

December 8, 2005

Mr. J. V. Parrish
Chief Executive Officer
Energy Northwest
P.O. Box 968 (Mail Drop 1023)
Richland, WA 99352-0968

SUBJECT: COLUMBIA GENERATING STATION - ISSUANCE OF AMENDMENT
RE: ONE-TIME EXTENSION OF THE COMPLETION TIME FOR TECHNICAL
SPECIFICATIONS 3.7.1 AND 3.8.1 (TAC NO. MC8241)

Dear Mr. Parrish:

The U.S. Nuclear Regulatory Commission (Commission) has issued the enclosed Amendment No. 195 to Facility Operating License No. NPF-21 for the Columbia Generating Station. The amendment consists of changes to the Technical Specifications (TS) in response to your application dated August 17, 2005, and its supplements dated November 15 and 30, 2005.

The amendment allows a one-time extension of the 72-hour Completion Time (CT) for the required action of Condition B of TS 3.7.1, "Standby Service Water (SW) System and Ultimate Heat Sink (UHS)," and TS 3.8.1, "AC Sources - Operating." Specifically, the proposed one-time extension request is for an additional 72 hours to the CT and would result in a 144-hour CT for an inoperable SW subsystem. This would allow extensive maintenance, not capable of being completed in the current 72-hour CT, to be conducted on the SW train B pump.

A copy of the related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

/RA/

Brian J. Benney, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-397

Enclosures: 1. Amendment No. 195 to NPF-21
2. Safety Evaluation

cc w/encls: See next page

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Docket No. 50-397

Enclosures: 1. Amendment No. 195 To NPF-21 LPLIV Reading
 2. Safety Evaluation

cc w/encls: See next page

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OFFICE	NRR/LPL4/PM	NRR/LPL4/LA	SBWB/BC	ITSB/BC	SBPB/BC	CPTB/BC
NAME	BBenney	LFeizollahi	LLois	TBoyce	SJones	DFischer for SLee
DATE	12/7/05	12/7/05	12/7/05	12/6/05	12/6/05	12/6/05
OFFICE	APLB/PRA/BC	EEEE/BC	OGC	NRR/LPL4/BC		
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DATE	11/28/05	12/7/05	12/6/05	12/7/05		

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ENERGY NORTHWEST

DOCKET NO. 50-397

COLUMBIA GENERATING STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 195
License No. NPF-21

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Energy Northwest (licensee) dated August 17, 2005, and its supplements dated November 15 and 30, 2005, comply with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's 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.
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 Facility Operating License No. NPF-21 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. _____ and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. The license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

David Terao, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: December 8, 2005

ATTACHMENT TO LICENSE AMENDMENT NO. 195

FACILITY OPERATING LICENSE NO. NPF-21

DOCKET NO. 50-397

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 vertical lines indicating the areas of change. The corresponding overleaf pages are also provided to maintain document completeness.

REMOVE

3.7.1-2
3.8.1-3

INSERT

3.7.1-2
3.8.1-3

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 195 TO FACILITY OPERATING LICENSE NO. NPF-21

ENERGY NORTHWEST

COLUMBIA GENERATING STATION

DOCKET NO. 50-397

1.0 INTRODUCTION

By letter dated August 17, 2005, as supplemented by letters dated November 15 and 30, 2005 (Agencywide Documents Access and Management System Accession Nos. ML052370324, ML053260425, and ML053420181, respectively), Energy Northwest (EN) submitted a request for a one-time extension of the 72-hour Completion Time (CT) for the required action on Condition B of Columbia Generating Station (CGS) Technical Specification (TS) 3.7.1, "Standby Service Water (SW) System and Ultimate Heat Sink (UHS)," and TS 3.8.1, "AC Sources - Operating." The current CGS TS requirements for the SW systems and diesel generators (DGs) only permit an allowed outage time (AOT) or CT of 72 hours for taking a header out of service whenever a unit is operating in Modes 1, 2, and 3.

The supplemental letters dated November 15 and 30, 2005, provided additional information that clarified the application, did not expand the scope of the application as originally noticed and did not change the NRC staff's originally proposed no significant hazards consideration determination.

The licensee states that it has determined a need to perform extensive maintenance on the SW train B pump. This determination is based on the June 15, 2005, failure of the SW train A pump. The cause of the pump failure was Intergranular Stress Corrosion Cracking (IGSCC) of two pump shaft end flanges. The SW train B pump is susceptible to the same failure mechanism. To eliminate the potential for unexpected failure of the B pump shaft couplings while at power, EN has proposed to replace the entire pump on-line rather than waiting for the next refueling outage. This evolution is expected to take more than the currently AOT of 72 hours. The licensee requested a one-time change to extend the AOT for the affected system to 144 hours. The licensee requested that this one-time extension of the AOT be applied to the following TS requirements:

Condition B of TS 3.7.1, "Standby Service Water (SW) System and Ultimate Heat Sink (UHS),"
and

Condition B of TS 3.8.1, "AC Sources - Operating."

The proposed change would be implemented by making reference to the following notes for the

affected TS CTs, respectively:

- * On a one-time basis, during the refurbishment/replacement of the 1B Service Water Pump during Cycle 18, the Completion Time for an inoperable service water subsystem is extended to 144 hours.
- * On a one-time basis, during the refurbishment/replacement of the 1B Service Water Pump during Cycle 18, the Completion Time for the Division 2 DG is extended to 144 hours.

Based on the results of these activities, the need for further one-time temporary TS changes will not be needed.

2.0 REGULATORY EVALUATION

CGS TSs currently require that if one service water system is inoperable it must be restored to an operable status within 72 hours. The required action is modified Action B.1, which further states that the applicable conditions of Limiting Condition of Operation (LCO) 3.8.1, "AC Sources - Operating," and LCO 3.4.9, "Residual Heat Removal (RHR) Shutdown Cooling System - Hot Shutdown," apply.

The licensee's Code of record for the CGS inservice testing program for pumps and valves is the 1989 Edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, which references ASME OM Part 6 of the ASME Code for Operation and standard for pumps (1987 Edition up to and including the 1988 addenda). The intent of testing as specified in the Code is to demonstrate the operational readiness of the component and to track degradation to provide reasonable assurance that the components will be capable of performing its intended function until the next test interval. The ASME Code is incorporated by reference in Section 50.55a of Title 10 of the *Code of Federal Regulations* (10 CFR).

The NRC staff performs its review of risk-informed changes to TS requirements in accordance with the guidance provided by Standard Review Plan (SRP), Chapter 16.1, "Risk-Informed Decisionmaking: Technical Specifications." SRP Chapter 16.1 refers to Regulatory Guide (RG) 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," as an acceptable approach for assessing proposed risk-informed changes to TS AOTs or CTs.

One acceptable approach for making risk-informed decisions about proposed TS changes, including both permanent and temporary TS changes, is to show that the proposed changes meet the five key principles stated in RG 1.177, Section B:

1. The proposed change meets the current regulations unless it is explicitly related to a requested exemption or rule change.
2. The proposed change is consistent with the defense-in-depth philosophy.
3. The proposed change maintains sufficient safety margins.
4. When proposed changes result in an increase in core damage frequency (CDF) or risk,

the increases should be small and consistent with the intent of the Commission's Safety Goal Policy Statement.

5. The impact of the proposed change should be monitored using performance measurement strategies.

The first three principles pertain to traditional engineering considerations and are evaluated in Section 3.0, below; whereas the last two principles involve risk considerations and are evaluated in Section 5.0.

Part 50 of 10 CFR, Appendix A, General Design Criterion (GDC) 17, "Electric power systems," requires, in part, that nuclear power plants have onsite and offsite electric power systems to permit the functioning of structures, systems, and components that are important to safety. The onsite system is required to have sufficient independence, redundancy, and testability to perform its safety function, assuming a single failure. The safety function for each system shall provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences, and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents.

Criterion 18, "Inspection and testing of electric power Systems," requires that electric power systems that are important to safety must be designed to permit appropriate periodic inspection and testing.

Paragraph 50.36(b) of 10 CFR, "Technical specification," requires that a licensee's TS be derived from the analyses and evaluation included in the safety analysis report and to establish LCOs that include CTs for equipment that is required for safe operation of the facility. Regulatory Guide (RG) 1.93, "Availability of Electric Power Sources," provides guidance with respect to operating restrictions (i.e., CTs) if the number of available alternating current (AC) sources is less than that required by the TS LCO. In particular, this guide prescribes a maximum CT of 72 hours for an inoperable onsite or offsite AC source.

3.0 TECHNICAL EVALUATION - TRADITIONAL ENGINEERING CONSIDERATIONS

3.1 Description of the Proposed Change

The proposed change is described above in Section 1.0. Based on a review of the information that was provided, it is the NRC staff's conclusion that the proposed change will eliminate the regulatory burden of requiring CGS to be shut down during the SW refurbishment activity. This consideration is consistent with the objectives of the Commission's Probabilistic Risk Assessment (PRA) Policy Statement and it establishes a suitable basis for proposing a risk-informed change to the CGS TS requirements.

3.1.1 Justification for Requesting a "One-Time" Change

The affected TS requirements typically only allow 72 hours for completing on-line repairs and

CGS would have to be shut down in order to complete this work. The extent and nature of compensatory measures that are needed in order to minimize exposure to risk and reductions in defense-in-depth make it difficult to justify the proposed change on a permanent basis, and the NRC staff does not consider this to be a viable option. Therefore, the licensee has adequately justified the need for this proposed one-time TS change for implementation of the planned modifications to the SW system. The adequacy of the proposed change in terms of nuclear safety is assessed based on traditional engineering considerations and an assessment of risk.

The August 17, 2005, submittal, as clarified by the additional information that was provided by the November 15 and 30, 2005, letters, discussed the licensee's rationale for proposing a one-time TS change for performing the SW pump refurbishment on-line instead of combining this activity with a concurrent refueling outage.

3.2 Traditional Engineering Evaluation

The evaluation presented below addresses the first three key principles of the NRC staff's philosophy of risk-informed decision making, which concern compliance with current regulations, evaluation of safety margins, and evaluation of defense-in-depth.

3.2.1 Compliance with Current Regulations

The licensee does not propose to deviate from existing regulatory requirements and compliance with existing regulations is maintained by the proposed one-time change to the TS requirements. Therefore, with respect to compliance with current regulations, the NRC staff considers the proposed one-time TS change to be acceptable.

3.2.2 Evaluation of Safety Margins

Design-basis analyses and system design criteria are not impacted by the proposed change and, consequently, safety margins are not affected.

3.2.3 Evaluation of Defense-in-Depth Attributes

The NRC staff has reviewed the information that was provided in this regard and evaluation of the defense-in-depth attributes is provided below.

- A reasonable balance among prevention of core damage, prevention of containment failure, and consequence mitigation is preserved.

The proposed change involves an extension of the current TS AOTs for systems that are impacted by the SW refurbishment project. The systems that are affected during a particular SW header outage are all associated with the train that corresponds to the affected SW header, leaving one train of safety equipment fully operable and capable of performing its safety functions. Consequently, the balance among the prevention of core damage, prevention of containment failure, and consequence mitigation is unaffected by the proposed change.

- Over-reliance on programmatic activities to compensate for weaknesses in plant design is avoided.

The proposed change involves an extension of the current TS AOTs for systems that are impacted by the SW refurbishment project. The systems that are affected during a particular SW header outage are all associated with the train that corresponds to the affected SW header, leaving one train of safety equipment fully operable and capable of performing its safety functions. The proposed extension of the AOT results in a corresponding increase in the amount of time that the redundancy that is normally afforded by the other (inoperable) train will not be available, thereby increasing the amount of time those safety systems are vulnerable to single failures. Attachment 3 of the application letter provided licensee commitments to implement certain compensatory measures in order to provide increased assurance that the operable train of safety equipment will not be unnecessarily challenged or compromised during the SW header outage. Some of the compensatory measures that have been identified do include programmatic activities, such as protecting the other (operable) train of safety equipment by deferring to the extent possible the performance of any maintenance or testing related to the operable train of equipment, and providing operator training in certain areas that are impacted. However, because this is a one-time change of limited duration, the NRC staff considers the programmatic activities to be appropriate and necessary for minimizing the risks involved and for maintaining defense-in-depth.

- System redundancy, independence, and diversity are preserved commensurate with the expected frequency, consequences of challenges to the system, and uncertainties (e.g., no risk outliers).

The operable train of safety equipment will continue to be capable of performing the necessary assumed safety functions consistent with accident analysis assumptions. The licensee has committed to implement certain compensatory measures in order to assure the availability and capability of the operable train of safety equipment while operating in the allowed outage period, including (for example) avoiding severe weather situations and periods of grid instability. The compensatory measures will also maintain to some extent the functional capability of the other (inoperable) train of safety equipment, such as the emergency core cooling system equipment. Given these considerations, the NRC staff agrees that sufficiently redundant, independent, and diverse capabilities will be maintained for performing critical safety functions during the proposed AOT.

- Defenses against potential common cause failures are preserved and the potential for the introduction of new common cause failure mechanisms is assessed.

As discussed in the previous bullet, the licensee has established compensatory measures to assure the availability and capability of redundant, independent, and diverse means of accomplishing critical safety functions during the proposed AOT. The compensatory measures include: avoiding (to the extent possible) severe weather conditions and periods of grid instability when in the proposed AOT; not performing elective maintenance and testing on risk-significant equipment without approval from the Plant General Manager; augmenting fire watches and limiting and controlling welding, grinding, brazing, and transient combustibles in the vicinity of protected equipment.

Limiting the extent of maintenance that can be performed during the proposed AOT will minimize the likelihood of fires occurring. Based on the information that was provided, the NRC staff finds that the licensee has taken appropriate measures to preserve defenses against potential common cause failures and the introduction of new common cause failure mechanisms has been adequately assessed and none have been identified.

- Independence of barriers is not degraded.

As discussed above in the third and fourth bullets, both primary and backup means of achieving and maintaining safe shutdown conditions will be maintained during the proposed AOT. These means are independent, redundant, and diverse and, consequently, they should prevent any undue challenges to the fuel cladding, reactor coolant pressure boundary, and containment from occurring. Additionally, refurbishment of the SW system does not directly impact these barriers or otherwise cause them to be degraded. Therefore, the NRC staff finds that the independence of barriers will not be degraded by the proposed AOT or by the SW refurbishment activities.

- Defenses against human errors are preserved.

As discussed in the third bullet above, the licensee has established contingencies for assuring that critical safety functions will be maintained during the proposed AOT. The contingencies include focused operator training and briefings to assure that operators are fully aware of the plant configuration and actions that may be needed in order to respond to problems that could arise during the proposed AOT for performing SW refurbishment activities. Administrative controls have been established and procedure changes have been made to facilitate implementation of these compensatory measures. Also, contingencies to prohibit discretionary maintenance and to otherwise minimize reactor trip hazards and challenges to critical safety systems will help prevent operator distractions from occurring. Therefore, the NRC staff finds that defenses against human errors will be adequately preserved during the proposed AOT.

- The intent of the GDC in Appendix A to 10 CFR Part 50 is maintained.

The proposed change involves an extension of the current TS AOTs for systems that are impacted by the SW refurbishment project. The systems that are affected during a particular SW header outage are all associated with the train that corresponds to the affected SW header, leaving one train of safety equipment fully operable and capable of performing its safety functions. The proposed change does not modify the plant design bases or the design criteria that were applied to structures, systems, and components during plant licensing. Consequently, the plant design with respect to the GDC is not affected by the proposed change.

Based on the above review of defense-in-depth attributes, the NRC staff finds that defense-in-depth will be adequately maintained during the one-time AOT extension that is proposed for the SW and supported systems.

3.3 Summary

The NRC staff has reviewed the traditional plant system engineering aspects of the licensee's evaluation related to the one-time proposed extension of the AOT to 144 hours for the SW and supported systems as defined in Section 1.0 of this Safety Evaluation. Based on the results of the evaluation performed above in Section 3.0, the NRC staff finds that the proposed changes are acceptable.

4.0 TECHNICAL EVALUATION - ELECTRICAL ENGINEERING CONSIDERATIONS

4.1 TS 3.8.1, "AC Sources - Operating"

Action "B" of TS 3.8.1.1 requires that when one required DG is inoperable in Modes 1,2, and 3, the inoperable DG be restored to operable status within 72 hours. Due to refurbishment/replacement of the 1B SW pump, which provides cooling water to the DG, the licensee has proposed to extend the allowed outage time for the affected DG an additional 72 hours. The following footnote will be added to Action "B" of TS 3.8.1.1 to temporarily allow one train of SW system to be inoperable for up to 144 hours:

- * On a one-time basis, during the refurbishment/replacement of the 1B Service Water Pump during Cycle 18, the Completion Time for the Division 2 DG is extended to 144 hours.

The licensee stated:

Consistent with the requirements of LCO 3.0.6, the safety function of the DG system will be maintained and provided by the division 1 DG. If this safety function was lost, then the appropriate TS action would be taken. The Columbia TS[s] do include a Safety Function Determination Program (SFDP). The SFDP was added to the TS[s] as a result of the conversion to the Improved TS (ITS). Training on the SFDP was provided to all licensed operations personnel prior to implementation of ITS. This program includes provisions for cross divisional verifications to ensure a loss of the capability to perform a safety function assumed in the accident analysis does not go undetected. TS LCO 3.0.6 establishes requirements regarding supported systems when support systems are inoperable. Upon entry into TS LCO 3.0.6, an evaluation is required to determine whether there has been a loss of safety function as implemented by Columbia Procedure SWP-OPS-02[,] "Safety Function Determination Program." Additionally, other limitations, remedial actions, or compensatory actions may be identified as a result of the support system inoperability and corresponding exception to entering supported system Conditions and Required Actions. The SFDP implements the requirements of TS LCO 3.0.6.

4.2 Compensatory Measures

The licensee stated that the following compensatory measures will be implemented to enhance the safety of the operation during the 144-hour period while SW subsystem B is out of service for refurbishment/replacement while CGS operates in Mode 1.

- On an 8-hour frequency, EN will verify correct breaker alignment and indicated power availability for each offsite power circuit. As part of this verification, EN will contact the Bonneville Power Administration (BPA) Munro and Dittmer Dispatching Centers to verify no unusual conditions exist that could affect the reliability of the plant offsite power circuits.
- Declare the required feature(s) supported by EDG [emergency diesel generator] 2 inoperable within 4 hours of discovery of the inoperability of the redundant required feature(s).
- Determine within 24 hours of entering TS 3.7.1 that EDG-1 and EDG-3 are not inoperable due to a common cause failure or perform the monthly testing pursuant to TS SR 3.8.1.2 on EDG-1 and EDG-3 within 24 hours.
- The normal entrances to the CGS transformer yard will be locked and posted. Planned maintenance in the transformer yard will be suspended. Access to the transformer yard is controlled in accordance with plant procedure PPM 1.9.13, "Transformer Yard Access and Controls."
- Periodic daily briefings will be conducted on the status of SW B subsystem restoration to station management.
- EN will reduce the duration of maintenance on the SW B subsystem as much as practical by using a 24-hour work schedule, dedicated project management, and dedicated support for the activity.
- EN will install protected train signs for the protected systems.
- EN will ensure that no maintenance activities are performed in the transformer yard that could directly cause a loss-of-offsite power event unless required to ensure the continued reliability and availability of the offsite power sources.
- BPA will be informed of the unavailability of SW B subsystem and will be requested to defer discretionary maintenance on the local network around CGS. The local network is defined as all 500 kV, 230 kV, and 115 kV transmission system equipment located in an area bounded by the Midway Substation, White Bluffs Substation, Benton Substation, and Ashe Substation.
- EN will request BPA notification of any emergent conditions that could affect local grid stability or reliability.
- A check of the weather forecast will be performed to anticipate severe weather. Severe weather is currently defined in plant procedures as wind gusts greater than or equal to 58 mph, hail greater than or equal to 3/4 inch in diameter, visual sighting of a funnel cloud or tornado, or lightning strikes in the local area. The work will be performed when the weather forecast is favorable.
- EN will not perform elective maintenance and testing on risk significant equipment without approval from the Plant General Manager. Required

surveillance testing on risk significant equipment will be performed only if it cannot be rescheduled around the 144-hour period.

- EN will provide simulator training for the applicable control room operating crews to practice procedures for performing a plant shutdown without the SW B subsystem and for coping with Station Blackout.
- EN will augment fire watches and limit and control welding, grinding, brazing, and transient combustibles in the vicinity of protected equipment. PRA insights will be used to identify areas for augmented fire watches and operator actions to reduce the impacts of postulated hot shorts on risk significant motor-operated valves.

The CGS TS would be utilized to determine the required actions if the offsite power system were to become inoperable during this 144-hour AOT.

On the basis of the above information, the NRC staff finds that the licensee has adequately addressed the NRC staff's concern.

4.3 Summary

The NRC staff concludes that the implementation of compensatory measures will ensure that the remaining sources of AC power are available during the additional 72 hours of repair on the SW pump, therefore, the deterministic evaluation supports the proposed extension of the AOT for the EDG from the current period of 72 hours to 144 hours on a one-time basis and, therefore, the proposed change is acceptable.

5.0 TECHNICAL EVALUATION - RISK ASSESSMENT

5.1 Probabilistic Evaluation

5.1.1 Risk Assessment Evaluation

In evaluating the risk information submitted by the licensee, the NRC staff followed the three-tiered approach documented in RG 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications."

Under the first tier, the NRC staff determines if the proposed change is consistent with the NRC's Safety Goal Policy Statement, as documented in RG 1.174, for adequacy of plant protection from potential risk. Specifically, the first tier objective is to ensure that the plant risk does not increase unacceptably during the period the equipment is taken out of service.

The second tier addresses the need to preclude potentially high-risk plant configurations that could result if additional equipment, not associated with the proposed change, is taken out of service during the proposed 72-hour additional AOT extension.

The third tier addresses the establishment of a configuration risk management program for identifying risk-significant configurations resulting from maintenance or other operational activities, and taking appropriate compensatory measures to avoid such configurations.

5.1.2 Basis and Quality of Risk Assessment

The licensee used its PRA model and appropriate conservative assumptions to assess the risk increase associated with operation at-power for a period of an additional 72 hours without an operable train "B" SW system. The licensee employed a plant-specific WinNUPRA analysis, which employs a large fault tree/small event tree model, similar to the NRC's standardized plant risk analysis (SPAR) model, and is an NRC pilot plant for using RG 1.200 in the application of the DG CT extension submittal. The licensee incorporated a full-scope at-power fire PRA and upgraded the fire PRA in January of 2004. Two external review processes have been performed. The NRC staff assumes that the external independent reviewers have evaluated the service water system (SWS) as a part of the DG system. The NRC staff also evaluated the proposed waiver for entering TS 3.8.1 when the Division 2 DG is made inoperable during the corrective maintenance performance of the SW 1B pump. The Division 1 DG will take all the fire load during the maintenance period with fire watches as a precautionary compensatory measure.

The risk consideration included maintaining defense-in-depth and quantifying risk to determine the change in CDF and large early release frequency (LERF) as a result of the proposed 144-hour AOT extension for the "B" SWS. Also, the licensee is maintaining the continuous on-line risk management program to control the performance of other risk-significant tasks during the extended AOT period with consideration of specific compensatory measures listed in the submittal to minimize risk. The dominant accident sequences contributing to the assessed risk increase include the occurrence of conditions due to the unavailability of, and demand for, the use of the "B" SW subsystem.

The licensee evaluated the configuration risk without the SWS 1B pump, using a "zero maintenance" model, and uncertainty was estimated using the Monte-Carlo simulation with 15,000 random generations. Although the third, fourth, and fifth moments were not provided, the parametric uncertainty (Error Factor) was estimated as 3.7, close to 3.0, an indication of a good distribution.

The NRC staff evaluated the quality of the PRA models, major assumptions, and data used in the risk assessment, and found it to be acceptable for this application. This evaluation compared the applicable findings from the NRC staff's review of the licensee's PRA with the NRC's SPAR model, Version 3.2, employing NRC PRA quantification tool, SAPHIRE Version 7, and NRC Manual Chapter 0609, Appendix H, for LERF, as well as findings from similar evaluations of similar plants.

5.1.3 Risk Impact of the Proposed Change (Tier 1)

An acceptable approach to risk-informed decisionmaking is to show that the proposed change to the design basis meets several key principles. One of these principles is to show that the proposed change results in a small, but acceptable, increase in risk in terms of CDF and LERF, and is consistent with the NRC's Safety Goal Policy Statement. Acceptance guidelines for meeting this principle are presented in RG 1.174. The licensee used its PRA model to calculate risk increases due to the AOT extension of 72 hours, during which the other SWS 1A and associated Division 1 DGs are available. Both the incremental conditional core damage probability (ICCDP) and the incremental conditional large early release probability (ICLERP) were assessed. These quantities are a measure of the increase in probability of core damage and large early release, respectively, during a single outage that would last for the entire

duration allowed by the proposed change. The acceptance guideline for an extension of the TS AOT is provided in RG 1.177 as 5.0E-7 and 5.0E-8 for ICCDP and ICLERP, respectively. However, the RG 1.177 guideline is for permanent changes, and the reviewer has considered additional credits for the proposed one-time extension within the bounds of adequate protection under the guideline in RG 1.174. Based on the one-time extension of 72 hours, the incremental changes are summarized in the following table.

		Baseline CDF	Incremental Change in CCDP	Baseline LERF	Incremental Change in ICLERP
Prior to AOT extension		1.86E-5/year		3.06E-6/year	
Increase because of 7-day AOT extension (Licensee Results)			4.65E-7		5.47E-9
New Baseline CDF		1.91E-5/year		3.06E-6/year	
Increase because of 72-hour AOT extension	A. Using NRC SPAR 3.2 Model		1.8E-6		1.8E-7
	B. Compensatory Measures*		>4.15E-6		>4.1E-7
	A - B		<5.0E-7		<5.0E-8
Acceptance Guidelines**			5E-7		5E-8

* Quantifiable compensatory measures provided by the licensee

** Criteria for permanent change, flexibility considered for one-time changes.

Based on the NRC staff's analysis using the SPAR model, the configuration risk increases with SWS 1B pump out-of-service (fail-to-start and fail-to-run) is 1.8E-6 in ICCDP, almost four times greater than the threshold value of 5.0E-07, the acceptance guideline in RG 1.177 for permanent changes. The LERF is calculated by employing NRC Inspection Manual Chapter 0609, Significance Determination Process, Appendix H, with the CDF-LERF conversion factor of 0.1. The Mark II containment does not impose high LERF concerns with no special outliers, particularly with the precautionary compensatory measure to reduce the loss of offsite power initiator contribution by 48 percent. This ratio (LERF-to-CDF) is larger than the licensee results. This is conservative in determining the risk acceptability of the proposed one-time AOT extension. No additional risk will be added for waiving the TS 3.8.1 DG 2 requirement.

During the proposed extension period, the total CDF and LERF have been increased due to the incremental changes in ICCDP and ICLERP, respectively, resulting from the one time, 72-hour extension of the AOT under the TS 3.7.1. However, the licensee proposed 14 separate compensatory measures during the maintenance activities to reduce the plant risk by at least

1.0E-06 in ICCDP, and the resulting new baseline values for this proposed change under LCO 3.7.1 would be minimal for both CDF and LERF. The specifics of risk quantification (qualitative and quantitative) of the proposed compensatory measures are documented in the licensee's November 15, 2005, letter, and the risk increases under the proposed AOT extension are well within the acceptable range.

The NRC staff has developed risk insights, associated with conducting the repair to the "B" SW pump during at-power operation, and qualitatively compared the risk with the total risk of performing the maintenance activities following transitional operation and shutdown without "B" SW pump during which Division 2 DG will be made inoperable. The NRC staff concludes that the shutdown and transitional risk with only one available SW system are greater than at-power risk.

In conclusion, a one-time, 72-hour extension of TS LCO 3.7.1 at-power to perform appropriate maintenance work would be more desirable than to perform maintenance at hot shutdown.

5.1.4 Avoidance of High-Risk Plant Configurations (Tier 2)

The licensee's PRA will identify and estimate major risk contributors of plant configurations, contributing event sequences, and associated cutsets. Potential major risk contributors include plant equipment failures, human errors, and common cause failures. Insights from the risk assessment will be used in identifying and monitoring the plant configurations or conditions that may lead to significant risk increases during the AOT extension. The NRC staff finds that the proposed precautions, as well as the proposed compensatory measures, identified in the licensee's submittal are adequate for preventing plant configurations or conditions that may increase risk significantly. In conclusion, there is reasonable assurance that a high-risk plant configuration will not occur during the proposed 72-hour extension period.

5.1.5 Risk-Informed Configuration Risk Management (Tier 3)

The intent of risk-informed configuration risk management is to ensure that plant safety is maintained and monitored. A formal commitment to maintain a configuration risk management program is necessary on the part of a licensee prior to implementation of a risk-informed TS. This program can support the licensee's decisionmaking regarding the appropriate actions to control risk whenever a risk-informed TS LCO is entered. The NRC staff finds that the licensee has an adequate configuration management program.

5.2 Summary

The NRC staff has developed risk insights, associated with conducting the repair to the "B" SW pump during at-power operation, and qualitatively compared the risk with the total risk of performing the maintenance activities following transitional operation and shutdown without "B" SW pump during which Division 2 DG would be made inoperable. The NRC staff concludes that the shutdown and transitional risk with only one available SW system are greater than at-power risk and, thus, the proposed one-time, 72-hour extension of the AOT with an inoperable "B" SW pump is acceptable.

5.3 NRC Staff Findings

In summary, the NRC staff finds that the licensee's proposed change to revise the TS to extend the CT for SW pump refurbishment/repairs from 72 hours to 144 hours, and to similarly revise the TS 3.8.1, is acceptable because the applicable risk-related principles of risk-informed decisionmaking identified in RG 1.174 and RG 1.177 have been satisfied.

6.0 TECHNICAL EVALUATION - TESTING AND MAINTENANCE

The NRC staff has reviewed the licensee's regulatory and technical analysis in support of its license amendment which is described in Enclosure 1 of the licensee's August 17, 2005, submittal. The ASME Code of record for the CGS inservice testing program for pumps is the 1989 Edition of the ASME Boiler and Pressure Vessel Code, Section XI, which references the ASME OM Part 6 standard (1987 Edition up to and including the 1988 addenda).

Per ASME OM Part 6 and the CGS inservice testing program, Service Water Pumps are tested every 3 months. Differential Pressure, pump flow, and vibration levels are recorded and evaluated to the criteria of OM Part 6, Table 3, Ranges for Test Parameters. Table 3 specifies "alert" and "Required Action" ranges. If the operational characteristics fall into the "alert" range, the test frequency is doubled. If a pump meets or exceeds the values specified in the "required action" range, the pump is declared inoperable. The Code does not require continuous monitoring of differential pressure, flow, or vibration levels when operating.

On June 15, 2005, the "A" SWP experienced an unexpected step change in flow and differential pressure characteristics and dropped into the "alert" range. Licensee staff conservatively declared the pump inoperable and performed a pump disassembly. The disassembly and subsequent root cause evaluation showed a catastrophic failure of two pump shaft flanged ends. The root cause of the failure was determined to be IGSCC. Failure due to IGSCC is a sudden failure and may not be predicted solely by periodic testing in accordance with ASME OM Part 6 requirements. The root cause confirmed the susceptibility of the "B" SWP to this same failure mechanism.

Since June 15, 2005, the "A" SWP has been replaced. Since a replacement for the "B" SWP was not available, the licensee has implemented a number of enhancements to monitor pump performance and to respond more effectively to a sudden failure, should it occur. The licensee has changed its Code acceptance criteria for its SWPs such that if any value is determined to be in the "alert" range, the pump is immediately declared inoperable. These actions are more stringent than those required by the ASME Code. Pump run time has been minimized and pump operating characteristics are continuously monitored during operation.

IGSCC is age and stress related. The replacement of the "B" SWP with a new pump will effectively eliminate the near-term susceptibility to IGSCC and reduces the possibility of sudden failure of an SWP.

The licensee's proposed TS change and testing are in accordance with or more stringent than ASME OM Part 6 and NUREG-1482 and will ensure the operation readiness of the "B" SWP.

6.1 Summary

The NRC staff concludes that the proposed change to the Technical Specifications to extend the AOT from 72 hours to 144 hours to replace the "B" SWP is necessary and prudent. The

change will effectively eliminate the near-term susceptibility of the pump to IGSCC and provide greater confidence in the ability of the SWP to perform its intended function.

7.0 REGULATORY COMMITMENTS

The licensee identified the following commitments to be put into effect upon implementation of the requested license amendment:

Upon approval of the proposed license amendment, Energy Northwest will implement a change to the applicable TS Bases to add the following information:

On a one-time basis, during the refurbishment/replacement of the 1B Service Water Pump during Cycle 18, the COMPLETION TIME for an inoperable service water subsystem is extended to 144 hours. The one-time extension is based upon a risk assessment performed in accordance with Regulatory Guides 1.174 and 1.177. During this extended COMPLETION TIME, administrative controls must be implemented to enhance the reliability of required electrical sources and to minimize plant activities that might challenge other safety-related equipment. This one-time extension expires at the end of Cycle 18.

During the one-time extended COMPLETION TIME, the action to enter LCO 3.8.1, as directed by Note 1, is waived based on the implementation of selected risk management compensatory measures and the verification that a loss of safety function does not exist.

The following compensatory actions will be implemented during the period of time the SW subsystem B is out of service for refurbishment/replacement while Columbia operates in mode 1.

- On an 8 hour frequency, Energy Northwest will verify correct breaker alignment and indicated power availability for each offsite power circuit. As part of this verification, Energy Northwest will contact the BPA Munro and Dittmer Dispatching Centers to verify no unusual conditions exist that could affect the reliability of the plant offsite power circuits.
- Declare the required feature(s) supported by EDG-2 inoperable within 4 hours of discovery of the inoperability of the redundant required feature(s).
- Determine within 24 hours of entering TS 3.7.1, that EDG-1 and EDG-3 are not inoperable due to a common cause failure or perform the monthly testing pursuant to TS SR 3.8.1.2 on EDG-1 and EDG-3 within 24 hours.
- The normal entrances to the Columbia Generating Station transformer yard will be locked and posted. Planned maintenance in the transformer yard will be suspended. Access to the transformer yard is controlled in accordance with plant procedure PPM 1.9.13, "Transformer Yard Access and Controls."

- Periodic daily briefings will be conducted on the status of SW B subsystem restoration to station management.
- Energy Northwest will reduce the duration of maintenance on the SW B subsystem as much as practical by using a 24-hour work schedule, dedicated project management, and dedicated support for the activity.
- Energy Northwest will install protected train signs for the protected systems.
- Energy Northwest will ensure that no maintenance activities are performed in the transformer yard that could directly cause a loss of offsite power event unless required to ensure the continued reliability and availability of the offsite power sources.
- BPA will be informed of the unavailability of SW B subsystem and will be requested to defer discretionary maintenance on the local network around Columbia Generating Station. The local network is defined as all 500 kV, 230 kV and 115 kV transmission system equipment located in an area bounded by the Midway Substation, White Bluffs Substation, Benton Substation, and Ashe Substation.
- Energy Northwest will request BPA notification of any emergent conditions that could affect local grid stability or reliability.
- A check of the weather forecast will be performed to anticipate severe weather. Severe weather is currently defined in plant procedures as wind gusts greater than or equal to 58 mph, hail greater than or equal to 3/4" in diameter, visual sighting of a funnel cloud or tornado, or lightning strikes in the local area. The work will be performed when the weather forecast is favorable.
- Energy Northwest will not perform elective maintenance and testing on risk significant equipment without approval from the Plant General Manager. Required surveillance testing on risk significant equipment will be performed only if it cannot be rescheduled around the 144-hour period.
- Energy Northwest will provide simulator training for the applicable control room operating crews to practice procedures for performing plant shutdown without the SW B subsystem and for coping with Station Blackout.
- Energy Northwest will augment fire watches and limit and control welding, grinding, brazing, and transient combustibles in the vicinity of protected equipment. PRA insights will be used to identify areas for augmented fire watches and operator actions to reduce the impacts of postulated hot shorts on risk significant motor-operated valves.

8.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Washington State official was notified of the proposed issuance of the amendments. The State official had no comments.

9.0 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. 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. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (70 FR 56501; published September 27, 2005). 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.

10.0 PUBLIC COMMENT

A public comment was received that addressed the following compensatory measure:

Determine within 24 hours of entering TS 3.7.1, that EDG 1 and EDG 3 are not inoperable due to a common cause failure or perform the monthly testing pursuant to TS SR 3.8.1.2 on EDG-1 and EDG-3 within 24 hours.

The comment received suggested instead that the licensees perform a test of EDG-1 and EDG-3 *prior to* entering or immediately upon entering TS 3.7.1.

The proposed compensatory measure, by CGS, is to determine within 24 hours of entering TS 3.7.1 that, by taking EDG-2 out of service, a common cause failure of EDG-1 and EDG-3 was not introduced. This action does not increase the likelihood of a demand failure, while at the same time ensures that actions taken to protect EDG-2 from starting without cooling water did not inadvertently disable another EDG.

11.0 CONCLUSION

The standby service water system consists of three divisions and it supplies cooling water to the residual heat removal, reactor core isolation cooling, and high-pressure core spray systems. Even though there is a decrease in redundancy of a cooling water supply to the emergency core cooling system (ECCS) systems, the licensee has established adequate compensatory measures and there are a sufficient number of other ECCS systems and additional backup systems available for core cooling. Therefore, the proposal to extend the outage time from 72 hours to 144 hours for a one-time extension is acceptable.

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) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: J. Chung
S. Unikewicz
B. Benney

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Columbia Generating Station

cc:

Mr. W. Scott Oxenford (Mail Drop PE04)
Vice President, Technical Services
Energy Northwest
P. O. Box 968
Richland, WA 99352-0968

Mr. Dale K. Atkinson (Mail Drop PE08)
Vice President, Nuclear Generation
Energy Northwest
P.O. Box 968
Richland, WA 99352-0968

Mr. Albert E. Mouncer (Mail Drop PE01)
Vice President, Corporate Services/
General Counsel/CFO
Energy Northwest
P.O. Box 968
Richland, WA 99352-0968

Mr. William A. Horin, Esq.
Winston & Strawn
1700 K Street, N.W.
Washington, DC 20006-3817

Chairman
Energy Facility Site Evaluation Council
P.O. Box 43172
Olympia, WA 98504-3172

Mr. Matt Steuerwalt
Executive Policy Division
Office of the Governor
P.O. Box 43113
Olympia, WA 98504-3113

Mr. Douglas W. Coleman (Mail Drop PE20)
Manager, Regulatory Programs
Energy Northwest
P.O. Box 968
Richland, WA 99352-0968

Ms. Lynn Albin
Washington State Department of Health
P.O. Box 7827
Olympia, WA 98504-7827

Mr. Gregory V. Cullen (Mail Drop PE20)
Supervisor, Licensing
Energy Northwest
P.O. Box 968
Richland, WA 99352-0968

Technical Services Branch Chief
FEMA Region X
130 228th Street S.W.
Bothell, WA 98201-9796

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-4005

Cheryl M. Whitcomb (Mail Drop PE03)
Vice President, Organizational
Performance & Staffing/CKO
Energy Northwest
P.O. Box 968
Richland, WA 99352-0968

Chairman
Benton County Board of Commissioners
P.O. Box 190
Prosser, WA 99350-0190

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P.O. Box 69
Richland, WA 99352-0069

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