



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 95 TO FACILITY OPERATING LICENSE NO. NPF-42

WOLF CREEK NUCLEAR OPERATING CORPORATION

WOLF CREEK GENERATING STATION

DOCKET NO. 50-482

1.0 INTRODUCTION

By letter dated November 22, 1995, as supplemented by letter dated February 8, 1996, Wolf Creek Nuclear Operating Corporation (the licensee) requested changes to the Technical Specifications (Appendix A to Facility Operating License No. NPF-42) for the Wolf Creek Generating Station. The proposed changes would permit the containment personnel airlock doors to be open during core alterations and movement of irradiated fuel in containment. The surveillance requirements for containment penetrations have been revised to require that each be in its "required condition" instead of "closed/isolated condition."

The February 8, 1996, supplemental letter provided additional information concerning the administrative controls to be used and updated the Bases, but did not affect the staff's original proposed no significant hazards determination published in the Federal Register (60 FR 65687).

Specifically, the licensee proposes to change TS 3.9.4.b to read: "A minimum of one door in the emergency airlock is closed\* and one door in the personnel airlock is capable of being closed, and..." In Surveillance Requirements 4.9.4 and 4.9.4.a, "closed/isolated condition" is being changed to "required condition."

Section 3/4.9.4 of the Bases is being changed as follows.

1. The first sentence of the first paragraph will read: "The requirements on containment building penetration closure and OPERABILITY ensure that a release of radioactive material from containment will be minimized."

2. A new paragraph will be added:

Both containment personnel airlock doors may be open during movement of irradiated fuel or CORE ALTERATIONS, provided one airlock door is capable of being closed and the water level in the refueling pool is maintained as required. Administrative controls ensure that 1) appropriate personnel are aware of the open status of the containment during movement of irradiated fuel or CORE ALTERATIONS, 2) specified individuals are designated and readily available to close the airlock following an evacuation that would occur in the event of a fuel handling accident, and 3) any obstructions (e.g., cables and hoses) that could prevent rapid closure of an open airlock can be quickly removed.

2.0 BACKGROUND

The Wolf Creek Generating Station is a 3565 Mwt Westinghouse pressurized-water reactor located approximately 28 miles SSE of Emporia, Kansas. The WCGS containment is a dry-ambient type of post-tensioned, concrete construction. A shield building and secondary containment system are not provided.

The WCGS containment is provided with two airlocks, a personnel airlock (PAL) and an emergency airlock (EAL). The PAL provides access between the auxiliary building and the containment at the operating floor level. The EAL provides access to the containment at ground level. The airlocks are provided for the purpose of permitting personnel to enter and exit the containment without breaking the integrity of the containment pressure boundary. In order to accomplish this function, each airlock contains two doors with a personnel chamber between the doors. During those reactor conditions for which design basis accidents are postulated to occur in containment, at least one of the two doors must be closed. Mechanical interlocks are provided to ensure that both doors in the same airlock cannot be opened at the same time. During core alterations and refueling operations a fuel handling accident in containment (FHAIC) is the limiting event postulated for the design of accident mitigation features. This design basis accident assumes that a spent fuel bundle is dropped and fuel rods in one fuel assembly are ruptured. The mechanical interlocks are provided with bypass capability to permit both doors to be open during conditions when containment integrity is not required (e.g., shutdown operations) and frequent containment access is required.

The proposed TS change would allow the interlocks to be disabled and permit both doors in the PAL (only) to be opened during core alterations and fuel handling. The staff has established criteria for the acceptance of such TS amendments. The criteria are as follows:

- (1) The radiological consequences for an FHAIC must meet the Standard Review Plan (SRP) Section 15.7.4 acceptance criteria without credit for the mitigation effects of the primary containment.

- (2) Administrative procedures are established to ensure that
  - (a) appropriate personnel are aware of the OPEN status of the containment during core alterations and fuel handling,
  - (b) an open airlock is kept unobstructed and capable of rapid closure, and
  - (c) individuals are designated and readily available to close the airlock following the evacuation that would occur in the event of an accident.

### 3.0 EVALUATION

The current Section 3.9.4, "Containment Closure," of the WCGS TS requires that a minimum of one PAL door, as well as other containment penetrations, be closed during fuel movement and core alterations. This requirement is to prevent the release of radioactive material in the event of a fuel handling accident. The proposed TS changes would allow both doors of the containment PAL to be open during fuel movement and core alterations. The TS will also ensure that one airlock door is operable, that at least 23 feet of water is maintained over the fuel, and that fuel is not moved until at least 100 hours after shutdown. As indicated in the Bases for TS 3.9.4, administrative controls will ensure (1) that designated individuals will be readily available to close the airlock in the event of a fuel handling accident (FHA), and (2) that any cables or hoses running through the open airlock will be designed for quick removal.

The licensee recalculated the doses and revised the design basis for the fuel handling accident analysis to be consistent with Regulatory Guide (RG) 1.25, "Assumption Used for Evaluating the Potential Radiological Consequences of a Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors." Neither the current nor the revised design basis FHA analysis takes credit for the containment building barriers. The licensee's analysis calculated the doses for the 0-2 hour period at the exclusion area boundary to be 0.2 rem to the whole body and 55 rem to the thyroid. These calculated doses are within the SRP criteria of 6 rem to the whole body and 75 rem to the thyroid. The thyroid dose to the control room personnel was calculated to be 9.7 rem and is within the exposure guideline of General Design Criterion (GDC) 19.

The staff has completed its evaluation of the potential radiological consequences of a fuel handling accident at Wolf Creek based upon the conditions of the proposed technical specification changes. In addition to reviewing the licensee's submittal, the staff performed an independent analysis to determine conformance with the requirements of 10 CFR Part 100 and GDC 19 of Appendix A to 10 CFR Part 50. The staff analysis utilized the accident source term given in RG 1.4, the assumptions contained in RG 1.25,

and the review procedures specified in SRP Sections 15.7.4 and 6.4. The staff assumed an instantaneous puff release of noble gases and radioiodine from the gap and plenum of the broken fuel rods. These gas bubbles will pass through at least 23 feet of water covering the fuel prior to reaching the containment atmosphere. All airborne activity reaching the containment atmosphere is assumed to exhaust to the environment within 2 hours. As stipulated in the plant technical specifications, the gap activity is assumed to have decayed for a period of 100 hours.

The staff computed the offsite doses for WCGS using the assumptions described above and NRC's ACTICODE computer code. Control room operator doses were determined using the methodology in SRP Section 6.4, including use of the Murphy-Campe methodology for calculations of the meteorological factors. The computed offsite doses and control room operator doses are within the acceptance criteria given in SRP Section 15.7.4 and GDC 19. The resulting calculated values and the assumptions used in calculating those doses are attached in Tables 1 and 2, respectively.

The staff's dose calculation was based on the assumption that all of the radioactive material released to the containment escapes the containment within 2 hours. However, the staff has historically required plant technical specifications to maintain containment closure during core alterations and fuel handling as a defense-in-depth measure to further limit releases. Recently, the staff has allowed changes to plant technical specifications to keep both doors to a containment air lock open during core alterations and fuel handling with the provisions in place to close one door quickly, thereby reestablishing containment closure. The provisions described in this safety evaluation provide reasonable assurance that containment closure as a defense-in-depth measure can be reestablished quickly to limit releases much lower than assumed in the dose calculations.

The changes to Surveillance Requirements 4.9.4 and 4.9.4.a are required to recognize that the PAL may be open, instead of closed/isolated, during core alterations or when irradiated fuel is being moved within the containment. The staff finds this change acceptable.

The staff has reviewed the licensee's analysis and has performed an independent assessment of the radiological consequences resulting from a fuel handling accident during refueling operations with the containment airlocks open. The staff concludes that the radiological consequences associated with this accident are within the acceptance criteria set forth in 10 CFR Part 100 and the control room operator dose criteria specified in GDC 19 of Appendix A to 10 CFR Part 50 and are acceptable. Therefore, the proposed changes to allow the PAL to remain open during core alterations or irradiated fuel movement within the containment is acceptable.

#### 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 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 (60 FR 65687). 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) 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 Consequences  
2. Table 2 - Assumptions Used for Calculating  
Radiological Consequences

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TABLE 1  
CALCULATED RADIOLOGICAL CONSEQUENCES  
 (rem)

<u>Exclusion Area Boundary</u>	<u>Dose</u>	<u>SRP 15.7.4 Guidelines</u>
Whole Body	0.14	6
Thyroid	39.7	75
<u>Control Room Operator</u>	<u>Dose</u>	<u>GDC-19 Guidelines</u>
Whole Body	0.07	5
Thyroid	14.5	Equivalent to 5 rem whole body*

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

TABLE 2

ASSUMPTIONS USED FOR CALCULATING RADIOLOGICAL CONSEQUENCES

<u>Parameters</u>	<u>Quantity</u>
Power Level (Mwt)	3565
Number of Fuel Rods Damaged	264
Total Number of Fuel Rods	50,952
Shutdown time (hours)	100
Power Peaking Factor*	1.65
Fission Product Release Duration (hours)	2
Release Fractions*	
Iodine	10%
Noble Gases	10%
Krypton Gas	30%
Iodine Forms*	
Elemental	75%
Organic	25%
<u>Receptor Point Variables (per TID-14844)</u>	
Exclusion Area Boundary**	
Atmospheric Relative Concentration, X/Q (sec/m <sup>3</sup> ) 0-2 hours	1.4 x 10 <sup>-4</sup>
Control Room	
Atmospheric Relative Concentration, X/Q (sec/m <sup>3</sup> )	1.2 x 10 <sup>-3</sup>
Control Room Volume (cubic feet)	2.4 x 10 <sup>5</sup>
Maximum Infiltration Rate, ft <sup>3</sup> /min	1350
Geometry Factor	18

\* Regulatory Guide 1.25

\*\* Wolf Creek SER