LICENSEE EVENT REPORT (LER)

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TITLE (4)
INADEQUATE TESTING OF THE SCRAM DISCHARGE VOLUME VENT AND DRAIN VALVES DUE TO INSUFFICIENT TEST INSTRUCTIONS

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBERS(S)
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OPERATING MODE (9)	4	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 0 0	20.402(b)	20.405(C)	50.73(a)(2)(iv)	77.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.73(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
M. P. Reis, Compliance Supervisor	AREA CODE 5 0 9 | 3 7 7 - 4 1 5 2

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (16)

On July 15, 1992, two conditions involving test instructions that were not sufficient to demonstrate operability of the scram discharge volume (SDV) vent and drain valves were identified. These conditions involved 1) stroke time testing following a recent modification, and 2) the surveillance procedures used to satisfy Technical Specification stroke time requirements. It was also determined that the plant had operated with one valve, CRD-V-181, that exceeded stroke time limits.

The root causes for these conditions were: 1) incorrect incorporation of operability requirements into post-modification test instructions, and 2) development of surveillance procedures that were not technically adequate. Both conditions involved personnel errors. As corrective action, vent and drain valves were adjusted and retested under a Special Test. Additionally, the surveillance procedure used to stroke time these valves will be corrected, a Technical Specification Amendment will be requested to allow performance of this testing in cold shutdown, plant surveillance procedures will be reviewed to verify acceptability, handling of plant deficiencies will be discussed in training, existing controls for post-modification and post-maintenance test plan changes will be reviewed and strengthened, and a description of the conditions involved in this report was placed in required reading for engineers who are responsible for plant modification implementation.

The SDV vent and drain valves were able to close on demand, and at least one valve in each line was able to close within 30 seconds. Therefore, the conditions described in this report were not safety significant.

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TITLE (4)
INADEQUATE TESTING OF THE SCRAM DISCHARGE VOLUME VENT AND DRAIN VALVES DUE TO INSUFFICIENT TEST INSTRUCTIONS

Plant Conditions

Power Level - 0%
Plant Mode - 4 (Shutdown)

Event Description

On July 15, 1992, two conditions involving test instructions that were not sufficient to demonstrate operability of the scram discharge volume (SDV) vent and drain valves were identified. The first of these conditions involved inadequate stroke time testing following a recent modification to all four of the scram discharge volume vent and drain valves. The second condition involved inadequacies in the surveillance procedure that has been used to satisfy the SDV vent and drain valve stroke time requirements of Technical Specification 4.1.3.1.4.a.1.

The post-modification testing and surveillance test procedure deficiencies were identified by a plant engineer during a follow-up evaluation that was initiated to investigate the results of a scheduled, post-scram surveillance that was performed on July 10, 1992. Based upon computer data obtained during a plant trip that occurred on July 6, 1992, the surveillance results indicated that one of the SDV drain valves, CRD-V-181, had not closed within the time required by Technical Specifications. The follow-up evaluation confirmed this observation: CRD-V-181 had required at least 33 seconds to close. Technical Specification 4.1.3.1.4.a.1 requires that the SDV vent and drain valves must close within 30 seconds after receipt of a scram signal, from a rod density of $\leq 50\%$.

Recognition that the post-modification instructions and surveillance test procedure used to stroke time the SDV vent and drain valves occurred concurrently, and coincided with identification of the excessive stroke time for CRD-V-181. As a result of these conditions, operability of CRD-V-181 was not assured during recent plant operations when it was required to be operable, and operability of the SDV vent and drain valves was not adequately demonstrated by testing during previous operating cycles.

Immediate Corrective Action

Since the Plant was in Cold Shutdown when these conditions were discovered, and the SDV vent and drain valves are not required to be operable in this Operational Condition, no immediate actions were required.

Further Evaluation and Corrective Action

Further Evaluation

One of the conditions identified during the follow-up evaluation involved technically inadequate testing following a modification to the SDV vent and drain valves that was implemented during the previous refueling and maintenance outage (OT92). This outage ended shortly before the plant trip that occurred on July 6, 1992. The modification replaced existing needle valves in the air exhaust lines from the SDV vent and drain valves with needle valves that had better throttling characteristics. Stroke times for the vent and drain valves are controlled by using these needle valves to throttle exhaust air from the pneumatic valve actuators.

Stroke time requirements for the SDV vent and drain valves are derived from two sources: 1) the WNP-2 ASME Section XI Pump and Valve Inservice Test Program Plan (P&V), and 2) the plant Technical Specifications. Following implementation of the needle valve modification, the only stroke time testing performed for the vent and drain valves prior to returning them to service was conducted in accordance with the procedure that is used to satisfy P&V stroke time requirements. This testing was performed prior to Plant restart, and a baseline stroke time was obtained to support future testing.

The P&V test is based upon a WNP-2 request for relief that was previously reviewed and approved. This relief recognizes site specific attributes of the WNP-2 SDV vent and drain valve position indication design. The SDV drain line and vent line are each equipped with a pair of valves that are arranged in series. Main control board red (open) and green (closed) position indicating lights are configured such that there is a single green light and a single red light for each pair of vent valves, and a single green light and a single red light each pair of drain valves.

As a result of this configuration, position indication lights for the SDV vent and drain valves do not provide position indication for individual vent and drain valves. Instead, these lights essentially provide indication of whether the associated vent or drain line is open or closed. The relief allows the combined position indication lights to be used for quarterly stroke time testing of the vent and drain valves; however, it only pertains to ASME Section XI testing requirements.

Although the test method employed by the P&V test procedure satisfies ASME testing requirements, it is not sufficient to satisfy the requirements of Technical Specification 4.1.3.1.4.a.1. Technical Specifications require that the vent and drain valves are individually tested, and that the period of time from receipt of a scram signal until the valves receive a closure signal is considered in the stroke time calculation. These factors are not considered in the P&V test procedure. Consequently, a separate procedure exists to demonstrate Technical Specification stroke time requirements.

Testing requirements within the work package associated with the vent and drain valve modification were changed after approval to perform work on the modification was obtained. The change specified performance of the P&V test in lieu of the originally prescribed testing. This change was made in order to address concerns regarding the ability of the original testing plan to demonstrate P&V stroke time requirements.

Substitution of P&V testing in lieu of the originally prescribed test plan was due to a communication error involving the engineer who was responsible for development of testing requirements for the vent and drain valve modification and licensed control room personnel. The engineer who was responsible for development of post-modification testing requirements believed that he had authorized P&V testing as a supplement to the originally prescribed testing, and not as a replacement. However, the personnel who initiated the change understood that approval had been granted to replace the original test requirements with the P&V procedure. Personnel involved in this change did not recognize that the modified test plan would not satisfy Technical Specification stroke time requirements.

The originally specified testing plan required local timing of the vent and drain valves in order to verify that they stroked in less than 30 seconds. However, this testing plan would not have satisfied either the P&V requirements or the stroke time requirements of Technical Specification 4.1.3.1.4.a.1. The originally prescribed testing is different than the normal P&V testing method, and therefore would not have provided a baseline measurement that could be used to trend subsequent valve stroke times. Additionally, the originally prescribed testing would not have satisfied Technical Specification requirements because it did not include the period of time from the receipt of a signal for control rods to scram until the valves receive a closure signal in the stroke time calculation.

Equipment associated with the SDV vent and drain valve modification was declared operable based upon the previously described post-modification testing on June 9, 1992, and the modification package was documented as complete on June 30, 1992. WNP-2 entered Operational Condition 2 at 1339 hours on July 4, 1992, and Operational Condition 1 at 0010 hours on July 5, 1992. The plant was manually scrammed at 0458 hours on July 6, 1992. The plant re-entered Operational Condition 2 at 1915 hours on July 10, 1992, and Operational Condition 1 at 1230 hours on July 11, 1992. The plant was manually scrammed at 1338 hours on July 11, 1992.

Technical Specifications require that the SDV vent and drain valves stroke close within 30 seconds following receipt of a signal for the control rods to scram, and that these valves be operable in Operational Conditions 1 and 2. A Surveillance Requirement exception is provided that allows entry into Operational Condition 2 without prior demonstration of vent and drain valve stroke times provided that this testing is performed within 12 hours after achieving a rod density of $\leq 50\%$.

During the two plant startups that followed implementation of the vent and drain valve modification, a rod density of $\leq 50\%$ was not achieved until after Operational Condition 1 was entered. Therefore, the plant was operated in a condition where the SDV vent and drain valves were required to be operable from 0010 hours on July 5, 1992 to 0458 hours on July 6, 1992 (28 hours, 48 minutes), and 0715 hours to 1338 hours (6 hours, 23 minutes) on July 11, 1992.

The root cause for the condition involving inadequate post-modification testing was insufficient incorporation of operability requirements into both the original and modified post-modification test instructions. Inadequacies in the post-modification test instructions involved personnel errors by both the plant engineer who was responsible for developing the original post-modification test plan, and the personnel who revised the test plan. Substitution of inadequate test instructions for the originally prescribed testing was a contributing cause to this condition, but did not alone cause the post-modification test plan to be inadequate. The communication error that resulted in incorrect replacement of test instructions resulted from weakness in the management system used to control changes to post-modification test plans.

A second condition was identified that involved technical inadequacies in the surveillance procedure that was normally used to demonstrate the 30 second stroke time requirement of Technical Specification 4.1.3.1.4.a.1. The stroke timing method employed in this procedure has been used since initial plant operation, and used data extracted from computer points to determine valve stroke time. The stroke time was based upon the elapsed time between receipt of a scram signal and the "closed" position indication.

Each vent and drain valve has an assigned computer point that obtains its input from a limit switch on the associated valve. Although computer points for the vent and drain valves were programmed to display either an "open" or "closed" indication, the limit switch contact that provides the "closed" position indication also provides the "open" position indication. As a result, the vent and drain valve computer points were only capable of providing indication that the valve was either "open" or "not fully open". Due to this testing methodology inadequacy, previously performed stroke timing for the SDV vent and drain valves only recorded the time required for the valves to close from the "open" position to the "not fully open" position, and the 30 second stroke time requirement of Technical Specification 4.1.3.1.4.a.1 was not demonstrated.

The root cause for the condition involving inadequate surveillance testing of the SDV vent and drain valves during previous operating cycles was insufficient incorporation of system design features and Technical Specification operability requirements into surveillance procedures. Inadequacies in the test procedure used to satisfy Technical Specification stroke time requirements involved an error by the personnel who were originally responsible for developing the surveillance test procedure.

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An opportunity to identify and correct the condition created by inadequate post-modification testing was missed prior to the plant startup on July 11, 1992, when the significance of data from a failed surveillance test that was performed on July 10, 1992, was not fully recognized or adequately documented. On July 10, 1992, the plant engineer who identified that CRD-V-181 was out of specification turned the situation over to the system engineer for resolution. Within the memo used to perform the turnover, the plant engineer stated that the excessive stroke time for CRD-V-181 was not a restart issue. This was technically correct since the testing could be performed after entering Operational Condition 2. However, the system engineer incorrectly understood that the identified condition would have no impact on plant startup and operation.

As a result of this misunderstanding, stroke time testing activities were not rescheduled for the July 11 startup, investigation of the excessive stroke time was not initiated until July 13, 1992, and discovery and documentation of the post-modification and surveillance testing inadequacies described in this report was delayed until July 15, 1992. Delayed discovery of the conditions described in this report also allowed the plant to restart on July 11, 1992, in a condition that was not in accordance with Technical Specifications. The communication error and documentation omission were due, in part, to the fact that the plant was in an Operational Condition where the vent and drain valves were not required to be operable when the excessive stroke time was discovered. Indoctrination on the importance of properly documenting and handling plant deficiencies is the current topic in industry events training for plant employees.

The conditions described in this report are reportable pursuant to 10CFR50.73(a)(2)(i)(B) because they resulted in plant operation that was not in accordance with the plant Technical Specifications. As a result of post-modification testing inadequacies, inoperability of CRD-V-181 was unrecognized during operations when it was required to be operable. Additionally, both of the conditions described in this report involved operation of the plant without sufficient demonstration of operability for the SDV vent and drain valves. The conditions described in this report could not have prevented the fulfillment of a safety function.

The conditions described in this report were not contributed to by any structures, systems, or components that were inoperable prior to the start of this condition.

Further Corrective Action Completed

Following stroke time adjustments, testing of the four SDV drain and vent valves was performed as part of the July 18, 1992, plant startup under a Special Test procedure. The SDV vent and drain valve were returned to operable status at 0001 hours on July 18, 1992. This testing satisfied Technical Specification requirements for demonstrating that the SDV vent and drain valves closed within 30 seconds after receipt of a signal for control rods to scram from a control rod density of $\leq 50\%$.

Additionally, the computer points that display position information for the SDV vent and drain valves have been corrected to indicate that the valves are either "open" or "not fully open", and a description of the circumstances involved in this event has been provided as required reading for Plant Engineers who are responsible for implementing plant modifications.

Further Corrective Action

The following activities will also be undertaken as corrective actions: 1) plant procedures will be changed, as necessary, to provide required testing of the SDV vent and drain valves, 2) a Technical Specification Amendment request will be submitted to allow performance of this testing with the Plant in a cold shutdown condition, 3) existing methods for controlling changes to post-modification and post-maintenance test plans will be reviewed and strengthened, and 4) a team of engineers will be assigned to perform a technical and compliance review of Plant surveillance procedures. This review of surveillance procedures will ensure that surveillance procedures are technically accurate and that each surveillance requirement is satisfied within the plant procedures.

Changes to plant procedures are scheduled for completion by March 30, 1993. Initiation of the technical and compliance review of Technical Specification surveillance procedures is scheduled for November 1, 1992, and submittal of the Technical Specification change request is scheduled for December 31, 1992. Review existing controls for post-modification and post-maintenance test plan changes is scheduled for completion by 12/1/92.

Safety Significance

The SDV vent and drain valves are designed to close on a reactor scram and contain water discharged from the control rod drive mechanisms within the SDV. The SDVs are sized to completely accommodate water discharged from the control rod drive mechanisms during a scram. Although flow through the vent lines is not normally expected, any flow through the vent and drain lines flow would be directed to the radioactive equipment drain system.

There are redundant valves on each vent line and drain line. The inboard valve on each vent and drain line is set to close in approximately two seconds, while the outboard valve is set to close in 25-30 seconds. Consequently, closure of the outboard valve in slightly greater than 30 seconds, does not adversely affect isolation of the SDV following a scram. Quarterly P&V testing of the four vent and drain valves verified that the valves would close on demand.

The conditions described in this report did not involve failure of an inboard valve to close; however, even of they had, closure of the outboard valve in greater than 30 seconds would only result in a small discharge of Control Rod Drive Hydraulic water to the radioactive drain system, which is designed to receive this water. Additionally, the Reactor Building, which is where these drains are located, is serviced by a safety-related, filtered and monitored ventilation system. As a result, the conditions described in this report were not safety significant.

Similar Events

LERs 91-013, 018, 019, 028, 036, and 92-002 identified instances of failures to meet the Technical Specification Surveillance Requirements. These LERs documented specific corrective actions, and discussed the Quality Action Team (QAT) authorized to address potential improvements in Technical Specification compliance at WNP-2. The surveillance review team described in the further corrective action section above is a direct result of the QAT recommendations.

EIIS Information

Text Reference	EIIS Reference System	EIIS Reference Component
CRD-V-181	AA	ISV
Scram Discharge Volume Drain Valve	AA	ISV
Scram Discharge Volume Vent Valve	AA	VTV
Control Rod Drive Mechanisms	AA	75
Control Rod Drive Hydraulic	AA	75
Reactor Building	NG	--
Reactor Building Drains	WK	--