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Subject: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Technical Specifications Change Request
Containment Isolation Valves

Gentlemen:

Attached for your review and approval is a proposed change requesting the deletion of two containment isolation valves from Technical Specification (TS) Table 3 6-1. On March 31, 1991, as a followup to IE Information Notice 88-73, "Direction-Dependent Leak Characteristics of Containment Purge Valves", Entergy Operations discovered that the valve body for each of the inboard containment purge isolation valves was oriented in a direction which is less likely to seal when pressurized from the containment side. Due to the system design, local leak rate testing of the valves with pressure applied from the containment side of the valves is not possible. This condition resulted in these valves being declared inoperable. At the time of discovery, ANO-2 was nearing the end of a scheduled refueling outage. Evaluations conducted at the time concluded that extensive system modifications and/or complete replacement of the valves would be necessary to ensure the valves could be properly tested and verified acceptable as containment isolation valves. To allow restart from the shutdown condition, Entergy Operations requested and received a Temporary Waiver of Compliance (TWC) from the requirements of TS 3.0.4 as it applies to TS 3.6.3.1. The TWC was based on the staff position stated in Generic Letter (GL) 87-09, which recognized that the application of TS 3.0.4, in this case, unduly restricted ANO-2's operation when conformance with the action requirements for these inoperable valves provided an acceptable level of safety for operation of the unit.

Subsequently, on July 15, 1991, the ANO-2 TSs were amended to allow a specific exemption of TS 3.6.3.1 from the requirements of TS 3.0.4. However, as stated in GL 87-09 and reiterated in the Staff's Safety Evaluation accompanying the ANO-2 TS Amendment, nothing in the Staff position stated in GL 87-09 should be interpreted as endorsing or encouraging plant startup with inoperable equipment.

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Entergy Operations has completed necessary evaluations to determine the best course of action to resolve the problem with the purge system inboard containment isolation valves. Based on these evaluations, the attached provides the justification for deletion of these valves from Technical Specification Table 3.6-1. In accordance with 10CFR50.91(a)(1), and using the criteria in 10CFR50.92(c), Entergy Operations has determined that the change involves no significant hazards consideration. The basis for these determinations are included in the enclosed submittal. Although the circumstances of this proposed amendment is not exigent or emergency, your prompt review and approval is requested.

We request that the effective date of this change be upon NRC issuance of the amendment.

In addition to the requested Technical Specification change, in accordance with 10CFR50.12, Entergy Operation requests an exemption from the requirements of 10CFR50, Appendix A, General Design Criterion 56 as related to the containment isolation design provisions for the containment purge system piping penetrations.

Very truly yours,

J W Yelverton
for NSC

NSC/sjf
Attachments

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STATE OF ARKANSAS)
) SS
COUNTY OF LOGAN)

Affidavit

I, J. W. Yelverton, being duly sworn, subscribe to and say that I am General Manager, Plant Operations ANO for Entergy Operations, that I have full authority to execute this affidavit; that I have read the document numbered 2CAN109101 and know the contents thereof; and that to the best of my knowledge, information and belief the statements in it are true.

J. W. Yelverton

J. W. Yelverton

SUBSCRIBED AND SWORN TO before me, a Notary Public in and for the County and State above named, this 15th day of October, 1991.

Sandy Sievenmorgen

Notary Public

My Commission Expires:

May 11, 2000

ENCLOSURE

PROPOSED TECHNICAL SPECIFICATION

AND

RESPECTIVE SAFETY ANALYSES

IN THE MATTER OF AMENDING

LICENSE NO. NPF-6

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT TWO

DOCKET NO. 50-368

DESCRIPTION OF PROPOSED CHANGE

The proposed change revises ANO-2 Technical Specification Table 3.6-1 (page 3/4 6-19) which provides the containment purge isolation valve requirements applicable to operational modes 1, 2, 3, and 4. The proposed change removes the inboard containment purge isolation valves (2CV-8289-1 and 2CV-8291-1) from the listing of containment isolation valves given in this table. Additionally, Entergy Operations requests an exemption from compliance with the requirements of General Design Criteria 56 to allow use of the redundant outboard isolation valves to maintain containment integrity.

BACKGROUNL

On March 31, 1991, as a followup to Information Notice 88-73, Entergy Operations discovered that the sloped valve body seats of the inboard containment purge isolation valves (2CV-8289-1 and 2CV-8291-1) are oriented in a direction which is less likely to seal when pressurized from the containment side. Because of the system design, it is not possible to perform traditional Local Leak Rate Testing (LLRT) of the valves with the pressure applied to the valves' disc from the accident direction. Previous Local Leak Rate Testing was conducted by pressurizing the inboard isolation valves from a reverse direction. Because of the valves' seat orientation, it is possible that the valves will not perform their required safety function during accident conditions. Evaluations have concluded that the system design modifications necessary to allow proper leak rate testing of currently installed valves or complete replacement of the valves will result in substantial costs. The proposed Technical Specification change will allow the use of existing redundant outboard containment isolation valves in each affected penetration to provide containment isolation. This configuration will provide essentially equivalent isolation capability for these containment penetrations.

DISCUSSION

The ANO-2 containment building purge supply system consists of a centrifugal type fan, a hot water heating coil and a roll type filter. The purge supply line that penetrates the containment building utilizes thre[illegible]ves in series - one inside containment (2CV-8289-1) and two outside containment (2CV-8284-2 and 2CV-8283-1). The arrangement of the existing isolation valves for the purge supply and exhaust are shown in Figure 1, attached. The three purge supply isolation valves associated with penetration number 2V1 are listed in Technical Specification 3.6-1. The ANO-2 containment building purge exhaust system consists of a vaneaxial fan, a roughing filter, a HEPA filter, and a charcoal adsorber. The purge exhaust line that penetrates the containment building also utilizes three valves in series - one inside containment (2CV-8291-1) and two outside containment (2CV-8286-2 and 2CV-8285-1). The three purge exhaust isolation valves associated with penetration 2V2 are listed in Technical Specification Table 3.6-1. The two redundant outboard isolation valves in each penetration are air operated, fail closed, 54 inch butterfly valves constructed with resilent seats and manufactured by Fisher Valves. The valves are controlled by key operated handswitches located on the main control panels in the control room and are maintained in a sealed closed position in OPERATIONAL MODES 1, 2, 3 and 4 by removing the keys from the handswitches. This prevents power from being supplied to the solenoid valve used to supply operating air to the valve actuator. The valves also receive an automatic close signal upon initiation of containment isolation actuation or safety injection actuation (diverse containment isolation) from the engineered safety features actuation system.

The first outboard isolation valves receive a close signal from CIS/SIS #1 and the second outboard isolation valves are closed by a CIS/SIS #2 signal. Position indication for each valve is provided on the control room panels in accordance with the guidance provided in Regulatory Guide 1.97.

The proposed Technical Specification change removes the inboard containment purge isolation valves (2CV-8289-1 and 2CV-8291-1) from the listing of containment isolation valves in Technical Specification Table 3.6-1. The containment purge system is not credited for performing any safety-related function and is not required to operate during a design basis accident to maintain containment integrity. Containment integrity will be maintained by utilizing the redundant outboard isolation valves to provide a double barrier to the release of radioactivity following a design basis event. A vent line between the outboard isolation valves of the purge exhaust and supply lines was originally provided to route any potential leakage past the first outboard isolation valve to the Penetration Rooms Ventilation System. This line is now sealed closed with a welded pipe cap to maintain a double containment isolation barrier.

The purge supply and exhaust lines which penetrate the containment building are designed in accordance with 10CFR50, Appendix A, General Design Criterion (GDC) 56. This criteria specifies design requirements for lines that connect directly to the containment atmosphere and penetrate the reactor containment. GDC 56 requires that these types of lines incorporate one inside containment isolation and one outside containment isolation valve unless it can be demonstrated that isolation provisions for a specific class of lines are acceptable on some other defined basis. The required isolation valves may be automatic isolation valves, locked closed isolation valves, or an automatic isolation valve and a locked closed isolation valve.

The proposed arrangement of containment isolation valves for the ANO-2 containment purge system, in which both isolation valves are located outside containment, does not conform with the explicit requirements of GDC 56; however, this arrangement provides acceptable containment isolation provisions for these penetrations. Standard Review Plan (SRP) Section 6.2.4, "Containment Isolation System" provides specific criteria necessary to meet the relevant regulatory requirements and provides guidelines for acceptable alternate containment isolation provisions for certain classes of lines. Although no explicit guidelines are provided for alternate containment isolation design provisions for lines such as containment purge lines, the guidance contained in Acceptance Criteria 6.d is relevant to the proposed ANO-2 design. As stated in 6.d of SRP 6.2.4, both isolation valves may be located outside containment if the isolation valve nearest containment and the piping between the containment and the valve is conservatively designed to preclude a breach of piping integrity. The design of the ANO-2 outboard containment isolation valves and associated piping complies with this criterion. The outboard containment isolation valves and the associated piping are designed to Seismic Category I standards and have a design temperature and pressure rating of 300°F and 65 psig, respectively. These design ratings exceed the calculated peak design basis accident containment conditions. The valves and piping associated with the containment purge supply and exhaust are classified as Safety Class 2 and are protected from the dynamic effects of potential pipe ruptures. The outboard isolation valves and associated piping will be tested in accordance with the Technical Specifications 4.6.1.2.d and 4.6.3.1.4. Additionally, periodic replacement of the valve's resilent seats is included in the plant preventive maintenance program and performed at a frequency consistent with the

valve manufacturer's recommendations. The purge system isolation valves associated with penetrations 2V1 and 2V2 are required to be sealed closed barriers with handswitch keys removed during OPERATIONAL MODES 1, 2, 3, and 4 in accordance with Technical Specification 3.6.1.6. Therefore, the use of two redundant outboard isolation valves in each of these containment penetrations provides acceptable isolation provisions for the containment purge system penetrations.

The only potential concern resulting from the use of the outboard valves to provide containment isolation is the possibility of tornado missile damage. The outboard isolation valves are located in close proximity to each other (distances between outboard valves are shown in Figure 1). This physical arrangement minimizes the piping between the isolation valves which could be subjected to potential tornado missile damage. Additionally, the purge supply and exhaust piping penetrate the containment building at an elevation approximately half the height of the building and are significantly shielded from horizontal tornado missiles by the containment and auxiliary buildings.

Using the techniques of NUREG/CR-4713, the likelihood of any size tornado generating a missile that impacts any part of the outside containment purge piping or valves out through the second isolation valve (whether or not the impact degrades isolation capability) within 30 days following a LOCA of any size, has been shown to be insignificant. Specifically, the calculated probability for such an occurrence was shown to be much less than 10^{-10} per year. Therefore, the possibility of tornado missile damage to the purge isolation valves or piping concurrent with a LOCA is not considered credible.

The cost to replace the existing inboard isolation valves has been conservatively estimated to be approximately $600K with a valve delivery time of 12 to 14 months. This preliminary estimate was based on the assumption that the existing Limitorque motor actuators could be reused on the replacement valves. If these actuators also require replacement, the estimate would increase by approximately $80K to cover the actuator costs. Replacement of the inboard isolation valves would allow testing and verification of valve leak rates in accordance with the requirements of 10CFR50, Appendix J, thereby providing assurance of an inside containment isolation valve for these penetrations. However, the use of the redundant outboard valves provides essentially equivalent containment isolation. Consequently, the substantial costs of replacing the inboard isolation valves does not provide any significant benefit.

RELATED ACCIDENT ANALYSIS

There are two design basis events that require containment isolation. The first involves an unanticipated release of radioactivity in the containment building following a design basis accident. For this event, containment isolation is required to limit releases to ensure that offsite exposures are a small fraction of the 10CFR100 limits. The current design and Technical Specification requirements prevent significant post accident releases from the containment purge lines. The use of the outboard isolation valves to provide containment integrity will have no effect on offsite doses following a design basis accident. The containment purge isolation valves perform no active safety function and are passive components during Operational Modes 1, 2, 3,

and 4 since they are required to be closed in accordance with Technical Specification 3.6.1.6. Containment integrity is maintained by requiring that the redundant outboard isolation valves remain closed with handswitch keys removed for both the purge supply and exhaust penetrations. Therefore, containment isolation is assured during this event.

The second event concerns a fuel handling accident in the containment building during refueling operations with the containment purge system in operation. The exhaust air from the containment is monitored and filtered before being released to the atmosphere. Radiation monitors are provided to detect an increased airborne activity level and alarm when predetermined setpoints are reached. Additionally, one outboard containment isolation valve in each penetration is designed to close automatically upon detection of high activity levels, thereby preventing the release of radioactivity through the containment purge system.

With respect to this type of accident for ANO-2, the limiting release of radioactivity to the environment results from a fuel handling accident in the fuel spent fuel pool area since the auxiliary building cannot be completely isolated. The design basis evaluations of a fuel handling accident in the containment and in the fuel handling building were conducted in accordance with the guidance provided in Regulatory Guide 1.25, except where specific exemptions were taken. These specific exceptions are provided in Section 15.1.23.2.2 of the Safety Analysis Report. The radioactive material which escapes from the pool was assumed to be released from the building over a two hour time period in accordance with the Regulatory Guide 1.25 assumptions. No credit was taken for operation of the purge system isolation valves to isolate the containment building. The offsite doses resulting from the failure of an entire fuel assembly were calculated to be 31.5 Rem Inhalation Dose and 1.28 Rem Whole Body Dose which are well within the 10CFR100 limits. Operation of either the inboard or the outboard purge isolation valves to provide containment isolation during Operations Modes 5 or 6 is not required to maintain the offsite doses within the limits of 10CFR100 in accordance with the design basis fuel handling accident analysis.

The ANO-2 Safety Evaluation Report (SER), NUREG 0308, Section 15.4.7, "Fueling Handling Accident", discusses the accident analysis for a fuel handling accident in the spent fuel pool area and in the containment building. The SER states, "The radioactive material that escaped from the fuel pool was assumed to be released to the environment over a two hour time period with the iodine activity reduced by filtration through engineered safety feature system filters." The radiological consequences for the fuel handling accident within the spent fuel pool area are summarized in the SER as follows: "Calculated doses for the fuel handling accident in the spent fuel pool are well within the guidelines of 10CFR Part 100.". To assure that a refueling accident within containment would not result in significant releases of activity to the environment, the SER states, "...(2) purge exhaust during refueling operations will be conducted through containment purge filter units which are identical in design to the filter units in the fuel handling area ventilation system described in Table 9.4-3 of the Final Safety Analysis Report". The radiological consequences for the fuel handling accident within containment are summarized in the SER as follows: "...the radiological consequences of this accident are bounded by the radiological consequences of a fuel handling accident in the spent fuel pool area and are therefore acceptable". The accident analysis for a fuel handling accident in either the spent fuel pool area or the containment building does not take credit for isolation valves as a protective measure to prevent the release of radioactivity to the environment which could result in offsite doses in excess of the 10CFR100 limits.

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

An evaluation of the proposed change has been performed in accordance with 10CFR50.91(a)(1) regarding no significant hazards consideration using the standards in 10CFR50.92(c). A discussion of those standards as they relate to this amendment request follows:

Criterion 1 - Does Not Involve A Significant Increase in the Probability or Consequences of An Accident Previously Evaluated

The proposed changes does not involve a significant increase in the probability or consequences of an accident previously evaluated. The containment purge isolation valves are passive components during Operational Modes 1, 2, 3, and 4 since they are sealed closed in accordance with Technical Specification 3.6.1.6. These isolation valves perform no active safety function and have no effect on the probability of an accident occurring. The consequences of a design basis accident during MODES 1, 2, 3, and 4 are unchanged since containment integrity is maintained by redundant isolation valves for both the purge supply and exhaust penetrations. The use of the redundant outboard isolation valves to provide containment isolation does not increase the probability or consequences of any accident previously evaluated since the additional piping length, which will be part of containment boundary, is rated for greater than post accident containment conditions and the second outboard isolation valve is identical to the first outboard isolation valve which is currently used to provide containment isolation. The increase in probability of tornado missile damage to the isolation valves or associated piping concurrent with a design basis accident has been shown to be insignificant. Specifically, the calculated probability for such an occurrence was shown to be much less than 10^{-10} per year. Therefore, the consequences of previously evaluated accidents are not significantly increased. Previous analyses of accidents occurring during power operations credited a double isolation barrier to prevent containment releases through the purge supply and exhaust lines. The ability to provide a double isolation barrier to containment releases remains unchanged as a result of this Technical Specification change.

Previous evaluations of accidents occurring during MODES 5 and 6 with the purge system operating did not take credit for isolation of these penetrations. As a result, the probability and consequences of these accidents are not increased by this change.

The use of redundant outboard isolation valves to provide containment integrity does not involve a significant increase in the probability or consequences of an accident previously evaluated.

Criterion 2 - Does Not Create the Possibility of a New or Different Kind of Accident from Any Previously Evaluated

The proposed change does not create the possibility of a new or different kind of accident from any previously analyzed because the use of the redundant outboard isolation valves to provide containment integrity is equivalent to the degree of isolation provided by the current design. These isolation valves are used as passive components during reactor operation and have no effect on the type or kind of accident. The possibility of a new or different kind of accident from any previously evaluated is not created because the changes do not involve any design

changes, plant modifications, changes in acceptance criteria or changes in plant operation. The change to the valves used for isolation of the containment purge system penetrations will utilize redundant outboard isolation valves. The second outboard isolation valve is essentially identical in design to the first outboard isolation valve which is currently used to provide containment isolation. As a result, the possibility of a new or different kind of accident is not created.

Criterion 3 - Does Not Involve A Significant Reduction in The Margin of Safety

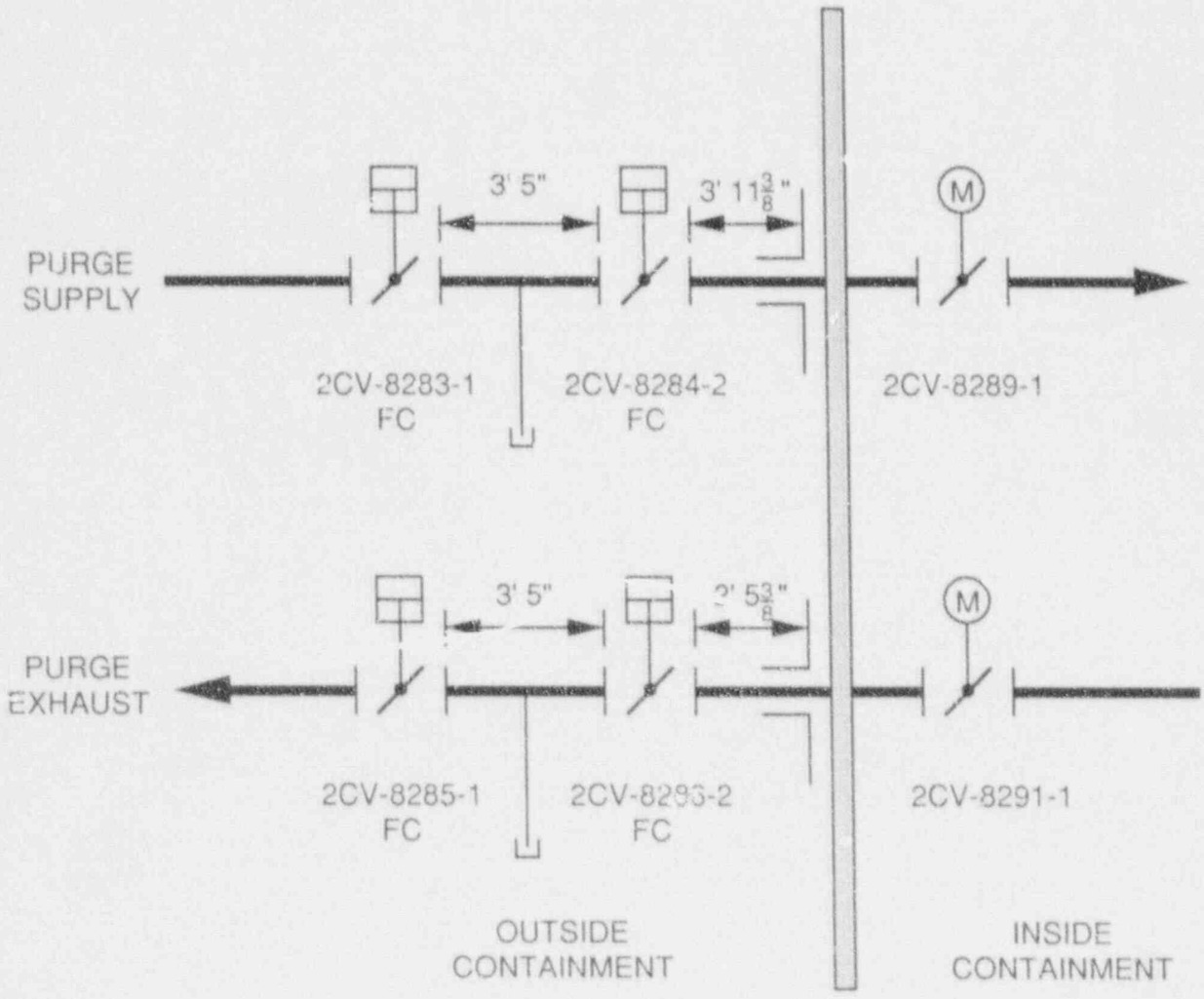
The proposed change does not involve a significant reduction in a margin of safety since the degree of containment isolation is unchanged from that assumed in the design basis analysis. The redundant isolation valves available for each penetration have been functionally tested and proven to be acceptable isolation barriers. No limits or surveillance requirements provided by the Technical Specifications have been changed. The change in the valves used to provide containment isolation does not involve a significant reduction in the margin of safety since the only changes is in the location (outside containment instead of inside containment) of the redundant isolation valve for each penetration.

The only potential concern resulting from the use of the outboard valves to provide containment isolation is the possibility of tornado missile damage. Using the techniques of NUREG/CR-4713, the likelihood of any size tornado generating a missile that impacts any part of the outside containment purge piping or valves out through the second isolation valve (whether or not the impact degrades isolation capability) within 30 days following a LOCA of any size, has been shown to be insignificant. Specifically, the calculated probability for such an occurrence was shown to be much less than 10^{-10} per year. Therefore, the possibility of tornado missile damage to the purge isolation valves or piping concurrent with a LOCA is not considered credible. In addition, the outboard isolation valves are located in close proximity to each other (distances between valves are shown in figure 1). This physical arrangement minimizes the piping between the isolation valves which could be subjected to potential tornado missile damage. Therefore, the margin of safety provided by the containment purge isolation valves and the mitigating function of the containment purge isolation valves is not significantly reduced.

The Commission has provided guidance concerning the application of these standards by providing examples. The proposed amendment most closely matches example (ix)(2): "The repaired or replacement component or system does not result in a significant change in its safety function or a significant reduction in any safety limit (or limiting condition or operation) associated with the component or system". The change to the Technical Specifications uses an alternative to strict compliance with 10CFR50, Appendix A, GDC 56 that provides an equivalent level of protection.

Therefore, based on the reasoning presented above and the previous discussion of the amendment request, Entergy Operations, Inc. has determined that the requested change does not involve a significant hazards consideration.

Figure 1
SIMPLIFIED SCHEMATIC
ANO-2 CONTAINMENT PURGE
SUPPLY AND EXHAUST



Note: Outboard Isolation Valves 2CV-8283-1, 2CV-8284-2, 2CV-8285-1, and 2CV-8286-2 sealed closed during OPERATIONAL MODES 1, 2, 3, & 4