Domestic Utilities
American Electric Power
Carolina Power & Light
Commonwealth Edison
Consolidated Edison
Duquesne Light
Duke Power
Georgia Power
Florida Power & Light
Houston Lighting & Power
New York Power Authority
Northeast Utilities
Northern States Power
Pacific Gas & Electric
Public Service Electric & Gas
Rochester Gas & Electric
South Carolina Electric & Gas
Southern Nuclear
Tennessee Valley Authority
TU Electric
Union Electric
Virginia Power
Wisconsin Electric Power
Wisconsin Public Service
Wolf Creek Nuclear

International Utilities
Electrabel
Kansai Electric Power
Korea Electric Power
Nuclear Electric plc
Nuklearna Elektrana
Spanish Utilities
Taiwan Power
Vattenfall

OG-96-090

Project Number 694

October 8, 1996

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

Subject: Westinghouse Owners Group
Westinghouse Owners Group Request for Relaxation of NRC Bulletin 96-01 Requirements (MUHP-1210)

On September 4, 1996 the NRC provided a response to the Westinghouse Owners Group (WOG) letter dated August 22, 1996 which requested relaxation of certain aspects of NRC Bulletin 96-01. In the NRC response, it was indicated that the WOG letter did not contain a sufficient technical basis to support the WOG's request to eliminate the necessity of testing fuel with a burnup below 40,000 MWD/MTU and that while most of the rod insertion problems have been in high burnup fuel, there have been cases of anomalous behavior with fuel at approximately 32,000 MWD/MTU.

The purpose of this letter is to provide additional information to the NRC to justify the WOG request for the 40,000 MWD/MTU, for 12 foot fuel, and 30,000 MWD/MTU, for 10 foot fuel, testing relaxation.

As stated above, in the NRC letter it is indicated that cases of anomalous behavior with fuel in the approximately 32,000 MWD/MTU have occurred. To date, the only cases of incomplete RCCA insertion below a burnup of approximately 49,000 MWD/MTU with fuel of the designs used in domestic PWRs has been with 14 foot fuel assemblies. The WOG acknowledges these cases of incomplete RCCA insertions; however, as stated in the WOG's August 22, 1996 letter, the request for relaxation in testing is only applicable to those plants which utilize 12 foot or 10 foot fuel (the testing which will be performed for plants utilizing 14 foot fuel will be specifically identified by the licensee). Therefore, the following information is provided to the NRC to further provide the WOG's basis for requesting the relaxation in Bulletin 96-01 testing.

A significant amount of testing/monitoring has been conducted by the WOG member utilities in response to Bulletin 96-01. Figure 1, provides a summary of recent RCCA insertions in WOG member plants utilizing 12 foot and 10 foot fuel with a fuel assembly burnup of equal to or less than 40,000 MWD/MTU (again it should be noted that there have been no reports of incomplete RCCA insertion below a burnup of 49,000 MWD/MTU in fuel of these designs). A compilation of the data which was used to prepare Figure 1 is provided in Table 1. As shown in Table 1, the data in Figure 1 is comprised from testing or reports of complete insertions during a reactor trip from 52 different tests/reports at 27 WOG utility plants. As shown on the Figure, there have been successful insertions in 2,230 fuel assemblies in this burnup range in fuel assemblies provided by Westinghouse, Framatome Cogema Fuel (formerly BWFC), and Siemens.

D048

In addition to the above rod drop testing/monitoring for complete insertion, a significant amount of drag testing has been performed by WOG utility members. Figures 2, 3, and 4 provide the results of this testing from 16 WOG member plants. The data which was used to prepare these figures is testing which has been performed by the WOG utility members in response to Bulletin 96-01. Proprietary data which has been obtained by Westinghouse for its root cause investigation is not included in these figures but has been provided to the NRC during the Westinghouse/NRC meeting conducted on September 9, 1996. These figures provide a graphic representation of the drag measurements from these tests. Withdrawal drag has been used when both withdrawal and insertion drags have been measured. Also, Westinghouse interpretations of the testing charts of the drag measurements has been used in those cases where this data is available.

Figure 2 provides a plot of the upper thimble tube drag versus dashpot drag, Figure 3 provides a plot of dashpot drag versus assembly burnup, and Figure 4 provides a plot of upper thimble tube drag versus burnup. A review of these figures indicates that during these tests:

1. there is no instance where a fuel assembly with a burnup of 40,000 MWD/MTU or less has had a drag in excess of the Westinghouse F-Specification criteria for dashpot drag,

2. there are very few instances where a fuel assembly with a burnup of 40,000 MWD/MTU or less has had a drag in excess of the Westinghouse F-Specification criteria for upper thimble tube drag.

It should be noted that the only instances of incomplete RCCA insertion in fuel designs used in domestic PWRs, other than the instances in 14 foot fuel, have occurred in fuel that was above 49,000 MWD/MTU burnup and the fuel assemblies exhibited drag that exceeded both of the Westinghouse F-Specification drag criteria. The fact that a few assemblies exhibited drag above the criteria in the upper thimble tube region at less than 40,000 MWD/MTU burnup is not considered significant since these assemblies have not exceeded the criteria in the dashpot region.

In conclusion, the WOG considers that there is sufficient data available from actual plant testing to permit a relaxation in the requirements of Bulletin 96-01 relative to 12 foot and 10 foot fuel utilized by WOG utility members. The relaxation which is requested is to eliminate the requirement for testing of assemblies below a burnup of 40,000 MWD/MTU, for 12 foot fuel, and 30,000 MWD/MTU, for 10 foot fuel.

In order to support the WOG plants with fall outages, we are requesting the NRC to approve this request by October 18, 1996.

Questions regarding the technical aspects of these items should be directed to Mr. John Duran, Westinghouse at (412) 374-6375 or sent to him at:

Westinghouse Electric Corporation
P.O. Box 355 (ECE 4-09A)
Pittsburgh, PA 15230

Other questions should be directed to either Mr. Vance VanderBurg, WOG Analysis Subcommittee Chairman at (616) 697-5142 or Mr. Rick Kohrt, WOG Analysis Subcommittee NRC Bulletin 96-01 Task Team Chairman at (414) 221-3964.

Very truly yours,

Vance D. VanderBurg, Chairman
Westinghouse Owners Group
Analysis Subcommittee

attachments

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WOG Primary Representatives
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Figure 1 - Summary of RCCA Insertion Information

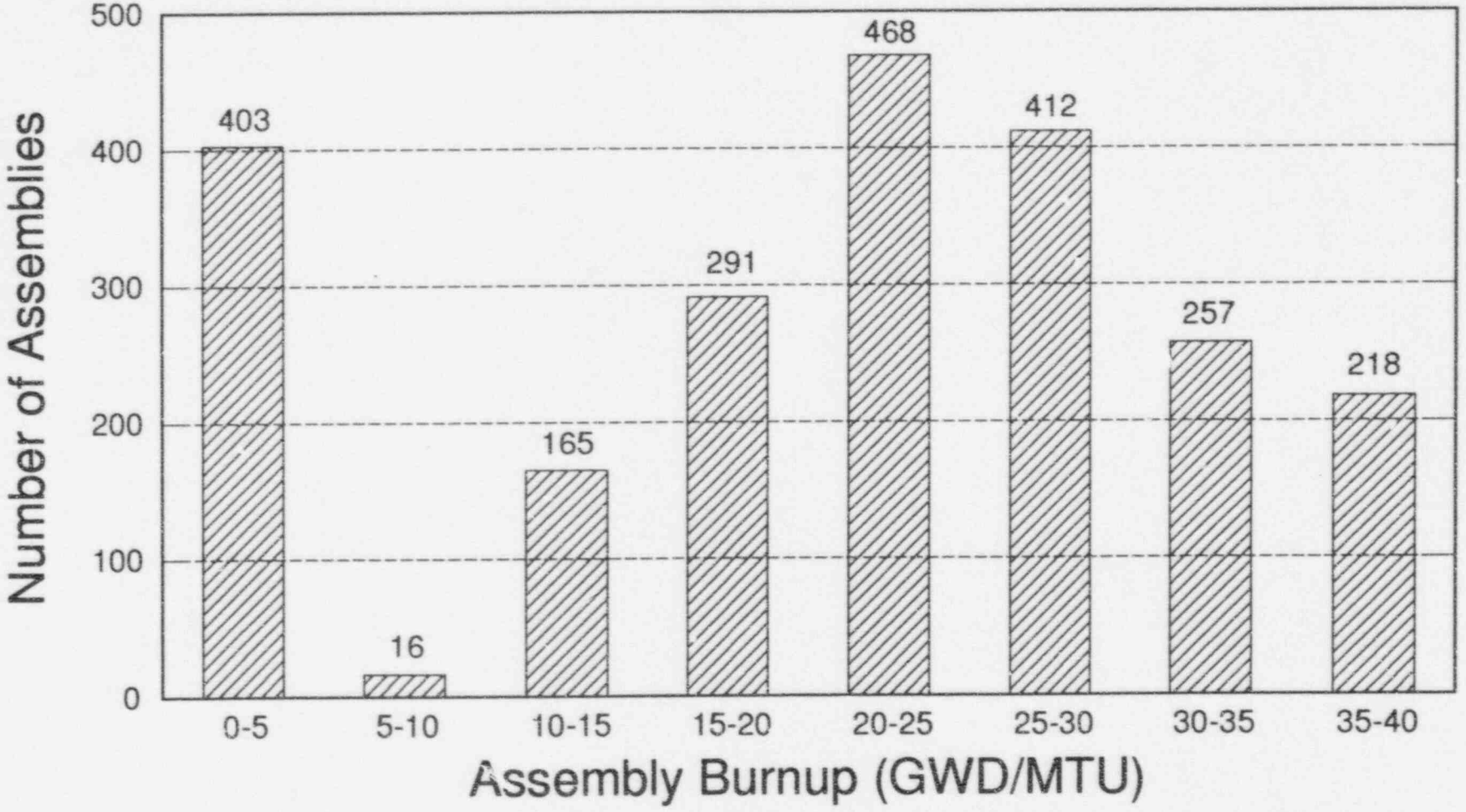

Figure 2 - Upper Thimble Tube Drag vs. Dashpot Drag

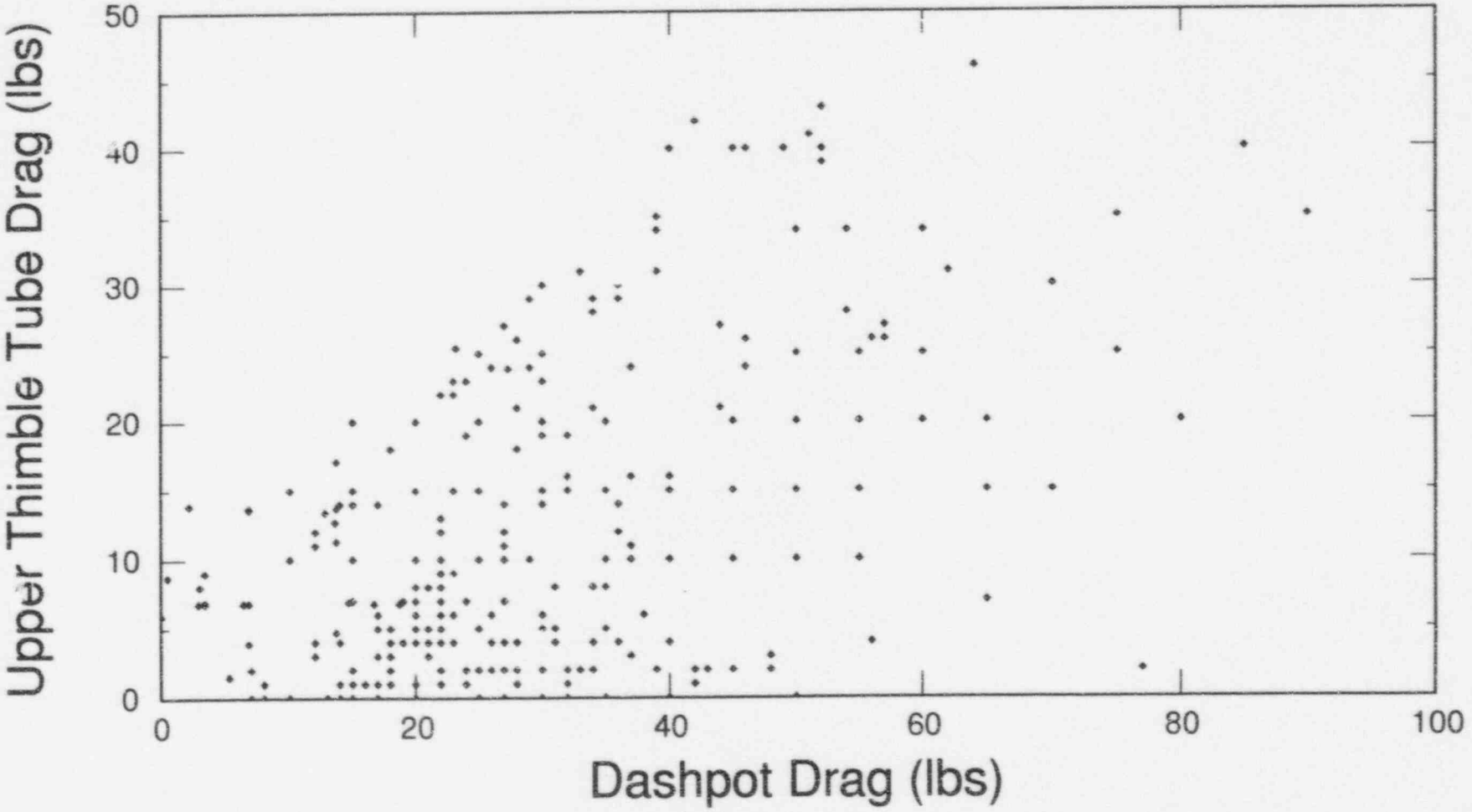

Figure 3 - Dashpot Drag vs. Assembly Burnup

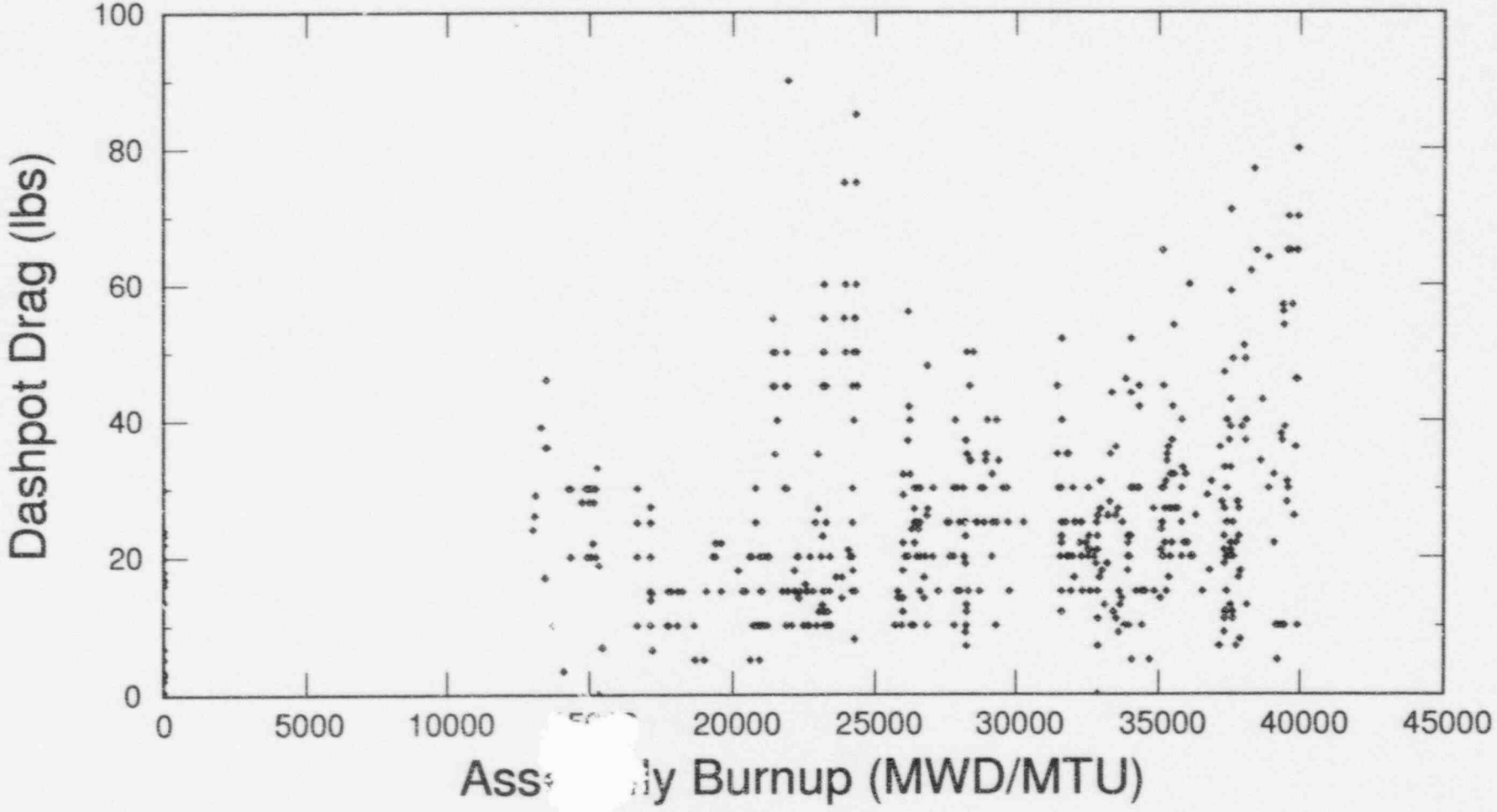

Figure 4 - Upper Thimble Tube Drag vs. Assembly Burnup

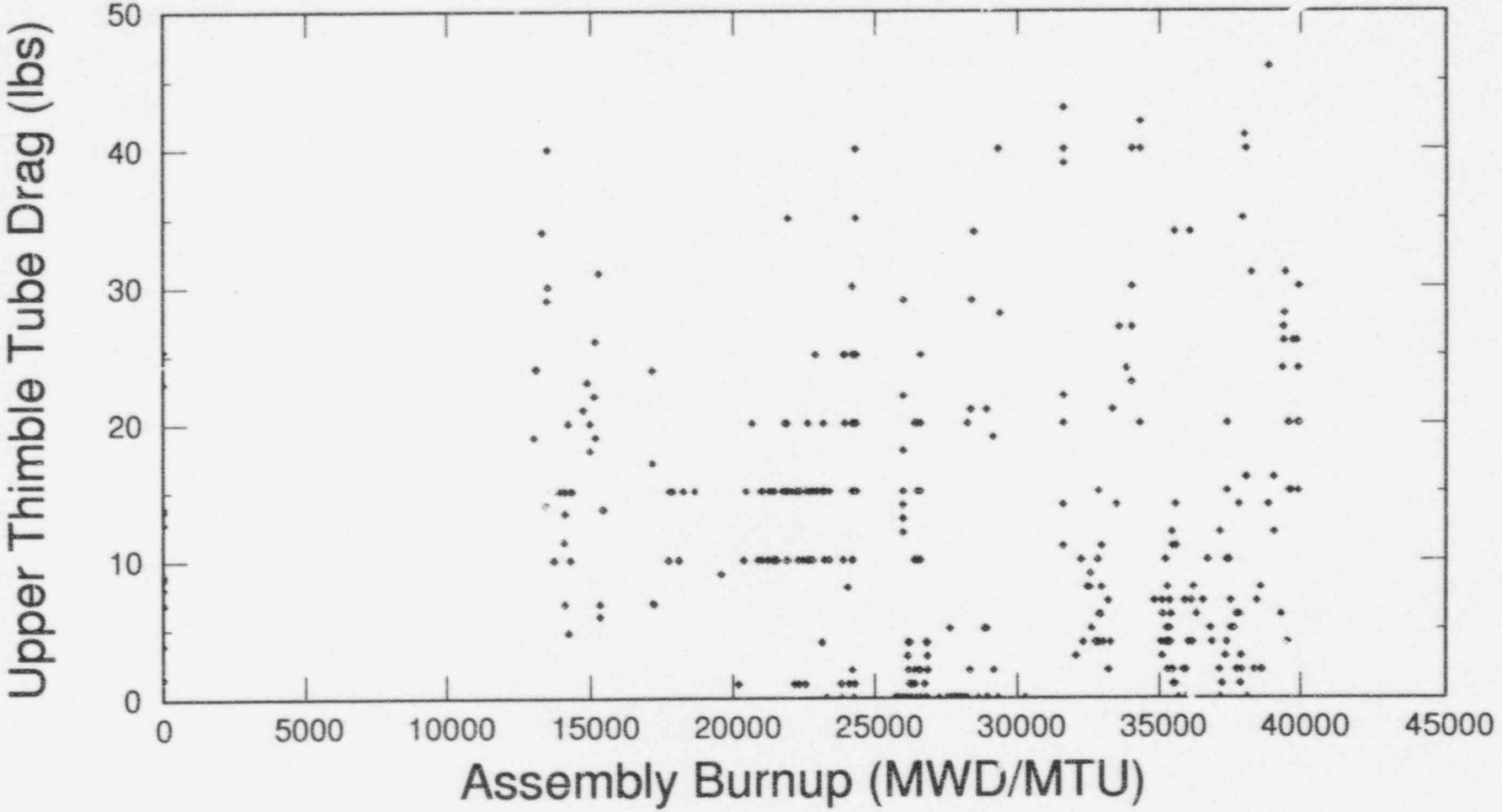

Table 1: Data Included In Figure 1 (Summary of RCCA Insertion Information)

Plant	Test	Fuel Type	IFM	Assembly Burnup Range (GWD/MTU)							
				0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Beaver Valley 1	11 EOC	17V5H	N	0	0	4	12	0	0	0	12
	12 BOC	17V5H	N	16	0	12	4	0	8	8	0
	12 M	17V5H	N	16	0	0	16	0	0	12	4
Braidwood 1	6 M	17OFA-I	Y	12	0	0	0	8	24	9	0
Braidwood 2	5 EOC	17OFA-I	Y	0	0	0	0	8	0	8	4
	6 BOC	17OFA-I	Y	16	0	0	0	31	5	1	0
Byron 1	7 BOC	17OFA-I	Y	12	0	0	0	40	0	1	0
	7 EOC	17OFA-I	Y	0	0	0	4	8	0	8	7
Catawba 1	9 BOC	17BW	N	0	0	0	35	9	8	1	0
	9 EOC	17BW	N	0	0	0	0	0	0	17	27
Catawba 2	8 BOC	17BW	N	0	0	8	23	21	0	1	0
	8 M	17BW	N	0	0	0	0	9	31	12	0
Comanche Peak 1	5 BOC	17SIE	N	0	0	8	14	30	0	0	0
		17STD	N	0	0	0	1	0	0	0	0
	5 M	17SIE	N	0	0	0	0	0	9	31	12
		17STD	N	0	0	0	0	0	1	0	0

Table 1: Data Included In Figure 1 (Summary of RCCA Insertion Information)

Plant	Test	Fuel Type	IFM	Assembly Burnup Range (GWD/MTU)							
				0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Comanche Peak 2	2 BOC	17OFA	N	0	12	40	1	0	0	0	0
	2 EOC	17OFA	N	0	0	0	0	9	16	28	0
	3 BOC	17OFA	N	0	0	8	8	37	0	0	0
	3 M	17OFA	N	0	0	0	2	14	37	0	0
DC Cook 2	10 BOC	17OFA-I	Y	20	0	0	0	31	1	1	0
	10 EOC	17OFA-I	Y	0	0	0	8	12	0	0	0
Diablo Canyon 1	8 BOC	17OFA-I	Y	36	0	0	0	12	4	1	0
	8 M	17OFA-I	Y	32	4	0	0	0	12	4	1
Diablo Canyon 2	7 BOC	17OFA-I	Y	32	0	0	4	4	12	0	1
	7 EOC	17OFA-I	Y	0	0	0	0	12	20	0	8
	8 BOC	17OFA-I	Y	28	0	0	4	0	20	0	1
Haddam Neck	19 M	15BW(10)	N	0	0	8	12	0	8	16	0
		15V5H(10)	N	1	0	0	0	0	0	0	0
Indian Pt.2	13 BOC	15OFA	N	0	0	4	8	17	12	0	0
		15V+I	Y	12	0	0	0	0	0	0	0
	13 M	15OFA	N	0	0	0	0	0	4	8	24
		15V+I	Y	0	0	12	0	0	0	0	0

Table 1: Data Included In Figure 1 (Summary of RCCA Insertion Information)

Plant	Test	Fuel Type	IFM	Assembly Burnup Range (GWD/MTU)							
				0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Kewaunee	21 BOC	14SIE	N	0	0	12	6	0	5	4	0
	21 M	14SIE	N	0	0	0	0	8	4	8	5
McGuire 2	10 BOC	17BW	N	0	0	0	36	0	15	1	1
	10 EOC	17BW	N	0	0	0	0	0	8	8	20
	11 BOC	17BW	N	0	0	0	16	24	8	4	1
Millstone 3	6 M	17V5H-I	Y	0	0	13	12	11	0	20	4
		17STD	N	0	0	0	0	0	0	0	1
North Anna 2	11 EOC	17V5H	N	0	0	0	0	0	0	0	12
		17P+	N	0	0	0	0	2	0	0	0
Point Beach 1	23 BOC	14OFA	N	16	0	8	0	0	6	2	0
	23 EOC	14OFA	N	0	0	8	8	0	8	0	0
	24 BOC	14OFA	N	16	0	4	8	0	0	0	0
Prairie Is. 2	17 BOC	14V+	N	16	0	0	0	7	5	0	0
		14OFA	N	0	0	0	0	0	0	0	1
	17 M	14V+	N	0	0	16	0	0	0	4	8
Robinson 2	17 BOC	15SIE	N	0	0	0	0	0	0	4	5
		15SIE-I	Y	4	0	0	12	0	8	12	0

Table 1: Data Included In Figure 1 (Summary of RCCA Insertion Information)

Plant	Test	Fuel Type	IFM	Assembly Burnup Range (GWD/MTU)							
				0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Sequoyah 2	7 BOC	17STD	N	0	0	0	0	1	0	8	0
		17V5H	N	36	0	0	8	0	0	0	0
	7 EOC	17V5H	N	0	0	0	0	36	0	0	8
Surry 2	13 BOC	15OFA	N	0	0	0	4	38	2	4	0
	13 EOC	15OFA	N	0	0	0	0	0	0	8	27
VC Summer	9 EOC	17V+I	Y	0	0	0	0	0	0	0	12
		17P+I	Y	0	0	0	0	8	16	0	0
Vogtle 1	6 EOC	17OFA-I	Y	0	0	0	0	0	32	1	0
Vogtle 2	5 BOC	17OFA-I	Y	36	0	0	3	5	9	0	0
	5 EOC	17OFA-I	Y	0	0	0	0	0	34	2	2
Wolf Creek	8 EOC	17V5H-I	Y	0	0	0	8	0	0	0	8
Zion 1	15 BOC	15V5	N	23	0	0	12	4	8	0	1
	15 M	15V5	N	23	0	0	0	12	12	0	1
TOTALS				**403**	**16**	**165**	**291**	**468**	**412**	**257**	**218**

Table 2: Data Included In Figures 2 thru 4

Plant	Test	Fuel Type	IFM	Assembly Burnup Range (GWD/MTU)								Used in Figure		
				0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	2	3	4
Beaver Valley 1	11 EOC & 12 BOC	17V5H	N	16	0	16	16	0	8	8	12	NA	Y	NA
Braidwood 2	5 EOC	17OFA-I	Y	0	0	0	0	8	0	8	4	NA	Y	NA
Byron 1	7 EOC	17OFA-I	Y	0	0	0	4	8	0	8	7	NA	Y	NA
Catawba 1	9 EOC	17BW	N	0	0	0	0	0	0	17	27	Y	Y	Y
Comanche Peak 2	2 EOC & 3 BOC	17OFA	N	0	0	8	8	46	16	28	0	Y*	Y	Y*
Diablo Canyon 2	7 EOC	17OFA-I	Y	0	0	0	0	12	20	0	8	Y	Y	Y
Ginna	25 EOC	14OFA	N	1	0	12	4	0	8	1	4	Y	Y	Y
McGuire 2	10 EOC	17BW	N	0	0	0	0	0	8	8	20	NA	Y	NA
North Anna 1	Feb. 1996	17V5H	N	0	0	0	0	0	0	0	2	Y	Y	Y
		17P+	N	0	0	0	0	3	0	0	0	Y	Y	Y
North Anna 2	Feb. 1996 & 11 EOC	17V5H	N	0	0	0	1	1	0	0	12	Y	Y	Y
		17P+	N	0	0	0	0	2	0	0	0	Y	Y	Y
Point Beach 1	24 BOC	14OFA	N	16	0	4	8	0	0	0	0	Y	Y	Y
Sequoyah 2	7 BOC & 7 EOC	17STD	N	0	0	0	0	1	0	8	0	NA	Y	NA
		17V5H	N	36	0	0	8	36	0	0	8	Y*	Y	Y*

Table 2: Data Included In Figures 2 thru 4

Plant	Test	Fuel Type	IFM	Assembly Burnup Range (GWD/MTU)								Used in Figure		
				0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	2	3	4
Surry 2	13 EOC	15OFA	N	0	0	0	0	0	0	8	27	Y	Y	Y
Turkey Point 4	15 EOC	15OFA	N	0	0	0	0	0	8	16	0	Y	Y	Y
VC Summer	9 EOC	17V+I	Y	0	0	0	0	0	0	0	12	Y	Y	Y
		17P+I	Y	0	0	0	0	8	16	0	0	Y	Y	Y
Vogtle 1	6 EOC	17OFA-I	Y	0	0	0	0	0	32	1	0	Y	Y	Y
TOTALS				**69**	**0**	**40**	**49**	**125**	**116**	**111**	**143**			

NA = Upper thimble tube drag data not available

Y* = Upper thimble tube drag data not available for all fuel assemblies tested, when upper thimble tube drag data was available it was used in Figures 2 and 4.

Definitions Applicable to Tables 1 and 2

Column Labeled "Test"

X EOC = End of cycle testing for cycle X

X BOC = Beginning of cycle testing for cycle X

X M = In-cycle testing during cycle X

Column Labeled "Fuel Type"

17V5H = Westinghouse 17x17 V5H fuel design

17OFA-I = Westinghouse 17x17 OFA fuel design with IFMs

17BW = Framatome Cogema Fuel (B&W) 17x17 fuel design

17SIE = Siemens Power Corporation 17x17 fuel design

17STD = Westinghouse 17x17 Standard fuel design

17OFA = Westinghouse 17x17 OFA fuel design

15BW(10) = Framatome Cogema Fuel (B&W) 15x15 (10 foot) fuel design

15V5H(10) = Westinghouse 15x15 V5H (10 foot) fuel design

15OFA = Westinghouse 15x15 OFA fuel design

15V+I = Westinghouse 15x15 Vantage+ fuel design with IFMs

14SIE = Siemens Power Corporation 14x14 fuel design

17V5H-I = Westinghouse 17x17 V5H fuel design with IFMs

17P+ = Westinghouse 17x17 Performance+ fuel design

14OFA = Westinghouse 14x14 OFA fuel design

14V+ = Westinghouse 14x14 Vantage+ fuel design

15SIE = Siemens Power Corporation 15x15 fuel design

15SIE-I = Siemens Power Corporation 15x15 fuel design with IFMs

17V+I = Westinghouse 17x17 Vantage+ fuel design with IFMs

17P+I = Westinghouse 17x17 Performance+ fuel design with IFMs

15V5 = Westinghouse 15x15 V5 fuel design