

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 D34710-1	Model D34710-2
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 034710-1

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 034710-2

2.2.1 Structural Design

This container satisfies the package standards of Subpart C in the same manner as does Model 034710-1.

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 holdown 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.

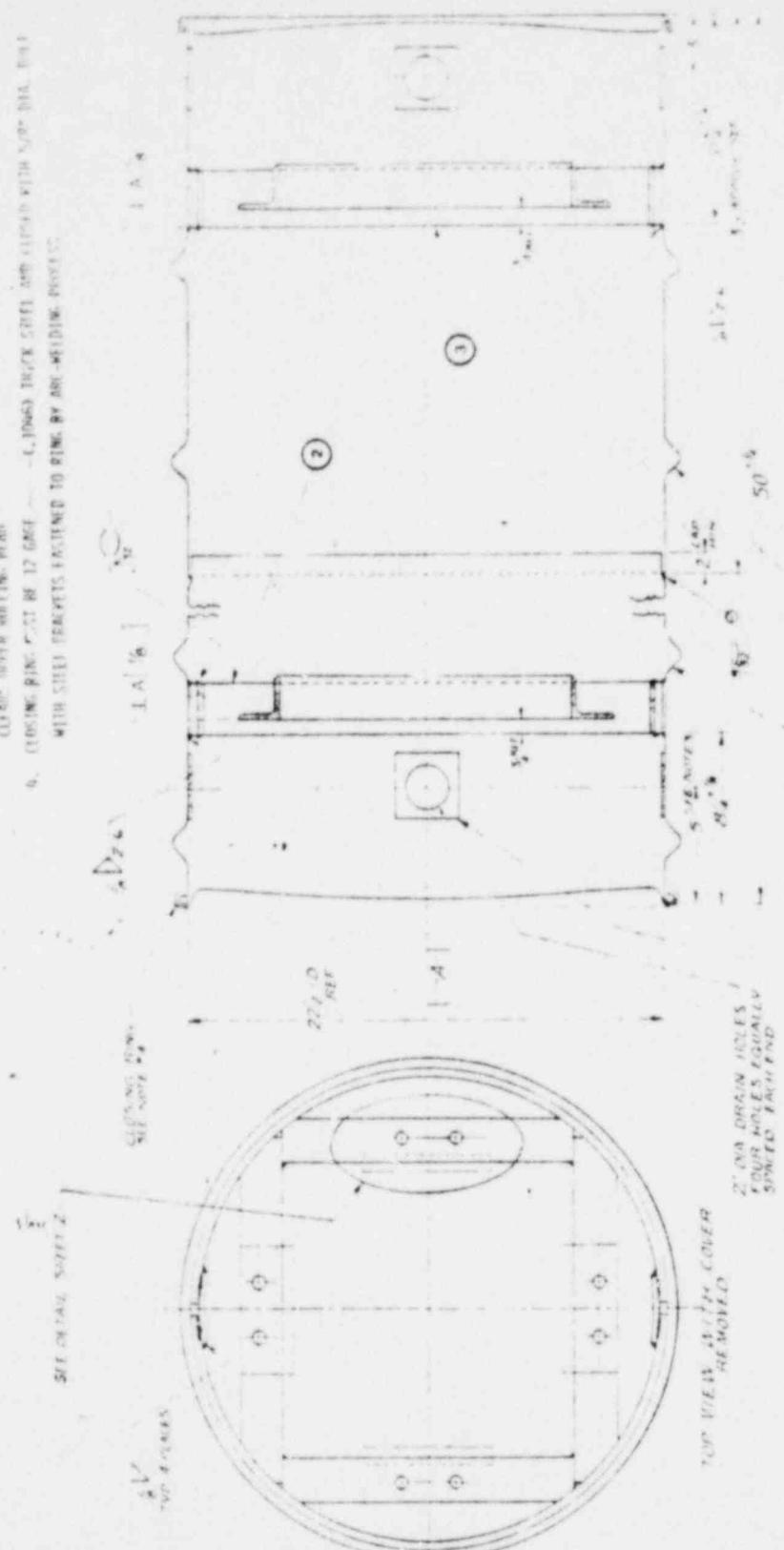
- 1) Prior to use, the containers will be inspected for internal and external damage, missing parts, etc., and surveyed to determine radioactive contamination, if any.
- 2) If contaminated, decontamination is effected
- 3) If repair work is required, a detailed listing of repair/replacement requirements 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.

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The first 2000 books to leave
Tunbridge Wells Station on the light
train from Tunbridge Wells to London
will receive a small gift.

1. \$5.00 - 100 PRIVATE H.R. VOTES - 100 VOTES - 100 VOTES - 100 VOTES
 2. AGAINST OTHER 17.00 FREE AND HELD IN NAME OF JOHN LEE WOODS - 100% AT
 CHURCHES, & IN DENTAL CLINICS AND HOSPITALS

3. THIS POSITION IS AGAINST AND NOT TO BE SUPPORTED - 100% AT
 CHURCHES, 100% L.I.P., 100% -
 4. 100% RING RINGS & 12.00 FREE - 100% AGAINST OTHER STUFF, AND CLASHED WITH 50% OF I.D.A. THAT
 WITH CHILDREN'S FATHERS, FATHERED TO RING BY ANY MEANS POSSIBLE



FURTHER SECTION

1

A technical drawing of a rectangular component. It features a central horizontal slot with a width of 1/2. On the left side, there is a vertical slot. On the right side, there are two circular features, one at the top labeled ④ and one at the bottom labeled ⑤.

Item
100
200
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POOR ORIGINAL

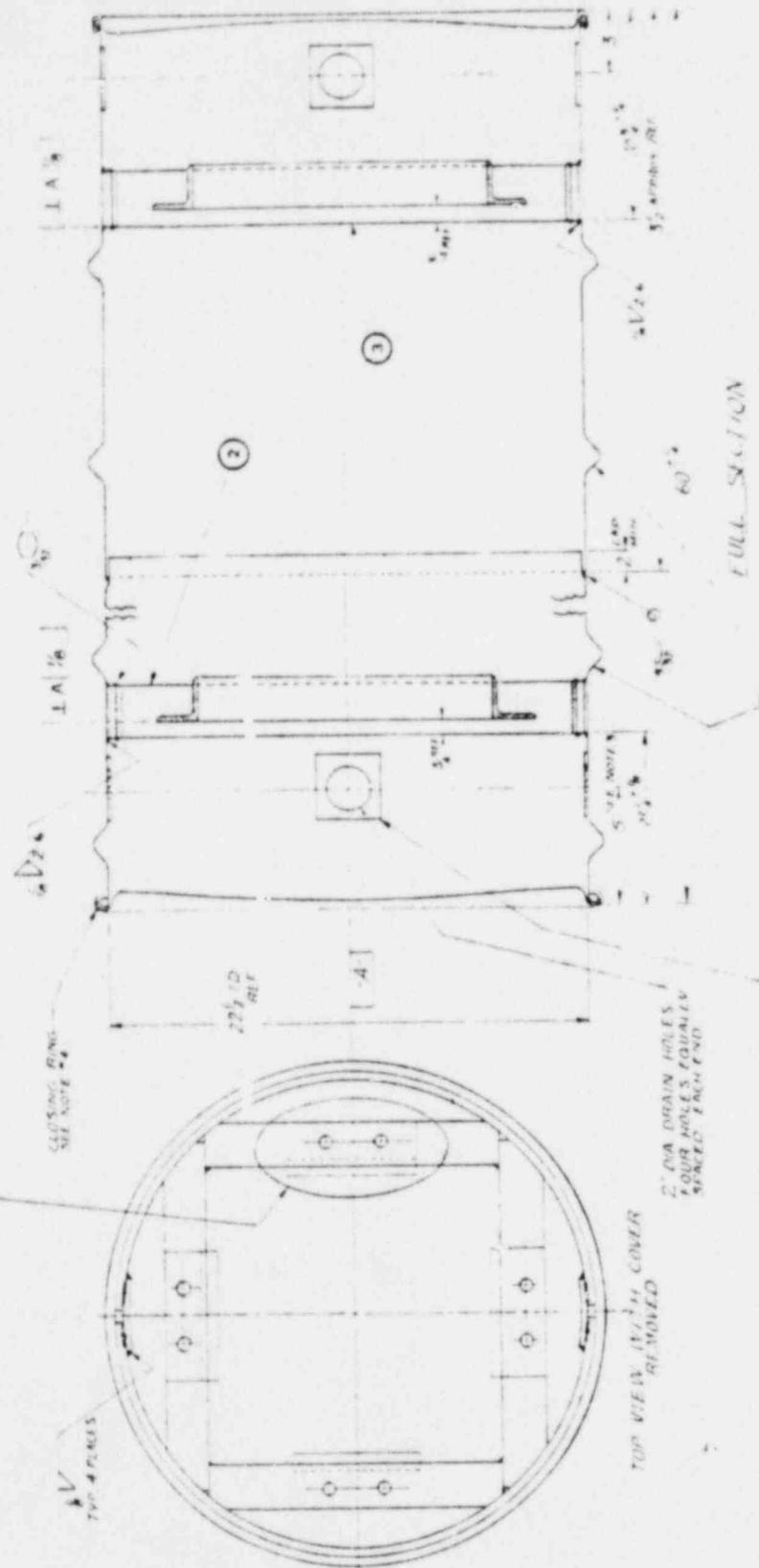
Group	Number of patients	Mean age (years)	Mean serum creatinine (mg/dL)	Mean serum albumin (g/dL)	Mean serum total protein (g/dL)	Mean serum cholesterol (mg/dL)
Normal subjects	10	30.0	0.72	4.5	6.0	180
Diabetics without nephropathy	10	30.0	0.72	4.5	6.0	180
Diabetics with nephropathy	10	30.0	1.25	3.5	5.0	200
Non-diabetic patients with nephropathy	10	30.0	1.25	3.5	5.0	200

2. SWING HORN OVER FIT, AT TOP AND WND TO INSIDE OF BUM TACK M/F. TACK LINE. AT CORNERS OF TWO OPPOSITE SIDES AND MIDDLE OF OTHER SIDES.

3. THIS QTR-NEXT IS CAVITY AND NOT TO BE FROZEN IN - LOCATE $\frac{1}{2}$ " FRAM HOLE SO THAT HOLE LIES AFTER DRILLING HEAD.

4. SWING RING, MUST BE 12 GA. STEEL, THIN STEEL AND CLOSED WITH 5/8" dia. BUT WITH STEEL PLATE ATTACHED TO BWD BY ARC WELDING PROCESS.

ST 6 247A/1 SUBF T 2



1000 1000

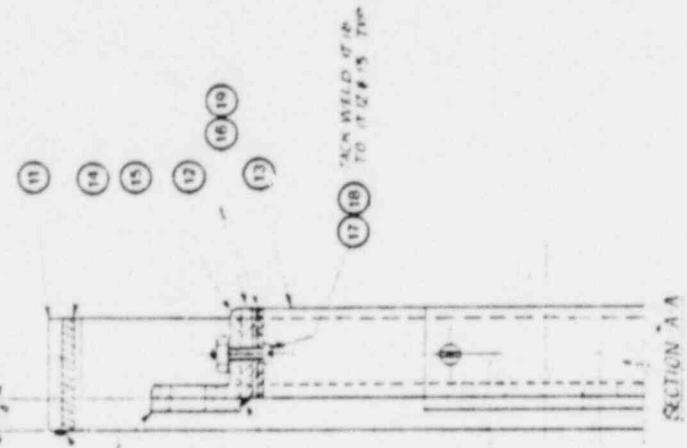
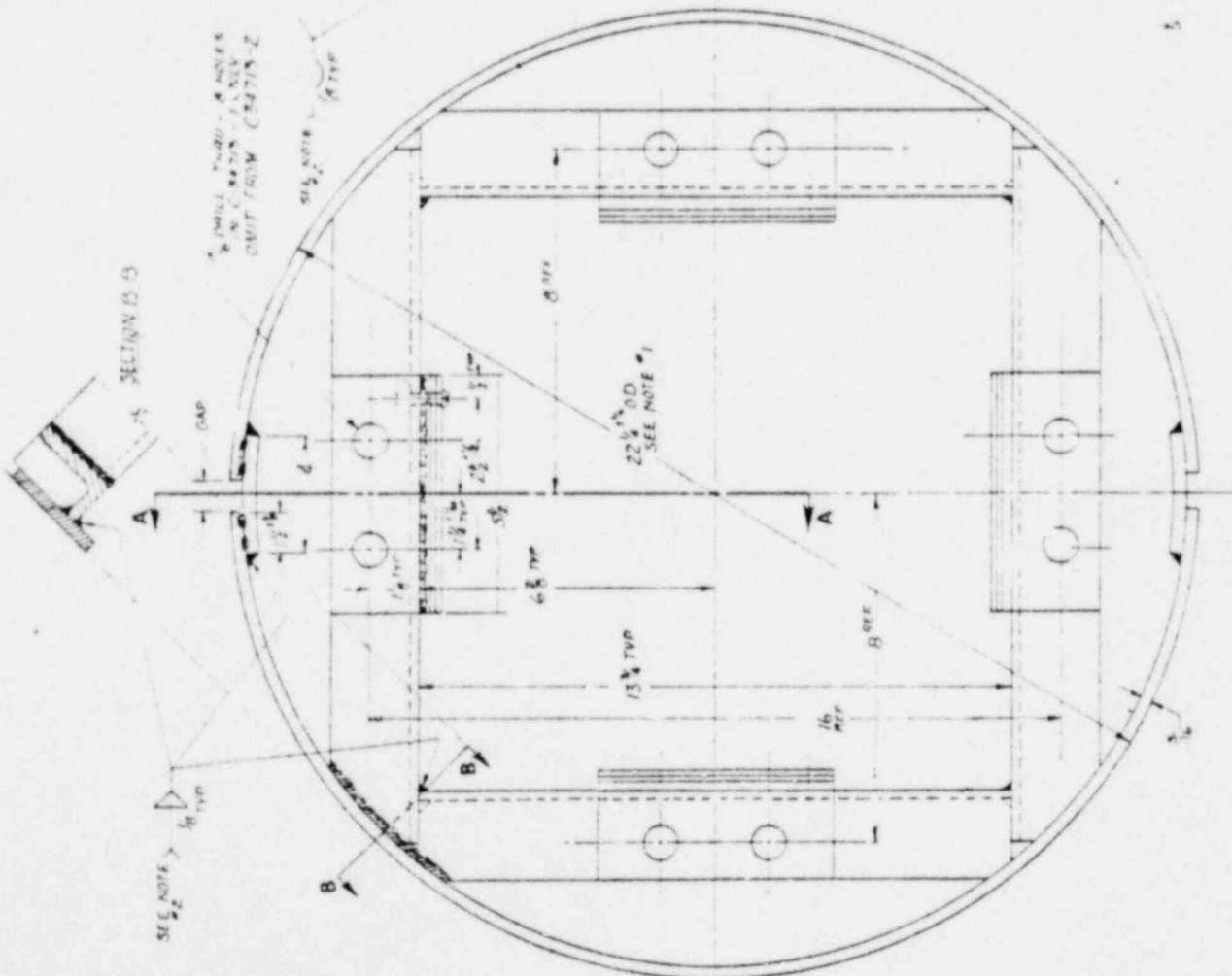
A diagram showing a rectangular container with a horizontal rod inside. The rod has two small circles at its ends. A circular hole is located in the upper right corner of the container's top surface.

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The new Justice Department has been established. The State Department has been reorganized.

1. THIS DIMENSION TO BE MODIFIED TO FIT INTERNAL DIA. OF SHIPPING CONTAINER
2. THESE MEASURES TO BE MADE AFTER ASSEMBLING AND SHIPPING CONTAINER



SECTION A

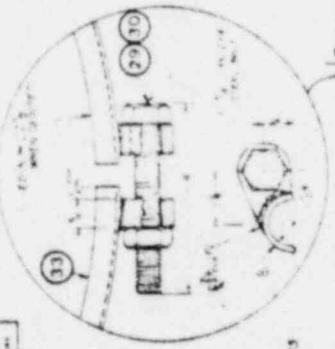
Ref'd	Description	Note	Serial Number		Drawing Number	Drawing Number
			Date	Approved By		
8	RE-24 1 1/2" x 6", 804 4294 424508 606 5040, E-20 1 1/2" x 2 1/2"					
8	901 875000 L-20 3					
8	901 875000 L-20 1/2					
6	RE-24 1 1/2" x 2 1/2"					
4	RE-24 1 1/2" x 2 1/2"					
4	RE-24 1 1/2" x 2 1/2"					
7	1 1/2" x 1 1/2" x 1/2"					
2	RE-24 1 1/2" x 2 1/2" x 1 1/2"					
2	RE-24 1 1/2" x 2 1/2" x 1 1/2"					
1	U.R.S. 3/4" x 2 1/2" x 1/2"					

POOR ORIGINAL

POOR ORIGINAL

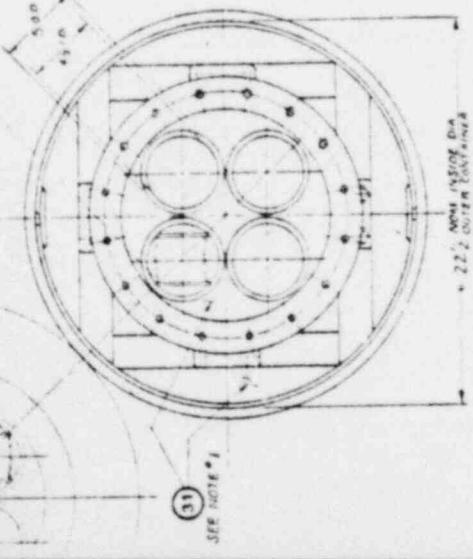
1. The author's name
2. The title of the book
3. The publisher's name
4. The date of publication

232



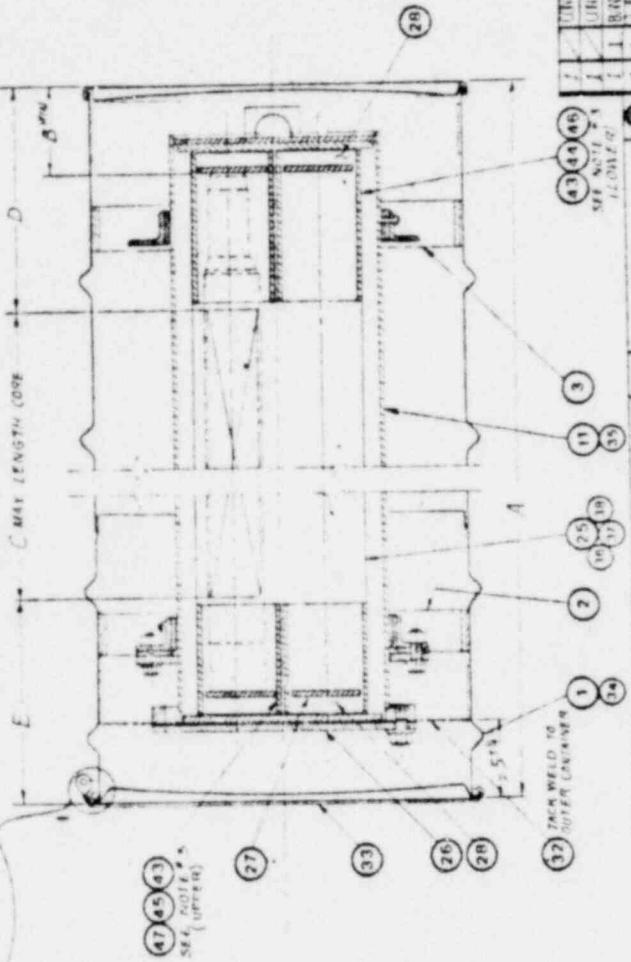
12. MIN DISTANCE BETWEEN
NEAREST COASTS, NARROWEST
DISTANCES IN AD. EAST COAST.

12 MIN DISTANCE FROM THE
NEAREST COAST LINE IN
PLATES IN AD. 1800-1803



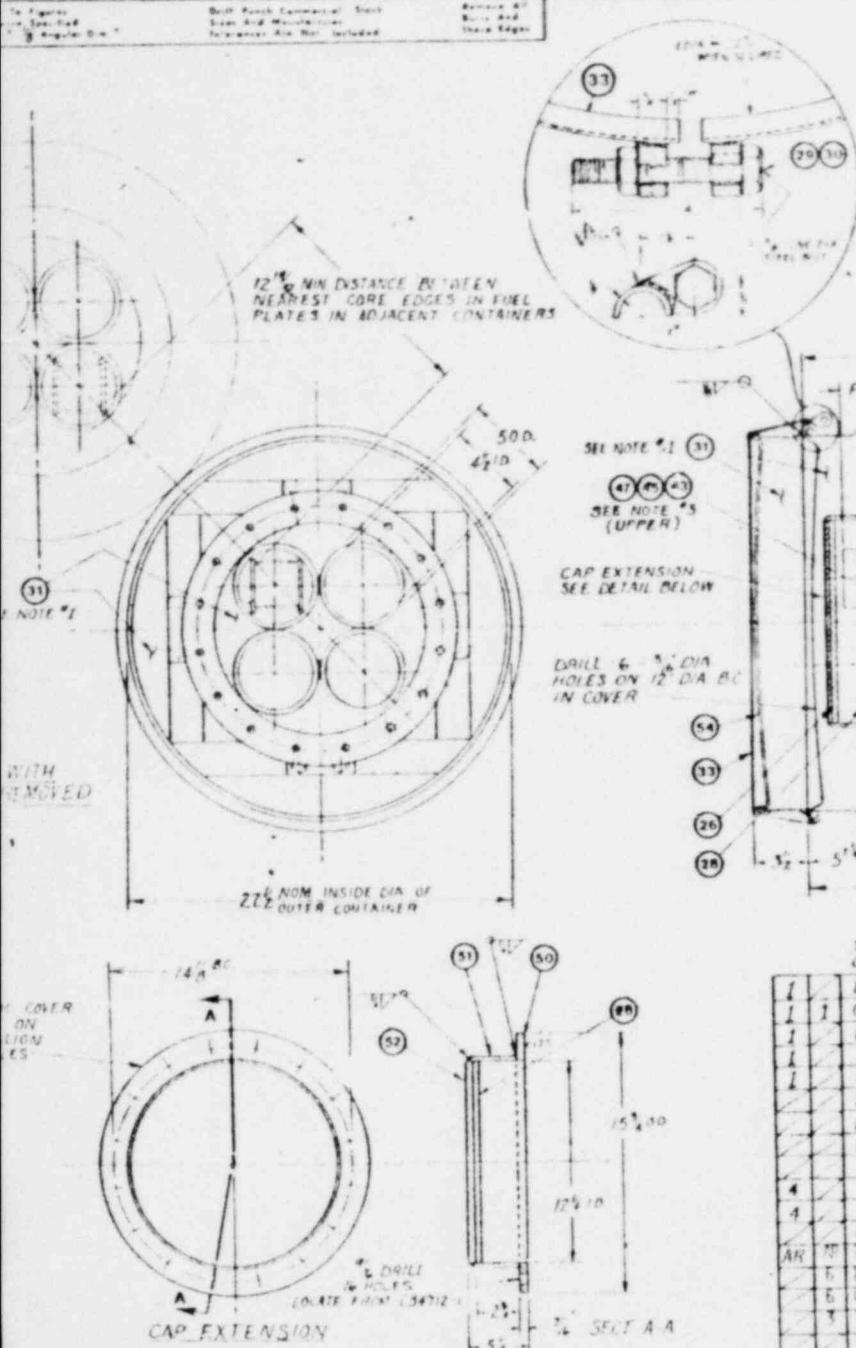
STATEMENT

3. *Calotropis procera* L. (White crown flower) is a tall herbaceous perennial, the stem



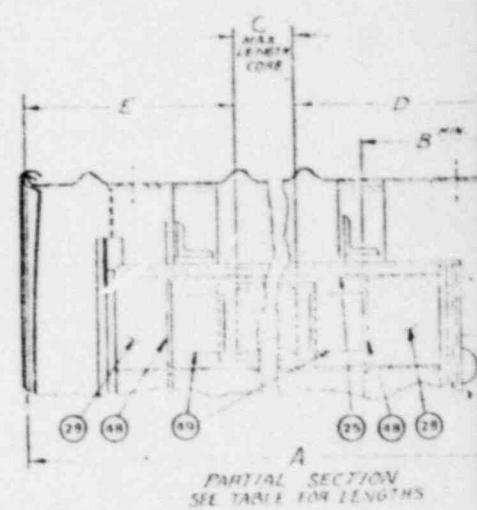
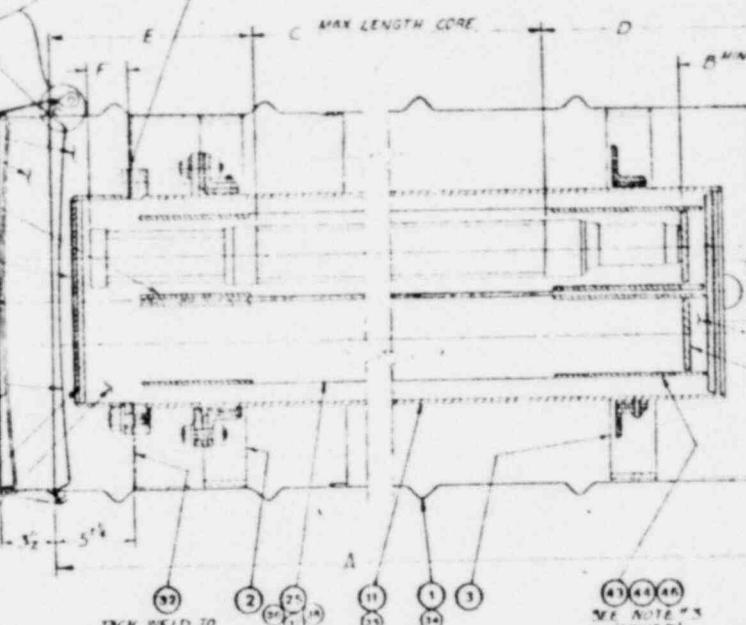
POOR ORIGINAL

Bolt Punch Commercial Stock
Screws And Washers
Hardware Are Not Included
Bolts And Washers
Hardware Are Not Included



NOTES

1. TAP ALL INSULATING MATERIAL FIRMLY WHEN FILLING INTO CONTAINERS
2. STICKER NVR BLACK LETTERS ON SIDE OF DRUM AS FOLLOWS:
 - A. E, S.F., 505R
 - B. INSULATING MATERIAL
 - C. 750°F.
3. CROWN DRILL TUBE TO 25 SECT LENGTHWISE FOR INSTALLATION. THE UPPER CAP DRILL TUBE TO 22 TAPE, USING FT. #2 TO THE CORE LINER
12 POUNDS EACH TUBE.
4. GASKET, ASCOSTS SHEET PACKING, GRANITE OR EQ. (FOR 750°F.)
15 5/8 D.O. x 12 1/4 I.D. x 1/16"



ITEM	DESCRIPTION	NOTE	REFERENCE DRAWING
1	CONTAINER, DRUM		34710
1	CONTAINER, JACKET		34710
1	CARRIER, STEEL 5/8 X 36		34710
1	DRILL NOZZLE, NUMBER 10		34710
2	AR AR		34710
3	AR AR		34710
4	AR AR		34710
5	HEX JAM NUT, STEEL 5/8		34710
6	PIPE, SS SCH 40 2 1/2 DIA x 12 1/4 I.D. x 2 1/2		34710
7	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
8	BLOCK LINER		34710
9	DISA, TRANSITE 14 DIA x 2		34710
10	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
11	DRUM EXTEN 100 1/2 L x 100 1/2 H		34710
12	GASKET		34710
13	PIPE, SS SCH 40 2 1/2 DIA x 12 1/4 I.D. x 2 1/2		34710
14	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
15	BLOCK LINER		34710
16	DISA, TRANSITE 14 DIA x 2		34710
17	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
18	DRUM EXTEN 100 1/2 L x 100 1/2 H		34710
19	TACK WELD TO OUTER CONTAINER		34710
20	DRUM EXTEN 100 1/2 L x 100 1/2 H		34710
21	DISA, TRANSITE 14 DIA x 2		34710
22	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
23	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
24	BLOCK LINER		34710
25	DISA, TRANSITE 14 DIA x 2		34710
26	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
27	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
28	BLOCK LINER		34710
29	DISA, TRANSITE 14 DIA x 2		34710
30	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
31	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
32	BLOCK LINER		34710
33	DISA, TRANSITE 14 DIA x 2		34710
34	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
35	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
36	BLOCK LINER		34710
37	DISA, TRANSITE 14 DIA x 2		34710
38	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
39	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
40	BLOCK LINER		34710
41	DISA, TRANSITE 14 DIA x 2		34710
42	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
43	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
44	BLOCK LINER		34710
45	DISA, TRANSITE 14 DIA x 2		34710
46	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
47	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
48	BLOCK LINER		34710
49	DISA, TRANSITE 14 DIA x 2		34710
50	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
51	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
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64	BLOCK LINER		34710
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67	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
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71	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
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75	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
76	BLOCK LINER		34710
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78	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
79	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
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82	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
83	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
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87	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
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90	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
91	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
92	BLOCK LINER		34710
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125	DISA, TRANSITE 14 DIA x 2		34710
126	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
127	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
128	BLOCK LINER		34710
129	DISA, TRANSITE 14 DIA x 2		34710
130	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
131	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
132	BLOCK LINER		34710
133	DISA, TRANSITE 14 DIA x 2		34710
134	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
135	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
136	BLOCK LINER		34710
137	DISA, TRANSITE 14 DIA x 2		34710
138	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
139	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
140	BLOCK LINER		34710
141	DISA, TRANSITE 14 DIA x 2		34710
142	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
143	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
144	BLOCK LINER		34710
145	DISA, TRANSITE 14 DIA x 2		34710
146	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
147	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
148	BLOCK LINER		34710
149	DISA, TRANSITE 14 DIA x 2		34710
150	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
151	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
152	BLOCK LINER		34710
153	DISA, TRANSITE 14 DIA x 2		34710
154	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
155	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
156	BLOCK LINER		34710
157	DISA, TRANSITE 14 DIA x 2		34710
158	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
159	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
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161	DISA, TRANSITE 14 DIA x 2		34710
162	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
163	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
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166	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
167	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
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171	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
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175	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
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183	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
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187	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
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190	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
191	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
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194	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
195	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
196	BLOCK LINER		34710
197	DISA, TRANSITE 14 DIA x 2		34710
198	CARDBOARD TUBE 5 1/2 DIA x 7 1/2 I.D. x 4 1/2		34710
199	FLANGE, IRIS 15 1/4 D.O. x 2 1/2 I.D. x 2		34710
200	BLOCK LINER		34710
201	DISA, TRANSITE 14 DIA x 2		34710</td

