

James A. FitzPatrick
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Michael J. Colomb
Site Executive Officer

August 25, 2000
JAFP-00-0195

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, D.C. 20555

Subject: **Docket No. 50-333**
LICENSEE EVENT REPORT: LER-00-008 (DER-00-03401)

"Reactor Water Recirc Speed Control Mechanical Stops Set Higher Than Value Assumed In Core Operating Limits Report"

Dear Sir:

This report is submitted in accordance with 10 CFR 50.73(a)(2)(ii)(B), "in a condition that was outside the design basis of the plant."

There are no commitments contained in this report.

Questions concerning this report may be addressed to Mr. Robert Steigerwald at (315) 349-6209.

Very truly yours,

A handwritten signature in black ink, appearing to read 'M. J. Colomb', written over the printed name.

MICHAEL J. COLOMB

MJC:RFS:las
Enclosure

cc: USNRC, Region 1
USNRC, Project Directorate
USNRC Resident Inspector
INPO Records Center

IE22

LICENSEE EVENT REPORT (LER)

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

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.

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TITLE (4)

Reactor Water Recirc Speed Control Mechanical Stops Set Higher Than Value Assumed in Core Operating Limits Report

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
07	28	00	00	008	00	08	25	00	N/A	05000
									N/A	05000

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)			
		20.2201(b)		20.2203(a)(2)(v)	50.73(a)(2)(i)
POWER LEVEL (10)	100	20.2203(a)(1)		20.2203(a)(3)(ii)	X 50.73(a)(2)(ii)
		20.2203(a)(2)(i)		20.2203(a)(3)(iii)	50.73(a)(2)(iii)
		20.2203(a)(2)(ii)		20.2203(a)(4)	50.73(a)(2)(iv)
		20.2203(a)(2)(iii)		50.36(c)(1)	50.73(a)(2)(v)
		20.2203(a)(2)(iv)		50.36(c)(2)	50.73(a)(2)(vii)

Specify in Abstract below or in NRC Form 366A

LICENSEE CONTACT FOR THIS LER (12)

NAME

Mr. Robert Steigerwald

TELEPHONE NUMBER (Include Area Code)

315-349-6209

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)

X YES (If yes, complete EXPECTED SUBMISSION DATE).

NO

EXPECTED

MONTH DAY YEAR
10 02 00

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

On July 28, 2000, with the reactor at approximately 100 percent power, it was discovered that the mechanical stop setting for the "A" Reactor Water Recirculation (RWR) pump speed limiter exceeded the value assumed in the calculation for the flow dependent Minimum Critical Power Ratio (MCPR) contained in the Core Operating Limits Report (COLR). On July 29, the "B" RWR pump mechanical stops were also discovered to be set above 102.5 percent. If a RWR pump transient such as a runaway RWR flow from a low flow condition is postulated, the flow dependent MCPR may be exceeded. This could result in exceeding the Safety Limit MCPR. This condition could have put the plant outside of its design bases and is being reported per 10CFR50.73(a)(2)(ii)(B). Review of plant operating history determined that the plant had not operated in a condition that would have resulted in exceeding Operating Limit MCPR and thus would not have exceeded the SLMCPR. Therefore, the safety significance was determined to be minimal. The preliminary investigation determined an apparent cause to be inadequate post work testing due to poor communications between system engineering and the work planning process and a failure of the post work testing determination process. Corrective actions include resetting and verifying the mechanical stops set at 102.5 percent (completed) and completion of the Root Cause Analysis. A supplement to this LER will be provided.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

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EVENT DESCRIPTION

On July 28, 2000, with the reactor at approximately 100 percent power, it was discovered that the mechanical stop setting for the "A" Reactor Water Recirculation (RWR) [AD] pump speed limiter was greater than the value assumed in the calculation for the flow dependent Minimum Critical Power Ratio (MCPR) contained in the Core Operating Limits Report (COLR). Subsequent testing for the "B" RWR pump mechanical stops on July 29 determined that its setting was also greater than the 102.5 percent value assumed in the COLR. The "A" and "B" RWR mechanical stops were last adjusted on April 4, 2000, during a plant shutdown. The post work testing during power ascension following the adjustments was not adequate to ensure settings were ≤ 102.5 percent. The post work testing only verified that a core flow of 100 percent could be achieved.

In the Fall of 1999, the FitzPatrick plant began experiencing difficulty achieving 100 percent core flow. This was following Noble Metals addition and implementation of the Leading Edge Flow Meter (LEFM) modification. Analysis by General Electric and Authority Reactor Engineers determined that core flow behavior was acceptable and that the RWR pump motor generator set limiters, electrical stops, and mechanical stops required adjustments.

The original plan was to perform the RWR pump limiter and stop setting adjustments on line. This would have obviated the need for the required post work testing since adjustments of the settings on-line verifies the setting by using actual flow conditions to set the limiter and stops. However, the opportunity arose to perform the work shutdown, during a forced outage. It was decided to perform the work during the forced outage due to the perception that it was safer, from a plant risk viewpoint, to perform the work off-line. The settings performed during shutdown conditions are based on limiter position measurements that are then extrapolated to determine the limiter position setpoint. Therefore, the new limiter settings needed to be verified during power ascension following startup. System engineering personnel understood this but it was not communicated effectively to the work planning organization or the test procedure writers.

The post work testing identified for performing the limiter and stop settings on-line was used for a different method of performing the limiter and stop settings off-line. The test verified that the RWR flow of 100 percent could be achieved, which ensured that the earlier problem of not being able to achieve 100 percent flow was corrected, but it failed to verify the settings under actual flow conditions.

A few days following startup, the system engineer realized that the post work testing was inadequate in that it did not verify the actual settings. The system engineer discussed this requirement at a planning meeting but did not adequately communicate the importance of the required post work testing with respect to the potential impact on the assumptions in the COLR and the need to promptly conduct the test under actual flow conditions. The post work test procedure was written and performed on July 28 and 29.

A Review of past history determined that the limiter and stops were set during shutdown conditions in the past (5 times since 1991) and the same post work testing was performed which may have lead to previous non-conservative settings.

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CAUSE OF THE EVENT

A Root Cause Analysis is in progress. A review of past history determined that the limiter and stops were set during shutdown conditions in the past (5 times since 1991) and the same post work testing was performed which may have lead to previous non-conservative settings. This may have contributed to the cause in that the work planning organization assumed the post work testing that was performed in the past was adequate. The determination of required post work testing should have been correctly identified in the work package planning process.

An apparent cause is that the post work test determination process was not adequate to identify the required testing (Cause Code E). The processes and procedures used to determine post work testing requirements will be reviewed for adequacy. The process used should have identified the critical characteristics affected by the maintenance and identified the adequate post work testing to verify the settings. Another apparent cause has been determined to be inadequate post work testing due to mis-communications between the system engineer and the work planning organization (Cause Code A - Personnel Error).

ANALYSIS OF THE EVENT

The mechanical stops are intended to limit flow in the event of a malfunction resulting in a RWR Pump run out to maximum speed. If a RWR pump transient such as a runaway RWR flow from a low flow condition is postulated, the flow dependent MCPR may be exceeded. This could result in exceeding the Safety Limit MCPR. This condition could have placed the plant outside of its design bases and is being reported per 10CFR50.73(a)(2)(ii)(B). The consequences and likelihood of this having an actual impact on plant safety are small due to the fact that JAF operates the RWR pumps individually in manual control. As such, the probability of a run out of both pumps simultaneously is a highly unlikely event. Also, the RWR motor generator electronic limiter settings were found to be approximately 102 percent. The electronic limiter and electrical stops are set at values below the mechanical stop.

The Flow Dependent MCPR Limit, k_f , correction factor is applied to the Operating Limit MCPR (OLMCPR) limits at low core flows to mitigate consequences of a Recirculation Pump run out, ensuring that OLMCPR margin is maintained at higher powers. Higher stop settings are possible, but they require using a more conservative (restrictive with respect to operation) correction factor. Higher stop settings require a greater correction factor. The setting of the RWR limiters is assumed in the function used by the 3D-Monicores computer when applying the k_f correction factor. As such, the discovery of the stops at a value higher than assumed (104.7 and 105.1 percent for "A" and "B" RWR mechanical stops, respectively) created the potential for operation with a non-conservative correction factor applied to MCPR when operating at lower core flows.

Review of the correlation used by 3D-Monicores between April 4 and July 29, 2000, reveals that the correction factor applied by 3D-Monicores in determining k_f was non-conservative between April 4 and April 8, 2000. Review of 3D-Monicores monitoring case records results show that correction for the non-conservative k_f factor during the April 4 and April 8 period did not result in violating OLMCPR. Additionally, an analysis utilizing a hypothesized mechanical stop setting of 107 percent and the associated correction factor determined that the net effect on the margin to thermal limits was negligible.

The previous as found settings of the mechanical stop settings cannot be determined. For the same reasons discussed above the safety significance is minimal; the RWR pump controls are operated individually in manual control and the electronic limiter and electrical stops were set, although unverified, at values less than the mechanical stops.

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EXTENT OF CONDITION

The extent of conditions is still under investigation per the Root Cause Analysis. An extent of condition review of planned refuel outage 14 adjustments to operational settings will be performed to ensure adequate post work setting verification.

CORRECTIVE ACTIONS

1. Complete the Root Cause Analysis and submit supplemental LER. (Scheduled completion date: October 2, 2000)
2. Correct settings were established during the post work testing on July 28 and 29, 2000. (Completed)
3. The method for determining the RWR motor generator limiter and stop settings and performing and verifying the settings will be reviewed and revised as necessary. (Scheduled completion date: prior to start up from refuel outage - Nov 10, 2000)
4. An extent of condition review of planned refuel outage 14 adjustments to operational settings will be performed to ensure adequate post work setting verification. (Scheduled completion date: prior to start up from refuel outage - Nov 10, 2000)
5. Management expectations with regard to communications and the need to follow-up with technical concerns were discussed with the individual involved. (Completed)

SAFETY SYSTEM FUNCTIONAL FAILURE REVIEW

This event did not result in a safety system functional failure in accordance with NEI 99-02, Revision 0.

PREVIOUS SIMILAR EVENTS

None.