

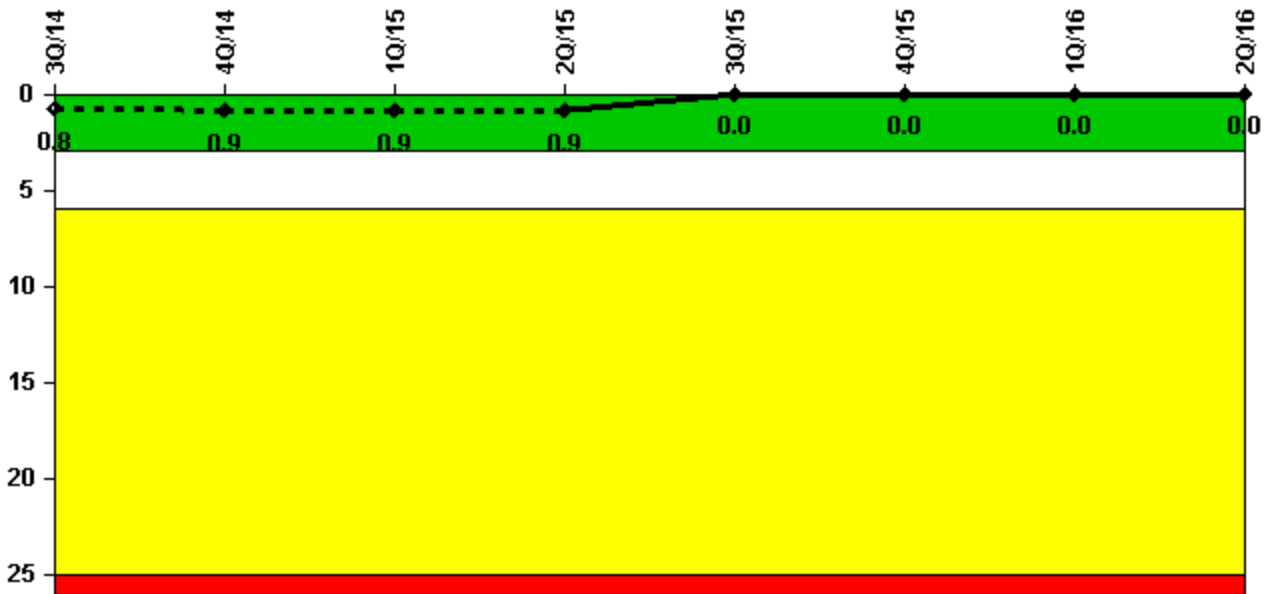
# Browns Ferry 1

## 2Q/2016 Performance Indicators

The solid trend line represents the current reporting period.

Licensee's General Comments: none

### Unplanned Scrams per 7000 Critical Hrs



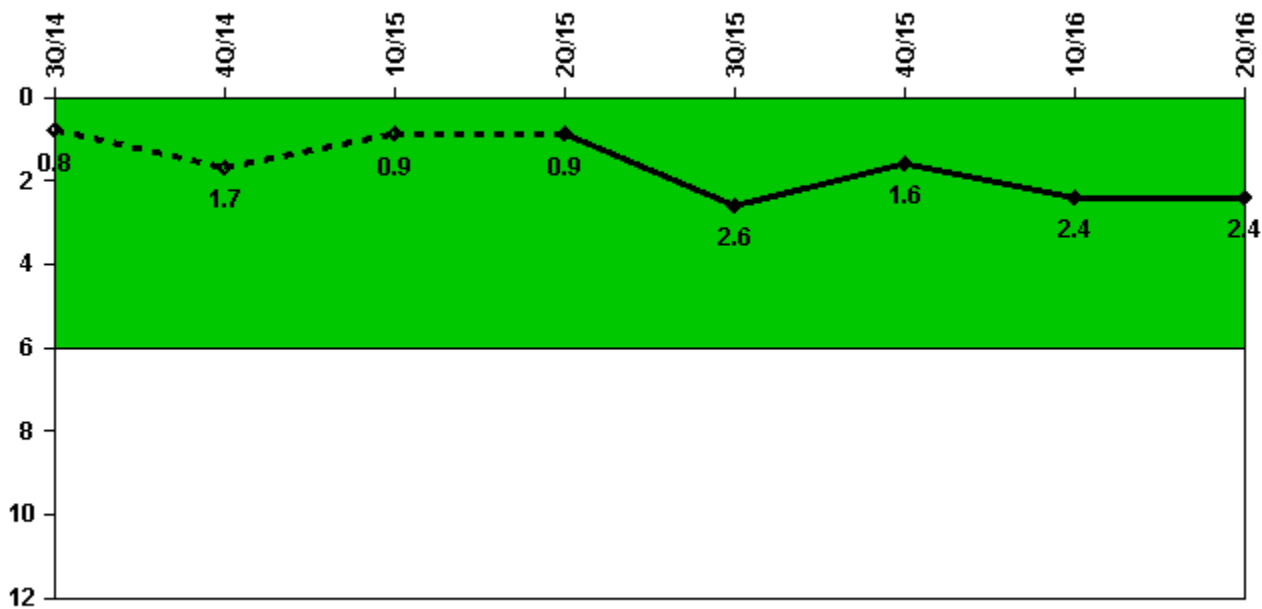
Thresholds: White > 3.0 Yellow > 6.0 Red > 25.0

### Notes

Unplanned Scrams per 7000 Critical Hrs	3Q/14	4Q/14	1Q/15	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16
Unplanned scrams	1.0	0	0	0	0	0	0	0
Critical hours	2118.6	1600.0	2159.0	2121.7	2208.0	2111.7	2183.0	2184.0
Indicator value	0.8	0.9	0.9	0.9	0	0	0	0

Licensee Comments: none

### Unplanned Power Changes per 7000 Critical Hrs



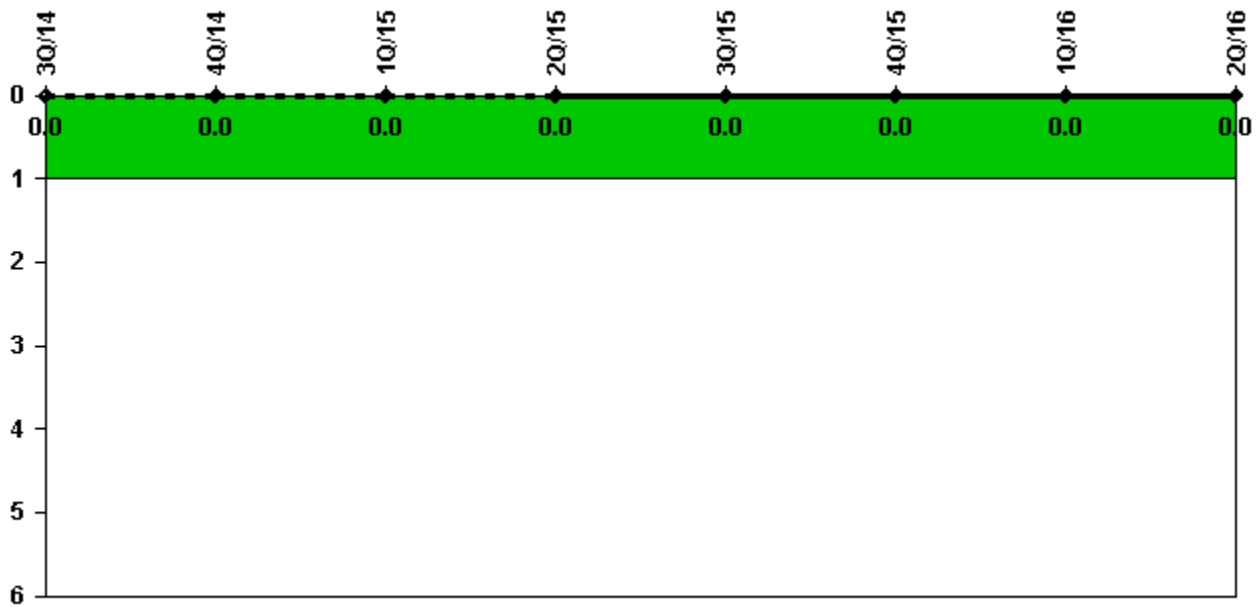
Thresholds: White > 6.0

#### Notes

Unplanned Power Changes per 7000 Critical Hrs	3Q/14	4Q/14	1Q/15	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16
Unplanned power changes	0	1.0	0	0	2.0	0	1.0	0
Critical hours	2118.6	1600.0	2159.0	2121.7	2208.0	2111.7	2183.0	2184.0
<b>Indicator value</b>	<b>0.8</b>	<b>1.7</b>	<b>0.9</b>	<b>0.9</b>	<b>2.6</b>	<b>1.6</b>	<b>2.4</b>	<b>2.4</b>

Licensee Comments: none

### Unplanned Scrams with Complications



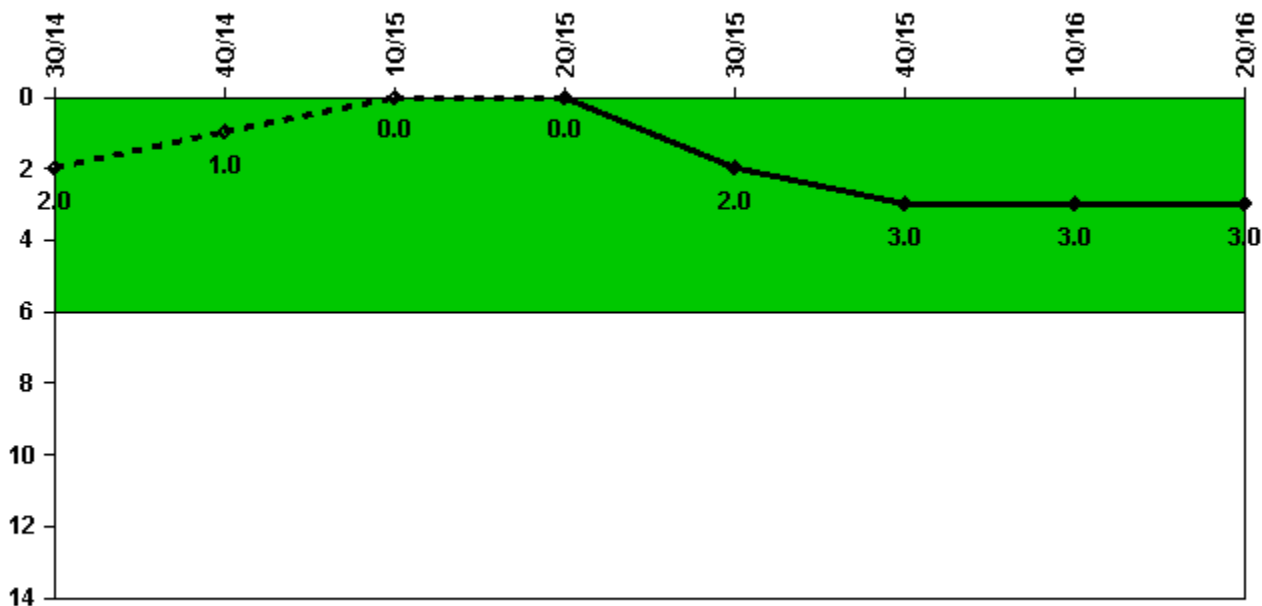
Thresholds: White > 1.0

#### Notes

Unplanned Scrams with Complications	3Q/14	4Q/14	1Q/15	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16
Scrams with complications	0	0	0	0	0	0	0	0
<b>Indicator value</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Licensee Comments: none

### Safety System Functional Failures (BWR)



Thresholds: White > 6.0

#### Notes

Safety System Functional Failures (BWR)	3Q/14	4Q/14	1Q/15	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16
Safety System Functional Failures	0	0	0	0	2	1	0	0
<b>Indicator value</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>

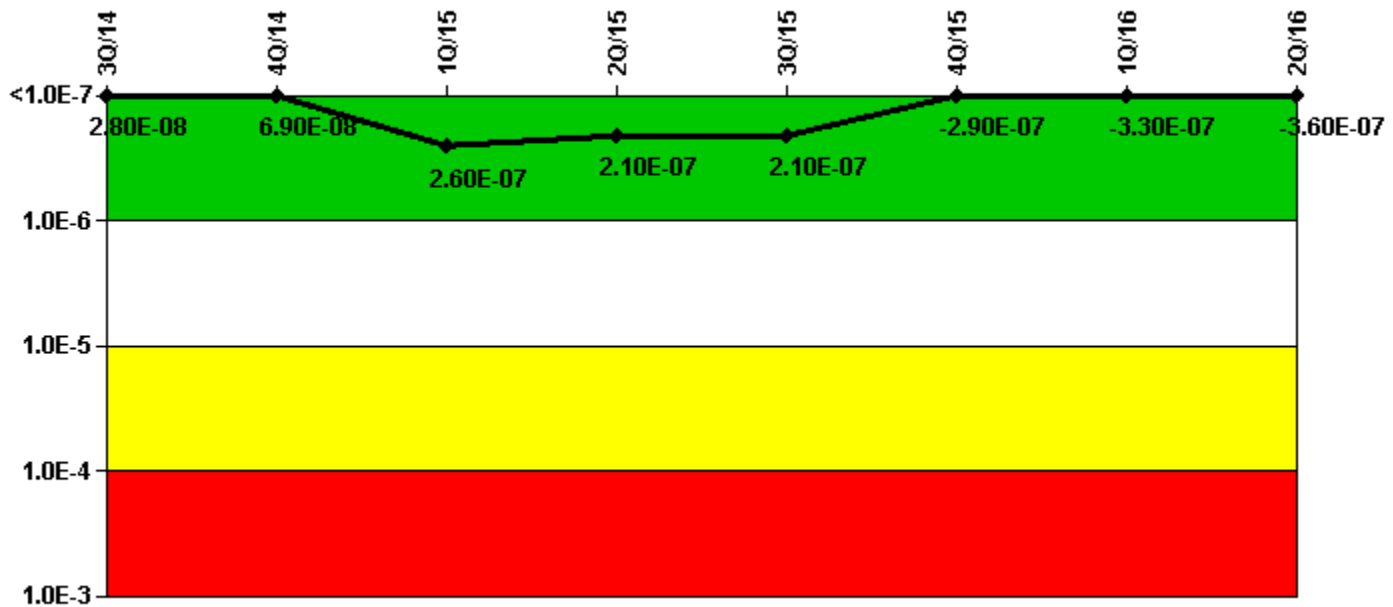
Licensee Comments:

4Q/15: LER 50-259/2015-004-00 - Containment Atmospheric Dilution B Train Supply System Inoperable Longer Than Allowed by Technical Specifications

3Q/15: LER 50-259/2015-002-00, High Pressure Coolant Injection System Inoperable Due to Slow Containment Isolation Valve Closing Time, and LER 50-259/2015-003-00, Loss of Cooling to the Unit 1 and Unit 2 Shutdown Board Rooms Due To Fouled Chiller Coils

4Q/14: BFN Unit 1 SSFF reported in May 2014 by LER 50-260/2014-001-00 was retracted by LER 50-260/2014-001-01 on 12/23/2014. There is no color change associated with this revision.

### Mitigating Systems Performance Index, Emergency AC Power System



Thresholds: White > 1.00E-6 Yellow > 1.00E-5 Red > 1.00E-4

#### Notes

Mitigating Systems Performance Index, Emergency AC Power System	3Q/14	4Q/14	1Q/15	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16
UAI (ΔCDF)	3.45E-08	4.26E-08	3.55E-08	1.62E-08	1.62E-08	1.88E-08	-2.25E-08	-2.47E-08
URI (ΔCDF)	-6.80E-09	2.65E-08	2.20E-07	1.89E-07	1.89E-07	-3.12E-07	-3.12E-07	-3.39E-07
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	2.80E-08	6.90E-08	2.60E-07	2.10E-07	2.10E-07	-2.90E-07	-3.30E-07	-3.60E-07

#### Licensee Comments:

2Q/16: Changed PRA Parameter(s). Unit 1: The CAFTA PRA Model Revision 7 was approved on 03/29/2016 with a corresponding MSPI Basis Document Revision 17 approved on 3/31/2016. The PRA model revision was a periodic update to the model which included a data update, HRA update and incorporating recent plant modifications. As a result of the PRA model change, the CDF, Fussel-Vesely and Basic Event Probabilities for all monitored trains and components were revised. Unit 2: The CAFTA PRA Model Revision 7 was approved on 03/29/2016 with a corresponding MSPI Basis Document Revision 16 approved on 3/31/2016. The PRA model revision was a periodic update to the model which included a data update, HRA update and incorporating recent plant modifications. As a result of the PRA model change, the CDF, Fussel-Vesely and Basic Event Probabilities for all monitored trains and components were revised.

3Q/15: Risk Cap Invoked. The MSPI Risk Cap is invoked. The contribution from the highest worth single failure (2.26E-06) has been replaced by a value of 5.00E-07.

2Q/15: Risk Cap Invoked. Changed PRA Parameter(s). The MSPI Risk Cap is invoked. The contribution from the

highest worth single failure ( $2.26E-06$ ) has been replaced by a value of  $5.00E-07$ . Changing PRA parameters did not result in any indicator color changes.

2Q/15: Risk Cap Invoked. The MSPI Risk Cap is invoked. The contribution from the highest worth single failure ( $2.26E-06$ ) has been replaced by a value of  $5.00E-07$ . Changing PRA parameters did not result in an indicator color changes. The BFN PRA Model Revision 6 was approved on 1/23/15 with a corresponding MSPI Basis Document Revisions approved on 7/17/15. The PRA model revision incorporated the Fire PRA (FPRA) and the Internal Events PRA (IE) into one model to assure the basic structure of both models remains consistent.. Additionally, identified errors, deficiencies, or over conservatisms in the Rev.5 model were corrected. As a result of the PRA model change, there is a slight decrease in CDF and a slight increase in LERF. Emergency AC Specific Change: In order for LOSP to result in core damage, multiple additional systems have to fail. Most important of those are the EDGs. In Rev. 5, failure of multiple EDGs was assumed to occur at the same time at  $T=0$  (beginning of the event). If AC power is not restored in 4 hours core damage is likely to occur. This is an unlikely occurrence. A more likely scenario is that the EDGs will fail at random times over an extended period of time, resulting in a higher probability that offsite power can be restore before all the EDGs fail or before core damage occurs. Convolution adjusts the offsite power recovery probabilities to account for this fact. This reduces the LOSP CDF and LERF contribution and EDG importance. This change was the sole reason for the net CDF decrease between Rev. 5 and Rev. 6. This comment was updated after the quarterly files were created.

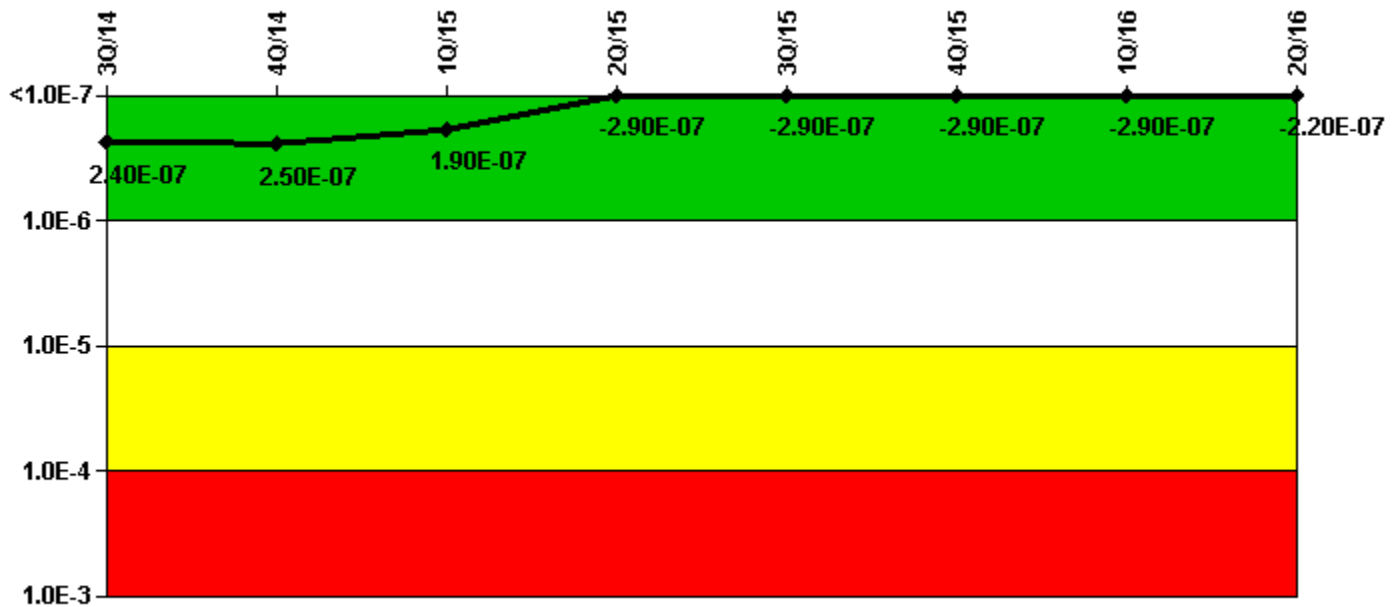
1Q/15: Risk Cap Invoked. The MSPI Risk Cap is invoked. The contribution from the highest worth single failure ( $2.03E-06$ ) has been replaced by a value of  $5.00E-07$ .

4Q/14: Risk Cap Invoked. The MSPI Risk Cap is invoked. The contribution from the highest worth single failure ( $2.03E-06$ ) has been replaced by a value of  $5.00E-07$ . Unavailability hours inappropriately missed for DG A from 9/30/2014 were added to September's data. These hours were due to vibration repairs that placed DG A in an unanalyzed condition and unavailability did accrue. There is no indicator color change associated with this revision.

3Q/14: Risk Cap Invoked. The MSPI Risk Cap is invoked. The contribution from the highest worth single failure ( $1.97E-06$ ) has been replaced by a value of  $5.00E-07$ . Unavailability hours inappropriately missed for DG A from 9/30/2014 were added after quarterly approval. These hours were due to vibration repairs that placed DG A in an unanalyzed condition and unavailability did accrue. There is no indicator color change associated with this revision.

3Q/14: Risk Cap Invoked. The MSPI Risk Cap is invoked. The contribution from the highest worth single failure ( $1.97E-06$ ) has been replaced by a value of  $5.00E-07$ .

### Mitigating Systems Performance Index, High Pressure Injection System



Thresholds: White > 1.00E-6 Yellow > 1.00E-5 Red > 1.00E-4

#### Notes

Mitigating Systems Performance Index, High Pressure Injection System	3Q/14	4Q/14	1Q/15	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16
UAI (ΔCDF)	9.03E-08	1.01E-07	4.43E-08	-6.30E-08	-6.30E-08	-6.30E-08	-6.30E-08	-5.24E-08
URI (ΔCDF)	1.46E-07	1.46E-07	1.46E-07	-2.30E-07	-2.30E-07	-2.30E-07	-2.30E-07	-1.69E-07
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	2.40E-07	2.50E-07	1.90E-07	-2.90E-07	-2.90E-07	-2.90E-07	-2.90E-07	-2.20E-07

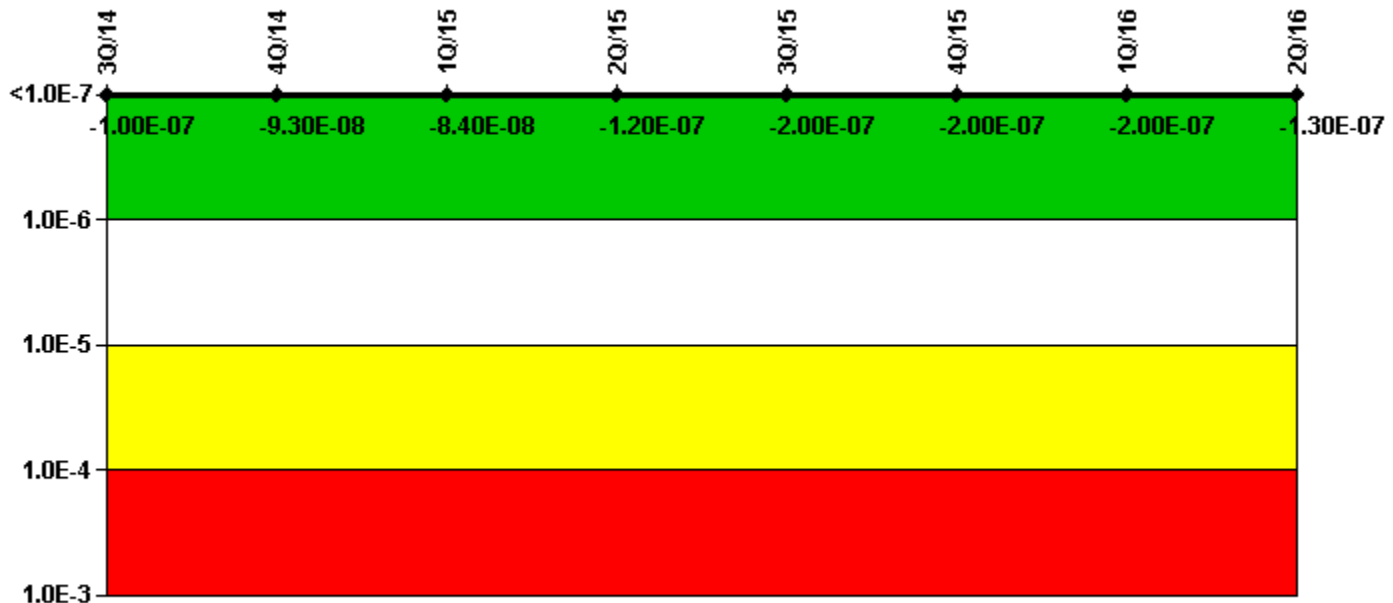
#### Licensee Comments:

2Q/16: Changed PRA Parameter(s). Unit 1: The CAFTA PRA Model Revision 7 was approved on 03/29/2016 with a corresponding MSPI Basis Document Revision 17 approved on 3/31/2016. The PRA model revision was a periodic update to the model which included a data update, HRA update and incorporating recent plant modifications. As a result of the PRA model change, the CDF, Fussel-Vesely and Basic Event Probabilities for all monitored trains and components were revised.

2Q/15: Changing PRA parameters did not result in any indicator color changes. The BFN PRA Model Revision 6 was approved on 1/23/15 with a corresponding MSPI Basis Document Revisions approved on 7/17/15. The PRA model revision incorporated the Fire PRA (FPRA) and the Internal Events PRA (IE) into one model to assure the basic structure of both models remains consistent.. Additionally, identified errors, deficiencies, or over conservatisms in the Rev.5 model were corrected. As a result of the PRA model change, there is a slight decrease in CDF and a slight increase in LERF. This comment was updated after the quarterly files were created.

2Q/15: Changed PRA Parameter(s). Changing PRA parameters did not result in any indicator color changes.

### Mitigating Systems Performance Index, Heat Removal System



Thresholds: White > 1.00E-6 Yellow > 1.00E-5 Red > 1.00E-4

#### Notes

Mitigating Systems Performance Index, Heat Removal System	3Q/14	4Q/14	1Q/15	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16
UAI ( $\Delta$ CDF)	5.32E-08	6.39E-08	7.26E-08	8.03E-08	6.79E-09	-2.03E-10	-9.55E-10	-1.69E-08
URI ( $\Delta$ CDF)	-1.57E-07	-1.57E-07	-1.57E-07	-2.04E-07	-2.04E-07	-2.04E-07	-2.04E-07	-1.18E-07
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	-1.00E-07	-9.30E-08	-8.40E-08	-1.20E-07	-2.00E-07	-2.00E-07	-2.00E-07	-1.30E-07

#### Licensee Comments:

2Q/16: Changed PRA Parameter(s). Unit 1: The CAFTA PRA Model Revision 7 was approved on 03/29/2016 with a corresponding MSPI Basis Document Revision 17 approved on 3/31/2016. The PRA model revision was a periodic update to the model which included a data update, HRA update and incorporating recent plant modifications. As a result of the PRA model change, the CDF, Fussel-Vesely and Basic Event Probabilities for all monitored trains and components were revised.

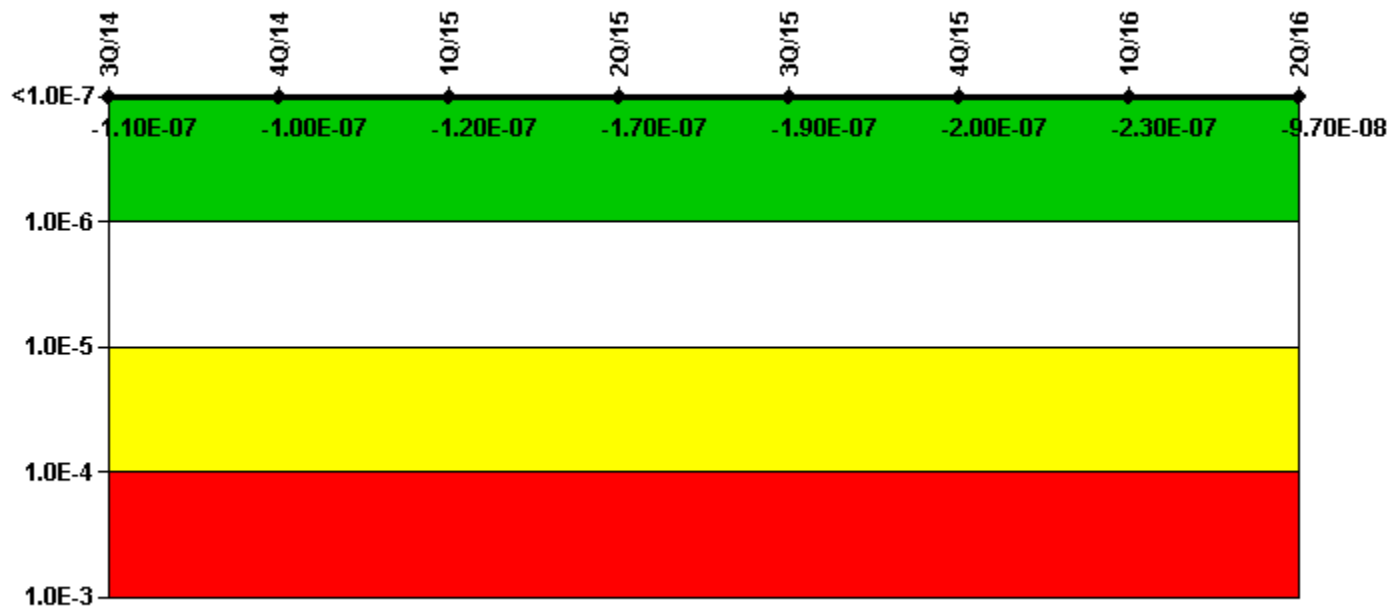
2Q/15: Changing PRA parameters did not result in any indicator color changes. The BFN PRA Model Revision 6 was approved on 1/23/15 with a corresponding MSPI Basis Document Revisions approved on 7/17/15. The PRA model revision incorporated the Fire PRA (FPRA) and the Internal Events PRA (IE) into one model to assure the basic structure of both models remains consistent.. Additionally, identified errors, deficiencies, or over



conservatism in the Rev.5 model were corrected. As a result of the PRA model change, there is a slight decrease in CDF and a slight increase in LERF. This comment was updated after the quarterly files were created.

2Q/15: Changed PRA Parameter(s). Changing PRA parameters did not result in any indicator color changes.

### Mitigating Systems Performance Index, Residual Heat Removal System



Thresholds: White > 1.00E-6 Yellow > 1.00E-5 Red > 1.00E-4

#### Notes

Mitigating Systems Performance Index, Residual Heat Removal System	3Q/14	4Q/14	1Q/15	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16
UAI ( $\Delta$ CDF)	9.05E-08	9.72E-08	8.03E-08	7.13E-08	5.03E-08	3.37E-08	9.32E-09	1.62E-08
URI ( $\Delta$ CDF)	-1.98E-07	-1.98E-07	-1.98E-07	-2.38E-07	-2.38E-07	-2.38E-07	-2.38E-07	-1.14E-07
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	-1.10E-07	-1.00E-07	-1.20E-07	-1.70E-07	-1.90E-07	-2.00E-07	-2.30E-07	-9.70E-08

#### Licensee Comments:

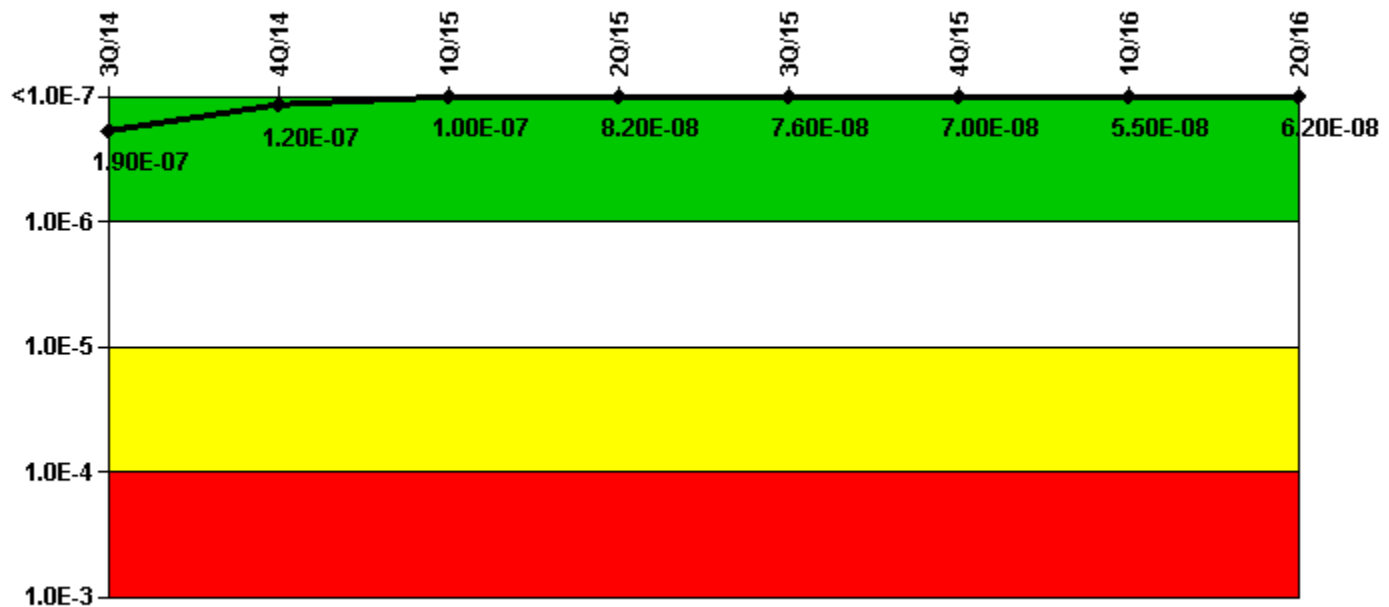
2Q/16: Changed PRA Parameter(s). Unit 1: The CAFTA PRA Model Revision 7 was approved on 03/29/2016 with a corresponding MSPI Basis Document Revision 17 approved on 3/31/2016. The PRA model revision was a periodic update to the model which included a data update, HRA update and incorporating recent plant modifications. As a result of the PRA model change, the CDF, Fussel-Vesely and Basic Event Probabilities for all monitored trains and

components were revised.

2Q/15: Changing PRA parameters did not result in any indicator color changes. The BFN PRA Model Revision 6 was approved on 1/23/15 with a corresponding MSPI Basis Document Revisions approved on 7/17/15. The PRA model revision incorporated the Fire PRA (FPRA) and the Internal Events PRA (IE) into one model to assure the basic structure of both models remains consistent.. Additionally, identified errors, deficiencies, or over conservatisms in the Rev.5 model were corrected. As a result of the PRA model change, there is a slight decrease in CDF and a slight increase in LERF. This comment was updated after the quarterly files were created.

2Q/15: Changed PRA Parameter(s). Changing PRA parameters did not result in any indicator color changes.

### Mitigating Systems Performance Index, Cooling Water Systems



Thresholds: White > 1.00E-6 Yellow > 1.00E-5 Red > 1.00E-4

#### Notes

Mitigating Systems Performance Index, Cooling Water Systems	3Q/14	4Q/14	1Q/15	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16
UAI (ΔCDF)	2.34E-07	1.65E-07	1.52E-07	1.25E-07	1.19E-07	1.13E-07	9.82E-08	8.49E-08
URI (ΔCDF)	-4.12E-08	-4.12E-08	-4.95E-08	-4.30E-08	-4.30E-08	-4.30E-08	-4.30E-08	-2.29E-08
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	1.90E-07	1.20E-07	1.00E-07	8.20E-08	7.60E-08	7.00E-08	5.50E-08	6.20E-08

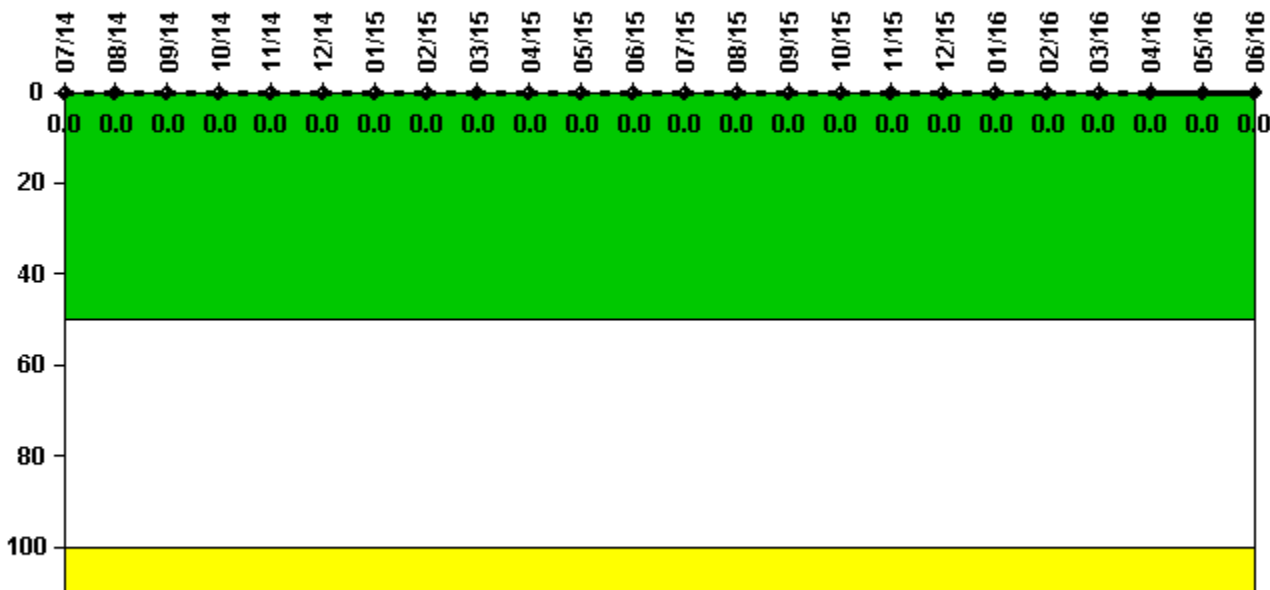
Licensee Comments:

2Q/16: Changed PRA Parameter(s). Unit 1: The CAFTA PRA Model Revision 7 was approved on 03/29/2016 with a corresponding MSPI Basis Document Revision 17 approved on 3/31/2016. The PRA model revision was a periodic update to the model which included a data update, HRA update and incorporating recent plant modifications. As a result of the PRA model change, the CDF, Fussel-Vesely and Basic Event Probabilities for all monitored trains and components were revised.

2Q/15: Changing PRA parameters did not result in any indicator color changes. The BFN PRA Model Revision 6 was approved on 1/23/15 with a corresponding MSPI Basis Document Revisions approved on 7/17/15. The PRA model revision incorporated the Fire PRA (FPRA) and the Internal Events PRA (IE) into one model to assure the basic structure of both models remains consistent.. Additionally, identified errors, deficiencies, or over conservatisms in the Rev.5 model were corrected. As a result of the PRA model change, there is a slight decrease in CDF and a slight increase in LERF. This comment was updated after the quarterly files were created.

2Q/15: Changed PRA Parameter(s). Changing PRA parameters did not result in any indicator color changes.

### Reactor Coolant System Activity



Thresholds: White > 50.0 Yellow > 100.0

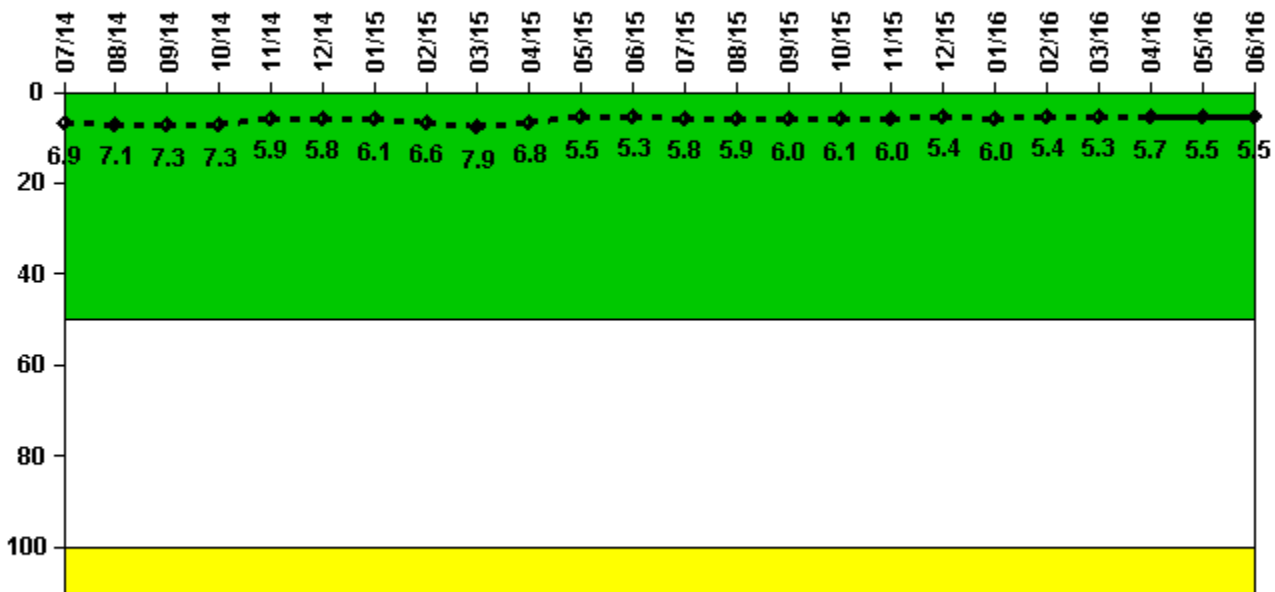
Notes

Reactor Coolant System Activity	7/14	8/14	9/14	10/14	11/14	12/14	1/15	2/15	3/15	4/15	5/15	6/15
Maximum activity	0.000089	0.000153	0.000152	0.000112	0.000072	0.000030	0.000041	0.000030	0.000043	0.000042	0.000036	0.000035

Technical specification limit	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
<b>Indicator value</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Reactor Coolant System Activity</b>	<b>7/15</b>	<b>8/15</b>	<b>9/15</b>	<b>10/15</b>	<b>11/15</b>	<b>12/15</b>	<b>1/16</b>	<b>2/16</b>	<b>3/16</b>	<b>4/16</b>	<b>5/16</b>	<b>6/16</b>
Maximum activity	0.000036	0.000066	0.000073	0.000035	0.000035	0.000075	0.000071	0.000074	0.000076	0.000082	0.000120	0.000087
Technical specification limit	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
<b>Indicator value</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Licensee Comments: none

### Reactor Coolant System Leakage



Thresholds: White > 50.0 Yellow > 100.0

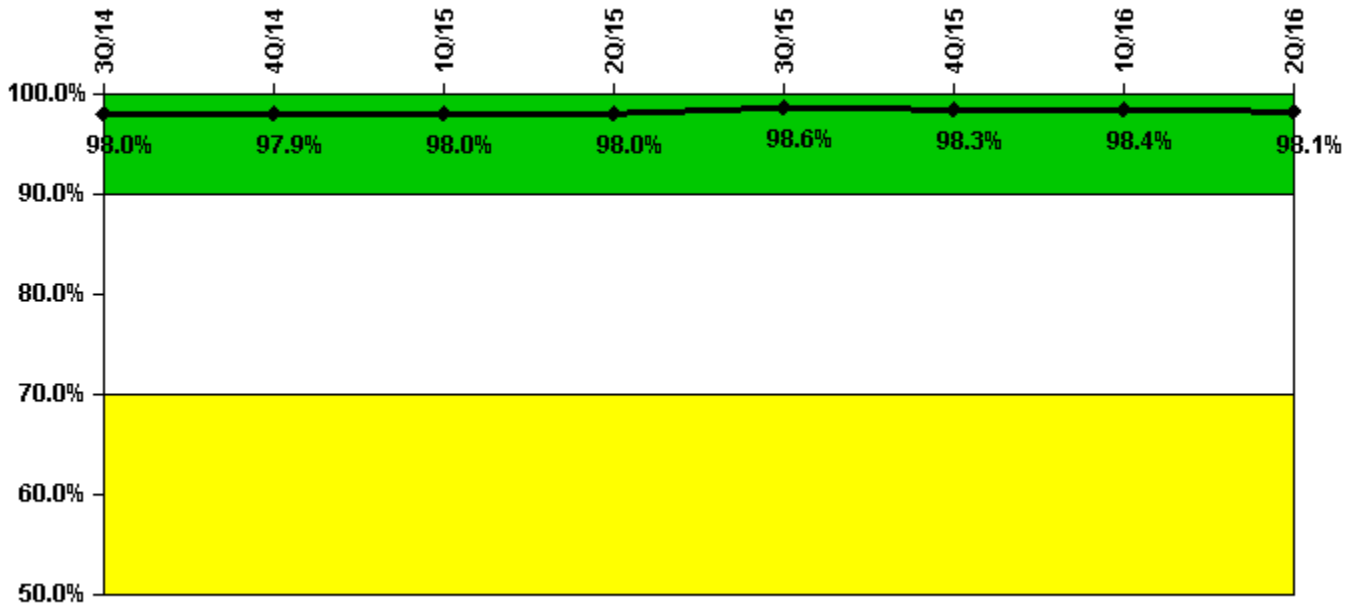
### Notes

Reactor Coolant System Leakage	7/14	8/14	9/14	10/14	11/14	12/14	1/15	2/15	3/15	4/15	5/15	6/15

Maximum leakage	2.070	2.130	2.190	2.190	1.780	1.750	1.840	1.980	2.380	2.050	1.650	1.600
Technical specification limit	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
<b>Indicator value</b>	<b>6.9</b>	<b>7.1</b>	<b>7.3</b>	<b>7.3</b>	<b>5.9</b>	<b>5.8</b>	<b>6.1</b>	<b>6.6</b>	<b>7.9</b>	<b>6.8</b>	<b>5.5</b>	<b>5.3</b>
<b>Reactor Coolant System Leakage</b>	<b>7/15</b>	<b>8/15</b>	<b>9/15</b>	<b>10/15</b>	<b>11/15</b>	<b>12/15</b>	<b>1/16</b>	<b>2/16</b>	<b>3/16</b>	<b>4/16</b>	<b>5/16</b>	<b>6/16</b>
Maximum leakage	1.750	1.760	1.800	1.820	1.810	1.630	1.790	1.620	1.590	1.700	1.660	1.640
Technical specification limit	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
<b>Indicator value</b>	<b>5.8</b>	<b>5.9</b>	<b>6.0</b>	<b>6.1</b>	<b>6.0</b>	<b>5.4</b>	<b>6.0</b>	<b>5.4</b>	<b>5.3</b>	<b>5.7</b>	<b>5.5</b>	<b>5.5</b>

Licensee Comments: none

### Drill/Exercise Performance



Thresholds: White < 90.0% Yellow < 70.0%

### Notes

Drill/Exercise Performance	3Q/14	4Q/14	1Q/15	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16
Successful opportunities	86.0	4.0	46.0	16.0	50.0	74.0	34.0	43.0
Total opportunities	90.0	4.0	46.0	16.0	50.0	75.0	34.0	45.0
<b>Indicator value</b>	<b>98.0%</b>	<b>97.9%</b>	<b>98.0%</b>	<b>98.0%</b>	<b>98.6%</b>	<b>98.3%</b>	<b>98.4%</b>	<b>98.1%</b>

Licensee Comments:

4Q/15: During the November 2015 Emergency Preparedness Graded Exercise NRC Inspection, the NRC identified an error in the PI Data. Emergency Preparedness(EP) failed to count a classification and notification. EP reported 12/12 Drill and Exercise Performance(DEP) opportunities and the actual count is 14/14. Additionally, when Operations Training submitted their October LOR paper work, it included documentation of two "as founds" from September 2015 that were not previously reported. This brought the total DEP opportunities for September 2015 to 18/18. There is no color change associated with this update.

### ERO Drill Participation



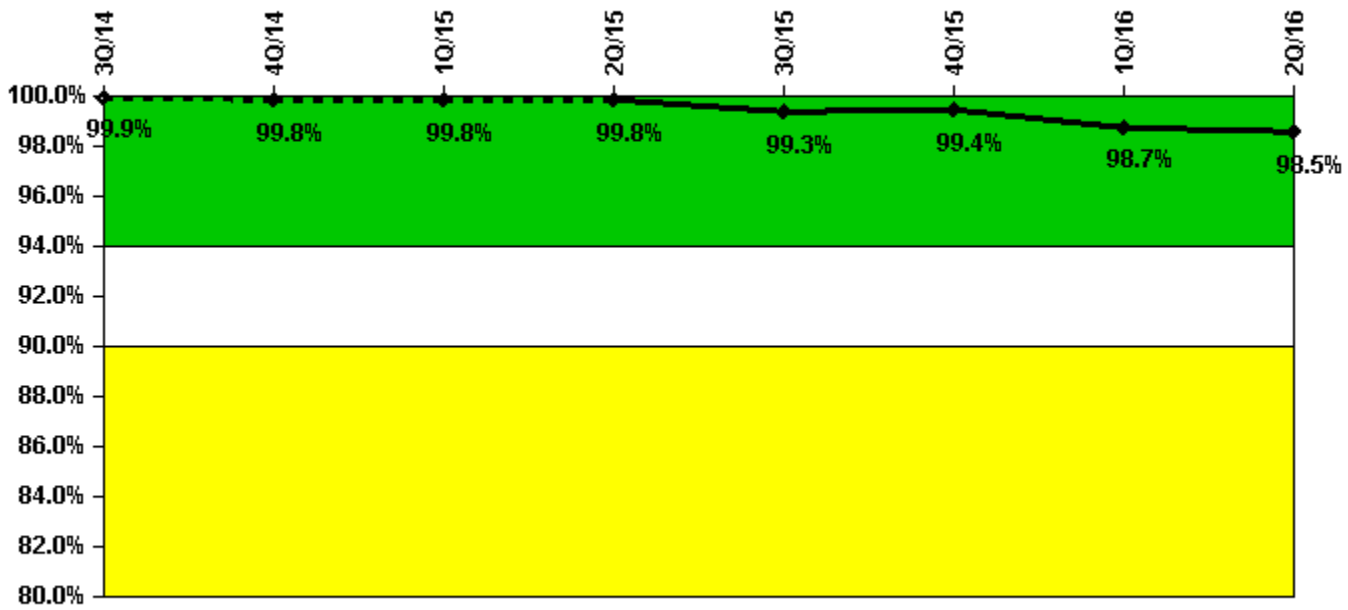
Thresholds: White < 80.0% Yellow < 60.0%

Notes

ERO Drill Participation	3Q/14	4Q/14	1Q/15	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16
Participating Key personnel	77.0	76.0	80.0	88.0	85.0	91.0	93.0	91.0
Total Key personnel	79.0	76.0	80.0	88.0	85.0	91.0	93.0	91.0
Indicator value	97.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Licensee Comments: none

### Alert & Notification System



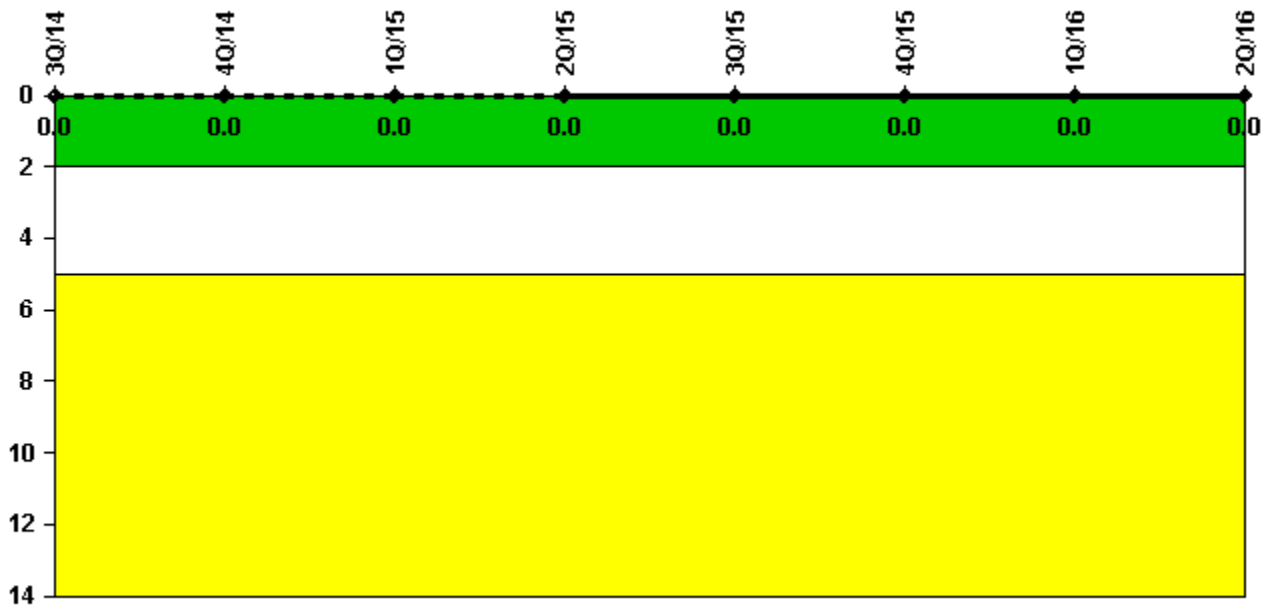
Thresholds: White < 94.0% Yellow < 90.0%

#### Notes

Alert & Notification System	3Q/14	4Q/14	1Q/15	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16
Successful siren-tests	1038	621	1040	624	918	726	881	718
Total sirens-tests	1040	624	1040	624	936	728	902	728
<b>Indicator value</b>	<b>99.9%</b>	<b>99.8%</b>	<b>99.8%</b>	<b>99.8%</b>	<b>99.3%</b>	<b>99.4%</b>	<b>98.7%</b>	<b>98.5%</b>

Licensee Comments: none

### Occupational Exposure Control Effectiveness



Thresholds: White > 2.0 Yellow > 5.0

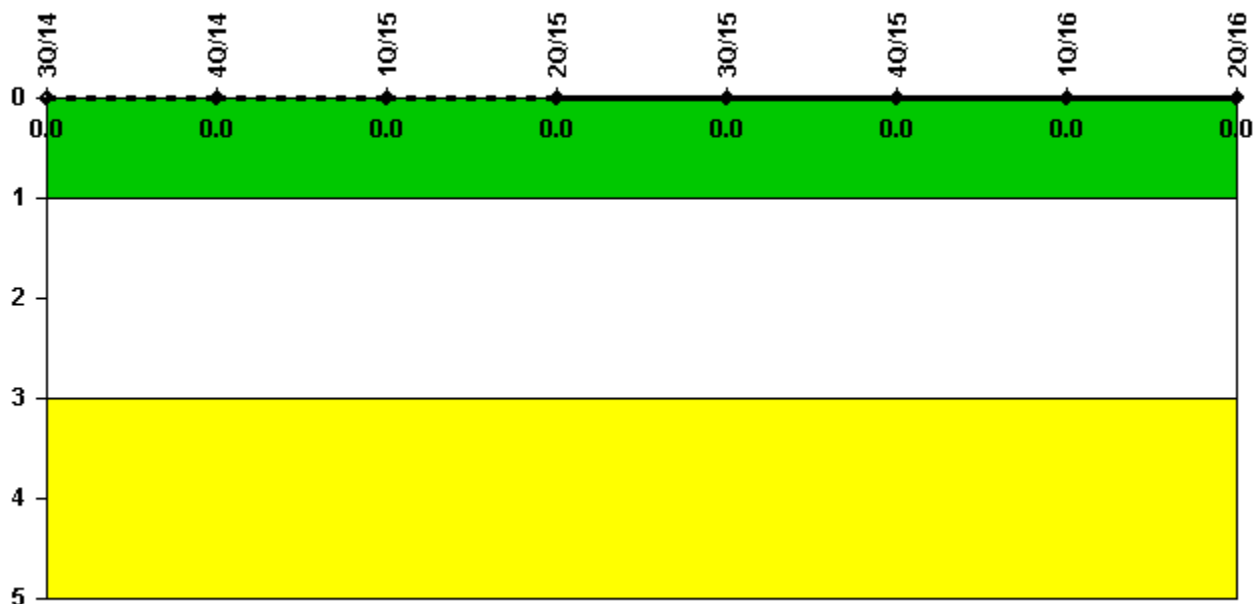
#### Notes

Occupational Exposure Control Effectiveness	3Q/14	4Q/14	1Q/15	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16
High radiation area occurrences	0	0	0	0	0	0	0	0
Very high radiation area occurrences	0	0	0	0	0	0	0	0
Unintended exposure occurrences	0	0	0	0	0	0	0	0
<b>Indicator value</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Licensee Comments: none



### RETS/ODCM Radiological Effluent



Thresholds: White > 1.0 Yellow > 3.0

#### Notes

RETS/ODCM Radiological Effluent	3Q/14	4Q/14	1Q/15	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16
RETS/ODCM occurrences	0	0	0	0	0	0	0	0
Indicator value	0	0	0	0	0	0	0	0

Licensee Comments: none

Although the Security Cornerstone is included in the Reactor Oversight Process assessment program, the Commission has decided that specific information related to findings and performance indicators pertaining to the Security Cornerstone will not be publicly available to ensure that security information is not provided to a possible adversary. Other than the fact that a finding or performance indicator is Green or Greater-Than-Green, security related information will not be displayed on the public web page.

▲ [Action Matrix Summary](#) | [Inspection Findings Summary](#) | [PI Summary](#) | [Reactor Oversight Process](#)

*Last Modified: July 25, 2016*