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

April 6, 2017

LICENSEE: Tennessee Valley Authority

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

SUBJECT: SUMMARY OF FEBRUARY 15, 2017, MEETING WITH TENNESSEE VALLEY AUTHORITY ON UPDATES TO THE TRANSMISSION SYSTEM REGARDING EXTENDED POWER UPRATE FOR BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3 (CAC NOS. MF6741, MF6742, AND MF6743)

On February 15, 2017, a Category 1 public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) staff 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 present to the NRC staff changes to the previously proposed modifications associated with the transmission system and impacts of those changes on the safety and environmental assessments regarding the extended power uprate (EPU) license amendment request (LAR) for Browns Ferry Nuclear Plant (Browns Ferry) Units 1, 2, and 3. The meeting notice and agenda, dated January 13, 2017, are available in the Agencywide Documents Access and Management System (ADAMS) under Accession No. ML17034A472. A list of attendees is provided as Enclosure 1.

The licensee submitted the EPU LAR on September 21, 2015 (ADAMS Accession No. ML15282A152), with numerous supplements. Upon approval of the EPU LAR, the licensee plans to implement the EPU in the spring of 2018 for Unit 3, the fall of 2018 for Unit 1, and the spring of 2019 for Unit 2. The proposed EPU amendment would increase the authorized maximum steady-state reactor core power level for each unit from 3,458 megawatts thermal (MWt) to 3,952 MWt.

The licensee's presentation document, which was provided prior to the meeting and attached to the meeting notice, is available under ADAMS Accession No. ML17034A332. The licensee's presentation began with providing background information regarding the transmission system. TVA stated that an Interconnection System Impact Study (SIS) was performed for Browns Ferry, Units 1, 2, and 3, at EPU conditions. The SIS determined that main generator stability issues exist for a three-phase fault on one of several transmission lines coincident with certain transmission lines already out of service (N-1-1 event). TVA stated that the main generators would become unstable during the N-1-1 event because the existing main generator's excitation systems could not raise the field voltage fast enough and high enough to prevent the instability. To mitigate the transient stability issues during an event, TVA had planned to install a new shunt-fed, static excitation system on each of the three Browns Ferry units. However, the licensee identified a legacy error in the generator field parameter values that were provided after stator rewind in 2003, and that were used in the development of the Interconnection SIS. The licensee found that, at EPU power levels, more extensive compensatory measures would be needed for the main generators to remain stable and that the previous stability mitigation plan, addressed in the licensee's Supplement 18, dated May 27, 2016 (ADAMS Accession No. ML16197A563), was no longer viable. The licensee further discussed the differences between the previous mitigation plan and the updated plan. TVA stated that the updated

stability mitigation plan for the N-1-1 event would include (1) modifying the existing excitation system from bus-fed type to self-excited type (instead of the previously proposed static excitation system) on each Browns Ferry unit, and (2) installing a static volt-ampere reactive compensator at the existing Limestone Substation near Browns Ferry. The NRC staff asked whether TVA plans to perform any testing in the future when the modifications are done. TVA responded that there is a requirement by the Federal Energy Regulatory Commission (FERC) to do testing and that the FERC-required testing would be performed in several years.

The licensee, in its letter dated January 20, 2017 (ADAMS Accession No. ML17023A200), submitted Supplement 36 to the EPU LAR. Enclosures to Supplement 36 provided revisions to the Interconnection SIS, Transmission Stability Study, TVA responses to the NRC staff's request for additional information, probabilistic risk assessment, Power Uprate Safety Analysis Report Section 2.5.1.2.2, and list and status of modifications. The licensee stated that the modifications related to the main generator's excitation systems will be implemented at Browns Ferry during the fall of 2020 at Unit 1, during the spring of 2021 at Unit 2, and during the spring of 2020 at Unit 3. The NRC staff noted that the updated system modifications will be implemented sooner than previously planned modifications. The licensee added that, from the time the EPU is implemented until modifications are complete, TVA will develop and follow operating guidelines and procedures for derating the plant, if needed.

The NRC staff asked clarifying questions throughout the presentation. Specifically, the NRC staff asked the licensee to provide the values (before the error and after correcting the error) of the generator field parameter affected by the identified legacy error. The licensee provided the requested information by an e-mail where the licensee explained that the open circuit transient time constant value was the generator field parameter affected by the identified legacy error. A value of 7.283 seconds was reported after the 2003 Stator rewind versus a 2016 corrected value of 9.273 seconds. Both of these numbers are at the 1,330-million volt-ampere rating. Additionally, during the presentation, the NRC staff asked TVA to provide a block diagram of the existing generator exciter system and the proposed modified generator exciter system. The licensee, in another e-mail, provided the requested diagrams as shown in Enclosure 2 of this meeting summary.

The licensee continued its presentation (starting from slide 14) by discussing environmental aspects of the transmission system update. TVA explained that instead of installing capacitor banks at the Wilson Substation in Wilson County, Tennessee, TVA would install a static volt-ampere reactive compensator at the existing Limestone Substation in Limestone County, Alabama, near Browns Ferry. TVA submitted LAR Supplement 37 on February 3, 2017 (ADAMS Accession No. ML17034A562), which included updated TVA responses to the staff's request for additional information associated with environmental reviews, Revision 2 of the supplemental environmental report, and updated draft environmental assessment and finding of no significant impact. TVA did not identify any significant environmental impact from the updated transmission system.

There was one member of the public in attendance by telephone. Public Meeting Feedback forms were not received. At the end of the meeting, following questions and answers between the NRC staff and TVA representatives, the member of the public stated his concerns about the possibility of flooding of the Tennessee River and malfunction of the nearby dams, and the impact on operations of the Browns Ferry units. The NRC staff responded that the issues regarding the flooding and functionality of dams were not relevant to the subject of this meeting. However, the NRC staff informed the member of the public that the NRC staff in the Office of Nuclear Reactor Regulation, Division of Japan Lessons Learned (JLD), has been evaluating

flooding hazards for all the nuclear power plants and that the majority of the JLD reports are publicly available in ADAMS.

Please direct any inquiries to me at 301-415-1447 or Farideh.Saba@nrc.gov.

Farideh E Saba

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

Enclosures:
1. List of Attendees
2. Charts - Existing Voltage Regulation and New Voltage Regulation

cc w/enclosures: Distribution via Listserv

LIST OF ATTENDEES

FEBRUARY 15, 2017, MEETING WITH TENNESSEE VALLEY AUTHORITY

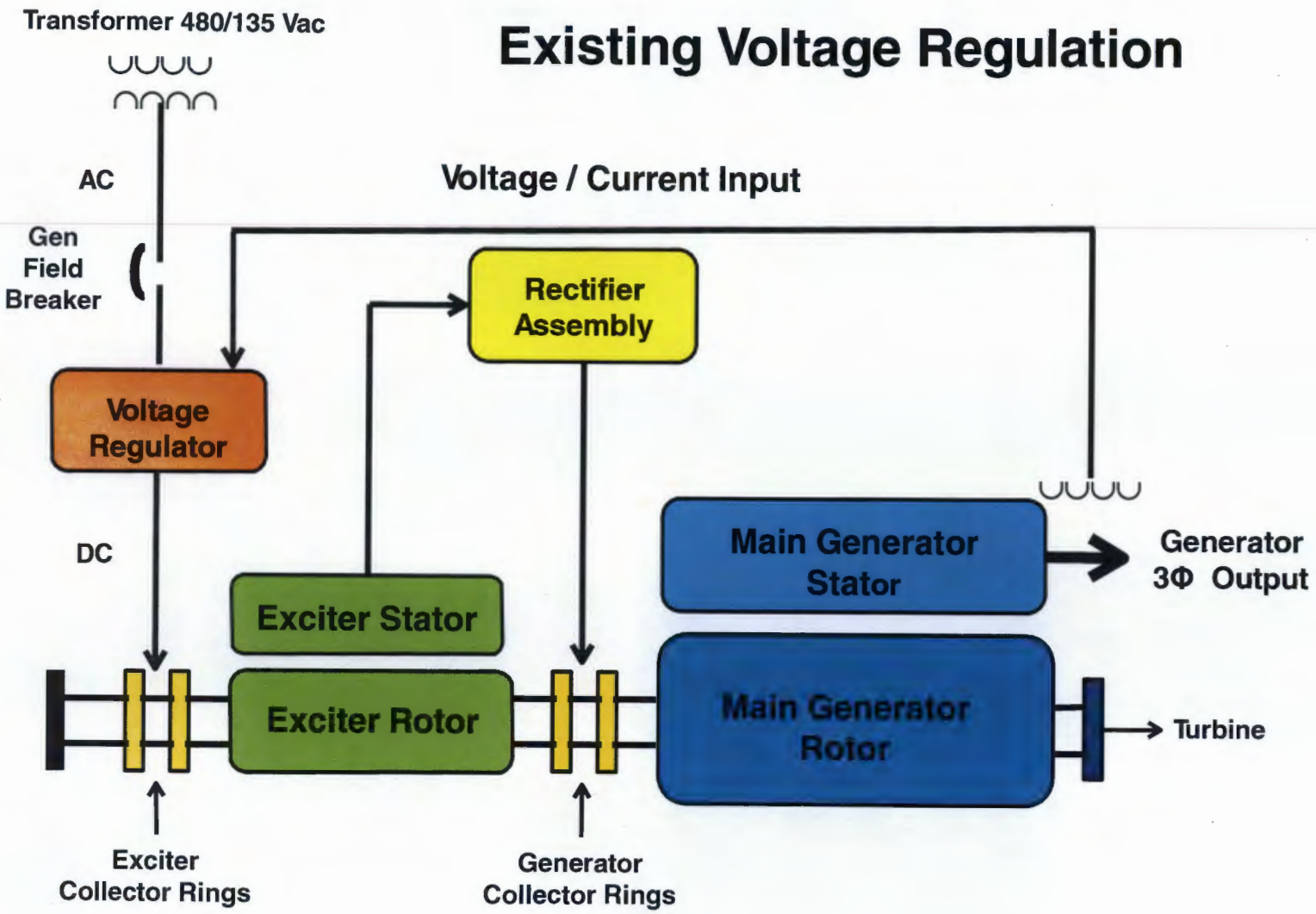
ON UPDATES TO THE TRANSMISSION SYSTEM REGARDING EXTENDED POWER

UPRATE FOR BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3

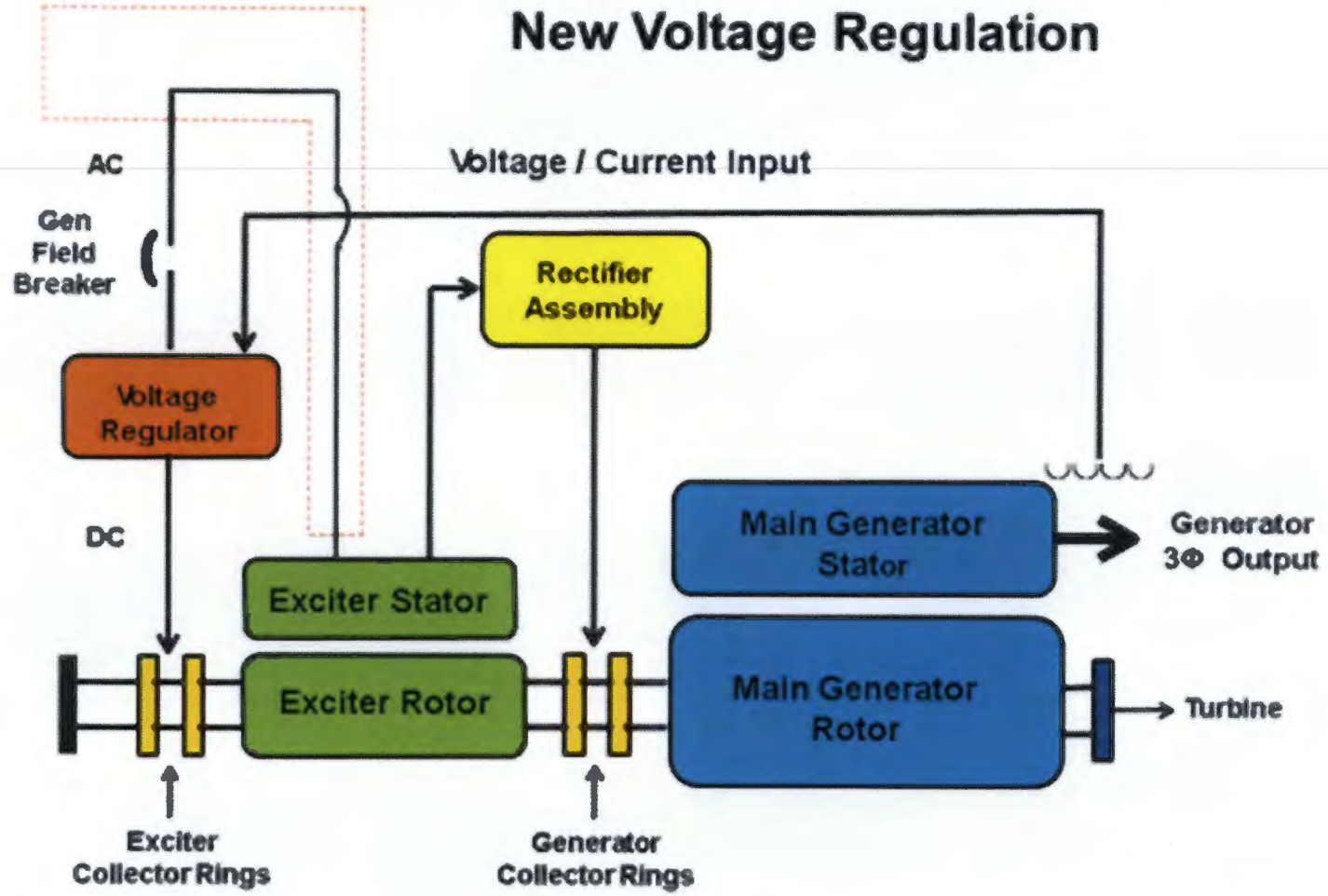
Name	**Organization**
Farideh Saba	U.S. Nuclear Regulatory Commission (NRC)
Benjamin Beasley	NRC
Russell Haskell	NRC
Vijay Goel	NRC
Adakou Foli	NRC
Todd Hilsmeier	NRC
Jeffrey Rikhoff	NRC
Kevin Folk	NRC
William Rautzen	NRC
Ami Patel	NRC
Briana Grange*	NRC
Gerard Doyle	Tennessee Valley Authority (TVA)
Pete Donahue	TVA
Dan Green	TVA
Ashley Michael	TVA
Joe Bashore	TVA
William Baker	TVA
Gordon Williams	TVA
Marvin Lewis*	Public

*By telephone

Existing Voltage Regulation



New Voltage Regulation



SUBJECT: SUMMARY OF FEBRUARY 15, 2017, MEETING WITH TENNESSEE VALLEY AUTHORITY ON UPDATES TO THE TRANSMISSION SYSTEM REGARDING EXTENDED POWER UPRATE FOR BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3 (CAC NOS. MF6741, MF6742, AND MF6743) DATED APRIL 6, 2017

DISTRIBUTION:

Public
LPL2-2 Reading File
RidsNrrLABClayton Resource
RidsRgn2MailCenter Resource
RidsACRS_MailCTR Resource
RidsNrrPMBrownsFerry Resource
RidsNrrDorlLpl2-2 Resource
RHaskell, NRR
THilsmeier, NRR
RidsNrrDra Resource
RidsNrrDe Resource
BGrange, NRR
APatel, NRR
WRautzen, NRR
JBowen, OEDO
TClark, OEDO
TWertz, NRR
VGoel, NRR
KFolk, NRR
JRikhoff, NRR
AFoli, NRR
RidsNrrDorl Resource

ADAMS Accession No.: ML17061A672 *by e-mail

OFFICE	NRR/DORL/LPL2-2/PM	NRR/DORL/LPL2-2/LA	NRR/DLR/RERP/BC(A)*
NAME	FSaba	BClayton (LRonewicz for)	JRikhoff
DATE	04/06/2017	04/06/2017	04/03/2017
OFFICE	NRR/DE/EEEB/BC*	NRR/DORL/LPL2-2/BC	NRR/DORL/LPL2-2/PM
NAME	JZimmerman (RMathew for)	BBeasley	FSaba
DATE	03/29/2017	04/06/2017	04/06/2017

OFFICIAL RECORD COPY