

December 22, 2000

MEMORANDUM TO: Susan F. Shankman, Deputy Director
Licensing and Inspection Directorate
Spent Fuel Project Office, NMSS

FROM: Robert Temps, Safety Inspector
Spent Fuel Project Office, NMSS

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SUBJECT: SUMMARY OF PUBLIC MEETING WITH THE NUCLEAR ENERGY
INSTITUTE REGARDING FUEL INVENTORY SURVEY

On December 20, 2000, a public meeting was held between representatives of the U.S. Nuclear Regulatory Commission (NRC) and the Nuclear Energy Institute (NEI) to discuss the status of the NEI survey regarding spent fuel inventories at commercial nuclear reactor sites. The meeting was noticed on December 7, 2000.

Following introductory remarks by NRC and NEI representatives, NEI described its intent to define the extent and form of data (on spent fuel inventory) that would be most useful for the NRC's purposes. NRC staff stated that the primary goal of the data collection effort is to identify industry trends on issues, such as fuel burnup, heat generation rate, and cladding types, so the staff can establish priorities and estimate staff resources. NEI committed to providing, by mid-January 2001, an outline describing the types of information that can be extracted from the survey results and identifying areas requiring further development. It was agreed that further discussions would be held on this topic.

No proprietary information was disseminated or presented at this meeting. No regulatory decisions were requested or made.

Please contact me if you wish to further discuss these issues.

Attachment: 1) Attendance List
2) NEI Handout

DISTRIBUTION:

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WBrach

WHodges

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|-------|-----------|---|----------|---|----------|---|--|--|--|--|--|--|
| OFC: | SFPO | E | SFPO | E | SFPO | E | | | | | | |
| NAME: | RTemps | | VHarpe | | MTokar | | | | | | | |
| DATE: | 12/20 /00 | | 12/21/00 | | 12/23/00 | | | | | | | |

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 22, 2000

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Licensing and Inspection Directorate
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Attachment 1

Attendance List

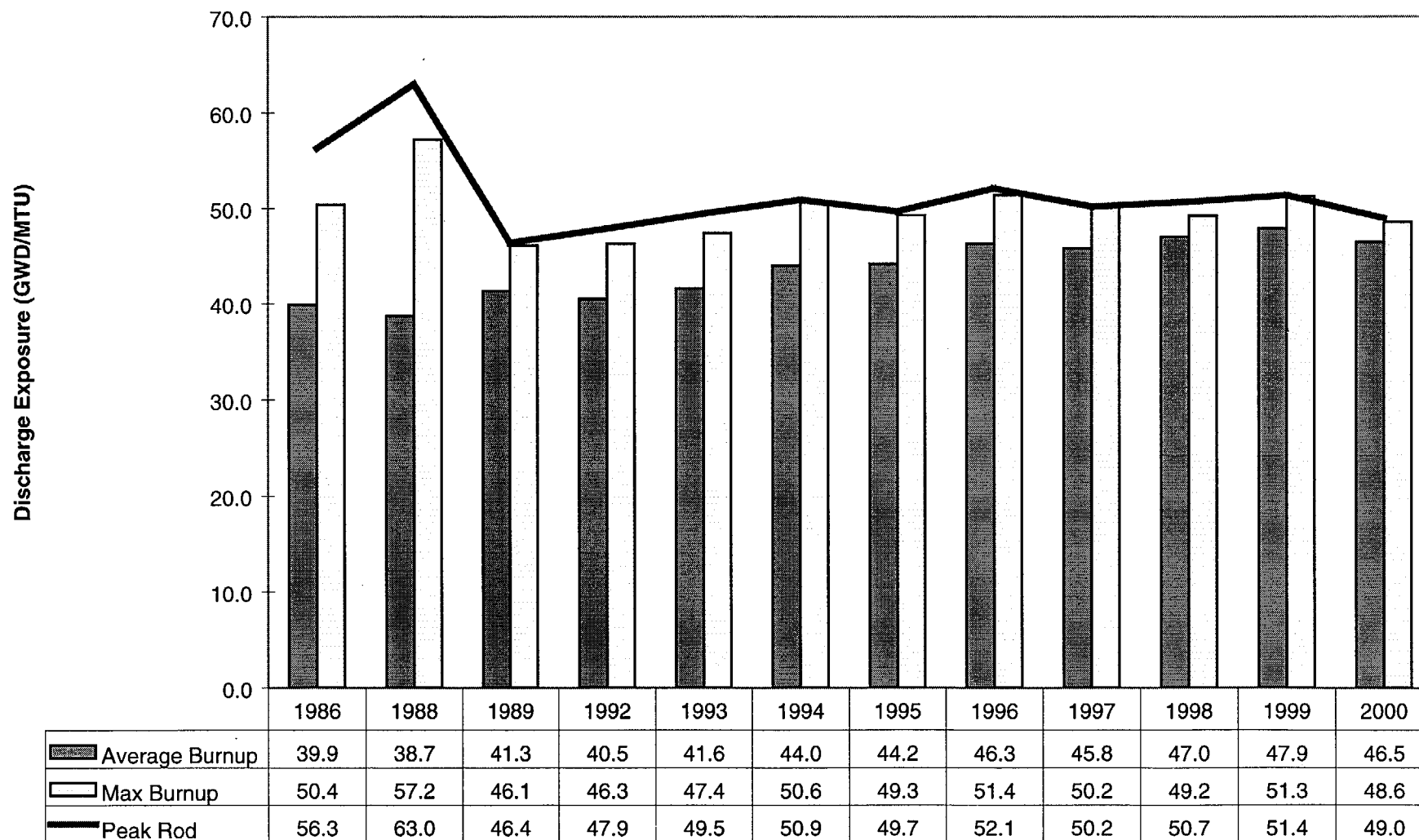
ATTENDANCE SHEET FOR 2/29/00 MEETING ON ISG-4

| NAME | AFFILIATION |
|---------------------|--------------------------------|
| Rob Temps | NRC/ SFPO |
| Charles Green | NRC/NMSS |
| John Vincent | NEI |
| Eileen Supko | Energy Resources International |
| Lynette Hendricks | NEI |
| Ed Wenzinger | NUS-LLS |
| Maureen Conley | McGraw-Hill |
| Alan Nelson | NEI |
| Christopher Jackson | NRC/SFPO |
| Chris Brown | NRC/SFPO |
| Earl P. Easton | NRC/SFPO |
| Kim Gruss | NRC/SFPO |
| Ralph Meyer | NRC/RES |
| Bill Brach | NRC/SFPO |
| Jack Guttman | NRC/SFPO |
| Pat Eng | NRC/SFPO |

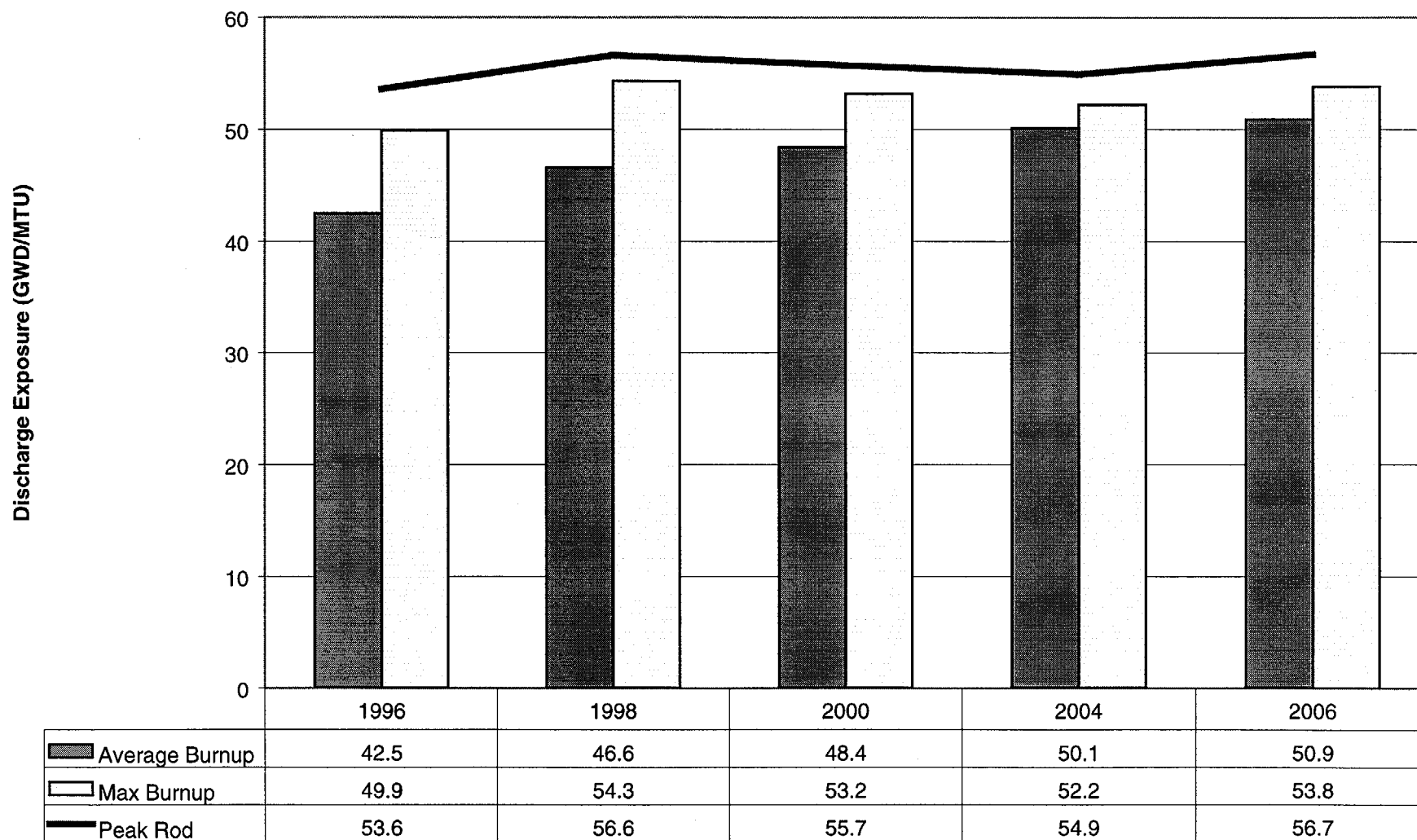
Attachment 2

NEI Handout

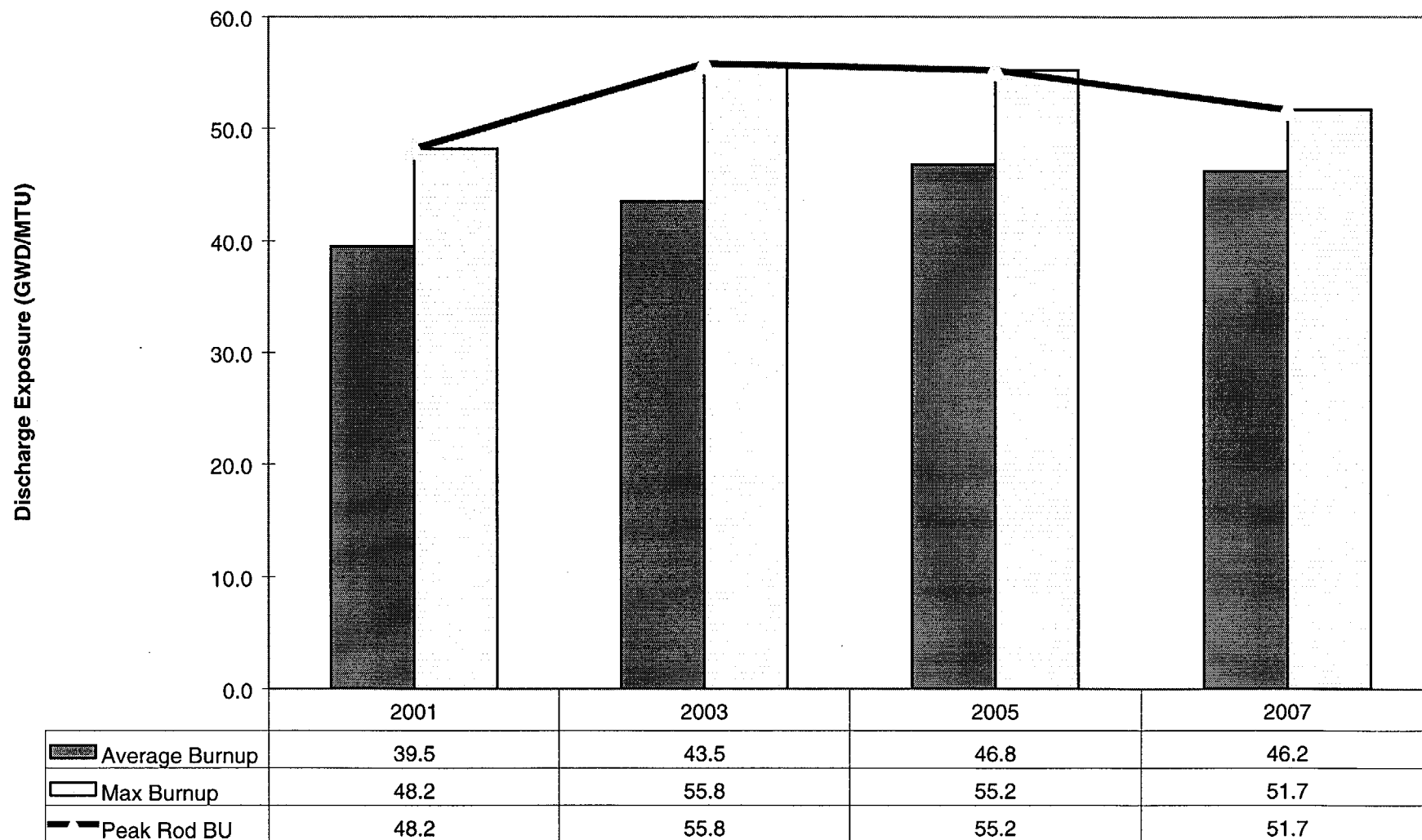
Calvert Cliffs Unit 1 and 2
Summary of Average, Maximum and Peak Rod Exposures



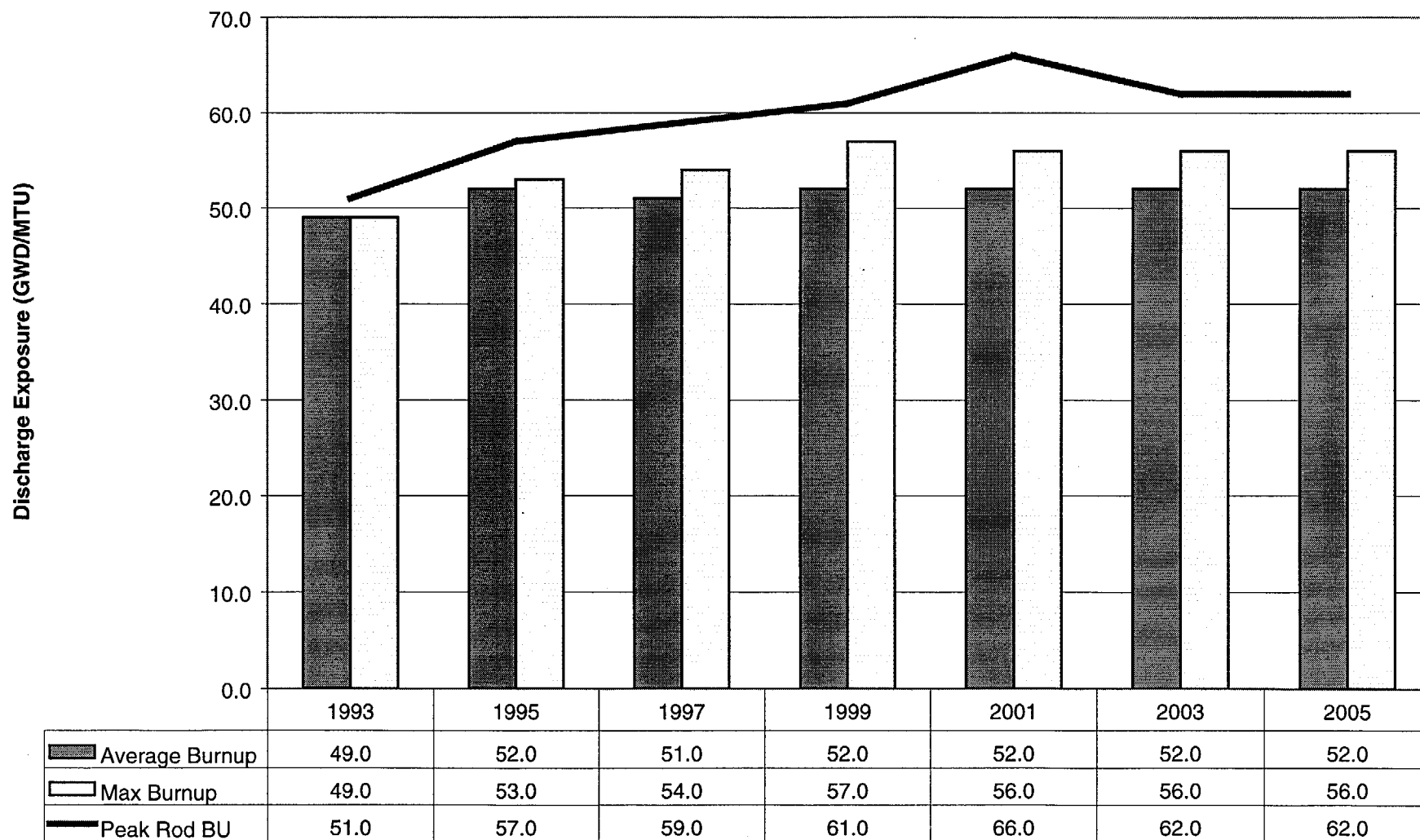
Davis Besse
Summary of Average, Maximum and Peak Pin Exposures



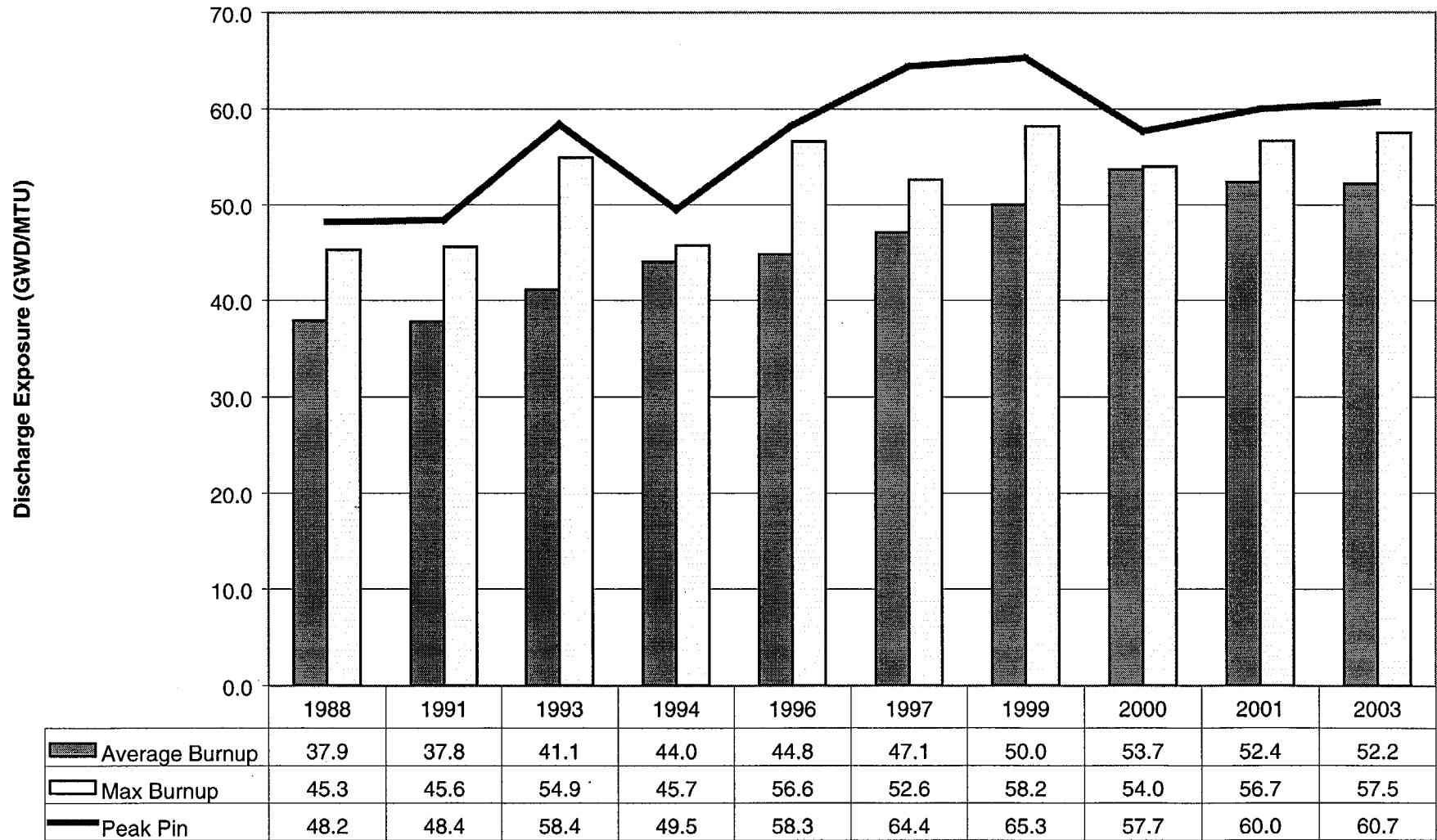
Perry
Summary of Average, Maximum and Peak Pin Exposures



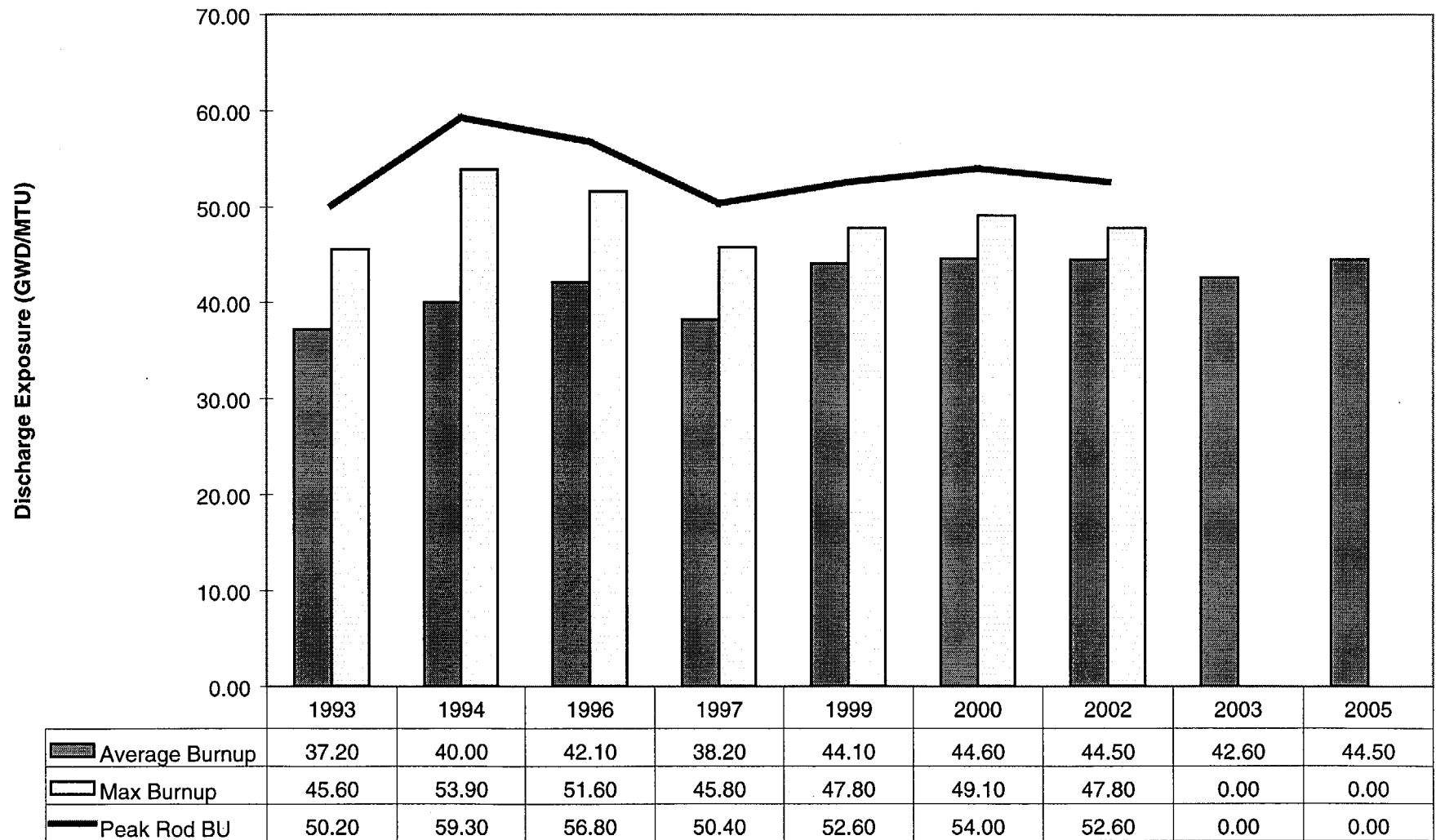
Three Mile Island **Summary of Average, Maximum and Peak Pin Exposures**



V.C. Summer
Summary of Average, Maximum and Peak Rod Exposures



Wolf Creek **Summary of Average, Maximum and Peak Pin Exposures**



Calvert Cliffs Units 1 and 2 Summary of Spent Fuel Discharge Data

| Discharge Year | Average Burnup (GWD/MTU) | Max Burnup (GWD/MTU) | Peak Rod Burnup (GWD/MTU) | # Assemblies | # Assemblies >45 GWD/MTU | Enrichment Range | Cladding Material | Fuel Design | % Uncertainty BU> 45 |
|----------------|--------------------------|----------------------|---------------------------|--------------|--------------------------|------------------|-------------------|-----------------------|----------------------|
| 1986 | 39.9 | 50.4 | 56.3 | 76 | 1 | 3.03 - 3.24 | Zircoloy-4 | ABB/CE 14X14 STD | 3-4 |
| 1988 | 38.7 | 57.2 | 63.0 | 93 | 5 | 3.03 - 4.05 | Zircoloy-4 | ABB/CE 14X14 STD | 3-4 |
| 1989 | 41.3 | 46.1 | 46.4 | 72 | 16 | 3.40 - 4.05 | Zircoloy-4 | ABB/CE 14X14 STD | 3-5 |
| 1992 | 40.5 | 46.3 | 47.9 | 78 | 16 | 3.40 - 4.05 | Zircoloy-4 | ABB/CE 14X14 STD | 3-6 |
| 1993 | 41.6 | 47.4 | 49.5 | 90 | 12 | 4.05 - 4.08 | Zircoloy-4 | ABB/CE 14X14 STD | 3-7 |
| 1994 | 44.0 | 50.6 | 50.9 | 80 | 48 | 3.40 - 4.08 | Zircoloy-4 | ABB/CE 14X14 STD | 3-8 |
| 1995 | 44.2 | 49.3 | 49.7 | 97 | 52 | 3.40 - 4.28 | Zircoloy-4 | ABB/CE 14X14 STD | 3-9 |
| 1996 | 46.3 | 51.4 | 52.1 | 81 | 65 | 3.89 - 4.18 | Zircoloy-4 | ABB/CE 14X14 STD | |
| 1997 | 45.8 | 50.2 | 50.2 | 101 | 61 | 3.99 - 4.28 | Zircoloy-4 | ABB/CE 14X14 GUARDIAN | |
| 1998 | 47.0 | 49.2 | 50.7 | 93 | 85 | 4.18 - 4.28 | Zircoloy-4 | ABB/CE 14X14 GUARDIAN | |
| 1999 | 47.9 | 51.3 | 51.4 | 101 | 76 | 3.40 - 4.47 | Zircoloy-4 | ABB/CE 14X14 GUARDIAN | |
| 2000 | 46.5 | 48.6 | 49.0 | 101 | 67 | 4.03 - 4.47 | Zircoloy-4 | ABB/CE 14X14 GUARDIAN | |

1,330 assemblies in wet storage

792 assemblies in dry storage

Davis Besse Summary of Spent Fuel Discharge Data

| Discharge Year | Average Burnup (GWD/MTU) | Max Burnup (GWD/MTU) | Peak Rod Burnup (GWD/MTU) | # Assemblies | # Assemblies >45 GWD/MTU | Enrichment Range | Cladding Material | Fuel Design | % Uncertainty BU> 45 |
|-------------------|--------------------------------|----------------------------|---------------------------------|-----------------|--------------------------------|---------------------|----------------------|---------------------|-------------------------|
| 1996 | 42.5 | 49.9 | 53.6 | 77 | 5 | 3.381 - 3.768 | Zircaloy 4 | B&W MarkB8 | 2% |
| 1998 | 46.6 | 54.3 | 56.6 | 77 | 41 | 3.381 - 4.054 | Zircaloy 4 | B&W MarkB8, MarkB10 | 2% |
| 2000 | 48.4 | 53.2 | 55.7 | 79 | 49 | 3.381 - 4.46 | Zircaloy 4 | B&W MarkB10 | 2% |
| 2004 | 50.1 | 52.2 | 54.9 | 73 | 73 | 3.381 - 4.47 | M5 | B&W MarkB10 | 5% |
| 2006 | 50.9 | 53.8 | 56.7 | 73 | 73 | 3.381 - 4.88 | NO | B&W MarkB10 | 5% |

673 assemblies in wet storage
72 assemblies in dry storage

Maine Yankee Summary of Spent Fuel Discharge Data

| Discharge Year | Average Burnup (GWD/MTU) | Max Burnup (GWD/MTU) | Peak Rod Burnup (GWD/MTU) | # Assemblies | # Assemblies >45 GWD/MTU | Enrichment Range | Cladding Material | Fuel Design | % Uncertainty BU> 45 |
|-------------------|--------------------------------|----------------------------|---------------------------------|-----------------|--------------------------------|---------------------|----------------------|-------------|-------------------------|
| 1990 | 40.16 | 46.05 | 50.18 | 73 | 9 | 3.3% | Zirc-4 | CE 14X14 | 3.03% |
| 1992 | 42.08 | 47.08 | 50.69 | 61 | 21 | 3.5% | Zirc-4 | CE 14X14 | 3.03% |
| | | | | | | | Zirc-4/Low Sn | | |
| 1993 | 43.90 | 49.24 | 53.18 | 77 | 32 | 3.7% | Zirc-4 | CE 14X14 | 3.03% |
| 1995 | 41.91 | 48.34 | 52.32 | 81 | 28 | 3.7% | Low Sn Zirc-4 | CE 14X14 | 3.03% |

1434 assemblies in wet storage
Dry storage planned -- 2001

Millstone 2 Summary of Spent Fuel Discharge Data

| Discharge Year | Average Burnup (GWD/MTU) | Max Burnup (GWD/MTU) | Peak Rod Burnup (GWD/MTU) | # Assemblies | # Assemblies >45 GWD/MTU | Enrichment Range | Cladding Material | Fuel Design | % Uncertainty BU> 45 |
|----------------|--------------------------|----------------------|---------------------------|--------------|--------------------------|------------------|-------------------|---------------|----------------------|
| | 43.17 | 50.71 | | 72 | 32 | 3.82-3.94 | Zirc-4 | Siemens 14x14 | 6% |
| | 42.63 | 49.57 | | 72 | 16 | 3.73-3.87 | Zirc-4 (no) | Siemens 14x14 | 6% |
| | 48.15 | 55.15 | | 84 | 68 | 4.30-4.49 | Zirc-4 (no) | Siemens 14x14 | 6% |
| | 48.15 | 55.15 | | 72 | 68 | 3.98-4.11 | Zirc-4 (no) | Siemens 14x14 | 6% |

940 assemblies in wet storage

Dry storage date unknown

Millstone 3 Summary of Spent Fuel Discharge Data

| Discharge Year | Average Burnup (GWD/MTU) | Max Burnup (GWD/MTU) | Peak Rod Burnup (GWD/MTU) | # Assemblies | # Assemblies >45 GWD/MTU | Enrichment Range | Cladding Material | Fuel Design | % Uncertainty BU> 45 |
|----------------|--------------------------|----------------------|---------------------------|--------------|--------------------------|------------------|-------------------|-------------|----------------------|
| 1991 | 39.4 | 50.5 | | 84 | 14 | 3.5-3.8 w/o | ZIRC-4 | W17x17 STD | 4% |
| 1993 | 43.3 | 54.8 | | 76 | 9 | 4.1-4.5 w/o | ZIRC-4 | W17x17 STD | 4% |
| 1995 | 43.0 | 47.2 | | 88 | 38 | 4.2-4.5 w/o | ZIRC-4 | W17x17 STD | 4% |
| 1999 | 43.9 | 47.8 | | 84 | 40 | 4.4 w/o | ZIRLO | W17x17 V5H | 4% |
| 2001 | 49.3 | 52.7 | | 84 | 64 | 4.6 w/o | ZIRLO | W17x17 V5H | 4% |
| 2003 | 50.0 | 53.0 | | 81 | 81 | 4.8 w/o | ZIRLO | W17x17 RFA | 4% |
| 2005 | 50.0 | 53.0 | | 76 | 76 | 4.4 - 4.8 w/o | ZIRLO | W17x17 RFA | 4% |

497 assemblies in wet storage

Dry storage date unknown

Peach Bottom Summary of Spent Fuel Discharge Data

| Discharge Year | Average Burnup (GWD/MTU) | Max Burnup (GWD/MTU) | Peak Rod Burnup (GWD/MTU) | # Assemblies | # Assemblies >45 GWD/MTU | Enrichment Range | Cladding Material | Fuel Design | % Uncertainty BU> 45 |
|-------------------|--------------------------------|----------------------------|---------------------------------|-----------------|--------------------------------|---------------------|----------------------|-------------|-------------------------|
| 1976 | 188 | | | | | | | | |
| 1977 | 172 | | | | | | | | |
| 1978 | 260 | | | | | | | | |
| 1980 | 276 | | | | | | | | |
| 1982 | 276 | | | | | | | | |
| 1984 | 292 | | | | | | | | |
| 1987 | 272 | | | | | | | | |
| 1991 | 160 | | | | | | | | |
| 1994 | 268 | | | | | | | | |
| 1996 | 272 | | | | | | | | |

3032 assemblies in wet storage

272 assemblies in dry storage

Perry Summary of Spent Fuel Discharge Data

| Discharge Year | Average Burnup (GWD/MTU) | Max Burnup (GWD/MTU) | Peak Rod Burnup (GWD/MTU) | # Assemblies | # Assemblies >45 GWD/MTU | Enrichment Range | Cladding Material | Fuel Design | % Uncertainty BU> 45 |
|----------------|--------------------------|----------------------|---------------------------|--------------|--------------------------|------------------|--------------------------|-------------|----------------------|
| 2001 | 39.5 | 48.2 | 48.2 | 304 | 31 | 2.0-4.6 | zirconium with zirconium | GE11 | <10% |
| 2003 | 43.5 | 55.8 | 55.8 | 308 | 57 | 2.0-4.9 | zirconium with zirconium | GE12 | <10% |
| 2005 | 46.8 | 55.2 | 55.2 | 308 | 266 | 2.0-4.9 | zirconium with zirconium | GE12 & GE14 | <10% |
| 2007 | 46.2 | 51.7 | 51.7 | 308 | 266 | 2.0-4.9 | zirconium | GE14 | <10% |

1785 assemblies in wet storage
Dry storage planned -- 2009

Rancho Seco Summary of Spent Fuel Discharge Data

| Discharge Year | Average Burnup (GWD/MTU) | Max Burnup (GWD/MTU) | Peak Rod Burnup (GWD/MTU) | # Assemblies | # Assemblies >45 GWD/MTU | Enrichment Range | Cladding Material | Fuel Design | % Uncertainty BU> 45 |
|-------------------|--------------------------------|----------------------------|---------------------------------|-----------------|--------------------------------|---------------------|----------------------|-------------|-------------------------|
| na | <45 | <45 | <45 | | 0 | na | na | na | na |
| na | <45 | <45 | <45 | | 0 | na | na | na | na |
| na | <45 | <45 | <45 | | 0 | na | na | na | na |
| na | <45 | <45 | <45 | | 0 | na | na | na | na |
| na | <45 | <45 | <45 | | 0 | na | na | na | na |
| na | <45 | <45 | <45 | | 0 | na | na | na | na |
| na | <45 | <45 | <45 | | 0 | na | na | na | na |
| na | <45 | <45 | <45 | | 0 | na | na | na | na |
| na | <45 | <45 | <45 | | 0 | na | na | na | na |
| na | <45 | <45 | <45 | | 0 | na | na | na | na |
| na | <45 | <45 | <45 | | 0 | na | na | na | na |
| na | <45 | <45 | <45 | | 0 | na | na | na | na |
| na | <45 | <45 | <45 | | 0 | na | na | na | na |
| na | <45 | <45 | <45 | | 0 | na | na | na | na |

Assemblies 493

Shutdown plant, Dry storage planned 2001

Three Mile Island Summary of Spent Fuel Discharge Data

| Discharge Year | Average Burnup (GWD/MTU) | Max Burnup (GWD/MTU) | Peak Rod Burnup (GWD/MTU) | # Assemblies | # Assemblies >45 GWD/MTU | Enrichment Range | Cladding Material | Fuel Design | % Uncertainty BU> 45 |
|-------------------|--------------------------------|----------------------------|---------------------------------|-----------------|--------------------------------|---------------------|----------------------|-------------|-------------------------|
| 1993 | 49.00 | 49 | 51 | 80 | 21 | 3.63-4.75 | zr-4 | FCF 15x15 | 5 |
| 1995 | 52.00 | 53 | 57 | 80 | 49 | 3.63-4.75 | zr-4 | FCF 15x15 | 5 |
| 1997 | 51.00 | 54 | 59 | 72 | 72 | 3.63-4.55 | zr-4 | FCF 15x15 | 5 |
| 1999 | 52.00 | 57 | 61 | 76 | 72 | 4.0-4.75 | zr-4 | FCF 15x15 | 5 |
| 2001 | 52.00 | 56 | 66 | 72 | 72 | 4.0-4.95 | M5 | FCF 15x15 | 5 |
| 2003 | 52.00 | 56 | 62 | 68 | 68 | 4.0-4.95 | M5 | FCF 15x15 | 5 |
| 2005 | 52.00 | 56 | 62 | 68 | 68 | 4.0-4.95 | M5 | FCF 15x15 | 5 |

1004 assemblies in wet storage

V.C. Summer Summary of Spent Fuel Discharge Data

| Discharge Year | Average Burnup (GWD/MTU) | Max Burnup (GWD/MTU) | Peak Rod Burnup (GWD/MTU) | # Assemblies | # Assemblies >45 GWD/MTU | Enrichment Range | Cladding Material | Fuel Design | % Uncertainty BU> 45 |
|-------------------|--------------------------------|----------------------------|---------------------------------|-----------------|--------------------------------|---------------------|----------------------|-------------|-------------------------|
| 1988 | 37.9 | 45.3 | 48.2 | 61 | 4 | 3.6 | Zirc-4 | W 17x17 V5 | 5 |
| 1991 | 37.8 | 45.6 | 48.4 | 72 | 4 | 3.8-4.2 | Zirc-4 | W 17x17 V5 | 5 |
| 1993 | 41.1 | 54.9 | 58.4 | 68 | 24 | 3.8-4.2 | ZIRLO | W 17x17 V+ | 5 |
| 1994 | 44.0 | 45.7 | 49.5 | 64 | 25 | 3.8-4.2 | ZIRLO | W 17x17 V+ | 5 |
| 1996 | 44.8 | 56.6 | 58.3 | 68 | 34 | 4.6 | ZIRLO | W 17x17 V+ | 5 |
| 1997 | 47.1 | 52.6 | 64.4 | 64 | 56 | 4.6 | ZIRLO | W 17x17 V+ | 5 |
| 1999 | 50.0 | 58.2 | 65.3 | 65 | 64 | 4.95 | ZIRLO | W 17x17 P+ | 5 |
| 2000 | 53.7 | 54.0 | 57.7 | 68 | 68 | 4.85 | ZIRLO | W 17x17 P+ | 5 |
| 2001 | 52.4 | 56.7 | 60.0 | 68 | 68 | 4.85 | no | W 17x17 P+ | 5 |
| 2003 | 52.2 | 57.5 | 60.7 | 68 | 68 | 4.95 | no | W 17x17 P+ | 5 |

769 assemblies in wet storage

Wolf Creek Summary of Spent Fuel Discharge Data

| Discharge Year | Average Burnup (GWD/MTU) | Max Burnup (GWD/MTU) | Peak Rod Burnup (GWD/MTU) | # Assemblies | # Assemblies >45 GWD/MTU | Enrichment Range | Cladding Material | Fuel Design | % Uncertainty BU> 45 |
|----------------|--------------------------|----------------------|---------------------------|--------------|--------------------------|------------------|-------------------|------------------|----------------------|
| 1993 | 37.20 | 45.60 | 50.20 | 68 | 4 | 3.4-4.1 | Zr-4 | W17STD | 3-4 |
| 1994 | 40.00 | 53.90 | 59.30 | 80 | 13 | 3.4-4.2 | Zr-4 | W17STD | 3-4 |
| 1996 | 42.10 | 51.60 | 56.80 | 113 | 17 | 3.8-4.2 | Zr-4 | W17V5H | 3-5 |
| 1997 | 38.20 | 45.80 | 50.40 | 89 | 29 | 4.0-4.4 | Zr-4 | W17V5H | 3-6 |
| 1999 | 44.10 | 47.80 | 52.60 | 85 | 47 | 4.0-4.4 | Zr-4 | W17V5H | 3-7 |
| 2000 | 44.60 | 49.10 | 54.00 | 89 | 60 | 4.0-4.4 | Zr-4, ZIRLO | W17V5H, W17V5HP+ | 3-8 |
| 2002 | 44.50 | 47.80 | 52.60 | 92 | 56 | 4.0-4.4 | ZIRLO | W17V5HP+ | 3-9 |
| 2003 | 42.60 | Not Available | Not Available | 89 | Not Available | 4.0-4.4 | ZIRLO | W17V5HP+ | |
| 2005 | 44.50 | Not Available | Not Available | 88 | Not Available | 4.0-4.4 | ZIRLO | W17V5HP+ | |

837 assemblies in wet storage