WOLF CREEK
NUCLEAR OPERATING CORPORATION

Donna Jacobs
Vice President Operations and Plant Manager

JUL 23 2004

WO 04-0027

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

Subject: Docket No. 50-482: Application for Technical Specification Improvement to Eliminate Requirements for Hydrogen Recombiners and Hydrogen Monitors Using the Consolidated Line Item Improvement Process

Gentlemen:

Pursuant to 10 CFR 50.90, Wolf Creek Nuclear Operating Corporation (WCNOC) hereby requests an amendment to Facility Operating License No. NPF-42 for the Wolf Creek Generating Station (WCGS).

The proposed amendment will delete the Technical Specification (TS) requirements related to hydrogen recombiners and hydrogen monitors. The proposed TS changes support implementation of the revisions to 10 CFR 50.55, "Standards for Combustible Gas Control System in Light-Water-Cooled Power Reactors," that became effective on October 16, 2003. The changes are consistent with Revision 1 of NRC-approved Industry/Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-447, "Elimination of Hydrogen Recombiners and Change to Hydrogen and Oxygen Monitors." The availability of this TS improvement was announced in the Federal Register on September 25, 2003, as part of the consolidated line item improvement process (CLIIP).

Attachment I provides a description of the proposed change, the requested confirmation of applicability, and plant-specific verifications and commitments. Attachment II provides the existing TS pages marked-up to show the proposed change. Attachment III provides revised, clean TS pages. Attachment IV contains the TS Bases changes (for information only) to assist the staff in its review of the proposed changes. Revision to the TS Bases will be implemented pursuant to the TS Bases Control Program, TS 5.5.14, upon implementation of this license amendment. Attachment V contains a list of commitments.

This amendment application was reviewed by the Plant Safety Review Committee and the Nuclear Safety Review Committee. In accordance with 10 CFR 50.91, a copy of this amendment application, with attachments, is being provided to the designated Kansas State official.

A001

WCNOC requests approval of the proposed amendment by July 29, 2005. The changes proposed are not required to address an immediate safety concern. It is anticipated that the license amendment, as approved, will be effective upon issuance, to be implemented within 90 days from the date of issuance. Please contact me at (620) 364-4246 or Mr. Kevin Moles at (620) 364-4126 for any questions you may have regarding this application.

Very truly yours,

Donna Jacobs

DJ/rlg

Attachments: I - Evaluation
II - Markup of Technical Specification pages
III - Retyped Technical Specification pages
IV - TS Bases Changes (For Information Only)
V - List of Commitments

cc: V. L. Cooper (KDHE), w/a
J. N. Donohew (NRC), w/a
D. N. Graves (NRC), w/a
B. S. Mallett (NRC), w/a
Senior Resident Inspector (NRC), w/a

STATE OF KANSAS)
) SS
COUNTY OF COFFEY)

Donna Jacobs, of lawful age, being first duly sworn upon oath says that she is Vice President Operations and Plant Manager of Wolf Creek Nuclear Operating Corporation; that she has read the foregoing document and knows the contents thereof; that she has executed the same for and on behalf of said Corporation with full power and authority to do so; and that the facts therein stated are true and correct to the best of her knowledge, information and belief.

By _____
Donna Jacobs
Vice President Operations and Plant Manager

SUBSCRIBED and sworn to before me this 23rd day of July, 2004.

NOTARY PUBLIC STATE OF KANSAS | RHONDA L. GLEUE My Appt. Exp. 5-11-2006

_____
Notary Public

Expiration Date May 11, 2006

EVALUATION

1.0 DESCRIPTION

The proposed amendment deletes Technical Specification (TS) 3.6.8, "Hydrogen Recombiners," and references to the hydrogen monitors in TS 3.3.3, "Post Accident Monitoring (PAM) Instrumentation." The proposed TS changes support implementation of the revisions to 10 CFR 50.44, "Standards for Combustible Gas Control System in Light-Water-Cooled Power Reactors," that became effective on October 16, 2003.

The changes are consistent with Revision 1 of NRC-approved Industry/Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-447, "Elimination of Hydrogen Recombiners and Change to Hydrogen and Oxygen Monitors." The availability of this TS improvement was announced in the Federal Register on September 25, 2003 (68 FR 55416) as part of the consolidated line item improvement process.

2.0 PROPOSED CHANGE

Due to minor differences between Wolf Creek Generating Station (WCGS) TS and TS Bases and the model Standard Technical Specifications in NUREG-1431, Revision 2, "Standard Technical Specifications, Westinghouse Plants," in several cases variances from the TSTF mark-up changes are made. These variances are discussed below and do not invalidate the NRC staff's model safety evaluation supporting the adoption of TSTF-447, Revision 1. Consistent with the NRC-approved Revision 1 of TSTF-447, the proposed TS changes include:

- In TS 3.3.3, the Note in Condition C indicating this Condition is not applicable to hydrogen analyzer channels is deleted.

- In TS 3.3.3, Condition D is deleted. Deletion of Condition D resulted in revisions to the lettering of subsequent Conditions in the ACTIONS Table and in Table 3.3.3-1.

- In TS Table 3.3.3-1, Function 10, "Containment Hydrogen Concentration Level," is deleted. This is a minor variance from TSTF-447 in that Function 11, "Hydrogen Monitors," is deleted and Function 10 is identified as "Not Used" in lieu of renumbering the subsequent Functions to minimize changes to plant procedures.

- TS 3.6.8, "Hydrogen Recombiners," is deleted. The Table of Contents, page ii, is revised to reflect the deletion of TS 3.6.8. The change to the Table of Contents is a minor variance from TSTF-447 in that this change is not reflected in the TSTF.

- TS 5.6.8, "PAM Report," is revised to reflect changing Condition G to Condition F in TS 3.3.3.

As described in NRC-approved Revision 1 of TSTF-447, the changes to TS requirements results in changes to various TS Bases sections. Revision to the TS Bases will be implemented pursuant to the TS Bases Control Program, TS 5.5.14, upon implementation of this license amendment.

3.0 BACKGROUND

The background for this application is adequately addressed by the NRC Notice of Availability published on September 25, 2003 (68 FR 55416), NRC Notice for Comment published August 2, 2002 (67 FR 50374), TSTF-477 (Revision 1), the documentation associated with the 10 CFR 50.44 rulemaking, and other related documents.

4.0 TECHNICAL ANALYSIS

Wolf Creek Nuclear Operating Corporation (WCNOC) has reviewed the model safety evaluation (SE) published on September 25, 2003 (68 FR 55416) as part of the CLIIP Notice of Availability. This verification included a review of the NRC staff's SE, as well as the information provided to support TSTF-447, Revision 1. WCNOC has concluded that the justifications presented in the TSTF proposal and the SE prepared by the NRC staff are applicable to the Wolf Creek Generating Station (WCGS) and justify this amendment for the incorporation of the changes to the WCGS TS.

5.0 REGULATORY ANALYSIS

A description of this proposed change and its relationship to applicable regulatory requirements and guidance was provided in the NRC Notice of Availability published on September 25, 2003 (68 FR 55416), TSTF-447 (Revision 1), the documentation associated with the 10 CFR 50.44 rulemaking, and other related documents.

5.1 VERIFICATION AND COMMITMENTS

As discussed in the model SE published in the Federal Register on September 25, 2003 (68 FR 55416) for the TS improvement, WCNOC is making the following verifications and regulatory commitments:

1. WCNOC has verified that a hydrogen monitoring system capable of diagnosing beyond design-basis accidents is installed at WCGS and is making a regulatory commitment to maintain that capability. The hydrogen monitors will be included in the Technical Requirements Manual. This regulatory commitment will be implemented within 90 days of NRC approval of this amendment request.

2. WCGS does not have an inerted containment.

5.2 NO SIGNIFICANT HAZARDS CONSIDERATION

WCNOC has reviewed the proposed no significant hazards consideration determination published on September 25, 2003 (68 FR 55416) as part of the CLIIP. WCNOC has concluded that the proposed determination presented in the notice is applicable to WCGS and the determination is hereby incorporated by reference to satisfy the requirements of 10 CFR 50.91 (a).

6.0 ENVIRONMENTAL CONSIDERATION

WCNOC has reviewed the environmental evaluation included in the model SE published on September 25, 2003 (68 FR 55416) as part of the CLIIP. WCNOC has concluded that the staff's findings presented in that evaluation are applicable to WCGS and the evaluation is hereby incorporated by reference for this application.

7.0 REFERENCES

1. Federal Register Notice: Notice of Availability of Model Application Concerning Technical Specification Improvement To Eliminate Hydrogen Recombiner Requirement, and Relax the Hydrogen and Oxygen Monitor Requirements for Light Water Reactors Using the Consolidated Line Item Improvement Process, published September 25, 2003 (68 FR 55416).

2. Federal Register Notice: Combustible Gas Control in Containment, Proposed Rule published August 2, 2002 (67 FR 50374)

3. Industry/Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-447, "Elimination of Hydrogen Recombiners and Change to Hydrogen and Oxygen Monitors," Revision 1.

4. Federal Register Notice: Combustible Gas Control in Containment, Final Rule published September 16, 2003 (68 FR 54123)

This application is being made in accordance with the CLIIP. Due to minor differences between Wolf Creek Generating Station (WCGS) TS and TS Bases and the model Standard Technical Specifications in NUREG-1431, Revision 2, "Standard Technical Specifications, Westinghouse Plants," in several cases variances from the TSTF mark-up changes are made. WCNOC is not proposing variations or deviations from the NRC staff's model SE published on September 25, 2003 (68 FR 55416).

ATTACHMENT II
MARKUP OF TECHNICAL SPECIFICATION PAGES

TABLE OF CONTENTS

No changes to this page.
Provided for context/continuity.

3.3 INSTRUMENTATION

3.3.3 Post Accident Monitoring (PAM) Instrumentation

LCO 3.3.3 The PAM instrumentation for each Function in Table 3.3.3-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2 and 3.

ACTIONS

NOTES

1. LCO 3.0.4 is not applicable.
2. Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action in accordance with Specification 5.6.8.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or more Functions with two or more required channels inoperable. NOTE: Not applicable to hydrogen analyzer channels.	C.1 Restore all but one channel to OPERABLE status.	7 days
D. Two hydrogen analyzer channels inoperable.	D.1 Restore one hydrogen analyzer channel to OPERABLE status.	72 hours
D. E. Required Action and associated Completion Time of Condition C or D not met.	E.1 D.1 Enter the Condition referenced in Table 3.3.3-1 for the channel.	Immediately
E. E.1 E.2 D.1 As required by Required Action E.1 and referenced in Table 3.3.3-1.	E.1 Be in MODE 3. AND E.2 Be in MODE 4.	6 hours 12 hours
F. F.1 D.1 As required by Required Action E.1 and referenced in Table 3.3.3-1.	F.1 Initiate action in accordance with Specification 5.6.8.	Immediately

Table 3.3.3-1 (page 1 of 1)
Post Accident Monitoring Instrumentation

	FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION
1.	Neutron Flux	2	E
2.	Reactor Coolant System (RCS) Hot Leg Temperature (Wide Range)	2	E
3.	RCS Cold Leg Temperature (Wide Range)	2	E
4.	RCS Pressure (Wide Range)	2	E
5.	Reactor Vessel Water Level	2	F
6.	Containment Normal Sump Water Level	2	E
7.	Containment Pressure (Normal Range)	2	E
8.	Steam Line Pressure	2 per steam generator	E
9.	Containment Radiation Level (High Range)	2	F
10.	Containment Hydrogen Concentration Level	2	F
11.	Pressurizer Water Level	2	E
12.	Steam Generator Water Level (Wide Range)	4	E
13.	Steam Generator Water Level (Narrow Range)	2 per steam generator	E
14.	Core Exit Temperature - Quadrant 1	2[(a)]	E
15.	Core Exit Temperature - Quadrant 2	2[(a)]	E
16.	Core Exit Temperature - Quadrant 3	2[(a)]	E
17.	Core Exit Temperature - Quadrant 4	2[(a)]	E
18.	Auxiliary Feedwater Flow Rate	4	E
19.	Refueling Water Storage Tank Level	2	E

Not Used

D.1

(a) A channel consists of two core exit thermocouples (CETs).

3.6 CONTAINMENT SYSTEMS

3.6.8 Hydrogen Recombiners

LCO 3.6.8 Two hydrogen recombiners shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One hydrogen recombiner inoperable.	A.1	----------NOTE---------- LCO 3.0.4 is not applicable. ---------- Restore hydrogen recombiner to OPERABLE status.	30 days
B. Two hydrogen recombiners inoperable.	B.1	Verify by administrative means that the hydrogen control function is maintained.	1 hour AND Once per 12 hours thereafter
	AND B.2	Restore one hydrogen recombiner to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.8.1	Perform a system functional test for each hydrogen recombiner.	18 months
SR 3.6.8.2	Visually examine each hydrogen recombiner enclosure and verify there is no evidence of abnormal conditions.	18 months
SR 3.6.8.3	Perform a resistance to ground test for each heater phase.	18 months

5.6 Reporting Requirements

5.6.6 Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR) (continued)

1. NRC letter dated December 2, 1999, "Wolf Creek Generating Station, Acceptance for Referencing of Pressure Temperature Limits Report (TAC No. MA4572)," and

2. WCAP-14040-NP-A, "Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves," January, 1996.

c. The PTLR shall be provided to the NRC upon issuance for each reactor vessel fluence period and for any revision or supplement thereto.

5.6.7 Not Used.

5.6.8 PAM Report

When a report is required by Condition B or F of LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

5.6.9 Not Used.

5.6.10 Steam Generator Tube Inspection Report

a. Within 15 days following the completion of each inservice inspection of steam generator tubes, the number of tubes plugged in each steam generator shall be reported to the Commission.

b. The complete results of the steam generator tube inservice inspection shall be submitted to the Commission in a report within 12 months following completion of the inspection. This Special Report shall include:

1) Number and extent of tubes inspected,

(continued)

ATTACHMENT III
RETYPED TECHNICAL SPECIFICATION PAGES

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One or more Functions with two or more required channels inoperable.	C.1	Restore all but one channel to OPERABLE status.	7 days
D. Required Action and associated Completion Time of Condition C not met.	D.1	Enter the Condition referenced in Table 3.3.3-1 for the channel.	Immediately
E. As required by Required Action D.1 and referenced in Table 3.3.3-1.	E.1	Be in MODE 3.	6 hours
	AND		
	E.2	Be in MODE 4.	12 hours
F. As required by Required Action D.1 and referenced in Table 3.3.3-1.	F.1	Initiate action in accordance with Specification 5.6.8.	Immediately

Table 3.3.3-1 (page 1 of 1)
Post Accident Monitoring Instrumentation

	FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION D.1
1.	Neutron Flux	2	E
2.	Reactor Coolant System (RCS) Hot Leg Temperature (Wide Range)	2	E
3.	RCS Cold Leg Temperature (Wide Range)	2	E
4.	RCS Pressure (Wide Range)	2	E
5.	Reactor Vessel Water Level	2	F
6.	Containment Normal Sump Water Level	2	E
7.	Containment Pressure (Normal Range)	2	E
8.	Steam Line Pressure	2 per steam generator	E
9.	Containment Radiation Level (High Range)	2	F
10.	Not Used		
11.	Pressurizer Water Level	2	E
12.	Steam Generator Water Level (Wide Range)	4	E
13.	Steam Generator Water Level (Narrow Range)	2 per steam generator	E
14.	Core Exit Temperature - Quadrant 1	2(a)	E
15.	Core Exit Temperature - Quadrant 2	2(a)	E
16.	Core Exit Temperature - Quadrant 3	2(a)	E
17.	Core Exit Temperature - Quadrant 4	2(a)	E
18.	Auxiliary Feedwater Flow Rate	4	E
19.	Refueling Water Storage Tank Level	2	E

(a) A channel consists of two core exit thermocouples (CETs).

5.6 Reporting Requirements

5.6.6 Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR) (continued)

1. NRC letter dated December 2, 1999, "Wolf Creek Generating Station, Acceptance for Referencing of Pressure Temperature Limits Report (TAC No. MA4572)," and

2. WCAP-14040-NP-A, "Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves," January, 1996.

c. The PTLR shall be provided to the NRC upon issuance for each reactor vessel fluence period and for any revision or supplement thereto.

5.6.7 Not Used.

5.6.8 PAM Report

When a report is required by Condition B or F of LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

5.6.9 Not Used.

5.6.10 Steam Generator Tube Inspection Report

a. Within 15 days following the completion of each inservice inspection of steam generator tubes, the number of tubes plugged in each steam generator shall be reported to the Commission.

b. The complete results of the steam generator tube inservice inspection shall be submitted to the Commission in a report within 12 months following completion of the inspection. This Special Report shall include:

1) Number and extent of tubes inspected,

(continued)

ATTACHMENT IV
TS BASES CHANGES (FOR INFORMATION ONLY)

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BASES

LCO
(continued)

8. Steam Line Pressure

Steam Line Pressure is a Type A, Category 1 variable for event diagnosis, natural circulation, and RCP trip criteria. It is a variable for determining if a secondary pipe rupture has occurred. This indication is provided to aid the operator in determining the faulted steam generator and to verify natural circulation.

9. Containment Radiation Level (High Range, GT-RIC-59, -60)

Containment Radiation Level is a Type A, Category 1 variable provided to monitor for the potential of significant radiation releases and to provide release assessment for use by operators in determining the need to invoke site emergency plans. Containment radiation level is used to determine if a high energy line break (HELB) has occurred, and whether the event is inside or outside of containment.

10. Containment Hydrogen Concentration Level

Not Used

Hydrogen analyzers are Category 1 variables provided to detect high hydrogen concentration conditions that represent a potential for containment breach from a hydrogen explosion. This variable is also important in verifying the adequacy of mitigating actions.

11. Pressurizer Water Level

Pressurizer Water Level is a Type A, Category 1 variable used to determine whether to terminate SI, if still in progress, or to reinitiate SI if it has been stopped. Knowledge of pressurizer water level is also used to verify the unit conditions necessary to establish natural circulation in the RCS and to verify that the unit is maintained in a safe shutdown condition.

12. Steam Generator Water Level (Wide Range)

SG Water Level (Wide Range) is a Category 1 variable provided to monitor SG dryout and as a criterion for establishing feed and bleed cooling of the RCS. The wide range level indicator for each steam generator is located in the main control room. Wide range steam generator level measurement meets the intent of the single failure criterion for Category 1 variables by virtue of independent diverse variables. In the emergency procedures, auxiliary feedwater (AFW) flow, reactor coolant pressure, and reactor coolant temperature indications are diverse variables which are

BASES

ACTIONS (continued)

C.1 (continued)

qualification requirements applied to the PAM instrumentation. Therefore, requiring restoration of all but one inoperable channel of the Function limits the risk that the PAM Function will be in a degraded condition should an accident occur. Condition C is modified by a Note that excludes hydrogen analyzer channels.

D.1

Condition D applies when two hydrogen analyzer channels are inoperable. Required Action D.1 requires restoring one hydrogen analyzer channel to OPERABLE status within 72 hours. The 72 hour Completion Time is reasonable based on the unlikely event that a LOCA (which would cause core damage) would occur during this time.

Condition E applies when the Required Action and associated Completion Time of Condition C or D are not met. Required Action E.1 requires entering the appropriate Condition referenced in Table 3.3.3-1 for the channel immediately. The applicable Condition referenced in the Table is Function dependent. Each time an inoperable channel has not met any Required Action of Condition C or D and the associated Completion Time has expired, Condition E is entered for that channel and provides for transfer to the appropriate subsequent Condition.

E.1 and E.2

If the Required Action and associated Completion Time of Conditions C or D are not met and Table 3.3.3-1 directs entry into Condition E, the unit must be brought to a MODE where the requirements of this LCO do not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and MODE 4 within 12 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

BASES

ACTIONS (continued)

Alternate means of monitoring Reactor Vessel Water Level and Containment Area Radiation have been developed. These alternate means may be temporarily used if the normal PAM channel cannot be restored to OPERABLE status within the allotted time. If these alternate means are used, the Required Action is not to shut down the unit but rather to follow the directions of Specification 5.6.8, in the Administrative Controls section of the TS. Monitoring the core exit thermocouples, pressurizer level indication (BB-LI-0459A, -0460A, or -0461) and RCS subcooling monitor indication (BB-TI-1390A or B) provide an alternate means for RVLIS. These 3 parameters provide diverse information to verify there is adequate core cooling. When Containment Radiation Level (High Range) monitors are inoperable, portable survey equipment with the capability to detect gamma radiation over the range 1E-03 to 1E04 provides an alternate means (Ref. 5).

SURVEILLANCE REQUIREMENTS

A Note has been added to the SR Table to clarify that SR 3.3.3.1 and SR 3.3.3.2 apply to each PAM instrumentation Function in Table 3.3.3-1.

SR 3.3.3.1

Performance of the CHANNEL CHECK once every 31 days ensures that a gross instrumentation failure has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION. The high radiation instrumentation should be compared to similar unit instruments located throughout the unit.

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including isolation, indication, and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit. If the channels are within the criteria, it is an indication that the channels are OPERABLE.

B 3.6 CONTAINMENT SYSTEMS

B 3.6.8 Hydrogen Recombiners

BASES

BACKGROUND

The function of the hydrogen recombiners is to eliminate the potential breach of containment due to a hydrogen oxygen reaction.

Per 10 CFR 50.44, "Standards for Combustible Gas Control Systems in Light-Water-Cooled Reactors" (Ref. 1), and GDC 41, "Containment Atmosphere Cleanup" (Ref. 2), hydrogen recombiners are required to reduce the hydrogen concentration in the containment following a loss of coolant accident (LOCA) or steam line break (SLB). The recombiners accomplish this by recombining hydrogen and oxygen to form water vapor. The vapor remains in containment, thus eliminating any discharge to the environment. The hydrogen recombiners are manually initiated since flammable limits would not be reached until several days after a Design Basis Accident (DBA).

Two 100% capacity independent hydrogen recombiner systems are provided. Each consists of controls located in the control room, a power supply and a recombiner. Recombination is accomplished by heating a hydrogen air mixture above 1150°F. The resulting water vapor and discharge gases are cooled prior to discharge from the recombiner. A single recombiner is capable of maintaining the hydrogen concentration in containment below the 4.0 volume percent (v/o) flammability limit. Two recombiners are provided to meet the requirement for redundancy and independence. Each recombiner is powered from a separate Engineered Safety Features bus, and is provided with a separate power panel and control panel.

APPLICABLE SAFETY ANALYSES

The hydrogen recombiners provide for the capability of controlling the bulk hydrogen concentration in containment to less than the lower flammable concentration of 4.0 v/o following a DBA. This control would prevent a containment wide hydrogen burn, thus ensuring the pressure and temperature design limits are not exceeded. The limiting DBA relative to hydrogen generation is a LOCA.

Hydrogen may accumulate in containment following a LOCA as a result of:

a. A metal steam reaction between the zirconium fuel rod cladding and the reactor coolant;

b. Radiolytic decomposition of water in the Reactor Coolant System (RCS) and the containment sumps;

BASES

APPLICABLE SAFETY ANALYSES (continued)

c. Hydrogen in the RCS at the time of the LOCA (i.e., hydrogen dissolved in the reactor coolant and hydrogen gas in the pressurizer vapor space); or

d. Corrosion of metals exposed to containment spray and Emergency Core Cooling System solutions.

To evaluate the potential for hydrogen accumulation in containment following a LOCA, the hydrogen generation as a function of time following the initiation of the accident is calculated. Conservative assumptions recommended by Reference 3 are used to maximize the amount of hydrogen calculated.

Based on the conservative assumptions used to calculate the hydrogen concentration versus time after a LOCA, the hydrogen concentration in the primary containment would reach 3.5 v/o about 6 days after the LOCA and 4.0 v/o about 4 days later if no recombiner was functioning (Ref. 3). Initiating one hydrogen recombiner one day following a LOCA will maintain the hydrogen concentration in the primary containment below flammability limits.

The hydrogen recombiners are designed such that, with the conservatively calculated hydrogen generation rates discussed above, a single recombiner is capable of limiting the peak hydrogen concentration in containment to less than 4.0 v/o (Ref. 4). The Hydrogen Purge System is similarly designed such that one of two redundant trains is an adequate backup to the redundant hydrogen recombiners.

The hydrogen recombiners satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

Two hydrogen recombiners must be OPERABLE. This ensures operation of at least one hydrogen recombiner in the event of a worst case single active failure.

Operation with at least one hydrogen recombiner ensures that the post LOCA hydrogen concentration can be prevented from exceeding the flammability limit.

APPLICABILITY

In MODES 1 and 2, two hydrogen recombiners are required to control the hydrogen concentration within containment below its flammability limit of 4.0 v/o following a LOCA, assuming a worst case single failure.

In MODES 3 and 4, both the hydrogen production rate and the total hydrogen produced after a LOCA would be less than that calculated for the DBA LOCA. Also, because of the limited time in these MODES, the probability of an accident requiring the hydrogen recombiners is low. Therefore, the hydrogen recombiners are not required in MODE 3 or 4.

BASES

APPLICABILITY (continued)

In MODES 5 and 6, the probability and consequences of a LOCA are low, due to the pressure and temperature limitations in these MODES. Therefore, hydrogen recombiners are not required in these MODES.

ACTIONS

A.1

With one containment hydrogen recombiner inoperable, the inoperable recombiner must be restored to OPERABLE status within 30 days. In this condition, the remaining OPERABLE hydrogen recombiner is adequate to perform the hydrogen control function. However, the overall reliability is reduced because a single failure in the OPERABLE recombiner could result in reduced hydrogen control capability. The 30 day Completion Time is based on the availability of the other hydrogen recombiner, the low probability of a LOCA or SLB occurring (that would generate an amount of hydrogen that exceeds the flammability limit), and the amount of time available after a LOCA or SLB (should one occur) for operator action to prevent hydrogen accumulation from exceeding the flammability limit.

Required Action A.1 has been modified by a Note that states the provisions of LCO 3.0.4 are not applicable. As a result, a MODE change is allowed when one recombiner is inoperable. This allowance is based on the availability of the other hydrogen recombiner, the low probability of a LOCA or SLB occurring (that would generate an amount of hydrogen that exceeds the flammability limit), and the amount of time available after a LOCA or SLB for operator action to prevent hydrogen accumulation from exceeding the flammability limit.

B.1 and B.2

With two hydrogen recombiners inoperable, the ability to perform the hydrogen control function via alternate capabilities must be verified by administrative means within 1 hour. The alternate hydrogen control capabilities are provided by the containment Hydrogen Purge System. The 1 hour Completion Time allows a reasonable period of time to verify that a loss of hydrogen control function does not exist. Both the initial verification and all subsequent verifications may be performed as an administrative check by examining logs or other information to determine the availability of the alternate hydrogen control system. It does not mean to perform the Surveillances needed to demonstrate OPERABILITY of the alternate hydrogen control system. If the ability to perform the hydrogen control function is maintained, continued operation is permitted with two hydrogen recombiners inoperable for up to 7 days. Seven days is a reasonable time to allow two hydrogen recombiners to be inoperable because the hydrogen control function is maintained and because of the low probability of the occurrence of a LOCA that would generate hydrogen in the amounts capable of exceeding the flammability limit.

BASES

ACTIONS (continued)

C.1

If the inoperable hydrogen recombiner(s) cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.6.8.1

Performance of a system functional test for each hydrogen recombiner ensures the recombiners are operational and can attain and sustain the temperature necessary for hydrogen recombination. In particular, this SR verifies that the minimum heater sheath temperature increases to $\geq$ 1150°F in $\leq$ 5 hours.

Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.6.8.2

This SR ensures there are no physical problems that could affect recombiner operation. Since the recombiners are mechanically passive, they are not subject to mechanical failure. The only credible failure involves loss of power, blockage of the internal flow, missile impact, etc.

A visual inspection is sufficient to determine abnormal conditions (i.e., loose wiring or structural connections, deposits of foreign materials, etc.) that could cause such failures. The 18 month Frequency for this SR was developed considering the incidence of hydrogen recombiners failing the SR in the past is low.

SR 3.6.8.3

This SR, which is performed following the functional test of SR 3.6.8.1, requires performance of a resistance to ground test for each heater phase to ensure that there are no detectable grounds in any heater phase. This is accomplished by verifying that the resistance to ground for any heater phase is $\geq$ 10,000 ohms.

The 18 month Frequency for this Surveillance was developed considering the incidence of hydrogen recombiners failing the SR in the past is low.

BASES

REFERENCES

1. 10 CFR 50.44.
2. 10 CFR 50, Appendix A, GDC 41.
3. Regulatory Guide 1.7, Revision 2.
3. USAR Section 6.2.5.

LIST OF COMMITMENTS

The following table identifies those actions committed to by WCNOC in this document. Any other statements in this submittal are provided for information purposes and are not considered to be commitments. Please direct questions regarding these commitments to Mr. Kevin Moles at (620) 364-4126.

COMMITMENT	Due Date/Event
The proposed changes to the WCGS Technical Specifications will be implemented within 90 days of NRC approval. Revision to the TS Bases will be implemented pursuant to the TS Bases Control Program, TS 5.5.14, upon implementation of this license amendment.	Within 90 days of NRC approval.
WCNOC has verified that a hydrogen monitoring system capable of diagnosing beyond design-basis accidents is installed at WCGS and is making a regulatory commitment to maintain that capability. The hydrogen monitors will be included in the Technical Requirements Manual. This regulatory commitment will be implemented within 90 days of NRC approval of this amendment request.	Within 90 days of NRC approval.