Enclosure 3

Reactor Oversight Process Task Force FAQ Log
January 12, 2017

Dated February 6, 2017

FAQ Log September 21, 2016 ROP Meeting

FAQ No.	PI	Topic	Status	Plant/Co.	Point of Contact
17-01	IE	Grand Gulf June 2016 Power Change	Introduced on January 12	Grand Gulf Nuclear Station Unit 1	James Nadeau (Entergy) Matt Young (NRC)
16-04	MS	Maintenance on High Pressure Coolant Injection	Introduced on November 16 Discussed on January 12	Browns Ferry Nuclear Plant Unit 2	Eric Bates (TVA) Jamie Paul (TVA) Z. Hollcraft (NRC)

For more information, contact: James Slider, (202) 739-8015, jes@nei.org

FAQ 16-04, Browns Ferry Safety System Functional Failure

Plant: Browns Ferry Nuclear Plant Unit 2
Date of Event: March 19, 2016
Submittal Date: November 8, 2016
Licensee Contact: Eric Bates/Jamie Paul Tel/email: 256-614-7180/256-729-2636
NRC Contact: _____ Tel/email: _____

Performance Indicator:
MS05 Safety System Functional Failure (SSFF)

Site-Specific FAQ (Appendix D)? No

FAQ requested to become effective: When approved.

Question Section:

1. If a condition on a single train safety system that could have affected operability is created during maintenance while the equipment is out of service (OOS), such that the condition did not exist prior to the equipment being declared inoperable for maintenance, was discovered during post-maintenance testing (PMT) prior to surveillance (SR) testing, and accident conditions or operation cannot produce the observed degradation or equipment failure, should it count as a SSFF against the Reactor Oversight Process (ROP) Performance Indicator (PI)?

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

1. Section 2.2, Safety System Function Failures: The guidance is silent regarding how to count a condition created while a system, structure, or component (SSC) was OOS for maintenance, which would have affected Operability, and was outside the scope of the planned maintenance. (page 30)

Event or circumstances requiring guidance interpretation:

Browns Ferry (BFN) entered Technical Specification (TS) Limiting Conditions for Operation (LCO) 3.5.1, Emergency Core Cooling Systems (ECCS) – Operating, Condition C on March 17, 2016. Condition C was entered due to High Pressure Coolant Injection (HPCI) inoperability for planned maintenance to repack the steam admission valve. The purpose of the HPCI system is to provide high pressure core cooling in the event of a Loss of Coolant Accident or in the event of a reactor isolation and failure of the Reactor Core Isolation Cooling (RCIC) system. Besides vessel injection, another safety function of the HPCI system is to maintain structural integrity regarding Primary and Secondary Containment pressure boundaries. On March 19, 2016, Operations personnel received a ground alarm during performance of valve diagnostic (MOVATS) testing on the Unit 2 HPCI Steam Admission Valve. The valve motor breaker was opened and the alarm cleared. The thermal overload relay was found tripped, resulted in the alarm, and was reset. Later on March 19, 2016, Operations attempted to stroke the valve from the Control Room for PMT using a hand switch and the valve failed to stroke due to a stuck contactor in the breaker.

Troubleshooting later revealed that the breaker thermal overloads had tripped and that a breaker contactor in the valve closing circuit had become hot enough to fuse its contacts together, which prevented the valve from opening. There was no vendor specific service life for these contacts. The cause of the equipment failure was determined to be due to excessive valve stroking during the earlier PMT on March 19, 2016. The cause was not reviewed by a vendor or an independent party. The corrective actions are to revise procedures to limit the number of strokes per hour for the applicable piece of equipment.

BFN received a NRC-identified Severity Level IV non-cited violation (NCV) of 10 CFR 50.72(b)(3)(v) and 10 CFR 50.73(a)(2)(v) for the licensee's failure to notify the NRC within 8 hours and submit a Licensee Event Report (LER) within 60 days of discovery of a condition that could have prevented the fulfillment of a safety function. Specifically, the licensee failed to notify the NRC that the HPCI system had been rendered inoperable due to an equipment failure. BFN submitted LER 50-260/2016-002-00, High Pressure Coolant Injection System Failure Due to Stuck Contactor, to the NRC in response to this NCV. BFN did not deny the violation but is advocating at the ROP TF that the condition should not count against the SSFF PI.

If licensee and NRC resident/region do not agree on the facts and circumstances explain:
BFN's NRC Senior Resident Inspector's perspective is the valve motor breaker failure was not part of the HPCI planned maintenance; therefore, the failure should count as a SSFF due to it not being part of the planned maintenance.

Potentially relevant existing FAQ numbers: There are no relevant FAQ numbers.

Response Section:

Proposed Resolution of FAQ:

The SSFF PI should only count failures that occur or potentially existed while there was an expectation that the SSC was Operable. Conditions affecting operability created during a maintenance OOS period that did not exist while the SSC was considered Operable and were identified and corrected while still in a maintenance state do not count for purposes of the SSFF PI. This exemption applies even if the condition created required repairs outside of the scope of planned maintenance and those repairs were required in order to return the equipment back to Operable status.

Examples of conditions that would not count as a SSFF under this resolution would include:

- An electrician transposes connecting leads to terminals in the actuation panel for a single train safety system causing a failed PMT. The condition was created during the maintenance activity and corrected while still in a maintenance state within the LCO window.

- During MOVATS testing, while a single train system is OOS for unrelated maintenance, a valve technician overheats the contactors causing them to stick. Replacement of the contactor is not part of the original scope of the planned maintenance activity but is identified and completed prior to SR Operability testing.
- A nearby instrument required to maintain operability of a single train safety system is damaged while breaking a bolt loose for an unrelated maintenance activity on the same system. This condition was not part of the preplanned maintenance. Correcting this condition requires an additional 4 hours of LCO time.

This proposed change applies similar treatment from MSPI failure guidance on page F-29 of NEI 99-02 to SSFF criteria.

> "Failures identified during post maintenance tests (PMT) are not counted unless the cause of the failure was independent of the maintenance performed" … "System or component failures introduced during the scope of work are not indicative of the reliability of the equipment, since they would not have occurred had the maintenance activity not been performed."

This failure was not counted by BFN as a MSPI failure and similarly should not count as a SSFF.

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

Add the following on Page 30, section 2.2, starting after the period on line 7:

> If the following elements are met for a condition affecting Operability of a SSC, then the condition does not count for purposes of the SSFF PI:
> - Created during a maintenance OOS period and it did not exist while the SSC was considered Operable,
> - Not possible and/or reproducible during accident conditions, and
> - Identified and corrected while still in a maintenance state.
>
> This exemption applies even if the condition:
> - Required repairs outside of the scope of planned maintenance, and
> - Repairs were required in order to return the equipment back to Operable status.

PRA update required to implement this FAQ? No
MSPI Basis Document update required to implement this FAQ? No

FAQ 17-01
Grand Gulf June 2016 Power Change

Plant:	Grand Gulf Nuclear Station Unit 1		
Date of Event:	June 17, 2016		
Submittal Date:	January 11, 2017		
Licensee Contact:	James Nadeau	**Tel/email:**	1-601-437-2103 / jnadea1@entergy.com
NRC Contact:	Matt Young	**Tel/email:**	1-601-437-2387 / matt.young@nrc.gov

Performance Indicator: Unplanned Power Changes per 7,000 Critical Hours

Site-Specific FAQ (see Appendix D)? ~~Yes~~ or No

FAQ to become effective when approved or (other date) Approval

Question Section

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

NEI 99-02, IE03 Unplanned Power Changes, Page 14, Examples, Lines 17 through 31:

17 Examples of occurrences that would be counted against this indicator include:
18 · Power reductions that exceed 20% of full power and are not part of a planned and
19 documented evolution or test. Such power changes may include those conducted in
20 response to equipment failures or personnel errors or those conducted to perform
21 maintenance.
22 · Runbacks and power oscillations greater than 20% of full power. A power oscillation
23 that results in an unplanned power decrease of greater than 20% followed by an
24 unplanned power increase of 20% should be counted as two separate PI events, unless the
25 power restoration is implemented using approved procedures. For example, an operator
26 mistakenly opens a breaker causing a recirculation flow decrease and a decrease in power
27 of greater than 20%. The operator, hearing an alarm, suspects it was caused by his action
28 and closes the breaker resulting in a power increase of greater than 20%. Both transients
29 would count since they were the result of two separate errors (or unplanned/non-
30 proceduralized action).
31 · Unplanned downpowers of greater than 20% of full power for ALARA11 reasons.

NEI 99-02, IE03 Unplanned Power Changes, Page 16, Lines 1 and 2:

1 Off-normal conditions that begin with one or more power reductions and end with an unplanned
2 reactor trip are counted in the unplanned reactor scram indicator only. However, if the cause of

Event or circumstances requiring guidance interpretation:

Event Discussion:

On June 17, 2016 the Grand Gulf Nuclear Station was performing routine Turbine Control Valve testing in accordance with an approved procedure. During this testing the operators depressed the rest button on a solenoid valve to test one turbine control valve closure. The solenoid did not perform as designed

and ultimately a second control valve closed and remaining two control valves began oscillating (open/close) in an attempt to maintain turbine load/power. This oscillation induced a similar power swing in the core. Upon release of the solenoid test switch the oscillations dampened but did not terminate.

The operators next attempted to reopen the first valve in accordance with the test procedure slow-close method using the control oil bleed-off valve. This attempt did not open the valve and two valves remained closed. This increased the magnitude of the oscillations of the remaining two valves. The increased oscillation of the control valves induces a larger power oscillation in the core. Upon closure of the bleed-off valve the oscillations again dampened but did not terminate.

In an attempt to reduce and control the power oscillations within the core the operators inserted a number of control rods several steps. This dampened the magnitude of the power oscillations and frequency time between oscillations. This final action ultimately lead to a OPRM reactor trip.

Questions:
It is Entergy's position, based on the guidance provided in Lines 1 & 2 on Page 16 of NEI 99-02, that this was one event caused by the unexpected closure of a second control valve. This closure resulted from equipment failure of the solenoid valve, which ultimately was terminated by the insertion of rods and the receipt of an OPRM reactor trip. Operator actions to attempt to open the first closed valve using the test procedure, and reduce power changed the magnitude and frequency of the power oscillations but could not in of themselves cause the oscillations without the second control valve being shut. Therefore this should be counted as an unplanned SCRAM.

To aid the reviews in understanding the event the following attachment is provided:

- A Graph showing the power oscillations. The graph depicts magnitude of the y-axes and the time on the x-axes.

Question 1: How should this event be counted?

> Should it be counted from start to finish as one event which resulted in an unplanned SCRAM?
>
> Or
>
> Should it be counted as two events one being Unplanned Power Change and one being an Unplanned SCRAM?

Question 2: If it counts as an Unplanned Power Change how should the event be counted?

> Should it be counted as one event (turbine control valve testing) which introduced oscillation and was ultimately terminated in a reactor scram?

Or

Should each power oscillation greater than 20% full power, be counted?

Or

Should a group of oscillations greater than 20% full power influenced by a single cause be counted as a one power change event?

Question 2 Supporting Questions:

If each oscillation greater than 20% full power is to be counted, how do we count it?

Do we count each oscillation greater than 20% full power from the initial power, just prior to the start of the event?

For example: It the initial power was 60% then each oscillation greater than 80.0% or less than 40.0% would be counted

Or

Do we count each oscillation greater than 20% full power from peak to valley and valley to peak?

If licensee and NRC resident/region do not agree on the facts and circumstances, explain:
The collection of facts that caused the power oscillations and reactor SCRAM are understood and agreed upon by both Entergy and the Nuclear Regulatory Commission (NRC).

The NRC inspectors at the Grand Gulf Nuclear Station, however, do not agree with the licensee's determination that this event is only counted in the Unplanned Scrams per7000 Critical Hours performance indicator. The NRC inspectors' position that NEI 99-02, Revision 7, guidance would cause the licensee to count this series· of events in both the Unplanned Scram, per 7000 Critical Hours and Unplanned Power Changes per 7000 Critical Hours performance indicators:

The basis for this position is as follows:

The first set of oscillations greater than 20 percent power resulted from the second control valve closure and operator action to maintain the manual push buttons depressed on the solenoid valves. The control rooms' decision to hold the manual push button on the solenoid valve depressed resulted in approximately five minutes, of power oscillations of greater than 20 percent power. When the manual push button on the solenoid valve was depressed, the operators were unknowingly diverting electrohydraulic system flow, which challenged the control valves ability to stabilize steam flow when

two stop valves were closed. Operators then decided to release the manual push buttons and the power oscillations reduced to approximately 10 percent. This response demonstrated that the second control valve closure and the pressure control system issue resulted in power oscillations that were limited to only 10 percent. The operator actions to maintain the manual push button depressed caused power oscillations that were greater than 20 percent power.

The second set of power oscillations of greater than 20 percent was caused by operator actions to troubleshoot the issue by attempting to reset and reopen a control valve using the slow closure method with a different solenoid valve. When the desired plant response was not achieved; operators backed out of the troubleshooting efforts, and the power oscillations returned to approximately 10 percent. The third set of increased power oscillations was caused by additional operator actions as attempts were made to troubleshoot the issue by resetting the control valve. These troubleshooting efforts resulted in additional power oscillations of greater than 20 percent. During the control valve reset, operators began to insert control rods with the intention to reduce power and stop the power oscillations. Operators believed that a power reduction to less than 50 percent power would stabilize the plant since two open control valves could pass the resultant steam produced.

Ultimately, operators inserted four control rods, which reduced power and increased the frequency of the power oscillations: Although the magnitude of the power oscillations decreased, the increased frequency of the power oscillations were now in the “counting domain" of the Oscillating Power Range Monitor system, and provided a valid input to the reactor protection system to cause an automatic reactor SCRAM.

Based on the above information and NEI 99-02, Revision 7, the inspectors' position is that the initial cause of the event (an unexpected control valve closure resulting in 10 percent power oscillations) was not the cause of the automatic reactor SCRAM. The reactor SCRAM was a result of operator action to insert control rods as an attempt to reduce power. Also, the cause of the greater than 20 percent power oscillations was a result of repeated operator decisions and actions to conduct troubleshooting activities during a 42 minute period. Therefore; this series of events should be counted in both the Unplanned Scrams per 7000 Critical Hours and Unplanned Power Changes per 7000 Critical Hours performance indicators.

Potentially relevant FAQs:

FAQ: 329
Date Entered: 12/12/2002
Cornerstone: Initiating Event
PI: IE03
Question:

NEI 99-02 states that unplanned power changes include runbacks and power oscillations greater than 20% of full power. Under what circumstances does a power oscillation that

results in an unplanned power decrease of greater than 20% followed by an unplanned power increase of 20% count as one PI event versus two PI events? For example: During a maintenance activity an operator mistakenly opens the wrong breaker which supplies power to the recirculation pump controller. Recirculation flow decreases resulting in a power decrease of greater than 20% of full power. The operator, hearing an audible alarm, suspects the alarm may have been caused by the activity and closes the breaker resulting in a power increase of greater than 20% full power.

Response:

Both transients in the example should be counted. There were two errors: (1) opening the wrong breaker and (2) reclosing the breaker without establishing the correct plant conditions for restarting the pump. If the pump had been restored per approved procedures only the first transient would be counted.

Response Section

Proposed Resolution of FAQ:

This even should be counted as an unplanned SCRAM. The cause of the power oscillation and ultimately the reactor SCRAM were the same, the unanticipated closure of the second control valve. The conduct of turbine control valve testing in accordance with approved testing procedures combined with an unexpected equipment failure caused the SCRAM.

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

No rewording of the guidance is required.

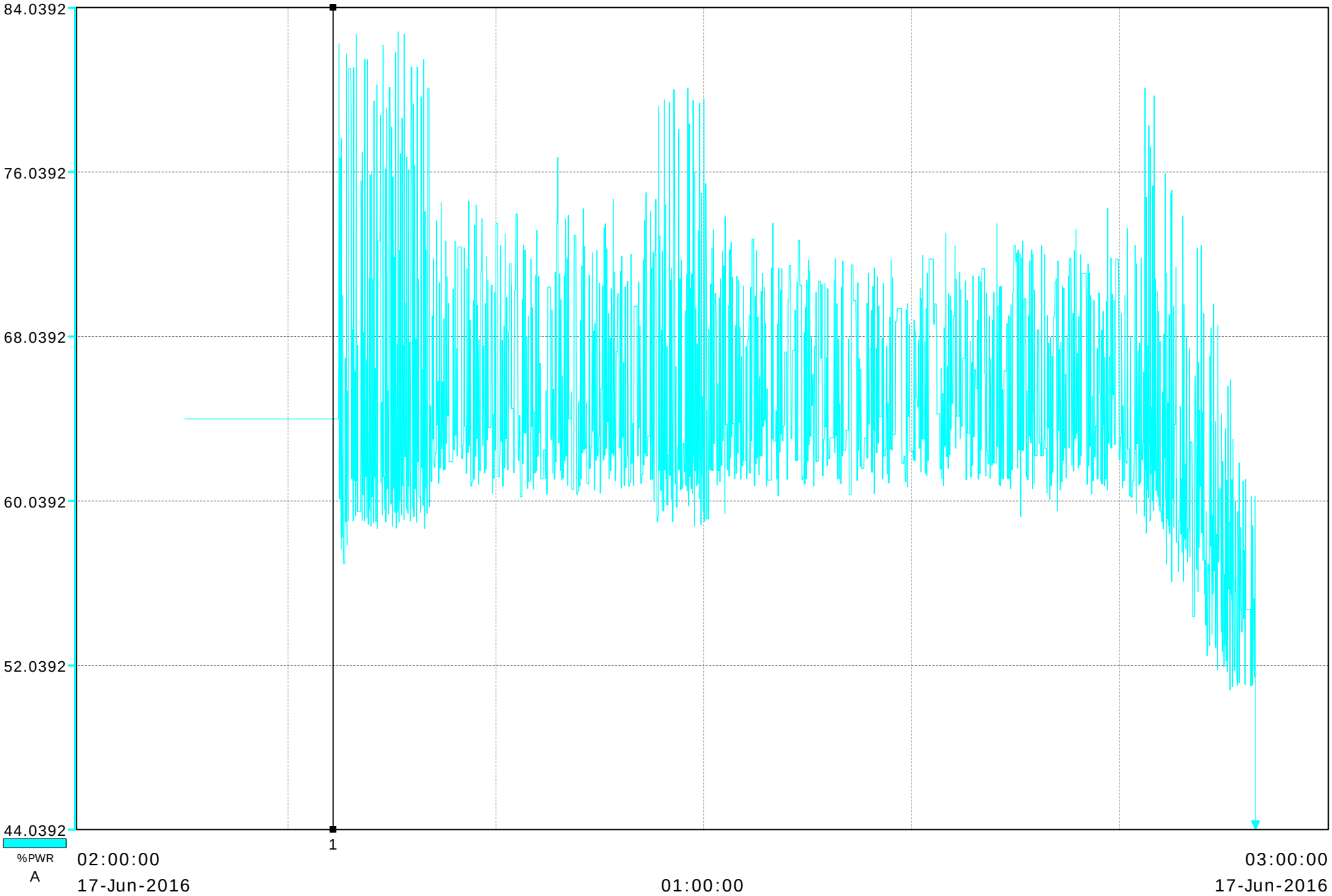
PRA update required to implement this FAQ?

No PRA updates are required.

MSPI Basis Document update required to implement this FAQ?

Not applicable.

PDS Trend Tool



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