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Browns Ferry 1 – Quarterly Performance Indicators

4Q/2017 Performance Indicators

The solid trend line represents the current reporting period.

Licensee's General Comments: none

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- Unplanned Scrams (IE01)
- Unplanned Power Changes per 7000 Critical Hours (IE03)
- Unplanned Scrams with Complications (IE04)
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- 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

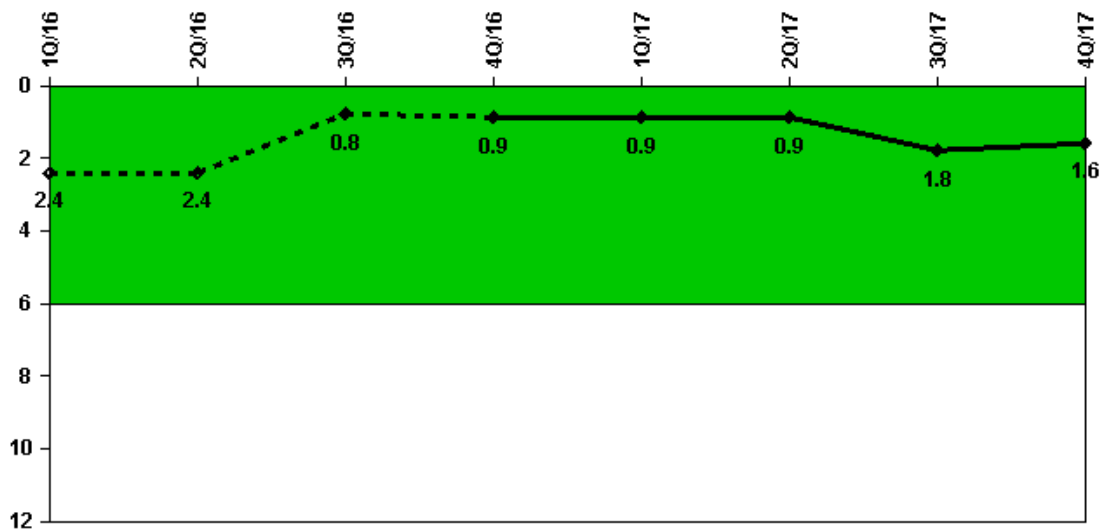
Unplanned Scrams per 7000 Critical Hrs	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17	3Q/17	4Q/17
Unplanned scrams	0	0	0	0	0	0	0	0
Critical hours	2183.0	2184.0	2073.5	1422.4	2159.0	2184.0	2208.0	2209.0

Indicator value	0	0	0	0	0	0	0	0
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Licensee Comments: none

Unplanned Power Changes per 7000 Critical Hrs



Thresholds: White > 6.0

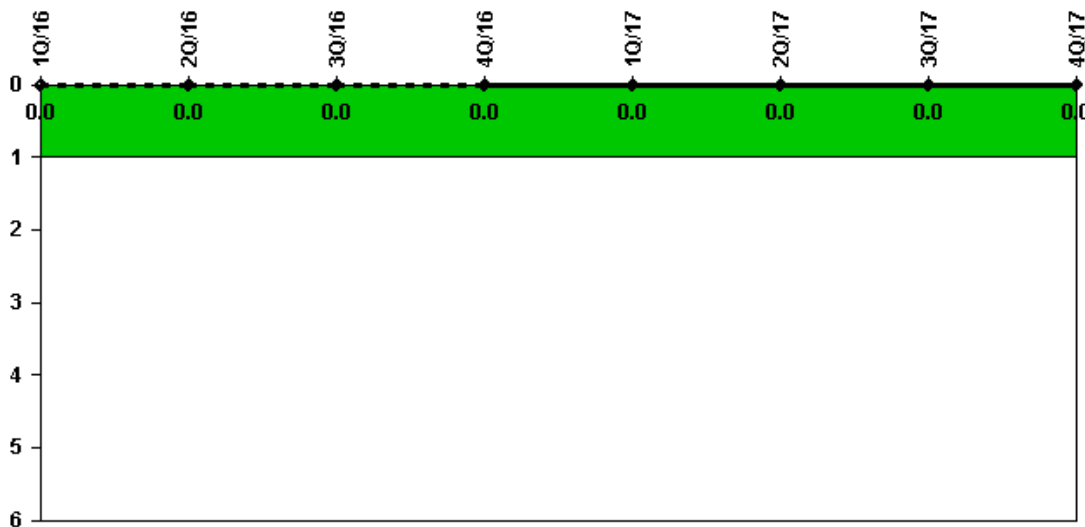
Notes

Unplanned Power Changes per 7000 Critical Hrs	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17	3Q/17	4Q/17
Unplanned power changes	1.0	0	0	0	1.0	0	1.0	0
Critical hours	2183.0	2184.0	2073.5	1422.4	2159.0	2184.0	2208.0	2209.0
Indicator value	2.4	2.4	0.8	0.9	0.9	0.9	1.8	1.6

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Licensee Comments: none

Unplanned Scrams with Complications



Thresholds: White > 1.0

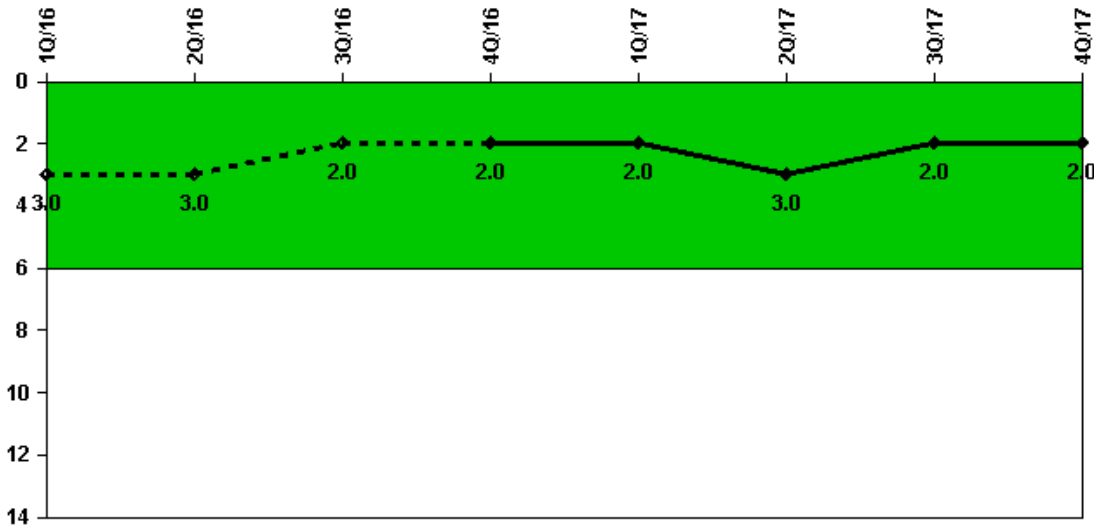
Notes

Unplanned Scrams with Complications	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17	3Q/17	4Q/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) 1Q/16 2Q/16 3Q/16 4Q/16 1Q/17 2Q/17 3Q/17 4Q/17

Safety System Functional Failures 0 0 1 1 0 1 0 1

Indicator value 3 3 2 2 2 3 2 2

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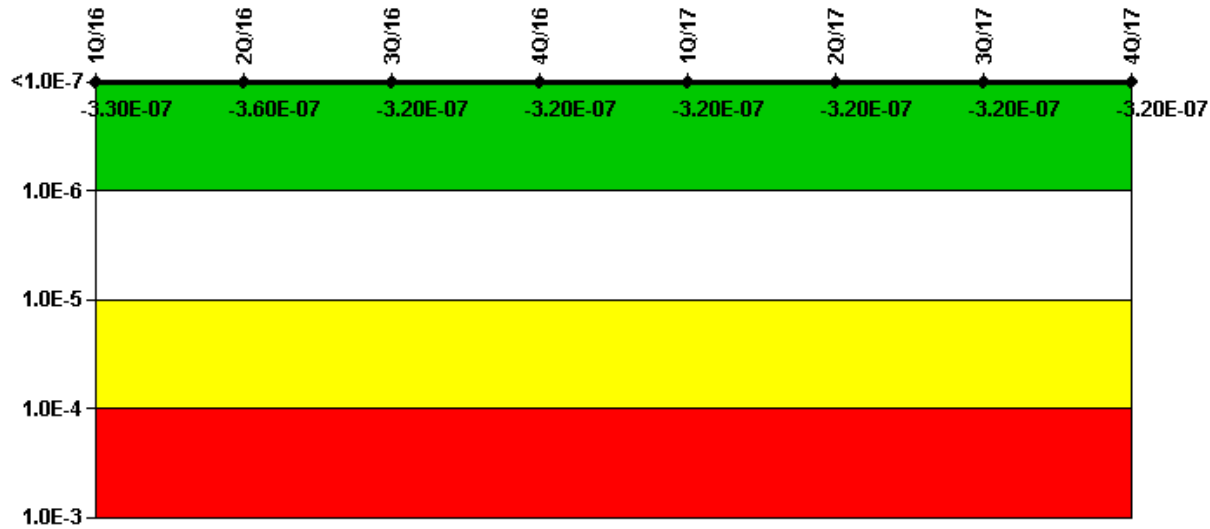
Licensee Comments:

2Q/17: LER 50-259/2017-003-00 - Unanalyzed Condition for Tornado Missiles Striking the Emergency Diesel Generator Fuel Oil Vent Lines

4Q/16: LER 259/2016-004-00 - Incorrect Tap Settings for 480V Shutdown Board Transformers Results in Inoperability of Associated 480V Shutdown Boards

3Q/16: LER 50-259/2016-002-00: High Pressure Coolant Injection System Inoperable Due to Slow Containment Isolation Valve Closing Time

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

	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17	3Q/17	4Q/17
UAI (Δ CDF)	-2.25E-08	-2.47E-08	-2.47E-08	-2.47E-08	-2.47E-08	-2.27E-08	-2.27E-08	-2.28E-08
URI (Δ CDF)	-3.12E-07	-3.39E-07	-2.98E-07	-2.98E-07	-2.98E-07	-2.98E-07	-2.98E-07	-2.98E-07
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	-3.30E-07	-3.60E-07	-3.20E-07	-3.20E-07	-3.20E-07	-3.20E-07	-3.20E-07	-3.20E-07

TOP

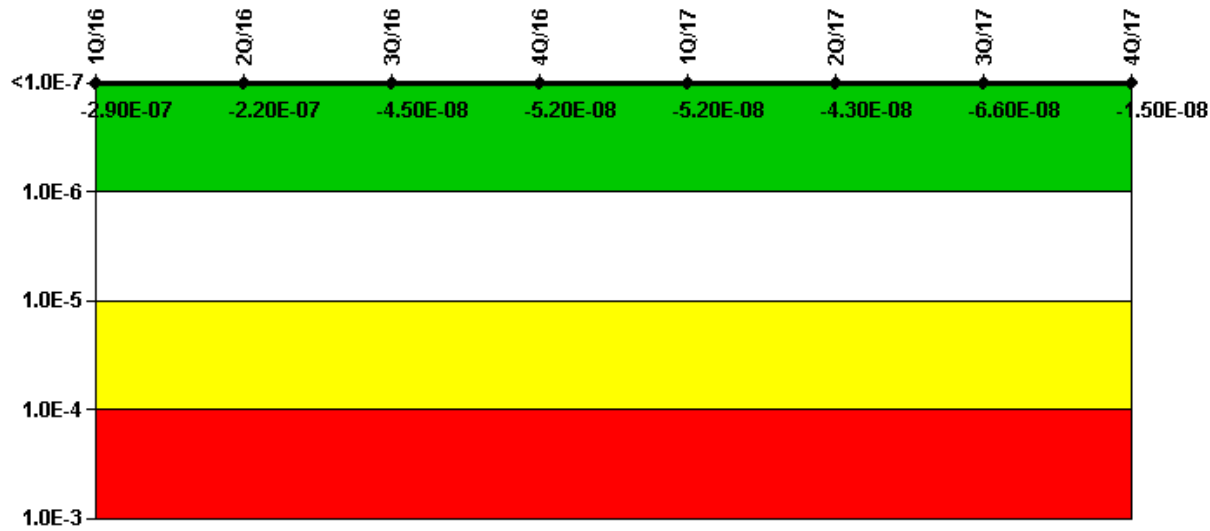
Licensee Comments:

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 1 MSPI Basis Document Revision 18 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: 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.

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

	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17	3Q/17	4Q/17
UAI (ΔCDF)	-6.30E-08	-5.24E-08	5.99E-08	5.22E-08	5.23E-08	6.15E-08	3.88E-08	8.90E-08
URI (ΔCDF)	-2.30E-07	-1.69E-07	-1.04E-07	-1.04E-07	-1.04E-07	-1.04E-07	-1.04E-07	-1.04E-07
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	-2.90E-07	-2.20E-07	-4.50E-08	-5.20E-08	-5.20E-08	-4.30E-08	-6.60E-08	-1.50E-08

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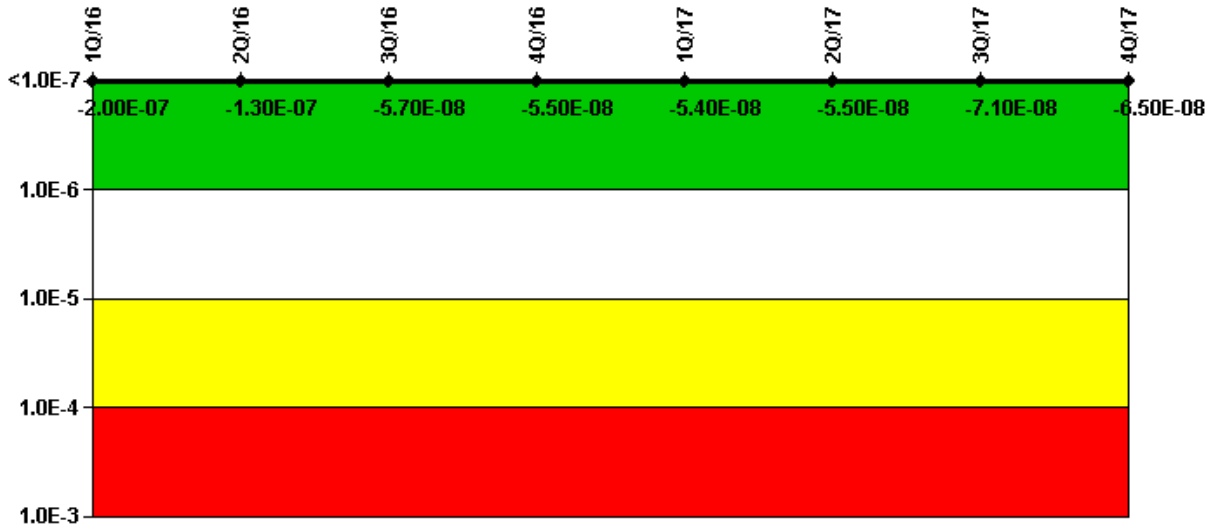
Licensee Comments:

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 1 MSPI Basis Document Revision 18 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.

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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

	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17	3Q/17	4Q/17
UAI (ΔCDF)	-9.55E-10	-1.69E-08	1.49E-08	1.74E-08	1.74E-08	1.73E-08	9.41E-10	6.78E-09
URI (ΔCDF)	-2.04E-07	-1.18E-07	-7.19E-08	-7.19E-08	-7.19E-08	-7.19E-08	-7.19E-08	-7.19E-08
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	-2.00E-07	-1.30E-07	-5.70E-08	-5.50E-08	-5.40E-08	-5.50E-08	-7.10E-08	-6.50E-08

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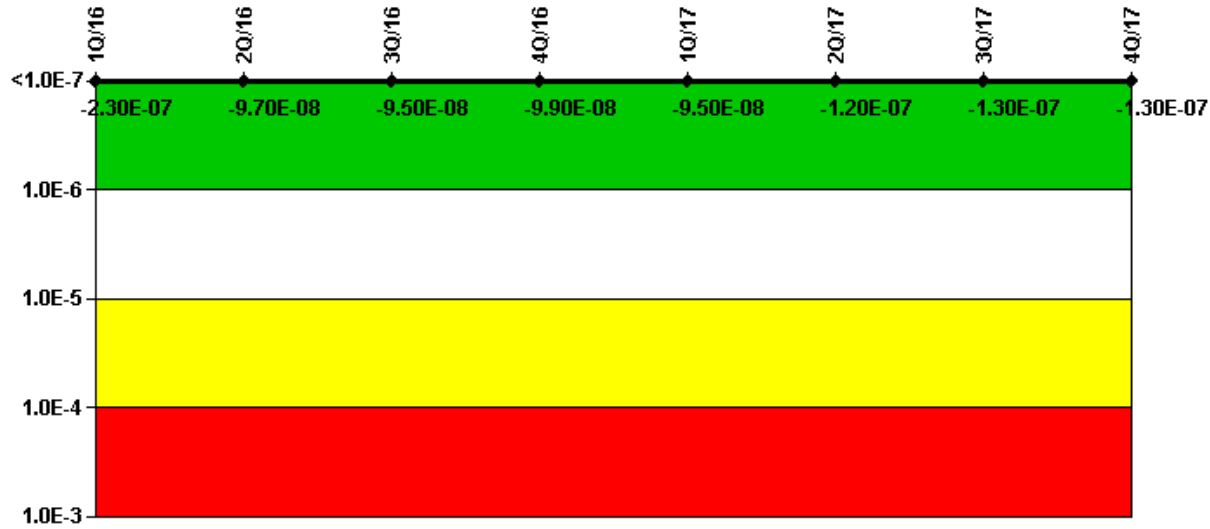
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4Q/16: Changed PRA Parameter(s). NDN-000-999-2010-0003 Revision 12 was updated to show the Failure to Run and Failure to Start basic event importances in each of the tables per CR 1110732-001. The Unit 1 MSPI Basis Document Revision 18 was approved 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.

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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

	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17	3Q/17	4Q/17
UAI (ΔCDF)	9.32E-09	1.62E-08	1.76E-08	1.40E-08	1.79E-08	-1.19E-08	-1.37E-08	-1.37E-08
URI (ΔCDF)	-2.38E-07	-1.14E-07	-1.13E-07	-1.13E-07	-1.13E-07	-1.13E-07	-1.13E-07	-1.13E-07
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	-2.30E-07	-9.70E-08	-9.50E-08	-9.90E-08	-9.50E-08	-1.20E-07	-1.30E-07	-1.30E-07

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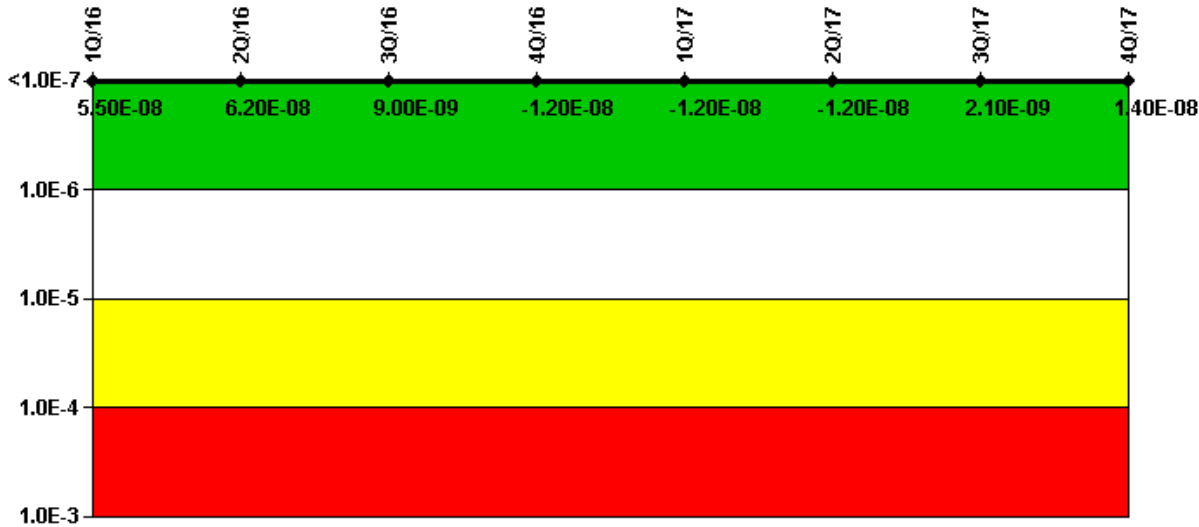
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4Q/16: Changed PRA Parameter(s). NDN-000-999-2010-0003 Revision 12 was updated to show the Failure to Run and Failure to Start basic event importances in each of the tables per CR 1110732-001. The Unit 1 MSPI Basis Document Revision 18 was approved 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.

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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

	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17	3Q/17	4Q/17
UAI (ΔCDF)	9.82E-08	8.49E-08	3.17E-08	1.08E-08	1.08E-08	1.08E-08	1.07E-08	2.27E-08
URI (ΔCDF)	-4.30E-08	-2.29E-08	-2.26E-08	-2.26E-08	-2.26E-08	-2.26E-08	-8.62E-09	-8.62E-09
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	5.50E-08	6.20E-08	9.00E-09	-1.20E-08	-1.20E-08	-1.20E-08	2.10E-09	1.40E-08

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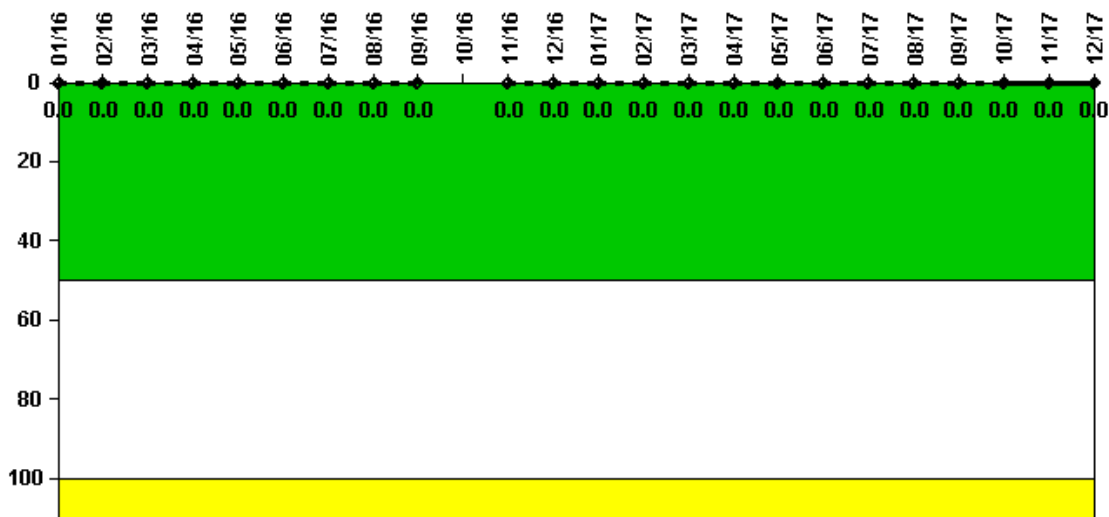
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4Q/16: Changed PRA Parameter(s). NDN-000-999-2010-0003 Revision 12 was updated to show the Failure to Run and Failure to Start basic event importances in each of the tables per CR 1110732-001. The Unit 1 MSPI Basis Document Revision 18 was approved 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 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.

Reactor Coolant System Activity



Thresholds: White > 50.0 Yellow > 100.0

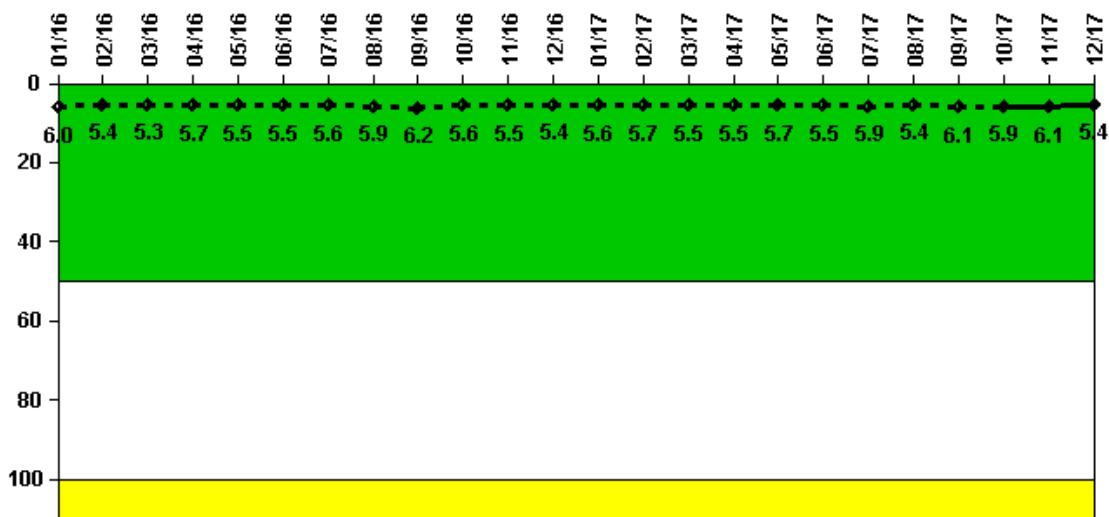
Notes

Reactor Coolant System Activity	1/16	2/16	3/16	4/16	5/16	6/16	7/16	8/16	9/16	10/16	11/16	12/16
Maximum activity	0.000071	0.000074	0.000076	0.000082	0.000120	0.000087	0.000072	0.000078	0.000082	N/A	0.000067	0.000070
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
Reactor Coolant System Activity	1/17	2/17	3/17	4/17	5/17	6/17	7/17	8/17	9/17	10/17	11/17	12/17
Maximum activity	0.000080	0.000084	0.000085	0.000088	0.000085	0.000080	0.000078	0.000081	0.000058	0.000081	0.000088	0.000089
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

TOP

Licensee Comments: none

Reactor Coolant System Leakage



Thresholds: White > 50.0 Yellow > 100.0

Notes

Reactor Coolant System Leakage	1/16	2/16	3/16	4/16	5/16	6/16	7/16	8/16	9/16	10/16	11/16	12/16
Maximum leakage	1.790	1.620	1.590	1.700	1.660	1.640	1.680	1.780	1.860	1.670	1.640	1.630
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

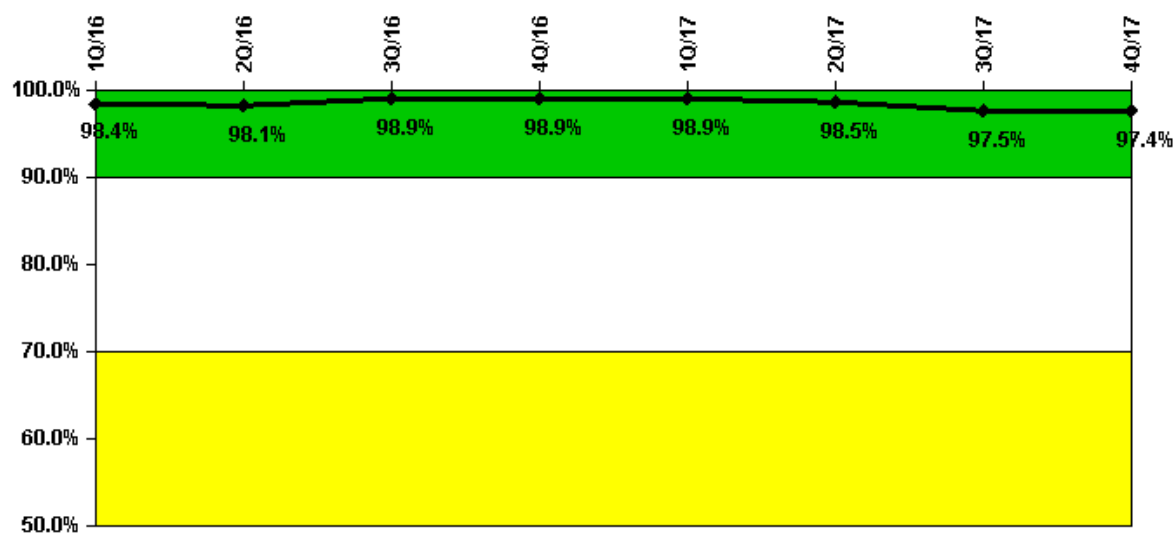
Indicator value	6.0	5.4	5.3	5.7	5.5	5.5	5.6	5.9	6.2	5.6	5.5	5.4
Reactor Coolant System Leakage	1/17	2/17	3/17	4/17	5/17	6/17	7/17	8/17	9/17	10/17	11/17	12/17
Maximum leakage	1.670	1.720	1.660	1.650	1.710	1.640	1.770	1.630	1.830	1.770	1.830	1.630
Technical specification limit	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

Indicator value	5.6	5.7	5.5	5.5	5.7	5.5	5.9	5.4	6.1	5.9	6.1	5.4
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Licensee Comments: none

Drill/Exercise Performance



Thresholds: White < 90.0% Yellow < 70.0%

Notes

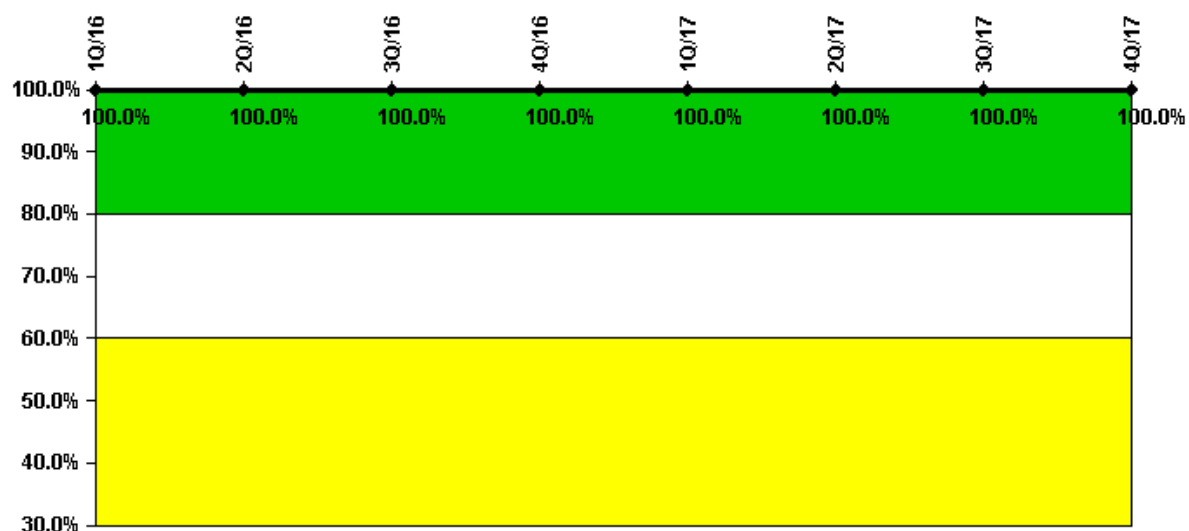
Drill/Exercise Performance	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17	3Q/17	4Q/17
Successful opportunities	34.0	43.0	94.0	6.0	36.0	58.0	85.0	26.0
Total opportunities	34.0	45.0	95.0	6.0	36.0	60.0	90.0	26.0

Indicator value **98.4% 98.1% 98.9% 98.9% 98.9% 98.5% 97.5% 97.4%**

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Licensee Comments: none

ERO Drill Participation



Thresholds: White < 80.0% Yellow < 60.0%

Notes

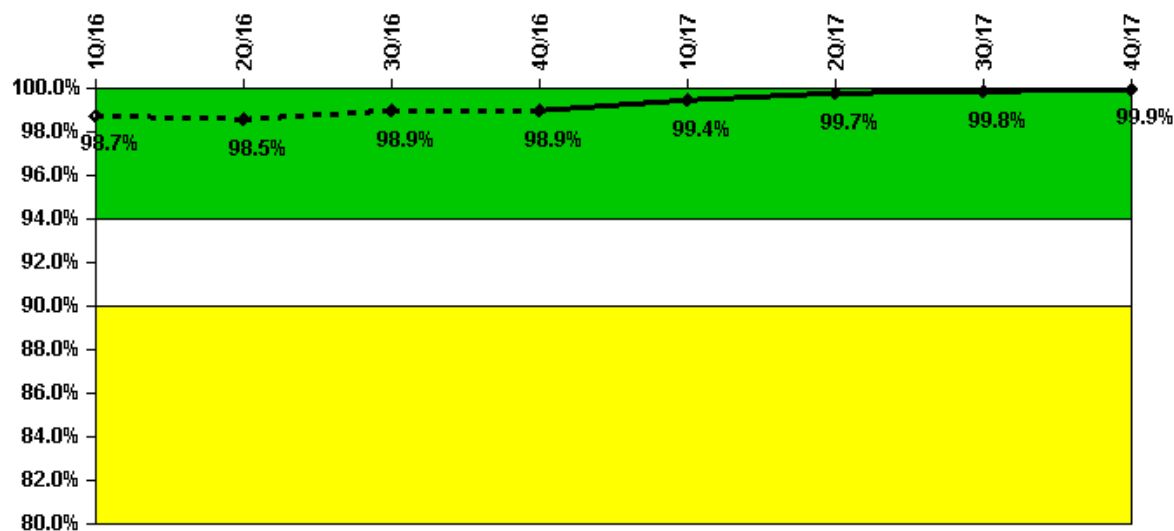
ERO Drill Participation	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17	3Q/17	4Q/17
Participating Key personnel	93.0	91.0	98.0	97.0	101.0	97.0	82.0	85.0
Total Key personnel	93.0	91.0	98.0	97.0	101.0	97.0	82.0	85.0

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

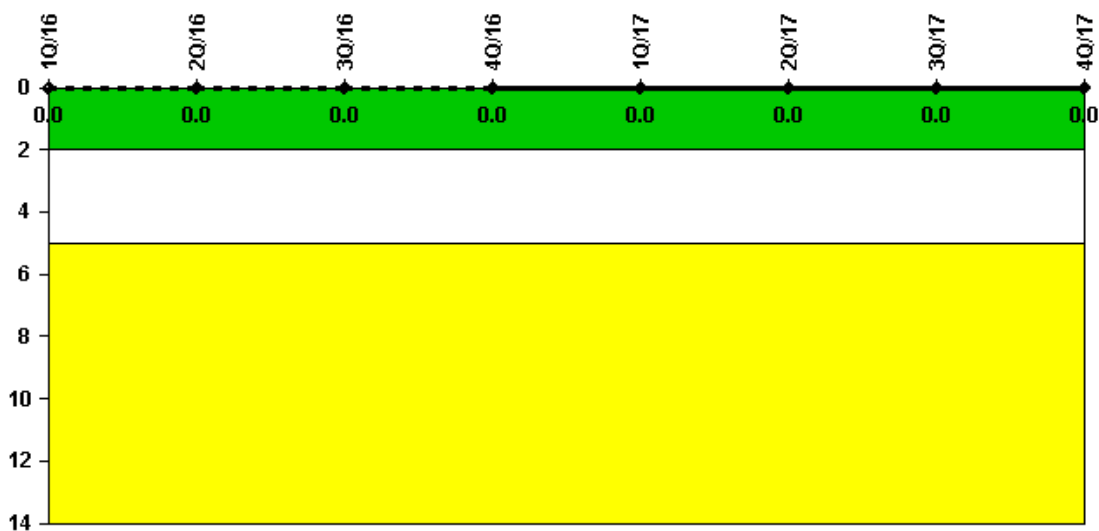
Alert & Notification System	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17	2Q/17	3Q/17	4Q/17
Successful siren-tests	881	718	932	828	831	727	832	832
Total sirens-tests	902	728	936	832	832	728	832	832

Indicator value 98.7% 98.5% 98.9% 98.9% 99.4% 99.7% 99.8% 99.9%

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Licensee Comments: none

Occupational Exposure Control Effectiveness



Thresholds: White > 2.0 Yellow > 5.0

Notes

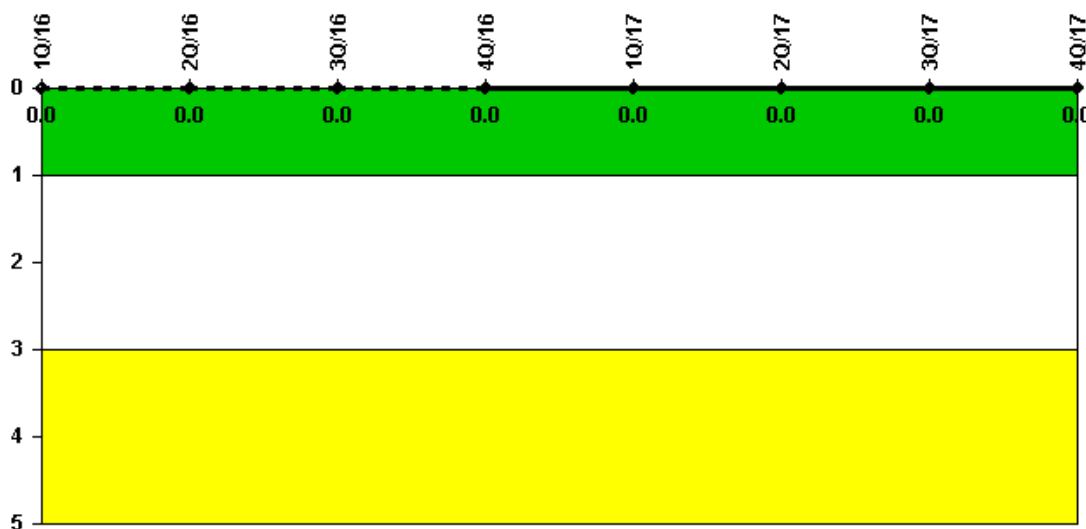
Occupational Exposure Control Effectiveness 1Q/16 2Q/16 3Q/16 4Q/16 1Q/17 2Q/17 3Q/17 4Q/17

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 1Q/16 2Q/16 3Q/16 4Q/16 1Q/17 2Q/17 3Q/17 4Q/17

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

Indicator value 0 0 0 0 0 0 0 0

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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: February 1, 2018

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