

UNITED STATES OF AMERICA
 NUCLEAR REGULATORY COMMISSION
 OFFICE OF NUCLEAR REACTOR REGULATION

Thomas E. Murley, Director

In the Matter of)	
)	
TEXAS UTILITIES ELECTRIC COMPANY)	Docket No. 50-445
)	10 CFR 2.206
(Comanche Peak Steam Electric)	
Station, Unit 1))	

DIRECTOR'S DECISION UNDER 10 CFR 2.206

1. INTRODUCTION

On November 20, 1990, Ms. Betty Brink (the Petitioner) filed a request (the Petition) with the Executive Director for Operations in accordance with Section 2.206 of Title 10 of the Code of Federal Regulations (10 CFR 2.206) on behalf of the Citizens for Fair Utility Regulation (CFUR) for action to be taken regarding the Comanche Peak Steam Electric Station. Specifically, CFUR requested a proceeding be instituted or such other action as may be proper to determine if the operating license for the Comanche Peak Steam Electric Station should be revoked, modified, or suspended. The Petition argued that "issues of safety" exist at Comanche Peak Steam Electric Station, based on CFUR assertions that (1) Borg-Warner check valves continue to fail and have never been able to perform their design function at the Comanche Peak Steam Electric Station; (2) the safety of certain Borg-Warner check valves installed at Comanche Peak is questionable because of the use of internal parts in the valves from suppliers who were not adequately qualified and the possible use of questionable replacement parts; (3) the Texas Utilities Electric Company (the licensee) failed to take adequate corrective actions to resolve the Borg-Warner check valve failures at the Comanche Peak Steam Electric Station; (4) the competence and integrity

of the Texas Utilities Electric Company's management is questionable; and (5) there was a failure to provide adequate documentation regarding the adequacy of the Borg-Warner check valves at the Comanche Peak Steam Electric Station.

In my letter of December 24, 1990, I acknowledged receipt of the CFUR Petition and stated that the U.S. Nuclear Regulatory Commission (NRC) would take action on the Petitioner's request within a reasonable time. I have now completed my evaluation of the CFUR Petition. I have determined, for the reasons set forth below, that no adequate basis exists to institute a proceeding, or for other such action to revoke, modify, or suspend the license for the Comanche Peak Steam Electric Station, Unit 1.

II. BACKGROUND

In support of the request the Petitioner cites a series of events involving Borg-Warner check valves that have occurred at Comanche Peak. The Petitioner used these events, described below, to identify a number of the issues in the Petition.

During hot functional testing performed before the plant was licensed, two events (one on April 23, 1989, and another on May 5, 1989) occurred at the Comanche Peak Steam Electric Station involving the flow of feedwater back through Borg-Warner check valves installed in the auxiliary feedwater (AFW) system. During these events, manual isolation valves were operated concurrently when they should have been operated sequentially. This action resulted in secondary system water flowing from the steam generators through stuck open Borg-Warner check valves in the AFW system to the condensate storage tank. During subsequent evaluations, both the licensee and the U.S. Nuclear Regulatory Commission (NRC) staff found that the bonnet-disc assemblies in the

Borg-Warner check valves in the AFW system had been improperly adjusted in the vertical elevation. This improper adjustment had allowed the discs to lodge under the upper seat surface such that the valves could not fully close. The NRC sent an Augmented Inspection Team (AIT) to independently investigate the events and determine the root causes.

During the evaluations following these two events, the investigators found that a swing arm (used in the check valves to connect the valve disc to the bonnet) had failed in a Borg-Warner check valve in the Station Service Water System. This failure raised concerns regarding use of commercial grade parts in safety-related systems. Responding to this concern, the NRC inspected BW/IP International, Incorporated, a supplier of the Borg-Warner check valves to Comanche Peak. The inspection was conducted in September 1989, and the report was issued on January 12, 1990.

On January 5, 1990, during post-work testing at Comanche Peak Steam Electric Station Unit 1, the licensee radiographed Borg-Warner check valves installed in the steam supply to the turbine-driven AFW system and found one valve with its disc lodged under the seat, while one other valve disc was laying off, but not lodged under, the seat.

In April and May 1990, during the startup test program after licensing and before commercial operation, feedwater flowed back through the Borg-Warner check valves in the AFW system on three separate occasions. The licensee subsequently performed tests and found that the feedwater had flowed back through the check valves because of low differential pressure across the check valves. The licensee found that the check valves were not stuck open.

An additional event involving Borg-Warner check valves occurred on April 19, 1991, which was after the Petition was filed. The event involved one of the Borg-Warner check valves in the AFW system at Comanche Peak Steam Electric Station that stuck open during testing of a downstream motor-operated isolation valve. This testing was conducted while the plant was shutdown for a maintenance outage. The Petitioner was informed of the event by the NRC staff.

III. DISCUSSION

The basis for the Petitioner's request is its assertion that the information cited in 19 documents, attached to the Petition, identifies a wide range of "issues of safety" at the Comanche Peak Steam Electric Station, including the following: (1) check valves continue to fail and have never been able to perform their design function at the Comanche Peak Steam Electric Station; (2) certain Borg-Warner check valves installed at the Comanche Peak Steam Electric Station are of questionable safety because they contain internal parts from suppliers who were not adequately qualified and possibly include questionable replacement parts; (3) the licensee failed to take adequate corrective actions to resolve the Borg-Warner check valve failures at the Comanche Peak Steam Electric Station; (4) the competence and integrity of the licensee's management is questionable; and (5) adequate documentation was not provided to support the adequacy of the Borg-Warner check valves at the Comanche Peak Steam Electric Station. The NRC will also address a number of miscellaneous issues raised in CFUR's Petition.

The NRC staff acknowledges that the performance of Borg-Warner check valves installed in Comanche Peak has been poor. Our inspection program and operations evaluation program are aimed at finding such poor equipment performance problems

and requiring the licensee to take corrective actions. These regulatory processes have been followed by the staff in the case of Comanche Peak, and the results are discussed in the following sections.

Each of the specific issues raised by the Petitioner is characterized below, followed by the staff's evaluation.

A. Check valves continue to fail and have never been able to perform their design function

The Petitioner contended that the check valves have leaked on three different occasions: April and May of 1989 during hot functional testing at Comanche Peak Steam Electric Station Unit 1; on January 5, 1990, before licensing; and, in April and May 1990, during the startup test program. The Petitioner claimed the continued leakage indicates that the check valves have failed and continue to be jammed open in such a way that they are unable to perform their design function. The Petitioner also stated a concern regarding on-going disassembly of Borg-Warner check valves at the Comanche Peak Steam Electric Station to correct the leaking.

In addressing this contention, a brief explanation of the safety function¹ of check valve is helpful. Piping systems often have multiple branches that

1 The Petitioner refers to the "design function" of check valves. Check valves have several design functions, including allowing forward flow and preventing reverse flow. The staff is primarily concerned with the safety functions of check valves, in line with its responsibility to ensure the public health and safety. In addition, the Petition deals with issues that relate to the safety function of the Borg-Warner check valves, and not the entire scope of design functions. The staff will, because of the two aforementioned reasons, only address the safety function of the Borg-Warner check valves in its response.

supply liquid or vapor to other components in the plant (such as tanks, heat exchangers, steam generators, and the reactor vessel). Check valves are installed in these piping systems to prevent the liquid or vapor from one of the branches from flowing backwards through another branch of the piping system while the system operates. This design ensures that the liquid or vapor will continue to flow to the component being supplied in sufficient quantity for the supplied component to perform its own safety function. When a check valve cannot prevent sufficient backflow during system operation to ensure supplied components have adequate flow to perform the supplied components' safety function, the check valve is considered to have failed to perform its safety function.

The Petitioner contends that the events that occurred in April and May 1989 during hot functional testing of the Comanche Peak Steam Electric Station, Unit 3, were the result of failures of Borg-Warner check valves. The staff also considers these two events to be related to failures of Borg-Warner check valves. However, these problems with the Borg-Warner check valves were found and corrected during the testing program before the plant received its license or began to operate. These problems, therefore, did not present a safety concern.

In NRC AIT report 50-445/89-30, 50-446/89-30 of July 10, 1989, the staff discussed the root causes and contributing factors for the failure of the Borg-Warner check valves in April and May 1989. Two significant issues raised in this report concerning the check valve failures were (1) the root cause of the valve disc jamming under the valve seat as a result of vertical misalignment of the check valve disc because of inadequate maintenance procedures, and (2) a lack of post-maintenance testing to ensure that the Borg-Warner check valves,

when reassembled, would perform their safety function before the associated system is placed back into operation, a contributing cause to the failure of the check valves. The licensee's corrective actions in response to these issues were stated in letters to the NRC, TXX-89596², of August 18, 1989, and TXX-89744, of October 14, 1989. The licensee revised the reassembly procedures for Borg-Warner check valves and provided for post-work testing of Borg-Warner check valves. In addition, to ensure the check valves were aligned properly and could perform their safety function, the licensee tested all Borg-Warner check valves in the Comanche Peak Steam Electric Station, Unit 1, and common systems, using either reverse flow testing (which ensures the check valves prevent a sufficient amount of backflow) or radiography. The licensee performed these corrective actions to provide assurance that, following work on Borg-Warner check valves, any problems are identified and corrected before the affected system is restored to service.

The staff reviewed and evaluated the licensee's actions specified in the referenced letters. The licensee's actions were found to be appropriate and effective in providing reasonable assurance that the Borg-Warner check valves will perform their safety function. As a result of these corrective actions, no Borg-Warner check valve has failed to perform its safety function with its associated system in service during plant operation. The staff has documented its evaluations in Inspection Reports (IR) 50-445, 50-446/89-30, 89-52, 89-71, 89-73, 90-03, and 90-09. Areas of inspection included witnessing the testing,

2 The licensee uses this numbering scheme to identify correspondence.

corrective maintenance and reassembly of Borg-Warner check valves, and performing followup inspections on open items resulting from the AIT report. Based on the NRC inspections and the licensee's corrective actions, the staff has determined that the licensee has adequately addressed the root causes of the April and May 1989 events.

The Petitioner contends that the January 1990 event also indicated a failure of Borg-Warner check valves to perform their safety function. This event occurred while the licensee was conducting post-maintenance radiography as part of the corrective action program resulting from the April and May 1989 events. The licensee found two Borg-Warner check valves in the main steam supply to the turbine-driven AFW system in abnormal configurations. The abnormal configurations could have rendered one of the valves inoperable, which indicates the valve may not have performed its safety function if the plant had been licensed and operating. In June 1989, the licensee had performed maintenance on this valve, but had not conducted the post-maintenance testing until January, 1990. The staff considers this event to be an extension of the April and May 1989 events, since the licensee found the abnormal conditions as part of the corrective actions to verify before plant licensing that all Borg-Warner check valves were aligned properly and could perform their safety function, as described above. The licensee evaluated this event, as documented in Technical Evaluation WC-90-79 (described in staff IR 50-445, 446/90-03), and determined that forward and reverse flow testing, and radiographic testing, of all Borg-Warner check valves verified that the remaining Borg-Warner check valves would not exhibit the same problem. In staff IR 50-445, 446/90-09, the staff documented its evaluation of the licensee's actions and noted that the

two valves found in the abnormal configurations had been disassembled, inspected, reassembled, and successfully air tested in the reverse flow direction. Based on the information in IR 50-445, 446/90-09, the staff found that the licensee's corrective action for this event was adequate to ensure the two affected Borg-Warner check valves would perform their safety function during plant operation.

The Petitioner contended that the April and May 1990 events, involving leakage back through Borg-Warner check valves in the AFW system, also indicated a failure of Borg-Warner check valves to perform their safety function. In the licensee's letters TXX-90172 of April 27, 1990, and TXX-90188 of May 18, 1990, the licensee stated that the leakage through the AFW check valves was minor, and that there was assurance the AFW check valves would perform their safety function because of the required surveillance testing and rework with post-work testing conducted during the transition from operational Modes 6 through 1. In addition, the licensee conducted tests and monitored the temperature of the AFW piping to quantify the leakage rates across the AFW check valves. As a result, the licensee found that the check valves had not hung open. The licensee concluded the check valves would perform their primary safety function of stopping backflow during an upstream pipe break. The licensee did consider these events to be an operational concern because actions were required by the operators to minimize the heating of AFW piping caused by the AFW check valve leakage during plant startups. The licensee subsequently modified the Borg-Warner check valves in the AFW system to reduce the operational effect on the operators, by adding a counter weight to the disc to enhance the seating characteristics of the valve.

The staff has reviewed and evaluated the licensee's assertions and corrective actions stated in the referenced letters. The staff agrees with the licensee's assessment, that the backleakage through the check valves in the AFW system during the April and May 1990 events was minor. Based on NRC inspection reports, the staff considers the licensee's corrective actions appropriate to address the operational concerns. The staff documented its inspections in IRs 50-445, 446/90-13, 90-19, 90-22, and 90-45. The staff inspected the test program to quantify reverse flow through the AFW check valves, and evaluated the safety implications of the April and May 1990 events. Based on NRC inspections, the staff determined that the minor backleakage has had no adverse effect on AFW system operability³ and does not affect the safety function of the valves.

The Petitioner also cited a general concern regarding on-going disassembly of Borg-Warner check valves at the Comanche Peak Steam Electric Station to correct the leaking problems. The Petitioner cites as a staff concern, stated in the AIT Report (NRC IR 50-445, 446/89-30), that disassembly and reassembly of Borg-Warner check valves may have contributed to the problems during hot functional testing.

The licensee evaluated this issue and determined that the practice or frequency of disassembling check valves to allow their use as flush and drain paths, which was the actual concern identified by the AIT, did not contribute

³ "Operability" is defined in the Comanche Peak Steam Electric Station Technical Specifications as the ability of a system, subsystem, train, component or device to perform its specified function(s).

to the failure of the Borg-Warner check valves. In the licensee's response to the AIT, they stated that the failures of the Borg-Warner check valves resulted instead from inadequate installation procedures. The licensee documented its response to this issue in a Texas Utilities Electric Company memorandum, CPSES-9001379 (discussed in NRC IR 50-445, 446/90-03).

The staff reviewed and evaluated the licensee's response to this issue. The staff documented its inspections in IR s 50-445, 446/89-30, 89-73, and 90-03. The staff agreed with the licensee's evaluation that the frequency of disassembly of Borg-Warner check valves did not contribute to the AFW backflow events.

The April 18, 1991, event (an event that occurred after receipt of the Petition) involved one of the eight Borg-Warner check valves in the AFW system. The check valve involved was in the flow path used to conduct Motor Operated Valve Testing (MOVAT) of an isolation valve downstream of the affected Borg-Warner check valve. The licensee submitted a Licensee Event Report (LER) of May 21, 1991, that documented its analysis, evaluation, and corrective actions.

After testing a downstream motor-operated valve (MOV) during a maintenance outage, the licensee conducted reverse flow testing of the associated AFW Borg-Warner check valve, in accordance with its corrective action program for the 1989 events. During the reverse flow testing, the licensee identified excessive reverse flow through the check valve. The licensee radiographed the check valve and determined that the valve was stuck fully open with the disc fully raised. This deficient condition is different from the failures of Borg-Warner check valves identified in April and May 1989, when the disc was

jammed under the valve seat. In addition, the licensee found the April 18, 1991, condition during post-work testing of a specific valve, and not during an integrated functional test as was the case during the April and May 1989 events. After disassembling the valve, the licensee discovered that the counterweight, installed to improve the seating characteristics of Borg-Warner check valves, had become lodged above a casting remnant,⁴ causing the failure during reverse flow testing. The licensee disassembled and inspected the other seven check valves in the AFW system, and none of the other valves had this casting remnant. The licensee removed and inspected the remnant, reassembled the valve, and successfully forward and reverse flow tested the valve. To verify that no other failure mechanism contributed to this event, the licensee tested the other AFW isolation valves in a manner similar to the tests of MOVs that initiated the event. The licensee also conducted reverse flow testing on all eight AFW check valves to ensure the valves would perform their safety function before restoring the AFW system to operation.

The staff has evaluated this event, and documented its review in IR 50-445, 446/91-14. The staff concluded that because the AFW piping was not observed to have an elevated temperature before the maintenance outage, it is unlikely that the Borg-Warner check valve with the casting defect was lodged open before the licensee tested the MOVs. Therefore, it is likely that the affected Borg-Warner check valve would have performed its safety function in the operating

4 This casting remnant was an approximately 1/8-inch-wide ridge left on the valve throat at the upper part of the disc cavity following valve manufacture.

period before the maintenance shutdown. Furthermore, the licensee identified the condition during post-work testing that was performed as a result of the corrective action program implemented to address the 1989 failures. This corrective action program enabled the licensee to identify the deficient condition and correct it before returning to operation after the maintenance shutdown.

The NRC staff also evaluated this event in the context of the preceding events, cited by the Petitioner. This most recent event resulted from a deficient condition isolated to one Borg-Warner check valve, and therefore provides no indication of a generic deficiency in the design or manufacture of Borg-Warner check valves.

In summary, the NRC staff inspected the licensee's maintenance and testing of Borg-Warner check valves at the Comanche Peak Steam Electric Station. The staff also assessed the licensee's corrective actions in response to the events in April and May 1989, January 1990, April and May 1990, and April 19, 1991. The staff has concluded that the licensee has satisfactorily addressed the issues raised by the Petitioner and that these issues do not present a substantial health or safety issue.

B. The questionable safety of Borg-Warner check valve because of internal parts from suppliers not adequately qualified

The Petitioner contends that questions exist regarding the safety of Borg-Warner check valves at the Comanche Peak Steam Electric Station because of certain swing arms that may be installed in the Borg-Warner check valves. The Petitioner cites as evidence the problems found by the NRC during a vendor

inspection at BW/IP International, Incorporated, in September 1989, and reported in IR 99900030/89-01 of January 12, 1990.

The NRC inspected BW/IP as a result of the failure of a swing arm in the service water system at the Comanche Peak Steam Electric Station and the licensee's subsequent filing of a construction deficiency report in accordance with 10 CFR 50.55(e) for the failed Borg-Warner check valves in April and May 1989. The inspection determined that BW/IP activities failed to meet certain NRC requirements and BW/IP procedures. In particular, in IR 99900030/89-01, the staff found that BW/IP did not adequately document the qualification of certain swing arms installed in Borg-Warner check valves. However, since TU Electric remains responsible for safety-related equipment at Comanche Peak, independent of staff activities at BW/IP, the licensee developed a test program to evaluate the acceptability of the swing arms installed in Borg-Warner check valves at the Comanche Peak Steam Electric Station. The licensee's program, described in TXX-89596 of August 18, 1989, with modifications and additional details provided in TXX-89860 of December 20, 1989, involved testing conducted by APTECH Engineering Services, Inc., on all Borg-Warner check valves installed in the Comanche Peak Steam Electric Station, Unit 1, and common systems to determine if the swing arms are suitable for use in safety-related systems. During the test program, some of the swing arms that were manufactured using a sand casting method were found unacceptable and replaced with swing arms manufactured using investment casting methods. The investment cast swing arms successfully passed the required tests and inspections for unrestricted operation. All replacement sand cast swing arms installed in Unit 1, including some swing arms from Unit 2, were also tested using the APTECH test program. APTECH found these sand cast

swing arms to be suitable for use in safety-related systems for at least three fuel cycles. The licensee committed, in letters TXX-90139 of April 9, 1990, and TXX-90149 of April 12, 1990, to replace all sand cast swing arms with investment cast swing arms, procured with acceptable quality assurance programs, before starting up from the third refueling outage.

The staff reviewed and evaluated the licensee's testing program and replacement of sand cast swing arms and found that the program is appropriate for determining the suitability of swing arms for use in safety-related systems. The staff also found that there is reasonable assurance that the remaining sand cast swing arms are acceptable for three fuel cycles. The NRC Staff inspections are documented in IR 50-445, 446/89-30, 89-64, 89-73, and 90-22. The staff found the licensee's program to evaluate the continued use of sand cast swing arms acceptable as documented in NUREG-0797, "Safety Evaluation Report Related to the Operation of Comanche Peak Steam Electric Station, Units 1 and 2," Supplement No. 24, April 1990. The staff concluded in the Safety Evaluation Report that the licensee's commitment to replace all sand cast swing arms with investment cast swing arms was appropriate.

The staff reviewed the programs for testing and replacing the swing arms in Borg-Warner check valves. The staff concluded that the licensee satisfactorily addressed the issues raised by the staff and cited by the Petitioner. Therefore, these issues do not present a substantial health or safety issue. Subsequent to the filing of this Petition, the licensee discussed, at a public meeting held on June 12, 1991, in Rockville, Maryland, their technical bases for a finding that the sand cast swing arms in Borg-Warner check valves are acceptable for long-term operation. The licensee subsequently submitted its detailed justification by letter dated June 21, 1991 (TXX-91229), based on extensive

testing conducted by Southwest Research Institute on arms removed from Comanche Peak Steam Electric Station Unit 1 and common system Borg-Warner check valves. The NRC staff concluded that the sand cast Borg-Warner check valve swing arms still installed in Comanche Peak Electric Station Unit 1 and common systems are acceptable for long term service. This conclusion, documented in NRC letter dated September 16, 1991, is based on examination of actual material properties of sand cast swing arms removed from service from Borg-Warner check valves during the APTECH testing described above, which demonstrated that the criteria used during the APTECH testing adequately screened out unacceptable swing arms.

C. Texas Utilities Electric Company failed to take adequate corrective actions to resolve the Borg-Warner check valve failures

The Petitioner contends that the NRC objected to most of the licensee's initial plans to correct the check valve problem before loading the fuel. The Petitioner cited an October 27, 1989, NRC report⁵ as containing these objections. The Petitioner then cited a specific staff concern regarding testing methods used on AFW piping that the NRC identified in a letter of September 14, 1989.

The NRC issued the October 27, 1989, letter to notify the licensee of a noticed meeting and enforcement conference. The enclosure to this letter listed the potential violations of NRC requirements identified by the AIT

5 The cited reference is not a "report", in that it does not describe a separate inspection or findings, but is a letter identifying potential violations based on a prior inspection report.

(discussed above) for problems that led to the check valve failures in April and May 1989. The staff views the May 1989 event as nearly identical to the April event, and determines that the licensee's ineffective corrective actions following the April event could justify the issuance of a Notice of Violation (NOV). In the staff's letter of January 25, 1990, which attached the NOV that followed, the staff made clear that the licensee's corrective actions taken in response to the April 1989 event should have prevented recurrence of the May 1989 event.

The Petitioner is correct in stating that the staff letters of October 27, 1989 and January 25, 1990, document the licensee's ineffective corrective actions in response to the April 1989 event. However, the staff has subsequently reviewed and evaluated the overall issue of the adequacy of the licensee's corrective actions to correct the problems with Borg-Warner check valves at the Comanche Peak Steam Electric Station. The licensee has taken extensive corrective action to address the Borg-Warner check valve issues. The licensee documented these corrective actions in letters TXX-89424 of June 19, 1989; TXX-89596 of August 18, 1989; TXX-89744 of October 14, 1989; TXX-89849 of December 21, 1989; TXX-90139 of April 9, 1990; TXX-90149 of April 12, 1990; TXX-90172 of April 27, 1990; TXX-90188 of May 18, 1990; TXX-90215 of June 18, 1990; TXX-90253 of July 27, 1990; and TXX-91076 of March 22, 1991.

The staff has reviewed and evaluated the licensee's responses to all the issues identified following the failures of Borg-Warner check valves at the Comanche Peak Steam Electric Station and has concluded that the licensee has taken adequate corrective actions to resolve these issues. The staff has

documented its evaluations in IRs 50-445, 446/89-30, 89-52, 89-64, 89-71, 89-73, 89-75, 90-03, 90-09, 90-13, 90-19, 90-22, 90-45, and 91-05.

The Petitioner takes exception to the staff's ultimate acceptance in IR 50-445, 446/90-03 of the licensee's use of ultrasonic inspections to verify that no plastic deformation occurred in AFW piping. The Petitioner's exception was based on the staff's concern expressed in the staff's September 14, 1989 letter, that changes in piping (the specific type referred to by the licensee as "plastic deformation") cannot be determined without knowing the original configuration of the piping. In response to this staff concern, the licensee revised its use of ultrasonic and radiographic testing to ensure that the piping met minimum thickness requirements and that no deteriorative damage had occurred. The licensee provided its description of this approach in TXX-89744, of October 14, 1989.

The staff has reviewed and evaluated the licensee's evaluations and inspection program for identifying any damage to the AFW piping at the Comanche Peak Steam Electric Station, Unit 1. The staff considers the licensee's evaluations and inspection program sufficient to determine the adequacy of the AFW piping for the remainder of plant life. The staff documented its inspections of the issue of AFW piping damage raised by the Petitioner in IRs 50-445, 446/89-30, 89-73, 89-75, and 90-03.

The staff reviewed the adequacy of the licensee's corrective action with regard to the Borg-Warner check valve failures and has concluded that the issues raised by the Petitioner have been satisfactorily addressed by the licensee and do not present a substantial health or safety issue.

D. The questionable competence and integrity of Texas Utilities Electric Company's management

The Petitioner contends that serious questions are raised about the competence and integrity of the licensee's officials and their commitment to the safe operation of a nuclear facility. The Petitioner bases the contention on the following two assertions. The first assertion is that the licensee's management "made commitments cynically simply to expedite the licensing" of the Comanche Peak Steam Electric Station, Unit 1. The second assertion is that the licensee's management has made misleading statements to the NRC staff that the Borg-Warner check valves would be corrected and able to perform their design function before licensing.

The Petitioner's contention that the licensee's management "made commitments cynically simply to expedite the licensing" of the Comanche Peak Steam Electric Station, Unit 1 implies that the licensee's management made commitments without intending to comply with the commitments. The licensee's corrective actions and commitments are provided in letters TXX-89424 of June 19, 1989; TXX-89596 of August 18, 1989; TXX-89744 of October 14, 1989; TXX-89849 of December 21, 1989; TXX-90109 of April 9, 1990; TXX-90149 of April 12, 1990; TXX-90172 of April 27, 1990; TXX-90188 of May 18, 1990; TXX-90215 of June 18, 1990; TXX-90253 of July 27, 1990; and TXX-91076 of March 22, 1991. The staff has reviewed and evaluated the licensee's responses to all the issues identified following the failures of Borg-Warner check valves at the Comanche Peak Steam Electric Station, including technical, operational, and management issues. The staff has determined that the licensee has adequately met its commitments, and that there is no justification to support the contention that the licensee

made its commitments without intending to meet those commitments. The staff has documented its evaluations in IRs 50-445, 446/89-30, 89-52, 89-64, 89-71, 89-73, 89-75, 90-03, 90-09, 90-13, 90-19, 90-22, 90-45, and 91-05.

The Petitioner's contention that the licensee's management has made misleading statements to the staff that the Borg-Warner check valves would be corrected and perform their design function before licensing is based on the Petitioner's assertion that the Borg-Warner check valves at the Comanche Peak Steam Electric Station continue to fail and have never been able to perform their design function. Based on its review and evaluation as discussed in response to Contention (A) above, the staff believes that the Borg-Warner check valves at the Comanche Peak Steam Electric Station will perform their safety function. The staff finds, therefore, that this contention is not supported and that the licensee's management has corrected the identified problems with the Borg-Warner check valves at the Comanche Peak Steam Electric Station, and there is reasonable assurance that the Borg-Warner check valves will perform their safety function. The staff considers this contention to be without merit.

The Petitioner questioned the competence and integrity of the licensee to operate a nuclear facility. The staff evaluated the licensee's management in two special inspections, the Operational Readiness Team Inspection (IR 50-445, 446/89-200) conducted before licensing, and a Special Performance Assessment (IR 50-445, 446/90-20) conducted before the facility exceeded 50 percent of rated power. Based on these inspections, the staff found the licensee's management responsive, sound, and reliable. The staff further found that the licensee's staff had demonstrated the proper concern to safely operate the reactors and had successfully made the transition from a construction to an

operations based organization. The staff has continued to evaluate the licensee management's ability to operate the Comanche Peak Steam Electric Station, and has found the licensee's management acceptable. The most recent summary of the staff's assessment is provided in the Systematic Assessment of Licensee Performance (SALP) Report 50-445, 446/90-46 of May 10, 1991.

The staff reviewed the licensee's resolution of the issues related to Borg-Warner check valves at the Comanche Peak Steam Electric Station, has assessed the licensee's management, and concludes that the licensee's management has adequately implemented its commitments and has the proper concern to safely operate the Comanche Peak Steam Electric Station. The staff, therefore, finds that the Petitioner's contention is without merit and does not present a substantial health or safety issue.

E. Failure to provide adequate documentation regarding the acceptability of Borg-Warner check valves

The Petitioner contends that the licensee and its vendors consistently have failed to provide documentation to support the adequacy of Borg-Warner check valves at the Comanche Peak Steam Electric Station. The Petitioner cites specific examples, including one issue regarding the licensee's revision of the root cause of a 1985 event that was a precursor to the April and May 1989 events and several issues regarding BW/IP International, Incorporated.

Citing from IRs 50-445, 446/89-73 and 89-84, the Petitioner contends that the staff inspectors determined that there was "no documentation" to support the licensee's revision of a root cause analysis regarding a failed Borg-Warner check valve in 1985. The staff has reviewed the IRs cited by the Petitioner and found that the IRs cite extensive documentation provided by the licensee to

support the basis for the revised root cause of the 1985 failure of a Borg-Warner check valve. The documentation included two Failure Analysis Reports, analytical documentation, vendor information, a Problem Report, and two internal licensee memoranda. However, this documentation did not include a record of one of the licensee's discussions with the vendor, BW/IP International, Incorporated. This discussion led to the licensee reevaluating the original, and ultimately correct, root cause of a 1985 event that was a precursor to the April and May 1989 events. Thus, the licensee had provided extensive documentation to justify its determination of the revised root cause for the 1985 precursor event, even though the revised root cause was incorrect. The staff issued a violation related to this event because the licensee did not take adequate corrective action to follow up on the original, and ultimately correct, root cause, not for lack of documentation. Therefore, the staff concludes that the Petitioner's contention is without merit.

The Petitioner's other examples relate to a more general contention regarding lack of documentation by the check valve vendor, BW/IP International, Incorporated, to support the quality assurance of swing arms installed in Borg-Warner check valves for use in safety-related systems. The Petitioner identified the examples as being contained in IR 99900030/89-01. In the subject IR, the staff identified the lack of documentation as a nonconformance with NRC regulations. The vendor evaluated its programs and identified corrective actions to ensure that future internal parts would include an adequate assurance of quality, with documentation to certify that the parts are suitable for use in safety-related systems. The vendor discussed its corrective actions in letters of February 22, 1990, and May 4, 1990.

The staff has evaluated the effect of this lack of documentation. The staff has determined that, because the licensee's program for evaluating the suitability of sand cast swing arms in Borg-Warner check valves at Comanche Peak Steam Electric Station is acceptable, the lack of documentation at BW/IP International, Incorporated, does not present a substantial health or safety issue at the Comanche Peak Steam Electric Station.

F. Other concerns raised by the Petitioner

The Petitioner identified the following additional issues:

1. Body-to-bonnet leakage in Borg-Warner check valves

The Petitioner implied that body-to-bonnet leakage in Borg-Warner check valves at the Comanche Peak Steam Electric Station is equivalent to the seat failures experienced in April and May of 1989. The Petitioner referred to IR 50-445, 446/90-09 as stating "that several of the check valves continued to leak." The Petitioner also contended that the corrective actions for the body-to-bonnet leakage are questionable.

Check valves have a safety function of preventing reverse flow by having a disk sit against a seating surface (both the disk and seat are inside the valve body). In the Borg-Warner check valves that failed at the Comanche Peak Steam Electric Station, the disk is attached to a bonnet on top of the valve. The bonnet is bolted into the upper portion of the valve body, and, in conjunction with a ring that seals the small gap between the body of the valve and the edges of the bonnet, closes the valve body from the external environment. Thus, because leakage between the body and the bonnet ("body-to-bonnet leakage") is not in the flow path through the valve, it does not affect the safety function of the valve. In IR 50-445, 446/90-09, the staff also stated

that because the body-to-bonnet leaks do not affect the operability of the check valves, there is no safety concern with the body-to-bonnet leakage. Thus, body-to-bonnet leakage is not related to leakage past the seating surface of the Borg-Warner check valves, and thus is not related to a failure of the Borg-Warner check valves to perform their safety function.

In IR 50-445, 446/90-03, the staff stated that the licensee had identified the body-to-bonnet leakage in Borg-Warner check valves. The referenced IR discusses the licensee's actions to correct the leakage, including honing and hot torquing.⁶ The staff reviewed and evaluated the licensee's corrective actions and determined that the actions were effective in correcting the body-to-bonnet leakage with the exception of minor leakage on two of the Borg-Warner check valves at the Comanche Peak Steam Electric Station. The staff has determined that the remaining minor leakage raises no safety concerns. In IRs 50-445, 446/90-03 and 90-09, the staff documented the licensee's corrective actions, and the staff's evaluation of the licensee's corrective actions.

Based on the staff's inspections which evaluated the significance of, and corrective actions related to, body-to-bonnet leakage in Borg-Warner check

6 "Hot torquing" is the tightening of the nuts that hold the bonnet in the body of Borg-Warner check valves at hot (normal operating temperature) conditions. When hot, the body, bonnet, and studs onto which the nuts are being tightened all expand. When tightened at hot conditions, the expanded studs allow additional tightening of the nuts, so that when the valve cools, the studs contract, increasing the pressure on the body-to-bonnet seal.

valves at the Comanche Peak Steam Electric Station, the staff has concluded that the licensee has satisfactorily addressed the issues raised by the Petitioner. Therefore, these issues do not present a substantial health or safety issue.

2. Use of hydraulic lifts on main feedwater isolation valves

The Petitioner contends that the licensee used a hydraulic lifting device to help operators lift the Main Feedwater Isolation Valve (MFWIV) discs off their seats on April 27, 1990. On May 9, 1990, at a public meeting with the staff, the licensee discussed this issue and the staff identified a concern about possible damage to the MFWIVs. The licensee evaluated the effect of using hydraulic lifting devices on MFWIVs and determined that the MFWIVs would not be overstressed. The licensee provided its evaluation in letter TXX-90188 of May 18, 1990.

The staff reviewed the licensee's evaluation regarding this concern and found it acceptable. The staff documented its inspections in IRs 50-445, 446/90-19 and 90-20.

The staff conducted these inspections to determine if the MFWIVs could be damaged by the use of hydraulic lifting devices. Based on these inspections, the staff concludes that the licensee has satisfactorily addressed the issues raised by the staff and identified by the Petitioner and that these issues do not present a substantial health or safety issue.

3. Availability of the report of the vendor inspection at BW/IP

International, Incorporated

The Petitioner contends that the availability of the January 12, 1990 report of the vendor inspection at BW/IP International ("vendor inspection

report"), raised serious questions regarding the integrity of the licensing process and the safety of Comanche Peak Steam Electric Station, Unit 1. The Petitioner contends that Region IV did not receive the referenced report until October 16, 1990, therefore the Petitioner had no way of knowing about the report until almost 10 months after the licensing decision. The Petitioner further contends that serious questions about the integrity of the licensing process were raised because the vendor inspection report was in existence less than a month before Comanche Peak Unit 1 was licensed and Region IV may not have known about the referenced report at the time of licensing.

The Staff has evaluated the Petitioner's contention. The referenced report was distributed through the NRC's internal distribution system (Regulatory Information Distribution System [RIDS]) to numerous offices and to the Public Document Room. The distribution code identified for the Inspection Report, RIDS IE:09, includes all Regions, including Region IV. The distribution made through this system is made within approximately two weeks of issuance, as evidenced by receipt of the vendor inspection report in the PDR on February 1, 1990. Thus, the referenced report was available to CFUR, as it was to the rest of the general public, shortly after it was issued.

At the time the Vendor Inspection Report was issued and throughout the licensing of Comanche Peak Unit 1, the inspection and licensing activities at Comanche Peak were being managed by the Associate Director for Special Projects (ADSP), Office of Nuclear Reactor Regulation, and not Region IV. The Vendor Inspection Report was received by the appropriate ADSP inspection staff, all of whom were located on site, and by ADSP management and licensing staff at NRC Headquarters, Rockville, Maryland, shortly after it was issued. The ADSP

Licensing and inspection staff evaluated the information contained in the vendor inspection report prior to licensing Comanche Peak Unit 1. Since the vendor inspection report was available and was evaluated by the appropriate NRC staff prior to the licensing decision, the staff considers the underlying premise for the Petitioner's contention to be invalid.

The vendor inspection evaluated the quality assurance certification process at BW/IP and would not have directly determined the safety of the swing arms actually installed at Comanche Peak. The licensee's test program, as discussed in detail in Section B of this response, tested all of the swing arms actually installed in Comanche Peak Unit 1 prior to licensing. The NRC staff determined that the results of this test program provided assurance that the swing arms actually installed in Comanche Peak Unit 1 were acceptable for use in safety-related systems. The NRC staff, therefore, had sufficient information, independent from the BW/IP inspection, to determine that the AFW check valves at Comanche Peak were acceptable prior to licensing, and the information contained in the vendor inspection report did not alter the NRC staff conclusions regarding the acceptability of the swing arms installed at Comanche Peak Unit 1.

Thus, the NRC staff considers the questions raised by the Petitioner regarding the integrity of the licensing process and safety of the plant itself based on the existence and availability of the Vendor Inspection Report of BW/IP to be without merit.

4. The Director, NRR's knowledge and use of the information in the vendor inspection report

The Petitioner contends that the Director of NRR knew of the Vendor Inspection Report of BW/IP and its findings prior to issuance of a low power license and chose to ignore it.

The Director of NRR was not specifically aware of the vendor inspection report at the time of low power licensing, although the subject of the adequacy of Borg-Warner check valves was reviewed by the Director at the time. The ADSP staff had conducted an evaluation of the impact that the results the vendor inspection may have had on the safety of Comanche Peak Unit 1 prior to licensing. The ADSP staff appropriately determined, based on its review of the Texas Utilities Electric Company test program of all of the swing arms installed in Borg-Warner check valves at Comanche Peak Steam Electric Station Unit 1, that the swing arms installed at the time of low power licensing were acceptable, and the quality assurance problems identified at BW/IP in the vendor inspection report did not alter the NRC staff conclusions regarding the acceptability of the Borg-Warner check valves installed at Comanche Peak Steam Electric Station Unit 1. Because the issues in the vendor inspection report did not affect the safety of the Borg-Warner check valves actually installed at Comanche Peak Steam Electric Station Unit 1, the vendor inspection was not identified to the Director of NRR as an issue in licensing the facility.

Because of the nature of this additional assertion, a copy of the Petition was provided to the NRC Inspector General on December 24, 1990, for action as appropriate.

5. Nuclear Regulatory Commission knowledge of and use of the information in the vendor inspection report

The Petitioner contends that the Commission may not have known about the January 12, 1990, Vendor Inspection Report of BW/IP in making its decision to issue the full power license for Comanche Peak. As discussed in detail in response to additional contentions F.3 and F.4 above, the ADSP staff evaluated the information in the vendor inspection report and determined that it did not affect the conclusions regarding the acceptability of the swing arms installed in Borg-Warner check valves at Comanche Peak Unit 1. Therefore, the vendor inspection report was not identified to the Commission during the full power licensing deliberations.

Based on staff assurance of the safety of the Borg-Warner check valves actually installed at Comanche Peak Steam Electric Station Unit 1 that was gained through plant-specific evaluation of the internals of Borg-Warner check valves, and that the vendor inspection report did not change that assurance, the staff has concluded that the contention raised by the Petitioner that the availability of the vendor inspection report raised serious questions about the licensing process is without merit, and does not present a significant health or safety issue.

IV. CONCLUSIONS

The NRC staff reviewed the arguments in CFUR's Petition that the failures of Borg-Warner check valves at the Comanche Peak Steam Electric Station represented "issues of safety" sufficient to require the licensee to show cause why its license to operate Comanche Peak Steam Electric Station, Unit 1, should not be revoked. The staff found that the licensee's corrective actions to resolve

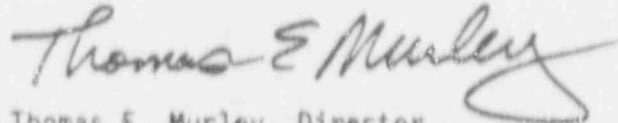
failures and other problems associated with the Borg-Warner check valves were appropriate, and responded to the staff's concerns and to the safety and operational issues involved in the failures and other problems with Borg-Warner check valves at Comanche Peak Steam Electric Station.

The NRC staff assessed the specific references and citations in the Petition and all of the technical analyses, inspections, reviews and evaluations conducted by both the licensee and the staff. The staff reviewed the complete text of all 19 of the documents attached to the Petition as well as many additional documents regarding Borg-Warner check valves at the Comanche Peak Steam Electric Station. The documents relied upon by the Petitioner in support of the petition were existing NRC and licensee documents. Based on its entire review, the staff has not found any substantial health and safety issues that would call into question the continued safe operation of Comanche Peak Steam Electric Station.

The institution of proceedings in response to a request in accordance with 10 CFR 2.206 is appropriate only when substantial health and safety issues have been raised. See Consolidated Edison Co. of New York (Indian Point, Units 1, 2, and 3), CLI-75-8, 2 NRC 173, 176 (1975), and Washington Public Power Supply System (WPPSS Nuclear Project No. 2), DD-84-7, 19 NRC 899, 923 (1984). This standard has been applied to determine if any action in response to the Petition is warranted. For the reasons discussed above, no basis exists for taking any action in response to the Petition as no substantial health or safety issues have been raised by the Petition. Accordingly, no action pursuant to Section 2.206 is being taken in this matter.

The staff will file a copy of this Decision with the Secretary of the Commission for the Commission's review in accordance with 10 CFR 2.206(c).

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in cursive script that reads "Thomas E. Murley". The signature is written in dark ink and is positioned above the printed name and title.

Thomas E. Murley, Director
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland
this 27th day of September 1991