



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

WOLF CREEK NUCLEAR OPERATING CORPORATION

WOLF CREEK GENERATING STATION

DOCKET NO. 50-482

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 72
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 February 7, 1994, 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. 72, 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 60 days of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

William D. Reekley for

Suzanne C. Black, Director
Project Directorate IV-2
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 3, 1994

ATTACHMENT TO LICENSE AMENDMENT NO.72

FACILITY OPERATING LICENSE NO. NPF-42

DOCKET NO. 50-482

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by amendment number and contain marginal lines indicating the area of change. The corresponding overleaf pages are also provided to maintain document completeness.

REMOVE

2-4
2-8
2-10
3/4 2-16
B 3/4 2-3

INSERT

2-4
2-8
2-10
3/4 2-16
B 3/4 2-3

TABLE 2.2.-1

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TOTAL ALLOWANCE (TA)	Z	SENSOR ERROR (S)	TRIP SETPOINT	ALLOWABLE VALUE
1. Manual Reactor Trip	N.A.	N.A.	N.A.	N.A.	N.A.
2. Power Range, Neutron Flux					
a. High Setpoint	7.5	4.56	0	≤109% of RTP*	≤112.3% of RTP*
b. Low Setpoint	8.3	4.56	0	≤25% of RTP*	≤28.3% of RTP*
3. Power Range, Neutron Flux, High Positive Rate	2.4	0.5	0	≤4% of RTP* with a time constant ≥2 seconds	≤6.3% of RTP* with a time constant ≥2 seconds
4. Power Range, Neutron Flux, High Negative Rate	2.4	0.5	0	≤4% of RTP* with a time constant ≥2 seconds	≤6.3% of RTP* with a time constant ≥2 seconds
5. Intermediate Range, Neutron Flux	17.0	8.41	0	≤25% of RTP*	≤35.3% of RTP*
6. Source Range, Neutron Flux	17.0	10.01	0	≤10 ⁵ cps	≤1.6 × 10 ⁵ cps
7. Overtemperature ΔT	7.0	4.86	1.67	See Note 1	See Note 2
8. Overpower ΔT	4.6	2.02	0.14	See Note 3	See Note 4
9. Pressurizer Pressure-Low	3.7	0.71	2.49	≥1915 psig	≥1906 psig
10. Pressurizer Pressure-High	7.5	0.71	2.49	≤2385 psig	≤2400 psig
11. Pressurizer Water Level-High	8.0	2.18	1.96	≤92% of instrument span	≤93.9% of instrument span

* RTP = RATED THERMAL POWER

**Loop design flow = 93,600 gpm

TABLE 2.2-1 (Continued)

TABLE NOTATIONS

NOTE 1: OVERTEMPERATURE ΔT

$$\Delta T \frac{(1 + \tau_1 S)}{(1 + \tau_2 S)} \left(\frac{1}{1 + \tau_3 S} \right) \leq \Delta T_0 [K_1 - K_2 \frac{(1 + \tau_4 S)}{(1 + \tau_5 S)} [T \left(\frac{1}{1 + \tau_6 S} \right) - T'] + K_3(P - P') - f_1(\Delta T)]$$

- Where:
- ΔT = Measured ΔT ;
 - $\frac{1 + \tau_1 S}{1 + \tau_2 S}$ = Lead-lag compensator on measured ΔT ;
 - τ_1, τ_2 = Time constants utilized in lead-lag compensator for ΔT , $\tau_1 = 5$ s,
 $\tau_2 = 3$ s;
 - $\frac{1}{1 + \tau_3 S}$ = Lag compensator on measured ΔT ;
 - τ_3 = Time constant utilized in the lag compensator for ΔT , $\tau_3 = 2$ s;
 - ΔT_0 = Indicated ΔT at RATED THERMAL POWER;
 - K_1 = 1.10;
 - K_2 = 0.0137/ $^{\circ}$ F;
 - $\frac{1 + \tau_4 S}{1 + \tau_5 S}$ = The function generated by the lead-lag compensator for T_{avg}
dynamic compensation;
 - τ_4, τ_5 = Time constants utilized in the lead-lag compensator for T_{avg} , $\tau_4 = 16$ s,
 $\tau_5 = 4$ s;
 - T = Average temperature, $^{\circ}$ F;
 - $\frac{1}{1 + \tau_6 S}$ = Lag compensator on measured T_{avg} ;
 - τ_6 = Time constant utilized in the measured T_{avg} lag compensator, $\tau_6 = 6$ s;

TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 1: (Continued)

T'	$\leq 586.5^\circ\text{F}$ (Nominal T_{avg} AT RATED THERMAL POWER);
K_3	$= 0.000671$;
P	$=$ Pressurizer pressure, psig;
P'	$= 2235$ psig (Nominal RCS operating pressure);
S	$=$ Laplace transform operator, s^{-1} ;

and $f_1(\Delta I)$ is a function of the indicated difference between top and bottom detectors of the power-range neutron ion chambers; with gains to be selected based on measured instrument response during plant STARTUP tests such that:

- (i) for $q_t - q_b$ between -25% and $+5\%$, $f_1(\Delta I) = 0$, where q_t and q_b are percent RATED THERMAL POWER in the top and bottom halves of the core respectively, and $q_t + q_b$ is total THERMAL POWER in percent of RATED THERMAL POWER;
- (ii) for each percent that the magnitude of $q_t - q_b$ exceeds -25% , the ΔT Trip Setpoint shall be automatically reduced by 1.8% of its value at RATED THERMAL POWER; and
- (iii) for each percent that the magnitude of $q_t - q_b$ exceeds $+5\%$, the ΔT Trip Setpoint shall be automatically reduced by 1.56% of its value at RATED THERMAL POWER.

NOTE 2: The channel's maximum Trip Setpoint shall not exceed its computed Trip Setpoint by more than 1.8% of ΔT span.

TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 3: OVERPOWER ΔT

$$\Delta T \left(\frac{1 + \tau_{15}}{1 + \tau_{12}} \right) \left(\frac{1}{1 + \tau_{13}} \right) \leq \Delta T_0 \left(K_4 - K_5 \left(\frac{\tau_{15}}{1 + \tau_{17}} \right) \right) \left(\frac{1}{1 + \tau_{18}} \right) T - K_6 \left[T \left(\frac{1}{1 + \tau_{16}} \right) - T^n \right] - f_2(\Delta T)$$

Where: ΔT = Measured ΔT ;

$\frac{1 + \tau_{15}}{1 + \tau_{12}}$ = Lead-lag compensator on measured ΔT ;

τ_{11}, τ_{12} = Time constants utilized in lead-lag compensator for ΔT , $\tau_{11} = 6$ s, $\tau_{12} = 3$ s;

$\frac{1}{1 + \tau_{13}}$ = Lag compensator on measured ΔT ;

τ_{14} = Time constant utilized in the lag compensator for ΔT , $\tau_{14} = 2$ s;

ΔT_0 = Indicated ΔT at RATED THERMAL POWER;

K_4 = 1.10;

K_5 = 0.02/°F for increasing average temperature and 0 for decreasing average temperature;

$\frac{\tau_{15}}{1 + \tau_{17}}$ = The function generated by the rate-lag compensator for T_{avg} dynamic compensation;

τ_{17} = Time constant utilized in the rate-lag compensator for T_{avg} , $\tau_{17} = 10$ s;

$\frac{1}{1 + \tau_{18}}$ = Lag compensator on measured T_{avg} ;

τ_{16} = Time constant utilized in the measured T_{avg} lag compensator, $\tau_{16} = 0$ s;

TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 3: (Continued)

- K_6 = 0.00128/°F for $T > T^n$ and $K_6 = 0$ for $T \leq T^n$;
- T = Average temperature, °F;
- T^n = Indicated T_{avg} at RATED THERMAL POWER (Calibration temperature for ΔT instrumentation, $\leq 586.5^\circ\text{F}$);
- S = Laplace transform operator, s^{-1} ; and
- $f_2(\Delta I)$ = 0 for all ΔI .

NOTE 4: The channel's maximum Trip Setpoint shall not exceed its computed Trip Setpoint by more than 2.6% of ΔT span.

POWER DISTRIBUTION LIMITS

3/4.2.5 DNB PARAMETERS

LIMITING CONDITION FOR OPERATION

ACTION: (Continued)

4. Identify and correct the cause of the out-of-limit condition prior to increasing THERMAL POWER above the reduced THERMAL POWER limit required by ACTION 1.b and/or 3, above; subsequent POWER OPERATION may proceed provided that the indicated RCS total flow rate is demonstrated to be within the region of acceptable operation prior to exceeding the following THERMAL POWER levels:
 - a. A nominal 50% of RATED THERMAL POWER,
 - b. A nominal 75% of RATED THERMAL POWER, and
 - c. Within 24 hours of attaining greater than or equal to 95% of RATED THERMAL POWER.

SURVEILLANCE REQUIREMENTS

- 4.2.5.1 The provisions of Specification 4.0.4 are not applicable to Specification 3.2.5.c.
- 4.2.5.2 Each of the parameters of Table 3.2-1 shall be verified to be within their limits at least once per 12 hours.
- 4.2.5.3 The RCS total flow rate indicators shall be subjected to a CHANNEL CALIBRATION at least once per 18 months.
- 4.2.5.4 The RCS total flow rate shall be determined by precision heat balance measurement at least once per 18 months. Within 7 days prior to performing the precision heat balance, the instrumentation used for determination of steam pressure, feedwater pressure, feedwater temperature, and feedwater venturi ΔP in the calorimetric calculations shall be calibrated.
- 4.2.5.5 The feedwater venturi shall be inspected for fouling and cleaned as necessary at least once per 18 months.

TABLE 3.2-1
DNB PARAMETERS

<u>PARAMETER</u>	<u>LIMITS</u>
1. Indicated Reactor Coolant System T_{avg}	Four Loops in <u>Operation</u> $\leq 590.5^{\circ}F$
2. Indicated Pressurizer Pressure	≥ 2220 psig*
3. Reactor Coolant System Flow Rate	$\geq 38.4 \times 10^4$ GPM

*Limit not applicable during either a THERMAL POWER ramp in excess of 5% of RATED THERMAL POWER per minute or a THERMAL POWER step in excess of 10% of RATED THERMAL POWER.

POWER DISTRIBUTION LIMITS

BASES

QUADRANT POWER TILT RATIO (Continued)

The 2-hour time allowance for operation with a tilt condition greater than 1.02 but less than 1.09 is provided to allow identification and correction of a dropped or misaligned control rod. In the event such ACTION does not correct the tilt, the margin for uncertainty on $F_0(X,Y,Z)$ is reinstated by reducing the maximum allowed power by 3% for each percent of tilt in excess of 1.

For purposes of monitoring QUADRANT POWER TILT RATIO when one excore detector is inoperable, the moveable incore detectors are used to confirm that the normalized symmetric power distribution is consistent with the QUADRANT POWER TILT RATIO. The incore detector monitoring is done with a full incore flux map or two sets of four symmetric thimbles. The two sets of four symmetric thimbles is a unique set of eight detector locations. These locations are C-8, E-5, E-11, H-3, H-13, L-5, L-11, N-8.

3/4.2.5 DNB PARAMETERS

The limits on the Reactor Coolant System T_{avg} and the pressurizer pressure assure that each of the parameters are maintained within the normal steady-state envelope of operation assumed in the transient and accident analyses. The limits are consistent with the initial USAR assumptions and have been analytically demonstrated adequate to maintain a DNBR above the safety analysis limit DNBR specified in the CORE OPERATING LIMITS REPORT (COLR) throughout each analyzed transient. The indicated T_{avg} value of 590.5°F and the indicated pressurizer pressure value of 2220 psig correspond to analytical limits of 593.0°F and 2205 psig respectively, with allowance for measurement uncertainty.

The 12-hour periodic surveillance of these parameters through instrument readout is sufficient to ensure that the parameters are restored within their limits following load changes and other expected transient operation.

Fuel rod bowing reduces the value of DNBR ratio. Credit is available to offset this reduction in the generic margin. The generic margins completely offset any rod bow penalties. This is the margin between the correlation DNBR limit and the safety analysis limit DNBR. These limits are specified in the COLR.

The applicable values of rod bow penalties are referenced in the USAR.

When RCS flow rate and $F_{\Delta H}(X,Y)$, per Specification 3.2.3, are measured, no additional allowances are necessary prior to comparison with the limits in the COLR. Measurement uncertainties of 2.5% for RCS total flow rate and 4% for $F_{\Delta H}(X,Y)$ have been allowed for in determination of the design DNBR value.

POWER DISTRIBUTION LIMITS

BASES

DNB PARAMETERS (Continued)

The measurement uncertainty for RCS total flow rate is based upon performing a precision heat balance and using the result to calibrate the RCS flow rate indicators. Potential fouling of the feedwater venturi which might not be detected could bias the result from the precision heat balance in a nonconservative manner. Therefore, an inspection is performed of the feedwater venturi each refueling outage.

The 12-hour periodic surveillance of indicated RCS flow is sufficient to detect only flow degradation which could lead to operation outside the acceptable region of operation specified in Table 3.2-1. This surveillance also provides adequate monitoring to detect any core crud buildup.