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

August 7, 2014

Mr. Adam C. Heflin
President, Chief Executive Officer,
and Chief Nuclear Officer
Wolf Creek Nuclear Operating Corporation
P.O. Box 411
Burlington, KS 66839

SUBJECT: WOLF CREEK GENERATING STATION - ISSUANCE OF AMENDMENT RE: REPLACE A METHODOLOGY IN TECHNICAL SPECIFICATION 5.6.5, "CORE OPERATING LIMITS REPORT (COLR)" (TAC NO. MF2790)

Dear Mr. Heflin:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 209 to Renewed 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 September 23, 2013.

The amendment revises TS 5.6.5, "CORE OPERATING LIMITS REPORT (COLR)," to replace the methodology of topical report WCAP-11596-P-A, "Qualification of the Phoenix-P/ANC Nuclear Design System for Pressurized Water Reactor Cores," with WCAP-16045-P-A, "Qualification of the Two-Dimensional Transport Code PARAGON," and WCAP-16045-P-A, Addendum 1-A, "Qualification of the NEXUS Nuclear Data Methodology," to determine core operating limits.

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,

CF Lyon

Carl F. Lyon, Project Manager
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-482

Enclosures:
1. Amendment No. 209 to NPF-42
2. Safety Evaluation

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WOLF CREEK NUCLEAR OPERATING CORPORATION

WOLF CREEK GENERATING STATION

DOCKET NO. 50-482

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 209
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) Renewed Facility Operating License No. NPF-42 filed by the Wolf Creek Nuclear Operating Corporation (the Corporation), dated September 23, 2013, 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 Renewed Facility Operating License No. NPF-42 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. 209, 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 prior to core reload during Refueling Outage 20, currently expected to begin in January 2015.

FOR THE NUCLEAR REGULATORY COMMISSION

Eric R. Oesterle, Acting Chief
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

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

Date of Issuance: August 7, 2014

ATTACHMENT TO LICENSE AMENDMENT NO. 209

RENEWED FACILITY OPERATING LICENSE NO. NPF-42

DOCKET NO. 50-482

Replace the following pages of the Renewed Facility Operating License No. NPF-42 and Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Renewed Facility Operating License

REMOVE	INSERT
4	4

Technical Specifications

REMOVE	INSERT
5.0-26	5.0-26

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

(6) The Operating Corporation, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the Commission=s regulations in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission, now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

The Operating Corporation is authorized to operate the facility at reactor core power levels not in excess of 3565 megawatts thermal (100% power) in accordance with the conditions specified herein.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 209, 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) Antitrust Conditions

Kansas Gas & Electric Company and Kansas City Power & Light Company shall comply with the antitrust conditions delineated in Appendix C to this license.

(4) Environmental Qualification (Section 3.11, SSER #4, Section 3.11, SSER #5)*

Deleted per Amendment No. 141.

*The parenthetical notation following the title of many license conditions denotes the section of the supporting Safety Evaluation Report and/or its supplements wherein the license condition is discussed.

5.6 Reporting Requirements

5.6.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

4. WCAP-10216-P-A, "Relaxation of Constant Axial Offset Control - F_Q Surveillance Technical Specification."

5. WCNOC Topical Report NSAG-007, "Reload Safety Evaluation Methodology for the Wolf Creek Generating Station."

6. NRC Safety Evaluation Report dated March 30, 1993, for the "Revision to Technical Specification for Cycle 7."

7. WCAP-10266-P-A, "The 1981 Version of the Westinghouse ECCS Evaluation Model Using the BASH Code."

8. WCAP-16045-P-A, "Qualification of the Two-Dimensional Transport Code PARAGON."

9. WCAP-16045-P-A, Addendum 1-A, "Qualification of the NEXUS Nuclear Data Methodology."

10. WCAP 10965-P-A, "ANC: A Westinghouse Advanced Nodal Computer Code."

11. WCAP-12610-P-A, "VANTAGE+ Fuel Assembly Reference Core Report."

12. WCAP-8745-P-A, "Design Bases for the Thermal Power ΔT and Thermal Overtemperature ΔT Trip Functions."

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

(continued)

UNITED STATES
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WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 209 TO

RENEWED 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 September 23, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13273A203), Wolf Creek Nuclear Operating Corporation (WCNOC, the licensee) requested changes to the Technical Specifications (TSs) for Wolf Creek Generating Station (WCGS).

The proposed changes would revise TS 5.6.5, "CORE OPERATING LIMITS REPORT (COLR)," to replace the methodology of Westinghouse Electric Company LLC (Westinghouse) topical report WCAP-11596-P-A, "Qualification of the Phoenix-P/ANC Nuclear Design System for Pressurized Water Reactor Cores," with WCAP-16045-P-A, "Qualification of the Two-Dimensional Transport Code PARAGON," and WCAP-16045-P-A, Addendum 1-A, "Qualification of the NEXUS Nuclear Data Methodology," to determine core operating limits.

The proposed references, WCAP-16045-P-A and WCAP-16045-P-A, Addendum 1-A, are collectively referred to as WCAP-16045-P-A and addendum. Non-proprietary versions of WCAP-16045-P-A and addendum, designated as WCAP-16045-NP-A and WCAP-16045-NP-A, Addendum 1, are publicly available in ADAMS under Accession Nos. ML042250322 and ML053460157, respectively. The proposed references will replace the PHOENIX-P methodology, described in WCAP-11596-P-A (not publicly available; proprietary information) in TS 5.6.5.

2.0 REGULATORY EVALUATION

The guidance in U.S. Nuclear Regulatory Commission (NRC) Generic Letter (GL) 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications," dated October 4, 1988 (ADAMS Accession No. ML031130447), indicates that it is acceptable for licensees to control reactor physics parameter limits by specifying an NRC-approved calculation methodology. These parameter limits may be removed from the TS and placed in a cycle-specific core operating limits report (COLR), which is defined in the TS and required to be submitted to the NRC every operating cycle or each time it is revised. As recommended by GL 88-16, the WCGS TS includes a list of references for the NRC-approved calculation

methodologies used to generate the cycle-specific operating limits. The TS changes requested by WCNOC are changes to this reference list.

Since WCAP-16045-P-A and addendum comprise a nuclear data methodology, there are no directly applicable regulatory requirements. The NRC safety evaluations (SEs) that provide generic approval for use of WCAP-16045-P-A and addendum cite Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Section 50.34, "Contents of applications; technical information," as their regulatory basis. This is appropriate, as accurate nuclear analysis forms an integral part of the safety analysis required to be provided by licensees and applicants. Similarly, these safety analyses are used to establish the limiting safety system settings (LSSS) and limiting conditions for operation (LCOs) contained in the TS. Therefore, 10 CFR 50.36, "Technical specifications," also applies; without an accurate nuclear analysis, it cannot be established that the LCOs and LSSS provide for the safe operation of the facility.

3.0 TECHNICAL EVALUATION

3.1 PARAGON and NEXUS Code Descriptions

The PARAGON code, as described in WCAP-16045-P-A, is a neutron transport code intended to replace PHOENIX-P for use in providing cross-section data to the Westinghouse proprietary Advanced Nodal Code (ANC), a core simulator code. NEXUS, described in WCAP-16045-P-A, Addendum 1-A, is an improvement to the PARAGON/ANC code system that changes the method of communicating the nuclear data output from PARAGON to ANC. Rather than using boron letdown curves, NEXUS accounts for variations in the neutron spectrum by parameterizing the PARAGON cross-section output and reconstructing it within ANC. As discussed in the NRC staff's SE dated July 17, 2013, approving the use of PARAGON and NEXUS at the Joseph M. Farley Nuclear Plant (ADAMS Accession No. ML13149A354), the NEXUS methodology provides a link between PARAGON and ANC without replacing either, and therefore still requires the use of both other codes.

Both WCAP-16045-P-A and addendum are NRC-approved, and the NRC staff has previously determined that they have been extensively validated and verified using a variety of experiments and plant data that account for a wide range of differences in operating conditions. In Addendum 1-A, the verification was expanded to include the comparison of NEXUS results for critical boron concentration to those obtained using the previous PARAGON methodology, showing excellent agreement between NEXUS predictions and available data.

3.2 Applicability to WCGS

The NRC staff reviewed the Updated Safety Analysis Report (USAR) for WCGS to verify that the fuel in use at WCGS is covered by the verification and validation database for PARAGON and NEXUS. WCGS USAR Chapter 4, "Reactor," indicates that the unit may use any combination of 17x17 Westinghouse LOPAR, VANTAGE 5H, VANTAGE 5H P+ and P+ Z^{+2}, RFA Z^{+2}, and RFA-2 Z^{+2} fuel designs with standard borosilicate glass, wet annular, and/or integral fuel burnable absorbers. The staff concluded that all of the design features of the fuel in use at WCGS are represented in the database mentioned in Section 3.1 of this SE and that the PARAGON/NEXUS system is acceptable for use at WCGS.

A single limitation imposed by the SEs for both PARAGON and NEXUS precludes their use for mixed oxide (MOX) cores. WCNOC stated in its application for this license amendment that WCGS TS 4.2.1, "Fuel Assemblies," specifies the initial composition of the fuel assemblies to be "natural or slightly enriched uranium dioxide (UO_2) as fuel material." The NRC staff evaluated this information and determined that the MOX limitation is therefore inherently satisfied for WCGS.

The NRC staff has therefore determined that the NRC-approved methodologies described in WCAP-16045-P-A and addendum are applicable to WCGS. This is consistent with the guidance in GL 88-16 that states that licensees may use NRC-approved methods to determine core operating limits. Furthermore, the applicability of the generic qualification helps to establish that nuclear design analyses performed for WCGS using the methods described in WCAP-16045-P-A and addendum will be accurate, consistent with the 10 CFR 50.34 requirements for safety analyses. Accuracy of the nuclear analysis also helps ensure the adequacy of the TS LCOs and LSSS to provide for the safe operation of the facility, consistent with the requirements of 10 CFR 50.36.

3.3 Additional Review Topics

The addendum to WCAP-16045-P-A brings about a change to the way boron letdown curves are calculated and input into the overall nuclear design method. Because of this, in previous reviews of PARAGON-NEXUS/ANC applications, the NRC staff has found it necessary to verify that no changes were made to the analysis methods for post loss-of-coolant accident (LOCA) subcriticality and boric acid precipitation behavior. In this case, WCNOC stated in its license amendment application that:

> The use of WCAP-16045-P-A, Addendum 1-A, for WCGS does not affect the inputs or method(s) for ensuring core subcriticality, both short and long-term post-Loss of Coolant Accident (LOCA), thereby precluding the potential for return to power following a large break LOCA. Since neither the post-LOCA boron source concentration nor heat generation are impacted by the use of Addendum 1-A, the current emergency operating procedure timing for boric acid precipitation and the action time for switching to simultaneous injection will continue to remain valid. Core design specific parameters that are verified each cycle to be conservative with respect to the LOCA inputs and refueling boron concentration, will continue to be calculated using NRC approved methods.

The NRC staff concludes this is acceptable, as it confirms that the implementation of PARAGON and NEXUS at WCGS will not affect the calculation of post-LOCA boron requirements or emergency procedures to mitigate post-LOCA boric acid precipitation. Based on the above, the staff concludes that the existing post-LOCA analyses for subcriticality and long-term cooling remain applicable.

3.4 Conclusion

The NRC staff has determined that the proposed TS changes required to replace the PHOENIX-P code system with the PARAGON/NEXUS code system are acceptable for WCGS. This determination is based on the following considerations: (1) that PARAGON and NEXUS

are NRC-approved methods which have been determined to be applicable to WCGS and (2) that the WCGS post-LOCA subcriticality and boric acid precipitation analyses will be unaffected by the proposed changes. The staff determined based on these considerations that the proposed TS revision is consistent with the guidance provided in GL 88-16, and that the generic qualification and robust validation of the PARAGON-NEXUS/ANC system satisfies the requirements of 10 CFR 50.34 and 10 CFR 50.36.

4.0 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.

5.0 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 published in the *Federal Register* on December 10, 2013 (78 FR 74186). 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.

6.0 CONCLUSION

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

Principal Contributor: R. Anzalone, NRR/DSS/SNPB

Date: August 7, 2014

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/

Carl F. Lyon, Project Manager
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
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ADAMS Accession No.: ML14156A246 *via memo dated 5/28/2014 **previously concurred

OFFICE	NRR/DORL/LPL4-1/PM	NRR/DORL/LPL4-1/LA**	NRR/DSS/STSB/BC**	NRR/DSS/SNPB/BC*
NAME	FLyon	JBurkhardt	RElliott	JDean
DATE	7/23/14	6/16/14	06/23/14	5/28/14

OFFICE	OGC – NLO **	NRR/DORL/LPL4-1/BC	NRR/DORL/LPL4-1/PM
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DATE	8/5/14	8/7/14	8/7/14

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