



Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381

William J. Museler  
Site Vice President  
Watts Bar Nuclear Plant

AUG 28 1992

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

Gentlemen:

|                                     |   |                    |
|-------------------------------------|---|--------------------|
| In the Matter of the Application of | ) | Docket Nos. 50-390 |
| Tennessee Valley Authority          | ) | 50-391             |

WATTS BAR NUCLEAR PLANT (WBN) - FIRE PROTECTION/APPENDIX R PROGRAMS

Previous discussions with NRR personnel established the need to review the WBN associated circuit evaluation. TVA submitted by letter dated June 15, 1992, the first of two planned submittals involving calculations for Appendix R associated circuit evaluation. This second submittal provides in the enclosure the remaining calculation WBPEVAR9001006, "Regulatory Guide 1.75 Associated Circuits and Appendix R Analysis for Non-Class 1E 120V AC and 250V DC Circuits."

If you have any questions, please telephone Paul Pace at (615) 365-1824.

Very truly yours,

William J. Museler

Enclosure  
cc: See page 2

030010  
9209040083 920828  
PDR ADOCK 05000390  
F PDR

AUG 28 1992

cc (Enclosure):

NRC Resident Inspector  
Watts Bar Nuclear Plant  
P.O. Box 700  
Spring City, Tennessee 37381

Mr. P. S. Tam, Senior Project Manager  
U.S. Nuclear Regulatory Commission  
One White Flint, North  
11555 Rockville Pike  
Rockville, Maryland 20852

Mr. B. A. Wilson, Project Chief  
U.S. Nuclear Regulatory Commission  
Region II  
101 Marietta Street, NW, Suite 2900  
Atlanta, Georgia 30323

ENCLOSURE  
WATTS BAR NUCLEAR PLANT (WBN)  
CALCULATION WBPEVAR9001006  
REGULATORY GUIDE 1.75 ASSOCIATED CIRCUITS AND  
APPENDIX R ANALYSIS FOR  
NON-CLASS 1E 120V AC AND 250V DC CIRCUITS

# QA Record

## EBASCO SERVICES INCORPORATED DNE CALCULATIONS

SHEET 1d

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |                                                                                                                            |                   |                        |                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| TITLE : REG. GUIDE-1.75 ASSOCIATED CIRCUITS AND APPENDIX R ANALYSIS FOR NON-CLASS 1E 120V AC & 250V DC CIRCUITS                                                                                                                                                                                                                                                                                                                                                                                         |                |                                                                                                                            |                   | PLANT/UNIT<br>WBNP/1&2 |                                                                                                                                             |
| REPARING ORGANIZATION,<br>Ebasco Services Inc                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                | KEY NOUNS(Consult RIMS DESCRIPTOR LIST)                                                                                    |                   |                        |                                                                                                                                             |
| BRANCH/PROJECT IDENTIFIERS<br>WBPEVAR9001006                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                | Each time these calculations are issued, preparers must ensure that the original (R0) RIMS accession number is filled in . |                   |                        |                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                | REV                                                                                                                        | (FOR RIMS USE)    | RIMS accession number  |                                                                                                                                             |
| APPLICABLE DESIGN DOCUMENTS<br>N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                | R0                                                                                                                         | 900220C0022       | B26900205407           |                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                | R10                                                                                                                        |                   | (913) R18 '92 0812 265 |                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                | R11                                                                                                                        |                   | (914) B18 '92 0817 251 |                                                                                                                                             |
| SAR SECTION<br>8.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | UNID SYSTEM(S) | R_                                                                                                                         |                   | cc 1117                |                                                                                                                                             |
| REVISION 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                | R10                                                                                                                        | R11               | R_                     | SAFETY RELATED ? YES [X] NO [ ]                                                                                                             |
| ECN NO.(or indicate Not Applicable)<br>N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                | See rev. log                                                                                                               | 588<br>Rev<br>LOG |                        | Statement of the Problem:                                                                                                                   |
| Prepared SEE PAGE 1 FOR SIGNATURE -<br>T M BARKER                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                | P. V. L.<br>8-11-92                                                                                                        | 8-15-92           |                        | SINCE WATTS BAR DOES NOT MEET THE MINIMUM SEPARATION CRITERIA OF REG. GUIDE 1.75, THE NON-CLASS 1E AND ASSOCIATED CIRCUITS MUST BE ANALYZED |
| Checked SEE PAGE 1 FOR SIGNATURE -<br>T A DENNIE                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                | 8-11-92                                                                                                                    | 8-15-92           |                        |                                                                                                                                             |
| Reviewed SEE PAGE 1 FOR SIGNATURE -<br>G L NICELY                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                | 8-11-92                                                                                                                    | 8-15-92           |                        |                                                                                                                                             |
| Approved SEE PAGE 1 FOR SIGNATURE -<br>M C BRICKEY                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                | 8-11-92                                                                                                                    | 8-15-92           |                        |                                                                                                                                             |
| Date 02-05-91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                | 8/11/92                                                                                                                    | 8/15/92           |                        |                                                                                                                                             |
| USE FORM TVA 10534 IF MORE SPACE IS REQUIRED                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                | SEE REV LOG                                                                                                                | 588<br>Rev<br>LOG |                        |                                                                                                                                             |
| LIST ALL PAGES ADDED BY THIS REVISION                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                | SEE REV LOG                                                                                                                | 588<br>Rev<br>LOG |                        | ORIGINAL                                                                                                                                    |
| LIST ALL PAGES ADDED BY THIS REVISION                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                | SEE REV LOG                                                                                                                | 588<br>Rev<br>LOG |                        |                                                                                                                                             |
| LIST ALL PAGES ADDED BY THIS REVISION                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                | SEE REV LOG                                                                                                                | 588<br>Rev<br>LOG |                        |                                                                                                                                             |
| <p>ABSTRACT :</p> <p>THIS CALCULATION CONTAINS AN UNVERIFIED ASSUMPTION(S) THAT MUST BE VERIFIED LATER YES [ ] NO [X]</p> <p>THIS CALCULATION CONTAINS SPECIAL REQUIREMENTS OR LIMITING CONDITIONS YES [ ] NO [X]</p> <p>THIS CALCULATION ANALYZES 120VAC &amp; 250VDC NON-CLASS 1E CIRCUITS TO DETERMINE THE ADEQUACY OF THE PROTECTION DEVICES AND DEMONSTRATE THAT CLASS 1E CIRCUITS(CABLES) WILL NOT BE DEGRADED BELOW AN ACCEPTABLE LEVEL.<br/>SEE CONCLUSION SECTION 9.0, FIR103C FOR RESULTS</p> |                |                                                                                                                            |                   |                        |                                                                                                                                             |
| <p>[ ] MICROFILM AND STORE CALCULATIONS IN RIMS SERVICE CENTER</p> <p>[X] MICROFILM AND RETURN CALCULATIONS TO : DCRM, TSOB, WBNP</p> <p>[ ] MICROFILM AND DESTROY</p> <p>ADDRESS : CCC, A-10B, WBNP</p>                                                                                                                                                                                                                                                                                                |                |                                                                                                                            |                   |                        |                                                                                                                                             |

cc: RIMS, SL26 C-K D. KILGORE, TR E-7 WBNP

THIS SHEET ADDED BY REV 10.

|                                                                                                                |  |                                                                                                                                                                        |                       |                                   |                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| TITLE REG. GUIDE-1.75 ASSOCIATED CIRCUITS AND APPENDIX R<br>ANALYSIS FOR NON-CLASS 1E 120VAC & 250VDC CIRCUITS |  |                                                                                                                                                                        |                       | PLANT/UNIT<br>WBNP/1&2            |                                                                                                                                             |
| PREPARING ORGANIZATION<br>BASCO SERVICES, INC.                                                                 |  | KEY NOUNS (Consult RIMS DESCRIPTORS LIST)<br>ELECTRICAL CALCULATIONS, ASSOCIATED CIRCUITS, APPENDIX R                                                                  |                       |                                   |                                                                                                                                             |
| BRANCH/PROJECT IDENTIFIERS<br>WBPEVAR9001006                                                                   |  | Each time these calculations are issued, preparers must ensure that the original (RO) RIMS accession number is filled in.<br>Rev (for RIMS' use) RIMS accession number |                       |                                   |                                                                                                                                             |
| APPLICABLE DESIGN DOCUMENT(S)<br>N/A 1/11-92                                                                   |  | R 7                                                                                                                                                                    | R 8                   | R 9                               |                                                                                                                                             |
| SAR SECTION(S)<br>8.3                                                                                          |  | UNID SYSTEM(S)<br>NA 1/11-92                                                                                                                                           |                       | R 7 920109C00008 B26 '91 1218 406 |                                                                                                                                             |
|                                                                                                                |  | R 8 MAR 18 1992 B26 '92 0314 401                                                                                                                                       |                       | R 9 MAY 19 1992 B18 '92 0420 261  |                                                                                                                                             |
| Revision 0                                                                                                     |  | R 7                                                                                                                                                                    | R 8                   | R 9                               | Safety-related? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                                                         |
| ECN No. (or indicate Not Applicable)<br>NA 1/11-92                                                             |  | NA 1/11-92                                                                                                                                                             | SEE REV LOG           | M16428A                           | Statement of Problem                                                                                                                        |
| Prepared *SEE PG 1 FOR<br>T. M. BARKER* SIGNATURES                                                             |  | G.R. GUEVARA 3-11-92                                                                                                                                                   | T. J. McLean 3-11-92  | T. J. McLean 4-17-92              | SINCE WATTS BAR DOES NOT MEET THE MINIMUM SEPARATION CRITERIA OF REG. GUIDE 1.75 THE NON CLASS 1E AND ASSOCIATED CIRCUITS MUST BE ANALYZED. |
| Checked<br>T. A. DENNIE*                                                                                       |  | D. J. Ceballos 3/11/92                                                                                                                                                 | P. R. Hunsley 3/11/92 | P. R. Hunsley 4/17/92             |                                                                                                                                             |
| Reviewed<br>G. L. NICELY*                                                                                      |  | D. J. Ceballos 3/11/92                                                                                                                                                 | P. R. Hunsley 3/11/92 | P. R. Hunsley 4/17/92             |                                                                                                                                             |
| Approved<br>M. C. BRICKEY* 10/2/92                                                                             |  | T. J. McLean 3/11/92                                                                                                                                                   | P. R. Hunsley 3/11/92 | P. R. Hunsley 4/17/92             |                                                                                                                                             |
| Date<br>02-05-91                                                                                               |  | 12/18/91                                                                                                                                                               | 3/14/92               | 4-17-92                           |                                                                                                                                             |
| List all pages added by this revision.                                                                         |  | SEE REV LOG                                                                                                                                                            | SEE REV LOG           | SEE REV LOG                       |                                                                                                                                             |
| List all pages deleted by this revision.                                                                       |  | SEE REV LOG                                                                                                                                                            | SEE REV LOG           | SEE REV LOG                       |                                                                                                                                             |
| List all pages changed by this revision.                                                                       |  | SEE REV LOG                                                                                                                                                            | SEE REV LOG           | SEE REV LOG                       |                                                                                                                                             |

ORIGINAL

## Abstract

These calculations contain an unverified assumption(s) that must be verified later. Yes ☐ No ☒

THIS CALCULATION ANALYZES 120VAC & 250VDC NON-CLASS 1E CIRCUITS TO DETERMINE THE ADEQUACY OF THE PROTECTION DEVICES AND DEMONSTRATE THAT CLASS 1E CIRCUITS (CABLES) WILL NOT BE DEGRADED BELOW AN ACCEPTABLE LEVEL.

SEE REVISION LOG FOR TOTAL PAGES AND FSAR COMPLIANCE.

☐ Microfilm and store calculations in RIMS Service Center.

☒ Microfilm and return calculations to: CALCULATION CONTROL CENTER DCRIM

Microfilm and destroy ☐

Address: CCC A ICB-WBNP  
QAC IC WBN

TITLE : REG. GUIDE 1.75 ASSOCIATED CIRCUITS AND APPENDIX R ANALYSIS FOR NON-CLASS 1E 120VAC &amp; 250VDC CIRCUITS

Plant/Unit  
WATTS BAR NUCLEAR PLANT/1&2

|                                                       |                                         |                                                                                                                                                                        |                       |                                |                                                                                                                                             |
|-------------------------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| ISSUING ORGANIZATION<br>BASCO SERVICES INCORPORATED   |                                         | KEY NOUNS (Consult RIMS DESCRIPTORS LIST)<br>ELECTRICAL CALCULATIONS, ASSOCIATED CIRCUITS, APPENDIX R                                                                  |                       |                                |                                                                                                                                             |
| CH/PROJECT IDENTIFIERS<br>WBPEVAR9001006              |                                         | Each time these calculations are issued, preparers must ensure that the original (RO) RIMS accession number is filled in.<br>Rev (for RIMS' use) RIMS accession number |                       |                                |                                                                                                                                             |
|                                                       |                                         | R0                                                                                                                                                                     | 900220C0022           | B26900205407                   |                                                                                                                                             |
| APPLICABLE DESIGN DOCUMENT(S)<br>NA                   |                                         | R4                                                                                                                                                                     | 901114F0002           | B18 901025 510                 |                                                                                                                                             |
|                                                       |                                         | R5                                                                                                                                                                     | 910925B0012           | B26 '91 0905 404               |                                                                                                                                             |
| SAR SECTION(S)<br>8.3                                 |                                         | R6                                                                                                                                                                     | 911011C0002           | B26 '91 1007 400               |                                                                                                                                             |
| UNID SYSTEM(S)<br>NA                                  |                                         |                                                                                                                                                                        |                       |                                |                                                                                                                                             |
| Revision 0                                            |                                         | R4                                                                                                                                                                     | R5                    | R6                             | Safety-related? Yes [X] No [ ]                                                                                                              |
| ECN No. (or Indicate Not Applicable)<br>NA            |                                         | DCN<br>P-5833-A                                                                                                                                                        | see REV.<br>NA<br>Log | DCNS<br>M-14174-A<br>P-01219-D | Statement of Problem                                                                                                                        |
| Prepared: *See Page 1 For<br>T. M. Barker* Signatures |                                         | R. S. S. S.                                                                                                                                                            | M. GERTZEN            | M. ROOPANE                     | Since Watts Bar does not meet the minimum separation criteria of Reg. Guide 1.75 the non class 1E and associated circuits must be analyzed. |
| Checked/Verified:<br>T. A. Dennie*                    |                                         | J. A. Gomez                                                                                                                                                            | D. J. C. S. S.        | D. J. C. S. S.                 |                                                                                                                                             |
| Reviewed:<br>G. L. Nicely*                            |                                         | D. Vantassell                                                                                                                                                          | D. J. C. S. S.        | D. J. C. S. S.                 |                                                                                                                                             |
| Approved:<br>M. C. Brickey*                           |                                         |                                                                                                                                                                        |                       |                                | LEGIBILITY EVALUATED and<br>ACCEPTED for issue.                                                                                             |
| Date<br>2-5-90                                        |                                         | 9/6/90                                                                                                                                                                 | 9-5-91                | 10-7-91                        |                                                                                                                                             |
| FORM 534                                              | List all pages added by this revision   | See Rev Log                                                                                                                                                            | SEE REV. LOG.         | SEE REV. LOG                   | Signature                                                                                                                                   |
| or MORE SPACE                                         | List all pages deleted by this revision | See Rev Log                                                                                                                                                            | SEE REV. LOG          | SEE REV. LOG                   |                                                                                                                                             |
| REQUIRED                                              | List all pages changed by this revision | See Rev Log                                                                                                                                                            | SEE REV. LOG          | SEE REV. LOG                   |                                                                                                                                             |

Abstract: These calculations contain an unverified assumption(s) that must be verified later. Yes ☒ No ☐

This calculation analyzes 120VAC &amp; 250VDC Non-Class 1E circuits to determine the adequacy of the protection devices and demonstrate that class 1E circuits (cables) will not be degraded below an acceptable level.

See Revision Log for total pages and FSAR Compliance

[ ] Microfilm and store calculations in RIMS Service Center

[X] Microfilm and return calculations to: R. Young Calculation Control Address: DCRM, TSOB, WBNP

cc: RIMS, SL 26 C-K

R. K. Hall, A123 IOB, WBNP

D Kilgore, Trailer A7 WBN/ESI Center  
J Simmons, Trailer A6 WBN/ESI

RTP 0123

6/22-10-0000

EEB

|                                                                                                                |                                          |                                                                                                                           |                       |                                      |                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| TITLE REG. GUIDE 1.75 ASSOCIATED CIRCUITS AND APPENDIX R<br>ANALYSIS FOR NON-CLASS IE 120VAC & 250VDC CIRCUITS |                                          |                                                                                                                           |                       | PLANT/UNIT<br>WATTS BAR N.P. / 1 & 2 |                                                                                                                                            |
| PREPARING ORGANIZATION<br>NE / EE / WBPE                                                                       |                                          | KEY NOUNS (Consult RIMS DESCRIPTORS LIST)<br>ELECTRICAL CALCULATIONS, ASSOCIATED CIRCUITS, APPENDIX R                     |                       |                                      |                                                                                                                                            |
| BRANCH/PROJECT IDENTIFIERS<br>WBPEVAR9001006                                                                   |                                          | Each time these calculations are issued, preparers must ensure that the original (RO) RIMS accession number is filled in. |                       |                                      |                                                                                                                                            |
|                                                                                                                |                                          | Rev                                                                                                                       | (for RIMS' use)       | RIMS accession number                |                                                                                                                                            |
|                                                                                                                |                                          | RO                                                                                                                        | 900220C0022           | B26 '90 0205 407                     |                                                                                                                                            |
| APPLICABLE DESIGN DOCUMENT(S)<br>NA                                                                            |                                          | R1                                                                                                                        | 900601A 0019          | B26 '90 0427 406                     |                                                                                                                                            |
|                                                                                                                |                                          | R2                                                                                                                        | 900625D0016           | B26 '90 0511 412                     |                                                                                                                                            |
| SAR SECTION(S)<br>8.3                                                                                          |                                          | UNID SYSTEM(S)<br>NA                                                                                                      | R3                    | 900730F0042                          | B26 '90 0713 405                                                                                                                           |
| Revision 0                                                                                                     |                                          | R1                                                                                                                        | R2                    | R3                                   | Safety-related? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                                                        |
| ECN No. (or indicate Not Applicable)<br>NA                                                                     |                                          | NA                                                                                                                        | DCN P-5297-A          | DCN<br>M-10948-A                     | Statement of Problem                                                                                                                       |
| Prepared<br>T.M. Barker                                                                                        |                                          | 4-27-90<br>T.M. Barker                                                                                                    | 5-7-90<br>T.M. Barker | 6-26-90<br>T.M. Barker               | SINCE WATTS BAR DOES NOT MEET THE MINIMUM SEPARATION CRITERIA OF REG. GUIDE 1.75 THE NON CLASS IE AND ASSOCIATED CIRCUITS MUST BE ANALYZED |
| Checked<br>T.A. Dennis                                                                                         |                                          | 4-27-90<br>T.A. Dennis                                                                                                    | 5-7-90<br>T.A. Dennis | 6-26-90<br>T.A. Dennis               |                                                                                                                                            |
| Reviewed<br>G. C. Lyke                                                                                         |                                          | 4-27-90<br>G. C. Lyke                                                                                                     | 5-7-90<br>G. C. Lyke  | 6-26-90<br>G. C. Lyke                |                                                                                                                                            |
| Approved<br>J.P. Tipton                                                                                        |                                          | 4-27-90<br>J.P. Tipton                                                                                                    | 5-7-90<br>J.P. Tipton | 6-26-90<br>J.P. Tipton               |                                                                                                                                            |
| Date<br>2-5-90                                                                                                 |                                          | 4-27-90                                                                                                                   | 5-7-90                | 6-26-90                              |                                                                                                                                            |
| Use form TVA 10534 if more space required.                                                                     | List all pages added by this revision.   | 0                                                                                                                         | SEE REV. LOG          | SEE REV. LOG                         | ORIGINAL                                                                                                                                   |
|                                                                                                                | List all pages deleted by this revision. | 3A                                                                                                                        |                       |                                      |                                                                                                                                            |
|                                                                                                                | List all pages changed by this revision. | 1, 2, 5, 7                                                                                                                |                       |                                      |                                                                                                                                            |

## Abstract

These calculations contain an unverified assumption(s) that must be verified later. Yes ☒ No ☐

THIS CALCULATION ANALYZES 120VAC & 250VDC NON-CLASS IE CIRCUITS TO DETERMINE THE ADEQUACY OF THE PROTECTIVE DEVICES AND DEMONSTRATE THAT CLASS IE CIRCUITS (CABLES) WILL NOT BE DEGRADED BELOW AN ACCEPTABLE LEVEL.

FSAR COMPLIANCE REVIEW: W.C. Lyke DATE: 2-5-90  
ABC / LE

TOTAL PAGES REV. 0: 356-357 INCLUDING P. 3A

FSAR COMPLIANCE REVIEW - REV 1: W.C. Lyke DATE: 4-27-90  
ABC / LE

FSAR COMPLIANCE REVIEW - REV 2: G.C. Lyke DATE: 5-10-90  
for MCB

FSAR COMPLIANCE REVIEW - REV 3: J.P. Tipton DATE: 7-13-90  
for MCB

☐ Microfilm and store calculations in RIMS Service Center.

☒ Microfilm and return calculations to:

Microfilm and destroy. ☐

BECKY YOUNG

Address: TSOB / WBN

## TIC SHEET

General Rules: One TIC per field  
One TIC per TID  
One TIC per file level  
The only information needed is:  
Total TICs  
Total records corrected  
Total records QCed

[illegible]



## TIC SHEET

General Rules: One TIC per field

One TIC per TID

One TIC per file level.

The only information needed is:

Total TICs

Total records corrected

Total records QCed

[illegible]