APPLICABILITY OF THE USE OF THE SQUARE-ROOT-OF-THE-SUM-OF-SQUARES (SRSS) METHOD FOR COMBINING PEAK DYNAMIC RESPONSES FOR WNP-2

TECHNICAL REPORT

prepared by

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for application to

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
NUCLEAR PROJECT NO. 2

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1. INTRODUCTION AND SUMMARY

This report describes a study made in order to demonstrate the applicability of the square root of the sum of the squares (SRSS) method for combining peak dynamic responses to the WNP-2 nuclear plant. It is prepared in compliance with the requirements of the NRC regarding confirmatory issues as stated in the Safety Evaluation Report for WNP-2, NUREG-0891 (Reference 1) and as delineated by the NRC in its letter of September 16, 1982 (Reference 2).

The scope of the study is in line with previous correspondence and discussions with the NRC (Reference 3) on the same subject. Combinations of dynamic responses due to safety relief valve (SRV) discharge and seismic loadings are considered at locations typical of the containment vessel in the drywell region. The study includes 96 combination samples of acceleration or displacement responses due to OBE or SSE seismic loading and single valve or all valve SRV loading.

To demonstrate the applicability of the SRSS method, the methodology used is directed towards compliance with Option 2 as proposed by the NRC in Reference 2 letter. In this regard, it is first noted in the study that each of the definitions of seismic and SRV loads individually meets the requirement on non-exceedence probability (NEP), namely 84 percent minimum. Then for each of the 96 sample combinations of seismic and SRV loads, the response magnitudes obtained by SRSS method are investigated to assess if they meet the required non-exceedence probability as determined from the cumulative distribution function (CDF) developed for the combination. The individual CDF's are generated using procedures similar to those in the previous report by Structural Mechanics Associates on the applicability of the SRSS method for Mark III nuclear plants (Reference 4). Two parameters affecting the CDF development, namely, the duration of the seismic loading and the number of time lags, per sample, between initiation of the seismic and SRV loads are investigated in the study.

The study finds that the requirements of Option 2 for the application of the SRSS method are satisfied. As noted above, the individual dynamic loads are defined to have non-exceedence probabilities of 84 percent or greater. With regard to the parameters affecting the generation of the CDF's, the study shows that the values used are conservative and satisfactory. Then using the generated CDF's, it is determined for each of the 96 samples that the response magnitude obtained by SRSS has a non-exceedence probability greater than 50 percent. Likewise for each of the 96 samples, the non-exceedence probability of 1.2 times the SRSS magnitude is found to exceed 85 percent. Thus, the square root of the sum of the squares method for combining dynamic responses is shown to be applicable to the WNP-2 nuclear plant.

2. RESPONSE CASES

The response cases considered in this study are described below:

a. Load Combinations

The SRV discharge and seismic load combinations which were used in this study are listed below.

(1) OBE + SRV (single valve)
(2) OBE + SRV (all valves)
(3) SSE + SRV (single valve)
(4) SSE + SRV (all valves)

The single valve and all valves discharge cases were used since they were found to be representative of all different SRV discharge design cases.

Load combinations involving LOCA plus SSE and more than two dynamic loads are not considered in this study since the use of the SRSS method was previously approved for these cases (see References 5 and 6).

b. Locations

In the wetwell, the responses of the WNP-2 containment structure to SRV discharge loads were found to be significantly (several times) larger than the responses to the seismic loads. Consequently, the difference between the combination of the two peak dynamic responses in the wetwell by the absolute sum (ABS) method and the SRSS method becomes small and the SRSS issue unimportant. This led us to limit the samples studied in this report to the drywell area of the WNP-2 containment structure. A total of 96 samples were studied of which 48 samples were response accelerations and 48 samples were response displacements.

3. TECHNICAL METHODOLOGY

a. Criteria - The methodology used herein to demonstrate the applicability of the SRSS method for combining peak dynamic responses is that proposed by the NRC as Option 2 in its letter of September 16, 1982 (Reference 2). This methodology corresponds to criteria established by the NRC in Methodology for Combining Dynamic Responses, NUREG-0484 Revision 1 (Reference 7) where it is stated that peak dynamic responses may be combined by SRSS if a NEP of 84 percent or greater is achieved for the combined response. An acceptable method of accomplishing this is summarized in Option 2 of Reference 2 letter as follows:

(1) Each dynamic load is defined to correspond to a NEP of 84 percent or greater.

(2) The SRSS value of the response combination has an NEP of at least 50 percent selected from a Cumulative Distribution Function (CDF) curve constructed on the assumption that individual response amplitudes are known and only random time phasing, defined by its probability density function, exists.

(3) 1.2 times the SRSS value of the response combination has an NEP of 85 percent or greater based on the preceding CDF curve.

b. Application to WNP-2 - The principal steps in the application of the above criteria to the WNP-2 project are described below.

(1) Definition of seismic and SRV loads

The seismic and SRV loads are each defined to satisfy the requirement of 84 percent minimum non-exceedence probability. The seismic loads used for the design of WNP-2 have been defined at a NEP in excess of 84 percent in accordance with Reference 8. The SRV load definition is given in Reference 9; as noted therein the design load has a NEP of 90 percent.

Time histories utilized for each of the seismic and SRV acceleration and displacement responses listed in Section 2 were obtained from project calculation/files.

Herein, the seismic response is designated $y_1(t)$ and the SRV discharge response is designated $y_2(t)$.

(2) Generation of CDF's

CDF curves are developed for each of the response cases listed in Section 2 by the procedure below. For each response case, the following steps are applicable.

(a) Review of the response time histories shows that the duration T_1 of the seismic response $y_1(t)$ is 20.48 seconds and the duration T_2 of the SRV response $y_2(t)$ is 2.048 seconds.

(b) The maximum responses are evaluated for each time history such that

$$y_{1m} = \text{maximum } y_1(t) \ ,$$

$$y_{2m} = \text{maximum } y_2(t) \ ,$$

and the SRSS response is calculated as

$$R_{SRSS} = \sqrt{y_{1m}^2 + y_{2m}^2} \ .$$

(c) The strong motion portion of the seismic response is used in this study. As discussed in Section 4 of this report this ensures conservative results (see also Reference 4). In this approach, the strong motion portion is defined as the time frame between the first and the last times that the response amplitude $y_1(t)$ reaches the value $\alpha \cdot y_{1m}$, a fractional part of the maximum value. Figure 1 shows this concept. In the figure, T_L and T_U are the times defining the start and end of the strong seismic motion. In Reference 4, the value of α was taken to be 0.5; the same value, $\alpha = 0.5$, is used in this study.

(d) The time lag, τ, between initiation of the seismic strong motion and the subsequent initiation of the SRV response is generated as a random variable with a uniform probability density function, $f(\tau)$:

$$f(\tau) = \frac{1}{T_U - T_L}\ , \quad T_L \leq \tau \leq T_U$$

(e) The method of generating the combined time history $y(t)$ is summarized in Figure 2. For a selected value of τ

$$y(t) = y_1(t)\ , \quad 0 \leq t \leq \tau\ ;$$
$$\tau + T_2 \leq t \leq T_1$$

$$y(t) = y_1(t) + y_2\ (t - \tau)\ ,$$
$$\tau \leq t \leq \tau + T_2$$

After $y(t)$ is determined, the maximum absolute value y_m associated with the selected value τ is obtained.

$$y_m = \text{maximum}\ |\, y(t) \,|$$

(f) Steps (d) and (e) are repeated for each selected value of τ. The number of Monte Carlo trials used in the study is 200, the same as in Reference 4. Thereby, a total of 200 values of y_m are obtained. The effect on the resulting CDF of varying the number of trials is discussed in Section 4, Results.

(g) Using conventional statistical methods as in Reference 10 , the histogram and associated CDF of y_m are constructed from the generated set of y_m data.

(h) Steps (a) through (g) are repeated for each of the response cases. Thereby 96 CDF's associated with the 96 response cases are obtained.

Program SUPRA was developed to perform the preceding steps. The program was verified and checked using manual calculations.

(3) Validation of SRSS Method

To demonstrate the applicability of the SRSS method to WNP-2 the following steps are performed for each of the response cases.

(a) From the CDF, the response at 50 percent NEP (R_{50}) and the response at 85 percent NEP (R_{85}) are read.

(b) Comparison is made between R_{SRSS} and R_{50} and between 1.2 x R_{SRSS} and R_{85}.

(c) If $R_{SRSS} \geq R_{50}$ and 1.2 $R_{SRSS} \geq R_{85}$, the SRSS method of combining peak dynamic responses is applicable.

4. RESULTS

a. Effect of Factor α - It has been conservatively assumed that the SRV response time history must begin at some time during the strong motion portion of the earthquake response. As previously discussed, the factor α is used to define the duration of the strong motion portion. The effects on the CDF's of several response cases are investigated for $\alpha = 0.0$ and $\alpha = 0.50$. The selected cases for the sensitivity study involve vertical acceleration of different points due to OBE and SRV discharge (all valves actuation/AVA); 200 trial values of time lag are used. The results are pictured in Figure 3 and listed in Table 1 for a typical response case. The conservatism which results from narrowing the duration of the strong motion portion of the seismic response is evident as the response at the same NEP level is always larger with $\alpha = 0.50$ than with $\alpha = 0.0$.

b. <u>Effect of Number of Monte Carlo Trials</u> - The effect of varying the number of Monte Carlo trials of time lag is investigated. CDF's are developed for the same response case as in subparagraph a. above for the number of trials equal to 400, 300, and 200 in turn. The results are given in Figure 4 and Table 2. It is evident that the differences between the CDF's are negligible. Consequently, the number of trials in this study, 200, is satisfactory.

c. <u>General Results</u> - A total of 96 response combinations are included in the study: Tables 3a and 3b show the associated load combinations. Responses at four elevations on the containment vessel in the drywell are investigated; the locations are shown in Figures 5a and 5b. For each elevation, three directions of acceleration and displacement are studied, namely, horizontal direction, vertical direction at $\theta = 0°$, and vertical direction at $\theta = 180°$ (see Figure 5c).

The resultant CDF's and numerical characteristics are given in Figures 6-1 through 6-48 and Tables 4.1 through 4.4 for acceleration responses and in Figures 7-1 through 7-48 and Tables 5.1 through 5.4 for displacement responses. For all 96 uses in the study it is determined that

$$R_{SRSS} \geqslant R_{50}$$

$$1.2\ R_{SRSS} \geqslant R_{85}\ .$$

5. CONCLUSION

It has been shown in this study that the criteria established by NRC for the applicability of the SRSS method for combining peak dynamic responses have been satisfied as follows:

a. Seismic and SRV discharge loads have each been defined to have an NEP of 84 percent or greater.

b. Based on investigation of 96 response cases covering combinations of seismic and SRV discharge responses, the SRSS value of the response combination in each case has an NEP of at least 50 percent as determined from the associated CDF curve.

c. Similarly for all 96 cases, 1.2 times the SRSS value of the response combination has an NEP of 85 percent or greater based on the CDF curve.

In view of the preceding, it is concluded that the SRSS method for combining peak dynamic responses is applicable to the WNP-2 nuclear plant.

REFERENCES:

1. USNRC: Safety Evaluation Report related to the operation of WPPSS Nuclear Project No. 2, Docket No. 50-397, Washington Public Power Supply System; NUREG-0892.

2. USNRC letter to the Supply System, A. Schwencer to R. L. Ferguson, on the subject: WNP-2 Request for additional information, dated September 16, 1982.

3. Supply System letter G02-82-886 to USNRC, G. D. Bouchey to A. Schwencer, on the subject: Nuclear Project No. 2 - SRSS Combination of Dynamic Responses, dated November 3, 1982.

4. Structural Mechanics Associates' Report SMA 12109.01-R001 entitled: "Study to Demonstrate the Generic Applicability of SRSS Combination of Dynamic Responses for Mark III Nuclear Steam Supply System and Balance-of-Plant Piping and Equipment Components," dated November 1981.

5. General Electric Company Report NEDE-24010-P entitled: "Technical Bases for the Use of the Square-Root-of-Sum-of-Squares (SRSS) Method for Combining Dynamic Loads for Mark II Plants," dated July 1977, with Supplements 1 through 3.

6. USNRC letter to Dr. Hancock Chau, Chairman of Mark II Owners Group, signed Roger J. Mattson, dated June 25, 1980, with Attachment including staff's evaluation of GE Topical report entitled: "Technical Bases for the Use of the Square-Root-of-the-Sum-of-Squares (SRSS) Method for Combining Dynamic Loads for Mark II Plants," NEDE-24010-P and Supplements 1 through 3 (see Reference 5).

7. USNRC: Methodology for Combining Dynamic Responses, NUREG-0484, Rev. 1, dated May 1980.

8. Washington Public Power Supply System, Nuclear Project No. 2, Final Safety Analysis Report, Vol. 6, Appendix 2.5 K: "Seismic Exposure Analysis for the WNP-2 and WNP-1/4 Sites."

9. "SRV Loads - Improved Definition and Application Methodology to Mark II Containments," Technical Report prepared by Burns and Roe, Inc., for Application to WPPSS-WNP 2, July 1980.

10. J. R. Benjamin and C. Allen Cornell: "Probability, Statistics and Decision for Civil Engineers," McGraw-Hill Book Company, 1970.

NODE NO.		α = 0.				α = 0.50				$\frac{R_{50}(\alpha=0.50)}{R_{50}(\alpha=0.)}$	$\frac{R_{85}(\alpha=0.50)}{R_{85}(\alpha=0.)}$
SEISMIC (FIG. 5a)	SRV (FIG.5b)	T_L	T_U	R_{50}	R_{85}	T_L	T_U	R_{50}	R_{85}		
152	26	0.0	20.49	5.263	6.388	1.16	16.01	5.585	6.510	1.06	1.02
148	28	0.0	20.49	5.654	6.936	1.16	16.01	5.946	7.056	1.05	1.02
144	30	0.0	20.49	6.939	8.288	1.16	16.01	7.329	9.161	1.06	1.11
140	33	0.0	20.49	8.775	10.22	1.16	16.01	9.147	10.89	1.04	1.07

LOADING CASE: OBE+SRV (AVA) 180°*

VERTICAL ACCELERATION RESPONSE

TABLE 1 - EFFECTS OF FACTOR α SELECTION

* See Figure 5c.

NODE NO.		N = 200				N = 300				N = 400				$\frac{R_{50}\ (N=200)}{R_{50}\ (N=400)}$	$\frac{R_{85}\ (N=200)}{R_{85}\ (N=400)}$
SEISMIC (Fig5a)	SRV (Fig 5b)	T_L	T_u	R_{50}	R_{85}	T_L	T_u	R_{50}	R_{85}	T_L	T_u	R_{50}	R_{85}		
152	26	1.16	16.01	5.585	6.510	1.16	16.01	5.569	6.526	1.16	16.01	5.592	6.608	1.00	0.99
148	28	1.16	16.01	5.946	7.056	1.16	16.01	6.091	7.088	1.16	16.01	5.982	7.071	0.99	1.00
144	30	1.16	16.01	7.329	9.161	1.16	16.01	7.295	8.729	1.16	16.01	7.295	8.609	1.00	1.06
140	33	1.16	16.01	9.147	10.89	1.16	16.01	9.189	10.97	1.16	16.01	9.395	11.09	0.97	0.98

LOADING CASE: OBE+SRV (AVA) 180° *

VERTICAL ACCELERATION RESPONSE

TABLE 2 - EFFECTS OF N (Number of trials) SELECTION

* See Figure 5c.

LOADING CASE TIME HISTORY	RESPONSE LOCATIONS INVESTIGATED	DIRECTION OF RESPONSE	AZIMUTH OF* RESPONSE LOCATION
SSE + SVA	4	Radial	0°
SSE + AVA	4	Radial	0°
OBE + SVA	4	Radial	0°
OBE + AVA	4	Radial	0°
SSE + SVA	4	Vertical	0°
SSE + AVA	4	Vertical	0°
OBE + SVA	4	Vertical	0°
OBE + AVA	4	Vertical	0°
SSE + SVA	4	Vertical	180°
SSE + AVA	4	Vertical	180°
OBE + SVA	4	Vertical	180°
OBE + AVA	4	Vertical	180°

TOTAL NUMBER OF CDF's GENERATED = 48

SSE - SAFE SHUTDOWN EARTHQUAKE

OBE - OPERATING BASE EARTHQUAKE

AVA - SRV, ALL VALVES ACTUATION

SVA - SRV, SINGLE VALVE ACTUATION

TABLE 3a - CASES STUDIED (ACCELERATIONS)

* See Figure 5c.

LOADING CASE TIME HISTORY	RESPONSE LOCATIONS INVESTIGATED	DIRECTION OF RESPONSE	AZIMUTH OF * RESPONSE LOCATION
SSE + SVA	4	Radial	0°
SSE + AVA	4	Radial	0°
OBE + SVA	4	Radial	0°
OBE + AVA	4	Radial	0°
SSE + SVA	4	Vertical	0°
SSE + AVA	4	Vertical	0°
OBE + SVA	4	Vertical	0°
OBE + AVA	4	Vertical	0°
SSE + SVA	4	Vertical	180°
SSE + AVA	4	Vertical	180°
OBE + SVA	4	Vertical	180°
OBE + AVA	4	Vertical	180°

TOTAL NUMBER OF CDF's GENERATED = 48

SSE - SAFE SHUTDOWN EARTHQUAKE

OBE - OPERATING BASE EARTHQUAKE

AVA - SRV, ALL VALVES ACTUATION

SVA - SRV, SINGLE VALVE ACTUATION

TABLE 3b - CASES STUDIED (DISPLACEMENTS)

* See Figure 5c.

LOADING - SSE + SINGLE VALVE												
Location		Direction	Azimuth	Peak Response		SRSS	NEP for SRSS(%)	1.2 SRSS	NEP for 1.2 SRSS (%)	R_{50}/ SRSS	R_{85}/ 1.2SRSS	ABS/ SRSS
Seismic (Fig. 5a)	SRV (Fig5b)			Y_1	Y_2							
152	26	Radial	0^o	12.73	10.53	16.52	88.79	19.83	96.50	0.813	0.809	1.41
148	28	Radial	0^o	11.95	9.11	15.03	79.50	18.03	97.00	0.850	0.856	1.40
144	30	Radial	0^o	12.46	11.65	17.06	79.70	20.47	98.50	0.885	0.871	1.41
140	33	Radial	0^o	13.81	1.561	13.90	95.51	16.68	100.00	0.994	0.828	1.11
152	26	Vertical	0^o	8.87	3.94	9.71	87.50	11.64	99.00	0.915	0.817	1.32
148	28	Vertical	0^o	9.36	2.68	9.74	89.50	11.68	100.00	0.961	0.816	1.24
144	30	Vertical	0^o	9.59	3.70	10.28	70.66	12.34	98.74	0.934	0.886	1.29
140	33	Vertical	0^o	9.36	3.95	10.16	88.00	12.19	99.00	0.923	0.816	1.31
152	26	Vertical	180^o	8.78	3.94	9.62	87.15	11.55	99.00	0.912	0.818	1.32
148	28	Vertical	180^o	8.77	2.68	9.17	90.00	11.01	100.00	0.956	0.814	1.25
144	30	Vertical	180^o	8.91	3.70	9.65	75.93	11.58	99.50	0.925	0.873	1.31
140	33	Vertical	180^o	9.29	3.95	10.09	87.50	12.11	99.00	0.921	0.814	1.31

TABLE 4.1 - GENERAL RESULTS (ACCELERATIONS - SSE + SINGLE VALVE)

LOADING - SSE + ALL VALVE												
Location		Direction	Azimuth	Peak Response		SRSS	NEP for SRSS (%)	1.2 SRSS	NEP for 1.2 SRSS (%)	R_{50}/ SRSS	R_{85}/ 1.2SRSS	ABS/ SRSS
Seismic (Fig.5a)	SRV (Fig5b)			y_1	y_2							
152	26	Radial	0^o	12.73	7.17	14.61	92.00	17.54	98.00	0.873	0.756	1.36
148	28	Radial	0^o	11.95	1.74	12.08	93.50	14.49	100.00	0.989	0.825	1.13
144	30	Radial	0^o	12.46	2.03	12.62	97.00	15.15	100.00	0.987	0.822	1.15
140	33	Radial	0^o	13.81	1.142	13.86	91.15	16.63	100.00	0.996	0.831	1.08
152	26	Vertical	0^o	8.87	4.48	9.94	91.11	11.92	100.00	0.893	0.802	1.34
148	28	Vertical	0^o	9.36	4.56	10.41	84.84	12.49	98.00	0.900	0.835	1.34
144	30	Vertical	0^o	9.59	6.41	11.53	78.00	13.85	96.00	0.865	0.874	1.39
140	33	Vertical	0^o	9.36	8.33	12.53	78.86	15.04	94.00	0.867	0.907	1.41
152	26	Vertical	180^o	8.78	4.48	9.86	91.44	11.83	100.00	0.891	0.802	1.35
148	28	Vertical	180^o	8.77	4.56	9.88	83.19	11.87	98.67	0.888	0.839	1.35
144	30	Vertical	180^o	8.91	6.41	10.98	76.00	13.18	97.50	0.864	0.849	1.40
140	33	Vertical	180^o	9.29	8.33	12.48	78.93	14.97	94.00	0.868	0.908	1.41

TABLE 4.2 - GENERAL RESULTS (ACCELERATIONS - SSE + ALL VALVE)

LOADING - OBE + SINGLE VALVE												
Location		Direction	Azimuth	Peak Response		SRSS	NEP for SRSS (%)	1.2 SRSS	NEP for 1.2 SRSS (%)	R_{50}/ SRSS	R_{85}/ 1.2SRSS	ABS/ SRSS
Seismic (Fig 5a)	SRV (Fig 5b)			Y_1	Y_2							
152	26	Radial	0°	7.46	10.53	12.90	78.00	15.49	97.20	0.912	0.856	1.40
148	28	Radial	0°	6.66	9.11	11.28	74.50	13.53	96.17	0.913	0.895	1.40
144	30	Radial	0°	6.36	11.65	13.27	68.50	15.93	98.82	0.957	0.895	1.36
140	33	Radial	0°	6.87	1.56	7.04	94.34	8.46	100.00	0.975	0.814	1.20
152	26	Vertical	0°	4.71	3.94	6.14	83.00	7.37	94.50	0.795	0.867	1.41
148	28	Vertical	0°	5.02	2.68	5.69	90.65	6.82	99.50	0.882	0.816	1.35
144	30	Vertical	0°	5.17	3.70	6.36	69.23	7.63	97.23	0.929	0.906	1.40
140	33	Vertical	0°	5.02	3.95	6.39	83.50	7.66	94.50	0.861	0.844	1.40
152	26	Vertical	180°	4.64	3.94	6.09	83.00	7.30	94.17	0.798	0.875	1.41
148	28	Vertical	180°	4.57	2.68	5.30	87.79	6.36	99.50	0.864	0.820	1.37
144	30	Vertical	180°	4.60	3.70	5.90	67.93	7.09	96.50	0.929	0.910	1.41
140	33	Vertical	180°	4.97	3.95	6.35	82.50	7.62	94.50	0.862	0.851	1.41

TABLE 4.3 - GENERAL RESULTS (ACCELERATIONS - OBE + SINGLE VALVE)

LOADING - OBE + ALL VALVE												
Location		Direction	Azimuth	Peak Response		SRSS	NEP for SRSS (%)	1.2 SRSS	NEP for 1.2 SRSS (%)	R_{50}/ SRSS	R_{85}/ 1.2SRSS	ABS/ SRSS
Seismic (Fig 5a)	SRV (Fig 5b)			y_1	y_2							
152	26	Radial	0^o	7.46	7.17	10.35	89.00	12.42	98.00	0.813	0.796	1.41
148	28	Radial	0^o	6.66	1.74	6.88	95.50	8.26	100.00	0.968	0.807	1.22
144	30	Radial	0^o	6.36	2.03	6.68	94.00	8.01	100.00	0.952	0.805	1.26
140	33	Radial	0^o	6.87	1.14	6.96	92.50	8.36	100.00	0.987	0.824	1.15
152	26	Vertical	0^o	4.71	4.48	6.50	82.49	7.80	97.85	0.864	0.843	1.41
148	28	Vertical	0^o	5.02	4.56	6.78	73.71	8.13	97.16	0.909	0.890	1.41
144	30	Vertical	0^o	5.17	6.41	8.24	68.50	9.89	94.50	0.926	0.935	1.41
140	33	Vertical	0^o	5.02	8.33	9.73	67.61	11.67	93.50	0.941	0.936	1.37
152	26	Vertical	180^o	4.64	4.48	6.45	82.00	7.74	97.50	0.866	0.842	1.41
148	28	Vertical	180^o	4.57	4.56	6.46	68.64	7.75	96.00	0.921	0.911	1.41
144	30	Vertical	180^o	4.60	6.41	7.89	67.50	9.47	90.82	0.928	0.967	1.40
140	33	Vertical	180^o	4.97	8.33	9.70	67.45	1.16	93.50	0.943	0.936	1.37

TABLE 4.4 - GENERAL RESULTS (ACCELERATIONS - OBE + ALL VALVE)

LOADING - SSE + SINGLE VALVE

Location		Direction	Azimuth	Peak Response		SRSS	NEP for SRSS (%)	1.2 SRSS	NEP for 1.2 SRSS (%)	R_{50}/ SRSS	R_{85}/ 1.2SRSS	ABS/ SRSS
Seismic (Fig 5a)	SRV (Fig 5b)			y_1	y_2							
152	26	Radial	0°	0.12535	0.00077	0.1254	99.50	0.1504	100.00	1.00	0.83	1.01
148	28	Radial	0°	0.13677	0.00132	0.1368	100.00	0.01641	100.00	1.00	0.83	1.01
144	30	Radial	0°	0.15403	0.00180	0.1540	95.08	0.1848	100.00	1.00	0.83	1.01
140	33	Radial	0°	0.18970	0.00014	0.1897	94.00	0.2276	100.00	1.00	0.83	1.00
152	26	Vertical	0°	0.02120	0.00042	0.02121	92.50	0.02545	100.00	1.00	0.83	1.02
148	28	Vertical	0°	0.02141	0.00042	0.02141	89.50	0.02569	100.00	1.00	0.83	1.02
144	30	Vertical	0°	0.02157	0.00048	0.02158	87.00	0.02589	100.00	1.00	0.83	1.02
140	33	Vertical	0°	0.02178	0.00050	0.02179	85.88	0.02615	100.00	1.00	0.83	1.02
152	26	Vertical	180°	0.02121	0.00042	0.02121	92.50	0.02545	100.00	1.00	0.83	1.02
148	28	Vertical	180°	0.02144	0.00042	0.02145	90.50	0.02573	100.00	1.00	0.83	1.02
144	30	Vertical	180°	0.02162	0.00048	0.02162	87.50	0.02594	100.00	1.00	0.83	1.02
140	33	Vertical	180°	0.02179	0.00050	0.02179	85.72	0.02615	100.00	1.00	0.83	1.05

TABLE 5.1 - GENERAL RESULTS (DISPLACEMENTS - SSE + SINGLE VALVE)

LOADING - SSE + ALL VALVE

Location		Direction	Azimuth	Peak Response		SRSS	NEP for SRSS (%)	1.2 SRSS	NEP for 1.2 SRSS (%)	R_{50}/ SRSS	R_{85}/ 1.2SRSS	ABS/ SRSS
Seismic (Fig 5a)	SRV (Fig 5b)			Y_1	Y_2							
152	26	Radial	0^o	0.12535	0.00010	0.12540	100.00	0.15040	100.00	1.00	0.83	1.00
148	28	Radial	0^o	0.13677	0.00003	0.13680	99.50	0.16410	100.00	1.00	0.83	1.00
144	30	Radial	0^o	0.15403	0.00007	0.15400	96.00	0.18480	100.00	1.00	0.83	1.00
140	33	Radial	0^o	0.18970	0.00003	0.18970	92.00	0.22760	100.00	1.00	0.83	1.00
152	26	Vertical	0^o	0.02120	0.00126	0.02124	80.00	0.02549	100.00	1.00	0.84	1.06
148	28	Vertical	0^o	0.02141	0.00129	0.02144	86.50	0.02573	100.00	1.00	0.83	1.06
144	30	Vertical	0^o	0.02157	0.00133	0.02161	86.66	0.02594	100.00	1.00	0.83	1.06
140	33	Vertical	0^o	0.02178	0.00141	0.02183	80.50	0.02619	100.00	1.00	0.84	1.06
152	26	Vertical	180^o	0.02121	0.00126	0.02124	80.00	0.02549	100.00	1.00	0.84	1.06
148	28	Vertical	180^o	0.02144	0.00129	0.02148	86.50	0.02578	100.00	1.00	0.83	1.06
144	30	Vertical	180^o	0.02162	0.00133	0.02166	87.00	0.02599	100.00	1.00	0.83	1.06
140	33	Vertical	180^o	0.02179	0.00141	0.02183	80.50	0.02620	100.00	1.00	0.84	1.06

TABLE 5.2 - GENERAL RESULTS (DISPLACEMENTS - SSE + ALL VALVE)

LOADING - OBE + SINGLE VALVE

Location		Direction	Azimuth	Peak Response		SRSS	NEP for SRSS(%)	1.2 SRSS	NEP for 1.2 SRSS (%)	R_{50}/ SRSS	R_{85}/ 1.2SRSS	ABS/ SRSS
Seismic (Fig 5a)	SRV (Fig5b)			Y_1	Y_2							
152	26	Radial	0^{o}	0.0631	0.000768	0.063	99.50	.076	100.00	1.00	0.83	1.01
148	28	Radial	0^{o}	0.069	0.00132	0.069	99.50	.083	100.00	0.999	0.83	1.02
144	30	Radial	0^{o}	0.076	0.0018	0.076	90.50	.091	100.00	0.999	0.83	1.02
140	33	Radial	0^{o}	0.093	0.00014	0.093	99.50	.I12	100.00	1.00	0.83	1.00
152	26	Vertical	0^{o}	0.0093	0.000425	0.00935	90.00	.0112	100.00	0.999	0.83	1.04
148	28	Vertical	0^{o}	0.0095	0.000419	0.00947	88.50	.0114	100.00	0.999	0.83	1.04
144	30	Vertical	0^{o}	0.0096	0.000484	0.00957	83.44	.0115	100.00	0.999	0.83	1.05
140	33	Vertical	0^{o}	0.0097	0.00050	0.00968	89.04	.0016	100.00	0.999	0.83	1.05
152	26	Vertical	180^{o}	0.0093	0.00042	0.00936	91.50	.0011	100.00	0.999	0.83	1.04
148	28	Vertical	180^{o}	0.0095	0.00042	0.00948	89.50	.0011	100.00	0.999	0.83	1.04
144	30	Vertical	180^{o}	0.0096	0.00048	0.00958	86.50	.0011	100.00	0.999	0.83	1.05
140	33	Vertical	180^{o}	0.0097	0.00050	0.00968	89.49	.0012	100.00	0.999	0.83	1.05

TABLE 5.3 - GENERAL RESULTS (DISPLACEMENTS - OBE + SINGLE VALVE)

LOADING - OBE + ALL VALVE

Location		Direction	Azimuth	Peak Response		SRSS	NEP for SRSS (%)	1.2 SRSS	NEP for 1.2 SRSS (%)	R_{50}/ SRSS	R_{85}/ 1.2SRSS	ABS/ SRSS
Seismic	SRV			Y_1	Y_2							
152	26	Radial	0°	0.063	0.000099	0.063	99.50	0.6756	100.00	1.00	0.83	1.00
148	28	Radial	0°	0.069	0.000030	0.069	100.00	0.0829	100.00	1.00	0.83	1.00
144	30	Radial	0°	0.076	0.000072	0.076	99.50	0.0913	100.00	1.00	0.83	1.00
140	33	Radial	0°	0.093	0.000026	0.093	99.50	0.112	100.00	1.00	0.83	1.00
152	26	Vertical	0°	0.0093	0.00126	0.0094	82.23	0.011	100.00	0.99	0.84	1.12
148	28	Vertical	0°	0.0095	0.00129	0.0096	85.00	0.012	100.00	0.99	0.84	1.13
144	30	Vertical	0°	0.0096	0.00133	0.0097	82.50	0.012	100.00	0.99	0.84	1.13
140	33	Vertical	0°	0.0097	0.00141	0.0098	83.50	0.012	100.00	0.99	0.84	1.13
152	26	Vertical	180°	0.0093	0.0013	0.0094	82.19	0.011	100.00	0.99	0.85	1.12
148	28	Vertical	180°	0.0095	0.0013	0.0096	86.49	0.012	100.00	0.99	0.83	1.13
144	30	Vertical	180°	0.0096	0.0013	0.0097	85.00	0.0012	100.00	0.99	0.83	1.12
140	33	Vertical	180°	0.0097	0.0014	0.0098	83.50	0.0012	100.00	0.99	0.83	1.13

TABLE 5.4 - GENERAL RESULTS (DISPLACEMENTS - OBE + ALL VALVE)

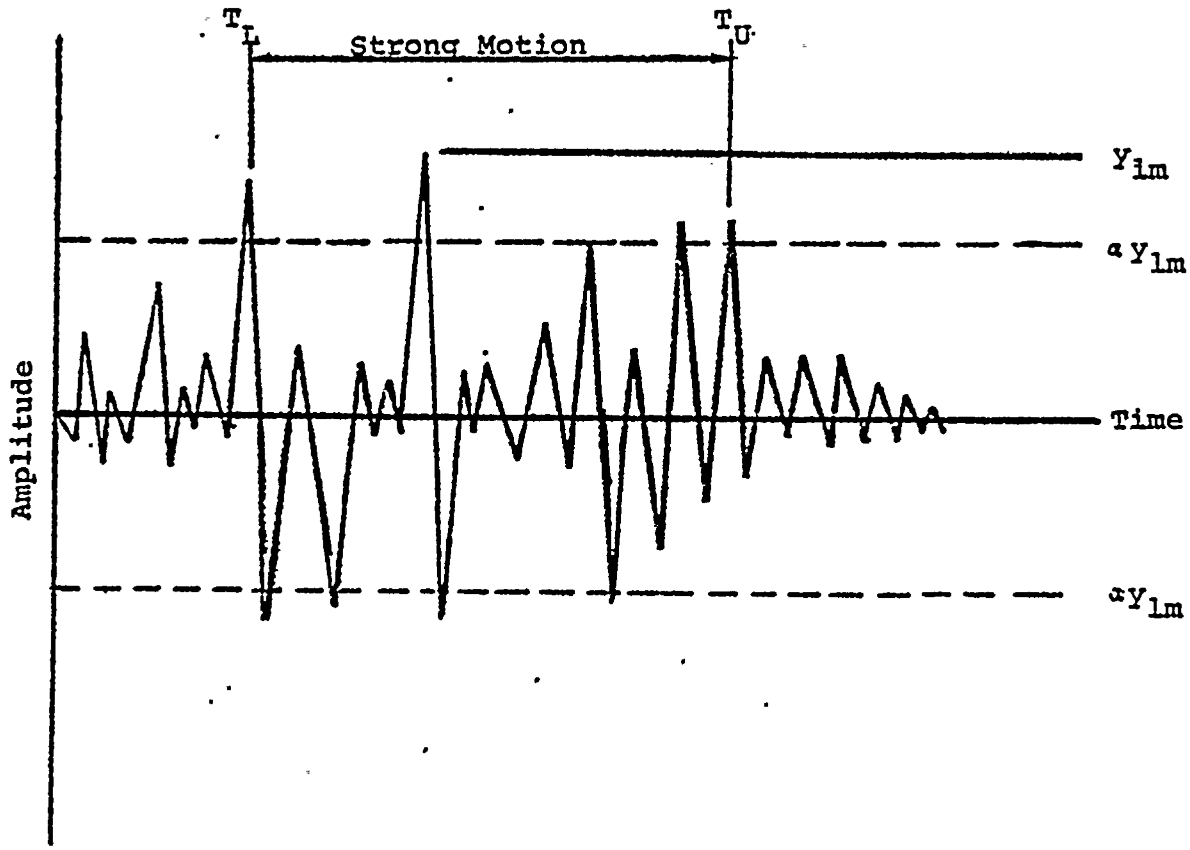


FIGURE 1 - Definition of T_L and T_U

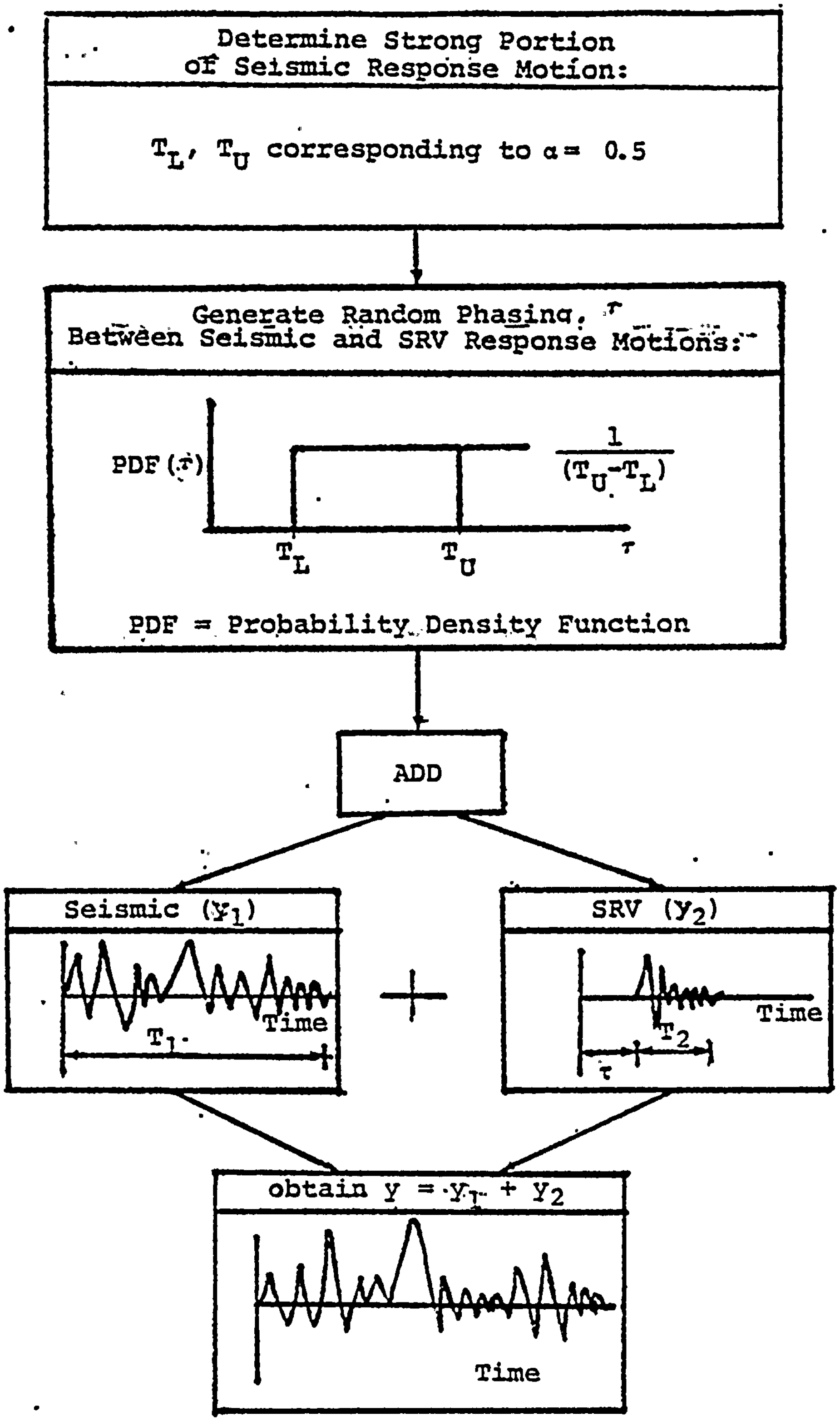


FIGURE 2 - Generation of Combined Time Histories

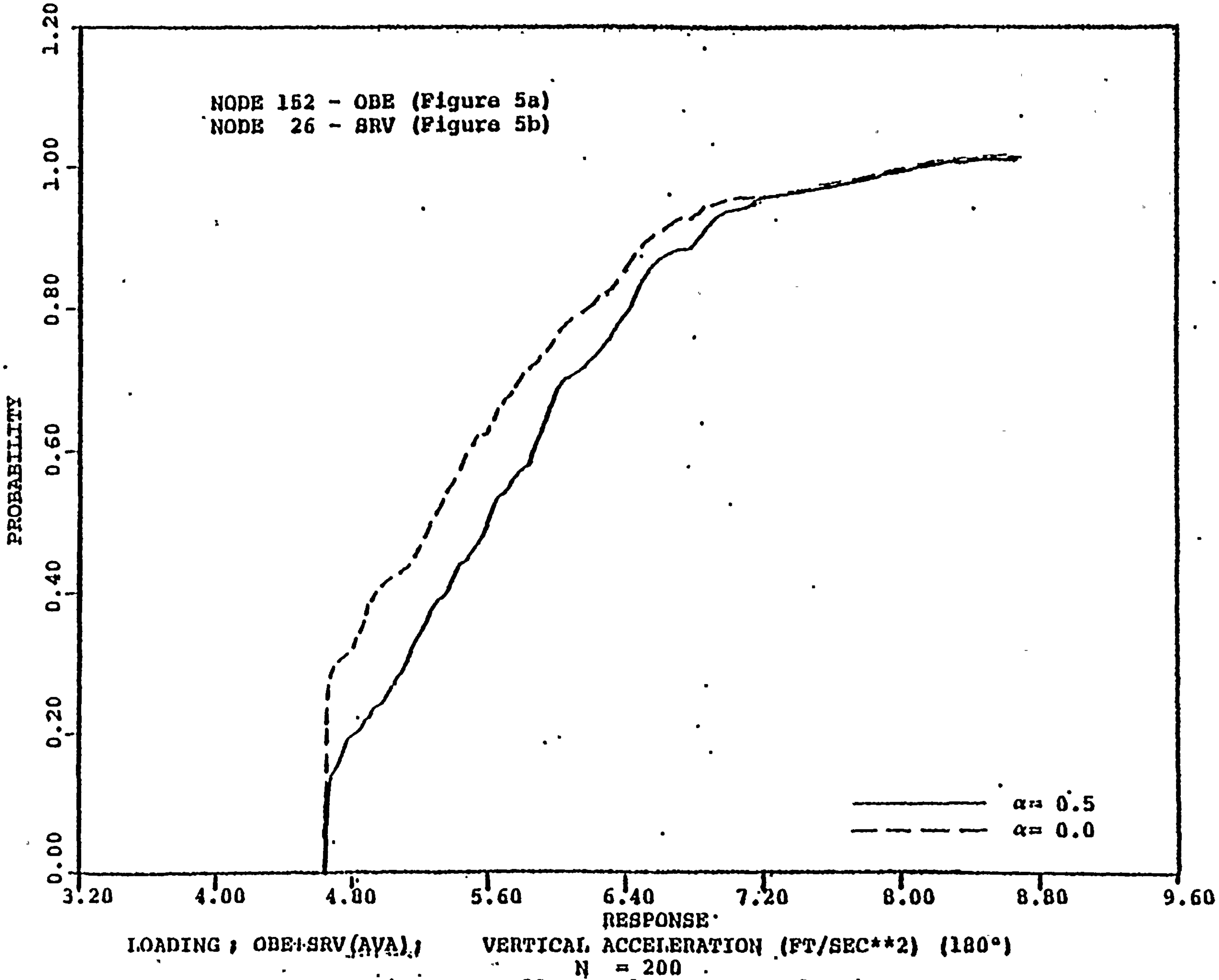
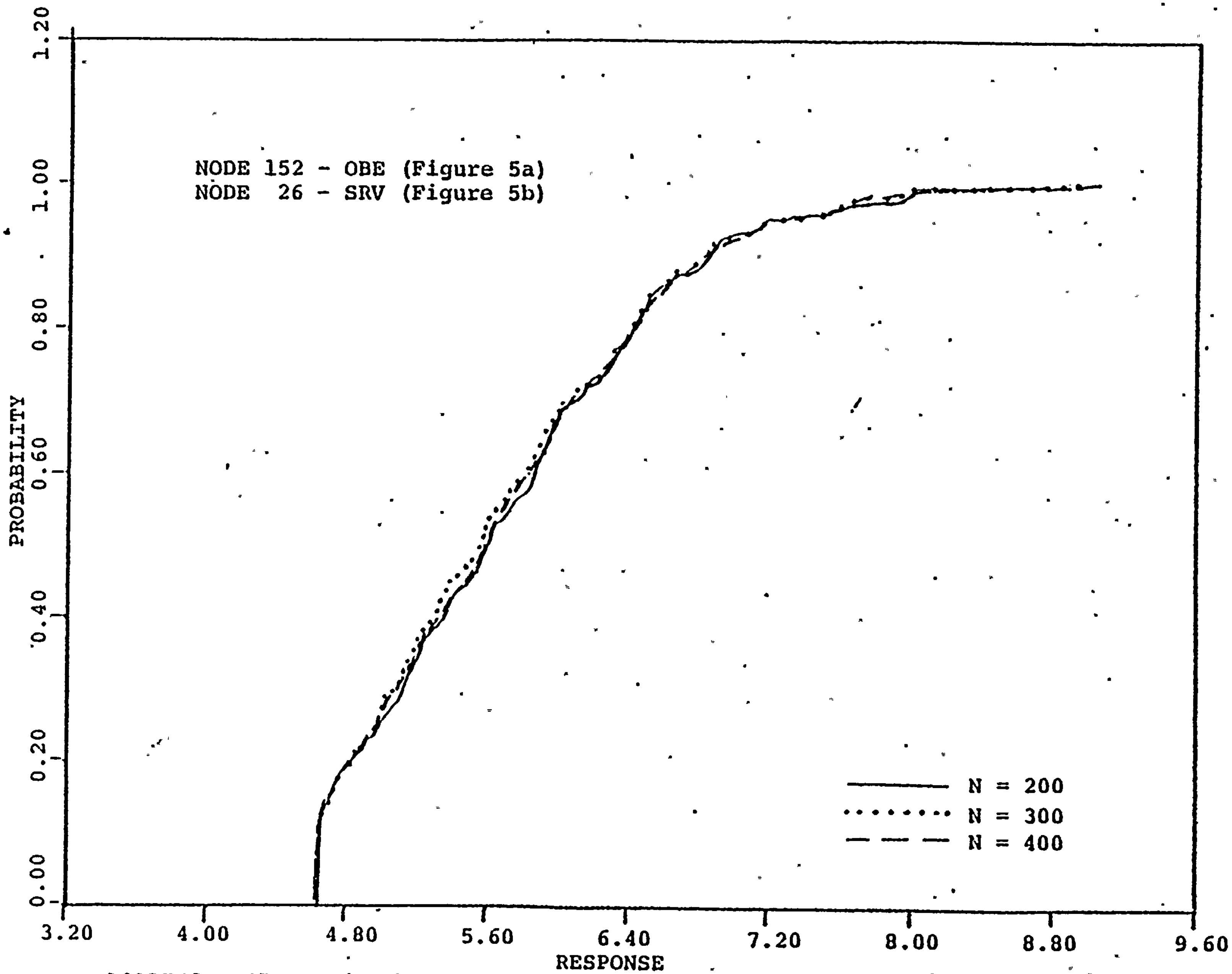


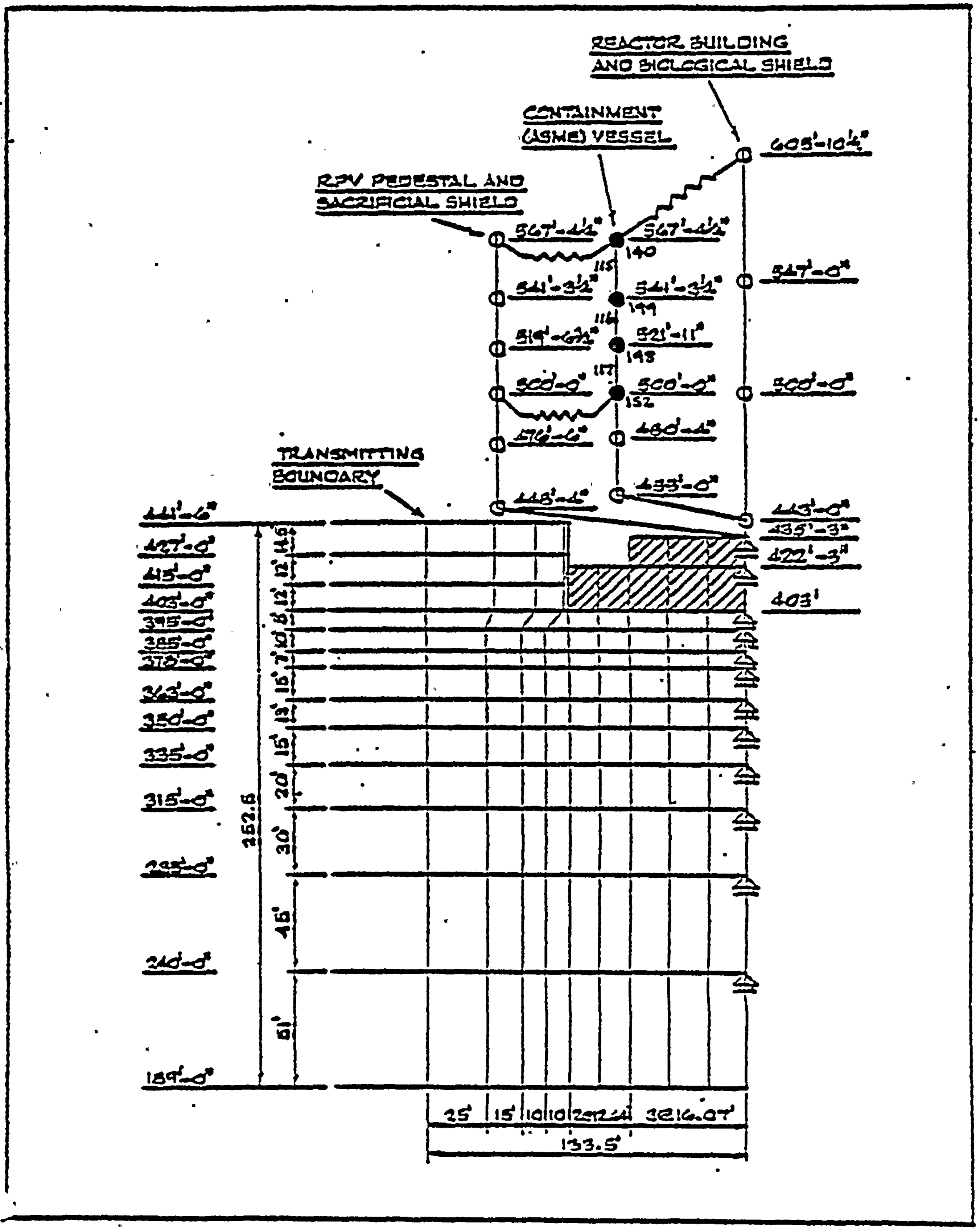
Figure 3: Effects of Factor α Selection



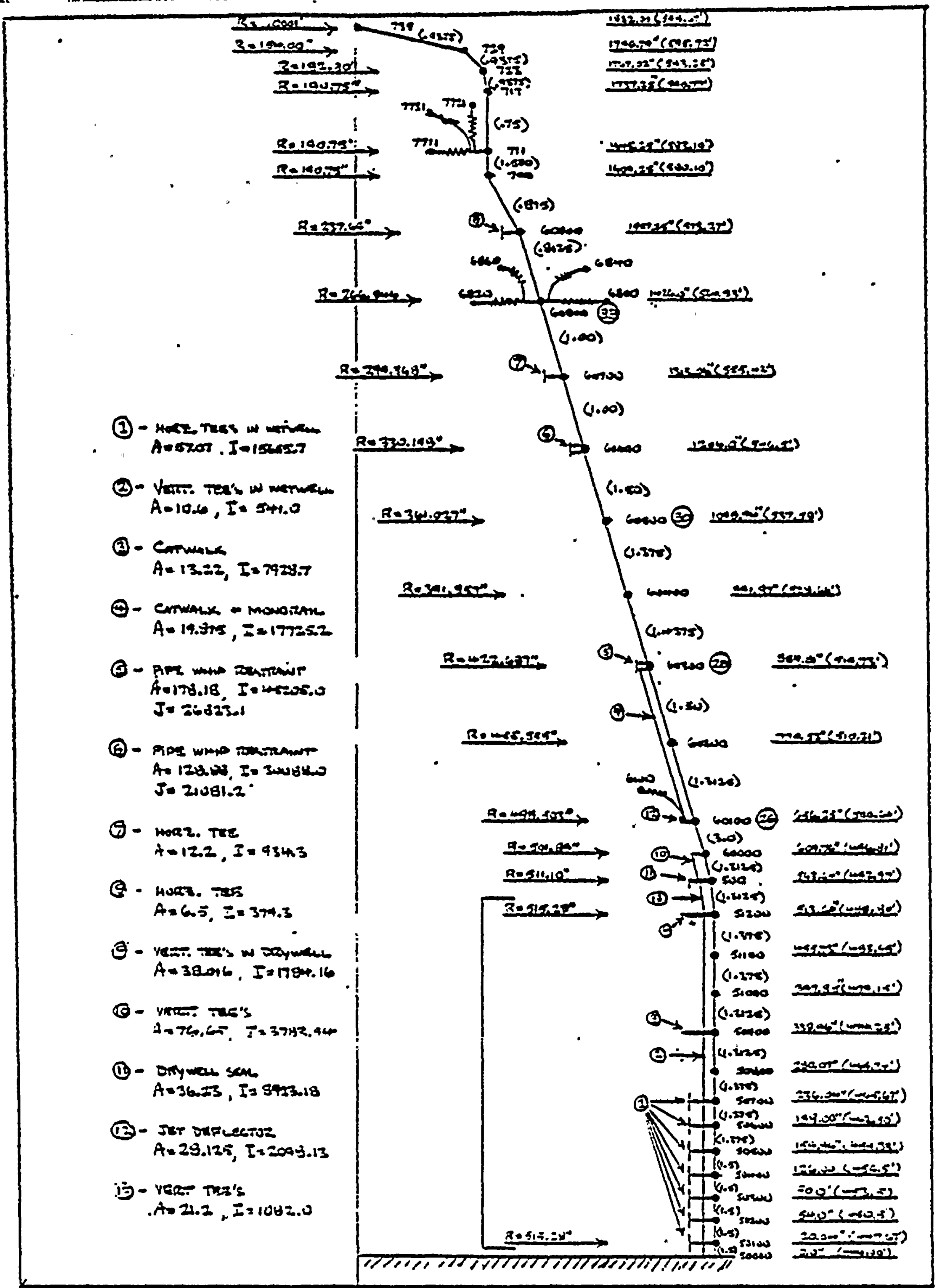
LOADING; OBE+SRV(AVA); VERTICAL ACCELERATION (FT/SEC**2) (180°)

$\alpha = 0.5$

Figure 4; Effects of N (Number of Trials) Selection



SEISMIC MODEL Figure 5a



SRV CONTAINMENT MODEL Figure 5b

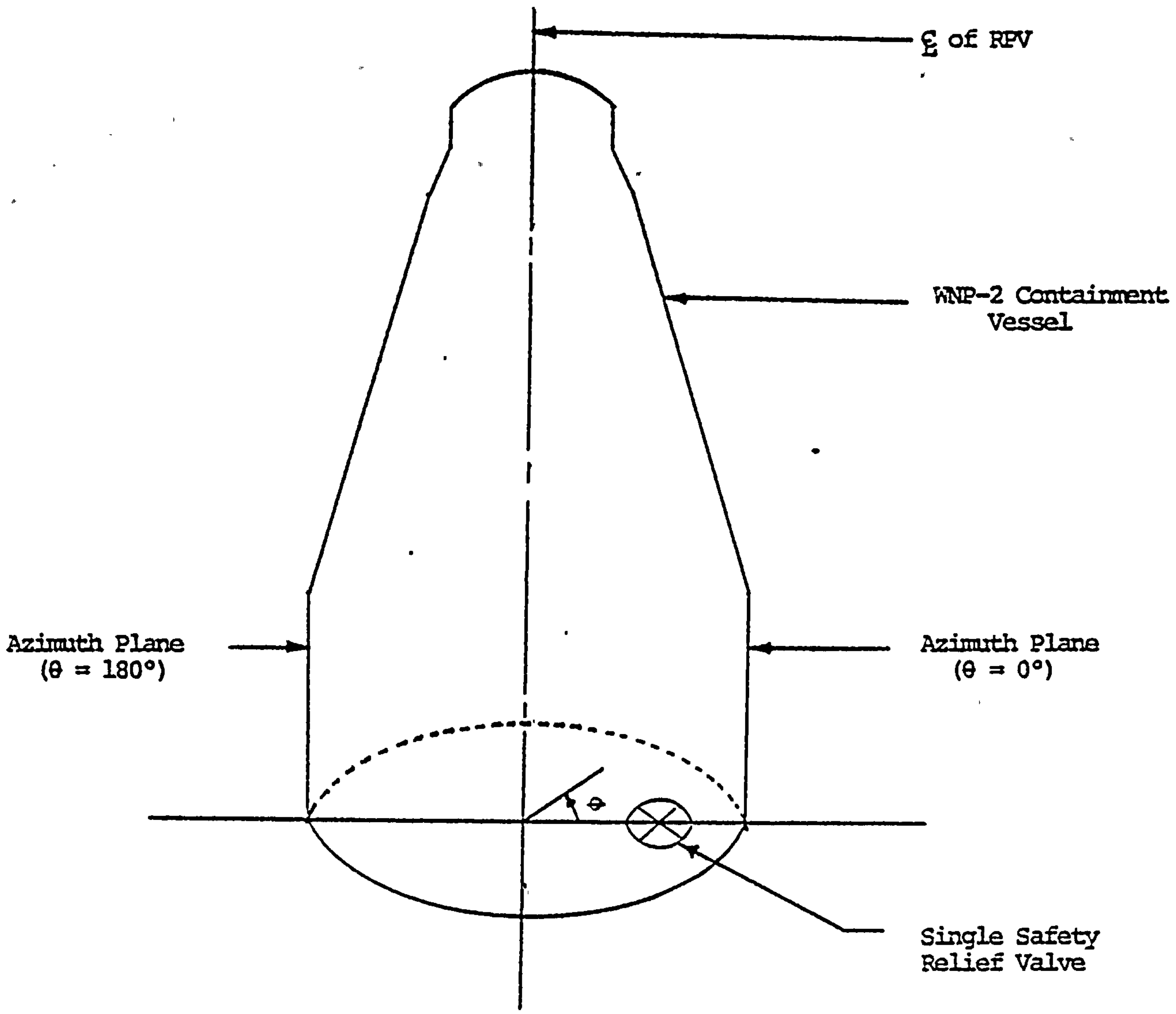
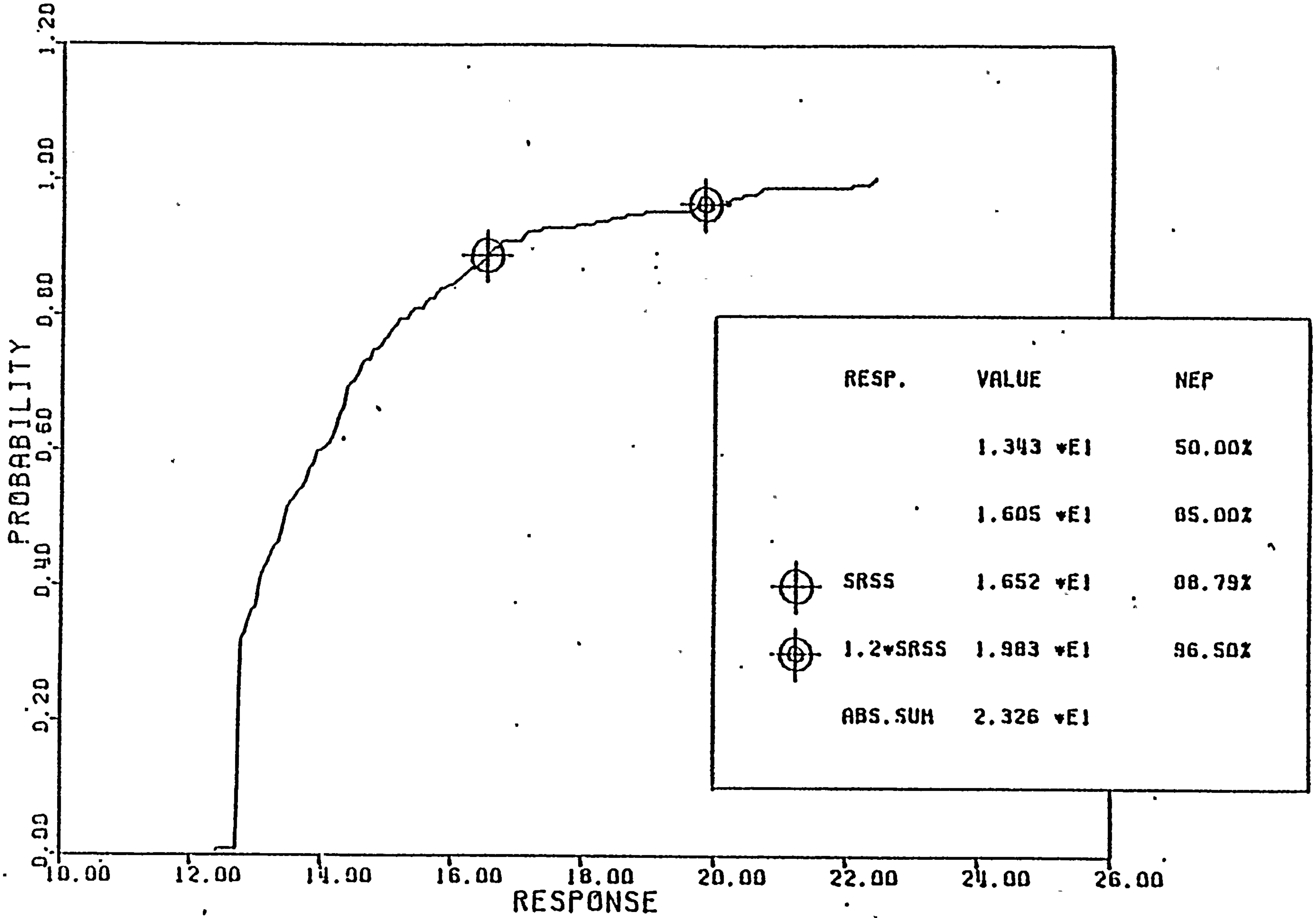
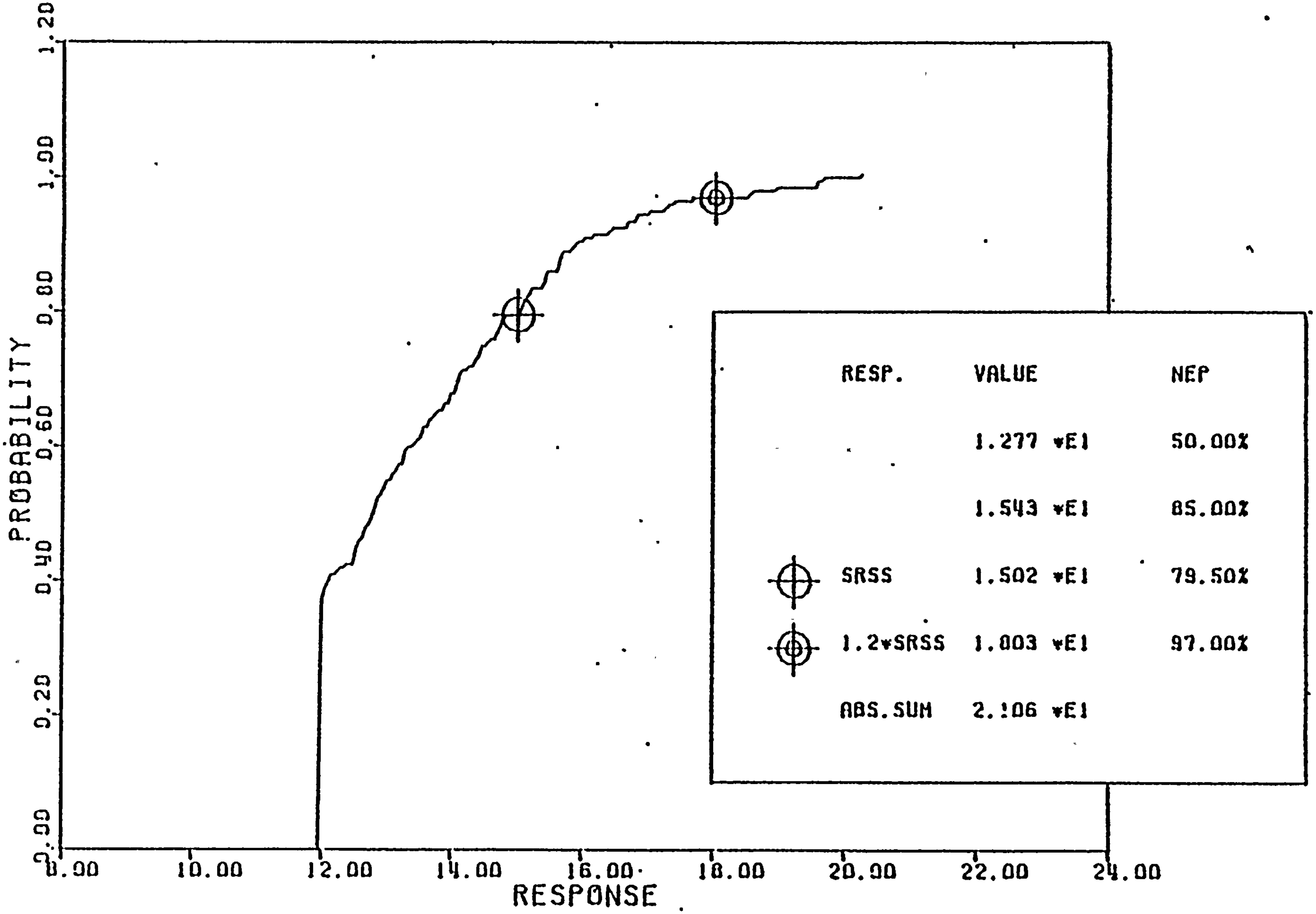


Figure 5c - DEFINITION OF RESPONSE AZIMUTH



LOADING SRV(SVA) + SSE, HORIZONTAL ACCELERATION (FT/SEC**2).
CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - SSE)

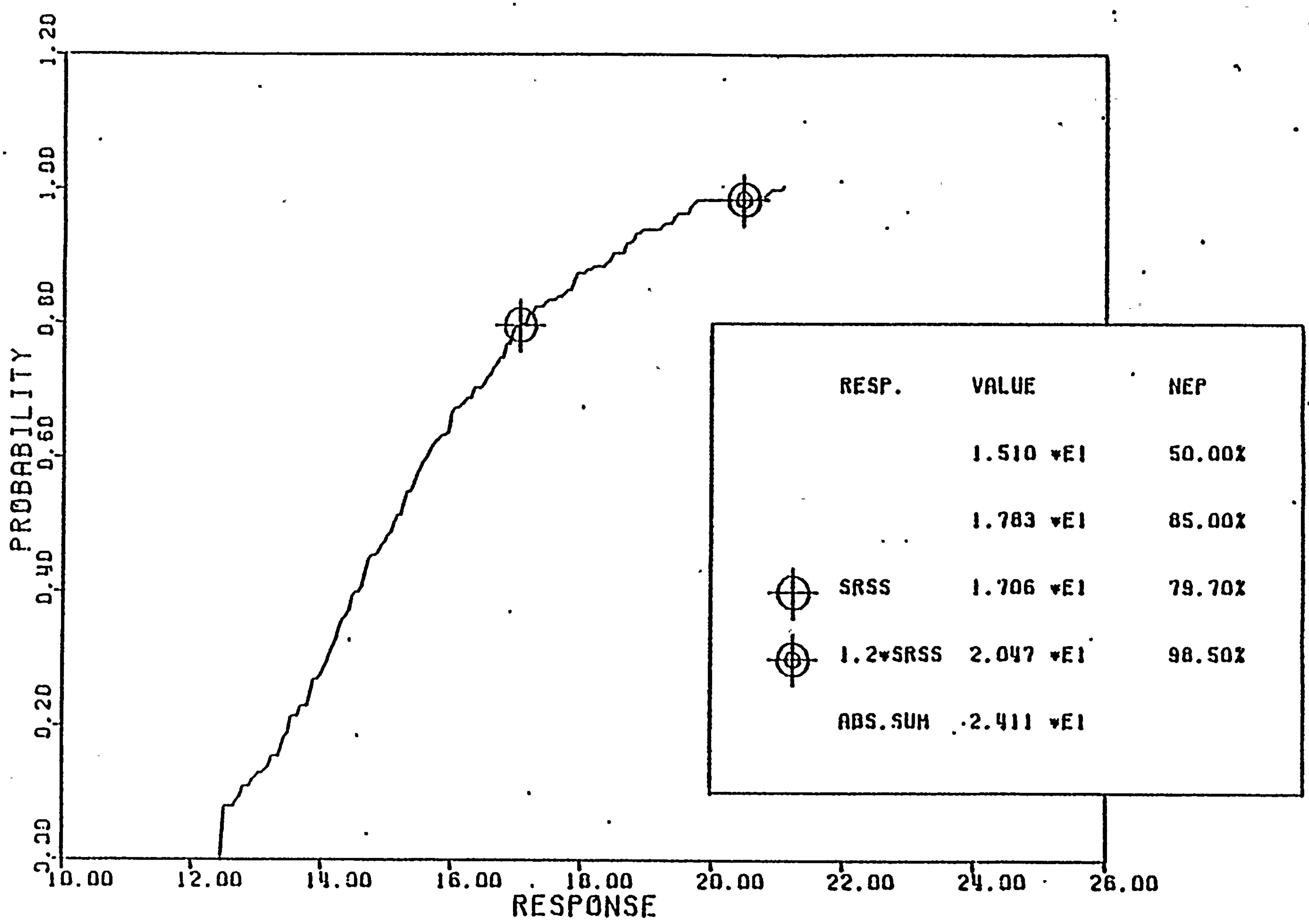
Figure 6-1



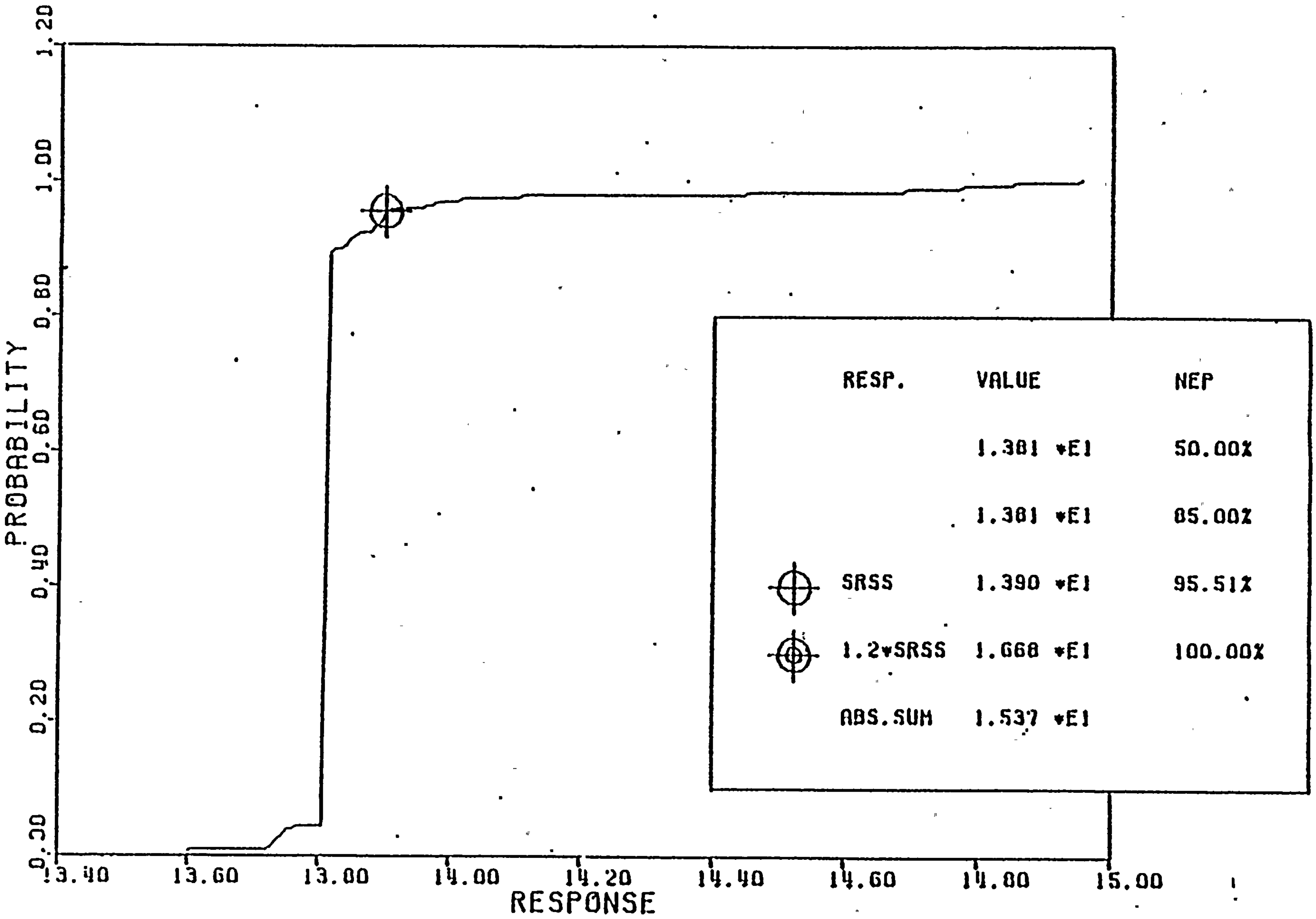
LOADING SRV(SVA) + SSE, HORIZONTAL ACCELERATION FT/SEC**2)

CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - SSE)

Figure 6-2



LOADING SRV(SVA) + SSE, HORIZONTAL ACCELERATION FT/SEC**2)
CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - SSE) Figure 6-3



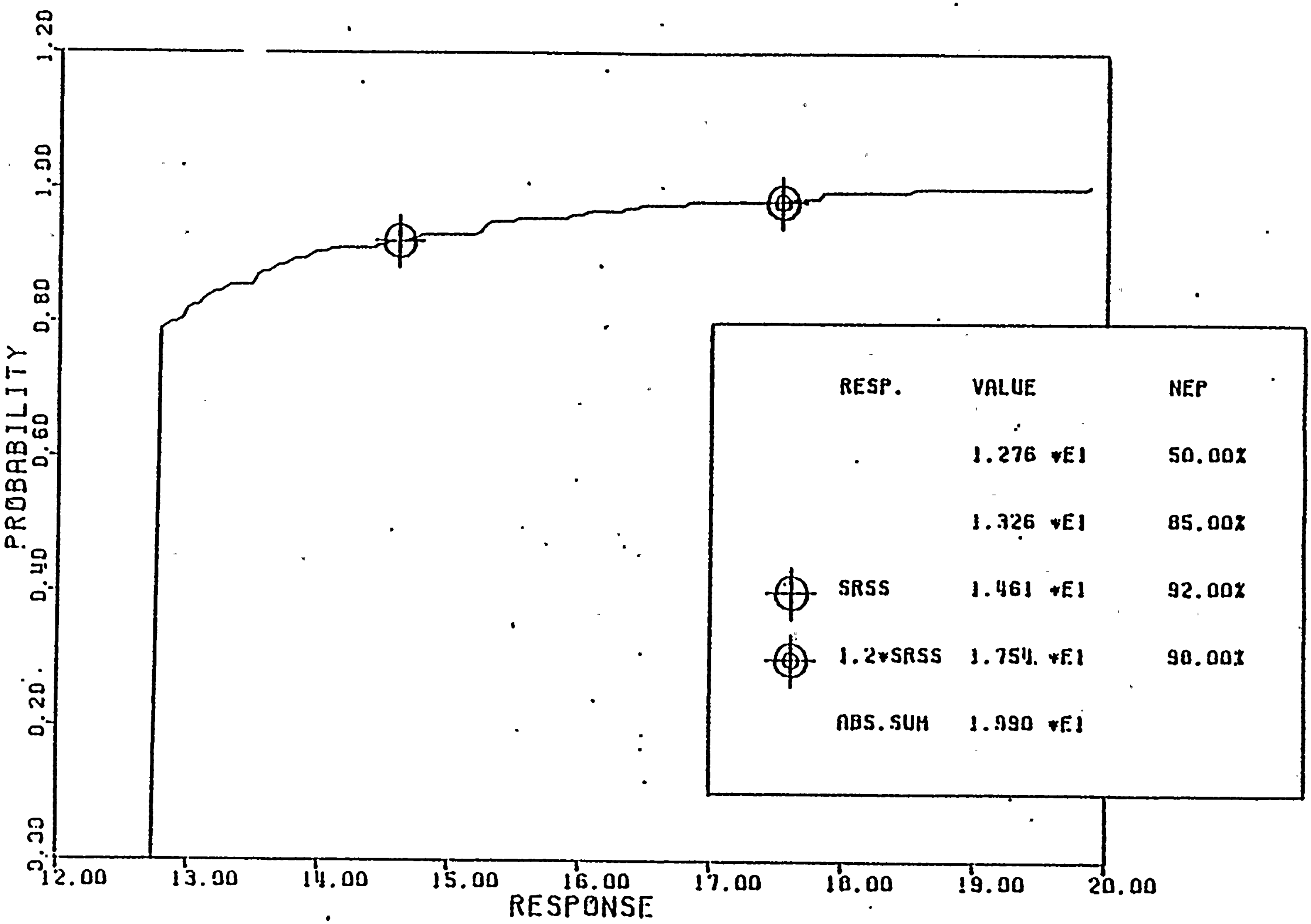
LOADING SRV(SVA) + SSE, HORIZONTAL ACCELERATION FT/SEC**2)
CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - SSE)

Figure 6-4

[illegible]

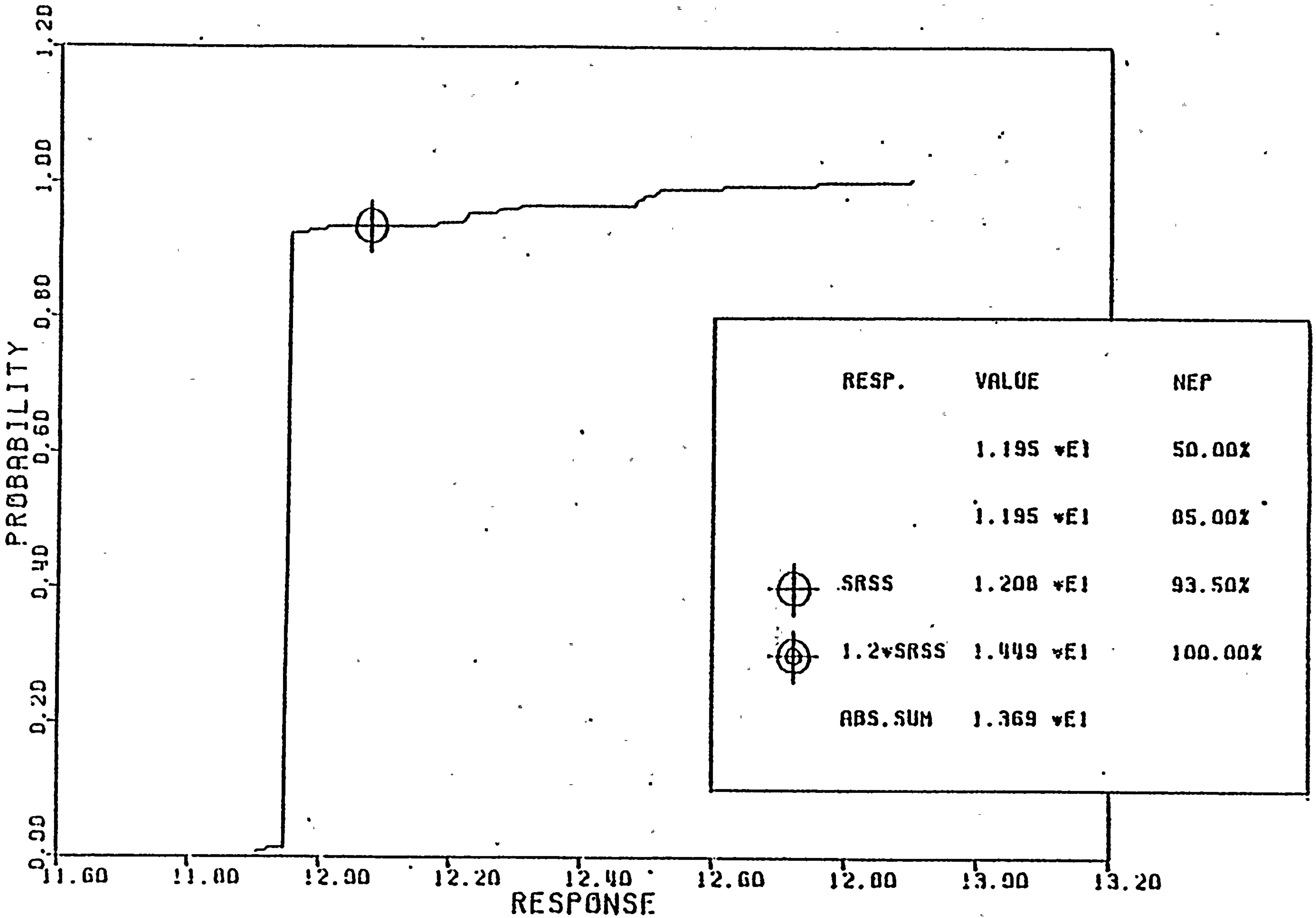
[illegible]

[illegible]



LOADING SRV (AVA) + SSE, HORIZONTAL ACCELERATION (FT/SEC**2)
CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - SSE)

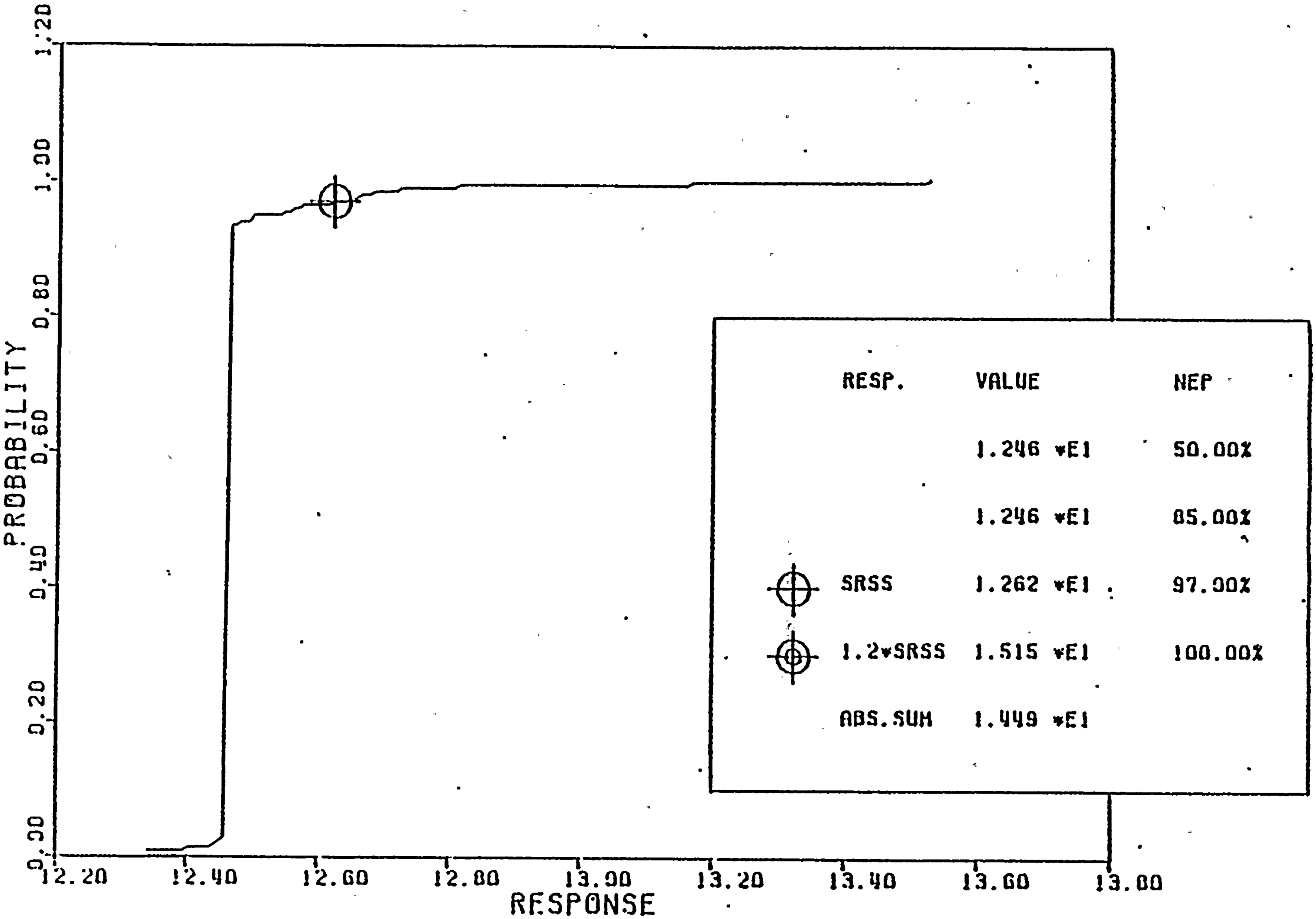
Figure 6-5



LOADING SRV(AVA) + SSE, HORIZONTAL ACCELERATION (FT/SEC**2)

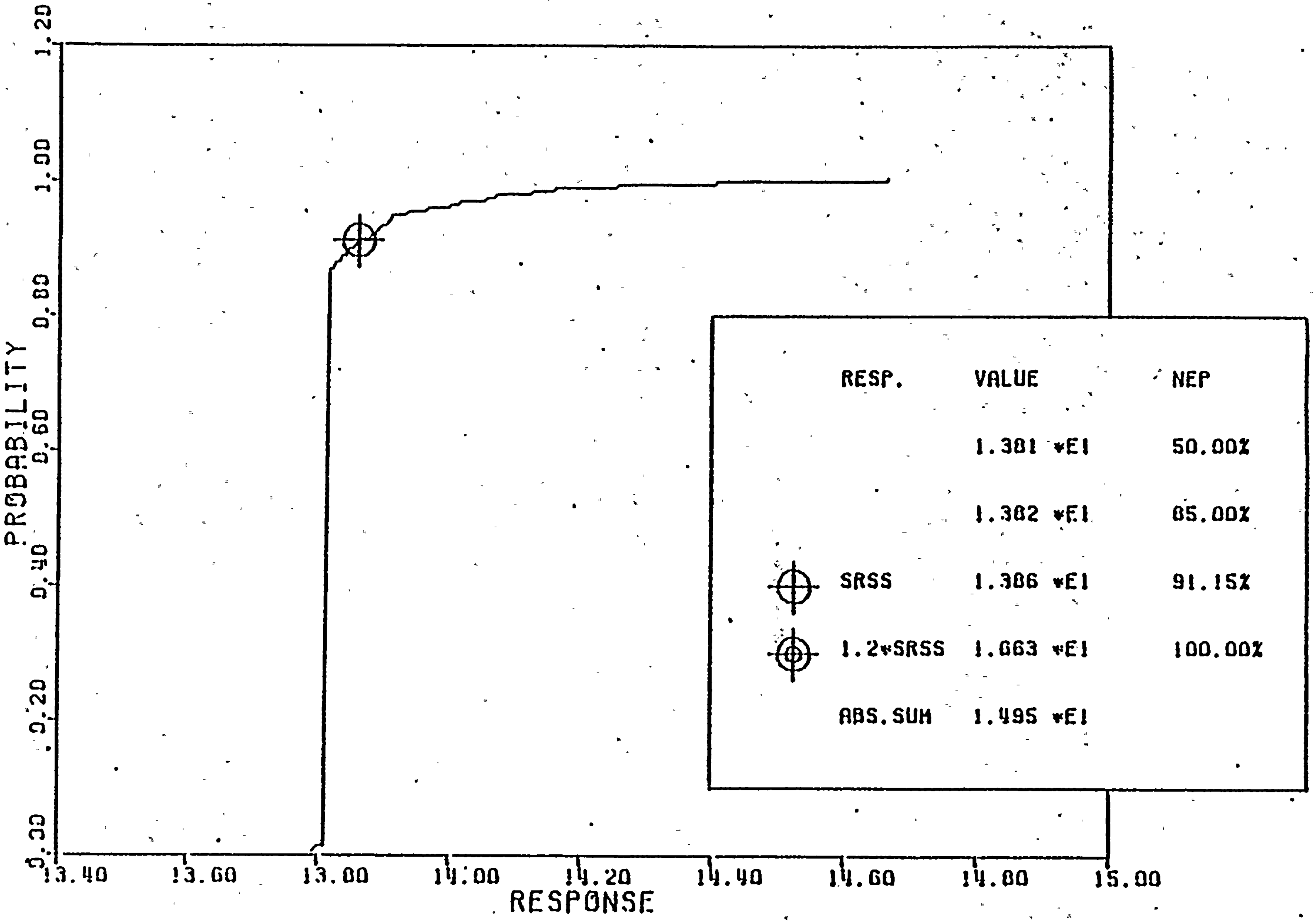
CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - SSE)

Figure 6-6.



LOADING SRV(AVA) + SSE, HORIZONTAL ACCELERATION (FT/SEC**2)
CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 144 - SSE)

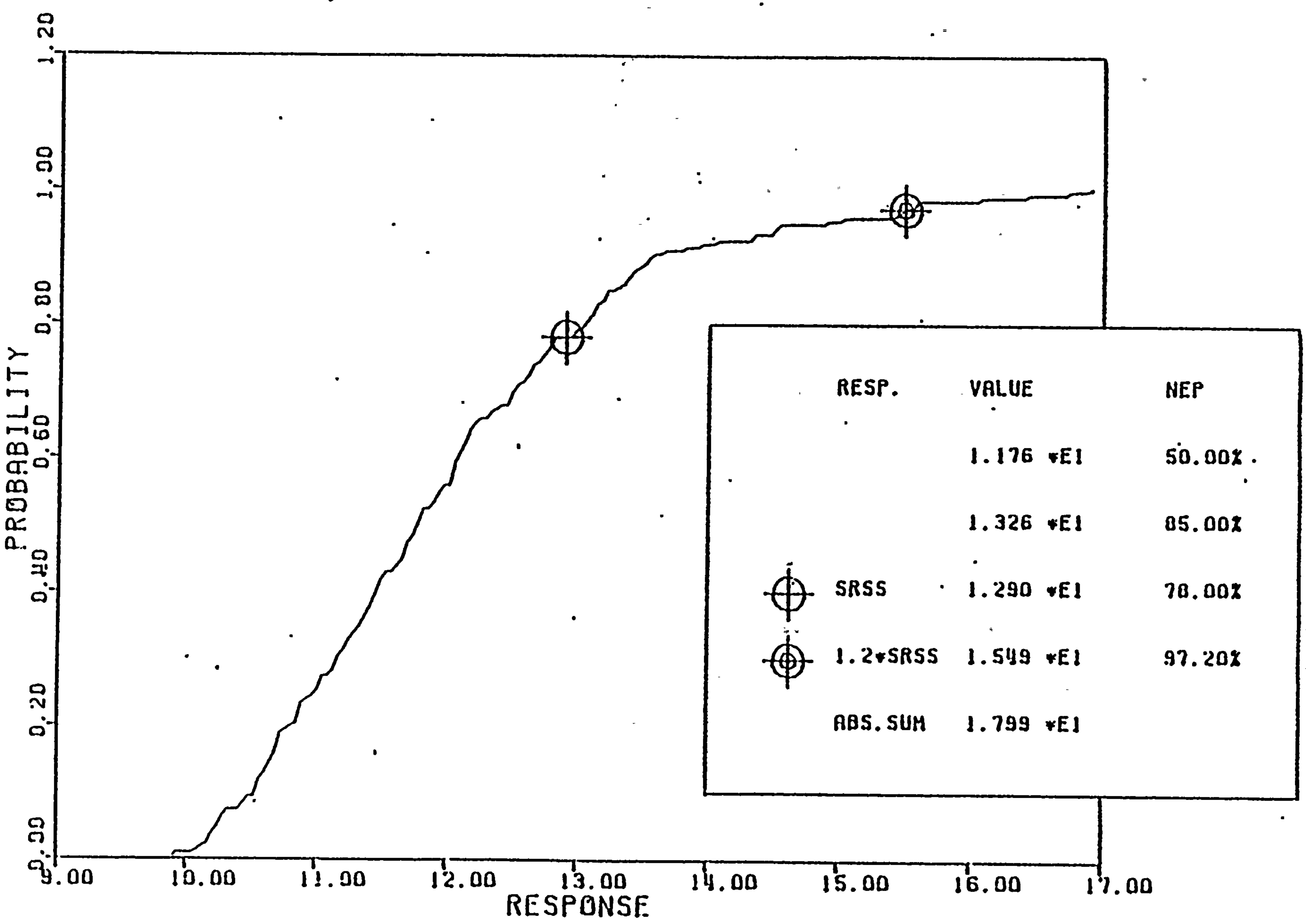
Figure 6-7



LOADING SRV (AVG) + SSE, HORIZONTAL ACCELERATION (FT/SEC**2)

CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - SSE)

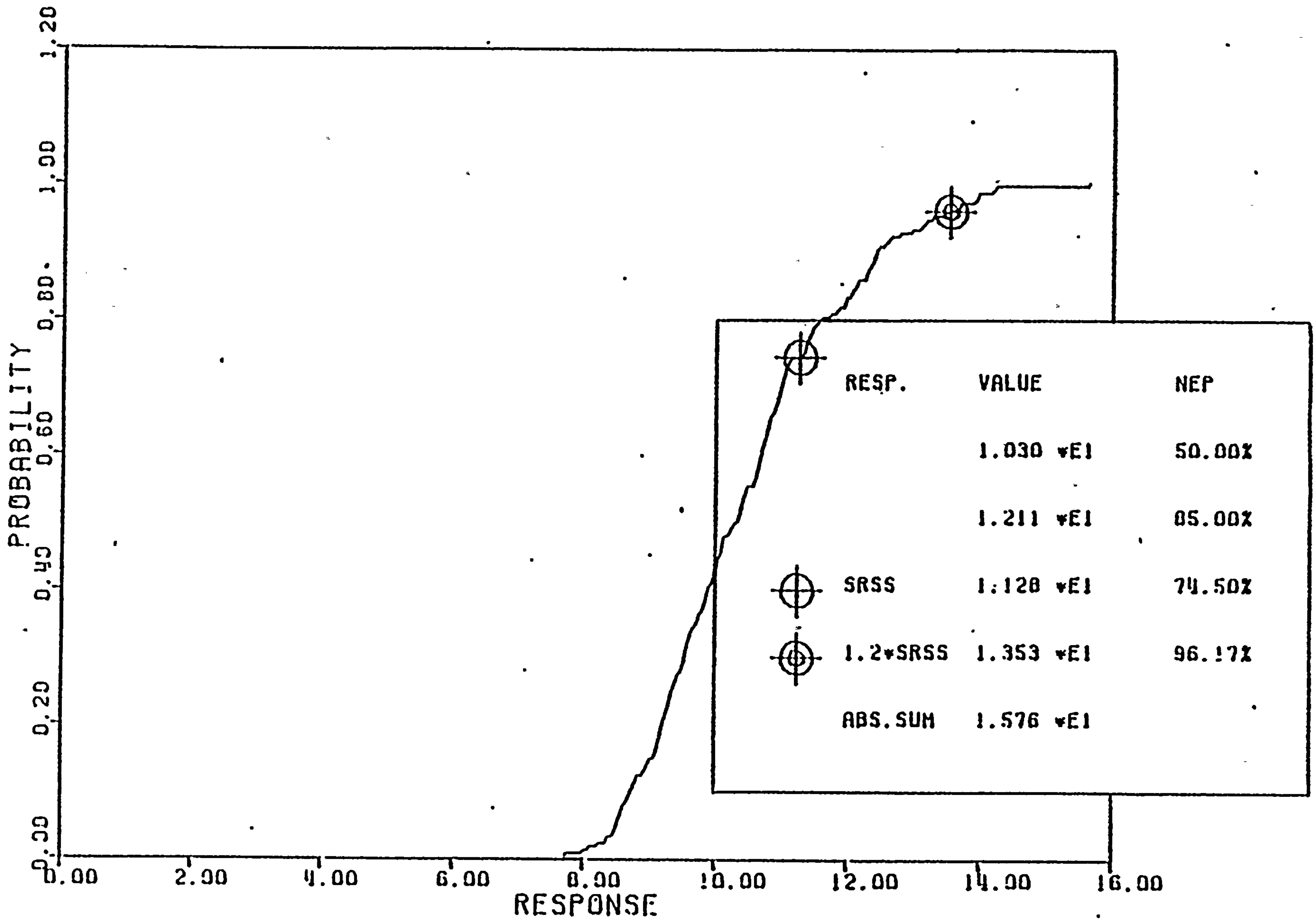
Figure 6-8



LOADING SRV(SVA) + OBE, HORIZONTAL ACCELERATION (FT/SEC**2)

CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - OBE)

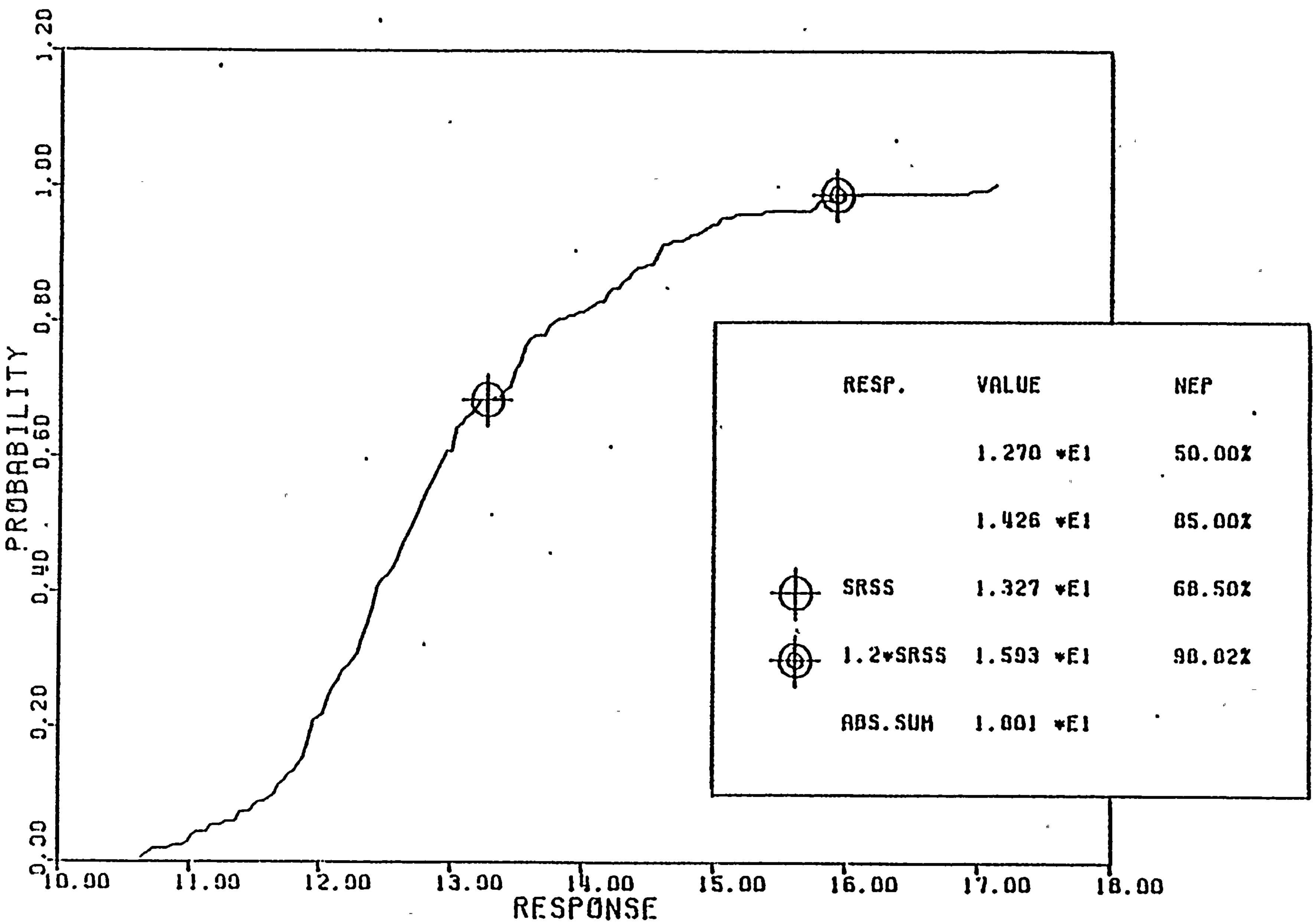
Figure 6-9



LOADING SRV(SVA) + OBE, HORIZONTAL ACCELERATION (FT/SEC**2)

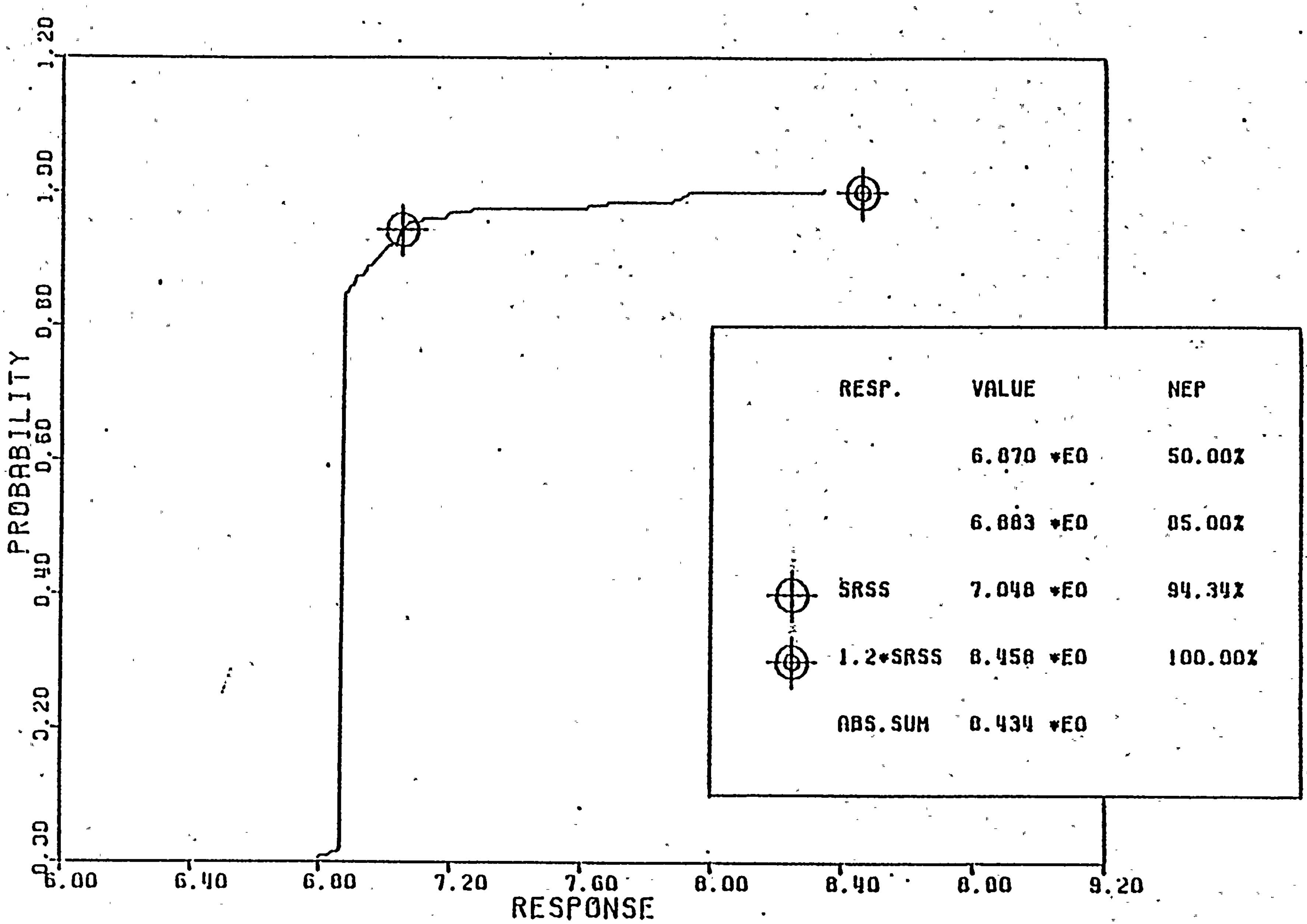
CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 140 - OBE)

Figure 6-10



LOADING SRV(SVA) + OBE. HORIZONTAL ACCELERATION (FT/SEC**2)

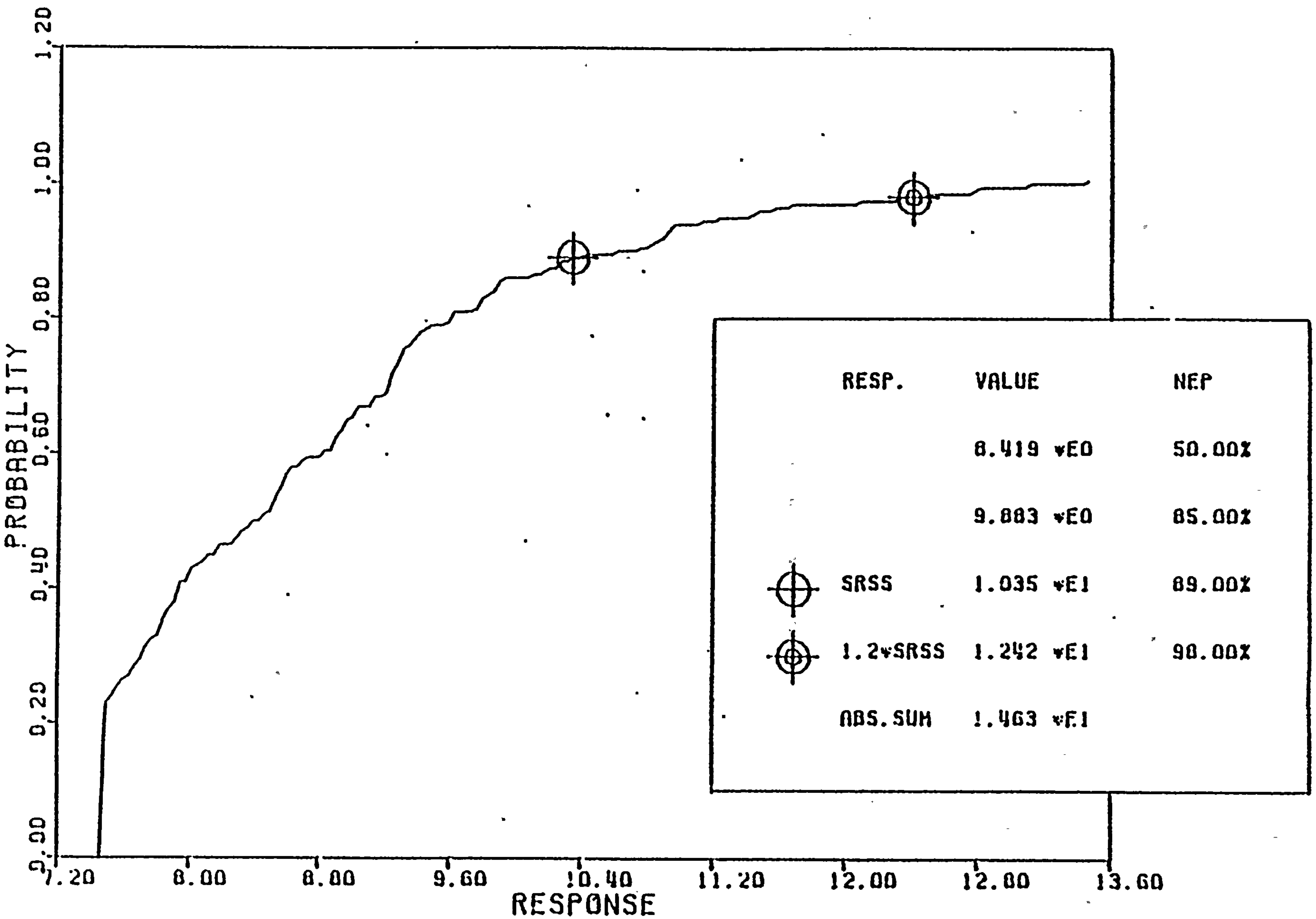
CONTAINMENT VESSEL DRYWELL. (NODE 30 - SRV), (NODE 144 - OBE) Figure 6-11



LOADING SRV(SVA) + OBE. HORIZONTAL ACCELERATION (FT/SEC**2)

CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - OBE)

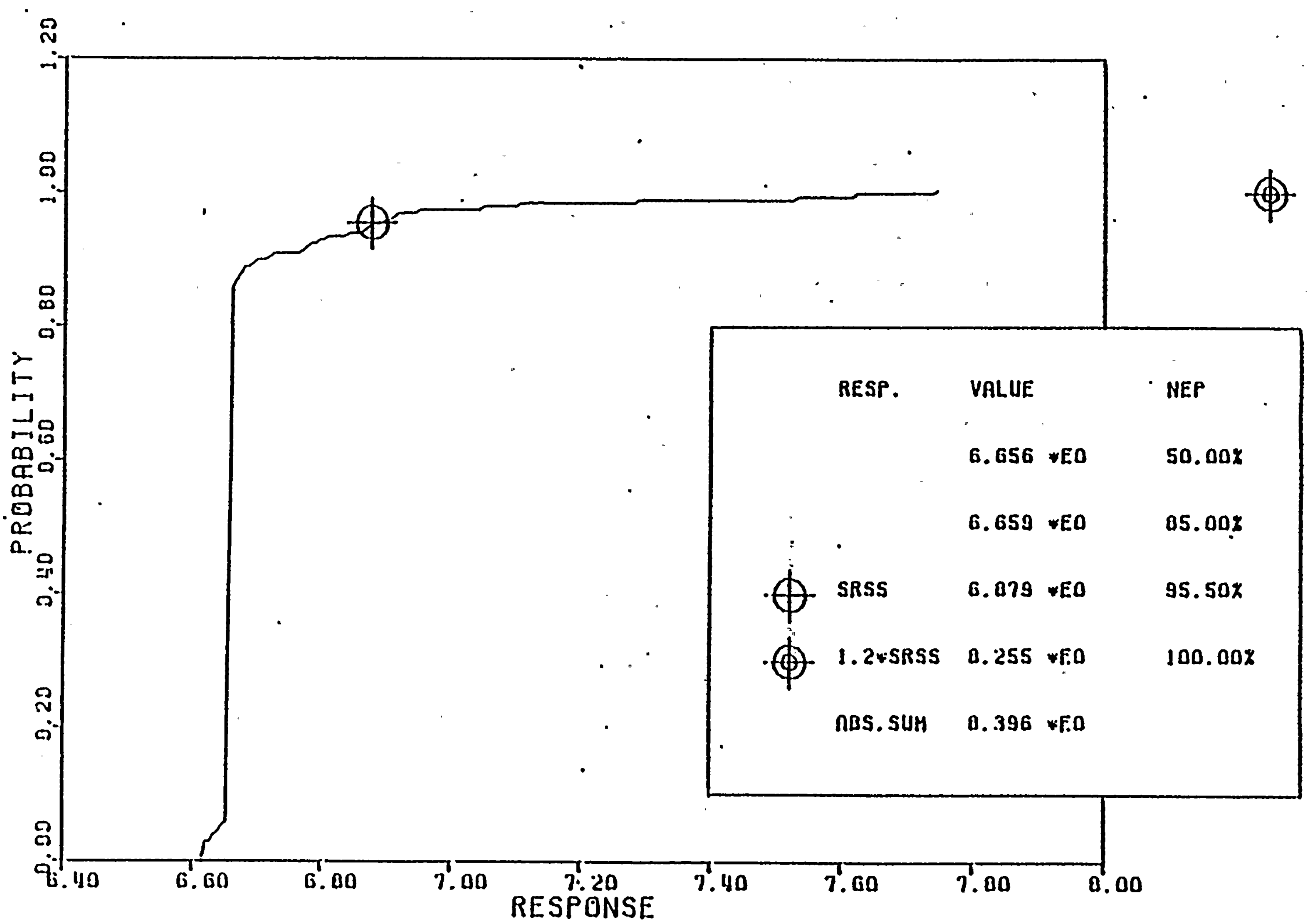
Figure 6-12



LOADING SRV(AVA) + OBE, HORIZONTAL ACCELERATION (FT/SEC**2)

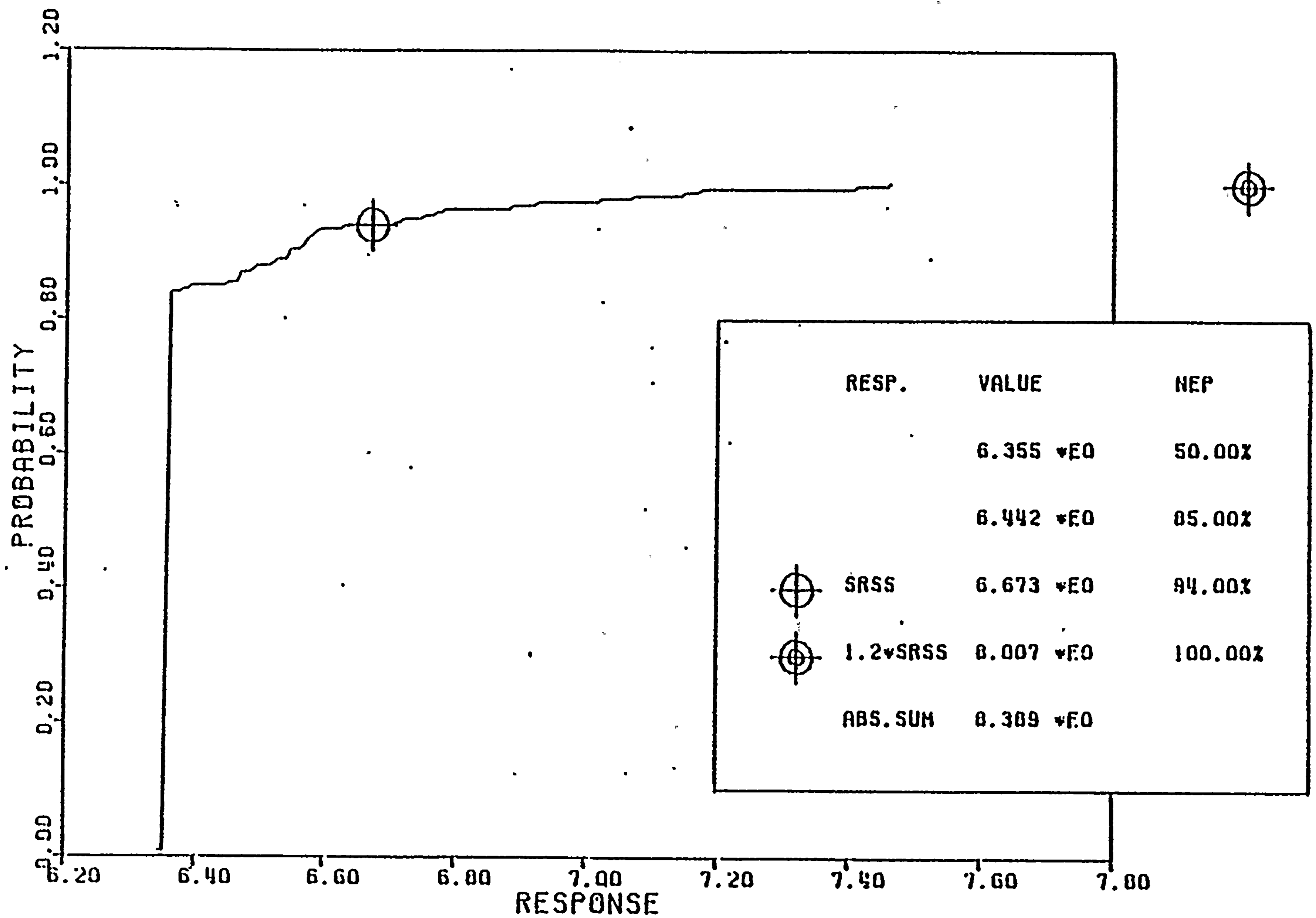
CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - OBE)

Figure 6-13



LOADING SRV(AVA) + OBE, HORIZONTAL ACCELERATION (FT/SEC**2)
CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 140 - OBE)

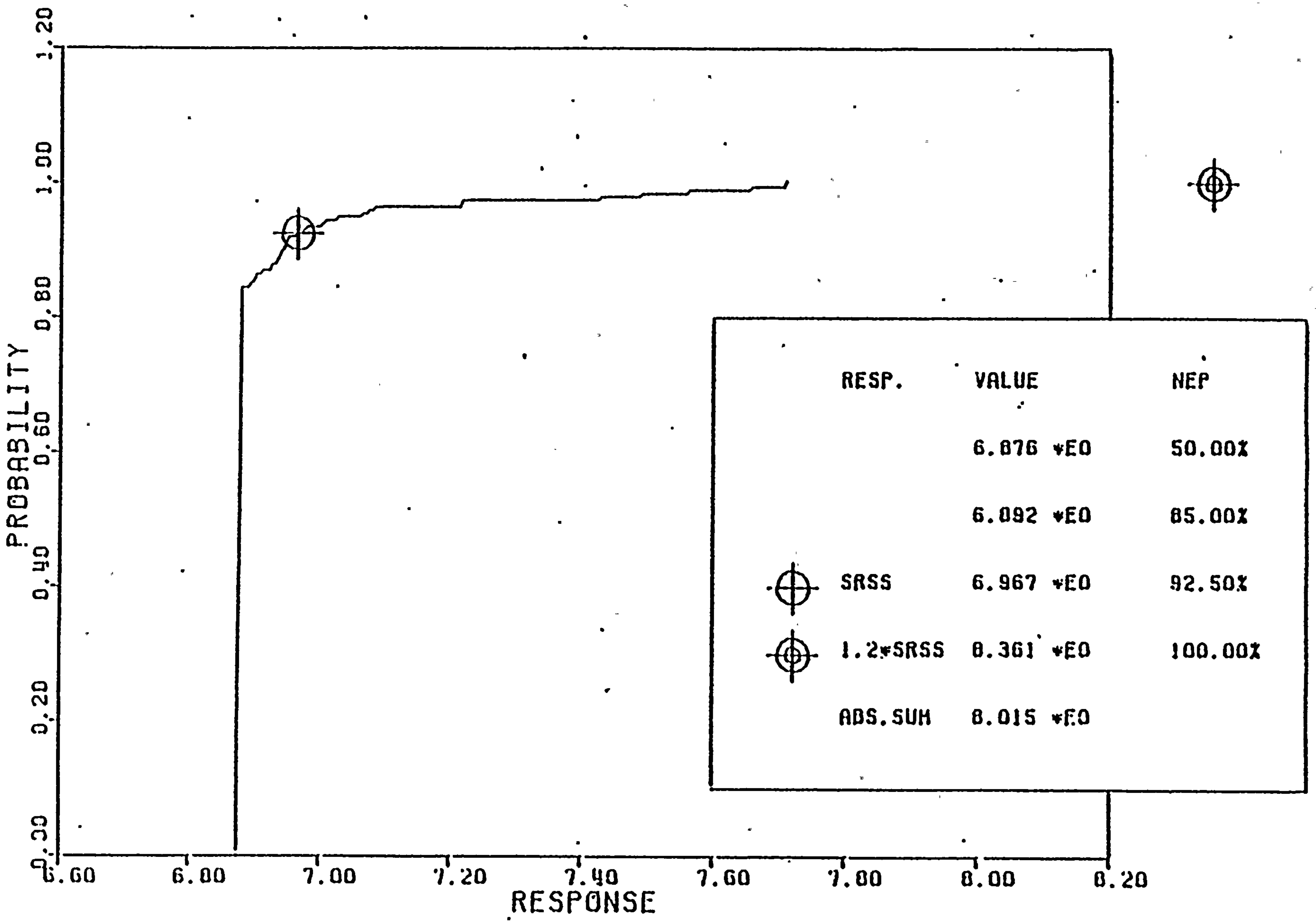
Figure 6-14



LOADING SRV(AVA) + OBE, HORIZONTAL ACCELERATION (FT/SEC**2)

CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - OBE)

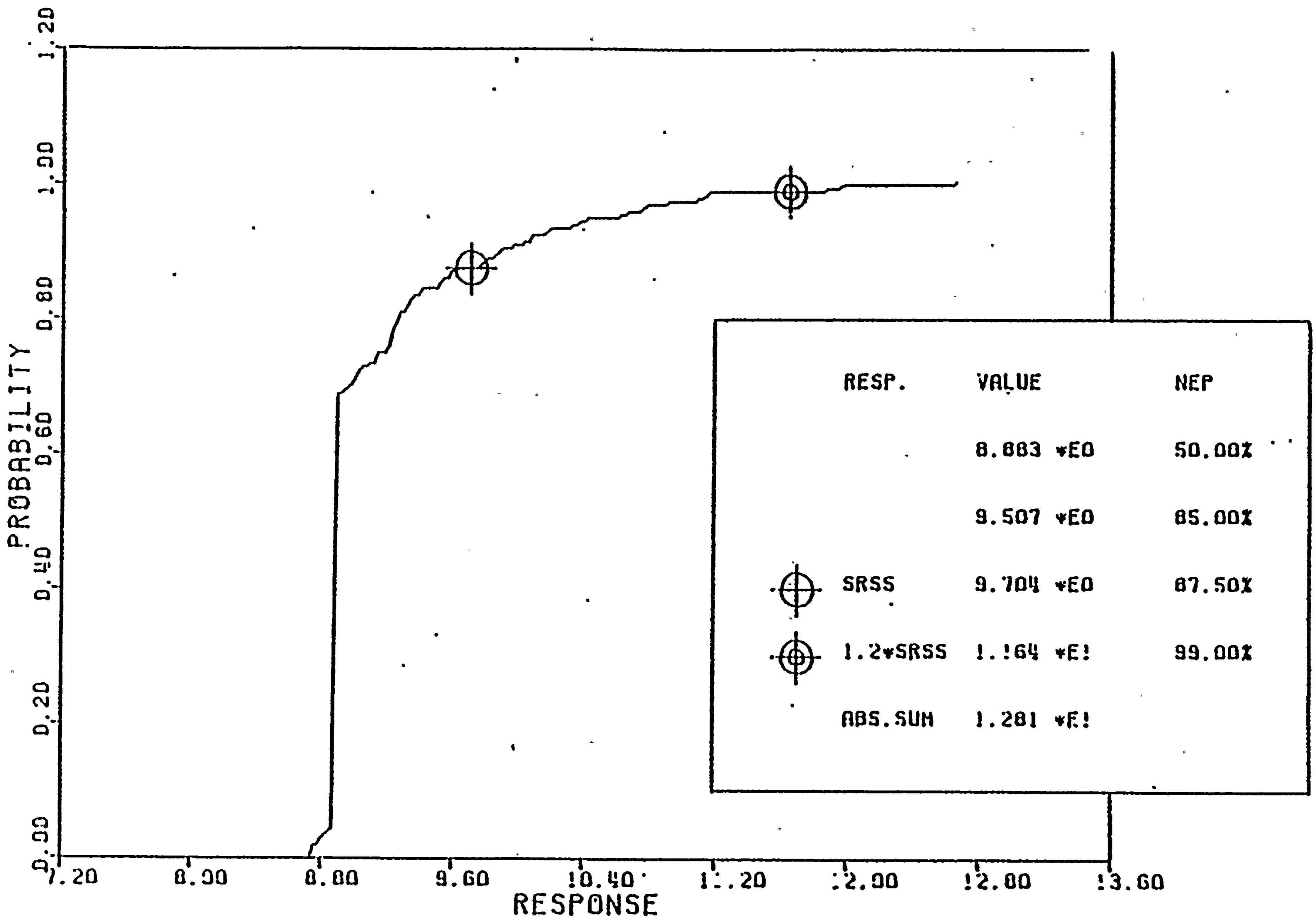
Figure 6-15



LOADING SRV(AVA) + OBE, HORIZONTAL ACCELERATION (FT/SEC**2)

CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - OBE)

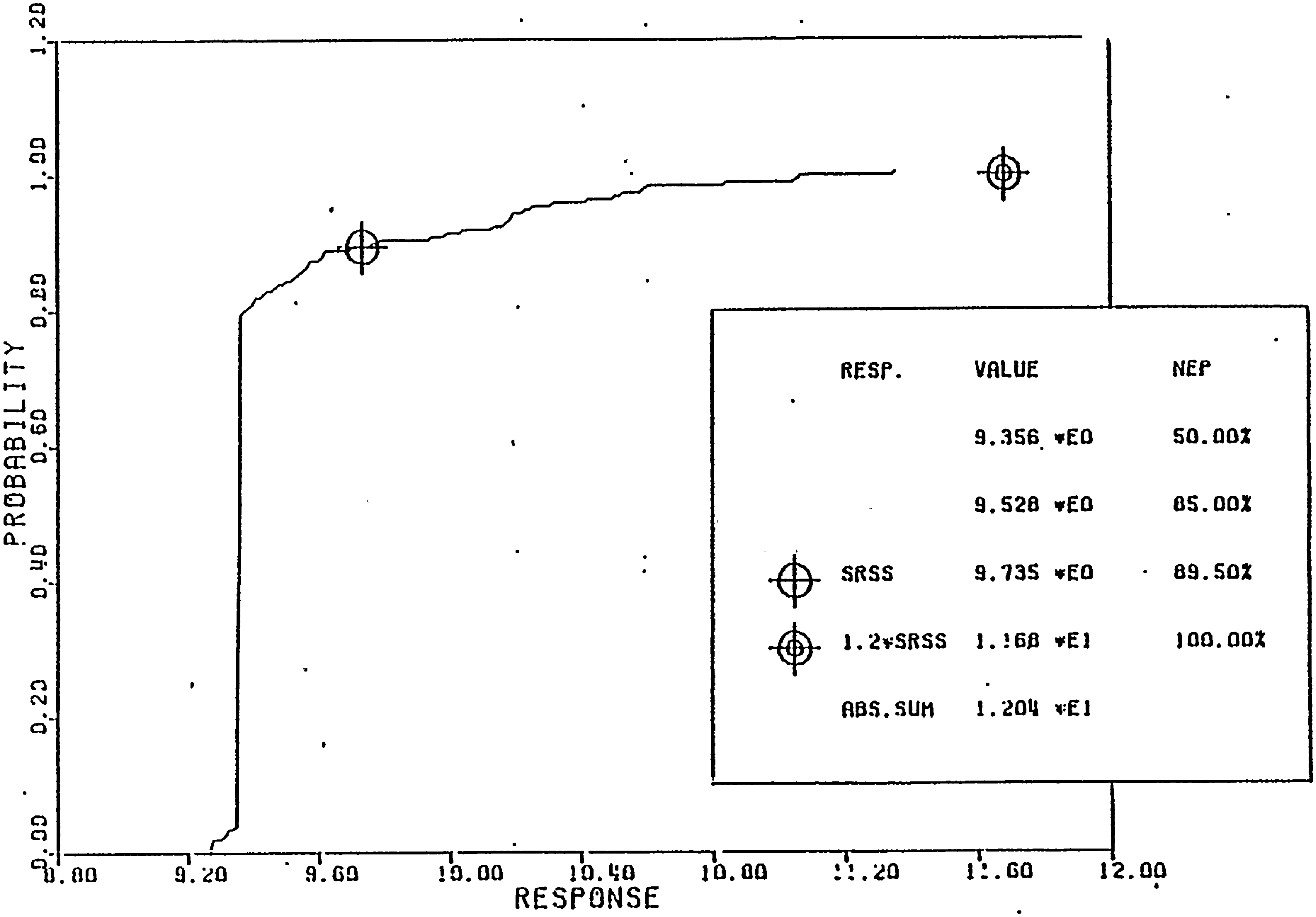
Figure 6-16



LOADING SRV(SVA) + SSE, VERTICAL ACCELERATION (FT/SEC**2) (0°)

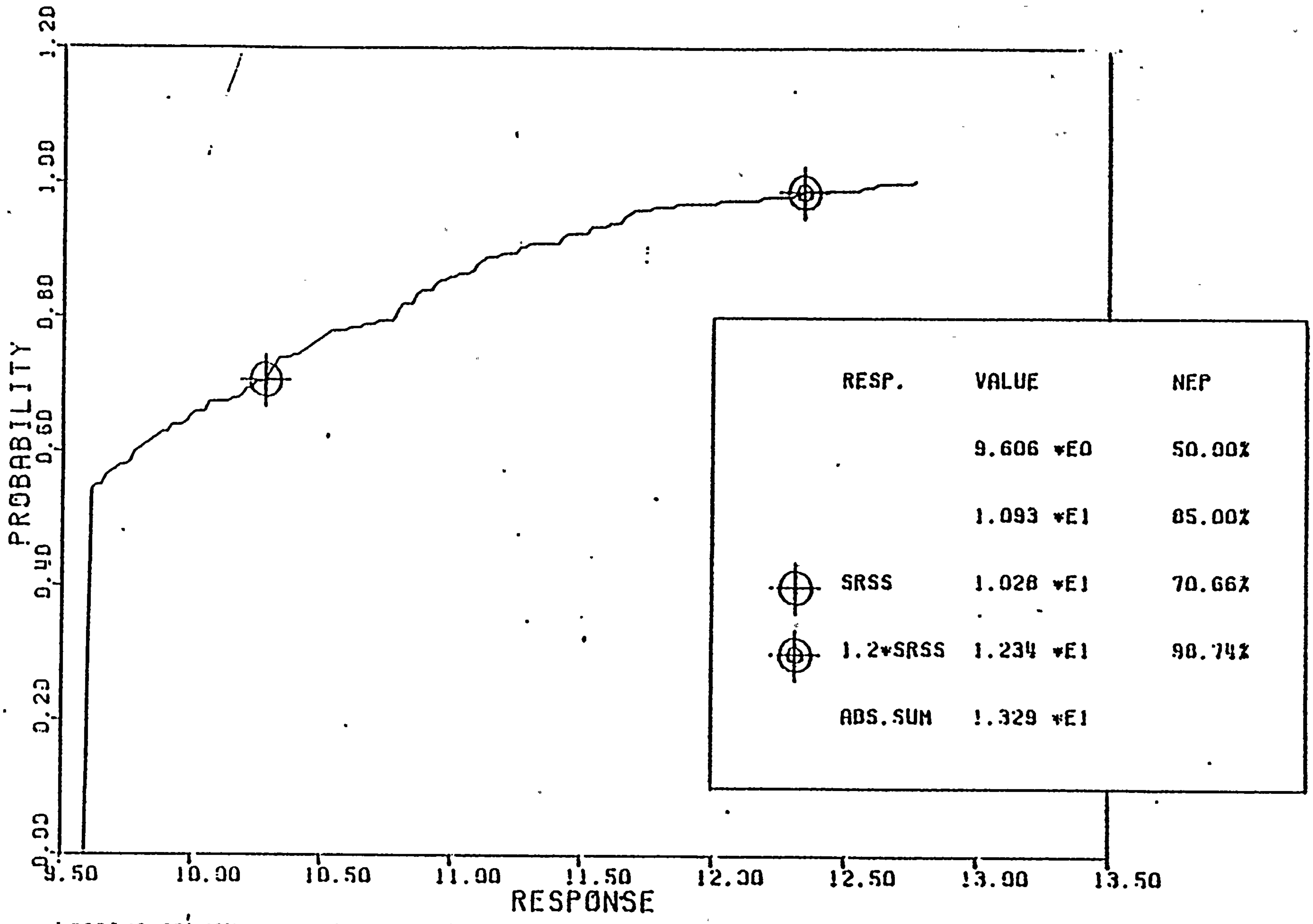
CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - SSE)

Figure 6-17



LOADING SRV(SVA) + SSE, VERTICAL ACCELERATION (FT/SEC**2) (0%)

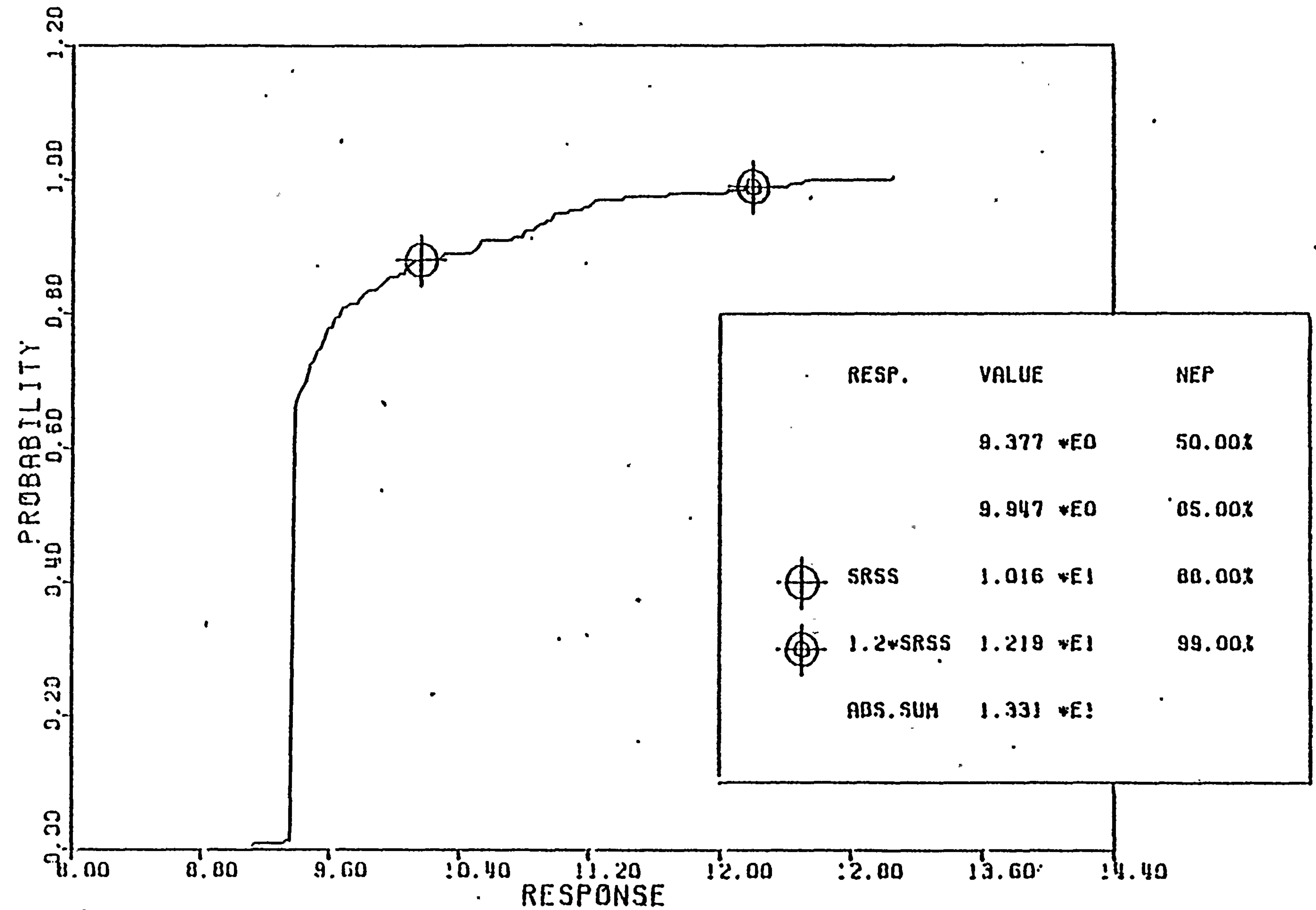
CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - SSE) Figure 6-18



LOADING SRV(SVA) + SSE, VERTICAL ACCELERATION (FT/SEC**2) (08)

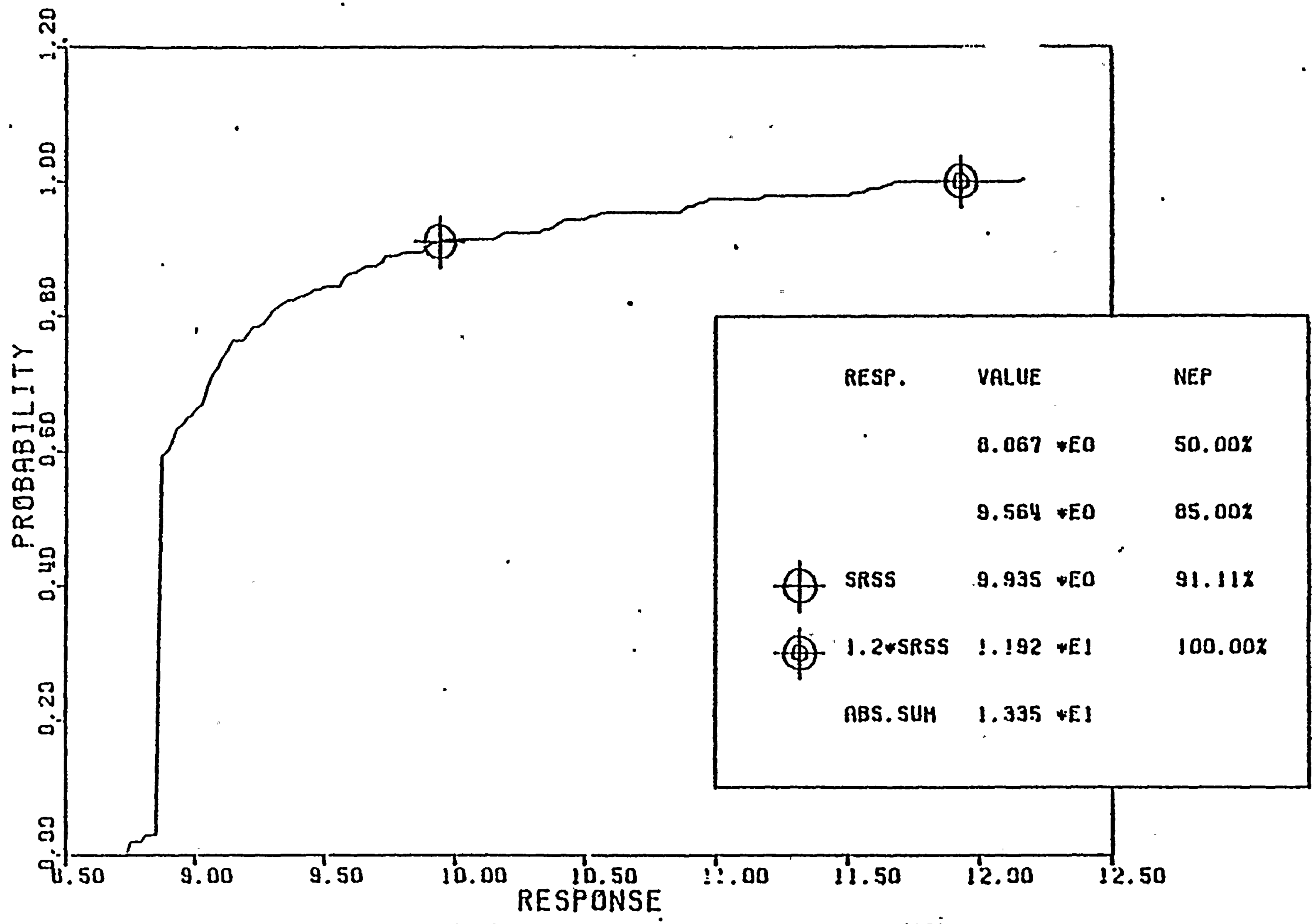
CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 154 - SSE)

Figure 6-19



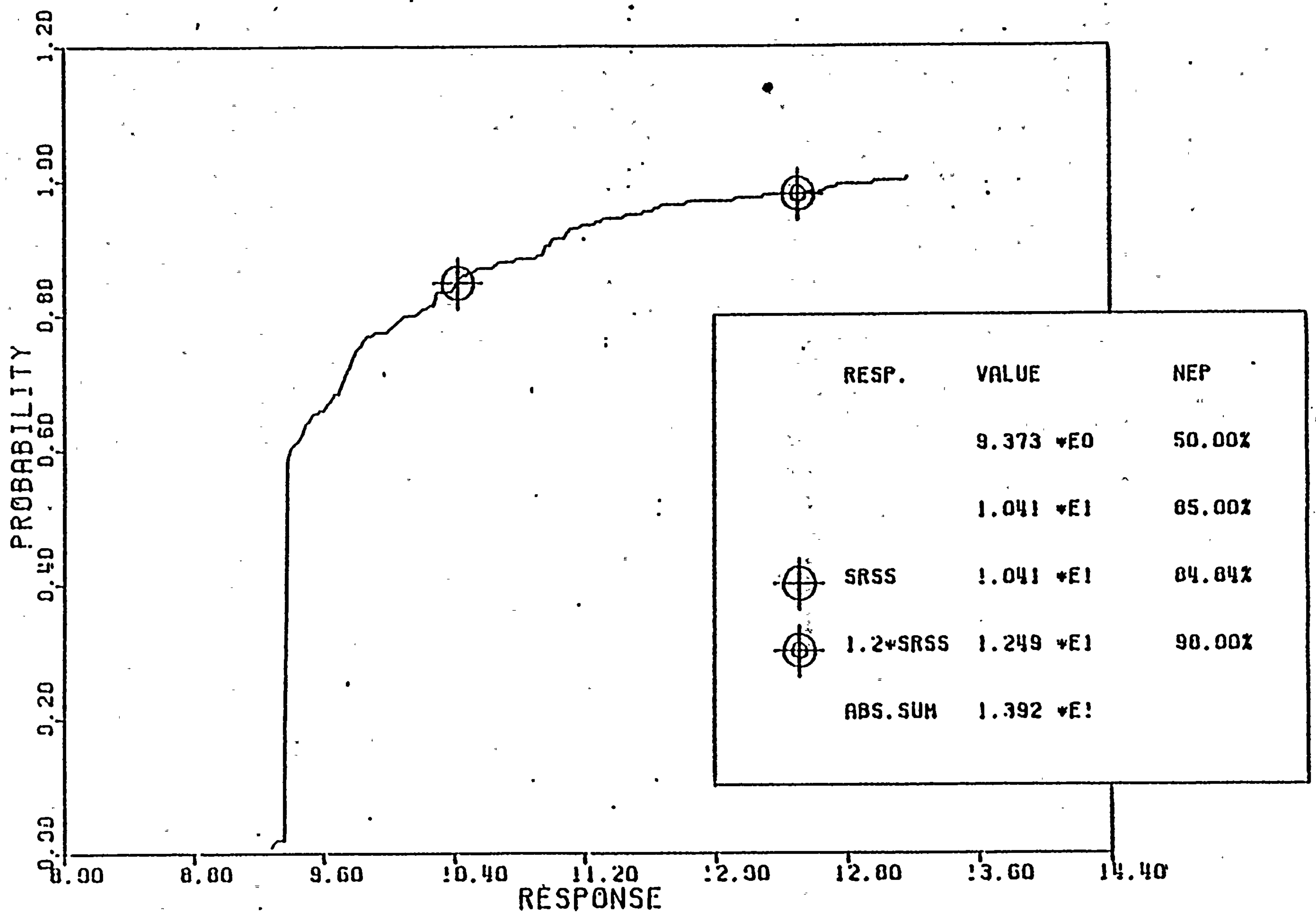
LOADING SRV(SVA) + SSE, VERTICAL ACCELERATION (FT/SEC**2) (Q°)
CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - SSE)

Figure 6-20



LOADING SRV(AVA) + SSE, VERTICAL ACCELERATION (FT/SEC**2) (0°),
CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - SSE)

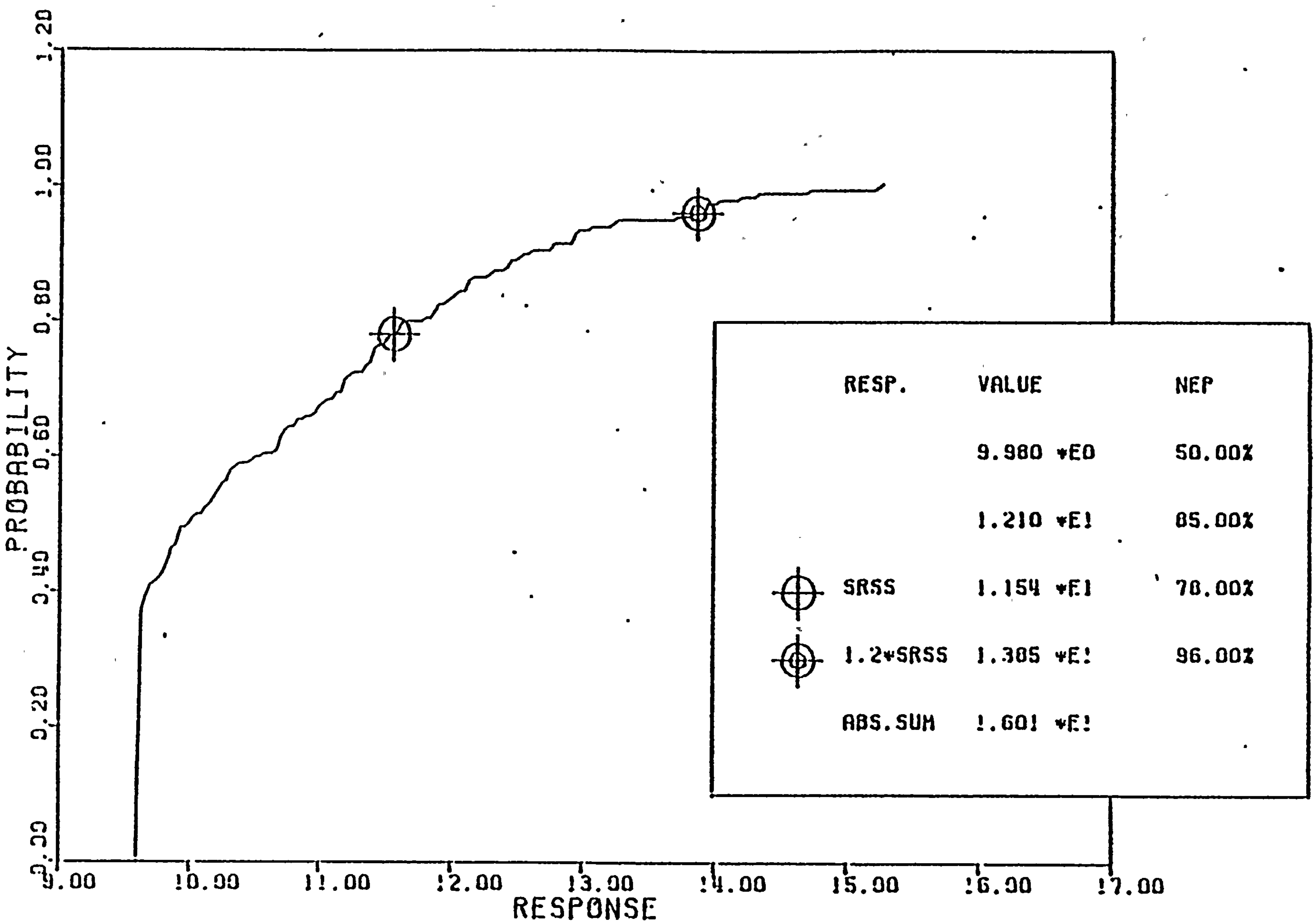
Figure 6-21



LOADING SRV(AVA) + SSE, VERTICAL ACCELERATION (FT/SEC**2) (0°)

CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - SSE)

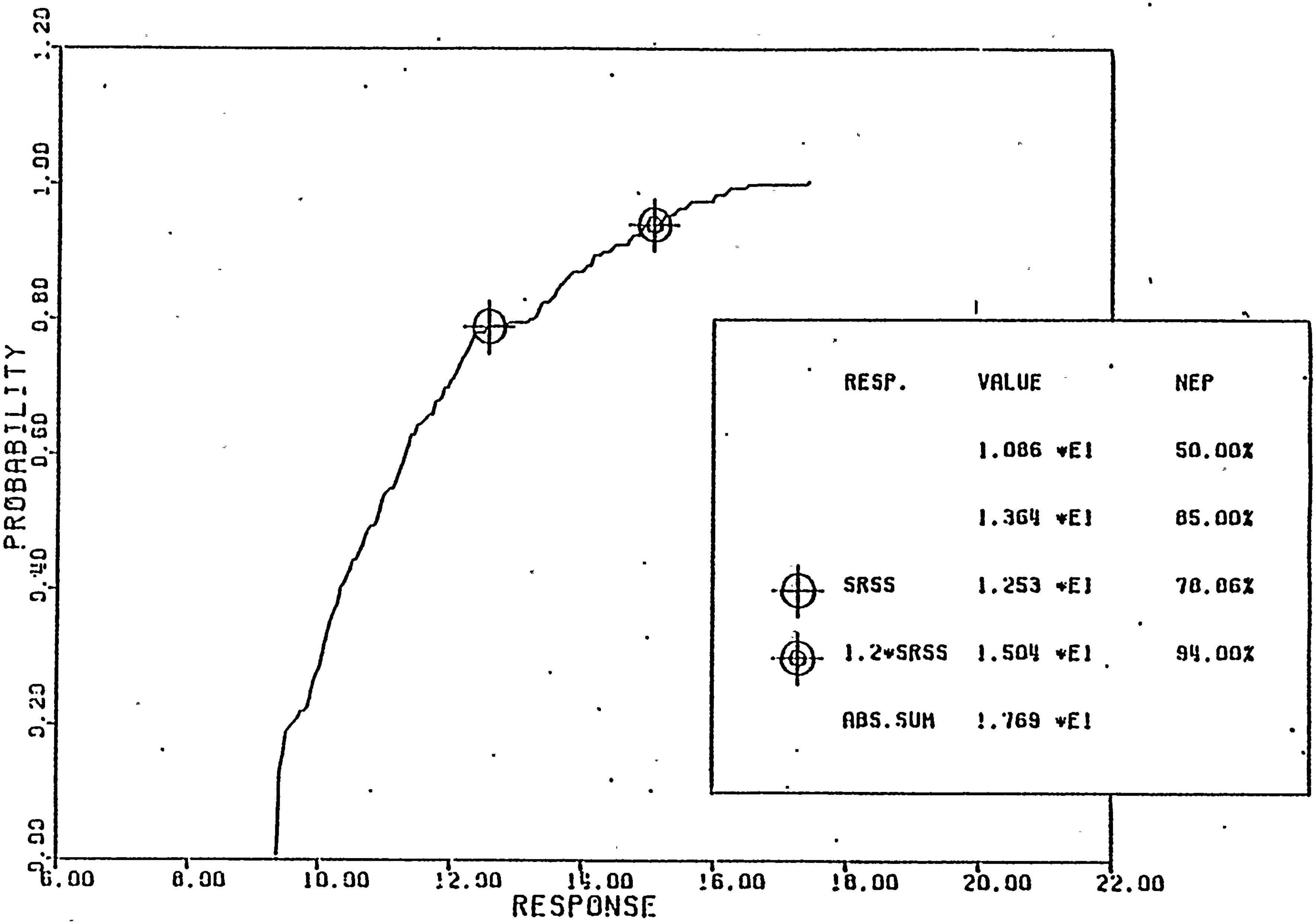
Figure 6-22



LOADING SRV(AVA) + SSE, VERTICAL ACCELERATION (FT/SEC**2) (0°)

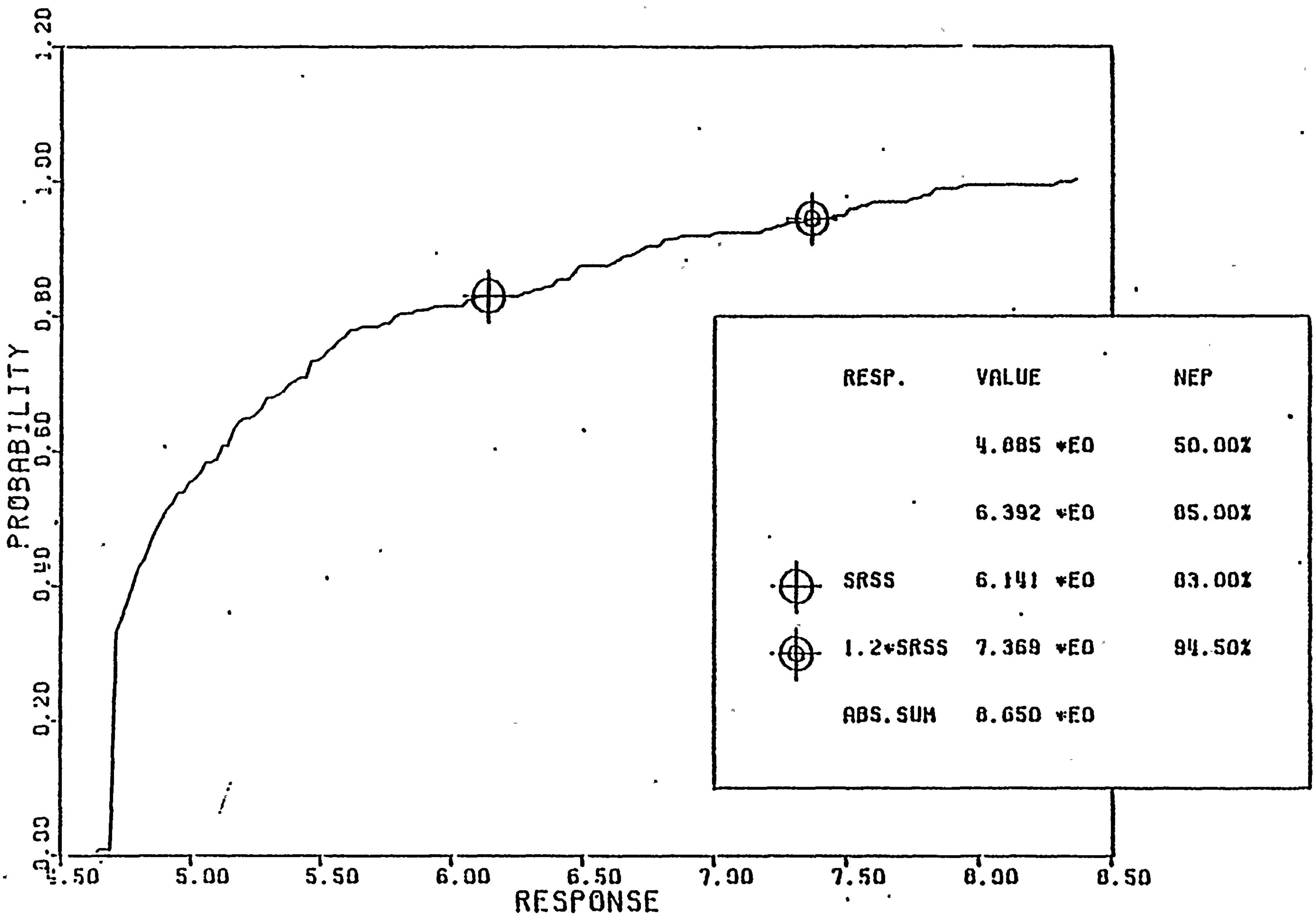
CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - SSE)

Figure 6-23



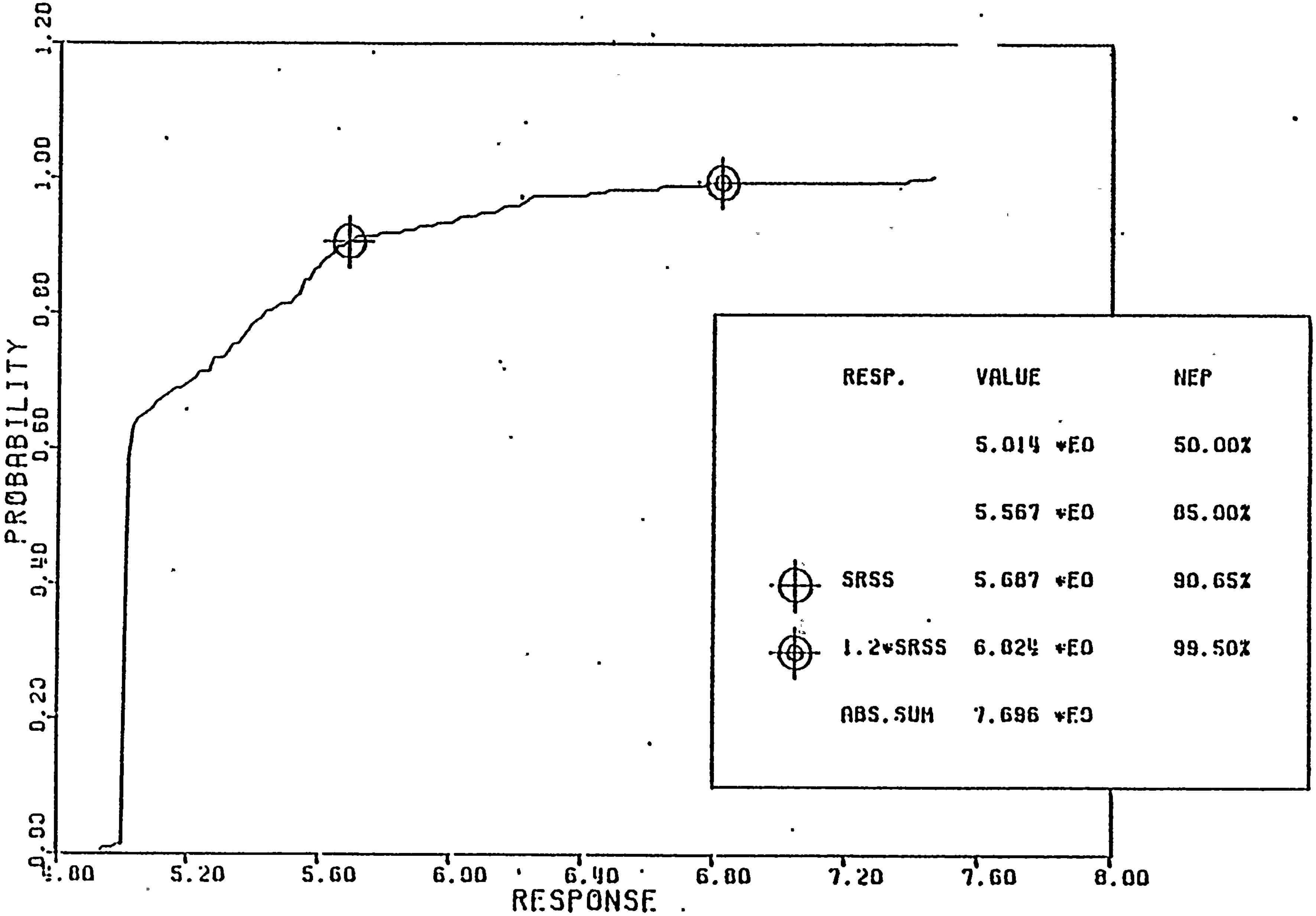
LOADING SRV(AVA) + SSE, VERTICAL ACCELERATION (FT/SEC**2) (0°)

CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - SSE) Figure 6-24



LOADING SRV(SVA) + OBE, VERTICAL ACCELERATION (FT/SEC**2) (0°)
CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - OBE)

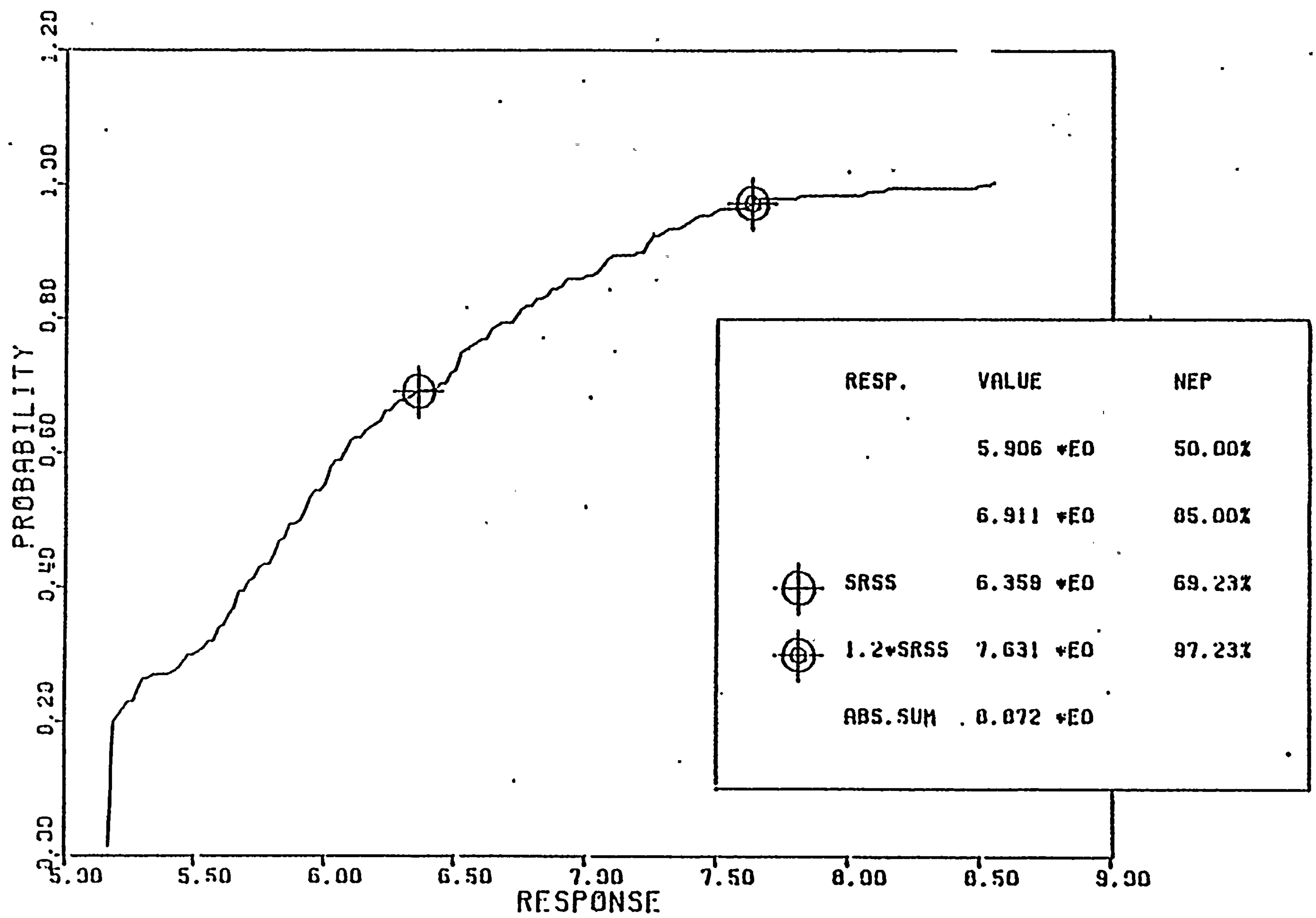
Figure 6-25



LOADING SRV(SVA) + OBE, VERTICAL ACCELERATION (FT/SEC**2) (0%)

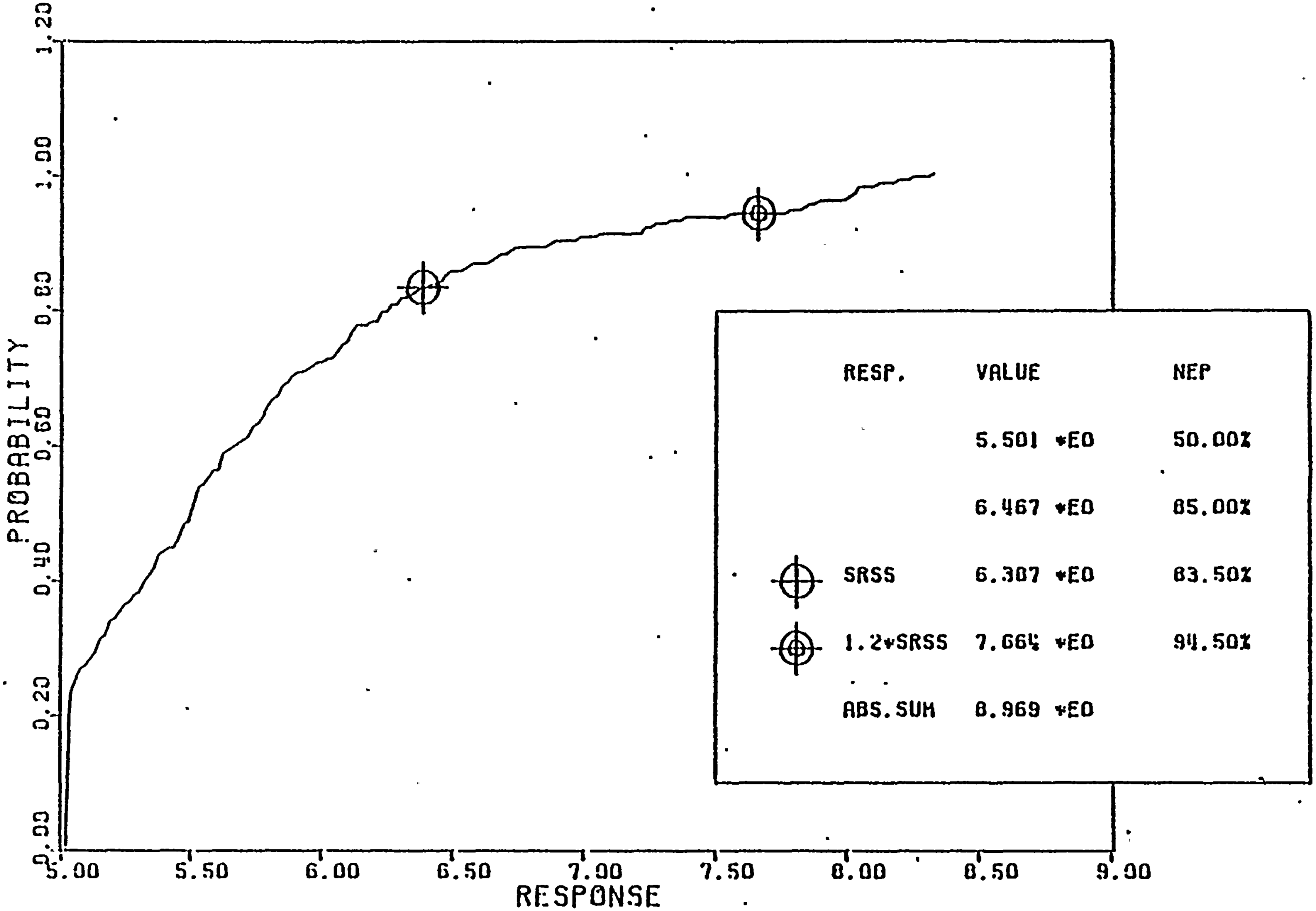
CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - OBE)

Figure 6-26



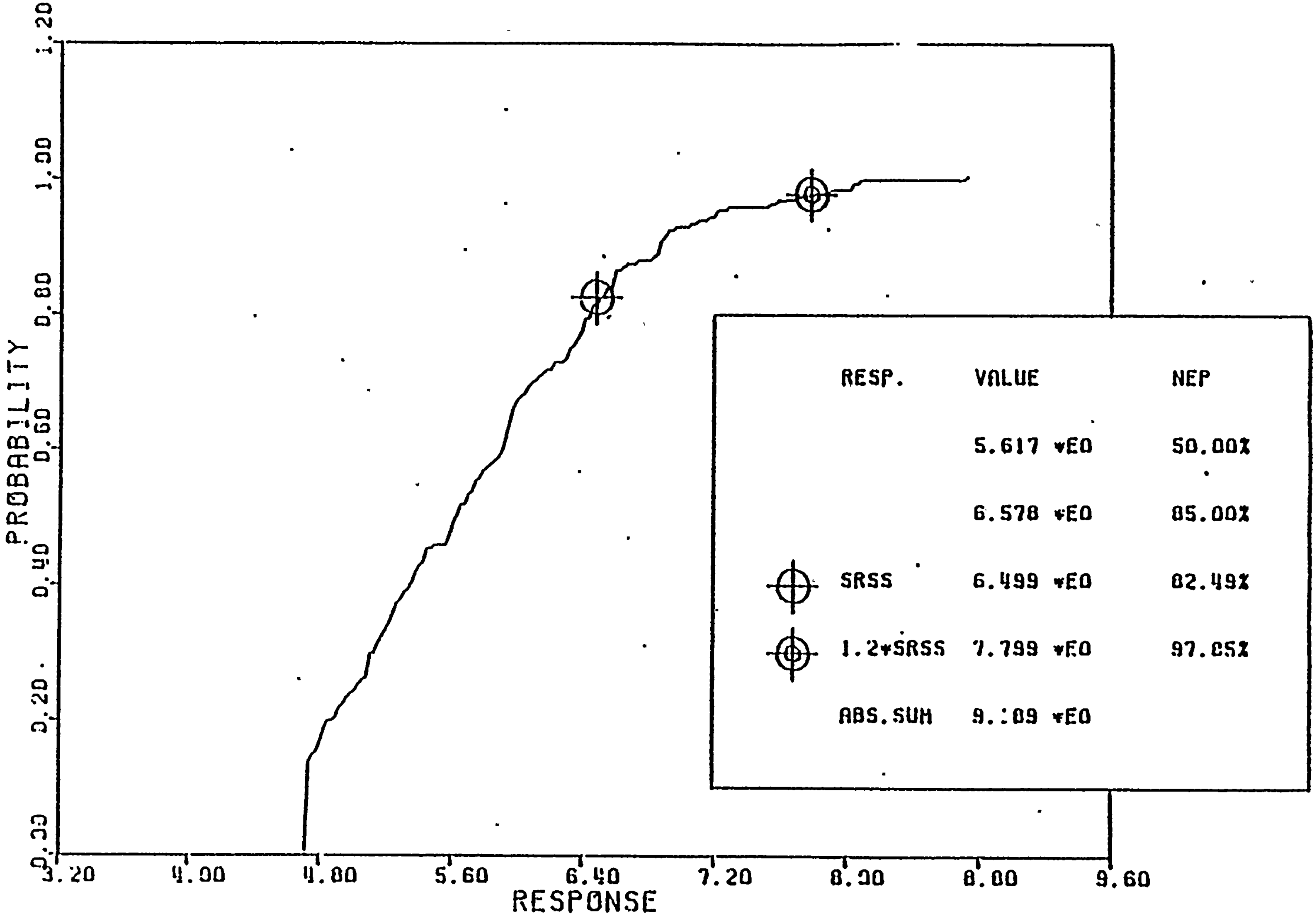
LOADING SRV(SVA) + OBE, VERTICAL ACCELERATION (FT/SEC**2) (0°)
CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - OBE)

Figure 6-27



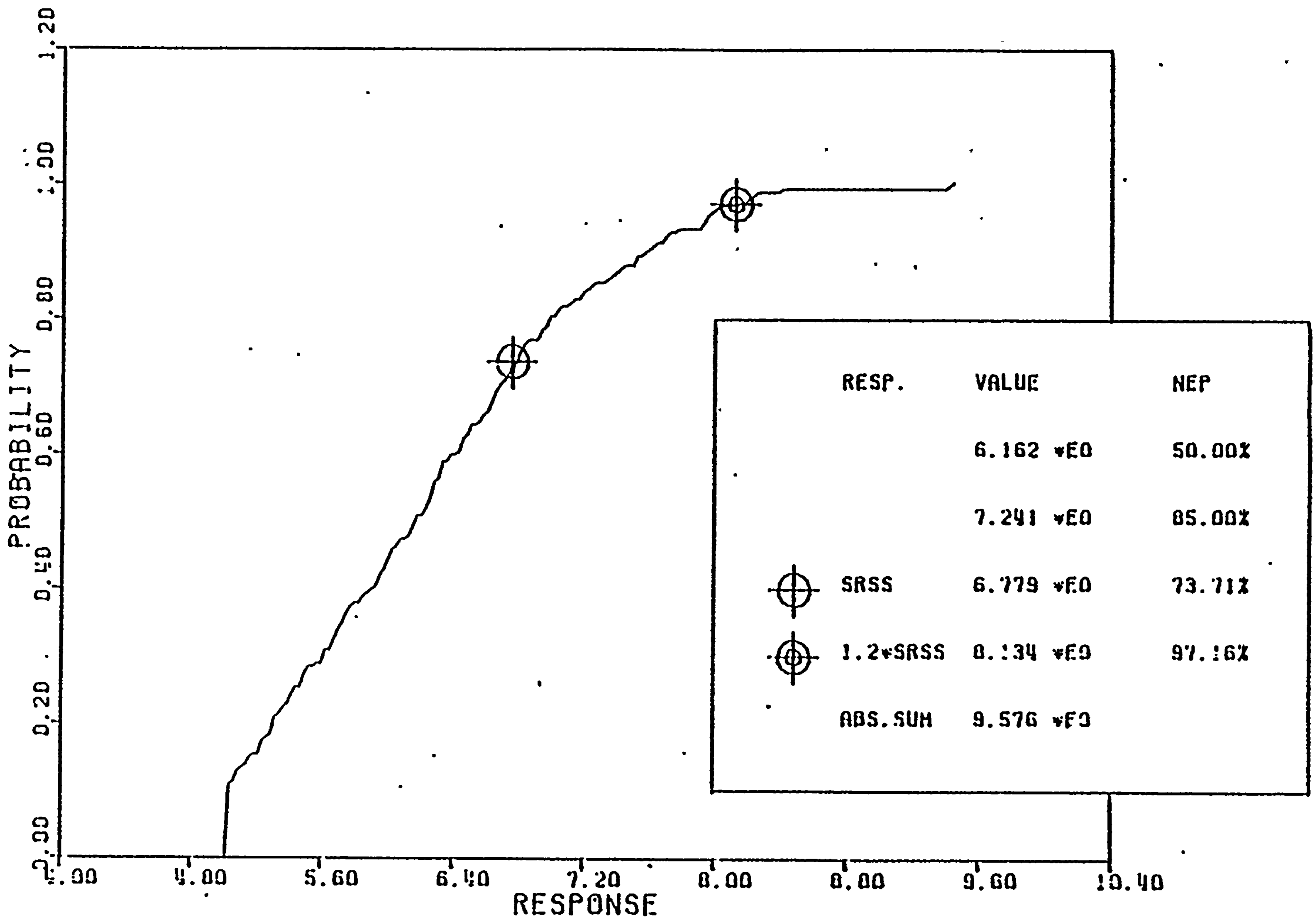
LOADING SRV(SVA) + OBE. VERTICAL ACCELERATION (FT/SEC**2) (0°)

CONTAINMENT VESSEL DRYWELL. (NODE 33 - SRV). (NODE 140 - OBE) Figure 6-28

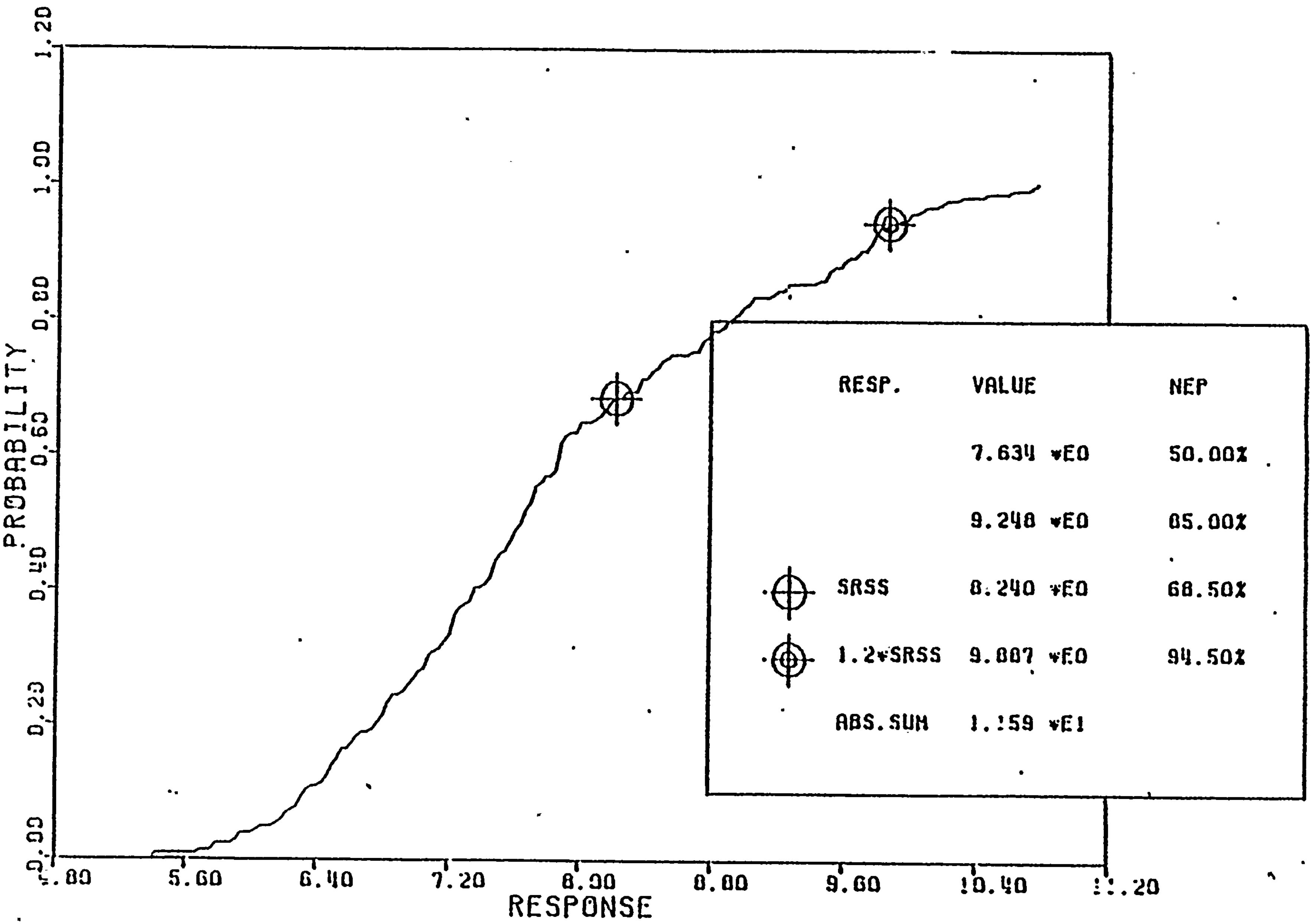


LOADING SRV(AVA) + OBE, VERTICAL ACCELERATION (FT/SEC**2) (0°)
CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - OBE)

Figure 6-29

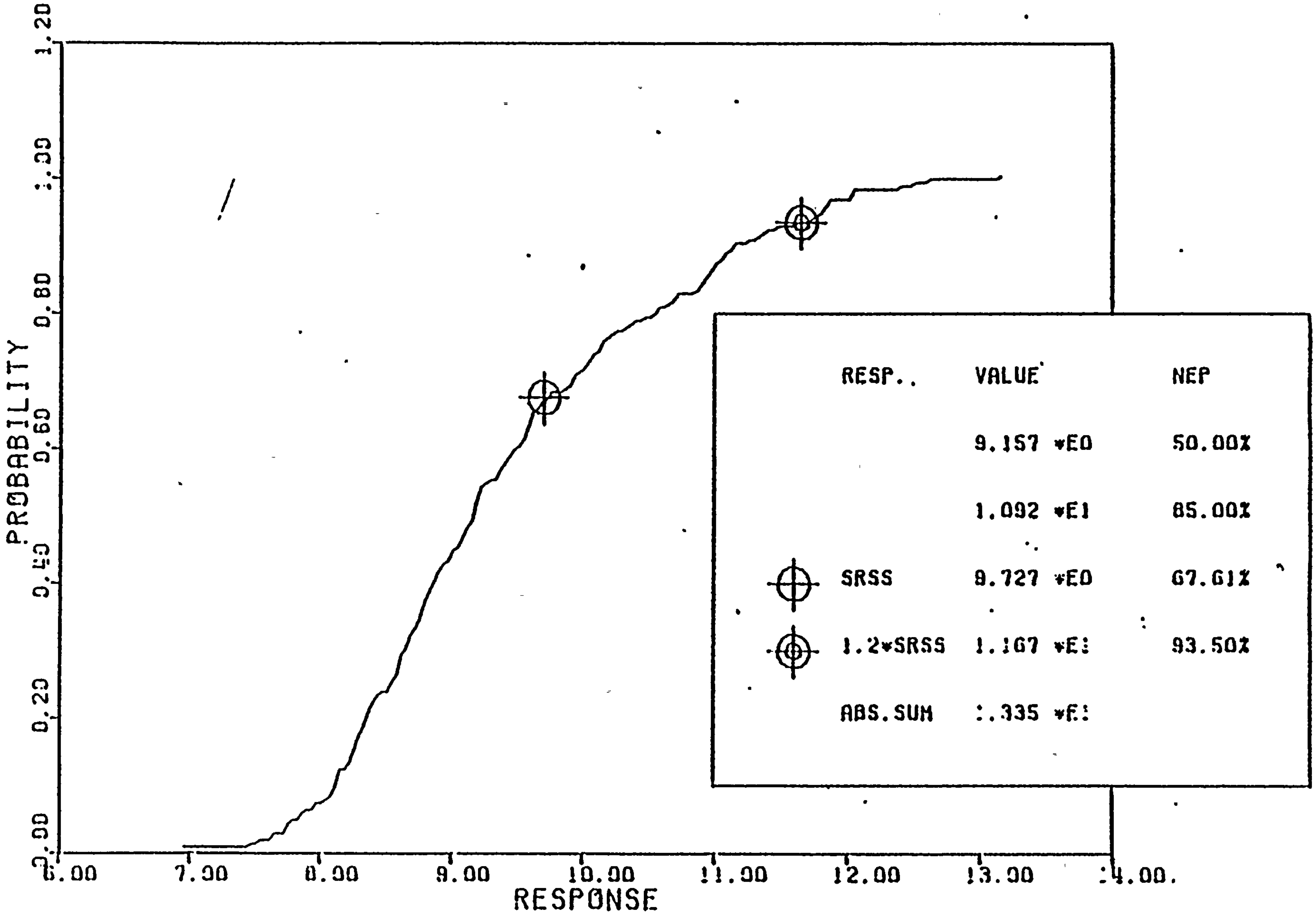


LOADING SRV(AVA) + OBE, VERTICAL ACCELERATION (FT/SEC**2) (0%)
CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - OBE) Figure 6-30



LOADING SRV(AVA) + OBE, VERTICAL ACCELERATION (FT/SEC**2) (0°)
CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - OBE)

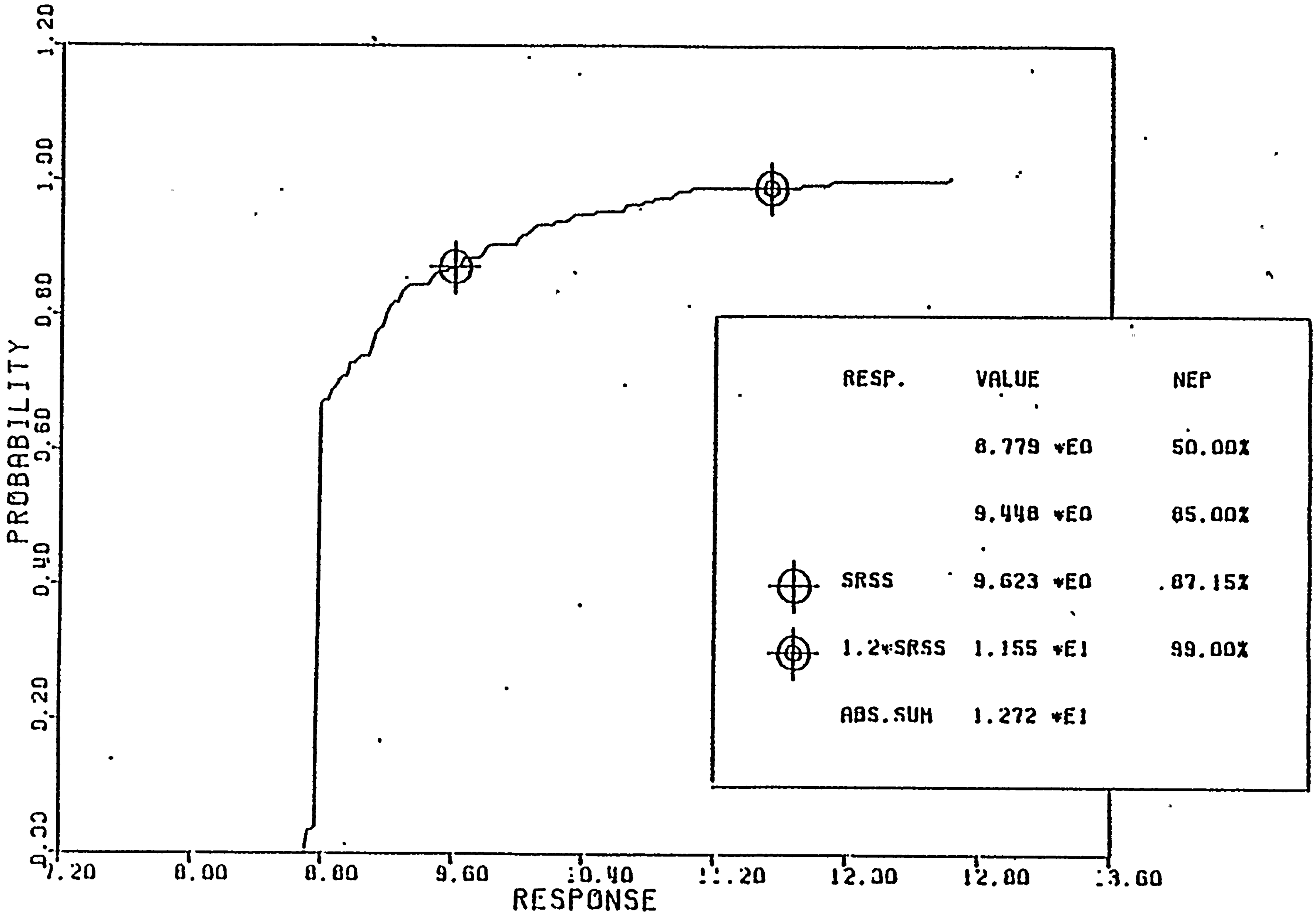
Figure 6-31



LOADING SRV(AVA) + OBE, VERTICAL ACCELERATION (FT/SEC**2) (0°)

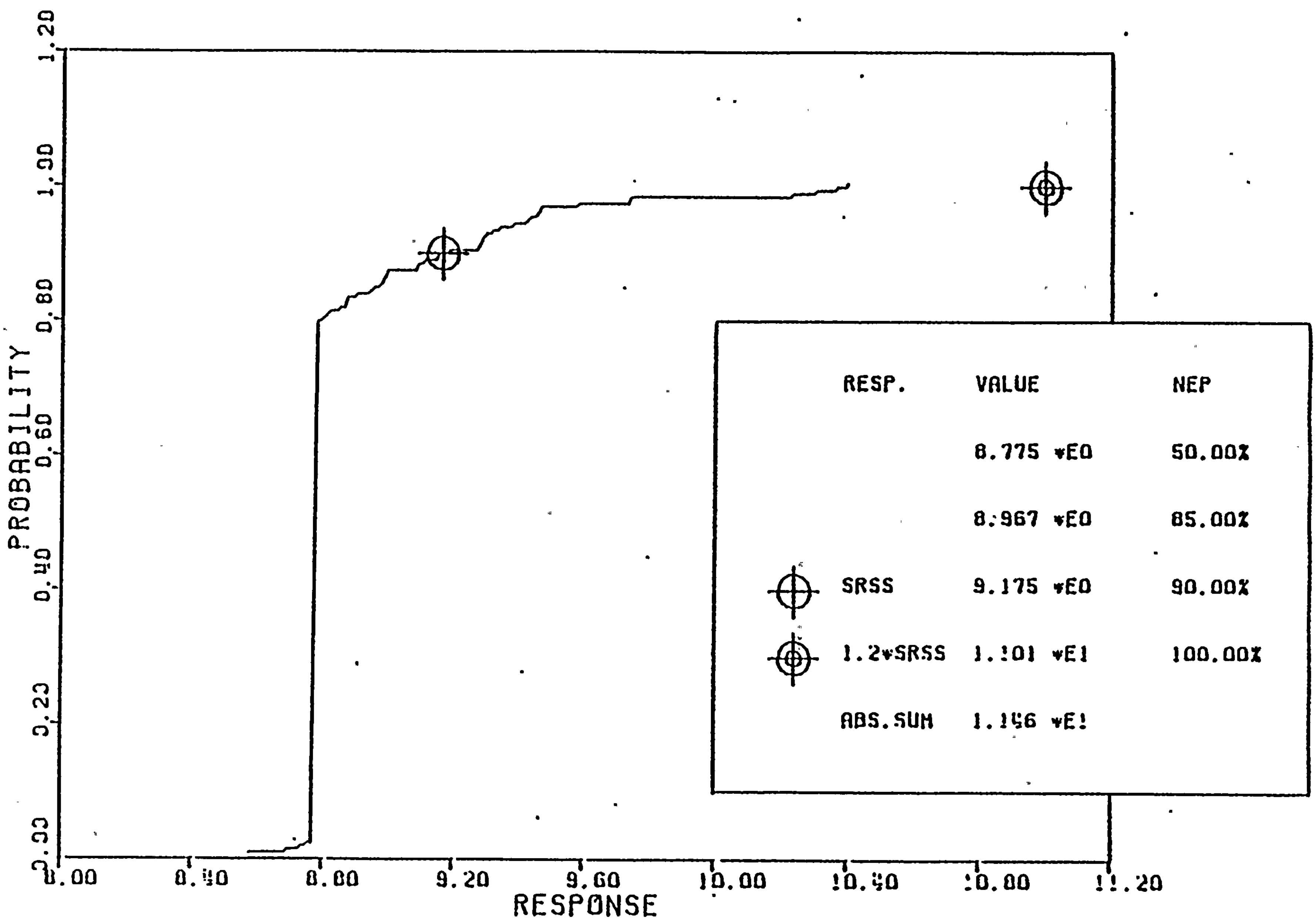
CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - OBE)

Figure 6-32



LOADING SRV(SVA) + SSE, VERTICAL ACCELERATION (FT/SEC**2) (180)
CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - SSE)

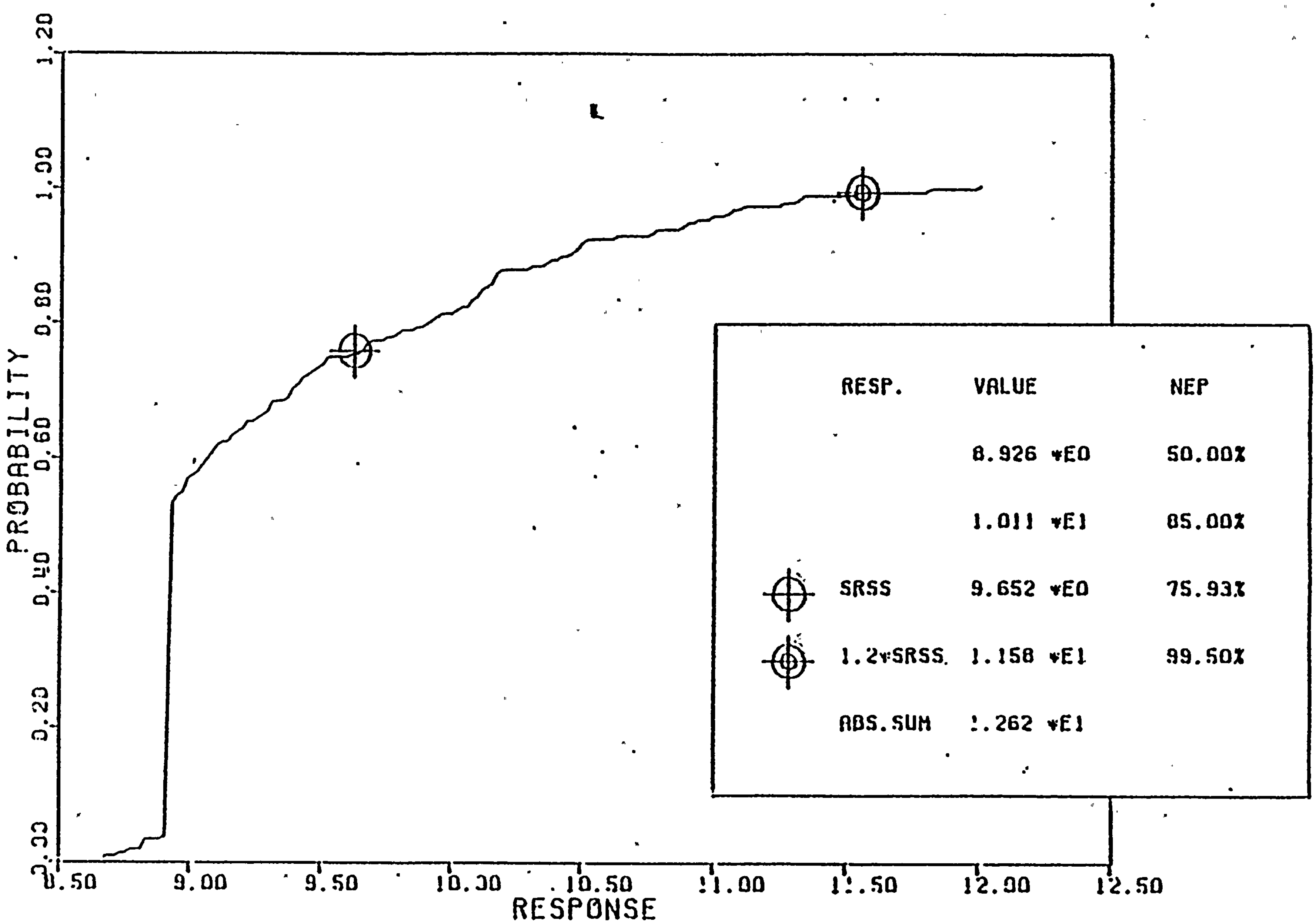
Figure 6-33



LOADING SRV(SVA) + SSE, VERTICAL ACCELERATION (FT/SEC**2) (180)

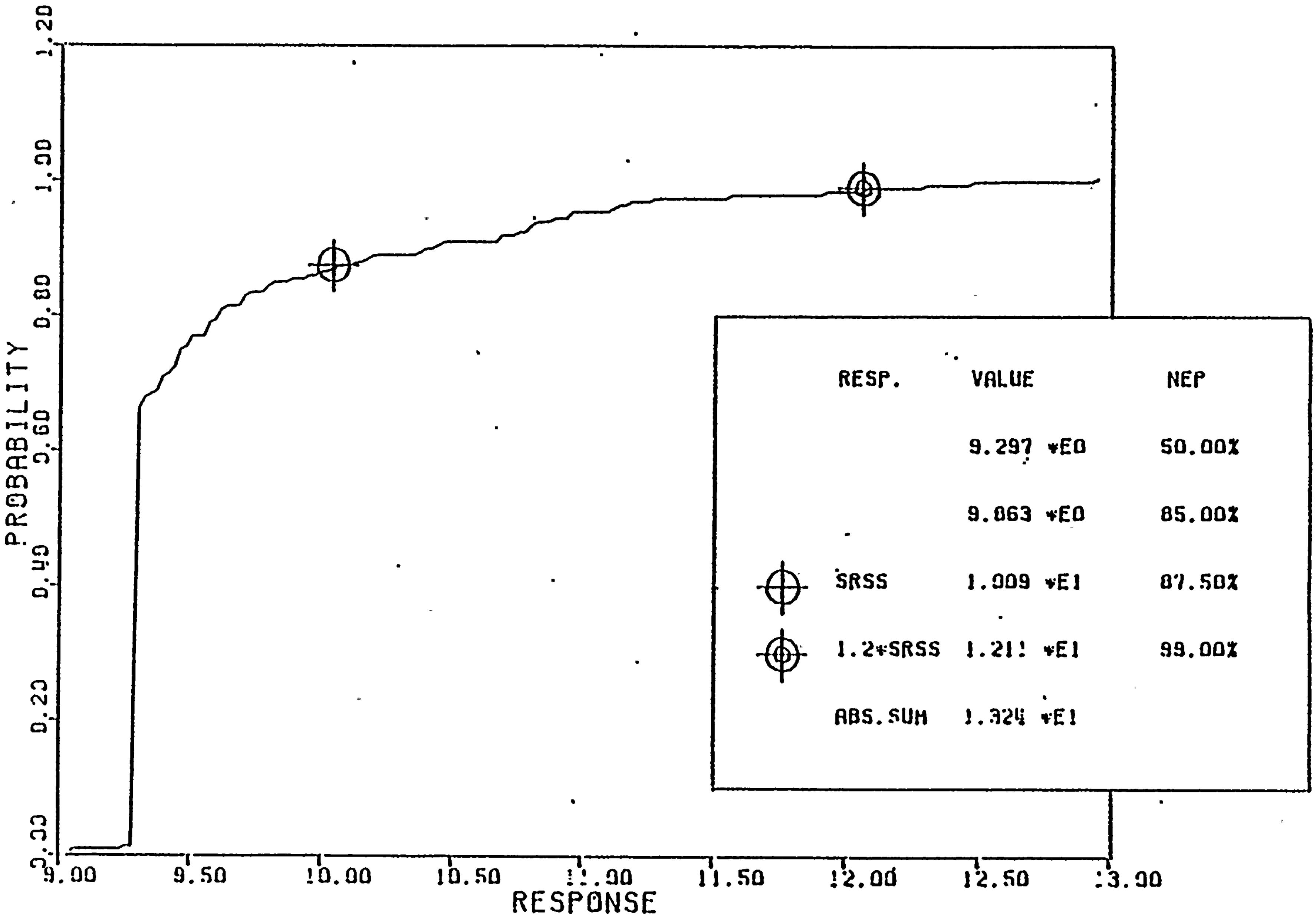
CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - SSE)

Figure 6-34.



LOADING SRV(SVA) + SSE, VERTICAL ACCELERATION (FT/SEC**2) (180)
CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - SSE)

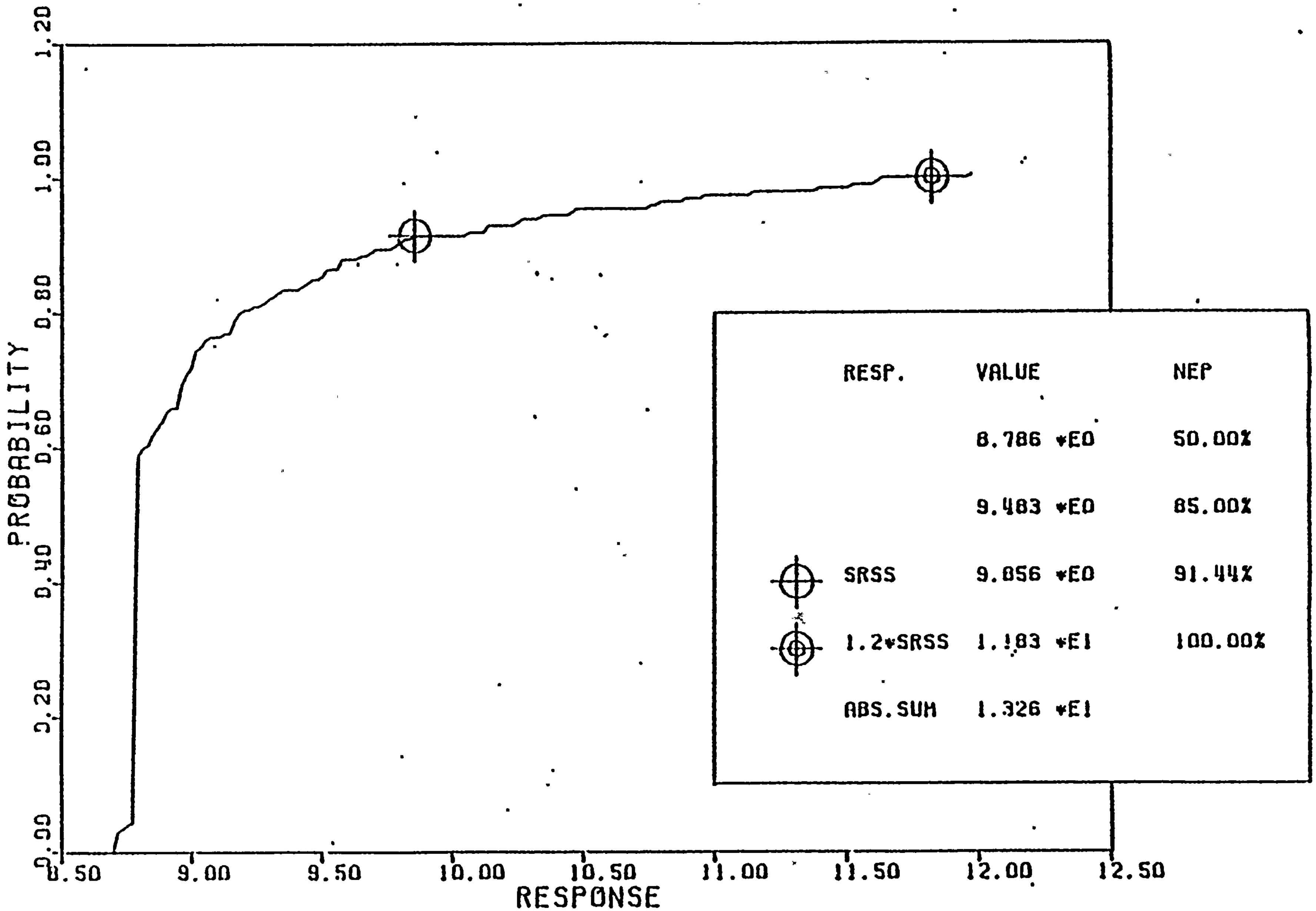
Figure 6-35



LOADING SRV(SVA) + SSE, VERTICAL ACCELERATION (FT/SEC**2) (180)

CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - SSE)

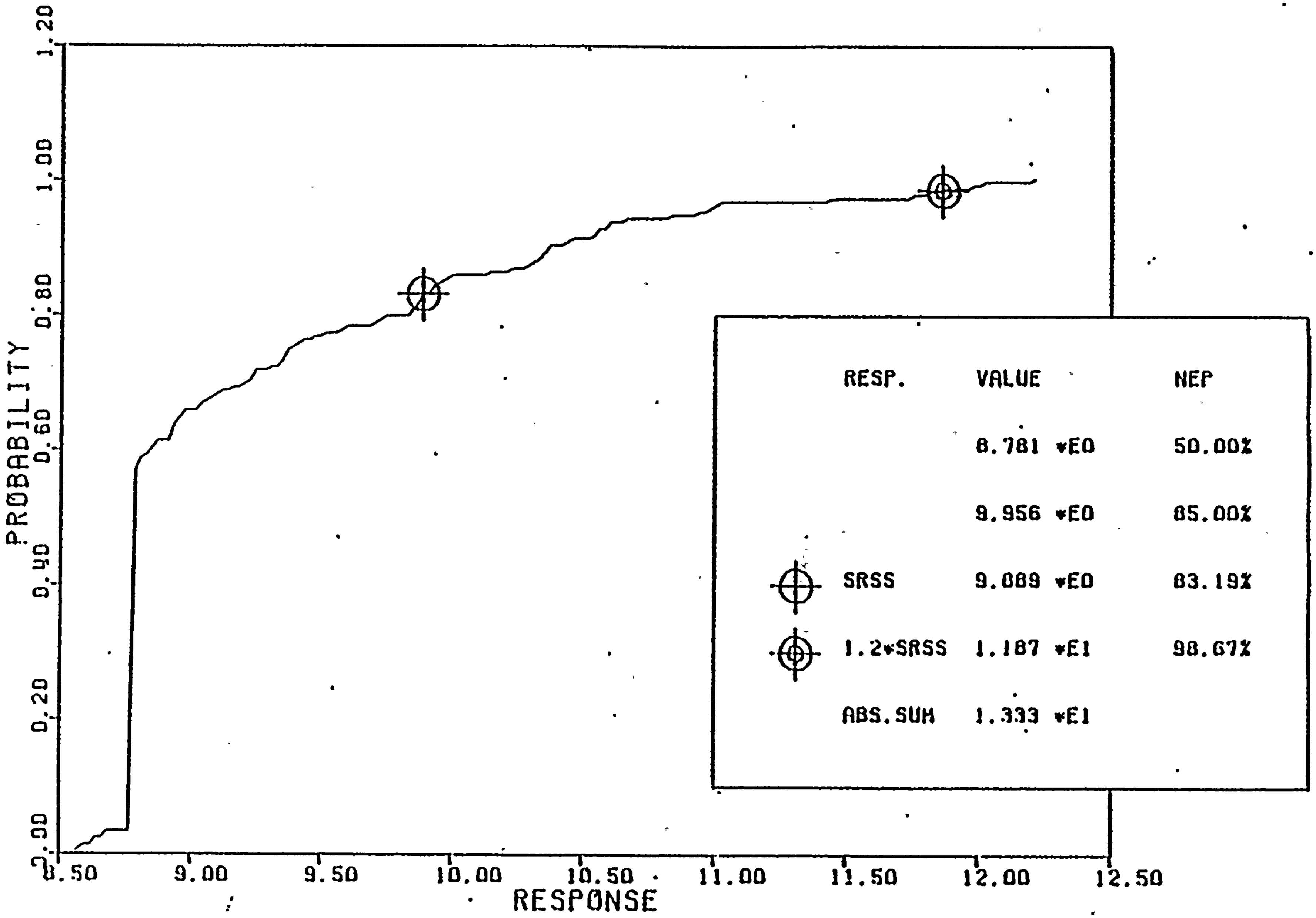
Figure 6-36



LOADING SRV(AVA) + SSE, VERTICAL ACCELERATION (FT/SEC**2) (180)

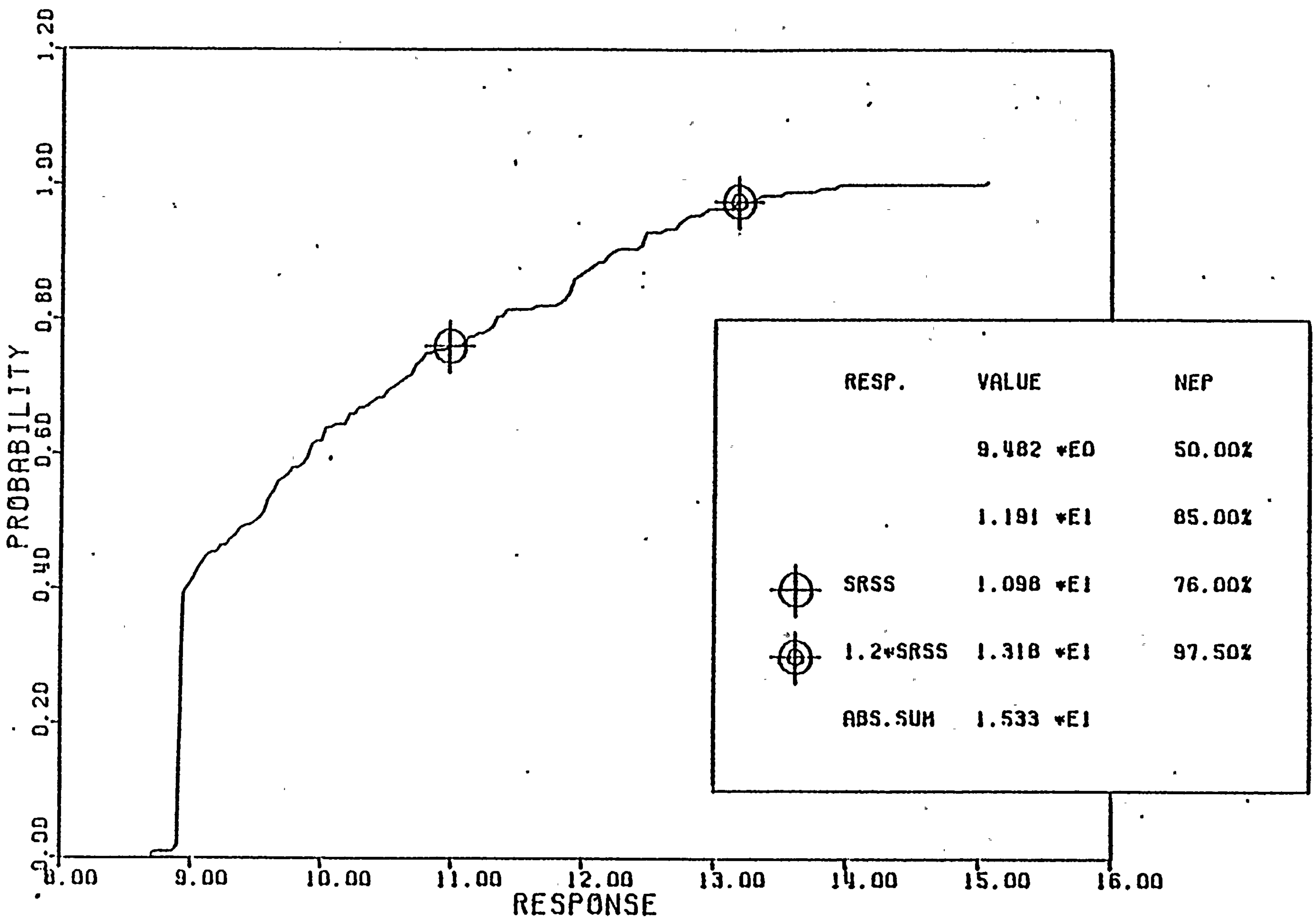
CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - SSE)

Figure 6-37



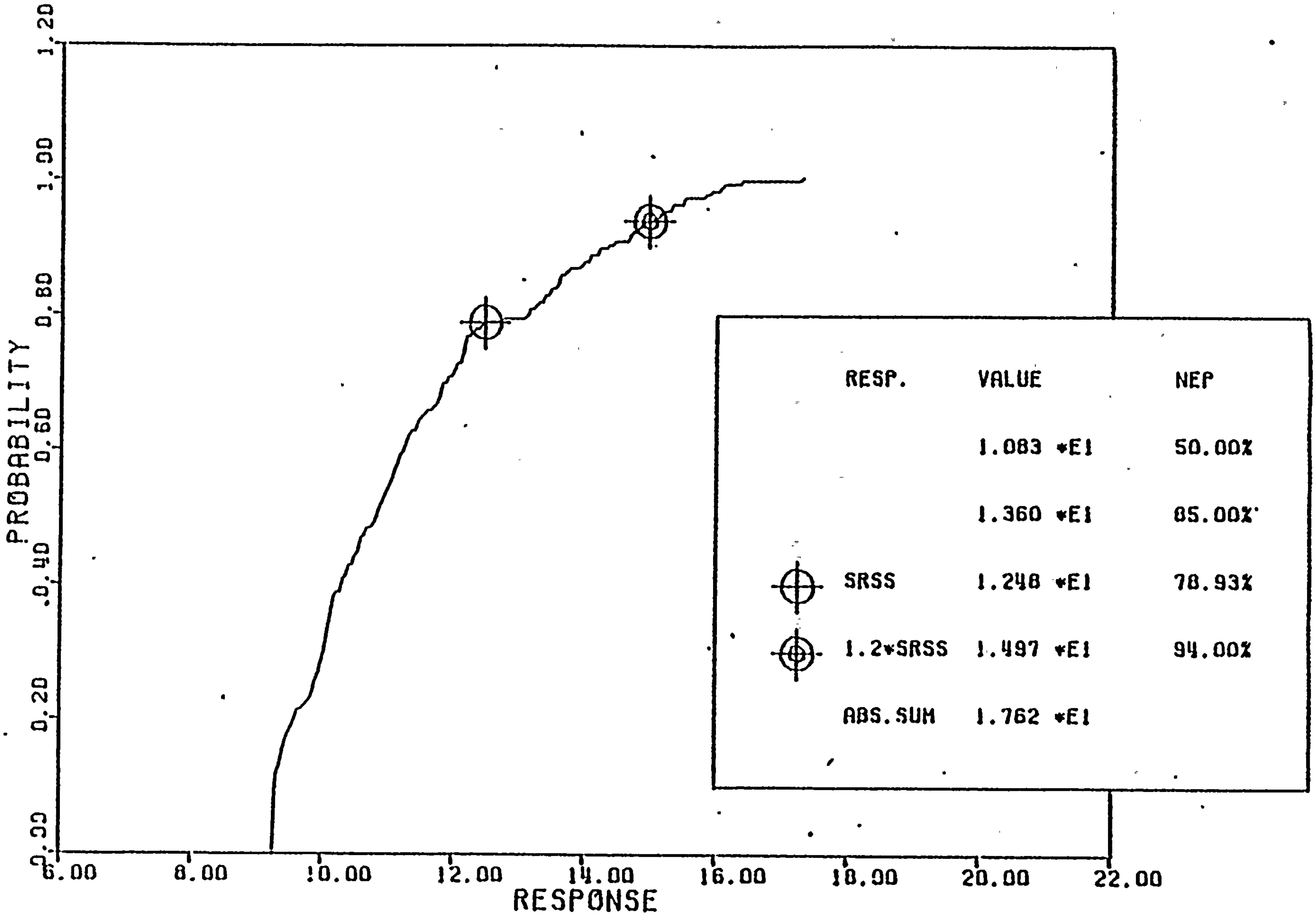
LOADING SRV(AVA) + SSE. VERTICAL ACCELERATION (FT/SEC**2) (180)
CONTAINMENT VESSEL DRYWELL. (NODE 28 - SRV). (NODE 148 - SSE)

Figure 6-38



LOADING SRV(AVA) + SSE, VERTICAL ACCELERATION (FT/SEC**2) (180)
CONTAINMENT VESSEL DR/WELL, (NODE 30 - SRV), (NODE 144 - SSE)

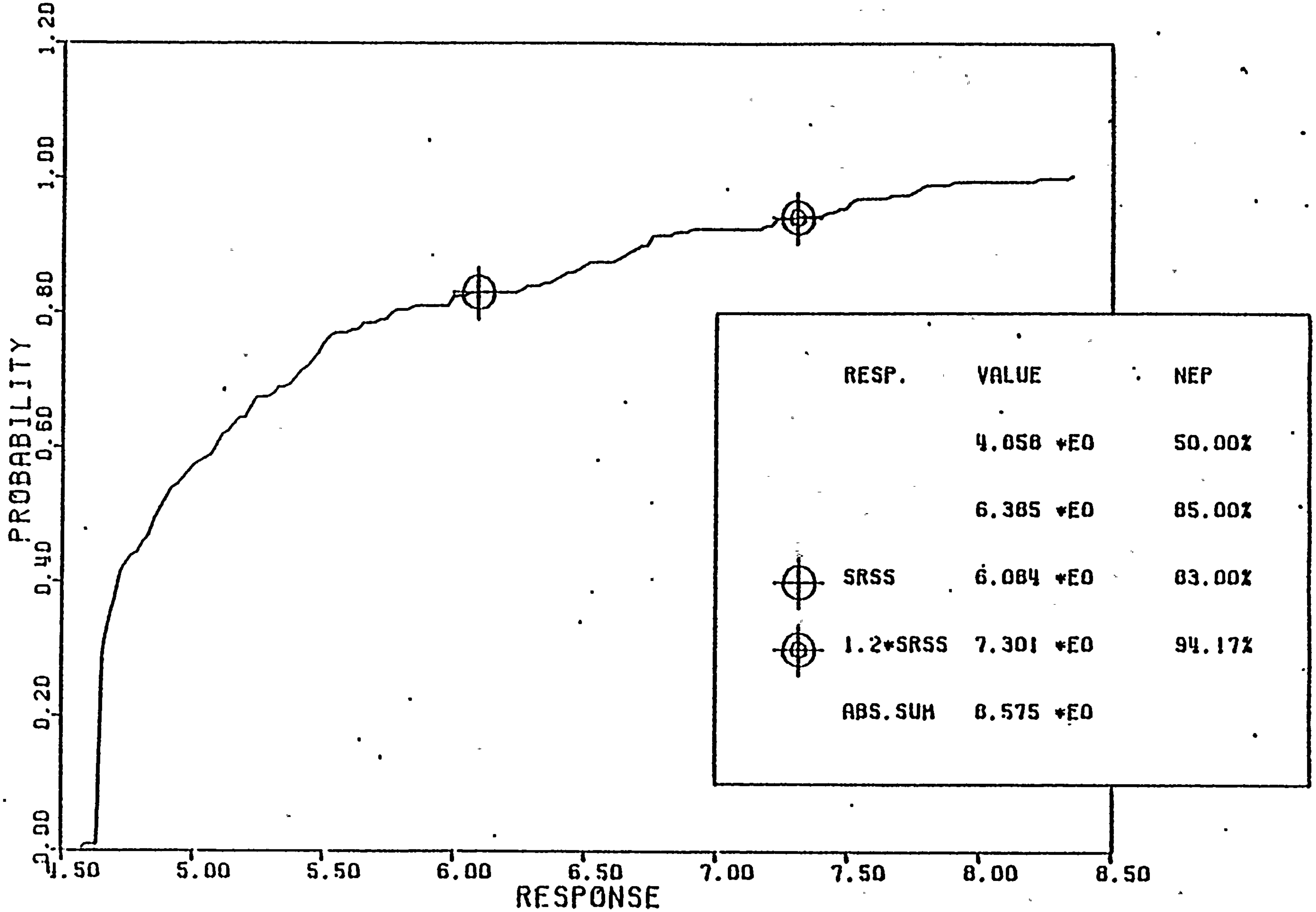
Figure 6-39



LOADING SRV(AVA) + SSE, VERTICAL ACCELERATION (FT/SEC**2) (180)

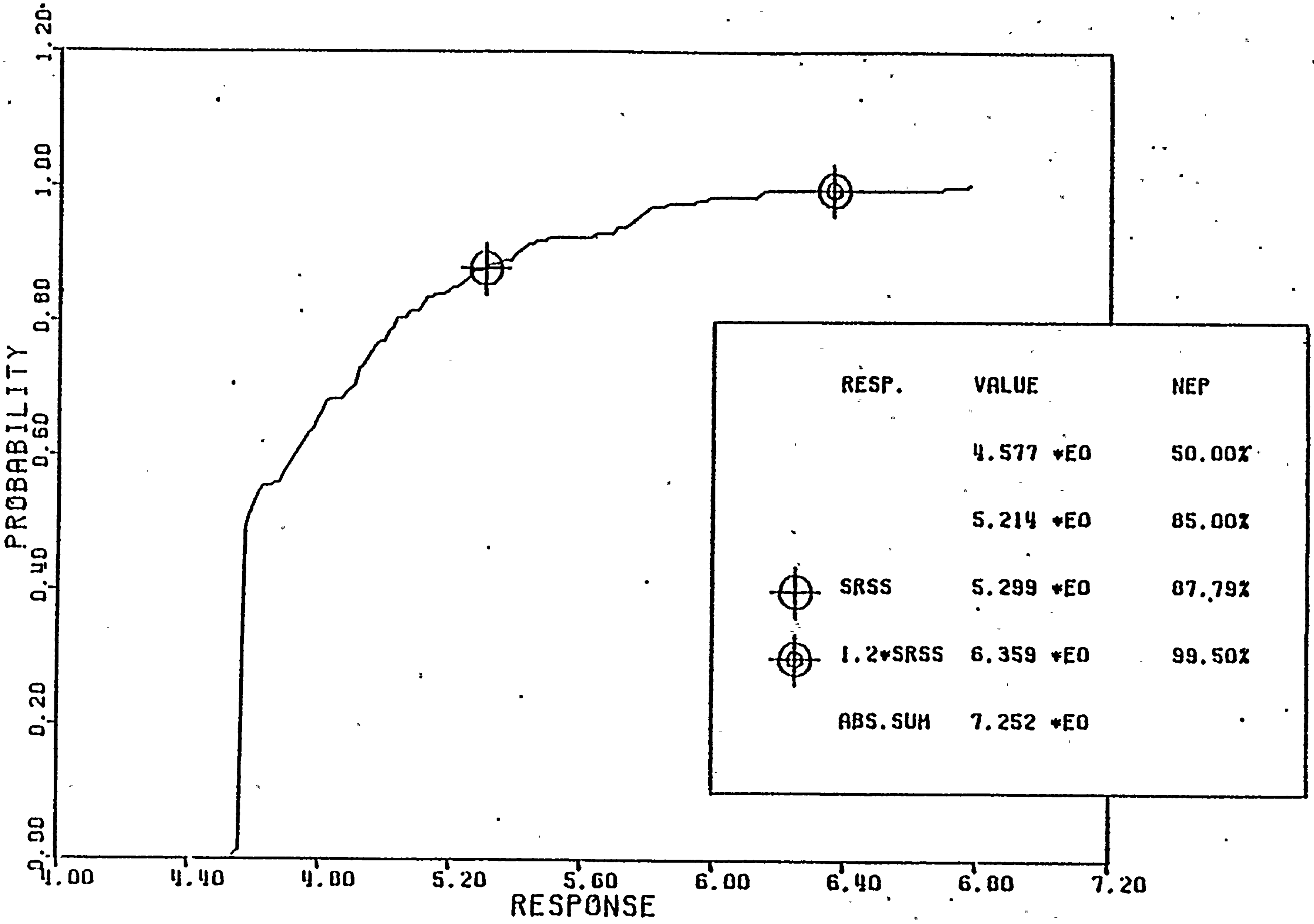
CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - SSE)

Figure 6-40



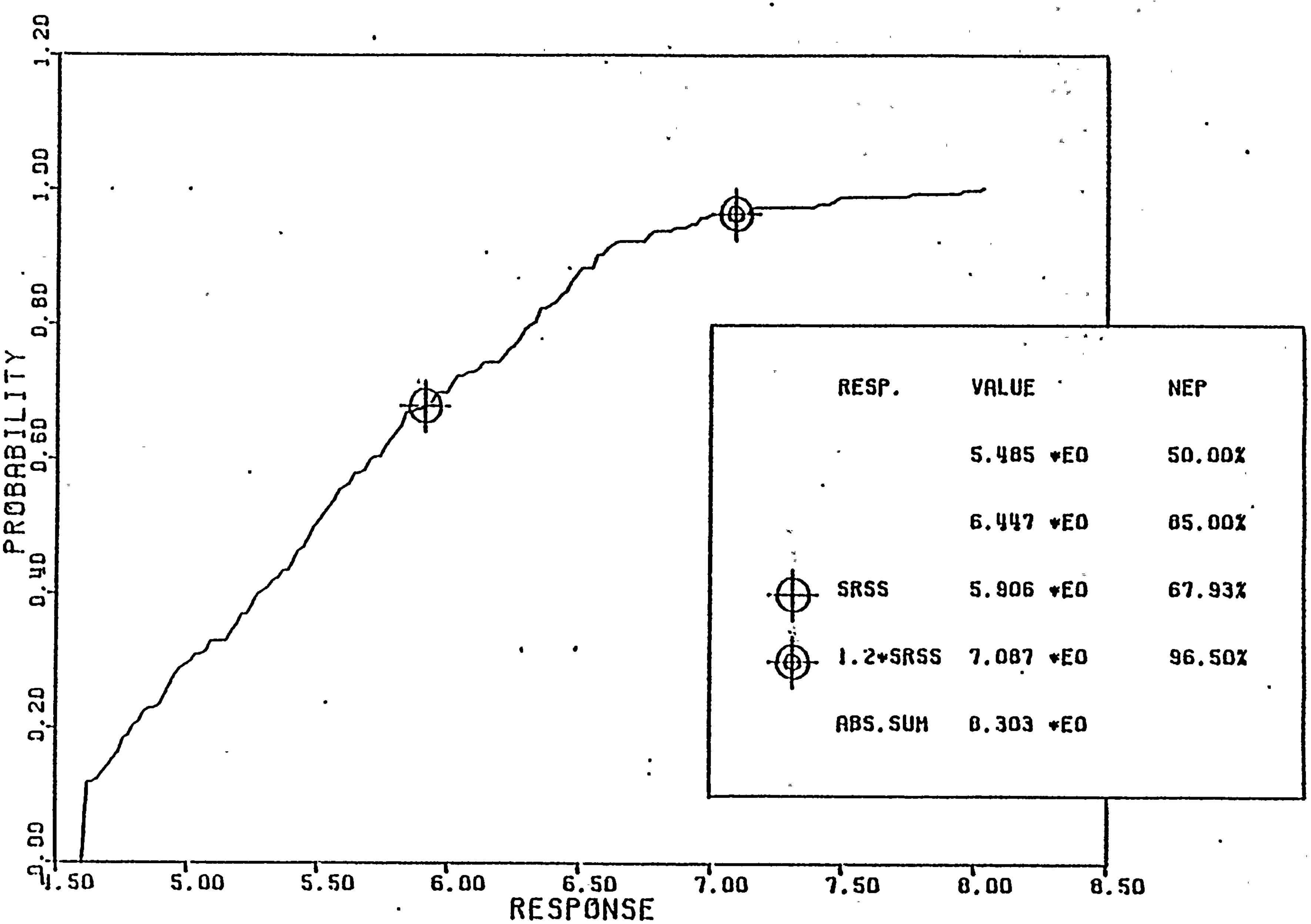
LOADING SRV(SVA) + OBE. VERTICAL ACCELERATION (FT/SEC**2) (180)
CONTAINMENT VESSEL DRYWELL. (NODE 26 - SRV). (NODE 152 - OBE)

Figure 6-41



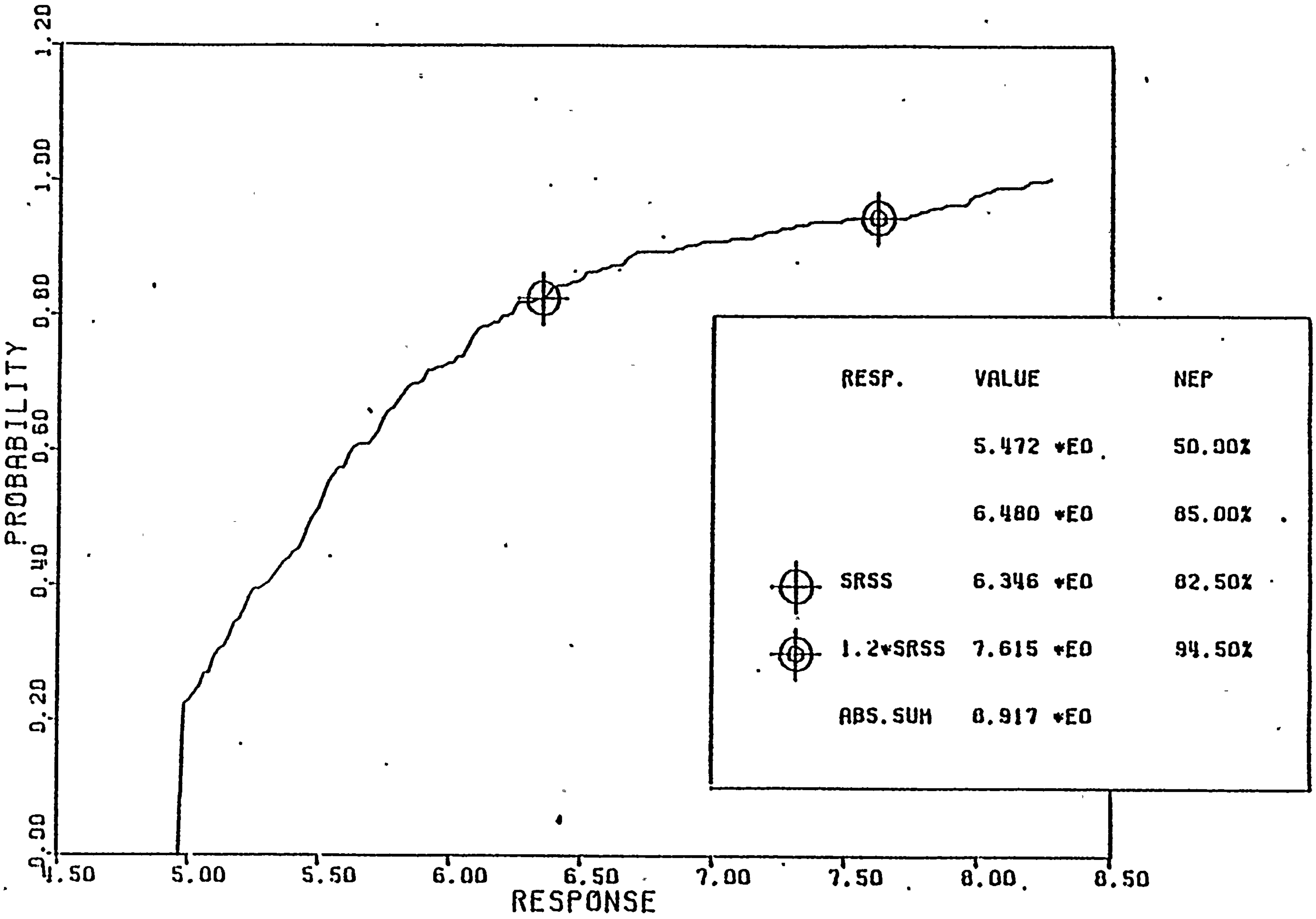
LOADING SRV(SVA) + OBE, VERTICAL ACCELERATION (FT/SEC**2) (180)
CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - OBE)

Figure 6-42



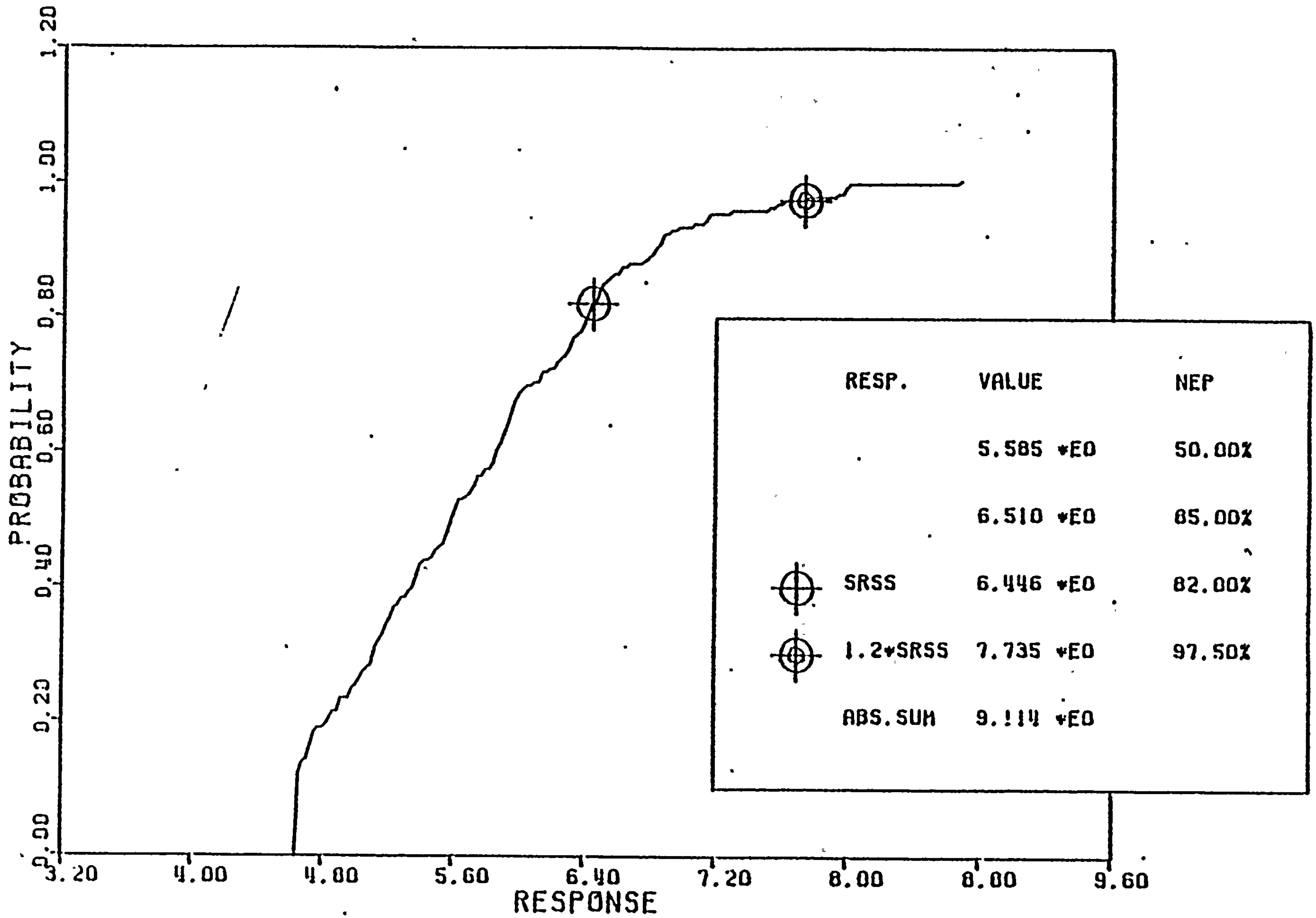
LOADING SRV(SVA) + OBE, VERTICAL ACCELERATION (FT/SEC**2) (180)
CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - OBE)

Figure 6-43



LOADING SRV(SVA) + OBE, VERTICAL ACCELERATION (FT/SEC**2) (100)
CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - OBE)

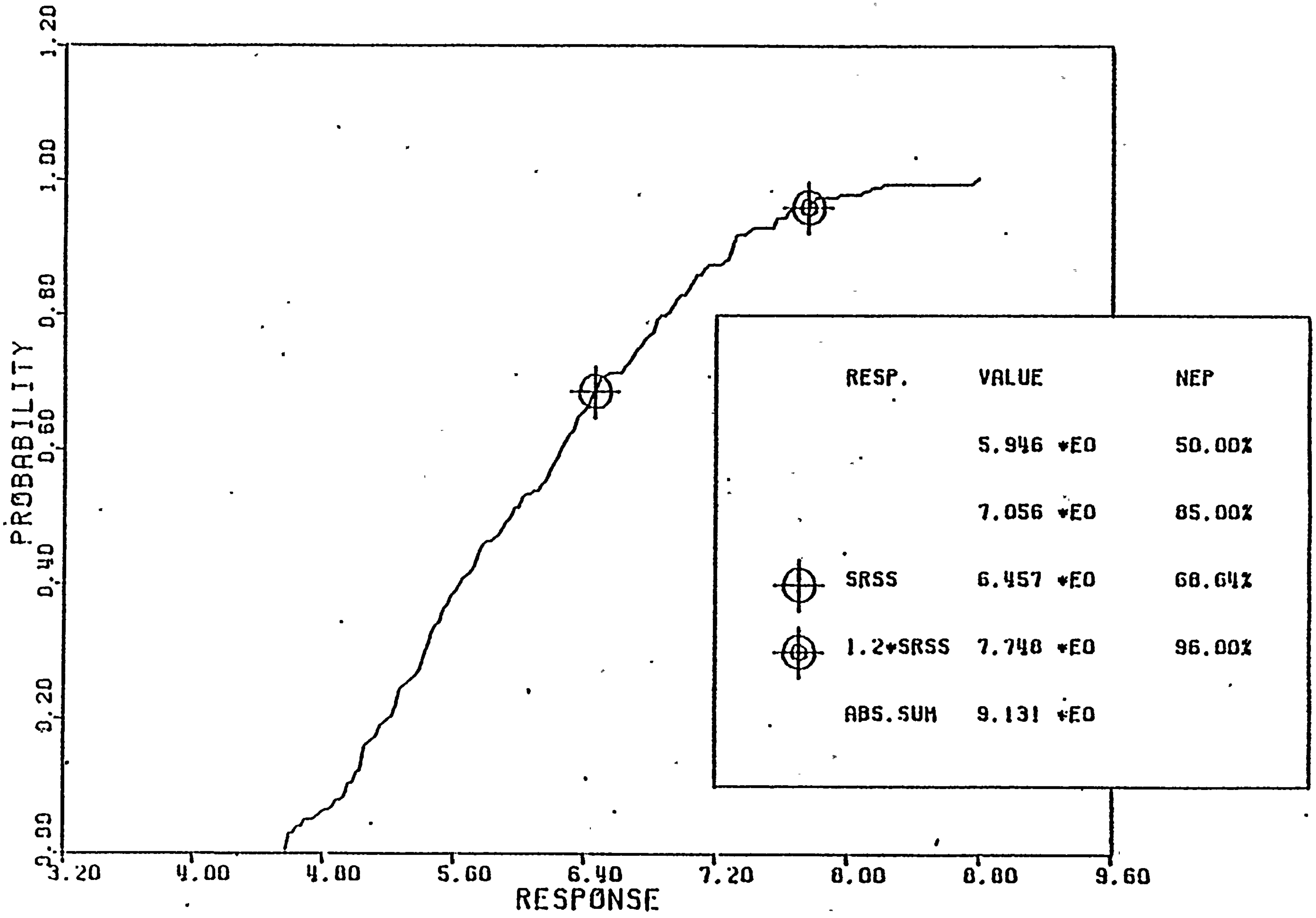
Figure 6-44



LOADING SRV(AVA) + OBE, VERTICAL ACCELERATION (FT/SEC**2) (180)

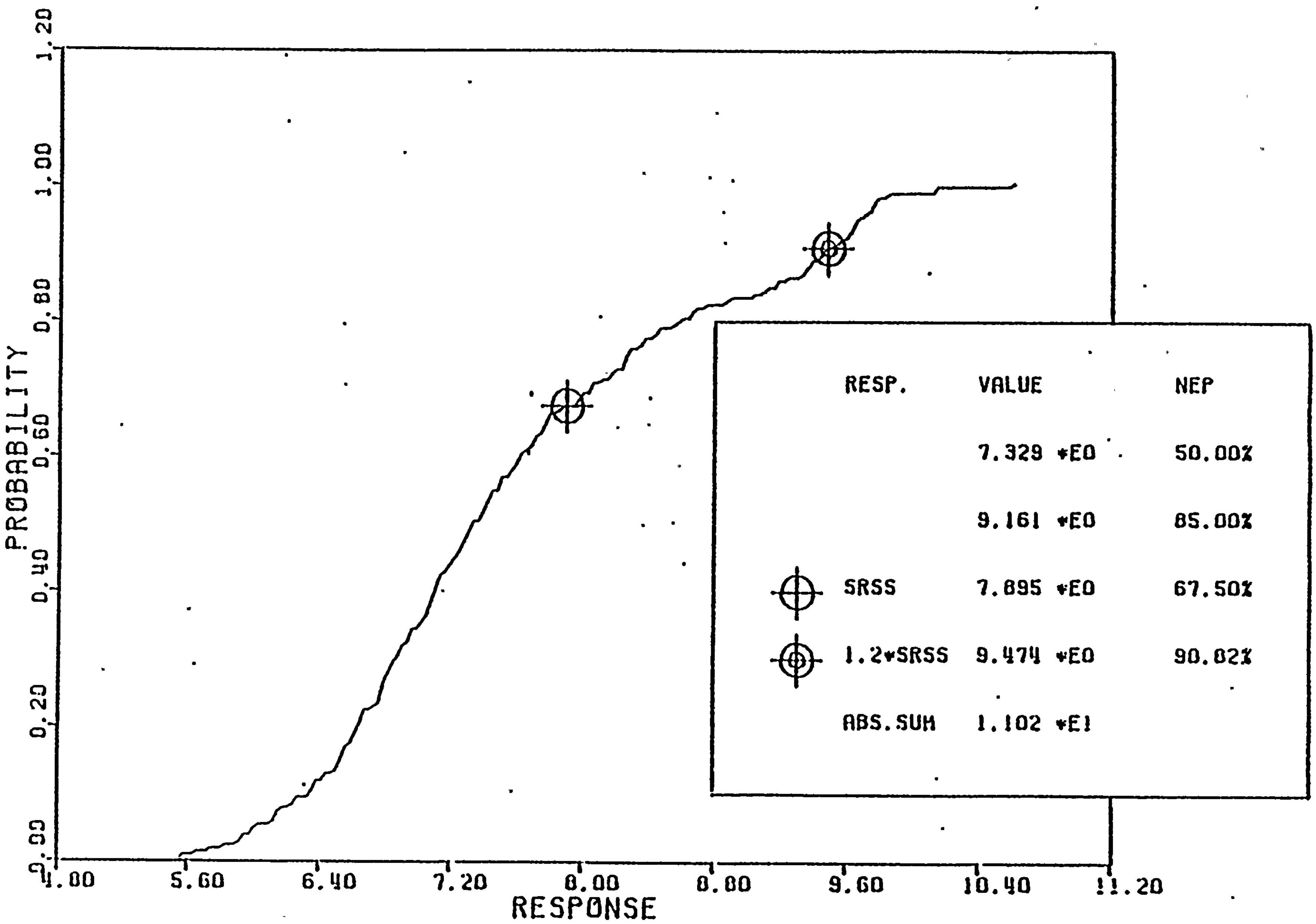
CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - OBE)

Figure 6-45



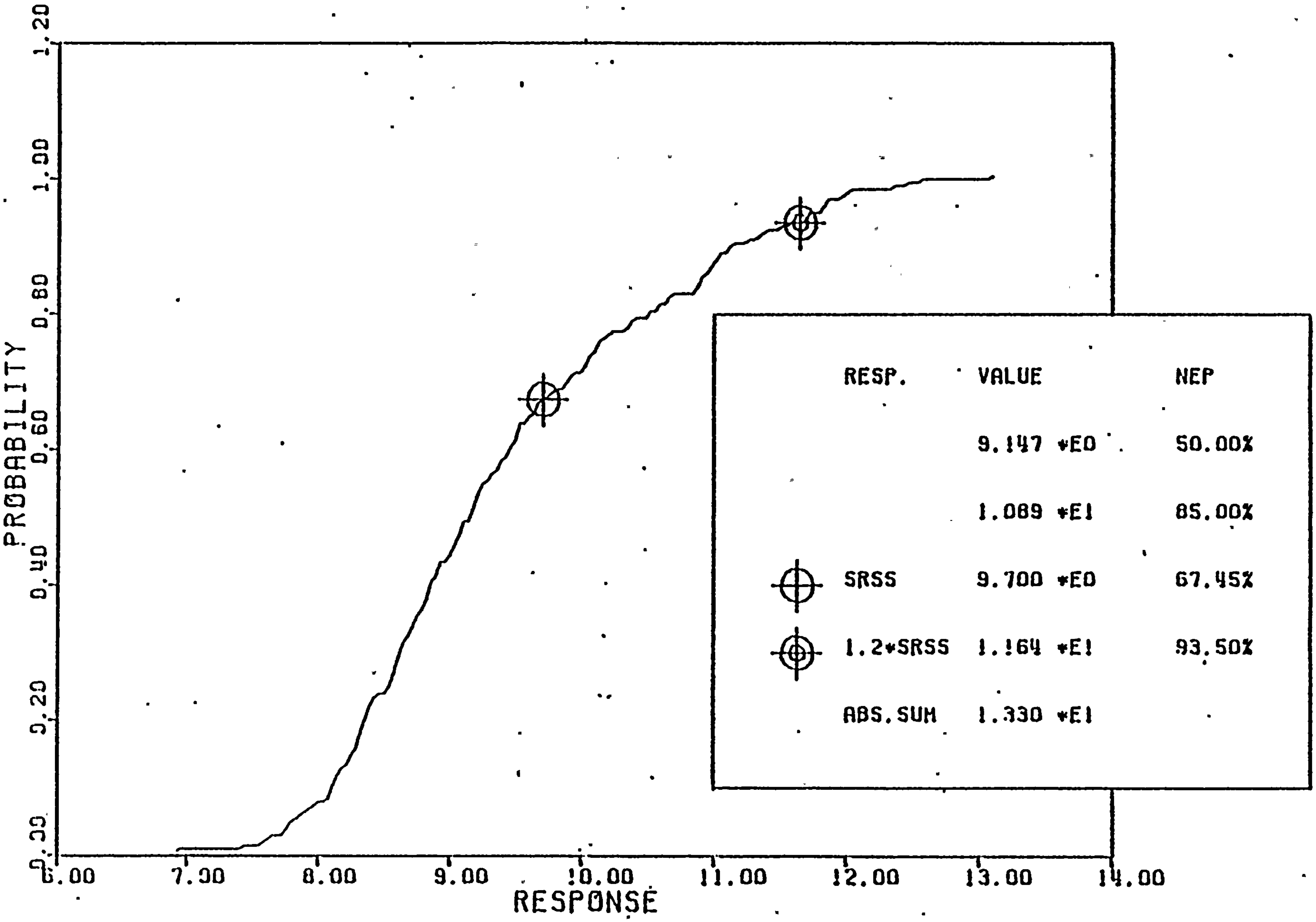
LOADING SRV(AVA) + OBE, VERTICAL ACCELERATION (FT/SEC**2) (180)
CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - OBE)

Figure 6-46



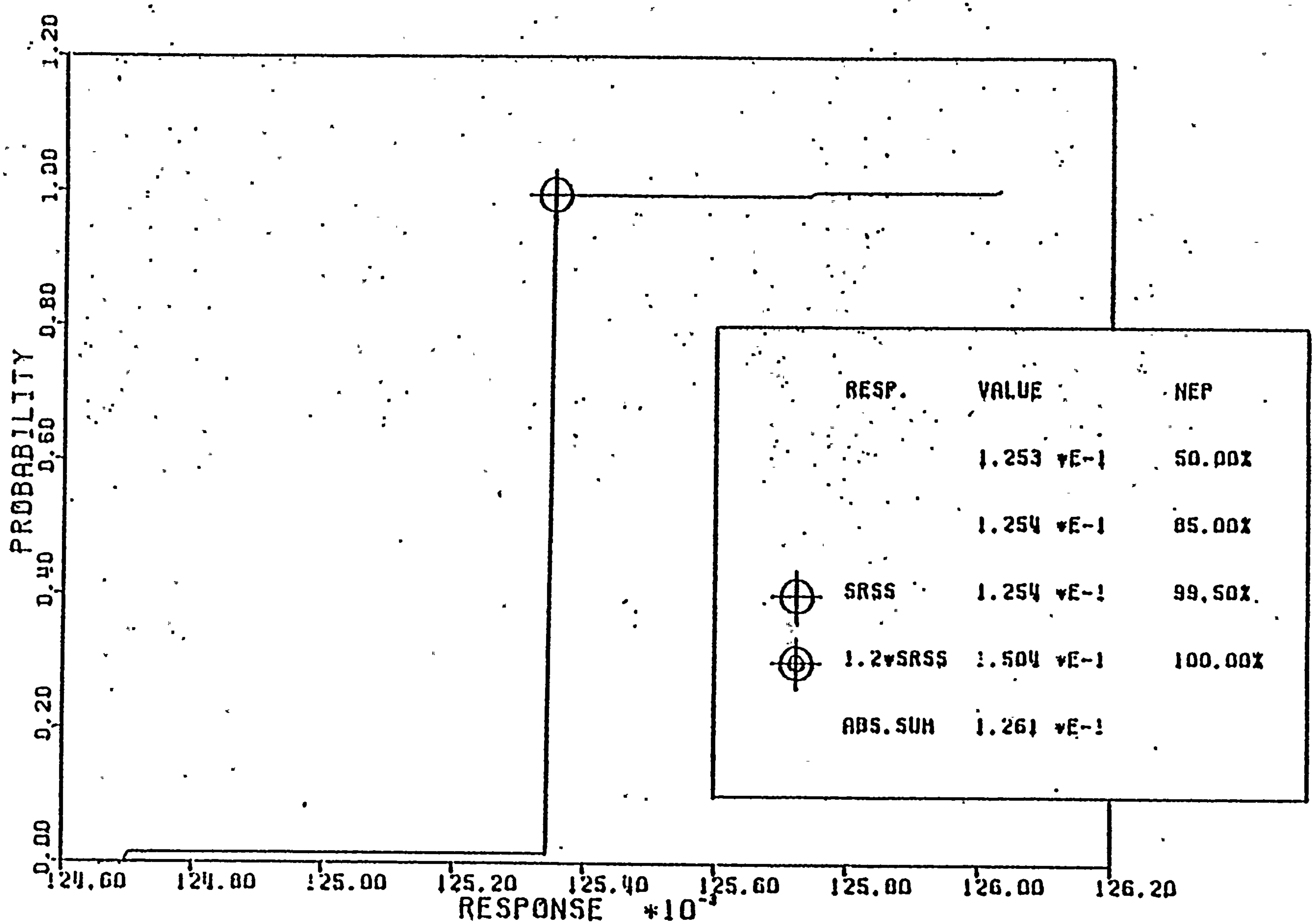
LOADING SRV(AVA) + OBE, VERTICAL ACCELERATION (FT/SEC**2) (180)
CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - OBE)

Figure 6-47



LOADING SRV(AVA) + OBE, VERTICAL ACCELERATION (FT/SEC**2) (180)
CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - OBE)

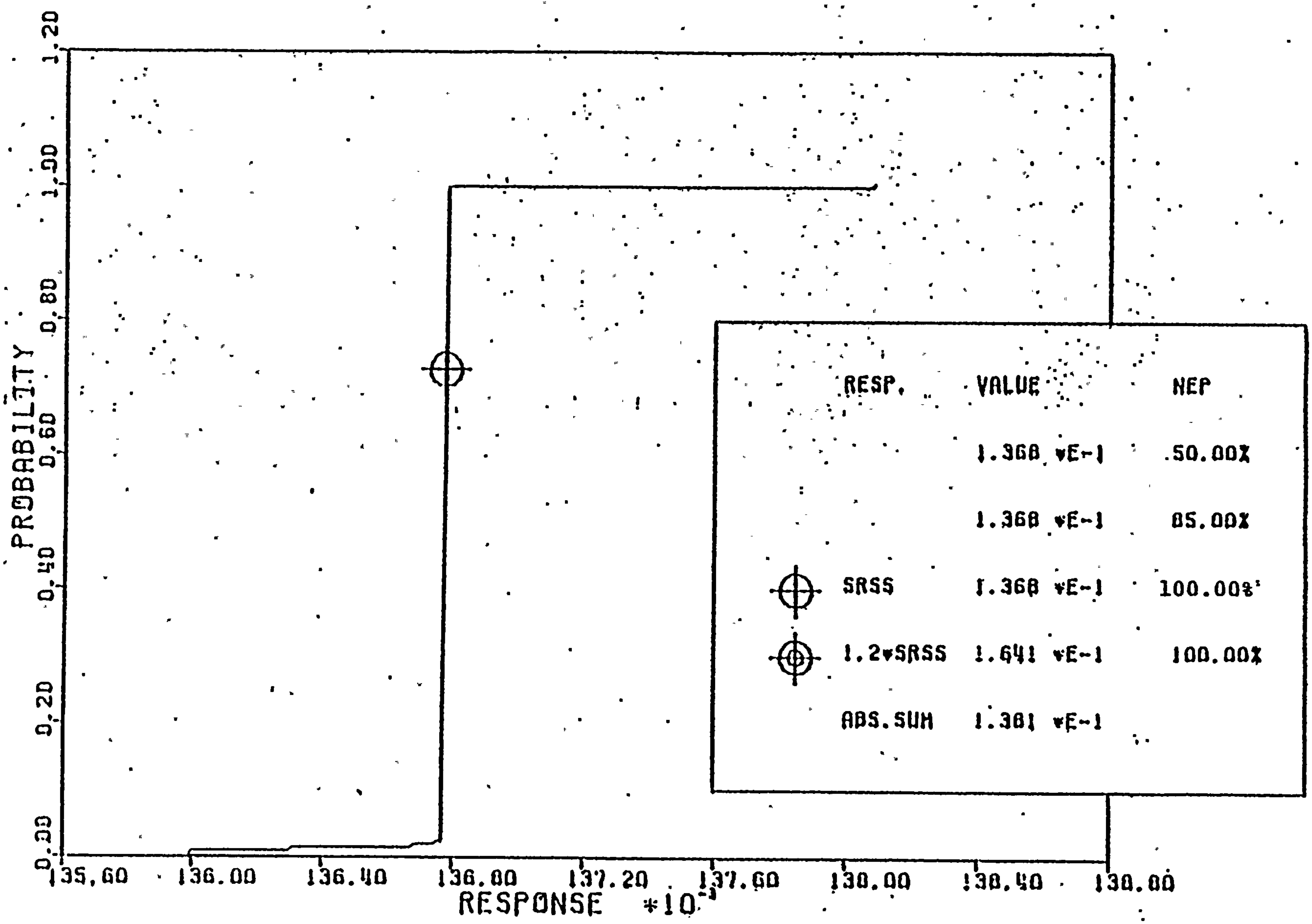
Figure 6-48



LOADING SRV(SVA) + SSE, HORIZONTAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - SSE)

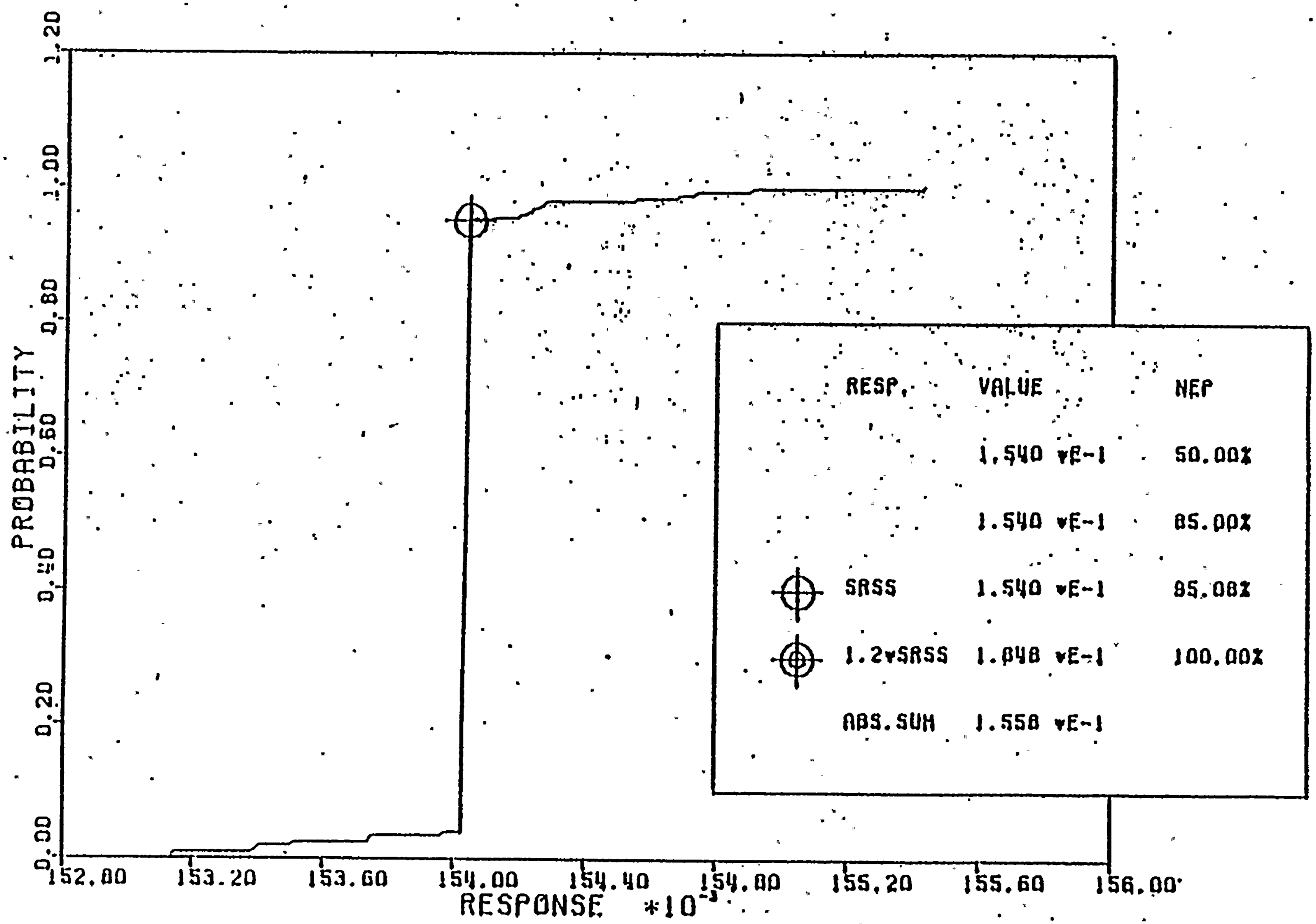
Figure 7-1



LOADING SRV(SVA) + SSE. HORIZONTAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - SSE)

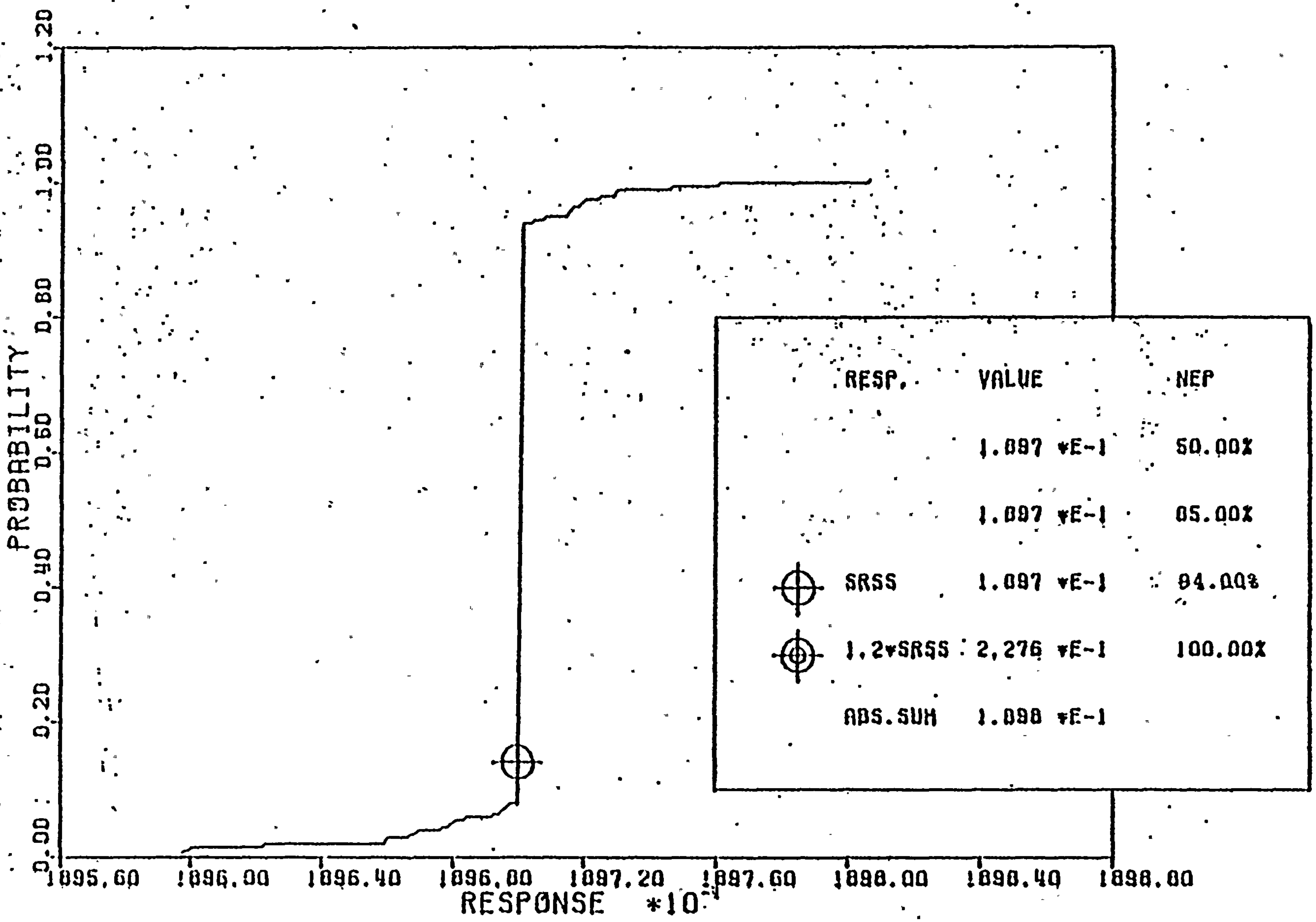
Figure 7-2



LOADING SRV(SVA) + SSE. HORIZONTAL DISPLACEMENT (FT)

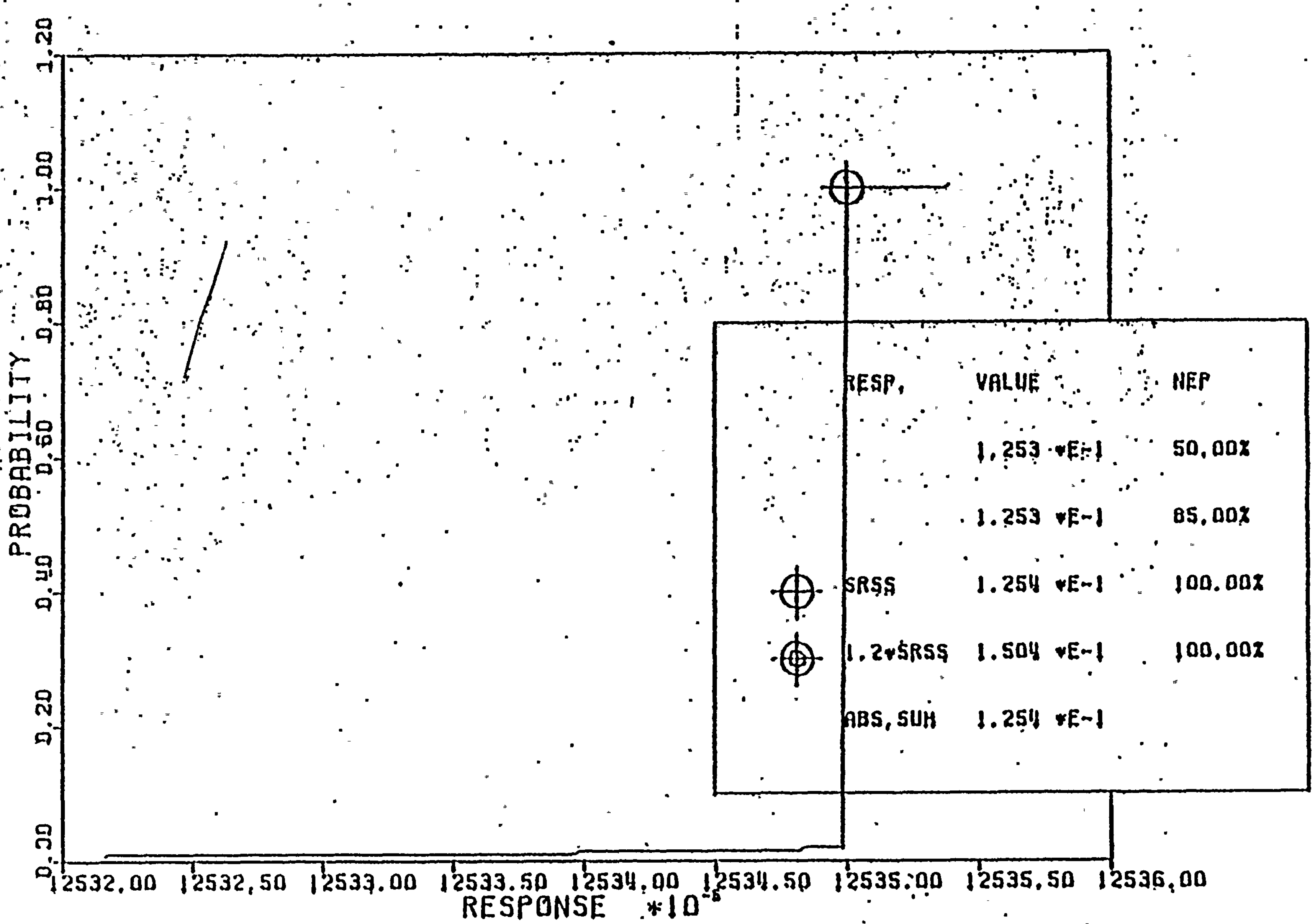
CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - SSE)

Figure 7-3



LOADING SRV(SVA) + SSE, HORIZONTAL DISPLACEMENT (FT)
CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - SSE)

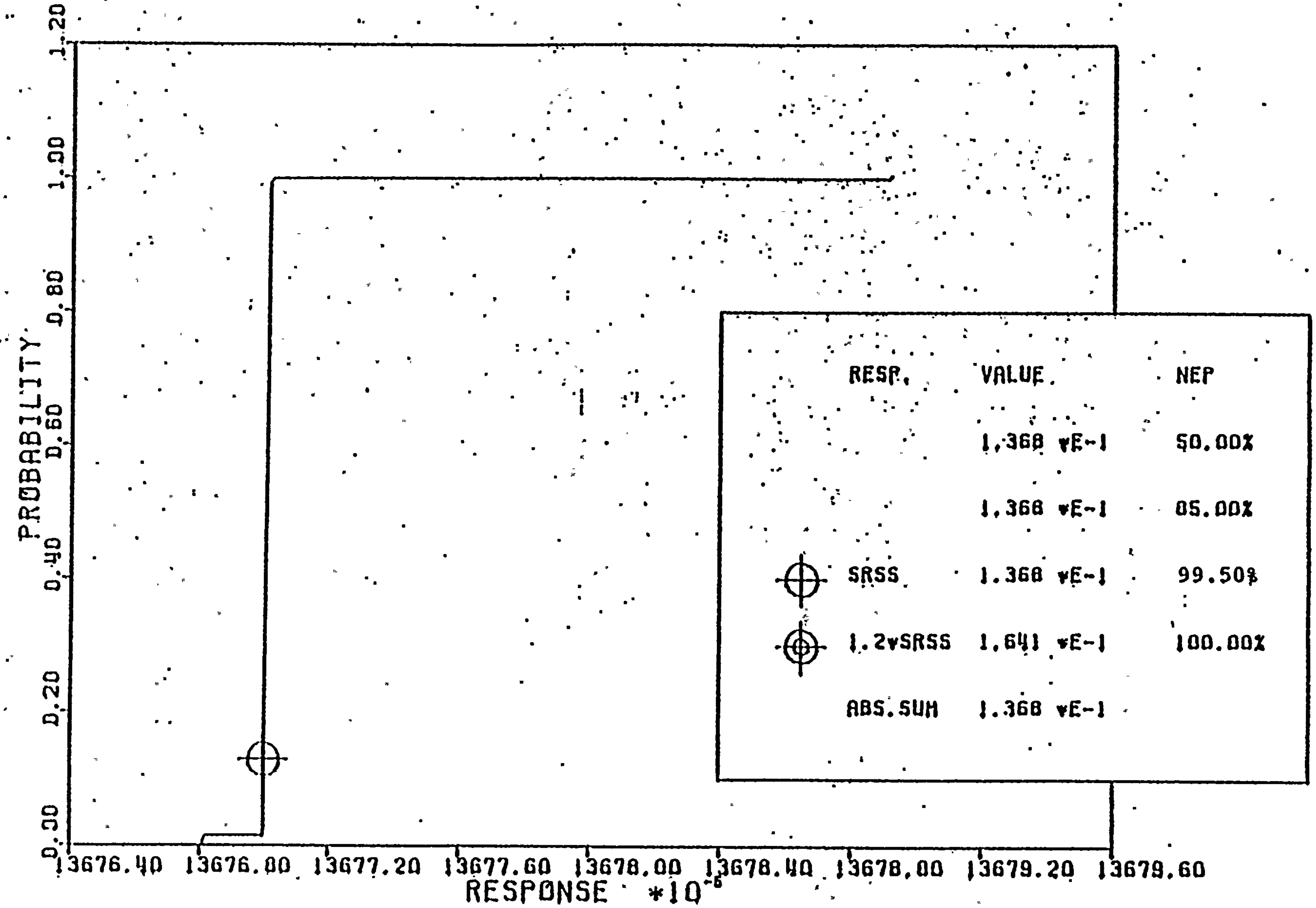
Figure 7-4



LOADING SRV(AVA) + SSE, HORIZONTAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 162 - SSE)

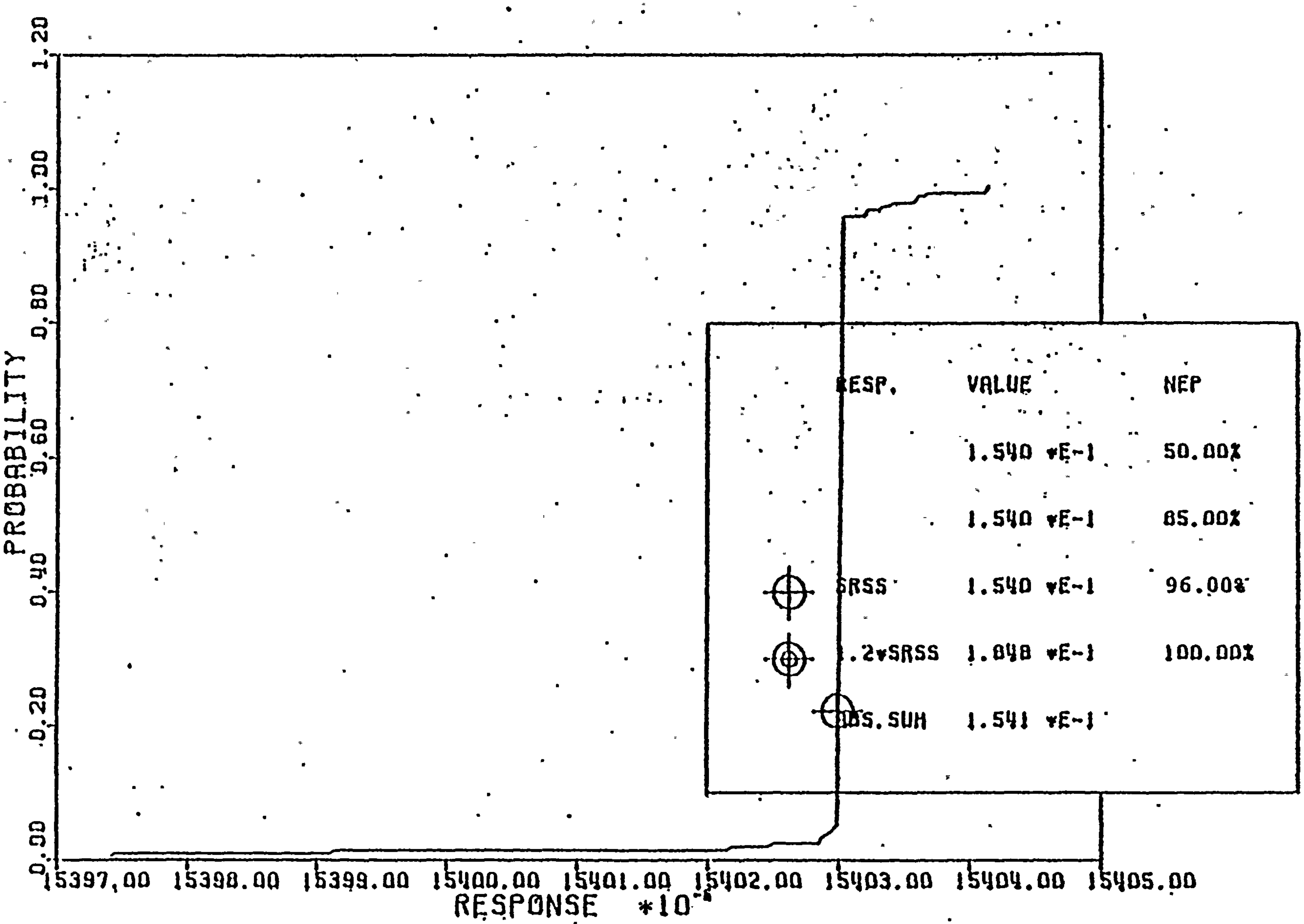
Figure 7-5



LOADING SRV(AVA) + SSE, HORIZONTAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - SSE)

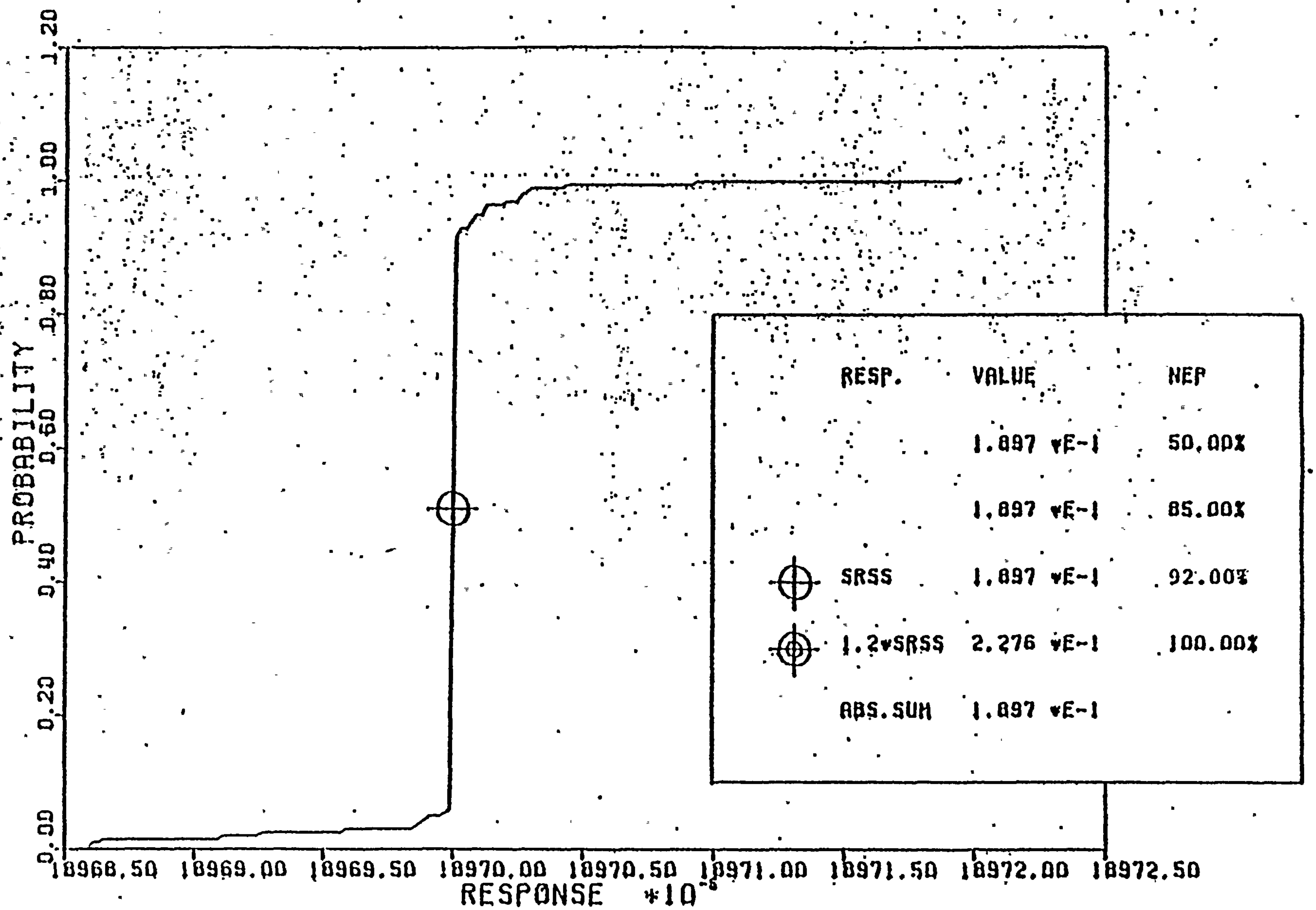
Figure 7-6



LOADING SRV (AVA) + SSE, HORIZONTAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - SSE)

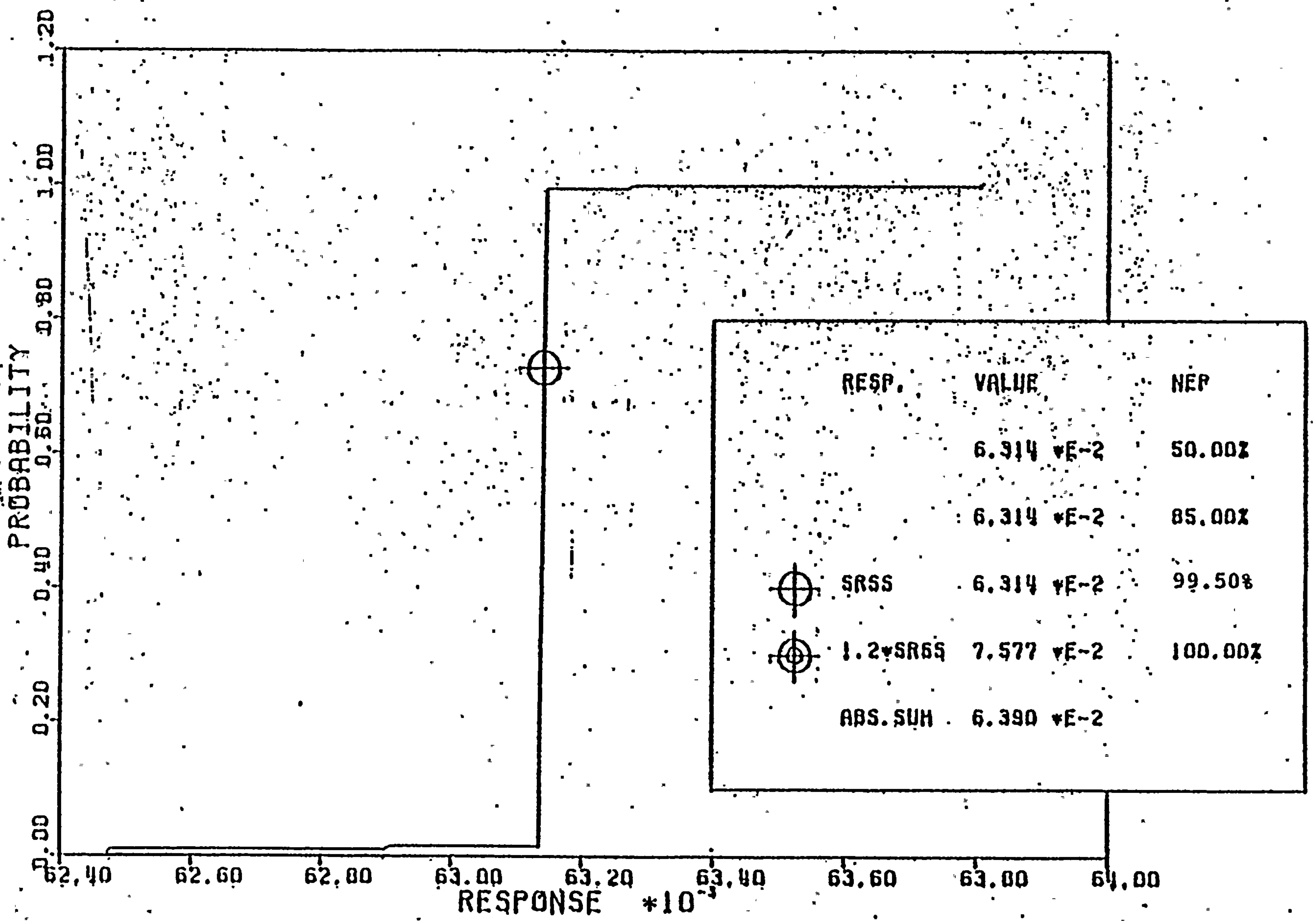
Figure 7-7



LOADING SRV (AVA) + SSE, HORIZONTAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - SSE)

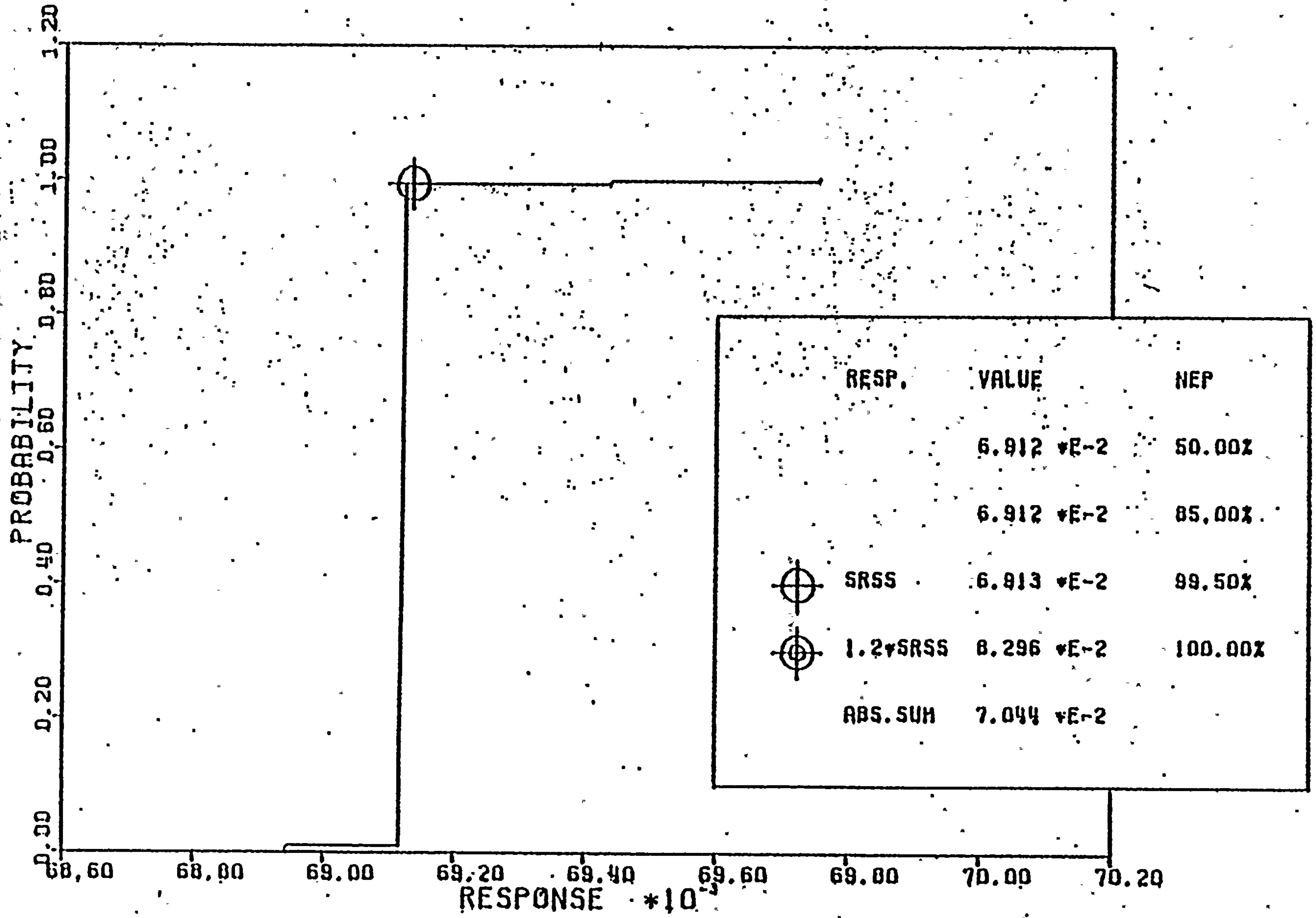
Figure 7-8



LOADING SRV(SVA) + OBE, HORIZONTAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - OBE)

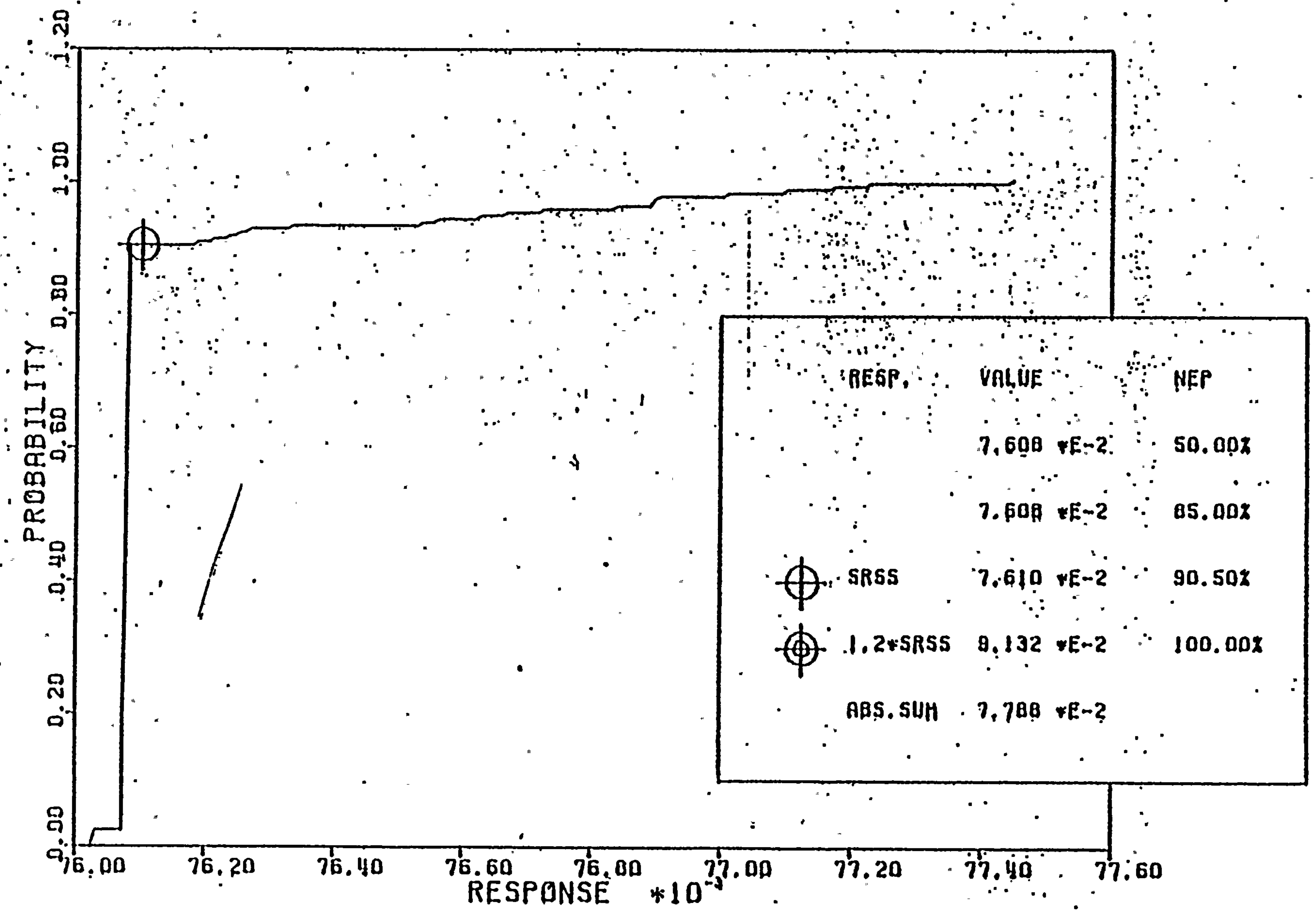
Figure 7-9



LOADING SRV(SVA) + OBE. HORIZONTAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - OBE)

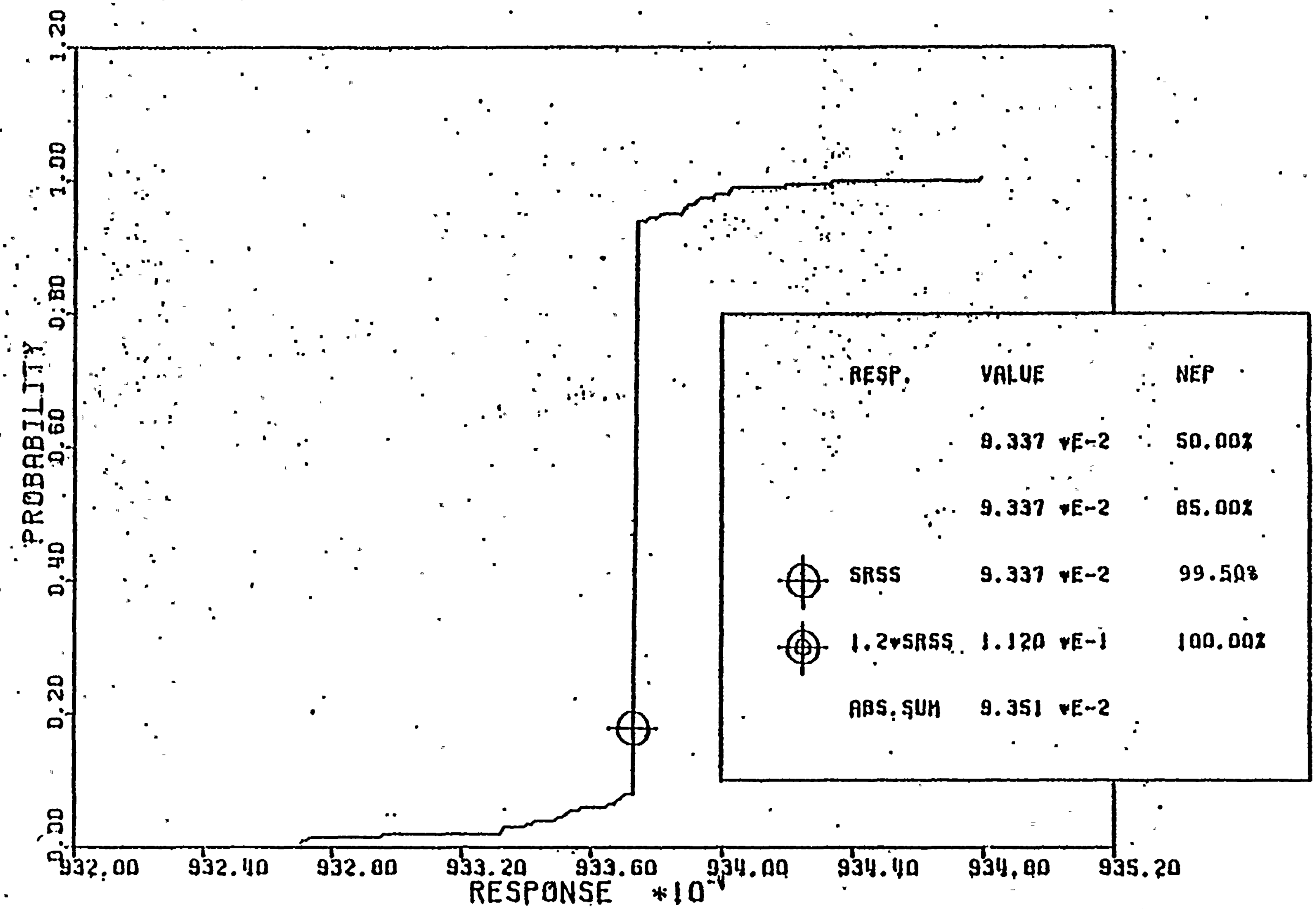
Figure 7-10



LOADING SRV(SVA) + OBE, HORIZONTAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - OBE)

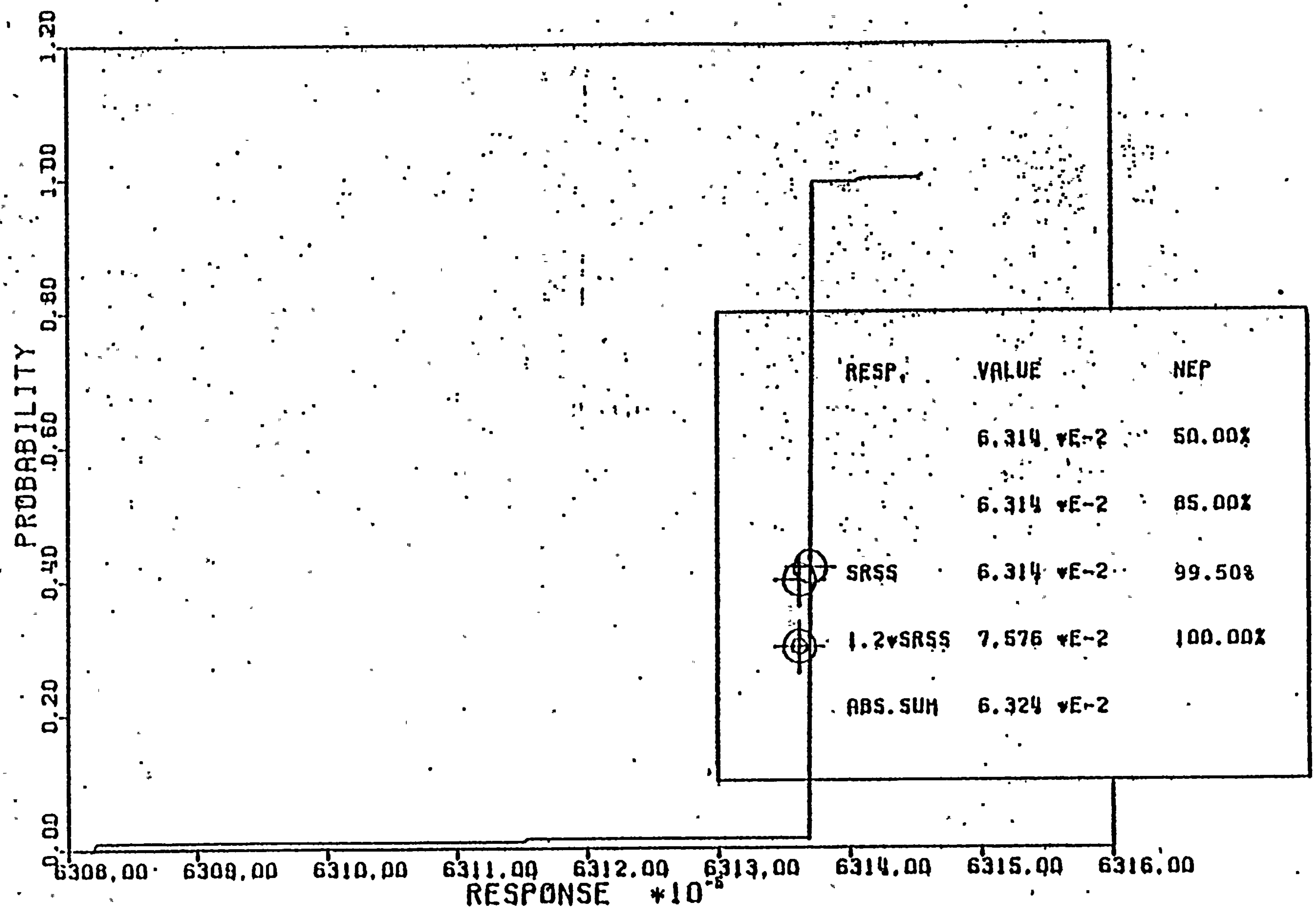
Figure 7-11



LOADING SRV(SVA) + OBE, HORIZONTAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - OBE)

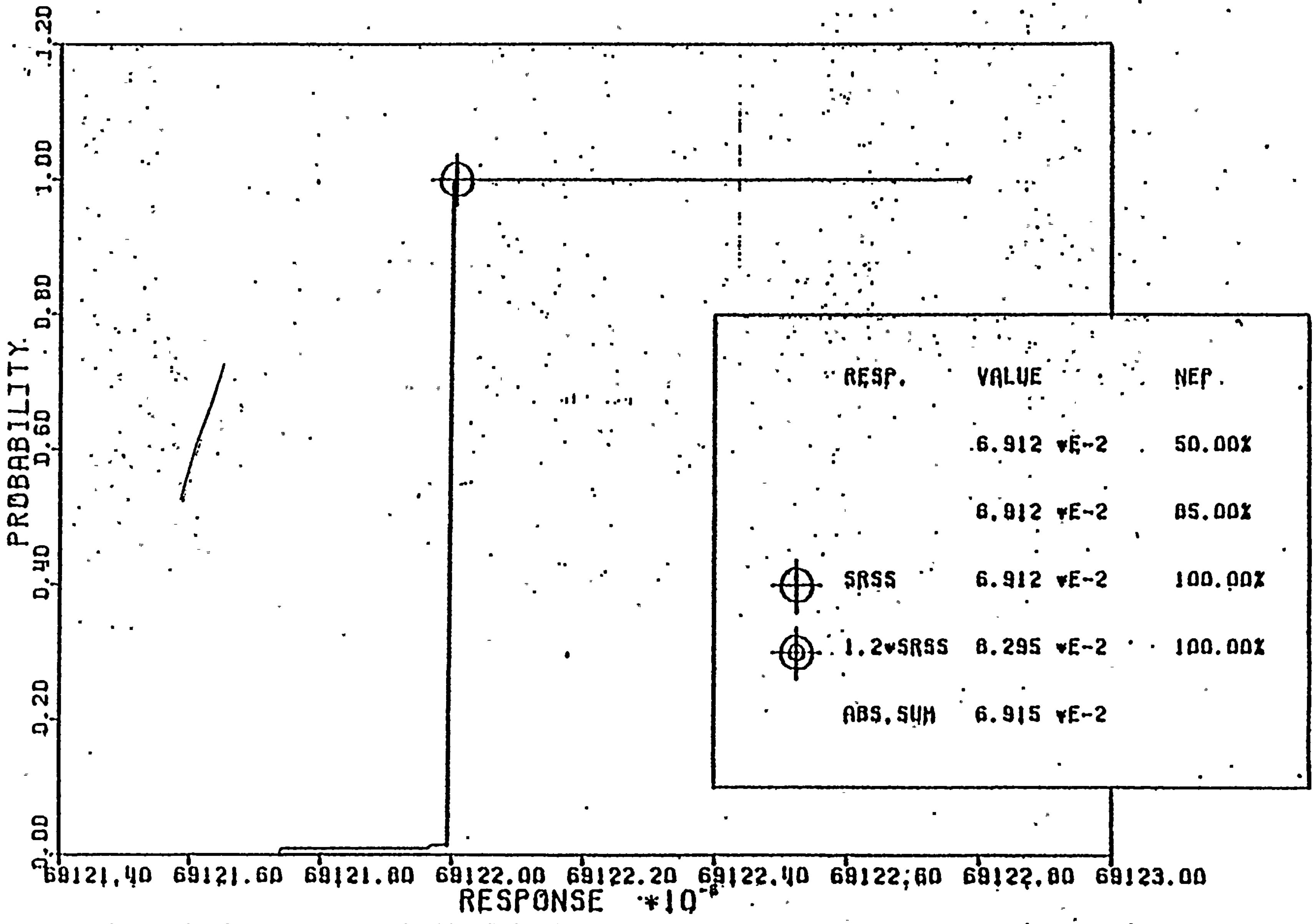
Figure 7-12



LOADING SRV(AVA) + OBE, HORIZONTAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - OBE)

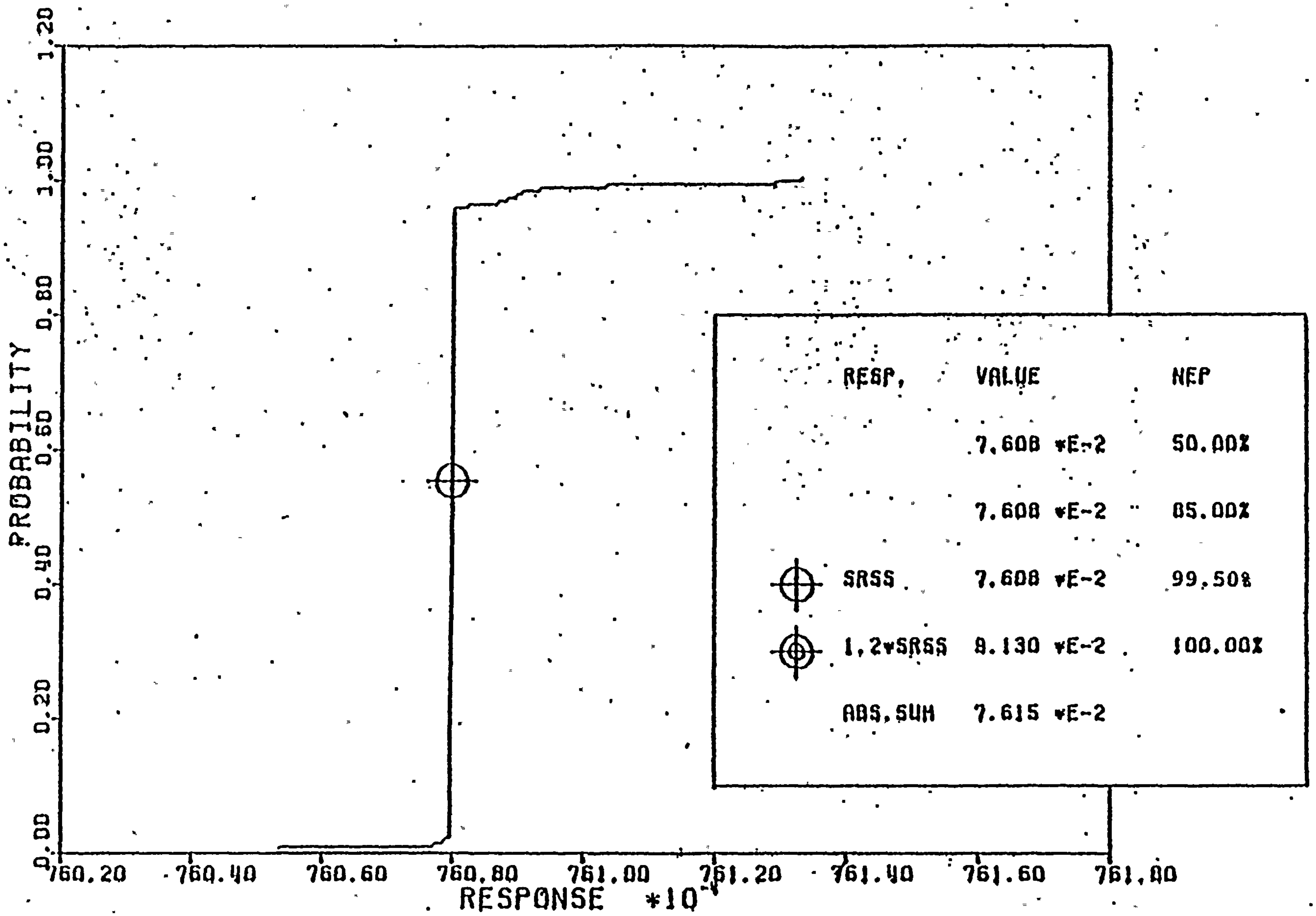
Figure 7-13



LOADING SRV(AVA) + OBE, HORIZONTAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - OBE)

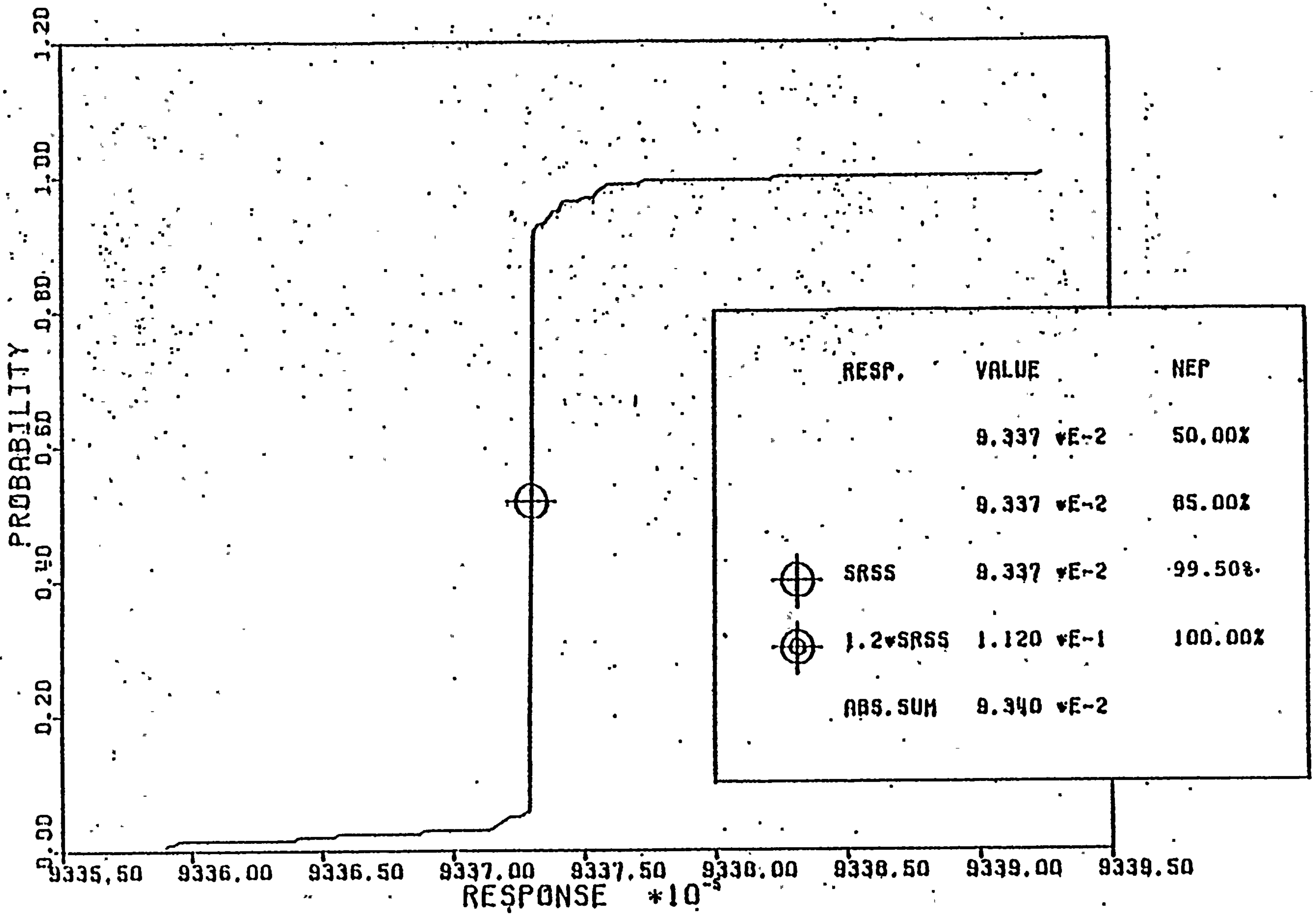
Figure 7-14



LOADING SRV (AVA) + OBE. HORIZONTAL DISPLACEMENT (FT)

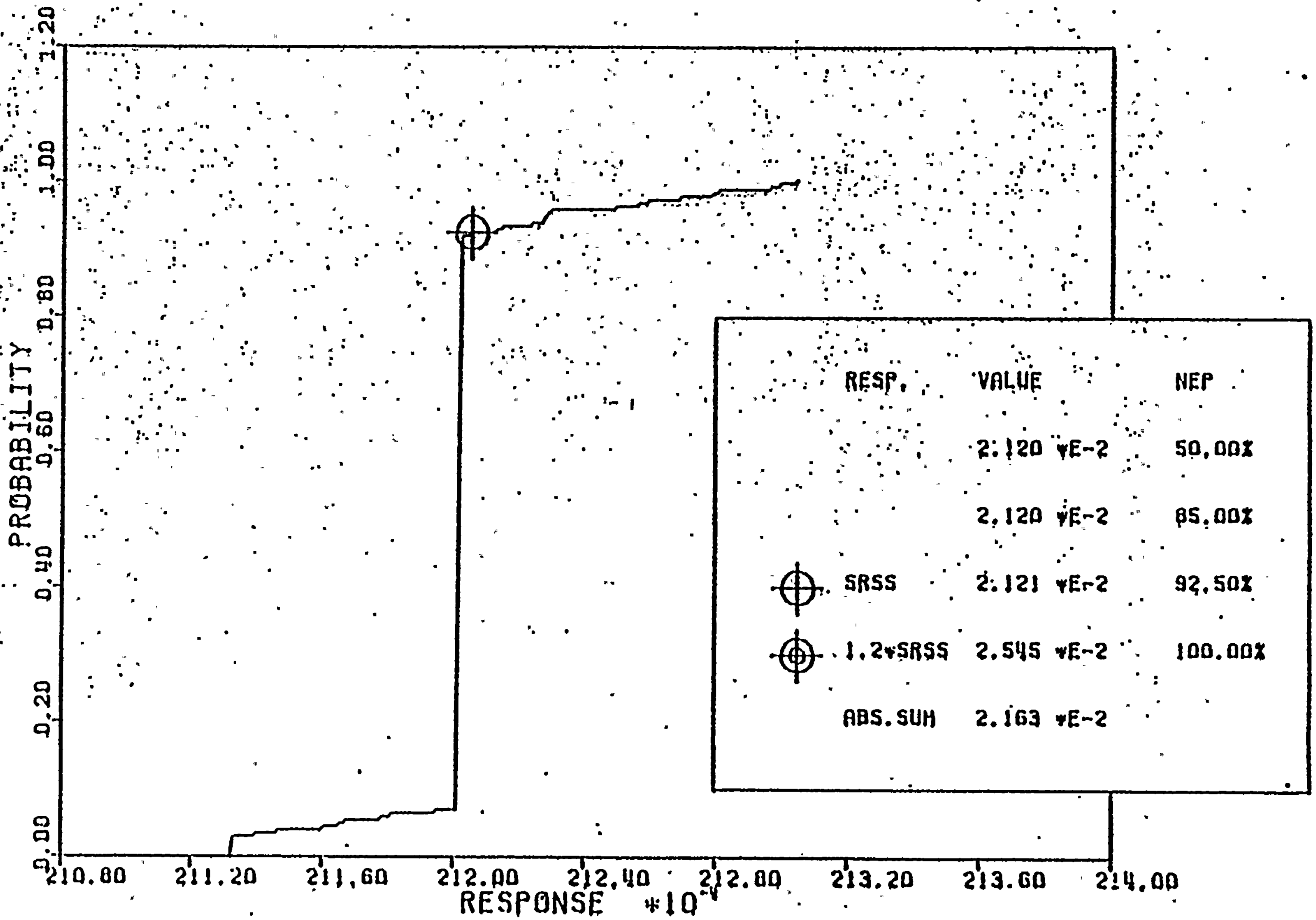
CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - OBE)

Figure 7-15



LOADING SRV(AVA) + OBE, HORIZONTAL DISPLACEMENT (FT)
CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - OBE)

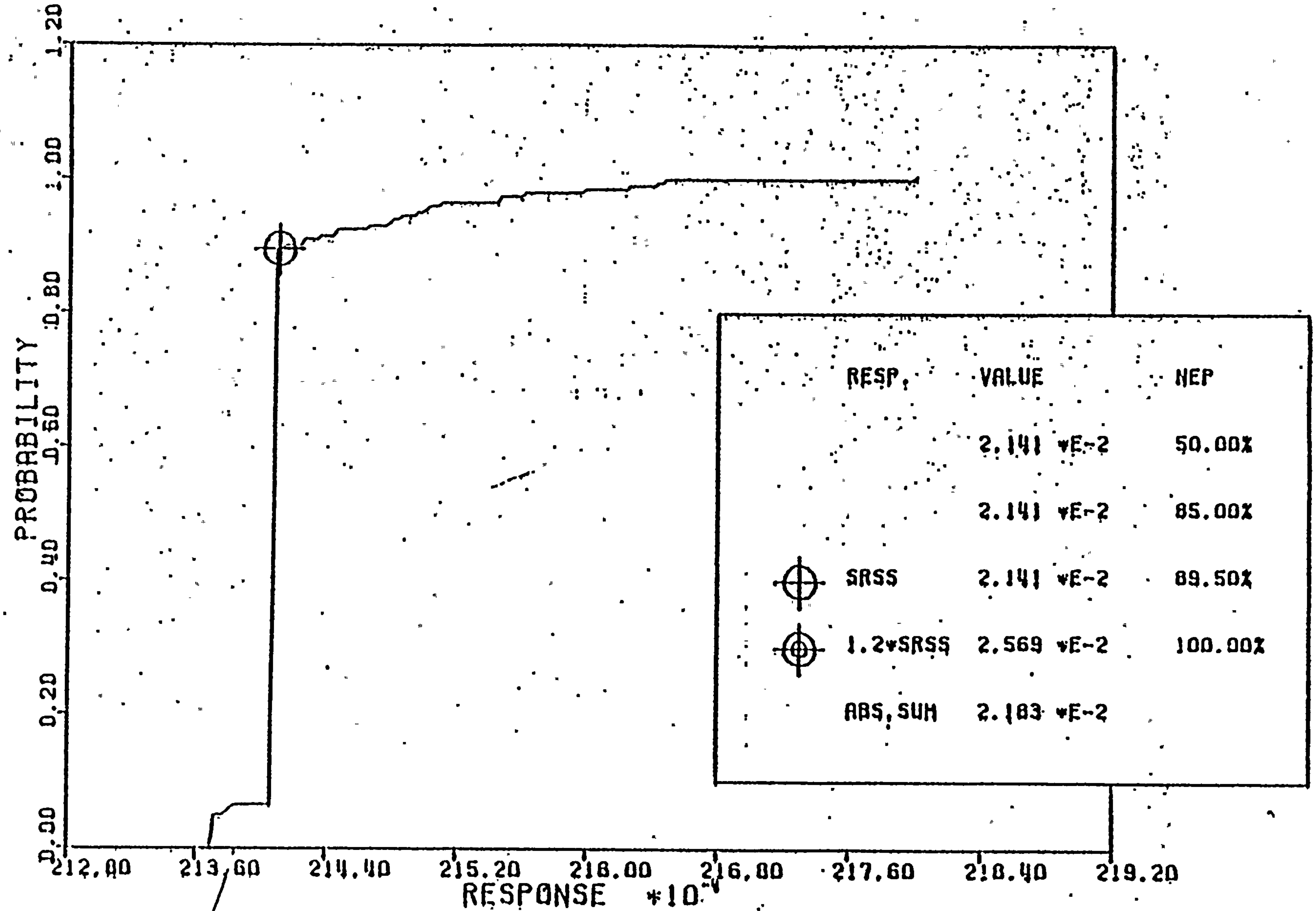
Figure 7-16



LOADING SRV(SVA) + SSE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - SSE)

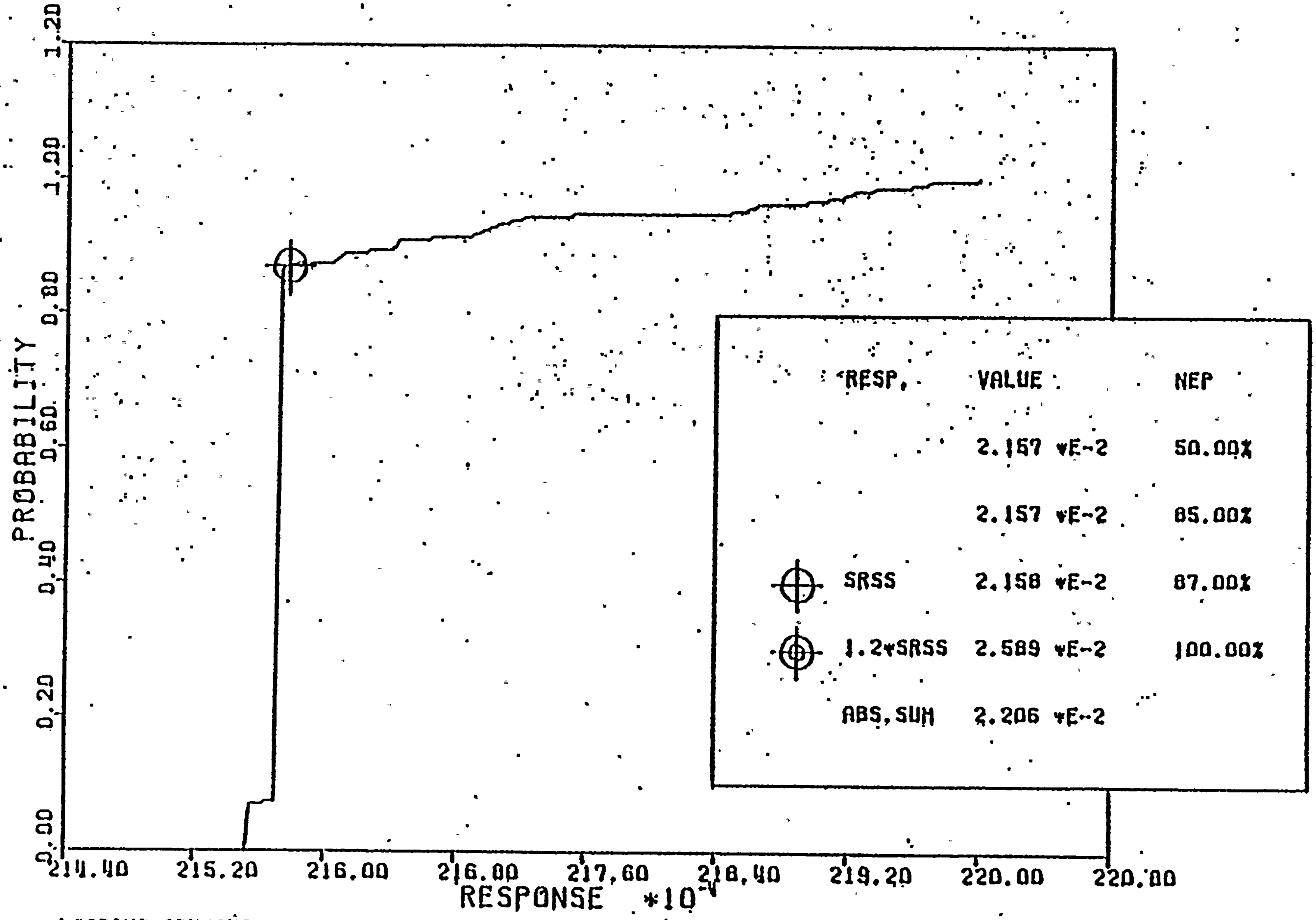
Figure 7-17



LOADING SRV(SVA) + SSE, VERTICAL DISPLACEMENT (FT)

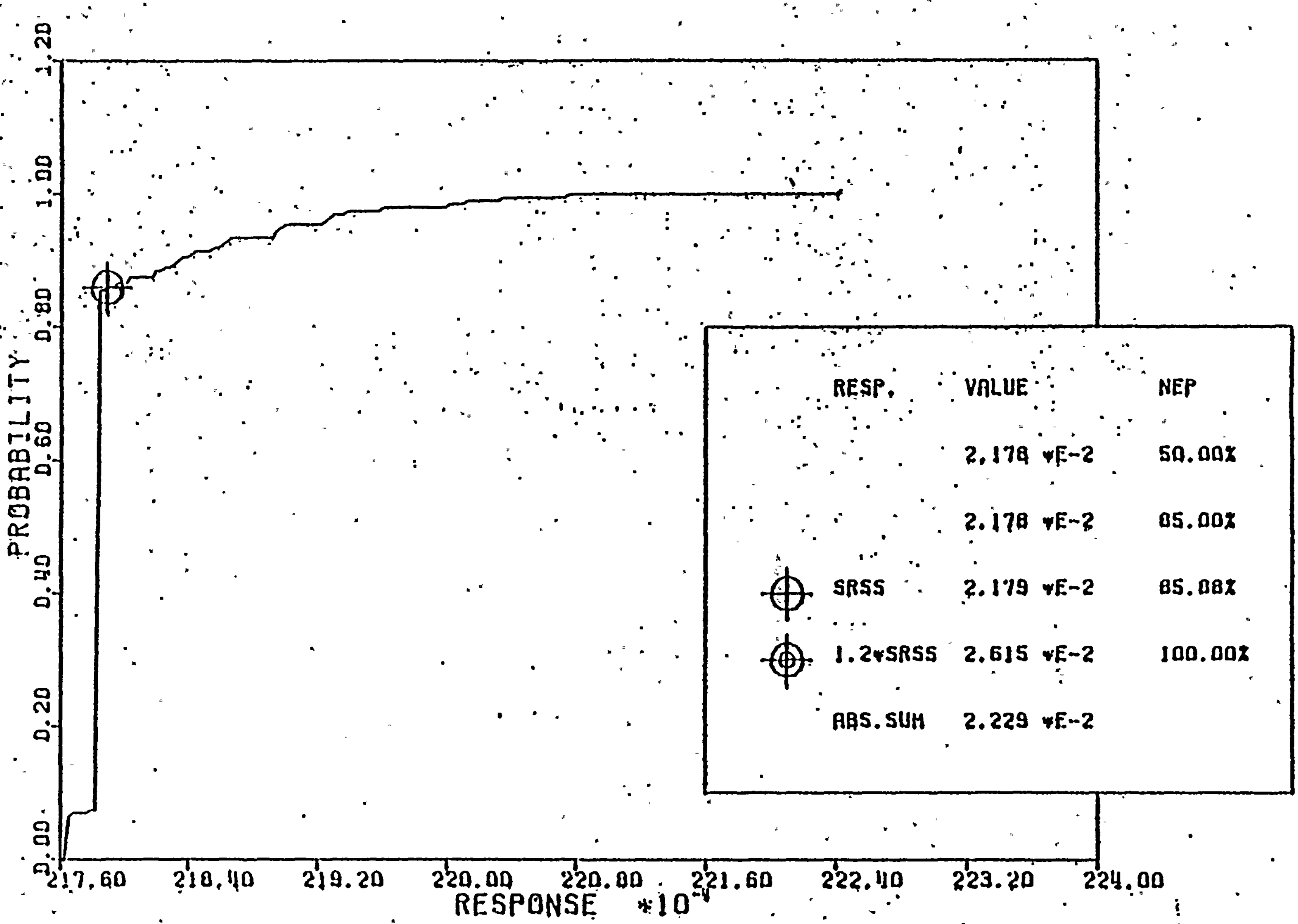
CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - SSE)

Figure 7-18



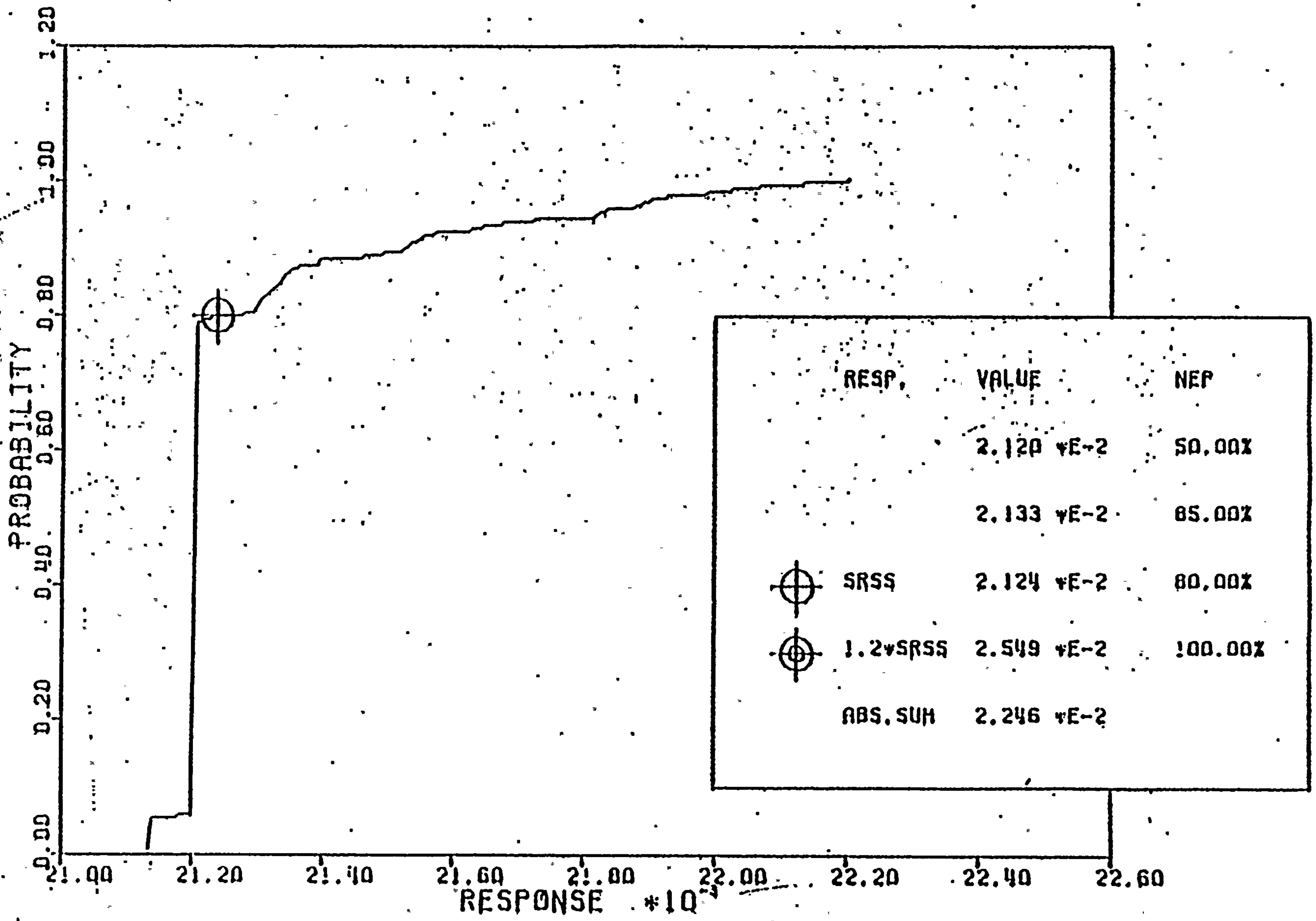
LOADING SRV(SVA) + SSE, VERTICAL DISPLACEMENT (FT)
CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - SSE)

Figure 7-19



LOADING SRV(SVA) + SSE, VERTICAL DISPLACEMENT (FT)
CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - SSE)

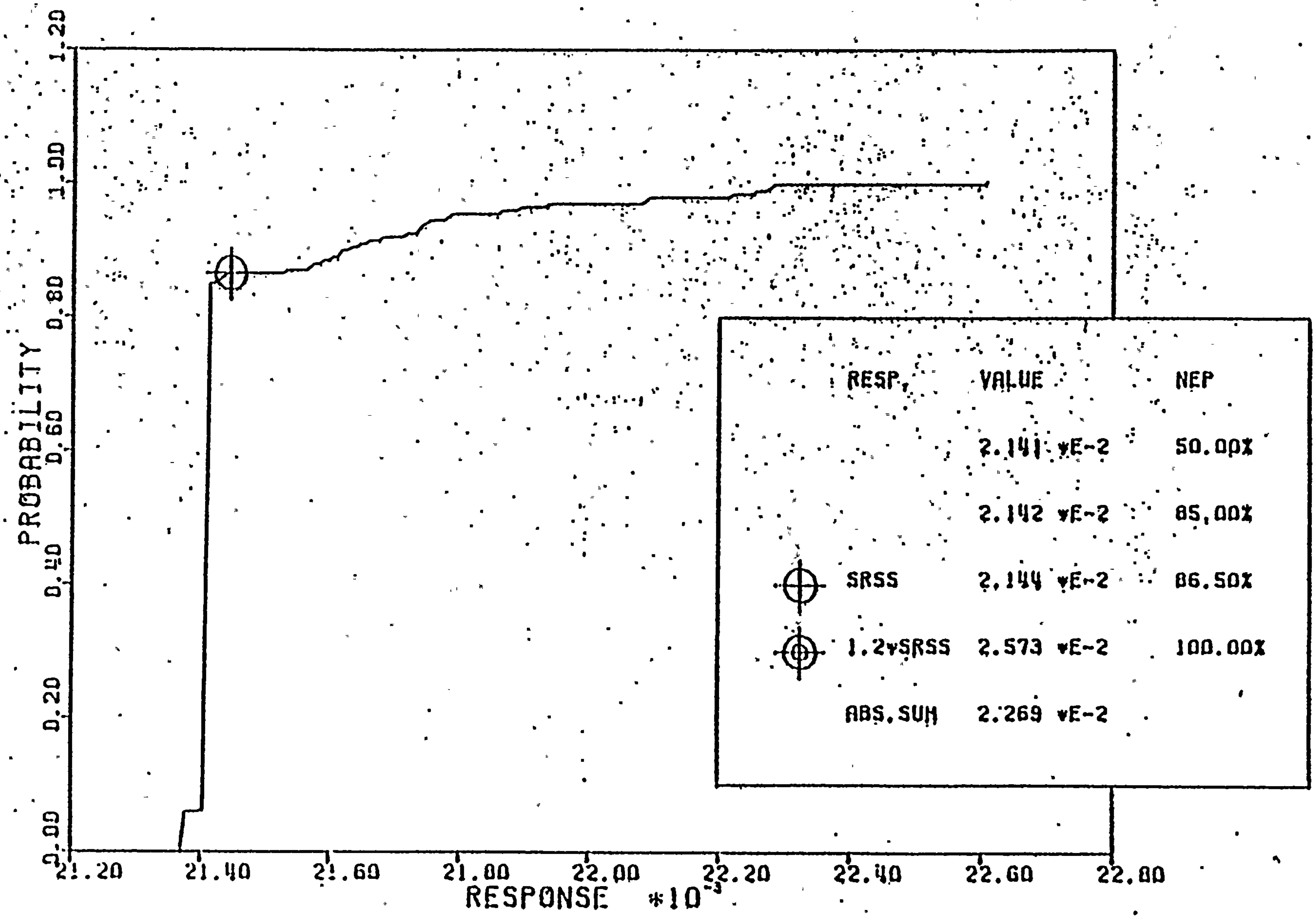
Figure 7-20



LOADING SRV(AVA) + SSE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - SSE)

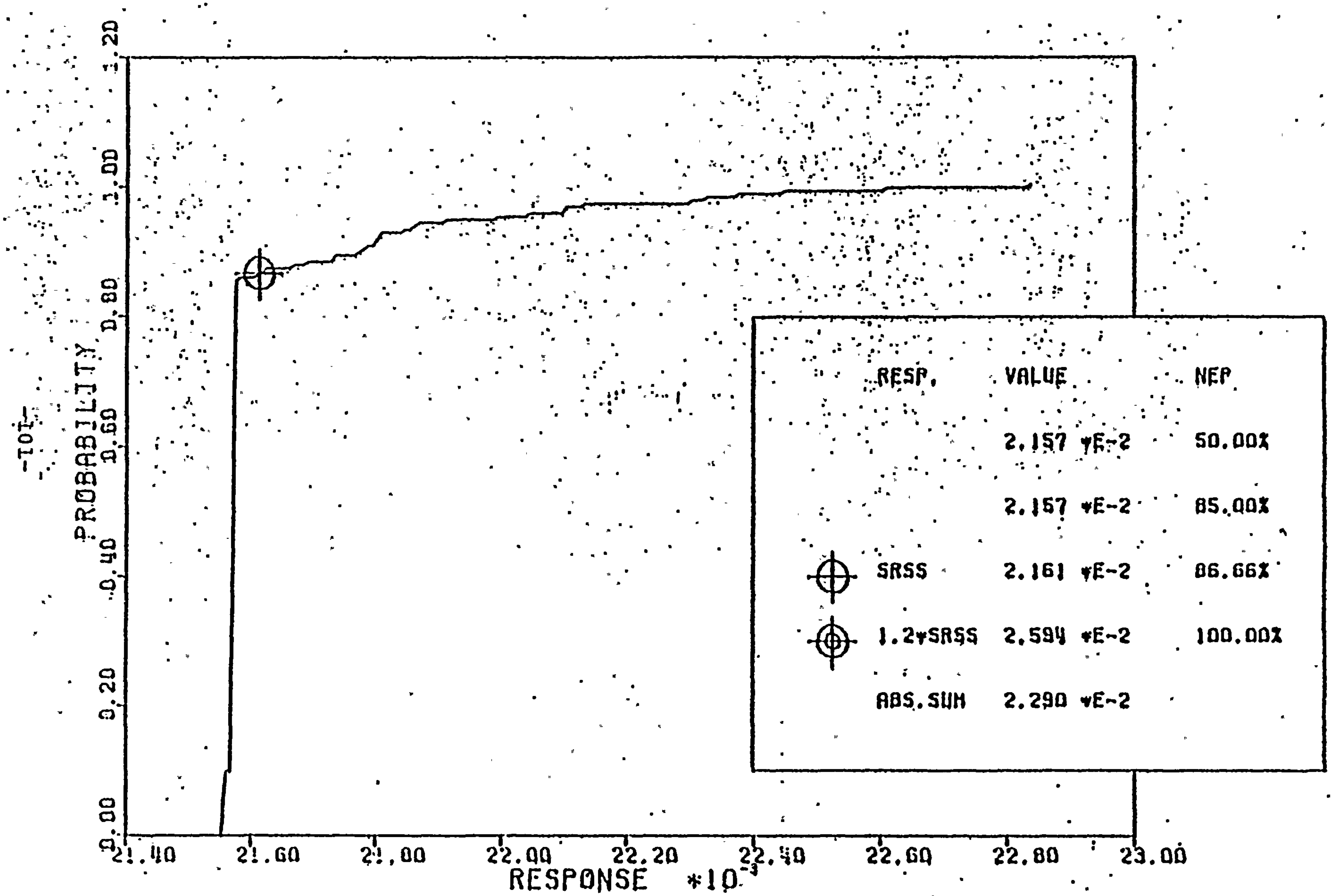
Figure 7-21



LOADING SRV(AVA) + SSE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - SSE)

Figure 7-22



LOADING SRV(AVA) + SSE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - SSE)

Figure 7-23

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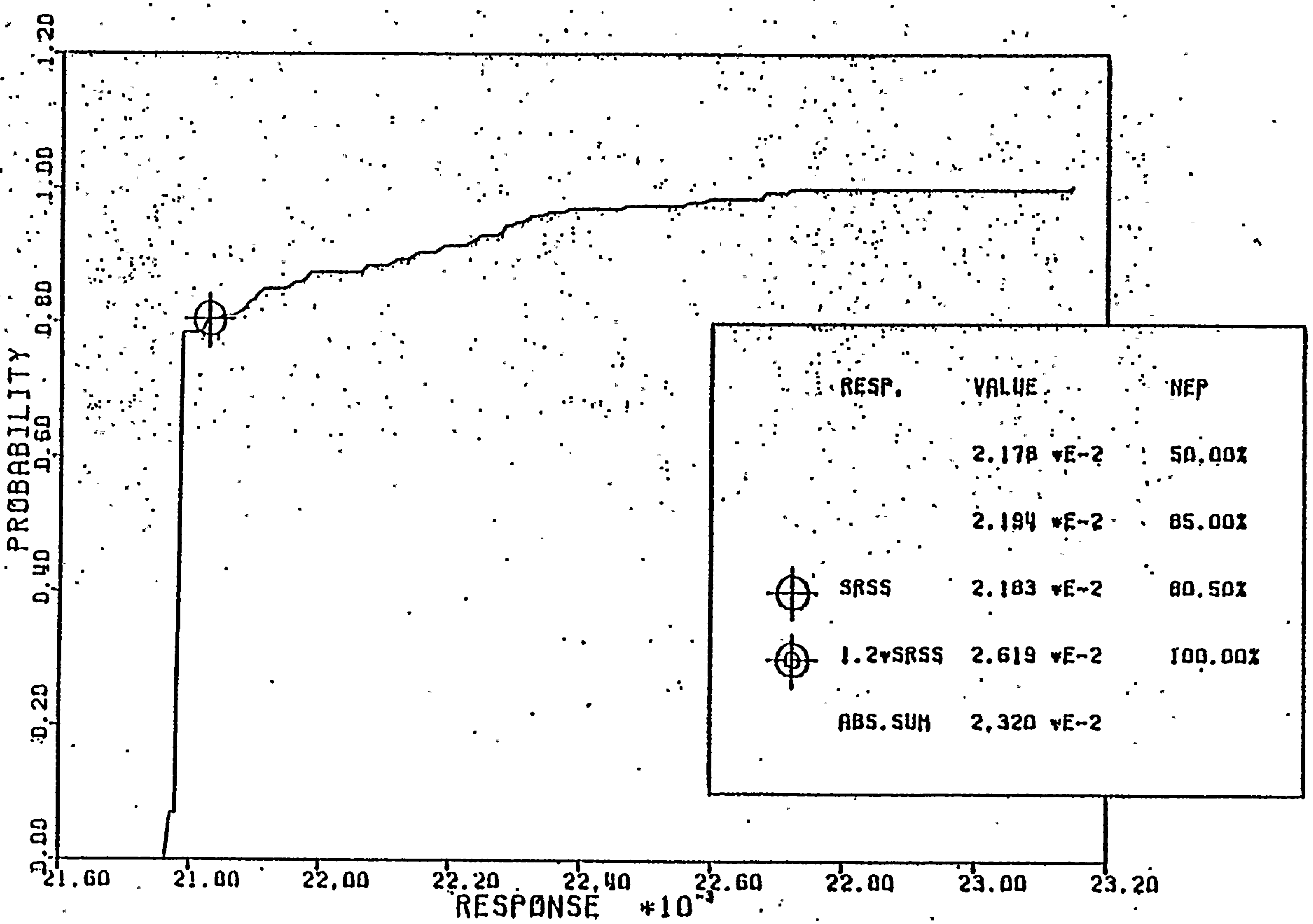
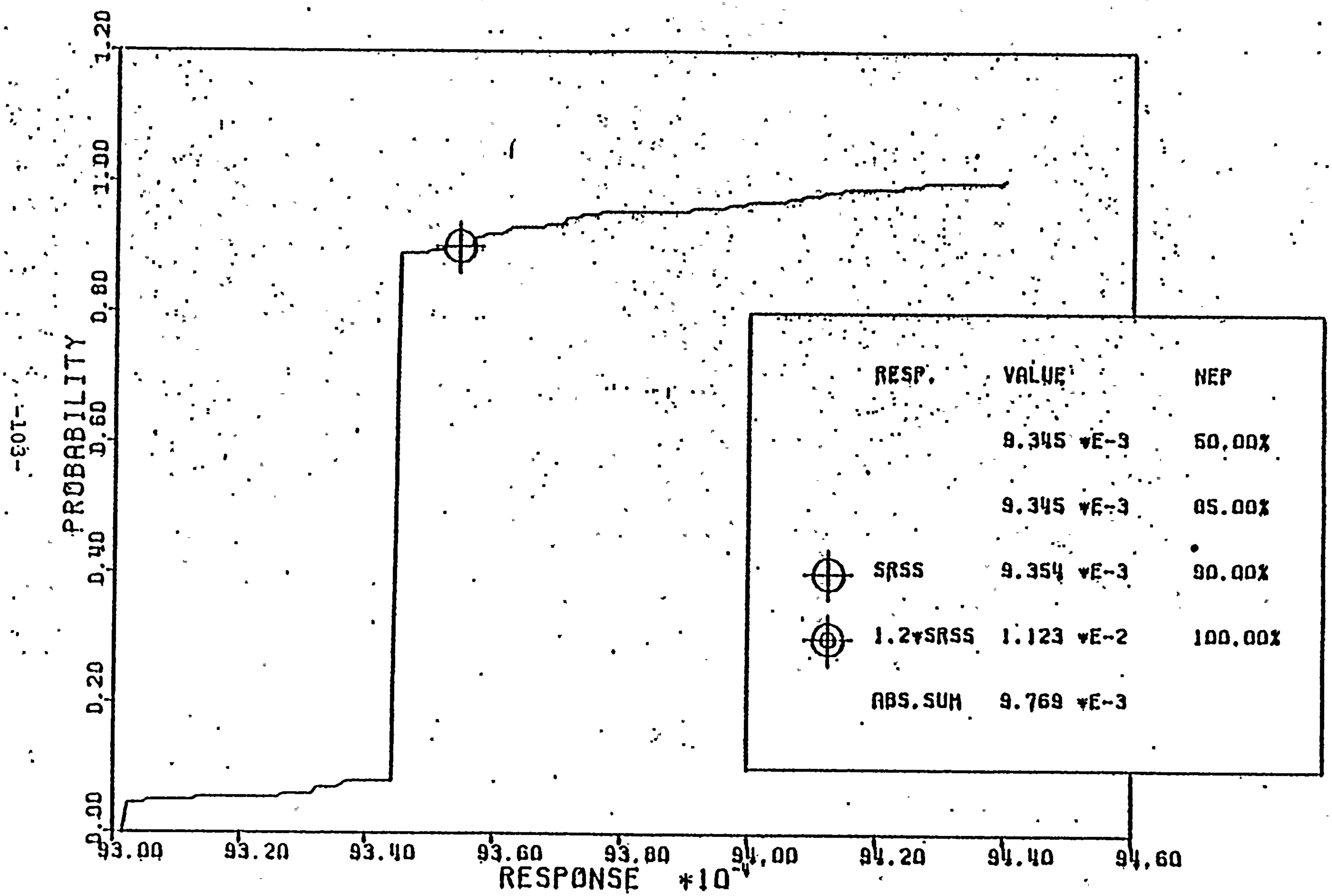


LOADING SRV(AVA) + SSE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - SSE)

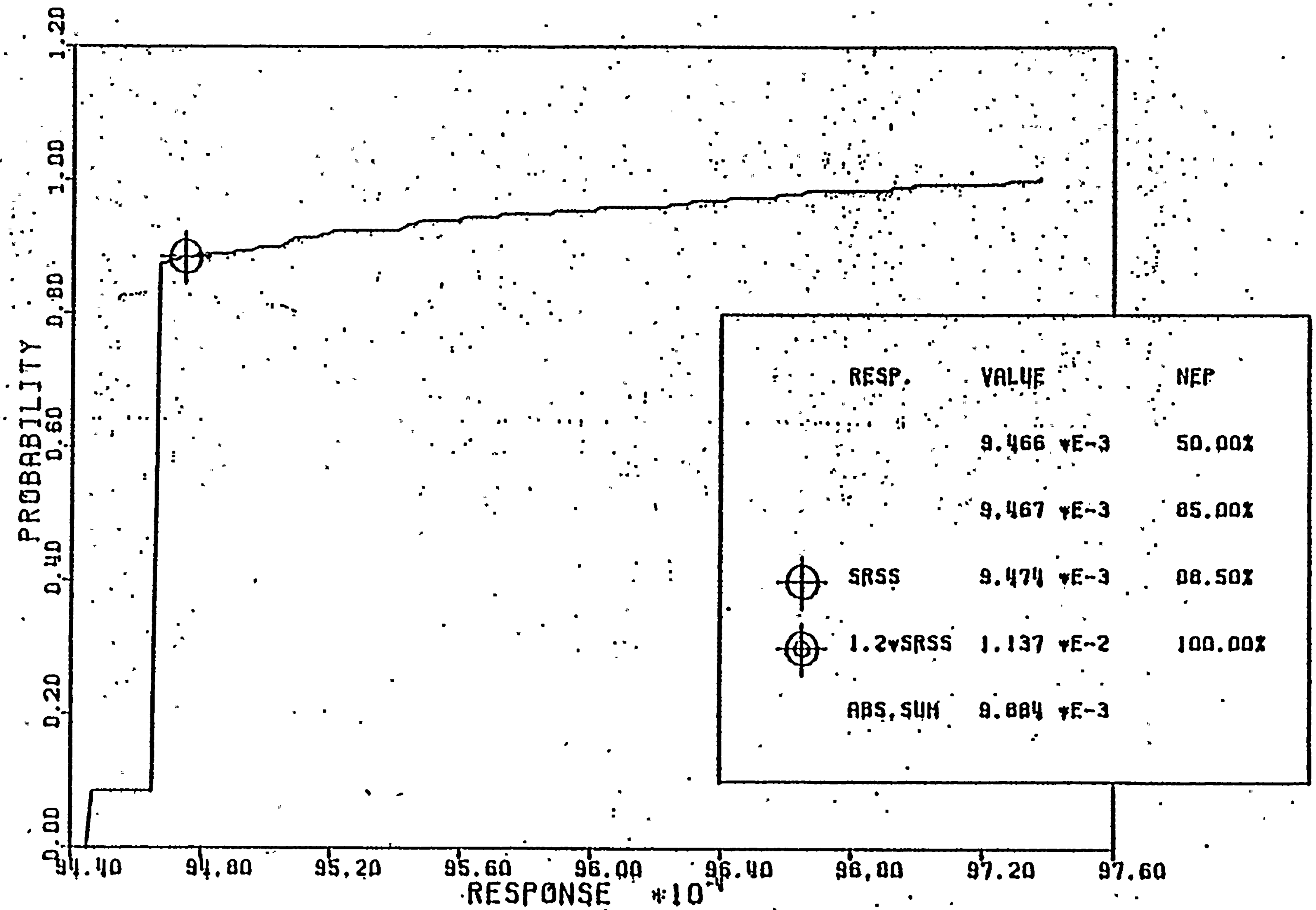
Figure 7-24



LOADING SRV(SVA) + OBE, VERTICAL DISPLACEMENT (FT)

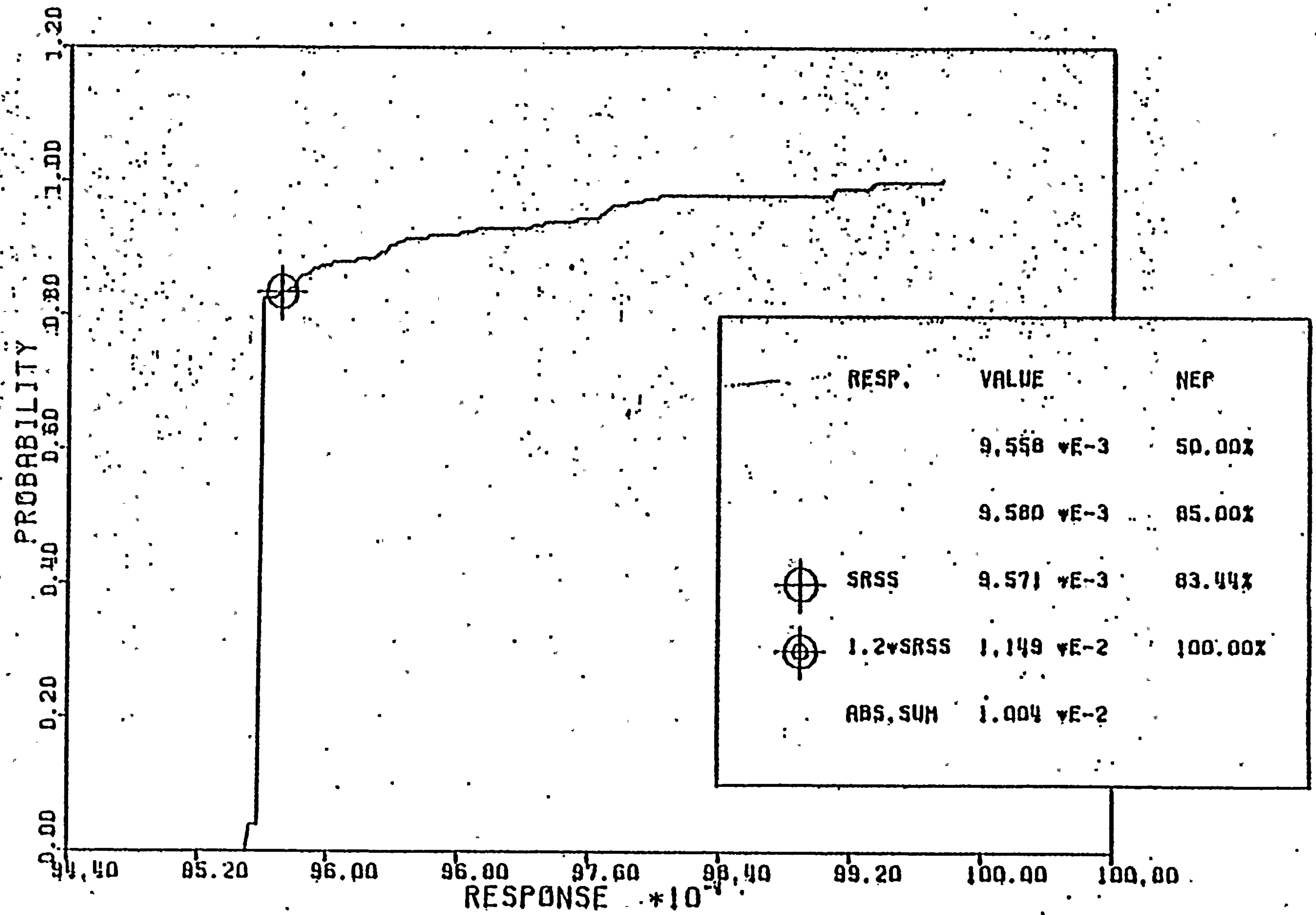
CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 152 - OBE)

Figure 7-25



LOADING SRV(SVA) + OBE, VERTICAL DISPLACEMENT (FT)
CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - OBE)

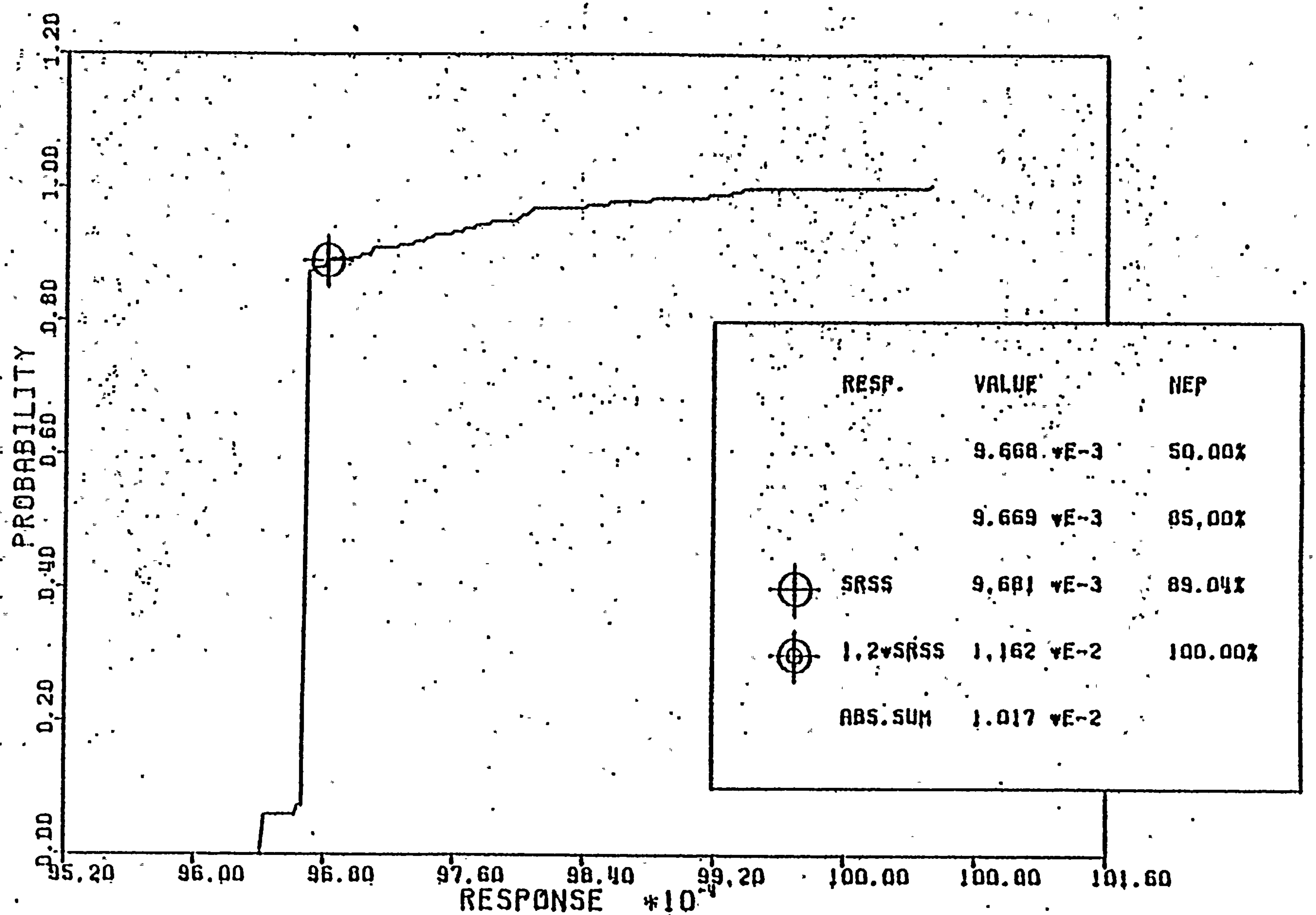
Figure 7-26



LOADING SRV(SVA) + OBE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - OBE)

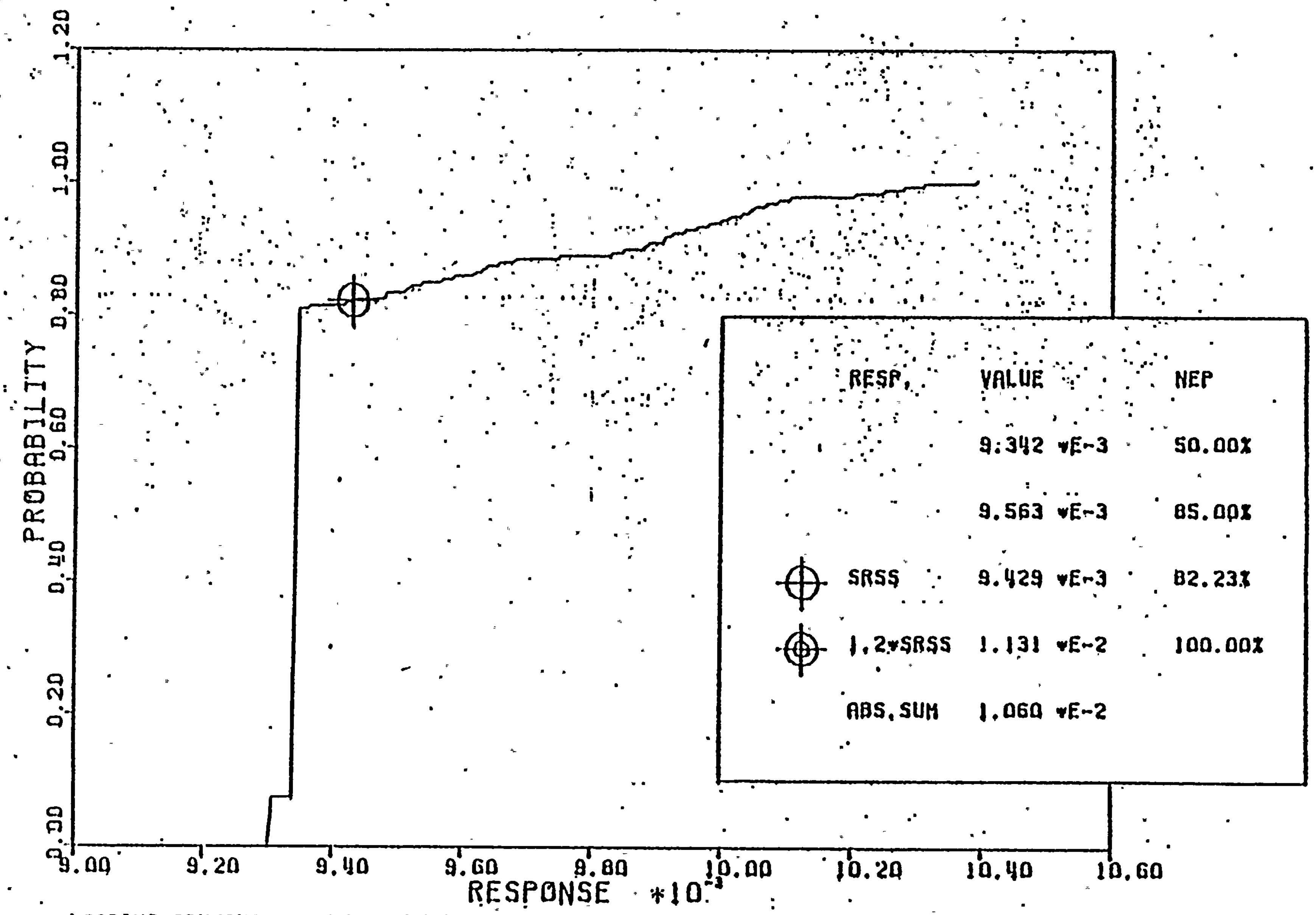
Figure 7-27



LOADING SRV(SVA) + OBE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - OBE)

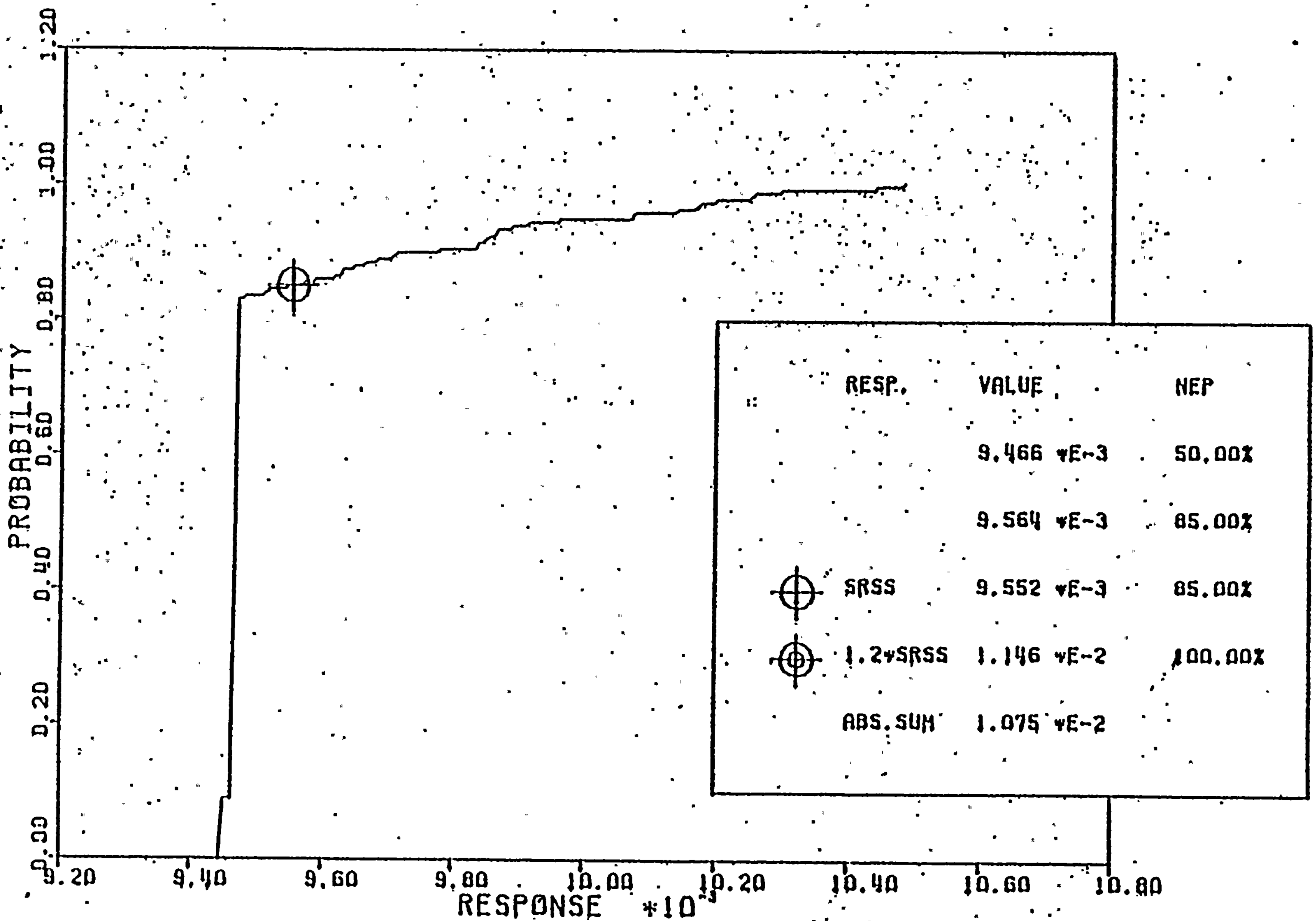
Figure 7-28



LOADING SRV(AVA) + OBE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - OBE)

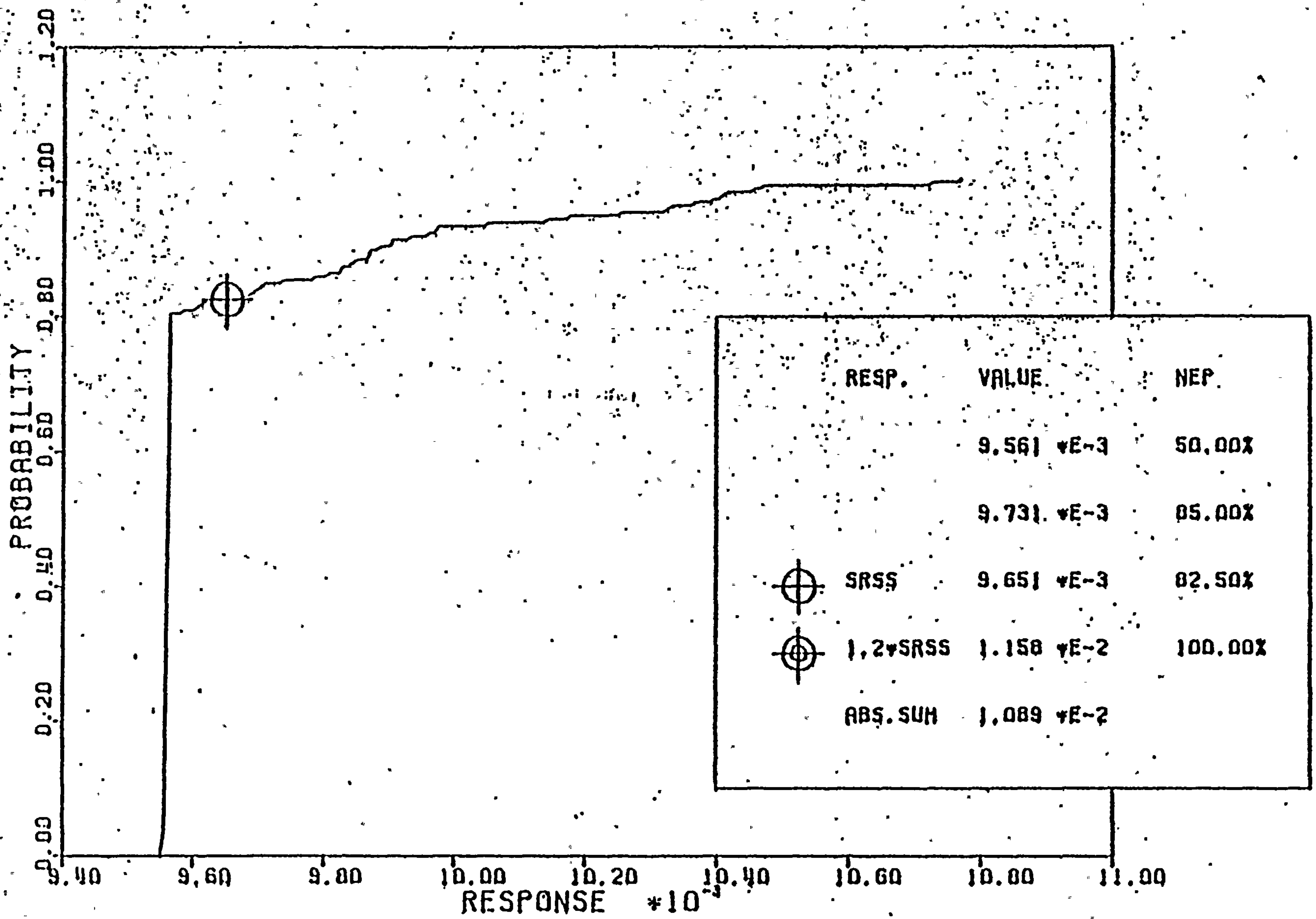
Figure 7-29



LOADING SRV(AVA) + OBE, VERTICAL DISPLACEMENT (FT)

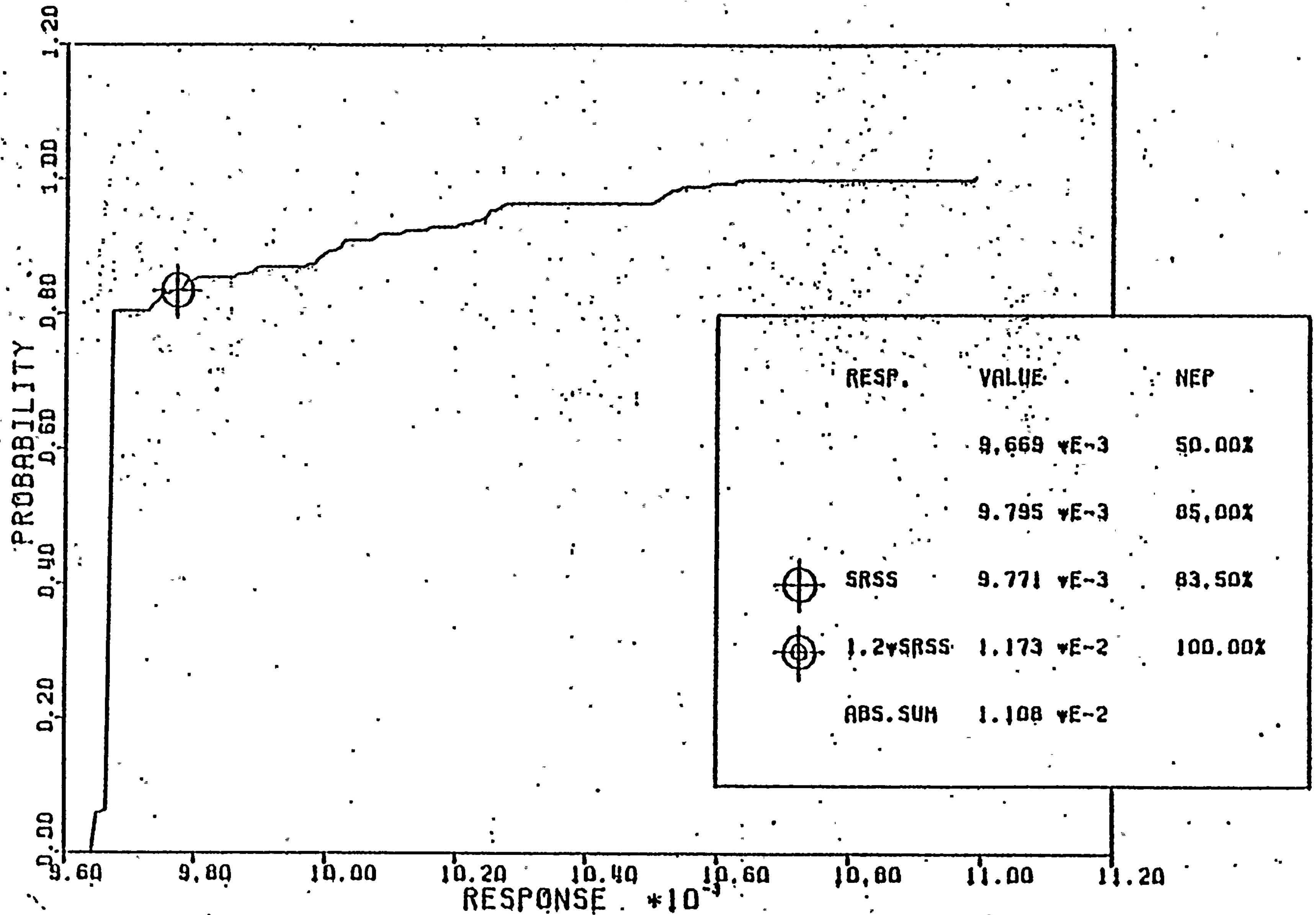
CONTAINMENT VESSEL DRYWELL, (NODE 20 - SRV). (NODE 148 - OBE)

Figure 7-30



LOADING SRV(AVA) + OBE, VERTICAL DISPLACEMENT (FT)
CONTAINMENT VESSEL DRYWELL. (NODE 30 - SRV). (NODE 144 - OBE)

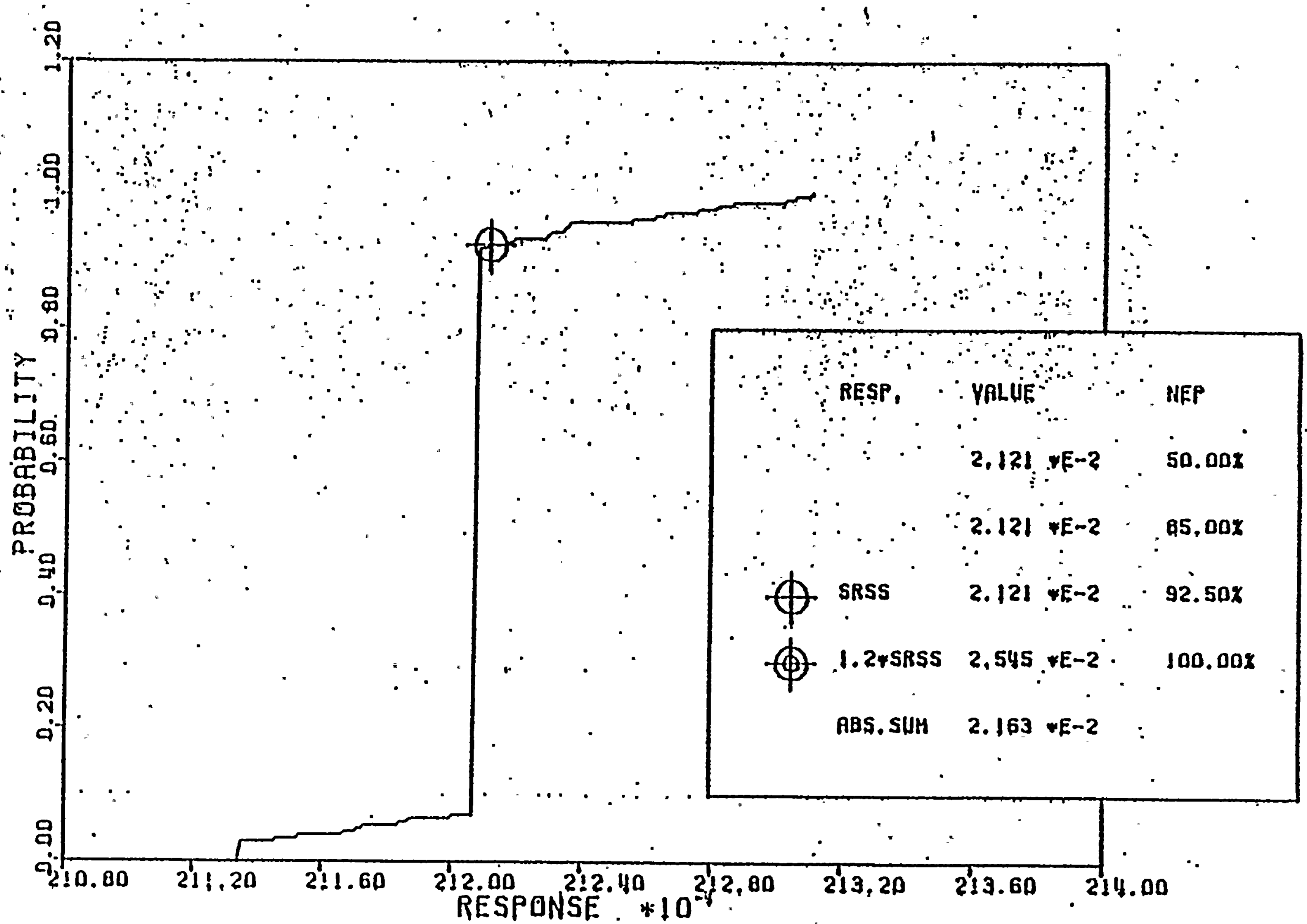
Figure 7-31



LOADING SRV(AVA) + OBE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL. (NODE 33 - SRV), (NODE 140 - OBE)

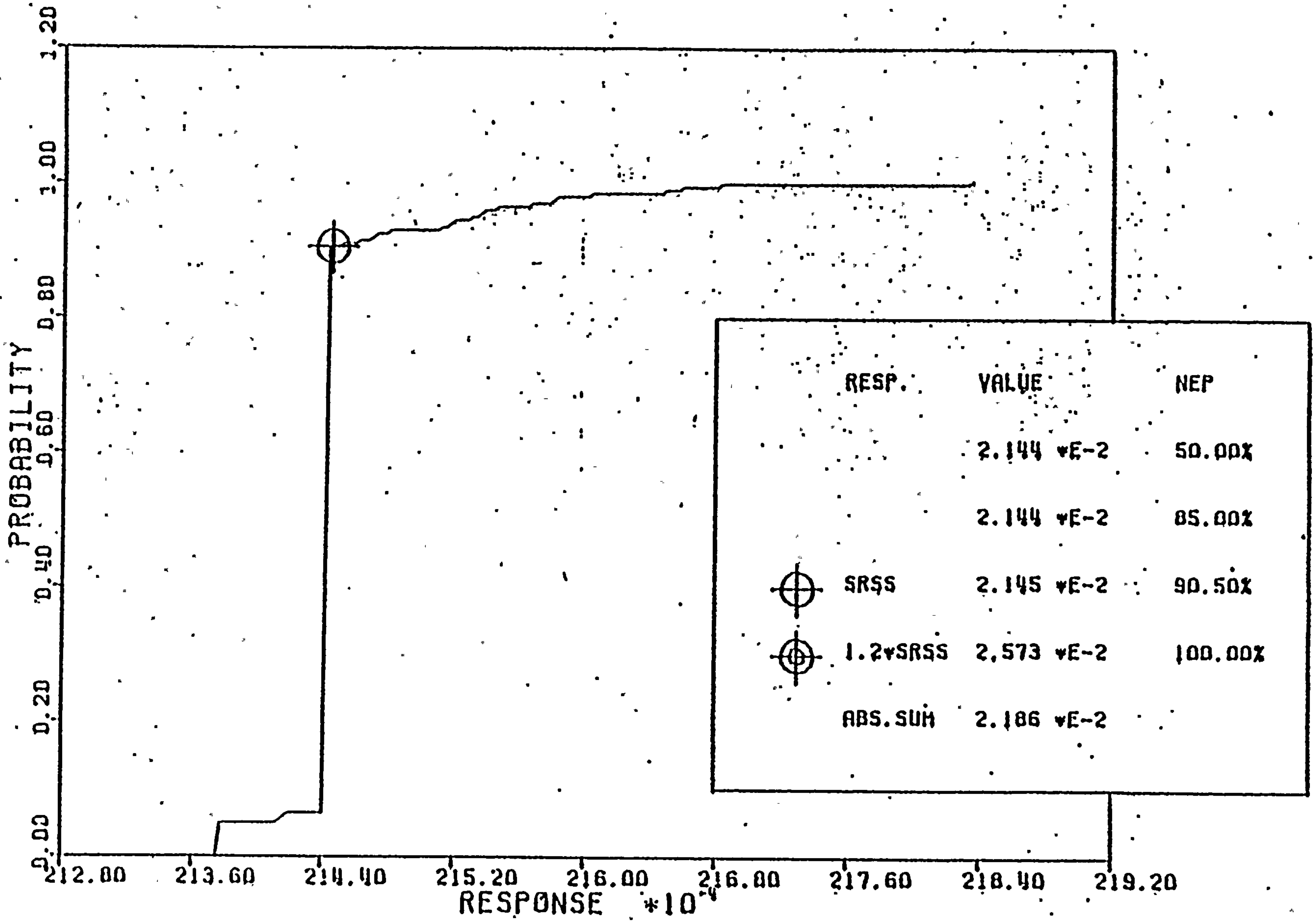
Figure 7-32.



LOADING SRV(SVA) + SSE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL. (NODE 26 - SRV), (NODE 152 - SSE) (180)

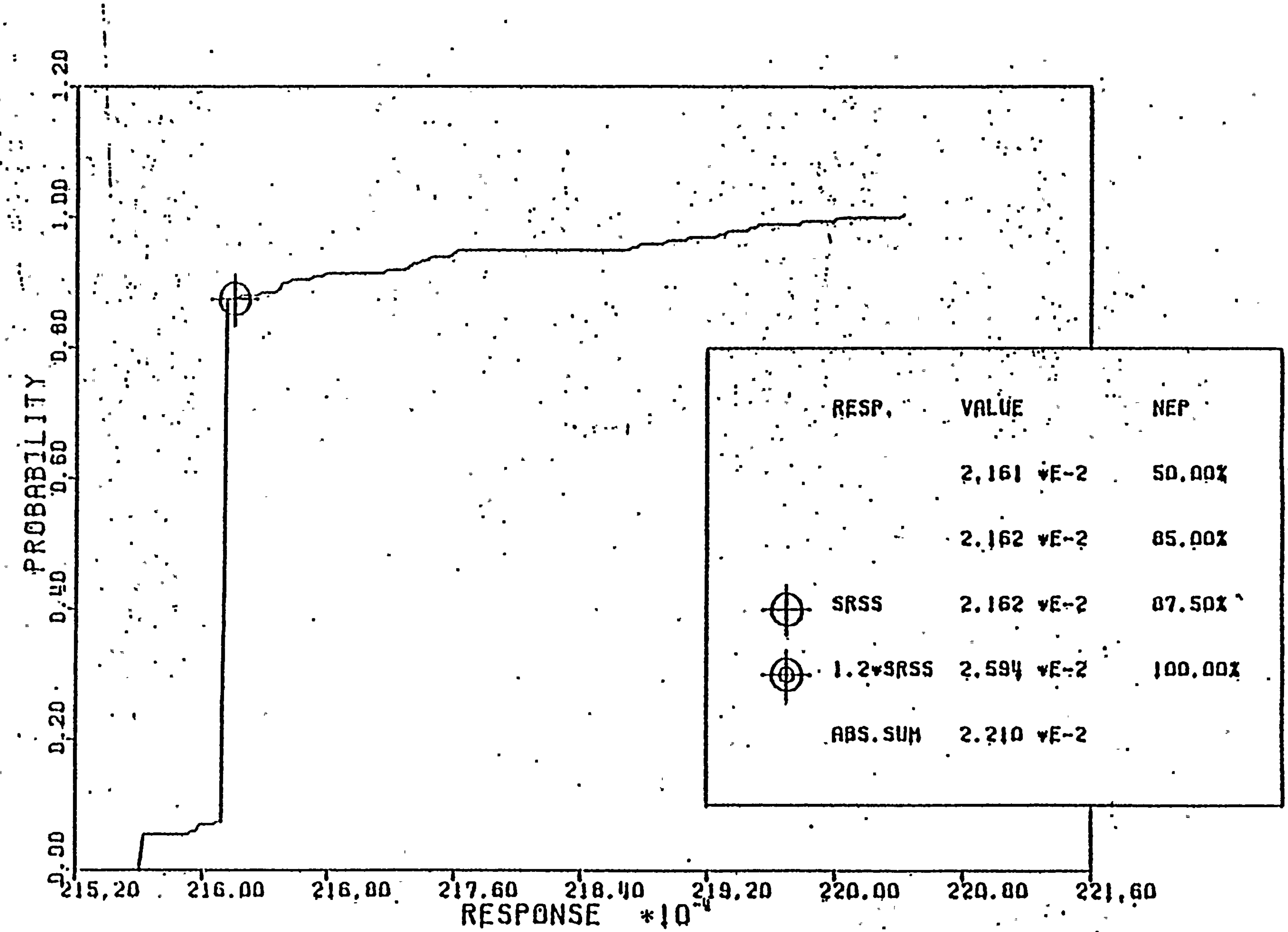
Figure 7-33



LOADING SRV(SVA) + SSE, VERTICAL DISPLACEMENT (FT)

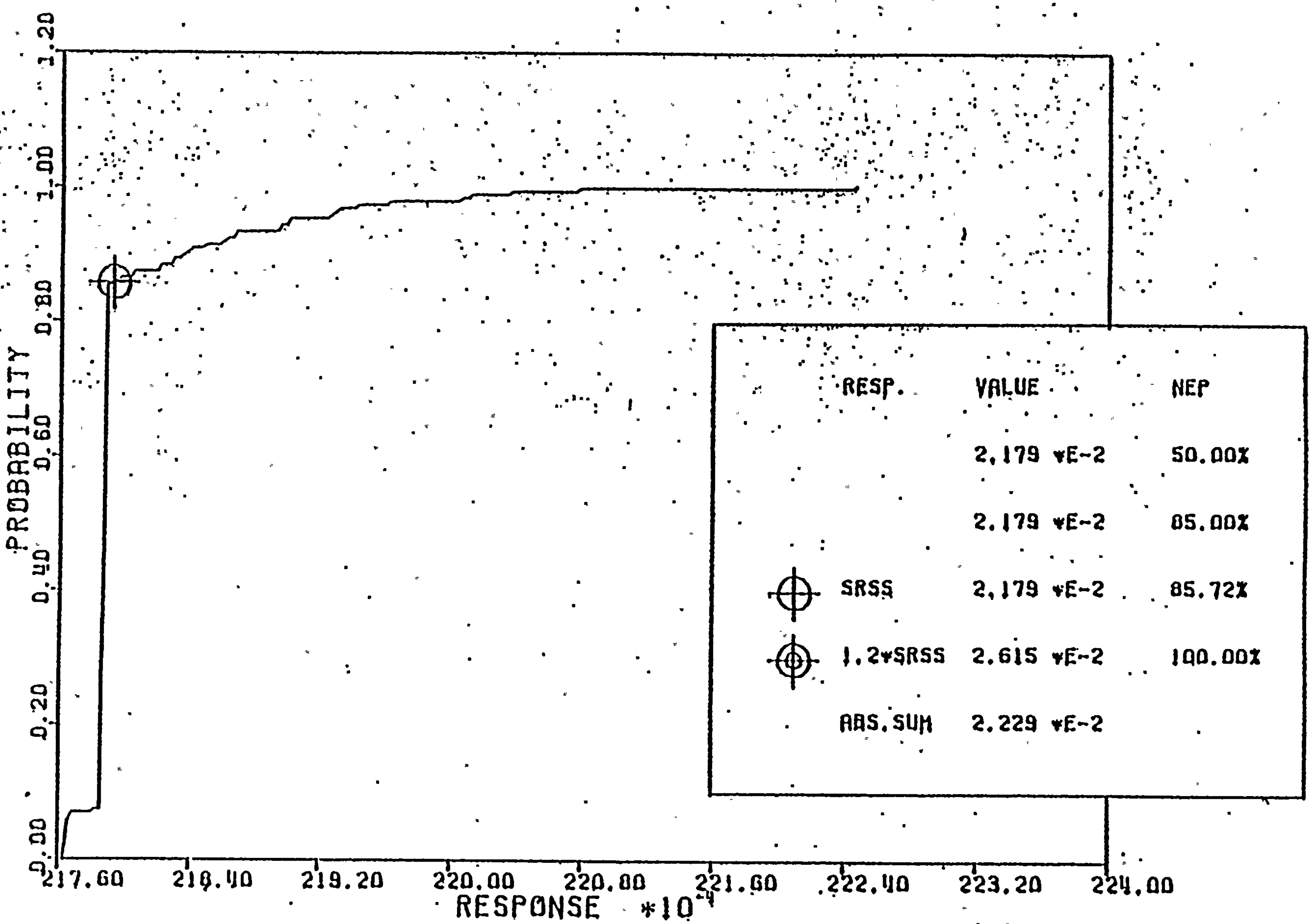
CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - SSE) (180)

Figure-7-34

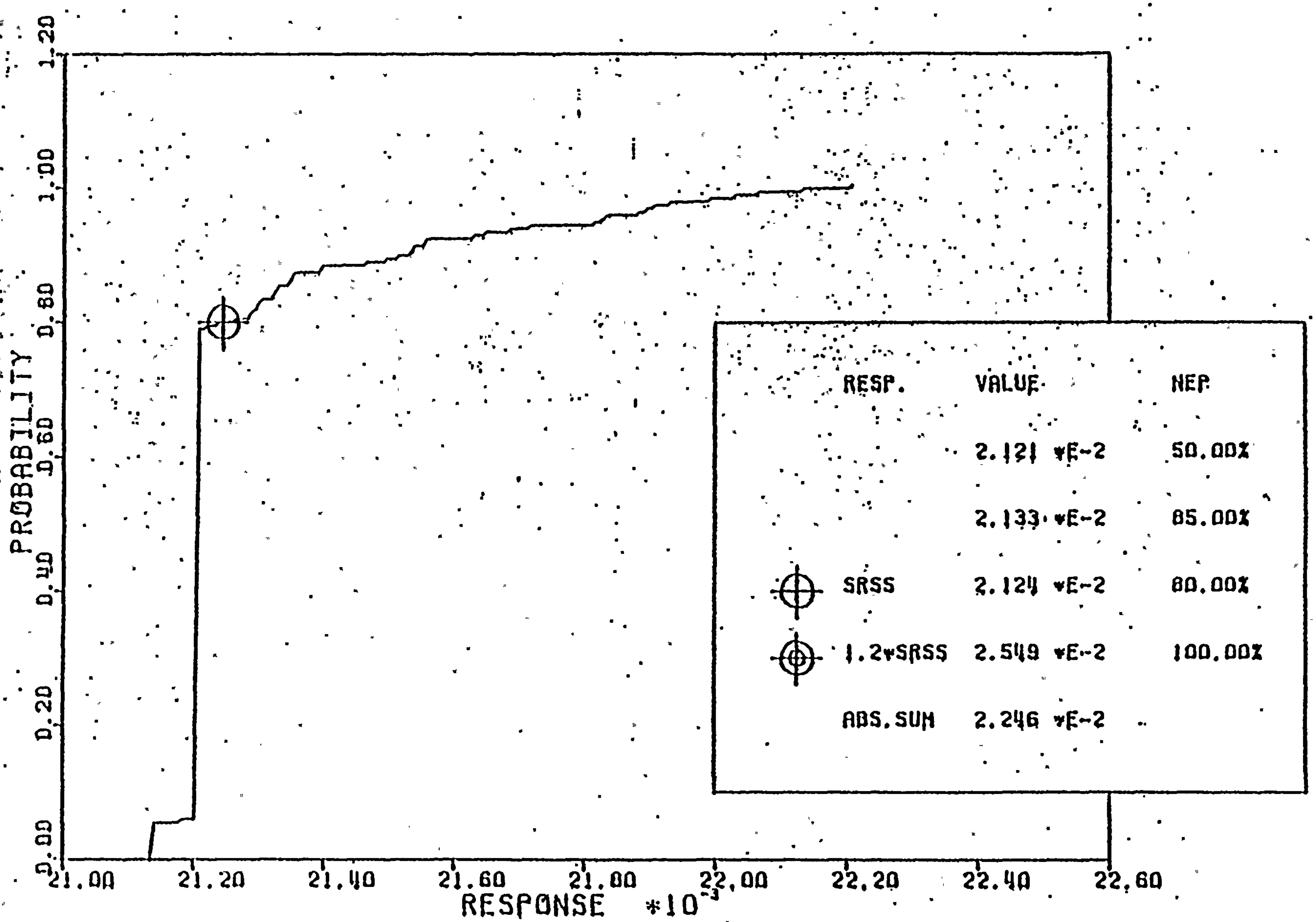


LOADING SRV(SVA) + SSE, VERTICAL DISPLACEMENT (FT)
CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - SSE) (180)

Figure 7-35

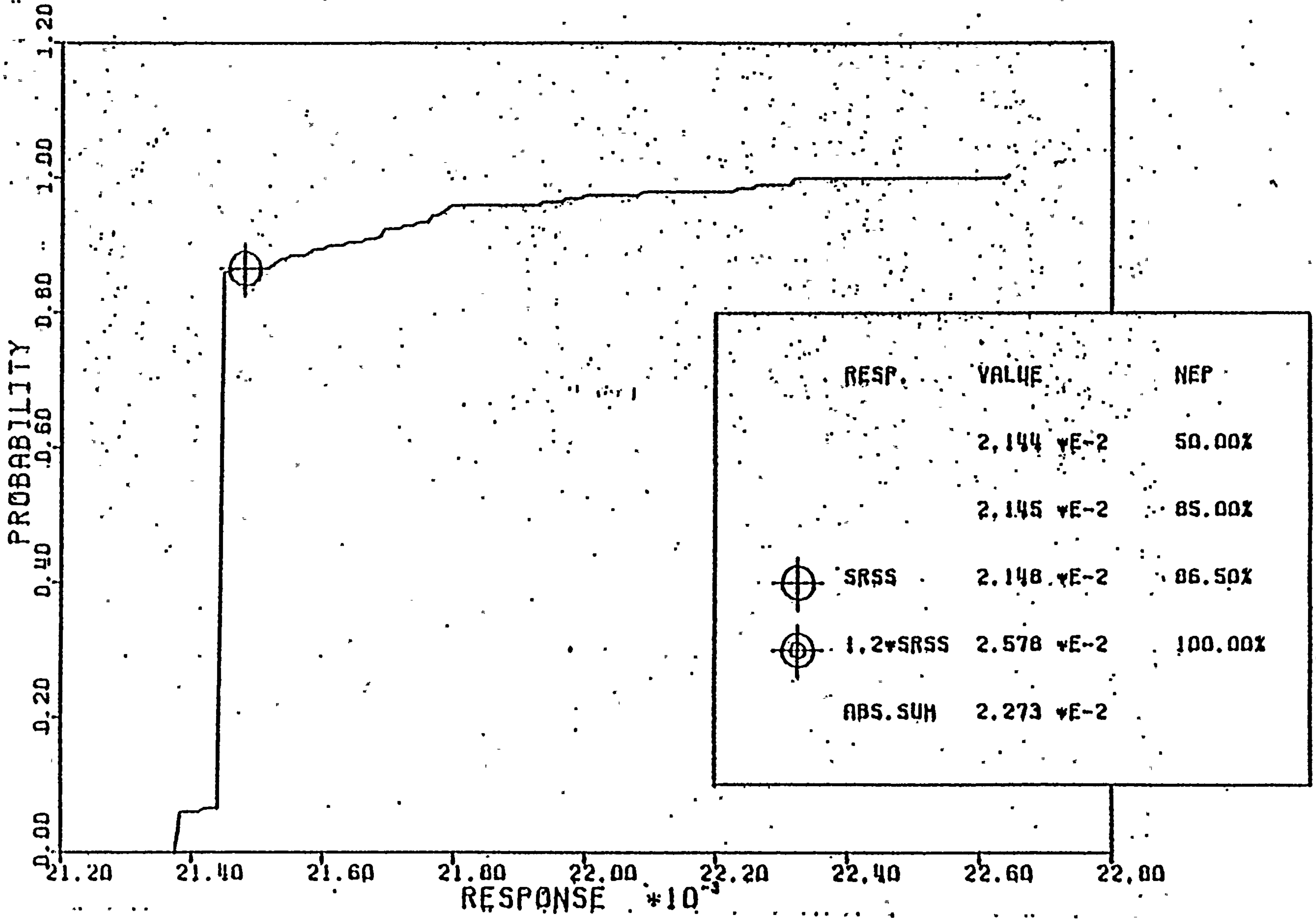


LOADING SRV(SVA) + SSE, VERTICAL DISPLACEMENT (FT)
CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - SSE) (180) Figure 7-36



LOADING SRV(AVA) + SSE, VERTICAL DISPLACEMENT (FT).
CONTAINMENT VESSEL DRYWELL. (NODE 26 - SRV); (NODE 152 - SSE) (180)

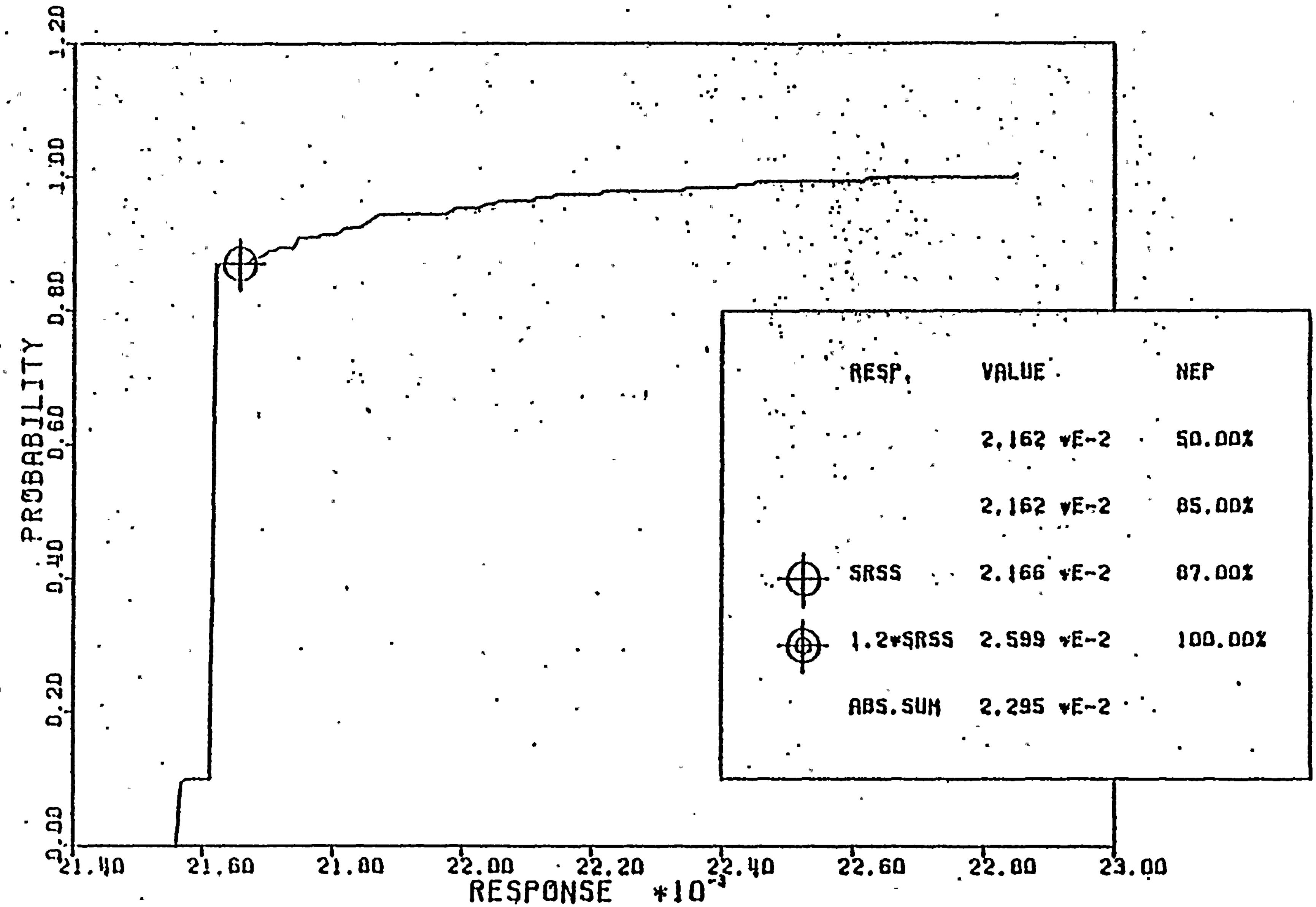
Figure 7-37



LOADING SRV(AVA) + SSE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - SSE) (180)

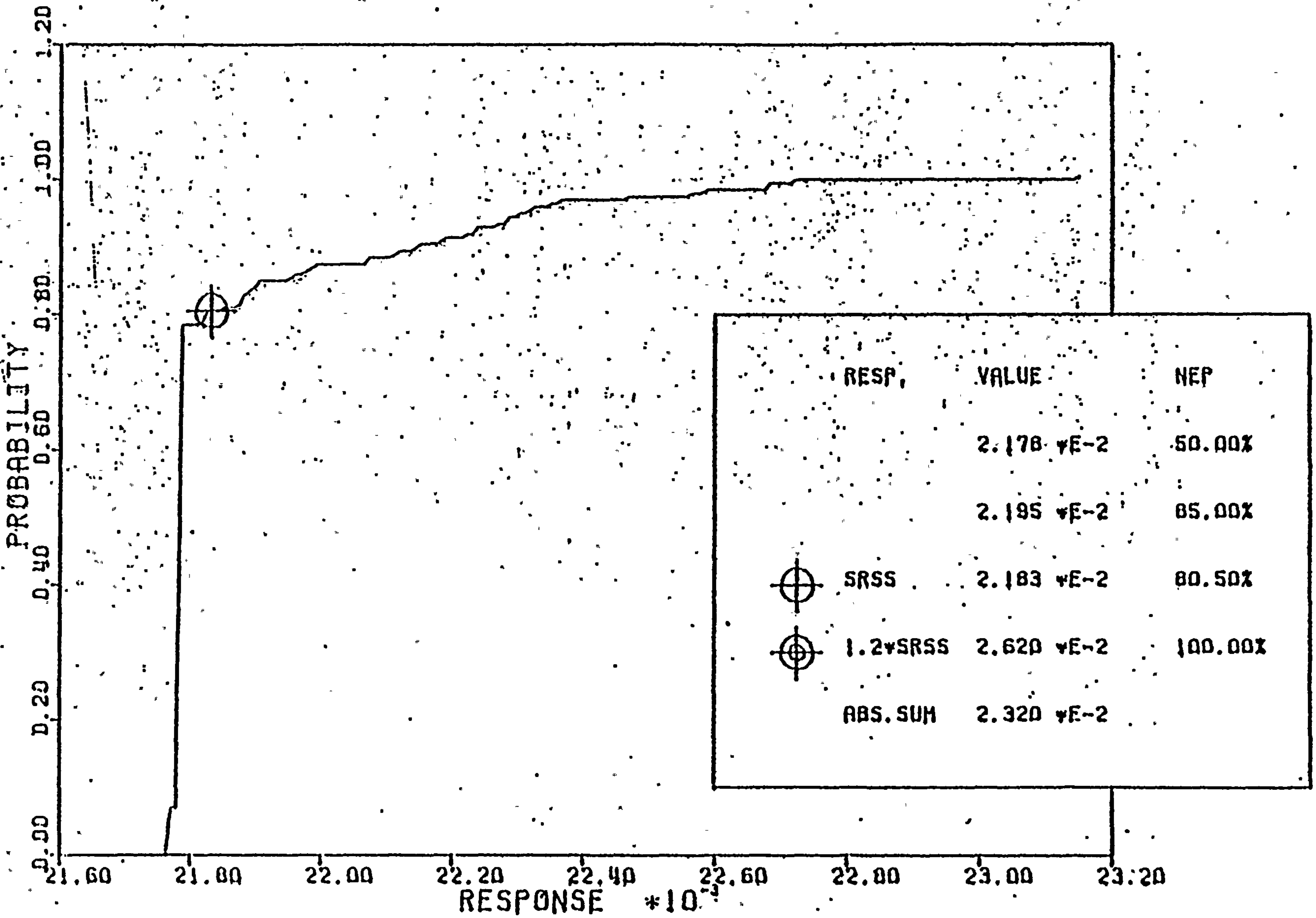
Figure 7-38



LOADING SRV (AVA) + SSE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL. (NODE 30 - SRV), (NODE 144 - SSE) (180)

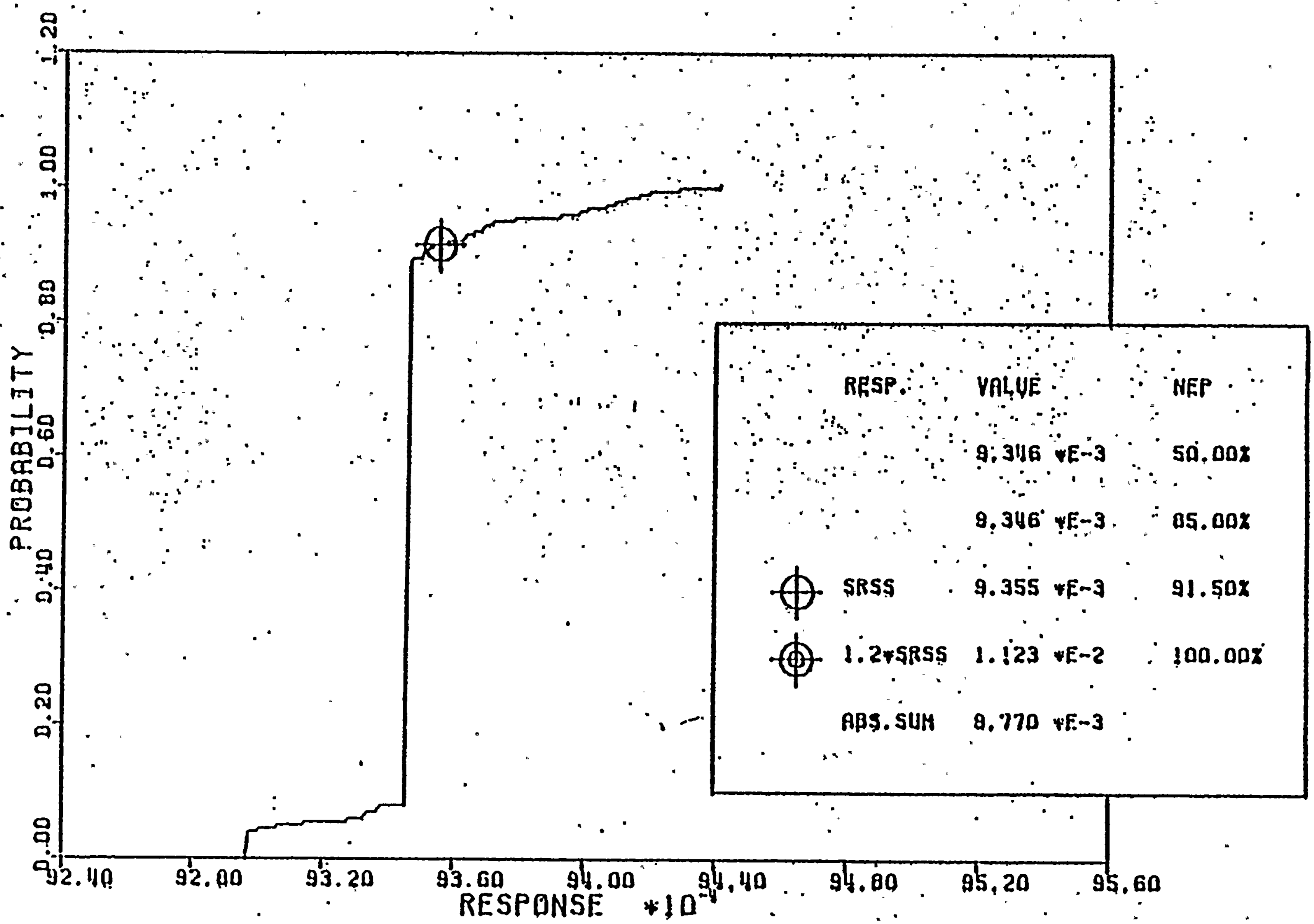
Figure 7-39



LOADING SRV (AVA) + SSE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - SSE) (180)

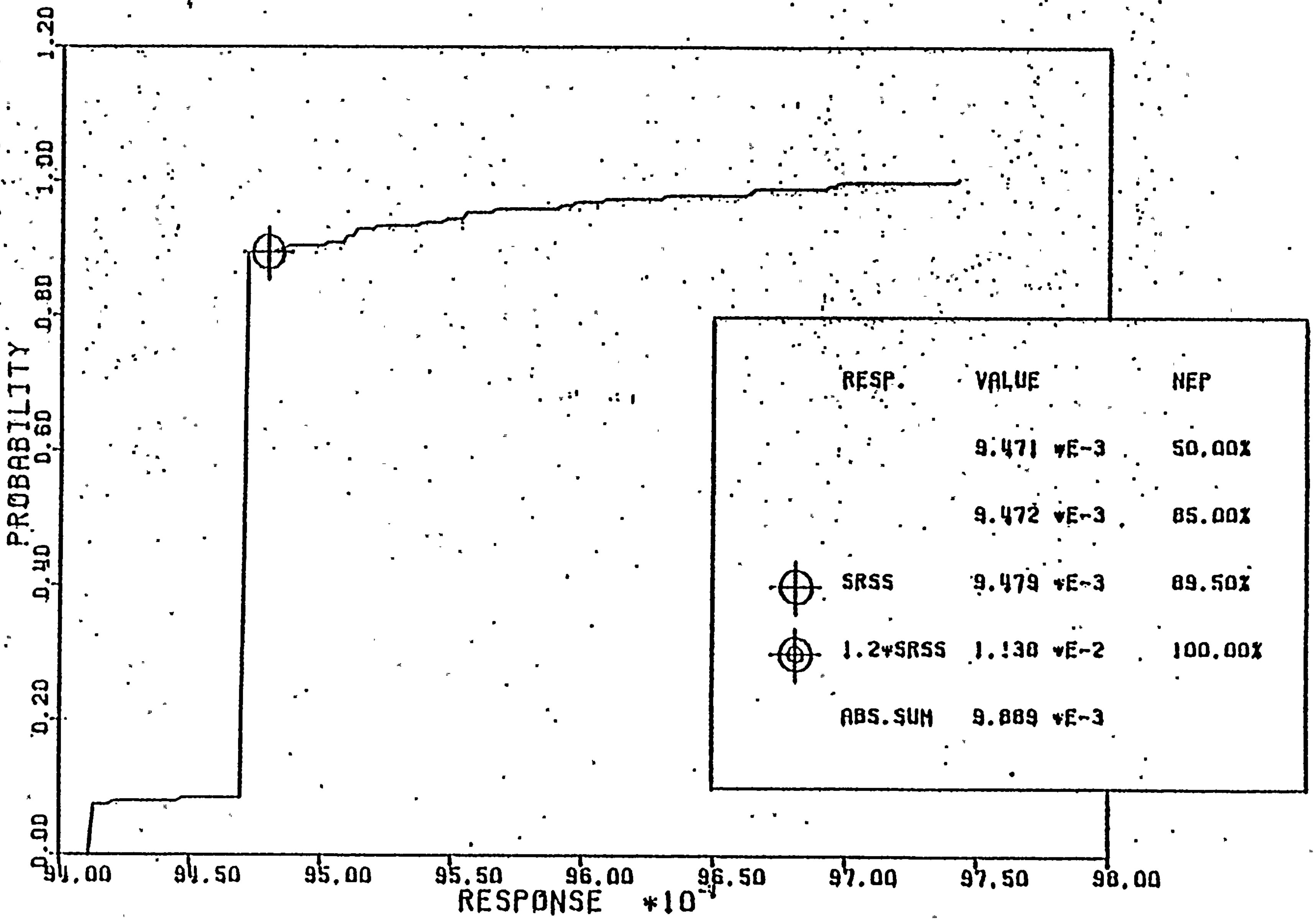
Figure 7-40



LOADING SRV(SVA) + OBE, VERTICAL DISPLACEMENT. (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - OBE) (180)

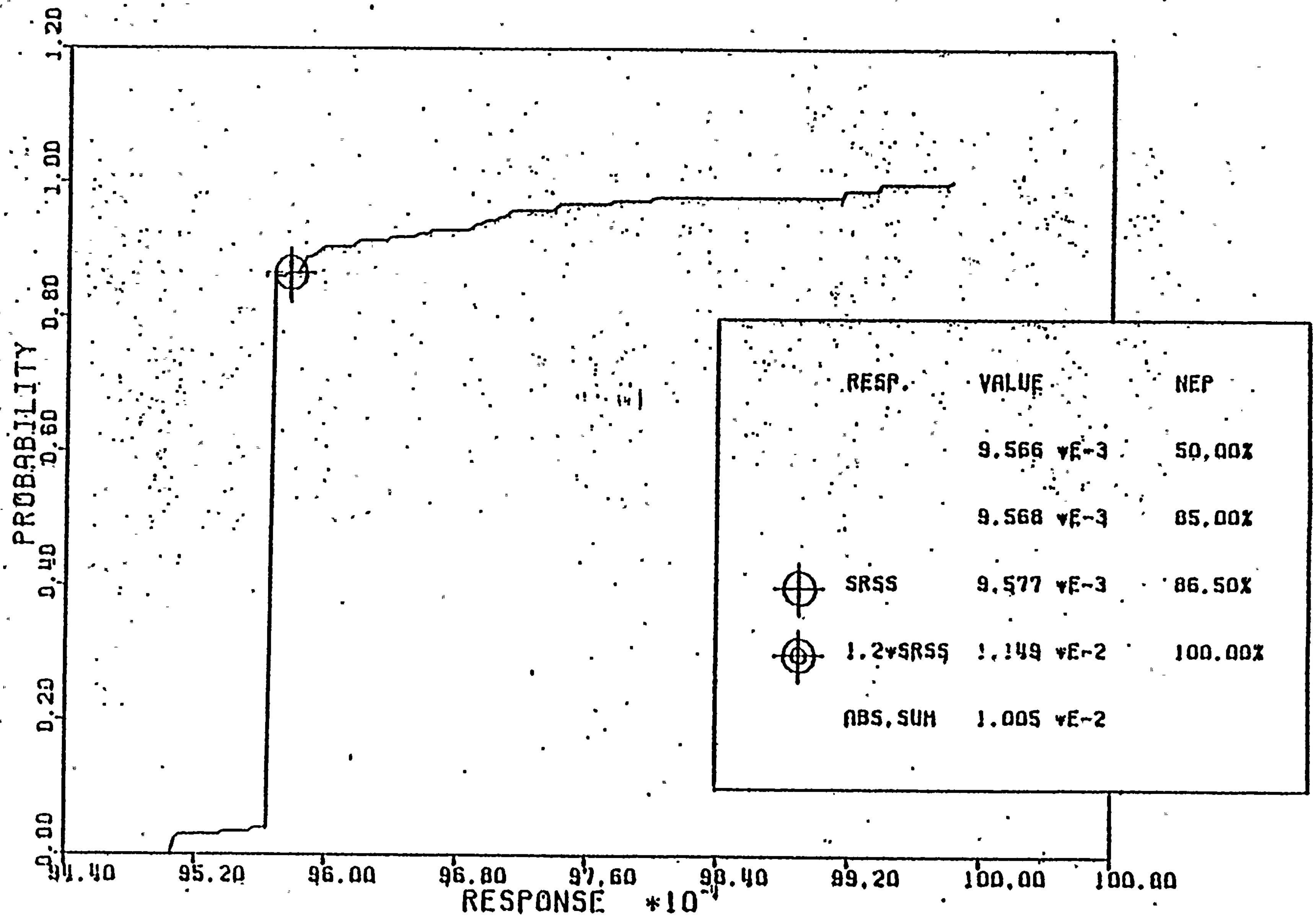
Figure 7-41



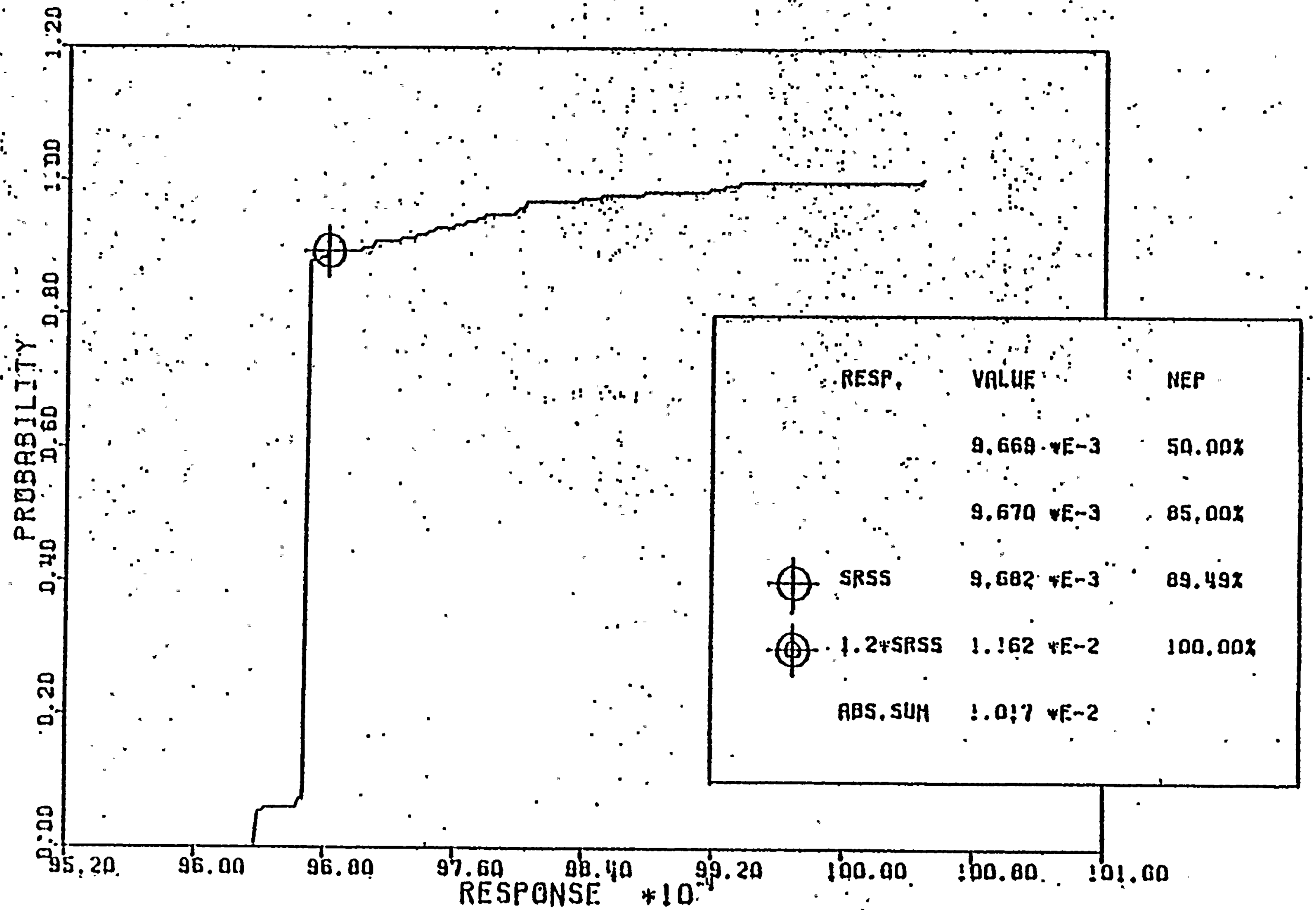
LOADING SRV(SVA) + OBE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - OBE) (180)

Figure 7-42



LOADING SRV(SVA) + OBE, VERTICAL DISPLACEMENT (FT)
CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - OBE) (180) Figure 7-43

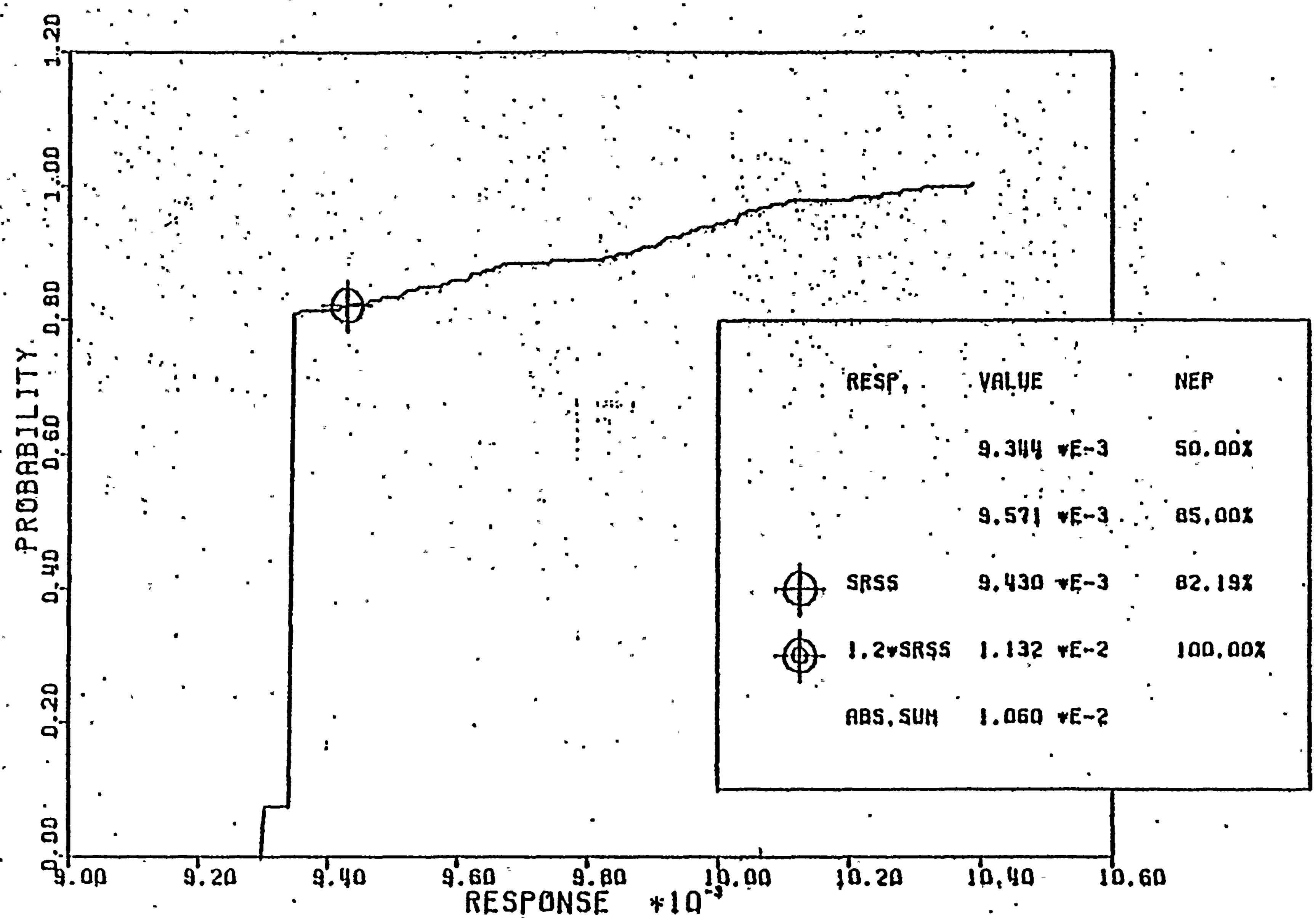


LOADING SRV(SVA) + OBE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - OBE) (100)

Figure 7-44

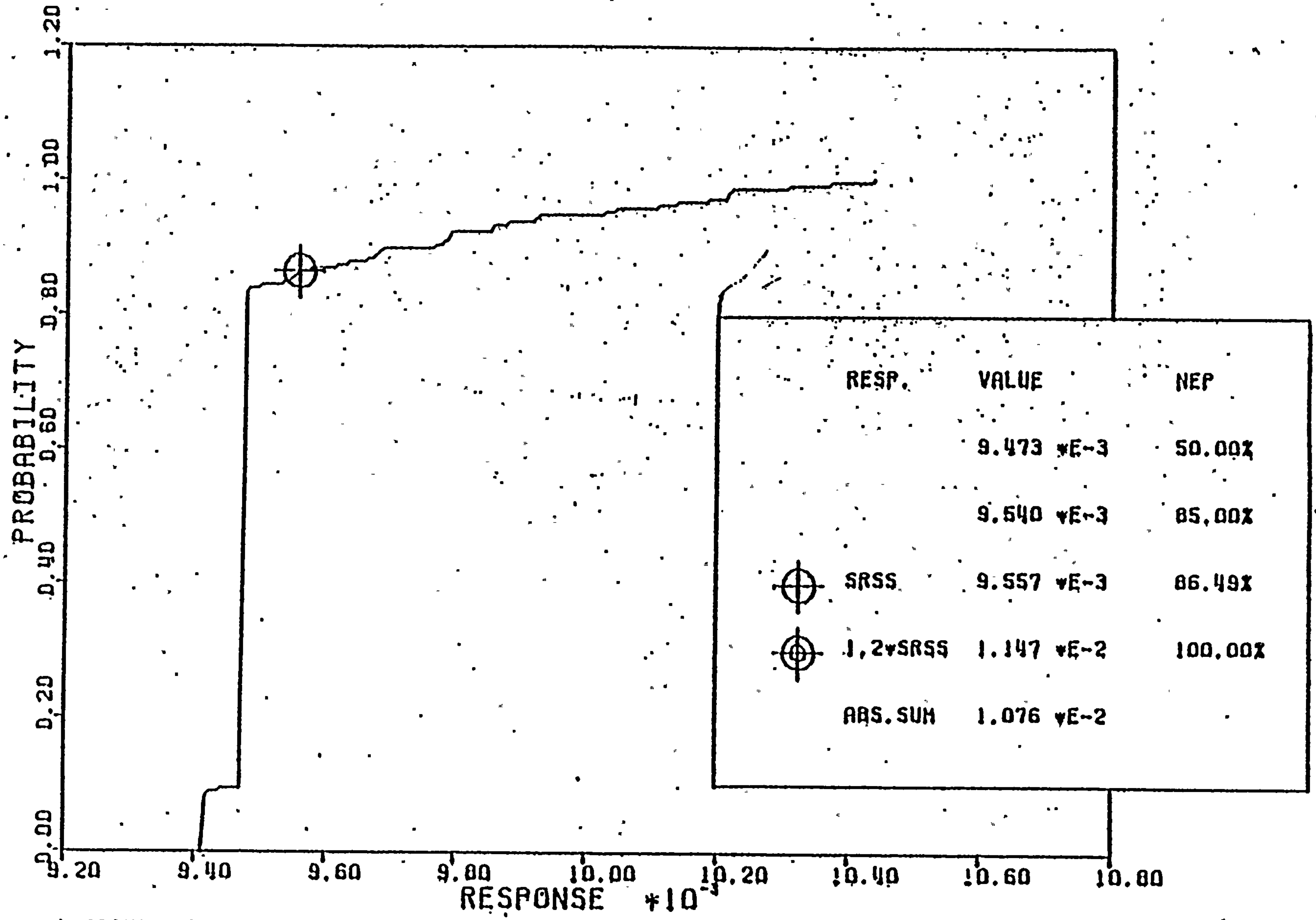
-123-



LOADING SRV(AVA) + OBE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 26 - SRV), (NODE 152 - OBE) (180)

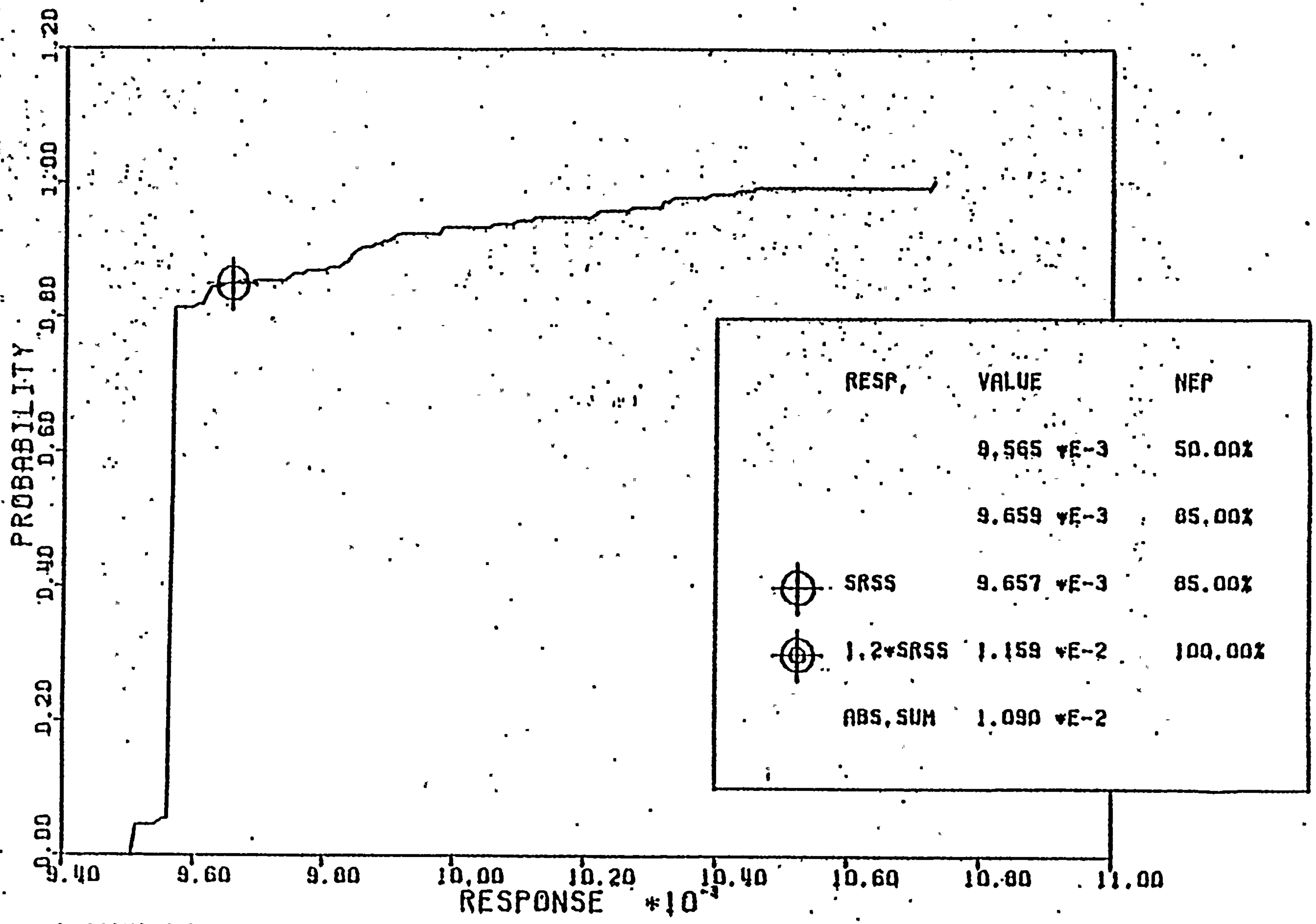
Figure 7-45



LOADING SRV(AVA) + OBE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 28 - SRV), (NODE 148 - OBE) (180)

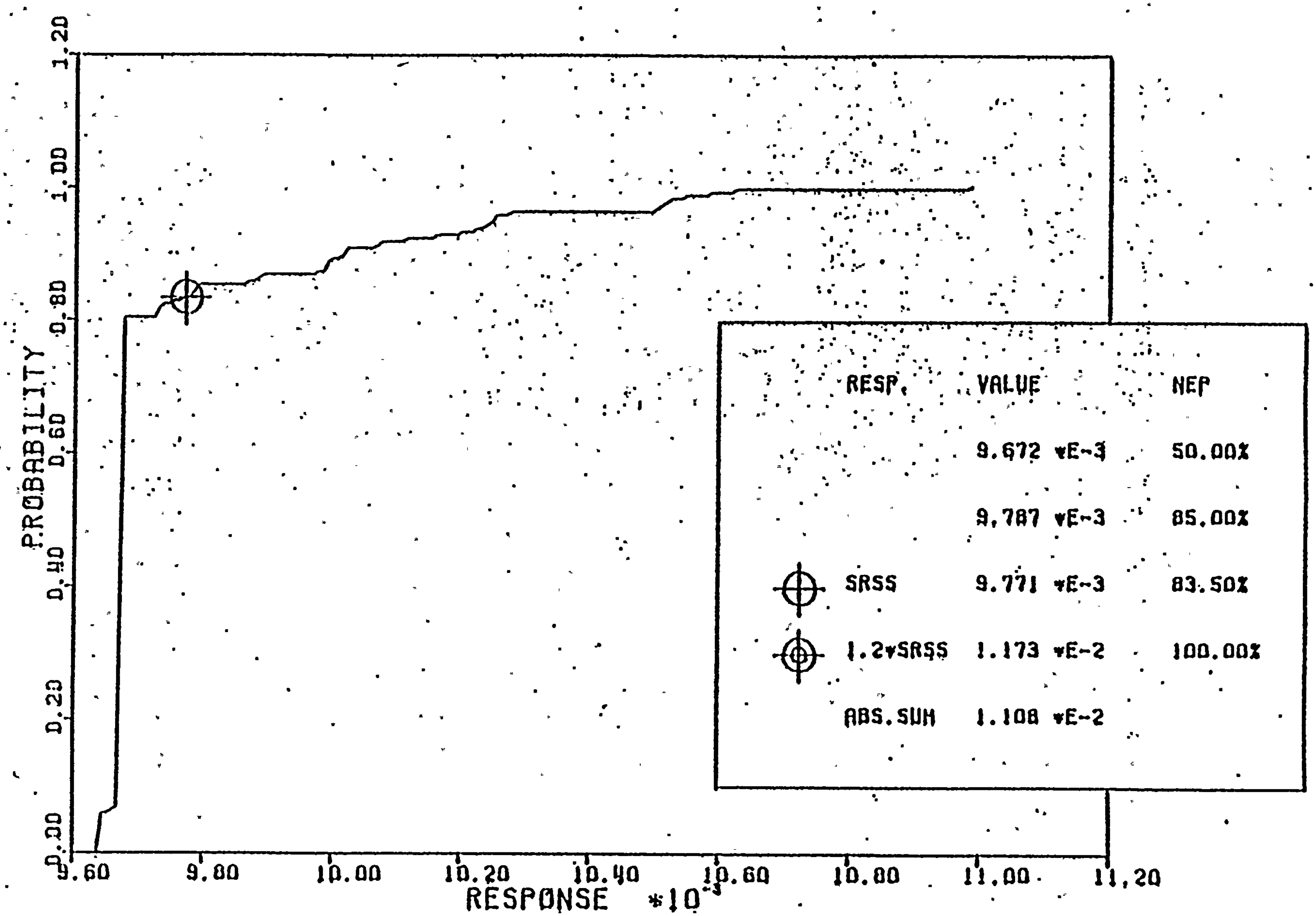
Figure 7-46



LOADING SRV(AVA) + OBE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 30 - SRV), (NODE 144 - OBE) (180).

Figure 7-47



LOADING SRV(AVA) + OBE, VERTICAL DISPLACEMENT (FT)

CONTAINMENT VESSEL DRYWELL, (NODE 33 - SRV), (NODE 140 - OBE). (180) Figure 7-48

ENCLOSURE 1

The information below is in response to the reference letter, dated December 9, 1982. The items are identified in the same manner as the reference letter.

271.07 Compare and correlate the systems described in Table 3.2-1 of the FSAR with the master systems list in the September 1982 program. Where systems have been omitted from the harsh environment qualification program provide the basis (e.g., not required for safe shutdown or accident mitigation). Identify the class 1E functions for each system.

Response: Enclosure 2 provides detailed response to the above inquiry.

271.08 Identify, by categories listed in NUREG-0737, the components (plant tag number and/or manufacturer and model number) included in the qualification program in response to TMI Action Plan Requirements.

Response: Appendix B of the WNP-2 FSAR provides the Supply System's Response to Regulatory Issues resulting from TMI-2. Also, Enclosure 3 includes additional information that addresses tasks involving equipment qualification for Task II.B.3. Enclosure 4 provides additional information on Task II.F.1.

271.09 Provide a statement that flooding and aging analyses have been sufficiently completed.

Response: The aging analyses have been completed as indicated in Section 4.2 of the WNP-2 Environmental Qualification Report for Safety-Related Equipment, transmitted to the NRC in September 1982.

The flooding analysis has been completed and will be available for review during the environmental audit.

271.10 Provide a statement that 1E equipment located in areas which experience a significant increase in radiation during a LOCA has been reviewed for possible damage to solid state devices.

Response: Equipment containing solid state devices which could be exposed to radiation levels equal to or greater than 10^4 rads have been qualified by test or analysis. Equipment that are not exposed to radiation levels approaching the 10^4 rad level are currently being evaluated. Should this investigation identify semi-conductors susceptible to threshold damage below 10^4 rads, the equipment will be relocated or replaced to eliminate the question of low-level radiation damage. This investigation will be completed by January 28, 1983.

271.11 Indicate that the "accuracy" information missing from the summary sheets, Appendix C, as well as other pertinent information, will be available at time of audit.

Response: Instrumentation accuracy is being obtained from specification and qualification data prepared by WNP-2 suppliers and designers for use code 1X, Levels 1 and 2 equipment (reference Appendix A of the Environmental Qualification Report). Some of this information will be available during the environmental audit. The summary sheets will be updated to include this data prior to fuel load.

271.12 Indicate that the effects of Beta radiation have been included in the qualification program.

Response: The WNP-2 qualification program does consider the effects of beta radiation. There are three types of equipment within the primary containment that need to be analyzed to determine their susceptibility to long-term beta effects. These are:

- o Electrical junction box components and wiring
- o Air-cooled motors
- o Some exposed cabling beneath the reactor pressure vessel.

The remaining equipment within the containment is adequately protected from beta effects. The results of the analysis for the equipment listed above will determine if corrective action is needed to protect this equipment.

271.13 In accordance with the Commission Memorandum and Order CLI-80-21, dated May 23, 1980, indicate that replacement parts will be qualified to NUREG-0588 Category I requirements unless sound reasons to the contrary exist.

Response: The Supply System is complying with the above by documenting sound reasons to the contrary where qualification to NUREG-0588, Category I, requirements cannot be achieved. Supply System procedures are in place to regulate this activity.

271.14 Indicate that the minimum set of safety equipment to provide a single success path to achieve the required safety functions will be qualified, or adequate justification will be provided, <u>prior to fuel load</u>.

Response: The Supply System has performed an analysis to satisfy the above. This analysis or justification for interim operation is contained in Appendix D of the Environmental Qualification Report, transmitted to the NRC in September 1982.

271.15 Indicate that safety equipment located inside primary containment has been qualified to the temperature/pressure profile described in Table 3.11-2.

Response: The safety-related equipment has been qualified to the first 24-hour period into the accident conditions depicted by Table 3.11-2 of the WNP-2 FSAR. This equipment is also qualified to the post-accident conditions defined by Profile 1 of Appendix B in the Environmental Qualification Report. A revision to this Profile has been made to include the 24-hour conditions of Table 3.11-2 superimposed on the plant-specific conditions. This composite identifies the margin inherent in the Table 3.11-2 generic profile and will be issued in a revision to the Environmental Qualification Report.

271.16 Before the Safety-Related Mechanical (SRM) equipment audit items can be selected, the applicant must provide a statement that all SRM equipment in a harsh environment is included in the mechanical equipment qualification program and must indicate the qualification status of the SRM equipment. If qualification is not complete, briefly describe the tasks to be performed. Provide a list of SRM equipment which is considered qualified from which audit items may be selected. Your review of equipment should be essentially complete before items are selected. The staff review will concentrate on materials which are sensitive to environmental effects, for example, seals, gaskets, lubricants, fluids for hydraulic systems, diaphragms.

Response: The Environmental Qualification Report (September 1982) detailed the Supply System's reevaluation program for Environmental Qualification of Safety-Related Mechanical equipment. This reevaluation program of the harsh environmental effects on Safety-Related Mechanical (SRM) equipment has been completed, and a detailed list of evaluated items is contained in Enclosure 5. All items are qualified with these exceptions:

MSLC-FN-1; SGT-FN-1A1, 1A2, 1B1, 1B2;
CEP-V-3A, 3B, 4A, 4B; CSP-V-6; CSP-AO-6, 9

Corrective action for non-qualified items has been defined and is being implemented.

ENCLOSURE 2

WNP-2 SAFETY RELATED

SYSTEMS LIST

A. Emergency Reactor Shutdown

Reactor Protection System (RPS)
  Average Power Range Monitor (APRM)
  Local Power Range Monitor System (LPRM)
Control Rod Drive System (CRD)
Note 6, 7

B. Primary Containment Isolation

Containment Instrument Air System (CIA)
Isolation Valves in the following systems:

RRC Hydraulic Control	HY
Main Steam System	MS
Reactor Feed Water System	RFW
Reactor Recirculation System	RRC
High Pressure Core Spray System	HPCS
Low Pressure Core Spray System	LPCS
Standby Liquid Control System	SLC
Residual Heat Removal System	RHR
Reactor Core Isolation Cooling System	RCIC
Containment Atmosphere Control	CAC
Containment Supply Purge System	CSP
Containment Exhaust Purge System	CEP
Reactor Closed Cooling System	RCC
Reactor Water Cleanup System	RWCU
Equipment Drain System	EDR
Floor Drain System	FDR
Containment Instrument Air System	CIA
Process Instrumentation System	PI
Control Air System	CAS
Fuel Pool Cooling System	FPC
Traversing In Core Probe System	TIP

Notes: 1, 2, 3, 5, 6, 7

C. Reactor Core Cooling (Short Term)

High Pressure Core Spray System	(HPCS)
Low Pressure Core Spray System	(LPCS)
Main Steam System	(MS)
Residual Heat Removal System	(RHR)
Containment Instrument Air System	(CIA)
Standby Service Water System	(SW)

Notes: 1 through 7

D. Containment Integrity

Containment Atmosphere Control system	(CAC)
Containment Return Air System	(CRA)
Containment Vacuum Breaker System	(CVB)
Residual Heat Removal System	(RHR)
Standby Service Water System	(SW)

Notes: 1 through 7

E. Core Residual Heat Removal

Residual Heat Removal System	(RHR)
Standby Service Water System	(SW)

Notes: 1 through 7

F. Prevent Release of Radioactive Material

Standby Gas Treatment System	(SGT)
Main Steam Leakage Control System	(MSLC)
Standby Service Water System	(SW)
Leak Detection System	(LD)
Miscellaneous Drain System	(MD)
Reactor Building Exhaust Air System (Reactor Building Isolation)	(REA)
Reactor Building Outside Air System (Reactor Building Isolation)	(ROA)

Notes: 1 through 7

NOTES

#1 Emergency Electrical Power Systems

Electrical Distribution System (CIE Portion)	(E)
Diesel Generator Systems	(DG)

Diesel Generator Systems

Diesel Exhaust System	(DE)
Diesel Lube Oil System	(DLO)
Diesel Starting Air System	(DSA)
Diesel Cooling Water System	(DCW)
Diesel Oil System	(DO)

#2 Reactor Building Emergency HVAC Systems

Reactor Building Recirculation System	(RRA)

#3 Diesel Generator Building Emergency HVAC Systems

Diesel Building Exhaust Air System	(DEA)
Diesel Building Mix Air System	(DMA)
Diesel Building Return Air System	(DRA)

#4 Control Room Emergency HVAC Systems

Waste Building Exhaust Air System	(WEA)
Waste Building Mixed Air System	(WMA)
Waste Building Outside Air System	(WOA)

#5 Service Water Pumphouse

Pumphouse Outside Air System	(POA)
Pumphouse Return Air System	(PRA)

#6 Only a portion of each system may be needed in order to support a particular safety function. The sum of all such portions of each safety system are included in the master Class 1 Electrical List.

#7 Portions of system alrady listed, as well as others which are purely instrumentation, (i.e., CMS and SPTM) are needed per Reg. Guide 1.97 in order to support accident mitigation. The individual instruments are listed on the master Class 1 Electrical List.

The six safety objectives for plant systems have been identified as:

- Emergency Reactor Shutdown
- Containment Isolation/Integrity
- Reactor Core Cooling (Short Term)
- Containment Heat Removal
- Core Residual Heat Removal
- Prevent Release of Radioactive Material

The eleven safety functions used to achieve these objectives as shown on the C1E and SRM lists are:

A. Emergency Reactor Shutdown, including SCRAM Signals and Reactivity Insertion

B1. Primary Containment Isolation

B2. Reactor Building Isolation

C. Emergency Core Heat Removal

D. Containment Atmosphere Control

E. Core Residual Heat Removal, including Long-term Cooling

F. Prevention of the Release of Radioactive Material to the Environment

G. No Active Safety Function but a Passive Integrity Function

H. Emergency Electrical Power Systems, AC and DC

I. Instrumentation to Follow the Course of an Accident

J. Compartment Heat Removal for Equipment Operability or Personnel Habitability

A cross-reference is provided below which shows the correlation between the system identifier and FSAR Table 3.2-1 (Amendment 26). It should be noted that only a portion of a system's components may be required to meet the safety functions listed.

OBJECTIVES	SAFETY FUNCTIONS
Emergency Reactor Shutdown	A, H, I
Containment Isolation/Integrity	B1, D, G, H
Reactor Core Cooling	C, G, H
Containment Heat Removal	E, G, H, I, J
Core Residual Heat Removal	E, G, H, I, J
Prevent Release of Radioactive Material	B2, F, G, H

FSAR EQUIPMENT LIST

CROSS REFERENCE

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
1. Reactor System		(A),(F)	
.1 Reactor vessel	MS		
.2 Reactor vessel support skirt	STR/MECH		
.3 Reactor vessel appurtances pressure retaining portions	STR/MECH		
.4 CRD housing supports	STR/MECH		
.5 Reactor internal structures, engineered safety features	STR/MECH,		See Neutron Monitoring
.6 Reactor internal structures, other	STR/MECH	NSR(1)	
.7 Control rods	STR/MECH		
.8 Control rod drives	CRD		
.9 Core support structure	STR/MECH		
.10 Power range detector hardware	LPRM		
.11 Fuel assemblies	STR/MECH		
.12 Reactor Vessel Stabilizer	STR/MECH		
2. Nuclear Boiler System		(A),(B),(C),(F)	
.1 Vessels, level instrumentation condensing chambers	MS		
.2 Vessels, air accumulators	MS		
.3 Piping, relief valve discharge from relief valve to suppression pool	STR/MECH		
.4 Piping, relief valve discharge within suppression chamber and suppression pool	STR/MECH		
.5 Piping, main steam and feedwater within outermost isolation valve	STR/MECH		
.6 Pipe supports, main steam	STR/MECH		
.7 Pipe restraints, main steam	STR/MECH		

FSAR EQUIPMENT LIST

CROSS REFERENCE

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
.8 Piping, other within outermost isolation valves	STR/MECH		
.9 Safety/relief valves	MS		
.10 Valves, main steam isolation valves	MS		
.11 Valves, other, isolation valves and within containment	MS, CVB		
.12 Valves, instrumentation beyond outermost isolation valves	MS,MD,MSLC		
.13 Mechanical modules, instrumentation, with safety function	MS		
.14 Electrical modules with safety function	MS		
.15 Cable, with safety function	E		
3. Reactor Recirculation System		(B),(F)	
.1 Piping	STR/MECH		
.2 Pipe suspension, recirculation line	STR/MECH		
.3 Pipe restraints, recirculation line	STR/MECH		
.4 Pumps	RRC		
.5 Valves	RRC, HY		
.6 Motor, pump	RRC		
.7 Electrical modules, with safety function	RRC		
.8 Cable with safety function	E		
.9 LFMG Sets		NSR(2)	

FSAR EQUIPMENT LIST

CROSS REFERENCE

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
4. CRD Hydraulic System		(A),(F)	
.1 Valves, scram discharge volume lines	CRD		
.2 Valves, insert and withdraw lines	CRD		
.3 Valves, other	CRD	NSR (3)	
.4 Piping, scram discharge volume lines	STR/MECH		
.5 Piping, insert and withdraw lines	STR/MECH		
.6 Piping, other	STR/MECH	NSR (3)	
.7 Hydraulic control unit	CRD		
.8 Elecrical modules, with safety function	CRD		
.9 Cables, with safety function	E		
5. Standby Liquid Control System		(B),(F)	A system generally consisting of Quality Class I, Seismic Class 1, Class 1E components existing for additional reactor safety, but not required to mitigate any postulated accidents or provide a necessary safety function.
.1 Standby liquid control tank	STR/MECH		
.2 Pump	SLC		
.3 Pump motor	SLC		
.4 Valves, explosive	SLC		
.5 Valves, isolation and within containment	SLC		
.6 Valves, beyond isolation valves	SLC		
.7 Piping, within isolation valves to reactor vessel	STR/MECH		
.8 Piping, beyond isolation valves	STR/MECH		
.9 Electrical modules, with safety function	SLC		
.10 Cable, with safety function	E		

FSAR EQUIPMENT LIST

CROSS REFERENCE

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
6. Neutron Monitoring System		(A),(B),(F)	
.1 Piping, TIP	STR/MECH		
.2 Electrical modules, IRM & APRM	IRM,APRM		
.3 Cable, IRM & APRM	APRM,IRM		
.4 Valves, tip isolation subsystem	TIP		
.5 Power range detector harware	LPRM		
7. Reactor Protection		(A)	
.1 Electrical modules	RPS		
.2 Cable	E		
8. Leak Detection System		(B),(F)	
.1 Temperature element	LD		
.2 Differential temperture switch	LD		
.3 Differential flow indicator	RWCU,RCIC		
.4 Pressure switch	RWCU,RCIC		
.5 Differential pressure indicator switch	RWCU,RCIC		
.6 Differential flow summer	LD		
9. Process Radiation Monitors		(F)	
.1 Electrical modules, main steam line and building ventilation monitors	MS,REA,WOA		
.2 Cable, main steam line and reactor building ventilation monitors	E		
10. RHR System		(B),(C),(D),(E),(F)	
.1 Heat exchangers, primary side	RHR		
.2 Heat exchanger, secondary side	SW		

FSAR EQUIPMENT LIST

CROSS REFERENCE

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
.3 Piping, within outermost isolation valves, reactor coolant pressure boundary	STR/MECH		
.4 Piping, other	STR/MECH		
.5 Pumps	RHR		
.6 Water leg pumps	RHR		
.7 Pump motors	RHR		
.8 Valves, isolation Reactor Coolant Pressure Boundary	RHR		
.9 Valves, other	RHR		
.10 Mechanical modules	RHR		
.11 Electrical modules with safety function	RHR		
.12 Cable, with safety function	E		
11. Low Pressure Core Spray		(B),(C)	
.1 Piping, within outermost isolation valves to reactor vessel	STR/MECH		
.2 Piping, beyond outermost isolation valves	STR/MECH		
.3 Pumps	LPCS		
.4 Water leg pumps	LPCS		
.5 Pump motors	LPCS		
.6 Valves, isolation, Reactor Coolant Pressure Boundary	LPCS		
.7 Valves, other	LPCS		
.8 Electrical modules with safety function	LPCS		
.9 Cable, with safety function	E		

FSAR EQUIPMENT LIST

CROSS REFERENCE

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
12. High Pressure Core Spray		(B),(C)	
.1 Piping, within outermost isolation valve	STR/MECH		
.2 Piping, return test line to condensate storage tank beyond second isolation valve	STR/MECH	NSR (4)	
.3 Piping, beyond outermost isolation valve, other	STR/MECH		
.4 Pump	HPCS		
.5 Water leg pumps	HPCS		
.6 Pump motor	HPCS		
.7 Valves, beyond diesel shutoff valves	SW		
.8 Valves, isolation, Reactor Coolant Pressure Boundary	HPCS		
.9 Valves, beyond isolation valves, motor operated	HPCS		
.10 Valves, other	HPCS		
.11 Electrical modules, with safety function	HPCS		
.12 Electrical auxiliary equipment	DG		
.13 Cable with safety function	E		
(HPCS Emergency Power Supply - see 38a)			
13. RCIC System		(B),(F)	The components of the RCIC system in general are Quality Class I, Seismic Class 1, Class 1 Electrical. The system exists
.1 Piping, within outermost isolation valves, Reactor Coolant Pressure Boundary	STR/MECH		

FSAR EQUIPMENT LIST

CROSS REFERENCE

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
.2 Piping, beyond outermost isolation valves	STR/MECH		for additional reactor safety but is not required to mitigate the consequences of a postulated accident.
.3 Piping, return test line to condensate storage tank beyond second stop valve, drip pot discharge valve to condenser	STR/MECH	NSR (4)	
.4 Pumps	RCIC		
.5 Water leg pumps	RCIC		
.6 Valves, isolation and Coolant Pressure Boundary	RCIC		
.7 Valves, other	RCIC		
.8 Turbine	RCIC		
.9 Electrical modules, with safety function	RCIC		
.10 Cable, with safety function	RCIC		
14. Fuel Service Equipment		(F)	
.1 Fuel preparation machine	NSSE		
.2 General purpose grapple	NSSE		
15. Reactor Vessel Service Equipment		(F)	
.1 Steam line plugs	NSSE		
.2 Dryer and separator sling and head strongback	NSSE		
16. In-Vessel Service Equipment		(F)	
.1 Control rod grapple	NSSE		
17. Refueling Equipment		(F)	
.1 Refueling equipment platform assembly	NSSE		
.2 Refueling Bellows	STR/MECH	NSR (5)	

FSAR EQUIPMENT LIST

CROSS REFERENCE

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
18. Storage Equipment		(F)	
.1 Fuel storage racks	STR/MECH		
.2 Defective fuel storage container	NSSE		
19. Radwaste System		(B),(F)	
.1 Tanks, atmospheric	STR/MECH	NSR (6)	
.2 Heat exchangers	STR/MECH	NSR (6)	
.3 Piping and valves forming part of containment boundary	EDR & FDR		
.4 Piping, other	STR/MECH	NSR (6)	
.5 Pumps	MWR	NSR (6)	
.6 Valves, flow control and filter systems	EDR, FDR, MWR	NSR (6)	
.7 Valves, other	PVR	NSR (6)	
.8 Mechanical modules	EDR,FDR,PVR,PWR	NSR (6)	
.9 Radioactive equipment & floor drains and other radwaste piping and valves upstream of collector tanks	STR/MECH	NSR (6)	
.10 Instrumentation and control boards	MWR,PWR	NSR (6)	
.11 Concentrator	PWR	NSR (6)	
.12 Plant discharge line		NSR (6)	
20. Reactor Water Cleanup System		(B),(F)	
.1 Vessels, filter/demineralizer	RWCU	NSR (7)	
.2 Heat exchangers	RWCU	NSR (7)	
.3 Piping, within outermost isolation valves	RWCU		
.4 Piping, beyond outermost containment isolation valves	RWCU	NSR (7)	
.5 Pumps	RWCU	NSR (7)	

FSAR EQUIPMENT LIST

CROSS REFERENCE

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
.6 Valves, isolation valves, Reactor Coolant Pressure Boundary	RWCU		
.7 Valves, beyond outermost containment isolation valves	RWCU	NSR (7)	
.8 Mechanical modules		NSR (7)	
21. Fuel Pool Cooling and Cleanup System		(B),(F)	
.1 Vessels, filter/demineralizers	FPC	NSR (8)	
.2 Vessels, other	FPC	NSR (8)	
.3 Heat exchngers	FPC		
.4 Piping	FPC		Cooling Portion Only
.5 Pumps	FPC		
.6 Makeup system (normal)	DM	NSR (8)	
.7 RHR connection	FPC		
.8 Makeup system (emergency)	SW		
.9 Piping, suppression pool to outer isolation valves	FPC		
22. Control Room Panels		(A) ----- (F)	
.1 Electrical modules with safety function	All Systems		
.2 Cable, with safety function	E		
23. Local Panels and Racks		(A) - (F)	
.1 Electrical modules with safety function	All Systems		
.2 Cable, with safety function	E		
24. Off-Gas System		NSR (9)	
.1 Tanks	OG	NSR (9)	

FSAR EQUIPMENT LIST

CROSS REFERENCE

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
.2 Heat exchangers	OG	NSR (9)	
.3 Piping	STR/MECH	NSR (9)	
.4 Pumps	OG	NSR (9)	
.5 Valves	OG	NSR (9)	
.6 Mechanical modules, with safety function	OG	NSR (9)	
.7 Pressure vessels	OG	NSR (9)	
25. Standby Service Water System		(B) ----- (F)	
.1 Piping	STR/MECH		
.2 Pumps	SW		
.3 Pump motors	SW		
.4 Valves	SW		
.5 Electrical modules, with safety function	SW		
.6 Cable, with safety function	SW		
26. Turbine Plant Service Water		NSR (10)	
.1 Piping and valves	TSW	NSR (10)	
.2 Pumps	TSW	NSR (10)	
27. Reactor Building Closed Cool Water System		(B),(F)	
.1 Heat exchangers	RCC	NSR (11)	
.2 Pumps	RCC	NSR (11)	
.3 Tanks	RCC	NSR (11)	
.4 Piping and valves inside containment	RCC		
.5 Containment isolatioin valves and associated piping	RCC		

FSAR EQUIPMENT LIST

CROSS REFERENCE

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
.6 Piping and valves in Reactor Building	RCC	NSR (11)	
.7 Piping and valves, other	RCC	NSR (11)	
28. Primary Containment Cooling System		(B),(F)	
.1 Piping and valves up to outermost isolation valves, containment purge and exhaust	CEP,CSP,CRA		
29. Standby Gas Treatment System		(F)	
.1 Filter units	SGT		
.2 Fans	SGT		
.3 Piping and valves	SGT		
30. Primary Containment Atmospheric Control System		(B)	
.1 Piping and valves	CAC		
.2 Equipment	CAC		
31. Other HVAC		(C) ----- (F)	
.1 Reactor Building (non-essential)	REA,ROA	NSR (12)	
.2 Reactor Building (essential)	RRA,REA,ROA		
.3 Turbine Building	TEA,TOA,TRA	NSR (12)	
.4 Radwaste Building	WRA,WEA,WOA,WMA	NSR (12)	
.5 Control Room, Critical Switchgear Area, Cable Spreading Area (non-essential)	WRA	NSR (12)	
.6 Control Room, Critical Switchgear Area, Cable Spreading Area (essential)	WEA,WMA,WOA		

FSAR EQUIPMENT LIST

CROSS REFERENCE

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
.7 Diesel Generator Bldg.	DEA,DMA,DRA,DOA		
.8 Standby Service Water Pumphouse	POA,PRA		
32. Condensate Storage & Transfer		NSR (13)	
.1 Condensate storage tank	COND	NSR (13)	
.2 Piping and valves	COND	NSR (13)	
.3 Pumps	COND	NSR (13)	
33. Instrument and Sample Lines			Refer to particular system for associated instrumentation
34. Fuel Storage Facilities		(F)	
.1 Fuel pool/dryer separator liner	STR/MECH		
.2 Storage racks & supports	STR/MECH		
35. Building Cranes		(F)	
.1 Reactor Building	MT		
.2 Turbine Building	MT	NSR (14)	
.3 Radwaste Building	MT	NSR (14)	
.4 Standby Service Water Pumphouse	MT	NSR (14)	
.5 Miscellaneous Areas	MT	NSR (14)	
36. Instrument and Service Air		(B)	
.1 Piping and valves	CAS		
.2 Compressors	CAS,SA	NSR (15)	
.3 Vessels	CAS,SA	NSR (15)	
37. Containment Instrument Air System		(B),(C),(D)	
.1 Piping and valves inside containment to and including outboard isolation valve	CIA		

FSAR EQUIPMENT LIST

CROSS REFERENCE

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
.2 Piping and valves to Main Steam relief valves	CIA		
.3 Other piping and valves	CAS	NSR (15)	
.4 Compressors	CAS	NSR (15)	
.5 Receiver	CAS	NSR (15)	
.6 Piping and valves outside containment isolation valves to nitrogen bottles	CIA		
	HPCS DIESEL GENERATORS		
38. a. Diesel Generator Systems		(C)	
.1 Day tanks	DO		
.2 Piping	DO		
.3 Pumps, fuel oil system	DO		
.4 Diesel-generators	DG		
.5 Electrical modules with safety function	DG,DSA,DCW,DLO,DO		
.6 Cable, with safety function	E		
.7 Diesel fuel storage tanks	DO		
.8 Diesel-generators service water supply	DCW,SW		
.9 DSA diesel starting air	DSA		
.10 Diesel intake exhaust piping	DE		
38. b. Standby AC Power Systems (Other Than HPCS)		(B) ----- (F)	
.1 Storage and day tanks	DO		
.2 Piping and valves diesel oil	DO		
.3 Pumps diesel oil	DO		
.4 Diesel-generators	DG		

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
.5 Electrical modules with safety function	DG,DSA,DLO,DCW,DO		
.6 Diesel cooling water supply	DCW		
.7 Cable with safety function	E		
.8 Diesel intake/exhaust air piping	DE		
.9 Diesel starting air	DSA		
39. Auxiliary AC Power System		(B) ----- (F)	
.1 Essential components	DG,E		
.2 Nonessential components	E	NSR (16)	
40. Auxiliary 125/250 Volt DC Power System		(B) ----- (F)	
.1 Batteries	E		
.2 Battery Charges	E		
.3 Cables	E		
.4 Modules	E		
41. 24 Volt DC Power System		(B) ----- (F)	
.1 Batteries	E		
.2 Battery Charges	E		
.3 Cables	E		
.4 Modules	E		
42. 120 Volt Critical Power Supply System		(B) ----- (F)	
.1 Equipment	E		
43. Power Conversion System (Figures 3.2-23, 3.2-24)		(F)	

FSAR EQUIPMENT LIST

CROSS REFERENCE

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
.1 Main steam piping from outermost isolation valves up to turbine stop valves	STR/MECH		
.2 Main steam branch piping to 1st valve capable of timely actuation	STR/MECH		
.3 Main turbine bypass piping up to bypass valve	STR/MECH	NSR (17)	
.4 First valve that is either normally closed or capable of automatic closure in branch piping connected to main steam and turbine bypass piping	MS,MD	NSR (17)	
.5 Turbine stop valves, turbine control valves and turbine bypass valves	MS	NSR (17)	
.6 Main steam leads from turbine control valve to turbine casing	STR/MECH	NSR (17)	
.7 Feedwater and condensate system beyond outermost isolation valve	RFW,COND	NSR (17)	
.8 Turbine generator	TG	NSR (17)	
.9 Condenser	COND	NSR (17)	
.10 Air ejection equipment	COND	NSR (17)	
.11 Feedwater treatment system	CPR	NSR (17)	
.12 Turbine bypass system beyond turbine bypass valve	MS	NSR (17)	
.13 Turbine gland sealing system components	BS	NSR (17)	
.14 Piping, valves, other	VARIOUS	NSR (17)	
.15 Equipment, other	VARIOUS	NSR (17)	

FSAR EQUIPMENT LIST

CROSS REFERENCE

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
44. Circulating Water and Cooling Tower Makeup Water System(s)		NSR (10)	
.1 Piping and valves	TMU	NSR (10)	
.2 Pumps	CW	NSR (10)	
.3 Cooling tower fans	CW	NSR (10)	
45. Main Steam Isolation Valves Leakage Control System		(B),(F)	
.1 Piping & valves within primary containment and out through the outermost isolation valves	STR/MECH,MSLC		
.2 Piping and valves beyond the outermost isolation valves	MSLC		
.3 Blowers	MSLC		
46. Containment Vessel	STR/MECH	(F)	
47. Buildings		(A) ----- (F)	
.1 Reactor Building	STR/MECH		
.2 Turbine Building	STR/MECH	NSR (18)	
.3 Radwaste Control Building	STR/MECH		
.4 Diesel Generator Building	STR/MECH		
.5 Spray Ponds and Standby Service Water Pumphouse	STR/MECH		
.6 Service Building	STR/MECH	NSR (18)	
.7 Cooling Towers	STR/MECH	NSR (18)	
.8 Makeup Water Pumphouse	STR/MECH	NSR (18)	
.9 Circulation Water Pumphouse	STR/MECH	NSR (18)	
.10 Air Intake Structures No. 1 & No. 2	STR/MECH		

FSAR EQUIPMENT LIST

CROSS REFERENCE

Principal Component FSAR Table 3.2-1	System Identifier(s)	Safety Function	Comments
48. Containment/Drywell Atmosphere Monitoring System	CMS	(C),(D),(E)	
49. Drywell Insulation		NSR (19)	
.1 Insulation on piping which is within the drywell	Various Systems		
50. Instrumentation and Control Equipment		(A) ----- (F)	
.1 Safety-related instrumentation and control systems	SPTM,PI,SP,ARM SRM		

General Notes:

A. Exhibit 1 references the system safety functions used on this listing.

B. Exhibit 2 references the notes used to describe the non safety-related components.

C. "STR/MECH" is used in lieu of a system identifier when the component identified is a generic structural or mechanical item such as piping or a building.

EXHIBIT 2

NOTES FOR NON SAFETY-RELATED (NSR) SYSTEMS OR COMPONENTS:

(1) Some internal components of the reactor vessel are considered to be NSR, but are QI, SCI to ensure core reliability.

(2) The RRC pumps and motors do not require a power source to perform their safety function.

(3) Only those components of the CRD system that are associated with the reactor scram function are safety-related.

(4) Subject piping is isolated from that portion of the system providing a safety function.

(5) This equipment is used during the refueling process but provides no safety function.

(6) The Radwaste Systems and components are designed to retain high and low level wastes in such a manner as to minimize personnel exposure. The design criteria incorporates 10CFR20 and 10CFR50 considerations but provides no safety-related functions.

(7) Only that portion of the RWCU that is part of the RCPB is safety-related. Those portions of the system downstream of the outermost containment isolation valve have no safety function.

(8) Only those portions of the FPC system required for spent fuel cooling and emergency pool makeup are necessary for safety.

(9) The off gas system has been analyzed and any postulated failure will not result in an off-site release greater than 0.5 REM.

(10) This system provides cooling to only non-essential components.

(11) RCC is not required for decay heat removal or for cooling any safety-related equipment.

(12) Only those portions of HVAC systems providing containment isolation and/or safety-related equipment cooling function is safety-related.

(13) The condensate storage system is not required as a source of emergency makeup, but may be used.

(14) Only those cranes directly involved with refueling are safety-related. The remainder are seismic Class I where necessary to prevent deleterious effects to safety-related equipment.

(15) Only those portions of CAS which form a boundary with CIA or which are part of the containment isolation boundary are safety-related.

(16) Those portions of the electrical system not associated with the supply of power to safety-related equipment are considered non-essential and not safety-related.

(17) Only those portions of the power conversion system which form an isolation boundary with the nuclear boiler system are safety-related.

(18) These buildings house only non-essential equipment and are not needed to prevent radioactive releases in excess of 10CFR100 limits.

(19) The insulating function is not required for safety, however, the insulation is design is Quality Class 1 and Seismic Class 1 in order to prevent any potential effects to safety-related equipment.

Enclosure 3

NUREG 0737 TASK II.B.3 VALVE POSITION INDICATORS

EPN	Description	Manufacturer	Model Number
PSR-V-X80-1	Solenoid Valve	Valcor	V526-5940
-X80-2	"	"	"
-X73-1	"	"	"
-X73-2	"	"	"
-X83-1	"	"	"
-X83-2	"	"	"
-X84-1	"	"	"
-X84-2	"	"	"
-X82-7	"	"	"
-X82-8	"	"	"
PSR-V-X77A-1	Solenoid Valve	Target Rock	102110
-X77A-2	"	"	"
-X77A-3	"	"	"
-X77A-4	"	"	"
-003-A	"	"	"
-003-B	"	"	"
PSR-V-X82-1	Solenoid Valve	Valcor	V526-5295
-X82-2	"	"	"
-X88-1	"	"	"
-X88-2	"	"	"
-012	"	"	"
-013	"	"	"
-014	"	"	"
-015	"	"	"
-016	"	"	"
-105	"	"	"
-108	"	"	"
-110	"	"	"
-011	"	"	"
SW-V-840	"	"	"
-842	"	"	"
-844	"	"	"
-846	"	"	"
PSR-IL-V/X80-1	Indicating Light	Master Spec. Comp.	800A2C1J2L2N2
X80-2	"	"	"
X73-1	"	"	"
X73-2	"	"	"
X83-1	"	"	"
X83-2	"	"	"
X84-1	"	"	"
X84-2	"	"	"
X82-7	"	"	"
X82-8	"	"	"
X77A-1	"	"	"
X77A-2	"	"	"
X77A-3	"	"	"
X77A-4	"	"	"

EPN	Description	Manufacturer	Model Number
PSR-IL-V/X82-1	Indicating Light	Master Spec. Comp.	800A2C1J2L2N2
X82-2	"	"	"
X88-1	"	"	"
X88-2	"	"	"
E-TR-S1B	Transformer		
-S2B	"		
E-S1B	Lamp Rack	Master Spec. Comp.	800-RH-04-03-1
-S2B	"	"	"
PSR-IL-V/X80/1/1	Indicating Light	Master Spec. Comp.	10HA2C7J3L(GR)
X80/2/1	"	"	"
X73/1/1	"	"	"
X73/2/1	"	"	"
X83/1/1	"	"	"
X83/2/1	"	"	"
X84/1/1	"	"	"
X84/2/1	"	"	"
X82/7/1	"	"	"
X82/8/1	"	"	"
X77A/1/1	"	"	"
X77A/2/1	"	"	"
X77A/3/1	"	"	"
X77A/4/1	"	"	"
X82/1/1	"	"	"
X82/2/1	"	"	"
X88/1/1	"	"	"
X88/2/1	"	"	"
003/A	"	"	"
003/B	"	"	"
012	"	"	"
013	"	"	"
014	"	"	"
015	"	"	"
016	"	"	"
105	"	"	"
108	"	"	"
110	"	"	"
011	"	"	"
SW-IL-V/840	"	"	"
842	"	"	"
844	"	"	"
846	"	"	"

Enclosure 4

NUREG 0737 TASK II.F.1.1 NOBLE GAS EFFLUENT RAD MONITOR

EPN	Description	Manufacturer	Model Number
REA-SR-27A	Sample Rack	Nuclear Meas. Corp.	RAK-2N
TEA-SR-26A	"	"	"
WEA-SR-25A	"	"	"
REA-SR-27	Sample Rack	Kaman Instruments	952312-001
TEA-SR-26	"	"	952309-001
WEA-SR-25	"	"	952299-001
REA-SR-37	Flow Control Rack	Air Monitor Corp.	AMC-79-128
TEA-SR-38	"	"	"
REA-RE-19	Detector	Kaman Instruments	952582
-19A	"	NMC	
TEA-RE-13	"	Kaman Instruments	952582
-13A	"	NMC	
WEA-RE-14	"	Kaman Instruments	952582
-14A	"	NMC	
REA-RIS-19	Ratemeter	Kaman Instruments	952279
-19A	"	NMC	
TEA-RIS-13	"	Kaman Instruments	952279
-13A	"	NMC	
WEA-RIS-14	"	Kaman Instruments	952279
-14A	"	NMC	
REA-RR-19	Recorder	Kaman Instruments	5-823335-000
-19A	"		
TEA-RR-13	"	Kaman Instruments	5-823335-000
WEA-RR-14	"	"	"
REA-V-055	Solenoid Valve	Asco	HR89028404LL
TEA-V-003	"	"	"
WEA-V-003	"	"	"
REA-FN-94	Sample Pump	Kaman Instruments	952455-000
TEA-FN-93	"	MDA Scientific Inc.	
WEA-FN-25	"	"	
CS/REA-FN-94	Control Module	Kaman Instruments	952577
CS/TEA-FN-93	"	"	952570
CS/WEA-FN-25	"	"	952577
REA-FIS-1	Flow Indicator Alarm	Kaman Instruments	952458
TEA-FIS-1	"	"	"
WEA-FICS-1	"	"	"

NUREG 0737 TASK II.F.1.2 PARTICULATE & IODINE EFFLUENT SAMPLE

EPN	Description	Manufacturer	Model Number
REA-SR-48	Sample Rack	Rocky Mt. Nuclear	(Later)

NUREG 0737 TASK II.F.1.3 CONTAINMENT HIGH RANGE RAD MONITORO

EPN	Description	Manufacturer	Model Number
CMS-RE-27E	Rad Detector	Victoreen	VHRCMS 875
-27F	"	"	"
CMS-RIS-27E	Ratemeter	Victoreen	VHRCMS 875
-27F	"	"	"
CMS-RR-27E	Recorder	Leeds & Northrup	100 Series
-27F	"	"	"

NUREG 0737 TASK II.F.1.4 CONTAINMENT PRESSURE MONITOR

EPN	Description	Manufacturer	Model Number
CMS-PT-1	Pressure Trans.	Rosemount	1153B Series
-2	"	"	"
-5	"	"	"
-6	"	"	"
-7	"	"	"
-8	"	"	"
CMS-PR-1	Recorder	Leeds & Northrup	135
-2	"	"	"
-7	"	"	134
-8	"	"	"
BD-GI-SRU-89	Signal Resister Un.	Bailey Instrument	766110BAAA2
-95	"	"	"
BD-GII-SRU-74	"	"	"
-76	"	"	"
BD-GI-E/S-99	Power Supply	General Electric	9T66Y990
BD-GII-E/S-299	"	"	"
CMS-PI-7	Meter	(Later)	(Later)

NUREG 0737 TASK II.F.1.5 CONTAINMENT WATER LEVEL

EPN	Description	Manufacturer	Model Number
CMS-LE-3A/3B	Transducer	Electrosyn Inc.	(Later)
-4A/4B	"	"	"
-5A/5B	"	"	"
CMS-LT-3	Level Transducer	Electrosyn Inc.	(Later)
-4	"	"	"
-5	"	"	"
CMS-LR-3	Recorder	Leeds & Northrup	134
-4	"	"	"

NUREG 0737 TASK II.F.1.6 CONTAINMENT HYDROGEN MONITOR

EPN	Description	Manufacturer	Model Number
CMS-AY-1	Hydrogen Anal.	Beckman Instruments	7C
-2	"	"	"
CMS-H2R-1	Recorder	Leeds & Northrup	134
-2	"	"	"
CMS-SR-13	Sample Rack	Beckman Instruments	799763
-14	"	"	"

Enclosure 5

NOMENCLATURE
SAFETY RELATED MECHANICAL EQUIPMENT LIST (SRM)

Appendix A contains the following information:

1. SRM User's Manual: a description of the use fields and abbreviations on the SRM List.

2. System Code List: a list of system abbreviations used on the SRM Equipment List.

3. Component Table: a list of component abbreviations used on the SRM Equipment List.

4. SRM Equipment List.

SRM Equipment List User's Manual: Description of codes used on the SRM list

Designation	Description
CONTRACT	The contract under which the equipment was purchased. The contracts beginning with 02 and Contract 59 were with the NSSS supplier. The two-digit contracts are for equipment purchased through the A/E and the three-digit contracts indicate equipment purchased through contractors at the construction site.
EQUIPMENT NO.	The equipment piece number (EPN) is listed. It is composed of the system designation (a complete list is enclosed), a component code (list enclosed) and a unique identifier.
MFG	Manufacturer: Contains the code prepared for the industry by Southwest Research Corporation indicating the company who manufactured the equipment. In a few cases where the manufacturer has not been determined, the supplier's code was put in this column until the manufacturer has been determined.
MFG MODEL NO.	The manufacturer's model number. In the cases where this has not been determined, General Electric purchased part drawing number or other applicable information is supplied.
Q.I.D.	The Qualification Identification is a six-digit number indicating a file which contains all the qualification documentation for that EPN along with summary forms and plant walk-through records.
Safety Function	The Class 1 action that a piece of equipment or a system is required to perform or monitor that makes it safety related.

A component may provide one or more of the safety functions listed below.

Symbol	Function
A.	Emergency Reactor Shutdown including SCRAM Signals and Reactivity Insertion.

B. Containment Isolation

B1 Primary Containment
B2 Reactor Building

C. Emergency Core Heat Removal

D. Containment Atmosphere Control

E. Core Residual Heat Removal, including Long-Term Cooling

F. Prevention of the Release of Radioactive Material to the Environment

G. No Active Safety Function but a Passive Integrity Function

H. Emergency Electrical Power Systems, AC and DC.

I. Instrumentation to Follow the Course of an Accident

J. Compartment Heat Removal for Equipment Operability or Personnel Habitability

PLANT LOCATION	The location of the component within the plant by building, elevation and coordinates.
EQUIPMENT DESCRIPTION	A description of the equipment function.
DRAWING	The plant P&ID on which the component appears.
USE	Contains codes which describe equipment use during accident and/or normal plant shutdown conditions. The USE field is based on Item 2 Appendix E of NUREG 0588.

The "USE" input field is a two-digit field. The first digit shows the equipment operability requirement for accident mitigation and the second shows the equipment operability requirements for Hot or Cold shutdown conditions.

X X

O The equipment is not required before, during or after a transient.

Example:	Equipment in this category provides no active function, but may provide a passive function by containing radioactive material outside the Reactor Building. It need not be qualified to demonstrate operability, even under non-accident service environments.
1	Equipment that will experience the environmental conditions of design basis accidents for which it must function to mitigate said accidents, and that will be qualified to demonstrate operability in the accident environment for the time required for accident mitigation with safety margin to failure.
Example:	Equipment in this category is required for accident mitigation of accidents analyzed in the FSAR. This includes: pumps, valves, valve operators, fans, NSSS Equipment and dampers to follow the course of an accident, etc.
2	Equipment will experience environmental conditions of design basis accidents through which it need not provide an active function for mitigation of said accidents, but through which it must not fail in a manner detrimental to plant safety or accident mitigation, and that will be qualified to demonstrate the capability to withstand any accident environment for the time during which it must not fail with safety margin to failure.
Example:	Equipment in this category must not actively fail in a manner detrimental to plant safety, e.g., a pump which is not required to operate but must maintain its integrity for the duration of the design basis events. Equipment that provides only a passive integrity function on a potentially contaminated system will be categorized as a "2" and will have a "G" placed in the "EC" column.

Category 2 will include all manual boundary, integrity, test and root valves which may be exposed to post-LOCA and radioactive drain systems components (FDR and EDR).

3 Equipment that will experience environmental conditions of design basis accidents through which it need not function for mitigation of said accidents, and whose failure (in ay mode) is deemed not detrimental to plant safety or accident mitigation, and <u>need</u> <u>not</u> be qualified for any accident environment but will be qualified for its nonaccident service environment.

Example: Equipment in this category is limited to the 1M equipment in the "harsh environments" which is Safety-Related only to prevent the release of radioactive material and will not be exposed to post-LOCA radioactive fluids.

This category will include the components of the Reactor Water Clean-up System downstream of the second containment isolation valve.

4 Equipment that will not experience environmental conditions of design basis accidents and that will be qualifed to demonstrate operability under the exposed extremes of its accident service environment. This equipment would be located outside the Reactor Building.

Second Digit

<u>X</u> <u>X</u>

0 The equipment is not required to operate to shut down the plant during normal conditions.

1 The equipment is required to operate for Hot Shutdown only during normal plant conditions.

2 The equipment is required to operate for Cold Shutdown only during normal plant conditions.

3 The equipment is required to operate for both Hot Shutdown and Cold Shutdown during normal conditions.

MEL-M35

WNP-2 MASTER EQUIPMENT LIST
SYSTEM CODE LIST

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PROJ	SYSTEM CODE	SYSTEM TITLE
02	ANN	ANNUNCIATORS
02	APRM	AVERAGE POWER RANGE MONITOR SYSTEM
02	AR	AIR REMOVAL SYSTEM
02	ARM	AREA RADIATION MONITORING
02	AS	AUXILIARY STEAM SYSTEM
02	BA	BACKWASH AIR SYSTEM
02	BCF	BOILER CHEMICAL FEED SYSTEM
02	BD	BLOWDOWN SYSTEM
02	BS	BLEED (EXTRACTION) STEAM SYSTEM
02	C	CONTAINMENT STRUCTURES AND APPURTANCES
02	CAC	CONTAINMENT ATMOSPHERE CONTROL SYSTEM
02	CAS	CONTROL AIR SYSTEM
02	CBD	CIRCULATING WATER BLOWDOWN SYSTEM
02	CEP	CONTAINMENT EXHAUST PURGE SYSTEM
02	CF	CHEMICAL FEED SYSTEM
02	CIA	CONTAINMENT INSTRUMENT AIR SYSTEM
02	CL	CHLORINE SYSTEM
02	CMS	CONTAINMENT MONITORING SYSTEM
02	CN	CONTAINMENT NITROGEN SYSTEM
02	CND	CONDENSOR DRAINS / VENTS SYSTEM
02	CO	AUXILIARY CONDENSATE SYSTEM
02	COND	NUCLEAR CONDENSATE SYSTEM
02	CO2	CARBON DIOXIDE SYSTEM
02	CPR	CONDENSATE DEMINERALIZER SYSTEM
02	CRA	CONTAINMENT RETURN AIR SYSTEM
02	CRD	CONTROL ROD DRIVE SYSTEM
02	CSP	CONTAINMENT SUPPLY PURGE SYSTEM
02	CTMA	C.T. ELECTRICAL BLDG MIXED AIR (HVAC) SYSTEM
02	CVB	CONTAINMENT VACUUM BREAKER SYSTEM
02	CW	CIRCULATING WATER SYSTEM
02	DCW	DIESEL COOLING WATER SYSTEM
02	DE	DIESEL EXHAUST (ENGINE) SYSTEM
02	DEA	DIESEL BUILDING EXHAUST AIR (HVAC) SYSTEM
02	DEH	DIGITAL-ELECTRO-HYDRAULIC CONTROL SYSTEM
02	DG	DIESEL GENERATOR SYSTEM
02	DLO	DIESEL LUBE OIL SYSTEM
02	DMA	DIESEL BUILDING MIXED AIR (HVAC) SYSTEM
02	DO	DIESEL OIL SYSTEM
02	DOA	DIESEL BUILDING OUTSIDE AIR (HVAC) SYSTEM
02	DRA	DIESEL BUILDING RETURN AIR (HVAC) SYSTEM
02	DSA	DIESEL STARTING AIR SYSTEM
02	DW	DEMINERALIZED WATER SYSTEM
02	E	ELECTRICAL SYSTEM
02	ED	EQUIPMENT DRAIN SYSTEM (PIPING ONLY)
02	EDR	EQUIPMENT DRAINS RADIOACTIVE SYSTEM
02	ES	EXHAUST STEAM (TURBINES) SYSTEM
02	FD	FLOOR DRAIN SYSTEM
02	FDR	FLOOR DRAIN RADIOACTIVE SYSTEM
02	FO	FUEL OIL SYSTEM
02	FP	FIRE PROTECTION SYSTEM
02	FPC	FUEL POOL COOLING SYSTEM

PROJ	SYSTEM CODE	SYSTEM TITLE
02	FW	FILTERED WATER SYSTEM
02	GEA	GUARD HOUSE EXHAUST AIR (HVAC) SYSTEM
02	GFP	GUARD HOUSE FIRE PROTECTION SYSTEM
02	GMA	GUARD HOUSE MIXED AIR (HVAC) SYSTEM
02	GOA	GUARD HOUSE OUTSIDE AIR (HVAC) SYSTEM
02	GPWH	GUARD HOUSE POTABLE HOT WATER SYSTEM
02	GRA	GUARD HOUSE RETURN AIR (HVAC) SYSTEM
02	GY	GLYCOL SYSTEM
02	HCO	HEATING STEAM CONDENSATE SYSTEM
02	HD	HEATER DRAIN SYSTEM
02	HHW	HEATING HOT WATER SYSTEM
02	HPCS	HIGH PRESSURE CORE SPRAY SYSTEM
02	HS	HEATING STEAM SYSTEM
02	HV	HEATER VENT SYSTEM
02	HY	RCC HYDRAULIC CONTROL
02	H2	HYDROGEN SYSTEM
02	IBD	ISO PHASE BUS DUCT SYSTEM
02	IRM	INTERMEDIATE RANGE MONITOR
02	LD	LEAK DETECTION SYSTEM
02	LE	LABORATORY EQUIPMENT
02	LPCS	LOW PRESSURE CORE SPRAY SYSTEM
02	LPRM	LOCAL POWER RANGE MONITOR SYSTEM
02	MD	MISCELLANEOUS DRAIN SYSTEM
02	MET	METEOROLOGICAL SYSTEM
02	MS	MAIN STEAM (NUCLEAR) SYSTEM
02	MSH	MACHINE SHOP EQUIPMENT
02	MSLC	MAIN STEAM LEAKAGE CONTROL SYSTEM
02	MSRV	MAIN STEAM RELIEF VALVE SYSTEM (PIPING ONLY)
02	MT	MATERIAL TRANSPORT SYSTEM
02	MV	MISCELLANEOUS VENTS (PIPING ONLY)
02	MW	MISCELLANEOUS WASTE SYSTEM
02	MWR	MISCELLANEOUS WASTE (RADIOACTIVE) SYSTEM
02	NSSE	NUCLEAR SYSTEM SERVICING EQUIPMENT SYSTEM
02	OG	OFF GAS SYSTEM
02	P	PUMP HOUSE (ALL) BLDG,STRUCTURE & APPURTANCES
02	PEA	PUMP HOUSE EXHAUST AIR (HVAC) SYSTEM
02	PI	PROCESS INSTRUMENTATION SYSTEM
02	PMA	PUMP HOUSE MIXED AIR (HVAC) SYSTEM
02	POA	PUMP HOUSE OUTSIDE AIR (HVAC) SYSTEM
02	PRA	PUMP HOUSE RETURN AIR (HVAC) SYSTEM
02	PS	PROCESS SAMPLING SYSTEM
02	PSR	PROCESS SAMPLING RADIOACTIVE SYSTEM
02	PV	PROCESS VENT SYSTEM
02	PVR	PROCESS VENTS RADIOACTIVE SYSTEM
02	PWC	POTABLE COLD WATER
02	PWH	POTABLE HOT WATER
02	PWR	PROCESS RADIOACTIVE (SOLIDS) SYSTEM
02	R	REACTOR BLDG STRUCTURE & APPURTANCES
02	RBM	ROD BLOCK MONITOR SYSTEM
02	RCC	CLOSED COOLING WATER SYSTEM
02	RCIC	REACTOR CORE ISOLATION COOLING SYSTEM

PROJ	SYSTEM CODE	SYSTEM TITLE
02	RD	ROOF DRAIN SYSTEM (PIPING ONLY)
02	REA	REACTOR BUILDING EXHAUST AIR (HVAC) SYSTEM
02	RFT	REACTOR FEEDWATER TURBINE SYSTEM
02	RFW	REACTOR FEEDWATER SYSTEM
02	RHR	RESIDUAL HEAT REMOVAL SYSTEM
02	ROA	REACTOR BUILDING OUTSIDE AIR (HVAC) SYSTEM
02	RPS	REACTOR PROTECTION SYSTEM
02	RPWH	REACTOR BUILDING POTABLE HOT WATER
02	RRA	REACTOR BUILDING RETURN AIR (HVAC) SYSTEM
02	RRC	REACTOR RECIRCULATION SYSTEM
02	RWCU	REACTOR WATER CLEANUP SYSTEM
02	S	SAMPLING SYSTEM
02	SA	SERVICE AIR SYSTEM
02	SAT	SULFURIC ACID TREATMENT SYSTEM
02	SCH	SERVICE BUILDING CHILLED WATER SYSTEM
02	SCI	SUPERVISORY CONTROL INSTRUMENTATION
02	SCW	STATOR COOLING WATER SYSTEM
02	SEA	SERVICE BUILDING EXHAUST AIR (HVAC) SYSTEM
02	SEC	PLANT SECURITY SYSTEM
02	SEIS	SEISMIC MONITORING SYSTEM
02	SGT	STANDBY GAS TREATMENT SYSTEM
02	SHCO	SERVICE BUILDING HEATING CONDENSATE SYSTEM
02	SHHW	SERVICE BUILDING HEATING HOT WATER SYSTEM
02	SLC	STANDBY LIQUID CONTROL SYSTEM
02	SM	SAMPLING SYSTEM
02	SMA	SERVICE BUILDING MIXED AIR (HVAC) SYSTEM
02	SO	SEAL OIL SYSTEM
02	SPTM	SUPPRESSION POOL TEMP MONITORING SYSTEM
02	SPWH	SERVICE BUILDING POTABLE HOT WATER SYSTEM
02	SRA	SERVICE BUILDING RETURN AIR (HVAC) SYSTEM
02	SRM	SOURCE RANGE MONITOR SYSTEM
02	SS	SEALING STEAM SYSTEM
02	SW	STANDBY SERVICE WATER SYSTEM
02	T	TURBINE BLDG STRUCTURE & APPURTANCES
02	TEA	TURBINE BUILDING EXHAUST AIR (HVAC) SYSTEM
02	TEST	TEST EQUIPMENT AND INSTRUMENTS
02	TG	TURBINE GENERATOR
02	TIP	TRAVERSING INCORE PROBE SYSTEM
02	TMU	TOWER MAKE UP WATER SYSTEM
02	TO	TURBINE LUBE OIL SYSTEM
02	TOA	TURBINE BUILDING OUTSIDE AIR (HVAC) SYSTEM
02	TPWH	TURBINE BUILDING POTABLE HOT WATER SYSTEM
02	TRA	TURBINE BUILDING RETURN AIR (HVAC) SYSTEM
02	TSW	PLANT SERVICE WATER SYSTEM
02	VR	RADIOACTIVE VENT (PIPING ONLY)
02	W	RADWASTE BLDG STRUCTURE & APPURTANCES
02	WCH	WASTE BUILDING CHILLED WATER SYSTEM
02	WEA	WASTE BUILDING EXHAUST AIR (HVAC) SYSTEM
02	WHCO	WASTE BUILDING HEATING CONDENSATE SYSTEM
02	WMA	WASTE BUILDING MIXED AIR (HVAC) SYSTEM
02	WNP2	GENERAL SITE STRUCTURES, SYSTEMS & EQUIPMENT

PROJ	SYSTEM CODE	SYSTEM TITLE
02	WOA	WASTE BUILDING OUTSIDE AIR (HVAC) SYSTEM
02	WPWH	WASTE BUILDING POTABLE HOT WATER SYSTEM
02	WRA	WASTE BUILDING RETURN AIR (HVAC) SYSTEM
02	WRE	WASTE BUILDING REFRIGERATION SYSTEM

COMP CODE	COMPONENT IDENTIFICATION	C R	NPRD COMP	ABCDEF	G	UNIT	H	UNIT	J	UNIT	C L	IE EE	C/ GR	P S	P M	SPARE PART NO	SAF CLS
AC	AIR CONDITIONING UNIT	M	BLOWER	K A ##		SCFM		PSIG		HP	C	#				02-015	
AD	AIR DAMPER	M	VALVEX	B G		IN		PSIG		DEGF	C	#	#			02-019	
AH	AIR HANDLING UNIT	M	BLOWER	C A ##		SCFM	#	#		HP	D	#				02-024	
ALM	ALARM			VS ED							B		#			02-187	
ALT	ALTERNATING RELAY	E	CKTBKR	EXCB				DEGF		AMP	B		#			02-355	
AM	AMMETER	E	INSTRU	II# #	#	#	#	#	#	#	B		#			02-295	
AMP	AMPLIFIER		INSTRU	VX CA							B		#			02-135	
ANN	ANNUNCIATORS	E	ANNUNC	CB####	#	#	#	#	#	#						02-	
AO	AIR OPERATOR	M	VALVOP	##		LB		FTLB	#	#	C	#	#			02-303	
AR	AIR RECEIVER			#									#			02-120	
AR	ALARM RECORDER			#									#			02-205	
ASW	AIR SWITCH	I	VALVEX	X							B	#				02-325	
AUX	AUX. INST. OR ELECT. EQUIP	I	INSTRU	XY####							B		#			02-165	
AV	AIR RELEASE VALVE	M	VALVEX	XFL		IN		PSIG		DEGF	D	#		#		02-130	
AW	AIR WASHER	M	FILTER	A ##				PSID		MICR	C	#				02-024	OT
AY	ANALYZER	I	INSTRU	A #							B	#	#			02-158	
BD	BOARD	E	#	######	#	#	#	#	#	#	B	#	#	#	#	02-#	#
BJM	BRANCH JUNCTION MODULE	I	INSTRU	XYICX#	#	#	#	#	#	#	B		#			02-385	
BL	BALER	M	MECFUN	XX ##		FTLB		RPM		RPM	C	#	#			02-020	
BLR	BOILER	M	HTEXCH	B #		KSFT		PSIG		MBH	C	#				02-025	OT
BUOY	BUOY	I	MECFUN	######	#	#	#	#	#	#	D	#	#			02-175	OT
B0	24 VOLT BATTERY	E	BATTRY	##	#	#		VDC		AMPH	B		#			02-260	
B1	125 VOLT BATTERY	E	BATTRY	##	#	#		VDC		AMPH	B		#			02-260	
B2	250 VOLT BATTERY	E	BATTRY	##	#	#		VDC		AMPH	B		#			02-260	
B3																02-	
C	COMPRESSOR	M	BLOWER	##		SCFM		PSIG		HP	C	#				02-010	
CAR	CHLORINE ANALYZER/RECORDER	I	INSTRU	A #							B		#			02-150	
CB	CIRCUIT BREAKER	E	CKTBRK	A		VAC		DEGF		AMP	B		#			02-265	
CBL	CABLE	E	ELECON	CXXXXX												02-	
CC	COOLING COIL	M	HTEXCH	CH #		KSFT		PSIG		MBH	C	#		#	#	02-055	
CCU	CENTRAL CONTROL UNIT	I	INSTRU	UCCFF	#	#	#	#	#	#						02-	
CE	CONDUCTIVITY ELEMENT	I	INSTRU	CE #							B					02-170	
CF	CHARCOAL FILTER	M	FILTER	A ##		SCFM		PSID		MICR	B	#		#		02-040	
CHL	CHLORINATORS	M		######	#	#	#	#	#	#	C	#	#			02-	
CI	CONDUCTIVITY INDICATOR	I	INSTRU	CIACK#	#	#	#	#	#	#	B	#	#			02-175	
CIS	CONDUCTIVITY INDIC. SWITCH	I	INSTRU	CSI #	#	#	#	#	#	#	B		#			02-325	
CIST	CONDUCTIVITY IND TRAN SWITCH	I	INSTRU	CTS #							B		#			02-230	
CIT	CONDUCTIVITY INDIC. TRANSMIT	I	INSTRU	CTI #							B		#			02-230	
CNTR	CONTACTOR,.CL.1E ONLY.	E	CKTBKR	B				DEGF		AMP						02-	
COE	CORROSIVITY SENSOR	I	INSTRU	XE# #	#	#	#	#	#	#	B	#	#			02-	
COMP	COMPUTER	I	INSTRU													02-202	
CON	CONDUCTIVITY ANAL/CONTROLLER	I	INSTRU	CX #							B		#			02-155	
CONN	CONNECTOR,.CL.1E ONLY.	E	ELECON	AXXXXX												02-	
COR	CORROSIVITY RECORDER	I	INSTRU	XR# #							B	#	#			02-	
CP	CONTROL PANEL	E	#	######	#	#	#	#	#	#	B	#	#	#	#	02-#	#
CPL	DATA COUPLER	I	INSTRU	#YRCK#	00001	VDC	#	ZZZ	#	ZZZ						02-035	
CR	DIODE,.CL.1E ONLY.															02-	
CR	CONDUCTIVITY RECORDER															02-205	
CR	CHILLER															02-055	
CRA	CRANE	M	MECFUN	CX ##		FTLB		RPM	RPM		C	#				02-106	
CRM	CONTROL ROOM MODULE	I	INSTRU	UYYCX	#	#	#	#	#	#						02-	
CS	CONDUCTIVITY SWITCH	I	INSTRU	CS# #	#	#	#	#	#	#	B					02-325	
CT	CURRENT TRANSFORMER			#								#	#			02-345	

MEL-M26

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
MASTER EQUIPMENT LIST
COMPONENT TABLE

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COMP CODE	COMPONENT IDENTIFICATION	C R	NPRD COMP	ABCDEF	G	UNIT	H	UNIT	J	UNIT	C L	IE EE	C/ GR	P S	P M	SPARE PART NO	SAF CLS
CT	CONDUCTIVITY TRANSMITTER			#								#	#			02-230	
CT	COOLING TOWER			#								#	#			02-055	
CU	CONDENSING UNIT	M	ACCUMU	X ###		PSIG		DEGF	#	#	C	#				02-080	
C0	24 VOLT BATTERY CHARGER	E	BATTRY	##	#	#		VDC		AMPH	B		#			02-261	
C1	125 VOLT BATTERY CHARGER	E	BATTRY	##	#	#		VDC		AMPH	B		#			02-261	
C2	250 VOLT BATTERY CHARGER	E	BATTRY	##	#	#		VDC		AMPH	B		#			02-261	
C3																02-	
D	DAMPER	M	VALVEX	B G		IN		PSIG		DEGF	D	#	#			02-019	OT
DC	DUST COLLECTOR	M	FILTER	##		SCFM		PSID		MICR	C	#	#			02-025	OT
DE	DENSITY ELEMENT	I	INSTRU	XE####	#	#	#	#	#	#	B	#	#			02-170	
DET	DETECTOR	I	INSTRU	ASEA##	#	#	#	#	#	#	B		#			02-170	
DFS	DIFFERENTIAL FLOW SWITCH	I	INSTRU	FSDE #							B		#			02-325	
DIF	DIFFUSER	M	PIPEXX	X #		IN		PSIG			C	#			#	02-080	OT
DISC	FUSED DISCONNECT	E	CKTBRK	A A				DEGF		AMP						02-	
DLR	DIFFERENTIAL LEVEL RECORDER	I	INSTRU	LRD #							B	#	#			02-205	
DLS	DIFFERENTIAL LEVEL SWITCH	I	INSTRU	LSD #							B		#			02-325	
DLT	DIFFEREN LEVEL TRANSMITTER	I	INSTRU	LTD #							B					02-230	
DM	DEMINERALIZER	M	DIMINX	###		GPM		PSID		GMSF	B	#		#	#	02-042	
DMS	DEMISTER	M	AIRDRY	CD#		PSIG		SCFM		DEGF		#		#	#	02-	
DMTR	DEMAND METER	E	INSTRU	II#CA#				AMP		AMP			#			02-295	
DOE	DISSOLVED OXYGEN ELEMENT	I	INSTRU	XE# #	#	#	#	#	#	#	B					02-170	
DOIT	DISSOLVED OXYGEN INDIC TRANS	I	INSTRU	AIT #							B		#			02-230	
DOOR	DOOR	M	PENETR	Z###	#	#	#	#	#	#	D	#	#			02-115	OT
DP	DISTRIBUTION PANEL	E	CKTBKR	K D/B#		120 VAC		DEGF		AMP	B		#			02-305	
DPC	D PRESS CONTROLLER	I	INSTRU	PCD #							B		#			02-155	
DPE	DRIP PAN ELBOW	M	PIPEXX	#		IN		PSIG	#	#	D	#	#	#		02-080	OT
DPI	D PRESS INDICATOR	I	INSTRU	PID #	#	#	#	#	#	#	B	#	#			02-175	
DPIC	D PRESS INDICAT, CONTROLLER	I	INSTRU	PCI #							B		#			02-155	
DPIR	D PRESS INDICIAT RECORDER	I	INSTRU	PRI #							B	#	#			02-205	
DPIS	D PRESS INDICATING SWITCH	I	INSTRU	PSI #	#	#	#	#	#	#	B		#			02-325	
DPIT	D PRESS INDICAT TRANSMITTER	I	INSTRU	PIS #							B		#			02-230	
DPR	D PRESS RECORDER	I	INSTRU	PRD #							B	#	#			02-205	
DPRC	D PRESS RECORDING CONTROLLER	I	INSTRU	PCR #							B		#			02-205	
DPS	D PRESS SWITCH	I	INSTRU	PSD #	#	#	#	#	#	#	B		#			02-325	
DPT	D PRESS TRANSMITTER	I	INSTRU	PTD #							B		#			02-230	
DRVE	DRIVE	M	CRDRVE	AB####	#	#	#	#	#	#	B	#				02-065	
DS	DENSITY SWITCH	I	INSTRU	XS# #	#	#	#	#	#	#	B		#			02-325	
DT	DENSITY TRANSMITTER										B		#			02-230	
DT	DRIVE TURBINE										B		#			02-125	
DTIS	D TEMP INDICATING SWITCH	I	INSTRU	TSI #	#	#	#	#	#	#	B		#			02-325	
DTRS	D TEMP RECORDING SWITCH	I	INSTRU	TRS #							B		#			02-205	
DTT	D TEMP TRANSMITTER	I	INSTRU	TTD #							B		#			02-230	
DU	DEAERATOR	M	HTEXCH	###	#	#		PSIG		HBH	C	#		#		02-055	
DV	DUMP VALVE	M	VALVEX			IN		PSIG		DEGF	C	#				02-130	
DVSP	DRAIN VALVE SPV	E	VALVEX	XEX		IN		PSIG		DEGF	U				#	02-	
DY	DRYER	M	AIRDRY	###		PSIG		SCFM		DEGF	C	#				02-082	
E/H	ELECTROHYDRAULIC CONVERTER	I	INSTRU	EX# #							B		#			02-165	
E/P	ELECTROPNUEMATIC CONVERTER	I	INSTRU	EY #							B		#			02-165	
E/S	ELECTRONIC POWER SUPPLY	I	INSTRU	XP XX#							B		#			02-195	
EAMP	VOLTAGE AMPLIFIER OR PREAMPL	I	INSTRU	EYY/F												02-177	
ED	EDUCTOR	M	PUMPXX	K # #		FTHD		GPM	#	#	C	#		#	#	02-081	OT
EFCK	EXCESS FLOW CHECK VALVE	M	VALVEX	CXX B		IN		PSIG		DEGF	B	#			#	02-130	
EHC	ELECTRIC HEATING COIL	E	HEATER	######	#	#	#	#	#	#	C		#			02-290	

COMP CODE	COMPONENT IDENTIFICATION	C R	NPRD COMP	ABCDEF	G	UNIT	H	UNIT	J	UNIT	C L	IE EE	C/ GR	P S	P M	SPARE PART NO	SAF. CLS
EHO	ELECTROHYDRAULIC OPERATOR	M	VALVOP	C ##		LB		FTLB	#	#	B		#			02-304	
EI	VOLTMETER(SEE V FOR B&R USE)	E	INSTRU	EI#CU#												02-295	
EJ	EXPANSION JOINT	M	PIPEXX	X X		IN		PSIG	#	#	C	#		#	#	02-080	
EJC	EJECTOR,INJECTOR OR EDUCTOR	M	PUMPXX	X # #		FTHD		GPM	#	#	C	#		#		02-081	
ELEV	ELEVATOR	E	MECFUN	XXX ##		FTLB		RPM		RPM	C	#	#			02-106	
ELF	EMER LIGHT FIXTURE,*CL.1E*	E	ELECON	XABXXX		VAC		#		#						02-	
ELP	EMERGENCY LIGHTING PANEL	C	CKTBKR	X DAB #		VAC		DEGF		AMP	B		#			02-305	
EMSQ	MEAN SQUARE VOLTAGE DEVICE	I	INSTRU	EYYAF												02-177	
ENG	ENGINE	M	ENGINE	###		HP		CYL		RPM	B		#			02-060	
EPP	EMERGENCY POWER PANEL	E	CKTBKR	X DAB #		VAC		DEGF		AMP	B		#			02-305	
EQ	SPECIALITY EQUIP AND TOOLS										C	#	#			02-035	
ES	EXHAUST SILENCER	M	PIPEXX	X #		IN		PSIG	#	#	D	#	#	#	#	02-080	OT
ESH	ELECTRIC STRIP HEATER	E	HEATER	#####	#	#	#	#	#	#	C		#			02-290	
ETD	TRANSDUCER,VOLTAGE	I	INSTRU	EY# #							B		#			02-	
EUH	ELECTRIC UNIT HEATER	E	HEATER	#####	#	#	#	#	#	#	C		#			02-290	OT
EV	EVAPORATOR	M	HTEXCH	E #		KSFT		PSIG		MBH	C	#		#	#	02-055	
EX	EXHAUSTER	M	BLOWER	C A ##		SCFM		PSIG		HP	D	#				02-280	
EXC	EXCITER	E	GENERA	X		RPM				KW	B		#			02-285	
F	PIPING FILTER	M	FILTER	##				PSID		MICR	C	#	#	#		02-	
FA	FLAME ARRESTOR	M	PIPEXX	X #		IN		PSIG	#	#	D	#		#	#	02-080	OT
FC	FAN COIL												#			02-024	
FC	FLOW CONTROLLER												#			02-155	
FCN	FILL CONNECTION	M	PIPEXX	X #		IN	#	#	#	#	D	#		#	#	02-080	OT
FCV	FLOW CONTROL VALVE	M	VALVEX	F G		IN		PSIG		DEGF	C	#				02-133	
FE	FLOW ELEMENT	I	INSTRU	FEXA #	#	#	#	#	#	#	B	#		#	#	02-170	
FG	FLOW GLASS	I	INSTRU	FINCC#	#	#	#	#	#	#	B	#		#	#	02-175	OT
FGEN	FUNCTION GENERATOR	I	INSTRU													02-177	
FH	FUME HOOD	M	BLOWER	D ##		SCFM		PSIG		HP	D	#				02-024	OT
FI	FLOW INDICATOR	I	INSTRU	FI# #	#	#	#	#	#	#	B	#	#			02-175	
FIC	FLOW INDICATING CONTROLLER	I	INSTRU	FCI #							B		#			02-155	
FIS	FLOW INDICATING SWITCH	I	INSTRU	FSI #	#	#	#	#	#	#	B		#			02-325	
FIT	FLOW INDICATING TRANSMITTER	I	INSTRU	FTI #							B		#			02-230	
FL	FILTER	M	FILTER	##		SCFM		PSID		MICR	C	#		#		02-040	
FLT	FILTER	M	FILTER	##		GPM		PSID		MICR	C	#		#		02-040	
FLX	FLEXIBLE CONNECTION	M	PIPEXX	X #		IN		PSIG	#	#	C	#		#		02-080	
FN	FAN	M	BLOWER	C A ##		SCFM		PSIG		HP	D	#				02-280	
FO	FREON ACTUATED OPERATOR	M	VALVOP	D ##							B	#				02-304	
FQ	FLOW INTEGRATOR	I	INSTRU	FQH #							B		#			02-180	
FQI	FLOW INTEGRATING INDICATOR	I	INSTRU	FQQ #							B		#			02-180	
FQS	FLOW INTEGRATING SWITCH	I	INSTRU	FSQ #							B		#			02-325	
FR	FLOW RECORDER	I	INSTRU	FR#					#	#	B	#	#			02-205	
FRC	FLOW RECORDING CONTROLLER	I	INSTRU	FCR #							B		#			02-205	
FRCS	FLOW RECORDING CONTRL SWITCH	I	INSTRU	FCR #							B		#			02-205	
FRS	FLOW RECORDING SWITCH	I	INSTRU	FSR #							B		#			02-235	
FS	FLOW SWITCH	I	INSTRU	FS# #	#	#	#	#	#	#	B					02-325	
FSPV	FLOW CONTROL VLV-SPV.	E	VALVEX	XEX		IN		PSIG		DEGF	B				#	02-	
FT	FLOW TRANSMITTER	I	INSTRU	FT#					#	#	B		#			02-230	
FTD	TRANSDUCER,FREQUENCY	I	INSTRU	SY# #							B		#			02-	
FU	FILTER UNIT	M	FILTER	##				PSID		MICR	C	#	#	#		02-	
FUH	FUSEBLOCK HOLDER*CL.1E ONLY*	E	CKTBKR	A ##		#		DEGF		AMP						02-	
FUSE	FUSE,*CL.1E ONLY*	E	CKTBKR	AXEX #		#		DEGF		AMP						02-	
FX	FLOW TEST POINT	I	INSTRU	FXX##	#	#	#	#	#	#	C	#		#	#	02-080	OT
GEN	GENERATOR	E	GENERA	D A		RPM		VAC		KW	B		#			02-285	

COMP CODE	COMPONENT IDENTIFICATION	C R	NPRD COMP	ABCDEF	G	UNIT	H	UNIT	J	UNIT	C L	IE EE	C/ GR	P S	P M	SPARE PART NO	SAF CLS
GVT	GRAVITY VENTILATOR	M	BLOWER	OXD **		SCFM	*	*	*	*	D	*	*			02-024	OT
H	HEATER	E	HEATER	******	*	*	*	*	*	*	C		*			02-290	
HAS	HIGH AMPLITUDE SELECTOR	I	INSTRU	UY* *	*	*	*	*	*	*	B		*			02-325	
HC	HEATING COIL	M	HEATER	****	*	*	*	*	*	*	C		*			02-290	
HCU	HYDRAULIC CONTROL UNIT	M	CRDRVE	X*****	*	*	*	*	*	*	B					02-065	
HF	HIGH EFFICIENCY FILTER	M	FILTER	A **		SCFM		PSID		MICR	B	*	*	*		02-040	
HGR	HANGER,SNUBBER,STRUT & SUPPT	M	SUPORT	*		KIPS	*	*	*	*		*		*		02-	
HO	HYDRAULIC OPERATOR	M	VALVOP	C **		LB		FTLB	*	*	B	*	*			02-304	
HOI	HOIST	M	MECFUN	C* **		FTLB		RPM		RPM	C	*				02-106	
HP	HYDRAULIC POWER UNIT	M	MECFUN	OXO **		FTLB		RPM		RPM	B	*				02-060	
HR	HYDROGEN RECOMBINER	M	RECOMB	***		BTUH		SCFM		DEGF	B	*		*		02-094	
HS	HOSE STATION	M	PIPEXX	K A *		IN		PSIG	*	*	D	*		*		02-095	OT
HT	HYDRANT	M	VALVEX	FAD		IN					D	*		*		02-045	OT
HTP	HOT WATER HEAT EXCHANGER	M	HTEXCH	******	*	*	*	*	*	*	C	*	*		*	02-055	OT
HU	HUMIDIFIER	M	HTEXCH	E *		KSFT		PSIG		MBH	C	*				02-024	OT
HV	HEATING AND VENTILATION UNIT	M	HTEXCH	GH *		KSFT	*	*		MBH	D	*	*			02-324	
HX	HEAT EXCHANGER	M	HTEXCH	G *		KSFT		PSIG		MBH	C	*		*	*	02-055	
HZM	FREQUENCY METER	E	INSTRU	SI*CO		HZ		HZ		HZ						02-	
H2R	HYDROGEN RECORDER	I	INSTRU	AR* *							B	*	*			02-235	
I/P	CURRENT/PNEUMATIC CONVERTER	I	INSTRU	IY*DC*							B		*			02-165	
IL	INDICATOR LIGHT,*CL.1E ONLY*	I	INSTRU	ZI*CX		MV		MV		*						02-	
IN	INVERTER	E	GENERA	FDA*FO	*	*		VAC		KW	B		*			02-185	
IR	INSTRUMENT RACK	E	MECFUN	XAX*		*		*		*						02-	
ITO	TRANSDUCER,CURRENT	I	INSTRU	IY* *							B		*			02-	
JI	WATTMETER(SEE W FOR B&R USE)	E	INSTRU	II*CB*				WATT		WATT			*			02-295	
JP	JET PUMP	M	PUMPXX	K **		FTHD		GPM	*	*	B	*		*	*	02-026	
LA	LIGHTNING ARRESTOR										B	*	*			02-	
LAG	ELECTRONIC TIME DELAY	I	INSTRU	UY* **	*	*	*	*	*	*	B		*			02-325	
LAS	LOW AMPLITUDE SELECTOR	I	INSTRU	UY* **	*	*	*	*	*	*	B		*			02-325	
LC	LEVEL CONTROLLER	I	INSTRU	LC* *							B		*			02-155	
LCV	LEVEL CONTROL VALVE	M	VALVEX	F X		IN		PSIG		DEGF	C	*				02-133	
LE	LEVEL ELEMENT	I	INSTRU	LE* *	*	*	*	*	*	*	B		*		*	02-170	
LG	LEVEL GLASS	I	INSTRU	LI*CC*	*	*	*	*	*	*	B	*			*	02-175	OT
LI	LEVEL INDICATOR	I	INSTRU	LI* *	*	*	*	*	*	*	D	*	*			02-175	
LIC	LEVEL INDICATING CONTROLLER	I	INSTRU	LCI *							B		*			02-155	
LIS	LEVEL INDICATING SWITCH	I	INSTRU	LSI* *		*	*	*	*	*	B		*			02-325	
LITS	LEVEL INDIC TRANS SWITCH	I	INSTRU	LTS *							B		*			02-230	
LMS	LIMIT SWITCH	E	INSTRU	ZS* *	*	*	*	*	*	*	B		*			02-325	
LMS	LOCAL MANUAL SWITCH	C	INSTRU	ZS* *	*	*	*	*	*	*	B		*			02-325	
LMTR	VOLTAGE/CURRENT SIGNAL LIMIT	I	INSTRU	VC FE							B		*			02-155	
LOC	LUBE OIL CONDITIONER	M	FILTER	C **		GPM		PSID		MICR	B	*	*	*		02-075	OT
LP	LIGHTING PANEL	E	CKTBKR	X DAB*	20E	VAC		DEGF		AMP	B		*			02-305	
LPW	ELECTRONIC POWER SUPPLY(E/S)	I	INSTRU	XP XX*							B		*			02-195	
LR	LEVEL RECORDER										B	*	*			02-205	
LRS	LEVEL RECORDING SWITCH	I	INSTRU	LRS *							B		*			02-205	
LS	LEVEL SWITCH	I	INSTRU	LS* *	*	*	*	*	*	*	B		*			02-325	
LSPV	LEVEL CONTROL VLV-SPV	E	VALVEX	XEX		IN		PSIG		DEGF	B				*	02-	
LT	LEVEL TRANSMITTER	I	INSTRU	LT* *							B		*			02-230	
LTO	TRANSDUCER LEVEL	I	INSTRU	LTE *							B		*			02-	
LVS	LOW VOLUME SELECTOR	I	INSTRU	UY* **	*	*	*	*	*	*	B		*			02-325	
LX	LEVEL TEST POINT	I	INSRTU	LE*BX*	*	*	*	*	*	*		*		*	*	02-360	OT
M	MOTOR	E	MOTORX	***	*	*				RPM	C					02-300	
M/A	MANUAL OR AUTO STATION	I	INSTRU	UC* *							B		*			02-155	

COMP CODE	COMPONENT IDENTIFICATION	C R	NPRD COMP	ABCDEF	G	UNIT	H	UNIT	J	UNIT	C L	IE EE	C/ GR	Q S	P M	SPARE PART NO	SAF CLS
MC	MOISTURE CONTROLLER			X							B		#			02-155	
MC	MOTOR CONTROL CENTER			X							B		#			02-305	
ME	MOISTURE ELEMENT	I	INSTRU	HE# ##	#	#	#	#	#	#	B	#	#			02-170	
MI	MOISTURE INDICATOR	I	INSTRU	HI# #	#	#	#	#	#	#	B	#	#			02-175	
MIC	MOISTURE INDIC CONTROLLER	I	INSTRU	HCI #							B	#	#			02-155	
MIS	MOISTURE INDICATING SWITCH	I	INSTRU	HSI #	#	#	#	#	#	#	B	#	#			02-325	
MO	MOTOR OPERATOR	E	VALVOP	##		LB		FTLB	#	#	C		#			02-302	
MR	MOISTURE RECORDER	I	INSTRU	HR# #							B	#	#			02-205	
MS	MOISTURE SEPARATOR	M	HTEXCH			KSFT		PSIG		MBH	C	#		#		02-055	
MT	MOISTURE TRANSMITTER	I	INSTRU	HT# #							B	#	#			02-230	
MV/I	M/VOLT TO CURRENT CONVERTER	I	INSTRU	ZY#DD#							B		#			02-168	
MV/P	MILLIVOLT TO PNEUMATIC CONVE	I	INSTRU	EY# #							B		#			02-165	
MX	MIXER	M	MECFUN	# ##		FTLB		RPM		RPM	C	#	#			02-121	OT
MZ	MULTIZONE AIR CONDITIONER	M	HTEXCH	GH #		KSFT	#	#		MBH	C	#	#		#	02-015	
N	NOZZLE	M	PIPEXX	E #		IN		PSIG	#	#	C	#		#		02-080	OT
NR	NEUTRAL GROUNDING RESISTOR	E	ELECON	X		VAC			#	#	B		#			02-345	
OSC	OSCILLOGRAPH	E	INSTRU	ER#												02-315	
O2R	OXYGEN RECORDER	I	INSTRU	AR# #	#	#		#	#	#	B	#	#			02-205	
P	PUMP	M	PUMPXX	#		FTHD		GPM		RPM	C	#				02-030	
PBU	SEISMIC PLAYBACK UNIT	I	INSTRU													02-205	
PC	PRESSURE CONTROLLER	I	INSTRU	PC# #							B	#	#			02-155	
PCV	PRESSURE CONTROL VALVE	M	VALVEX	H		IN		PSIG		DEGF	C	#				02-133	
PH	PH ANALYZER	I	INSTRU	AC# #							B	#	#			02-150	
PHE	PH ELEMENT	I	INSTRU	PE# #	#	#	#	#	#	#	B	#	#			02-170	
PHIC	PH INDICATING CONTROLLER	I	INSTRU	ACI #							B	#	#			02-155	
PHIT	PH INDICATING TRANSMITTER	I	INSTRU	ATI #							B	#	#			02-230	
PHRC	PH RECORDING CONTROLLER	I	INSTRU	ACR #							B	#	#			02-205	
PHT	PH TRANSMITTER	I	INSTRU	AT# #							B	#	#			02-230	
PI	PRESSURE INDICATOR	I	INSTRU	PI# #	#	#	#	#	#	#	B	#				02-175	
PIC	PRESS INDICATING CONTROLLER	I	INSTRU	PCI #							B		#			02-185	
PIS	PRESSURE INDICATING SWITCH	I	INSTRU	PSI #	#	#	#	#	#	#	B		#			02-325	
POC	POSITION INDICATION ELEMENT	I	INSTRU	E									#			02-175	
POI	POSITION INDICATOR	I	INSTRU	ZI# #							B	#	#			02-175	
POS	POSITION SWITCH	I	INSTRU	ZS# #	#	#	#	#	#	#	B	#	#			02-325	
POT	POSITION TRANSMITTER	I	INSTRU	ZT# #							B	#	#			02-230	
POTR	POTENTIOMETER,*CL.1E ONLY*	E	ELECCH	XXXXX#						#						02-	
PP	PUMP PACKAGE										B		#			02-030	
PP	POWER PANEL										B		#			02-305	
PR	PRESSURE RECORDER	I	INSTRU	PR# #	#	#	#	#	#	#	B	#	#			02-205	
PROG	PROGRAMMER	I	INSTRU	UYC #							B	#	#			02-	
PRV	PRESSURE REDUCING VALVE	M	VALVEX	F H		IN		PSIG		DEGF	C	#				02-133	
PS	PRESSURE SWITCH	I	INSTRU	PS# #	#	#	#	#	#	#	B					02-325	
PSV	SOLENOID PILOT VALVE	E	VALVEX	XFX		IN		PSIG		DEGF	B				#	02-134	
PT	POTENTIAL TRANSFORMER			#							B		#			02-345	
PT	PRESSURE TRANSMITTER			#							B		#			02-230	
PTD	PRESSURE TRANSDUCER	I	INSTRU								B				#	02-165	
PUI	PURITY INDICATOR	I	INSTRU	XI# #	#	#	#	#	#	#	B	#	#			02-175	
PUIT	PURITY INDIC TRANSMITTER	I	INSTRU	XTI #							B	#	#			02-230	
PUS	PURITY SWITCH	I	INSTRU	XS# #	#	#	#	#	#	#	B	#	#			02-325	
PV	PILOT VALVE	M	VALVEX	X		IN		PSIG		DEGF	C				#	02-130	
PWC	DEW POINT TRANSMITTER	I	INSTRU	MT# #							B	#	#			02-230	
PWS	PIPE WHIP RESTRAINT	S	SUPORT	I ##		KIPS	#	#	#	#	D	#	#	#		02-080	
PX	PRESSURE TEST POINT	I	INSTRU	PX### #	#	#	#	#	#	#	C	#		#	#	02-080	OT

MASTER EQUIPMENT LIST

COMPONENT TABLE

COMP CODE	COMPONENT IDENTIFICATION	C R	NPRD COMP	ABCDEF	G	UNIT	H	UNIT	J	UNIT	C L	IE EE	C/ GR	P S	P M	SPARE PART NO	SAF CLS
QDC	QUICK DISCONNECT COUPLING	H	PIPEXX	X #		IN		PSIG	#	#	D	#		#	#	02-	OT
QHM	RUN TIME METER	E	INSTRU	XI#CC		#		#		HR						02-	
QSV	QUICK ACTING SOLENOID PILOT	E	VALVEX	XEX		IN		PSIG		DEGF	B					02-134	
R/I	RESISTANCE/CURRENT CONVER	I	INSTRU	YY# #							B		#			02-165	
RAM	RADIATION AMPLIFIER	I	INSTRU	AP# #							B		#			02-016	
RC	REMOTE CAPPER			#								#				02-325	
RC	RADIATION CONTROLLER			#								#				02-155	
RC	RECOMBINER			#								#				02-054	
RD	RUPTURE DISC	H	PIPEXX	# #		IN		PSIG	#	#	C	#		#	#	02-085	
RE	RADIATION ELEMENT	I	INSTRU	RE# #							B		#			02-170	
REL	FLOW BALANCING RELAY	I	INSTRU	UY# #							B	#	#			02-355	
RES	ESISTOR,*CL.1E ONLY*	E	ELECON	XXXXX#						#						02- 8	
RF	REFRIGERATION MACHINE	H	HTEXCH	C #		KSFT		PSIG		MBH	C	#				02-015	
RI	RADIATION INDICATOR	I	INSTRU	RI# #	#	#	#	#	#	#	B	#	#			02-175	
RIS	RADIATION INDICATING SWITCH	I	INSTRU	R #							B		#			02-325	
RLY	RELAY	E	RELAYX	#					#	#	B		#			02-355	
RMC	REMOTE MANUAL CONTROLLER	I	INSTRU	#CSEX#	#	#	#	#	#	#	D		#			02-155	
RMS	REMOTE MANUAL CONTROL SWITCH	E	CKTBRK	ECDAAA				DEGF		AMP	B		#		#	02-325	OT
RO	RESTRICTING ORIFICE	H	PIPEXX	D #		IN		PSIG	#	#	C	#			#	02-080	
ROD	ROD	H	CONROD	EFBB##	#	#	#	#	#	#	B	#	#	#		02-026	
RPV	REACTOR PRESSURE VESSEL	H	VESSEL	A ####	#	#		PSIG		DEGF	B	#		#		02-026	
RR	RADIATION RECORDER	I	INSTRU	RR# #							B	#	#			02-205	
RS	RADIATION SWITCH	I	INSTRU	RS# #	#	#	#	#	#	#	B		#			02-325	
RSA	RESPONSE SPECTRUM ANNUNCIATO	I	INSTRU	UX AH												02-251	
RSM	RADIATION SAMPLER	I	INSTRU	RE#XX#	#	#	#	#	#	#	B	#	#	#	#	02-	OT
RSR	TRIAXIAL RESPONSE SPECTRUM R	I	INSTRU	VR AH												02-205	
RSRT	RSR TRANSDUCER FOR RSA	I	INSTRU													02-205	
RST	RESIN TRAP	H	FILTER	##		GPM		PSID		MICR	C	#		#		02-100	
RT	RADIATION TRANSMITTER	I	INSTRU	RT# #							B		#			02-230	
RV	RELIEF VALVE	H	VALVEX	F B		IN		PSIG		DEGF	C	#				02-085	
RVT	ROOF VENTILATOR	H	BLOWER	D ##		SCFM		PSIG		HP	D	#				02-024	OT
S	ELECTRONIC TRIP UNIT			X #												02-187	
S	SILENCER			X #												02-090	
SC	SPEED CONTROLLER	I	INSTRU	SC# #							B		#			02-155	
SCR	SCREEN	H	FILTER	A ##				PSID		MICR	D	#	#	#		02-100	OT
SE	SPEED ELEMENT	I	INSTRU	SEX #							B		#			02-170	
SEW	SAFETY EYE WASH	H	#	######	#	#	#	#	#	#	#	#	#	#		02-	OT
SH	6.9 KV SWITCH GEAR	E	CKTBRK	FACAFE	6900	VAC	#	#	2000	AMP	B					02-330	
SI	SPEED INDICATOR	I	INSTRU	XT #	#	#	#	#	#	#	B	#	#			02-175	
SIOA	SILICON AND OXYGEN ANALYZER	I	INSTRU	AE# #	#	#	#	#	#	#	B	#	#			02-180	
SL	480VOLT SWITCH GEAR	E	CKTBRK	FACACD	480	VAC	#	#		AMP	B					02-330	
SM	4.16KV SWITCH GEAR	E	CKTBRK	FACAEE	4160	VAC	#	#		AMP	B					02-330	
SMA	TRIAXIAL ACCELERATION SENSOR	I	INSTRU	VEIAH												02-170	
SMO	SMOKE DETECTOR	I	INSTRU	KSE #	#	#	#	#	#	#	B	#	#			02-045	
SMX	STATIC MIXER	H	PIPEXX	X #		IN		PSIG	#	#	C	#		#	#	02-080	OT
SNB	SNUBBER	H	SUPORT	D ##		KIPS	#	#	#	#	C	#		#		02-050	
SP	SAMPLE POINT	H	PIPEXX	X #		IN		PSIG	#	#	C	#		#	#	02-210	OT
SPV	SOLENIOD PILOT VALVE	E	VALVEX	XEX		IN		PSIG		DEGF	B				#	02-134	
SQRT	SQUARE ROOT EXTRACTOR	I	INSTRU	UY# #							B		#			02-165	
SR	SAMPLE RACK	E	#	######	#	#	#	#	#	#	B	#	#	#	#	02-#	#
SS	SELECTOR SWITCH	H	CKTBKR	FAB#				DEGF		AMP						02-325	
SS	SPEED SWITCH	H	CKTBKR	FAB#				DEGF		AMP						02-	
ST	STRAINER	I	INSTRU	VEIAH												02-100,	

COMP CODE	COMPONENT IDENTIFICATION	C R	NPRD COMP	ABCDEF	G	UNIT	H	UNIT	J	UNIT	C L	IE EE	C/ GR	P S	P M	SPARE PART NO	SAF CLS
ST	SEISMIC TRIGGER	I	INSTRU	VEIAH												02-325	
SUH	STEAM UNIT HEATER	M	HTEXCH	AH #		KSFT		PSIG		MBH	C	#			#	02-024	OT
SUM	SUMMER	I	INSTRU	UO# #							U		#			02-215	
SUMP	SUMP	M	ACCUMU	BX ##	#	PSIG		DEGF	#	#	D	#	#	#	#	02-120	OT
SV	SOLENOID OPERATED VALVE	E	VALVEX	XE		IN		PSIG		DEGF	B				#	02-	
T	TRAP	M	VALVEX	XFP		IN		PSIG		DEGF	C	#		#		02-110	
T/SS	(TEMP) SELECTOR SWITCH	E	CKTBKR	E DA A				DEGF		AMP	B		#			02-325	
TA	TRIP AUXILIARY UNIT	I	INSTRU													02-177	
TAPE	MAGNETIC TAPE UNIT	I	INSTRU	MRMGX#	#	ZZZ	#	ZZZ	#	ZZZ						02-035	
TBE	TURBIDITY ELEMENT	I	INSTRU	XEH #	#	#	#	#	#	#	B	#				02-170	
TBIT	TURBIDITY INDICATING TRANS	I	INSTRU	XTI #							B		#			02-	
TBR	TURBIDITY RECORDER	I	INSTRU	XR# #							B	#	#			02-205	
TBS	TURBIDITY SWITCH	I	INSTRU	XS# #							B	#	#			02-325	
TBT	TURBIDITY TRANSMITTER	I	INSTRU	XT# #							B					02-230	
TC	TEMPERATURE CONTROLLER	I	INSTRU	C# #							B	#	#			02-155	
TCV	TEMPERATURE CONTROL VALVE	M	VALVEX	#		IN		PSIG		DEGF	C	#				02-133	
TD	TIME DELAY RELAY												#			02-355	
TD	TRANSFER DOLLY												#			02-395	
TDS	TIME DELAY SWITCH	I	INSTRU	XSK #	#	#	#	#	#	#	B		#			02-325	
TE	TEMPERATURE ELEMENT	I	INSTRU	TE# #	#	#	#	#	#	#	B					02-170	
TI	TEMPERATURE INDICATOR	I	INSTRU	TI# #	#	#	#	#	#	#	B	#	#			02-175	
TIC	TEMP INDICATING CONTROLLER	I	INSTRU	TCI #							#		#			02-155	
TIS	TEMP INDICATING SWITCH	I	INSTRU	SI #	#	#	#	#		#	B	#	#			02-325	
TK	TANK	M	ACCUMU	##		PSIG		DEGF	#	#	C	#		#	#	02-120	
TM	TIMER	I	INSTRU	XSC #	#	#	#	#	#	#	B		#			02-225	
TQ	TIME TOTALIZER	I	INSTRU	XQ# #							B		#			02-130	
TQR	TORQUE RECORDER	I	INSTRU	XRQ #							B	#	#			02-205	
TQS	TORQUE SWITCH	I	INSTRU	XSQ #							B		#			02-325	
TQT	TORQUE TRANSMITTER	I	INSTRU	XTQ #							B	#	#			02-230	
TR	TRANSFORMER															02-395	
TR	TEMPERATURE RECORDER															02-205	
TR	TRIAXIAL RECORDER															02-205	
TRB	TERMINAL BLOCK/STRIP•CL.1E•	E	ELECON	AAXXXX												02-	
TRL	TRANSLATOR	I	INSTRU	EY#EC#	#	ZZZ	.00001	VDC	00001	VDC						02-035	
TRS	TEMPERATURE RECORDING SWITCH	I	INSTRU	TSR #							B		#			02-205	
TS	TEMPERATURE SWITCH	I	INSTRU	S# #	#	#	#	#	#	#	B		#			02-325	
TSC	TEMPERATURE SCANNER	I	INSTRU	TT###							B	#	#			02-150	
TT	TEMPERATURE TRANSMITTER	I	INSTRU	TT #							B		#			02-230	
TV	TEST VALVE	I	VALVEX	F		IN		PSIG		DEGF	C	#		#		02-130	
TX	THERMOWELL	I	PIPEXX	F A		IN		PSIG	#	#	C	#		#	#	02-	OT
TY	RELAY,PNEUMATIC CONTROL	I	INSTRU	PC#AA#								#	#			02-	
UFM	UNIPLEX FIELD MODULE	I	INSTRU	UYYCK	#	#	#	#	#	#						02-	
V	VALVE	M	VALVEX			IN		PSIG		DEGF	C	#			#	02-130	
V	USE EI FOR MEL(M&R USE ONLY)	M	VALVEX			IN		PSIG		DEGF	C	#			#	02-130	
VARM	VAR METER	E	INSTRU	EI#CU#									#			02-295	
VATD	TRANSDUCER,VAR	E	INSTRU	Y#							B		#			02-	
VB	VACUUM BREAKER	M	VALVEX			IN		PSIG			C					02-085	
VBAM	VIBRATION AMPLIFIER	I	INSTRU	VP# #	#	#	#	#	#	#	B		#			02-	
VBE	VIBRATION ELEMENT	I	INSTRU	VE# #							B		#			02-170	
VBEC	VIBRATION/ECCENTRICITY INDIC	I	INSTRU	VE# #	#	#	#	#	#	#	D		#			02-325	
VBIS	VIBRATION INDICATING SWITCH	I	INSTRU	VSI #	#	#	#	#	#	#	D	#	#			02-325	
VBS	VIBRATION SWITCH	I	INSTRU	VS# #	#	#	#	#	#	#	B	#	#			02-325	
VD	VIEWING DEVICE	M	PIPEXX	A #		IN		PSIG	#	#	C	#	#	#	#	02-395	OT

COMP CODE	COMPONENT IDENTIFICATION	C R	NPRD COMP	ABCDEF	G	UNIT	H	UNIT	J	UNIT	C I	IE EE	C/ GR	P S	P M	SPARE PART NO	SAF CLS
VX	INSTRUMENT ISOLATION VALVE	M	VALVEX	FAD B		IN		PSIG		DEGF	C	#		#	#	02-	
VZ	VAPORIZER	M	HTEXCH	E #		KSFT		PSIG		MBH	C	#		#	#	02-055	
W	USE JI FOR MEL(U&R USE ONLY)															02-	
WDR	WIND DIRECTION RECORDER	I	INSTRU	ZR#GA	00005	VDC	#	222	00005	VDC						02-035	
WDT	WIND DIRECTION TRANSMITTER	I	INSTRU	ZETEH#	00040	DEG	00001	VDC	00001	VDC						02-035	
WHM	WATT-HOUR METER	E	INSTRU	IQICB#									#			02-295	
WSR	WIND SPEED RECORDER	I	INSTRU	SR#GA#	00005	VDC	#	222	00005	VDC						02-035	
WST	WIND SPEED TRANSMITTER	I	INSTRU	SETAI#	00090	MPH	00001	VCC	00001	VDC						02-035	
WTD	WATT TRANSDUCER	E	INSTRU	Y#							B		#			02-	
WUH	WATER UNIT HEATER	M	HTEXCH	A #		KSFT		PSIG		MBH	C	#			#	02-055	
X	PRIMARY CONTAINMENT PENETRAT	M	PENETR	###										#		02-115	
XE	ELEMENT, SPECIAL TYPES	I	INSTRU	E									#			02-170	
XR	RECORDER, SPECIAL TYPES	I	INSTRU										#			02-	
XT	TRANSMITTER, SPECIAL TYPES	I	INSTRU										#			02-230	
33C	VLV TRVL POS SW CLOSED	E	INSTRU	ZS# #	#	#	#	#	#	#	B		#			02-	
33IC	VLV TRVL POS SW INTER CLOSED	E	INSTRU	ZS# #	#	#	#	#	#	#	B		#			02-	
33IO	VLV TRVL POS SW INTER OPEN	E	INSTRU	ZS# #	#	#	#	#	#	#	B		#			02-	
33O	VLV TRVL POS SW OPEN	E	INSTRU	ZS# #	#	#	#	#	#	#	B		#			02-	
33TC	VLV TRVL POS SW TORQ CLOSED	E	INSTRU	QS# #	#	#	#	#	#	#	B		#			02-	
33TO	VLV TRVL POS SW TORQ OPEN	E	INSTRU	QS# #	#	#	#	#	#	#	B		#			02-	
42	ELECTRICAL MOTOR START COIL	E	CKTBRK	D				DEGF		AMP	B		#			02-	

USER: VANCE -AT

SRM.SORT.REPORT

LABEL: PRT001 -FORM

SPOOLED: 83-01-06.13:58
STARTED: 83-01-06.13:59, ON: PRO BY: PRA

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
SAFETY RELATED MECHANICAL EQUIPMENT
SORT REPORT

NUMERICALLY SPECIFY THE FIELDS YOU WISH SORTED. ANY FIVE MAY BE SELECTED.

SORT:				
	CONTRACT..	EPN.. 1	MFG..	MODEL..
	BLDG..	ELEV..	SEIS-QUAL..	ENV-QUAL..
	COMPONENT..	COMPOSITE-EPN..		QID..

PLACING A NUMBER OR LETTER IN ONE OF THE BOXES BELOW ALLOWS ONLY RECORDS CONTAINING THAT VALUE TO PRINT ON YOUR REPORT. AN EMPTY BOX ALLOWS ANY VALUE TO PRINT ON YOUR REPORT.

LEVEL:	VALUE1..	VALUE2..	VALUE3..
USE:	VALUE1..	VALUE2..	VALUE3..
SEISMIC QUALIFY:	YES..	NO..	
ENVIRONMENTAL QUALIFY:	YES..	NO..	
BUILDING:	VALUE1..	VALUE2..	

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	HL	TEST / SAFETY	ANL	FO C / FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
					SEISMIC (S) PARAMETERS								
CAC-FCV-1A	F130	53A5659			A	P	Y		01	0	09	H554	H11
2.5" (EHO) FLOW CONTROL FROM X-99			R	575	H2/5.2	1 0		D			133001	42A	2 A
CAC-FCV-1A+					A					0		H554	H11
COMPOSITE FOR CAC-FCV-1A			R	575	H2/5.2	1 0		D			133001		1 A
CAC-FCV-1B	F130	53A5659			A	P	Y		01	0	09	H554	H6
2.5" (EHO) FLOW CONTROL FROM X-97			R	564	J.6/6.7	1 0		D			133001	42A	2 A
CAC-FCV-1B+					A					0		H554	H6
COMPOSITE FOR CAC-FCV-1B			R	564	J6/6.7	1 0		D			133001		1 A
CAC-FCV-2A	F130	53A5659			A	P	N		01	0	09	H554	F10
2.5" (EHO) FLOW CONTROL TO X-96			R	560	H.1/7.7	1 0		D			133001	42A	2 A
CAC-FCV-2A+					A					0		H554	F10
COMPOSITE FOR CAC-FCV-2A			R	560	H.1/7.7	1 0		D			133001		1 A
CAC-FCV-2B	F130	53A5659			A	P	Y		01	0	09	H554	F6
2.5" (EHO) FLOW CONTROL TO X-98			R	558	H.5/6.6	1 0		D			133001	42A	2 A
CAC-FCV-2B+					A					0		H554	F6
COMPOSITE FOR CAC-FCV-2B			R	558	H.5/6.6	1 0		D			133001		1 A
CAC-FCV-3A	F130	53A5659			A	P	Y		01	0	09	H554	D10
2.5" (EHO) FLOW CONTROL FROM X-105			R	495	H.8/4.7	1 0		D			133001	42A	2 A
CAC-FCV-3A+					A					0		H554	D10
COMPOSITE FOR CAC-FCV-3A			R	495	H.8/4.7	1 0		D			133001		1 A
CAC-FCV-3B	F130	53A5659			A	P	Y		01	0	09	H554	D6
2.5" (EHO) FLOW CONTROL FROM X-104			R	496	J.0/7.4	1 0		D			133001	42A	2 A
CAC-FCV-3B+					A					0		H554	D6
COMPOSITE FOR CAC-FCV-3B			R	496	J.0/4.7	1 0		D			133001		1 A
CAC-FCV-4A	F130	53A5659			C	P	N		0	0	09	H554	E10
2.5" (EHO) FLOW CONTROL TO X-102			R	495	N.4/6.0	1 0		D			133001	42A	2 A
CAC-FCV-4A+					C					0		H554	E10
COMPOSITE FOR CAC-FCV-4A			R	495	N.4/6.0	1 0		D			133001		1 A
CAC-FCV-4B	F130	53A5659			A		N		0	0	09	H554	E6
2.5" (EHO) FLOW CONTROL TO X-103			R	495	N.4/6.0	1 0		D			133001	42A	2 A
CAC-FCV-4B+					A					0		H554	E6
COMPOSITE FOR CAC-FCV-4B			R	495	N.4/6.0	1 0		D			133001		1 A
CAC-FCV-5A	C678	47			A		N	21		0		H554	F14
1.0" GLOBE CAC-AW-1A S.W. INLET			R	572	H.6/6.4	1 0		D			133005	71	2 A
CAC-FCV-5A+					A					0		H554	F14
COMPOSITE FOR CAC-FCV-5A			R	572	H.6/6.4	1 0		D			133005		1 A

EPN DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E DETAIL	TH USE	HL	TEST SAFETY FUNCTION	ANL	FO	C	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL EC
CAC-FCV-5B 1.0" GLOBE CAC-AV-1B S.W. INLET	C678	48	R	573	A M.6/7.5	F 1 0	N	21 D			0	 133005	M554 71	F2 2 A
CAC-FCV-5B+ COMPOSITE FOR CAC-FCV-5B			R	573	A M.6/7.5	 1 0		 D			0	 133005	M554	F2 1 A
CAC-FCV-6A 2.0" EHO GLOBE CAC-FN-1A RECIRC.	C678	50	R	572	A M.6/6.4	F 1 0		21 D			0	 133005	M554 71	G12 2 A
CAC-FCV-6A+ COMPOSITE FOR CAC-FCV-6A			R	572	A M.6/6.4	 1 0		 D			0	 133005	M554	G12 1 A
CAC-FCV-6B 2.0" EHO GLOBE CAC-FN-1B RECIRC.	C678	49	R	573	A M.6/7.5	F 1 0	N	21 D			0	 133005	M554 71	G4 2 A
CAC-FCV-6B+ COMPOSITE FOR CAC-FCV-6B			R	573	A M.6/7.5	 1 0		 D			0	 133005	M554	G4 1 A
CAC-FN-1A BLOWER 25 HP	A136	01.14	R	572	A M.5/6.6	F 1 0	N	21 D			0	 145021	M554 71	E13 2 A
CAC-FN-1B BLOWER 25 HP	A136	01.14	R	572	A M.5/7.4	F 1 0	N	21 D			0	 145021	M554 71	F3 2 A
CAC-HR-1A+ COMPOSITE HYDROGEN RECOMBINER 1A	A120	P-2040	R	573	A M.5/6.6	 1 0		 D			0	 173001	M554	D14 1 A
CAC-HR-1B+ COMPOSITE HYDROGEN RECOMBINER 1B	A120	P-2040	R	573	A M.6/7.5	 1 0		 D			0	 173001	M554	D2 1 A
CAC-TCV-4A 2.0" GLOBE CAC-EV-1A SW IN (EHO)	C678	46	R	572	A M.6/6.4	F 1 0	N	21 D			0	 335002	M554 71	D12 2 A
CAC-TCV-4A+ COMPOSITE FOR CAC-TCV-4A			R	572	A M6/6.4	 1 0		 D			0	 335002	M554	D12 1 A
CAC-TCV-4B 2.0" GLOBE CAC-EV-1B S.W. INLET	C678		R	573	A M.6/7.5	F 1 0	N	21 D			0	 335002	M554 71	D5 2 A
CAC-TCV-4B+ COMPOSITE FOR CAC-TCV-4B			R	573	A M.6/7.5	 1 0		 D			0	 335002	M554	D5 1 A
CAC-V-11 4.0" GATE CAC LINE TO (X-98)	V085	DWG P2-3311-N-7	R	558	A M.4/6.4	P 1 0	N	 B1,D	01		9	58 361708	M554 41A	G6 2 A
CAC-V-11+ COMPOSITE FOR CAC-V-11			R	558	A M.4/6.4	 1 0		 B1,D	01		9	58 361708	M554	G6 1 A
CAC-V-13 4.0" GATE CAC LINE TO (X-103)	V085	DWG P2-3311-N-7	R	495	A M.4/6.0	P 1 0	Y	 B1,D	01		9	58 361708	M554 41A	E7 2 A
CAC-V-13+ COMPOSITE FOR CAC-V-13			R	495	A M.4/6.0	P 1 0	Y	 B1,D	01		9	58 361708	M554	E7 1 A

EPN DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E DETAIL	TM USE	IL SAFETY FUNCTION	TEST	ANL	FO	C	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL	EC
CAC-V-15 4.0" GATE CAC LINE FROM (X-97)	V085	DWG P2-3311-N-7	R	564	A J.6/6.8	P 1 0	Y B1.D		01		9	58 361708	M554 41A	H6 2	A
CAC-V-15+ COMPOSITE FOR CAC-V-15			R	564	A J.6/6.7	P 1 0	Y B1.D		01		9	58 361708	M554	H6 1	A
CAC-V-17 4.0" GATE CAC LINE FROM (X-104)	V085	DWG P2-3311-N-7	R	496	A J.0/7.4	P 1 0	Y B1.D		01		9	58 361708	M554 41A	D6 2	A
CAC-V-17+ COMPOSITE FOR CAC-V-17			R	496	A J.0/7.4	P 1 0	Y B1.D		01		9	58 361708	M554	D6 1	A
CAC-V-1A 2" SAUNDERS TO CAC-AW-1A (EHO)	I207	NH-95C2670F3L2	R	572	A M.6/6.4	F 1 0	N D	21			0	 361943	M554 71	F15 2	A
CAC-V-1A+ COMPOSITE FOR CAC-V-1A			R	572	A M.6/6.4	 1 0	 D				0	 361943	M554	F15 1	A
CAC-V-1B 2" SAUNDERS TO CAC-AW-1B (EHO)	I207	NH-95C2670F362	R	573	A M.6/7.5	F 1 0	N D	21			0	 361943	M554 71	F2 2	A
CAC-V-1B+ COMPOSITE FOR CAC-V-1B			R	573	A M.6/7.5	 1 0	 D				0	 361943	M554	F2 1	A
CAC-V-2 4.0" GATE CAC LINE TO (X-96)	V085	DWG P2-3311-N-7	R	560	A L.2/7.1	P 1 0	Y B1.D		01		9	58 361708	M554 41A	G10 2	A
CAC-V-2+ COMPOSITE FOR CAC-V-2			R	560	A L.2/7.1	P 1 0	Y B1.D		01		9	58 361708	M554	G10 1	A
CAC-V-2A 2.0" SAUNDERS (EHO) CAC RETURN	I207	NH-91C2070F3L2	R	572	A M.6/6.4	F 1 0	N D	21			0	 361944	M554 71	F12 2	A
CAC-V-2A+ COMPOSITE FOR CAC-V-2A			R	572	A M.6/6.4	 1 0	 D					 361944	M554	F12 1	A
CAC-V-2B 2.0" SAUNDERS (EHO) CAC RETURN	I207	NH-91C2070F3L2	R	573	A M.6/7.5	F 1 0	N D	21			0	 361944	M554 71	F4 2	A
CAC-V-2B+ COMPOSITE FOR CAC-V-2B			R	573	A M.6/7.5	 1 0	 D					 361944	M554	F4 1	A
CAC-V-3A 0.75" GLOBE CAC-MS-1A DRAIN	I207	NH-95C1670F3L3	R	572	A M.6/6.4	F 1 0	N D	21			0	 361945	M554 71	D12 2	A
CAC-V-3A+ COMPOSITE FOR CAC-V-3A			R	572	A M.6/6.4	 1 0	 D					 361945	M554	D12 1	A
CAC-V-3B 0.75" GLOBE CAC-MS-1B DRAIN	I207	NH-95C1670F3L3	R	573	A M.6/7.5	F 1 0	N D	21			0	 361945	M554 71	D4 2	A
CAC-V-3B+ COMPOSITE FOR CAC-V-3B			R	573	A M6/7.5	 1 0	 D					 361945	M554	D4 1	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH / USE	HL	TEST / SAFETY	ANL	FO C / FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
CAC-V-4 / 4.0" GATE CAC LINE TO (X-102)	V085	DWG P2-3311-N-7	R	491	B / M.9/8.7	P / 1.0	N	B1.D	01	9	58 / 361708	M554 / 41A	E10 / 2 A
CAC-V-4+ / COMPOSITE FOR CAC-V-4			R	491	B / M.9/8.7	1.0		B1.D	01	9	58 / 361708	M554	E10 / A
CAC-V-6 / 4.0" GATE CAC LINE FROM (X-99)	V085	DWG P2-3311-N-7	R	574	A / L.7/5.5	P / 1.0	Y	B1.D	01	9	58 / 361708	M554 / 41A	H10 / 2 A
CAC-V-6+ / COMPOSITE FOR CAC-V-6			R	574	A / L.7/5.5	P / 1.0	Y	B1.D	01	9	58 / 361708	M554	H10 / 1 A
CAC-V-8 / 4.0" GATE CAC LINE FROM (X-105)	V085	DWG P2-3311-N-7	R	492	A / M.7/4.7	P / 1.0	Y	B1.D	01	9	58 / 361708	M554 / 41A	D10 / 2 A
CAC-V-8+ / COMPOSITE FOR CAC-V-8			R	492	A / M.7/4.5	P / 1.0	Y	B1.D	01	9	58 / 361708	M554	D10 / 1 A
CEP-AO-1A / AIR OPERATOR FOR CEP-V-1A	M322	A83B	R	560	A / J.4/5.4	P / 2.3	Y	B1.F	01	9	07 / 018001	M543 / 68	J13 / 2 A
CEP-AO-1B / AIR OPERATOR FOR CEP-V-1B	M322	A83B	R	558	M / J.4/5.3	2.3		B1.F			018001	M543 / 68	J13 / 2 A
CEP-AO-2A / AIR OPERATOR FOR CEP-V-2A	M322	A83B	R	558	A / J.4/5.4	P / 2.3	Y	B1.F	01	9	07 / 018001	M543 / 2	J13 / 2 A
CEP-AO-2B / AIR OPERATOR FOR CEP-V-2B	M322	A83B	R	558	M / J.4/5.3	2.3		B1.F		9	018001	M543 / 68	J13 / 2 A
CEP-AO-3A / AIR OPERATOR FOR CEP-V-3A	M322	A83B	R	497	A / H.5/5.4	P / 2.3	Y	B1.F	01	9	10 / 018001	M543 / 68	C14 / 2 A
CEP-AO-3B / AIR OPERATOR FOR CEP-V-3B	I206	A83B	R	495	S / H.5/5.7	P / 2.3	Y	B1.F		9	06 / 018001	M543 / 68	C14 / 2 A
CEP-AO-4A / AIR OPERATOR FOR CEP-V-4A	M322	A83B	R	497	A / H.5/5.4	P / 2.3	Y	B1.F	01	9	10 / 018001	M543 / 68	C14 / 2 A
CEP-AO-4B / AIR OPERATOR FOR CEP-V-4B	I206	A83B	R	498	S / H.5/5.4	P / 2.3	Y	B1.F		9	06 / 018001	M543 / 68	C14 / 2 A
CEP-V-1A / 0.0" [illegible]	D250	DWG A-206763	R	[illegible]	A / [illegible]	P	Y		01	0	07	M543	J13

EPN DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E DETAIL	***SEISMIC (S) PARAMETERS*** TM USE	ML	TEST ANL	FO C	SAFETY FUNCTION	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL	EC
CEP-V-2A 30.0" BLFY DRYWELL EXHAUST(AO)	B250	DWG A-206763	R	558	A J.4/5.4	P 1.3	Y		9	B1,F	07 361104	M543 2	J13 2	A
CEP-V-2A+ COMPOSITE FOR VALVE CEP-V-2A			R	558	K J.4/5.4	 1.3				B1,F	 361402	M543 68	J13 1	A
CEP-V-2B 2" GATE CEP-V-2A BYPASS	I208	DWG V-502L-119A	R	558	M J.4/5.3	 1.3	Y	01	9	B1,F	 361402	M543 68	J13 2	A
CEP-V-2B+ COMPOSITE FOR VALVE CEP-V-2B			R	558	K J.4/5.3	 1.3				B1,F	 361402	M543 68	J13 1	A
CEP-V-3A 24.0" BLFY SUPP. CHAMBER EXHAUST	B250	DWG A-206764	R	495	A H.5/5.4	P 1.3	Y	01	9	B1,F	10 361106	M543 2	C14 2	A
CEP-V-3A+ COMPOSITE FOR VALVE CEP-V-3A			R	495	K H.5/5.4	 1.3				B1,F	 361106	M543 68	C14 1	A
CEP-V-3B 2.0" GATE CEP-V-3A BYPASS	I208	DWG V502L119A	R	495	A H.7/5.6	 1.3	N	01	9	B1,F	 361402	M543 68	C14 2	A
CEP-V-3B+ COMPOSITE FOR VALVE CEP-V-3B			R	475	A H.7/5.6	 1.3				B1,F	 361402	M543 68	C14 1	A
CEP-V-4A 24.0" BFLY SUPP.CHAMBER EXHAUST	B250	DWG A-206764	R	495	A H.5/5.4	P 1.3	N	01	9	B1,F	10 361106	M543 2	C14 2	A
CEP-V-4A+ COMPOSITE FOR VALVE CEP-V-4A			R	495	K H.6/5.7	 1.3				B1,F	 361106	M543 68	C14 1	A
CEP-V-4B 2.0" GATE CEP-V-4A BYPASS	I208	V-502L-119A	R	495	A H.5/5.7	 1.3	N	01	9	B1,F	 361402	M543 68	C14 2	A
CEP-V-4B+ COMPOSITE FOR VALVE CEP-V-4B			R	495	A H.5/5.7	 1.3				B1,F	 361402	M543 68	C14 1	A
CIA-V-20 .75"GLB.(MO)OUTERMOST ISOLATION	B350	P 304CAB3-001	R	540	A J.5/7.1	P 1.3	Y	01	9	B1	36 361252	M556 215	J6 2	A
CIA-V-20+ COMPOSITE FOR CIA-V-20			R	540	A J.5/7.1	P 1.3	Y			B1	 361252	M556 [illegible]	J6 1	A
CIA-V-30A .75"(MO) GLB [illegible] OUTER ISOL (X-89B)	B350	DWG 82110[illegible]	R	540	A [illegible]	P 1.3	Y	01	9	B1,G	49 361294	M556 215	H6 2	A
CIA-V-30A+ [illegible] FOR VALVE [illegible]			R	540	K [illegible]	P 1.3	Y			B1,G	 361294	M556 215	H6 1	A
CIA-V-30B .75"(MO) GLB [illegible] OUTER ISOL (X-91)	B350	DWG 82110[illegible]	R	540	B [illegible]	P 1.3	Y	01	9	B1,G	49 361294	M556 215	F6 2	A
CIA-V-30B+ [illegible] FOR VALVE [illegible]			R	540	K [illegible]	P 1.3	Y			B1,G	 361294	M556 215	F6 1	A

EPN / DESCRIPTION	MFG	MODEL	BLDG ELEV.	STATUS S E / DETAIL	***SEISMIC (S) PARAMETERS*** TM HL TEST ANL FO C / USE SAFETY FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
CRA-FN-1A1 PRI CONT FAN MC-7B ALL	J127	36-26 1/2-1170	C 506 62	M D AZ R30	F Y 01 2 3 N	40 145015	M543 67	D12 2 A
CRA-FN-1A2 PRI CONT FAN MC-7B ALL	J127	36-26 1/2-1770/1170	C 506 66	M D AZ R30	F Y 11 01 2 3 N	64 145015	M543 67	D12 2 A
CRA-FN-1B1 PRI CONT FAN MC-8B ALL	J127	36-26 1/2-1170	C 506 182	M D AZ R30	F Y 01 2 3 N	40 145015	M543 67	D11 2 A

EPN / DESCRIPTION	MFG	MODEL	BLDG ELEV	STATUS S E DETAIL	TH USE	ML	TEST ANL FO C SAFETY FUNCTION	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL EC
CRA-FN-1B2	J127	36-26 1/2-1770/1170		M	F	Y	11 01	64	M543	D11
PRI CONT FAN MC-8B ALL			C 506 186	D AZ R30	2 3	N		145015	67	2 A
CRA-FN-1C1	J127	36-26 1/2-1170		M	F	Y	01	40	M543	D8
PRI CONT FAN MC-8B ALL			C 506 271	D AZ R30	2 3	N		145015	67	2 A
CRA-FN-1C2	J127	36-26 1/2-1770/1170		M		Y	11 01	64	M543	D9
PRI CONT FAN MC-8B ALL			C 506 275	D AZ R30	2 3	N		145015	67	2 A
CRA-FN-2A1	J127	38-26 1/2-1770		M		Y	01	52	M543	H11
PRI CONT FAN MC-7B ALL			C 551 358	D AZ R23	2 3	N		145019	67	2 A
CRA-FN-2A2	J127	23-1/4X17-1/2-3450		M		Y	01	77	M543	H11
PRI CONT FAN MC-8B ALL			C 551 2	D AZ R23	2 3	N		145020	67	2 A
CRA-FN-2B1	J127	38-26 1/2-1770		M		Y	01	52	M543	H8
PRI CONT FAN MC-8B ALL			C 547 215	D AZ R23	2 3	N		145019	67	2 A
CRA-FN-2B2	J127	23-1/4X17-1/2-3450		M		Y	01	92	M543	H9
PRI CONT FAN MC 8B ALL			C 547 219	D AZ R23	2 3	N		145020	67	2 A
CRA-FN-3A	J127	1388009-8		A	F	Y	01	--	M543	F12
LOWER LEVEL RECIRC. FAN MC-7B			C 534 50	D AZ R17	1 3	D		145002	22A	2 A
CRA-FN-3A+				K		Y			M543	F12
			C 534 50	D AZ R17	1 3	D		145002		1 A
CRA-FN-3B	J127	1388009-8		A	F	Y	01		M543	F9
LOWER LEVEL RECIRC. FAN MC-8B			C 534 140	D AZ R17	1 3	D		145002	22A	2 A
CRA-FN-3B+				K		Y			M543	F9
			C 534 140	D AZ R17	1 3	D		145002		1 A
CRA-FN-3C	J127	1388009-8		A	F	Y	01		M543	F8
LOWER LEVEL RECIRC. FAN MC-8B			C 534 60	D AZ R17	1 3	D		145002	22A	2 A
CRA-FN-3C+				K		Y			M543	F8
			C 534 60	D AZ R17	1 3	D		145002		1 A
CRA-FN-4A	J127	500722-113		C E	F	Y	01	71	M543	J10
CONTAINMENT DOME H2 MIXING FAN			C 572 330	D AZ R17	1 3	D		145001	22A	2 A
CRA-FN-4A+						Y			M543	J10
			C 572 330	D AZ R17	1 3	D		145001		1 A
CRA-FN-4B	J127	500722-113		C E	F	Y	01	71	M543	J9
CONTAINMENT DOME H2 MIXING FAN			C 572 206	D AZ R17	1 3	D		145001	22A	2 A
CRA-FN-4B+				K		Y			M543	J9
			C 572 206	D AZ R17	1 3	D		145001		1 A
CRA-FN-5A	J127	1388009-8		A	F	Y	01		M543	J8
UPPER LEVEL RECIRC. FAN MC-7B			C 572 180	D AZ R17	1 3	D		145002	22A	2 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH / USE	ML	TEST / SAFETY	ANL / FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRA-FN-5A+					K		Y				M543	J8	
COMPOSITE OF CRA-FN-5A			C	572	180 D AZ R17	1 3		D		145002		1	A
CRA-FN-5B	J127	1388009-8			A	F	Y		01		M543	J11	
UPPER LEVEL RECIRC. FAN MC-8B			C	572	20 D AZ R17	1 3		D		145002	22A	2	A
CRA-FN-5B+					K		Y				M543	J11	
COMPOSITE OF CRA-FN-5B			C	572	20 D AZ R17	1 3		D		145002		1	A
CRA-FN-5C	J127	1388009-8			A	F	Y		01		M543	J8	
UPPER LEVEL RECIRC. FAN MC-7B			C	572	270 D AZ R17	1 3		D		145002	22A	2	A
CRA-FN-5C+					K		Y				M543	J8	
COMPOSITE OF CRA-FN-5C			C	572	270 D AZ R17	1 3		D		145002		1	A
CRA-FN-5D	J127	1388009-8			A	F	Y		01		M543	J11	
UPPER LEVEL RECIRC. FAN MC-8D			C	572	90 D AZ R17	1 3		D		145002	22A	2	A
CRA-FN-5D+					K		Y				M543	J11	
COMPOSITE OF CRA-FN-5D			C	572	90 D AZ R17	1 3		D		145002		1	A
CRD-AO-126/XXXX & CRD-AO-127/XXXX													
CRD-DRVE-0219	G080	7RDB144C			A		Y	11	02		M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A		092001	02B13	2	A
CRD-DRVE-0223	G080	7RDB144C			A		Y	11	02		M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A		092001	02B13	2	A
CRD-DRVE-0227	G080	7RDB144C			A		Y	11	02		M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A		092001	02B13	2	A
CRD-DRVE-0231	G080	7RDB144C			A		Y	11	02		M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A		092001	02B13	2	A
CRD-DRVE-0235	G080	7RDB144C			A		Y	11	02		M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A		092001	02B13	2	A
CRD-DRVE-0239	G080	7RDB144C			A		Y	11	02		M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A		092001	02B13	2	A
CRD-DRVE-0243	G080	7RDB144C			A		Y	11	02		M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A		092001	02B13	2	A
CRD-DRVE-0615	G080	7RDB144C			A		Y	11	02		M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A		092001	02B13	2	A
CRD-DRVE-0619	G080	7RDB144C			A		Y	11	02		M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A		092001	02B13	2	A
CRD-DRVE-0623	G080	7RDB144C			A		Y	11	02		M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A		092001	02B13	2	A
CRD-DRVE-0627	G080	7RDB144C			A		Y	11	02		M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A		092001	02B13	2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH / USE	HL	TEST	ANL	FO	C / SAFETY FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
					SEISMIC (S) PARAMETERS									
CRD-DRVE-0631	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-0635	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-0639	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-0643	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-0647	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-1011	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-1015	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-1019	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-1023	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-1027	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-1031	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-1035	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-1039	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-1043	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-1047	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-1051	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-1407	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A
CRD-DRVE-1411	G080	7RDB144C			A		Y	11	02				H528	G9
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3					A	092001	02B13	2 A

EPN	DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E	DETAIL	TH	USE	HL	TEST	SAFETY FUNCTION	ANL	FREQ	QID	A/E DRAWING	CONTRACT	A/E ZONE	LEVEL	EC
CRD-DRVE-1415	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1419	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1423	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1427	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1431	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1435	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1439	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1443	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1447	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1451	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1455	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1803	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1807	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1811	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1815	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1819	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1823	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A
CRD-DRVE-1827	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A	UNDER VESSEL		1 3	Y	11	A	02		092001	M528	02B13	G9	2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH / USE	ML	TEST / SAFETY	ANL / FUNCTION	FO C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-DRVE-1831	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-1835	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-1839	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-1843	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-1847	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-1851	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-1855	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-1859	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-2203	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-2207	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-2211	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-2215	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-2219	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-2223	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-2227	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-2231	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-2235	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-2239	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	DETAIL	STATUS S E	TH USE	HL	TEST / SAFETY	ANL FO C / FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
CRD-DRVE-2243 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2247 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2251 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2255 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2259 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2603 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2607 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2611 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2615 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2619 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2623 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2627 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2631 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2635 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2639 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2643 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2647 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A
CRD-DRVE-2651 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11 A	02	092001	M528 02B13	G9 2 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH USE	HL	TEST	ANL FO C	SAFETY FUNCTION	FREQ QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-DRVE-2655 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-2659 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-3003 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-3007 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-3011 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-3015 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-3019 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-3023 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-3027 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-3031 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-3035 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-3039 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-3043 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-3047 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-3051 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-3055 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-3059 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A
CRD-DRVE-3403 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	1 3	Y	11	02	A	092001	M528 02B13	G9 2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH USE	HL	TEST	ANL	FO C / SAFETY FUNCTION	FREQ QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-DRVE-3407 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3411 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3415 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3419 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3423 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3427 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3431 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3435 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3439 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3443 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3447 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3451 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3455 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3459 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3803 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3807 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3811 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A
CRD-DRVE-3815 / DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A / UNDER VESSEL	1 3	Y	11	02	A	092001	M528 / 02B13	G9 / 2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E DETAIL	***SEISMIC (S) PARAMETERS*** TM IL	TEST	ANL FO C FUNCTION	USE	SAFETY	FREQ QID	A/E DRAWING	CONTRACT	A/E ZONE	LEVEL	EC
CRD-DRVE-3819 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-3823 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-3827 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-3831 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-3835 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-3839 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-3843 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-3847 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-3851 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-3855 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-3859 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-4203 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-4207 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-4211 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-4215 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-4219 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-4223 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A
CRD-DRVE-4227 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	A UNDER VESSEL	Y	11	02	1 3	A	092001	M528	02B13	G9	2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG ELEV	STATUS S E / DETAIL	TM USE	HL	TEST SAFETY	ANL FUNCTION	FO C	FREQ QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-DRVE-4231 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4235 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4239 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4243 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4247 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4251 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4255 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4259 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4607 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4611 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4615 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4619 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4623 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4627 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4631 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4635 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4639 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A
CRD-DRVE-4643 DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C 501	A UNDER VESSEL	1 3	Y	11 A	02		092001	M528 02813	G9 2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH USE	HL	TEST / SAFETY	ANL	FO C / FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
					SEISMIC (S) PARAMETERS									
CRD-DRVE-4647	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-4651	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-4655	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-5011	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-5015	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-5019	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-5023	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-5027	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-5031	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-5035	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-5039	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-5043	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-5047	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-5051	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-5415	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-5419	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-5423	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A
CRD-DRVE-5427	G080	7RDB144C			A		Y	11	02			M528	G9	
DRIVE ASSM. CNTRL. ROD DR.			C	501	UNDER VESSEL	1 3		A			092001	02B13	2	A

EPN	DESCRIPTION	MFG	MODEL	BLDG	ELEV	DETAIL	STATUS S E	TH USE	HL	TEST	ANL FO C	SAFETY FUNCTION	FREQ	QID	A/E DRAWING	CONTRACT	A/E ZONE	LEVEL	EC
CRD-DRVE-5431	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11	02	A		092001	M528	02B13	G9	2	A
CRD-DRVE-5435	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11	02	A		092001	M528	02B13	G9	2	A
CRD-DRVE-5439	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11	02	A		092001	M528	02B13	G9	2	A
CRD-DRVE-5443	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11	02	A		092001	M528	02B13	G9	2	A
CRD-DRVE-5447	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11	02	A		092001	M528	02B13	G9	2	A
CRD-DRVE-5819	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11	02	A		092001	M528	02B13	G9	2	A
CRD-DRVE-5823	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11	02	A		092001	M528	02B13	G9	2	A
CRD-DRVE-5827	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11	02	A		092001	M528	02B13	G9	2	A
CRD-DRVE-5831	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11	02	A		092001	M528	02B13	G9	2	A
CRD-DRVE-5835	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11	02	A		092001	M528	02B13	G9	2	A
CRD-DRVE-5839	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11	02	A		092001	M528	02B13	G9	2	A
CRD-DRVE-5843	DRIVE ASSM. CNTRL. ROD DR.	G080	7RDB144C	C	501	UNDER VESSEL	A	1 3	Y	11	02	A		092001	M528	02B13	G9	2	A
CRD-HCU-0219	CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	L5/8.4	A	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-0223	CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	L5/8.4	A	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-0227	CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	L5/8.4	A	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-0231	CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	L5/8.4	A	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-0235	CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	K2/8.4	A	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-0239	CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	K2/8.4	A	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	HL	TEST	ANL FO C / SAFETY FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
CRD-HCU-0243	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-0615	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-0619	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-0623	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-0627	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-0631	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-0635	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-0639	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-0643	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-0647	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-1011	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-1015	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-1019	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-1023	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-1027	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-1031	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-1035	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3			A	167001	02C12	1 A
CRD-HCU-1039	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3			A	167001	02C12	1 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM USE	HL	TEST SAFETY	ANL FO C FUNCTION	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL EC
CRD-HCU-1043 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1047 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1051 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1407 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1411 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1415 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1419 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1423 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1427 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1431 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1435 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1439 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1443 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1447 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1451 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1455 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1803 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A
CRD-HCU-1807 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/8.4	1 3	Y	11 A	02	02 167001	M528 02C12	C3 1 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH USE	HL	TEST / SAFETY	ANL	FO C FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-HCU-1811	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-1815	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-1819	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-1823	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-1827	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-1831	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-1835	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-1839	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-1843	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-1847	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-1851	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-1855	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-1859	G080	761E50001			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-2203	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-2207	G080	761E50001			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-2211	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-2215	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A			167001	02C12	1	A
CRD-HCU-2219	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A			167001	02C12	1	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	DETAIL	STATUS S E	TM USE	HL	TEST	ANL	SAFETY FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
CRD-HCU-2223 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	L5/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2227 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	L5/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2231 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	L5/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2235 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	K2/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2239 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	K2/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2243 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	K2/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2247 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	K2/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2251 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	K2/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2255 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	K2/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2259 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	K2/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2603 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	L5/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2607 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	L5/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2611 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	L5/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2615 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	L5/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2619 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	L5/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2623 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	L5/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2627 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	L5/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A
CRD-HCU-2631 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	L5/8.4	A	1 3	Y	11	02	A	02 / 167001	M528 / 02C12	C3 / 1 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	IIL	TEST / SAFETY	ANL FO C / FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
							SEISMIC (S) PARAMETERS					
CRD-HCU-2635	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3		A		167001	02C12	1 A
CRD-HCU-2639	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3		A		167001	02C12	1 A
CRD-HCU-2643	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3		A		167001	02C12	1 A
CRD-HCU-2647	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3		A		167001	02C12	1 A
CRD-HCU-2651	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3		A		167001	02C12	1 A
CRD-HCU-2655	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3		A		167001	02C12	1 A
CRD-HCU-2659	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/8.4	1 3		A		167001	02C12	1 A
CRD-HCU-3003	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A		167001	02C12	1 A
CRD-HCU-3007	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A		167001	02C12	1 A
CRD-HCU-3011	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A		167001	02C12	1 A
CRD-HCU-3015	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A		167001	02C12	1 A
CRD-HCU-3019	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A		167001	02C12	1 A
CRD-HCU-3023	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A		167001	02C12	1 A
CRD-HCU-3027	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/8.4	1 3		A		167001	02C12	1 A
CRD-HCU-3031	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A		167001	02C12	1 A
CRD-HCU-3035	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A		167001	02C12	1 A
CRD-HCU-3039	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A		167001	02C12	1 A
CRD-HCU-3043	G080	761E500G1			A		Y	11	02	02	M528	C3
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A		167001	02C12	1 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH USE	HL	TEST / SAFETY	ANL	FO C FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-HCU-3047	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3051	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3055	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3059	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3403	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3407	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3411	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3415	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3419	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3423	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3427	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3431	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3435	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3439	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3443	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3447	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3451	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A			167001	02C12	1	A
CRD-HCU-3455	G080	761E500G1			A		Y	11	02		02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A			167001	02C12	1	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM USE	HL	TEST SAFETY	ANL	FO C FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
CRD-HCU-3459 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-3803 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-3807 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-3811 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-3815 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-3819 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-3823 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-3827 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-3831 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-3835 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-3839 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-3843 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-3847 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-3851 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-3855 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-3859 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-4203 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A
CRD-HCU-4207 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/3.7	1 3	Y	11 A	02		02 167001	M528 02C12	C3 1 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH / USE	HL	TEST / SAFETY	ANL	FO C / FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-HCU-4211 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / L5/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4215 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / L5/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4219 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / L5/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4223 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / L5/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4227 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / L5/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4231 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / K2/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4235 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / K2/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4239 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / K2/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4243 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / K2/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4247 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / K2/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4251 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / K2/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4255 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / K2/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4259 / CRD HYDRAULIC CONTROL UNIT ASSY	#	761E500G1	R	522	A / K2/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4607 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / L5/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4611 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / L5/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4615 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / L5/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4619 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / L5/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A
CRD-HCU-4623 / CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A / L5/3.7	1 3	Y	11 / A	02		02 / 167001	M528 / 02C12	C3 / 1	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH USE	HL	TEST SAFETY	ANL FO C FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-HCU-4627	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-4631	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-4635	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-4639	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-4643	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-4647	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-4651	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-4655	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-5011	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-5015	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-5019	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-5023	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-5027	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	L5/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-5031	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-5035	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-5039	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-5043	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A		167001	02C12	1	A
CRD-HCU-5047	G080	761E500G1			A		Y	11	02	02	M528	C3	
CRD HYDRAULIC CONTROL UNIT ASSY			R	522	K2/3.7	1 3		A		167001	02C12	1	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH USE	HL	TEST	ANL FO C	SAFETY FUNCTION	FREQ	QID	A/E DRAWING	CONTRACT	A/E ZONE	LEVEL	EC
CRD-HCU-5051 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-5415 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-5419 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-5423 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-5427 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-5431 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-5435 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-5439 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-5443 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-5447 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-5819 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-5823 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-5827 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A L5/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-5831 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-5835 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-5839 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A
CRD-HCU-5843 CRD HYDRAULIC CONTROL UNIT ASSY	G080	761E500G1	R	522	A K2/3.7	1 3	Y	11	02	A	02	167001	M528	02C12	C3	1	A

SEISMIC (S) PARAMETERS

EPN DESCRIPTION	MFG	MODEL	BLDG	ELEV	DETAIL	STATUS S E	TM USE	HL	TEST	ANL	FO	C	SAFETY FUNCTION	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL	EC
CRD-V-10 1.0" GLOBE SCRAM DISCH VOL VENT	H035	CV502L-1A	R	543	J.1/5.1	A	P 1 0	Y		01			A,F	99+ 361402	M528 02C12	K6 2	A
CRD-V-10+ CRD-V-10 COMPOSITE			R	543	J.1/5.1	K	P 1 0	Y					A,F	 361402	M528	K6 1	A
CRD-V-11 2" GLOBE SCRAM DISCH VOL DRAIN AO	H035	V502L-1A	R	523	J.1/4.9	A	 2 3	N		01			A,F,G	57 361402	M528 02C12	F6 2	A
CRD-V-11+ COMPOSITE FOR CRD-V-11			R	523	J.1/4.9	K	 2 3						A	 361402	M528	F6 1	A
CRD-V-120 1"CHK.SCRAM DISCH.HDR VAC.BKR.	V135	B-35772	R	544	J.1/5.1	Q	 2 3						G	 361803	M528 215	K6 2	A
CRD-V-126/0219 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	L5/8.4	A	 1 3	Y	11	02			A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/0223 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	L5/8.4	A	 1 3	Y	11	02			A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/0227 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	L5/8.4	A	 1 3	Y	11	02			A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/0231 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	L5/8.4	A	 1 3	Y	11	02			A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/0235 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	K2/8.4	A	 1 3	Y	11	02			A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/0239 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	K2/8.4	A	 1 3	Y	11	02			A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/0243 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	K2/8.4	A	 1 3	Y	11	02			A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/0615 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	L5/8.4	A	 1 3	Y	11	02			A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/0619 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	L5/8.4	A	 1 3	Y	11	02			A,B1	02 361961	M528 02C12	C4 2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH / USE	HL	TEST	ANL FO C / SAFETY FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-V-126/0623	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/0627	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/0631	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/0635	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/0639	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/0643	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/0647	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/1011	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/1015	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/1019	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/1023	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/1027	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/1031	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/1035	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/1039	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/1043	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/1047	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3			A,B1	361961	02C12	2	A
CRD-V-126/1051	R290	83470-A1			A		Y	11	02	02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3			A,B1	361961	02C12	2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	***SEISMIC (S) PARAMETERS*** TH / USE	HL	TEST / SAFETY	ANL FO C / FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
CRD-V-126/1407	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1411	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1415	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1419	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1423	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1427	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1431	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1435	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1439	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1443	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1447	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1451	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1455	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1803	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1807	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1811	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1815	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-126/1819	R290	83470-A1			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	IIL / SAFETY FUNCTION	TEST	ANL	FO C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-V-126/1823	R290	83470-A1			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3	A,B1				361961	02C12	2	A
CRD-V-126/1827	R290	83470-A1			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3	A,B1				361961	02C12	2	A
CRD-V-126/1831	R290	83470-A1			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3	A,B1				361961	02C12	2	A
CRD-V-126/1835	R290	83470-A1			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3	A,B1				361961	02C12	2	A
CRD-V-126/1839	R290	83470-A1			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3	A,B1				361961	02C12	2	A
CRD-V-126/1843	R290	83470-A1			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3	A,B1				361961	02C12	2	A
CRD-V-126/1847	R290	83470-A1			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3	A,B1				361961	02C12	2	A
CRD-V-126/1851	R290	83470-A1			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3	A,B1				361961	02C12	2	A
CRD-V-126/1855	R290	83470-A1			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3	A,B1				361961	02C12	2	A
CRD-V-126/1859	R290	83470-A1			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/8.4	1 3	A,B1				361961	02C12	2	A
CRD-V-126/2203	R290	83470-A1			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3	A,B1				361961	02C12	2	A
CRD-V-126/2207	R290	83470-A1			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3	A,B1				361961	02C12	2	A
CRD-V-126/2211	R290	83470-A1			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3	A,B1				361961	02C12	2	A
CRD-V-126/2215	R290	83470-A1			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3	A,B1				361961	02C12	2	A
CRD-V-126/2219	R290	83470-A1			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/8.4	1 3	A,B1				361961	02C12	2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM USE	ML	TEST / SAFETY	ANL	FO C FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-V-126/2235 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / K2/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2239 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / K2/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2243 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / K2/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2247 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / K2/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2251 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / K2/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2255 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / K2/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2259 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / K2/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2603 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / L5/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2607 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / L5/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2611 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / L5/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2615 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / L5/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2619 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / L5/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2623 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / L5/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2627 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / L5/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2631 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / L5/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2635 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / K2/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2639 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / K2/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A
CRD-V-126/2643 / 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A / K2/8.4	1 3	Y	11 / A,B1	02		02 / 361961	M528 / 02C12	C4 / 2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E	DETAIL	TM USE	HL	TEST / SAFETY	ANL	FO C FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-V-126/2647 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/8.4	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/2651 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/8.4	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/2655 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/8.4	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/2659 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/8.4	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/3003 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	L5/8.4	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/3007 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	L5/8.4	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/3011 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	L5/8.4	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/3015 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	L5/8.4	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/3019 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	L5/8.4	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/3023 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	L5/8.4	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/3027 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	L5/8.4	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/3031 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/3035 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/3039 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/3043 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/3047 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/3051 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A
CRD-V-126/3055 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1 3	Y	11 A,B1	02		02 361961	M528 02C12	C4 2	A

EPN DESCRIPTION	MFG	MODEL	BLDG ELEV	STATUS S E DETAIL	***SEISMIC (S) PARAMETERS*** TM USE	HL TEST ANL FO C SAFETY FUNCTION	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL EC
CRD-V-126/3059 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 K2/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3403 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 L5/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3407 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 L5/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3411 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 L5/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3415 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 L5/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3419 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 L5/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3423 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 L5/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3427 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 L5/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3431 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 K2/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3435 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 K2/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3439 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 K2/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3443 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 K2/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3447 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 K2/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3451 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 K2/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3455 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 K2/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3459 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 K2/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3803 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 L5/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A
CRD-V-126/3807 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R 522 L5/3.7	A	1 3	Y 11 02 A,B1	02 361961	M528 02C12	C4 2 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	HL	TEST	ANL	FO C / SAFETY FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-V-126/3811 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/3815 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/3819 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/3823 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/3827 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/3831 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/3835 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/3839 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/3843 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/3847 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/3851 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/3855 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/3859 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4203 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4207 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4211 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4215 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4219 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A

SEISMIC (S) PARAMETERS

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH / USE	HL	TEST	ANL	FO C / SAFETY FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-V-126/4223 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4227 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4231 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4235 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4239 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4243 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4247 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4251 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4255 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4259 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4607 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4611 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4615 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4619 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4623 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4627 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A L5/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4631 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A
CRD-V-126/4635 1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A K2/3.7	1 3	Y	11	02	A,B1	02 361961	M528 02C12	C4 2	A

EPN	DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E	DETAIL	TM USE	HL	TEST	SAFETY	ANL FO C FUNCTION	FREQ	QID	A/E DRAWING	CONTRACT	A/E ZONE	LEVEL	EC
CRD-V-126/4639	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/4643	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/4647	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/4651	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/4655	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/5011	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	L5/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/5015	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	L5/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/5019	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	L5/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/5023	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	L5/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/5027	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	L5/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/5031	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/5035	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/5039	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/5043	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/5047	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/5051	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	K2/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/5415	1" GLOBE SCRAM INLET VALVE (AO)	R290	83470-A1	R	522	A	L5/3.7	1.3	Y	11	A.B1	02	02	361961	M528	02C12	C4	2	A
CRD-V-126/5419	[illegible]	R290	83470-A1	R	[illegible]	A	L5/3.[illegible]	[illegible]	Y	11	[illegible]	02	02	[illegible]	M528	[illegible]	C4	[illegible]	[illegible]

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH USE	***SEISMIC (S) PARAMETERS*** HL TEST ANL FO C / SAFETY FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
CRD-V-126/5423	R290	83470-A1			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/3.7	1.3	A,B1	361961	02C12	2 A
CRD-V-126/5427	R290	83470-A1			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/3.7	1.3	A,B1	361961	02C12	2 A
CRD-V-126/5431	R290	83470-A1			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/3.7	1.3	A,B1	361961	02C12	2 A
CRD-V-126/5435	R290	83470-A1			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/3.7	1.3	A,B1	361961	02C12	2 A
CRD-V-126/5439	R290	83470-A1			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/3.7	1.3	A,B1	361961	02C12	2 A
CRD-V-126/5443	R290	83470-A1			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/3.7	1.3	A,B1	361961	02C12	2 A
CRD-V-126/5447	R290	83470-A1			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/3.7	1.3	A,B1	361961	02C12	2 A
CRD-V-126/5819	R290	83470-A1			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/3.7	1.3	A,B1	361961	02C12	2 A
CRD-V-126/5823	R290	83470-A1			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/3.7	1.3	A,B1	361961	02C12	2 A
CRD-V-126/5827	R290	83470-A1			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	L5/3.7	1.3	A,B1	361961	02C12	2 A
CRD-V-126/5831	R290	83470-A1			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/3.7	1.3	A,B1	361961	02C12	2 A
CRD-V-126/5835	R290	83470-A1			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/3.7	1.3	A,B1	361961	02C12	2 A
CRD-V-126/5839	R290	83470-A1			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/3.7	1.3	A,B1	361961	02C12	2 A
CRD-V-126/5843	R290	83470-A1			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM INLET VALVE (AO)			R	522	K2/3.7	1.3	A,B1	361961	02C12	2 A
CRD-V-127/0219	R290	83470-B2			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/8.4	1.3	A,B1	361961	02C12	2 A
CRD-V-127/0223	R290	83470-B2			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/8.4	1.3	A,B1	361961	02C12	2 A
CRD-V-127/0227	R290	83470-B2			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/8.4	1.3	A,B1	361961	02C12	2 A
CRD-V-127/0231	R290	83470-B2			A		Y 11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/8.4	1.3	A,B1	361961	02C12	2 A

EPN	DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E DETAIL	TH USE	HL SAFETY	TEST	ANL FO C FUNCTION	FREQ	QID	A/E DRAWING	CONTRACT	A/E ZONE	LEVEL	EC
CRD-V-127/0235	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/0239	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/0243	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/0615	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/0619	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/0623	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/0627	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/0631	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/0635	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/0639	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/0643	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/0647	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/1011	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/1015	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/1019	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/1023	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/1027	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A
CRD-V-127/1031	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A,B1	11	02	02	361961	M528	02C12	C4	2	A

EPN / Description	MFG	Model	Bldg	Elev	Status S E / Detail	TH / Use	ML	Test / Safety	ANL FO C / Function	Freq / QID	A/E Drawing / Contract	A/E Zone / Level	EC
CRD-V-127/1035 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/1039 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/1043 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/1047 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/1051 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/1407 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/1411 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/1415 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/1419 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/1423 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/1427 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/1431 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/1435 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CPD-V-127/1439 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/1443 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/1447 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/1451 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/1455 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A F2/8.4	1 3	Y	11 A,B1	02	02 361961	M528 02C12	C4 2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH / USE	HL / SAFETY	TEST	ANL	FO C FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE	LEVEL	EC
CRD-V-127/1803 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/1807 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/1811 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/1815 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/1819 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/1823 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/1827 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/1831 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/1835 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/1839 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/1843 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/1847 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/1851 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/1855 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/1859 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/2203 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/2207 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A
CRD-V-127/2211 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y A.B1	11	02		02 361961	M528 02C12	C4	2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	HL	TEST / SAFETY	ANL FO C / FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-V-127/2215 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y	11 A.B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/2219 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y	11 A.B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/2223 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y	11 A.B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/2227 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y	11 A.B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/2231 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A L5/8.4	1 3	Y	11 A.B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/2235 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A.B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/2239 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A.B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/2243 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A.B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/2247 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A.B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/2251 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A.B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/2255 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A.B1	02	02 361961	M528 02C12	C4 2	A
CRD-V-127/2259 1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	A K2/8.4	1 3	Y	11 A.B1	02	02 361961	M528 02C12	C4 2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	HL	TEST / SAFETY	ANL FO C / FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
CRD-V-127/2627	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-127/2631	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-127/2635	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-127/2639	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-127/2643	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-127/2647	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-127/2651	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-127/2655	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-127/2659	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-127/3003	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-127/3007	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-127/3011	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-127/3015	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-127/3019	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CPD-V-127/3023	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-127/3027	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/8.4	1 3		A,B1		361961	02C12	2 A
CRD-V-127/3031	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1		361961	02C12	2 A
CRD-V-127/3035	R290	83470-B2			A		Y	11	02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1		361961	02C12	2 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	HL	TEST / SAFETY	ANL	FO C FUNCTION	FREQ / OID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
CRD-V-127/3039	R290	83470-B2			A		Y	11	02		02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2 A
CRD-V-127/3043	R290	83470-B2			A		Y	11	02		02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2 A
CRD-V-127/3047	R290	83470-B2			A		Y	11	02		02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2 A
CRD-V-127/3051	R290	83470-B2			A		Y	11	02		02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2 A
CRD-V-127/3055	R290	83470-B2			A		Y	11	02		02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2 A
CRD-V-127/3059	R290	83470-B2			A		Y	11	02		02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2 A
CRD-V-127/3403	R290	83470-B2			A		Y	11	02		02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1			361961	02C12	2 A
CRD-V-127/3407	R290	83470-B2			A		Y	11	02		02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1			361961	02C12	2 A
CRD-V-127/3411	R290	83470-B2			A		Y	11	02		02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1			361961	02C12	2 A
CRD-V-127/3415	R290	83470-B2			A		Y	11	02		02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1			361961	02C12	2 A
CRD-V-127/3419	R290	83470-B2			A		Y	11	02		02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1			361961	02C12	2 A
CRD-V-127/3423	R290	83470-B2			A		Y	11	02		02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1			361961	02C12	2 A
CRD-V-127/3427	R290	83470-B2			A		Y	11	02		02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1			361961	02C12	2 A
CRD-V-127/3431	R290	83470-B2			A		Y	11	02		02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2 A
CRD-V-127/3435	R290	83470-B2			A		Y	11	02		02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2 A
CRD-V-127/3439	R290	83470-B2			A		Y	11	02		02	M528	C4
1" [illegible] EXHAUST VALVE (AO)			[illegible]	[illegible]	[illegible]	1 3		A,B1			361961	[illegible]	2 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH USE	HL	***SEISMIC (S) PARAMETERS*** TEST ANL FO C / SAFETY FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
CRD-V-127/3451	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3455	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3459	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3803	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	15/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3807	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	15/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3811	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	15/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3815	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	15/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3819	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	15/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3823	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	15/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3827	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	15/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3831	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3835	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3839	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3843	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3847	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3851	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3855	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1	361961	02C12	2 A
CRD-V-127/3859	R290	83470-B2			A		Y	11 02	02	M528	C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1	361961	02C12	2 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH / USE	HL	TEST / SAFETY	ANL FO C / FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E LEVEL	ZONE / EC
CRD-V-127/4203	R290	83470-B2			A		Y	11	02	02	M528		C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1		361961	02C12	2	A
CRD-V-127/4207	R290	83470-B2			A		Y	11	02	02	M528		C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1		361961	02C12	2	A
CRD-V-127/4211	R290	83470-B2			A		Y	11	02	02	M528		C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1		361961	02C12	2	A
CRD-V-127/4215	R290	83470-B2			A		Y	11	02	02	M528		C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1		361961	02C12	2	A
CRD-V-127/4219	R290	83470-B2			A		Y	11	02	02	M528		C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1		361961	02C12	2	A
CRD-V-127/4223	R290	83470-B2			A		Y	11	02	02	M528		C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1		361961	02C12	2	A
CRD-V-127/4227	R290	83470-B2			A		Y	11	02	02	M528		C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1		361961	02C12	2	A
CRD-V-127/4231	R290	83470-B2			A		Y	11	02	02	M528		C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1		361961	02C12	2	A
CRD-V-127/4235	R290	83470-B2			A		Y	11	02	02	M528		C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1		361961	02C12	2	A
CRD-V-127/4239	R290	83470-B2			A		Y	11	02	02	M528		C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1		361961	02C12	2	A
CRD-V-127/4243	R290	83470-B2			A		Y	11	02	02	M528		C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1		361961	02C12	2	A
CRD-V-127/4247	R290	83470-B2			A		Y	11	02	02	M528		C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1		361961	02C12	2	A
CRD-V-127/4251	R290	83470-B2			A		Y	11	02	02	M528		C4
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1		361961	02C12	2	A
CRD-													

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH USE	HL	TEST	ANL	SAFETY FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-V-127/4619	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3				A,B1	361961	02C12	2	A
CRD-V-127/4623	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3				A,B1	361961	02C12	2	A
CRD-V-127/4627	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3				A,B1	361961	02C12	2	A
CRD-V-127/4631	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3				A,B1	361961	02C12	2	A
CRD-V-127/4635	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3				A,B1	361961	02C12	2	A
CRD-V-127/4639	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3				A,B1	361961	02C12	2	A
CRD-V-127/4643	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3				A,B1	361961	02C12	2	A
CRD-V-127/4647	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3				A,B1	361961	02C12	2	A
CRD-V-127/4651	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3				A,B1	361961	02C12	2	A
CRD-V-127/4655	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3				A,B1	361961	02C12	2	A
CRD-V-127/5011	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3				A,B1	361961	02C12	2	A
CRD-V-127/5015	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3				A,B1	361961	02C12	2	A
CRD-V-127/5019	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3				A,B1	361961	02C12	2	A
CRD-V-127/5023	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3				A,B1	361961	02C12	2	A
CRD-V-127/5027	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3				A,B1	361961	02C12	2	A
CRD-V-127/5031	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3				A,B1	361961	02C12	2	A
CRD-V-127/5035	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3				A,B1	361961	02C12	2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	HL	TEST / SAFETY	ANL	FO C / FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
CRD-V-127/5043	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5047	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5051	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5415	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5419	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5423	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5427	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5431	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5435	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5439	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5443	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5447	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5819	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5823	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5827	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	L5/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5831	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5835	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2	A
CRD-V-127/5839	R290	83470-B2			A		Y	11	02		02	M528	C4	
1" GLOBE SCRAM EXHAUST VALVE (AO)			R	522	K2/3.7	1 3		A,B1			361961	02C12	2	A

EPN	DESCRIPTION	MFG	MODEL	BLDG	ELEV	DETAIL	STATUS S E	TH	USE	HL	TEST	ANL	FO	C	SAFETY FUNCTION	FREQ	QID	A/E DRAWING	CONTRACT	A/E ZONE	LEVEL	EC
CRD-V-127/5843	1" GLOBE SCRAM EXHAUST VALVE (AO)	R290	83470-B2	R	522	K2/3.7	A		1 3	Y	11	02			A.81	02	361961	M528	02C12	C4	2	A
CSP-AO-1	AIR OPERATOR FOR CSP-V-1	M322	A83B	R	508	N.0/7.7	C	P	1 3			01		9	B1.F	07	018001	M543	68	D5	2	A
CSP-AO-10	AIR OPERATOR FOR CSP-V-10	M322	A83B	R	491	151 DEG AZ	C	P	2 3						B1.F		018003	M543	68	C6	2	A
CSP-AO-2	AIR OPERATOR FOR CSP-V-2	M322	A83B	R	508	7.7/N.0	C	P	2 3			01			B1.F	07	018001	M543	68	D6	2	A
CSP-AO-3	AIR OPERATOR FOR CSP-V-3	M322	A83B	R	481	N.6/7.6	C	P	2 3			01			B1.F	10	018001	M543	68	D5	2	A
CSP-AO-4	AIR OPERATOR FOR CSP-V-4	M322	A83B	R	478	N.6/7.6	C	P	2 3			01			B1.F	10	018001	M543	68	C5	2	A
CSP-AO-5	AIR OPERATOR FOR CSP-V-5	M322	A83B	R	475	N.7/8.3	C	P	2 3			01			B1.F	10	018001	M543	68	C5	2	A
CSP-AO-6	AIR OPERATOR FOR CSP-V-6	M322	A83B	R	480	N.5/7.7	C	P	2 3			01			B1.F	10	018001	M543	68	B14	2	A
CSP-AO-7	AIR OPERATOR FOR CSP-V-7	M332	G-73	R	475	N.5/7.7	M	P	2 3						B1.F		018003	M543	213	C6	2	A
CSP-AO-8	AIR OPERATOR FOR CSP-V-8	M332	G-73	R	484	0 DEG AZ	M	P	2 3						B1.F		018003	M543	213	B14	2	A
CSP-AO-9	AIR OPERATOR FOR CSP-V-9	M322	A83B	R	490	N.9/5.1	C	P	2 3			01			B1.F	10	018001	M543	68	C6	2	A
CSP-V-1	30" BFLY CONTAINMENT ISOL VALVE	B250	A-206763	R	508	N.5/7.6	C	P	2 3	N		01		0	B1.F	07	361104	M543	68	D5	2	A
CSP-V-1+	COMPOSITE FOR CSP-V-1			R	508	N.5/7.6	K		2 3			01			B1.F		361104	M543	68	D5	1	A
CSP-V-10	24" VACUUM RELIEF VALVE	A415	CV1-L	R	491	151 DEG AZ	C	P	1 3	Y		01		9	B1.F		361901	M543	213	C6	2	A
CSP-V-10+	COMPOSITE FOR CSP-V-10			R	491	151 DEG AZ	K		1 3						B1.F		361901	M543		C6	1	A
CSP-V-2	30" BFLY CONTAINMENT ISOL VALVE	B250	A-206763	R	508	N.5/7.4	C	P	2 3	N		01		0	B1.F	07	361104	M543	68	D6	2	A
CSP-V-2+	COMPOSITE FOR CSP-V-2			R	508	N.5/7.4	K		2 3			01			B1.F		361104	M543	68	D6	1	A
CSP-V-3	24" BFLY CONTAINMENT ISOL VALVE	B250	DWG A-206764	R	481	N.6/7.6	C	P	2 3	N		01		9	B1.F	10	361106	M543	68	D5	2	A

EPN DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E DETAIL	TH USE	HL	TEST SAFETY FUNCTION	ANL	FO	C	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL	EC
CSP-V-3+ COMPOSITE FOR CSP-V-3			R	481	K M.6/7.6	2 3		B1.F				361106	M543 68	D5 1	A
CSP-V-4 24" BFLY CONTAINMENT ISOL VALVE	B250	DWG A-206764	R	478	C 7.6/M.6	P 2 3	N	B1.F	01		9	10 361106	M543 68	C5 2	A
CSP-V-4+ COMPOSITE FOR CSP-V-4			R	478	K M.6/7.6	2 3		B1.F				361106	M543 68	C5 1	A
CSP-V-5 24" BFLY CONTAINMENT ISOL VALVE	B250	DWG A-206764	R	475	C M.7/8.3	P 1 3	N	B1.F	01		9	10 361106	M543 68	C5 2	A
CSP-V-5+ COMPOSITE FOR CSP-V-5			R	475	K M.7/8.3	1 3		B1.F				361106	M543 68	B14 1	A
CSP-V-6 24" BFLY CONTAINMENT ISOL VALVE	B250	A-206765	R	480	C N.5/7.7	P 1 3	N	B1.F	01		9	10 361106	M543 68	B14 2	A
CSP-V-6+ COMPOSITE FOR CSP-V-6			R	480	K N.5/7.7	1 3		B1.F				361106	M543 68	B14 1	A
CSP-V-7 24" CHECK VAC RELIEF TO SUPP CHAMB	A415	CV1-L	R	475	C N.5/7.7	P 1 3	Y	B1.F	01		9	361901	M543 213	C5 2	A
CSP-V-7+ COMPOSITE FOR CSP-V-7			R	475	K N.5/7.7	1 3		B1.F				361901	M543	C5 1	A
CSP-V-8 .75" GLOBE 24" VACUUM RELIEF VALVE	A415	CV1-L	R	484	C 0 DEG AZ	P 1 3	Y	B1.F	01		9	361901	M543 213	B14 2	A
CSP-V-8+ COMPOSITE FOR CSP-V-8			R	484	K 0 DEG AZ	1 3		B1.F				361901	M543	B14 1	A
CSP-V-9 24"BFLY VAC RELIEF TO SUPP CHAMB	B250	DWG A-206764	R	490	C M.9/5.1	P 1 3	Y	B1.F	01		9	10 361106	M543 68	C6 2	A
CSP-V-9+ COMPOSITE FOR CSP-V-9			R	490	K M.9/5.1	1 3		B1.F				361106	M543 68	C6 1	A
CVB-V-1A 24" CHK VAC RELIEF TO DRYWELL	A415	CV1-L/TYPE	C	492	A 6 D AZ R35	P 1 0	Y	124 D	01		0	17 361901	M543 213	B12 2	A
CVB-V-1A+			C	492	K 6 D AZ R35	1 0	Y	D				361901	M543	B12 1	A
CVB-V-1B 24" CHK VAC RELIEF TO DRYWELL	A415	CV1-L/TYPE	C	492	A 6 D [illegible] R35	P [illegible]	Y	124 D	01		0	17 [illegible]	M543	B12 2	[illegible]

EPN DESCRIPTION	MFG	MODEL	BLDG ELEV	STATUS S E DETAIL	TH USE	HL	TEST SAFETY	ANL FUNCTION	FO	C	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL EC
CVB-V-1C+			C 492 27	K D AZ R35	 1 0	Y	 D				 361901	H543	B11 1 A
CVB-V-1D 24" CHK VAC RELIEF TO DRYWELL	A415	CV1-L/TYPE	C 492 27	A D AZ R35	P 1 0	Y	124 D	01		0	17 361901	H543 213	B12 2 A
CVB-V-1D+			C 492 27	K D AZ R35	 1 0	Y	 D				 361901	H543	B12 1 A
CVB-V-1E 24" CHK VAC RELIEF TO DRYWELL	A415	CV1-L-TYPE	C 492 90	A D AZ R35	P 1 0	Y	124 D	01		0	17 361901	H543 213	B11 2 A
CVB-V-1E+			C 492 90	K D AZ R35	 1 0	Y	 D				 361901	H543	B11 1 A
CVB-V-1F 24" CHK VAC RELIEF TO DRYWELL	A415	CV1-L-TYPE	C 492 90	A D AZ R35	P 1 0	Y	124 D	01		0	17 361901	H543 213	B11 2 A
CVB-V-1F+			C 492 90	K D AZ R35	 1 0	Y	 D				 361901	H543	B11 1 A
CVB-V-1G 24" CHK VAC RELIEF TO DRYWELL	A415	CV1-L-TYPE	C 441 153	M D AZ R35	P 1 0	Y	124 D	01		0	17 361901	H543 213	B11 2 A
CVB-V-1G+			C 492 153	K D AZ R35	 1 0	Y	 D				 361901	H543	B11 1 A
CVB-V-1H 24.0"CHK. VAC.RELIEF TO DRYWELL	A415	CV1-L-TYPE	C 492 153	A D AZ R35	P 1 0	Y	124 D	01		0	17 361901	H543 213	B11 2 A
CVB-V-1H+			C 492 153	K D AZ R35	 1 0	Y	 D				 361901	H543	B11 1 A
CVB-V-1J 24" CHECK VAC RELIEF TO DRYWELL	A415	CV1-L-TYPE	C 492 175	A D AZ R35	P 1 0	Y	124 D	01		0	17 361901	H543 213	B9 2 A
CVB-V-1J+			C 492 175	K D AZ R35	 1 0	Y	 D				 361901	H543	B9 1 A
CVB-V-1K 24" CHK VAC RELIEF TO DRYWELL	A415	CV1-L-TYPE	C 492 175	A D AZ R35	P 1 0	Y	124 D	01		0	17 361901	H543 213	B9 2 A
CVB-V-1K+			C 492 175	K D AZ R35	 1 0	Y	 D				 361901	H543	B9 1 A
CVB-V-1L 24" CHECK VAC RELIEF TO DRYWELL	A415	CV1-L-TYPE	C 492 196	A D AZ R35	P 1 0	Y	124 D	01		0	17 361901	H543 213	B8 2 A
CVB-V-1L+			C 492 196	K D AZ R35	 1 0	Y	 D				 361901	H543	B8 1 A
CVB-V-1M 24" CHECK VAC RELIEF TO DRYWELL	A415	CV1-L-TYPE	C 492 196	A D AZ R35	P 1 0	Y	124 D	01		0	17 361901	H543 213	B9 2 A

EPN DESCRIPTION	MFG	MODEL	BLDG ELEV	STATUS S E DETAIL	TM USE	HL	TEST SAFETY FUNCTION	ANL	FO	C	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL EC
CVB-V-1M+			C 492 196	K D AZ R35	 1 0	Y	 D				 361901	M543	B9 1 A
CVB-V-1N 24" CHECK VAC RELIEF TO DRYWELL	A415	CV1-L-TYPE	C 492 260	A D AZ R35	P 1 0	Y	124 D	01		0	17 361901	M543 213	B8 2 A
CVB-V-1N+			C 492 260	K D AZ R35	 1 0	Y	 D				 361901	M543	B8 1 A
CVB-V-1P 24" CHECK VAC RELIEF TO DRYWELL	A415	CV1-L-TYPE	C 492 260	A D AZ R35	P 1 0	Y	124 D	01		0	17 361901	M543 213	B8 2 A
CVB-V-1P+			C 492 260	K D AZ R35	 1 0	Y	 D				 361901	M543	B8 1 A
CVB-V-1Q 24" CHECK VAC RELIEF TO DRYWELL	A415	CV1-L-TYPE	C 492 344	A D AZ R35	P 1 0	Y	124 D	01		0	17 361901	M543 213	B7 2 A
CVB-V-1Q+ COMPOSITE OF CVB-V-1Q			C 492 344	K D AZ R35	 1 0	Y	 D				 361901	M543	B7 1 A
CVB-V-1R 24" CHECK VAC RELIEF TO DRYWELL	A415	CV1-L-TYPE	C 492 344	A D AZ R35	P 1 0	Y	124 D	01		0	17 361901	M543 213	B7 2 A
CVB-V-1R+			C 492 344	K D AZ R35	 1 0	Y	 D				 361901	M543	B7 1 A
CVB-V-1S													
CVB-V-1T 24" CHK VAC RELIEF TO DRYWELL	A415	CV1-L-TYPE	C 492 281	A D AZ R35	P 1 0	Y	124 D	01		0	17 361901	M543 213	B7 2 A
CVB-V-1T+			C 492 281	K D AZ R35	 1 0	Y	 D				 361901	M543	B7 1 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	HL	TEST / SAFETY FUNCTION	ANL	FO	C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
EDR-AO-19	K125	60CSR10SP176			S	P	Y	121			9	09	M537	D9
AIR OPERATOR EDR-V-19			R	467	M.5/4.7	1 0		B1				018007	41A	2 A
EDR-AO-20	K125	60CSR10SP176			S	P	Y	121			9	09	M537	D9
AIR OPERATOR EDR-V-20			R	467	M.5/4.7	1 0		B1				018007	41A	2 A
EDR-V-19	V085	P2-3311-N-21			A	P	Y		01		9	60	M537	D9
3"AO GATE FROM DRYWELL SUMP			R	467	M.5/4.7	1 0		B1				361718	41A	2 A
EDR-V-19+					A	P	Y		01				M537	D9
			R	467	M.5/4.7	1 0		B1				361718		1 A
EDR-V-20	V085	P2-3311-N-21			A	P	Y		01		9		M537	D9
3" GATE FROM DRYWELL SUMP (AO)			R	467	M.5/4.7	1 0		B1				361718	41A	2 A
EDR-V-20+					A	P	Y		01				M537	D9
			R	467	M.5/4.7	1 0		B1				361718		1 A
FDR-AO-3	K125	60CSR10SP176			S	P	Y	121			9	09	M539	D6
AIR OPERATOR FDR-V-3			R	467	M.0/4.1	1 0		B1				018007	41A	2 A
FDR-AO-4	K125	60CSR10SP176			S	P	Y	121			9	09	M539	D6
AIR OPERATOR FDR-V-4			R	467	M.0/4.1	1 0		B1				018007	41A	2 A
FDR-V-3	V085	P2-3311-N-21			A	P	Y		01		9		M539	D6
3"" GATE VLV AO			R	467	M.0/4.1	1 0		B1				361718	41A	2 A
FDR-V-3+					K	P	Y		01				M539	D6
COMPOSITE FOR FDR-V-3			R	467	M.0/4.1	1 0		B1				361718		1 A
FDR-V-4	V085	P2-3311-N-21			N	P	Y		01		9		M539	D6
3" GATE CONT TO DRN FD-SUMP-R3 AO			R	467	M.0/4.1	1 0		B1				361718	41A	2 A
FDR-V-4+					K	P	Y		01				M539	D6
COIPOSITE FOR FDR-V-4			R	467	M.0/4.1	1 0		B1				361718		1 A
FPC-P-1A	W318	3LR-9			M	P							M526	D13
FUEL POOL CIRC PUMP 1A			R	549	8.6/L.7	2 3		G				233007	21A	2 A
FPC-P-1A+					K								M526	D13
FUEL POOL COOLING PUMP			R	549	L.7/8.6	2 3		G				233007		1 A
FPC-P-1B	W318	3LR-9			M	P							M526	C13
FUEL POOL CIRC PUMP 1B			R	549	L.7/8.8	2 3		G				233007	21A	2 A
FPC-P-1B+					K								M526	C13
FUEL POOL COOLING PUMP			R	549	L.7/8.8	2 3		G				233007		1 A
FPC-V-153	V085	P2-3311-N-9			A	P	Y		01		9	48+	M526	B11
6" MO GATE FPC-P-3 SUCT SUPP POOLBD-N			R	448	J.9/7.9	1 0		B1				361710	41A	2 A
FPC-V-153+					A	P	Y		01		9	48	M526	B11
6" GATE MO FPC-P-3 SUCT SUPP POOL			R	448	J.9/7.9	1 0		B1				361710		1 A

EPN DESCRIPTION	MFG	MODEL	BLDG ELEV	STATUS S E DETAIL	TM USE	HL	TEST	ANL	FO	C	SAFETY FUNCTION	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL EC
FPC-V-154 6" MO GATE FPC-P-3 SUCT SUPP POOLBD-N	V085	P2-3311-N-9	R 448 J.9/8.0	A	P 1 0	Y		01		9	B1	48+ 361710	M526 41A	B11 2 A
FPC-V-154+ 6" MO GATE FPC-V-3 SUCTION ISOL			R 448 J.9/8.0	A	P 1 0	Y		01		9	B1	48 361710	M526	B11 1 A
FPC-V-156 6" MO GATE SUPP POOL RETURN ISOLBD-N	V085	DWG P2-3311-N-9	R 466 K.2/8.2	A	P 1 0	Y		01		9	B1	48+ 361710	M526 41A	C11 2 A
FPC-V-156+ 6" MO GATE SUPP POOL RETURN ISOL			R 466 K.2/8.2	A	P 1 0	Y		01		9	B1	48 361710	M526	B11 1 A
FPC-V-172 8" GATE VALVE MOTOR OPERATED	V085	P2-3311-NP-62	R 471 K9/9	M	P 1 3						B2	361745	M526 41A	C9 2 A
FPC-V-172+			R 471 K9/9	K	1 3						B2	361745	M526	C9 1 A
FPC-V-173 8" GATE VALVE MOTOR OPERATED	V085	P2-3311-NP-62	R 471 K/9.4	M	P 1 3						B2	361745	M526 41A	C8 2 A
FPC-V-173+			R 471 K/9.4	K	1 3						B2	361745	M526	C8 1 A
FPC-V-175 8" GATE VALVE MOTOR OPERATED	V085	P2-3311-NP-62	R 548	M	P 2 3						B2	361745	M526 41A	C10 2 A
FPC-V-175+			R 548	K	2 3						B2	361745	M526	C10 1 A
FPC-V-181A 8" GATE VALVE MOTOR OPERATED	V085	P2-3311-NP-62	R 548	M	P 2 3						G	361745	M526 41A	D14 2 A
FPC-V-181A+ 8" GATE VALVE MOTOR OPERATED			R 548	K	2 3						G	361745	M526	D14 1 A
FPC-V-181B 8" GATE VALVE MOTOR OPERATED	V085	P2-3311-NP-62	R 548	M	P 2 3						G	361745	M526 41A	C14 2 A
FPC-V-181B+ 8" GATE VALVE MOTOR OPERATED			R 548	K	2 3						G	361745	M526	C14 1 A
FPC-V-184 8" GATE VALVE MOTOR OPERATED	V085	P2-3311-NP-62	R 471 L/9.4	M	P 1 3						B2	361745	M526 41A	C9 2 A
FPC-V-184+ COMPOSITE TO FPC-V-184			R 471 L/9.4	K	1 3						B2	361745	M526	C9 1 A
HPCS-AO-5 AIR OPERATOR HPCS-V-5	K125	D-SK-2765	C 548 232 D AZ	M	P 3 0	Y						41 018004	M520 50	H8 2 A
HPCS-P-1 HPCS PUMP	I075	FIG 080570-351861171	R 423 H.3/3.6	A	1 0					0	C,G	11 233008	M520 02E22	B6 2 A

EPN / DESCRIPTION	MFG	MODEL	BLDG ELEV	STATUS S E / DETAIL	TM / USE	HL	TEST / SAFETY FUNCTION	ANL	FO C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
HPCS-P-1+				A							M520	B5	
HPCS PUMP			R 423	M.3/3.6	1 0		C			233008		1	A
HPCS-P-3	C666	3065-1055-6599		A		N		01	0	82	M520	C6	
HPCS SYSTEM WATER LEG PUMP			R 423	L.6/3.5	1 0		C,G			233006	35A	2	A
HPCS-P-3+				A							M520	C6	
HPCS SYSTEM WATER LEG PUMP			R 423	L.6/3.5	1 0		C			233006		1	A
HPCS-RV-14	L265	LCT-20		Q		N		01		73	M520	C6	
1"X1" RELIEF HPCS-P-3 SUCTION			R 427	M.0/3.4	2 0		G			297002	215	2	A
HPCS-RV-35	L265	LCT-20		Q		N		01		99+	M520	C5	
1" x 2" RELIEF HPCS-P-3 DISCH			R 434	M.0/3.5	2 0		G			297003	215	2	A
HPCS-V-1	A391	DWG 5310-2-1		A	P	N		01	0	33+	M520	C7	
14" GATE MO COND WTR INTO HPCS			R 435	M.0/3.9	1 0		C			361070	02E22	2	A
HPCS-V-10	A391	DWG 1927-3		A	P	N		01	0	74+	M520	E3	
10"MO GLOBE HPCS RETURN TO CST			R 448	L.9/3.7	2 0		C,G			361006	02E22	2	A
HPCS-V-10+				A					0		M520	E3	
COMP FOR 10IN GLOBE RETURN TO CST			R 448	L9/3.7	2 0		C			361006		1	A
HPCS-V-11	A391	DWG 1927-3		A	P	N		01	0	74	M520	E3	
10" MO GLOBE HPCS RETURN TO CST			R 448	L.9/3.7	2 0		G			361006	02E22	2	A
HPCS-V-11+				A					0		M520	E3	
COMP FOR 10IN GLOBE RETURN TO CST			R 448	L9/3.7	2 0		C			361006		1	A
HPCS-V-12	A391	94-13306		A	P	N		01	9	33+	M520	B5	
4"GATE HPCS-P-1 MIN FLOW (MO)			R 430	M.0/3.7	1 0		C			361060	02E22	2	A
HPCS-V-12+				K							M520	B5	
COMP FOR 4IN GATE HPCS-P-1 MIN FLO			R 449	L3/3.9	1 0		C			361060		1	A
HPCS-V-15	A391	94-13272		M	P	Y			9		M520	D7	
18"MO GATE SUPP POOL OUTLT TO HPCS			R 449	L.3/3.9	1 0		B1,C			361075	02E22	2	A
HPCS-V-15+				A							M520	D7	
18"MO GATE SUPP POOL OUTLT TO HPCS			R 449	L3/3.9	1 0		C			361075		1	A
HPCS-V-16	A395	DWG 2621-3		Q	P	Y		01			M520	D6	
24" CHECK SUPP POOL SUCTION			R 449	L.3/3.5	1 0		C,G			361047	41B	2	A
HPCS-V-2	A395	DWG 2620-3		R	P	N					M520	C6	
20" CHECK HPCS-P-1 CST SUCTION			R 430	M.7/3.8	1 0		C,G			361045	41B	2	A

EPN DESCRIPTION	MFG	MODEL	BLDG ELEV	STATUS S E DETAIL	TM USE	HL	TEST	ANL	FO	C	SAFETY FUNCTION	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL EC
HPCS-V-23 12" MO GLOBE HPCS TEST LINE	A391	DWG 1928-3	R 450	A L.5/3.7	P 2 0	N		01		0	B1,G	65 361007	M520 02E22	E5 2 A
HPCS-V-23+ 12" MO TEST LINE COMPOSITE			R 450	A L5/3.7	2 0						B1,G	361007	M520	E5 1 A
HPCS-V-24 16" CHECK HPCS-P-1 DISCHARGE	A391	DWG 2632-3	R 430	R M.0/3.7	P 1 0	N					C,G	361043	M520 41B	B4 2 A
HPCS-V-4 12" GATE CONTAINMENT ISOL(MO)	A391	DWG 94-13401	C 538	A M.3/7.3	P 1 0	N		01		0	B1,C	55 361065	M520 02E22	G7 2 A
HPCS-V-4+ 12" MO CONTAINMENT ISO VLV COMP	A391		R 547	A M.3/7.3	1 0						C	361065	M520	G7 1 A
HPCS-V-5 12" CHECK CONTAINMENT ISOL (AO)	V085	P2-2767-N-2	C 548	A 231 D AZ R17	P 1 0	Y		01		9	B1,C	51 361742	M520 69	H8 2 A
HPCS-V-5+ 12"&CHECK VLV CONTAINMENT ISO COMP			C 548	A 231 D AZ R17	1 0	Y					B1,C	361742	M520	H8 1 A
HPCS-V-7 1.5" CHECK HPCS-P-3 DISCHARGE	B350	P 76550-1	R 426	Q L.7/3.6	2 0						G	361220	M520 215	C5 2 A
LPCS-FCV-11 3" GLOBE LPCS-P-1 MIN FLOW MO	F130	5248657	R 423	A K1/3.5	P 1 0	N		01		9	C,G	38 133002	M520 42A	B13 2 A
LPCS-FCV-11+ 3"MO GLOBE LPCS P-1 MIN FLOW RECIR			R 423	A K1/3.5	1 0						C	133002	M520	B13 1 A
LPCS-P-1 LPCS PUMP	I075	29APKD-5 STAGE	R 426	M K.0/4.0	1 0	N		02			C,G	37 233011	M520 02E21	B12 2 A
LPCS-P-1+ LPCS PUMP			R 426	M K.0/4.0	1 0						C	233011	M520 02E21	B12 1 A
LPCS-P-2 LPCS WATER LEG PUMP	C666	FIG 3065-1055-6599	R 424	A J.7/3.6	1 0	N		01		0	C,G	82 233006	M520 35A	C12 2 A
LPCS-P-2+ LPCS WATER LEG PUMP			R 424	A J.7/3.6	1 0						C	233006	M520	C12 1 A
LPCS-RV-18 1.5"X2"RV LPCS-P-1	L265	D-30F	R 528	Q L.8/4.1	2 0	N		01			G	99+ 297003	M520 215	G12 2 A
LPCS-RV-31 1"X1" LPCS-P-2 SUCTION	L265	LCT20	R 426	O K.0/3.7	2 0	N		01			G	73 297002	M520 215	C12 2 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	HL	TEST	ANL / SAFETY FUNCTION	FO	C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
LPCS-V-1	V085	DWG P2-3313-N-40			A	P	Y		01		9	37	M520	D11
24" MO GATE SUPP POOL SUCTION			R	450	K.0/4.7	1 0			C.G.B1			361736	41A	2 A
LPCS-V-1+					A	P	Y		01		9		M520	D11
24"MO SUPP POOL SUCTION VALVE			R	450	K.0/4.7	1 0			C			361736	41A	1 A
LPCS-V-12	A395	DWG 2647-3			S	P	Y		01		9	41	M520	E15
12" GLOBE MO TEST LINE TO SUPP POO			R	450	J.9/3.9	2 0			C.G.B1			361024	41B	2 A
LPCS-V-3	A395	DWG 2624-3			R	P	N						M520	B13
16" CHECK LPCS-P-1 DISCHARGE			R	435	K.0/3.7	1 0			C.G			361043	41B	2 A
LPCS-V-33	B350	P 76550-1			O								M520	C12
1.5" CHECK LPCS-P-2 DISCHARGE			R	424	K.2/3.5	2 0			G			361220	215	2 A
LPCS-V-5	V085	P2-3311-N-15			A	P	Y	21	.01		9	43	M520	G11
12" MO GATE TO REACTOR VESSEL INJ LINE			R	525	M.0/4.5	1 0			C.G.B1			361715	41A	2 A
LPCS-V-5+					A								M520	G11
12"MO GATE CONTAINMENT BOUNDARY VL			R	525	M.0/4.5	1 0			C			361715	41A	1 A
LPCS-V-6	V085	P2-2767-N2			A	P	Y		01		9	51	M520	G9
12" CHECK TO REACTOR VESSEL			C	548	121 D AZ R16	1 0			B1.C.G			361742	69	2 A
LPCS-V-6+					A		Y						M520	G9
12" CHECK TO REACTOR VESSEL			C	548	121 D AZ R16	1 0			B1.C			361742	69	1 A
MS-AO-13A (MS-AO-2A)	C710	C5246			C		Y	121			0		M529	F10
RELIEF VLV AIR OPERATOR			C	547	AZ 35 R18	1 0			C			018008	02	2 A
MS-AO-13B (MS-AO-3A)	C710	C5246			C		Y	121			0		M529	F10
RELIEF VLV AIR OPERATOR			C	547	AZ 45 R18	1 0			C			018008	02	2 A
MS-AO-1A	C710	C5246			C		Y	121			0		M529	F10
AIR OPPERATOR TO MS-RV-1A			C	547	AZ 24 R18	1 0			C			018008	02	2 A
MS-AO-1B	C710	C5246			C		Y	121			0		M529	D11
AIR OPPERATOR TO MS-RV-1B			C	547	AZ 45 R22	1 0			C			018008	02	2 A
MS-AO-1C	C710	C5246			C		Y	121			0		M529	F6
AIR OPPERATOR TO MS-RV-1C			C	547	AZ 313 R22	1 0			C			018008	02	2 A
MS-AO-1D	C710	C5246			C		Y	121			0		M529	D7
AIR OPPERATOR TO MS-RV-1D			C	547	AZ 333 R18	1 0			C			018008	02	2 A
MS-AO-22A	S157	SA-A022			M	P	Y	115	05		9	15	M529	F12
AIR OPERATOR MS-V-22A			C	510	10 D AZ R30	1 3			B1.F			018002	02B22	2 A
MS-AO-22B	S157	SA-A022			M	P	Y	115	05		9	15	M529	E12
AIR OPERATOR MS-V-22B			C	510	17 D AZ R30	1 3			B1.F			018002	02B22	2 A
MS-AO-22C	S157	SA-A022			M	P	Y	115	05		9	15	M529	F5
AIR OPERATOR MS-V-22C			C	510	344 D AZ R30	1 3			B1.F			018002	02B22	2 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM	USE	HL	TEST / SAFETY FUNCTION	ANL	FO C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
MS-AO-22D AIR OPERATOR MS-V-22D	S157	SA-A022	C	510	M 350 D AZ R30	P	1 3	Y	115 B1,F	05	9	15 018002	M529 02B22	E5 2 A
MS-AO-28A AIR OPERATOR MS-V-28A	S157	SA-A022	R	515	M H,3/6,0	P	1 3	Y	115 B1,F	05	9	15 018002	M529 02B22	F13 2 A
MS-AO-28B AIR OPERATOR MS-V-28B	S157	SA-A022	R	515	M H,3/6,0	P	1 3	Y	115 B1,F	05	9	15 018002	M529 02B22	E13 2 A
MS-AO-28C AIR OPERATOR MS-V-28C	S157	SA-A022	R	515	M H,3/6,0		1 3	Y	115 B1,F	05	9	15 018002	M529 02B22	F4 2 A
MS-AO-28D AIR OPERATOR MS-V-28D	S157	SA-A022	R	515	M H,3/6,0	P	1 3	Y	115 B1,F	05	9	15 018002	M529 02B22	E4 2 A
MS-AO-2B AIR OPPERATOR TO MS-RV-2B	C710	C5246	C	547	C AZ 60 R22	P	1 0	Y	121 C		0	018008	M529 02	D10 2 A
MS-AO-2C AIR OPPERATOR TO MS-RV-2C	C710	C5246	C	547	C AZ 305 R22	P	1 0	Y	121 C		0	018008	M529 02	F7 2 A
MS-AO-2D AIR OPPERATOR TO MS-RV-2D	C710	C5246	C	547	C AZ 321 R18	P	1 0	Y	121 C		0	018008	M529 02	D7 2 A
MS-AO-3B AIR OPPERATOR TO MS-RV-3B	C710	C5246	C	547	C AZ 67 R22		1 0	Y	121 C		0	018008	M529 02	D10 2 A
MS-AO-3C AIR OPPERATOR TO MS-RV-3C	C710	C5246	C	547	C AZ 293 R22		1 0	Y	121 C		0	018008	M529 02	F7 2 A
MS-AO-3D AIR OPPERATOR ON MS-RV-3D	C710	C5246	C	547	C AZ 315 R18		1 0	Y	121 C		0	018008	M529 02	D8 2 A
MS-AO-4A AIR OPPERATOR TO MS-RV-4A	C710	C5246	C	547	C AZ 60 R18		1 0	Y	121 C		0	018008	M529 02	F9 2 A
MS-AO-4B AIR OPPERATOR TO MS-RV-4B	C710	C5246	C	547	C AZ 75 R22		1 0	Y	121 C		0	018008	M529 02	D9 2 A
MS-AO-4C AIR OPPERATOR TO S-RV-4C	C710	C5246	C	547	C AZ 288 R22		1 0	Y	121 C		0	018008	M529 02	F7 2 A
MS-AO-4D AIR OPPERATOR TO MS-RV-4D	C710	C5246	C	547	C AZ 305 R18		1 0	Y	121 C		0	018008	M529 02	D8 2 A
MS-AO-5B AIR OPPERATOR TO MS-RV-5B	C710	C5246	C	547	C AZ 80 R22		1 0	Y	121 C		0	018008	M529 02	D9 2 A
MS-AO-5C AIR OPPERATOR TO MS-RV-5C	C710	C5246	C	547	C AZ 279 R22		1 0	Y	121 C		0	018008	M529 02	F8 2 A
MS-RV-1A 6" X 10" MAIN STEAM SAFETY RELIEF	C710	6R10 HR-65-BP	C	547	C AZ 24 R18		1 0	Y	121 C	00	0	15 297009	M529 02B22	F11 2 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	HL	TEST / SAFETY FUNCTION	ANL	FO	C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
MS-RV-1A+					C		Y						M529	F11
MS RELIEF VLV			C	547	AZ 24 R18	1 0		C				297009		1 A
MS-RV-1B	C710	6R10 HB-65-BP			C		Y	121	00		0	15	M529	D11
6" X 10" MS SAFETY RELIEF VALVE			C	547	AZ 45 R22	1 0		C				297009	02B22	2 A
MS-RV-1B+					C		Y						M529	D11
MS-REL[illegible]			C	547	AZ [illegible]	[illegible] 0		C				297[illegible]		1 A

EPN DESCRIPTION	MFG	MODEL	BLDG ELEV	STATUS S E DETAIL	TH USE	HL SAFETY	TEST	ANL	FO	C	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL EC
MS-RV-3B+ MS-RELIEF VLV			C 547	C AZ 67 R22	 1 0	Y C					 297009	M529	D10 1 A
MS-RV-3C 6" X 10" MS SAFETY RELIEF VALVE	C710	6R10 HB-65-BP	C 547	C AZ 293 R22	 1 0	Y C	121	00		0	15 297009	M529 02B22	E7 2 A
MS-RV-3C+ MS-RELIEF VLV			C 547	C AZ 293 R22	 2 0	Y C					 297009	M529	E7 1 A
MS-RV-3D 6" X 10" MS SAFETY RELIEF VALVE	C710	6R10 HB-65-BP	C 547	C AZ 315 R18	 1 0	Y C,F	121	00		0	15 297009	M529 02B22	E8 2 A
MS-RV-3D+ MS-RELIEF VLV			C 547	C AZ 315 R18	 1 0	Y C,F					 297009	M529	E8 1 A
MS-RV-4A 6" X 10" MS SAFETY RELIEF VALVE	C710	6R10 HB-65-BP	C 547	C AZ 60 R18	 1 0	Y C,F	121	00		0	15 297009	M529 02B22	F9 2 A
MS-RV-4A+ MS-RELIEF VLV			C 547	C AZ 60 R18	 1 0	Y C,F					 297009	M529	F9 1 A
MS-RV-4B 6" X 10" MS SAFETY RELIEF VALVE	C710	6R10 HB-65-BP	C 547	C AZ 75 R22	 1 0	Y C,F	121	00		0	15 297009	M529 02B22	D9 2 A
MS-RV-4B+ MS-RELIEF VLV			C 547	C AZ 75 R22	 1 0	Y C,F					 297009	M529	D9 1 A
MS-RV-4C 6" X 10" MS SAFETY RELIEF VALVE	C710	6R10 HB-65-BP	C 547	C AZ 288 R22	 1 0	Y C,F	121	00		0	15 297009	M529 02B22	F8 2 A
MS-RV-4C+ MS-RELIEF VLV			C 547	C AZ 288 R22	 1 0	Y C,F					 297009	M529	F8 1 A
MS-RV-4D 6" X 10" MS SAFETY RELIEF VALVE	C710	6R10 HB-65-BP	C 547	C AZ 305 R18	 1 0	Y C,F	121	00		0	15 297009	M529 02B22	E8 2 A
MS-RV-4D+ MS-RELIEF VLV			C 547	C AZ 305 R18	 1 0	Y C,F					 297009	M529	E8 1 A
MS-RV-5B 6" X 10" MS SAFETY RELIEF VALVE	C710	6R10 HB-65-BP	C 547	C AZ 80 R22	 1 0	Y C,F	121	00		0	15 297009	M529 02B22	E9 2 A
MS-RV-5B+ MS-RELIEF VLV			C 547	C AZ 80 R22	 1 0	Y C,F					 297009	M529	E9 1 A
MS-RV-5C 6" X 10" MS SAFETY RELIEF VALVE	C710	6R10 HB-65-BP	C 547	C AZ 279 R22	 1 0	Y C,F	121	00		0	15 297009	M529 02B22	F8 2 A
MS-RV-5C+ MS-RELIEF VLV			C 547	C AZ 279 R22	 1 0	Y C,F					 297009	M529	F8 1 A
MS-V-1 2" GLOBE VLV MO RX VENT	B350	P 76850-1	C 573	A 225 D A R15	P 2 0	Y G		01		0	35 361231	M529 215	J10 2 A

EPN / DESCRIPTION	MFG	MODEL	BLDG ELEV	STATUS S E DETAIL	TH USE	HL	TEST	ANL	FO	C	SAFETY FUNCTION	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL EC
MS-V-1+ REACTOR VESSEL HEAD VENT VLV			C 573 AZ 225 R15	A	P 2 0	Y		01		9	G	35 361231	M529	J10 1 A
MS-V-16 3" MO GATE FROM PRICONT	V085	P2-3311-N-1	C 502 360 D AZ R36	A	P 1 3	Y		01		9	B1,F	58 361702	M529 41A	B13 2 A
MS-V-16+ 3" MO GATE VLV FROM PRI CONT			C 502 AZ 360 R36	A	P 1 0	Y		01			B1,F	361702	M529	B13 1 A
MS-V-19 3" MO GATE DRAIN BLOCK	V085	DWG P2-3311-N-1	R 504 H,3/6,0	A	P 1 3	Y		01		9	B1,F	58 361701	M529 41A	B14 2 A
MS-V-19+ 3"MO GATE VLV FM DRAIN BLOCK			R 504 H,3/6,0	A	P 1 0	Y		01		9	B1,F	361701	M529	B14 1 A
MS-V-2 2" GLOBE MO RV HEAD VENT	B350	P 76850-1	C 573 230 D AZ R15	A	P 2 0	Y		01		9	G	35 361231	M529 215	J10 2 A
MS-V-2+ REACTOR VESSEL HEAD VENT			C 573 AZ 230 R15	A	P 2 0	Y		01		9	G	35 361231	M529	J10 1 A
MS-V-22A 26" AO GLOBE MSIV (INBOARD)	R340	1612JMMNTY	C 505 AZ 5 R32	M	1 3	Y	115	01	05	9	B1,F	15 361964	M529 02822	F12 2 A
MS-V-22A+ MS ISOL VLV			C 505 AZ 5 R32	K	1 3	Y	115				B1,F	361964	M529	F12 1 A
MS-V-22B 26" AO GLOBE MSIV (INBOARD)	R340	1612JMMNTY	C 506 AZ 15 R32	M	1 3	Y	115	05		9	B1,F	15 361964	M529 02822	E12 2 A
MS-V-22B+ MS ISOL VLV			C 506 AZ 15 R32	K	1 3	Y	115				B1,F	361964	M529	E12 2 A
MS-V-22C 26" AO GLOBE MSIV (OUTBOARD)	R340	1612JMMNTY	C 506 AZ 315 R32	M	1 3	Y	115	05		9	B1,F	15 361964	M529 02822	F5 2 A
MS-V-22C+ MS ISOL VLV			C 506 AZ 315 R32	K	1 3	Y	115				B1,F	361964	M529	F5 1 A
MS-V-22D 26" AO GLOBE MSIV (INBOARD)	R340	1612JMMNTY	C 506 355 D AZ R32	M	1 3	Y	115	05		9	B1,F	15 361964	M529 02822	E5 2 A
MS-V-22D+ MS ISOL VLV			C 506 AZ 355 R32	K	1 3	Y	115				B1,F	361964	M529	E5 1 A
MS-V-28A 26" AO GLOBE MSIV (OUTBOARD)	R340	1612JMMNTY	R 506 H,8/5,8	M	1 3	Y	115	05		9	B1,F	15 361964	M529 02822	F13 2 A
MS-V-28A+ MS ISOL VLV			R 506 H,8/5,8	K	1 3	Y	115				B1,F	361964	M529	F13 1 A
MS-V-28B 26" AO GLOBE MSIV (OUTBOARD)	R340	1612JMMNTY	R 506 H,8/5,[illegible]	M	1 3	Y	115	05		9	B1,F	15 [illegible]	M529 [illegible]	E13 2 [illegible]

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	HL	TEST / SAFETY	ANL	FO	C.	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
MS-V-28B+ / MS ISOL VLV			R	506	K / H.8/5.6	1.3	Y	115 / B1,F				361964	M529	E13 / 1	A
MS-V-28C / 26" AO GLOBE MSIV (OUTBOARD)	R340	1612JMMNTY	R	506	M / H.8/6.4	1.3	Y	115 / B1,F	05	9		15 / 361964	M510 / 02822	H5 / 2	A
MS-V-28C+ / MS ISOL VLV			R	506	K / H.8/6.4	1.3	Y	115 / B1,F				361964	M529	F4 / 1	A
MS-V-28D / 26" AO GLOBE MSIV (OUTBOARD)	R340	1612JMMNTY	R	506	M / H.8/6.2	1.3	Y	115 / B1,F	05	9		15 / 361964	M510 / 02822	H5 / 2	A
MS-V-28D+ / MS ISOL VLV			R	506	K / H.8/6.2	1.3	Y	115 / B1,F				361964	M529	E4 / 1	A
MS-V-67A / 1.5" GATE MS-V-28A BODY DRAIN SHUT	B350	P 76890-1	R	506	C / H.8/5.8	P / 1.3	Y	B1,F	01	9		45 / 361258	M529 / 215	F13 / 2	A
MS-V-67A+ / MS-V-28A BODY DRAIN			R	506	C / H.8/5.8	P / 1.3	Y	B1,F				361258	M529	F13 / 1	A
MS-V-67B / 1.5" GATE MS-V-28B BODY DRAIN SHUT	B350	P 76890-1	R	506	C / H.8/5.6	P / 1.3	Y	B1,F	01	9		45 / 361258	M529 / 215	D13 / 2	A
MS-V-67B+ / MS-V-28B BODY DRAIN			R	506	C / H.8/5.6	1.3	Y	B1,F				361258	M529	D13 / 1	A
MS-V-67C / 1.5" GATE MS-V-28C BODY DRAIN SHUT	B350	P 76890-1	R	506	C / H.8/6.4	P / 1.3		B1,F	01	9		45 / 361258	M529 / 215	F4 / 2	A
MS-V-67C+ / MS-V-28C BODY DRAIN			R	506	C / H.8/6.4	P / 1.3		B1,F				361258	M529	F4 / 1	A
MS-V-67D / 1.5" GATE MS-V-28D BODY DRAIN SHUT	B350	P 76890-1	R	506	C / H.8/6.2	P / 1.3	Y	B1,F	01	9		45 / 361258	M529 / 215	D4 / 2	A
MS-V-67D+ / MS-V-28D BODY DRAIN			R	506	C C / H.8/6.2	P / 1.3	Y	B1,F				361258	M529	D4 / 1	A
MSLC-FN-1 / INBD. MS LINE DEPRESS. FAN	B515	7W93689	R	473	M / H.3/6.3	1.0	N	F	01			145009	M557 / 28	E4 / 2	A
MSLC-FN-1+ / INBD. MS LINE DEPRESS. FAN			R	473	K / H.3/6.3	1.0		F				145009	M557 / 28	E4 / 1	A
MSLC-FN-2 / OUTBD MS LINE DEPRES FAN	B515	745-9789	R	511	M / H.3/7.0	1.0	N	F	01			145009	M557 / 28	H3 / 2	A
MSLC-FN-2+ / OUTBD. MS LINE DEPRESS. FAN			R	511	K / H.3/7.0	1.0		F				145009	M557 / 28	H3 / 1	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH / USE	HL	TEST ANL / SAFETY FUNCTION	FO	C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
MSLC-V-10 / 1.5" GATE MS DEPRES. VENT VALVE TO	B350	P 76890-001	R	501	C / H.1/6.4	P / 1 0		01 / F		9	45 / 361258	M557 / 215	H5 / 2	A
MSLC-V-10+ / 1.5" GATE MS DEPRESS VENT VALVE			R	501	C / H.1/6.4	1 0		F			361258	M557 / 215	H5 / 1	A
MSLC-V-1A / 1.5" GATE MS VENT BYPASS VALVE	B350	P76020	R	471	A / H.5/5.5	P / 1 0	Y	01 / F		9	49 / 361242	M557 / 215	C7 / 2	A
MSLC-V-1A+ / 1.5" GATE MS VENT BYPASS VALVE			R	471	A / H.5/5.5	P / 1 0	Y	01 / F			49 / 361242	M557 / 215	C7 / 1	A
MSLC-V-1B / 1.5" GATE MS VENT BYPASS VALVE TO	B350	P76020	R	471	A / H.5/5.6	P / 1 0	Y	01 / F		9	49 / 361242	M557 / 215	C5 / 2	A
MSLC-V-1B+ / 1.5" GATE MS VENT BYPASS VALVE			R	471	A / H.5/5.6	P / 1 0	Y	01 / F			49 / 361242	M557 / 215	C5 / 1	A
MSLC-V-1C / 1.5" GATE MS VENT BYPASS VALVE TO	B350	79020-001	R	471	A / H.5/5.6	P / 1 0	Y	01 / F		9	49 / 361242	M557 / 215	D7 / 2	A
MSLC-V-1C+ / 1.5" GATE VENT BYPASS MS VALVE			R	471	A / H.5/5.6	P / 1 0	Y	01 / F			49 / 361242	M557 / 215	D7 / 1	A
MSLC-V-1D / 1.5" GATE MS VENT BYPASS VALVE TO	B350	P76020	R	471	A / H.5/5.5	P / 1 0	Y	01 / F		9	49 / 361242	M557 / 215	D5 / 2	A
MSLC-V-1D+ / 1.5" GATE MS VENT BYPASS VALVE			R	471	A / H.5/5.5	P / 1 0	Y	01 / F			49 / 361242	M557 / 215	D5 / 1	A
MSLC-V-2A / 1.5" GATE LOOP "A"	B350	P 76890-001	R	502	C / H.6/5.5	P / 1 0	Y	01 / F		9	361258	M557 / 215	C8 / 2	A
MSLC-V-2A+ / 1.5" GATE LOOP "A" MANIFOLD			R	502	K / H.6/5.5	P / 1 0	Y	F			361258	M557 / 215	C8 / 1	A
MSLC-V-2B / 1.5" GATE LOOP "B" MANIFOLD MO	B350	P 76890-001	R	502	C / H.6/5.3	P / 1 0	Y	01 / F		9	45 / 361258	M557 / 215	C8 / 2	A
MSLC-V-2B+ / 1.5" GATE LOOP "B" MANIFOLD			R	502	K / H.6/5.3	P / 1 0	Y	F			361258	M557 / 215	C8 / 1	A
MSLC-V-2C / 1.5" GATE LOOP "C" MANIFOLD MO	B350	P 76890-001	R	502	C / H.6/6.4	P / 1 0	Y	01 / F		9	45 / 361258	M557 / 215	E8 / 2	A
MSLC-V-2C+ / 1.5" GATE LOOP "C" MANIFOLD			R	502	K / H.6/6.4	P / 1 0	Y	F			361258	M557 / 215	E8 / 1	A
MSLC-V-2D / 1.5" GATE LOOP "D" MANIFOLD MO	B350	P 76890-001	R	502	C / H.4/5.8	P / 1 0	Y	01 / F		9	45 / 361258	M557 / 215	E8 / 2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH / USE	HL TEST / SAFETY	ANL	FO C / FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
MSLC-V-2D+ 1.5" GATE LOOP "D" MANIFOLD			R	502	K H.4/5.8	 1 0	 F			 361258	M557 215	E8 1 A
MSLC-V-3A 1.5" GATE LOOP "A" MO	B350	P 76890-001	R	502	C H.6/5.5	P 1 0	 F	01	9	45 361258	M557 215	C9 2 A
MSLC-V-3A+ 1.5" GATE LOOP "A"			R	502	K H.6/5.5	P 1 0	 F			 361258	M557 215	C9 1 A
MSLC-V-3B 1.5" GATE LOOP "B" MO	B350	P 76890-001	R	502	C H.6/5.3	P 1 0	 F	01	9	45 361258	M557 215	C8 2 A
MSLC-V-3B+ 1.5" GATE LOOP "B"			R	502	K H.6/5.3	P 1 0	 F			 361258	M557 215	C8 1 A
MSLC-V-3C 1.5" GATE LOOP "C" MO	B350	P 76890-001	R	502	C H.6/6.4	P 1 0	 F	01	9	45 361258	M557 215	D9 1 A
MSLC-V-3C+ 1.5" GATE LOOP "C"			R	502	K H.6/6.4	P 1 0	 F			 361258	M557 215	D9 1 A
MSLC-V-3D 1.5" GATE LOOP "C" MO	B350	P 76890-001	R	502	C H.4/5.8	P 1 0	 F	01	9	45 361258	M557 215	E8 2 A
MSLC-V-3D+ 1.5" GATE LOOP "D"			R	502	C H.4/5.8	 1 0	 F			 361258	M55M 215	E8 1 A
MSLC-V-4 1.5" GATE TO GAS TREATMENT	B350	P 76890-001	R	502	C H.2/6.0	P 1 0	 F	01	9	45 361258	M557 215	J5 2 A
MSLC-V-4+ 1.5" GATE TO GAS TREATMENT			R	502	C H.2/6.0	 1 0	 F			 361258	M557 215	J5 1 A
MSLC-V-5 1.5" GATE TO GAS TREATMENT	B350	P 76890-001	R	502	C H.2/6.2	P 1 0	 F	01	9	45 361258	M557 215	J5 2 A
MSLC-V-5+ 1.5" GATE TO GAS TREATMENT			R	502	C H.2/6.2	P 1 0	 F			 361258	M557 215	J5 1 A
MSLC-V-9 1.5" GATE MS DEPRES VENT VALVE TO	B350	P 76890-1	R	502	C H.2/6.4	P 1 0	 F	01	9	45 361258	M557 215	H5 2 A
MSLC-V-9+ 1.5" GATE MS DEPRES VENT VALVE	B350	P 76890-1	R	502	C H.2/6.4	P 1 0	 F			 361258	M557 215	H5 1 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH / USE	ML	TEST / SAFETY FUNCTION	ANL	FO	C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
RCC-V-104	V085	DWG# P2-3311-NF-61			A	P	Y		01		9	65	M525	E10	
10" GATE VALVE BODY			R	514	K.0/4.3	1	0	B1				361744	41A	2	A
RCC-V-104+					A								M525	E10	
COMPOSITE 10" MO GATE				514	K.0/4.3	1	0	B1				361744	41A	1	A

EPN DESCRIPTION	MFG	MODEL	BLDG ELEV	STATUS S E DETAIL	***SEISMIC (S) PARAMETERS*** TH HL TEST ANL FO C USE SAFETY FUNCTION	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL EC
RCC-V-129 8" GATE FPC-HXS INLET	V085	P2-3311-NP-62		M	1 0 B2	361745	M525 41A	E05 2 A
RCC-V-129+ COMPOSITE FOR RCC-V-129				K	1 0 B2	361745	M525	E05 1 A
RCC-V-130 RCC-V-130+ COMPOSITE FOR RCC-V-130				R	1 0 B2	361745	M525	E06 1 A
RCC-V-131 8" GATE MO FPC-HXS OUTLET	V085	P2-3311-NP-62	R 556 1/9	M	1 0 B2	361745	J 41A	E6 2 A
RCC-V-131+ COMPOSITE FOR RCC-V-131				K	1 0 B2	361745	M525	E06 1 A
RCC-V-21 10" MO GATE PRIM CONT OUT	V085	P2-3311-N-11	R 514 K.3/4.2	A	P Y 01 9 1 0 B1	48 361712	M525 41A	D10 2 A
RCC-V-21+ COMPOSITE FOR RCC-V-21			R 514 K.3/4.2	A	1 0 B1	361712	M525	D10 1 A
RCC-V-40 10" GATE MO RCC RET FROM PR	V085	P2-3311-N-11	C 514 78 D AZ R33	A	P Y 01 9 1 0 B1	48+ 361712	M525 41A	D11 2 A
PCC-V-40+ COMPOSITE FOR RCC-V-40			C 514 78 D AZ R33	K	Y 1 0 B1	361712	M525	D11 1 A
RCC-V-5 10" MO GATE PRIM CONT INLET ISO	V085	P2-3311-N-11	R 514 K.3/4.1	A	P Y 01 9 1 0 B1	48+ 361712	M525 41A	E10 2 A
RCC-V-5+ COMPOSITE FOR RCC-V-5			R 514 K.3/4.1	A	1 0 B1	361712	M525	E10 1 A
RCIC-V-110 2" VAC. REL. VLV-M.O.-80	B350	P 79360	R 476 J.4/7.5	B	P Y 01 9 1 1 B1	99+ 361243	M519 215	E7 2 A
RCIC-V-110+			R 475 J.6/7.4	B	P Y 9 1 1 B1	361243	M519	E7 1 A
RCIC-V-113 2" GATE VLV MO	B350	P 79360	R 475 J.6/7.4	B	P Y 01 9 1 1 B1	99+ 361243	M519 215	E7 2 A
RCIC-V-113+			R 475 J.6/7.4	B	P Y 9 1 1 B1	361243	M519	E7 1 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	HL	TEST / SAFETY FUNCTION	ANL	FO C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
RCIC-V-13														
RCIC-V-13+					A	P	Y			9	58	M519	H7	
			R	552	H.3/5.5	1 1		B1			361704		1	A
RCIC-V-19	B350	P 76850				P	Y					M519	E7	
2" GLOBE VLV			R	467	J.4/7.7	1 1		B1				215	2	A
RCIC-V-19+												M519	E7	
			R	467	J.4/7.7	1 1		B1					1	A
RCIC-V-19B	B350	P 78560			A	P	Y		01	0	32	M519	J6	
1" AOFC GLOBE SUPPLY TO SP19B				568	H.3/5.3	2 0		B1			361241	215	2	A
RCIC-V-31														
RCIC-V-31+					A	P	Y		01	9	48	M519	D7	
			R	449	H.8/7.0	1 1		B1			361710		1	A
RCIC-V-63	V085	P2-3311-N-14			A	P	Y		01	9	50+	M519	H3	
10" MO GATE MS TO RHR HX RCIC TURB			C	551	130 D AZ R19	2 1		B1			361714	41A	2	A
RCIC-V-63+					A		Y					M519	H3	
			C	551	130 D AZ R19	2 1		B1			361714		1	A
RCIC-V-64														
RCIC-V-64+					A	P	Y		01	9	50+	M519	G6	
			R	550	L.7/4.7	2 1		B1			361714		1	A
RCIC-V-68	V085	P2-3311-N-11			A	P	Y		01	9	48+	M519	E7	
10" MO GATE TURB EXH TO SUPP POOL			R	474	J.1/7.5	1 1		B1			361712	41A	2	A
RCIC-V-68+					A							M519	E8	
			R	474	J.1/7.5	1 1		B1			361712		1	A
RCIC-V-69	B350	P 79360			A	P	Y		01	9	99+	M519	D7	
1.50" GATE VLV TO SUPP			R	465	345 D AZ	1 1		B1			361243	215	2	A
RCIC-V-69+					A	P	Y			9		M519	D7	
			R	465	345 D AZ	1 1		B1			361243		1	A
RCIC-V-76	B350	106DAA3-001			A	P	Y		01	0	34+	M519	H3	
1" GLOBE RCIC-V-63 BYPASS MO			C	556	120 D	2 1		B1			361248	215	2	A
RCIC-V-76+					A		Y					M519	H3	
			C	556	120 D	2 1		B1			361248		1	A
RCIC-V-8														
RCIC-V-8+					A	P	Y		01		58	M519	F6	
			R	512	J.1/5.0	1 1		B1			361702		1	A
REA-AO-1														
REA-V-1	B250	DWG A-206760			B	P				9		M545	J3	
72.0" BFLY R BLD ISO			R	597	H.2/6.2	1 3		B2,F			361102	68	2	A
REA-V-1+					B							M545	J3	
RX BLDG EXH VLV DISCH COMPOSITE			R	597	H.2/6.2	1 3		B2,F			361102		1	A
REA-AO-2														
REA-V-2	B250	DWG A-206760			A	P						M545	J3	
72.0" BFLY R BLD ISO			R	597	H.4/6.2	1 3		B2,F			361102	68	2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	ML / SAFETY	TEST	ANL / FUNCTION	FO	C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
REA-V-2+					A						9		M545	J3	
RX BLDG EXH VLV DISCH COMPOSITE			R	597	H.4/6.2	1 3	B2,E					361102		1	A
RFW-V-32A	A395	3084-3			M	P	N		01		9		M529	G13	
24" AO CHECK RFW OUTBOARD ISOL			R	512	H6/5.7	1 3	B1					361057	41B	2	A
RFW-V-32A+					K								M529	G13	
24" AO CHECK RFW OUTBOARD ISOL			R	512	H.6/5.7	1 3	B1					361057		1	A
RFW-V-32B	A395	3084-3			M	P	N		01		9		M529	G5	
24" AO CHECK RFW OUTBOARD ISOL			R	512	H6/6.3	1 3	B1					361057	41B	2	A
RFW-V-32B+					K								M529	G5	
24" AO CHECK RFW OUTBOARD ISOL			R	512	H.6/6.3	1 3	B1					361057		1	A
RFW-V-65A	V085	P2-3313-N-33			A	P	Y		01		9	38	M529	G13	
24" MO GATE RFW INLET TO RPV			R	501	H4/5.7	1 3	B1					361732	41A	2	A
RFW-V-65A+					K								M529	G13	
24" MO GATE RFW INLET TO RPV			R	501	H.4/5.7	1 3	B1					361732		1	A
RFW-V-65B	V085	P2-3313-N-33			A	P	Y		01		9	38	M529	G4	
24" MO GATE RFW INLET TO RPV			R	512	H3/6	1 3	B1					361732	41A	2	A
RFW-V-65B+					K								M529	G4	
24" MO GATE RFW INLET TO RPV			R	512	H.3/6.0	1 3	B1					361732		1	A
RHR-AO-89	K125	D-SK-2765			M	P	Y					41	M521/2	J10	
AIR OPERATOR RHR-V-89			R	553	M.2/8.9	2 0	C					018004	69	2	A
RHR-FCV-64A	F130	52A8657			A	P	N		01		9	38	M521/1	B12	
3" MO GLOBE RHR A MIN FLOW			R	443	K.0/9.1	1 3	B1,C,E					133002	42A	2	A
RHR-FCV-64A+					K								M521	C12	
3" MO GLOBE RHR A MIN FLOW			R	443	K.0/9.1	1 3	B1,C,E					133002		1	A
RHR-FCV-64B	F130	52A8657			A	P	N		01		9	38	M521/2	B6	
3" MO GLOBE RHR B MIN FLOW			R	443	M.0/9.1	1 3	B1,C,E					133002	[illegible]	2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	IL / SAFETY FUNCTION	TEST	ANL	FO C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
RHR-LCV-65B	F130	2808-42A			A	P	N		01	9	28	M521/2	G8	
2.5"GLOBE LINE FROM RHR HEAT EXCHA			R	475	L.3/8.1	2 1	C				193001	42A	2	A
RHR-LCV-65B+					K							M521	H4	
2.5"GLOBE LINE FROM RHR HEAT EXCHA			R	475	L.3/8.1	2 1	C				193001		1	A
RHR-P-2A	I075	29APKD			A		N		02	0	18	M521/1	B12	
RHR PUMP LOOP A HX SUPPLY			R	424	K.2/8.5	1 3	C,E				233011	02E12	2	A
RHR-P-2A+					M							M521	B12	
RHR PUMP A			R	424	K.2/8.5	1 3	C,E				233011		1	A
RHR-P-2B	I075	29APKD-3			A		N		02	0	18	M521/2	D4	
RHR PUMP LOOP B HX SUPPLY			R	424	L.8/8.5	1 3	C,E				233011	02E12	2	A
RHR-P-2B+					M							M521	B6	
RHR PUMP			R	424	L.8/8.5	1 3	C,E				233011		1	A
RHR-P-2C	I075	29APKD-3			A		N		02	0	18	M521/2	C8	
RHR PUMP CE12-C002C			R	422	H.7/4.7	1 0	C,E				233011	02E12	2	A
RHR-P-2C+					M							M521	B9	
RHR PUMP CE12-C002C			R	422	H.7/4.7	1 0	C,E				233011		1	A
RHR-P-3	C666	FIG 3065-1055-6599			A		N		01	0	82	M521/2	C8	
RHR WATER LEG PUMP			R	423	H.3/4.7	1 3	C,E				233006	35A	2	A
RHR-P-3+					A							M521	B9	
RHR WATER LEG PUMP			R	423	H.3/4.7	1 3	C,E				233006		1	A
RHR-PCV-51A	F130	TYPE 667 EWP			A	P	N		01	9	17+	M521/1	J11	
8 CONTV PIC SONIC FLOW: SPECIAL TY			R	578	J.0/9.3	1 1	C,E				236004	42A	2	A
RHR-PCV-51A+					A							M521	K13	
8 CONTV PIC SONIC FLOW: SPECIAL TY			R	578	J.0/9.3	1 1	C,E				236004		1	A
RHR-PCV-51B	F130	TYPE 667 EWP			A		N		01	9	17+	M521/2	J5	
8 CONTV PIC SONIC FLOW: SPECIAL TY			R	575	M.8/9.1	1 1	C,E				236004	42A	2	A
RHR-PCV-51B+					A							M521	K4	
8 CONTV PIC SONIC FLOW: SPECIAL TY			R	575	M.8/9.3	1 1	C,E				236004		1	A
RHR FCV-64C	F130	[illegible]			A	P			01	9	30	M521/2	D4	
3" [illegible] GLOBE PMP C MIN FLOW			R	443	J.0/4.9	1 0	B1,C,[illegible]				133002	42A	2	A
RHR FCV-64C+					K							M521	C8	
3" [illegible] GLOBE PMP C MIN FLOW			R	443	J/4.9	1 0	B1,C,[illegible]				133002		1	A
RHR-RV-5	L265	D-200			D		N		01		99+	M521/1	C8	
RELIEF VALVE-SHUTDOWN COOL SUCTION			R	[illegible]	[illegible]/7.1	1 3	E				297003	215	2	A
RHR-RV-88A	L265	LCT-11			A		N	248	01	0	99+	M521/1	C7	
3/4"X1" PUMP 2A SUCTION RELIEF			R	440	K.8/8.3	1 0	C,E				297002	215	2	A

EPN	DESCRIPTION	MFG	MODEL	BLDG	ELEV	DETAIL	STATUS S E	TM	USE	HL	TEST	SAFETY FUNCTION	ANL	FO C	FREQ	QID	A/E DRAWING	CONTRACT	A/E ZONE	LEVEL	EC
RHR-RV-88B	3/4"X1" RHR PUMP 2B SUCTION RELIEF	L265	LCT-11	R	422	L.2/8.3	A		1 0	N	248	C,F	01	0	99+	297002	M521/2	215	B9	2	A
RHR-RV-88C	3/4"X1" RHR PUMP 2C SUCTION RELIEF	L265	LCT-11	R	450	J.1/4.2	C		1 0	N	248	C,F	01	0	99+	297002	M521/2	215	C8	2	A
RHR-V-105	10" CHECK FPC SYST RETURN TO RHR	A395	2623-3	R	434	M.3/8.2	Q	P	1 0	N		C,F				361040	M521/1	41B	C9	2	A
RHR-V-115	14" MO GATE FROM SW	V085	DWG P2-3313-N-31	R	553	9.1/N.0	A	P	1 0	Y		B2,C,F	01	9	50	361731	M521/2	41A	H8	2	A
RHR-V-115+	14" MO GATE FROM SW			R	553	N.0/9.1	A	P	1 0	Y		B2,C,F	01	9		361731	M521		J6	1	A
RHR-V-116	14" MO GATE FROM SW	V085	DWG P2-3313-N-31	R	553	9.0/N.0	A	P	1 0	Y		B2,C,F	01	9	50	361731	M521/2	41A	H9	2	A
RHR-V-116+	14" MO GATE FROM SW			R	553	N.0/9.0	K	P	1 0	Y		B2,C,F	01	9		361731	M521		J6	1	A
RHR-V-11A	4" MO GATE RHR HX A DRAIN	V085	P2-3311-N-7	R	474	K.2/8.1	A	P	1 1	Y		B1,C,F	01	9	58	361708	M521/1	41A	E11	2	A
RHR-V-11A+	4" MO GATE RHR A OUTLET			R	474	K.2/8.1	A	P	1 1	Y		BI,C,F	01	9	58	361708	M521		F12	1	A
RHR-V-11B	4" MO GATE RHR HX B DRAIN	V085	P2-3311-N-7	R	474	L.8/8.1	A	P	1 1	Y		B1,C,F	01	9	58	361708	M521/2	41A	C11	2	A
RHR-V-11B+	4" MO GATE RHR HX B OUTLET			R	474	L.8/8.1	A	P	1 1	Y		B1,C,F	01	9	58	361708	M521		E7	1	A
RHR-V-123A	1" GATE MO RHR-V-50 BYPASS	B350	P 76890-2	C	513	93 D AZ R31	A	P	1 0	Y		B1	01	9	45	361258	M521/1	215	E5	2	A
RHR-V-123A+	RHR-V-50 BYPASS			C	513	93 D AZ R31	A		1 0	Y		B1				361258	M521		G10	1	A
RHR-V-123B	1" GATE MO RHR-V-50 BYPASS	B350	P 76890-2	C	509	270 D AZ R27	A	P	1 0	Y		B1	01	9	45	361258	M521/2	215	E13	2	A
RHR-V-123B+	RHR-V-50 BYPASS			C	509	270 D AZ R27	A		1 0	Y		B1				361258	M521		G8	1	A
RHR-V-124A	RHR DRIP POT DRAIN TO POOL	B350	P 304EAB3-001	R	472	K.8/8.1	A		1 1	N		C,B1	01	9	65	361253	M521/1	215	B13	2	A
RHR-V-124A+	RHR DRIP POT DRAIN TO RADWASTE			R	472	K.8/8.1	A		2 1	N		C,E				361253	M521		D14	1	A
RHR-V-124B	RHR DRIP POT TO POOL	B350	P 304EAB3-001	R	472	L.2/8.1	A		1 1	N		C,B1	01	9	65	361253	M521/1	215	C13	2	A

EPN DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E DETAIL	TM USE	HL	TEST	ANL	FO	C	SAFETY FUNCTION	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL	EC
RHR-V-124B+ RHR DRIP POT DRAIN TO RADWASTE			R	472	A L.2/8.1	 1 1	N					C,B1	 361253	M521	D14 1	A
RHR-V-125A RHR DRIP POT DRAIN TO POOL	B350	P 304EAB3-001	R	472	A 8/L.5	 1 1	Y		01		9	C,B1	65 361253	M521/2 215	D4 2	A
RHR-V-125A+ RHR DRIP POT DRAIN			R	472	K L.5/8.0	 1 1	Y					C,B1	 361253	M521	D4 1	A
RHR-V-125B RHR DRIP POT DRAIN TO POOL	B350	P 304EAB3-001	R	472	A 8/L.4	 1 1	Y		01			C,B1	65 361253	M521/2 215	D4 2	A
RHR-V-125B+ RHR DRIP POT DRAIN TO RADWASTE			R	472	A L.4/8.0	 1 1	Y					C,B1	 361253	M521	D4 1	A
RHR-V-134A 2" GLOBE MO CAC TIE TO RHR	B350	P 304FAB3-002	R	548	C K1/9.0	P 1 0						D,B1	 361254	M521/1 215	E14 2	A
RHR-V-134A+ CAC INTERTIE TO RHR			R	548	C K.1/9.0	 1 0						D,B1	 361254	M521	G15 1	A
RHR-V-134B 2" GLOBE MO CAC TIE TO RHR	B350	P 304FAB3-002	R	548	C L5/9.2	P 1 0						D,B1	 361254	M521/2 215	F6 2	A
RHR-V-134B+ CAC INTERTIE TO RHR			R	548	C L.5/9.2	 1 0						D,B1	 361254	M521	F2 1	A
RHR-V-16A 16" MO GATE SPRAY HEADER	V085	P2-3313-N-35	C	550	A L.0/4.5	P 1 0	Y		01		9	B1,C,E	72 361725	M521/1 41A	H7 2	A
RHR-V-16A+ 16" MO GATE SPRAY HEADER			R	550	A L.0/4.5	P 1 0	Y		01		9	B1,C,E	72 361725	M521	H11 1	A
RHR-V-16B 16" MO GATE DRYWELL SPRAY HEADER	V085	P2-3313-N-35	R	513	A K.1/7.9	P 1 0	Y		01		9	B1,C,E	72 361725	M521/2 41A	C10 2	A
RHR-V-16B+ 16" MO GATE DRYWELL SPRAY HEADER			R	513	A K.1/7.9	P 1 0	Y		01		9	B1,C,E	72 361725	M521	F6 1	A
RHR-V-17A 16" MO GATE DRYWELL SPRAY HDR	V085	P2-3313-N-35	C	550	A L.1/4.5	P 1 0	Y		01		9	B1,C,E	72 361725	M521/1 41A	H5 2	A
RHR-V-17A+ 16" MO GATE DRYWELL SPRAY HDR			R	550	A L.1/4.5	P 1 0	Y		01		9	B1,C,E	72 361725	M521	H10 1	A
RHR-V-17B 16" MO GATE DRYWELL SPRAY HEADER	V085	P2-3313-N-35	R	508	A K/8.3	P 1 0	Y		01		9	B1,C,E	72 361725	M521/2 41A	D11 2	A
RHR-V-17B+ 16" MO GATE DRYWELL SPRAY HEADER			R	508	A K.0/8.3	P 1 0	Y		01		9	B1,C,3	72 361725	M521	F6 1	A
RHR-V-19 6" CHECK TO REACTOR HEAD SPRAY	A395	DWG 2630-3	R	550	A M.2/5.1	P 2 3	Y					B1,E	 361038	M521/2 41B	J13 2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	HL	TEST / SAFETY	ANL FD	C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
RHR-V-21	A395	DWG 2648-3			A	P	Y		01	0	35+	M521/2	E8	
18" MO GLOBE LOOP C RET TO SUPP PO			R	446	M.4/5.8	1.0		B1,C,E			361027	41B	2	A
RHR-V-21+					A							M521	E11	
18" MO GLOBE LOOP C RET TO SUPP PO			R	446	M.4/5.8	1.0		B1,C,E			361027		1	A
RHR-V-23	A395	DWG 2654-3			A	P	Y		01	0	93	M521/2	J13	
6" MO GLOBE RHR TO RX HEAD SPRAY			R	550	M.2/5.1	1.3		B1,E			361021	41B	2	A
RHR-V-23+					A	P	Y					M521	J7	
6" MO GLOBE RHR TO RX HEAD SPRAY			R	550	M.2/5.1	1.3		B1,E			361021		1	A
RHR-V-24A	A395	DWG 2648-3			A	P	Y		01	0	35+	M521/1	E9	
18" MO GLOBE LOOP A TEST LINE			R	474	B.1/K	1.3		B1,C,E			361027	41B	2	A
RHR-V-24A+					A							M521	E12	
18" MO GLOBE LOOP A TEST THROTTLE			R	474	K.0/8.1	1.3		B1,C,E			361027		1	A
RHR-V-24B	A395	DWG 2648-3			A	P	Y		01	0	35+	M521/2	C11	
18" MO GLOBE LOOP B TEST THROTTLE			R	474	M.2/8.1	1.3		B1,C,E			361027	41B	2	A
RHR-V-24B+					A	P	Y					M521	E6	
18" MO GLOBE LOOP B TEST THROTTLE			R	474	M.2/8.1	1.3		B1,C,E			361027		1	A
RHR-V-27A	V085	P2-3311-N-10			A	P	Y		01	9	88	M521/1	D7	
6" MO GATE LOOP A TO SUPP POL SPRY			R	495	K.3/4.1	1.0		B1,C,E			361711	41A	2	A
RHR-V-27A+					A	P	Y		01	9	88	M521	E11	
6" MO GATE LOOP A TO SUPP POL SPRY			R	495	K.3/4.1	1.0		B1,C,E			361711		1	A
RHR-V-27B	V085	P2-3311-N-10			A	P	Y		01	9	88	M521/2	C11	
6" MO GATE LOOP B TO POOL SPRAY			R	495	M.1/7.7	1.0		B1,C,E			361711	41A	2	A
RHR-V-27B+					A	P	Y		01	9	88	M521	E7	
6" MO GATE LOOP B TO POOL SPRAY			R	495	M.1/7.7	1.0		B1,C,E			361711		1	A
RHR-V-31A	A395	2625-3			R	P	N		01			M521/1	C14	
18" CHECK RHR PUMP A DISCHARGE			R	447	J.7/8.8	2.3		G			361044	41B	2	A
RHR-V-31B	A395	DWG 2625-3			R	P	N		01			M521/2	C3	
18" CHECK RHR PUMP B DISCHARGE			R	449	M.2/8.8	2.3		G			361044	41B	2	A
RHR-V-31C	A395	DWG 2625-3			R	P	N		01			M521/2	C5	
18" CHECK RHR PUMP C DISCHARGE			R	437	H.8/4.4	1.0		C,E			361044	41B	2	A
RHR-V-3A	V085	P2-3313-N-40			A	P	N		01	0	55	M521/1	G10	
18" MO GATE HX A OUTLET ISOL			R	544	J.9/8.5	2.1		C,E			361736	41A	2	A
RHR-V-3A+					A	P	N		01	9		M521	J13	
18" MO GATE HX A OUTLET ISOL			R	544	J.9/8.5	2.1		C,E			361736		1	A
RHR-V-3B	V085	P2-3313-N-40			A	P	N		01	0	55	M521/2	J9	
18" MO GATE HX B OUTLET ISOL			R	557	H.1/8.4	2 1		C,E			361736	41A	2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	DETAIL	STATUS S E	TM / USE	ML	TEST	SAFETY FUNCTION	ANL	FO C	FREQ	QID	A/E DRAWING	CONTRACT	A/E ZONE	LEVEL	EC
RHR-V-38+ 18" MO GATE HX B OUTLET ISOL			R	557	M.1/8.4	A	P 2 1	N		C,E	01	9		361736	M521		J4	1	A
RHR-V-40 4" MO GLOBE LOOP B TO FL DR TK	A395	DWG 2645-3	R	552	M.7/8.3	A	P 2 0	Y	121	B2	01	0	99+	361020	M521/2	41B	G4	2	A
RHR-V-40+ 4" MO GLOBE RHR LOOP B RETURN TO			R	552	M.7/8.3	A	2 0			B2				361020	M521		G4	1	A
RHR-V-41A 14" TESTABLE CHECK @ RHR RET	V085	P2-2767-N-2	C	563	20 D AZ R19	A	P 1 0	Y		B1,G	01	9	41	361742	M521/1	69	F5	2	A
RHR-V-41A+			C	563	20 D AZ R19	A	1 0	Y		B1,G				361742	M521		G10	1	A
RHR-V-41B 14" TESTABLE CHECK RHR RET	V085	P2-2767-N-2	C	563	160D AZ R19	A	P 1 0	Y		B1,G	01	9	41	361742	M521/2	69	G13	2	A
RHR-V-41B+ 14" TESTABLE CHECK RHR RET			C	563	160 D AZ R19	A	1 0	Y		B1,G				361742	M521		G8	1	A
RHR-V-41C 14" TESTABLE CHECK @ RHR RET	V085	P2-2767-N-2	C	563	340 D AZ R20	A	P 1 0	Y		B1,G	01	9	41	361742	M521/2	58	D13	2	A
RHR-V-41C+ 14" TESTABLE CHECK @ RHR RET			C	563	340 D AZ R20	A	1 0	Y		B1,G				361742	M521		G10	1	A
RHR-V-42A 14" MO GATE OUTBOARD RETURN TO RPV	V085	P2-3311-N-36	R	527	J.0/6.0	A	1 0	Y		B1,C,E	01	9	42	361726	M521/1	41A	G7	2	A
RHR-V-42A+ 14" MO GATE OUTBOARD RETURN TO RPV			R	572	J.0/6.0	A	1 0			B1,C,E				361726	M521		G11	1	A
RHR-V-42B 14" MO GATE RET TO RPV, OUTBOARD	V085	P2-3311-N-36	R	525	H.0/5.6	A	1 0	Y		B1,C,E	01	9	42	361726	M521/2	41A	F12	2	A
RHR-V-42B+ 14" MO GATE RET TO RPV, OUTBOARD			R	525	H.0/5.6	A	1 0			B1,C,E				361726	M521		G7	1	A
RHR-V-42C 14"GATE RHR RETURN TO RPV, OUTBD	V085	P2-3311-N-36	R	527	J.0/5.8	A	1 0	Y		B1,C,E	01	9	42	361726	M521/2	41A	E12	2	A
RHR-V-42C+ 14"GATE RHR RETURN TO RPV,OUTBD			R	527	J.0/5.8	A	1 0			B1,C,E				361726	M521		G10	1	A
RHR-V-47A 18"MO GATE RHR HX INLET ISOL	V085	P2-3313-N-40	R	575	J.7/8.7	A	P 2 1	N		C,E	01	0	55	361736	M521/1	41A	J13	2	A
RHR-V-47A+ 18" MO GATE RHR HX INLET ISOL			R	575	J.7/8.7	A	P 2 3	N		C,E	01	9		361736	M521		J14	1	A
RHR-V-47B 18"GATE MO RHR HX INLET ISOL	V085	P2-3313-N-40	R	576	H.3/8.4	A	P 2 1	Y		C,E	01	9		361736	M521/2	41A	J3	2	A

EPN	DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E	DETAIL	TH	USE	HL	TEST SAFETY	ANL FO	C FUNCTION	FREQ	OID	A/E DRAWING	CONTRACT	A/E ZONE	LEVEL	EC
RHR-V-47B+	18"GATE MO RHR HX INLET ISOL			R	576	K A	M.3/8.4	P	2 3	N	C,E	01	9		361736	M521		J3	1	A
RHR-V-48A	18" MO GLOBE RHR HEX A BYPASS BLOC	A395	DWG 2648-3	R	552	A	J.0/8.7	P	1 3	N	C,E	01	0	35+	361027	M521/1	41B	J11	2	A
RHR-V-48A+	18" MO GLOBE RHR HEX A BYPASS BLOC			R	552	A	J.0/8.7		1 3		C,E				361027	M521		J13	1	A
RHR-V-48B	18" MO GLOBE HEX B BYPASS BLOCK	A391	DWG 2648-3	R	553	A	M.9/8.9	P	1 3	N	C,E	01	0	35+	361027	M521/2	41B	J8	2	A
RHR-V-48B+	18" MO GLOBE HEX B BYPASS BLOCK			R	553	A	M.9/8.9		1 3		C,E				361027	M521		J5	1	A
RHR-V-49	4"MO GATE LOOP B TO FLOOR DRAIN TK	V085	P2-3311-N-7	R	552	A	M.7/8.4	P	2 0	N	B2	01	9	58	361708	M521/2	41A	G4	2	A
RHR-V-49+	4"MO GATE LOOP B TO FLOOR DRAIN TK			R	552	A	M.7/8.4	P	2 0	N	B2	01	9	58	361708	M521		G4	1	A
RHR-V-4A	24" MO GATE SUPP POOL LOOP A SUPPY	V085	P2-3313-N-40	C	447	A	L.0/8.3	P	1 0	Y	B1,C,E	01	9	37	361736	M521/1	41A	C7	2	A
RHR-V-4A+	24" MO GATE SUPP POOL LOOP A SUPPY			R	447	A	L.0/8.3	P	1 0	Y	B1,C,E	01	9		361736	M521		E11	1	A
RHR-V-4B	24" MO GATE SUPP POOL LOOP B OTLET	V085	P2-3313-N-40	R	522	A	L.2/8.3	P	1 0	Y	B1,C,E	01	9	37	361736	M521/2	41A	B11	2	A
RHR-V-4B+	24" MO GATE SUPP POOL LOOP B OTLET			R	522	A	L.2/8.3	P	1 0	Y	B1,C,E	01	9		361736	M521		D6	1	A
RHR-V-4C	24" MO GATE SUPP POOL LOOP C SUPPY	V085	P2-3313-N-40	R	449	A	J.0/4.2	P	1 0	Y	B1,C,E	01	9	37	361736	M521/2	41A	B11	2	A
RHR-V-4C+	24" MO GATE SUPP POOL LOOP C SUPPY			R	449	A	J.0/4.2	P	1 0	Y	B1,C,E	01	9		361736	M521		D11	1	A
RHR-V-50A	12" AO CHECK TEST CHECK LOOP A	V085	P2-2767-N-3	C	508	A	85 D AZ R28	P	2 3	Y	B1,C,E	01		43	361743	M521/1	69	F5	2	A
RHR-V-50A+	12" AO CHECK TEST CHECK LOOP A			R	508	A	85 D AZ R28		2 3		B1,C,E				361743	M521		G10	1	A
RHR-V-50B	12" AO CHECK TEST CHECK LOOP B	V085	P2-2767-N-3	C	510	M	270D AZ R27	P	2 3	Y	B1,C,E	01		43	361743	M521/2	69	E13	2	A
RHR-V-50B+	12" AO CHECK TEST CHECK LOOP B			C	508	K	270 D AZ R27		2 3	Y	B1,C,E				361743	M521		G8	1	A
RHR-V-52A	8" GLOBE RCIC STEAM TO RHR HX	F130	SMB-00-10-EWP	R	574	A	H.8/8.7		1 1	N	C,E	01	0		361931	M521/1	42A	J10	2	A

EPN	DESCRIPTION	MFG	MODEL	BLDG	ELEV	DETAIL	STATUS S E	TM	HL	TEST	ANL	FO	C	USE	SAFETY FUNCTION	FREQ	QID	A/E DRAWING	CONTRACT	A/E ZONE	LEVEL	EC
RHR-V-52A+	8" GLOBE RCIC STEAM TO RHR HX			R	574	H.8/8.7	A							1 1	C.E		361931	M521		K12	1	A
RHR-V-52B	8" MO GLOBE RCIC STEAM TO RHR HX	F130	SMB-00-10-EWP	R	575	N.0/9.2	A		N		01		0	1 1	C.E.		361931	M521/2	42A	J6	2	A
RHR-V-52B+	8" GLOBE RCIC STEAM TO RHR HX			R	575	N.0/9.2	A							1 1	C.E		361931	M521		K5	1	A
RHR-V-53A	12" MO GATE SHUTDOWN COOL LOOP A	A391	DWG 2658-3	R	516	K.3/4.1	A	P	Y	21	01		9	1 3	B1.C.E	26	361024	M521/1	41B	F6	2	A
RHR-V-53A+	12" MO GATE SHUTDOWN COOL LOOP A			R	516	K.3/4.1	A							1 3	B1.C.3		361024	M521		G11	1	A
RHR-V-53B	12" MO GLOBE SHUTD COOL LOOP B	A391	DWG 2658-3	C	512	L/7.9 AZ 256D	S	P	Y	-	01		9	1 3	B1.C.E	99+	361024	M521/2	41B	F12	2	A
RHR-V-53B+	12" MO GLOBE SHUTD COOL LOOP B			R	512	L.0/7.9	K							1 3	B1.C.E		361024	M521		G7	1	A
RHR-V-68A	16"GATE MO RHR HX SW ISOL	V085	P2-3313-N-39	R	553	M.9/9.3	A	P	N		01		9	1 3	C.E.F	43	361735	M524/1	41A	D14	2	A
RHR-V-68A+	16"GATE MO RHR HX SW ISOL			R	553	M.9/9.3	A							1 3	C.E.F		361735	M524		H12	1	A
RHR-V-68B	16"MO GATE RHR HX SW ISOL	V085	P2-3313-N-39	R	551	M.7/9.3	A		N		01		9	1 3	C.E.F	43	361735	M524/2	41A	G13	2	A
RHR-V-68B+	16"MO GATE RHR HX SW ISOL			R	551	M.7/9.3	A							2 0	C.E.F		361735	M524		H10	1	A
RHR-V-6A	18"MO GATE RHR PUMP A INLET BLOCK	V085	P2-3313-N-40	R	435	K.3/8.2	A	P	N		01		9	1 3	C.E	55	361736	M521/1	41A	B8	2	A
RHR-V-6A+	18"MO GATE RHR PUMP A INLET BLOCK						A	P	N		01		9	1 3	C.E		361736	M521		C12	1	A
RHR-V-6B	18"MO GATE RHR PUMP B INLET	V085	P2-3313-N-40	R	434	L.0/8.3	A	P	N		01		9	1 3	C.E	55	361736	M521/1	41A	C7	2	A
RHR-V-6B+	18"MO GATE RHR PUMP B INLET			R	434	L.0/8.3	A	P	N		01		9	1 3	C.E		361736	M521		C6	1	A
RHR-V-73A	2" GLOBE MO RHR H EX A VENT SHELL	B350	P 304FAB3-001	R	572	J8/9	A	P					0	2 1	C.E		361254	M521/1	215	H14	2	A
RHR-V-73A+	RHR H EX A VENT SHELL SI			R	572	J.8/9.0	A							2 1	C.E		361254	M521		J14	1	A
RHR-V-73B	2" GLOBE MO RHR H EX B VENT SHELL	B350	P 304FAB3-001	R	572		C	P					0	2 1	C.E		361254	M521/2	215	H4	2	A

SEISMIC (S) PARAMETERS

EPN / DESCRIPTION	MFG	MODEL	BLDG ELEV	STATUS S E DETAIL	TH / USE	HL	TEST / SAFETY FUNCTION	ANL	FO	C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
RHR-V-73B+				C								M521	J3	
RHR H EX B VENT SHELL SI			R 572		2 1		C,F				361254		1	A
RHR-V-8	V085	P2-3313-N-33		A	P	Y		01		9	76	M521/1	E6	
20" GATE SHUTDOWN COOLING SUPPLY			C 504 M9/7.3		1 3		B1,C,F				361732	41A	2	A
RHR-V-8+				A	P	Y		01		9		M521	F11	
20" GATE SHUTDOWN COOLING SUPPLY			R 504 M.9/7.3		1 3		B1,C,F				361732		1	A
RHR-V-89	V085	P2-2767-N-2		A	P	Y		01		9	41	M521/2	J10	
14" TESTABLE CHECK ON SW X-TIE			R 553 M2/8.9		2 0		C				361742	69	2	A
RHR-V-89+				A								M521	J6	
14" TESTABLE CHECK ON SW X-TIE			R 553 M.2/8.9		2 0		C				361742		1	A
RHR-V-9	V085	P2-3313-N-33		A	P	Y		01		9	76	M521/1	D6	
20" GATE SHUTDOWN COOLING SUPPLY			C 509 120 D AZ R27		1 3		B1,C,F				361732	41A	2	A
RHR-V-9+				A	P	Y		01		9		M521	F10	
20" GATE SHUTDOWN COOLING SUPPLY			C 509 120 D AZ R27		1 3		B1,C,F				361732		1	A
ROA-AD-10	P014	P.O. 630-N-31408		R								M545	E14	
MCC ROOM I AUTO DAMPER			R 542 M.5/3.9		1 0		J				011001	216	2	A
ROA-AO-10														
ROA-AD-10+				K								M545	E14	
					1 0		J				011001		1	A
ROA-AD-11	P014	P.O. 630-N-31408		R								M545	E8	
MCC ROOM II AUTO DAMPER			R 542 M.7/8.1		1 0		J				011001	216	2	A
ROA-AO-11														
ROA-AD-11+				K								M545	E8	
					1 0		J				011001		1	A
ROA-AD-12	MI39	332-2799		R								M545	C7	
DC MCC ROOM AUTO DAMPER			R 480 J.0/8.3		1 0		J				011004	216	2	A
ROA-AO-12														
ROA-AD-12+				K								M545	C7	
					1 0		J				011004	216	1	A
ROA-AD-13	P014	P.O. 630-N-31408		R								M545	G14	
RECOMB MCC RMI AUTO DAMPER			R 591 M.5/6.0		1 0		BD				011001	216	2	A
ROA-AO-13														
ROA-AD-13+				K								M545	G14	
					1 0		J				011001		1	A
ROA-AD-14	P014	P.O. 630-N-31408		R								M545	G13	
RECOMB MCC RM II AUTO DAMPER			R 591 M.9/7.4		1 0		BD				011001	216	2	A
ROA-AO-14														
ROA-AD-14+				K								M545	G13	
					1 0		J				011001		1	A
ROA-AD-15	P014	P.O. 630-N-31408		R								M545	G13	
ANA RM 1A AUTO DAMPER			R 563 M.8/4.8		1 0		J				011001	216	2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH USE	HL TEST ANL FO C / SAFETY FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
ROA-AO-15										
ROA-AD-15+					K	1 0	J	011001	M545	G13 / 1 A
ROA-AD-17 / ANA RM 1B AUTO DAMPER	P014	P.O. 630-N-31408	R	563	R / M.8/4.2	1 0	J	011001	M545 / 216	G14 / 2 A
ROA-AO-17										
ROA-AD-17+					K	1 0	J	011001	M545	G14 / 1 A
ROA-AD-19 / FUEL POOL HEAT EXCH & PUMP RM	P014	630-N-31408	R	548	R / L.0/4.0	1 0	J	011001	M545 / 216	F8 / 2 A
ROA-AO-19										
ROA-AD-19+					K	1 0	J	011001	M545	F8 / 1 A
ROA-V-1 / 84.0" R BLDG ISO VALVE	B250	0657	R	578	A / N.7/5.7	P / 1 0	N 02 0 / B2.D	14 / 361101	M545 / 68	F3 / 2 A
ROA-AO-V1										
ROA-V-2 / 84.0" R BLDG ISO VALVE	B250	0657	R	578	A / N.7/5.0	P / 1 0	N 02 0 / B2.D	14 / 361101	M545 / 68	F3 / 2 A
ROA-AO-V2										

EPN DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E DETAIL	***SEISMIC (S) PARAMETERS*** TM IL TEST ANL FO C USE SAFETY FUNCTION	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL EC
RRA-FN-1 FAN FOR RRA-FC-1	P114	150	R	443	A H.7/4.3	F N 1 3 J	 145012	M545 67	B14 2 A
RRA-FN-10 FAN FOR RRA-FC-10	P295	150	P	522	A N3/3.8	N 1 0 J	 145012	M545 67	E15 2 A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	DETAIL	STATUS S E	TH / USE	HL / SAFETY FUNCTION	TEST	ANL	FO	C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
RRA-FN-11 FAN FOR RRA-FC-11	P295	150	R	522	H5/8	A	1 0	N J					145012	M545 67	E7 2 A
RRA-FN-12 DC MCC ROOM RECIRC FAN	B515	60PC/ADJUSTAX	R	471	H5/8	A	F 1 0	N J		01			99+ 145013	M545 216	C7 2 A
RRA-FN-13 FAN FOR RRA-FC-13	B515	40PC/ADJUSTAX	R	572	M3/6	A	F 1 0	N J		01			99+ 145013	M545 216	H15 2 A
RRA-FN-14 FAN FOR RRA-FC-14	B515	40PC/ADJUSTAX	R	572	M7/8	A	F 1 0	N J		01			99+ 145013	M545 216	H13 2 A
RRA-FN-15 FAN FOR RRA-FC-15	B515	40PC/ADJUSTAX	R	548	M5/4.5	A	F 1 0	N J		01			99+ 145013	M545 216	G13 2 A
RRA-FN-17 13300 CFM ANAL RM 18 RECIRC FAN	B515	40PC/ADJUSTAX	R	548	M5/4.7	A	F 1 0	N J		01			99+ 145013	M545 216	G14 2 A
RRA-FN-19 FPC HEAT EXCH & PMP RM FLO			R	548		A	F 1 3	N J		01			99+ 145024	M545 28	G9 2 A
RRA-FN-2 FAN FOR RRA-FC-2	P114	150	R	441	K.2/8.2	A	F 1 3	N J					145012	M545 67	B8 2 A
RRA-FN-20 FPC HEAT EXCH & PMP RM FLO			R			A	F 1 3	N J		01			99+ 145024	M545 215	G9 2 A
RRA-FN-3 FAN FOR RRA-FC-3	P114	150	R	441	L.8/8.0	A	F 1 0	N J					145012	M545 67	B9 2 A
RRA-FN-4 FAN FOR RRA-FC-4	P295	245	R	444	M.5/4.1	A	F 1 0	N J		01			145018	M545 67	B13 2 A
RRA-FN-5 FAN FOR RRA-FC-5	P114	150	R	441	K.7/3.8	A	F 1 0	N J					145012	M545 67	B12 2 A
RRA-FN-6 FAN FOR RRA-FC-6	P114	135	R	441	H.6/7.7	A	F 1 1	N J					145011	M545 67	B7 2 A
RRC-P-1A RECIRCULATION PUMP	B260	210099	C	508	135 D AZ R22	A	P 2 0	Y G		01		9	233020	M521/1 02B35	E4 2 A
RRC-P-1A+ RECIRCULATION PUMP			C	508	315 D AZ R22	A	2 0	Y G					233020	M530	C11 1 A
RRC-P-1B RECIRCULATION PUMP	B260	210100	C	508	315 D AZ R22	A	P 2 0	Y G		01		9	233020	M530 02B35	C7 2 A
RRC-P-1B+ RECIRCULATION PUMP			C	508	315 D AZ R22	A	2 0	Y G					233020	M530	C7 1 A
RRC-V-16A .75" GATE MO PUMP SURGE INLET	B350	79290	R	501	M.4/4.4	B	P 1 0	Y B1					361242	M530 215	C14 2 A

EPN / DESCRIPTION	MFG	MODEL	BLDG ELEV	STATUS S E / DETAIL	TH / USE	HL	TEST / SAFETY FUNCTION	ANL	FO	C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL EC
RRC-V-16A+				K	P	Y						M530	C14
RRC PUMP SEAL PURGE INLE			R 501	M.4/4.4	1 0		B1				361242		1 A
RRC-V-16B RRC-V-16B+				K	P	Y						M530	B14
RRC PUMP SEAL PURGE INLE			R 501	J.0/7.3	1 0		B1				361242		1 A
RRC-V-23A	A585	DWG 9210875V		A	P	Y		01		9	37	M530	D12
24" MO GATE			C 503 160	D AZ R16	2 0		G				361907	02B35	2 A
RRC-V-23A+				K		Y						M530	D12
24" MO GATE			C 503 160	D AZ R16	2 0		G				361907		1 A
R[illegible]C-[illegible] B	[illegible]	[illegible] 9210875V			P	Y		01		9	37	[illegible]	[illegible]

EPN DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E DETAIL	TH USE	HL	TEST	ANL	FO	C SAFETY FUNCTION	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL EC
RWCU-V-101 4"MO GATE RWCU FROM RPV DRAIN	V085	P2-3311-N-2	C	514 22	A D AZ R18	P 2 0	Y		01		0 G	58 361702	M523 41A	F14 2 A
RWCU-V-101+			C	514 22	A D AZ R18	2 0	Y				G	361702	M523	F14 1 A
RWCU-V-102 6" MO GLOBE FROM RECIRC PUMP	A391	4513-47	C	502 59	A D AZ R20	P 2 0	Y		01		0 G	76 361004	M523 41B	G15 2 A
RWCU-V-102+			C	502 59	A D AZ R20	2 0	Y				G	361004	M523	G15 1 A
RWCU-V-106 4" MO GATE RWCU WATER FROM RECIRC	V085	P2-3311-N-2	C	501 30	A DEG. AZ.	P 2 0	Y		01		0 G	58 361702	M523 41A	G12 2 A
RWCU-V-106+			C	501 30	A D AZ R17	P 2 0	Y		01		G	58 361702	M523	G12 1 A
RWCU-V-4 6"GATE MO CONT ISOL VALVE	V085	P2-3311-N-4	R	538	A H.7/5.0	P 1 0	Y		01		9 B1	70 361704	M523 41A	E15 2 A
RWCU-V-4+			R	538	A H7/5	P 1 0	Y		01		9 B1	361704	M523	E15 1 A
RWCU-V-40 6" GATE MO RWCU RETURN TO RFW LINE	V085	DWG P2-3311-N-4	R	515	A K.0/4.3	P 1 0	Y	121	01		9 B1	10 361704	M523 41A	H11 2 A
RWCU-V-40+			R	516	A J1/5	P 1 0	Y		01		9 B1	361704	M523	H11 1 A
SGT-AD-1A1 AIR DAMPER FOR SGT-FN-1A1			R	576	R H.6/7.7	F 1 0					D		M544 28	J6 2 A
SGT-AD-1A2 AIR DAMPER FOR SGT-FN-1A2			R	576	R H.8/7.7	F 1 0					D		M544 28	G6 2 A
SGT-AD-1B1 AIR DAMPER FOR SGT-FN-1B1			R	576	R J.1/7.7	F 1 0					D		M544 28	E6 2 A
SGT-AD-1B2 AIR DAMPER FOR SGT-FN-1B2			R	576	R J.5/7.7	F 1 0					D		M544 28	C6 2 A
SGT-AO-2A MOTOR OPERATOR SGT-V-2A	M322	A-50B	R	580	A H.6/5.3	P 1 0	N		01		9 D.F	06 018009	M544 68	H15 2 A
SGT-AO-2B MOTOR OPERATOR SGT-V-2B	M322	A50B	R	580	A H-6/5.3	P 1 0	N		01		9 D.F	06 018009	M544 68	D15 2 A
SGT-DV-1A1+ DELUGE VALVE ASSY FOR SGT-FL-1A	F030	D-54898-1	R	579	K H.3/3.9	2 0					F	100001	M544 18	F12 1 A
SGT-DV-1A2+ DELUGE VALVE ASSY FOR SGT-CF-1A-1	F030	D-54898-1	R	579	K H.3/4.0	2 0					F	100001	M544 18	F11 1 A

EPN DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E DETAIL	***SEISMIC (S) PARAMETERS*** TH USE	HL	TEST	ANL	FO C SAFETY FUNCTION	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL EC
SGT-DV-1A3+ DELUGE VALVE ASSY FOR SGT-CF-1A-2	F030	D-54898-1	R	575	K H.3/4.0	 2.0				 F	 100001	M544 18	F10 1 A
SGT-DV-1B1+ DELUGE VALVE ASSY FOR SGT-FL-1B	F030	D-54898-1	R	575	K H.3/3.9	 2.0				 F	 100001	M544 18	B12 1 A
SGT-DV-1B2+ DELUGE VALVE ASSY FOR SGT-CF-1B-1	F030	D-54898-1	R	575	K H.6/3.7	 2.0				 F	 100001	M544 18	B11 1 A
SGT-DV-1B3+ DELUGE VALVE ASSY FOR SGT-CF-1B-2	F030	D-54898-1	R	578	K H.6/3.7	P 2.0	N	200	01	 F	 100001	M544 18	B10 1 A
SGT-FN-1A1 EXHAUST FAN SGT-FU-1A	B515	74S-9797	R	576	A H.6/7.7	F 1.0	N		01	 D,F	42 145014	M544 28	J6 2 A
SGT-FN-1A1+ EXHAUST FAN FOR SGT-FU-1A-1			R	576	A H.6/7.7	F 1.0				 D,F	 145014	M544	J6 1 A
SGT-FN-1A2 EXHAUST FAN SGT-FU-1A	B515	74S-9797	R	576	A H.8/7.7	F 1.0	N		01	 D,F	42 145014	M544 28	H6 2 A
SGT-FN-1A2+ EXHAUST FAN FOR SGT-FU-1A-2			R	576	A H.8/7.7	F 1.0				 D,F	 145014	M544 28	H6 1 A
SGT-FN-1B1 EXHAUST FAN SGT-FU-1B	B515	74S-9798	R	576	A J.1/7.7	F 1.0	N		01	 D,F	42 145014	M544 28	E6 2 A
SGT-FN-1B1+ EXHAUST FAN FOR SGT-FU-1B-1			R	576	A J.1/7.7	F 1.0				 D,F	 145014	M544	E6 1 A
SGT-FN-1B2 EXHAUST FAN SGT-FU-1B	B515	74S-9798	R	576	A J.6/7.7	F 1.0	N		01	 D,F	42 145014	M544 28	C6 2 A
SGT-FN-1B2+ EXHAUST FAN FOR SGT-FU-1B-2			R	576	A J.5/7.7	F 1.0				 D,F	 145014	M544	C6 1 A
SGT-PCV-F1 2" CONT DELUGE VLV SGT-DV-1A1	V125	D-4	R	580	R H.3/3.8	 2.0				 F	 236005	M544 18	G12 2 A
SGT-PCV-F2 2" CONT DELUGE VLV SGT-DV-1A2	V125	D-4	R	580	R H.3/2.9	 2.0				 F	 236005	M544 18	G11 2 A
SGT-PCV-F3 2" CONT DELUGE VLV SGT-DV-1A3	V125	D-4	R	576	R H.3/3.9	 2.0				 F	 236005	M544 18	G10 2 A
SGT-PCV-[illegible]	V1[illegible]	D-4			R							[illegible]	[illegible]

EPN DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E DETAIL	TM USE	HL	TEST SAFETY	ANL	FO	C	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL	EC
SGT-PCV-F5 2" CONT DELUGE VLV SGT-DV-1B2	V125	D-4	R	580	R H.3/3.7	 2.0		 F				 236005	M544 18	B11 2	A
SGT-PCV-F6 2" CONT DELUGE VLV SGT-DV-1B3	V125	D-4	R	580	R H.3/3.8	 2.0		 F				 236005	M544 18	B9 2	A
SGT-V-1A 18" MO BFLY SGT TIE	B250	A-206761	R	583	A H8/5.3	P 1.0	N	 D.F	01		9	99+ 361103	M544 68	H14 2	A
SGT-V-1A+ 18" MO BFLY SGT TIE			R	583	A H8/5.3	 1.0		 D.F				 361103	M544	H14 1	A
SGT-V-1B 18" MO BFLY SGT TIE	B250	A-206761	R	583	A J3/5.3	P 1.0	N	 D.F	01		9	99+ 361103	M544 68	E14 2	A
SGT-V-1B+ 18" MO BFLY SGT TIE			R	583	A J3/5.3	 1.0		 D.F				 361103	M544	E14 1	A
SGT-V-2A 18" AO BFLY SGT LINE TO SGT-FU-1A	B250	0657	R	580	A H7/5.3	P 1.0	N	 D.F	01		9	06 361110	M544 68	H15 2	A
SGT-V-2A+ 18" AO BFLYSGT LINE TO SGT-FU-1A			R	580	A H7/5.3	 1.0		 D.F				 361110	M544	H15 1	A
SGT-V-2B 18" AO BFLY SGT LINE TO SGT-FU-1B	B250	0657	R	580	A J3/5.3	P 1.0	N	 D.F	01		9	06 361110	M544 68	D15 2	A
SGT-V-2B+ 18" AO BFLY SGTLINE TO SGT-FU-1B			R	580	A J3/5.3	 1.0		 D.F				 361110	M544	D15 1	A
SGT-V-3A1 18" MO BFLY SGT-FN-1A2	B250	A-206761	R	576	A H8/7.7	P 1.0	N	 D.F	01		9	99+ 361103	M544 68	G7 2	A
SGT-V-3A1+ 18" MO BFLY SGT-FN-1A2			R	576	A H8/7.7	 1.0		 D.F				 361103	M544 18	G7 1	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	HL	TEST / SAFETY	ANL / FUNCTION	FO C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
SGT-V-3A2	B250	A-206761			A	P	N		01	9	99+	M544	J7	
18" MO BFLY SGT-FN-1A1			R	576	J.0/7.7	1	0	D.F			361103	68	2	A
SGT-V-3A2+					A							M544	J7	
18" MO BFLY SGT-FN-1A1			R	576	J.0/7.7	1	0	D.F			361103		1	A
SGT-V-3B1	B250	A-206761			A	P	N		01	9	99+	M544	E7	
18" MO BFLY SGT-FN-1B2 INLET			R	576	J3/6.8	1	0	D.F			361103	68	2	A
SGT-V-3B1+					A							M544	E7	
18" MO BFLY SGT-FN-1B2 INLET			R	576	J3/6.8	1	0	D.F			361103		1	A
SGT-V-3B2	B350	A-206761			A	P	N		01	9	99+	M544	C7	
18" MO BFLY SGT-FN-1B1 INLET			R	576	J3/7.4	1	0	D.F			361103	68	2	A
SGT-V-3B2+					A							M544	C7	
18" MO BFLY SGT-FN-1B1 INLET			R	576	J3/7.4	1	0	D.F			361103		1	A
SGT-V-4A1	B250	A-206761			A	P	N		01	9	99+	M544	J5	
18" MO BFLY SGT-FN-1A1 OUTLET			R	587	H8/7.1	1	0	D.F			361103	68	2	A
SGT-V-4A1+					A							M544	J5	
18" MO BFLY SGT-FN-1A1 INLET			R	587	H8/7.1	1	0	D.F			361103		1	A
SGT-V-4A2	B250	A-206761			A	P	N		01	9	99+	M544	G5	
18" MO BFLY SGT-FN-1A2 DISCH			R	587	J.0/7.0	1	0	D.F			361103	68	2	A
SGT-V-4A2+		A-206761			A							M544	G5	
18" MO BFLY SGT-FN-1A2 DISCH.			R	587	J.0/7.0	1	0	D.F			361103		1	A
SGT-V-4B1	B250	A-206761			A	P	N		01	9	99+	M544	C5	
18" MO BFLY SGT-FN-1B1 DISCH			R	585	J2/5.1	1	0	D.F			361103	68	2	A
SGT-V-4B1+					A							M544	C5	
18" MO BFLY SGT-FN-1B1 DISCH.			R	585	J2/5.1	1	0	D.F			361103		1	A
SGT-V-4B2	B250	A-206761			A	P	N		01	9	99+	M544	D5	
18" BFLY SGT-FN-1B2 DISCH			R	585	J6/7.1	1	0	D.F			361103	68	2	A
SGT-V-4B2+					A							M544	D5	
18" MO BFLY SGT-FN-1O2 DISCH.			R	585	J6/7.1	1	0	D.F			361103		1	A
SGT-V-5A1	B250	A-206761			A	P	N		01	9	99+	M544	J5	
18 BFLY SGT-FN-1A-1 OUTLET			R	587	H.6/7.0	1	0	D.F			361103	68	2	A
SGT-V-5A1+					A							M544	J5	
18" MO BFLY SGT-FN-1A-1 INLET			R	587	H.6/7.0	1	0	D.F			361103		1	A
SGT-V-5A2	B250	A-206761			A	P	N		01	9	99+	M544	G5	
18" MO BFLY SGT-FN-1A2 DISCH			R	587	J/7.1	1	0	D.F			361103	68	2	A
SGT-V-5A2+					A							M544	G5	
18" MO BFLY SGT-FN-1A2 DISCH.			R	587	J/7.1	1	0	D.F			361103		1	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TM / USE	HL	TEST / SAFETY	ANL FO / FUNCTION	C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
SGT-V-5B1	B250	A-206761			A	P	N		01	9	99+	M544	C5	
18" MO BFLY SGT-FN-1B1 OUTLET			R	587	J2/7	1.0		D,F			361103	68	2	A
SGT-V-5B1+					A							M544	C5	
18" MO BFLY SGT-FN-1B1 OUTLET			R	585	J2/7	1.0		D,F			361103		1	A
SGT-V-5B2	B250	A-206761			A	P	N		01	9	99+	M544	E5	
18" BFLY SGT-FN-1B2 OUTLET			R	585	J6/7	1.0		D,F			361103	68	2	A
SGT-V-5B2+					A							M544	E5	
18" BFLY SGT-FN-1B2 OUTLET			R	585	J6/7	1.0		D,F			361103		1	A
SLC-P-1A	U055	2X3 TD-60			M		Y		01	9		M522	F6	
SLC PUMP			R	549	M.2/3.6	2.0		A			233016	02C41	2	A
SLC-P-1A+					K							M522	F6	
COMPOSITE FOR SLC-P-1A			R	548	N.2/3.7	2.0		A			233016	02C41	1	A
SLC-P-1B	U055	2X3TD-60			M		Y		01	9		M522	D6	
SLC PUMP			R	549	M.2/3.7	2.0		A			233016	02C41	2	A
SLC-P-1B+					K							M522	D06	
COMPOSITE FOR SLC-P-1B			R	549	M2/3.7	2.0		A			233016	02C41	1	A
SLC-V-1A	A391	DWG 2662-3			A	P	N		01	0	99+	M522	E4	
4" MO GLOBE SLC TANK OUTLET			R	550	M.6 /3.7	2.0		A			361003	41B	2	A
SLC-V-1A+					A	P	N		01		99+	M522	E04	
COMPOSITE FOR SLC-V-1A			R	550	M6/3.7	2.0		A			361003	41B	1	A
SLC-V-1B	A391	DWG 2662-3			A	P	Y		01	0	99+	M522	D4	
4" MO GLOBE SLC TANK OUTLET			R	548	M7/3.7	2.0		A			361003	41B	2	A
SLC-V-1B+					A	P	Y		01	0	99+	M522	D04	
COMPOSITE FOR SLC-V-1B			R	548	M7/3.7	2.0		A			361003	41B	1	A

EPN / DESCRIPTION	MFG	MODEL	BLDG ELEV	STATUS S E DETAIL	TH USE	HL TEST ANL FO C SAFETY FUNCTION	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL	EC
SW-V-187A 6" GATE (MO) SW INTO FPX-HX-1A	V085	P2-3311-NP-62	R 548	M	P 1 0	G	361745	M524 41A	B8 2	A
SW-V-187A+ FPC-HX-7A INLET COMPOSITE			R	K	1 0	G	361745	M524	B8 1	A
SW-V-187B 6" GATE (MO) SW INTO FPC-HX-1B	V085	P2-3311-NP-62	R 548	M	P 1 0	G	361745	M524 41A	B6 2	A
SW-V-187B+ COMPOSITE TO SW-V-187B			R	K	1 0	G	361745	M524	B6 1	A
SW-V-188A 6" GATE (MO) SW OUT FPC-HX-1A	V085	P2-3311-NP-62	R 548	M	P 1 0	G	361745	M524 41A	B7 2	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH / USE	HL	TEST	ANL	FO	C	SAFETY FUNCTION	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
SW-V-188A+					K									M524	B7	
FPC-HX-1A SW OUTLET COMPOSITE			R			1 0						G	361745		1	A
SW-V-188B	V085	P2-3311-NP-62			M	P								M524	B7	
6" GATE (MO) SW OUT FPC-HX-1B			R	548		1 0						G	361745	41A	2	A
SW-V-188B+					K									M524	B7	
FPC-HX-1B SW OUTLET COMPOSITE			R			1 0						G	361745		1	A
SW-V-24A	B350	P 79020			A	P	N		01		9		49	M524	D12	
2" GATE VLV MO RHR PUMP MTR			R	446	L.7/8.3	1 3						C,F	361242	215	2	A
SW-V-24A+					A	P	N		01					M524	D12	
COMPOSITE OF SW-V-24A			R	446	L.7/8.3	1 3						C,F	361242		1	A
SW-V-24B	B350	P 79020			A	P	N		01		9		49	M524	D10	
2" GATE VLV MO RHR PUMP MTR			R	447	L.7/8.3	1 3						C,F	361242	215	2	A
SW-V-24B+					A	P	N		01					M524	D10	
COMPOSITE OF SW-V-24B			R	447	L.7/8.3	1 3						C,F	361242		1	A
SW-V-24C	B350	P 79020			A	P	N		01		9		49	M524	D13	
2" GATE VLV MO RHR PUMP MTR			R	446	H.7/4.3	1 3						C,F	361242	215	2	A
SW-V-24C+					A	P	N		01					M524	D13	
COMPOSITE OF SW-V-24C			R	446	H.7/4.3	1 3						C,F	361242		1	A

EPN / DESCRIPTION	MFG	MODEL	BLDG	ELEV	STATUS S E / DETAIL	TH / USE	HL	TEST / SAFETY FUNCTION	ANL	FO	C	FREQ / QID	A/E DRAWING / CONTRACT	A/E ZONE / LEVEL	EC
SW-V-44 LPCS PUMP ROOM ISOL VALVE	B350	DWG 79020	R	446	A K.9/3.8	P 1 0	N	C	01		9	49 361242	M524 215	D9 2	A
SW-V-44+ COMPOSITE OF SW-V-44+			R	446	K K.9/3.9	P 1 0	N	C	01			-- 361242	M524	D9 1	A
SW-V-54 2" GT SW RTN RRA-CC-4, HPCS PMP RM	B350	DWG 79020	R	450	A M.8/3.9	P 1 0	Y	E	01		9	49 361242	M524 215	D9 2	A
SW-V-54+ COMPOSITE OF SW-V-54+			R	450	A M.8/3.9	P 1 0	N	E	01			361242	M524	D9 1	A

EPN / DESCRIPTION	MFG	MODEL	BLDG ELEV	STATUS S E DETAIL	TH USE	HL TEST ANL FO C SAFETY FUNCTION	FREQ QID	A/E DRAWING CONTRACT	A/E ZONE LEVEL EC
SW-V-75A 2" GLOBE VLV MO TO FUEL POOL	B350	P 76630-2	R 530	R H.7/9.4	2 0	N 01 F	99+ 361225	M524/1 215	B13 2 A
SW-V-75A+ SW TIELINE TO FUEL POOL			R 530	K H.7/9.4	2 0	F	361225	M524	G11 1 A
SW-V-75B 2" GLOBE VLV MO TO FUEL POOL	B350	P 76630-2	R 530	R N.0/9.4	2 0	N 01 F	99+ 361225	M524/1 215	A13 2 A

Attachment A

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RESPONSE TO ENCLOSURES 1 AND 2 OF REFERENCE (a)

1. INTRODUCTION

Purge and vent butterfly valve and actuator assemblies are being qualified by combination of analysis and testing for structural integrity and for operability. Operability is being considered for open to fail-closed operation. The analyses considers design basis LOCA loads in combination with seismic plus hydrodynamic vibration loads and normal operating loads. Testing was performed by the manufacturer on similar butterfly valves to determine torque coefficients which included the effect of upstream elbows.

The air operators on the 24-inch and 30-inch purge and vent valves were sized to accomodate the required valve seating torque. The seating torque was specified as 17,000 inch pounds for the 24-inch valves and 27,800 inch pounds for the 30-inch valves. Subsequent fluid flow analyses in combination with the experimentally determined dynamic torque coefficients resulted in maximum dynamic torques of 13,808 and 22,174 in-lb (attached analysis). However, containment isolation is more conservatively addressed than these numbers indicate because the dynamic torques which exist in the isolation sequence act to close the valve and the opposing bearing frictional torques are small.

Preliminary stress analyses for the dynamic and operating loads show that the critically stressed members are the protrusions for mounting the air operator to the valve body. The existing stress analysis is based on piping stress analysis with very conservative input motion. The input motion is being revised to be more realistic. When the loads on the valves have been revised, the valve analysis will be updated and the results submitted to the NRC. If there is not a significant reduction of loading, the operator mounting protrusions will be reinforced.

2. RESPONSES TO SPECIFIC QUESTIONS IN ENCLOSURE 1 OF REFERENCE (a)

Question 1

The torque sizing letter of January 9, 1976, BIF to Burns and Roe, indicated the dynamic flow forces of air during normal operation were negligible and the seating torque was considered the governing design load. Dynamic loads under LOCA pressures were not considered. WPPSS should determine if the dynamic flow loads during DBA-LOCA pressures are negligible as compared to the seating torques. The dynamic flow loads must be based on test (either model or actual size).

Response

Dynamic loads based on model testing and analysis for LOCA pressures have been determined (the report is attached). The dynamic load at all times is tending to close the valves and is always less than the seating torque.

Question 2

The applicant should show the operator has the ability to close the valve at all angles. Dynamic torque loads will vary with disc angle. The April 17, 1976, letter, BIF to Burns and Roe, indicated operator torque capability also varies with disc angle.

Response

The attached report shows that the operator has the ability to close the valve from all angles. The dynamic flow, in fact, aids the closing of the valve.

Question 3

If the dynamic torque under LOCA pressure for these valves is greater than the seating torque, a new analysis should be performed to show the effects of combined LOCA dynamic loads plus SSE seismic loads.

Response

Not applicable. The seating torque is always greater than the dynamic torque under LOCA pressure.

Question 4

Stress allowables for the analysis are yield strength values. No additional margin is applied. Stress allowables should reflect some margin. For example: the maximum shear allowable should be .6 Sm (Sm as defined by ASME B&PV code, Section III) for ASME Section III Components or .4 Sy (Sy = yield strength, allowable as defined by AISC) for all other components. In addition, ultimate strength was used for non-pressure boundary components. For valves required to operate conservative allowables should be used to allow for deviations in manufacturing. Margins should be conservatively applied.

Response

The allowable values being used in the stress analysis for non pressure retaining parts of these valves and operators are those specified in the AISC Handbook as shown below. For the pressure retaining parts, the allowables for ASME Section III, Class 2 have been used.

AISC Allowables

Normal Condition:	Bending	0.6 Fy
	Shear	0.4 Fy
Faulted Condition:	Bending	0.96 Fy
	Shear	0.64 Fy

However, the minimum yield strength, Sy, from the ASME B&PV Code is being used instead of the nominal yield strength, Fy. This results in significant additional margin.

Question 5

The valve appears to have natural frequencies at 17.3 Hz and 23.9 Hz but the seismic analysis for the valve assembly assumed the valve to be rigid. In addition, seismic qualification for a component which has a function beyond simple pressure boundary should be qualified by test.

Response

The calculated natural frequencies are in the range of the hydrodynamic excitation. The analysis of the valve and its operator assembly is being based on loads derived from a dynamic, finite element piping analysis into which the valve assembly is carefully modeled.

The valve design has been closely examined. The only failure mechanisms which could reasonably be expected involve binding of moving parts. These are being examined conservatively by analysis and operating experience. No additional testing is planned.

3. RESPONSES TO SPECIFIC QUESTIONS IN ENCLOSURE 2 TO REFERENCE (a)

272.01 Demonstration of operability of the containment purge and vent valves and the ability of these valves to close during a design basis accident is necessary to assure containment isolation. This demonstration of operability is required by NUREG-0737, "Clarification of TMI Action Plan Requirements", II.E.4.2 for containment purge and vent valves which are not sealed closed during operational conditions 1, 2, 3, and 4.

1. For each purge and vent valve covered in the scope of this review, the following documentation demonstrating compliance with the "Guidelines for Demonstration of Operability of Purge and Vent Valves" (Attachment 2) is to be submitted for staff review:

   A. Dynamic Torque Coefficient Test Reports (Butterfly valves only) - including a description of the test setup.

   B. Operability Demonstration or In-situ Test Reports (when used).

C. Stress Reports.

D. Seismic Reports for Valve Assembly (valve and operator) and associated parts.

E. Sketch or description of each valve installation showing the following (Butterfly valves only):

1. direction of flow
2. disc closure direction
3. curved side of disc, upstream or downstream (asymmetric discs)
4. orientation and distance of elbows, tees, bends, etc. within 20 pipe diameters of valve
5. shaft orientation
6. distance between valves

F. Demonstration that the maximum combined torque developed by the valve is below the actuator rating.

2. The applicant should respond to the "Specific Valve Type Questions" (Attachment 1) which relate to his valve.

3. Analysis, if used, should be supported by tests which establish torque coefficients of the valve at various angles. As torque coefficients in butterfly valves are dependent on disc shape, aspect ratio, angle of closure flow direction and approach flow, these things should be accurately represented during tests. Specifically, piping installations (upstream and downstream of the valve) during the test should be representative of actual field installations. For example, non-symmetric approach flow from an elbow upstream of a valve can result in fluid dynamic torques of double the magnitude of those found for a valve with straight piping upstream and downstream.

4. In-situ tests, when performed on a representative valve, should be performed on a valve of each size/type which is determined to represent the worst case load. Worst case flow direction, for example, should be considered.

5. For two valves in series where the second valve is a butterfly valve, the effect of non-symmetric flow from the first valve should be considered if the valves are within 15 pipe diameters of each other.

6. If the applicant takes credit for closure time vs. the buildup of containment pressure, he must demonstrate that the method is conservative with respect to the actual valve closure rate. Actual valve closure rate is to be determined under both loaded and unloaded conditions (if valves close faster at all angles of opening under loaded conditions, no load closure time may be used as conservative) and periodic inspection under tech. spec. requirements should be performed to assure closure rate does not increase with time or use.

Response

1. A. The dynamic torque coefficient test reports are considered by BIF as proprietary information. The reports are available to the NRC or to the Supply System at their offices in West Warwick, Rhode Island.

   The results of the tests are summarized in the graphs on the last two pages of the attached report from BIF.

   B. Operability is being demonstrated by analysis. The results of this analysis will be submitted.

   C. The stress reports are being revised and the results will be submitted as soon as they have been completed, reviewed, and approved.

   D. The seismic analysis is included in C (above).

   E. A sketch of each valve installation is attached. (Figures 1 & 2)

   F. Demonstration that the maximum combined torque developed by the valve is below the actuator rating.

   Dynamic torque as a function of valve disk angle has been presented in the attached analysis for both the 24- and 30-inch butterfly valves, in steam and airflow, using the worst-case upstream-piping configuration. These results show that the disk seating torque is the maximum torque achieved in the closing sequence.

   The actuator rating can be based on the minimum spring force developed, which is equal to the spring preload. For spring-actuated, fail-closed operation, these preloads develop a torque on the valve disk in the closed position up to the following limits:

   <u>24" Valve (8" cylinder)</u>

   (preload) 1500 lb *11.26 in = 16,890 in lb > 13,808 in lb (seating torque)

   <u>30" Valve (10" cylinder)</u>

   (preload) 2900 lb (Ref **) *11.18 in = 32,422 in lb > 22,174 in lb (seating torque)

2. The "specific valve type questions" are answered in response to Question 272.02 (below).

3. The analysis used to determine the operating torques is attached. The torque coefficients used conservatively considered the disc share, aspect ratio, angle of closure, flow direction, and approach flow.

4. No in-situ testing has been performed on these valves. If the analysis now being performed does not show conclusively that these valves will operate safely through an hypothesized event, testing will be used to gain that assurance.

5. These valves are in series and are within 15 pipe diameters of each other. However, the effect of an elbow immediately before the analyzed valve oriented in the manner which causes the greatest torque is greater than the effect of the other valve. The effect of the other valve was, therefore, not considered.

6. As shown on Page 9 of the attached BIF report, unloaded, the valve closes in four seconds or less. Loaded, the valve will close in less time.

   Our valve operability test and inspection program will assure that the valve closing time is not increased beyond four seconds with age. This is a normal part of our maintenance program per Section XI of the ASME Code.

272.02 The following questions apply to specific valve types only and need to be answered only where applicable. If not applicable, state so.

A. Torque Due to Containment Backpressure Effect (TCB)

   For those air operated valves located inside containment, is the operator design of a type that can be affected by the containment pressure rise (backpressure effect) i.e., where the containment pressure acts to reduce the operator torque capability due to TCB. Discuss the operator design with respect to the air vent and bleeds. Show how TCB was calculated (if applicable).

B. Where air operated valve assemblies use accumulators as the fail safe feature, describe the accumulator air system configuration and its operation. Discuss active electrical components in the accumulator system and the basis used to determine their qualification for the environmental conditions experienced. Is this system seismically designed? How is the allowable leakage from the accumulators determined and monitored?

C. For valve assemblies requiring a seal pressurization system (inflatable main seal), describe the air pressurization system configuration and operation including means used to determine their qualification for the environmental condition experienced. Is this system seismically designed?

D. Where electric motor operators are used to close the valve, has the minimum available voltage to the electric operator under both normal or emergency modes been determined and specified to the operator manufacturer to assure the adequacy of the operator to stroke the valve at accident conditions with these lower limit voltages available? Does this reduce voltage operation result in any significant change in stroke timing? Describe the emergency mode power source used.

E. Where electric motor and air operator units are equipped with handwheels, does their design provide for automatic re-engagement of the motor operator following the hand-wheel mode of operation? If not, what steps are taken to preclude the possibility of the valve being left in the handwheel mode following some maintenance, test, etc. type operation?

F. For electric motor operated valves, have the torques developed during operation been found to be less than the torque limiting settings?

Response

The six specific questions A through F are not applicable to the WNP-2 containment purge and vent valves as noted below:

A. The vent and purge valves are located outside of containment.

B. These valves are spring-actuated for the fail-close feature.

C. An inflatable main seal design is not present.

D. Electric motor operators are not present on the valves.

E. There are no handwheels on these valves.

F. Electric motor operators are not present on the valves.

4. RESPONSES TO QUESTIONS IN ATTACHMENT 1 TO ENCLOSURE 2 OF REFERENCE (a)

ATTACHMENT 1 TO ENCLOSURE 2
Guidelines for Demonstration
Of Operability of Purge and
Vent Valves

Operability

In order to establish operability it must be shown that the valve actuator's torque capability has sufficient margin to overcome or resist the torques and/or forces (i.e., fluid dynamic, bearing, seating, friction) that resist closure when stroking from the initial open position to full seated (bubble tight) in the time limit specified. This should be predicted on the pressure(s) established in the containment following a design basis LOCA. Considerations which should be addressed in assuring valve design adequacy include:

1. Valve closure rate versus time - i.e., constant rate or other.

2. Flow direction through valve; ΔP across valve.

3. Single valve closure (inside containment or outside containment valve) or simultaneous closure. Establish worst case.

4. Containment back pressure effect on closing torque margins of air operated valve which vent pilot air inside containment.

5. Adequacy of accumulator (when used) sizing and initial charge for valve closure requirements.

6. For valve operators using torque limiting devices are the settings of the devices compatible with the torques required to operate the valve during the design basis condition.

7. The effect of the piping system (turns, branches) upstream and downstream of all valve installation.

8. The effect of butterfly valve disc and shaft orientation to the fluid mixture egressing from the containment.

Demonstration

Demonstration of the various aspects of operability of purge and vent valves may be by analysis, bench testing, in-situ testing, or a combination of these means.

Purge and vent valve structural elements (valve/actuator assembly) must be evaluated to have sufficient stress margins to withstand loads imposed while valve closes during a design basis accident. Torsional shear, shear, bending, tension and compression loads/stresses should be considered. Seismic loading should be addressed.

Once valve closure and structural integrity are assured by analysis, testing or a suitable combination, a determination of the sealing integrity after closure and long term exposure to the containment environment should be evaluated. Emphasis should be directed at the effect of radiation and of the containment spray chemical solutions on seal material. Other aspects such as the effect on sealing from outside ambient temperatures and debris should be considered.

The following considerations apply when testing is chosen as a means for demonstrating valve operability:

Bench Testing

A. Bench testing can be used to demonstrate suitability of the in-service valve by reason of its traceability in design to a test valve. The following factors should be considered when qualifying valves through bench testing.

   1. Whether a valve was qualified by testing of an identical valve assembly or by extrapolation of data from a similarly designed valve.

   2. Whether measures were taken to assure that piping upstream and downstream and valve orientation are simulated.

3. Whether the following load and environmental factors were considered:

   a. Simulation of LOCA

   b. Seismic loading

   c. Temperature soak

   d. Radiation exposure

   e. Chemical exposure

   f. Debris

B. Bench testing of installed valves to demonstrate the suitability of the specific valve to perform its required function during the postulated design basis accident is acceptable.

   1. The factors listed in Items A.2 and A.3 should be considered when taking this approach.

<u>In-Situ Testing</u>

In-situ testing of purge and vent valves may be performed to confirm the suitability of the valve under actual conditions. When performing such tests, the conditions (loading, environment) to which the valve(s) will be subjected during the test should simulate the design basis accident.

NOTE: Post test valve examination should be performed to establish structural integrity of the key valve/actuator components.

<u>Response</u>

3.2.1 <u>Operability</u>

1. Valve closure rates were assumed to be uniform and conservatively slow for calculations of flow rates. Page 9 of attached BIF calculations.

2. Maximum dynamic torque coefficients were determined for the worst case flow directions and the worst case valve disk and shaft orientations relative to both flow direction and the orientation of an upstream elbow (Page 17 of attached calculations).

   Maximum flow rate for different degree of openings based on the mass flow rate through the valve due to ascending differential pressure as furnished by WPPSS Calc. No. ME-02-83-08-0 dated 10/8/82 (Page 18).

3. Simultaneous closure increases the back-pressure on the upstream valve and hence reduces the dynamic torque. This acts only to lessen the conservatism of the analysis since the dynamic torque tends to close the valves.

4, 5, & 6

Not applicable - The valves do not vent pilot air inside containment and accumulators are not used to actuate valve to fail-closed position. There are no torque limiting devices on the valves or actuators.

7 & 8

These effects have been considered for developing torque coefficients. See item 2 above.

The concerns of this section have been addressed as discussed in the above introduction. The results of the stress analysis will be transmitted when they are completed.

A preliminary evaluation shows that the decontamination chemicals have little effect on EPT and stainless steel seats. EPT seats generally can resist a cumulative radiation dosage of 1×10^7 rad. Also, during a LOCA, the valve internal temperature would be expected to be higher than ambient which would tend to increase sealing capability after valve closure.

Bench Testing

The results of bench testing are reported in the attached BIF calculations.

In-Situ Testing

No in-situ testing is planned for these valves except for the normal operability tests. If analysis cannot assure operability, the valve assemblies will be tested in-situ.

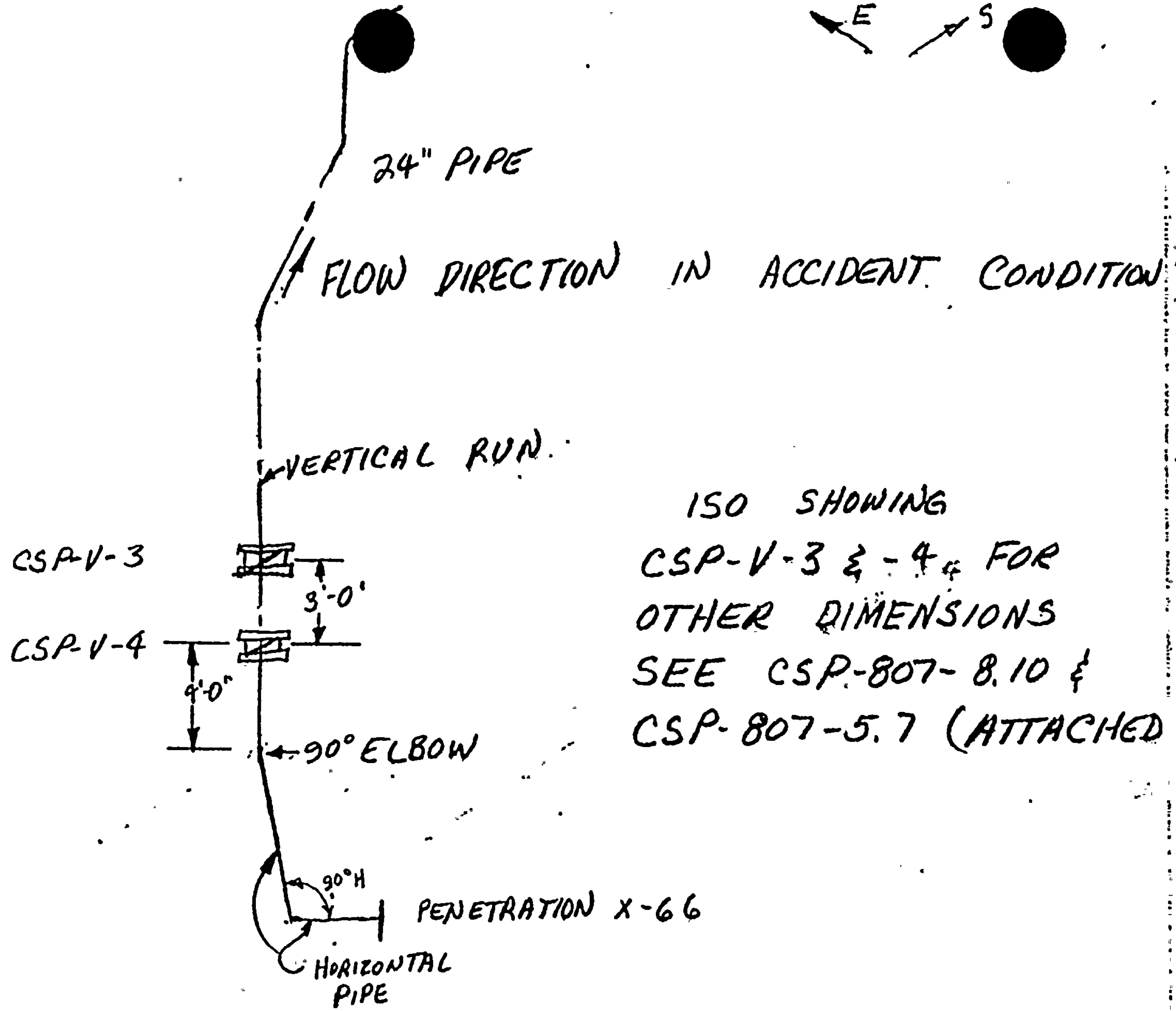


Figure 1

SEE ORIENTATION FOR
CSP-V-1 & -2 FOR VALVE
RELATIONSHIP

SKETCH SHOWING
VALVES CSP-V-3 &
CSP-V-4

RW Hickman

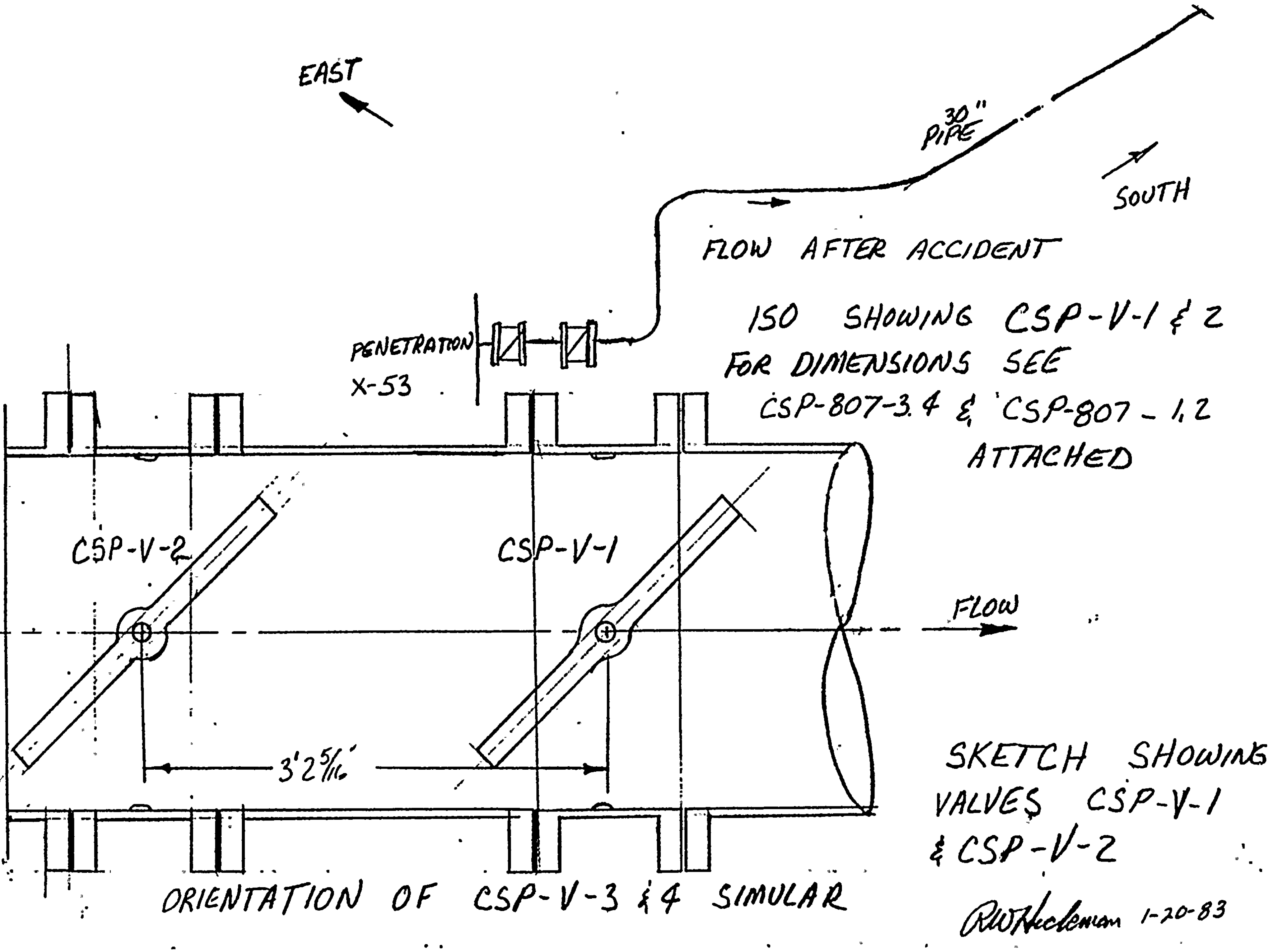

EAST
30" PIPE
SOUTH
FLOW AFTER ACCIDENT
PENETRATION X-53
ISO SHOWING CSP-V-1 & 2
FOR DIMENSIONS SEE
CSP-807-3.4 & CSP-807-1.2
ATTACHED
CSP-V-2
CSP-V-1
FLOW
3'2 5/16"
SKETCH SHOWING
VALVES CSP-V-1
& CSP-V-2
ORIENTATION OF CSP-V-3 & 4 SIMULAR
RWHeckman 1-20-83

Figure 2

B I F A UNIT OF GENERAL SIGNAL
1600 DIVISION ROAD
WEST WARWICK, R.I. 02893

QUALIFICATION OF PRIMARY CONTAINMENT BUTTERFLY ISOLATION VALVES UNDER LOCA CONDITION.

DYNAMIC TORQUE CALCULATION OF BUTTERFLY VALVE

PREPARED FOR:

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

VALVE SIZES 30", and 24"
WPPSS CONTRACT NO. 68
BIF ORDER NO.: PN27234 & PN27235
WPPSS IDENTIFICATION NO. CSP-V-1 & 2, and
CSP-V-3 & 4

Prepared by: Debendra K. Das Debendra K. Das
Date: Nov. 10, 1982
Checked by: Dezso Szilagyi Dezso Szilagyi
Date: Nov. 10. 1982

REPORT NO. TR-27234 And
TR-27235

TABLE OF CONTENTS

SUMMARY

This report contains the dynamic torque analysis of two butterfly valves of sizes 30, and 24 inch. The analysis is performed for LOCA (loss of Coolant Accident) per WPPSS Specification, reference 1 on page six of this report. The analytical procedure and the assumptions are outlined in the section beginning on page seven. Dynamic torque calculations have been performed for two media, namely, air and saturated steam for various angles of opening of these valves.

The results of the analysis tabulated on page two through five of the report indicate that the dynamic torques developed under the specified flow conditions are less than the design torques used in the original Seismic and Stress analysis of these valves. Therefore the valves are safe against the action of dynamic torque in the event of a LOCA.

SUMMARY OF RESULTS

Table - 1, 30 Inch Valve, airflow

Time s	Angle α deg.	Dynamic Torque in-lb
1.0	90 (Full open)	11020
1.5	78.75	23098
2.0	67.50	18138
2.5	56.25	14747
3.0	45.00	12428
3.5	33.75	10780
4.0	22.50	8014
4.5	11.25	3972
5.0	9.0 (Full closed)	0.0 *

T_{Net} = 22174 in-lb

* At full closed position the dynamic torque is zero and the net torque is due to seating and bearing friction.

NOTE: The design torque used in the Seismic analysis report No. TR-74-8 by McPherson Associates for this valve is 27800 in-lb. Therefore the design is safe.

SUMMARY OF RESULTS

Table - 2, 30 Inch Valve Steam flow

Time s	Angle α deg.	Dynamic Torque in-lb
1.0	90 (Full open)	11032
1.5	78.75	23175
2.0	67.50	18142
2.5	56.25	14668
3.0	45.00	12424
3.5	33.75	10580
4.0	22.50	7809
4.5	11.25	3867
5.0	9.0 (Full closed)	0.0 *

T_{Net} = 22174 in-lb

* At full closed position the dynamic torque is zero and the net torque is due to seating and bearing friction.

SUMMARY OF RESULTS

Table - 3, 24 Inch Valve, Air flow

Time s	Angle α deg.	Dynamic Torque in-lb
1.0	90 (Full open)	5525
1.5	78.75	11692
2.0	67.50	9095
2.5	56.25	7428
3.0	45.00	6239
3.5	33.75	5430
4.0	22.50	4043
4.5	11.25	2020
5.0	9.0 (Full closed)	0.0 *

T_{Net} = 13808 in-lb

* At full closed position the dynamic torque is zero and the net torque is due to seating and bearing friction.

Note: The design torque used in the Seismic analysis report No. TR-74-7 by McPherson Associate for this valve is 1700 in-lb. Therefore the deisgn is safe.

SUMMARY OF RESULTS

Table - 4, 24 Inch Valve, Steam flow

Time s	Angle α deg.	Dynamic Torque in-lb
1.0	90 (Full open)	5425
1.5	78.75	11394
2.0	67.50	8921
2.5	56.25	7213
3.0	45.00	6109
3.5	33.75	5202
4.0	22.50	3842
4.5	11.25	1902
5.0	9.0 (Full closed)	0.0 *

T_{Net} = 13808 in-lb

* At full closed position the dynamic torque is zero and the net torque is due to seating and bearing friction.

REFERENCES

1. WPPSS Specification 2808-68, Calc. No. ME-02-83-08-0, Sheets 1 thru 9, dated 10/8/82.

   LOCA Temperature Curve Fig. 6.2-2.
   LOCA Pressure Curve Fig. 6.2-3.

2. ANSI/AWWA C504-80, AWWA Standard for Rubber-Seated Butterfly Valves. American Water Works ASsociation,Colo.

3. Beard,C., Final Control Elements, Valves and Actuators, First Edition, Rimbach Publications, 1969.

4. Hutchison, J. W., ISA Handbook of Control Valves, 2nd Edition.

5. Torque and Sizing Calculation for BIF Butterfly Valves, No. D-214590, dated 1/9/75 for WPPSS Contract #68.

6. B I F Test Report for Dynamic Torque and Head Loss Tests of Cast Iron Streamline Disc versus Fabricated Flat Plate Disc dated May 13, 1974.

7. B I F Test Report #TR-0650-43, Hydrodynamic and Headloss Test of 12" - 150 Lb. Butterfly Valve with directly connected short radius elbow upstream, dated 2/24/82.

8. B I F Drawings: 30 inch Valve General Arrangement Drawing A-206763
   24 inch Valve General Arrangement Drawing A-206764

ANALYTICAL PROCEDURE

The valves analysed in this report are primary containment isolation Butterfly Valves used in the purge system. Valve sizes considered here are 30 inch and 24 inch.

During the normal operation these valves are in full open position and should close completely in case of an accident. In the event of a LOCA (Loss of Coolant Accident) the valves have to close against ascending differential pressure. During the closing operation the valve disc will be in semi-open positions and will experience fluid dynamic forces due to uneven pressure distribution across the faces of the disc.

The pressure rise and temperature rise inside the containment with respect to time, is given in WPPSS addendum (reference 1). The flow through the valve causes aerodynamic effect on the disc that gives rise to the dynamic torque. This dynamic torque is given by the formula:

$$T_D = C_T \, (\Delta P) \, D^3 \qquad \text{(Ref. 2)..............(1)}$$

Where T_D = Dynamic Torque (in.-Lb.)

C_T = Coefficient of dynamic torque obtained from test (Dimensionless constant)(Ref. 7)

ΔP = Differential pressure across the valve (psi)

D = Disc diameter (in.)

During the closing operation of the valve C_T and ΔP will be changing for varying closing angles of the disc. The dynamic torque will tend to close the valve where as the shaft bearing friction torque will oppose it. The bearing friction torque is given by the formula:

$$T_b = \frac{\pi D^2}{4} \left[f_b \, (d/2) \, \Delta p \right] \qquad \text{(Ref. 2)...............(2)}$$

T_b = Shaft bearing friction torque (LB-in.)

D = Valve Port diameter (in.)

f_b = Bearing friction coefficient (dimensionless constant)

d = Shaft diameter (in.)

Δp = Differential pressure (psi)

Therefore the net unbalanced torque is

$$T_N = T_D - T_b$$

The differential pressure Δp across the valve shall be calculated from the data on volumetric flow rate under LOCA Condition supplied to us by WPPSS. The equation used will be the one for sub-sonic gas flow recommended by the Fluid Controls Institute:

$$Q = 963\ C_V \sqrt{\frac{P_1^2 - P_2^2}{GT_1}} \qquad \text{(Ref. 3 and 4)} \ldots\ldots\ldots\ldots\text{(3)}$$

Where Q = Gasflow in SCFH

P_1 = Valve upstream pressure (psia)

P_2 = Valve downstream pressure (psia)

G = Specific gravity (air =1 at 60°F and 1 atm. pressure)

T_1 = Upstream temperature in ° Rankine

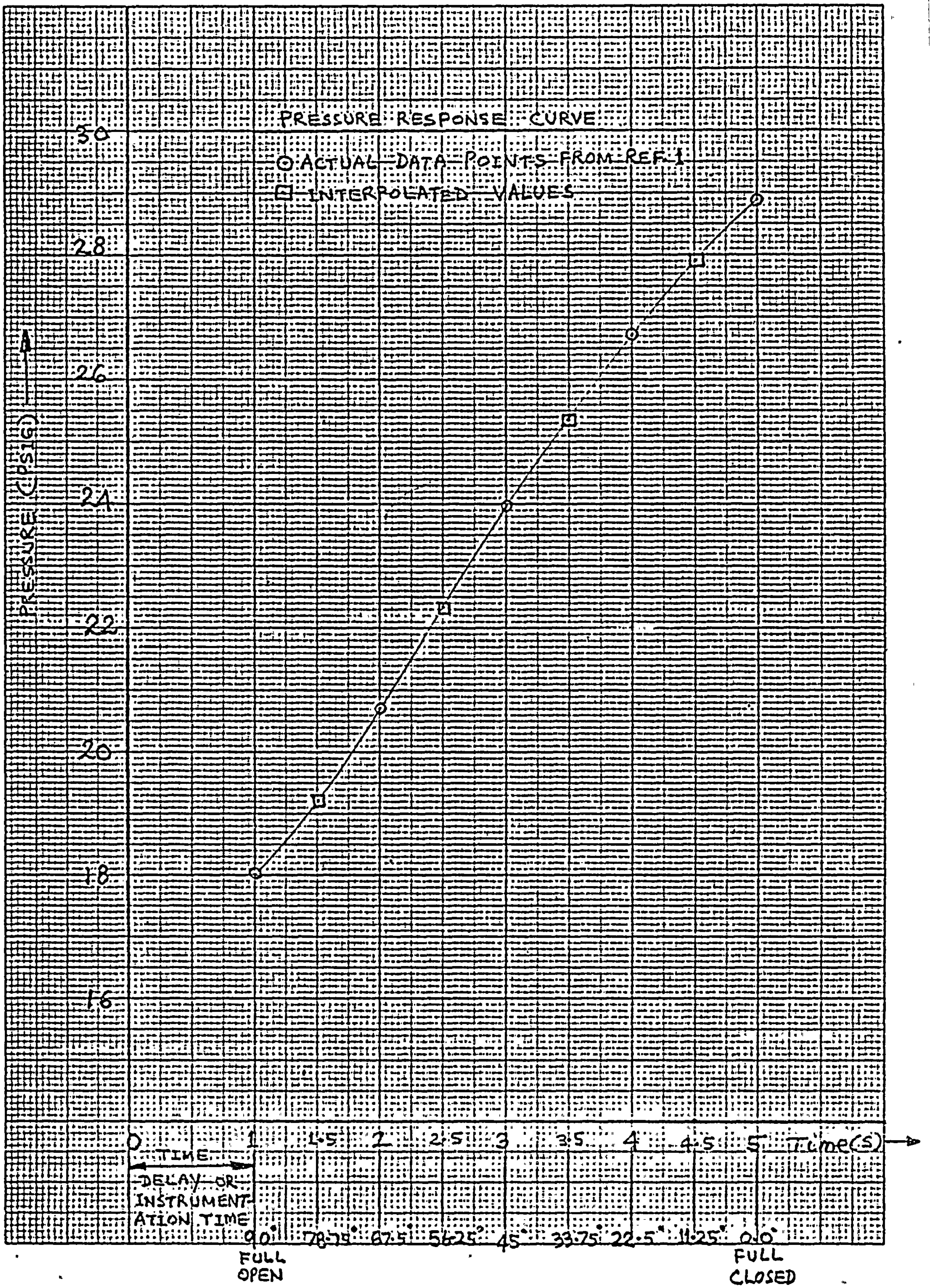
C_V = Valve coefficient $= \dfrac{29.9D^2}{\sqrt{K_V}}$

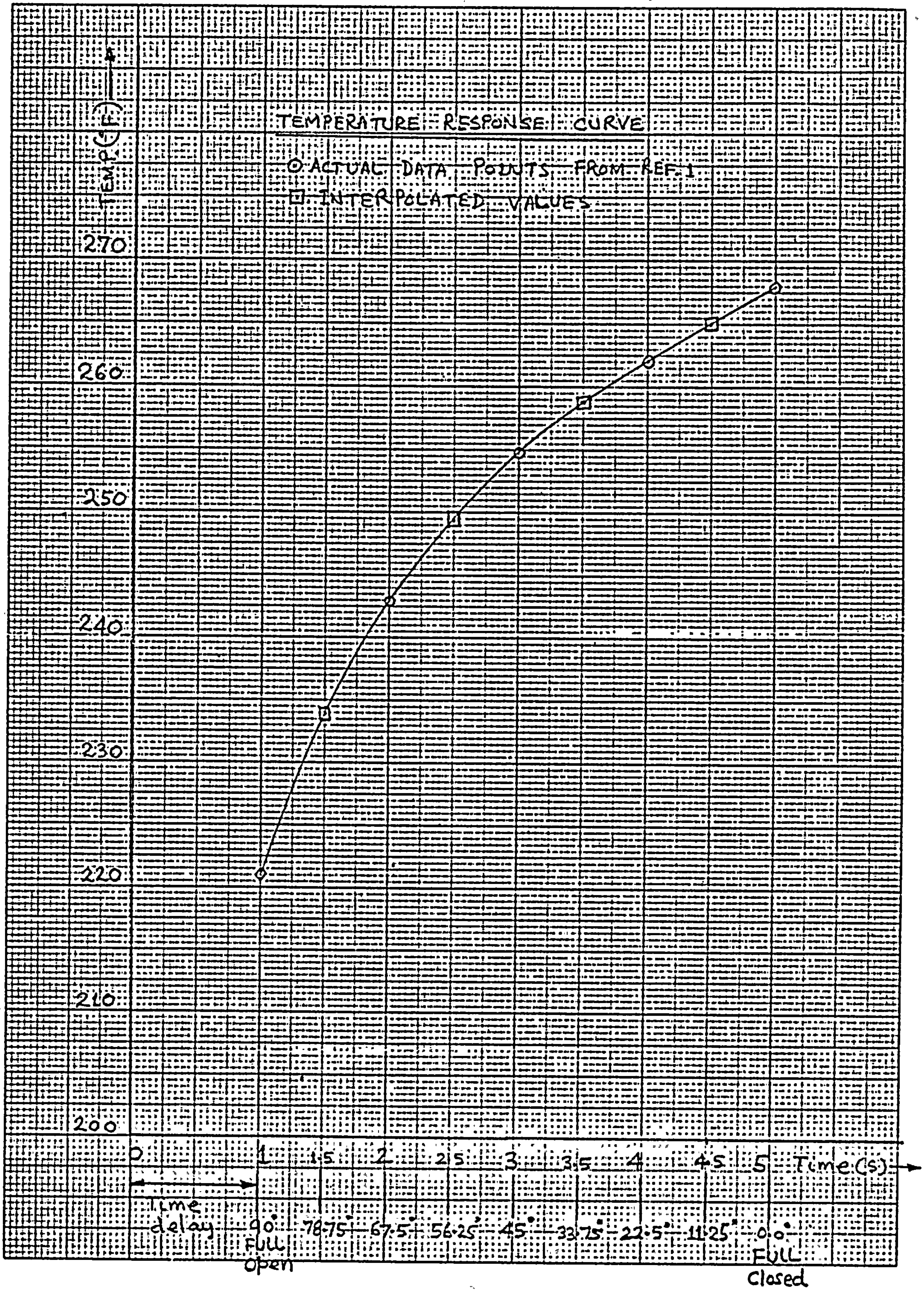
D = Valve Port diameter (in.)

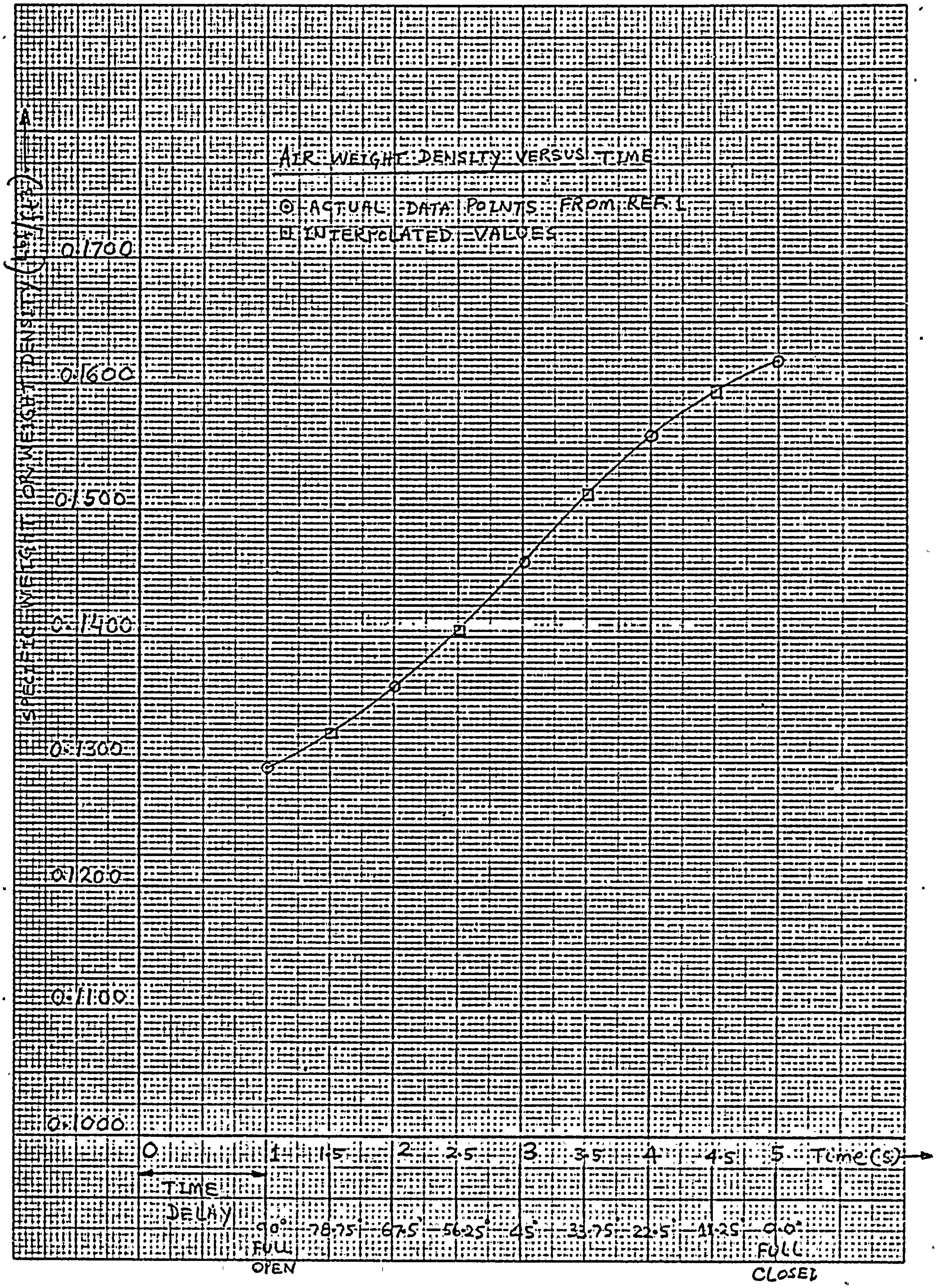
K_V = Coefficient of flow (dimensionless constant) (Ref. 7)

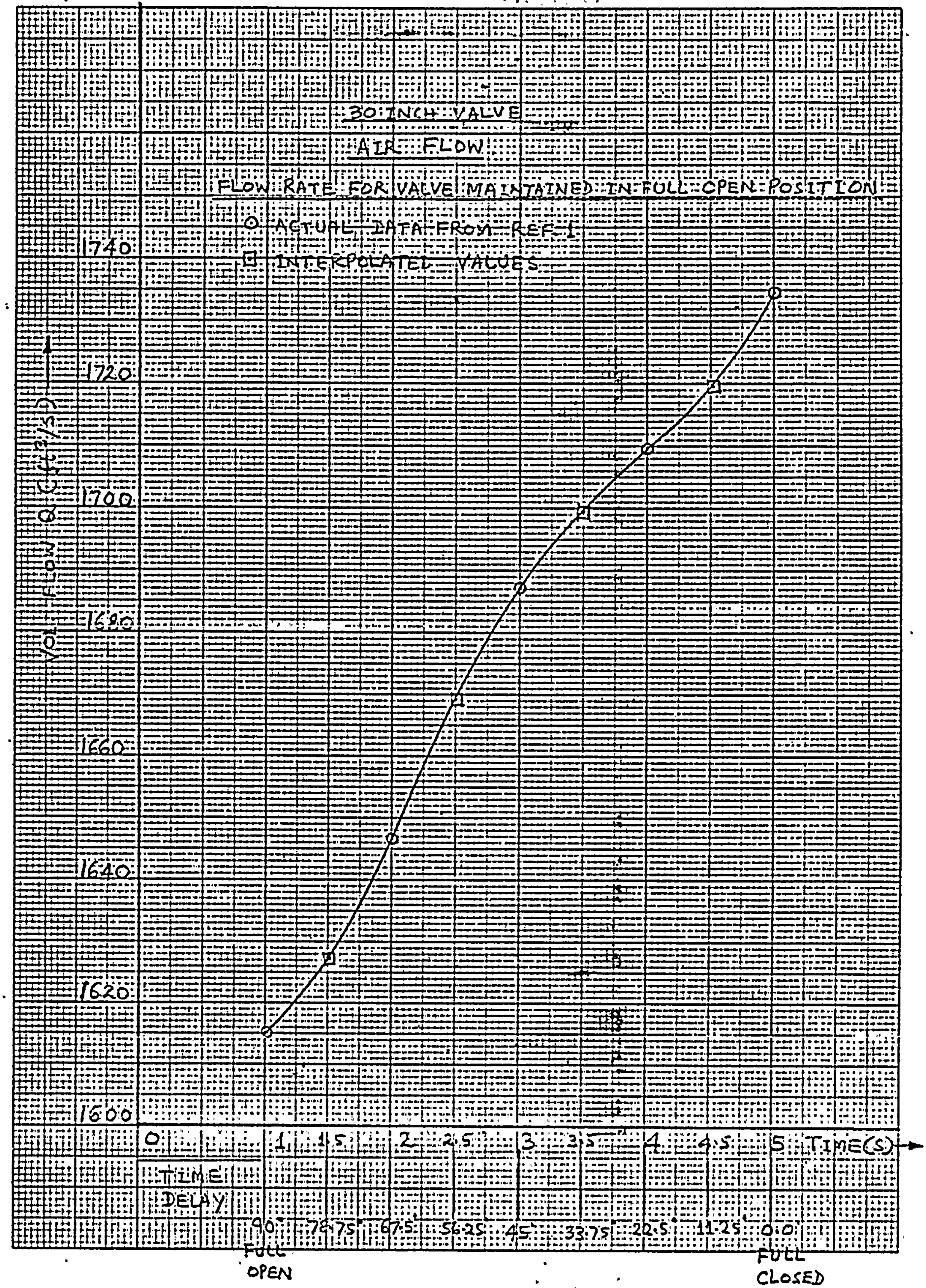
WPPSS recommends that with the occurrence of LOCA inside containment, a signal is sent to the main control which automatically sends the valves to the failure mode. The time delay (instrumentation time) before the Butterfly valve starts to close is given to be less than one second. We have conservatively assumed this delay to be one full second. Time of closure from the full-open position to full-close position is four seconds. This closure time was the original requirement of the valve operator and has been tested at B I F for several valves and is noted to be often less than four seconds and even as low as one and a half seconds. A smaller closing time will obviously cause less flow due to lower containment pressure and a lower dynamic torque. However, the maximum closure time of four seconds is used in this analysis. Therefore, from the onset of LOCA to the full closure of the valve the time duration is five seconds.

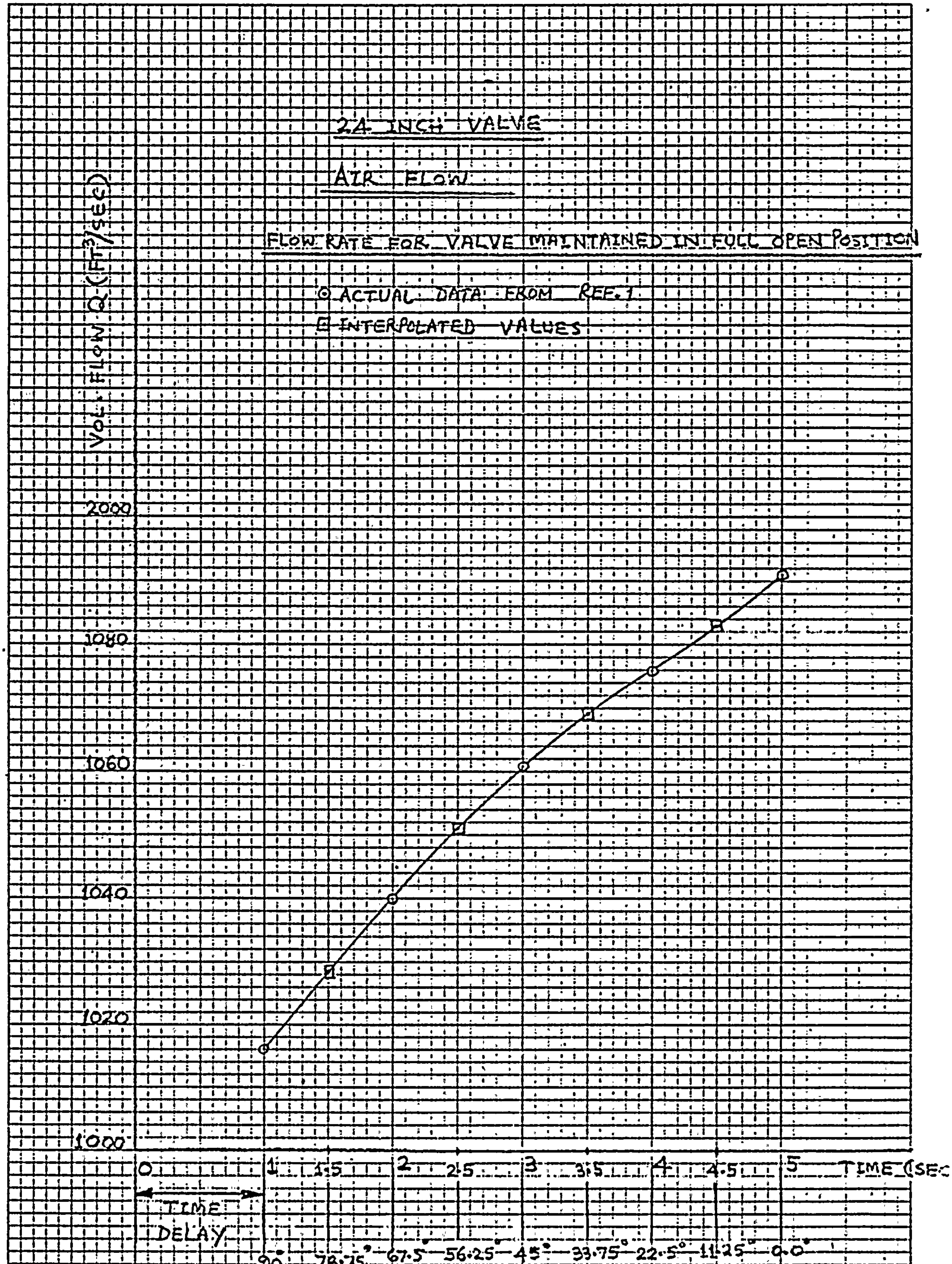
Using this time period we have abstracted the pressure and temperature response under a LOCA condition from WPPSS curves of Reference 1, Fig. 6.2-2 and Fig. 6.2-3. The drywell pressure and temperature are used which are considerably higher than the wetwell values. The enlarged plots for the period of interest are shown on pages 10 and 11. The specific volume and the volumetric flow rate of both saturated steam and air are also presented in WPPSS addendum, reference 1. These quantities are also plotted against time for both steam and air as shown in pages 10, thru 15. For saturated steam the specific volume or specific weight are obtained from the steam table.
The period of closure of the valve has been divided into eight equal divisions each of 0.5 second duration representing 11.25 degree of closure of the butterfly valve at a uniform rate. This division facilitates in

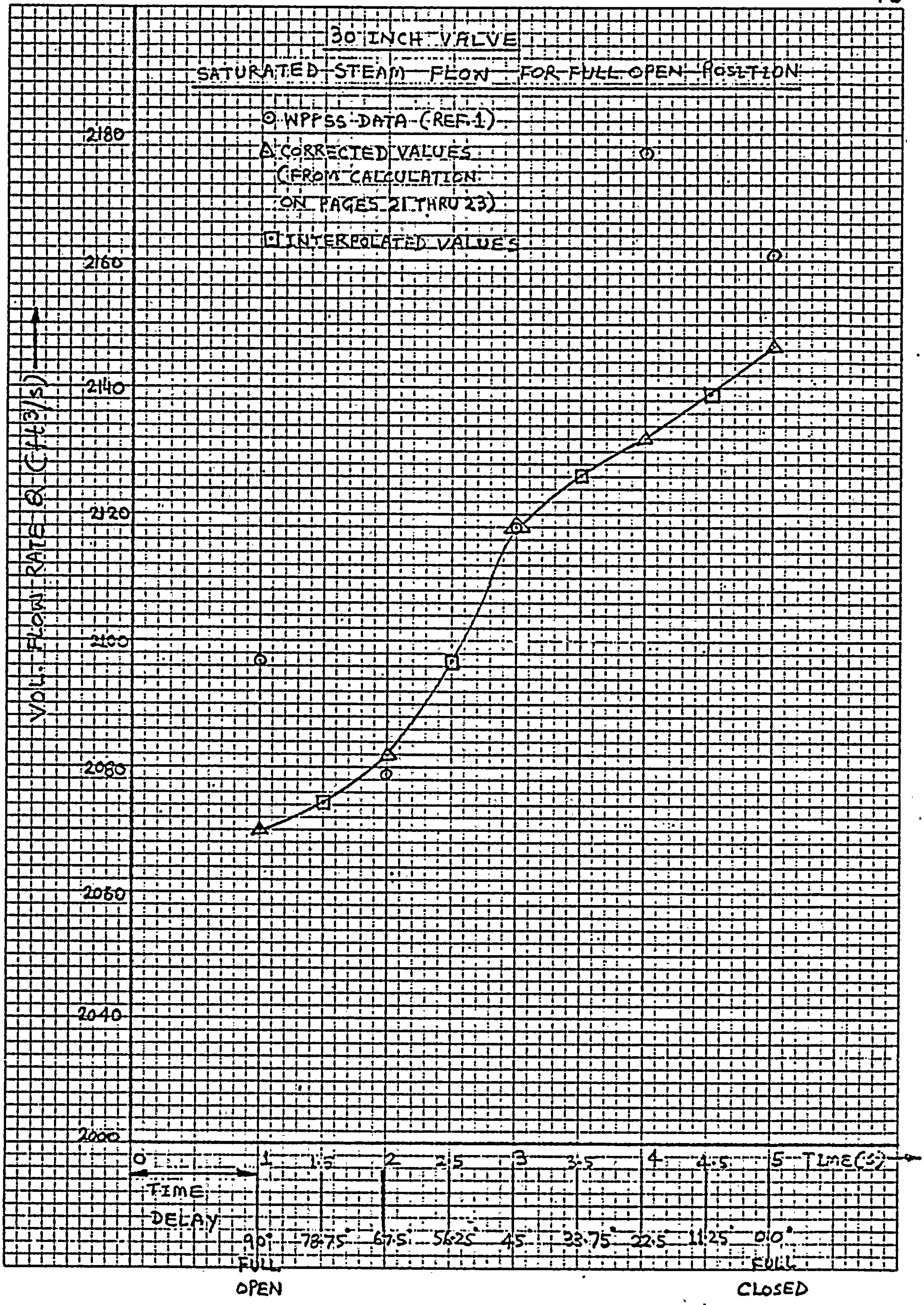

PRESSURE RESPONSE CURVE
⊙ ACTUAL DATA POINTS FROM REF 1
□ INTERPOLATED VALUES
PRESSURE (PSIG)
30
28
26
24
22
20
18
16
0
1
1.5
2
2.5
3
3.5
4
4.5
5
Time(s)
TIME DELAY OR INSTRUMENTATION TIME
90°
78.75°
67.5°
56.25°
45°
33.75°
22.5°
11.25°
0.0°
FULL OPEN
FULL CLOSED


TEMPERATURE RESPONSE CURVE
ACTUAL DATA POINTS FROM REF. 1
INTERPOLATED VALUES
TEMP. (°F)
270
260
250
240
230
220
210
200
0
1
1.5
2
2.5
3
3.5
4
4.5
5
Time (s)
Time delay
90°
Full open
78.75°
67.5°
56.25°
45°
33.75°
22.5°
11.25°
0.0°
Full Closed


AIR WEIGHT DENSITY VERSUS TIME
⊙ ACTUAL DATA POINTS FROM REF 1
⊡ INTERPOLATED VALUES
SPECIFIC WEIGHT OR WEIGHT DENSITY (lbf/ft³)
0.1700
0.1600
0.1500
0.1400
0.1300
0.1200
0.1100
0.1000
0
1
1.5
2
2.5
3
3.5
4
4.5
5
Time (S)
TIME DELAY
90° FULL OPEN
78.75
67.5
56.25
45
33.75
22.5
11.25
0.0° FULL CLOSED


30 INCH VALVE
AIR FLOW
FLOW RATE FOR VALVE MAINTAINED IN FULL OPEN POSITION
⊙ ACTUAL DATA FROM REF. I
⊡ INTERPOLATED VALUES
VOL. FLOW Q (ft³/s)
1740
1720
1700
1680
1660
1640
1620
1600
0
1
1.5
2
2.5
3
3.5
4
4.5
5
TIME (S)
TIME DELAY
90
78.75
67.5
56.25
45
33.75
22.5
11.25
0.0
FULL OPEN
FULL CLOSED


24 INCH VALVE
AIR FLOW
FLOW RATE FOR VALVE MAINTAINED IN FULL OPEN POSITION
⊙ ACTUAL DATA FROM REF. 1
⊡ INTERPOLATED VALUES
VOL. FLOW Q (FT³/SEC)
2000
1080
1060
1040
1020
1000
0
1
1.5
2
2.5
3
3.5
4
4.5
5
TIME (SEC)
TIME DELAY
90°
78.75°
67.5°
56.25°
45°
33.75°
22.5°
11.25°
0.0°
FULL OPEN
FULL CLOSED


30 INCH VALVE
SATURATED STEAM FLOW FOR FULL OPEN POSITION
WPPSS DATA (REF 1)
CORRECTED VALUES (FROM CALCULATION ON PAGES 21 THRU 23)
INTERPOLATED VALUES
VOL. FLOW RATE @ (ft3/s)
2180
2160
2140
2120
2100
2080
2060
2040
2000
0
1
1.5
2
2.5
3
3.5
4
4.5
5
TIME (S)
TIME DELAY
90°
78.75
67.5
56.25
45
33.75
22.5
11.25
0.0°
FULL OPEN
FULL CLOSED

reading the interpolated values of pressure, temperature density and volumetric flow as can be seen from the plots on pages 10, thru 15. Data obtained from reference 1, and the interpolated values are presented below. 8 equal intervals representing 11.25° rotation of the disc are considered.

TABLE - 1

Time s	Angle deg.	Pressure psig	Temp. °F	Air density Lbf/ft^3	Sat.Steam density Lbf/ft^3
1.0	90(Full open)	18	221	0.1295	0.0789
1.5	78.75	19.2*	234*	0.1325*	0.0818
2.0	67.50	20.7	243	0.1359	0.085
2.5	56.25	22.3*	249.5*	0.1405*	0.0886
3.0	45.00	24.0	255	0.1460	0.0926
3.5	33.75	25.4*	259*	0.1515*	0.0953
4.0	22.50	26.7	262	0.156	0.0984
4.5	11.25	27.9*	265*	0.1595*	0.1009
5.0	0.0(full closed)	28.9	268	0.1618	0.1033
*Interpolated from graphs.		Page 10	Page 11	Page 12	For saturated steam from stea table at the given pressure.

Coefficient of flow K_V and the dynamic torque coefficient C_T for different angles of valve opening are obtained from the test report reference 7. B I F has conducted extensive test on different types of disc geometry and disc and shaft orientation with respect to the direction of flow which are summarized in reference 6 and 7. The test medium is water and no air test is undertaken. Reference 6 is for two types of discs, namely, cast iron streamline disc and fabricated flat plate disc. Measurements have been made for dynamic torque coefficient and flow coefficient for both flatside upstream and flatside downstream of the disc. The comparison indicates that the disc orientation of flatside down stream always causes higher dynamic torque. Reference 7 incorporates a directly connected short radius elbow upstream to study the effect of flow non-uniformity on dynamic torque. Several tests have been performed with shaft vertical and shaft horizontal, counter clockwise opening and clock wise opening, with flatside upstream and flatside downstream. These test data are also compared with that of a straight pipe without any elbow upstream of the valve. A careful study of these experimental results indicate that the most severe case is a vertical shaft orientation (i.e. perpendicular to the plane of the elbow) with flatside of the disc downstream with a clockwise rotation of the disc.

This orientation results in approximately 30% increase in maximum dynamic torque coefficient than that obtained for a straight pipe. In this report this most severe case is used to obtain torque coefficients at various angle of valve opening. This approach results in higher torque values and represents the worst condition. The test data are presented in the tabular form.

TABLE - 6

Time Sec.	Angle(α) Deg.	K_V	C_T
1.0	90	0.55	0.275
1.5	78.75	0.70	0.560
2.0	67.50	1.10	0.35
2.5	56.25	2.30	0.175
3.0	45.00	5.20	0.09
3.5	33.75	14.00	0.045
4.0	22.50	45.00	0.02
4.5	11.25	170.00	0.01
5.0	0.0	Closed	0.0

The volume and mass flow rate through the valve due to ascending differential pressure is presented by WPPSS in reference1. We note that this is the flow rate for valve in fully open position. However, the valve is closing gradually and the flow rate should decrease accordingly and when the valve is fully shut the flow rate should reduce to zero. This would occur at the end of 5 seconds. Therefore, we have to obtain the percentage of full open flow corresponding to the appropriate percentage of opening. Reference 3 and 4 provide such information. In reference 3, page 38, the flow characteristic of a butterfly valve is presented. This is a plot of percent of flow versus percent open which shows an equal percentage curve for the firt 25% of flow a linear curve thereafter for the remaining 75% of flow. In reference 4, page 166, the flow characteristic of Butterfly valve is shown to fall between the linear and equal percentage curve. Therefore from these plots the fraction of maximum flow at a percentage opening can be determined. Before deciding whether to use the linear or equal percentage curve some careful consideration has been given to determine which one should give the worst dynamic torque. Upon some reflection it is observed from equation (1) that the dynamic torque increases when the pressure drop increases. It is also apparent from equation (3) that the pressure drop is greater when the flow rate is greater. This is achieved by using the linear curve which predicts higher flow than the equal percentage curve. Therefore on the basis of this argument following flow rates are established for different degree of opening of the Butterfly valve.

TABLE -7

For 30 inch valve Air flow

Time s	Angle deg.	Percentage open %	Full open Flow ft^3/s	Percentage Flow ft^3/s
1.0	90 Full open	100	1614.9	1614.9
1.5	78.75	87.5	1625*	1423.6
2.0	67.5	75	1646.4	1234.8
2.5	56.25	62.5	2669.5*	1043.4
3.0	45	50	1687.2	843.6
3.5	33.75	37.5	1700*	637.5
4.0	22.5	25	1709.9	427.5
4.5	11.25	12.5	1719.5*	214.9
5.0	0.0 Full Closed	0.0	1734.3	0.0
			↑ Page 13	↑ Ref. 3 and 4

*Interpolated from graph

For the 24 inch WPPSS recommends that in order to establish the flow rate same velocity as that of 30 inch valve be used. Therefore following flow rates are obtained from the velocity data of WPPSS.

TABLE-8
For 24 inch valve air flow

Time s	Angled deg.	Velocity ft/s	Full open Flow ft^3/s	Percentage flo ft^3/s
1	90 Full open	352	1015.6	1015.6
1.5	78.75	--(1)	1028*	899.5
2.0	67.5	358.9	1035.5	776.6
2.5	56.25	--	1052*	657.5
3.0	45.00	367.8	1061.2	530.6
3.5	33.75	--	1070*	401.3
4.0	22.5	372.8	1075.6	268.9
4.5	11.20	--	1085*	135.6
5.0	0.0 Full closed	378.1	1090.9	0.0
		Ref.1	Page 14	

(1) Not given

* Interpolated from graph

24 inch valve I.d = 23 inch

Area = 2.8852 Ft^2

For saturated steam flow data of WPPSS some discrepanceis are observed. Calculations presented on Sheet no. 7 of 9 and 8 of 9 and the table on Sheet 9 of 9 indicate that the flow rate is decreasing with respect to time especially at time 2 and 5 seconds. These data points are plotted on page 15 of this report. Since the containment pressure is rising with respect to time the flow rate should increase. This can be seen from the behavior of the air flow results. Therefore steam flow rates were re-calculated to establish the corrected flow rates. The results are as follows:

Reference 1. Sheet No. 7 of 9 and 8 of 9

30 inch valve saturated steam flow

$$W = 0.525\, y\, d^2 \sqrt{\frac{\Delta P}{K \bar{V}}} \qquad d - 29 \text{ inch, } K\text{-}6.0$$

$$q = W \bar{V}$$

At 1 sec.

$$\Delta p = 18 \text{ psi}$$

$$P_1 = 32.7 \text{ psia}$$

$$\frac{\Delta P}{P_1} = 0.55$$

$$Y = 0.76$$

$$\bar{V} - 12.68 \quad ft^3/Lbf$$

$$q = W \bar{V} = \left[0.525\ (0.76)\ (29)^2 \sqrt{\frac{18}{6(12.68)}}\right](12.68) = 2070 \ ft^3/s$$

Steam flow - continued

At 2 Sec.

ΔP = 20.7 psi

P_1 = 35.4 psia

$\frac{\Delta P}{P_1}$ = 0.585

Y = 0.74

$\overline{V}$ = 11.7222 ft^3/Lbf

$$q = \left[0.525\ (0.74)(29)^2 \sqrt{\frac{20.7}{6.0(11.772)}}\right](11.772) = 2082\ ft^3/s$$

Very close to WPPSS result.

At 3 Sec.

Same as WPPSS result = 2118.2 ft^3/s

At 4 Sec.

ΔP = 26.7 psi

P_1 = 41.4 psia

$\frac{\Delta P}{P_1}$ = 0.645

Y = 0.718

$\overline{V}$ = 10.165 ft^3/lbf

$$q = \left[0.525(0.718)(29)^2 \sqrt{\frac{26.7}{6(10.165)}}\right](19.165) = 2132\ ft^3/s$$

At 5 Sec.

ΔP = 28.9 psi

P_1 = 43.6 psia

$\frac{\Delta P}{P_1}$ = 0.663

Y = 0.712

$\overline{V}$ = 9.683 ft^3/lbf

$$q = \left[0.525(0.712)(29)^2 \sqrt{\frac{28.9}{6(9.683)}}\right](9.683) = 2147\ ft^3/s$$

These corrected values of steam flow rate is plotted earlier on page 15. From this plot the intermediate values are interpolated.

TABLE-9
30 inch valve, Saturated Steam flow

Time s	Angle deg.	Full open flow ft^3/s	Percentage flow ft^3/s
1.0	90	2070	2070
1.5	78.75	2074*	1814.8
2.0	67.5	2082	1561.5
2.5	56.25	2097*	1310.6
3.0	45	2118.2	1059.1
3.5	33.75	2126*	797.3
4.0	22.50	2132	533.0
4.5	11.25	2139*	267.4
5.0	0.0	2147	0.0

From pages 21 & 22 and reference 1

* Interpolated from the graph on page 15.

The corrected values of Steam flow rate obtained for the 30 inch valve were used to arrrive at the proper flow rate for the 24 inch valve based upon the criterion of same velocities in both the valves. The results are presented below.

TABLE 10
25 inch valve, Saturated Steam flow

Time s	Angle deg.	Full open flow for 30" valve, ft^3/s	Full open flow for 24" valve, ft^3/s	Percentage flow, ft^3/s
1.0	90	2070	1289.6	1289.6
1.5	78.75	2074	1291	1130.5
2.0	67.5	2082	1297	972.8
2.5	56.25	2097	1306.4	816.5
3.0	45	2118.2	1319.6	659.8
3.5	33.75	2126	1324.4	496.7
4.0	22.50	2132	1328.2	332.1
4.5	11.25	2139	1332.54	166.6
5.0	0.0	2147	1337.5	0.0

From Page 23 — Shown below

Velocity in 30 inch VALVE $= \frac{Q_{30"}}{A_{30"}} = \frac{Q_{30"}}{4.631338}$ = same velocity in 24 inch valve

Full open flow in 24 inch valve $= \frac{Q_{30"}}{A_{30"}} (A_{24"}) = Q_{30"} \; (0.62297)$

When the valve shuts off completely the flow through the valve ceases and therefore the dynamic torque vanishes. In this position the differential pressure across the valve disc is the containment absolute pressure minus the atmospheric pressure. This is equal to the gage pressure inside the containment. Thus the necessary torque to completely close the valve and maintain it in the fully-shut condition against the existing differential pressure is due to the sum of the shaft bearing friction torque and the rubber seat friction torque called the seating torque.

The shaft bearing friction torque is presented as equation 2 earlier. The seating torque is given by

$$T_s = C_s D^2 \quad \text{(Ref.2)} \ldots\ldots\ldots\ldots (4)$$

Where

T_s = Seating or unseating torque (in-lb)

C_s = Coefficient of seating or unseating torque (Ref.5)

D = Valve part diameter (inch)

With all data available the necessary calculation is performed using equation (1) through (4). Dynamic torque is calculated for each angular position to determine its maximum value and at what angle it occurs. There are two valves (30 inch and 24 inch) and for each 9 sets of calculation has to be made. Furthermore two flowing media are considered, namely, air and satruated steam. Therefore altogether it requires 36 sets of calculation. For this repetitive type of work a computer program is written following the methodology described earlier in the analytical procedure Section. In order to validate

the computer program hand calculation of several test cases are performed in the beginning. Subsequently the computer results are presented including the input and output. Comparisions with the test cases show there is full agreement with the manual calculation thus verifying the validity of computer program.

SAMPLE CALCULATION

VALVE SIZE: 30 Inch

Medium: Air

Valve opening angle of 90 degree occurring at 1.0 second

Inlet pressure from pressure curve = 18.0 + 14.7 = 32.7 psia

Inlet temperature from temperature curve = 221 + 460 = 681 °R

Note that the higher pressure and temperature are used from the Drywell curves.

Density from the density curve for air or from steam table for Saturated Steam = 0.1295 Lbf/ft^3

Full open volume flow rate from flowrate curve = 1614.9 ft^3/s

Percentage flow at percentage opening = (1614.9)(1) = 1614.9 ft^3/s

Flow rate in SCFH $Q_s = (5.8136)10^6 \left[\frac{520(32.7)}{14.7(681)}\right] = 9.8749 \times 10^6$ ft^3/hr.

Valve coefficient $C_v = \frac{29.9D^2}{\sqrt{K_v}} = \frac{29.9(29.14)^2}{\sqrt{0.55}} = 34.2349 \times 10^3$ $K_v = 0.55$ (Ref.7)

Specific gravity $G = \frac{0.1295}{0.0766} = 1.691$ based on air wieght density at 60°F and 1 atm. pressure.

Downstream pressure $p_2 = \sqrt{32.7^2 - \left[\frac{(9.8749)10^6}{963(34.2349)10^3}\right]^2 (1.691)(681)} = 31.08$ psia

Therefore pressure drop $\Delta p = p_1 - p_2 = 1.62$ psi

Dynamic torque $T_D = C_T \Delta p D^3 = 11023$ in-Lb $C_T = .275$ (Ref. 7 elbow effect plus most adverse shaft orientation and disc rotation)

The shaft friction torque $T_b = \frac{\pi}{4}(29.14)^2\left[0.004(2.5/2)(1.62)\right]$

$= 5.402$ in-lb (NEGLIGIBLY SMALL)(1)

Therefore the net unbalanced torque is $T_N = T_D - T_b = 11017.6$ in-lb

This is a set of calculation for one valve angle.
Similar calcualations are performed for different angles and presented in subsequent pages.

(1) THE SHAFT FRICTION TORQUE IS NEGLIGIBLY SMALL. THEREFORE NO FURTHER CALCULATION OF THIS TORQUE WOULD BE MADE. SINCE THIS IS SUBTRACTED FROM THE DYNAMIC TORQUE TO OBTAIN THE NET TORQUE AT ANY ANGULAR POSITION THIS APPROACH IS CONSERVATIVE.

SAMPLE CALCULATION

VALVE SIZE: 30 Inch

Medium: Air

Valve opening angle of 78.75 degree occurring at 1.5 second

Inlet pressure from pressure curve = 19.2 + 14.7 = 33.9 psia

Inlet temperature from temperature curve = 234 + 460 = 694 °R

Note that the higher pressure and temperature are used from the Drywell curves.

Density from the density curve for air or from steam table for Saturated Steam = 0.1325 lbf/ft³

Full open volume flow rate from flowrate curve = 1627 ft³/s

Percentage flow at percentage opening = (1627)(0.875) = 1423.6 ft³/s

Flow rate in SCFH $Q_S = (5.1249)10^6 \left[\frac{520(33.9)}{14.7(694)}\right] = 8.8555 \times 10^6$ ft³/hr

Valve coefficient $C_V = \frac{29.9D^2}{\sqrt{K_V}} = \frac{29.9(29.14)^2}{\sqrt{0.70}} = 30.346 \times 10^3$ $K_V = 0.70$ (Ref. 7)

Specific gravity $G = \frac{0.1325}{0.0766} = 1.73$ based on air wieght density at 60°F and 1 atm. pressure.

Downstream pressure $p_2 = \sqrt{33.9^2 - \left[\frac{(8.8555)10^6}{963(30.346)10^3}\right]^2 (1.73)(694)} = 32.23$ psia

Therefore pressure drop $\Delta p = p_1 - p_2 = 1.667$ psi

Dynamic torque $T_D = C_T \Delta P D^3 = 23098$ in-lb $C_T = .56$ (Ref. 7 elbow effect plus most adverse shaft orientation and disc rotation)

RUN

VALVE 17:18 SUN 07 NOV 82 30 INCH VALVE, AIR FLOW

ENTER THE NUMBER OF DATA SETS
?9

FOR EACH DATA SET ENTER THE FOLLOWING DATA IN ITS
RESPECTIVE ORDER SEPERATED BY A COMMA OR A BLANK.

A) UPSTREAM PRESSURE IN PSIG
B) UPSTREAM TEMPERATURE IN DEG. F
C) DENSITY IN LB/FT**3
D) ACTUAL FLOW RATE IN FT**3/SEC
E) LOSS COEFFICIENT
F) TORQUE COEFFICIENT

ENTER DATA FOR SET NO. 1
?18 221 .1295 1614.9 .55 .275

ENTER DATA FOR SET NO. 2
?19.2 234 .1325 1423.6 .7 .56

ENTER DATA FOR SET NO. 3
?20.7 243 .1359 1234.8 1.1 .35

ENTER DATA FOR SET NO. 4
?22.3 249.5 .1405 1043.4 2.3 .175

ENTER DATA FOR SET NO. 5
?24 255 .146 843.6 5.2 .09

ENTER DATA FOR SET NO. 6
?25.4 259 .1515 637.5 14 .045

ENTER DATA FOR SET NO. 7
?26.7 262 .156 427.5 45 .02

ENTER DATA FOR SET NO. 8
?27.9 265 .1595 214.9 170 .01

ENTER DATA FOR SET NO. 9
?28.9 268 .1618 0 CLOSED .0

THE [illegible]PUT IS AS FOLLOWS:

SET NO.	P PSI	T DEG. F	RO LB/FT**3	QA FT**3/SEC	KV	CT
1	18.0	221.0	0.1295	1614.9	0.55	0.275
2	19.2	234.0	0.1325	1423.6	0.70	0.560
3	20.7	243.0	0.1359	1234.8	1.10	0.350
4	22.3	249.5	0.1405	1043.4	2.30	0.175
5	24.0	255.0	0.1460	843.6	5.20	0.090
6	25.4	259.0	0.1515	637.5	14.00	0.045
[illegible]	26.7	262.0	0.1560	427.5	45.00	0.020
8	27.9	265.0	0.1595	214.9	170.00	0.010
9	28.9	268.0	0.1618	0.0	CLOSED	0.0

DO YOU W ISH TO MAKE ANY CHANGES?
?NO

CALCULATION AT ANGLE = 90 DEG. OCCURING AT TIME = 1.0 SE

ABSOLUTE UPSTREAM PRESSURE P1 = 32.7 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 681.0 DEG. R

FLOW RATE IN SCFH = 9874936. FT**3/HR

VALVE COEFFICIENT CV = 34234.9

SPECIFIC GRAVITY G = 1.691

CALCULATED DOWNSTREAM PRESSURE P2 = 31.1 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 1.620 PSI

DYNAMIC TORQUE TD = 11020. LB-IN

CALCULATION AT ANGLE = 78.75 DEG. OCCURING AT TIME = 1.5 SE

ABSOLUTE UPSTREAM PRESSURE P1 = 33.9 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 694.0 DEG. R

FLOW RATE IN SCFH = 8855571. FT**3/HR

VALVE COEFFICIENT CV = 30346.0

SPECIFIC GRAVITY G = 1.730

CALCULATED DOWNSTREAM PRESSURE P2 = 32.2 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 1.667 PSI

DYNAMIC TORQUE TD = 23098. LB-IN

CALCULATION AT ANGLE = 67.5 DEG. OCCURING AT TIME = 2.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 35.4 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 703.0 DEG. R

FLOW RATE IN SCFH = 7918319. FT**3/HR

VALVE COEFFICIENT CV = 24207.7

SPECIFIC GRAVITY G = 1.774

CALCULATED DOWNSTREAM PRESSURE P2 = 33.3 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 2.094 PSI

DYNAMIC TORQUE TD = 18138. LB-IN

CALCULATION AT ANGLE = 56.25 DEG. OCCURING AT TIME = 2.5 SE

ABSOLUTE UPSTREAM PRESSURE P1 = 37.0 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 709.5 DEG. R

FLOW RATE IN SCFH = 6929288. FT**3/HR

VALVE COEFFICIENT CV = 16741.2

SPECIFIC GRAVITY G = 1.834

CALCULATED DOWNSTREAM PRESSURE P2 = 33.6 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 3.406 PSI

DYNAMIC TORQUE TD = 14747. LB-IN

CALCULATION AT ANGLE = 45 DEG. OCCURING AT TIME = 3.0 SE

ABSOLUTE UPSTREAM PRESSURE P1 = 38.7 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 715.0 DEG. R

FLOW RATE IN SCFH = 5814734. FT**3/HR

VALVE COEFFICIENT CV = 11133.9

SPECIFIC GRAVITY G = 1.906

CALCULATED DOWNSTREAM PRESSURE P2 = 33.1 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 5.581 PSI

DYNAMIC TORQUE TD = 12428. LB-IN

CALCULATION AT ANGLE = 33.75 DEG. OCCURING AT TIME = 3.5 SE

ABSOLUTE UPSTREAM PRESSURE P1 = 40.1 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 719.0 DEG. R

FLOW RATE IN SCFH = 4527766. FT**3/HR

VALVE COEFFICIENT CV = 6785.6

SPECIFIC GRAVITY G = 1.978

CALCULATED DOWNSTREAM PRESSURE P2 = 30.4 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 9.682 PSI

DYNAMIC TORQUE TD = 10780. LB-IN

CALCULATION AT ANGLE = 22.5 DEG. OCCURING AT TIME = 4.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 41.4 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 722.0 DEG. R

FLOW RATE IN SCFH = 3121673. FT**3/HR

VALVE COEFFICIENT CV = 3784.8

SPECIFIC GRAVITY G = 2.037

CALCULATED DOWNSTREAM PRESSURE P2 = 25.2 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 16.194 PSI

DYNAMIC TORQUE TD = 8014. LB-IN

CALCULATION AT ANGLE = 11.25 DEG. OCCURING AT TIME = 4.5 SE

ABSOLUTE UPSTREAM PRESSURE P1 = 42.6 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 725.0 DEG. R

FLOW RATE IN SCFH = 1608037. FT**3/HR

VALVE COEFFICIENT CV = 1947.3

SPECIFIC GRAVITY G = 2.082

CALCULATED DOWNSTREAM PRESSURE P2 = 26.5 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 16.054 PSI

DYNAMIC TORQUE TD = 3972. LB-IN

CALCULATION AT ANGLE = 0 DEG. OCCURING AT TIME = 5.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 43.6 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 728.0 DEG. R

FLOW RATE IN SCFH = 0. FT**3/HR

VALVE COEFFICIENT CV = 0.0

SPECIFIC GRAVITY G = 2.112

PRESSURE DROP ACCROSS THE VALVE DP = 0.000 PSI

DYNAMIC TORQUE TD = 0. LB-IN

SEE NEXT PAGE FOR SEATING TORQUE.

Valve in full closed position. Angle $\alpha = 0^{\circ}$

This occurs at 5.0 second

Upstream pressure = 28.9 + 14.7 = 43.6 psia

Downstream pressure = Atmospheric = 14.7 psia, valve fully shut downstream is exposed to atmosphere.

Differential pressure Δp = 43.6 - 14.7 = 28.9 psi

Flow rate is zero since the valve is fully closed. Therefore the dynamic torque is zero.

Friction torque at the shaft bearing is

$$T_b = \frac{\pi}{8} (D^2)(f_b\, d)\,\Delta p$$

$$= \frac{\pi}{8}(29.14)^2(0.004)(2.5)(28.9) \qquad \text{(Ref. 5)}$$

$$= 96.4 \quad \text{in-lb}$$

Valve seating torque due to rubber friction is

$$T_s = D^2 K$$

$$= (29.14)^2(26) = 22077.6 \text{ in-lb} \qquad \text{(Ref. 5)}$$

Net torque $T_N = T_b + T_s = 22174$ in-lb

NOTE THAT RUBBER FRICTION COEFFICIENT K WOULD BE LESS THAN 26 OBTAINED FROM REF. 5. THIS VALUE IS FOR A DIFFERENTIAL PRESSURE OF 45 PSI WHICH IS GREATER THAN THE PRESENT VALUE OF 28.9 PSI. THEREFORE THE VALUE OF T_S IS CONSERVATIVE.

SAMPLE CALCULATION

VALVE SIZE: 30 Inch

Medium: Saturated Steam

Valve opening angle of 78.75 degree occurring at 1.5 second

Inlet pressure from pressure curve = 19.2 + 14.7 = 33.9 psia

Inlet temperature from temperature curve = 234 + 460 = 694 °R

Note that the higher pressure and temperature are used from the Drywell curves.

Density from the density curve for air or from steam table for Saturated Steam = 0.0818 Lbf/ft^3

Full open volume flow rate from flowrate curve = 2074 ft^3/s

Percentage flow at percentage opening = (2074)(.875) = 1814.8 ft^3/s

Flow rate in SCFH $Q_S = (6.533)10^6 \left[\frac{520(33.9)}{14.7(694)}\right] = 11.289 \times 10^6$ ft^3/hr

Valve coefficient $C_V = \frac{29.9D^2}{\sqrt{K_v}} = \frac{29.9(29.14)^2}{\sqrt{0.70}} = 30.346 \times 10^3$ $K_v = 0.70$ (Ref.7)

Specific gravity $G = \frac{0.0818}{0.0766} = 1.068$ based on air wieght density at 60°F and 1 atm. pressure.

Downstream pressure $p_2 = \sqrt{33.9^2 - \left[\frac{(11.289)10^6}{963(30.346)10^3}\right]^2 (1.068)(694)} = 32.2275$ psia

Therefore pressure drop $\Delta p = p_1 - p_2 = 1.6725$ psi

Dynamic torque $T_D = C_T \Delta P D^3 = 23175$ in-Lb $C_T = .56$ (Ref. 7 elbow effect plus most adverse shaft orientation and disc rotation)

SAMPLE CALCULATION

VALVE SIZE: 30 Inch

Medium: Saturated Steam

Valve opening angle of 67.5 degree occurring at 2.0 second

Inlet pressure from pressure curve = 20.7 + 14.7 = 35.4 psia

Inlet temperature from temperature curve = 243 + 460 = 703 °R

Note that the higher pressure and temperature are used from the Drywell curves.

Density from the density curve for air or from steam table for Saturated Steam = 0.085 Lbf/ft^3

Full open volume flow rate from flowrate curve = 2082 ft^3/s

Percentage flow at percentage opening = (2082)(0.75) = 1561.5 ft^3/s

Flow rate in SCFH $Q_S = (5.621)10^6 \left[\frac{520(35.4)}{14.7(703)}\right] = 10.0133 \times 10^6$ ft^3/hr

Valve coefficient $C_V = \frac{29.9D^2}{\sqrt{K_V}} = \frac{29.9(29.14)^2}{\sqrt{1.1}} = 24.2077 \times 10^3$ $K_V = 1.1$ (Ref.7)

Specific gravity $G = \frac{0.085}{0.0766} = 1.11$ based on air wieght density at 60°F and 1 atm. pressure.

Downstream pressure $p_2 = \sqrt{35.4^2 - \left[\frac{(10.0133)10^6}{963(24.207)10^3}\right]^2 (1.11)(703)} = 33.31$ psia

Therefore pressure drop $\Delta p = p_1 - p_2 = 2.09$ psi

Dynamic torque $T_D = C_T \Delta P D^3 = 18100$ in-Lb $C_T = .35$ (Ref. 7 elbow effect plus most adverse shaft orientation and disc rotation)

RUN

VALVE 17:28 SUN 07 NOV 82 . 30 INCH VALVE

STEAM FLOW

ENTER THE NUMBER OF DATA SETS

FOR EACH DATA SET ENTER THE FOLLOWING DATA IN ITS RESPECTIVE ORDER SEPERATED BY A COMMA OR A BLANK.

A) UPSTREAM PRESSURE IN PSIG
B) UPSTREAM TEMPERATURE IN DEG. F
C) DENSITY IN LB/FT**3
D) ACTUAL FLOW RATE IN FT**3/SEC
E) LOSS COEFFICIENT
F) TORQUE COEFFICIENT

ENTER DATA FOR SET NO. 1
?18 221 .0789 2070 .55 .275

ENTER DATA FOR SET NO. 2
?19.2 234 .0818 1814.8 .7 .56

ENTER DATA FOR SET NO. 3
?20.7 243 .085 1561.5 1.1 .35

ENTER DATA FOR SET NO. 4
?22.3 249.5 .0886 1310.6 2.3 .175

ENTER DATA FOR SET NO. 5
?24 255 .0926 1059.1 5.2 .09

ENTER DATA FOR SET NO. 6
?25.4 259 .0953 797.3 14 .045

ENTER DATA FOR SET NO. 7
?26.7 262 .0984 533 45 .02

ENTER DATA FOR SET NO. 8
?27.9 265 .1009 267.4 170 .01

ENTER DATA FOR SET NO. 9
?28.9 268 .1033 0 CLOSED 0

INPUT IS AS FOLLOWS:

SET NO.	P PSI	T DEG. F	RO LB/FT**3	QA FT**3/SEC	KV	CT
1	18.0	221.0	0.0789	2070.0	0.55	0.275
2	19.2	234.0	0.0818	1814.8	0.70	0.560
3	20.7	243.0	0.0850	1561.5	1.10	0.350
4	22.3	249.5	0.0886	1310.6	2.30	0.175
5	24.0	255.0	0.0926	1059.1	5.20	0.090
6	25.4	259.0	0.0953	797.3	14.00	0.045
7	26.7	262.0	0.0984	533.0	45.00	0.020
8	27.9	265.0	0.1009	267.4	170.00	0.010
9	28.9	268.0	0.1033	0.0	CLOSED	0.0

DO YOU WISH TO MAKE ANY CHANGES?
?NO

CALCULATION AT ANGLE = 90 DEG. OCCURING AT TIME = 1.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 32.7 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 681.0 DEG. R

FLOW RATE IN SCFH = 12657823. FT**3/HR

VALVE COEFFICIENT CV = 34234.9

SPECIFIC GRAVITY G = 1.030

CALCULATED DOWNSTREAM PRESSURE P2 = 31.1 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 1.621 PSI

DYNAMIC TORQUE TD = 11032. LB-IN

CALCULATION AT ANGLE = 78.75 DEG. OCCURING AT TIME = 1.5 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 33.9 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 694.0 DEG. R

FLOW RATE IN SCFH = 11289048. FT**3/HR

VALVE COEFFICIENT CV = 30346.0

SPECIFIC GRAVITY G = 1.068

CALCULATED DOWNSTREAM PRESSURE P2 = 32.2 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 1.673 PSI

DYNAMIC TORQUE TD = 23175. LB-IN

CALCULATION AT ANGLE = 67.5 DEG. OCCURING AT TIME = 2.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 35.4 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 703.0 DEG. R

FLOW RATE IN SCFH = 10013326. FT**3/HR

VALVE COEFFICIENT CV = 24207.7

SPECIFIC GRAVITY G = 1.110

CALCULATED DOWNSTREAM PRESSURE P2 = 33.3 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 2.095 PSI

DYNAMIC TORQUE TD = 18142. LB-IN

CALCULATION AT ANGLE = 56.25 DEG. OCCURING AT TIME = 2.5 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 37.0 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 709.5 DEG. R

FLOW RATE IN SCFH = 8703782. FT**3/HR

VALVE COEFFICIENT CV = 16741.2

SPECIFIC GRAVITY G = 1.157

CALCULATED DOWNSTREAM PRESSURE P2 = 33.6 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 3.387 PSI

DYNAMIC TORQUE TD = 14668. LB-IN

CALCULATION AT ANGLE = 45 DEG. OCCURING AT TIME = 3.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 38.7 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 715.0 DEG. R

FLOW RATE IN SCFH = 7300124. FT**3/HR

VALVE COEFFICIENT CV = 11133.9

SPECIFIC GRAVITY G = 1.209

CALCULATED DOWNSTREAM PRESSURE P2 = 33.1 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 5.579 PSI

DYNAMIC TORQUE TD = 12424. LB-IN

CALCULATION AT ANGLE = 33.75 DEG. OCCURING AT TIME = 3.5 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 40.1 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 719.0 DEG. R

FLOW RATE IN SCFH = 5662727. FT**3/HR

VALVE COEFFICIENT CV = 6785.6

SPECIFIC GRAVITY G = 1.244

CALCULATED DOWNSTREAM PRESSURE P2 = 30.6 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 9.502 PSI

DYNAMIC TORQUE TD = 10580. LB-IN

CALCULATION AT ANGLE = 22.5 DEG. OCCURING AT TIME = 4.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 41.4 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 722.0 DEG. R

FLOW RATE IN SCFH = 3892051. FT**3/HR

VALVE COEFFICIENT CV = 3784.8

SPECIFIC GRAVITY G = 1.285

CALCULATED DOWNSTREAM PRESSURE P2 = 25.6 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 15.780 PSI

DYNAMIC TORQUE TD = 7809. LB-IN

CALCULATION AT ANGLE = 11.25 DEG. OCCURING AT TIME = 4.5 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 42.6 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 725.0 DEG. R

FLOW RATE IN SCFH = 2000880. FT**3/HR

VALVE COEFFICIENT CV = 1947.3

SPECIFIC GRAVITY G = 1.317

CALCULATED DOWNSTREAM PRESSURE P2 = 27.0 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 15.628 PSI

DYNAMIC TORQUE TD = 3867. LB-IN

CALCULATION AT ANGLE = 0.0 DEG. OCCURING AT TIME = 5.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 43.6 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 728.0 DEG. R

FLOW RATE IN SCFH = 0. FT**3/HR

VALVE COEFFICIENT CV = 0.0

SPECIFIC GRAVITY G = 1.349

PRESSURE DROP ACCROSS THE VALVE DP = 0.000 PSI

DYNAMIC TORQUE TD = 0. LB-IN

SEATING TORQUE IS SAME AS SHOWN IN PAGE 39

SAMPLE CALCULATION

VALVE SIZE: 24 Inch

Medium: AIR

Valve opening angle of 78.75 degree occurring at 1.5 second

Inlet pressure from pressure curve = 19.2 + 14.7 = 33.9 psia

Inlet temperature from temperature curve = 234 + 460 = 694 °R

Note that the higher pressure and temperature are used from the Drywell curves.

Density from the density curve for air or from steam table for Saturated Steam = 0.1325 lbf/ft^3

Full open volume flow rate from flowrate curve = 1028 ft^3/s

Percentage flow at percentage opening = (1028)(.875) = 899.5 ft^3/s

Flow rate in SCFH $Q_S = (3.238)10^6 \left[\frac{520(33.9)}{14.7(694)}\right] = 5.59538 \times 10^6$ ft^3/hr

Valve coefficient $C_V = \frac{29.9D^2}{\sqrt{K_V}} = \frac{29.9(23.0)^2}{\sqrt{0.70}} = 18.905 \times 10^3$ $K_V = 0.70$ (Ref.7)

Specific gravity $G = \frac{0.1325}{0.0766} = 1.73$ based on air wieght density at 60°F and 1 atm. pressure.

Downstream pressure $p_2 = \sqrt{33.9^2 - \left[\frac{(5.59538)10^6}{963(18.905)10^3}\right]^2 (1.73)(694)} = 32.184$ psia

Therefore pressure drop $\Delta p = p_1 - p_2 = 1.716$ psi

Dynamic torque $T_D = C_T \Delta P\ D^3 = 11692$ in-lb $C_T = .56$ (Ref. 7 elbow effect plus most adverse shaft orientation and disc rotation)

SAMPLE CALCULATION

VALVE SIZE: 24 Inch

Medium: AIR

Valve opening angle of 56.25 degree occurring at 2.5 second

Inlet pressure from pressure curve = 22.3 + 14.7 = 37 psia

Inlet temperature from temperature curve = 249.5 + 460 = 709.5 °R

Note that the higher pressure and temperature are used from the Drywell curves.

Density from the density curve for air or from steam table for Saturated Steam = 0.1405 Lbf/ft³

Full open volume flow rate from flowrate curve = 1052 ft³/s

Percentage flow at percentage opening = (1052)(0.625) = 657.5 ft³/s

Flow rate in SCFH $Q_s = (2.367)10^6 \left[\frac{520(37)}{14.7(709.5)}\right] = 4.3665 \times 10^6$ ft³/hr

Valve coefficient $C_v = \frac{29.9D^2}{\sqrt{K_v}} = \frac{29.9(23)^2}{\sqrt{2.3}} = 10.4295 \times 10^3$ $K_v = 2.3$ (Ref.7)

Specific gravity $G = \frac{0.1405}{0.0766} = 1.834$ based on air wieght density at 60°F and 1 atm. pressure.

Downstream pressure $p_2 = \sqrt{37^2 - \left[\frac{(4.3665)10^6}{963(10.4295)10^3}\right]^2 (1.834)(709.5)} = 33.512$ psia

Therefore pressure drop $\Delta p = p_1 - p_2 = 3.488$ psi

Dynamic torque $T_D = C_T \Delta p\, D^3 = 7427$ in-Lb C_T = .175 (Ref. 7 elbow effect plus most adverse shaft orientation and disc rotation)

RUN

55

.VALVE 17:39 SUN 07 NOV 82 24 INCH VALVE

AIR FLOW

ENTER THE NUMBER OF DATA SETS
?9

FOR EACH DATA SET ENTER THE FOLLOWING DATA IN ITS RESPECTIVE ORDER SEPERATED BY A COMMA OR A BLANK.

A) UPSTREAM PRESSURE IN PSIG
B) UPSTREAM TEMPERATURE IN DEG. F
C) DENSITY IN LB/FT**3
D) ACTUAL FLOW RATE IN FT**3/SEC
E) LOSS COEFFICIENT
F) TORQUE COEFFICIENT

```
ENTER DATA FOR SET NO.  1
?18    221   .1295   1015.6   .55   .275

ENTER DATA FOR SET NO.  2
?19.2   234   .1325   899.5   .7   .56

ENTER DATA FOR SET NO.  3
?20.7   243   .1359   776.6   1.1   .35

ENTER DATA FOR SET NO.  4
?22.3   249.5   .1405   657.5   2.3   .175

ENTER DATA FOR SET NO.  5
?24   255   .146   530.6   5.2   .09

ENTER DATA FOR SET NO.  6
?25.4   259   .1515   401.3   14   .045

ENTER DATA FOR SET NO.  7
?26.7   262   .156   268.9   45   .02

ENTER DATA FOR SET NO.  8
?27.9   265   .1595   135.6   170   .01

ENTER DATA FOR SET NO.  9
?28.9   268   .1618   0   CLOSED   0
```

E INPUT IS AS FOLLOWS:

SET NO.	P PSI	T DEG. F	RO LB/FT**3	QA FT**3/SEC	KV	CT
1	18.0	221.0	0.1295	1015.6	0.55	0.275
2	19.2	234.0	0.1325	899.5	0.70	0.560
3	20.7	243.0	0.1359	776.6	1.10	0.350
4	22.3	249.5	0.1405	657.5	2.30	0.175
5	24.0	255.0	0.1460	530.6	5.20	0.090
6	25.4	259.0	0.1515	401.3	14.00	0.045
7	26.7	262.0	0.1560	268.9	45.00	0.020
8	27.9	265.0	0.1595	135.6	170.00	0.010
9	28.9	268.0	0.1618	0.0	CLOSED	0.0

DO YOU WI ISH TO MAKE ANY CHANGES?
?NO

CALCULATION AT ANGLE = 90 DEG. OCCURING AT TIME = 1.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 32.7 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 681.0 DEG. R

FLOW RATE IN SCFH = 6210283. FT**3/HR

VALVE COEFFICIENT CV = 21327.8

SPECIFIC GRAVITY G = 1.691

CALCULATED DOWNSTREAM PRESSURE P2 = 31.0 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 1.651 PSI

DYNAMIC TORQUE TD = 5525. LB-IN

CALCULATION AT ANGLE = 78.75 DEG. OCCURING AT TIME = 1.5 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 33.9 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 694.0 DEG. R

FLOW RATE IN SCFH = 5595381. FT**3/HR

VALVE COEFFICIENT CV = 18905.0

SPECIFIC GRAVITY G = 1.730

CALCULATED DOWNSTREAM PRESSURE P2 = 32.2 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 1.716 PSI

DYNAMIC TORQUE TD = 11692. LB-IN

CALCULATION AT ANGLE = 67.5 DEG. OCCURING AT TIME = 2.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 35.4 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 703.0 DEG. R

FLOW RATE IN SCFH = 4980051. FT**3/HR

VALVE COEFFICIENT CV = 15081.0

SPECIFIC GRAVITY G = 1.774

CALCULATED DOWNSTREAM PRESSURE P2 = 33.3 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 2.136 PSI

DYNAMIC TORQUE TD = 9095. LB-IN

CALCULATION AT ANGLE = 56.25 DEG. OCCURING AT TIME = 2.5 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 37.0 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 709.5 DEG. R

FLOW RATE IN SCFH = 4366501. FT**3/HR

VALVE COEFFICIENT CV = 10429.5

SPECIFIC GRAVITY G = 1.834

CALCULATED DOWNSTREAM PRESSURE P2 = 33.5 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 3.488 PSI

DYNAMIC TORQUE TD = 7428. LB-IN

CALCULATION AT ANGLE = 45 DEG. OCCURING AT TIME = 3.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 38.7 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 715.0 DEG. R

FLOW RATE IN SCFH = 3657300. FT**3/HR

VALVE COEFFICIENT CV = 6936.3

SPECIFIC GRAVITY G = 1.906

CALCULATED DOWNSTREAM PRESSURE P2 = 33.0 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 5.698 PSI

DYNAMIC TORQUE TD = 6239. LB-IN

CALCULATION AT ANGLE = 33.75 DEG. OCCURING AT TIME = 3.5 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 40.1 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 719.0 DEG. R

FLOW RATE IN SCFH = 2850185. FT**3/HR

VALVE COEFFICIENT CV = 4227.3

SPECIFIC GRAVITY G = 1.978

CALCULATED DOWNSTREAM PRESSURE P2 = 30.2 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 9.918 PSI

DYNAMIC TORQUE TD = 5430. LB-IN

CALCULATION AT ANGLE = 22.5 DEG. OCCURING AT TIME = 4.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 41.4 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 722.0 DEG. R

FLOW RATE IN SCFH = 1963550. FT**3/HR

VALVE COEFFICIENT CV = 2357.9

SPECIFIC GRAVITY G = 2.037

CALCULATED DOWNSTREAM PRESSURE P2 = 24.8 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 16.613 PSI

DYNAMIC TORQUE TD = 4043. LB-IN

CALCULATION AT ANGLE = 11.25 DEG. OCCURING AT TIME = 4.5 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 42.6 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 725.0 DEG. R

FLOW RATE IN SCFH = 1014658. FT**3/HR

VALVE COEFFICIENT CV = 1213.1

SPECIFIC GRAVITY G = 2.082

CALCULATED DOWNSTREAM PRESSURE P2 = 26.0 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 16.601 PSI

DYNAMIC TORQUE TD = 2020. LB-IN

CALCULATION AT ANGLE = 0 . DEG. OCCURING AT TIME = 5.0 . SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 43.6 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 728.0 DEG. R

FLOW RATE IN SCFH = 0. FT**3/HR

VALVE COEFFICIENT CV = 0.0

SPECIFIC GRAVITY G = 2.112

PRESSURE DROP ACCROSS THE VALVE DP = 0.000 PSI

DYNAMIC TORQUE TD = 0. LB-IN

SEE NEXT PAGE FOR SEATING TORQUE.

Valve in full closed position. Angle $\alpha = 0^\circ$

This occurs at 5.0 second

Upstream pressure = 28.9 + 14.7 = 43.6 psia

Downstream pressure = Atmospheric = 14.7 psia, valve fully shut downstream is exposed to atmosphere.

Differential pressure Δp = 43.6 - 14.7 = 28.9 psi

Flow rate is zero since the valve is fully closed. Therefore the dynamic torque is zero.

Friction torque at the shaft bearing is

$$T_b = \frac{\pi}{8} (D^2)(f_b\, d)\,\Delta p$$

$$= \frac{\pi}{8}(23)^2(0.004)(2.25)(28.9) \quad \text{(Ref. 5)}$$

$$= 54 \quad \text{in-lb}$$

Valve seating torque due to rubber friction is

$$T_s = D^2 K$$

$$= (23)^2(26) \quad \text{(Ref. 5)}$$

Net torque $T_N = T_b + T_s$ = 13808 in-lb

SAMPLE CALCULATION

VALVE SIZE: 24 Inch

Medium: saturated Steam

Valve opening angle of 78.75 degree occurring at 1.5 second

Inlet pressure from pressure curve = 19.2 + 14.7 = 33.9 psia

Inlet temperature from temperature curve = 234 + 460 = 694 °R

Note that the higher pressure and temperature are used from the Drywell curves.

Density from the density curve for air or from steam table for Saturated Steam = 0.0818 Lbf/ft^3

Full open volume flow rate from flowrate curve = 1292 ft^3/s

Percentage flow at percentage opening = (1292)(.875) = 1130.5 ft^3/s

Flow rate in SCFH $Q_S = (4.0698)10^6 \left[\frac{520(33.9)}{14.7(694)}\right] = 7.0323 \times 10^6$ ft^3/hr

Valve coefficient $C_V = \frac{29.9 D^2}{\sqrt{K_v}} = \frac{29.9(23)^2}{\sqrt{0.70}} = 18.905 \times 10^3$ $K_v = 0.70$ (Ref.7)

Specific gravity $G = \frac{0.0818}{0.0766} = 1.0683$ based on air wieght density at 60°F and 1 atm. pressure.

Downstream pressure $p_2 = \sqrt{33.9^2 - \left[\frac{(7.0233)10^6}{963(18.905)10^3}\right]^2 (1.068)(694)} = 32.228$ psia

Therefore pressure drop $\Delta p = p_1 - p_2 = 1.672$ psi

Dynamic torque $T_D = C_T \Delta P\, D^3 = 11394$ in-Lb C_T = .56 (Ref. 7 elbow effect plus most adverse shaft orientation and disc rotation)

SAMPLE CALCULATION

VALVE SIZE: 24 Inch

Medium: Saturated steam

Valve opening angle of 22.5 degree occurring at 4 second

Inlet pressure from pressure curve = 26.7 + 14.7 = 41.4 psia

Inlet temperature from temperature curve = 262 + 460 = 722 °R

Note that the higher pressure and temperature are used from the Drywell curves.

Density from the density curve for air or from steam table for Saturated Steam = 0.0984 Lbf/ft^3

Full open volume flow rate from flowrate curve = 1328.2 ft^3/s

Percentage flow at percentage opening = (1328.2)(0.25) = 332.05 ft^3/s

Flow rate in SCFH $Q_S = (1.1954)10^6\left[\frac{520(41.4)}{14.7(722)}\right] = 2.4247\times10^6$ ft^3/hr

Valve coefficient $C_V = \frac{29.9D^2}{\sqrt{K_V}} = \frac{29.9(23)^2}{\sqrt{45}} = 2.3579\times10^3$ $K_V = 45$ (Ref.7)

Specific gravity $G = \frac{0.0984}{0.0766} = 1.2843$ based on air wieght density at 60°F and 1 atm. pressure.

Downstream pressure $p_2 = \sqrt{41.4^2 - \left[\frac{(2.4247)10^6}{963(2.3579)10^3}\right]^2(1.2843)(722)} = 25.62$ psia

Therefore pressure drop $\Delta p = p_1 - p_2 = 15.78$ psi

Dynamic torque $T_D = C_T \Delta P D^3 = 3840$ in-lb $C_T = .02$ (Ref. 7 elbow effect plus most adverse shaft orientation and disc rotation)

```
RUN

VALUE        17:54   SUN   07 NOV 82
```

24 INCH VALVE
STEAM FLOW

```
 ENTER THE NUMBER OF DATA SETS
?9

 FOR EACH DATA SET ENTER THE FOLLOWING DATA IN ITS
 RESPECTIVE ORDER SEPERATED BY A COMMA OR A BLANK.

      A)   UPSTREAM PRESSURE IN PSIG
      B)   UPSTREAM TEMPERATURE IN DEG. F
      C)   DENSITY IN LB/FT**3
      D)   ACTUAL FLOW RATE IN FT**3/SEC
      E)   LOSS COEFFICIENT
      F)   TORQUE COEFFICIENT


ENTER DATA FOR SET NO.  1
?18   221   .0789   1289.6   .55   .275

ENTER DATA FOR SET NO.  2
?19.2   234   .0818   1130.5   .7   .56

ENTER DATA FOR SET NO.  3
[illegible].7   243   .085   972.8   1.1   .35

ENTER DATA FOR SET NO.  4
?22.3   249.5   .0886   816.5   2.3   .175

ENTER DATA FOR SET NO.  5
?24   255   .0926   659.8   5.2   .09

ENTER DATA FOR SET NO.  6
?25.4   259   .0953   496.7   14   .045

ENTER DATA FOR SET NO.  7
?26.7   262   .0984   332.1   45   .02

ENTER DATA FOR SET NO.  8
?27.9   265   .1009   166.6   170   .01

ENTER DATA FOR SET NO.  9
?28.9   268   .1033   0              0
```

THE INPUT IS AS FOLLOWS:

SET NO.	P PSI	T DEG. F	RO LB/FT**3	QA FT**3/SEC	KV	CT
1	18.0	221.0	0.0789	1289.6	0.55	0.275
2	19.2	234.0	0.0818	1130.5	0.70	0.560
3	20.7	243.0	0.0850	972.8	1.10	0.350
4	22.3	249.5	0.0886	816.5	2.30	0.175
5	24.0	255.0	0.0926	659.8	5.20	0.090
6	25.4	259.0	0.0953	496.7	14.00	0.045
7	26.7	262.0	0.0984	332.1	45.00	0.020
8	27.9	265.0	0.1009	166.6	170.00	0.010
9	28.9	268.0	0.1033	0.0	CLOSED	0.0

DO YOU WISH TO MAKE ANY CHANGES?
?NO

CALCULATION AT ANGLE = 90 . DEG. OCCURING AT TIME = 1.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 32.7 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 681.0 DEG. R

FLOW RATE IN SCFH = 7885763. FT**3/HR

VALVE COEFFICIENT CV = 21327.8

SPECIFIC GRAVITY G = 1.030

CALCULATED DOWNSTREAM PRESSURE P2 = 31.1 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 1.621 PSI

DYNAMIC TORQUE TD = 5425. LB-IN

CALCULATION AT ANGLE = 78.75 DEG. OCCURING AT TIME = 1.5 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 33.9 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 694.0 DEG. R

FLOW RATE IN SCFH = 7032328. FT**3/HR

VALVE COEFFICIENT CV = 18905.0

SPECIFIC GRAVITY G = 1.068

CALCULATED DOWNSTREAM PRESSURE P2 = 32.2 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 1.672 PSI

DYNAMIC TORQUE TD = 11394. LB-IN

CALCULATION AT ANGLE = 67.5 DEG. OCCURING AT TIME = 2.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 35.4 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 703.0 DEG. R

FLOW RATE IN SCFH = 6238209. FT**3/HR

VALVE COEFFICIENT CV = 15081.0

SPECIFIC GRAVITY G = 1.110

CALCULATED DOWNSTREAM PRESSURE P2 = 33.3 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 2.095 PSI

DYNAMIC TORQUE TD = 8921. LB-IN

CALCULATION AT ANGLE = 56.25 DEG. OCCURING AT TIME = 2.5 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 37.0 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 709.5 DEG. R

FLOW RATE IN SCFH = 5422430. FT**3/HR

VALVE COEFFICIENT CV = 10429.5

SPECIFIC GRAVITY G = 1.157

CALCULATED DOWNSTREAM PRESSURE P2 = 33.6 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 3.388 PSI

DYNAMIC TORQUE TD = 7213. LB-IN

CALCULATION AT ANGLE = 45 DEG. OCCURING AT TIME = 3.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 38.7 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 715.0 DEG. R

FLOW RATE IN SCFH = 4547844. FT**3/HR

VALVE COEFFICIENT CV = 6936.3

SPECIFIC GRAVITY G = 1.209

CALCULATED DOWNSTREAM PRESSURE P2 = 33.1 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 5.579 PSI

DYNAMIC TORQUE TD = 6109. LB-IN

CALCULATION AT ANGLE = 33.75 DEG. OCCURING AT TIME = 3.5 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 40.1 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 719.0 DEG. R

FLOW RATE IN SCFH = 3527751. FT**3/HR

VALVE COEFFICIENT CV = 4227.3

SPECIFIC GRAVITY G = 1.244

CALCULATED DOWNSTREAM PRESSURE P2 = 30.6 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 9.502 PSI

DYNAMIC TORQUE TD = 5202. LB-IN

CALCULATION AT ANGLE = 22.50 DEG. OCCURING AT TIME = 4.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 41.4 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 722.0 DEG. R

FLOW RATE IN SCFH = 2425048. FT**3/HR

VALVE COEFFICIENT CV = 2357.9

SPECIFIC GRAVITY G = 1.285

CALCULATED DOWNSTREAM PRESSURE P2 = 25.6 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 15.787 PSI

DYNAMIC TORQUE TD = 3842. LB-IN

CALCULATION AT ANGLE = 11.25 DEG. OCCURING AT TIME = 4.5 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 42.6 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 725.0 DEG. R

FLOW RATE IN SCFH = 1246622. FT**3/HR

VALVE COEFFICIENT CV = 1213.1

SPECIFIC GRAVITY G = 1.317

CALCULATED DOWNSTREAM PRESSURE P2 = 27.0 PSI

PRESSURE DROP ACCROSS THE VALVE DP = 15.631 PSI

DYNAMIC TORQUE TD = 1902. LB-IN

CALCULATION AT ANGLE = 0 DEG. OCCURING AT TIME = 5.0 SEC

ABSOLUTE UPSTREAM PRESSURE P1 = 43.6 PSI

ABSOLUTE UPSTREAM TEMPERATURE T1 = 728.0 DEG. R

FLOW RATE IN SCFH = 0. FT**3/HR

VALVE COEFFICIENT CV = 0.0

SPECIFIC GRAVITY G = 1.349

PRESSURE DROP ACCROSS THE VALVE DP = 0.000 PSI

DYNAMIC TORQUE TD = 0. LB-IN

SEATING TORQUE IS SAME AS SHOWN ON PAGE 66.

APPENDIX

WPPSS

'WASHINGTON PUBLIC POWER SUPPLY SYSTEM

CALCULATION COVER SHEET

SHEET 1 OF 9

PROJECT	DISCIPLINE	CALC. NO.
WNP-2	MECH.	ME-02-82-08-0
CONTRACT	**SPECIFICATION**	**QUALITY CLASS**
	2808-68	I

TITLE

MASS FLOW RATES & VELOCITIES THROUGH CEP 30"
BUTTERFLY VALVES

ACTION REQUIRED

☐ SAR CHANGE ☐ SPEC. CHANGE ☒ OTHER (IDENTIFY)

VALUES TO BE USED BY VALVE VENDOR (BIF) IN CALCULATING VALVE CLOSING TORQUES NEEDED FOR VALVE QUALIFICATION

ATTACHMENTS

☐ COMPUTER PRINTOUT ☒ OTHER (IDENTIFY)

FSAR FIGURE 6.2-2
FSAR FIGURE 6.2-3

☐ PRELIMINARY ☒ FINAL

SUPERSEDED BY

SUPERSEDES

REV. NO.	REVISION DESCRIPTION	CALCULATION BY	DATE	REVIEWED	DATE	APPROVED	DATE
0	ORIGINAL	R L Heid	10/5/82	[signature]	10/5/82		

WP-603 R3

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

CALC. NO.

SHEET NO. 2 OF 9

PERFORMED BY	DATE
R. L. HEID	OCT. 1, 1982

ADDITIONAL INFORMATION IF REQUIRED

MASS FLOW RATES & VELOCITIES THROUGH CEP 30" BUTTERFLY VALVES

GIVEN: CONTAINMENT PRESSURES AND TEMPERATURES AT t = 1, 2, 3, 4, 5 AND 18 SEC. AFTER A LOCA AS FOLLOWS:

TIME (SEC.)	CONT PRESSURE PSIG	CONT PRESSURE PSIA	TEMP. °F	SP VOLUME FT³/LB AIR	SP VOLUME FT³/LB STM	
1	18	32.7	221	7.72	12.68	LOCA PRESSURES AND TEMPERATURES FROM REF. 5+6, RESPECTIVELY
2	20.7	35.4	243	7.36	11.49	
3	24	38.7	255	6.85	10.8	
4	26.7	41.4	262	6.41	10.4	
5	28.9	43.6	268	6.18	9.6	
18	34.7	49.4	278	5.53	8.6	

FIND: MASS FLOW RATES AND VELOCITIES FOR AIR AND SAT. STEAM FROM CONTAINMENT, AT THE PRESSURES AND TEMPERATURES LISTED ABOVE, TO THE ATMOSPHERE THROUGH THE 30" PIPING AND 34"x34" DUCT CEP SYSTEM AS SHOWN ON ISOMETRIC DWGS: CEP-625-5.8,-9,-10,-11.12, M-810 AND M-812.

REVIEWED INITIALS/DATE
[signature] 10/5/82

WP-810 R2

SYSTEM RESISTANCE COEFFICIENT (K) VALUES

PIPING K VALUES

K_P

ID = 29.0" = 2.42'
f = .011 [P.A-4, REF.1] $K = f\frac{L}{D} = .011 \times \frac{60.5}{2.42}$ = .28
L = 60.5 ft.

90° ELLS (2) K = .185 AT r/d = 1.5 [FIG. 3.2.1, P-15, REF.2] = .37

45° ELLS (1) K = .09 AT r/d = 1.5 [FIG 3.2.1, P-15, REF.2] = .09

VALVES (3) 30" BUTTERFLY VALVES K = .27 [REF.3] = .81

TEE'S 30 x 30

(1) FLOW THROUGH BRANCH TO RUN ; K_B = 1.2 [P.266, REF 4] = 1.75
K_R = .55

(1) FLOW FROM RUN TO BRANCH K = .9 x 1.45 [P.280, REF.4] = 1.3

ENTRANCE EFFECT (1) K = 0.5 [P.92, REF.4] = .5

TOTAL PIPING RESISTANCE 5.10

DUCT K VALUES (34 x 36 : ORDINARY GALVANIZED)

L = 54.75 ft

$R_H = \frac{34 \times 36}{2(34+36)} = 8.74"$ $D_H = 4 R_H = 34.97" = 2.91'$

e = .006 [P.63, REF 4] $e/D = \frac{.006}{34.97} = .0002$ (ASSUMING $R_e \geq 10^6$)

f = .013 [P.68, REF 4]

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DUCTING $K = f\frac{L}{D} = .013 \times \frac{54.75}{2.91} =$ .245

ELLS

45° (1) $K = A_1 \times B_1 \times C_1 = .6 \times .17 \times 1.0 =$ .102
[P.208, REF.4]

90° (2) $K = A_1 B_1 C_1 = 1.0 \times .15 \times 1.0 \times 2$ .30
[P.208, REF 4]

TEE (1)
BRANCH TO RUN $K_B = .50$, $K_R = -.25$ $K_T = K_B + K_R =$ .25
[P. 278, 279, REF 4]

EXIT LOSS $K = 1.0$ [P.416, REF.4] 1.0

K_D = TOTAL DUCT RESISTANCE 1.90

34.97" DUCT LOSS IN TERMS OF 29.0" PIPE

$$K_{29} = K_{34.97}\left(\frac{D_{29}}{D_{34.97}}\right)^4 = 1.9\left(\frac{29}{34.97}\right) = 0.9 \qquad K_D = 0.9$$

[P.3-4, REF. 1]

TOTAL CEP PIPING RESISTANCE FROM PENETRATION X-3

TO EXHAUST PLENUM

$$K_T = K_P + K_D = 5.10 + .9 = \underline{6.0}$$

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[signature] 10/8/82

MASS FLOW RATE AND VELOCITIES (100% AIR)

AT 1 SEC.

$w = 0.525\, Y d_1^2 \sqrt{\frac{\Delta P}{K \bar{V}}}$ [P. 3-4, REF. 1]

$= .525 \times .76 \times 29^2 \sqrt{\frac{18}{6.0 \times 7.72}}$

$\therefore w =$ 209.2 LB/SEC

$Q = 209.2 \times 7.72 =$ 1614.9 ft³/SEC

d = 29 IN.
ΔP = 18.0 PSI
$\bar{V}$ = 7.72 ft³/LB
K = 6.0
P' = 32.7 PSIA
$\Delta P/P$ = .55
Y = .76 [P. A-22, REF. 1]
A = 4.587 ft²

VELOCITY

$V = Q/A = 1548 \frac{ft^3}{SEC} \times \frac{1}{4.587} =$ 352 FPS

AT 2 SEC. (100% AIR)

$w = .525 \times .74 \times 841 \sqrt{\frac{20.7}{6.0 \times 7.36}}$

$w =$ 223.7 LB/SEC

$Q = 223.7 \times 7.36 =$ 1646.4 ft³/SEC

$V = \frac{1646.4}{4.587} =$ 358.9 FPS

ΔP = 20.7 PSI
P_1 = 35.4 PSIA
$\Delta P/P_1$ = .596
Y = .74
K = 6.53
$\bar{V}$ = 7.36 ft³/LB

AT 3 SEC. (100% AIR)

$w = .525 \times .73 \times 841 \sqrt{\frac{24}{6.53 \times 6.85}}$

$w =$ 246.3 LB/SEC

$Q = 246.3 \times 6.85 =$ 1687.2 ft³/SEC

$V = \frac{1687.2}{4.587} =$ 367.8 FPS

ΔP = 24 PSI
P_1 = 38.7 PSIA
$\Delta P/P_1$ = .62
Y = .73
K = 6.0
$\bar{V}$ = 6.85 ft³/LB
A = 4.587 ft²

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[signature] 10/8/82

At 4 Sec (100% Air)

$\omega = .525 \times .725 \times 841 \sqrt{\frac{26.7}{6.0 \times 6.41}}$

$\omega = \underline{266.8 \text{ LB/SEC}}$

$g = 266.8 \times 6.41 = \underline{1709.9 \text{ ft}^3/\text{sec}}$

$V = \frac{1709.9}{4.587} = \underline{372.8 \text{ fps}}$

$\Delta P = 26.7$ PSI
$P_1 = 41.4$ PSIA
$\Delta P/P = .64$
$Y = .725$
$K = 6.0$
$\bar{V} = 6.41 \text{ ft}^3/\text{LB}$
$A = 4.587 \text{ ft}^2$

At 5 Sec, (100% Air)

$\omega = .525 \times .72 \times 841 \sqrt{\frac{28.9}{6.0 \times 6.18}}$

$\omega = \underline{280.6 \text{ LB/SEC}}$

$g = 280.6 \times 6.18 = \underline{1734.3 \text{ ft}^3/\text{sec}}$

$V = \frac{1734.3}{4.587} = \underline{378.1 \text{ fps}}$

$\Delta P = 28.9$ PSI
$P_1 = 43.6$ PSIA
$\Delta P/P = .66$
$K = 6.0$
$Y = .72$
$V = 6.18 \text{ ft}^3/\text{LB}$
$A = 4.587 \text{ ft}^2$

At 18 Sec. (100% Air), P_1, T Max.

$\omega = .525 \times .69 \times 841 \sqrt{\frac{34.7}{6.0 \times 5.53}}$

$\omega = \underline{311.5 \text{ LB/SEC}}$

$g = 311.5 \times 5.53 = \underline{1722.6 \text{ ft}^3/\text{sec}}$

$V = \frac{1722.6}{4.587} = \underline{375.5 \text{ fps}}$

$\Delta P = 34.7$ PSI
$P_1 = 49.4$ PSIA
$\Delta P/P = .70$
$Y = .69$
$V = 5.53 \text{ ft}^3/\text{LB}$
$A = 4.587 \text{ ft}^2$
$K = 6.0$

CHECKED INITIALS/DATE
[signature] 10/8/82

Mass Flow Rates And Velocities (Sat. Steam)

At 1 Sec.

$\omega = 0.525 \, Y d_1^2 \sqrt{\frac{\Delta P}{K \bar{V}}}$ [P.3-4, Ref. 1]

$= .525 \times .77 \times 29^2 \sqrt{\frac{18}{6.0 \times 12.68}}$

$\omega = \underline{165.4 \text{ LB/SEC}}$

$Q = 165.4 \frac{LB}{SEC} \times 12.68 \frac{ft^3}{LB} = \underline{2097.3 \, ft^3/SEC}$

$V_{EL.} = Q/A = 2097.3 \frac{ft^3}{SE} \times \frac{1}{4.587} = \underline{457.2 \text{ FPS}}$

$d_1 = 29$ IN
$\Delta P = 18$ PSI
$P_1 = 32.7$ PSIA
$\Delta P/P = .55$
$Y = .77$
$K = 6.0$
$\bar{V} = 12.68 \, ft^3/LB$
$A = 4.587 \, ft^2$

At 2 Sec. (Sat Stm)

$\omega = .525 \times .74 \times 841 \sqrt{\frac{20.7}{6.0 \times 11.8}}$

$\omega = \underline{176.2 \text{ LB/SEC}}$

$Q = 176.2 \times 11.8 = \underline{2079.2 \, ft^3/SEC}$

$V = \frac{2079.2}{4.587} = \underline{453.3 \text{ FPS}}$

$\Delta P = 20.7$ PSI
$P' = 35.4$ PSIA
$\Delta P/P = .58$
$K = 6.0$
$Y = .74$
$\bar{V} = 11.8 \, ft^3/LB$
$A = 4.587 \, ft^2$

At 3 Sec. (Sat. Stm.)

$\omega = .525 \times .73 \times 841 \sqrt{\frac{24}{6.0 \times 10.8}}$

$\omega = \underline{196.2 \text{ LB/SEC}}$

$Q = 196.2 \times 10.8 = \underline{2118.2 \, ft^3/LB}$

$V = \frac{2118.2}{4.587} = \underline{461.8 \text{ FPS}}$

$\Delta P = 24$ PSI
$P = 38.7$ PSIA
$\Delta P/P = .62$
$K = 6.0$
$Y = .73$
$\bar{V} = 10.8 \, ft^3/LB$
$A = 4.587 \, ft^2$

CHECKED INITIALS/DATE
[signature] 11/5/82

At 4 Sec. (Sat. Stm.)

$\omega = .525 \times .725 \times 841 \sqrt{\frac{26.7}{6.0 \times 10.4}}$

ω = 209.4 LB/SEC

$\dot{\gamma}$ = 209.4 × 10.4 = 2177.5 ft³/SEC

$V = \frac{2177.5}{4.587}$ = 474.7 FPS

ΔP = 26.7 PSI
P' = 41.4 PSIA
K = 6.53
ΔP/P = .645
Y = .725
$\bar{V}$ = 10.4 ft³/LB
A = 4.587 ft²

At 5 Sec.

$\omega = .525 \times .72 \times 841 \sqrt{\frac{28.9}{6.0 \times 9.6}}$

ω = 225.2 LB/SEC

$\dot{\gamma}$ = 225.2 × 9.6 = 2161.7 ft³/SEC.

$V = \frac{2161.7}{4.587}$ = 471.3 FPS

ΔP = 28.9 PSI
P' = 43.6 PSIA
ΔP/P = .66
K = 6.0
Y = .72
$\bar{V}$ = 9.6 ft³/LB
A = 4.587 ft²

At 18 Sec. (Max. LOCA P, T)

$\omega = .525 \times .70 \times 841 \sqrt{\frac{34.7}{6.0 \times 8.6}}$

ω = 253.4 LB/SEC

$\dot{\gamma}$ = 253.4 × 8.6 = 2179.6 ft³/SEC

$V = \frac{2179.6}{4.587}$ = 475.2 FPS

ΔP = 34.7 PSI
P' = 49.4 PSIA
ΔP/P = .7
K = 6.0
Y = .70
$\bar{V}$ = 8.6 ft³/LB
A = 4.587 ft²

CHECKED INITIALS/DATE
[initials] 10/5/82

TABULATED RESULTS

TIME (SEC.)	AIR				STEAM		
	FLOW RATE		VELOCITY		FLOW RATE		VELOCITY
	LB/SEC	ft^3/SEC	FPS		LB/SEC	ft^3/SEC	FPS
1	209.2	1614.9	352		165.4	2097.3	457.2
2	223.7	1646.4	358.9		176.7	2079.2	453.3
3	246.3	1687.2	367.8		196.2	2118.2	461.8
4	266.8	1709.9	372.8		209.4	2177.5	474.7
5	280.6	1734.3	378.1		225.2	2161.7	471.3
18	311.5	1722.6	375.5		253.4	2179.6	475.2

REFERENCES

1. CRANE TECHNICAL PAPER NO. 410

2. INTERNAL FLOW, D.S. MILLER

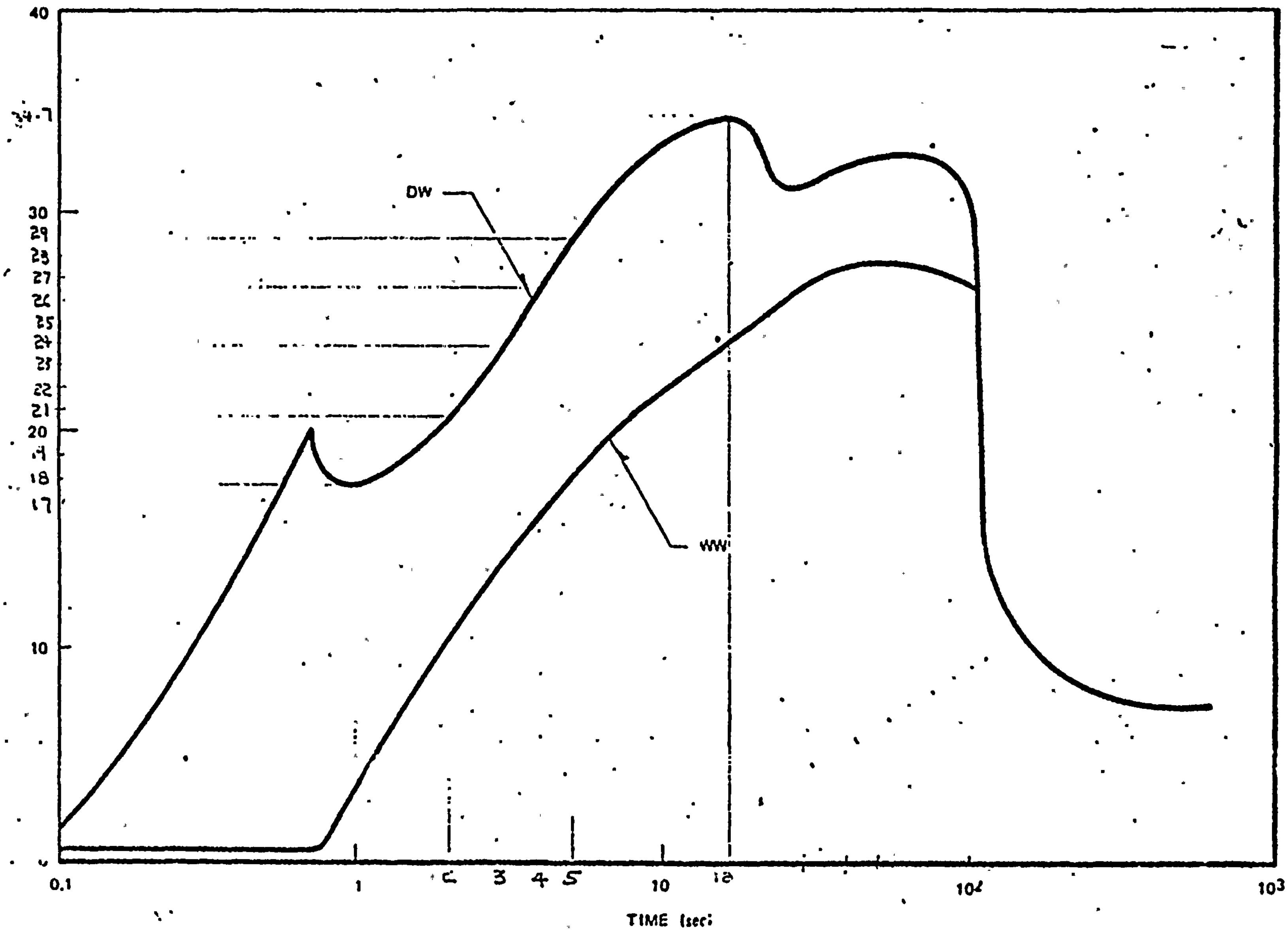
3. BIF VALVE DATA SHEET # D-207110-F

4. HANDBOOK OF HYD. RESISTANCE, COEFFICIENTS OF LOCAL RESISTANCES AND OF FRICTION, I.E. IDEL'CHICK, 1960

5. PRESSURE RESPONSE FOR RECIRCULATION LINE BREAK WNP-2 FSAR, FIG. 6.2-2

6. TEMPERATURE RESPONSE FOR RECIRCULATION LINE BREAK. WNP-2 FSAR, FIG. 6.2-[illegible]

CHECKED INITIALS/DATE
[illegible] 10/8/82



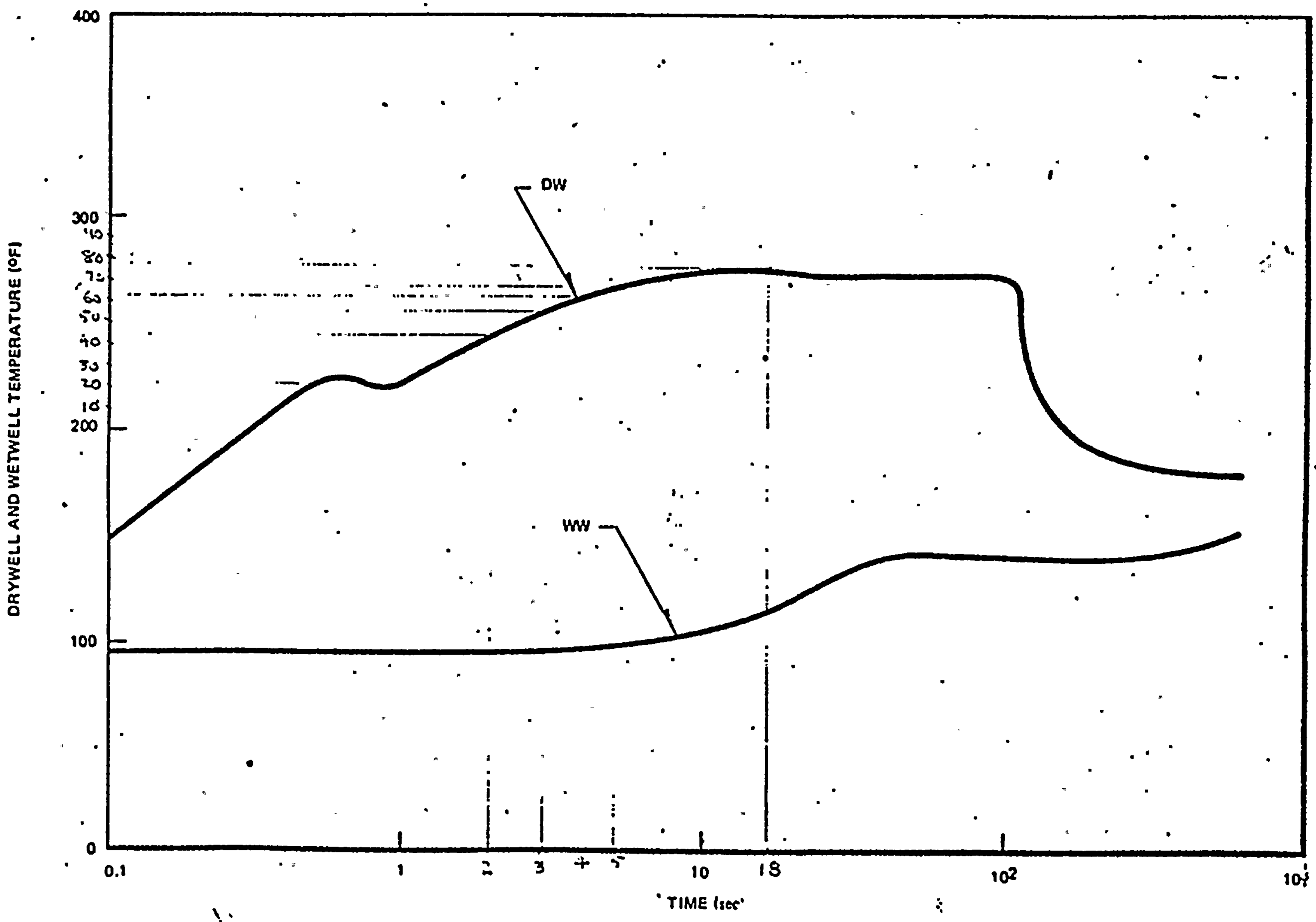
WASHINGTON PUBLIC POWER SUPPLY SYSTEM
NUCLEAR PROJECT NO. 2

PRESSURE RESPONSE FOR RECIRCULATION LINE BREAK

FIGURE 6.2-2

ATTACHMENT #1

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
NUCLEAR PROJECT NO. 2



TEMPERATURE RESPONSE FOR RECIRCULATION LINE BREAK

FIGURE 6.2-3

Washington Public Power Supply System

P.O. Box 968 3000 George Washington Way Richland, Washington 99352 (509) 372-5000

October 22, 1982
SE-02-RWH-82-012

BIF Industries
1600 Division Road
Warwick, RI 02893

Attention: J. McDonald

Subject: NUCLEAR PROJECT 2
CONFIRMATION OF INFORMATION

This letter confirms the following information transmitted by R. W. Hickman to Rick Ricapato on October 19, 1982 by telephone.

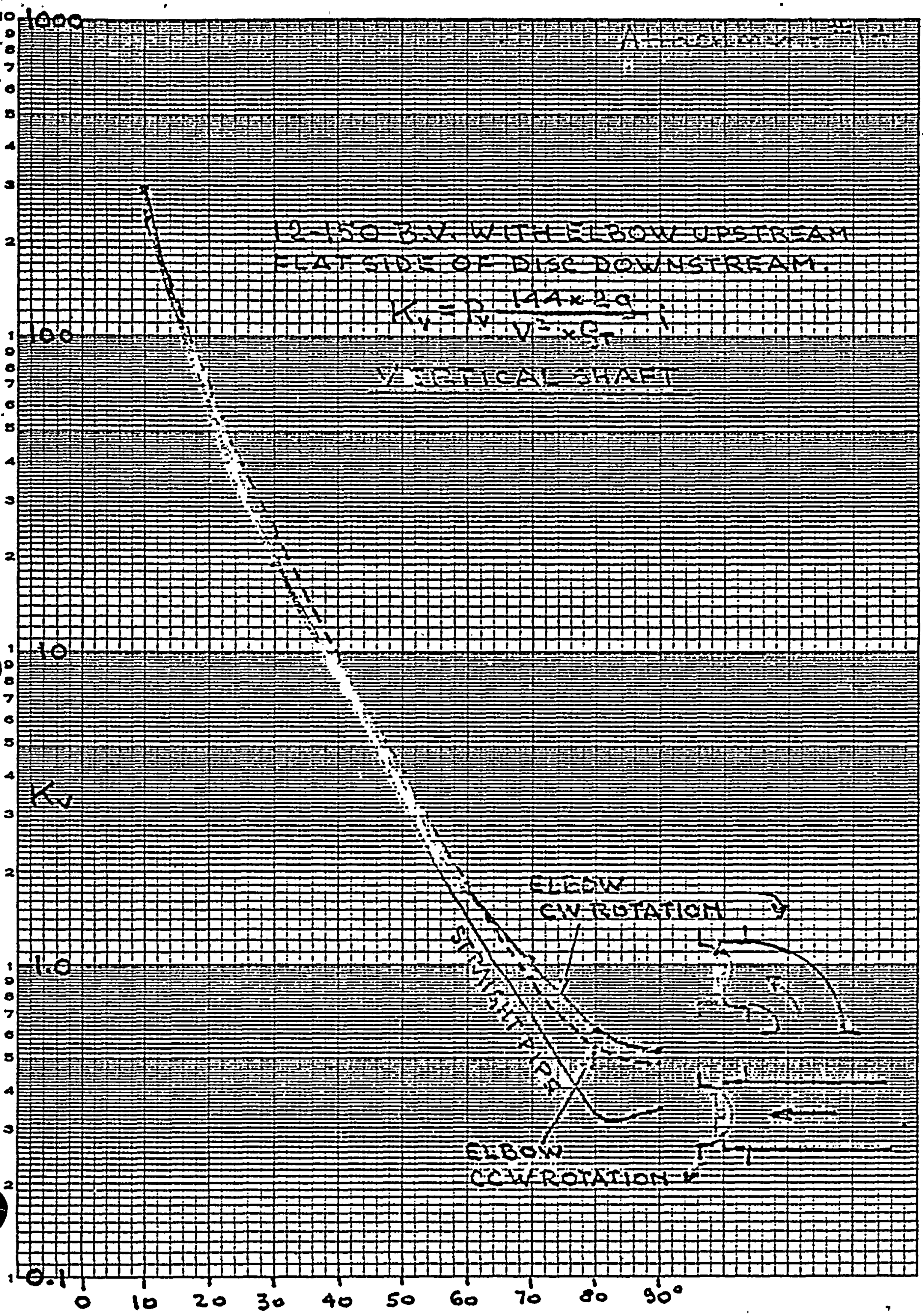
1. The purge and vent valves which BIF is analyzing for closing torque will receive the signal to begin closing prior to one (1) second after a LOCA.

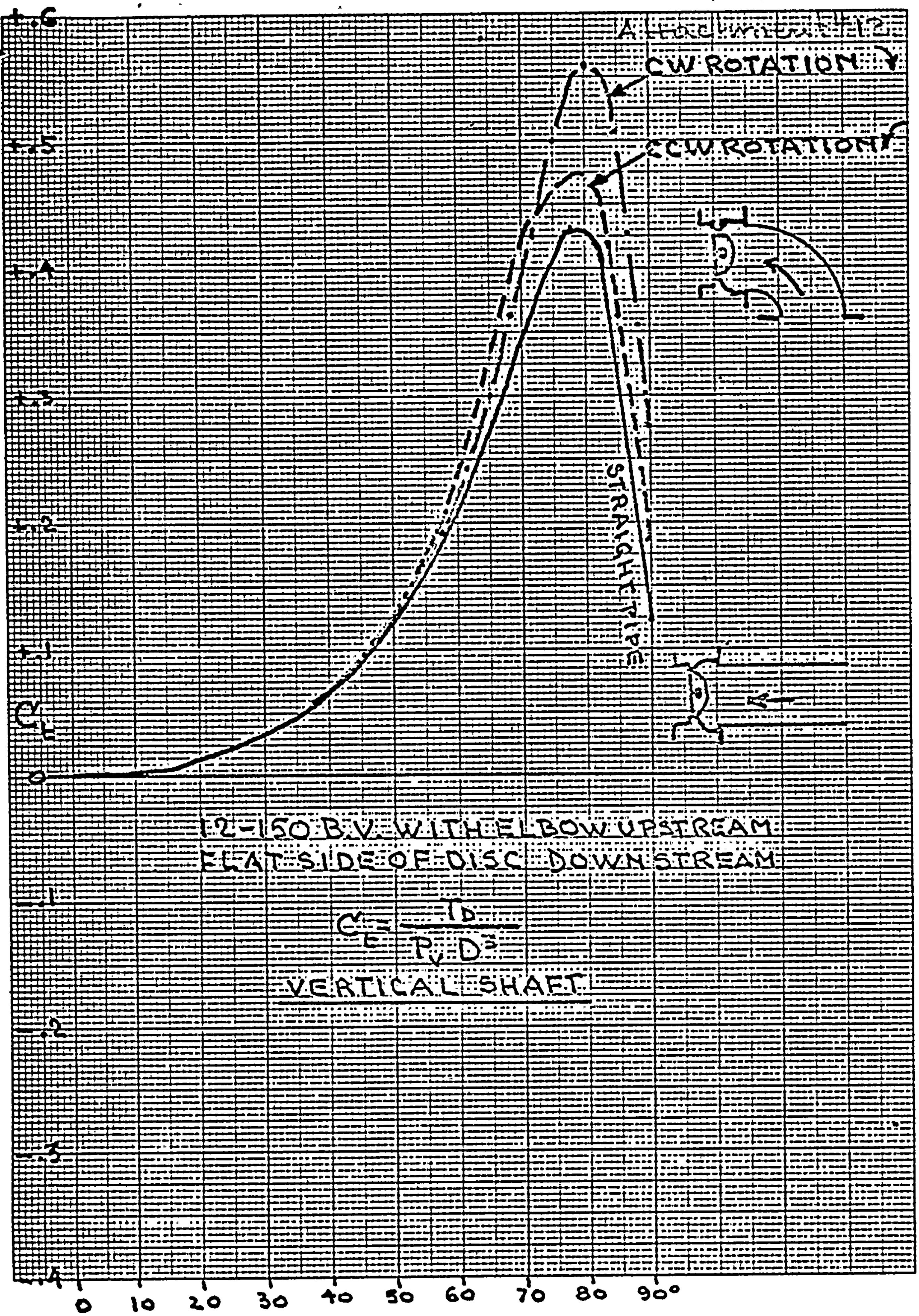
2. For the analysis of the 24-inch valve, use the same velocities which were established in WPPSS Calculation ME-02-82-08-0 which were transmitted on October 9, 1982 by TWX.

Please do everything within your power to see that the November 10, 1982 completion date which Mr. Ricapato gave Mr. Hickman is met. We are committed to have the results for the NRC by October 15, 1982.

R. A. Holmberg / SO6D
Manager, WNP-2 Engineering

RWH/sms


12-150 B.V. WITH ELBOW UPSTREAM
FLAT SIDE OF DISC DOWNSTREAM.
K_V = P_V 144 x 2g / V^2 x ρ
VERTICAL SHAFT
Kv
ELBOW
CW ROTATION
STRAIGHT PIPE
ELBOW
CCW ROTATION
1000
100
10
1.0
0.1
0
10
20
30
40
50
60
70
80
90°
SEMI-LOGARITHMIC
4 CYCLES X 10 DIVISIONS PER INCH
EUGENE DIETZGEN CO.
MADE IN U.S.A.


Attachment 12
CW ROTATION
CCW ROTATION
STRAIGHT PIPE
+.6
+.5
+.4
+.3
+.2
+.1
0
-.1
-.2
-.3
-.4
C_t
12-150 B.V. WITH ELBOW UPSTREAM
FLAT SIDE OF DISC DOWNSTREAM
$C_t = \frac{T_D}{P_v D^3}$
VERTICAL SHAFT
0
10
20
30
40
50
60
70
80
90°