Dominion Nuclear Connecticut, Inc.
Millstone Power Station
Rope Ferry Road
Waterford, CT 06385

Dominion

NOV 1 2002

Docket No. 50-423
B18788

RE: TS 6.9.1.6

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Millstone Power Station, Unit No. 3
Core Operating Limits Report, Cycle 9

Pursuant to Technical Specification 6.9.1.6, Dominion Nuclear Connecticut, Inc., hereby submits the Core Operating Limits Report (COLR) for Cycle 9. The COLR is enclosed as Attachment 1.

There are no regulatory commitments contained within this letter.

If you have any additional questions concerning this submittal, please contact Mr. David W. Dodson at (860) 447-1791, extension 2346.

Very truly yours,

DOMINION NUCLEAR CONNECTICUT, INC.

J. Alan Price
Site Vice President - Millstone

Attachment (1)

cc: H. J. Miller, Region I Administrator
V. Nerses, NRC Senior Project Manager, Millstone Unit No. 3
Millstone Senior Resident Inspector

A001

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Attachment 1

Millstone Power Station, Unit No. 3

Core Operating Limits Report, Cycle 9

TRM APPENDIX 8.1

MILLSTONE UNIT 3

CYCLE 9

CORE OPERATING LIMITS REPORT

Revision 1

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Millstone Unit 3

Cycle 9

Core Operating Limits Report

1.0 Core Operating Limits Report

This Core Operating Limits Report (COLR) for Millstone Unit 3 Cycle 9 has been prepared in accordance with the requirements of Technical Specification 6.9.1.6.a. The Technical Specifications affected by this report are listed below.

3/4.1.1.3	Moderator Temperature Coefficient
3/4.1.3.5	Shutdown Rod Insertion Limit
3/4.1.3.6	Control Rod Insertion Limits (Four Loop)
3/4.2.1.1	Axial Flux Difference - Four Loop
3/4.2.2.1	Heat Flux Hot Channel Factor - Four Loop
3/4.2.3.1	Nuclear Enthalpy Rise Hot Channel Factor - Four Loop
3/4.3.5	Shutdown Margin Monitor Alarm Setpoint

2.0 Operating Limits

The cycle-specific parameter limits for the specifications listed in Section 1.0 are presented in the following subsections. These limits have been developed using the NRC-approved methodologies specified in Technical Specification 6.9.1.6.b. Limits for N-1 loop operation are not provided. Power operation in N-1 loop conditions is not allowed for Cycle 9.

2.1 Moderator Temperature Coefficient (Specification 3/4.1.1.3)

2.1.1 The Moderator Temperature Coefficient (MTC) limits are as follows:

- The BOL/ARO/0% - 70% RTP MTC shall be less positive than + 0.5 x 10^{-4} $\Delta k/k/°F$. Above 70% RTP, the MTC limit is a linear ramp to 0 $\Delta k/k/°F$ at 100% RTP.
- The EOL/ARO/RTP MTC shall be less negative than - 5.65 x 10^{-4} $\Delta k/k/°F$.

2.1.2 The MTC surveillance limit is as follows:

- The 300 ppm/ARO/RTP MTC should be less negative than or equal to -4.9×10^{-4} $\Delta k/k/°F$,

where: BOL stands for Beginning Of Cycle Life
ARO stands for All Rods Out
HZP stands for Hot Zero Power
EOL stands for End Of Cycle Life
RTP stands for Rated Thermal Power.

2.2 Shutdown Rod Insertion Limit (Specification 3/4.1.3.5)

- The shutdown rods shall be at least 220 steps withdrawn (inclusive).

2.3 Control Rod Insertion Limits (Specification 3/4.1.3.6)

- The control rod banks shall be limited in physical insertion as shown in Figure 1 for four-loop operation, and
- Control bank A shall be at least 220 steps withdrawn.

2.4 Axial Flux Difference (Four - Loop Operation) (Specification 3/4.2.1.1)

2.4.1 The Axial Flux Difference (AFD) limits are provided in Figure 2.

2.4.2 The AFD target band during base load operation is $\pm$ 5%.

2.4.3 The minimum allowable (nuclear design) power level for base load operation (APL^{ND}) is 80% of Rated Thermal Power.

2.5 Section Deleted

2.6 Heat Flux Hot Channel Factor (Four-Loop Operation) - $F_Q(Z)$ (Specification 3/4.2.2.1)

$$F_Q(Z) \leq \frac{F_Q^{RTP}}{P} * K(Z) \qquad \text{for } P > 0.5$$

$$F_Q(Z) \leq \frac{F_Q^{RTP}}{0.5} * K(Z) \qquad \text{for } P \leq 0.5$$

where: $$P = \frac{THERMAL\ POWER}{RATED\ THERMAL\ POWER}$$

2.6.1 $F^{RTP}_Q = 2.60$.

2.6.2 K(Z) is provided in Figure 3.

2.7 Heat Flux Hot Channel Factor Surveillance (Four-Loop Operation) - $F_Q(Z)$ (Specification 3/4.2.2.1.2)

$$F_Q(Z) \leq \frac{F_Q^{RTP} * K(Z)}{P * W(Z)} \qquad \text{for } P > 0.5$$

$$F_Q(Z) \leq \frac{F_Q^{RTP} * K(Z)}{0.5 * W(Z)} \qquad \text{for } P \leq 0.5$$

where: $$P = \frac{THERMAL\ POWER}{RATED\ THERMAL\ POWER}$$

2.7.1 $F^{RTP}_Q = 2.60$.

2.7.2 K(Z) is provided in Figure 3.

2.7.3* W(Z) values for 4-Loop RAOC operation are provided in Table 1. Note that the W(Z) values at Axial Mesh 1 are at the top of the core. The Cycle 9 burnup dependent RAOC W(Z) values are valid over the range of burnup from 0 to 21,200 MWD/MTU.

2.7.4* W(Z) values for 4-Loop Base Load (BL) operation are provided in Table 2. Note that the W(Z) values at Axial Mesh 1 are at the top of the core. The Cycle 9 burnup dependent BL W(Z) values are valid over the range of burnup from 0 to 21,200 MWD/MTU.

2.7.5* A 2% factor shall be used for surveillance requirements 4.2.2.1.2 and 4.2.2.1.4 .

* Sections 2.7.3 through 2.7.5 are prepared by Dominion.

2.8 Section Deleted

2.9 Section Deleted

2.10 Nuclear Enthalpy Rise Hot Channel Factor (Four-Loop Operation) - $F^N_{\Delta H}$ (Specification 3/4.2.3.1)

$$F^N_{\Delta H} \leq F^{RTP}_{\Delta H} * (1 + PF_{\Delta H} * [1 - P])$$

where: $P = \frac{\text{Thermal Power}}{\text{Rated Thermal Power}}$

2.10.1 $F^{RTP}_{\Delta H}$ = 1.54 for VANTAGE 5H fuel assembly

$F^{RTP}_{\Delta H}$ = 1.58 for Robust Fuel Assembly (RFA).

2.10.2 $PF_{\Delta H}$ = 0.3 for $P < 1.0$.

2.11 Section Deleted

2.12 Shutdown Margin Monitor Alarm Setpoint (Specification 3/4.3.5)+

The Shutdown Margin Monitor (SMM) minimum count rate and Alarm Ratio Setting to meet LIMITING CONDITION FOR OPERATION (LCO) 3.3.5 shall be as shown below.

Tech. Spec. LCO	SMM Alarm Ratio Setting	Min. Count Rate (counts/sec)
3.3.5.a	1.50	1.0
	1.25	0.6
3.3.5.b.1	1.50	0.50
	1.25	0.35
3.3.5.b.2	1.50	0.35
	1.25	0.25

The combination of the SMM Alarm Ratio setting and minimum count rate accounts for the time lag between the indicated and actual count rates, as well as other uncertainties. The specified SMM Alarm Ratio setting ensures that the assumption that an alarm is generated at flux doubling in the Boron Dilution Event analysis remains valid. The count rate is displayed on the SMM.

+ Section 2.12 was prepared by Dominion based on boron dilution analyses performed by Westinghouse.

Figure 1

Control Rod Bank Insertion Limits versus Thermal Power for Four Loop Operation

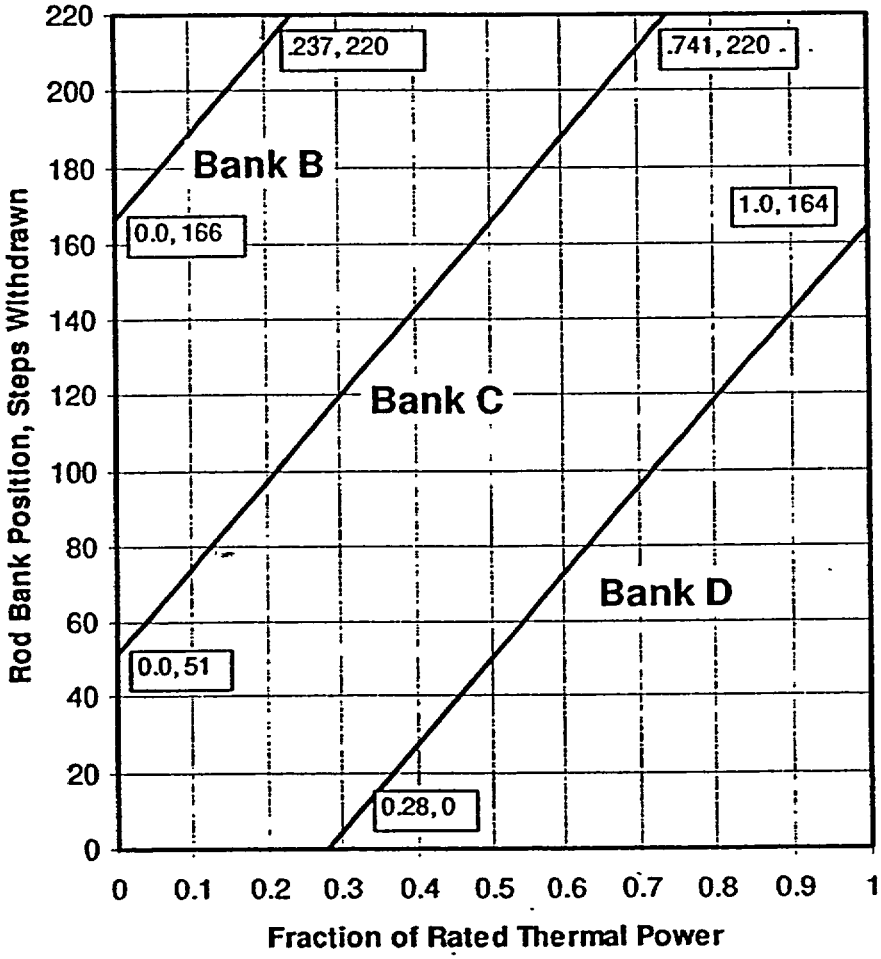

Figure 2
Axial Flux Difference Limits as a Function of Rated Thermal Power for Four Loop Operation

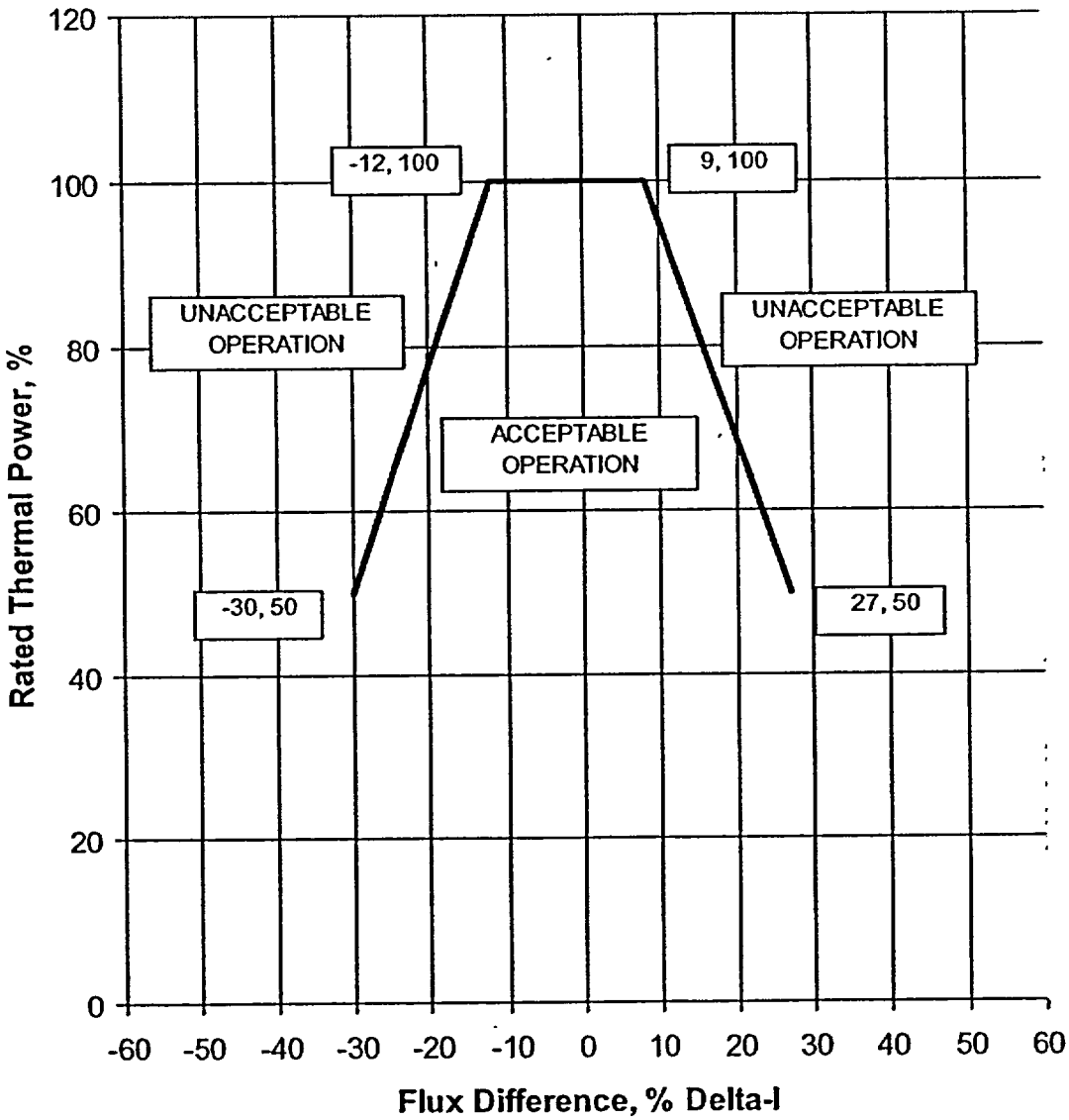

Figure 3

K(Z) - Normalized $F_Q(Z)$ as a Function of Core Height for Four Loop Operation

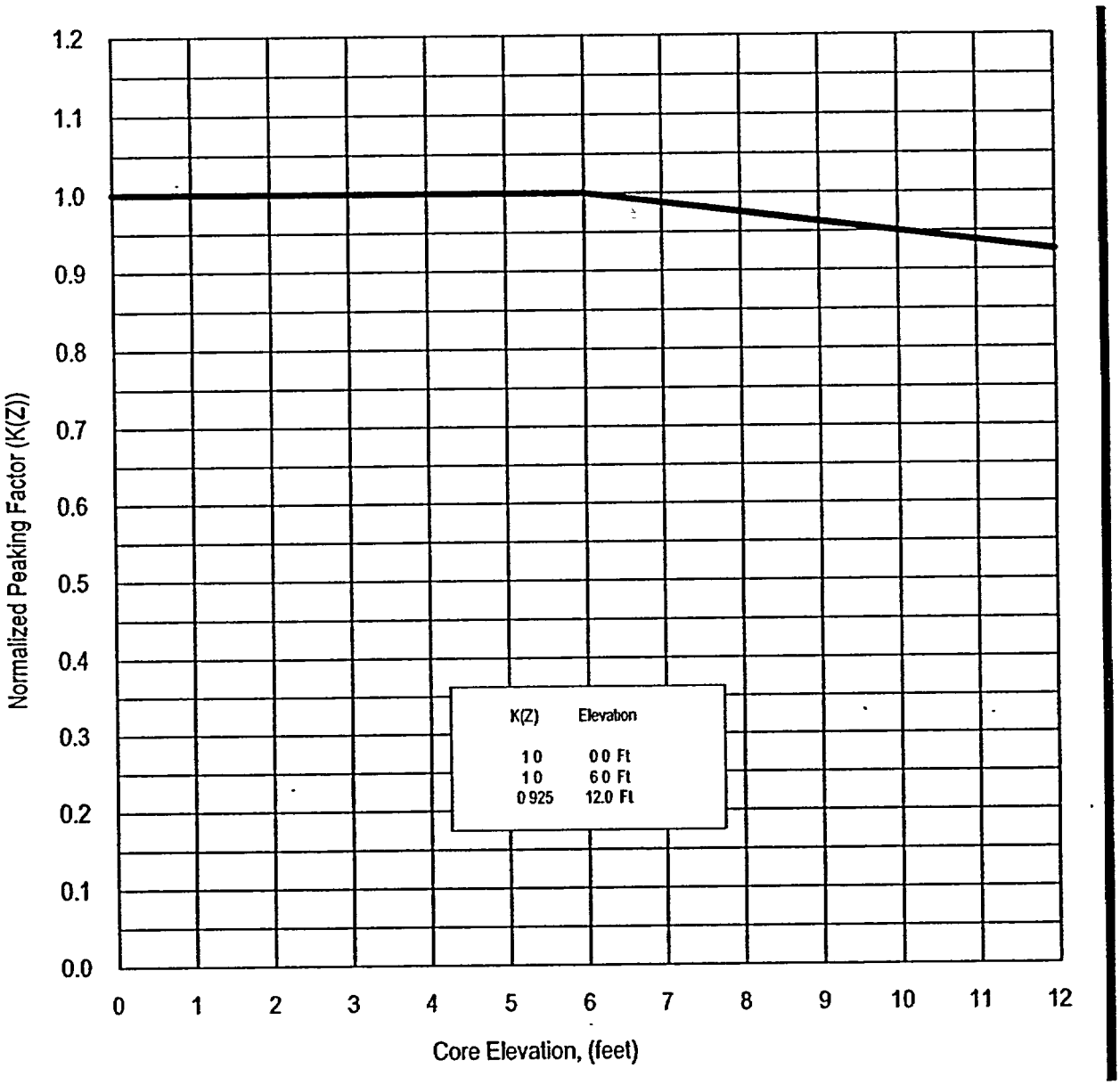

Table 1
Four Loop RAOC W(Z) Function
Millstone Unit 3 - Cycle 9
-12/+9 AFD at 100% RTP

Mesh No.	Axial* Height	Burnup 150 MWD/MTU	Burnup 3000 MWD/MTU	Burnup 10000 MWD/MTU	Burnup 12000 MWD/MTU	Burnup 18000 MWD/MTU
1	12.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2	11.8333	1.0000	1.0000	1.0000	1.0000	1.0000
3	11.6667	1.0000	1.0000	1.0000	1.0000	1.0000
4	11.5000	1.0000	1.0000	1.0000	1.0000	1.0000
5	11.3333	1.0000	1.0000	1.0000	1.0000	1.0000
6	11.1667	1.0000	1.0000	1.0000	1.0000	1.0000
7	11.0000	1.0000	1.0000	1.0000	1.0000	1.0000
8	10.8333	1.0000	1.0000	1.0000	1.0000	1.0000
9	10.6667	1.0000	1.0000	1.0000	1.0000	1.0000
10	10.5000	1.3703	1.3664	1.3616	1.3665	1.3301
11	10.3333	1.3507	1.3576	1.3455	1.3482	1.3212
12	10.1667	1.3319	1.3496	1.3267	1.3262	1.3091
13	10.0000	1.3209	1.3443	1.3064	1.3015	1.2952
14	9.8333	1.3133	1.3355	1.2922	1.2857	1.2800
15	9.6667	1.3067	1.3234	1.2823	1.2765	1.2629
16	9.5000	1.2999	1.3110	1.2698	1.2639	1.2449
17	9.3333	1.2882	1.2941	1.2548	1.2493	1.2339
18	9.1667	1.2722	1.2733	1.2381	1.2337	1.2279
19	9.0000	1.2561	1.2531	1.2195	1.2155	1.2203
20	8.8333	1.2432	1.2384	1.1977	1.1915	1.2148
21	8.6667	1.2328	1.2266	1.1802	1.1724	1.2144
22	8.5000	1.2217	1.2120	1.1765	1.1718	1.2182
23	8.3333	1.2092	1.1980	1.1742	1.1728	1.2212
24	8.1667	1.1974	1.1882	1.1708	1.1712	1.2234
25	8.0000	1.1892	1.1839	1.1715	1.1733	1.2281
26	7.8333	1.1816	1.1796	1.1722	1.1755	1.2319
27	7.6667	1.1744	1.1732	1.1706	1.1753	1.2332
28	7.5000	1.1692	1.1660	1.1681	1.1740	1.2330
29	7.3333	1.1642	1.1580	1.1644	1.1716	1.2312
30	7.1667	1.1578	1.1491	1.1597	1.1681	1.2278
31	7.0000	1.1501	1.1396	1.1542	1.1638	1.2228
32	6.8333	1.1437	1.1287	1.1479	1.1587	1.2165
33	6.6667	1.1394	1.1182	1.1406	1.1523	1.2088
34	6.5000	1.1356	1.1120	1.1324	1.1435	1.1997
35	6.3333	1.1324	1.1100	1.1239	1.1331	1.1900
36	6.1667	1.1296	1.1099	1.1167	1.1239	1.1799
37	6.0000	1.1258	1.1085	1.1129	1.1193	1.1693
38	5.8333	1.1214	1.1074	1.1121	1.1186	1.1594
39	5.6667	1.1180	1.1072	1.1122	1.1188	1.1539

* Distance from bottom of active core (feet)

Table 1(continued)
Four Loop RAOC W(Z) Function
Millstone Unit 3 - Cycle 9
-12/+9 AFD at 100% RTP

Mesh No.	Axial* Height	Burnup 150 MWD/MTU	Burnup 3000 MWD/MTU	Burnup 10000 MWD/MTU	Burnup 12000 MWD/MTU	Burnup 18000 MWD/MTU
40	5.5000	1.1181	1.1070	1.1135	1.1205	1.1563
41	5.3333	1.1189	1.1076	1.1146	1.1218	1.1602
42	5.1667	1.1205	1.1102	1.1156	1.1223	1.1619
43	5.0000	1.1217	1.1121	1.1174	1.1241	1.1629
44	4.8333	1.1220	1.1135	1.1195	1.1264	1.1633
45	4.6667	1.1225	1.1147	1.1214	1.1285	1.1628
46	4.5000	1.1253	1.1155	1.1229	1.1303	1.1616
47	4.3333	1.1286	1.1160	1.1241	1.1317	1.1597
48	4.1667	1.1312	1.1164	1.1251	1.1328	1.1572
49	4.0000	1.1336	1.1165	1.1256	1.1334	1.1542
50	3.8333	1.1358	1.1175	1.1265	1.1342	1.1506
51	3.6667	1.1377	1.1214	1.1282	1.1354	1.1468
52	3.5000	1.1398	1.1250	1.1309	1.1378	1.1430
53	3.3333	1.1427	1.1278	1.1336	1.1405	1.1386
54	3.1667	1.1466	1.1313	1.1361	1.1427	1.1346
55	3.0000	1.1516	1.1382	1.1395	1.1452	1.1396
56	2.8333	1.1618	1.1463	1.1477	1.1534	1.1509
57	2.6667	1.1779	1.1555	1.1612	1.1682	1.1628
58	2.5000	1.1938	1.1703	1.1746	1.1812	1.1747
59	2.3333	1.2091	1.1875	1.1874	1.1929	1.1864
60	2.1667	1.2246	1.2037	1.2004	1.2050	1.1981
61	2.0000	1.2398	1.2197	1.2131	1.2169	1.2094
62	1.8333	1.2544	1.2353	1.2253	1.2281	1.2204
63	1.6667	1.2682	1.2501	1.2368	1.2387	1.2308
64	1.5000	1.0000	1.0000	1.0000	1.0000	1.0000
65	1.3333	1.0000	1.0000	1.0000	1.0000	1.0000
66	1.1667	1.0000	1.0000	1.0000	1.0000	1.0000
67	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
68	0.8333	1.0000	1.0000	1.0000	1.0000	1.0000
69	0.6667	1.0000	1.0000	1.0000	1.0000	1.0000
70	0.5000	1.0000	1.0000	1.0000	1.0000	1.0000
71	0.3333	1.0000	1.0000	1.0000	1.0000	1.0000
72	0.1667	1.0000	1.0000	1.0000	1.0000	1.0000
73	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000

* Distance from bottom of active core (feet).

Table 2
Four Loop Base Load W(Z) Function
Millstone Unit 3 - Cycle 9

Mesh No.	Axial* Height	Burnup 150 MWD/MTU	Burnup 1200 MWD/MTU	Burnup 3000 MWD/MTU	Burnup 10000 MWD/MTU	Burnup 18000 MWD/MTU
1	12.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2	11.8333	1.0000	1.0000	1.0000	1.0000	1.0000
3	11.6667	1.0000	1.0000	1.0000	1.0000	1.0000
4	11.5000	1.0000	1.0000	1.0000	1.0000	1.0000
5	11.3333	1.0000	1.0000	1.0000	1.0000	1.0000
6	11.1667	1.0000	1.0000	1.0000	1.0000	1.0000
7	11.0000	1.0000	1.0000	1.0000	1.0000	1.0000
8	10.8333	1.0000	1.0000	1.0000	1.0000	1.0000
9	10.6667	1.0000	1.0000	1.0000	1.0000	1.0000
10	10.5000	1.2518	1.2669	1.2477	1.1532	1.1562
11	10.3333	1.2459	1.2598	1.2389	1.1523	1.1559
12	10.1667	1.2392	1.2526	1.2310	1.1524	1.1578
13	10.0000	1.2336	1.2468	1.2251	1.1536	1.1595
14	9.8333	1.2282	1.2413	1.2197	1.1519	1.1586
15	9.6667	1.2235	1.2367	1.2154	1.1482	1.1563
16	9.5000	1.2190	1.2326	1.2121	1.1447	1.1548
17	9.3333	1.2097	1.2236	1.2040	1.1365	1.1509
18	9.1667	1.1970	1.2112	1.1924	1.1265	1.1464
19	9.0000	1.1864	1.2009	1.1831	1.1212	1.1447
20	8.8333	1.1785	1.1931	1.1756	1.1173	1.1402
21	8.6667	1.1720	1.1859	1.1677	1.1141	1.1369
22	8.5000	1.1651	1.1778	1.1577	1.1142	1.1430
23	8.3333	1.1569	1.1684	1.1465	1.1157	1.1497
24	8.1667	1.1494	1.1600	1.1369	1.1192	1.1549
25	8.0000	1.1450	1.1552	1.1316	1.1218	1.1628
26	7.8333	1.1424	1.1528	1.1297	1.1236	1.1702
27	7.6667	1.1414	1.1518	1.1288	1.1248	1.1754
28	7.5000	1.1434	1.1524	1.1268	1.1262	1.1793
29	7.3333	1.1451	1.1525	1.1241	1.1267	1.1819
30	7.1667	1.1450	1.1511	1.1207	1.1262	1.1831
31	7.0000	1.1440	1.1488	1.1163	1.1252	1.1830
32	6.8333	1.1422	1.1466	1.1133	1.1234	1.1818
33	6.6667	1.1394	1.1443	1.1121	1.1207	1.1795
34	6.5000	1.1357	1.1416	1.1110	1.1170	1.1759
35	6.3333	1.1324	1.1392	1.1103	1.1138	1.1714
36	6.1667	1.1296	1.1372	1.1099	1.1120	1.1664
37	6.0000	1.1259	1.1343	1.1084	1.1120	1.1614
38	5.8333	1.1214	1.1311	1.1074	1.1122	1.1568
39	5.6667	1.1180	1.1288	1.1072	1.1123	1.1533

* Distance from bottom of active core (feet)

Table 2 (continued)
Four Loop Base Load W(Z) Function
Millstone Unit 3 - Cycle 9

Mesh No.	Axial* Height	Burnup 150 MWD/MTU	Burnup 1200 MWD/MTU	Burnup 3000 MWD/MTU	Burnup 10000 MWD/MTU	Burnup 18000 MWD/MTU
40	5.5000	1.1181	1.1285	1.1063	1.1118	1.1512
41	5.3333	1.1182	1.1280	1.1048	1.1107	1.1488
42	5.1667	1.1175	1.1269	1.1030	1.1092	1.1452
43	5.0000	1.1164	1.1254	1.1008	1.1073	1.1412
44	4.8333	1.1149	1.1235	1.0982	1.1050	1.1370
45	4.6667	1.1130	1.1211	1.0952	1.1023	1.1326
46	4.5000	1.1108	1.1185	1.0920	1.0995	1.1275
47	4.3333	1.1083	1.1157	1.0886	1.0969	1.1219
48	4.1667	1.1055	1.1125	1.0850	1.0947	1.1157
49	4.0000	1.1025	1.1092	1.0812	1.0923	1.1089
50	3.8333	1.0994	1.1035	1.0800	1.0894	1.1028
51	3.6667	1.0961	1.1048	1.0804	1.0868	1.0983
52	3.5000	1.0928	1.1028	1.0807	1.0869	1.0957
53	3.3333	1.0903	1.1012	1.0808	1.0875	1.0930
54	3.1667	1.0892	1.1006	1.0810	1.0887	1.0903
55	3.0000	1.0946	1.1077	1.0907	1.0920	1.0905
56	2.8333	1.1051	1.1200	1.1056	1.1002	1.0958
57	2.6667	1.1170	1.1328	1.1195	1.1130	1.1054
58	2.5000	1.1291	1.1458	1.1338	1.1259	1.1148
59	2.3333	1.1413	1.1591	1.1485	1.1385	1.1238
60	2.1667	1.1535	1.1725	1.1633	1.1513	1.1331
61	2.0000	1.1657	1.1857	1.1779	1.1639	1.1422
62	1.8333	1.1774	1.1985	1.1921	1.1761	1.1510
63	1.6667	1.1886	1.2107	1.2056	1.1877	1.1594
64	1.5000	1.0000	1.0000	1.0000	1.0000	1.0000
65	1.3333	1.0000	1.0000	1.0000	1.0000	1.0000
66	1.1667	1.0000	1.0000	1.0000	1.0000	1.0000
67	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
68	0.8333	1.0000	1.0000	1.0000	1.0000	1.0000
69	0.6667	1.0000	1.0000	1.0000	1.0000	1.0000
70	0.5000	1.0000	1.0000	1.0000	1.0000	1.0000
71	0.3333	1.0000	1.0000	1.0000	1.0000	1.0000
72	0.1667	1.0000	1.0000	1.0000	1.0000	1.0000
73	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000

* Distance from bottom of active core (feet)