



Tennessee Valley Authority, 1101 Market Street, LP 5A, Chattanooga, Tennessee 37402-2801

May 15, 2009

10 CFR 52.79

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

In the Matter of)
Tennessee Valley Authority)

Docket No. 52-014 and 52-015

BELLEFONTE UNITS 3 AND 4, COMBINED LICENSE APPLICATION - RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION - HYDROLOGY PROBABLE MAXIMUM FLOOD LEVEL CALCULATIONS

- References: (1) Letter from J. A. Bailey (TVA) to Document Control Desk (NRC), Review of Hydrology Information Contained in FSAR Section 2.4, October 22, 2008.
- (2) Letter from T. Bergman (NRC) to Ashok Bhatnagar (TVA), Change in Schedule of Bellefonte Units 3 and 4 Combined License Application Hydrology Review, October 29, 2008.
- (3) Letter from Joseph Sebrosky (NRC) to Andrea Sterdis (TVA), Request for Additional Information Letter No. 158 Related to SRP Section 2.4.3 for the Bellefonte Units 3 and 4 Combined License Application, dated May 12, 2009.

On March 30, 2009, the NRC and TVA met to discuss the ongoing efforts to confirm the hydrology probable maximum flood (PMF) level calculation utilized to develop information provided in the Bellefonte (BLN) 3&4 combined license (COL) application. During that meeting, TVA presented the current status and target dates for completing the PMF confirmation project, including the input calculations that had been completed and approved by TVA through the end of March 2009. NRC has requested that TVA submit the calculations on the BLN 3&4 docket so that they can be used to support the development of simplified/bounding calculations and confirmatory numerical tools to complete their independent evaluation of the PMF when the hydrology review resumes. Reference 3 constitutes NRC's RAI asking that TVA submit the input calculations and Verification and Validation (V&V) documents on the BLN 3&4 COL application docket. In response to the subject RAI, this letter provides TVA's submittal of those input calculations which have been approved to date.

TVA has informed the NRC that the process to verify the river system inputs requires model calibration, and in some cases PMF computation, to be completed in order to confirm the final input values. Although the model calibration and PMF computation(s) may result in revisions to input calculations, NRC's use of these and the remaining input calculations to support confirmatory model development should not be impacted. As these calculations are further updated, TVA will notify the NRC of any significant revisions.

DOS

Document Control Desk
Page 2
May 15, 2009

Consistent with our discussions with the NRC regarding the submittal of these calculations in advance of completing the PMF computations (scheduled for December 2009), TVA understands that the NRC has agreed that any further RAIs will be limited to those areas necessary to support development of the confirmatory model. The NRC has indicated that RAIs resulting from the detailed review of the supplied calculations will be held pending the completion of the PMF confirmation efforts and corresponding final submittals of the supplied calculations scheduled for 4th quarter CY 2009.

If you should have any questions, please contact Tom Ryan at 1101 Market Street, LP5A, Chattanooga, Tennessee 37402-2801, by telephone at (423) 751-2596, or via email at wtryan@tva.gov.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 15th day of MAY, 2009.



Andrea L. Sterdis
Manager, New Nuclear Licensing and Industry Affairs
Nuclear Generation Development & Construction

Enclosure

cc: See Page 3

Document Control Desk
Page 3
May 15, 2009

cc: (w/ Enclosures)

J. P. Berger, EDF
J. M. Sebrosky, NRC/HQ
E. Cummins, Westinghouse
S. P. Frantz, Morgan Lewis
M. W. Gettler, FP&L
R. Grumbir, NuStart
P. S. Hastings, NuStart
P. Hinnenkamp, Entergy
M. C. Kray, NuStart
D. Lindgren, Westinghouse
G. D. Miller, PG&N
M. C. Nolan, Duke Energy
N. T. Simms, Duke Energy
K. N. Slays, NuStart
G. A. Zinke, NuStart

cc: (w/o Enclosure)

B. C. Anderson, NRC/HQ
M. M. Comar, NRC/HQ
B. Hughes/NRC/HQ
R. G. Joshi, NRC/HQ
R. H. Kitchen, PGN
M. C. Kray, NuStart
A. M. Monroe, SCE&G
C. R. Pierce, SNC
R. Reister, DOE/PM
L. Reyes, NRC/RII
T. Simms, NRC/HQ
L. Raghavan, NRC/HQ
T. Boyce, NRC/HQ

Enclosure
TVA letter dated May 15, 2009
RAI Response

Responses to NRC Request for Additional Information letter No. 158 dated May 12, 2009
(3 pages, including this list)

Subject: Request for Additional Information Letter No. 158 Related to SRP Section 2.4.3 for the
Bellefonte Units 3 and 4 Combined License Application

<u>RAI Number</u>	<u>Date of TVA Response</u>
02.04.03-08	This letter – see following pages

<u>Associated Additional Attachments / Enclosures</u>	<u>Pages Included</u>
Attachment 02.04.03-08A	5 Pages

Enclosure
TVA letter dated May 15, 2009
RAI Response

NRC Letter Dated: May 12, 2009

NRC Review of Final Safety Analysis Report

NRC RAI NUMBER: 02.04.03-08

TVA presents calculation of the probable maximum flood (PMF) height at the Bellefonte COL Site in Section 2.4.3 of the FSAR. These calculations address regulatory requirements associated with General Design Criterion 2 and 10 CFR 100.20(c). TVA has continued to develop its analysis since the FSAR was submitted, and has developed additional calculation packages/documents associated with computation of the PMF height. The specifics of this analysis were discussed during a March 30, 2009 public meeting held at NRC Headquarters (see ML091180052 and ML0911204490). The NRC staff requests that TVA provide the following input deliverables:

- (a) V&V Docs (16 docs; April 2009)(1)
- (b) UH Calcs – Rev 0 (17 calcs; April 2009)
- (c) UH Calcs – Rev 1 (5 calcs; June 2009)
- (d) Dam Rating Curves (20 calcs; March 2009)
- (e) SOCH Calibrations (6 calcs; July 2009)
- (f) Other Input Calcs (3 calcs; April 2009)

The titles of these input deliverables follow the naming convention used by TVA on Slide 10 of its March 30, 2009 presentation (see ML091180052). The number of calculations/documents and the anticipated TVA completion date are shown in parenthesis. This information also originates from Slide 10 of the presentation.

Enclosure

(1) TVA can provide the information in item (a) above on the docket or provide the information in reading rooms to which NRC and its' contractors have access.

BLN RAI ID: 2778

BLN RESPONSE:

TVA is providing BLN Hydrology Calculation DVD's with the following information in support of the information requested in the associated RAI request. The information being submitted is:

1. 12 V&V Documents
2. 16 UH Calculations Rev 0
3. 0 UH Calculations Rev 1
4. 20 Dam Rating Curves
5. 0 SOCH Calibrations
6. 2 Input Calculations (Reservoir Storage Table and 1997-2008 Precipitation Data).

The actual calculations being submitted on DVD media are shown in Attachment 02.04.03-08A. Additional calculations will be submitted as they are completed and approved.

Enclosure
TVA letter dated May 15, 2009
RAI Response

The following provides a schedule for submittal of the remaining requested documents and calculations:

- | | |
|-------------------------------------|-----------------|
| 1. 4 V&V Documents | June 8, 2009 |
| 2. 1 UH Calculations Rev 0 | June 8, 2009 |
| 3. 5 UH Calculations Rev 1 | July 24, 2009 |
| 4. 20 Dam Rating Curves | Complete |
| 5. 6 SOCH Calibrations | August 17, 2009 |
| 6. 1 Input Calculations* | July 7, 2009 |
| 7. 2 Additional Input Calculations* | July 7, 2009. |

*Currently submitting Input Calculations for: Precipitation Data (1997-2008NWS) and Reservoir Storage Tables. Remaining Input Calculations include: Precipitation Data (1973 Storm), Rain Runoff Index and Operating Guidelines.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None

ASSOCIATED ATTACHMENTS/ENCLOSURES:

Attachment 02.04.03-08A: BLN Hydrology Project Calculation List

ASSOCIATED ATTACHMENTS/ENCLOSURES:

Attachment 02.04.03-08A: BLN Hydrology Project Calculation List

(5 pages including the cover sheet)

**BLN Hydrology Project
Calculation List**

DAM RATING CURVES

Calculation No:	Calculation Title	Rev.	EDMS No.
CDQ000020080001	Dam Rating Curve, Apalachia	0	L58 090128 003
CDQ000020080002	Dam Rating Curves, Blue Ridge	0	L58 090128 001
CDQ000020080003	Dam Rating Curve, Boone	0	L58 090128 004
CDQ000020080004	Dam Rating Curves, Chatuge	1	L58 090216 004
CDQ000020080005	Dam Rating Curves, Cherokee	1	L58 090406 003
CDQ000020080006	Dam Rating Curves, Chickamauga	0	L58 090224 005
CDQ000020080007	Dam Rating Curves, Douglas	2	L58 090406 002
CDQ000020080008	Dam Rating Curves, Fontana	1	L58 090216 002
CDQ000020080009	Dam Rating Curves, Fort Loudoun	0	L58 090304 001
CDQ000020080010	Dam Rating Curve, Fort Patrick Henry	0	L58 090120 003
CDQ000020080011	Dam Rating Curves, Guntersville	0	L58 090224 004
CDQ000020080012	Dam Rating Curves, Hiwassee	1	L58 090216 001
CDQ000020080013	Dam Rating Curve, Melton Hill	1	L58 090210 002
CDQ000020080014	Dam Rating Curves, Nickajack	0	L58 090216 007
CDQ000020080015	Dam Rating Curves, Norris	0	L58 090210 001
CDQ000020080016	Dam Rating Curves, Nottely	1	L58 090216 003
CDQ000020080017	Dam Rating Curves, South Holston	0	L58 090224 001
CDQ000020080018	Dam Rating Curves, Tellico	0	L58 090304 002
CDQ000020080019	Dam Rating Curves, Watauga	0	L58 090120 002
CDQ000020080020	Dam Rating Curves, Watts Bar	0	L58 090224 002

**BLN Hydrology Project
Calculation List**

UNIT HYDROGRAPHS

Calculation No.	Calculation Title	Rev.	EDMS No.
CDQ000020080056	Douglas Dam Watershed (Subbasins 1 through 6) Unit Hydrograph Validation	0	L58 090422 001
CDQ000020080057	Subbasin 48 (Sequatchie River) Unit Hydrograph Validation	0	L58 081125 800
CDQ000020080058	Subbasin 46 (South Chickamauga Creek) Unit Hydrograph Validation	0	L58 081105 002
CDQ000020080060	Calculation of Initial Flood Flows from Subbasins 47A and 47B for use in the SOCH Model Calibration and Unit Hydrograph Validation	0	L58 090424 005
CDQ000020080061	Subbasins 38 (Chatuge Dam), 39 (Nottely Dam), 40 (Hiwassee Dam), 41 (Apalachia Dam), and 43 (Ocoee No. 1 Dam) Unit Hydrograph Validations	0	L58 090414 001
CDQ000020080062	Unit Hydrograph Validation for Subbasin 7 (Little Pigeon River at Sevierville)	0	L58 090227 001
CDQ000020080063	Holston River Watershed above Cherokee Dam (Subbasins 9 through 15) Unit Hydrograph Validation	0	L58 090422 002
CDQ000020080064	Calculation of Initial Flood Flows from Subbasins 44B and 45, Local Inflows to Chickamauga Dam, for Use in the SOCH Model Calibration and Unit Hydrograph Validation	0	L58 090424 004
CDQ000020080065	Calculation of Initial Flood Flows from Subbasins 25, 33, 34, 36, and 37 for use in SOCH Model Calibration and Unit Hydrograph Validation	0	L58 090511 002
CDQ000020080066	Subbasin 26 (Norris Dam) Unit Hydrograph Validation	0	L58 090216 005
CDQ000020080067	Subbasin 35 (Emory River at Mouth) Unit Hydrograph Validation	0	L58 090227 002
CDQ000020080068	Calculation of Initial Flood Flows from Subbasin 27 (Melton Hill Local) for Use in the SOCH Model Calibration and Subsequent Unit Hydrograph Validation	0	L58 090511 003
CDQ000020080069	Calculation of Initial Flood Flows from the Fort Loudoun-Tellico Watershed (Subbasins 8, 16, 17, 18, and 24) for Use in the SOCH Model Calibration and Unit Hydrograph Validation	0	L58 090511 001
CDQ000020080070	Little Tennessee River Watershed above Chilhowee Dam (Subbasins 19 through 23) Unit Hydrograph Validation	0	L58 090414 002
CDQ000020080071	Unit Hydrograph Validation for Subbasin 44A, the Lower Hiwassee River from Charleston (River Mile 18.9) to Apalachia and Ocoee No. 1 Dams	0	L58 090216 006
CDQ000020080091	Subbasin 42 (Blue Ridge Dam) Unit Hydrograph Validation	0	L58 081030 007

**BLN Hydrology Project
Calculation List**

SOFTWARE V&V DOCUMENTS

Title	Rev.	EDMS No.
User's Manual		
WEIGHTED WIDTH (WWIDTH) Version 1.0 CONVEYANCE (CONVEY) Version 1.0	0	L58 090213 001
UNITGRPH,FLDHYDRO,TRBROUTE,CHANROUT Version 1.0	0	L58 090325 001
DBREACH Version 1.0	0	L58 090213 002
Software Requirements Specification (SRS)		
WEIGHTED WIDTH (WWIDTH) Version 1.0 CONVEYANCE (CONVEY) Version 1.0	0	L58 081219 001
UNITGRPH,FLDHYDRO,TRBROUTE,CHANROUT Version 1.0	0	L58 090331 001
DBREACH Version 1.0	0	L58 081219 002
Software Design Description (SDD)		
WEIGHTED WIDTH (WWIDTH) Version 1.0 CONVEYANCE (CONVEY) Version 1.0	0	L58 081219 005
UNITGRPH,FLDHYDRO,TRBROUTE,CHANROUT Version 1.0	0	L58 090331 002
DBREACH Version 1.0	0	L58 081125 801
Software Verification and Validation Report (SVVR)		
WEIGHTED WIDTH (WWIDTH) Version 1.0 CONVEYANCE (CONVEY) Version 1.0	0	L58 090210 005
UNITGRPH,FLDHYDRO,TRBROUTE,CHANROUT Version 1.0	0	L58 090327 001
DBREACH Version 1.0	0	L58 090224 006

**BLN Hydrology Project
Calculation List**

OTHER

Calculation No:	Calculation Title	Rev.	EDMS No.
CDQ000020080051	Reservoir Storage Tables	0	L58 090406 004
CDQ000020080055	Processing and Validation of National Weather Service's NEXRAD Stage III Hourly Precipitation Data for Hydrologic Analysis of TVA Subbasins (1997 - 2008 MAPX Data)	1	L58 090210 004