

ENERGY SYSTEMS GROUP
ROCKWELL INTERNATIONAL
CANOGA PARK, CALIFORNIA

APPLICATION FOR A CERTIFICATE OF COMPLIANCE RENEWAL
AUTHORIZING DELIVERY OF SPECIAL NUCLEAR MATERIAL
TO A CARRIER FOR TRANSPORT

AUGUST 1980

FEE EXEMPT

8010020095

17051

1.0 GENERAL INFORMATION

1.1 INTRODUCTION

The following information describes two nearly identical models of shipping containers (D34710-1 and D34710-2) in accordance with the provision of 10 CFR 71, Section 71.21. These shipping containers were originally designed, built, tested, and used by the National Lead Company, Albany, New York. U.S. Nuclear purchased these containers from the National Lead Company for the purpose of delivering Special Nuclear Material to a carrier for transport. Relicensing is being initiated by Energy Systems Group, Rockwell International, who is the current primary user. The form of the Special Nuclear Material to be shipped in these containers will be as fuel plates or uranium metal or alloy fuel elements of up to 93.5 w/o in the U-235 isotope.

The containers are used as a Fissile Class II.

In accordance with Section 71.39(b), the maximum number of Fissile Class II containers that can be grouped together for shipment are shown in the tables below.

MODEL D34710-1

Maximum U-235 per Container (kg)	Transport Index	No. of Containers Shipped Together
2.025	1.2	41
1.700	1.0	50
1.400	0.9	55
1.100	0.8	62
.800	0.7	71
.500	0.5	100

The first two columns of the above table are taken from Amendment 71-5 of SNM-686 issued by the USAEC on October 15, 1968.

MODEL D34710-2

Maximum U-235 per Container (kg)	Transport Index	No. of Containers Shipped Together
860	.7	71
500	.5	100

1.2 PACKAGE DESCRIPTION

1.2.1 Model N34710-1

1.2.1.1 Packaging

The shipping container identified as Model D34710-1 consists of a metal, drum-type "birdcage" container, similar to D.O.T. Specification 6L. It has a gross weight of approximately 420 lb. The outer drum is fabricated by welding together two sections of 18-gauge, D.O.T. Specifications 17C or 17H steel drums (55-gal size). The overall height of the container is 50 in. The inner container is similar to D.O.T. Specification 2-R (except that the I.D. is 12.5 in.) and is a 40 to 41-in. long section of schedule 20 steel pipe with a bolted-flanged-gasketed closure on one end and a welded 5/16-in. thick end plate on the other. The inner container is centered and supported within the outer drum by means of 2 x 2 x 1/8-in. steel angle iron welded into two square frames, complete with internal insulation pads and steel hoops which are welded to the outer drum. The inner container is bolted into the two square frames.

1.2.1.2 Operational Features

Fuel elements are placed in tubes constructed of cardboard and sheet metal and up to four of these tubes are placed inside the inner container. The fuel elements are sealed in polyethylene sleeves and supported on the ends by transite insulation and polystyrene pads.

Vermiculite is packed between the tubes in the inner container and in the annular region between the inner and outer containers. This container is constructed in accordance with National Lead Company Drawing D34710, C34711, C34712, and C34713.

1.2.1.3 Contents of Package

The maximum radioactivity of the contents is 0.14 curies of U-235 with the maximum quantity of fissile material being 2.025 kg of U-235. The container will be used to ship fuel plates and/or fuel elements containing uranium enriched to a maximum of 93.5 w/o in the U-235 isotope which is alloyed with or dispersed in aluminum or stainless steel. Full reflection is assumed with a H/X ratio less than 2. The maximum weight is 420 lb. There is no decay heat in the unirradiated contents.

Previous conditions for contents, allowing for differing H/X ratios considering all hydrogenous material between fuel elements and the U-235 content of the uranium are listed as follows:

Max. Kilograms U-235 per Container	Maximum H/X
2.025	2.2
1.700	2.6
1.400	3.2
1.000	4.1
0.800	5.6
0.500	8.9
0.350	10.4
0.290	13.0

1.2.2 Model D34710-2

1.2.2.1 Packaging

This container, identified as Model D34710-2, is identical to Model D34710-1 described above except that the length of the outer container is 60 in. and the length of the inner container is 50 to 51 in. This container is constructed in accordance with National Lead Company Drawings D34710, C34711, C34712, and C34713.

1.2.2.2 Contents of Packaging

Considering all hydrogenous material between fuel elements within the inner container and the weight of uranium are listed as follows:

Gram U-235 per Container	Atomic Ratio H/X
860	6.1
800	6.5
700	7.5
600	8.7
500	10.4
400	13.0

1.3 APPENDIX

University of Missouri Drawing Number	Model 034710-1	Model 034710-2
1288 - 1 of 7 Container, Outer Shipping	X	
- 2 of 7 Container, Outer Shipping		X
- 3 of 7 Support, Internal Shipping Container	X	X
- 4 of 7 Container, Inner Shipping	X	X
- 5 of 7 Container, Shipping (4 Tube)	X	X
- 6 of 7 Container, Shipping (4 Tube)		X
- 7 of 7 Container, Shipping (3 Tube)	X	X

2.0 STRUCTURAL EVALUATION

2.1 MODEL D34710-1

2.1.1 Structural Design

The container satisfies the package standards of Subpart C, specifically Sections 71.31 through 71.39. This was demonstrated in test of "normal conditions of transport" and "hypothetical accident conditions" as described in a National Lead Report entitled "Testing of a Radioactive Material Shipping Container to the Requirements of the Atomic Energy Commission Regulation 10 CFR, Part 71," by Alan S. Wilder and George T. Ladd, September 29, 1966. This report was included with the National Lead Company application for SNM 686, Amendment 2, Docket 70-750, dated October 31, 1966. A verbatim retyped copy is attached with this application.

2.2 MODEL D34710-2

2.2.1 Structural Design

This container satisfies the package standards of Subpart C in the same manner as does Model D34710-1.

3.0 THERMAL EVALUATION

3.1 DISCUSSION

(Reference Part 2.0)

4.0 CONTAINMENT

4.1 CONTAINMENT BOUNDARY

(Reference Part 2.0)

5.0 SHIELDING EVALUATION

5.1 DISCUSSION AND RESULTS

(Reference Part 2.0)

6.0 CRITICALITY EVALUATION

No review of original criticality parameters has been attempted. Relicensing is based on limits specified in original National Lead Company License SNM-686, Amendments 71-5 and 71-7, Docket 70-750.

These limits are repeated in Part 1.1 and in Parts 1.2.1.3 and 1.2.2.2.

7.0 OPERATING PROCEDURES

The shipping containers will be loaded per the instructions on a route card which travels with the contents to be loaded. These instructions insure that the requirements of Section 71.51(b) are met. The primary instructions are listed below, and each must be signed off on the route card by the person following the instructions.

Operation Number	Description
1	Check fuel element numbers against Fuel Element Route Card
2	Visually inspect interior and exterior of container for damage, dirt, moisture, etc.
3	Health and Safety representative takes samples for surface contamination
4	Check flange seat--free of dirt chips, etc.
5	Place fuel element into sleeves in inner container. Note: Check criticality value to assure loading does not exceed license shipping limit.
6	Place polystyrene pads at ends of elements
7	Install transite insulation block in inner container.
8	Check gasket (attached to cover) for damage. Replace if necessary.
9	Place cover on internal container
10	Place washer on cap screws (16) and screw cap screws finger tight
11	Tighten cap screws evenly
12	Add additional vermiculite if necessary
13	Place cover on outer container and install cover clamp ring
14	Tighten holddown bolt

8.0 ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

8.1 ACCEPTANCE TESTS

Reference the attached test report "Testing of a Radioactive Material Shipping Container to the Requirements of the Atomic Energy Commission Regulation 10 CFR, Part 71.

8.2 MAINTENANCE PROGRAM

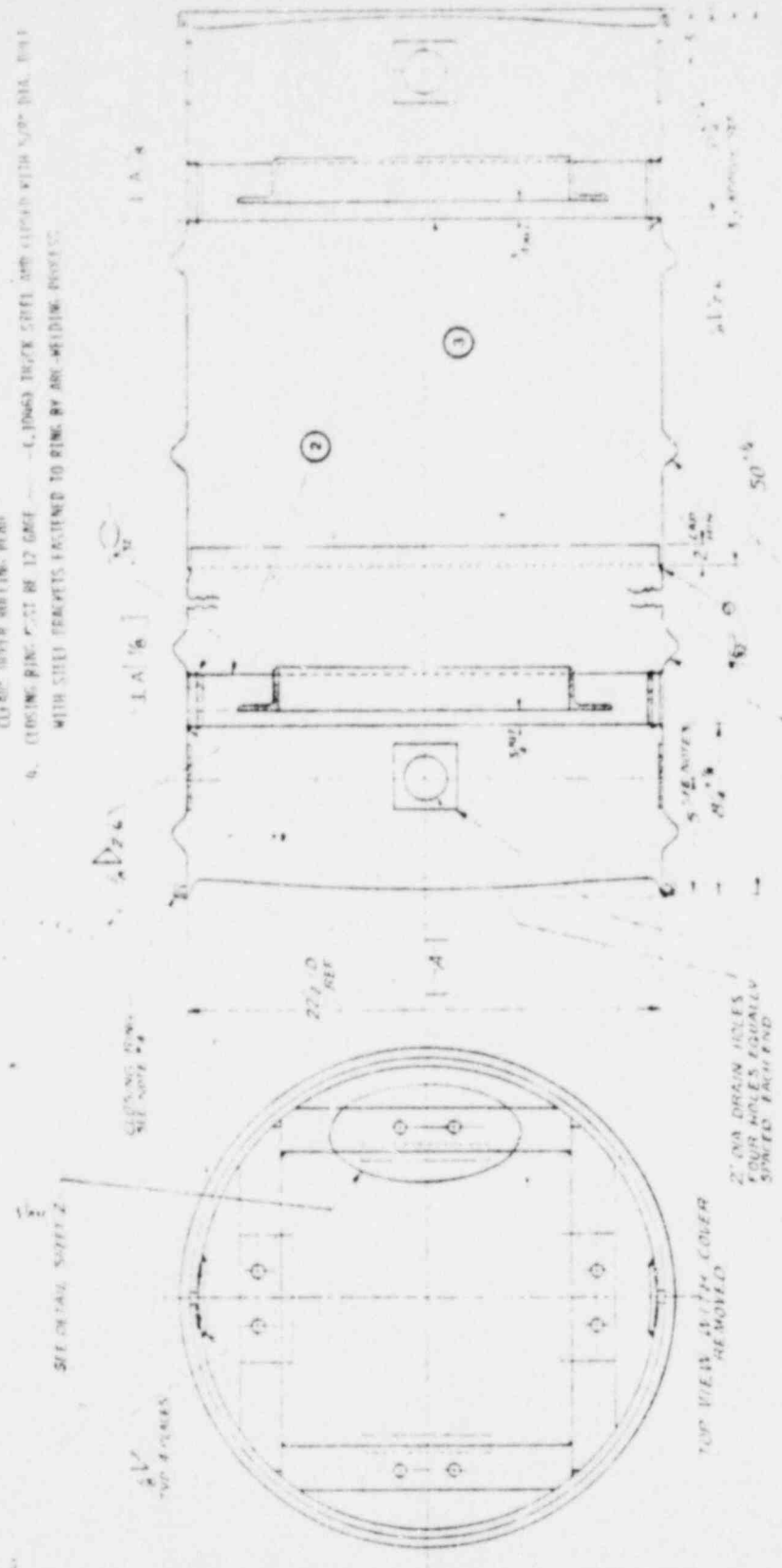
Prior to the reuse of any container, it will be inspected to assure that it meets the criteria of 49 CFR 173.393 and 173.28 and the requirement 10 CFR 71.

- 1) Prior to use, the containers will be inspected for internal and external damage, missing parts, etc., and surveyed to determine radioactive contamination, if any.
- 2) If contaminated, decontamination is effected
- 3) If repair work is required, a detailed listing of repair/replacement requirements will be initiated
- 4) After repair, an inspection to assure that the container meets the transportation requirements is made
- 5) Containers meeting transportation criteria will be stored in a holding area until required for a shipment.

POOR ORIGINAL

1. 55 GAL. FULL REMOVABLE HEAD ROOM - ECG-17C (ALTERNATE ECG-17M)
 2. DRAIN HOSE FOSTER (17.0) FORM AND WELD TO INSIDE OF DRAIN TANK WITH 1/2" DIA. 304 L. 100. 61
 (CONSP. 6) TWO (2) 1/2" DIA. STEEL RINGS AND WELDED TO OTHER SIDE
 3. THIS DIMENSION IS MAXIMUM AND NOT TO BE EXCEEDED - LOCATE 2" DRAIN HOSE TO 1/2" HOSE
 CLEARANCE OVER ROLLING HEAD
 4. CLOSING RING MUST BE 1/2" GAGE - (4) 1/2" DIA. THICK STEEL AND CLOSING WITH 5/8" DIA. DIA. 1
 WITH STEEL TRACKS FASTENED TO RING BY ARC WELDING PROCESS

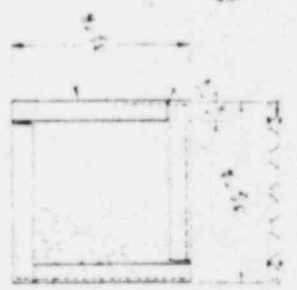
NOTES



FULL SECTION

1

2 DRAIN HOSE COVER
SEE NOTE #2



3

4 STEEL RING COVER
SEE NOTE #3 & #4

CELTAIL

REV.	DATE	DESCRIPTION	BY	CHKD.
1	11/11/51	ISSUED FOR CONSTRUCTION	J. J. [unclear]	[unclear]
2	11/11/51	ISSUED FOR CONSTRUCTION	J. J. [unclear]	[unclear]
3	11/11/51	ISSUED FOR CONSTRUCTION	J. J. [unclear]	[unclear]
4	11/11/51	ISSUED FOR CONSTRUCTION	J. J. [unclear]	[unclear]
5	11/11/51	ISSUED FOR CONSTRUCTION	J. J. [unclear]	[unclear]

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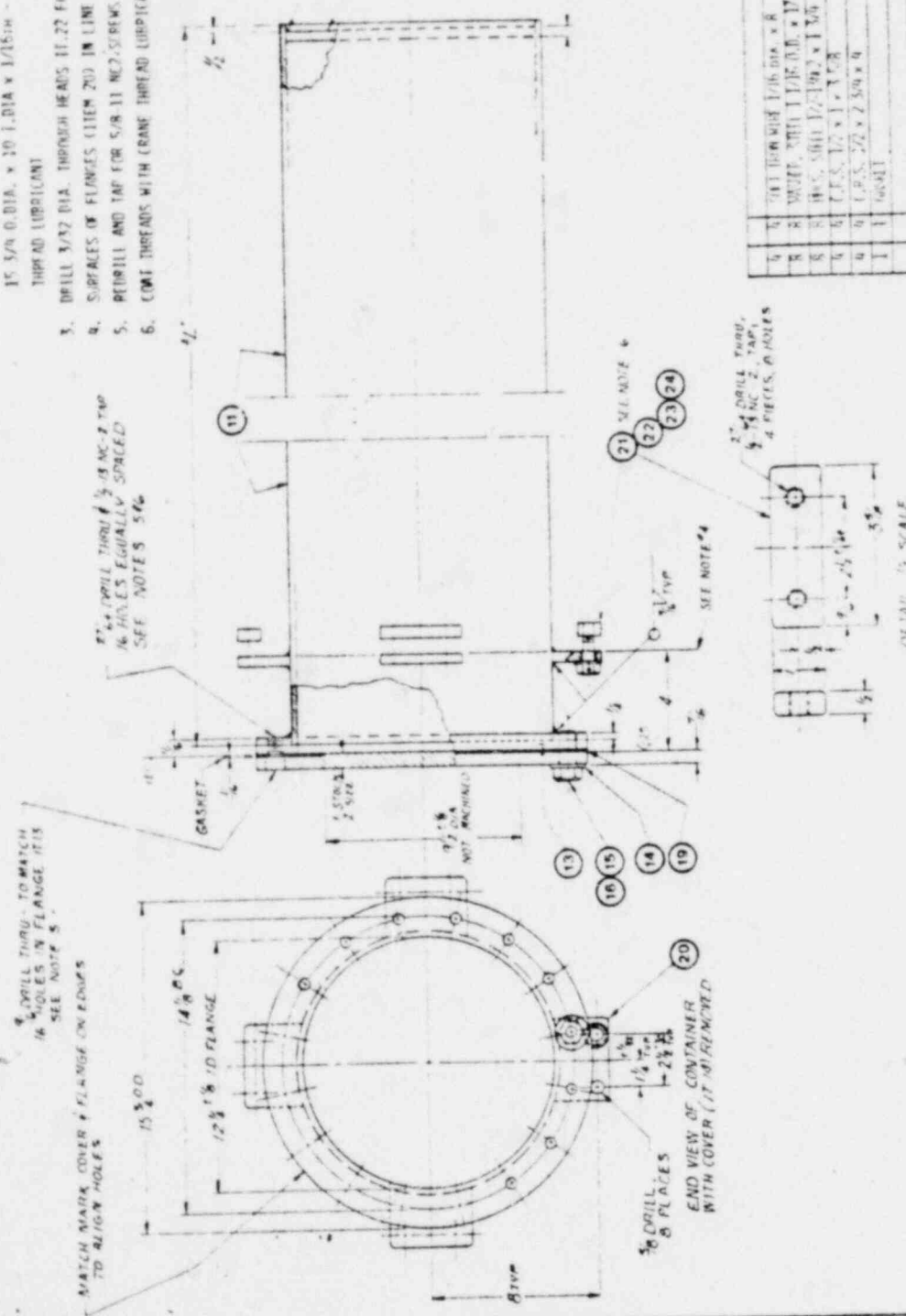
Project No. [unclear] Drawing No. [unclear] Sheet [unclear] of [unclear]

POOR ORIGINAL

On the basis of the following information, the design of this drawing is based on the information furnished by the customer and is not to be construed as a guarantee of performance.

NOTES

1. MATERIAL, IT-1 - SEAMLESS OR WELDED STEEL PIPE, 12 x SCHED. 20, ASTM A-53, GR-A
2. GASKET (IT-10) MATERIAL: ASBESTOS SHEETPILING, GRANITE OR EQUAL (FOR 750/75 - 11700) 15 3/4 O. DIA. x 20 1/8 I.D. x 1/16 IN. - CEMENT TO COVER IT, 10 AND COAT WITH CRANE THIRAD LUBRICANT
3. DRILL 3/32 DIA. THROUGH HEADS IT-22 FOR LOCKWIRE IT-24
4. SURFACES OF FLANGES (ITEM 20) IN LINE WITHIN 1/16"
5. RETRILL AND TAP FOR 5/8-11 NC-2 SCREWS WHEN THREADS BEFORE WORN
6. COAT THREADS WITH CRANE THREAD LUBRICANT BEFORE TIGHTENING.



Item	Material	Description	Size	Note	Reference Drawing Number
4	IT-10	ASBESTOS SHEETPILING	15 3/4 O.D. x 20 1/8 I.D. x 1/16 IN.	1	12.85
5	IT-1	SEAMLESS OR WELDED STEEL PIPE	12 x SCHED. 20, ASTM A-53, GR-A	2	
6	IT-2	CRANE THREAD LUBRICANT		3	
7	IT-3	CRANE THREAD LUBRICANT		4	
8	IT-4	CRANE THREAD LUBRICANT		5	
9	IT-5	CRANE THREAD LUBRICANT		6	
10	IT-6	CRANE THREAD LUBRICANT		7	
11	IT-7	CRANE THREAD LUBRICANT		8	
12	IT-8	CRANE THREAD LUBRICANT		9	
13	IT-9	CRANE THREAD LUBRICANT		10	
14	IT-10	CRANE THREAD LUBRICANT		11	
15	IT-11	CRANE THREAD LUBRICANT		12	
16	IT-12	CRANE THREAD LUBRICANT		13	
17	IT-13	CRANE THREAD LUBRICANT		14	
18	IT-14	CRANE THREAD LUBRICANT		15	
19	IT-15	CRANE THREAD LUBRICANT		16	
20	IT-16	CRANE THREAD LUBRICANT		17	
21	IT-17	CRANE THREAD LUBRICANT		18	
22	IT-18	CRANE THREAD LUBRICANT		19	
23	IT-19	CRANE THREAD LUBRICANT		20	
24	IT-20	CRANE THREAD LUBRICANT		21	

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Approved By: [Name] Date: 1/15/60

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Model No.	Material	Description	Size	Note	Reference Drawing Number
CS0712-7	IT-17	CRANE THREAD LUBRICANT		18	
CS0712-1	IT-18	CRANE THREAD LUBRICANT		19	

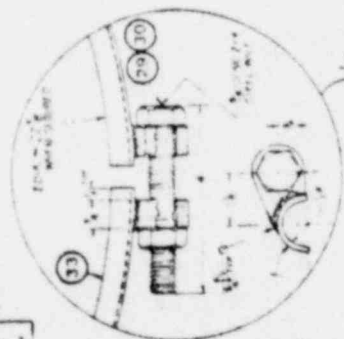
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Date: 1/15/60
Drawing Number: 12.85

POOR ORIGINAL

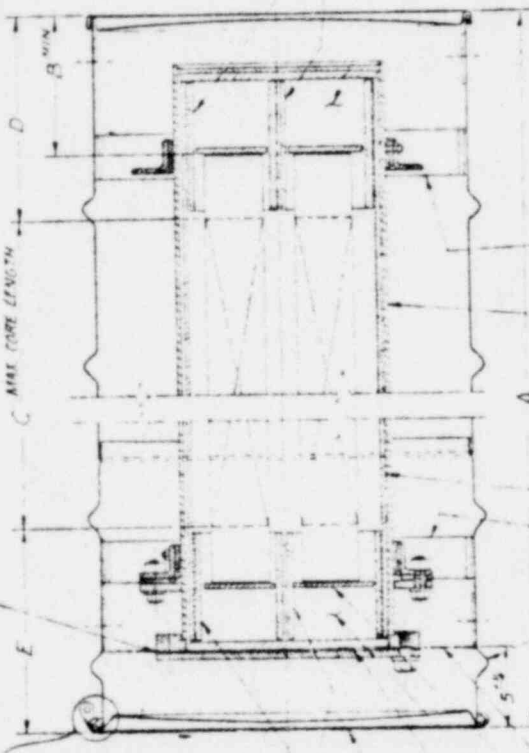
NOTES

1. TAMP ALL INSULATING MATERIAL FIRMLY WHEN FILLING INTO CONTAINERS
2. SHOW 1/8 BLOCK LETTERS ON SIDE OF IRON AS FOLLOWS:
I.C.C. S.P. 5088
FISSILE RADIOACTIVE MATERIAL
DORM NO.
3. CARBONED TUBES TO BE SLIT LENGTHWISE FOR INSTALLATION. THE UPPER CARBONED TUBES TO BE TAPED, USING IT, 42 TO THE TUBE LINER (2 FLANGES EACH TUBE).

4. 600 PSI, ASPHALT SHEET PAVING, GRANITE OR EQ. (FOR 750 PSI)
15 3/4 O.D. x 12 1/4 I.D. x 1/16"

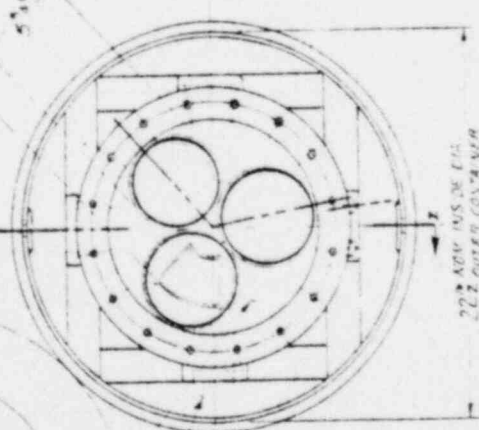


14" MIN. DISTANCE BETWEEN NEAREST CORE EDGES IN FUEL PLATES IN ADJACENT CONTAINERS.



SECTION Z-Z

32 TANK WELD TO OUTER CONTAINER
33
34
35
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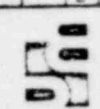


20 ADV INS DR DIA
22 OUTER COVER DIA

Item	Quantity	Description	Notes	Reference Drawing
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