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0CAN120402

December 3, 2004

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: Arkansas Nuclear One, Units 1 & 2
Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-6
10CFR50 Appendix A Exemption Request for Steam Trap Isolation Valves

Dear Sir or Madam:

By letter dated October 30, 2003, (0CAN100302), Entergy Operations, Inc. (Entergy) requested exemptions from the requirements of General Design Criteria (GDC) 57 of 10CFR50 Appendix A for Arkansas Nuclear One (ANO), Units 1 and 2. The proposed exemptions were to allow ANO-1 and ANO-2 to operate at power with certain valves in the open position rather than locked closed as required by GDC 57. Originally, Entergy requested exemptions from the requirements of GDC 57 to operate at power with the manual isolation valves for the ANO-1 and ANO-2 Emergency Feedwater System (EFW) steam traps and the ANO-2 atmospheric dump valve (ADV) drain steam trap in the open position. In a letter dated November 15, 2004, (0CAN110403), Entergy supplemented the original exemption request to include the manual isolation valve for an ANO-1 ADV drain steam trap

The purpose of this letter is to provide clarification regarding the requested exemptions. Specifically, Entergy requests exemptions from the requirements of GDC 57 to operate at power with the applicable manual upstream isolation valves for the ANO-1 and ANO-2 EFW steam traps and atmospheric dump valve drain steam traps in the open position. Operating with these valves open does not affect the consequences of any of the accidents analyzed in the Safety Analysis Reports of either ANO unit. However, operating with the EFW steam trap isolation valves closed would pose a potential challenge to the operability of the steam-driven EFW pumps.

There are no new commitments contained in this submittal. If you have any questions or require additional information, please contact Richard Scheide at 479-858-4618.

Sincerely,

Dale E. James
Manager, Licensing

DEJ/rhs

Attachment:
Analysis of Proposed Exemptions

A001

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Attachment
to
0CAN120402

Analysis of Proposed Exemptions

1.0 DESCRIPTION

Entergy Operations, Inc. (Entergy) requests exemptions from the requirements of 10CFR50 Appendix A, GDC 57 for Arkansas Nuclear One (ANO), Units 1 and 2. The proposed exemptions will allow ANO-1 and ANO-2 to operate at power with the manual isolation valves for the Emergency Feedwater System (EFW) steam traps and atmospheric dump valve (ADV) drain steam traps in the open position. These traps are located on main steam lines outside containment and upstream of the main steam Isolation valves (MSIVs). The proposed exemptions are being requested in accordance with 10 CFR 50.12, "Specific exemptions."

2.0 PROPOSED EXEMPTIONS

The proposed exemptions will allow operation at power with the ANO-1 and ANO-2 EFW steam trap manual isolation valves and ADV drain steam trap manual isolation valves open, contrary to the requirements of General Design Criterion (GDC) 57. The subject piping configurations are shown in Safety Analysis Report figures 7-22 (Unit-1) and 10.2-3 (Unit-2).

3.0 BACKGROUND

The design and construction of ANO-1 and ANO-2 began before the issuance of the General Design Criteria. Consequently, the historical design and licensing basis documentation of both ANO units did not clearly designate the GDC classification of containment penetrations. However, the containment penetration table in the ANO-2 Final Safety Analysis Report (FSAR) listed the GDC that each penetration most closely represented. The ANO-1 Safety Analysis Report (SAR) was subsequently revised to do the same.

In 1995, an engineering report was completed which documented the design basis of the piping penetrations of the ANO-1 and ANO-2 containment buildings. This report concluded that design documentation supported the position that secondary system piping inside the containment buildings was an extension of the containment liner and, therefore, the secondary system isolation valves outside containment were not subject to GDC 57. Subsequently, Safety Analysis Report (SAR) changes were made in accordance with 10CFR 50.59 which documented this conclusion.

In 2002, the NRC staff questioned the position that design and licensing documentation supported secondary system piping inside containment being an extension of the containment liner and upon review of this issue, the validity of the SAR changes made under 10CFR50.59.

After evaluating the NRC's concern, Entergy decided to return the applicable secondary system piping penetrations to GDC 57 classification. Actions have been issued within the ANO corrective action program to complete the appropriate SAR changes in accordance with 10CFR50.59.

The secondary system piping penetrations of both ANO units comply with the requirements of the applicable GDCs to the extent practicable with the following exceptions:

- The ANO-1 steam generator sampling lines were not designed as Seismic Class I since Regulatory Guide 1.29, "Seismic Design Classification," specifically excludes lines less than 2 ½ inches in diameter connected to secondary system piping inside the outermost containment isolation valve, including the secondary side of the steam generators, from Seismic Class I design requirements. The non-seismic design of the sample lines was communicated to the NRC in response to FSAR Question 9.17. In addition, the basis for the acceptability of the design was communicated to the NRC in response to FSAR Question 5.65 and was incorporated into the FSAR. The response stated, "The steam generator sample lines do not explicitly meet Criterion 57 when the system is in use. When the system is in use, the design is acceptable on the basis that the system is infrequently used, the piping is closed inside the Reactor Building, the inboard isolation valves are remotely operated and redundant to the closed system, and the manual valve outside the Reactor Building is normally closed. In addition to the physical design and infrequent use, administrative control is exercised to insure the manual isolation valve will be closed in a timely manner." Since this configuration was communicated to the NRC during the initial licensing process for ANO and was included in the FSAR, an exemption is not required.

- The eight ANO-1 steam generator (SG) drain lines are less than 2 ½ inches in diameter and were excluded from Seismic Class I design requirements in accordance with Regulatory Guide 1.29. Each of these drain lines is isolated from the Seismic Class II four inch drain header by a single manual isolation valve which is normally closed. The associated containment penetrations are Seismic Class I and their inboard and outboard isolation valves are locked closed during power operation as required by GDC 56. The following basis for the acceptability of the design is included in the SAR. "The steam generator drain lines do not explicitly meet Criterion 56 when the system is in use. When the system is in use, the design is acceptable on the basis that the system is infrequently used, the piping is closed inside the reactor building, the inboard isolation valves are remotely operated and redundant to the closed system, and the manual valve outside the Reactor Building is normally closed. In addition to the physical design and infrequent use, administrative control is exercised to insure the manual isolation valve will be closed in a timely manner." Since this configuration was included in the FSAR during the initial licensing process for ANO, an exemption is not required.

- The steam supply lines for the ANO-1 EFW pumps and the ADVs tap off of the "A" and "B" main steam headers outside containment and upstream of the Main Steam Isolation Valves (MSIVs). Both EFW steam supplies have a steam trap upstream of the EFW pump turbine isolation valve, which is a GDC 57 boundary valve. Therefore, the upstream isolation valves for these steam traps are subject to GDC 57. The manual isolation valves for these steam traps are normally open during power operation. Keeping the EFW steam trap isolation valves closed during operation potentially threatens the operability of the steam-driven EFW pumps. The ADV associated with the "A" main steam header has a drain steam trap whose isolation valves are maintained open during power operation. The upstream isolation valve for this steam trap is also subject to GDC 57. Since these are manual valves and do not have remote closure capability, GDC 57 requires that they be locked closed. Therefore, Entergy requests an

exemption from the requirements of GDC 57 to keep these valves open during operation.

- The steam supply lines for the ANO-2 EFW pumps and the ADVs tap off of the "A" and "B" main steam headers outside containment and upstream of the Main Steam Isolation Valves (MSIVs). The steam supply from the "B" main steam header has a steam trap upstream of the EFW pump turbine isolation valve, which is a GDC 57 boundary valve. Therefore, the upstream isolation valve for this steam trap is subject to GDC 57. The manual isolation valves for this steam trap are normally open during power operation. Keeping the EFW steam trap isolation valves closed during operation potentially threatens the operability of the steam-driven EFW pumps. It is noted that the EFW steam trap for the "A" EFW pump turbine is located downstream of the turbine isolation valve. The ADV associated with the "A" main steam header has a drain steam trap whose isolation valves are also maintained open during power operation. The upstream isolation valve for this steam trap is also subject to GDC 57. Since these are manual valves and do not have remote closure capability, GDC 57 requires that they be locked closed. Therefore, Entergy requests an exemption from the requirements of GDC 57 to keep the manual isolation valves associated with the above referenced steam traps open during power operation.

4.0 TECHNICAL ANALYSIS

GDC 57 states, "Each line that penetrates primary reactor containment and is neither part of the reactor coolant pressure boundary nor connected directly to the containment atmosphere shall have at least one containment isolation valve which shall be either automatic, or locked closed, or capable of remote manual operation. This valve shall be outside containment and located as close to the containment as possible. A simple check valve may not be used as the automatic isolation valve."

Valves in branch lines connected to piping between a GDC 57 containment isolation valve and the outer containment wall are also subject to the requirements of the GDC.

For ANO-1, there are 11 GDC 57 penetrations. They include Main Steam (P1, P2), Main Feedwater (P3, P4), Steam Generator Sampling (P10), Emergency Feedwater (P17, P65), and Service Water (P21, P22, P55, P63). The valves associated with these penetrations are either automatic, capable of remote manual operation, or locked closed during operation as required by GDC 57 with the exception of the manual isolation valves for the two steam traps for the EFW steam supply lines and the "A" main steam header ADV drain steam trap. Therefore, Entergy requests an exemption from the requirements of GDC 57 to maintain the above referenced manual isolation valves open during power operation. An evaluation of the impact of leaving these valves open is included below.

For ANO-2, there are 13 GDC 57 penetrations. They include Main Steam (2P1, 2P2), Main Feedwater (2P3, 2P4), Steam Generator Sampling (2P7), Steam Generator Blowdown, (2P32, 2P64), Emergency Feedwater (2P35, 2P65), and Service Water (2P20, 2P21, 2P56, 2P63). All of the valves associated with these penetrations are either automatic, capable of remote manual operation, or closed during operation with the exception of the manual isolation valves for the steam trap for the "B" EFW steam supply line and the steam trap for the "A" main steam header atmospheric dump valve drain. Since these are manual valves and do not have remote

closure capability, GDC 57 requires that they be locked closed. Therefore, Entergy requests an exemption from the requirements of GDC 57 to maintain these valves open during power operation. An evaluation of the impact of leaving these valves open is included below.

Design Bases Discussion

ANO-1

Operating with the EFW steam trap and ADV drain isolation valves open results in having only the secondary system pressure boundary inside containment as a barrier against the release of radioactivity to the environment through the steam trap piping. However, the effects of these valves being open during power operation have been evaluated and shown to have no impact on the consequences of any of the events evaluated in the SAR. Operating with the EFW steam trap isolation valves closed could compromise the operability of the EFW pump turbine due to condensate buildup.

Of the 17 events listed in Chapter 14 of the ANO-1 SAR, only eight involve a radiation dose consequence evaluation. Two of these, the waste gas decay tank rupture and the fuel handling accident, need not be evaluated since they cannot physically involve a release through the EFW steam trap isolation valves. The remaining six events are the loss of coolant accident (LOCA), main steam line break, steam generator tube failure, rod ejection accident, loss of electric power, and the maximum hypothetical accident.

The limiting main steam line break analysis assumes that the break occurs between the reactor building and a main steam isolation valve. Therefore, the EFW and ADV steam trap isolation valves being open during this event does not impact the dose consequence evaluation.

A secondary system isolation is not assumed following a rod ejection accident or loss of electric power event. Therefore, having the isolation valves for the EFW and ADV steam traps open would not impact the dose consequences of these events.

For the LOCA, activity in the secondary is not considered in the dose estimate because of the massive radioisotope inventories that are conservatively and deterministically considered to come from the containment building. The fact that there is no credit taken for the isolation of any secondary system flowpath is evidence of this. Therefore, having the EFW and ADV steam trap isolation valves open during this event does not impact the evaluation.

The maximum hypothetical accident analysis assumed fission product releases greater than any that could actually occur to demonstrate that the plant design was adequate to preclude any undue risk to the general public. Secondary system isolation was not assumed for this event. Therefore, leaving the EFW and ADV steam trap isolation valves open would have no effect on the consequences of this event.

The steam generator tube rupture analysis does not generate a main steam line isolation signal and automatic isolation of the affected steam generator is not assumed. The analysis assumes that the affected generator is isolated at 34 minutes by reducing RCS temperature to a value lower than a temperature corresponding to a saturation pressure below the setpoint of the main steam safety valves. This effectively stops the tube leak. All of the reactor coolant mass that

leaked to the secondary system prior to termination of the primary to secondary leak is assumed to exit to atmosphere either through the main steam safety valves or through the condenser. The discharge of the subject traps is routed to the condenser. Therefore, leaving the EFW and ADV steam trap isolation valves open would have no effect on the consequences of this event.

Based on the above discussion, leaving the EFW and ADV steam trap isolation valves open during power operation would have no impact on the consequences of any of the accidents evaluated in the SAR.

ANO-2

Operating with the EFW steam trap and Atmospheric Dump Valve (ADV) drain steam trap isolation valves open results in the secondary system pressure boundary inside containment providing the only barrier against the release of radioactivity to the environment through the steam trap piping. However, the effects of these valves being open during power operation have been evaluated and shown to have no impact on the consequences of any of the events evaluated in the SAR. Operating with the EFW steam trap isolation valves closed could compromise the operability of the EFW pump turbine due to condensate buildup.

Of the 36 events listed in Chapter 15 of the SAR, only ten involve a radiation dose evaluation. The waste gas decay tank rupture and the fuel handling accident need not be evaluated since they cannot physically involve the EFW and ADV steam trap isolation valves. Additionally, the malfunction of the turbine gland sealing system can also be eliminated from evaluation since it is bounded by the turbine trip event which will be discussed below. The remaining seven events are loss of reactor coolant system (RCS) forced flow, turbine trip, loss of AC power, excess heat removal, LOCA, main steam/feed line break, and steam generator tube rupture.

For the turbine trip, loss of AC power, excess heat removal, and main steam/feed line break, no post-event RCS activity is involved in the dose estimate since the RCS integrity is not compromised. Having the EFW and ADV steam trap isolation valves open would not impact this event since the containment isolation function is not a factor.

For the loss of RCS forced flow, only the RCP shaft seizure has a dose estimate and that dose estimate is based on a normal cooldown to shutdown cooling with no secondary isolations assumed. Therefore, having the EFW and ADV steam trap isolation valves open would not impact this event.

For the LOCA, activity in the secondary is not considered in the dose estimate because of the massive radioisotope inventories that are conservatively and deterministically considered to come from the containment building. No credit for the closure of the main steam isolation valves or other secondary system flowpaths is taken for this analysis unless a passive failure of the secondary system pressure boundary inside containment is assumed. Since the design and quality of the secondary system process and drain lines inside containment is equivalent to that of the containment liner, a passive failure of this piping is not considered credible. Therefore, having the EFW and ADV steam trap isolation valves open would not impact this event.

For the steam generator tube rupture, no containment isolation signal or main steam isolation signal would be generated. Manual isolation of the affected steam generator is assumed to occur 60 minutes following a steam generator tube rupture followed by cooldown to shutdown cooling conditions using the unaffected steam generator. The isolation of the affected steam

generator includes the local manual isolation of the EFW and ADV steam traps. Therefore, the fact that they are not equipped to be operated remotely has no affect on analyzed dose consequences.

Based on the above discussion, leaving the EFW and ADV steam trap isolation valves open during power operation would have no impact on the consequences of any of the accidents evaluated in the SAR.

5.0 JUSTIFICATION FOR 10CFR50, APPENDIX A, GDC 57 EXEMPTIONS

10CFR50.12 states that the commission may grant an exemption from the requirements contained in 10CFR50 provided that:

1. The requested exemption is authorized by law: No law has been identified which precludes the activities covered by this exemption request.

2. The requested exemption does not present an undue risk to the public health and safety: The previous discussions document that leaving the isolation valves for the ANO-1 and ANO-2 EFW steam traps and ADV drain steam traps open during power operation would have no impact on the offsite doses associated with the accidents analyzed in the SARs of both ANO units.

3. The requested exemption will not endanger the common defense and security: The common defense and security is not impacted by this exemption request.

4. Special circumstances are present which necessitate the request for an exemption: This exemption request meets the special circumstances described in 10CFR50.12(a)(2)(ii) since the underlying purpose of the rule will continue to be met with the isolation valves for the subject steam traps open. As discussed above, the offsite dose consequences of the accidents analyzed in the SARs of both ANO units are not affected by leaving the isolation valves for the ANO-1 and ANO-2 EFW steam traps and ADV drain steam traps open. Additionally, if the EFW steam trap isolation valves were maintained closed during operation as required by GDC 57, the operability of the steam-driven EFW pumps could be compromised as a result of condensate buildup.

6.0 CONCLUSION

The discussions above demonstrate that:

- Leaving the isolation valves for the ANO-1 and ANO-2 EFW steam traps and ADV drain steam traps open during power operation would continue to meet the underlying purpose of the rule in that the dose consequences of the accidents analyzed in the ANO-1 and ANO-2 SARs would not be impacted.

- Maintaining the isolation valves for the EFW steam traps closed as required by GDC 57 could compromise the operability of the EFW pumps due to condensate buildup.

Therefore, in accordance with 10CFR50.12, Entergy requests an exemption from the requirements of GDC 57 of 10CFR50, Appendix A, to allow operating ANO-1 and ANO-2 at power with the isolation valves for the referenced EFW steam traps in the open position and with the isolation valves for the referenced ADV drain steam traps open.