UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF SPECIAL PROJECTS

FOR EMPLOYEE CONCERNS

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 AND 2

ELEMENT REPORT EN 232.6, "RUBBER GASKET DETERIORATION

I. SUBJECT

Category: Engineering
Subcategory: Piping and Valve Design
Element: Rubber Gasket Deterioration
Concern: IN-85-400-002

The issue defined by TVA is that rubber gaskets used in the ERCW, RCW, and other unspecified systems exhibit deterioration over short periods of time. Such a condition may have an impact on plant safety.

II. SUMMARY OF ISSUE

Rubber gaskets, used in flange joints, installed in safety-related raw water piping systems such as Essential Raw Cooling Water (ERCW), exhibit rapid deterioration and could impact plant nuclear safety.

III. EVALUATION

Flanged joints allow for easier maintenance, repair and replacement of mechanical equipment, such as pumps and valves. The gasket in a flanged piping joint is used to obtain a water tight joint without the expense of lapping and grinding. The gasket provides a seal and is not associated with the pressure retaining function of the flanges and bolting. The failure of a gasket usually does cause a sudden loss of pressure, but results in a slow leak. The amount of system inventory lost as a result of a deteriorated gasket normally is not sufficient to diminish a safety system's ability to meet its intended purpose.

As discussed in the Subject Element Report, this concern was first investigated at Watts Bar. Interviews with WBN maintenance personnel revealed that about seven years ago there was one isolated incident where a rubber gasket did not perform satisfactorily in a non-safety related system and had to be replaced. However, WBN maintenance personnel could not establish a historical problem with rubber gaskets. Based upon the WBN concern, the TVA SQN Generic Task Force identified "rubber gasket deterioration" as a potential generic issue. SQN maintenance personnel were interviewed and none were aware of any rubber gasket deterioration. A review of 1555 maintenance requests (MR) on the ERCW system for the six years prior to March, 1986 was performed. Five of these MR's identified system leakage; however, none involved rubber gaskets.

A review was made of present drawing requirements for rubber gaskets in SQN systems. A standard rubber gasket material, Garlock #122 ring type red rubber, is specified. This is the standard material used for this application. The gasket material meets the requirements of ASTM D 1330, specification for Rubber-Sheet Gaskets. The ASME B&PV Code, Section III requires that the gaskets be made of materials that are not deteriorated by the fluid in the pipe or by temperature within the piping design temperature range. The design maximums of 200°F temperature and 185 psig pressure where rubber gaskets are used in safety-related systems are below the conditions which red rubber gaskets are suitable.

The employee concern maintained that "rubber gaskets . . . exhibit deterioration over short periods of time", and it is assumed that "short" refers to weeks or months rather than years. TVA has instituted a maintenance program to replace all rubber gaskets within containment within nine years, which is a shorter time than the predicted life of the gaskets. In addition, whenever a flanged joint is broken to perform maintenance or inspections, the gaskets are replaced.

IV. Conclusions

The NRC staff believes that the TVA investigation of the employee concern IN-85-400-002 was adequate. TVA's resolution of the concern as described in Element Report EN 232.6(B), Revision 0 and their response to our teletyped inquiry of December 18, 1986 is acceptable.