



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

February 11, 2010

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 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.
- (2) Letter from Jack A. Bailey (TVA) to Document Control Desk (NRC), Bellefonte Combined License Application-Periodic Update-Hydrology, dated February 3, 2010.

This letter provides the Tennessee Valley Authority's (TVA) supplemental response to the Nuclear Regulatory Commission's (NRC) request for additional information (RAI) items included in Reference 1. This response supplements TVA's previous response provided in Reference 2. This document was previously submitted to NRC but due to a mail room addressing error the submittal was retrieved from the mail service provider prior to receipt by the NRC Document Control Desk. This document is being resent with the date changes to reflect this submittal date.

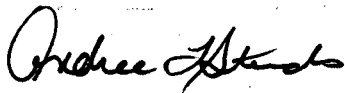
If you should have any questions, please contact Tom Ryan at 1101 Market Street, LP5A, Chattanooga, Tennessee 37402-2801, by telephone at (423) 751-2596, or via email at wtryan@tva.gov.

DOBS
NRLO

Document Control Desk
Page 2
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I declare under penalty of perjury that the foregoing is true and correct.
Executed on this 11th day of Feb, 2010

Sincerely,



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

Enclosure
cc: See Page 3

cc: (W/ Enclosure)

S. P. Frantz, Morgan Lewis
M.W. Gettler, FP&L
R. C. Grumbir, NuStart
P. S. Hastings, NuStart
P. Hinnenkamp, Entergy
M. A. Hood, NRC/HQ
R. H. Kitchen, PGN
M. C. Kray, NuStart
A. M. Monroe, SCE&G
C. R. Pierce, SNC
L. Reyes, NRC/R11
J. M. Sebrosky, NRC/HQ
R. F. Smith-Kevern, DOE/HQ
A. Zinke, NuStart

cc: (W/ Enclosure)

G. P. Arent, EQB 1A - WBN
J. A. Bailey, LP 5A - C
C. C. Chandler, WT 6A - K
A. L. Sterdis, LP 5A - C
E. J. Vigluicci, WT 6A - K
S. A. Vance, WT 6A - K
P.C. Willingham, LP-6A-C
EDMS, WT CA - K

Enclosure
TVA letter dated February 11, 2010
RAI Response

Responses to NRC Request for Additional Information letter No. 158 dated May 12, 2009
(2 pages, including this list)
Subject: Hydrology Probable Maximum Flood Level Calculations

RAI Number Date of TVA Response
02.04.03-08 May 15, 2009; Supplemented by this letter – see following pages

<u>Associated Additional Attachments / Enclosures</u>	<u>Pages Included</u>
Attachment 02.04.03-08A	RAI 158 Supplement 2 Calculation List 17 pages
Attachment 02.04.03-08B	1973 Flood Data Verification Package 296 pages
Attachment 02.04.03-08C	Flood Operational Guides 65 pages
Attachment 02.04.03-08D	API and Rain Runoff Relationship for Tennessee River Watershed 500 pages

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.

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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 List to support the information requested in the associated RAI request. See attached Attachment 02.04.03-08A, "BLN Hydrology Project Calculation List" for the documents and disks that are associated with this submittal.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None

ASSOCIATED ATTACHMENTS/ENCLOSURES:

Attachment 02.04.03-08A	BLN Hydrology Project	RAI 158 Supplement 2 Calculation List
Attachment 02.04.03-08B	CDQ000020080049	1973 Flood Data Verification Package
Attachment 02.04.03-08C	CDQ000020080050	Flood Operational Guides
Attachment 02.04.03-08D	CDQ000020080052	API and Rain Runoff Relationship for Tennessee River Watershed

Attachment 02.04.03-08A
TVA letter dated February 11, 2010
RAI Response

Attachment 02.04.03-8A: BLN Hydrology Project RAI 158 Supplement 2 Calculation List

(17 Pages including Cover Sheet)

Calculation **CDQ000020080049, Rev. 1**

Title **1973 Flood Data Verification Package**

EDMS Number: **L58 090921 001**

Summary

Total Hard Copy Pages:	<u>295</u>
Total Electronic Files on DVD:	<u>143</u>

File Inventory for NRC Documentation Submittal

	<u>Type</u>	<u>Pages</u>	NRC ADAMS Form
Calculation Main Body	pdf	25	Paper
<u>Electronic Attachments</u>			
Appendix A_Thiessen Polygon and Area Measurement Software Check.pdf	pdf	3	Paper
jobs1.gpk	gpk	NA	File
ReservoirAreasMicrostation.xls	xls	NA	File
Station Locations_2d.dgn	dgn	NA	File
Summary_Thiessens_ESR1_vs_Geopak.pdf	pdf	5	Paper
THIESENS.dgn	dgn	NA	File
THIESENS.xls	xls	NA	File
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voronoi.in	in	NA	File
voronoi.out	out	NA	File
voronoi.OUT.xls	xls	NA	File
voronoi.tar.txt	txt	NA	File
voronoi-edges.csv	csv	NA	File
voronoi-vertices.csv	csv	NA	File
Appendix_B_RevD_CDQ00020080049_Rev1_091709.pdf	pdf	9	Paper
Attachment_01_FLDHYDRO_Input_Files_with_Overlays.pdf	pdf	78	Paper

Attachment 02.04.03-08A
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Attachment_02_Guntersville_Thiessens_6_GIE_322_E_200803_R2_D_05112009_Rev2pjn.pdf	pdf	1	Paper
Attachment_03_Summary_Thiessens_ESRI_vs_Geopak.pdf	pdf	5	Paper
Attachment_04_USWB Rainfall Map.pdf	pdf	1	Paper
Attachment_05_Rainfall Data Hourly Summation and Daily Adjustments.xls	xls	NA	File
Attachment_06_Calculated_vs_Corrected_Thiessens.pdf	pdf	7	Paper
Attachment_07_Feb_1973_Precipitation_Data.pdf	pdf	38	Paper
Attachment_08_March_1973_Precipitation_Data.pdf	pdf	40	Paper
Attachment_09_FLDHYDRO Input 12May09.pdf	pdf	1	Paper
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Chickamauga_Reservoir021309.dat	dat	NA	File
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Clinch_R_mouth_to_mile_16_123008.dat	dat	NA	File
Fort_Loudoun_local_123008.dat	dat	NA	File
Fort_Loudoun_Reservoir_020509.dat	dat	NA	File
French_Broad_R_local_123008.dat	dat	NA	File
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Guntersville_south_local_051209.dat	dat	NA	File
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Poplar_Cr_at_mouth_020509.dat	dat	NA	File
Tellico_Reservoir_021309.dat	dat	NA	File
Watts_Bar_local_ab_Clinch_R_UA25_021309.dat	dat	NA	File

Attachment 02.04.03-08A
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Attachment_10_Twts_1973GagingStations_gdb_05112009_
Rev4pjn.pdf

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Readme.txt	txt	NA	File
timestamps.txt	txt	NA	File
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Attachment_12_20090818_Wheeler_Thiessen_Map.pdf	pdf	1	Paper
Attachment_13_Rainfall_Data_Hourly_Summmation_&_Daily_Adjustments.xls	xls	NA	File
Attachment_14_20090818_Corrected_Thiessen_Weights.pdf	pdf	6	Paper
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Attachment_15_FLDHYDRO_Input_20090828.pdf	pdf	1	Paper
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20090818_Paint_Rock_Local.dat	dat	NA	File
20090818_Sugar_Creek_at_Mouth.dat	dat	NA	File
20090824_Richland_Creek_at_Mouth.dat	dat	NA	File
20090828_Wheeler_Local.dat	dat	NA	File
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RainStations1973_20090817.sbx	sbx	NA	File

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789R.pdf	pdf	3	Paper

825A.pdf	pdf	3	Paper
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827R.pdf	pdf	2	Paper

Calculation **CDQ000020080049, Rev. 1**

Title **1973 Flood Data Verification Package**

EDMS Number: **L58 090921 001**

Summary

Total Hard Copy Pages:	<u>295</u>
Total Electronic Files on DVD:	<u>143</u>

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			NRC
	<u>Type</u>	<u>Pages</u>	<u>ADAMS Form</u>
Calculation Main Body	pdf	25	Paper
<u>Electronic Attachments</u>			
Appendix A_Thiessen Polygon and Area Measurement Software Check.pdf	pdf	3	Paper
jobs1.gpk	gpk	NA	File
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Attachment 02.04.03-08A
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Attachment_02_Guntersville_Thiessens_6_GIE_322_E_200803_R2_D_05112009_Rev2pjn.pdf	pdf	1	Paper
Attachment_03_Summary_Thiessens_ESRI_vs_Geopak.pdf	pdf	5	Paper
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Attachment_05_Rainfall Data Hourly Summation and Daily Adjustments.xls	xls	NA	File
Attachment_06_Calculated_vs_Corrected_Thiessens.pdf	pdf	7	Paper
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Attachment 02.04.03-08A
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20090824_Richland_Creek_at_Mouth.dat	dat	NA	File
20090828_Wheeler_Local.dat	dat	NA	File
Attachment_16.pdf	pdf	1	Paper
RainStation1973_20090817.dbf	dbf	NA	File
RainStations1973_20090817.prj	prj	NA	File
RainStations1973_20090817.sbn	sbn	NA	File
RainStations1973_20090817.sbx	sbx	NA	File
RainStations1973_20090817.shp	shp	NA	File
RainStations1973_20090817.shx	shx	NA	File
Thiessen_Polys_20090817.dbf	dbf	NA	File
Thiessen_Polys_20090817.prj	prj	NA	File
Thiessen_Polys_20090817.sbn	sbn	NA	File
Thiessen_Polys_20090817.sbx	sbx	NA	File
Thiessen_Polys_20090817.shp	shp	NA	File
Thiessen_Polys_20090817.shx	shx	NA	File
Twt_Watersheds_20090817.dbf	dbf	NA	File
Twt_Watersheds_20090817.prj	prj	NA	File
Twt_Watersheds_20090817.sbn	sbn	NA	File
Twt_Watersheds_20090817.sbx	sbx	NA	File
Twt_Watersheds_20090817.shp	shp	NA	File
Twt_Watersheds_20090817.shx	shx	NA	File
Watersheds_20090817.dbf	dbf	NA	File
Watersheds_20090817.prj	prj	NA	File
Watersheds_20090817.sbn	sbn	NA	File
Watersheds_20090817.sbx	sbx	NA	File
Watersheds_20090817.shp	shp	NA	File
Watersheds_20090817.shx	shx	NA	File

Attachment_17.pdf	pdf	1	Paper
381A.pdf	pdf	3	Paper
441A.pdf	pdf	3	Paper
506R.pdf	pdf	1	Paper
60R.pdf	pdf	2	Paper
624R.pdf	pdf	3	Paper
674R.pdf	pdf	3	Paper
69R.pdf	pdf	1	Paper
773R.pdf	pdf	3	Paper
776R.pdf	pdf	3	Paper
780R.pdf	pdf	3	Paper
789R.pdf	pdf	3	Paper
825A.pdf	pdf	3	Paper
825R.pdf	pdf	2	Paper
827R.pdf	pdf	2	Paper

Calculation **CDQ000020080050, Rev. 2**

Title **Flood Operational Guides**

EDMS Number: **L58 091230 051**

Summary

Total Hard Copy Pages:	<u>64</u>
Total Electronic Files on DVD:	<u>1</u>

File Inventory for NRC Documentation Submittal

	<u>Type</u>	<u>Pages</u>	<u>NRC ADAMS Form</u>
Calculation Main Body	pdf	64	Paper
<u>Electronic Attachments</u>			
SOCH input data.xls	xls	NA	File

Attachment 02.04.03-08A
 TVA letter dated February 11, 2010
 RAI Response

Calculation **CDQ000020080052, Rev. 1**

Title **API and Rain Runoff Relationship for Tennessee River Watershed**

EDMS Number: **L58 091230 053**

Summary

Total Hard Copy Pages:	<u>499</u>
Total Electronic Files on DVD:	<u>10</u>

File Inventory for NRC Documentation Submittal

	<u>Type</u>	<u>Pages</u>	<u>NRC ADAMS Form</u>
Calculation Main Body	pdf	47	Paper
<u>Electronic Attachments</u>			
Attachment_01-USWB_Rainfall_Map.pdf	pdf	1	Paper
Attachment_02- FLDHYDRO look-up tables.pdf	pdf	10	Paper
Attachment_03-API-RI-Runoff_graphs.pdf	pdf	6	Paper
Attachment_04-NRCS Data-French Broad.pdf	pdf	26	Paper
Attachment_05-French Broad soils9Feb09.xls	xls	NA	File
Attachment_06-NRCS_Data-Nolichucky.pdf	pdf	24	Paper
Attachment_07-Nolichucky soils9Feb09.xls	xls	NA	File
Attachment_08-NRCS_Data-Norris.pdf	pdf	33	Paper
Attachment_09-Norris soils9Feb09.xls	xls	NA	File
Attachment_10-NRCS_Data-Sequatchie.pdf	pdf	112	Paper
Attachment_11-Sequatchie soils9Feb09.xls	xls	NA	File
Attachment_12-NRCS_Data-South_Chickamauga.pdf	pdf	28	Paper
Attachment_13-South Chickamauga soils9Feb09.xls	xls	NA	File
Attachment_14-Land_Cover.pdf	pdf	1	Paper
Attachment_15-Kohler&LinsleyPaper34.pdf	pdf	12	Paper
Attachment_16-Office_Memo_6-8-50.pdf	pdf	3	Paper
Attachment_17-Fry_Work_Assignment.pdf	pdf	2	Paper
Attachment_18-Engstrom.pdf	pdf	21	Paper

Attachment 02.04.03-08A
TVA letter dated February 11, 2010
RAI Response

Attachment_19-Linsley_Kohler_Text.pdf	pdf	8	Paper
Attachment_20-Sittner.pdf	pdf	16	Paper
Attachment_21-Chow.pdf	pdf	9	Paper
Attachment_22-Bousfield.pdf	pdf	67	Paper
Attachment_23-Beschta.pdf	pdf	10	Paper
Attachment_24-II.3-api-slc_NWSRFS.pdf	pdf	11	Paper
Attachment_25-II.3-api-cont_NWSRFS_.pdf	pdf	28	Paper
Attachment_26_- _Map_6_GIE_322_E_200901_RO_D.pdf	pdf	1	Paper
Attachment_27-USWB Storm Studies Map.pdf	pdf	3	Paper
Attachment_28-Sherwani.pdf	pdf	4	Paper
Attachment_29- HauserTables.pdf	pdf	9	Paper
Attachment_30-Rainfall vs Runoff Graphs.pdf	pdf	2	Paper
Attachment_31_PMP_FrenchBroad.xls	xls	NA	File
Attachment_32_PMP_Nolichucky.xls	xls	NA	File
Attachment_33_PMP_Norris.xls	xls	NA	File
Attachment_34_PMP_SouthChickamauga.xls	xls	NA	File
Attachment_35_PMP_Sequatchie.xls	xls	NA	File
Attachment_36_RFI_BE21146056B028.pdf	pdf	3	Paper
Attachment_37_NRCS Curve Number Table.pdf	pdf	2	Paper