

ISSUED	
ON	12/27/83
BY	WED

11:30

Before the shutdown
commenced on 1/9/84

UNIT	2
CYCLE	9
SEQ	112
REV	4

CONTROL ROD SEQUENCE PACKAGE

DRESDEN UNIT 2

<i>Mark E. Whynne</i>	
prepared	NE
<i>Salloco, Mark</i>	Dec 14 1983
reviewed	QNE
<i>L.H. Poff</i>	12-14-83
approved	LQNE
<i>John M. Almer</i>	12-14-83
approved	OE
<i>Jack D. Brunner</i>	12/19/83
approved	TSS
<i>Douglas Hunt</i>	
approved	Station Superintendent
	12/19/83
	date

Copies to: LNE
S.P.

1A	1B	2A	2B	3A	3B	4A	4B	
G-8	N-4	G-10	L-4	F-1	H-3	H-15	M-5	
J-8	C-12	J-6	E-12	K-15	H-13	H-1	D-11	
E-10	E-2	J-10	E-4	K-1	D-7	P-9	M-11	
L-6	N-12	G-6	L-12	F-15	M-9	B-7	D-5	
E-6	A-6	L-8	G-2	P-5	D-9	P-7	H-11	
L-10	R-6	E-8	J-14	B-11	M-7	E-9	H-5	
G-4	E-14	N-10	J-2	P-11	F-11	K-3	K-9	
J-12	L-2	C-6	G-14	B-5	K-5	F-13	F-7	
J-4	A-10	N-6	R-8	D-13	K-11	F-3	K-7	
G-12	L-14	C-10	A-8	M-3	F-5	K-13	I-9	
N-8	C-4			M-13	H-9			
C-8	R-10			D-3	H-7			
5A	5B	5C	6A	6B	7A	7B	7C1	7C2
C-13	A-7	J-1	M-14	B-12	J-9	E-11	N-9	J-3
N-3	R-9	G-15	D-2	P-4	G-7	L-5	C-7	G-13
N-13	A-9	G-1	D-14	P-12	G-9	L-11	N-7	G-3
C-3	R-7	J-15	M-2	B-4	J-7	E-5	C-9	J-13
8A1	8A2	8B1	8B2	9A	9B	9C1	9C2	9D
E-7	G-5	N-5	L-13	H-8	F-10	D-8	H-12	D-12
L-9	J-11	C-11	E-3		K-6	M-8	H-4	M-4
L-7	J-5	N-11	E-13		K-10			M-12
E-9	G-11	C-5	L-3		F-6			D-4
9E1	9E2	10A1	10A2	10B1	10B2	10C1	10C2	
P-10	F-14	K-8	H-6	D-10	K-4	P-8	H-2	
B-6	K-2	F-8	H-10	M-6	F-12	B-8	H-14	
P-6	K-14			M-10	K-12			
B-10	F-2			D-6	F-4			

A SEQUENCE ARRAYS

Tom Rausch 8-23-77 Approved by *[Signature]*

James Dancy 8-13-79

[Signature]

[Signature]

DRESDEN GENERIC CONTROL ROD SEQUENCE

A-2

STEP	ARRAY	MOVE*	STEP	ARRAY	MOVE*
1	1A	0-48	35	7A	4-8)**
2	1B	0-48	36	5A	4-8)
3	2A	0-48	37	7C1, 7C2	8-12
4	2B	0-48	38	7B	8-12
5	3A	0-4	39	7A	8-12
6	3B	0-4	40	5A	8-12
7	3A	4-6	41	7C1, 7C2	12-48
8	3B	4-6	42	7B	12-48
9	3A	6-8	43	7A	12-48
10	3B	6-8	44	8B1, 8B2	0-4
11	3A	8-10	45	8A1, 8A2	0-4
12	3B	8-10	46	5C	0-4
13	3A	10-12	47	5B	0-4
14	3B	10-12	48	8B1, 8B2	4-8
15	3A	12-48	49	8A1, 8A2	4-8
16	3B	12-48	50	5C	4-8
17	4A	0-4	51	5B	4-8
18	4B	0-4	52	5C	8-12
19	4A	4-6	53	5B	8-12
20	4B	4-6	54	5A	12-48
21	4A	6-8	55	5C	12-48
22	4B	6-8	56	5B	12-48
23	4A	8-10	57	6A	0-12
24	4B	8-10	58	6B	0-12
25	4A	10-12	59	6A	12-48
26	4B	10-12	60	6B	12-48
27	4A	12-48	61	8B1, 8B2	8-12
28	4B	12-48	62	8A1, 8A2	8-12
29	7C1, 7C2	0-4			
30	7B	0-4			
31	7A	0-4			
32	5A	0-4			
33	7C1, 7C2	4-8)**			
34	7B	4-8)			

*Smaller increments may be desirable for the actual working sequence. Also, rods designated 48 may be left at intermediate positions and pulled as desired.

**Smaller increments may be desirable for the actual working sequence to further reduce the possibility of short periods.

Tom Rensch 8-23-79

James Doherty 8-23-79

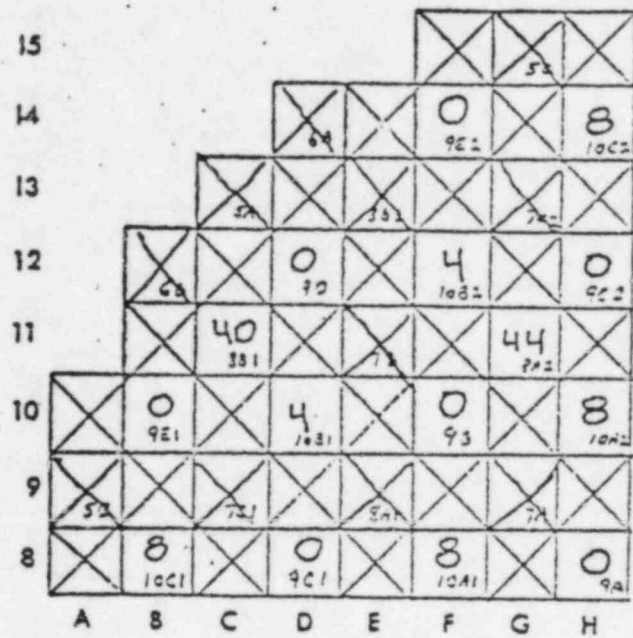
Approved by

D. J. Jansen

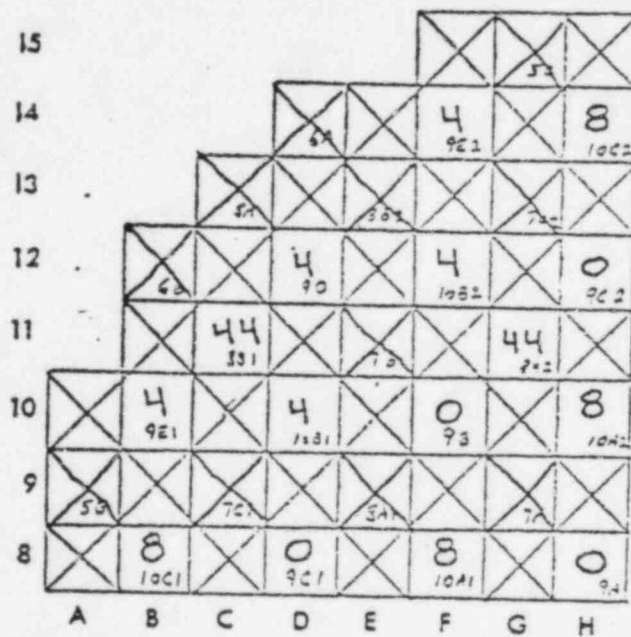
A. W. Pagan

B. J. H. H. H.

CONTROL ROD MAPS FOR SEQUENCE BREAKPOINTS



RWM Breakpoint



BPWS Breakpoint

CONTROL ROD SEQUENCE PACKAGE

sequence A2 rev. 4 unit 2

step	array	move		nso-date-time	Verit	nso-date-time	Verit	nso-date-time	Verit
1	1A	0-48	out						
			in						
2	1B	0-48	out						
			in						
3	2A	0-48	out						
			in						
4	2B	0-48	out						
			in						

NOTE:

WITH LOW XENON, CRITICALITY IS POSSIBLE IN ARRAY 3A OR 3B. WHEN NEAR CRITICALITY AND BEFORE HEATING IT IS ADVISABLE TO NOTCH INDIVIDUAL CONTROL RODS BETWEEN 4 + 12.

5	3A	0-4	out						
			in						
6	3B	0-4	out						
			in						
7	3A	4-6	out						
			in						
8	3B	4-6	out						
			in						
9	3A	6-8	out						
			in						
10	3B	6-8	out						
			in						
11	3A	8-10	out						
			in						
12	3B	8-10	out						
			in						
13	3A	10-12	out						
			in						
14	3B	10-12	out						
			in						

Verification of one of the following must be performed as shown below:

1. When the reactor thermal power is greater than 20%, "N/A" should be inserted in box.
2. When the Rod Worth Minimizer is in operation, insert "RWM" in box.
3. When a second N.S.O. is verifying all rod moves to be in proper sequence, insert his initials in box.

CONTROL ROD SEQUENCE PACKAGE

sequence AZ rev. 4 unit 2

step	array	move		nso-date-time	Verit	nso-date-time	Verit	nso-date-time	Verit
15	3A	12-48	out in						
16	3B	12-48	out in						
17	4A	0-4	out in						
18	4B	0-4	out in						
19	4A	4-6	out in						
20	4B	4-6	out in						
21	4A	6-8	out in						
22	4B	6-8	out in						
23	4A	8-10	out in						
24	4B	8-10	out in						
25	4A	10-12	out in						
26	4B	10-12	out in						
27	4A	12-48	out in						
28	4B	12-48	out in						

NOTE: BEYOND THIS POINT ON UNIT STARTUPS, DO NOT USE
NOTCH OVERRIDE BETWEEN POSITIONS 0-24 UNTIL:
(1) FIRST BYPASS IS OPEN
OR (2) UNIT IS ON LINE

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CONTROL ROD SEQUENCE PACKAGE

sequence AZ rev. 4 unit 2

step	array	move		nso-date-time	Verif.	nso-date-time	Verif.	nso-date-time	Verif.
29	7C1	0-4	out						
			in						
30	7C2	0-4	out						
			in						
31	7B	0-4	out						
			in						
32	7A	0-4	out						
			in						
33	5A	0-4	out						
			in						
34	7C1	4-6	out						
			in						
35	7C2	4-6	out						
			in						
36	7B	4-6	out						
			in						
37	7A	4-6	out						
			in						
38	5A	4-6	out						
			in						
39	7C1	6-8	out						
			in						
40	7C2	6-8	out						
			in						
41	7B	6-8	out						
			in						
42	7A	6-8	out						
			in						
43	5A	6-8	out						
			in						
44	7C1	8-12	out						
			in						

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CONTROL ROD SEQUENCE PACKAGE

sequence AZ rev. 4 unit 2

step	array	move		nso-date-time	verif.	nso-date-time	verif.	nso-date-time	verif.
45	7C2	8-12	out in						
46	7B	8-12	out in						
47	7A	8-12	out in						
48	5A	8-12	out in						
49	7C1	12-48	out in						
50	7C2	12-48	out in						
51	7B	12-48	out in						
52	7A	12-48	out in						
53	8B1	0-4	out in						
54	8B2	0-4	out in						
55	8A1	0-4	out in						
56	8A2	0-4	out in						
57	5C	0-4	out in						
58	5B	0-4	out in						
59	8B1	4-8	out in						
60	8B2	4-8	out in						

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CONTROL ROD SEQUENCE PACKAGE

sequence AZ rev. 4 unit 2

step	array	move		nso-date-time	Verif.	nso-date-time	Verif.	nso-date-time	Verif.
61	8A1	4-8	out in						
62	8A2	4-8	out in						
63	SC	4-8	out in						
64	SB	4-8	out in						
65	SC	8-12	out in						
66	SB	8-12	out in						
67	SA	12-48	out in						
68	SC	12-48	out in						
69	SB	12-48	out in						
70	6A	0-12	out in						
71	6B	0-12	out in						
72	6A	12-48	out in						
73	6B	12-48	out in						
74	8B1	8-12	out in						
75	8B2	8-12	out in						
76	8A1	8-12	out in						

Verification of one of the following must be performed as shown below:

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CONTROL ROD SEQUENCE PACKAGE

sequence A2 rev. 4 unit 2

step	array	move		nso-date-time	Verit	nso-date-time	Verit	nso-date-time	Verit
77	8A2	8-12	out in						
78	8B2	12-40	out in						
79	8A1	12-40	out in						
80	8B1	12-36	out in						
81	8A2	12-36	out in						
82	10B1	0-4	out in						
83	10A2	0-4	out in						
84	10C1	0-4	out in						
85	10C2	0-4	out in						
86	10A1	0-4	out in						
87	10B2	0-4	out in						
88	8A1	40-44	out ³ in						
89	8B2	40-44	out in						
90	8A2	36-40	out in						
91	8B1	36-40	out in						
92	10A2	4-8	out in						

ERROR DISCOVERED

SKIPPED

Verification of one of the following must be performed as shown below:

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3. When a second N.S.O. is verifying all rod moves to be in proper sequence, insert his initials in box.

CONTROL ROD SEQUENCE PACKAGE

sequence A2 rev. 4 unit 2

step	array	move		nso-date-time	Verif.	nso-date-time	Verif.	nso-date-time	Verif.
93	10C1	4-8	out						
			in						
94	10C2	4-8	out						
			in						
95	10A1	4-8	out						
			in						
96	8A1	44-48	out	12-31-83 0748	HA				
			in						
97	8B2	44-48	out	2 12-31-83 0749	HA				
			in						
98	8A2	40-44	out	2 12-31-83 0810	gm				
			in						

ROD WORTH MINIMIZER
ONLY LOADED TO STEP 98

INITIALIZE ROD WORTH
MINIMIZER HERE FOR SHUTDOWNS

99	8B1	40-44	out	12/31/83 0805					
			in						
100	9E1	0-4	out						
			in						
101	9E2	0-4	out						
			in						
102	9D	0-4	out						
			in						

END
OF
BPWS

VERIFY THAT THE CORE THERMAL POWER
IS > 20% OF RATED BEFORE PROCEEDING. RECORD
FRACTION OF RATED POWER AND NSO INITIALS

			out						
			in						
103	9E1	4-20	out						
			in						

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CONTROL ROD SEQUENCE PACKAGE

sequence A2 rev. 4 unit 2

seq	array	move		nso-date-time					
104	9E2	4-20	out	} SKIPPED					
			IN						
105	9D	4-16	out	12/28 0336					
			IN						
106	10A1	8-12	out	} SKIPPED					
			IN						
107	10A2	8-12	out						
			IN						
108	10C1	8-12	out	} SKIPPED					
			IN						
109	10C2	8-12	out						
			IN						
110	9E1	20-32	out	12/28 0333					
			IN						
111	9E2	20-32	out	} SKIPPED					
			IN						
112	9D	16-24	out	12/28 0336					
			IN						
NE Holdpoint			X out						
113	8A2	44-48	out	2 12/28/83 0333					
			IN						
114	8B1	44-48	out	12/28/83 0335					
			IN						

sequence A2 rev. 4 unit 2

lep array m			nso-date-time			
115	10C1	12-16	out	}	SKIPPED	
			in			
116	10C2	12-16	out	}		
			in			
117	9E1	32-36	out	3.14.5.8.5 out gm		
			in			
118	9E2	32-36	out	4.1.1.1.1.5.2.1.6 gm		
			in			
119	10A1	12-16	out	from 12/28 0410		
			in			
120	10A2	12-16	out	from 12/28 0412		
			in			
121	9D	24-32	out	7.12.13.1.8.3 070 gm		
			in			
122	10C1	16-24	out	}	SKIPPED	
			in			
123	10C2	16-24	out	}		
			in			
124	10A1	16-20	out	12/28 gm 00.55		
			in			
125	10A2	16-20	out	12/29 T/C 00.32		
			in			
126	10B1	4-8	out	12/29 0414		
			in			

CONTROL ROD SEQUENCE PACKAGE

sequence A2 rev. 4 unit 2

seq	array	move		nso-date-time					
127	10B2	4-8	out	11/12/79 12:15					
			IN						
128	9E1	36-40	out	5/11/85 12:16 PM					
			IN						
129	9E2	36-40	out	6/13/85 12:16 PM					
			IN						
130	10C1	24-30	out	3/10/88 12:15 PM					
			IN						
131	10C2	24-30	out	3/10/88 12:15 PM					
			IN						
132	10A1	20-24	out	5/11/85 9 AM					
			IN						
133	10A2	20-24	out	6/13/85 9 AM					
			IN						
134	9D	32-36	out						
			IN						
135	9A	0-4	out	3/10/88 12:15 PM					
			IN						
136	9B	0-4	out	3/10/88 12:15 PM					
			IN						
137	10C1	30-34	out						
			IN						
138	10C2	30-34	out						
			IN						

CONTROL ROD SEQUENCE PACKAGE

sequence A2 rev. 4 unit 2

step	array	move		nso-date-time						
139	10A1	24-28	out							
			IN							
140	10A2	24-28	out							
			IN							
141	9E1	40-44	out							
			IN							
142	9E2	40-44	out							
			IN							
143	10B1	8-10	out	12-29-83 MTC 10:13						
			IN							
144	10B2	8-10	out	12-29-83 MTC 10:25						
			IN							
145	9A	4-6	out	0924 12-30-83						
			IN							
146	9B	4-6	out	12/30/83 07:50						
			IN	1-3-84 1053-133						
147	9D	36-40	out							
			IN							
148	9C1	0-4	out	12/21/83 913	11/18/83 0830 TSR					
			IN	1-2-84 1803						
149	9C2	0-4	out	12/30/83 45	1-5-84 0858					
			IN	1-3-84 0126						
150	10B1	10-12	out	12-29-83 MTC 10:13						
			IN	1-5-84 0853						

sequence A2 rev. 4 unit 2

tep array move			nso-date-time						
151	10B2	10-12	out	504, 2-5-83 0751					
			IN	PR 1-2-84 0835					
152	9E1	44-48	out						
			IN						
153	9E2	44-48	out						
			IN						
154	9D	40-44	out						
			IN						
155	10C1	34-38	out						
			IN						
156	10C2	34-38	out						
			IN						
157	9A	6-8	out	1/4/83 0842 TSP					
			IN	8 ¹¹ 2127 1/8/84					
158	9B	6-8	out	2412-5-83 0719					
			IN	PR 1-2-84 1405					
159	10A1	28-32	out						
			IN						
160	10A2	28-32	out						
			IN						
161	9C1	4-6	out	2412-5-83 0817					
			IN	17 1-2-84 1703					
162	9C2	4-6	out	2412-5-83 0820					
			IN	05 1-2-84 1951					

CONTROL ROD SEQUENCE PACKAGE

sequence A2 rev. 4 unit 2

	array	move	nso-date-time						
163	9D	44-48	out						
			IN						
164	10B1	12-14	out						
			IN						
165	10B2	12-14	out						
			IN						
166	9A	8-10	out						
			IN						
167	9B	8-10	out						
			IN						
168	10B1	14-16	out						
			IN						
169	10B2	14-16	out						
			IN						
170	9A	10-12	out						
			IN						
171	9B	10-12	out						
			IN						
172	9C1	6-8	out						
			IN						
173	9C2	6-8	out						
			IN						
			out						
			IN						