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February 23, 2021
L-21-034

10 CFR 50.59(d)(2)

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-001

SUBJECT:
Beaver Valley Power Station, Unit No. 2
Docket No. 50-412, License No. NPF-73
Report of Facility Changes, Tests and Experiments

In accordance with 10 CFR 50.59(d)(2), the Energy Harbor Nuclear Corp. hereby submits the attached Report of Facility Changes, Tests and Experiments for the Beaver Valley Power Station, Unit No. 2 (BVPS-2). This report reflects the implemented changes, tests and experiments that were evaluated pursuant to 10 CFR 50.59 during the period of February 1, 2019 through January 31, 2021.

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,

Grabnar, John 19072
Site Vice President, Beaver Valley
I am approving this document
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John J. Grabnar

Attachment:
Beaver Valley Power Station, Unit 2, Report of Facility Changes, Tests, and Experiments

cc: NRC Region I Administrator
NRC Resident Inspector
NRC Project Manager
Director BRP/DEP
Site BRP/DEP Representative

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Title:

Steam Generator Examination Program

Activity Description:

This activity involves the revision of the Steam Generator Examination Program procedure by eliminating of the requirement to remove tubes from the Unit 2 steam generators on a periodic basis.

Summary of Evaluation:

This procedure change eliminates the requirements to remove tubes from the Unit 2 steam generator on a periodic basis. The requirement to remove tubes on a periodic basis from the Unit 2 steam generators is documented in the license amendment request dated June 18, 1996 for implementation of Generic Letter (GL) 95-05. The license amendment request states that the number and frequency of tube pulls will be consistent with Generic Letter 95-05 requirements, or BVPS-2 will participate in a Nuclear Regulatory Commission (NRC) endorsed industry program per Section 4.a.

Section 4 of GL 95-05 describes that implementation of the generic letter should include a program of tube removals for testing and examination. Specifically, Section 4.a states that on an ongoing basis, additional (follow-up) pulled tube specimens should be obtained at the refueling outage following accumulation of 34 effective full power months of operation, or at a maximum interval of three refueling outages, whichever is shorter. Alternatively, the request to acquire pulled tube specimens may be met by participating in an industry sponsored tube pull program endorsed by the NRC that meets the objectives of GL 95-05 guidance.

Energy Harbor Nuclear Corp. conducted an evaluation using the criteria of GL 95-05 to document the acceptability to eliminate the periodic removal of tube segments from the Unit 2 steam generators.

The procedure for the Unit 2 Steam Generator Examination Program was revised to incorporate Generic Letter 95-05 tube removal for testing and examination.

Title:

Safety Analysis of Radiological Consequences of Waste Gas System Rupture (WGSR) Design Basis Accident at BVPS-2, Control Room, Exclusion Area Boundary (EAB), and Low Population Zone (LPZ) Doses

Activity Description:

Raising the Beaver Valley Control Room Envelope (CRE) allowable unfiltered inflow from a maximum of 500 cubic feet per minute (cfm) up to a maximum of 1250 cfm requires an update of the BVPS-2 WGSR Dose Consequence Calculation resulting in slightly higher dose consequences.

The WGSR control room doses were based on 500 cfm of unfiltered CRE inflow with a control room emergency ventilation system (CREVS) sensitivity case done at 1030 cfm. The calculation addendum evaluates the CRE doses at an allowable unfiltered inflow as high as 1250 cfm, which bounds the total CRE inflow in the CREVS pressurization or isolation alignments. No changes to the EAB or LPZ doses result from the CRE ventilation change; however, higher EAB and LPZ whole body radiological dose consequence values are adopted.

Summary of Evaluation:

Increasing the CRE allowable unfiltered inleakage from 500 cfm to 1250 cfm and the rounding up of the EAB whole body radiological dose consequence results in increases in the calculated doses to the control room operators and to the public from a postulated WGSR. The evaluation shows that the dose increases are less than the 10 percent allowance of margin to the regulatory limits (or Standard Review Plan limits), and therefore can be made without specific permission from the NRC.

Title:

Inspection of BVPS-2 Main Turbine Throttle and Governor Valves on 40-Month Interval

Activity Description:

The BVPS-2 turbine overspeed protection system has a surveillance requirement to inspect the throttle and governor valves every forty months. Effectively, since the fuel cycles at BVPS-2 last 18 months, the inspection requirement is every other refueling interval, or 36 months. The scope involves disassembling one (1) throttle and one (1) governor valve on the main steam inlets to the high-pressure turbine to perform a visual and surface inspection of the valve seats, disks and stems. The purpose is to verify that the valves have not experienced unacceptable flaws or excessive corrosion over the (previous period of operation).

The purpose of the evaluation is to extend the current stated inspection interval from 40 months by one additional refueling cycle of 18 months (from 2R21 to 2R22) or a total of 54 months. The extension will reduce the resource burden imposed by the current Coronavirus (COVID-19) at the scheduled time of 2R21 in April 2020.

Summary of Evaluation:

The change is to an input that is an implicit assumption in the turbine missile analysis of record, to reflect both the currently installed Westinghouse low pressure turbines as well as a six-month test interval based on WCAP-16051 in place of the original three-month interval.

The reference documents used in the BVPS-2 analysis do not explicitly list the 40-month inspection interval. Westinghouse document WCAP-11525, identified as the source of the probabilistic methodology, explicitly stated that the inspection interval was not used as an input. Additionally, neither WCAP-14732 nor WCAP-16051 specifically mention the turbine and governor valve inspection intervals.

BVPS-2 Technical Specification Amendment 115 with NRC Safety Evaluation Report (SER) dated September 2000, also does not explicitly specify an inspection interval. The SER included only a qualitative statement that proper valve maintenance is important to minimize the importance of overspeed events.

The BVPS-2 turbine missile analysis was modeled on the equivalent turbine missile calculation for BVPS-1, developed from Westinghouse calculation, "Beaver Valley Units 1 and 2 Update of Turbine Missile Ejection Probability Due to Reheat Stop and Interceptor Valve Test Interval," (December 2012). The Westinghouse calculation noted that to reach design overspeed requires the failure of one or more governor valves. The failure probability of the governor valves affects the design overspeed results; however, the calculation did not specify an inspection interval for the governor valves.

The actual input value of overall inspection interval (each valve being inspected in four three-year intervals or every twelve years) was determined to remain the same as assumed in the Standard Review Plan and the SER despite the nominal change represented by the License Requirements Surveillance (LRS) 3.3.9.6 wording. Therefore, the change does not affect the calculations as developed in WCAPs -11525, 14732 (originally with three-month valve stroke test intervals) and 16501 (with six-month valve stroke testing intervals). The probability of a missile ejection remains at $1.88\text{E-}06$ events year (meeting the acceptance threshold of $<1\text{ E-}5$ events per year). Neither BVPS-2 – Total Turbine Missile Generation Probability Analysis calculation 10080-DMC-0761 nor BVPS-2 Updated Final Safety Analysis Report (UFSAR) require any revisions.

The inspection history of the BVPS-2 turbine throttle and governor valves has shown no real evidence of operating wear and other degradation. A memorandum from the turbine vendor (Siemens) noted that BVPS would experience less valve degradation than other plants, since the BVPS turbines are located indoors and are thus not exposed to the environment. Furthermore, since BVPS-2 operates in the full-arc mode of valve control, the valves seldom move throughout an operating cycle, minimizing wear.

All UFSAR described plant responses and analyses remain in effect. There are no changes to the turbine missile accident description. No new accidents are introduced because the plant equipment and response remain the same as previously with the proposed LRS inspection interval; therefore, the proposed BVPS-2 turbine throttle/governor valve inspection interval change does not meet the criteria in 10 CFR 50.59(c)(2) and no license amendment request is needed for this change.

Title:

Remove the 2R21 (April 2020) Calibration Requirement for the Unit 2 Seismic Instrumentation from the Licensing Requirements Manual (LRM)

Activity Description:

An exception will be added to the calibration frequency of the seismic monitoring instruments in the LRM allowing the 2R21 (April 2020) calibration to be postponed. Specifically, the calibration of the triaxial time-history accelerographs and the response spectrum analyzer will not be accomplished during the 2R21 outage due to the COVID-19 pandemic. Postponing this calibration, will reduce the number of off-site personnel at BVPS-2 thus helping to comply with the COVID-19 isolation orders and protect plant personnel from virus contamination.

Summary of Evaluation:

A triaxial time-history accelerograph system is provided to sense, record, and analyze data associated with seismic events. Except for the sensors, the system is located within the BVPS-2 control room. The system is made up of two sets of three accelerographs. Accelerographs are part of the Condor seismic instrumentation and directly provide their data to the response spectrum analyzer. The response spectrum analyzer reviews the data following a seismic event and determines if a threshold has been exceeded. These accelerographs are stand-alone units that record data triggered by a seismic event. The calibration frequency of these instruments and system are under consideration by this evaluation.

The triaxial time-history accelerographs and response spectrum analyzer have no impact on plant control, no impact on accident response, no impact on the consequences of any accident described in the UFSAR, and no impact on the analysis's methodology used in the design of the plant. The only connection to the remainder of the plant is the control room annunciator system. Annunciator A 10-5H will annunciate from the Condor instrumentation upon a seismic event that exceeds a setpoint or if there is a failure of the system. Therefore, changing the calibration period will not have an adverse effect on any aspect of the plant as described in the BVPS-2 UFSAR.

Extending the calibration interval will slightly raise the probability that the instrument may not be accurate when called upon to function. However, a review of the calibration history shows that the instruments have been found to be within tolerance and have not required adjustment in the past five surveillance calibrations, except for the zero value AID checks for 2ERS-ACS-1,2,3 at 2R20. The analog to digital (A/D) converter allows the analog signal from the sensors to be digitized so they can be analyzed and displayed. The worst-case tolerance was found to be approximately 9 mv from the required zero volt reading which is outside the required tolerance of +/- 5 mv. This zero-value is not significant during a seismic event considering the full range span of the sensors is +/- 2.500 VDC. Additionally, the procedures allow a +/- 125 mv zero offset

voltage for in service conditions. This is much greater than the ± 5 mv tolerance for the zero setting. Therefore, the instrument will perform satisfactorily even if the zero point is slightly out of tolerance. A review of the channel operational tests and the channel checks for these instruments since 2R20 in October 2018 has also found no issues. Therefore, there is a high confidence that the instruments will be accurate, despite the longer calibration period.

Title:

Downgrade and Isolate BVPS-2 Hydrogen Analyzer Remote Control Panels BV-2HCS-PNL-100A and BV-2HCS-PNL-100B

Activity Description:

The power supply internal to the control panel for the BVPS-2 "B" hydrogen analyzer failed, which renders the "B" hydrogen analyzer non-functional under the BVPS-2 License Requirements Manual (LRM). A prompt functionality assessment (PFA) was developed to allow BVPS-2 to continue to operate with only the "A" hydrogen analyzer. Engineers determined that the most effective action would be to modify the panel power supply circuit to allow reclassification of the panel power supply to non-Class 1E. This quality assurance category reclassification from Class-1E to non-Class 1E will allow a more easily procurable power supply to be obtained and installed, since the existing obsolete Intel model (procured through Exe-Sensor) is extremely difficult to obtain.

An engineering change package (ECP) will downgrade the BVPS-2 "A" and "B" hydrogen analyzer remote control panels from Safety-Related (Q) to Augmented Quality (A). The power supplies will continue to be seismically mounted in the panels, with the external boxes remaining intact and qualified. Safety-related fuses will also be installed in the panels. Downgrading the panel power supplies means the panels will no longer be assumed to function during a design basis accident (DBA), in this case a loss of coolant accident (LOCA) with a postulated concurrent loss of offsite power. As a result, the "A" and "B" hydrogen analyzer panels can no longer be credited with meeting NRC Regulatory Guide 1.97, Rev. 2 Category 1 criteria; therefore, the BVPS-2 UFSAR RG 1.97 Table 7.5-1 category of the "A" and "B" hydrogen analyzers will be revised from their current Safety-Related/Class-1E classification to non-safety related/non-Class 1E. In addition, the component classification of the analyzers in BVPS-2 UFSAR will be revised from safety-related (Q) to non-safety related.

Summary of Evaluation:

The change in downgrading hydrogen analyzers BV-2 2HCS-PNL100A & B from Class-1 E, seismic to non-class 1 E (augmented quality, still seismically mounted and analyzed) does not require a license amendment and further NRC review for the following reasons:

1. As a change to post-accident monitoring equipment, a reclassification of the hydrogen analyzers cannot increase the probability of an already postulated DBA LOCA.

2. The change does not increase the probability of malfunction of equipment (namely the hydrogen analyzers) used to mitigate an accident discussed in the BVPS-2 licensing bases for two (2) major reasons:
 - a. There is no actual physical change, because the classification is purely nominal. The panels will in fact continue to be powered from Class-1E 120 VAC power supplies (Panels 2AC-E1 and E2) as before. Furthermore, the power supplies continue to be seismically mounted in panels that are themselves seismically qualified. The area where 2HCS-PNL-100A and B are located (emergency switchgear area in the BVPS-2 Service Building) is not subject to a harsh post-accident environment either thermally or radiologically.
 - b. The hydrogen analyzers are not actually credited with mitigating any design bases accidents, and the BVPS-2 UFSAR only describes them and are not discussed in the LOCA analysis of Section 15.6.5. More significantly, both the Safety Evaluation Report for BVPS-2 TS Amendment 142 (Elimination of Hydrogen Recombiners) and the LRM 3.3.13 Bases both note that the analyzers are only used in a beyond design bases (BDB) LOCA with significant core uncovering.
3. Since neither the probability of an accident nor the likelihood of mitigation equipment malfunction has increased, the calculated exclusion area boundary and control room doses resulting from a DBA LOCA remain the same.
4. Since there are no changes to systems that constitute accident initiators there is no probability for an accident of a different type.
5. An engineering change package is installing safety related, seismic fuses in the 2HCS-PNL-100A and B control panels in series with the existing Class-1 E 120VAC supply breakers, which will meet the isolation requirements of NRC Regulatory Guide 1.75, Rev. 2. Although, as stated in 2.a. above, there are no stressors that would cause the power supplies to fail, even if such failure is postulated. The dual isolation prevents any potential electrical fault from propagating back to the 120VAC E-1 and E-2 power supplies. Therefore, there is no potential for an accident of a different type.
6. Based on the above discussion this change does not directly or indirectly affect a fission product barrier.
7. This change, as a reclassification enabling an equivalent replacement with an attendant physical change, does not involve any design analysis or analytical methodology.

Therefore, no license amendment request is needed for this change.