



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PA 19406-2713

September 23, 2015

Mr. David A. Lochbaum
Director, Nuclear Safety Project
Union of Concerned Scientists
PO Box 15316
Chattanooga, TN 37415

Dear Mr. Lochbaum:

I am writing in response to your July 22, 2015, letter to Mr. Daniel Dorman, Regional Administrator of the U.S. Nuclear Regulatory Commission (NRC) Region I office. You expressed concerns with the James A. FitzPatrick Nuclear Power Plant (FitzPatrick) fuel support piece (FSP) associated with fuel cell 38-39, which was found to be elevated after the last refueling outage in September 2014. You stated you felt FitzPatrick was operating in an unanalyzed condition because the NRC has not approved the FitzPatrick reactor to operate with a misaligned FSP or with flow partially obstructed through the FSP's orifices. Additionally, you stated that the NRC has not approved the reactor's operation with corrected thermal limits (Minimum Critical Power Ratio [MCPR]), and that the NRC has neither reviewed nor approved anything with regards to this apparent change to the facility as described in the Updated Final Safety Analysis Report. Finally, you questioned whether the NRC verified or validated the thermal-hydraulics model for the flow reduction (23.63 percent) through the four fuel bundles in cell 38-39.

On July 24, 2015, Mr. Ed Knutson, FitzPatrick Senior Resident Inspector, discussed some of these concerns with you. Following that conversation, you stated in an email to me that you still had concerns with the FSP being mispositioned. Additionally, during a conversation with Mr. Thomas Setzer, Senior Project Engineer, you questioned what confidence the NRC had in the General Electric (GE) Hitachi Thermal-hydraulic model that produced the 23.63 percent reduction in flow.

The mispositioned FSP was identified during an Entergy Nuclear Northeast (Entergy) investigation of high temperature associated with control rod drive 38-39. Upon discovery, this non-conforming condition was entered into FitzPatrick's corrective action program and an ongoing operability assessment was commenced. These actions were in accordance with NRC's expectations for licensee response to the identification of degraded and non-conforming conditions, as discussed in Inspection Manual Chapter 0326, "Operability Determinations and Functionality Assessments for Conditions Adverse to Quality or Safety." Entergy performed an extent of condition by completing a review of the core verification videotape, which confirmed that no other FSPs were out of position. The Resident Inspectors confirmed these actions utilizing Inspection Procedure 71111.15, "Operability Determinations and Functionality Assessments," during the first and second quarterly NRC inspections of 2015.

The first of these inspections resulted in identification of a Green non-cited violation for Entergy's failure to follow procedures in verifying correct fuel assembly seating, thereby missing

the opportunity to have identified the condition while corrective action could be taken prior to completion of the refueling outage. This inspection also reviewed the vendor analysis, which concluded that the mispositioned FSP would result in bypass flow around the affected fuel assemblies to adversely affect their thermal limits. A thermal limit penalty has been applied to the four affected fuel assemblies, and is described in more detail below. The Resident Inspectors, with assistance from our experts in Headquarters, reviewed the corrective actions and supporting vendor thermal-hydraulics analysis and concluded that they were reasonable and did not adversely affect the safe operation of the plant. Furthermore, the vendor performed a structural evaluation of the mispositioned FSP and associated components which concluded that the FSP will remain stable in its current position (that is, it will not rotate or fall) under all operating and design basis conditions (static and dynamic), and that all structural elements will maintain stress levels below design allowable limits. The inspectors reviewed this evaluation and concluded that the results were reasonable.

Regarding the flow reduction (23.63 percent) through the four fuel bundles in cell 38-39, Entergy concluded that this reduction would not lead to the onset of transition boiling (MCPR = 1.0), and would have a conservative 0.22 penalty/impact (MCPR = 1.21 for cell 38-39). This MCPR value was determined conservatively using a 105 percent maximum licensed core flow pressure drop. Additionally, the reduction in bundle power due to the reduced moderation of lower flow caused by this condition was conservatively ignored, and the extra bypass flow caused as a result of the raised FSP was treated as a core wide effect (not just for cell 38-39). Based on observations of the core verification videotape, the FSP was assumed to be elevated by 1.5 inch. Although the videotape indicates a slight rotation of the FSP (approximately 6 degrees), this does not significantly contribute to the flow reduction, as the total flow effect is conservatively accounted for with the total blockage and leakage evaluation. The inspectors reviewed this analysis and determined that it contained appropriate assumptions and conservatively arrived at a MCPR value that was within both safety and licensed operating limits. Additionally, Entergy has recently completed an update of the Core Operating Limits Report to reflect the new analysis using approved methodologies.

Thank you for your questions regarding FitzPatrick. I hope this response addresses your concerns.

Sincerely,

/RA/

Arthur L. Burritt, Chief
Reactor Projects Branch 2
Division of Reactor Projects

the opportunity to have identified the condition while corrective action could be taken prior to completion of the refueling outage. This inspection also reviewed the vendor analysis, which concluded that the mispositioned FSP would result in bypass flow around the affected fuel assemblies to adversely affect their thermal limits. A thermal limit penalty has been applied to the four affected fuel assemblies, and is described in more detail below. The Resident Inspectors, with assistance from our experts in Headquarters, reviewed the corrective actions and supporting vendor thermal-hydraulics analysis and concluded that they were reasonable and did not adversely affect the safe operation of the plant. Furthermore, the vendor performed a structural evaluation of the mispositioned FSP and associated components which concluded that the FSP will remain stable in its current position (that is, it will not rotate or fall) under all operating and design basis conditions (static and dynamic), and that all structural elements will maintain stress levels below design allowable limits. The inspectors reviewed this evaluation and concluded that the results were reasonable.

Regarding the flow reduction (23.63 percent) through the four fuel bundles in cell 38-39, Entergy concluded that this reduction would not lead to the onset of transition boiling (MCPR = 1.0), and would have a conservative 0.22 penalty/impact (MCPR = 1.21 for cell 38-39). This MCPR value was determined conservatively using a 105 percent maximum licensed core flow pressure drop. Additionally, the reduction in bundle power due to the reduced moderation of lower flow caused by this condition was conservatively ignored, and the extra bypass flow caused as a result of the raised FSP was treated as a core wide effect (not just for cell 38-39). Based on observations of the core verification videotape, the FSP was assumed to be elevated by 1.5 inch. Although the videotape indicates a slight rotation of the FSP (approximately 6 degrees), this does not significantly contribute to the flow reduction, as the total flow effect is conservatively accounted for with the total blockage and leakage evaluation. The inspectors reviewed this analysis and determined that it contained appropriate assumptions and conservatively arrived at a MCPR value that was within both safety and licensed operating limits. Additionally, Entergy has recently completed an update of the Core Operating Limits Report to reflect the new analysis using approved methodologies.

Thank you for your questions regarding FitzPatrick. I hope this response addresses your concerns.

Sincerely,

/RA/

Arthur L. Burritt, Chief
 Reactor Projects Branch 2
 Division of Reactor Projects

DOCUMENT NAME: G:\DRP\BRANCH2\Communications\2015\Dave Lochbaum Fitz FSP\Lochbaum FSP response letter.docx
 ADAMS Accession No. **ML15271A037**

<input checked="" type="checkbox"/> SUNSI Review		<input checked="" type="checkbox"/> Non-Sensitive <input type="checkbox"/> Sensitive		<input checked="" type="checkbox"/> Publicly Available <input type="checkbox"/> Non-Publicly Available	
OFFICE	RI/DRP	RI/DRP			
NAME	TSetzer/TCS	ABurritt/ALB			
DATE	9/23/15	9/23/15			