TEST REPORT

REPORT NO. 12632
OUR JOB NO. D 4536
YOUR P. O. NO. 7537
CONTRACT NAS 8-2651

WYLE LABORATORIES, El Segundo, California, Eastgate 2-1763, Oregon 8-4251, TWX EL SEG 4236

SPACO, INC.
POST OFFICE BOX 113
HUNTSVILLE INDUSTRIAL CENTER
HUNTSVILLE, ALABAMA

31-PAGE REPORT

DATE 5 JULY 1962

REVISION "A"
5 OCTOBER 1962

VIBRATION AND SHOCK TESTING
ON
PROTOTYPE HORIZON SENSOR
FOR
SPACO, INC.

STATE OF CALIFORNIA
COUNTY OF LOS ANGELES } ss.

JOHN R. HERRING, being duly sworn, deposes and says: That the information contained in this report is the result of complete and carefully conducted tests and is to the best of his knowledge true and correct in all respects.

SEAL

SUBSCRIBED and sworn to before me this 5 day of JULY, 19 62

Notary Public in and for the County of Los Angeles, State of California.

My Commission expires 16 MARCH, 19 64

TEST BY DYNAMICS SECTION

TEST WITNESS AFGCR

CR-50,482

WYLE LABORATORIES / El Segundo, California

REPORT NO. 12632

PAGE NO. 1

REVISION SHEET

Revision	Date	Revised By	Approved By	Pages Affected	Description of Changes
A	10-5-62			24 - 31	Addition of Pages 24 thru 31,
					Addendum 1

1.0 PURPOSE

THE PURPOSE OF THIS REPORT IS TO PRESENT THE TEST PROCEDURES USED AND THE TEST RESULTS OBTAINED DURING THE PERFORMANCE OF A TEST PROGRAM. THE TEST PROGRAM WAS CONDUCTED TO DETERMINE CONFORMANCE OF A PROTOTYPE HORIZON SENSOR MOUNTING AND DOME TO THE VIBRATION AND SHOCK REQUIREMENTS SPECIFIED IN REFERENCE 2.1, IN ACCORDANCE WITH REFERENCE 2.2.

2.0 REFERENCES

2.1 SPACO, INC., SCOPE OF WORK NUMBER CPB-02-1084-62, DATED 14 FEBRUARY 1962.

2.2 SPACO, INC., PURCHASE ORDER NUMBER 7537.

3.0 MANUFACTURER

SPACO, INC.
POST OFFICE BOX 113
HUNTSVILLE INDUSTRIAL CENTER
HUNTSVILLE, ALABAMA

4.0 SUMMARY 18158

4.1 A PROTOTYPE HORIZON SENSOR MOUNTING AND DOME WAS SUBJECTED TO A VIBRATION AND SHOCK TEST PROGRAM AS DESCRIBED IN DETAIL IN THIS REPORT.

4.2 DURING THE COURSE OF THE VIBRATION TEST, A NUMBER OF RIVETS WERE SHEARED OFF DUE TO MOTION OF SPECIMEN. ALSO, THE DOME WAS OBSERVED TO ROTATE ON ITS MOUNTINGS. AT THE COMPLETION OF THE VIBRATION TEST PROGRAM, THE EXPLOSIVE CHARGE SHEAR PINS WERE FOUND TO BE BROKEN.

4.3 THERE WAS NO EVIDENCE OF DAMAGE AS A RESULT OF THE SHOCK TEST.

4.4 THE EJECTION TEST OF THE PROTECTIVE DOME COVER WAS CANCELLED BY THE SPACO REPRESENTATIVE, AT THE REQUEST OF THE N.A.S.A. REPRESENTATIVE.

5.0 TEST CONDITIONS AND TEST EQUIPMENT

5.1 AMBIENT CONDITIONS

5.1.1 UNLESS OTHERWISE SPECIFIED HEREIN, ALL TESTS REQUIRED BY THE SPECIFICATION WERE PERFORMED AT AN ATMOSPHERIC PRESSURE OF 760±15MM OF MERCURY, A TEMPERATURE OF 70±20F, AND A RELATIVE HUMIDITY OF APPROXIMATELY 50 PER CENT. WHERE TESTS WERE PERFORMED WITH ATMOSPHERIC CONDITIONS SUBSTANTIALLY DIFFERENT FROM THE SPECIFIED VALUES, PROPER ALLOWANCES FOR CHANGES IN INSTRUMENT READINGS WERE MADE TO COMPENSATE FOR THE DEVIATION FROM THE SPECIFIED CONDITIONS.

5.0 TEST CONDITIONS AND TEST EQUIPMENT (CONTINUED)

5.2 INSTRUMENTATION AND EQUIPMENT

5.2.1 VIBRATION TEST

APPARATUS	MANUFACTURER AND MODEL NO.	DESCRIPTION	WYLE NO.
VIBRATION EXCITER	LINE ELEC., MODEL 249	28,000 FORCE LBS.	-
VISICORDER	MINN.-HONEYWELL MODEL	----	50126
DYNA-MONITOR	ENDEVCO, MODEL 2702B	7.07 VRMS	4667
DYNA-MONITOR	ENDEVCO, MODEL 2702B	7.07 VRMS	4666
DYNA-MONITOR	ENDEVCO, MODEL 2702B	7.07 VRMS	4668
DYNA-MONITOR	ENDEVCO, MODEL 2702C	7.07 VRMS	4680
ACCELEROMETER	ENDEVCO, MODEL 2213	0-10,000G	4365
ACCELEROMETER	ENDEVCO, MODEL 2213	0-10,000G	4373
ACCELEROMETER	ENDEVCO, MODEL 2213	0-10,000G	RAE 43
ACCELEROMETER	ENDEVCO, MODEL 2213	0-10,000G	4368
ACCELEROMETER	ENDEVCO, MODEL 2213	0-10,000G	4361
ACCELEROMETER	ENDEVCO, MODEL 2213	0-10,000G	4360
ACCELEROMETER	ENDEVCO, MODEL 2213	0-10,000G	4363
ACCELEROMETER	ENDEVCO, MODEL 2213	0-10,000G	R1262
ACCELEROMETER	ENDEVCO, MODEL 2213	0-10,000G	1904
ACCELEROMETER	ENDEVCO, MODEL 2213	0-10,000G	1912
ACCELEROMETER	ENDEVCO, MODEL 2213	0-10,000G	2428

5.0 TEST CONDITIONS AND TEST EQUIPMENT (CONTINUED)

5.2 INSTRUMENTATION AND EQUIPMENT (CONTINUED)

5.2.1 VIBRATION TEST (CONTINUED)

APPARATUS	MANUFACTURER AND MODEL NO.	DESCRIPTION	WYLE NO.
FREQUENCY CONVERTER	WAUGH ENGR., MODEL FR111	10-3000 CPS	3248
VIBRATION METER	MB MFG., MODEL M-6	2000 CPS VEL.	3192
RANDOM MOTION CONSOLE	LING ELEC., MODEL ESD40/ASD40		----
TIMER	STANDARD, MODEL S-60	0-60 MIN.	3144
METER-TRUE RMS	B&K MODEL 2416	0-1000V	5523
OSCILLATOR	B&K, MODEL 1018	5-3000 CPS	5584

5.2.2 MECHANICAL SHOCK TEST

APPARATUS	MANUFACTURER AND MODEL NO.	DESCRIPTION	WYLE NO.
SHOCK MACHINE	M.D.I., MODEL DS10-16-10	350,000 FORCE LBS.	----
VISICORDER	MINN.-HONEYWELL MODEL		50120
OSCILLOSCOPE	TEKTRONIX, TYPE 502 MODEL 407A		5535
CAMERA	TEKTRONIX, MODEL C-12		5536
DYNA-MONITOR	ENDEVCO MODEL 2702B	0-8.5v	4659
ACCELEROMETER	ENDEVCO, MODEL	0-10,000G	D-808
ACCELEROMETER	ENDEVCO, MODEL 2232	0-10,000G	1900

6.0 REQUIREMENTS, PROCEDURES, AND RESULTS

6.1 VIBRATION TEST

TEST BY: D. BOWLES
TEST STARTED: 10 JUNE 1962
TEST COMPLETED: 11 JUNE 1962

6.1.1 TEST REQUIREMENTS

REFERENCE 2.1

6.1.1.1 THE PROTOTYPE HORIZON SENSOR MOUNTING AND DOME IS TO BE SUBJECTED TO THE FOLLOWING TESTS:

PRELIMINARY SEARCH SWEEPS
COMBINED RESONANCE AND SWEEP TESTS
RANDOM VIBRATION TESTS

6.1.2 TEST PROCEDURE

THE TEST SPECIMEN WAS ASSEMBLED TO A CAST K1A MAGNESIUM TEST FIXTURE AS SHOWN IN PHOTOGRAPHS 2 THROUGH 6. (THE FIXTURE DETAIL IS SHOWN IN PHOTOGRAPH 1.) THE FIXTURE AND SPECIMEN WERE THEN INSTRUMENTED AS SHOWN IN FIGURE 1. ALL ACCELEROMETER OUTPUTS WERE THEN RECORDED ON A VISICORDER. ACCELEROMETER LOCATIONS 2 THROUGH 10 WERE NOT CHANGED DURING TESTING.

6.1.2.1 A FAST SWEEP FROM 20 TO 800 CPS AT ± 0.5G WAS MADE AT THE REQUEST OF THE SPACO, INC., REPRESENTATIVE. THE SWEEP WAS NOT RECORDED AND, AT THE CONCLUSION OF THE SWEEP, MEASUREMENTS WERE MADE AND RETAINED BY THE SPACO, INC., REPRESENTATIVE. THE SWEEP DURATION WAS TWO MINUTES.

6.1.2.2 A RESONANCE SWEEP WAS MADE FROM 16 TO 2000 CPS AT ±1G IN EACH AXIS. THE SWEEPS WERE OF A DURATION OF TEN MINUTES IN THE PITCH AXIS, NINE MINUTES 45 SECONDS IN THE LONGITUDINAL AXIS, AND NINE MINUTES 30 SECONDS IN THE YAW AXIS. THE RESPONSE OF ALL THE ACCELEROMETERS WAS RECORDED AND IS PRESENTED IN TABULAR FORM IN TABLES I, III, AND V.

6.1.2.3 THE COMBINED RESONANCE AND SWEEP TESTS WERE THEN CONDUCTED AT THE FOLLOWING LEVELS AND RANGES:

4 TO 16 CPS AT 0.2 INCH DOUBLE AMPLITUDE
16 TO 64 CPS AT ±2.7G
64 TO 123 CPS AT 0.013 INCH DOUBLE AMPLITUDE
123 TO 2000 CPS AT ±10G

7.0 REQUIREMENTS, PROCEDURES, AND RESULTS (CONTINUED)

7.1.2 TEST PROCEDURE (CONTINUED)

7.1.2.3 THE RESPONSE OF ALL ACCELEROMETERS WAS RECORDED, AND IS PRESENTED IN TABULAR FORM IN TABLES II, IV, AND VI.

7.1.2.4 THE TEST SPECIMEN WAS THEN SUBJECTED TO THE RANDOM VIBRATION TESTS SPECIFIED IN REFERENCE 2.1 ALONG EACH OF THREE EQUALLY PERPENDICULAR AXES.

FIRST LEVEL: A POWER SPECTRAL DENSITY OF 0.2 G^2/CPS OVER A FREQUENCY BAND FROM 10 TO 2000 CPS FOR 20 SECONDS PER AXIS.

SECOND LEVEL: A POWER SPECTRAL DENSITY OF 0.02 G^2/CPS OVER A FREQUENCY BAND FROM 10 TO 2000 CPS FOR 240 SECONDS PER AXIS.

7.1.3 TEST RESULTS

THE TEST RESULTS ARE SHOWN IN TABLES I THROUGH VI WHICH SHOW DATA REDUCED FROM OSCILLOGRAPH RECORDS.

7.1.3.1 MEASUREMENTS WERE MADE IN ORDER TO DETECT PERMANENT DEFORMATION BETWEEN THE SIMULATED SKIN AND THE HORIZON SENSORS, BY SPACO, INC., PERSONNEL. THE RESULT OF THESE MEASUREMENTS WERE RETAINED BY SPACO, INC., PERSONNEL AND ARE NOT SHOWN IN THIS REPORT.

7.1.3.2 DURING THE COURSE OF THE VIBRATION TEST, A NUMBER OF RIVETS WERE SHEARED OFF DUE TO MOTION OF SPECIMEN. ALSO, THE DOME WAS OBSERVED TO ROTATE ON ITS MOUNTINGS. AT THE COMPLETION OF THE VIBRATION TEST PROGRAM, THE EXPLOSIVE CHARGE SHEAR PINS WERE FOUND TO BE BROKEN.

6.0 REQUIREMENTS, PROCEDURES, AND RESULTS (CONTINUED)

6.2 MECHANICAL SHOCK TEST

TEST BY: D. BOWLES

TEST STARTED: 12 JUNE 1962

TEST COMPLETED: 12 JUNE 1962

6.2.1 TEST REQUIREMENTS

REFERENCE 2.1

6.2.1.1 A TOTAL OF TWO SHOCKS APPLIED IN THE DIRECTION OF FLIGHT, HAVING A MAGNITUDE OF 35G PEAK AND A PULSE DURATION OF EIGHT MILLISECONDS SHALL BE CONDUCTED. THE WAVE SHAPE OF THE PULSE SHALL APPROXIMATE A HALF-SINE WAVE.

6.2.2 TEST PROCEDURE

THE TEST SPECIMEN WAS ASSEMBLED TO A CAST K1A MAGNESIUM TEST FIXTURE, AND ATTACHED TO THE SHOCK TEST MACHINE AS SHOWN IN PHOTOGRAPH 7. THE FIXTURE-SPECIMEN SYSTEM WAS THEN INSTRUMENTED AS SHOWN IN FIGURE 2. ALL ACCELEROMETER OUTPUTS WERE RECORDED FOR BOTH SHOCK PULSES.

6.2.2.1 THE TEST SPECIMEN WAS SUBJECTED TO TWO SHOCKS AT MAGNITUDES AND DURATIONS AS SPECIFIED ABOVE.

6.2.3 TEST RESULTS

THERE WAS NO EVIDENCE OF MECHANICAL FAILURE OR DETERIORATION OF THE TEST SPECIMEN AS A RESULT OF THE SHOCK TEST.

6.2.3.1 THE RECORDED DATA WAS REDUCED, AND IT WAS FOUND THAT DURING EACH OF THE TWO SHOCK PULSES, THE RESPONSE OF THE TEST SPECIMEN WAS A NOMINAL 31.7G WITH A NOMINAL DURATION OF 11 MILLISECONDS. THE RESPONSE OF THE FIXTURE IN THE YAW AXIS WAS 0.

RESPONSE ACCELEROMETER LOCATION
FOR VIBRATION TESTS, AND DEFINITION OF AXES

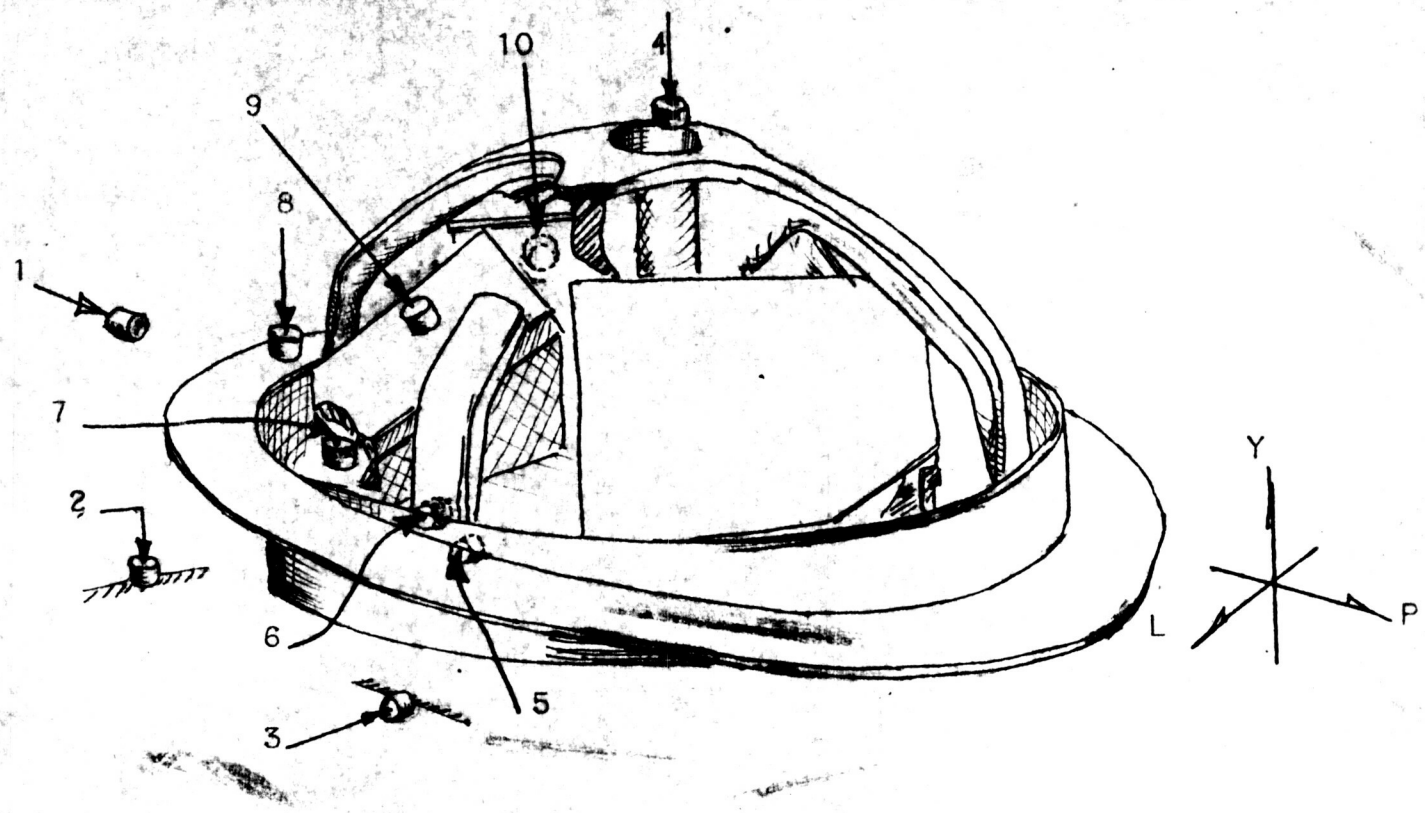


FIGURE 1

1. CONTROL - SHOWN FOR PITCH AXIS.
2. YAW - RESPONSE OF FIXTURE.
3. LONG - RESPONSE OF FIXTURE.
4. YAW - RESPONSE SPECIMEN.
5. LONG - RESPONSE OF BASE CASTING.
6. LONG - RESPONSE OF SPIDER BASE.
7. YAW - RESPONSE OF BASE CASTING.
8. YAW - RESPONSE OF SPECIMEN.
9. RESPONSE OF HORIZON SENSOR.
10. RESPONSE OF HORIZON SENSOR.

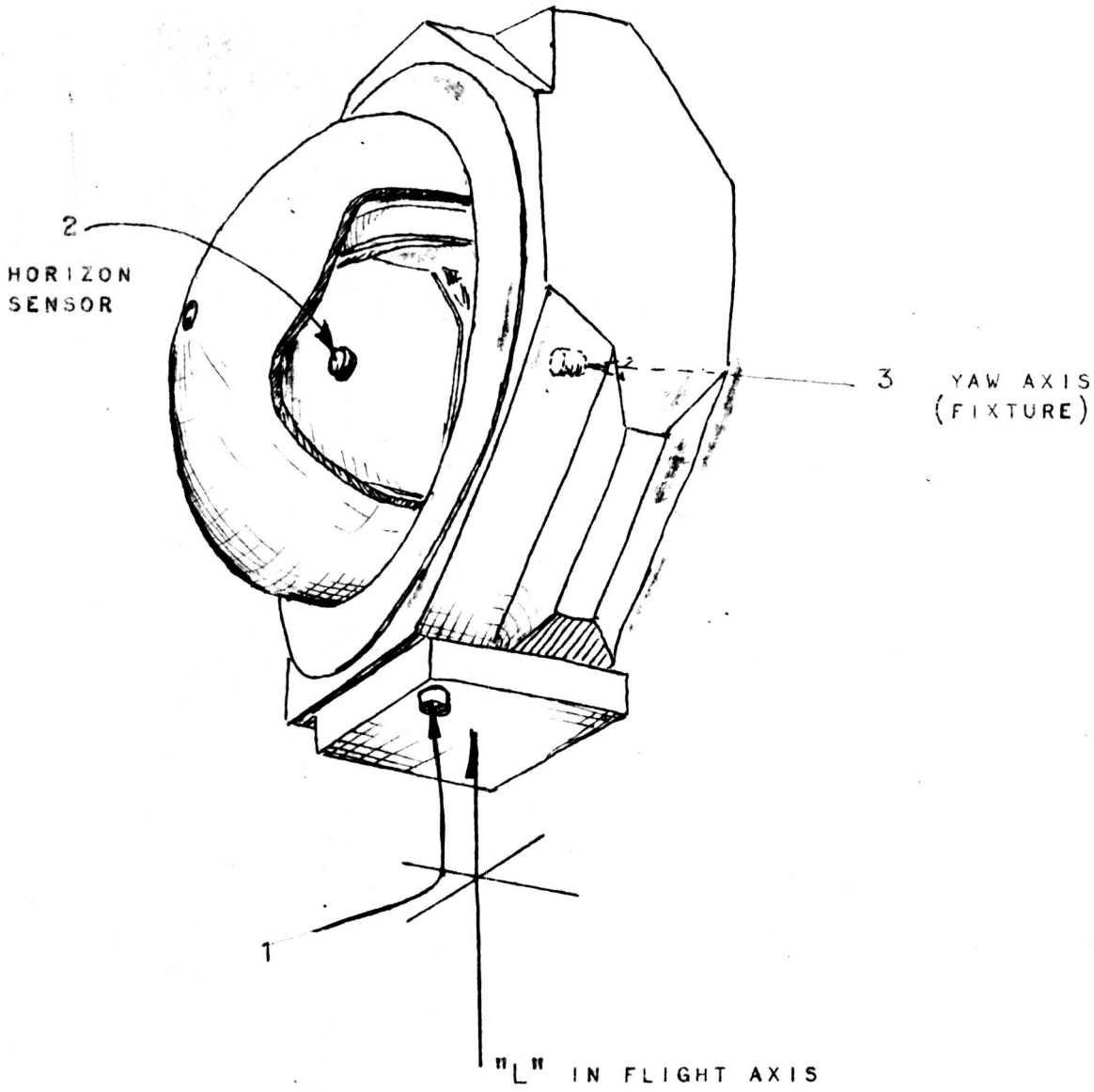


FIGURE 2

TABLE I
VIBRATION TEST RESULTS
PITCH AXIS - RESONANCE SEARCH SWEEP
PROTOTYPE HORIZON SENSOR

FREQ. (CPS)	*ACCEL. LOC:	ACCELERATION (G PEAK) 1	2	3	4	5	6	7	8	9	10
97		1.08	6.2	5.8	8.3	13.0	29.4	13.8	12.8	20.3	12.4
212		1.06	3.5	5.0	9.0	6.5	23.4	13.5	12.6	11.6	6.8
290		1.0	5.8	3.2	9.8	10.8	50.5	10.8	37.0	35.4	6.5
500		1.07	9.0	7.8	30.0	16.5	204.0	14.2	37.6	22.2	35.0
700		1.0	17.6	6.9	9.0	21.0	186.0	30.0	27.1	30.0	9.0
1750		1.0	21.9	19.5	---	6.0	96.0	12.3	13.5	11.4	15.6

*NOTE: SEE FIGURE 1 FOR ACCELEROMETER LOCATIONS.

TABLE II
VIBRATION TEST RESULTS
PITCH AXIS - COMBINED RESONANCE AND SWEEP TESTS
PROTOTYPE HORIZON SENSOR

FREQ. (CPS) ***ACCEL. LOC:	ACCELERATION (G PEAK) 1	2	3	4	5	6	7	8	9	10
200	9.4	8.7	---	14.7	22.2	48.0	14.4	23.4	19.2	*
218 - 224**	11.4	9.0	14.7	39.6	29.4	36.0	22.8	34.2	34.2	40.8
500	11.7	9.0	7.8	30.0	16.5	204.0	14.2	27.6	22.2	35.0
700	11.0	---	9.0	30.0	---	186.0	30.0	27.1	30.0	30.0
870	11.2	---	---	---	---	---	---	---	15.0	30.0
1750	10.0	21.5	19.5	---	---	28.8	12.3	13.5	11.4	15.6

* DOME ROTATING; TEST STOPPED FOR EVALUATION.

** DOME TAPED TO BASE TO PREVENT ROTATION. NO RESONANCES WERE DETECTED IN THE FREQUENCY RANGE FROM 4 TO 16 CPS. (SEE TABLE I)

***NOTE: SEE FIGURE 1 FOR ACCELEROMETER LOCATIONS.

TABLE III
VIBRATION TEST RESULTS
LONGITUDINAL FLIGHT AXIS - RESONANCE SEARCH SWEEP
PROTOTYPE HORIZON SENSOR

FREQ. (CPS)	*ACCEL. LOC:	ACCELERATION (G PEAK) 1	2	3	4	5	6	7	8	9	10
49		1.0	---	---	3.1	3.2	4.6	3.8	2.8	5.6	8.6
90		1.0	---	---	5.3	10.8	8.9	8.2	5.8	13.6	13.8
104		1.3	---	---	8.1	5.7	4.3	5.6	3.8	6.4	8.1
158		1.2	---	---	4.2	8.3	7.0	6.3	4.3	18.7	11.4
277		1.3	---	---	3.2	8.3	7.3	9.0	4.3	11.0	13.0
495		1.0	---	3.8	8.4	10.0	22.8	6.3	9.8	13.8	12.4
625		1.0	---	7.2	3.4	13.2	8.6	7.7	7.0	9.5	5.3
980		1.0	---	---	---	---	1.8	---	2.0	84.0	33.0
1730		1.0	---	2.8	---	3.5	10.4	2.2	3.5	83.0	31.0

*NOTE: SEE FIGURE 1 FOR ACCELEROMETER LOCATIONS

TABLE IV
VIBRATION TEST RESULTS
LONGITUDINAL FLIGHT AXIS - COMBINED RESONANCE AND SWEEP TESTS
PROTOTYPE HORIZON SENSOR

FREQ. (CPS)	*ACCEL. LOC:	ACCELERATION (G PEAK)									
		1	2	3	4	5	6	7	8	9	10
156		3.8	2.6	7.2	10.0	42.4	42.0	10.0	9.6	120.0	100.0
246		4.6	3.8	5.8	12.4	99.0	126.0	7.8	6.7	108.0	72.0
323		11.6	2.6	6.6	10.7	56.0	139.0	53.0	51.0	86.0	65.0
486		10.8	4.1	6.4	8.5	113.0	212.0	58.0	78.0	98.0	138.0
926		10.8	1.3	4.8	---	18.0	126.0	11.0	13.0	206.5	204.0
1720		10.4	3.8	7.4	---	27.0	186.0	22.0	32.0	198.0	60.2

*NOTE: SEE FIGURE 1 FOR ACCELEROMETER LOCATIONS

TABLE V
VIBRATION TEST RESULTS
YAW AXIS - RESONANCE SEARCH
PROTOTYPE HORIZON SENSOR

FREQ. (CPS)	*ACCEL. LOC:	ACCELERATION (G PEAK) 1	2	3	4	5	6	7	8	9	10
50		1.2	1.7	---	4.6	2.3	2.4	2.4	1.8	3.1	4.6
139		1.1	2.8	2.1	13.2	13.6	11.3	11.5	8.2	29.4	27.8
328		1.1	1.5	---	44.0	3.5	10.0	7.1	5.6	5.6	9.5
880		1.0	2.3	---	---	---	2.9	---	---	6.3	4.3
1960		1.0	2.4	---	---	3.6	7.0	4.6	3.2	1.9	2.2

*NOTE: SEE FIGURE 1 FOR ACCELEROMETER LOCATIONS

TABLE VI
VIBRATION TEST RESULTS
YAW AXIS - COMBINED RESONANCE AND SWEEP TESTS
PROTOTYPE HORIZON SENSOR

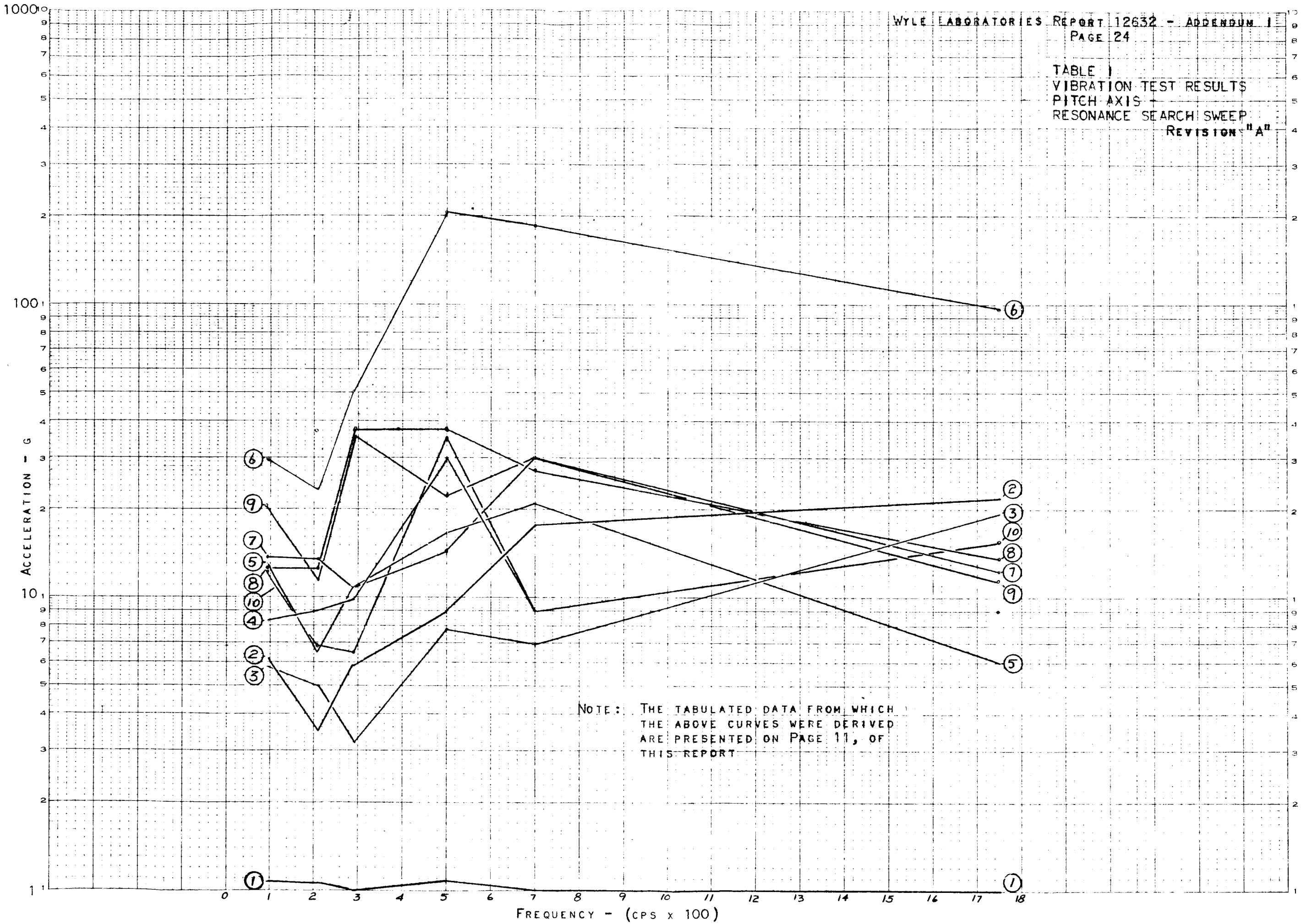
FREQ. (CPS) *** ACCEL. LOC:	ACCELERATION (G PEAK) 1	2	3	4	5	6	7	8	9	10
60	4.2	---	---	12.6	---	8.4	4.2	5.4	10.5	13.8
65	4.2	---	---	9.6	---	9.3	7.2	6.3	12.3	10.8
80*	5.4	---	---	13.8	10.5	12.9	14.1	9.6	30.0	27.0
135 - 158	12.5	16.8	---	53.0	93.0	14.8	68.0	80.0	104.0	118.0
243**	12.0	---	---	29.0	29.0	29.0	32.0	24.0	56.0	86.0
252	12.0	---	---	21.0	55.0	38.0	42.0	28.0	73.0	100.0
262	13.0	---	---	24.0	29.0	53.0	28.0	29.0	59.0	83.0
268	14.0	---	---	24.0	24.0	61.0	28.0	29.0	62.0	62.0
318	12.0	---	---	32.0	---	63.0	34.0	28.0	25.0	29.0
352	10.0	---	---	49.0	25.0	108.0	34.0	34.0	32.0	60.0
880	11.0	---	---	---	---	44.0	---	---	46.0	47.0
1100	10.0	---	---	---	---	20.0	---	---	31.0	41.0
1249	10.0	---	---	---	---	32.0	---	---	12.0	41.0
1351	10.0	---	---	---	---	39.0	---	---	---	---

* RIVET FATIGUE.

** RIVETS REPLACED AND ADDITIONAL 10-32 SCREWS PLACED ON CENTER BETWEEN EXISTING RIVETS.

***NOTE: SEE FIGURE 1 FOR ACCELEROMETER LOCATIONS

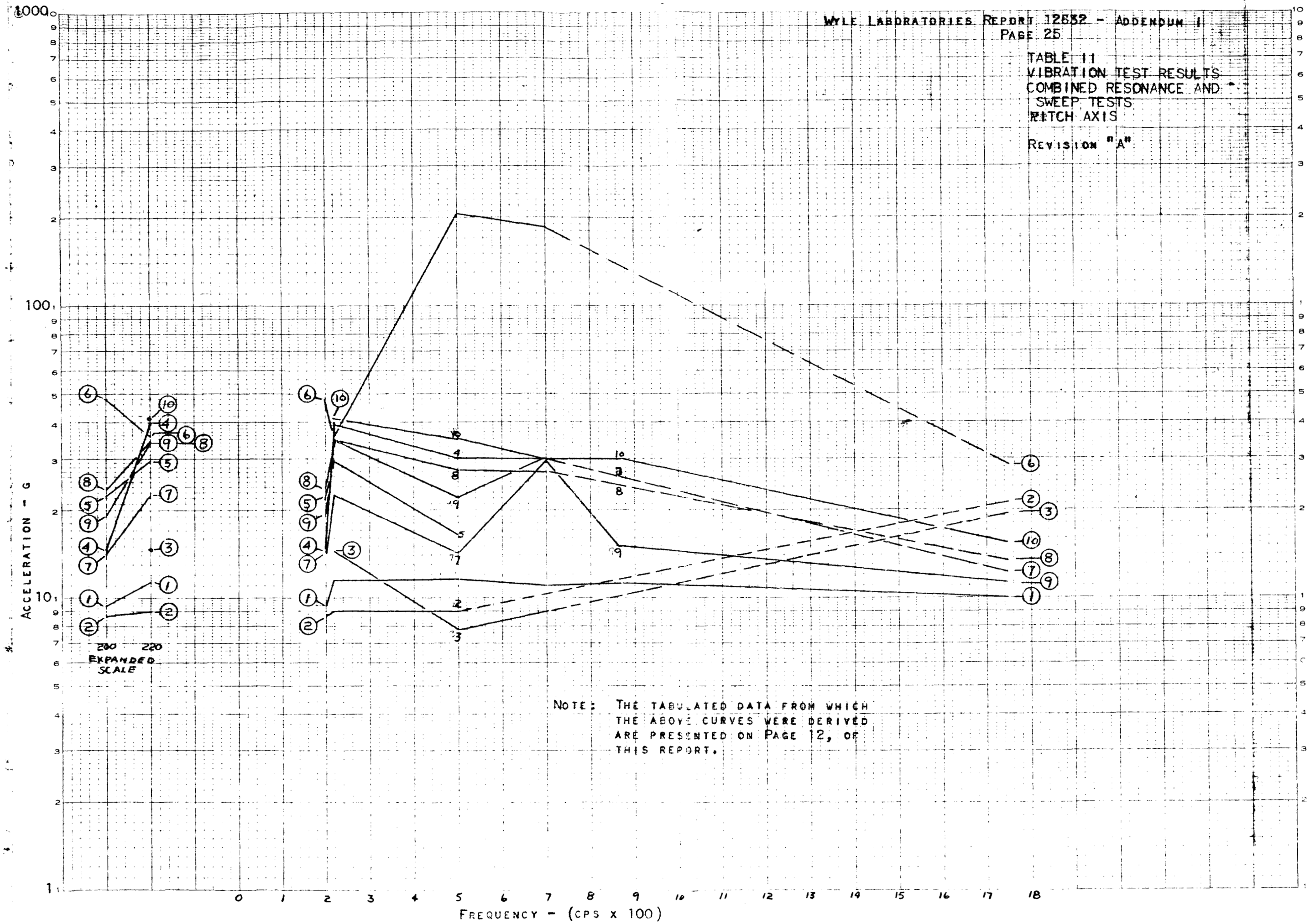
TABLE I
VIBRATION TEST RESULTS
PITCH AXIS -
RESONANCE SEARCH SWEEP
REVISION "A"



NOTE: THE TABULATED DATA FROM WHICH THE ABOVE CURVES WERE DERIVED ARE PRESENTED ON PAGE 11, OF THIS REPORT

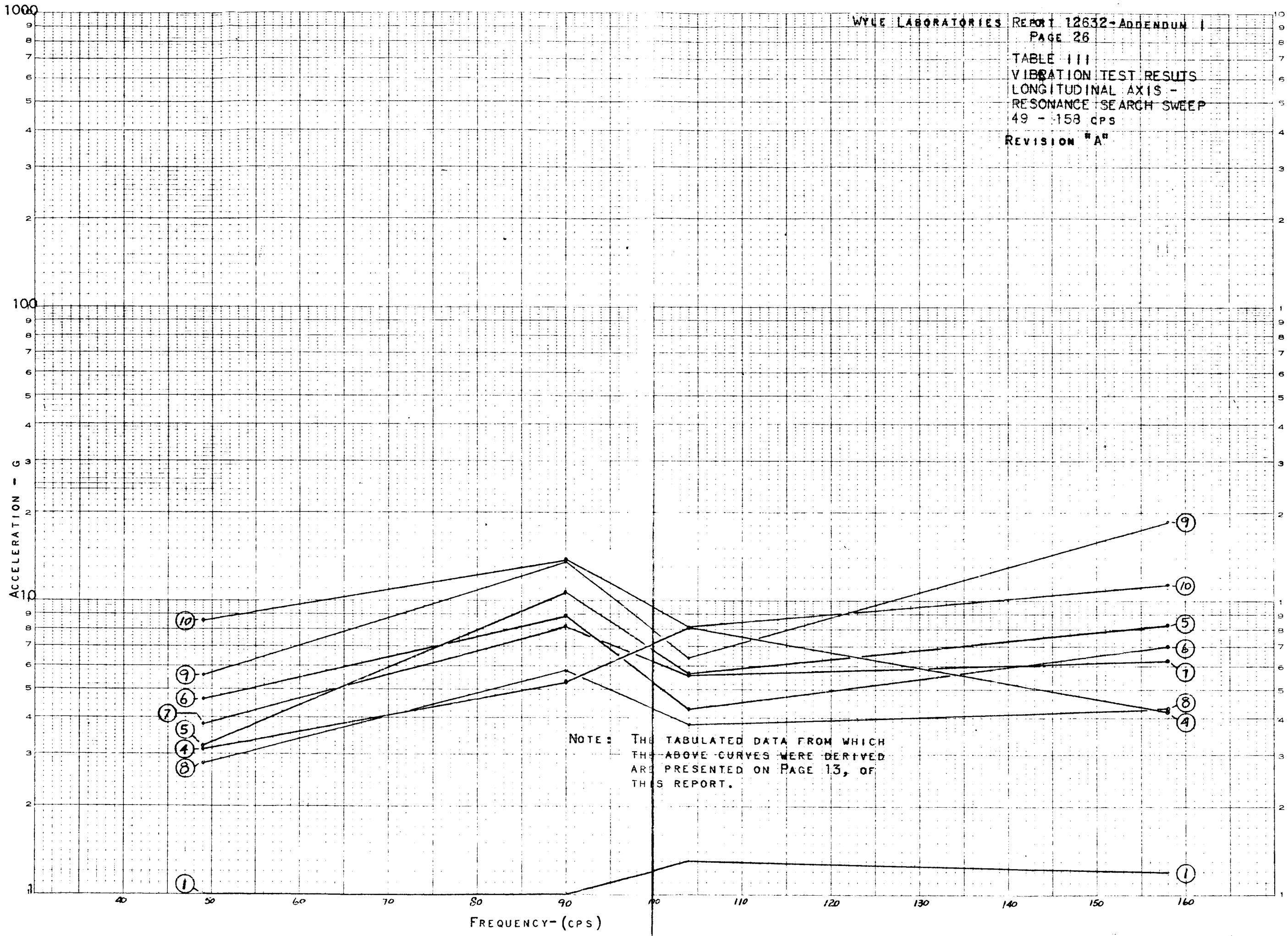
TABLE 11
VIBRATION TEST RESULTS
COMBINED RESONANCE AND
SWEEP TESTS
PITCH AXIS

REVISION "A"



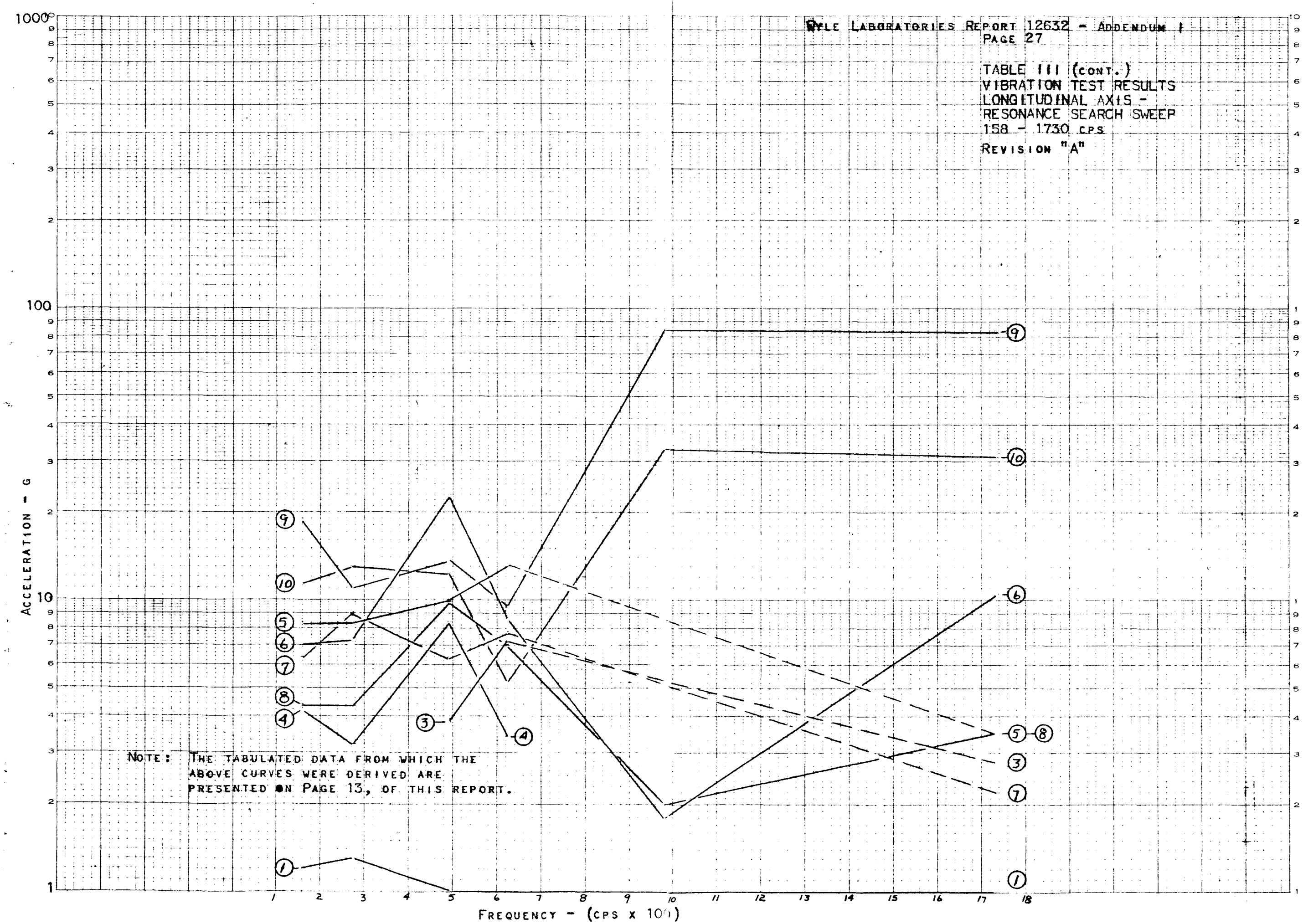
NOTE: THE TABULATED DATA FROM WHICH THE ABOVE CURVES WERE DERIVED ARE PRESENTED ON PAGE 12, OF THIS REPORT.

TABLE III
VIBRATION TEST RESULTS
LONGITUDINAL AXIS -
RESONANCE SEARCH SWEEP
49 - 158 CPS
REVISION "A"



NOTE: THE TABULATED DATA FROM WHICH THE ABOVE CURVES WERE DERIVED ARE PRESENTED ON PAGE 13, OF THIS REPORT.

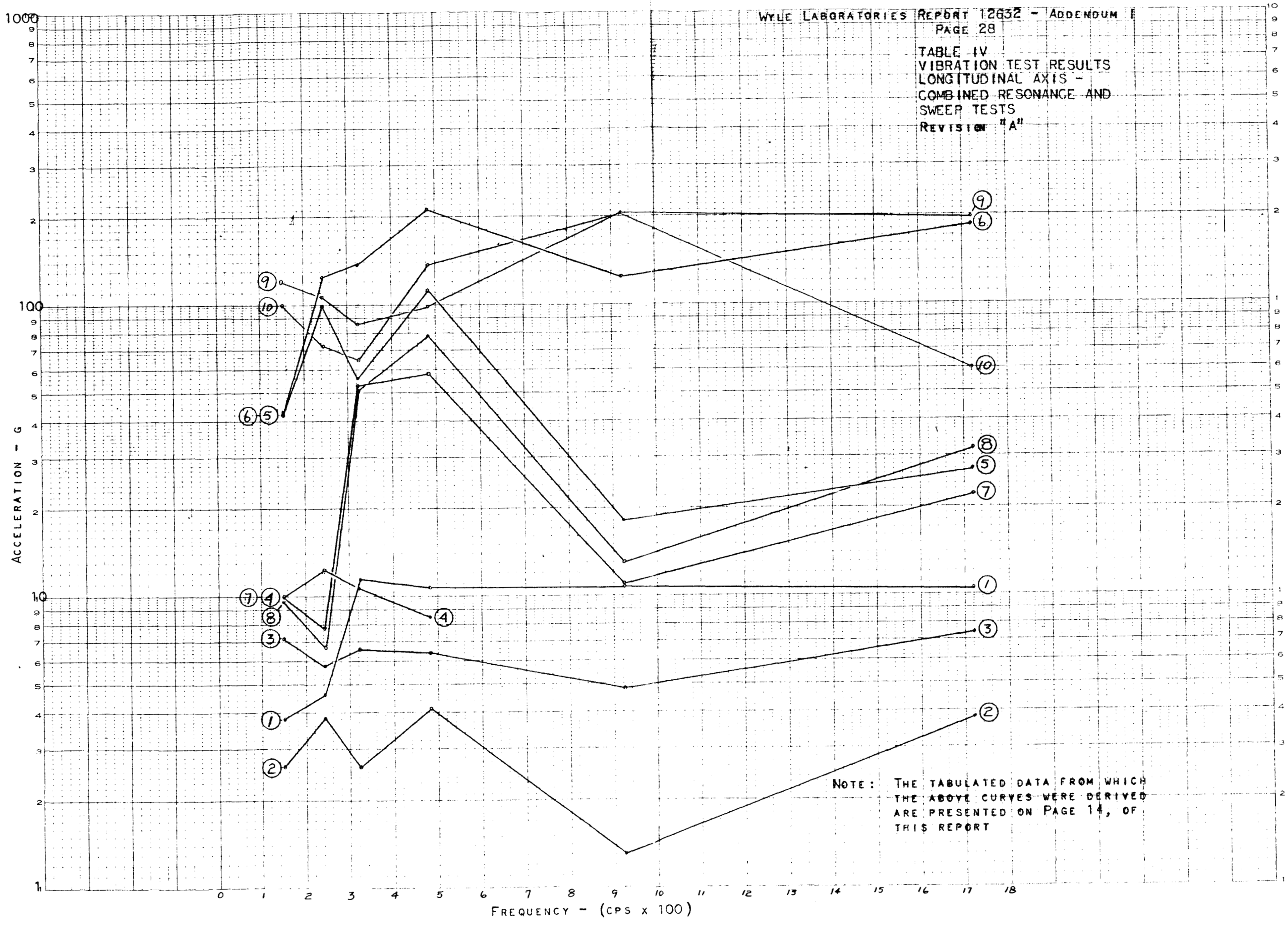
TABLE III (CONT.)
VIBRATION TEST RESULTS
LONGITUDINAL AXIS -
RESONANCE SEARCH SWEEP
158 - 1730 CPS
REVISION "A"



NOTE: THE TABULATED DATA FROM WHICH THE ABOVE CURVES WERE DERIVED ARE PRESENTED ON PAGE 13, OF THIS REPORT.

EUGENE DIETZGEN CO.
MADE IN U.S.A.
340DR-L310 DIETZGEN GRAPH PAPER
LOGARITHMIC 3 CYCLES X 140 DIVISIONS

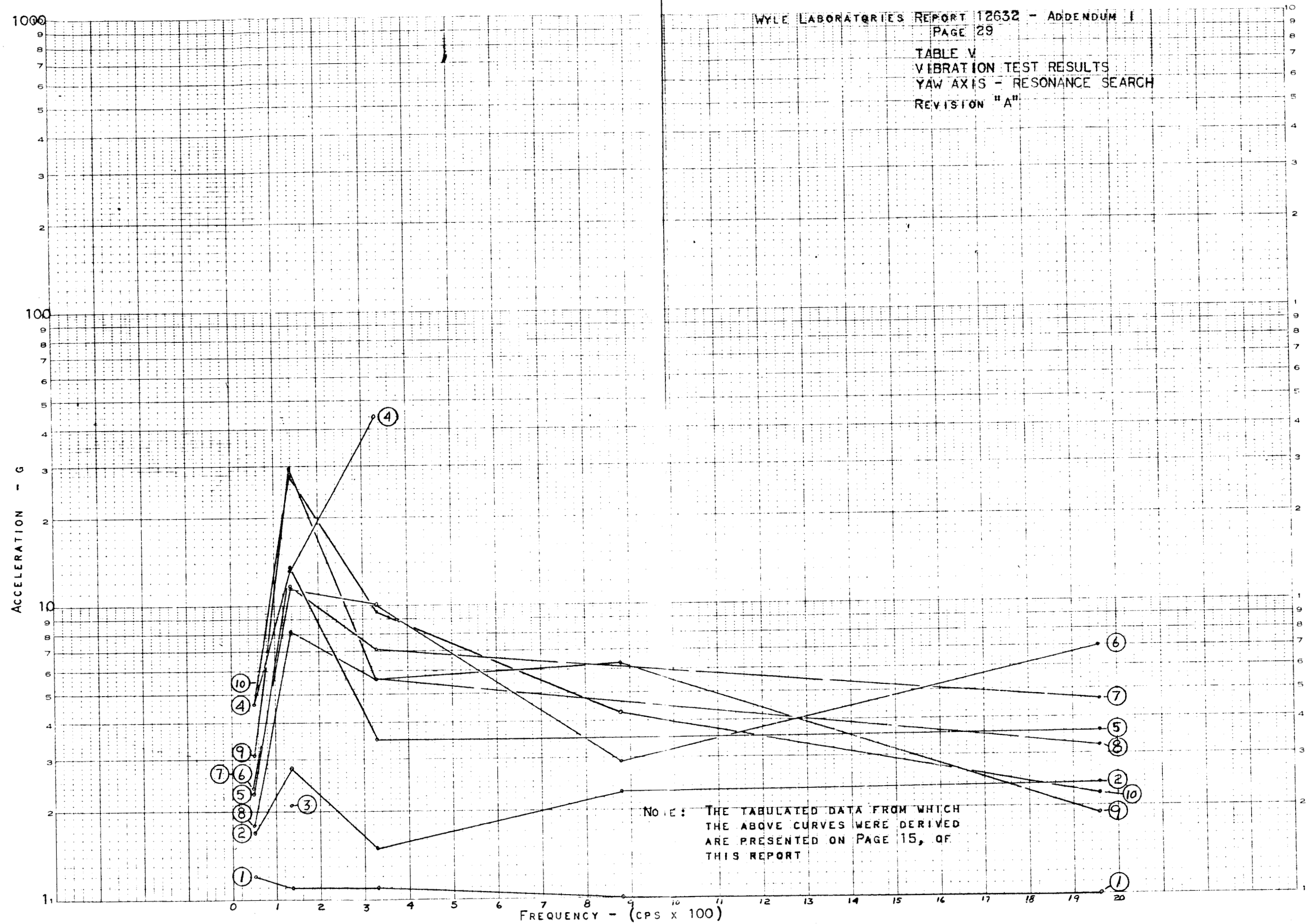
TABLE IV
VIBRATION TEST RESULTS
LONGITUDINAL AXIS -
COMBINED RESONANCE AND
SWEEP TESTS
REVISION "A"



NOTE: THE TABULATED DATA FROM WHICH THE ABOVE CURVES WERE DERIVED ARE PRESENTED ON PAGE 14, OF THIS REPORT

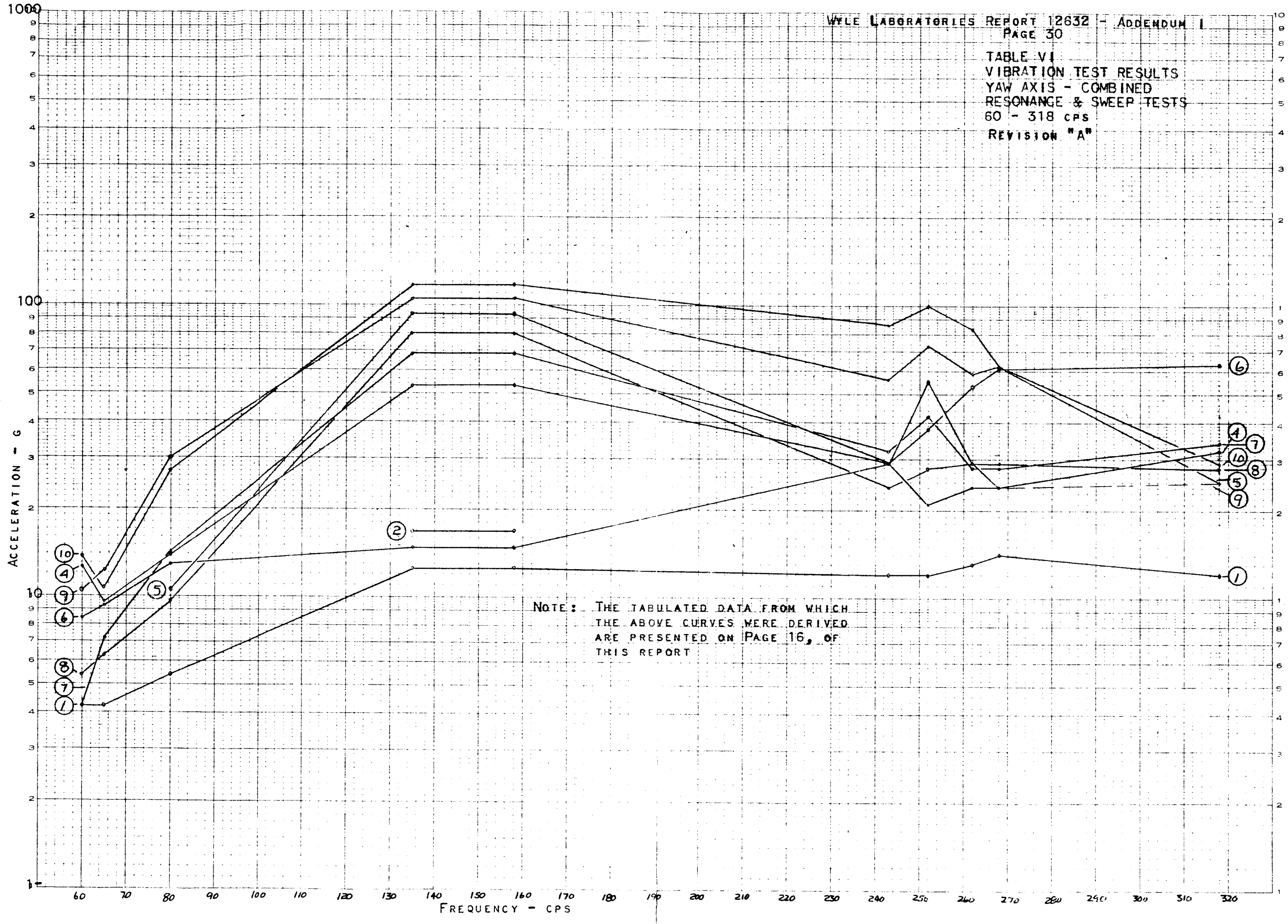
EUGENE DIETZGEN CO.
340CR-L110 DIETZGEN GRAPH PAPER
LOGARITHMIC 3 CYCLES X 140 DIVISIONS

TABLE V
VIBRATION TEST RESULTS
YAW AXIS - RESONANCE SEARCH
REVISION "A"



EUGENE DIETZGEN CO.
340DR LOGARITHMIC 3 CYCLES DIETZGEN GRAPH PAPER X 140 DIVISIONS

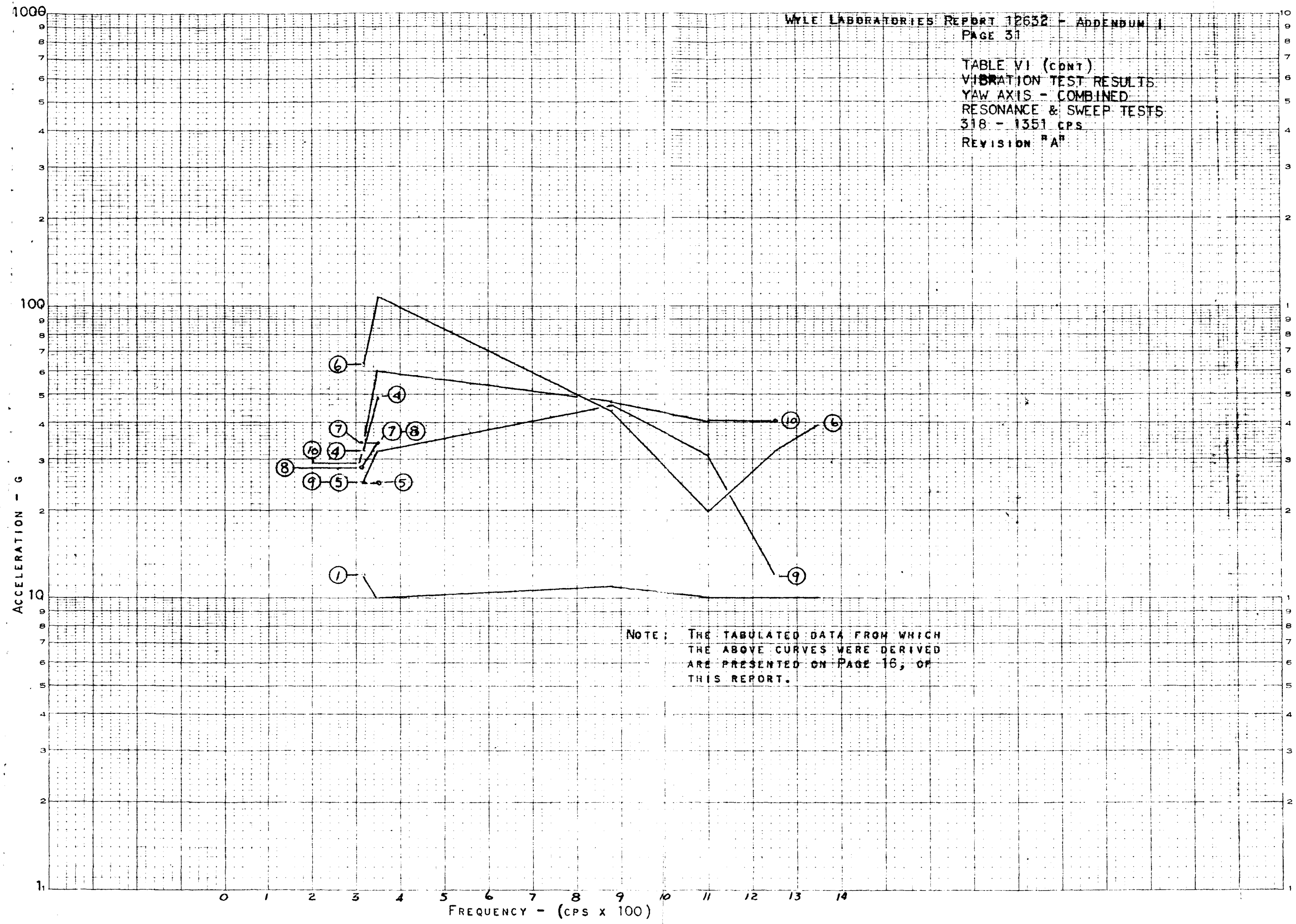
TABLE VI
VIBRATION TEST RESULTS
YAW AXIS - COMBINED
RESONANCE & SWEEP TESTS
60 - 318 CPS
REVISION "A"



NOTE: THE TABULATED DATA FROM WHICH THE ABOVE CURVES WERE DERIVED ARE PRESENTED ON PAGE 16, OF THIS REPORT

EUGENE DIETZGEN CO.
LOGARITHMIC 3 CYCLES X 140 DIVISIONS

TABLE VI (CONT)
VIBRATION TEST RESULTS
YAW AXIS - COMBINED
RESONANCE & SWEEP TESTS
318 - 1351 CPS
REVISION "A"



NOTE: THE TABULATED DATA FROM WHICH THE ABOVE CURVES WERE DERIVED ARE PRESENTED ON PAGE 16, OF THIS REPORT.

PITCH AXIS SET-UP
WITH DOME REMOVED