



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20566

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF FROM CONSTRUCTION CODE ASA B31.1,

CODE CASE N-3 REQUIREMENTS FOR THREADED CONNECTIONS

IN NUCLEAR PIPE AT SURRY NUCLEAR POWER PLANT

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NOS. 50-280 & 50-281

1.0 INTRODUCTION

By letter dated December 20, 1991, Virginia Electric and Power Company (the licensee) requested relief from the repair of threaded connections as specified in their Construction Code. The Construction Code, Code ASA B31.1, 1955 Edition, "Code For Pressure Piping," and clarified by Code Case N-3, "Proposed Case on Screwed Connections," does not permit the use of threaded connections in nuclear piping systems where the threads are the only seal. The licensee has identified threaded connections that do not conform to its Construction Code.

The licensee detected the nonconformance when a leak was found in a resistance temperature detector (RTD) bypass line in the reactor coolant system (RCS). The leak occurred at a threaded connection that was not seal welded. This configuration was in nonconformance with the original Construction Code. The licensee performed a walkdown inspection of all accessible portions of safety systems inside containment for Unit 2 and outside containment for Units 1 and 2. As a result of the inspection, the licensee identified additional nonconforming threaded connections in instrument piping lines.

The licensee replaced the leaking threaded connection and another connection in the "C" loop RTD bypass line in Unit 2 with structural welds. The licensee repaired the threaded pipe plugs found in the "B" loop RTD bypass line in Unit 2. These repairs corrected the identified nonconformances in Class 1 piping systems in Unit 2. The licensee determined that repair of other nonconforming threaded connections did not conform with their outage planning.

The licensee proposed to bring the known and suspected nonconforming threaded connections into compliance with the original Construction Code at the next refueling outages, which started February 29, 1992 for Unit 1 and is scheduled for April 1993 for Unit 2.

## 2.0 DISCUSSION

The known and suspected nonconforming threaded connections were found on Class 1 and Class 2, small diameter (1/2" and 3/4") instrument piping systems. These instrument piping systems were connected to the RCS, chemical and volume control system high head safety injection system, low head safety injection system and outside recirculation spray system. In the event of a postulated failure of a threaded connection, the affected system would have adequate makeup water to provide for the orderly shutdown and cooldown of the reactor.

The original Construction Code with the Code Case N-3 was conservative since it required threaded connections be seal welded to minimize the likelihood of leakage. Paragraph IWB-7313 of Section XI of the ASME Boiler and Pressure Vessel Code, 1980 Edition, Winter 1980 Addendum (VEPCO's commitment code for inservice inspection) requires that Class 1 threaded connections be seal welded. However, paragraph IWC-7300 references paragraph NC-3671 of Section III for replacing Class 2 piping which allows, within specified limitations, threaded connections to provide the seal. The Class 2 instrument piping, as installed, satisfies the specified limitations. The use of later editions of the Construction Code or Section III, either in its entirety or portions thereof, is authorized by paragraph IWA-4120.

### 2.1 Unit 1

The licensee was unable to identify the use of threaded connections as seals in Class 1 instrument piping systems because the unit was at power. The licensee committed to and has conducted a complete walkdown inspection during the February 1992 refueling outage. There was reasonable assurance that the structural integrity would be maintained in the RCS until the suspected nonconformance was verified. At worst, the threaded connection would have leaked while maintaining the structural integrity. However, if a break had occurred at a threaded connection in the suspected instrument piping systems, the leakage would have been within the makeup capacity of the unit's RCS. If the connection failed, the temperature and radiation monitors in containment would have detected the failure. The licensee has since corrected the identified nonconforming conditions to meet the requirements of the original Construction Code during the February 1992 scheduled refueling outage.

The less restrictive paragraph NC-3671 of Section III of ASME 1971 and later Editions allow threaded connections in Class 2 piping without seal welds. Paragraph NC-3671 has been endorsed by the NRC in 10 CFR 50.55a.

## 2.2 Unit 2

Threaded connections in Class 1 piping have been repaired to meet the requirements of the original Construction Code.

Threaded connections in Class 2 piping that are using the threads as seals follow the same discussion presented for Unit 1. To require further inspections and weld repair of Class II piping would have resulted in additional radiation exposure to licensee personnel without a compensatory increase in safety when considering that even if there were only threaded connections they would still comply with paragraph NC-3671 of the ASME and later editions. In Attachment 1 of the December 20, 1991 submittal, the licensee committed to correct the identified nonconforming condition to meet the requirements of the original Construction Code during the next refueling outage scheduled for April 1993 regardless of present day requirements.

## 3.0 CONCLUSION

The staff has concluded that using threaded connections as installed in Class 1 piping will provide reasonable assurance of structural integrity until the next refueling outage scheduled for Surry Unit 2. In accordance with 10 CFR 50.55a(a)(3)(ii), full conformance with the original requirements would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety. Therefore, relief as requested is granted for Surry, Units 1 and 2. The licensee shall correct the nonconforming conditions to comply with the original Construction Code during the next scheduled refueling outage for Unit 2.

Principal Contributor: D. Naujock

Date: June 26, 1992