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Ref: 10CFR50.90

CPSES-200101191
Log # TXX-01092
File # 00236

August 24, 2001

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445 AND 50-446
LICENSE AMENDMENT REQUEST (LAR) 01-008
REVISION TO TECHNICAL SPECIFICATION (TS) 3.3.2. ESFAS INSTRUMENTATION AND 3.3.6, CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION

Gentlemen:

Pursuant to 10CFR50.90, TXU Electric hereby requests an amendment to the CPSES Unit 1 Operating License (NPF-87) and CPSES Unit 2 Operating License (NPF-89) by incorporating the attached change into the CPSES Units 1 and 2 Technical Specifications. This change request applies to both units.

The proposed change will revise TS 3.3.2 entitled "ESFAS Instrumentation" and TS 3.3.6 entitled "Containment Ventilation Isolation Instrumentation". The proposed change will revise the CPSES Units 1 and 2 Technical Specifications to change the surveillance frequency for Westinghouse type AR relays, used as Solid State Protection System slave relays or auxiliary relays, from quarterly to refueling outage frequency. Surveillance Requirements (SR) 3.3.2.6 and 3.3.6.5 would be revised to change the frequency from "92 days" to "92 days OR 18 months for Westinghouse type AR relays."

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Attachment 1 is the required affidavit. Attachment 2 provides a detailed description of the proposed changes, a safety analysis of the proposed changes, TXU Electric's determination that the proposed changes do not involve a significant hazard consideration, a regulatory analysis of the proposed changes and an environmental evaluation. Attachment 3 provides the affected Technical Specification pages marked-up to reflect the proposed changes. Attachment 4 provides proposed changes to the Technical Specifications Bases for information only. These changes will be processed per CPSES site procedures. Attachment 5 provides retyped Technical Specification pages which incorporate the requested changes. Attachment 6 provides retyped Technical Specification Bases pages which incorporate the proposed changes.

TXU Electric requests approval of the proposed License Amendment by June 1, 2002 to be implemented within 60 days of the issuance of the license amendment. The requested approval date was administratively selected to allow for NRC review but the plant does not require this amendment to allow continued safe full power operations.

This communication contains the following new commitments which will be completed as noted:

Commitment Number	Commitment
27240	All normally energized Westinghouse Type AR relays used as SSPS slave or auxiliary relays that are subject to the requirements of Technical Specifications 3.3.2 and 3.3.6 will be replaced after twenty (20) years of service life.
27241	If any normally energized type AR relay used as a SSPS slave or auxiliary relay fails before twenty (20) years of service, the service life will be reevaluated if the failure mechanism involves the end of life relay binding due to material degradation of the coil bobbin.

The Commitment number is used by TXU Electric for the internal tracking of CPSES commitments.

In accordance with 10CFR50.91(b), TXU Electric is providing the State of Texas with a copy of this proposed amendment.

Should you have any questions, please contact Mr. Robert A. Slough at (254) 897-5727.

Sincerely,

C. L. Terry

By: Roger D. Walker
Roger D. Walker
Regulatory Affairs Manager

RAS/ras
Attachments
1. Affidavit
2. Description and Assessment
3. Markup of Technical Specifications pages
4. Markup of Technical Specifications Bases pages (for information)
5. Retyped Technical Specifications Pages
6. Retyped Technical Specifications Bases Pages (for information)

c - E. W. Merschoff, Region IV
J. A. Clark, Region IV
D. H. Jaffe, NRR
Resident Inspectors, CPSES

Mr. Arthur C. Tate
Bureau of Radiation Control
Texas Department of Public Health
1100 West 49th Street
Austin, Texas 78704

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)		
	)		
TXU Electric	)	Docket Nos.	50-445
	)		50-446
(Comanche Peak Steam Electric Station,	)	License Nos.	NPF-87
Units 1 & 2)	)		NPF-89

AFFIDAVIT

Roger D. Walker being duly sworn, hereby deposes and says that he is Regulatory Affairs Manager of TXU Electric, the licensee herein; that he is duly authorized to sign and file with the Nuclear Regulatory Commission this License Amendment Request 01-008; that he is familiar with the content thereof; and that the matters set forth therein are true and correct to the best of his knowledge, information and belief.

Roger D. Walker
Regulatory Affairs Manager

STATE OF TEXAS)
)
COUNTY OF Johnson)

Subscribed and sworn to before me, on this 24th day of August, 2001.

Carolyn L Cosentino
Notary Public

ATTACHMENT 2 to TXX-01092

DESCRIPTION AND ASSESSMENT

LICENSEE'S EVALUATION

DESCRIPTION AND ASSESSMENT

1.0 INTRODUCTION

Proposed change LAR 01-008 is a request to revise Technical Specifications (TS) 3.3.2, "ESFAS Instrumentation" and 3.3.6, "Containment Ventilation Isolation Instrumentation" for Comanche Peak Steam Electric Station (CPSES) Units 1 and 2.

TXU Electric is requesting this change to the slave relay testing frequency in order to minimize the risk of plant transients such as unnecessary ESF actuations or reactor trips due to slave relay testing. Relaxing the surveillance interval also reduces the frequency that safety systems will be removed from service for testing and, therefore, increases their availability to perform their required safety functions. This results in a reduction of risk. A reduction in slave relay testing frequency will also be cost beneficial by reducing the burden on the plant operations, maintenance, and engineering staff.

No changes to the CPSES Final Safety Analysis Report are anticipated at this time as a result of this License Amendment Request.

2.0 DESCRIPTION OF PROPOSED AMENDMENT

The proposed change would revise the CPSES TS to change the surveillance frequency for Westinghouse type AR relays, used as Solid State Protection System slave relays or auxiliary relays, from quarterly to refueling outage frequency.

Specifically, Surveillance Requirements (SR) 3.3.2.6 and 3.3.6.5 would be revised to change the frequency from "92 days" to "92 days OR 18 months for Westinghouse type AR relays."

For information only, this LAR includes proposed associated changes to the Technical Specification Bases. The Bases for Surveillance Requirements (SR) 3.3.2.6 and 3.3.6.5 would be revised by the addition of the following paragraph:

"For ESFAS slave relays which are Westinghouse type AR relays, the SLAVE RELAY TEST is performed every 18 months. The Frequency is based on the slave relay reliability assessment presented in Reference 10[3]. This reliability assessment is relay specific and applies only to Westinghouse type AR relays. Note that, for normally energized applications, the relays may require periodic replacement in accordance with the guidance given in Reference 10[3]."

In addition, WCAP-13877, Rev. 2-P-A, August 2000 would be added as Reference 10 to the TS 3.3.2 Bases and as Reference 3 to the TS 3.3.6 Bases.

3.0 BACKGROUND

Generic Letter (GL) 93-05, "Line Item Technical Specification Improvements to Reduce Surveillance Requirements for Testing During Power Operation," [Reference 10.1] was approved in September 1993. This GL is the result of recommendations from a 1983 NRC task group formed to investigate problems with surveillance testing required by Technical Specifications (TS). The objectives of the NRC task group were: 1) to review the basis for test frequencies; 2) to ensure that the tests promote safety and do not degrade equipment; and 3) to review surveillance tests for unnecessary burden on plant personnel. The studies found that while some testing at power is essential to verify equipment and system operability, safety can be improved, equipment degradation decreased, and unnecessary personnel burden relaxed by reducing the amount of testing at power. The relaxation of the slave relay test frequency is consistent with the objectives of the NRC task group. The results of the studies were documented in WCAP-13877 (proprietary) [Reference 10.2] and WCAP-14129 (non-proprietary) [Reference 10.3].

Some slave relay testing results in actuation of ESF equipment. These actuations have caused plant transients at other plants, such as inadvertent ESF actuations and reactor trips. Failures in the testing circuitry, particularly for those ESF components which are not intended to be actuated during the test, can also contribute to an increase in inadvertent plant trips due to slave relay testing. Changing the frequency of slave relay testing from quarterly to a refueling frequency will minimize the risks associated with unnecessary ESF actuations or reactor trips.

Performance of some slave relay testing requires that the associated safety systems be removed from service. Examples of systems that must be removed from service for slave relay testing include the Auxiliary Feedwater System, the Containment Spray System, and portions of the Safety Injection System. Relaxing the surveillance interval reduces the frequency that safety systems will be removed from service and, therefore, increases their availability to perform their required safety functions. This results in a reduction of risk.

A reduction in slave relay testing frequency will also be cost beneficial by reducing the burden on plant operations, maintenance, and engineering staff.

3.1 SSPS Overview (FSAR Chapters 7.1, 7.2, 7.3, and 7.6)

The Solid State Protection System (SSPS) is designed to actuate plant engineered safety feature (ESF) components when it receives the appropriate combination of input signals. The SSPS consists of two redundant, electrically independent trains. ESF components are arranged so that a failure of either SSPS train will not result in the loss of a required safety function.

ESF components are actuated by slave relays in the SSPS. The slave relays are actuated by master relays, which are actuated by the logic circuits of the SSPS. Each slave relay actuates multiple ESF components either directly or indirectly. Most slave relays actuate the ESF component directly. A number of slave relays actuate auxiliary (interposing) relays that actuate the ESF components.

A safeguards test cabinet (STC) is also provided to allow testing of the slave relays. The STC consists of test switches that apply voltage to a particular slave relay to determine operability of the relay. Each slave relay has a unique test switch.

Several tests are performed to verify the operability of all parts of the SSPS. An actuation logic test verifies the reactor trip and ESF logic signal output when simulated input signals are provided to the SSPS. A master relay test circuit energizes each master relay and verifies the continuity of the circuit through each slave relay coil associated with the particular master relay. Slave relay coil continuity is demonstrated by a reduced voltage test signal, which is sufficient to light a test lamp, but not sufficient to cause actuation of the slave relay. Finally, a slave relay test is performed that actuates each slave relay. Each slave relay is actuated via a test switch in the STC that applies normal voltage to the associated slave relay. The slave relay is then verified operable through a continuity check or by actuation of the associated ESF components.

3.2 Relay Types and Construction

The basic Westinghouse type AR relay consists of a coil assembly and a contact block assembly. The principal components of the contact block assembly are the cover, crossbar, and a set of contact cartridge assemblies. A contact assembly adder block provides four additional contact poles and is functionally identical to the four-pole contact block assembly. Type AR relays can be equipped with a latch assembly.

A detailed description of the Westinghouse type AR relay subcomponents, drawings, and photographs are included in WCAP-13877 [Reference 10.2].

The SSPS slave relays and auxiliary relays used at CPSES are Westinghouse type AR440 or AR880 relays. CPSES does not use the AR660 model relay.

3.3 Relay Operation

Westinghouse type AR non-latching relays are either normally energized (NE) or normally de-energized (ND). A relay is considered to be NE if its coil is energized

to maintain a desired contact position under normal plant operating conditions. A relay is considered to be ND if its coil is de-energized during normal plant operating conditions.

Latching relays are ND. Typically, a latching relay is used to control functions where loss of power should not cause an inadvertent reset, or where deliberate action is required to reset or terminate a function, such as safety injection.

Type AR relays are designed to operate without the aid of gravity. The de-energized contact state is maintained or restored by a return spring. When the relay coil is energized, the upper-half armature is drawn into the coil block assembly, overcoming the resistance of the return spring. The crossbar is pulled along by the action of the relay coil assembly, causing the change of state of the relay contacts.

Type AR latching relays are equipped with an ARLA latch attachment which is engaged when the relay coil is energized and do not change position when the coil is de-energized. The latch is disengaged by momentarily energizing the latch (reset) coil, allowing the contacts to return to the de-energized state.

3.4 Interposing Relays

A number of the slave relays actuate interposing relays that actuate the ESF components. Interposing relays are typically tested during slave relay testing; however, some interposing relays are tested during performance of TS required equipment testing other than slave relay testing. The reliability assessments performed in the referenced WCAPs encompass these interposing relays if they are Westinghouse type AR relays. Relays which are not Westinghouse type AR will continue to be tested every 92 days.

4.0 REGULATORY REQUIREMENTS AND GUIDANCE

The regulatory basis for Technical Specifications (TS) 3.3.2, "ESFAS Instrumentation" and 3.3.6, "Containment Ventilation Isolation Instrumentation" is to ensure that accident conditions are sensed and operation of systems and components important to safety is initiated in order to protect against violating core design limits, challenging the Reactor Coolant System pressure boundary, and to mitigate the consequences of accidents.

GDC 20, "Protection system functions, " requires that the protection system be designed to initiate the operation of systems and components important to safety.

GDC 21, "Protection system reliability and testability," requires that the protection system shall be designed for high functional reliability and inservice testability commensurate with the safety functions to be performed. GDC 21 also requires that the protection system be designed so as to permit periodic functional testing during reactor operation in order to determine and identify failures and losses of redundancy.

GDC 29, "Protection against anticipated operational occurrences," requires that protection systems be designed to assure an extremely high probability of accomplishing their functions in the event of anticipated operational occurrences.

10CFR50.55a, "Codes and Standards" requires in paragraph (h) that protection systems meet the requirements set forth in the Institute of Electrical and Electronics Engineers' Standard, "Criteria for Protection Systems for Nuclear Power Generating Stations" (IEEE 279). Section 4.10 of IEEE 279-1971 requires that capability be provided for testing and calibrating protection system equipment and indicates when such equipment must be tested during reactor operation.

U. S. NRC Regulatory Guides (RG) 1.22 and 1.118 provide guidance on periodic testing of protection systems. Regulatory Guide 1.22 describes acceptable methods of including the actuation devices in the periodic tests of the protection system during reactor operation. Regulatory Guide 1.22 does not, however, address the frequency of such testing.

NUREG-0800, "U.S. NRC Standard Review Plan," Section 7.1, Appendix B provides guidance to the NRC staff for the review and evaluation of system design features and plant procedures provided for conformance to the requirements of IEEE 279.

5.0 TECHNICAL ANALYSIS

The NRC staff has reviewed WCAP-13877, "Reliability Assessment of Westinghouse Type AR Series Relays," Revision 1 (proprietary) [Reference 10.2]. The NRC staff's Safety Evaluation Report (SER) approved WCAP-13877, Revision 1 (proprietary) [Reference 10.2] for reference in plant specific license amendment requests. Additionally the staff required that licensees referencing WCAP-13877, Revision 1 in plant specific TS change amendment requests for test interval extensions involving type AR relays for SSPS applications should:

1. Confirm the applicability of the WCAP-13877, Revision 1 analyses to their plant.

2. Ensure that the contact loading analysis for type AR relays has been performed to determine the acceptability of these relays.

3. Determine the qualified life for the type AR relays based on plant-specific environmental conditions, and

4. Establish a program to evaluate the adequacy of the proposed test interval if two or more AR relays fail in a 12-month period.

Westinghouse subsequently discovered certain errors in WCAP-13877, Revision 1 which required revision of the topical reports. Revision 2 to WCAP-13877 was submitted to the NRC for review and approval on November 5, 1999. The NRC's Safety Evaluation Report documenting the acceptability of the proposed changes to WCAP-13877, Revision 1 was forwarded by letter dated July 12, 2000 from Stuart A. Richards of the NRC to H. A. Sepp of Westinghouse. The NRC Safety Evaluation Report for WCAP-13877, Revision 2 [Accession No. ML003731486] reiterated that the previous SER for Revision 1 was still applicable and that plant-specific TS change requests for extended surveillance test intervals should meet the requirements identified in the previous staff safety evaluations.

5.1 Applicability of WCAP-13877, " Reliability Assessment of Westinghouse Type AR Relays Used as SSPS Slave Relays," Revision 2-P-A

WCAP-13877 section 2.0 defines the scope of the reliability analysis for Westinghouse Type AR relays. Specifically, the report covers all AR440 and AR880 relays, including any with the ARLA (mechanical latch attachment) used in SSPS slave relay applications. The report can also be applied to ARD relays (DC coils) which are not used as slave relays, but are used in interposing relay applications. The AR660 was excluded from the assessment because it is not used in any known nuclear safety-related applications. Type AR relays with the ARMLA (magnetic latch attachment) were also excluded because the magnetic latch is not qualified for use in safety-related applications. Thus, the WCAP-13877 analysis can be applied to all type AR relays except the AR660 relay and type AR relays with the magnetic latch assembly ARMLA.

The Comanche Peak SSPS slave relays are AR440 and AR880 models, some of which are equipped with the qualified ARLA latch assembly. In addition to the AR440 and AR880, Comanche Peak also uses the ARD440 and ARD880 models in some applications requiring interposing relays. The AR660 is not used at Comanche Peak in safety related applications. The magnetic latch ARMLA is not used at Comanche Peak. The Comanche Peak slave and associated interposing relays are the type AR relays subject to the analysis. Therefore, WCAP-13877 can be applied to the Comanche Peak slave and associated interposing relays that are subject to testing at 92-day intervals to satisfy Technical Specification Surveillance Requirements 3.3.2.6 and 3.3.6.5.

Section 8.0 of topical report WCAP-13877 presents the aging assessment of the type AR relay component materials. The results of the aging assessment are based on environmental data collected by a survey of Westinghouse Owner's Group (WOG) plants. CPSES was one of the Westinghouse vintage plants which contributed plant specific environmental temperature data as shown in Table 8-1 of WCAP-13877.

TXU Electric therefore concludes that the analyses presented in WCAP-13877, Revision 2-P-A is specifically applicable to CPSES Units 1 and 2.

5.2 Contact Loading Analysis for Type AR Relays

TXU Electric has performed a contact loading analysis of all Westinghouse type AR relays used at CPSES as SSPS slave and auxiliary relays. Calculation EE-CA-0008-5134, Revision 0, documents the results of the slave and auxiliary relay contact loading analysis. The purpose of the analysis was to analyze Solid State Protection System slave relay contacts and their interposing relay contacts to verify that the contact ratings are adequate for the applied loads, thereby ensuring that they can perform their safeguards function. By demonstrating that the contacts are properly applied, it is reasonable to conclude that their operation will not be subject to failure modes that are indicative of misapplication or contact overloading. The analysis specifically applies to slave relay contacts in circuits which are subject to testing at 92-day intervals to satisfy Technical Specification Surveillance Requirements 3.3.2.6 and 3.3.6.5. The analysis addresses the Unit 1 and Common Train A & B circuits. The Unit 2 Train A & B circuits were reviewed for any load differences not analyzed by the calculation. The review confirmed the Unit 2 loads were the same as the Unit 1 loads and that no unanalyzed loads existed from a Unit difference. Thus, it is reasonable to conclude the results of the study are also applicable to Unit 2.

The analysis consisted of the following general steps:

a. Identifying the slave relays and associated contacts which perform a safeguards function, any interposing relays, and actuated equipment.
b. Obtaining and documenting load data.
c. Evaluating each contact application (contact rating vs. load) for make, break, and continuous operation.
d. Testing of relay contacts with test loads.

The initial evaluation indicated the following loads exceeded the published contact rating.

DESCRIPTION	MANUFACTURER	PART #
Solenoid Valve	GE	TSN 150562
6.9kV Breaker Close/Trip coil	ITE Siemens	TSN 157070
480V SWGR Spring Release Device	Westinghouse	TSN 291745
480V SWGR Shunt Trip Coil	Westinghouse	TSN 381153
480V MCC Breaker Shunt Trip Coil	GE	TSN 290567

CPSES contracted Nuclear Logistics, Inc. of Fort Worth, TX to test the Type AR relay contacts for the above loads for a minimum of 1000 cycles. NLI test report TR-032009-1 documents the results. The test report concludes the relays can properly operate the loads for a minimum of 1000 cycles. Additionally, the test resistance readings supported a conclusion that the loads could be properly operated for significantly more operations. Thus, the Type AR relay contacts are adequate for the loads.

The analysis concluded that the Type AR slave relay contacts are adequate for the actual applications, and thus the contacts will not be subject to long-term degradation and reduced service life which could result from contact overloading. Therefore, testing on a refueling frequency is adequate to confirm reliability and demonstrate continued operability of slave relays.

5.3 Qualified Life Determination for Type AR Relays

Section 8.0 of topical report WCAP-13877 presents the aging assessment of the type AR relay component materials. The results of the aging assessment are based on environmental data collected by a survey of Westinghouse Owner's Group (WOG) plants as shown in Table 8-1 of WCAP-13877. CPSES was one of the Westinghouse vintage plants which collected and provided environmental temperature data for the Solid State Protection System based on a plant specific study. The specific aging assessment presented in WCAP-13877 uses the temperature data supplied by the Farley Nuclear Plant. As shown in Table 8-2 of WCAP-13877, the maximum ambient temperature reported by the Farley Nuclear Plant was 83.85 degrees Fahrenheit while the maximum ambient temperature reported for CPSES was 80 degrees Fahrenheit.

WCAP-13877, section 8.3.4 describes the methodology for determining the service life of type AR relays in support of extending the slave relay surveillance interval. The expected service lives are calculated based on the relay duty cycle

(i.e., % of time that relay coil is energized), and ambient and internal temperature data for the cabinets that house the relays. WCAP-13877, Appendix D provides the following Arrhenius equation for the service life calculation:

$$t_s = \frac{t_0}{f_{s1} e^{\left(\left(\frac{-E}{K}\right)\left(\frac{1}{T_{s1}} - \frac{1}{T_0}\right)\right)} + f_{s2} e^{\left(\left(\frac{-E}{K}\right)\left(\frac{1}{T_{s2}} - \frac{1}{T_0}\right)\right)}}$$

where

t_s = total service life at temperature Ts
e = base of natural log (2.71828)
t_0 = time at temperature T_0 (accelerated aging temperature)
T_s = material temperature at total service life conditions (°K)
T_0 = material temperature at accelerated aging conditions (°K)
E = material activation energy (eV) for property of interest
K = Boltzman's Constant (8.62 x 10^{-5})

WCAP-13877, section 8.3 concludes that relay binding due to material degradation of the coil bobbin is the limiting time/temperature-dependent failure mechanism to be considered in assessing types ARD and AR relay service lives. WCAP-13877, Table 5-1 identifies Nylon Zytel 101 as the component material for the coil bobbin. WCAP-13877, Table 8-5 provides the following material aging data for Nylon Zytel 101:

Component Material	Relay Component	Temperature Rise	Activation Energy/ Material Property	Aging Test Reference Data
Nylon Zytel 101	Coil Bobbin	30°C	0.8787 eV Tensile strength (50% Retention)	100 hrs @ 175°C

As previously noted, CPSES collected temperature data in support of the WCAP-13877 study. The data was collected during the summer of 1996 for June 25 through August 20. Data was collected in the Control Room and in the Unit 1 Cable Spreading Room at the various cabinets that house the relays. Due to the similarity between the Unit 1 and Unit 2 SSPS cabinet locations and environment, it is reasonable to conclude the results of the analysis are also applicable to Unit 2. The following table provides the maximum, minimum, and average ambient and cabinet rise temperatures for the period June 25 through August 20, 1996.

CPSES Temperature Data

Room	Cabinet		Ambient (°F)	Rise (°F)
Control Room	TBX-ESELSP-01A1	Max	80.950	1.596
		Avg	75.362	1.867
		Min	68.242	1.214
Control Room	CP1-ECPRCR-03	Max	81.027	3.988
		Avg	74.569	2.673
		Min	68.723	1.430
Control Room	CP1-ECPRCR-13	Max	81.027	6.304
		Avg	75.302	6.984
		Min	69.630	6.357
Control Room	CP1-ECPRCR-15	Max	76.771	7.252
		Avg	70.255	7.461
		Min	64.108	1.644
Control Room	CPX-ECPRCV-01	Max	78.907	2.346
		Avg	71.396	5.800
		Min	58.414	6.494
Control Room	CPX-ECPRCV-03	Max	78.752	4.989
		Avg	71.604	4.822
		Min	65.024	4.616
Cable Spreading Room	CP1-ECPRCR-32	Max	86.907	3.659
		Avg	81.121	4.447
		Min	78.243	3.953
Cable Spreading Room	CPX-ECPRCV-15	Max	85.218	-1.121
		Avg	79.454	0.120
		Min	76.262	-0.294

From this, the highest peak and average for the room ambient and internal cabinet temperature rise were selected for the calculation. The CPSES highest temperatures are provided below.

CPSES Highest Recorded Temperatures

		Ambient (°F)	Rise (°F)
Control Room	Maximum	81.0	7.3
	Average	75.4	7.5
Cable Spreading Room	Maximum	86.9	3.7
	Average	81.1	4.5

The CPSES temperature data was used to calculate the service life as outlined in WCAP-13877, Revision 2-P-A, Appendix D and as illustrated in the following example:

Example Calculation

$$t_s = \frac{t_0}{f_{s1} e^{\left(\left(\frac{-E}{K}\right)\left(\frac{1}{T_{s1}} - \frac{1}{T_0}\right)\right)} + f_{s2} e^{\left(\left(\frac{-E}{K}\right)\left(\frac{1}{T_{s2}} - \frac{1}{T_0}\right)\right)}}$$

For 100% duty cycle, highest peak ambient and cabinet rise;

$t0$ = 100 hrs

f_{s1} = 100 % (normally energized)

T_{s1} = 448° K (175° C)

T_0 = 335.6°K (30.5°C$_{(86.9\,°F\ ambient)}$ + 30°C$_{(component\ rise)}$ + 2.1°C$_{(3.7\,°F\ Cabinet\ Rise)}$)

E = 0.8787 eV

K = Boltzman's Constant (8.62 x 10^{-5})

$$t_s = \frac{100\ hrs}{100\,\% e^{\left(\left(\frac{-0.8787}{8.62 x 10^{-5}}\right)\left(\frac{1}{335.6} - \frac{1}{448}\right)\right)} + 0\,\% e^{\left(\left(\frac{-0.8787}{8.62 x 10^{-5}}\right)\left(\frac{1}{305.6} - \frac{1}{448}\right)\right)}}$$

t_s = 204,849 *hrs*

t_s = 23.4 *yrs*

For normally energized (NE) relays, a duty cycle of 100% is assumed. For normally de-energized (ND) relays, a duty cycle of ≤ 20% is assumed. The results of the CPSES specific service life calculations are provided in the following table:

CPSES Service Life for AR Relays (Ambient Temperatures)				
Location	Relay Duty Cycle	Ambient Temperature (°F)	Cabinet Temperature Rise (°F)	Service Life (yrs)
Control Room	100%	81.0°	7.3°	26.2
		75.4°	7.5°	34.6
	20%	81.0°	7.3°	109.4
		75.4°	7.5°	145.8
	0%	81.0°	7.3°	531.0
		75.4°	7.5°	741.3
Cable Spreading Room	100%	86.9°	3.7°	23.4
		81.1°	4.5°	30.1
	20%	86.9°	3.7°	97.2
		81.1°	4.5°	126.4
	0%	86.9°	3.7°	461.6
		81.1°	4.5°	626.9

Using the CPSES highest ambient and cabinet rise values from the summer temperatures provides a conservative service life calculation that is consistent with the results produced for the Farley Nuclear Plant as described in WCAP-13877. For normally de-energized relays with a duty cycle ≤ 20%, the calculated service life is >>40 years. For normally energized relays, the highest average temperature results in a calculated service life of 30 years. The highest maximum temperature produced a calculated service life of 23 years.

For normally de-energized relays, the CPSES temperature specific calculation results in the same >>40 years established in WCAP-13877. Therefore, the CPSES service life for normally de-energized relays is 40 years. The most conservative calculated life for normally energized relays at CPSES was 23 years. WCAP-18377 section 8.3.2 cautions against using strict Arrhenius calculation results beyond 20 years. Thus, the service life for normally energized relays is conservatively limited to 20 years. CPSES Train A K731 is the only energized relay subject to the slave relay surveillance test. Therefore, Train A K731 should be replaced after 20 years of service.

WCAP-13877 established criteria to replace the remaining normally energized relays at the Farley Nuclear Plant if any normally energized relay failed after 14 years. Since CPSES has only one normally energized relay subject to the slave relay surveillance there is no need for this criteria. However, if the normally energized relay fails before 20 years of service, the service life should be reevaluated if the failure mechanism involves the end of life relay binding due to material degradation of the coil bobbin.

5.4 Surveillance Interval Adequacy Monitoring Program

The CPSES Maintenance Rule Program implements the requirements of 10CFR50.65 and provides instructions for initiation, analysis, retrieval, trending, and periodic reporting of data relative to performance indicators for plant systems and components. The program includes guidance for trending and reporting of repetitive preventable failures of functions within the scope of the Maintenance Rule. It also includes performance of cause determinations for failure to meet performance criteria and for repetitive failures. The program assigns plant engineers responsibility for identifying when performance criteria are not met and increased monitoring under paragraph (a)(1) of the Maintenance Rule is required, along with the corrective actions necessary to restore acceptable performance. Corrective actions are based on identified causes, such as inadequate preventative maintenance and/or poor work-scheduling practices, and may include increased surveillance. The functions performed by the slave and interposing relays have been included in the scope of this program. The performance criteria established for the slave and interposing relays under the CPSES Maintenance Rule Program are equal to or more restrictive than the requirements specified in the staff safety evaluation report.

In conclusion, the proposed changes allow safe operation because the reliability documented in WCAP-13877 verified that Westinghouse type AR relays are highly reliable. The aging assessment concludes that the degradation of normally deenergized (ND) and normally energized (NE) relays is sufficiently slow that a refueling frequency surveillance interval will adequately identify relay failures. The aging assessment also demonstrates that ND relays can be expected to operate reliably for a 40-year service life. All NE relays used as SSPS slave or auxiliary relays at CPSES that are subject to the requirements of TS 3.3.2 and 3.3.6 will be replaced after 20 years of service life. If any normally energized type AR relay used as a SSPS slave or auxiliary relay, in either train of either Unit SSPS, should fail before 20 years of service, the service life will be reevaluated if the failure mechanism involves relay binding due to material degradation of the coil bobbin. Testing on a refueling frequency is also adequate to confirm reliability and continuing operability of interposing relays which are Westinghouse type AR relays, subject to the same service life limitations of NE relays. Relays which are not Westinghouse type AR relays will continue to be tested every 92 days.

Based on the above evaluation, TXU Electric concludes that there is reasonable assurance that the health and safety of the public will not be affected by the proposed changes.

6.0 REGULATORY ANALYSIS

The requirements of GDC 20, 21, and 29 continue to be met since no changes are being proposed which would affect the design capability, function, operation, or method of testing the SSPS or associated slave or auxiliary relays. The requirements of IEEE 279 continue to be satisfied because the only change being proposed is a reduction in the frequency of required testing which is not addressed in IEEE 279. Although the testing frequency is reduced, the capability for testing during power operation will be retained. Therefore the applicable guidance of RG 1.22 and 1.118 continue to be met since the frequency of testing is specifically excluded from the scope of RG 1.22. 10CFR50.55a(h) will continue to be satisfied since the SSPS will continue to meet the requirements of IEEE 279.

There are no regulatory requirements, other than the CPSES Technical Specifications, which dictate that SSPS slave or auxiliary relays must be tested at any defined periodicity. The necessary and prudent frequency of such testing is, and should be, a function of the equipment reliability and importance to safety. Although the SSPS slave and auxiliary relays are important for accident mitigation, the Westinghouse type AR relays used at CPSES have proven to be highly reliable. The aging assessment provided in WCAP-13877 concludes that the degradation of normally deenergized (ND) and normally energized (NE) relays is sufficiently slow that a refueling frequency surveillance interval will adequately identify relay failures.

In conclusion, based on the considerations discussed above, (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.

7.0 NO SIGNIFICANT HAZARDS CONSIDERATION

TXU Electric has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10CFR50.92, "Issuance of amendment," as discussed below:

1. Do the proposed changes involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   The proposed change to the Technical Specifications does not result in a condition where the design, material, or construction standards that were applicable prior to the change are altered. The same ESFAS instrumentation is being used and the same ESFAS system reliability is expected. The proposed change will not modify any system interface or function and could not increase the likelihood of an accident since these events are independent of this change. The proposed activity will not change, degrade or prevent the performance of any accident mitigation systems or alter any assumptions previously made in evaluating the radiological consequences of an accident as described in the safety analysis report.

   Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Do the proposed changes create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No

   The proposed change does not alter the performance of the ESFAS mitigation systems assumed in the plant safety analysis. Changing the interval for periodically verifying ESFAS slave relays (assuring equipment operability) will not create any new accident initiators or scenarios.

   Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Do the proposed changes involve a significant reduction in a margin of safety?

Response: No

The proposed change does not affect the total ESFAS system response assumed in the safety analysis. The periodic slave relay functional verification is relaxed because of the demonstrated high reliability of the relay and its insensitivity to any short term wear or aging effects.

Therefore the proposed change does not involve a reduction in a margin of safety.

Based on the above evaluations, TXU Electric concludes that the propose amendment(s) present no significant hazards consideration under the standards set forth in 10CFR50.92(c) and, accordingly, a finding of "no significant hazards consideration" is justified.

8.0 ENVIRONMENTAL CONSIDERATION

TXU Electric has determined that the proposed amendment would change requirements with respect to the installation or use of a facility component located within the restricted area, as defined in 10CFR20, or would change an inspection or surveillance requirement. TXU Electric has evaluated the proposed changes and has determined that the changes do not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amount of effluent that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set forth in 10CFR51.22 (c)(9). Therefore, pursuant to 10CFR51.22 (b), an environmental assessment of the proposed change is not required.

9.0. PRECEDENT

By letter dated February 28, 1996, the Tennessee Valley Authority (TVA), as the lead plant licensee, submitted proposed Technical Specification changes for the Watts Bar Nuclear Plant based on the topical reports in References 10.2, 10.3, and 10.4. The NRC staff's safety evaluation report (SER) (Reference 10.5) approving these topical reports for reference in plant specific license amendment requests was transmitted by letter to Louis F. Liberatori, Jr. (Westinghouse Owner's Group) by Thomas H. Essig (USNRC), dated October 26, 1998.

10.0 REFERENCES

10.1 United States Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation. "Generic Letter 93-05, Line Item Technical Specification Improvements to Reduce Surveillance Requirements for Testing During Power Operation". Washington, D.C.: USNRC; September 27, 1993.

10.2 Span, R. M., ed. Reliability Assessment of Westinghouse Type AR Relays Used as SSPS Slave Relays, WCAP-13877 (Proprietary), Revision 1. Pittsburgh, PA: Westinghouse Electric Company; August, 1998.

10.3 Span, R. M., ed. Reliability Assessment of Westinghouse Type AR Relays Used as SSPS Slave Relays, WCAP-14129 (Non-Proprietary), Revision 1. Pittsburgh, PA: Westinghouse Electric Company; August, 1998.

10.4. Extension of Slave Relay Surveillance Test Intervals, WCAP-13900. Pittsburgh, PA: Westinghouse Electric Company; April, 1994.

10.5. United States Nuclear Regulatory Commission, Division of Reactor Controls and Human Factors. "Safety Evaluation by the Office of Nuclear Reactor Regulation Technical Specification Changes Regarding Surveillance Test Interval Extension for SSPS Slave Relays Westinghouse Owners Group Topical Reports WCAP-13877, 14129, and 13900". Washington, D.C.: USNRC; 1998.

10.6 Calculation EE-CA-0008-5134, Rev. 0. TXU Electric.

10.7 Test Report TR-032009-1. Fort Worth, TX: Nuclear Logistics, Inc.

ATTACHMENT 3 to TXX-01092

MARKUP OF TECHNICAL SPECIFICATION PAGES

Pages 3.3-27
3.3-50

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.2.4	Perform MASTER RELAY TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.2.5	Perform COT.	92 days
SR 3.3.2.6	Perform SLAVE RELAY TEST.	92 days OR 18 months for Westinghouse type AR relays
SR 3.3.2.7	----------NOTES---------- 1. Verification of relay setpoints not required. 2. Actuation of final devices not included ---------- Perform TADOT.	31 days
SR 3.3.2.8	----------NOTE---------- Verification of setpoint not required for manual initiation functions. ---------- Perform TADOT.	18 months
SR 3.3.2.9	----------NOTE---------- This Surveillance shall include verification that the time constants are adjusted to the prescribed values. ---------- Perform CHANNEL CALIBRATION.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.6.2	Perform ACTUATION LOGIC TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.6.3	Perform MASTER RELAY TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.6.4	Perform COT.	92 days
SR 3.3.6.5	Perform SLAVE RELAY TEST.	92 days OR 18 months for Westinghouse type AR relays
SR 3.3.6.6	Not Used.	
SR 3.3.6.7	Perform CHANNEL CALIBRATION.	18 months

ATTACHMENT 4 to TXX-01092

MARKUP OF TECHNICAL SPECIFICATION BASES PAGES
(For Information Only)

Pages B 3.3-115
B 3.3-116
B 3.3-117
B 3.3-118
B 3.3-119
B 3.3-167
B 3.3-168

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.5

SR 3.3.2.5 is the performance of a COT.

A COT is performed on each required channel to ensure the entire channel will perform the intended Function. Setpoints must be found within the Allowable Values specified in Table 3.3.2-1.

The difference between the current "as found" values and the previous test "as left" values must be consistent with the drift allowance used in the setpoint calculation. The setpoint shall be left set consistent with the assumptions of the current unit specific setpoint calculation.

The Frequency of 92 days is justified in Reference 6.

SR 3.3.2.6

SR 3.3.2.6 is the performance of a SLAVE RELAY TEST. The SLAVE RELAY TEST is the energizing of the slave relays. Contact operation is verified in one of two ways. Actuation equipment that may be operated in the design mitigation mode is either allowed to function, or is placed in a condition where the relay contact operation can be verified without operation of the equipment. Actuation equipment that may not be operated in the design mitigation mode is prevented from operation by the SLAVE RELAY TEST circuit. For this latter case, contact operation is verified by a continuity check of the circuit containing contacts operated by the slave relay. This test is performed every 92 days. The Frequency is adequate, based on industry operating experience, considering instrument reliability and operating history data. | 16

For ESFAS slave relays and auxiliary relays which are Westinghouse type AR relays, the SLAVE RELAY TEST is performed every 18 months. The Frequency is based on the slave relay reliability assessment presented in Reference 10. This reliability assessment is relay specific and applies only to Westinghouse type AR relays. Note that, for normally energized applications, the relays may require periodic replacement in accordance with the guidance given in Reference 10. | 16

SR 3.3.2.7

SR 3.3.2.7 is the performance of a TADOT every 31 days. This test is a check of the Loss of Offsite Power Function.

The SR is modified by a Note that excludes verification of setpoints for relays. Relay setpoints require elaborate bench calibration and are

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.7 (continued)

verified during CHANNEL CALIBRATION. The SR is modified by a second note that excludes the actuation of final devices from the surveillance testing. The start of the auxiliary feedwater pumps during this SR is unnecessary as these pumps are adequately tested by the SRs for LCO 3.7.5. The Frequency is adequate. It is based on industry operating experience, considering instrument reliability and operating history data.

SR 3.3.2.8

SR 3.3.2.8 is the performance of a TADOT. This test is a check of the Manual Actuation Functions and AFW pump start on trip of all MFW pumps. The Safety Injection TADOT shall independently verify the OPERABILITY of the handswitch undervoltage and shunt trip contacts for both the Reactor Trip Breakers and Reactor Trip Bypass Breakers as well as the contacts for safety injection actuation. It is performed every 18 months. As a minimum, each Manual Actuation Function is tested up to, but not including, the master relay coils. This test overlaps with the master relay coil testing performed in accordance with SR 3.3.2.4. The Frequency is adequate, based on industry operating experience and is consistent with the typical refueling cycle. The SR is modified by a Note that excludes verification of setpoints during the TADOT for manual initiation Functions. The manual initiation Functions have no associated setpoints.

SR 3.3.2.9

SR 3.3.2.9 is the performance of a CHANNEL CALIBRATION.

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to measured parameter within the necessary range and accuracy.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.9 (continued)

CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the unit specific setpoint methodology.

The Frequency of 18 months is based on the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint methodology.

This SR is modified by a Note stating that this test should include verification that the time constants are adjusted to the prescribed values where applicable.

SR 3.3.2.10

This SR ensures the individual channel ESF RESPONSE TIMES are less than or equal to the maximum values assumed in the accident analysis. Response Time testing, required channels, and acceptance criteria are included in the Technical Requirements Manual (Ref. 7). For each Functional Unit to which this SR applies, at least one ESF function has a required response time but not necessarily all associated ESF functions. No credit was taken in the safety analyses for those channels with response time listed as N.A. When the response time for a function in the TRM is NA, no specific testing need be performed to comply with this SR. Individual component response times are not modeled in the analyses. The analyses model the overall or total elapsed time, from the point at which the parameter exceeds the Trip Setpoint value at the sensor, to the point at which the equipment in both trains reaches the required functional state (e.g., pumps at rated discharge pressure, valves in full open or closed position).

For channels that include dynamic transfer functions (e.g., lag, lead/lag, rate/lag, etc.), the response time testing may be performed with the transfer functions set at their nominal values. The response time may be measured by a series of overlapping tests such that the entire response time is measured.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.10 (continued)

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, signal processing and actuation logic response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be used for selected components provided that the components and methodology for verification have been previously NRC approved.

ESF RESPONSE TIME tests are performed on an 18 month STAGGERED TEST BASIS. The testing shall include at least one train such that both trains are tested at least once per 36 months. Testing of the final actuation devices, which make up the bulk of the response time, is included in the testing of each channel. The final actuation device in one train is tested with each channel. Therefore, staggered testing results in response time verification of these devices every 18 months. The 18 month Frequency is consistent with the typical refueling cycle and is based on unit operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

This SR is modified by a Note that clarifies that the turbine driven AFW pump is tested within 24 hours after reaching 532 psig in the SGs.

SR 3.3.2.11

SR 3.3.2.11 is the performance of a TADOT as described in SR 3.3.2.8, except that it is performed for the P-4 Reactor Trip Interlock. This Frequency is based on operating experience.

The SR is modified by a Note that excludes verification of setpoints during the TADOT. The Function tested has no associated setpoint.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.12

SR 3.3.2.12 is the performance of a CHANNEL CALIBRATION.

A CHANNEL CALIBRATION is performed every 9 months. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to measured parameter within the necessary range and accuracy.

CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the unit specific setpoint methodology.

The Frequency of 9 months is based on the assumption of an 9 month calibration interval in the determination of the magnitude of equipment drift in the setpoint methodology.

REFERENCES

1. FSAR, Chapter 6.
2. FSAR, Chapter 7.
3. FSAR, Chapter 15.
4. IEEE-279-1971.
5. 10 CFR 50.49.
6. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.
7. Technical Requirements Manual.
8. Not used.
9. "Westinghouse Setpoint Methodology for Protection Systems Comanche Peak Unit 1, Revision 1," WCAP-12123, Revision 2, April, 1989.
10. WCAP-13877-P-A, Revision 2, August 2000. | 16

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.3

SR 3.3.6.3 is the performance of a MASTER RELAY TEST. The MASTER RELAY TEST is the energizing of the master relay, verifying contact operation and a low voltage continuity check of the slave relay coil. Upon master relay contact operation, a low voltage is injected to the slave relay coil. This voltage is insufficient to pick up the slave relay, but large enough to demonstrate signal path continuity. This test is performed every 31 days on a STAGGERED TEST BASIS. The Surveillance interval is acceptable based on instrument reliability and industry operating experience.

SR 3.3.6.4

A COT is performed every 92 days on each required channel to ensure the entire channel will perform the intended Function. The Frequency is based on the staff recommendation for increasing the availability of radiation monitors according to NUREG-1366 (Ref. 2). This test verifies the capability of the instrumentation to provide the containment purge and exhaust system isolation. The setpoint shall be left consistent with the current calibration procedure tolerance.

SR 3.3.6.5

SR 3.3.6.5 is the performance of a SLAVE RELAY TEST. The SLAVE RELAY TEST is the energizing of the slave relays. Contact operation is verified in one of two ways. Actuation equipment that may be operated in the design mitigation mode is either allowed to function or is placed in a condition where the relay contact operation can be verified without operation of the equipment. Actuation equipment that may not be operated in the design mitigation mode is prevented from operation by the SLAVE RELAY TEST circuit. For this latter case, contact operation is verified by a continuity check of the circuit containing contacts operated by the slave relay. This test is performed every 92 days. The Frequency is acceptable based on instrument reliability and industry operating experience. | 16

(continued)

BASES

SURVEILLANCE REQUIREMENTS ~~(continued)~~

SR 3.3.6.5 (continued) 16

For ESFAS slave relays and auxiliary relays which are Westinghouse type AR relays, the SLAVE RELAY TEST is performed every 18 months. The Frequency is based on the slave relay reliability assessment presented in Reference 3. This reliability assessment is relay specific and applies only to Westinghouse type AR relays. Note that, for normally energized applications, the relays may require periodic replacement in accordance with the guidance given in Reference 3.

SR 3.3.6.6

Not Used.

SR 3.3.6.7

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

The Frequency is based on operating experience and is consistent with the typical industry refueling cycle.

REFERENCES

1. 10 CFR 100.11.

2. NUREG-1366, July 22, 1993.

3. WCAP-13877-P-A, Revision 2, August 2000. 16

ATTACHMENT 5 to TXX-01092

RETYPED TECHNICAL SPECIFICATION PAGES

Pages 3.3-27
3.3-50

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.3.2.4	Perform MASTER RELAY TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.2.5	Perform COT.	92 days
SR 3.3.2.6	Perform SLAVE RELAY TEST.	92 days OR 18 months for Westinghouse type AR relays
SR 3.3.2.7	----------NOTES---------- 1. Verification of relay setpoints not required. 2. Actuation of final devices not included ---------- Perform TADOT.	31 days
SR 3.3.2.8	----------NOTE---------- Verification of setpoint not required for manual initiation functions. ---------- Perform TADOT.	18 months
SR 3.3.2.9	----------NOTE---------- This Surveillance shall include verification that the time constants are adjusted to the prescribed values. ---------- Perform CHANNEL CALIBRATION.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.6.2	Perform ACTUATION LOGIC TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.6.3	Perform MASTER RELAY TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.6.4	Perform COT.	92 days
SR 3.3.6.5	Perform SLAVE RELAY TEST.	92 days OR 18 months for Westinghouse type AR relays
SR 3.3.6.6	Not Used.	
SR 3.3.6.7	Perform CHANNEL CALIBRATION.	18 months

ATTACHMENT 6 to TXX-01092

RETYPED TECHNICAL SPECIFICATION BASES PAGES
(For Information Only)

Pages B 3.3-115
B 3.3-116
B 3.3-117
B 3.3-118
B 3.3-119
B 3.3-167
B 3.3-168

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.5

SR 3.3.2.5 is the performance of a COT.

A COT is performed on each required channel to ensure the entire channel will perform the intended Function. Setpoints must be found within the Allowable Values specified in Table 3.3.2-1.

The difference between the current "as found" values and the previous test "as left" values must be consistent with the drift allowance used in the setpoint calculation. The setpoint shall be left set consistent with the assumptions of the current unit specific setpoint calculation.

The Frequency of 92 days is justified in Reference 6.

SR 3.3.2.6

SR 3.3.2.6 is the performance of a SLAVE RELAY TEST. The SLAVE RELAY TEST is the energizing of the slave relays. Contact operation is verified in one of two ways. Actuation equipment that may be operated in the design mitigation mode is either allowed to function, or is placed in a condition where the relay contact operation can be verified without operation of the equipment. Actuation equipment that may not be operated in the design mitigation mode is prevented from operation by the SLAVE RELAY TEST circuit. For this latter case, contact operation is verified by a continuity check of the circuit containing contacts operated by the slave relay. This test is performed every 92 days. The Frequency is adequate, based on industry operating experience, considering instrument reliability and operating history data. | 16

For ESFAS slave relays and auxiliary relays which are Westinghouse type AR relays, the SLAVE RELAY TEST is performed every 18 months. The Frequency is based on the slave relay reliability assessment presented in Reference 10. This reliability assessment is relay specific and applies only to Westinghouse type AR relays. Note that, for normally energized applications, the relays may require periodic replacement in accordance with the guidance given in Reference 10. | 16

SR 3.3.2.7

SR 3.3.2.7 is the performance of a TADOT every 31 days. This test is a check of the Loss of Offsite Power Function.

The SR is modified by a Note that excludes verification of setpoints for relays. Relay setpoints require elaborate bench calibration and are

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.7 (continued)

verified during CHANNEL CALIBRATION. The SR is modified by a second note that excludes the actuation of final devices from the surveillance testing. The start of the auxiliary feedwater pumps during this SR is unnecessary as these pumps are adequately tested by the SRs for LCO 3.7.5. The Frequency is adequate. It is based on industry operating experience, considering instrument reliability and operating history data.

SR 3.3.2.8

SR 3.3.2.8 is the performance of a TADOT. This test is a check of the Manual Actuation Functions and AFW pump start on trip of all MFW pumps. The Safety Injection TADOT shall independently verify the OPERABILITY of the handswitch undervoltage and shunt trip contacts for both the Reactor Trip Breakers and Reactor Trip Bypass Breakers as well as the contacts for safety injection actuation. It is performed every 18 months. As a minimum, each Manual Actuation Function is tested up to, but not including, the master relay coils. This test overlaps with the master relay coil testing performed in accordance with SR 3.3.2.4. The Frequency is adequate, based on industry operating experience and is consistent with the typical refueling cycle. The SR is modified by a Note that excludes verification of setpoints during the TADOT for manual initiation Functions. The manual initiation Functions have no associated setpoints.

SR 3.3.2.9

SR 3.3.2.9 is the performance of a CHANNEL CALIBRATION.

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to measured parameter within the necessary range and accuracy.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.9 (continued)

CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the unit specific setpoint methodology.

The Frequency of 18 months is based on the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint methodology.

This SR is modified by a Note stating that this test should include verification that the time constants are adjusted to the prescribed values where applicable.

SR 3.3.2.10

This SR ensures the individual channel ESF RESPONSE TIMES are less than or equal to the maximum values assumed in the accident analysis. Response Time testing, required channels, and acceptance criteria are included in the Technical Requirements Manual (Ref. 7). For each Functional Unit to which this SR applies, at least one ESF function has a required response time but not necessarily all associated ESF functions. No credit was taken in the safety analyses for those channels with response time listed as N.A. When the response time for a function in the TRM is NA, no specific testing need be performed to comply with this SR. Individual component response times are not modeled in the analyses. The analyses model the overall or total elapsed time, from the point at which the parameter exceeds the Trip Setpoint value at the sensor, to the point at which the equipment in both trains reaches the required functional state (e.g., pumps at rated discharge pressure, valves in full open or closed position).

For channels that include dynamic transfer functions (e.g., lag, lead/lag, rate/lag, etc.), the response time testing may be performed with the transfer functions set at their nominal values. The response time may be measured by a series of overlapping tests such that the entire response time is measured.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.10 (continued)

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, signal processing and actuation logic response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be used for selected components provided that the components and methodology for verification have been previously NRC approved.

ESF RESPONSE TIME tests are performed on an 18 month STAGGERED TEST BASIS. The testing shall include at least one train such that both trains are tested at least once per 36 months. Testing of the final actuation devices, which make up the bulk of the response time, is included in the testing of each channel. The final actuation device in one train is tested with each channel. Therefore, staggered testing results in response time verification of these devices every 18 months. The 18 month Frequency is consistent with the typical refueling cycle and is based on unit operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

This SR is modified by a Note that clarifies that the turbine driven AFW pump is tested within 24 hours after reaching 532 psig in the SGs.

SR 3.3.2.11

SR 3.3.2.11 is the performance of a TADOT as described in SR 3.3.2.8, except that it is performed for the P-4 Reactor Trip Interlock. This Frequency is based on operating experience.

The SR is modified by a Note that excludes verification of setpoints during the TADOT. The Function tested has no associated setpoint.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.12

SR 3.3.2.12 is the performance of a CHANNEL CALIBRATION.

A CHANNEL CALIBRATION is performed every 9 months. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to measured parameter within the necessary range and accuracy.

CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the unit specific setpoint methodology.

The Frequency of 9 months is based on the assumption of an 9 month calibration interval in the determination of the magnitude of equipment drift in the setpoint methodology.

REFERENCES

1. FSAR, Chapter 6.

2. FSAR, Chapter 7.

3. FSAR, Chapter 15.

4. IEEE-279-1971.

5. 10 CFR 50.49.

6. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.

7. Technical Requirements Manual.

8. Not used.

9. "Westinghouse Setpoint Methodology for Protection Systems Comanche Peak Unit 1, Revision 1," WCAP-12123, Revision 2, April, 1989.

10. WCAP-13877-P-A, Revision 2, August 2000. | 16

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.3

SR 3.3.6.3 is the performance of a MASTER RELAY TEST. The MASTER RELAY TEST is the energizing of the master relay, verifying contact operation and a low voltage continuity check of the slave relay coil. Upon master relay contact operation, a low voltage is injected to the slave relay coil. This voltage is insufficient to pick up the slave relay, but large enough to demonstrate signal path continuity. This test is performed every 31 days on a STAGGERED TEST BASIS. The Surveillance interval is acceptable based on instrument reliability and industry operating experience.

SR 3.3.6.4

A COT is performed every 92 days on each required channel to ensure the entire channel will perform the intended Function. The Frequency is based on the staff recommendation for increasing the availability of radiation monitors according to NUREG-1366 (Ref. 2). This test verifies the capability of the instrumentation to provide the containment purge and exhaust system isolation. The setpoint shall be left consistent with the current calibration procedure tolerance.

SR 3.3.6.5

SR 3.3.6.5 is the performance of a SLAVE RELAY TEST. The SLAVE RELAY TEST is the energizing of the slave relays. Contact operation is verified in one of two ways. Actuation equipment that may be operated in the design mitigation mode is either allowed to function or is placed in a condition where the relay contact operation can be verified without operation of the equipment. Actuation equipment that may not be operated in the design mitigation mode is prevented from operation by the SLAVE RELAY TEST circuit. For this latter case, contact operation is verified by a continuity check of the circuit containing contacts operated by the slave relay. This test is performed every 92 days. The Frequency is acceptable based on instrument reliability and industry operating experience. | 16

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.6.5 (continued) | 16

For ESFAS slave relays and auxiliary relays which are Westinghouse type AR relays, the SLAVE RELAY TEST is performed every 18 months. The Frequency is based on the slave relay reliability assessment presented in Reference 3. This reliability assessment is relay specific and applies only to Westinghouse type AR relays. Note that, for normally energized applications, the relays may require periodic replacement in accordance with the guidance given in Reference 3.

SR 3.3.6.6

Not Used.

SR 3.3.6.7

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

The Frequency is based on operating experience and is consistent with the typical industry refueling cycle.

REFERENCES

1. 10 CFR 100.11.

2. NUREG-1366, July 22, 1993.

3. WCAP-13877-P-A, Revision 2, August 2000. | 16