

Westinghouse Non-Proprietary Class 3

WCAP-17590-NP
Revision 0

September 2012

Peach Bottom Units 2 & 3 Replacement Steam Dryer Acoustic Load Definition

Enclosure B.1



WCAP-17590-NP
Revision 0

Peach Bottom Units 2 & 3 Replacement Steam Dryer Acoustic Load Definition

David A. Suddaby*
Acoustics & Structural Analysis

September 2012

Reviewer: Robert C. Theuret*
Acoustics & Structural Analysis

Approved: David R. Forsyth*, Manager
Acoustics & Structural Analysis

*Electronically approved records are authenticated in the electronic document management system.

Westinghouse Electric Company LLC
1000 Westinghouse Drive
Cranberry Township, PA 16066, USA

© 2012 Westinghouse Electric Company LLC
All Rights Reserved

TABLE OF CONTENTS

LIST OF TABLES iii

LIST OF FIGURES iv

LIST OF ACRONYMS/ABBREVIATIONS v

1 EXECUTIVE SUMMARY 1-1

2 []^{a,c} THE REPLACEMENT STEAM DRYER 2-1

2.1 []^{a,c} 2-1

2.2 []^{a,c} 2-8

3 []^{a,c} 3-1

3.1 []^{a,c} 3-3

3.2 []^{a,c} 3-5

3.3 []^{a,c} 3-7

4 REFERENCES 4-1

LIST OF TABLES

Table 3-1 []^{a,c}3-4

Table 3-2 []^{a,b,c}3-5

Table 3-3 []^{a,b,c}3-6

Table 3-4 []^{a,c}3-6

Table 3-5 []^{a,c}3-8

LIST OF FIGURES

Figure 2-1 [	] ^{a,c}	2-2
Figure 2-2a [	] ^{a,c}	2-3
Figure 2-2b [	] ^{a,c}	2-4
Figure 2-2c [	] ^{a,c}	2-5
Figure 2-3a [	] ^{a,c}	2-6
Figure 2-3b [	] ^{a,c}	2-7
Figure 2-4 [	] ^{a,c}	2-8
Figure 2-5 [	] ^{a,c}	2-9
Figure 3-1 [	] ^{a,c}	3-1
Figure 3-2 [	] ^{a,b,c}	3-9
Figure 3-3 [	] ^{a,b,c}	3-10
Figure 3-4 [	] ^{a,b,c}	3-11
Figure 3-5 [	] ^{a,b,c}	3-12

LIST OF ACRONYMS/ABBREVIATIONS

Acronym	Definition
3-D	three-dimensional
ACM	acoustic circuit model
CLTP	current licensed thermal power
EPU	extended power uprate
FIV	flow-induced vibration
MSL	main steam line
PBAPS	Peach Bottom Atomic Power Station
PSD	power spectral density
RMS	root mean square
RPV	reactor pressure vessel
RSD	replacement steam dryer
SNR	signal-to-noise ratio
SRSS	square root of the sum of the squares
SRV	safety relief valve
SSV	spring safety valve

1 EXECUTIVE SUMMARY

The qualification [3 replacement steam dryer design requires [structure. [

]° of the Peach Bottom Units 2 &]° analysis of the alternating stresses acting on the

]°^{a,b,c}

2 [DRYER

] ^{a,c} THE REPLACEMENT STEAM

In order to qualify the Peach Bottom Atomic Power Station (PBAPS) Units 2 & 3 replacement steam dryer design for acoustic pressure loads originating from flow-induced vibration (FIV) phenomena, it is necessary to define [

] ^{a,c}

2.1 [

] ^{a,c}

[

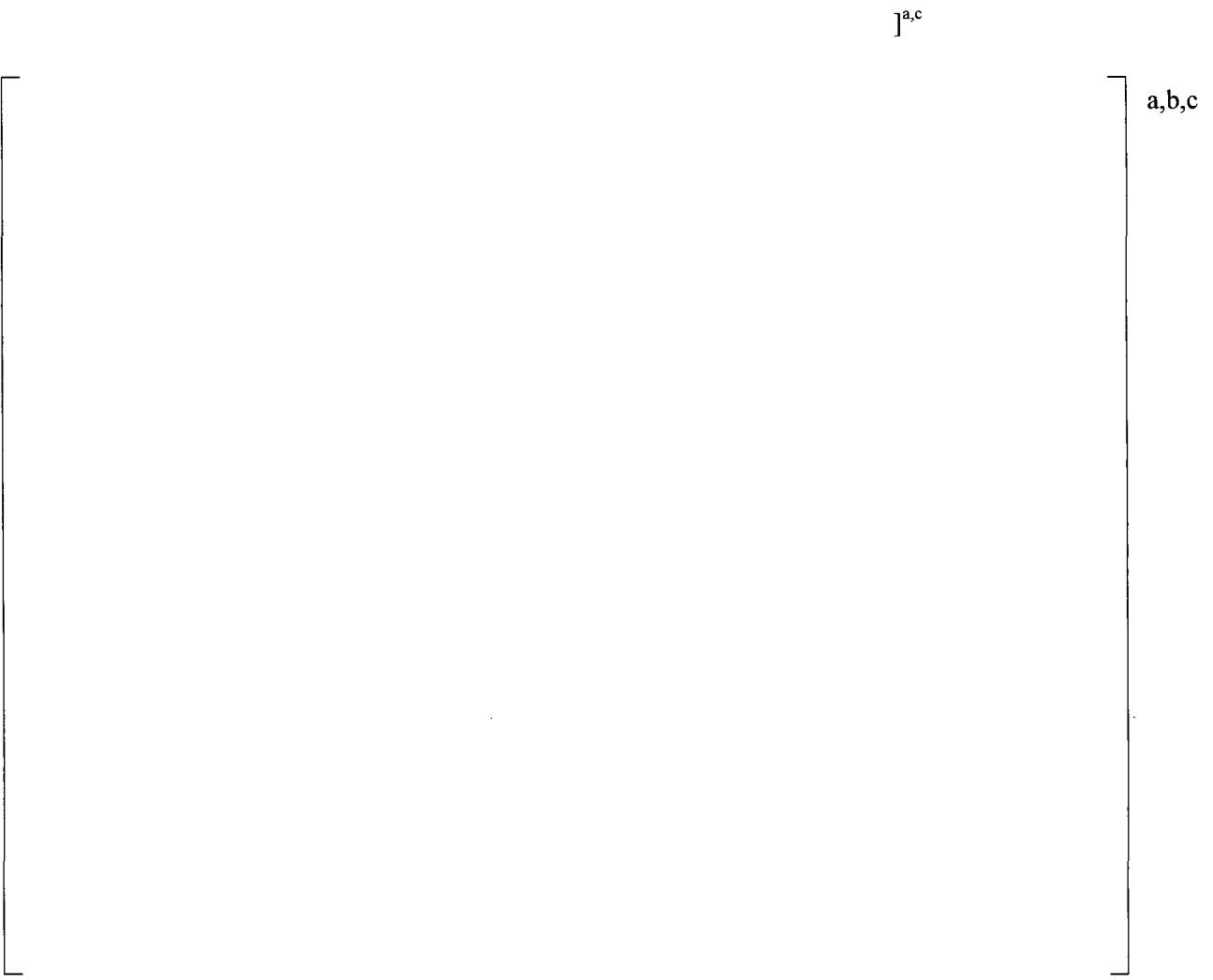


Figure 2-1 [

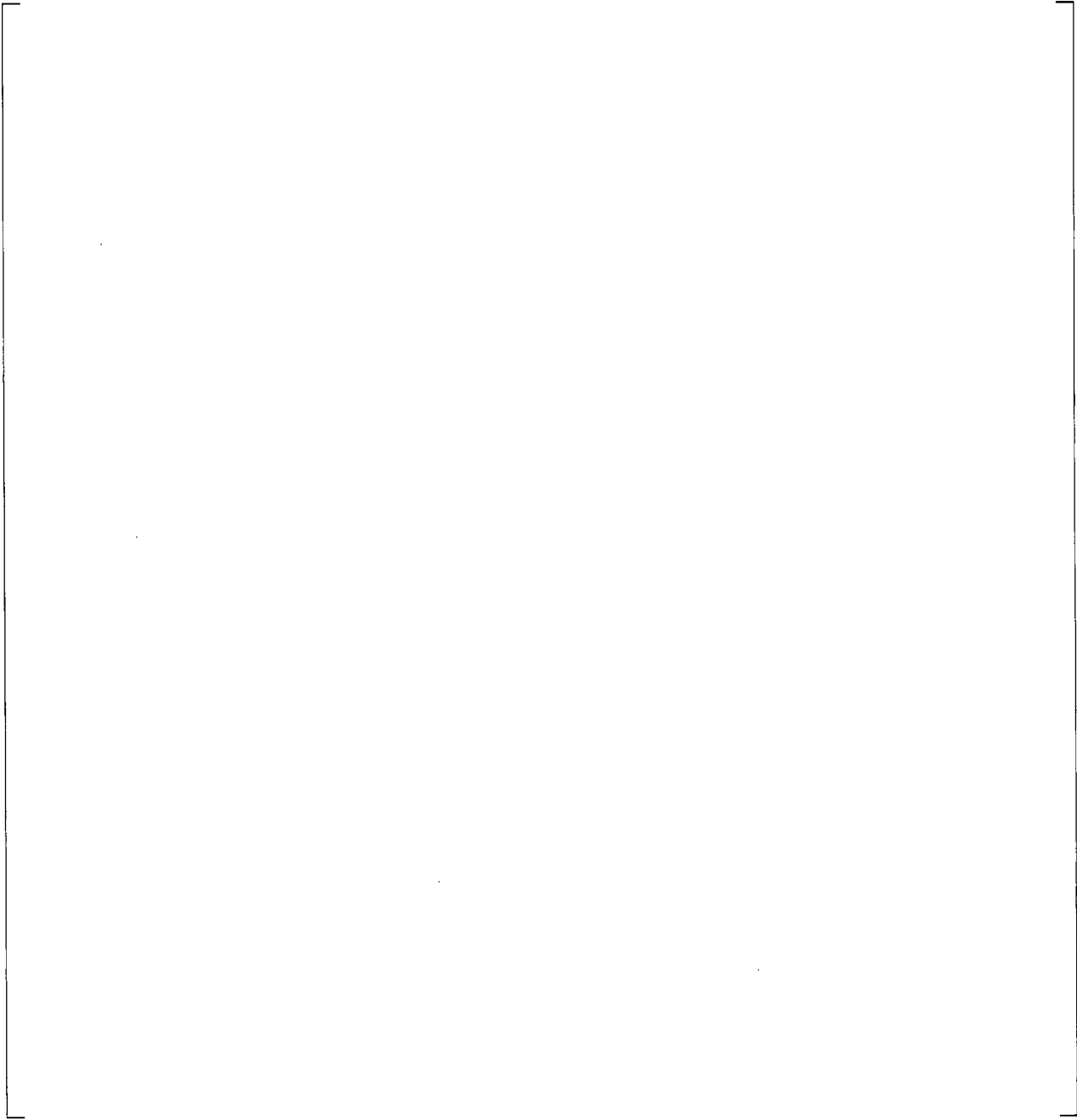
]a,c



a,c

Figure 2-2a [

] ^{a,c}



a,c

Figure 2-2b [

] a,c

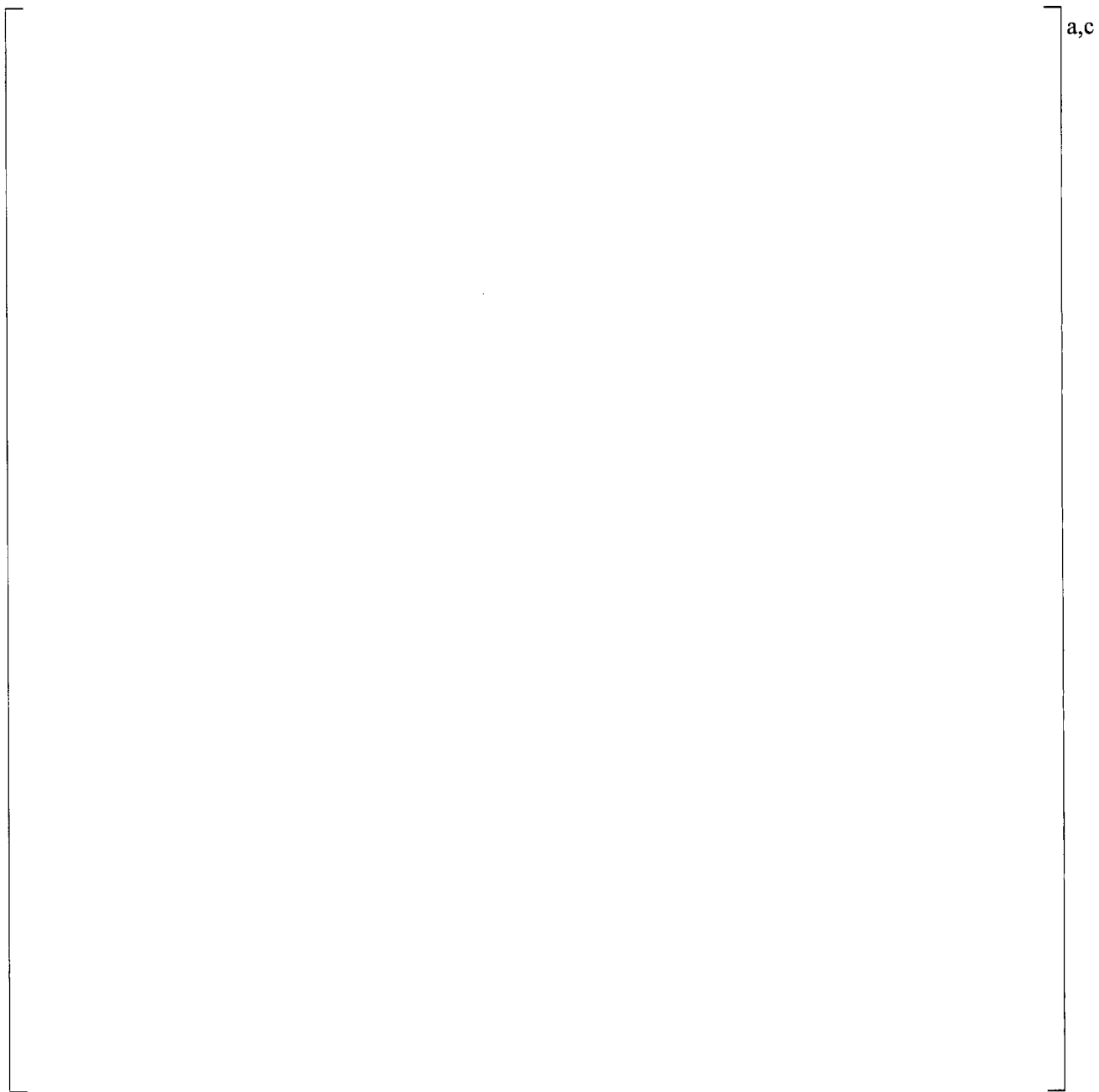
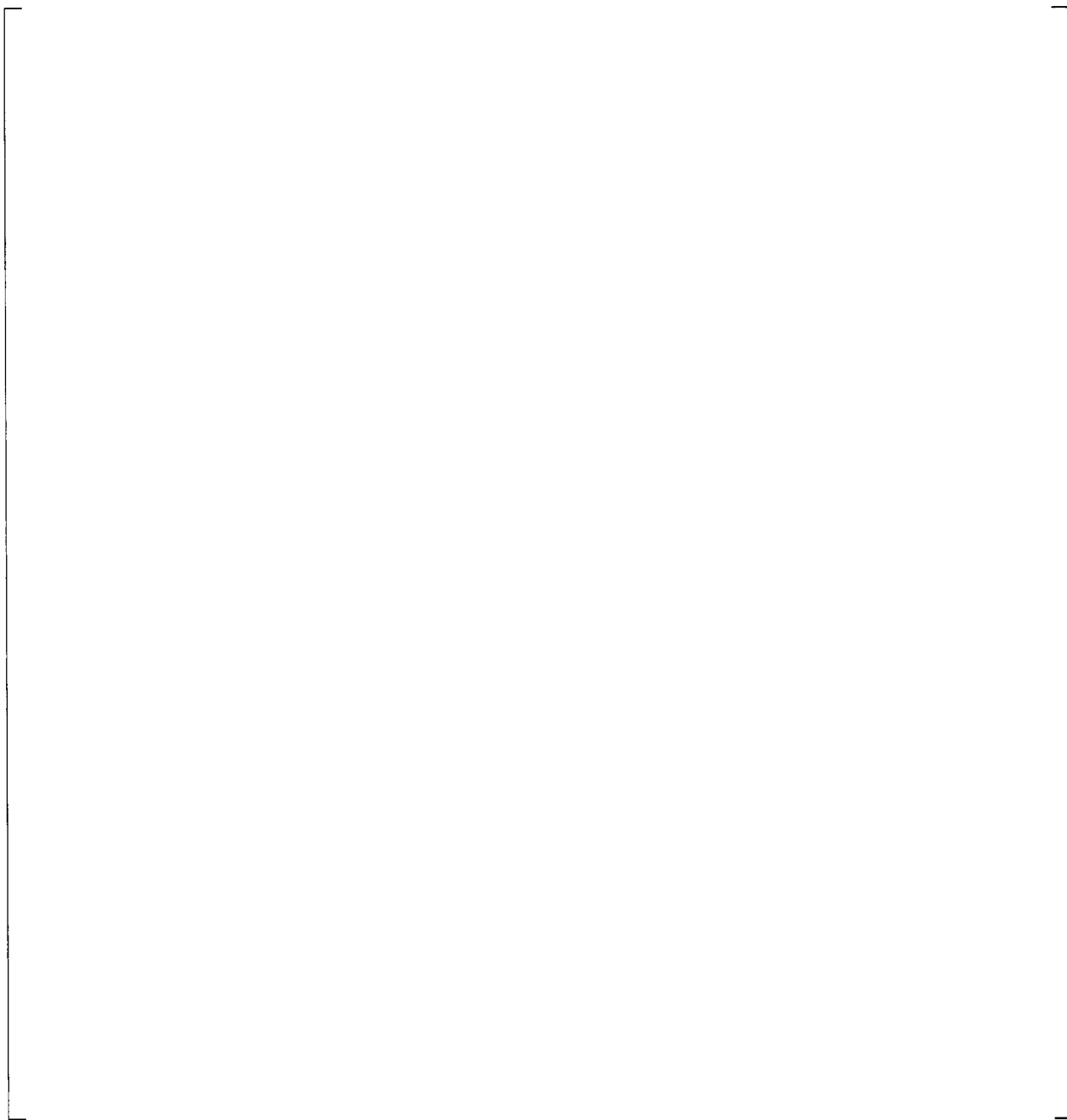


Figure 2-2c [

] ^{a,c}



a,c

Figure 2-3a [

] a,c



Figure 2-3b [

] a,c

2.2 [

] ^{a,c}

[

] ^{a,c}

[

] ^{a,c}

[

] ^{a,c}

[

] ^{a,c}

Figure 2-4 [

] ^{a,c}

[

] ^{a,c}

[

] ^{a,c}

[

] ^{a,c}

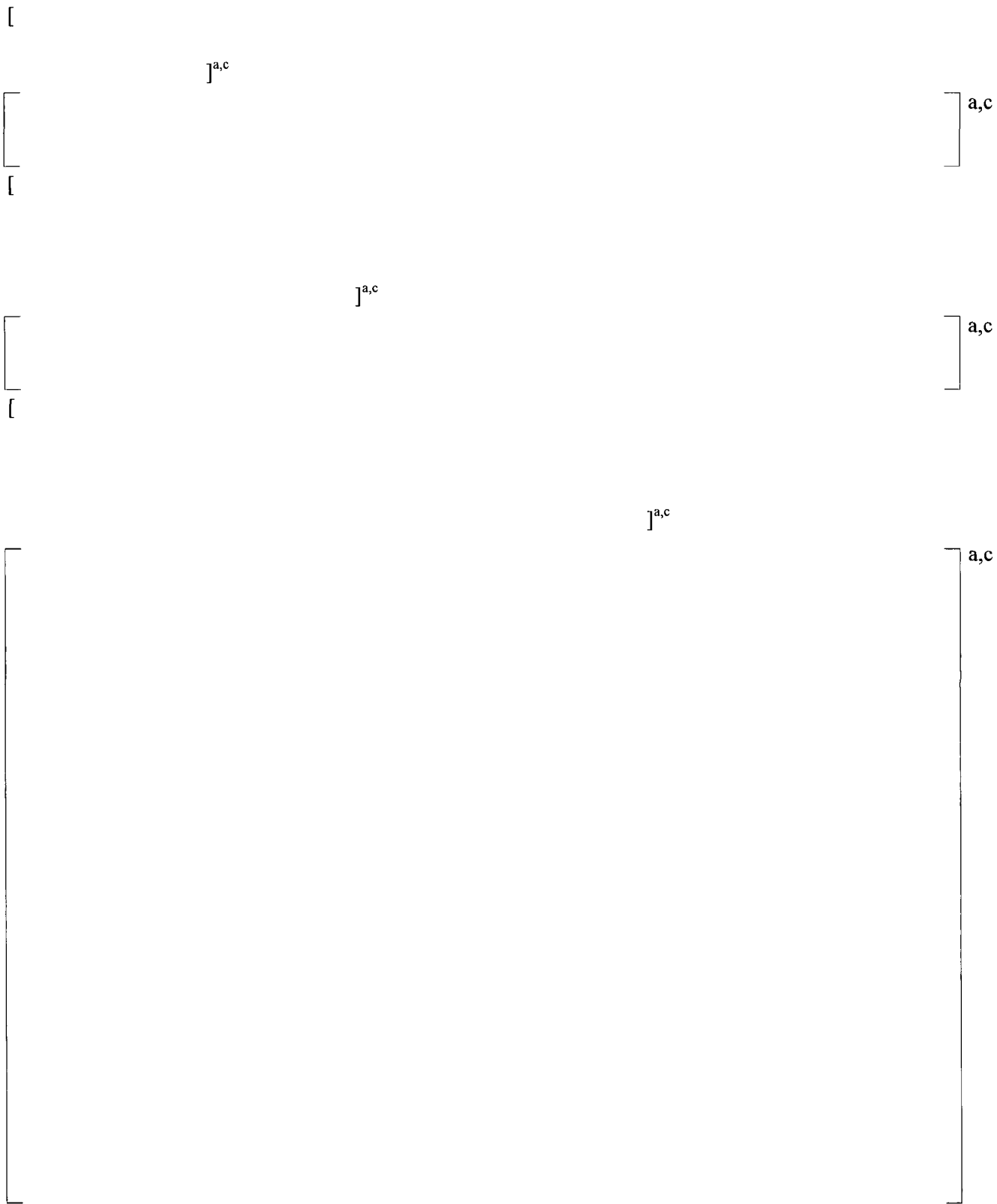


Figure 2-5 []^{a,c}

[

] ^{a,c}

3 [

] ^{a,c}

[

] ^{a,b,c}



a,c

Figure 3-1 [

] ^{a,c}

[

] ^{a,c}

[

] a,c

[

] a,c

[

] ^{a,c}

[

] a,c

[

] ^{a,c}

[] a,c

[

]a,c

[] a,c

[

]a,c

3.1 [

]a,c

[

]a,c

Table 3-1 []^{a,c}

a,b,c

3.2 []^{a,c}

[

] ^{a,c}

	a,b,c
--	-------

[

] ^{a,c}

Table 3-2 [] ^{a,b,c} [1]		

Table 3-3 | **J^{a,b,c}**

a,b,c

Table 3-4 | **J^{a,c}**

a,b,c

3.3 []^{a,c}

[

]^{a,c}

[

] a,c

[

] ^{a,c}

[

] a,c

[

] ^{a,b,c}

Table 3-5		] ^{a,c}		

] ^{a,c}



Figure 3-2 [

] a,b,c



a,b,c

Figure 3-3 [

]a,b,c



Figure 3-4 [

] a,b,c



a,b,c

Figure 3-5 [

]a,b,c

4 REFERENCES

1. Continuum Dynamics, Inc., Technical Note No. 11-10P, Rev. 0, "User Documentation and Sample Calculation for ACM Rev. 4.1" Milton E. Teske, September 2011.
2. Westinghouse Calculation Note CN-A&SA-12-06, Rev. 1, "Acoustic Load Definition for the Peach Bottom Units 2 & 3 Replacement Steam Dryers," July 24, 2012 (Westinghouse Proprietary Class 2).
3. Westinghouse Calculation Note CN-A&SA-12-12, Rev. 0, "Peach Bottom Unit 2 Replacement Steam Dryer Four-Line Acoustic Subscale Model Testing Data Analysis and Derivation of Plant CLTP and EPU MSL Acoustic Signatures," July 23, 2012 (Westinghouse Proprietary Class 2).
4. Westinghouse Calculation Note CN-A&SA-12-13, Rev. 0, "Peach Bottom Unit 3 Replacement Steam Dryer Four-Line Acoustic Subscale Model Testing Data Analysis and Derivation of Plant CLTP and EPU MSL Acoustic Signatures," July 24, 2012 (Westinghouse Proprietary Class 2).
5. Westinghouse Letter, LTR-A&SA-10-11, Rev. 0, "Field Preparation of Main Steam Lines at Peach Bottom Unit 2 for Strain Gauge Installation," November 4, 2010 (Westinghouse Proprietary Class 2).
6. Westinghouse Letter, LTR-A&SA-11-53, Rev. 0, "Field Preparation of Main Steam Lines at Peach Bottom Unit 3 for Strain Gauge Installation," October 6, 2011 (Westinghouse Proprietary Class 2).
7. Westinghouse Report, WCAP-17428-P, Rev. 0, "Acoustic Loads Definition for the Peach Bottom Atomic Power Station Unit 2 Steam Dryer Qualification Project," December 13, 2011 (Westinghouse Proprietary Class 2).
8. Exelon Transmittal of Design Information TODI EPU-MOD-RSD-02-1, "Design Parameters for Replacement Steam Dryer Design," April 17, 2012.
9. Structural Integrity Calculation Package, 1000102.301, Rev. 0, "Peach Bottom Unit 2 Strain Gage Uncertainty Evaluation and Pressure Conversion Factors," Structural Integrity Associates, Inc., November 8, 2010.
10. Structural Integrity Calculation Package, 1000102.303, Rev. 0, "Peach Bottom Unit 3 Strain Gage Uncertainty Evaluation and Pressure Conversion Factors," Structural Integrity Associates, Inc., October 25, 2011.