TVA

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SEP 08 1992

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Gentlemen:

In the Matter of the Application of	)	Docket Nos. 50-390
Tennessee Valley Authority	)	50-391

WATTS BAR NUCLEAR PLANT (WBN) UNITS 1 AND 2 REVISED REQUEST - 10 CFR 50.55a(a)(3) - PROPOSED ALTERNATIVE TO THE MATERIALS REQUIREMENTS OF SECTION III, SUBSECTIONS NC/ND PARAGRAPH 7153 OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) BOILER AND PRESSURE VESSEL CODE

This submittal revises TVA's previous submittal dated February 25, 1992, requesting pursuant to 10 CFR 50.55a(a)(3), NRC authorization to use an alternative to the construction and installation requirements of Section III, subsections NC/ND, paragraph 7153, of the ASME Boiler and Pressure Vessel Code. Subsequent discussions with the NRC have led to additional information being requested to augment the original submittal including worst case scenarios. TVA has reviewed the information previously provided and the as-built configuration, and determined that the proposed alternative provides an acceptable level of quality and safety. Compliance with the specified requirements of subsections NC/ND, paragraph 7153, at this time would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety.

Enclosed is a revised description of the proposed alternative. Included in this submittal is a commitment to revise the Final Safety Analysis Report after receiving NRC approval of this alternative.

If there are any questions, please telephone P. L. Pace at (615) 365-1824.

Very truly yours,

W.J. Museler

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Enclosures
cc: See Page 2

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ENCLOSURE

REVISED REQUEST
PROPOSED ALTERNATIVE TO THE CONSTRUCTION
AND INSTALLATION REQUIREMENTS
OF SECTION III, SUBSECTIONS NC/ND PARAGRAPH 7153
OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
(ASME) BOILER AND PRESSURE VESSEL CODE

Contrary to ASME Code Section III subsections NC/ND, Articles 7000, paragraph 7153, requirements, four intervening "stop" (or block) valves (two for each unit) without positive controls and interlocks have been installed in the Boron Recycle System. These valves are located between the safety relief valve and the point of discharge for the volume control tank, boron injection tank, waste gas compressor A, and waste gas compressor B (see attachment).

The actual physical location of the block valves is a secured valve gallery on Elevation 713 in the Auxiliary Building between Units 1 and 2. Because the valve room is considered a high radiation area and there are no routine operational reasons for entry, access is controlled during plant operations.

The 1971 ASME Code in effect for the original Watts Bar design was interpreted by TVA that the intent of the code was satisfied with a systems approach; that is, overpressure protection for the systems is provided through the use of prudent and conservative operating procedures. The administrative procedures used to control and verify the position of the isolation valves would be adequate to meet the intent of the code. This position is consistent with code interpretation III-80-67, which permitted the use of administrative controls on stop valves. The relief valve discharge piping was installed based on this interpretation.

The requirements for positive controls and interlocks were not clearly defined until Code Interpretation III-80-67R, which ruled that "operating procedures governing the use and application of the system" were not acceptable as the "controls." This decision apparently reversed the position previously stated in III-80-67. Interpretation III-1-89-25 restated that an arrangement such as described in this request does not meet the code requirements.

The present arrangement of subject block valves in lines to the holdup tanks allows isolation of either holdup tank for maintenance or when removal of the holdup tank relief valve for testing and/or maintenance is required. Because this is a common system to both units, either holdup tank is available to support continuous operation when one valve is closed. Other possible methods for accomplishing relief valve testing and/or maintenance are as follows:

1. Isolation without block valves or blind flanges. This would require all relief valves tied into the HUTs, the gas decay packages, and both HUTs to be out of service for the duration of the maintenance. This alignment severely limits the availability of the Chemical and Volume Control System and Waste Gas Systems and the length of time a hold up tank can be out of service.

2. Venting both holdup tanks of their cover gases while flange connections are taken apart and blind flanges are installed at the block valve location. This is the same as having block valves without the same safeguards, and therefore does not meet the ASME Code requirements. The alternative would require all relief valves tied into the holdup tanks, the gas decay packages, and both holdup tanks to be out of service for the duration of the blind flange installation operation and subsequent postmaintenance removal. Anytime the system pressure boundary would be broken in the alignment without block valves, there would be increased radiation exposure to plant personnel.

3. Reroute the subject piping from the relief valves which discharge into the holdup tanks. This would relocate the block valves for the volume control and boron injection tanks to a single block valve between the Unit 1 and Unit 2 relief piping. In addition, the relief valve for each waste gas compressor would be routed separately to the holdup tanks. This alternative would unitize the holdup tanks, such that isolation of a holdup tank for maintenance would require that the associated unit's volume control tank also be removed from service. Isolation of a holdup tank and removal from service of the associated volume control tank would require unit shutdown since the chemical and volume control system would no longer be able to receive letdown. In addition, unitization of the holdup tanks also limits the availability of the waste gas compressors.

With the present arrangement, there are administrative controls in place to ensure the locked open position of at least one valve and flow path at all times. The plant instructions provide information and direction regarding the means of control, locking, position, applicability, and accessibility for these controlled valves. The information regarding the subject block valves is as follows:

Requirement: PLANT SAFETY
Applicability: ALL MODES
Accessibility: ANYTIME
Means of Admin Control: LOCKED WITH BRASS CHAIN AND LEAD SEAL
Position: OPEN
In addition, references are also given to the applicable system operating instructions.

The plant operating instruction for the Boron Recycle System now requires valve position verification, checklist signoff, and independent verification before the system can be put into service. Plant operating instructions for the Waste Gas Disposal System, Safety Injection System, and Chemical Volume Control System that require relief through the subject valves have also been revised to insure that the block valves are open before the system can be put into service. This means that prior to putting these systems into service or at the completion of an activity that may result in valve configuration changes, the position of the block valves must be verified as OPEN and LOCKED. In the case that one of the valves is closed (for maintenance purposes), the position of the redundant valve must be verified as locked open.

The Shift Operations supervisor would be notified if one of the isolation valves is found to be mispositioned, the valve would be repositioned to the proper position, and a root cause investigation initiated. The following information describes the worst case scenario if the subject stop valves were closed during plant operation:

Waste Gas Compressors

The following addresses the worst case scenario of block valves 1 and 2-62-957 completely blocking the discharge flowpath from relief valves 0-RFV-77-758A and 758B. These relief valves, set at 145 psig, prevent the waste gas compressors from pressurizing the gaseous waste disposal system above the design pressure of 150 psig. This could occur if the discharge from one or both waste gas compressor packages were to become inadvertently isolated. Based on conversations with the compressor manufacturer, overpressurization of the gaseous waste disposal system would not occur immediately because the waste gas compressors are only capable of developing a limited maximum dead head pressure. The compressor's maximum developed head will not exceed the compressor casing design pressure of 150 psig. Since the gaseous waste disposal system is designed for 150 psig, it is not expected that isolation of the compressor discharge would immediately cause any portion of the system to fail. In time, pressure would begin to rise in the discharge of the compressor due to the heat input from operation at dead head conditions. If the improper system valve alignment went undetected, increasing pressure would eventually cause leakage at some point from the compressor package. Assuming that the compressors are taking suction from the highest possible radiation source of a waste gas decay tank, the compressors would begin pumping the contents of the decay tank out the leak. Although progression of this event to the complete discharge of one gas decay tank is considered highly unlikely, the release of one gas decay tank has already been evaluated as a design basis event and shown not to exceed the offsite dose limits of 10 CFR 100.

Boron Injection Tank

The following discussion addresses the worst case scenario of block valves 1 and 2-62-953 completely blocking the discharge flowpath from relief valve 1-RFV-63-577 to the HUT. Valve 1-RFV-63-577 originally existed in the safety injection system to protect the boron injection tank (BIT) from overpressurization due to thermal expansion of its contents should the tank's heaters fail to operate properly (failed on). However, the BIT heaters have been deleted due to the BIT concentration reduction. Although 1-RFV-63-577 still exists in the system, the relief valve no longer has a specific overpressurization protection function. Based on the above discussion, no safety injection system failure is postulated due to the closure of both 1 and 2-62-953.

Volume Control Tank

The following discussion addresses the worst case scenario of block valves 1 and 2-62-953 completely blocking the discharge flowpath from relief valve 1-RFV-62-688 to the holdup tank. This relief valve protects the volume control tank from overpressurization when the tank's normal outlet lines are closed and letdown flow is still entering the tank. The worst case scenario is the simultaneous failure of the two volume control tank level channels which combine (2 out of 2 logic sequence) to isolate the volume control tank outlet valves to the centrifugal charging pump suction. A failure of the volume control tank level control circuits (false lo-level signal) would close the volume control tank outlet valves automatically and open the refueling water storage tank suction valves to maintain makeup flow. In this postulated event the letdown flow is not automatically diverted to the HUT such that the volume control tank continues to fill. A hi/lo level alarm in the main control room would alert the operator of volume control tank level problems. In addition, the volume control tank outlet isolation valves and the refueling water storage tank suction valves have position indicator lights in the main control room. These lights would alert the operators that the outlet valves had changed position requiring appropriate actions to be taken to correct any volume control tank level problems.

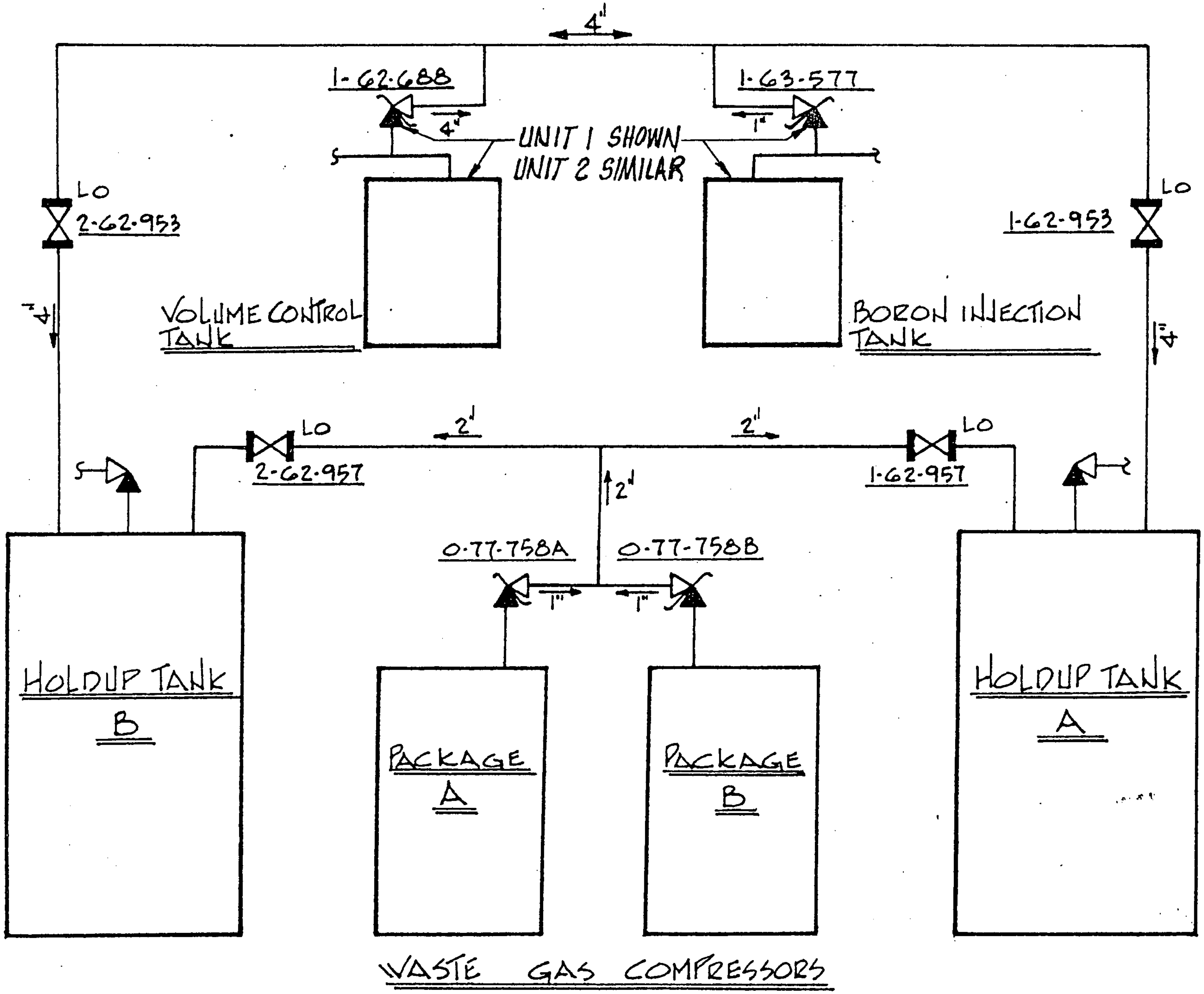
The above described scenario would require a failure involving operator error to allow closure of both block valves 1 and 2-62-953, subsequent failure of both volume control tank level channels, and a failure by the control room to take appropriate action.

In order to determine the actual time the subject block valves could potentially be closed during plant operation, TVA contacted other plants with similar designs.

The only completely accurate way to determine the frequency and duration for closure of the subject block valves would be to review the configuration log for representative plants. The information obtained is based on the best recollection of people involved in the operation of the chemical and volume control system. Based on a survey of Sequoyah, Vogtle, and Commanche Peak operations personnel, the most definitive statement that can be made about the frequency and duration of block valve closure is that closure occurs every 2 to 10 years with a closure duration not to exceed 1 shift. The results of this informal survey supports Watts Bar's position that block valve closure will be infrequent and of short duration.

It is the position of TVA that (1) the administrative control program and the verification requirements of the operating instructions are positive controls that will provide a high level of confidence that the relief valve discharge path cannot be blocked during system operation and (2) the present arrangement provides an acceptable alternative that meets the intent of the code requirements.

Therefore, the present design provides an acceptable level of quality and safety. The removal of the block valves would result in an operational hardship and a potential for increased airborne radiation and personnel exposure that cannot be justified by any marginally small increase in the level of safety. Rerouting the subject piping from the relief valves which discharge into the HUTs would require pipe stress requalification and additional pipe supports. The pipe reroute method of accomplishing ASME code compliance would
also result in a loss of operational flexibility. The replacement of the block valves with automatic valves using positive controls and interlocks would require the procurement and installation of new control valves, additional pressure sensing instrumentation and associated controls, and additional power and control cabling. Potential pipe reroutes resulting from space constraints associated with installing new control valves would also require pipe stress analysis requalification and possibly additional pipe supports. The existing arrangement provides a sound design, is safe for maintenance personnel, and provides operational flexibility and efficiency. Therefore, compliance with the specified code interpretation would result in hardship without a compensating increase in the level of quality and safety.



SKETCH No 1
Relief Valve Discharge
Block Valves

ATTACHMENT