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Docket No.: 50-364

NL-19-0734

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

Joseph M. Farley Nuclear Plant - Unit 2  
Licensee Event Report 2019-002-00  
Manual Reactor Trip due to Misaligned Rod during Low Power Physics Testing

Ladies and Gentlemen:

In accordance with the requirements of 10 CFR 50.73(a)(2)(iv)(A), Southern Nuclear Company is submitting the enclosed Licensee Event Report for Unit 2.

This letter contains no NRC commitments. If you have any questions regarding this submittal, please contact Gene Surber at (334) 814-5448.

Respectfully submitted,

Charles Kharrl  
Vice President - Farley

CK/rgs/scm

Enclosure: Unit 2 Licensee Event Report 2019-002-00

Cc: Regional Administrator, Region II  
NRR Project Manager - Farley Nuclear Plant  
Senior Resident Inspector - Farley Nuclear Plant  
RTYPE: CFA04.054

**Joseph M. Farley Nuclear Plant - Unit 2  
Licensee Event Report 2019-002-00  
Manual Reactor Trip due to Misaligned Rod during Low Power Physics Testing**

**Enclosure**

**Unit 2 Licensee Event Report 2019-002-00**



**LICENSEE EVENT REPORT (LER)**

(See Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form  
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollect.Resource@nrc.gov](mailto:Infocollect.Resource@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NE08-10202 (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.

<b>1. Facility Name</b> Joseph M. Farley Nuclear Plant, Unit 2	<b>2. Docket Number</b> 05000 364	<b>3. Page</b> 1 OF 3
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**4. Title**  
Manual Reactor Trip due to Misaligned Rod during Low Power Physics Testing

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
05	01	2019	2019	002	00	06	27	2019	Facility Name	Docket Number 05000

**9. Operating Mode**      **11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)**

<b>2</b>	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<b>10. Power Level</b>	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
<b>000</b>	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
		<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> Other (Specify in Abstract below or in NRC Form 366A)	

**12. Licensee Contact for this LER**

<b>Licensee Contact</b> Gene Surber, Licensing Manager	<b>Telephone Number (Include Area Code)</b> 334-814-5448
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**13. Complete One Line for each Component Failure Described in this Report**

Cause	System	Component	Manufacturer	Reportable to ICES	Cause	System	Component	Manufacturer	Reportable to ICES
X	AA	ROD	W351	Y					

<b>14. Supplemental Report Expected</b> <input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date) <input checked="" type="checkbox"/> No	<b>15. Expected Submission Date</b> Month:    Day:    Year:
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**Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)**

At 16:43 CDT on May 1, 2019, with Farley Nuclear Plant (FNP) Unit 2 in Mode 2 with power in the Intermediate Range the reactor was manually tripped. Operators manually tripped the reactor during Low Power Physics Testing due to a misaligned rod. The trip was not complex with all systems responding normally. Operations stabilized the plant in Mode 3. Decay heat was removed by the Steam Generator Atmospheric Relief Valves due to Main Steam Isolation Valves being closed during Low Power Physics Testing.

This event is reportable under 10CFR50.73(a)(2)(iv)(A) due to manual actuation of systems listed in 10CFR50.73(a)(2)(iv)(B). FNP Unit 1 was not affected during this event.

Corrective Actions included resistance readings in the power cabinet and inspecting local connectors on the reactor head. Additionally, multiple control rod bank withdrawals and insertions were performed while collecting system operating data. No abnormal conditions were identified, and crud is the suspected reason for the misalignment.



**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

(See NUREG-1022, R.3 for instruction and guidance for completing this form  
<http://www.nrc.gov/reading-rm/doc-collections/nureqs/staff/sr1022r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollects.Resource@nrc.gov](mailto:Infocollects.Resource@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.

1. FACILITY NAME  Joseph M. Farley Nuclear Plant, Unit 2	2. DOCKET NUMBER  05000- 364	3. LER NUMBER		
		YEAR 2019	SEQUENTIAL NUMBER 002	REV NO. 00

**NARRATIVE**

**A. Event Description:**

On May 1, 2019, at 11:36 CDT, Farley Nuclear Plant (FNP) Unit 2 entered Mode 2 with Reactor Coolant System (RCS) [EIS:AB] at 547 degrees Fahrenheit and RCS pressure at 2243 psig following a refueling outage. Upon entry into Mode 2 FNP began performing Low Power Physics Testing (LPPT). During this testing, Control Rods [EIS:AA/Rod] are fully withdrawn and inserted into the core by the Operator at the Controls (OATC) to test their amount of negative reactivity. At the beginning of this event all Control Banks and Safety Banks were fully withdrawn per the LPPT procedure and Reactor Power was in the Intermediate Range. Per the LPPT procedure the OATC began testing the Bank B Control Rods (CBB). During the insertion of CBB the OATC identified after approximately 9 seconds (16:32 CDT) that Control Rod M6 (Part of CBB) had a greater than 12 step difference between the Digital Rod Position Indication (DRPI) and the group step counter. Upon recognition of the divergence in rod positions the OATC stopped all CBB rod movement. The OATC under direction of the Senior Reactor Operator (SRO) then inserted CBB rods at 16:36 CDT to add additional negative reactivity to establish a slight negative startup rate to maintain power stable in the intermediate range. Following this CBB insertion, CBB was verified at 156 steps withdrawn (DRPI) while rod M6 was at 132 steps withdrawn (DRPI). After validating the DRPI indications, the Control Room crew entered the FNP abnormal operating procedure for the misaligned Control Rod at 16:40 CDT. At 16:43 CDT the crew procedurally tripped the reactor with Reactor Power low in the Intermediate Range. This operator action manually initiated a Reactor Protection System actuation [EIS:JC]. All Control Banks and Safety Banks fully inserted including Control Rod M6. The Main Feed Water system [EIS:SJ] was not in service at the time and the Auxiliary Feed Water (AFW) System [EIS:BA] continued to feed the steam generators. Decay heat was removed by the Steam Generator Atmospheric Relief Valves [EIS:SB] due to the Main Steam Isolation valves being closed during Low Power Physics Testing.

**B. Cause of Event:**

Control Rod M6 most likely became misaligned due to CRUD in the Control Rod Drive Mechanism (CRDM) based on site and industry operating experience. The cause of the crud being present in the CRDM is unknown.

**C. Safety Assessment:**

When the Control Room Operator manually initiated the reactor trip, all systems responded as designed. The Reactor Protection System (RPS) actuated as designed, and all Control Banks and Safety Banks fully inserted into the core. A turbine trip was not necessary because the turbine was not online at the time. Because all systems responded as required and there were no adverse effects on the health and safety of the public, the safety significance is low and no loss of safety function occurred. Additionally, no dose limits were challenged.

**D. Corrective Actions:**

Resistance readings were taken at the power cabinet for Control Rod M6 with no abnormal conditions identified. The connector on the reactor head for Control Rod M6 was also inspected. The resistance readings were checked before and after the connector was inspected. The resistance readings before and after were equivalent. During the inspection of the Control Rod M6 connector on the reactor head no issues were identified. Control Bank B was withdrawn to the full rods out position (229 steps) and inserted three times to ensure that any potential crud was removed. The other Unit 2 Control Banks and Shutdown Banks were also fully withdrawn and inserted three times to ensure no similar condition existed. All Unit 2 Control Rods and Safety Rods operated normally with no misalignment issues.



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CONTINUATION SHEET**

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1. FACILITY NAME  Joseph M. Farley Nuclear Plant, Unit 2	2. DOCKET NUMBER  05000- 364	3. LER NUMBER		
		YEAR 2019	SEQUENTIAL NUMBER 002	REV NO. 00

**NARRATIVE**

**E. Similar Events:**

There have been no recent events at Farley Nuclear Plant (FNP) that would demonstrate that there is a current concern in system operation. The following similar events were identified in FNP history which there was a similar cause:

07/28/2008 (CAR 168529)- During startup from forced outage Control Rod B06 became misaligned with the remaining group of rods by 12 steps. It was determined crud had spread into the CRDM housing causing the latching mechanisms not to latch up correctly. As a result, the B06 rod continuously slipped as it was being pulled out.

06/17/2005 (CR 2005105949 / OE20984) - While performing a Full Length Control Rod Operability Test, a control rod did not return to Digital Rod Position Indication (DRPI) of 228 as did the other rods. Several maneuvers of that particular control rod bank were conducted which ultimately resulted in two rods being misaligned with the remaining rods in the bank fully withdrawn. The investigation of this event along with the root cause analysis indicated that the most probable cause of the rod control anomaly resulted from service age crud transferred to the new CRDM via the rod drive shaft.