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RECIP.NAME RECIPIENT AFFILIATION
DENTON,H.R. Office of Nuclear Reactor Regulation, Director
STOLZ,J.F. Operating Reactors Branch 4

SUBJECT: Application to amend OLs,revising Tech Spec 3.1 allowing full power operation of Unit 1 for interim period until appropriate safety valve ring settings can be implemented.

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HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

October 14, 1982

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: J. F. Stolz, Chief
Operating Reactors Branch No. 4

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

Dear Sir:

Pursuant to 10CFR 50, §50.90 Duke Power Company requests an amendment to the Oconee Nuclear Station Facility Operating License and revision to the Oconee Technical Specifications. This request concerns the operability of the Reactor Coolant System (RCS) code safety valves. The bases for this request is provided in Attachment 1. The proposed change is provided in Attachment 2.

In order to allow continued full power operation of Oconee Unit 1 for an interim period of time until the appropriate safety valve ring settings can be implemented, the immediate approval of this proposed change is requested. The valves for Unit 3 will be adjusted prior to restart from the current outage. Pursuant to 10CFR 170, §170.22 please find attached a check in the amount of $4,800 to cover the necessary license fees.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

RLG:scs

Attachments

A001 w/check $4,800

cc: Mr. J. P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II, Suite 3100
101 Marietta Street
Atlanta, Georgia 30303

Mr. W. T. Orders, NRC Inspector
Oconee Nuclear Station

Mr. P. C. Wagner, Project Manager
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

HAL B. TUCKER, being duly sworn, states that he is Vice President of Duke Power Company; that he is authorized on the part of said Company to sign and file with the Nuclear Regulatory Commission this request for amendment of the Oconee Nuclear Station Technical Specifications, Appendix A to Facility Operating Licenses DPR-38, DPR-47, and DPR-55; and that all statements and matters set forth therein are true and correct to the best of his knowledge.

Hal B. Tucker, Vice President

Subscribed and sworn to before me this 14th day of October, 1982.

Notary Public

My Commission Expires:

September 20, 1984

Duke Power Company

Oconee Nuclear Station

Proposed Facility Operating License Amendment

Bases

Background

NUREG 0737 Item II.D.1. required that a relief and safety valve test program be conducted to verify operability of these valves under postulated accident conditions. As a participant in this program, Duke Power was provided the result of the testing for the Oconee relief and safety valves. Of particular importance here are the Oconee safety valves, Dresser 31739A with short inlet pipe configuration (2.5 inch).

Results of Testing

During the course of the EPRI valve testing it was determined that the positions of the rings (eg upper, middle, lower on Figure) were important to valve performance. Complete test results are contained in the "EPRI Safety and Relief Valve Report," NP2628-LD, September, 1982, which was transmitted to the NRC by David P. Hoffman on September 30, 1982. Preliminary assessment of preliminary test reports were provided in Duke letter dated July 1, 1982.

The results of the testing indicated that acceptable valve performance under all expected conditions would occur with ring settings of +11, -40, -48 (lower, middle, upper rings) for the Dresser 31739A valve.

Evaluation of Result

Duke has been evaluating these results and had established a contract with B&W and CDI to evaluate the test data and to determine the optimum ring settings based on specific valve characteristics such as spring rate and internal dimensions. (These are expected to be fine-tune adjustments of the EPRI settings.) At the time this was in progress, the actual valve ring settings were unknown. The present valve ring settings were obtained from the valve manufacturer on October 12, 1982 from field inspection record at Dresser and are shown in Table 1. Upon receipt of these ring settings Duke became concerned with the difference between the recorded valves and the recommended ring settings from the testing. While the present ring settings from Dresser records were substantially different, they had neither been verified by actual inspection nor had a safety evaluation been completed using various assmed conditions of safety valve operability. Two spare valves from Oconee were shipped to Wylie Laboratories on October 12, 1982 for inspection and refurbishment following the recent Unit 3 refueling outage. The observed ring settings were obtained on 10/13 and are indicated in Table 2.

The observed valves are not identical to the recorded Dresser valves, and are substantially different from the valves recommended from EPRI testing. This alone does not determine whether or not the safety valves are functionally

operable and capable of performing their design bases function of relieving overpressure conditions during anticipated occurrences and design bases events.

Detailed analyses of the EPRI data have been performed to attempt the derive valve performance using the Oconee ring settings. Since no EPRI tests were performed with ring setting comparable to Oconee, no absolute valves can be obtained and actual valve performance is unknown. However, based on the EPRI tests, there is reason to believe that valve performance given the Oconee ring settings would be substantially degraded from rated valve performance.

As indicated in Table 1 the two new Oconee valves (BT 4976 and BT 4975) have unknown ring settings. This is because the valves have not yet been sent by Duke to Wylie for refurbishment and Dresser does not know what the as built ring settings are. Thus the operability of these two valves is unknown.

TABLE 1

Oconee Safety Valve Ring Settings

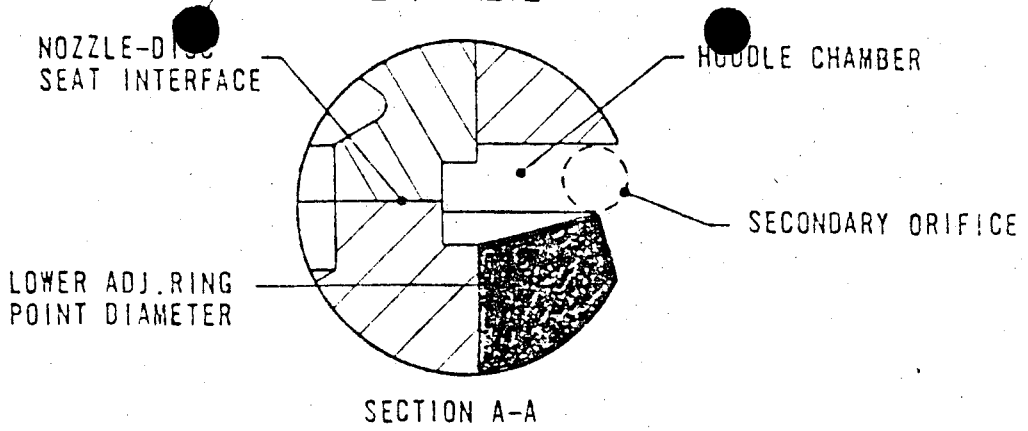
	Valve Serial Number	Ring Settings Upper	Middle	Lower
Unit 1	BL-8894 BT-4976	-48	+40	-8
Unit 2	BL-8889	-48	+41	-8
	BL-8895	-48	+41	-9
Unit 3	BL-8890 BT-4975			-7
SPARE	BL-8891	-48	+70	-7
	BL-8896	-48	+35	-8

TABLE 2

AS FOUND RING SETTINGS AT WYLIE

SPARE	BL-8891	-71	+39	-9
VALVES	BL-8896	-74	+40	-4

DRESSER SAFETY VALVE



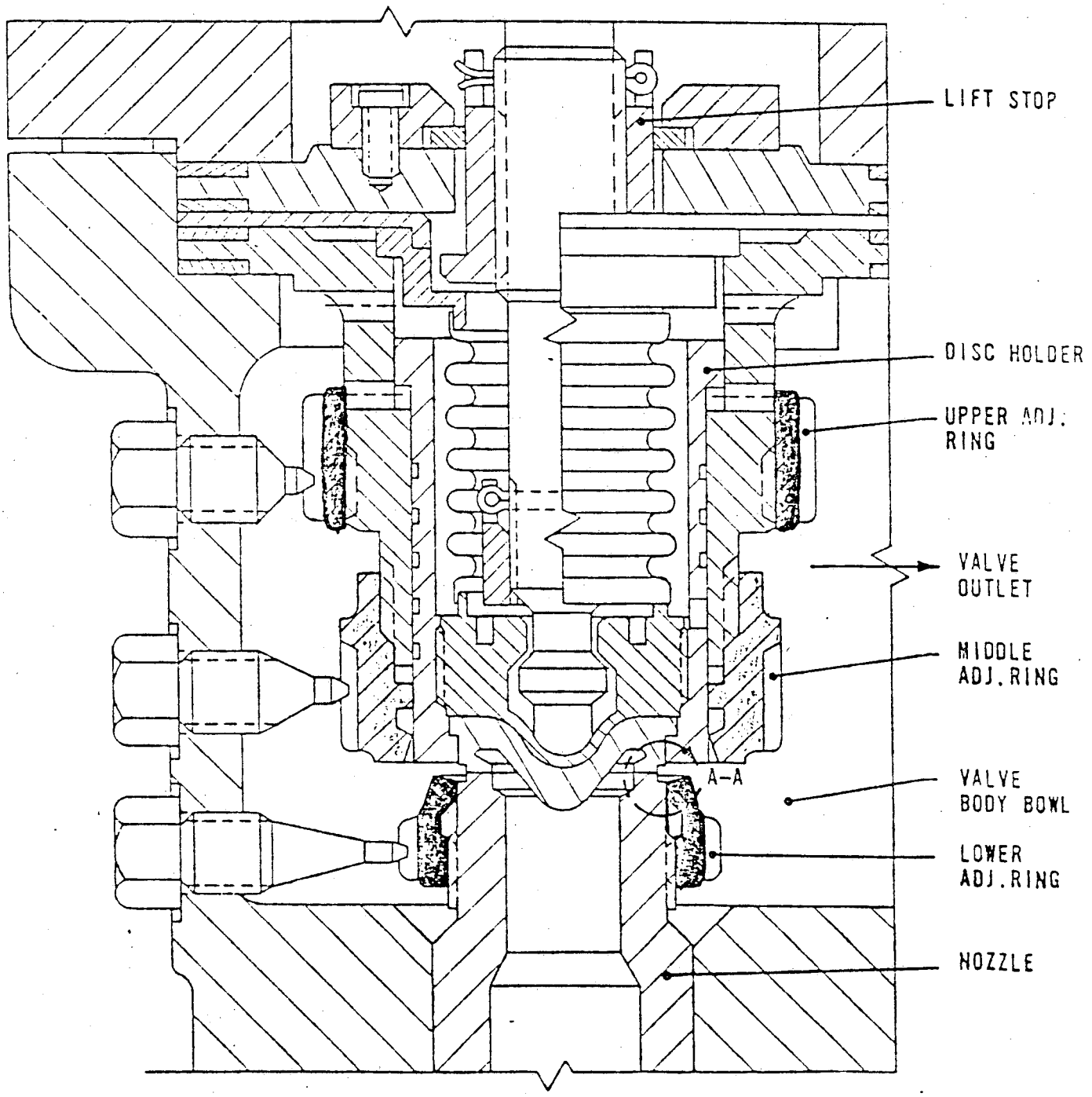


FIGURE 1

Safety Evaluation

A number of plant transients and accidents involve a pressure transient in the reactor coolant system. The safety systems provided for overpressure protection are the Reactor Protection System--through the high RCS pressure trip function--and the pressurizer safety valves. Most of the events involving an RCS overpressure condition are adequately mitigated by the RPS as evidenced by the operating experience.

The safety limit, applicable to operational events and anticipated transients, on RCS pressure is 2750 psig. In order to evaluate the impact of the possible inadequate safety valve ring setting on the continued operability of the plant on a short-term basis, analyses have been performed on a number of anticipated transients, design basis events, and certain other abnormal conditions. These analyses were performed by using the values of system and core parameters for the present time in cycle of Oconee 1 and Oconee 2 and by assuming that the safety valves are totally inoperable. The results of these analyses are as follows:

Among the anticipated transients, the limiting transient is the accidental withdrawal of a control rod group while the reactor is at hot-zero power. The calculated pressure for this event is found not to exceed the safety limit.

Analyses have also been performed for a rod ejection accident at hot-zero power and a feedwater line break from full power. The calculations for these events were found to be less limiting than the rod withdrawal event discussed above.

Certain other abnormal events have also been examined—namely, a spurious actuation of the high pressure injection system and a spurious energization of all the pressurizer heaters. These events are generally terminated by operator action. The limiting event for this category is the spurious actuation of the HPI. Analysis of this event indicates that sufficient time (greater than 10 minutes) is available for operator action to terminate these events without exceeding the safety limit.

In summary, the results of transient analysis involving a spectrum events constituting RCS overpressure conditions indicate that the necessary plant safety can be maintained for continued operation of Oconee 1 and Oconee 2, at least for a month.

Estimated Likelihood of Demand for RCS Pressure Relief Via Pressurizer Safety Valves

In order to provide additional perspective on the potential impact of continued interim operation of Oconee 1 and 2, the frequencies of event sequences that could result in the necessity for RCS pressure relief using the pressurizer safety relief valves (SRVs) were investigated. Two approaches to evaluating these frequencies were pursued. The first approach was to review U. S. PWR operating experience with demands for SRVs, and to specialize the implied frequency using Bayesian techniques to obtain a distribution on the frequency of such demands at Oconee. The second approach entailed application of the event-tree/fault-tree models and data developed during the course of the Oconee PRA to estimate the frequency of each category of sequences of interest.

In the first approach, Westinghouse and Babcock and Wilcox operating data (data for Combustion Engineering units were not readily available) were updated with the Oconee evidence of zero demands for SRV openings in 15.9 reactor years

(adjusted for service factor). The estimated mean annual frequency using this approach is 4.8×10^{-3}.

In addition, the following categories of sequences were assessed using plant-specific logic models and data:

- o extended loss of steam generator heat sink
- o excessive makeup to the RCS
- o failures of the pressure control systems for the RCS
- o reactivity excursions

These categories comprise a complete set of the events that could require operation of the SRVs. The composite frequency for these sequences is estimated to be 1.8×10^{-3}/reactor-year.

The results of these two approaches agree reasonably well, and indicate a probability of demand for SRV operation of approximately 2 to 4×10^{-4} for an interim period of unit operation of up to one month. This value is judged to be acceptably low for continued operation.

Cost of replacement for Oconee Units 1 & 2

If 1 unit must be out of service: Assume 141,120 MWH's per week lost (840 x 168 hrs)
Oconee cost to produce = 141,120 MWH x 5.6 $/MWH = $790,272

To purchase the Williams unit of SCE&G as short term @ $.65 per KW per week

Capacity cost =	$377,000	= 580,000 KW x $.65/KW week
Startup cost =	90,000	
Total	$467,000	capacity and startup

Unit operates at 280 MW min so Duke must purchase 47,040 MWH @ $47/MWH

At least 12 hrs per day we can use 47 as an economy base against approximately $28/MWH from APCo for the remaining 300 MW of capacity so we will buy 25200 MWH @ $37.5

The remainder of the energy will be replaced from Duke's systems at $18.5

Cost of replacement energy is therefore:

47,000 MWH @ 47 $/MWH	=	2,210,880
25,200 MWH @ 37.5 $/MWH	=	945,000
68,880 MWH @ 18.5 $/MWH	=	1,274,280
Total energy cost		$4,430,160
Plus capacity & startup		467,000
Cost of replacement energy		$4,897,160
Less Oconee cost to produce		- 790,272
Additional replacement cost for 1 unit for 1 week		$4,106,888

If a second unit is lost - assume a similar capacity and startup of $467,000

Also assume that since most of additional capacity will likely be combustion turbines that the entire unit energy will be replaced by economy purchase against the reserved capacity and Duke's combustion turbines which is estimated to average $60 per MWH

Total energy cost = 141,120 MWH x $60/MWH	=	$8,467,200
Plus capacity and Startup		+ 467,000
		8,934,200
Less Oconee cost to produce		- 790,272
Cost to replace the second unit	=	$8,143,928

Cost for 2 units for 1 week = $12,250,816

Proposed Schedule

Oconee Unit 3 is shutdown in a forced outage due to a steam generator tube leak. It will not be restarted until safety valves with correct ring settings are installed.

Oconee Unit 2 will be shutdown today, October 14, in order to remove the two safety valves with known incorrect ring settings and will have safety valves with correct ring settings installed prior to startup.

Oconee Unit 1 has one safety valve with ring settings known to be incorrect. For the other safety valve, the ring settings are not known. Unit 1 will be shutdown following return to service of the other two Oconee units or by October 29, 1982 at the latest.

Summary

Duke Power has evaluated the safety significance of the difference in ring settings between the valve vendor records and the EPRI recommended settings. Design bases events and anticipated transients have been analyzed using best estimate and realistic input assumptions of plant parameters. The RCS pressure excursion is less than 2750 psi. An evaluation of estimated frequency of demand of the pressurizer safety valves showed that such demand is of relatively low probability, particularly during a limited two-week period of time.

Finally, an operating experience review has shown that challenges to the safety valves is relatively low. Duke initiated efforts to make six safety valves available with correct ring settings within the next several days. Four are expected to be on site by the weekend; and two more by the early part of next week. However, in order to allow the continued operation of at least one Oconee Unit through the next seven days. The proposed Technical Specification revision is submitted for NRC review and approval.

The proposed Technical Specification change requires that the safety valves of all Oconee units be reset with new settings by October 29, 1982 or be shutdown. This also allows at least one Oconee unit to remain operating during the next two-week period while the safety valves are set with new ring settings and returned to the site for installation.