



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

November 12, 2014

LICENSEE: Tennessee Valley Authority

FACILITY: Browns Ferry Nuclear Plant, Units 1, 2, and 3

SUBJECT: SUMMARY OF OCTOBER 14, 2014, MEETING WITH TENNESSEE VALLEY AUTHORITY REGARDING PRE-SUBMITTAL OF EXTENDED POWER UPRATE LICENSE AMENDMENT REQUEST - FUEL ASPECTS FOR BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3 (TAC NOS. MF4851, MF4852, AND MF4853)

On October 14, 2014, a Category 1 public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) and representatives of Tennessee Valley Authority (TVA, the licensee) at NRC Headquarters, One White Flint North, 11555 Rockville Pike, Rockville, Maryland. The purpose of the meeting was for TVA to discuss with NRC staff the content and level of detail to be contained in the fuel safety analysis report (FUSAR) portion of a forthcoming extended power uprate (EPU) license amendment request (LAR) for Browns Ferry Nuclear Plant, Units 1, 2, and 3 (BFN). The meeting notice and agenda dated September 25, 2014, is available in the Agencywide Documents Access and Management System (ADAMS) at Accession No. ML14281A196. The licensee provided presentation slides prior to the meeting that are available in ADAMS at Accession No. ML14281A066. A list of attendees is enclosed.

The licensee presented an overview of the slides and its purpose for the meeting acknowledging the withdrawal of previous BFN EPU LAR submittals (ADAMS Accession No. ML14267A427) and reiterating that a new consolidated EPU LAR would supersede the previous submittals (ADAMS Accession Nos. ML042800186 and ML041840301, respectively). TVA stated that they would employ knowledge gained through the previous EPU LAR process (including content generated through NRC staff requests for additional information (RAIs)) to mitigate potential future submittal content insufficiencies. TVA noted that the forthcoming EPU LAR submittal will conform to NRC RS-001 titled "Review Standard for Extended Power Uprates" and that an improved submittal verification process internal to TVA will be executed to ensure completeness and accuracy. TVA provided an overview of its proposed submittal schedule indicating an October 2015 and October 2017 target date for LAR submittal and NRC issuance of the amendments, respectively. The EPU implementation target is 2018 to 2019.

TVA then focused discussion to the content and relationship between fuel aspects of previous and future BFN FUSAR and safety analysis report for extended power uprate (PUSAR) submittals. It was stated that the aim of previous PUSAR submittals was to address various analyses affected by the EPU, including fuel- and plant-related analyses, and that the reference fuel type used was Global Nuclear Fuel (GNF) GE13/GE14. The FUSAR was described as a supplement to the PUSAR, which considers impacts of alternative fuel types on analyses. For example, previous FUSAR submittals considered Areva's ATRIUM 10 fuel type while the forthcoming FUSAR submittals will consider Areva's ATRIUM 10XM. In the forthcoming submittal, the PUSAR will retain GNF GE14 as the reference fuel type. Legacy ATRIUM 10 will

be addressed in the FUSAR as appropriate. Details on FUSAR fuel type considerations and fuel related analyses to be included in the forthcoming EPU LAR were discussed. NRC staff noted that in addition to considerations listed in the TVA presentation, NRC inquiries could include situations related to loss-of-feedwater heating, plant response, and cycle-to-cycle reproducibility.

TVA subsequently summarized numerous reports to be included in the forthcoming EPU LAR submittal. With regards to fuel dependent analyses for the transition core, TVA indicated that a separate representative EPU ATRIUM 10XM reload report would be provided. Plant-related analyses, nonfuel dependent event disposition, and fuel dependent analyses were also discussed. Both NRC staff and TVA representatives noted the importance of demonstrating the applicability of the PUSAR by comparing analysis results based on the ATRIUM 10XM to the reference GNF GE14 fuel type. Additional fuel-related reports, consistent with recently approved BFN fuel transition LARs, to be provided, include the transition cycle design report, equilibrium cycle ATRIUM 10XM design report, nuclear fuel design report, reload report, fuel mechanical design report, fuel rod thermal mechanical report, thermal hydraulic report, boiling water reactor methods compendium, methods applicability report, and an update to the National Fire Protection Association 805 fire protection analysis report. All applicable reports will include most recent updates and will be submitted considering lessons learned from previous iterations of NRC RAIs for recently approved fuel related BFN LARs. TVA indicated that loss-of-coolant accident (LOCA) reports will be updated to include EPU conditions based on ATRIUM 10XM (e.g., break spectrum and fuel maximum average planar linear heat generation rate (MAPLHGR) reports). NRC staff conversed with TVA regarding how fuel burn-up conditions are reflected in the analyses.

TVA raised a few potential implications of the ongoing NRC rulemaking process to add Title 10, *Code of Federal Regulations* (10 CFR) Section 50.46c, which relates to the acceptance criteria for emergency core cooling systems for zirconium alloy clad fuel rods under LOCA conditions, on the forthcoming BFN EPU LAR. Considerations included a single failure proof automatic depressurization system logic and top down core spray licensing basis requirements. Hydrogen pickup effects and a potential grandfathered treatment of ATRIUM 10 fuel were also discussed. The NRC staff will remain available to coordinate with the licensee regarding the status of the 10 CFR 50.46c rulemaking process.

TVA stated that reactivity initiated accident considerations, such as the value chosen for the fuel enthalpy rise criteria, will comply with emerging NRC regulatory requirements and as such will likely be vetted and addressed through the RAI process. The NRC staff will remain available to coordinate with the licensee regarding the scheduled release of reactivity initiated accident guidance.

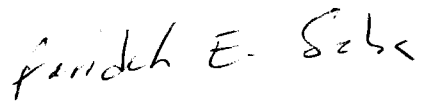
The meeting concluded with a summary of TVA and NRC followup items related to preparation for the forthcoming EPU LAR submittal. TVA items include demonstration of: 1) the applicability of PUSAR conclusions by comparing reactor vessel fluence resulting from GE14 fuel to reactor vessel fluence resulting from ATRIUM 10XM fuel; 2) the impacts of and associated critical thinking/analyses performed relating to EPU on events described in the disposition of event summary in the representative ATRIUM 10XM reload report (e.g., overpower events, positive reactivity insertion events, loss of feedwater heating); 3) information with respect to the LOCA approach to legacy ATRIUM 10; specifically, an explanation regarding MAPLHGR limit analysis

and how fuel burn-up conditions are reflected in the analysis; and 4) a listing and description of any additional fuel related power ascension tests that would be required for EPU.

Additional NRC and TVA items include: 1) the planning of a followup meeting regarding the approach to the treatment of 10 CFR 50.46c; and 2) the determination/coordination of activities based on the scheduled release of NRC revised standard review plan guidance with respect to reactivity initiated accidents.

Members of the public participated by phone. No public meeting feedback forms were received.

Please direct any inquiries to me at 301-415-1447, or [farideh.saba@nrc.gov](mailto:farideh.saba@nrc.gov).

Handwritten signature of Farideh E. Saba in black ink.

Farideh E. Saba, Senior Project Manager  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos.: 50-259, 50-260  
and 50-296

Enclosure:  
List of Attendees

cc w/encl: Distribution via Listserv

LIST OF ATTENDEES

OCTOBER 14, 2014, MEETING WITH TENNESSEE VALLEY AUTHORITY

REGARDING PRE-SUBMITTAL EXTENDED POWER UPRATE LICENSE AMENDMENT  
REQUEST FUEL ASPECTS

NRC STAFF AND CONTRACTORS

Reed Anzalone  
Jonathan Bartley  
Daniel Beacon  
Davida Cunanan  
Jeremy Dean  
Andy Hon  
Mathew Panicker  
Benjamin Parks  
Blake Purnell  
Candace Pfefferkorn  
Lisa Regner  
Farideh Saba

TVA STAFF AND CONTRACTORS

Gerard Doyle  
Pete Donahue  
George Rorke  
Dan Green  
Ed Schrull  
Greg Storey  
Tom Eichenberg  
Gordon Williams\*

AREVA STAFF AND CONTRACTORS

David McBurney  
Alan Meginnis  
Robert Schnepf\*  
Scott Tylinski\*

PUBLIC

Steve Sparks\* – ANATECH Corp.  
William Freebairn\* – Platts Nucleonics Week

\* By phone.

Enclosure

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Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

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JJandovitz, OEDO	BPurnell, NRR

**ADAMS Accession Nos.:** Meeting Notice ML14281A196 Meeting Summary ML14300A203  
Handout ML14281A066

OFFICE	NRR/DORL/LPII-2/PM	NRR/DORL/LPII-2/PM	NRR/DOR/LPLII-2/LA
NAME	CPfefferkorn	FSaba	BClayton
DATE	11/5/14	11/3/14	10/31/14
OFFICE	NRR/DSS/SNPB/BC	NRR/DOR/LPLII-2/BC(A)	NRR/DORL/LPII-2/PM
NAME	JDean	LRegner	FSaba
DATE	11/6/14	11/12/14	11/12/14