

FAQ Log 06/13

TempNo.	PI	Topic	Status	Plant/ Co.
69.2	MSPI	Fuel Oil Line Leak	03/21 Introduced and discussed 04/11 Discussed 05/16 Discussed 06/13 FAQ rejected and will go to appeal	Kewaunee
70.0	MSPI	Blown Fuse on Diesel	06/13 Introduced	Ft. Calhoun

Kewaunee Power Station FAQ

Plant: Kewaunee Power Station
Date of Event: August 17, 2006
Submittal Date: March 7, 2007
Licensee Contact: Paul Miller Tel/email: 920-388-8350/paul.c.miller@dom.com
NRC Contact: S. C. Burton Tel: 920-388-3156

Performance Indicator: MSPI

Site-Specific FAQ (Appendix D)? No
FAQ requested to become effective when approved.

Question Section

NEI 99-02 Guidance needing interpretation (include page and line citation):

Clarification of the guidance related to whether “time of discovery” is when the licensee first becomes aware that the component cannot perform its monitored function or is when the licensee completes a cause determination and concludes the component would not have performed its monitored function at some earlier time, similar to the situation described in the event section below.

Lines 19-20 on page F-5 of section F 1.2.1 in discussion about train unavailable hours. “Fault exposure hours are not included; unavailable hours are counted only for the time required to recover the train’s monitored functions.”

Lines 18-19 on page F-22 of section F 2.2.2. “Unplanned unavailability would accrue in all instances from the time of discovery or annunciation consistent with the definition in section F 1.2.1.”

Lines 34-40 on page F-5 of section F 1.2.1. “*Unplanned unavailable hours:* These hours include elapsed time between the discovery and the restoration to service of an equipment failure or human error (such as a misalignment) that makes the train unavailable. Unavailable hours to correct discovered conditions that render a monitored component incapable of performing its monitored function are counted as unplanned unavailable hours. An example of this is a condition discovered by an operator on rounds, such as an obvious oil leak, that resulted in the equipment being non-functional even though no demand or failure actually occurred.”

Event or circumstances requiring guidance interpretation:

On June 28, 2006 a small leak (one drop per minute) was identified in a diesel generator fuel oil system. A work request was written on that day to repair the leak, but no

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operability determination or repair was performed. On July 20, the diesel was successfully run for 2.6 hours with the leak still present. On August 17, the diesel was run for 0.35 hours, at which time it was identified that the leak became more significant. The diesel was shut down 1 hour after being started. At this time the diesel was declared inoperable. The diesel was considered operable up until the time the leak became more significant on August 17. The fuel line was repaired and the diesel was returned to service August 18.

A diesel failure was assigned in the MSPI data for 3Q06 and unplanned unavailability hours were assigned for the August 17-18, 2006, time needed to restore the diesel to service.

If licensee and NRC resident/region do not agree on the facts and circumstances explain

The Kewaunee Senior Resident Inspector believes the "time of discovery" should start when the original small leak on the fuel oil line was discovered on June 28, 2006. This was based on the fact that the station did not perform an operability determination (OD) when this leak was found and that a reasonable conclusion of a proper OD at that time would have been that the EDG would not have been able to complete its monitored safety function, and, therefore, the unplanned unavailable hours should start in June.

Potentially relevant existing FAQ numbers

None

Response Section

Proposed Resolution of FAQ

Kewaunee Power Station believes that in MSPI, unavailable hours are counted only for the time required to recover the train's monitored functions, and, therefore, the "time of discovery" for the purposes of assigning unplanned unavailable hours starts from the time the diesel was declared inoperable on August 17, 2006, and that the guidance adequately states this. Unavailability, prior to the determination that the failure affected the ability of the diesel to perform its monitored function, is actually fault exposure, which is not included in the MSPI unavailability calculation. Since performance deficiencies were noted for this event, the Significance Determination Process (SDP) was used to characterize the risk of the event and this process evaluated the fault exposure period to determine that risk.

The example given on Page F-5, lines 38-40 (*An example of this is a condition discovered by an operator on rounds, such as an obvious oil leak, that resulted in the equipment being non-functional even though no demand or failure actually occurred*) would imply that the discovery of the oil leak in June should be the starting point for unavailability. However, the determination that the degraded condition affected the ability of the diesel to perform its monitored function was not made until some time after the failure in

**Fort Calhoun Station FAQ
May 24, 2007**

Plant: Fort Calhoun Station
Date of Event: July 21, 2004
Submittal Date: May 24, 2007
Licensee Contact: Gary R. Cavanaugh Tel/email: 402-533-6913 /
gcavanaugh@oppd.com
NRC Contact: L. M. Willoughby Tel/email: 402-533-6613 / lmw1@nrc.gov

Performance Indicator: MSPI

Site-Specific FAQ (Appendix D)? No
FAQ requested to become effective when approved.

Question Section

NEI 99-02 Guidance needing interpretation (include page and line citation):

Clarification of the guidance is requested for “time of discovery.” Is time of discovery when the licensee first had the opportunity to determine that the component cannot perform its monitored function or when the licensee completes a cause determination and concludes the component would not have performed its monitored function at some earlier time, similar to the situation described in the event section below.

Page F-5, Section F 1.2.1, lines 19-21:

Fault exposure hours are not included; unavailable hours are counted only for the time required to recover the train’s monitored functions. In all cases, a train that is considered to be OPERABLE is also considered to be available.

Page F-22, Section F 2.2.2, lines 18-19:

Unplanned unavailability would accrue in all instances from the time of discovery or annunciation consistent with the definition in section F 1.2.1.

Page F-5, Section F 1.2.1, lines 34-40:

Unplanned unavailable hours: These hours include elapsed time between the discovery and the restoration to service of an equipment failure or human error (such as a misalignment) that makes the train unavailable. Unavailable hours to correct discovered conditions that render a monitored component incapable of performing its monitored function are counted as unplanned unavailable hours. An example of this is a condition discovered by an operator on rounds, such as an obvious oil leak, that resulted in the equipment being non-functional even though no demand or failure actually occurred.

Event or circumstances requiring guidance interpretation:

On October 19, 2004, while reviewing detailed plant computer data related to the operation of the Emergency Diesel Generator Number 2 (DG-2), Fort Calhoun Station (FCS) discovered that DG-2 had become inoperable for 29 days beginning on July 21, 2004. On August 18, 2004 when DG-2 was started for the next monthly surveillance test, DG-2 started but failed to achieve proper voltage and frequency. At that time, DG-2 was declared inoperable, trouble shooting commenced, and three hours later following a fuse replacement, DG-2 was declared operable.

Data obtained from the FCS control room computer subsequently confirmed that the condition occurred as the operators were performing engine unloading and shutdown during completion of the monthly surveillance test on July 21, 2004. As DG-2 was being shut down following the successful surveillance test, the control room staff received numerous expected alarms. The alarms in question are plant computer alarms and not tiled annunciator alarms. Since the alarms were expected as part of unloading and shutting down DG-2 they were acknowledged and treated as a normal system response.

The earliest opportunity for the discovery of the failed fuse condition was upon receipt of the plant computer alarms for DG-2 low output frequency and low output voltage which occurred following the opening of the DG-2 output breaker. These expected plant computer alarms were received within moments of when they normally would have occurred.

When attempting to complete the next monthly surveillance test in August 2004, DG-2 started but failed to achieve proper voltage and frequency. At that time, DG-2 was declared inoperable, trouble shooting commenced, and three hours later DG-2 was declared operable following fuse replacement. In an effort to determine unavailability hours for reporting of the Emergency AC Power MSPI, FCS determined that the unavailability began on August 18, 2004 when DG-2 was started for the next monthly surveillance.

If licensee and NRC resident/region do not agree on the facts and circumstances explain

Issue #1:

In the opening lines of the FAQ, the licensee references NEI 99-02, page F-5, lines 19-21, which states: *"Fault exposure hours are not included; unavailable hours are counted only for the time required to recover the train's monitored functions. In all cases, a train that is considered to be OPERABLE is also considered to be available."*

...and the licensee further references page F-5, lines 34-40, stating ...*"Unplanned unavailable hours: These hours include elapsed time between the discovery and the*

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restoration to service of an equipment failure or human error (such as a misalignment) that makes the train unavailable. Unavailable hours to correct discovered conditions that render a monitored component incapable of performing its monitored function are counted as unplanned unavailable hours. An example of this is a condition discovered by an operator on rounds, such as an obvious oil leak, that resulted in the equipment being non-functional even though no demand or failure actually occurred."

As described in NRC Inspection Report 05000285/2005010, Emergency Diesel Generator #1 was both inoperable and unavailable from July 21, 2004 until August 19, 2004. The inspection report also explained why discovery of the condition should reasonably have occurred on July 21, 2004:

"After a review of this event, the inspectors noted that the licensee had several opportunities to promptly identify the degraded voltage condition that affected the safety function of Emergency Diesel Generator 2. These opportunities included:

- § The failure to recognize the alarm for low emergency diesel generator output voltage was indicative of a degraded voltage condition.
- § The failure to recognize that the watt-hour meter turns off when emergency voltage goes below the watt-hour trigger setpoint, indicative of a degraded voltage condition.
- § The failure to recognize that the emergency diesel generator output voltage meter indications were reading approximately half their normal value, indicative of a degraded voltage condition.
- § The failure to recognize that data obtained during surveillance Operating Procedure OP-ST-DG-0002, performed on July 21, 2004, showed the emergency diesel generator output voltage decreasing to approximately 2200 volts, indicative of a degraded voltage condition. This surveillance procedure was reviewed and determined satisfactory by three operations personnel and the system engineer."

Based on the multiple opportunities to identify this condition, the Resident Inspectors/Regional staff believe the conditions mentioned above would be indicative of an "obvious" condition, similar to the leaking oil condition example above. Therefore, the definition of unavailable hours would be met.

Issue #2:

In the licensee's FAQ, the licensee stated on page 2, "... the control room staff received numerous expected alarms." and then went on to say "These expected plant computer alarms were received within moments of when they normally would have occurred." Please refer to the 4 bullets listed above. The control room alarms were not expected at the times that they occurred, and the significance of these conditions were neither recognized individually or collectively by multiple licensed operators. As described in the NRC Inspection Report 05000285/2005010... "Emergency Diesel Generator 2 was operated at normal speed, unloaded, for approximately 12 minutes to cool down the turbo charger. During this time operators discussed the loss of indication on the watt-hour meter and decided to write a condition report on the discrepancy." Given that the alarms/indications were present approximately 12 minutes early, the Residents/Regional staff do not agree with the licensee's assertion that this equates to "within moments of when they normally would have occurred."

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Issue #3:

In the "Proposed Resolution" section of the FAQ, the licensee stated... *"Although the earliest opportunity to discover the failed fuse was July 21, 2004, FCS concluded that it would have been an improbable catch for them to do so. While changes were put into place following discovery of this condition to prevent recurrence, it was determined that it would have been unreasonable to expect the control room staff to have caught this when it occurred."* The licensee further stated... *"...this issue was appropriately classified as discovery on August 18, 2004."*

Region IV personnel believe that it was reasonable, as documented in the previous sections and in the inspection report, for the control room staff to have caught this when it occurred.

Issue #4:

In the licensee's FAQ, they stated: "... the Significance Determination Process (SDP) was used to characterize the risk of the event and this process evaluated the fault exposure period to determine that risk."

Once a performance deficiency is identified, the SDP assesses the risk of a condition, (i.e., how significant is it during the time that equipment was unable to perform its function), irrespective of whether the equipment is considered fault exposure time or unavailability hours. Region IV personnel consider that one of the salient aspects of the PI, an indicator of performance, is to identify both unavailability and fault exposure hours. The staff considers this period to be unavailability in regard to the PI.

Issue #5:

The licensee has considered the failure of DG-1 as a Failure-to-Load on August 19, 2004 in their calculations.

The Region IV staff considers this should be counted as a Failure-to-Run (FTR) on July 21, 2004 instead of a Failure-to-Load. Per the NEI guidance, Failure-to-Load items are those that prevent the engine from starting or running for an hour. The fuse failure occurred after the engine had run successfully for greater than one hour. While the "type" of failure does not directly affect the subject of this FAQ (calculation of hours for the PI), erroneous failure classifications could be misleading if they are to be considered with any subsequent failures.

Summary:

In summary, the licensee stated that "... *unavailability should accrue on August 18, 2004 when the failure occurred.*" The licensee believes that the duration between July 21 and August 19, should be counted as Fault Exposure Hours. However, Region IV staff does not agree with this position. The licensee had ample opportunity to identify and correct this condition, as was stated in a previously cited 10 CFR 50, Appendix B, Criterion XVI violation. Region IV staff believes the duration that DG-1 was non-functional should be counted as Unavailability Hours.

Potentially relevant existing FAQ numbers

None

Response Section

Proposed Resolution of FAQ

Although the earliest opportunity to discover the failed fuse was July 21, 2004, FCS concluded that it would have been an improbable catch for them to do so. While changes were put into place following discovery of this condition to prevent recurrence, it was determined that it would have been unreasonable to expect the control room staff to have caught this when it occurred.

In a strict determination of the unavailability you would have to conclude that since an annunciation occurred, it should have been caught by the control room staff (i.e., time of discovery). However, when presented with the facts surrounding this case, FCS concludes that this issue was appropriately classified as discovery on August 18, 2004.

FCS has reviewed NEI 99-02, Revision 4 guidance and determined that in MSPI, unavailable hours are counted only for the time required to recover the train's monitored functions. Therefore, the "time of discovery" for the purposes of assigning unavailable hours starts from the time the diesel was declared inoperable on August 18, 2004. Unavailability, prior to the determination that the failure affected the ability of the diesel to perform its monitored function, is actually fault exposure, which is not included in the MSPI unavailability calculation. Since performance deficiencies were noted for this event, the Significance Determination Process (SDP) was used to characterize the risk of the event and this process evaluated the fault exposure period to determine that risk.

The information provided in lines 18-19 on page F-22 of section F 2.2.2. "Unplanned unavailability would accrue in all instances from the time of discovery or annunciation consistent with the definition in section F 1.2.1.", might be misunderstood to imply that any alarm originating in the control room would indicate that monitored equipment is obviously inoperable. In this instance the control room annunciation was from a computer monitored point and indicated "DG-2 Low Output Frequency and Low Output Voltage," as expected.

Consistent with the definition in F1.2.1 lines page F-5 lines 20 and 21 "In all cases, a train that is considered to be OPERABLE is also considered to be available." Therefore, the unavailability should accrue on August 18, 2004 when the failure occurred.

If appropriate, provide proposed rewording of guidance for inclusion in next revision.

N/A

MSPI Change

BACKGROUND

In the current MSPI Basis Document, the Oconee Emergency AC Power System is identified as two independent separate trains, one being the overhead Keowee Hydro Unit (KHU) and path and the other being the underground Keowee Hydro Unit and path. This was a simplified, conservative categorization that was chosen not only because of its simplicity and the way historical unavailability data had been previously collected, but also because it emulated, as closely as it could, independent EDG trains from a PI perspective.

After the pole jumper failure occurred on KHU-2, the MSPI indicator turned White, as expected. This change in color caused the MSPI inputs to be reviewed to determine whether the inputs into MSPI accurately reflected the emergency power configuration at Oconee and whether the current white indicator for Emergency Power was a true reflection of Keowee due to a singular failure on one of the Keowee Hydro Units.

The following was determined:

The Unavailability portion of the index is calculated by adding the unavailability for each train. The formula uses the highest PRA risk importance value of any individual component within the train. When the failed KHU is out of service, the MSPI Index interprets this as the entire train associated with the unit as out of service. The highest PRA risk component in this train is a breaker in the power path, so it is used to calculate the importance of the KHU being out of service. However, in reality, both power paths were available since the remaining unit of Keowee can be aligned to either power path.

Therefore, it was seen that there was unnecessary conservatism in the MSPI model. Due to the unique arrangement with respect to Keowee Hydro as the emergency power source, i.e. two independent power paths with two interchangeable power sources, it has since been realized that that the current train definitions do not appropriately communicate the true risk profile of the emergency power source arrangement. By redefining the Emergency AC Power System into 4 trains/segments, i.e. each Keowee unit is a segment and each power path is a segment, this is an acceptable modeling approach per NEI 99-02 and will more accurately reflect the Emergency Power System and allow a more appropriate risk profile to be used. Now a PRA risk importance value for the KHU itself will be used in determining the significance of having a unit of Keowee Hydro unavailable as opposed to path risk importance.

Proposed MSPI Guidance Change Changes to CDE for Basis Document Parameters

Introduction

This paper proposes a guidance change to improve consistency of the guidance and allow flexibility in the timing of CDE entries made to reflect changes in site MSPI basis documents.

The current MSPI guidance (NEI 99-02, Rev 5) states the following regarding changes to baseline information:

Page 30, lines 35-40 and Page 31, line 1-12 (regarding changes to PRA parameters):

The MSPI calculation uses coefficients that are developed from plant specific PRAs. The PRA used to develop these coefficients should reasonably reflect the as-built, as-operated configuration of each plant. Updates to the MSPI coefficients developed from the plant specific PRA will be made as soon as practical following an update to the plant specific PRA. The revised coefficients will be used in the MSPI calculation the quarter following the update. Thus, the PRA coefficients in use at the beginning of a quarter will remain in effect for the remainder of that quarter. Changes to the CDE database and MSPI basis document that are necessary to reflect changes to the plant specific PRA of record should be incorporated as soon as practical but need not be completed prior to the start of the reporting quarter in which they become effective. The quarterly data submittal should include a comment that provides a summary of any changes to the MSPI coefficients. Any PRA model changes will take effect the following quarter (model changes include error, corrections, updates, etc.)

For example, if a plant's PRA model of record is approved on September 29 (3rd quarter), MSPI coefficients based on that model of record should be used for the 4th quarter. The calculation of the new coefficients should be completed (including a revision of the MSPI basis document if required by the plant specific processes) and input to CDE prior to reporting the 4th quarter's data (i.e., completed by January 21).

Page F-8, line 44 and following to Page F-9, line 3 (regarding changes to baseline planned unavailability)

The baseline planned unavailability should be revised as necessary during the quarter prior to the planned maintenance evolution and then removed after twelve quarters. A comment should be placed in the comment field of the quarterly report to identify a substantial change in planned unavailability. The baseline value of planned unavailability is changed at the discretion of the licensee. Revised values will be used in the calculation the quarter following their update.

Page F-23, lines 38-40 (regarding changes in estimates of demands):

The new estimates will be used in the calculation the quarter following the input of the updated estimates into CDE.

The concern is that the guidance is unnecessarily restrictive regarding CDE entry for changes in baseline planned unavailability and estimated demands, especially when compared to the guidance for PRA model changes. If a plant makes a change to its basis document for baseline planned unavailability or estimated demands, these values should not be used until the quarter following the change. However, sites should be allowed the flexibility to enter these changes into CDE at a later time if necessary. The site basis document can be easily audited to ensure that the change was approved prior to the beginning of the new quarter.

Proposed Guidance Changes

Revise Page F-8, line 44 and following to Page F-9, line 3 as follows:

The baseline planned unavailability should be revised in the basis document as necessary during the quarter prior to the planned maintenance evolution and then removed after twelve quarters. A comment should be placed in the comment field of the quarterly report to identify a substantial change in planned unavailability. The baseline value of planned unavailability is changed at the discretion of the licensee. Revised values will be used in the calculation the quarter following the basis document revision.

Revise Page F-23, lines 38-40 as follows:

Changes to the estimated demands should be revised in the basis document during the quarter prior to the change. The new estimates will be used in the calculation the quarter following the basis document revision.