energy harbor

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October 27, 2023
L-23-222

10 CFR 50.59(d)(2)

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject:
Perry Nuclear Power Plant
Docket No. 50-440, License No. NPF-58
Report of Facility Changes, Tests, and Experiments

Pursuant to 10 CFR 50.59(d)(2), Energy Harbor Nuclear Corp. hereby submits the Perry Nuclear Power Plant Report of Facility Changes, Tests, and Experiments. The attached report covers the period from October 9, 2021 to October 9, 2023.

There are no regulatory commitments contained in this submittal. If there are any questions or if additional information is required, please contact Mr. Phil H. Lashley, Manager, Fleet Licensing, at (330) 696-7208.

Sincerely,

Rod L. Penfield

Attachment:
Perry Nuclear Power Plant Report of Facility Changes, Tests, and Experiments for the Period October 9, 2021 to October 9, 2023

cc: NRC Region III Administrator
NRC Resident Inspector
NRC Project Manager

Title:

Rod Control and Information System (RC&IS) Control System Upgrade, Phase 1

Activity Description:

The original rod control and information system (RC&IS) at Perry Nuclear Power Plant (PNPP) had numerous obsolescence issues. In particular, the availability of the rod pattern controller (RPC), a software-based instrument in each rod pattern control system (RPCS) channel, had become a source of concern. The RC&IS allows the reactor operator to insert or withdraw control rods for power generation purposes. One of the major subordinate systems in RC&IS is the rod action control system (RACS), which includes two safety related RPCS channels, both of which must be operational in order to move control rods. The RACS was a digital system designed in the 1980s. The original equipment manufacturer of the RPC no longer supports it, and the device is obsolete, making replacement parts unavailable.

As a result, PNPP has upgraded the RACS equipment with nuclear measurement analysis and control (NUMAC) equipment supplied by GE-Hitachi Nuclear Energy. The scope of the replacement included the equipment in each of the two RACS cabinets, the interconnecting fiber, and incorporating a small number of new functions and enhancements.

Summary of Evaluation:

The modification does not meet any of the criteria in paragraph (c)(2) of 10 CFR 50.59 based on the following summary discussion. Evaluations were performed in a qualitative assessment and a failure modes and effects analysis (FMEA) to demonstrate the dependability of the software for the NUMAC system. These evaluations concluded that the likelihood of failure is sufficiently low. The installation of the NUMAC system does not increase the frequency of occurrence of an event previously evaluated in the updated safety analysis report (USAR). The NUMAC system interfaces with the same systems as the original RACS equipment. The function of the replacement system does not change the operating or design parameters of any plant system during station operations and provides increased functionality and reliability. The NUMAC system is designed to be highly reliable, redundant, and fault-tolerant. Therefore, the modification does not result in a more than minimal increase in the likelihood of occurrence of a malfunction of a system, structure, and component (SSC) important to safety previously evaluated in the USAR.

The FMEA performed for the modification demonstrates that a failure of the new NUMAC system is bounded by the existing accident analysis provided in the USAR; therefore, the change does not result in a more than minimal increase in the consequences of an accident previously evaluated in the USAR. The new NUMAC system exhibits the same failure effects affecting radiological releases as the original RC&IS control system; therefore, the change does not result in a more than minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the USAR.

The modification does not change any operational parameters or response times of any system described in the USAR. The system-level failure modes of the NUMAC system, including software failure modes, are equivalent to, or bounded by, the failure modes of the original RC&IS system. Thus, there is no possibility of creating a new accident of a different type with this modification.

The modification does not establish any new operating modes or operating parameters that would create the possibility of a malfunction of any SSC that is different from the prior design. System reliability is improved with this modification. The failure effects of the new NUMAC system have been evaluated and the consequences of a failure are unchanged from the original RC&IS control system. Therefore, the modification does not create the possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated in the USAR.

The modification to the RACS equipment is not a departure from a method of evaluation described in the USAR, nor does it exceed or alter a design bases limit or fission product barrier described in the USAR. The modification does not meet any of the 10 CFR 50.59(c)(2) criteria; therefore, a license amendment is not required.

Title:

Temporary jumper to the Bypass Flow Switch for the Steam Jet Air Ejector (SJAE) B

Activity Description:

This temporary modification (TM) defeats the low steam flow isolation signal to the second stage B SJAE suction isolation air operated valves (AOVs). The trip signal from the flow switch that controls the associated AOV solenoid valves is jumpered out. This is to ensure that SJAE B remains on-line in case the flow switch activates its low steam flow trip due to a flow switch malfunction. This trip signal isolates AOVs when steam flow to the second stage B SJAE reaches the flow trip setpoint of 7,440 pounds per hour (lbs/hr) steam.

The flow switch is currently indicating off-scale high due to the effects of a steam leak at the flange location of the associated flow element. As such, operations personnel have lost the flow switch as a reliable indication for steam flow to SJAE B. Alternate means to validate proper SJAE B operation are available. The low steam flow trip signal from the second stage SJAE B flow switch is being temporarily defeated by this TM.

The flow element, flow switch, isolation AOVs, and their solenoid valves are non-safety related, non-seismic classified components. The control wiring is non-safety and non-safety jumpers are used to defeat the automatic isolation function of the flow switch. The alarm function of the switch remains available, however, the operating point may not be per the setpoint due to the influence of the steam leak.

The installation of the jumper prevents the automatic isolation of the SJAE B suction valves during low steam flow to the B SJAE sensed by the potentially impaired flow switch.

Summary of Evaluation:

The TM has been implemented in conjunction with activities associated with isolating the steam leak identified on the steam flow element via leak sealant repair. The steam flow indication has pegged high (>10,000 lbs/hr) and the reliability of the flow switch may be reduced due to the steam leak and subsequent insulation removal and sealant injection.

Accordingly, the installation of the jumper prevents the automatic isolation of the SJAE suction isolation valves during low steam flow conditions to the B SJAE.

This evaluation concluded that sufficient alarms and indication are currently in place to alert the operators that there may exist a low dilution steam flow to the SJAE B and allow actions to place the unit in a safe condition in the event that steam flow cannot be re-established. The evaluation credits several alarm response instructions alerting

operators that a low dilution steam flow exists. This TM is expected to be in place until repairs to the steam leak are completed.

The evaluation was performed assuming that an occurrence of low dilution steam flow occurs while the jumper was in place. Various alarms are provided in the control room that would result from a potential low dilution steam flow occurrence. It is concluded that the actions to close the suction isolation valves could be realized by responding to these alarms. The conclusion was that the plant would not experience a transient worse than that evaluated in the USAR for a loss of condenser vacuum. Failure of the SJAE piping is considered a limiting fault and the TM does not increase the frequency of this event.

The TM cannot increase consequences of an accident or a malfunction of equipment, nor will it create the possibility of an accident of a different type or malfunction of an SSC with a different result. The activity cannot impact fission product barriers, nor is it considered a departure of a methodology used in establishing the design basis limit or fission product barrier described in the USAR. The TM does not meet any of the 10 CFR 50.59(c)(2) criteria; therefore a license amendment is not required.