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June 12, 2015
L-15-192

10 CFR 54

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

SUBJECT:

Davis-Besse Nuclear Power Station, Unit No. 1
Docket No. 50-346, License Number NPF-3
Supplemental Information for the Review of the Davis-Besse Nuclear Power Station,
Unit No. 1, License Renewal Application (TAC No. ME4640) and License Renewal
Application Amendment No. 58

By letter dated August 27, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML102450565), FirstEnergy Nuclear Operating Company (FENOC) submitted an application pursuant to Title 10 of the *Code of Federal Regulations*, Part 54 for renewal of Operating License NPF-3 for the Davis-Besse Nuclear Power Station, Unit No. 1 (Davis-Besse). Based on a recent plant event, FENOC is providing supplemental operating experience information to support the completion of the Nuclear Regulatory Commission (NRC) review of the License Renewal Application (LRA).

The Attachment provides the supplemental operating experience information for the LRA. The Enclosure provides Amendment No. 58 to the Davis-Besse LRA.

There are no regulatory commitments contained in this letter. If there are any questions or if additional information is required, please contact Mr. Clifford I. Custer, Fleet License Renewal Project Manager, at 724-682-7139.

I declare under penalty of perjury that the foregoing is true and correct. Executed on June 12th, 2015.

Sincerely,

A handwritten signature in cursive script, appearing to read "Raymond A. Lieb".

Raymond A. Lieb

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Attachment:

Supplemental Operating Experience Information for the Review of the Davis-Besse Nuclear Power Station, Unit No. 1 (Davis-Besse), License Renewal Application (LRA), Section B.2.19

Enclosure:

Amendment No. 58 to the Davis-Besse License Renewal Application

cc: NRC DLR Project Manager
NRC Region III Administrator

cc: w/o Attachment or Enclosure
NRC DLR Director
NRR DORL Project Manager
NRC Resident Inspector
Utility Radiological Safety Board

Attachment
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Supplemental Operating Experience Information for the Review of the
Davis-Besse Nuclear Power Station, Unit No. 1 (Davis-Besse),
License Renewal Application (LRA),
Section B.2.19
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On May 9, 2015, a Moisture Separator Reheater Drains System steam line failure occurred (ICES Report 316616) at an elbow, immediately downstream of a restricting orifice, on a 4-inch line in the Davis-Besse Turbine Building. The piping that failed is downstream from the Train 1 moisture separator reheater and second stage reheat drain tank, and is not within the scope of license renewal.

An extent-of-condition review and ultrasonic testing of the comparable elbow in the opposite train (Train 2) identified that the piping was below the piping standard minimum (87.5 percent nominal) wall thickness. The failed elbow and the degraded elbow were subsequently replaced. A review of the Flow-Accelerated Corrosion (FAC) Program modeling software, CHECWORKS SFA, identified that the reheat vent piping model contained incorrect orifice size data for both lines, which resulted in predicting a less-aggressive wear rate for the two elbows.

Further investigation was performed to determine if other incorrect information regarding restricting orifices (which includes flow elements) was contained in the CHECWORKS SFA database. This review identified other data entry errors. Of the 68 other orifices in the database:

- 27 orifices had dimensions in the database that required correction;
 - Correction of the dimensions for 6 of the 27 orifices resulted in changes in predicted wear rates that required additional investigation;
 - Existing ultrasonic testing data was available for the piping downstream of four of the six orifices that confirmed fitness for service
 - Ultrasonic testing was required prior to plant startup for the piping downstream of two of the six orifices, which confirmed fitness for service

The modeled piping near orifices in the scope of the Flow-Accelerated Corrosion Program are not an operational or safety concern based on the extent-of-condition review and the testing performed.

It has been identified that incorrect input parameter data for the orifices had been entered into an earlier version of the FAC software in the 1987 to 1989 time frame and was carried forward to later versions. It has been further identified that corrective actions associated with the 2006 Train 1 moisture separator reheater first stage reheat

drain line steam leak event did not include input parameter verification of restricting orifice data. Corrective actions are being taken to address both concerns.

Based on the steam line failure event and the issues identified during the investigation, LRA Table A-1, "Davis-Besse License Renewal Commitments," and Section B.2.19, "Flow-Accelerated Corrosion Program," Element 10, "Operating Experience," are revised to address the new operating experience described above.

See the Enclosure to this letter for the revision to the Davis-Besse LRA.

Enclosure

Davis-Besse Nuclear Power Station, Unit No. 1 (Davis-Besse)

Letter L-15-192

Amendment No. 58 to the
Davis-Besse License Renewal Application

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License Renewal Application
Sections Affected

Table A-1

B.2.19

The Enclosure identifies the change to the License Renewal Application (LRA) by Affected LRA Section, LRA Page No., and Affected Paragraph and Sentence. The count for the affected paragraph, sentence, bullet, etc. starts at the beginning of the affected Section or at the top of the affected page, as appropriate. Below each section the reason for the change is identified, and the sentence affected is printed in *italics* with deleted text ~~*lined-out*~~ and added text *underlined*.

Affected LRA Section **LRA Page No.** **Affected Paragraph and Sentence**
Table A-1 **A-69** **New Commitment No. 55**

In response to the steam line failure event of May 9, 2015, and the resulting Root Cause Evaluation Corrective Actions affecting the Flow-Accelerated Corrosion Program, LRA Table A-1, "Davis-Besse License Renewal Commitments," is revised to include new license renewal future Commitment 55, as follows:

Table A-1 Davis-Besse License Renewal Commitments				
Item Number	Commitment	Implementation Schedule	Source	Related LRA Section No./ Comments
<u>55</u>	<p><u>Perform the following actions to improve and maintain the fidelity of the data in the Flow-Accelerated Corrosion Program:</u></p> <ul style="list-style-type: none"> <u>Perform a review of the CHECWORKS SFA model to determine which inputs are critical to the determination of fitness for service and which inputs are non-critical. This action will document the listing of all input fields within the software, and whether their accuracy affects the output of the model.</u> <u>Perform a validation of the data inputs into CHECWORKS SFA. This task will include the validation of any input which would have consequence, as used by the CHECWORKS SFA software in the determination of fitness for service of piping and components for the Flow Accelerated Corrosion (FAC) program. Data contained within the CHECWORKS SFA model that does not impact fitness for service will be annotated during this validation as being</u> 	<u>October 22, 2016</u>	<u>FENOC Letter L-15-192</u>	<u>A.1.19</u> <u>B.2.19</u>

Table A-1
Davis-Besse License Renewal Commitments

Item Number	Commitment	Implementation Schedule	Source	Related LRA Section No./ Comments
	<p><u>non-critical to the function of the software, while still attempting to validate it.</u></p> <ul style="list-style-type: none"> • <u>Document the results of the validation of the CHECWORKS SFA database. This action will create a document (Reference Material, Program Manual, etc.) that will serve as a listing of inputs into the CHECWORKS SFA database and be maintained as a quality record.</u> • <u>Revise the CHECWORKS SFA model to correct the restriction orifices' size/dimension for the orifice and flow elements identified in the Steam Line Failure Root Cause Evaluation.</u> • <u>Establish a list of components for the site that meet the bulleted items within Section 4.4.4 of NSAC-202L, Revision 4. Compile the inspection history of the relevant components. Perform an evaluation for any components without inspection data, and add components requiring inspection to 19RFO scope. These locations are to specifically include:</u> <ul style="list-style-type: none"> ○ <u>Locations downstream of orifices, flow elements, venturis, thermowells, angle valves, flow control valves or level control valves.</u> ○ <u>Locations or lines known to contain backing rings or counterbore.</u> ○ <u>Field-fabricated tees and laterals.</u> 			

Table A-1
Davis-Besse License Renewal Commitments

Item Number	Commitment	Implementation Schedule	Source	Related LRA Section No./ Comments
	<ul style="list-style-type: none"> ○ <u>Nozzles.</u> ○ <u>Complex geometric locations such as components located within two diameters of each other (e.g., an elbow welded to a tee).</u> ○ <u>Components downstream of replaced components (upstream if expander), and components that have been replaced in the past if not upgraded to resistant material.</u> ○ <u>Components (including straight pipe) immediately downstream of FAC-resistant components (e.g., containing chromium greater than 0.10%).</u> ○ <u>Locations immediately downstream of turning vanes.</u> ○ <u>Expansion joints.</u> • <u>Revise the Flow-Accelerated Corrosion Program procedure as follows:</u> <ul style="list-style-type: none"> ○ <u>Add requirements to the procedure that would involve review and selection of examination scope based on recommendations from NSAC-202L, Rev 4, Section 4.4.4. This action requires documentation of the basis for selection or exclusion of the scope for the given outage. Documentation would be in the</u> 			

Table A-1
Davis-Besse License Renewal Commitments

Item Number	Commitment	Implementation Schedule	Source	Related LRA Section No./ Comments
	<p><u>form of discussion in the Outage Technical Report (pre-outage) and Outage Summary Report (post-outage).</u></p> <ul style="list-style-type: none"> ○ <u>Add a step that would require review, approval, and documentation of updates to the CHECWORKS SFA database. The scope of these changes would exclude data collected and evaluated during outages, but would be inclusive of all others (such as plant uprates, plant modifications, engineering change packages, etc.). Documentation for this step would be through an Engineering Evaluation Request.</u> 			

<u>Affected LRA Section</u>	<u>LRA Page No.</u>	<u>Affected Paragraph and Sentence</u>
B.2.19	Page B-86	Operating Experience, 2nd Paragraph

In response to the steam line failure event of May 9, 2015, LRA Section B.2.19, "Flow-Accelerated Corrosion Program," program element "Operating Experience", 2nd paragraph on LRA page B-86, is revised to read as follows:

In 2006, a steam leak was discovered on the moisture separator reheater 1 first stage reheat drain line that should have been detected by the Flow-Accelerated Corrosion (FAC) Program but resulted in a power reduction to facilitate repairs. Corrective actions associated with this event focused on separating modeled lines into single-phase and two-phase flow subsections, but did not include input parameter verification of restricting orifices. The program was enhanced at that time to improve the documentation on quality of the software model and to include a second level of verification for entering data into CHECWORKS. Additionally, a moisture separator reheater 1 second stage reheat vent line failed in May of 2015, resulting in a plant trip and forced outage. The failed elbow was confirmed by destructive examination to be a result of FAC, and the failure was attributed to a data entry error discovered in the CHECWORKS SFA model. A restricting orifice immediately upstream of the failed elbow had its dimension incorrectly input into the original FAC computer model in the 1987 to 1989 time frame. Due to the error in the restricting orifice size, the model had predicted a less-aggressive wear rate from the inception of the FAC program. Corrective actions from this recent event include verification of all critical design inputs to the current CHECWORKS SFA model, enhancing the documentation requirements and approval process for changes to the CHECWORKS SFA model, and procedure updates for evaluating configurations known to accelerate wear in FAC-susceptible piping.