SMUD
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November 16, 1982

DIRECTOR OF NUCLEAR REACTOR REGULATION
ATTENTION JOHN F STOLZ CHIEF
OPERATING REACTORS BRANCH 4
U S NUCLEAR REGULATORY COMMISSION
WASHINGTON D C 20555

DOCKET 50-312
RANCHO SECO NUCLEAR GENERATING STATION
UNIT NO 1
GENERIC ITEM B-24 AND NUREG ITEM II.E.4.2
CONTAINMENT ISOLATION DEPENDABILITY

Your letter dated June 29, 1982, requested additional information in order to complete your review regarding containment isolation dependability. The attachment to this letter is our response to your request.

Your letter also requested that we propose a Technical Specification change incorporating the proposed requirements for purge and vent valve leakage tests. Our Technical Specifications currently require leak detection tests be performed at least once during each refueling outage. We feel that this is adequate since the purge and vent valves are currently being maintained closed during plant operation. When the technical issues addressed in this letter are resolved, we will review our Technical Specifications and propose any necessary changes to our testing program.

In your letter, you also discussed demonstration of valve operability and referred to our blocking of the valves as an interim position. In our letter of April 20, 1981, we submitted an analysis which provided assurance that the purge valves (inlet and outlet) would operate when opened at or less than 80% of full stroke for the motor operated valves inside the containment and 60% of full stroke for the air operated valves outside the containment. This analysis was based on the results of the Allis-Chalmers test program. We feel that the test program demonstrated the operability of these valves when in the limited position and meets the guidelines in your letter dated September 27, 1979. Consequently, upon completion of your review, we expect that you will find it acceptable to allow Rancho Seco to resume purge operation during plant operation at least on a limited basis.

Based on the operating history of Rancho Seco and similar nuclear units we have estimated our annual purge requirements during plant operation above cold shutdown to be 1200 hours. This value is based upon two conditions: 1) Purging prior to and during personnel entries into containment while the unit is in



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power operation at a once per month frequency (snubber inspection, etc.). We estimate the need for purge system operation in this case to be approximately 72 hours in duration and to occur approximately ten times per year for a total of 720 hours; and 2) Purging prior to planned outages or forced outages to cold shutdown in order to substantially reduce the time delay before in-containment work can begin. Typically, at least 24 hours of outage time can be eliminated by purging the containment prior to and during plant shutdowns by allowing personnel entry for in-containment work much earlier than if the purge is delayed until after cold shutdown is reached. Each day of eliminated outage time is worth approximately $1.13 million to Northern California electricity users based on displacement of foreign oil for generation. We estimate that 96 hours of purge system operation while above cold shutdown will be needed per outage and that five such outages will occur each year for a total of 480 hours per year.

Kenneth J. Mellor
Acting General Manager

Attachment

Attachment

SMUD RESPONSE TO:

ENCLOSURE 3 - REQUEST FOR ADDITIONAL INFORMATION

Question: 1. Please provide information concerning the provisions made to ensure that isolation valve (12" and 66") closure will not be prevented by debris which could potentially become entrained in the escaping air and steam. We recommend that debris screens be provided for the purge supply and exhaust systems. The debris screens should be seismic Category I design and installed about one-pipe-diameter away from the inner side of each inboard isolation valve. The piping between the debris screen and the isolation valve should also be seismic Category I design.

Response: As stated in our submittal of January 24, 1980, the purge air supply and purge air exhaust (66" valves) ductwork in the reactor building have wire cages (grills) covering the openings to prevent debris from entering the ductwork. The debris screens are over 10 feet from the inboard isolation valves. The ductwork and related equipment inboard of the isolation valves were designed for a loading of 0.20g horizontal and 0.10g vertical. As stated in the Updated Safety Analysis Report for Rancho Seco Unit 1, section 2.6, values of 0.25g horizontal and 0.17g vertical were used for the Design Basis Earthquake. It also states that ground accelerations greater than 0.05g are not expected to occur during the life of the plant. Consequently, we believe that the ductwork and screens are adequately designed to withstand mechanical loads from credible seismic events. A debris screen has been installed on the 12-inch pressure equalizing line as committed in our January 24, 1980, submittal. It is approximately one-pipe-diameter from the inboard valve and the piping and debris screen inboard of the valve are designed to seismic Category 1 standards.

Question: 2. Please provide an analysis for the effect of the reduction in ECCS backpressure resulting from a LOCA with the purge valves initially open. You have stated that the analysis of the effect of the reduction in ECCS backpressure from a LOCA with the purge valves initially open is found in the Rancho Seco FSAR. You also indicated that this analysis shows that the containment pressure for ECCS backpressure determination is reduced by 1/300. This information supplied by you does not adequately address the performance of the ECCS in regard to the reduced containment backpressure.

Response: B&W Topical Report BAW-10103A, Rev. 3, "ECCS Analysis of B&W's 177-FA Lowered Loop NSS", Figure 6-10 shows the containment pressure vs. time for the 8.55 $ft^2$ double

ended break at pump discharge. This break is the worst-break location and provides the highest peak cladding temperature following a LOCA. A reduction in the containment pressure curve shown on figure 6-10 will cause an increase in peak cladding temperature. Our submittal of July 8, 1975, compares the B&W generic ECCS evaluation model to Rancho Seco Unit 1 and states that the generic model is bounding. It was concluded that the heat sinks used in the B&W generic model are more conservative (greater) that the as-built condition of Rancho Seco Unit 1. Attachment 3 to the July 8, 1975, submittal provides a comparison of the parameters used in the B&W generic ECCS model and Rancho Seco Unit 1. This shows that the generic model is more conservative than Rancho Seco Unit 1. We have calculated the reduction in containment pressure for the 14.1 $ft^2$ and 8.55 $ft^2$ breaks and it is less than 10 percent. Because the generic model is more conservative than for Rancho Seco Unit 1 the decrease in pressure still is within the bounds of the generic model. Thus the ECCS will still perform within the bounds of the Generic Model with the reduced backpressure.

Question: 3. Please provide an analysis that indicates the amount of the mass of air and steam released to the environment prior to purge system isolation following a LOCA.

Response: The total mass of steam and air released with the purge valves open eight seconds is $1.7 \times 10^4$ $lb_m$ for the 8.55 $ft^2$ break and $1.82 \times 10^4$ $lb_m$ for the 14.1 $ft^2$ break.

SMUD Response to:
Enclosure 4 - Request for Additional Information
Rancho Seco Nuclear Generating Station
Purge and Vent Valve Operability

66 inch, Allis Chalmers Valves

(The following questions pertain to SFV-53605 and SFV-53604 as it is expected balves SFV-53504 and SFV-53503 will remain closed above cold shutdown).

Question: 1. Present technical specifications require valves SFV-53605 and SFV-53604 to be periodically verified to close within eight seconds and three seconds respectively. As the qualification approach for the ability of these valves to close against LOCA loads is dependent on the pressure rise vs. time, delay time to start of closure and closure time under load are critical to the valve qualification. SMUD should verify the delay time from initiation of a LOCA event through start of closure of the valve for valves SFV-53604 and SFV-53605. Qualification of the valve from the maximum opening angle should use, as a minimum, the differential pressure occurring within the appropriate delay time. Delay time should include time delay from line break to signal.

Periodic tests on closure time for these valves are performed under a no-load condition. The Allis Chalmers test report (VER-0209) indicates for these valves flow through the valve tends to hold the valve open, thereby possibly increasing closure time. Actual closure time in a LOCA event, therefore, may be longer than no-load test times. To determine minimum differential pressure loads at angles as the valve starts to close, the maximum closure time should be used. As these valves will tend to close slower under load, technical specification test times should reflect a no-load closure time which is appropriately less than the load closure time used in the qualification.

The qualification analysis and/or technical specification closure times should be revised to reflect the above concerns.

Response:

The delay time from initiation of a LOCA event through start of closure of the valves is less than one second for a design basis LOCA. The closure of the purge valves is initiated by the Safety Features Actuation System at either a reactor coolant pressure of 1600 psi or a reactor building pressures of 4 psig. Figure 14.2-22 of the Rancho Seco Unit 1 Updated Safety Analysis Report (USAR) shows that reactor coolant pressure reaches 1600 psi almost instantaneously for most breaks (under 0.1 second). Section 14.4 of the USAR shows that the reactor building pressure increases rapidly for larger breaks. From this, it can be seen that for a LOCA that would produce a rapid change in reactor building pressure, the delay time from initiation of a LOCA to start of purge valve closure would be insignificant (less than 0.1 second). The Allis-Chalmers tests were performed assuming a delay time of 0.5 second, which is conservative.

We do not agree that the Allis-Chalmers tests indicate that flow through the valve increases closure time. The tests show that with different delay times (leading to higher pressure) for initiation of valve closure that the time to close the valves is constant. The concern that the tests demonstrated was that for higher pressures the shaft torque could exceed design limits. The closure times for the Rancho Seco purge valves would remain relatively constant with higher pressures. On June 19, 1982, the containment isolation purge valves were tested and had the following closure times:

| Valve No. | Tech Spec Max Closure Time | Actual Closure Time |
|---|---|---|
| SFV-53503 (Air Operated) | 5 sec. | 2.84 sec. |
| SFV-53604 (Air Operated) | 3 sec. | 1.87 sec. |
| SFV-53504 (Motor Operated) | 8 sec. | 3.50 sec. |
| SFV-53605 (Motor Operated) | 8 sec. | 3.59 sec. |

This shows, based on the insignificant expected delay times and the results of the Allis-Chalmers tests, that the qualification analysis and technical specification closure times are satisfactory for these valves.

Question: 2. SMUD's valve qualification for the 66" valves is based on dynamic torque data from the Allis Chalmer's report VER-0209. This report assumes line losses to the valve equivalent to those experienced in the test. SMUD should confirm that the line losses in the piping at Rancho Seco will be at least equal to those experienced in the Allis Chalmers test.

Response: The line losses in the piping/duct work are four inches SPWG for the supply air system and eight inches SPWG for the exhaust air system during purge (74,000 CFM). The line loss in the Allis-Chalmers test is less than one inch SPWG for the same flow velocity. Thus, the line losses in the piping at Rancho Seco are similar but somewhat greater than that in the Allis-Chalmers test.

Question: 3. Seismic loading in combination with the LOCA loads should be accounted for. Critical elements for the combined loads need to be determined as they may vary from critical elements determined under either load separately.

Response: The primary system at Rancho Seco is seismic Class 1, thus the combination of the two events, seismic and LOCA, is not credible for Rancho Seco.

Question: 4. Describe how valve assemblies were environmentally qualified. Solenoid valves were identified in previous submittals as qualified to IEEE 323. State which revision was used.

Response: Valve assemblies will be qualified per DOR guidelines as outlined in IE Bulletin 79-01B. Solenoid valves were qualified to IEEE 323-74.

Question: 5. Describe the inservice testing and preventative maintenance procedures used specifically for these valves. Describe vendor recommended periodic maintenance. Explain any differences.

Response: Our submittals of January 24, 1980, and February 12, 1980, describe the inservice testing and preventive maintenance procedures for these valves. A special preventive maintenance program is being developed for the limitorque operators. According to the vendor provided literature and manuals, there are no recommended periodic maintenance requirements for these valves except for adjustment of the disc for a better seal.

12-inch Fisher Valves (SFV-53603 and SFV-53610)

Question: 1. Provide the following information for these 12-inch valves:

a. Pressure rating
b. Style number
c. Stroke time (technical specification required time)
d. Location (inside or outside containment)
e. Operator torque ratings (for electric operators use ratings at the lowest available voltage)

Response:

a. 60 psig
b. 7620 RL 12" Butterfly Valve
c. SFV 53610 - 15 sec., SFV-53603 - 9 sec.
d. Air operated-outside, Electric operated-inside
e. Bettis 744A - 15R-42 air operator has a running torque of 19,800 in-lb and a breakout torque of 38,600 in-lb with an 80 psi supply. The Limitorque SMBO-25/H2BC motor operator has a torque rating of 14,700 in-lb. The motor operator is derated by the square of the derating factor, i.e., 80 percent voltage would give 64 percent of rated torque. Fisher calculated the torque required to close a 90° open valve at 60 psid to be 6310 in-lb which is well within the capability of the operators.

Question: 2. Describe which of the following are used on these valves:

a. Handwheels (if used, describe procedures used to prevent leaving in the manual mode).
b. Inflatable Seal (is used, describe systems used to assure seal pressurization and their qualification).
c. Accumulators (if required for safety function, describe qualification of system and periodic inspection for leakage).

Response:

a. The motor operator (limitorque) has a handwheel that is overriden by the motor operator. The air operator does not have a handwheel, but does fail closed on loss of air.
b. Inflatable seals are not used.
c. Accumulators are not used.

Question: 3. Describe how seismic loads were combined with LOCA loads in determining ability of these valves to close under LOCA loads.

Response: The primary system at Rancho Seco is seismic Class 1, thus the combination of the two events, seismic and LOCA, is not credible for Rancho Seco.

Question: 4. Describe the inservice testing and preventative maintenance programs for these valves. Describe vendor recommended periodic maintenance. Explain the difference.

Response: Our submittals of January 24, 1980, and February 12, 1980, describe the inservice testing and preventive maintenance procedures for these valves. A special preventive maintenance program is being developed for the limitorque operators. According to vendor provided literature and manuals, there are no vendor recommended periodic maintenance requirements for these valves.

Both 66-inch and 12-inch Valves

Question: 1. Describe what methods are used to assure air supplies to valves with solenoids are both clean and dry.

Response: Air is provided by the instrument air system which is equipped with an air dryer, spare air dryer, and air filters.

SMUD response to:

Enclosure 5 - REQUEST FOR ADDITIONAL INFORMATION

Question: 1. Please describe and justify the manual containment ventilation and isolation (CVI) system actuation system design employed at Rancho Seco. It is our position that a single switch should be available to actuate the CVI system.

Response: As stated in our response to Enclosure 4, Item 1, the closure of the containment purge valves is initiated by low RC pressure and high containment pressure signals in the Safety Features Actuation System. There is a separate switch for each valve for manual operation. Since the valves are closed automatically by SFAS, we feel that this meets the intent of single switch actuation.

Question: 2. Justify the use of the nonsafety radiation monitor used for initiation of control room isolation.

Response: We are in the process of upgrading the radiation monitor used for initiation of control room isolation to safety grade. This will be completed during the outage scheduled for 1984-1985.