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LAMB MULTIBURST CALCULATIONS FOR VARIOUS ATTACK SCENARIOS.(U)
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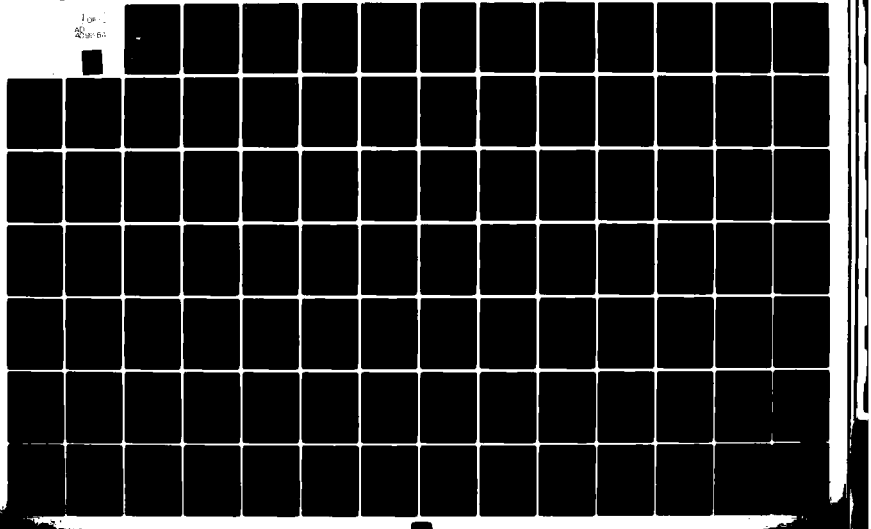

LAMB MULTIBURST CALCULATIONS FOR VARIOUS ATTACK SCENARIOS

H. J. Abeyta
Capt W. E. Gifford, III
J. W. Aubrey

May 1980

Final Report

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Prepared for
Director
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Washington, DC 20305

AIR FORCE WEAPONS LABORATORY
Air Force Systems Command
Kirtland Air Force Base, NM 87117

A

This final report was prepared by the Air Force Weapons Laboratory, Kirtland Air Force Base, New Mexico, under Job Order WDNB4405. Mr James W. Aubrey (NTESB) was the Laboratory Project Officer-in-Charge.

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Overpressure	Nuclear
Overpressure Impulse	

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report contains the results of 33 Low Altitude Multiburst (LAMB) calculations. These calculations provide overpressure and overpressure impulse time histories, as well as shock front velocities for 12 multiburst attack scenarios. Yields of 1, 3, and 5 Mt were used in these calculations, with shelter spacing of 1000, 1500, or 2000 m.

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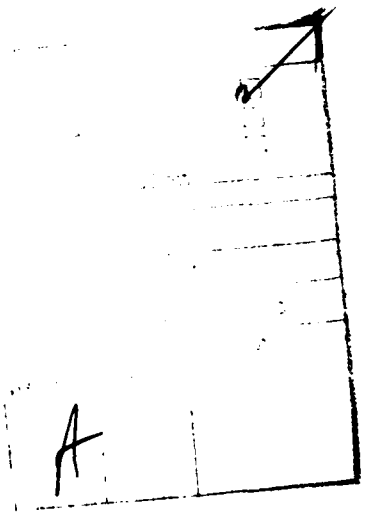


INTRODUCTION

This report consists of 33 LAMB calculations (Table 1) and a description of the data. It was written to provide overpressure and overpressure impluse-time histories as well as shock front velocities for various multiburst scenarios. The Air Force Weapons Laboratory LAMB code was used because of its fast computation running time and economy.

TABLE 1. MULTIBURST PROBLEM MATRIX

Problem		RV/Shelter Attack	Yield	HOB	Spacing	PEAKS PRES (MPa)	PEAKS IMP (MPa-s)
1	33.1012	1/2(a)	3 Mt	0 m	1500 m	3.5	2.4
2	33.1122	1/2(b)	3 Mt	0 m	1500 m	7.6	1.9
3	33.1232	1/2(c)	3 Mt	0 m	1500 m	3.6	2.5
4	33.1142	1/2(d)	3 Mt	0 m	1500 m	7.6	1.8
5	33.8001	1/3	3 Mt	0 m	1000 m	18.	2.8
6	33.8002	1/3	3 Mt	0 m	1500 m	4.8	1.3
7	33.8003	1/3	3 Mt	0 m	2000 m	2.0	0.7
8	53.8001	1/3	5 Mt	0 m	1000 m	30.	4.7
9	53.8002	1/3	5 Mt	0 m	1500 m	7.8	2.1
10	53.8003	1/3	5 Mt	0 m	2000 m	3.2	1.2
11	33.8012	1/3(a)	3 Mt	0 m	1500 m	4.8	1.4
12	53.8012	1/3(a)	5 Mt	0 m	1500 m	7.8	2.2
13	33.8032	1/3(c)	3 Mt	0 m	1500 m	2.3	1.4
14	53.8032	1/3(c)	5 Mt	0 m	1500 m	3.8	2.5
15	33.1201	1/3(e)	3 Mt	0 m	1000 m	9.3	4.6
16	33.1202	1/3(e)	3 Mt	0 m	1500 m	3.5	2.1
17	33.1203	1/3(e)	3 Mt	0 m	2000 m	1.7	1.1
18	53.1201	1/3(e)	5 Mt	0 m	1000 m	15.	8.0
19	53.1202	1/3(e)	5 Mt	0 m	1500 m	5.6	3.5
20	53.1203	1/3(e)	5 Mt	0 m	2000 m	2.7	2.0
21	53.6001	1/4	5 Mt	0 m	1000 m	15.	2.5
22	53.6002	1/4	5 Mt	0 m	1500 m	4.1	1.2
23	53.6003	1/4	5 Mt	0 m	2000 m	1.8	0.66
24	33.6011	1/4(a)	3 Mt	0 m	1000 m	9.0	1.4
25	33.6012	1/4(a)	3 Mt	0 m	1500 m	2.6	0.68
26	33.6013	1/4(a)	3 Mt	0 m	2000 m	1.1	0.34
27	53.6011	1/4(a)	5 Mt	0 m	1000 m	15.	2.2
28	53.6012	1/4(a)	5 Mt	0 m	1500 m	4.1	1.1
29	53.6013	1/4(a)	5 Mt	0 m	2000 m	1.8	0.64
30	13.1211	2/3	1 Mt	0 m	1000 m	4.8	2.2
31	13.1212	2/3	1 Mt	0 m	1500 m	2.0	1.1
32	13.1213	2/3	1 Mt		2000 m	1.0	0.64
33	13.1012	2/3(a)	1 Mt	0 m	1500 m	1.4	0.84

APPROACH

A uniform laydown of reentry vehicles (RV) over an evenly distributed system of targets (shelters) was assumed. The ratio of RV to targets was used to describe the attack laydown pattern. Thus, attack scenario 1/2 refers to an attack laydown such that there is one RV attacking each pair of shelters. The suffixes on the various scenarios (e.g., 1/2 (a)) refer to the different laydown configurations possible. Using this nomenclature, the 12 attack scenarios examined were 1/2(a), 1/2(b), 1/2(c), 1/2(d), 1/3, 1/3(a), 1/3(c), 1/3(e), 1/4, 1/4(a), 2/3 and 2/3(a) (figures are in Appendix A). Yields of 1, 3 and 5 Mt were used. Spacing between shelters was 1000, 1500, or 2000 m. Bursts were numbered sequentially as a function of increasing angle clockwise from 0° (top of page) and were detonated simultaneously at ground level.

Stations were not colocated with shelters (which tend to fall on symmetry points) for the following reasons:

1. The LAMB code underpredicts peak overpressure at symmetry points.
2. Perfect symmetry will not occur in MX construction.
3. Zero CEP is highly improbable.
4. Assuming zero CEP, simultaneous detonation and perfect symmetry are not operationally obtainable environments.

Thus, measuring overpressure-time histories at nonsymmetry points provides more realistic waveforms for physically plausable attack scenarios. Stations were placed 100 m from the shelter and 20° off a direct line between the shelter and the nearest burst (Fig. 1). Three stations were required to define overpressure and overpressure impulse-time histories for the 1/3 and 1/3(a) scenarios. One station sufficed for each of the other scenarios.

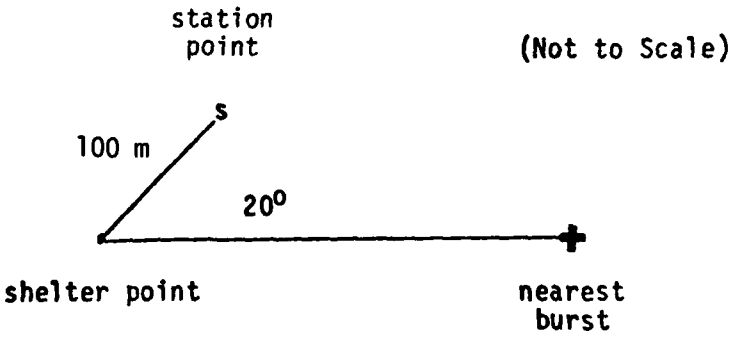


Figure 1. Shelter-station relation.

Test cases were run to determine the number of bursts to be used in each calculation. These test cases represent the worst possible attacks (for the scenarios examined) in terms of the number of bursts reaching the station point at approximately the same time. The results of the test cases (Fig. 2 through 7) show that restrictions on the number of bursts in a calculation could be made while preserving the significant overpressure-time history at the station point. All bursts which were within four closest burst-to-shelter radii of the shelter were included in the calculations for the 1/3 and 1/4 scenarios. For economy, the number of bursts was restricted to 12 for each of the other scenarios.

All the calculations were run to detonation time, plus 12 s. All of the shock waves had passed over each station by this time. The shock front velocities were computed in the following manner:

> A shock velocity function subroutine, VSHCK, was called from the LAMB code with height of burst, shock radius, height-of-station point, and yield as input parameters. The analytic expression used for shock velocity was obtained from the Rankine-Hugoniot relation:

$$U = c\left(1 + \frac{\gamma + 1}{2\gamma} \cdot \frac{\Delta P}{P}\right)^{1/2}$$

where

U = shock front velocity
c = ambient speed of sound
γ = ratio of specific heats for air
ΔP = overpressure
P = ambient pressure
γ = 1.4 was used for this case

The direction of the shock was determined by computing the angle between the burst and the station in polar coordinates.

RESULTS

Overpressure and overpressure impulse-time histories are presented in Appendix B. The number associated with each peak is the burst number. The shock arrival time (s), shock velocity (m/s), shock direction (°), burst number, and burst range (m) are presented in tabular form. The attack scenario is presented at each overpressure plot where the number corresponds to a burst point and the letter s depicts a station point (Appendix A). Shock direction is equivalent to the bearing from the burst. As it passes over the station, the shock is travelling parallel to the bearing from burst station. Burst range refers to the distance between the burst and station.

TEST CASE

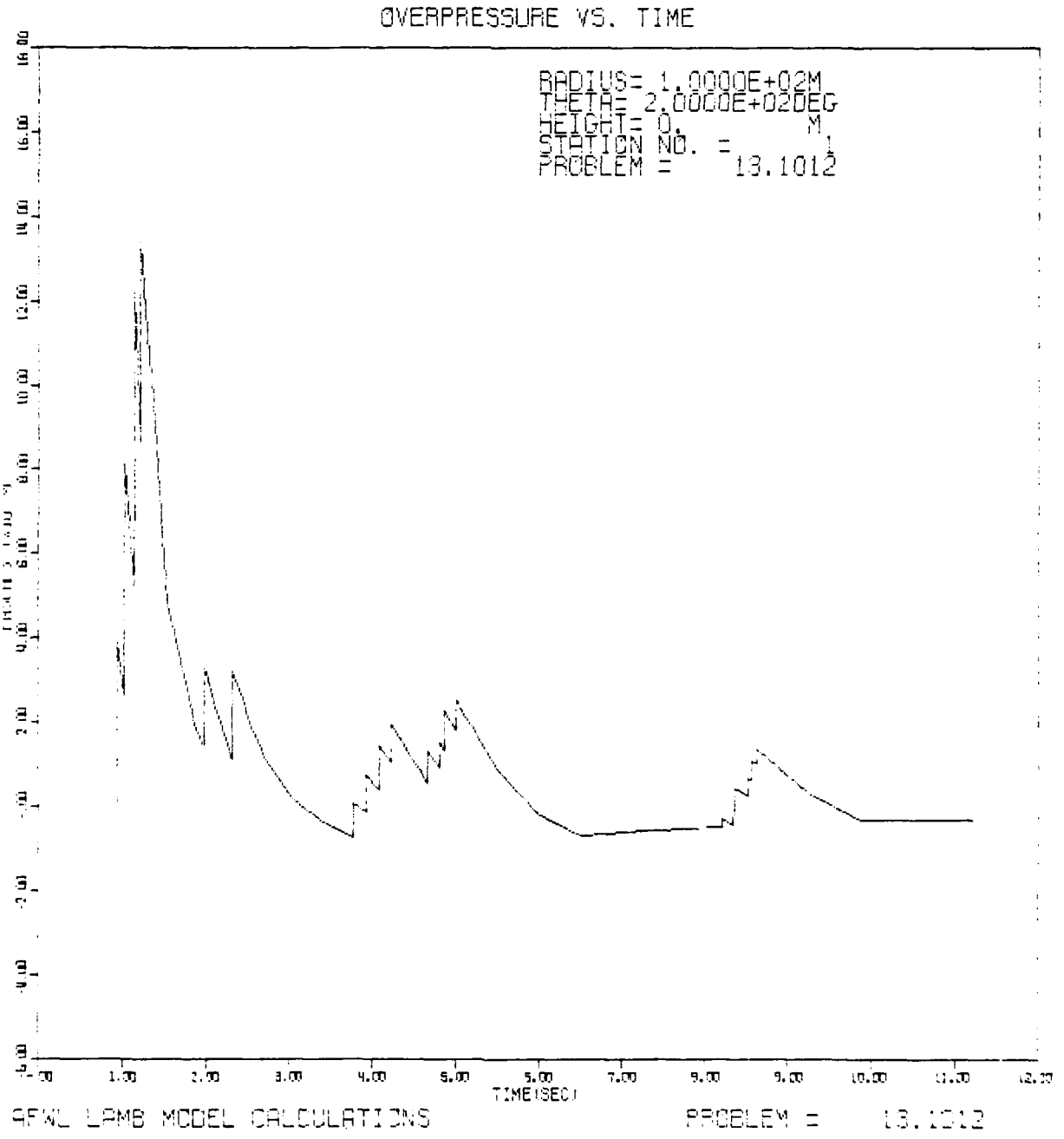


Figure 2. Overpressure versus time-2/3(a) attack (with added bursts).

TEST CASE

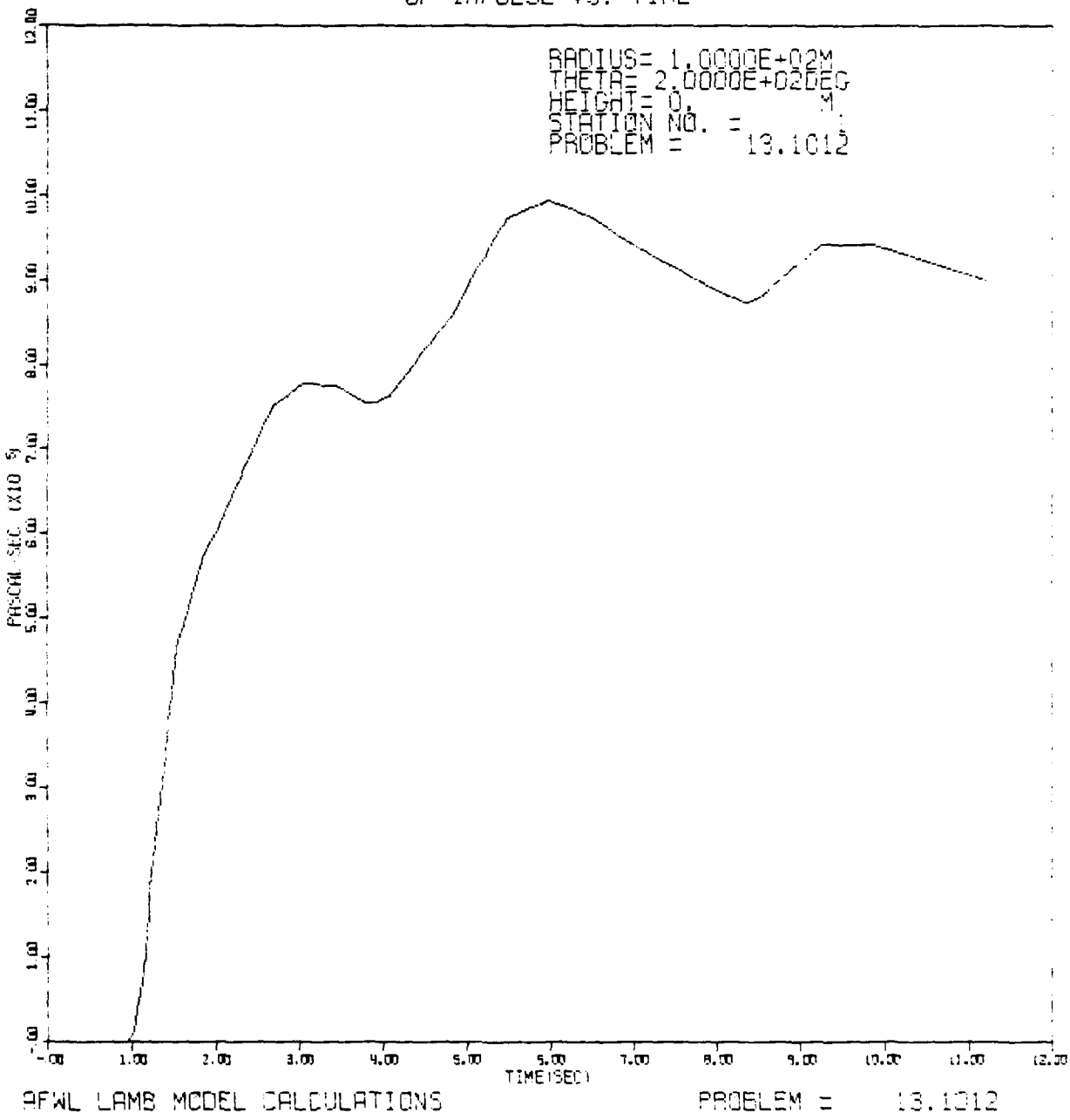


Figure 3. Overpressure pulse versus time-2/3(a) attack (with added bursts).

TEST CASE

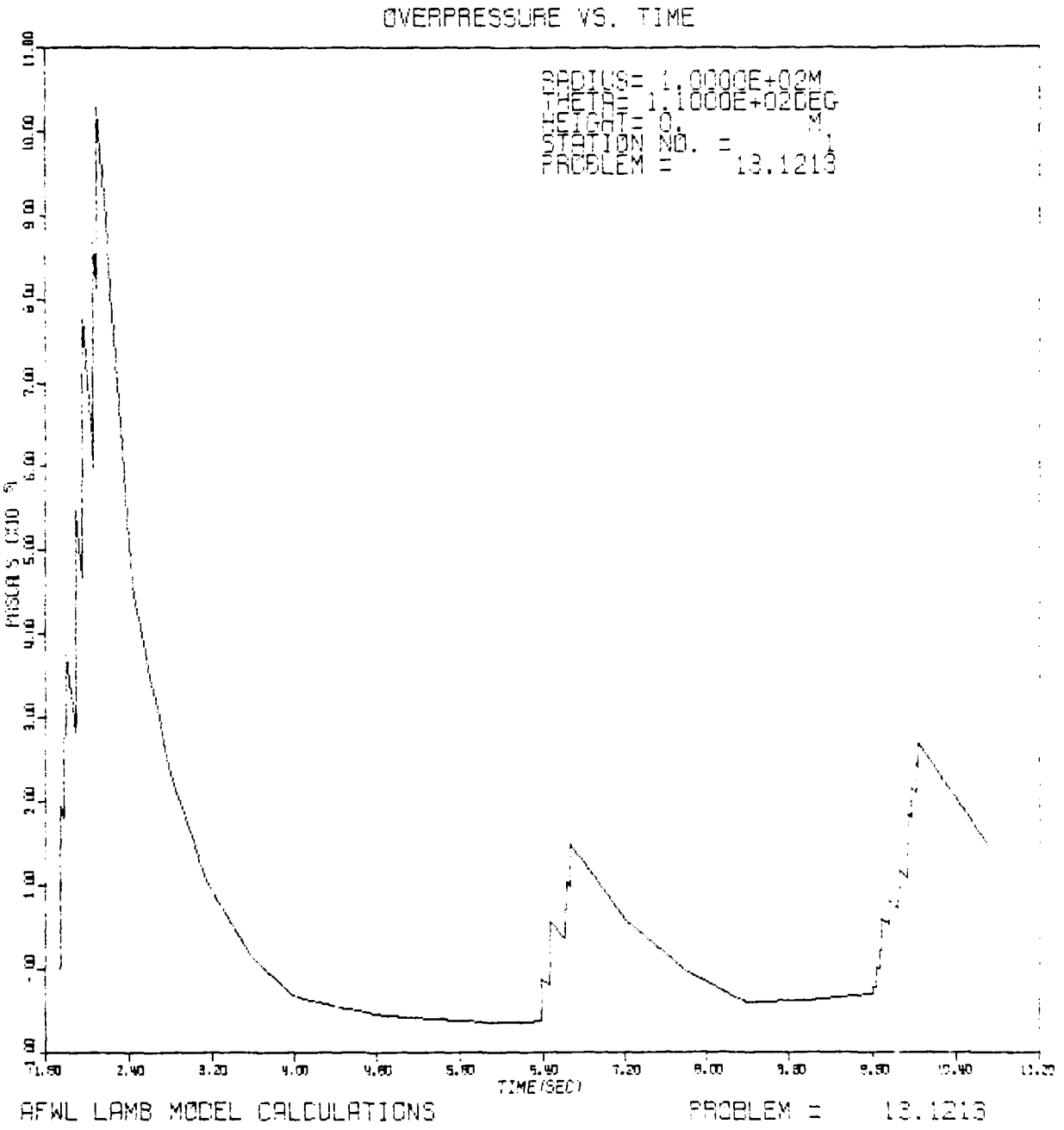


Figure 4. Overpressure versus time-2/3 attack (with added bursts).

TEST CASE

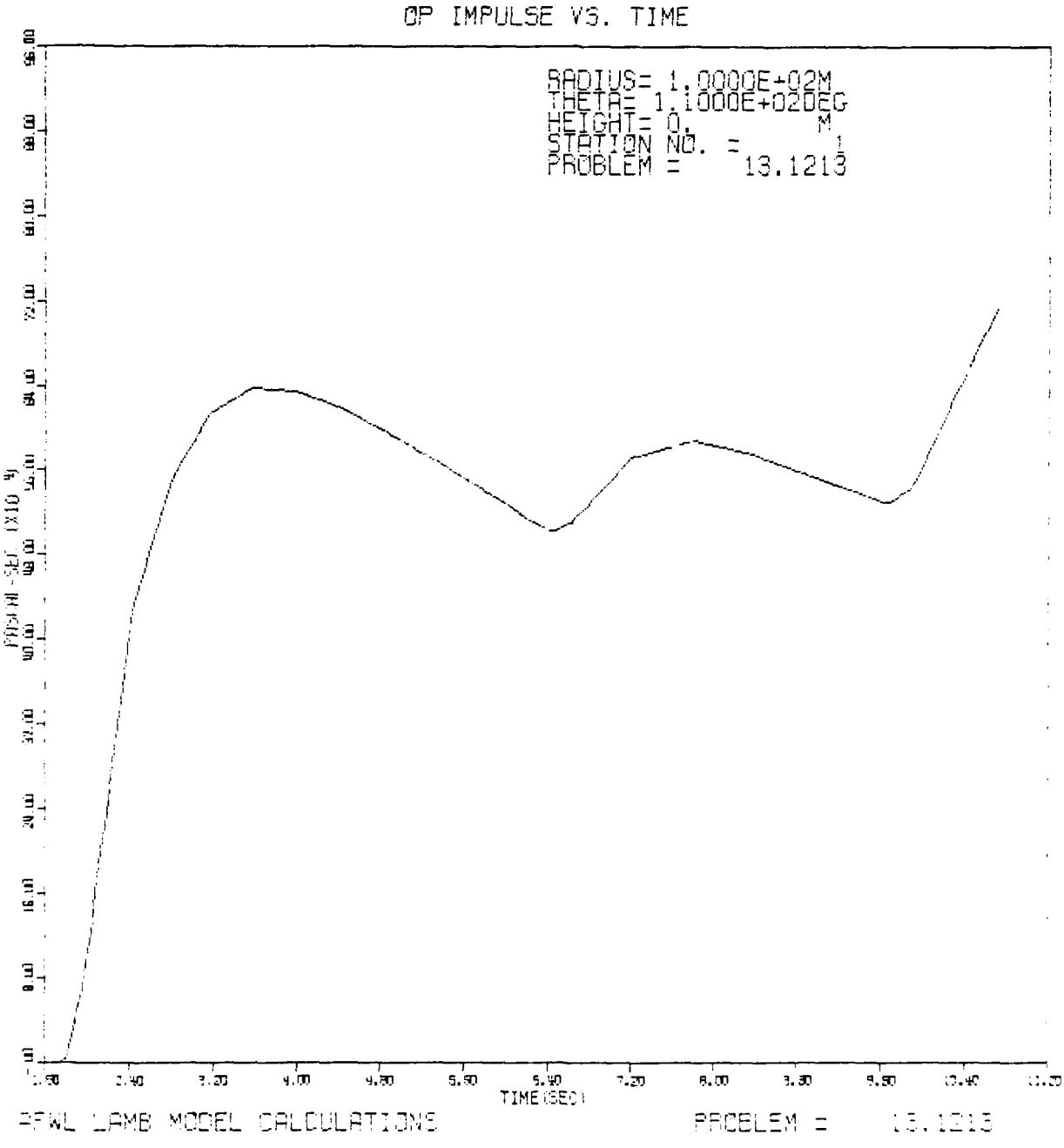


Figure 5. Overpressure impulse versus time-2/3 attack (with added bursts).

TEST CASE

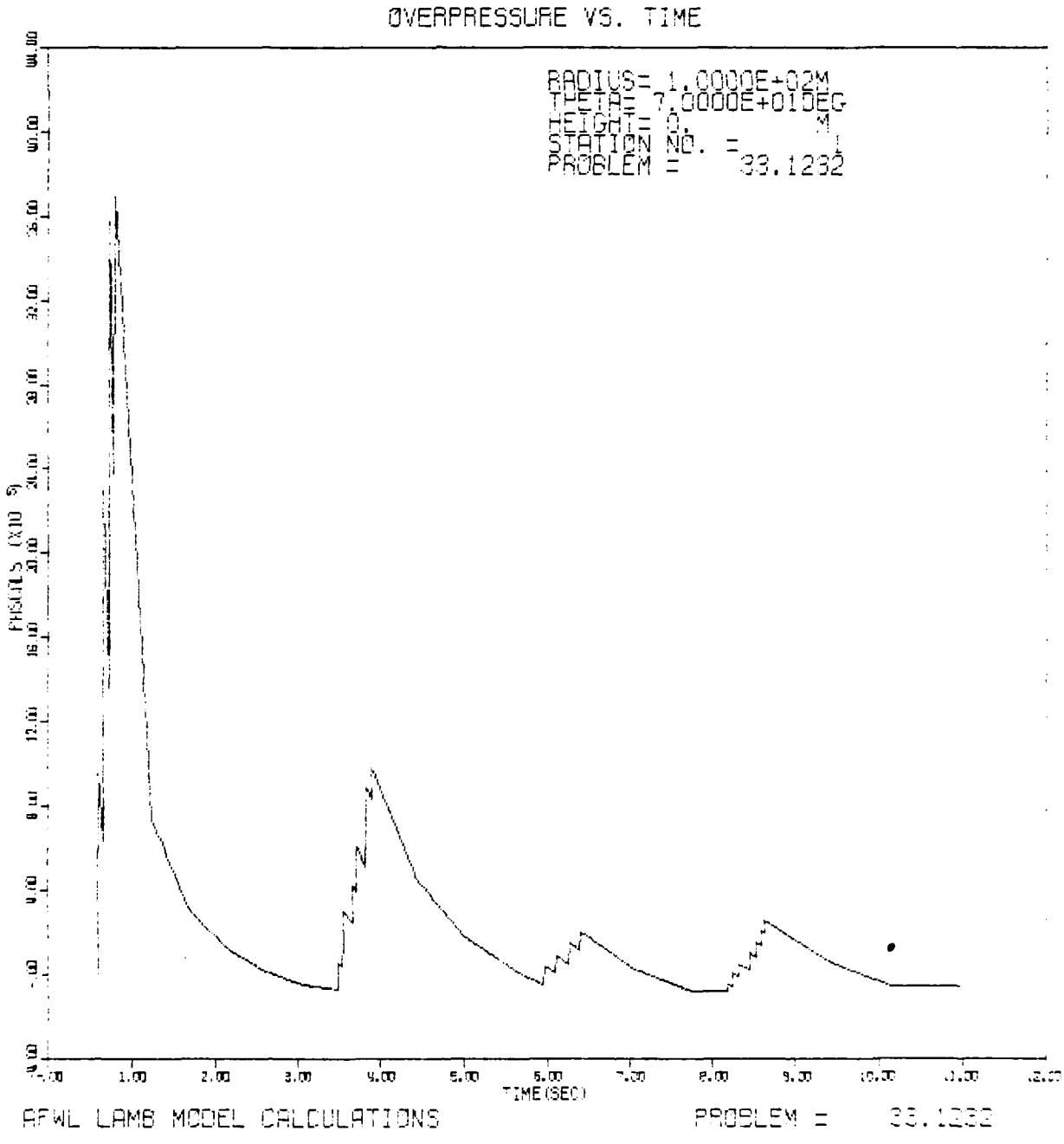


Figure 6. Overpressure versus time-1/2(c) attack (with added bursts).

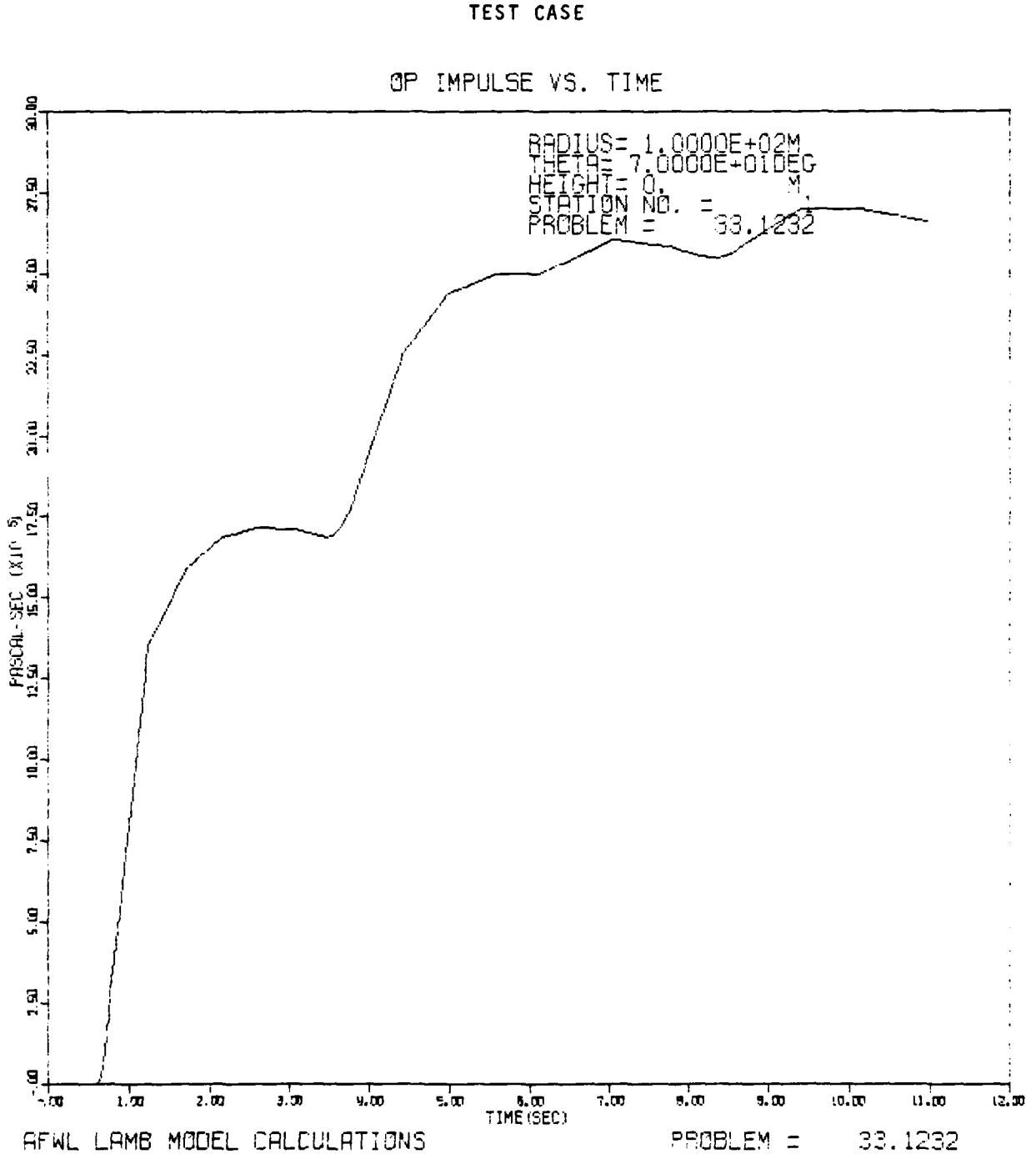


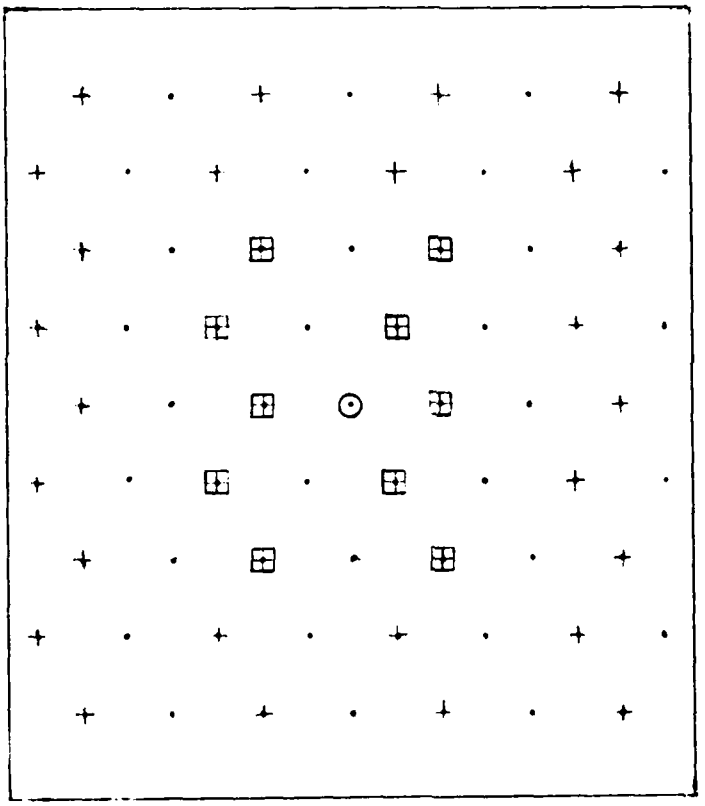
Figure 7. Overpressure impulse versus time-1/2(c) attack (with added bursts).

APPENDIX A

The following 12 figures illustrate the various attack scenarios used in this multiburst study. Included in these figures are launch points, aim points, calculational burst points and station points. The various attack scenarios are described as a ratio of RV to targets. For example, a 1/2 scenario refers to one RV attacking each pair of targets.

LEGEND:

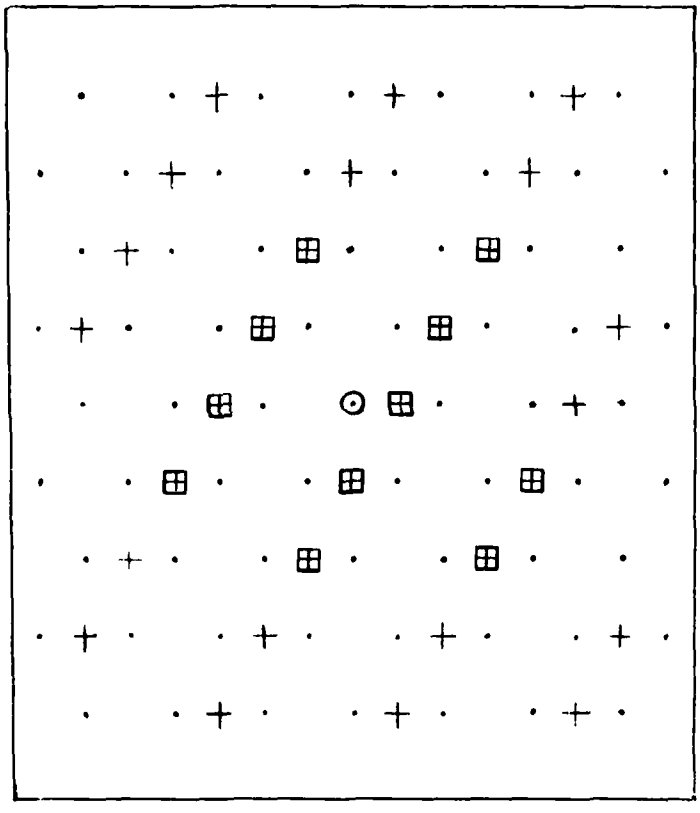
·	Launch Point
+	Aim Point
□	Calculation Burst Point
○	Station Point



1/2(a) ATTACK

LEGEND:

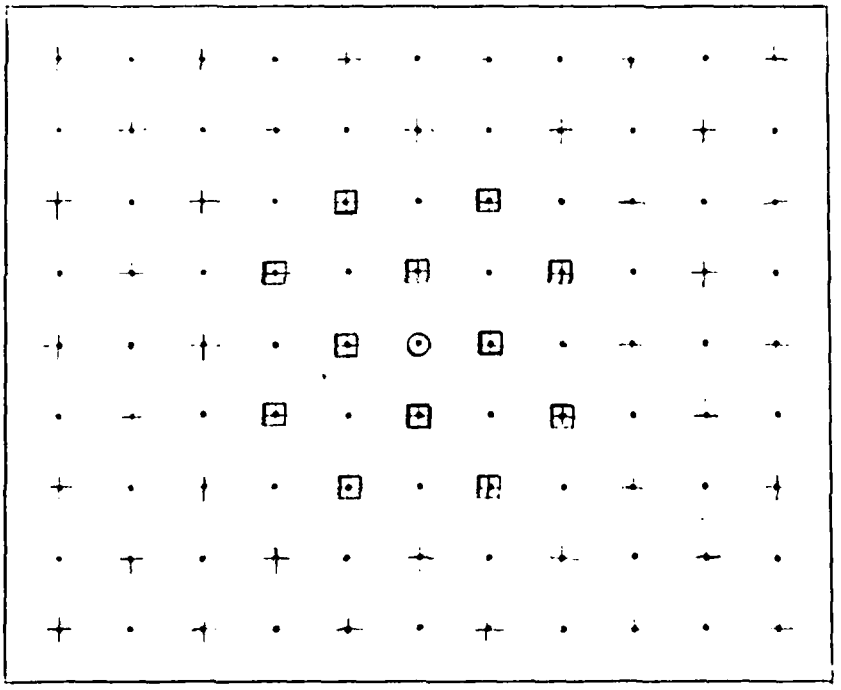
·	Launch Point
+	Aim Point
□	Calculation Burst Point
○	Station Point



1/2(b) ATTACK

LEGEND:

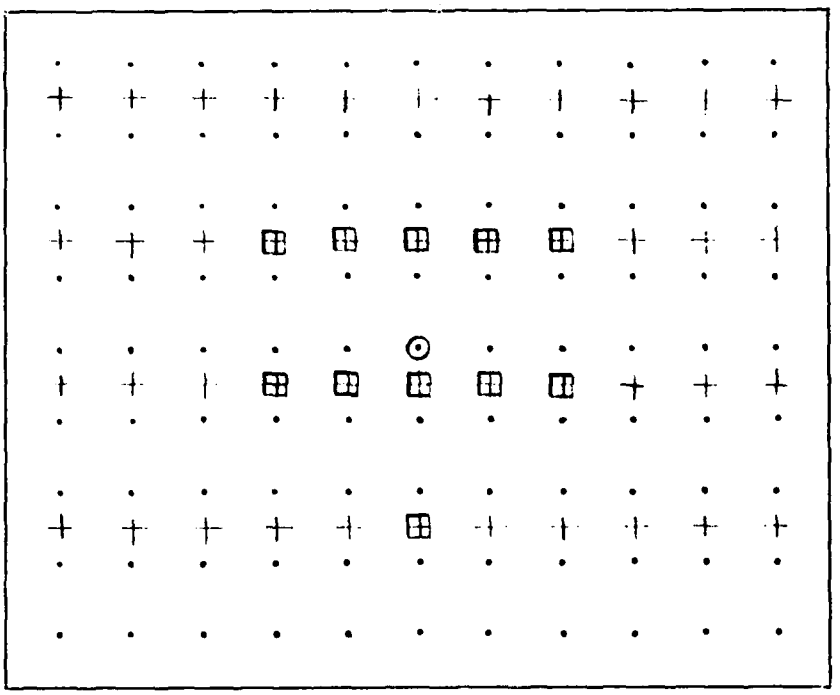
·	Launch Point
+	Aim Point
□	Calculation Burst Point
○	Station Point



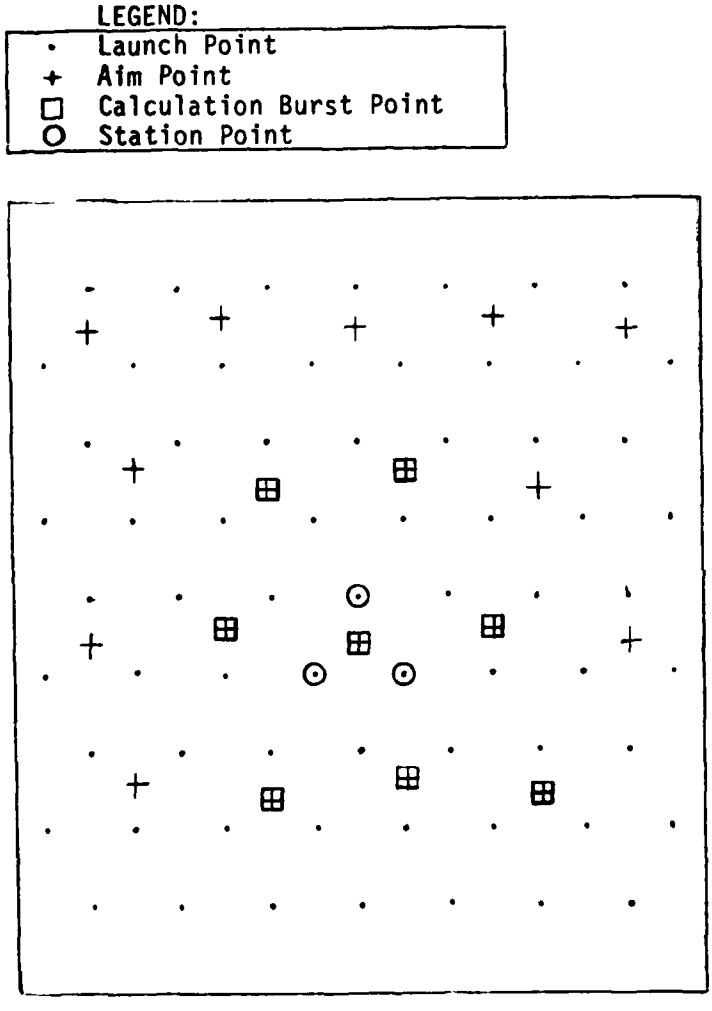
1/2(c) ATTACK

LEGEND:

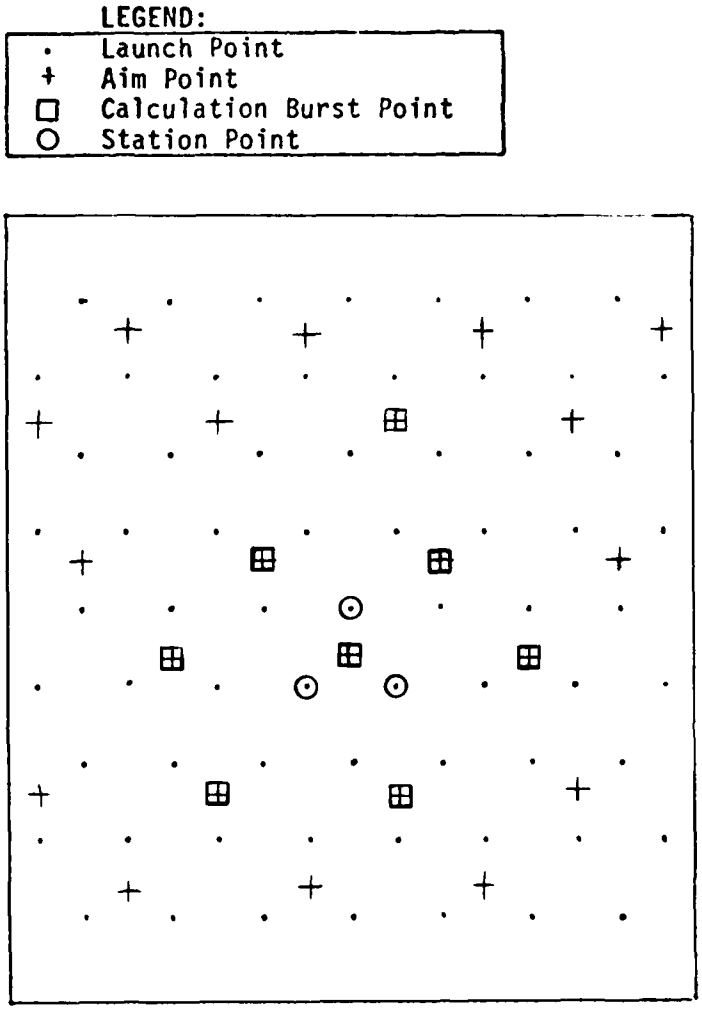
- Launch Point
- Aim Point
- Calculation Burst Point
- Station Point



1/2(d) ATTACK


LEGEND:
Launch Point
Aim Point
Calculation Burst Point
Station Point

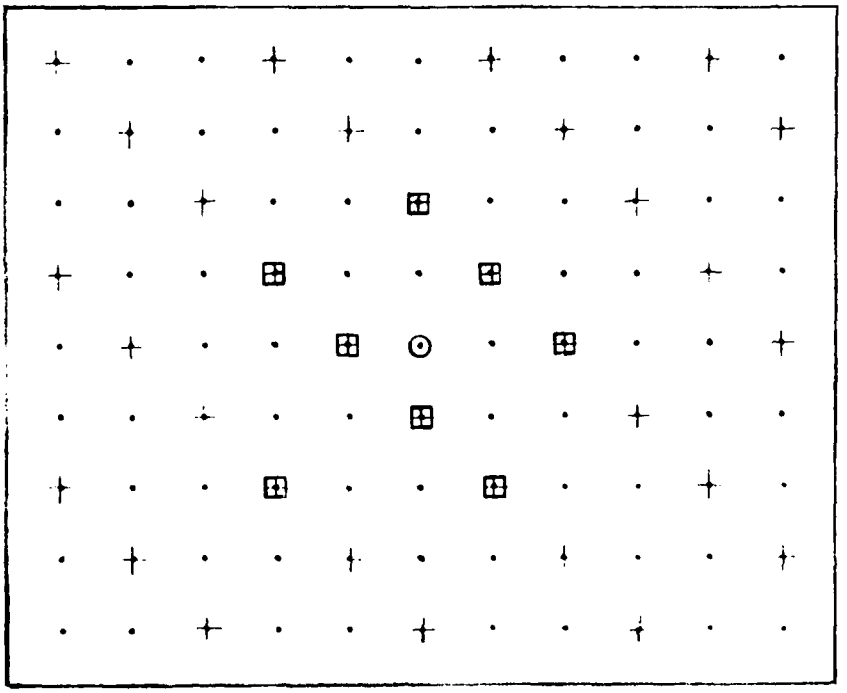
1/3 ATTACK


LEGEND:
Launch Point
Aim Point
Calculation Burst Point
Station Point

1/3(a) ATTACK

LEGEND:

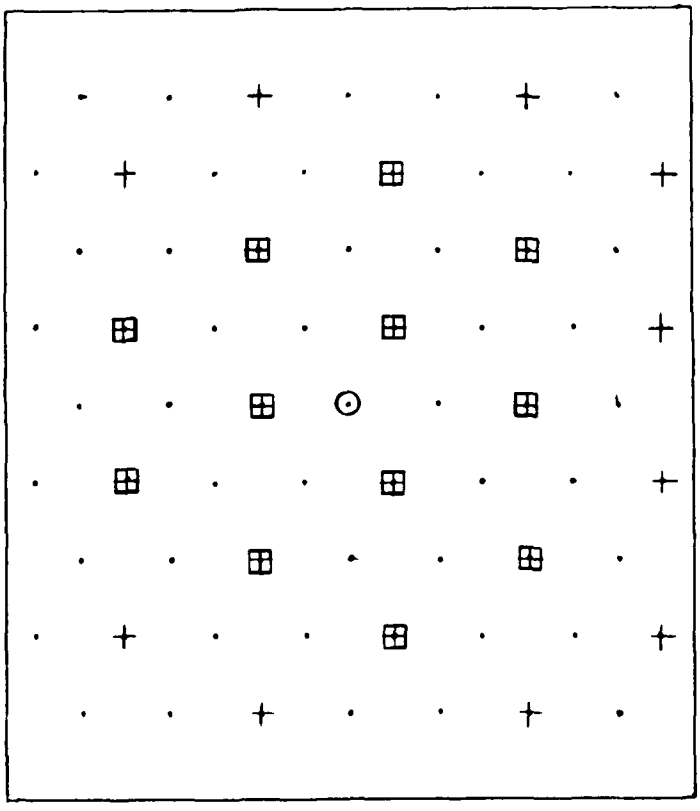
- Launch Point
- Aim Point
- Calculation Burst Point
- Station Point



1/3(c) ATTACK

LEGEND:

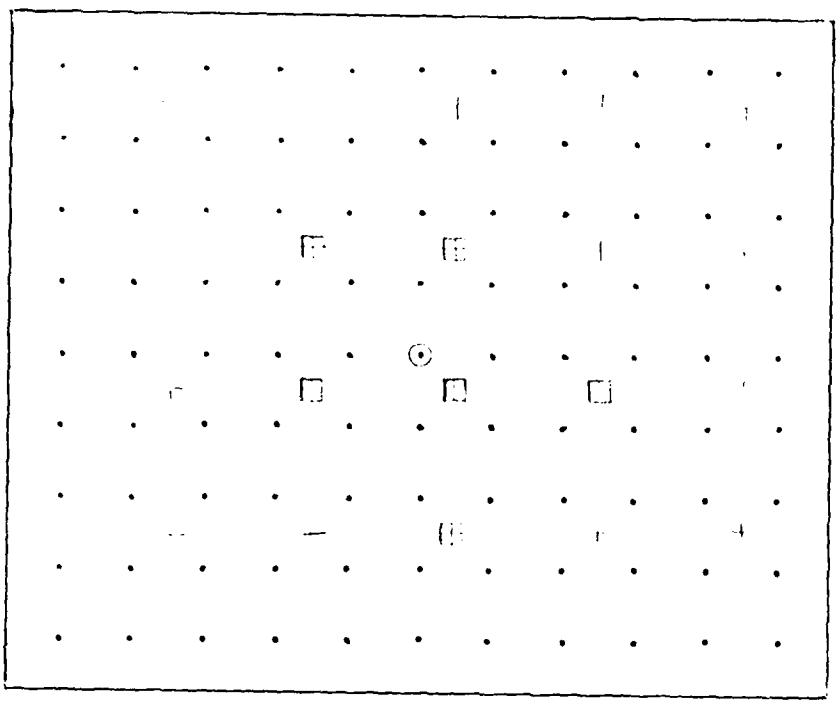
·	Launch Point
+	Aim Point
□	Calculation Burst Point
○	Station Point



1/3(e) ATTACK

LEGEND:

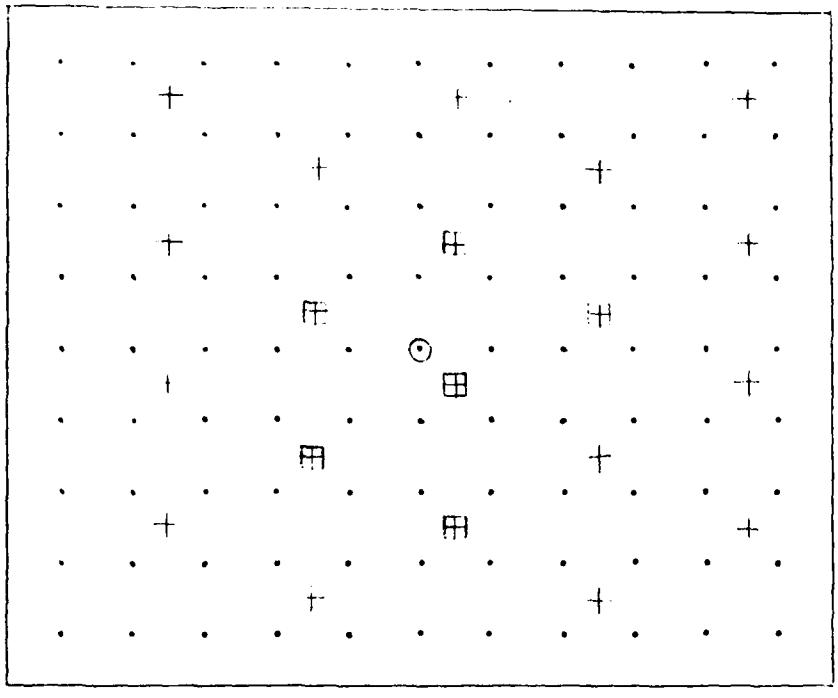
·	Launch Point
+	Aim Point
□	Calculation Burst Point
○	Station Point



1/4 ATTACK

LEGEND:

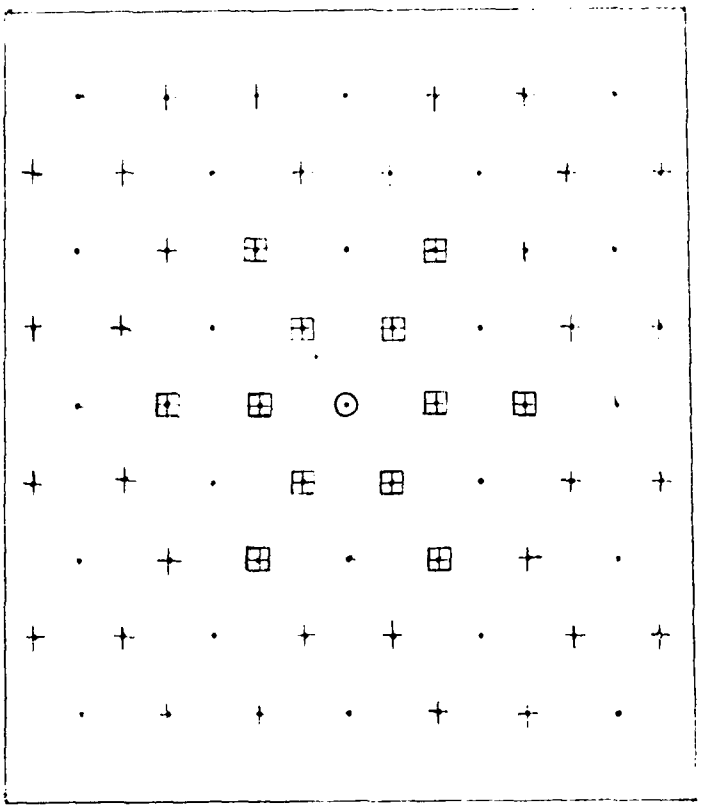
·	Launch Point
+	Aim Point
□	Calculation Burst Point
○	Station Point



1/4(a) ATTACK

LEGEND:

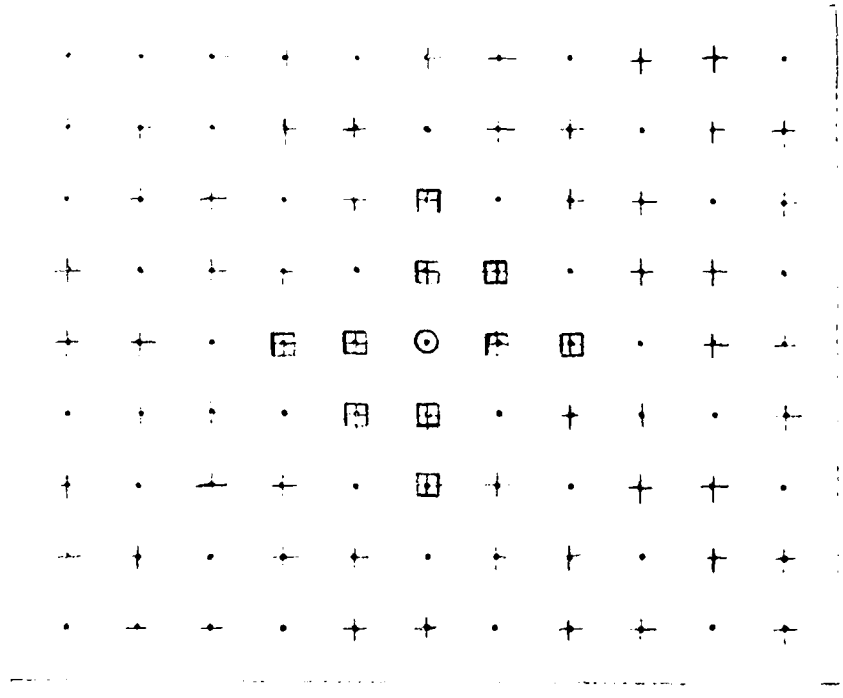
·	Launch Point
+	Aim Point
□	Calculation Burst Point
○	Station Point



2/3 ATTACK

LEGEND:

·	Launch Point
+	Aim Point
□	Calculation Burst Point
O	Station Point



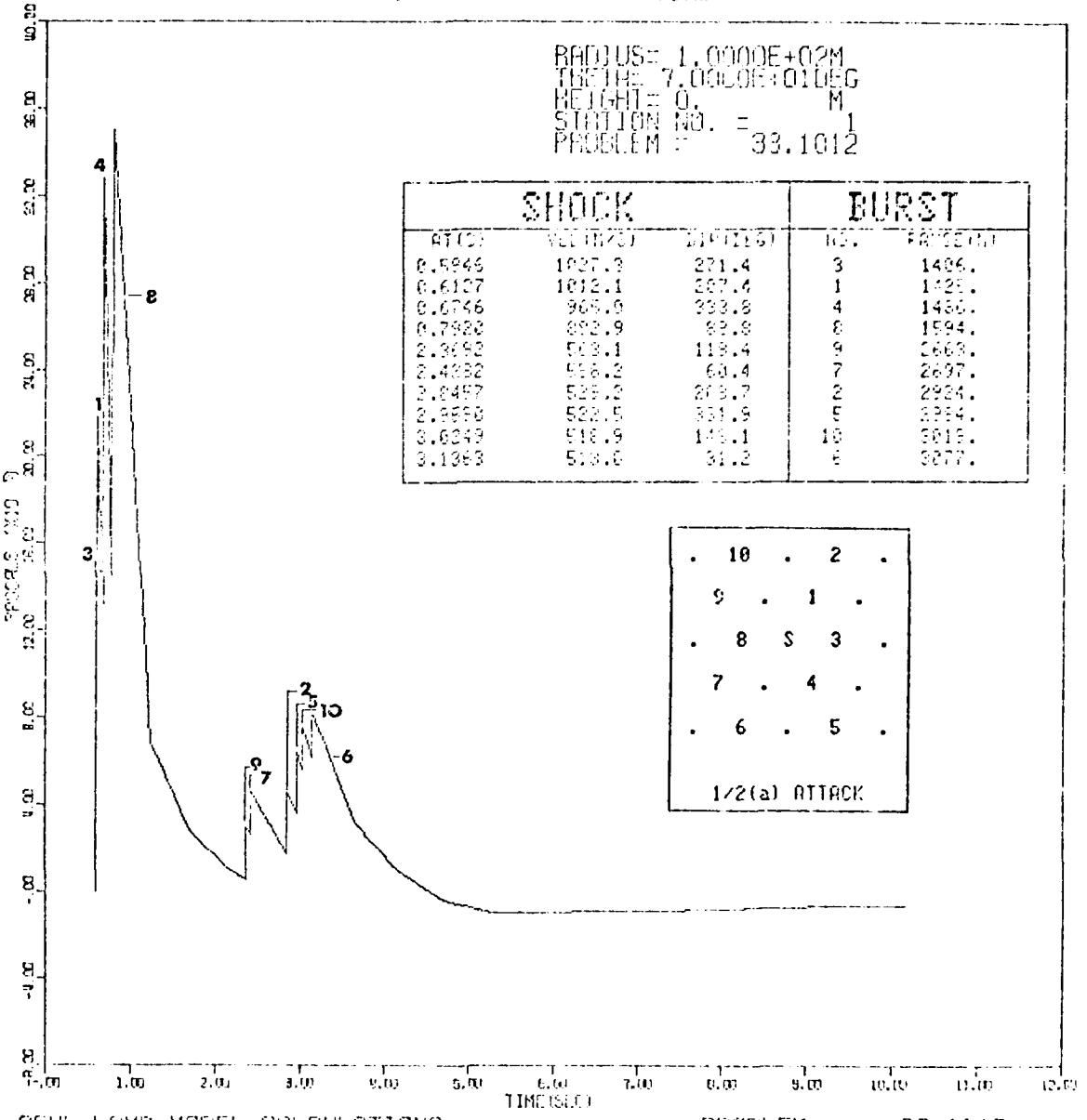
2/3(a) ATTACK

APPENDIX B

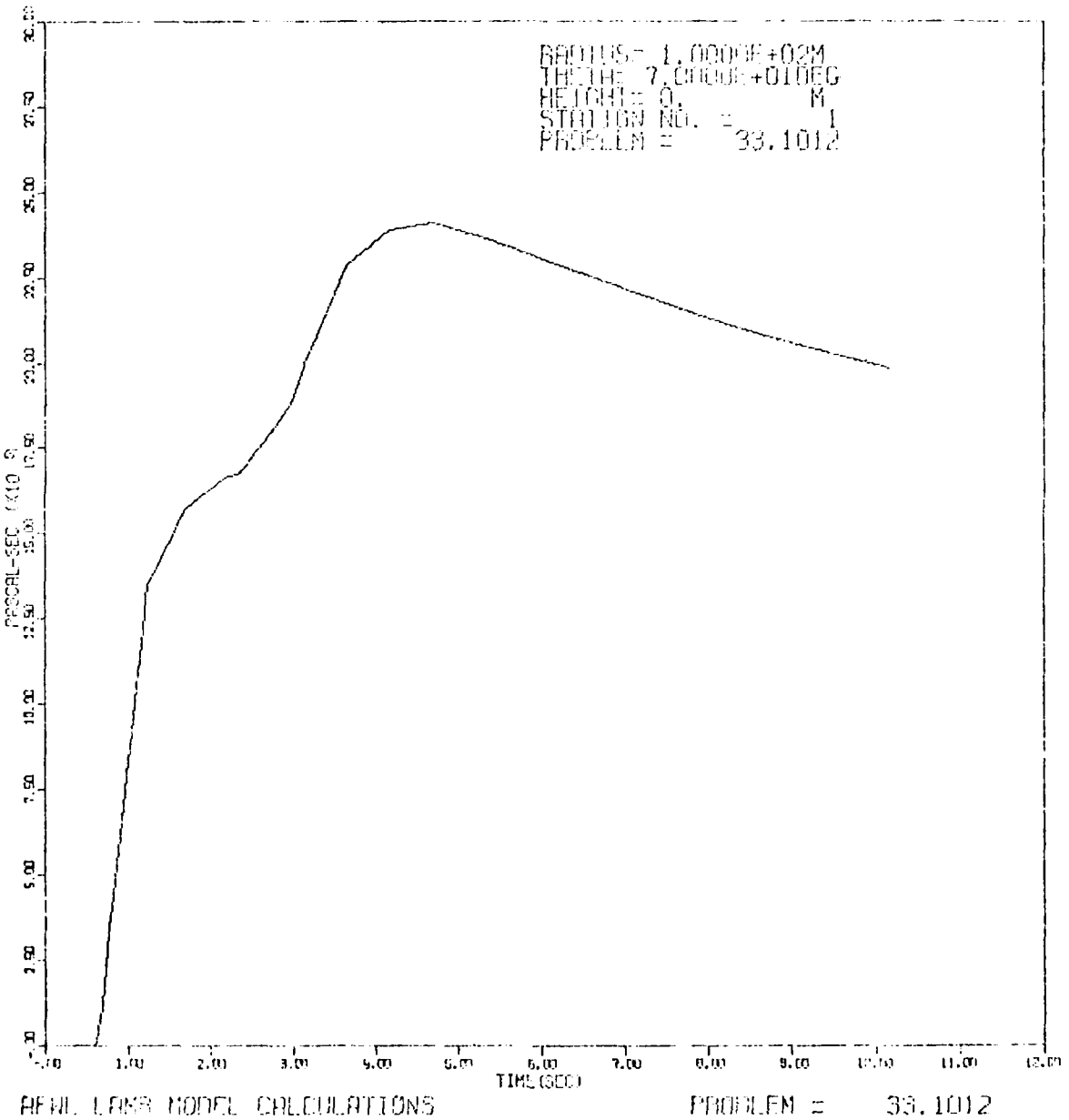
The following figures are overpressure and overpressure impulse-time histories of the various attacks described in Appendix A. The burst number associated with the overpressure peaks corresponds to the attack scenario burst number inset on each plot. In addition, the shock arrival time, shock velocity, shock direction, burst number and burst range are presented on the overpressure plots.

HOB= 0m
YIELD= 3Mt
SPACING= 1500m

OVERPRESSURE VS. TIME

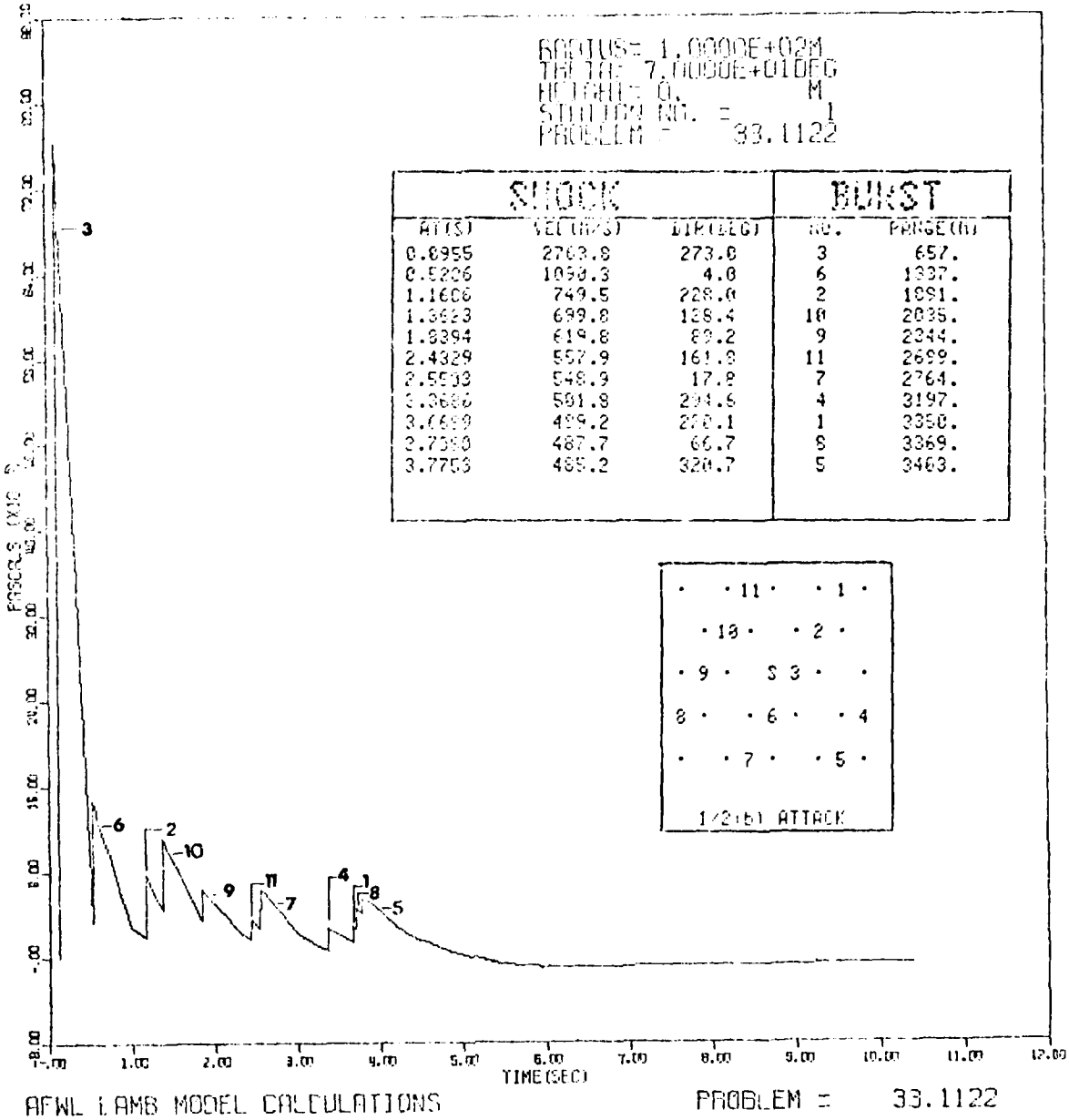


AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.1012


OP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETHE 7.0000E+01DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.1012
PASCAL-SEC (X10 0
TIME(SEC)
AEWL LANS MODEL CALCULATIONS
PROBLEM = 33.1012

HOB= 0m
YIELD= 3Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



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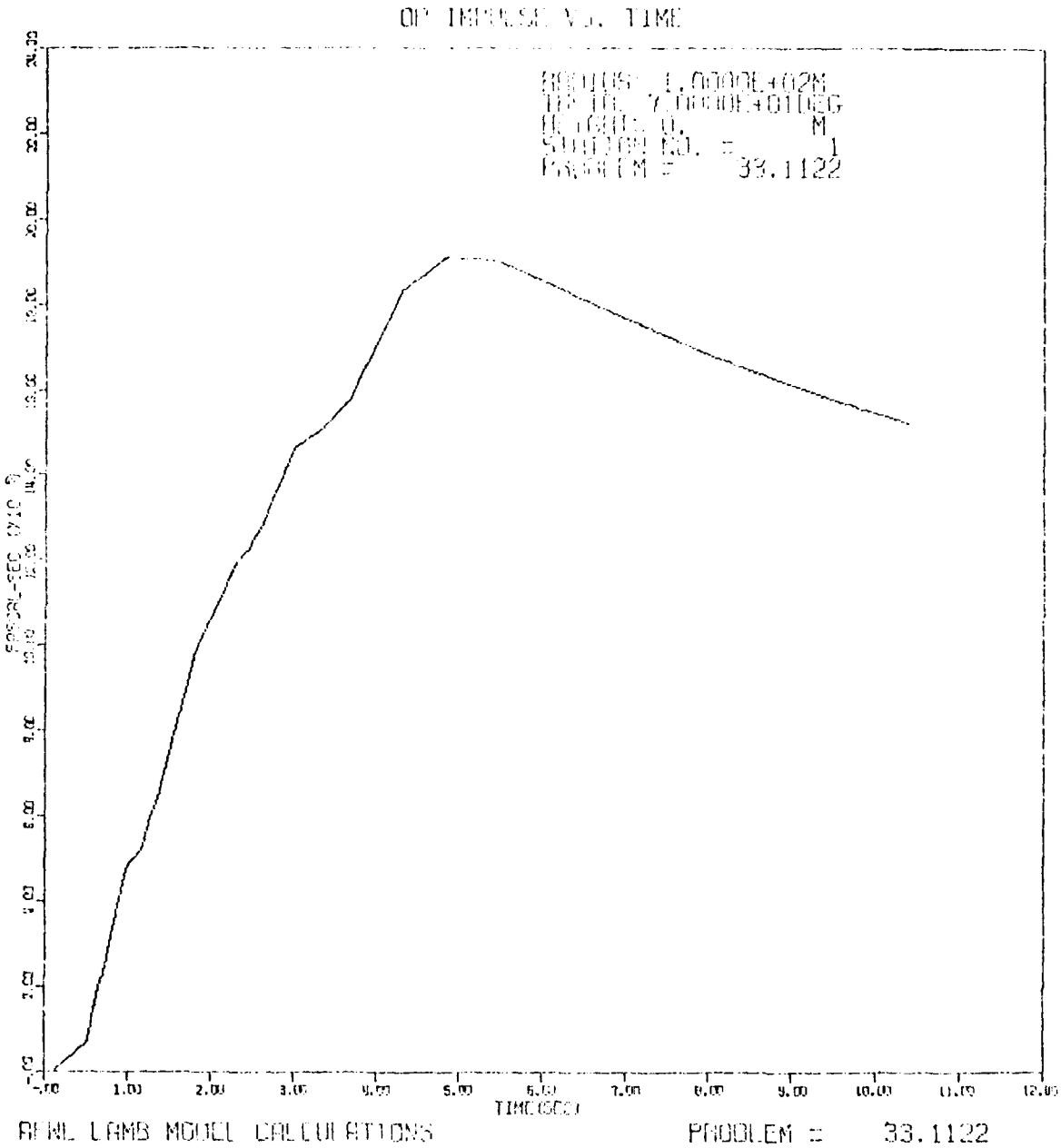
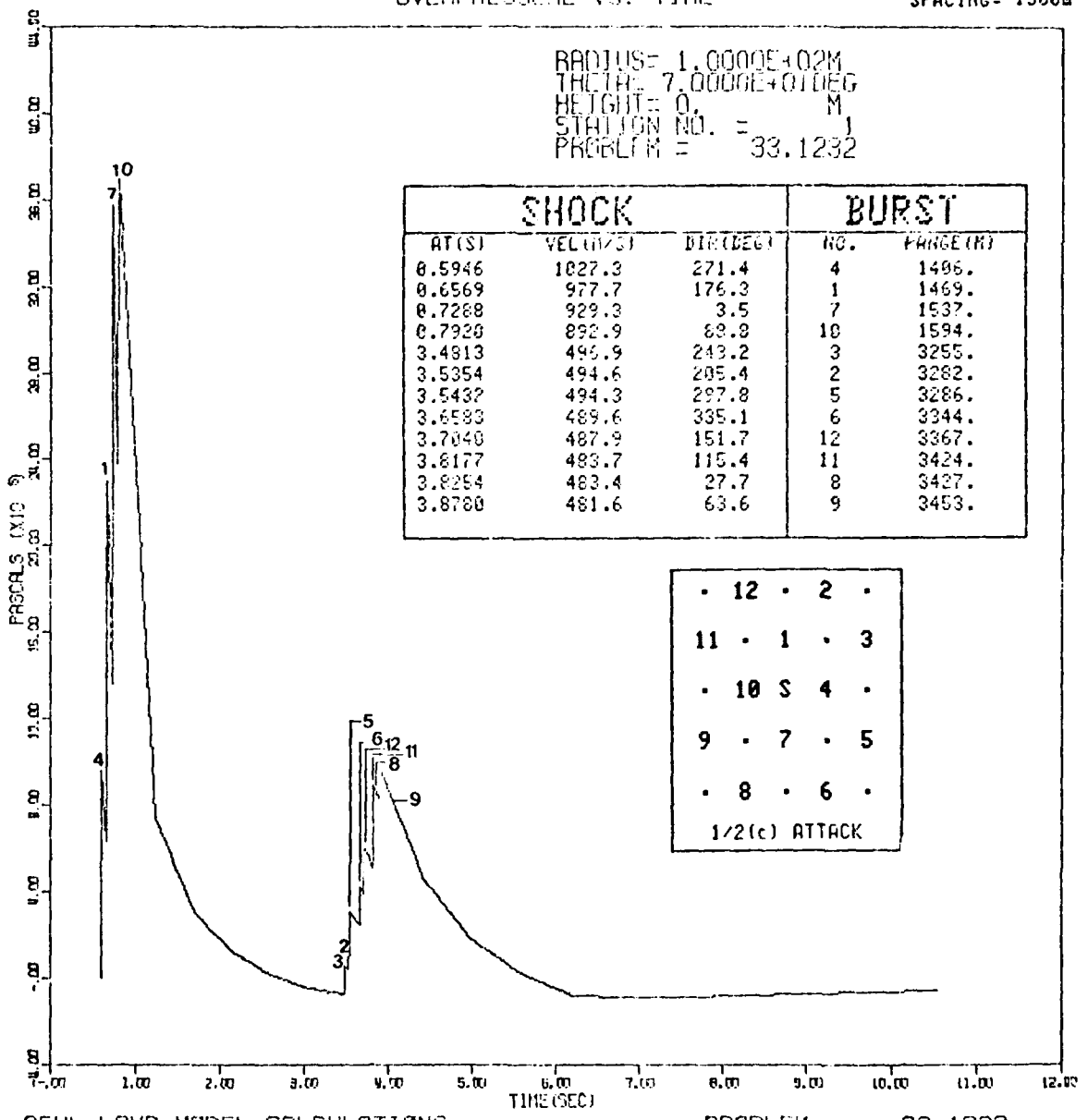

OF IMPULSE Vs. TIME
RADIUS = 1.0000E+02M
TIP TIL = 7.0000E+01DEG
ELEVATION = 0. M
SOLUTION NO. = 1
PROBLEM = 33.1122
TIME(SEC)
REAL LAMB MODEL CALCULATIONS
PROBLEM = 33.1122

HOB= 0m
YIELD= 3Mt
SPACING= 1500m

OVERPRESSURE VS. TIME

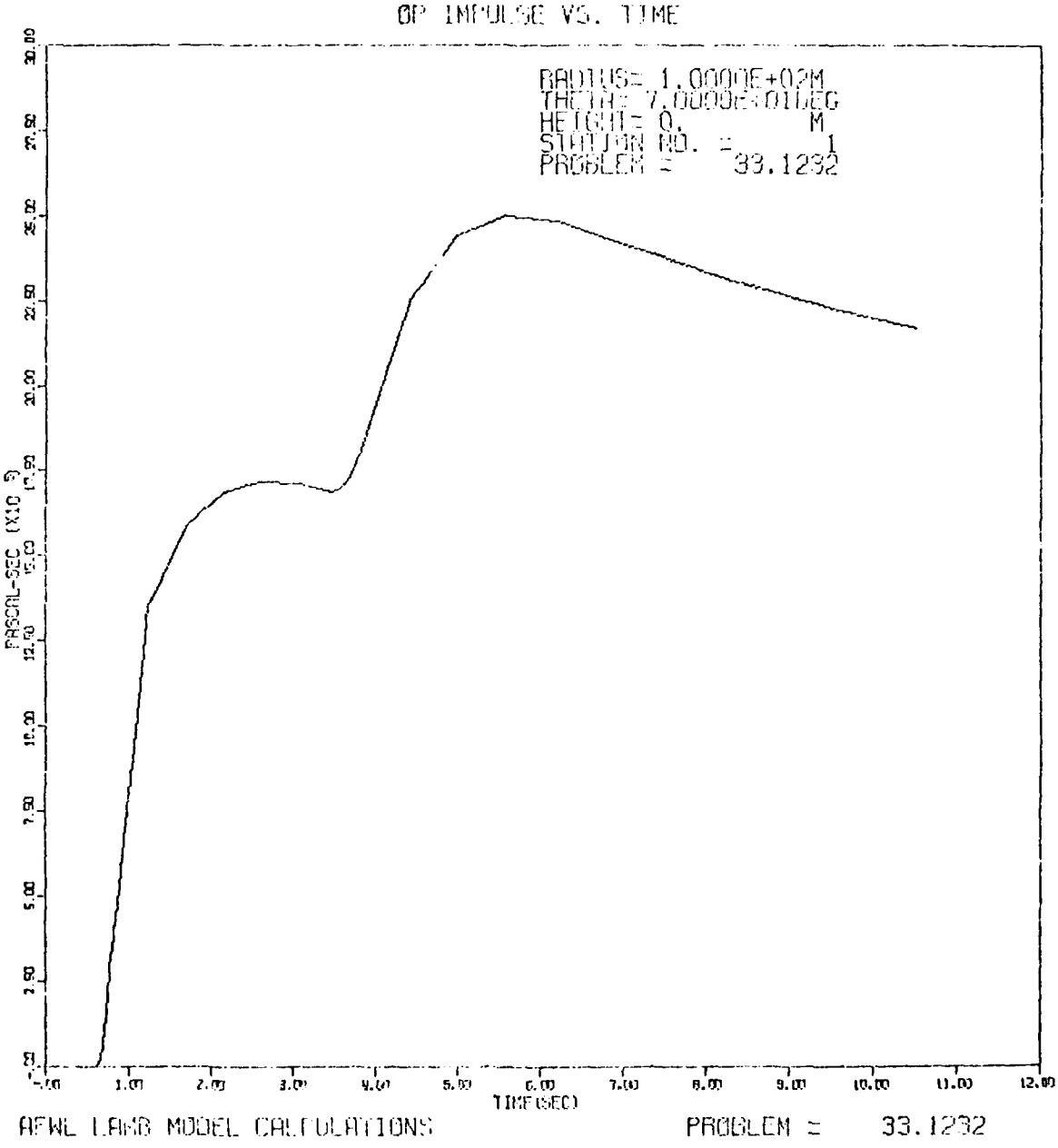


SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.5946	1027.3	271.4	4	1406.
0.6569	977.7	176.3	1	1469.
0.7288	929.3	3.5	7	1537.
0.7920	892.9	68.8	10	1594.
3.4813	496.9	243.2	3	3255.
3.5354	494.6	205.4	2	3282.
3.5432	494.3	297.8	5	3286.
3.6583	489.6	335.1	6	3344.
3.7040	487.9	151.7	12	3367.
3.8177	483.7	115.4	11	3424.
3.8254	483.4	27.7	8	3427.
3.8780	481.6	63.6	9	3453.

·	12 · 2	·
11	· 1 ·	3
·	10 S 4	·
9	· 7 ·	5
·	8 · 6	·

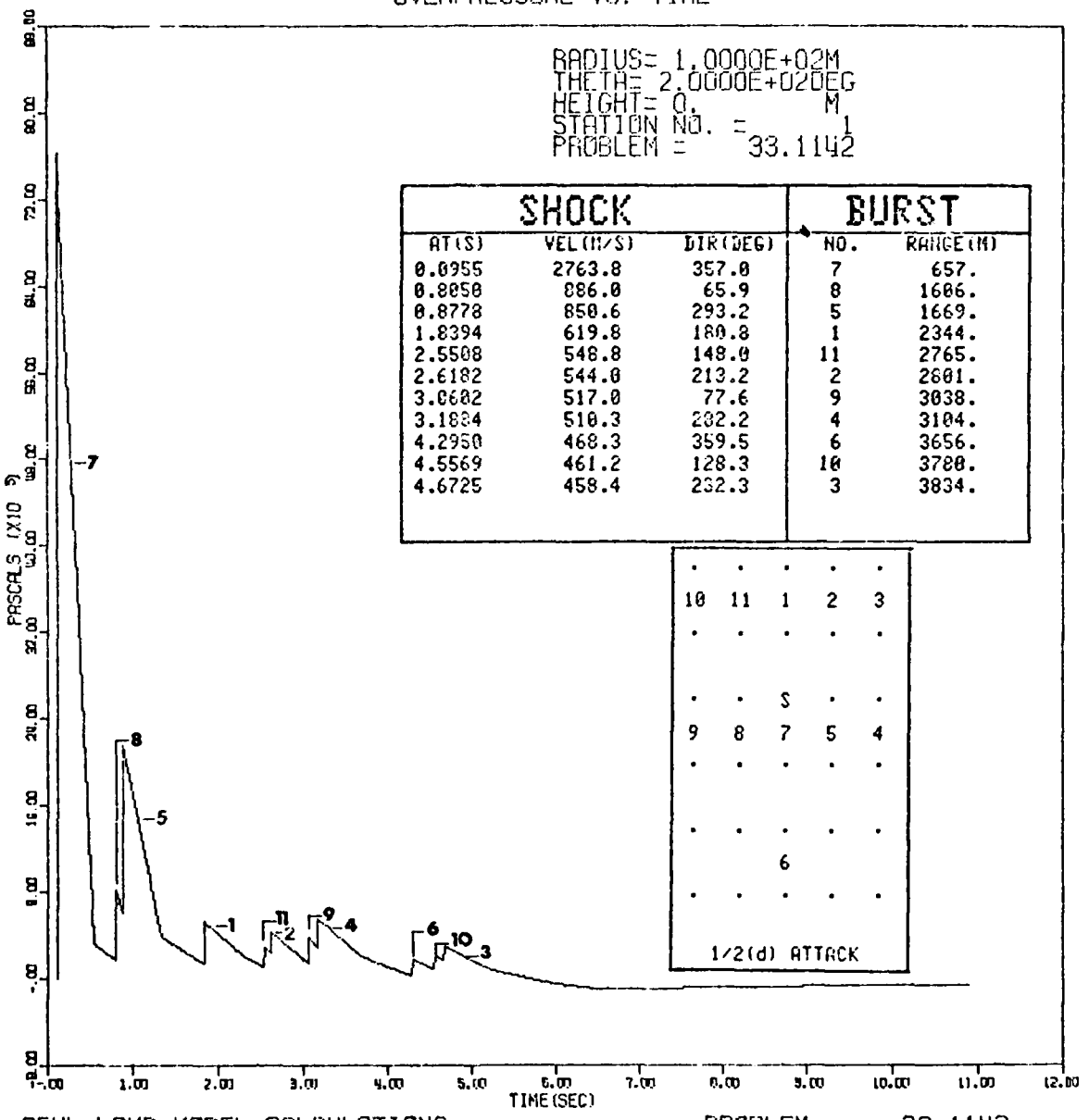
1/2(c) ATTACK

AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.1232


OP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 7.0000E+01DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.1232
PASCAL-SEC (X10 5)
TIME(SEC)
AFWL LAND MODEL CALCULATIONS
PROBLEM = 33.1232

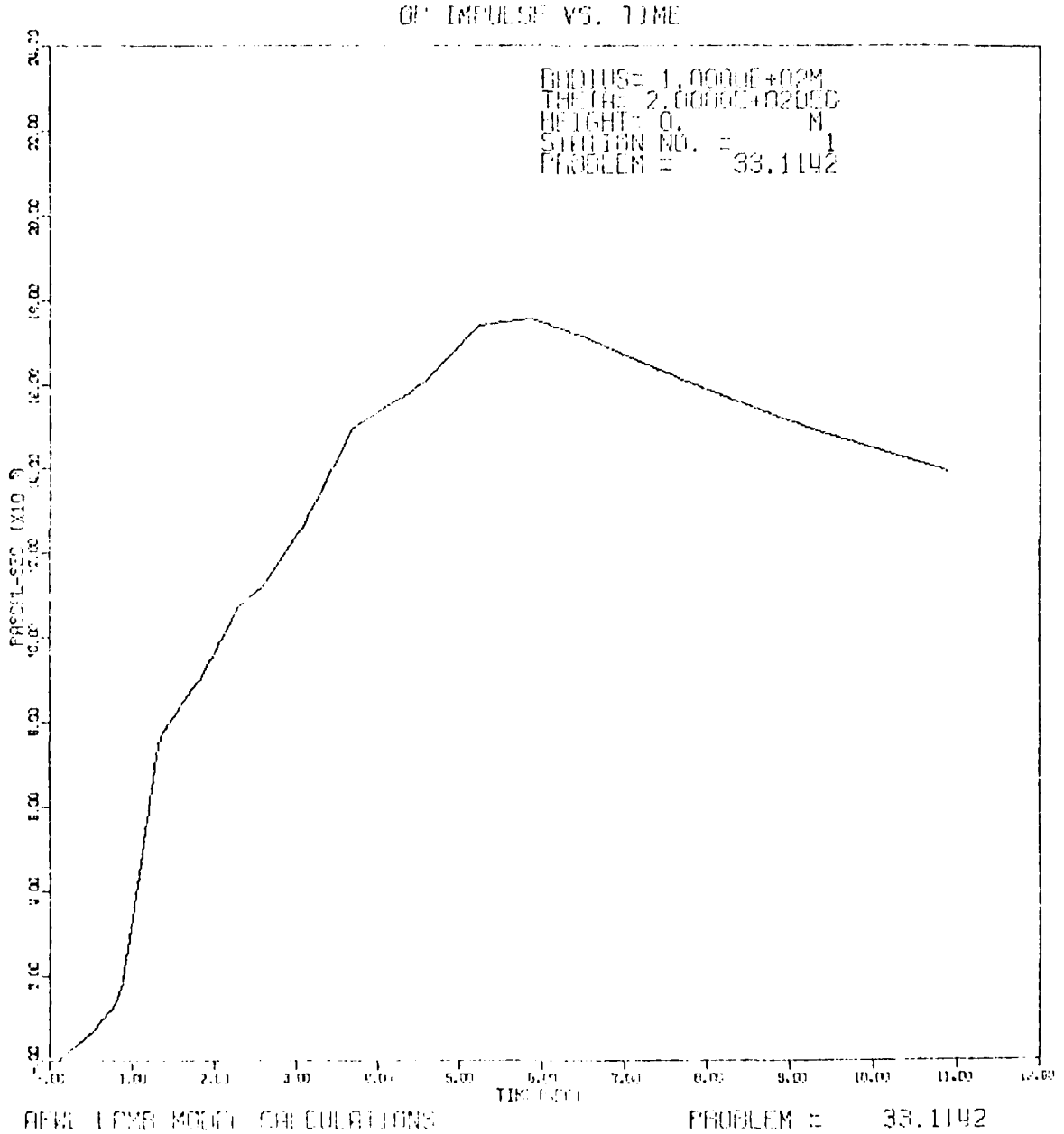
HOB= 0m
YIELD= 3Mt
SPACING= 1500m

OVERPRESSURE VS. TIME

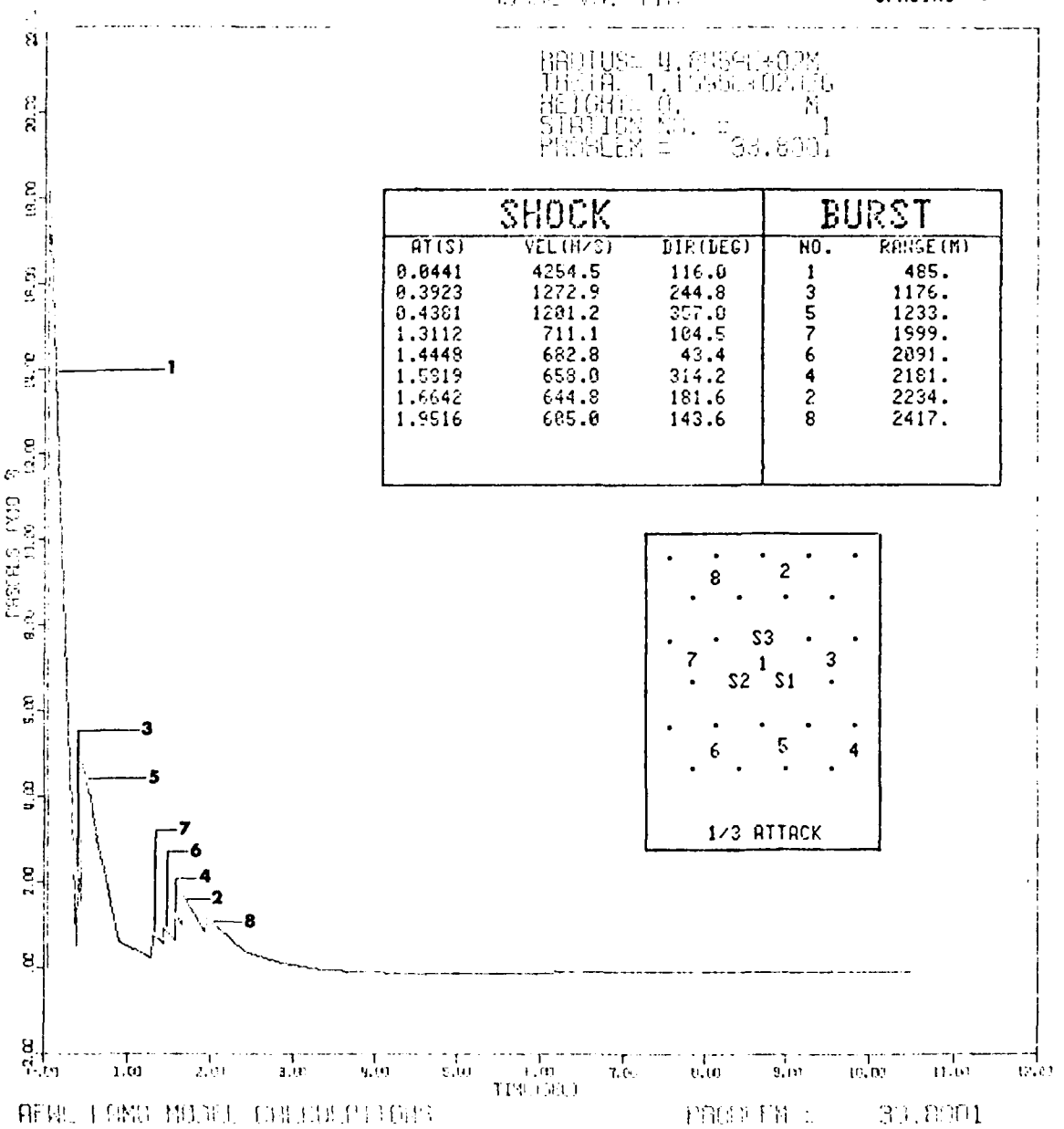


SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.0955	2763.8	357.0	7	657.
0.8050	886.0	65.9	8	1606.
0.8778	850.6	293.2	5	1669.
1.8394	619.8	180.8	1	2344.
2.5508	548.8	148.0	11	2765.
2.6182	544.0	213.2	2	2801.
3.0602	517.0	77.6	9	3038.
3.1884	510.3	282.2	4	3104.
4.2950	468.3	359.5	6	3656.
4.5569	461.2	128.3	10	3780.
4.6725	458.4	232.3	3	3834.

AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.1142

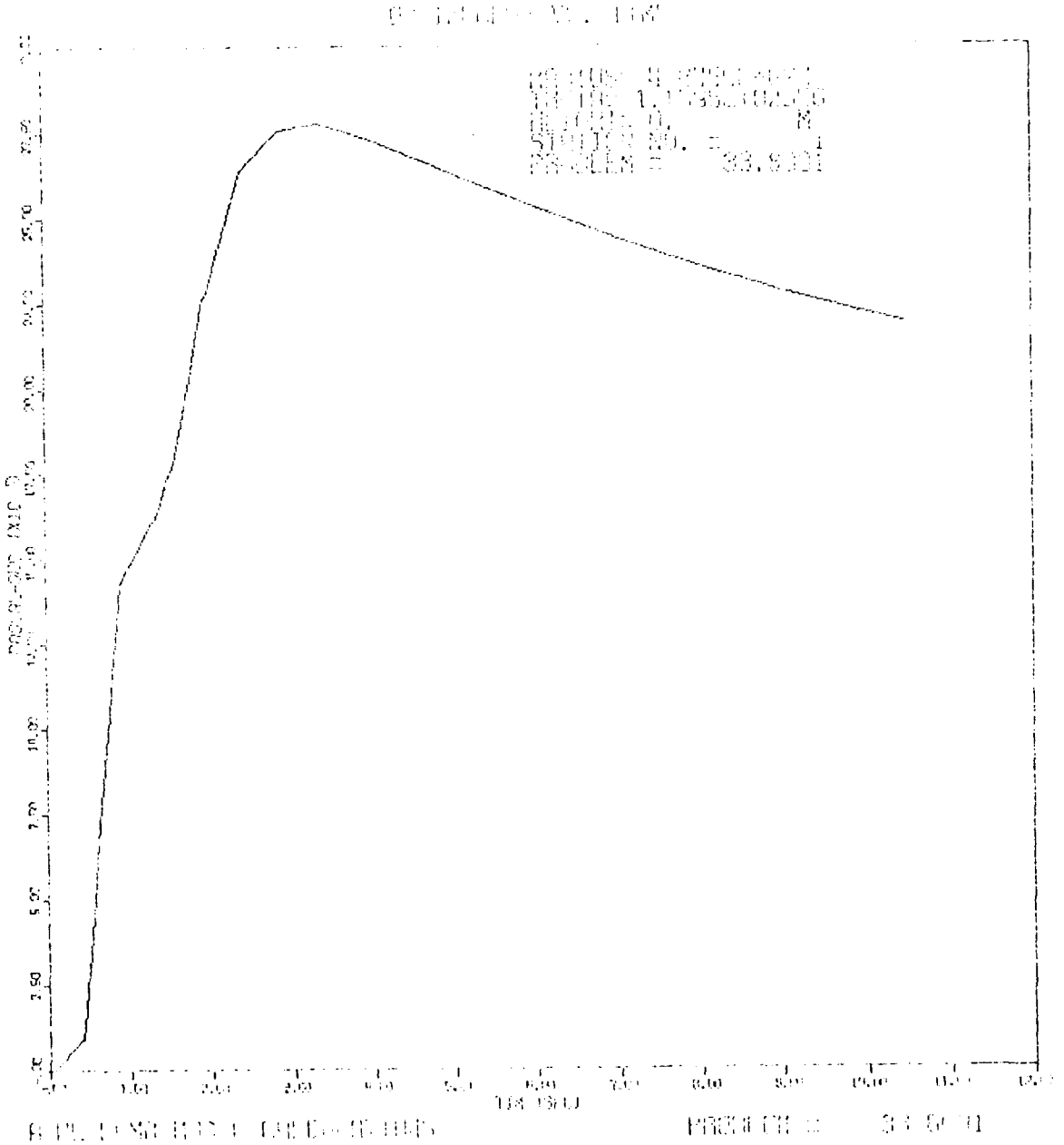

OF IMPULSE VS. TIME
RADIUS= 1.000UE+02M
THETA= 2.000000+02DEG
WEIGHT= 0. M
SECTION NO. = 1
PROBLEM = 33.1142
PARTICLE-SEC (X10 9)
TIME (SEC)
ARMY TAYLOR MODEL CALCULATIONS
PROBLEM = 33.1142

HOB= 0m
YIELD= 3Mt
SPACING= 1000m

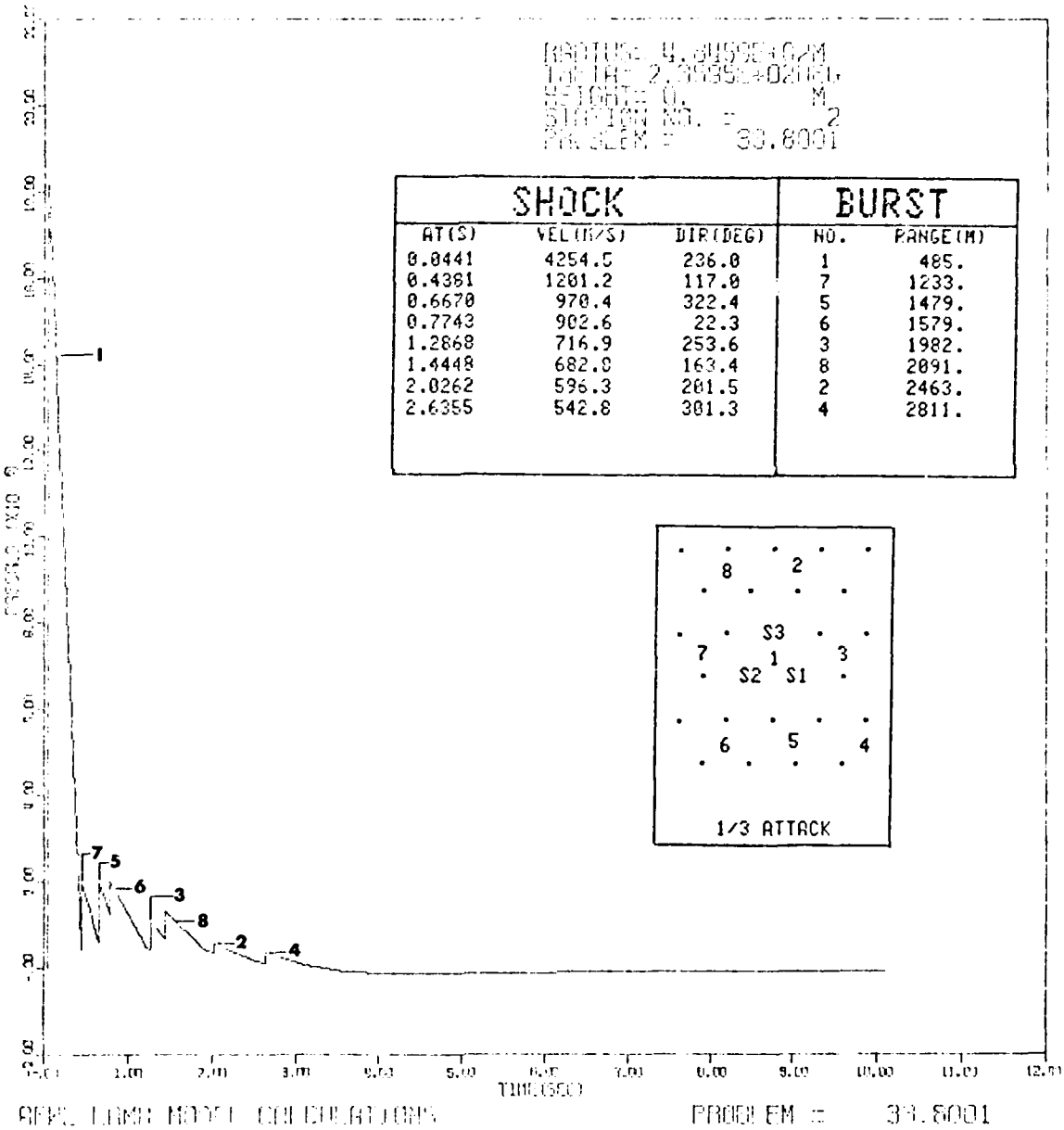


SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.0441	4254.5	116.0	1	485.
0.3923	1272.9	244.8	3	1176.
0.4381	1201.2	357.0	5	1233.
1.3112	711.1	104.5	7	1999.
1.4448	682.8	43.4	6	2091.
1.5919	658.0	314.2	4	2181.
1.6642	644.8	181.6	2	2234.
1.9516	605.0	143.6	8	2417.

AFWL LONG MODEL CALCULATIONS PROBLEM = 33.8001

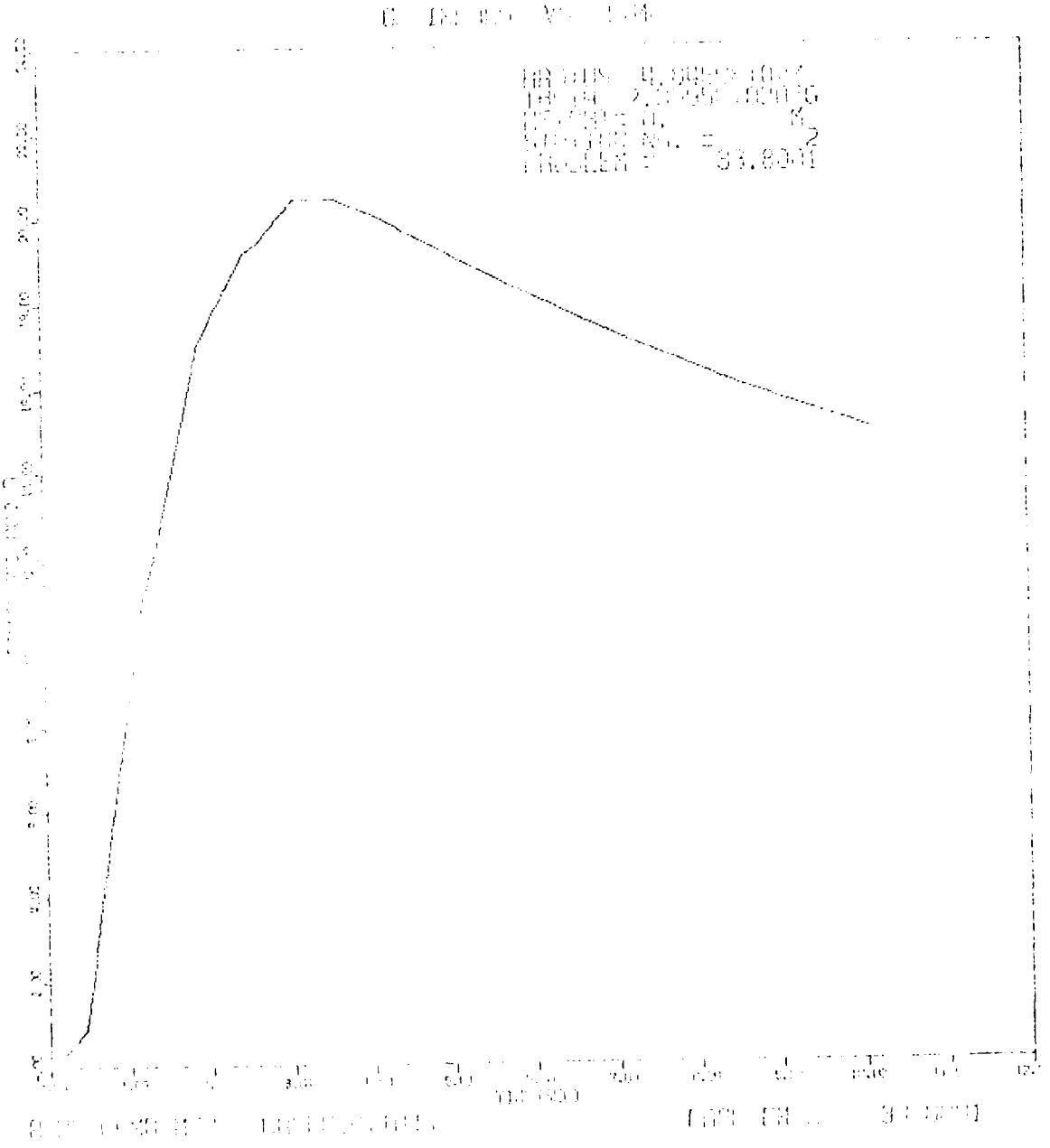


HOB= 0m
YIELD= 3Mt
SPACING= 1000m

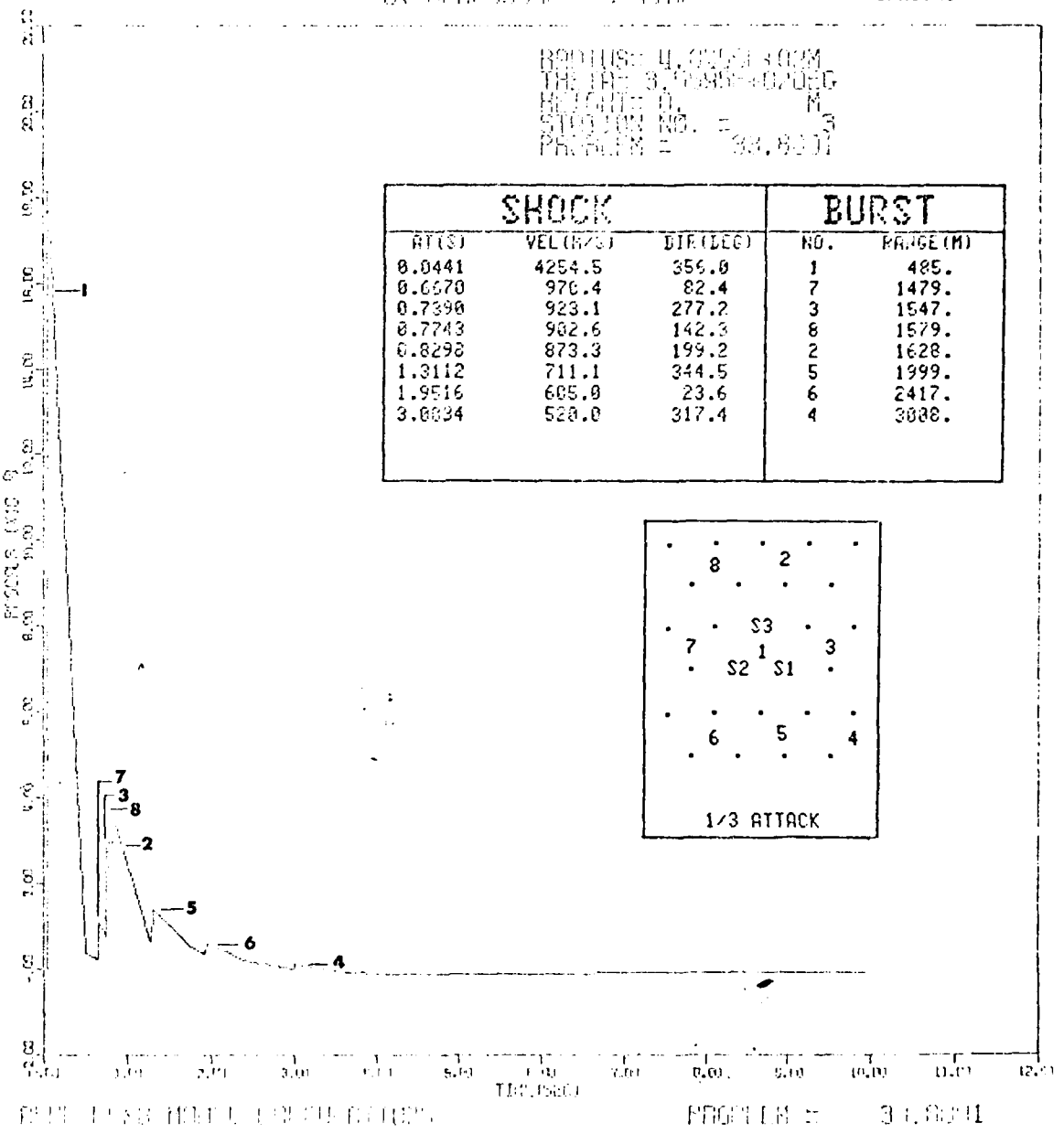


SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.0441	4254.5	236.0	1	485.
0.4381	1201.2	117.0	7	1233.
0.6670	970.4	322.4	5	1479.
0.7743	902.6	22.3	6	1579.
1.2868	716.9	253.6	3	1982.
1.4448	682.8	163.4	8	2091.
2.0262	596.3	201.5	2	2463.
2.6355	542.8	301.3	4	2811.

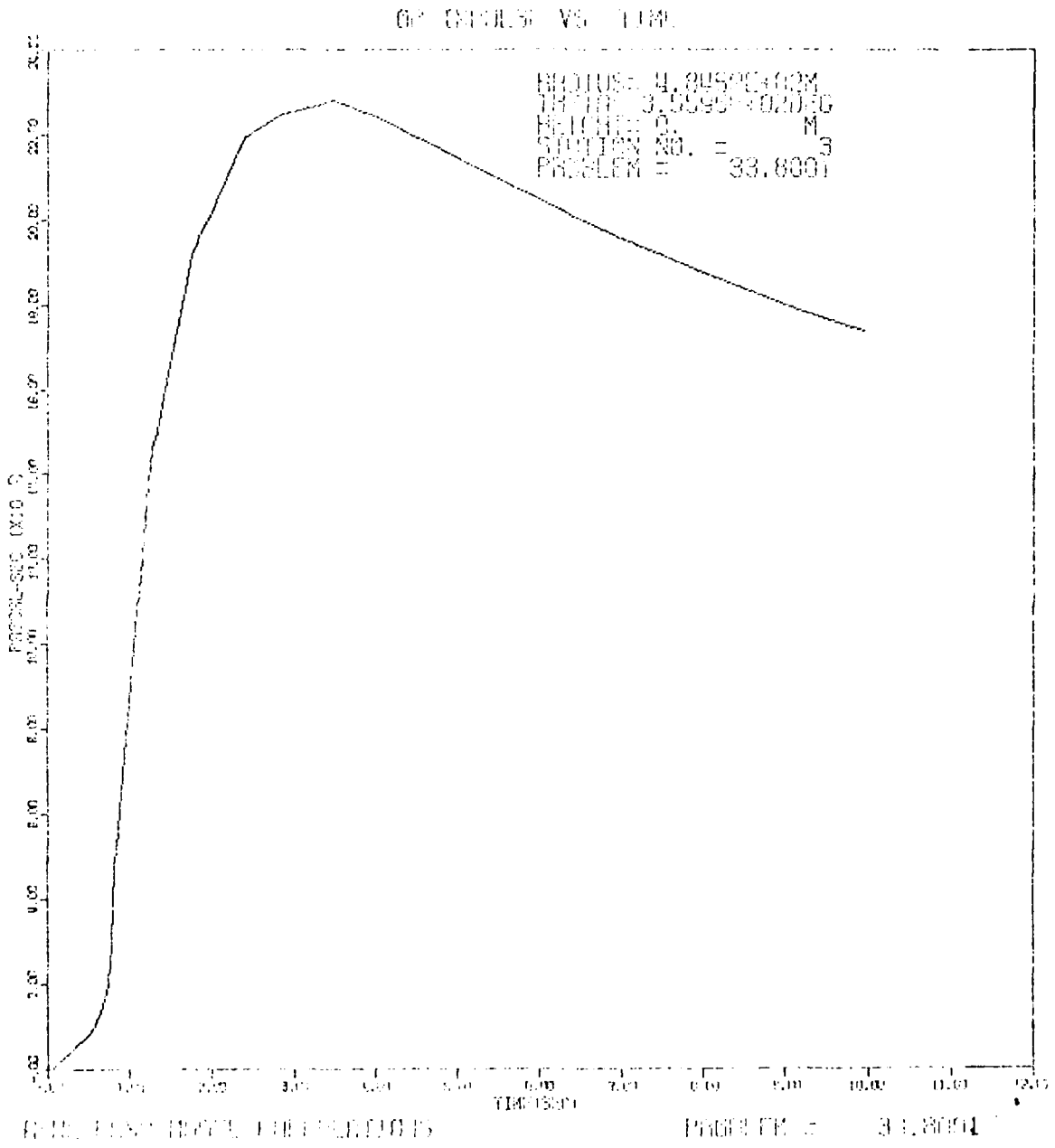
PROBLEM = 33.8001



HOB= 0m
YIELD= 3Mt
SPACING= 1000m



SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.0441	4254.5	356.0	1	485.
0.6670	970.4	82.4	7	1479.
0.7390	923.1	277.2	3	1547.
0.7743	902.6	142.3	8	1579.
0.8298	873.3	199.2	2	1628.
1.3112	711.1	344.5	5	1999.
1.9516	605.0	23.6	6	2417.
3.0034	528.0	317.4	4	3088.

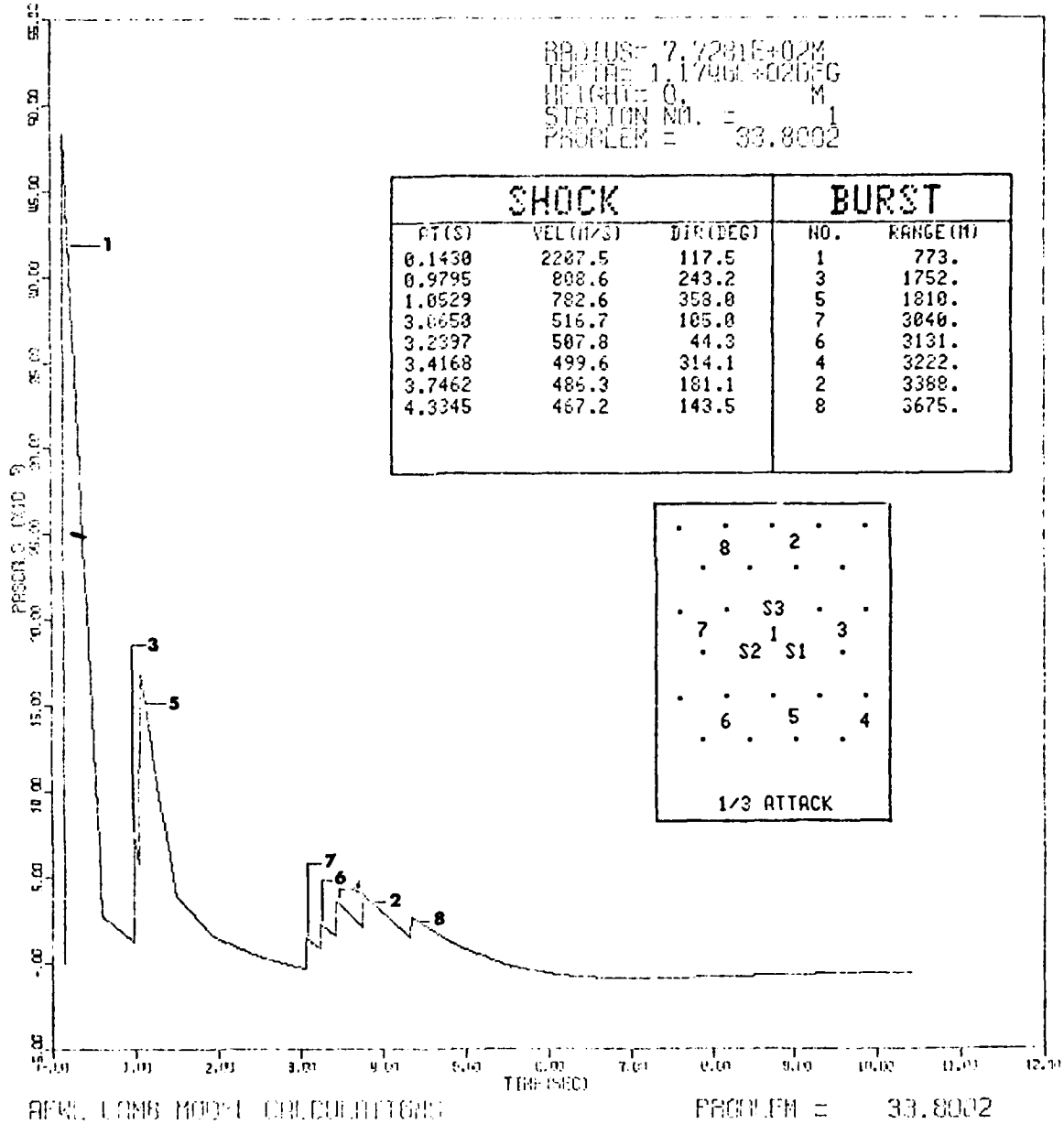

RADIUS= 4.0050E+03M
DEPTH= 3.0000E+02M
HEIGHT= 0. M
SOLUTION NO. = 3
PROBLEM = 33.0001

HOB= 0m
YIELD= 3Mt
SPACING= 1500m

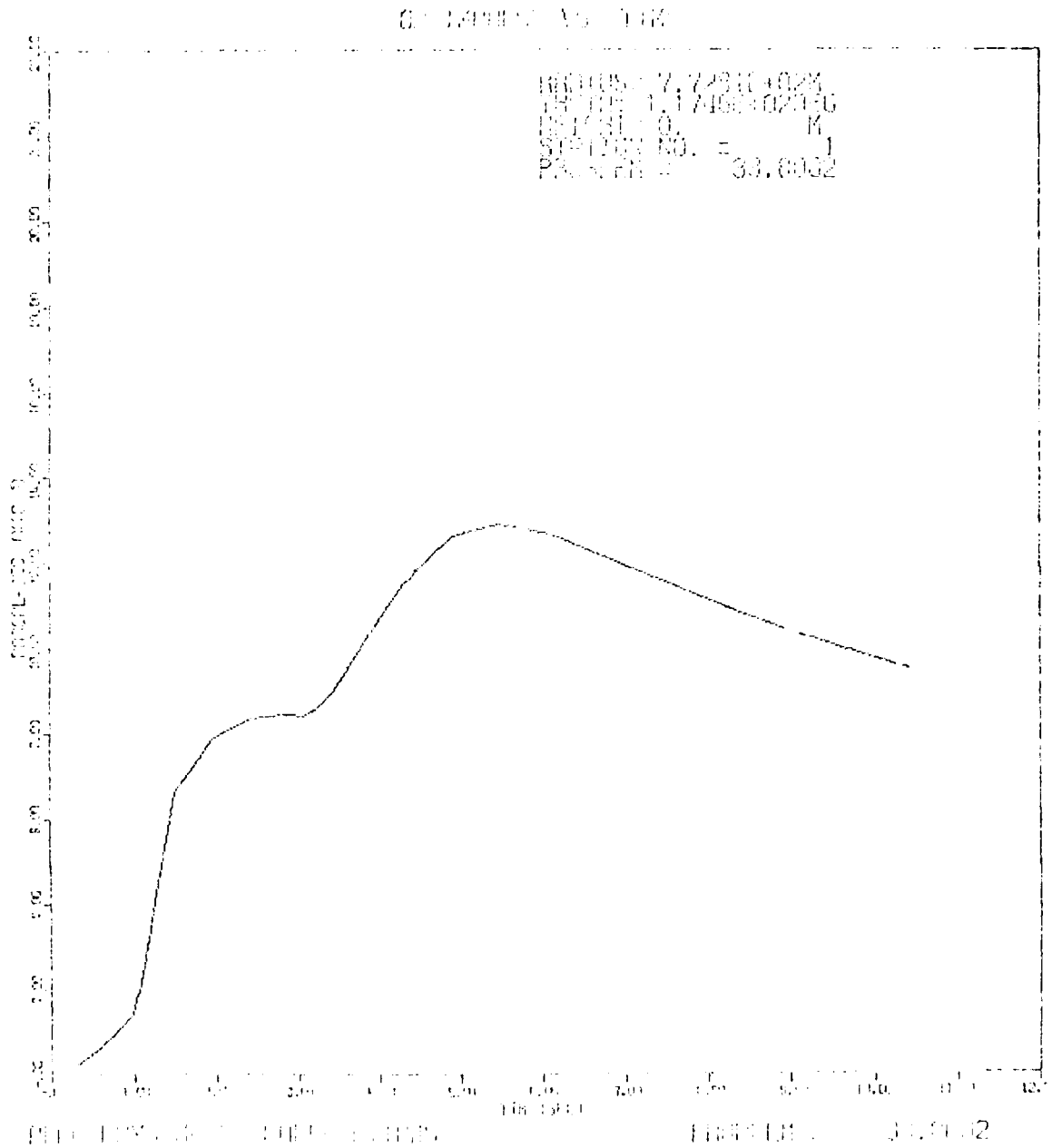
OVERPRESSURE VS. TIME

RADIUS= 7.7281E+02M
THETA= 1.1796E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.8002

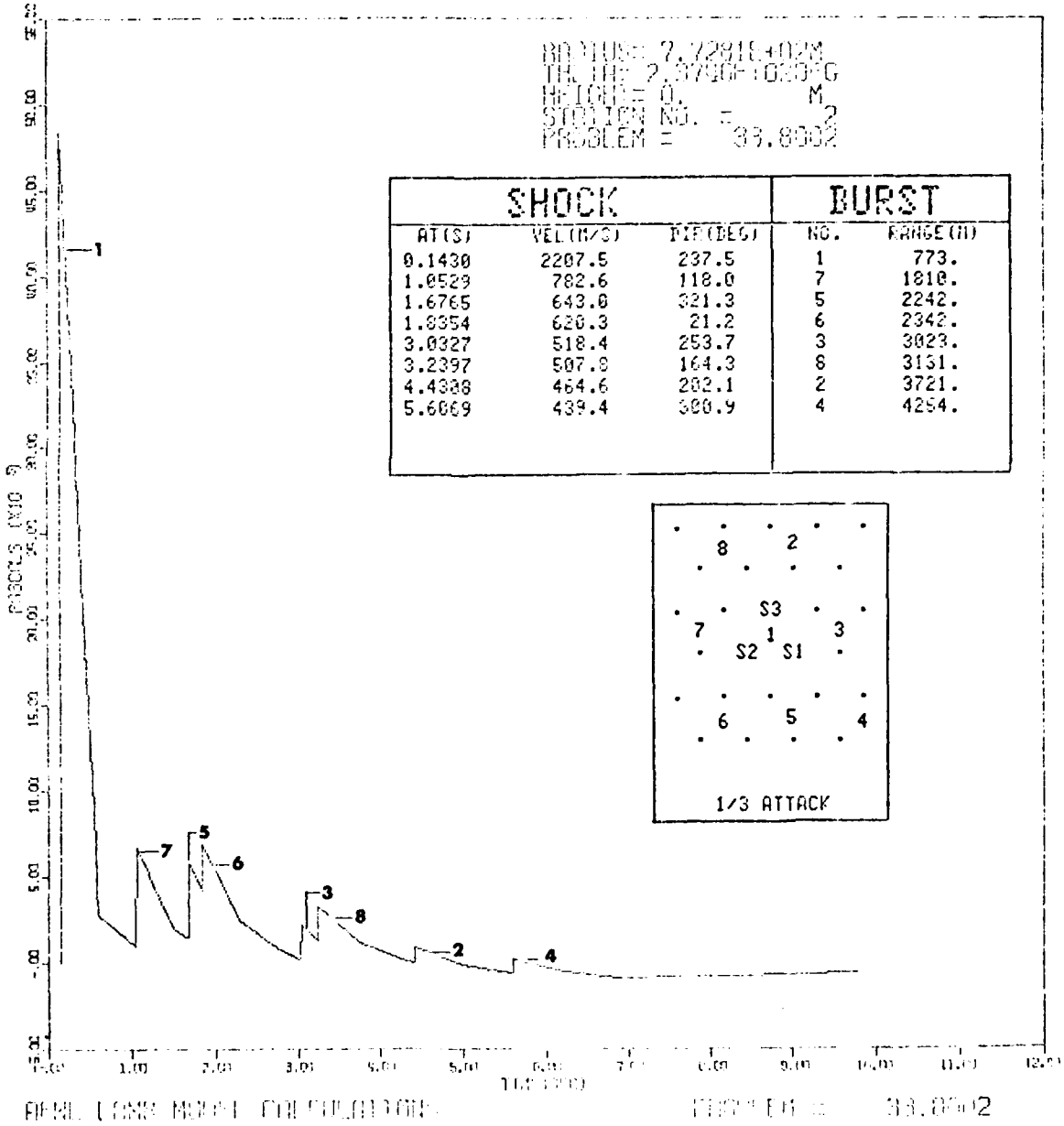
SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1430	2207.5	117.5	1	773.
0.9795	808.6	243.2	3	1752.
1.0529	782.6	358.0	5	1810.
3.0658	516.7	105.0	7	3040.
3.2397	507.8	44.3	6	3131.
3.4168	499.6	314.1	4	3222.
3.7462	486.3	181.1	2	3388.
4.3345	467.2	143.5	8	3675.



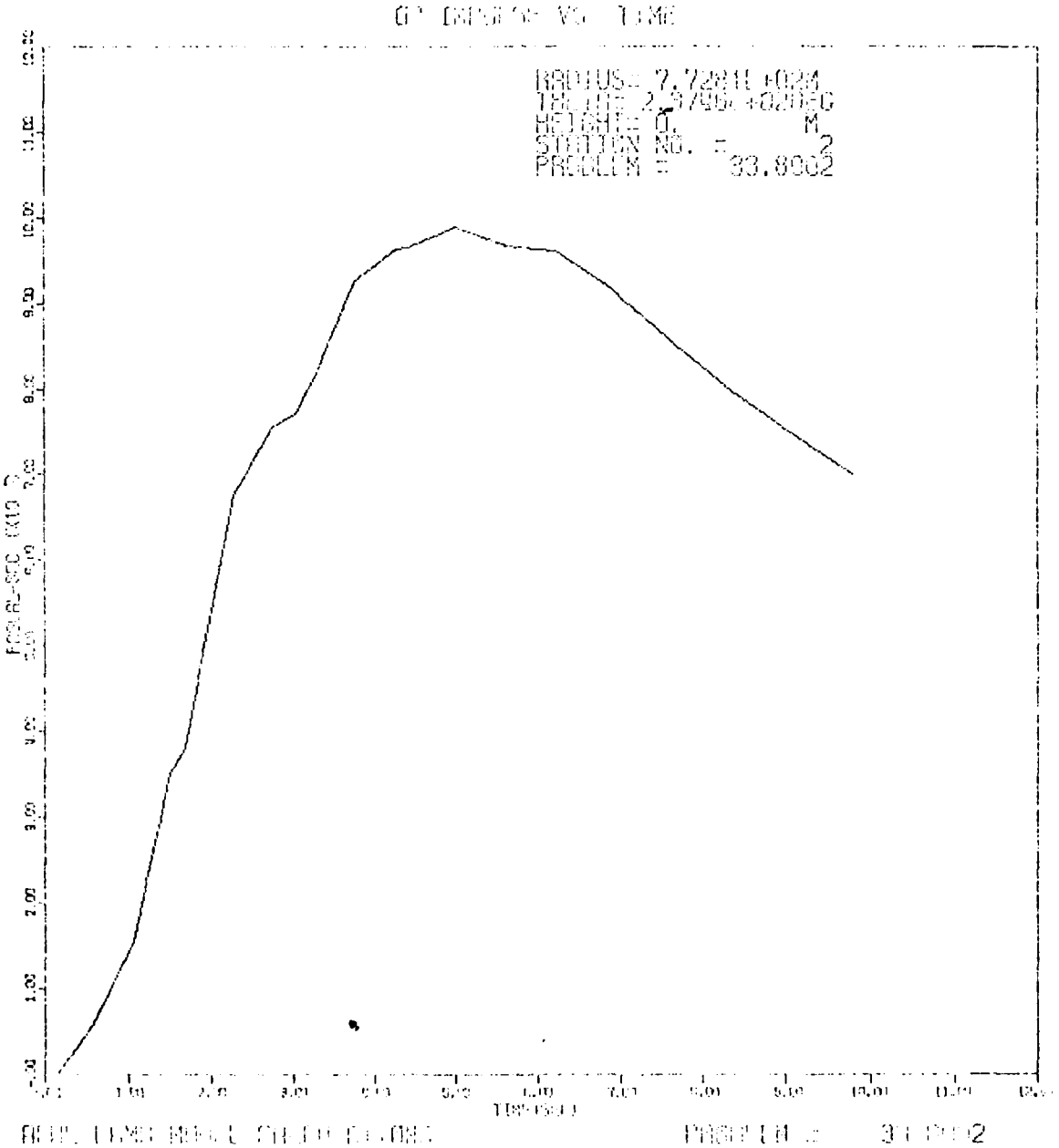
AFWL LOAD MODEL CALCULATIONS PROBLEM = 33.8002



HOB= 0m
YIELD= 3Mt
SPACING= 1500m



SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1430	2207.5	237.5	1	773.
1.0529	782.6	118.0	7	1818.
1.6765	643.8	321.3	5	2242.
1.8354	620.3	21.2	6	2342.
3.0327	518.4	253.7	3	3023.
3.2397	507.8	164.3	8	3151.
4.4308	464.6	202.1	2	3721.
5.6069	439.4	300.9	4	4294.

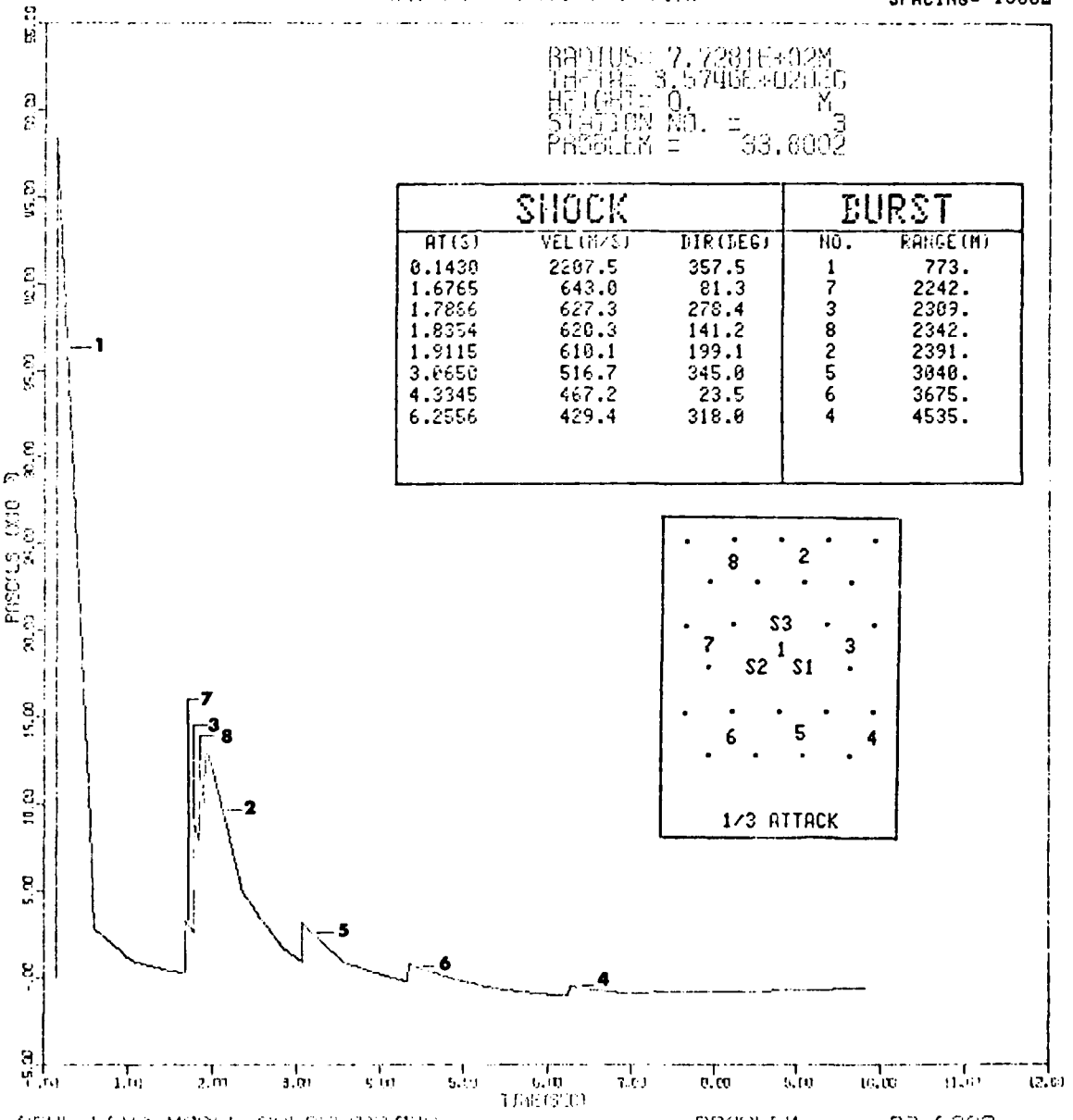

RADIUS= 7.7281E+024
PRESSURE =
33.8002

HOB= 0a
YIELD= 3Mt
SPACING= 1500m

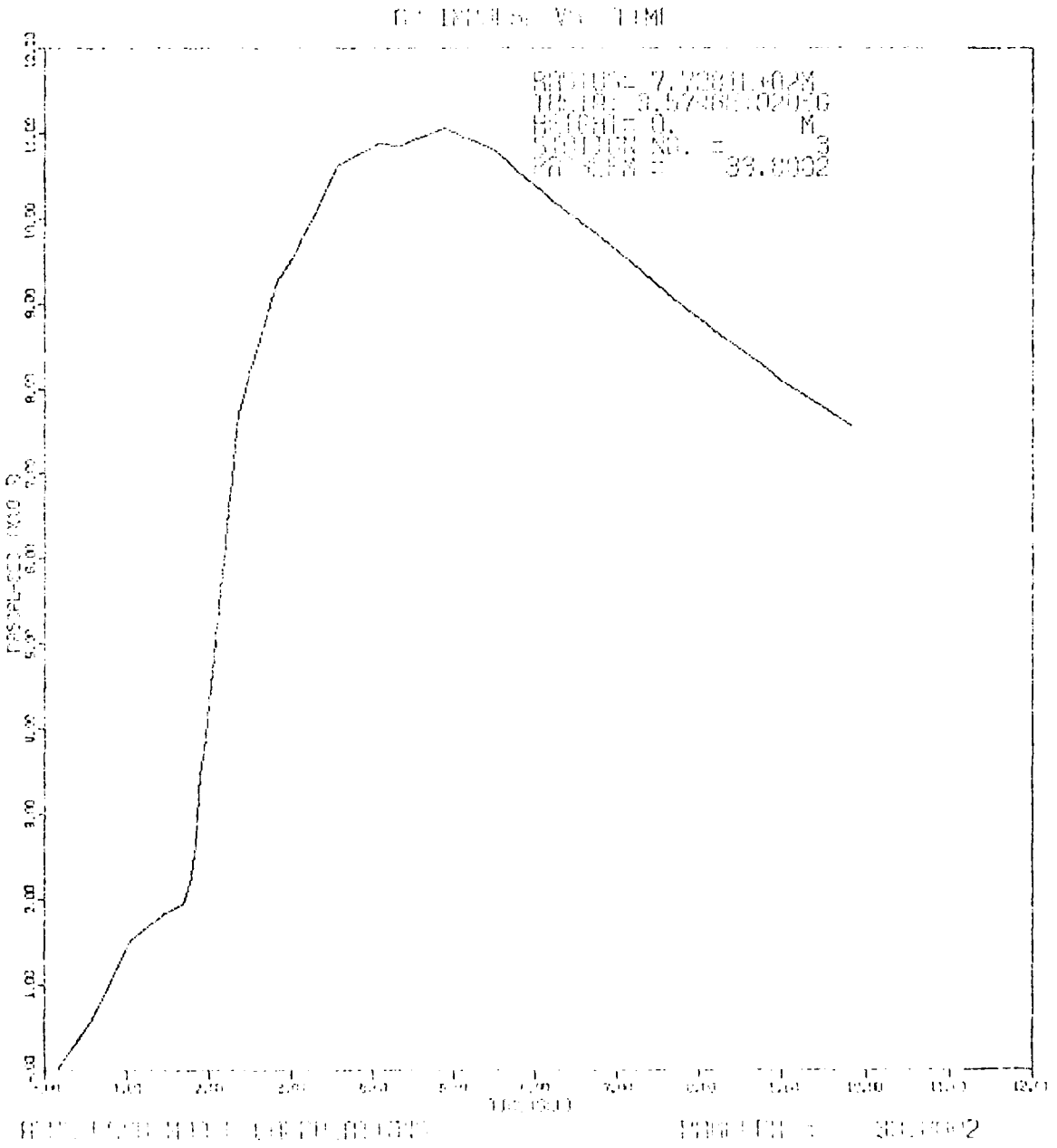
OVERPRESSURE VS. TIME

RADIUS= 7.7281E+02M
TAPIR= 3.5740E+02DEG
HEIGHT= 0. M
STATION NO. = 3
PROBLEM = 33.0002

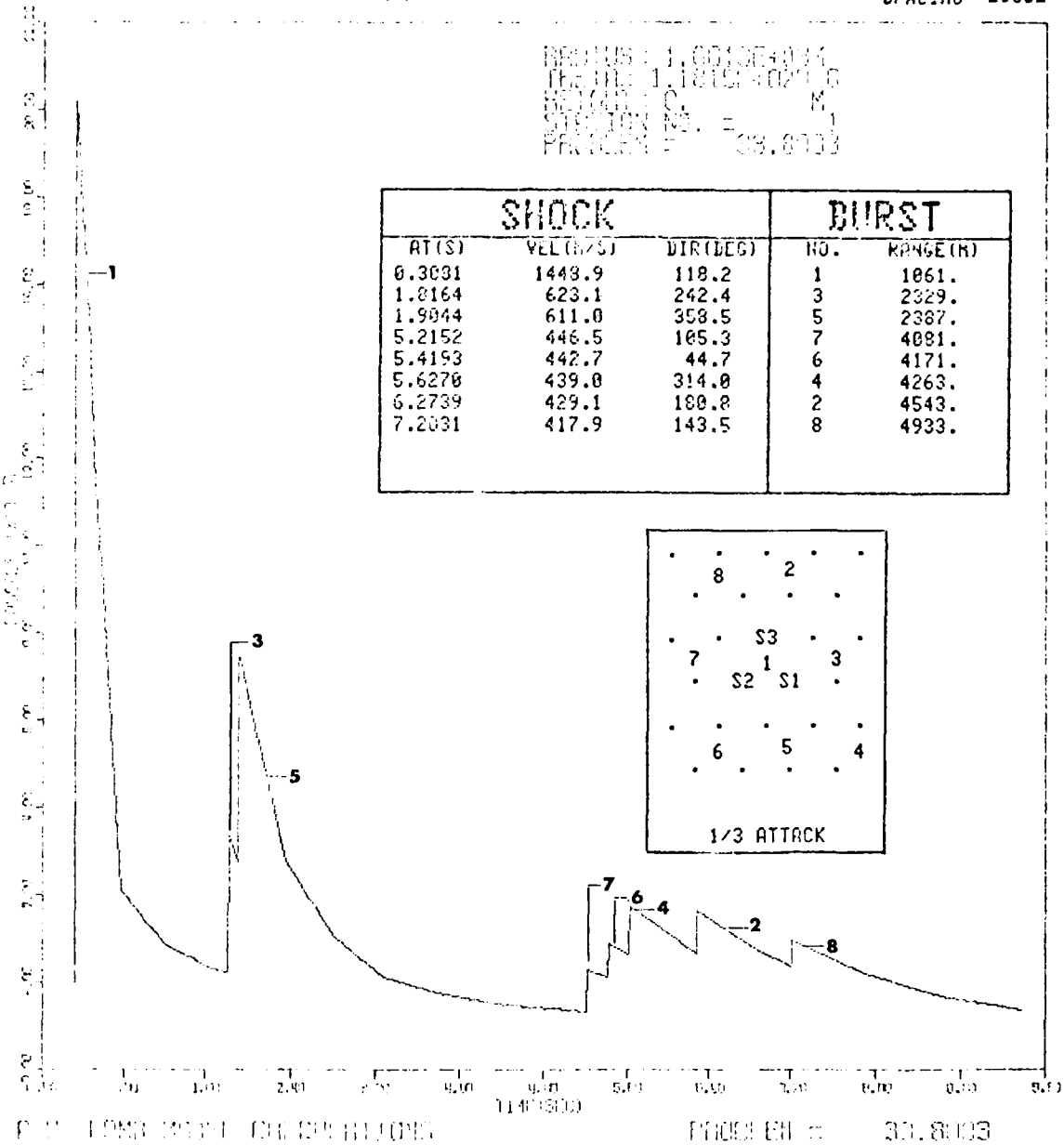
SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1430	2207.5	357.5	1	773.
1.6765	643.0	81.3	7	2242.
1.7866	627.3	278.4	3	2309.
1.8354	620.3	141.2	8	2342.
1.9115	610.1	199.1	2	2391.
3.0650	516.7	345.0	5	3040.
4.3345	467.2	23.5	6	3675.
6.2556	429.4	318.0	4	4535.



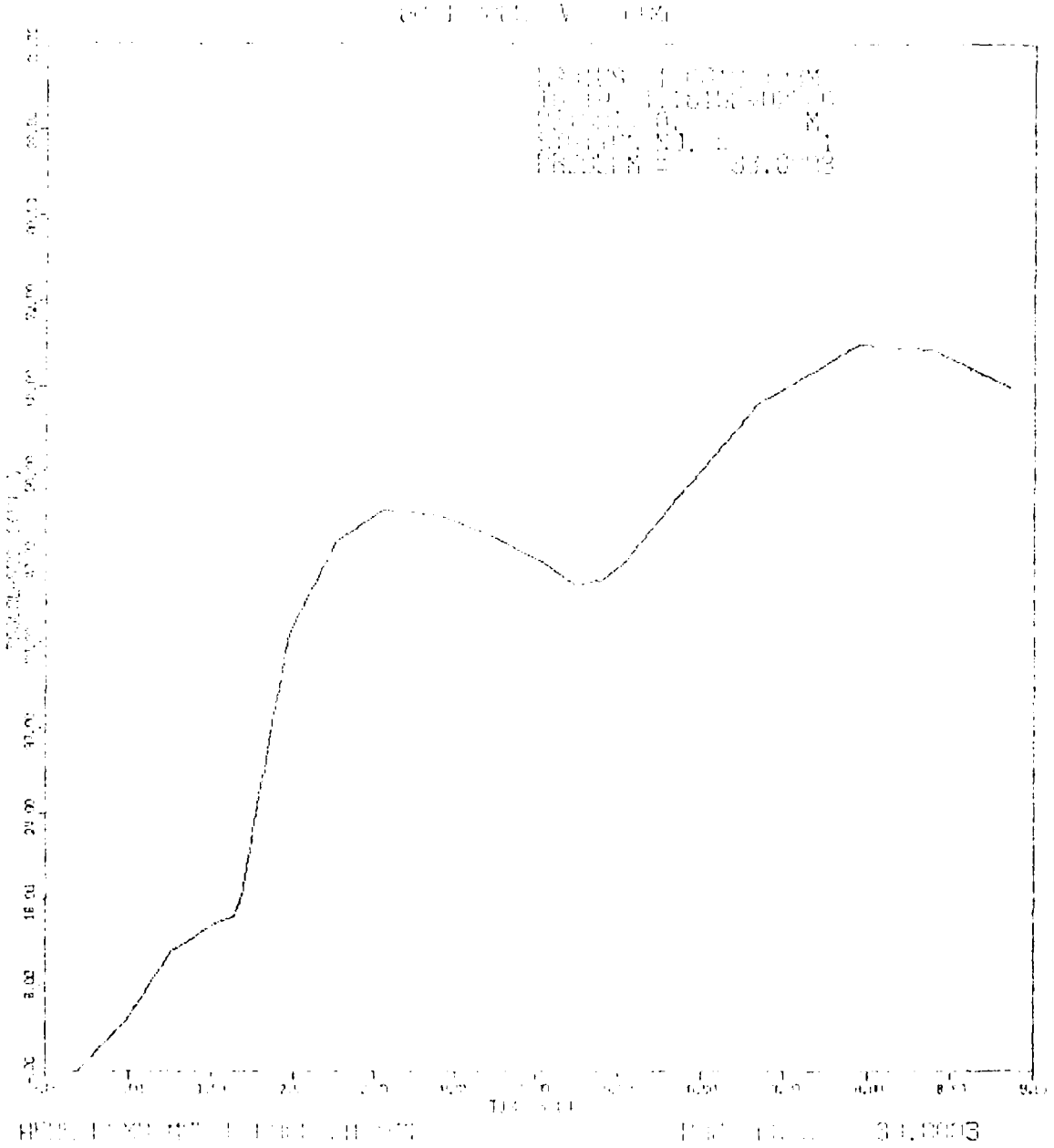
NEWL LONG MODEL CORRECTIONS PROBLEM = 33.0002



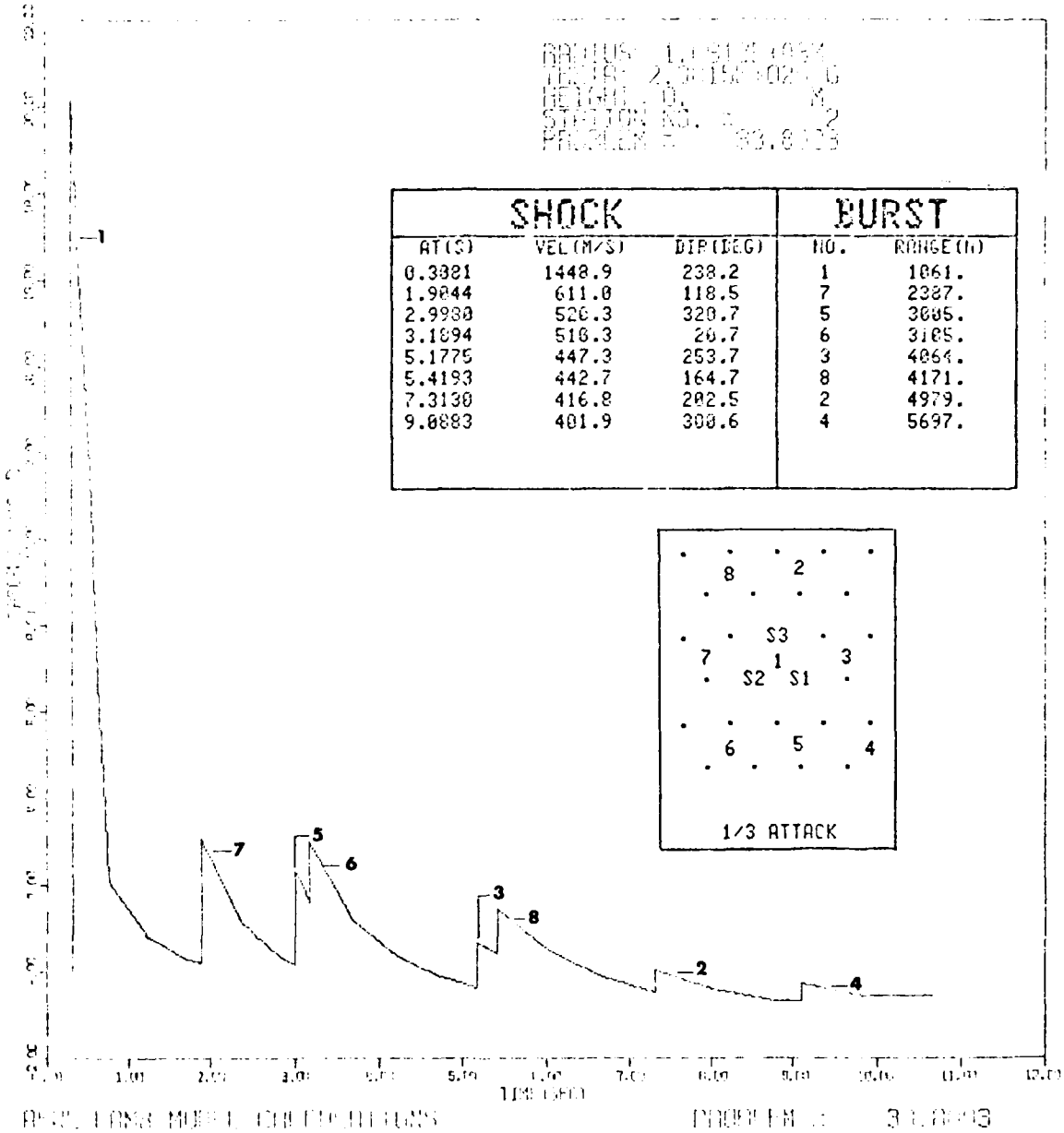
HOB= 0m
YIELD= 3Mt
SPACING= 2000m



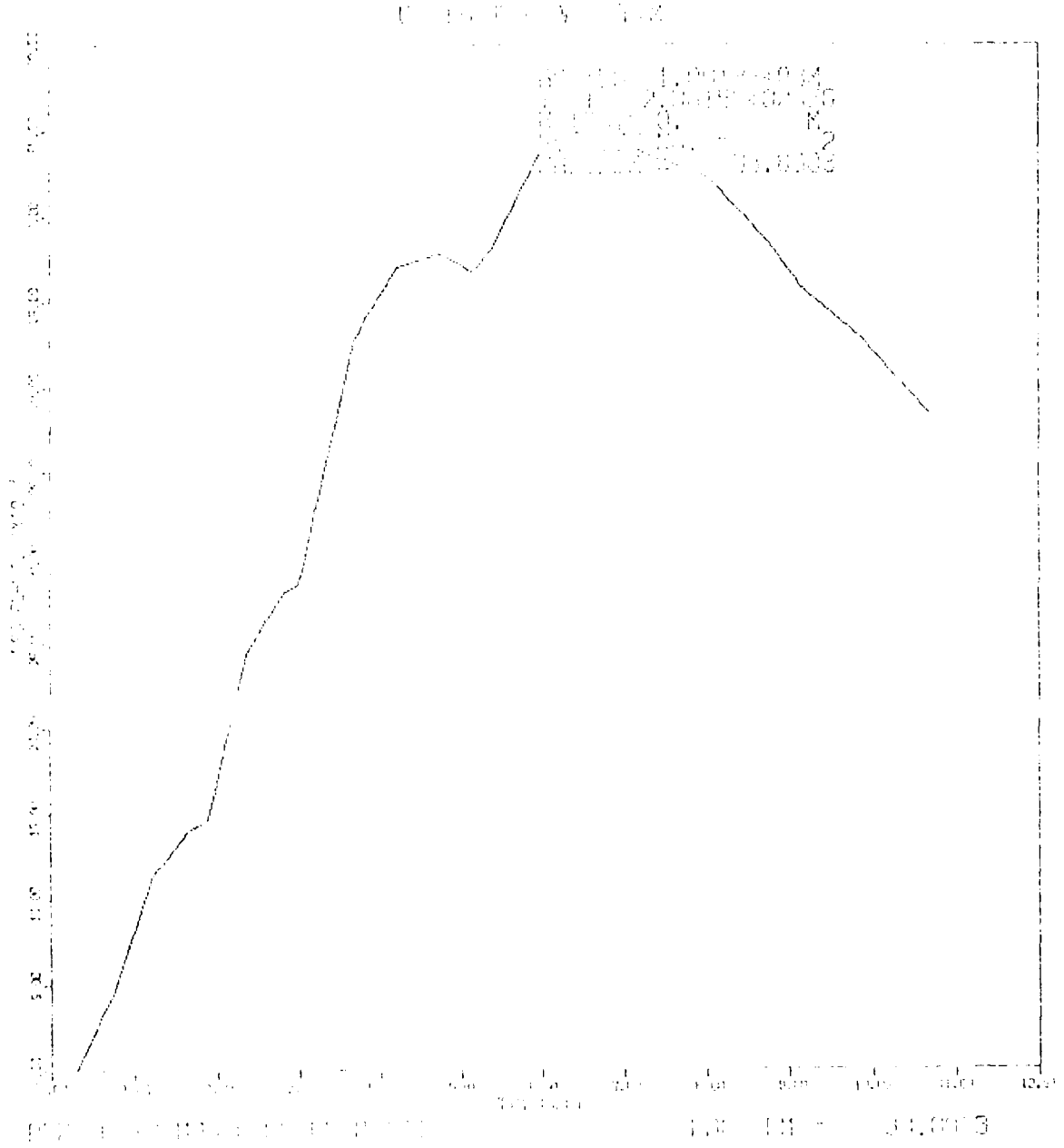
SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.3031	1448.9	118.2	1	1061.
1.0164	623.1	242.4	3	2329.
1.9044	611.0	358.5	5	2387.
5.2152	446.5	105.3	7	4081.
5.4193	442.7	44.7	6	4171.
5.6270	439.0	314.0	4	4263.
6.2739	429.1	180.0	2	4543.
7.2031	417.9	143.5	8	4933.



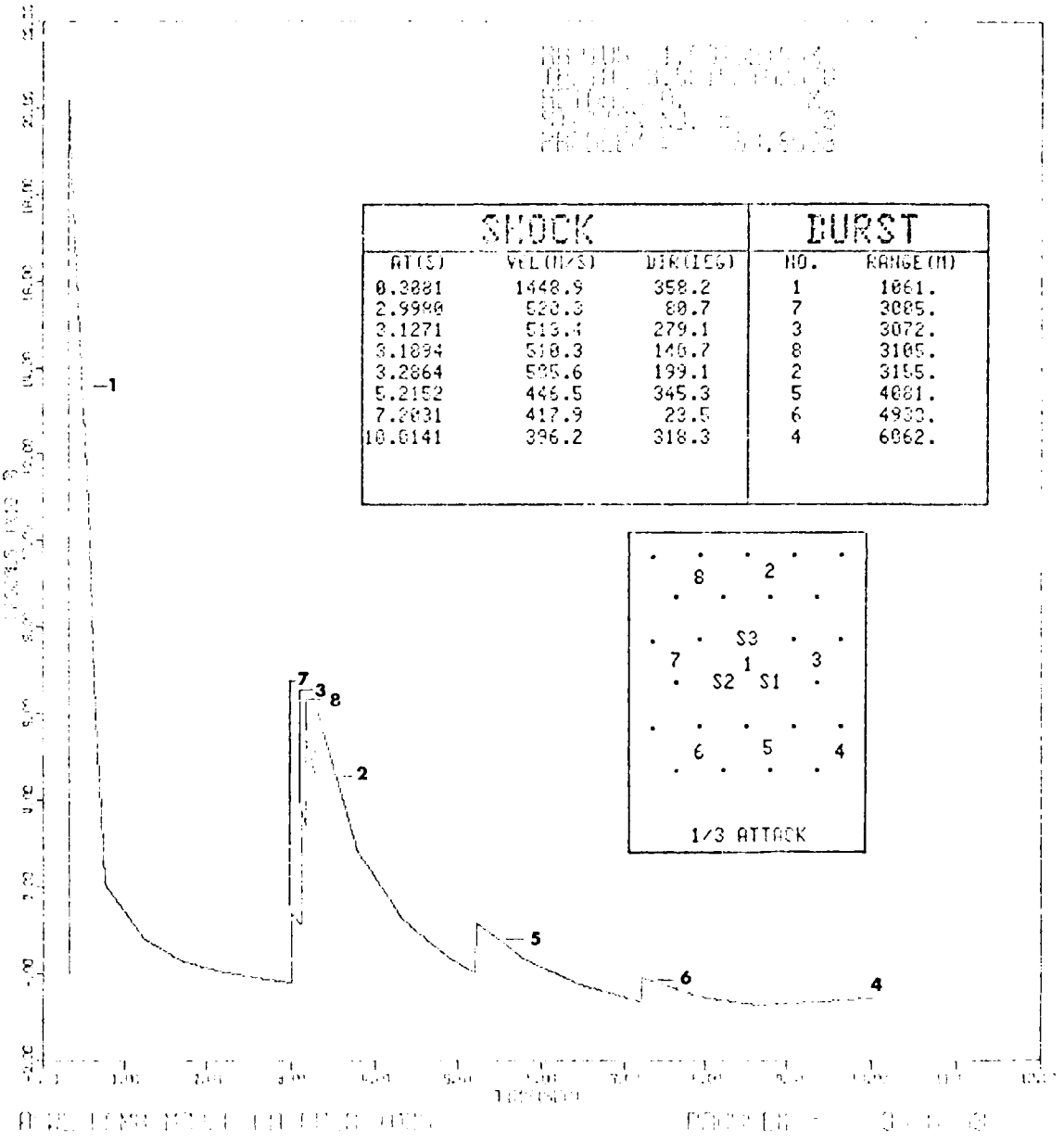
HOB= 0m
YIELD= 3Mt
SPACING= 2000m



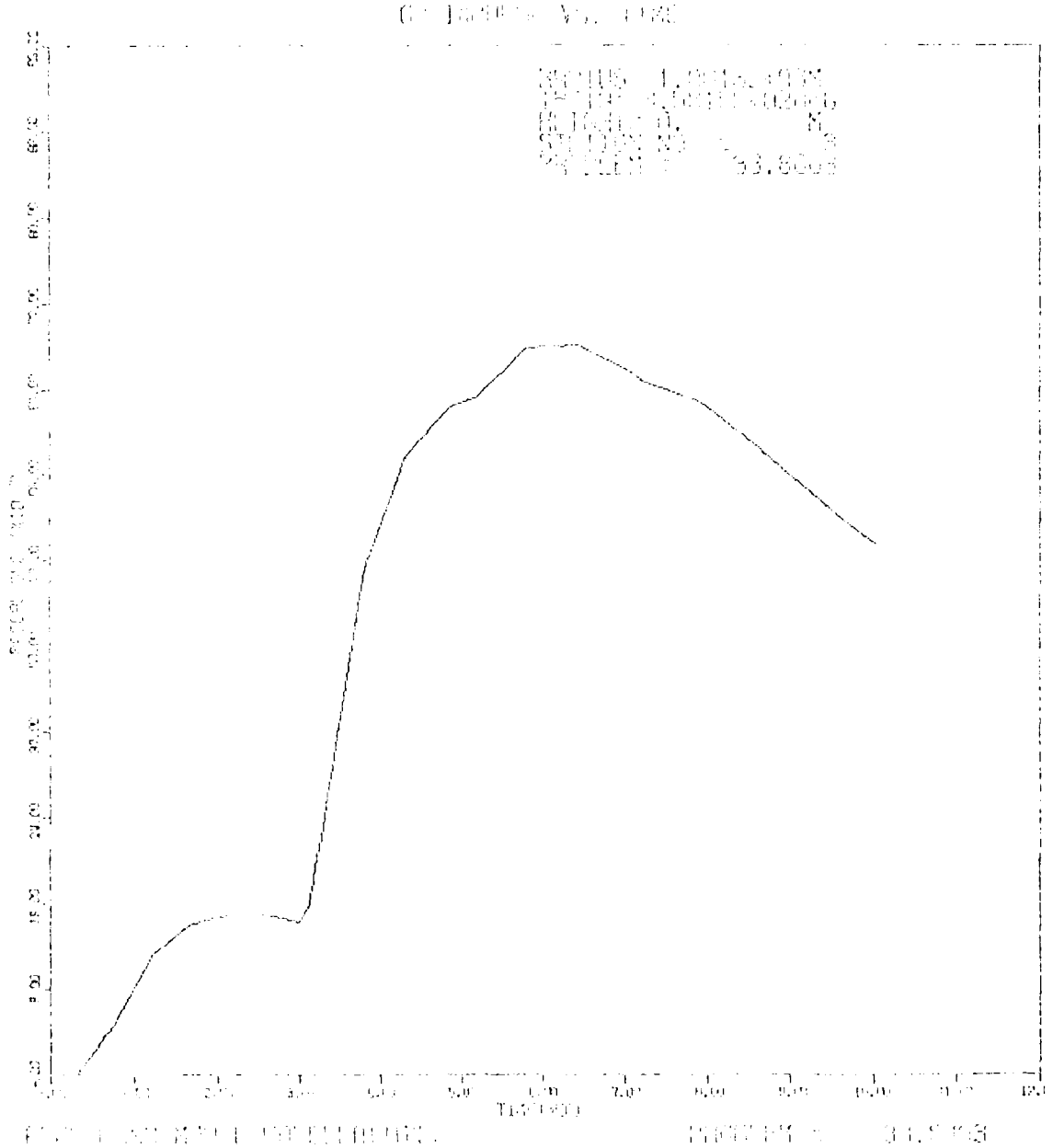
SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.3381	1448.9	238.2	1	1061.
1.9044	611.0	118.5	7	2387.
2.9930	520.3	320.7	5	3005.
3.1094	516.3	20.7	6	3105.
5.1775	447.3	253.7	3	4064.
5.4193	442.7	164.7	8	4171.
7.3130	416.8	202.5	2	4979.
9.0883	401.9	300.6	4	5697.



HOB= 0m
YIELD= 3Mt
SPACING= 2000m

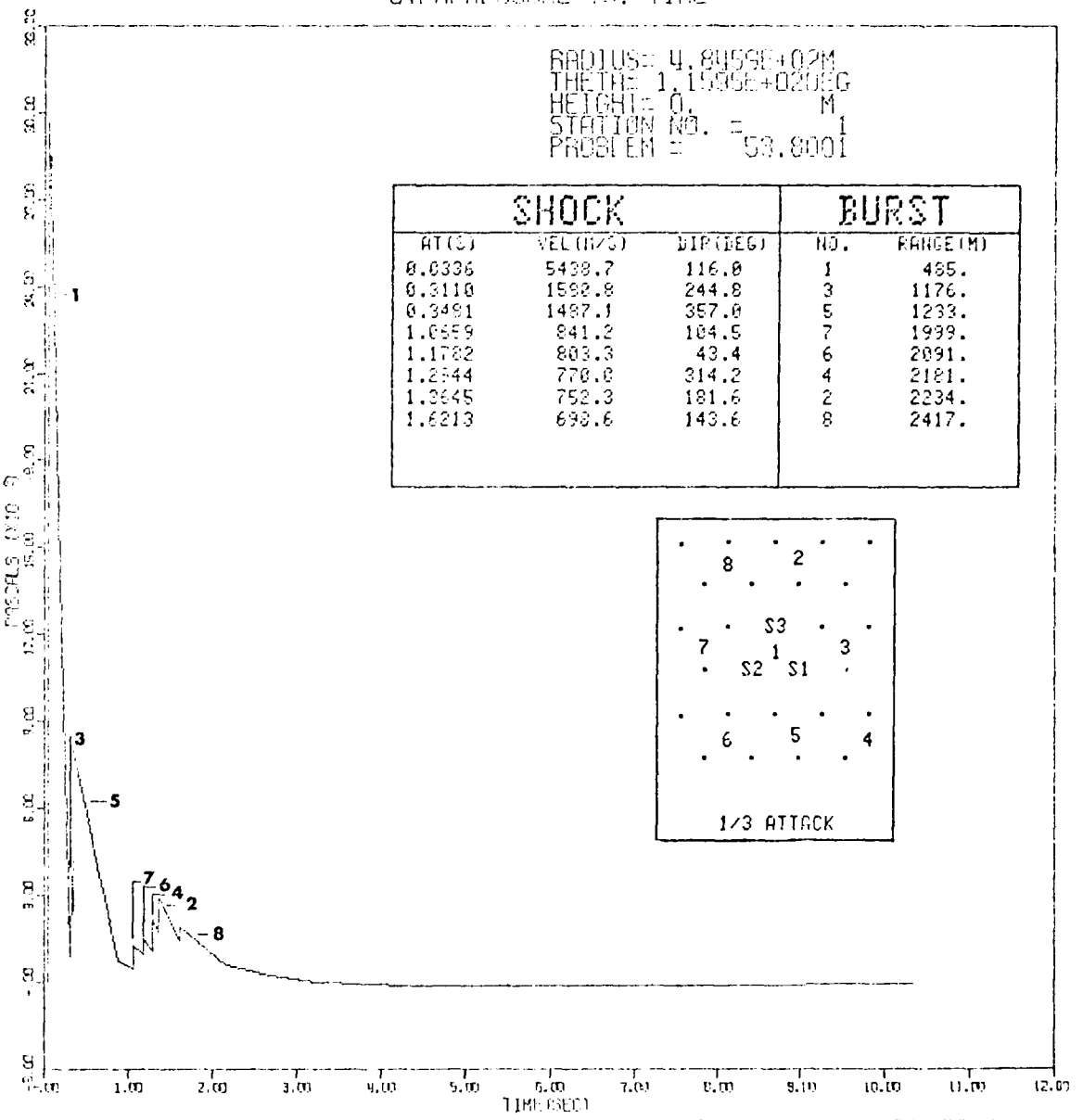


SHOCK			BURST	
ATT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.3081	1448.9	358.2	1	1061.
2.9990	523.3	80.7	7	3085.
3.1271	513.4	279.1	3	3072.
3.1894	510.3	140.7	8	3105.
3.2864	505.6	199.1	2	3155.
5.2152	446.5	345.3	5	4881.
7.2031	417.9	23.5	6	4933.
10.0141	396.2	318.3	4	6062.



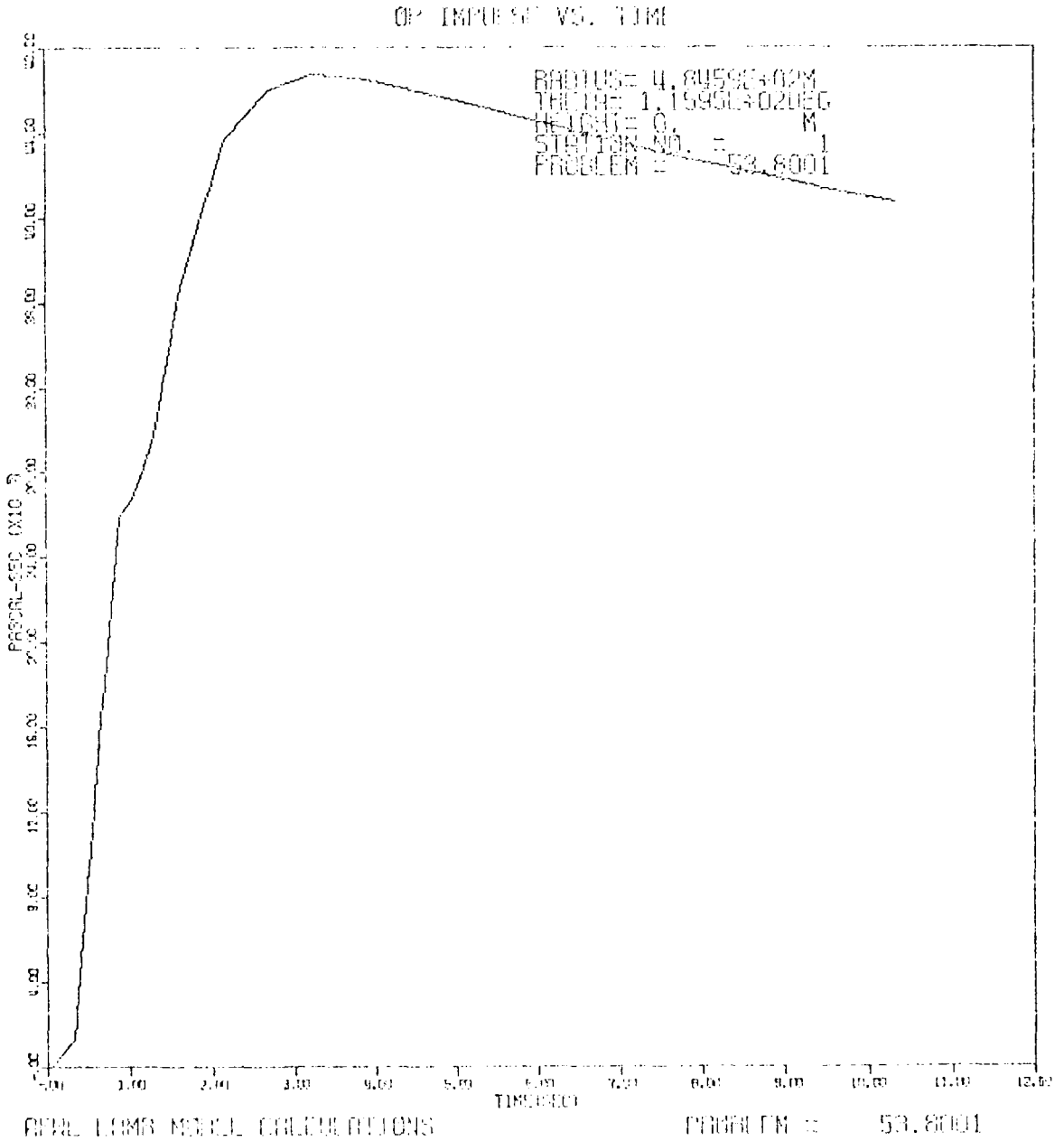
HOB= 0m
YIELD= 5Mt
SPACING= 1000m

OVERPRESSURE VS. TIME



SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.0336	5438.7	116.0	1	485.
0.3110	1598.8	244.8	3	1176.
0.3491	1487.1	357.0	5	1233.
1.0659	841.2	104.5	7	1999.
1.1782	803.3	43.4	6	2091.
1.2944	770.8	314.2	4	2181.
1.3945	752.3	181.6	2	2234.
1.6213	698.6	143.6	8	2417.

AFWL LAMS MODEL CALCULATIONS PROBLEM = 53.8001


OF IMPULSE VS. TIME
RADIUS= 4.8959E+02M
THETA= 1.1595E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.8001
PASCAL-SEC (X10 5)
TIME(SEC)
AFRL ICBM MODEL CALCULATIONS
PROBLEM = 53.8001

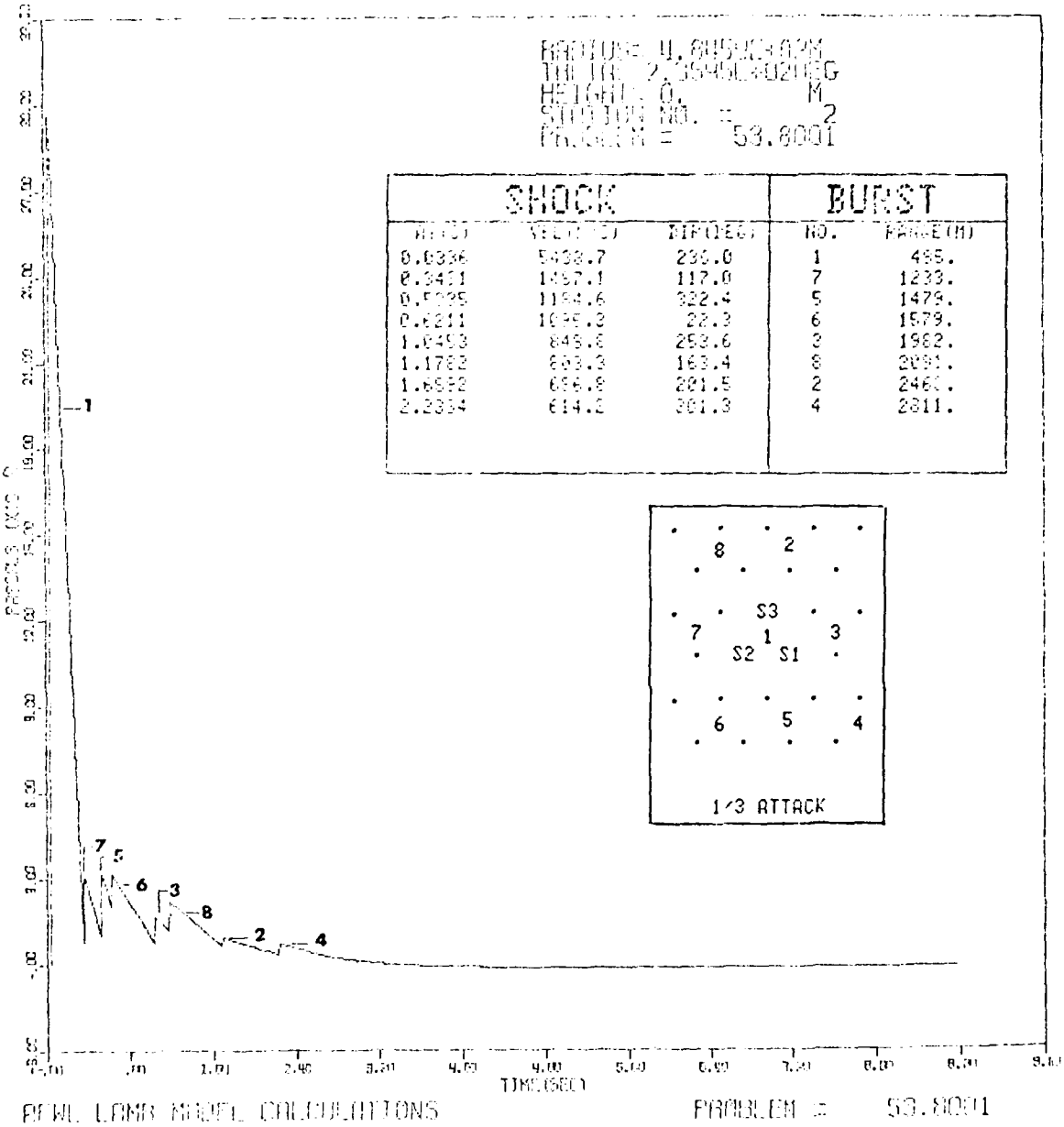
8

HOB= 0m
YIELD= 5Mt
SPACING= 1000m

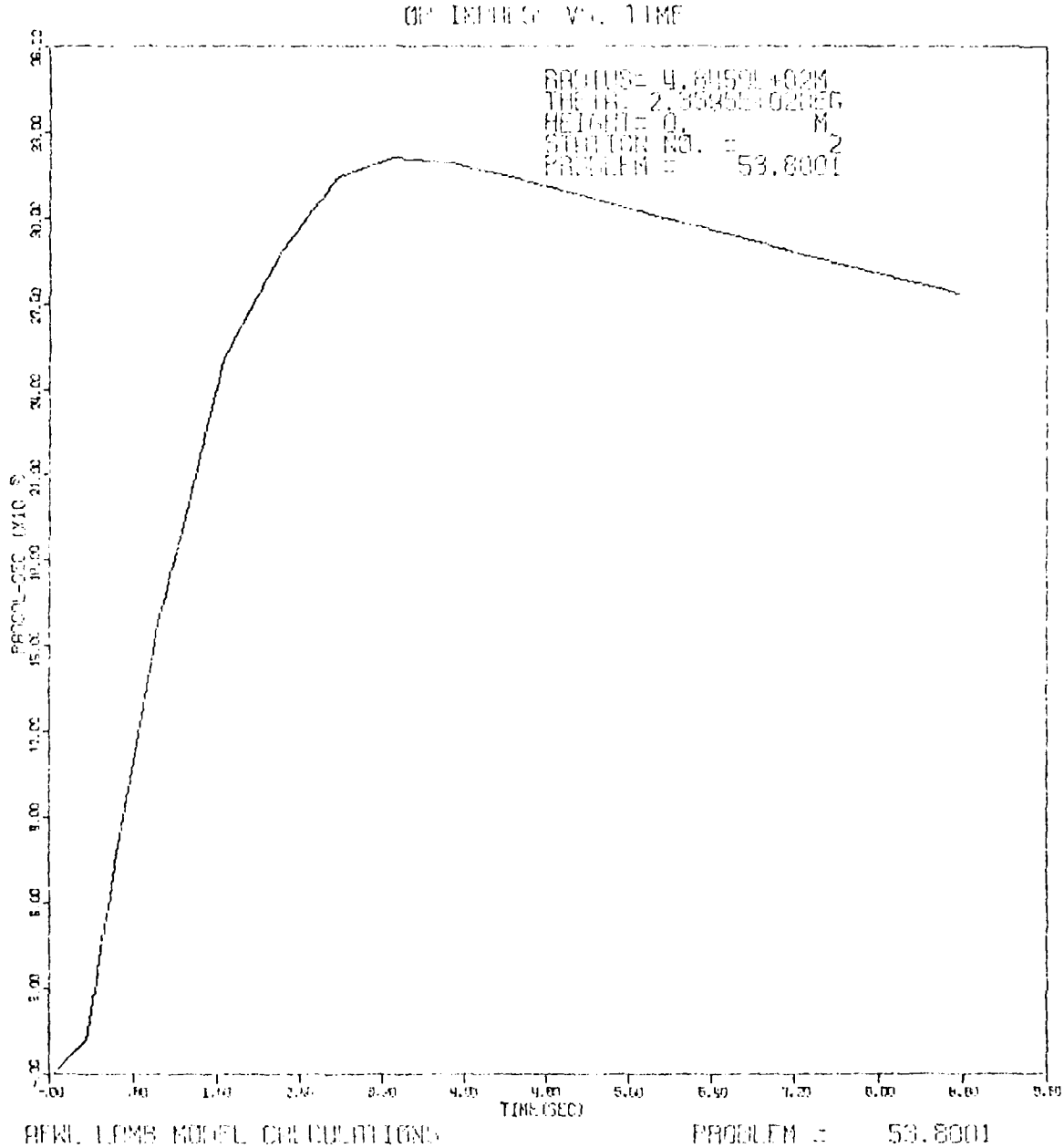
OVERPRESSURE VS. TIME

RADIUS= 4.000KGAM
THETA= 2.3540E+02DEG
HEIGHT= 0. M
STATION NO. = 2
PROBLEM = 53.8001

SHOCK			BURST	
			NO.	RANGE(M)
0.0336	5438.7	236.0	1	485.
0.3421	1457.1	117.0	7	1233.
0.5295	1154.6	322.4	5	1479.
0.6211	1045.3	22.3	6	1579.
1.0493	849.6	253.6	3	1962.
1.1782	693.3	163.4	8	2091.
1.6652	656.8	201.5	2	2460.
2.2334	614.2	301.3	4	2811.



BRL LAMB MODEL CALCULATIONS PROBLEM = 53.8001

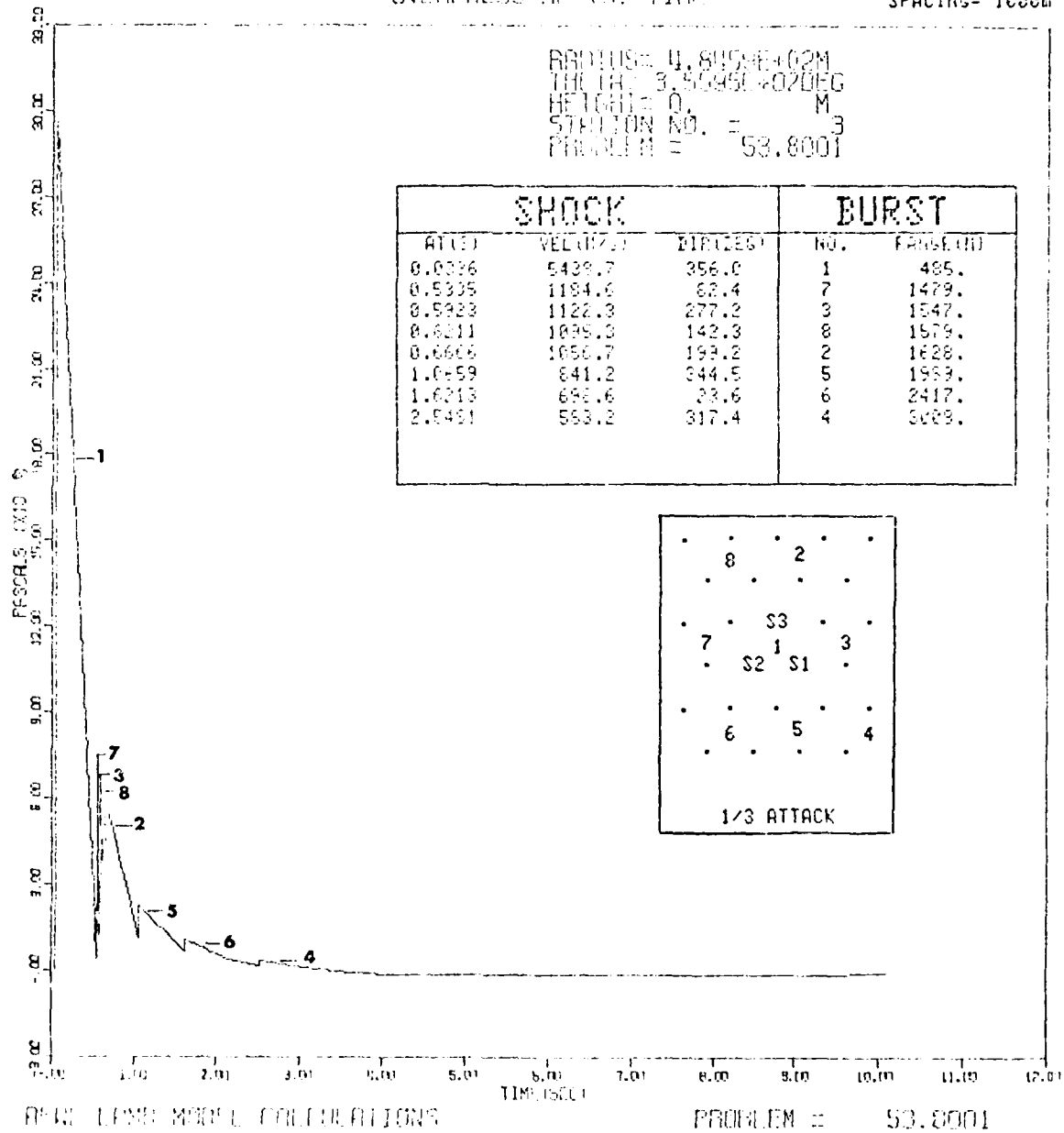

RADIUS= 4.6859L+02M
HEIGHT= 0. M
STATION NO. = 2
PROBLEM = 53.8001
TIME(SEC)
AFWL LOMB MODEL CALCULATIONS
PROBLEM = 53.8001

HOB= 0m
YIELD= 5Mt
SPACING= 1000m

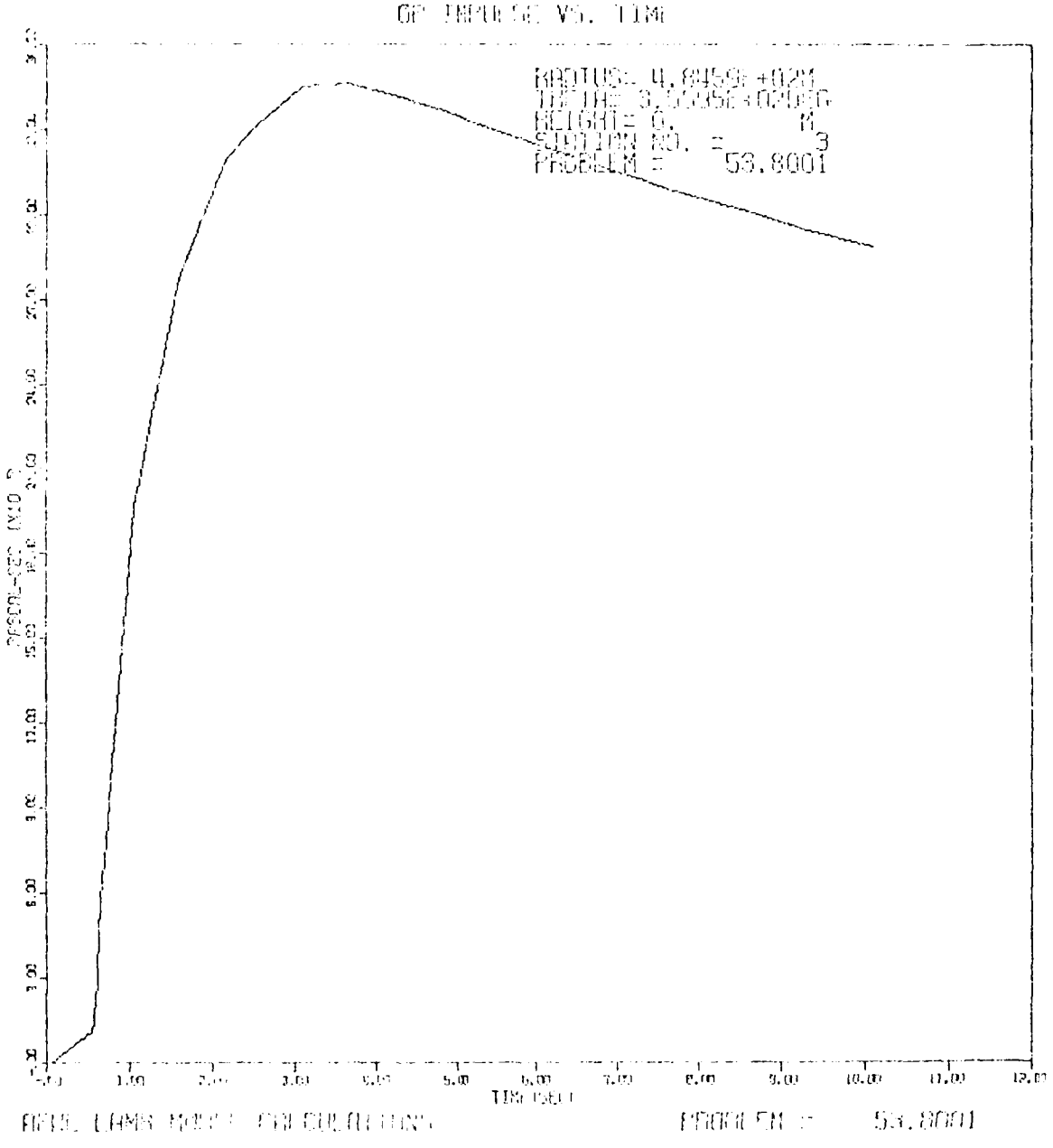
OVERPRESSURE VS. TIME

RADIUS= 4.8950E+02M
THETA= 3.5000E+02DEG
HEIGHT= 0. M
STATION NO. = 3
PROBLEM = 53.8001

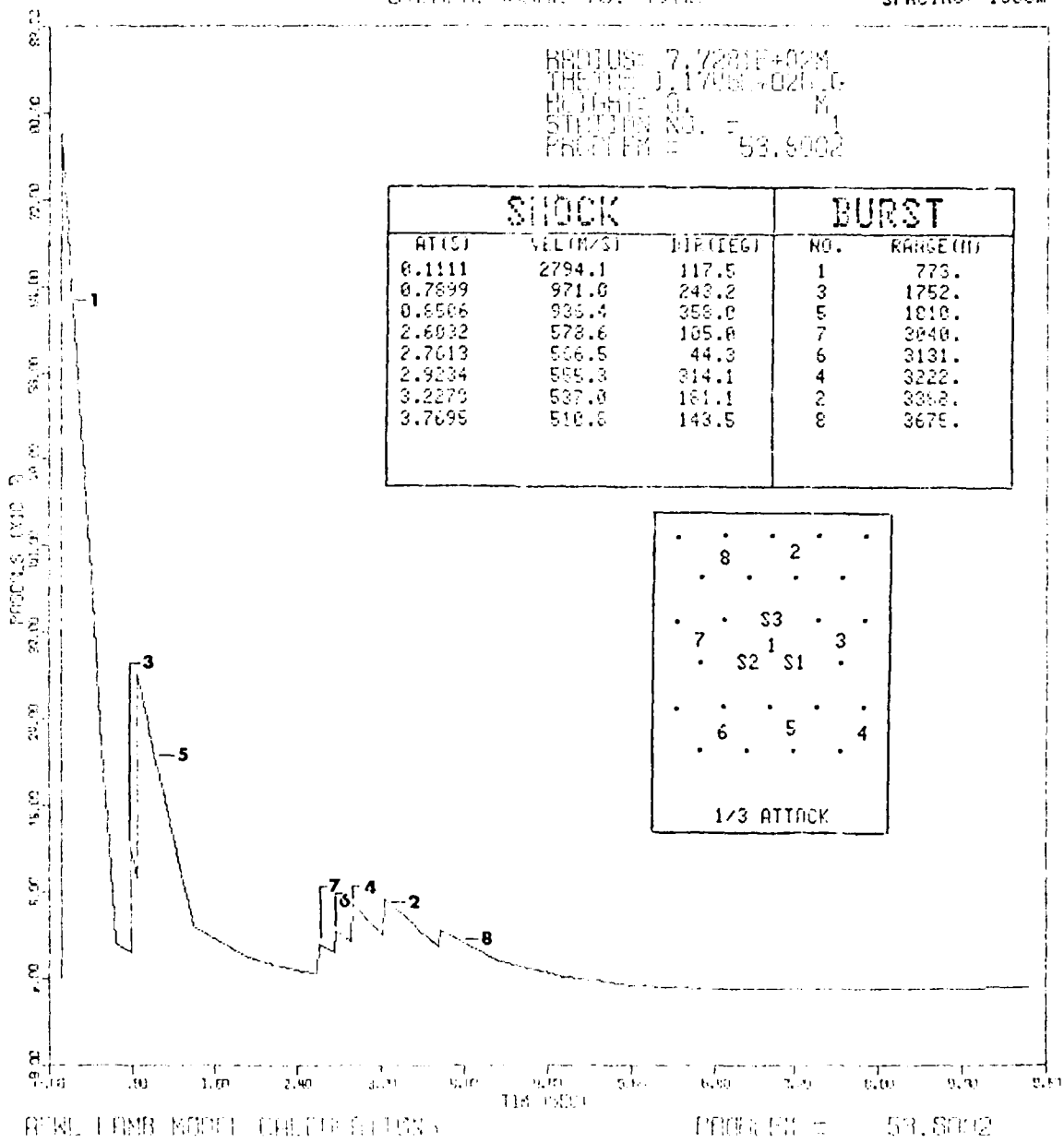
SHOCK			BURST	
ATIME	VELOCITY	DIRECTION	NO.	FRAGLOAD
0.0036	5438.7	356.0	1	485.
0.5335	1184.6	62.4	7	1479.
0.5923	1122.3	277.2	3	1547.
0.6211	1095.3	142.3	8	1579.
0.6606	1058.7	199.2	2	1628.
1.0+59	841.2	344.5	5	1939.
1.6213	696.6	23.6	6	2417.
2.5481	563.2	317.4	4	3089.



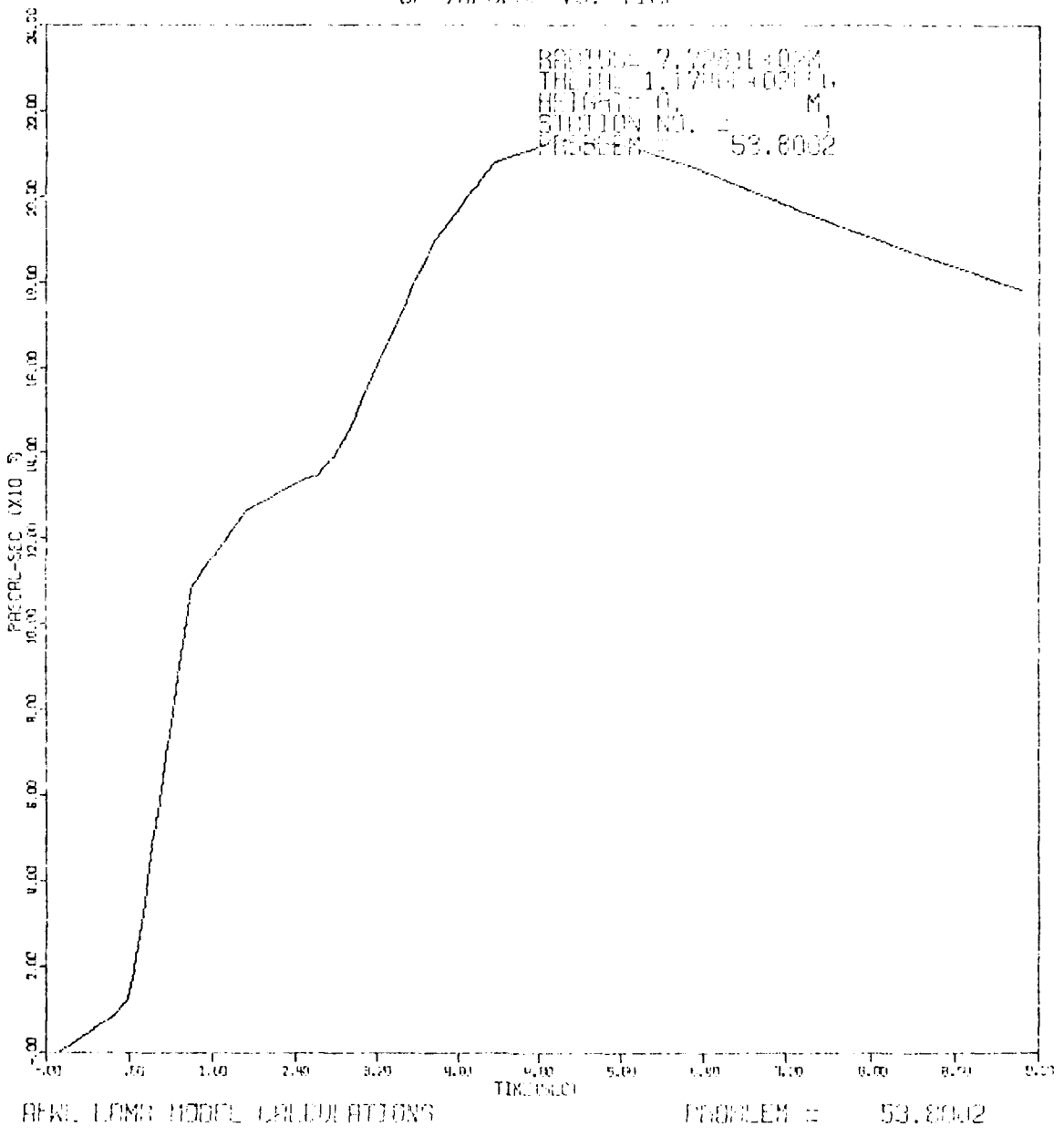
AFWL LASER MODEL CALCULATIONS PROBLEM = 53.8001


RADIUS= 4.8459E+021
THETA= 3.5035E+020EG
HEIGHT= 0. M
SUBITEM NO. = 3
PROBLEM = 53.0001
TIME (SEC)

HOB= 0m
YIELD= 5Kt
SPACING= 1500m



REAL LAMB MODEL CALCULATIONS PRESS= 53.5002

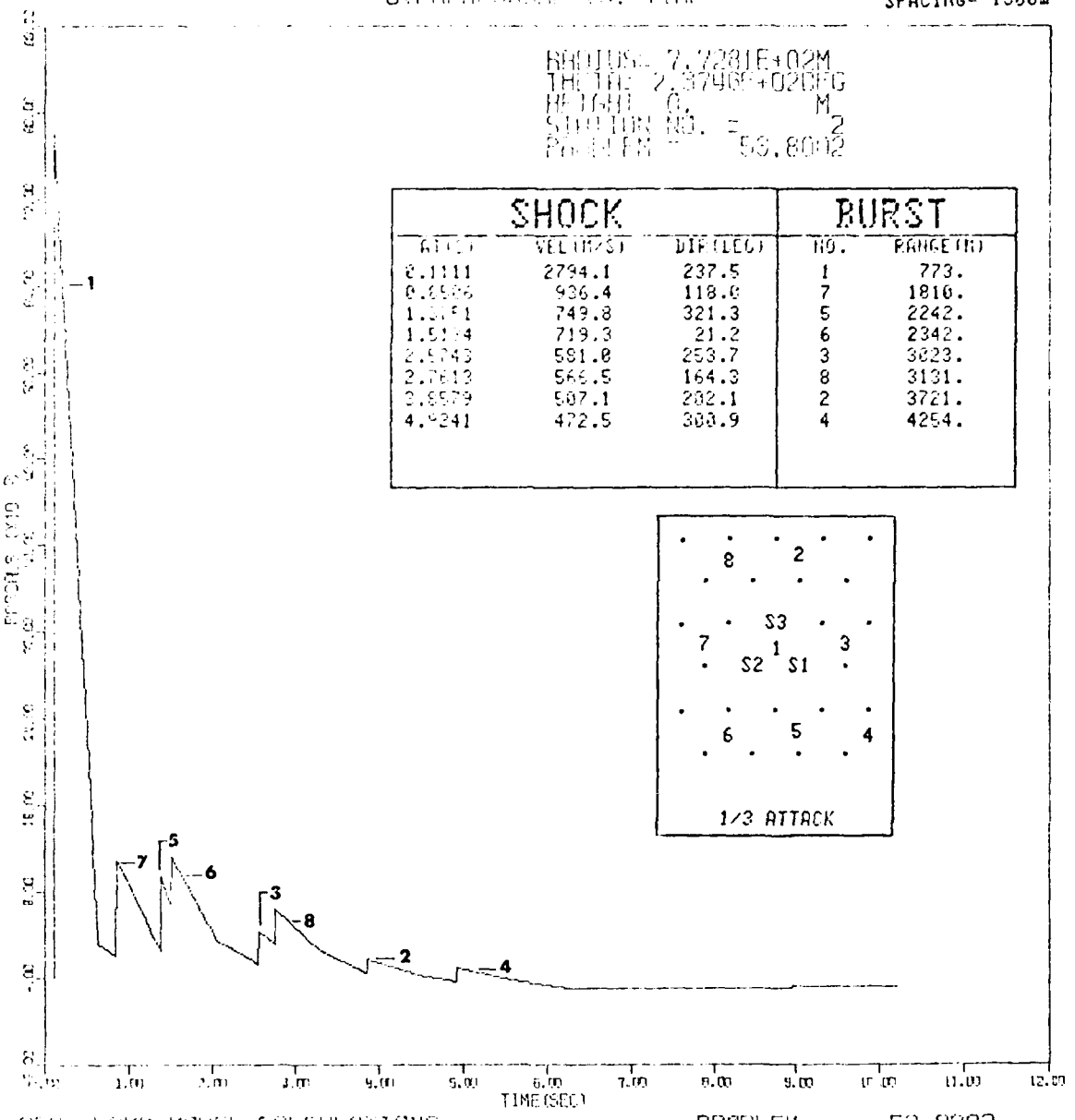

GP IMPACT VS. TIME
PASCAL-SEC (X10 5)
TIME (SEC)
PROBLEM = 53.8002
REAL LOAD MODEL CALCULATIONS
PROBLEM = 53.8002

HOB= 0m
YIELD= 5Mt
SPACING= 1500m

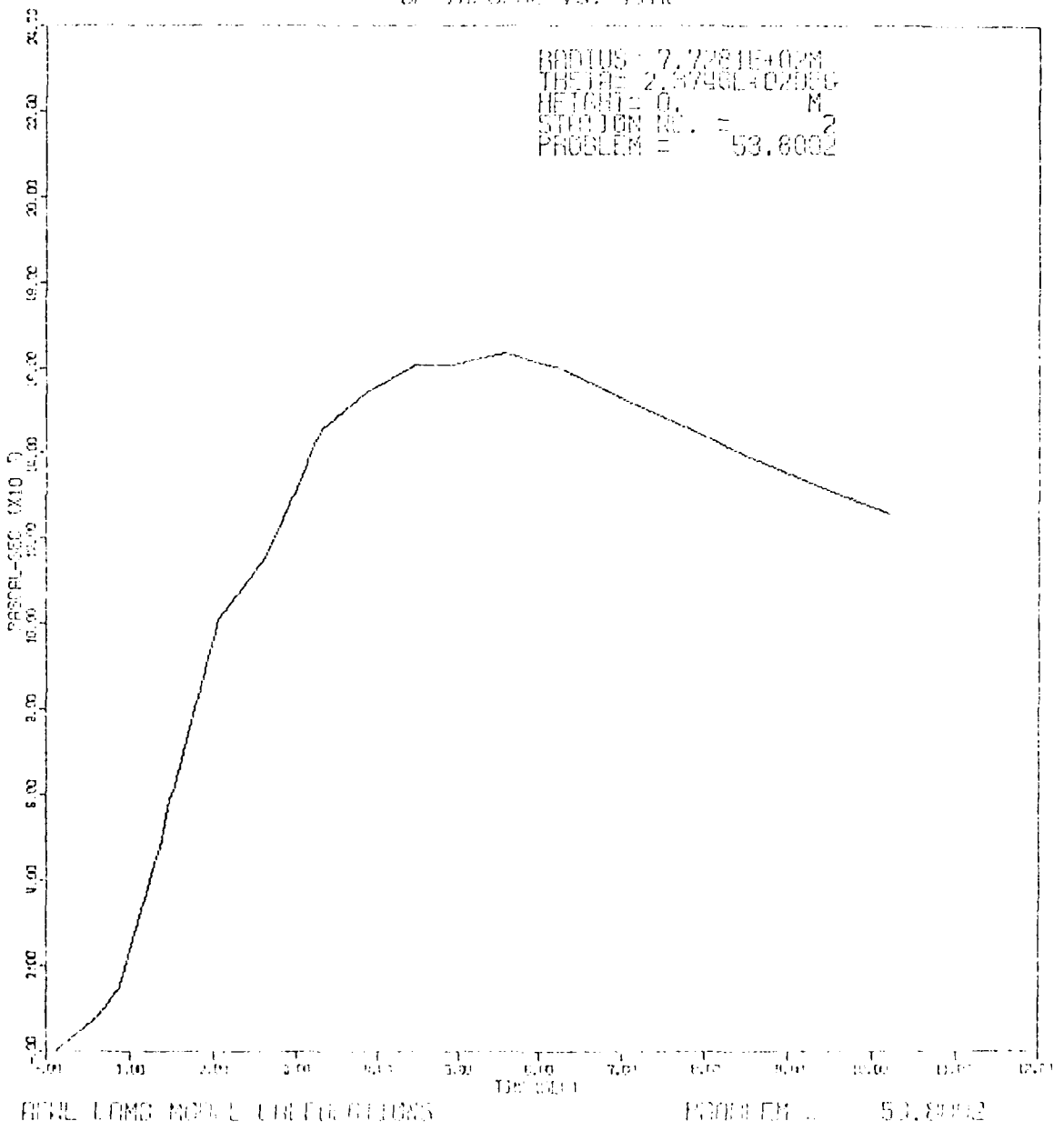
OVERPRESSURE VS. TIME

RADIUS= 7.7281E+02M
THETHE= 2.3749E+02DEG
RETARD= 0. M
STATION NO. = 2
PROBLEM = 53.8002

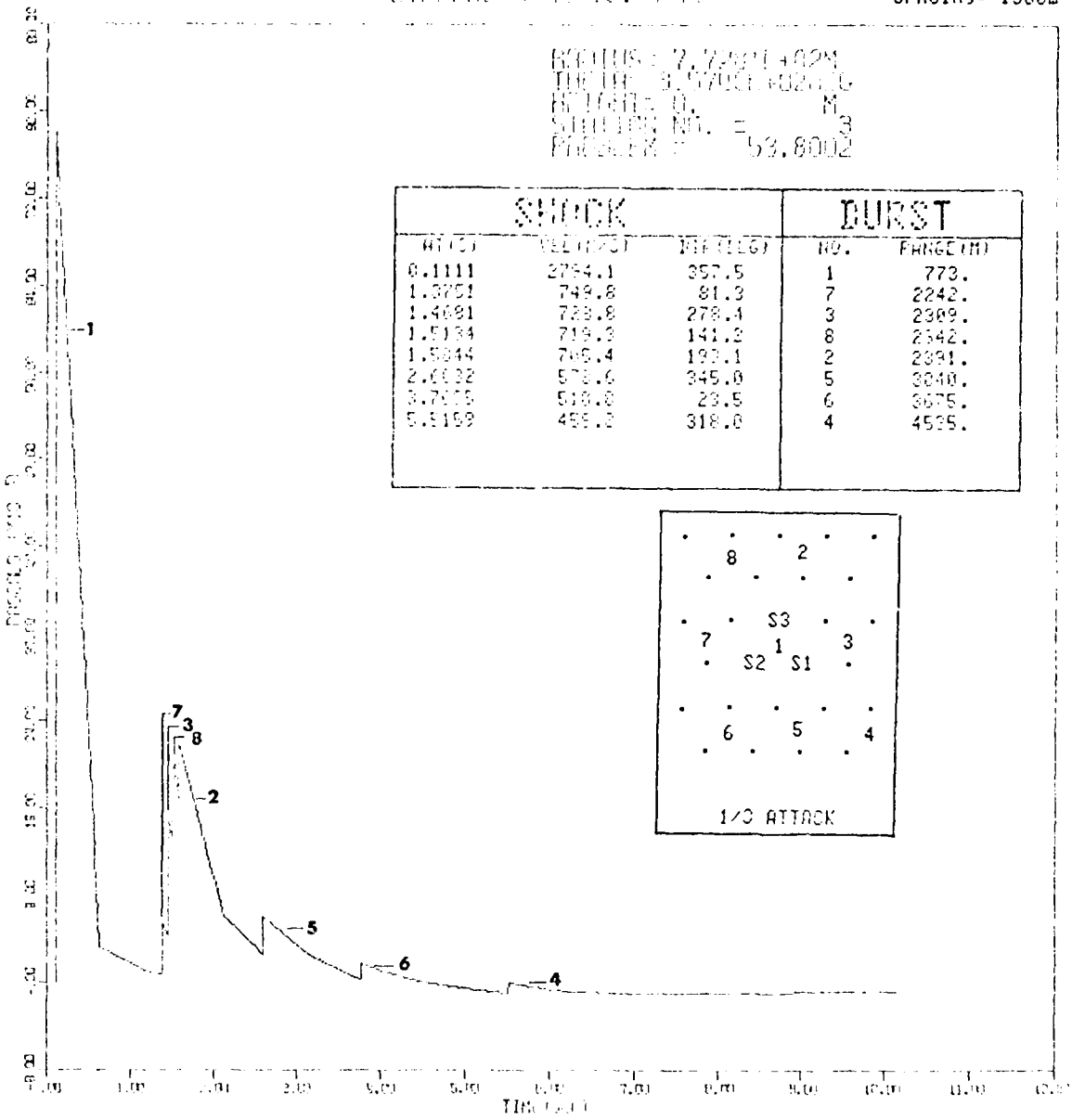
SHOCK			BURST	
ATTK	VEL(M/ST)	DIR(DEG)	NO.	RANGE(M)
0.1111	2794.1	237.5	1	773.
0.6586	936.4	118.0	7	1810.
1.3851	749.8	321.3	5	2242.
1.5134	719.3	21.2	6	2342.
2.5243	581.0	253.7	3	3023.
2.7813	566.5	164.3	8	3131.
3.8579	507.1	202.1	2	3721.
4.9241	472.5	300.9	4	4254.



REAL TIME MODEL CALCULATIONS PROBLEM = 53.8002

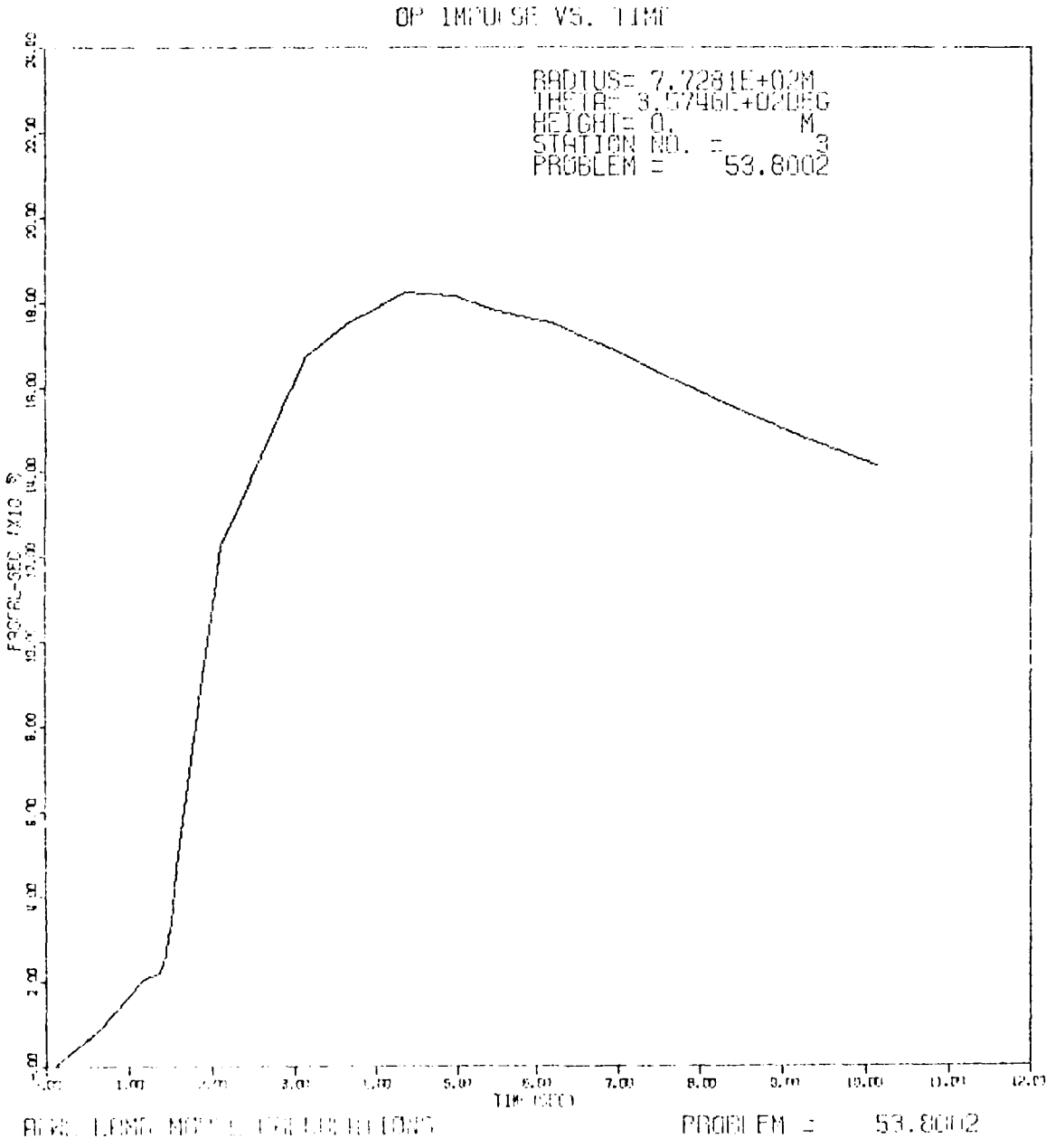

DP IMPULSE VS. TIME
RADIUS = 7.7281E+02M
TRUE = 2.5740E+02SEC
HEIGHT = 0. M
STATION NO. = 2
PROBLEM = 53.6002
PASCAL-SEC (X10)
TIME (SEC)
REAL LOMA NOVA 2 UNIVERSITY
PROBLEM = 53.6002

HOB= 0m
YIELD= 5Mt
SPACING= 1500m

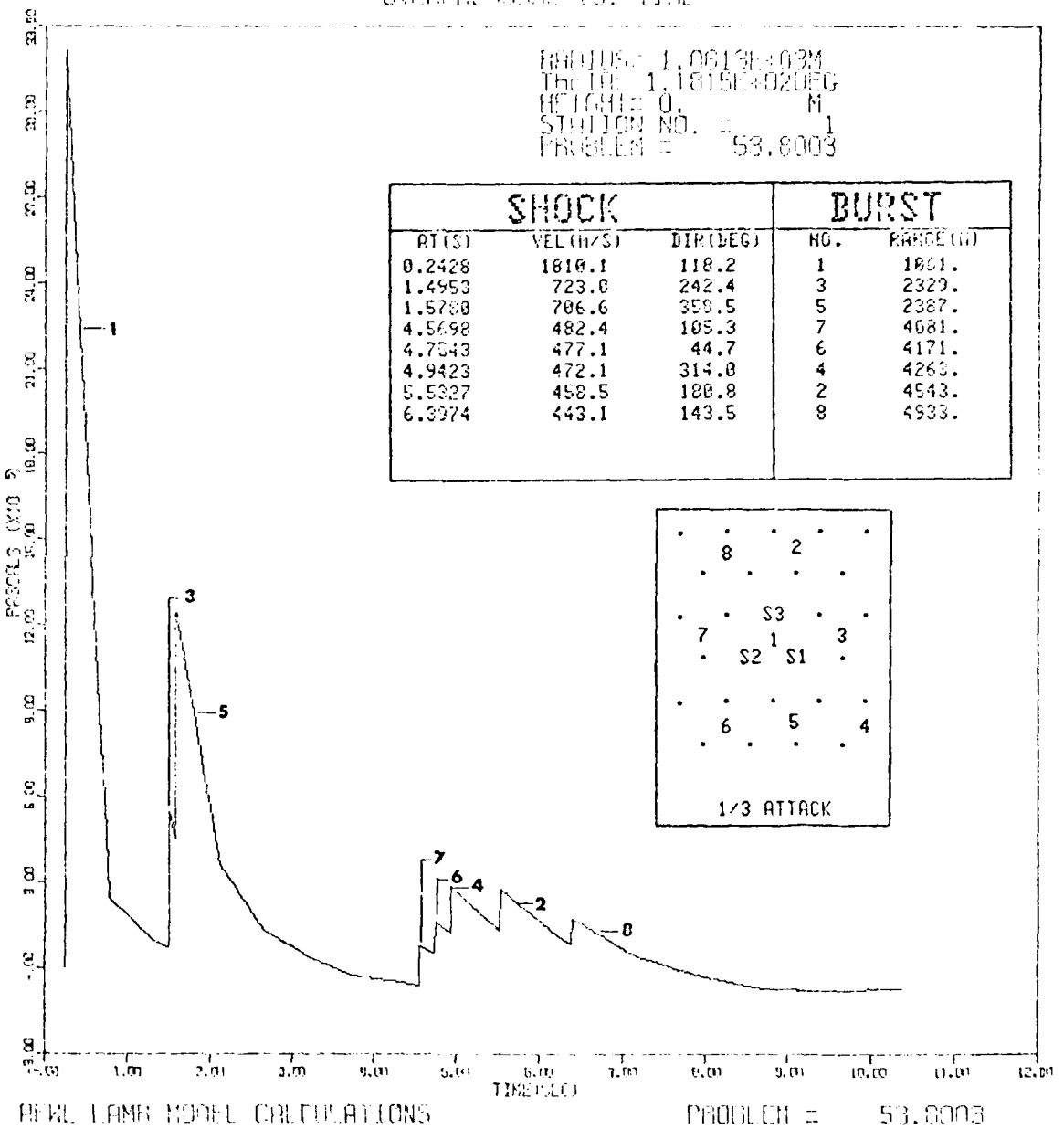


SHOCK			BURST	
MACH	VELOCITY	DIRECTION	NO.	RANGE(M)
0.1111	2764.1	357.5	1	773.
1.3751	749.8	81.3	7	2242.
1.4081	728.8	278.4	3	2309.
1.5134	719.3	141.2	8	2642.
1.5844	746.4	193.1	2	2891.
2.0032	571.6	345.0	5	3840.
3.7275	516.0	23.5	6	3875.
5.8199	458.2	318.0	4	4525.

AFWL LOWS BURST CALCULATIONS PRESSURE = 53.800PSI

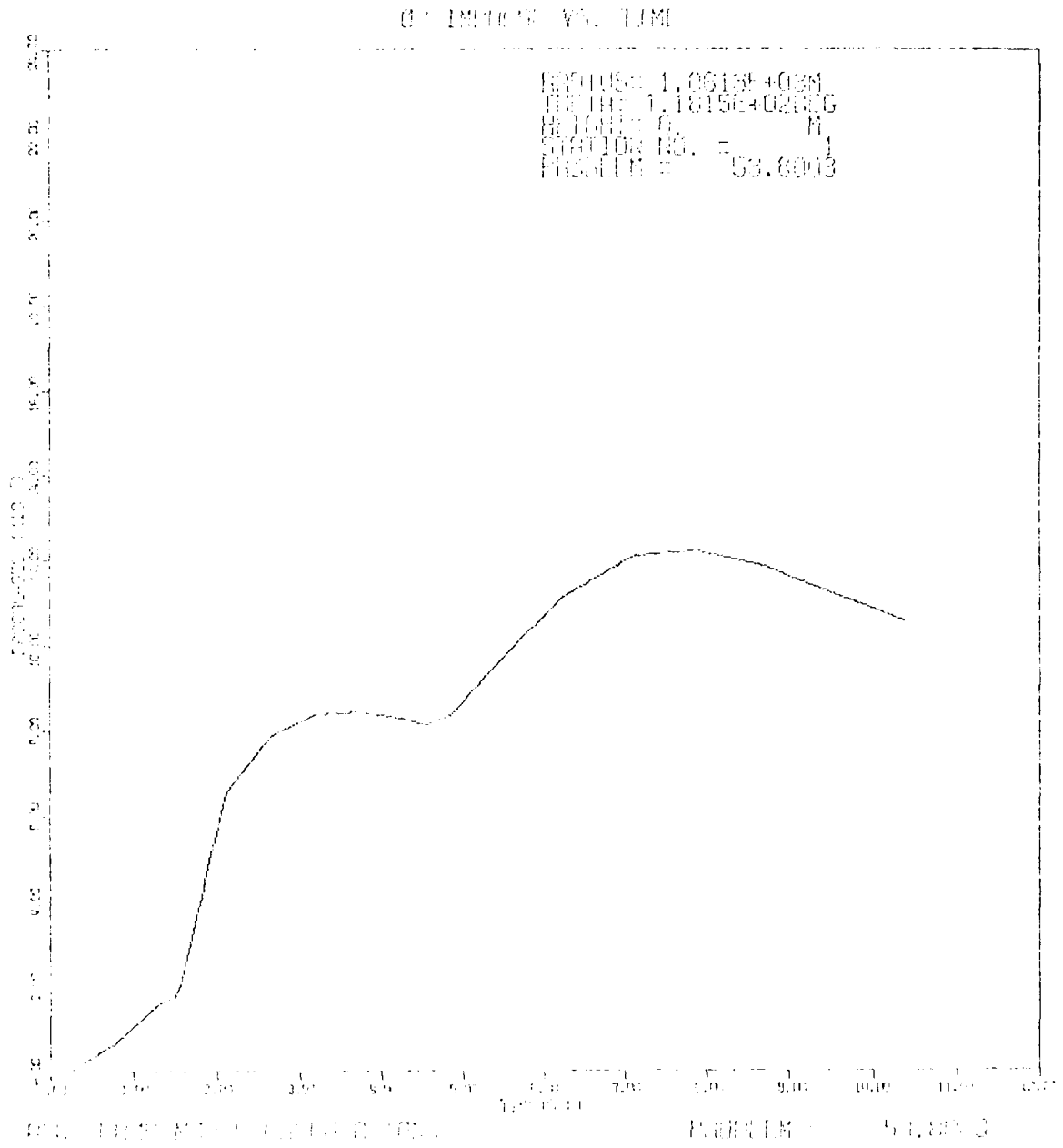

OP IMPULSE VS. TIME
RADIUS= 7.7281E+02M
THETA= 3.0746E+02DEG
HEIGHT= 0. M
STATION NO. = 3
PROBLEM = 53.8002
TIME (SEC)
PROBLEM = 53.8002

HOB= 0m
YIELD= 5Mt
SPACING= 2000m

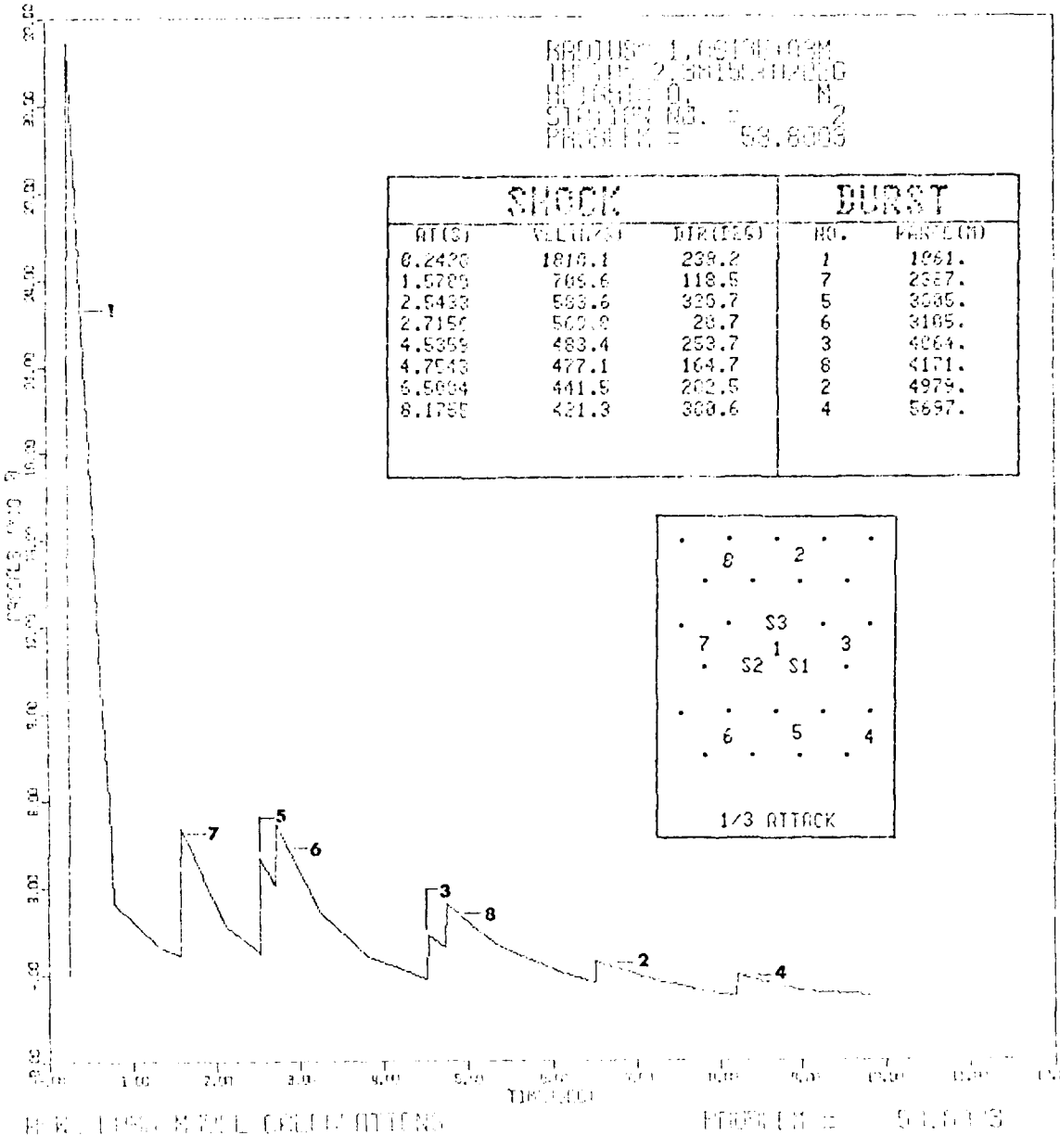


SHOCK			BURST	
RT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.2428	1810.1	118.2	1	1061.
1.4953	723.0	242.4	3	2329.
1.5788	706.6	358.5	5	2387.
4.5698	482.4	105.3	7	4081.
4.7843	477.1	44.7	6	4171.
4.9423	472.1	314.0	4	4263.
5.5327	458.5	180.8	2	4543.
6.3974	443.1	143.5	8	4933.

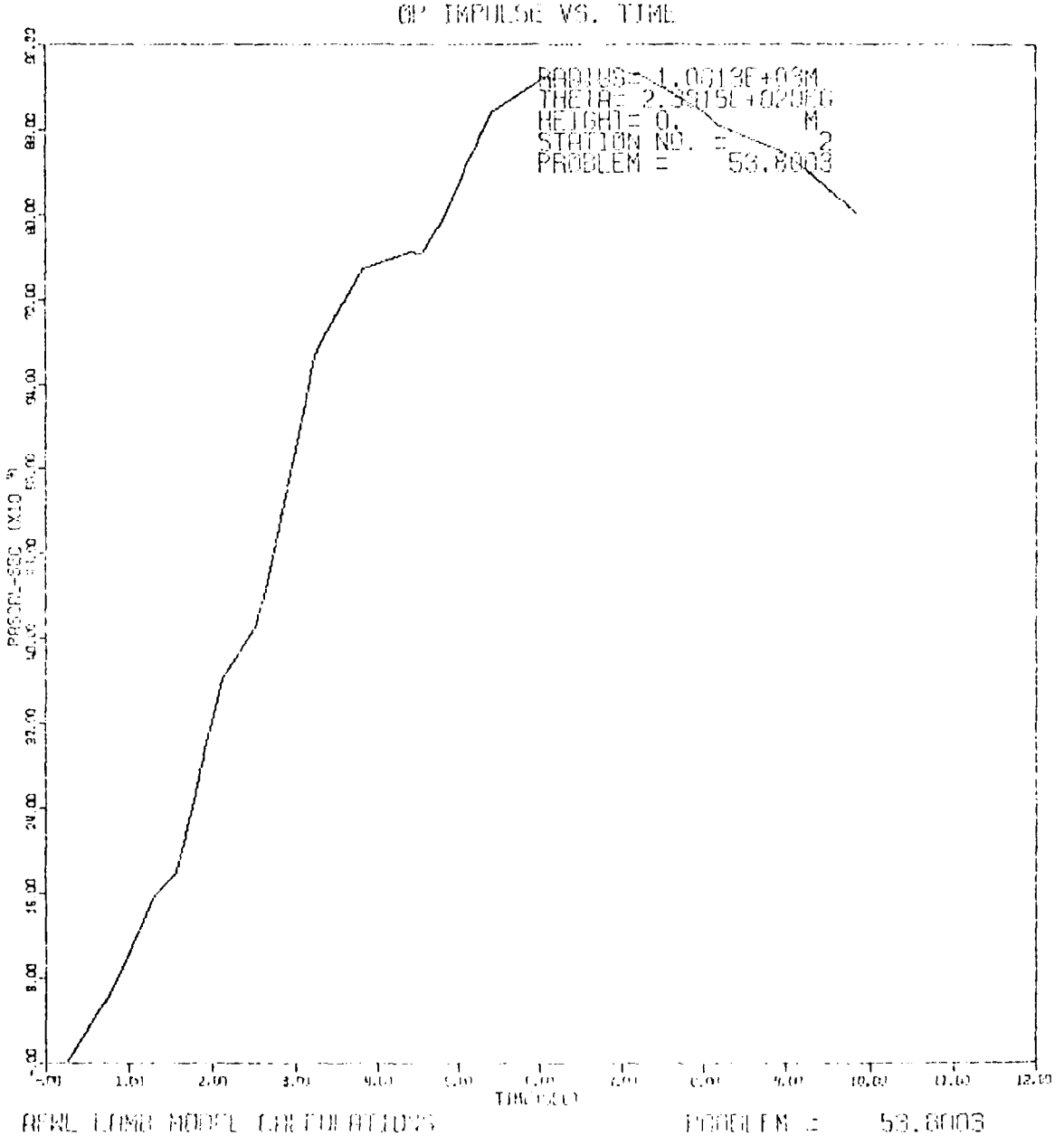
BRL LAMB MODEL CALCULATIONS PROBLEM = 53.0003


1.0619E+03M
1.1815E+02SG
M
1
53.6013

HOB= 0m
YIELD= 5Mt
SPACING= 2000m



SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.2420	1810.1	239.2	1	1961.
1.5789	705.6	118.5	7	2387.
2.5433	583.6	329.7	5	3085.
2.7159	560.9	28.7	6	3165.
4.5359	483.4	253.7	3	4064.
4.7043	477.1	164.7	8	4171.
6.5694	441.5	202.5	2	4979.
8.1755	421.3	300.6	4	5697.

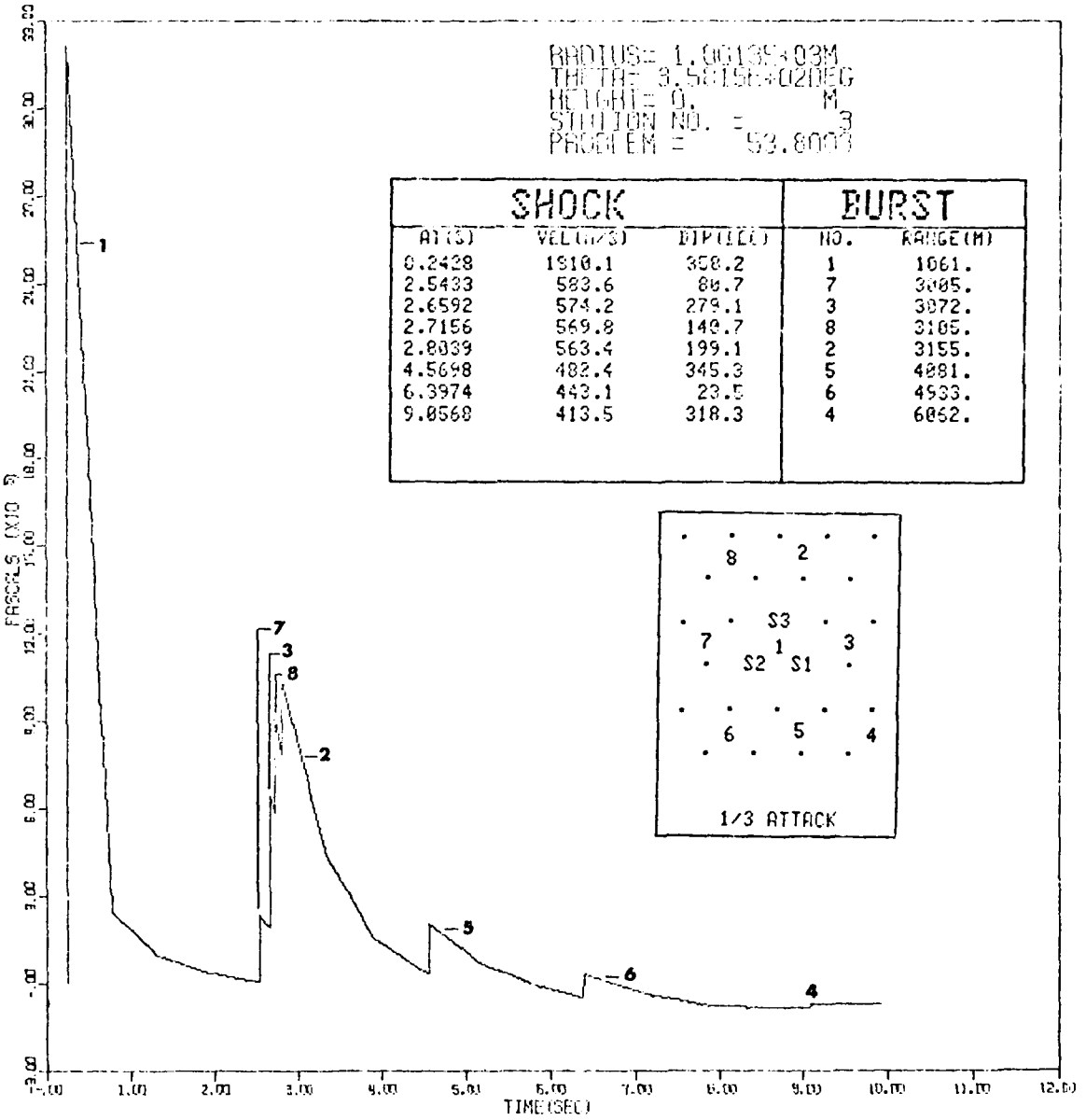

Ø' IMPULSE VS. TIME
RADIUS= 1.0513E+03M
THETA= 2.3915E+02DEG
HEIGHT= 0. M
STATION NO. = 2
PROBLEM = 53.0003
PRESSURE-SEC (X10 **)
TIME (SEC)
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
72.00
80.00
88.00
96.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
11.00
12.00

HOB= 0m
YIELD= 5Mt
SPACING= 2000m

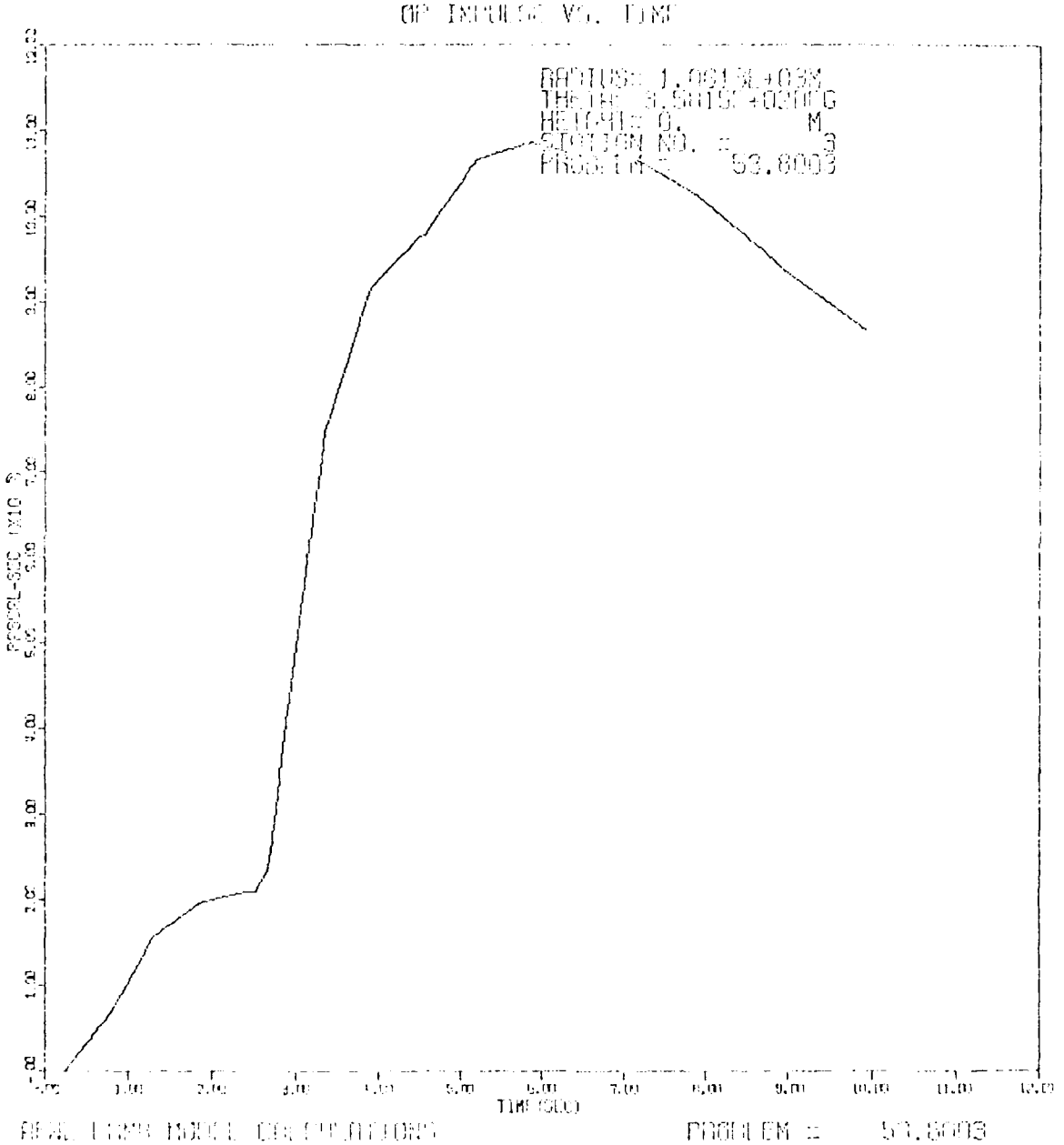
OVERPRESSURE VS. TIME

RADIUS= 1.0013E+03M
THETA= 3.5815E+02DEG
HEIGHT= 0. M
STATION NO. = 3
PROBLEM = 53.8003

SHOCK			BURST	
AT(S)	VEL(M/S)	DIP(DEG)	NO.	RANGE(M)
0.2428	1910.1	358.2	1	1061.
2.5433	583.6	86.7	7	3005.
2.6592	574.2	279.1	3	3072.
2.7156	569.8	140.7	8	3105.
2.8039	563.4	199.1	2	3155.
4.5698	482.4	345.3	5	4081.
6.3974	443.1	23.5	6	4933.
9.0568	413.5	318.3	4	6062.



AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.8003

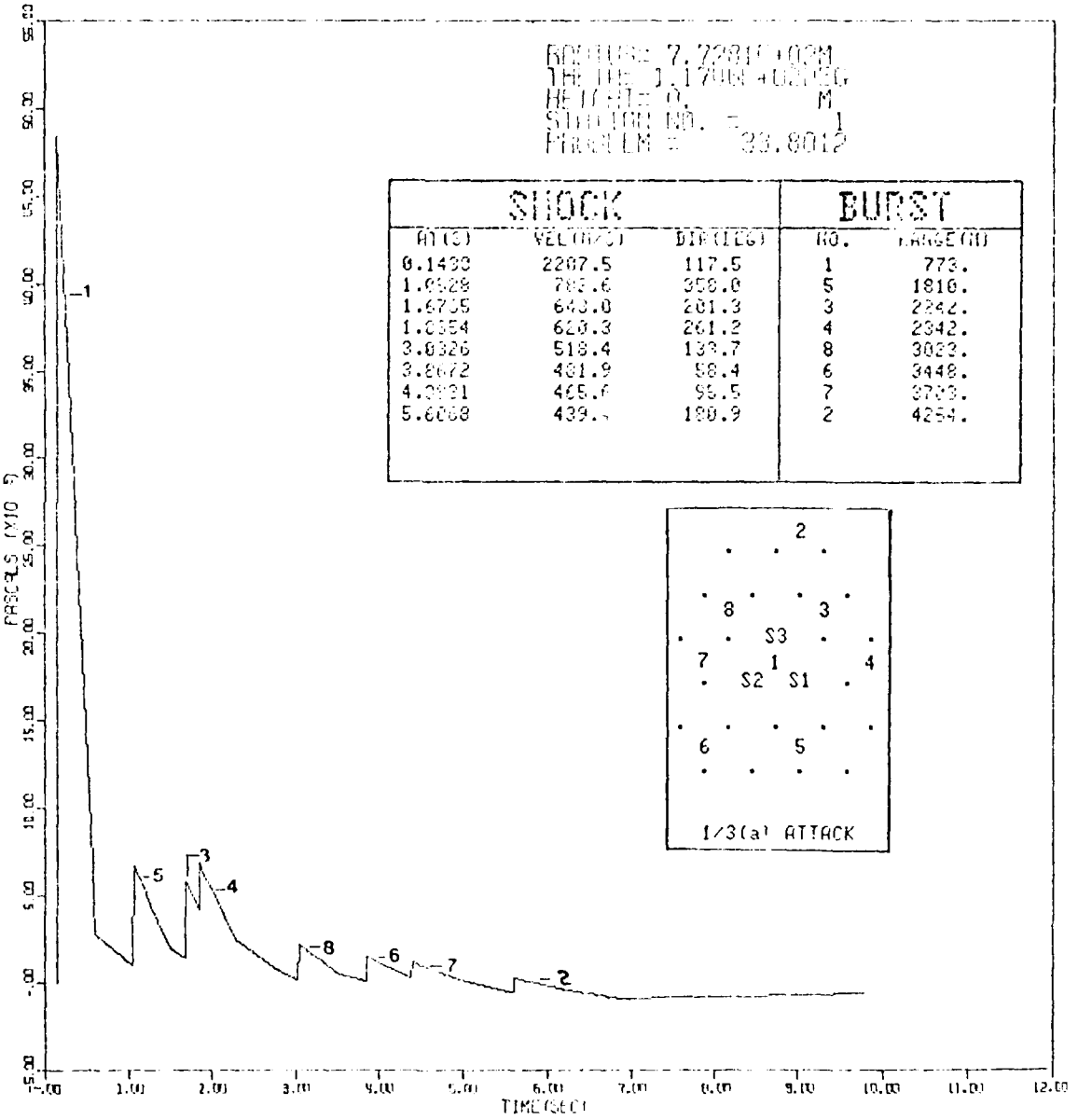

OF IMPULSE VS. TIME
RADIUS= 1.0018E+03M
M.
3
53.8003
PRESSURE-SIDE (X10 3)
TIME (SEC)
REAL TIME MODEL OPERATIONS
PROBLEM = 53.8003

HOB= 0m
YIELD= 3Mt
SPACING= 1500m

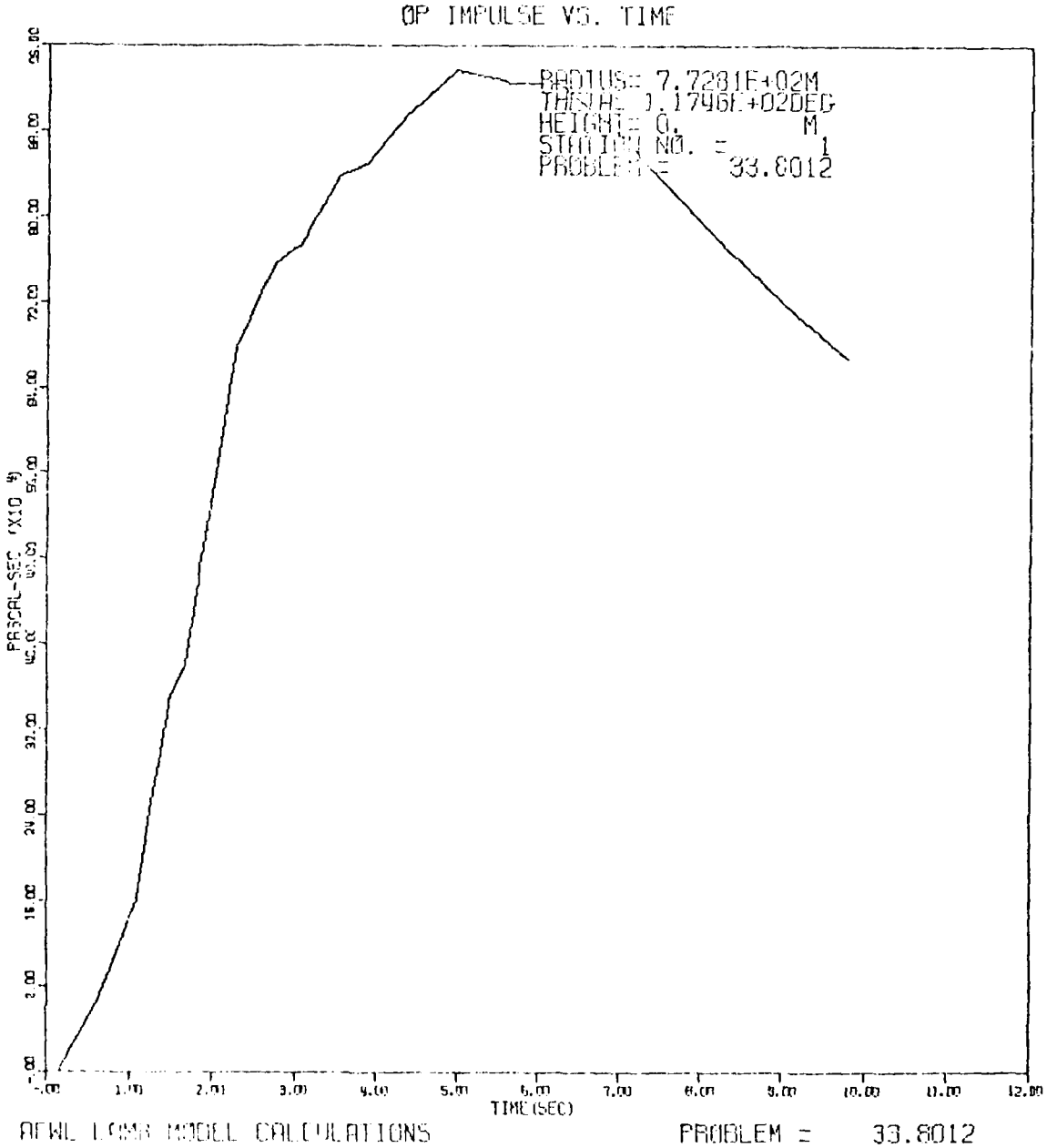
OVERPRESSURE VS. TIME

RADIUS= 7.2281E+03M
THETA= 1.1700E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.8012

SHOCK			BURST	
ATT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1433	2207.5	117.5	1	773.
1.0528	783.6	358.0	5	1810.
1.6705	643.0	201.3	3	2242.
1.8354	620.3	261.2	4	2342.
3.8326	518.4	139.7	8	3023.
3.8672	491.9	58.4	6	3448.
4.2931	465.6	95.5	7	3703.
5.6068	439.3	180.9	2	4254.



AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.8012

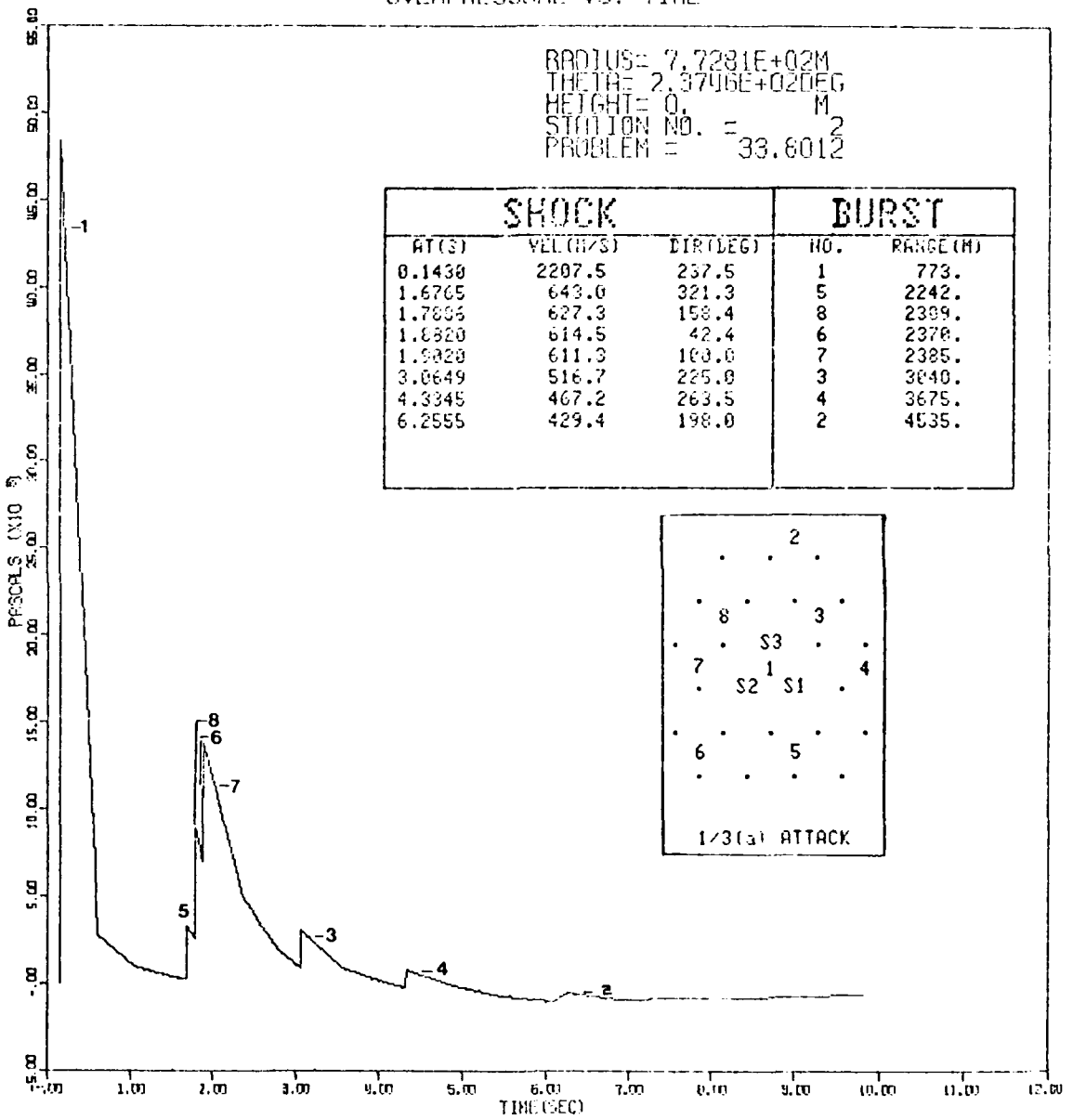

OP IMPULSE VS. TIME
RADIUS= 7.7281E+02M
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.8012
PASCAL-SEC (X10 4)
TIME(SEC)
AFWL LOSS MODEL CALCULATIONS
PROBLEM = 33.8012

HOB= 0m
YIELD= 3Mt
SPACING= 1500m

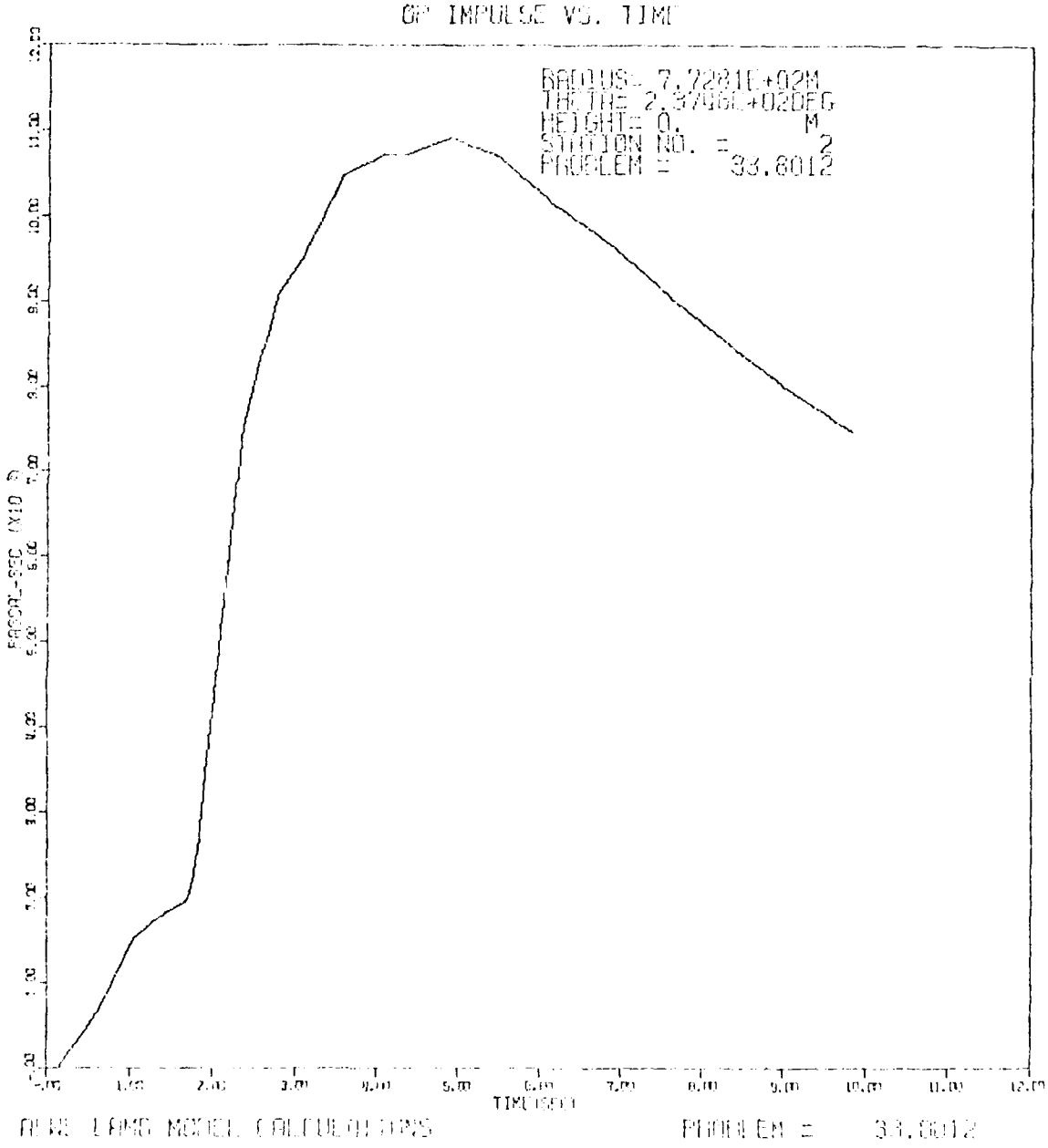
OVERPRESSURE VS. TIME

RADIUS= 7.7281E+02M
THETA= 2.3706E+02DEG
HEIGHT= 0. M
STATION NO. = 2
PROBLEM = 33.8012

SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1430	2207.5	237.5	1	773.
1.6765	643.0	321.3	5	2242.
1.7886	627.3	158.4	8	2389.
1.8820	614.5	42.4	6	2370.
1.9020	611.3	100.0	7	2385.
3.0649	516.7	225.8	3	3040.
4.3345	467.2	263.5	4	3675.
6.2555	429.4	198.0	2	4535.

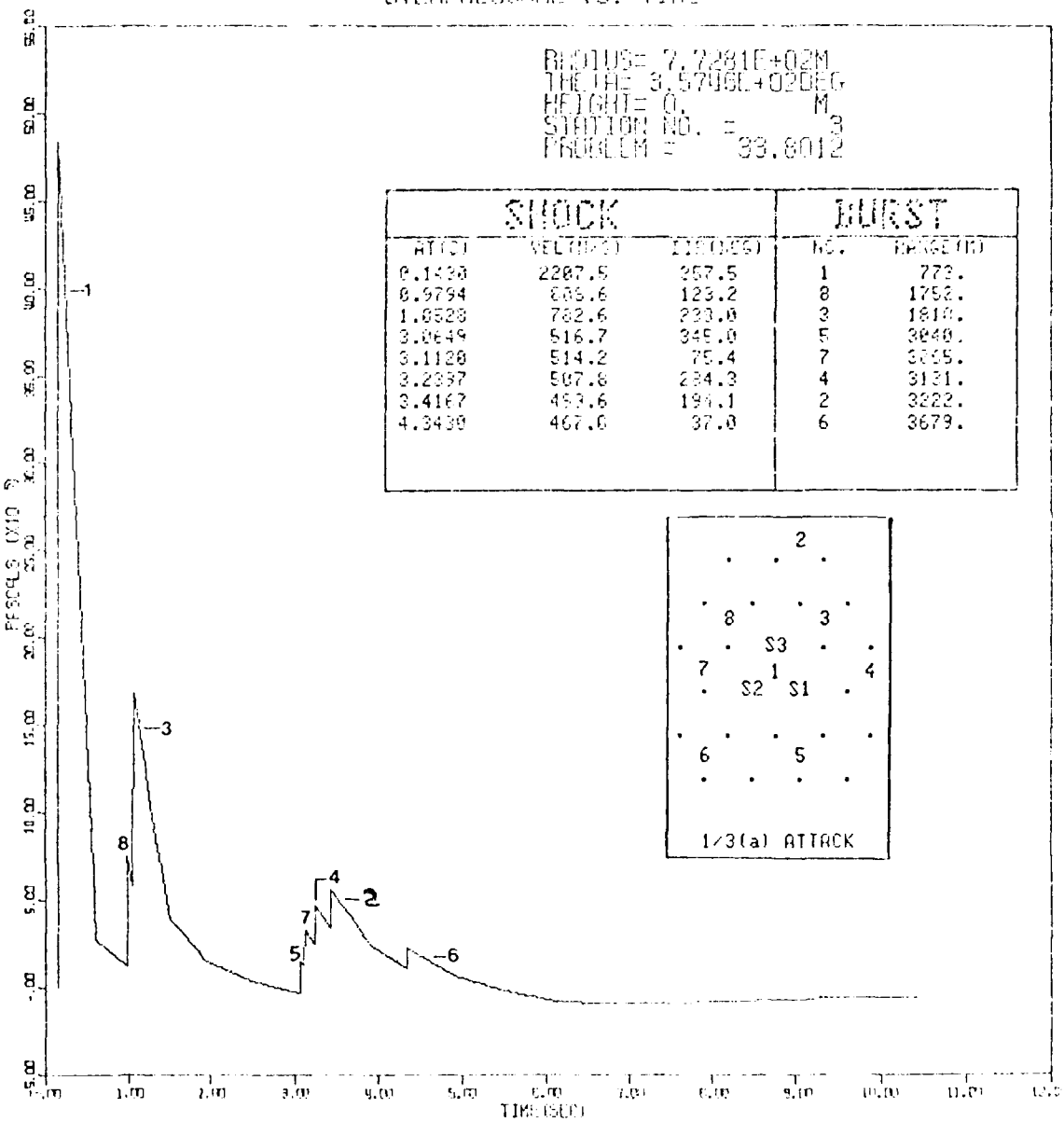


AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.8012

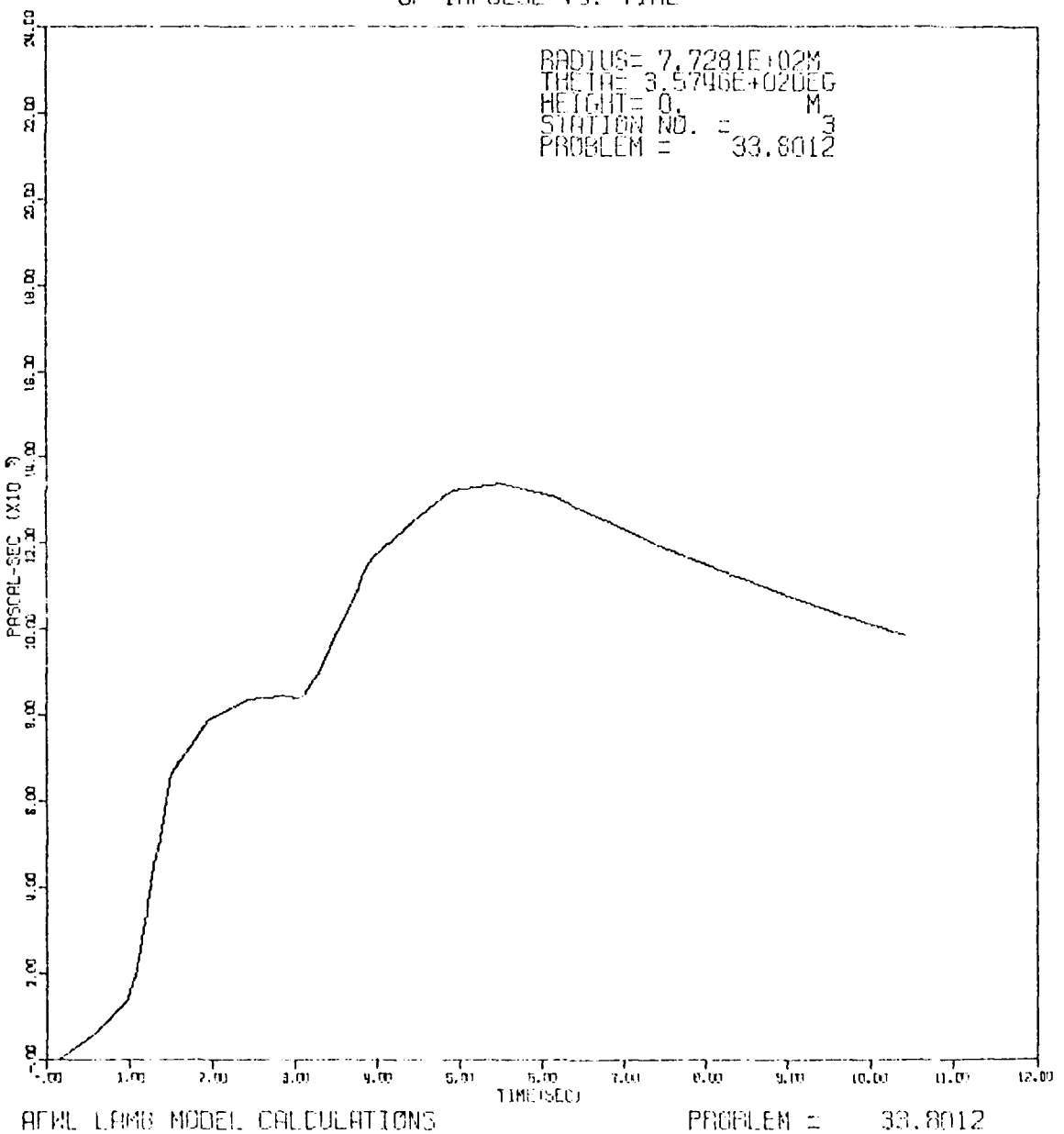

GP IMPULSE VS. TIME
RADIUS= 7.7281E+02M
THETHE= 2.3700E+02DEG
HEIGHT= 0. M
STATION NO. = 2
PROBLEM = 33.8012
PARCEL-SEC (X10 P
TIME(SEC)
NEW LAMB MODEL CALCULATIONS
PROBLEM = 33.8012

HOB= 0m
YIELD= 3Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



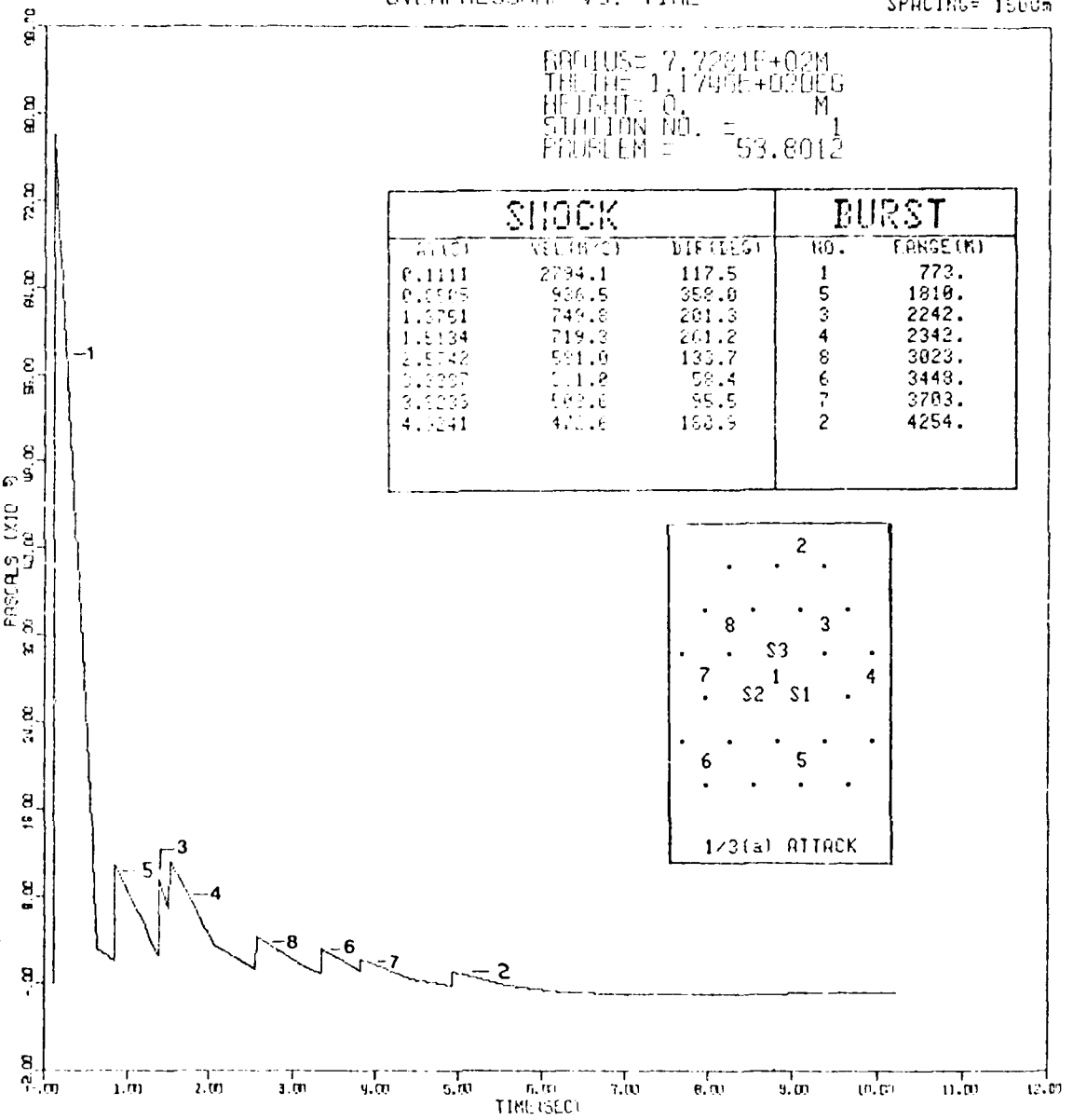
AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.6012



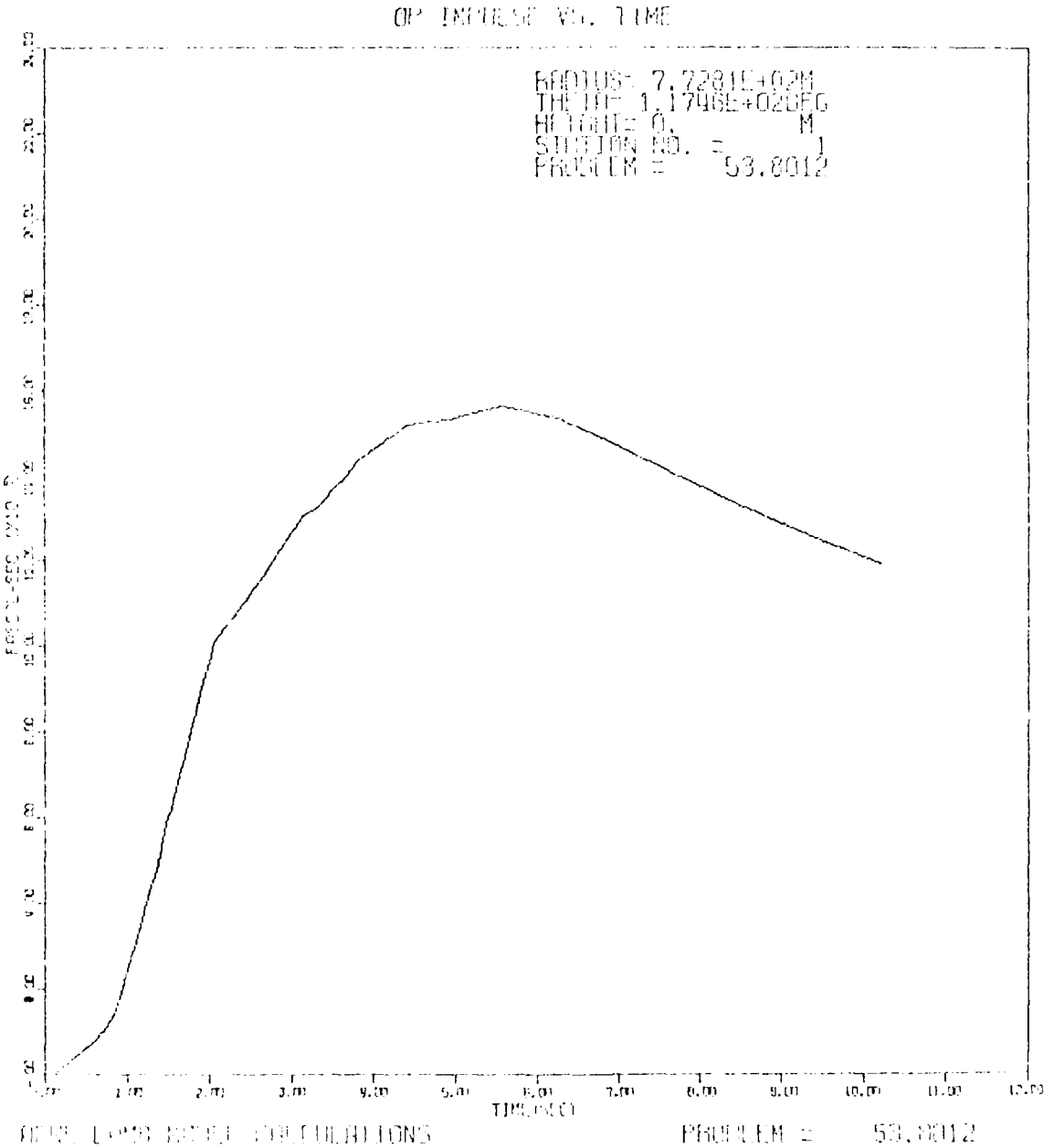
AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.8012

HOB= 0m
YIELD= 5Mt
SPACING= 1500m

OVERPRESSURE VS. TIME

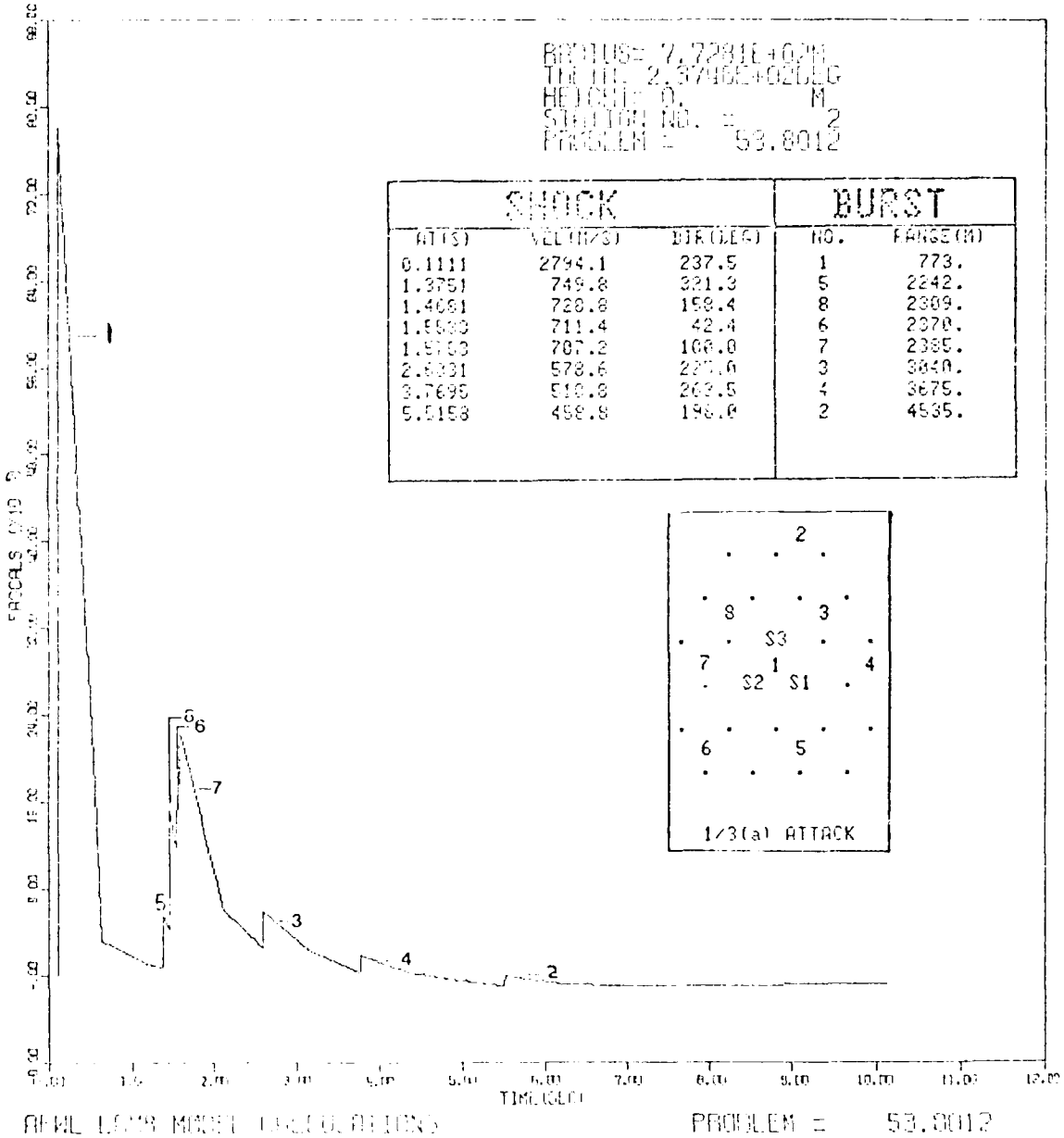


AFWL TOMB MODEL CALCULATIONS PROBLEM = 53.8012


RADIUS= 7.2281E+02M
THETA= 1.1740E+02DEG
HEIGHT= 0. M
SECTION NO. = 1
PROBLEM = 53.8012
TIME(SEC)
PROBLEM = 53.8012

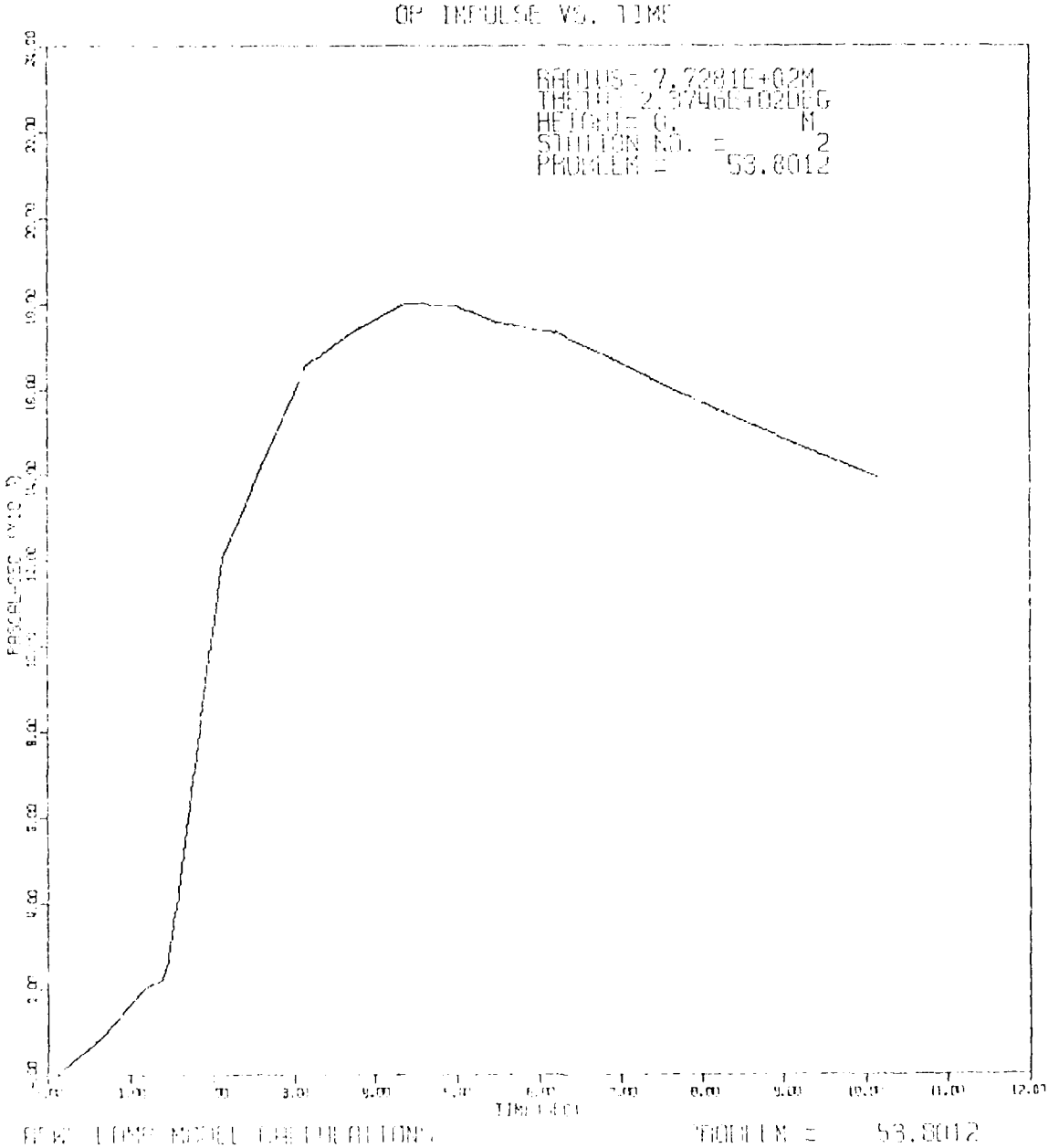
HOB= 0m
YIELD= 5Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



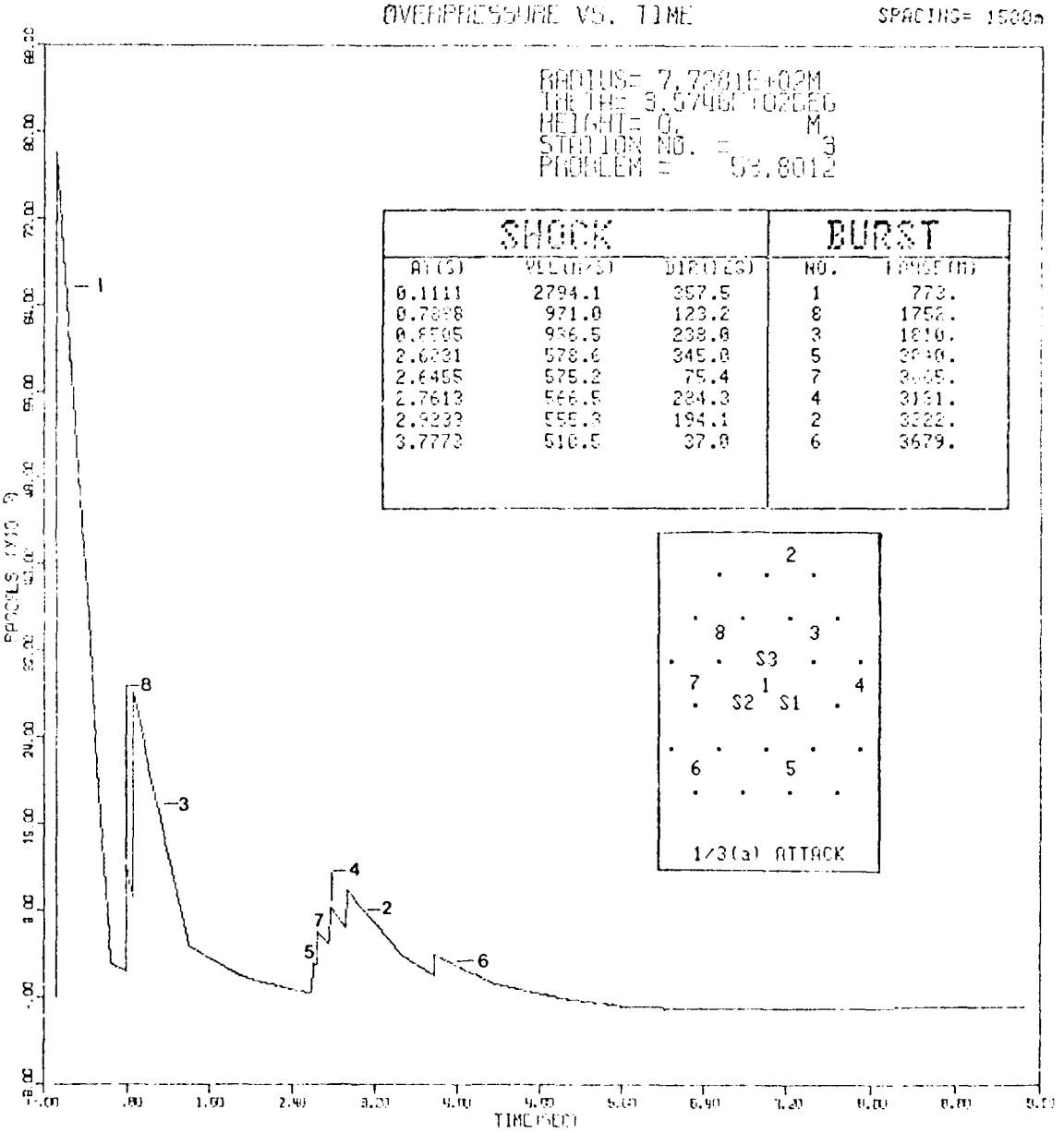
SHOCK			BURST	
ATT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1111	2794.1	237.5	1	773.
1.3751	749.8	321.3	5	2242.
1.4681	728.8	158.4	8	2309.
1.5589	711.4	42.4	6	2370.
1.5763	707.2	100.0	7	2385.
2.8031	578.6	279.6	3	3840.
3.7695	518.8	203.5	4	3675.
5.5153	458.8	196.0	2	4535.

AERIAL BURST MODEL CALCULATIONS PROBLEM = 53.0012


OF IMPULSE VS. TIME
RADIUS = 7.2281E+02M
THETA = 2.5746E+02DEG
HEIGHT = 0. M
STATION NO. = 2
PROBLEM = 53.8012
PROBLEM = 53.8012

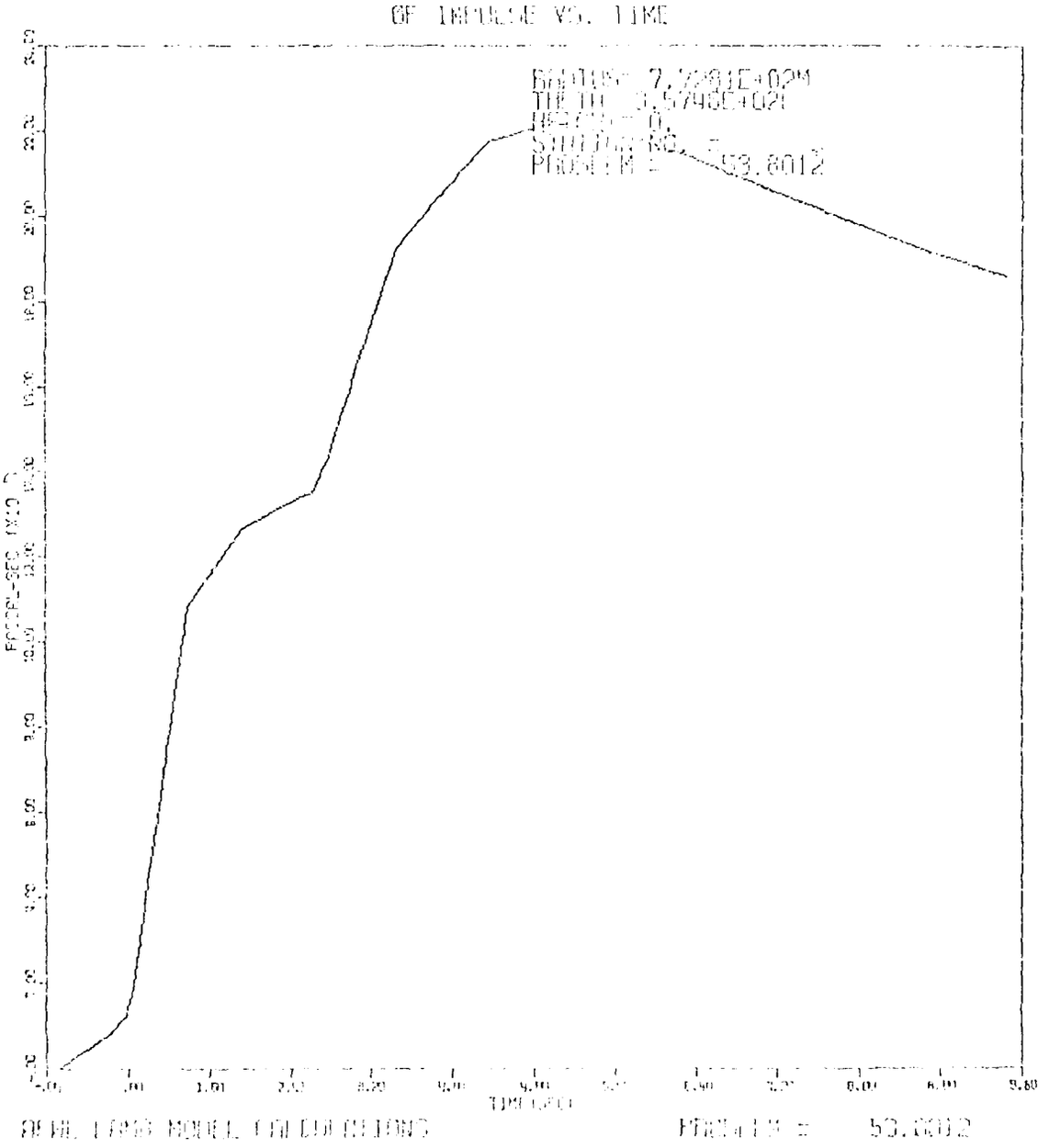
HOB= 0m
YIELD= 5Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



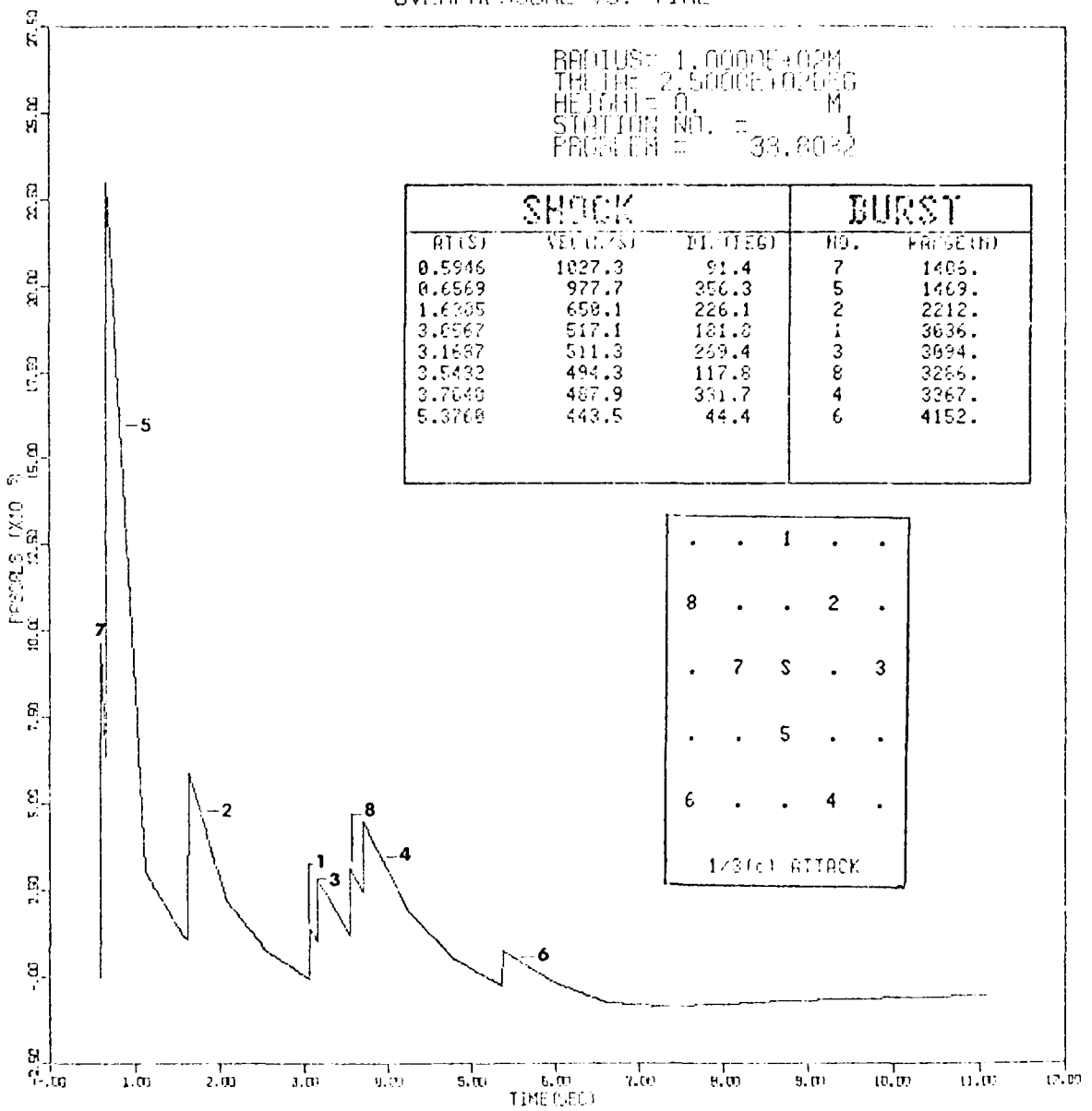
SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	TIME(S)
0.1111	2794.1	357.5	1	773.
0.7898	971.0	123.2	8	1752.
0.8595	936.5	238.8	3	1810.
2.6231	578.6	345.8	5	3030.
2.6455	575.2	75.4	7	3065.
2.7613	566.5	284.3	4	3191.
2.9233	555.3	194.1	2	3322.
3.7773	510.5	37.8	6	3679.

AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.8012


OF IMPULSE VS. TIME
PROGRAM = 53.8012
TIME (SEC)

HOB= 0m
YIELD= 1Mt
SPACING= 1500m

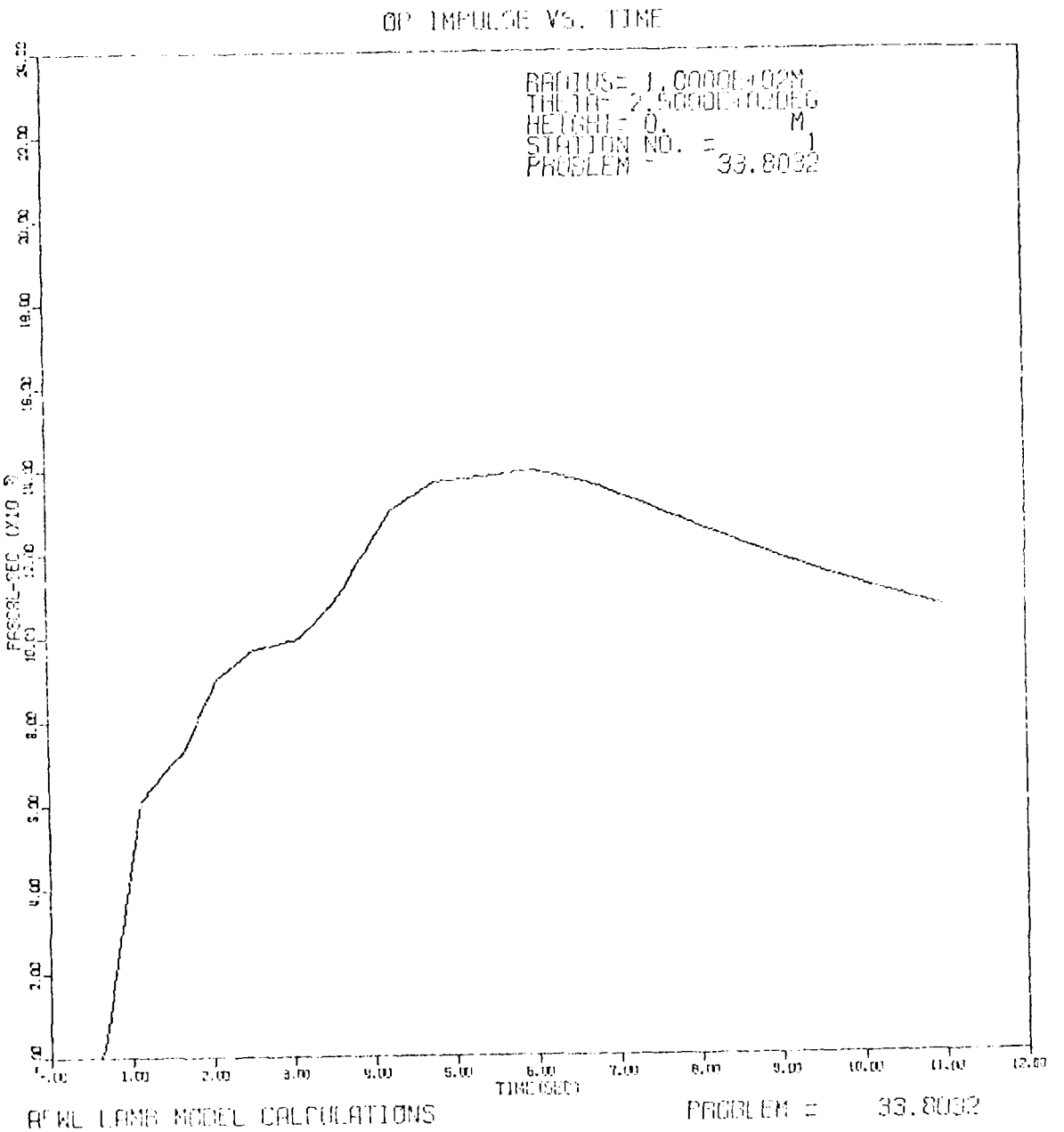
OVERPRESSURE VS. TIME



SHOCK			BURST	
RT(S)	VEL(FPS)	DI.(DEG)	NO.	RANGE(m)
0.5946	1027.3	91.4	7	1406.
0.6569	977.7	356.3	5	1469.
1.6305	658.1	226.1	2	2212.
3.0567	517.1	181.8	1	3636.
3.1687	511.3	269.4	3	3694.
3.5432	494.3	117.8	8	3266.
3.7049	487.9	331.7	4	3367.
5.3768	443.5	44.4	6	4152.

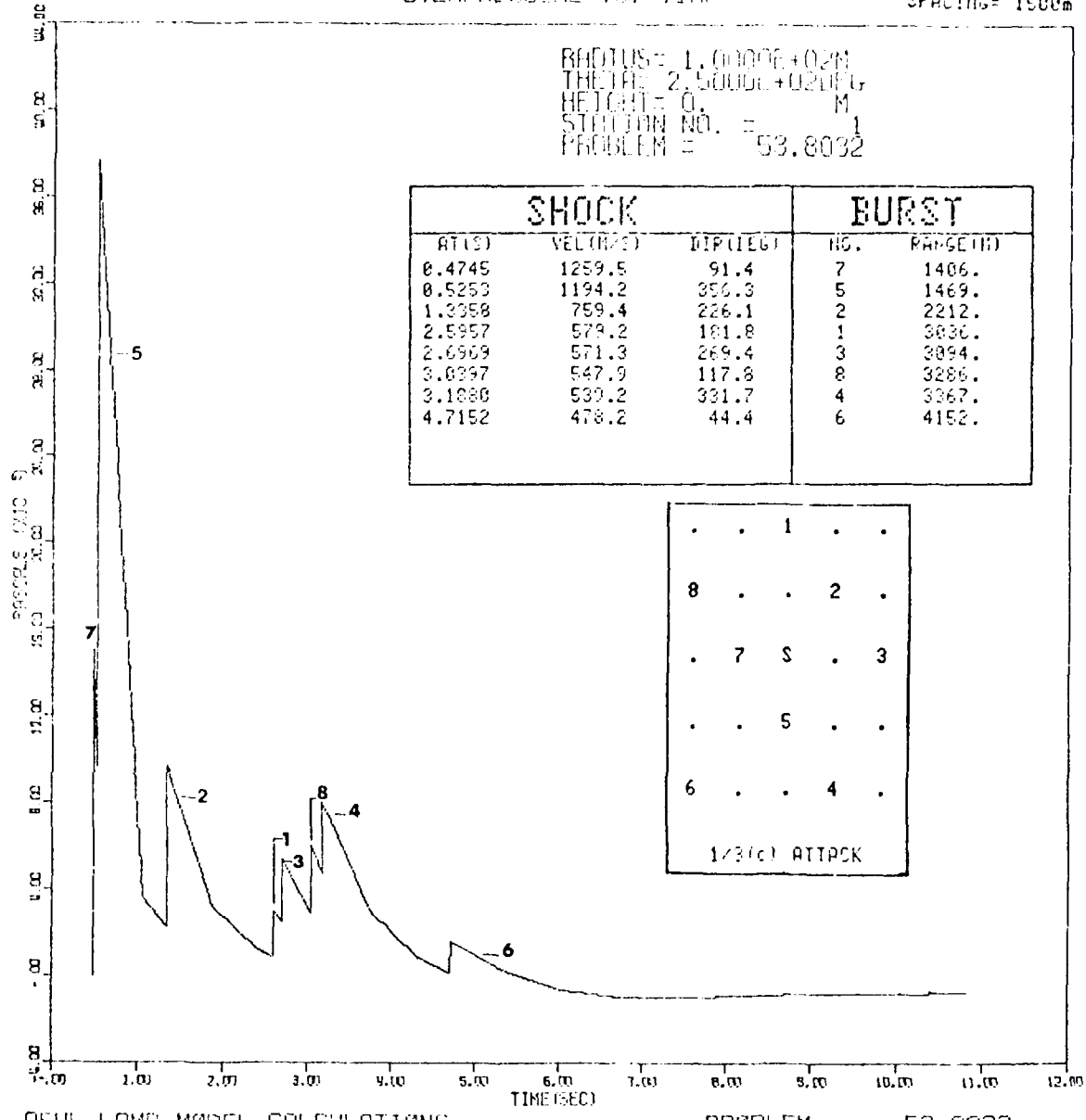
.	.	1	.	.
8	.	.	2	.
.	7	S	.	3
.	.	5	.	.
6	.	.	4	.

AFWL IAMS MODEL CALCULATIONS PROBLEM = 33.8032

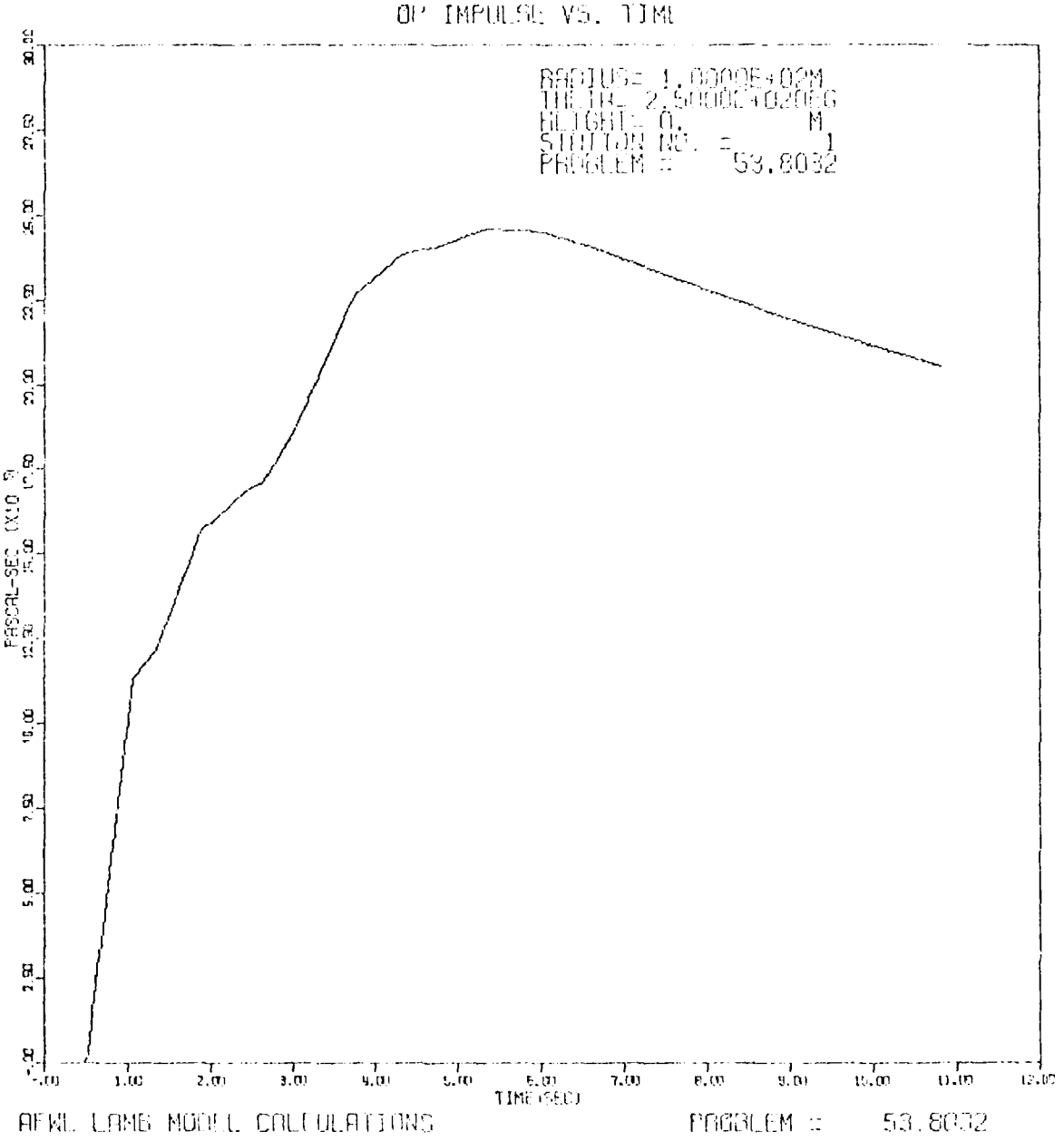

DP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 2.5000E+01DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.8032
PASCAL-SEC (X10 **)
TIME(SEC)
AFWL LAMB MODEL CALCULATIONS
PROBLEM = 33.8032

HOB= 0m
YIELD= 5Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.8032

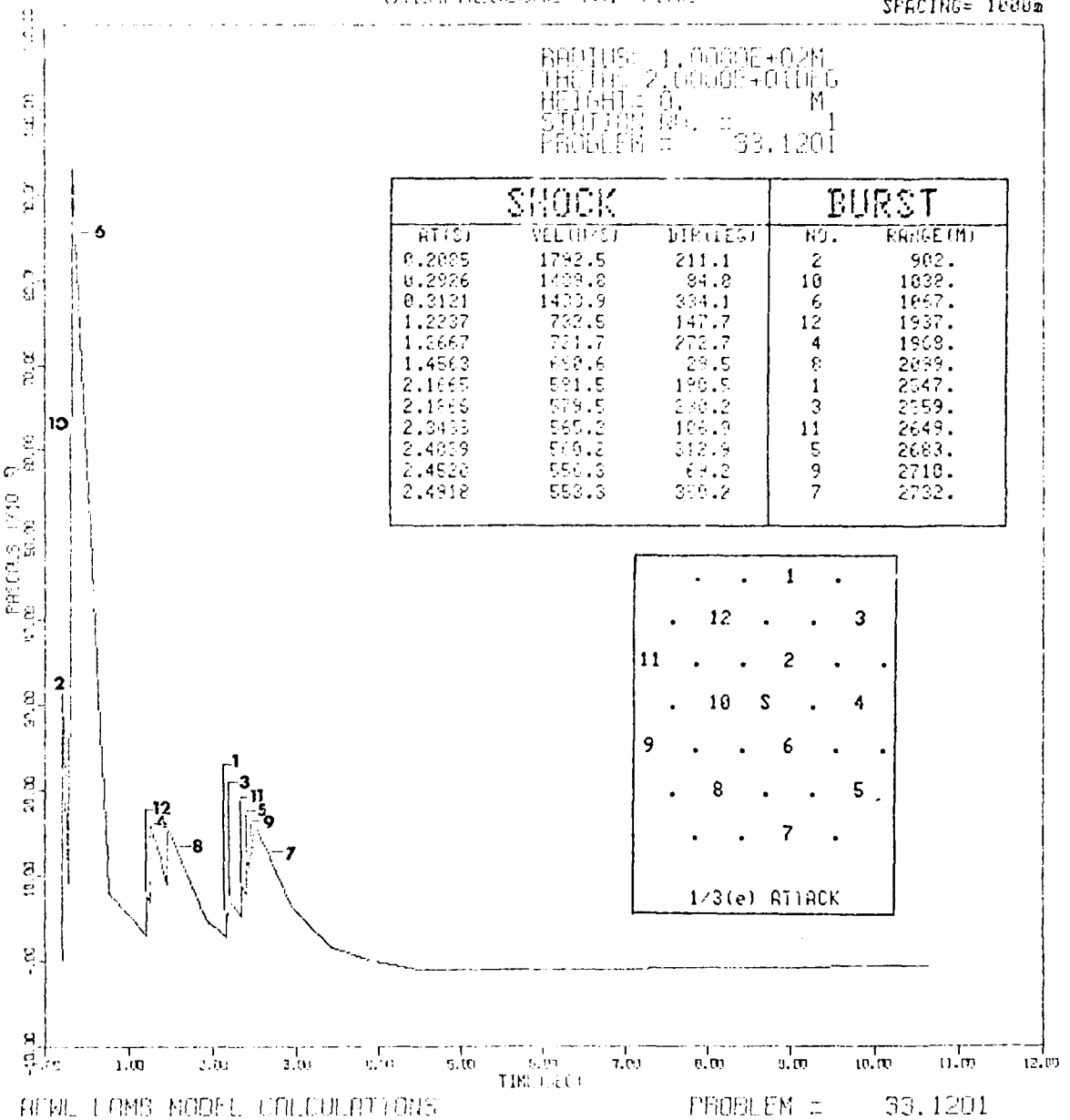

OP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 2.5000E+020DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.8032
PASCAL-SEC (X10 **)
TIME(SEC)
AFWL LAMB MODEL CALCULATIONS
PROBLEM = 53.8032

HOB= 0m
YIELD= 3Mt
SPACING= 1000m

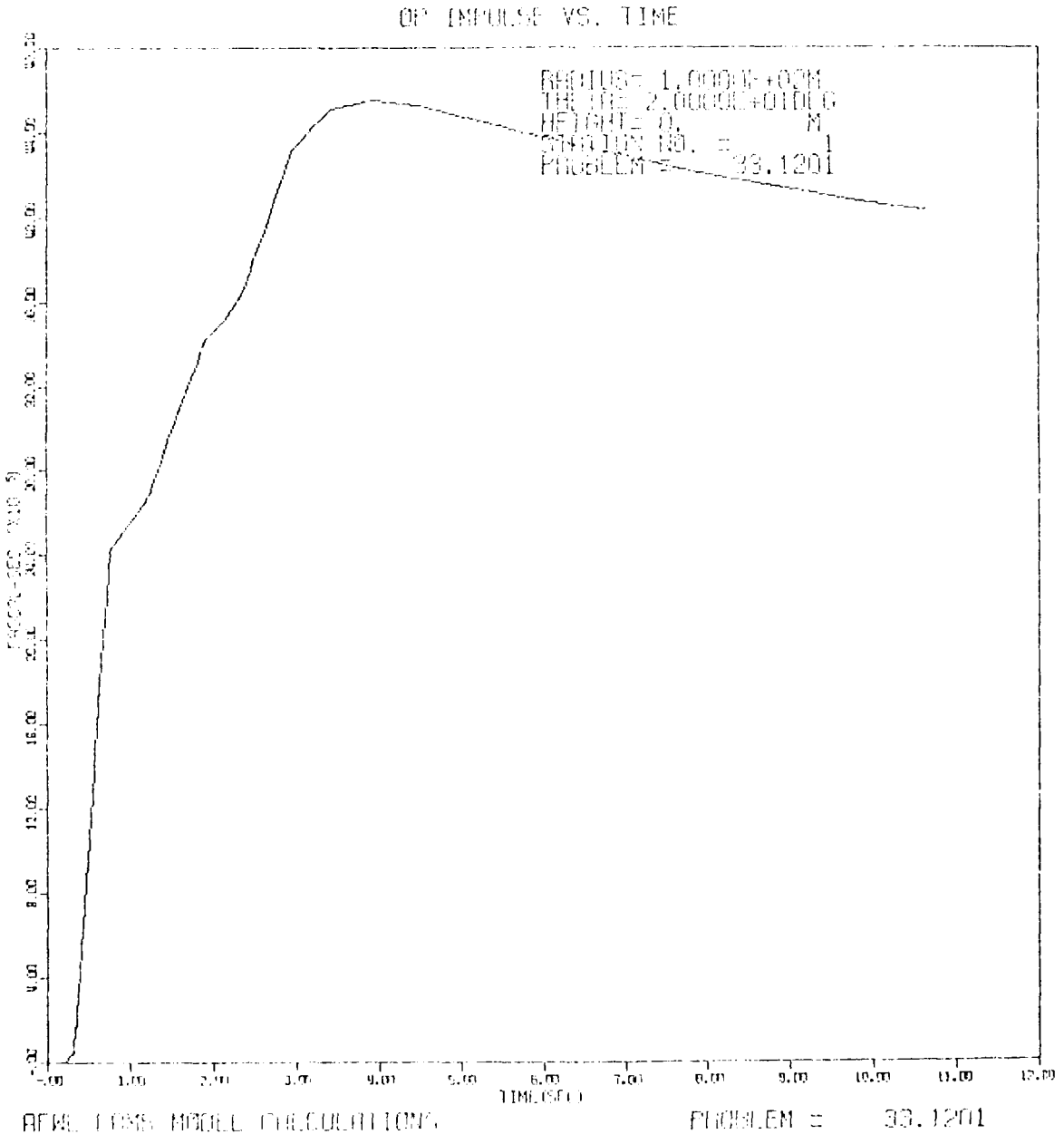
OVERPRESSURE VS. TIME

RADIUS= 1.0000E+02M
TAGTIME= 2.0000E+01SEC
HEIGHT= 0. M
STRUCTURE NO. = 1
PROBLEM = 33.1201

SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.2005	1792.5	211.1	2	902.
0.2926	1409.8	84.8	10	1038.
0.3121	1403.9	334.1	6	1067.
1.2237	732.5	147.7	12	1937.
1.3667	721.7	272.7	4	1908.
1.4563	650.6	29.5	8	2089.
2.1665	591.5	190.5	1	2547.
2.1966	578.5	340.2	3	2559.
2.3433	565.2	106.9	11	2649.
2.4039	560.2	312.9	5	2683.
2.4520	556.3	64.2	9	2710.
2.4818	553.3	359.2	7	2732.

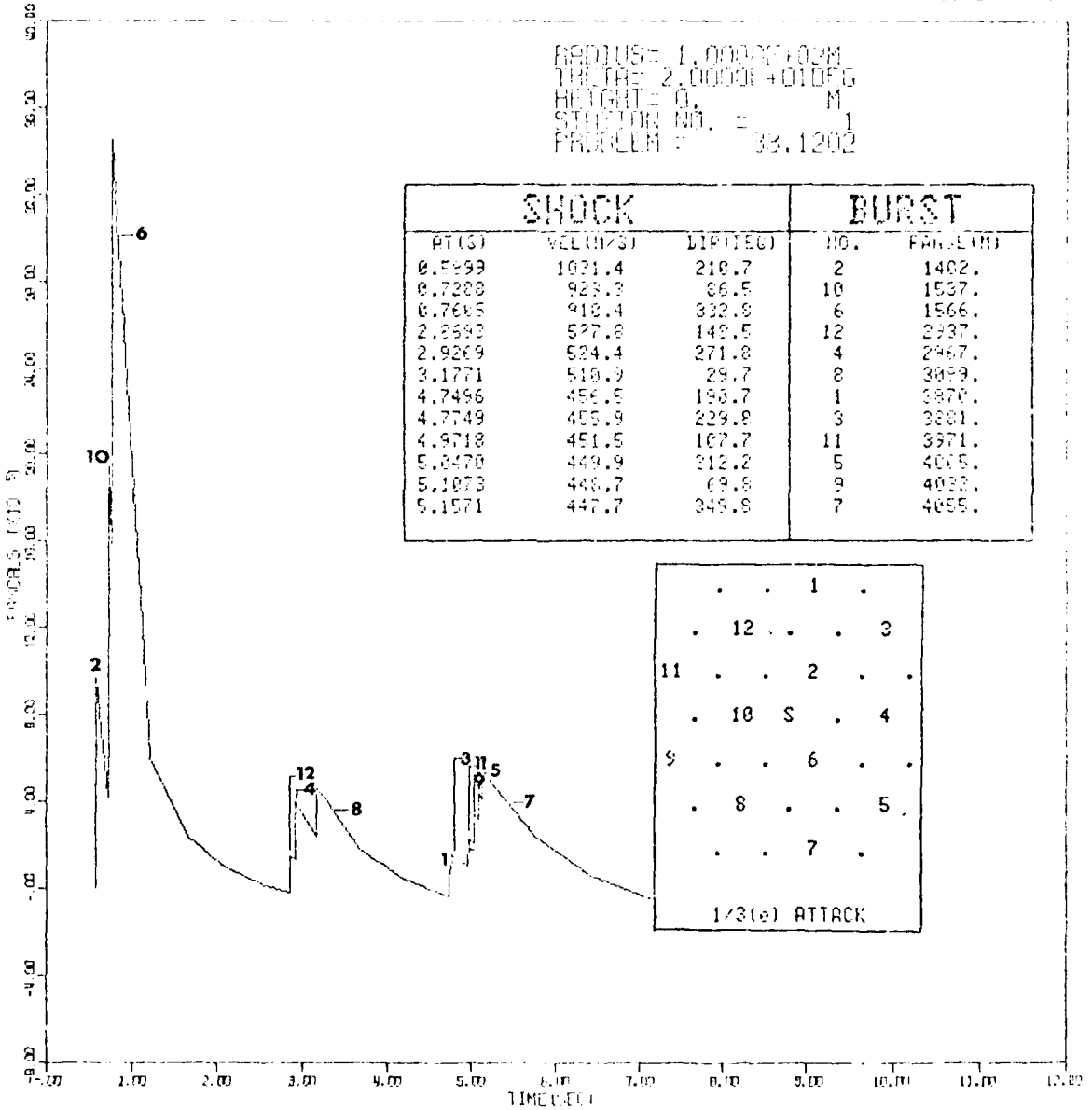


AFWL LAMS MODEL CALCULATIONS PROBLEM = 33.1201

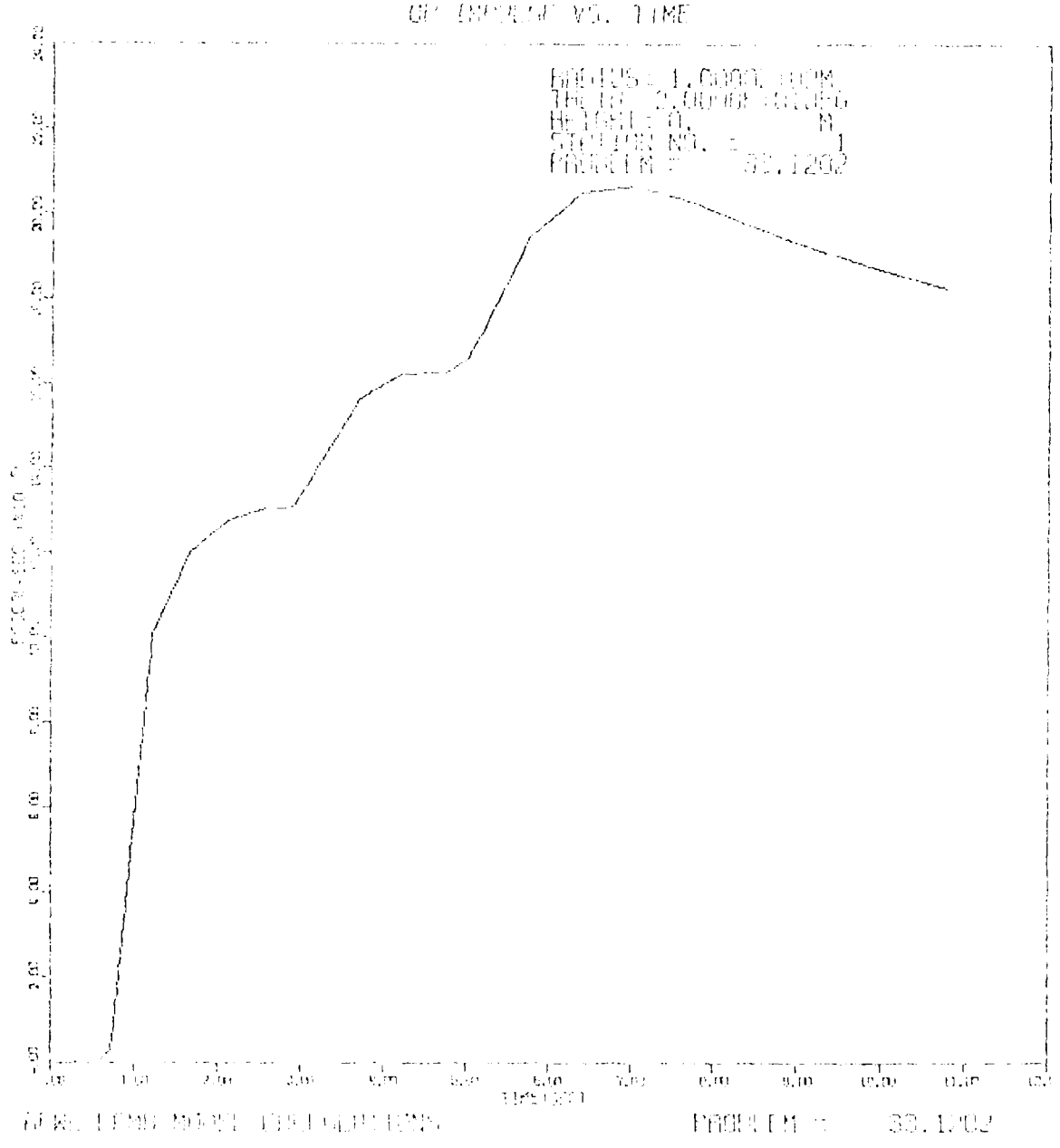

OF IMPULSE VS. TIME
RADIUS= 1.0000E+00M
TIME= 2.0000E+01MSEC
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.1201
TIME(MSEC)
AFWL 1985 MODEL CALCULATIONS
PROBLEM = 33.1201

HOB= 0m
YIELD= 5Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



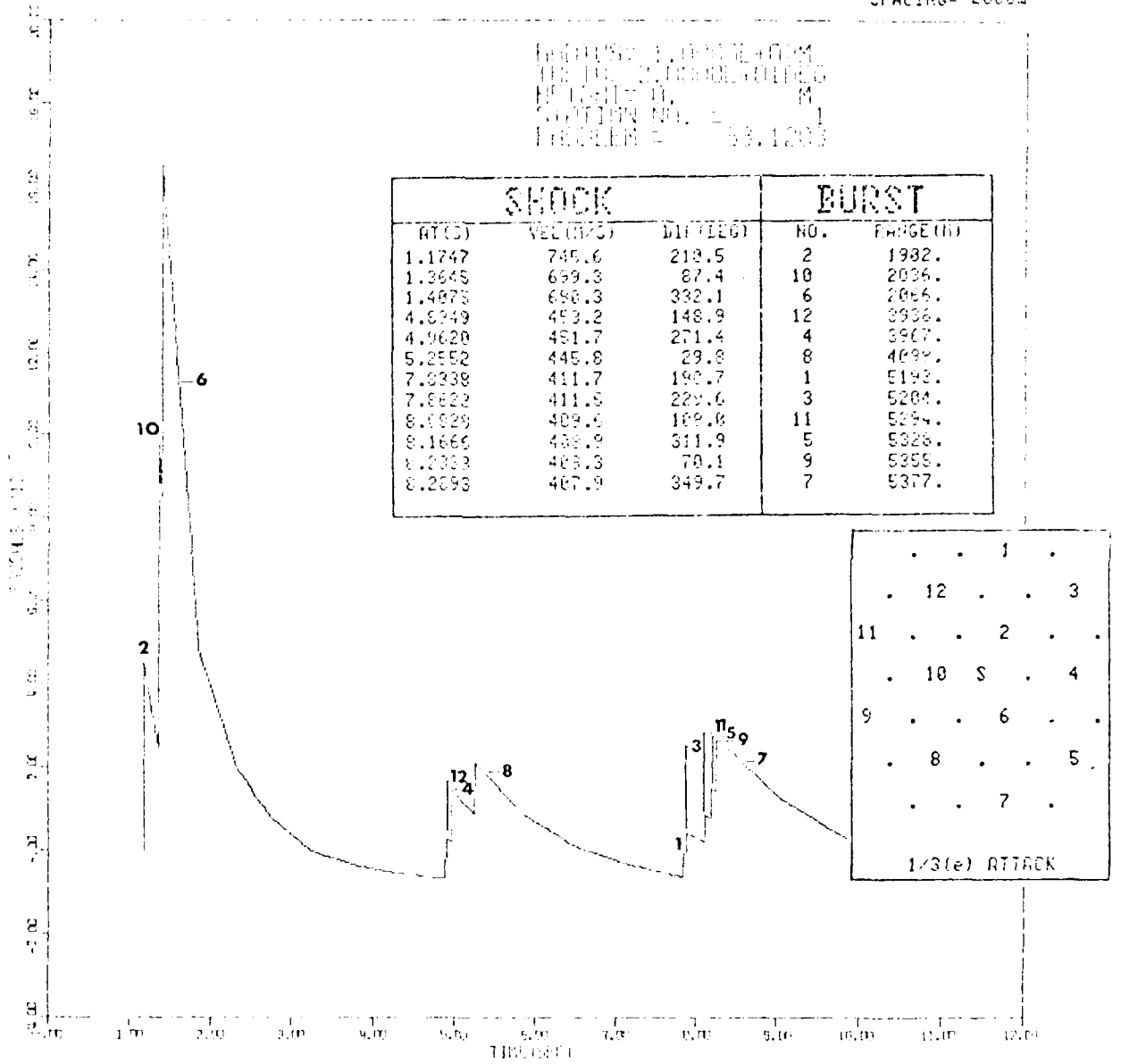
AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.1202



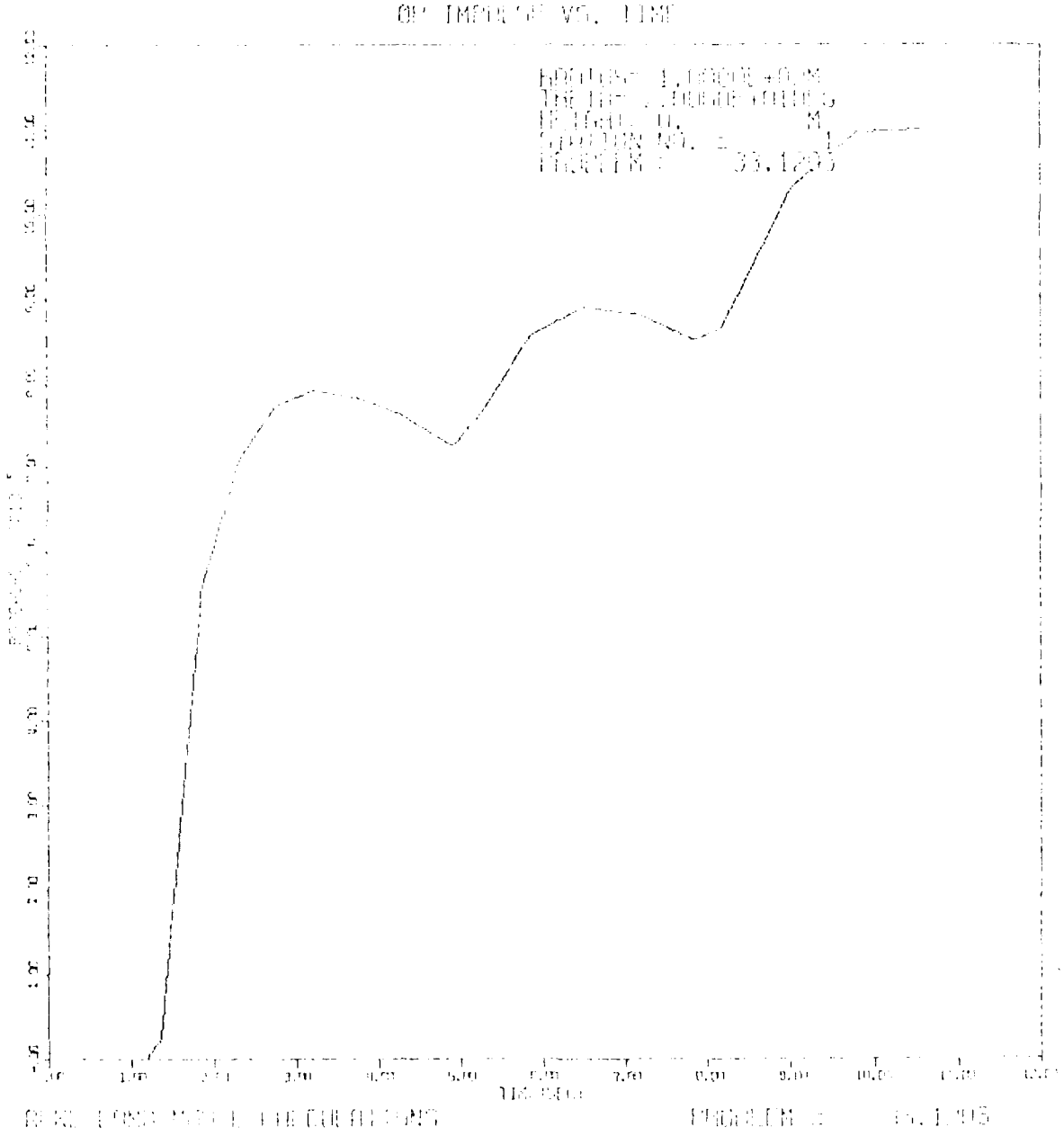
HOB= 0m
YIELD= 5Mt
SPACING= 2000m

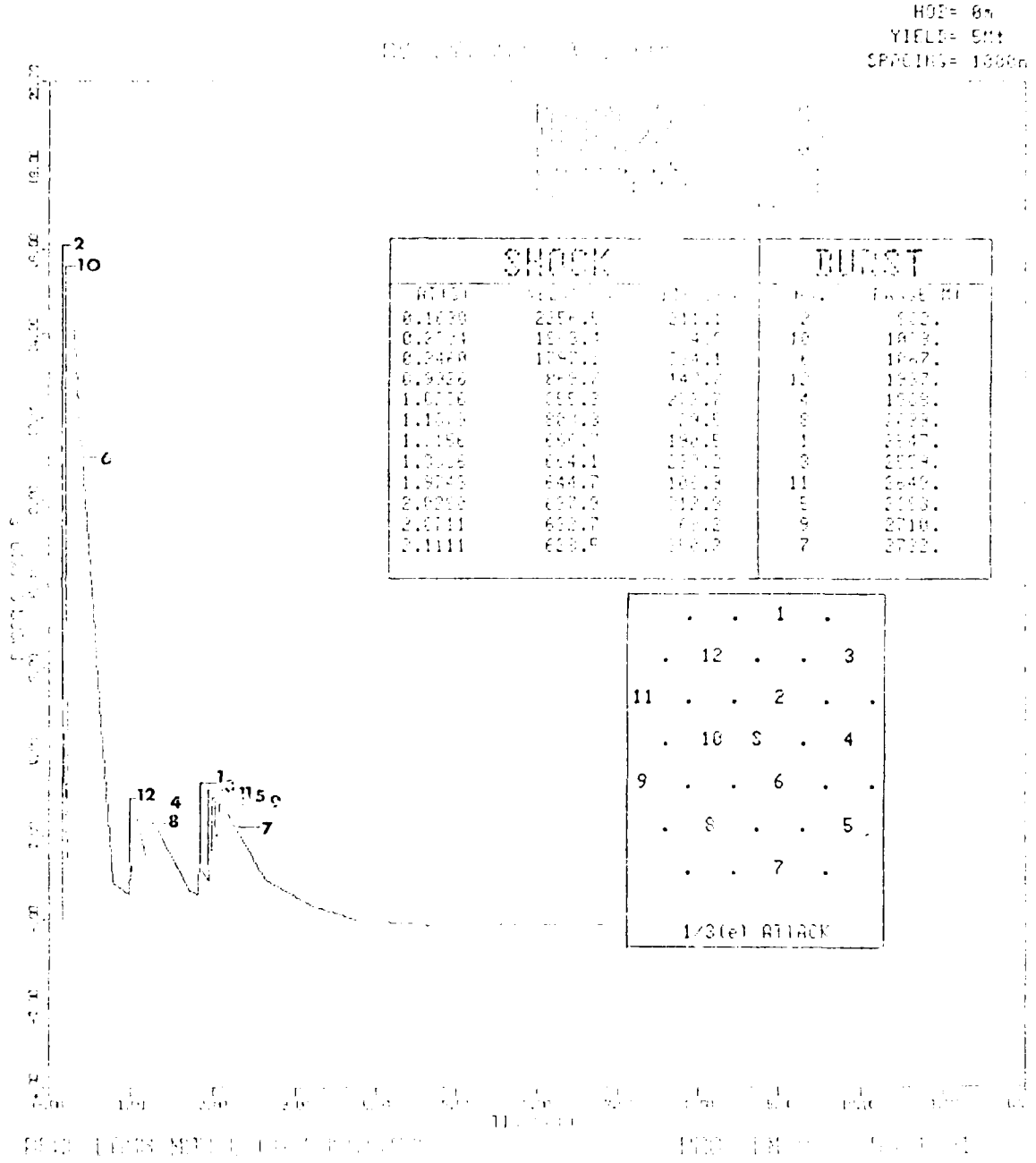
OVERPRESSURE Vs. TIME

SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
1.1747	745.6	218.5	2	1982.
1.3645	699.3	87.4	10	2036.
1.4073	690.3	332.1	6	2066.
4.8349	453.2	148.9	12	3936.
4.9620	451.7	271.4	4	3967.
5.2552	445.8	29.8	8	4039.
7.8338	411.7	190.7	1	5193.
7.8622	411.5	229.6	3	5204.
8.0029	409.6	169.8	11	5264.
8.1666	408.9	311.9	5	5328.
8.2303	408.3	70.1	9	5355.
8.2693	407.9	349.7	7	5377.

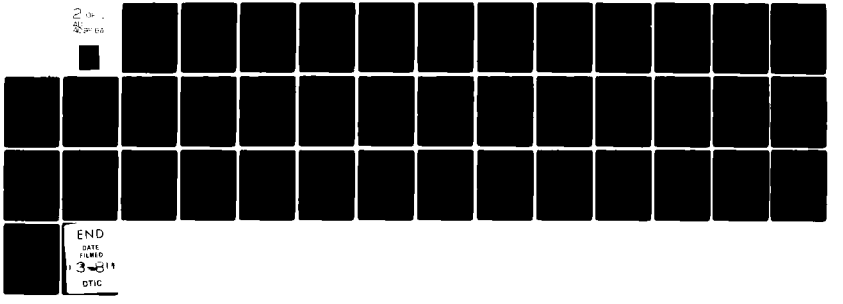


REAL LAMS MODEL CALCULATIONS PROBLEM # 33.1203

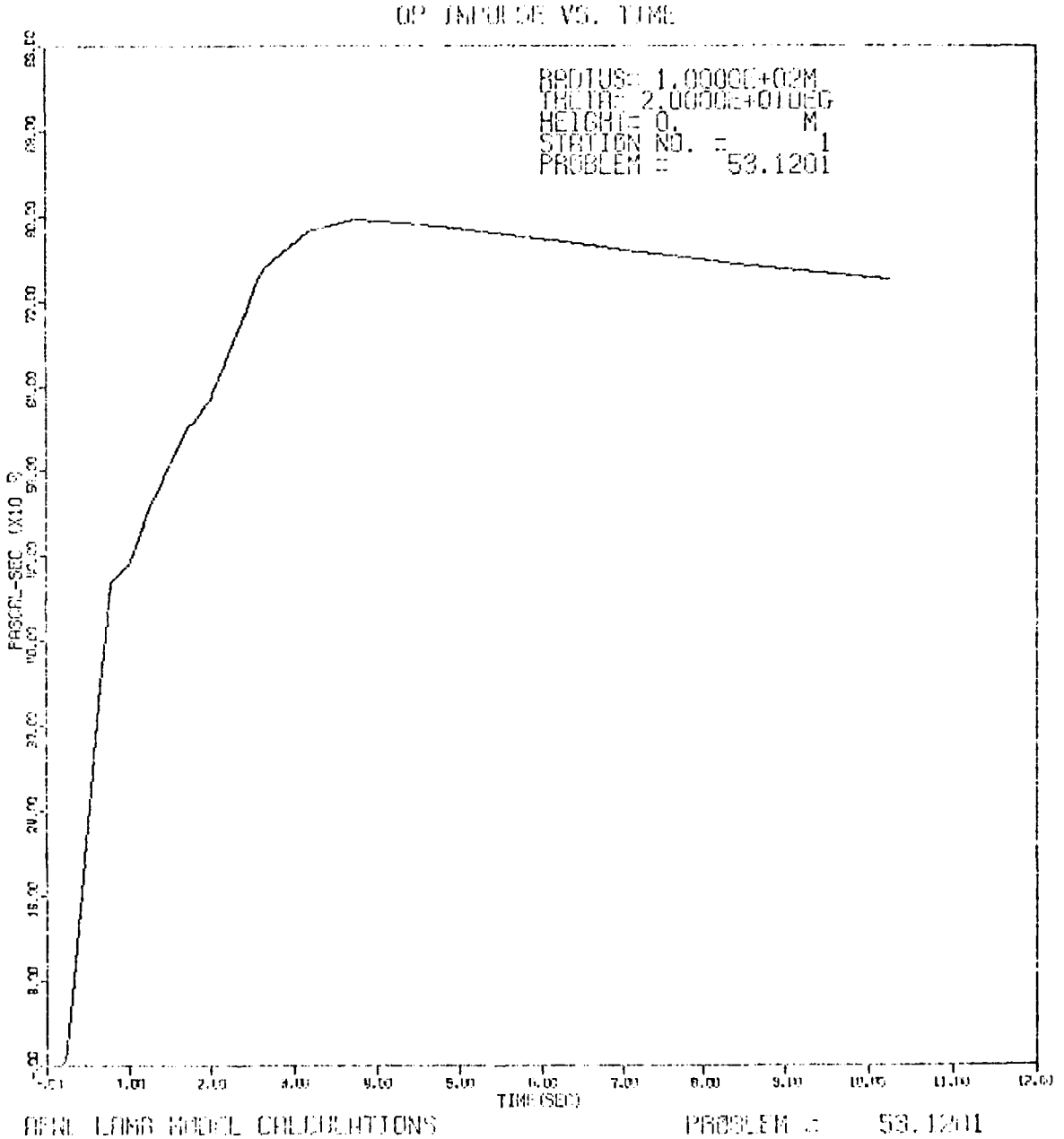



HOB= 0%
YIELD= 5Mt
SPACING= 1300m
SHOCK
BURST
1/3(e) ATTACK

AD-A095 641 AIR FORCE WEAPONS LAB KIRTLAND AFB NM F/G 18/3
LAMB MULTIBURST CALCULATIONS FOR VARIOUS ATTACK SCENARIOS.(U)
MAY 80 J W AUBREY, H J ABEYTA, W E GIFFORD
UNCLASSIFIED AFWL-TR-79-200 NL



END
DATE FILMED
3-81
DTIC



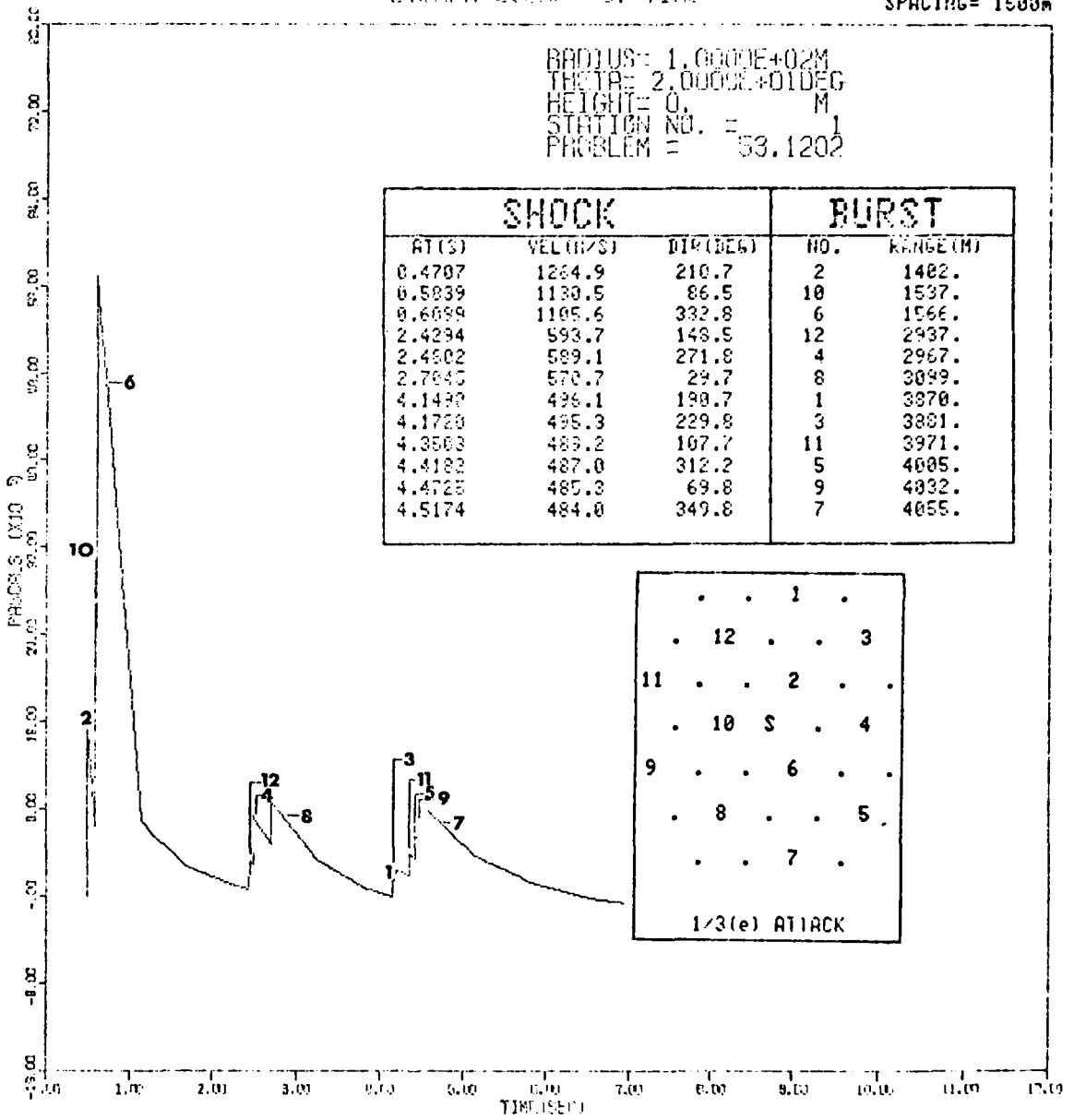
BRL LAMB MODEL CALCULATIONS PROBLEM = 53.1201

HOB= 0m
YIELD= 5Mt
SPACING= 1500m

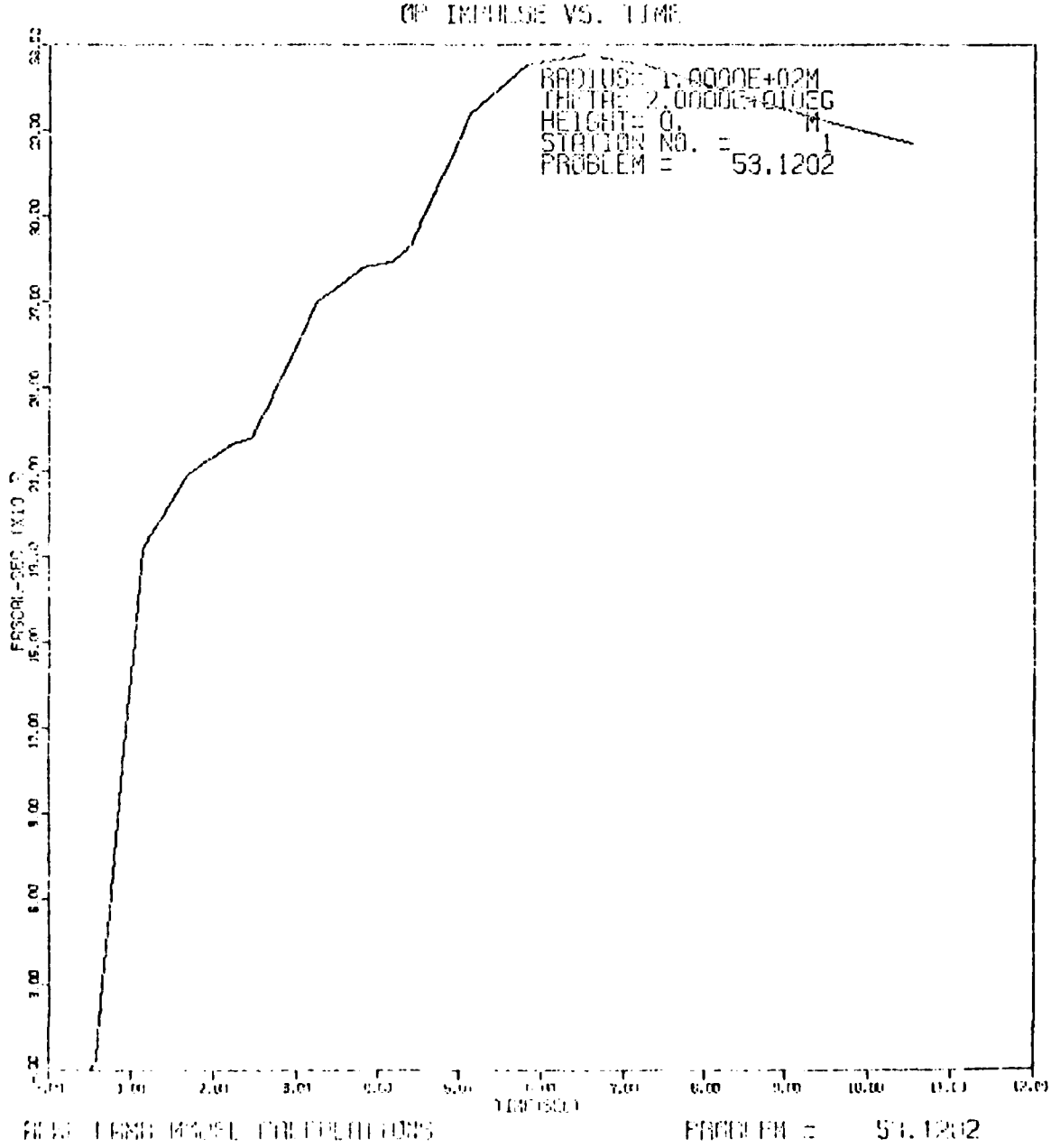
OVERPRESSURE VS. TIME

RADIUS= 1.0000E+02M
THETA= 2.0000E+01DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.1202

SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.4707	1264.9	210.7	2	1402.
0.5039	1130.5	86.5	10	1537.
0.6089	1105.6	332.8	6	1566.
2.4294	593.7	148.5	12	2937.
2.4602	589.1	271.8	4	2967.
2.7945	570.7	29.7	8	3099.
4.1439	496.1	190.7	1	3870.
4.1728	495.3	229.8	3	3881.
4.3503	489.2	107.7	11	3971.
4.4182	487.0	312.2	5	4005.
4.4725	485.3	69.8	9	4032.
4.5174	484.0	349.8	7	4055.



BRL LAMB MODEL CALCULATIONS PROBLEM = 53.1202

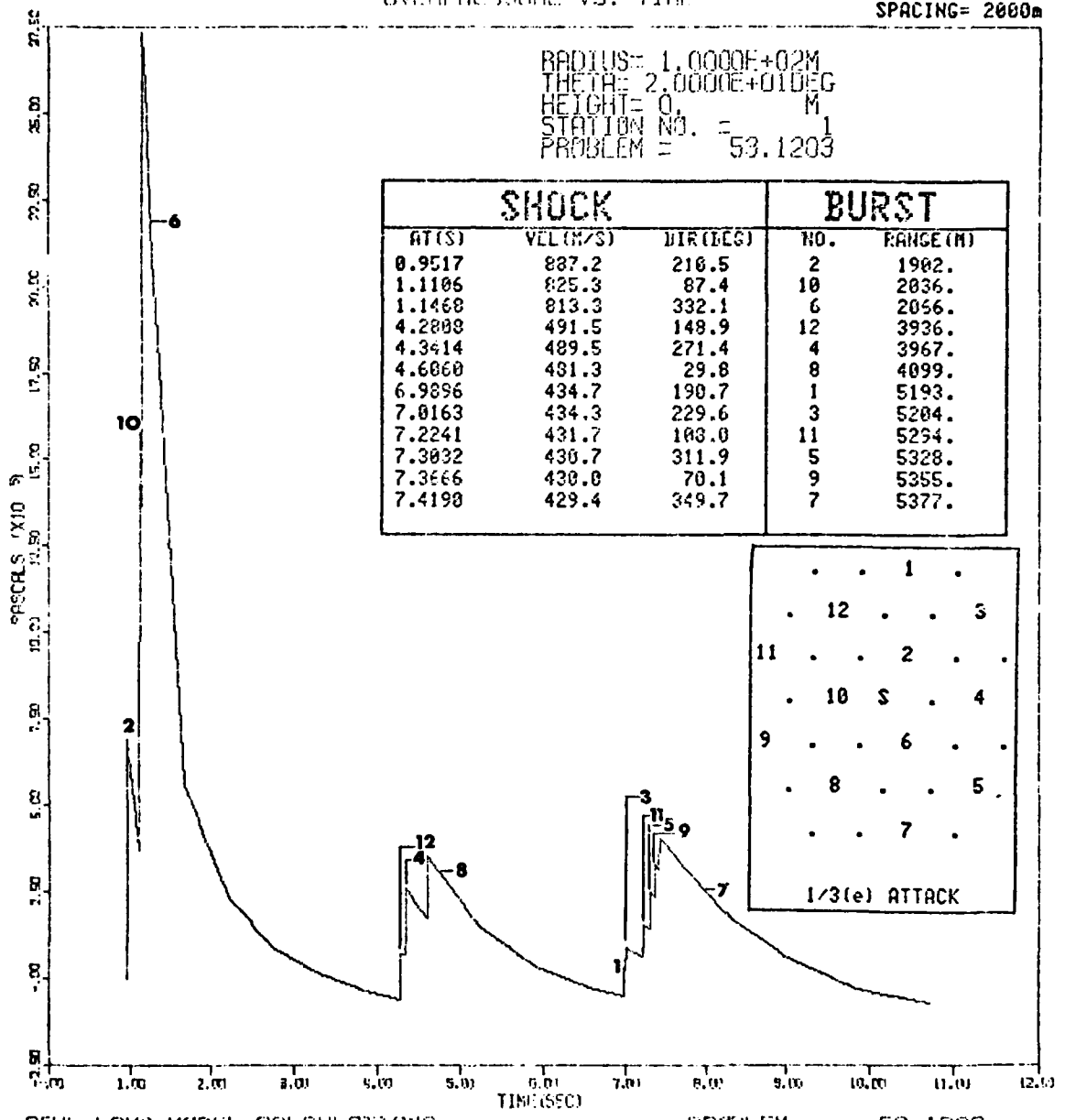

OF IMPULSE VS. TIME
RADIUS= 1.0000E+02M
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.1202

HOB= 0m
YIELD= 5Mt
SPACING= 2000m

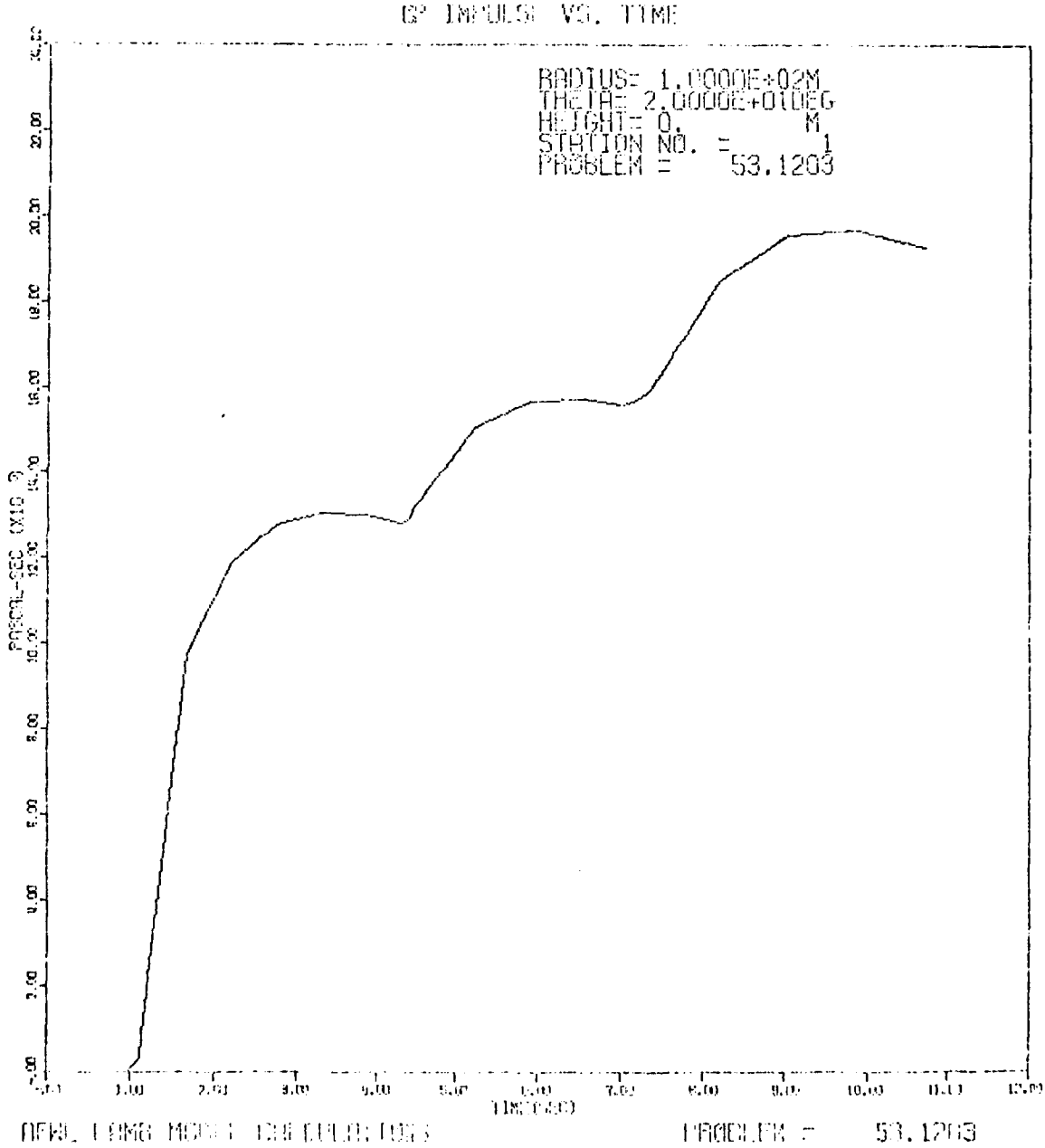
OVERPRESSURE VS. TIME

RADIUS= 1.0000E+02M
THETA= 2.0000E+01DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.1203

SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.9517	887.2	216.5	2	1902.
1.1106	825.3	87.4	10	2036.
1.1468	813.3	332.1	6	2056.
4.2808	491.5	148.9	12	3936.
4.3414	489.5	271.4	4	3967.
4.6060	481.3	29.8	8	4099.
6.9896	434.7	190.7	1	5193.
7.0163	434.3	229.6	3	5204.
7.2241	431.7	108.0	11	5294.
7.3032	430.7	311.9	5	5328.
7.3666	430.0	70.1	9	5355.
7.4198	429.4	349.7	7	5377.

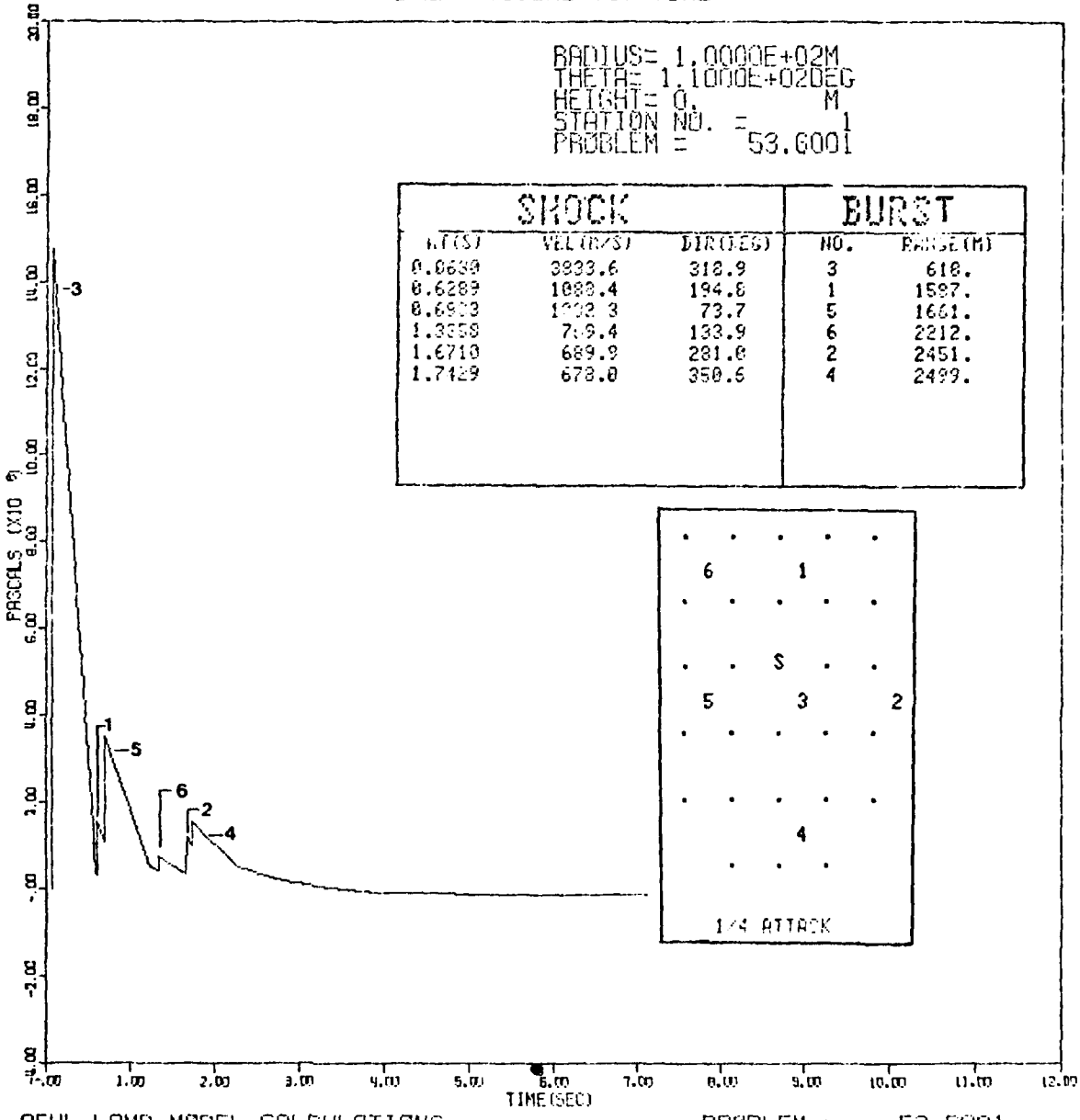


AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.1203

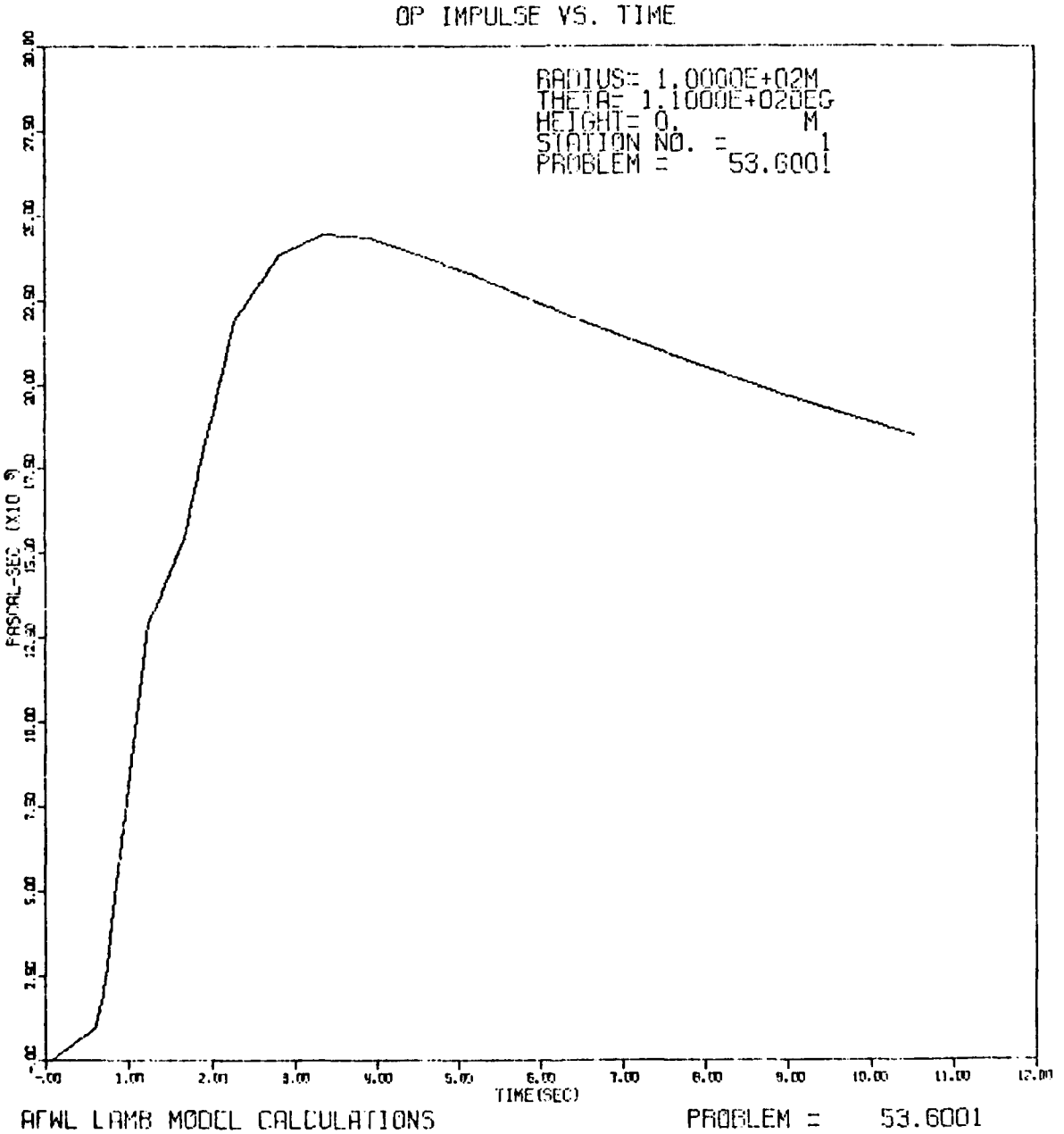

G² IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 2.0000E+01DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.1203
PASCAL-SEC (X10 2)
TIME(SEC)
PROBLEM = 53.1203

HOB= 0M
YIELD= 5Mt
SPACING= 1600m

OVERPRESSURE VS. TIME

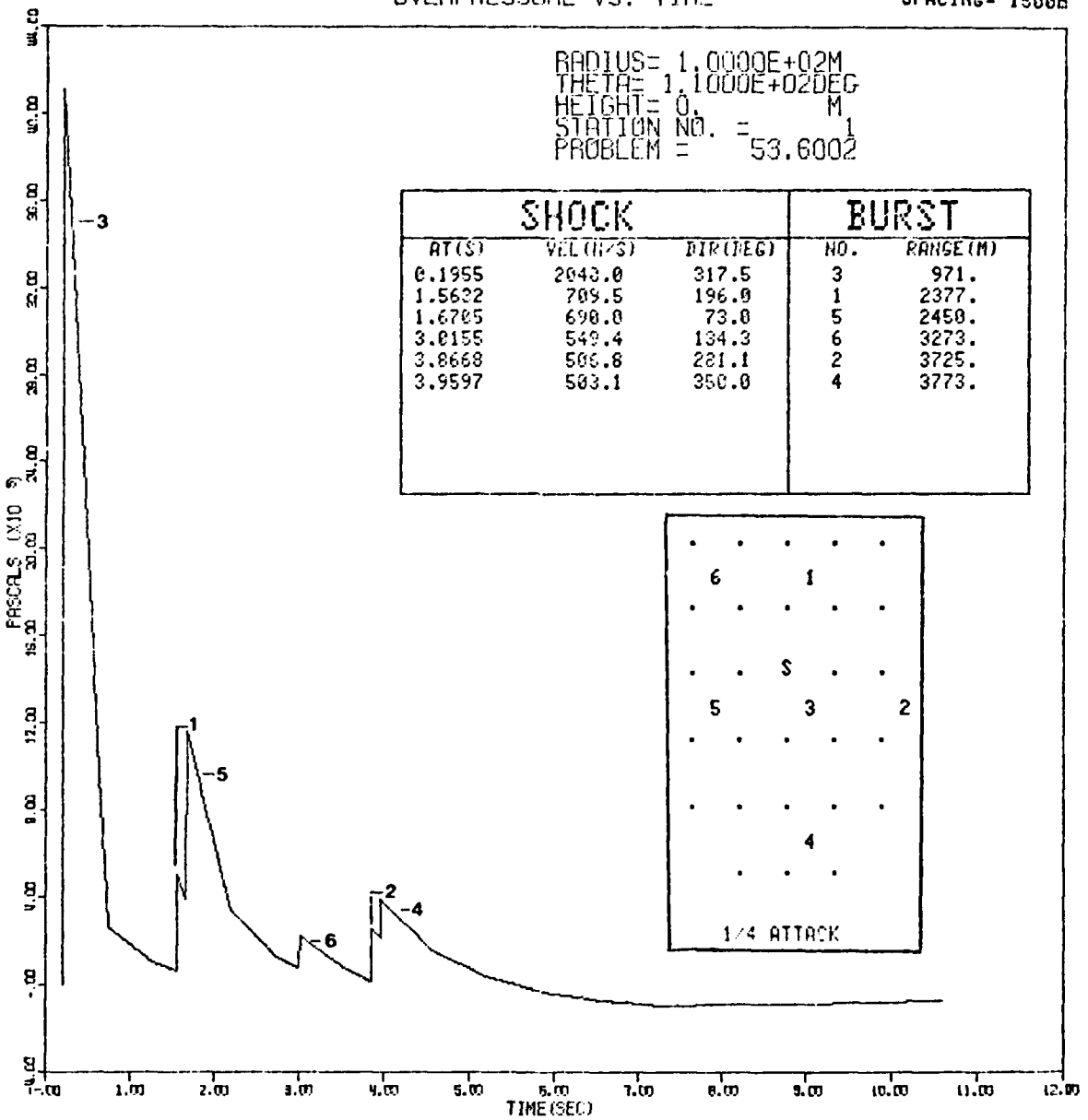


AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.6001


OP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 1.1000E+020EG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.6001
PASCAL-SEC (X10 9)
TIME(SEC)
AFWL LAMB MODEL CALCULATIONS
PROBLEM = 53.6001

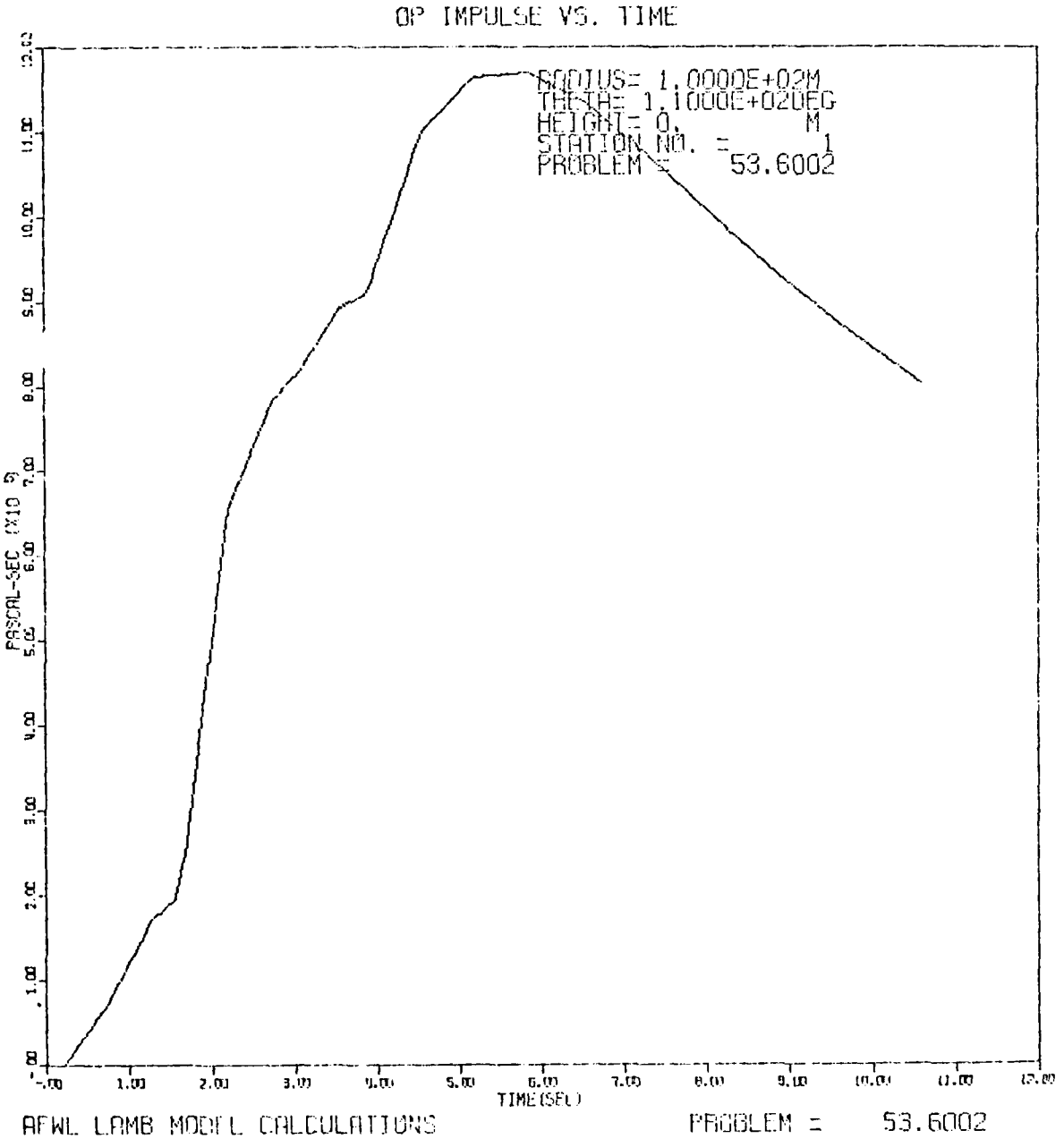
HOB= 0m
YIELD= 5Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1955	2040.0	317.5	3	971.
1.5632	709.5	196.9	1	2377.
1.6705	698.0	73.8	5	2458.
3.0155	549.4	134.3	6	3273.
3.8668	506.8	281.1	2	3725.
3.9597	503.1	350.0	4	3773.

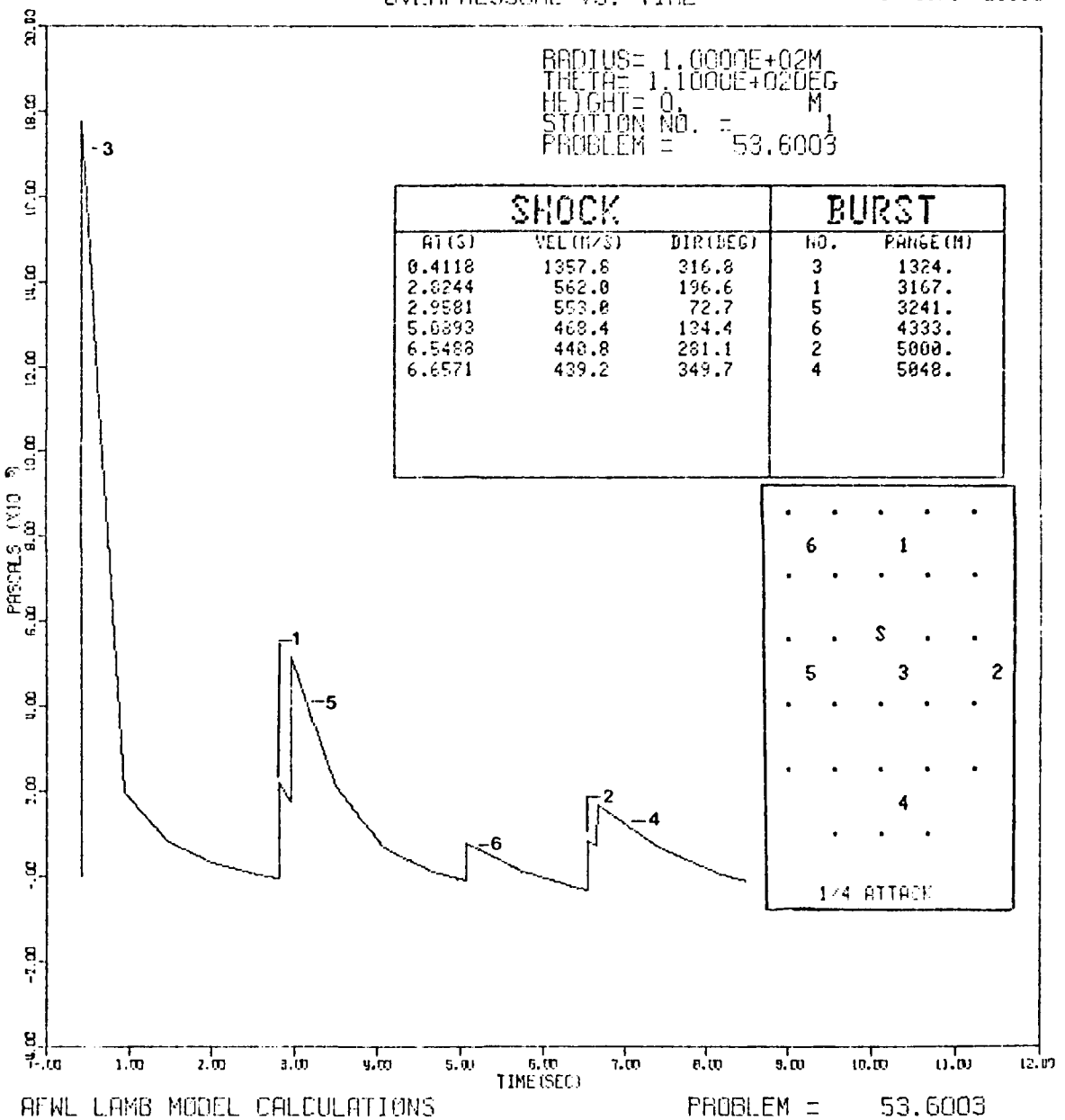
AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.6002



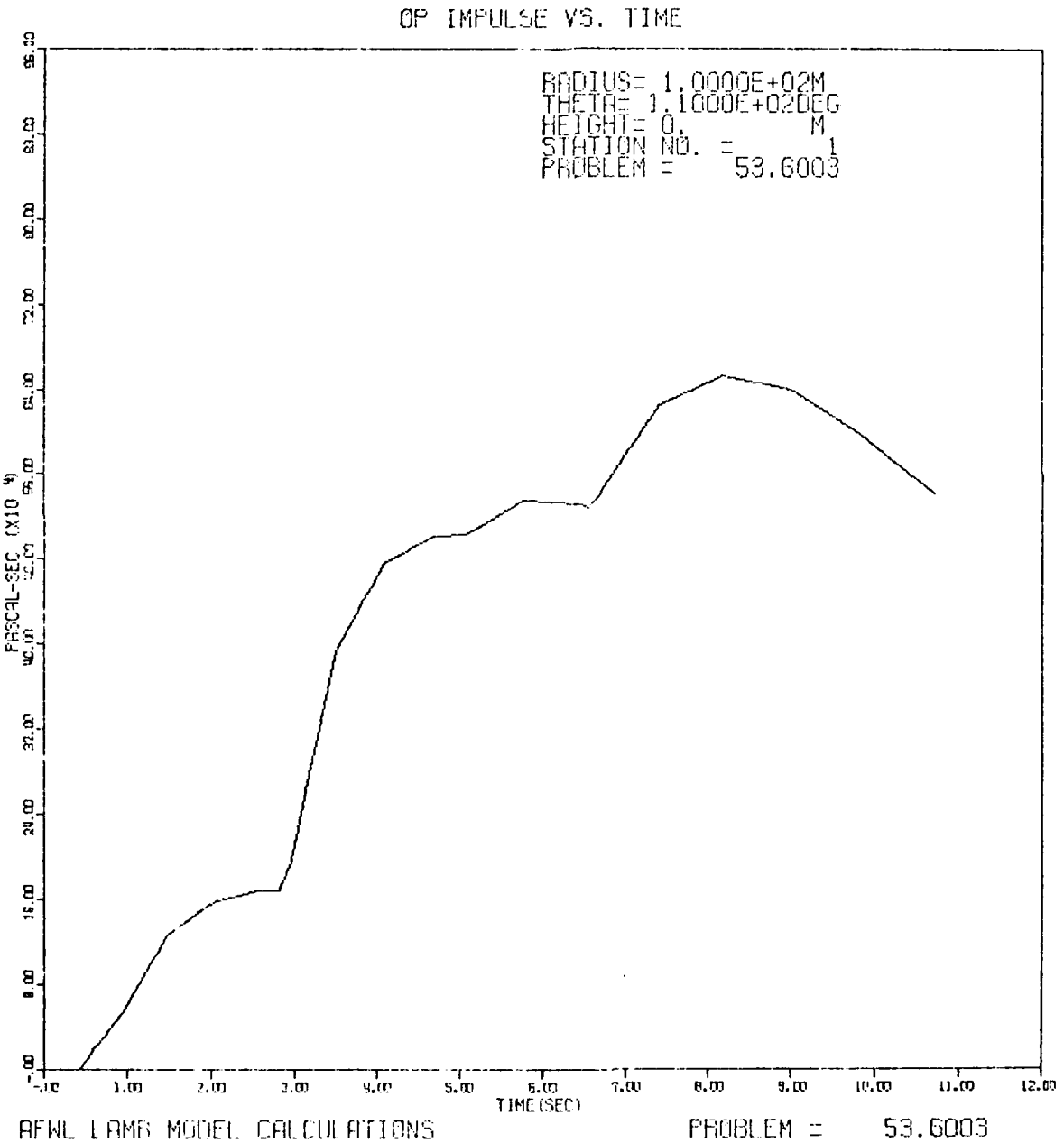
AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.6002

HOB= 0m
YIELD= 5Mt
SPACING= 2000m

OVERPRESSURE VS. TIME

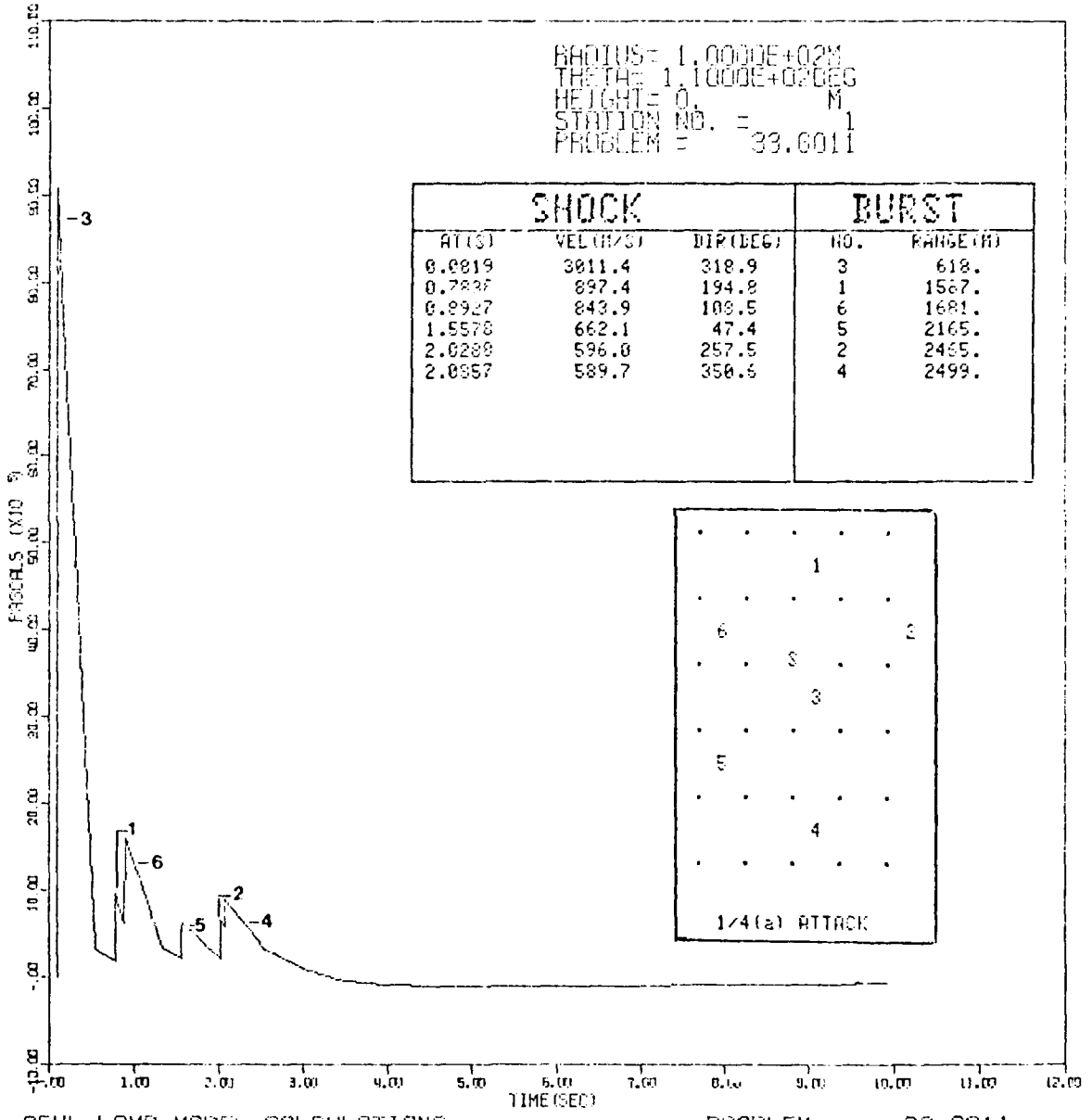


AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.6003


ΔP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 1.1000E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.6003
PASCAL-SEC (X10 **4)
TIME(SEC)
AFWL LAMB MODEL CALCULATIONS
PROBLEM = 53.6003

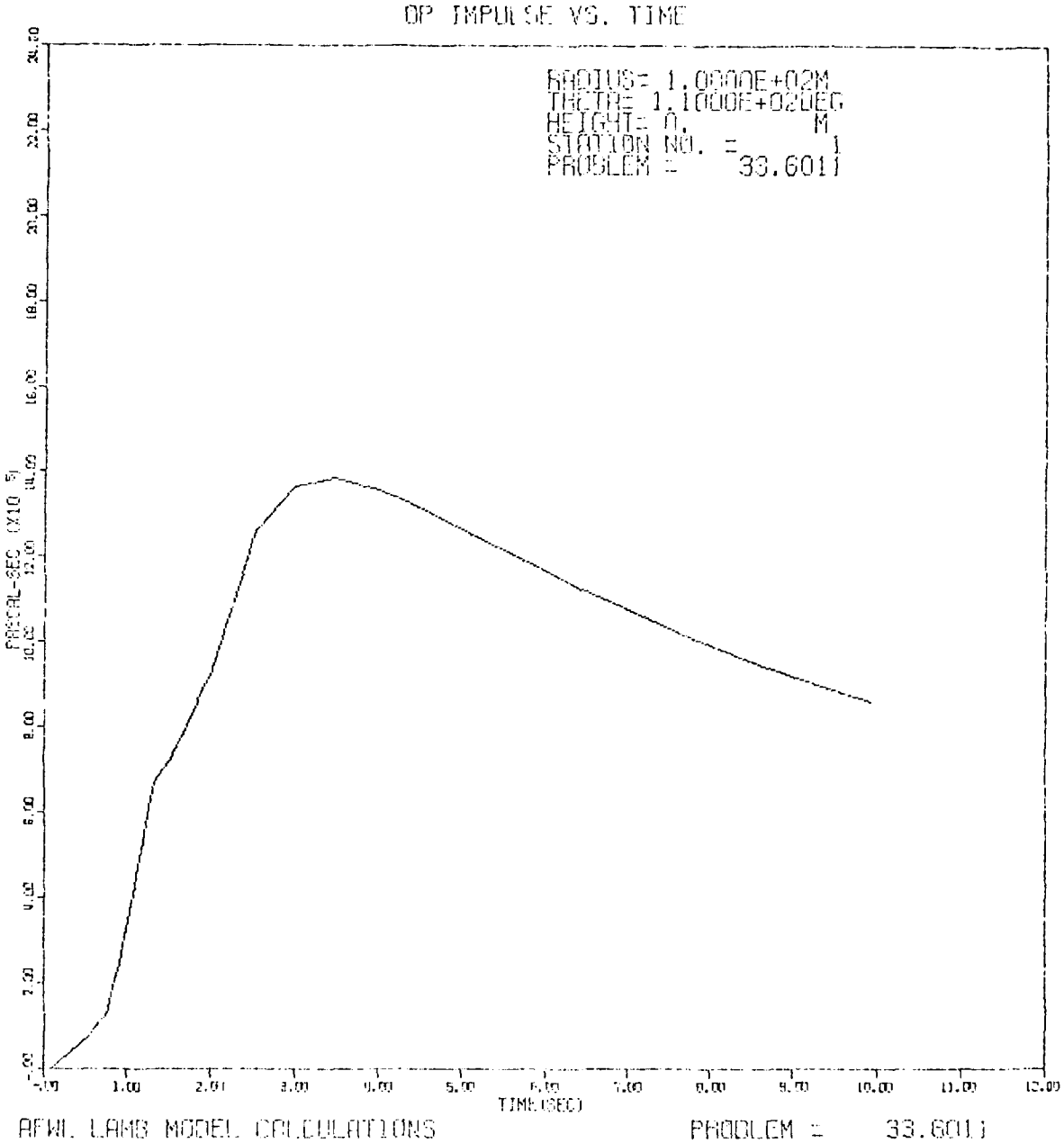
HOB= 0m
YIELD= 3Mt
SPACING= 1000m

OVERPRESSURE VS. TIME



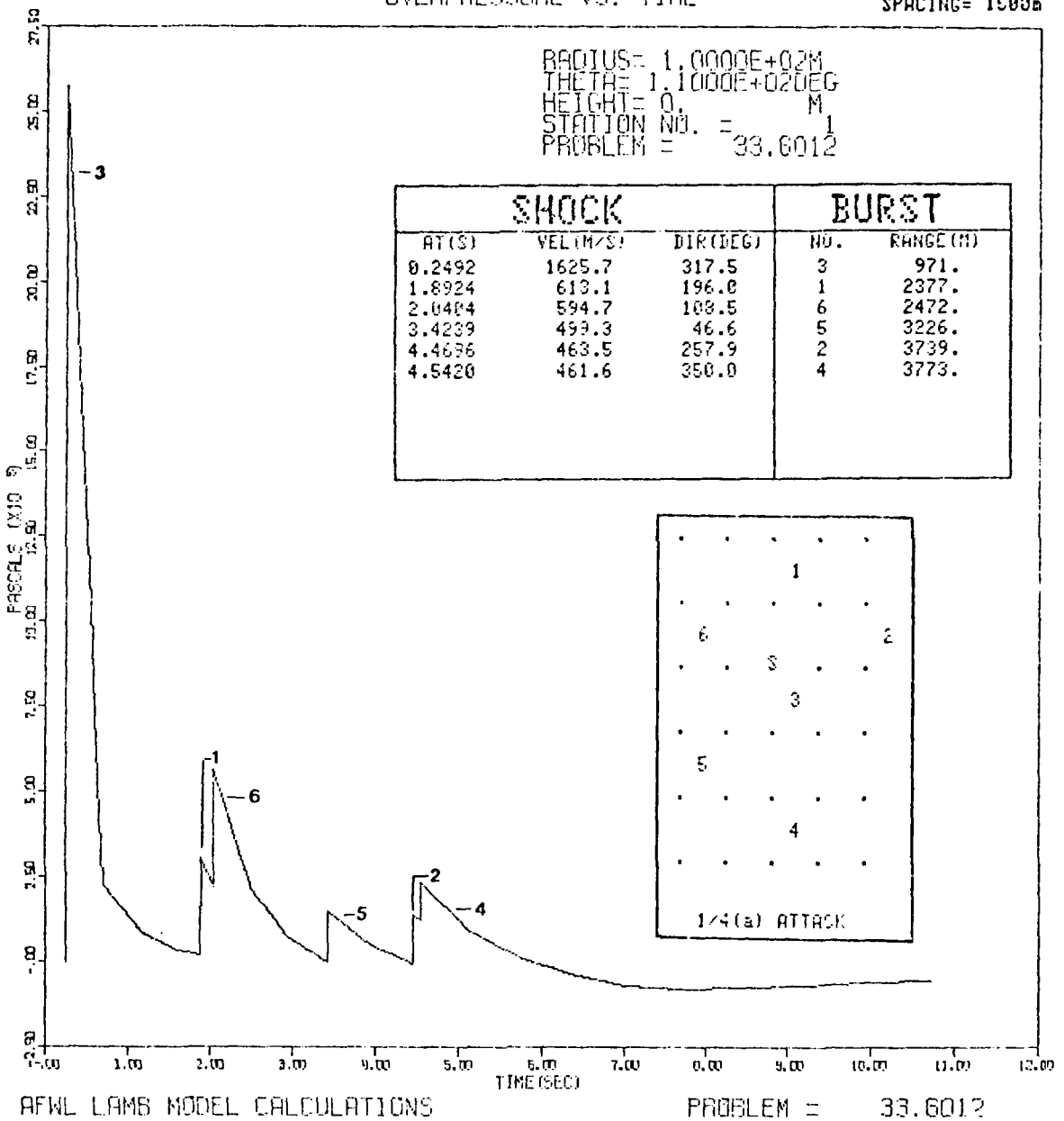
SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.0019	3011.4	318.9	3	618.
0.7837	897.4	194.8	1	1567.
0.8927	843.9	108.5	6	1681.
1.5578	662.1	47.4	5	2165.
2.0288	596.0	257.5	2	2465.
2.0857	589.7	350.6	4	2499.

AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.6011


OP IMPULSE VS. TIME
RADIUS= 1.0000E+02M.
THETA= 1.1000E+02DEG.
HEIGHT= 0. M.
STATION NO. = 1
PROBLEM = 33.6011
PASCAL-SEC (X10 5)
TIME(SEC)
AFWL LAMB MODEL CALCULATIONS
PROBLEM = 33.6011

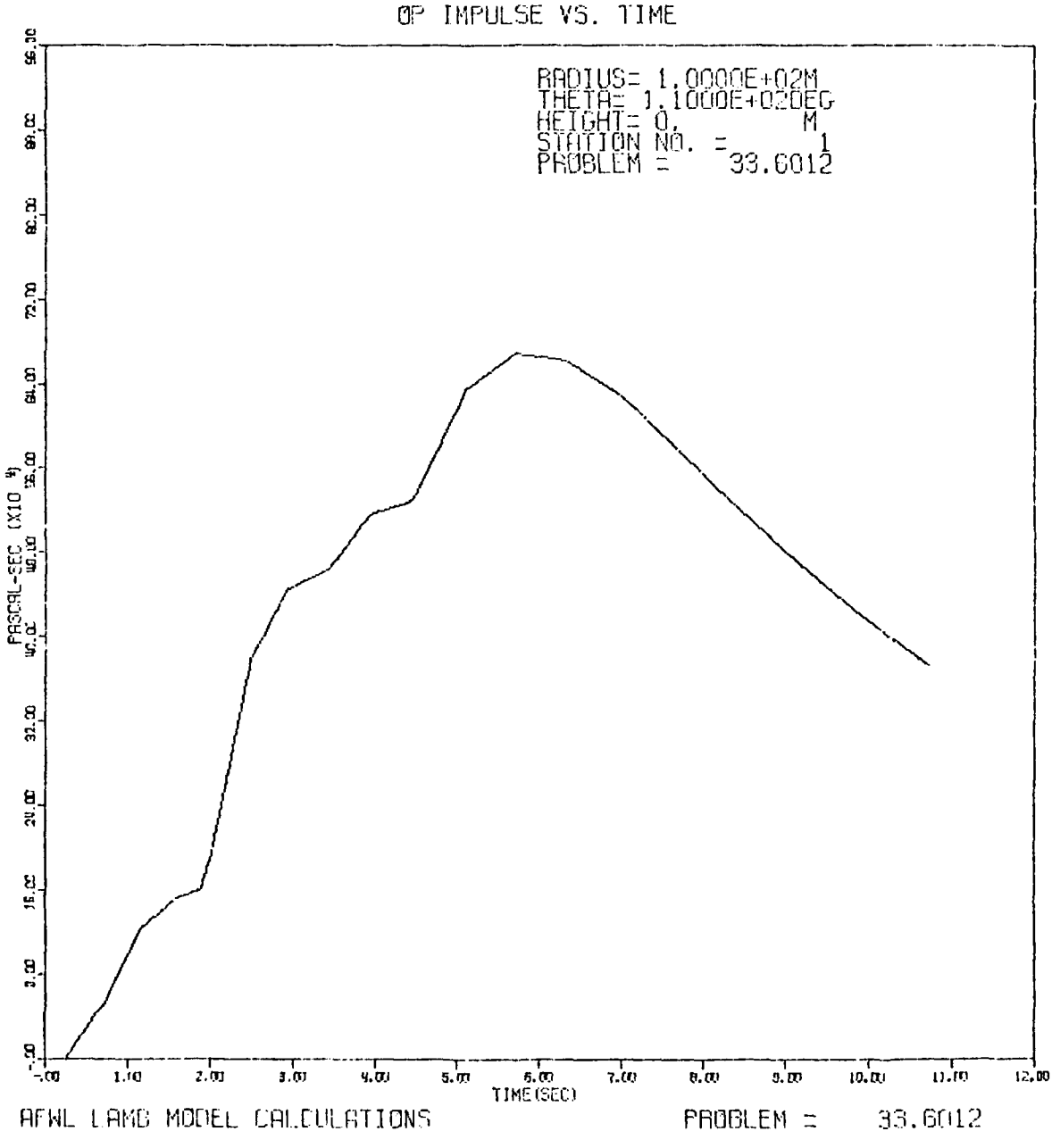
HOB= 0m
YIELD= 3Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.2492	1625.7	317.5	3	971.
1.8924	613.1	196.0	1	2377.
2.0404	594.7	108.5	6	2472.
3.4239	499.3	46.6	5	3226.
4.4636	463.5	257.9	2	3739.
4.5420	461.6	350.0	4	3773.

AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.6012

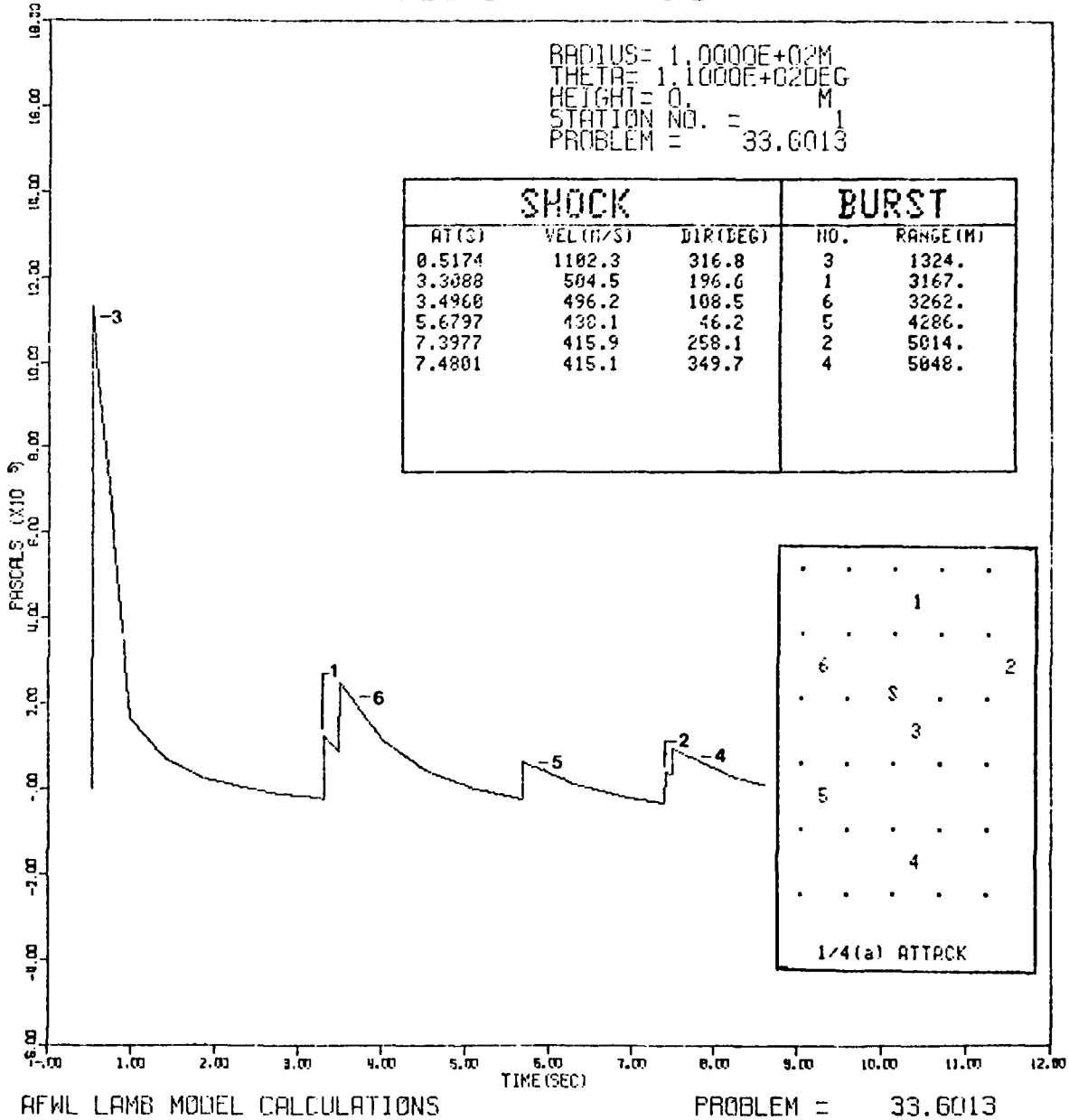

OP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 1.1000E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.6012
PASCAL-SEC (X10 4)
TIME(SEC)
AFWL LAMB MODEL CALCULATIONS
PROBLEM = 33.6012

HOB= 0m
YIELD= 3Mt
SPACING= 2000m

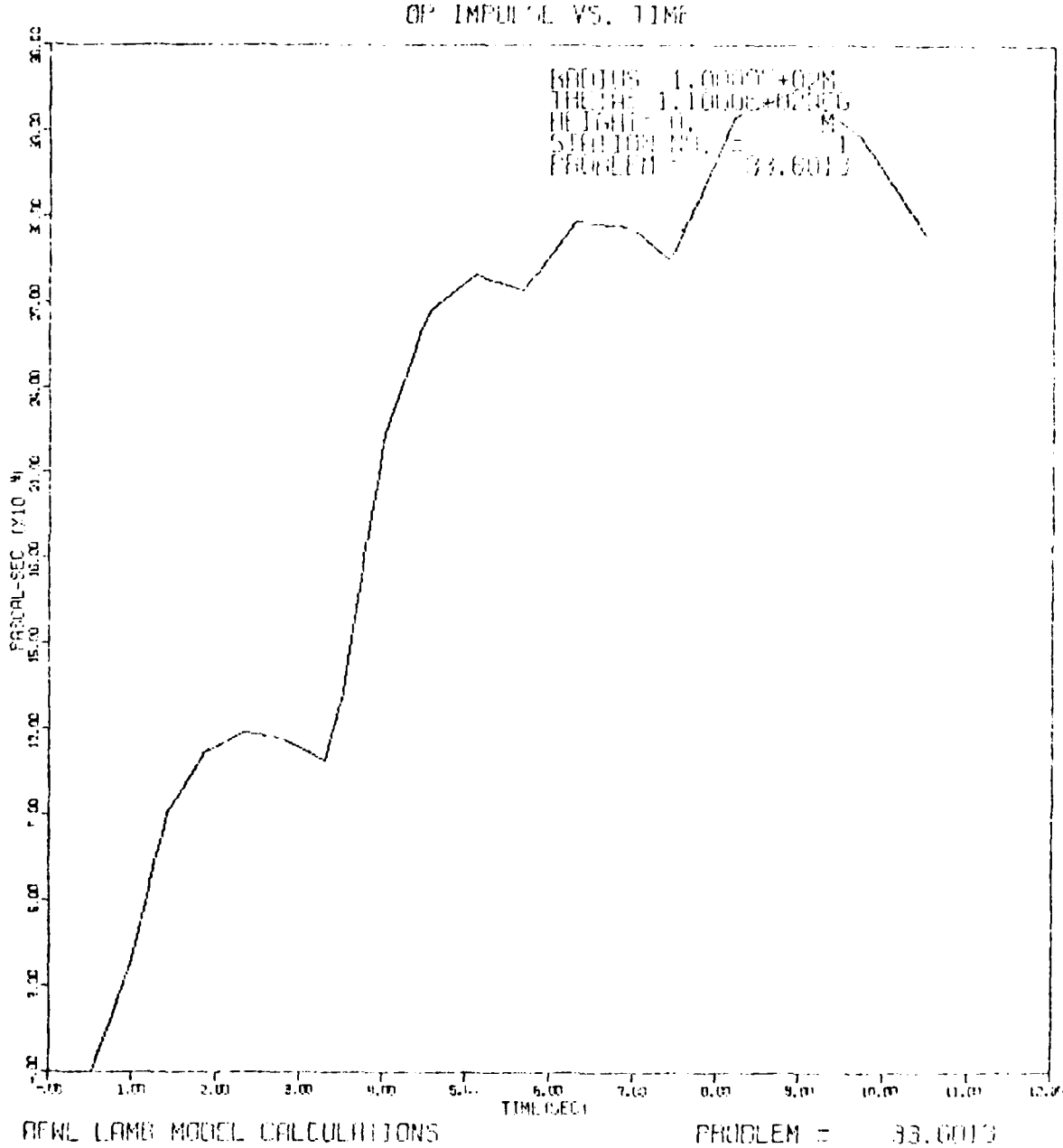
OVERPRESSURE VS. TIME

RADIUS= 1.0000E+02M
THETA= 1.1000E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.6013

SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.5174	1102.3	316.8	3	1324.
3.3088	504.5	196.6	1	3167.
3.4960	496.2	108.5	6	3262.
5.6797	430.1	46.2	5	4286.
7.3977	415.9	258.1	2	5014.
7.4801	415.1	349.7	4	5048.



AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.6013



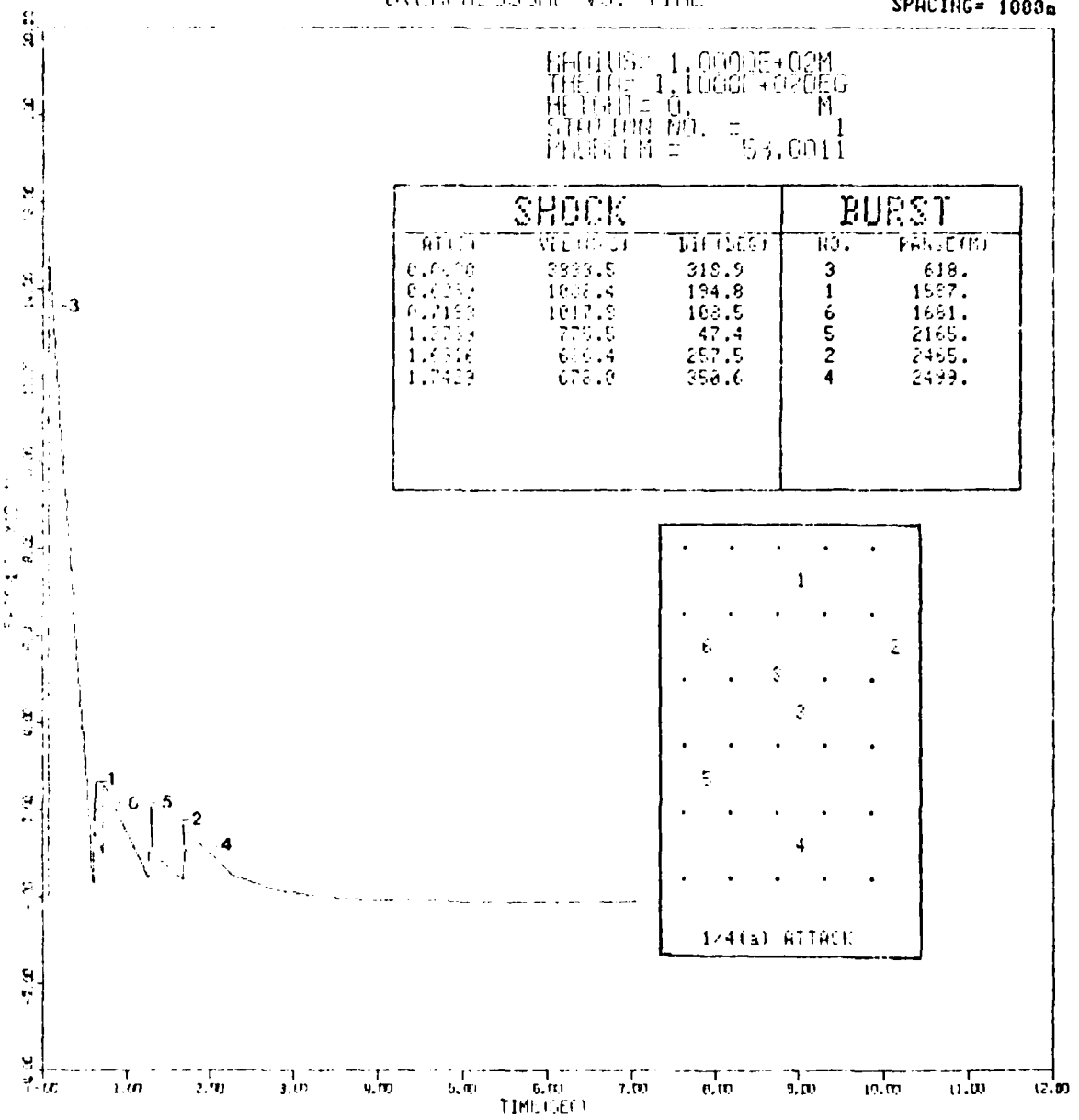
AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.0013

HOB= 0m
YIELD= 5Mt
SPACING= 1000m

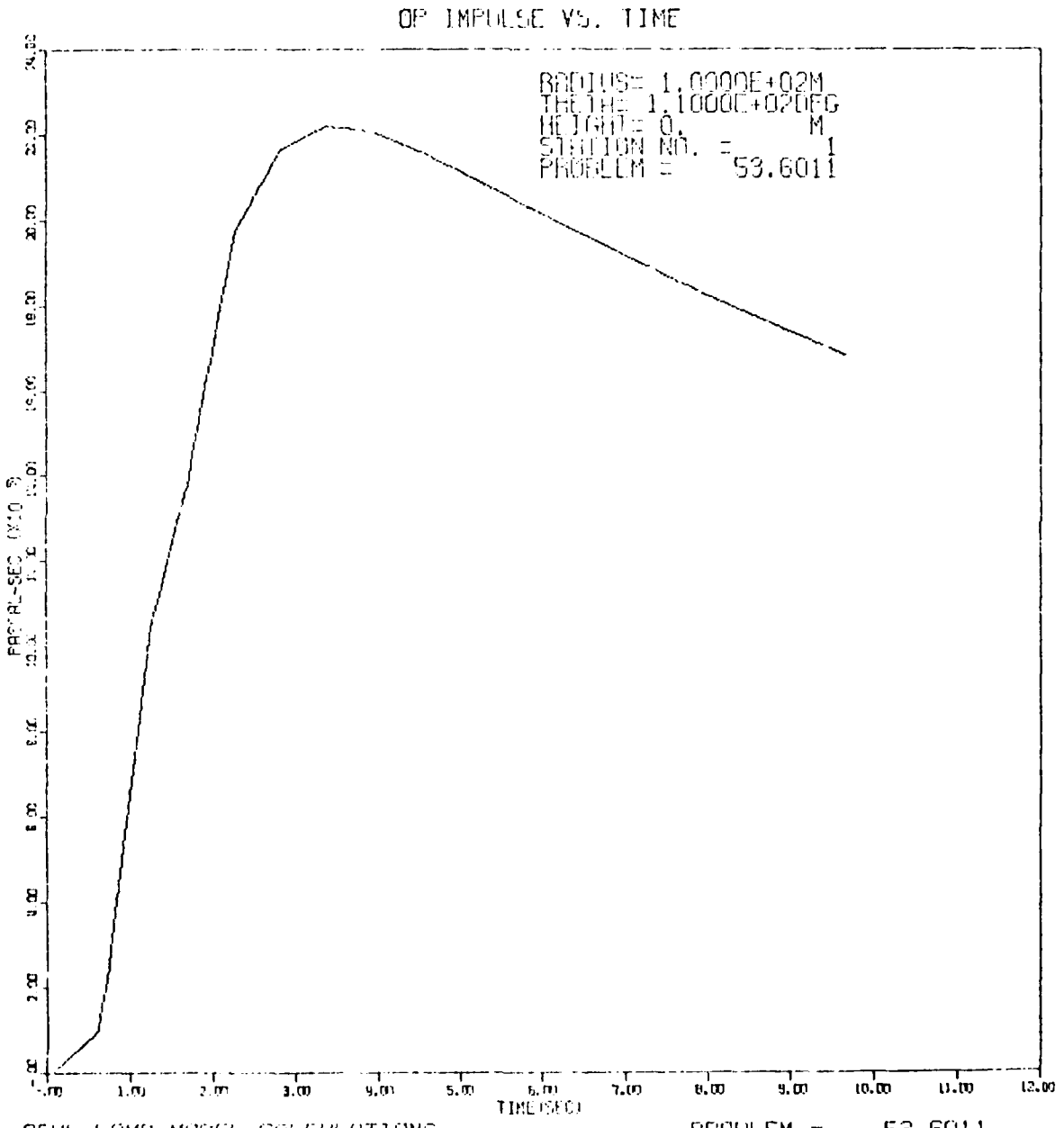
OVERPRESSURE VS. TIME

RADIUS= 1.0000E+02M
THETA= 1.1000E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.0011

SHOCK			BURST	
ARRIV	VELOCITY	DIFF(SEC)	NO.	RANGE(M)
0.6470	3883.5	318.9	3	618.
0.9659	1908.4	194.8	1	1587.
1.1613	1017.9	108.5	6	1681.
1.2698	779.8	47.4	5	2165.
1.3146	686.4	257.5	2	2465.
1.5723	378.0	350.6	4	2499.



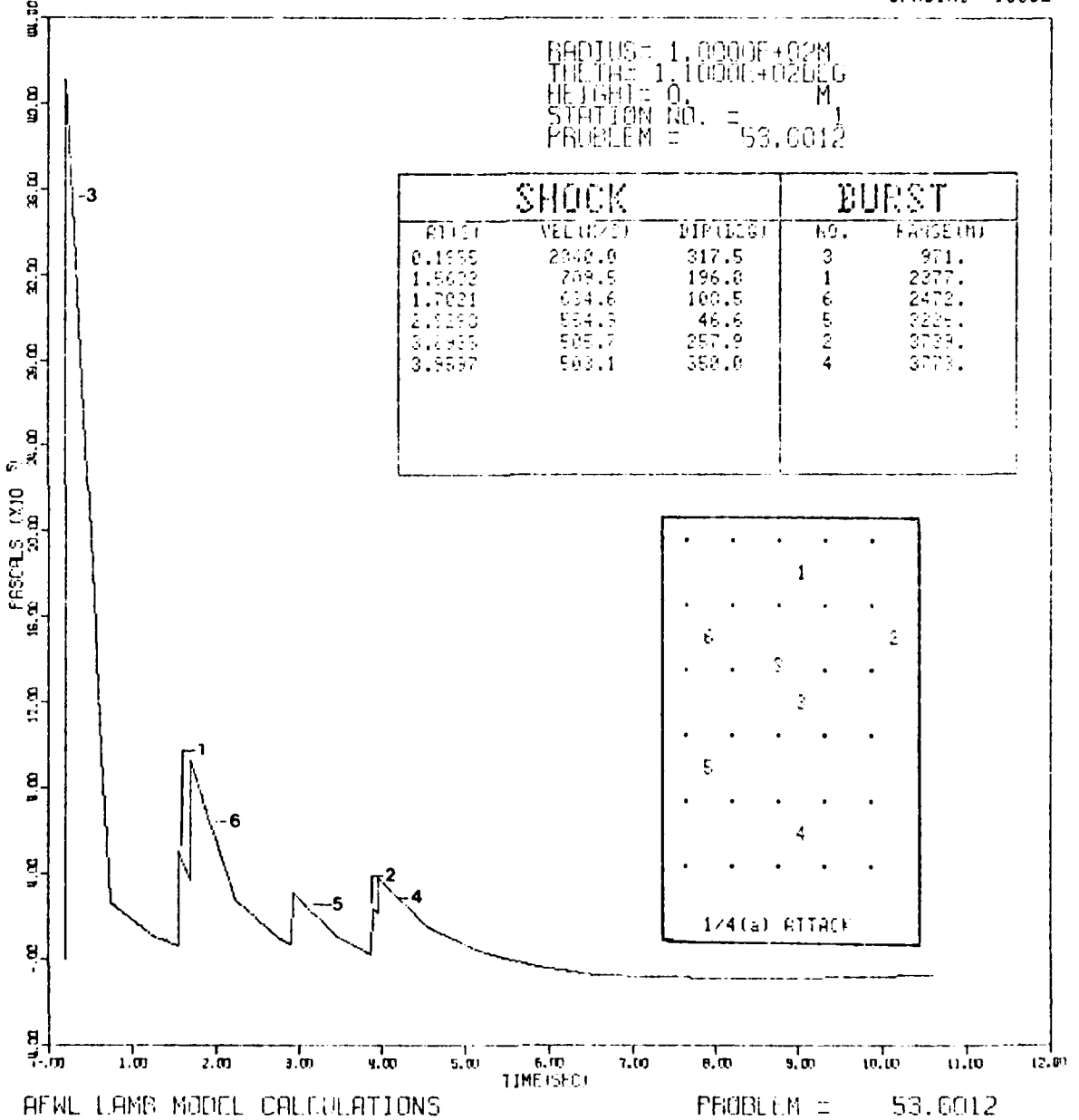
AFWL LOAN MODEL CALCULATIONS PROBLEM = 53.0011



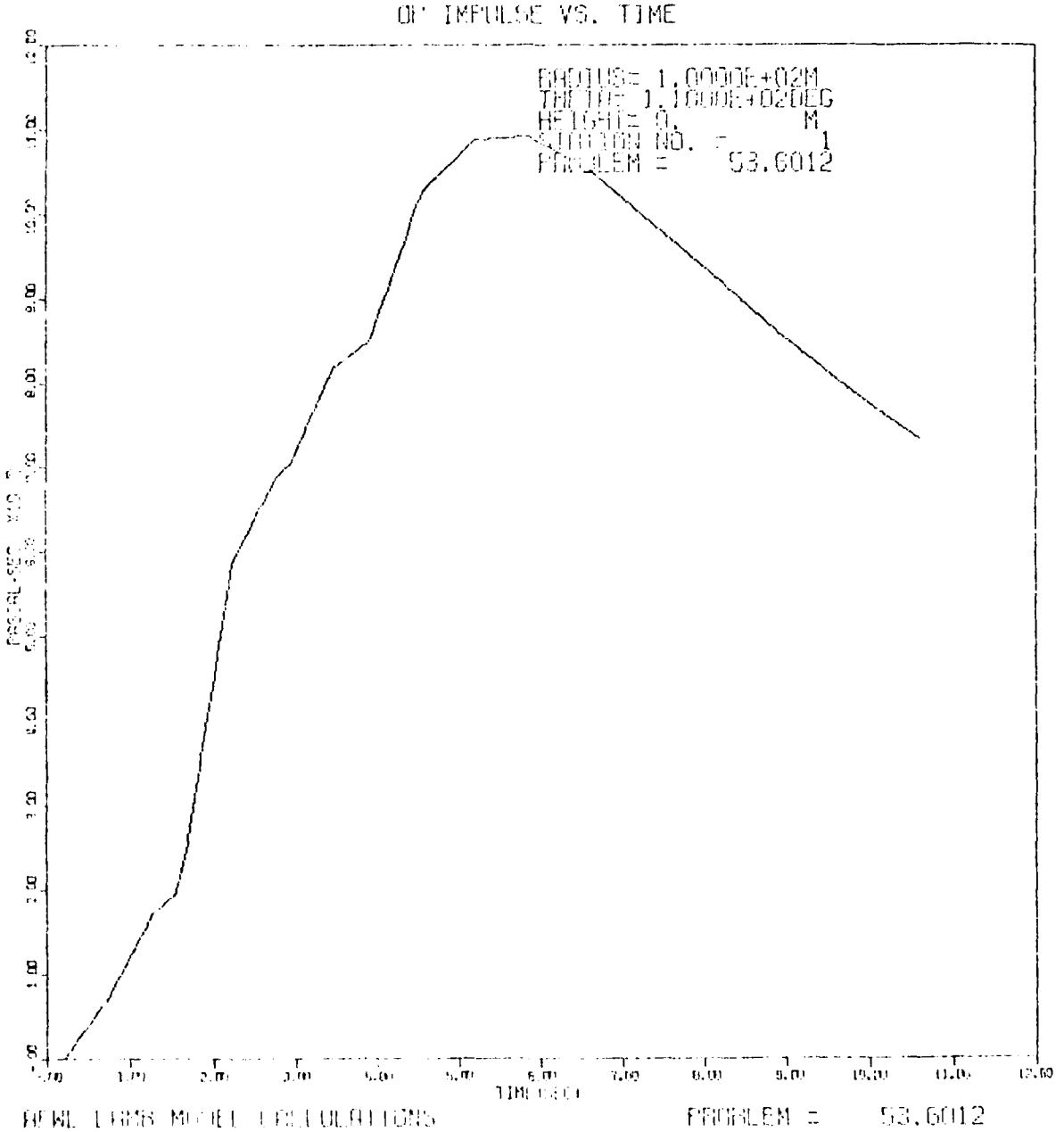
AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.6011

HOB= 0m
YIELD= 5Mt
SPACING= 1500m

OVERPRESSURE VS. TIME

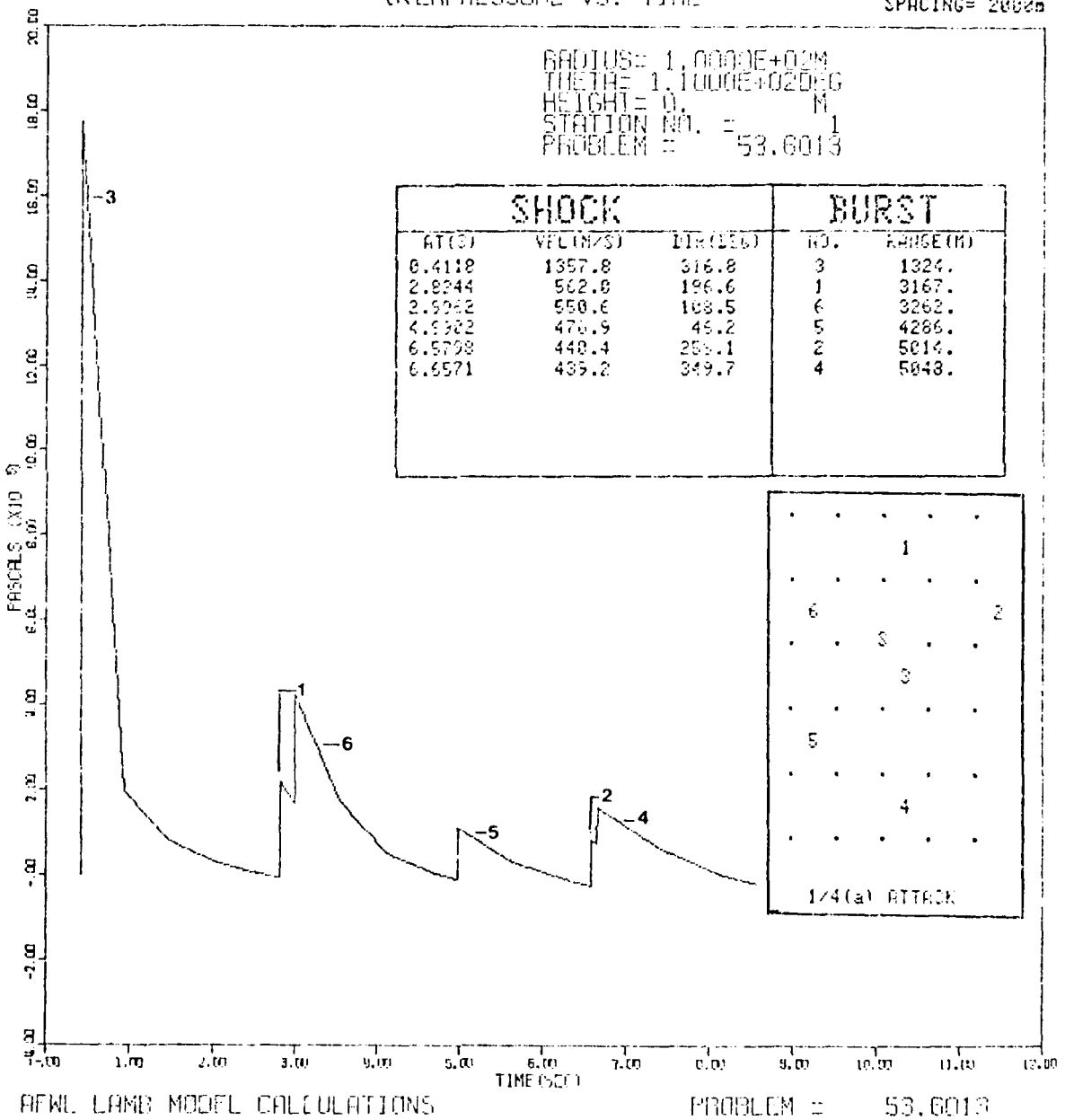


AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.0012


OF IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 1.1000E+02DEG
HEIGHT= 0. M
SOLUTION NO. = 1
PROBLEM = 53.6012
PSI-AL-SEC
TIME (SEC)
AFWL 1986 MODEL CALCULATIONS
PROBLEM = 53.6012

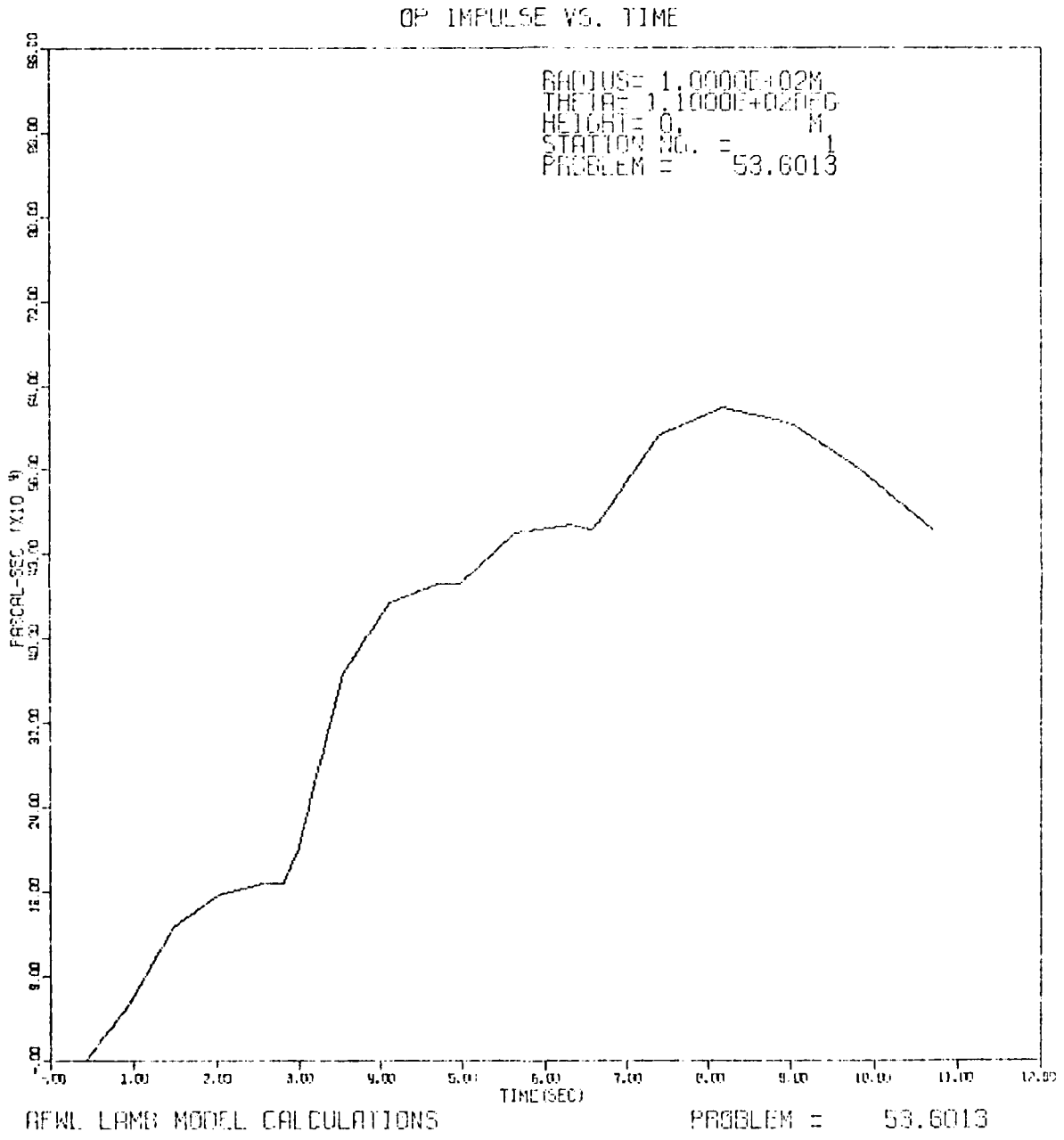
HOB= 0m
YIELD= 5Mt
SPACING= 2000m

OVERPRESSURE VS. TIME



SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.4118	1357.8	316.8	3	1324.
2.8244	562.8	196.6	1	3167.
2.9962	550.6	168.5	6	3262.
4.6302	476.9	46.2	5	4286.
6.5798	440.4	286.1	2	5014.
6.6571	436.2	349.7	4	5048.

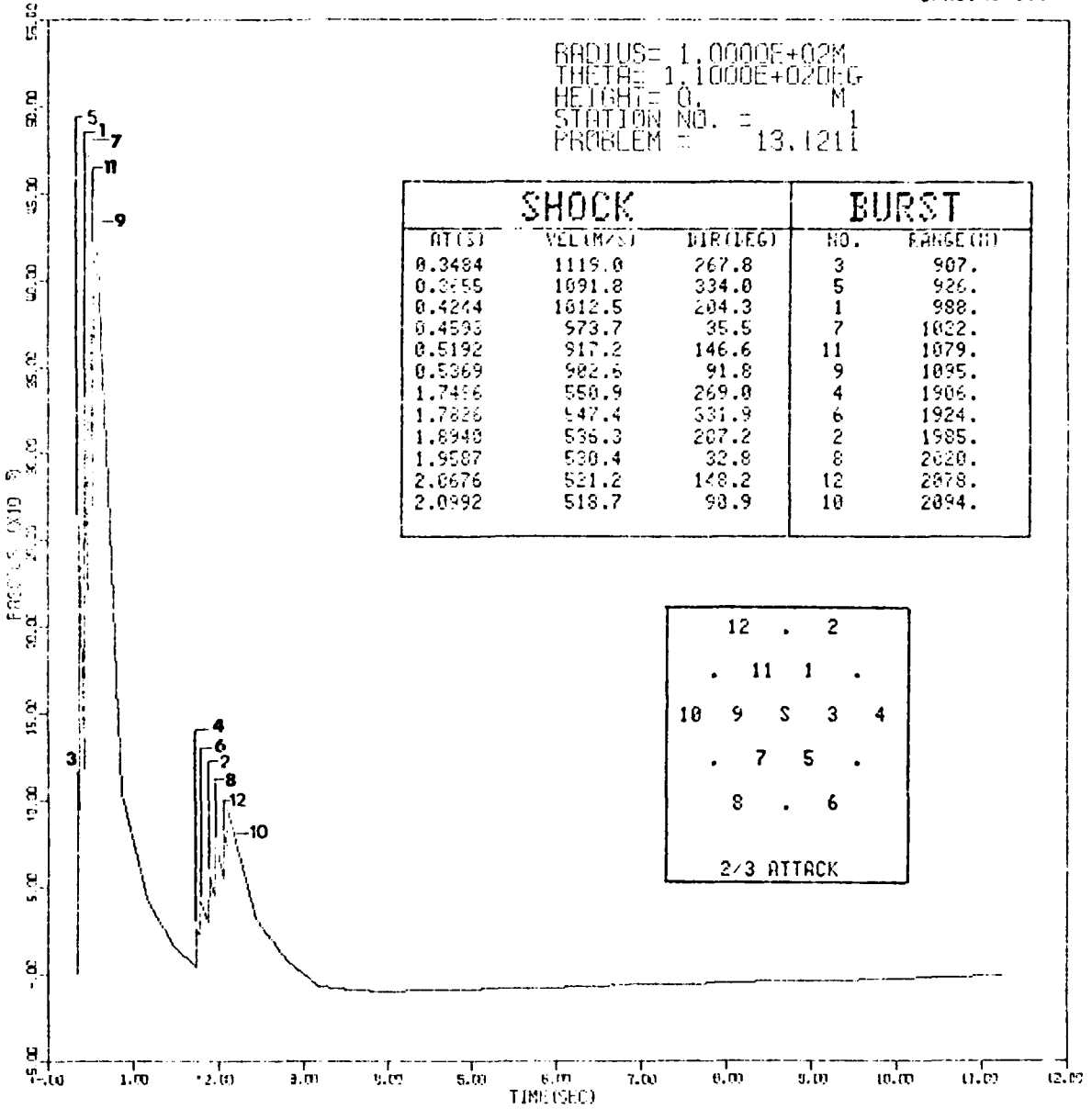
AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.6013



AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.6013

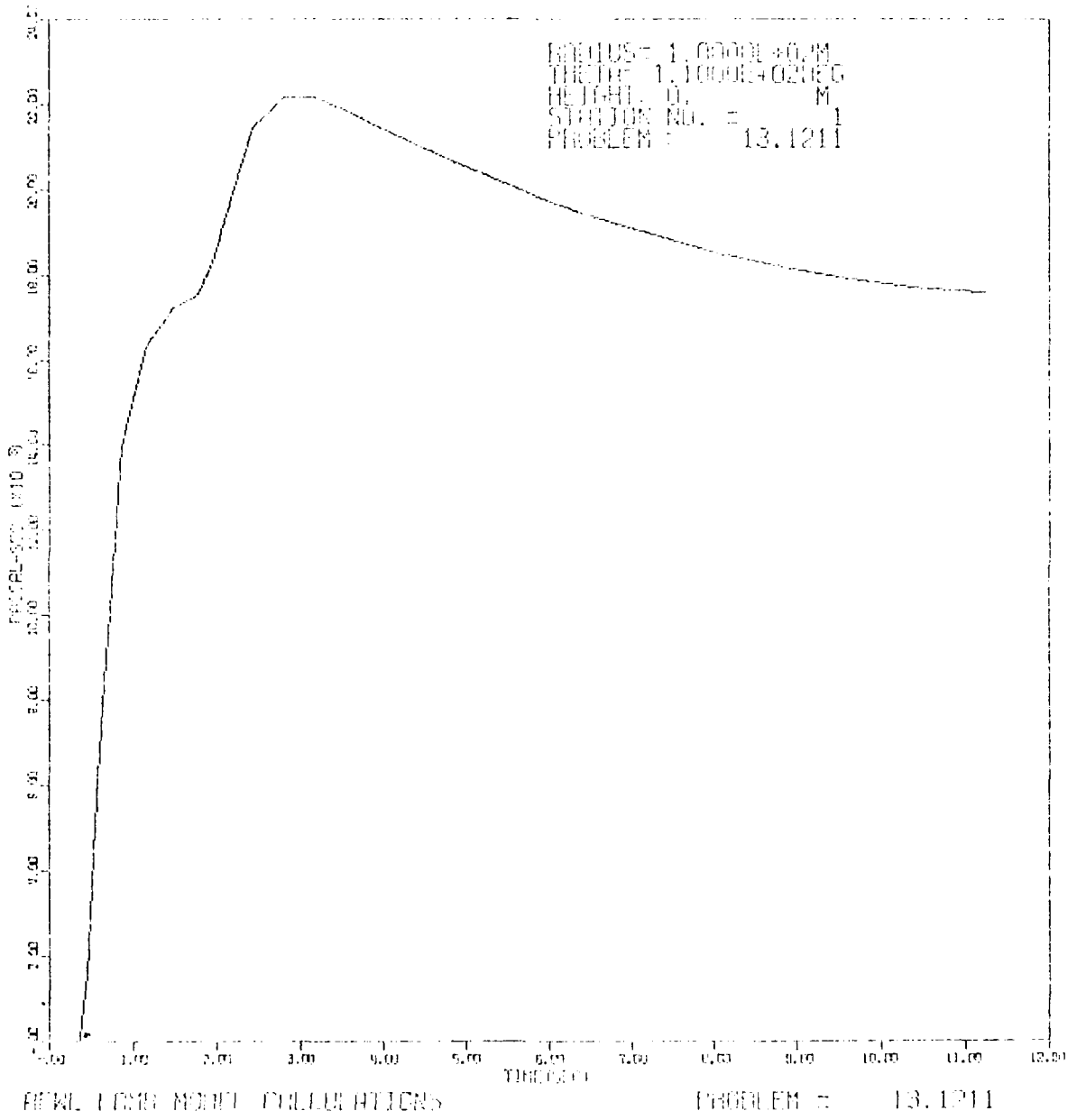
HOB= 0m
YIELD= 1Mt
SPACING=1000m

OVERPRESSURE VS. TIME



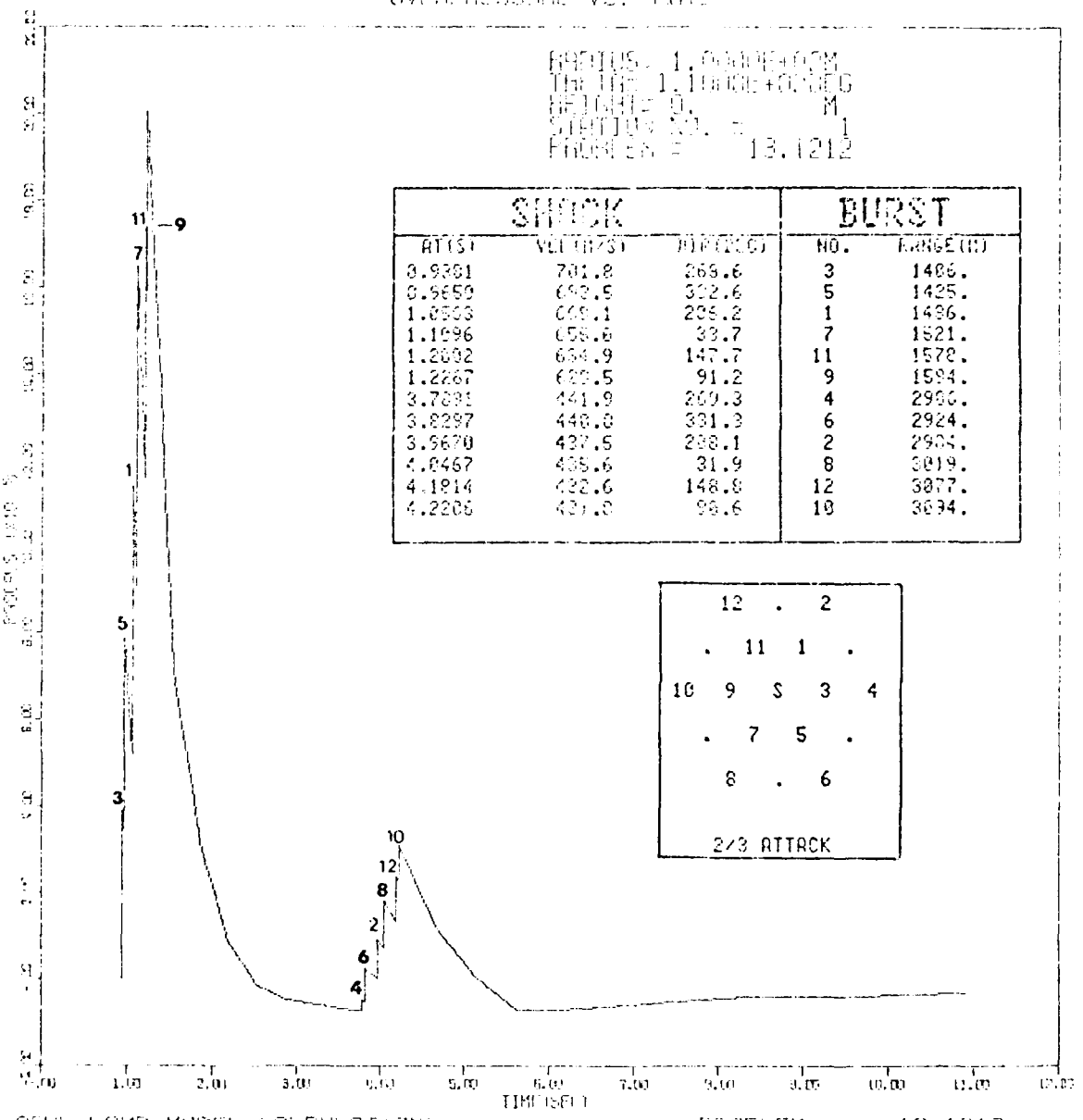
SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.3484	1119.0	267.8	3	907.
0.3655	1091.8	334.0	5	926.
0.4244	1012.5	204.3	1	988.
0.4593	973.7	35.5	7	1022.
0.5192	917.2	146.6	11	1079.
0.5369	902.6	91.8	9	1095.
1.7496	550.9	269.0	4	1906.
1.7826	547.4	331.9	6	1924.
1.8948	536.3	207.2	2	1985.
1.9587	530.4	32.8	8	2020.
2.0676	521.2	148.2	12	2078.
2.0992	518.7	90.9	10	2094.

AFWL LAMB MODEL CALCULATIONS PROBLEM = 13.1211


RADIUS= 1.0000E+00M
THETA= 1.0000E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 13.1211
TIME(SEC)
PROBLEM = 13.1211

HOB= 0m
YIELD= 1Mt
SPACING= 1500m

OVERPRESSURE VS. TIME

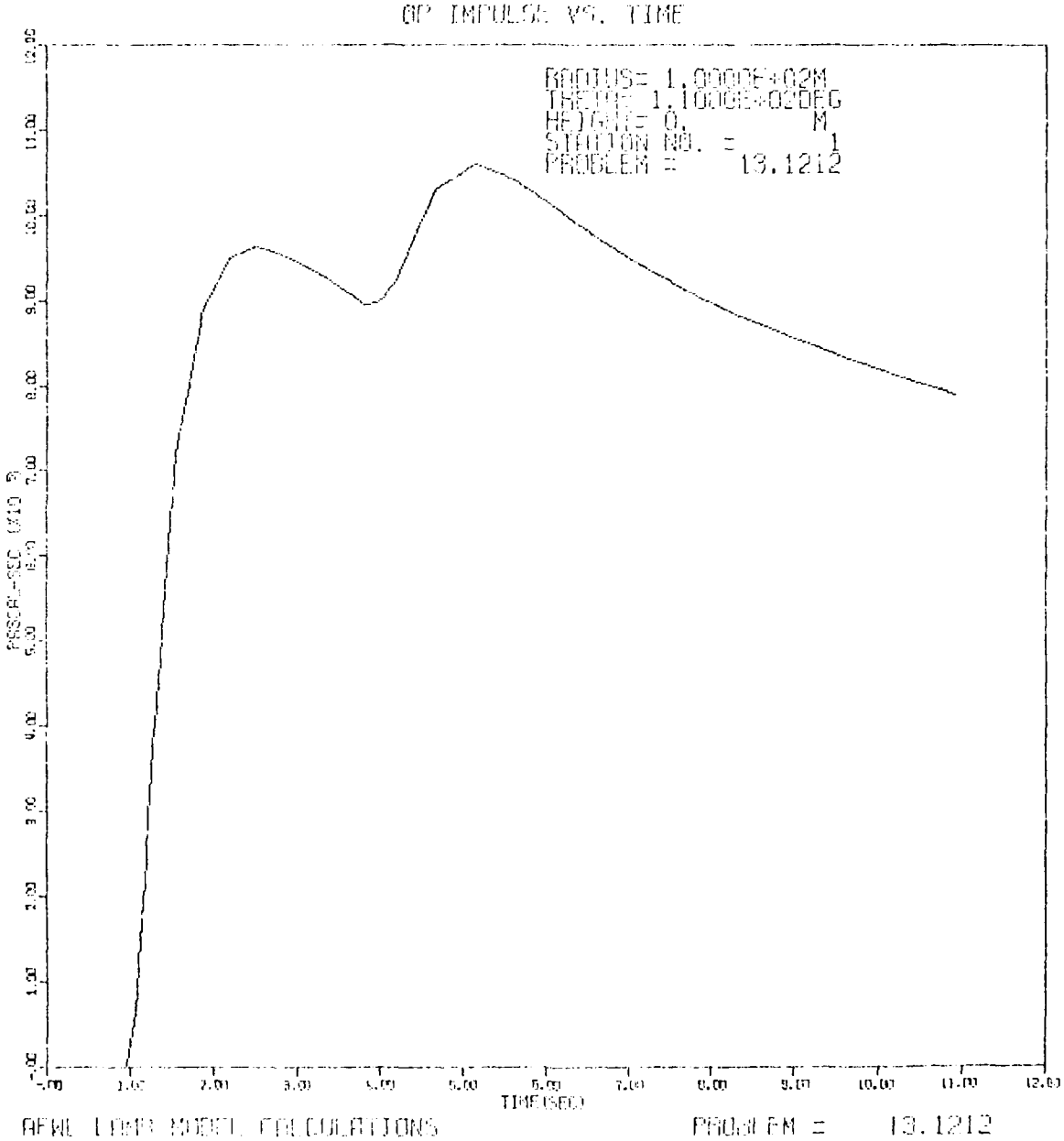


SHOCK			BURST	
ARRIVAL	VELOCITY	DIRECTION	NO.	RANGE(M)
0.9381	701.8	266.6	3	1406.
0.9659	692.5	302.6	5	1425.
1.0503	669.1	295.2	1	1496.
1.1096	656.6	33.7	7	1521.
1.2092	634.9	147.7	11	1570.
1.2267	630.5	91.2	9	1594.
3.7881	141.9	269.3	4	2966.
3.8297	440.8	331.3	6	2924.
3.9670	437.5	208.1	2	2905.
4.0467	436.6	31.9	8	3019.
4.1814	432.6	148.8	12	3077.
4.2206	431.8	98.6	10	3094.

		12	.	2
	.	11	1	.
10	9	S	3	4
	.	7	5	.
		8	.	6

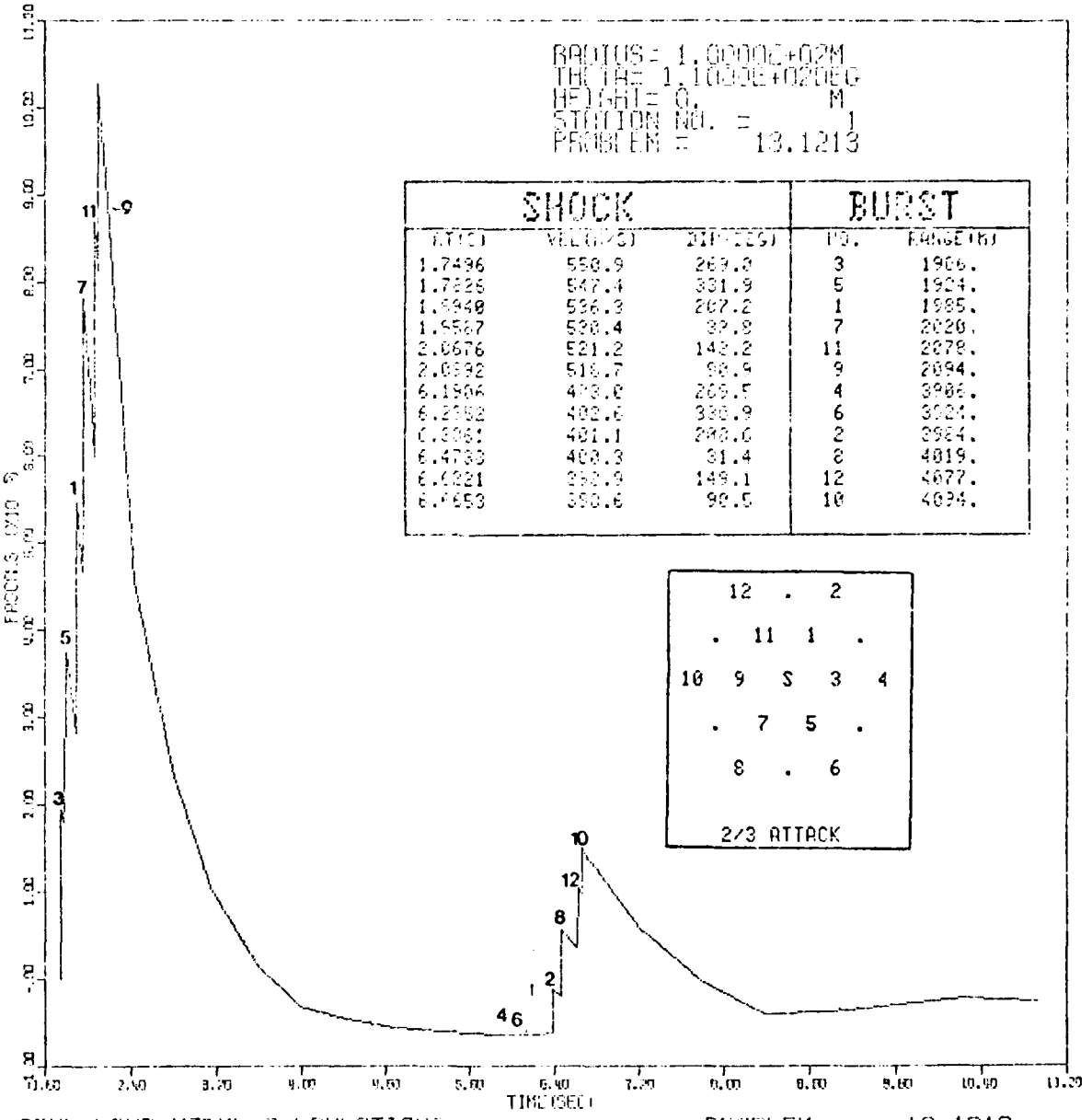
2/3 ATTACK

BRL BOMB MODEL CALCULATIONS PROBLEM # 13.1212


OP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 1.1000E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 13.1212
PSSCAL-SEC (X10 P)
TIME(SEC)
AFWL LOAD MODEL CALCULATIONS
PROBLEM = 13.1212

HOB= 0m
YIELD= 1Mt
SPACING= 2000m

OVERPRESSURE VS. TIME

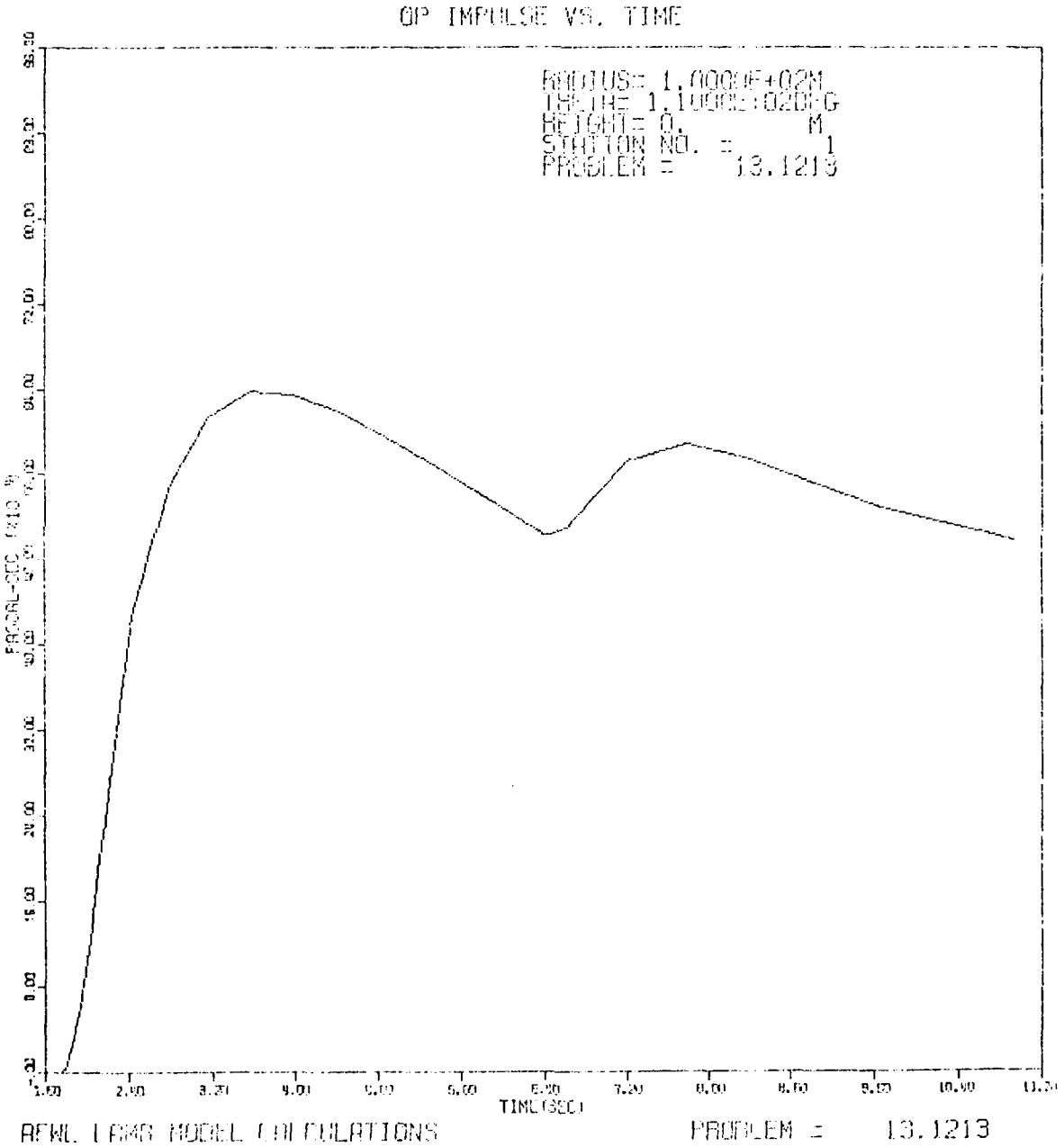


SHOCK			BURST	
ATIC)	VEL(M/S)	DIP(DEG)	NO.	RANGE(M)
1.7496	550.9	269.3	3	1906.
1.7825	547.4	331.9	5	1924.
1.8940	536.3	207.2	1	1985.
1.9567	530.4	89.9	7	2020.
2.0676	521.2	148.2	11	2078.
2.0892	516.7	90.9	9	2094.
6.1906	403.0	269.5	4	3906.
6.2252	402.6	330.9	6	3924.
6.3061	401.1	208.6	2	3964.
6.4736	400.3	31.4	8	4019.
6.6021	398.9	149.1	12	4077.
6.7653	398.6	90.5	10	4094.

	12 . 2	
	. 11 1 .	
10	9 S 3	4
	. 7 5 .	
	8 . 6	

2/3 ATTACK

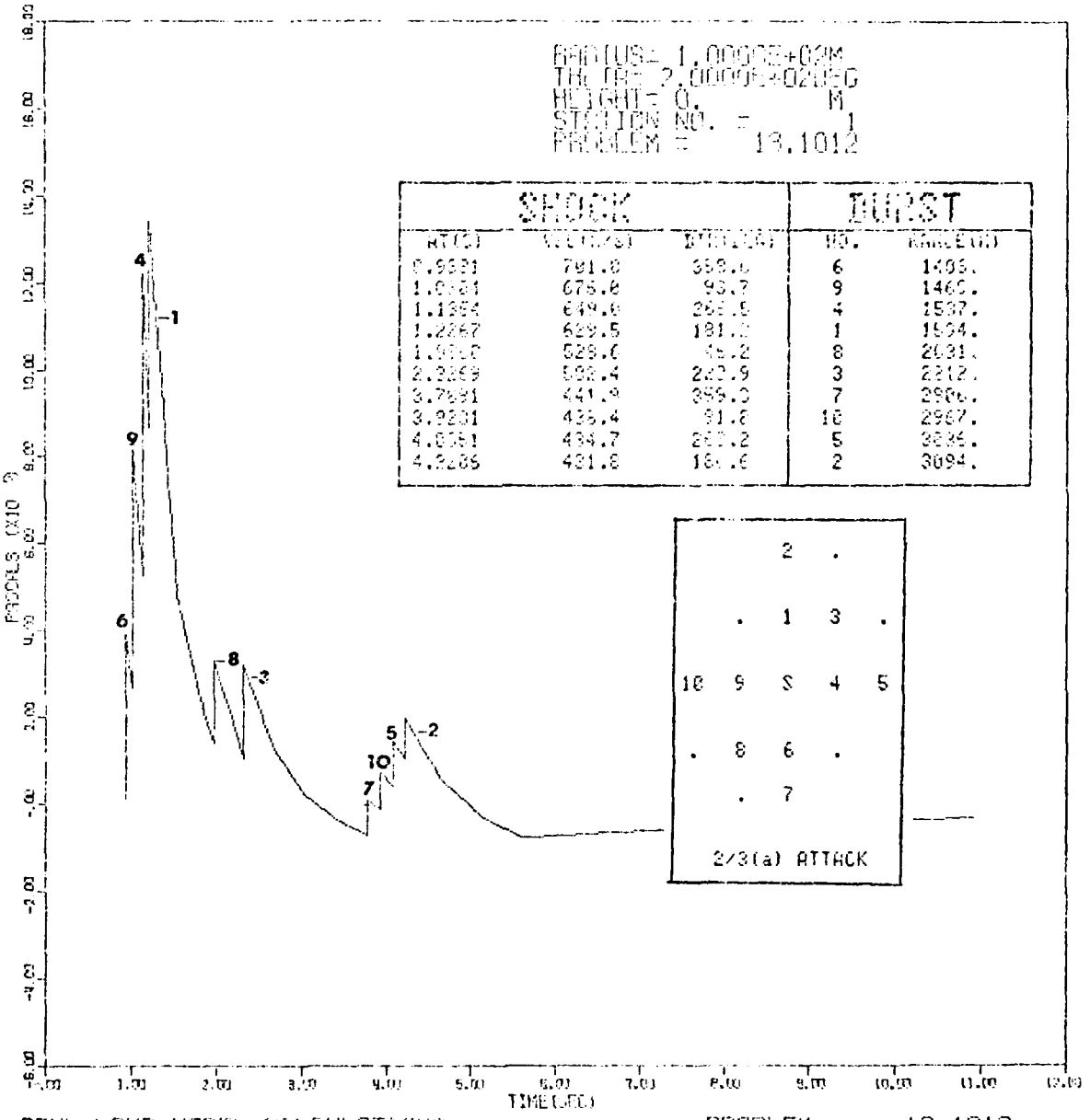
BRWL LANG MODEL CALCULATIONS PROBLEM = 13.1213



BRL CAM MODEL CALCULATIONS PROBLEM = 13.1213

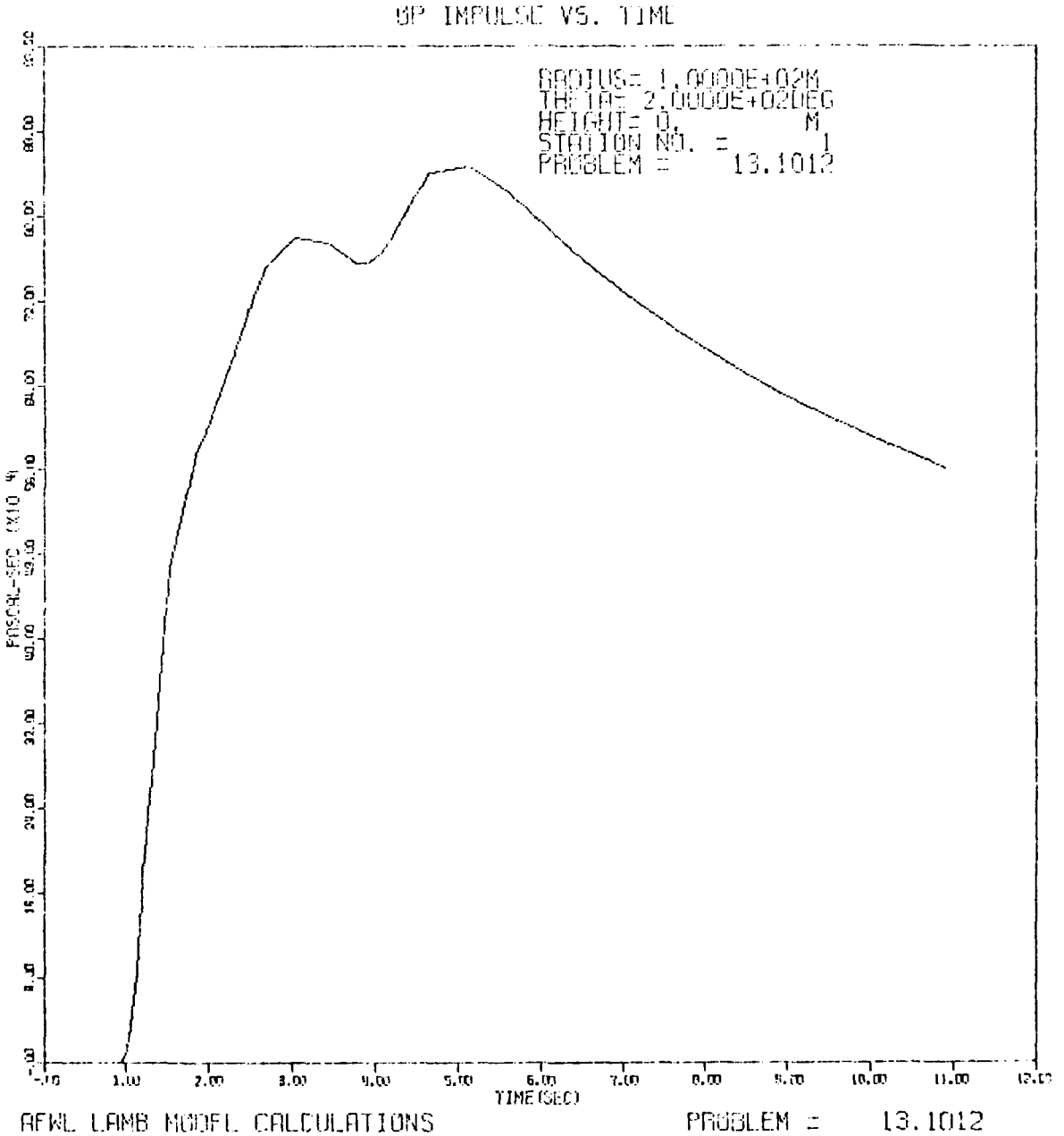
HOB= 0m
YIELD= 1Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



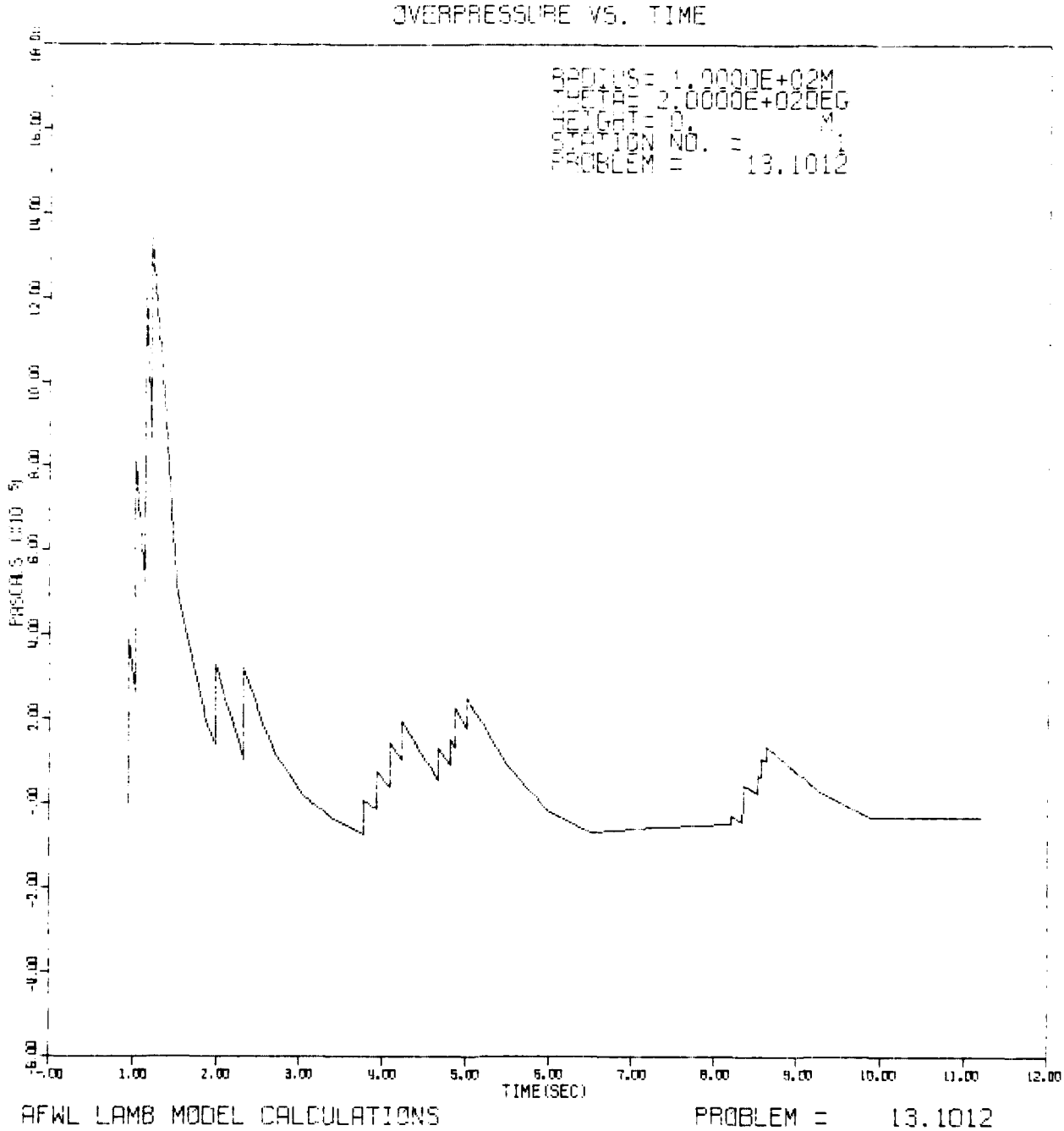
SHOCK			BURST	
RT(S)	V(FT/S)	DP(PSI)	NO.	R(FEET)
0.9931	781.0	358.6	6	1486.
1.0381	675.0	98.7	9	1460.
1.1354	649.0	266.5	4	1537.
1.2267	629.5	181.3	1	1504.
1.9560	528.0	46.2	8	2031.
2.2269	508.4	242.9	3	2212.
3.7691	441.9	359.3	7	2986.
3.9231	436.4	81.6	10	2987.
4.0361	434.7	242.2	5	3035.
4.2285	431.8	164.6	2	3094.

AFWL LAMB MODEL CALCULATIONS PROBLEM = 13.1012



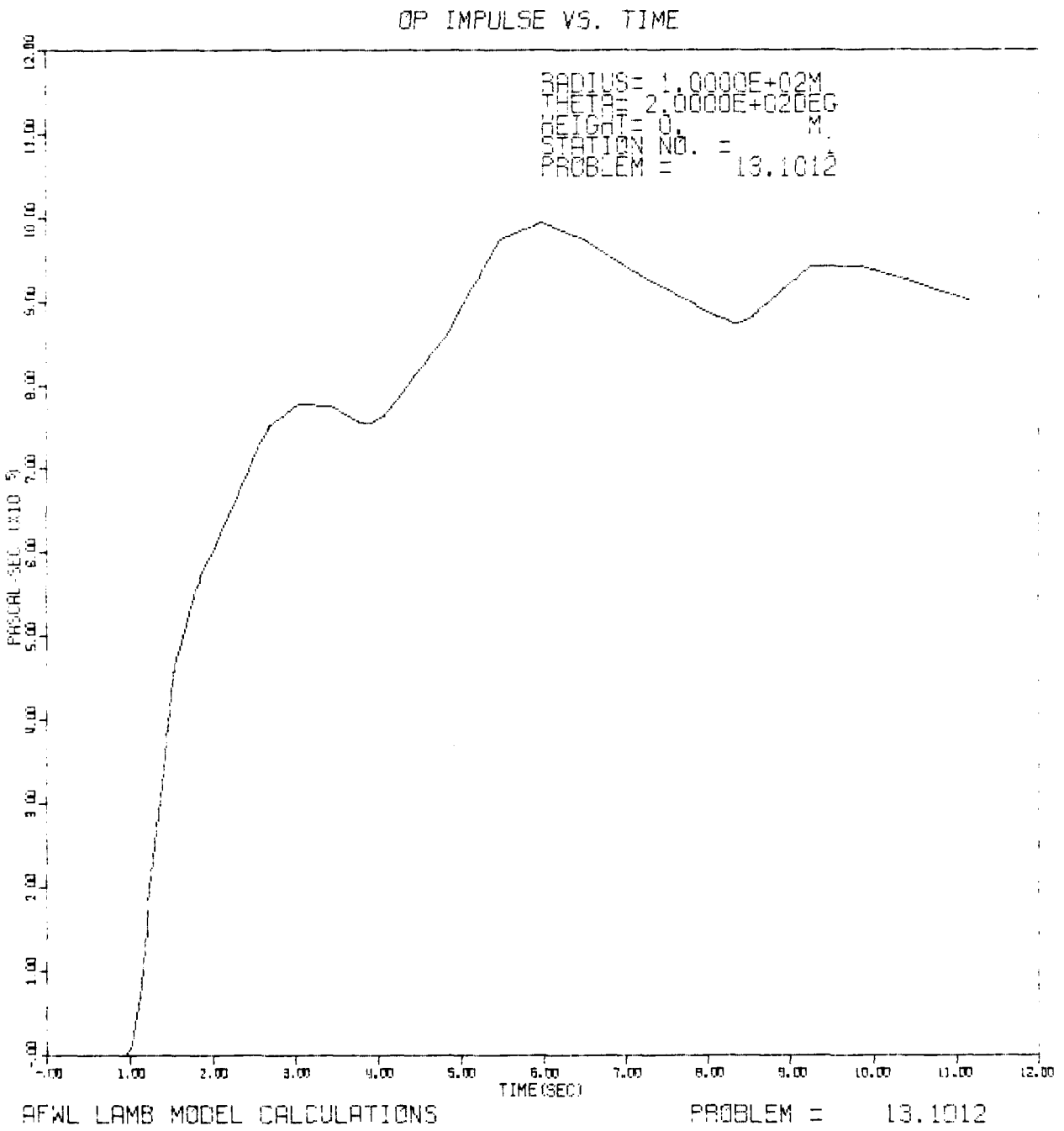
AFWL LAMB MODEL CALCULATIONS PROBLEM = 13.1012

TEST CASE



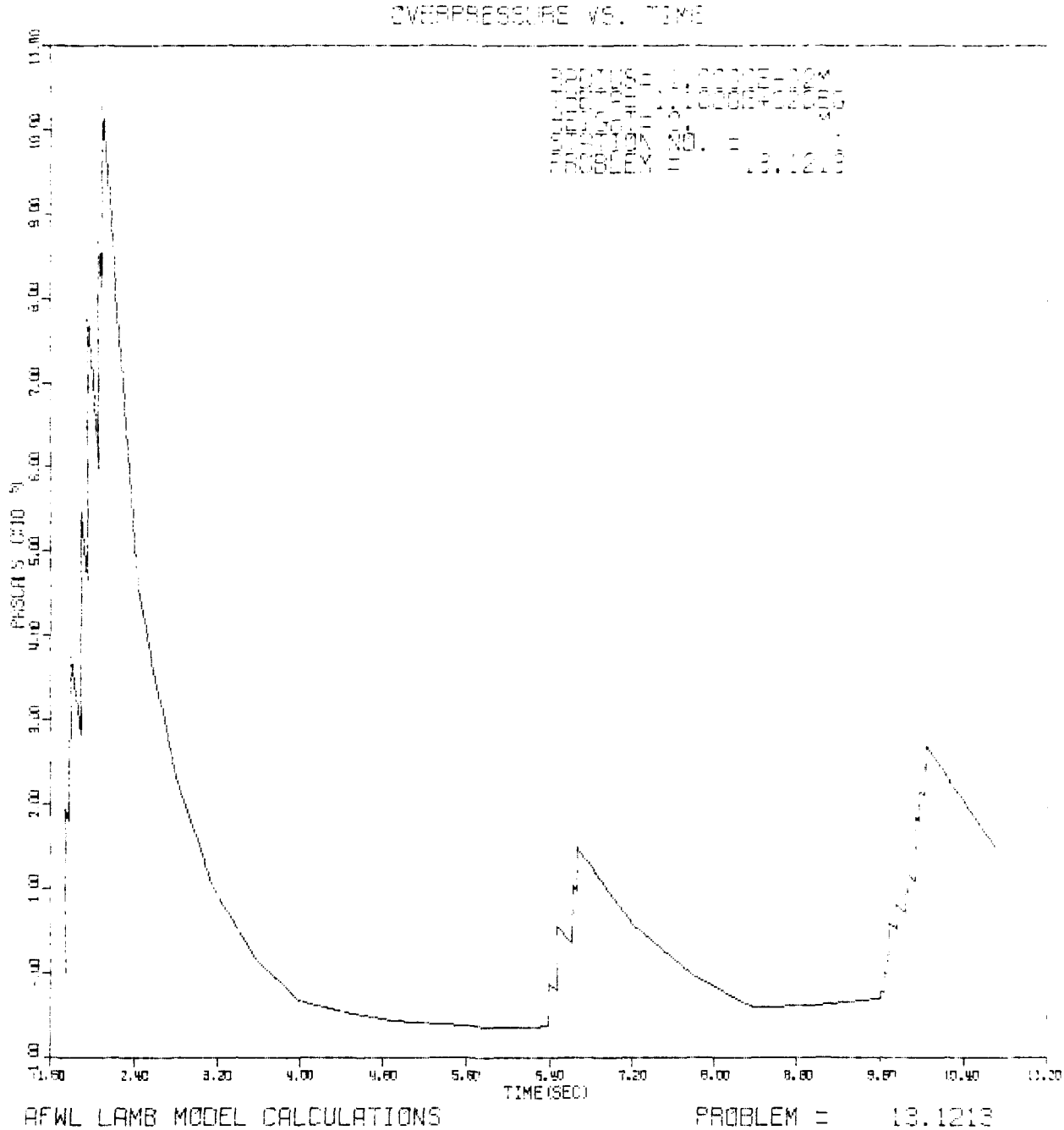
2/3(a) ATTACK (WITH ADDED BURSTS)

TEST CASE



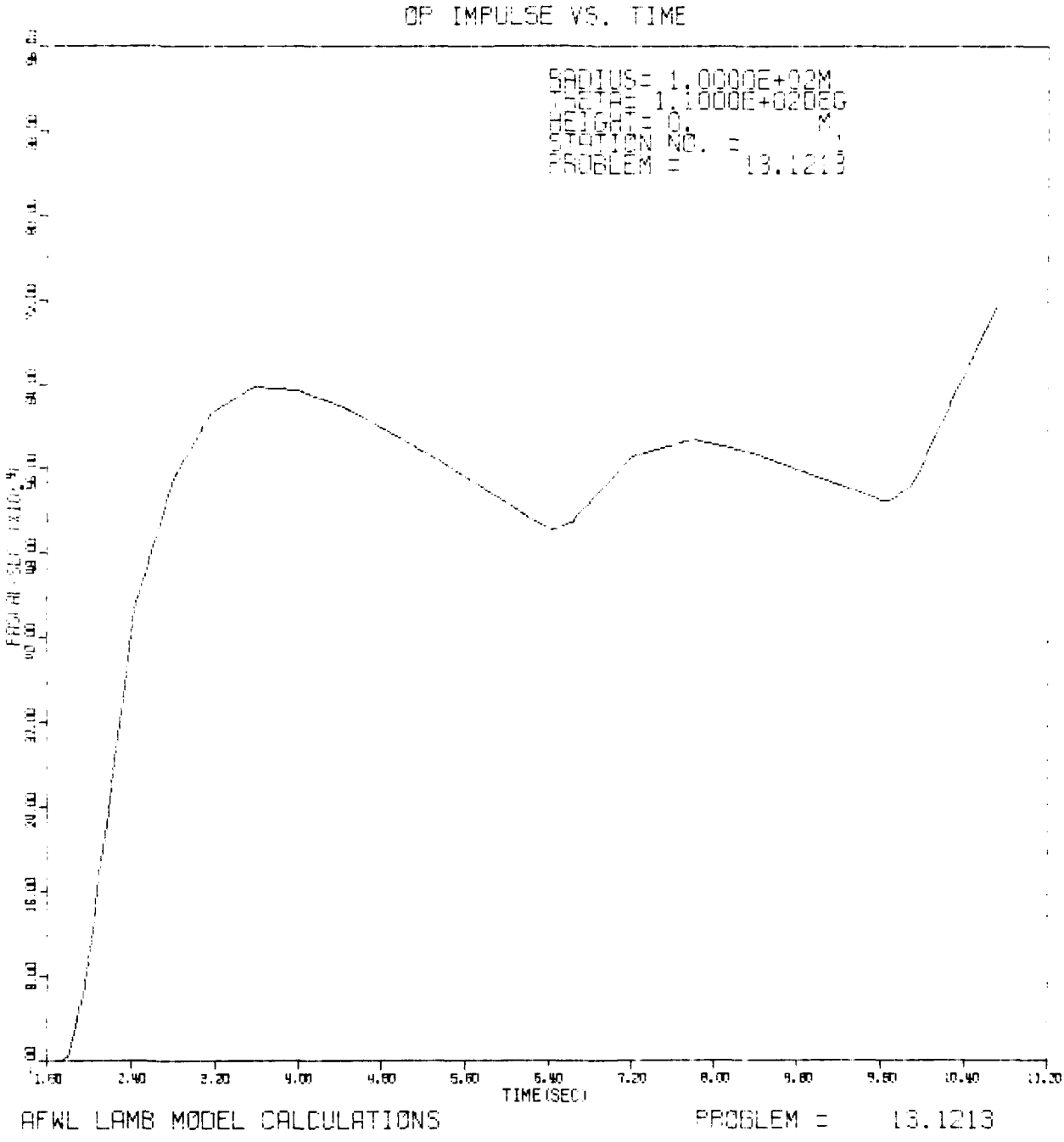
2/3(a) ATTACK (WITH ADDED BURSTS)

TEST CASE



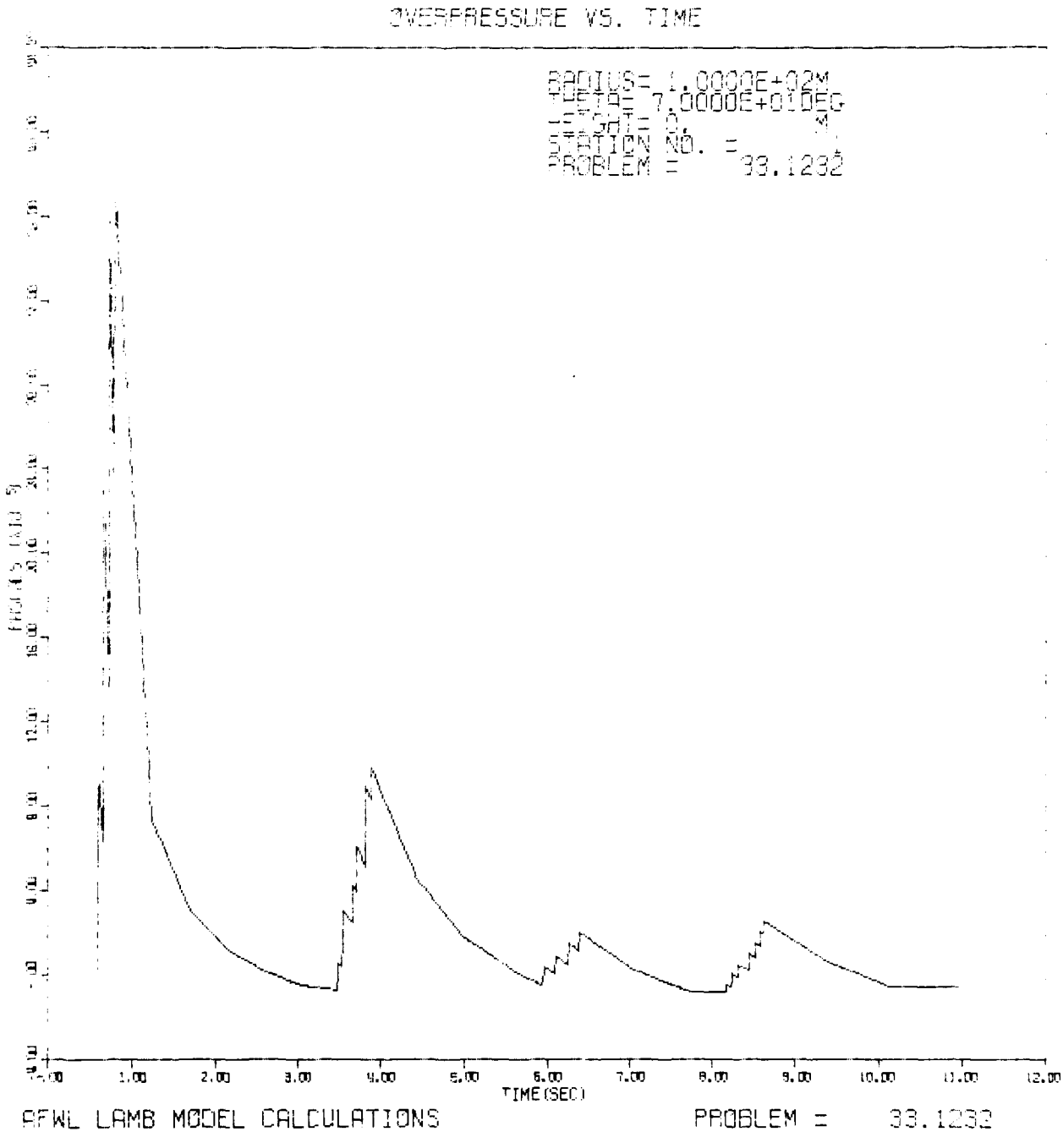
2/3 ATTACK (WITH ADDED BURSTS)

TEST CASE



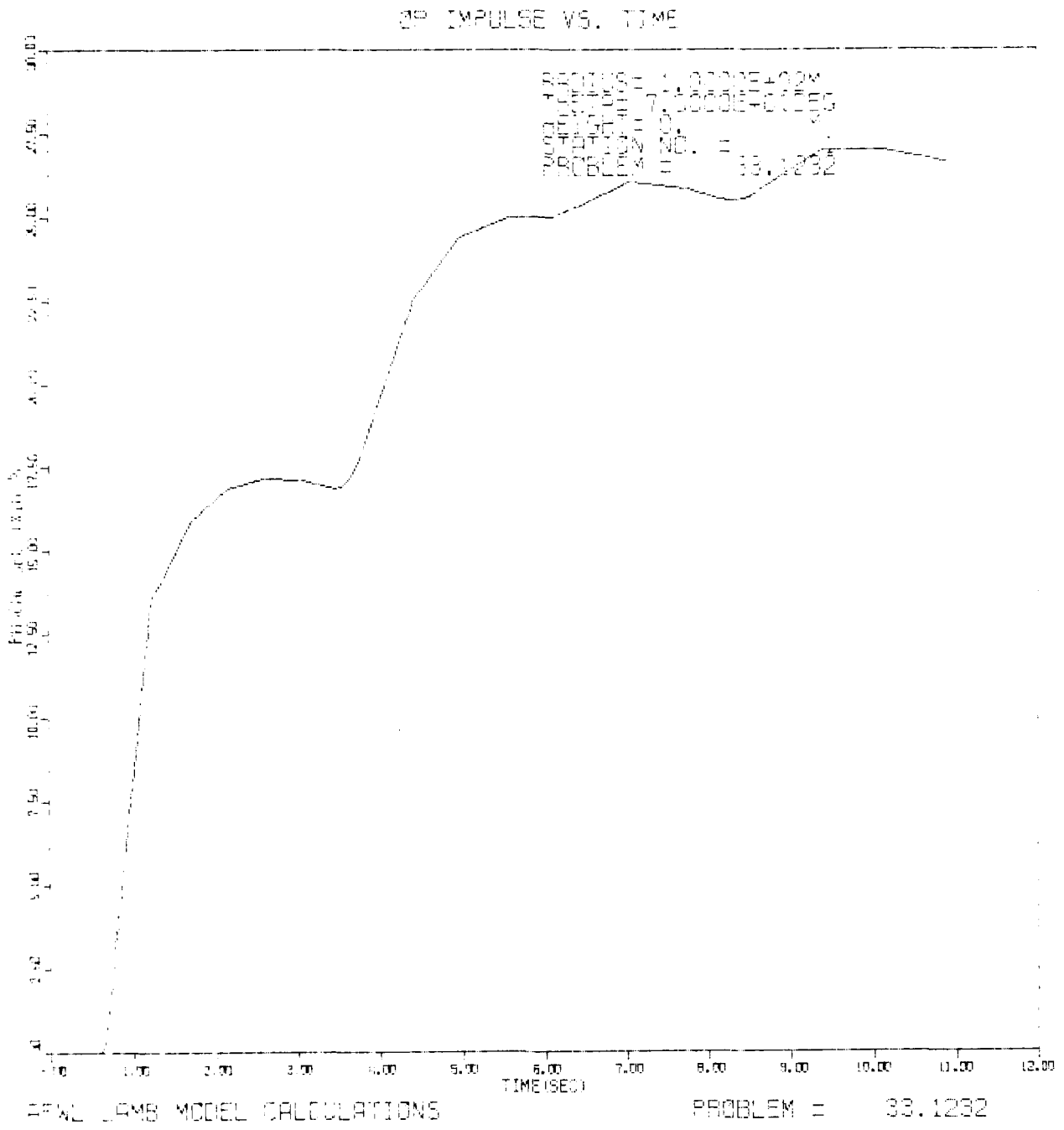
2/3 ATTACK (WITH ADDED BURSTS)

TEST CASE



1/2(c) ATTACK (WITH ADDED BURSTS)

TEST CASE



1/2(c) ATTACK (WITH ADDED BURSTS)

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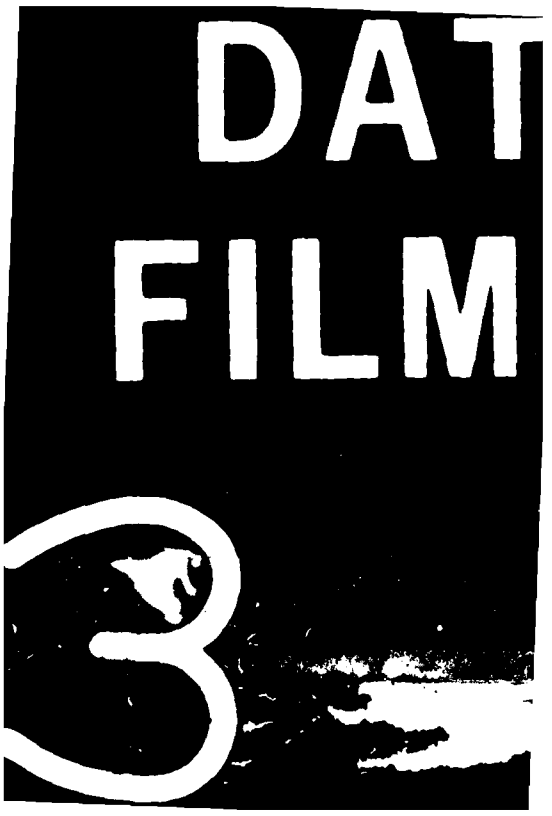
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