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## **D.C. Cook 1 – Quarterly Performance Indicators**

### **1Q/2017 Performance Indicators**

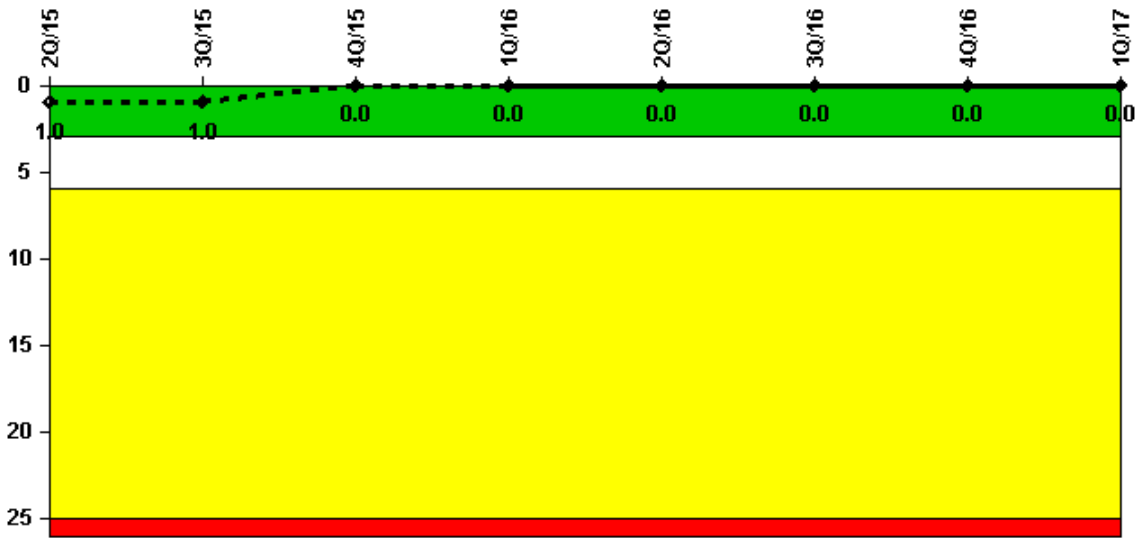
The solid trend line represents the current reporting period.

Licensee's General Comments: none

On this page:

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- Unplanned Power Changes per 7000 Critical Hours (IE03)
- Unplanned Scrams with Complications (IE04)
- Safety System Functional Failures (MS05)
- Emergency AC Power Systems (MS06)
- High Pressure Injection Systems (MS07)
- Heat Removal Systems (MS08)
- Residual Heat Removal Systems (MS09)
- Cooling Water Systems (MS10)
- Reactor Coolant System Activity (BI01)
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- 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

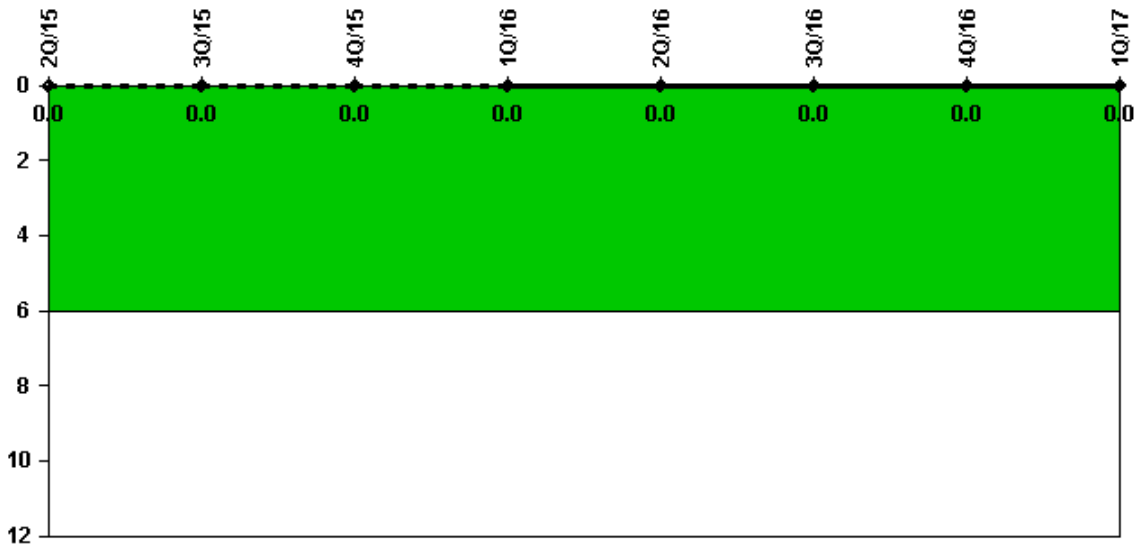
**Notes**

Unplanned Scrams per 7000 Critical Hrs	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17
Unplanned scrams	0	0	0	0	0	0	0	0
Critical hours	1466.5	1525.0	2209.0	1967.0	1552.1	2208.0	2209.0	2159.0
<b>Indicator value</b>	<b>1.0</b>	<b>1.0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

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Licensee Comments: none

### Unplanned Power Changes per 7000 Critical Hrs



Thresholds: White > 6.0

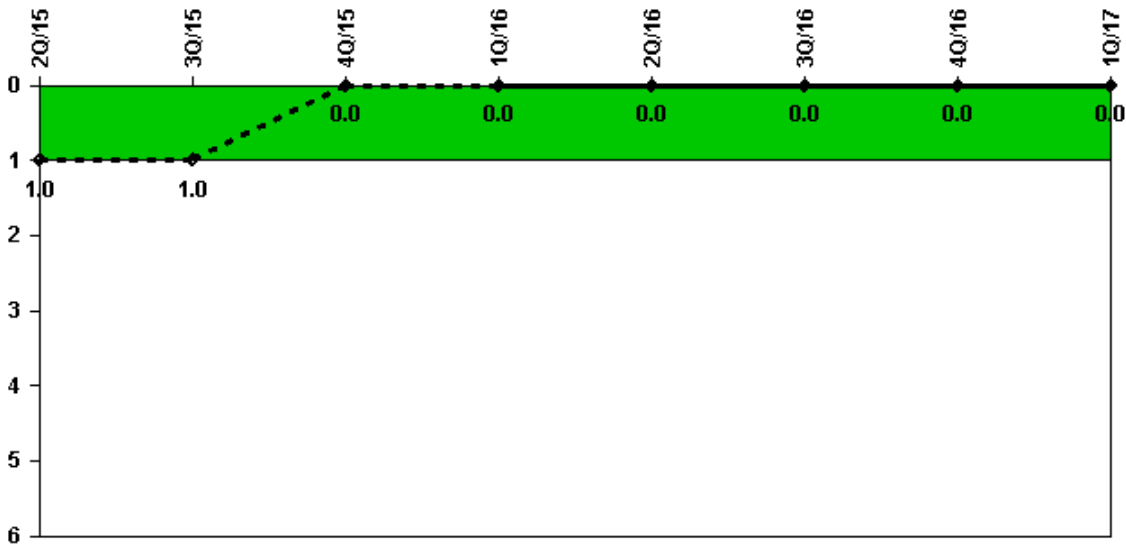
**Notes**

Unplanned Power Changes per 7000 Critical Hrs	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17
Unplanned power changes	0	0	0	0	0	0	0	0
Critical hours	1466.5	1525.0	2209.0	1967.0	1552.1	2208.0	2209.0	2159.0
<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>

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Licensee Comments: none

### Unplanned Scrams with Complications



Thresholds: White > 1.0

#### Notes

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

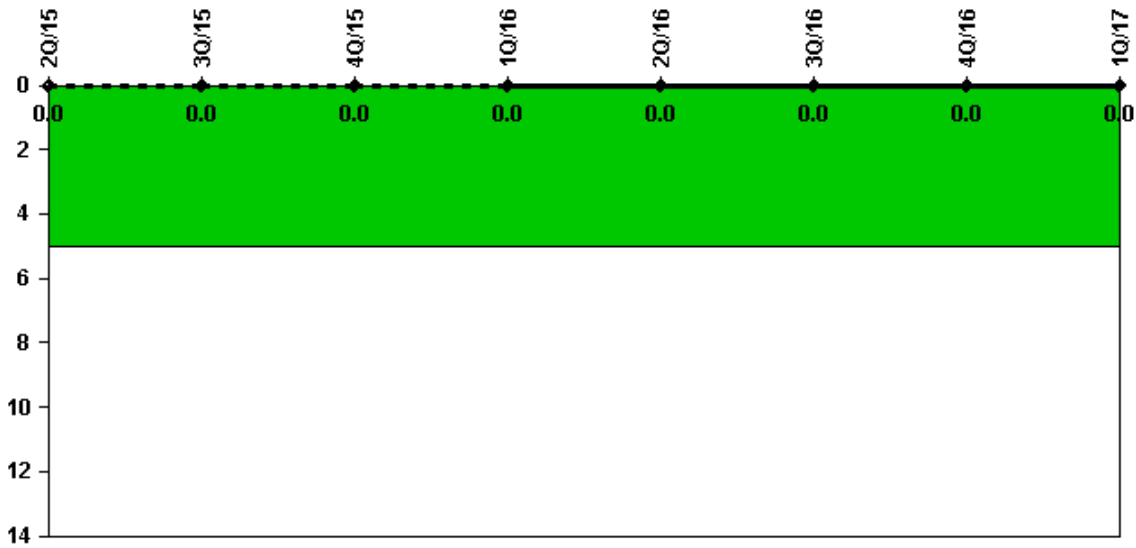
Scrams with complications 0 0 0 0 0 0 0 0

Indicator value 1.0 1.0 0.0 0.0 0.0 0.0 0.0 0.0

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Licensee Comments: none

### Safety System Functional Failures (PWR)



Thresholds: White > 5.0

#### Notes

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

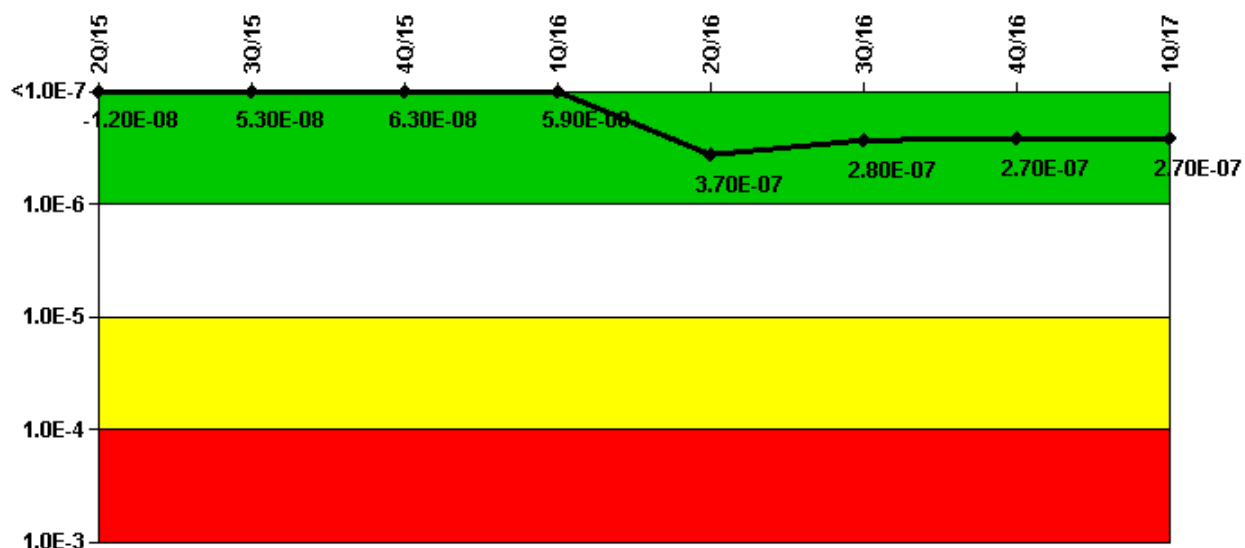
Safety System Functional Failures 0 0 0 0 0 0 0 0 0

Indicator value 0 0 0 0 0 0 0 0 0

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Licensee Comments: none

### 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

	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17
UAI (ΔCDF)	1.57E-09	8.60E-08	9.65E-08	9.28E-08	1.62E-07	7.43E-08	7.39E-08	7.40E-08
URI (ΔCDF)	-1.34E-08	-3.31E-08	-3.34E-08	-3.37E-08	2.03E-07	2.01E-07	2.00E-07	2.00E-07
PLE	NO	NO	NO	NO	NO	NO	NO	NO
<b>Indicator value</b>	<b>-1.20E-08</b>	<b>5.30E-08</b>	<b>6.30E-08</b>	<b>5.90E-08</b>	<b>3.70E-07</b>	<b>2.80E-07</b>	<b>2.70E-07</b>	<b>2.70E-07</b>

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#### Licensee Comments:

4Q/16: Engineering testing and analysis determined that the previously identified design and manufacturing issue with the fuel injection pump delivery valve holders did not result in a run time failure for any of the emergency diesel generators.

4Q/16: Engineering testing is being conducted on the fuel injection pump delivery valve holders to evaluate a design and manufacturing issue which will determine the impact on the run time failures being reported. Run time failures are being reported conservatively pending the results of this testing.

3Q/16: Changed PRA Parameter(s). The D.C. Cook PRA Model revision was approved on 06/30/16 with a corresponding MSPI Basis Document revision approved on 09/09/16. Revision 12 of the D.C. Cook MSPI Basis Document incorporates the update of the PRA. The PRA model revision was an update to the model which included crediting of offsite power recovery in accident scenarios that do not begin with a Loss of Offsite Power. As a result of the PRA model change, the CDF and Fussel-Vesely numbers for all monitored trains and components were revised.

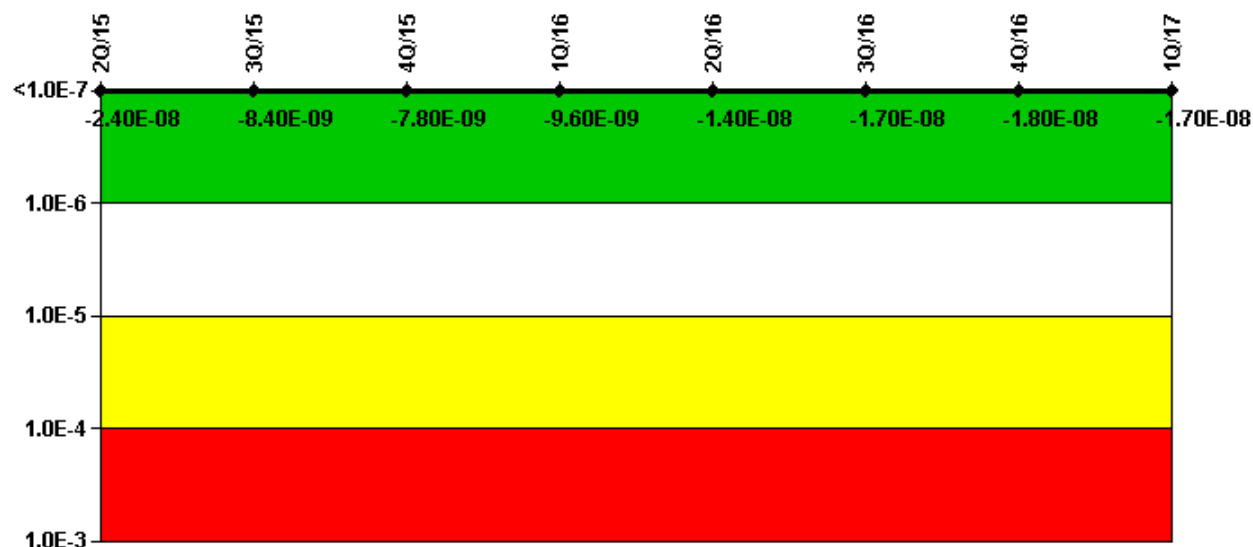
2Q/16: Changed PRA Parameter(s). The D.C. Cook PRA Model Revision 2 was approved on 03/31/16 with a corresponding MSPI Basis Document Revision 10 approved on 06/02/16. New software was used to form the PRA model and to calculate risk importance to provide increased precision on the calculated metrics. As a result of the PRA model change, the CDF, Fussel-Vesely and Basic Event Probabilities for all monitored trains and components were revised. Additionally, this revision includes changes to the model of record made to resolve facts and observations from the 2015 Peer Review of the D.C Cook PRA model of record. The MSPI Basis Document was also updated to show compliance with the changes to NEI 99-02 Appendix G from the approval of FAQ 14-01.

No new components were scoped into MSPI or excluded from monitoring due to the changes incorporated in this revision. MSPI Basis Document Revision 11 was approved on 06/29/16. This revision was for correction of typographical errors and had no numerical or programmatic impact.

4Q/15: An FAQ has been submitted due to an unresolved issue from the NRC 3rd Quarter Baseline Inspection. The unresolved issue is related to a PRA Modeling error discovered and entered into the Station Corrective Action Program and corrected in the 3rd Quarter 2015 submittal following approval of the PRA Model revision in the 2nd Quarter 2015. The NRC Resident Inspectors questioned why previously submitted MSPI data was not corrected when the error was discovered. The Station's understanding of NEI 99-02 guidance for correcting previously submitted data is that changes based on PRA Model revisions, including error correction, are implemented in the quarter following approval of the revised PRA Model and previously submitted data is not updated.

3Q/15: Changed PRA Parameter(s). The 2015 DC Cook Internal Events PRA Model of Record was approved on 6/30/15 with a corresponding MSPI Basis Document Revision 9 approved on 10/01/15. The PRA model revision was a full-scope periodic update to the model which included a data update and correction of modeling issues identified in the 2009 model. 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

	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17
UAI (ΔCDF)	1.04E-11	8.77E-10	1.45E-09	-3.43E-10	1.10E-09	-2.55E-09	-3.47E-09	-1.87E-09
URI (ΔCDF)	-2.40E-08	-9.24E-09	-9.24E-09	-9.24E-09	-1.56E-08	-1.49E-08	-1.49E-08	-1.49E-08
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	-2.40E-08	-8.40E-09	-7.80E-09	-9.60E-09	-1.40E-08	-1.70E-08	-1.80E-08	-1.70E-08

Licensee Comments:

4Q/16: Changed PRA Parameter(s).

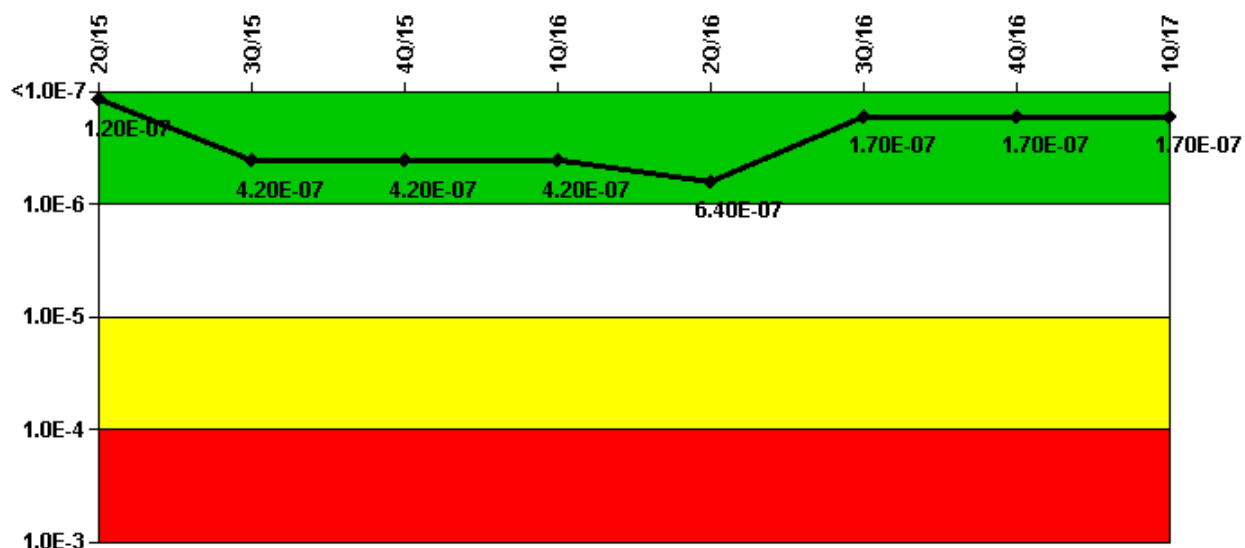
3Q/16: Changed PRA Parameter(s). The D.C. Cook PRA Model revision was approved on 06/30/16 with a corresponding MSPI Basis Document revision approved on 09/09/16. Revision 12 of the D.C. Cook MSPI Basis Document incorporates the update of the PRA. The PRA model revision was an update to the model which included crediting of offsite power recovery in accident scenarios that do not begin with a Loss of Offsite Power. As a result of the PRA model change, the CDF and Fussel-Vesely numbers for all monitored trains and components were revised.

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4Q/15: An FAQ has been submitted due to an unresolved issue from the NRC 3rd Quarter Baseline Inspection. The unresolved issue is related to a PRA Modeling error discovered and entered into the Station Corrective Action Program and corrected in the 3rd Quarter 2015 submittal following approval of the PRA Model revision in the 2nd Quarter 2015. The NRC Resident Inspectors questioned why previously submitted MSPI data was not corrected when the error was discovered. The Station's understanding of NEI 99-02 guidance for correcting previously submitted data is that changes based on PRA Model revisions, including error correction, are implemented in the quarter following approval of the revised PRA Model and previously submitted data is not updated.

3Q/15: Changed PRA Parameter(s). The 2015 DC Cook Internal Events PRA Model of Record was approved on 6/30/15 with a corresponding MSPI Basis Document Revision 9 approved on 10/01/15. The PRA model revision was a full-scope periodic update to the model which included a data update and correction of modeling issues identified in the 2009 model. 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, Heat Removal System**



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

**Notes**

2Q/15 3Q/15 4Q/15 1Q/16 2Q/16 3Q/16 4Q/16 1Q/17



**Mitigating Systems Performance Index, Heat Removal System**

UAI (ΔCDF)	-2.03E-11	-7.23E-09	-7.23E-09	-7.20E-09	-1.89E-08	-4.79E-09	-4.79E-09	-4.79E-09
URI (ΔCDF)	1.23E-07	4.31E-07	4.31E-07	4.31E-07	6.61E-07	1.70E-07	1.70E-07	1.70E-07
PLE	NO	NO	NO	NO	NO	NO	NO	NO
<b>Indicator value</b>	<b>1.20E-07</b>	<b>4.20E-07</b>	<b>4.20E-07</b>	<b>4.20E-07</b>	<b>6.40E-07</b>	<b>1.70E-07</b>	<b>1.70E-07</b>	<b>1.70E-07</b>

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**Licensee Comments:**

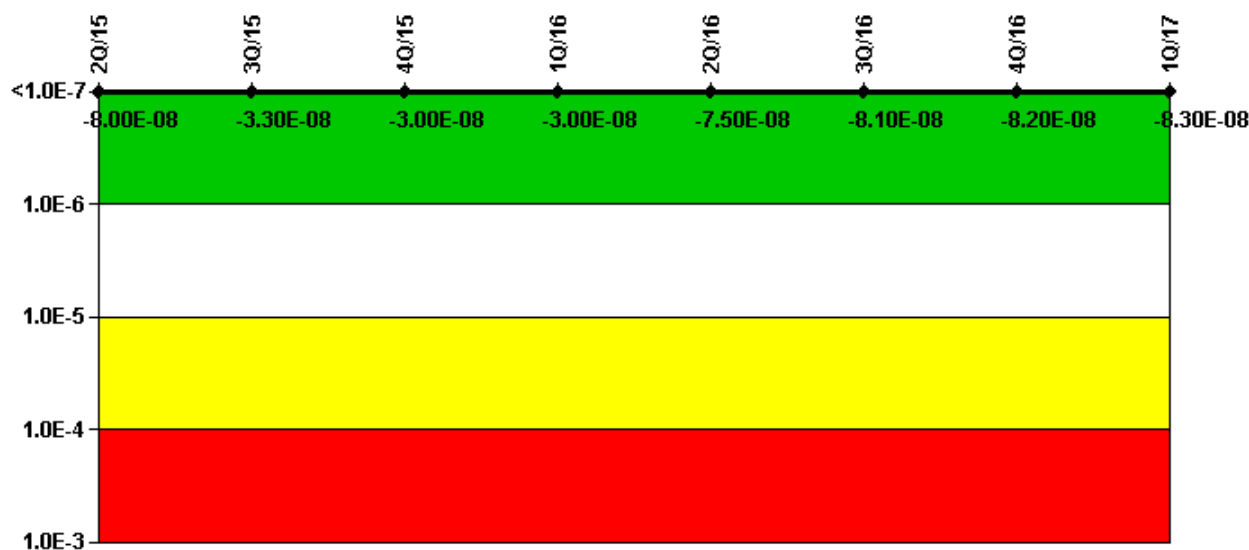
3Q/16: Changed PRA Parameter(s). The D.C. Cook PRA Model revision was approved on 06/30/16 with a corresponding MSPI Basis Document revision approved on 09/09/16. Revision 12 of the D.C. Cook MSPI Basis Document incorporates the update of the PRA. The PRA model revision was an update to the model which included crediting of offsite power recovery in accident scenarios that do not begin with a Loss of Offsite Power. As a result of the PRA model change, the CDF and Fussel-Vesely numbers for all monitored trains and components were revised.

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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

	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17
UAI (ΔCDF)	-3.23E-13	-1.91E-09	1.74E-09	2.13E-09	4.82E-09	-1.15E-09	-1.15E-09	-1.15E-09
URI (ΔCDF)	-8.05E-08	-3.15E-08	-3.19E-08	-3.23E-08	-7.99E-08	-7.99E-08	-8.10E-08	-8.21E-08
PLE	NO	NO	NO	NO	NO	NO	NO	NO
Indicator value	-8.00E-08	-3.30E-08	-3.00E-08	-3.00E-08	-7.50E-08	-8.10E-08	-8.20E-08	-8.30E-08

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#### Licensee Comments:

3Q/16: Changed PRA Parameter(s). The D.C. Cook PRA Model revision was approved on 06/30/16 with a corresponding MSPI Basis Document revision approved on 09/09/16. Revision 12 of the D.C. Cook MSPI Basis Document incorporates the update of the PRA. The PRA model revision was an update to the model which included crediting of offsite power recovery in accident scenarios that do not begin with a Loss of Offsite Power. As a result of the PRA model change, the CDF and Fussel-Vesely numbers for all monitored trains and components were revised.

2Q/16: Changed PRA Parameter(s). The D.C. Cook PRA Model Revision 2 was approved on 03/31/16 with a corresponding MSPI Basis Document Revision 10 approved on 06/02/16. New software was used to form the PRA model and to calculate risk importance to provide increased precision on the calculated metrics. As a result of the PRA model change, the CDF, Fussel-Vesely and Basic Event Probabilities for all monitored trains and components were revised. Additionally, this revision includes changes to the model of record made to resolve facts and observations from the 2015 Peer Review of the D.C Cook PRA model of record. The MSPI Basis Document was also updated to show compliance with the changes to NEI 99-02 Appendix G from the approval of FAQ 14-01. No new components were scoped into MSPI or excluded from monitoring due to the changes incorporated in this revision. MSPI Basis Document Revision 11 was approved on 06/29/16. This revision was for correction of typographical errors and had no numerical or programmatic impact.

4Q/15: Changed PRA Parameter(s). An FAQ has been submitted due to an unresolved issue from the NRC 3rd Quarter Baseline Inspection. The unresolved issue is related to a PRA Modeling error discovered and entered into the Station Corrective Action

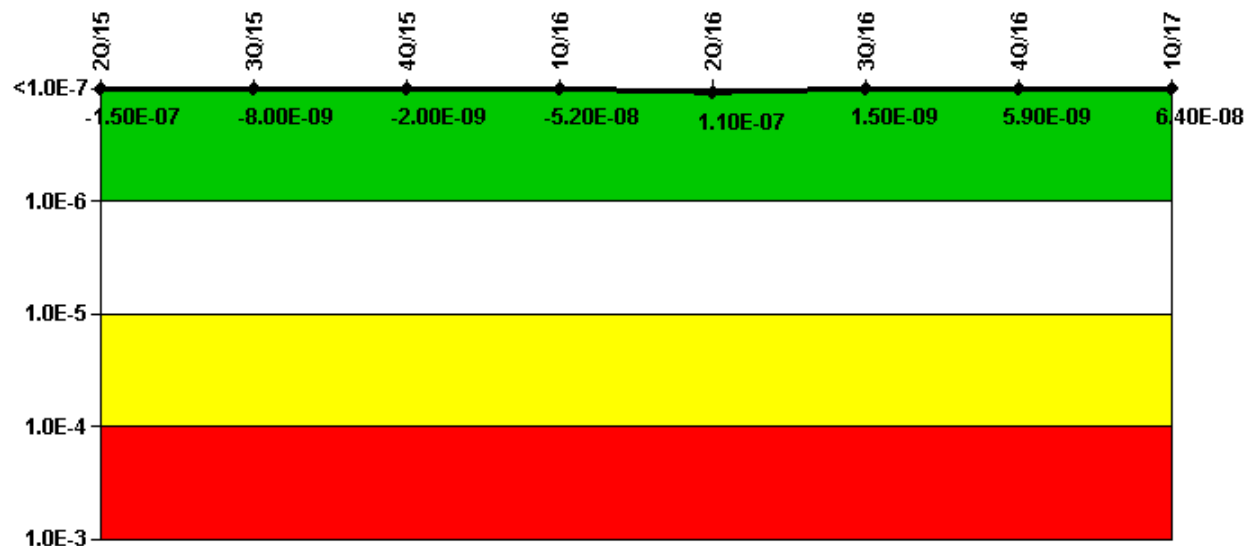
Program and corrected in the 3rd Quarter 2015 submittal following approval of the PRA Model revision in the 2nd Quarter 2015. The NRC Resident Inspectors questioned why previously submitted MSPI data was not corrected when the error was discovered. The Station's understanding of NEI 99-02 guidance for correcting previously submitted data is that changes based on PRA Model revisions, including error correction, are implemented in the quarter following approval of the revised PRA Model and previously submitted data is not updated.

3Q/15: Changed PRA Parameter(s). The 2015 DC Cook Internal Events PRA Model of Record was approved on 6/30/15 with a corresponding MSPI Basis Document Revision 9 approved on 10/01/15. The PRA model revision was a full-scope periodic update to the model which included a data update and correction of modeling issues identified in the 2009 model. As a result of the PRA model change, the CDF, Fussel-Vesely, and Basic Event Probabilities for all monitored trains and components were revised. The RHR scope of monitored components was revised. 1-CMO-419 and 1-CMO-429, RHR Heat Exchanger CCW Outlet Valves, are now included in the scope of monitored components based on their Birnbaum importance. 1-ICM-311 and 1-ICM-321, RHR Pump Discharge MOVs, are removed from the scope of monitored components since they do not have an active safety function modeled in the PRA..

3Q/15: Changed PRA Parameter(s). Data entry errors were identified in the third quarter 2015 MSPI Parameter update for Unit 1 Residual Heat Removal following submittal. As a result, the FVURC value for 1-ICM-305 (Unit 1 Recirculation Sump to East RHR/CTS Pumps Suction Containment Isolation Valve) and the FVURC and URPC values for 1-IMO-390 (Unit 1 Refueling Water Storage Tank TK-33 to Residual Heat Removal Pumps Suction Shutoff Valve) were revised for the third quarter 2015. The Unit 1 RHR MSPI color remained green following these changes.

2Q/15: On 6/14/15, Operations identified an oil leak on the Unit 1 East RHR Motor Lower Bearing. An engineering evaluation of the ability of the RHR pump to perform its MSPI function with the identified oil leak has not been completed. Preliminary evaluation of this condition determined that the RHR pump was capable of operating successfully for the 24 hour PRA mission time used for MSPI reporting with the identified oil leak. Based on the preliminary evaluation, a Failure to Run is not being counted for the Unit 1 East RHR Pump.

**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**

	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17
UAI (ΔCDF)	6.17E-11	8.67E-08	9.31E-08	4.36E-08	2.66E-08	2.68E-08	3.20E-08	9.08E-08

URI (ΔCDF)	-1.52E-07	-9.47E-08	-9.51E-08	-9.54E-08	8.23E-08	-2.53E-08	-2.60E-08	-2.67E-08
PLE	NO	NO	NO	NO	NO	NO	NO	NO
<b>Indicator value</b>	<b>-1.50E-07</b>	<b>-8.00E-09</b>	<b>-2.00E-09</b>	<b>-5.20E-08</b>	<b>1.10E-07</b>	<b>1.50E-09</b>	<b>5.90E-09</b>	<b>6.40E-08</b>

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Licensee Comments:

4Q/16: Changed PRA Parameter(s).

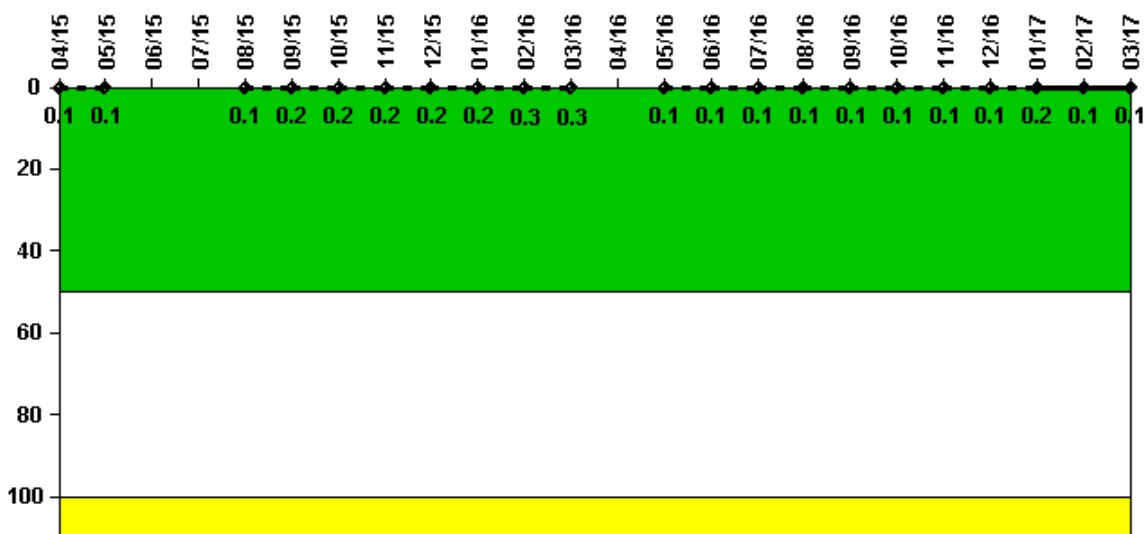
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### Reactor Coolant System Activity



Thresholds: White > 50.0 Yellow > 100.0

#### Notes

#### Reactor Coolant

System Activity	4/15	5/15	6/15	7/15	8/15	9/15	10/15	11/15	12/15	1/16	2/16	3/16
Maximum activity	0.000446	0.000474	N/A	N/A	0.000508	0.000542	0.000577	0.000609	0.000629	0.000648	0.000892	0.000940
Technical specification limit	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4

**Indicator value**      **0.1**      **0.1** N/A N/A      **0.1**      **0.2**      **0.2**      **0.2**      **0.2**      **0.2**      **0.3**      **0.3**

Reactor Coolant System Activity	4/16	5/16	6/16	7/16	8/16	9/16	10/16	11/16	12/16	1/17	2/17	3/17
Maximum activity	N/A	0.000299	0.000333	0.000345	0.000379	0.000392	0.000454	0.000454	0.000451	0.000547	0.000491	0.000513
Technical specification limit	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4

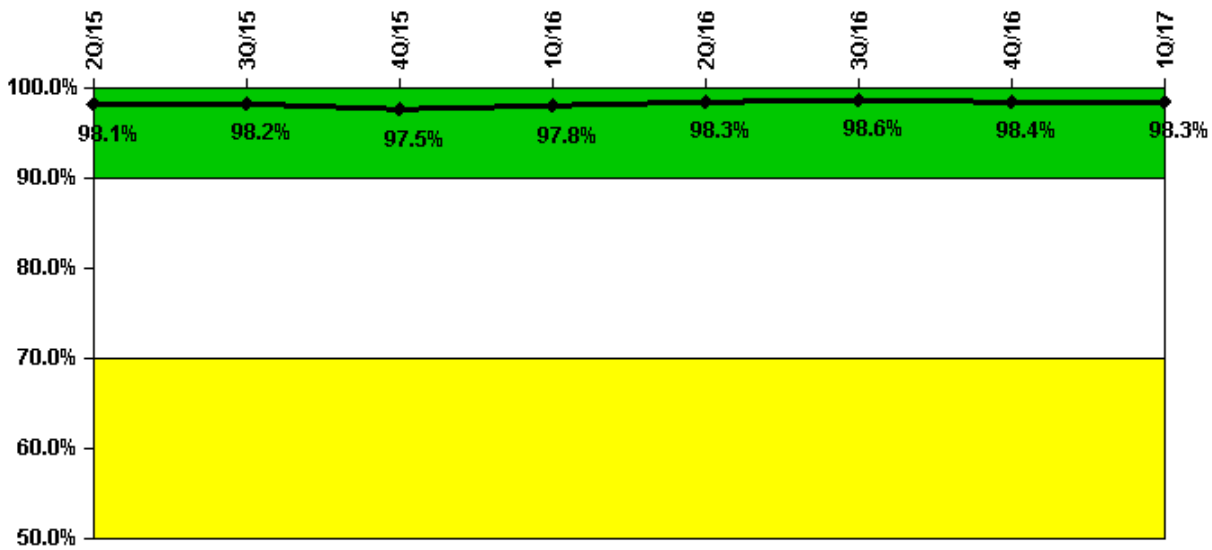
**Indicator value**      N/A      **0.1**      **0.1**      **0.1**      **0.1**      **0.1**      **0.1**      **0.1**      **0.1**      **0.2**      **0.1**      **0.1**

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Licensee Comments: none



### Drill/Exercise Performance



Thresholds: White < 90.0% Yellow < 70.0%

#### Notes

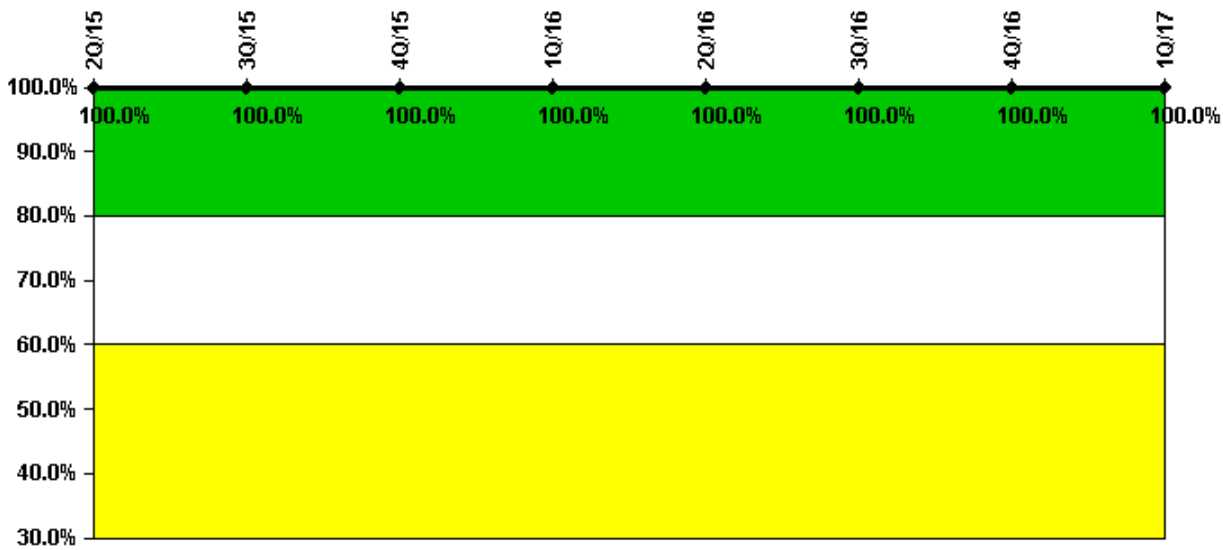
Drill/Exercise Performance	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17
Successful opportunities	12.0	62.0	56.0	62.0	34.0	81.0	1.0	48.0
Total opportunities	12.0	62.0	60.0	62.0	34.0	82.0	1.0	49.0

**Indicator value**                    98.1% 98.2% 97.5% 97.8% 98.3% 98.6% 98.4% 98.3%

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Licensee Comments: none

### ERO Drill Participation



Thresholds: White < 80.0% Yellow < 60.0%

#### Notes

ERO Drill Participation	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17
Participating Key personnel	134.0	132.0	132.0	132.0	109.0	116.0	115.0	110.0
Total Key personnel	134.0	132.0	132.0	132.0	109.0	116.0	115.0	110.0

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

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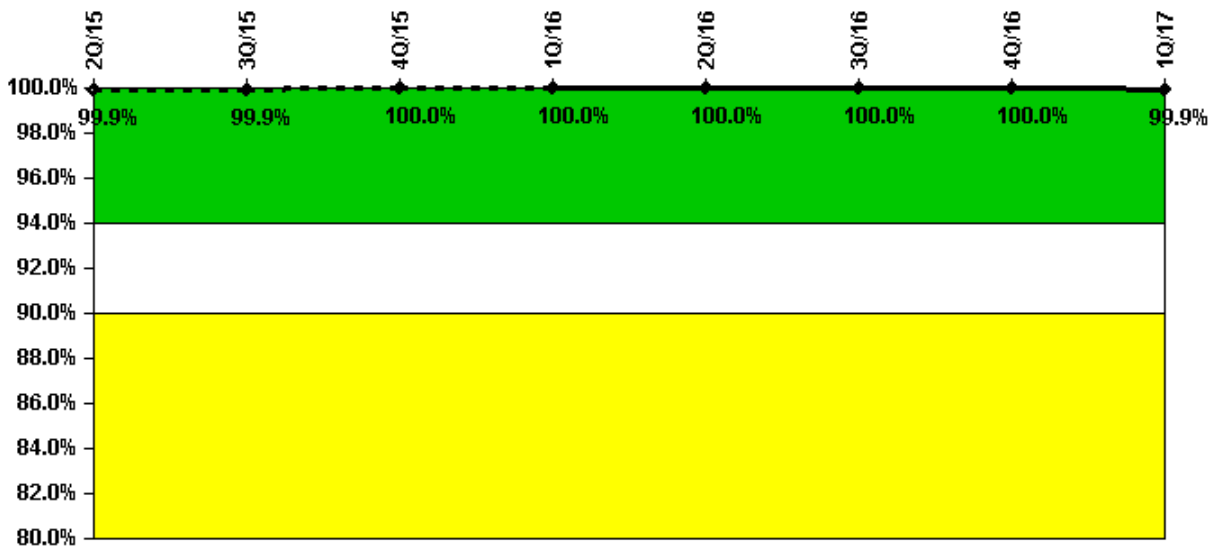
#### Licensee Comments:

4Q/16: Newly added drill participant was not counted. Data was corrected to reflect the change.

3Q/16: Newly added drill participant was not counted. Data was corrected to reflect the change.



### Alert & Notification System



Thresholds: White < 94.0% Yellow < 90.0%

#### Notes

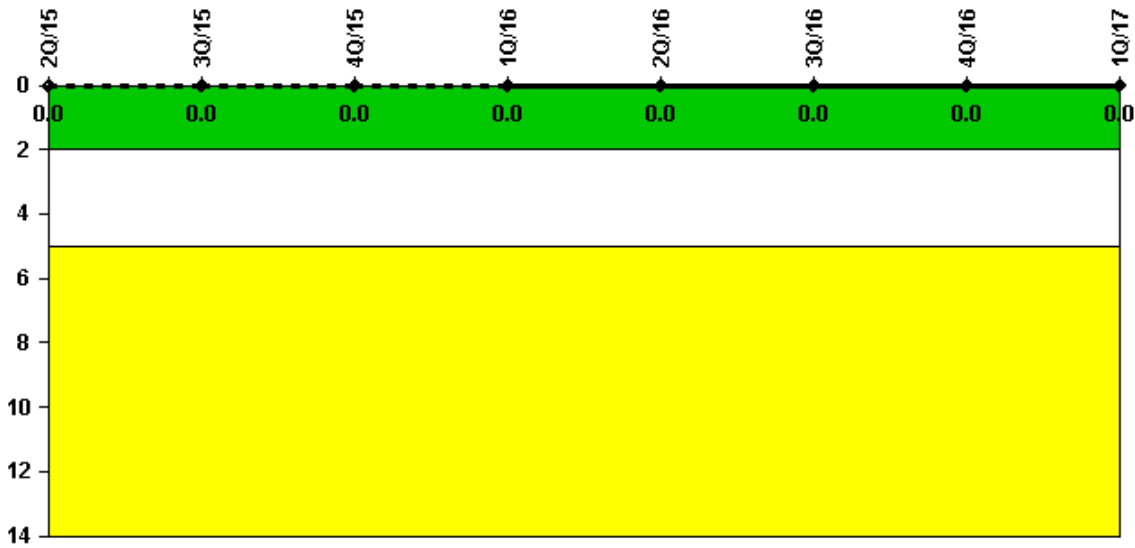
Alert & Notification System	2Q/15	3Q/15	4Q/15	1Q/16	2Q/16	3Q/16	4Q/16	1Q/17
Successful siren-tests	1119	1190	1120	1119	1119	1050	1120	1047
Total sirens-tests	1119	1190	1120	1120	1119	1050	1120	1050

**Indicator value**                    **99.9% 99.9% 100.0% 100.0% 100.0% 100.0% 100.0% 100.0% 99.9%**

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Licensee Comments: none

### Occupational Exposure Control Effectiveness



Thresholds: White > 2.0 Yellow > 5.0

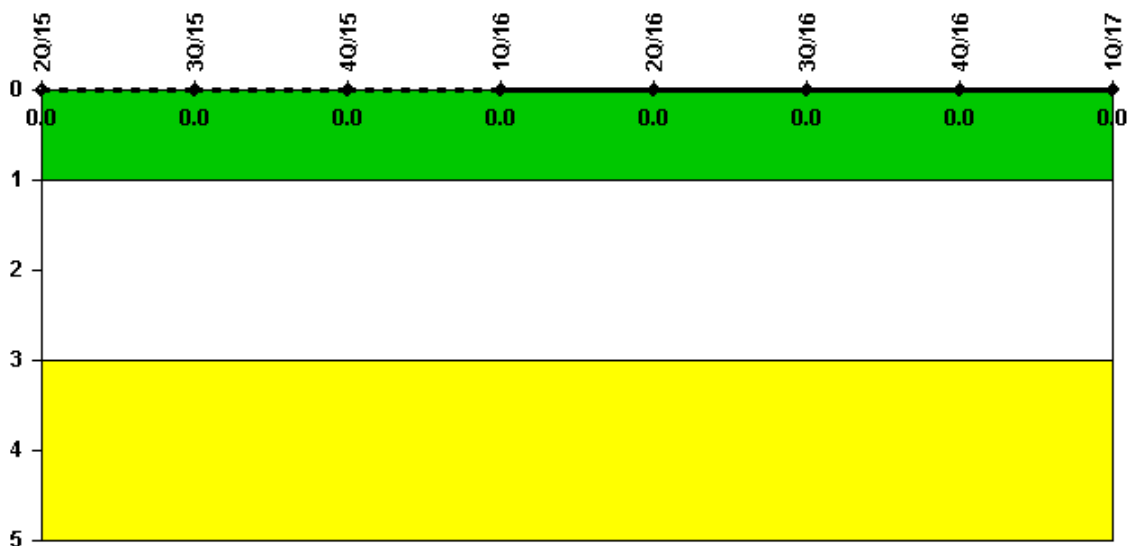
**Notes**

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

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Licensee Comments: none

### RETS/ODCM Radiological Effluent



Thresholds: White > 1.0 Yellow > 3.0

#### Notes

RETS/ODCM Radiological Effluent 2Q/15 3Q/15 4Q/15 1Q/16 2Q/16 3Q/16 4Q/16 1Q/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: May 5, 2017

Page Last Reviewed/Updated Wednesday, June 07, 2017