

October 5, 1995

Mr. J. V. Parrish (Mail Drop 1023)  
Vice President Nuclear Operations  
3000 George Washington Way  
Washington Public Power Supply System  
P.O. Box 968  
Richland, Washington 99352-0968

SUBJECT: ISSUANCE OF AMENDMENT FOR THE WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
NUCLEAR PROJECT NO. 2 (TAC NO. M90247)

Dear Mr. Parrish:

The Commission has issued the enclosed Amendment No. 142 to Facility Operating License No. NPF-21 for WPPSS Nuclear Project No. 2. The amendment consists of changes to the Technical Specifications (TS) in response to your application dated December 6, 1993.

The amendment changes the surveillance requirement contained in TS 4.6.6.1.b.3 to provide more appropriate acceptance criteria for demonstrating operability of the primary containment hydrogen recombiner systems.

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,

*Kustine M. Thomas for*

James W. Clifford, Senior Project Manager  
Project Directorate IV-2  
Division of Reactor Projects III/IV  
Office of Nuclear Reactor Regulation

Docket No. 50-397

Enclosures: 1. Amendment No. 142 to NPF-2  
2. Safety Evaluation

cc w/encls: See next page

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DOCUMENT NAME: WNP90247.AMD \*See Previous Sheet for Concurrence

OFC	PDIV-2/LA	PDIV-2/PM	BC/SCSB*	OGC*	PDIV-2/PM
NAME	E <sup>esp</sup> Peyton	K <sup>KMT</sup> Thomas:ye	CBerlinger	CMarco	J <sup>KMT</sup> Clifford
DATE	10/9/3/95	10/9/3/95	9/21/95	9/27/95	10/9/3/95

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WPPSS PUBLIC POWER SUPPLY SYSTEM OFFICIAL RECORD COPY DFDI

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

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Docket No. 50-397

Enclosures: 1. Amendment No. 142 to NPF-21  
2. Safety Evaluation

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

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

DOCKET NO. 50-397

NUCLEAR PROJECT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 142  
License No. NPF-21

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by the Washington Public Power Supply System (licensee) dated December 6, 1993, complies 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. 142 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. This amendment is effective as of its date of issuance and shall be implemented within 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

*Kristine M. Thomas*

James W. Clifford, Senior Project Manager  
Project Directorate IV-2  
Division of Reactor Projects III/IV  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance: October 5, 1995

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 142 TO FACILITY OPERATING LICENSE NO. NPF-21

DOCKET NO. 50-397

Replace the following pages of the Appendix A Technical Specifications with the enclosed 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

3/4 6-44  
B 3/4 6-5  
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INSERT

3/4 6-44  
B 3/4 6-5  
B 3/4 6-6  
B 3/4 6-7

## CONTAINMENT SYSTEMS

### 3/4.6.6 PRIMARY CONTAINMENT ATMOSPHERE CONTROL

#### DRYWELL AND SUPPRESSION CHAMBER HYDROGEN RECOMBINER SYSTEMS

##### LIMITING CONDITION FOR OPERATION

3.6.6.1 Two independent drywell and suppression chamber hydrogen recombiner systems shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

ACTION: With one drywell and suppression chamber hydrogen recombiner system inoperable, restore the inoperable system to OPERABLE status within 30 days or be in at least HOT SHUTDOWN within the next 12 hours.

##### SURVEILLANCE REQUIREMENTS

4.6.6.1 Each drywell and suppression chamber hydrogen recombiner system shall be demonstrated OPERABLE:

- a. At least once per 6 months by verifying during a recombiner system warmup test that the minimum recombiner heater outlet temperature increases to greater than or equal to 500°F within 90 minutes.
- b. At least once per 18 months by:
  1. Performing a CHANNEL CALIBRATION of all recombiner operating instrumentation and control circuits.
  2. Verifying the integrity of all heater electrical circuits by performing a resistance to ground test within 30 minutes following the above required functional test. The resistance to ground for any heater phase shall be greater than or equal to 10,000 ohms.
  3. Verifying during a recombiner system functional test that upon introduction of at least 1% by volume hydrogen into the catalyst bed preheated to a temperature not to exceed 300°F that:
    - a) the effluent stream has a hydrogen concentration of less than 25 ppm by volume, and;
    - b) that at least 75% of the temperature increase occurs above the fourth temperature measuring device in the catalyst bed.
  4. Verifying through a visual examination that there is no evidence of abnormal conditions within the recombiner enclosure; i.e., loose wiring or structural connections, deposits of foreign materials, etc.
- c. By measuring the system leakage rate:
  1. As a part of the overall integrated leakage rate test required by Specification 3.6.1.2, or
  2. By measuring the leakage rate of the system outside of the containment isolation valves at  $P_a$ , on the schedule required by Specification 4.6.1.2, and including the measured leakage as a part of the leakage determined in accordance with Specification 4.6.1.2.



## CONTAINMENT SYSTEMS

### BASES

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#### 3/4.6.4 VACUUM RELIEF

Vacuum relief breakers are provided to equalize the pressure between the suppression chamber and drywell and between the reactor building and suppression chamber. This system will maintain the structural integrity of the primary containment under conditions of large differential pressures.

The vacuum breakers between the suppression chamber and the drywell must not be inoperable in the open position since this would allow bypassing of the suppression pool in case of an accident. There are nine pairs of valves to provide redundancy and capacity so that operation may continue indefinitely with no more than two pairs of vacuum breakers inoperable in the closed position.

#### 3/4.6.5 SECONDARY CONTAINMENT

Secondary containment is designed to minimize any ground level release of radioactive material which may result from an accident. The reactor building and associated structures provide secondary containment during normal operation when the drywell is sealed and in service. At other times the drywell may be open and, when required, secondary containment integrity is specified.

Establishing and maintaining a vacuum in the reactor building with the standby gas treatment system once per 18 months, along with the surveillance of the doors, hatches, dampers, and valves, is adequate to ensure that there are no violations of the integrity of the secondary containment.

The OPERABILITY of the standby gas treatment systems ensures that sufficient iodine removal capability will be available in the event of a LOCA. The reduction in containment iodine inventory reduces the resulting SITE BOUNDARY radiation doses associated with containment leakage. The operation of this system and resultant iodine removal capacity are consistent with the assumptions used in the LOCA analyses. Continuous operation of the system with the heaters OPERABLE for 10 hours during each 31 day period is sufficient to reduce the buildup of moisture on the adsorbers and HEPA filters.

#### 3/4.6.6 PRIMARY CONTAINMENT ATMOSPHERE CONTROL

The OPERABILITY of the systems required for the detection and control of oxygen/hydrogen gas ensures that these systems will be available to maintain the oxygen concentration within the primary containment below the lower oxygen limit for oxygen/hydrogen mixture during post-LOCA conditions. Either drywell and suppression chamber oxygen/hydrogen recombiner system is capable of controlling the expected oxygen generation associated with radiolytic decomposition of water. The oxygen/hydrogen control system is consistent with the recommendations of Regulatory Guide 1.7, "Control of Combustible Gas Concentrations in Containment Following a LOCA," September 1976.

## CONTAINMENT SYSTEMS

### BASES

#### PRIMARY CONTAINMENT ATMOSPHERE CONTROL (Continued)

Following an accident the inerted primary containment oxygen level is controlled to not exceed 4.8% volume with the catalytic recombiner system. By FSAR Figure 6.2-26 the containment will reach 4.8% oxygen approximately 60 hours after the accident if either recombiner system is operating.

To provide assurance that recombiners are capable of achieving the required oxygen removal, the feed and effluent streams will be sampled during surveillance testing to establish that the effluent hydrogen concentration is less than 25 ppm by volume for a feed of at least 1% hydrogen by volume. This will confirm a minimum efficiency of 99.75% for the expected range of post-accident conditions. This efficiency will be adequate to maintain the post-accident oxygen level below 4.8% by volume.

The CAC system employs a platinum on alumina catalyst to recombine the oxygen and hydrogen flow from the containment. During accident conditions, the gas mixture is preheated to approximately 450 to 550°F prior to entering the catalyst. This preheat increases the effectiveness of the hydrogen/oxygen recombination because it limits the potential for bed poisoning. In the test configuration, the blower is used as the only source of gas stream heating and the catalyst preheaters are not energized. The blowers are capable of heating the gas stream by compression. Temperatures at the blower exit are limited for test purposes to approximately 300°F due to the blower gas exit temperature trip setpoint.

The capacity of the catalyst bed can be reduced through mechanical, thermal, or chemical (poisoning) deactivation. Poison can be introduced through the environment or the process. To protect the catalyst, the CAC skid is maintained isolated with a pressurized nitrogen blanket. During the performance of the required surveillance testing, the catalyst is exposed to air (and the potential for poisoning from the environment). However, the process of testing establishes that the bed is operable and has not been damaged. The process stream, in a design bases event, may include iodine. Iodine can chemically poison the platinum catalyst; however, the CAC skid scrubs the process gas to remove iodine from the process stream and heats it to reduce effects on the catalyst.

It is important to note that a catalyst bed and its ability to recombine hydrogen and oxygen does not deplete simply from use. Any reduction in recombination capability is caused by poisoning or other damage to or loss of catalyst, or by insufficient activation energy (low inlet temperature). Given adequate inlet temperature, the presence of poisoning in the top few inches of the bed will simply move the peak reactor further down in the bed with very little effect on the percent completion of the reaction. Any such downward movement in the site of the majority of the recombination should be evaluated to determine any actions that may be necessary. Measuring the hydrogen concentration in the effluent stream provides the necessary information that in fact the catalyst is able to recombine hydrogen and oxygen at greater than the 99% efficiency assumed in the containment analysis. Verification that the

## CONTAINMENT SYSTEMS

### BASES

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#### PRIMARY CONTAINMENT ATMOSPHERE CONTROL (Continued)

maximum temperature rise occurs near the top of the bed (i.e., as seen on the first three RTDs) assures that no damage to the bed is preventing proper operation. If the maximum temperature rise occurs near the bottom of the bed (i.e., on the lowest RTD), verification that at least 75% of the increase was achieved above that RTD indicates that the lower portion of the bed is still capable of providing the necessary catalytic function. However, the change of location of that recombination process provides indication of the potential degradation of the catalyst.

Degradation of the catalyst bed will also be indicated by the decreased ability to recombine hydrogen and oxygen. This indication can be determined through the evaluation of the hydrogen content of the influent and effluent. The catalyst bed should maintain a relatively constant capacity for recombination. If the comparison of the influent and effluent hydrogen concentrations begins to indicate a degradation of the catalyst bed, replacement of the bed will be evaluated.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 142 TO FACILITY OPERATING LICENSE NO. NPF-21  
WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
NUCLEAR PROJECT NO. 2  
DOCKET NO. 50-397

1.0 INTRODUCTION

By letter dated December 6, 1993, the Washington Public Power Supply System (WPPSS or the licensee) requested changes to the Technical Specifications (Appendix A to Facility Operating License No. NPF-21) for the WPPSS Nuclear Project No. 2. The letter superseded a request made by letter dated March 18, 1992. The proposed changes would revise the Surveillance Requirement 4.6.6.1.b.3 to provide more appropriate acceptance criteria for demonstrating operability of the primary containment hydrogen recombiner systems.

2.0 EVALUATION

The surveillance requirement in TS 4.6.6.1.b.3 pertains to the operability of the catalyst beds in the primary containment hydrogen recombiner systems in the containment atmosphere control (CAC) system. The changes to the TS are being made to provide more appropriate acceptance criteria for demonstrating operability of the catalyst beds, since the licensee determined that the present temperature rise acceptance criteria is not, by itself, an accurate reflection of catalyst operability. Specifically, it was determined that the acceptance criteria is very dependent on the analytical methods of calculating the input parameters and measurement of performance indicators (i.e., hydrogen concentration, process flows and temperatures). Depending on the methods of calculating the input parameters, it was determined that the required temperature rise can vary significantly. In addition to the analytical methods used to determine the input parameters, other factors such as heat removed by the gas flow; heat capacity of the catalyst bed and the vessel; heat losses through vessel insulation, supports and piping; time lag; and heat loss caused by temperature sensors and uncertainties in flow determination during testing, all led to the conclusion that the present criteria was not, by itself, an accurate reflection of catalyst operability.

As a result, the licensee proposed a change to TS 4.6.6.1.b.3 which includes two methods to monitor the effectiveness of the catalyst beds; one test will examine the temperature profile through the bed, which will indicate the relative location of the catalytic reaction, while the other will determine the operability of the catalyst by comparing the hydrogen content in the influent and effluent process streams. Successful tests will show that the recombination process is occurring near the top of the bed (i.e., at least 75 percent of the maximum temperature rise occurs before the fourth temperature

device), with an adequate level of recombination (i.e., with the introduction of at least 1 percent by volume hydrogen into the catalyst bed, the effluent stream has a hydrogen concentration of less than 25 ppm by volume).

If the catalyst activity is degraded for any reason, the reaction will take place further into the bed and the location of the peak temperature will move accordingly. Therefore, taking temperature readings of the catalyst bed during the surveillance to determine the location of the maximum temperature increase and verification that at least 75 percent of the temperature increase occurred in the area of the first three in-bed detectors will provide the data that supports the analysis of the catalyst's capability. In addition, if the maximum temperature rise occurs near the bottom of the bed (i.e., on the last RTD), verification that at least 75 percent of the increase was achieved above that RTD indicates that the lower portion of the bed is still capable of providing the necessary catalytic function.

Degradation of the catalyst bed will also be indicated by a decreased ability to recombine hydrogen and oxygen. Therefore, it was concluded that sampling of the influent and effluent gases would be a direct indication of catalyst efficiency. An appropriate acceptance criterion is the sampling of the effluent gas stream for hydrogen concentration for a defined input volume percent of hydrogen. A sample retaining less than 25 ppm by volume after passing through the catalyst bed indicates acceptable recombiner operation for a feed of at least 1 percent hydrogen by volume. In addition, the catalyst bed should maintain a relatively constant capacity for recombination. If the comparison of the influent and effluent hydrogen concentrations begins to indicate a degradation of the catalyst bed, replacement of the bed will be evaluated.

Based on the above, the proposed changes to Surveillance Requirement 4.6.6.1.b.3 provide more appropriate acceptance criteria for demonstrating operability of the primary containment hydrogen recombiner systems, and are therefore acceptable.

### 3.0 STATE CONSULTATION

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

### 4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the 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. 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 (59 FR 34670). 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.

## 5.0 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) 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.

Principal Contributors: K. Thomas  
T. D'Angelo

Date: October 5, 1995