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Browns Ferry 2 – Quarterly Performance Indicators

2Q/2017 Performance Indicators

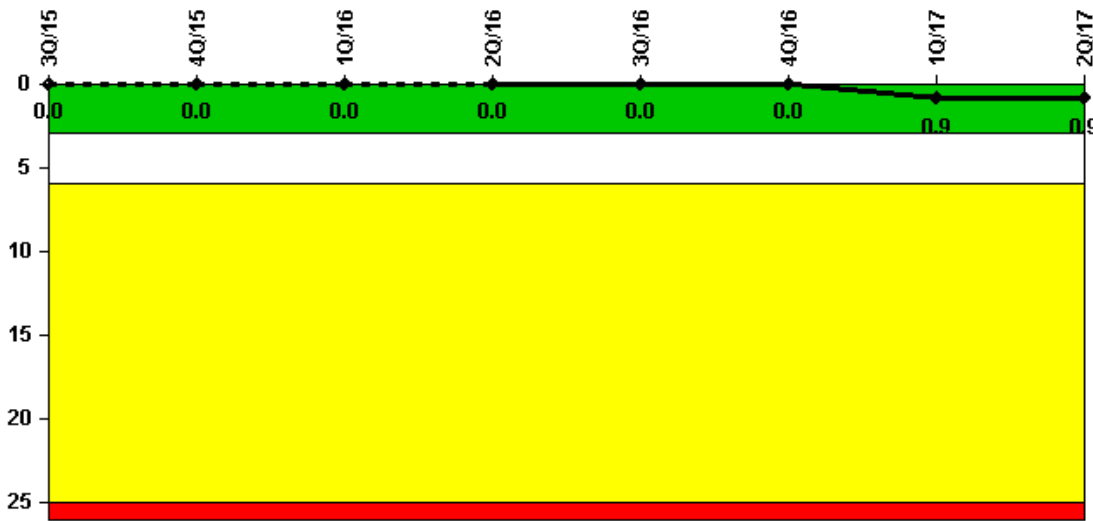
The solid trend line represents the current reporting period.

Licensee's General Comments: none

On this page:

- Unplanned Scrams (IE01)
- Unplanned Power Changes per 7000 Critical Hours (IE03)
- Unplanned Scrams with Complications (IE04)
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- Emergency AC Power Systems (MS06)
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- Heat Removal Systems (MS08)
- Residual Heat Removal Systems (MS09)
- Cooling Water Systems (MS10)
- Reactor Coolant System Activity (BI01)
- Reactor Coolant System Leakage (BI02)
- Drill/Exercise Performance (EP01)
- Emergency Response Organization Drill Participation (EP02)
- Alert and Notification System Reliability (EP03)
- Occupational Exposure Control Effectiveness (OR01)
- RETS/OCDM Radiological Effluent Occurrence (PR01)
- Protected Area Equipment (PP01)

Unplanned Scrams per 7000 Critical Hrs



Thresholds: White > 3.0 Yellow > 6.0 Red > 25.0

Notes

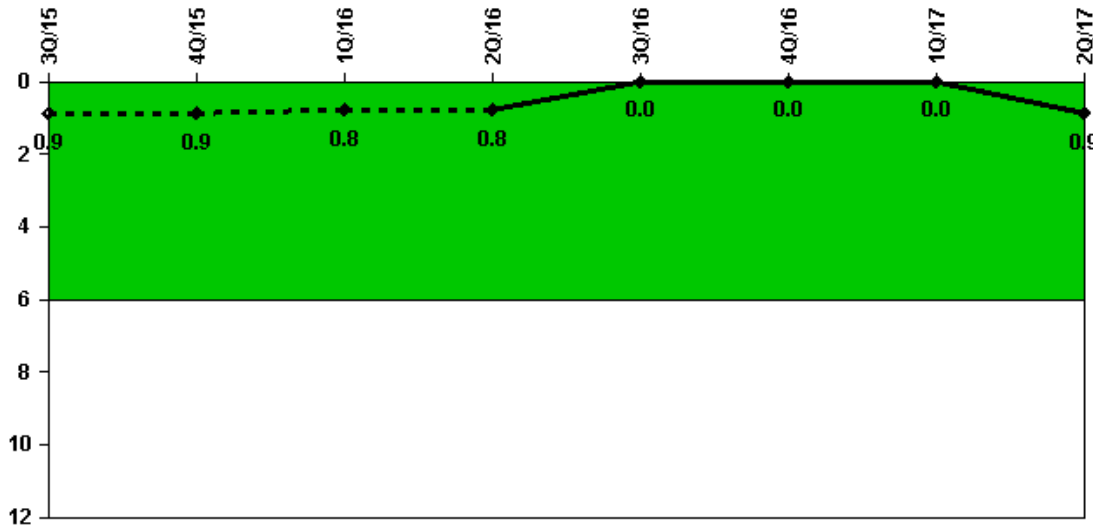
Unplanned Scrams per 7000 Critical Hrs	3Q/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17
Unplanned scrams	0	0	0	0	0	0	1.0	0
Critical hours	2208.0	2064.5	2183.0	2184.0	2208.0	2209.0	1354.8	2184.0

Indicator value	3Q/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17
	0	0	0	0	0	0	0.9	0.9

TOP

Licensee Comments: none

Unplanned Power Changes per 7000 Critical Hrs



Thresholds: White > 6.0

Notes

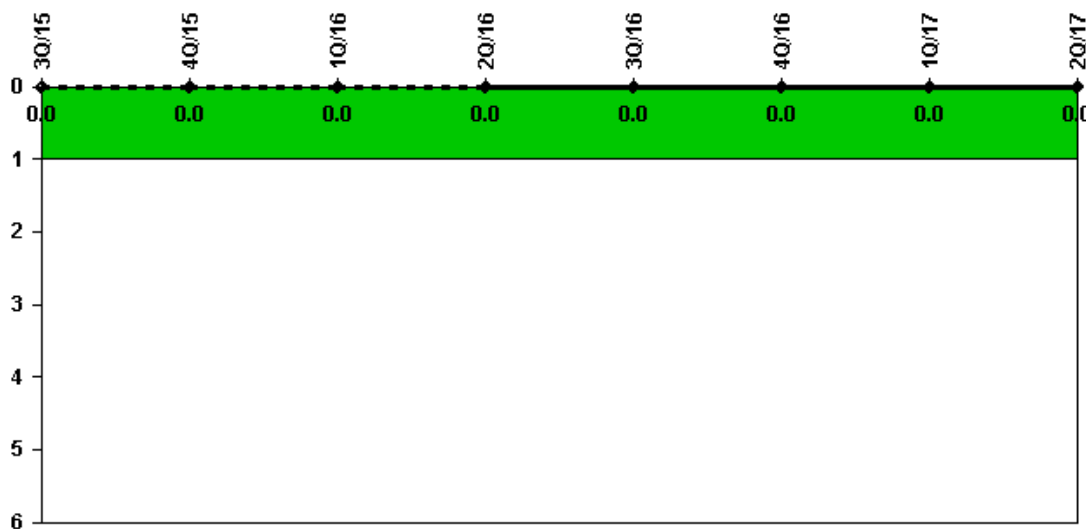
Unplanned Power Changes per 7000 Critical Hrs	3Q/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17
Unplanned power changes	1.0	0	0	0	0	0	0	1.0
Critical hours	2208.0	2064.5	2183.0	2184.0	2208.0	2209.0	1354.8	2184.0

Indicator value	0.9	0.9	0.8	0.8	0	0	0	0.9
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Licensee Comments: none

Unplanned Scrams with Complications



Thresholds: White > 1.0

Notes

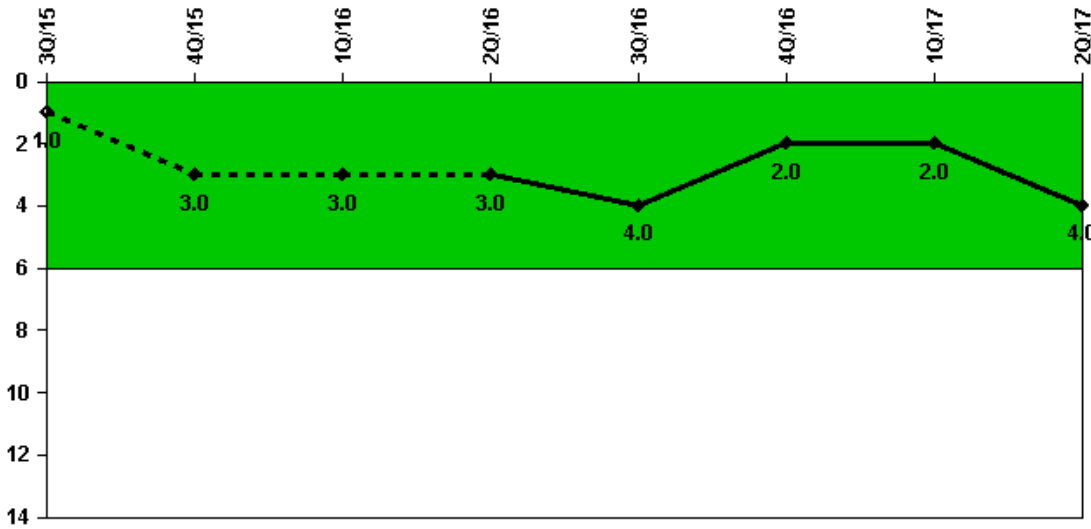
Unplanned Scrams with Complications	3Q/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17
Scrams with complications	0	0	0	0	0	0	0	0

Indicator value	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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Licensee Comments: none

Safety System Functional Failures (BWR)



Thresholds: White > 6.0

Notes

Safety System Functional Failures (BWR) 3Q/15 4Q/15 1Q/16 2Q/16 3Q/16 4Q/16 1Q/17 2Q/17
 Safety System Functional Failures 1 2 0 0 2 0 0 2

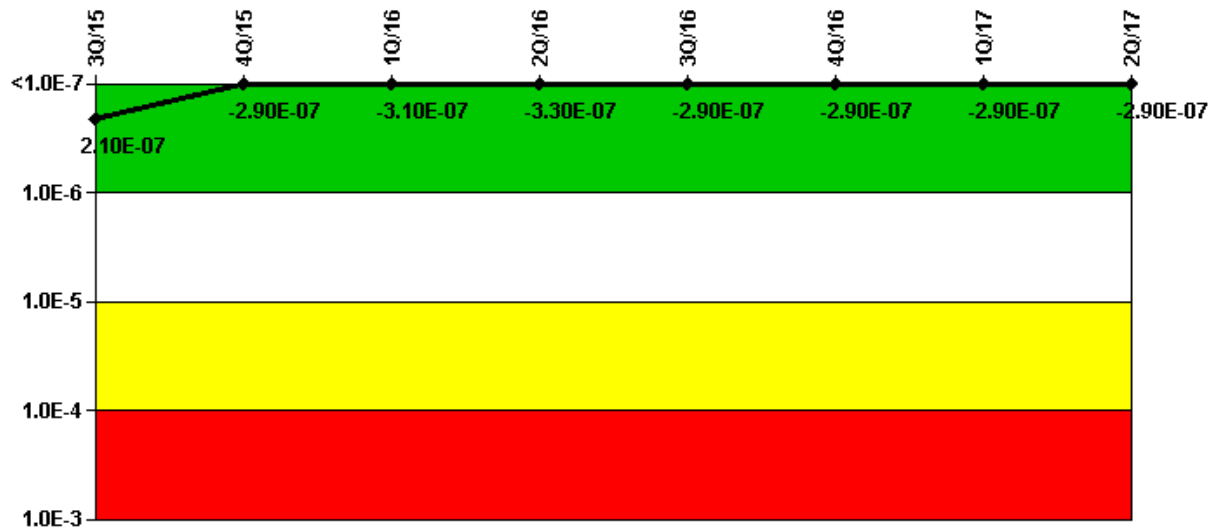
Indicator value 1 3 3 3 4 2 2 4

TOP

Licensee Comments:

2Q/17: LER 50-260/2017-001-00 - High Pressure Coolant Injection Safety System Functional Failure Due to a Blown Fuse LER 50-259/2017-003-00 - Unanalyzed Condition for Tornado Missiles Striking the Emergency Diesel Generator Fuel Oil Vent Lines
 3Q/16: LER 50-260/2016-001-00: High Pressure Coolant Injection Safety System Functional Failure due to a Blown Fuse and a Failed Relay; LER 50-260/2016-002-00: High Pressure Coolant Injection Safety System Functional Failure Due To Stuck Contactor
 4Q/15: (1) LER 50-260/2015-002-00 - High Pressure Coolant Injection System Inoperable Due to Turbine Steam Supply Valve Packing Failure (2) LER 50-259/2015-004-00 - Containment Atmospheric Dilution B Train Supply System Inoperable Longer Than Allowed by Technical Specifications
 3Q/15: LER 50-259/2015-003-00, Loss of Cooling to the Unit 1 and Unit 2 Shutdown Board Rooms Due To Fouled Chiller Coils

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/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17
UAI (ΔCDF)	-6.77E-09	-4.65E-09	-2.22E-08	-2.38E-08	-2.38E-08	-2.38E-08	-2.37E-08	-2.30E-08
URI (ΔCDF)	2.16E-07	-2.85E-07	-2.85E-07	-3.04E-07	-2.69E-07	-2.69E-07	-2.69E-07	-2.69E-07
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	2.10E-07	-2.90E-07	-3.10E-07	-3.30E-07	-2.90E-07	-2.90E-07	-2.90E-07	-2.90E-07

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Licensee Comments:

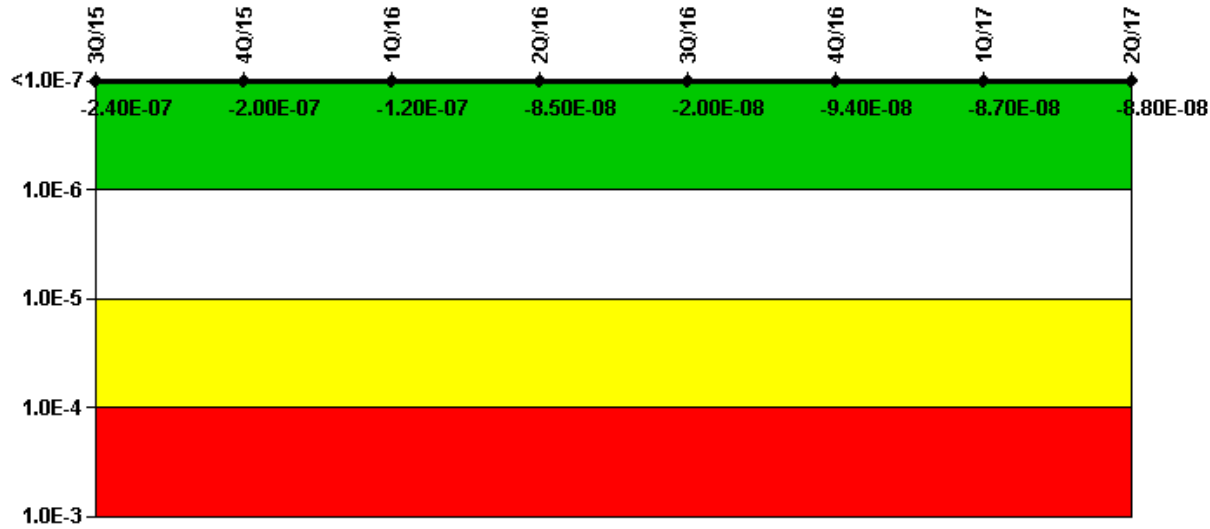
4Q/16: Changed PRA Parameter(s). NDN-000-999-2010-0003 Revision 12 was updated to show the Failure to Run and Failure to Start basic event importances in each of the tables per CR 1110732-001. The Unit 2 MSPI Basis Document Revision 17 was approved on 9/30/2016 to reflect that change. This change allows the use of Option 2 to determine the FV/UR ratio as described in NEI 99-02, Appendix F 2.3.3. Previously, Option 1 was used with other ratio options shown with a strikethrough. The PRA UnR tables for EDG, HPCI, RCIC, RHR, and RHRSW were revised to reflect the change. Additionally, this revision incorporates the changes to the EECW System Description as required by CR 1202022.

3Q/16: Changed PRA Parameter(s). The MSPI Basis documents for all three units were revised to incorporate PRA changes. The PRA was updated to show the Failure to Run and Failure to Start basic event importance in each of the tables. This change allows the use of Option 2 to determine the FV/UR ratio as described in NEI 99-02, Section F 2.3.3. Previously, Option 1 as described in NEI 99-02 F2.3.3, was used with other ratio options shown with a strikethrough. The PRA UnR tables for EDG, HPCI, RCIC, and RHRSW were revised.

2Q/16: 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 (2.06E-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/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17
UAI (ΔCDF)	-1.02E-08	2.29E-08	1.04E-07	8.49E-08	8.44E-08	1.08E-08	1.71E-08	1.69E-08
URI (ΔCDF)	-2.28E-07	-2.21E-07	-2.21E-07	-1.70E-07	-1.04E-07	-1.04E-07	-1.04E-07	-1.04E-07
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	-2.40E-07	-2.00E-07	-1.20E-07	-8.50E-08	-2.00E-08	-9.40E-08	-8.70E-08	-8.80E-08

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Licensee Comments:

4Q/16: Changed PRA Parameter(s). NDN-000-999-2010-0003 Revision 12 was updated to show the Failure to Run and Failure to Start basic event importances in each of the tables per CR 1110732-001. The Unit 2 MSPI Basis Document Revision 17 was approved on 9/30/2016 to reflect that change. This change allows the use of Option 2 to determine the FV/UR ratio as described in NEI 99-02, Appendix F 2.3.3. Previously, Option 1 was used with other ratio options shown with a strikethrough. The PRA UnR tables for EDG, HPCI, RCIC, RHR, and RHRSW were revised to reflect the change. Additionally, this revision incorporates the changes to the EECW System Description as required by CR 1202022.

3Q/16: Changed PRA Parameter(s). The MSPI Basis documents for all three units were revised to incorporate PRA changes. The PRA was updated to show the Failure to Run and Failure to Start basic event importance in each of the tables. This change allows the use of Option 2 to determine the FV/UR ratio as described in NEI 99-02, Appendix F 2.3.3. Previously, Option 1 as described in NEI 99-02 F2.3.3, was used with other ratio options shown with a strikethrough. The PRA UnR tables for EDG, HPCI, RCIC, RHR, and RHRSW were revised.

2Q/16: 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.

1Q/16: Third and Fourth Quarter 2015 data was updated to reflect ICES# 318401 change. This changed ICES #318401 from a failure to a

non-failure. This change does not affect the color of the indicator.

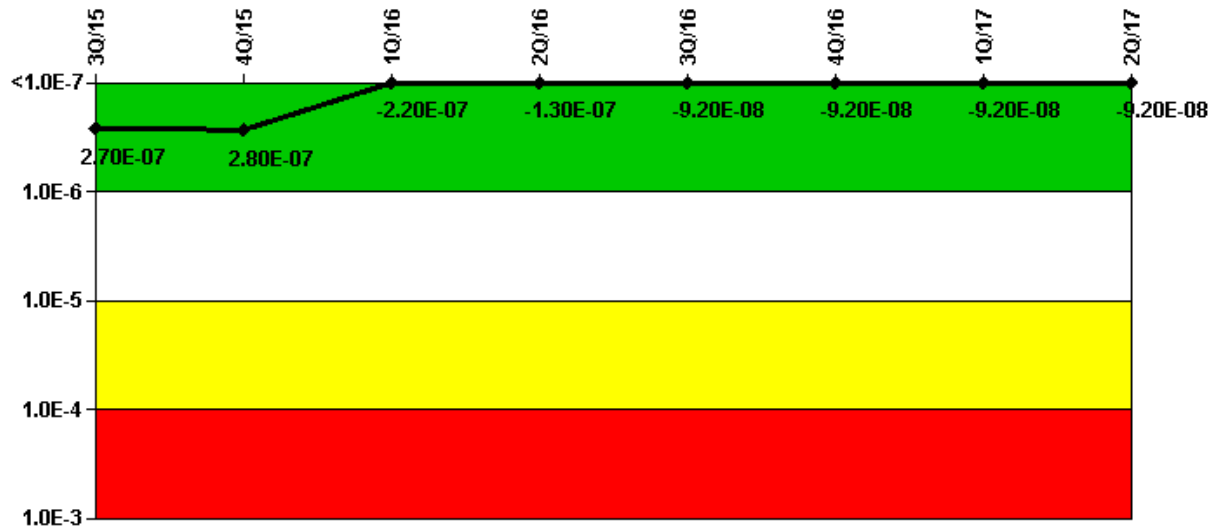
4Q/15: The MSPI Risk Cap is invoked. The contribution from the highest worth single failure (7.86E-7) has been replaced by a value of 5E-7.

4Q/15: Risk Cap Invoked. The MSPI Risk Cap is invoked. The contribution from the highest worth single failure (7.86E-7) has been replaced by a value of 5E-7.

3Q/15: The MSPI Risk Cap is invoked. The contribution from the highest worth single failure (7.72E-07) has been replaced by a value of 5.00E-07.

3Q/15: Risk Cap Invoked. The MSPI Risk Cap is invoked. The contribution from the highest worth single failure (7.72E-07) has been replaced by a value of 5.00E-07.

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/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17
UAI (ΔCDF)	1.36E-07	1.31E-07	-3.61E-08	-2.30E-08	-2.30E-08	-2.34E-08	-2.34E-08	-2.34E-08
URI (ΔCDF)	1.31E-07	1.52E-07	-1.87E-07	-1.09E-07	-6.87E-08	-6.87E-08	-6.87E-08	-6.87E-08
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	2.70E-07	2.80E-07	-2.20E-07	-1.30E-07	-9.20E-08	-9.20E-08	-9.20E-08	-9.20E-08

TOP

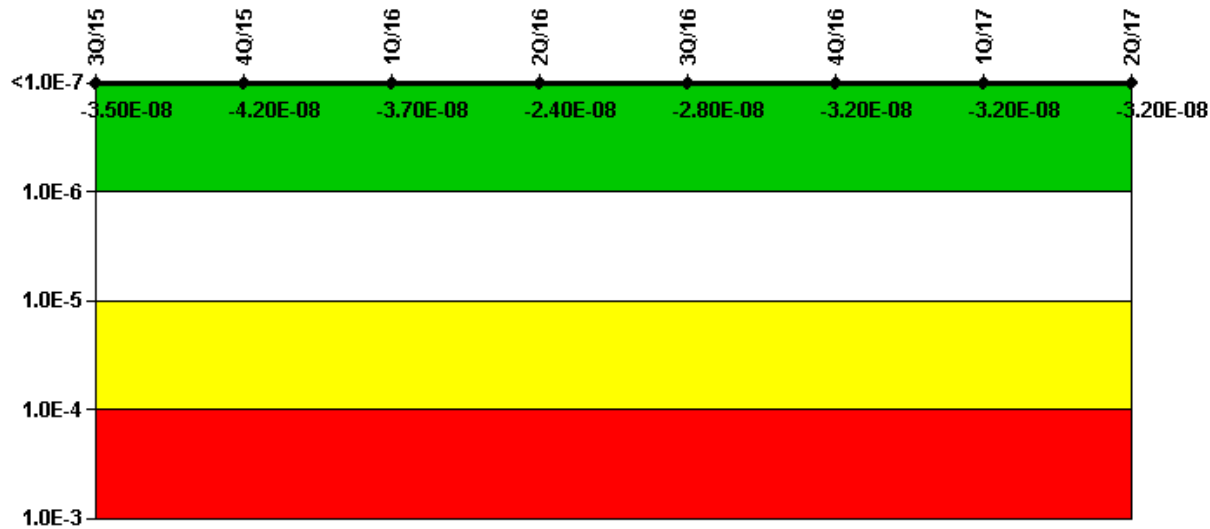
Licensee Comments:

4Q/16: Changed PRA Parameter(s). NDN-000-999-2010-0003 Revision 12 was updated to show the Failure to Run and Failure to Start basic event importances in each of the tables per CR 1110732-001. The Unit 2 MSPI Basis Document Revision 17 was approved on 9/30/2016 to reflect that change. This change allows the use of Option 2 to determine the FV/UR ratio as described in NEI 99-02, Appendix F 2.3.3. Previously, Option 1 was used with other ratio options shown with a strikethrough. The PRA UnR tables for EDG, HPCI, RCIC, RHR, and RHRSW were revised to reflect the change. Additionally, this revision incorporates the changes to the EECW System Description as required by CR 1202022.

3Q/16: Changed PRA Parameter(s). The MSPI Basis documents for all three units were revised to incorporate PRA changes. The PRA was updated to show the Failure to Run and Failure to Start basic event importance in each of the tables. This change allows the use of Option 2 to determine the FV/UR ratio as described in NEI 99-02, Appendix F 2.3.3. Previously, Option 1 as described in NEI 99-02 F2.3.3, was used with other ratio options shown with a strikethrough. The PRA UnR tables for EDG, HPCI, RCIC, RHR, and RHRSW were revised.

2Q/16: 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.

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/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17
UAI (ΔCDF)	4.06E-08	3.39E-08	3.93E-08	4.35E-09	2.36E-10	-4.11E-09	-3.89E-09	-4.10E-09
URI (ΔCDF)	-7.60E-08	-7.60E-08	-7.60E-08	-2.86E-08	-2.82E-08	-2.82E-08	-2.82E-08	-2.82E-08
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	-3.50E-08	-4.20E-08	-3.70E-08	-2.40E-08	-2.80E-08	-3.20E-08	-3.20E-08	-3.20E-08

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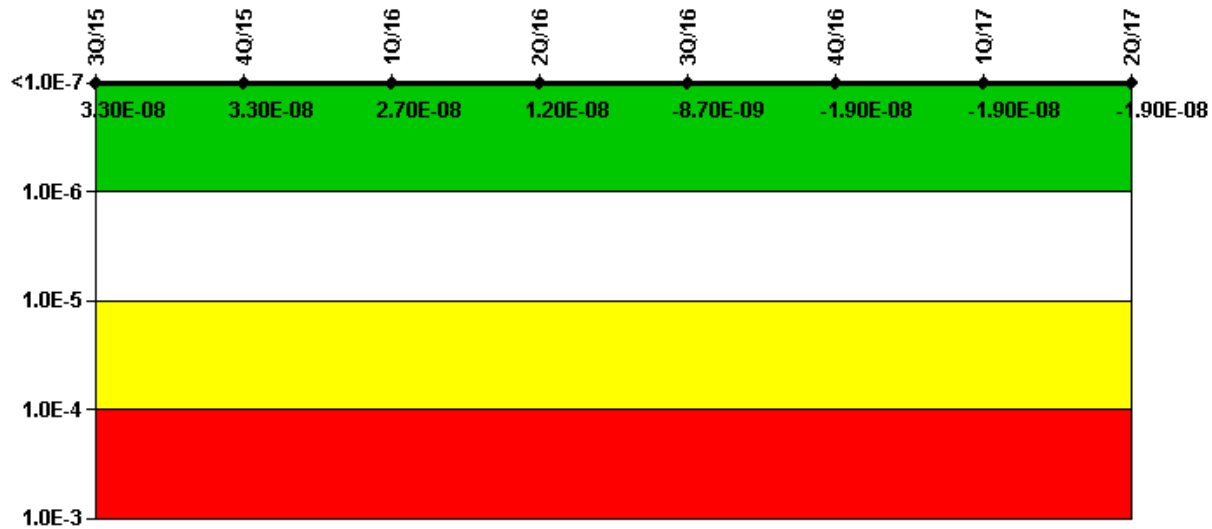
Licensee Comments:

4Q/16: Changed PRA Parameter(s). NDN-000-999-2010-0003 Revision 12 was updated to show the Failure to Run and Failure to Start basic event importances in each of the tables per CR 1110732-001. The Unit 2 MSPI Basis Document Revision 17 was approved on 9/30/2016 to reflect that change. This change allows the use of Option 2 to determine the FV/UR ratio as described in NEI 99-02, Appendix F 2.3.3. Previously, Option 1 was used with other ratio options shown with a strikethrough. The PRA UnR tables for EDG, HPCI, RCIC, RHR, and RHRSW were revised to reflect the change. Additionally, this revision incorporates the changes to the EECW System Description as required by CR 1202022.

3Q/16: Changed PRA Parameter(s). The MSPI Basis documents for all three units were revised to incorporate PRA changes. The PRA was updated to show the Failure to Run and Failure to Start basic event importance in each of the tables. This change allows the use of Option 2 to determine the FV/UR ratio as described in NEI 99-02, Appendix F 2.3.3. Previously, Option 1 as described in NEI 99-02 F2.3.3, was used with other ratio options shown with a strikethrough. The PRA UnR tables for EDG, HPCI, RCIC, RHR, and RHRSW were revised.

2Q/16: 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.

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/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17
UAI (ΔCDF)	7.00E-08	7.03E-08	6.41E-08	3.20E-08	1.06E-08	3.39E-10	6.37E-10	6.37E-10
URI (ΔCDF)	-3.73E-08	-3.73E-08	-3.73E-08	-1.95E-08	-1.92E-08	-1.92E-08	-1.92E-08	-1.92E-08
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	3.30E-08	3.30E-08	2.70E-08	1.20E-08	-8.70E-09	-1.90E-08	-1.90E-08	-1.90E-08

TOP

Licensee Comments:

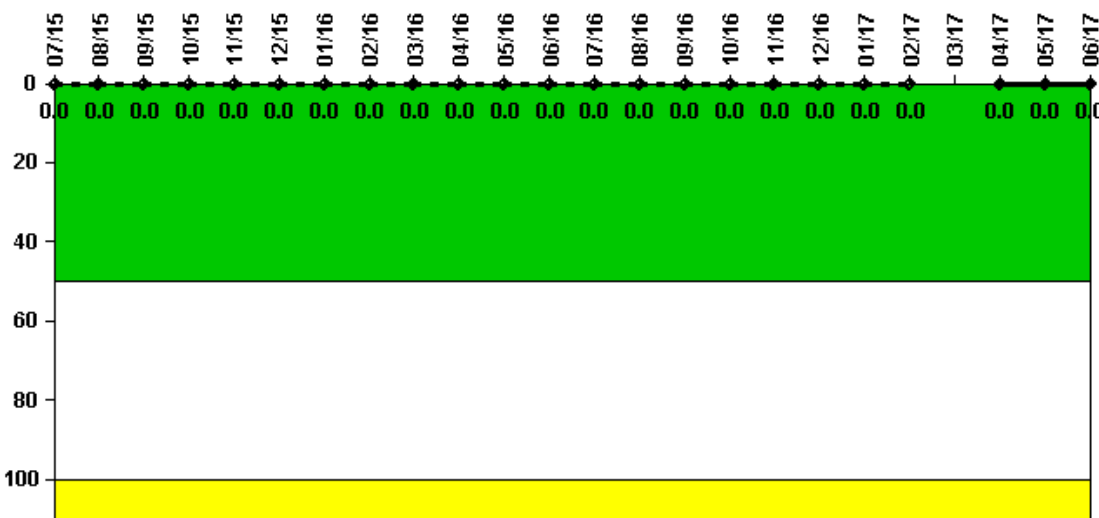
4Q/16: Changed PRA Parameter(s). NDN-000-999-2010-0003 Revision 12 was updated to show the Failure to Run and Failure to Start basic event importances in each of the tables per CR 1110732-001. The Unit 2 MSPI Basis Document Revision 17 was approved on 9/30/2016 to reflect that change. This change allows the use of Option 2 to determine the FV/UR ratio as described in NEI 99-02, Appendix F 2.3.3. Previously, Option 1 was used with other ratio options shown with a strikethrough. The PRA UnR tables for EDG, HPCI, RCIC, RHR, and RHRSW were revised to reflect the change. Additionally, this revision incorporates the changes to the EECW System Description as required by CR 1202022.

3Q/16: Changed PRA Parameter(s). The MSPI Basis documents for all three units were revised to incorporate PRA changes. The PRA

was updated to show the Failure to Run and Failure to Start basic event importance in each of the tables. This change allows the use of Option 2 to determine the FV/UR ratio as described in NEI 99-02, Appendix F 2.3.3. Previously, Option 1 as described in NEI 99-02 F2.3.3, was used with other ratio options shown with a strikethrough. The PRA UnR tables for EDG, HPCI, RCIC, RHR, and RHRSW were revised.

2Q/16: Changed PRA Parameter(s). 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.

Reactor Coolant System Activity



Thresholds: White > 50.0 Yellow > 100.0

Notes

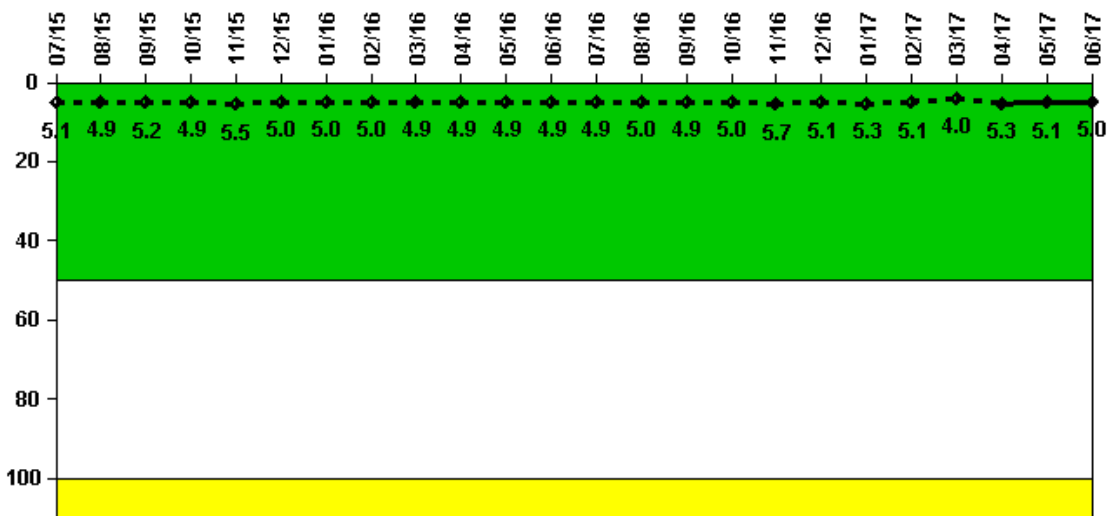
Reactor Coolant System Activity	7/15	8/15	9/15	10/15	11/15	12/15	1/16	2/16	3/16	4/16	5/16	6/16
Maximum activity	0.000043	0.000028	0.000028	0.000059	0.000068	0.000026	0.000021	0.000029	0.000031	0.000022	0.000025	0.000025
Technical specification limit	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Indicator value	0	0	0	0	0	0	0	0	0	0	0	0
Reactor Coolant System Activity	7/16	8/16	9/16	10/16	11/16	12/16	1/17	2/17	3/17	4/17	5/17	6/17
Maximum activity	0.000026	0.000056	0.000043	0.000062	0.000025	0.000026	0.000039	0.000021	N/A	0.000035	0.000022	0.000033
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

Indicator value 0 0 0 0 0 0 0 0 0 N/A 0 0 0

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Licensee Comments: none

Reactor Coolant System Leakage



Thresholds: White > 50.0 Yellow > 100.0

Notes

Reactor Coolant System Leakage	7/15	8/15	9/15	10/15	11/15	12/15	1/16	2/16	3/16	4/16	5/16	6/16
Maximum leakage	1.540	1.480	1.560	1.470	1.660	1.510	1.490	1.510	1.470	1.480	1.480	1.460
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

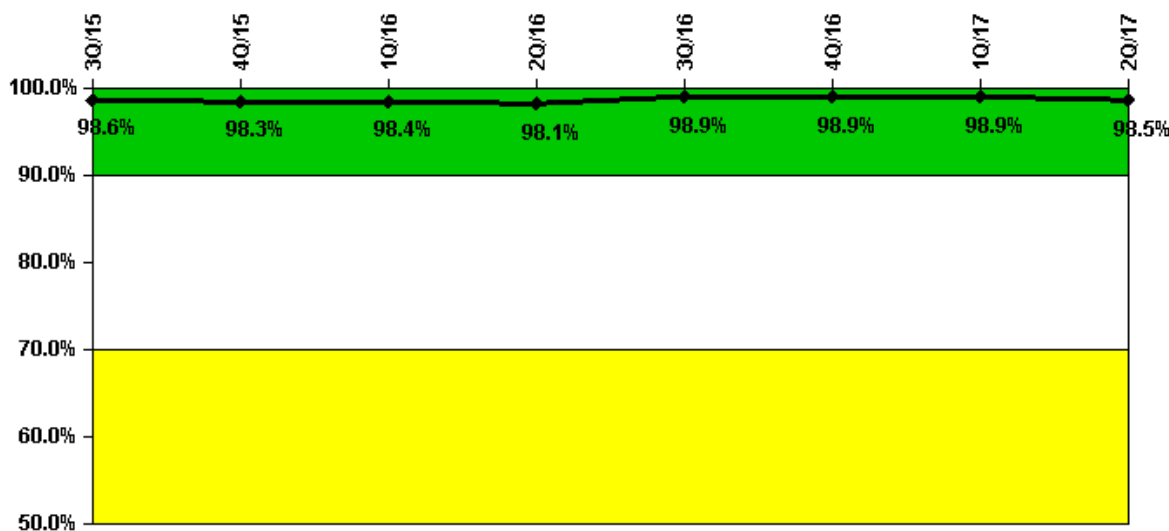
Indicator value	5.1	4.9	5.2	4.9	5.5	5.0	5.0	5.0	4.9	4.9	4.9	4.9
Reactor Coolant System Leakage	7/16	8/16	9/16	10/16	11/16	12/16	1/17	2/17	3/17	4/17	5/17	6/17
Maximum leakage	1.470	1.490	1.470	1.490	1.710	1.520	1.580	1.540	1.210	1.590	1.530	1.510
Technical specification limit	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

Indicator value	4.9	5.0	4.9	5.0	5.7	5.1	5.3	5.1	4.0	5.3	5.1	5.0
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Licensee Comments: none

Drill/Exercise Performance



Thresholds: White < 90.0% Yellow < 70.0%

Notes

Drill/Exercise Performance	3Q/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17
Successful opportunities	50.0	74.0	34.0	43.0	94.0	6.0	36.0	58.0
Total opportunities	50.0	75.0	34.0	45.0	95.0	6.0	36.0	60.0

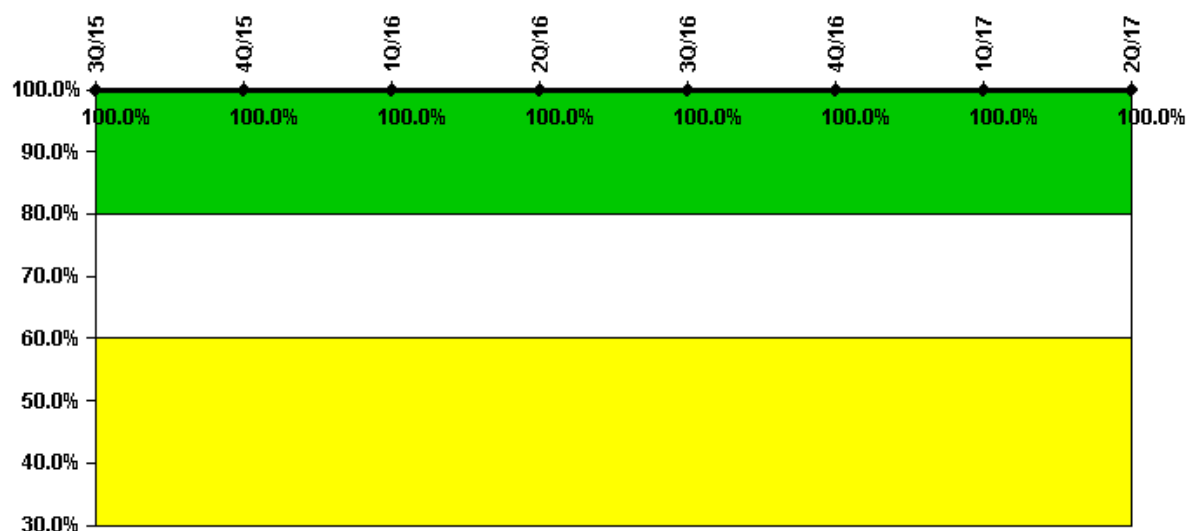
Indicator value **98.6% 98.3% 98.4% 98.1% 98.9% 98.9% 98.9% 98.5%**

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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

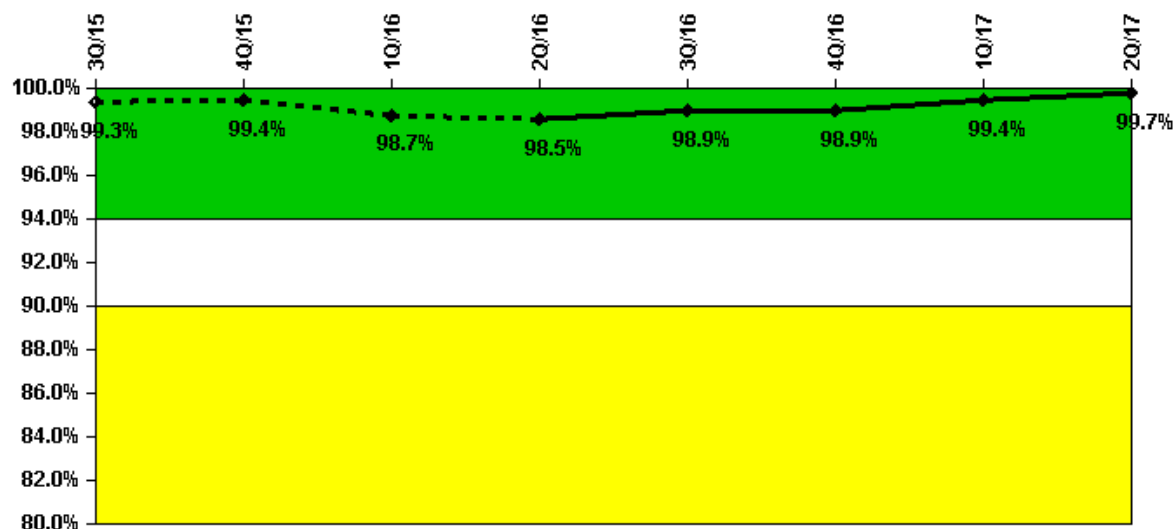
ERO Drill Participation	3Q/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17
Participating Key personnel	85.0	91.0	93.0	91.0	98.0	97.0	101.0	97.0
Total Key personnel	85.0	91.0	93.0	91.0	98.0	97.0	101.0	97.0

Indicator value **100.0% 100.0% 100.0% 100.0% 100.0% 100.0% 100.0% 100.0%**

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Licensee Comments: none

Alert & Notification System



Thresholds: White < 94.0% Yellow < 90.0%

Notes

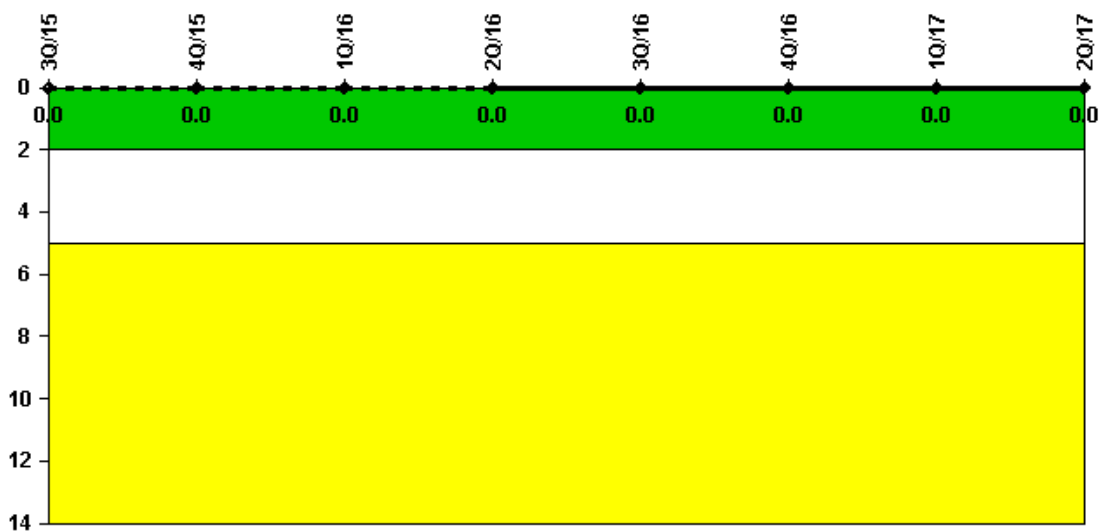
Alert & Notification System	3Q/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17
Successful siren-tests	918	726	881	718	932	828	831	727
Total sirens-tests	936	728	902	728	936	832	832	728

Indicator value **99.3% 99.4% 98.7% 98.5% 98.9% 98.9% 99.4% 99.7%**

▲ TOP

Licensee Comments: none

Occupational Exposure Control Effectiveness



Thresholds: White > 2.0 Yellow > 5.0

Notes

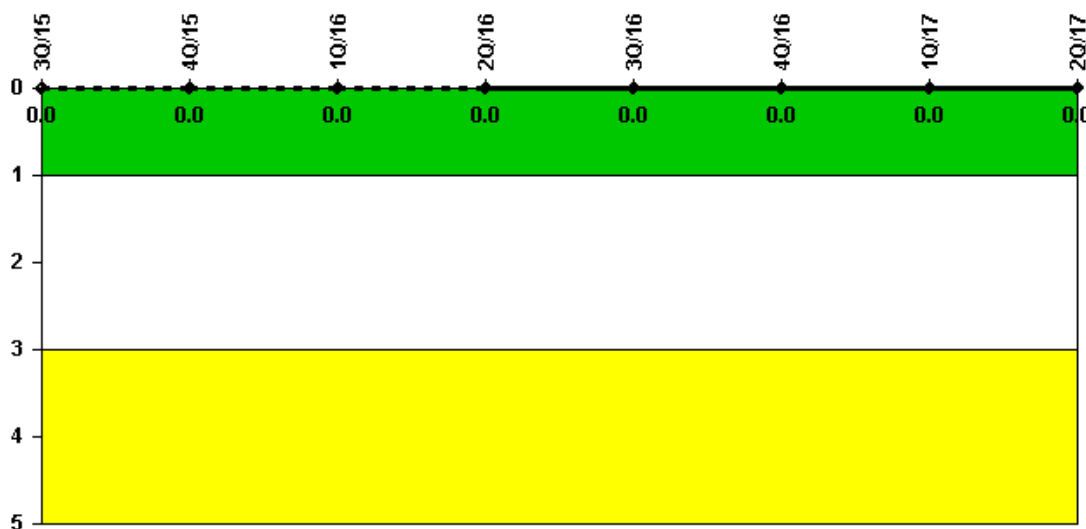
Occupational Exposure Control Effectiveness 3Q/15 4Q/15 1Q/16 2Q/16 3Q/16 4Q/16 1Q/17 2Q/17

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
Indicator value	0	0	0	0	0	0	0	0

TOP

Licensee Comments: none

RETS/ODCM Radiological Effluent



Thresholds: White > 1.0 Yellow > 3.0

Notes

RETS/ODCM Radiological Effluent 3Q/15 4Q/15 1Q/16 2Q/16 3Q/16 4Q/16 1Q/17 2Q/17

RETS/ODCM occurrences 0 0 0 0 0 0 0 0

Indicator value 0 0 0 0 0 0 0 0

▲ TOP

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.

Current data as of: July 26, 2017

Page Last Reviewed/Updated Wednesday, June 07, 2017