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OCT 2 7 2000

L-2000-216
10 CFR § 50.73

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

Re: Turkey Point Unit 4
Docket No. 50-251
Reportable Event: 2000-002-00
Date of Event: September 30, 2000
Containment Ventilation System Inoperable due to Missed Surveillance

The attached Licensee Event Report 2000-002 is being submitted pursuant to the requirements of 10 CFR § 50.73 to provide notification of the subject event.

If there are any questions, please contact us.

Very truly yours,

R. J. Hovey
Vice President
Turkey Point Nuclear Plant

CLM
Attachment

cc: Regional Administrator, USNRC, Region II
Senior Resident Inspector, USNRC, Turkey Point Nuclear Plant

IE22

NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4)
Containment Ventilation System Inoperable due to Missed Surveillance

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 NAME	DOCKET NUMBER
09	30	2000	2000	- 002 -	00	10	27	2000	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	6	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
			20.2201(b)		20.2203(a)(2)(v)	x	50.73(a)(2)(i)		50.73(a)(2)(viii)
POWER LEVEL (10)	0		20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
			20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
			20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER
			20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Craig L Mowrey	(305) 246 - 6204

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

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

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

During the Unit 4, Cycle 18/19, refueling outage, reactor core offload was started on September 30, 2000, with the containment purge system in operation. However, all of the required testing of the containment purge system was not completed. Generation of the isolation signal was tested, and the valves were stroked manually, but the automatic isolation function was not tested as required by Technical Specification 4.9.4.

The root cause was inadequate procedures. The purge valves were not originally intended to be opened during core alterations. When plans changed, the impact of the change was not adequately reviewed since the controlling procedures did not trigger a re-review. Because containment (including purge valve closure) is not credited in the fuel handling accident analysis, the health and safety of the public were not affected by the inadequate surveillance test.

The two procedures identified as inadequate will be revised. Implementing procedures for all of the refueling section of Technical Specifications will be reviewed to determine if there are other instances where a procedure provides condition options and does not provide a barrier to reconsider the impact if the condition changes. Personnel involved have been counseled. This event will be discussed with each operating crew.

EVENT DESCRIPTION

On September 30, 2000, during the Unit 4, Cycle 18/19, refueling outage, reactor core alterations were started, with the containment purge system [BB, VA] in operation, but without having tested the containment purge valves [VA:isv] automatic isolation function as required by Technical Specification 4.9.4. This event occurred during the reactor core off-load.

Prior to the refueling outage, the plant's intent was that the containment purge would remain isolated during the reactor core offload window. Based on that intent, when surveillance procedure 4-OSP-067.1, Process Radiation Monitoring Operability Test, was performed on September 29, 2000, at 05:00, the operating crew was directed to perform the test of the containment atmosphere radiation monitors [IL] without testing the trip function of the containment purge valves.

On September 30, 2000, at 05:40, a different operating crew (first midnight shift for new crew) placed the containment purge system in service at the request of Health Physics and with the concurrence of the Operations Refueling Shift Director. The containment purge was requested to reduce noble gas concentration outside the containment personnel hatch. The noble gas was causing high background levels on the personnel friskers at the control point.

When the containment purge system was placed in operation on September 30, 2000, at 05:40, there was no requirement to satisfy Technical Specification 4.9.4 since there were no core alterations in progress. When permission was given to commence core alterations on September 30, 2000, at 21:47, the controlling procedure 4-OP-038.1, Preparation for Refueling Activities, indicated to the current nuclear plant supervisor that Technical Specification 4.9.4 had been satisfied on September 29, 2000, at 05:00. (The procedure credited for complying with the above Technical Specifications prior to core alteration is 4-OSP-067.1.) Permission was given to perform core alterations based on this information. The information in 4-OP-038.1 did not clearly show that the Technical Specification was not satisfied.

Technical Specification 3.9.4 requires, in part, that each penetration providing direct access from the containment atmosphere to the outside atmosphere shall be either closed by an isolation valve, blind flange, or manual valve, or be capable of being closed by an OPERABLE automatic containment ventilation isolation valve during core alterations or movement of irradiated fuel within containment. Surveillance requirement 4.9.4 specifies that each applicable containment penetration shall be determined to be either in its closed/isolated condition or capable of being closed by an OPERABLE automatic containment isolation valve within 100 hours prior to the start of and at least once per 7 days during core alterations or movement of irradiated fuel within the containment by:

a) verifying the penetrations are in their closed/isolated condition, or
b) testing the containment ventilation isolation valves per the applicable portions of Specification 4.6.4.2.

The applicable portion of Surveillance Requirement 4.6.4.2 that addresses Containment Ventilation Isolation valves is 4.6.4.2c. Section 4.6.4.2c requires that component operability be determined by verifying that on a Containment Ventilation Isolation test signal, each purge, exhaust, and instrument air bleed valve actuates to its isolation position.

Failure to perform the required surveillance prior to core alterations is a condition prohibited by Technical Specifications, reportable under 10CFR50.73(a)(2)(i)(b).

BACKGROUND

The Containment Ventilation Isolation System (CVIS) is activated by a Safety Injection signal, a High Containment Pressure signal, or a high radiation signal from Containment Radiation Monitors R-11 and R-12. In response to an activation signal, the CVIS closes any open purge valves. Both the supply and exhaust containment isolation valves are quick closing butterfly valves capable of closing in less than five seconds upon receipt of a containment isolation signal or high activity signal from the particulate or gaseous activity radiation monitors.

Containment ventilation isolation trips both supply and exhaust fans and shuts all supply and exhaust butterfly valves. Containment ventilation isolation is initiated by:

(1) Hi containment particulate activity from R-11
(2) Hi containment gaseous activity from R-12
(3) Safety Injection Signal (auto or manual initiation)
(4) Phase A isolation (manual pushbutton)
(5) Phase B isolation (manual pushbutton)

When 4-OSP-067.1 was completed on September 29, 2000, at 05:00, the purge valves and the instrument air bleed valves were not adequately tested to verify that they would be capable of automatically closing upon receipt of a high radiation test signal from each containment radiation monitoring instrumentation channel. Thus, in keeping with Technical Specification 3/4.9.4, the containment purge valves should not have been opened during the core offload.

Data obtained from ERDADS indicates that the containment purge exhaust penetration was open during core alteration activities. The data also indicates that the instrument air bleed and containment purge supply penetrations remained isolated during core alteration and core offload.

Sections 7.1 and 7.2 of procedure 4-OSP-067.1 did verify operability of the Containment Ventilation System Isolation relays (e.g., 4-86/CIVI) within the 100 hour window prior to core alteration. These relays provide containment ventilation isolation by operating the containment purge and instrument air bleed valves. Accordingly, a portion of the containment purge valve actuation logic was tested using a high radiation test signal from the PRMS.

In addition to the Containment Ventilation Isolation relay tests, the above time line indicates that the purge valves were also manually operated within the 100 hour window using the control room hand switch. A review of the purge valve control circuit, however, indicates that operation of the hand switch does not adequately verify that the remaining portion of the containment purge valve actuation logic would operate on a PRMS high radiation test signal. Thus, no credit can be taken for overlap testing within the 100 hour pre-core alteration window.

A search was made to see if other surveillance or post-maintenance tests were performed during the 100 hour window that could be credited with testing the purge valve / PRMS interface. No plant evolutions were identified that tested the PRMS related Containment Ventilation Isolation contacts.

Since the containment purge exhaust valves were not stroke tested using a PRMS high radiation test signal, and overlap testing was insufficient, it is concluded that the requirements of Technical Specification 3/4.9.4 were not satisfied for the containment purge exhaust penetration prior to core alteration.

CAUSE OF THE EVENT

Root Cause

The root cause for this event was determined to be inadequate procedural control of the containment purge valves.

1. Procedure 4-OP-038.1, Preparations for Refueling Activities, provides an option for containment purge without a barrier to require personnel to reconsider the option should conditions change.

2. Procedure 4-OP-053, Containment Purge System does not have a reminder to ensure that the requirements of TS 4.9.4 are satisfied prior to initiating a containment purge.

Contributing Causes

1. Change Management prior to Core Off-load - The outage plan for the containment purge was changed due to unanticipated radiation levels caused by noble gas. Personnel on shift including the NPS authorizing core alterations did not recognize the significance of the change in the status of the containment purge.

2. Self-Checking prior to Core Off-load - Personnel involved with the decision not to test the containment purge valves did not set up an adequate barrier or turn over information so that others were aware of their decision.

3. Self-Checking - The 4-OP-038.1 step for containment purge was changed from N/A to in service and the testing requirements of 4-OSP-067.1 were not challenged.

4. Written Communications - containment purge was already in progress when the reactor core alterations were started.

RISK SIGNIFICANCE AND SAFETY CONSEQUENCE

The risk significance of this event is the probability that a fuel handling accident will result in increased dose to the public. The magnitude of the risk increase during the period of time when fuel movement or core alterations were being performed concurrent with the purge valves being open is the product of the frequency of a fuel handling accident resulting in a release of fission products to the immediate environment and the increase in the probability of failure of the purge valves to close given a high radiation signal due to the omission in the surveillance test. The frequency of a fuel handling accident resulting in a release of fission products to the immediate environment is very low. When 4-OSP-067.1 was performed on September 29, 2000, all aspects of purge actuation (mechanical and electrical) were tested within the required surveillance window except those Containment Ventilation Isolation relay contacts unique to the containment purge valves. The failure rate of electrical components such as relay contacts is very low given the passive nature of the devices. Thus, the increase in the probability of failure of the purge valves to close given a high radiation signal due to the omission in the surveillance test is also very low. Therefore, the product of the frequency of a fuel handling accident and the probability of failure of the purge valves to close is extremely low. It should also be noted that this condition existed for only four days before the purge valves were closed, further reducing the overall annualized risk to the public from plant operation. Failure to demonstrate that the purge valves would automatically close on a high radiation signal prior to core alteration or irradiated fuel movement inside containment would result in an extremely small increase in risk to the public.

The containment purge valves are described in Sections 6.6 and 9.8 of the Updated Final Safety Analysis Report (UFSAR). Both sections indicate that the purge supply and exhaust valves are maintained closed during normal power operation. Both sections also state that they are designed to close automatically on "a high containment radiation signal from R11/R12 or by the containment isolation signal."

The purpose of the purge valve surveillance in Technical Specifications is to ensure that upon receipt of a high radiation signal, the purge valves will close as designed. Although the purge valves are safety-related components, failure to test the automatic isolation function prior to core alteration or movement of irradiated fuel inside containment has little safety significance. Operation of the containment purge valves during these refueling activities does not impact core decay heat removal or available shutdown margin, and does not diminish or defeat any of the safety features provided on the fuel handling equipment to prevent fuel-related accidents.

The dose consequences of a fuel handling accident inside containment are analyzed in UFSAR Section 14.2.1. As indicated in Table 14.2.1-1, purge valve isolation on high radioactivity is not modeled in the analysis. The activity released from a damaged fuel assembly is assumed to be immediately released to the outside atmosphere. Therefore, had a fuel handling accident occurred, failure of the purge valves to close would not have increased off site doses beyond those already analyzed in the Turkey Point UFSAR. The offsite dose would have remained a small fraction of the 10 CFR 100 limits.

CORRECTIVE ACTIONS

1. Procedures 3/4-OP-038.1 have been revised to place specific guidance for verification of proper surveillance testing of the containment atmosphere radiation monitors and the containment purge valves. The revision also includes guidance for establishing a barrier. An equipment clearance order is required to be issued to prevent opening the valves unless they have been properly tested.

2. Operating Procedure 0-OP-053, Containment Purge System, will be modified to include a condition for Mode 6 purge operation that verifies the requirements of Technical Specifications 4.9.4 and 4.9.9 have been satisfied prior to opening the containment purge valves, when core alterations are in progress or anticipated.

3. The Operations Supervisor coached and counseled the personnel involved in the event.

4. A copy of the approved Condition Report Response has been provided to each on-shift Nuclear Plant Supervisor for his review and to discuss this event with his crew.

5. Operations will review the implementing procedures for all of Technical Specification Section 4.9, Refueling Operations, to determine if there are other instances where a procedure provides condition options and does not provide a barrier to reconsider the impact if the condition changes.

ADDITIONAL INFORMATION

There have been two earlier events reported related to Containment Purge Valves. LER 250-87-007-00 reported an event similar to the one reported herein. That event resulted in the incorporation of the relevant steps presently in 3/4-OP-038.1, but did not consider the possibility of changing conditions that led to the current event. LER 250-98-007-00 reported an event in which a Containment Purge Supply Isolation valve opened further than allowed by Technical Specification 3.7.1.7.b.

EIIS Codes are shown in the format [EIIS SYSTEM:IEEE component function identifier, second component function identifier (if appropriate)].