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**A Classification Scheme for
LWR Fuel Assemblies**

R. S. Moore
D. A. Williamson
K. J. Notz

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Chemical Technology Division

A CLASSIFICATION SCHEME FOR
LWR FUEL ASSEMBLIES

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NOTICE This document contains information of a preliminary nature. It is subject to revision or correction and therefore does not represent a final report.

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PREFACE

This work was done under the auspices of the U.S. Department of Energy Office of Civilian Radioactive Waste Management. The work was carried out at Oak Ridge National Laboratory (ORNL) with the assistance of the Maxima Corporation. One of the authors did his work during a summer assignment at ORNL in connection with a Master's Degree program at the University of Florida. His research was performed under appointment to the Radioactive Waste Management Fellowship program administered by Oak Ridge Associated Universities for the U.S. Department of Energy.



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A Classification Scheme for
LWR Fuel Assemblies

R. S. Moore, D. A. Williamson, K. J. Notz

ABSTRACT

With over 100 light water nuclear reactors operating nationwide, representing designs by four primary vendors, and with reload fuel manufactured by these vendors and additional suppliers, a wide variety of fuel assembly types are in existence. At Oak Ridge National Laboratory, both the Systems Integration Program and the Characteristics Data Base project required a classification scheme for these fuels. This scheme can be applied to other areas and is expected to be of value to many Office of Civilian Radioactive Waste Management programs.

To develop the classification scheme, extensive information on the fuel assemblies that have been and are being manufactured by the various nuclear fuel vendors was compiled, reviewed, and evaluated. It was determined that it is possible to characterize assemblies in a systematic manner, using a combination of physical factors.

A two-stage scheme was developed consisting of 79 assembly types, which are grouped into 22 assembly classes. The assembly classes are determined by the general design of the reactor cores in which the assemblies are, or were, used. The general BWR and PWR classes are divided differently but both are based on reactor core configuration.

This system includes all known existing fuel types and is adaptable to take into account any future additions. If desirable or necessary, a third level of detail can be added to the classification scheme.

1. INTRODUCTION

With over 100 nuclear reactors operating nationwide, designed by four primary vendors, and with reload fuel manufactured by these vendors plus additional suppliers, a wide variety of fuel assembly types are in existence. In addition, the evolutionary nature of these fuels (i.e., the constant updating, fuel improvements, design improvements, and backfitting) further increases the variety of designs on the market, making a system for classifying these assemblies coherently and logically very important. At Oak Ridge National Laboratory (ORNL), both the Systems Integration Program and the Characteristics Data Base (CDB) project found it necessary to have such a classification scheme. Therefore, in order that the methodologies be systematic, complete, and compatible, the classification scheme described in this report was developed.

Once the system had been developed, it was found to be useful in other areas and to other groups. The Energy Information Administration (EIA), for example, has adopted this classification scheme for use in their spent-fuel data base, which is based on utility input via the RW-859 form. The classification scheme has also found use in fuel assembly consolidation studies and packaging and cask design projects. This scheme can be applied to other areas also and is expected to be of value to many other Office of Civilian Radioactive Waste Management (OCRWM) programs.

2. APPROACH

2.1 PRELIMINARY REVIEW AND EVALUATION

To develop the classification system, extensive information was necessary on the fuel assemblies that have been and are being manufactured by the various nuclear fuel vendors. To gather this information, ORNL successfully placed contracts with four of the five major fuel vendors. ORNL was unable to place a contract with General Electric (GE). Accordingly, the data on GE fuels was extracted from the federal dockets and various other open literature sources by one of the authors. A separate report on GE fuel assembly types is in preparation (ORNL/TM-10902).

Using this information, an extensive evaluation and review was then performed. Each fuel assembly was evaluated on the basis of the array size; length, with control rods inserted, with hold-down devices, and with only the bare assembly; fuel manufacturer; reactor manufacturer; material differences; hardware differences; and other criteria. It was determined that it is possible to distinguish between assemblies systematically using a combination of these factors, reactor core configuration being the most logical primary factor.

2.2 SCHEME DEVELOPMENT AND IMPLEMENTATION

A two-stage system was developed for initial implementation. First, 22 broad categories were identified, which group similar fuel assemblies that share certain common controlling characteristics. These groupings are called the Assembly Classes. The classes that resulted from the data analysis were divided by reactor core design guidelines, with the result that all reactors of similar core design use the same class of fuel. In other words, there is a one-to-one correspondence between basic reactor core design and fuel assembly class.

Reactors of a particular design do use fuels that share certain controlling characteristics, but there is still a wide variety exhibited by other, equally important fuel characteristics. Additionally, any given reactor may, and often does, utilize fuel from different vendors. This fact provided the need for a further subdivision, the Assembly Type. Initially, 52 assembly types were identified. Within an assembly class, all assemblies are of a similar length and have the same reactor manufacturer, but other characteristics -- array size, fuel manufacturer, materials of construction, etc. -- often differ considerably, and these differences form the basis for determining the individual assembly types.

Additional data obtained on the GE fuel assemblies made it possible to better define these assembly types and to make distinctions that were previously overlooked. This resulted in an increase in the number of types from 52 to 72. Additionally, interaction with the utilities via the EIA has identified 7 additional assembly types, bringing the current total to 79. As the informational data base improves and new assembly types are identified, they will be added to the scheme.

3. RESULTS

3.1 SCHEME DESCRIPTION

Currently, the system has 79 assembly types grouped into 22 assembly classes. The classes are determined by the general design of the reactor or reactors in which they are, or were, used. Thirteen classes are reactor specific (i.e., the fuels described by these classes are unique to one core design and are not used by any other reactors). Five of these -- Big Rock Point, Dresden 1, Elk River, Humboldt Bay, and Lacrosse -- are BWR designs, and the other eight are PWR designs. The 2 general BWR classes and 7 general PWR classes bring the total number of classes to 22.

The core designs of PWRs and BWRs have different controlling characteristics, so that the generic BWR classes and PWR classes, while still based on core design, are divided

differently. For the BWRs, all of the reactors were built by GE (with the exceptions of Elk River and Lacrosse, which were built by Allis Chalmers and are themselves classes on their own), so that it is unnecessary to divide them by vendor. The two classes are determined by the reactor "generation." In other words, for the BWR/2 and BWR/3 designs, the core designs are similar and make up one assembly class and the BWR/4, BWR/5 and BWR/6 core designs make up the second class. Unlike the PWR classes, both BWR classes contain more than one array size. This is made possible by two BWR design characteristics: the control blades are external to the fuel assemblies, so that changes in the array size do not affect control blade operation, and the fuels are all designed with the same assembly envelope size, regardless of array size. The array size may thus vary over the life of a BWR reactor, and often does.

In the PWR reactors, on the other hand, the control rods are inserted directly into the assembly. Since changes in array size would interfere with control rod placement, so array size variations are generally not possible. Accordingly, array size is a primary factor in determining the PWR assembly class. The other necessary datum is the reactor manufacturer. Each vendor has its own core design, so that fuel must be manufactured to meet those specific design criteria. Hence, the PWR assembly class is determined by the reactor manufacturer and the array size.

There are two minor exceptions to the array size restrictions of PWRs. The Surry 1 and 2 reactors operated by Virginia Power and Electric Company are both Westinghouse 15 X 15 array reactors. Their standard fuel load is Westinghouse 15 X 15 Std/ZC Variation fuel, but each reactor has discharged two Westinghouse 17 X 17 Std assemblies that they tested. This was made possible by inserting the assemblies in non-control rod positions. The Oconee 2 reactor operated by Duke Power Company has also conducted a similar test. The normal fuel load at Oconee 2 is Babcock & Wilcox 15 X 15 Mark B fuel, but Duke has discharged four Babcock & Wilcox 17 X 17 Mark C assemblies. Thus, minor exceptions are possible in PWRs for testing purposes.

3.2 ASSEMBLY CLASS DESCRIPTIONS

Table 1 provides a complete listing of the assembly classification scheme. The major features in the determination of each class are explained below.

CLASS: Big Rock Point (BWR)

This design possesses an unusually large array size, either 9 X 9 or 11 X 11. The fuel is also only about 83 in. long, less than half the length of later BWR fuel.

Table 1. Assembly classes and their associated types

FUEL MANUFACTURER	ARRAY SIZE	VERSION	EIA IDENTIFIER
ASSEMBLY CLASS: BIG ROCK POINT			
General Electric	9 X 9	GE-1, VERS. 5	09G15
General Electric	11 X 11	GE-1, VERS. 6	11G16
Exxon / ANF	9 X 9	BRP	09EBR
Exxon / ANF	11 X 11	Gen. Electric	11EBR
Nuclear Fuel Services	11 X 11	Big Rock Pt	11NBR
ASSEMBLY CLASS: DRESDEN 1			
General Electric	6 X 6	GE-1, VERS. 1	06G11
Exxon / ANF	6 X 6	Gen. Electric	06EGD
United Nuclear	6 X 6	Dresden-1	06UGD
ASSEMBLY CLASS: ELK RIVER			
Allis Chalmers	5 X 5	Elk River	-----
ASSEMBLY CLASS: HUMBOLDT BAY			
General Electric	6 X 6	GE-1, VERS. 2	06G12
General Electric	7 X 7	GE-1, VERS. 3	07G13
Exxon / ANF	6 X 6	Humboldt Bay	06EGH
ASSEMBLY CLASS: LACROSSE			
Allis Chalmers	10 X 10		10AST
Exxon / ANF	10 X 10	AC	10EAC
ASSEMBLY CLASS: FORT CALHOUN			
Combustion Engineering	14 X 14	Fort Calhoun	14CFC
Exxon / ANF	14 X 14	Fort Calhoun	14EFC
ASSEMBLY CLASS: HADDAM NECK			
Babcock & Wilcox	15 X 15	St. Steel	15BWH
Westinghouse	15 X 15	Std/SC	15WSS
ASSEMBLY CLASS: INDIAN POINT 1			
Babcock & Wilcox	13 X 14		-----
Westinghouse	13 X 14		14WIP
ASSEMBLY CLASS: PALISADES			
Combustion Engineering	15 X 15	Palisades	15CPR
Exxon / ANF	15 X 15	Comb. Eng.	14EPR
ASSEMBLY CLASS: SAINT LUCIE 2			
Combustion Engineering	16 X 16	Lucie 2	16CSL
ASSEMBLY CLASS: SAN ONOFRE 1			
Westinghouse	14 X 14	Std/SC	14WSS

Table 1. (continued)

FUEL MANUFACTURER	ARRAY SIZE	VERSION	EIA IDENTIFIER
ASSEMBLY CLASS: SOUTH TEXAS 1&2			
Westinghouse	17 X 17	XLR	17WXL
ASSEMBLY CLASS: YANKEE ROWE			
Combustion Engineering	15 X 16	Yankee Rowe	16CYR
United Nuclear	15 X 16	Yankee Rowe	16UYR
Exxon / ANF	15 X 16	Westinghouse	16EYR
Westinghouse	17 X 18		18WYR
ASSEMBLY CLASS: GE BWR/2,3			
General Electric	7 X 7	GE-1, VERS. 4	07G14
General Electric	7 X 7	GE-2, VERS. 1	07G21
General Electric	7 X 7	GE-3, VERS. 1	07G31
General Electric	8 X 8	GE-4, VERS. 1	08G41
General Electric	8 X 8	GE-5, VERS. 1	08G51
General Electric	8 X 8	GE-6, VERS. 1	08G61
General Electric	8 X 8	GE-7, VERS. 1	08G71
General Electric	8 X 8	GE-8, VERS. 1	08G81
General Electric	8 X 8	GE-9, VERS. 1	08G91
Exxon / ANF	7 X 7	Gen. Electric	07EGE
Exxon / ANF	8 X 8	JP-3	08EG3
Exxon / ANF	9 X 9	JP-3	09EG3
ASSEMBLY CLASS: GE BWR/4,5,6			
General Electric	7 X 7	GE-2, VERS. 2	07G22
General Electric	7 X 7	GE-3, VERS. 2	07G32
General Electric	7 X 7	GE-3, VERS. 3	07G33
General Electric	8 X 8	GE-4, VERS. 2	08G42
General Electric	8 X 8	GE-4, VERS. 3	08G43
General Electric	8 X 8	GE-5, VERS. 2	08G52
General Electric	8 X 8	GE-6, VERS. 2	08G62
General Electric	8 X 8	GE-7, VERS. 2	08G72
General Electric	8 X 8	GE-8, VERS. 2	08G82
General Electric	8 X 8	GE-9, VERS. 2	08G92
Exxon / ANF	8 X 8	JP-4,5	08EG4
Exxon / ANF	9 X 9	JP-4,5	09EG4
ASSEMBLY CLASS: BW 15 X 15 ARRAY			
Babcock & Wilcox	15 X 15	Mark B	15BMB
Babcock & Wilcox	15 X 15	Mark BZ	15BBZ
ASSEMBLY CLASS: BW 17 X 17 ARRAY			
Babcock & Wilcox	17 X 17	Mark C	17BMC

Table 1. (continued)

FUEL MANUFACTURER	ARRAY SIZE	VERSION	EIA IDENTIFIER
ASSEMBLY CLASS: CE 14 X 14 ARRAY			
Combustion Engineering	14 X 14	Standard	14CST
Exxon / ANF	14 X 14	Comb. Eng.	14ECE
Westinghouse	14 X 14	Model C	14WMC
ASSEMBLY CLASS: CE 16 X 16 ARRAY			
Combustion Engineering	16 X 16	Onofre	16CSD
Combustion Engineering	16 X 16	ANO2	16CSD
Combustion Engineering	16 X 16	System 80	16CS8
ASSEMBLY CLASS: WE 14 X 14 ARRAY			
Westinghouse	14 X 14	Std/ZCA	14WZS
Westinghouse	14 X 14	Std/ZCB	14WZZ
Westinghouse	14 X 14	OFA	14WOF
Exxon / ANF	14 X 14	Westinghouse	14EWE
Exxon / ANF	14 X 14	Top Rod	14ETR
Babcock & Wilcox	14 X 14	Ginna	14BST
ASSEMBLY CLASS: WE 15 X 15 ARRAY			
Westinghouse	15 X 15	Std/ZC	15WZZ
Westinghouse	15 X 15	Std/ZC, Var	15WZS
Westinghouse	15 X 15	OFA	15WOF
Exxon / ANF	15 X 15	Westinghouse	15EWE
ASSEMBLY CLASS: WE 17 X 17 ARRAY			
Westinghouse	17 X 17	Standard	17WST
Westinghouse	17 X 17	OFA	17WOF
Westinghouse	17 X 17	Vantage 5	17WVA
Exxon / ANF	17 X 17	Westinghouse	17EWE
Babcock & Wilcox	17 X 17	Mark BW	17BBW

CLASS: Dresden 1 (BWR)

This BWR design has an unusually small array size, only 6 X 6. The fuel is also approximately 3 ft shorter than standard BWR length.

CLASS: Elk River (BWR)

This is one of two Allis Chalmers LWR designs. It has a small array size (5 X 5) and the fuel is only about 82 in. long. The fuel is Uranium-Thorium mixed oxide.

CLASS: Humboldt Bay (BWR)

This is a BWR design with a small array size (6 X 6 and 7 X 7) and short fuel (only 95 in.).

CLASS: Lacrosse (BWR)

This is the second Allis Chalmers LWR design. The design and array size (10 X 10) are unique on this BWR design.

CLASS: Fort Calhoun (PWR)

This is a Combustion Engineering 14 X 14 design, but the fuel is about 10 in. shorter than the standard design.

CLASS: Haddam Neck (PWR)

This is a Westinghouse 15 X 15 design, but the assemblies are approximately 22 in. shorter than standard.

CLASS: Indian Point 1 (PWR)

This reactor is one of two PWRs utilizing cruciform control blades. Accordingly, the fuel assemblies are of a nonsquare (13 X 14) array design to accommodate their use.

CLASS: Palisades (PWR)

This is the only Combustion Engineering 15 X 15 array design.

CLASS: Saint Lucie 2 (PWR)

This design is approximately 20 in. shorter than the standard Combustion Engineering 16 X 16 design.

CLASS: San Onofre 1 (PWR)

This assembly is approximately 20 in. shorter than the standard Westinghouse 14 X 14 array.

CLASS: South Texas 1&2 (PWR)

These assemblies are over 3 ft longer than the normal Westinghouse 17 X 17 array, and approximately 20 in. longer than any other fuel assembly of any class or type.

CLASS: Yankee Rowe (PWR)

This is the second PWR which uses cruciform control blades and therefore uses nonsquare arrays (15 X 16 and 17 X 18).

CLASS: GE BWR/2,3

This is the general class for BWR/2 and BWR/3 designs. Array sizes vary, but the fuel is all approximately 171 in. in length.

CLASS: GE BWR/4,5,6

This is the general class for the later BWR models, the BWR/4, BWR/5, and BWR/6 designs. Again, the array sizes vary, but these assemblies are all approximately 176 in. in length.

CLASS: BW 15 X 15 Array

This is the general class for the Babcock & Wilcox 15 X 15 array. The assemblies are approximately 166 in. in length.

CLASS: BW 17 X 17 Array

This is the general class for the Babcock & Wilcox 17 X 17 array. The assemblies are approximately 166 in. in length.

CLASS: CE 14 X 14 Array

This is the general class for the Combustion Engineering 14 X 14 array. The assemblies are approximately 157 in. in length.

CLASS: CE 16 X 16 Array

This is the general class for the Combustion Engineering 16 X 16 array. The assemblies are approximately 177 in. in length.

CLASS: WE 14 X 14 Array

This is the general class for the Westinghouse 14 X 14 array. The assemblies are approximately 160 in. in length.

CLASS: WE 15 X 15 Array

This is the general class for the Westinghouse 15 X 15 array. The assemblies are approximately 160 in. in length.

CLASS: WE 17 X 17 Array

This is the general class for the Westinghouse 17 X 17 array. The assemblies are approximately 160 in. in length.

3.3 SCHEME EXCEPTIONS

This system includes all known LWR fuel types, with three exceptions. These exceptions are for three reactors that have been permanently shut down. The first is the Pathfinder reactor, an Allis Chalmers design formerly operated by Northern States Power Company until it was shut down in 1967. All fuel from this reactor has been reprocessed, to the best of the authors' knowledge; therefore, there are no assemblies to account for and no assembly class for this reactor.

The remaining two reactors are the BONUS reactor operated by the Atomic Energy Commission and the Puerto Rico Water Resources Authority in Punta Higuera, Puerto Rico, and the

Shippingport Atomic Power Station (the original LWR version) operated by the Department of Energy and Duquesne Light Company in Shippingport, Pennsylvania. The BONUS reactor was shut down in 1968, and one batch of this fuel was reprocessed at the West Valley facility. There is no known BONUS fuel still in existence.

The Shippingport reactor was shut down in 1982, and all of its breeder fuel loads were sent to Idaho National Engineering Laboratory (INEL). The location of the earlier (LWR) cores is uncertain at this time. It is thought that they may have been sent to INEL under the naval fuels program, and, in that case, were probably reprocessed. This fuel was of an unusual nature. The core consisted of plate fuel assemblies of enriched uranium fuel surrounded by blanket assemblies of natural uranium. The blanket assemblies resembled the modern LWR fuel assembly.

4. DATA TABULATIONS

4.1 LENGTH BASIS

Table 2 provides an assembly classification system based on length. The assemblies are divided into 17 groups of similar length in ascending order. In three cases, Groups A, H, and O, assemblies were broken out of a larger group because of a highly dissimilar assembly width. Thus, all assembly widths within a group are also of a similar dimension.

There are a number of assemblies for which the quantity is listed as zero. Some of these are new assembly types (i.e., assembly types that have just entered service and have not been discharged at this time) and are identified as "New" in the NOTE column. The two assembly types in length group G are marked with "***" in the NOTE column. When initial fuel classifications were made, discrepancies were found and some of the fuel assemblies classified as B&W 15 X 15 St. Steel are actually WE 15 X 15 Std/SC. These numbers will be adjusted as these discrepancies are corrected, but until that time, the number given for the B&W fuel represents the total number of both B&W 15 X 15 and WE 15 X 15 fuels present at Haddam Neck. Finally, the B&W 13 X 14 Indian Point 1 assembly type in length group H also has a zero quantity. It is believed that all of this particular fuel type has been reprocessed.

There is also one other point that bears mentioning in relationship to a length classification scheme. The fuel rods in the assemblies expand under irradiation by as much as 2 in. over the lifetime in the core. The fuel assemblies, however, do not change very much, so this added length is accommodated within the assembly structure. Accordingly, this expansion should make little or no difference to most applications of this classification scheme, as applied to intact assemblies.

Table 2. Assembly classification by length

FUEL VERSION	LENGTH	WIDTH	QUANTITY (EIA, 1987)	ORNL CLASS	NOTE
LENGTH GROUP A					
AC 5X5 Elk River	81.6	3.5	188	ELK RIVER	
			Subtotal:	188	
LENGTH GROUP B					
Exxon 9X9 Big Rock Point	82	6.5	4	BIG ROCK PT.	
GE 9X9 GE-1, Vers. 5	(82)		143	BIG ROCK PT.	
GE 11X11 GE-1, Vers. 6	(82)		6	BIG ROCK PT.	
Exxon 11X11 Gen. Electric	83.970	6.515	128	BIG ROCK PT.	
			Subtotal:	281	
LENGTH GROUP C					
GE 6X6 GE-1, Vers. 2	95	4.662	176	HUMBOLDT BAY	
Exxon 6X6 Humboldt Bay	95		126	HUMBOLDT BAY	
GE 7X7 GE-1, Vers. 3	95	4.662	358	HUMBOLDT BAY	
			Subtotal:	660	
LENGTH GROUP D					
Allis Chalmers 10X10	102.34	5.61	156	LACROSSE	
Exxon 10X10 AC	102.45	5.614	178	LACROSSE	
			Subtotal:	334	
LENGTH GROUP E					
Exxon 15X16 Westinghouse	111.775	7.614	228	YANKEE ROWE	
CE 15X16 Yankee Rowe	111.785	7.6	40	YANKEE ROWE	
WE 17X18 Yankee Rowe	(112)		76	YANKEE ROWE	
			Subtotal:	344	
LENGTH GROUP F					
Exxon 6X6 Gen. Electric	134.32	4.275	66	DRESDEN 1	
GE 6X6 GE-1, Vers. 1	(134)		365	DRESDEN 1	
			Subtotal:	431	
LENGTH GROUP G					
WE 14X14 Std/SC	137.06	7.76	416	SAN ONOFRE 1	
WE 15X15 Std/SC	137.06	8.42	0	HADDAM NECK	***
B&W 15X15 St. Steel	137.06	8.466	736	HADDAM NECK	***
			Subtotal:	1152	
LENGTH GROUP H					
B&W 13X14 Indian Point 1	(138)		0	INDIAN PT. 1	

Table 2. (continued)

FUEL VERSION	LENGTH	WIDTH	QUANTITY (EIA, 1987)	ORNL CLASS	NOTE
LENGTH GROUP H (continued)					
WE 13X14 Indian Point 1	137.752	6.2675	160	INDIAN PT.	1
	Subtotal:		160		
LENGTH GROUP I					
CE 14X14 Fort Calhoun	146	8.1	290	FORT CALHOUN	
Exxon 14X14 Fort Calhoun	147		104	FORT CALHOUN	
CE 15X15 Palisades	147.5	8.2	273	PALISADES	
Exxon 15X15 Comb. Eng.	148.852	8.250	272	PALISADES	
	Subtotal:		939		
LENGTH GROUP J					
CE 14X14 Standard	157.00	8.10	2503	CE 14 X 14	
WE 14X14 Model C	157.238	8.03	219	CE 14 X 14	
Exxon 14X14 Comb. Eng.	157.24	8.110	383	CE 14 X 14	
	Subtotal:		3105		
LENGTH GROUP K					
CE 16X16 Lucie 2	158.129	8.1	240	ST. LUCIE 2	
Exxon 15X15 Westinghouse	159.7	8.426	695	WE 15 X 15	
WE 14X14 OFA	159.71	7.76	20	WE 14 X 14	
WE 14X14 Std/ZCA	159.71	7.76	605	WE 14 X 14	
WE 14X14 Std/ZCB	159.71	7.76	1369	WE 14 X 14	
WE 15X15 Std/ZC	159.71	8.434	1885	WE 15 X 15	
Exxon 17X17 Westinghouse	159.71	8.426	60	WE 17 X 17	
WE 15X15 OFA	159.765	8.424	144	WE 15 X 15	
WE 17X17 Standard	159.765	8.434	4645	WE 17 X 17	
WE 17X17 OFA	159.765	8.434	485	WE 17 X 17	
WE 17X17 Vantage 5	160.1	8.426	4	WE 17 X 17	
Exxon 14X14 Westinghouse	160.13	7.763	540	WE 14 X 14	
Exxon 14X14 Top Rod	160.13	7.763	207	WE 14 X 14	
	Subtotal:		10899		
LENGTH GROUP L					
B&W 15X15 Mark B	165.625	8.536	3354	B&W 15 X 15	
B&W 15X15 Mark BZ	165.625	8.536	0	B&W 15 X 15	New
B&W 17X17 Mark C	165.71875	8.536	4	B&W 17 X 17	
	Subtotal:		3358		
LENGTH GROUP M					
GE 7X7 GE-1, Vers. 4	171.125	5.438	1140	GE BWR/2,3	
GE 7X7 GE-2, Vers. 1	171.2	5.438	5516	GE BWR/2,3	

Table 2. (continued)

FUEL VERSION	LENGTH	WIDTH	QUANTITY (EIA, 1987)	ORNL CLASS	NOTE
LENGTH GROUP M (continued)					
GE 7X7 GE-3, Vers. 1	171.125	5.438	400	GE BWR/2,3	
GE 8X8 GE-4, Vers. 1	171.125	5.438	3164	GE BWR/2,3	
GE 8X8 GE-5, Vers. 1	171.125	5.438	964	GE BWR/2,3	
GE 8X8 GE-6, Vers. 1	171.125	5.438	920	GE BWR/2,3	
GE 8X8 GE-7, Vers. 1	171.125	5.438	16	GE BWR/2,3	
GE 8X8 GE-8, Vers. 1	(171)		0	GE BWR/2,3	New
GE 8X8 GE-9, Vers. 1	(171)		0	GE BWR/2,3	New
E Exxon 7X7 Gen. Electric	171.25	5.247	260	GE BWR/2,3	
E Exxon 8X8 JP-3	171.29	5.251	416	GE BWR/2,3	
E Exxon 9X9 JP-3	171.29	5.251	0	GE BWR/2,3	New
			Subtotal:	12796	
LENGTH GROUP N					
GE 7X7 GE-2, Vers. 2	175.87	5.438	974	GE BWR/4,5,6	
GE 7X7 GE-3, Vers. 2	175.87	5.438	3917	GE BWR/4,5,6	
GE 7X7 GE-3, Vers. 3	175.87	5.438	1184	GE BWR/4,5,6	
GE 8X8 GE-4, Vers. 2	175.87	5.478	1868	GE BWR/4,5,6	
GE 8X8 GE-4, Vers. 3	175.87	5.438	1787	GE BWR/4,5,6	
GE 8X8 GE-5, Vers. 2	175.87	5.478	2854	GE BWR/4,5,6	
GE 8X8 GE-6, Vers. 2	175.87	5.438	5117	GE BWR/4,5,6	
GE 8X8 GE-7, Vers. 2	175.87	5.438	238	GE BWR/4,5,6	
GE 8X8 GE-8, Vers. 2	(176)		0	GE BWR/4,5,6	New
GE 8X8 GE-9, Vers. 2	(176)		0	GE BWR/4,5,6	New
E Exxon 8X8 JP-4,5	176.05	5.251	0	GE BWR/4,5,6	New
E Exxon 9X9 JP-4,5	176.058	5.251	0	GE BWR/4,5,6	New
			Subtotal:	17939	
LENGTH GROUP O					
CE 16X16 ANO2	176.803	8.1	326	CE 16 X 16	
CE 16X16 Onofre	176.803	8.1	482	CE 16 X 16	
			Subtotal:	808	
LENGTH GROUP P					
CE 16X16 System 80	178.250	8.1	80	CE 16 X 16	
			Subtotal:	80	
LENGTH GROUP Q					
WE 17X17 XLR	199	8.43	0	S. TEXAS 1&2	New
			Subtotal:	0	
			TOTAL:	53474	

The lengths and widths quoted were taken from the Characteristics Data Base.¹ The quantities are based on the 1987 EIA data, as reported by the utilities via RW-859. The ORNL classes are consistent with this report. This table was generated using dBase III+.

4.2 QUANTITIES BASIS (BY ASSEMBLY CLASS)

Tables 3a, 3b, and 3c were generated to illustrate the relative importance of each assembly class. They clearly show which assembly classes are the most important at the present time and also the current trends that will determine the important classes in future years. The calculations were performed using Lotus 1-2-3, while the data base functions were executed with dBase III+.

4.3 ASSEMBLY CLASS BASIS

Table 4 provides a listing of reactors grouped by the assembly class utilized. Additionally, the table also lists the year the reactor began commercial operation and the year in which it was permanently shut down prior to decommissioning. It gives the number of assemblies that make up a full core load and, if the reactor is a GE BWR, it also lists the reactor generation (i.e., whether it is a BWR/1, BWR/2, etc., design). This data base and report and those following were generated with dBaseIII+, using the PC data files in the CDB.

4.4 REACTOR BASIS

Table 5 presents an alphabetical listing of shut down, currently operable and planned nuclear reactors; the utility by which they are owned; and the fuel assembly class as developed in this report.

4.5 UTILITY BASIS

Table 6 provides an alphabetical listing of the nuclear utilities and the reactors that they operate. Listed also are the assembly class and the INIS number assigned to reactors by the EIA.

4.6 CONSOLIDATION BASIS

In the course of gathering fuel assembly information from the vendors for the development of the Characteristics Data Base,¹ the vendors were asked to provide a "difficulty index" for performing various consolidation-related tasks on their fuel assembly designs. No guidelines were given for these indexes, so the resulting numbers are highly subjective. The results are shown in Table 7.

Table 3a. Assembly class quantity data
based on discharges as of Dec. 31, 1987 (EIA)

ASSEMBLY CLASS	NUMBER IN CLASS	PERCENT OF TOTAL	METRIC TON (HEAVY METAL) IN CLASS	PERCENT OF TOTAL
BIG ROCK POINT	289	0.50	38	0.24
DRESDEN 1	889	1.53	87	0.54
ELK RIVER	188	0.32	5	0.03
HUMBOLDT BAY	660	1.14	50	0.31
LACROSSE	334	0.57	38	0.24
FORT CALHOUN	394	0.68	143	0.88
HADDAM NECK	736	1.27	304	1.88
INDIAN POINT 1	160	0.28	31	0.19
PALISADES	545	0.94	219	1.35
SAINT LUCIE 2	240	0.41	90	0.56
SAN ONOFRE 1	416	0.72	152	0.94
SOUTH TEXAS 1&2	0	0.00	0	0.00
YANKEE ROWE	377	0.65	91	0.56
GE BWR/2,3	12802	22.04	2406	14.89
GE BWR/4,5,6	19475	33.53	3587	22.19
BW 15 X 15 ARRAY	3354	5.77	1542	9.54
BW 17 X 17 ARRAY	4	0.01	2	0.01
CE 14 X 14 ARRAY	3105	5.35	1188	7.35
CE 16 X 16 ARRAY	888	1.53	370	2.29
WE 14 X 14 ARRAY	2741	4.72	1071	6.63
WE 15 X 15 ARRAY	5303	9.13	2384	14.75
WE 17 X 17 ARRAY	5190	8.93	2365	14.63
TOTALS:	58090	100.00	16163	100.00

Table 3b. Assembly class quantity data
based on discharges and fuel incore as of Dec. 31, 1987 (EIA)

ASSEMBLY CLASS	NUMBER IN CLASS	PERCENT OF TOTAL	METRIC TON (HEAVY METAL) IN CLASS	PERCENT OF TOTAL
BIG ROCK POINT	353	0.44	47	0.21
DRESDEN 1	889	1.11	87	0.39
ELK RIVER	188	0.23	5	0.02
HUMBOLDT BAY	660	0.82	50	0.23
LACROSSE	334	0.42	38	0.17
FORT CALHOUN	438	0.54	158	0.71
HADDAM NECK	837	1.04	345	1.56
INDIAN POINT 1	160	0.20	31	0.14
PALISADES	749	0.93	299	1.35
SAINT LUCIE 2	257	0.32	97	0.44
SAN ONOFRE 1	573	0.71	210	0.95
SOUTH TEXAS 1&2	0	0.00	0	0.00
YANKEE ROWE	377	0.47	91	0.41
GE BWR/2,3	15306	19.04	2851	12.88
GE BWR/4,5,6	31178	38.79	5726	25.88
BW 15 X 15 ARRAY	4507	5.61	2077	9.39
BW 17 X 17 ARRAY	4	0.00	2	0.01
CE 14 X 14 ARRAY	3634	4.52	1396	6.31
CE 16 X 16 ARRAY	1863	2.32	773	3.49
WE 14 X 14 ARRAY	3284	4.09	1268	5.73
WE 15 X 15 ARRAY	6259	7.79	2757	12.46
WE 17 X 17 ARRAY	8527	10.61	3820	17.26
TOTALS:	80377	100.00	22128	100.00

Table 3c. Assembly class quantity data
based on discharges to 2020 (see reference 2)

ASSEMBLY CLASS	NUMBER IN CLASS	PERCENT OF TOTAL	METRIC TON (HEAVY METAL) IN CLASS	PERCENT OF TOTAL
BIG ROCK POINT	511	0.19	66	0.09
DRESDEN 1*	683	0.26	69	0.09
ELK RIVER*	188	0.07	5	0.01
HUMBOLDT BAY*	390	0.15	28	0.04
LACROSSE*	606	0.23	68	0.09
FORT CALHOUN	1040	0.39	376	0.50
HADDAM NECK	1307	0.49	538	0.71
INDIAN POINT 1	160	0.06	31	0.04
PALISADES	1401	0.52	552	0.73
SAINT LUCIE 2	1528	0.57	579	0.76
SAN ONOFRE 1*	520	0.19	193	0.25
SOUTH TEXAS 1&2	2292	0.86	1235	1.63
YANKEE ROWE	643	0.24	154	0.20
GE BWR/2,3	32339	12.09	5870	7.74
GE BWR/4,5,6	120057	44.88	21864	28.84
BW 15 X 15 ARRAY	10706	4.00	4971	6.56
BW 17 X 17 ARRAY	3847	1.44	1750	2.31
CE 14 X 14 ARRAY	8890	3.32	3328	4.39
CE 16 X 16 ARRAY	11917	4.45	5106	6.73
WE 14 X 14 ARRAY	6301	2.36	2329	3.07
WE 15 X 15 ARRAY	13529	5.06	6144	8.10
WE 17 X 17 ARRAY	48662	18.19	20557	27.12
TOTALS:	267517	100.00	75813	100.00

* Data points for these reactors need to be updated.

Table 4. Reactors grouped by assembly class

REACTOR	REACTOR VENDOR	COMMERCIAL OPERATION DATE	PERMANENT SHUTDOWN DATE	NUMBER OF ASSEMBLIES IN FULL CORE
ASSEMBLY CLASS: None				
BONUS	CE	1964	1968	
Pathfinder	AC	1964	1967	
Shippingport LWR	WE	1957	1982	
ASSEMBLY CLASS: BIG ROCK PT.				
Big Rock Point	GE	1962		84
ASSEMBLY CLASS: DRESDEN 1				
Dresden 1	GE	1960	1984	536
ASSEMBLY CLASS: ELK RIVER				
Elk River	AC	1962	1968	148
ASSEMBLY CLASS: HUMBOLDT BAY				
Humboldt Bay	GE	1963	1983	188
ASSEMBLY CLASS: LACROSSE				
LaCrosse	AC	1969	1987	72
ASSEMBLY CLASS: FORT CALHOUN				
Fort Calhoun	CE	1973		133
ASSEMBLY CLASS: HADDAM NECK				
Haddam Neck	WE	1968		157
ASSEMBLY CLASS: INDIAN PT. 1				
Indian Point 1	BW	1962	1980	160
ASSEMBLY CLASS: PALISADES				
Palisades	CE	1971		204
ASSEMBLY CLASS: ST. LUCIE 2				
St. Lucie 2	CE	1983		217
ASSEMBLY CLASS: SAN ONOFRE 1				
San Onofre 1	WE	1968		157
ASSEMBLY CLASS: S. TEXAS 1&2				
South Texas 1	WE	1988E		193
South Texas 2	WE	1989E		193
ASSEMBLY CLASS: YANKEE ROWE				
Yankee-Rowe	WE	1961		76

Table 4. (continued)

REACTOR	REACTOR VENDOR	COMMERCIAL OPERATION DATE	PERMANENT SHUTDOWN DATE	NUMBER OF ASSEMBLIES IN FULL CORE
ASSEMBLY CLASS: GE BWR/2,3				
Dresden 2	GE	1970		724
Dresden 3	GE	1971		724
Millstone 1	GE	1970		580
Monticello	GE	1971		484
Nine Mile Point 1	GE	1969		532
Oyster Creek	GE	1969		560
Pilgrim	GE	1972		580
Quad Cities 1	GE	1972		724
Quad Cities 2	GE	1972		724
ASSEMBLY CLASS: GE BWR/4,5,6				
Browns Ferry 1	GE	1974		764
Browns Ferry 2	GE	1975		764
Browns Ferry 3	GE	1977		764
Brunswick 1	GE	1977		560
Brunswick 2	GE	1975		560
Clinton	GE	1987		548
Cooper Station	GE	1974		548
Duane Arnold	GE	1975		368
Enrico Fermi 2	GE	1988E		764
Fitzpatrick	GE	1975		560
Grand Gulf 1	GE	1985		800
Grand Gulf 2	GE	INDEF		800
Hatch 1	GE	1975		560
Hatch 2	GE	1979		560
Hope Creek	GE	1987		764
LaSalle 1	GE	1982		764
LaSalle 2	GE	1984		764
Limerick 1	GE	1986		764
Limerick 2	GE	1990E		764
Nine Mile Point 2	GE	1988E		764
Peach Bottom 2	GE	1974		764
Peach Bottom 3	GE	1974		764
Perry 1	GE	1987		748
Perry 2	GE	INDEF		748
River Bend 1	GE	1986		548
Shoreham	GE	INDEF		560
Susquehanna 1	GE	1983		764
Susquehanna 2	GE	1985		764
Vermont Yankee	GE	1972		368
Washington Nuclear 2	GE	1984		764
ASSEMBLY CLASS: B&W 15 X 15				
Arkansas 1	BW	1974		177

Table 4. (continued)

REACTOR	REACTOR VENDOR	COMMERCIAL OPERATION DATE	PERMANENT SHUTDOWN DATE	NUMBER OF ASSEMBLIES IN FULL CORE
ASSEMBLY CLASS: B&W 15 X 15 (continued)				
Crystal River 3	BW	1977		177
Davis-Besse	BW	1977		177
Oconee 1	BW	1973		177
Oconee 2	BW	1974		177
Oconee 3	BW	1974		177
Rancho Seco	BW	1975		177
Three Mile Island 1	BW	1974		177
Three Mile Island 2	BW	1979	1979	177
ASSEMBLY CLASS: B&W 17 X 17				
Bellefonte 1	BW	1994E		207
Bellefonte 2	BW	1996E		207
Washington Nuclear 1	BW	INDEF		205
ASSEMBLY CLASS: CE 14 X 14				
Calvert Cliffs 1	CE	1975		217
Calvert Cliffs 2	CE	1977		217
Maine Yankee	CE	1972		217
Millstone 2	CE	1975		217
St. Lucie 1	CE	1976		217
ASSEMBLY CLASS: CE 16 X 16				
Arkansas 2	CE	1980		177
Palo Verde 1	CE	1986		221
Palo Verde 2	CE	1986		221
Palo Verde 3	CE	1988E		221
San Onofre 2	CE	1983		217
San Onofre 3	CE	1984		217
Washington Nuclear 3	CE	INDEF		221
Waterford 3	CE	1985		217
ASSEMBLY CLASS: WE 14 X 14				
Ginna	WE	1970		121
Kewaunee	WE	1974		121
Point Beach 1	WE	1970		121
Point Beach 2	WE	1972		121
Prairie Island 1	WE	1973		121
Prairie Island 2	WE	1974		121
ASSEMBLY CLASS: WE 15 X 15				
Cook 1	WE	1975		193
Indian Point 2	WE	1974		193
Indian Point 3	WE	1976		193

Table 4. (continued)

REACTOR	REACTOR VENDOR	COMMERCIAL OPERATION DATE	PERMANENT SHUTDOWN DATE	NUMBER OF ASSEMBLIES IN FULL CORE
ASSEMBLY CLASS: WE 15 X 15 (continued)				
Robinson 2	WE	1971		157
Surry 1	WE	1972		157
Surry 2	WE	1973		157
Turkey Point 3	WE	1972		157
Turkey Point 4	WE	1973		157
Zion 1	WE	1973		193
Zion 2	WE	1974		193
ASSEMBLY CLASS: WE 17 X 17				
Beaver Valley 1	WE	1977		157
Beaver Valley 2	WE	1987		157
Braidwood 1	WE	1988E		193
Braidwood 2	WE	1988E		193
Byron 1	WE	1985		193
Byron 2	WE	1987		193
Callaway	WE	1985		193
Catawba 1	WE	1985		193
Catawba 2	WE	1986		193
Comanche Peak 1	WE	1989E		193
Comanche Peak 2	WE	1990E		193
Cook 2	WE	1978		193
Diablo Canyon 1	WE	1985		193
Diablo Canyon 2	WE	1986		193
Farley 1	WE	1977		157
Farley 2	WE	1981		157
Harris	WE	1987		157
McGuire 1	WE	1981		193
McGuire 2	WE	1984		193
Millstone 3	WE	1986		193
North Anna 1	WE	1978		157
North Anna 2	WE	1980		157
Salem 1	WE	1977		193
Salem 2	WE	1981		193
Seabrook 1	WE	INDEF		193
Sequoyah 1	WE	1981		193
Sequoyah 2	WE	1982		193
Summer	WE	1984		157
Trojan	WE	1976		193
Vogtle 1	WE	1987		193
Vogtle 2	WE	1989E		193
Watts Bar 1	WE	INDEF		193
Watts Bar 2	WE	INDEF		193
Wolf Creek	WE	1985		193

Table 5. Reactor assembly class

REACTOR	UTILITY	ASSEMBLY CLASS
Arkansas 1	Arkansas Power & Light	B&W 15 X 15
Arkansas 2	Arkansas Power & Light	CE 16 X 16
BONUS	Puerto Rico Water Resources Au.	
Beaver Valley 1	Duquesne Light Co.	WE 17 X 17
Beaver Valley 2	Duquesne Light Co.	WE 17 X 17
Bellefonte 1	Tennessee Valley Authority	B&W 17 X 17
Bellefonte 2	Tennessee Valley Authority	B&W 17 X 17
Big Rock Point	Consumers Power Co.	BIG ROCK PT.
Braidwood 1	Commonwealth Edison Co.	WE 17 X 17
Braidwood 2	Commonwealth Edison Co.	WE 17 X 17
Browns Ferry 1	Tennessee Valley Authority	GE BWR/4,5,6
Browns Ferry 2	Tennessee Valley Authority	GE BWR/4,5,6
Browns Ferry 3	Tennessee Valley Authority	GE BWR/4,5,6
Brunswick 1	Carolina Power & Light Co.	GE BWR/4,5,6
Brunswick 2	Carolina Power & Light Co.	GE BWR/4,5,6
Byron 1	Commonwealth Edison Co.	WE 17 X 17
Byron 2	Commonwealth Edison Co.	WE 17 X 17
Callaway	Union Electric Co.	WE 17 X 17
Calvert Cliffs 1	Baltimore G&E	CE 14 X 14
Calvert Cliffs 2	Baltimore G&E	CE 14 X 14
Catawba 1	Duke Power Co.	WE 17 X 17
Catawba 2	Duke Power Co.	WE 17 X 17
Clinton	Illinois Power Company	GE BWR/4,5,6
Comanche Peak 1	Texas Utilities Generation Co.	WE 17 X 17
Comanche Peak 2	Texas Utilities Generation Co.	WE 17 X 17
Cook 1	Indiana and Michigan Electric	WE 15 X 15
Cook 2	Indiana and Michigan Electric	WE 17 X 17
Cooper Station	Nebraska Public Power District	GE BWR/4,5,6
Crystal River 3	Florida Power Corporation	B&W 15 X 15
Davis-Besse	Toledo Edison Co.	B&W 15 X 15
Diablo Canyon 1	Pacific Gas & Electric Co.	WE 17 X 17
Diablo Canyon 2	Pacific Gas & Electric Co.	WE 17 X 17
Dresden 1	Commonwealth Edison Co.	DRESDEN 1
Dresden 2	Commonwealth Edison Co.	GE BWR/2,3
Dresden 3	Commonwealth Edison Co.	GE BWR/2,3
Duane Arnold	Iowa Elec. Light & Power Co.	GE BWR/4,5,6
Elk River	Rural Coop Power Association	ELK RIVER
Enrico Fermi 2	Detroit Edison Co.	GE BWR/4,5,6
Farley 1	Alabama Power Co.	WE 17 X 17
Farley 2	Alabama Power Co.	WE 17 X 17
Fitzpatrick	Power Auth. of State of NY	GE BWR/4,5,6
Fort Calhoun	Omaha Public Power District	FORT CALHOUN
Ginna	Rochester Gas & Elec. Corp.	WE 14 X 14
Grand Gulf 1	Mississippi Power & Light Co.	GE BWR/4,5,6
Grand Gulf 2	Mississippi Power & Light Co.	GE BWR/4,5,6
Haddam Neck	Connecticut Yankee Atomic Power	HADDAM NECK
Harris	Carolina Power & Light Co.	WE 17 X 17

Table 5. (continued)

REACTOR	UTILITY	ASSEMBLY CLASS
Hatch 1	Georgia Power Company	GE BWR/4,5,6
Hatch 2	Georgia Power Company	GE BWR/4,5,6
Hope Creek	Public Serv. Elec. & Gas Co.	GE BWR/4,5,6
Humboldt Bay	Pacific Gas & Electric Co.	HUMBOLDT BAY
Indian Point 1	Consolidated Edison Co. NY	INDIAN PT. 1
Indian Point 2	Consolidated Edison Co. NY	WE 15 X 15
Indian Point 3	Power Auth. of State of NY	WE 15 X 15
Kewaunee	Wisconsin Public Service Corp.	WE 14 X 14
LaCrosse	Dairyland Power Coop	LACROSSE
LaSalle 1	Commonwealth Edison Co.	GE BWR/4,5,6
LaSalle 2	Commonwealth Edison Co.	GE BWR/4,5,6
Limerick 1	Philadelphia Electric Co.	GE BWR/4,5,6
Limerick 2	Philadelphia Electric Co.	GE BWR/4,5,6
Maine Yankee	Maine Yankee Atomic Power Co.	CE 14 X 14
McGuire 1	Duke Power Co.	WE 17 X 17
McGuire 2	Duke Power Co.	WE 17 X 17
Millstone 1	Northeast Utilities Service Co.	GE BWR/2,3
Millstone 2	Northeast Utilities Service Co.	CE 14 X 14
Millstone 3	Northeast Utilities Service Co.	WE 17 X 17
Monticello	Northern States Power Co.	GE BWR/2,3
Nine Mile Point 1	Niagara Mohawk Power Corp.	GE BWR/2,3
Nine Mile Point 2	Niagara Mohawk Power Corp.	GE BWR/4,5,6
North Anna 1	Virginia Electric & Power Co.	WE 17 X 17
North Anna 2	Virginia Electric & Power Co.	WE 17 X 17
Oconee 1	Duke Power Co.	B&W 15 X 15
Oconee 2	Duke Power Co.	B&W 15 X 15
Oconee 3	Duke Power Co.	B&W 15 X 15
Oyster Creek	GPU Nuclear	GE BWR/2,3
Palisades	Consumers Power Co.	PALISADES
Palo Verde 1	Arizona Public Service Co.	CE 16 X 16
Palo Verde 2	Arizona Public Service Co.	CE 16 X 16
Palo Verde 3	Arizona Public Service Co.	CE 16 X 16
Pathfinder	Northern States Power Co.	
Peach Bottom 2	Philadelphia Electric Co.	GE BWR/4,5,6
Peach Bottom 3	Philadelphia Electric Co.	GE BWR/4,5,6
Perry 1	Cleveland Electric Illum. Co.	GE BWR/4,5,6
Perry 2	Cleveland Electric Illum. Co.	GE BWR/4,5,6
Pilgrim	Boston Edison Co.	GE BWR/2,3
Point Beach 1	Wisconsin Electric Power Co.	WE 14 X 14
Point Beach 2	Wisconsin Electric Power Co.	WE 14 X 14
Prairie Island 1	Northern States Power Co.	WE 14 X 14
Prairie Island 2	Northern States Power Co.	WE 14 X 14
Quad Cities 1	Commonwealth Edison Co.	GE BWR/2,3
Quad Cities 2	Commonwealth Edison Co.	GE BWR/2,3
Rancho Seco	Sacramento Municipal Util. Dis.	B&W 15 X 15
River Bend 1	Gulf States Utilities	GE BWR/4,5,6

Table 5. (continued)

REACTOR	UTILITY	ASSEMBLY CLASS
Robinson 2	Carolina Power & Light Co.	WE 15 X 15
Salem 1	Public Serv. Elec. & Gas Co.	WE 17 X 17
Salem 2	Public Serv. Elec. & Gas Co.	WE 17 X 17
San Onofre 1	Southern California Edison Co.	SAN ONOFRE 1
San Onofre 2	Southern California Edison Co.	CE 16 X 16
San Onofre 3	Southern California Edison Co.	CE 16 X 16
Seabrook 1	Public Service of New Hampshire	WE 17 X 17
Sequoyah 1	Tennessee Valley Authority	WE 17 X 17
Sequoyah 2	Tennessee Valley Authority	WE 17 X 17
Shippingport LWR	Duquesne Light Co.	
Shoreham	Long Island Lighting Co.	GE BWR/4,5,6
South Texas 1	Houston Lighting & Power	S. TEXAS 1&2
South Texas 2	Houston Lighting & Power	S. TEXAS 1&2
St. Lucie 1	Florida Power & Light	CE 14 X 14
St. Lucie 2	Florida Power & Light	ST. LUCIE 2
Summer	South Carolina Elec. & Gas Co.	WE 17 X 17
Surry 1	Virginia Electric & Power Co.	WE 15 X 15
Surry 2	Virginia Electric & Power Co.	WE 15 X 15
Susquehanna 1	Pennsylvania Power & Light Co.	GE BWR/4,5,6
Susquehanna 2	Pennsylvania Power & Light Co.	GE BWR/4,5,6
Three Mile Island 1	GPU Nuclear	B&W 15 X 15
Three Mile Island 2	GPU Nuclear	B&W 15 X 15
Trojan	Portland General Elec.	WE 17 X 17
Turkey Point 3	Florida Power & Light	WE 15 X 15
Turkey Point 4	Florida Power & Light	WE 15 X 15
Vermont Yankee	Vermont Yankee Nuclear Power	GE BWR/4,5,6
Vogtle 1	Georgia Power Company	WE 17 X 17
Vogtle 2	Georgia Power Company	WE 17 X 17
Washington Nuclear 1	Washington Public Power Supply	B&W 17 X 17
Washington Nuclear 2	Washington Public Power Supply	GE BWR/4,5,6
Washington Nuclear 3	Washington Public Power Supply	CE 16 X 16
Waterford 3	Louisiana Power & Light	CE 16 X 16
Watts Bar 1	Tennessee Valley Authority	WE 17 X 17
Watts Bar 2	Tennessee Valley Authority	WE 17 X 17
Wolf Creek	Kansas Gas & Electric Co.	WE 17 X 17
Yankee-Rowe	Yankee Atomic Electric Co.	YANKEE ROWE
Zion 1	Commonwealth Edison Co.	WE 15 X 15
Zion 2	Commonwealth Edison Co.	WE 15 X 15

Table 6. Reactor assembly classes listed by utility

REACTOR	ASSEMBLY CLASS	INIS IDENTIFIER
UTILITY: Alabama Power Co.		
Farley 1	WE 17 X 17	0101
Farley 2	WE 17 X 17	0102
UTILITY: Arizona Public Service Co.		
Palo Verde 1	CE 16 X 16	0301
Palo Verde 2	CE 16 X 16	0302
Palo Verde 3	CE 16 X 16	0303
UTILITY: Arkansas Power & Light		
Arkansas 1	B&W 15 X 15	0401
Arkansas 2	CE 16 X 16	0402
UTILITY: Baltimore G&E		
Calvert Cliffs 1	CE 14 X 14	0501
Calvert Cliffs 2	CE 14 X 14	0502
UTILITY: Boston Edison Co.		
Pilgrim	GE BWR/2,3	0601
UTILITY: Carolina Power & Light Co.		
Brunswick 1	GE BWR/4,5,6	0701
Brunswick 2	GE BWR/4,5,6	0702
Harris	WE 17 X 17	0703
Robinson 2	WE 15 X 15	0705
UTILITY: Cleveland Electric Illum. Co.		
Perry 1	GE BWR/4,5,6	0901
Perry 2	GE BWR/4,5,6	0902
UTILITY: Commonwealth Edison Co.		
Braidwood 1	WE 17 X 17	1001
Braidwood 2	WE 17 X 17	1002
Byron 1	WE 17 X 17	1003
Byron 2	WE 17 X 17	1004
Dresden 1	DRESDEN 1	1005
Dresden 2	GE BWR/2,3	1006
Dresden 3	GE BWR/2,3	1007
LaSalle 1	GE BWR/4,5,6	1008
LaSalle 2	GE BWR/4,5,6	1009
Quad Cities 1	GE BWR/2,3	1010
Quad Cities 2	GE BWR/2,3	1011
Zion 1	WE 15 X 15	1012
Zion 2	WE 15 X 15	1013
UTILITY: Connecticut Yankee Atomic Power		
Haddam Neck	HADDAM NECK	5701

Table 6. (continued)

REACTOR	ASSEMBLY CLASS	INIS IDENTIFIER
UTILITY: Consolidated Edison Co. NY		
Indian Point 1	INDIAN PT. 1	1101
Indian Point 2	WE 15 X 15	1102
UTILITY: Consumers Power Co.		
Big Rock Point	BIG ROCK PT.	1201
Palisades	PALISADES	1204
UTILITY: Dairyland Power Coop		
LaCrosse	LACROSSE	1301
UTILITY: Detroit Edison Co.		
Enrico Fermi 2	GE BWR/4,5,6	1402
UTILITY: Duke Power Co.		
Catawba 1	WE 17 X 17	1501
Catawba 2	WE 17 X 17	1502
McGuire 1	WE 17 X 17	1504
McGuire 2	WE 17 X 17	1505
Oconee 1	B&W 15 X 15	1506
Oconee 2	B&W 15 X 15	1507
Oconee 3	B&W 15 X 15	1508
UTILITY: Duquesne Light Co.		
Beaver Valley 1	WE 17 X 17	1601
Beaver Valley 2	WE 17 X 17	1602
Shippingport LWR		
UTILITY: Florida Power & Light		
St. Lucie 1	CE 14 X 14	1801
St. Lucie 2	ST. LUCIE 2	1802
Turkey Point 3	WE 15 X 15	1803
Turkey Point 4	WE 15 X 15	1804
UTILITY: Florida Power Corporation		
Crystal River 3	B&W 15 X 15	1701
UTILITY: GPU Nuclear		
Oyster Creek	GE BWR/2,3	1903
Three Mile Island 1	B&W 15 X 15	1901
Three Mile Island 2	B&W 15 X 15	1902
UTILITY: Georgia Power Company		
Hatch 1	GE BWR/4,5,6	2001
Hatch 2	GE BWR/4,5,6	2002
Vogtle 1	WE 17 X 17	2003
Vogtle 2	WE 17 X 17	2004

Table 6. (continued)

REACTOR	ASSEMBLY CLASS	INIS IDENTIFIER
UTILITY: Gulf States Utilities River Bend 1	GE BWR/4,5,6	2101
UTILITY: Houston Lighting & Power South Texas 1	S. TEXAS 1&2	2201
South Texas 2	S. TEXAS 1&2	2202
UTILITY: Illinois Power Company Clinton	GE BWR/4,5,6	2301
UTILITY: Indiana and Michigan Electric Cook 1	WE 15 X 15	5801
Cook 2	WE 17 X 17	5802
UTILITY: Iowa Elec. Light & Power Co. Duane Arnold	GE BWR/4,5,6	2401
UTILITY: Kansas Gas & Electric Co. Wolf Creek	WE 17 X 17	2501
UTILITY: Long Island Lighting Co. Shoreham	GE BWR/4,5,6	2601
UTILITY: Louisiana Power & Light Waterford 3	CE 16 X 16	2701
UTILITY: Maine Yankee Atomic Power Co. Maine Yankee	CE 14 X 14	2801
UTILITY: Mississippi Power & Light Co. Grand Gulf 1	GE BWR/4,5,6	2901
Grand Gulf 2	GE BWR/4,5,6	2902
UTILITY: Nebraska Public Power District Cooper Station	GE BWR/4,5,6	3001
UTILITY: Niagara Mohawk Power Corp. Nine Mile Point 1	GE BWR/2,3	3101
Nine Mile Point 2	GE BWR/4,5,6	3102
UTILITY: Northeast Utilities Service Co. Millstone 1	GE BWR/2,3	3201
Millstone 2	CE 14 X 14	3202
Millstone 3	WE 17 X 17	3203
UTILITY: Northern States Power Co. Monticello	GE BWR/2,3	3301

Table 6. (continued)

REACTOR	ASSEMBLY CLASS	INIS IDENTIFIER
UTILITY: Northern States Power Co.	(continued)	
Pathfinder		3304
Prairie Island 1	WE 14 X 14	3302
Prairie Island 2	WE 14 X 14	3303
UTILITY: Omaha Public Power District		
Fort Calhoun	FORT CALHOUN	3401
UTILITY: Pacific Gas & Electric Co.		
Diablo Canyon 1	WE 17 X 17	3501
Diablo Canyon 2	WE 17 X 17	3502
Humboldt Bay	HUMBOLDT BAY	3503
UTILITY: Pennsylvania Power & Light Co.		
Susquehanna 1	GE BWR/4,5,6	3601
Susquehanna 2	GE BWR/4,5,6	3602
UTILITY: Philadelphia Electric Co.		
Limerick 1	GE BWR/4,5,6	3701
Limerick 2	GE BWR/4,5,6	3702
Peach Bottom 2	GE BWR/4,5,6	3704
Peach Bottom 3	GE BWR/4,5,6	3705
UTILITY: Portland General Elec.		
Trojan	WE 17 X 17	3801
UTILITY: Power Auth. of State of NY		
Fitzpatrick	GE BWR/4,5,6	3901
Indian Point 3	WE 15 X 15	3902
UTILITY: Public Serv. Elec. & Gas Co.		
Hope Creek	GE BWR/4,5,6	4201
Salem 1	WE 17 X 17	4202
Salem 2	WE 17 X 17	4203
UTILITY: Public Service of New Hampshire		
Seabrook 1	WE 17 X 17	5901
UTILITY: Puerto Rico Water Resources Au.		
BONUS		
UTILITY: Rochester Gas & Elec. Corp.		
Ginna	WE 14 X 14	4401
UTILITY: Rural Coop Power Association		
Elk River	ELK RIVER	----

Table 6. (continued)

REACTOR	ASSEMBLY CLASS	INIS IDENTIFIER
UTILITY: Sacramento Municipal Util. Dis. Rancho Seco	B&W 15 X 15	4501
UTILITY: South Carolina Elec. & Gas Co. Summer	WE 17 X 17	4601
UTILITY: Southern California Edison Co. San Onofre 1	SAN ONOFRE 1	4701
San Onofre 2	CE 16 X 16	4702
San Onofre 3	CE 16 X 16	4703
UTILITY: Tennessee Valley Authority Bellefonte 1	B&W 17 X 17	4801
Bellefonte 2	B&W 17 X 17	4802
Browns Ferry 1	GE BWR/4,5,6	4803
Browns Ferry 2	GE BWR/4,5,6	4804
Browns Ferry 3	GE BWR/4,5,6	4805
Sequoyah 1	WE 17 X 17	4808
Sequoyah 2	WE 17 X 17	4809
Watts Bar 1	WE 17 X 17	4810
Watts Bar 2	WE 17 X 17	4811
UTILITY: Texas Utilities Generation Co. Comanche Peak 1	WE 17 X 17	4901
Comanche Peak 2	WE 17 X 17	4902
UTILITY: Toledo Edison Co. Davis-Besse	B&W 15 X 15	5001
UTILITY: Union Electric Co. Callaway	WE 17 X 17	5101
UTILITY: Vermont Yankee Nuclear Power Vermont Yankee	GE BWR/4,5,6	6001
UTILITY: Virginia Electric & Power Co. North Anna 1	WE 17 X 17	5201
North Anna 2	WE 17 X 17	5202
Surry 1	WE 15 X 15	5203
Surry 2	WE 15 X 15	5204
UTILITY: Washington Public Power Supply Washington Nuclear 1	B&W 17 X 17	5301
Washington Nuclear 2	GE BWR/4,5,6	5302
Washington Nuclear 3	CE 16 X 16	5303
UTILITY: Wisconsin Electric Power Co. Point Beach 1	WE 14 X 14	5401

Table 6. (continued)

REACTOR	ASSEMBLY CLASS	INIS IDENTIFIER
UTILITY: Wisconsin Electric Power Co. Point Beach 2	(continued) WE 14 X 14	5402
UTILITY: Wisconsin Public Service Corp. Kewaunee	WE 14 X 14	5501
UTILITY: Yankee Atomic Electric Co. Yankee-Rowe	YANKEE ROWE	5601

Table 7.
Consolidation Difficulty Indexes

Fuel Vendor	B&W	CE	CE	Exxon	W
Number of classes	2	4	2	10	3
Number of types	4	6	2	15	10
For Cutting	3	0	2	0	0-3
Mechanical Disassembly in Air	5	1	2	1	3
Underwater Consolidation	3	0	2	0	0-3
Underwater Rod Replacement	5	3	4	1	3

Scale: "0" not required, "1" simple,....."6" impossible

These ratings are obviously vendor-specific and may reflect individual subjective opinions rather than true differences. An objective cross-comparison was not done as part of the comparison. Nevertheless, these results are reported because of possible interest.

4.7 QUANTITIES (ASSEMBLY TYPE) BASIS

The six appendixes provide information on both incore and discharged fuel assemblies. The utility and reactor listing have the quantities listed on one table and the metric tonnages listed on another. The assembly listings group the incore quantities and tonnages on one and the discharged quantities and tonnages on the other. These appendixes were all generated by dBase III+.

There are a number of special cases as denoted by the NOTES column. Reactors listed as "New" have not provided any information on fuel assembly types at this date. This is due to the reactor being either incomplete or just recently completed and, thus, not fully operational at the time this data was collected. Refer to Table 4 for the current estimated startup date of these reactors. Any fuel information given is purely speculative based on the assembly class of the reactor and the assumption that these new reactors will be using the most recent fuel design of their type currently in service. These reactors will be excluded from the discharged fuel listing, as they have not yet discharged fuel.

Fuels listed as "Added" denote new fuel types that are in the process of being added to the Characteristics Data Base.

Fuels listed as "Assumed" are new fuel types that need verification before being added to the data base. Fuels marked "Unknown" are insufficiently classified. Additional information must be provided by the utility before these fuels can be properly classified. Finally, the fuels for the Pathfinder, Shippingport, and BONUS reactors are listed as "Reproc," for reprocessed. All of these fuels have been reprocessed; therefore, there are no assembly quantities to dispose of.

5. FUTURE DEVELOPMENTS

The LWR fuel assembly classification scheme presented here includes all assembly types that are known to have been used or to be in use in the nation's light-water reactors, with the three exceptions noted earlier. In addition, it also includes some new fuel designs that have not yet found users in the nuclear industry, such as the Exxon fuel designs for BWR/4,5,6 reactors and the Westinghouse QUAD+ design. In the future, additional assembly types will be added as they appear. There may also still be some old styles that have not been identified and which will need to be added to the scheme. It should be relatively straightforward to add these additional assembly types into the existing assembly classes. It is unlikely that there will be any need for new assembly classes in the near future, as this would require a new LWR design to create this need.

Addition of a third level to the classification scheme has been considered and may be implemented at a later date. This additional level would be subgroups of the assembly types, which would be to account for minor assembly differences in such things as assembly configuration. For example, Combustion Engineering 16 X 16 San Onofre fuel can be loaded with either 0, 4, 8, or 12 non-fueled burnable poison rods. This results in substantial range of weights in the heavy metal content of the assemblies. This is of importance for many applications. GE fuels also exhibit this configuration variance and would be suitable for similar subtypes. Ginna fuel differs from the others in its class because it has two additional spacer grids. In cases where that degree of complexity is unnecessary, the additional level could easily be ignored, giving the system an added flexibility. However, until this third level is implemented, the existing two-level system has proven adequate for all tasks to date.

Finally, at one time, dividing the two BWR classes by array size was considered due to the importance of array size to fuel rod consolidation studies. Each BWR class would then be divided into 3, raising the total number of assembly classes to 26. However, making these divisions would displace the present one-to-one correspondence of reactor core designs to assembly classes. For the overall scope of the classification scheme, this relationship was considered very important, so

this approach was discarded. However, such divisions may well have merit, if it can be implemented in a manner similar to the subtype approach (i.e., it needs to be implemented so that it can be ignored if it does not directly apply to the particular application).

6. REFERENCES

- 1) U.S. Department of Energy. Characteristics of Spent Fuel, High-Level Waste, and Other Radioactive Wastes Which May Require Long-Term Isolation, DOE/RW-0184, Vols. 1-6, December, 1987, Vols. 7-8, June, 1988.
- 2) Heeb, C. M., et al., Reactor-Specific Spent Fuel Discharge Projections: 1985 to 2020, PNL-5833, September, 1986.

Appendix A

ASSEMBLY TYPES BY REACTOR - NUMBER OF ASSEMBLIES

Table A-1. Listing of reactors and the assembly types
with number of assemblies used at each
as of Dec. 31, 1987 (EIA)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
ARKANSAS 1 Babcock & Wilcox	15 X 15	Mark B	448	177	
ARKANSAS 2 Combustion Engineering	16 X 16	Onofre	288	177	
BONUS			0	0	Reproc
BEAVER VALLEY 1 Westinghouse	17 X 17	OFA	2	0	
Westinghouse	17 X 17	Standard	354	101	
BEAVER VALLEY 2 Westinghouse	17 X 17	Vantage 5	0	0	New
BELLEFONTE 1 Babcock & Wilcox	17 X 17	Mark C	0	0	New
BELLEFONTE 2 Babcock & Wilcox	17 X 17	Mark C	0	0	New
BIG ROCK POINT General Electric	7 X 7	BRP	4	0	Assumed
General Electric	8 X 8	BRP	2	0	Assumed
Exxon/ANF	9 X 9	BRP	4	0	
General Electric	9 X 9	BRP	143	0	Assumed
Exxon/ANF	11 X 11	Gen. Electric	128	64	
General Electric	11 X 11	BRP	6	0	Assumed
Nuclear Fuel Services	11 X 11	Gen. Electric	2	0	Added
BRAIDWOOD 1 Westinghouse	17 X 17	OFA	0	192	
BRAIDWOOD 2 Westinghouse	17 X 17	Vantage 5	0	0	New
BROWNS FERRY 1 General Electric	7 X 7	GE-2, VERS. 2	168	0	
General Electric	7 X 7	GE-3, VERS. 2	596	0	
General Electric	8 X 8	GE-4, VERS. 2	168	0	
General Electric	8 X 8	GE-5, VERS. 2	156	0	
General Electric	8 X 8	GE-6, VERS. 2	240	468	
General Electric	8 X 8	GE-7, VERS. 2	0	296	

Table A-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
BROWNS FERRY 2					
General Electric	7 X 7	GE-2, VERS. 2	168	0	
General Electric	7 X 7	GE-3, VERS. 2	596	0	
General Electric	8 X 8	GE-4, VERS. 2	164	4	
General Electric	8 X 8	GE-5, VERS. 2	196	36	
General Electric	8 X 8	GE-6, VERS. 2	64	724	
BROWNS FERRY 3					
General Electric	8 X 8	GE-4, VERS. 3	764	0	
General Electric	8 X 8	GE-5, VERS. 2	184	24	
General Electric	8 X 8	GE-6, VERS. 2	56	732	
General Electric	8 X 8	GE-4, VERS. 2	0	8	
BRUNSWICK 1					
General Electric	8 X 8	GE-4, VERS. 3	560	0	
General Electric	8 X 8	GE-5, VERS. 2	136	384	
General Electric	8 X 8	GE-6, VERS. 2	176	0	
BRUNSWICK 2					
General Electric	7 X 7	GE-3, VERS. 2	561	0	
General Electric	8 X 8	GE-4, VERS. 3	140	0	
General Electric	8 X 8	GE-5, VERS. 2	48	412	
General Electric	8 X 8	GE-6, VERS. 2	148	0	
General Electric	8 X 8	GE-7, VERS. 2	0	148	
BYRON 1					
Westinghouse	17 X 17	OFA	88	191	
BYRON 2					
Westinghouse	17 X 17	OFA	0	193	
CALLAWAY					
Westinghouse	17 X 17	OFA	0	84	
Westinghouse	17 X 17	Standard	180	13	
CALVERT CLIFFS 1					
Combustion Engineering	14 X 14	Standard	620	217	
CALVERT CLIFFS 2					
Combustion Engineering	14 X 14	Standard	520	129	
CATAWBA 1					
Westinghouse	17 X 17	OFA	132	125	
CATAWBA 2					
Westinghouse	17 X 17	OFA	193	0	

Table A-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
CLINTON					
General Electric	8 X 8	GE-7, VERS. 2	0	0	New
COMANCHE PEAK 1					
Westinghouse	17 X 17	Vantage 5	0	0	New
COMANCHE PEAK 2					
Westinghouse	17 X 17	Vantage 5	0	0	New
COOK 1					
Exxon/ANF	15 X 15	Westinghouse	386	0	
Westinghouse	15 X 15	OFA	47	113	
Westinghouse	15 X 15	Std/ZC	193	0	
COOK 2					
Exxon/ANF	17 X 17	Westinghouse	60	192	
Westinghouse	17 X 17	Standard	364	1	
COOPER STATION					
General Electric	7 X 7	GE-2, VERS. 2	128	0	
General Electric	7 X 7	GE-3, VERS. 3	420	0	
General Electric	8 X 8	GE-4, VERS. 2	72	0	
General Electric	8 X 8	GE-4, VERS. 3	136	0	
General Electric	8 X 8	GE-5, VERS. 2	188	0	
General Electric	8 X 8	GE-6, VERS. 2	172	396	
CRYSTAL RIVER 3					
Babcock & Wilcox	15 X 15	Mark B	395	102	
DAVIS-BESSE					
Babcock & Wilcox	15 X 15	Mark B	204	177	
DIABLO CANYON 1					
Westinghouse	17 X 17	Standard	68	193	
DIABLO CANYON 2					
Westinghouse	17 X 17	Standard	68	125	
DRESDEN 1					
Exxon/ANF	6 X 6	Gen. Electric	66	0	
General Electric	6 X 6	GE-1, VERS. 1	365	0	
United Nuclear	6 X 6	Dresden-1	457	0	Added
General Electric	8 X 8	UNKNOWN	1	0	Unknown
DRESDEN 2					
General Electric	7 X 7	GE-2, VERS. 1	1477	0	

Table A-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
DRESDEN 2	(continued)				
General Electric	7 X 7	GE-3, VERS. 1	32	0	
General Electric	8 X 8	GE-4, VERS. 1	284	0	
DRESDEN 3					
General Electric	7 X 7	GE-2, VERS. 1	724	0	
General Electric	7 X 7	GE-3, VERS. 1	52	0	
General Electric	8 X 8	GE-4, VERS. 1	332	0	
DUANE ARNOLD					
General Electric	7 X 7	GE-3, VERS. 2	372	0	
General Electric	8 X 8	GE-4, VERS. 2	272	5	
General Electric	8 X 8	GE-5, VERS. 2	180	120	
General Electric	8 X 8	GE-7, VERS. 2	0	115	
ELK RIVER					
Allis Chalmers	5 X 5	Elk River	188	0	Assumed
ENRICO FERMI 2					
General Electric	8 X 8	GE-6, VERS. 2	0	764	
FARLEY 1					
Westinghouse	17 X 17	OFA	2	0	
Westinghouse	17 X 17	Standard	408	139	
FARLEY 2					
Westinghouse	17 X 17	Standard	320	93	
FITZPATRICK					
General Electric	7 X 7	GE-2, VERS. 2	132	0	
General Electric	7 X 7	GE-3, VERS. 2	428	0	
General Electric	8 X 8	GE-4, VERS. 2	132	0	
General Electric	8 X 8	GE-5, VERS. 2	136	0	
General Electric	8 X 8	GE-6, VERS. 2	372	176	
General Electric	8 X 8	GE-7, VERS. 2	0	196	
FORT CALHOUN					
Combustion Engineering	14 X 14	Fort Calhoun	290	0	
Exxon/ANF	14 X 14	Fort Calhoun	104	44	
GINNA					
Exxon/ANF	14 X 14	Westinghouse	181	12	
Westinghouse	14 X 14	OFA	4	73	
Westinghouse	14 X 14	Std/ZCA	364	0	

Table A-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
GRAND GULF 1					
Exxon/ANF	8 X 8	JP-4,5	0	264	
General Electric	8 X 8	GE-6, VERS. 2	552	248	
GRAND GULF 2					
General Electric	8 X 8	GE-7, VERS. 2	0	0	New
HADDAM NECK					
Babcock & Wilcox	15 X 15	St. Steel	736	101	
HARRIS					
Westinghouse	17 X 17	Standard	0	157	
HATCH 1					
General Electric	7 X 7	GE-3, VERS. 2	560	0	
General Electric	8 X 8	GE-4, VERS. 2	92	0	
General Electric	8 X 8	GE-5, VERS. 2	384	0	
General Electric	8 X 8	GE-6, VERS. 2	287	40	
General Electric	8 X 8	GE-7, VERS. 2	53	335	
HATCH 2					
General Electric	8 X 8	GE-5, VERS. 2	509	64	
General Electric	8 X 8	GE-6, VERS. 2	199	144	
General Electric	8 X 8	GE-7, VERS. 2	8	352	
HOPE CREEK					
General Electric	8 X 8	GE-6, VERS. 2	0	92	
General Electric	8 X 8	GE-7, VERS. 2	0	672	
HUMBOLDT BAY					
Exxon/ANF	6 X 6	Humboldt Bay	126	0	
General Electric	6 X 6	GE-1, VERS. 2	176	0	
General Electric	7 X 7	GE-1, VERS. 3	358	0	
INDIAN POINT 1					
Westinghouse	13 X 14		160	0	
INDIAN POINT 2					
Westinghouse	15 X 15	Std/ZC, Var.	393	0	Added
Westinghouse	15 X 15	Std/ZC	139	125	
INDIAN POINT 3					
Westinghouse	15 X 15	OFA	1	75	
Westinghouse	15 X 15	Std/ZC	367	42	

Table A-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
KEWAUNEE					
Exxon/ANF	14 X 14	Westinghouse	203	81	
Westinghouse	14 X 14	Std/ZCA	241	0	
LACROSSE					
Allis Chalmers	10 X 10		156	0	
Exxon/ANF	10 X 10	AC	178	0	
LASALLE 1					
General Electric	8 X 8	UNKNOWN	996	0	Unknown
LASALLE 2					
General Electric	8 X 8	UNKNOWN	540	0	Unknown
General Electric	8 X 8	GE-5, VERS. 2	224	0	
LIMERICK 1					
General Electric	8 X 8	GE-6, VERS. 2	92	0	
General Electric	8 X 8	GE-7, VERS. 2	176	496	
LIMERICK 2					
General Electric	8 X 8	GE-7, VERS. 2	0	0	New
MAINE YANKEE					
Combustion Engineering	14 X 14	Standard	505	1	
Exxon/ANF	14 X 14	Comb. Eng.	352	8	
MCGUIRE 1					
Westinghouse	17 X 17	OFA	63	121	
Westinghouse	17 X 17	Standard	193	0	
MCGUIRE 2					
Westinghouse	17 X 17	OFA	3	117	
Westinghouse	17 X 17	Standard	181	12	
MILLSTONE 1					
General Electric	7 X 7	GE-1, VERS. 4	580	0	
General Electric	7 X 7	GE-2, VERS. 1	82	0	
General Electric	7 X 7	GE-3, VERS. 1	154	0	
General Electric	8 X 8	GE-4, VERS. 1	392	0	
General Electric	8 X 8	GE-5, VERS. 1	328	384	
General Electric	8 X 8	GE-6, VERS. 1	180	0	
General Electric	8 X 8	GE-7, VERS. 1	16	0	
MILLSTONE 2					
Combustion Engineering	14 X 14	Standard	361	0	

Table A-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
MILLSTONE 2 Westinghouse	(continued) 14 X 14	Model C	219	149	
MILLSTONE 3 Westinghouse	17 X 17	Standard	84	109	
MONTICELLO					
General Electric	7 X 7	GE-2, VERS. 1	484	0	
General Electric	8 X 8	GE-4, VERS. 1	272	8	
General Electric	8 X 8	GE-5, VERS. 1	260	20	
General Electric	8 X 8	GE-6, VERS. 1	496	144	
General Electric	8 X 8	GE-7, VERS. 1	0	184	
General Electric	8 X 8	GE-8, VERS. 1	0	480	
NINE MILE POINT 1					
General Electric	7 X 7	GE-2, VERS. 1	596	0	
General Electric	7 X 7	GE-3, VERS. 1	140	0	
General Electric	8 X 8	GE-4, VERS. 1	440	16	
General Electric	8 X 8	GE-5, VERS. 1	184	0	
General Electric	8 X 8	GE-6, VERS. 1	84	316	
NINE MILE POINT 2					
General Electric	8 X 8	GE-7, VERS. 2	0	0	New
NORTH ANNA 1					
Westinghouse	17 X 17	Standard	369	91	
NORTH ANNA 2					
Westinghouse	17 X 17	Standard	306	93	
OCONEE 1					
Babcock & Wilcox	15 X 15	Mark B	649	117	
OCONEE 2					
Babcock & Wilcox	15 X 15	Mark B	518	177	
Babcock & Wilcox	17 X 17	Mark C	4	0	
OCONEE 3					
Babcock & Wilcox	15 X 15	Mark B	540	49	
OYSTER CREEK					
Exxon/ANF	7 X 7	Gen. Electric	260	0	
General Electric	7 X 7	GE-1, VERS. 4	560	0	
General Electric	7 X 7	GE-2, VERS. 1	156	0	
Exxon/ANF	8 X 8	JP-3	416	200	

Table A-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
OYSTER CREEK (continued)					
General Electric	8 X 8	GE-6, VERS. 1	0	176	
General Electric	8 X 8	GE-7, VERS. 1	0	184	
PALISADES					
Combustion Engineering	15 X 15	Palisades	273	0	
Exxon/ANF	15 X 15	Comb. Eng.	272	204	
PALO VERDE 1					
Combustion Engineering	16 X 16	System 80	80	161	
PALO VERDE 2					
Combustion Engineering	16 X 16	System 80	0	182	
PALO VERDE 3					
Combustion Engineering	16 X 16	System 80	0	0	New
PATHFINDER					
			0	0	Reproc
PEACH BOTTOM 2					
General Electric	7 X 7	GE-3, VERS. 2	764	0	
General Electric	8 X 8	GE-4, VERS. 2	360	0	
General Electric	8 X 8	GE-5, VERS. 2	260	0	
General Electric	8 X 8	GE-6, VERS. 2	351	201	
General Electric	8 X 8	GE-7, VERS. 2	1	291	
PEACH BOTTOM 3					
General Electric	7 X 7	GE-3, VERS. 3	764	0	
General Electric	8 X 8	GE-4, VERS. 3	187	0	
General Electric	8 X 8	GE-5, VERS. 2	253	0	
General Electric	8 X 8	GE-6, VERS. 2	484	284	
General Electric	8 X 8	GE-7, VERS. 2	0	288	
PERRY 1					
General Electric	8 X 8	GE-7, VERS. 2	0	0	New
PERRY 2					
General Electric	8 X 8	GE-7, VERS. 2	0	0	New
PILGRIM					
General Electric	7 X 7	GE-2, VERS. 1	580	0	
General Electric	8 X 8	GE-4, VERS. 1	580	0	
General Electric	8 X 8	GE-6, VERS. 1	160	356	
General Electric	8 X 8	GE-7, VERS. 1	0	32	

Table A-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
POINT BEACH 1					
Westinghouse	14 X 14	OFA	0	56	
Westinghouse	14 X 14	Std/ZCB	472	26	
POINT BEACH 2					
Westinghouse	14 X 14	OFA	16	80	
Westinghouse	14 X 14	Std/ZCB	415	17	
PRAIRIE ISLAND 1					
Exxon/ANF	14 X 14	Top Rod	110	37	
Exxon/ANF	14 X 14	Westinghouse	80	40	
Westinghouse	14 X 14	Std/ZCB	241	0	
PRAIRIE ISLAND 2					
Exxon/ANF	14 X 14	Top Rod	97	81	
Exxon/ANF	14 X 14	Westinghouse	76	0	
Westinghouse	14 X 14	OFA	0	40	
Westinghouse	14 X 14	Std/ZCB	241	0	
QUAD CITIES 1					
General Electric	7 X 7	GE-2, VERS. 1	693	0	
General Electric	7 X 7	GE-3, VERS. 1	22	0	
General Electric	7 X 7	UNKNOWN	5	0	Unknown
General Electric	7 X 7	UNKNOWN	1	0	Unknown
General Electric	8 X 8	GE-4, VERS. 1	372	4	
General Electric	8 X 8	GE-5, VERS. 1	192	0	
QUAD CITIES 2					
General Electric	7 X 7	GE-2, VERS. 1	724	0	
General Electric	8 X 8	GE-4, VERS. 1	492	0	
RANCHO SECO					
Babcock & Wilcox	15 X 15	Mark BZ	0	56	
Babcock & Wilcox	15 X 15	Mark B	316	121	
RIVER BEND 1					
General Electric	8 X 8	GE-6, VERS. 2	164	420	
General Electric	8 X 8	GE-7, VERS. 2	0	40	
ROBINSON 2					
Exxon/ANF	15 X 15	Westinghouse	309	109	
Westinghouse	15 X 15	Std/ZC	140	0	
Westinghouse	15 X 15	Std/ZC	314	0	
Westinghouse	15 X 15	Std/ZC	13	0	

Table A-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
SALEM 1					
Westinghouse	17 X 17	OFA	2	0	
Westinghouse	17 X 17	Standard	462	109	
SALEM 2					
Westinghouse	17 X 17	Standard	224	193	
SAN ONOFRE 1					
Westinghouse	14 X 14	Std/SC	416	157	
SAN ONOFRE 2					
Combustion Engineering	16 X 16	Onofre	268	109	
SAN ONOFRE 3					
Combustion Engineering	16 X 16	Onofre	160	129	
SEABROOK 1					
Westinghouse	17 X 17	Vantage 5	0	0	New
SEABROOK 2					
Westinghouse	17 X 17	Vantage 5	0	0	New
SEQUOYAH 1					
Westinghouse	17 X 17	Standard	212	121	
SEQUOYAH 2					
Westinghouse	17 X 17	Standard	136	193	
SHIPPINGPORT LWR					
			0	0	Reproc
SHOREHAM					
General Electric	8 X 8	GE-6, VERS. 2	0	560	
SOUTH TEXAS 1					
Westinghouse	17 X 17	XLR	0	0	New
SOUTH TEXAS 2					
Westinghouse	17 X 17	XLR	0	0	New
ST. LUCIE 1					
Combustion Engineering	14 X 14	Standard	497	0	
Exxon/ANF	14 X 14	Comb. Eng.	31	25	
ST. LUCIE 2					
Combustion Engineering	16 X 16	Lucie 2	240	17	

Table A-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
SUMMER					
Westinghouse	17 X 17	Standard	176	89	
Westinghouse	17 X 17	Vantage 5	0	4	
SURRY 1					
Westinghouse	15 X 15	Std/ZC, Var.	514	157	Added
Westinghouse	17 X 17	Vantage 5	2	0	
SURRY 2					
Westinghouse	15 X 15	Std/ZC, Var.	407	157	Added
Westinghouse	17 X 17	Vantage 5	2	0	
SUSQUEHANNA 1					
Exxon/ANF	8 X 8	JP-4,5	0	488	
General Electric	8 X 8	GE-6, VERS. 2	728	36	
SUSQUEHANNA 2					
General Electric	8 X 8	GE-6, VERS. 2	324	440	
Exxon/ANF	9 X 9	JP-4,5	0	324	
THREE MILE ISLAND 1					
Babcock & Wilcox	15 X 15	Mark B	284	177	
THREE MILE ISLAND 2					
Babcock & Wilcox	15 X 15	Mark B	0	0	Failed
TROJAN					
Westinghouse	17 X 17	Standard	436	145	
TURKEY POINT 3					
Westinghouse	15 X 15	OFA	16	16	
Westinghouse	15 X 15	Std/ZC	272	5	
TURKEY POINT 4					
Westinghouse	15 X 15	OFA	0	96	
Westinghouse	15 X 15	Std/ZC	447	61	
VERMONT YANKEE					
General Electric	7 X 7	GE-2, VERS. 2	378	0	
General Electric	7 X 7	GE-3, VERS. 2	40	0	
General Electric	8 X 8	GE-4, VERS. 2	608	0	
General Electric	8 X 8	GE-6, VERS. 2	432	0	
VOGTLE 1					
Westinghouse	17 X 17	Vantage 5	0	0	New

Table A-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
VOGTLE 2 Westinghouse	17 X 17	Vantage 5	0	0	New
WASHINGTON NUCLEAR 1 Babcock & Wilcox	17 X 17	Mark C	0	0	New
WASHINGTON NUCLEAR 2 Exxon/ANF	8 X 8	JP-4,5	0	128	
General Electric	8 X 8	GE-6, VERS. 2	276	488	
WASHINGTON NUCLEAR 3 Combustion Engineering	16 X 16	System 80	0	0	New
WATERFORD 3 Combustion Engineering	16 X 16	Onofre	92	217	
WATTS BAR 1 Westinghouse	17 X 17	Vantage 5	0	0	New
WATTS BAR 2 Westinghouse	17 X 17	Vantage 5	0	0	New
WOLF CREEK Westinghouse	17 X 17	Standard	104	141	
YANKEE-ROWE Exxon/ANF	15 X 16	Westinghouse	228	0	
United Nuclear	15 X 16	Yankee Rowe	73	0	Added
Westinghouse	17 X 18		76	0	Assumed
ZION 1 Westinghouse	15 X 15	Std/ZC (???)	1261	0	Unknown
ZION 2 Westinghouse	15 X 15	OFA	80	0	

Appendix B

ASSEMBLY TYPES BY REACTOR - MTIHM

Table B-1. Listing of reactors and the assembly types
with metric ton quantities used at each
as of Dec. 31, 1987 (EIA)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TONS DISCHARGED	TONS IN CORE	NOTE
ARKANSAS 1 Babcock & Wilcox	15 X 15	Mark B	207.54	82.00	
ARKANSAS 2 Combustion Engineering	16 X 16	Onofre	120.80	73.61	
BONUS			0.00	0.00	Reproc
BEAVER VALLEY 1 Westinghouse	17 X 17	OFA	0.84	0.00	
Westinghouse	17 X 17	Standard	162.75	46.71	
BEAVER VALLEY 2 Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
BELLEFONTE 1 Babcock & Wilcox	17 X 17	Mark C	0.00	0.00	New
BELLEFONTE 2 Babcock & Wilcox	17 X 17	Mark C	0.00	0.00	New
BIG ROCK POINT General Electric	7 X 7	BRP	0.53	0.00	Assumed
General Electric	8 X 8	BRP	0.22	0.00	Assumed
Exxon/ANF	9 X 9	BRP	0.51	0.00	
General Electric	9 X 9	BRP	19.62	0.00	Assumed
Exxon/ANF	11 X 11	Gen. Electric	16.33	8.38	
General Electric	11 X 11	BRP	0.75	0.00	Assumed
Nuclear Fuel Services	11 X 11	Gen. Electric	0.27	0.00	Added
BRAIDWOOD 1 Westinghouse	17 X 17	OFA	0.00	81.76	
BRAIDWOOD 2 Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
BROWNS FERRY 1 General Electric	7 X 7	GE-2, VERS. 2	32.88	0.00	
General Electric	7 X 7	GE-3, VERS. 2	111.83	0.00	
General Electric	8 X 8	GE-4, VERS. 2	30.89	0.00	
General Electric	8 X 8	GE-5, VERS. 2	28.59	0.00	
General Electric	8 X 8	GE-6, VERS. 2	43.77	85.62	
General Electric	8 X 8	GE-7, VERS. 2	0.00	54.16	

Table B-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TONS DISCHARGED	TONS IN CORE	NOTE
BROWNS FERRY 2					
General Electric	7 X 7	GE-2, VERS. 2	32.86	0.00	
General Electric	7 X 7	GE-3, VERS. 2	111.54	0.00	
General Electric	8 X 8	GE-4, VERS. 2	30.18	0.74	
General Electric	8 X 8	GE-5, VERS. 2	35.72	6.56	
General Electric	8 X 8	GE-6, VERS. 2	11.70	132.41	
BROWNS FERRY 3					
General Electric	8 X 8	GE-4, VERS. 3	142.76	0.00	
General Electric	8 X 8	GE-5, VERS. 2	33.70	4.40	
General Electric	8 X 8	GE-6, VERS. 2	10.23	134.06	
General Electric	8 X 8	GE-4, VERS. 2	0.00	1.48	
BRUNSWICK 1					
General Electric	8 X 8	GE-4, VERS. 3	104.46	0.00	
General Electric	8 X 8	GE-5, VERS. 2	24.89	70.50	
General Electric	8 X 8	GE-6, VERS. 2	32.25	0.00	
BRUNSWICK 2					
General Electric	7 X 7	GE-3, VERS. 2	79.41	0.00	
General Electric	8 X 8	GE-4, VERS. 3	26.14	0.00	
General Electric	8 X 8	GE-5, VERS. 2	8.78	75.57	
General Electric	8 X 8	GE-6, VERS. 2	27.08	0.00	
General Electric	8 X 8	GE-7, VERS. 2	0.00	27.43	
BYRON 1					
Westinghouse	17 X 17	OFA	37.31	43.67	
BYRON 2					
Westinghouse	17 X 17	OFA	0.00	82.32	
CALLAWAY					
Westinghouse	17 X 17	OFA	0.00	35.88	
Westinghouse	17 X 17	Standard	82.99	6.00	
CALVERT CLIFFS 1					
Combustion Engineering	14 X 14	Standard	237.63	84.31	
CALVERT CLIFFS 2					
Combustion Engineering	14 X 14	Standard	199.19	50.23	
CATAWBA 1					
Westinghouse	17 X 17	OFA	55.95	53.07	
CATAWBA 2					
Westinghouse	17 X 17	OFA	82.02	0.00	

Table B-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TONS DISCHARGED	TONS IN CORE	NOTE
CLINTON General Electric	8 X 8	GE-7, VERS. 2	0.00	0.00	New
COMANCHE PEAK 1 Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
COMANCHE PEAK 2 Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
COOK 1 Exxon/ANF	15 X 15	Westinghouse	165.04	0.00	
Westinghouse	15 X 15	OFA	21.65	51.96	
Westinghouse	15 X 15	Std/ZC	87.48	0.00	
COOK 2 Exxon/ANF	17 X 17	Westinghouse	24.11	77.23	
Westinghouse	17 X 17	Standard	167.14	0.46	
COOPER STATION General Electric	7 X 7	GE-2, VERS. 2	25.10	0.00	
General Electric	7 X 7	GE-3, VERS. 3	79.84	0.00	
General Electric	8 X 8	GE-4, VERS. 2	13.24	0.00	
General Electric	8 X 8	GE-4, VERS. 3	25.41	0.00	
General Electric	8 X 8	GE-5, VERS. 2	34.34	0.00	
General Electric	8 X 8	GE-6, VERS. 2	31.44	72.57	
CRYSTAL RIVER 3 Babcock & Wilcox	15 X 15	Mark B	183.48	47.27	
DAVIS-BESSE Babcock & Wilcox	15 X 15	Mark B	96.23	82.93	
DIABLO CANYON 1 Westinghouse	17 X 17	Standard	31.35	89.18	
DIABLO CANYON 2 Westinghouse	17 X 17	Standard	31.29	57.48	
DRESDEN 1 Exxon/ANF	6 X 6	Gen. Electric	6.28	0.00	
General Electric	6 X 6	GE-1, VERS. 1	34.21	0.00	
United Nuclear	6 X 6	Dresden-1	46.62	0.00	Added
General Electric	8 X 8	UNKNOWN	0.10	0.00	Unknown
DRESDEN 2 General Electric	7 X 7	GE-2, VERS. 1	284.08	0.00	

Table B-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TONS DISCHARGED	TONS IN CORE	NOTE
DRESDEN 2	(continued)				
General Electric	7 X 7	GE-3, VERS. 1	6.00	0.00	
General Electric	8 X 8	GE-4, VERS. 1	52.32	0.00	
DRESDEN 3					
General Electric	7 X 7	GE-2, VERS. 1	140.22	0.00	
General Electric	7 X 7	GE-3, VERS. 1	9.78	0.00	
General Electric	8 X 8	GE-4, VERS. 1	61.02	0.00	
DUANE ARNOLD					
General Electric	7 X 7	GE-3, VERS. 2	69.84	0.00	
General Electric	8 X 8	GE-4, VERS. 2	50.11	0.81	
General Electric	8 X 8	GE-5, VERS. 2	32.90	21.94	
General Electric	8 X 8	GE-7, VERS. 2	0.00	21.20	
ELK RIVER					
Allis Chalmers	5 X 5	Elk River	5.04	0.00	Assumed
ENRICO FERMI 2					
General Electric	8 X 8	GE-6, VERS. 2	0.00	140.14	
FARLEY 1					
Westinghouse	17 X 17	OFA	0.85	0.00	
Westinghouse	17 X 17	Standard	187.51	64.30	
FARLEY 2					
Westinghouse	17 X 17	Standard	146.94	43.27	
FITZPATRICK					
General Electric	7 X 7	GE-2, VERS. 2	25.83	0.00	
General Electric	7 X 7	GE-3, VERS. 2	80.24	0.00	
General Electric	8 X 8	GE-4, VERS. 2	24.35	0.00	
General Electric	8 X 8	GE-5, VERS. 2	24.84	0.00	
General Electric	8 X 8	GE-6, VERS. 2	68.02	32.10	
General Electric	8 X 8	GE-7, VERS. 2	0.00	36.16	
FORT CALHOUN					
Combustion Engineering	14 X 14	Fort Calhoun	106.02	0.00	
Exxon/ANF	14 X 14	Fort Calhoun	37.07	15.37	
GINNA					
Exxon/ANF	14 X 14	Westinghouse	67.59	4.29	
Westinghouse	14 X 14	OFA	1.40	25.79	
Westinghouse	14 X 14	Std/ZCA	142.59	0.00	

Table B-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TONS DISCHARGED	TONS IN CORE	NOTE
GRAND GULF 1					
Exxon/ANF	8 X 8	JP-4,5	0.00	46.68	
General Electric	8 X 8	GE-6, VERS. 2	101.46	45.48	
GRAND GULF 2					
General Electric	8 X 8	GE-7, VERS. 2	0.00	0.00	New
HADDAM NECK					
Babcock & Wilcox	15 X 15	St. Steel	304.06	41.41	
HARRIS					
Westinghouse	17 X 17	Standard	0.00	73.01	
HATCH 1					
General Electric	7 X 7	GE-3, VERS. 2	104.95	0.00	
General Electric	8 X 8	GE-4, VERS. 2	16.93	0.00	
General Electric	8 X 8	GE-5, VERS. 2	70.26	0.00	
General Electric	8 X 8	GE-6, VERS. 2	52.55	7.32	
General Electric	8 X 8	GE-7, VERS. 2	9.71	61.73	
HATCH 2					
General Electric	8 X 8	GE-5, VERS. 2	93.38	11.72	
General Electric	8 X 8	GE-6, VERS. 2	36.43	26.36	
General Electric	8 X 8	GE-7, VERS. 2	1.47	65.03	
HOPE CREEK					
General Electric	8 X 8	GE-6, VERS. 2	0.00	17.05	
General Electric	8 X 8	GE-7, VERS. 2	0.00	124.21	
HUMBOLDT BAY					
Exxon/ANF	6 X 6	Humboldt Bay	8.79	0.00	
General Electric	6 X 6	GE-1, VERS. 2	13.44	0.00	
General Electric	7 X 7	GE-1, VERS. 3	28.03	0.00	
INDIAN POINT 1					
Westinghouse	13 X 14		30.58	0.00	
INDIAN POINT 2					
Westinghouse	15 X 15	Std/ZC, Var.	177.32	0.00	Added
Westinghouse	15 X 15	Std/ZC	63.51	57.42	
INDIAN POINT 3					
Westinghouse	15 X 15	OFA	0.46	34.70	
Westinghouse	15 X 15	Std/ZC	167.64	19.15	

Table B-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TONS DISCHARGED	TONS IN CORE	NOTE
KEWAUNEE					
Exxon/ANF	14 X 14	Westinghouse	76.80	30.73	
Westinghouse	14 X 14	Std/ZCA	95.69	0.00	
LACROSSE					
Allis Chalmers	10 X 10		18.74	0.00	
Exxon/ANF	10 X 10	AC	19.34	0.00	
LASALLE 1					
General Electric	8 X 8	UNKNOWN	182.76	0.00	Unknown
LASALLE 2					
General Electric	8 X 8	UNKNOWN	98.66	0.00	Unknown
General Electric	8 X 8	GE-5, VERS. 2	40.96	0.00	
LIMERICK 1					
General Electric	8 X 8	GE-6, VERS. 2	17.09	0.00	
General Electric	8 X 8	GE-7, VERS. 2	32.59	91.76	
LIMERICK 2					
General Electric	8 X 8	GE-7, VERS. 2	0.00	0.00	New
MAINE YANKEE					
Combustion Engineering	14 X 14	Standard	190.08	0.35	
Exxon/ANF	14 X 14	Comb. Eng.	133.09	3.04	
MCGUIRE 1					
Westinghouse	17 X 17	OFA	26.73	51.38	
Westinghouse	17 X 17	Standard	88.67	0.00	
MCGUIRE 2					
Westinghouse	17 X 17	OFA	1.27	49.61	
Westinghouse	17 X 17	Standard	83.26	5.55	
MILLSTONE 1					
General Electric	7 X 7	GE-1, VERS. 4	113.38	0.00	
General Electric	7 X 7	GE-2, VERS. 1	15.93	0.00	
General Electric	7 X 7	GE-3, VERS. 1	28.88	0.00	
General Electric	8 X 8	GE-4, VERS. 1	72.23	0.00	
General Electric	8 X 8	GE-5, VERS. 1	58.11	68.36	
General Electric	8 X 8	GE-6, VERS. 1	31.82	0.00	
General Electric	8 X 8	GE-7, VERS. 1	2.85	0.00	
MILLSTONE 2					
Combustion Engineering	14 X 14	Standard	138.91	0.00	

Table B-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TONS DISCHARGED	TONS IN CORE	NOTE
MILLSTONE 2 Westinghouse	(continued) 14 X 14	Model C	88.99	60.81	
MILLSTONE 3 Westinghouse	17 X 17	Standard	38.78	50.32	
MONTICELLO					
General Electric	7 X 7	GE-2, VERS. 1	93.67	0.00	
General Electric	8 X 8	GE-4, VERS. 1	50.08	1.47	
General Electric	8 X 8	GE-5, VERS. 1	47.80	3.68	
General Electric	8 X 8	GE-6, VERS. 1	88.80	25.60	
General Electric	8 X 8	GE-7, VERS. 1	0.00	32.61	
General Electric	8 X 8	GE-8, VERS. 1	0.00	85.72	
NINE MILE POINT 1					
General Electric	7 X 7	GE-2, VERS. 1	115.63	0.00	
General Electric	7 X 7	GE-3, VERS. 1	26.42	0.00	
General Electric	8 X 8	GE-4, VERS. 1	80.96	2.94	
General Electric	8 X 8	GE-5, VERS. 1	32.45	0.00	
General Electric	8 X 8	GE-6, VERS. 1	14.82	55.74	
NINE MILE POINT 2					
General Electric	8 X 8	GE-7, VERS. 2	0.00	0.00	New
NORTH ANNA 1					
Westinghouse	17 X 17	Standard	169.64	41.99	
NORTH ANNA 2					
Westinghouse	17 X 17	Standard	140.83	43.00	
OCONEE 1					
Babcock & Wilcox	15 X 15	Mark B	287.15	54.20	
OCONEE 2					
Babcock & Wilcox	15 X 15	Mark B	239.37	82.05	
Babcock & Wilcox	17 X 17	Mark C	1.83	0.00	
OCONEE 3					
Babcock & Wilcox	15 X 15	Mark B	250.06	22.73	
OYSTER CREEK					
Exxon/ANF	7 X 7	Gen. Electric	47.41	0.00	
General Electric	7 X 7	GE-1, VERS. 4	109.27	0.00	
General Electric	7 X 7	GE-2, VERS. 1	30.25	0.00	
Exxon/ANF	8 X 8	JP-3	72.80	35.00	

Table B-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TONS DISCHARGED	TONS IN CORE	NOTE
OYSTER CREEK (continued)					
General Electric	8 X 8	GE-6, VERS. 1	0.00	31.33	
General Electric	8 X 8	GE-7, VERS. 1	0.00	32.79	
PALISADES					
Combustion Engineering	15 X 15	Palisades	112.60	0.00	
Exxon/ANF	15 X 15	Comb. Eng.	106.31	80.02	
PALO VERDE 1					
Combustion Engineering	16 X 16	System 80	33.84	65.31	
PALO VERDE 2					
Combustion Engineering	16 X 16	System 80	0.00	73.84	
PALO VERDE 3					
Combustion Engineering	16 X 16	System 80	0.00	0.00	New
PATHFINDER					
			0.00	0.00	Reproc
PEACH BOTTOM 2					
General Electric	7 X 7	GE-3, VERS. 2	144.57	0.00	
General Electric	8 X 8	GE-4, VERS. 2	66.25	0.00	
General Electric	8 X 8	GE-5, VERS. 2	47.46	0.00	
General Electric	8 X 8	GE-6, VERS. 2	64.12	36.71	
General Electric	8 X 8	GE-7, VERS. 2	0.18	53.23	
PEACH BOTTOM 3					
General Electric	7 X 7	GE-3, VERS. 3	145.03	0.00	
General Electric	8 X 8	GE-4, VERS. 3	34.91	0.00	
General Electric	8 X 8	GE-5, VERS. 2	46.30	0.00	
General Electric	8 X 8	GE-6, VERS. 2	88.19	51.90	
General Electric	8 X 8	GE-7, VERS. 2	0.00	52.96	
PERRY 1					
General Electric	8 X 8	GE-7, VERS. 2	0.00	0.00	New
PERRY 2					
General Electric	8 X 8	GE-7, VERS. 2	0.00	0.00	New
PILGRIM					
General Electric	7 X 7	GE-2, VERS. 1	111.90	0.00	
General Electric	8 X 8	GE-4, VERS. 1	106.73	0.00	
General Electric	8 X 8	GE-6, VERS. 1	28.34	63.06	
General Electric	8 X 8	GE-7, VERS. 1	0.00	5.71	

Table B-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TONS DISCHARGED	TONS IN CORE	NOTE
POINT BEACH 1					
Westinghouse	14 X 14	OFA	0.00	20.09	
Westinghouse	14 X 14	Std/ZCB	187.90	10.47	
POINT BEACH 2					
Westinghouse	14 X 14	OFA	5.87	28.70	
Westinghouse	14 X 14	Std/ZCB	165.68	6.83	
PRAIRIE ISLAND 1					
Exxon/ANF	14 X 14	Top Rod	40.13	13.53	
Exxon/ANF	14 X 14	Westinghouse	30.33	14.39	
Westinghouse	14 X 14	Std/ZCB	95.87	0.00	
PRAIRIE ISLAND 2					
Exxon/ANF	14 X 14	Top Rod	35.37	28.39	
Exxon/ANF	14 X 14	Westinghouse	28.79	0.00	
Westinghouse	14 X 14	OFA	0.00	14.20	
Westinghouse	14 X 14	Std/ZCB	96.75	0.00	
QUAD CITIES 1					
General Electric	7 X 7	GE-2, VERS. 1	133.99	0.00	
General Electric	7 X 7	GE-3, VERS. 1	4.13	0.00	
General Electric	7 X 7	UNKNOWN	0.93	0.00	Unknown
General Electric	7 X 7	UNKNOWN	0.17	0.00	Unknown
General Electric	8 X 8	GE-4, VERS. 1	68.51	0.74	
General Electric	8 X 8	GE-5, VERS. 1	33.99	0.00	
QUAD CITIES 2					
General Electric	7 X 7	GE-2, VERS. 1	140.06	0.00	
General Electric	8 X 8	GE-4, VERS. 1	90.60	0.00	
RANCHO SECO					
Babcock & Wilcox	15 X 15	Mark BZ	0.00	25.90	
Babcock & Wilcox	15 X 15	Mark B	146.35	56.14	
RIVER BEND 1					
General Electric	8 X 8	GE-6, VERS. 2	30.49	77.72	
General Electric	8 X 8	GE-7, VERS. 2	0.00	7.39	
ROBINSON 2					
Exxon/ANF	15 X 15	Westinghouse	132.80	45.53	
Westinghouse	15 X 15	Std/ZC	63.82	0.00	
Westinghouse	15 X 15	Std/ZC	131.75	0.00	
Westinghouse	15 X 15	Std/ZC	5.91	0.00	

Table B-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TONS DISCHARGED	TONS IN CORE	NOTE
SALEM 1					
Westinghouse	17 X 17	OFA	0.84	0.00	
Westinghouse	17 X 17	Standard	212.24	50.55	
SALEM 2					
Westinghouse	17 X 17	Standard	102.82	89.18	
SAN ONOFRE 1					
Westinghouse	14 X 14	Std/SC	152.18	58.13	
SAN ONOFRE 2					
Combustion Engineering	16 X 16	Onofre	111.47	45.66	
SAN ONOFRE 3					
Combustion Engineering	16 X 16	Onofre	65.66	54.61	
SEABROOK 1					
Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
SEABROOK 2					
Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
SEQUOYAH 1					
Westinghouse	17 X 17	Standard	97.30	55.87	
SEQUOYAH 2					
Westinghouse	17 X 17	Standard	62.41	88.82	
SHIPPINGPORT LWR					
			0.00	0.00	Reproc
SHOREHAM					
General Electric	8 X 8	GE-6, VERS. 2	0.00	102.41	
SOUTH TEXAS 1					
Westinghouse	17 X 17	XLR	0.00	0.00	New
SOUTH TEXAS 2					
Westinghouse	17 X 17	XLR	0.00	0.00	New
ST. LUCIE 1					
Combustion Engineering	14 X 14	Standard	189.56	0.00	
Exxon/ANF	14 X 14	Comb. Eng.	10.84	8.84	
ST. LUCIE 2					
Combustion Engineering	16 X 16	Lucie 2	90.37	6.38	

Table B-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TONS DISCHARGED	TONS IN CORE	NOTE
SUMMER					
Westinghouse	17 X 17	Standard	80.79	41.00	
Westinghouse	17 X 17	Vantage 5	0.00	1.70	
SURRY 1					
Westinghouse	15 X 15	Std/ZC, Var.	233.51	72.18	Added
Westinghouse	17 X 17	Vantage 5	0.91	0.00	
SURRY 2					
Westinghouse	15 X 15	Std/ZC, Var.	184.98	72.11	Added
Westinghouse	17 X 17	Vantage 5	0.92	0.00	
SUSQUEHANNA 1					
Exxon/ANF	8 X 8	JP-4,5	0.00	86.00	
General Electric	8 X 8	GE-6, VERS. 2	133.59	6.61	
SUSQUEHANNA 2					
General Electric	8 X 8	GE-6, VERS. 2	59.51	80.62	
Exxon/ANF	9 X 9	JP-4,5	0.00	56.23	
THREE MILE ISLAND 1					
Babcock & Wilcox	15 X 15	Mark B	131.75	82.20	
THREE MILE ISLAND 2					
Babcock & Wilcox	15 X 15	Mark B	0.00	0.00	Failed
TROJAN					
Westinghouse	17 X 17	Standard	200.30	66.85	
TURKEY POINT 3					
Westinghouse	15 X 15	OFA	7.35	7.35	
Westinghouse	15 X 15	Std/ZC	123.99	2.29	
TURKEY POINT 4					
Westinghouse	15 X 15	OFA	0.00	44.16	
Westinghouse	15 X 15	Std/ZC	202.97	27.92	
VERMONT YANKEE					
General Electric	7 X 7	GE-2, VERS. 2	72.80	0.00	
General Electric	7 X 7	GE-3, VERS. 2	7.53	0.00	
General Electric	8 X 8	GE-4, VERS. 2	111.67	0.00	
General Electric	8 X 8	GE-6, VERS. 2	79.05	0.00	
VOGTLE 1					
Westinghouse	17 X 17	Vantage 5	0.00	0.00	New

Table B-1. (continued)

REACTOR FUEL MANUFACTURER	ARRAY SIZE	FUEL VERSION	TONS DISCHARGED	TONS IN CORE	NOTE
VOGTLE 2 Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
WASHINGTON NUCLEAR 1 Babcock & Wilcox	17 X 17	Mark C	0.00	0.00	New
WASHINGTON NUCLEAR 2 Exxon/ANF	8 X 8	JP-4,5	0.00	22.56	
General Electric	8 X 8	GE-6, VERS. 2	50.66	89.41	
WASHINGTON NUCLEAR 3 Combustion Engineering	16 X 16	System 80	0.00	0.00	New
WATERFORD 3 Combustion Engineering	16 X 16	Onofre	38.58	89.38	
WATTS BAR 1 Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
WATTS BAR 2 Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
WOLF CREEK Westinghouse	17 X 17	Standard	47.98	65.30	
YANKEE-ROWE Exxon/ANF	15 X 16	Westinghouse	53.24	0.00	
United Nuclear	15 X 16	Yankee Rowe	17.42	0.00	Added
Westinghouse	17 X 18		20.78	0.00	Assumed
ZION 1 Westinghouse	15 X 15	Std/ZC (???)	574.99	0.00	Unknown
ZION 2 Westinghouse	15 X 15	OFA	36.56	0.00	

Appendix C

ASSEMBLY TYPES BY UTILITY AND REACTOR -
NUMBER OF ASSEMBLIES

Table C-1. Listing of reactors by utility and the assembly types with number of assemblies used at each as of Dec. 31. 1987 (EIA)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE NOTE
ALABAMA POWER CO.				
Farley 1				
Westinghouse	17 X 17	OFA	2	0
Westinghouse	17 X 17	Standard	408	139
Farley 2				
Westinghouse	17 X 17	Standard	320	93
ARIZONA PUBLIC SERVICE CO.				
Palo Verde 1				
Combustion Engineering	16 X 16	System 80	80	161
Palo Verde 2				
Combustion Engineering	16 X 16	System 80	0	182
Palo Verde 3				
Combustion Engineering	16 X 16	System 80	0	0 New
ARKANSAS POWER & LIGHT				
Arkansas 1				
Babcock & Wilcox	15 X 15	Mark B	448	177
Arkansas 2				
Combustion Engineering	16 X 16	Onofre	288	177
BALTIMORE G&E				
Calvert Cliffs 1				
Combustion Engineering	14 X 14	Standard	620	217
Calvert Cliffs 2				
Combustion Engineering	14 X 14	Standard	520	129
BOSTON EDISON CO.				
Pilgrim				
General Electric	7 X 7	GE-2, VERS. 1	580	0
General Electric	8 X 8	GE-4, VERS. 1	580	0
General Electric	8 X 8	GE-6, VERS. 1	160	356
General Electric	8 X 8	GE-7, VERS. 1	0	32

Table C-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE NOTE
CAROLINA POWER & LIGHT CO.				
Brunswick 1				
General Electric	8 X 8	GE-4, VERS. 3	560	0
General Electric	8 X 8	GE-5, VERS. 2	136	384
General Electric	8 X 8	GE-6, VERS. 2	176	0
Brunswick 2				
General Electric	7 X 7	GE-3, VERS. 2	561	0
General Electric	8 X 8	GE-4, VERS. 3	140	0
General Electric	8 X 8	GE-5, VERS. 2	48	412
General Electric	8 X 8	GE-6, VERS. 2	148	0
General Electric	8 X 8	GE-7, VERS. 2	0	148
Harris				
Westinghouse	17 X 17	Standard	0	157
Robinson 2				
Exxon/ANF	15 X 15	Westinghouse	309	109
Westinghouse	15 X 15	Std/ZC	140	0
Westinghouse	15 X 15	Std/ZC	314	0
Westinghouse	15 X 15	Std/ZC	13	0
CLEVELAND ELECTRIC ILLUM. CO.				
Perry 1				
General Electric	8 X 8	GE-7, VERS. 2	0	0 New
Perry 2				
General Electric	8 X 8	GE-7, VERS. 2	0	0 New
COMMONWEALTH EDISON CO.				
Braidwood 1				
Westinghouse	17 X 17	OFA	0	192
Braidwood 2				
Westinghouse	17 X 17	Vantage 5	0	0 New
Byron 1				
Westinghouse	17 X 17	OFA	88	191
Byron 2				
Westinghouse	17 X 17	OFA	0	193

Table C-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
COMMONWEALTH EDISON CO. (continued)					
Dresden 1					
Exxon/ANF	6 X 6	Gen. Electric	66	0	
General Electric	6 X 6	GE-1, VERS. 1	365	0	
United Nuclear	6 X 6	Dresden-1	457	0	Added
General Electric	8 X 8	UNKNOWN	1	0	Unknown
Dresden 2					
General Electric	7 X 7	GE-2, VERS. 1	1477	0	
General Electric	7 X 7	GE-3, VERS. 1	32	0	
General Electric	8 X 8	GE-4, VERS. 1	284	0	
Dresden 3					
General Electric	7 X 7	GE-2, VERS. 1	724	0	
General Electric	7 X 7	GE-3, VERS. 1	52	0	
General Electric	8 X 8	GE-4, VERS. 1	332	0	
LaSalle 1					
General Electric	8 X 8	UNKNOWN	996	0	Unknown
LaSalle 2					
General Electric	8 X 8	UNKNOWN	540	0	Unknown
General Electric	8 X 8	GE-5, VERS. 2	224	0	
Quad Cities 1					
General Electric	7 X 7	GE-2, VERS. 1	693	0	
General Electric	7 X 7	GE-3, VERS. 1	22	0	
General Electric	7 X 7	UNKNOWN	5	0	Unknown
General Electric	7 X 7	UNKNOWN	1	0	Unknown
General Electric	8 X 8	GE-4, VERS. 1	372	4	
General Electric	8 X 8	GE-5, VERS. 1	192	0	
Quad Cities 2					
General Electric	7 X 7	GE-2, VERS. 1	724	0	
General Electric	8 X 8	GE-4, VERS. 1	492	0	
Zion 1					
Westinghouse	15 X 15	Std/ZC (???)	1261	0	Unknown
Zion 2					
Westinghouse	15 X 15	OFA	80	0	

Table C-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE NOTE
CONNECTICUT YANKEE ATOMIC POWER				
Haddam Neck Babcock & Wilcox	15 X 15	St. Steel	736	101
CONSOLIDATED EDISON CO. NY				
Indian Point 1 Westinghouse	13 X 14		160	0
Indian Point 2 Westinghouse	15 X 15	Std/ZC, Var.	393	0 Added
Westinghouse	15 X 15	Std/ZC	139	125
CONSUMERS POWER CO.				
Big Rock Point General Electric	7 X 7	BRP	4	0 Assumed
General Electric	8 X 8	BRP	2	0 Assumed
Exxon/ANF	9 X 9	BRP	4	0
General Electric	9 X 9	BRP	143	0 Assumed
Exxon/ANF	11 X 11	Gen. Electric	128	64
General Electric	11 X 11	BRP	6	0 Assumed
Nuclear Fuel Services	11 X 11	Gen. Electric	2	0 Added
Palisades				
Combustion Engineering	15 X 15	Palisades	273	0
Exxon/ANF	15 X 15	Comb. Eng.	272	204
DAIRYLAND POWER COOP				
LaCrosse				
Allis Chalmers	10 X 10		156	0
Exxon/ANF	10 X 10	AC	178	0
DETROIT EDISON CO.				
Enrico Fermi 2 General Electric	8 X 8	GE-6, VERS. 2	0	764
DUKE POWER CO.				
Catawba 1 Westinghouse	17 X 17	OFA	132	125

Table C-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
DUKE POWER CO. (continued)					
Catawba 2 Westinghouse	17 X 17	OFA	193	0	
McGuire 1 Westinghouse	17 X 17	OFA	63	121	
Westinghouse	17 X 17	Standard	193	0	
McGuire 2 Westinghouse	17 X 17	OFA	3	117	
Westinghouse	17 X 17	Standard	181	12	
Oconee 1 Babcock & Wilcox	15 X 15	Mark B	649	117	
Oconee 2 Babcock & Wilcox	15 X 15	Mark B	518	177	
Babcock & Wilcox	17 X 17	Mark C	4	0	
Oconee 3 Babcock & Wilcox	15 X 15	Mark B	540	49	
DUQUESNE LIGHT CO.					
Beaver Valley 1 Westinghouse	17 X 17	OFA	2	0	
Westinghouse	17 X 17	Standard	354	101	
Beaver Valley 2 Westinghouse	17 X 17	Vantage 5	0	0	New
Shippingport LWR			0	0	Reproc
FLORIDA POWER & LIGHT					
St. Lucie 1 Combustion Engineering	14 X 14	Standard	497	0	
Exxon/ANF	14 X 14	Comb. Eng.	31	25	
St. Lucie 2 Combustion Engineering	16 X 16	Lucie 2	240	17	

Table C-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE NOTE
FLORIDA POWER & LIGHT (continued)				
Turkey Point 3				
Westinghouse	15 X 15	OFA	16	16
Westinghouse	15 X 15	Std/ZC	272	5
Turkey Point 4				
Westinghouse	15 X 15	OFA	0	96
Westinghouse	15 X 15	Std/ZC	447	61
FLORIDA POWER CORPORATION				
Crystal River 3				
Babcock & Wilcox	15 X 15	Mark B	395	102
GPU NUCLEAR				
Oyster Creek				
Exxon/ANF	7 X 7	Gen. Electric	260	0
General Electric	7 X 7	GE-1, VERS. 4	560	0
General Electric	7 X 7	GE-2, VERS. 1	156	0
Exxon/ANF	8 X 8	JP-3	416	200
General Electric	8 X 8	GE-6, VERS. 1	0	176
General Electric	8 X 8	GE-7, VERS. 1	0	184
Three Mile Island 1				
Babcock & Wilcox	15 X 15	Mark B	284	177
Three Mile Island 2				
Babcock & Wilcox	15 X 15	Mark B	0	0 Failed
GEORGIA POWER COMPANY				
Hatch 1				
General Electric	7 X 7	GE-3, VERS. 2	560	0
General Electric	8 X 8	GE-4, VERS. 2	92	0
General Electric	8 X 8	GE-5, VERS. 2	384	0
General Electric	8 X 8	GE-6, VERS. 2	287	40
General Electric	8 X 8	GE-7, VERS. 2	53	335
Hatch 2				
General Electric	8 X 8	GE-5, VERS. 2	509	64
General Electric	8 X 8	GE-6, VERS. 2	199	144
General Electric	8 X 8	GE-7, VERS. 2	8	352

Table C-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED IN	TOTAL CORE	NOTE
GEORGIA POWER COMPANY (continued)					
Vogtle 1 Westinghouse	17 X 17	Vantage 5	0	0	New
Vogtle 2 Westinghouse	17 X 17	Vantage 5	0	0	New
GULF STATES UTILITIES					
River Bend 1 General Electric	8 X 8	GE-6, VERS. 2	164	420	
General Electric	8 X 8	GE-7, VERS. 2	0	40	
HOUSTON LIGHTING & POWER					
South Texas 1 Westinghouse	17 X 17	XLR	0	0	New
South Texas 2 Westinghouse	17 X 17	XLR	0	0	New
ILLINOIS POWER COMPANY					
Clinton General Electric	8 X 8	GE-7, VERS. 2	0	0	New
INDIANA AND MICHIGAN ELECTRIC					
Cook 1 Exxon/ANF	15 X 15	Westinghouse	386	0	
Westinghouse	15 X 15	OFA	47	113	
Westinghouse	15 X 15	Std/ZC	193	0	
Cook 2 Exxon/ANF	17 X 17	Westinghouse	60	192	
Westinghouse	17 X 17	Standard	364	1	
IOWA ELEC. LIGHT & POWER CO.					
Duane Arnold General Electric	7 X 7	GE-3, VERS. 2	372	0	
General Electric	8 X 8	GE-4, VERS. 2	272	5	
General Electric	8 X 8	GE-5, VERS. 2	180	120	
General Electric	8 X 8	GE-7, VERS. 2	0	115	

Table C-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE NOTE
KANSAS GAS & ELECTRIC CO.				
Wolf Creek Westinghouse	17 X 17	Standard	104	141
LONG ISLAND LIGHTING CO.				
Shoreham General Electric	8 X 8	GE-6, VERS. 2	0	560
LOUISIANA POWER & LIGHT				
Waterford 3 Combustion Engineering	16 X 16	Onofre	92	217
MAINE YANKEE ATOMIC POWER CO.				
Maine Yankee Combustion Engineering	14 X 14	Standard	505	1
Exxon/ANF	14 X 14	Comb. Eng.	352	8
MISSISSIPPI POWER & LIGHT CO.				
Grand Gulf 1 Exxon/ANF	8 X 8	JP-4,5	0	264
General Electric	8 X 8	GE-6, VERS. 2	552	248
Grand Gulf 2 General Electric	8 X 8	GE-7, VERS. 2	0	0 New
NEBRASKA PUBLIC POWER DISTRICT				
Cooper Station General Electric	7 X 7	GE-2, VERS. 2	128	0
General Electric	7 X 7	GE-3, VERS. 3	420	0
General Electric	8 X 8	GE-4, VERS. 2	72	0
General Electric	8 X 8	GE-4, VERS. 3	136	0
General Electric	8 X 8	GE-5, VERS. 2	188	0
General Electric	8 X 8	GE-6, VERS. 2	172	396
NIAGARA MOHAWK POWER CORP.				
Nine Mile Point 1 General Electric	7 X 7	GE-2, VERS. 1	596	0
General Electric	7 X 7	GE-3, VERS. 1	140	0
General Electric	8 X 8	GE-4, VERS. 1	440	16

Table C-1. (continued)

UTILITY	REACTOR	ARRAY	FUEL VERSION	TOTAL	TOTAL
	MANUFACTURER	SIZE		DISCHARGED	IN CORE NOTE
NIAGARA MOHAWK POWER CORP. (continued)					
Nine Mile Point 1 (continued)					
	General Electric	8 X 8	GE-5, VERS. 1	184	0
	General Electric	8 X 8	GE-6, VERS. 1	84	316
Nine Mile Point 2					
	General Electric	8 X 8	GE-7, VERS. 2	0	0 New
NORTHEAST UTILITIES SERVICE CO.					
Millstone 1					
	General Electric	7 X 7	GE-1, VERS. 4	580	0
	General Electric	7 X 7	GE-2, VERS. 1	82	0
	General Electric	7 X 7	GE-3, VERS. 1	154	0
	General Electric	8 X 8	GE-4, VERS. 1	392	0
	General Electric	8 X 8	GE-5, VERS. 1	328	384
	General Electric	8 X 8	GE-6, VERS. 1	180	0
	General Electric	8 X 8	GE-7, VERS. 1	16	0
Millstone 2					
	Combustion Engineering	14 X 14	Standard	361	0
	Westinghouse	14 X 14	Model C	219	149
Millstone 3					
	Westinghouse	17 X 17	Standard	84	109
NORTHERN STATES POWER CO.					
Monticello					
	General Electric	7 X 7	GE-2, VERS. 1	484	0
	General Electric	8 X 8	GE-4, VERS. 1	272	8
	General Electric	8 X 8	GE-5, VERS. 1	260	20
	General Electric	8 X 8	GE-6, VERS. 1	496	144
	General Electric	8 X 8	GE-7, VERS. 1	0	184
	General Electric	8 X 8	GE-8, VERS. 1	0	480
Pathfinder					
				0	0 Reproc
Prairie Island 1					
	Exxon/ANF	14 X 14	Top Rod	110	37
	Exxon/ANF	14 X 14	Westinghouse	80	40
	Westinghouse	14 X 14	Std/ZCB	241	0

Table C-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE NOTE
NORTHERN STATES POWER CO. (continued)				
Prairie Island 2				
Exxon/ANF	14 X 14	Top Rod	97	81
Exxon/ANF	14 X 14	Westinghouse	76	0
Westinghouse	14 X 14	OFA	0	40
Westinghouse	14 X 14	Std/ZCB	241	0
OMAHA PUBLIC POWER DISTRICT				
Fort Calhoun				
Combustion Engineering	14 X 14	Fort Calhoun	290	0
Exxon/ANF	14 X 14	Fort Calhoun	104	44
PACIFIC GAS & ELECTRIC CO.				
Diablo Canyon 1				
Westinghouse	17 X 17	Standard	68	193
Diablo Canyon 2				
Westinghouse	17 X 17	Standard	68	125
Humboldt Bay				
Exxon/ANF	6 X 6	Humboldt Bay	126	0
General Electric	6 X 6	GE-1, VERS. 2	176	0
General Electric	7 X 7	GE-1, VERS. 3	358	0
PENNSYLVANIA POWER & LIGHT CO.				
Susquehanna 1				
Exxon/ANF	8 X 8	JP-4,5	0	488
General Electric	8 X 8	GE-6, VERS. 2	728	36
Susquehanna 2				
General Electric	8 X 8	GE-6, VERS. 2	324	440
Exxon/ANF	9 X 9	JP-4,5	0	324
PHILADELPHIA ELECTRIC CO.				
Limerick 1				
General Electric	8 X 8	GE-6, VERS. 2	92	0
General Electric	8 X 8	GE-7, VERS. 2	176	496
Limerick 2				
General Electric	8 X 8	GE-7, VERS. 2	0	0 New

Table C-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE NOTE
PHILADELPHIA ELECTRIC CO. (continued)				
Peach Bottom 2				
General Electric	7 X 7	GE-3, VERS. 2	764	0
General Electric	8 X 8	GE-4, VERS. 2	360	0
General Electric	8 X 8	GE-5, VERS. 2	260	0
General Electric	8 X 8	GE-6, VERS. 2	351	201
General Electric	8 X 8	GE-7, VERS. 2	1	291
Peach Bottom 3				
General Electric	7 X 7	GE-3, VERS. 3	764	0
General Electric	8 X 8	GE-4, VERS. 3	187	0
General Electric	8 X 8	GE-5, VERS. 2	253	0
General Electric	8 X 8	GE-6, VERS. 2	484	284
General Electric	8 X 8	GE-7, VERS. 2	0	288
PORTLAND GENERAL ELEC.				
Trojan				
Westinghouse	17 X 17	Standard	436	145
POWER AUTH. OF STATE OF NY				
Fitzpatrick				
General Electric	7 X 7	GE-2, VERS. 2	132	0
General Electric	7 X 7	GE-3, VERS. 2	428	0
General Electric	8 X 8	GE-4, VERS. 2	132	0
General Electric	8 X 8	GE-5, VERS. 2	136	0
General Electric	8 X 8	GE-6, VERS. 2	372	176
General Electric	8 X 8	GE-7, VERS. 2	0	196
Indian Point 3				
Westinghouse	15 X 15	OFA	1	75
Westinghouse	15 X 15	Std/ZC	367	42
PUBLIC SERV. ELEC. & GAS CO.				
Hope Creek				
General Electric	8 X 8	GE-6, VERS. 2	0	92
General Electric	8 X 8	GE-7, VERS. 2	0	672
Salem 1				
Westinghouse	17 X 17	OFA	2	0
Westinghouse	17 X 17	Standard	462	109

Table C-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE NOTE
PUBLIC SERV. ELEC. & GAS CO. (continued)				
Salem 2 Westinghouse	17 X 17	Standard	224	193
PUBLIC SERVICE OF NEW HAMPSHIRE				
Seabrook 1 Westinghouse	17 X 17	Vantage 5	0	0 New
Seabrook 2 Westinghouse	17 X 17	Vantage 5	0	0 New
PUERTO RICO WATER RESOURCES AU.				
BONUS			0	0 Reproc
ROCHESTER GAS & ELEC. CORP.				
Ginna Exxon/ANF Westinghouse Westinghouse	14 X 14 14 X 14 14 X 14	Westinghouse OFA Std/ZCA	181 4 364	12 73 0
RURAL COOP POWER ASSOC.				
Elk River Allis Chalmers	5 X 5	Elk River	188	0 Assumed
SACRAMENTO MUNICIPAL UTIL. DIS.				
Rancho Seco Babcock & Wilcox Babcock & Wilcox	15 X 15 15 X 15	Mark BZ Mark B	0 316	56 121
SOUTH CAROLINA ELEC. & GAS CO.				
Summer Westinghouse Westinghouse	17 X 17 17 X 17	Standard Vantage 5	176 0	89 4

Table C-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE NOTE
SOUTHERN CALIFORNIA EDISON CO.				
San Onofre 1 Westinghouse	14 X 14	Std/SC	416	157
San Onofre 2 Combustion Engineering	16 X 16	Onofre	268	109
San Onofre 3 Combustion Engineering	16 X 16	Onofre	160	129
TENNESSEE VALLEY AUTHORITY				
Bellefonte 1 Babcock & Wilcox	17 X 17	Mark C	0	0 New
Bellefonte 2 Babcock & Wilcox	17 X 17	Mark C	0	0 New
Browns Ferry 1 General Electric	7 X 7	GE-2, VERS. 2	168	0
General Electric	7 X 7	GE-3, VERS. 2	596	0
General Electric	8 X 8	GE-4, VERS. 2	168	0
General Electric	8 X 8	GE-5, VERS. 2	156	0
General Electric	8 X 8	GE-6, VERS. 2	240	468
General Electric	8 X 8	GE-7, VERS. 2	0	296
Browns Ferry 2 General Electric	7 X 7	GE-2, VERS. 2	168	0
General Electric	7 X 7	GE-3, VERS. 2	596	0
General Electric	8 X 8	GE-4, VERS. 2	164	4
General Electric	8 X 8	GE-5, VERS. 2	196	36
General Electric	8 X 8	GE-6, VERS. 2	64	724
Browns Ferry 3 General Electric	8 X 8	GE-4, VERS. 3	764	0
General Electric	8 X 8	GE-5, VERS. 2	184	24
General Electric	8 X 8	GE-6, VERS. 2	56	732
General Electric	8 X 8	GE-4, VERS. 2	0	8
Sequoyah 1 Westinghouse	17 X 17	Standard	212	121
Sequoyah 2 Westinghouse	17 X 17	Standard	136	193

Table C-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
TENNESSEE VALLEY AUTHORITY (continued)					
Watts Bar 1 Westinghouse	17 X 17	Vantage 5	0	0	New
Watts Bar 2 Westinghouse	17 X 17	Vantage 5	0	0	New
TEXAS UTILITIES GENERATION CO.					
Comanche Peak 1 Westinghouse	17 X 17	Vantage 5	0	0	New
Comanche Peak 2 Westinghouse	17 X 17	Vantage 5	0	0	New
TOLEDO EDISON CO.					
Davis-Besse Babcock & Wilcox	15 X 15	Mark B	204	177	
UNION ELECTRIC CO.					
Callaway Westinghouse	17 X 17	OFA	0	84	
Westinghouse	17 X 17	Standard	180	13	
VERMONT YANKEE NUCLEAR POWER					
Vermont Yankee General Electric	7 X 7	GE-2, VERS. 2	378	0	
General Electric	7 X 7	GE-3, VERS. 2	40	0	
General Electric	8 X 8	GE-4, VERS. 2	608	0	
General Electric	8 X 8	GE-6, VERS. 2	432	0	
VIRGINIA ELECTRIC & POWER CO.					
North Anna 1 Westinghouse	17 X 17	Standard	369	91	
North Anna 2 Westinghouse	17 X 17	Standard	306	93	
Surry 1 Westinghouse	15 X 15	Std/ZC, Var.	514	157	Added
Westinghouse	17 X 17	Vantage 5	2	0	

Table C-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
VIRGINIA ELECTRIC & POWER CO. (continued)					
Surry 2					
Westinghouse	15 X 15	Std/ZC, Var.	407	157	Added
Westinghouse	17 X 17	Vantage 5	2	0	
WASHINGTON PUBLIC POWER SUPPLY					
Washington Nuclear 1					
Babcock & Wilcox	17 X 17	Mark C	0	0	New
Washington Nuclear 2					
Exxon/ANF	8 X 8	JP-4,5	0	128	
General Electric	8 X 8	GE-6, VERS. 2	276	488	
Washington Nuclear 3					
Combustion Engineering	16 X 16	System 80	0	0	New
WISCONSIN ELECTRIC POWER CO.					
Point Beach 1					
Westinghouse	14 X 14	OFA	0	56	
Westinghouse	14 X 14	Std/ZCB	472	26	
Point Beach 2					
Westinghouse	14 X 14	OFA	16	80	
Westinghouse	14 X 14	Std/ZCB	415	17	
WISCONSIN PUBLIC SERVICE CORP.					
Kewaunee					
Exxon/ANF	14 X 14	Westinghouse	203	81	
Westinghouse	14 X 14	Std/ZCA	241	0	
YANKEE ATOMIC ELECTRIC CO.					
Yankee-Rowe					
Exxon/ANF	15 X 16	Westinghouse	228	0	
United Nuclear	15 X 16	Yankee Rowe	73	0	Added
Westinghouse	17 X 18		76	0	Assumed

Appendix D

ASSEMBLY TYPES BY UTILITY AND REACTOR -
MTIHM

Table D-1. Listing of reactors by utility and the assembly types with metric ton quantities used at each as of Dec. 31. 1987 (EIA)

UTILITY	REACTOR	ARRAY	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
	MANUFACTURER	SIZE				
ALABAMA POWER CO.						
	Farley 1					
	Westinghouse	17 X 17	OFA	0.85	0.00	
	Westinghouse	17 X 17	Standard	187.51	64.30	
	Farley 2					
	Westinghouse	17 X 17	Standard	146.94	43.27	
ARIZONA PUBLIC SERVICE CO.						
	Palo Verde 1					
	Combustion Engineering	16 X 16	System 80	33.84	65.31	
	Palo Verde 2					
	Combustion Engineering	16 X 16	System 80	0.00	73.84	
	Palo Verde 3					
	Combustion Engineering	16 X 16	System 80	0.00	0.00	New
ARKANSAS POWER & LIGHT						
	Arkansas 1					
	Babcock & Wilcox	15 X 15	Mark B	207.54	82.00	
	Arkansas 2					
	Combustion Engineering	16 X 16	Onofre	120.80	73.61	
BALTIMORE G&E						
	Calvert Cliffs 1					
	Combustion Engineering	14 X 14	Standard	237.63	84.31	
	Calvert Cliffs 2					
	Combustion Engineering	14 X 14	Standard	199.19	50.23	
BOSTON EDISON CO.						
	Pilgrim					
	General Electric	7 X 7	GE-2, VERS. 1	111.90	0.00	
	General Electric	8 X 8	GE-4, VERS. 1	106.73	0.00	
	General Electric	8 X 8	GE-6, VERS. 1	28.34	63.06	
	General Electric	8 X 8	GE-7, VERS. 1	0.00	5.71	

Table D-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE NOTE
CAROLINA POWER & LIGHT CO.				
Brunswick 1				
General Electric	8 X 8	GE-4, VERS. 3	104.46	0.00
General Electric	8 X 8	GE-5, VERS. 2	24.89	70.50
General Electric	8 X 8	GE-6, VERS. 2	32.25	0.00
Brunswick 2				
General Electric	7 X 7	GE-3, VERS. 2	79.41	0.00
General Electric	8 X 8	GE-4, VERS. 3	26.14	0.00
General Electric	8 X 8	GE-5, VERS. 2	8.78	75.57
General Electric	8 X 8	GE-6, VERS. 2	27.08	0.00
General Electric	8 X 8	GE-7, VERS. 2	0.00	27.43
Harris				
Westinghouse	17 X 17	Standard	0.00	73.01
Robinson 2				
Exxon/ANF	15 X 15	Westinghouse	132.80	45.53
Westinghouse	15 X 15	Std/ZC	63.82	0.00
Westinghouse	15 X 15	Std/ZC	131.75	0.00
Westinghouse	15 X 15	Std/ZC	5.91	0.00
CLEVELAND ELECTRIC ILLUM. CO.				
Perry 1				
General Electric	8 X 8	GE-7, VERS. 2	0.00	0.00 New
Perry 2				
General Electric	8 X 8	GE-7, VERS. 2	0.00	0.00 New
COMMONWEALTH EDISON CO.				
Braidwood 1				
Westinghouse	17 X 17	OFA	0.00	81.76
Braidwood 2				
Westinghouse	17 X 17	Vantage 5	0.00	0.00 New
Byron 1				
Westinghouse	17 X 17	OFA	37.31	43.67
Byron 2				
Westinghouse	17 X 17	OFA	0.00	82.32

Table D-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
COMMONWEALTH EDISON CO. (continued)					
Dresden 1					
Exxon/ANF	6 X 6	Gen. Electric	6.28	0.00	
General Electric	6 X 6	GE-1, VERS. 1	34.21	0.00	
United Nuclear	6 X 6	Dresden-1	46.62	0.00	Added
General Electric	8 X 8	UNKNOWN	0.10	0.00	Unknown
Dresden 2					
General Electric	7 X 7	GE-2, VERS. 1	284.08	0.00	
General Electric	7 X 7	GE-3, VERS. 1	6.00	0.00	
General Electric	8 X 8	GE-4, VERS. 1	52.32	0.00	
Dresden 3					
General Electric	7 X 7	GE-2, VERS. 1	140.22	0.00	
General Electric	7 X 7	GE-3, VERS. 1	9.78	0.00	
General Electric	8 X 8	GE-4, VERS. 1	61.02	0.00	
LaSalle 1					
General Electric	8 X 8	UNKNOWN	182.76	0.00	Unknown
LaSalle 2					
General Electric	8 X 8	UNKNOWN	98.66	0.00	Unknown
General Electric	8 X 8	GE-5, VERS. 2	40.96	0.00	
Quad Cities 1					
General Electric	7 X 7	GE-2, VERS. 1	133.99	0.00	
General Electric	7 X 7	GE-3, VERS. 1	4.13	0.00	
General Electric	7 X 7	UNKNOWN	0.93	0.00	Unknown
General Electric	7 X 7	UNKNOWN	0.17	0.00	Unknown
General Electric	8 X 8	GE-4, VERS. 1	68.51	0.74	
General Electric	8 X 8	GE-5, VERS. 1	33.99	0.00	
Quad Cities 2					
General Electric	7 X 7	GE-2, VERS. 1	140.06	0.00	
General Electric	8 X 8	GE-4, VERS. 1	90.60	0.00	
Zion 1					
Westinghouse	15 X 15	Std/ZC (???)	574.99	0.00	Unknown
Zion 2					
Westinghouse	15 X 15	OFA	36.56	0.00	

Table D-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
CONNECTICUT YANKEE ATOMIC POWER					
Haddam Neck Babcock & Wilcox	15 X 15	St. Steel	304.06	41.41	
CONSOLIDATED EDISON CO. NY					
Indian Point 1 Westinghouse	13 X 14		30.58	0.00	
Indian Point 2 Westinghouse	15 X 15	Std/ZC, Var.	177.32	0.00	Added
Westinghouse	15 X 15	Std/ZC	63.51	57.42	
CONSUMERS POWER CO.					
Big Rock Point General Electric	7 X 7	BRP	0.53	0.00	Assumed
General Electric	8 X 8	BRP	0.22	0.00	Assumed
Exxon/ANF	9 X 9	BRP	0.51	0.00	
General Electric	9 X 9	BRP	19.62	0.00	Assumed
Exxon/ANF	11 X 11	Gen. Electric	16.33	8.38	
General Electric	11 X 11	BRP	0.75	0.00	Assumed
Nuclear Fuel Services	11 X 11	Gen. Electric	0.27	0.00	Added
Palisades					
Combustion Engineering	15 X 15	Palisades	112.60	0.00	
Exxon/ANF	15 X 15	Comb. Eng.	106.31	80.02	
DAIRYLAND POWER COOP					
LaCrosse					
Allis Chalmers	10 X 10		18.74	0.00	
Exxon/ANF	10 X 10	AC	19.34	0.00	
DETROIT EDISON CO.					
Enrico Fermi 2 General Electric	8 X 8	GE-6, VERS. 2	0.00	140.14	
DUKE POWER CO.					
Catawba 1 Westinghouse	17 X 17	OFA	55.95	53.07	

Table D-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE NOTE
DUKE POWER CO. (continued)				
Catawba 2 Westinghouse	17 X 17	OFA	82.02	0.00
McGuire 1 Westinghouse	17 X 17	OFA	26.73	51.38
Westinghouse	17 X 17	Standard	88.67	0.00
McGuire 2 Westinghouse	17 X 17	OFA	1.27	49.61
Westinghouse	17 X 17	Standard	83.26	5.55
Oconee 1 Babcock & Wilcox	15 X 15	Mark B	287.15	54.20
Oconee 2 Babcock & Wilcox	15 X 15	Mark B	239.37	82.05
Babcock & Wilcox	17 X 17	Mark C	1.83	0.00
Oconee 3 Babcock & Wilcox	15 X 15	Mark B	250.06	22.73
DUQUESNE LIGHT CO.				
Beaver Valley 1 Westinghouse	17 X 17	OFA	0.84	0.00
Westinghouse	17 X 17	Standard	162.75	46.71
Beaver Valley 2 Westinghouse	17 X 17	Vantage 5	0.00	0.00 New
Shippingport LWR			0.00	0.00 Reproc
FLORIDA POWER & LIGHT				
St. Lucie 1 Combustion Engineering	14 X 14	Standard	189.56	0.00
Exxon/ANF	14 X 14	Comb. Eng.	10.84	8.84
St. Lucie 2 Combustion Engineering	16 X 16	Lucie 2	90.37	6.38

Table D-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE NOTE
FLORIDA POWER & LIGHT (continued)				
Turkey Point 3				
Westinghouse	15 X 15	OFA	7.35	7.35
Westinghouse	15 X 15	Std/ZC	123.99	2.29
Turkey Point 4				
Westinghouse	15 X 15	OFA	0.00	44.16
Westinghouse	15 X 15	Std/ZC	202.97	27.92
FLORIDA POWER CORPORATION				
Crystal River 3				
Babcock & Wilcox	15 X 15	Mark B	183.48	47.27
GPU NUCLEAR				
Oyster Creek				
Exxon/ANF	7 X 7	Gen. Electric	47.41	0.00
General Electric	7 X 7	GE-1, VERS. 4	109.27	0.00
General Electric	7 X 7	GE-2, VERS. 1	30.25	0.00
Exxon/ANF	8 X 8	JP-3	72.80	35.00
General Electric	8 X 8	GE-6, VERS. 1	0.00	31.33
General Electric	8 X 8	GE-7, VERS. 1	0.00	32.79
Three Mile Island 1				
Babcock & Wilcox	15 X 15	Mark B	131.75	82.20
Three Mile Island 2				
Babcock & Wilcox	15 X 15	Mark B	0.00	0.00 Failed
GEORGIA POWER COMPANY				
Hatch 1				
General Electric	7 X 7	GE-3, VERS. 2	104.95	0.00
General Electric	8 X 8	GE-4, VERS. 2	16.93	0.00
General Electric	8 X 8	GE-5, VERS. 2	70.26	0.00
General Electric	8 X 8	GE-6, VERS. 2	52.55	7.32
General Electric	8 X 8	GE-7, VERS. 2	9.71	61.73
Hatch 2				
General Electric	8 X 8	GE-5, VERS. 2	93.38	11.72
General Electric	8 X 8	GE-6, VERS. 2	36.43	26.36
General Electric	8 X 8	GE-7, VERS. 2	1.47	65.03

Table D-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
GEORGIA POWER COMPANY (continued)					
Vogtle 1 Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
Vogtle 2 Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
GULF STATES UTILITIES					
River Bend 1 General Electric	8 X 8	GE-6, VERS. 2	30.49	77.72	
General Electric	8 X 8	GE-7, VERS. 2	0.00	7.39	
HOUSTON LIGHTING & POWER					
South Texas 1 Westinghouse	17 X 17	XLR	0.00	0.00	New
South Texas 2 Westinghouse	17 X 17	XLR	0.00	0.00	New
ILLINOIS POWER COMPANY					
Clinton General Electric	8 X 8	GE-7, VERS. 2	0.00	0.00	New
INDIANA AND MICHIGAN ELECTRIC					
Cook 1 Exxon/ANF	15 X 15	Westinghouse	165.04	0.00	
Westinghouse	15 X 15	OFA	21.65	51.96	
Westinghouse	15 X 15	Std/ZC	87.48	0.00	
Cook 2 Exxon/ANF	17 X 17	Westinghouse	24.11	77.23	
Westinghouse	17 X 17	Standard	167.14	0.46	
IOWA ELEC. LIGHT & POWER CO.					
Duane Arnold General Electric	7 X 7	GE-3, VERS. 2	69.84	0.00	
General Electric	8 X 8	GE-4, VERS. 2	50.11	0.81	
General Electric	8 X 8	GE-5, VERS. 2	32.90	21.94	
General Electric	8 X 8	GE-7, VERS. 2	0.00	21.20	

Table D-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE NOTE
KANSAS GAS & ELECTRIC CO.				
Wolf Creek Westinghouse	17 X 17	Standard	47.98	65.30
LONG ISLAND LIGHTING CO.				
Shoreham General Electric	8 X 8	GE-6, VERS. 2	0.00	102.41
LOUISIANA POWER & LIGHT				
Waterford 3 Combustion Engineering	16 X 16	Onofre	38.58	89.38
MAINE YANKEE ATOMIC POWER CO.				
Maine Yankee Combustion Engineering	14 X 14	Standard	190.08	0.35
Exxon/ANF	14 X 14	Comb. Eng.	133.09	3.04
MISSISSIPPI POWER & LIGHT CO.				
Grand Gulf 1 Exxon/ANF	8 X 8	JP-4,5	0.00	46.68
General Electric	8 X 8	GE-6, VERS. 2	101.46	45.48
Grand Gulf 2 General Electric	8 X 8	GE-7, VERS. 2	0.00	0.00 New
NEBRASKA PUBLIC POWER DISTRICT				
Cooper Station General Electric	7 X 7	GE-2, VERS. 2	25.10	0.00
General Electric	7 X 7	GE-3, VERS. 3	79.84	0.00
General Electric	8 X 8	GE-4, VERS. 2	13.24	0.00
General Electric	8 X 8	GE-4, VERS. 3	25.41	0.00
General Electric	8 X 8	GE-5, VERS. 2	34.34	0.00
General Electric	8 X 8	GE-6, VERS. 2	31.44	72.57
NIAGARA MOHAWK POWER CORP.				
Nine Mile Point 1 General Electric	7 X 7	GE-2, VERS. 1	115.63	0.00
General Electric	7 X 7	GE-3, VERS. 1	26.42	0.00
General Electric	8 X 8	GE-4, VERS. 1	80.96	2.94

Table D-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
NIAGARA MOHAWK POWER CORP. (continued)					
Nine Mile Point 1 (continued)					
General Electric	8 X 8	GE-5, VERS. 1	32.45	0.00	
General Electric	8 X 8	GE-6, VERS. 1	14.82	55.74	
Nine Mile Point 2					
General Electric	8 X 8	GE-7, VERS. 2	0.00	0.00	New
NORTHEAST UTILITIES SERVICE CO.					
Millstone 1					
General Electric	7 X 7	GE-1, VERS. 4	113.38	0.00	
General Electric	7 X 7	GE-2, VERS. 1	15.93	0.00	
General Electric	7 X 7	GE-3, VERS. 1	28.88	0.00	
General Electric	8 X 8	GE-4, VERS. 1	72.23	0.00	
General Electric	8 X 8	GE-5, VERS. 1	58.11	68.36	
General Electric	8 X 8	GE-6, VERS. 1	31.82	0.00	
General Electric	8 X 8	GE-7, VERS. 1	2.85	0.00	
Millstone 2					
Combustion Engineering	14 X 14	Standard	138.91	0.00	
Westinghouse	14 X 14	Model C	88.99	60.81	
Millstone 3					
Westinghouse	17 X 17	Standard	38.78	50.32	
NORTHERN STATES POWER CO.					
Monticello					
General Electric	7 X 7	GE-2, VERS. 1	93.67	0.00	
General Electric	8 X 8	GE-4, VERS. 1	50.08	1.47	
General Electric	8 X 8	GE-5, VERS. 1	47.80	3.68	
General Electric	8 X 8	GE-6, VERS. 1	88.80	25.60	
General Electric	8 X 8	GE-7, VERS. 1	0.00	32.61	
General Electric	8 X 8	GE-8, VERS. 1	0.00	85.72	
Pathfinder					
			0.00	0.00	Reproc
Prairie Island 1					
Exxon/ANF	14 X 14	Top Rod	40.13	13.53	
Exxon/ANF	14 X 14	Westinghouse	30.33	14.39	
Westinghouse	14 X 14	Std/ZCB	95.87	0.00	

Table D-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED IN	TOTAL CORE NOTE
NORTHERN STATES POWER CO. (continued)				
Prairie Island 2				
Exxon/ANF	14 X 14	Top Rod	35.37	28.39
Exxon/ANF	14 X 14	Westinghouse	28.79	0.00
Westinghouse	14 X 14	OFA	0.00	14.20
Westinghouse	14 X 14	Std/ZCB	96.75	0.00
OMAHA PUBLIC POWER DISTRICT				
Fort Calhoun				
Combustion Engineering	14 X 14	Fort Calhoun	106.02	0.00
Exxon/ANF	14 X 14	Fort Calhoun	37.07	15.37
PACIFIC GAS & ELECTRIC CO.				
Diablo Canyon 1				
Westinghouse	17 X 17	Standard	31.35	89.18
Diablo Canyon 2				
Westinghouse	17 X 17	Standard	31.29	57.48
Humboldt Bay				
Exxon/ANF	6 X 6	Humboldt Bay	8.79	0.00
General Electric	6 X 6	GE-1, VERS. 2	13.44	0.00
General Electric	7 X 7	GE-1, VERS. 3	28.03	0.00
PENNSYLVANIA POWER & LIGHT CO.				
Susquehanna 1				
Exxon/ANF	8 X 8	JP-4,5	0.00	86.00
General Electric	8 X 8	GE-6, VERS. 2	133.59	6.61
Susquehanna 2				
General Electric	8 X 8	GE-6, VERS. 2	59.51	80.62
Exxon/ANF	9 X 9	JP-4,5	0.00	56.23
PHILADELPHIA ELECTRIC CO.				
Limerick 1				
General Electric	8 X 8	GE-6, VERS. 2	17.09	0.00
General Electric	8 X 8	GE-7, VERS. 2	32.59	91.76
Limerick 2				
General Electric	8 X 8	GE-7, VERS. 2	0.00	0.00 New

Table D-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE NOTE
PHILADELPHIA ELECTRIC CO. (continued)				
Peach Bottom 2				
General Electric	7 X 7	GE-3, VERS. 2	144.57	0.00
General Electric	8 X 8	GE-4, VERS. 2	66.25	0.00
General Electric	8 X 8	GE-5, VERS. 2	47.46	0.00
General Electric	8 X 8	GE-6, VERS. 2	64.12	36.71
General Electric	8 X 8	GE-7, VERS. 2	0.18	53.23
Peach Bottom 3				
General Electric	7 X 7	GE-3, VERS. 3	145.03	0.00
General Electric	8 X 8	GE-4, VERS. 3	34.91	0.00
General Electric	8 X 8	GE-5, VERS. 2	46.30	0.00
General Electric	8 X 8	GE-6, VERS. 2	88.19	51.90
General Electric	8 X 8	GE-7, VERS. 2	0.00	52.96
PORTLAND GENERAL ELEC.				
Trojan				
Westinghouse	17 X 17	Standard	200.30	66.85
POWER AUTH. OF STATE OF NY				
Fitzpatrick				
General Electric	7 X 7	GE-2, VERS. 2	25.83	0.00
General Electric	7 X 7	GE-3, VERS. 2	80.24	0.00
General Electric	8 X 8	GE-4, VERS. 2	24.35	0.00
General Electric	8 X 8	GE-5, VERS. 2	24.84	0.00
General Electric	8 X 8	GE-6, VERS. 2	68.02	32.10
General Electric	8 X 8	GE-7, VERS. 2	0.00	36.16
Indian Point 3				
Westinghouse	15 X 15	OFA	0.46	34.70
Westinghouse	15 X 15	Std/ZC	167.64	19.15
PUBLIC SERV. ELEC. & GAS CO.				
Hope Creek				
General Electric	8 X 8	GE-6, VERS. 2	0.00	17.05
General Electric	8 X 8	GE-7, VERS. 2	0.00	124.21
Salem 1				
Westinghouse	17 X 17	OFA	0.84	0.00
Westinghouse	17 X 17	Standard	212.24	50.55

Table D-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
PUBLIC SERV. ELEC. & GAS CO. (continued)					
Salem 2 Westinghouse	17 X 17	Standard	102.82	89.18	
PUBLIC SERVICE OF NEW HAMPSHIRE					
Seabrook 1 Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
Seabrook 2 Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
PUERTO RICO WATER RESOURCES AU.					
BONUS					
			0.00	0.00	Reproc
ROCHESTER GAS & ELEC. CORP.					
Ginna Exxon/ANF Westinghouse Westinghouse	14 X 14 14 X 14 14 X 14	Westinghouse OFA Std/ZCA	67.59 1.40 142.59	4.29 25.79 0.00	
RURAL COOP POWER ASSOC.					
Elk River Allis Chalmers	5 X 5	Elk River	5.04	0.00	Assumed
SACRAMENTO MUNICIPAL UTIL. DIS.					
Rancho Seco Babcock & Wilcox Babcock & Wilcox	15 X 15 15 X 15	Mark BZ Mark B	0.00 146.35	25.90 56.14	
SOUTH CAROLINA ELEC. & GAS CO.					
Summer Westinghouse Westinghouse	17 X 17 17 X 17	Standard Vantage 5	80.79 0.00	41.00 1.70	

Table D-1. (continued)

UTILITY	REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE NOTE
SOUTHERN CALIFORNIA EDISON CO.					
	San Onofre 1 Westinghouse	14 X 14	Std/SC	152.18	58.13
	San Onofre 2 Combustion Engineering	16 X 16	Onofre	111.47	45.66
	San Onofre 3 Combustion Engineering	16 X 16	Onofre	65.66	54.61
TENNESSEE VALLEY AUTHORITY					
	Bellefonte 1 Babcock & Wilcox	17 X 17	Mark C	0.00	0.00 New
	Bellefonte 2 Babcock & Wilcox	17 X 17	Mark C	0.00	0.00 New
	Browns Ferry 1 General Electric	7 X 7	GE-2, VERS. 2	32.88	0.00
	General Electric	7 X 7	GE-3, VERS. 2	111.83	0.00
	General Electric	8 X 8	GE-4, VERS. 2	30.89	0.00
	General Electric	8 X 8	GE-5, VERS. 2	28.59	0.00
	General Electric	8 X 8	GE-6, VERS. 2	43.77	85.62
	General Electric	8 X 8	GE-7, VERS. 2	0.00	54.16
	Browns Ferry 2 General Electric	7 X 7	GE-2, VERS. 2	32.86	0.00
	General Electric	7 X 7	GE-3, VERS. 2	111.54	0.00
	General Electric	8 X 8	GE-4, VERS. 2	30.18	0.74
	General Electric	8 X 8	GE-5, VERS. 2	35.72	6.56
	General Electric	8 X 8	GE-6, VERS. 2	11.70	132.41
	Browns Ferry 3 General Electric	8 X 8	GE-4, VERS. 3	142.76	0.00
	General Electric	8 X 8	GE-5, VERS. 2	33.70	4.40
	General Electric	8 X 8	GE-6, VERS. 2	10.23	134.06
	General Electric	8 X 8	GE-4, VERS. 2	0.00	1.48
	Sequoyah 1 Westinghouse	17 X 17	Standard	97.30	55.87
	Sequoyah 2 Westinghouse	17 X 17	Standard	62.41	88.82

Table D-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED	TOTAL IN CORE	NOTE
TENNESSEE VALLEY AUTHORITY (continued)					
Watts Bar 1 Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
Watts Bar 2 Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
TEXAS UTILITIES GENERATION CO.					
Comanche Peak 1 Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
Comanche Peak 2 Westinghouse	17 X 17	Vantage 5	0.00	0.00	New
TOLEDO EDISON CO.					
Davis-Besse Babcock & Wilcox	15 X 15	Mark B	96.23	82.93	
UNION ELECTRIC CO.					
Callaway Westinghouse	17 X 17	OFA	0.00	35.88	
Westinghouse	17 X 17	Standard	82.99	6.00	
VERMONT YANKEE NUCLEAR POWER					
Vermont Yankee General Electric	7 X 7	GE-2, VERS. 2	72.80	0.00	
General Electric	7 X 7	GE-3, VERS. 2	7.53	0.00	
General Electric	8 X 8	GE-4, VERS. 2	111.67	0.00	
General Electric	8 X 8	GE-6, VERS. 2	79.05	0.00	
VIRGINIA ELECTRIC & POWER CO.					
North Anna 1 Westinghouse	17 X 17	Standard	169.64	41.99	
North Anna 2 Westinghouse	17 X 17	Standard	140.83	43.00	
Surry 1 Westinghouse	15 X 15	Std/ZC, Var.	233.51	72.18	Added
Westinghouse	17 X 17	Vantage 5	0.91	0.00	

Table D-1. (continued)

UTILITY REACTOR MANUFACTURER	ARRAY SIZE	FUEL VERSION	TOTAL DISCHARGED IN	TOTAL CORE NOTE
VIRGINIA ELECTRIC & POWER CO. (continued)				
Surry 2				
Westinghouse	15 X 15	Std/ZC, Var.	184.98	72.11 Added
Westinghouse	17 X 17	Vantage 5	0.92	0.00
WASHINGTON PUBLIC POWER SUPPLY				
Washington Nuclear 1				
Babcock & Wilcox	17 X 17	Mark C	0.00	0.00 New
Washington Nuclear 2				
Exxon/ANF	8 X 8	JP-4,5	0.00	22.56
General Electric	8 X 8	GE-6, VERS. 2	50.66	89.41
Washington Nuclear 3				
Combustion Engineering	16 X 16	System 80	0.00	0.00 New
WISCONSIN ELECTRIC POWER CO.				
Point Beach 1				
Westinghouse	14 X 14	OFA	0.00	20.09
Westinghouse	14 X 14	Std/ZCB	187.90	10.47
Point Beach 2				
Westinghouse	14 X 14	OFA	5.87	28.70
Westinghouse	14 X 14	Std/ZCB	165.68	6.83
WISCONSIN PUBLIC SERVICE CORP.				
Kewaunee				
Exxon/ANF	14 X 14	Westinghouse	76.80	30.73
Westinghouse	14 X 14	Std/ZCA	95.69	0.00
YANKEE ATOMIC ELECTRIC CO.				
Yankee-Rowe				
Exxon/ANF	15 X 16	Westinghouse	53.24	0.00
United Nuclear	15 X 16	Yankee Rowe	17.42	0.00 Added
Westinghouse	17 X 18		20.78	0.00 Assumed

Appendix E

REACTORS BY ASSEMBLY TYPE - INCORE

Table E-1. Assembly types and the reactors at which they are used
incore fuel information as of Dec. 31, 1987 (EIA)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS: BIG ROCK POINT			
ASSEMBLY TYPE: Exxon 11X11 Gen. Electric Big Rock Point	64	8.38	
ASSEMBLY CLASS: FORT CALHOUN			
ASSEMBLY TYPE: Exxon 14X14 Fort Calhoun Fort Calhoun	44	15.37	
ASSEMBLY CLASS: HADDAM NECK			
ASSEMBLY TYPE: B&W 15X15 St. Steel Haddam Neck	101	41.41	
ASSEMBLY CLASS: PALISADES			
ASSEMBLY TYPE: Exxon 15X15 Comb. Eng. Palisades	204	80.02	
ASSEMBLY CLASS: ST. LUCIE 2			
ASSEMBLY TYPE: CE 16X16 Lucie 2 St. Lucie 2	17	6.38	
ASSEMBLY CLASS: SAN ONOFRE 1			
ASSEMBLY TYPE: WE 14X14 Std/SC San Onofre 1	157	58.13	
ASSEMBLY CLASS: SOUTH TEXAS 1&2			
ASSEMBLY TYPE: WE 17X17 XLR South Texas 1	0	0.00	New
South Texas 2	0	0.00	New
ASSEMBLY CLASS: GE BWR/2,3			
ASSEMBLY TYPE: Exxon 8X8 JP-3 Oyster Creek	200	35.00	
ASSEMBLY TYPE: GE 8X8 GE-4, Vers. 1 Monticello	8	1.47	
Nine Mile Point 1	16	2.94	
Quad Cities 1	4	0.74	

Table E-1. (continued)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS: GE BWR/2,3 (continued)			
ASSEMBLY TYPE: GE 8X8 GE-5, Vers. 1			
Millstone 1	384	68.36	
Monticello	20	3.68	
ASSEMBLY TYPE: GE 8X8 GE-6, Vers. 1			
Monticello	144	25.60	
Nine Mile Point 1	316	55.74	
Oyster Creek	176	31.33	
Pilgrim	356	63.06	
ASSEMBLY TYPE: GE 8X8 Ge-7, Vers. 1			
Monticello	184	32.61	
Oyster Creek	184	32.79	
Pilgrim	32	5.71	
ASSEMBLY TYPE: GE 8X8 GE-8, Vers. 1			
Monticello	480	85.72	
ASSEMBLY CLASS: GE BWR/4,5,6			
ASSEMBLY TYPE: Exxon 8X8 JP-4,5			
Grand Gulf 1	264	46.68	
Susquehanna 1	488	86.00	
Washington Nuclear 2	128	22.56	
ASSEMBLY TYPE: GE 8X8 GE-4, Vers. 2			
Browns Ferry 2	4	0.74	
Duane Arnold	5	0.81	
ASSEMBLY TYPE: GE 8X8 GE-5, Vers. 2			
Browns Ferry 2	36	6.56	
Browns Ferry 3	24	4.40	
Brunswick 1	384	70.50	
Brunswick 2	412	75.57	
Duane Arnold	120	21.94	
Hatch 2	64	11.72	
ASSEMBLY TYPE: Ge 8X8 Ge-6, Vers. 2			
Browns Ferry 1	468	85.62	
Browns Ferry 2	724	132.41	
Browns Ferry 3	732	134.06	
Cooper Station	396	72.57	
Enrico Fermi 2	764	140.14	
Fitzpatrick	176	32.10	

Table E-1. (continued)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS: GE BWR/4,5,6 (continued)			
ASSEMBLY TYPE: Ge 8X8 Ge-6, Vers. 2 (continued)			
Grand Gulf 1	248	45.48	
Hatch 1	40	7.32	
Hatch 2	144	26.36	
Hope Creek	92	17.05	
Peach Bottom 2	201	36.71	
Peach Bottom 3	284	51.90	
River Bend 1	420	77.72	
Shoreham	560	102.41	
Susquehanna 1	36	6.61	
Susquehanna 2	440	80.62	
Washington Nuclear 2	488	89.41	
ASSEMBLY TYPE: GE 8X8 GE-7, Vers. 2			
Browns Ferry 1	296	54.16	
Brunswick 2	148	27.43	
Clinton	0	0.00	New
Duane Arnold	115	21.20	
Fitzpatrick	196	36.16	
Grand Gulf 2	0	0.00	New
Hatch 1	335	61.73	
Hatch 2	352	65.03	
Hope Creek	672	124.21	
Limerick 1	496	91.76	
Limerick 2	0	0.00	New
Nine Mile Point 2	0	0.00	New
Peach Bottom 2	291	53.23	
Peach Bottom 3	288	52.96	
Perry 1	0	0.00	New
Perry 2	0	0.00	New
River Bend 1	40	7.39	
ASSEMBLY TYPE: GE 8X8 GE-4, Vers. 2			
Browns Ferry 3	8	1.48	
ASSEMBLY TYPE: Exxon 9X9 JP-4,5			
Susquehanna 2	324	56.23	
ASSEMBLY CLASS: BW 15 X 15 ARRAY			
ASSEMBLY TYPE: B&W 15X15 Mark BZ			
Rancho Seco	56	25.90	

Table E-1. (continued)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS: BW 15 X 15 ARRAY (continued)			
ASSEMBLY TYPE: B&W 15X15 Mark B			
Arkansas 1	177	82.00	
Crystal River 3	102	47.27	
Davis-Besse	177	82.93	
Oconee 1	117	54.20	
Oconee 2	177	82.05	
Oconee 3	49	22.73	
Rancho Seco	121	56.14	
Three Mile Island 1	177	82.20	
ASSEMBLY CLASS: BW 17 X 17 ARRAY			
ASSEMBLY TYPE: B&W 17X17 Mark C			
Bellefonte 1	0	0.00	New
Bellefonte 2	0	0.00	New
Washington Nuclear 1	0	0.00	New
ASSEMBLY CLASS: CE 14 X 14 ARRAY			
ASSEMBLY TYPE: CE 14X14 Standard			
Calvert Cliffs 1	217	84.31	
Calvert Cliffs 2	129	50.23	
Maine Yankee	1	0.35	
ASSEMBLY TYPE: Exxon 14X14 Comb. Eng.			
Maine Yankee	8	3.04	
St. Lucie 1	25	8.84	
ASSEMBLY TYPE: WE 14X14 Model C			
Millstone 2	149	60.81	
ASSEMBLY CLASS: CE 16 X 16 ARRAY			
ASSEMBLY TYPE: CE 16X16 System 80			
Palo Verde 1	161	65.31	
Palo Verde 2	182	73.84	
Palo Verde 3	0	0.00	New
Washington Nuclear 3	0	0.00	New
ASSEMBLY TYPE: CE 16X16 Onofre			
Arkansas 2	177	73.61	
San Onofre 2	109	45.66	
San Onofre 3	129	54.61	
Waterford 3	217	89.38	

Table E-1. (continued)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS: WE 14 X 14 ARRAY			
ASSEMBLY TYPE: Exxon 14X14 Top Rod			
Prairie Island 1	37	13.53	
Prairie Island 2	81	28.39	
ASSEMBLY TYPE: Exxon 14X14 Westinghouse			
Ginna	12	4.29	
Kewaunee	81	30.73	
Prairie Island 1	40	14.39	
ASSEMBLY TYPE: WE 14X14 OFA			
Ginna	73	25.79	
Point Beach 1	56	20.09	
Point Beach 2	80	28.70	
Prairie Island 2	40	14.20	
ASSEMBLY TYPE: WE 14X14 Std/ZCB			
Point Beach 1	26	10.47	
Point Beach 2	17	6.83	
ASSEMBLY CLASS: WE 15 X 15 ARRAY			
ASSEMBLY TYPE: Exxon 15X15 Westinghouse			
Robinson 2	109	45.53	
ASSEMBLY TYPE: WE 15X15 OFA			
Cook 1	113	51.96	
Indian Point 3	75	34.70	
Turkey Point 3	16	7.35	
Turkey Point 4	96	44.16	
ASSEMBLY TYPE: WE 15X15 Std/ZC, Var.			
Surry 1	157	72.18	Added
Surry 2	157	72.11	Added
ASSEMBLY TYPE: WE 15X15 Std/ZC			
Indian Point 2	125	57.42	
Indian Point 3	42	19.15	
Turkey Point 3	5	2.29	
Turkey Point 4	61	27.92	

Table E-1. (continued)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS: WE 17 X 17 ARRAY			
ASSEMBLY TYPE: Exxon 17X17 Westinghouse			
Cook 2	192	77.23	
ASSEMBLY TYPE: WE 17X17 OFA			
Braidwood 1	192	81.76	
Byron 1	191	43.67	
Byron 2	193	82.32	
Callaway	84	35.88	
Catawba 1	125	53.07	
McGuire 1	121	51.38	
McGuire 2	117	49.61	
ASSEMBLY TYPE: WE 17X17 Standard			
Beaver Valley 1	101	46.71	
Callaway	13	6.00	
Cook 2	1	0.46	
Diablo Canyon 1	193	89.18	
Diablo Canyon 2	125	57.48	
Farley 1	139	64.30	
Farley 2	93	43.27	
Harris	157	73.01	
McGuire 2	12	5.55	
Millstone 3	109	50.32	
North Anna 1	91	41.99	
North Anna 2	93	43.00	
Salem 1	109	50.55	
Salem 2	193	89.18	
Sequoyah 1	121	55.87	
Sequoyah 2	193	88.82	
Summer	89	41.00	
Trojan	145	66.85	
Wolf Creek	141	65.30	
ASSEMBLY TYPE: WE 17X17 Vantage 5			
Beaver Valley 2	0	0.00	New
Braidwood 2	0	0.00	New
Comanche Peak 1	0	0.00	New
Comanche Peak 2	0	0.00	New
Seabrook 1	0	0.00	New
Seabrook 2	0	0.00	New
Summer	4	1.70	
Vogtle 1	0	0.00	New
Vogtle 2	0	0.00	New
Watts Bar 1	0	0.00	New

Table E-1. (continued)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS: WE 17 X 17 ARRAY(continued)			
ASSEMBLY TYPE: WE 17X17 Vantage 5 Watts Bar 2	0	(continued) 0.00	New

Appendix F

REACTORS BY ASSEMBLY TYPE - DISCHARGED

Table F-1. Assembly types and the reactors at which they are used discharged fuel information as of Dec. 31, 1987 (EIA)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS:			
ASSEMBLY TYPE:			
BONUS	0	0.00	Reproc
Pathfinder	0	0.00	Reproc
Shippingport LWR	0	0.00	Reproc
ASSEMBLY CLASS: BIG ROCK POINT			
ASSEMBLY TYPE: GE 7X7 Big Rock Point			
Big Rock Point	4	0.53	Assumed
ASSEMBLY TYPE: GE 8X8 Big Rock Point			
Big Rock Point	2	0.22	Assumed
ASSEMBLY TYPE: Exxon 9X9 Big Rock Point			
Big Rock Point	4	0.51	
ASSEMBLY TYPE: GE 9X9 Big Rock Point			
Big Rock Point	143	19.62	Assumed
ASSEMBLY TYPE: Exxon 11X11 Gen. Electric			
Big Rock Point	128	16.33	
ASSEMBLY TYPE: GE 11X11 Big Rock Point			
Big Rock Point	6	0.75	Assumed
ASSEMBLY TYPE: NFS 11X11 Gen. Electric			
Big Rock Point	2	0.27	Added
ASSEMBLY CLASS: DRESDEN 1			
ASSEMBLY TYPE: Exxon 6X6 Gen. Electric			
Dresden 1	66	6.28	
ASSEMBLY TYPE: GE 6X6 GE-1, Vers. 1			
Dresden 1	365	34.21	
ASSEMBLY TYPE: UN 6X6 Dresden-1			
Dresden 1	457	46.62	Added
ASSEMBLY TYPE: GE 8X8 UNKNOWN			
Dresden 1	1	0.10	Unknown

Table F-1. (continued)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS: ELK RIVER			
ASSEMBLY TYPE: AC 5X5 Elk River Elk River	188	5.04	Assumed
ASSEMBLY CLASS: HUMBOLDT BAY			
ASSEMBLY TYPE: Exxon 6X6 Humboldt Bay Humboldt Bay	126	8.79	
ASSEMBLY TYPE: GE 6X6 GE-1, Vers. 2 Humboldt Bay	176	13.44	
ASSEMBLY TYPE: GE 7X7 GE-1, Vers. 3 Humboldt Bay	358	28.03	
ASSEMBLY CLASS: LACROSSE			
ASSEMBLY TYPE: AC 10X10 LaCrosse	156	18.74	
ASSEMBLY TYPE: Exxon 10X10 AC LaCrosse	178	19.34	
ASSEMBLY CLASS: FORT CALHOUN			
ASSEMBLY TYPE: CE 14X14 Fort Calhoun Fort Calhoun	290	106.02	
ASSEMBLY TYPE: Exxon 14X14 Fort Calhoun Fort Calhoun	104	37.07	
ASSEMBLY CLASS: HADDAM NECK			
ASSEMBLY TYPE: B&W 15X15 St. Steel Haddam Neck	736	304.06	
ASSEMBLY CLASS: INDIAN POINT 1			
ASSEMBLY TYPE: WE 13X14 Indian Point 1	160	30.58	

Table F-1. (continued)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS: PALISADES			
ASSEMBLY TYPE: CE 15X15 Palisades Palisades	273	112.60	
ASSEMBLY TYPE: Exxon 15X15 Comb. Eng. Palisades	272	106.31	
ASSEMBLY CLASS: ST. LUCIE 2			
ASSEMBLY TYPE: CE 16X16 Lucie 2 St. Lucie 2	240	90.37	
ASSEMBLY CLASS: SAN ONOFRE 1			
ASSEMBLY TYPE: WE 14X14 Std/SC San Onofre 1	416	152.18	
ASSEMBLY CLASS: YANKEE ROWE			
ASSEMBLY TYPE: Exxon 15X16 Westinghouse Yankee-Rowe	228	53.24	
ASSEMBLY TYPE: UN 15X16 Yankee Rowe Yankee-Rowe	73	17.42	Added
ASSEMBLY TYPE: WE 17X18 Yankee-Rowe	76	20.78	Assumed
ASSEMBLY CLASS: GE BWR/2,3			
ASSEMBLY TYPE: Exxon 7X7 Gen. Electric Oyster Creek	260	47.41	
ASSEMBLY TYPE: GE 7X7 GE-1, Vers. 4 Millstone 1	580	113.38	
Oyster Creek	560	109.27	
ASSEMBLY TYPE: GE 7X7 GE-2, Vers. 1 Dresden 2	1477	284.08	
Dresden 3	724	140.22	
Millstone 1	82	15.93	
Monticello	484	93.67	
Nine Mile Point 1	596	115.63	
Oyster Creek	156	30.25	
Pilgrim	580	111.90	

Table F-1. (continued)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS: GE BWR/2,3 (continued)			
ASSEMBLY TYPE: GE 7X7 GE-2, Vers. 1 (continued)			
Quad Cities 1	693	133.99	
Quad Cities 2	724	140.06	
ASSEMBLY TYPE: GE 7X7 GE-3, Vers. 1			
Dresden 2	32	6.00	
Dresden 3	52	9.78	
Millstone 1	154	28.88	
Nine Mile Point 1	140	26.42	
Quad Cities 1	22	4.13	
ASSEMBLY TYPE: GE 7X7 UNKNOWN			
Quad Cities 1	5	0.93	Unknown
Quad Cities 1	1	0.17	Unknown
ASSEMBLY TYPE: Exxon 8X8 JP-3			
Oyster Creek	416	72.80	
ASSEMBLY TYPE: GE 8X8 GE-4, Vers. 1			
Dresden 2	284	52.32	
Dresden 3	332	61.02	
Millstone 1	392	72.23	
Monticello	272	50.08	
Nine Mile Point 1	440	80.96	
Pilgrim	580	106.73	
Quad Cities 1	372	68.51	
Quad Cities 2	492	90.60	
ASSEMBLY TYPE: GE 8X8 GE-5, Vers. 1			
Millstone 1	328	58.11	
Monticello	260	47.80	
Nine Mile Point 1	184	32.45	
Quad Cities 1	192	33.99	
ASSEMBLY TYPE: GE 8X8 GE-6, Vers. 1			
Millstone 1	180	31.82	
Monticello	496	88.80	
Nine Mile Point 1	84	14.82	
Pilgrim	160	28.34	
ASSEMBLY TYPE: GE 8X8 Ge-7, Vers. 1			
Millstone 1	16	2.85	

Table F-1. (continued)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS: GE BWR/4,5,6			
ASSEMBLY TYPE: GE 7X7 GE-2, Vers. 2			
Browns Ferry 1	168	32.88	
Browns Ferry 2	168	32.86	
Cooper Station	128	25.10	
Fitzpatrick	132	25.83	
Vermont Yankee	378	72.80	
ASSEMBLY TYPE: GE 7X7 GE-3, Vers. 2			
Browns Ferry 1	596	111.83	
Browns Ferry 2	596	111.54	
Brunswick 2	561	79.41	
Duane Arnold	372	69.84	
Fitzpatrick	428	80.24	
Hatch 1	560	104.95	
Peach Bottom 2	764	144.57	
Vermont Yankee	40	7.53	
ASSEMBLY TYPE: GE 7X7 GE-3, Vers. 3			
Cooper Station	420	79.84	
Peach Bottom 3	764	145.03	
ASSEMBLY TYPE: GE 8X8 UNKNOWN			
LaSalle 1	996	182.76	Unknown
LaSalle 2	540	98.66	Unknown
ASSEMBLY TYPE: GE 8X8 GE-4, Vers. 2			
Browns Ferry 1	168	30.89	
Browns Ferry 2	164	30.18	
Cooper Station	72	13.24	
Duane Arnold	272	50.11	
Fitzpatrick	132	24.35	
Hatch 1	92	16.93	
Peach Bottom 2	360	66.25	
Vermont Yankee	608	111.67	
ASSEMBLY TYPE: GE 8X8 GE-4, Vers. 3			
Browns Ferry 3	764	142.76	
Brunswick 1	560	104.46	
Brunswick 2	140	26.14	
Cooper Station	136	25.41	
Peach Bottom 3	187	34.91	

Table F-1. (continued)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS: GE BWR/4,5,6 (continued)			
ASSEMBLY TYPE: GE 8X8 GE-5, Vers. 2			
Browns Ferry 1	156	28.59	
Browns Ferry 2	196	35.72	
Browns Ferry 3	184	33.70	
Brunswick 1	136	24.89	
Brunswick 2	48	8.78	
Cooper Station	188	34.34	
Duane Arnold	180	32.90	
Fitzpatrick	136	24.84	
Hatch 1	384	70.26	
Hatch 2	509	93.38	
LaSalle 2	224	40.96	
Peach Bottom 2	260	47.46	
Peach Bottom 3	253	46.30	
ASSEMBLY TYPE: Ge 8X8 Ge-6, Vers. 2			
Browns Ferry 1	240	43.77	
Browns Ferry 2	64	11.70	
Browns Ferry 3	56	10.23	
Brunswick 1	176	32.25	
Brunswick 2	148	27.08	
Cooper Station	172	31.44	
Fitzpatrick	372	68.02	
Grand Gulf 1	552	101.46	
Hatch 1	287	52.55	
Hatch 2	199	36.43	
Limerick 1	92	17.09	
Peach Bottom 2	351	64.12	
Peach Bottom 3	484	88.19	
River Bend 1	164	30.49	
Susquehanna 1	728	133.59	
Susquehanna 2	324	59.51	
Vermont Yankee	432	79.05	
Washington Nuclear 2	276	50.66	
ASSEMBLY TYPE: GE 8X8 GE-7, Vers. 2			
Hatch 1	53	9.71	
Hatch 2	8	1.47	
Limerick 1	176	32.59	
Peach Bottom 2	1	0.18	

Table F-1. (continued)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS: BW 15 X 15 ARRAY			
ASSEMBLY TYPE: B&W 15X15 Mark B			
Arkansas 1	448	207.54	
Crystal River 3	395	183.48	
Davis-Besse	204	96.23	
Oconee 1	649	287.15	
Oconee 2	518	239.37	
Oconee 3	540	250.06	
Rancho Seco	316	146.35	
Three Mile Island 1	284	131.75	
ASSEMBLY CLASS: BW 17 X 17 ARRAY			
ASSEMBLY TYPE: B&W 17X17 Mark C			
Oconee 2	4	1.83	
ASSEMBLY CLASS: CE 14 X 14 ARRAY			
ASSEMBLY TYPE: CE 14X14 Standard			
Calvert Cliffs 1	620	237.63	
Calvert Cliffs 2	520	199.19	
Maine Yankee	505	190.08	
Millstone 2	361	138.91	
St. Lucie 1	497	189.56	
ASSEMBLY TYPE: Exxon 14X14 Comb. Eng.			
Maine Yankee	352	133.09	
St. Lucie 1	31	10.84	
ASSEMBLY TYPE: WE 14X14 Model C			
Millstone 2	219	88.99	
ASSEMBLY CLASS: CE 16 X 16 ARRAY			
ASSEMBLY TYPE: CE 16X16 System 80			
Palo Verde 1	80	33.84	
ASSEMBLY TYPE: CE 16X16 Onofre			
Arkansas 2	288	120.80	
San Onofre 2	268	111.47	
San Onofre 3	160	65.66	
Waterford 3	92	38.58	

Table F-1. (continued)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS: WE 14 X 14 ARRAY			
ASSEMBLY TYPE: Exxon 14X14 Top Rod			
Prairie Island 1	110	40.13	
Prairie Island 2	97	35.37	
ASSEMBLY TYPE: Exxon 14X14 Westinghouse			
Ginna	181	67.59	
Kewaunee	203	76.80	
Prairie Island 1	80	30.33	
Prairie Island 2	76	28.79	
ASSEMBLY TYPE: WE 14X14 OFA			
Ginna	4	1.40	
Point Beach 2	16	5.87	
ASSEMBLY TYPE: WE 14X14 Std/ZCA			
Ginna	364	142.59	
Kewaunee	241	95.69	
ASSEMBLY TYPE: WE 14X14 Std/ZCB			
Point Beach 1	472	187.90	
Point Beach 2	415	165.68	
Prairie Island 1	241	95.87	
Prairie Island 2	241	96.75	
ASSEMBLY CLASS: WE 15 X 15 ARRAY			
ASSEMBLY TYPE: Exxon 15X15 Westinghouse			
Cook 1	386	165.04	
Robinson 2	309	132.80	
ASSEMBLY TYPE: WE 15X15 OFA			
Cook 1	47	21.65	
Indian Point 3	1	0.46	
Turkey Point 3	16	7.35	
Zion 2	80	36.56	
ASSEMBLY TYPE: WE 15X15 Std/ZC (UNKNOWN)			
Zion 1	1261	574.99	Unknown
ASSEMBLY TYPE: WE 15X15 Std/ZC, Var.			
Indian Point 2	393	177.32	Added
Surry 1	514	233.51	Added
Surry 2	407	184.98	Added

Table F-1. (continued)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS: WE 15 X 15 ARRAY (continued)			
ASSEMBLY TYPE: WE 15X15 Std/ZC			
Cook 1	193	87.48	
Indian Point 2	139	63.51	
Indian Point 3	367	167.64	
Robinson 2	140	63.82	
Robinson 2	314	131.75	
Robinson 2	13	5.91	
Turkey Point 3	272	123.99	
Turkey Point 4	447	202.97	
ASSEMBLY CLASS: WE 17 X 17 ARRAY			
ASSEMBLY TYPE: Exxon 17X17 Westinghouse			
Cook 2	60	24.11	
ASSEMBLY TYPE: WE 17X17 Vantage 5			
Surry 1	2	0.91	
Surry 2	2	0.92	
ASSEMBLY TYPE: WE 17X17 OFA			
Beaver Valley 1	2	0.84	
Byron 1	88	37.31	
Catawba 1	132	55.95	
Catawba 2	193	82.02	
Farley 1	2	0.85	
McGuire 1	63	26.73	
McGuire 2	3	1.27	
Salem 1	2	0.84	
ASSEMBLY TYPE: WE 17X17 Standard			
Beaver Valley 1	354	162.75	
Callaway	180	82.99	
Cook 2	364	167.14	
Diablo Canyon 1	68	31.35	
Diablo Canyon 2	68	31.29	
Farley 1	408	187.51	
Farley 2	320	146.94	
McGuire 1	193	88.67	
McGuire 2	181	83.26	
Millstone 3	84	38.78	
North Anna 1	369	169.64	
North Anna 2	306	140.83	
Salem 1	462	212.24	
Salem 2	224	102.82	

Table F-1. (continued)

REACTOR	QUANTITY	METRIC TONS	NOTE
ASSEMBLY CLASS: WE 17 X 17 ARRAY(continued)			
ASSEMBLY TYPE: WE 17X17 Standard		(continued)	
Sequoyah 1	212	97.30	
Sequoyah 2	136	62.41	
Summer	176	80.79	
Trojan	436	200.30	
Wolf Creek	104	47.98	

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