

Maine Yankee

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April 13, 1998

MN-98-27

GAZ-98-23

UNITED STATES NUCLEAR REGULATORY COMMISSION
Attention: Document Control Desk
Washington, DC 20555

Reference: (a) License No. DPR-36 (Docket No. 50-309)
(b) Letter: M. J. Meisner to USNRC; Request for Exemption From the Financial Protection Requirement Limits of 10CFR50.54(w) and 10CFR140.11; MN-98-01, dated January 20, 1998
(c) Letter: USNRC to M. J. Meisner; Request for Additional Information For Exemption From Financial Protection Requirement Limits (TAC Nos. MA0659 and MA0660; dated April 9, 1998)

Subject: Response to NRC Request for Additional Information For Exemption From Financial Protection Requirement Limits; (TAC Nos. MA0659 and MA0660)

Gentlemen:

In Reference (b), Maine Yankee submitted a request for exemption from the financial protection requirement limits of 10CFR50.54(w) and 10CFR140.11. In Reference (c), NRC requested additional information that the NRC believes is necessary to assist in reviewing the licensing requests.

In response to Item No. 43, we are attaching a decay heat curve which properly represents the total spent fuel pool decay heat generation of the Maine Yankee fuel. We strongly urge the NRC to use this curve rather than the generic one found in the Branch Technical Position.

In reviewing Reference (c), we find that a number of requested parameters were not required as a part of Maine Yankee's analysis or are inherently included as a standard subroutine in the analytical techniques utilized (see Attachment II to Reference (b)). Those parameters that fall into this classification are request nos. 2, 12, 13, 15-20, 22, 23, 26-36, 38, 39, and 42-44. In each case, we have attempted to provide the best answer available; however, we are limited to the work being done in response to this RAI. With respect to those requests dealing with the properties of materials, we have derived these values from engineering texts, the internet and vendor information. These derived values may not necessarily agree with subroutine values.

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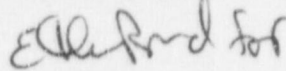
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The designated point of contact for this information is Mr. Robert P. Jordan, Manager, Engineering Analysis, (Phone No. (207) 882-5688). If you have any questions, please contact us.

Very truly yours,



George A. Zinke, Director
Nuclear Safety & Regulatory Affairs

c: Mr. Hubert Miller
Mr. Mike Webb
Mr. Mike Masnik
Mr. Singh Bajwa
Mr. R. A. Rasmussen
Mr. Clough Toppan
Mr. Patrick J. Dostie
Mr. Uldis Vanags

ATTACHMENT
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING ASSESSMENT OF THE LOSS OF
WATER FROM THE SPENT FUEL POOL AT A DECOMMISSIONED PLANT

1. Location (region) in pool (if applicable): See Table 1 (Spent Fuel Pool (SFP) Region Stored)
2. Number of assemblies per batch: See Table 1 below
3. Fuel burnup (MWD/MTU): See Table 1 below (Batch Average)
4. Enrichment (%): See Table 1 below (Batch Average)
5. Metric tons of uranium per assembly (MTU): See Table 1 below (Batch Average)
6. Batch discharge date: See Table 1 below

TABLE 1						
Batch No.	Number of assemblies	SFP Region Stored	Fuel Burnup MWD/MTU	Enrichment %	Metric tons of Uranium per assembly MTU	Final Discharge Date
0100010	12	II	10611	2.027	0.393887	06/29/74
0101010	56	II	11912	2.407	0.358295	06/29/74
0102010	2	I	6522	2.944	0.395219	06/29/74
0103010	1	I	10470	2.957	0.368196	06/29/74
0104010	1	I	10359	2.957	0.358808	06/29/74
0100011	57	II	15695	2.023	0.393993	05/02/75
0101011	24	II	15994	2.410	0.358201	05/02/75
0102011	22	I	8565	2.947	0.394659	05/02/75
0103011	35	I - 20	13330	2.950	0.367985	05/02/75
		II - 15				
0104011	7	II	14884	2.953	0.358410	05/02/75
0110011	2	I	2769	2.341	0.395455	05/02/75
0111011	2	II	4316	1.938	0.395323	05/02/75
0112011	2	II	5058	1.930	0.386173	05/02/75
0113011	1	II	5150	2.006	0.380050	05/02/75
0110030	12	II	15850	1.938	0.395273	07/14/78
0111030	53	II	16223	1.935	0.386436	07/14/78
0200020	69	II	18042	1.950	0.389669	04/09/77

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TABLE 1						
Batch No.	Number of assemblies	SFP Region Stored	Fuel Burnup MWD/MTU	Enrichment %	Metric tons of Uranium per assembly MTU	Final Discharge Date
0201020	1	II	20434	2.515	0.354183	04/09/77
0200030	12	II	29423	2.517	0.353782	07/14/78
0201030	28	II	24409	2.887	0.389028	07/14/78
0202030	12	II	28842	2.884	0.372158	07/14/78
0203030	16	II	29262	2.884	0.363271	07/14/78
0200040	61	II	29696	2.517	0.353710	01/11/80
0201040	12	II	33193	2.888	0.389409	01/11/80
0200050	1	II	28070	2.506	0.351636	05/08/81
0200060	1	II	28812	2.524	0.352289	09/24/82
0200070	1	II	30476	2.517	0.354361	03/31/84
0200080	1	II	31865	2.530	0.353373	08/17/85
0200090	1	II	33819	2.517	0.354368	03/28/87
0200100	1	II	33676	2.518	0.353516	10/15/88
0300050	16	II	31944	2.741	0.388814	05/08/81
0301050	4	II	33035	2.744	0.379997	05/08/81
0302050	12	II	33687	2.738	0.380382	05/08/81
0303050	40	II	31461	3.036	0.387765	05/08/81
0400060	48	II	31912	3.035	0.388812	09/24/82
0401060	24	II	35405	3.032	0.378882	09/24/82
0500070	48	II	32726	3.003	0.381481	03/31/84
0501070	4	II	38235	3.003	0.372852	03/31/84
0502070	20	II	34873	3.003	0.363991	03/31/84
0600080	48	II	35509	3.002	0.380831	08/17/85
0601080	4	II	38341	3.004	0.371499	08/17/85

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TABLE 1						
Batch No.	Number of assemblies	SFP Region Stored	Fuel Burnup MWD/MTU	Enrichment %	Metric tons of Uranium per assembly MTU	Final Discharge Date
0602080	20	II	35685	3.002	0.363157	08/17/85
0700090	8	II	39684	3.288	0.379564	03/28/87
0701090	12	II	41717	3.288	0.371060	03/28/87
0702090	40	II	35804	3.288	0.362447	03/28/87
0703090	4	II	41988	3.288	0.354176	03/28/87
0700110	8	II	36536	3.288	0.379415	04/07/90
0800090	3	II	32218	3.303	0.362029	03/28/87
0801100	28	II	39152	3.303	0.370051	10/15/88
0802100	28	II	39543	3.302	0.361453	10/15/88
0800110	1	II	46045	3.299	0.362537	04/07/90
0800120	1	II	47079	3.300	0.362544	02/14/92
0800130	1	II	44257	3.304	0.361651	07/30/93
0800140	1	II	43206	3.299	0.361722	01/14/95
0800150	8	II	36718	3.301	0.378931	12/06/96
0801150	1	II	38137	3.302	0.361382	12/06/96
0900100	8	II	32305	3.301	0.369564	10/15/88
0900110	4	II	40182	3.307	0.388183	04/07/90
0901110	24	II	41781	3.303	0.378365	04/07/90
0902110	36	II	39721	3.302	0.370192	04/07/90
1000120	20	II	39592	3.502	0.389140	02/14/92
1001120	20	II	45284	3.501	0.379850	02/14/92
1002120	16	II	42939	3.500	0.370907	02/14/92
1000130	8	II	43601	3.496	0.371834	07/30/93
1000140	8	II	39401	3.502	0.389811	01/14/95

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TABLE 1						
Batch No.	Number of assemblies	SFP Region Stored	Fuel Burnup MWD/MTU	Enrichment %	Metric tons of Uranium per assembly MTU	Final Discharge Date
1100120	4	II	34250	3.694	0.380873	02/14/92
1100130	28	II	42355	3.690	0.390712	07/30/93
1101130	32	II	44040	3.693	0.380545	07/30/93
1102130	8	II	49241	3.695	0.372789	07/30/93
1200140	36	II	39212	3.684	0.390577	01/14/95
1201140	12	II	46028	3.682	0.382465	01/14/95
1202140	20	II	47923	3.681	0.374061	01/14/95
1200150	4	II	40240	3.681	0.381497	12/06/96
1300140	4	II	30052	3.702	0.390455	01/14/95
1300150	16	II	32739	3.702	0.390680	12/06/96
1301150	28	II	36864	3.701	0.381292	12/06/96
1302150	20	II	40535	3.702	0.372285	12/06/96
1400150	8	I	21222	3.918	0.391319	12/06/96
1401150	28	I - 16	24838	3.906	0.381947	12/06/96
		II - 12				
1402150	36	I - 4	25643	3.895	0.373550	12/06/96
		II - 32				
1500150	8	I	7340	3.742	0.390342	12/06/96
1501150	32	I	9340	3.739	0.389643	12/06/96
1502150	28	I	9905	3.740	0.389498	12/06/96

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Each Batch:

7. Spent fuel array parameter (i.e. 15x15, 7x7): See Table 2
8. Number of active fuel rods per assembly: See Table 2
9. Outside rod diameter of the fuel (m): See Table 2
10. Rod center-to-center pitch (m): See Table 2
40. Length of active fuel (m): See Table 2

TABLE 2					
Batch	Spent Fuel Array Parameter	No. of active fuel rods per assembly	Outside rod diameter of the fuel (m)	Rod center-to-center pitch (m)	Length of active fuel (m)
0100010	14 x 14	176	0.011176	0.014732	3.47218
0101010	14 x 14	160	0.011176	0.014732	3.47218
0102010	14 x 14	176	0.011176	0.014732	3.47218
0103010	14 x 14	164	0.011176	0.014732	3.47218
0104010	14 x 14	160	0.011176	0.014732	3.47218
0100011	14 x 14	176	0.011176	0.014732	3.47218
0101011	14 x 14	160	0.011176	0.014732	3.47218
0102011	14 x 14	176	0.011176	0.014732	3.47218
0103011	14 x 14	164	0.011176	0.014732	3.47218
0104011	14 x 14	160	0.011176	0.014732	3.47218
0110011	14 x 14	176	0.011176	0.014732	3.47218
0111011	14 x 14	176	0.011176	0.014732	3.47218
0112011	14 x 14	172	0.011176	0.014732	3.47218
0113011	14 x 14	171	0.011176	0.014732	3.47218
0110030	14 x 14	176	0.011176	0.014732	3.47218
0111030	14 x 14	172	0.011176	0.014732	3.47218
0200020	14 x 14	176	0.011176	0.014732	3.47218

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TABLE 2					
Batch	Spent Fuel Array Parameter	No. of active fuel rods per assembly	Outside rod diameter of the fuel (m)	Rod center-to-center pitch (m)	Length of active fuel (m)
0201020	14 x 14	160	0.011176	0.014732	3.47218
0200030	14 x 14	160	0.011176	0.014732	3.47218
0201030	14 x 14	176	0.011176	0.014732	3.47218
0202030	14 x 14	168	0.011176	0.014732	3.47218
0203030	14 x 14	164	0.011176	0.014732	3.47218
0200040	14 x 14	160	0.011176	0.014732	3.47218
0201040	14 x 14	176	0.011176	0.014732	3.47218
0200050	14 x 14	160	0.011176	0.014732	3.47218
0200060	14 x 14	160	0.011176	0.014732	3.47218
0200070	14 x 14	160	0.011176	0.014732	3.47218
0200080	14 x 14	160	0.011176	0.014732	3.47218
0200090	14 x 14	160	0.011176	0.014732	3.47218
0200100	14 x 14	160	0.011176	0.014732	3.47218
0300050	14 x 14	176	0.011176	0.014732	3.47218
0301050	14 x 14	172	0.011176	0.014732	3.47218
0302050	14 x 14	172	0.011176	0.014732	3.47218
0303050	14 x 14	176	0.011176	0.014732	3.47218
0400060	14 x 14	176	0.011176	0.014732	3.47218
0401060	14 x 14	172	0.011176	0.014732	3.47218
0500070	14 x 14	176	0.011176	0.014732	3.47218
0501070	14 x 14	172	0.011176	0.014732	3.47218
0502070	14 x 14	168	0.011176	0.014732	3.47218
0600080	14 x 14	176	0.011176	0.014732	3.47218
0601080	14 x 14	172	0.011176	0.014732	3.47218

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TABLE 2					
Batch	Spent Fuel Array Parameter	No. of active fuel rods per assembly	Outside rod diameter of the fuel (m)	Rod center- to-center pitch (m)	Length of active fuel (m)
0602080	14 x 14	168	0.011176	0.014732	3.47218
0700090	14 x 14	176	0.011176	0.014732	3.47218
0701090	14 x 14	172	0.011176	0.014732	3.47218
0702090	14 x 14	168	0.011176	0.014732	3.47218
0703090	14 x 14	164	0.011176	0.014732	3.47218
0700110	14 x 14	176	0.011176	0.014732	3.47218
0800090	14 x 14	168	0.011176	0.014732	3.47218
0801100	14 x 14	172	0.011176	0.014732	3.47218
0802100	14 x 14	168	0.011176	0.014732	3.47218
0800110	14 x 14	168	0.011176	0.014732	3.47218
0800120	14 x 14	168	0.011176	0.014732	3.47218
0800130	14 x 14	168	0.011176	0.014732	3.47218
0800140	14 x 14	168	0.011176	0.014732	3.47218
0800150	14 x 14	176	0.011176	0.014732	3.47218
0801150	14 x 14	168	0.011176	0.014732	3.47218
0900100	14 x 14	168	0.011176	0.014732	3.47218
0900110	14 x 14	176	0.011176	0.014732	3.47218
0901110	14 x 14	172	0.011176	0.014732	3.47218
0902110	14 x 14	168	0.011176	0.014732	3.47218
1000120	14 x 14	176	0.011176	0.014732	3.47218
1001120	14 x 14	172	0.011176	0.014732	3.47218
1002120	14 x 14	168	0.011176	0.014732	3.47218
1000130	14 x 14	168	0.011176	0.014732	3.47218
1000140	14 x 14	176	0.011176	0.014732	3.47218

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TABLE 2					
Batch	Spent Fuel Array Parameter	No. of active fuel rods per assembly	Outside rod diameter of the fuel (m)	Rod center- to-center pitch (m)	Length of active fuel (m)
1100120	14 x 14	172	0.011176	0.014732	3.47218
1100130	14 x 14	176	0.011176	0.014732	3.47218
1101130	14 x 14	172	0.011176	0.014732	3.47218
1102130	14 x 14	168	0.011176	0.014732	3.47218
1200140	14 x 14	176	0.011176	0.014732	3.47218
1201140	14 x 14	172	0.011176	0.014732	3.47218
1202140	14 x 14	168	0.011176	0.014732	3.47218
1200150	14 x 14	172	0.011176	0.014732	3.47218
1300140	14 x 14	176	0.011176	0.014732	3.46075
1300150	14 x 14	176	0.011176	0.014732	3.46075
1301150	14 x 14	172	0.011176	0.014732	3.46075
1302150	14 x 14	168	0.011176	0.014732	3.46075
1400150	14 x 14	176	0.011176	0.014732	3.46075
1401150	14 x 14	172	0.011176	0.014732	3.46075
1402150	14 x 14	168	0.011176	0.014732	3.46075
1500150	14 x 14	176	0.011176	0.014732	3.46075
1501150	14 x 14	176	0.011176	0.014732	3.46075
1502150	14 x 14	176	0.011176	0.014732	3.46075

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11. Fuel rack cell/channel dimension(s) (m): See Table 3 (Inner Dimensions)
12. Thickness of the cell wall (m): See Table 3
13. Center-to-center pitch of assemblies (m): See Table 3
14. Diameter of baseplate hole (m): See Table 3
15. Thermal conductivity of the cell walls (W/m-K): See Table 3
16. Specific heat of cell walls (Joule/Kg-K): See Table 3
17. Density of cell walls (Kg/m³): See Table 3

TABLE 3							
Region	Fuel Rack Cell/channel Dimension(s) (m)	Thickness of the Cell Wall (m)	Center-to-center Pitch of Assemblies (m)	Diameter of Baseplate Hole (m)	Thermal Conductivity of the Cell Walls (W/m-K)	Specific Heat of Cell Walls (Joule/Kg-K)	Density of Cell Walls (Kg/m ³)
I	0.2256	0.001886	0.265	0.102	Table 3a	Table 3a	Table 3a
II	0.2256	0.001886	0.229	0.102	Table 3a	Table 3a	Table 3a

The Following Racks are Region I Racks: AA, BB, CC, DD, EE

The Following Racks are Region II Racks: A, B, C, D, E, F, G, H, I, J, M, N, O, P, S, T, U, V, W, X, Y.

See Figure 6-1 for Basic Fuel Storage Cell

Cell Wall: 304L stainless steel Thickness: 0.0747 in.
 Sheath covering BORAL™: 304L stainless steel Thickness: 0.032 in.
 BORAL™ Dimensions: Width: 7.75 ±0.0625 in.
 Length: 140 ±0.0625 in.
 Thickness: 0.075 ±0.004 in.
 BORAL™: 0.065 in.
 Aluminum: 2 x 0.005 in.

TABLE 3a			
Material	Thermal Conductivity of the Cell Walls (W/m-K)	Specific Heat of Cell Walls (Joule/Kg-K)	Density of Cell Walls (Kg/m ³)
304L Stainless Steel	18.86 @ 500°F 21.11 @ 800°F	502.42	7.831 x 10 ³
BORAL™	85.9	936	2.481 x 10 ³
Aluminum	162.1	919	2.713 x 10 ³

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18. Thermal conductivity of the fuel (W/m-K): See Table 4
19. Specific heat of fuel (J/Kg-K): See Table 4
20. Density of fuel (Kg/m³): See Table 4

TABLE 4						
Batch	Thermal Conductivity of the Fuel (W/m-K)		Specific heat of fuel (J/Kg-K)		Density of fuel (Kg/m ³)	
	500°K	700°K	500°K	700°K	500°K	700°K
All Batches	6.86	5.29	279.58	296.93	10890	10830

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21. Cladding material: See Table 5
 22. Thermal conductivity of the clad (W/m-K): See Table 5
 23. Specific heat of clad (J/Kg-K): See Table 5
 24. Density of clad (Kg/m³): See Table 5
 25. Thickness of the clad (m): See Table 5

TABLE 5						
Batch	Cladding material	Thermal conductivity of the clad (W/m-K)	Specific heat of clad (J/Kg-K)		Density of clad (Kg/m ³)	Thickness of the clad (m)
			500°K	700°K		
0100010	Zircaloy	15.48	306.9	327.3	6500	0.00066
0101010	Zircaloy	15.48	306.9	327.3	6500	0.00066
0102010	Zircaloy	15.48	306.9	327.3	6500	0.00066
0103010	Zircaloy	15.48	306.9	327.3	6500	0.00066
0104010	Zircaloy	15.48	306.9	327.3	6500	0.00066
0100011	Zircaloy	15.48	306.9	327.3	6500	0.00066
0101011	Zircaloy	15.48	306.9	327.3	6500	0.00066
0102011	Zircaloy	15.48	306.9	327.3	6500	0.00066
0103011	Zircaloy	15.48	306.9	327.3	6500	0.00066
0104011	Zircaloy	15.48	306.9	327.3	6500	0.00066
0110011	Zircaloy	15.48	306.9	327.3	6500	0.00066
0111011	Zircaloy	15.48	306.9	327.3	6500	0.00066
0112011	Zircaloy	15.48	306.9	327.3	6500	0.00066
0113011	Zircaloy	15.48	306.9	327.3	6500	0.00066
0110030	Zircaloy	15.48	306.9	327.3	6500	0.00066
0111030	Zircaloy	15.48	306.9	327.3	6500	0.00066
0200020	Zircaloy	15.48	306.9	327.3	6500	0.000711
0201020	Zircaloy	15.48	306.9	327.3	6500	0.000711
0200030	Zircaloy	15.48	306.9	327.3	6500	0.000711

ATTACHMENT
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING ASSESSMENT OF THE LOSS OF
WATER FROM THE SPENT FUEL POOL AT A DECOMMISSIONED PLANT

TABLE 5						
Batch	Cladding material	Thermal conductivity of the clad (W/m-K)	Specific heat of clad (J/Kg-K)		Density of clad (Kg/m ³)	Thickness of the clad (m)
			500°K	700°K		
0201030	Zircaloy	15.48	306.9	327.3	6500	0.000711
0202030	Zircaloy	15.48	306.9	327.3	6500	0.000711
0203030	Zircaloy	15.48	306.9	327.3	6500	0.000711
0200040	Zircaloy	15.48	306.9	327.3	6500	0.000711
0201040	Zircaloy	15.48	306.9	327.3	6500	0.000711
0200050	Zircaloy	15.48	306.9	327.3	6500	0.000711
0200060	Zircaloy	15.48	306.9	327.3	6500	0.000711
0200070	Zircaloy	15.48	306.9	327.3	6500	0.000711
0200080	Zircaloy	15.48	306.9	327.3	6500	0.000711
0200090	Zircaloy	15.48	306.9	327.3	6500	0.000711
0200100	Zircaloy	15.48	306.9	327.3	6500	0.000711
0300050	Zircaloy	15.48	306.9	327.3	6500	0.000711
0301050	Zircaloy	15.48	306.9	327.3	6500	0.000711
0302050	Zircaloy	15.48	306.9	327.3	6500	0.000711
0303050	Zircaloy	15.48	306.9	327.3	6500	0.000711
0400060	Zircaloy	15.48	306.9	327.3	6500	0.000711
0401060	Zircaloy	15.48	306.9	327.3	6500	0.000711
0500070	Zircaloy	15.48	306.9	327.3	6500	0.000787
0501070	Zircaloy	15.48	306.9	327.3	6500	0.000787
0502070	Zircaloy	15.48	306.9	327.3	6500	0.000787
0600080	Zircaloy	15.48	306.9	327.3	6500	0.000787
0601080	Zircaloy	15.48	306.9	327.3	6500	0.000787
0602080	Zircaloy	15.48	306.9	327.3	6500	0.000787
0700090	Zircaloy	15.48	306.9	327.3	6500	0.000787

ATTACHMENT
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING ASSESSMENT OF THE LOSS OF
WATER FROM THE SPENT FUEL POOL AT A DECOMMISSIONED PLANT

TABLE 5						
Batch	Cladding material	Thermal conductivity of the clad (W/m-K)	Specific heat of clad (J/Kg-K)		Density of clad (Kg/m ³)	Thickness of the clad (m)
			500°K	700°K		
0701090	Zircaloy	15.48	306.9	327.3	6500	0.000787
0702090	Zircaloy	15.48	306.9	327.3	6500	0.000787
0703090	Zircaloy	15.48	306.9	327.3	6500	0.000787
0700110	Zircaloy	15.48	306.9	327.3	6500	0.000787
0800090	Zircaloy	15.48	306.9	327.3	6500	0.000787
0801100	Zircaloy	15.48	306.9	327.3	6500	0.000787
0802100	Zircaloy	15.48	306.9	327.3	6500	0.000787
0800110	Zircaloy	15.48	306.9	327.3	6500	0.000787
0800120	Zircaloy	15.48	306.9	327.3	6500	0.000787
0800130	Zircaloy	15.48	306.9	327.3	6500	0.000787
0800140	Zircaloy	15.48	306.9	327.3	6500	0.000787
0800150	Zircaloy	15.48	306.9	327.3	6500	0.000787
0801150	Zircaloy	15.48	306.9	327.3	6500	0.000787
0900100	Zircaloy	15.48	306.9	327.3	6500	0.000711
0900110	Zircaloy	15.48	306.9	327.3	6500	0.000711
0901110	Zircaloy	15.48	306.9	327.3	6500	0.000711
0902110	Zircaloy	15.48	306.9	327.3	6500	0.000711
1000120	Zircaloy	15.48	306.9	327.3	6500	0.000711
1001120	Zircaloy	15.48	306.9	327.3	6500	0.000711
1002120	Zircaloy	15.48	306.9	327.3	6500	0.000711
1000130	Zircaloy	15.48	306.9	327.3	6500	0.000711
1000140	Zircaloy	15.48	306.9	327.3	6500	0.000711
1100120	Zircaloy	15.48	306.9	327.3	6500	0.000711
1100130	Zircaloy	15.48	306.9	327.3	6500	0.000711

ATTACHMENT
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING ASSESSMENT OF THE LOSS OF
WATER FROM THE SPENT FUEL POOL AT A DECOMMISSIONED PLANT

TABLE 5

Batch	Cladding material	Thermal conductivity of the clad (W/m-K)	Specific heat of clad (J/Kg-K)		Density of clad (Kg/m ³)	Thickness of the clad (m)
			500°K	700°K		
1101130	Zircaloy	15.48	306.9	327.3	6500	0.000711
1102130	Zircaloy	15.48	306.9	327.3	6500	0.000711
1200140	Zircaloy	15.48	306.9	327.3	6500	0.000711
1201140	Zircaloy	15.48	306.9	327.3	6500	0.000711
1202140	Zircaloy	15.48	306.9	327.3	6500	0.000711
1200150	Zircaloy	15.48	306.9	327.3	6500	0.000711
1300140	Zircaloy	15.48	306.9	327.3	6500	0.000711
1300150	Zircaloy	15.48	306.9	327.3	6500	0.000711
1301150	Zircaloy	15.48	306.9	327.3	6500	0.000711
1302150	Zircaloy	15.48	306.9	327.3	6500	0.000711
1400150	Zircaloy	15.48	306.9	327.3	6500	0.000711
1401150	Zircaloy	15.48	306.9	327.3	6500	0.000711
1402150	Zircaloy	15.48	306.9	327.3	6500	0.000711
1500150	Zircaloy	15.48	306.9	327.3	6500	0.000711
1501150	Zircaloy	15.48	306.9	327.3	6500	0.000711
1502150	Zircaloy	15.48	306.9	327.3	6500	0.000711

ATTACHMENT
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING ASSESSMENT OF THE LOSS OF
WATER FROM THE SPENT FUEL POOL AT A DECOMMISSIONED PLANT

For spent fuel pool and building:

- 26. Thermal conductivity of the concrete [pool encasement] (W/m-K): 1.7304
- 27. Specific heat of concrete (Joule/Kg-K): 628
- 28. Density of concrete (Kg/m³): 2.35×10^3
- 29. Thickness of pool concrete encasement (m): 1.8288

See Table 6 for Item Nos. 30 through 33

- 30. Thermal conductivity of the storage building walls and ceiling (W/m-K): See Table 6
- 31. Specific heat of storage building walls and ceiling (Joule/Kg-K): See Table 6
- 32. Density of storage building walls and ceiling (Kg/m³): See Table 6
- 33. Average thickness of the storage building walls and ceiling (m): See Table 6

TABLE 6					
	Material	Thermal Conductivity (W/m-K)	Specific Heat (Joule/Kg-K)	Density (Kg/m ³)	Average Thickness (m)
Ceiling	Steel Plate	53	447.988	7801.74	0.0064
	Insulation	.0361	66.989	96.12	0.0381
	Combination	0.0421			0.0445
Walls	Metal Siding	53	447.988	7801.74	0.000853
	Insulation	.0361	66.989	96.12	0.0381
	Combination	0.0370			0.0390

- 34. Total surface area of the storage building walls and ceiling (m²): 1739.3
- 35. Volume of storage building (m³): 2352.59
- 36. Total surface area of the pool floor (m²): 141.81
- 37. Height from pool floor to baseplate of the rack (m): 0.1389
- 38. Width of downcomer - distance between racks and the edge of the pool (m): See Answer to Item No. 45(a)
- 39. Cross-sectional area of the border of the pool [space between the pool wall and the cells] (m²): See Answer to Item No. 45(a)
 Total Free Surface Area Available to Act as Downcomer (m²): 44.06
- 40. Length of active fuel (m): See Table 2
- 41. Length from the top of the active fuel to the top of the spent fuel rack (m): 0.422

ATTACHMENT
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING ASSESSMENT OF THE LOSS OF
WATER FROM THE SPENT FUEL POOL AT A DECOMMISSIONED PLANT

42. To characterize the open volume in the racks that do not contain assemblies, please describe the amount of empty cells, water boxes, etc. in the pool.

Out of 1758 current storage location is the Fuel Storage Pool, the 1454 storage locations are being used for the following objects:

- 1431 complete spent fuel assemblies,
- 1 partial spent fuel assembly,
- 2 partially consolidated spent fuel assemblies,
- 2 partially full failed fuel rod containers, and
- 18 trash baskets.

43. Decay Heat for each assembly (KW): Maine Yankee is providing our plant specific Decay Heat Curve.

See Figure entitled "Projected Spent Fuel Pool Power".

The decay heat for the limiting assembly identified for this analysis was 2.90833 KW as of January 16, 1998.

44. Emissivity of pool walls and cladding: For a Temperature Range of 450-1725°F:
Pool Walls: 0.54 to 0.63. Cladding: Not Available

45. Provide diagrams showing elevations or distances for the pool:

- (a) Top View Provide a top view of the pool. Please include, but not limited to, the lengths and widths of pool, clearances/space around the edge of the pool, layout of the modules, open space, and cask loading area (if applicable).

See Drawing 03443-EM-1A-1 and Rack Final Positioning Measurement Drawings for Racks A, B, C, D, E, F, G, H, I, J, M, N, O, P, S, T, U, V, W, X, Y, AA, BB, CC, DD, EE

- (b) Top view Provide a top view of a cell showing the wall thickness and cell dimensions.

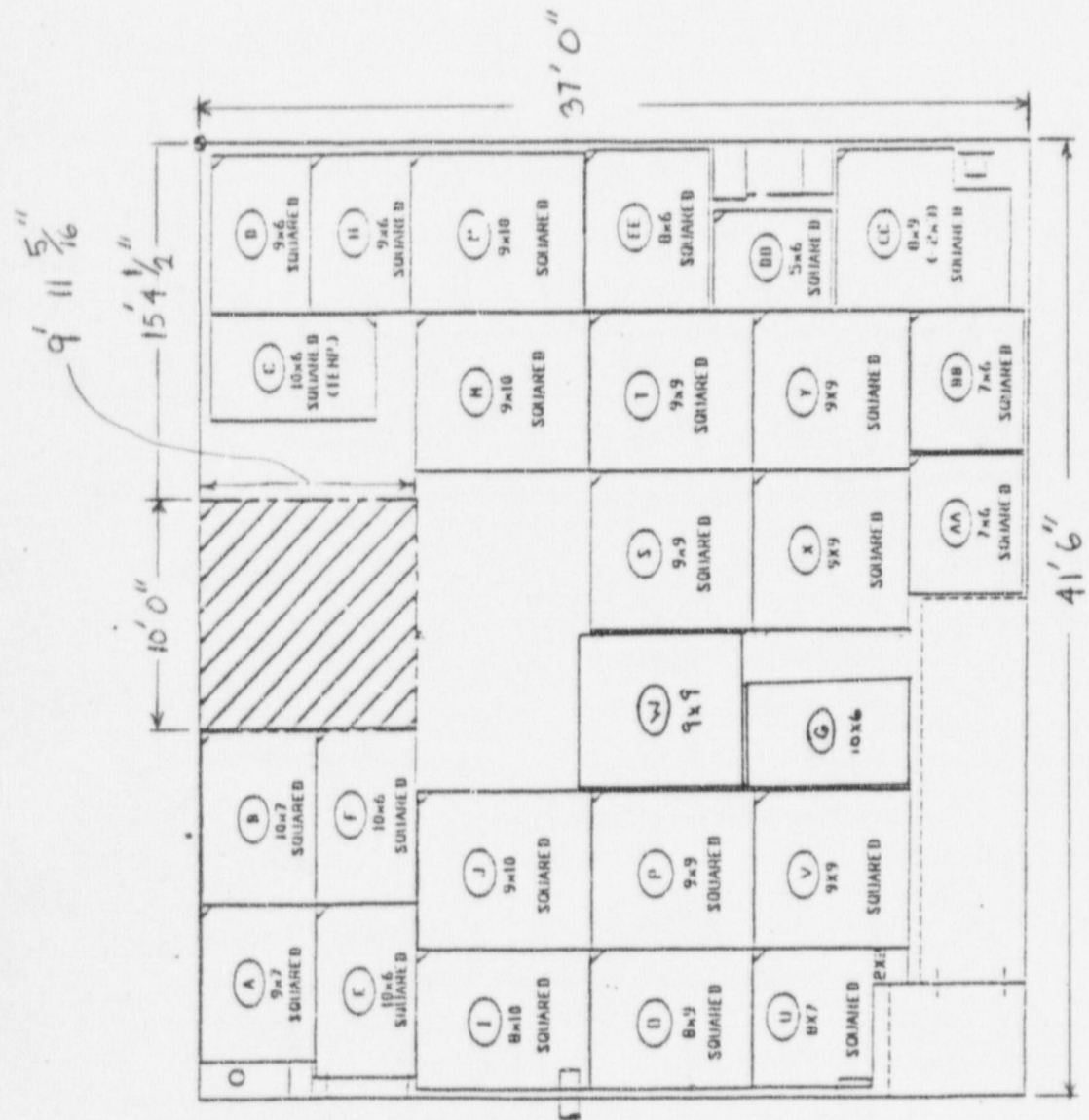
See attached Figure 6-1, 6-2, and 6-3 from MYAPC Letter to USNRC dated January 25, 1993, (MN-93-09)

- (c) Side view Provide an elevation drawing of the fuel racks from the pool floor to the top of the racks. Please include, but not limited to, the space between the floor and the bottom of the spent fuel rack, the active fuel height, the distance from the top of the active fuel to the top of the cell.

See Spent Fuel Pool Elevation Drawing

1-Y1-7

450



RE-RACKING PHASE R R

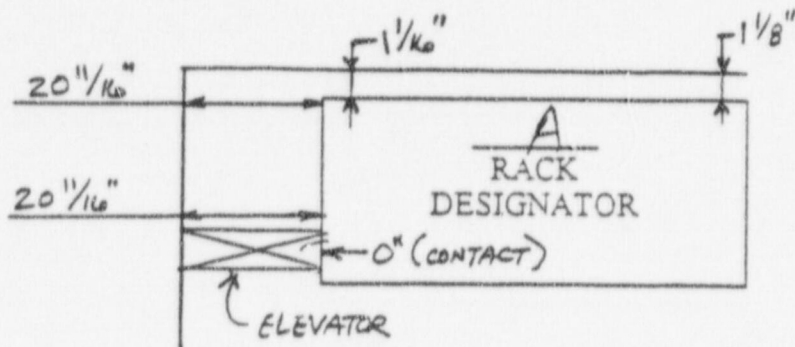
HIGH DENSITY SPENT
FULL RACK LAYOUT
FOR A TWO REGION POOL
MADE UTILITY SERVICES
MADE VINCENT ATOMIC POWER CO
PROJECT 3.0000000000000000
DATE 03-4-63
BY 1A-1

RACK FINAL POSITION MEASUREMENT DRAWING

RACK "A"

RACK DIMENSIONS: 63.875 x 82.125 inches

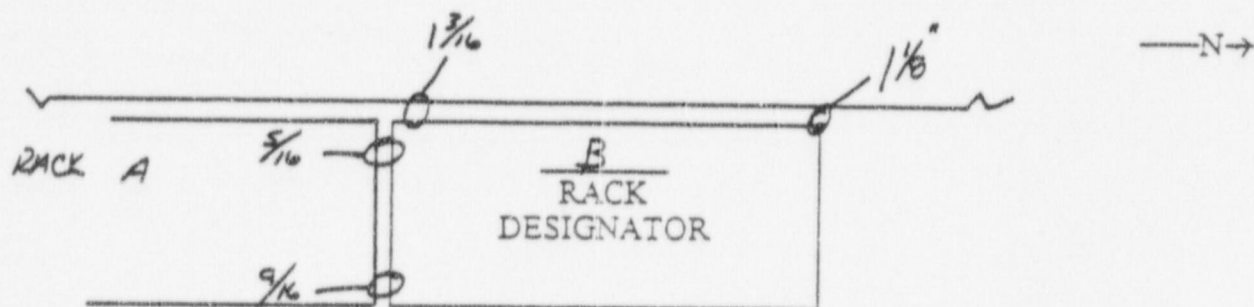
— N →



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "B"

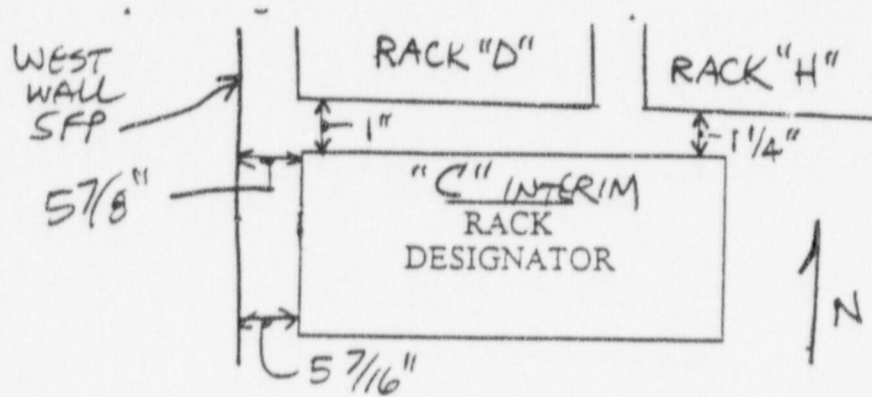
RACK DIMENSIONS: 63.75 x 91.125 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "C"

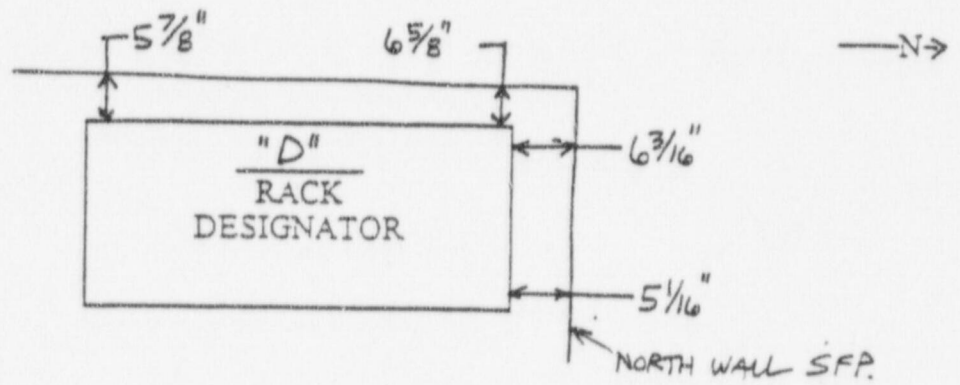
RACK DIMENSIONS: 54.688 x 91.188 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "D"

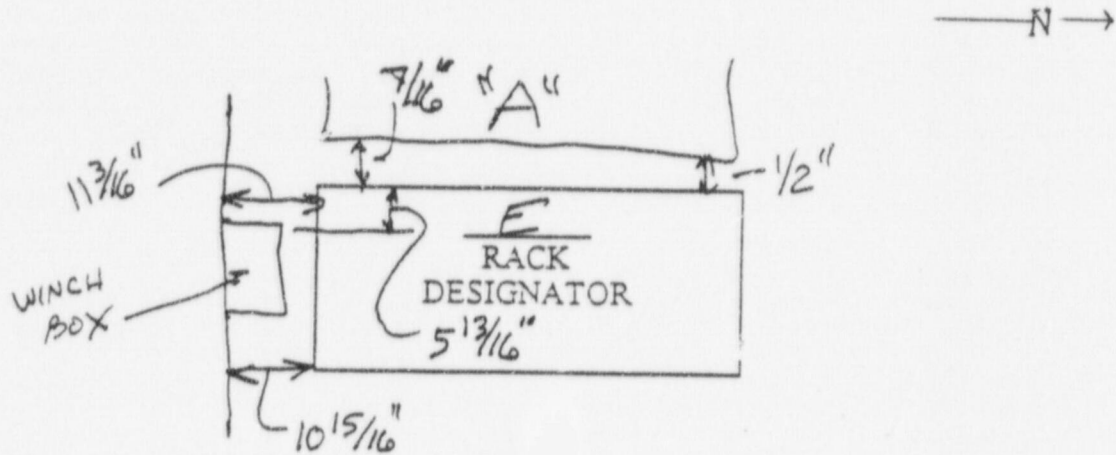
RACK DIMENSIONS: 54.625 x 81.934 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "E"

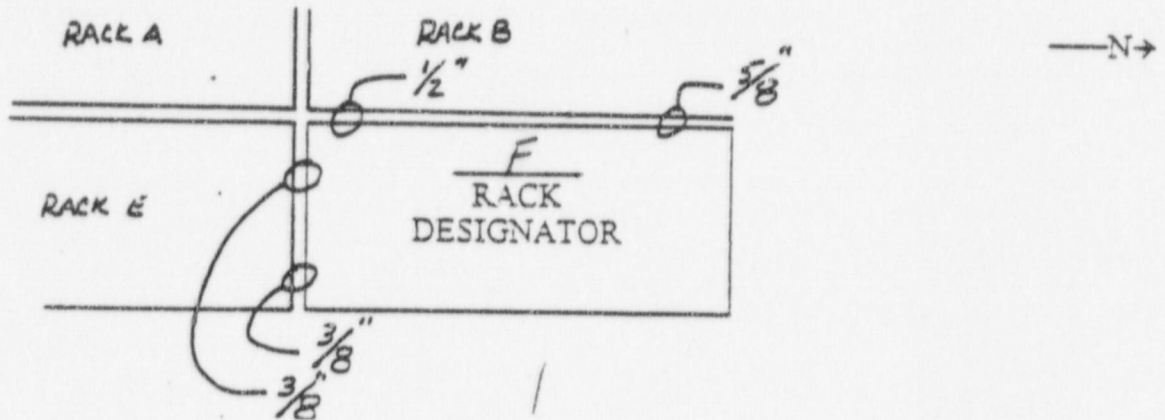
RACK DIMENSIONS: 54.687 x 91.25 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "F"

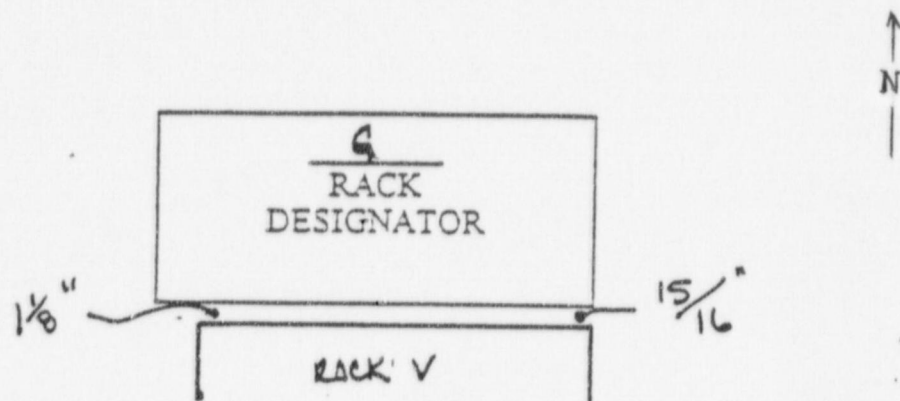
RACK DIMENSIONS: 54.75 x 91.125 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "G"

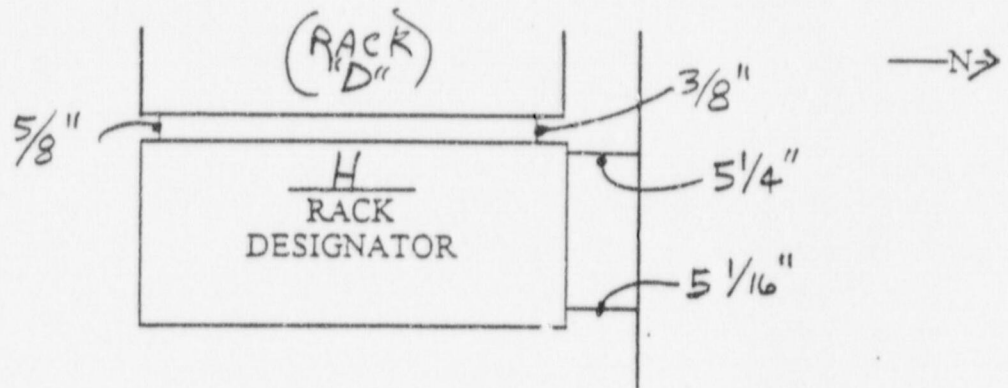
RACK DIMENSIONS: 54.813 x 91.188 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "H"

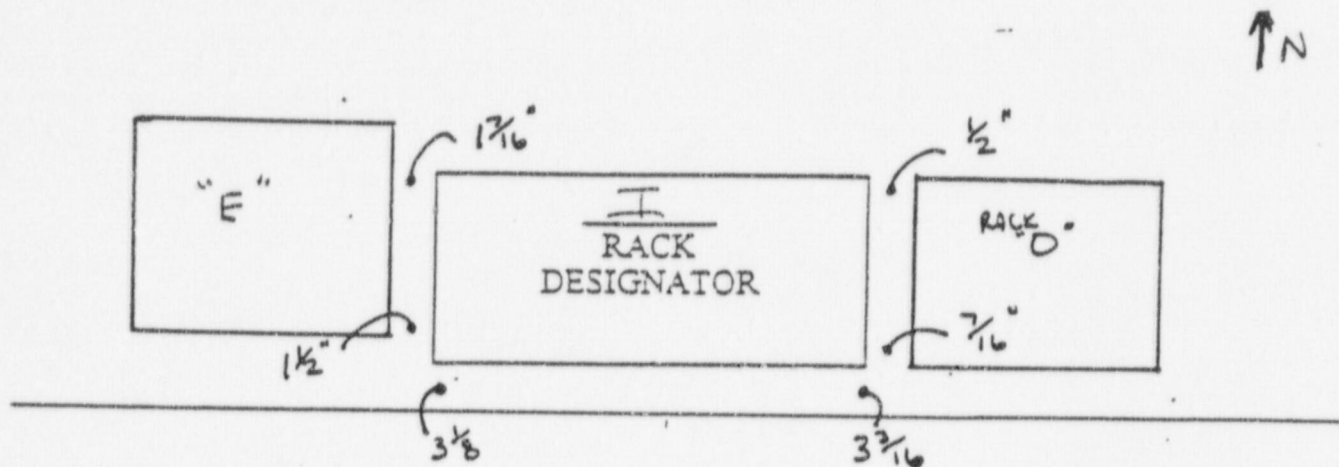
RACK DIMENSIONS: 54.75 x 82.093 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "I"

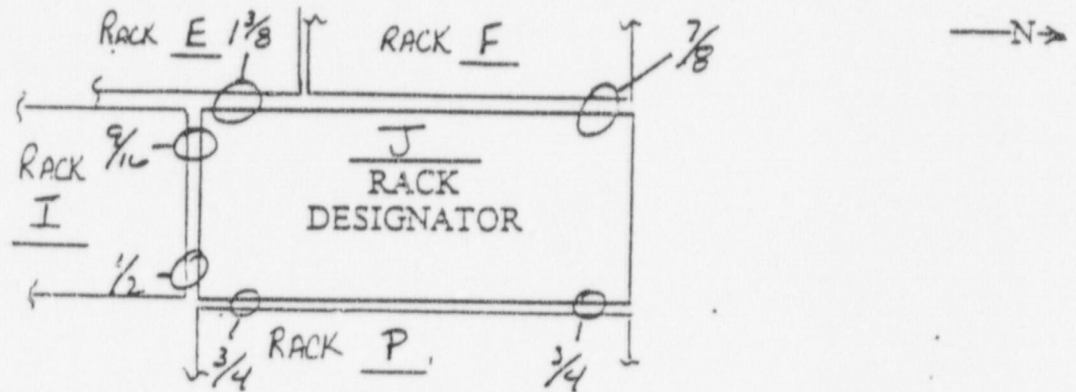
RACK DIMENSIONS: 72.973 x 91.125 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "J"

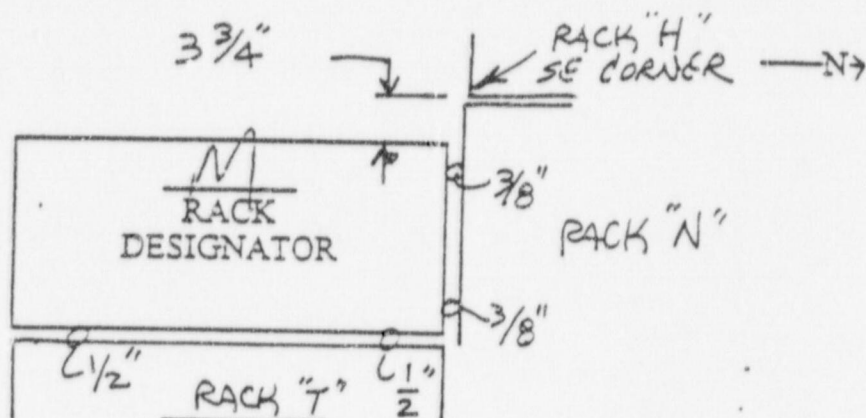
RACK DIMENSIONS: 82.188 x 91.063 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "M"

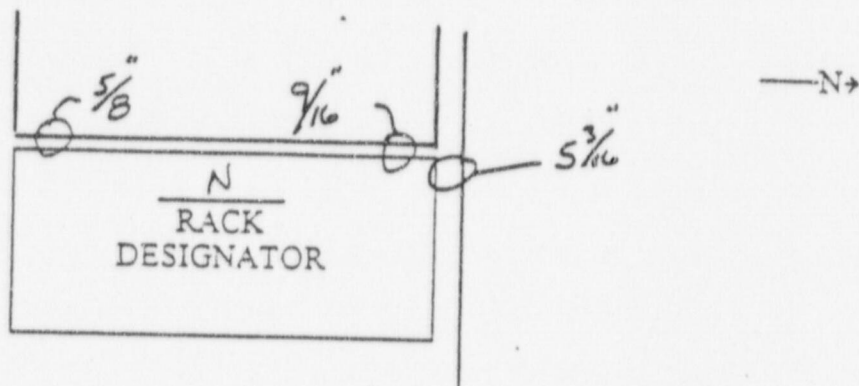
RACK DIMENSIONS: 82 x 91.063 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "N"

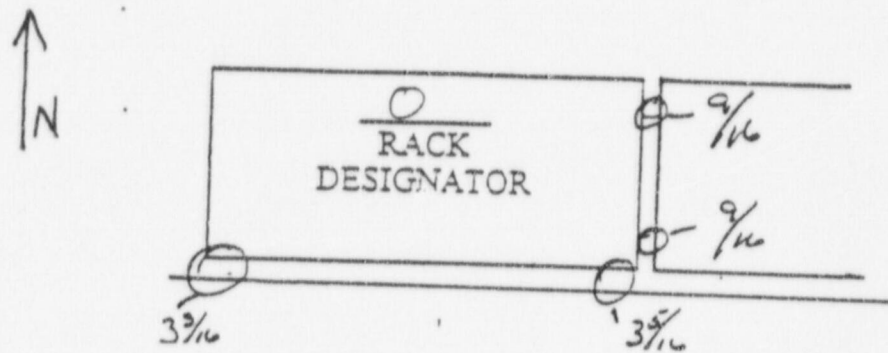
RACK DIMENSIONS: 82 x 91.125 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "O"

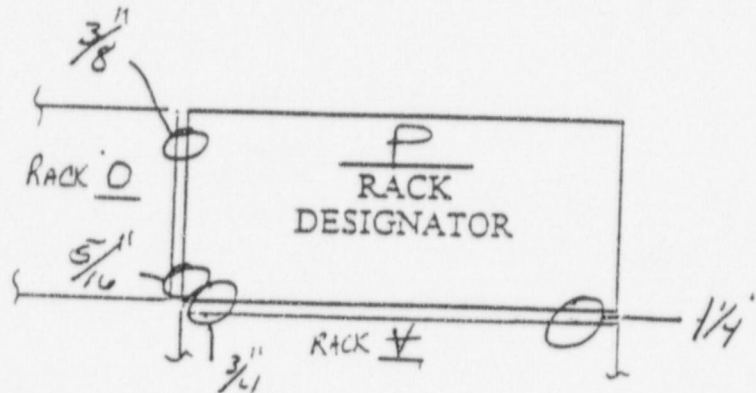
RACK DIMENSIONS: 73 x 82.06 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "P"

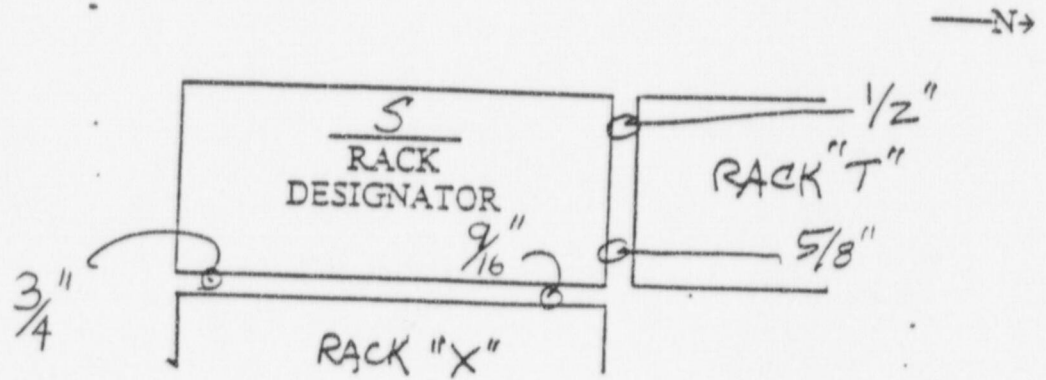
RACK DIMENSIONS: 82 x 82.062 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "S"

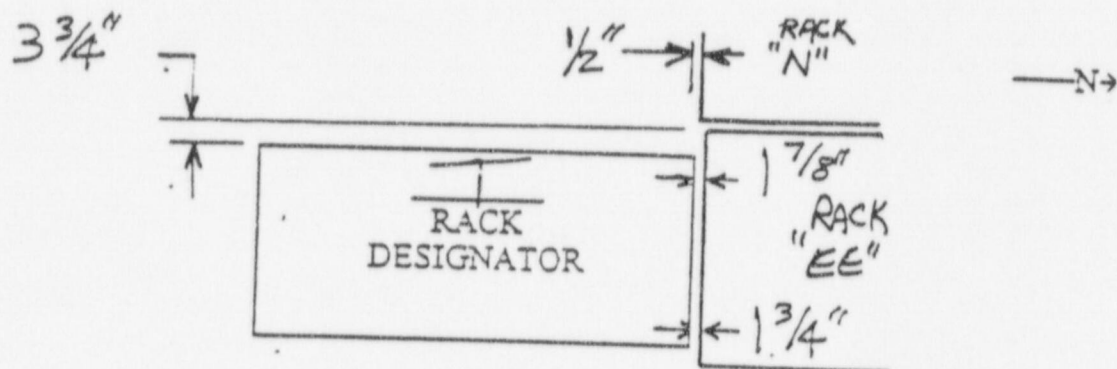
RACK DIMENSIONS: 81.938 x 82 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "T"

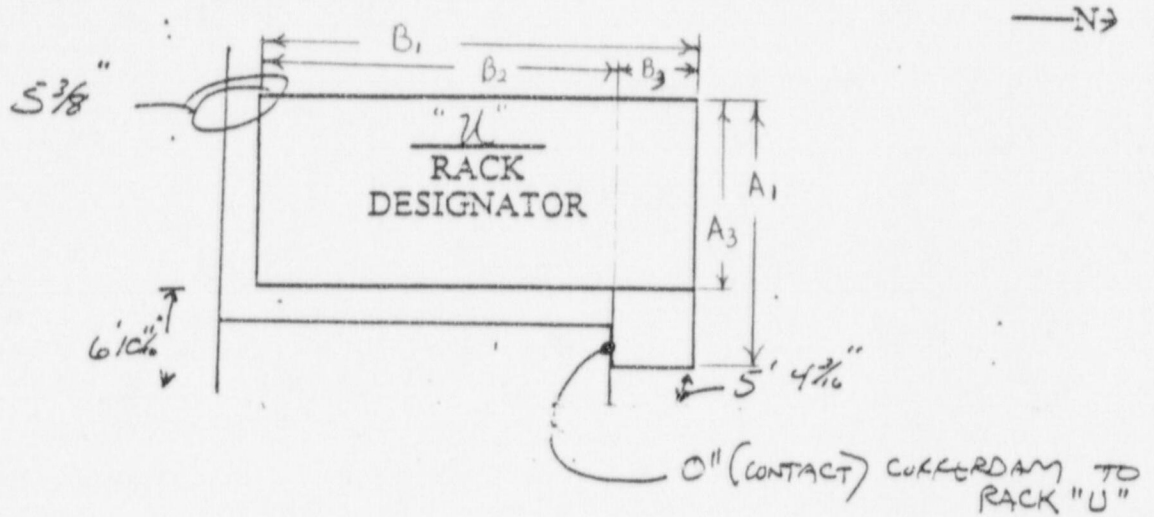
RACK DIMENSIONS: 82.032 x 82.032 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "U"

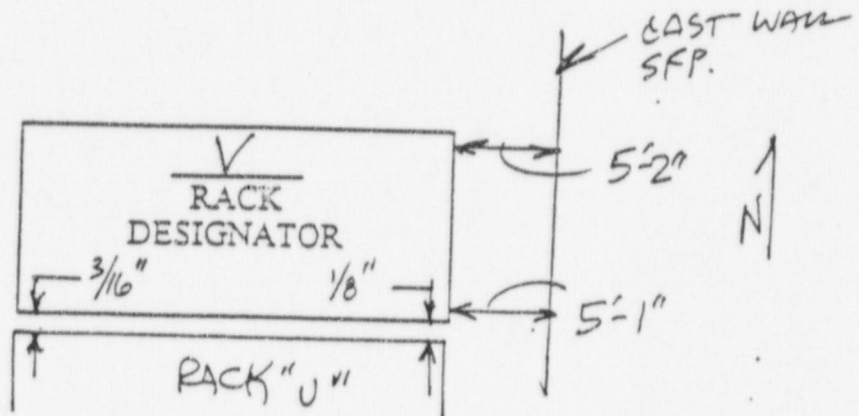
RACK DIMENSIONS: $A_1=82.125$, $A_3=63.875$, $B_1=73$, $B_3=18.5$ inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "V"

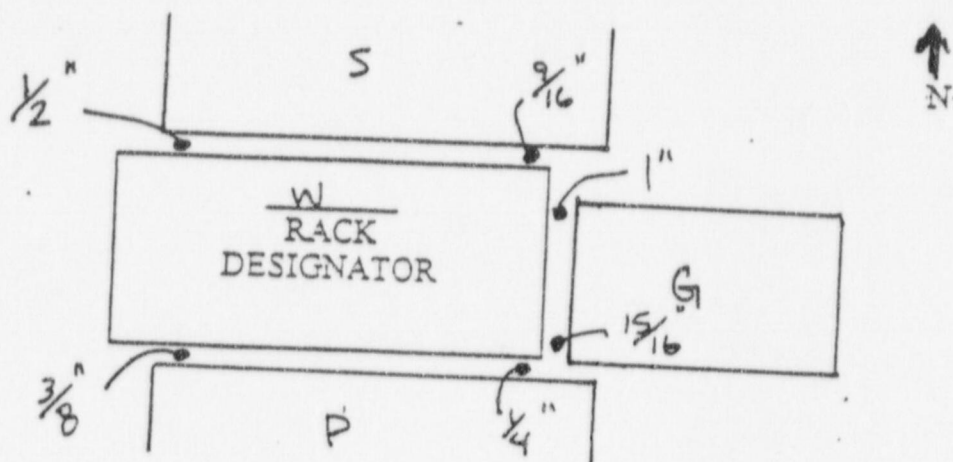
RACK DIMENSIONS: 82 x 82.063 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "W"

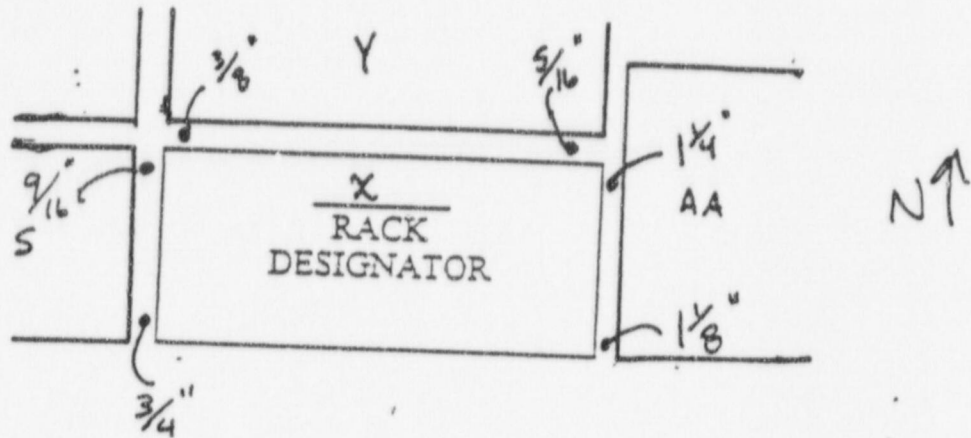
RACK DIMENSIONS: 82.063 x 82.063 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "X"

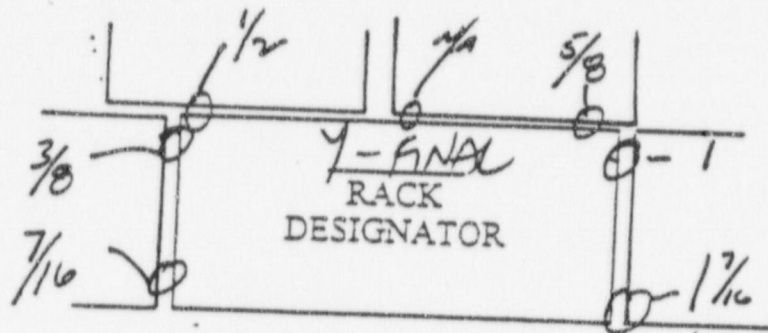
RACK DIMENSIONS: 82.063 x 82.125 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "Y"

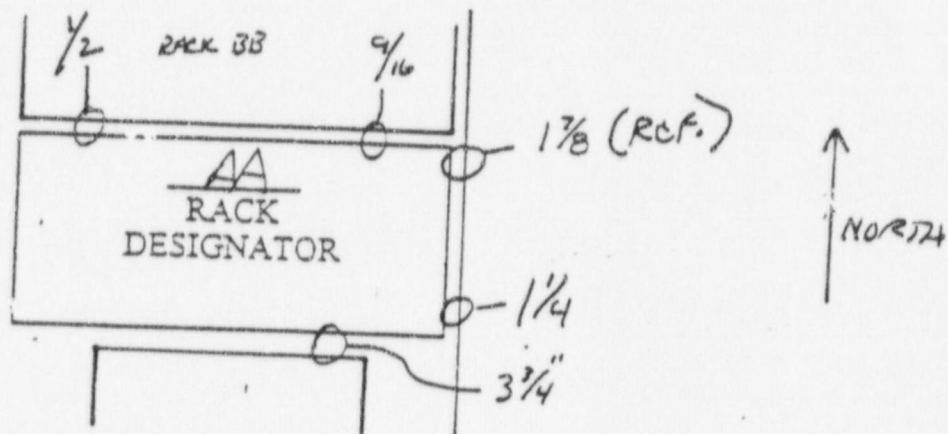
RACK DIMENSIONS: 81.938 x 82.062 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "AA"

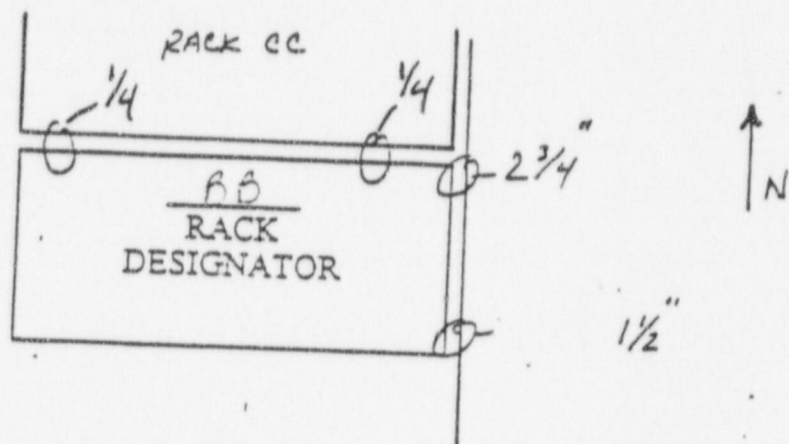
RACK DIMENSIONS: 61.938 x 72.313 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "BB"

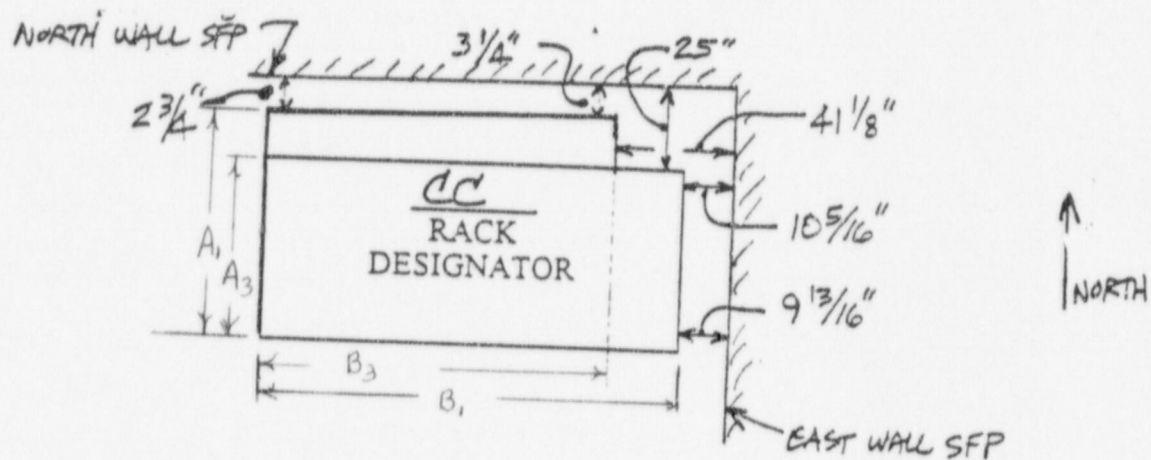
RACK DIMENSIONS: 62 x 72.375 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "CC"

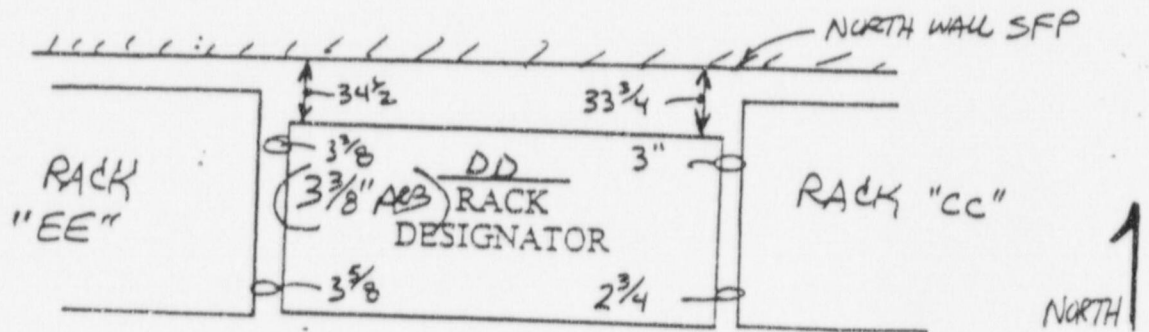
RACK DIMENSIONS: $A_1=82.937$, $A_3=61.937$, $B_1=93.375$, $B_3=61.875$ inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "DD"

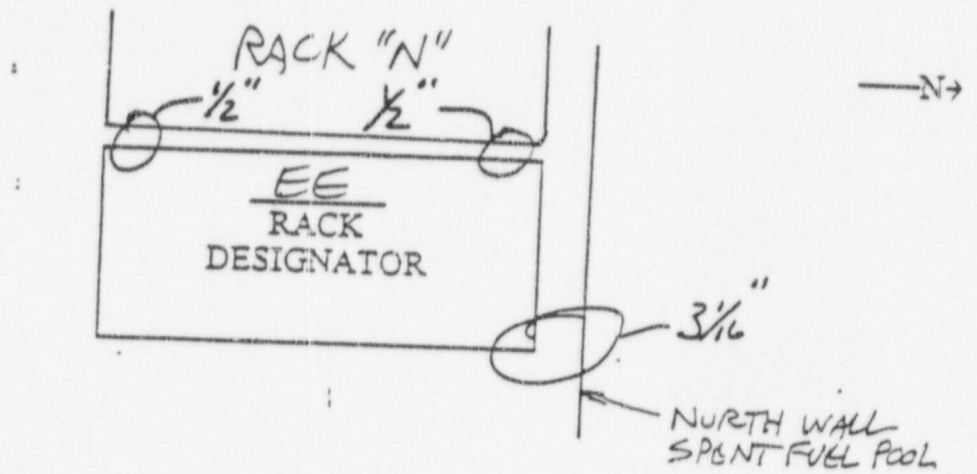
RACK DIMENSIONS: 61.875 x 51.5 inches



RACK FINAL POSITION MEASUREMENT DRAWING

RACK "EE"

RACK DIMENSIONS: 61.875 x 82.875 inches



MAINE YANKEE ATOMIC POWER COMPANY

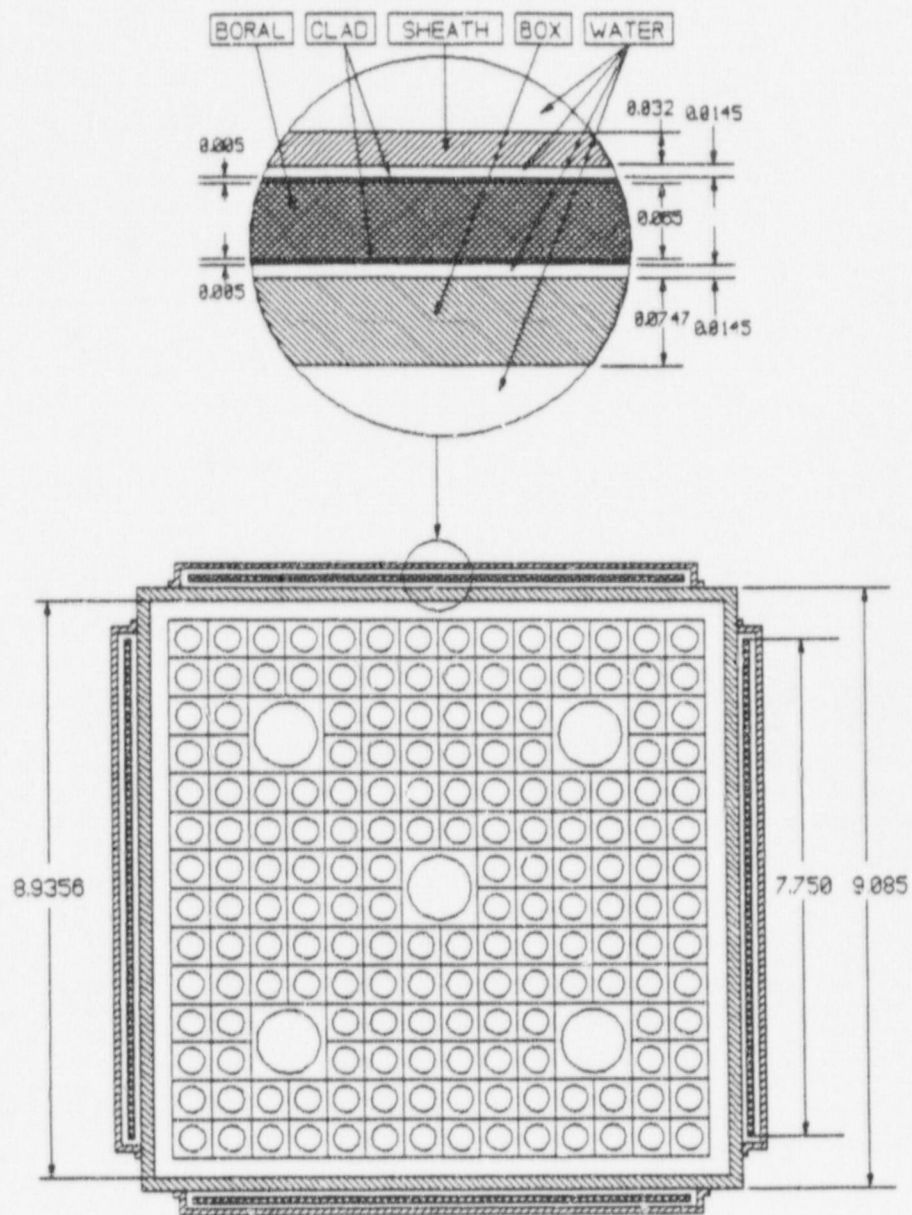


FIGURE 6-1
BASIC FUEL STORAGE CELL

MAINE YANKEE ATOMIC POWER COMPANY

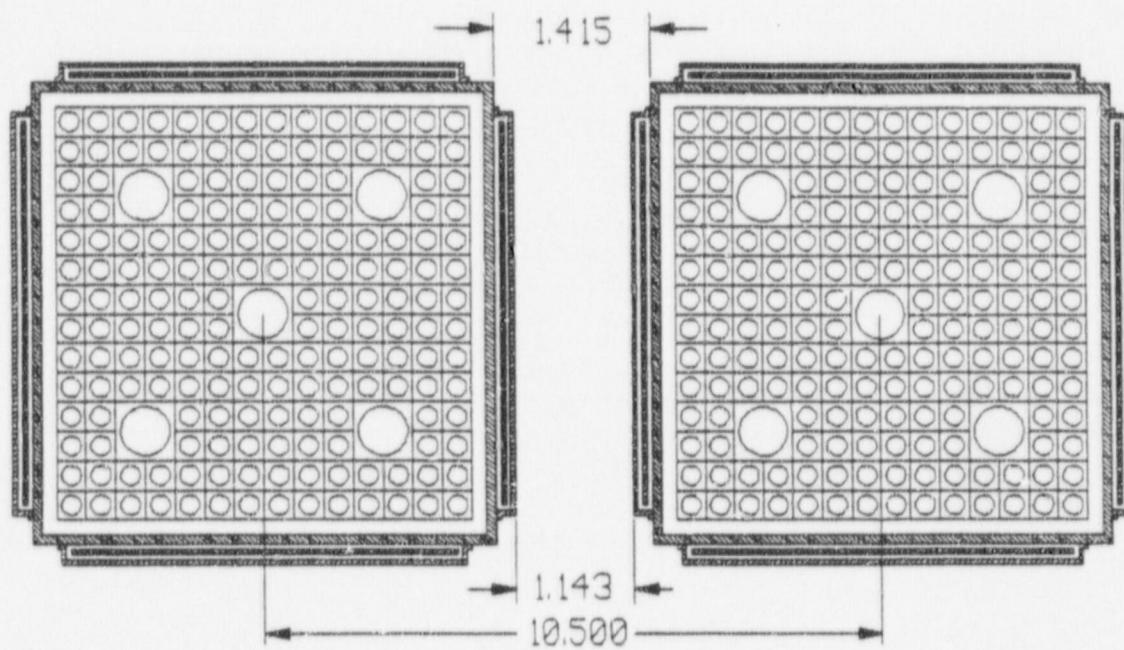


FIGURE 6-2
REGION I CONFIGURATION

MAINE YANKEE ATOMIC POWER COMPANY

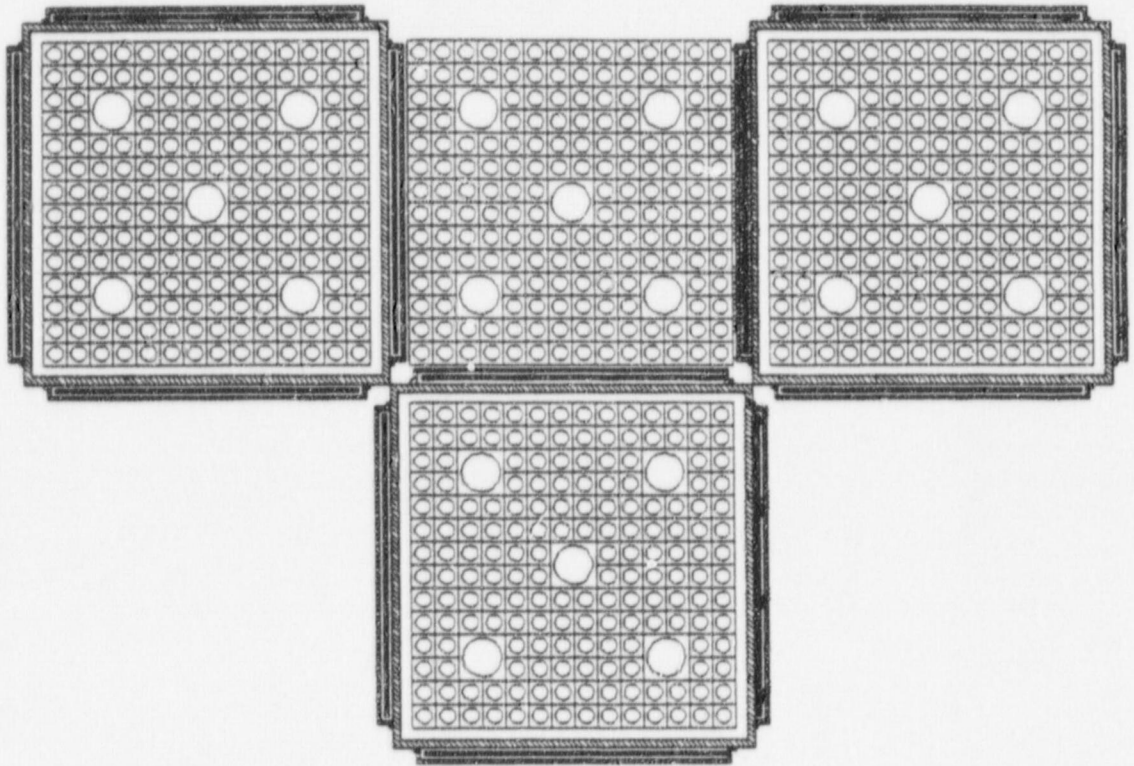


FIGURE 6-3
REGION II CONFIGURATION

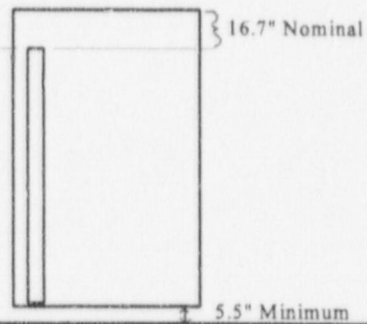
Spent Fuel Pool Elevation Drawing

46' El.

45' El. High Water Level Alarm
44' El. Normal Water Level
43' El. Low Water Level Alarm

22.578 El. Top of Highest Rack
21.184' El. Top of Active Fuel (Highest)

7.5' El.



Projected Spent Fuel Pool Power

Based on Day 313 Measurement

▲ Projected

