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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Edwin I. Hatch Nuclear Plant
Third 10-Year Interval Inservice Testing Program,
Revision to Existing Relief Request RR-V-11

Ladies and Gentlemen:

Plant Hatch Units 1 and 2 are presently in their third ten-year inservice testing (IST) interval. The existing IST Program was developed to comply with the ASME OM Code 1990 Edition for IST of pumps and valves, and the 1995 Edition for IST of safety and relief valves (see IST Program Relief Request RR-G-1 approved in NRC SE dated 4/12/96).

Events in early 2002 at Plant Hatch, and the resultant engineering evaluations by Southern Nuclear Operating Company (SNC), have resulted in the need to revise a previous NRC approved relief request. The changes to the proposed alternative testing must be reviewed and approved by the NRC prior to implementation at Plant Hatch.

Safety and relief valve (SRV) seat leakage has been experienced at Plant Hatch and other Boiling Water Reactor (BWR) nuclear plants after the valves have been tested, refurbished, and certified leak tight by an independent testing laboratory ( Wyle Laboratory for Plant Hatch). Engineering evaluation has concluded that any challenge to the SRV after return from the testing laboratory that requires movement of the pilot disk or main disk has a significant potential to affect the seating characteristics of both the pilot and main disk. Changes in the seating characteristics of the pilot or main disk could then result in subsequent reactor coolant system (RCS) steam leaking into the suppression pool. SNC engineering personnel have discussed this issue with both the valve vendor (i.e., Target-Rock) and Wyle Laboratory personnel in an attempt to determine the cause and measures that could be taken to alleviate the problem. To date, no solutions other than those proposed in the attached relief request have been identified.

SNC is an active participant in the Boiling Water Reactor Owners Group (BWROG) which has established a committee to evaluate industry problems with SRVs. SNC will continue to closely follow any initiatives or recommendations made by the BWROG related to resolution of these SRV problems. However, in the interim, SNC proposes the alternative testing described in revised relief request RR-V-11 pursuant to 10 CFR 50.55a(a)(3)(i).

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SNC is also an active participant in the ASME OM Code Committee and recently discussed these issues with an NRC staff individual that is a member of the OM Code Appendix I (safety and relief valve testing) Committee.

The next refueling outage at Plant Hatch is scheduled to begin March 1, 2003 (Unit 2 Refueling Outage Seventeen). In order to properly plan and schedule maintenance activities for the outage related to SRV testing, NRC review of the attached relief request is requested on an expedited basis. NRC review is requested no later than December 31, 2002. If the NRC is unable to support this review schedule, please advise as soon as possible so that SNC can discuss other possible actions with NRC staff personnel.

Should you have any questions in this regard, please contact this office.

Respectfully submitted,

H. L. Sumner, Jr.

DMS/IFL/eb

Enclosure: IST Relief Request RR-V-11

cc: <u>Southern Nuclear Operating Company</u>
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Enclosure

Edwin I. Hatch Nuclear Plant
Third 10-Year Interval Inservice Testing Program,
IST Relief Request RR-V-11

VALVE RELIEF REQUEST

RR-V-11

SYSTEM: Main Steam Safety Relief Valves (SRVs)

VALVES: 1B21-F013A, B, C, D, E, F, G, H, J, K, & L
2B21-F013A, B, C, D, E, F, G, H, K, L, & M

CLASS: Class 1-Main Steam Pressure Relief Valves With Auxiliary Actuating Devices

TEST REQUIREMENT:

ASME OM Code-1995 Edition, Appendix I, paragraph I 3.4.1(d) requires that valves that have been maintained or refurbished in place, removed for maintenance and testing, or both, and reinstalled shall be remotely actuated at reduced or normal system pressure to verify open and close capability of the valve before resumption of electric power generation.

BASIS FOR RELIEF:

Exercising the main disk of the SRV after reinstallation can only be performed during reactor startup when there is sufficient steam pressure to actuate the main disk. Past history indicates that the main and pilot disks routinely do not re-seat properly after being exercised during reactor startup resulting in steam leakage into the suppression pool. This leakage results in a decrease in plant performance and the potential for increased suppression pool temperatures which could force a plant shutdown to repair a leaking SRV. Past operating history indicates that the exercising performed during reactor startup is of no significant benefit in ensuring the proper operation of the individual SRV assemblies.

**System Description**

The Unit 1 and Unit 2 SRVs are the Target Rock Two-Stage, Model 7567F design. The SRVs are dual-function valves capable of being independently opened in either the safety or the relief mode of operation. A total of 11 SRVs are installed on each unit.

In the safety mode of operation, each SRV opens when system pressure exceeds the valve's set-point pressure, which is controlled by pre-compression of the set-point spring acting down on the pilot disc. Venting the volume on the reactor side of the pilot disc creates a differential pressure across the main piston, thereby providing a force to open the main disc and relieve system overpressure. Hence, reactor vessel steam is allowed to flow directly through the main disc to seat opening and to the suppression pool via the discharge piping. All 11 SRVs operate in the safety mode, which provides the safety function of over-pressurization protection. The requirements for this mode are listed in Technical Specification 3.4.3.

In the relief mode of operation, each SRV is opened by an electro-pneumatic actuator, which consists of a three-way solenoid valve, an attachment manifold, and a pneumatic operator. When the solenoid valve is energized, pneumatic pressure is routed into the operator to lift the pilot rod against the force of the compressed set-point spring. This allows system pressure to lift the pilot disc, venting the volume on the reactor side of the disc, and opening the valve as in the safety mode discussed above. This mode of operation is used for Automatic Depressurization System (ADS), Low-Low-Set (LLS), and remote manual operation. Technical Specifications 3.5.1 and 3.6.1.6 provide requirements for the ADS and LLS System. Manual operation is not safety related and is not addressed by Technical Specifications. In each unit, seven SRVs are part of ADS, while the remaining four constitute LLS.

**Current Testing at Plant Hatch**

Testing of Plant Hatch SRVs is performed to satisfy Technical Specifications Surveillance Requirements (SRs) and the ASME OM Code (1995), "Code for Operation and Maintenance of Nuclear Power Plants." Certain tests are performed with the SRVs installed (in situ), while others are performed as "bench tests" after the valve is removed and transported to a maintenance and testing facility. Current requirements are as follows:

1. SRs 3.5.1.12 and 3.6.1.6.1 provide SRV manual actuation testing requirements for the ADS and LLS Functions, respectively, to demonstrate operability of the SRV relief mode.

2. Remote manual actuation is also required by the ASME OM Code, Appendix I, paragraph 3.4.1(d), to verify open and close capability of the valve before resumption of electric power generation. This applies to valves that have been either maintained or refurbished in place, or removed for maintenance and testing and reinstalled. This remote manual actuation is performed at zero system pressure.

   Plant Hatch currently meets the two above testing requirements by opening and closing each SRV by defeating the control room switches and leakrate testing the pilot air operators and associated accumulator piping. Valve opening and closing capability is then confirmed by measuring the change in depth of the pilot rod.

3. Plant Hatch Units 1 and 2 Technical Specifications SRs 3.5.1.11 and 3.6.1.6.2 require that the SRVs be opened on an actual or simulated automatic initiation signal to demonstrate that the solenoids operate when initiated by a signal. Actual valve actuation is excluded from these tests which are performed on a once per operating cycle frequency.

   Plant Hatch currently meets the above testing requirement by performing the test in conjunction with Logic System Functional Tests (LSFT) for the initiating instrument logic, which are also required by Technical Specifications.

4. ASME OM Code (1995) I 3.3.1 (d) and (e) require that SRV auxiliary components be tested in place as follows: solenoid valve and pneumatic actuator integrity is verified by performance of leak rate tests, and solenoid valve electrical function is verified.

   Plant Hatch satisfies the above requirement by tests performed following maintenance on the valves which demonstrate operability of the valve pneumatic actuation system.

**Current Testing at Outside Facilities**

During each refueling outage, all 11 SRV pilot assemblies and approximately one-third of the main stages are removed and shipped to Wyle Laboratories for "as-found" testing, which includes visual inspection, leakage testing, pilot disc-to-seat sticking testing, and set pressure testing. The tests are performed on a valve prior to maintenance on the valve. The leakage and set pressure tests are performed at a steam pressure of approximately 1035 psig. Both tests meet the requirements of ASME OM Code (1995) I 3.3.1(a), (b), and (c).

Following the "as-found" testing, the SRVs are given a dimensional inspection followed by refurbishment, if required. This work is performed by the valve supplier, Target Rock Corporation.

Valve warming for post maintenance testing is performed at a steam pressure of approximately 1010 psig. Post maintenance testing includes initial valve leakage testing, safety mode valve actuation to satisfy requirements for set pressure, reseat pressure, main disc stroke time, and final leakage testing. Final seat leakage tests are performed at approximately 1070 psig. Upon successful test completion, each valve receives written certification from the lab and is returned to Plant Hatch for reinstallation. To receive certification, the valve must have zero seat leakage and meet the acceptance criteria for set pressure. These tests meet the requirements of ASME OM Code (1995) I 3.3.1 and Technical Specifications SR 3.4.3.1 (for lift set-point pressure verification).

**General Change Justification**

Leaking SRVs result in the following challenges to Plant Hatch components and operation.

1. Leakage during operation may cause the valve to inadvertently actuate, possibly resulting in an unplanned plant shutdown, with its attendant challenges to plant safety systems and components. This has occurred previously at at least one domestic BWR plant.

2. Leaking SRVs create operational problems associated with the suppression pool. SRV leakage increases both pool temperature and level, requiring more frequent use of the suppression pool cooling mode of the Residual Heat Removal (RHR) system.

3. Plant efficiency is impacted because the transfer of heat to the suppression pool is a source of thermal heat loss from the power generation steam cycle, thereby reducing electrical generating capacity. SRV leakage results in radiological challenges since radioactive nuclides contained in the steam can become a potential source for personnel contamination.

As described previously, each SRV pilot assembly and approximately one-third of the main stages are bench tested at Wyle Laboratories during each refueling outage. The valves are refurbished as necessary to meet the acceptance criteria of zero leakage, and are certified in writing as being leak free. The valves are then reinstalled in the plant and proper pilot operation is confirmed through leakrate testing of the pilot air operators and associated accumulator piping and in situ measurements of the pilot rod movement. Following this surveillance test, Plant Hatch has typically experienced one or more leaking valves from what was originally a leak-free population supplied by the vendor (Wyle Laboratories). For example, Plant Hatch Unit 1 was shutdown in February 2002 due to Main Condenser Off-Gas System problems. During this forced outage, three SRVs were replaced with leak-tight valves, which were actuated as described above. One of the replacement SRVs then began leaking following startup.

Several aspects of SRV design and operation can contribute to valve leakage. As mentioned earlier, these include test pressure, pilot valve disc and rod configuration, and system and valve cleanliness. Actuation of the SRVs after laboratory testing by any means allows these contributors to impact the ability of the valve to re-close completely. Plant Hatch has made significant efforts to minimize the effects of these contributors. However, elimination of in situ valve testing under any condition that disturbs the pilot disc/seat interface is expected to have the most positive impact in reducing SRV leakage.

Additionally, reducing challenges to the SRVs is a recommendation of NUREG-0737, "TMI Action Plan Requirements" item II.K.3.(16). This recommendation is based on a stuck open SRV being a possible cause of a Loss of Coolant Accident (LOCA). This submittal is consistent with that NRC recommendation.

ALTERNATE TESTING:

As an alternate to the testing required by ASME OM Code-1995, Appendix I, paragraph I 3.4.1(d), SNC proposes to actuate the SRVs in the relief mode at the test facility (i.e., Wyle Laboratory). The solenoid valve will be energized, the actuator will stroke, and the pilot rod lift will be measured. This test will verify that, given a signal to energize the solenoid, the pilot disc rod will lift. The rod movement measurement will be performed using calibrated equipment and will be recorded in the test documentation package for future reference, as needed.

Alternate testing is justified since the remaining segments of the SRV mode of operation are proven by other tests. The ability of the pilot disc to open is shown in the safety mode actuation bench test. The integrity of the pneumatic and solenoid system for the SRVs are verified by performance of post maintenance leakrate testing and the "click" test, respectively. Automatic valve actuation is proven operable by logic system functional tests which include verification that the solenoid actuates from the automatic signal.

Each refueling outage, all 11 pilot assemblies and approximately one-third of the main disc assemblies are sent to Wyle Laboratories and tested with steam pressure. As a result, even though actual valve movement is not performed after the SRV is re-installed in the plant, all pilot assemblies are tested with steam pressure once per cycle and all the main discs are tested with steam pressure approximately once every three cycles. This testing adequately demonstrates SRV operational readiness.