

   c. The principal owners, manufacturers, and users of the above;

d. The probable activity in these areas over the next five years is discussed below. (Ref: (1) WASH 1238, December 1972 "Environmental Survey of Transportation of Radioactive Materials to and From Nuclear Power Plants," USAEC, DRS, Section VD; (2) Construction Status of Nuclear Power Plants, January 24, 1975; (3) Operating Units Status Report, January 24, 1975.)

Considering each light water reactor power p... is rated to deliver 1000 MWe and each year one-fifth of a ...WR's and one-third of a PWR's fuel are replaced each year, the number of shipments for a single refueling will require on the average 60 truck shipments, 10 rail car shipments or five barge shipments.

Presently there are 52 light water reactor plants in operation with an assumed estimated average power level of 500 MWe. Assuming that 75% of all shipments are by truck, 20% by rail and 5% by barge, the estimated number of shipments per year, presently are:

Per Plant:

$$S_1 = [60(.75) + 10(.2) + 5(.05)] (.5) = [47.25](.5) = 23.6 \frac{\text{Shipment}}{\text{Plant Year}}$$

Per Year:

$$S_{75} = (52)(23.6) = 123 \text{ Shipments/Year}$$

1227

The number of plants with construction permits expected to be loaded and in operation in 1980 is 75 plants. Two of these have recently slipped their schedules to 1981. Based on the above assumptions and that 52 + 73 = 125 plants are expected to be in operation in 1980, with 52 at 500 MWe average power and 73 at 1000 MWe average power, the estimated number of shipments per year by 1980 is:

$$S_{80} = 123^{0} + (73)[47.2] = 123^{0} + 3450 = 3573 \text{ shipments/year.}$$

1230
4680 4680

9. Are periodic tests and maintenance requirements placed upon the cask owner? The cask user? If so, what is the nature of these requirements and how are they enforced?

   a. No such requirements are placed on the owner.

   b. Periodic tests and maintenance requirements are placed upon the licensee (who is the user of the cask) in (1) 10 CFR 71.53 "Preliminary Determinations" and (2) 10 CFR 71.54 "Routine Determinations."

   c. The nature of these requirements of the licensee are:

      (1) Prior to first use perform inspection for defects and verification tests;

      (2) Prior to each use ascertain that the requirements of 10 CFR 71, Subpart C "Package Standards" are met. Also to check for damage, required moderators or neutron absorbers are present, seals & closure free of defects, valves protected against tampering, maximum normal operating internal pressure won't be exceeded, and contamination limits wont be exceeded.

   d. These requirements are enforceable under 10 CFR 71.63 "Inspection and Tests."

      (a) The licensee shall permit the commission at all reasonable times to inspect the licensed materials, packaging, and premises and facilities in which the licensed material or packaging are used, produced, tested, stored or shipped.

      (b) The licensee shall perform, and permit the Commission to perform, such tests as the Commission deems necessary or appropriate for the administration of the regulation in this chapter.

J. I. Tiesland

Note: Item 4 on pgs. 7-10.

cc: J. G. Davis
B.H. Grier
E. M. Howard, IE:IV

4. Determine the timing and interfaces of IE inspection activities with NMSS licensing actions which would produce optimum effectiveness with a minimum cost in manpower. The interfaces are diagramed in Figure 1, enclosed. The determination for effectiveness and manpower cost is summarized in subparagraph d. The commercial activities in the spent fuel shipping business consist of:

(1) Cask Owner - Who purchases the spent fuel shipping cask (cask). The cask purchase order includes design drawings and design specifications (which may have been obtained by subcontract). The cask owner applies to NMSS for a Certificate of Compliance (C of C) for the cask design. The Transportation Branch of NM & FCVL, NMSS reviews the design and issues the C of C. Approximataly one year after receipt and docketing of the C of C application. This C of C only verifies adequacy of the cask, but does not authorize its use. The Transportation Branch also reviews the Owner's QA Program for the design and procurement of the shipping cask. Implementation of the Owner's QA plan for design and procurement of the cask should be inspected by LC/VIP after Licensing approves the QA Program. A cask owner Inspection Program will be developed.

(2) Cask Manufacturer - Who fabricates the cask in accordance with the purchase order. The manufacturer is not required to hold a certificate of conformance or a license. He will be inspected to assure that he has a QA Program that conforms to the requirements of 10 CFR 71, proposed Appendix E and that the cask purchase documents include a C of C. LC/VIP should inspect the manufacturer to verify the conformance of his QA Program, that the program is being implemented and that the finished cask meets the requirements of the C of C. Schedules for inspection of the cask manufactures is dependent on the timing of C of C or License issuance and should be established by LC/VIP. Some consideration should be given by LC/VIP to the orders in process and scheduled and whether or not the shop has ASME Certification when the time and degree of inspection is scheduled. A Cask Manufacturer Inspection Program has been drafted.

(3) Licensee - Arrange for the cask shipment between nuclear power plants and reprocessing facilities for loading and unloading spent fuel. An applicant for a license, who may also be the cask owner, is required to submit documentation including an SAR and a QA Program relating to the use of the cask. If the application includes a C of C for the cask the time for issuance of a license is dependent upon the review of the QA Program, which is about 3 months from the date of receipt of the application (docketing date). Otherwise a C of C review of about one year duration will be necessary. The licensee will normally be a spent fuel reprocessing company but may be utility or other company such as a manufacturer or shipper. On this basis it is the responsibility of the facility inspector of the pertinent Region to verify that the licensee is implementing the approved QA Program. The Region inspectors for the utilities and fuel processors should verify that there are at implementing procedures at these facilities which conform to the user's QA Program and that these procedures are being used. A "Cask User Inspection Program" will be prepared and issued for use of the Regions.

The above relationships and responsibilities are recommended as providing the optimum effectiveness with minimum cost in manpower. The bases for these conclusions are:

a. The cask owner may or may not become a licensee. During design and procurement of the cask, including the fabrication, inspection of the owner's implementation of his QA Program will be most effectively performed by LC/VIP. These inspectors have more experience inspecting design implementation of QA for procurement than the Regions and can be expected to perform these functions more efficiently. LC/VIP inspections of the cask manufacturers will also consider the interface with the cask purchaser or owner. Thus, one inspector could be expected to inspect both the purchaser and the manufacturer to maintain continuity and consistency of inspections until cask completion. The LC/VIP inspection activities relating to the owner cease after cask acceptance tests have been completed and the cask accepted from the manufacturer.

b. The cask manufacturer is considered to be essentially the same type of organization as those supplying equipment for nuclear facilities. On this basis, inspection in accordance with the "Component Manufacturer Inspection Program," subchapter 2730 is considered to require the least additional manpower requirements. In addition, LC/VIP inspectors who are trained in the inspection of fabrication processes are expected to provide the optimum effectiveness for cask manufacturer inspections.

c. The cask licensee performs as operational function in contrast to the owner and manufacturer and thus is more akin to the operator of nuclear facilities, which are inspected by the Ragional offices in which the facility is located. As stated previously, the licensee will normally be a fuel processor who is inspected by Regional offices inspectors. On these bases, as well as recognizing that the Regional offices have inspectors trained in operations, the minimum of addition manpower and training of existing personnel will be required to optimize the effectiveness of cask licensee inspection if Regional offices, rather than an LC/VIP, perform these inspections. Also, inspection time and effort can be saved by combining licensee inspections with the facilities operations inspections.

d. Summarizing the timing and interface between IE inspection activities with NMSS licensing actions, the following sequence of activities should be utilized by IE and Licensing:

i. Owner Certificate of Conformance issued by Licensing. Time: 0

ii. Inspection of Owner QA Program Implementation by LC/VIP. Time: +3 months

iii. Inspection of manufacturers QA Program and its implementation by LC/VIP. Time: LC/VIP determination in accordance with Program schedules.

iv. Inspection of manufacturers fabrication processes by LC/VIP, if no ASME Certification has been obtained by the manufacturer. Time: same as iii above.

v. User issued a license by Licensing. Time: 0

vi. Inspection of licensee's (user's) QA program implementation by Regional Offices. Time: +3 months

vii. Inspection of loading, testing and unloading procedures of nuclear power and fuel reprocessing plants by Regional Offices. Time: In conjunction with inspection of the facility per program schedule.

viii. Feedback of inspection reports regarding conformance or nonconformance by Regional Offices and LC/VIP. Inspection + 30 days.

ix. Letter of inspection results to owner, manufacturer or licensee by LC/VIP or by Regional Office. Inspection + 30 days.

x. Publishing results of inspection in "White Book." Time: Inspection + 45 days average; issue twice a month.

xi. Use of "White Book" in C of C and licensing evaluation by Licensing. Time: As needed.

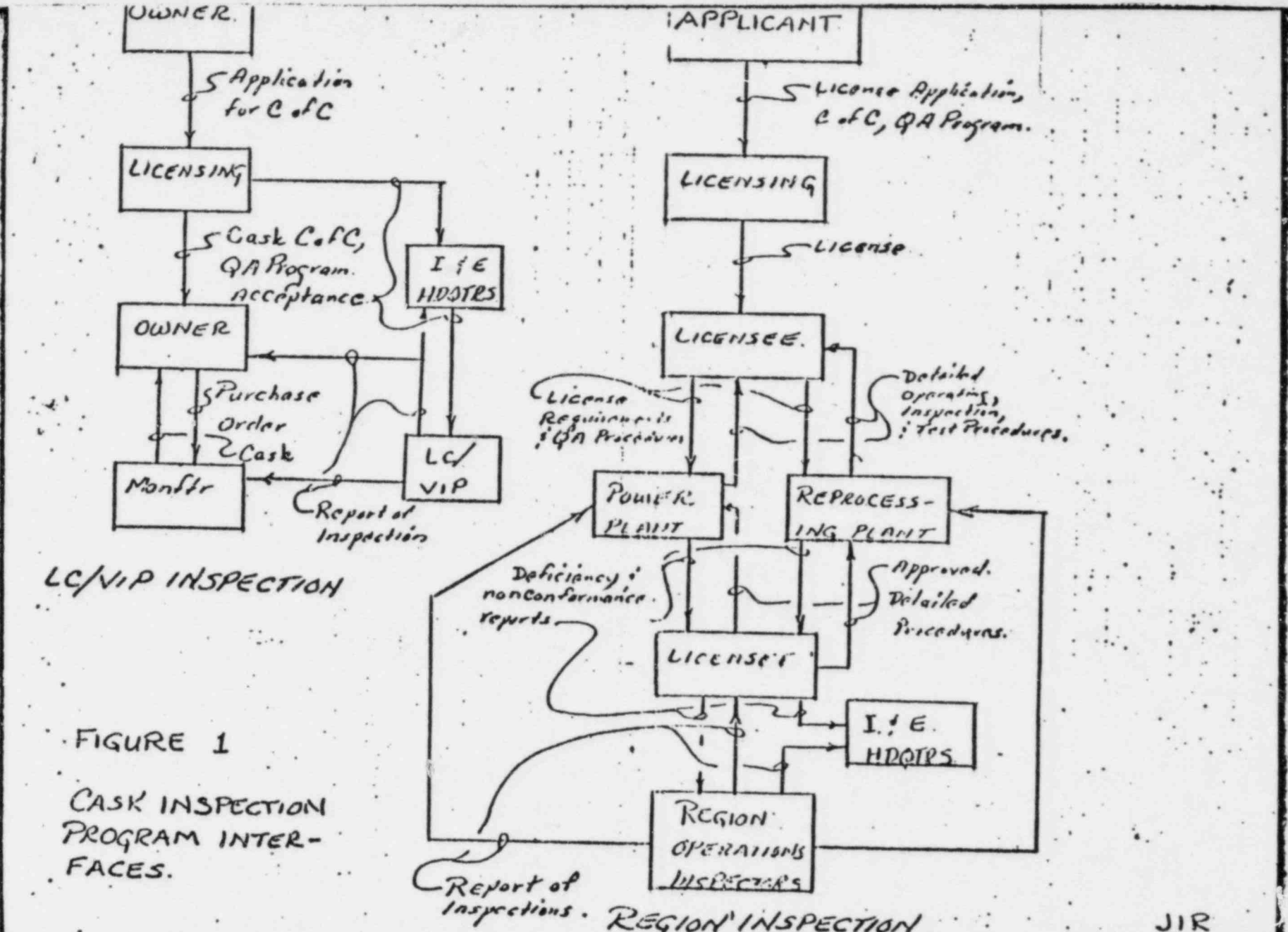

FIGURE 1

CASK INSPECTION PROGRAM INTERFACES.

JIR
3/7/75

Response to 8a, b & c.

6

SPENT-FUEL SHIPPING CASK CHARACTERISTICS

Designation	NFS-1/S-1/Stearay	Model No. 100 (NFS-2)	NFS-4	GF IF-100	GF IF-200	IF-300
Owner	Nuclear Fuel Services, Inc.	Nuclear Fuel Services, Inc.	Nuclear Fuel Services, Inc.	General Electric Co.	General Electric Co.	General Electric Co. (Midwest Fuel Reprocessing
Designer	Stearns Roger	Battelle Memorial Institute	Nuclear Fuel Services, Inc.	National Lead	National Lead	Stearns-Roger/GE
Fabricator	Stearns Roger			National Lead/ Stearns Roger	National Lead	Stearns-Roger
Docket No.	70-606	70-1104		70-729, 70-764, 70-1053	70-951, 70-1053, 70-534	70-1220
Date of Design Report	August 1964	Feb. 1, 1968	Dec. 30, 1971	1962	1965	October 1969 January 1971
Design Report Title		The Shipment of Big Rock Point and Humboldt Bay Irradiated Fuel Subassemblies in NFS Shipping Cask Rail	Safety Analysis Report for Nuclear Fuel Services Spent Fuel Shipping Cask NFS-4 Truck			Design and Analysis Report IF 300 Shipping Cask
Transport Mode	Rail			Truck	Truck	Truck/Rail
Loaded Weight, lb.	140,000 +	120,000	80,000	44,000/45,000	56,000	125,000-135,000
Gamma Shield	9-1/2 in. Lead + 1-1/2 in. Steel	8-3/4 in. Lead + 2-3/8 in. Steel	6.6 in. Lead + 1-5/8 in. Steel	8-3/8 in. Lead	8-3/8 in. Lead + 1-3/4 in. Steel	Depleted Uranium
Neutron Shield	none	none	4.5 in. Water	none	Wood Crate	2-4 in. Water
Internal Coolant	Water	Water	Water	Water	Water	Water
Cavity Dimensions Length/diameter,	114-1/2 - 140-3/4/41 across hex flats	103/40	178/13.8	129-137/13	140/15	167 1/4 - 179 1/2/37 1/2
Contents		12 Big Rock Point/18 Humboldt Bay fuel assemblies	1 PWR/2 BWR	4 Dresden 1/ 7 CVTR assemblies	2 Indian Point assemblies	7 PWR/18 BWR assemblies 7 BWR Failed Fuel Cans
Decay Heat Btu/hr	100,000	68,900	42,000	20,000	45,000	262,000
Thermal Heat Transfer	Natural convection - finned surface	Natural convection - finned surface	Natural convection - unfinned surface	Natural convection - finned surface	Natural convection - finned surface	Forced air convection - corrugations
Maximum Normal Operating Pressure, psig	120	100	160	100		200

Designation	JMTR	Argonne TREAT Cask	FSV-1	PB-1	TN-2	L
Owner	Japanese Atomic Energy Research Institute	USAEC/Argonne	Gulf General Atomic	Philadelphia Electric Company	Transnuclearre	USAEC
Designer	National Lead	Argonne	GGA/NL	Battelle Memorial Institute	Transnuclearre	Atomics
Fabricator	National Lead	Argonne	National Lead	Whitehead and Kales	Robatel	
Docket No.			70-72, 70-1165	70-1238		
Date of Design Design Report	May 1970	June 1970	April 17, 1969	January 15, 1970	March 1968	Novembe
Design Report Title	Design Report JMTR Spent Fuel Transport Cask W-5200	Evaluation of the Uranium Shielded Shipping Cask for Radioactive Materials/Spec. ETD-PO-0029	Final Design Report for Ft. St. Vrain Fuel Shipping Cask	The Shipment of Peach Bottom No. 1 Irradiated Fuel in Whitehead & Kales Shipping Cask Model PB-1	TN.2/TRI/00	NUPF St radiatc ping Ca 47/ Ra
Transport Mode	Truck	Truck	Truck	Truck	Truck	
Loaded Weight, lb	41,061	19,360	46,500	62,800	70,548	85,000
Gamma Shield	9-3/8 in. Lead + 1-3/8 in. Steel	3 in. Depleted Uranium + 2.5 in. Steel	3-1/2 in. Depleted Uranium + 1-5/8 in. Steel	6-1/2 in. Lead + 1-3/4 in. Steel	8.07 in. Lead + 1.18 in. Steel	7 in. L 2-1/2 in
Neutron Shield	none	none	none	none	none	none
Internal Coolant	Air	Air	Helium	Helium	Air	Air
Cavity Dimensions Length/diameter, in.	32.35/10.0	113-5/8/ 11-3/8	200-11/16/21	173.1/40.6	152.6/17.3x17.3	197-1/2
Contents	41 HTR fuel Assemblies	1 Special Form Container containing TREAT experimental 19-37 U-Pu fuel pins 109	6 spent fuel elements (in a container) Ft. St. Vrain HTGR station 2,322	19 spent fuel elements (in a container) Peach Bottom 1 HTGR station 14,250		6 NUPF a
Decay Heat, watts/hr	28,295				51,200	922
Thermal Heat Transfer	Natural convection + finned surface	Natural convection + unfinned surface	Natural convection + unfinned surface	Natural convection + unfinned surface	Natural convection + pin type fins	Natural c unfinned
Maximum Normal Operating Pressure, psig	70	7.5	50	100	0	5

	Yankee - Rail ELC-1002	Yankee - Truck	H-100	Piqua/Elk River	NLC-6502	MTR
Owner	Westinghouse	Westinghouse	U.S. Navy	Atcor		National Lead
Designer	Westinghouse/Battelle	Edlow Lead	National Lead	National Lead	National Lead	National Lead
Fabricator	Edlow Lead	Edlow Lead	National Lead	National Lead	National Lead	National Lead
Docket No.	70-596					
Date of Design Report	October 1961	February 1965		February 1952		
Design Report Title	Shipment of Irradiated Yankee Fuel Elements WCAP-1859	Experience in the Shipment of Yankee Fuel Assemblies for Post-Irradiation Examination WCAP-6062		Piqua/Elk River Reactors Spent Fuel Shipping Cask Design Report TID-21246		
Transport Mode	Rail	Truck		Truck	Truck	Truck
Loaded Weight, lbs.	150,000	44,000	220,000	60,000	44,000	24,000
Gamma Shield	10 in. Lead + 1-3/4 in. Steel	9-3/8 in. Lead 1 in. Steel	10 1/2 in Lead + 2 in. Steel	8 in. Lead + 1-3/4 in. Steel	Lead, Uranium & Steel = 10 in. Lead equiv.	8 1/2 in. Lead, 1 in. Steel
Neutron Shield	none	none	none	none	none	none
External Coolant	Water	Water	Water	Air		Air
Cavity Dimensions Length/diameter, in.	119/38	115/12	132/55	83/30	12x12x130	29 5/16 - 34/22 1/2
Contents	9 Yankee Rowe Assemblies	1 Yankee Rowe Assembly		19 Piqua and 19 Elk River Fuel Assemblies	20 NRU/20 NRX elements	28 MTR elements
Decay Heat, Btu/hr	273,000	29,000	300,000	7000	25,000	16,460
External Heat Transfer	Forced internal convection - external fins	Natural convection - external fins	Air cooled heat exchanger	Natural convection - external fins	Natural convection - unfinned surface	Natural convection - finned surface
Design Normal Operating Pressure, psig	75	50	300	100		20

	L	L
Designation	BMI-1	PRDC
Owner	Battelle Memorial Institute	
Designer	Battelle Memorial Institute	Battelle Memorial Institute
Fabricator	Battelle/Edward Lead	Central Ohio Welding
Docket No.	70-813	
Date of Design Report	November 14, 1963	September 30, 1966
Design Report Title	Battelle Research Reactor Spent Fuel Shipping Cask	The Shipment of Power Reactor Development Company's Irradiated Fermi Fuel Assemblies
Transport Mode	Truck	Truck
Loaded Weight, lbs.	23,200	34,250
Gamma Shield	8 in. Lead + 3/4 in. Steel	8-1/4 in. Lead + 1 in. Steel
Neutron Shield	None	None
Internal Coolant	Water	Water
Cavity Dimensions length/ diameter, in.	54/15-1/2	121/28.6
Contents	24 MTR assemblies	1 Fermi Subassembly
Decay Heat, Btu/hr.	7682	4100
External Heat Transfer	Natural convection - finned surface	Natural convection - unfinned surface
Maximum Normal Operating Pressure, psig	100	25

ENCLOSURE 11

(13)

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

71-6698

APR 0 1 1983

Gentlemen:

The attached order:

(a) Prohibits the use of Model No. NFS-4 packaging by NRC licensees until a determination is made that the packaging meets the requirements of Certificate of Compliance No. 6698.

(b) Requires an evaluation of deviations from the design approval.

(c) Requires further order of the Commission to return the packagings to service.

This order is effective immediately.

Sincerely,

William J. Dircks, Director
Office of Nuclear Material Safety
and Safeguards

Enclosure: As stated

cc w/encl: Mr. Richard R. Rawl
Department of Transportation

Dr. William E. Mott
Department of Energy

Identical orders sent to those on
attached list

A13

8305020196
PDR

Enclosure 1

Identical orders sent to:

Nuclear Fuel Services, Inc.
ATTN: Mr. Larry Wiedemann
P.O. Box 124
West Valley, NY 14171

Commonwealth Edison
ATTN: Mr. L. D. Butterfield, Jr.
P.O. Box 767
Chicago, IL 60690

Maine Yankee Atomic Power Co.
ATTN: Mr. L. H. Heider
Turnpike Road (RT 9)
Westboro, MA 01581

Nuclear Assurance Corporation
ATTN: Mr. Jack D. Rollins
24 Executive Park West
Atlanta, GA 30529

Wisconsin Electric Power Company
ATTN: Mr. Sol Burstein
231 West Michigan
Milwaukee, WI 53201

Rochester Gas & Electric Corporation
ATTN: Mr. L. D. White, Jr.
89 East Avenue
Rochester, NY 14649

Jersey Central Power & Light Company
ATTN: Mr. J. T. Carroll, Jr.
P.O. Box 388
Forked River, NJ 08731

Duke Power Company
ATTN: Mr. W. O. Parker, Jr.
422 South Church Street
Charlotte, NC 28201

Southern California Edison Company
ATTN: Mr. William H. Seaman
P.O. Box 800
Rosemead, CA 91770

Florida Power and Light Company
ATTN: Mr. Robert E. Uhrig
P.O. Box 013100
Miami, FL 33101

Baltimore Gas & Electric Company
ATTN: Mr. A. E. Lundvall, Jr.
Gas & Electric Building
Baltimore, MD 21203

Battelle Columbus Laboratories
ATTN: Mr. Harley L. Toy
505 King Avenue
Columbus, OH 43201

Babcock and Wilcox Company
ATTN: Mr. D. W. Zeff
P.O. Box 1260
Lynchburg, VA 24505

Boston Edison Company
ATTN: Mr. G. Carl Andognini
800 Boylston Street
Boston, MA 02199

Dairyland Power Cooperative
ATTN: Mr. R. E. Shimshak
P.O. Box 135
Genoa, WI 54632

Westinghouse Electric Corporation
ATTN: Mr. Ronald P. Dipiazza
P.O. Box 355
Pittsburgh, PA 15230

Florida Power Corporation
ATTN: Mr. J. T. Rodgers
P.O, Box 14042
St. Petersburg, FL 33733

General Electric Company
ATTN: Mr. D. M. Dawson
175 Curtner Avenue
San Jose, CA 95125

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
WASHINGTON, D.C. 20555

ORDER TO SHOW CAUSE (IMMEDIATELY EFFECTIVE)

During a meeting on March 29, 1979, and by letter dated April 2, 1979, the Nuclear Assurance Corporation informed the NRC staff that a cask designated as the Model No. NFS-4 (NAC-1, Serial A) was not fabricated in accordance with the design approved by NRC Certificate of Compliance No. 6698. Cask Model No. NFS-4 is used for transportation of spent reactor fuel and is authorized to carry one PWR element or two BWR elements. Eighteen owner/users and the Department of Energy are currently authorized to use this model cask.

The deviations were characterized as a difference in the dimensions of the steel shells identified as Part Numbers 67 and 69 as shown in NFS Drawing No. E10080, Revision 16. In addition, copper plates were welded to the outside of Part 69. The information provided by Nuclear Assurance Corporation in the March 29 meeting indicates that one or more of the shells is warped or bowed, but the exact cause or extent of the warp or bow is not known at this time. Also, the NRC staff was informed that the cask manufacturer added increased shielding material in an area of reduced shielding thickness by welding copper plates to the outer shell of the cask.

The full safety implications of these reported deviations are not known at this time but they could represent a substantial reduction in the effectiveness of the package such that it would not meet the requirements of 10 CFR Part 71 for normal and accident conditions. It is possible that other casks fabricated to this design contain similar deviations. There are six casks fabricated to the design and one under construction at the present time.

II

In view of the foregoing and in the interest of public health and safety all casks of this design should be withdrawn from use until a determination can be made of the exact nature of any deviations from the approved design and an assessment can be made of the safety significance of such deviations.

Accordingly, pursuant to the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR Parts 2 and 71, IT IS HEREBY ORDERED THAT:

1) Effective immediately, the general license to use casks designated as Model No. NFS-4 is suspended pending further order of the Commission.

2) Each owner/user shall show cause in the manner hereinafter provided why the general license to use cask Model No. NFS-4 should not remain suspended until such time as:

> The owner/user demonstrates to the Commission that each cask was fabricated in accordance with the design approved by the Commission in Certificate of Compliance No. 6698. This demonstration shall include review of the quality assurance records required by Condition 17 to Certificate of Compliance No. 6698 and actual physical measurements of existing packages.

III

In view of the facts set forth in Part I, above, and the importance to public health and safety of proper fabrication of the casks, the Director of the Office of Nuclear Material Safety and Safeguards has determined pursuant to 10 CFR 2.202(f) that the suspension of the general license to use cask Model No. NFS-4 shall be immediately effective.

An owner/user to whom this Order applies may, within 20 days from the receipt of this Order, file a written answer to this Order under oath or affirmation. Within the same time, an owner/user may request a hearing. Any answer or request for hearing shall be filed with Mr. Richard E. Cunningham, Director, Division of Fuel Cycle and Material Safety, U. S. Nuclear Regulatory Commission, Washington, D.C. 20555. Any request for a hearing shall not stay the immediate effectiveness of this Order. If a hearing is requested, the Commission will issue an Order designating the time and place for hearing.

IV

In the event a hearing is requested, the issues to be considered at such a hearing shall be:

1) Whether the owner/user's casks designated Model No. NFS-4 were fabricated in accordance with design approved by NRC Certificate of Compliance No. 6698, and

2) Whether this ORDER should be sustained.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

William J. Dircks, Director
Office of Nuclear Material Safety
and Safeguards

Dated at Bethesda, Maryland
this 6th day of April, 1979.

ENCLOSURE 12

(14)

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

FCTC:RHO
71-6698

DEC 12 1979

Those on attached list

Gentlemen:

The attached order:

(a) Amends Certificate of Compliance No. 6698.

(b) Lifts suspension of the general license to use casks having Serial Nos. NAC-1B, NAC-1D, and NAC-1E.

This order is effective immediately.

Sincerely,

William J. Dircks, Director
Office of Nuclear Material Safety
and Safeguards

Enclosures:
1. Order Concerning Model No. NFS-4 Packaging
2. Certificate of Compliance No. 6698, Rev. No. 9

cc: w/encl
Mr. Richard R. Rawl
Department of Transportation

Dr. Donald M. Ross
Department of Energy

Identical orders sent to those on attached list.

A14

7911280033

PDR/LPDR

MODEL NO. NFS-4 PACKAGING
USA/6698/B( )F

Addressee's (w/encls)

Ltr dated: DEC 12 1979

Nuclear Fuel Services, Inc.
ATTN: Mr. James R. Clark
6000 Executive Boulevard, Suite 600
Rockville, MD 20852

Commonwealth Edison
ATTN: Mr. L. D. Butterfield, Jr.
P.O. Box 767
Chicago, IL 60690

Maine Yankee Atomic Power Co.
ATTN: Mr. L. H. Heider
Turnpike Road (RT 9)
Westboro, MA 01581

Nuclear Assurance Corporation
ATTN: Mr. John R. Donnell
24 Executive Park West
Atlanta, GA 30329

Wisconsin Electric Power Company
ATTN: Mr. Sol Burstein
231 West Michigan
Milwaukee, WI 53201

Rochester Gas & Electric Corporation
ATTN: Mr. L. D. White, Jr.
89 East Avenue
Rochester, NY 14649

Jersey Central Power & Light Company
ATTN: Mr. J. T. Carroll, Jr.
P.O. Box 388
Forked River, NJ 08731

Duke Power Company
ATTN: Mr. W. O. Parker, Jr.
422 South Church Street
Charlotte, NC 28242

Southern California Edison Company
ATTN: Mr. William H. Seaman
P.O. Box 800
Rosemead, CA 91770

Florida Power and Light Company
ATTN: Mr. Robert E. Uhrig
P.O. Box 529100
Miami, FL 33152

Baltimore Gas & Electric Company
ATTN: Mr. A. E. Lundvall, Jr.
P.O. Box 1475
Baltimore, MD 21203

Battelle Columbus Laboratories
ATTN: Mr. Harley L. Toy
505 King Avenue
Columbus, OH 43201

Babcock and Wilcox Company
ATTN: Mr. D. W. Zeff
P.O. Box 1260
Lynchburg, VA 24505

Boston Edison Company
ATTN: Mr. G. Carl Andognini
800 Boylston Street
Boston, MA 02199

Dairyland Power Cooperative
ATTN: Mr. R. E. Shimshak
P.O. Box 135
Genoa, WI 54632

Westinghouse Electric Corporation
ATTN: Mr. Ronald P. DiPiazza
P.O. Box 355
Pittsburgh, PA 15230

Florida Power Corporation
ATTN: Mr. J. T. Rodgers
P.O. Box 14042
St. Petersburg, FL 33733

General Electric Company
ATTN: Mr. D. M. Dawson, MC 861
175 Curtner Avenue
San Jose, CA 95125

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of NRC CERTIFICATE OF COMPLIANCE NO. 6698 FOR RADIOACTIVE MATERIALS PACKAGES	)))))	Docket No. 71-6698

ORDER AMENDING CERTIFICATE AND TERMINATING IN PART ORDER TO SHOW CAUSE

I

By Order dated April 6, 1979, the Director, Office of Nuclear Material Safety and Safeguards suspended the use of seven casks used for transportation of spent reactor fuel pending a showing that these casks were fabricated in accordance with the design approved by the NRC in Certificate of Compliance No. 6698 (Revision 8).1/

As required by the April 6th Order as a condition to rescission of the ordered suspension, the Nuclear Assurance Corporation (NAC) and Duke Power Company have reviewed their quality assurance records and have made physical measurements of five of the affected casks (Serial Nos. NAC-1A, NAC-1B, NAC-1C, NAC-1D, and NAC-1E).2/ The Commission's Office of Inspection and Enforcement has inspected the quality assurance records of the casks built by Excelco Developments, Inc. for NAC.

The results of these various reviews and inspections indicate that two casks (Serial Nos. NAC-1A and NAC-1C) are bowed and therefore do not meet the requirements of Certificate of Compliance No. 6698. It is not known at this time whether the cause of the bowing in these two casks occurred during their manufacture or during their actual use. The NRC staff has found that

1/ Seven casks designated as Model No. NFS-4 have been fabricated to the design approved in the Certificate: Serial Nos. NAC-1A, NAC-1B, NAC-1C, NAC-1D, NAC-1E, NFS-4A, and NFS-4B. These casks are used to transport spent reactor fuel. The basis for the April 6th Order was the discovery that measurements of the dimensions of the inner shell of one cask (Serial No. NAC-1A) indicated that the shell was warped or bowed, but the exact cause or extent of the warp or bow was not known at the time.

2/ These casks were originally manufactured by Excelco Developments, Inc., for NAC. Duke Power Company is the present owner of casks Serial Nos. NAC-1A and NAC-1B. NAC owns the remaining casks in the NAC-1 series. Casks Serial Nos. NFS-4A and NFS-4B, owned by Nuclear Fuel Services, Inc. (NFS), were also subject to the April 6th Order, but NFS has not submitted any information in response to the Order. Accordingly, the suspension as provided in the April Order remains in full effect with respect to these two casks.

casks Serial Nos. NAC-1B, NAC-1D, and NAC-1E substantially conform to Certificate of Compliance No. 6698 (Revision 8), except for certain minor differences that are unrelated to bowing or warping of the cask cavity shells.3/ Therefore, the NRC staff believes that these three casks can be returned to service, subject to certain restrictions incorporated in Revision 9 to Certificate of Compliance No. 6698 (attachment to this Order and discussed in Part II infra), without undue risk to the health and safety of the public.

II

While the review of casks Serial Nos. NAC-1B, NAC-1D, and NAC-1E show that these casks conform to the design authorized by Certificate of Compliance No. 6698 (as revised to include the minor technical amendments discussed in footnote 3), the staff has determined the three casks should not be returned to unrestricted service without further technical evaluation, on the basis that:

3/ As part of the quality assurance review under the April 6th Order, Nuclear Assurance Corporation (NAC) reviewed and compared the drawings approved in Certificate No. 6698 with fabrication drawings to which the casks were actually built, reviewed the quality assurance records, and made physical measurements of the casks' cavities. This review indicated that certain tolerances and dimensions on the fabricated casks differed from those shown on Nuclear Fuel Services (NFS) Drawing No. E10080 (Revision 16), which is the drawing approved in Certificate of Compliance No. 6698. By letters dated June 8, July 26, and October 31, 1979, NAC requested an amendment to Certificate of Compliance No. 6698 to incorporate changes in dimensions, tolerances, and notations, that were unrelated to bowing or warping of the cask cavity shells. Revising the Certificate to include these requested changes would resolve the discrepancies between the drawings approved in Certificate No. 6698 (Revision 8) and the as-built casks, Serial Nos. NAC-1B, NAC-1D, NAC-1E. NAC has requested that Certificate of Compliance No. 6698 be amended to incorporate Revision 19 of NFS Drawing No. E10080 as the approved design drawing. Casks Serial Nos. NAC-1B, NAC-1D, and NAC-1E have been constructed in accordance with Revision 19 to Drawing No. E10080. The staff is issuing Revision 9 to Certificate No. 6698 (attached as Appendix A to this Order) to incorporate the requested changes as well as to impose various restrictions further described in this Order. All items identified in the NRC's inspections will be resolved to the NRC's satisfaction with the incorporation of Revision 19 of Drawing No. E-10080 and revised Condition No. 13 into Certificate of Compliance No. 6698 (Revision 9).

1. the bowing observed in casks Serial Nos. NAC-1A and NAC-1C, both of which are of the same design as the other casks, may be an indication that casks of this design are susceptible to buckling of the inner shell in unrestricted use;

2. the cask design has not been analyzed to show that the inner shell would not buckle in unrestricted operation; and

3. it cannct be concluded without such analysis that the cask would meet the requirements in 10 CFR Part 71 under Normal and Hypothetical Accident Conditions.

Accordingly, Certificate of Compliance No. 6698 has been revised (Revision 9) to include additional restrictions which would permit limited use of casks Serial Nos. NAC-1B, NAC-1D, and NAC-1E, and which would also require certain additional inspections of the casks at periodic intervals. The staff believes these restrictions are sufficient to assure the integrity of the inner shell under normal conditions of transport and that the possibility of buckling under accident conditions would be reduced. Revision 9 to the Certificate reduces the maximum decay heat load of the contents permitted in the cask from 11.5 kilowatts to 2.5 kilowatts. The casks are also required to be shipped dry (i.e., water is no longer permitted in the cask cavity during shipment). These provisions will substantially reduce the pressures within the cask cavity under the normal and hypothetical accident conditions, specified in 10 CFR Part 71. In addition, the temperatures and thermal gradients through the cask walls and longitudinally along the shells would also be reduced. These restrictions will lower the stresses present in the inner shell during use of the casks under normal and accident conditions. The revised Certificate also requires the inner shell of each cask to be inspected and measured at intervals not to exceed six months. The casks are to be withdrawn from service if the measurements indicate any changes in the dimensions of the inner cavity. Also, the cask cavity is required to be pressure tested quarterly for possible leakage.

Even if the inner shell were to buckle under the hypothetical accident conditions in 10 CFR Part 71, and if this should lead to a violation of the integrity of the inner shell, the amount of material released would not be expected to exceed the amount permitted in 10 CFR Part 71 based on the guidance provided in Regulatory Guide 25.

III

Accordingly, pursuant to the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR Parts 2 and 71, IT IS HEREBY ORDERED THAT:

(1) Certificate of Compliance No. 6698, Revision 9, supersedes in its entirety Certificate of Compliance No. 6698, Revision 8, dated October 25, 1978; and

(2) The suspension of the use of NAC casks with Serial Nos. NAC-1B, NAC-1D, and NAC-1E is hereby rescinded.

The Order of April 6, 1979, except as stated above, remains in effect in accordance with its terms.

IV

Any person who has an interest affected by this Order may request a hearing, within twenty (20) days of the date of this Order, with respect to this Order. Any request for a hearing shall be addressed to the Director, Office of Nuclear Material Safety and Safeguards, U. S. Nuclear Regulatory Commission, Washington, D.C. 20555. Any request for a hearing shall not stay the immediate effectiveness of this Order.

If a hearing is requested by a person whose interest is affected by this Order, the Commission will issue an order designating the time and place of hearing. The issue to be considered at such hearing will be:

Whether the restrictions added by Revision 9 to Certificate of Compliance No. 6698 are necessary to provide reasonable assurance that the casks will meet the Normal and Hypothetical Accident Conditions in accordance with 10 CFR Part 71.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

William J. Dircks, Director
Office of Nuclear Material Safety
and Safeguards

Effective Date: DEC 12 1979
Silver Spring, Maryland

Form NRC-618
(12-73)
10 CFR 71

U.S. NUCLEAR REGULATORY COMMISSION

CERTIFICATE OF COMPLIANCE

For Radioactive Materials Packages

1.(a) Certificate Number	1.(b) Revision No.	1.(c) Package Identification No.	1.(d) Pages No.	1.(e) Total No. Pages
6698	9	USA/6698/B( )F	1	6

2. PREAMBLE

2.(a) This certificate is issued to satisfy Sections 173.393a, 173.394, 173.395, and 173.396 of the Department of Transportation Hazardous Materials Regulations (49 CFR 170-189 and 14 CFR 103) and Sections 146–19–10a and 146–19–100 of the Department of Transportation Dangerous Cargoes Regulations (46 CFR 146–149), as amended.

2.(b) The packaging and contents described in item 5 below, meets the safety standards set forth in Subpart C of Title 10, Code of Federal Regulations, Part 71, "Packaging of Radioactive Materials for Transport and Transportation of Radioactive Material Under Certain Conditions."

2.(c) This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

3. This certificate is issued on the basis of a safety analysis report of the package design or application–

3.(a) Prepared by *(Name and address)*:

Nuclear Fuel Services, Inc.
P.O. Box 124
West Valley, NY 14171

3.(b) Title and identification of report or application:

NFS application dated October 6, 1972, as supplemented.

3.(c) Docket No. 71-6698

4. CONDITIONS

This certificate is conditional upon the fulfilling of the requirements of Subpart D of 10 CFR 71, as applicable, and the conditions specified in item 5 below.

5. Description of Packaging and Authorized Contents, Model Number, Fissile Class, Other Conditions, and References:

(a) Packaging

(1) Model No.: NFS-4

(2) Description

A steel, lead and water shielded shipping cask. The cask is a right circular cylinder with upper and lower steel encased balsa impact limiters. The overall dimensions are 214 inches in length and 50 inches in diameter. The gross weight of the cask is approximately 50,000 pounds. The inner cavity is 178 inches long and 13.5 inches in diameter. The thickness of the inner shell is 5/16 inch and 1-1/4 inches for the outer shell. The two stainless steel shells are welded to a 2-inch thick stainless steel shield disc at the bottom. The annulus between the inner and outer shells is filled with lead (max. lead thickness 6-5/8 inches, minimum 5 inches).

The lid is stainless steel frustum of cone 7.5 inches thick. The lid is secured to the cavity flange by six ASTM-A320, Grade L43, 1-1/4 inch diameter bolts. The seal is provided by two polytetrafluoroethylene O-rings. Four neutron shield tanks, each with surge tank and rupture disc, provide a 4-1/2 inch thick (borated) water-ethylene glycol mixture around the outer shell. Four trunnions, two located on either side of the upper or lower impact limiter, are provided. Other cask features include two drain valves located in the bottom shield disc, vent valve, head closure gasket leak check valve, rupture disc-pressure relief valve system located in the cavity flange, fuel canisters for PWR and BWR shipments, and spacers to accommodate shorter fuel assemblies. For transport the cask may be enclosed in an expanded metal cage.

5. (a) Packaging (continued)

(3) Drawings

The NFS-4 shipping cask is constructed in accordance with Nuclear Fuel Services, Inc., Drawing No. E 10080, Rev. 19 (Sheets 1 through 4). The fuel assemblies are positioned within the fuel canisters shown in Figure 2.1.3 of the application dated October 6, 1972. Spacers may be used to accommodate shorter fuel assemblies within the fuel canisters.

(b) Contents

(1) Type and form of material

The minimum cooling time of each fuel assembly and rod shall be 120 days, and

(i) Irradiated PWR or BWR uranium oxide fuel assemblies with the following maximum active dimensions and maximum compositions prior to irradiation:

Fuel Assembly Data	PWR	BWR
Envelope, inches	8.60x8.60x150	5.44x5.44x144
Enrichment, w/o U-235	3.6	3.0
Weight of Uranium, kg	480	197
H/U atomic ratio	-	5.51

(ii) Fuel assembly enriched in the U-235 isotope to not more than 2.5 w/o, with active fuel dimensions not to exceed 4.2" x 4.2" x 110" long.

(iii) Byproduct and special nuclear material in the form of irradiated uranium oxide fuel rods.

(iv) Solid nonfissile irradiated hardware and neutron source components.

(v) Fuel assembly enriched in the U-235 isotope to not more than 4.1 w/o, with active fuel dimensions not to exceed 7.8" x 121" long.

(vi) Byproduct and special nuclear material in the form of irradiated uranium and plutonium oxide fuel rods. Prior to irradiation, the maximum enrichment in U-235 plus plutonium not to exceed 4.0 w/o.

(vii) Irradiated PWR uranium oxide fuel assemblies including additional irradiated fuel rods inserted and secured in the guide thimbles. The fuel assemblies shall conform to the maximum active dimensions as described in Item 5(b)(1)(i) and partially disassembled fuel assemblies shall be equipped with an assembly carrier as shown in Battelle Drawing No. 00-001-676, or equivalent.

5. (b) Contents (continued)

(1) Type and form of material (continued)

(viii) Irradiated BWR uranium oxide fuel assemblies. Prior to irradiation, the maximum enrichment in the U-235 isotope shall not exceed 4.0 w/o with active fuel dimensions not to exceed 5.63" x 5.63" x 83.8" long.

(2) Maximum quantity of material per package.

Not to exceed a decay heat generation of 2.5 kw and

(i) Item 5(b)(i) above:

One (1) PWR fuel assembly, or
Two (2) BWR fuel assemblies; or

(ii) Item 5(b)(1)(ii) above:

Four (4) fuel assemblies contained within the fuel basket shown in NFS Dwg. No. 1A-T-1107, Rev. 0; or

(iii) Item 5(b)(1)(iii) above:

Maximum Enrichment (w/o U-235)	Maximum Fissile Mass Limit (kg of U-235)
3	2.0
4	1.6
5	1.5; or

(2) Maximum quantity of material per package (continued)

(iv) Item5(b)(1)(iv) above:

As needed, appropriate component spacers shall be used in the cask cavity to limit movement of contents during shipment; or

(v) Item 5(b)(1)(v) above:

One (1) fuel assembly; or

(vi) Item 5(b)(1)(vi) above:

Fuel rods within the fuel canisters described in 5(a)(3). The maximum mass of U-235 plus plutonium shall not exceed 4.0 kg. A suitable fixture may be used to secure the fuel rods within the canister; or

5. (b) Contents (continued)

(2) Maximum quantity of material per package (continued)

(vii) Item 5(b)(1)(vii) above:

The maximum compositions of one PWR fuel assembly including additional rods shall conform to Item 5(b)(1); or

(viii) Item 5(b)(1)(viii) above:

Two (2) BWR fuel assemblies. Prior to irradiation, the maximum uranium content per assembly shall not exceed 122 kg.

(c) Fissile Class III

Maximum number of packages per shipment One (1)

6. The cask shall be shipped dry (no water coolant in cask cavity).

7. The water-ethylene glycol mixture in the neutron shield tanks may contain up to 1.0 weight percent boron. This mixture shall not freeze or precipitate in a temperature range from -40°F to 330°F.

8. The cask contents shall be so limited under normal conditions of transport that 27 times the neutron dose rate plus 1.4 times the gamma dose rate will not exceed 1,000 millirems per hour at three (3) feet from the external surface of the package.

9. The vent and drain valves shall be 1/2" FG466TSW Miser ball valves (Worchester Valve Company, Inc.). The ball of the valve may have a bleed hole to equalize the pressure between the cask cavity and the ball passage in a closed position. Alternatively, the vent and drain lines may be sealed with pipe plugs.

10. In addition to the requirements of Subpart D of 10 CFR Part 71, each package prior to first use shall meet the acceptance tests and criteria specified on pages A-21 thru A-34 of the Nuclear Fuel Services, Inc. application dated October 6, 1972, as amended, March 1, 1973 and Nuclear Assurance Corporation letter dated November 1, 1974. The results of these tests shall be documented and retained for the life of the cask.

11. At periodic intervals not to exceed (3) years, the thermal performance of the cask shall be analyzed to verify that the cask operation has not degraded below that which is licensed. Following the initial acceptance tests, the heat source may be that provided by the decay heat from the contents of the package provided that the heat source is equal to at least 25% of the design heat load for the package. Each cask that fails to meet the thermal acceptance criteria given on pages A-21(a) and A-21(b) using the TAP computer program, or equivalent, shall be withdrawn from service until corrective action can be completed.

12. The rupture discs for the neutron shield tanks shall be type "B" or "DV" (BS&B Safety Systems, Inc.) or equivalent.

13. In lieu of the requirements of 10 CFR §71.54(h), the licensee shall perform periodic maintenance and testing of O-rings, drain and vent ball valves, relief valves, and rupture discs of the cask as indicated in the table given below. During inactive periods, the maintenance and testing frequency may be disregarded provided that the package is brought into full compliance prior to the next use of the package.

Cask Component	Period	Test/Action
Ball Valve	Each shipment	Hydro test to 80 psig*
Ball Valve	Annually	Replace seats and seals
O-rings	Each shipment	Test to 80 psig*
O-rings	Quarterly	Test to 167 psig*
O-rings	Annually	Test to 1006 psig*
Inner Containment Vessel	Quarterly	Test to 250 psig*
Cavity Relief Valve	Annually	Test at set point
Cavity Rupture Disc	Annually	Replace
Neutron Shield Tank Rupture Disc	Annually	Replace
Impact Limiters	Annually	Test for leakage

*There shall be no visual (pressure gauge) indications of pressure drop for the component under test during a 10-minute test period. Otherwise, corrective action shall be taken and the test repeated until such time as the component meets the specified test. (Test to pressures equal to or greater than those indicated.)

14. At least every six (6) months, commencing six months following the first shipment of irradiated fuel under Revision No. 9 to Certificate of Compliance No. 6698, the licensee shall perform physical measurements of the cask inner shell. Any cask whose inner container dimensions are measured to deviate by more than +0.015 inch at comparable points from the dimensions documented in Appendix C to NAC letter dated June 8, 1979 shall be removed from service.

15. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR §71.12(b).

16. Expiration date: December 31, 1980.

REFERENCES

Nuclear Fuel Services, Inc. application dated October 6, 1972.

Supplements dated: November 9, 1972; January 10 and 22, February 1 and 28, March 1, 14, and 21, May 4, June 4, and July 26, 1973; July 17, 1974; May 4, 1976; and November 9, 1977.

Nuclear Assurance Corporation supplements dated: November 1, 1974; August 13 and December 24, 1975; September 13, 1976; October 20, 1977; May 25, July 18, and September 25, 1978; and June 8, July 26, and October 31, 1979.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Charles E. MacDonald

Charles E. MacDonald, Chief
Transportation Certification Branch
Division of Fuel Cycle and
Material Safety

Date: DEC 12 1979