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FPL Energy.

Duane Arnold Energy Center

April 26, 2007

NG-07-0308
10 CFR 50.73

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Duane Arnold Energy Center
Docket 50-331
License No. DPR-49

Licensee Event Report #2007-005-00

Please find attached the subject Licensee Event Report (LER) submitted in accordance with 10 CFR 50.73. This letter makes no new commitments or changes to any existing commitments.

Gary Van Middlesworth
Site Vice President, Duane Arnold Energy Center
FPL Energy Duane Arnold, LLC

cc: Administrator, Region III, USNRC
Project Manager, DAEC, USNRC
Resident Inspector, DAEC, USNRC

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NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose 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.

# LICENSEE EVENT REPORT (LER)

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

| 1. FACILITY NAME | 2. DOCKET NUMBER | 3. PAGE |
|---|---|---|
| Duane Arnold Energy Center | 05000 331 | 1 OF 4 |

**4. TITLE**

Automatic Reactor Scram Due To Scram Discharge Volume High Water Level During Performance of a Surveillance Test

| 5. EVENT DATE | | | 6. LER NUMBER | | | 7. REPORT DATE | | | 8. OTHER FACILITIES INVOLVED | |
|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REV NO. | MONTH | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| | | | | | | | | | | 05000 |
| 03 | 02 | 2007 | 2007 | - 5 - | 0 | 04 | 26 | 2007 | FACILITY NAME | DOCKET NUMBER |
| | | | | | | | | | | 05000 |

**9. OPERATING MODE**

5

**10. POWER LEVEL**

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**11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:** *(Check all that apply)*

| | | | |
|---|---|---|---|
| ☐ 20.2201(b) | ☐ 20.2203(a)(3)(i) | ☐ 50.73(a)(2)(i)(C) | ☐ 50.73(a)(2)(vii) |
| ☐ 20.2201(d) | ☐ 20.2203(a)(3)(ii) | ☐ 50.73(a)(2)(ii)(A) | ☐ 50.73(a)(2)(viii)(A) |
| ☐ 20.2203(a)(1) | ☐ 20.2203(a)(4) | ☐ 50.73(a)(2)(ii)(B) | ☐ 50.73(a)(2)(viii)(B) |
| ☐ 20.2203(a)(2)(i) | ☐ 50.36(c)(1)(i)(A) | ☐ 50.73(a)(2)(iii) | ☐ 50.73(a)(2)(ix)(A) |
| ☐ 20.2203(a)(2)(ii) | ☐ 50.36(c)(1)(ii)(A) | ☑ 50.73(a)(2)(iv)(A) | ☐ 50.73(a)(2)(x) |
| ☐ 20.2203(a)(2)(iii) | ☐ 50.36(c)(2) | ☐ 50.73(a)(2)(v)(A) | ☐ 73.71(a)(4) |
| ☐ 20.2203(a)(2)(iv) | ☐ 50.46(a)(3)(ii) | ☐ 50.73(a)(2)(v)(B) | ☐ 73.71(a)(5) |
| ☐ 20.2203(a)(2)(v) | ☐ 50.73(a)(2)(i)(A) | ☐ 50.73(a)(2)(v)(C) | ☐ OTHER |
| ☐ 20.2203(a)(2)(vi) | ☐ 50.73(a)(2)(i)(B) | ☐ 50.73(a)(2)(v)(D) | Specify in Abstract below or in NRC Form 366A |

**12. LICENSEE CONTACT FOR THIS LER**

| FACILITY NAME | TELEPHONE NUMBER *(Include Area Code)* |
|---|---|
| Doreen Barta, Engineering Analyst | (319) 851-7277 |

**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

| CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

**14. SUPPLEMENTAL REPORT EXPECTED**

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ◉ NO

**15. EXPECTED SUBMISSION DATE**

| MONTH | DAY | YEAR |
|---|---|---|
| | | |


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

On March 2, 2007, during Refueling Outage 20, Surveillance Test Procedure NS550002 was being performed for testing of the Control Rod Drive System Back-up Scram Valves. The procedure required insertion of a manual reactor scram, however, the procedure did not require bypassing the Scram Discharge Volume High Level Scram signal prior to resetting the manual scram. Subsequently, an automatic reactor scram occurred on March 2, 2007 at approximately 2332 hours due to Scram Discharge Volume high level. All control rods were already fully inserted prior to beginning the Surveillance Test, therefore, control rod motion did not occur as a result of either the manual or automatic scram during performance of the Surveillance Test.

Operators bypassed the Scram Discharge Volume high water level signal and successfully reset the Scram at approximately 2332 hours on March 2, 2007.

The cause of this event was determined to be inadequate guidance in the surveillance procedure to bypass the Scram Discharge Volume High Level Signal prior to resetting the reactor scram.

There were no actual safety consequences and no effect on public health and safety as a result of this event.

| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (6) | | | PAGE (3) |
|---|---|---|---|---|---|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Duane Arnold Energy Center | 05000331 | 2007 | -- 005 -- | 00 | 2 of 4 |

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

## I. Description of Event:

On March 2, 2007, while the Plant was shutdown and in Mode 5 for Refueling Outage 20, Surveillance Test Procedure (STP), NS550002, "SV-1840A And SV-1840B Test," was scheduled to be performed. This surveillance test provides documentation for ASME in-service valve testing of the Control Rod Drive (CRD) System Back-up Scram Valves SV-1840 A and B. The procedure requires insertion of a reactor manual scram so that it can be verified that the Back-up Scram Valves operate properly.

Prior to performance of the surveillance test, a pre-job brief was conducted which included all personnel involved with the surveillance testing. During performance of the surveillance at approximately 2330 hours a manual scram was inserted, as required by the procedure, by depressing the reactor manual scram pushbuttons at Control Room Panel 1C05. At 23:31:22 hours the "Scram Discharge Volume Not Drained" alarm was received at Panel 1C05. The manual scram was reset at 1C05 at 23:31:29 hours. The Scram Discharge Volume (SDV) Rod Block alarm was received at Panel 1C05 at 23:31:34 hours. The Reactor Scram Channel B High SDV level trip was received at 23:31:37 hours, and the Reactor Scram Channel A High SDV level trip was received at 23:31:39 hours, resulting in an automatic full reactor scram. At approximately 2332 hours the SDV High Level Scram signal was electronically bypassed with the control switch on panel 1C05, and the reactor scram was successfully reset. STP NS550002 was successfully completed at 2351 on March 2, 2007.

Since all control rods were already fully inserted prior to the beginning of the Surveillance Test, no control rod motion resulted from either the manual or automatic scram.

When the steps within the Surveillance Test Procedure to confirm air vented from the Back-up Scram Valves and to confirm local header pressure are completed, the procedure directs the Control Room Operator to reset the scram. As seen by the times given above, when the Control Room Operator took the action to reset the scram, the SDV high level alarms for rod block and scram were not annunciated. The "Scram Discharge Volume Not Drained" alarm had annunciated only seven seconds prior to the scram reset. The actions to be taken for the "Scram Discharge Volume Not Drained" alarm per the Annunciator Response Procedure are not specific to shutdown conditions, but direct the Control Room Operator during reactor power operations to verify SDV drain and vent valves are open. The Operator planned to perform this action by resetting the scram, however, after the scram was reset, the amount of time it took for the SDV vent and drain valves to open and drain the water from the SDV exceeded the time it took for the water continuing to discharge to the SDV through the CRD mechanisms to reach the SDV high water level scram set point. As a result, an automatic reactor scram occurred on high SDV level.

At the time of this event there were no structures, systems, or components that were inoperable that contributed to the event.

A 10 CFR 50.72(b)(3)(iv)(A) notification was made on March 3, 2007 and is listed as event number 43210.

## II. Assessment of Safety Consequences:

The automatic scram described in this event had no adverse impact on Reactivity Control since all control rods were already fully inserted. The automatic scram did not affect the availability of systems or components needed to mitigate the consequences of a loss of decay heat removal or loss of inventory in

either the reactor vessel or spent fuel pool. During this event the Scram Discharge Volume equipment and Control Rod Drive System operated as designed. Therefore, this event did not affect the availability of systems or components that are needed to maintain safe shutdown conditions, remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident.

This event did not result in a Safety System Functional Failure.

**III. Cause of Event:**

An investigation into this event was completed under Apparent Cause Evaluation (ACE) 1699.

This event occurred when the scram signal was reset before the SDV high level scram set point was reached. If the "SDV High Level Trip" alarm had been annunciated, Operators would have bypassed the SDV high level scram signal prior to resetting the manual scram. Procedure NS550002 failed to mention the potential SDV level alarms or trips that could be experienced during the performance of this procedure. Review of past performances of this procedure indicates that an automatic reactor scram on high SDV level did not occur either because the scram was reset prior to the SDV level getting too high or, the SDV Rod Block and scram signals had already been received and the Operators bypassed the SDV high level scram signal prior to resetting the scram.

The apparent cause of this event was determined to be inadequate guidance provided in the Surveillance Test Procedure NS550002. Specifically, the procedure did not provide guidance for bypassing the SDV High Level Scram signal prior to resetting the scram even though the normal scram recovery procedure provides such guidance.

A contributing cause for this event included lack of focus during the pre-job brief on system interrelationships to determine "What can go wrong" type situations. If this focus had been effectively applied, the adequacy of the procedure to address issues associated with the SDV levels and the overall affect may have been identified and discussed with potential solutions.

Extent of Condition Review for ACE 1699

A review of all NS Surveillance and STP Surveillance procedures was conducted. No other NS procedures direct the action to initiate either a half or full manual scram during performance of the procedure.

A review of the STP Surveillance procedures revealed that the Reactor Protection System (RPS) Test Box, which allows testing of RPS circuits without generating a half scram, is utilized for the majority of the procedures that result in a half scram. The other STP Surveillance procedures that result in a half scram condition that do not utilize the RPS Test Box clearly direct the Reactor Operators to reset the half scram condition prior to proceeding.

The one exception noted during the review of STP Surveillance procedures was STP 3.3.1.1-23, "Mode Switch In Shutdown – Functional Test." The performance of this procedure directs a full reactor scram to be generated as the result of placing the Reactor Mode Switch in the Shutdown position. Following the placement of the Mode Switch to Shutdown, the procedure directs the Reactor Operator to place the SDV High Water Level Bypass Handswitch on Panel 1C05 to the Bypass position prior to resetting the scram. This guidance is appropriate and clear.

The review did not identify any other surveillance test procedures that do not mention potential SDV high water levels when a full reactor scram is to be initiated.

During this event the SDV System operated as designed. Since all control rods were already fully inserted prior to the beginning of the surveillance, no control rod motion resulted from either the manual or automatic scram during performance of the surveillance. The scram signal was reset properly after the SDV High Level Scram signal was bypassed.

**IV. Corrective Actions:**

**Immediate Actions to address the Condition**

Immediately after this event occurred, Operations personnel bypassed the SDV High Level Scram signal by placing the SDV High Water Level Bypass Handswitch on the 1C05 panel into the bypass position. The scram was then successfully reset at approximately 2332 hours on March 2, 2007.

**Corrective Actions to Address Apparent Cause and Contributing Cause**

To address the apparent cause, CA045591 was written to revise Surveillance Procedure NS550002 by adding a Precaution related to potential SDV water levels and their affect, as well as adding a step to bypass the SDV High Level Scram signal prior to resetting the reactor scram.

To address the contributing cause, CA044665 tracks completion of the design and development of the Duane Arnold Energy Center Operator Fundamentals Improvement Plan which will reinforce Operator fundamentals.

**Corrective Actions to Address Extent of Condition**

Based upon the extent of condition review, no additional corrective actions are required.

**V. Additional Information:**

Previous Similar Occurrences:

From LER review over the previous 10 years, one similar occurrence was identified in LER 2001-001, "Valid Reactor Protection System Actuation from High Scram Discharge Volume Water Level Due to Maintenance-Induced Equipment Problems" dated May 8, 2001. The specific corrective actions for this event were maintenance related and are not expected to have prevented the scram on March 2, 2007.

EIIS System and Component Codes:

AA Control Rod Drive System (BWR)

Reporting Requirements:

This report is being submitted pursuant to 10CFR50.73(a)(2)(iv)(A).