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U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Subject: Oconee Nuclear Station
Docket Nos. 50-269,-270, -287
Licensee Event Report 269/2002-04, Revision 0
Problem Investigation Process No.: O-02-3709

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 269/2002-04, Revision 0, concerning a condition that might have resulted in a loss of safety function due to inadequate procedural guidance for some non-design basis scenarios.

This report is being submitted in accordance with 10 CFR 50.73(a)(2)(v)(D). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

W. R. McCollum, Jr.

Attachment

IE22

cc: Mr. Luis A. Reyes
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INPO (via E-mail)

NRC FORM 366 (7-2001) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004

Estimated burden per response to comply with this mandatory information collection request 50 hours Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U S Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503 If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Oconee Nuclear Station, Unit 1	050- 0269	1 OF 8

4. TITLE

Potential loss of Safety Function Due to Inadequate Design Documentation and Procedure Change

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									Unit 2	270
12	20	2001	2002	- 04 -	00	09	09	2002	FACILITY NAME: Unit 3	DOCKET NUMBER: 287

9. OPERATING MODE	1
10. POWER LEVEL	100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
20 2201(d)	20.2203(a)(4)	50 73(a)(2)(iii)	50.73(a)(2)(x)
20.2203(a)(1)	50.36(c)(1)(i)(A)	50.73(a)(2)(iv)(A)	73 71(a)(4)
20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73 71(a)(5)
20 2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A
20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50 73(a)(2)(v)(C)	
20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	X 50 73(a)(2)(v)(D)	
20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50 73(a)(2)(vii)	
20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)	
20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)	

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
L.E. Nicholson, Regulatory Compliance Manager	(864) 885-3292

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED			15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On 7/11/02 an Engineer referenced the Operations Emergency Operating Procedure (EOP) steps for alignment of an alternate post-LOCA Boron Dilution path if the primary path failed. He recognized that the guidance allowed alignment at Reactor Coolant System temperatures and pressures which might result in damage to the flow path. At 2202 hours on 7/11/02 the NRC was notified pursuant to 10CFR50.72(b)(3)(v)(D).

On 7/12/02 the EOP was revised to require engineering evaluation of plant parameters prior to establishing the alternate flow path during any event.

The root cause of this deficient procedure was inadequate design documentation which resulted in a deficient procedure change package for a revision approved 12/20/01. This event is considered to have no significance with respect to the health and safety of the public.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

EVALUATION:

BACKGROUND

This event is reportable per 10CFR 50.73(a)(2)(v)(D) as an event or condition that could have resulted in the loss of a safety function.

The Oconee Nuclear Site (ONS) Low Pressure Injection (LPI) [EIIS:BP] System provides the Post-LOCA Safety Injection function and the decay heat removal function, both Post-LOCA and for normal cold shutdown. After the safety injection phase of accident mitigation is over, the LPI system is aligned to take suction from the Reactor Building Emergency Sump (RBES) to recirculate cooling flow to the reactor vessel.

Following a cold leg break loss of coolant accident (LOCA), the boron in the reactor vessel may concentrate as coolant inventory boils off and vents via the break, leaving the boron behind. Over a prolonged time, the boron concentration in the vessel could become very high with the potential for precipitation of boron to result in fuel channel flow blockages. To counteract this, a Boron Dilution flow path must exist to allow flow of coolant from the core region of the reactor vessel through the Reactor Coolant System (RCS) [EIIS:AC] hot leg to the RBES.

Two active boron dilution flow paths can be aligned by manually closing associated breakers at motor control centers in the plant then operating motor operated valves from the control room. The Emergency Operating Procedure (EOP) assures that the boron dilution flow path is aligned within the time frame required by the accident analysis. The primary boron dilution flow path is through 1,2,3LP-103 and 1,2,3LP-104 discharging over the RBES. The alternate boron dilution flow path for Unit 1 is through 1LP-1, 1LP-2, and 1LP-105 discharging into the LPI Pump suction piping at the point it connects to the RBES. The alternate post LOCA boron dilution flow path for Unit 2 & 3 is through 2,3LP-1, 2,3LP-2, 2,3LP-3, and 2,3LP-19/LPI Pump Suction.

A third, passive path uses the clearances between the reactor vessel and vessel internals around the hot leg nozzles to provide for circulation of liquid in the core region of the reactor vessel.

Calculations have shown the clearances for all three Oconee units to be adequate to prevent excessive buildup of boron.

Prior to this event Units 1, 2, and 3 were operating in Mode 1 at 100% power with no safety systems or components out of service that would have contributed to this event.

EVENT DESCRIPTION

Prior to 1995, the EOP contained steps to align the alternate post LOCA boron dilution flow path in the event of a LOCA and the failure of the primary dilution flow path. In January 1995, it was recognized that, for small breaks and some non-design basis scenarios, the existing guidance could allow this path to be aligned while RCS pressure and temperature was sufficient to overpressurize the piping in the path. Hot RCS water could potentially flash to steam and eject a water slug, which has been postulated to damage pipe in the LPI system and/or the Foreign Material Exclusion (FME) screen over the RBES. Damage of this pipe or the RBES screen could potentially result in the loss of recirculation flow through the sump and, therefore, loss of long term decay heat removal capability.

Therefore, on 1/12/1995, the Oconee EOP was revised to delete use of the alternate path during these scenarios.

However, the issue of potential damage when aligning the alternate dilution flow path was not properly documented. Ideally, one action should have addressed revision of appropriate design documents to capture the limitations on system operation due to the over pressurization issue discussed above. Logically, the Design Basis Documentation (DBD) was one appropriate place to document this issue. The project to consolidate existing design information into DBDs was still in progress in 1995. The LPI System DBD was approved on 11/27/1995 but did not include any reference to this issue. Another potential option for documenting this issue would have been to revise the ONS Updated Final Safety Analysis Report (UFSAR), but this also did not occur.

In January 2000, a project was initiated to revise the Oconee EOP to comply with Babcock and Wilcox Owners' Group (BWOG) Technical Basis Document Rev. 9 and to change from a one-column format to a

two-column format. During the preparation of the revised EOP, the revision team inserted contingency steps into two scenarios. These steps were to align the alternate boron dilution flow path if the primary path could not be aligned. This was the same guidance which had been deleted in 1995. Due to the passage of time, it could not be determined if the addition of these steps was the result of a conscious decision or of a "cut and paste" error in duplicating the alignment of the primary path from the large break scenario where it is appropriate.

In addition, the "Description of Change" documentation describing the change to the EOP did not identify these steps as an addition. By directive and management expectations, the personnel reviewing this EOP change were to review the identified changes rather than the entire procedure. Therefore, omission of these steps from the "Description of Change" document also removed them from the change review process.

On 12/20/01, the revised EOP was approved for use. Due to the inclusion of these steps to align the alternate dilution flow path without adequate guidance with respect to system pressure, a condition was created which is postulated to result in a loss of safety function in certain limited scenarios.

On 7/11/02 a Design Basis Engineer, who was knowledgeable of the overpressurization issue, recognized that the EOP sequence of steps applicable to a small break LOCA contained the steps to place the alternate post-LOCA Boron Dilution path in service if the primary path alignment failed. These steps did not contain appropriate guidance to avoid potential problems due to high RCS temperature and pressure.

At 2202 hours on 7/11/02 the Nuclear Regulatory Commission (NRC) was notified pursuant to 10CFR50.72(b)(3)(v)(D).

An Operations Guide was written as an interim action to address this issue while Operations processed a procedure change.

On 7/12/02 an EOP revision was approved which revised steps to require Technical Support Center (TSC) guidance prior to use of the alternate path. A TSC guidance document was also issued, which provided additional guidance for engineering evaluation of plant

parameters prior to establishing the flow path during a scenario in progress.

On 7/17/02 an additional EOP revision was approved which revised steps to require similar TSC guidance prior to use of the alternate path in the High Pressure Injection (HPI) [EIIS:BG] Cooldown section of the EOP.

CAUSAL FACTORS

The immediate cause of this event is a deficient procedure. The root cause is inadequate documentation of a known problem. In 1995, Engineering did not address the issue of using the alternate dilution flow path for scenarios other than large break LOCAs in the LPI DBD, UFSAR, or other appropriate Engineering documents. As a result of this oversight, Operations procedure writers did not have a reference documenting that use of the alternate path was inappropriate in the given scenarios.

A contributing factor was that the steps containing inappropriate guidance were not identified as part of the change in the "Description of Change" documents, and therefore were not included in the review process. Due to the magnitude of the total change and the elapsed time since the change, it was not possible to identify who prepared the "Description of Change" documents for the sections of the procedure involved in this event.

The Oconee EOP was completely reviewed and validated in 1999. The adoption of B&WOG TBD Rev.9 as the basis for the Oconee EOP was a transformation of form only with limited revision of technical content. Because the 2001 format change was significant in scope, the procedure change received significant review and validation. Therefore, it is believed that the addition of these steps was an isolated error and the overall quality of the EOP has not been compromised.

CORRECTIVE ACTIONS

Immediate:

1. An Operations Guide was written as an interim action to address this issue while Operations processed a procedure change.

Subsequent:

1. A Technical Support Center (TSC) guidance document, which provided guidance for evaluation of plant parameters prior to establishing the flow path, was issued to support the EOP.

2. The LOCA and HPI cooldown sections of the EOP were revised.

3. Operations Procedure Group management has communicated expectations for more thorough descriptions of changes to better assure that changes are reviewed to a level adequate to limit recurrence of this type of event.

Planned:

1. The LPI DBD and/or the UFSAR will be revised to better describe the design, functions, and limitations associated with placing the alternate boron dilution flow path in service.

None of these corrective actions are considered NRC Commitment items. There are no other NRC Commitment items contained in this LER.

SAFETY ANALYSIS

This event does not involve an actual Functional Failure of a Safety System. However, this event is considered a Safety System Functional Failure due to the potential that guidance in the EOP might, under certain conditions, have led to damage to LPI system components, which, in turn might have resulted in the loss of the decay heat removal safety function.

The inadequate guidance was included in the EOP between 12/20/01 and 7/11/02. In order for a loss of safety function to occur, an event requiring high pressure recirculation must occur during that limited time period. If the primary dilution path could be

established, there would be no detrimental effect. Only in the event of an independent failure of the primary path did the EOP instruct the operators to align the secondary path.

If the pressure and temperature in the RCS were still sufficiently above the pressure/temperature conditions in the Reactor Building, as the valves in the line opened, the hot RCS water in the line might flash to steam and propel the cooler water already in the decay heat line through the line. A preliminary analysis model was not sufficiently reliable to eliminate the potential that a slug of cooler water might be ejected with enough velocity to either damage LPI piping where it connects to the RBES, or damage the screen over the RBES. The screen protects against foreign materials being pulled into the LPI suction. Either of these results might have caused a loss of LPI system function under the limited set of conditions that challenge this scenario.

The conditional increase in core damage probability (CDP) as a result of the possible use of the alternate boron dilution path, and potential for RBES damage, has been evaluated. The core damage frequency has been estimated by considering, 1) the frequency of initiating events for which the issue is applicable, 2) the likelihood that the alternate boron dilution path is required, 3) the potential for loss of sump recirculation, and 4) the potential for operator action to prevent core damage given the loss of recirculation. The conditional CDP has been evaluated to be less than 1E-07. This is an insignificant increase in the CDP.

The potential for damage to the RBES screen has no implications for containment bypass or other mechanisms related to a large early release of fission products following a core damage accident. Large dry containments such as Oconee's have been evaluated by many to have low conditional probabilities of early containment failure, < 0.01 for typical LOCA initiated sequences. Therefore, the estimated change in the large early release probability is estimated to be less than 1E-09, which is insignificant.

Therefore, this event had no actual impact on the health and safety of the public.

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ADDITIONAL INFORMATION

A review was performed for similar events. LER 269/1999-07 Revision 1, dated 3/30/2000, addressed several problems with an earlier version of the EOP. However, that report was due to an earlier programmatic weakness in the consideration of potential failures and the validation of the ability to perform time critical actions. While several other deficiencies have been found in Operations procedures, none were sufficiently similar to this current event or had the same root cause, therefore this event is not considered to be a recurring event.

There were no releases of radioactive materials, radiation exposures or personnel injuries associated with this event.

This event is not considered reportable under the Equipment Performance and Information Exchange (EPIX) program.