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DOCUMENT TITLE

Thermal Analysis of the ZrH Reactor 4 Pi and Void Backed Reflector Assemblies

AUTHOR

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SUPPORTING DOCUMENT

PROGRAM TITLE

ZrH Core Test Reactor Program

DOCUMENT TITLE

Thermal Analysis of the ZrH Reactor 4 P1
and Void Backed Reflector Assemblies

PREPARED BY/DATE
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EP

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ABSTRACT

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A steady state thermal analysis is presented for:
1) a BeO-Talow-B₄C poison back drum, and 2) a Be void back drum. TAP listings and a results summary are presented for both drums. The results indicate the poison back drum may be used with an 1150°F cold wall and the void back drum may be used with a 1000°F cold wall.

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** Appendices Not Included

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I. Introduction

The thermal analysis of the reference design of the ZrH Reactor 4-P1 Control Drum has been reported previously in TI-696-26-017 (Reference 1) and TI-696-24-040 (Reference 2). The analysis presented in this report studied the effect on drum temperatures of eliminating the dry wells, substituting instead a "cold wall" heat sink external to the reflector assembly. This current concept was made possible by the reduction of the core power level to 250 kwt and outlet temperature to 1200°F. A beryllium void back reflector assembly was also analyzed.

The drum studied previously (Refs. 1 and 2) was clad BeO ($4\frac{1}{2}$ inch diameter) with a TALOW-B₄C (poison) strong back. A 5 inch diameter version of this drum with clad BeO stationary segments between the drums was also studied in the present work. In addition a 3.5 inch thick 7.5 inch diameter void back Be drum with Be stationary segments similar to the S3DR reflector was studied.

As noted above, the former studies (Ref 1 and 2) assumed the control drums would be in drywells which would be cooled by the reactor coolant. Cooling the drums in this manner creates the problem of a large thermal gradient across the inner core vessel and outer row or two of fuel elements, see Figure 1 for relative position of the drum and core vessel. In order to eliminate this ΔT , alternate cooling schemes were studied. The two most promising approaches were to: 1) Provide no reflector cooling and force

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all heat generated in the reflector assembly to radiate back to the core vessel where the heat may be removed by the NaK coolant; and 2) provide a cold wall about the reflector assembly to which the reflector may radiate any generated heat. The cold wall may be cooled by the inlet NaK or some secondary fluid.

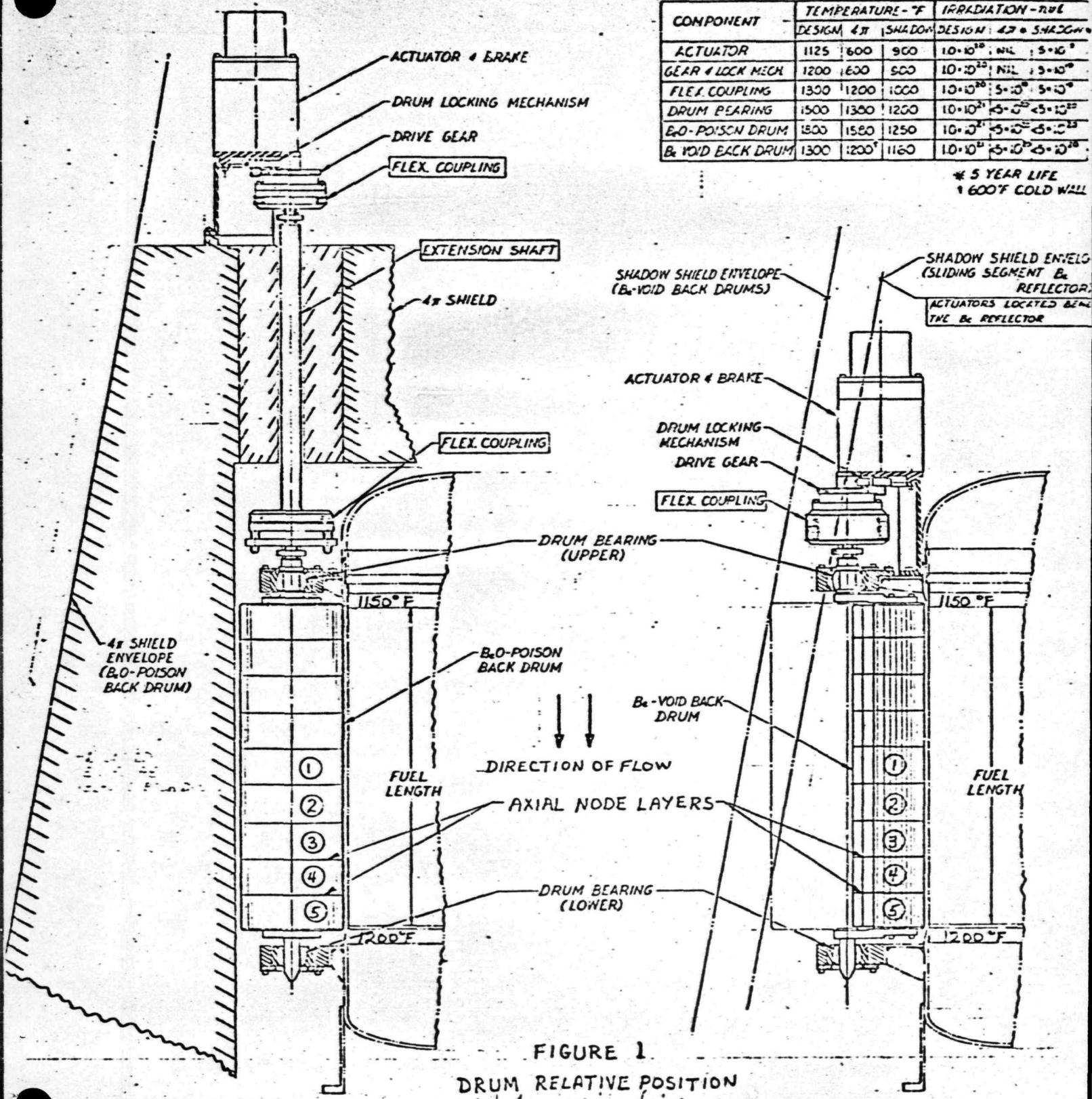


FIGURE 1
DRUM RELATIVE POSITION

II. Discussion

This study was conducted for a reactor power level of 250 kwt. The drums were positioned to represent maximum heat generation rates. This corresponds to the "drum in" position for the Be void back drum and the "poison in" position for the poison back drum. Heat generation rates for 250 kwt operation were not available when this study was performed. The 600 kwt heat generation rates reported by R. J. Thompson in Reference 3 were scaled down for 250 kwt for use in this study. An axial profile was obtained from Reference 4, see Figure 2, and a radial profile was obtained from R. J. Thomson, Reference 5. The resulting total heat generation per drum was 356 watts/drum for the void back drum and 386 watts/drum for the poison back drum. A single 400 kwt (618 watts/drum) run was conducted for the poison back drum. Provisions are made in the models to allow scaling the heat generation rates up or down for different power levels or more accurate heat generation rates.

The thermal analysis was performed with the TAP-4E (Tape #50153) computer code (Ref. 6). A three dimensional network was formulated for each drum type. The poison back drum network is presented in Appendix I; and the void back drum network is presented in Appendix II. Appendix III contains a third network for use in analyzing a 5 inch diameter Be drum with B_4C poison inserts in the back side of the drum. This network was formulated and checked out but was never used when work on this drum configuration was discontinued. This network is included in this report in case further study of this drum is resumed.

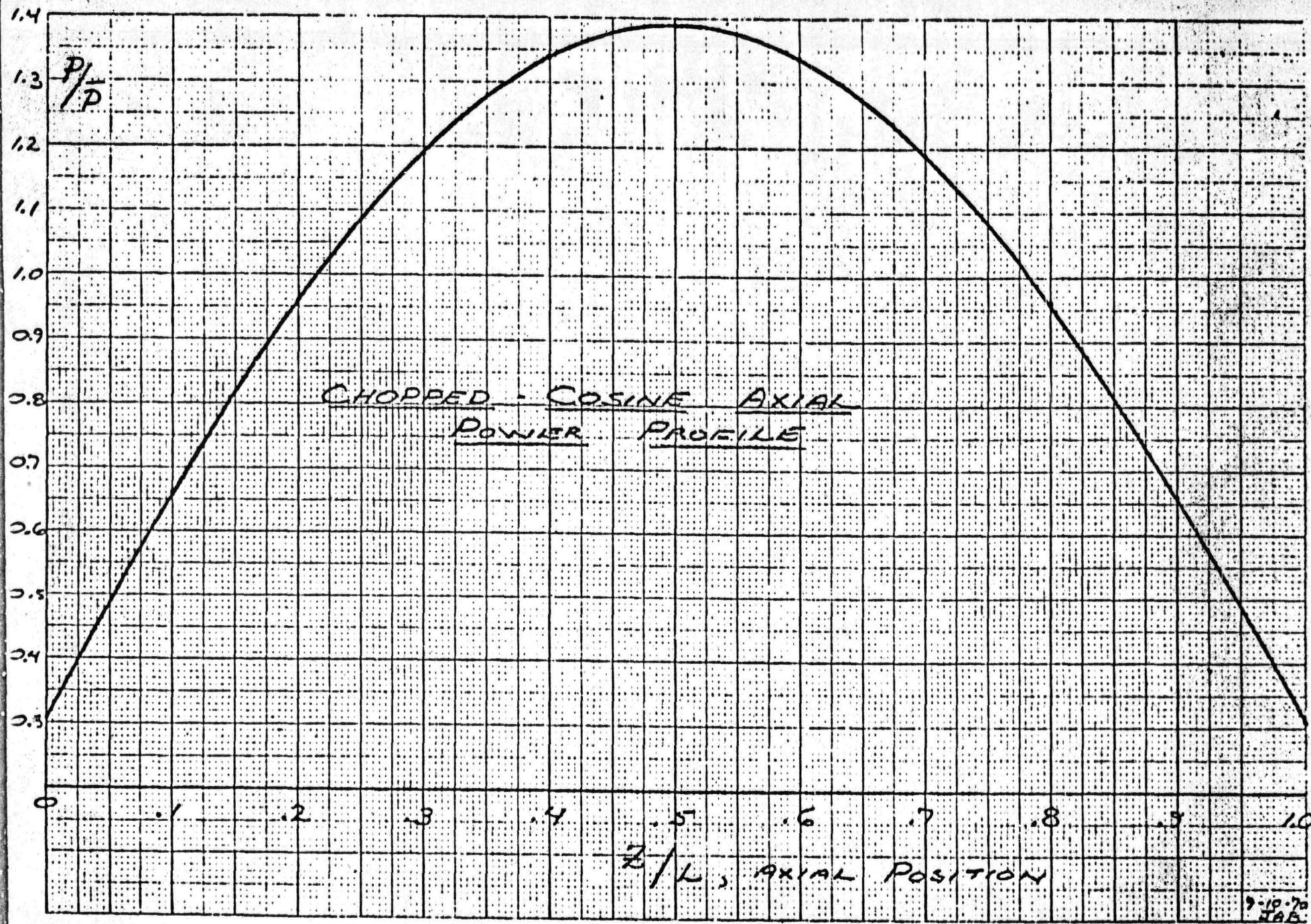


FIGURE 2

For each model the reflector assembly is considered to be sufficiently symmetric such that one drum and one half of the stationary reflector segments on each side of this drum are representative of the total reflector assembly. The thermal model may then be used to mock up a radially sectioned half of the drum and the stationary segments adjacent to this drum half. In the axial direction the reflector assembly is divided into 9 two-inch thick sections, see Figure 1. Because the drum is axially symmetric and the outlet end is hotter than the inlet end only the 5 layers from the midplane to the outlet end need be analyzed (numbered segments of Figure 1.)

The BeO poison back drum model is then subdivided as shown in Figure 3. This cross section is based on a 10 drum reflector assembly with a 12.8 inch diameter core vessel. The Ta-10W portion of the drum and the stationary BeO segments between the drums were considered to be axially continuous pieces of constant cross section but the BeO was divided into 2 inch axial segments. In the present drum design the Ta-10W is continuous over its full 18 inch length but the BeO portion of the drum is divided into 3 not 2 inch segments. When this model was formulated the stationary reflector segment design was not sufficiently complete to determine if the BeO segments would be continuous or not. The use of 2 inch rather than 3 inch BeO segments results in slightly higher peak temperatures than would occur in the real case but it greatly simplifies the thermal model. The heat generation resulting from the B_4C inserts in the Ta-10W was included in the model but the B_4C was ignored in the balance of the analysis. When the model was formulated the B_4C was to be contained in

wells within the Ta-10W but how many wells and where they would be was not defined. Considering that the B_4C would be totally contained in the Ta-10W and that its temperature would be about equal to the Ta-10W the B_4C was ignored in order to further simplify the model.

The Be void back model is subdivided as shown in Figure 4. This cross section is based on a 7 drum reflector assembly with an 11.9 inch diameter core vessel. The Be in the drum and the stationary segments between the drums were considered to be axially continuous. This is consistent with the design when this model was formulated. As the drum may have one or two shims, a shim interface was assumed in the model, as shown in Figure 4.

The heat transfer at all interfaces for both model was assumed to be by radiation only with effective emittances defined as follows:

Single barriers:

$$E_{eff} = \frac{1}{\frac{1}{\epsilon_1} + \frac{1}{\epsilon_2} - 1}$$

Multiple barriers:

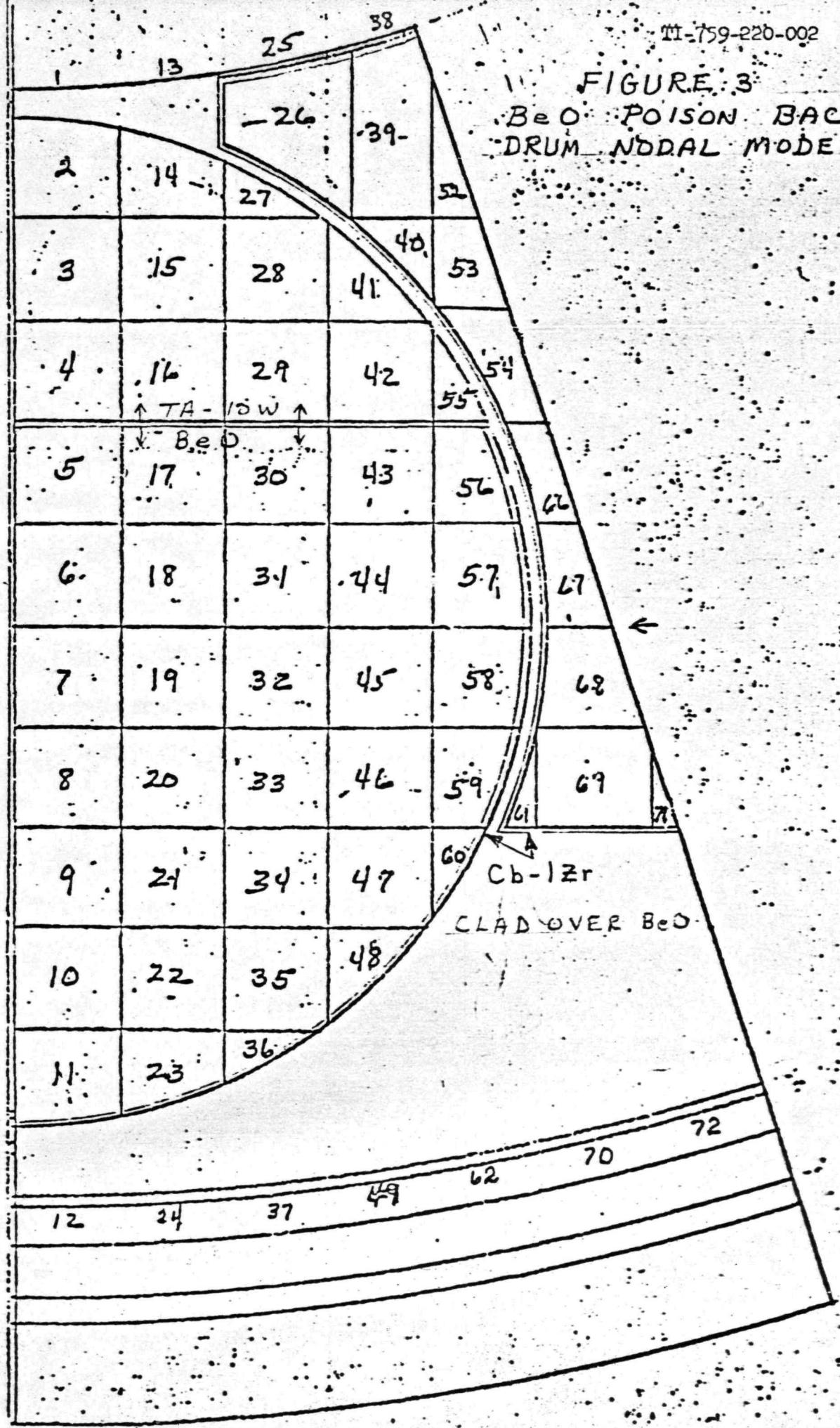
$$E_{eff} = \frac{\epsilon_{mb}}{n(2 - \epsilon_{mb}) + \frac{\epsilon_{mb}}{\epsilon_1} + \left(\frac{1 - \epsilon_2}{\epsilon_2}\right)\epsilon_{mb}}$$

where: ϵ_1 = emissivity of first surface

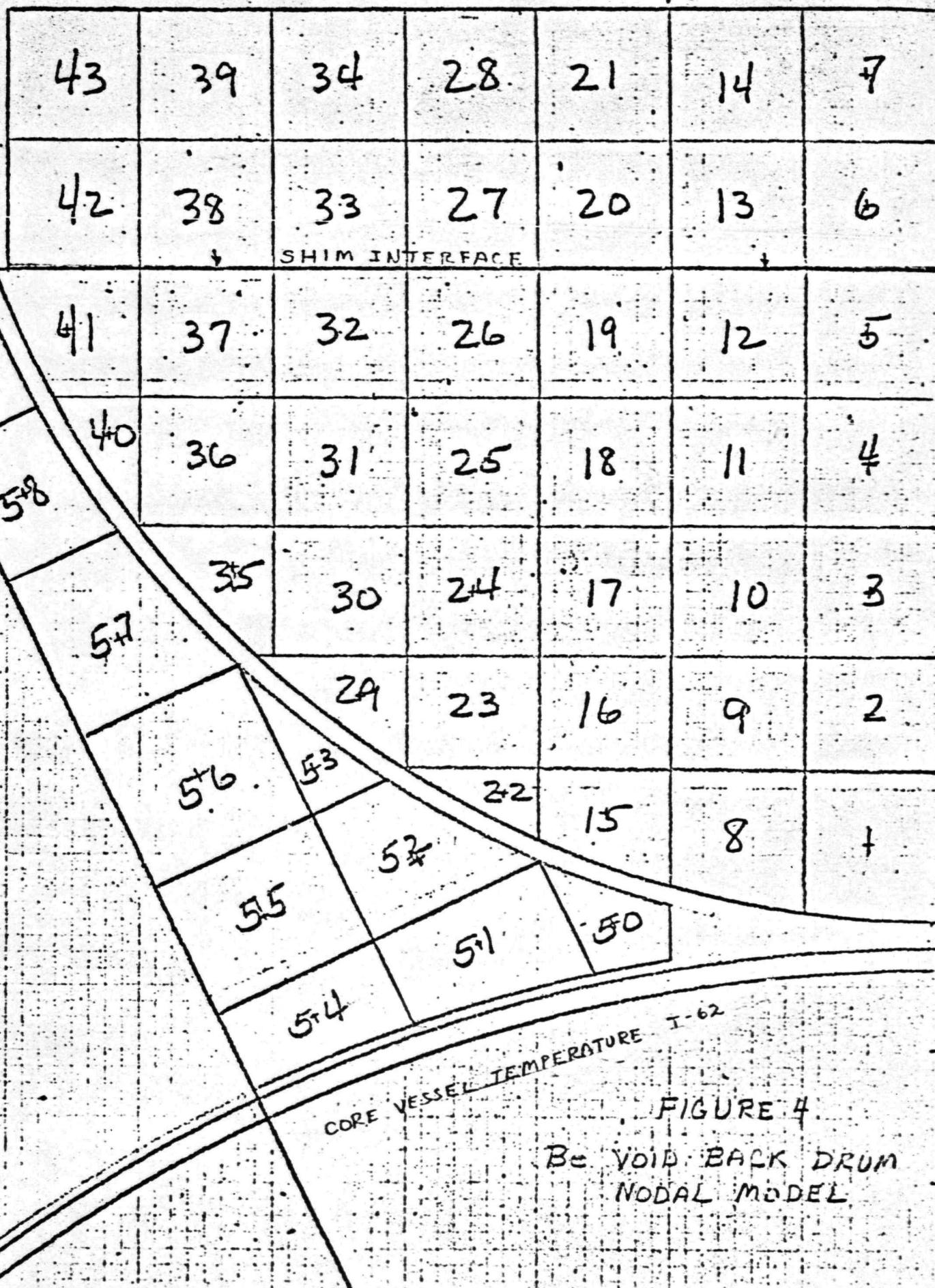
ϵ_2 = emissivity of second surface

ϵ_{mb} = emissivity of middle barrier

n = number of middle barriers



COLD WALL TEMPERATURE T-65



Emissivities for the various materials used in this study are shown in Table 1. Considering the 5 year life requirements and the high vacuum environment, conservative emissivities were chosen for use in this analysis. Excluding the drum surfaces facing the cold wall, all view factors were assumed to be equal to 1.0. A time share computer code was used to compute view factors for the drum to cold wall exchange. Drum to cold wall view factors from this code were ~.84. Considering the uncertainty in the drum design and the conservative emissivities chosen, a view factor of 1.0 was used in the thermal analysis.

Table 1
Material Emissivities

	ϵ	
Beryllium Oxide	0.35	(7)(8)
Beryllium	0.6	(11)
Niobium-1% zirconium	0.35	(7)
Tantalum- 10% tungsten	0.22	(7) (10)
Uncoated	0.8	(12)
Type 316 stainless steel	0.3	(7) (9)
Uncoated	0.8	(12)

III. Results

Results of the BeO poison back drum study are shown in Tables 2 -4 and Figures 5 and 6. Table 2 summarizes the results for various cold wall temperatures with natural emissivities used for all surfaces. Table 3 summarizes the results with high emissivity coatings on the core vessel and Ta-10W strong back surfaces. Table 4 summarizes the results of the one run at 400 kwt. The term adiabatic wall refers to the no cold wall case where all heat generated in the reflector must radiate to the core vessel where the NaK coolant will remove the heat. Bearing temperatures have been estimated from the outlet end drum temperatures and the work performed by Beiriger (Ref. 13). Beiriger's work indicates the peak bearing temperature will be equal to the outlet end drum temperature if they are in contact. The drum and bearing will be thermally isolated with spacers. In view of the spacers, the drum temperature was estimated to be lower than the outlet end drum temperature by the average ΔT across the axial BeO interfaces for the particular cold wall temperature. These results are also consistent with the bearing temperatures calculated by Marchese (Ref. 14). Figures 5 and 6 illustrate the temperature variation across the drum and stationary reflector.

Table 2
Control Drum and Stationary Reflector Temperature

<u>Natural Emissivity</u>	Cold Wall Temperature, °F					<u>Adiabatic Wall</u>
	<u>200</u>	<u>500</u>	<u>800</u>	<u>1000</u>	<u>1150</u>	
BeO-TaLOW-B ₄ C Drum						
BeO Stationary Reflector						
Drum Temperature						
Peak BeO	1315	1335	1383	1436	1485	1844
Peak Ta-low	1407	1420	1450	1485	1517	1770
Outlet End Peak	-	-	-	-	-	-
BeO	1121	1153	1224	1301	1371	1764
Ta-low	1374	1386	1415	1449	1480	1711
Bearing Temperature	1325	1340	1375	1415	1450	1691
Stationary Reflector						
Peak	1293	1315	1356	1400	1442	1757
Outlet End Peak	1264	1281	1323	1368	1410	1721

Table 3

Control Drum and Stationary Reflector Temperature

Core Vessel & Ta-low	Cold Wall Temperature, °F		
<u>Coated to yield $\epsilon \geq 0.8$</u>	800	1150	Adiabatic Wall
BeO-TaLOW-B ₄ C Drum			
BeO Stationary Reflector			
Drum Temperature			
Peak BeO	1284	1373	1512
Peak Ta-low	1301	1354	1436
Outlet End Peak	-	-	-
BeO	1164	1301	1466
Ta-low	1270	1317	1389
Bearing Temperature	1240	1300	1377
Stationary Reflector			
Peak	1273	1347	1466
Outlet End Peak	1245	1320	1442

Table 4

Control Drum and Stationary Reflector Temperature

Core Vessel & Ta-LOW

Coated to yield $\epsilon \geq 0.8$

400 Wt. Adiabatic Wall

BeO-Ta 10W-B₄C Drum

BeO Stationary Reflector

Drum Temperature

Peak BeO 1681

Peak Ta-LOW 1576

Outlet End Peak

BeO 1605

Ta-LOW 1497

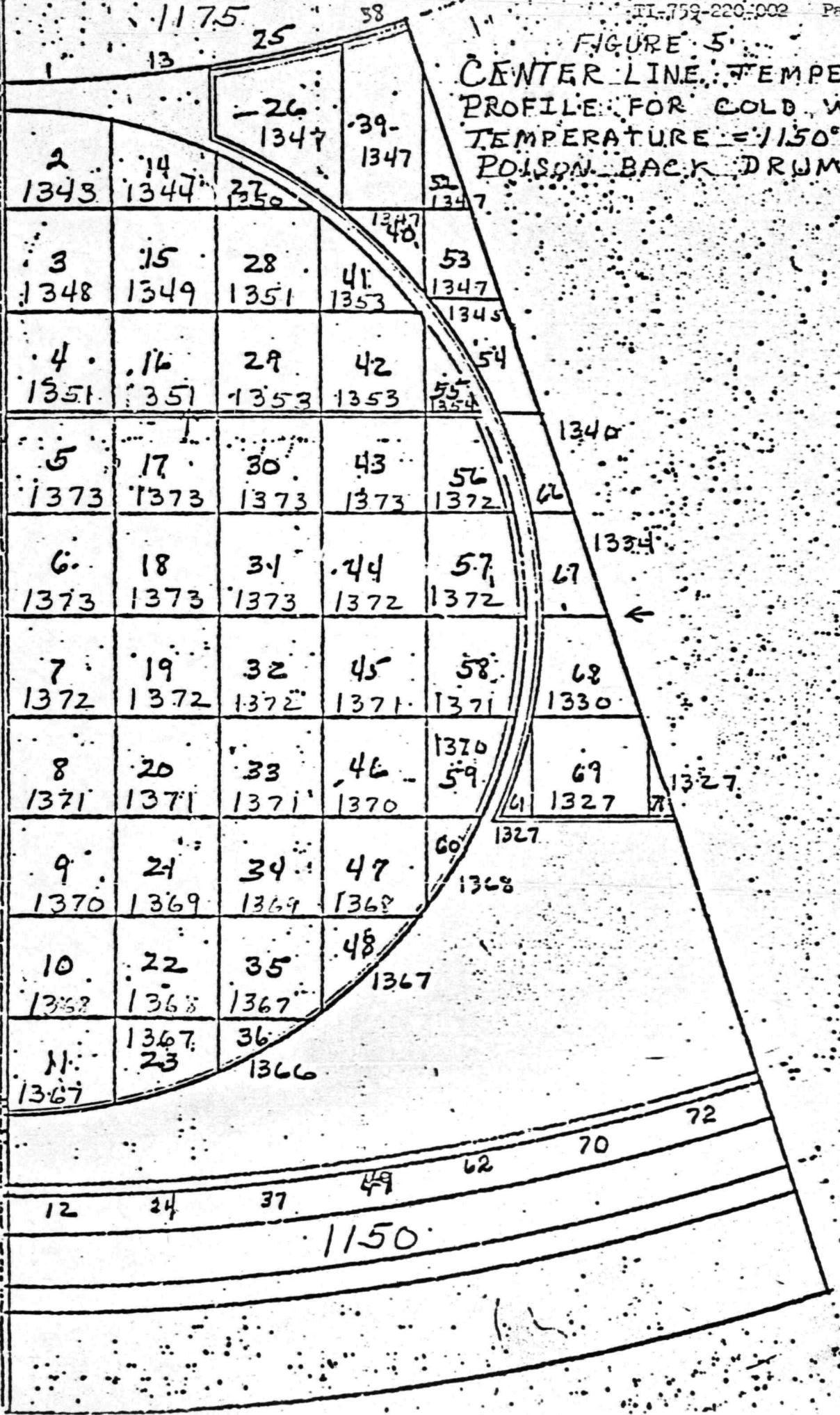
Bearing Temperature 1477

Stationary Reflector

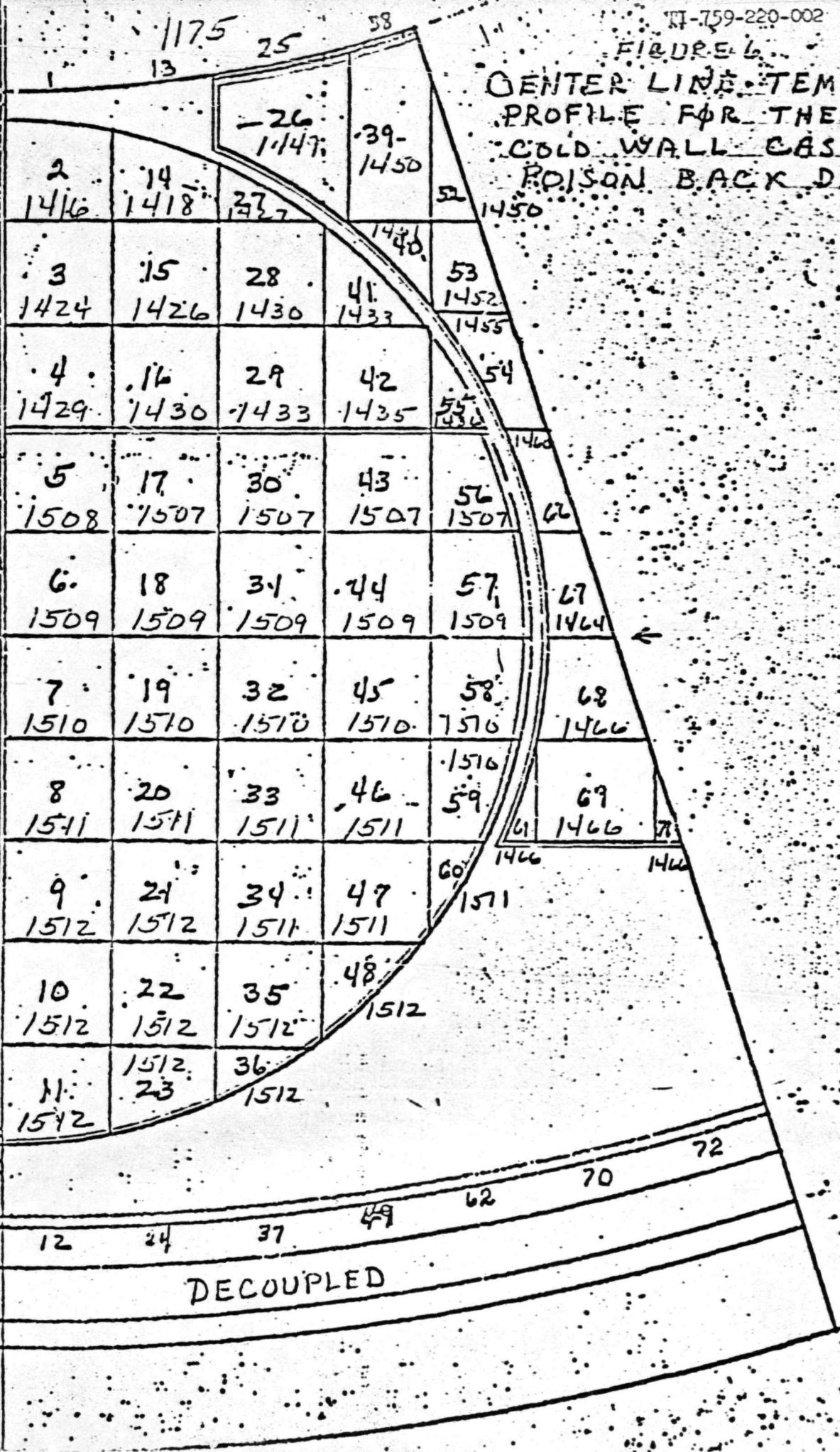
Peak 1619

Outlet End Peak 1577

FIGURE 5
CENTER LINE TEMPERATURE PROFILE FOR COLD WALL
TEMPERATURE = 1150°F
POISON BACK DRUM



CENTER LINE TEMPERATURE
PROFILE FOR THE NO
COLD WALL CASE
POISON BACK DRUM
1450



The void back study results are shown in Table 5 and Figure 7. Two cold (adiabatic) wall cases were studied for this drum. In the first the γ -shield heating was ignored, while in the second the γ -shield heating was assumed to radiate back into the drum and increase the effective drum heating.

IV. Conclusions

The results indicate that either drum configuration can be designed and operated without flowing coolant through the reflector assembly. Based on peak bearing temperatures $< 1600^{\circ}\text{F}$ and peak BeO temperatures $< 1850^{\circ}\text{F}$, the poison back drum can be used with an 1150°F (or inlet temperature) cold wall with natural emissivities; or if high emissivity coatings are provided no cold wall is required. Based on Peak Be temperatures $< 1350^{\circ}\text{F}$, the Be void back drum may be used if a 1000°F cold wall is provided.

Table 5
Control Drum and Stationary Reflector Temperatures

	Cold Wall Temperature, °F					Adiabatic Wall
	200	500	800	1000	1150	
Be Drum Void Back						Without γ shield Heating
Be Stationary Reflector						With γ shield Heating
Drum Temperature						
Peak	1162	1182	1229	1281	1315	1353
Outlet End	1155	1175	1222	1274	1309	1346
Bearing Temperature	1100	1121	1163	1222	1260	1300
Stationary Reflector						
Peak	1183	1199	1238	1281	1311	1348
Outlet End	1176	1192	1230	1274	1303	1341

43 1207	39 1207	34 1207	28 1207	21 1207	14 1207	7 1207
42 1208	38 1208	33 1208	27 1208	20 1208	13 1208	6 1208
41 1278	37 1279	32 1279	26 1279	19 1279	12 1279	5 1279
40 1279	36 1279	31 1280	25 1280	18 1280	11 1280	4 1280
35 1280	30 1280	24 1280	17 1281	10 1281	3 1281	
29 1280	23 1281	16 1281	15 1281	8 1281	2 1281	
53 1281	22 1281	15 1281				
54 1281	51 1281	50 1281				

FIGURE 7
VOID BACK DRUM
CENTER LINE TEMPERATURE
PROFILE FOR COLD WALL
TEMPERATURE = 1000°F

T-62 1175

References

1. TI-696-26-017, "Thermal Analysis of Various Control Drum Configurations," by H. Moore, October 2, 1968.
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10. AI-AEC-12876, "Test Report, Development-Emittance of Ta-10W, Emittance and Coating Adhesion of an Aluminide Coating on a Ta-10W Substrate," by G. F. Queener, August 7, 1969.
11. "Aerospace Structural Materials Handbook Vol. IIA," by Mechanical Properties Data Center.
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APPENDIX I

POISON BACK DRUM PROGRAM LISTING

ALL NEW INPUT DATA FOR THIS RUN

10000000

* 1 TITLES AND STORED COMMENTS

E.M.LARSON AI EXTENSION 1304

10000010

NETWORK TO CALCULATE DRUM AND STATIONARY REFLECTOR TEMPS.

10000020

LATEST CHANGE DATE 4/5/71

10000030

DRUM MATERIAL BEO + TA-10W + B4C

10000040

STATIONARY REFLECTOR BEO

10000050

POWER LEVEL 250 KWT

10000060

CORE AVERAGE TEMPERATURE 1175.0 DEG F

10000070

CORE INLET TEMPERATURE 1150 DEG F

10000080

TA-10W DRUM SEGMENT AND CORE VESSEL WALL EMISSIVITY =0.8

10000090

11000000

* 10

NETWORK DESCRIPTION

* NODE CONNECTIONS IN THE RADIAL DIRECTION

11000005

Y 1 Y401 0 0.0 0.0 T 1 T 2 100 100 100 RAD

11000010

Y 2 Y402 0 0.0 0.0 T 2 T 3 100 100 100

11000020

Y 3 Y403 0 0.0 0.0 T 3 T 4 100 100 100

11000030

Y 4 Y404 0 0.0 0.0 T 4 T 5 100 100 100

11000040

Y 5 Y405 0 0.0 0.0 T 5 T 6 100 100 100

11000050

Y 6 Y406 0 0.0 0.0 T 6 T 7 100 100 100

11000060

Y 7 Y407 0 0.0 0.0 T 7 T 8 100 100 100

11000070

Y 8 Y408 0 0.0 0.0 T 8 T 9 100 100 100

11000080

Y 9 Y409 0 0.0 0.0 T 9 T 10 100 100 100

11000090

Y 10 Y410 0 0.0 0.0 T 10 T 11 100 100 100

11000100

Y 11 Y411 0 0.0 0.0 T 11 T 12 100 100 100 RAD

11000110

Y 13 Y413 0 0.0 0.0 T 13 T 14 100 100 100 RAD

11000120

Y 14 Y414 0 0.0 0.0 T 14 T 15 100 100 100

11000130

Y 15 Y415 0 0.0 0.0 T 15 T 16 100 100 100

11000140

Y 16 Y416 0 0.0 0.0 T 16 T 17 100 100 100

11000150

Y 17 Y417 0 0.0 0.0 T 17 T 18 100 100 100

11000160

Y 18 Y418 0 0.0 0.0 T 18 T 19 100 100 100

11000170

Y 19 Y419 0 0.0 0.0 T 19 T 20 100 100 100

11000180

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11000190

Y 21 Y421 0 0.0 0.0 T 21 T 22 100 100 100

11000200

Y 22 Y422 0 0.0 0.0 T 22 T 23 100 100 100

11000210

Y 23 Y423 0 0.0 0.0 T 23 T 24 100 100 100 RAD

11000220

Y 25 Y425 0 0.0 0.0 T 25 T 26 100 100 100 RAD

11000230

Y 26 Y426 0 0.0 0.0 T 26 T 27 100 100 100 RAD

11000240

Y 27 Y427 0 0.0 0.0 T 27 T 28 100 100 100

11000250

Y 28 Y428 0 0.0 0.0 T 28 T 29 100 100 100

11000260

Y 29 Y429 0 0.0 0.0 T 29 T 30 100 100 100

11000270

Y 30 Y430 0 0.0 0.0 T 30 T 31 100 100 100

11000280

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Y 31	Y431	0	0.0	0.0	T 31	T 32	100	100	100	11000290
Y 32	Y432	0	0.0	0.0	T 32	T 33	100	100	100	11000300
Y 33	Y433	0	0.0	0.0	T 33	T 34	100	100	100	11000310
Y 34	Y434	0	0.0	0.0	T 34	T 35	100	100	100	11000320
Y 35	Y435	0	0.0	0.0	T 35	T 36	100	100	100	11000330
Y 36	Y436	0	0.0	0.0	T 36	T 37	100	100	100 RAD	11000340
Y 38	Y438	0	0.0	0.0	T 38	T 39	100	100	100 RAD	11000350
Y 39	Y439	0	0.0	0.0	T 39	T 40	100	100	100	11000360
Y 40	Y440	0	0.0	0.0	T 40	T 41	100	100	100 RAD	11000370
Y 41	Y441	0	0.0	0.0	T 41	T 42	100	100	100	11000380
Y 42	Y442	0	0.0	0.0	T 42	T 43	100	100	100	11000390
Y 43	Y443	0	0.0	0.0	T 43	T 44	100	100	100	11000400
Y 44	Y444	0	0.0	0.0	T 44	T 45	100	100	100	11000410
Y 45	Y445	0	0.0	0.0	T 45	T 46	100	100	100	11000420
Y 46	Y446	0	0.0	0.0	T 46	T 47	100	100	100	11000430
Y 47	Y447	0	0.0	0.0	T 47	T 48	100	100	100	11000440
Y 48	Y448	0	0.0	0.0	T 48	T 49	100	100	100 RAD	11000450
Y 52	Y452	0	0.0	0.0	T 52	T 53	100	100	100	11000480
Y 53	Y453	0	0.0	0.0	T 53	T 54	100	100	100	11000490
Y 54	Y454	0	0.0	0.0	T 54	T 55	100	100	100 RAD	11000500
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Y 59	Y459	0	0.0	0.0	T 59	T 60	100	100	100	11000550
Y 60	Y460	0	0.0	0.0	T 60	T 62	100	100	100 RAD	11000560
Y 61	Y461	0	0.0	0.0	T 61	T 62	100	100	100	11000570
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Y 67	Y467	0	0.0	0.0	T 67	T 68	100	100	100	11000620
Y 68	Y468	0	0.0	0.0	T 68	T 69	100	100	100	11000630
Y 69	Y469	0	0.0	0.0	T 69	T 70	100	100	100	11000640
Y 71	Y471	0	0.0	0.0	T 71	T 72	100	100	100	11000660
*	NODE CONNECTIONS IN THE CORE AXIAL DIRECTION									11001000
Y502	Y802	0	0.0	0.0	T 2	T 102	100	100	100	11001010
Y503	Y803	0	0.0	0.0	T 3	T 103	100	100	100	11001020
Y504	Y804	0	0.0	0.0	T 4	T 104	100	100	100	11001030
Y514	Y814	0	0.0	0.0	T 14	T 114	100	100	100	11001110
Y515	Y815	0	0.0	0.0	T 15	T 115	100	100	100	11001120
Y516	Y816	0	0.0	0.0	T 16	T 116	100	100	100	11001130
Y525	Y826	0	0.0	0.0	T 26	T 126	100	100	100	11001210
Y527	Y827	0	0.0	0.0	T 27	T 127	100	100	100	11001220
Y528	Y828	0	0.0	0.0	T 28	T 128	100	100	100	11001230

Y529	Y329	0	0.0	0.0	T 29	T129	100	100	100	11001240
Y539	Y839	0	0.0	0.0	T 39	T139	100	100	100	11001320
Y540	Y840	0	0.0	0.0	T 40	T140	100	100	100	11001330
Y541	Y841	0	0.0	0.0	T 41	T141	100	100	100	11001340
Y542	Y842	0	0.0	0.0	T 42	T142	100	100	100	11001350
Y552	Y852	0	0.0	0.0	T 52	T152	100	100	100	11001440
Y553	Y853	0	0.0	0.0	T 53	T153	100	100	100	11001450
Y554	Y854	0	0.0	0.0	T 54	T154	100	100	100	11001460
Y555	Y855	0	0.0	0.0	T 55	T155	100	100	100	11001470
Y561	Y861	0	0.0	0.0	T 61	T151	100	100	100	11001530
Y566	Y866	0	0.0	0.0	T 66	T166	100	100	100	11001570
Y567	Y867	0	0.0	0.0	T 67	T167	100	100	100	11001580
Y568	Y868	0	0.0	0.0	T 68	T168	100	100	100	11001590
Y569	Y869	0	0.0	0.0	T 69	T169	100	100	100	11001600
Y571	Y871	0	0.0	0.0	T 71	T171	100	100	100	11001620

* NODE CONNECTIONS IN THE CIRCUMFERENTIAL DIRECTION.

Y 78	Y478	0	0.0	0.0	T 2	T 14	100	100	100	11002010
Y 79	Y479	0	0.0	0.0	T 14	T 27	100	100	100	11002020
Y 80	Y490	0	0.0	0.0	T 26	T 39	100	100	100	11002030
Y 81	T481	0	0.0	0.0	T 39	T 52	100	100	100	11002040
Y 82	Y482	0	0.0	0.0	T 3	T 15	100	100	100	11002050
Y 83	Y483	0	0.0	0.0	T 15	T 28	100	100	100	11002060
Y 84	Y484	0	0.0	0.0	T 28	T 41	100	100	100	11002070
Y 85	Y485	0	0.0	0.0	T 40	T 53	100	100	100	11002080
Y 86	Y486	0	0.0	0.0	T 4	T 16	100	100	100	11002090
Y 87	Y487	0	0.0	0.0	T 16	T 29	100	100	100	11002100
Y 88	Y488	0	0.0	0.0	T 29	T 42	100	100	100	11002110
Y 89	Y489	0	0.0	0.0	T 42	T 55	100	100	100	11002120
Y 90	Y490	0	0.0	0.0	T 5	T 17	100	100	100	11002130
Y 91	Y491	0	0.0	0.0	T 17	T 30	100	100	100	11002140
Y 92	Y492	0	0.0	0.0	T 30	T 43	100	100	100	11002150
Y 93	Y493	0	0.0	0.0	T 43	T 56	100	100	100	11002160
Y 94	Y494	0	0.0	0.0	T 56	T 66	100	100	100 RAD	11002170
Y 95	Y495	0	0.0	0.0	T 6	T 18	100	100	100	11002180
Y 96	Y496	0	0.0	0.0	T 18	T 31	100	100	100	11002190
Y 97	Y497	0	0.0	0.0	T 31	T 44	100	100	100	11002200
Y 98	Y498	0	0.0	0.0	T 44	T 57	100	100	100	11002210
Y 99	Y499	0	0.0	0.0	T 57	T 67	100	100	100 RAD	11002220
Y578	Y978	0	0.0	0.0	T 7	T 19	100	100	100	11002230
Y579	Y979	0	0.0	0.0	T 19	T 32	100	100	100	11002240
Y580	Y980	0	0.0	0.0	T 32	T 45	100	100	100	11002250
Y581	Y981	0	0.0	0.0	T 45	T 58	100	100	100	11002260
Y582	Y982	0	0.0	0.0	T 58	T 69	100	100	100 RAD	11002270

Y583	Y983	0	0.0	0.0	T 8	T 20	100	100	100	11002380
Y584	Y984	0	0.0	0.0	T 20	T 33	100	100	100	11002390
Y585	Y985	0	0.0	0.0	T 33	T 46	100	100	100	11002390
Y586	Y986	0	0.0	0.0	T 46	T 59	100	100	100	11002390
Y587	Y987	0	0.0	0.0	T 59	T 61	100	100	100 RAD	11002390
Y588	Y988	0	0.0	0.0	T 61	T 69	100	100	100	11002390
Y589	Y989	0	0.0	0.0	T 69	T 71	100	100	100	11002390
Y590	Y990	0	0.0	0.0	T 9	T 21	100	100	100	11002390
Y591	Y991	0	0.0	0.0	T 21	T 34	100	100	100	11002390
Y592	Y992	0	0.0	0.0	T 34	T 47	100	100	100	11002390
Y593	Y993	0	0.0	0.0	T 47	T 60	100	100	100	11002390
Y596	Y996	0	0.0	0.0	T 10	T 22	100	100	100	11002410
Y597	Y997	0	0.0	0.0	T 22	T 35	100	100	100	11002420
Y598	Y998	0	0.0	0.0	T 35	T 48	100	100	100	11002430
Y 37	Y437	0	0.0	0.0	T 11	T 23	100	100	100	11002470
Y 51	Y451	0	0.0	0.0	T 23	T 36	100	100	100	11002480
* 20										12003000

INPUT PARAMETERS AND INIT. TEMPS

SETTING INITIAL TEMPERATURES

CORE HEAT SINK TEMPERATURES

*										12000010
*										12000020
T 1	0	-1	1.17500E 03	0.0	0	0	0	0	1	CORE C/L
T 13	0	-1	1.17500E 03	0.0	0	0	0	0	1	12000030
T 25	0	-1	1.17500E 03	0.0	0	0	0	0	1	12000040
T 38	0	-1	1.17500E 03	0.0	0	0	0	0	1	12000050
T101	0	-1	1.18050E 03	0.0	0	0	0	0	1	12000060
T113	0	-1	1.18050E 03	0.0	0	0	0	0	1	12000070
T125	0	-1	1.18050E 03	0.0	0	0	0	0	1	12000080
T138	0	-1	1.18050E 03	0.0	0	0	0	0	1	12000090
T201	0	-1	1.18610E 03	0.0	0	0	0	0	1	12000100
T213	0	-1	1.18610E 03	0.0	0	0	0	0	1	12000110
T225	0	-1	1.18610E 03	0.0	0	0	0	0	1	12000120
T238	0	-1	1.18610E 03	0.0	0	0	0	0	1	12000130
T301	0	-1	1.19160E 03	0.0	0	0	0	0	1	12000140
T313	0	-1	1.19160E 03	0.0	0	0	0	0	1	12000150
T325	0	-1	1.19160E 03	0.0	0	0	0	0	1	12000160
T338	0	-1	1.19160E 03	0.0	0	0	0	0	1	12000170
T401	0	-1	1.19720E 03	0.0	0	0	0	0	1	12000180
T413	0	-1	1.19720E 03	0.0	0	0	0	0	1	12000190
T425	0	-1	1.19720E 03	0.0	0	0	0	0	1	12000200
T438	0	-1	1.19720E 03	0.0	0	0	0	0	1	12000210
*										12000220
*										12000300
T 12	T412	-1	1.15000E 03	0.0	0	0	0	0	100	CORE IN +10DEG F
T 24	T424	-1	1.15000E 03	0.0	0	0	0	0	100	12000310
										12000320

COLD WALL HEAT SINK TEMPERATURES

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T 37	T 37	-1	1.15000E 03	0.0	0	0	0	0	100	12000330
T 49	T 49	-1	1.15000E 03	0.0	0	0	0	0	100	12000340
T 62	T 62	-1	1.15000E 03	0.0	0	0	0	0	100	12000350
T 70	T 70	-1	1.15000E 03	0.0	0	0	0	0	100	12000360
T 72	T 72	-1	1.15000E 03	0.0	0	0	0	0	100	12000370

* SETTING INITIAL DPU M TEMPERATURES

T 2	T 11	0	1.45000E 03	0.0	0	0	0	0	1	12000500
T102	T111	0	1.45000E 03	0.0	0	0	0	0	1	12000510
T202	T211	0	1.45000E 03	0.0	0	0	0	0	1	12000520
T302	T311	0	1.45000E 03	0.0	0	0	0	0	1	12000530
T402	T411	0	1.45000E 03	0.0	0	0	0	0	1	12000540

*										12000550
T 14	T 23	0	1.45000E 03	0.0	0	0	0	0	1	12000555
T114	T123	0	1.45000E 03	0.0	0	0	0	0	1	12000560
T214	T223	0	1.45000E 03	0.0	0	0	0	0	1	12000570
T314	T323	0	1.45000E 03	0.0	0	0	0	0	1	12000580
T414	T423	0	1.45000E 03	0.0	0	0	0	0	1	12000590

*										12000600
T 27	T 36	0	1.45000E 03	0.0	0	0	0	0	1	12000610
T127	T136	0	1.45000E 03	0.0	0	0	0	0	1	12000620
T227	T236	0	1.45000E 03	0.0	0	0	0	0	1	12000630
T327	T336	0	1.45000E 03	0.0	0	0	0	0	1	12000640
T427	T436	0	1.45000E 03	0.0	0	0	0	0	1	12000650

*										12000660
T 41	T 48	0	1.45000E 03	0.0	0	0	0	0	1	12000663
T141	T148	0	1.45000E 03	0.0	0	0	0	0	1	12000665
T241	T248	0	1.45000E 03	0.0	0	0	0	0	1	12000670
T341	T348	0	1.45000E 03	0.0	0	0	0	0	1	12000680
T441	T448	0	1.45000E 03	0.0	0	0	0	0	1	12000690

*										12000700
T 55	T 60	0	1.45000E 03	0.0	0	0	0	0	1	12000710
T155	T160	0	1.45000E 03	0.0	0	0	0	0	1	12000720
T255	T260	0	1.45000E 03	0.0	0	0	0	0	1	12000730
T355	T360	0	1.45000E 03	0.0	0	0	0	0	1	12000740
T455	T460	0	1.45000E 03	0.0	0	0	0	0	1	12000750

*										12000760
*										12000770
*										12000780

* SETTING INNER STATIONARY REFLECTOR TEMPERATURES

T 26	0	0	1.40000E 03	0.0	0	0	0	0	1	12000910
T126	0	0	1.40000E 03	0.0	0	0	0	0	1	12000920
T226	0	0	1.40000E 03	0.0	0	0	0	0	1	12000930
T326	0	0	1.40000E 03	0.0	0	0	0	0	1	12000940
T426	0	0	1.40000E 03	0.0	0	0	0	0	1	12000950

*										12000960
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T 39	T 40	0	1.40000E 03	0.0	0	0	0	0	1	12010970
T139	T140	0	1.40000E 03	0.0	0	0	0	0	1	12000780
T239	T240	0	1.40000E 03	0.0	0	0	0	0	1	12000790
T339	T340	0	1.40000E 03	0.0	0	0	0	0	1	12001000
T439	T440	0	1.40000E 03	0.0	0	0	0	0	1	12001010
*										12001020
T 52	T 54	0	1.40000E 03	0.0	0	0	0	0	1	12001030
T152	T154	0	1.40000E 03	0.0	0	0	0	0	1	12001040
T252	T254	0	1.40000E 03	0.0	0	0	0	0	1	12001050
T352	T354	0	1.40000E 03	0.0	0	0	0	0	1	12001060
T452	T454	0	1.40000E 03	0.0	0	0	0	0	1	12001070
*										12001160
T 61	T 71	0	1.37500E 03	0.0	0	0	0	0	10	12001170
T161	T171	0	1.37500E 03	0.0	0	0	0	0	10	12001180
T261	T271	0	1.37500E 03	0.0	0	0	0	0	10	12001190
T361	T371	0	1.37500E 03	0.0	0	0	0	0	10	12001200
T461	T471	0	1.37500E 03	0.0	0	0	0	0	10	12001210
*										12001220
T 66	T 69	0	1.37500E 03	0.0	0	0	0	0	1	12001230
T166	T169	0	1.37500E 03	0.0	0	0	0	0	1	12001240
T266	T269	0	1.37500E 03	0.0	0	0	0	0	1	12001250
T366	T369	0	1.37500E 03	0.0	0	0	0	0	1	12001260
T466	T469	0	1.37500E 03	0.0	0	0	0	0	1	12001270
*										12001280
*										12010000
*	DUMMIES TO HOLD EFFECTIVE EMISSIVITY					17E+17E-1				12010010
D981	0	0	6.67000E-01	0.0	0	0	0	0	1	CORE VES-TA-1OW 12010020
D982	0	0	1.28000E-01	0.0	0	0	0	0	1	CORE VES-ST.A.BED 12010030
D983	0	0	1.01000E-01	0.0	0	0	0	0	1	COLD WALL-BED DR 12010040
D984	0	0	1.01000E-01	0.0	0	0	0	0	1	COLD WALL-ST.BED 12010050
D985	0	0	1.28000E-01	0.0	0	0	0	0	1	TA-1OW DR-ST.BED 12010053
D987	0	0	7.07000E-02	0.0	0	0	0	0	1	BED DR-STAT.BED 12010055
D986	0	0	3.23000E-01	0.0	0	0	0	0	1	TA-1OW TO BED 12010061
*	MATERIAL CONDUCTIVITY									12010065
D990	0	0	1.90000E 01	0.0	0	0	0	0	1	K DRUM BED 1500F 12010070
*	NOT USED IN THIS MODEL AS YET ALL DRUM USES K FOR BED									12010073
D992	0	0	3.60000E 01	0.0	0	0	0	0	1	K TA-1OW 1500F 12010075
D991	0	0	1.90000E 01	0.0	0	0	0	0	1	K ST.REF.BED 1500 12010080
D995	0	0	4.17000E-01	0.0	0	0	0	0	1	PTHIS RUN/600KWT 12010090
*	DUMMIES TO HOLD NODE VOLUME					CUBIC INCHES				12010100
*	DUMMY VOLUMES ARE BASED ON A 1 INCH HIGH NODE									12010105
*	ASSUME ALL NODES ARE SQUARE AND EQUAL									12010110
D992	D960	0	2.50000E-01	0.0	0	0	0	0	1	12010120

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* NOW CHANGE THOSE NODES THAT ARE NOT EQUAL

12010130

* DUM NODS

12010140

D902	0	0	2.30000E-01	0.0	0	0	0	0	1	12010150
D911	0	0	2.30000E-01	0.0	0	0	0	0	1	12010160
D914	0	0	1.75000E-01	0.0	0	0	0	0	1	12010170
D923	0	0	1.75000E-01	0.0	0	0	0	0	1	12010180
D927	0	0	6.50000E-02	0.0	0	0	0	0	1	12010190
D936	0	0	6.50000E-02	0.0	0	0	0	0	1	12010200
D941	0	0	1.20000E-01	0.0	0	0	0	0	1	12010210
D948	0	0	1.20000E-01	0.0	0	0	0	0	1	12010220
D955	0	0	6.50000E-02	0.0	0	0	0	0	1	12010230
D960	0	0	6.50000E-02	0.0	0	0	0	0	1	12010240
D956	0	0	1.75000E-01	0.0	0	0	0	0	1	12010250
D959	0	0	1.75000E-01	0.0	0	0	0	0	1	12010260
D957 D958	0	0	2.30000E-01	0.0	0	0	0	0	1	12010270
*			INNER STATIONARY REFLECTOR							12010300
D926	0	0	3.36000E-01	0.0	0	0	0	0	1	12010310
D939	0	0	3.18000E-01	0.0	0	0	0	0	1	12010320
D952	0	0	7.70999E-02	0.0	0	0	0	0	1	12010330
D940	0	0	7.00000E-02	0.0	0	0	0	0	1	12010340
D953	0	0	1.13000E-01	0.0	0	0	0	0	1	12010350
D954	0	0	1.29000E-01	0.0	0	0	0	0	1	12010360
D961	0	0	3.10000E-02	0.0	0	0	0	0	1	12010430
D966	0	0	9.40000E-02	0.0	0	0	0	0	1	12010470
D967	0	0	1.21000E-01	0.0	0	0	0	0	1	12010480
D968	0	0	2.07000E-01	0.0	0	0	0	0	1	12010490
D969	0	0	2.78000E-01	0.0	0	0	0	0	1	12010495
D971	0	0	2.30000E-02	0.0	0	0	0	0	1	12010510

* DUMMIES TO HOLD PER UNIT VOLUME HEAT GENERATION RATES

12020000

* SET ALL HEAT GENERATION RATES TO ZERO

12020002

D 1 D 62 D 0 0.0 0.0 0 0 0 0 1

12020005

* SET ALL HEAT GENERATION RATES BUT THOSE FOR THE CORE

12020007

* VESSEL WALL AND THE COLD WALL

12020008

D 2	0	0	3.25000E 01	0.0	0	0	0	0	1	12020010
D 3	0	0	2.13000E 01	0.0	0	0	0	0	1	12020020
D 4	0	0	1.57000E 01	0.0	0	0	0	0	1	12020030
D 5	0	0	1.22000E 01	0.0	0	0	0	0	1	12020040
D 6	0	0	6.40000E 00	0.0	0	0	0	0	1	12020050
D 7	0	0	5.25000E 00	0.0	0	0	0	0	1	12020060
D 8	0	0	4.30000E 00	0.0	0	0	0	0	1	12020070
D 9	0	0	3.60000E 00	0.0	0	0	0	0	1	12020080
D 10	0	0	3.05000E 00	0.0	0	0	0	0	1	12020090
D 11	0	0	2.53000E 00	0.0	0	0	0	0	1	12020100

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D 14	0	0	2.90000E 01	0.0	0	0	0	0	1	12020110
D 15	0	0	2.11000E 01	0.0	0	0	0	0	1	12020120
D 16	0	0	1.55000E 01	0.0	0	0	0	0	1	12020130
D 17	0	0	1.22000E 01	0.0	0	0	0	0	1	12020140
D 18	0	0	6.40000E 00	0.0	0	0	0	0	1	12020150
D 19	0	0	5.20000E 00	0.0	0	0	0	0	1	12020160
D 20	0	0	4.30000E 00	0.0	0	0	0	0	1	12020170
D 21	0	0	3.60000E 00	0.0	0	0	0	0	1	12020180
D 22	0	0	3.00000E 00	0.0	0	0	0	0	1	12020190
D 23	0	0	2.62000E 00	0.0	0	0	0	0	1	12020200
D 26	0	0	1.79000E 01	0.0	0	0	0	0	1	12020210
D 27	0	0	2.55000E 01	0.0	0	0	0	0	1	12020220
D 28	0	0	2.05000E 01	0.0	0	0	0	0	1	12020230
D 29	0	0	1.50000E 01	0.0	0	0	0	0	1	12020240
D 30	0	0	1.16000E 01	0.0	0	0	0	0	1	12020250
D 31	0	0	6.10000E 00	0.0	0	0	0	0	1	12020260
D 32	0	0	5.08000E 00	0.0	0	0	0	0	1	12020270
D 33	0	0	4.20000E 00	0.0	0	0	0	0	1	12020280
D 34	0	0	3.50000E 00	0.0	0	0	0	0	1	12020290
D 35	0	0	2.92000E 00	0.0	0	0	0	0	1	12020300
D 36	0	0	2.65000E 00	0.0	0	0	0	0	1	12020310
D 39	0	0	1.65000E 01	0.0	0	0	0	0	1	12020320
D 40	0	0	1.23000E 01	0.0	0	0	0	0	1	12020330
D 41	0	0	1.86000E 01	0.0	0	0	0	0	1	12020340
D 42	0	0	1.43000E 01	0.0	0	0	0	0	1	12020350
D 43	0	0	7.40000E 00	0.0	0	0	0	0	1	12020360
D 44	0	0	6.00000E 00	0.0	0	0	0	0	1	12020370
D 45	0	0	5.00000E 00	0.0	0	0	0	0	1	12020380
D 46	0	0	4.10000E 00	0.0	0	0	0	0	1	12020390
D 47	0	0	3.50000E 00	0.0	0	0	0	0	1	12020400
D 48	0	0	3.00000E 00	0.0	0	0	0	0	1	12020410
D 52	0	0	1.74000E 01	0.0	0	0	0	0	1	12020440
D 53	0	0	1.11000E 01	0.0	0	0	0	0	1	12020450
D 54	0	0	8.85000E 00	0.0	0	0	0	0	1	12020460
D 55	0	0	8.30000E 00	0.0	0	0	0	0	1	12020470
D 55	0	0	1.27000E 01	0.0	0	0	0	0	1	STAT. REFL 12020470
D 56	0	0	7.10000E 00	0.0	0	0	0	0	1	12020480
D 57	0	0	5.70000E 00	0.0	0	0	0	0	1	12020490
D 58	0	0	3.12500E 00	0.0	0	0	0	0	1	12020500
D 59	0	0	4.00000E 00	0.0	0	0	0	0	1	12020510
D 60	0	0	3.55000E 00	0.0	0	0	0	0	1	12020520
D 61	0	0	3.65000E 00	0.0	0	0	0	0	1	THE BALANCE OF 12020530
D 66	0	0	6.30000E 00	0.0	0	0	0	0	1	12020570

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D 67	0	0	5.45000E 00	0.0	0	0	0	0	1	1202580
D 68	0	0	4.40000E 00	0.0	0	0	0	0	1	12020590
D 69	0	0	3.75000E 00	0.0	0	0	0	0	1	12020600
D 71	0	0	3.50000E 00	0.0	0	0	0	0	1	12020620
* 30										13000000

FUNCTION STATEMENTS

*					NODE ADMITTANCES IN THE RADIAL DIRECTION					13000005
Y 1	Y401	49	0.0		1.00000E 00	0 0981	0	0	100 RAD	13000010
Y 2	Y402	101	0.0		1.67000E-01	0990	0	0	100	13000020
Y 3	Y403	101	0.0		1.67000E-01	0990	0	0	100	13000030
Y 4	Y404	49	0.0		1.00000E 00	0 0986	0	0	100 RAD	13000040
Y 5	Y405	101	0.0		1.67000E-01	0990	0	0	100	13000050
Y 6	Y406	101	0.0		1.67000E-01	0990	0	0	100	13000060
Y 7	Y407	101	0.0		1.67000E-01	0990	0	0	100	13000070
Y 8	Y408	101	0.0		1.67000E-01	0990	0	0	100	13000080
Y 9	Y409	101	0.0		1.67000E-01	0990	0	0	100	13000090
Y 10	Y410	101	0.0		1.67000E-01	0990	0	0	100	13000100
Y 11	Y411	49	0.0		1.00000E 00	0 0983	0	0	100 RAD	13000110
Y 13	Y413	49	0.0		1.00000E 00	0 0981	0	0	100 RAD	13000120
Y 14	Y414	101	0.0		1.67000E-01	0990	0	0	100	13000130
Y 15	Y415	101	0.0		1.67000E-01	0990	0	0	100	13000140
Y 16	Y416	49	0.0		1.00000E 00	0 0986	0	0	100	13000150
Y 17	Y417	101	0.0		1.67000E-01	0990	0	0	100	13000160
Y 18	Y418	101	0.0		1.67000E-01	0990	0	0	100	13000170
Y 19	Y419	101	0.0		1.67000E-01	0990	0	0	100	13000180
Y 20	Y420	101	0.0		1.67000E-01	0990	0	0	100	13000190
Y 21	Y421	101	0.0		1.67000E-01	0990	0	0	100	13000200
Y 22	Y422	101	0.0		1.67000E-01	0990	0	0	100	13000210
Y 23	Y423	49	0.0		1.00000E 00	0 0983	0	0	100 RAD	13000220
Y 25	Y425	49	0.0		1.25000E 00	0 0982	0	0	100 RAD	13000230
Y 26	Y426	49	0.0		1.12500E 00	0 0985	0	0	100 RAD	13000240
Y 27	Y427	101	0.0		2.57000E-01	0990	0	0	100	13000250
Y 28	Y428	101	0.0		1.67000E-01	0990	0	0	100	13000260
Y 29	Y429	49	0.0		1.00000E 00	0 0986	0	0	100	13000270
Y 30	Y430	101	0.0		1.67000E-01	0990	0	0	100	13000280
Y 31	Y431	101	0.0		1.67000E-01	0990	0	0	100	13000290
Y 32	Y432	101	0.0		1.67000E-01	0990	0	0	100	13000300
Y 33	Y433	101	0.0		1.67000E-01	0990	0	0	100	13000310
Y 34	Y434	101	0.0		1.67000E-01	0990	0	0	100	13000320
Y 35	Y435	101	0.0		2.57000E-01	0990	0	0	100	13000330
Y 36	Y436	49	0.0		1.00000E 00	0 0983	0	0	100 RAD	13000340
Y 38	Y438	49	0.0		6.38000E-01	0 0982	0	0	100 RAD	13000350
Y 39	Y439	101	0.0		1.25000E-01	0991	0	0	100	13000360

Y 40	Y440	49	0.0	1.37500E 00	0 0985	0	0	100 RAD	13000370
Y 41	Y441	101	0.0	2.23000E-01	0990	0	0	100	13000380
Y 42	Y422	49	0.0	1.00000E 00	0 0986	0	0	100	13000390
Y 43	Y443	101	0.0	1.67000E-01	0990	0	0	100	13000400
Y 44	Y444	101	0.0	1.67000E-01	0990	0	0	100	13000410
Y 45	Y445	101	0.0	1.67000E-01	0990	0	0	100	13000420
Y 46	Y446	101	0.0	1.67000E-01	0990	0	0	100	13000430
Y 47	Y447	101	0.0	2.23000E-01	0990	0	0	100	13000440
Y 48	Y448	49	0.0	1.37500E 00	0 0985	0	0	100 RAD	13000450
Y 52	Y452	101	0.0	1.00000E-01	0991	0	0	100	13000480
Y 53	Y453	101	0.0	1.25000E-01	0991	0	0	100	13000490
Y 54	Y454	49	0.0	1.12500E 00	0 0985	0	0	100 RAD	13000500
Y 55	Y455	49	0.0	5.00000E-01	0 0986	0	0	100	13000510
Y 56	Y456	101	0.0	1.46000E-01	0990	0	0	100	13000520
Y 57	Y457	101	0.0	1.57000E-01	0990	0	0	100	13000530
Y 58	Y458	101	0.0	1.46000E-01	0990	0	0	100	13000540
Y 59	Y459	101	0.0	1.11000E-01	0990	0	0	100	13000550
Y 60	Y460	49	0.0	1.12500E 00	0 0985	0	0	100 RAD	13000560
Y 61	Y461	49	0.0	3.05000E-01	0 0985	0	0	100 RAD	13000570
Y 66	Y466	101	0.0	6.30000E-02	0991	0	0	100	13000510
Y 67	Y467	101	0.0	1.04000E-01	0991	0	0	100	13000620
Y 68	Y468	101	0.0	1.77000E-01	0991	0	0	100	13000630
Y 64	Y464	101	0.0	5.90000E-02	0991	0	0	100	13000550
Y 69	Y469	49	0.0	1.12500E 00	0 0984	0	0	100 RAD	13000670
Y 71	Y471	49	0.0	1.06000E 00	0 0984	0	0	100 RAD	13000710
*	NODE ADMITTANCES IN THE CORE AXIAL DIRECTION								13000700
Y502	Y802	101	0.0	9.60000E-03	0990	0	0	0 100	13001010
Y503	Y803	101	0.0	1.04000E-02	0990	0	0	0 100	13001020
Y504	Y804	101	0.0	1.04000E-02	0990	0	0	0 100	13001030
Y514	Y814	101	0.0	7.30000E-03	0990	0	0	0 100	13001110
Y515	Y815	101	0.0	1.04000E-02	0990	0	0	0 100	13001120
Y516	Y816	101	0.0	1.04000E-02	0990	0	0	0 100	13001130
Y526	Y826	101	0.0	1.40000E-02	0991	0	0	0 100	13001210
Y527	Y827	101	0.0	2.70000E-03	0990	0	0	0 100	13001220
Y528	Y828	101	0.0	1.04000E-02	0990	0	0	0 100	13001230
Y529	Y829	101	0.0	1.04000E-02	0990	0	0	0 100	13001240
Y539	Y839	101	0.0	1.32000E-02	0991	0	0	0 100	13001320
Y540	Y840	101	0.0	2.90000E-03	0991	0	0	0 100	13001330
Y541	Y841	101	0.0	5.00000E-03	0990	0	0	0 100	13001340
Y542	Y842	101	0.0	1.04000E-02	0990	0	0	0 100	13001350
Y552	Y852	101	0.0	3.20000E-03	0991	0	0	0 100	13001460
Y553	Y853	101	0.0	4.70000E-03	0991	0	0	0 100	13001450
Y554	Y854	101	0.0	5.40000E-03	0991	0	0	0 100	13001460

Y555	Y555	101	0.0	2.70000E-03	D990	0	0	0	100	13001470
Y561	Y561	101	0.0	1.30000E-03	D991	0	0	0	100	13001530
Y566	Y566	101	0.0	3.40000E-03	D991	0	0	0	100	13001573
Y567	Y567	101	0.0	5.00000E-03	D991	0	0	0	100	13001580
Y568	Y568	101	0.0	8.60000E-03	D991	0	0	0	100	13001590
Y569	Y569	101	0.0	1.16000E-02	D991	0	0	0	100	13001600
Y571	Y571	101	0.0	1.00000E-03	D991	0	0	0	100	13001620
* VODE ADMITTANCES IN THE CIRCUMFERENTIAL DIRECTION										
Y 78	Y478	101	0.0	1.46000E-01	D990	0	0	0	100	13002010
Y 79	Y479	101	0.0	8.33000E-02	D990	0	0	0	100	13002020
Y 80	Y480	101	0.0	2.70000E-01	D991	0	0	0	100	13002030
Y 81	Y481	101	0.0	4.60000E-01	D991	0	0	0	100	13002040
Y 82	Y482	101	0.0	1.67000E-01	D990	0	0	0	100	13002050
Y 83	Y483	101	0.0	1.67000E-01	D990	0	0	0	100	13002060
Y 84	Y484	101	0.0	2.23000E-01	D990	0	0	0	100	13002070
Y 85	Y485	101	0.0	2.92000E-01	D991	0	0	0	100	13002080
Y 86	Y486	101	0.0	1.67000E-01	D990	0	0	0	100	13002090
Y 87	Y487	101	0.0	1.67000E-01	D990	0	0	0	100	13002100
Y 88	Y488	101	0.0	1.67000E-01	D990	0	0	0	100	13002110
Y 89	Y489	101	0.0	2.57000E-01	D990	0	0	0	100	13002120
Y 90	Y490	101	0.0	1.67000E-01	D990	0	0	0	100	13002130
Y 91	Y491	101	0.0	1.67000E-01	D990	0	0	0	100	13002140
Y 92	Y492	101	0.0	1.67000E-01	D990	0	0	0	100	13002150
Y 93	Y493	101	0.0	1.91000E-01	D990	0	0	0	100	13002160
Y 94	Y494	49	0.0	1.00000E 00	0 D987	0	0	100	RAD	13002170
Y 95	Y495	101	0.0	1.67000E-01	D990	0	0	0	100	13002180
Y 96	Y496	101	0.0	1.67000E-01	D990	0	0	0	100	13002190
Y 97	Y497	101	0.0	1.67000E-01	D990	0	0	0	100	13002200
Y 98	Y498	101	0.0	1.73000E-01	D990	0	0	0	100	13002210
Y 99	Y499	49	0.0	1.00000E 00	0 D987	0	0	100	RAD	13002220
Y578	Y978	101	0.0	1.67000E-01	D990	0	0	0	100	13002230
Y579	Y979	101	0.0	1.67000E-01	D990	0	0	0	100	13002240
Y580	Y980	101	0.0	1.67000E-01	D990	0	0	0	100	13002250
Y581	Y981	101	0.0	1.73000E-01	D990	0	0	0	100	13002260
Y582	Y982	49	0.0	1.00000E 00	0 D987	0	0	100	RAD	13002270
Y583	Y983	101	0.0	1.67000E-01	D990	0	0	0	100	13002280
Y584	Y984	101	0.0	1.67000E-01	D990	0	0	0	100	13002290
Y585	Y985	101	0.0	1.67000E-01	D990	0	0	0	100	13002300
Y586	Y986	101	0.0	1.91000E-01	D990	0	0	0	100	13002310
Y587	Y987	49	0.0	1.06000E 00	0 D987	0	0	100	RAD	13002320
Y588	Y988	101	0.0	3.33000E-01	D991	0	0	0	100	13002330
Y589	Y989	101	0.0	3.33000E-01	D991	0	0	0	100	13002340
Y590	Y990	101	0.0	1.67000E-01	D990	0	0	0	100	13002350

Y591	101	0.0	1.67000E-01	D990	0	0	0	100	1300	
Y592	Y992	101	0.0	1.67000E-01	D990	0	0	0	100	13002370
Y593	Y993	101	0.0	2.57000E-01	D990	0	0	0	100	13002380
Y596	Y996	101	0.0	1.67000E-01	D990	0	0	0	100	13002410
Y597	Y997	101	0.0	1.67000E-01	D990	0	0	0	100	13002420
Y598	Y998	101	0.0	2.23000E-01	D990	0	0	0	100	13002430
Y 37	Y437	101	0.0	1.46000E-01	D990	0	0	0	100	13002470
Y 51	Y451	101	0.0	8.33000E-02	D990	0	0	0	100	13002480

* MULTIPLY HEAT GENERATION RATE TIMES VOLUME

D202	D271	152	0.0	2.00000E 00	D 2 D902	1	1	1	GETS BIN N DE	13050000
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* NOW MULTIPLY BY AXIAL PROFILE: ENTER RATIO OF POWER LEVEL

* TO 600 KWT AS DUMMY D945

Q 2 Q 71	152	0.0	1.38300E 00	D202 D995	1	0	1	1	13050040
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Q102	Q171	152	0.0	1.32500E 00	D202 D995	1	0	1	AXIAL FLUX PROF.	13050050
------	------	-----	-----	-------------	-----------	---	---	---	------------------	----------

Q202	Q271	152	0.0	1.14000E 00	D202 D995	1	0	1	13050060
------	------	-----	-----	-------------	-----------	---	---	---	----------

Q302	Q371	152	0.0	8.58000E-01	D202 D995	1	0	1	13050070
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Q402	Q471	152	0.0	5.05000E-01	D202 D995	1	0	1	13050080
------	------	-----	-----	-------------	-----------	---	---	---	----------

* 70									17000000
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CONTROL CONSTANTS

4			1.00000E-02	CONVERGENCE TEST ON RATE OF TEMPERATURE CHANGE	17000010
---	--	--	-------------	--	----------

5			1.00000E 00	0. = TRANSIENT; +1. = STEADY STATE; >1. = AITKEN	17000020
---	--	--	-------------	--	----------

6			1.00000E 00	+1. = DUMP DYTQ AT END OF CASE; >1. = AITKEN	17000030
---	--	--	-------------	--	----------

9			1.18950E-11	STEFAN-BOLTZMANN CONSTANT	17000040
---	--	--	-------------	---------------------------	----------

* 80									19000000
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PRINT-OUT SPECIFICATIONS

T 1	T472	0	0.0	0.0	0	0	0	0	1	18000010
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* 90										19000000
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PRINT-OUT AND STOP TIMES

0	0	0	0.0	2.50000E 03	0	0	0	0	1	19000010
---	---	---	-----	-------------	---	---	---	---	---	----------

0	0	0	1.48000E 04	5.00000E 01	0	0	0	0	1	19000020
---	---	---	-------------	-------------	---	---	---	---	---	----------

0	0	0	1.50000E 04	0.0	0	0	0	0	1	19000030
---	---	---	-------------	-----	---	---	---	---	---	----------

* 96										19600000
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North American Rockwell**

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APPENDIX II

VOID BACK DRUM PROGRAM LISTING

ALL NEW INPUT DATA FOR THIS RUN

* 1 10000000

TITLES AND STORED COMMENTS

E.M.LARSON AT EXTENSION 1304

10000010

NETWORK TO CALCULATE DRUM AND STATIONARY REFLECTOR TEMPS.

10000020

LATEST CHANGE DATE 4/2/71

10000030

DRUM MATERIAL BE VOID BACK

10000040

STATIONARY REFLECTOR BE

10000050

POWER LEVEL 250 KWT

10000060

CORE AVERAGE TEMPERATURE 1175 DEG F

10000070

HEAT SINK TEMPERATURE 1000 DEG F

10000080

11000000

* 10

NETWORK DESCRIPTION

* NODE CONNECTIONS IN THE RADIAL DIRECTION

11000005

Y 1 Y401 0 0.0 0.0 T 1 T 2 100 100 100 RAD

11000010

Y 2 Y402 0 0.0 0.0 T 2 T 3 100 100 100

11000020

Y 3 Y403 0 0.0 0.0 T 3 T 4 100 100 100

11000030

Y 4 Y404 0 0.0 0.0 T 4 T 5 100 100 100

11000040

Y 5 Y405 0 0.0 0.0 T 5 T 6 100 100 100

11000050

Y 6 Y406 0 0.0 0.0 T 6 T 7 100 100 100

11000060

Y 7 Y407 0 0.0 0.0 T 7 T 60 100 100 100

11000070

Y 8 Y408 0 0.0 0.0 T 8 T 9 100 100 100

11000080

Y 9 Y409 0 0.0 0.0 T 9 T 10 100 100 100

11000090

Y 10 Y410 0 0.0 0.0 T 10 T 11 100 100 100

11000100

Y 11 Y411 0 0.0 0.0 T 11 T 12 100 100 100 RAD

11000110

Y 12 Y412 0 0.0 0.0 T 12 T 13 100 100 100

11000115

Y 13 Y413 0 0.0 0.0 T 13 T 14 100 100 100 RAD

11000120

Y 14 Y414 0 0.0 0.0 T 14 T 60 100 100 100

11000130

Y 15 Y415 0 0.0 0.0 T 15 T 16 100 100 100

11000140

Y 16 Y416 0 0.0 0.0 T 16 T 17 100 100 100

11000150

Y 17 Y417 0 0.0 0.0 T 17 T 18 100 100 100

11000160

Y 18 Y418 0 0.0 0.0 T 18 T 19 100 100 100

11000170

Y 19 Y419 0 0.0 0.0 T 19 T 20 100 100 100

11000180

Y 20 Y420 0 0.0 0.0 T 20 T 21 100 100 100

11000190

Y 21 Y421 0 0.0 0.0 T 21 T 60 100 100 100

11000200

Y 22 Y422 0 0.0 0.0 T 22 T 23 100 100 100

11000210

Y 23 Y423 0 0.0 0.0 T 23 T 24 100 100 100 RAD

11000220

Y 24 Y424 0 0.0 0.0 T 24 T 25 100 100 100

11000225

Y 25 Y425 0 0.0 0.0 T 25 T 26 100 100 100 RAD

11000230

Y 26 Y426 0 0.0 0.0 T 26 T 27 100 100 100 RAD

11000240

Y 27 Y427 0 0.0 0.0 T 27 T 28 100 100 100

11000250

Y 28 Y428 0 0.0 0.0 T 28 T 60 100 100 100

11000260

Y 29 Y429 0 0.0 0.0 T 29 T 30 100 100 100

11000270

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Y 30	Y 30	0	0.0	0.0	T 30	T 31	100	100	100		11000230
Y 31	Y 431	0	0.0	0.0	T 31	T 32	100	100	100		11000290
Y 32	Y 432	0	0.0	0.0	T 32	T 33	100	100	100		11000300
Y 33	Y 433	0	0.0	0.0	T 33	T 34	100	100	100		11000310
Y 34	Y 434	0	0.0	0.0	T 34	T 60	100	100	100		11000320
Y 35	Y 435	0	0.0	0.0	T 35	T 36	100	100	100		11000330
Y 36	Y 436	0	0.0	0.0	T 36	T 37	100	100	100 RAD		11000340
Y 37	Y 437	0	0.0	0.0	T 37	T 38	100	100	100		11000345
Y 38	Y 438	0	0.0	0.0	T 38	T 39	100	100	100 RAD		11000350
Y 39	Y 439	0	0.0	0.0	T 39	T 60	100	100	100		11000360
Y 40	Y 440	0	0.0	0.0	T 40	T 41	100	100	100 RAD		11000370
Y 41	Y 441	0	0.0	0.0	T 41	T 42	100	100	100		11000380
Y 42	Y 442	0	0.0	0.0	T 42	T 43	100	100	100		11000390
Y 43	Y 443	0	0.0	0.0	T 43	T 60	100	100	100		11000400
Y 51	Y 451	0	0.0	0.0	T 51	T 52	100	100	100		11000475
Y 52	Y 452	0	0.0	0.0	T 52	T 53	100	100	100		11000490
Y 54	Y 454	0	0.0	0.0	T 54	T 55	100	100	100 RAD		11000500
Y 55	Y 455	0	0.0	0.0	T 55	T 56	100	100	100		11000510
Y 56	Y 456	0	0.0	0.0	T 56	T 57	100	100	100		11000520
Y 57	Y 457	0	0.0	0.0	T 57	T 58	100	100	100		11000530
Y 58	Y 458	0	0.0	0.0	T 58	T 59	100	100	100		11000540
Y 59	Y 459	0	0.0	0.0	T 59	T 60	100	100	100		11000550
Y 60	Y 460	0	0.0	0.0	T 62	T 1	100	100	100 RAD		11000600
Y 61	Y 461	0	0.0	0.0	T 62	T 8	100	100	100 RAD		11000610
Y 62	Y 462	0	0.0	0.0	T 62	T 50	100	100	100 RAD		11000620
Y 63	Y 463	0	0.0	0.0	T 62	T 51	100	100	100 RAD		11000630
Y 64	Y 464	0	0.0	0.0	T 62	T 54	100	100	100 RAD		11000640
*	NODE CONNECTIONS IN THE CORE AXIAL DIRECTION										11001000
Y501	Y801	0	0.0	0.0	T 1	T101	100	100	100		11001005
Y502	Y802	0	0.0	0.0	T 2	T102	100	100	100		11001010
Y503	Y803	0	0.0	0.0	T 3	T103	100	100	100		11001020
Y504	Y804	0	0.0	0.0	T 4	T104	100	100	100		11001030
Y505	Y805	0	0.0	0.0	T 5	T105	100	100	100		11001040
Y506	Y806	0	0.0	0.0	T 6	T106	100	100	100		11001050
Y507	Y807	0	0.0	0.0	T 7	T107	100	100	100		11001060
Y508	Y808	0	0.0	0.0	T 8	T108	100	100	100		11001070
Y509	Y809	0	0.0	0.0	T 9	T109	100	100	100		11001080
Y510	Y810	0	0.0	0.0	T 10	T110	100	100	100		11001090
Y511	Y811	0	0.0	0.0	T 11	T111	100	100	100		11001100
Y512	Y812	0	0.0	0.0	T 12	T112	100	100	100		11001103
Y513	Y813	0	0.0	0.0	T 13	T113	100	100	100		11001107
Y514	Y814	0	0.0	0.0	T 14	T114	100	100	100		11001110
Y515	Y815	0	0.0	0.0	T 15	T115	100	100	100		11001120

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Y516	6	0	0.0	0.0	T 16	T116	100	100	100	1100130
Y517	Y817	0	0.0	0.0	T 17	T117	100	100	100	11001140
Y518	Y818	0	0.0	0.0	T 18	T118	100	100	100	11001150
Y519	Y819	0	0.0	0.0	T 19	T119	100	100	100	11001160
Y520	Y820	0	0.0	0.0	T 20	T120	100	100	100	11001170
Y521	Y821	0	0.0	0.0	T 21	T121	100	100	100	11001180
Y522	Y822	0	0.0	0.0	T 22	T122	100	100	100	11001190
Y523	Y823	0	0.0	0.0	T 23	T123	100	100	100	11001200
Y524	Y824	0	0.0	0.0	T 24	T124	100	100	100	11001207
Y525	Y825	0	0.0	0.0	T 25	T125	100	100	100	11001208
Y526	Y826	0	0.0	0.0	T 26	T126	100	100	100	11001210
Y527	Y827	0	0.0	0.0	T 27	T127	100	100	100	11001220
Y528	Y828	0	0.0	0.0	T 28	T128	100	100	100	11001230
Y529	Y829	0	0.0	0.0	T 29	T129	100	100	100	11001240
Y530	Y830	0	0.0	0.0	T 30	T130	100	100	100	11001250
Y531	Y831	0	0.0	0.0	T 31	T131	100	100	100	11001260
Y532	Y832	0	0.0	0.0	T 32	T132	100	100	100	11001270
Y533	Y833	0	0.0	0.0	T 33	T133	100	100	100	11001280
Y534	Y834	0	0.0	0.0	T 34	T134	100	100	100	11001290
Y535	Y835	0	0.0	0.0	T 35	T135	100	100	100	11001300
Y536	Y836	0	0.0	0.0	T 36	T136	100	100	100	11001310
Y537	Y837	0	0.0	0.0	T 37	T137	100	100	100	11001313
Y538	Y838	0	0.0	0.0	T 38	T138	100	100	100	11001317
Y539	Y839	0	0.0	0.0	T 39	T139	100	100	100	11001320
Y540	Y840	0	0.0	0.0	T 40	T140	100	100	100	11001330
Y541	Y841	0	0.0	0.0	T 41	T141	100	100	100	11001340
Y542	Y842	0	0.0	0.0	T 42	T142	100	100	100	11001350
Y543	Y843	0	0.0	0.0	T 43	T143	100	100	100	11001360
Y550	Y850	0	0.0	0.0	T 50	T150	100	100	100	11001430
Y551	Y851	0	0.0	0.0	T 51	T151	100	100	100	11001435
Y552	Y852	0	0.0	0.0	T 52	T152	100	100	100	11001440
Y553	Y853	0	0.0	0.0	T 53	T153	100	100	100	11001450
Y554	Y854	0	0.0	0.0	T 54	T154	100	100	100	11001460
Y555	Y855	0	0.0	0.0	T 55	T155	100	100	100	11001470
Y556	Y856	0	0.0	0.0	T 56	T156	100	100	100	11001480
Y557	Y857	0	0.0	0.0	T 57	T157	100	100	100	11001490
Y558	Y858	0	0.0	0.0	T 58	T158	100	100	100	11001500
Y559	Y859	0	0.0	0.0	T 59	T159	100	100	100	11001510
*	NODE CONNECTIONS IN THE CIRCUMFERENTIAL DIRECTION									11002000
Y 70	Y470	0	0.0	0.0	T 1	T 8	100	100	100	DRUM RAD CONN.
Y 71	Y471	0	0.0	0.0	T 2	T 9	100	100	100	11002020
Y 72	Y472	0	0.0	0.0	T 3	T 10	100	100	100	11002030
Y 73	Y473	0	0.0	0.0	T 4	T 11	100	100	100	11002040

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Y 74	Y 74	0	0.0	0.0	T	5	T	12	100	100	100		11002050
Y 75	Y 75	0	0.0	0.0	T	6	T	13	100	100	100		11002060
Y 76	Y 76	0	0.0	0.0	T	7	T	14	100	100	100		11002070
Y 77	Y 77	0	0.0	0.0	T	8	T	15	100	100	100		11002080
Y 78	Y 78	0	0.0	0.0	T	9	T	16	100	100	100		11002090
Y 79	Y 79	0	0.0	0.0	T	10	T	17	100	100	100		11002100
Y 80	Y 80	0	0.0	0.0	T	11	T	18	100	100	100		11002110
Y 81	Y 81	0	0.0	0.0	T	12	T	19	100	100	100		11002120
Y 82	Y 82	0	0.0	0.0	T	13	T	20	100	100	100		11002130
Y 83	Y 83	0	0.0	0.0	T	14	T	21	100	100	100		11002140
Y 84	Y 84	0	0.0	0.0	T	15	T	22	100	100	100		11002150
Y 85	Y 85	0	0.0	0.0	T	16	T	23	100	100	100		11002160
Y 86	Y 86	0	0.0	0.0	T	17	T	24	100	100	100		11002170
Y 87	Y 87	0	0.0	0.0	T	18	T	25	100	100	100		11002180
Y 88	Y 88	0	0.0	0.0	T	19	T	26	100	100	100		11002190
Y 89	Y 89	0	0.0	0.0	T	20	T	27	100	100	100		11002200
Y 90	Y 90	0	0.0	0.0	T	21	T	28	100	100	100		11002210
Y 91	Y 91	0	0.0	0.0	T	23	T	29	100	100	100		11002220
Y 92	Y 92	0	0.0	0.0	T	24	T	30	100	100	100		11002230
Y 93	Y 93	0	0.0	0.0	T	25	T	31	100	100	100		11002240
Y 94	Y 94	0	0.0	0.0	T	26	T	32	100	100	100		11002250
Y 95	Y 95	0	0.0	0.0	T	27	T	33	100	100	100		11002260
Y 96	Y 96	0	0.0	0.0	T	28	T	34	100	100	100		11002270
Y590	Y990	0	0.0	0.0	T	30	T	35	100	100	100		11002271
Y591	Y991	0	0.0	0.0	T	31	T	36	100	100	100		11002272
Y592	Y992	0	0.0	0.0	T	32	T	37	100	100	100		11002273
Y593	Y993	0	0.0	0.0	T	33	T	38	100	100	100		11002274
Y594	Y994	0	0.0	0.0	T	34	T	39	100	100	100		11002275
Y 97	Y 97	0	0.0	0.0	T	36	T	40	100	100	100		11002280
Y 98	Y 98	0	0.0	0.0	T	37	T	41	100	100	100		11002290
Y 99	Y 99	0	0.0	0.0	T	38	T	42	100	100	100		11002300
Y100	Y500	0	0.0	0.0	T	39	T	43	100	100	100		11002310
Y571	Y971	0	0.0	0.0	T	50	T	51	100	100	100		11002320
Y572	Y972	0	0.0	0.0	T	51	T	54	100	100	100		11002330
Y573	Y973	0	0.0	0.0	T	52	T	55	100	100	100		11002340
Y574	Y974	0	0.0	0.0	T	53	T	56	100	100	100		11002350
Y580	Y980	0	0.0	0.0	T	50	T	15	100	100	100	RADIATION	11002400
Y581	Y981	0	0.0	0.0	T	52	T	22	100	100	100	RAD	11002410
Y582	Y982	0	0.0	0.0	T	53	T	29	100	100	100	RAD	11002420
Y583	Y983	0	0.0	0.0	T	57	T	35	100	100	100	RAD	11002430
Y584	Y984	0	0.0	0.0	T	58	T	40	100	100	100	RAD	11002440
Y585	Y985	0	0.0	0.0	T	59	T	41	100	100	100	RAD	11002450
* 20													12000000

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INPUT PARAMETERS AND INIT. TEMPS

*	SETTING INITIAL TEMPERATURES								12000010	
*	CORE HEAT SINK TEMPERATURES								12000020	
T 62	0	-1	1.17500E 03	0.0	0	0	0	0	1 CORE C/L	12000030
T162	0	-1	1.18050E 03	0.0	0	0	0	0	1 CORE C/L + 2.0	12000040
T262	0	-1	1.18610E 03	0.0	0	0	0	0	1 CORE C/L + 4.0	12000050
T362	0	-1	1.19160E 03	0.0	0	0	0	0	1 CORE C/L + 6.0	12000060
T462	0	-1	1.19720E 03	0.0	0	0	0	0	1 CORE C/L + 8.0	12000070
*	COLD WALL HEAT SINK TEMPERATURES								12000300	
T 60 T460	-1	1.00000E 03	0.0	0	0	0	0	100		12000710
*	SETTING INITIAL DRUM TEMPERATURES								12000500	
T 1 T 43	0	1.30000E 03	0.0	0	0	0	0	1		12000510
T101 T143	0	1.30000E 03	0.0	0	0	0	0	1		12000520
T201 T243	0	1.30000E 03	0.0	0	0	0	0	1		12000530
T301 T343	0	1.30000E 03	0.0	0	0	0	0	1		12000540
T401 T443	0	1.30000E 03	0.0	0	0	0	0	1		12000550
*	SETTING INNER STATIONARY REFLECTOR TEMPERATURES								12000555	
T 50 T 59	0	1.32500E 03	0.0	0	0	0	0	1		12000900
T150 T159	0	1.32500E 03	0.0	0	0	0	0	1		12000920
T250 T259	0	1.32500E 03	0.0	0	0	0	0	1		12000930
T350 T359	0	1.32500E 03	0.0	0	0	0	0	1		12000940
T450 T459	0	1.32500E 03	0.0	0	0	0	0	1		12000950
*	DUMMIES TO HOLD EFFECTIVE EMISSIVITY							1/E+1/F-1	12000960	
D981	0	0	2.50000E-01	0.0	0	0	0	0	1 CORE VES TO DRUM	12010020
D982	0	0	2.50000E-01	0.0	0	0	0	0	1 CORE VES TO REF	12010030
D983	0	0	2.50000E-01	0.0	0	0	0	0	1 COLD WALL-DRUM	12010040
D984	0	0	2.50000E-01	0.0	0	0	0	0	1 COLD WALL-REF	12010050
D985	0	0	4.28000E-01	0.0	0	0	0	0	1 DR TO REFLECTOR	12010060
*	MATERIAL CONDUCTIVITY								12010065	
D990	0	0	5.40000E-01	0.0	0	0	0	0	1 KDP BE 1300 FUM	12010070
D991	0	0	5.40000E-01	0.0	0	0	0	0	1 KREF BE 1300 F	12010080
D995	0	0	4.17000E-01	0.0	0	0	0	0	1 THISRUN/600KW	12010090
D996	0	0	1.00000E 00	0.0	0	0	0	0	1	12010095
*	DUMMIES TO HOLD NODE VOLUME							CUBIC INCHES	12010100	
*	DUMMY VOLUMES ARE BASED ON A 1 INCH HIGH NODE								12010105	
*	ASSUME ALL NODES ARE SQUARE AND EQUAL								12010110	
D993 D943	0	2.50000E-01	0.0	0	0	0	0	1		12010120
*	NOW CHANGE THOSE NODES THAT ARE NOT EQUAL								12010130	
*	DRUM NODES								12010140	
D901	0	0	2.72000E-01	0.0	0	0	0	0		12010150
D902	0	0	2.18000E-01	0.0	0	0	0	0		12010160

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D90	0	0	2.50000E-01	0.0	0	0	0	0	1	12010170
D99	0	0	2.19000E-01	0.0	0	0	0	0	1	12010180
D915	0	0	1.70000E-01	0.0	0	0	0	0	1	12010190
D916	0	0	2.18000E-01	0.0	0	0	0	0	1	12010200
D922	0	0	6.60000E-02	0.0	0	0	0	0	1	12010210
D923	0	0	2.18000E-01	0.0	0	0	0	0	1	12010220
D929	0	0	1.25000E-01	0.0	0	0	0	0	1	12010230
D935	0	0	1.44000E-01	0.0	0	0	0	0	1	12010240
D940	0	0	8.20000E-02	0.0	0	0	0	0	1	12010250
D941	0	0	2.22000E-01	0.0	0	0	0	0	1	12010260
*	INNER STATIONARY REFLECTOR									12010300
D950	0	0	1.13000E-01	0.0	0	0	0	0	1	12010310
D951	0	0	2.85000E-01	0.0	0	0	0	0	1	12010320
D952	0	0	2.65000E-01	0.0	0	0	0	0	1	12010330
D953	0	0	9.30000E-02	0.0	0	0	0	0	1	12010340
D954	0	0	2.15000E-01	0.0	0	0	0	0	1	12010350
D955	0	0	3.49000E-01	0.0	0	0	0	0	1	12010360
D956	0	0	4.10000E-01	0.0	0	0	0	0	1	12010370
D957	0	0	3.64000E-01	0.0	0	0	0	0	1	12010380
D958	0	0	2.64000E-01	0.0	0	0	0	0	1	12010390
D959	0	0	2.59000E-01	0.0	0	0	0	0	1	12010400
*	DUMMIES TO HOLD PER UNIT VOLUME HEAT GENERATION RATES									12020000
*	SET ALL HEAT GENERATION RATES TO ZERO									12020002
D 1 D 62	0	0.0	0.0	0	0	0	0	0	1	12020005
*	SET ALL HEAT GENERATION RATES BUT THOSE FOR THE CORE									12020007
*	VESSEL WALL AND THE COLD WALL									12020008
*	DRUM HEAT GENERATION RATES									12020009
D 1	0	0	1.70000E 01	0.0	0	0	0	0	1	12020010
D 2	0	0	1.29000E 01	0.0	0	0	0	0	1	12020020
D 3	0	0	1.02000E 01	0.0	0	0	0	0	1	12020030
D 4	0	0	8.10000E 00	0.0	0	0	0	0	1	12020040
D 5	0	0	6.50000E 00	0.0	0	0	0	0	1	12020050
D 6	0	0	5.30000E 00	0.0	0	0	0	0	1	12020060
D 7	0	0	4.40000E 00	0.0	0	0	0	0	1	12020070
D 8	0	0	1.60000E 01	0.0	0	0	0	0	1	12020080
D 9	0	0	1.27000E 01	0.0	0	0	0	0	1	12020090
D 10	0	0	1.01000E 01	0.0	0	0	0	0	1	12020100
D 11	0	0	8.00000E 00	0.0	0	0	0	0	1	12020110
D 12	0	0	6.40000E 00	0.0	0	0	0	0	1	12020120
D 13	0	0	5.20000E 00	0.0	0	0	0	0	1	12020130
D 14	0	0	4.30000E 00	0.0	0	0	0	0	1	12020140
D 15	0	0	1.51000E 01	0.0	0	0	0	0	1	12020150
D 16	0	0	1.24000E 01	0.0	0	0	0	0	1	12020160

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D 17	0	0	9.90000E 00	0.0	0	0	0	0	1		12020170
D 18	0	0	7.70000E 00	0.0	0	0	0	0	1		12020180
D 19	0	0	6.30000E 00	0.0	0	0	0	0	1		12020190
D 20	0	0	5.10000E 00	0.0	0	0	0	0	1		12020200
D 21	0	0	4.20000E 00	0.0	0	0	0	0	1		12020210
D 22	0	0	1.35000E 01	0.0	0	0	0	0	1		12020220
D 23	0	0	1.16000E 01	0.0	0	0	0	0	1		12020230
D 24	0	0	9.30000E 00	0.0	0	0	0	0	1		12020240
D 25	0	0	7.30000E 00	0.0	0	0	0	0	1		12020250
D 26	0	0	6.00000E 00	0.0	0	0	0	0	1		12020260
D 27	0	0	5.00000E 00	0.0	0	0	0	0	1		12020270
D 28	0	0	4.20000E 00	0.0	0	0	0	0	1		12020280
D 29	0	0	1.04000E 01	0.0	0	0	0	0	1		12020290
D 30	0	0	8.70000E 00	0.0	0	0	0	0	1		12020300
D 31	0	0	7.00000E 00	0.0	0	0	0	0	1		12020310
D 32	0	0	5.70000E 00	0.0	0	0	0	0	1		12020320
D 33	0	0	4.70000E 00	0.0	0	0	0	0	1		12020330
D 34	0	0	4.00000E 00	0.0	0	0	0	0	1		12020340
D 35	0	0	7.90000E 00	0.0	0	0	0	0	1		12020350
D 36	0	0	6.60000E 00	0.0	0	0	0	0	1		12020360
D 37	0	0	5.50000E 00	0.0	0	0	0	0	1		12020370
D 38	0	0	4.60000E 00	0.0	0	0	0	0	1		12020380
D 39	0	0	3.80000E 00	0.0	0	0	0	0	1		12020390
D 40	0	0	6.00000E 00	0.0	0	0	0	0	1		12020400
D 41	0	0	5.00000E 00	0.0	0	0	0	0	1		12020410
D 42	0	0	4.30000E 00	0.0	0	0	0	0	1		12020420
D 43	0	0	3.60000E 00	0.0	0	0	0	0	1		12020430
*	STATIONARY REFLECTOR HEAT GENERATION RATES										
D 50	0	0	1.90000E 01	0.0	0	0	0	0	1		12020510
D 51	0	0	1.83000E 01	0.0	0	0	0	0	1		12020520
D 52	0	0	1.14000E 01	0.0	0	0	0	0	1		12020530
D 53	0	0	7.30000E 00	0.0	0	0	0	0	1		12020540
D 54	0	0	1.95000E 01	0.0	0	0	0	0	1		12020550
D 55	0	0	1.48000E 01	0.0	0	0	0	0	1		12020560
D 56	0	0	1.10000E 01	0.0	0	0	0	0	1		12020570
D 57	0	0	8.30000E 00	0.0	0	0	0	0	1		12020580
D 58	0	0	6.30000E 00	0.0	0	0	0	0	1		12020590
D 59	0	0	5.00000E 00	0.0	0	0	0	0	1		12020600
* 30											130000000

FUNCTION STATEMENTS

*	NODE ADMITTANCES IN THE RADIAL DIRECTION										130000005
Y 1	Y401	101	0.0	1.67000E-01	0.990	0	0	0	100		13000010
Y 2	Y402	101	0.0	1.78000E-01	0.990	0	0	0	100		13000020
Y 3	Y403	101	0.0	1.67000E-01	0.990	0	0	0	100		13000030
Y 4	Y404	101	0.0	1.67000E-01	0.990	0	0	0	100		13000040
Y 5	Y405	49	0.0	1.00000E 00	0.9985	0	0	0	100 RAD		13000050
Y 6	Y406	101	0.0	1.67000E-01	0.990	0	0	0	100		13000060
Y 7	Y407	49	0.0	1.00000E 00	0.9985	0	0	0	100 RAD		13000070

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Y 9	Y411	101	0.0	1.78000E-01	D990	0	0	0	100	13000110
Y 10	Y410	101	0.0	1.67000E-01	D990	0	0	0	100	13000120
Y 11	Y411	101	0.0	1.67000E-01	D990	0	0	0	100	13000130
Y 12	Y412	49	0.0	1.00000E 00	0 D985	0	0	0	100 RAD	13000140
Y 13	Y413	101	0.0	1.67000E-01	D990	0	0	0	100	13000150
Y 14	Y414	49	0.0	1.00000E 00	0 D983	0	0	0	100 RAD***	13000160
Y 15	Y415	101	0.0	2.22000E-01	D990	0	0	0	100	13000170
Y 16	Y416	101	0.0	1.78000E-01	D990	0	0	0	100	13000180
Y 17	Y417	101	0.0	1.67000E-01	D990	0	0	0	100	13000190
Y 18	Y418	101	0.0	1.67000E-01	D990	0	0	0	100	13000200
Y 19	Y419	49	0.0	1.00000E 00	0 D985	0	0	0	100 RAD	13000210
Y 20	Y420	101	0.0	1.67000E-01	D990	0	0	0	100	13000220
Y 21	Y421	49	0.0	1.00000E 00	0 D983	0	0	0	100 RAD***	13000230
Y 22	Y422	101	0.0	2.67000E-01	D990	0	0	0	100	13000240
Y 23	Y423	101	0.0	1.78000E-01	D990	0	0	0	100	13000250
Y 24	Y424	101	0.0	1.67000E-01	D990	0	0	0	100	13000260
Y 25	Y425	101	0.0	1.67000E-01	D990	0	0	0	100	13000270
Y 26	Y426	49	0.0	1.00000E 00	0 D985	0	0	0	100 RAD	13000280
Y 27	Y427	101	0.0	1.67000E-01	D990	0	0	0	100	13000290
Y 28	Y428	49	0.0	1.00000E 00	0 D983	0	0	0	100 RAD***	13000300
Y 29	Y429	101	0.0	2.01000E-01	D990	0	0	0	100	13000310
Y 30	Y430	101	0.0	1.67000E-01	D990	0	0	0	100	13000320
Y 31	Y431	101	0.0	1.67000E-01	D990	0	0	0	100	13000330
Y 32	Y432	49	0.0	1.00000E 00	0 D985	0	0	0	100 RAD	13000340
Y 33	Y433	101	0.0	1.67000E-01	D990	0	0	0	100	13000350
Y 34	Y434	49	0.0	1.00000E 00	0 D983	0	0	0	100 RAD***	13000360
Y 35	Y435	101	0.0	1.98000E-01	D990	0	0	0	100	13000370
Y 36	Y436	101	0.0	1.67000E-01	D990	0	0	0	100	13000380
Y 37	Y437	49	0.0	1.00000E 00	0 D985	0	0	0	100 RAD	13000390
Y 38	Y438	101	0.0	1.67000E-01	D990	0	0	0	100	13000400
Y 39	Y439	49	0.0	1.00000E 00	0 D983	0	0	0	100 RAD***	13000410
Y 40	Y440	101	0.0	1.19000E-01	D990	0	0	0	100	13000420
Y 41	Y441	49	0.0	1.00000E 00	0 D985	0	0	0	100 RAD	13000430
Y 42	Y442	101	0.0	1.67000E-01	D990	0	0	0	100	13000440
Y 43	Y443	49	0.0	1.00000E 00	0 D983	0	0	0	100 RAD***	13000450
Y 51	Y451	101	0.0	3.00000E-01	D991	0	0	0	100	13000460
Y 52	Y452	101	0.0	9.80000E-02	D991	0	0	0	100	13000470
Y 54	Y454	101	0.0	2.54000E-01	D991	0	0	0	100	13000480
Y 55	Y455	101	0.0	1.67000E-01	D991	0	0	0	100	13000490
Y 56	Y456	101	0.0	1.80000E-01	D991	0	0	0	100	13000500
Y 57	Y457	101	0.0	1.19000E-01	D991	0	0	0	100	13000510
Y 58	Y458	101	0.0	1.20000E-01	D991	0	0	0	100	13000520
Y 59	Y459	49	0.0	8.12000E-01	0 D984	0	0	0	100 RAD***	13000530
Y 60	Y460	49	0.0	1.00000E 00	0 D981	0	0	0	100 RAD	13000540
Y 61	Y461	49	0.0	1.03000E 00	0 D981	0	0	0	100 RAD	13000550

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Y 62	Y462	49	0.0	5.78000E-01	0 0982	0	0	100 RAD	13000620
Y 63	Y463	49	0.0	1.43700E 00	0 0982	0	0	100 RAD	13000630
Y 64	Y464	49	0.0	1.31200E 00	0 0982	0	0	100 RAD	13000640
*			NODE ADMITTANCES	IN THE CORE AXIAL DIRECTION					
Y501	Y801	101	0.0	1.13000F-02 0990	0	0	0	100	13001005
Y502	Y802	101	0.0	9.10000E-03 0990	0	0	0	100	13001010
Y503	Y803	101	0.0	1.04000E-02 0990	0	0	0	100	13001020
Y504	Y804	101	0.0	1.04000E-02 0990	0	0	0	100	13001030
Y505	Y805	101	0.0	1.04000E-02 0990	0	0	0	100	13001040
Y506	Y806	101	0.0	1.04000E-02 0990	0	0	0	100	13001050
Y507	Y807	101	0.0	1.04000E-02 0990	0	0	0	100	13001060
Y508	Y808	101	0.0	1.04000E-02 0990	0	0	0	100	13001070
Y509	Y809	101	0.0	9.10000E-03 0990	0	0	0	100	13001080
Y510	Y810	101	0.0	1.04000F-02 0990	0	0	0	100	13001090
Y511	Y811	101	0.0	1.04000E-02 0990	0	0	0	100	13001100
Y512	Y812	101	0.0	1.04000E-02 0990	0	0	0	100	13001103
Y513	Y813	101	0.0	1.04000E-02 0990	0	0	0	100	13001107
Y514	Y814	101	0.0	1.04000E-02 0990	0	0	0	100	13001110
Y515	Y815	101	0.0	9.10000E-03 0990	0	0	0	100	13001120
Y516	Y816	101	0.0	9.10000E-03 0990	0	0	0	100	13001130
Y517	Y817	101	0.0	1.04000E-02 0990	0	0	0	100	13001140
Y518	Y818	101	0.0	1.04000E-02 0990	0	0	0	100	13001150
Y519	Y819	101	0.0	1.04000E-02 0990	0	0	0	100	13001160
Y520	Y820	101	0.0	1.04000E-02 0990	0	0	0	100	13001170
Y521	Y821	101	0.0	1.04000E-02 0990	0	0	0	100	13001180
Y522	Y822	101	0.0	2.70000E-03 0990	0	0	0	100	13001190
Y523	Y823	101	0.0	9.10000E-03 0990	0	0	0	100	13001200
Y524	Y824	101	0.0	1.04000E-02 0990	0	0	0	100	13001203
Y525	Y825	101	0.0	1.04000E-02 0990	0	0	0	100	13001207
Y526	Y826	101	0.0	1.04000E-02 0990	0	0	0	100	13001210
Y527	Y827	101	0.0	1.04000E-02 0990	0	0	0	100	13001220
Y528	Y828	101	0.0	1.04000E-02 0990	0	0	0	100	13001230
Y529	Y829	101	0.0	5.20000E-03 0990	0	0	0	100	13001240
Y530	Y830	101	0.0	1.04000E-02 0990	0	0	0	100	13001250
Y531	Y831	101	0.0	1.04000F-02 0990	0	0	0	100	13001260
Y532	Y832	101	0.0	1.04000E-02 0990	0	0	0	100	13001270
Y533	Y833	101	0.0	1.04000E-02 0990	0	0	0	100	13001280
Y534	Y834	101	0.0	1.04000E-02 0990	0	0	0	100	13001290
Y535	Y835	101	0.0	6.00000E-03 0990	0	0	0	100	13001300
Y536	Y836	101	0.0	1.04000E-02 0990	0	0	0	100	13001310
Y537	Y837	101	0.0	1.04000E-02 0990	0	0	0	100	13001313
Y538	Y838	101	0.0	1.04000E-02 0990	0	0	0	100	13001317
Y539	Y839	101	0.0	1.04000E-02 0990	0	0	0	100	13001320

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Y540	Y440	101	0.0	3.40000E-03 D990	0	0	0	100	13001530
Y541	Y441	101	0.0	1.04000E-02 D990	0	0	0	100	13001540
Y542	Y442	101	0.0	1.04000E-02 D990	0	0	0	100	13001550
Y543	Y443	101	0.0	1.04000E-02 D990	0	0	0	100	13001560
*	STATIONARY REFLECTOR AXIAL ADMITTANCES								13001570
Y550	Y450	101	0.0	4.70000E-03 D991	0	0	0	100	13001510
Y551	Y451	101	0.0	1.18000E-02 D991	0	0	0	100	13001520
Y552	Y452	101	0.0	1.10000E-02 D991	0	0	0	100	13001530
Y553	Y453	101	0.0	3.90000E-03 D991	0	0	0	100	13001540
Y554	Y454	101	0.0	9.00000E-03 D991	0	0	0	100	13001550
Y555	Y455	101	0.0	1.45000E-02 D991	0	0	0	100	13001560
Y556	Y456	101	0.0	1.71000E-02 D991	0	0	0	100	13001570
Y557	Y457	101	0.0	1.51000E-02 D991	0	0	0	100	13001580
Y558	Y458	101	0.0	1.10000E-02 D991	0	0	0	100	13001590
Y559	Y459	101	0.0	1.08000E-02 D991	0	0	0	100	13001600
*	NODE ADMITTANCES IN THE CIRCUMFERENTIAL DIRECTION								13002000
Y 70	Y470	101	0.0	1.67000E-01 D991	0	0	0	100	DRUM RAD CONN.
Y 71	Y471	101	0.0	1.46000E-01 D991	0	0	0	100	13002020
Y 72	Y472	101	0.0	1.67000E-01 D991	0	0	0	100	13002030
Y 73	Y473	101	0.0	1.67000E-01 D991	0	0	0	100	13002040
Y 74	Y474	101	0.0	1.67000E-01 D991	0	0	0	100	13002050
Y 75	Y475	101	0.0	1.67000E-01 D991	0	0	0	100	13002060
Y 76	Y476	101	0.0	1.67000E-01 D991	0	0	0	100	13002070
Y 77	Y477	101	0.0	1.46000E-01 D991	0	0	0	100	13002080
Y 78	Y478	101	0.0	1.46000E-01 D991	0	0	0	100	13002090
Y 79	Y479	101	0.0	1.67000E-01 D991	0	0	0	100	13002100
Y 80	Y480	101	0.0	1.67000E-01 D991	0	0	0	100	13002110
Y 81	Y481	101	0.0	1.67000E-01 D991	0	0	0	100	13002120
Y 82	Y482	101	0.0	1.67000E-01 D991	0	0	0	100	13002130
Y 83	Y483	101	0.0	1.67000E-01 D991	0	0	0	100	13002140
Y 84	Y484	101	0.0	1.07000E-01 D991	0	0	0	100	13002150
Y 85	Y485	101	0.0	1.46000E-01 D991	0	0	0	100	13002160
Y 86	Y486	101	0.0	1.67000E-01 D991	0	0	0	100	13002170
Y 87	Y487	101	0.0	1.67000E-01 D991	0	0	0	100	13002180
Y 88	Y488	101	0.0	1.67000E-01 D991	0	0	0	100	13002190
Y 89	Y489	101	0.0	1.67000E-01 D991	0	0	0	100	13002200
Y 90	Y490	101	0.0	1.67000E-01 D991	0	0	0	100	13002210
Y 91	Y491	101	0.0	1.67000E-01 D991	0	0	0	100	13002220
Y 92	Y492	101	0.0	1.67000E-01 D991	0	0	0	100	13002230
Y 93	Y493	101	0.0	1.67000E-01 D991	0	0	0	100	13002240
Y 94	Y494	101	0.0	1.67000E-01 D991	0	0	0	100	13002250
Y 95	Y495	101	0.0	1.67000E-01 D991	0	0	0	100	13002260
Y 96	Y496	101	0.0	1.67000E-01 D991	0	0	0	100	13002270

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Y590	Y990	101	0.0	2.01000E-01	D990	0	0	0	100		13002271
Y591	Y991	101	0.0	1.67000E-01	D990	0	0	0	100		13002272
Y592	Y992	101	0.0	1.67000E-01	D990	0	0	0	100		13002273
Y593	Y993	101	0.0	1.67000E-01	D990	0	0	0	100		13002274
Y594	Y994	101	0.0	1.67000E-01	D990	0	0	0	100		13002275
Y 97	Y497	101	0.0	2.22000F-01	D991	0	0	0	100		13002280
Y 98	Y498	101	0.0	1.72000F-01	D991	0	0	0	100		13002290
Y 99	Y499	101	0.0	1.67000E-01	D991	0	0	0	100		13002300
Y100	Y500	101	0.0	1.67000E-01	D991	0	0	0	100		13002310
Y571	Y971	101	0.0	1.36000E-01	D991	0	0	0	100		13002320
Y572	Y972	101	0.0	9.10000E-02	D991	0	0	0	100		13002330
Y573	Y973	101	0.0	1.37000F-01	D991	0	0	0	100		13002340
Y574	Y974	101	0.0	1.98000F-01	D991	0	0	0	100		13002350
Y580	Y980	49	0.0	1.06000E 00	0 D985	0	0	100	RADIATION		13002400
Y581	Y981	49	0.0	1.37500E 00	0 D985	0	0	100	RAD		13002410
Y582	Y982	49	0.0	1.40000F 00	0 D985	0	0	100	RAD		13002420
Y583	Y983	49	0.0	1.34000F 00	0 D985	0	0	100	RAD		13002430
Y584	Y984	49	0.0	1.12000E 00	0 D985	0	0	100	RAD		13002440
Y585	Y985	49	0.0	1.12000E 00	0 D985	0	0	100	RAD		13002450
*				MULTIPLY TABULATED HEAT GENERATION RATES BY CORRECTION							13049500
*				FACTOR TO MATCH EXPECTED Q TOTAL							13049510
D301	D362	152	0.0	1.00000E 00	D 1 D996	1	0	1			13049520
*				MULTIPLY HEAT GENERATION RATE TIMES VOLUME							13050000
D201	D262	152	0.0	2.00000E 00	D301 D901	1	1	1			13050010
*				NOW MULTIPLY BY AXIAL PROFILE: ENTER RATIO OF POWER LEVEL							13050020
*				TO 600 KWT AS DUMMY D995							13050030
Q 1 0 62	152	0.0		1.38300E 00	D201 D995	1	0	1			13050040
Q101	Q162	152	0.0	1.32500F 00	D201 D995	1	0	1	AXIAL FLUX PROF.		13050050
Q201	Q262	152	0.0	1.14000E 00	D201 D995	1	0	1			13050060
Q301	Q362	152	0.0	8.58000E-01	D201 D995	1	0	1			13050070
Q401	Q462	152	0.0	5.05000E-01	D201 D995	1	0	1			13050080
* 70											17000000
				CONTROL CONSTANTS							
4				1.00000E-02 CONVERGENCE TEST ON RATE OF TEMPERATURE CHANGE							17000010
5				1.00000E 00 0. = TRANSIENT; +1. = STEADY STATE; >1. = AITKEN							17000020
6				1.00000E 00 +1. = DUMP DYTQ AT END OF CASE; >1. = AITKEN							17000030
9				1.12950F-11 STEFAN-BOLTZMANN CONSTANT							17000040
* 80				PRINT-OUT SPECIFICATIONS							14000000
T 1 T 65	0	0.0		0.0		0	0	0	1		13000010
T101	T165	0	0.0	0.0		0	0	0	1		13000020
T201	T265	0	0.0	0.0		0	0	0	1		13000030

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T301	T365	0	0.0	0.0	0	0	0	0	1	18000040
T401	T445	0	0.0	0.0	0	0	0	0	1	18000050
* 90										12000000
PRINT-OUT AND STOP TIMES										
0	0	0	0.0	2.50000E 03	0	0	0	0	1	19000010
0	0	0	1.48000E 04	5.00000E 01	0	0	0	0	1	12000020
0	0	0	1.50000E 04	0.0	0	0	0	0	1	12000030
* 96										12600000

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APPENDIX III

BE POISON BACK DRUM PROGRAM LISTING

F. M. LARSON AT EXTENSION 1304

NETWORK TO CALCULATE DRUM AND STATIONARY REFLECTOR TEMPS.

LATEST CHANGE DATE 3/24/71

DRUM MATERIAL BE F-34C

STATIONARY REFLECTOR BF

POWER LEVEL 500KWT

CORE AVERAGE TEMPERATURE 1132.5 DEG F

CORE INLET TEMPERATURE 1065 DEG F

10000000

10000010

10000020

10000030

10000040

10000050

10000060

10000070

10000080

11000000

10 NODE CONNECTIONS IN THE RADIAL DIRECTION

11000005

1Y401 T 1T 2 100 100 100RAD

11000010

2Y402 T 2T 3 100 100 100

11000020

3Y403 T 3T 4 100 100 100

11000030

4Y404 T 4T 5 100 100 100

11000040

5Y405 T 5T 6 100 100 100

11000050

6Y406 T 6T 7 100 100 100

11000060

7Y407 T 7T 8 100 100 100

11000070

8Y408 T 8T 9 100 100 100

11000080

9Y409 T 9T 10 100 100 100

11000090

10Y410 T 10T 11 100 100 100

11000100

11Y411 T 11T 12 100 100 100RAD

11000110

13Y413 T 13T 14 100 100 100RAD

11000120

14Y414 T 14T 15 100 100 100

11000130

15Y415 T 15T 16 100 100 100

11000140

16Y416 T 16T 17 100 100 100

11000150

17Y417 T 17T 18 100 100 100

11000160

18Y418 T 18T 19 100 100 100

11000170

19Y419 T 19T 20 100 100 100

11000180

20Y420 T 20T 21 100 100 100

11000190

21Y421 T 21T 22 100 100 100

11000200

22Y422 T 22T 23 100 100 100

11000210

23Y423 T 23T 24 100 100 100RAD

11000220

25Y425 T 25T 26 100 100 100RAD

11000230

26Y426 T 26T 27 100 100 100RAD

11000240

27Y427 T 27T 28 100 100 100

11000250

28Y428 T 28T 29 100 100 100

11000260

29Y429 T 29T 30 100 100 100

11000270

30Y430 T 30T 31 100 100 100

11000280

31Y431 T 31T 32 100 100 100

11000290

32Y432 T 32T 33 100 100 100

11000300

33Y433 T 33T 34 100 100 100

11000310

34Y434 T 34T 35 100 100 100

11000320

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35Y435	T 35T 36 100 100 100	11000330
36Y436	T 36T 37 100 100 100RAD	11000340
38Y438	T 38T 39 100 100 100RAD	11000350
39Y437	T 39T 40 100 100 100	11000360
40Y440	T 40T 41 100 100 100RAD	11000370
41Y441	T 41T 42 100 100 100	11000380
42Y442	T 42T 43 100 100 100	11000390
43Y443	T 43T 44 100 100 100	11000400
44Y444	T 44T 45 100 100 100	11000410
45Y445	T 45T 46 100 100 100	11000420
46Y446	T 46T 47 100 100 100	11000430
47Y447	T 47T 48 100 100 100	11000440
48Y448	T 48T 49 100 100 100RAD	11000450
49Y449	T 49T 50 100 100 100	11000460
50Y450	T 50T 51 100 100 100RAD	11000470
52Y452	T 52T 53 100 100 100	11000480
53Y453	T 53T 54 100 100 100	11000490
54Y454	T 54T 55 100 100 100RAD	11000500
55Y455	T 55T 56 100 100 100	11000510
56Y456	T 56T 57 100 100 100	11000520
57Y457	T 57T 58 100 100 100	11000530
58Y458	T 58T 59 100 100 100	11000540
59Y459	T 59T 60 100 100 100	11000550
60Y460	T 60T 62 100 100 100RAD	11000560
61Y461	T 61T 62 100 100 100	11000570
62Y462	T 62T 63 100 100 100	11000580
63Y463	T 63T 64 100 100 100	11000590
64Y464	T 64T 65 100 100 100RAD	11000600
65Y465	T 66T 67 100 100 100	11000610
67Y467	T 67T 68 100 100 100	11000620
68Y468	T 68T 69 100 100 100	11000630
69Y469	T 69T 70 100 100 100	11000640
70Y470	T 70T 71 100 100 100	11000650
71Y471	T 71T 72 100 100 100	11000660
72Y472	T 72T 73 100 100 100	11000670
74Y474	T 74T 75 100 100 100RAD	11000680
75Y475	T 75T 76 100 100 100	11000690
76Y476	T 76T 77 100 100 100	11000700
77Y477	T 77T 78 100 100 100RAD	11000710
NODE CONNECTIONS IN THE CORE AXIAL DIRECTION		
02Y802	T 2T102 100 100 100	11001010
03Y803	T 3T103 100 100 100	11001020
04Y804	T 4T104 100 100 100	11001030

505Y805	T 5T105	100 100 100	11001040
506Y806	T 6T106	100 100 100	11001050
507Y807	T 7T107	100 100 100	11001060
503Y808	T 8T108	100 100 100	11001070
508Y809	T 9T109	100 100 100	11001080
510Y810	T 10T110	100 100 100	11001090
511Y811	T 11T111	100 100 100	11001100
514Y814	T 14T114	100 100 100	11001110
515Y815	T 15T115	100 100 100	11001120
516Y816	T 16T116	100 100 100	11001130
517Y817	T 17T117	100 100 100	11001140
518Y818	T 18T118	100 100 100	11001150
519Y819	T 19T119	100 100 100	11001160
520Y820	T 20T120	100 100 100	11001170
521Y821	T 21T121	100 100 100	11001180
522Y822	T 22T122	100 100 100	11001190
523Y823	T 23T123	100 100 100	11001200
526Y826	T 26T126	100 100 100	11001210
527Y827	T 27T127	100 100 100	11001220
528Y828	T 28T128	100 100 100	11001230
529Y829	T 29T129	100 100 100	11001240
530Y830	T 30T130	100 100 100	11001250
531Y831	T 31T131	100 100 100	11001260
532Y832	T 32T132	100 100 100	11001270
533Y833	T 33T133	100 100 100	11001280
534Y834	T 34T134	100 100 100	11001290
535Y835	T 35T135	100 100 100	11001300
536Y836	T 36T136	100 100 100	11001310
539Y839	T 39T139	100 100 100	11001320
540Y840	T 40T140	100 100 100	11001330
541Y841	T 41T141	100 100 100	11001340
542Y842	T 42T142	100 100 100	11001350
543Y843	T 43T143	100 100 100	11001360
544Y844	T 44T144	100 100 100	11001370
545Y845	T 45T145	100 100 100	11001380
546Y846	T 46T146	100 100 100	11001390
547Y847	T 47T147	100 100 100	11001400
548Y848	T 48T148	100 100 100	11001410
549Y849	T 49T149	100 100 100	11001420
550Y850	T 50T150	100 100 100	11001430
552Y852	T 52T152	100 100 100	11001440
553Y853	T 53T153	100 100 100	11001450
554Y854	T 54T154	100 100 100	11001460

555Y855	T 55T155	100 100 100	11001470
556Y856	T 56T156	100 100 100	11001480
557Y857	T 57T157	100 100 100	11001490
558Y859	T 58T158	100 100 100	11001500
559Y859	T 59T159	100 100 100	11001510
560Y860	T 60T160	100 100 100	11001520
561Y861	T 61T161	100 100 100	11001530
562Y862	T 62T162	100 100 100	11001540
563Y863	T 63T163	100 100 100	11001550
564Y864	T 64T164	100 100 100	11001560
566Y866	T 66T165	100 100 100	11001570
567Y867	T 67T167	100 100 100	11001580
568Y868	T 68T168	100 100 100	11001590
569Y869	T 69T169	100 100 100	11001600
570Y870	T 70T170	100 100 100	11001610
571Y871	T 71T171	100 100 100	11001620
572Y872	T 72T172	100 100 100	11001630
574Y874	T 74T174	100 100 100	11001640
575Y875	T 75T175	100 100 100	11001650
576Y876	T 76T176	100 100 100	11001660
577Y877	T 77T177	100 100 100	11001661
NODE CONNECTIONS IN THE CIRCUMFERENTIAL DIRECTION			11002000
78Y473	T 2T 14	100 100 100	11002010
79Y473	T 14T 27	100 100 100	11002020
80Y480	T 26T 39	100 100 100	11002030
81Y481	T 39T 52	100 100 100	11002040
82Y482	T 3T 15	100 100 100	11002050
83Y483	T 15T 28	100 100 100	11002060
84Y484	T 28T 41	100 100 100	11002070
85Y485	T 40T 53	100 100 100	11002080
86Y486	T 4T 16	100 100 100	11002090
87Y487	T 16T 29	100 100 100	11002100
88Y488	T 29T 42	100 100 100	11002110
89Y489	T 42T 55	100 100 100	11002120
90Y490	T 5T 17	100 100 100	11002130
91Y491	T 17T 30	100 100 100	11002140
92Y492	T 30T 43	100 100 100	11002150
93Y493	T 43T 56	100 100 100	11002160
94Y494	T 56T 66	100 100 100RAD	11002170
95Y495	T 6T 18	100 100 100	11002180
96Y496	T 13T 31	100 100 100	11002190
97Y497	T 31T 44	100 100 100	11002200
98Y498	T 44T 57	100 100 100	11002210

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99Y400	T 57T 67 100 100 100RAD	11002220
573Y979	T 7T 19 100 100 100	11002230
579Y979	T 19T 32 100 100 100	11002240
580Y980	T 32T 45 100 100 100	11002250
581Y981	T 45T 58 100 100 100	11002260
582Y982	T 58T 68 100 100 100RAD	11002270
583Y983	T 8T 20 100 100 100	11002280
584Y984	T 20T 33 100 100 100	11002290
585Y985	T 33T 46 100 100 100	11002300
586Y986	T 46T 59 100 100 100	11002310
587Y987	T 59T 61 100 100 100RAD	11002320
588Y988	T 61T 69 100 100 100	11002330
589Y989	T 69T 74 100 100 100	11002340
590Y990	T 9T 21 100 100 100	11002350
591Y991	T 21T 34 100 100 100	11002360
592Y992	T 34T 47 100 100 100	11002370
593Y993	T 47T 60 100 100 100	11002380
594Y994	T 62T 70 100 100 100	11002390
595Y995	T 70T 75 100 100 100	11002400
596Y996	T 10T 22 100 100 100	11002410
597Y997	T 22T 35 100 100 100	11002420
598Y998	T 35T 48 100 100 100	11002430
599Y999	T 49T 63 100 100 100	11002440
12Y412	T 63T 71 100 100 100	11002450
23Y423	T 71T 76 100 100 100	11002460
37Y437	T 11T 23 100 100 100	11002470
51Y451	T 23T 36 100 100 100	11002480
65Y465	T 50T 64 100 100 100	11002490
73Y473	T 64T 72 100 100 100	11002500
901Y905	T 72T 77 100 100	11002510
20		12000000

SETTING INITIAL TEMPERATURES

CORE HEAT SINK TEMPERATURES

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1	-11132.5	CORE C/L	12000030
13	-11132.5		12000040
25	-11132.5		12000050
38	-11132.5		12000060
101	-11147.5	CORE C/L + 2.0	12000070
113	-11147.5		12000080
125	-11147.5		12000090
138	-11147.5		12000100
201	-11162.5	CORE C/L + 4.0	12000110
213	-11152.5		12000120

225	-11162.5		12000130
238	-11177.5		12000140
301	-11177.5	CORE C/L + 6.0	12000150
313	-11177.5		12000160
325	-11177.5		12000170
338	-11177.5		12000180
401	-11192.5	CORE C/L + 8.0	12000190
413	-11192.5		12000200
425	-11192.5		12000210
438	-11192.5		12000220
COLD WALL HEAT SINK TEMPERATURES			
12T412	-11075.	100CORE IN +100EG F	12000310
24T424	-11075.	100	12000320
37T437	-11075.	100	12000330
51T451	-11075.	100	12000340
65T455	-11075.	100	12000350
73T473	-11075.	100	12000360
73T478	-11075.	100	12000370
SETTING INITIAL DRUM TEMPERATURES			
2T 11	1450.		12000510
102T111	1450.		12000520
202T211	1450.		12000530
302T311	1450.		12000540
402T411	1450.		12000550
			12000555
14T 23	1450.		12000560
114T123	1450.		12000570
214T223	1450.		12000580
314T323	1450.		12000590
614T623	1450.		12000600
			12000610
27T 36	1450.		12000620
127T136	1450.		12000630
227T236	1450.		12000640
327T336	1450.		12000650
427T436	1450.		12000660
			12000663
41T 48	1450.		12000665
141T148	1450.		12000670
241T248	1450.		12000680
341T348	1450.		12000690
441T448	1450.		12000700
			12000710

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T 55T 60	150.	12000720
T155T160	1450.	12000730
T255T260	1450.	12000740
T355T360	1450.	12000750
T455T460	1450.	12000760
	SETTING INNER STATIONARY REFLECTOR TEMPERATURES	12000900
T 26	1400.	12000910
T 26	1400.	12000920
T 26	1400.	12000930
T 326	1400.	12000940
T 426	1400.	12000950
		12000960
T 39T 40	1400.	12000970
T139T140	1400.	12000980
T239T240	1400.	12000990
T339T340	1400.	12001000
T439T440	1400.	12001010
		12001020
T 52T 54	1400.	12001030
T152T154	1400.	12001040
T252T254	1400.	12001050
T352T354	1400.	12001060
T452T454	1400.	12001070
	SETTING OUTER STATIONARY REFLECTOR TEMPERATURES	12001100
T 49T 50	1375.	12001110
T149T150	1375.	12001120
T249T250	1375.	12001130
T349T350	1375.	12001140
T449T450	1375.	12001150
		12001160
T 61T 64	1375.	12001170
T161T164	1375.	12001180
T261T264	1375.	12001190
T361T364	1375.	12001200
T461T464	1375.	12001210
		12001220
T 66T 72	1375.	12001230
T166T172	1375.	12001240
T266T272	1375.	12001250
T366T372	1375.	12001260
T466T472	1375.	12001270
		12001280

74T 77	75.		12001290
174T177	1375.		12001300
274T277	1375.		12001310
374T377	1375.		12001320
474T477	1375.		12001330
	DUMMIES TO HOLD EFFECTIVE EMISSIVITY	1/E+1/E-1	12010000
981	0.25	CORE VES TO DRUM	12010020
982	0.25	CORE VES TO REF	12010030
983	0.25	COLD WALL-DRUM	12010040
984	0.25	COLD WALL-REF	12010050
985	0.428	DR TO REFLECTOR	12010060
	MATERIAL CONDUCTIVITY		12010065
790	54.	KDR BE 1300 FJM	12010070
791	54.	KREF BE 1300 F	12010080
795	1.0	PTHSISRUN/500KW	12010090
	DUMMIES TO HOLD NODE VOLUME	CUBIC INCHES	12010100
	DUMMY VOLUMES ARE BASED ON A 1 INCH HIGH NODE		12010105
	ASSUME ALL NODES ARE SQUARE AND EQUAL		12010110
7020960	0.25		12010120
	NOW CHANGE THOSE NODES THAT ARE NOT EQUAL		12010130
	DRUM NODES		12010140
702	0.23		12010150
711	0.23		12010160
714	0.175		12010170
723	0.175		12010180
727	0.065		12010190
736	0.065		12010200
741	0.12		12010210
748	0.12		12010220
755	0.065		12010230
760	0.065		12010240
756	0.175		12010250
759	0.175		12010260
7570953	0.23		12010270
	INNER STATIONARY REFLECTOR		12010300
726	0.336		12010310
739	0.318		12010320
752	0.078		12010330
740	0.07		12010340
753	0.113		12010350
754	0.129		12010360
	OUTER REFLECTOR SEGMENT		12010400

1949	0.125	12010410
1950	0.292	12010420
1961	0.031	12010430
1962	0.172	12010440
1963	0.25	12010450
1964	0.248	12010460
1966	0.039	12010470
1967	0.121	12010480
1968	0.207	12010490
1969	0.278	12010495
1970	0.316	12010500
1971	0.28	12010510
1972	0.21	12010520
1974	0.023	12010530
1975	0.123	12010540
1976	0.195	12010550
1977	0.117	12010560
	DUMMIES TO HOLD PER UNIT VOLUME HEAT GENERATION RATES	12020000
	SET ALL HEAT GENERATION RATES TO ZERO	12020002
10473	0.0	12020005
	SET ALL HEAT GENERATION RATES BUT THOSE FOR THE CORE	12020007
	VESSEL WALL AND THE COLD WALL	12020008
1 2	32.5	12020010
1 3	21.3	12020020
1 4	15.7	12020030
1 5	12.2	12020040
1 6	6.4	12020050
1 7	5.25	12020060
1 8	4.3	12020070
1 9	3.6	12020080
1 10	3.05	12020090
1 11	2.53	12020100
1 14	22.0	12020110
1 15	21.1	12020120
1 16	15.5	12020130
1 17	12.2	12020140
1 18	6.4	12020150
1 19	5.2	12020160
1 20	4.3	12020170
1 21	3.6	12020180
1 22	3.0	12020190
1 23	2.62	12020200
1 25	35.0	12020210
	STAT. PFF	

27	25.5		12020220
28	20.5		12020230
29	15.0		12020240
30	11.6		12020250
31	6.1		12020260
32	5.08		12020270
33	4.2		12020280
34	3.5		12020290
35	2.72		12020300
36	2.65		12020310
39	29.5	STAT. REFL.	12020320
40	20.2	STAT. REFL.	12020330
41	19.6		12020340
42	14.3		12020350
43	7.4		12020360
44	6.0		12020370
45	5.0		12020380
46	4.1		12020390
47	3.5		12020400
48	3.0		12020410
49	2.67	STAT. REFL	12020420
50	2.37	STAT. REFL	12020430
52	21.2	STAT. REFL	12020440
53	17.5	STAT. REFL	12020450
54	13.5	STAT. REFL	12020460
55	12.7	STAT. REFL	12020470
56	7.1		12020480
57	5.7		12020490
58	3.125		12020500
59	4.0		12020510
60	3.55		12020520
61	3.65	THE BALANCE OF	12020530
62	3.13	THE NODES ARE	12020540
63	2.72	ALL STATIONARY	12020550
64	2.32	REFLECTOR NODES.	12020560
66	6.30		12020570
67	5.45		12020580
68	4.4		12020590
69	3.75		12020600
70	3.13		12020610
71	2.63		12020620
72	2.25		12020630
74	3.5		12020640

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75	2.95			12020650
76	2.48			12020660
77	2.23			12020670
30				13000000
		NODE ADMITTANCES IN THE RADIAL DIRECTION		13000005
1Y401	49	1.	D981	100RAD
2Y402	101	0.178	D990	100
3Y403	101	0.167	D990	100
4Y404	101	0.167	D990	100
5Y405	101	0.167	D990	100
6Y406	101	0.167	D990	100
7Y407	101	0.167	D990	100
8Y408	101	0.167	D990	100
9Y409	101	0.167	D990	100
10Y410	101	0.178	D990	100
11Y411	49	1.	D983	100RAD
13Y413	49	1.	D981	100RAD
14Y414	101	0.191	D990	100
15Y415	101	0.167	D990	100
16Y416	101	0.167	D990	100
17Y417	101	0.167	D990	100
18Y418	101	0.167	D990	100
19Y419	101	0.167	D990	100
20Y420	101	0.167	D990	100
21Y421	101	0.167	D990	100
22Y422	101	0.191	D990	100
23Y423	49	1.	D983	100RAD
25Y425	49	1.25	D982	100RAD
26Y426	49	1.125	D985	100RAD
27Y427	101	0.257	D990	100
28Y428	101	0.167	D990	100
29Y429	101	0.167	D990	100
30Y430	101	0.167	D990	100
31Y431	101	0.167	D990	100
32Y432	101	0.167	D990	100
33Y433	101	0.167	D990	100
34Y434	101	0.167	D990	100
35Y435	101	0.257	D990	100
36Y436	49	1.	D983	100RAD
38Y438	49	0.688	D982	100RAD
39Y439	101	0.125	D991	100
40Y440	49	1.375	D985	100RAD
41Y441	101	0.223	D990	100

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42Y442	101	0.167	D990	100	13000390
43Y443	101	0.167	D990	100	13000400
44Y444	101	0.167	D990	100	13000410
45Y445	101	0.167	D990	100	13000420
46Y446	101	0.167	D990	100	13000430
47Y447	101	0.223	D990	100	13000440
48Y448	49	1.175	D985	100RAD	13000450
49Y449	101	0.223	D991	100	13000460
50Y450	49	1.	D984	100RAD	13000470
52Y452	101	0.10	D991	100	13000480
53Y453	101	0.125	D991	100	13000490
54Y454	49	1.125	D985	100RAD	13000500
55Y455	101	0.111	D990	100	13000510
56Y456	101	.146	D990	100	13000520
57Y457	101	0.157	D990	100	13000530
58Y458	101	.145	D990	100	13000540
59Y459	101	.111	D990	100	13000550
60Y460	49	1.125	D985	100RAD	13000560
61Y461	101	0.0836	D991	100	13000570
62Y462	101	0.157	D991	100	13000580
63Y463	101	0.167	D991	100	13000590
64Y464	49	1.0	D984	100RAD	13000600
66Y466	101	0.10	D991	100	13000610
67Y467	101	0.104	D991	100	13000620
68Y468	101	0.177	D991	100	13000630
69Y469	101	0.177	D991	100	13000640
70Y470	101	0.177	D991	100	13000650
71Y471	101	0.215	D991	100	13000660
72Y472	49	1.125	D984	100RAD	13000670
74Y474	101	0.061	D991	100	13000660
75Y475	101	0.099	D991	100	13000670
76Y476	101	0.223	D991	100	13000670
77Y477	49	1.06	D984	100RAD	13000670
NODE ADMITTANCES IN THE CORE AXIAL DIRECTION					
502Y802	101	0.0096	D990	100	13001010
503Y803	101	0.0104	D990	100	13001020
504Y804	101	0.0104	D990	100	13001030
505Y805	101	0.0104	D990	100	13001040
506Y806	101	0.0104	D990	100	13001050
507Y807	101	0.0104	D990	100	13001060
508Y808	101	0.0104	D990	100	13001070
509Y809	101	0.0104	D990	100	13001080
510Y810	101	0.0104	D990	100	13001090

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Y511Y811	101	0.0096	D990	100	13001100
Y514Y814	101	0.0073	D990	100	13001110
Y515Y815	101	0.0104	D990	100	13001120
Y515Y815	101	0.0104	D990	100	13001130
Y517Y817	101	0.0104	D990	100	13001140
Y518Y818	101	0.0104	D990	100	13001150
Y519Y819	101	0.0104	D990	100	13001160
Y520Y820	101	0.0104	D990	100	13001170
Y521Y821	101	0.0104	D990	100	13001180
Y522Y822	101	0.0104	D990	100	13001190
Y523Y823	101	0.0073	D990	100	13001200
Y526Y826	101	0.014	D991	100	13001210
Y527Y827	101	0.0027	D990	100	13001220
Y528Y828	101	0.0104	D990	100	13001230
Y529Y829	101	0.0104	D990	100	13001240
Y530Y830	101	0.0104	D990	100	13001250
Y531Y831	101	0.0104	D990	100	13001260
Y532Y832	101	0.0104	D990	100	13001270
Y533Y833	101	0.0104	D990	100	13001280
Y534Y834	101	0.0104	D990	100	13001290
Y535Y835	101	0.0104	D990	100	13001300
Y536Y836	101	0.0027	D990	100	13001310
Y539Y839	101	0.0132	D991	100	13001320
Y540Y840	101	0.0029	D991	100	13001330
Y541Y841	101	0.0050	D990	100	13001340
Y542Y842	101	0.0104	D990	100	13001350
Y543Y843	101	0.0104	D990	100	13001360
Y544Y844	101	0.0104	D990	100	13001370
Y545Y845	101	0.0104	D990	100	13001380
Y546Y846	101	0.0104	D990	100	13001390
Y547Y847	101	0.0104	D990	100	13001400
Y548Y848	101	0.0050	D990	100	13001410
Y549Y849	101	0.0052	D991	100	13001420
Y550Y850	101	0.0121	D991	100	13001430
Y552Y852	101	0.0032	D991	100	13001440
Y553Y853	101	0.0047	D991	100	13001450
Y554Y854	101	0.0054	D991	100	13001460
Y555Y855	101	0.0027	D990	100	13001470
Y556Y856	101	0.0073	D990	100	13001480
Y557Y857	101	0.0026	D990	100	13001490
Y558Y858	101	0.0096	D990	100	13001500
Y559Y859	101	0.0073	D990	100	13001510
Y560Y860	101	0.0027	D990	100	13001520

/561Y861	101	0.0013	D991	100	13001530
/562Y862	101	0.0072	D991	100	13001540
/563Y863	101	0.0104	D991	100	13001550
/564Y864	101	0.0103	D991	100	13001560
/566Y866	101	0.0016	D991	100	13001570
/567Y867	101	0.0050	D991	100	13001580
/568Y868	101	0.0086	D991	100	13001590
/569Y869	101	0.0116	D991	100	13001600
/570Y870	101	0.0131	D991	100	13001610
/571Y871	101	0.0116	D991	100	13001620
/572Y872	101	0.0087	D991	100	13001630
/574Y874	101	0.0010	D991	100	13001640
/575Y875	101	0.0051	D991	100	13001650
/576Y876	101	0.0081	D991	100	13001660
/577Y877	101	0.0049	D991	100	13001661
NODE ADMITTANCES IN THE CIRCUMFERENTIAL DIRECTION					13002000
/78Y478	101	0.146	D990	100	13002010
/79Y479	101	0.0833	D990	100	13002020
/80Y480	101	0.27	D991	100	13002030
/81Y481	101	0.46	D991	100	13002040
/82Y482	101	0.167	D990	100	13002050
/83Y483	101	0.167	D990	100	13002060
/84Y484	101	0.223	D990	100	13002070
/85Y485	101	0.29	D991	100	13002080
/86Y486	101	0.167	D990	100	13002090
/87Y487	101	0.167	D990	100	13002100
/88Y488	101	0.167	D990	100	13002110
/89Y489	101	0.257	D990	100	13002120
/90Y490	101	0.167	D990	100	13002130
/91Y491	101	0.167	D990	100	13002140
/92Y492	101	0.167	D990	100	13002150
/93Y493	101	0.191	D990	100	13002160
/94Y494	49	.375	D985	100RAD	13002170
/95Y495	101	0.167	D990	100	13002180
/96Y496	101	0.167	D990	100	13002190
/97Y497	101	0.167	D990	100	13002200
/98Y498	101	0.178	D990	100	13002210
/99Y499	49	1.0	D985	100RAD	13002220
/573Y978	101	0.167	D990	100	13002230
/579Y979	101	0.167	D990	100	13002240
/580Y980	101	0.167	D990	100	13002250
/581Y981	101	0.178	D990	100	13002260
/592Y982	49	1.	D985	100RAD	13002270

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583Y983	101	0.167	D990	100	13002280
534Y934	101	0.167	D990	100	13002290
585Y985	101	0.167	D990	100	13002300
586Y986	101	0.121	D990	100	13002310
587Y987	49	1.06	D985	100RAD	13002320
593Y988	101	0.333	D991	100	13002330
599Y989	101	0.333	D991	100	13002340
590Y990	101	0.167	D990	100	13002350
591Y991	101	0.167	D990	100	13002360
592Y992	101	0.167	D990	100	13002370
593Y993	101	0.257	D990	100	13002380
594Y994	101	0.214	D991	100	13002390
595Y995	101	0.25	D991	100	13002400
596Y996	101	0.167	D990	100	13002410
597Y997	101	0.167	D990	100	13002420
598Y998	101	0.223	D990	100	13002430
599Y999	101	0.242	D991	100	13002440
12Y412	101	0.148	D991	100	13002450
23Y+23	101	0.156	D991	100	13002460
37Y437	101	0.146	D990	100	13002470
51Y451	101	0.0833	D990	100	13002480
65Y455	101	0.208	D991	100	13002490
73Y473	101	0.137	D991	100	13002500
901Y905	101	0.104	D991		13002510
* MULTIPLY HEAT GENERATION RATE TIMES VOLUME					13050000
22020277	152	2.	D 2D902	1 1 1G IS 2IN NODE	13050010
* NOW MULTIPLY BY AXIAL PROFILE: ENTER RATIO OF POWER LEVEL					13050020
* TO 600 KWT AS DUMMY D995					13050030
22 77 152		1.383	D2020995	1 1	13050040
21020177	152	1.325	D2020995	1	13050050
22220277	152	1.14	D2020995	1 1	13050060
23020377	152	0.859	D2020995	1 1	13050070
24020477	152	0.505	D2020995	1 1	13050080
* 70					17000000
4		0.01			17000010
5		1.0			17000020
6		1.0			17000030
9		1.199500E-11			17000040
* 80					18000000
T 1T478					18000010
* 90					19000000
0.0		2500.			19000010
14300.		52.			19000020

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15000. 0.0

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NODAL MAP FOR Be
POISON BACK DRUM

