UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 6, 2023

Mr. Barry N. Blair
Site Vice President
Energy Harbor Nuclear Corp.
Beaver Valley Power Station
Mail Stop P-BV-SSB
P.O. Box 4, Route 168
Shippingport, PA 15077-0004

SUBJECT: BEAVER VALLEY POWER STATION, UNIT 1 – ISSUANCE OF AMENDMENT NO. 319 RE: CHANGE TO CERTAIN TECHNICAL SPECIFICATIONS TO ADD A NOTE ALLOWING A ONE-TIME USE OF AN ALTERNATE MANUAL FLOW PATH TO SUPPORT REPAIR OF A LEAK **(EMERGENCY CIRCUMSTANCES)** (EPID L-2023-LLA-0027)

Dear Mr. Blair:

The U.S. Nuclear Regulatory Commission (NRC or the Commission) has issued the enclosed Amendment No. 319 to Renewed Facility Operating License No. DPR-66 for the for the Beaver Valley Power Station, Unit No. 1. The amendment consists of changes to the technical specifications (TS) in response to your application dated March 1, 2023, as supplemented by two letters dated March 4, 2023.

The amendment modifies TS 3.5.2 “ECCS [emergency core cooling system] – Operating,” Limiting Condition for Operation (LCO) 3.5.2, to add a note allowing a one-time, time limited (36 hours), use of an alternate manual flow path to support repair of a leak in the main flow path.

The license amendment is issued under emergency circumstances as provided in the provisions of paragraph 50.91(a)(5) of Title 10 of the *Code of Federal Regulations* due to the time-critical nature of the amendment. In this instance, an emergency situation exists in that the amendment is needed to allow the licensee to avoid a plant shutdown.

The NRC’s related safety evaluation is also enclosed. The safety evaluation describes the emergency circumstances under which the amendment is issued and the final no significant hazards determination. A Notice of Issuance addressing the final no significant hazards

determination and opportunity for a hearing associated with the emergency circumstances will be included in the Commission's monthly *Federal Register* notice.

Sincerely,

/RA/

Sujata Goetz, Project Manager
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-334

Enclosures:
1. Amendment No. 319 to DPR-66
2. Safety Evaluation

cc: Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

ENERGY HARBOR NUCLEAR CORP.

ENERGY HARBOR NUCLEAR GENERATION LLC

DOCKET NO. 50-334

BEAVER VALLEY POWER STATION, UNIT NO. 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 319
Renewed Facility Operating License No. DPR-66

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

A. The application for amendment by Energy Harbor Nuclear Corp.* acting on its own behalf and as agent for Energy Harbor Nuclear Generation LLC (the licensee), dated March 1, 2023, as supplemented by two letters dated March 4, 2023, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I

B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

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*Energy Harbor Nuclear Corp. is authorized to act as agent for Energy Harbor Nuclear Generation LLC and has exclusive responsibility and control over the physical construction, operation, and maintenance of the facility.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-66 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 319, are hereby incorporated in the renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented immediately.

FOR THE NUCLEAR REGULATORY COMMISSION

Hipolito J. Gonzalez

Digitally signed by Hipolito J. Gonzalez
Date: 2023.03.06 16:13:25 -05'00'

Hipólito J. González, Chief
Plant Licensing Branch 1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Renewed Facility Operating License and Technical Specifications

Date of Issuance: March 6, 2023

ATTACHMENT TO LICENSE AMENDMENT NO. 319

BEAVER VALLEY POWER STATION, UNIT NO. 1

RENEWED FACILITY OPERATING LICENSE NOS. DPR-66

DOCKET NO. 50-334

Replace the following page of the License with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove Page	Insert Page
Page 3	Page 3

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages	Insert Pages
3.5.2-1	3.5.2-1
3.5.2-2	3.5.2-2
3.5.2-3	3.5.2-3

(3) Energy Harbor Nuclear Corp., pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(4) Energy Harbor Nuclear Corp., pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use in amounts as required any byproduct, source, or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components;

(5) Energy Harbor Nuclear Corp., pursuant to the Act and 10 CFR Parts 30, 40, and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter 1: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

Energy Harbor Nuclear Corp. is authorized to operate the facility at a steady state reactor core power level of 2900 megawatts thermal.

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 319, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

(3) Auxiliary River Water System

(Deleted by Amendment No. 8)

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS - Operating

LCO 3.5.2 Two ECCS trains shall be OPERABLE.

- NOTES -

1. In MODE 3, both low head safety injection pump flow paths may be isolated by closing the isolation valves for up to 2 hours to perform pressure isolation valve testing per SR 3.4.14.1.

2. In MODE 3, one of the required charging pumps may be made incapable of injecting to support transition into or from the Applicability of LCO 3.4.12, "Overpressure Protection System (OPPS)," for up to 4 hours or until the temperature of all RCS cold legs exceeds the OPPS enable temperature specified in the PTLR plus 25°F, whichever comes first.

3. For Unit 1 only. In MODE 3, the ECCS automatic high head safety injection (HHSI) flow path may be isolated to support transition into or from the Applicability of LCO 3.4.12, "Overpressure Protection System (OPPS)" for up to 4 hours or until the temperature of all RCS cold legs exceeds the OPPS enable temperature specified in the PTLR plus 25°F, whichever comes first.

4. For Unit 1 only. One ECCS train may use an alternate manual flow path on a one-time basis not to exceed 36 hours while the compensatory measures described in Section 3.3 of Energy Harbor Nuclear Corp. letter L-23-073, dated March 1, 2023, are implemented, if not otherwise inoperable. This allowance expires at 2400 EDT on April 7, 2023.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more trains inoperable.	A.1 Restore train(s) to OPERABLE status.	72 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	6 hours 12 hours
C. Less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.	C.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE				FREQUENCY
SR 3.5.2.1	Verify the following valves are in the listed position with power to the valve operator control circuit removed.			In accordance with the Surveillance Frequency Control Program
	For Unit 1 only			
	Number	Position	Function	
	MOV-1SI-890A	Closed	Low head safety injection (LHSI) to Hot Leg	
	MOV-1SI-890B	Closed	LHSI to Hot Leg	
	MOV-1SI-890C	Open	LHSI to Cold Leg	
	MOV-1SI-869A	Closed	HHSI Pump to Hot Leg	
	MOV-1SI-869B	Closed	HHSI Pump to Hot Leg	
	For Unit 2 only			
	Number	Position	Function	
	2SIS*MOV8889	Closed	LHSI to Hot Legs	
	2SIS*MOV869A	Closed	HHSI to Hot Leg	
	2SIS*MOV869B	Closed	HHSI to Hot Leg	
	2SIS*MOV841	Open	HHSI to Cold Leg	
	2CHS*MOV8132A	Open	HHSI Pump Discharge Cross Connect	
	2CHS*MOV8132B	Open	HHSI Pump Discharge Cross Connect	
	2CHS*MOV8133A	Open	HHSI Pump Discharge Cross Connect	
	2CHS*MOV8133B	Open	HHSI Pump Discharge Cross Connect	

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.2.2	Verify the HHSI pump minimum flow valve is open with power to the valve operator removed.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.3	Verify each ECCS manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.4	Verify each ECCS pump's developed head at the test flow point is greater than or equal to the required developed head.	In accordance with the INSERVICE TESTING PROGRAM
SR 3.5.2.5	Verify each ECCS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.6	Verify each ECCS pump starts automatically on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 319

TO RENEWED FACILITY OPERATING LICENSE NO. DPR-66

ENERGY HARBOR NUCLEAR GENERATION LLC

DOCKET NO. 50-334

1.0 INTRODUCTION

1.1 Background

By letter dated March 1, 2023, (Agencywide Documents Access and Management System (ADAMS)) Accession No. ML23060A018, as supplemented by letters dated March 4, 2023 (ML23063A144 and ML23063A146), Energy Harbor Nuclear Corp. (the licensee) submitted an emergency license amendment request (LAR) for changes to the Beaver Valley Power Station (Beaver Valley), Unit 1, technical specifications (TS), which are in Appendix A of the Beaver Valley Renewed Facility Operating License No. DPR-66.

The proposed changes would modify Beaver Valley, Unit 1, TS 3.5.2, “ECCS [emergency core cooling system] – Operating,” Limiting Condition for Operation (LCO) 3.5.2, to add a note allowing a one-time, time limited (not to exceed 36 hours), use of an alternate manual flow path to support repair of a leak. In its application, the licensee requested that the U.S. Nuclear Regulatory Commission (NRC or the Commission) process the proposed amendment under emergency circumstances.

1.2 Description of the Emergency Core Cooling System Design Basis and Technical Specifications

Engineered safety features (ESF), together with the containment system, serve as protection to the public in the unlikely event of a loss-of-coolant accident (LOCA). One of the ESF is the emergency core cooling system (ECCS). Beaver Valley, Unit 1, updated final safety analysis report (UFSAR), section 6.3.1.1, states that the purpose of the ECCS is to cool the reactor core and provide additional shutdown capability for analyzed accident sequences including pipe breaks, and spurious relief or safety valve lifting in the reactor coolant system (RCS) which cause a discharge larger than that which can be made up by the normal charging system, up to and including the rupture of the largest pipe in the RCS so fuel damage does not occur. Section 6.3.2 of the UFSAR describes the automatic operation of the ECCS in the event of a LOCA to provide reactor core cooling through two parallel paths to the reactor coolant system.

1.3 Description of the Proposed Changes

The licensee discovered a leak from an ECCS boron injection tank relief valve on February 12, 2023. To allow repair of the leak, the normal ECCS injection flow path must be isolated. The licensee proposed in its LAR, as supplemented, to establish an alternate flow path for the ECCS trains through a normally closed motor-operated valve (MOV) which does not open automatically on safety injection signal. Operators would be required to manually open the valve either from the control room or locally at the valve itself. Specifically, the licensee requested a corresponding change to add LCO 3.5.2, Note number 4 stating:

> 4. For Unit 1 only. One ECCS train may use an alternate manual flow path on a one-time basis not to exceed 36 hours while the compensatory measures described in Section 3.3 of Energy Harbor Nuclear Corp. Letter L-23-073, dated March 1, 2023, are implemented, if not otherwise inoperable. This allowance expires at 2400 EDT on April 7, 2023.

2.0 REGULATORY EVALUATION

2.1 Regulatory Requirements

Regulation in 10 CFR 50.34(b), Final safety analysis report, states in part:

> Each application for an operating license shall include a final safety analysis report. The final safety analysis report shall include information that describes the facility, presents the design bases and the limits on its operation, and presents a safety analysis of the structures, systems, and components and of the facility as a whole, and shall include the following:
>
> (2) A description and analysis of the structures, systems, and components of the facility, with emphasis upon performance requirements, the bases, with technical justification therefore, upon which such requirements have been established, and the evaluations required to show that safety functions will be accomplished. The description shall be sufficient to permit understanding of the system designs and their relationship to safety evaluations.

Regulation in 10 CFR 50.36(c)(2)(i) states in part:

> Limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met.

Regulation in 10 CFR 50.55a(b)(3)(ii), OM condition: Motor-Operated Valve (MOV) testing, states in part:

> Licensees must comply with the provisions for testing MOVs in ASME OM Code, ISTC 4.2, 1995 Edition with the 1996 and 1997 Addenda, or ISTC-3500, 1998 Edition through the latest edition and addenda incorporated by reference in

> paragraph (a)(1)(iv) of this section and must establish a program to ensure that MOVs continue to be capable of performing their design basis safety functions.

Regulation in 10 CFR 50.55a(f)(4), Inservice testing standards requirement for operating plants, states in part:

> Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, pumps and valves that are within the scope of the ASME OM Code must meet the inservice test requirements (except design and access provisions) set forth in the ASME OM Code and addenda that become effective subsequent to editions and addenda specified in paragraphs (f)(2) and (3) of this section and that are incorporated by reference paragraph (a)(1)(iv) of this section, to the extent practical within the limitations of design, geometry, and materials of construction of the components.

Beaver Valley, Unit 1, is designed to the 1967 Atomic Energy Commission General Design Criteria (GDC) as noted in the Beaver Valley UFSAR section 1.3.2, “General Design Criteria.” UFSAR Appendix A, “Quality Assurance,” provides a discussion of the degree of conformance to the general design criteria published as regulations in 10 CFR Part 50, Appendix A, “General Design Criteria for Nuclear Power Plants,” in 1971.

Appendix A to 10 CFR Part 50, “General Design Criteria for Nuclear Power Plants,” criterion 35, “Emergency core cooling,” states:

> A system to provide abundant emergency core cooling shall be provided. The system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented and (2) clad metal-water reaction is limited to negligible amounts.
>
> Suitable redundancy in components and features, and suitable interconnections, leak detection, isolation, and containment capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure.

NUREG-1764, Revision 1, “Guidance for the Review of Changes to Human Actions,” (ML072640413) provides review guidance for human performance aspects of licensing actions.

NUREG-0800, “Standard Review Plan,” Chapter 18, attachment A, “Guidance for Evaluating Credited Manual Operator Actions,” Revision 3 (ML16125A114) provides review guidance specific to the evaluation of manual operator actions.

Regulatory Guide (RG) 1.174, “An Approach for Using Probabilistic Risk Assessment [PRA] in Risk- Informed Decisions on Plant-Specific Changes to the Licensing Basis,” Revision 3, January 2018 (ML17317A256), describes an acceptable method for licensees and the NRC to use for assessing the nature and impact of proposed changes to the licensing basis by considering engineering issues and applying risk insights. This regulatory guide also provides risk-acceptance guidelines for evaluating the results of such evaluations.

RG 1.177, “An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications,” Revision 1, May 2011 (ML100910008), describes methods acceptable to the NRC for assessing the nature and impact of proposed permanent TS changes, including allowed outage times, by considering engineering issues and applying risk insights. This regulatory guide also provides risk-acceptance guidelines for evaluating the results of such assessments.

3.0 TECHNICAL EVALUATION

3.1 Risk Evaluation

3.1.1 Licensee’s PRA Analysis

In its LAR, the licensee provided a risk assessment of the impact of implementing an emergency one-time change to Technical Specification 3.5.2 “ECCS – Operating”. The change to the TS would allow the removal of the normal safety injection alignment from service, and, in the event of a LOCA, the use of an alternate flow path through motor-operated valve MOV-1SI-836. The valve MOV-1SI-836 is not actuated automatically but must be opened by operator action, which introduces human event probabilities into the risk assessment. The licensee requested a duration of 36 hours for this one-time TS change.

The licensee provided the results of its risk assessment for this one-time TS change in support of the LAR. The licensee did not request that this TS change be evaluated as a risk-informed action, which would entail an evaluation of the licensee’s probabilistic risk assessment of record against RG 1.200. However, in its assessment, the licensee considered the acceptance guidelines specific to one-time only completion time (CT) changes, as outlined in section 2.4 of RG 1.177. These guidelines state, in part

a. The licensee has demonstrated that implementation of the one-time only TS CT change impact on plant risk is acceptable (Tier 1):

    1. ICCDP (incremental conditional core damage probability) of less than 1.0x10-6 and an ICLERP (incremental conditional large early release frequency) of less than 1.0x10-7, or
    2. ICCDP of less than 1.0x10-5 and an ICLERP of less than 1.0x10-6 with effective compensatory measures implemented to reduce the sources of increased risk.

b. The licensee has demonstrated that there are appropriate restrictions on dominant risk significant configurations associated with the change (Tier 2).

In addition to the valve alignment, as described by the LAR, the licensee provided additional compensatory measures to maintain a defense-in-depth posture. Three of these compensatory actions are noted below:

- Continuous fire watches in two fire compartments, 1-CR-4, Process Instrumentation Room, and 1-ES-1, Train A, Emergency Switchgear Room. No hot work will be permitted in these fire compartments.

- Dedicated Reactor Operator to open MOV-1SI-836 in the control room if a safety injection is required.
- Dedicated field operator located in the Safeguards Building (West Cable Vault) in proximity to valve MOV-1SI-836, available to locally open the valve manually if required.

The licensee stated it used its most recent PRA model of record (BV1REV8), issued January 5, 2023, to calculate the ICCDP and ICLERP for the base case configuration and other postulated configurations. The licensee stated in its LAR, that the risk assessment is specifically focused on ICCDP because it was the limiting metric and because all ICLERP results were consistent with ICCDP. The base case configuration is as described by the Note in the one-time revised TS, that is, the closure of safety injection valves 1SI-867A, 1SI867B, 1SI867C, and 1SI867D to isolate the normal safety injection (SI) path, and the energizing of MOV-1SI-836 to make available the alternate safety injection flow path. The licensee stated that nominal values for human event probability from the model were used in this risk estimate. The ICCDP for this base case scenario was calculated to be 5.00E-7 for the requested 36-hour duration.

In addition, the licensee calculated the ICCDP for three sensitivity cases accounting for varying probabilities of success. Sensitivity Case 1 assumes guaranteed success of the operator action to open the valve to the alternate flow path. The ICCDP for Sensitivity Case 1 was calculated to be 3.24E-07 over the 36-hour duration. Sensitivity Case 2 takes some credit for the two dedicated operators to open valve MOV-1SI-836 by reducing the human event probability. The calculated ICCDP for Sensitivity Case 2, is 3.25E-07 over the 36-hour duration. Sensitivity Case 3 is considered the worst-case bounding scenario that assumes guaranteed failure to open valve MOV-1SI-836. The calculated ICCDP for Sensitivity Case 3 is 3.74E-06 over the 36-hour duration.

3.1.2 Technical Conclusion

The NRC staff evaluated the risk results for the base case configuration and sensitivity scenarios as compared to the acceptance guidelines described in RG 1.177. The staff also evaluated the top contributors to the risk as listed in the Attachment 5 of the LAR.

Over 90 percent of the risk increase associated with the proposed plant configuration is dominated by fire scenarios that may result in a LOCA. As explained in the LAR, the risk increase associated with the proposed plant configuration is dominated by fire scenarios in which a LOCA may result, whether by spurious opening of a PORV (power operated relief valve), a valid PORV demand with failure to properly re-close, fire induced failure of PORVs to open, resulting in challenging a primary safety valve which fails to re-close, failure of reactor coolant pumps seal injection and shutdown seals with a resultant reactor coolant pump seal LOCA, etc. Therefore, the NRC staff requested additional information on the licensee's fire PRA model and the associated risk insights.

In the LAR, the licensee stated that the fire PRA model was developed to the state of the art in order to support the NFPA-805 fire protection licensing basis, issued by letter dated January 22, 2018 (ML17291A081). By letter dated March 3, 2023, NRC staff issued a request for additional information (RAI) requesting an overview of any changes in the fire PRA model since the adoption of NFPA-805, a discussion of uncertainties associated with the fire PRA, and the licensee's rationale for selecting the risk sensitivity studies to the operator action in aligning the alternate injection path through MOV-1SI-836. In its response dated March 4, 2023, the licensee provided an overview of the changes to the fire PRA, which included several

peer-reviewed PRA upgrades and minor modeling updates. The licensee also provided a review of uncertainties associated with the fire PRA and a qualitative discussion on how these uncertainties may impact the risk results. The staff finds that the licensee's response provides reasonable confidence that the fire PRA, as relates to this one-time TS action, is sufficient and can reasonably support the risk calculations for this one-time TS action.

In addition to risk metrics, the licensee also provided an overview of risk insights. The LAR identified and discussed top fire risk contributors as fire scenario in fire compartment 1-CR-4 (process instrumentation room) and fire scenarios in fire compartment 1-ES-1 (Train A, Emergency Switchgear Room). The LAR also proposed compensatory measures associated with these risk scenarios, including continuous fire watches and no hot work permitted in the fire compartments 1-CR-4 and 1-ES-1. In the RAI response dated March 4, 2023, the licensee confirmed the fire risk is dominated by fires in compartments 1-CR-4 and 1-ES-1 comprising over 81 percent of the total change in core damage frequency (CDF). The licensee stated that compensatory actions should remain focused on the highest risk factors, and that the next highest three risk contributors, comprising 13.1 percent of total change in CDF, have low overall impact compared to compartments 1-CR-4 and 1-ES-1, where compensatory actions are being taken. The NRC staff finds this rationale acceptable.

The NRC staff finds that the licensee's base case and three sensitivity studies adequately capture the risk scenarios associated with the one-time TS action requested in the licensee submittal. The calculated ICCDP values during the 36-hour duration of the TS change for the base case, Sensitivity Case 1, Sensitivity Case 2, where opening of the alternate safety injection path is credited, are lower than ICCDP of 1.00E-06 required to satisfy the acceptance guidelines in RG 1.177 and are therefore acceptable. Furthermore, the staff review of the MOV-1SI-836 functionality and the Human Factors discussed below in this safety evaluation (SE) adequately support crediting the alternate safety injection path in the risk analysis.

In addition, Sensitivity Case 3, which assumes failure to open MOV-1SI-836 and failure to open the alternate safety injection path, resulted in a calculated ICCDP of 3.74E-06 over the 36-hour duration of the TS change. This ICCDP is greater than the ICCDP of 1.00E-06 required to satisfy the acceptance guidelines in RG 1.177, but still below an accepted ICCDP value of 1.00E-05, provided effective compensatory measures are implemented. The information provided in the licensee submittal and supplement provides adequate confidence that the compensatory actions listed in the licensee submittal, when implemented, will be effective. Therefore, the ICCDP for Sensitivity Case three also meets the acceptance guidelines in RG 1.177 and is therefore acceptable. Thus, the NRC staff finds that the risk assessment provided by the licensee is acceptable and supports the proposed 36-hour duration of the one-time TS action.

3.2 Control Room Emergency Ventilation System

The licensee quantified the leakage from RV-1SI-857 on February 12, 2023, as equating to 16,800 cubic centimeter per hour (cc/hr), which exceeds the bounding UFSAR ECCS leakage limit stated in UFSAR Section 14.3.5.2 of 11,400 cc/hr used for the radiological dose to the control room (that is common to Beaver Valley, Units 1 and 2) causing both units to enter TS LCO 3.7.10. The licensee implemented immediate actions with both units isolating the control room dampers and monitoring the leak degradation daily. As a mitigating action, an engineering evaluation report was approved, which provides a revised ECCS leakage limit of 45,600 cc/hr. This additional analysis credited a supplementary leak collection and release system being in operation. This revised ECCS leakage limit satisfies the 24-hour action for LCO 3.7.10

Condition B, Required Action B.2, but does not support control room envelope operability. As such, the 90-day completion time for LCO 3.7.10 Required Action B.3 to restore the control room envelope boundary to operable status still applies and will expire on May 13, 2023. The licensee states that the repair of the leak would restore the control room envelope boundary to operable status and allow TS LCO 3.7.10 to be met for both Units and the associated actions to be exited.

3.2.1 Technical Conclusion

The NRC staff determined that the proposed plan to repair the leak is acceptable because it will allow restoring the control room envelope boundary to operable status, and thus, enable both units to meet the LCO as consistent with the regulatory requirements of 10 CFR 50.36(c)(2).

3.3 Motor-Operated Valve MOV-1SI-836 Functionality

In the Beaver Valley Emergency LAR, the licensee proposed a new safety function for the MOV-1SI-836 actuator to open the valve to provide an alternate ECCS pathway during the short-term repair activities for the boron injection tank (BIT) relief valve.

The NRC regulations in 10 CFR 50.55a(f)(4) specify the overall requirements for licensees of operating nuclear power plants to meet the inservice testing (IST) program requirements in the applicable editions and addenda of the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code) as incorporated by reference in 10 CFR 50.55a. The code of record for the Beaver Valley IST Program is currently the 2004 Edition through the 2006 Addenda of the ASME OM Code. In addition to meeting the IST program requirements of the ASME OM Code as incorporated by reference in 10 CFR 50.55a, the NRC regulations in 10 CFR 50.55a(b)(3)(ii) require that licensees must establish a program to ensure that MOVs continue to be capable of performing their design basis safety functions. The LAR proposed to modify the safety function of MOV-1SI-836, high head signal injection (HHSI) to RCS Cold Leg Isolation Valve, in the licensing basis for the ECCS described in the Beaver Valley UFSAR.

The LAR in Section 3.3, “Compensatory Measures,” under “Alternate SI Alignment with LCO 3.5.2, Note 4 Invoked” states in Item 3 the following:

> MOV-1SI-836 will remain energized and closed. MOV-1SI-836 will be available and operable, and capable of being opened manually via control switch on control room bench board. An extra, dedicated Reactor Operator will be assigned to this task as described in Section 3.1. In the event that MOV-1SI-836 fails to stroke, an extra, dedicated operator will be assigned to locally manually open MOV-1SI-836. Actions required to establish and verify the alternate SI flow path will be governed by a site procedure.

On March 3, 2023, the NRC staff provided an RAI to the licensee to obtain additional information regarding the capability of MOV-1SI-836 to perform the safety function proposed in the Beaver Valley Emergency LAR. The licensee responded with supplemental information provided in two letters dated March 4, 2023. The licensee provided the following information relevant to the LAR:

In the event that the ECCS is needed in response to a plant event, the licensee will initially attempt to open the normally closed MOV-1SI-836 from the control room using the electric

switch. In the event that MOV-1SI-836 fails to open by the control room switch, the licensee will have a dedicated reactor operator stationed near MOV-1SI-836 in the plant to deenergize the motor and manually open the valve using the handwheel attached to the actuator.
The Beaver Valley IST Program Plan dated October 10, 2017, (ML17289A214) specifies that MOV-1SI-836 is a normally closed 3-inch motor-operated gate valve with required stroke-time testing open and closed every cold shutdown or refueling outage, and leak testing and remote position verification every 2 years. The IST Program Plan also indicates that diagnostic testing in the open direction is performed every three refueling outages per ASME OM Code Case OMN-1, "Alternative Rules for Preservice and Inservice Testing of Active Electric Motor Operated Valve Assemblies in Light-Water Reactor Power Plants." The licensee reported that the tests specified in Code Case OMN-1 were most recently performed during the spring 2016 and fall 2021 refueling outages at Beaver Valley. Based on past good performance of the valve, the licensee stated that Beaver Valley obtained NRC authorization through a previous request to perform the valve leak testing on an extended frequency with the most recent test performed in October 2022. The NRC staff confirmed that the referenced Alternative Request VRR4 for Beaver Valley was authorized on July 16, 2020 (ML20153A014) allowing an extended leak testing frequency for several valves (including MOV-1SI-836) based on their excellent performance history in accordance with 10 CFR 50.55a(z)(2).

The licensee reported that an open capability evaluation for MOV-1-SI-836 was performed in April 2021 using diagnostic test data. Based on the test data, the licensee asserted that MOV-1SI-836 was determined to have high margin without any test anomalies. To support this information, the licensee submitted on March 4, 2023, the following documents: (1) Calculation No. 8700-DMC-2722 (Revision 8, October 1, 2007), "Torque Calculations for MOV-1SI-836," and (2) Beaver Valley Work Order 200790758 (April 26, 2021), "Margin Assessment (Test Frequency Determination) and Trending for MOV-1SI-836." The MOV-1SI-836 Torque Calculation provides an opening capability evaluation for MOV-1SI-836, including assumptions for such parameters as differential pressure, valve friction coefficient, stem friction coefficient, degraded voltage, and weak link. Work Order 200790758 provides the results of the most recent and previous diagnostic tests of MOV-1SI-836. The information in the MOV-1SI-836 Torque Calculation and Work Order 200790758 supports the licensee's assertion that MOV-1SI-836 has significant capability margin in the valve opening direction.

The licensee reported that MOV-1SI-836 was dynamically tested with diagnostics in February 1995 as its qualifying basis as part of the Beaver Valley program in response to NRC Generic Letter (GL) 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance." The licensee stated that the dynamic test results indicated positive capability margin for MOV-1SI-836. The licensee also stated that MOV-1SI-836 is stroked under dynamic conditions without diagnostics during the HHSI full flow test each refueling outage every 18 months.

The licensee reported that MOV-1SI-836 is a flexwedge gate valve and that MOV-1SI-836 has been evaluated for the potential for pressure locking and thermal binding. Based on the operating conditions, the licensee determined that the valve is not susceptible to these phenomena.

The licensee stated in its LAR, that MOV-1SI-836 was operated electrically from the control room in October 2022 during refueling outage 28. The licensee reported that MOV-1SI-836 had been operated with the handwheel under static conditions during the last static test and inspection in April 2021 during refueling outage 27.

Regarding the use of extension or cheater bars when operating an MOV actuator handwheel that might damage the actuator or valve, the licensee stated that the plant procedure that governs the process for maintaining plant status control does not allow the use of valve wrenches or extension devices on MOVs. Further, the licensee reported that no extension or cheater bars are allowed to be applied to any MOV handwheel at Beaver Valley.

The licensee reported that MOV-1SI-836 was most recently visually examined for stem nut wear, such as bronze shavings below the actuator and stem nut transition time changes, in April 2021 during the refueling outage 27 static testing and inspection. The licensee stated that the inspection did not identify any bronze shavings below the actuator, and transition times had no major changes that indicate stem nut wear. The licensee also noted that an examination of MOV-1SI-836 had been performed on November 2, 2022, during the most recent refueling outage. The licensee stated that no linear or crack-like indications were observed on MOV-1SI-836 during those examinations.

3.3.1 Technical Conclusion

Based on its review, the NRC staff has determined that the licensee has justified the capability of MOV-1SI-836 to perform the safety function proposed in the Beaver Valley Emergency LAR. The licensee has performed dynamic flow tests and conducted evaluations to demonstrate the capability margin for the actuator to open the valve under dynamic flow conditions. Since 2021 the licensee has exercised the valve via handwheel and under electric power, and has inspected the external condition of the valve without anomalies. The licensee operates MOV-1SI-836 under dynamic conditions each refueling outage. In the event that MOV-1SI-836 does not open using the control room switch, the licensee will have a dedicated Reactor Operator stationed near the valve to open this small 3-inch gate valve using the actuator handwheel, and plant procedures prohibit the use of extension or cheater bars that could cause damage to the actuator or valve when operating the handwheel of MOV actuators. Therefore, the NRC staff finds that the licensee has provided reasonable assurance that MOV-1SI-836 has sufficient capability for the actuator to open the valve to provide an alternate ECCS pathway if needed during the short-term repair activities described in the Beaver Valley Emergency LAR.

The NRC staff also finds that the proposed manual operator actions to open MOV-1SI-836 to provide safety injection, if necessary, during the time expected to complete the described leak repair, are feasible and reliable given the time available to perform the actions. The alternate flow path is the same safety class as the normal flow path and the alternate injection valve receives emergency power. Therefore, the proposed amendment does not involve a significant reduction in a margin of safety.

3.4 Emergency Core Cooling System

The NRC staff reviewed the proposed changes and actions for the license amendment request pertaining to the ECCS design criteria and requirements. The proposed actions affect the single failure criteria ECCS design conformance requirements of the Beaver Valley 1 UFSAR section 1.3.2 and 6.3.1.2. Specifically, the ECCS Single Active Failure Analysis (UFSAR Table 6.3-1) requirement C.1 for automatically operating valves during the safety injection signal (SIS) injection phase is not met for the duration of the proposed actions.

The submittal describes a station equipment alignment where the normal BIT outlet valves MOV-1SI-867C and MOV-1SI-867D are closed and deenergized for personnel safety to perform maintenance around a leaking BIT relief valve. The upstream BIT inlet manual gate valves SI-

867A and SI-867B which are normally locked open are also closed. These valves perform the ECCS function to automatically open on a SIS and deliver HHSI water to the RCS cold legs for the injection phase of a LOCA. Instead of using the BIT normal safety injection flow path, ECCS will be provided via the alternate safety injection flow path which is through a manually operated MOV-1SI-836. This valve does not respond to SIS and manual operator actions will be performed in lieu of automatic actions to ensure ECCS injection flow to the RCS cold legs upon receipt of a SIS. This proposed alignment does not maintain the single active failure criteria as the HHSI safety function can be defeated by a single active failure of MOV-1SI-836 to open manually.

In the licensee's response to the NRC staff RAI dated March 4, 2023, the licensee provided the following information regarding the ability to maintaining adequate safety protection in lieu of the single failure vulnerability of the proposed configuration:

a. What additional actions or measures can be taken to provide assurance that MOV-1SI-836 is operating properly during the proposed configuration?

   The licensee's response stated that online stroke testing is not feasible with the reactor operating because it would essentially be an inadvertent safety injection which would adversely affect reactivity management and other operational parameters. The licensee's response noted that there are multiple means of establishing HHSI through MOV 1-SI-836 if needed. First, the valve can be opened from the control room by operators taking the manual switch to open. Alternatively, the valve can be opened by locally declutching the motor and using the handwheel to operate the valve directly.

b. Providing additional information related to IST program performance and equipment history data regarding the availability and reliability of MOV-1SI-836.

   The licensee's response stated that the valve is stroked every 18 months during refueling outages and available data dating back to 1999 shows no issues with stroke testing. Other than routine preventive maintenance on the valve, the only adverse maintenance condition noted on the valve was a boric acid leak in 2004 that required repacking, but that condition did not affect stroking or the ECCS safety function of the valve.

c. What actions or recovery measures can be taken in response to a failure of MOV-1SI-836 in the proposed configuration.

The licensee's response stated that this condition is a loss of all HHSI subsystem function which is scenario which is currently analyzed within the emergency operating procedure (EOP) network and operators are already trained for. If an HHSI occurs during a small break LOCA where pressure remains above the low head safety injection low-head safety injection (LHSI) shutoff head, then operators will use EOP FR-C.1, Response to Inadequate Core Cooling, to cool the RCS using the steam generators, and by depressurizing the steam generators, RCS pressure will also be reduced to below the LHSI shutoff head pressure allowing the ECCS cooling function to be accomplished with the LHSI and Accumulator SI subsystems as necessary .

3.4.1 Technical Conclusion

The NRC staff concluded that although the single failure criteria is not maintained in the proposed configuration, adequate safety protection exists because historical reliability data for the alternate ECCS flow path MOV-1SI-836 show a very low likelihood of failure, consistent with the PRA sensitivity case 2 provided in the licensee's submittal. The staff also determined that even if the unlikely failure of MOV-1SI-836 occurred, while it would result in a failure of the HHSI subsystem function which is the primary means of mitigating a small break LOCA event, that additional mitigating strategies to depressurize the RCS to LHSI pressure remain available with a reasonable expectation of preventing further adverse consequences such as core damage.

3.5 Human Factors

3.5.1 Description of the Operator Manual Action

The licensee's LAR dated March 1, 2023, proposed a one-time use of manual operator actions to establish an alternate manual flow path to support repair of a leak in the ECCS. The alternate flow path would enable the initial safety injection mode upon receipt of a SIS with the normal flow path isolated to repair the leak. Section 2.4 of the March 1,2023, LAR, "Description of the Proposed Change," states that the duration of the repair is expected to be no more than 24 hours.

Establishing the alternate flow path requires manual opening of valve MOV-1SI-836. This valve is manually opened from the control room bench board and the manual action to open the valve would be accomplished by a dedicated reactor operator following the receipt of an automatic SIS or a manual safety injection from the control room. An additional, dedicated operator will be stationed locally to manually open valve MOV-1SI-836 if the valve fails to stroke from the control room.

The NRC staff reviewed the human performance aspects of licensing action requests utilizing guidance in NUREG-1764, Revision 1, "Guidance for the Review of Changes to Human Actions" (ML072640413). NUREG-1764 describes human factors reviews as Level I (high risk) or Level II (medium risk) with the possibility of reduction to a Level III (low risk) review, if appropriate. NUREG 1764, Rev. 1, Section 2.4, "Screening Process for Non-Risk-Informed Change Requests," and Table A.2, "Generic PWR [Pressurized Water Reactor] Human Actions That are Risk-Important," and "Group 2: PWR Potentially Risk-Important Human Actions" includes actions involving the risk-important systems.

The licensee's submittal dated March 1, 2023, proposes new manual operator actions associated with a risk-important system (i.e., ECCS –HHSI). In addition, attachment 5 of the March 1, 2023, LAR, provided risk information in support of the requested one-time amendment, and stated that it is low risk as compared to RG 1.77 criteria. This result is partially dependent on the feasibility and reliability of the proposed manual actions to open valve MOV-1SI-836. Therefore, the NRC staff concludes that the proposed actions are considered potentially risk--important, and a Level II human factors review is appropriate.

3.5.2 General Deterministic Review

Section 2.4. "Description of the Proposed Change," in the LAR dated March 1, 2023, describes that the proposed manual actions to open MOV-1SI-836 would support establishing an alternate SI flow path. The normal flow path would be isolated to facilitate the repair on the leaking

RV-1SI-857 boron injection tank relief valve with the plant remaining in Mode 1. The licensee estimates that the repair activity will take no more than 24 hours to complete and includes a restriction of 36 hours based on a determination that PRA analysis shows a 72-hour low-risk duration.

The interconnecting subsystem design of the ECCS, described in Section 2.1, “System Design and Operation,” in the LAR dated March 1, 2023, describes that the interconnecting subsystem design of the ECCS allows the use of components from opposite trains to be utilized to provide the alternate safety injection flow path proposed. HHSI injection line throttle valves are set to balance flow to the RCS and ensure sufficient flow to the reactor core. Additionally, per the NRC evaluation above, the NRC staff has determined that the licensee has justified the capability of MOV-1SI-836 to perform the safety function proposed in the Beaver Valley Emergency LAR. In particular, the licensee prepared an evaluation of MOV-1SI-836 in 2007 that demonstrated the capability margin for the actuator to open the valve under dynamic flow conditions.

Section 3.3, “Compensatory Measures,” in the LAR dated March 1, 2023, describes compensatory actions that will be established during the repair activity. These compensatory actions include the following:

- MOV-1SI-867C and MOV-1SI-867D will be closed and the power supply for the valves will be deenergized such that they will not open on a SIS. These valves will serve as a clearance boundary for repair of RV-1SI-857.

- Normally locked open valves 1SI-867A and 1SI-867B will be closed and will serve as a clearance boundary for repair of RV-1SI-857.

- MOV-1SI-836 will be maintained available and operable while energized and closed. The proposed manual action to open this valve manually from either the control room or locally is being established by the licensee as a compensatory action for the repair activity.

- Additional compensatory actions including equipment and work controls, as well as fire watches, will be established.

The licensee’s submittal demonstrates that the plant configuration is designed such that the proposed alternate safety injection flow path can be established, and the repair activity is limited to a time frame that is consistent with assessments of plant risk. Compensatory actions are specified to maintain the integrity of the alternate flow path. The NRC staff concludes that the proposed establishment of the alternate flow path for the duration of the repair activity is feasible and will maintain the safety injection function provided that the operator manual actions to open MOV-1SI-836 upon a SIS are feasible and reliable. The feasibility and reliability of the proposed manual actions is evaluated below.

3.5.3 Technical Analysis

NUREG-0800, “Standard Review Plan,” Chapter 18, Attachment A, “Guidance for Evaluating Credited Manual Operator Actions,” Revision 3 (ML16125A114), provides review guidance specific to the evaluation of manual operator actions. The guidance includes two criteria to analyze the time available and time required for manual operator actions:

- The time available to perform the required manual actions is greater than the time required for the operator(s) to perform the actions.

- The operator(s) can perform the actions correctly and reliably in the time available.

The licensee’s supplemental response dated March 4, 2023, stated that, per the Beaver Valley UFSAR, accident analysis assumes that the HHSI system will deliver water to the RCS 27 seconds after an SIS. This is the required time for signal processing and automatic actuation of plant systems and components. However, the supplement described the analytical time required for safety injection to the RCS and modeled in the PRA analyses as 58 minutes to mitigate a small-break LOCA and 21 minutes for a medium-break LOCA. The HHSI system is not credited in the accident analyses for large-break LOCA. Therefore, the most limiting available time for the operators to perform the manual actions to open MOV-1SI-836 and provide safety injection to the RCS via the HHSI system is established at 21 minutes.

The March 4, 2023, supplement reported a total time to manually open MOV-1SI-836 from the control room and verify safety injection flow as 12 seconds as validated by simulator validation. The total time required for local manual actuation to open MOV-1SI-836 was reported as 3 minutes as derived from previous operator validations to manually operate the valve and estimates for time to traverse from the local power supply to the valve. Local manual actuation would be initiated should actuation from the control room fail to open MOV-1SI-836. This failure would be apparent when control room verification of safety injection flow could not be obtained 12 seconds after the control room receives the SIS. Therefore, the most limiting required operator manual action time to open MOV-1SI-836 and provide safety injection flow is 3 minutes and 12 seconds, associated with local manual actuation of the valve.

The March 4, 2023, supplement stated that a dedicated reactor operator will be assigned to perform the control room manual actuation of MOV-1SI-136 by taking the board switch to open when the need for safety injection is indicated. Four separate control room annunciators and indicators will indicate the need for safety injection in the control room:

- A5-29 - Containment Pressure High Reactor Trip and Safety Injection

- A5-31: - Pressurizer Pressure Low Reactor Trip and Safety Injection

- Ab-13 – Low Steam Line Pressure Reactor Trip Safety Injection and Steam Line Isolation

- Negative RCS Pressure and Pressurizer Level Trends

No other tasks are required of the dedicated control room operator beyond operation of the MOV-1SI-836 control switch that is clearly defined and indicated on the bench board panel in the control room and subsequent verification of safety injection flow on control room flow

indicator FI-1SI-940. Should the valve fail to actuate from the control room, as described in the supplement, the designated operator stationed locally will be notified via an open, dedicated phone line. Notification of the local designated operator will be directed by an emergency operations procedure to be issued for the specific repair activity. A once per 15-minute check-in from the control room with the dedicated local designated operator will be performed throughout the duration of the repair activity to assure alertness and readiness to respond. Furthermore, the local designated operator will be stationed in the west cable vault which is a low dose, low noise, and low traffic area in the proximity of the “A” penetrations room where MOV-1SI-836 is located.

The March 4, 2023, supplement describes four tasks required by the designated operator stationed locally to manually open MOV-1SI-836:

- Receive notification from the control room on the dedicated, open phone line.
- Open the electrical supply breaker in the west cable vault, where the designated operator is standing by, to remove power from the valve motor.
- Enter the “A” penetrations room and declutch the motor operator.
- Manually open the valve using the valve handwheel.

As described in the March 4, 2023, supplement, the designated control room reactor operator, and local operators will be directed to remain at their stations unless relieved by another designated operator that has been pre-briefed on the expectations.

The time available to perform the proposed manual operator actions is 21 minutes and the most limiting required manual operation action time is 3 minutes and 12 seconds. The available time is based on the most limiting LOCA scenario. This provides a margin of approximately 85 percent to perform the manual actions. The tasks are normal operator tasks for the respective actions and are uncomplicated and procedure driven. The control room actions were verified by simulator runs and the local manual action time was derived from previous operator validations to manually operate the valve and allowances for time to traverse from the local power supply to the valve. In addition, designated operators performing the tasks are dedicated solely to these tasks and environmental considerations as well as reliable communication issues are addressed. Therefore, the NRC staff concludes that the operators can perform the actions correctly and reliably in the time available with ample margin.

3.5.4 Design of Human System-Interfaces, Procedures, and Training

The proposed manual actions both in the control room and locally at MOV-1SI-836 described in the licensee’s supplemental response dated March 4, 2023, utilize the existing controls and equipment and the tasks are considered normal operator functions. The manual actions for both the control room and local dedicated operators will be directed by a standing order and an emergency operation procedure that will be issued for the specific repair activity. In addition, a pre-evolution brief will be conducted at the beginning of each shift detailing the required roles and responsibilities. The proposed operator manual actions are one-time, limited-duration actions to support the repair of a leak on the ECCS and continuing training is not required.

Therefore, the NRC staff concludes that no new human system- interfaces are required or will used to perform the manual actions and that the procedures and instruction provided to the operators supports the feasibility and reliability of the manual operator actions.

3.5.5 Human Action Verification

The licensee's supplemental response dated March 4, 2023, described the simulator run conducted to validate the control room manual actions to open MOV-1SI-836 and provide safety injection flow. The simulator was set up in Mode 1 at 100 percent power with the alternate flow path established to repair the ECCS leak. With the designated operator stationed at the control room bench board, a 1,000 gallon-per-minute LOCA was inserted to the simulator. Operator action was not taken until the SIS setpoint was reached and alarmed on annunciator A5-31 – Pressurizer Pressure Low Reactor Trip and Safety Injection. The dedicated control room operator was then initiated by the annunciator alarm to open MOV-1SI-836 at the bench board and verify safety injection flow on indicator FI-1SI-940. The timed sequence was as follows:

- Time = 0: safety injection annunciates.
- Time = + 5 seconds: MOV-1SI-836 is taken to open.
- Time = + 12 seconds: safety injection flow greater than 400 gallons per minute verified on indicator FI-1SI-940.

The licensee's supplemental response dated March 4, 2023, described the time required for local manual actuation to open MOV-1SI-836 as derived from previous operator validations to manually operate the valve and estimates for time to traverse from the local power supply to the valve. The assessment was based, in part, on previous timed validation simulations that demonstrated a time of 30 seconds to locally manually operate the 3-inch MOV-1SI-836 gate valve. Two minutes were allotted to disconnect the power supply in the vicinity of the operator's station and traverse to the location of MV-1SI-836. An additional 30 seconds was added to the required time for the local operator which accommodates task integration including receiving notification from a continuously manned open and dedicated phone line and initiating the local manual action. The total required time from notification to opening of MOV-1SI-836 was determined to be 3 minutes.

The NRC staff determined that the simulator run was designed with appropriate parameters and specific system configurations to verify the control room operator tasks associated with the proposed manual actions to actuate MOV-1SI-836 from the control room. The derivation of the local manual actuation required time utilized previous validation information and incorporated reasonable estimates for disconnecting the valve power supply and transit time to MOV-1SI-836. The results are consistent with expected times required to complete the tasks associated with the proposed local operator manual actions. Therefore, the NRC staff concludes that the simulator run, and local task derivation described in the licensee's supplemental response dated March 4, 2023, provides adequate human action validation of the proposed manual actions to actuate MOV-1SI-836 from the control room or locally and initiate safety injection flow under the proposed leak repair activities.

3.5.6 Human Factors Review Conclusion

Based on the human factors engineering review above, the NRC staff concludes that the proposed manual operator actions to open MOV-1SI-836 to provide safety injection, if necessary, during the time expected to complete the described leak repair, are feasible and reliable given the time available to perform the actions.

3.6 Technical Specification Conclusion

The proposed TS 3.5.2 LCO Note 4 allows a one-time use of an alternate manual flow path to support repair of a leak in the main flow path. The NRC staff determined that the regulatory requirements of 10 CFR 50.36(c)(2) will continue to be met because the modified LCO will continue to describe the lowest functional capability or performance level of equipment required for safe operation of the facility and the remedial actions permitted by the TSs until the LCO can be met. The compensatory actions included in the proposed TS 3.5.2 note provide reasonable assurance that the temporary alternate flowpath will not significantly affect plant safety because during the period the note is invoked, the ECCS will remain capable of mitigating the consequences of a design basis event such as a LOCA.

4.0 EMERGENCY SITUATION

The NRC's regulations in 10 CFR 50.91(a)(5) state that where the NRC finds that an emergency situation exists, in that failure to act in a timely way would result in derating or shutdown of a nuclear power plant, or in prevention of either resumption of operation or of increase in power output up to the plant's licensed power level, it may issue a license amendment involving no significant hazards consideration without prior notice and opportunity for a hearing or for public comment. In such a situation, the NRC will publish a notice of issuance under 10 CFR 2.106, providing for opportunity for a hearing and for public comment after issuance.

In the application letter dated March 1, 2023, the licensee requested that the NRC process the proposed amendment on an emergency situation basis. The licensee stated that mitigating actions and daily leak rate monitoring were conducted in accordance with the site procedure to collect RCS pressure boundary leakage. Despite additional torques on the valve, daily leakage values continued to increase toward the updated ECCS allowable leakage value. If this value was exceeded, it would require both Beaver Valley Unit 1 and 2 to enter LCO 3.7.10 Condition C requiring shutdown to Mode 5 in 36 hours and prompt isolation of the BIT relief valve. The isolation of the BIT relief valve would require Beaver Valley Unit 1 to enter LCO 3.5.2 Condition C, which would then require immediate entry into LCO 3.0.3. Without an emergency amendment, Beaver Valley, Unit 1, would need to shutdown to Mode 4 to install a blank flange on RV-1SI-857.

The NRC staff reviewed the licensee's basis for processing the proposed amendment as an emergency amendment (as discussed above) and determines that an emergency situation exists consistent with the provisions in 10 CFR 50.91(a)(5). Furthermore, the NRC staff determined that: (1) the licensee used its best efforts to make a timely application; (2) the licensee could not reasonably have avoided the situation; and (3) the licensee has not abused the provisions of 10 CFR 50.91(a)(5). Based on these findings, and the determination that the amendment involves no significant hazards consideration as discussed below, the NRC staff has determined that a valid need exists for issuance of the license amendment using the emergency provisions of 10 CFR 50.91(a)(5).

5.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION

The NRC's regulation in 10 CFR 50.92(c) states that the NRC may make a final determination, under the procedures in 10 CFR 50.91, that a license amendment involves no significant hazards consideration if operation of the facility, in accordance with the amendment, would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

As required by 10 CFR 50.91(a), by letter dated March 1, 2003, the licensee provide its analysis of the issue of no significant hazards consideration, which is presented below:

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   The proposed change allows a one-time use of an alternate manual flow path in the Emergency Core Cooling System (ECCS). The proposed change does not affect accident initiators or precursors. The ECCS will remain capable of adequately responding to a design basis event or transient during the period that the note is invoked. A probability risk assessment (PRA) was performed for this proposed change and determined that this has low risk.

   Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different accident from any accident previously evaluated?

   Response: No

   The function of ECCS is to cool the core as well as provide additional shutdown capability following an accident. ECCS operation is not a precursor for any accident listed in Chapter 14 of the Updated Final Safety Analysis Report. The proposed change allows a one-time use of an alternate manual flow path in the ECCS. The function of the ECCS is maintained during the period that the note is invoked.

   Therefore, the proposed amendment will not create the possibility of a new or different accident from any accident previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

   Response: No.

   The proposed change allows a one-time use of an alternate manual flow path ECCS. The proposed change does not exceed or alter a design basis or safety limit. During the period the note is invoked, the ECCS will remain capable of mitigating the consequences of a design basis event such as a loss-of-coolant accident. In addition, simulator runs have validated that the manual action can be reliably performed in the necessary timeframe to meet the accident analysis. The alternate injection flow path is validated in

the High Head Safety Injection Full Flow test ensuring the proper injection flowrate. The alternate flow path is the same safety class as the normal flow path and the alternate injection valve receives emergency power.

Therefore, the proposed amendment does not involve a significant reduction in a margin of safety.

6.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Pennsylvania State official was notified of the proposed issuance of the amendment on March 3, 2023. The State official had no comments.

7.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

8.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Date: March 6, 2023

SUBJECT: BEAVER VALLEY POWER STATION, UNIT 1 – ISSUANCE OF AMENDMENT NO. 319 RE: CHANGE TO CERTAIN TECHNICAL SPECIFICATIONS TO ADD A NOTE ALLOWING A ONE-TIME USE OF AN ALTERNATE MANUAL FLOW PATH TO SUPPORT REPAIR OF A LEAK **(EMERGENCY CIRCUMSTANCES)** (EPID L-2023-LLA-0027) DATED MARCH 6, 2023

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NAME	SBailey	VCusumano	DWoodyatt	KDowling
DATE	3/6/2023	3/05/2023	3/5/2023	3/6/2023
OFFICE	NRR/DORL/LPL1/LA	NRR/DORL/LPL1/BC	NRR/DORL/LPL1/PM	
NAME	KZeleznock (KEntz for)	HGonzalez	SGoetz	
DATE	3/6/2023	3/6/2023	03/6/2023	

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