



INFORMATION SYSTEM ON OCCUPATIONAL EXPOSURE

General Distribution

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ISOE Information Sheet

**North American Technical Center
Information System on Occupational Exposure**

**North American Pressurized Water Reactor (PWR)
2009 Occupational Dose Benchmarking Charts**

NATC ISOE Information Sheet No. 09-4

NATC ISOE Information Sheet No. 09-4 presents the North American Pressurized Water Reactor (PWR) occupational exposure results for FY 2009. Exposure categories per unit include refueling outage duration and dose, normal operations dose, and total dose.

The 2009 PWR charts are arranged in the following format:

Table 1a-d: Outage Duration Quartiles

Table 2a-d : Outage Dose Quartiles

Table 3a-d : Normal Operation Dose Quartiles

Table 4a-d : Total Dose Quartiles

Table 5: 2009 PWR Occupation Dose Data

For reference, selected data for 2009 PWR collective dose per reactor unit is provided in the table below:

| Country | Collective Dose per Reactor (man.Sv) |
|-------------------|---|
| United States | 0.69 |
| France | 0.69 |
| Republic of Korea | 0.47 |

Table 1a: 2009 PWR Outage Duration - Top Quartile

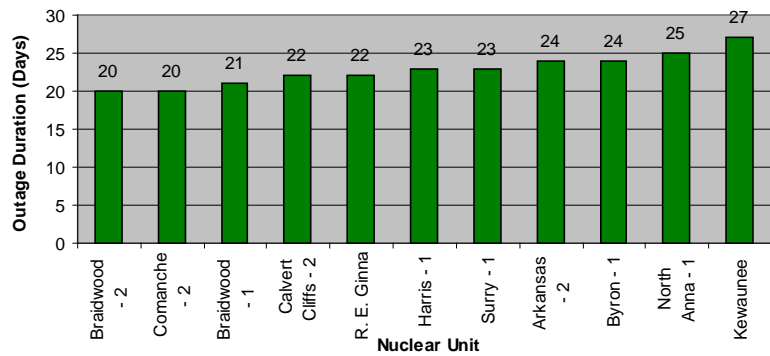


Table 1c: 2009 PWR Outage Duration - Third Quartile

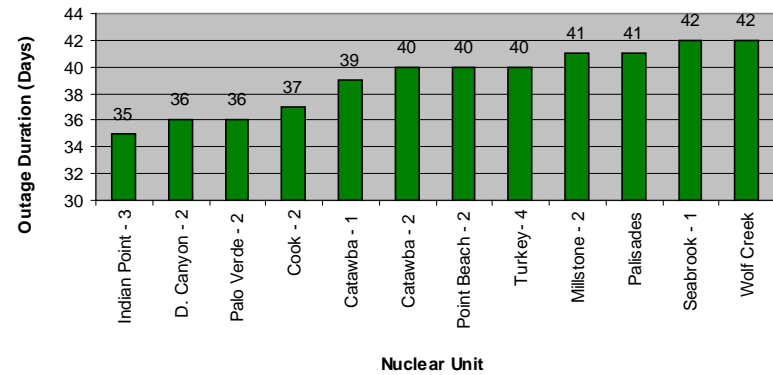


Table 1b: 2009 PWR Outage Duration - Second Quartile

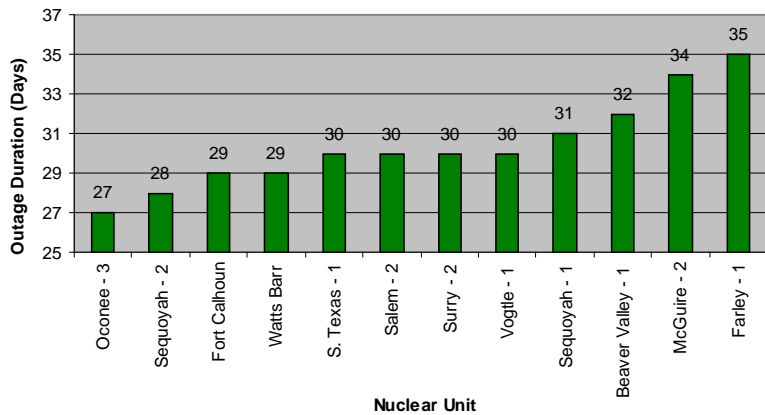
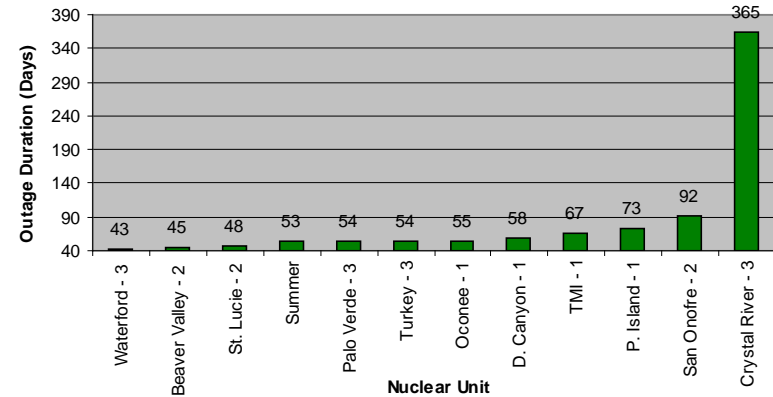
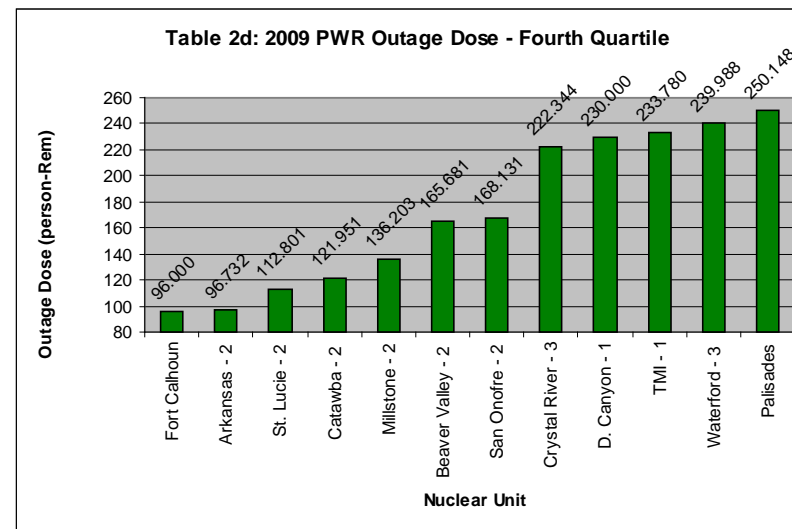
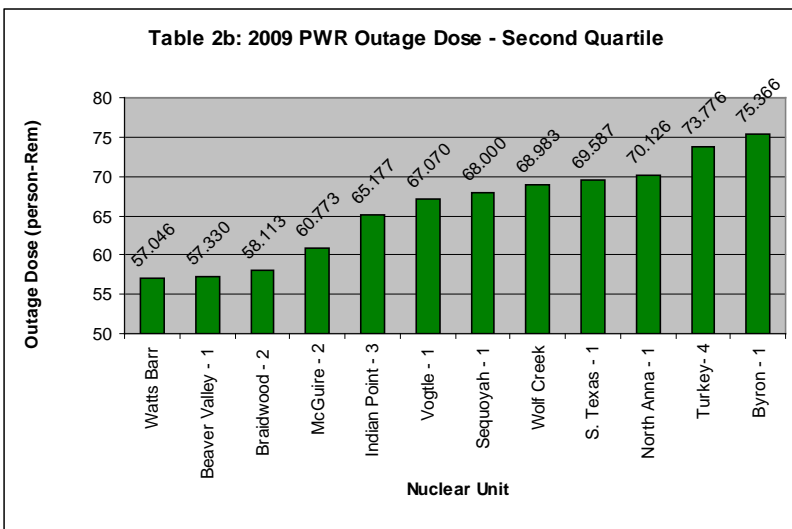
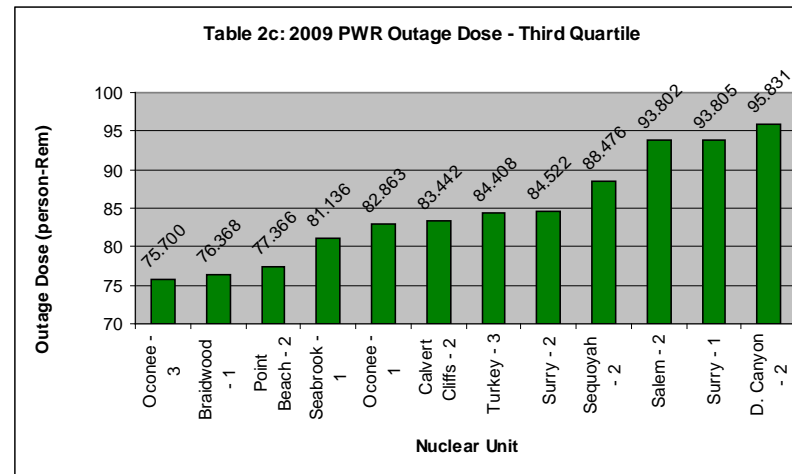
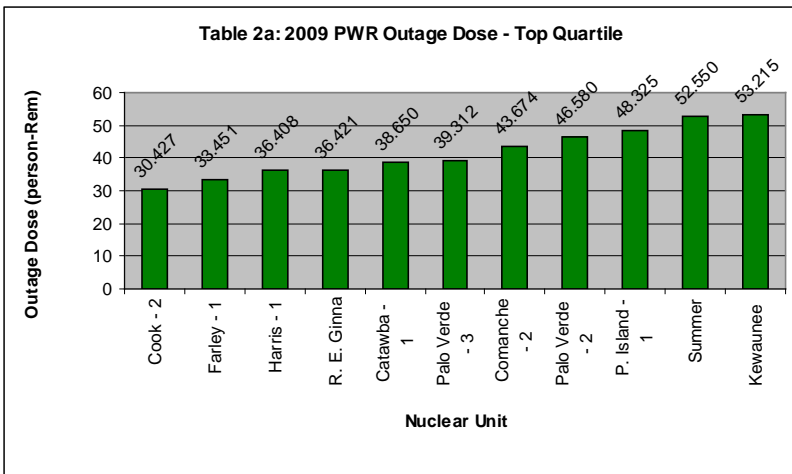


Table 1d: 2009 PWR Outage Duration - Fourth Quartile





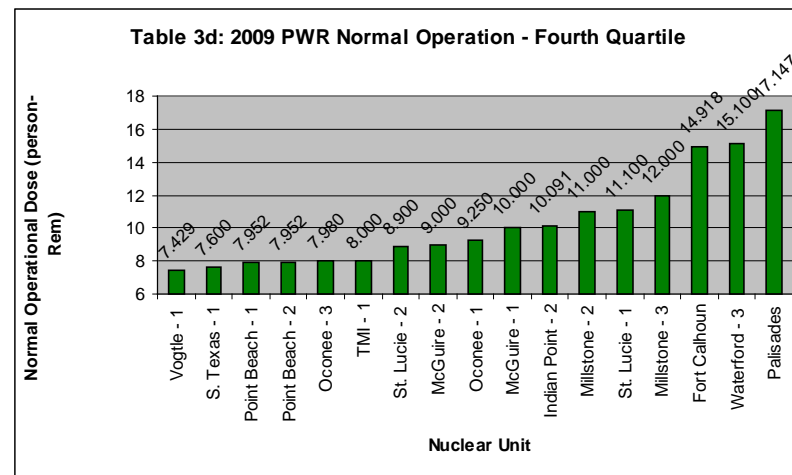
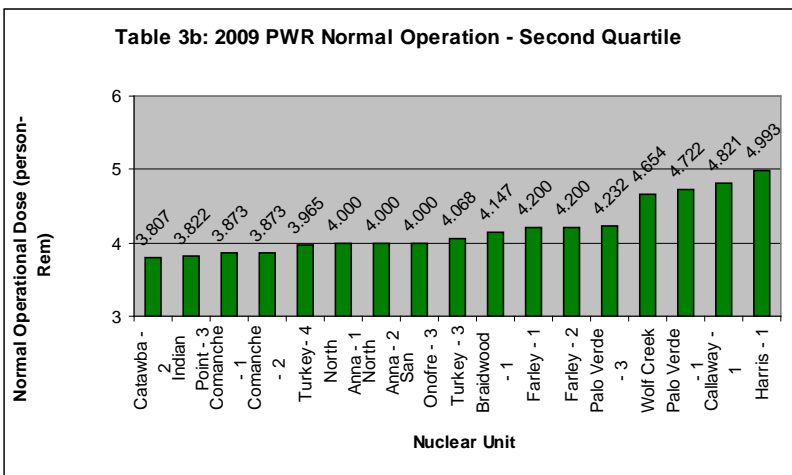
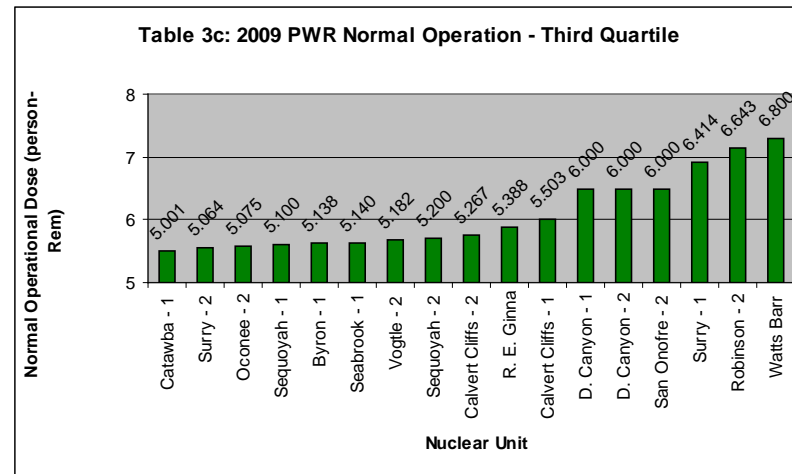
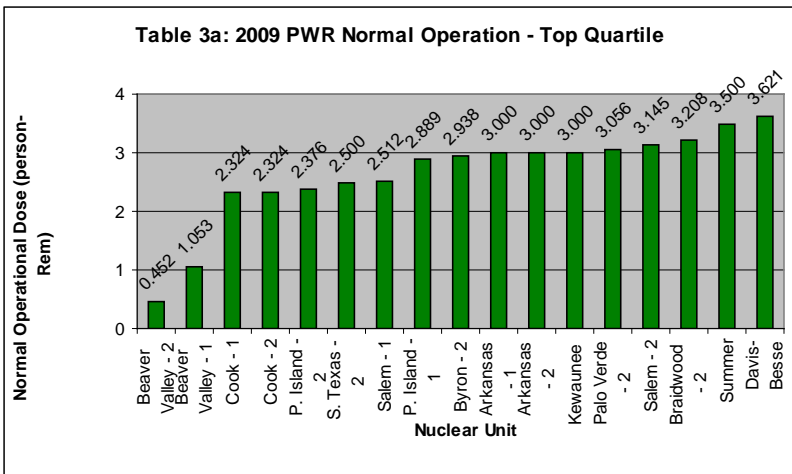


Table 4a: 2009 PWR Total Dose - Second Quartile

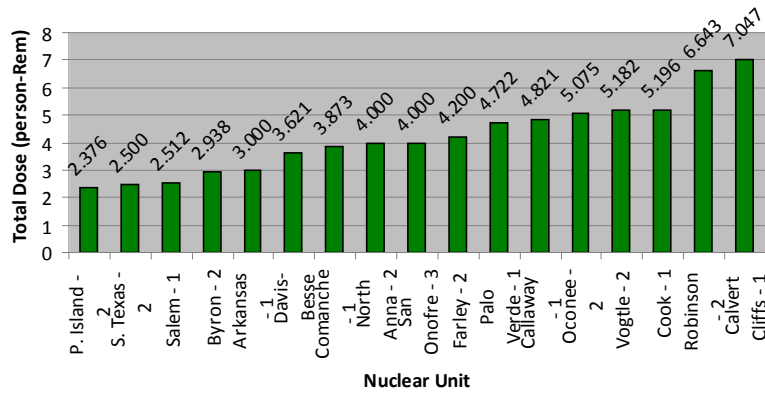


Table 4c: 2009 PWR Total Dose - Second Quartile

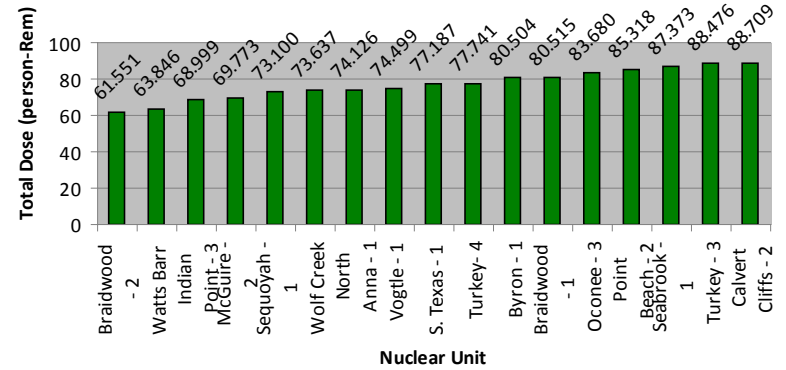


Table 4b: 2009 PWR Total Dose - Second Quartile

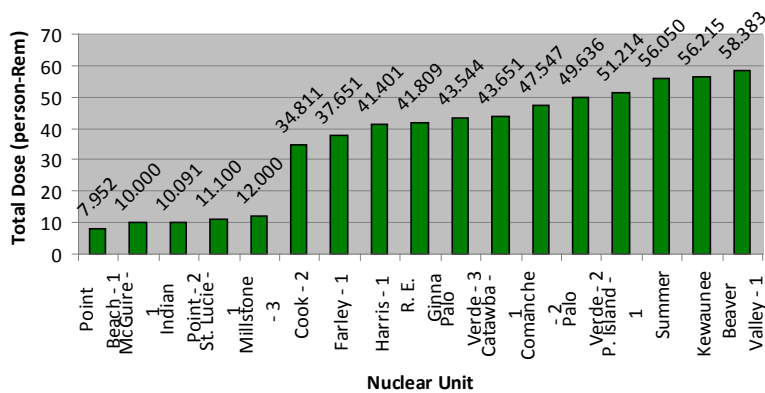


Table 4d: 2009 PWR Total Dose - Second Quartile

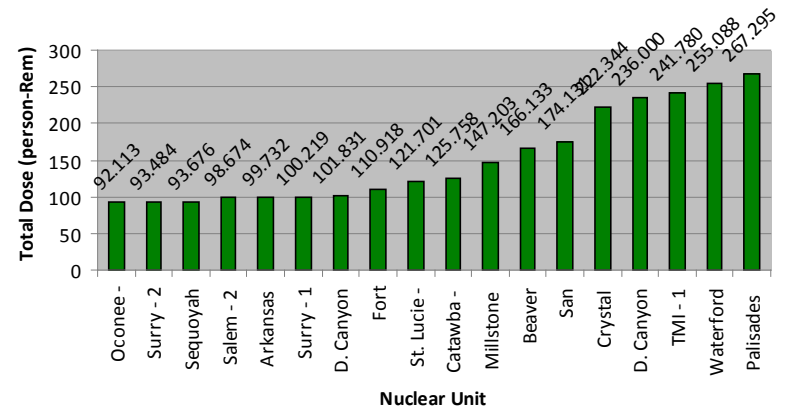


Table 5: 2009 PWR Occupation Dose Data

| Nuclear Unit | Outage Start Date | Outage End Date | Outage Duration (Days) | Outage Dose | Normal Operation | Other Shutdowns | Total Unit Dose | Total Site Dose | TLD Values |
|--------------------|-------------------|-----------------|------------------------|-------------|------------------|-----------------|-----------------|-----------------|------------|
| Arkansas - 1 | | | | | 3.000 | | 3.000 | | |
| Arkansas - 2 | 9/1/2009 | 9/25/2009 | 24 | 96.732 | 3.000 | | 99.732 | 102.732 | 102.732 |
| Beaver Valley - 1 | 4/20/2009 | 5/21/2009 | 32 | 57.330 | 1.053 | | 58.383 | | |
| Beaver Valley - 2 | 10/12/2009 | 11/26/2009 | 45 | 165.681 | 0.452 | | 166.133 | 224.516 | 224.516 |
| Braidwood - 1 | 3/29/2009 | 4/19/2009 | 21 | 76.368 | 4.147 | | 80.515 | | |
| Braidwood - 2 | 10/2/2009 | 10/21/2009 | 20 | 58.113 | 3.208 | 0.230 | 61.551 | 142.066 | 142.066 |
| Byron - 1 | 9/13/2009 | 10/8/2009 | 24 | 75.366 | 5.138 | | 80.504 | | |
| Byron - 2 | | | | | 2.938 | | 2.938 | 83.442 | 83.442 |
| Callaway - 1 | | | | | 4.821 | | 4.821 | 4.821 | 4.821 |
| Calvert Cliffs - 1 | | | | | 5.503 | 1.544 | 7.047 | | |
| Calvert Cliffs - 2 | 2/22/2009 | 3/15/2009 | 22 | 83.442 | 5.267 | | 88.709 | 95.756 | 95.756 |
| Catawba - 1 | 11/6/2009 | 12/15/2009 | 39 | 35.421 | 5.626 | | 41.047 | | |
| Catawba - 2 | 3/7/2009 | 4/18/2009 | 42 | 124.411 | 3.951 | | 128.362 | 169.409 | 169.409 |
| Comanche - 1 | | | | | 3.873 | | 3.873 | | |
| Comanche - 2 | 10/7/2009 | 11/1/2009 | 20 | 43.674 | 3.873 | | 47.547 | 51.420 | 51.420 |
| Cook - 1 | | | | | 2.324 | 2.872 | 5.196 | | |
| Cook - 2 | 3/25/2009 | 5/1/2009 | 37 | 30.427 | 2.324 | 2.060 | 34.811 | 40.007 | 40.007 |
| Crystal River - 3 | 1/1/2009 | 12/31/2009 | 365 | 222.344 | | | 222.344 | 222.344 | 222.344 |
| D. Canyon - 1 | 1/26/2009 | 3/23/2009 | 58 | 230.000 | 6.000 | | 236.000 | | |
| D. Canyon - 2 | 10/4/2009 | 11/10/2009 | 36 | 95.831 | 6.000 | | 101.831 | 337.831 | 337.831 |
| Davis-Besse | | | | | 3.621 | | 3.621 | 3.621 | 3.621 |
| Farley - 1 | 4/2/2009 | 5/7/2009 | 35 | 33.451 | 4.200 | | 37.651 | | |
| Farley - 2 | | | | | 4.200 | | 4.200 | 41.851 | 41.851 |
| Fort Calhoun | 11/1/2009 | 11/30/2009 | 29 | 96.000 | 14.918 | | 110.918 | 110.918 | 110.918 |

| Nuclear Unit | Outage Start Date | Outage End Date | Outage Duration (Days) | Outage Dose | Normal Operation | Other Shutdowns | Total Unit Dose | Total Site Dose | TLD Values |
|------------------|-------------------|-----------------|------------------------|-------------|------------------|-----------------|-----------------|-----------------|------------|
| Harris - 1 | 4/18/2009 | 5/10/2009 | 23 | 36.408 | 4.993 | | 41.401 | 41.401 | 41.401 |
| Indian Point - 2 | | | | | 10.091 | | 10.091 | 10.091 | 10.091 |
| Indian Point - 3 | 3/11/2009 | 4/15/2009 | 35 | 65.177 | 3.822 | | 68.999 | 68.999 | 68.999 |
| Kewaunee | 9/26/2009 | 10/22/2009 | 27 | 53.215 | 3.000 | | 56.215 | 56.215 | 56.215 |
| McGuire - 1 | | | | | 10.342 | | 10.342 | | |
| McGuire - 2 | 9/5/2009 | 10/10/2009 | 35 | 59.202 | 10.229 | | 69.431 | 79.773 | 79.773 |
| Millstone - 2 | 10/7/2009 | 11/17/2009 | 41 | 136.203 | 11.000 | | 147.203 | | |
| Millstone - 3 | | | | | 12.000 | | 12.000 | 159.203 | 159.203 |
| North Anna - 1 | 3/8/2009 | 4/2/2009 | 25 | 70.126 | 4.000 | | 74.126 | | |
| North Anna - 2 | | | | | 4.000 | | 4.000 | 78.126 | 78.126 |
| Oconee - 1 | 10/1/2009 | 11/24/2009 | 55 | 80.716 | 11.008 | | 91.724 | | |
| Oconee - 2 | | | | | 5.404 | | 5.404 | | |
| Oconee - 3 | 4/24/2009 | 5/21/2009 | 27 | 74.149 | 9.591 | | 83.740 | 180.868 | 180.868 |
| P. Island - 1 | 9/12/2009 | 11/23/2009 | 73 | 48.325 | 2.889 | | 51.214 | | |
| P. Island - 2 | | | | | 2.376 | | 2.376 | 53.590 | 53.590 |
| Palisades | 3/22/2009 | 5/2/2009 | 41 | 250.148 | 17.147 | | 267.295 | 267.295 | 267.295 |
| Palo Verde - 1 | | | | | 4.722 | | 4.722 | | |
| Palo Verde - 2 | 10/3/2009 | 11/8/2009 | 36 | 46.580 | 3.056 | | 49.636 | | |
| Palo Verde - 3 | 4/3/2009 | 5/27/2009 | 54 | 39.312 | 4.232 | | 43.544 | 97.902 | 97.902 |
| Point Beach - 1 | | | | | 7.952 | | 7.952 | | |
| Point Beach - 2 | 10/15/2009 | 11/25/2009 | 40 | 77.366 | 7.952 | | 85.318 | 93.270 | 93.270 |
| R. E. Ginna | 9/14/2009 | 10/2/2009 | 22 | 36.421 | 5.388 | | 41.809 | 41.809 | 41.809 |
| Robinson - 2 | | | | | 6.643 | | 6.643 | 6.643 | 6.643 |
| S. Texas - 1 | 9/30/2009 | 10/30/2009 | 30 | 69.587 | 7.600 | | 77.187 | | |
| S. Texas - 2 | | | | | 2.500 | | 2.500 | 79.687 | 79.687 |

| Nuclear Unit | Outage Start Date | Outage End Date | Outage Duration (Days) | Outage Dose | Normal Operation | Other Shutdowns | Total Unit Dose | Total Site Dose | TLD Values |
|----------------|-------------------|-----------------|------------------------|-------------|------------------|-----------------|-----------------|-----------------|------------|
| Salem - 1 | | | | | 2.512 | | 2.512 | | |
| Salem - 2 | 10/13/2009 | 11/12/2009 | 30 | 93.802 | 3.145 | 1.727 | 98.674 | 101.186 | 101.186 |
| San Onofre - 2 | 10/19/2009 | 1/19/2010 | 92 | 168.131 | 6.000 | | 174.131 | | |
| San Onofre - 3 | | | | | 4.000 | | 4.000 | 178.131 | 178.131 |
| Seabrook - 1 | 10/1/2009 | 11/11/2009 | 42 | 81.136 | 5.140 | 1.097 | 87.373 | 87.373 | 87.373 |
| Sequoyah - 1 | 3/27/2009 | 4/27/2009 | 31 | 68.000 | 5.100 | | 73.100 | | |
| Sequoyah - 2 | 10/26/2009 | 11/24/2009 | 28 | 88.476 | 5.200 | | 93.676 | 166.776 | 166.776 |
| St. Lucie - 1 | | | | | 11.100 | | 11.100 | | |
| St. Lucie - 2 | 4/26/2009 | 6/13/2009 | 48 | 112.801 | 8.900 | | 121.701 | 132.801 | 132.801 |
| Summer | 10/17/2009 | 12/9/2009 | 53 | 52.550 | 3.500 | | 56.050 | 56.050 | 56.050 |
| Surry - 1 | 4/19/2009 | 5/11/2009 | 23 | 93.805 | 6.414 | | 100.219 | | |
| Surry - 2 | 11/1/2009 | 11/29/2009 | 30 | 84.522 | 5.064 | 3.898 | 93.484 | 193.703 | 193.703 |
| TMI - 1 | 10/26/2009 | 12/31/2009 | 67 | 233.780 | 8.000 | | 241.780 | 241.780 | 241.780 |
| Turkey - 3 | 3/16/2009 | 5/9/2009 | 54 | 84.408 | 4.068 | | 88.476 | | |
| Turkey- 4 | 10/26/2009 | 12/5/2009 | 40 | 73.776 | 3.965 | | 77.741 | 166.217 | 166.217 |
| Vogtle - 1 | 9/20/2009 | 10/20/2009 | 30 | 67.070 | 7.429 | | 74.499 | | |
| Vogtle - 2 | | | | | 5.182 | | 5.182 | 79.681 | 79.681 |
| Waterford - 3 | 10/20/2009 | 12/2/2009 | 43 | 239.988 | 15.100 | | 255.088 | 255.088 | 255.088 |
| Watts Barr | 9/21/2009 | 10/20/2009 | 29 | 57.046 | 6.800 | | 63.846 | 63.846 | 63.846 |
| Wolf Creek | 10/10/2009 | 11/21/2009 | 42 | 68.983 | 4.654 | | 73.637 | 73.637 | 73.637 |