

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)

Washington Nuclear Plant - Unit 2

DOCKET NUMBER (2)

0 5 0 0 0 3 9 7

PAGE (3)

1 OF 7

TITLE (4)

SURVEILLANCE REQUIREMENTS FOR REFUELING PLATFORM INADEQUATELY IMPLEMENTED DUE TO ANALYSIS DEFICIENCIES AND SURVEILLANCE REQUIREMENT MISINTERPRETATION

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)		
0	4	0993	93	011	01	0	5	0593		05000		
										05000		

OPERATING MODE (9) 1 THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

POWER LEVEL (10) 0 9 7	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
D. A. Swank, Licensing Engineer	
AREA CODE	
5 0 9 3 7 7 - 4 5 6 3	

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS

SUPPLEMENTAL REPORT EXPECTED (14)

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

☐ YES (If yes, complete EXPECTED SUBMISSION DATE) ☒ NO

ABSTRACT (16)

On March 10, 1993, and on April 9, 1993, it was determined that previously performed surveillance testing had not been fully adequate to demonstrate operability of hoists associated with the refueling platform. As a result of inadequacies in the previous test method, testing of load-related hoist interlocks and cutoffs did not ensure they would operate within Technical Specification limits. The affected features include: the overload cutoff, hoist loaded interlock, redundant hoist loaded interlock, slack cable cutoff for the main hoist, and the overload cutoff and loaded interlocks for the frame mounted and monorail hoists.

The root causes of this event are: 1) an error by nonlicensed utility personnel that resulted in misinterpretation of testing requirements for the slack cable cutoff; 2) inadequate consideration of instrument loop uncertainties when determining setpoints and specifying test weights used to verify operation of hoist interlocks and cutoffs; and 3) inadequate verification during initial procedure preparation to ensure the procedures satisfied the Technical Specification requirements. As corrective actions, calculations are being performed, a Technical Specification Amendment request is being prepared, and calibration and test procedures will be revised to meet Technical Specification

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Abstract (Cont'd)

requirements. As a general corrective action projects to improve surveillance procedure and setpoint calculation adequacy are in progress. The described condition did not result in unavailability of the refueling platform protective features, or result in setpoint errors of sufficient magnitude to appreciably increase the likelihood of equipment damage. Consequently, the condition described in this report did not have an adverse effect on plant or public safety.

Plant Conditions

Operational Mode - 1 (Power Operation)

Power Level - 90%

Event Description

On March 10, 1993, and April 9, 1993, it was determined that previously performed surveillance testing had not been fully adequate to demonstrate operability of hoists associated with the refueling platform. Technical Specification 3/4.9.6 requires periodic testing of protective interlocks and cutoffs associated with the refueling platform hoists. These requirements were not fully implemented during previous testing due to: 1) inadequate consideration of instrument uncertainties when determining setpoints and specifying test weights used to verify operation of the refueling platform interlocks and cutoffs; 2) misinterpretation of slack cable cutoff test requirements for the main hoist, and 3) inadequate verification during initial procedure preparation to assure the procedures satisfied the Technical Specification requirements.

As a result, testing of load-related hoist interlocks and cutoffs did not ensure that they would operate within Technical Specification limits. The affected features include: the overload cutoff, hoist loaded interlock, redundant hoist loaded interlock, slack cable cutoff for the main hoist, and the overload cutoff and loaded interlocks for the frame mounted and monorail hoists. Operability of the uptravel electrical stop and downtravel electrical cutoff protective features were not affected by the condition described in this report, and were adequately demonstrated by previous testing.

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Immediate Corrective Action

Operability requirements for the refueling platform are only applicable during refueling operations involving handling of control rods and fuel assemblies within the reactor pressure vessel. WNP-2 was operating at power when the condition described in this report was identified, and was not involved in activities that required the refueling platform to be operable. Consequently, no immediate corrective actions were necessary.

Further Evaluation, Root Cause, and Corrective Action

A. Further Evaluation

1. The condition described in this report is reportable pursuant to the requirements of 10CFR50.73(a)(2)(i)(B) as an operation or condition that is prohibited by Technical Specifications. Operability of load-related refueling platform hoist interlocks and cutoffs was not fully demonstrated during prior plant operations when the refueling platform was required.
2. Failure to fully implement refueling platform Surveillance Requirements was identified by a project engineer on March 10, 1993, during preparation of documentation for an anticipated plant modification involving replacement of the refueling platform mast. In order to support the modification, load-related hoist interlock and cutoff setpoints were calculated for the existing mast on a preliminary basis. These preliminary calculations identified problems with the method used to calibrate and test load-related refueling platform hoist interlocks and cutoffs. These calculations were necessary because formal setpoint calculations had not been used to determine hoist interlocks and cutoffs for the existing refueling mast.

Operability of the load-related refueling platform hoist interlocks and cutoffs is demonstrated by lifting a series of test weights and verifying proper interlock and cutoff feature operation. The test weights previously used to verify operation of these interlocks and cutoffs were sized to include consideration of weight contributions due to the hoist cable and refueling mast, but did not consider the effects of instrument accuracy or drift. As a result, the test weights were oversized, and setpoint verifications for the load-related interlocks and cutoffs that were performed using these test weights were not accurate. Failure to consider instrument loop uncertainties also resulted in incorrect calibration data for instrumentation associated with these interlocks and cutoffs.

The project engineer's review also identified a second discrepancy associated with the slack cable cutoff for the main hoist. Technical Specifications require the slack cable cutoff feature to operate when the load on the main hoist is less than 50 pounds. In order to assure this cutoff occurs before the main hoist load is less than 50 pounds, the slack cable cutoff setpoint must

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account for instrument accuracy and drift. Calibration and surveillance procedures for the slack cable cutoff incorrectly set and verified operation of this feature at a load of less than 50 pounds. This discrepancy resulted due to misinterpretation of the slack cable cutoff Surveillance Requirement that has existed since initial procedure development.

3. On April 9, 1993, a Shift Technical Advisor identified an additional deficiency in that Technical Specification 4.9.6.b requires the overload cutoff on the frame mounted and monorail hoists be set at 485 ± 50 pounds and these cutoffs were being set in accordance with the hoist technical manual at 1000 pounds.
4. As previously identified, the affected hoist interlocks and cutoffs include: the overload cutoff, hoist loaded interlock, redundant hoist loaded interlock, slack cable cutoff for the main hoist, and the overload cutoff and loaded interlocks for the frame mounted and monorail hoists. The effect that the identified deficiencies had on these protective features is described below:

Overload Cutoff - Main Hoist - The main hoist overload cutoff interlock is designed to prevent damage to either the fuel bundles or reactor internals by stopping hoist travel when excessive force is applied. The maximum setpoint value for the overload cutoff is established in Technical Specifications as 1250 pounds. In order to assure that hoist travel is stopped at 1250 pounds, or less, this interlock must be set at a value below 1250 pounds in order to account for uncertainties in the calculation. The overload cutoff could have been set as high as 1441 pounds using the previous test method.

Hoist Loaded Interlock - Main Hoist - The hoist loaded interlock provides a control rod block and indication to the refuel bridge operator that a load is attached to the hoist. The maximum setpoint value for the hoist loaded interlock is established in Technical Specifications as 535 pounds. In order to assure that hoist travel is stopped at 535 pounds, or less, this interlock must be set at a value below 535 pounds in order to account for uncertainties in the calculation. This interlock could have been set as high as 670 pounds using the previous test method.

Hoist Loaded Redundant Interlock - Main Hoist - The hoist loaded redundant interlock prevents upward movement of the refuel mast if the grapple is not closed and the hoist is loaded. The maximum setpoint value for the redundant hoist loaded interlock is established in Technical Specifications as 600 pounds. In order to assure that hoist travel is stopped at 600 pounds, or less, this interlock must be set at a value below 600 pounds in order to account for uncertainties in the calculation. This interlock could have been set as high as 736 pounds using the previous test method.

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Slack Cable Cutoff - Main Hoist - The slack cable cutoff is designed to stop hoist travel when there is 50 pounds or less on the main hoist. The purpose of this feature is to stop main hoist travel before the hoist cable becomes slack. This ensures control of the fuel is maintained. In order to assure that hoist travel is stopped at 50 pounds or less decreasing, the slack cable cutoff must be calibrated to a value higher than 50 pounds. However, the slack cable setpoint value was previously misinterpreted, and was set and verified at a value below 50 pounds in calibration and surveillance procedures. Additionally, the slack cable cutoff setpoint did not consider instrument uncertainties.

Loaded Interlocks - Frame Mounted and Monorail Hoists - Loaded Interlocks for the frame mounted and monorail hoists are designed to prevent uplifting over the reactor vessel if a control rod is withdrawn and a load is attached to the hoist. The maximum setpoint value for these loaded interlocks are not established in the Technical Specifications, but have been and will continue to be set at 535 pounds or less to provide the necessary protection.

Overload Cutoff - Frame Mounted and Monorail Hoists - The overload cutoffs for the frame and monorail hoists are designed to limit the hoist loads to less than the design load to prevent hoist damage or failure. The design load for these hoists is 1000 pounds which is where the cutoffs have previously been set. However, the Technical Specification setpoint is 485 ± 50 pounds. To assure that hoist travel is stopped at 535 pounds, or less, the cutoffs must be set at a value below 535 pounds to account for instrument loop uncertainties.

B. Root Cause

Three root causes have been identified for the conditions described in this report. The first root cause was misinterpretation of the slack cable cutoff Surveillance Requirement. As a result of this misinterpretation, the slack cable cutoff was set and verified at a value that was below the required setpoint in calibration and surveillance procedures. This misunderstanding involved an error by non-licensed, utility personnel during the initial development of the surveillance procedure. The second root cause resulted from inadequate analysis of setpoints for load-related interlocks and cutoffs associated with the refueling platform hoists. Setpoints for these interlocks and cutoffs were not determined within formal calculations. The informal calculations used did not provide adequate consideration of instrument loop uncertainty when developing setpoints and determining test weight specifications. The third root cause was inadequate verification during initial procedure preparation in that the procedural requirements were not compared to the Technical Specification requirements to ensure the Technical Specifications were met. A contributing cause was a documentation deficiency where the Technical Specification requirements for the frame mounted and monorail hoists overload cutoffs were specified at a conservative value which did not correspond to the hoists capabilities.

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C. Further Corrective Action

1. The following corrective actions were taken prior to declaring the refueling platform hoists operable.
 - a. Setpoint calculations for load-related interlocks and cutoffs associated with the refueling platform were performed. These calculations include consideration of instrument loop uncertainties.
 - b. The following procedures were changed to incorporate results of the interlock and cutoff calculations:
 - 1) PPM 10.25.72, Calibration of Load Cell Switches for Refuel Platform
 - 2) PPM 10.27.14, Refueling Main Hoist Load Cell and Slack Cable Pressure Switch Calibration
 - 3) PPM 7.4.9.1, Refuel Interlocks
 - 4) PPM 7.4.9.6, Refuel Platform Crane and Hoist Interlock Surveillance
 - c. New test weights were fabricated, as specified within the interlock and cutoff setpoint calculations.
2. In response to previous events involving setpoint calculation deficiencies and procedural implementation of Technical Specification Surveillance Requirements, the following corrective actions have been initiated:
 - a. A project team is currently performing a technical and compliance review of the WNP-2 Surveillance Testing Program. This review will ensure that procedures used to satisfy Technical Specification Surveillance Requirements are technically accurate, and that each Surveillance Requirement is satisfied within plant procedures. LER 93-010 provides a more detailed description of this project.
 - b. An extensive Setpoint Verification Program is in progress. This effort will review/evaluate calculations in order to identify and correct setpoint calculation deficiencies that may exist.
3. A Technical Specification Amendment request will be submitted by July 31, 1993, to clarify the Refueling Platform requirements.

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Safety Significance

WNP-2 has not experienced an event involving equipment damage resulting from incorrect interlock and cutoff setpoints for the refueling platform hoists. Although incorrect setpoints could have resulted in hoist loads in excess of Technical Specification limits, these increases were not of sufficient magnitude to appreciably affect the likelihood of damage to reactor vessel internal components, fuel bundles, or the refueling platform hoists. Consequently, the condition described in this report did not have an adverse effect on safe operation of the plant, or the health and safety of plant personnel or the general public.

Similar Events

Previous instances involving procedures that were not adequate to satisfy Surveillance Requirements have recently been reported in LERs 91-13, 91-18, 91-19, 91-28, 91-36, 92-02, 92-35, 93-08, and 93-10. Previous instances involving inadequate setpoint calculations have been reported in LERs 87-26, 88-23, 89-06, 92-02, 92-06, 92-09, 92-14, and 93-03. Corrective actions have been initiated in response to these previous events in order to resolve programmatic deficiencies involving setpoint calculations and procedural implementation of Technical Specification Surveillance Requirements.

EIIS Information

Text Reference

Refueling Platform
Control Rod
Fuel Bundle
Hoists

EIIS Reference

<u>System</u>	<u>Component</u>
DB	FHM
AA	JC
AC	---
DB	HOI