ENCLOSURE 1

ATTACHMENT 2

"Steam Dryer," GE Nuclear Energy, Design Specification Data Sheet, 26A6266AB, Revision 4, dated May 5, 2005

GE Nuclear Energy

26A6266AB SH NO. 1
REV. 4

EIS IDENT: STEAM DRYER DSDS

REVISION STATUS SHEET

DOCUMENT TITLE STEAM DRYER

LEGEND OR DESCRIPTION OF GROUPS

TYPE: DESIGN SPEC DATA SHEET

FMF: DRESDEN 2 & 3
QUAD CITIES 1 & 2

MPL NO: B13-D005

| - DENOTES CHANGE

SAFETY-RELATED CLASSIFICATION CODE N

REVISIONS			C
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1	RMCN05922 3/30/2005		
2	RMCN06074 4/24/2005		
3	RMCN06137 5/02/2005		
4	RMCN06178 5/05/2005		

PRINTS TO

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CHKD BY:	ISSUED 01/21/2005	CONT ON SHEET 2

MS WORD (2/98)

1.0 SCOPE

1.1 Specification 26A6266 defines the design requirements for a replacement 251-inch BWR/3 Steam Dryer Assembly and for the replacement Steam Dryer Units including initial installation of the replacement steam dryer into the Reactor Pressure Vessel (RPV).

1.2 This document defines particular design requirements parameters for the specific nuclear power plant(s) to which it is assigned.

2.0 APPLICABLE DOCUMENTS, CODES, AND STANDARDS

2.1 Design Specification 26A6266 shall be used with and form a part of this document. If there are any conflicts between 26A6266 and these data sheets, 26A6266AB shall govern.

2.2 The following documents are shown for reference. When specified on the Master Parts List they are binding and form part of this specification.

2.3 Standards and Specifications

a. Design Specification – Steam Dryer - 26A6266.

b. NUREG-0612 "Control of Heavy Loads at Nuclear Power Plants."

c. ANSI N14.6 "For Radioactive Materials - Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds (4500 kg) or More."

3.0 DESCRIPTION.

3.1 See Section 3.0 of the Design Specification 26A6266.

4.0 REQUIREMENTS.

4.1 Steam Dryer Loads.

4.1.1 Differential pressure across the steam dryer during normal and accident conditions.

a. DPn - Differential 'static' Pressure Load During Normal Operation (100P/108F) - 0.30 psid. This load is applied for all components except for the steam dryer outer hoods adjacent to the main steam outlet nozzles. For the steam dryer outer hoods adjacent to the main steam outlet nozzles DPn is 0.90 psid.

b. DPu - Differential 'static' Pressure Load During Upset Operation (102P/108F) - 0.45 psid. This load is applied for all components except for the steam dryer outer hoods adjacent to the main steam outlet nozzles. For the steam dryer outer hoods adjacent to the main steam outlet nozzles DPn is 1.35 psid.

c. DPfl - Differential Pressure Load in the Faulted condition, due to Main Steam Line Break at the Rated Power and Core Flow (Hi-Power) condition (102P/108F) - 2.1 psid

d. DPf2 - Differential Pressure Load in the Faulted condition, due to Main Steam Line Break at the Low Power/High Core Flow (Interlock) condition (18.8P/108F) - 3.4 psid

e. AC1 - Acoustic load due to Main Steam Line Break (MSLB) outside containment, at the Rated Power and Core Flow (Hi-Power) Condition (102P/108F)
The acoustic loads on the dryer hood is calculated as follows:

$P_{dryer}(x,y,t) = P_o((\Delta P/\Delta P_{Vessel})$ from Figures 1-9)

Where $P_o = 2.92*(45/MSLBST)$
MSLBST = Main Steam Line Break Separation Time – milliseconds
x = Horizontal distance from the edge of the vertical cover plate on the side of the broken steam line (ft).
y = Vertical distance above the dryer vertical cover plate (ft).
t = Time in milliseconds

The maximum acoustic loads distribution on the vertical cover plate at EPU power level is determined by multiplying the values in Table 4.1.1.e by P_o. If the maximum acoustic load is applied as a static load, the loads must include a dynamic amplification factor consistent with the time histories provided in Figures 1-9.

Justification for the Main Steam Line Break Separation time used will be contained in the Design Record File for the design calculation.

Table 4.1.1.e - Acoustic Load on the Vertical Cover Plate

y, Edge of Vertical Cover Plate	Normalized Pressure Differential								
7.5 ft	0.21	0.23	0.24	0.23	0.21	0.18	0.16	0.14	0.13
6.0 ft	1.70	1.85	1.89	1.81	1.64	1.45	1.28	1.13	1.00
4.5 ft	2.89	3.20	3.31	3.11	2.76	2.41	2.10	1.85	1.64
3.0 ft	3.51	4.14	4.41	3.92	3.30	2.78	2.38	2.06	1.81
1.5 ft	3.93	5.11	6.31	4.63	3.64	2.97	2.49	2.13	1.86
0 ft	4.10	5.43	6.38	4.90	3.77	3.04	2.53	2.16	1.87
Coordinate (x,y)	0.000 ft	1.642 ft	3.284 ft	4.926 ft	6.568 ft	8.210 ft	9.852 ft	11.494 ft	13.136 ft

x, Lower Horizontal Cover Plate

x = 0 at edge of dryer face nearest steamline with break, y = 0 at lower horizontal cover plate

f. AC2 - Acoustic load due to Main Steam Line Break (MSLB) outside containment, Low Power/High Core Flow (Interlock) condition (18.8P/108F).

The acoustic loads on the dryer hood is calculated as follows:

$P_{dryer}(x,y,t) = P_o((\Delta P/\Delta P_{Vessel})$ from Figures 1-9)

Where $P_o = (SFR/11.982)*(2.92)*(45/MSLBST)$
MSLBST = Main Steam Line Break Separation Time – milliseconds

SFR = Steam Flow Rate - Mlbm/hr
x = Horizontal distance from the edge of the vertical cover plate on the side of the broken steam line (ft).
y = Vertical distance above the dryer vertical cover plate (ft).
t = Time in milliseconds

The maximum acoustic loads distribution on the vertical cover plate at EPU power level is determined by multiplying the values in Table 4.1.1.e by P_o. If the maximum acoustic load is applied as a static load, the loads must include a dynamic amplification factor consistent with the time histories provided in Figures 1-9.

Justification for the Main Steam Line Break Separation time used will be contained in the Design Record File for the design calculation.

Design Calculations for the differential pressure across the steam dryer during normal, upset, and accident conditions are contained in Design Record File 0000-0029-5121.

4.1.2 Flow Induced Vibration (FIV) loads.

a. FIV loads for the steam dryer for normal operation (FIVn for Load Combination A) will be determined by use of acoustic circuit analysis techniques (by customer) based upon two different data inputs:

   1. Data from Scale Model Test (SMT) facility instrumented replacement steam dryer.

   2. Data from Quad Cities in-plant measurements of main steam line strain, main steam line dynamic pressures, and RPV dynamic pressures.

b. FIV loads for the steam dryer for upset operation (FIVu for Load Combination B3) will be determined based on FIVn and the upset multiplier used to define DPu. The upset multiplier used to define DPu is 1.50.

Documentation of the FIV loads used in the design calculation are archived in Design Record File 0000-0034-6079.

c. Structural damping for evaluation of FIV loads shall be 1%, except 2% may be used for the dryer skirt, and 4% may be used for the dryer vane banks.

4.2 Handling and Transportation.

4.2.1 Transportation loads of 1g continuous dead weight and +/- 0.5g (in any direction) dynamic for 500,000 cycles shall be assumed. Adequacy of the proposed shipping arrangement to protect the steam dryer shall be demonstrated by structural analysis in accordance with ASME Code Section III Subsection NG. Shipping is to be assumed as a Service Level A condition. Fatigue usage factor shall be 0.001 or less.

4.2.2 The steam dryer shall be demonstrated by analysis to comply with NUREG-0612 and ANSI N14.6 for lifting from the lifting eyes using the lifting strong back.

5.0 EXCEPTIONS TO BASE SPECIFICATION 26A6266 (QUAD CITIES 1 & 2 ONLY).

5.1 Added Section 2.6 which reads as follows:

2.6 Other References

a. GE Nuclear Energy 10 CFR Part 21 Communication SC04-14 "Narrow Range Water Level Instrument Level 3 Trip Final Report," October 11, 2004.

5.2 Replace Paragraph 4.2.2.4 with the following.

4.2.2.4 The RPV Low Water Level 3 Analytical Limit is 503 inches above RPV elevation zero outside of the steam dryer skirt. The steam dryers for Quad Cities 1 & 2 have twelve (12) regularly spaced drain channel openings at the topside of the dryer skirt base ring. Under certain low water level conditions, these openings permit steam to cross from inside the dryer skirt to the annulus without passing underneath the dryer skirt. The steam bypass flow through these slots is acceptable provided that the approved Quad Cities L3 trip setpoint provisions are consistent with General Electric Nuclear Energy 10 CFR Part 21 Communication SC04-14 (Paragraph 2.6.a).

Figure 1

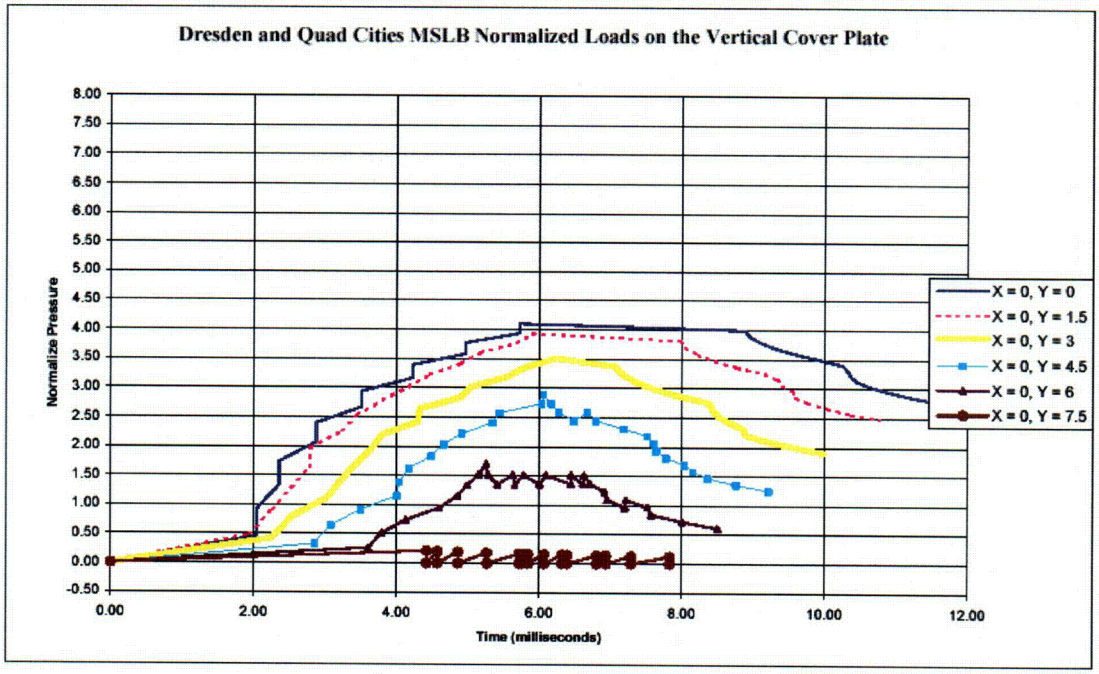
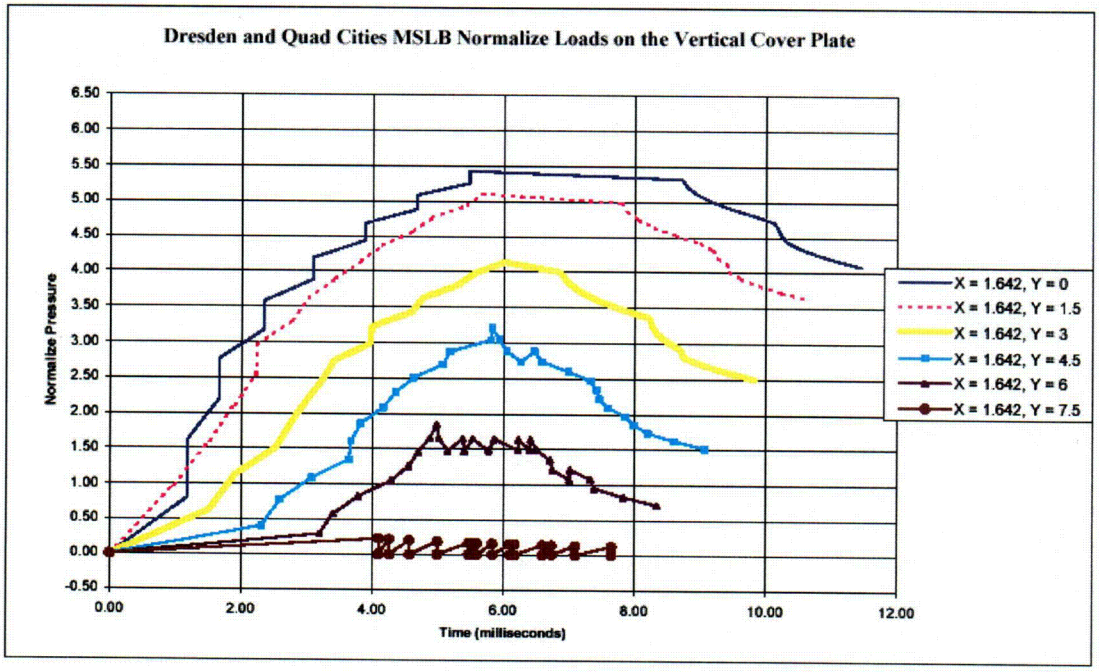


Figure 2



C01

Figure 3

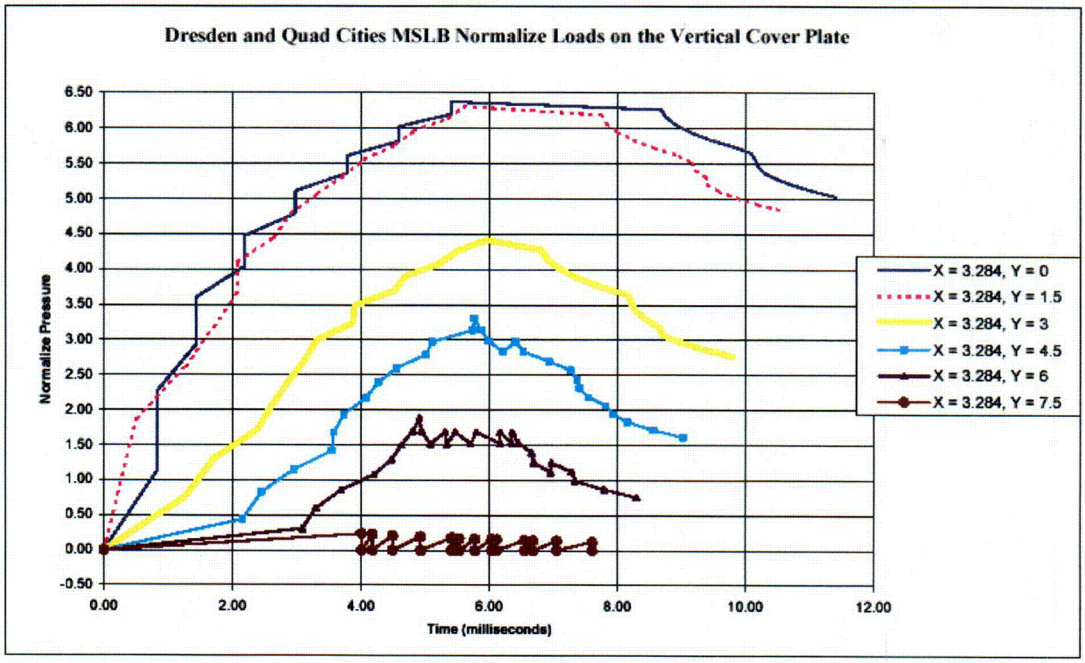
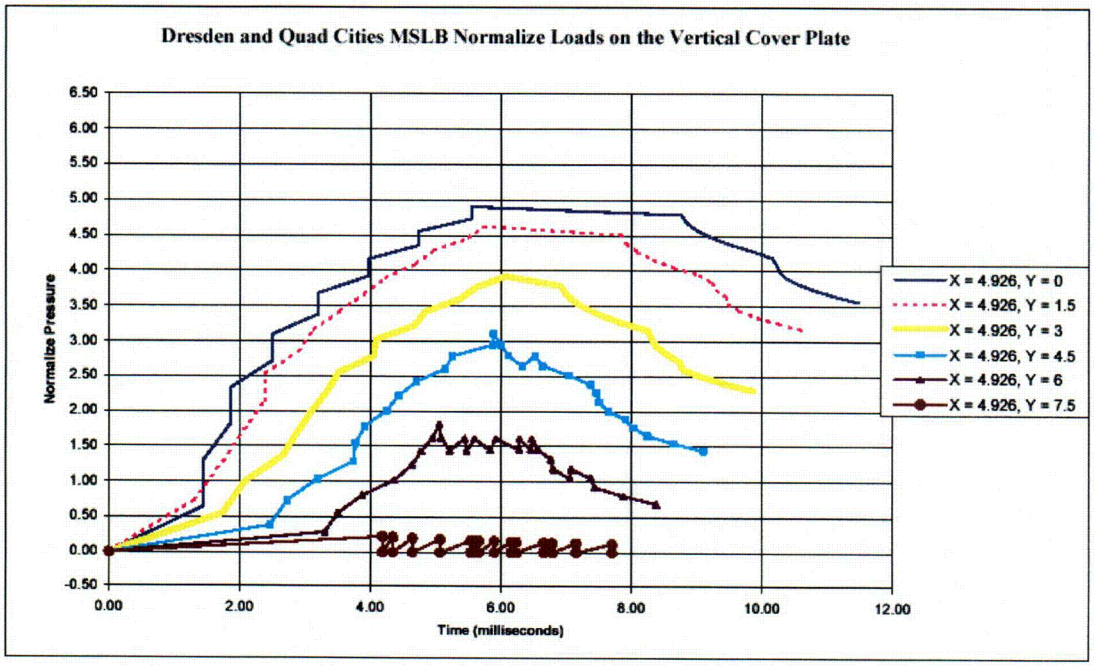


Figure 4



C02

Figure 5

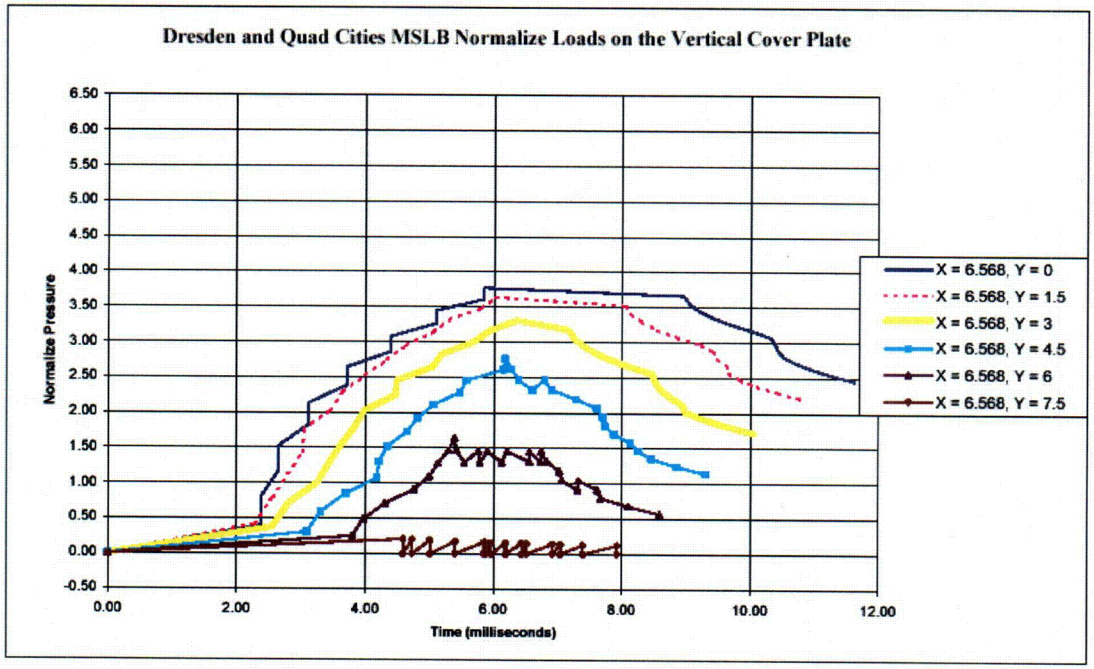


Figure 6

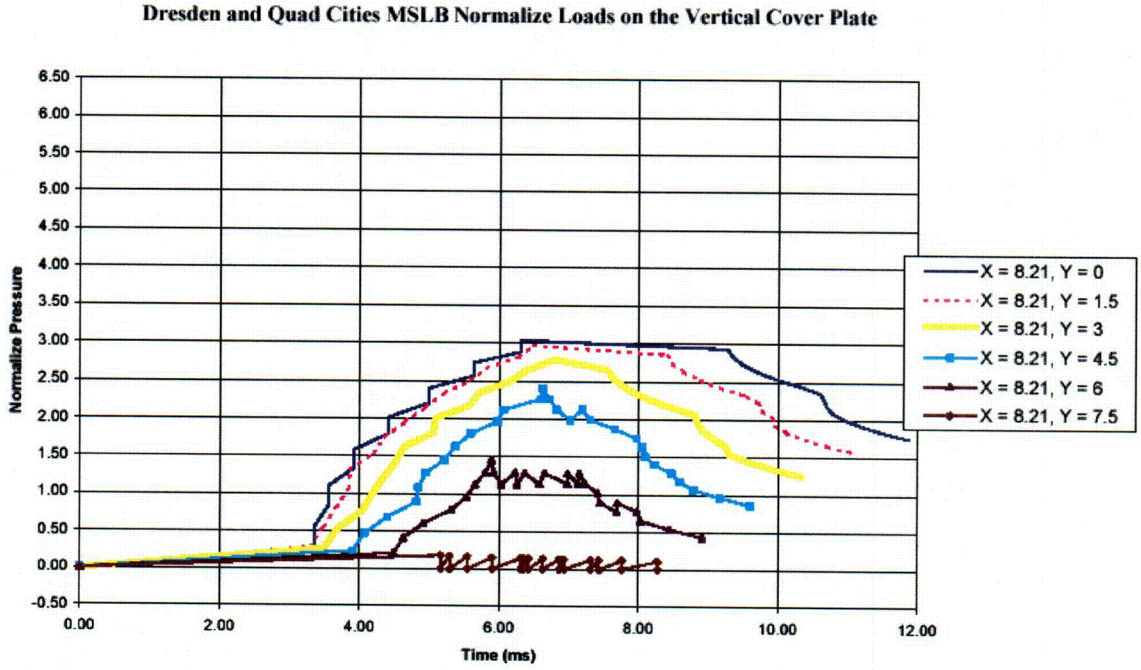


Figure 7

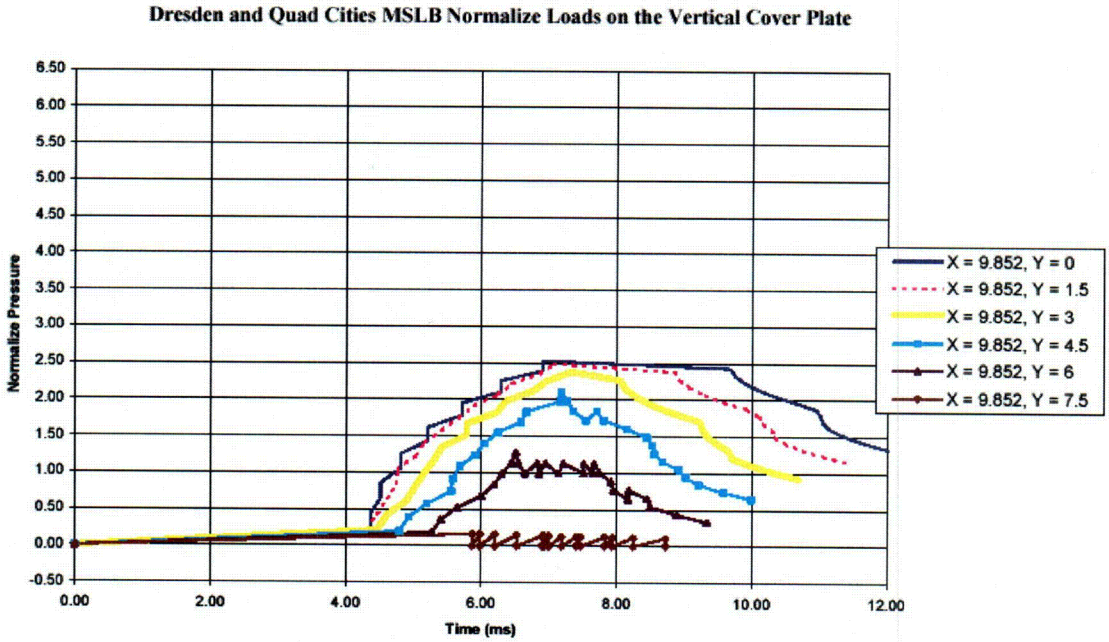


Figure 8

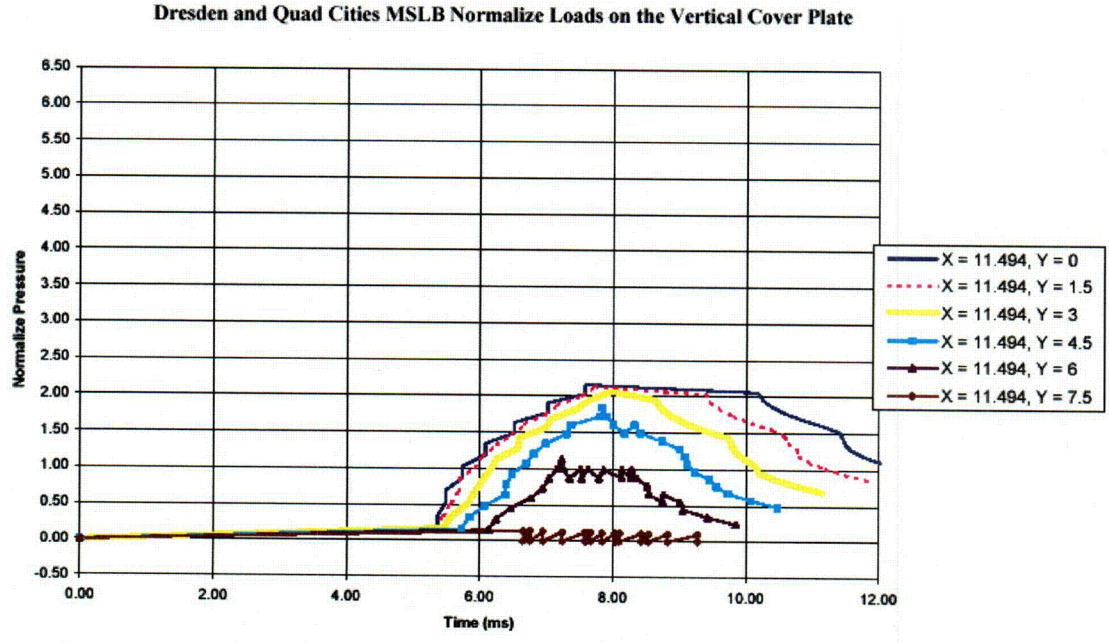
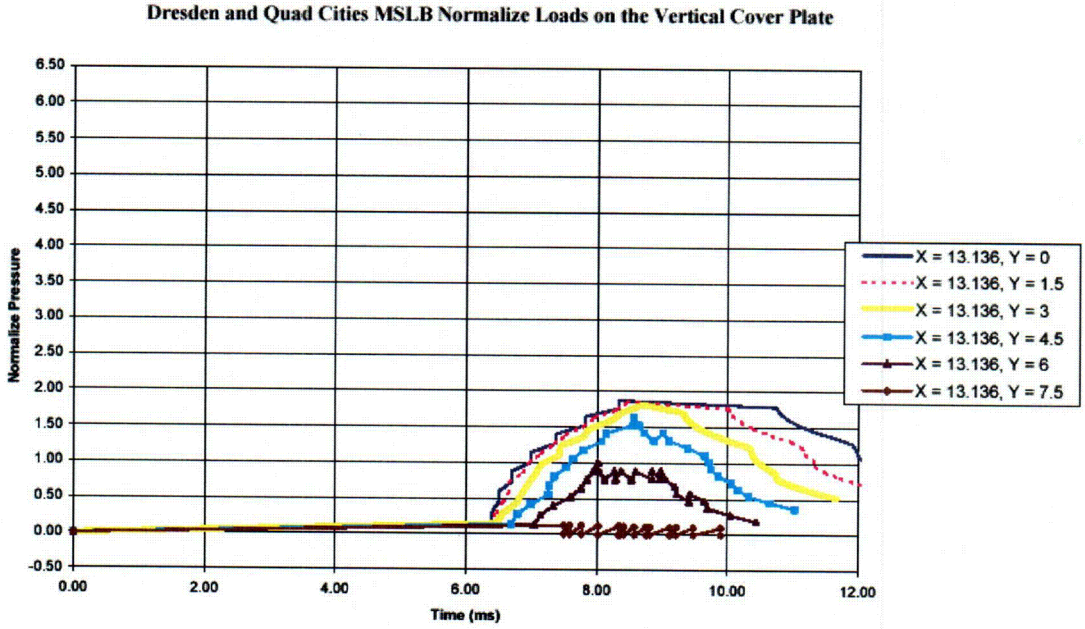


Figure 9


Dresden and Quad Cities MSLB Normalize Loads on the Vertical Cover Plate
Normalize Pressure
6.50
6.00
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
-0.50
0.00
2.00
4.00
6.00
8.00
10.00
12.00
Time (ms)
X = 13.136, Y = 0
X = 13.136, Y = 1.5
X = 13.136, Y = 3
X = 13.136, Y = 4.5
X = 13.136, Y = 6
X = 13.136, Y = 7.5