TXU Power

Ref: 10CFR50.90

TXU Power
Comanche Peak Steam
Electric Station
P. O. Box 1002 (E01)
Glen Rose, TX 76043
Tel: 254 897 5209
Fax: 254 897 6652
mike.blevins@txu.com

Mike Blevins
Senior Vice President &
Chief Nuclear Officer

CPSES-200700738
Log # TXX-07081
File # 00236

May 22, 2007

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) 07-001
REVISION TO TECHNICAL REQUIREMENTS SURVEILLANCE
13.3.33.2 FREQUENCY FOR THE TURBINE STOP AND CONTROL
VALVES

REF: TU Electric Letter, logged TXX-92503, from William J. Cahill, Jr. to the U.S. Nuclear Regulatory Commission, dated November 10, 1992.

Dear Sir or Madam:

Pursuant to 10CFR50.59(c)(2) and 10CFR50.90, TXU Generation Company LP (TXU Power) hereby requests approval of a change to the required frequency of performance of Technical Requirements Surveillance (TRS) 13.3.33.2 which requires cycling each of the high pressure and low pressure turbine stop and control valves. The proposed change would reduce the frequency of performance of TRS 13.3.33.2 from 12 weeks to 26 weeks. This change request applies to both Units.

Attachment 1 provides a detailed description of the proposed changes, a technical analysis of the proposed change, TXU Power's determination that the proposed change does not involve a significant hazard consideration, a regulatory analysis of the proposed change and an environmental evaluation. Attachment 2 provides the affected TRM page marked-up to reflect the proposed change. Attachment 3 provides proposed changes to the TRM Bases. Attachment 4 provides retyped TRM pages which incorporate the requested change. Attachment 5 provides retyped TRM Bases pages which incorporate the proposed change. Attachments 2 through 5 are provided for information only and will be processed per CPSES site procedures.

A001

Implementation of the proposed change will have the following benefits to the plant:

- Reduces the possibility of reactor trips
- Reduces the wear to the valves and stress to the steam system
- Increases plant capacity factor
- Reduce unnecessary burden on personnel resources

Therefore, TXU Power requests approval of the proposed change to the frequency for TS 13.3.33.2 by December 17, 2007 to be implemented within 120 days of NRC approval.

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

Should you have any questions, please contact Ms. Tamera J. Ervin at (254) 897-6902.

I state under penalty of perjury that the foregoing is true and correct.

Executed on May 22, 2007

Sincerely,

TXU Generation Company LP

By: TXU Generation Management Company LLC
Its General Partner

Mike Blevins

By: Fred W. Madden
Director, Oversight and Regulatory Affairs

TJE

Attachments
1. Description and Assessment
2. Proposed Technical Requirements Manual Changes (for information)

3. Proposed Technical Requirements Manual Bases Changes (for information)
4. Retyped Technical Requirements Manual Pages (for information)
5. Retyped Technical Requirements Manual Bases Pages (for information)

c - B. S. Mallet, Region IV
M. C. Thadani, NRR
Resident Inspectors, CPSES

Ms. Alice Rogers
Environmental & Consumer Safety Section
Texas Department of State Health Services
1100 West 49th Street
Austin, Texas 78756-31

ATTACHMENT 1 to TXX-07081

DESCRIPTION AND ASSESSMENT

LICENSEE'S EVALUATION

1.0 DESCRIPTION

By this letter, TXU Generation Company LP (TXU Power) hereby requests a change to the Comanche Peak Steam Electric Station (CPSES) Unit 1 and Unit 2 licensing basis by incorporating the attached change into the Technical Requirements Manual (TRM). Pursuant to 10CFR50.59(c)(2), the proposed License Amendment Request 07-001 is a request to change the frequency of performance of turbine valve testing as required by Technical Requirements Surveillance (TRS) 13.3.33.2.

The proposed change will increase the frequency interval for the turbine stop and control valves testing to 26 weeks.

Reducing the surveillance frequency for the turbine stop and control valves will have following benefits:

- Reduces the possibility of reactor trips
- Reduces the wear to the valves and stress to the steam system
- Increases plant capacity factor
- Reduce unnecessary burden on personnel resources

2.0 PROPOSED CHANGE

The current Comanche Peak Steam Electric Station (CPSES) Technical Requirements Manual (TRM) 13.3.33 "Turbine Overspeed Protection" Surveillance Frequency for the high- and low-pressure turbine stop and control valves is once every 12 weeks. The proposed change would revise the TRM Surveillance Frequency (TRS) 13.3.33.2 from 12 weeks to every 26 weeks. Test results are evaluated and trended and will continue to be evaluated and trended to determine if the valves remain within specifications as a result of this change. Attachment 2 to this LAR contains the proposed changes to TRS 13.3.33.2.

For information only, this License Amendment Request (LAR) includes markups in Attachment 3 indicating proposed associated changes to the TRM Bases for 13.3.33, "Turbine Overspeed Protection." Retyped TRM pages and retyped TRM Bases pages (for information only) which incorporate the proposed changes are provided in Attachments 4 and 5, respectively.

In summary, the proposed change will increase the frequency interval for TRS 13.3.33.2 to 26 weeks. Test results will continue to be evaluated and trended to determine if the valves are within specifications as a result of this change.

3.0 BACKGROUND

In February 1999, TXU Power adopted the Improved Standard Technical Specifications for the Comanche Peak Steam Electric Station (CPSES) Units 1 and 2 (Amendment 64). Upon implementation of the Improved Standard Technical Specifications for CPSES the turbine valve Surveillance was relocated to the Technical Requirements Manual (TRM) under the control of 10CFR50.59.

NUREG-1366 was written to support the efforts of the Improved Standard Technical Specifications. As discussed in NUREG-1366, the Nuclear Regulatory Commission (NRC) identified that turbine valve testing could be reduced from weekly to as infrequently as quarterly without prior staff approval, resulting in a substantial safety benefit by trip reduction. Therefore, TXU Power accomplished this change under 10CFR50.59. However, per the current guidance for 10CFR50.59 Criterion (ii) as described in NEI 96-07, no increases in Surveillance test intervals which double the probability of occurrence of a malfunction of a structure, system, or component (SSC) important to safety previously evaluated in the FSAR can be allowed under 10CFR50.59 without prior NRC staff approval.

Since adopting the quarterly Surveillance test interval, two turbine generator modifications which affected the turbine missile probability have been implemented at CPSES Units 1 and 2. The low pressure turbine rotors have been replaced and the turbine controls have been replaced with digital controls. Also included within the scope of these modifications was a change in the methodology for turbine missile generation probability analysis. These changes were made in accordance with 10CFR50.59.

As noted above, CPSES Units 1 and 2 have upgraded to a digital Turbine Generator Protection System. Included in the upgrade was a new Turbine Overspeed Protection System. The new system is redundant and diverse and most of the devices are tested on line at least once a day. This robust system provides high system reliability. Therefore, the probability of a missile strike due to turbine overspeed failure at CPSES is sufficiently low, due to turbine favorable orientation and placement, shielding, quality assurance in design and fabrication, inspection and testing programs, and upgraded Turbine Overspeed Protection System.

The current Surveillance Requirement, TRS 13.3.33.2, requires cycling each high- and low pressure turbine stop and control valve once every 12 weeks using the manual test or Automatic Turbine Tester (ATT). The test verifies freedom of movement of the valve components and is beneficial in detecting problems with valve operation. The Surveillance ensures that all turbine steam inlet valves are capable of closing to protect the turbine from excessive overspeed which could generate potentially damaging turbine missiles.

Turbine valve testing is considered a high-risk evolution. In Reference 7.2, the NRC evaluated several proposed improvements to Technical Specifications (TS) Surveillance Requirements. In particular, NUREG-1366 identified the following turbine valve testing concerns:

1. The surveillance causes a significant number of reactor trips.
2. The surveillance results in some wear to the valves and stress to the steam system, in some cases causing relief valves to lift.
3. When the test is conducted, in order to avoid a reactor trip the steam flow to the turbine must be reduced. This is done by reducing reactor power which results in a reduction in capacity factor.
4. Because of the reduction in power, the test becomes more difficult to perform at the end of cycle when there may not be enough boron dilution to override xenon.

Although the Turbine Overspeed Protection requirements have been relocated from the TS to the TRM, the recommendations of NUREG-1366 (Reference 7.2) still apply. Furthermore, Generic Letter (GL) 93-05 (Reference 7.7), "Line-Item Technical Specifications Improvements to Reduce Surveillance Requirements for Testing During Power Operation," supports the NUREG findings and encourages licensees to adopt the recommendations of NUREG-1366.

To minimize these negative effects while assuring proper protection against overspeed, CPSES approached Siemens Westinghouse Power Corporation (Siemens), who is the turbine vendor, to determine if a longer surveillance test interval would be appropriate. Siemens performed the requested analysis to reduce the surveillance frequency for the turbine stop and control valves from 12 weeks to 26 weeks. This recommendation was based on a quantitative evaluation on the probability of failure of the overspeed trip and protection system as a function of the turbine stop and control valve test interval. The basic principles of the methodology are the same as those used by Siemens in previous studies which included the CPSES original designs, Grand Gulf, Connecticut Yankee, and Limerick and which have been previously reviewed and accepted by the NRC (Reference 7.8). This methodology, "Missile Analysis Methodology for GE Nuclear Steam Turbine Rotors by the SWPC," TP-03142 (Proprietary) and TP-03143 (Non-Proprietary) July 31, 2003, has been approved by the NRC (Reference 7.9).

The proposed change reduces the surveillance frequency of the turbine stop and control valves and will provide the following benefits:

- Reduces the possibility of reactor trips
- Reduces the wear to the valves and stress to the steam system
- Increases plant capacity factor
- Reduce unnecessary burden on personnel resources

Related background in the CPSES Final Safety Analysis Report (FSAR) (Reference 7.3) is found primarily in Sections 3.5 and 10.2.

4.0 TECHNICAL ANALYSIS

The proposed change will increase the TRS 13.3.33.2 frequency interval for turbine stop and control valves to 26 weeks. Test results are evaluated and trended and will continue to be evaluated and trended to determine if the valves remain within specifications as a result of this change. This 26 week frequency is based on a quantitative evaluation performed by Siemens (the turbine manufacturer) of the probability of failure of the overspeed trip and protection system as a function of the turbine stop and control valve test interval. The methodology used by Siemens has been previously reviewed and accepted by the NRC (Reference 7.9).

Turbine Favorable Orientation and Placement

CPSES' turbines are favorably oriented to the Containment building, i.e., the turbine axis is radial to the Containment building as described in Regulatory Guide (RG) 1.115 (Reference 7.4). CPSES Final Safety Analysis Report (FSAR) Figure 3.5-3 shows the plant layout drawing including turbine placement and orientation of both Units. Since there are no essential systems or structures located inside the low-trajectory missile zones, the protection of essential systems and structures is considered acceptable by the NRC and then only high-trajectory missiles need be considered.

Based upon the vendor analysis discussed later in Section 4, the probability of generating external, high-trajectory turbine missiles resulting from a hypothetical low-pressure (LP) turbine disk failure which could adversely affect safety related structure, system, or component is acceptably low and less than the NRC threshold for favorably oriented turbines.

Shielding

Each of the two CPSES LP turbines is a double-flow, 1800 revolutions per minute (rpm) steam turbine-generator with 46-inch last stage blades designed by Siemens Westinghouse for light water reactor applications. Each rotor is made from a stepped shaft with a total of 8 shrunk-on blade disks arranged in symmetrical groups of four disks per flow. The generation of external turbine missiles by virtue of turbine casing penetration does not occur until speeds exceed 145% of rated speed for all four disks of the LP turbines. This speed is based upon design values using deterministic missile energy analysis techniques. The calculated speeds at which final ductile burst of disks would occur exceed 160% of rated speed for all four disks.

The missile probability analysis used for this turbine is based upon methodologies and principles previously accepted by the NRC as discussed earlier. Results are based on theoretical design specifications for disc material properties rather than the actual material properties. The analysis is based upon previously accepted external missile probabilities based upon the design of the turbine, turbine inspection interval, overspeed protection test interval, and vulnerability of plant structures, systems, and components (SSCs) relative to the orientation of the turbine.

The missile deflection angles postulated for a last stage disk burst is 25 degrees. The turbines of the CPSES are so oriented that low-trajectory turbine missiles cannot strike any of the essential systems and thus the CPSES design is in compliance with Revision 1 of RG 1.115 (Reference 7.4). Thus for low-trajectory missiles, shielding is not required.

As discussed later in Section 4, the vender analysis concludes that the probability of generating external/high-trajectory turbine missiles resulting from a hypothetical LP turbine disk failure which could adversely affect safety related SSCs is acceptably low and less than the NRC threshold per year for favorably oriented turbines and thus shielding to provide protection from external, high-trajectory turbine missiles is not required.

The licensing basis associated with the turbine overspeed event is General Design Criterion (GDC) 4 for Turbine Missile Prevention. The potential failure mode affected by the proposed change is the possibility of a turbine overspeed event caused by a functional failure of the main stop and control valves. The potential for and consequences of a turbine overspeed event have been previously evaluated. The evaluation concluded that the station's structures, systems, and components important to safety are appropriately protected against dynamic effects, including the effects of missiles.

The seismic Category I structures are designed for the effects of tornado-generated missiles. The CPSES structures, systems, and components are designed to withstand the effects of a design basis tornado, including tornado missiles, and are in conformance with Regulatory Guide (RG) 1.117 (Reference 7.6).

In addition, the upgraded Turbine Overspeed Protection System is redundant and diverse and most of the devices are tested on line at least once a day. This robust system provides high system reliability. Therefore, the probability of a missile strike due to turbine overspeed failure at CPSES is acceptably low. The vendor analysis has determined that the probability of a high-trajectory missile is within the NRC's acceptance criteria. Therefore, CPSES' SSCs important to safety are adequately protected from and can withstand the effects of missiles.

Quality Assurance in Design and Fabrication

Each turbine at CPSES has been retrofitted with the advanced Siemens LP turbines that significantly reduce missile probability by:

- Improved design uses 8 disks instead of 10 to reduce missile probability.
- Increased residual compression stresses made possible due to larger disk sizes reduces the probability of disk burst due to stress corrosion cracking.
- To reduce the probability of disk burst due to reduced stress corrosion crack growth rates at reduced temperature, the first and second disks were keyed on the down stream side of steam flow.
- To reduce the probability of disk burst due to stress corrosion cracking, disks 3 and 4 were not keyed which reduced the stress concentration factor.

Additional information on turbine disk integrity that includes disc material, fracture toughness, temperature properties, design, and pre-service inspections is detailed in Section 10.2 of the FSAR (Reference 7.3).

The turbine is a multicasing, tandem compound, four-flow, reaction type, 1800-rpm unit with 46-inch last stage blades. The turbine consists of one double flow, high pressure element in tandem with two double flow, low pressure elements. Steam from the steam generators is supplied to the high pressure (HP) turbine through four pipes, each containing a stop valve in series with a control valve combined into a single compact casing. The valve units are located above the operating deck close to the high pressure turbine, with two units on either side of the turbine. This location minimizes the entrapped steam volume on valve closure, thus limiting potential overspeed following a load rejection. The above-floor arrangement and turbine rollaway cover simplify valve inspection and maintenance.

The high pressure (HP) stop valve is opened by control fluid pressure and closes rapidly by spring force when tripped. The HP control valve is positioned by a hydraulic servomotor but also closes rapidly by spring force after loss of control fluid pressure. Upstream from each HP stop and control valve is a permanently installed steam strainer body which includes a removable steam strainer.

Steam from the MSRs enters the low pressure turbine through low pressure (LP) stop and control valves located at each low pressure turbine inlet. Each of these valves has its own hydraulic actuator. The LP stop valves are operated by the trip system while the LP control valves are operated by the control system. These valves limit overspeed and maintain unit stability on loss of load. Provisions have been included to allow for automatic testing of the HP and LP stop and control valves while the turbine is in operation.

The high pressure stop valves are simple two position valves which are held open against spring force by control fluid pressure. Loss of this pressure causes rapid closure. The control valves are also opened by fluid pressure and closed by spring force. They close rapidly on trip command in a manner similar to the stop valves. The stop valves are designed to be leak-tight when closed. Both the stop and control valves have stems, sealing rings, and other sliding surfaces which are designed and manufactured for reliable operation. The stem seals are of the labyrinth type with radial clearance between the stem and sealing rings. This radial clearance is provided as insurance against the possibility of valve sticking caused by galling or buildup of material deposits on sliding surfaces.

The low pressure stop and control valves in each low pressure turbine steam admission are of butterfly-type design. Each valve has its own actuator. The low pressure stop valves are two position valves which close rapidly on receipt of a trip command. The low pressure control valves are equipped with actuators similar to the high pressure control valves for position control in response to a control signal.

Position measurement sensors have been installed on the HP and LP turbine stop and control valves. The closing stroke times and cycling of the high pressure turbine stop and control valves are monitored by the Automatic Turbine Tester (ATT) system and recorded on a flight recorder. The data from these sensors is trended to detect valve closing time degradation as input to scheduled maintenance. The high pressure stop and control valves have closing times of less than 500 milliseconds and the butterfly-type low pressure LP stop and control valves close in less than 1500 milliseconds. These tests are normally conducted at least once every 12 weeks using the ATT or manual test.

Overspeed is limited by rapid closure of the turbine control or stop valves whenever turbine power exceeds generator output, as would exist immediately after a load reduction. The important function of overspeed protection is provided by both the redundant electrohydraulic control (EHC) System and the redundant Overspeed Protection Systems. The EHC System serves as the primary device for mitigation of an overspeed event. If for some reason the EHC System was unable to prevent an overspeed event, two independent and diverse electronic Overspeed Protection Systems will trip the turbine at 110% of rated speed (1980 rpm). The Overspeed Trip Systems consist of two independent and diverse trip circuits called Hardware (HW) and Software (SW) Overspeed Trip Systems. Either system will independently trip the turbine. Each system is configured for 2 of 3 trip logic. The Overspeed Protection System meets the intent of NUREG-0800 Section 10.2 Part III (Reference 7.5) for redundancy and independence. In summary, the turbine generator and all its appurtenances meet all applicable codes, standards, and legislations and the advanced design lowers turbine missile probability. Thus, CPSES has a robust design which retains quality assurance and design features such that protection, redundancy, independence, and diversity are maintained commensurate with the expected frequency and consequences of turbine missiles.

Inspection and Testing Programs

The turbine is subject to an Inservice Inspection Program to provide assurance that disk flaws which could lead to brittle failures at design speeds are detected. This inspection includes disassembly of the turbine at approximately 12-year intervals during plant shutdowns coincident with the Inservice Inspection schedule required by Section XI of the ASME B&PV Code. The program includes visual and surface examinations and the latest volumetric examinations as required. All normally inaccessible parts are inspected, including couplings, coupling bolts, shafts, LP blading, LP disks, and HP rotors.

To preclude the possibility of a failure of an LP turbine due to cracking in the turbine disk, an ultrasonic inspection of the disk bore and keyway areas is performed for each LP turbine at intervals not to exceed 100,000 operating hours. In-place visual examination of the turbine assembly at accessible locations is conducted during refueling shutdowns at intervals not exceeding three years.

As part of the Inservice Inspection Program and TRS 13.3.33.4, at least one HP stop valve and control valve is dismantled to allow visual and surface examinations of the valve seat, disc, and stem. The valve disc and accessible portions of the shafts of at least one LP stop valve and control valve are visually inspected from within the associated piping. If an inspection reveals unacceptable flaws such as cracks or excessive corrosion, further investigation of valves of that type are conducted as necessary commensurate with inspection requirements for the higher safety class valves of ASME Section XI, Subsection IWB, Paragraph IWB-2430. Inspection of one valve of each type is performed at least once per 40 months. All valves are inspected within the 10-year Inservice Inspection interval.

Periodic testing of the stop and control valves is necessary to insure reliability and continuity of service; therefore, valve testing for all nuclear units is recommended with a manual test or with the aid of an automatic turbine test (ATT). During normal operation, the performance of the turbine trip device can be checked by the ATT. The ATT is a software-based system built into the Turbine Protection System and is initiated through the Operating and Monitoring (OM) control screen located in the Control Room and is capable of testing the Turbine Trip Block (TTB), the HP stop and control valves, and the LP stop and control valves.

The function of the TTB test is to test the trip function of the hydraulic trip block during turbine-generator operation. This test is performed during normal operation without initiating a turbine trip once every 14 days as required by TRS 13.3.33.1. To test the TTB, the operator starts the TTB test from the control screen. Tests are completed in the shortest possible time by the use of automatic sequential testing. Safety of operation is ensured because only one trip block piston is tested at a time. A trip will not occur because the turbine trip block requires two pistons in the tripped position to drain turbine trip fluid. The test sequences until each trip piston is tested and then exits automatically. Any failures are annunciated on the operator annunciator screen. If the trip block piston does not move to its predefined position (CLOSED or OPEN depending on the test step), the ATT is terminated and a fault criteria alarm is displayed on the operating control screen. The test is also terminated in the event of a turbine trip.

For testing of the HP and LP valves, the turbine generator load must be less than 85% and the load controller must be activated. These tests are conducted at least once every twelve weeks using the manual test or ATT as required by TRS 13.3.33.2. The test process for the HP and LP valves starts with closing the control valve of the valve combination to be tested. The associated stop valve is closed by actuating the test solenoid. The stop valve re-opens automatically when the test solenoid valve is deactivated. The control valve is opened via the test motor by intervening in the hydraulic pre-control of the valve actuator. The running time of the individual steps of the program is monitored, and a message sent to the OM computer workstation screen if running time is exceeded in one or more steps. The Turbine Protection System is fully functional during the ATT. The closing stroke times and cycling of the high pressure turbine stop and control valves are monitored by the ATT system and recorded on a flight recorder. The data from these sensors is trended to detect valve closing time degradation. In the event of a turbine trip, the ATT is interrupted.

The proposed change is to relax the frequency for the HP and LP turbine stop and control valves surveillance testing from once every 12 weeks to once every 26 weeks. No other Inservice Inspections or requirements will change as a result of the proposed change. After implementation of the proposed change, the closing stroke times and cycling of the high-pressure turbine stop and control valves will still be monitored by the ATT system and recorded on a flight recorder every 26 weeks instead of every 12 weeks. The data from these sensors will still be trended to detect valve closing time degradation. The vendor has analyzed and justified the proposed change as discussed later.

Overspeed Protection System

Protection from excessive overspeed is necessary to prevent the generation of potentially damaging missiles which could impact and damage safety-related components, equipment and structures. Turbine overspeed is limited by rapid closure of the turbine stop or control valves whenever turbine power exceeds generator output, as would exist immediately following a load rejection.

The EHC System is the primary means of limiting the extent of an overspeed event, with the Turbine Overspeed Protection System as a backup. The EHC System is designed to limit transient overspeed to less than 110% of rated speed after a full load rejection by closing both the HP and LP control valves. This function of the EHC System is performed by the normal speed and load control logic in conjunction with additional protection logic that ensures closure of all control valves under certain load rejection scenarios. To minimize the possibility of a component failure resulting in a loss of the control function, the EHC System utilizes triple redundant speed and load inputs, dual redundant digital controller processors, and dual redundant outputs (amplifiers, proportional valves, and follow-up piston banks) to the control valves.

If for some reason the EHC control system was unable to prevent an overspeed event, two independent and diverse electronic Overspeed Protection Systems will trip the turbine at 110 percent of rated speed (1980 rpm). The Overspeed Protection System is made up of the following basic component groups:

- Independent and redundant speed sensors and associated signal processing instrumentation, including bistables, provide individual speed channel trip signals to the Turbine Digital Protection System and the Hardware Overspeed Trip System (both described below) whenever turbine speed exceeds 1980 rpm.

- The Turbine Digital Protection System consists of three independent and redundant trains of equipment, including input modules, dual redundant automation processors and associated software, output modules, and output relays. Each train of the Turbine Digital Protection System processes the individual speed channel trip signals using 2 of 3 trip logic. When the trip logic is satisfied, the associated output relays de-energize, each one subsequently de-energizing its associated TTB solenoid valve.

- The Hardware Overspeed Protection System consists of relay logic and output relays that are diverse from, and completely bypass, the Turbine Digital Protection System described above. The Hardware Overspeed Protection System is a fail-safe system in that all inputs and outputs are normally energized in the non-tripped state. The relay logic processes the individual speed channel trip signals using 2 of 3 trip logic. When the trip logic is satisfied, all three output relays de-energize, each one subsequently de-energizing its associated TTB solenoid valve.

- The TTB utilizes three independent and redundant solenoid valves to actuate associated hydraulic pistons that are configured in a manner that provides a hydraulic 2 of 3 trip logic. When any two of the three solenoid valves de-energize, actuation of the associated pistons rapidly de-pressurizes the Turbine Trip Fluid System, causing all turbine stop and control valves to close. De-energization of a single solenoid valve will not trip the turbine.

The Overspeed Protection System consists of two redundant and diverse sub-systems, the Hardware Overspeed Sub-system and the Software Overspeed Sub-system, that are configured using the component groups described above. Either of these sub-systems can independently trip the turbine.

The Hardware Overspeed Sub-system utilizes a set of three dedicated speed channels, each of which provides a trip signal to the Relay Protection System. Upon receipt of trip signals from any two of these speed channels, the relay logic de-energizes all three output relays which subsequently de-energize all three TTB solenoid valves, causing the turbine to trip.

As a backup, the three dedicated Hardware Overspeed Sub-system speed channels also provide trip signals to all three of the Turbine Digital Protection System protection trains. Upon receipt of trip signals from any two of these speed channels, the output relay of each protection train is de-energized, subsequently de-energizing all three TTB solenoid valves, causing the turbine to trip.

The Software Overspeed Sub-system utilizes a second set of three dedicated speed channels which provide input to all three of the Turbine Digital Protection System protection trains. Upon receipt of trip signals from any two of these speed channels, the output relay of each protection train is de-energized, subsequently de-energizing all three TTB solenoid valves, causing the turbine to trip. The Software Overspeed System speed channels also provide speed signals to the EHC System described above.

The design of the Overspeed Protection System includes several testing features that are used to ensure OPERABILITY of the system. These features include three ATT tests that are manually initiated by the operator. They also include a test that is automatically executed by the system to ensure OPERABILITY of the speed channel instrumentation. The ATT HP and LP valve tests cycle all stop and control valves to ensure reliability and continuity of service. The HP and LP stop valve closure times are also verified to be within required response times (500 and 1500 milliseconds, respectively). These tests cycle one pair of stop and control valves at a time and is performed with the plant on-line below approximately 85% power.

The ATT TTB test de-energizes each TTB solenoid valve and verifies that the associated hydraulic piston moves to the trip position. The solenoid valve/piston pairs are sequentially tested one at a time, until all three are tested. Each pair is reset prior to testing the subsequent pair. Since only one solenoid valve/piston pair is tested at a time, the Trip Fluid System is never de-pressurized and the turbine does not trip.

Each of the six individual speed channels (three for the Hardware Overspeed Sub-system and three for the Software Overspeed Sub-system), is automatically tested once every 24 hours when turbine speed is > 40 rpm. These tests verify that the speed channels trip when speed is simulated above 1980 rpm. The tests are initiated by the Turbine Digital Protection System in a manner that precludes two speed channels from being tested at the same time. If desired, the speed channel tests may also be initiated by the operator. Alarms are provided to alert the operator in the event a fault or failure is detected during the execution of any of the tests.

The robust design of the Overspeed Protection System, with its multiple speed channels, diverse hardware and software logic, and multiple TTB solenoid valves and hydraulic pistons, meets the intent of NUREG-0800 Section 10.2 Part III (Reference 7.5) for redundancy and independence. Due to the robust design of the Overspeed Protection System, the probability change due to the increased valve test interval from 12 to 26 weeks falls below the NRC limit. Therefore it is acceptable to reduce the frequency of TRS 13.3.33.2 for testing the turbine stop and control valves from 12 weeks to 26 weeks.

Vendor Analysis

As recommended by NUREG-1366 (Reference 7.2), CPSES requested Siemens, the turbine manufacturer, to provide an analysis using a 26 week valve test interval for the HP and LP stop and control valves. The results of the analysis show the new valve test interval of 26 weeks with a turbine inspection interval of 100,000 hours is safe and acceptable. Safe and acceptable is defined as the probability of occurrence of a turbine missile per turbine year is less than the NRC limit of 1E-4 per turbine-year (8760 hours) or 11.42E-4 at 100,000 hours. This conclusion was based on a quantitative evaluation on the probability of failure of the Overspeed Protection System as a function of the turbine stop and control valve test interval. The basic principles of the methodology are the same as those used by Siemens in previous studies which included the CPSES original designs, Grand Gulf, Connecticut Yankee, and Limerick. This methodology has been reviewed and accepted by the Nuclear Regulatory Commission (NRC) as documented in a Safety Evaluation entitled "Missile Analysis Methodology for GE Nuclear Steam Turbine Rotors by the SWPC" (Reference 7.8) issued in July, 2003. In accordance with the NRC Safety Evaluation (Reference 7.8) for the Siemens methodology for evaluating turbine missile probabilities (Reference 7.9), Siemens has verified that they have used the NRC prescribed values for certain selected parameters as discussed in Section 3.0 and 4.0 of the NRC safety evaluation (Reference 7.8).

For favorably oriented turbines, the NRC limit for P4 (the probability of generating external/high-trajectory turbine missiles resulting from a hypothetical LP turbine disk failure which could adversely affect safety related SSCs) is less than 1E-07 per year. P4 is calculated as follows:

P4 = P1 * P2 * P3, where

P1 = probability of turbine failure resulting in the ejection of turbine disc or internal structure fragments through the turbine casing

P2 = probability of ejected missiles perforating intervening barriers and striking safety-related structures, systems, or components

P3 = probability of struck structures, systems, or components failing to perform their safety function

and P2 * P3 is assumed to equal 1E-3 per year.

The CPSES turbine missile analysis resulted in a conservatively high turbine missile generation probability (P1) of 1.56E-4 at 100,000 hours. The analysis was based on the calculation of P1 for a hypothetical disk burst with a turbine disk inspection interval of 100,000 hours. For an equivalent comparison to the NRC limit, the NRC limit of 1E-4 per turbine year, or 8760 hours, must be extrapolated to 100,000 hours. This is done by multiplying 1E-4 by 100,000 hours/8760 hours which yields a NRC limit of 11.42E-4 at 100,000 hours.

The probability of an external missile (P1) is evaluated by considering two distinct types of LP rotor disk failures, namely:

1) failure at normal operating speed up to and including 120% of the rated speed, and

2) failure due to run-away overspeed greater than 120% of the rated speed.

The probability calculation includes many variables. However, the only variable of the calculation affected by the proposed test interval change is P10 (probability of a run-away due to a failure of the Overspeed Protection System). All other variables remain the same as in the previous analysis on which the current testing interval of 12 weeks is based. P10 was recalculated using the 26 week valve test interval. The result of this calculation was then used to recalculate P1 to determine if the change to a 26-week test interval causes P1 to exceed the NRC limit of 1E-4 per year (equal to 11.42E-4 at 100,000 hours).

The result for a 26 week test frequency is that P10 changes to 1.37E-5 per year and P1 increases to 1.56E-4 at 100,000 hours. However, 1.56E-4 at 100,000 hours is less than the NRC limit of 11.42E-4 at 100,000 hours (extrapolated from 1E-4 per turbine year), thereby ensuring an acceptable risk for the loss of an essential system from a single event. Thus the 26 week interval would not increase the calculated missile generation probability above the NRC limit.

Since the probability of generating external, high trajectory turbine missiles from a hypothetical LP turbine disk failure which could adversely affect safety related SSCs (P4) due to the increased valve test interval of 26 weeks still falls below the NRC limit of 1E-4 per turbine-year, it is acceptable to increase the turbine valve test interval in TRS 13.3.33.2 from 12 weeks to 26 weeks.

The turbine manufacturer has justified by analysis the proposed change. Not only will this improve the capacity factor of the turbine generator, the proposed change will also improve safety, reduce equipment degradation, and lessen burden on plant personnel resources as recommended in Generic Letter 93-05 (Reference 7.7) and in NUREG-1366 (Reference 7.2) for TR 13.3.33 "Turbine Overspeed Protection."

Conclusion and Results

In conclusion, the proposed change will revise Technical Requirements Surveillance 13.3.33.2 to increase the frequency interval for turbine stop and control valves testing to 26 weeks.

The probability of generating external, high trajectory turbine missiles from a hypothetical LP turbine disk failure which could adversely affect safety related SSCs (P4) due to the increased valve test interval of 26 weeks remains well within the NRC limit. The turbine missile analysis methodology has been previously reviewed and accepted by the NRC in July 2003 (Reference 7.8). It is therefore acceptable to increase the turbine valve test interval in TRM TRS 13.3.33.2 from 12 weeks to 26 weeks.

5.0 REGULATORY ANALYSIS

5.1 No Significant Hazards Consideration

TXU Power has evaluated whether or not a significant hazards consideration is involved with the proposed amendment(s) 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 will increase the frequency interval for testing the high pressure (HP) and low pressure (LP) turbine stop and control valves to 26 weeks. This test requires the movement of the HP and LP turbine valves through one complete cycle once every 26 weeks. The test verifies freedom of movement of the valve components and is beneficial in early detection of problems with valve operation.

Siemens, the turbine manufacturer for Comanche Peak Steam Electric Station (CPSES), has evaluated the change in the probability of generating external/high-trajectory turbine missiles resulting from a hypothetical LP turbine disk failure which could adversely affect safety related SSCs due to the change in the surveillance interval weeks using a previously approved missile probability analysis methodology. The results of the analysis show the new valve test interval of 26 weeks with a turbine inspection interval of 100,000 hours is safe and acceptable as the probability of occurrence of a turbine missile per turbine year is less than the Nuclear Regulatory Commission (NRC) limit of 1E-4 per 8760 hours (turbine year) or 11.42E-4 at 100,000 hours (Reference 7.4). Therefore, the risk of the loss of an essential system from a single event is acceptable. Since the probability of generating external, high-trajectory turbine missiles resulting from a hypothetical LP turbine disk failure which could adversely affect safety related SSCs due to the increased valve test interval from 12 to 26 weeks is less than the NRC limit, it is acceptable to increase the turbine test interval in TRS 13.3.33.2. The test interval change would increase overall plant capacity factor and result in a net improvement in plant safety by reducing the likelihood of plant trips and stress and wear on plant components. In addition, the increased test intervals would reduce the likely cause of a plant transient and unnecessary burden on personnel resources which is consistent with Generic Letter 93-005 (Reference 7.7) and NUREG-1366 (Reference 7.2). Based upon Siemens' analysis and the updated stop and control valves failure probability, it is concluded that the implementation of this change in testing frequency will not increase the probability or consequences of an accident previously evaluated in the UFSAR.

The proposed change does not adversely affect accident initiators or precursors nor alter the design assumptions, conditions, or configuration of the facility or the manner in which the plant is operated and maintained. The proposed change does not alter or prevent the ability of structures, systems, and components (SSCs) from performing their intended function to mitigate the consequences of an initiating event within the assumed acceptance limits. The proposed change does not affect the source term, containment isolation, or radiological release assumptions used in evaluating the radiological consequences of an accident previously evaluated. The proposed change is consistent with safety analysis assumptions and resultant consequences.

Therefore, the proposed change does 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 will reduce the frequency for testing the high pressure (HP) and low pressure (LP) turbine stop and control valves weeks. Turbine overspeed is limited by rapid closure of the turbine stop and control valves. Turbine overspeed can result in the occurrence of turbine missiles from a burst type failure of the low pressure blades or disks. The damage from turbine missiles has been previously evaluated in the UFSAR (Reference 7.3). The proposed activity does not introduce the possibility of a new accident because no new failure modes are introduced.

Turbine overspeed with the resulting turbine missiles is the only accident potentially affected by failure of the turbine stop and control valves. The turbine missile analysis is not altered by reducing the frequency of high and low pressure stop and control valve testing. Reducing the frequency of turbine valve testing from every 12 weeks to every 26 weeks does not result in a significant change in the failure rate, nor does it affect the failure modes for the turbine valves.

There are no hardware changes nor are there any changes in the method by which any safety-related plant system performs its safety function. This amendment will not affect the normal method of plant operation or change any operating parameters. No performance requirements or response time limits will be affected. No new accident scenarios, transient precursors, failure mechanisms, or limiting single failures are introduced as a result of this amendment. There will be no adverse effect or challenges imposed on any safety-related system as a result of this amendment.

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 involve a significant reduction in a margin of safety since the conclusions of the safety analyses in the CPSES FSAR (Reference 7.3) are essentially unchanged and NRC safety limits are not exceeded.

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

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

5.2 Applicable Regulatory Requirements/Criteria

The regulatory bases and guidance documents associated with the systems discussed in this amendment application include:

GDC 4 requires that structures, systems, and components important to safety be designed to accommodate the effects of, and to be compatible with, the environmental conditions associated with the normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents. These structures, systems, and components shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, discharging fluids that may result from equipment failures, and from events and conditions outside the nuclear power unit. However, dynamic effects associated with postulated pipe ruptures in nuclear power units may be excluded from the design basis when analyses reviewed and approved by the Commission demonstrate that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping.

NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements" has identified problems caused by turbine valve testing. As stated in the NUREG, if the turbine vender agrees, the turbine valve surveillance test intervals should be extended. NRC Generic Letter 93-05 (Reference 7.7) endorses NUREG-1366 (Reference 7.2) and encourages licensees to prepare license amendment requests to implement the NUREG recommendations. Although CPSES' Turbine Overspeed Protection requirements have been relocated from the TS to the TRM, the NRC recommendations still apply.

RG 1.115 discusses the acceptable method for protecting safety-related structures, systems, and components against low-trajectory missiles resulting from turbine failure by appropriate orientation and placement of the turbine-generator sets.

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.

6.0 ENVIRONMENTAL CONSIDERATION

TXU Power 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 Power has evaluated the proposed changes and has determined that the changes do not involve (1) a significant hazards consideration, (2) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (3) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed changes meet 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.

7.0 REFERENCES

7.1 CPSES License Amendment 64 and NRC Safety Evaluation Report dated February 26, 1999.

7.2 NRC NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements," May 1992.

7.3 Comanche Peak Steam Electric Station Final Safety Analysis Report, Docket Nos. 50-445 and 50-446.

7.4 NRC Regulatory Guide 1.115, Revision 1, "Protection Against Low-Trajectory Turbine Missiles," July 1977.

7.5 NRC NUREG-0800, Revision 2, "Standard Review Plan," July 1981.

7.6 NRC Regulatory Guide 1.117, Revision 1, "Tornado Design Classification," April 1978.

7.7 NRC Generic Letter 93-05, "Line-Item Technical Specifications Improvements to Reduce Surveillance Requirements for Testing During Power Operation," September 27, 1993.

7.8 Letter to Stan Dembkowski (Siemens Westinghouse Power Corporation) from Herbert N. Berkow (USNRC) dated July 22, 2003, "Safety Evaluation for Acceptance of Referencing the Siemens Westinghouse Topical Report, 'Missile Analysis Methodology for General Electric (GE) Nuclear Steam Turbine Rotors by the Siemens Westinghouse Power Corporation (SWPC)' (TAC NO. MB5679)."

7.9 "Missile Analysis Methodology for GE Nuclear Steam Turbine Rotors by the SWPC," TP-03142 (Proprietary) and TP-03143 (Non-Proprietary) July 31, 2003.

ATTACHMENT 2 to TXX-07081

PROPOSED TECHNICAL REQUIREMENTS MANUAL CHANGES (MARK-UP)
(Markup For Information Only)

Pages 13.3-19

SURVEILLANCE REQUIREMENTS

- NOTE -
The provisions of TRS 13.0.4 are not applicable.

SURVEILLANCE		FREQUENCY
TRS 13.3.33.1	Test the Turbine Trip Block using the Automatic Turbine Tester (ATT).	14 days
TRS 13.3.33.2	Cycle each of the following valves through at least one complete cycle from the running position using the manual test or Automatic Turbine Tester (ATT). a. Four high pressure turbine stop valves, b. Four high pressure turbine control valves, c. Four low pressure turbine stop valves, and d. Four low pressure turbine control valves.	~~12~~ 26 weeks
TRS 13.3.33.3	Deleted	
TRS 13.3.33.4	Disassemble at least one high pressure turbine stop valve and one high pressure control valve and perform a visual and surface inspection of valve seats, disks and stems and verify no unacceptable flaws are found. If unacceptable flaws are found, all other valves of that type shall be inspected.	40 months
TRS 13.3.33.5	Visually inspect the disks and accessible portions of the shafts of at least one low pressure turbine stop valve and one low pressure control valve and verify no unacceptable flaws are found. If unacceptable flaws are found, all other valves of that type shall be inspected.	40 months

(continued)

ATTACHMENT 3 to TXX-07081

PROPOSED TECHNICAL REQUIREMENTS MANUAL BASES CHANGES
(Markup For Information Only)

Pages B 13.3-10
B 13.3-11
B 13.3-12
B 13.3-13
B 13.3-14
B13.3-15

BASES

BACKGROUND (continued)

System in a manner that precludes two speed channels from being tested at the same time. If desired, the speed channel tests may also be initiated by the operator.

Alarms are provided to alert the operator in the event of a fault/failure is detected during the execution of any of the aforementioned tests.

APPLICABLE SAFETY ANALYSES

The Overspeed Protection System is required to be OPERABLE to provide sufficient protection against generation of potentially damaging missiles which could impact and damage safety-related components, equipment and structures. The turbine missile analysis is presented in Reference 2. Using References 3 ~~through~~ and 5 as a basis, this analysis ~~concludes that the risk for loss of~~ an essential system due to a turbine missile event is acceptably low.

The robust design of the Overspeed Protection System, with its multiple speed channels, diverse hardware and software logic, and multiple Turbine Trip Block solenoid valves/hydraulic pistons, meets the intent of SRP 10.2 Part III for redundancy and independence.

LCO

The Turbine Overspeed Protection Sub-systems are the Hardware Overspeed Sub-system and the Software Overspeed Sub-system, one of which shall be OPERABLE.

The robust design of these sub-systems allows for the failure of individual components without rendering the sub-system(s) inoperable. Specifically, the minimum operability requirements for the Hardware Overspeed Sub-system include:

- two OPERABLE dedicated hardware speed channels, and associated OPERABLE hardware relay logic with two OPERABLE output relays and associated Turbine Trip Block solenoid valves/hydraulic pistons

  OR

- two OPERABLE dedicated hardware speed channels and two associated OPERABLE AG-95F System trains, including output relays and associated Turbine Trip Block solenoid valves/ hydraulic pistons

(continued)

BASES

BACKGROUND (continued)

System in a manner that precludes two speed channels from being tested at the same time. If desired, the speed channel tests may also be initiated by the operator.

Alarms are provided to alert the operator in the event of a fault/failure is detected during the execution of any of the aforementioned tests.

APPLICABLE SAFETY ANALYSES

The Overspeed Protection System is required to be OPERABLE to provide sufficient protection against generation of potentially damaging missiles which could impact and damage safety-related components, equipment and structures. The turbine missile analysis is presented in Reference 2. Using References 3 ~~through~~ and 5 as a basis, this analysis concludes that the risk for loss of an essential system due to a turbine missile event is acceptably low.

The robust design of the Overspeed Protection System, with its multiple speed channels, diverse hardware and software logic, and multiple Turbine Trip Block solenoid valves/hydraulic pistons, meets the intent of SRP 10.2 Part III for redundancy and independence.

LCO

The Turbine Overspeed Protection Sub-systems are the Hardware Overspeed Sub-system and the Software Overspeed Sub-system, one of which shall be OPERABLE.

The robust design of these sub-systems allows for the failure of individual components without rendering the sub-system(s) inoperable. Specifically, the minimum operability requirements for the Hardware Overspeed Sub-system include:

- two OPERABLE dedicated hardware speed channels, and associated OPERABLE hardware relay logic with two OPERABLE output relays and associated Turbine Trip Block solenoid valves/hydraulic pistons

  OR

- two OPERABLE dedicated hardware speed channels and two associated OPERABLE AG-95F System trains, including output relays and associated Turbine Trip Block solenoid valves/ hydraulic pistons

(continued)

BASES

LCO (continued)

The minimum operability requirements for the Software Overspeed Sub-system include:

- two OPERABLE dedicated software speed channels and two associated OPERABLE AG-95F System trains, including output relays and associated Turbine Trip Block solenoid valves/ hydraulic pistons

Individual component failures that do not render the sub-system(s) inoperable are addressed under the Corrective Action Program (CAP) with restoration times commensurate with the severity of the failure and the operational impact associated with the rework or repair.

Furthermore, component failures that result in rendering only one Overspeed Protection Sub-system inoperable are also addressed under the CAP with restoration times commensurate with the severity of the failure and the operational impact associated with the rework or repair.

The OPERABILITY of one Overspeed Protection Sub-system ensures that the Overspeed Protection System is available to prevent an overspeed event while the unit is operating in MODE 1, 2, and 3 with steam available to roll the turbine. The APPLICABILITY is modified by a Note specifying that Overspeed Protection Sub-system OPERABILITY is not required in MODE 2 and 3 if the turbine is isolated from the steam supply by closing all Main Steam Isolation Valves and associated bypass valves.

ACTIONS

A.1, A.2, and A.3

This ACTION is modified by a Note that specifies that separate Condition entries are allowed for each steam line if valves are inoperable in multiple steam lines.

If an HP Stop or Control Valve is inoperable such that it is not capable of properly isolating the steam line to the turbine in response to an overspeed event, action must be taken to restore the valve(s) to OPERABLE status. Failure to restore the valve(s) to OPERABLE status within 72 hours requires that compensatory action be taken within the following 6 hours to ensure that the affected steam line is isolated by other means.

(continued)

BASES

ACTIONS (continued)

A.1, A.2, and A.3 (continued)

The 72 hour Completion Time for restoring the valve(s) takes into account the OPERABILITY of the remaining valve in the affected steam line and reasonable time for rework or repair. The 6 hour compensatory action Completion Time is reasonable, based on operating experience, for reaching the required unit conditions from full power operation in an orderly manner and without challenging unit systems.

B.1, B.2, and B.3

This ACTION is modified by a Note that specifies that separate Condition entries are allowed for each steam line if valves are inoperable in multiple steam lines.

If an LP Stop or Control Valve is inoperable such that it is not capable of properly isolating the steam line to the turbine in response to an overspeed event, action must be taken to restore the valve(s) to OPERABLE status. Failure to restore the valve(s) to OPERABLE status within 72 hours requires that compensatory action be taken within the following 6 hours to ensure that the affected steam line is isolated by other means.

The 72 hour Completion Time for restoring the valve(s) takes into account the OPERABILITY of the remaining valve in the affected steam line and reasonable time for rework or repair. The 6 hour compensatory action Completion Time is reasonable, based on operating experience, for reaching the required unit conditions from full power operation in an orderly manner and without challenging unit systems.

C.1

If both Overspeed Protection Sub-systems are inoperable, such that neither is capable of initiating a turbine trip in response to an overspeed event, action must be taken within 6 hours to isolate the turbine from the steam supply.

The 6 hour Completion Time for isolating the turbine from the steam supply is reasonable, based on operating experience, for reaching the required unit conditions from full power operation in an orderly manner and without challenging unit systems.

(continued)

ACTIONS (continued)

D.1, D.2, and D.3

In the event that the aforementioned ACTIONS and associated Completion Times cannot be satisfied, action must be initiated within 1 hour to place the unit in a lower MODE, with subsequent action to place the unit in MODE 3 within the following 6 hours and to place the unit in MODE 4 within 6 hours after entering MODE 3. The need to perform these actions would most likely result from the inability to isolate the turbine from the steam supply. Placing the unit in MODE 4 will reduce steam pressure to the point where there is insufficient motive force to overspeed the turbine, even if it is not isolated from the steam generators.

The Completion Times are reasonable, based on operating experience, for reaching MODE 3 and MODE 4 from full power operation in an orderly manner and without challenging unit systems.

TECHNICAL REQUIREMENTS SURVEILLANCE

The TRS 13.3.33 requirements are modified by a Note that specifies that the provisions of TRS 13.0.4 are not applicable.

TRS 13.3.33.1

This TRS specifies testing of the Turbine Trip Block using the Automatic Turbine Tester (ATT). This test de-energizes each Turbine Trip Block solenoid valve and verifies that the associated hydraulic piston moves to trip position. The solenoid valve/piston pairs are sequentially tested one at a time, until all three are tested. Each pair is reset prior to testing the subsequent pair. Since only one solenoid valve/piston pair is tested at a time, the Trip Fluid System is never de-pressurized, and the turbine does not trip.

The 14 day test Frequency is based on the assumptions in the analyses presented in References 2 and 4.

TRS 13.3.33.2

manual test or the

This TRS specifies testing of the turbine HP and LP Stop and Control Valves using the ATT. These tests cycle all Stop and Control Valves to ensure reliability and continuity of service. The HP and LP Stop Valve closure times are also verified to be within required response times (500 and 1500 msec, respectively). These tests cycle one pair of Stop and Control Valves at a time, so they may be performed with the plant on-line below approximately 85% power.

26

The 12 week test Frequency is based on the assumptions in the analyses presented in Reference 2 and 6.

5

(continued)

BASES

TECHNICAL REQUIREMENTS SURVEILLANCE (continued)

TRS 13.3.33.3

This TRS has been deleted.

TRS 13.3.33.4

This TRS requires disassembly and inspection of at least one HP Stop Valve and one HP Control Valve on a 40 month Frequency to satisfy the turbine inservice inspection requirements described in Reference 6.

TRS 13.3.33.5

This TRS requires inspection of at least one LP Stop Valve and one LP Control Valve on a 40 month Frequency to satisfy the turbine inservice inspection requirements described in Reference 6.

TRS 13.3.33.6

This TRS requires a test of the Hardware Overspeed Sub-system 2 of 3 relay logic and output relays to ensure that this equipment is capable of processing an overspeed turbine trip signal on demand.

This equipment cannot be tested with the unit at power because performance of the test will trip the turbine. The 18 month test Frequency is consistent with Technical Specification test Frequencies assigned to similar equipment, and it affords the opportunity to test the equipment while the unit is shutdown. This test Frequency is judged to be acceptable based on the reliability of the equipment.

REFERENCES:

1. CPSES FSAR, Section 10.2.2.7.

2. CPSES FSAR, Section 3.5.1.3.

3. Engineering Report No. ER-504, Probability of Turbine Missiles from 1800 R/MIN Nuclear Steam Turbine-Generators with 46 -Inch Last Stage Turbine Blades, Allis-Chalmers (Siemens) Power Systems, Inc, October 1975 [VL-04-001540].

4. Supplement to ER-504, Comparison MTBF Evaluation Comanche Peak ST Protection and Trip System and Engineering Report No. ER-504 Probability of Turbine Missiles, Siemens Power Corporation, February 11, 2004 [VL-05-000489].

Deleted

(continued)

5

BASES

REFERENCES: (continued)

5. CT-27331, Revision 4, Missile Probability Analysis Methodology for TXU Generation Company LP, Comanche Peak Units 1 and 2 with Siemens Retrofit Turbines, Siemens Westinghouse Power Corporation, October 29, 2004 (VL-05-001268).

January 18, 2007

6. CPSES FSAR, Section 10.2.3.6.

3

7. 59EV-2004-000774-01 and 59EV-2004-000774-02, 10CFR50.59 Evaluations for installation of the Turbine Generator Digital Protection System in Comanche Peak Unit 1 and Unit 2, respectively.

8. LDCR TR-2007-003, Change TRS 13.3.33.2 Frequency from 12 weeks to 26 weeks, EVAL-2005-002580-02.

ATTACHMENT 4 to TXX-07081

RETYPED TECHNICAL REQUIREMENTS MANUAL PAGES
(For Information Only)

Pages 13.3-19

SURVEILLANCE REQUIREMENTS

- NOTE -
The provisions of TRS 13.0.4 are not applicable.

	SURVEILLANCE	FREQUENCY
TRS 13.3.33.1	Test the Turbine Trip Block using the Automatic Turbine Tester (ATT).	14 days
TRS 13.3.33.2	Cycle each of the following valves through at least one complete cycle from the running position using the manual test or Automatic Turbine Tester (ATT). a. Four high pressure turbine stop valves, b. Four high pressure turbine control valves, c. Four low pressure turbine stop valves, and d. Four low pressure turbine control valves.	26 weeks
TRS 13.3.33.3	Deleted	
TRS 13.3.33.4	Disassemble at least one high pressure turbine stop valve and one high pressure control valve and perform a visual and surface inspection of valve seats, disks and stems and verify no unacceptable flaws are found. If unacceptable flaws are found, all other valves of that type shall be inspected.	40 months
TRS 13.3.33.5	Visually inspect the disks and accessible portions of the shafts of at least one low pressure turbine stop valve and one low pressure control valve and verify no unacceptable flaws are found. If unacceptable flaws are found, all other valves of that type shall be inspected.	40 months

(continued)

ATTACHMENT 5 to TXX-07081

RETYPED TECHNICAL REQUIREMENTS MANUAL BASES PAGES
(For Information Only)

Pages B 13.3-10
B 13.3-11
B 13.3-12
B 13.3-13
B 13.3-14
B 13.3-15

BASES

BACKGROUND (continued)

System in a manner that precludes two speed channels from being tested at the same time. If desired, the speed channel tests may also be initiated by the operator.

Alarms are provided to alert the operator in the event of a fault/failure is detected during the execution of any of the aforementioned tests.

APPLICABLE SAFETY ANALYSES

The Overspeed Protection System is required to be OPERABLE to provide sufficient protection against generation of potentially damaging missiles which could impact and damage safety-related components, equipment and structures. The turbine missile analysis is presented in Reference 2. Using References 3 and 5 as a basis, this analysis concludes that the risk for loss of an essential system due to a turbine missile event is acceptably low.

The robust design of the Overspeed Protection System, with its multiple speed channels, diverse hardware and software logic, and multiple Turbine Trip Block solenoid valves/hydraulic pistons, meets the intent of SRP 10.2 Part III for redundancy and independence.

LCO

The Turbine Overspeed Protection Sub-systems are the Hardware Overspeed Sub-system and the Software Overspeed Sub-system, one of which shall be OPERABLE.

The robust design of these sub-systems allows for the failure of individual components without rendering the sub-system(s) inoperable. Specifically, the minimum operability requirements for the Hardware Overspeed Sub-system include:

- two OPERABLE dedicated hardware speed channels, and associated OPERABLE hardware relay logic with two OPERABLE output relays and associated Turbine Trip Block solenoid valves/hydraulic pistons

OR

- two OPERABLE dedicated hardware speed channels and two associated OPERABLE AG-95F System trains, including output relays and associated Turbine Trip Block solenoid valves/ hydraulic pistons

(continued)

BASES

ACTIONS (continued)

A.1, A.2, and A.3 (continued)

The 72 hour Completion Time for restoring the valve(s) takes into account the OPERABILITY of the remaining valve in the affected steam line and reasonable time for rework or repair. The 6 hour compensatory action Completion Time is reasonable, based on operating experience, for reaching the required unit conditions from full power operation in an orderly manner and without challenging unit systems.

B.1, B.2, and B.3

This ACTION is modified by a Note that specifies that separate Condition entries are allowed for each steam line if valves are inoperable in multiple steam lines.

If a LP Stop or Control Valve is inoperable such that it is not capable of properly isolating the steam line to the turbine in response to an overspeed event, action must be taken to restore the valve(s) to OPERABLE status. Failure to restore the valve(s) to OPERABLE status within 72 hours requires that compensatory action be taken within the following 6 hours to ensure that the affected steam line is isolated by other means.

The 72 hour Completion Time for restoring the valve(s) takes into account the OPERABILITY of the remaining valve in the affected steam line and reasonable time for rework or repair. The 6 hour compensatory action Completion Time is reasonable, based on operating experience, for reaching the required unit conditions from full power operation in an orderly manner and without challenging unit systems.

C.1

If both Overspeed Protection Sub-systems are inoperable, such that neither is capable of initiating a turbine trip in response to an overspeed event, action must be taken within 6 hours to isolate the turbine from the steam supply.

The 6 hour Completion Time for isolating the turbine from the steam supply is reasonable, based on operating experience, for reaching the required unit conditions from full power operation in an orderly manner and without challenging unit systems.

(continued)

ACTIONS (continued)

D.1, D.2, and D.3

In the event that the aforementioned ACTIONS and associated Completion Times cannot be satisfied, action must be initiated within 1 hour to place the unit in a lower MODE, with subsequent action to place the unit in MODE 3 within the following 6 hours and to place the unit in MODE 4 within 6 hours after entering MODE 3. The need to perform these actions would most likely result from the inability to isolate the turbine from the steam supply. Placing the unit in MODE 4 will reduce steam pressure to the point where there is insufficient motive force to overspeed the turbine, even if it is not isolated from the steam generators.

The Completion Times are reasonable, based on operating experience, for reaching MODE 3 and MODE 4 from full power operation in an orderly manner and without challenging unit systems.

TECHNICAL REQUIREMENTS SURVEILLANCE

The TRS 13.3.33 requirements are modified by a Note that specifies that the provisions of TRS 13.0.4 are not applicable.

TRS 13.3.33.1

This TRS specifies testing of the Turbine Trip Block using the Automatic Turbine Tester (ATT). This test de-energizes each Turbine Trip Block solenoid valve and verifies that the associated hydraulic piston moves to trip position. The solenoid valve/piston pairs are sequentially tested one at a time, until all three are tested. Each pair is reset prior to testing the subsequent pair. Since only one solenoid valve/piston pair is tested at a time, the Trip Fluid System is never de-pressurized, and the turbine does not trip.

The 14 day test Frequency is based on the assumptions in the analyses presented in Reference 2.

TRS 13.3.33.2

This TRS specifies testing of the turbine HP and LP Stop and Control Valves using the manual test or the ATT. These tests cycle all Stop and Control Valves to ensure reliability and continuity of service. The HP and LP Stop Valve closure times are also verified to be within required response times (500 and 1500 msec, respectively). These tests cycle one pair of Stop and Control Valves at a time, so they may be performed with the plant on-line below approximately 85% power.

The 26 week test Frequency is based on the assumptions in the analyses presented in Reference 2 and 5.

(continued)

BASES

TECHNICAL REQUIREMENTS SURVEILLANCE (continued)

TRS 13.3.33.3

This TRS has been deleted.

TRS 13.3.33.4

This TRS requires disassembly and inspection of at least one HP Stop Valve and one HP Control Valve on a 40 month Frequency to satisfy the turbine inservice inspection requirements described in Reference 6.

TRS 13.3.33.5

This TRS requires inspection of at least one LP Stop Valve and one LP Control Valve on a 40 month Frequency to satisfy the turbine inservice inspection requirements described in Reference 6.

TRS 13.3.33.6

This TRS requires a test of the Hardware Overspeed Sub-system 2 of 3 relay logic and output relays to ensure that this equipment is capable of processing an overspeed turbine trip signal on demand.

This equipment cannot be tested with the unit at power because performance of the test will trip the turbine. The 18 month test Frequency is consistent with Technical Specification test Frequencies assigned to similar equipment, and it affords the opportunity to test the equipment while the unit is shutdown. This test Frequency is judged to be acceptable based on the reliability of the equipment.

REFERENCES:

1. CPSES FSAR, Section 10.2.2.7.
2. CPSES FSAR, Section 3.5.1.3.
3. Engineering Report No. ER-504, Probability of Turbine Missiles from 1800 R/MIN Nuclear Steam Turbine-Generators with 46 -Inch Last Stage Turbine Blades, Allis-Chalmers (Siemens) Power Systems, Inc, October 1975.
4. Deleted

(continued)

BASES

REFERENCES: (continued)

5. CT-27331, Revision 5, Missile Probability Analysis Methodology for TXU Generation Company LP, Comanche Peak Units 1 and 2 with Siemens Retrofit Turbines, Siemens Westinghouse Power Corporation, January 18, 2007.

6. CPSES FSAR, Section 10.2.3.6.

7. 59EV-2004-000773-01 and 59EV-2004-000773-02, 10CFR50.59 Evaluations for installation of the Turbine Generator Digital Protection System in Comanche Peak Unit 1 and Unit 2, respectively.

8. LDCR TR-2007-003, change TRS 13.3.33.2 Frequency from 12 weeks to 26 weeks, EVAL-2005-002580-02.