WOLF CREEK
NUCLEAR OPERATING CORPORATION

Neil S. "Buzz" Carns
Chairman, President and
Chief Executive Officer

June 1, 1995
WM 95-0014

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-137
Washington, D. C. 20555

Subject: Docket No. 50-482: Request for Relief From the Requirements of ASME Section III, Article NC-7153

Gentlemen:

This letter requests relief pursuant to 10 CFR 50.55a(a)(3) from the requirements of ASME Section III, Article NC-7153, 1974 Edition with addenda through and including Summer 1975 addenda. The attached relief request, if approved, would allow Wolf Creek Generating Station to retain the installed configuration of the block valves located in series with overpressure protection devices. The block valves are part of the standard design provided by Westinghouse. They facilitate maintenance of components, and have strict administrative controls to maintain the block valves in an open position during plant operation to ensure that the overpressure protection is not defeated.

The proposed alternatives to the requirements of ASME Section III provided in the attached relief request provide an acceptable level of quality and safety. Compliance with the requirements of ASME Section III would result in undue hardship without a compensating increase in the level of quality and safety.

If you should have any questions regarding this submittal, please contact me at (316) 364-8831, extension 4100, or Mr. Richard D. Flannigan at extension 4500.

Very truly yours,

Neil S. Carns

NSC/jra

Attachments

cc: L. J. Callan (NRC), w/a
D. F. Kirsch (NRC), w/a
J. F. Ringwald (NRC), w/a
J. C. Stone (NRC), w/a

A001

ASME SECTION III RELIEF REQUEST

Pursuant to 10 CFR 50.55a(a)(3), relief is requested for Wolf Creek Generating Station (WCGS) from the requirements of ASME Section III, Article NC-7153, 1974 Edition with addenda through and including Summer 1975 addenda. This relief request would allow WCGS to retain the installed configuration of several block valves located in series with overpressure protection devices for the Volume Control Tank, Regenerative Heat Exchanger, Safety Injection Pumps suction and discharge piping, Centrifugal Charging Pumps suction piping, Residual Heat Removal Pumps discharge piping, and Recycle Evaporator Feed Demineralizer Inlet Header. The block valves are part of the standard design provided by Westinghouse. They facilitate maintenance of the associated components, and have strict administrative controls to maintain the block valves in an open position during plant operation to ensure that the overpressure protection is not defeated.

I. COMPONENTS FOR WHICH RELIEF IS REQUESTED

Block Valves HE8557A&B

The subject block valves are locked open manual valves installed in the discharge paths of the following relief valves:

Volume Control Tank Relief Valve BG8120

Recycle Evaporator Feed Demineralizer Inlet Header Relief Valve HE8634

Residual Heat Removal Cold Leg Train "A" Relief Valve EJ8856A

Residual Heat Removal Cold Leg Train "B" Relief Valve EJ8856B

Residual Heat Removal Hot Leg Relief Valve EJ8842

Safety Injection Pump "A" Suction Relief Valve EM8858A

Safety Injection Pump "B" Suction Relief Valve EM8858B

Centrifugal Charging Pump Suction Relief Valve BG8124

Safety Injection Pump "A" Discharge Header Relief Valve EM8853A

Safety Injection Pump "B" Discharge Header Relief Valve EM8853B

Safety Injection Pump Discharge Cold Leg Relief Valve EM8851

The relief valves listed above discharge into one of the two available Boron Recycle Holdup Tanks (THE02A/B) to ensure the radioactive gas or liquid released is contained within a closed system. The purpose of the block valves is to isolate the individual Boron Recycle Holdup Tanks for personnel safety during maintenance, allow processing of individual Boron Recycle Holdup Tank contents without uncontrolled discharges into the other Boron Recycle Holdup Tank, and allow testing of an individual Boron Recycle Holdup Tank without incapacitating the entire system or overpressure protection of the listed components.

The size and the source of overpressure for each relief valve listed above is provided in Attachment II. Figure 1 provides a schematic of the configuration for the relief valves, block valves and Boron Recycle Holdup Tanks.

Block Valve BGV0018

Block valve BGV0018 is installed in the discharge path of spring loaded thermal relief check valve BGV0019. The relief valve provides overpressure protection for the Regenerative Heat Exchanger (EBG07) in the event of a Chemical and Volume Control System malfunction and discharges to the Reactor Coolant System. The purpose of the block valve is to facilitate maintenance of the Regenerative Heat Exchanger. Figure 2 provides a schematic of the configuration for the Regenerative Heat Exchanger block/relief valve. Figure 3 provides a simplified schematic of the Emergency Core Cooling System.

II. CODE REQUIREMENTS

The subject components are installed per ASME Section III, 1974 Edition with addenda through Summer 1975, Class 2 requirements. Article NC-7153 allows the use of stop valves placed relative to a pressure relief device, provided that the stop valves are constructed and installed with positive controls and interlocks to ensure the code required relieving requirements are met. To address the meaning of the term, "controls and interlocks," ASME Section III Code Interpretation III-1-80-67R, dated March 1, 1989, states that "controls and interlocks are pressure sensing devices which would activate the stop valve to provide fluid access to the relief valve, thereby assuring the pressure relieving function is met at all times." Interpretation III-1-80-67R also states that administrative controls such as operating procedures governing the use and application of the system may not be construed as "controls." Even though Interpretation III-1-80-67R is strictly applicable to later versions of ASME Section III, it may be conservatively applied to 1974 Edition of ASME Section III.

Therefore, the location of a manual block valve in series with a pressure relieving device without the proper "controls and interlocks" does not conform with the intent of ASME Section III requirements.

III. CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

Relief is requested from the "control and interlock" requirements of 1974 ASME Section III, Article NC-7153 which states the following:

"No stop valve or other device shall be placed relative to a pressure relief device so that it could reduce the overpressure protection below that required by these rules, unless such stop valves are constructed and installed with positive controls and interlocks so that the relieving capacity requirements of NC-7400 are met under all conditions of operation of the system and the stop valves."

IV. PROPOSED ALTERNATIVE TO CODE REQUIREMENTS

As an alternative to the ASME Section III requirements, the following administrative controls will be maintained in place:

1. Valves HE8557A&B and BGV0018 are locked open manual valves. Their position is administratively controlled by Procedure AP 21G-001, "Control of Locked Component Status."

2. The valves have their handwheels administratively controlled to prevent the valves' position from being inadvertently altered or repositioned. Independent verification of the position of the valve is made any time their position is changed and restored to their required locked position. This verification includes a check of the locking device to ensure that it is adequately attached and provides the proper control.

3. As an enhancement to the existing program, an Operator Aid has been placed on block valves HE8557A&B stating "TO ENSURE ECCS RELIEF LINE INTEGRITY, ONE RHUT INLET ISOLATION MUST BE OPEN AT ALL TIMES."

Several options were considered for retrofit compliance with ASME Section III requirements:

a) Removal of valve in[illegible]ls with the valve internals being reinstalled whenever isolation is required.

This option would result in significant radiation exposure to plant personnel each time the valve internals were removed and reinstalled. Each removal and installation of valve internals would also require shutdown of several systems. Frequent assembly and disassembly of the valves introduces a potential for damaging valve components and reducing valve life.

b) Use of freeze plugs to isolate the block valves.

This option would require an expensive physical modification to remove the valves from the lines. In addition, each time isolation of the block valves is required for maintenance, expensive freeze plugs would be needed. The use of freeze plugs would subject the piping to unnecessary thermal gradients and would increase maintenance time and reduce plant availability. The option would also result in significant radiation exposure to personnel during modification and freeze plug installations.

c) Provide the block valves with limit switches and alarms in the Control Room.

This would be the most expensive option because it would require running cables from the Radwaste Building and Containment Building to the Control Room. This option would also add inservice testing requirements for valve position indication. Again, there would be a significant radiation exposure to personnel. This modification would not significantly enhance the availability of the relieving paths, considering the cost of the modification and the administrative controls already in place.

d) Install another relief device in the relief valve discharge line prior to the manual valves.

This option requires expensive physical modifications and subjects plant personnel to significant radiation exposure. The installation of relief valves would introduce new failure modes and additional maintenance work.

These four options would result in undue hardships because of the additional expense for a modification, unnecessary radiation exposure to workers during the modification and subsequent periodic maintenance. These options would not increase the level of quality and safety.

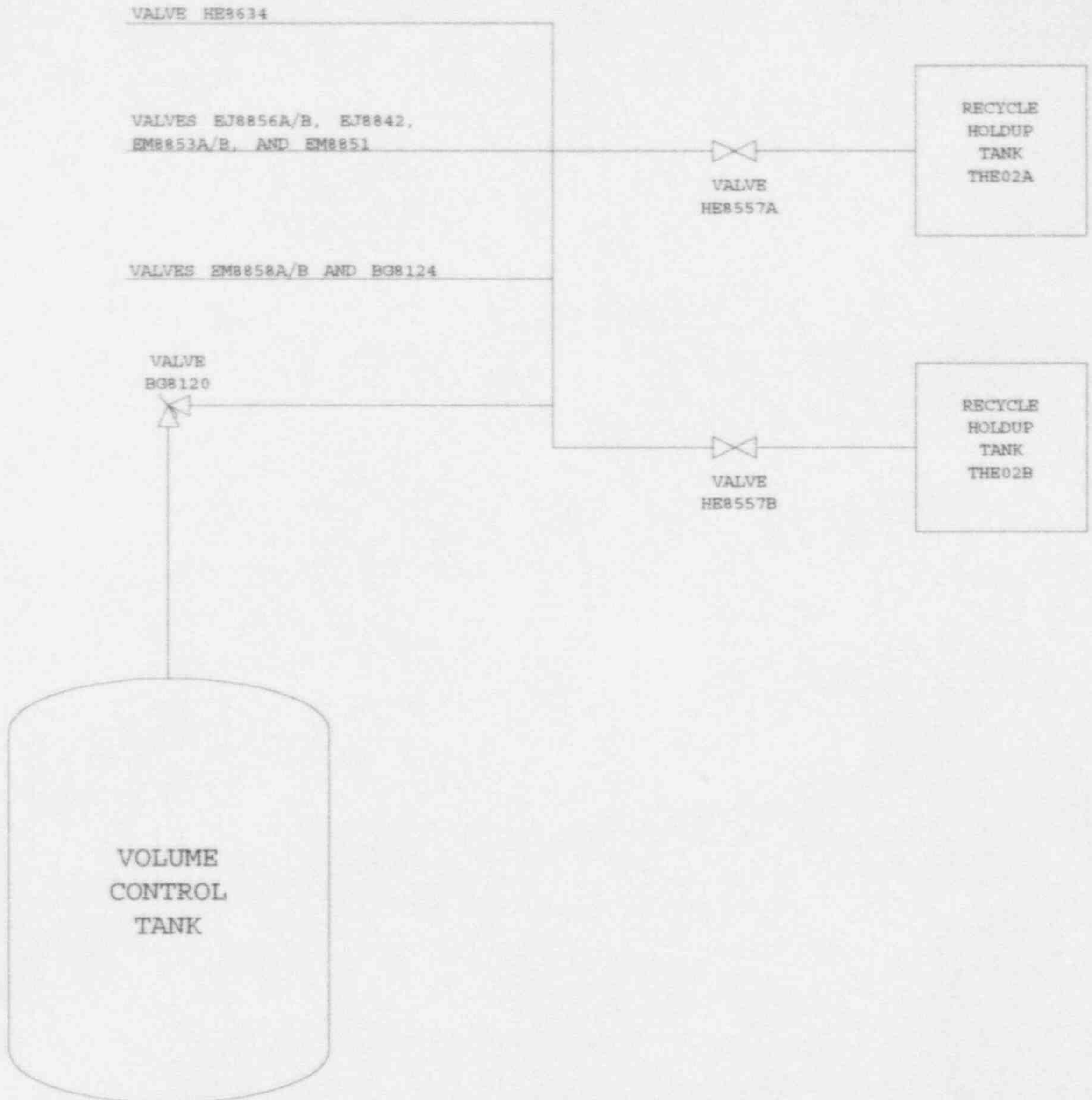

FIGURE 1
ARRANGEMENT OF RELIEF VALVES DISCHARGING TO THE RECYCLE HOLDUP TANKS

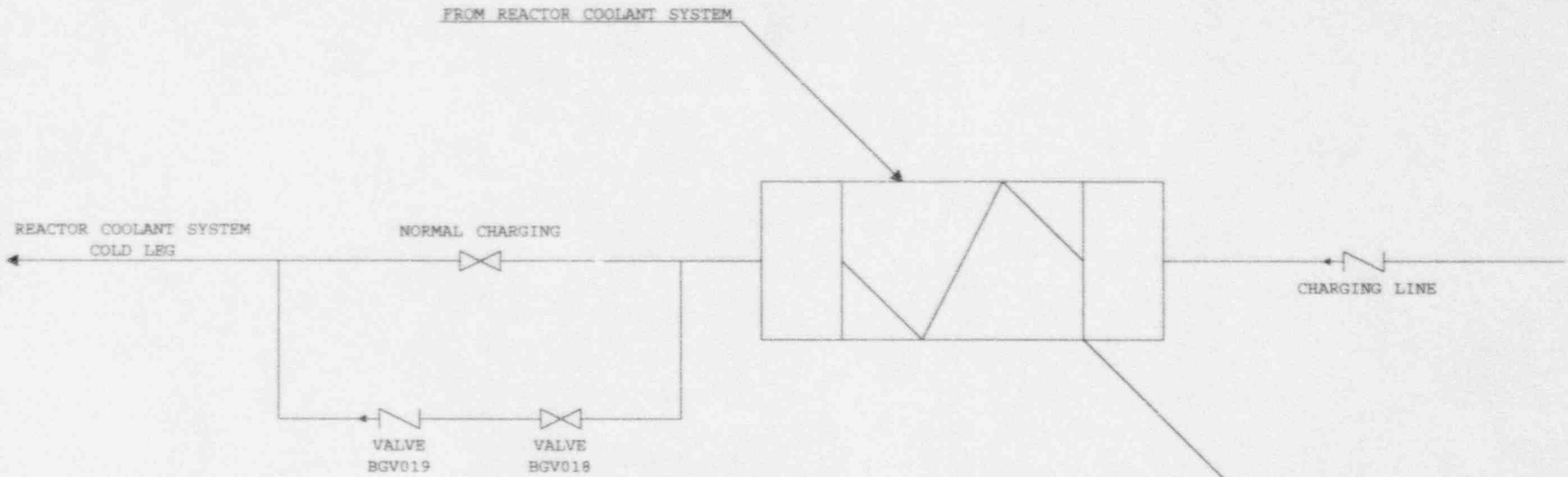

FIGURE 2
RELIEF PATH FOR THE REGENERATIVE HEAT EXCHANGER

NOTE:
1. THIS DIAGRAM IS A SIMPLIFICATION OF THE SYSTEM INTENDED TO FACILITATE THE UNDERSTANDING OF RELATIVE LOCATIONS OF THE RELIEF VALVES.

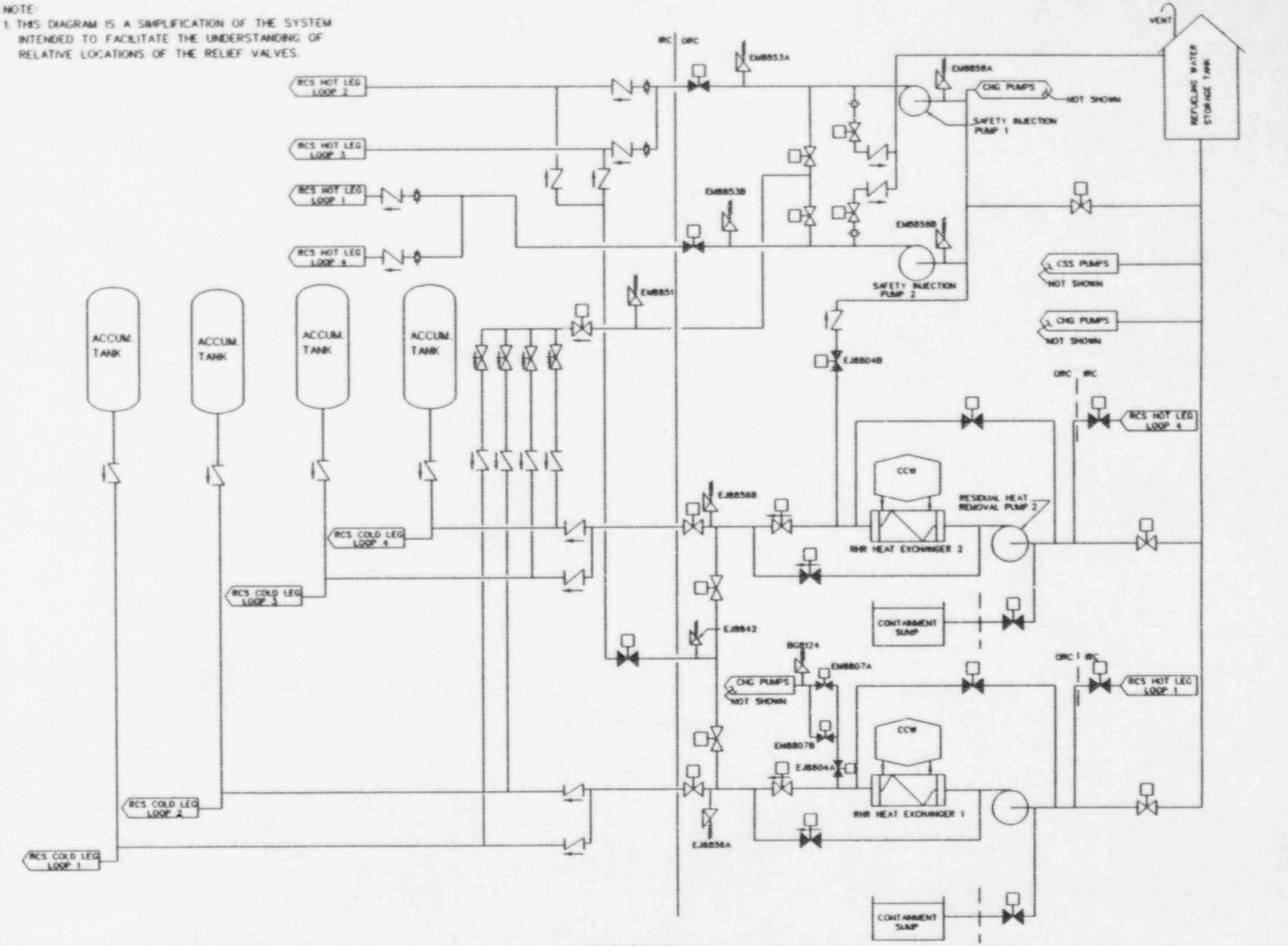

FIGURE 3

List of Relief Valves

1. Volume Control Tank Relief Valve BG8120

This safety relief valve permits the Volume Control Tank to be designed for a lower pressure than the upstream equivalent. This valve has a capacity equal to the summation of the following flows: maximum letdown, normal seal water return, excess letdown, and nominal flow from one Reactor Makeup Water Pump. The relief valve is set to relieve the design pressure of the Volume Control Tank (75 psig) and is sized to relieve 350 gpm.

2. Recycle Evaporator Feed Demineralizer Inlet Header Relief Valve HE8634

This relief valve protects the piping upstream of the Recycle Evaporator Feed Demineralizers. The valve set pressure is equal to the design pressure of this part of the system (150 psig) and its relieving capacity (350 gpm) is based on maximum letdown flow.

3. Residual Heat Removal Cold Leg Train A/B Relief Valves EJ8856A/B

These relief valves protect the Residual Heat Removal Heat Exchangers and the piping in the Residual Heat Removal System from overpressurization due to back leakage through the check valves from the Reactor Coolant System. The relief valves are set to relieve the design pressure of the Residual Heat Removal System (600 psig) and are sized to accommodate only minimal flow (20 gpm).

4. Residual Heat Removal Hot Leg Relief Valve EJ8842

This relief valve protects the piping in the Residual Heat Removal System from overpressurization due to back leakage through the check valves from the Reactor Coolant System. The relief valve is set to relieve the design pressure of the Residual Heat Removal System (600 psig) and is sized to accommodate only minimal flow (20 gpm).

5. Safety Injection Pump Discharge Line Relief Valves EM8853A/B

These relief valves protect the piping associated with the Safety Injection Pumps' discharge line from overpressurization due to leakage through the check valves from the Reactor Coolant System. The relief valves are set to relieve at 1750 psig, which is above the shutoff head of the pumps, and must accommodate only minimal flow (20 gpm).

6. Safety Injection Pump Discharge Cold Leg Relief Valve EM8851

This relief valve protects the piping associated with the Safety Injection Pumps' discharge line from overpressurization due to leakage through the check valves from the Reactor Coolant System. The relief valve is set to relieve at 1750 psig, which is above the shutoff head of the pumps, and must accommodate only minimal flow (20 gpm).

7. Safety Injection Pump Suction Line Relief Valve EM8858A/B

These relief valves protect the piping associated with the Safety Injection Pumps' suction line from overpressurization due to leakage through the valves connected to the Residual Heat Removal System. The relief valves are set to relieve the design pressure of piping (220 psig) and are sized to accommodate only minimal flow (25 gpm).

8. Chemical and Volume Control System Charging Pump Suction Header Relief Valve BG8124

This valve must relieve over pressurization of the piping associated with the Chemical and Volume Control System Charging Pumps' suction due to leakage through the valves connecting to the Residual Heat Removal System. The relief valve is set to relieve at the design pressure of the piping and has a set pressure above the Residual Heat Removal System pump safety injection pressure during the recirculation phase of safety injection (220 psig) and must accommodate only minimal flow (25 gpm).

9. Regenerative Heat Exchanger Thermal Relief Valve BGV0019

This relief valve protects the charging side of the Regenerative Heat Exchanger in the event that the charging side is isolated while the hot letdown flow continues at its maximum rate. The volumetric expansion of coolant on the charging side of the heat exchanger is relieved to the Reactor Coolant System through a spring loaded isolation check valve. The spring in the valve is designed to permit the check valve to begin to open in the event that the differential pressure reaches the design pressure differential at 75 psi. The valve is sized to relieve 20 gpm at a 200 psi differential.

FAILURE CONSEQUENCES

Inadvertent closure of Block Valves HE8557A&B

Figure 1 shows the arrangement of various valves that discharge into the Boron Recycle Holdup Tanks by way of these manual valves. Considering the administrative controls placed on these valves, an overpressurization event is highly unlikely to occur. There are several other critical locked open or closed valves in the Emergency Core Cooling System which are similarly controlled. However, failure of each protected system is postulated here and the consequences discussed.

Volume Control Tank Relief Valve BG8120

An overpressurization event in a worst case scenario would result in the rupture of the Volume Control Tank. The Volume Control Tank provides additional surge capacity for Reactor Coolant System water expansion not accommodated by the Pressurizer. If the water level in the Volume Control Tank exceeds the normal operating range, a proportional controller modulates a three way valve to divert a portion of the letdown to the Boron Recycle System. If the high level limit in the Volume Control Tank is reached, an alarm is actuated in the Control Room and letdown flow is completely diverted to the Boron Recycle System. Therefore, an overpressurization event due to overfill is not likely to occur.

Low pressure nitrogen is supplied at 50 psig reduced from 125 psig through a pressure regulating valve. Hydrogen is supplied at 15 psig regulated through a pressure regulating valve from a supply pressure of 100 psig. A defective pressure regulating valve can also overpressurize the tank.

Only the tank and the lines to level transmitters BGLT149/112/185 are designed to 75 psig. Other connecting lines are designed to higher pressures. Therefore, most likely event is that the lines or the tank will fail.

An overpressurization event would result in a leak in the Volume Control Tank. A low level in the Volume Control Tank would initiate makeup from the Reactor Makeup Control System. If the Reactor Makeup Control System did not supply sufficient makeup to keep the Volume Control Tank level from falling, a low level alarm would be actuated. If the level continued to decrease a low-low level signal from both channels would cause the suction of the Centrifugal Charging Pumps to be transferred from the Volume Control Tank to the Refueling Water Storage Tank and the Volume Control Tank outlet isolation valves would be closed.

Assuming a worst case scenario, a Volume Control Tank full of water would spill on the floor resulting in a maximum spillage of 2992 gallons.

The Auxiliary Building has sumps, sump pumps, and safety-related high level alarms that annunciate in the Control Room. All pump start and stop times are monitored and recorded by the Nuclear Plant Information System Computer.

The Volume Control Tank is located at the 2000 foot elevation of the Auxiliary Building. Safety-related components which are located at the lowest elevation (1974 foot) of the Auxiliary Building are housed within watertight compartments. The drainage arrangement for these areas is such that external drain or flood water is prevented from back flow into these areas. Flooding within rooms of one train of the safety-related components cannot communicate with the areas associated with the redundant train. The Auxiliary Building sump instrumentation would provide the earliest warning of a small leak. Periodic walkdowns are performed by system engineering to monitor the performance and general condition of the systems. Also, plant operators perform plant walkdowns periodically and would quickly detect any problems.

Section 15.6.2 of the Updated Safety Analysis Report (USAR) addresses the consequences of a break in an instrument line or other lines from the Reactor Coolant System pressure boundary which penetrate the Containment Building. The most severe pipe rupture regarding a radioactivity release during normal plant operation would be a rupture of the Chemical and Volume Control System letdown line at a point outside of the Containment Building. It has been determined that the occurrence of a complete severance of the letdown line would result in a loss of Reactor Coolant System water at the rate of 141 gpm. Since this release rate would be within the capability of the Reactor Makeup Control System, it would not result in Engineered Safety Features System actuation. Frequent operation of the Reactor Makeup Control System would provide the operator with some indication of the loss of Reactor Coolant System water. In this analysis, a total of 70900 lbs (approximately 8,500 gallons) of Reactor Coolant System water is assumed to be spilled. The resultant doses for 0-2 hour duration at the exclusion area boundary and for the duration of accident at the low population zone are as follows and well within 10 CFR 100 limits.

Exclusion Area Boundary (0-2 hours)

Thyroid	2.49E-1 rem
Whole Body	2.50E-2 rem

Low Population Zone Outer Boundary (Duration)

Thyroid	3.32E-2 rem
Whole Body	3.33E-3 rem

These doses are based on an assumption that the leak goes undetected for 30 minutes and no holdup and filtration occurs in the Auxiliary Building.

The above results show that the failure of a Volume Control Tank which causes a spill of approximately 3000 gallons will not result in a safety hazard greater than what is already analyzed.

<u>Recycle Evaporator Feed Demineralizer Inlet Header Relief Valve HE8634</u>

The relief for this valve is based on maximum Chemical and Volume Control System letdown flow rate. The failure of the letdown line outside the Containment Building is discussed in Section 15.6.2 of the USAR. The radiological consequences are provided above.

Residual Heat Removal System Cold Leg Train A/B Relief Valves EJ8856A/B

During normal plant operation, when the Residual Heat Removal Pumps are in the standby mode, the source of high pressure would be any leakage through the Reactor Coolant System pressure isolation check valves. The leakage of these check valves is governed by Wolf Creek Generating Station Technical Specification 3.4.6.2. Residual Heat Removal System piping protected by this valve is designed to 600 psig whereas the piping down stream of the relief valve is designed to 75 psig. Since the maximum relieving capacity is 20 gpm, the consequences of this failure are enveloped by the analysis in Section 15.6.2 of the USAR.

Residual Heat Removal System Hot Leg Relief Valve EJ8842

This relief valve has 20 gpm relieving capacity and protects the Residual Heat Removal System piping from any pressure buildup due to leakage through the Reactor Coolant System pressure isolation check valves. The protected piping is designed to 600 psig whereas the one inch piping downstream of the relief valve is designed to 75 psig. The leak rate of 20 gpm is enveloped by the analysis described in Section 15.6.2 of the USAR.

Safety Injection Pump Discharge Relief Valves EM8853A/B & EM8851

The protected piping is designed to 1750 psig. The piping downstream of the relief valve is designed to 75 psig. The leakage of 20 gpm is enveloped by the analysis of Section 15.6.2 of the USAR.

Safety Injection Pump Suction Line Relief Valves EM8858A/B

An overpressurization event is not possible when the Residual Heat Removal System is not operating. During Modes 4 and 5, when the Reactor Coolant System pressure is less than or equal to 450 psig and the Residual Heat Removal Pumps are in operation, there is potential for leakage from the closed valves EJHV8804A/B and EMHV8807A/B to overpressurize the suction lines. These lines are designed to 220 psig whereas the relief valves discharge lines are designed to 75 psig. The discharge capacity of each valve is 25 gpm. Therefore, this event is also enveloped by the analysis of Section 15.6.2 of the USAR.

Centrifugal Charging Pump Suction Relief Valve BG8124

The source of overpressurization is similar to Safety Injection Pump Suction Relief Valves EM8858A/B. The design pressure for the protected piping is 220 psig. The relief valves discharge piping is designed to 75 psig. The relief capacity is 25 gpm which is enveloped by the analysis of Section 15.6.2 of the USAR.

Block Valve BGV0018 is inadvertently closed

The Regenerative Heat Exchanger is designed to recover heat from the Chemical and Volume Control System letdown flow by reheating the charging flow, which reduces thermal effects on the Reactor Coolant System piping. The letdown stream flows through the shell of the Regenerative Heat Exchanger and the charging stream flows through the tubes. The Regenerative Heat Exchanger functions are not safety-related. In the event of system malfunction, Reactor Coolant System water on the charging side of the heat exchanger may be relieved to the Reactor Coolant System through spring loaded thermal relief check valve BGV0019 to preserve the integrity of the Regenerative Heat Exchanger. Block valve BGV0018 is installed upstream of relief valve BGV0019. The relief valve does not have an active safety function and is not required to actively operate during or following an accident to perform a nuclear safety function.

Due to the administrative controls described earlier, the probability of inadvertent closure of block valve BGV0018 during power operation is extremely low.

If a thermal transient were to occur with all normal flow paths and the relief line closed, the Regenerative Heat Exchanger could be damaged, thereby releasing primary coolant water and gases to the Containment Building.

The small break loss of coolant accidents are evaluated in Section 15.6.5.3.3 of the USAR, with the limiting case being a 6-inch diameter pipe break in the cold leg of the Reactor Coolant System. Since the charging and letdown lines to and from the Regenerative Heat Exchanger are 3 inches in diameter and the Regenerative Heat Exchanger can be isolated from the Reactor Coolant System, a postulated rupture of the Regenerative Heat Exchanger would result in less Reactor Coolant System water loss to the Containment Building. Therefore, this scenario is enveloped by the existing loss of coolant accident analysis.

Commitments Contained in Letter WM 95-0015
"Request for Relief From the Requirements of ASME Section III"

As an alternative to the ASME Section III requirements, the following administrative controls will be maintained in place:

1. Valves HE8557A&B and BGV0018 are locked open manual valves. Their position is administratively controlled by Procedure AP 21G-001, "Control of Locked Component Status."

2. The valves have their handwheels administratively controlled to prevent the valves position from being inadvertently altered or repositioned. Independent verification of the position of the valve is made any time their position is changed and restored to their required locked position. This verification includes a check of the locking device to ensure that it is adequately attached and provides the proper control.

3. As an enhancement to the existing program, an Operator Aid has been placed on block valves HE8557A&B stating "TO ENSURE ECCS RELIEF LINE INTEGRITY, ONE RHUT INLET ISOLATION MUST BE OPEN AT ALL TIMES."