

July 30, 2002

Mr. Otto L. Maynard
President and Chief Executive Officer
Wolf Creek Nuclear Operating Corporation
Post Office Box 411
Burlington, KS 66839

SUBJECT: WOLF CREEK GENERATING STATION - ISSUANCE OF AMENDMENT RE:
EQUIPMENT HATCH OPEN DURING REFUELING (TAC NO. MB2599)

Dear Mr. Maynard:

The Commission has issued the enclosed Amendment No. 146 to Facility Operating License No. NPF-42 for the Wolf Creek Generating Station. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated August 7, 2001 (ET 01-0021), as supplemented by letter dated February 20, 2002 (ET 02-0013).

The amendment revises Limiting Condition for Operation 3.9.4 to allow the equipment hatch to be open during core alterations or movement of irradiated fuel assemblies inside containment, and adds the requirement to verify the capability to install the equipment hatch in a new Surveillance Requirement 3.9.4.2. The existing SR 3.9.4.2 would be renumbered SR 3.9.4.3, but would otherwise not be changed.

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

Sincerely,

/RA/

Jack Donohew, Senior Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-482

Enclosures: 1. Amendment No. 146 to NPF-42
2. Safety Evaluation

cc w/encls: See next page

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* See previous concurrence

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Wolf Creek Generating Station

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WOLF CREEK NUCLEAR OPERATING CORPORATION

WOLF CREEK GENERATING STATION

DOCKET NO. 50-482

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No.146
License No. NPF-42

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the Wolf Creek Generating Station (the facility) Facility Operating License No. NPF-42 filed by the Wolf Creek Nuclear Operating Corporation (the Corporation), dated August 7, 2001, as supplemented by letter dated February 20, 2002, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, as amended, 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 license 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-42 is hereby amended to read as follows:

2. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No.146, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated in the license. The Corporation 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 and shall be implemented within 6 months of the date of issuance, including the incorporation of changes to the Technical Specification Bases as described in the licensee's application dated August 7, 2001, and supplemental letter dated February 20, 2002.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Stephen Dembek, Chief, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: July 30, 2002

ATTACHMENT TO LICENSE AMENDMENT NO. 146

FACILITY OPERATING LICENSE NO. NPF-42

DOCKET NO. 50-482

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

REMOVE

3.9-5

3.9-6

INSERT

3.9-5

3.9-6

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 146 TO FACILITY OPERATING LICENSE NO. NPF-42

WOLF CREEK NUCLEAR OPERATING CORPORATION

WOLF CREEK GENERATING STATION

DOCKET NO. 50-482

1.0 INTRODUCTION

By application dated August 7, 2001, as supplemented by letter dated February 20, 2002, Wolf Creek Nuclear Operating Corporation (the licensee) requested changes to the Technical Specifications (TSs, Appendix A to Facility Operating License No. NPF-42) for the Wolf Creek Generating Station (WCGS). The proposed changes would (1) revise Limiting Condition for Operation (LCO) 3.9.4, "Containment Penetrations," for the equipment hatch during core alterations or movement of irradiated fuel assemblies inside containment, and (2) add the requirement to verify the capability to install the equipment hatch in a new Surveillance Requirement (SR) 3.9.4.2. The existing SR 3.9.4.2 would be renumbered SR 3.9.4.3, but would not otherwise be changed, to be consistent with the new SR.

The proposed changes would revise item a. of LCO 3.9.4 to allow the equipment hatch with direct access to the outside atmosphere to be open during refueling operations with core alterations or irradiated fuel movement inside containment. There are also changes to the TS Bases for the proposed changes to TS 3.9.4.

The supplemental letter dated February 20, 2002, 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 original proposed no significant hazards consideration determination as published in the *Federal Register* on December 12, 2001 (66 FR 64307). The licensee discussed its application with the NRC staff in the meeting held on November 15, 2001, and provided the additional information in the supplemental letter of February 20, 2002. The meeting summary was issued by the NRC staff on November 27, 2001.

2.0 EVALUATION

The licensee has proposed to add the following: (1) the phrase, "or if open, capable of being closed," to existing item a of LCO 3.9.4 for the equipment hatch, and (2) a new SR requiring the verification of the capability to install the equipment hatch. The new SR would be numbered SR 3.9.4.2 and the current SR 3.9.4.2 would be renumbered SR 3.9.4.3.

The proposed changes to TS 3.9.4 are to allow the equipment hatch to be open during core alterations or movement of irradiated fuel assemblies inside containment and to verify that the capability to close the hatch, if this is needed, is in place. This allowance would be used during refueling operations when the reactor is shut down, and there is 23 feet of water above the reactor flange in accordance with TS 3.9.7, "Refueling Pool Water Level," which requires at least that level of water above the flange during movement of irradiated fuel assemblies within containment.

The licensee stated that the equipment hatch provides a means for moving large equipment components into and out of containment during plant outages, such as a refueling outage. It is a large, welded steel assembly with a double-gasketed, flanged, and bolted cover, which is raised and lowered with two dedicated hoists powered from non-Class 1E power or from a backup propane generator. There is a moveable missile shield on the outside of the reactor building to protect the equipment hatch from external missiles. Because it is part of the containment pressure boundary, the current TSs require that the equipment hatch is closed and held in place by bolts when (1) the containment must be closed and operable (this is in reactor Modes 1 through 4 in accordance with TS 3.6.1, "Containment"), and (2) there are core alterations or irradiated fuel movement in Mode 6 (this is in accordance with TS 3.9.4).

The licensee explained that the proposed changes to TS 3.9.4 will allow it to optimize refueling outages by permitting planned outage work to proceed in conjunction with critical path activities, thereby shortening the outage. The proposed amendment will permit operations currently scheduled for early in the refueling outage, when there is no core alterations or movement of irradiated fuel assemblies inside containment and the containment may be open, to later in the outage when the reactor vessel is open and covered by 23 feet of water when the risk of severe core damage is lower. The licensee stated that this could reduce the overall risk, duration, and cost of refueling outages.

The postulated accidents that could result in a release of radioactive material through the equipment hatch would be as follows: (1) a fuel handling accident (FHA) inside containment, and (2) a loss of cooling to the core that leads to core boiling and uncover. These are discussed in Section 2.3 below.

2.1 Administrative Controls

If the licensee would open the equipment hatch in outages when there are core alterations or fuel movement inside containment, the licensee has proposed to have the equipment hatch under administrative controls. The equipment hatch would be maintained in an isolable condition (i.e., capable of being closed and bolted) and there would be procedures in place that would require the following:

- Appropriate personnel are aware of the open status of the containment (i.e., an open equipment hatch) during movement of irradiated fuel or core alterations.
- Specified individuals are designated and readily available to close the equipment hatch following an evacuation that would occur in the event of an FHA.

- Any obstructions (e.g., cables and hoses) that would prevent rapid closure of an open equipment hatch can be quickly removed.

A description of the administrative controls is given in the licensee's application and will be added to the Bases of the TSs.

In its supplemental letter of February 20, 2002, the licensee stated that it estimated the time to close the open equipment hatch is typically less than one hour. The licensee based this estimate on a review of past plant logs and discussions with containment coordinators.

2.2 Tornado Missiles

In its supplemental letter of February 20, 2002, the licensee addressed tornado missiles and the protection provided in the design of WCGS. Section 3.5.1.4 of the WCGS Updated Safety Analysis Report (USAR) addresses missiles generated by natural phenomena. USAR Section 3.5.2, which discusses systems which are to be protected, states in part that "All safety-related systems and components to be protected from tornado missiles are enclosed within protective structures which meet the requirements of Regulatory Guide 1.117[, 'Tornado Design Classification.']. ... Openings to these structures are designed to prevent the entry of the design basis missile when the result would preclude the safety functions of the enclosed system or components. Prevention of missile entry includes the use of missile doors and barriers at openings and adjacent buildings as shields in penetration areas. The missile barriers are designed utilizing the procedures given in [USAR] Section 3.5.3."

In the supplemental letter, the licensee stated that the equipment hatch does not provide missile protection for the containment. This protection is provided by the moveable missile shield which is located outside the containment to protect the equipment hatch. During Modes 1 through 4, when the containment is required to be operable by TS 3.6.1, the missile shield covers the equipment hatch. For Modes 5 and 6, during plant shutdown conditions when the containment is not required to be operable, the licensee stated that the missile shield is not required because the equipment hatch cover with 6 bolts provides adequate missile protection for the safety-related equipment inside the containment. The licensee stated that the local portion of the hatch hit by the missile would yield and deform permanently; however, this damage would not cause any perforation or penetration in the hatch, which is allowed by the description of tornado-resistance structures in USAR Section 3.5.3. Therefore, based on what the licensee has stated, the NRC staff concludes that the equipment hatch with 6 bolts in place would protect the safety-related systems and components within the containment.

In addressing what will happen at the site during refueling with severe weather, the licensee stated that procedures require that the equipment hatch shall be in place with 6 bolts installed upon the arrival of any threatening weather conditions which could generate missiles. The equipment hatch is closed for tornado warnings, which is when severe weather has been reported or is imminent. The staff concludes that the estimated time to close the open hatch of "typically less than one hour" is acceptable for closing the hatch upon a tornado warning.

Because 6 bolts are needed for the equipment hatch to be a severe weather missile shield, as discussed above, there is an apparent conflict between this and the requirement in LCO 3.9.4 that the equipment hatch is closed and held in place by 4 bolts. In a conference call with the

licensee on July 26, 2002, the licensee explained that the requirement for having the equipment hatch closed with at least 4 bolts in LCO 3.9.4, as explained in the TS Bases, is to restrict fission product radioactivity within containment from escaping to the environment when the LCO requirements are met. It is not for missile protection. The LCO requirements are for "containment closure" rather than "containment operability." Containment closure means that all potential escape paths are closed or capable of being closed, and there is no potential for containment pressurization. The requirements on the equipment hatch to also be a severe weather missile shield for inside containment result in the requirement of more bolts needing to be in place. The licensee explained that the administrative controls on the equipment hatch during the refueling outage have the equipment hatch closed with at least 6 bolts because of the stricter requirement on missile protection. Because the basis for LCO 3.9.4 is not for missile protection, the staff concludes that there is no need to change the LCO to at least 6 bolts.

2.3 Postulated Accidents

The limiting event during refueling when there are core alterations or fuel handling inside the containment is the FHA inside containment. The licensee has described this event in Section 15.7.4 of the USAR for WCGS and the NRC staff's acceptance criteria is given in Standard Review Plan (SRP) 15.7.4 of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants."

The licensee's and the staff's calculated potential dose consequences for the FHA inside containment at the exclusion area boundary and the assumptions used for the calculated dose consequences are in the attached Tables 1 and 2, respectively. The staff's calculated values of the potential dose consequences to the control room operators are also given in Table 1, and the assumptions are provided in Table 2. The acceptance criteria for the exposure of the control room operators is General Design Criterion (GDC) 19 in Appendix A to 10 CFR Part 50.

The licensee's dose consequences in Table 1 came from USAR Table 15.7-8 (exclusion area boundary dose consequences for the FHA inside the reactor building and containment) and Table 15.6-8 (for the control room operator doses for the large-break loss-of-coolant accident which bounds the FHA). The assumptions for these values are in USAR Tables 15.7-7, 15.A-1, and 15.A-2. The staff's dose consequences were reported in Amendment No. 95 issued February 28, 1996, and Amendment No. 120 issued March 22, 1999. The potential dose consequences in Amendment No. 95 were part of the basis of the approval to have both containment personnel airlock doors open during refueling with core alterations or irradiated fuel movement inside containment. The dose consequences reported by the staff in Amendment No. 120 are higher than that in Amendment No. 95 because Amendment No. 120 takes into account the increase in potential fuel burnup with the increase in nominal fuel enrichment to 5 weight percent of U-235 that was approved in that amendment. The staff's assumptions reported in Amendment No. 120 were increased to 1.2 fuel assemblies damaged and 12 percent radioiodines and 30 percent noble gases released (for the extended burnup due to the higher fuel enrichment) from the damaged fuel. These same dose consequences were reported in Amendment No. 135 issued September 12, 2000, for open containment penetrations, with access directly to the outside atmosphere, during refueling with core alterations or irradiated fuel movement inside containment.

Because the licensee has assumed the same 2-hour period of release that the staff assumed for the FHA inside containment, the staff concludes that the time to close the containment penetrations under the licensee's administrative controls discussed above will not be more than the 2-hour period assumed in the licensee's and staff's dose calculations reported in Table 1.

For the doses to the public or the control room operators, the proposed amendment does not change the staff's evaluation of potential dose consequences or control room habitability for the FHA inside containment. Because the potential dose consequences from the licensee and the staff given in Table 1 for the FHA inside containment are within the acceptance criteria given in SRP Section 15.7.4 and GDC 19, the staff concludes that the potential dose consequences are acceptable.

For the case of a loss of cooling to the core, the licensee has stated that the equipment hatch is typically closed in less than one hour. This time is shorter than the time for the core to start boiling. The licensee stated that the minimum time to core boiling is 5 hours (at the beginning of fuel offload). The time to core boiling for reduced water inventory in mid-loop operation in a refueling outage is not applicable to this review because TS 3.9.7 requires 23 feet of water above the top of the reactor vessel flange during movement of irradiated fuel assemblies within containment. Therefore, the proposed amendment does not apply to mid-loop operations.

2.4 Conclusion

Based on the administrative controls described in the licensee's application, which will be added to the TS Bases; the demonstrated short time to close the equipment hatch in the case of an accident inside containment; the acceptable potential consequences of the design basis FHA inside containment (including the doses to control room operators); and the protection of equipment needed to keep the plant safely shut down from tornado missiles during refueling; the NRC staff concludes that the proposed addition to LCO 3.9.4 is acceptable.

The licensee also proposed to add SR 3.9.4.2 to the TSs to assure that the administrative controls to close the equipment hatch are in place when the hatch is open during core alterations or movement of irradiated fuel inside containment. The licensee proposed the following: (1) a frequency of seven days for the periodic surveillance, and (2) a note that states SR 3.9.4.2 is only required when the equipment hatch is open. The licensee states in the changes to the Bases for SR 3.9.4.2 that the surveillance interval of seven days was selected to be commensurate with the normal duration of time to the fuel handling operations and the note only requires that the surveillance be met when the equipment hatch is open. The proposed frequency is consistent with similar SRs in the WCGS TSs, and the surveillance needs only to be conducted when the equipment hatch is open. Also, the proposed SR is the same as that approved for Vogtle Electric Generating Plant, Units 1 and 2, on September 11, 2000, and Comanche Peak, Units 1 and 2, on February 20, 2002, for the same amendment. Based on this and the fact that SR 3.9.4.2 is only necessary when the equipment hatch is open, the NRC staff concludes that the proposed SR 3.9.4.2 is acceptable.

With the new SR 3.9.4.2 being added to the TSs, the existing SR 3.9.4.2 will be renumbered SR 3.9.4.3, with no other changes being made to the SR. Because a new SR 3.9.4.2 is being added to the TSs and only the number of the existing SR 3.9.4.2 is being changed, the NRC staff concludes that the change to the existing SR 3.9.4.2 is acceptable.

Therefore, based on the above, the NRC staff further concludes that the proposed amendment to the WCGS TSs is acceptable.

The NRC staff has reviewed the description of the administrative controls in the licensee's application and has no disagreement with the description. In its supplemental letter, the licensee agreed to add this description to the TS Bases during the implementation of the amendment and that this will be a condition of the amendment to the operating license. Therefore, when the amendment is incorporated into the TSs, the description of the administrative controls will become a part of the Bases of the TSs. Any changes to the description of the administrative controls will be controlled by Section 5.5.14, "Technical Specifications (TS) Bases Control Program," of the Administrative Section of the TSs, which is acceptable to the staff.

3.0 STATE CONSULTATION

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

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. 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 (66 FR 46482). 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.

Attachments: 1. Table 1, Calculated Radiological Dose Consequences (Rem)
2. Table 2, Assumptions Used in Calculating Radiological Dose Consequences
Fuel Handling Accident Inside Containmentment

Principal Contributor: Jack Donohew

Date: July 30, 2002

TABLE 1

CALCULATED RADIOLOGICAL DOSE CONSEQUENCES (REM)

<u>Exclusion Area Boundary</u>	<u>Licensee Doses¹</u>	<u>Staff Doses</u>		<u>NRC Acceptance Criteria</u>
		<u>Amdt 95²</u>	<u>Amdt 120³</u>	<u>SRP 15.7.4 Guidelines</u>
Whole Body	0.18	0.14	Not Given	6
Thyroid	64.1	39.7	57.2	75

<u>Control Room (operator)</u>	<u>Licensee Doses</u>	<u>Staff Doses</u>		<u>NRC Acceptance Criteria</u>
		<u>Amdt 95</u>	<u>Amdt 120</u>	<u>GDC-19 Guidelines</u>
Whole Body	0.20	0.07	Not Given	5
Thyroid	17.8	14.5	15.4	Equivalent to 5 rem whole body**

¹ Doses from Wolf Creek Updated Safety Analysis Report Table 15.7-8 for the radiological consequences at the exclusion area boundary for a fuel handling accident (FHA) in the reactor building (containment), and Table 15.6-8 for the control room operator doses for a large-break loss-of-coolant accident (which bounds the FHA in the reactor building).

² Doses from Amendment No. 95, issued February 28, 1996.

³ Doses from Amendment No. 120, issued March 22, 1999.

** Guideline doses provided in Standard Review Plan (SRP) Section 6.4 define the dose equivalent as 30 rem to the thyroid.

TABLE 2

ASSUMPTIONS USED IN CALCULATING RADIOLOGICAL DOSE CONSEQUENCES
FUEL HANDLING ACCIDENT INSIDE CONTAINMENT

<u>Parameters</u>	<u>Licensee</u> <u>Value</u> ¹	<u>Staff</u> <u>Value</u> ² (Amdt 95)	<u>Staff</u> <u>Value</u> ³ (Amdt 120)
Power level (MWt)	3565	3565	3565
Number of fuel rods damaged		264	317
Total number of fuel rods		50,952	50,952
Number of assemblies affected	1.2	1.0	1.2
Shutdown time (hours)	100	100	100
Power radial peaking factor*	1.65	1.65	1.65
Fission product release duration (hours)	2.0	2.0	2.0
Release fractions:*			
Radioiodine	12.0% ⁴	10.0%	12.0% ⁴
Noble gases	10.0%	10.0%	30.0%
Krypton gases	30.0%	30.0%	30.0%
Radioiodine forms:*			
Elemental	75.0%	75.0%	75.0%
Organic	25.0%	25.0%	25.0%
<u>Receptor Point Variables (per TID-14844)</u>			
Exclusion area boundary**			
Atmospheric relative concentration, X/Q (sec/m ³)			
0-2 hours	1.5 x 10 ⁻⁴	1.4 x 10 ⁻⁴	1.4 x 10 ⁻⁴
Control room			
Atmospheric Dispersion, X/Q (sec/m ³)			
Control room volume (feet ³)	5.3 x 10 ⁻⁴	1.2 x 10 ⁻³	5.3 x 10 ⁻⁴
Maximum filtration rate (feet ³ /minute)	2.4 x 10 ⁺⁵	2.4 x 10 ⁺⁵	2.4 x 10 ⁺⁵
Geometry factor	1350	1350	1350
		18	

¹ Wolf Creek Updated Safety Analysis Report Tables 15.7-7, 15A-1, and 15.A-2 on parameters (including control room and atmospheric dispersion factors) used in evaluating the accident analysis of a fuel handling accident inside containment.

² Staff parameters from Amendment No. 95, issued February 28, 1996.

³ Staff parameters from Amendment No. 120, issued March 22, 1999.

⁴ Higher extended burnup release fraction for Iodine 131 from NUREG/CR-5009.

* NRC Regulatory Guide (RG) 1.25, "Assumptions Used for Evaluating the Potential Radiological Consequences of a Fuel Handling Accident in the Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors."

** Wolf Creek Safety Evaluation Report (SER), NUREG-0881.