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Edwin I. Hatch Nuclear Plant – Unit 2
Response to Request for Additional Information for Alternative RR-V-11 Regarding Main Steam
Safety Valve Testing Requirements

Ladies and Gentlemen:

By letter dated August 3, 2017 (Agencywide Documents Access and Management System Accession No. ML17215A558), Southern Nuclear Operating Company (SNC) submitted a request for alternative for the Edwin I. Hatch Nuclear Plant, Unit 2 (Hatch Unit 2). The requested alternative would authorize a one-time extension of the main steam safety relief valve (SRV) main body test frequency, allowing the required testing to be performed at the next Hatch Unit 2 refueling outage in February 2019. The NRC staff has reviewed the information provided by SNC, and has determined that additional information is needed to complete its evaluation. This additional information was requested via emailed correspondence dated March 8, 2018.

The Enclosure provides the SNC response to the NRC request for additional information Questions 1 – 3. The SNC response to Question 4 will be provided once test results are available for the Unit 1 SRVs from the recently completed February 2018 refueling outage.

This letter contains no NRC commitments. If you have any questions, please contact Ken McElroy at 205.992.7369.

Respectfully submitted,


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CAG/RMJ

Enclosure: Response to NRC Request for Additional Information

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Edwin I. Hatch Nuclear Plant – Unit 2
Response to Request for Additional Information for Alternative RR-V-11
Regarding Main Steam Safety Valve Testing Requirements

Enclosure

Response to NRC Request for Additional Information

NRC RAI #1

Discuss the as-found condition of the SRVs currently in service in Hatch Unit 2 following limited flow testing and prior to performing the Part 21 recommended actions before returning them to service.

SNC Response to NRC RAI #1

All Hatch Unit 2 safety relief valve (SRV) main valve bodies (MVBs) were replaced with pre-tested components during a forced outage in May 2016. The MVBs installed were tested with the limited flow testing and then disassembled and inspected per the Part 21 inspection (TRFS-406 Rev B). This inspection found no abnormal wear or deformation. Some main disc jam nuts were found loose, but still within tolerance. These jam nuts were tightened per procedure with the locking tab. Since the pressure boundary was broken for inspection, the valves were hydro tested to confirm no leakage was introduced. This post-test inspection confirmed that valves currently installed on Unit 2 have tight locking nuts and tabs, as well as no deformation on the main disc shoulder. The valves have not been lifted since the Part 21 inspection was completed.

NRC RAI #2

Discuss the operating, test, and examination history of the subject valve for both Hatch Unit 2 and Hatch Unit 1.

SNC Response to NRC RAI #2

The Hatch Unit 1 main valve bodies (MVBs) removed during the February 2016 refueling outage were shipped to NWS Technologies Inc. to perform post-operational as-found testing required by Technical Specifications, and to inspect these valves for susceptibility to the Part 21 notification. These valves were initially placed in service prior to the Part 21 notification. The as-found tests resulted in all 11 MVBs stroking successfully in the required time. For further Part 21 investigation into the testing methods, multiple tests were performed on the valves. Three of 11 MVBs stroked fully open, but failed to fully reseal following the second actuation test for the valve. All three valves successfully cycled once during their automatic steam test; however, the valves failed to fully reseal during subsequent attempts.

Of the three MVBs that failed to reseal, one was found closed when removed from the test stand, one was manually closed following removal from the test stand, and the third was manually actuated during inspection. In all three cases, the valves exhibited free travel of the main disc assembly when moved by hand.

Internal inspection of the valves that failed to reseal found shortened spring lengths outside of prescribed acceptance criteria, loss of locking nut preload, the lock tab washer rotated and not engaged, and stem / piston thread degradation. The cause of the failure to fully reseal on the test stand was attributed to the pressure of the limited flow testing imparting impact loads greater than the local yield strength of the main disc and/or main piston. After limited flow testing, the main internals have been found in a degraded condition. When the impact load is much greater than the local yield strength, the preload on the joint is not only removed, but clearance is established between the disc and piston shoulders. The magnitude of the clearance, if greater than 0.004", allows the piston to rock on the stem shoulder, wearing grooves into the main guide fretting or increasing the relative clearance between the piston and

disc threads. The induced vibration load is plant-specific and Plant Hatch has minimal vibration on these locations of steam piping.

The 1B21-F013A SRV failed to fully re-seat after its second automatic lift during post-operational testing. The main stage disc remained approximately 0.2" from full closure after testing. A tool was used to close the valve with hand pressure. The valve closed freely, and upon inspection, the piston and stem assembly was able to move freely in the guide. Although the valve had severe thread damage to the piston and stem and the piston could tilt on the stem, no signs of binding or seizure which would have been indicated by axial scoring in the guide liner were noted. Fretting was observed in the guide around the piston rings that measured to a depth of 0.003" with shallow ramp angles.

The 1B21-F013D valve failed to fully re-seat after the second automatic lift during post-operational testing. When the valve body was removed from the test stand in a hot condition, the disc closed under its own power. During inspection, the piston and stem assembly could move freely by hand in the guide cylinder. Fretting was observed in the guide around the piston rings that measured to a depth of 0.005" with shallow ramp angles. The piston and disc were measured to check for de-shouldering of the piston. Similar to the B21-F013A SRV, no signs of binding or seizure were present to indicate axial scoring in the guide liner from the two certification lifts and full re-closure.

The 1B21-F013H SRV failed to fully re-seat after the manual (solenoid) actuation during post-operational testing. Technicians did not attempt to close the valve by hand, but the disc was observed to be able to move in the open direction. During inspection and disassembly, the piston and stem assembly could be moved freely by hand in the guide cylinder. The thread damage to the piston and stem areas were similar in nature to the "A" valve (MVB SN 270), and "D" valve (MVB SN 92) with the piston able to be tilted relative to the stem, but still maintaining free movement. The piston was also able to move ¼" axially relative to the stem when pressure was applied in both directions; however, the threads for the jam nut were in pristine condition. There were no indications of seizure or binding in the guide liner. Fretting was observed in the guide around the piston rings that measured to a depth of 0.015" with shallow ramp angles.

The Hatch Unit 2 MVBs removed from service during the forced outage in May 2016 were sent to NTS in Huntsville, AL. The MVBs were not as-found tested to preserve evidence and not introduce new damage from as-found limited flow testing. Based on disassembly and inspection results of the Hatch Unit 2 MVBs, no evidence was present to suggest that any of the eleven MVBs would not have passed as-found testing, and the MVBs fully stroked on the test stand. Although jam nuts were found loose and deformation was present on the MVB disc stems, the de-shouldering between the disc and the piston did not meet the threshold requirements of 0.004" that would allow rocking of the piston while in service.

NRC RAI #3

Have the valves been actuated in-service during the current Hatch Unit 2 or previous Hatch Unit 1 fuel cycles? If so, what were the results?

SNC Response to NRC RAI #3

The valves have not been lifted since installation. No valves in either unit have been stroked online/in-service since implementation of the 3-stage target rock design.