October 20, 1997

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

SUBJECT: WOLF CREEK GENERATING STATION - AMENDMENT NO. 113 TO FACILITY OPERATING LICENSE NO. NPF-42 (TAC NO. M99153)

Dear Mr. Maynard:

The Commission has issued the enclosed Amendment No. 113 to Facility Operating License No. NPF-42 for the Wolf Creek Generating Station. The amendment consists of changes to the Technical Specifications (TS) in response to your application dated July 3, 1997, as supplemented by letter dated August 20, 1997.

The amendment revises Surveillance Requirements 4.3.1.2 and 4.3.2.2, and TS 3/4.3.1 and 3/4.3.2, and associated Bases Sections B 3/4.3.1 and B 3/4.3.2 to eliminate periodic response time testing requirements for selected pressure and differential pressure sensors in the reactor trip system and engineered safety features actuation system instrumentation channels.

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,

Original Signed By

Kristine M. Thomas, Project Manager
Project Directorate IV-2
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-482

Enclosures: 1. Amendment No. 113 to NPF-42
2. Safety Evaluation

cc w/encls: See next page

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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. 113
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 July 3, 1997, as supplemented by letter dated August 20, 1997, 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. 113, 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 before restart from the ninth refueling outage currently scheduled to start on October 4, 1997.

FOR THE NUCLEAR REGULATORY COMMISSION

Kristine M. Thomas, Project Manager
Project Directorate IV-2
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: October 20, 1997

ATTACHMENT TO LICENSE AMENDMENT NO. 113

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. The corresponding overleaf pages are also provided to maintain document completeness.

REMOVE	INSERT
3/4 3-1	3/4 3-1
3/4 3-13a	3/4 3-13a
B 3/4 3-2	B 3/4 3-2
B 3/4 3-3	B 3/4 3-3

3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the Reactor Trip System instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE.

APPLICABILITY: As shown in Table 3.3-1.

ACTION:

As shown in Table 3.3-1.

SURVEILLANCE REQUIREMENTS

4.3.1.1 Each Reactor Trip System instrumentation channel and interlock and the automatic trip logic shall be demonstrated OPERABLE by the performance of the Reactor Trip System Instrumentation Surveillance Requirements specified in Table 4.3-1.

4.3.1.2 The REACTOR TRIP SYSTEM RESPONSE TIME of each Reactor trip function shall be verified to be within its limit at least once per 18 months. Neutron detectors are exempt from response time testing. Each verification shall include at least one train such that both trains are verified at least once per 36 months and one channel per function such that all channels are verified at least once every N times 18 months where N is the total number of redundant channels in a specific Reactor trip function as shown in the "Total No. of Channels" column of Table 3.3-1.

TABLE 3.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
1. Manual Reactor Trip	2	1	2	1,2	1
	2	1	2	3*,4*,5*	10
2. Power Range, Neutron Flux					
a. High Setpoint	4	2	3	1,2	2#
b. Low Setpoint	4	2	3	1###,2	2#
3. Power Range, Neutron Flux, High Positive Rate	4	2	3	1,2	2#
4. Power Range, Neutron Flux, High Negative Rate	4	2	3	1,2	2#
5. Intermediate Range, Neutron Flux	2	1	2	1###,2	3
6. Source Range, Neutron Foux					
a. Startup	2	1	2	2##	4
b. Shutdown	2	1	2	3,4,5	5
7. Overtemperature ΔT Four Loop Operation	4	2	3	1,2	6#
8. Overpower ΔT Four Loop Operation	4	2	3	1,2	6#
9. Pressurizer Pressure-Low	4	2	3	1	6#
10. Pressurizer Pressure-High	4	2	3	1,2	6#

3/4.3.2 ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

SURVEILLANCE REQUIREMENTS

4.3.2.1 Each ESFAS instrumentation channel and interlock and the automatic actuation logic and relays shall be demonstrated OPERABLE by the performance of the ESFAS Instrumentation Surveillance Requirements specified in Table 4.3-2.

4.3.2.2 The ENGINEERED SAFETY FEATURES RESPONSE TIME* of each ESFAS function shall be verified to be within the limit at least once per 18 months. Each verification shall include at least one train such that both trains are verified at least once per 36 months and one channel per function such that all channels are verified at least once per N times 18 months where N is the total number of redundant channels in a specific ESFAS function as shown in the "Total No. of Channels" Column of Table 3.3-3.

*The provisions of Specification 4.0.4 are not applicable for response time testing of the steam turbine-driven auxiliary feedwater pump for entry into MODE 3.

TABLE 3.3-3

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
1. Safety Injection, (Reactor Trip, Phase "A" Isolation, Feedwater Isolation, Component Cooling Water, Turbine Trip, Auxiliary Feedwater-Motor-Driven Pump, Emergency Diesel Generator Operation, Containment Cooling, and Essential Service Water Operation)					
a. Manual Initiation	2	1	2	1, 2, 3, 4	18
b. Automatic Actuation Logic and Actuation Relays (SSPS)	2	1	2	1, 2, 3, 4	14
c. Containment Pressure-High-1	3	2	2	1, 2, 3	28*
d. Pressurizer Pressure-Low	4	2	3	1, 2, 3#	28*
e. Steam Line Pressure-Low	3/steam line	2/steam line any steam line	2/steam line	1, 2, 3#	28*
2. Containment Spray					
a. Manual Initiation	2 pair	1 pair operated simul-taneously	2 pair	1, 2, 3, 4	18
b. Automatic Actuation Logic and Actuation Relays (SSPS)	2	1	2	1, 2, 3, 4	14
c. Containment Pressure-High-3	4	2	3	1, 2, 3	16

3/4.3.1 and 3/4.3.2 REACTOR TRIP SYSTEM AND ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

The OPERABILITY of the Reactor Trip System and the Engineered Safety Features Actuation System instrumentation and interlocks ensure that: (1) the associated ACTION and/or Reactor trip will be initiated when the parameter monitored by each channel or combination thereof reaches its Setpoint, (2) the specified coincidence logic is maintained, (3) sufficient redundancy is maintained to permit a channel to be out-of-service for testing or maintenance, and (4) sufficient system functional capability is available from diverse parameters.

The OPERABILITY of these systems is required to provide the overall reliability, redundancy, and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of each of these systems is consistent with the assumptions used in the safety analyses. The Surveillance Requirements specified for these systems ensure that the overall system functional capability is maintained comparable to the original design standards. The periodic surveillance tests performed at the minimum frequencies are sufficient to demonstrate this capability.

When determining compliance with action statement requirements, addition to the RCS of borated water with a concentration greater than or equal to the minimum required RWST concentration shall not be considered to be a positive reactivity change.

The Engineered Safety Features Actuation System Instrumentation Trip Setpoints specified in Table 3.3-4 are the nominal values at which the bistables are set for each functional unit. A Setpoint is considered to be adjusted consistent with the nominal value when the "as measured" Setpoint is within the band allowed for calibration accuracy. Specified surveillance intervals and surveillance and maintenance outage times have been determined in accordance with WCAP-10271, and Supplement 1, "Evaluation of Surveillance Frequencies and Out of Service Times for the Reactor Protection Instrumentation System," supplements to that report, and the NRC's Safety Evaluation dated February 21, 1985, WCAP-10271 Supplement 2 and WCAP-10271-P-A Supplement 2, Revision 1, "Evaluation of Surveillance Frequencies and Out of Service Times for the Engineered Safety Features Actuation System," the NRC's Safety Evaluation dated February 22, 1989, and the NRC's Supplemental Safety Evaluation dated April 30, 1990. Surveillance intervals and out of service times were determined based on maintaining an appropriate level of reliability of the Reactor Protection System and Engineered Safety Features instrumentation.

REACTOR TRIP SYSTEM AND ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION (Continued)

To accommodate the instrument drift assumed to occur between operational tests and the accuracy to which Setpoints can be measured and calibrated, Allowable Values for the Setpoints have been specified in Table 3.3-4. Operation with Setpoints less conservative than the Trip Setpoint but within the Allowable Value is acceptable since an allowance has been made in the safety analysis to accommodate this error. An optional provision has been included for determining the OPERABILITY of a channel when its Trip Setpoint is found to exceed the Allowable Value. The methodology of this option utilizes the "as measured" deviation from the specified calibration point for rack and sensor components in conjunction with a statistical combination of the other uncertainties of the instrumentation to measure the process variable and the uncertainties in calibrating the instrumentation. In Equation 3.3-1, $Z + R + S \leq TA$, the interactive effects of the errors in the rack and the sensor, and the "as measured" values of the errors are considered. Z, as specified in Table 3.3-4, in percent span, is the statistical summation of errors assumed in the analysis excluding those associated with the sensor and rack drift and the accuracy of their measurement. TA or Total Allowance is the difference, in percent span, between the Trip Setpoint and the value used in the analysis for the actuation. R or Rack Error is the "as measured" deviation, in percent span, for the affected channel from the specified Trip Setpoint. S or Sensor Error is either the "as measured" deviation of the sensor from its calibration point or the value specified in Table 3.3-4, in percent span, from the analysis assumptions.

The methodology to derive the Trip Setpoints is based upon combining all of the uncertainties in the channels. Inherent to the determination of the Trip Setpoints are the magnitudes of these channel uncertainties. Sensor and rack instrumentation utilized in these channels are expected to be capable of operating within the allowances of these uncertainty magnitudes. Rack drift in excess of the Allowable Value exhibits the behavior that the rack has not met its allowance. Being that there is a small statistical chance that this will happen, an infrequent excessive drift is expected. Rack or sensor drift, in excess of the allowance that is more than occasional, may be indicative of more serious problems and should warrant further investigation.

The verification of response time at the specified frequencies provides assurance that the reactor trip and the engineered safety features actuation associated with each channel is completed within the time limit assumed in the safety analysis. No credit is taken in the analysis for those channels with response times indicated as not applicable (i.e., N.A.).

Response time may be verified by actual response time tests in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be obtained from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) inplace, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. WCAP-13632-P-A Revision 2, "Elimination of Pressure Sensor

REACTOR TRIP SYSTEM AND ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION (Continued)

Response Time Testing Requirements" provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for specific sensors identified in the WCAP. Response time verification for other sensor types must be demonstrated by test.

The allocation for sensor response times must be verified prior to placing the component in operational service and re-verified following maintenance that may adversely affect response time. In general, electrical repair work does not impact response time provided the parts used for repair are of the same type and value. One example where response time could be affected is replacing the sensing assembly of a transmitter.

The Engineered Safety Features Actuation System senses selected plant parameters and determines whether or not predetermined limits are being exceeded. If they are, the signals are combined into logic matrices sensitive to combinations indicative of various accidents, events, and transients. Once the required logic combination is completed, the system sends actuation signals to those Engineered Safety Features components whose aggregate function best serves the requirements of the condition. As an example, the following actions may be initiated by the Engineered Safety Features Actuation System to mitigate the consequences of a steam line break or loss-of-coolant accident: (1) Safety Injection pumps start and automatic valves position, (2) Reactor trip, (3) Feedwater System isolates, (4) the emergency diesel generators start, (5) containment spray pumps start and automatic valves position, (6) containment isolates, (7) steam line isolation, (8) Turbine trip, (9) auxiliary feedwater pumps start and automatic valves position, (10) containment cooling fans start and automatic valves position, (11) essential service water pumps start and automatic valves position, and (12) isolate normal control room ventilation and start Emergency Ventilation System.

Engineered Safety Features Actuation System Interlocks

The Engineered Safety Features Actuation System interlocks perform the following functions:

P-4 Reactor tripped - Actuates Turbine trip, closes main feedwater valves on T_{avg} below Setpoint, prevents the opening of the main feedwater valves which were closed by a Safety Injection or High Steam Generator Water Level signal, allows Safety Injection block so that components can be reset or tripped.

Reactor not tripped - prevents manual block of Safety Injection.

P-11 On increasing pressure P-11 automatically reinstates safety injection actuation on low pressurizer pressure and low steamline pressure and automatically blocks steamline isolation on negative steamline pressure rate. On decreasing pressure; P-11 allows the manual block of Safety Injection on low pressurizer pressure and low steamline pressure and allows steamlime isolation on negative steamline pressure rate to become active upon manual block of low steamline pressure SI.

3/4.3.3 MONITORING INSTRUMENTATION

3/4.3.3.1 RADIATION MONITORING FOR PLANT OPERATIONS

The OPERABILITY of the radiation monitoring instrumentation for plant operations ensures that: (1) the associated ACTION will be initiated when the radiation level monitored by each channel or combination thereof reaches its Setpoint, (2) the specified coincidence logic is maintained, and (3) sufficient redundancy is maintained to permit a channel to be out-of-service for testing or maintenance. The radiation monitors for plant operations senses radiation levels in selected plant systems and locations and determines whether or not predetermined limits are being exceeded. If they are, the signals are combined into logic matrices sensitive to combinations indicative of various accidents and abnormal conditions. Once the required logic combination is completed, the system sends actuation signals to initiate alarms or automatic isolation action and actuation of Emergency Exhaust or Control Room Emergency Ventilation Systems.

3/4.3.3.2 DELETED

3/4.3.3.3 DELETED

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 113 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 July 7, 1997, as supplemented by letter dated August 20, 1997, Wolf Creek Nuclear Operating Corporation (the licensee) requested an amendment to Facility Operating License No. NPF-42 to change the Technical Specifications (TS) for Wolf Creek Generating Station. The proposed TS changes would eliminate periodic response time testing (RTT) surveillance requirements for the following pressure and differential pressure sensors in reactor trip system (RTS) and engineered safety features actuation system (ESFAS) instrument channels:

- Steam generator water level - Barton 764 Differential Pressure Transmitter
- Pressurizer pressure - Tobar 32PA1 Absolute Pressure Transmitter
- Steam line pressure - Barton 763 Gauge Pressure Transmitter
- Containment pressure - Barton 752 Differential Pressure Transmitter
- Containment pressure - Rosemount 1153DB6 Differential Pressure Transmitter
- Reactor coolant flow - Rosemount 1153HD5 Differential Pressure Transmitter
- Refueling water storage tank level - Barton 752 Differential Pressure Transmitter

The August 20, 1997, supplemental letter forwarded additional information concerning the hydraulic response time testing and periodic monitoring of Rosemount transmitters and did not change the staff's original no significant hazards determination published in the Federal Register on July 30, 1997 (62 FR 40862).

2.0 BACKGROUND

The proposed TS amendment would revise RTS Instrumentation Surveillance Requirement 4.3.1.2 and ESFAS Instrumentation Surveillance Requirement 4.3.2.2 to indicate that the response time of each RTS and ESFAS instrumentation channel shall be periodically "verified" versus "tested." The associated Bases section would be revised to state that the total channel response time may be verified by either actual response time tests of the entire channel in any series of sequential, overlapping or total channel measurements, or by

summation of allocated sensor response times with actual tests on the remainder of the channel in any series of sequential or overlapping measurements. The use of allocated sensor response times would only apply to the specific sensors identified above.

2.1 Reactor Trip System Instrumentation

TS Section 3/4.3.1 Reactor Trip System Instrumentation, Surveillance Requirement 4.3.1.2 will be modified. The requirement currently reads:

> The REACTOR TRIP SYSTEM RESPONSE TIME of each Reactor trip function shall be demonstrated to be within its limit at least once per 18 months. Neutron detectors are exempt from response time testing. Each test shall include at least one train such that both trains are tested at least once per 36 months and one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific Reactor trip function as shown in the "Total No. of Channels" column of Table 3.3-1.

The new requirement will read:

> The REACTOR TRIP SYSTEM RESPONSE TIME of each Reactor trip function shall be verified to be within its limit at least once per 18 months. Neutron detectors are exempt from response time testing. Each verification shall include at least one train such that both trains are verified at least once per 36 months and one channel per function such that all channels are verified at least once every N times 18 months where N is the total number of redundant channels in a specific Reactor trip function as shown in the "Total No. of Channels" column of Table 3.3-1.

2.2 Engineered Safety Feature Actuation System Instrumentation

TS Section 3/4.3.2, Engineered Safety Feature Actuation System Instrumentation, Surveillance Requirement 4.3.2.2 will be modified. The requirement currently reads:

> The ENGINEERED SAFETY FEATURES RESPONSE TIME of each ESFAS function shall be demonstrated to be within the limits at least once per 18 months. Each test shall include at least one train such that both trains are tested at least once per 36 months and one channel per function such that all channels are tested at least once per N times 18 months where N is the total number of redundant channels in a specific ESFAS function as shown in the "Total No. of Channels" Column of Table 3.3-3.

The new requirement will read:

> The ENGINEERED SAFETY FEATURES RESPONSE TIME of each ESFAS function shall be verified to be within the limits at least once per 18 months. Each verification shall include at least one train such that both trains are verified at least once per 36 months and one channel per function such that all channels are verified at least once per N times 18 months where

N is the total number of redundant channels in a specific ESFAS function as shown in the "Total No. of Channels" Column of Table 3.3-3.

2.3 Technical Specification Bases

The TS bases for the reactor trip system and engineered safety feature actuation system instrumentation will replace one paragraph with three new paragraphs. The third paragraph on page B 3/4 3-2, continuing on page B 3/4 3-3 will be replaced. The paragraph currently reads:

> The measurement of response time at the specified frequencies provides assurance that the Reactor trip and the Engineered Safety Feature actuation associated with each channel is completed within the time limit assumed in the safety analysis. No credit was taken in the analysis for those channels with response times indicated as not applicable. Response time may be demonstrated by any series of sequential, overlapping or total channel test measurements provided that such tests demonstrate the total channel response time as defined. Sensor response time verification may be demonstrated by either: (1) in place, onsite, or offsite test measurements, or (2) utilizing replacement sensors with certified response times.

The new paragraphs will read:

> The verification of response time at the specified frequencies provides assurance that the reactor trip and the engineered safety features actuation associated with each channel is completed within the time limit assumed in the safety analysis. No credit is taken in the analysis for those channels with response times indicated as not applicable (i.e., N.A.).
>
> Response time may be verified by actual response time tests in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be obtained from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) inplace, onsite, or offsite (e.g. vendor) test measurements, or (3) utilizing vendor engineering specifications. WCAP-13632-P-A Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements" provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for specific sensors identified in the WCAP. Response time verification for other sensor types must be demonstrated by test.
>
> The allocation for sensor response times must be verified prior to placing the component in operational service and reverified following maintenance that may adversely affect response time. In general, electrical repair work does not impact response time provided the parts

used for repair are of the same type and value. One example where response time could be affected is replacing the sensing assembly of a transmitter.

The technical basis for the proposed changes is described in Westinghouse Topical Report WCAP-13632, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," which was used by the licensee in support of these proposed TS changes. WCAP-13632, Revision 2 was completed as an industry effort to demonstrate that TS requirements to perform periodic RTT of selected pressure and differential pressure sensors in RTS and ESFAS instrumentation loops could be eliminated.

3.0 EVALUATION

The licensee noted that the Institute of Electrical and Electronic Engineers (IEEE) Standard 338-1977, "Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems," as endorsed by Regulatory Guide 1.118, Revision 2, "Periodic Testing of Electric Power and Protection Systems," dated June 1978, defines a basis for eliminating RTT. Section 6.3.4 of IEEE Standard 338 states in part:

> "Response time testing of all safety-related equipment, per se, is not required if, in lieu of response time testing, the response time of the safety system equipment is verified by functional testing, calibration check, or other tests, or both. This is acceptable if it can be demonstrated that changes in response time beyond acceptable limits are accompanied by changes in performance characteristics which are detectable during routine periodic tests."

The licensee stated that WCAP-13632, Revision 2, provided the technical basis for the elimination of periodic RTT of the subject pressure and differential pressure sensors. WCAP-13632, Revision 2, utilized Electric Power Research Institute (EPRI) failure modes and effects analyses (FMEA) as documented in EPRI Report NP-7243, Revision 1, "Investigation of Response Time Testing Requirements," and Westinghouse Owners Group (WOG) similarity analyses to justify the elimination of RTT surveillance requirements for a number of pressure and differential pressure sensors, including the specific sensors identified in Section 1.0 of this evaluation.

As indicated in WCAP-13632, Revision 2, the basic premise for the elimination of periodic RTT of pressure and differential pressure sensors installed in RTS and ESFAS channels is that pressure sensor component failures that can cause response time degradation will also affect sensor output and, therefore, can be detected during other TS surveillance tests, such as channel checks and calibrations. In addition, these other surveillance tests are performed more frequently than current response time tests. Based on this information, WCAP-13632, Revision 2, concludes that RTT is redundant to other TS surveillance requirements.

The staff approved WCAP-13632, Revision 2, in its safety evaluation report (SER) dated September 5, 1995, as a basis for the elimination of TS RTT requirements for each of the pressure sensors identified in WCAP-13632, Revision 2. As described in the staff's SER, the results of the EPRI FMEAs and the WOG sensor analyses indicated that, in general, potential sensor component failure modes associated with sensors identified in WCAP 13632, Revision 2, would not affect sensor response time independently of sensor output. Therefore, sensor failure modes that have the potential to affect sensor response time would be detected during the performance of other TS surveillance tests.

However, the EPRI results did identify several potential failure modes in certain pressure sensors that could affect sensor response time without concurrently affecting sensor output. To address these failures modes and other generic concerns, the staff stipulated four actions that licensees must commit to take, if applicable, when eliminating sensor RTT.

First, the staff's SER stated that licensees referencing WCAP-13632 must perform a hydraulic RTT prior to installation of a new transmitter/switch or following refurbishment of the transmitter/switch to determine an initial sensor-specific response time value. In response, the Wolf Creek licensee stated that applicable plant surveillance test procedures stipulate that allocations for pressure sensor response times must be verified by performance of an appropriate RTT prior to placing a sensor in operational service and reverified following maintenance that may adversely affect sensor response time, such as replacing the sensing assembly of a transmitter. When sensor RTT is required, the resultant pressure sensor response times will be documented in the plant procedure data packages. The staff finds this response acceptable as it satisfactorily addresses action item 1 of the staff's SER approving WCAP-13632, Rev. 2.

Secondly, the EPRI FMEAs identified crimped capillaries as a manufacturing or handling defect that has the potential to affect response times of sensors containing capillaries. As a result, the staff's SER stated that for transmitters and switches with capillary tubes, a RTT must be performed after initial installation and after any maintenance or modification activity that could damage the capillary tubes. In response, the Wolf Creek licensee stated that plant procedures and other appropriate administrative controls stipulate that pressure sensors utilizing capillary tubes, e.g., containment pressure, must be subjected to RTT after initial installation and following any maintenance or modification activity which could damage the capillary tubes. The staff finds this response acceptable as it satisfactorily addresses action item 2.

The third stipulated action in the staff's SER was included as a result of identified failure modes associated with transmitters that have variable damping potentiometers. However, this action is not applicable to Wolf Creek because the licensee stated that variable damping transmitters are not installed in any RTS or ESFAS application for which RTT is required.

The fourth action of the staff's SER stipulates periodic drift monitoring of all Model 1151, 1152, 1153, and 1154 Rosemount pressure and differential pressure transmitters, for which RTT elimination is proposed, in accordance with the guidance contained in Rosemount Technical Bulletin No. 4, "Guideline for Detection of Sluggishness During a Standard Transmitter Calibration," and specifies continued full compliance with any prior commitments to Bulletin 90-01, Supplement 1. An alternative to periodic drift monitoring of Rosemount transmitters was also permitted as follows (1) ensure that operators and technicians are aware of the Rosemount transmitter loss of fill oil issue and, (2) revise and review surveillance testing procedures to ensure the recognition of significant response time degradation.

In response, the licensee proposed RTT elimination of Rosemount pressure transmitters at Wolf Creek installed for containment pressure and reactor coolant flow measurements. Even though these transmitters were manufactured after July 11, 1989, the date on which Rosemount transmitters of the improved design began to be manufactured, the staff notes that loss of fill oil is still a credible failure mode in Rosemount pressure and differential pressure transmitters including Model 1153 transmitters manufactured after July 11, 1989. The licensee stated that based on the guidance of Rosemount Technical Bulletin No. 4 dated December 22, 1989, periodic drift monitoring is performed on Rosemount transmitters for which response time testing elimination is proposed in accordance with Appendix A, Section 4 of the Rosemount bulletin.

Periodic drift monitoring is performed by trending the redundant channels of reactor coolant flow and containment pressure transmitters for which response time testing elimination is proposed. In each case, three redundant transmitters are trended by obtaining simultaneous data from each transmitter on a two week interval and plotting the results in graphic form. The data is reviewed for long-term drift trends as recommended in Rosemount Technical Bulletin No. 4. Sustained drift trends would indicate the possibility of loss of oil and indicate the need for further investigation and analysis.

Additionally, the calibration frequency of the transmitters proposed for RTT elimination is 18 months. Calibrations are performed by experienced technicians, knowledgeable in the Rosemount transmitter loss-of-fill oil concern, who would question response times indicative of fill oil loss. The calibration and monitoring of the transmitters at Wolf Creek are consistent with the guidance of Appendix B, Section 2 of the Rosemount bulletin. This Section states "In a standard calibration of a pressure transmitter, a precision pressure is applied to the transmitter so that the output of the transmitter can be verified to be correct. Typically, precision pressure sources do not apply a step pressure change, rather they ramp the pressure up over a short period of time. When a transmitter is being calibrated, the technician learns from experience how much time the transmitter requires to reach a stable output. If the output of the transmitters is observed when pressure is applied, the technician can generally tell that a transmitter is sluggish based solely on past experience. When pressure is reduced, the transmitter output should also be observed to verify correct response. For range codes five through nine, the transmitter output current should always follow the input pressure to within one second. Typical field failures have

been returned with response times ranging from several minutes to over 1 hour, thus a sluggish transmitter at calibration is relatively easy to detect. The staff finds this response to be acceptable as it satisfactorily addresses action item 4.

The licensee has proposed using allocated sensor response times in accordance with the methodology contained in Section 9.0 of WCAP-13632, Revision 2, to verify total RTS or ESFAS channel response time. Allocations for sensor response times would be obtained from (1) historical records based on acceptable RTT (hydraulic, noise, or power interrupt tests); (2) inplace, onsite, or offsite (e.g., vendor) test measurements; or (3) vendor engineering specifications. WCAP-13632 makes no specific recommendation regarding which of these methods to use, although the allocated response time value will be increasingly more conservative progressing through these methods. In cases where data from previous tests, whether onsite or offsite, is used, the allocated sensor response time must include a valid statistical tolerance interval such as described in Chapter 8 of NUREG-1475. The tolerance limit, whether one-sided or two-sided, must be appropriate for the safety function performed. For most safety related trip systems, this would be a 95/95 confidence level. Available manufacturer supplied and Westinghouse engineering specification response time values for the subject pressure sensors are shown in Table 9-1 of WCAP-13632, Revision 2. The total channel response time is obtained by summing the allocated sensor response time with the measured response time of the remainder of the channel. This methodology, as described in WCAP-13632, Revision 2, was previously approved in the staff's SER dated September 5, 1995. The licensee's use of WCAP-13632 guidance for establishing allocated sensor response time is acceptable to the staff.

In addition to the above, the staff notes that replacement of the term "test" with "validate" in the Wolf Creek technical specifications, in accordance with WCAP-13632, allows only the sensor to use allocated response times, while the remainder of the channel still requires actual test and measurements of response times. Further, only those sensors approved in the staff's September 5, 1995, SER on WCAP-13632 may have response time measurements replaced with allocated values, and if, in the future, these sensors are replaced with sensors not approved in the SER, actual measurement of sensor response times will be required.

In accordance with the guidance of Regulatory Guide 1.118, Revision 2, and IEEE 338-1977, Section 6.3.4, response time testing of instrumentation can be eliminated if it can be shown that changes in the response time of an instrument will be accompanied by changes in performance characteristics which are detectable during other routine periodic surveillance tests. The sensor analyses results in WWCAP-13632, Revision 2, concluded that RTT is redundant to other periodic surveillance tests, such as channel checks and calibrations, because these other surveillance tests will detect sensor component failures that cause response time degradation. Furthermore, these other surveillance tests are performed more frequently than current response time tests. The staff found this conclusion acceptable as indicated in its SER dated September 5, 1996, approving WCAP-13632.

Based on its review of the licensee's plant specific analysis of RTT elimination, the staff concludes that the licensee's proposed TS changes are consistent with the guidance of WCAP-13632 and the actions identified in its SER approving WCAP-13632. The staff agrees that sensor component failures that can significantly degrade sensor response time can be detected during the performance of other required surveillance tests. Thus, the staff concludes that other existing TS surveillance requirements for the selected pressure and differential pressure sensors indicated below provide confidence that the safety function of the plant instrumentation will be satisfied without the need for specific RTT. The staff, therefore, concludes that the licensee's proposal to eliminate the TS RTT requirements for the following pressure and differential pressure sensors is acceptable:

- Steam generator water level - Barton 764 Differential Pressure Transmitter
- Pressurizer pressure - Tobar 32PA1 Absolute Pressure Transmitter
- Steam line pressure - Barton 763 Gauge Pressure Transmitter
- Containment pressure - Barton 752 Differential Pressure Transmitter
- Containment pressure - Rosemount 1153DB6 Differential Pressure Transmitter
- Reactor coolant flow - Rosemount 1153HD5 Differential Pressure Transmitter
- Refueling water storage tank level - Barton 752 Differential Pressure Transmitter

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 (62 FR 40862). 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.

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