50-447

GENERAL ELECTRIC

NUCLEAR POWER

SYSTEMS DIVISION

GENERAL ELECTRIC COMPANY, 175 CURTNER AVE., SAN JOSE, CALIFORNIA 95125
M/C 682 Ext. (408) 925-5039

MFN 170-81
JNF 24-81

September 18, 1981

RECEIVED SEP 22 1981 U.S. NUCLEAR REGULATORY COMMISSION

U.S. Nuclear Regulatory Commission
Division of Systems Integration
Office of Nuclear Reactor Regulation
Washington, D.C. 20555

Attention: Mr. Nelson Su
Containment Systems Branch

Gentlemen:

SUBJECT: SRV POOL DYNAMIC LOADS

Enclosed are GE's responses to the NRC questions on the SRV Pool dynamic loads in Mr. Kniel's May 21, 1981 letter. These responses will be used as the basis for the pending GESSAR II amendment. Only minor editorial changes are expected; however, there will be no technical differences between these responses and the formal responses in the amendment.

J. N. Fox

J.N. Fox
BWR Standardization
Nuclear Safety & Licensing Operation

cc: G.G. Sherwood (w/o enclosure)
W.M. Davis "
D.S. Braden "
H.C. Pfefferlen "

E003
s
1/1
ADD:
Nelson Su

8109220347 810918
PDR ADOCK 05000447
A PDR

3BO.3.3.1 QUESTION/RESPONSE 3BA.1

QUESTION 3BA.1

The strategy outlined in GESSAR II (Section 3BA.12.5) for the calculation of the maximum positive pressure (MPP) design value does not provide sufficient justification or documentation in support of the multiplication factor (FACT) for load amplitude (see Equation 3BA-14). The methodology is shown in Figure 38A-58 to overpredict the first actuation and subsequent action MPP values and thus it is asserted that a multiplication factor is warranted. However, this is probably a consequence of the additional conservatism associated with large air volumes as discussed in GESSAR II and not necessarily a constant conservative factor for all plant conditions.

To illustrate this factor, consider the shape of the air volume term of the prediction equation as given in Figure 3BA-65 of GESSAR II. The Caorso air volume/quencher area value (VAAQ), as given in Appendix C of Reference 1, is sufficiently large to place it is the plateau region where a constant value is used for the VAAQ term of the prediction equation. The constant value is used to conservatively bound the VAAQ contribution to the maximum positive pressure in a region where it is known to decrease asymptotically toward zero. Since the VAAQ term contributes approximately 37% to the magnitude of MPP at Caorso plant conditions, we believe that this conservatism is primarily responsible for the high Caorso prediction values.

However, the standard Mark III 238 plant VAAQ value places it in the ramp portion of the curve where the highest values of positive pressure were observed. As a consequence, no conservatism of the type discussed above is anticipated and therefore the use of a multiplication factor appears not to be justified. In order to continue our review of the quencher methodology, the following items are requested:

Question 3BA.1(A)

Provide any additional justification for the use of the multiplication factor for Mark III plants.

---

1. "Caorso SRV Discharge Tests Phase I Test Report", NEDE-25100-P, May 1979.

RESPONSE TO 3BA.1(A)

The justification for the use of the multiplication factor for the Mark III Standard Plant is provided with the comparisons of the Caorso test data to the GESSAR II safety/relief valve (SRV) load definition. The applicable Caorso test data used in this comparison includes both phase I and phase II tests of valves A, E, and U. The measured maximum and minimum (negative) pressure amplitudes of these tests were taken from the recordings of pressure sensors P19, P13, P15, P50, P51, and P57.

The maximum and minimum pressure values of each Caorso measurement were adjusted to the Mark III Standard Plant conditions. The test parameters adjusted were steam flow rate, pool temperature, valve opening time, water leg, and SRV discharge line air volume. All parameters were adjusted with the relationships presented in Table 3BA-21 except for air volume. The least square best fit shown in Figure 3BA.1(A)-1 was used for the air volume adjustment of 1.6 psid for first actuation and 2.8 psid for subsequent actuations. The relationship used to adjust the Caorso pressure data to the Mark III design condition is as follows:

$$P_{adjusted} = P_{\substack{measured\\Caorso}} + \left[P_{\substack{Std\ plant\\prediction}} - P_{\substack{Caorso\\prediction}} + P_{\substack{modified\\air\ volume\\effect}} \right] \text{---(1)}$$

or using the GESSAR II nomenclature:[1]

$$PPAC = PPMC + \left(PRED_{Std\ plant} - PRED_{Caorso} + PVAAQ \right) \text{-----(2)}$$

where

$$PRED = PRD1_{SVA} \quad \text{(for first actuations)}$$
$$= 1.744 \times PRD1_{CVA} \quad \text{(for subsequent actuations)}$$

$$PRD1_{CVA} = PRD1_{SVA} + 0.1377\ (LNTW_{CVA} - LNTW_{SVA})$$

$$PVAAQ = 1.6 \text{ psid} \quad \text{(for first actuations)}$$
$$= 1.744 \times 1.6 \text{ psid} = 2.8 \text{ psid} \quad \text{(for subsequent actuations)}$$

Note 1: See nomenclature at end of response.

RESPONSE TO 3BA.1(A) - Continued

Figure 3BA.1(A)-2 presents a comparison of the adjusted Caorso maximum positive pressure for valves A, E, and U versus the GESSAR II design values. This figure demonstrates the conservatism in the current GESSAR II design value which bounds both the maximum positive pressure and the 95-95 limit of the adjusted Caorso data for both first and subsequent actuations. Figures 3BA.1(A)-3 and 3BA.1(A)-4 demonstrate the additional margin in the GESSAR II design values of approximately 50% for first actuations and 40% for subsequent actuations considering the Caorso data for values A, E, and U.

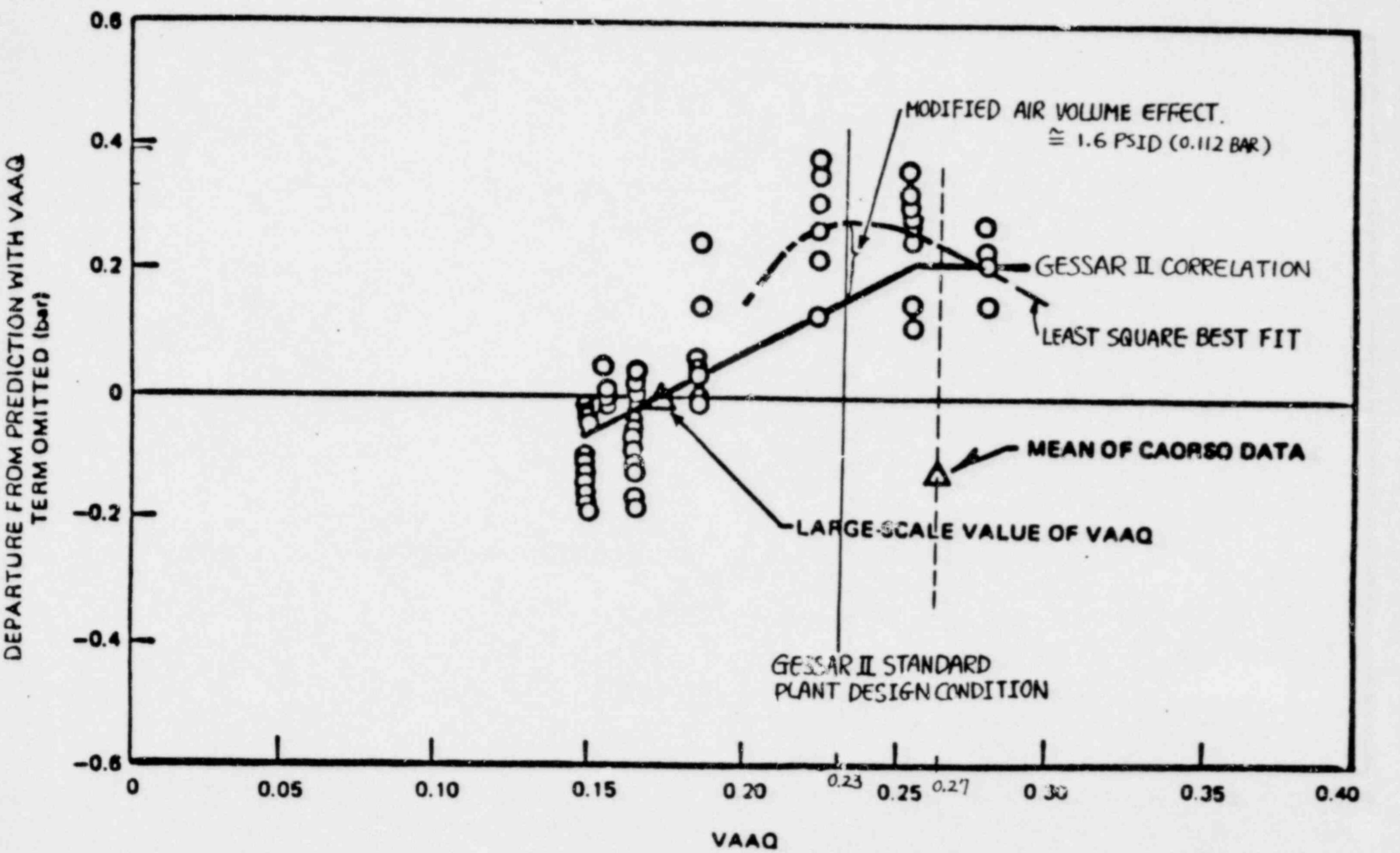


Figure 3BA.1(A)-1 **Shell Residual (VAAQ Omitted) and Effect of VAAQ Term on Prediction**

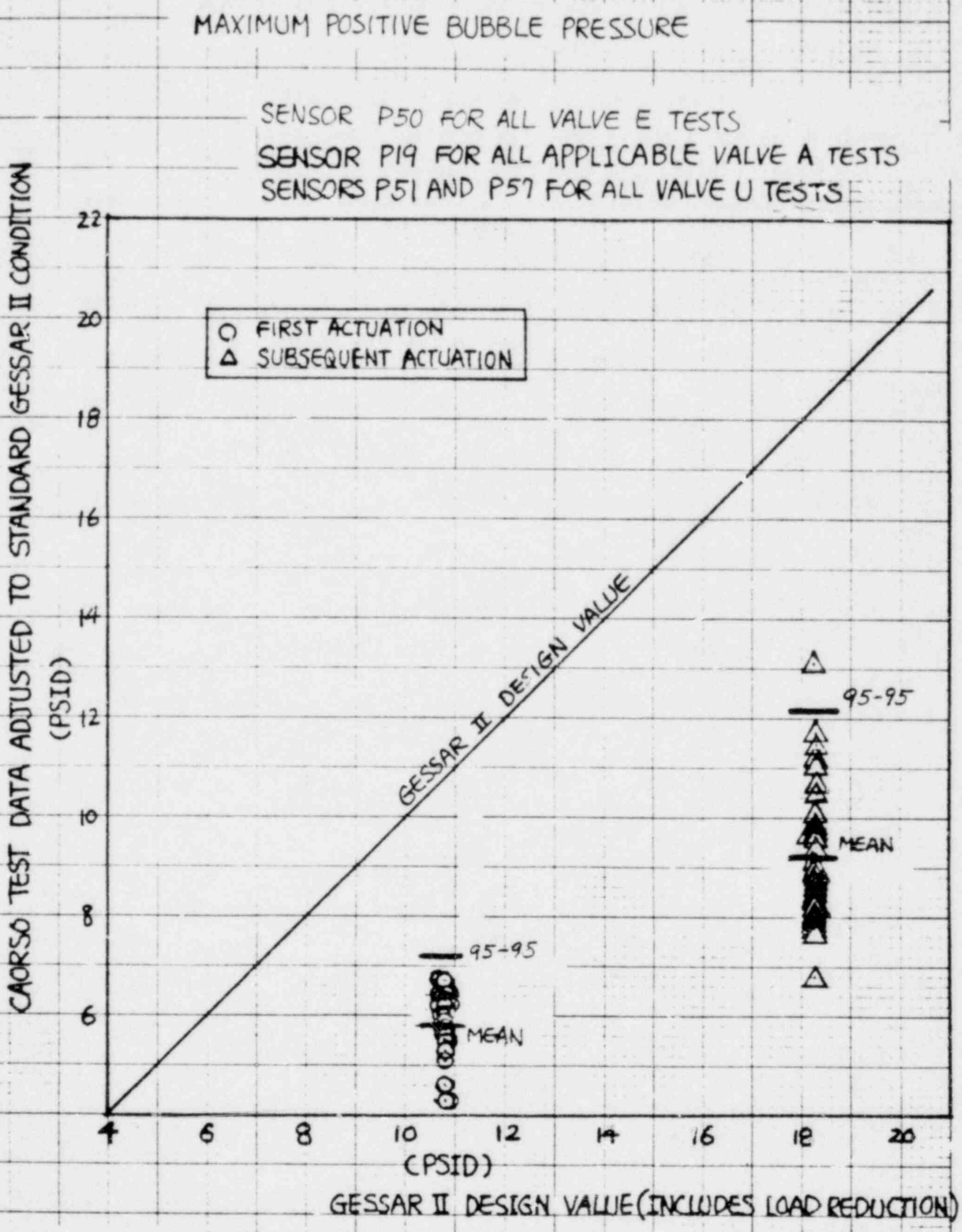
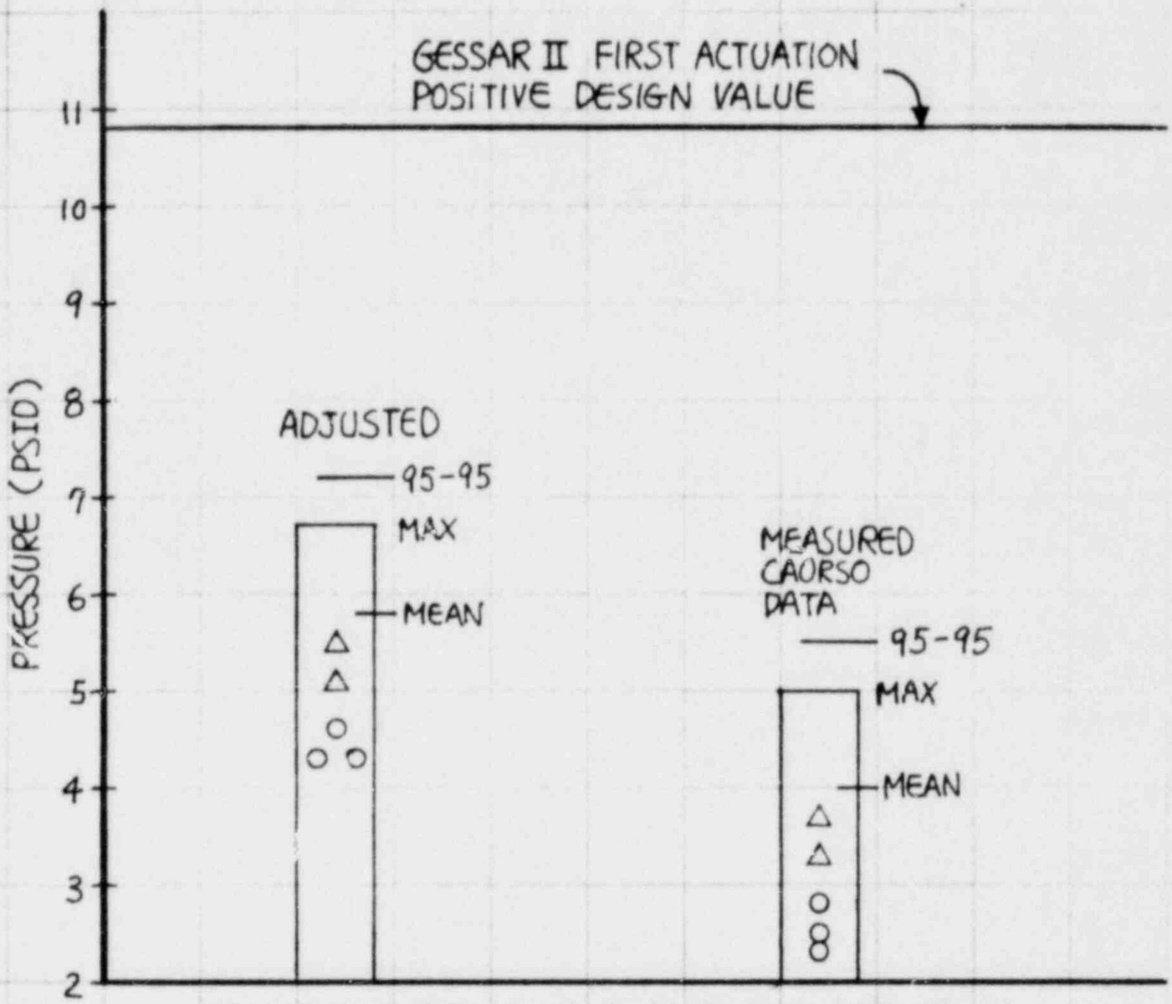


FIGURE 3BA.1(A)-2 COMPARISON OF CAORSO TEST ADJUSTED TO STANDARD PLANT DESIGN CONDITIONS AND GESSAR II DESIGN VALUES.



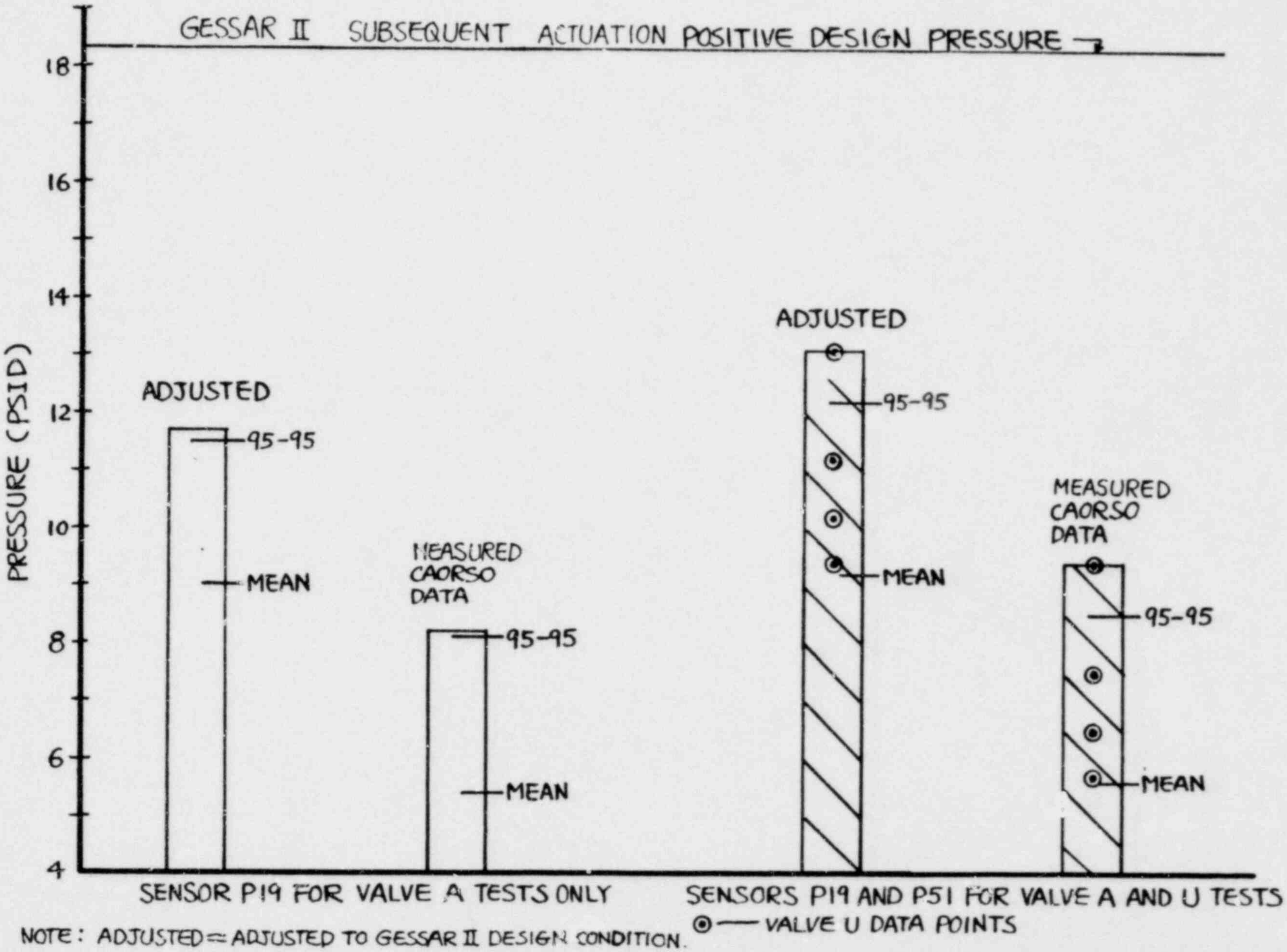
SENSOR P19 FOR VALVE A TESTS PLUS DATA FROM VALVES E AND U

NOTE: ADJUSTED = CAORSO TEST DATA ADJUSTED TO GESSAR II DESIGN CONDITION.

SENSOR P50 WAS USED FOR VALVE E TESTS.
△ — VALVE E DATA

SENSOR P57 WAS USED FOR VALVE U TESTS.
○ — VALVE U DATA

FIGURE 3BA.1(A)-3 COMPARISON OF CAORSO FIRST ACTUATION TEST DATA WITH GESSAR II LOAD DEFINITION.



NOTE: ADJUSTED = ADJUSTED TO GESSAR II DESIGN CONDITION.

FIGURE 3BA.1(A)-4 COMPARISON OF CAORSO TEST DATA WITH GESSAR II LOAD DEFINITION SUBSEQUENT ACTUATION

QUESTION 3BA.1(B)

Identify which Caorso data points were used in Figure 3BA-[illegible] (i.e., test and transducer numbers) and tabulate the various parameters used to generate the prediction values.

RESPONSE 3BA.1(B)

The measured and predicted Caorso positive pressure data were incorrectly plotted in Figure 3B-58. Figure 3BA.1(B)-1 represents the correct Caorso data and now includes all applicable phase I and II data. The relationship presented in Table 3BA-21 was used to predict the Caorso test pressures. The predicted pressures and the various parameters used to generate the predicted values are summarized in Table 3BA.1(B)-1. A tabulation of the measured and predicted Caorso positive pressures is presented in Table 3BA.1(B)-2.

TABLE 3BA.1(B)-1 CAORSO TEST PARAMETERS AND PREDICTIONS FOR ALL SENSORS

TEST CONDITION : SVA,CP,NWL; VAAQ=.255

TEST NUMBER	TEST PHASE	STEAM FLOW RT (LBM/S)	MNAQ (MT/S)	POOL TEMP. (F)	LNTW	WCL (FT)	WCL (M)	VOT (MS)	PRED (BAR)	PRED (PSID)
1	1	238.	9.4	76.	3.2	17.7	5.4	45.	0.583	8.5
2	1	238.	9.4	76.	3.2	17.7	5.4	45.	0.583	8.5
3	1	238.	9.4	76.	3.2	17.7	5.4	45.	0.583	8.5
4	1	238.	9.4	76.	3.2	17.7	5.4	45.	0.583	8.5
501	1	238	9.4	76.	3.2	17.7	5.4	45.	0.583	8.5
601F	1	23[illegible]	9.4	77.	3.2	17.7	5.4	45.	0.586	8.5
601	1	238.	9.4	76.	3.2	17.7	5.4	45.	0.583	8.5
7	1	238.	9.4	77.	3.2	17.7	5.4	45.	0.586	8.5
8	1	238.	9.4	78.	3.2	17.7	5.4	45.	0.589	8.5
9	1	238.	9.4	79.	3.3	17.7	5.4	45.	0.592	8.6
10	1	241.	9.5	79.	3.3	17.7	5.4	45.	0.593	8.6
1101	1	241.	9.5	79.	3.3	17.7	5.4	45.	0.593	8.6
1201	1	240.	9.4	81.	3.3	17.7	5.4	45.	0.598	8.7
1301	1	237.	9.3	83.	3.3	17.7	5.4	45.	0.603	8.7
1401	1	238.	9.4	80.	3.3	17.7	5.4	45.	0.595	8.6
21	1	242.	9.5	79.	3.3	17.7	5.4	45.	0.593	8.6
2201	1	240.	9.4	80.	3.3	17.7	5.4	45.	0.596	8.6
2301	2	238.	9.4	84.	3.4	17.7	5.4	56.	0.605	8.8
2311	2	238.	9.4	79.	3.3	17.7	5.4	45.	0.592	8.6
2321	2	235.	9.3	86.	3.4	17.7	5.4	43.	0.611	8.9
39	2	238.	9.4	80.	3.3	17.7	5.1	39.	0.596	8.6
40	2	237.	9.3	59.	2.7	17.7	5.4	30.	0.518	7.5

TABLE 3BA.1(B)-1 (CONT') CAORSO TEST PARAMETERS AND PREDICTIONS FOR ALL SENSORS

TEST CONDITION	TEST PHASE	TEST NUMBER	BASE SVA TEST NO.	BASE SVA FRD1 (bar)	(LNTW CVA - LNTW SVA)	FRD1 CVA (bar)	FRED (bar)
CVA WP NWL	I	502	501	0.583	3.2 - 3.2	0.583	1.02
		503	501	0.583	3.2 - 3.2	0.583	1.02
		602	601	0.583	3.2 - 3.2	0.583	1.02
		602F	601F	0.586	3.3 - 3.2	0.600	1.05
		603	601	0.583	3.4 - 3.2	0.611	1.07
	II	2302	2301	0.605	3.4 - 3.4	0.605	1.06
		2303	2301	0.605	3.4 - 3.4	0.605	1.06
CVA HP DWL	I	504	501	0.583	3.3 - 3.2	0.597	1.04
		505	501	0.583	3.3 - 3.2	0.597	1.04
		604	601	0.583	3.4 - 3.2	0.611	1.07
		605	601	0.583	3.4 - 3.2	0.611	1.07
		2202	2201	0.596	3.5 - 3.3	0.624	1.09
		2203	2201	0.596	3.4 - 3.3	0.610	1.06
		2204	2201	0.596	3.4 - 3.3	0.610	1.06
		2205	2201	0.596	3.4 - 3.3	0.610	1.06
	II	2304	2301	0.605	3.4 - 3.4	0.605	1.06
		2305	2301	0.605	3.4 - 3.4	0.605	1.06
		2322	2321	0.611	3.4 - 3.4	0.611	1.07
		2323	2321	0.611	3.4 - 3.4	0.611	1.07
		2324	2321	0.611	3.4 - 3.4	0.611	1.07
		2325	2321	0.611	3.4 - 3.4	0.611	1.07
CVA WP EWL	I	1302	1301	0.603	3.4 - 3.3	0.617	1.08
		1303	1301	0.603	3.6 - 3.3	0.644	1.12
		1402	1401	0.595	3.4 - 3.3	0.609	1.06
		1403	1401	0.595	3.5 - 3.3	0.623	1.09
	II	2312	2311	0.592	3.3 - 3.3	0.592	1.03
CVA HP EWL	I	1304	1301	0.603	3.5 - 3.3	0.631	1.10
		1305	1301	0.603	3.6 - 3.3	0.644	1.12
		1404	1401	0.595	3.5 - 3.3	0.623	1.09
		1405	1401	0.595	3.6 - 3.3	0.636	1.11

TABLE 3BA.1(B)-1 (CONT') CAORSO TEST PARAMETERS AND PREDICTIONS FOR ALL SENSORS.

TEST CONDITION : MVA(4 VALVES),CP,NVL; VAAQ=.255 AVAQ=13.0

TEST NUMBER	TEST PHASE	STEAM FLOW RT (LBM/S)	MNAQ (MT/S)	POOL TEMP. (F)	LNTW	WCL (FT)	WCL (M)	VOT (MS)	PRED (BAR)	PRED (PSID)
27	2	228.	9.1	77.	3.2	17.7	5.4	53.	0.642	9.3
28	2	228.	9.1	80.	3.3	17.7	5.4	47.	0.651	9.4
29	2	228.	9.1	80.	3.3	17.7	5.4	57.	0.650	9.4
30	2	231.	9.2	80.	3.3	17.7	5.4	50.	0.652	9.4
451	2	229.	9.1	80.	3.3	17.7	5.4	50.	0.651	9.4
452	2	231.	9.2	80.	3.3	17.7	5.4	43.	0.653	9.5

TEST CONDITION : MVA(8 VALVES),CP,NVL; VAAQ=.255 AVAQ=6.50

TEST NUMBER	TEST PHASE	STEAM FLOW RT (LBM/S)	MNAQ (MT/S)	POOL TEMP. (F)	LNTW	WCL (FT)	WCL (M)	VOT (MS)	PRED (BAR)	PRED (PSID)
32	2	237.	9.3	80.	3.3	17.7	5.4	50.	0.775	11.2

TABLE 3BA.1(B)-2 CAORSO DATA AND PREDICTIONS FOR SENSOR P19

TEST CONDITION	TEST PHASE	TEST NUMBER	CAORSO DATA (psid)	CAORSO DATA (bar)	CAORSO PREDICTION (psid)	CAORSO PREDICTION (bar)
SVA CP NWL	I	1	3.4	0.23	8.5	0.58
		2	3.7	0.26	8.5	0.58
		3	4.0	0.28	8.5	0.58
		4	4.4	0.30	8.5	0.58
		501	3.8	0.26	8.5	0.58
		601	4.5	0.31	8.5	0.58
		601F	3.9	0.27	8.5	0.59
		7	4.4	0.30	8.5	0.59
		8	3.9	0.27	8.5	0.59
		9	3.8	0.26	8.6	0.59
		10	4.6	0.32	8.6	0.59
		1101	4.3	0.30	8.6	0.59
		1201	4.3	0.30	8.7	0.60
		1301	4.8	0.33	8.7	0.60
		1401	4.2	0.29	8.6	0.60
		21	4.3	0.30	8.6	0.59
		2201	3.8	0.26	8.6	0.60
	II	2301	4.4	0.30	8.8	0.61
		2311	4.4	0.30	8.6	0.59
		2321	4.6	0.32	8.9	0.61
		39	5.0	0.34	8.6	0.60
		40	3.8	0.26	7.5	0.52
MVA CP NWL (4 Valve)	II	27	5.0	0.34	9.3	0.64
		28	4.1	0.28	9.4	0.65
		29	6.2	0.43	9.4	0.65
		30	5.8	0.40	9.4	0.65
		45-1	4.0	0.28	9.4	0.65
		45-2	5.0	0.34	9.5	0.65
8 Valve		32	5.6	0.39	11.2	0.78

TABLE 3BA.1(B)-2 (CONT') CAORSO DATA AND PREDICTION FOR SENSOR P19

TEST CONDITION	TEST PHASE	TEST NUMBER	CAORSO DATA (psid)	CAORSO DATA (bar)	CAORSO PREDICTION (psid)	CAORSO PREDICTION (bar)
CVA WP DWL	I	502	4.0	0.28	14.79	1.02
		503	5.3	0.37	14.79	1.02
		602	4.0	0.28	14.79	1.02
		602F	5.0	0.34	15.23	1.05
		603	4.4	0.30	15.52	1.07
	II	2302	4.2	0.29	15.37	1.06
		2303	5.1	0.35	15.37	1.06
CVA HP DWL	I	504	5.3	0.37	15.08	1.04
		505	5.0	0.34	15.08	1.04
		604	6.1	0.42	15.52	1.07
		605	5.2	0.36	15.52	1.07
		2202	7.5	0.52	15.81	1.09
		2203	6.2	0.43	15.37	1.06
		2204	5.8	0.40	15.37	1.06
		2205	5.0	0.34	15.37	1.06
	II	2304	6.4	0.44	15.37	1.06
		2305	7.5	0.52	15.37	1.06
		2322	5.8	0.40	15.52	1.07
		2323	4.4	0.30	15.52	1.07
		2324	8.2	0.57	15.52	1.07
		2325	7.6	0.52	15.52	1.07
CVA WP EWL	I	1302	4.1	0.28	15.66	1.08
		1303	5.0	0.34	16.24	1.12
		1402	4.6	0.32	15.37	1.06
		1403	5.3	0.37	15.81	1.09
	II	2312	4.2	0.29	14.94	1.03
CVA HP EWL	I	1304	4.8	0.33	15.95	1.10
		1305	4.1	0.28	16.24	1.12
		1404	5.1	0.35	15.81	1.09
		1405	6.0	0.41	16.10	1.11

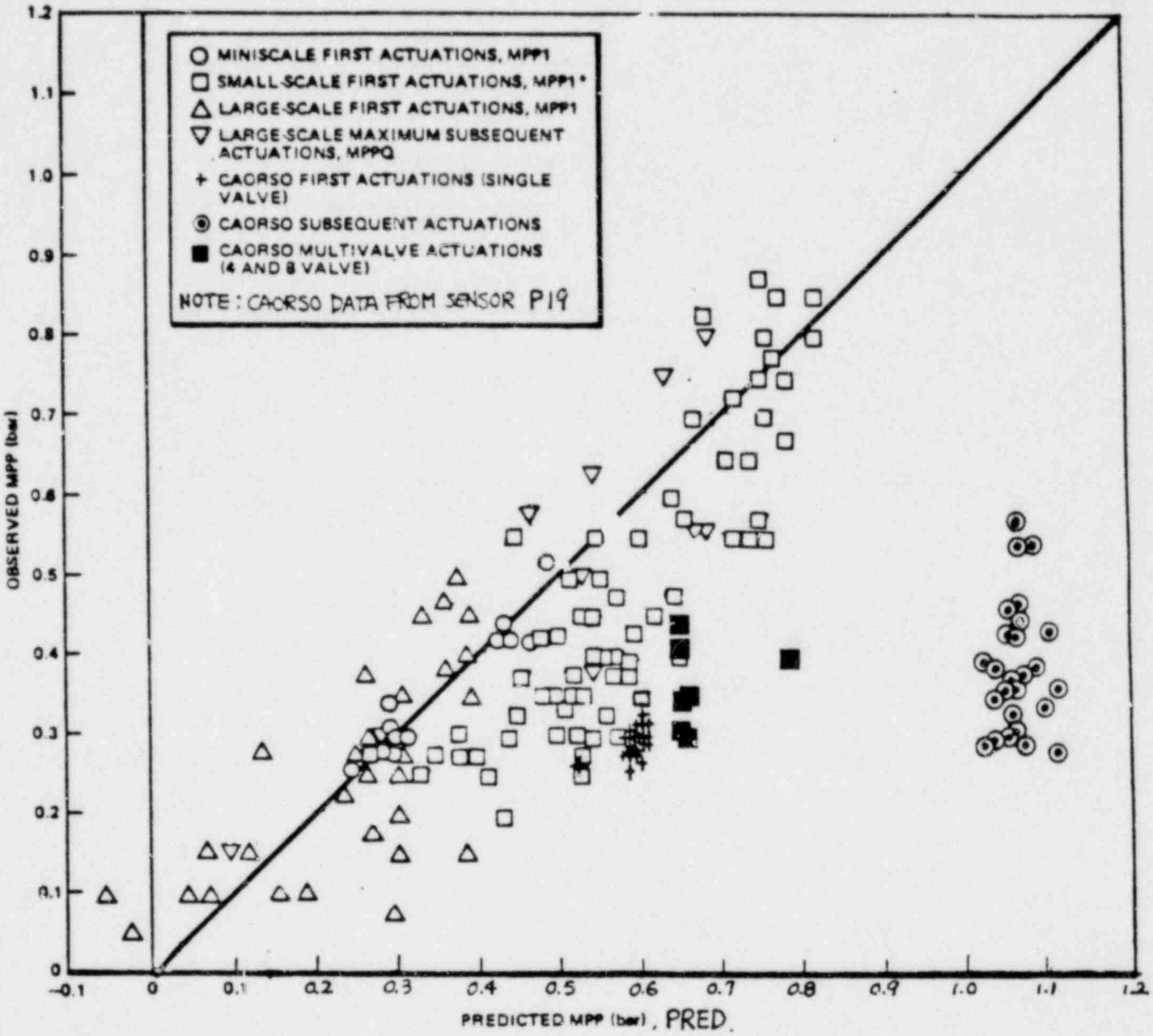


FIGURE 3BA.1(B)-1 MPP OBSERVED vs. PREDICTED VALUES.

QUESTION 3BA.1(C)

Describe the rationale behind multiplying the confidence coefficient and standard deviation by the multiplication factor in Equation 3BA-14.

RESPONSE TO 3BA.1(C)

As shown below, a multiplication factor (FACT) was applied to the maximum positive pressure design value (MPPDV) as a convenience in determining a load reduction factor from the Caorso data.

EQUATION 3BA-14

$$\text{MPPDV} = \text{FACT (PRED + CONF X SIFV)}$$

is equivalent to

$$\text{MPPDV} = \text{FACT X } \left(\text{MPPDV}\right)_{\text{unreduced}}$$

Justification of the load reduction factor (FACT) based on Caorso data was presented in the response to question 1A.

QUESTION 3BA.2

The correlation of the positive and negative pressure peaks as presented in Section 3BA.12.4.1 of GESSAR II is a vital part of the quencher design calculation methodology. Therefore, since the Caorso test data are being used to establish design load amplitudes, the staff requests that the following additional information be provided.

QUESTION 3BA.2(A)

It is stated in Section 3BA.12.4.2 that the Caorso tests also confirmed the comparison which utilized the small-scale and large-scale test data as illustrated in Figure 3BA-53, i.e., a comparison of minimum absolute pressures predicted by Equations 3BA-12 and the actual measured values. Provide a similar figure using the Caorso data along with a tabulation of the measured values. Include, as part of the tabulation, the test number and transducer number of the various pressure measures used in the comparison.

RESPONSE TO 3BA.2(A)

The requested figure and tabulations are provided in Figure 3BA.2(A)-1 and Table 3BA.2(A)-1. Equation 3BA-12 was used to determine the predicted minimum pressure of Figure 3BA.2(A)-1. This figure confirms the GESSAR II absolute minimum pressure prediction of equation 3BA-12, and it also shows that the GESSAR II correlation provides a margin of approximately 20% based on a best fit of the prediction of the Caorso data.

TABLE 3BA.2(A)-1 COMPARISON OF PREDICTION vs. CAORSO DATA FOR MINIMUM PRESSURE

CAORSO TEST DATA, SENSOR (P19)

TEST NUMBER	TEST PHASE	OBSERVED PRES. POS.(PSID)	NEG.	PREDICTED NEG. PRES.
2301	2	4.4	3.9	3.7
2302	2	4.2	2.4	3.5
2303	2	5.1	4.1	4.2
2304	2	6.4	3.0	5.0
2305	2	7.5	3.2	5.6
2311	2	4.4	4.0	3.7
2312	2	4.2	3.5	3.5
2313	2	5.1	5.0	4.2
2314	2	1.7	1.1	1.6
2315	2	3.4	2.7	3.0
2321	2	4.6	3.7	3.8
2322	2	5.8	4.0	4.6
2323	2	4.4	3.0	3.7
2324	2	8.2	3.0	6.0
2325	2	7.6	4.3	5.7
24	2	5.2	2.9	4.2
25	2	3.7	2.0	3.2
26	2	4.2	2.5	3.5
27	2	5.0	2.8	4.1
28	2	4.1	3.6	3.5
29	2	6.2	4.5	4.9
30	2	5.8	1.9	4.6
45-1	2	4.0	2.1	3.4
45-2	2	5.0	5.3	4.1
31	2	1.0	1.1	1.0
32	2	5.6	4.6	4.5
39	2	5.0	2.6	4.1
40	2	3.8	1.9	3.3

TABLE 3BA.2(A)-1 (CONT') COMPARISON OF PREDICTION vs. CAORSO DATA FOR MINIMUM PRESSURE

CAORSO TEST DATA SENSOR (P19)

TEST NUMBER	TEST PHASE	OBSERVED PRES. POS. (PSID)	OBSERVED PRES. NEG.	PREDICTED NEG. PRES.
1	1	3.4	1.8	3.0
2	1	3.7	2.0	3.2
3	1	4.0	2.5	3.4
4	1	4.4	3.4	3.7
501	1	3.8	1.9	3.3
502	1	4.0	3.7	3.4
503	1	5.3	2.9	4.3
504	1	5.3	3.6	4.3
505	1	5.0	2.8	4.1
601F	1	3.9	2.3	3.3
602F	1	5.0	2.0	4.1
601	1	4.5	3.0	3.8
602	1	4.0	2.3	3.4
603	1	4.4	2.8	3.7
604	1	6.1	3.4	4.8
605	1	5.2	2.6	4.2
7	1	4.4	2.4	3.7
8	1	3.9	2.1	3.3
9	1	3.8	4.3	3.3
10	1	4.6	2.6	3.8
1101	1	4.3	2.5	3.6
1201	1	4.3	2.5	3.6
1301	1	4.8	3.3	4.0
1302	1	4.1	3.9	3.5
1303	1	5.0	3.4	4.1
1304	1	4.8	3.8	4.0
1305	1	4.1	1.6	3.5
1401	1	4.2	2.1	3.5
1402	1	4.6	3.4	3.8
1403	1	5.3	4.8	4.3
1404	1	5.1	3.4	4.2
1405	1	6.0	3.3	4.7
21	1	4.3	2.4	3.6
2201	1	3.8	2.4	3.3
2202	1	7.5	5.2	5.6
2203	1	6.2	3.1	4.9
2204	1	5.8	3.1	4.6
2205	1	5.0	3.0	4.1

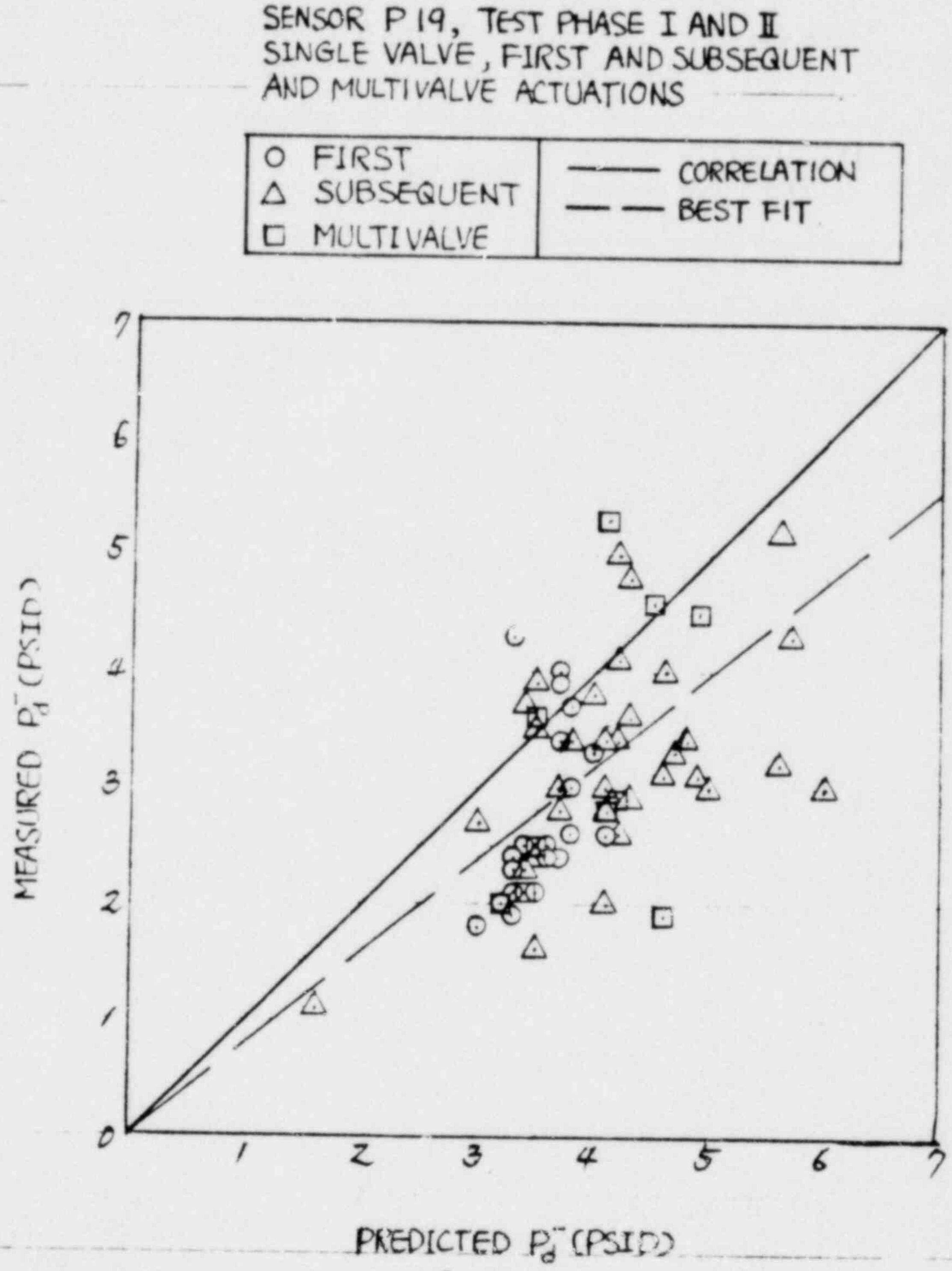


FIGURE 3BA.2(A)-1 COMPARISON OF P_d^- PREDICTION vs. CAORSO DATA FOR MINIMUM PRESSURE.

QUESTION 3BA.2(B)

Section 3BA.12.5.14 presents the equation for the maximum negative pressure design value (MNPDV). This equation is based on the correlation of the positive and negative pressure peaks as discussed above. However, an additional term (FACT), which is based on the Caorso data, has been added in the denominator of the equation. Provide the justification and rationale behind the addition of this term which reduces the magnitude of the design value.

RESPONSE TO 3BA.2(B)

The equation of the maximum negative pressure design value (MNPDV) presented in Section #BA.12.5.14 is:

$$MNPDV = \frac{PINF \ X \ MPPDV}{PINF + \frac{MPPDV}{FACT}} \quad \text{-------(1)}$$

This equation is equivalent to:

$$MNPDV = FACT \ X \ (MNPDV)_{unreduced}$$

for $MPPDV = FACT \ X \ (MPPDV)_{unreduced}$

where the "FACT" term is applied to the final design value as a convenience.

In Figures 3BA.2(B)-1 through 3BA.2(B)-3 the adjusted Caorso maximum negative (minimum) pressures are plotted versus the current GESSAR II design value obtained with Equation (1). The adjusted pressure data were obtained with Equation (2) below sing the GESSAR II equation 3BA-12 and the same adjustment procedure as for positive pressures:

$$PNAC = PNNC + \frac{PINF \ X \ (\Delta P + PRED_{Caorso})}{PINF + (\Delta P + PRED_{Caorso})} - \frac{PINF \ X \ PRED_{Caorso}}{PINF + PRED_{Caorso}} \quad \text{-----(2)}$$

where $\Delta P = PRED_{Std\ plant} - PRED_{Caorso} + PVAAQ$

$PNIF = 1.557 \ bar = 22.5 \ psi$

The comparisons shown in these figures reveals that both the maximum and 95-95 limits of the adjusted Caroso data are bounded by the GESSAR II design value. Therefore, the use of the multiplication factor is justified.

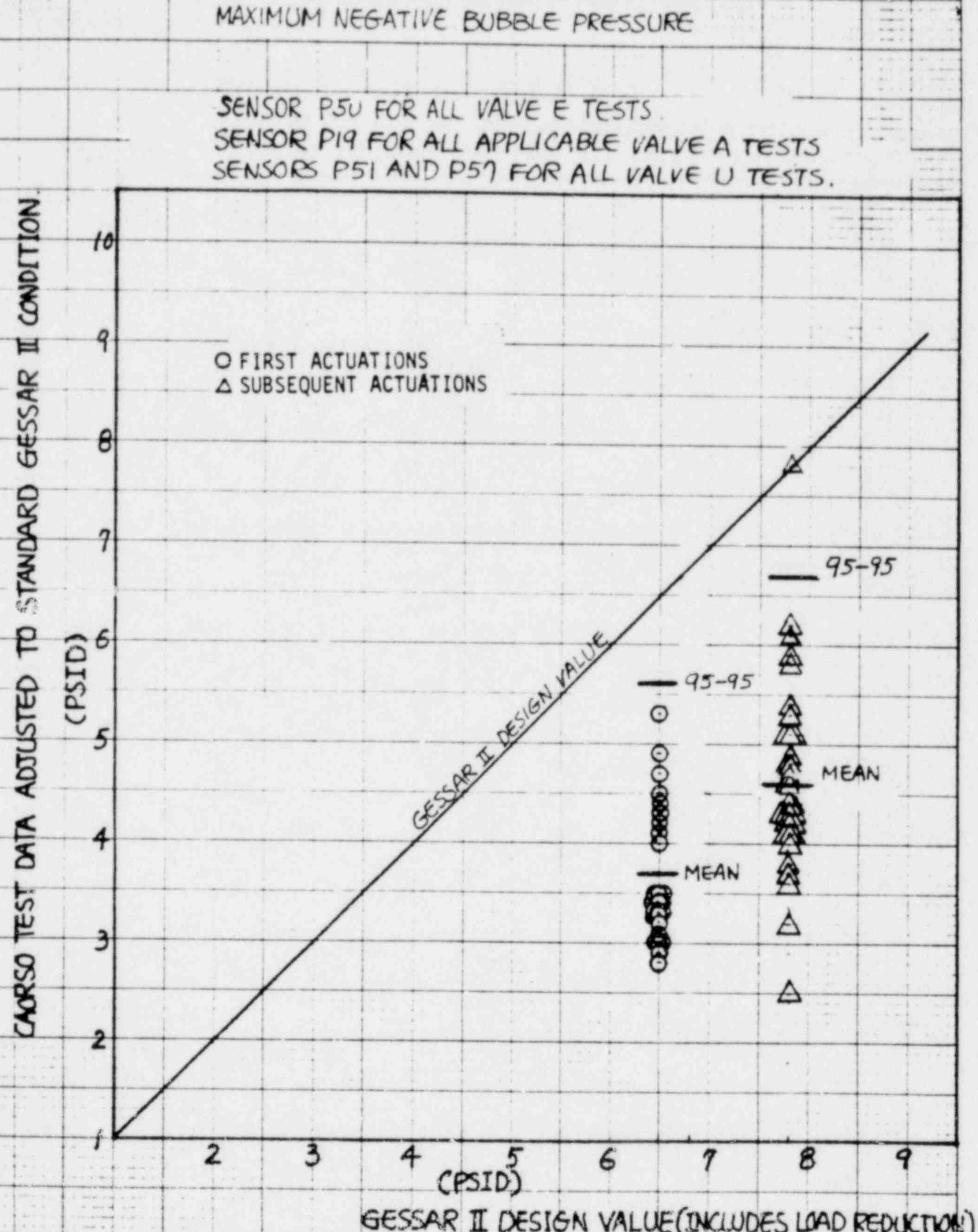
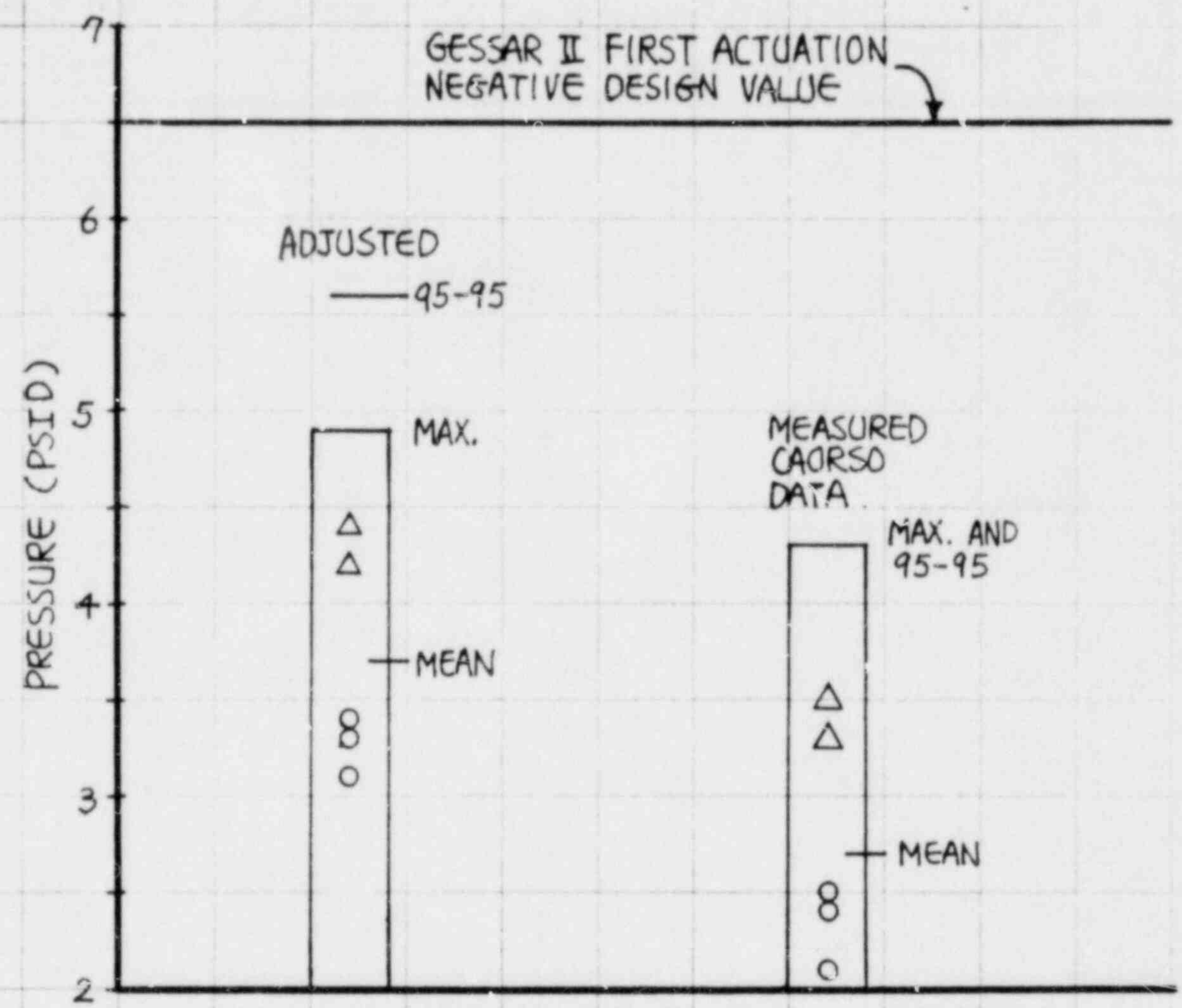


FIGURE 3BA.2(B) - 1 COMPARISON OF CAORSO TEST ADJUSTED TO STANDARD PLANT DESIGN CONDITIONS AND GESSAR II DESIGN VALUES.



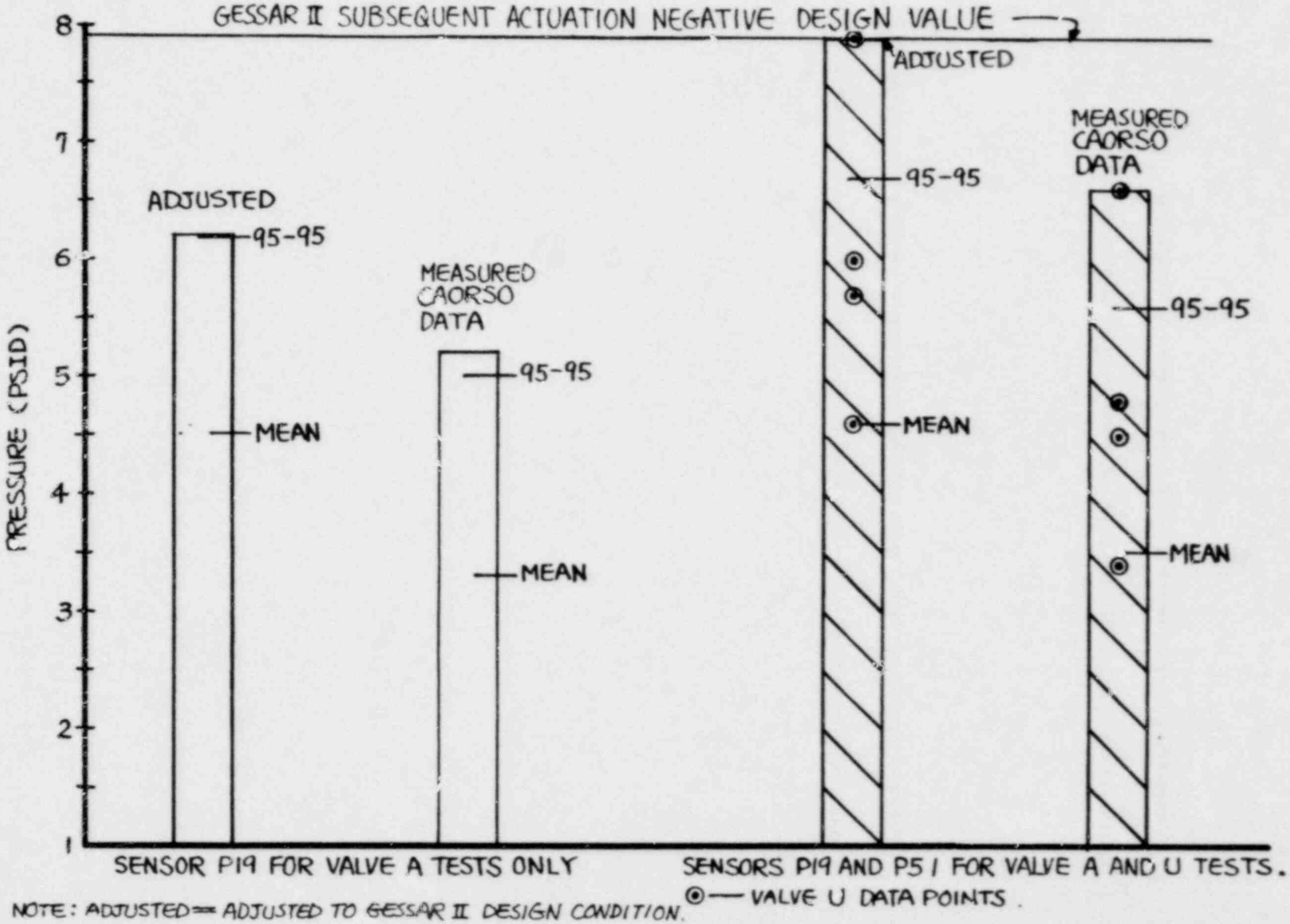
SENSOR P19 FOR VALVE A TESTS PLUS DATA FROM VALVES E AND U

NOTE: ADJUSTED = CAORSO DATA ADJUSTED TO GESSAR II DESIGN CONDITION.

SENSOR P50 WAS USED FOR VALVE E TESTS
△ — VALVE E DATA

SENSOR P57 WAS USED FOR VALVE U TESTS
○ — VALVE U DATA

FIGURE 3BA.2(B)-2 COMPARISON OF CAORSO FIRST ACTUATION TEST DATA WITH GESSAR II LOAD DEFINITION



NOTE: ADJUSTED = ADJUSTED TO GESSAR II DESIGN CONDITION.

FIGURE 3BA.2(B)-3 COMPARISON OF CAORSO SUBSEQUENT ACTUATION TEST DATA WITH GESSAR II LOAD DEFINITION

Nomenclature:

AWAQ	Effective pool surface area per quencher area
CONF	Confidence coefficient for a given statistical tolerance limit
CP	Cold pipe
CVA	Subsequent single valve actuation
DWL	Depressed water level
EWL	Elevated water level
FACT	Load reduction multiplication factor
HP	Hot pipe
LNTW	Natural log of suppression pool temperature (^oC)
MNAQ	SRV steam mass flux
MNPDV	Maximum predicted negative design pressure value
MPPDV	Maximum predicted positive design pressure value
MVA	Multiple valve actuation
NWC	Normal water level
P^-d	Negative (minimum) differential pressure
PINF	Absolute pressure at the level of the quencher arm centerline
PNAC	Peak negative Caorso data adjusted to Mark III Standard Plant condition
PNMC	Measured peak negative Caorso data
PPAC	Peak positive Caorso data adjusted to Mark III Standard Plant condition
PPMC	Measured peak positive Caorso data
PRD1	Predicted first actuation peak positive pressure (50-50 confidence level)
PRED	Predicted peak positive pressure (50-50 confidence level)
PVAAQ	Pressure adjustment due to the effect of VAAQ term
SIFV	Standard deviation of data peak
SVA	Single valve first actuation
VAAQ	SRV discharge line air volume per quencher area
VOT	SRV valve opening time
NCL	Water leg length from quencher arm centerline to the air water interface
WP	Warm pipe
ΔP	Pressure adjustment for maximum positive Caorso pressure