HEALTH AND SAFETY EXECUTIVE

HEAVY GAS DISPERSION TRIALS
THORNEY ISLAND 1982-3

DATA FOR TRIAL 015/1

Research and Laboratory Services Division
Red Hill, Sheffield S3 7HQ Tel: 0742 78141

8 Trials 24 to 29

The correct heights for the gas sensors on the mast at (372,228) are 0.4, 2.4 and 4.4 metres, not 0.4, 1.4 and 2.4 as shown. In trials 26 and 27, where the mast was in the cloud, gas was detected at a height 2.4 m as shown on page G05. The height shown on page G05 is therefore correct.

9 Trial 23

Pages E05 and E17 have been inverted. Although the page numbers are incorrect, the positional information on the plots is correct.

10 Trials 26 to 28

The key to the instrument list shows

BE = Building east side i.e. to right of axis

BW = Building west side i.e. to left of axis

This should be

BE = Building east side i.e. to left of axis

BW = Building west side i.e. to right of axis

I shall be pleased to answer any queries arising from the above changes.

B ROEBUCK
HGDT Project Manager
Health and Safety Executive
Safety Engineering Laboratory
Broad Lane, Sheffield S3 7HQ

Tel 0742 78141

HEALTH AND SAFETY EXECUTIVE

HEAVY GAS DISPERSION TRIALS
THORNEY ISLAND 1982-3

Data for Trial 015/I

Research and Laboratory Services Division
Red Hill, Sheffield S3 7HQ

Health & Safety Executive

Red Hill
Broad Lane
Sheffield S3 7HQ
Telephone 0742 78141
ext
Telex 668113

Telex No 54556

Your reference

Our reference

Date

COMMERCIAL IN CONFIDENCE

This report is issued to sponsors of the trials on a commercial in confidence basis and must not be released before 1 January 1984.

THORNEY ISLAND TRIALS SPILL 015 28 APRIL 1983

SUMMARY INFORMATION AT THE TIME OF THE SPILL

Gas released at:	15:27:00 hrs
Freon 12/Nitrogen mixture: relative density	1.41
Number of smoke canisters discharged:	4
Mean Wind Speed at 10 m height:	
During main data collection period:	5.4 m/s
From 5 minute cyclic data just before the release:	5.9 m/s
Mean Wind Heading ('A' station) (relative to the centre line of the array)	0.8°

NB Positive angles are to the right (clockwise) of the centre line when looking downwind of the gas bag.

Relative Humidity (at 10 m height)	88.4%
Insolation	645W/m^2
Ambient Air Temperature (at 9 m height)	10.3°C
Treated Runway Surface Temperature	16.9°C
Grass Surface Temperature	20.4°C
Observed Cloud Cover	2/8

STABILITY CONDITION

B/C (From Observations)
D (From DT/DZ)
C (From Solarimeter)
C (From Heat Flux)
A (From Richardson No)
D (From Bulk Richardson No)
E (From Standard Deviation of Wind Heading)

Stability condition inferred from data during the release and just before the release: C/D.

THORNEY ISLAND TRIALS SPILL 015 28 APRIL 1983

HISTORY

The day began with light winds (typically between 1 to 2 m/s) blowing slightly to the left of the centre line of the array of sensors (between 0 and -20 degrees). Insolation was slight. However, between 1100 and 1200 hours the wind speed increased significantly to values of between 4 and 5 m/s, but the wind direction remained more or less the same. During this period insolation also increased substantially and continued to increase until about 1400 hours when it attained its maximum value for the day of about 800 W/m^2. From this time onwards insolation decreased gradually so that by the time gas was released insolation was moderate (approximately 650 W/m^2). In the last few hours before the spill the wind speed fluctuated between 5 and 6 m/s and the heading varied between 0 and -20°. The ambient temperature also increased slowly during the day reaching a maximum (at 2 m) of about 11.5°C after having started the day at about 8°C (1000 hours). This was generally a slightly unstable day with the higher winds causing the stability to remain in the 'B' to 'C' category for most of the day; by the time of the release however the decrease in insolation caused the stability to be closer to a neutral condition, and may be represented by a C/D category.

THORNEY ISLAND HEAVY GAS DISPERSION TRIALS

Notes on information presented in the Summary Sheets

1 ATMOSPHERIC STABILITY

The atmospheric stability during the period of the experiment was obtained from the following methods:

i) Visual Observation

This is based on the amount of cloud cover, or the judged level of incoming solar radiation and the value of the wind speed (see attached table provided by the Meteorological Office).

ii) Temperature Difference (DT/DZ)

This method is one of the two suggested by the US Nuclear Regulatory Commission and in the present exercise was calculated as:

$$\frac{DT}{DZ} = \frac{T_{30} - T_9}{21} * 100.0$$

The NRC tables, see e.g. Sedefian and Bennett[1] or McQuaid[2] were then consulted to determine the appropriate stability.

iii) Solarimeter

The measured insolation, from the solarimeter, was used together with the wind speed to determine the stability based on the information presented in Pasquill[3] (Figure 6.13).

iv) Heat Flux

Heat flux (H) was calculated from the insolation (R) by the formula $H = 0.4(R-100)$ based on the suggestion by Smith[4]. Pasquill's[3], Figure 6.13 was then consulted to determine the stability. This method therefore agrees generally with the previous method.

v) Richardson Number

The Richardson number is calculated according to Sedefian and Bennett[1] as:

$$R_i = \frac{g(D\theta/DZ)}{T(DU/DZ)^2}$$

where θ is the potential temperature and T is the actual temperature; in this case, the temperature at 16 m above the ground. $D\theta/DZ$ was calculated as:

$$\frac{T_{30} - T_9}{21} + 0.00986$$

$\frac{DU}{DZ}$ was calculated as $\frac{U_{30} - U_{10}}{20}$

Sedefian and Bennett calculate the limits of Richardson number for the various stability categories, however the limits they presented were valid for measurements at heights whose geometric mean was 22 m. Since the measurement stations were at 30 m, 9 m and 16 m the limits of Richardson number for the various stability categories were recalculated to correspond to a geometric mean height of 16 m.

vi) Bulk Richardson Number

The bulk Richardson number was also calculated according to Sedefian and Bennett[1] as:

$$R_{i_\infty} = \frac{g(D\theta/DZ)\overline{Z}^2}{T\ \overline{U}^2}$$

where $\overline{Z}$ is the geometric mean height = $\sqrt{9 \times 30}$
T is the temperature at 16 m above the ground
and $\overline{U}$ is the mean wind speed at 30 m.

Here again the limits of R_{i_∞} were recalculated to correspond to a geometric mean height of 16 m.

vii) Standard Deviation of Wind Heading

The standard deviation of wind heading was calculated from the Porton wind vane, which has a resolution bandwidth of 11°. The resulting accuracy is predicted to be around $\pm 2°$ or so, assuming a Gaussian distribution of wind direction. These estimates were compared with the simple assumption that the standard deviation is approximately 1/6 (maximum-minimum angle).

The NRC limits for σ_θ are then used to determine the appropriate stability category.

2 WIND SPEED

Two values of wind speed are presented. The first is the mean value at the 10 m height for the first 10 minutes of the data collection period, which generally began about one minute before the gas bag was dropped.

The second wind speed is also a mean value obtained at the 10 m height, but corresponds to data taken over a five minute period just before main data collection began; data during this period is termed the 'cyclic' data.

REFERENCES

1 Sedefian L and Bennett E (1980) "A comparison of Turbulence classification schemes". Atmospheric Environment, Vol 14, No 7, pp 741-750.

2 McQuaid J (1981) "Climatological records from the Thorney Island mast". Commercial in Confidence HGDT Report 1981/6.

3 Pasquill F (1974) "Atmospheric Diffusion". 2nd Ed. Published by Ellis Horwood Ltd, Chichester.

4 Smith F B (1979) "The relation between Pasquill stability P and Kazanski-Monin stability (in neutral and unstable conditions). Atmospheric Environment, Vol 13, pp 879-881.

MODIFIED PASQUILL STABILITY CATEGORIES

Wind Speed (kt)	DAYTIME (excluding 1 hour after sunrise and 1 hour before sunset)				Within 1 hour before sunset or after sunrise	NIGHT-TIME		
	Incoming Solar Radiation ($W\ m^{-2}$)					Cloud Amount (oktas)		
	Strong (>600)	Mod (300-600)	Slt (<300)	Overcast		0-3	4-7	8
<3	A	A-B	B	C	D	F or G see note 2 below	F	D
4-5	A-B	B	C	C	D	F	E	D
6-9	B	B-C	C	C	D	E	D	D
10-12	C	C-D	D	D	D	D	D	D
≥12	C	D	D	D	D	D	D	D

Notes

1 Night was originally defined to include periods of one hour before sunset and after sunrise. These two hours are always categorised here as D.

2 Pasquill said that in light winds on clear nights the vertical spread may be less than for cateogry F but excluded such cases because the surface plume is unlikely to have any definable travel. However, they are important from the point of view of the build up of pollution and category G (night-time, 0 or 1 okta of cloud, wind speed 0 or 1 kt) has been added.

3 1 kt = 0.52 m/s.

KEY TO GRAPHS

1 AVERAGING TIME

Length of the time window over which mean values have been calculated for the purpose of the plots. Since the full record contains 20 samples per second, an averaging time of 0.6 seconds gives the arithmetic mean of 12 samples of the original signal. Note that it is not a running average but a 'box' window which is moved through the data in increments of the averaging time.

2 X:Y:Z

The location in metres of the sensor on the trials site. The (X,Y) axes are defined by the grid of fixed masts, the release point is at X = 400 metres, Y = 200 metres. The Z axis defines the height of the sensor on the mast at location (X, Y) - see mast array. Note that the axis is defined by measurement from the mast base and is not absolute in the sense that it takes no account of any slope of the trials site.

3 TYPE

Defines the type of sensor which generated the data shown in the plots.

GAS:	Standard oxygen deficiency sensor Frequency response 1 Hz (at - 3 dB point)
HGAS	High speed oxygen deficiency sensor Frequency response 10 Hz (at - 3 dB point)
SMOK	High speed light scattering smoke sensor Frequency response 10 Hz (at - 3 dB point)
WSPD:	Wind heading as indicated by wind vanes in degrees relative to the site axis. Positive values are to the right of the site axis (looking 'downwind' for the source) and negative values to the left.
AIRT:	Air temperature in degrees centigrade
SOLA:	Solar radiation as measured by solarimeter in watts/square metre.
BROM:	Barometric pressure measured in millibars.
TEMP:	Rapid response platinum resistance thermometer. Frequency response 10 Hz approximately.
UANA:	Velocity component A of tri-axial anemometers in the horizontal (X Y) plane.
UANB:	Velocity component B of tri-axial anemometer in the horizontal (X Y) plane.
UANW:	Velocity component W of tri-axial anemometer in the vertical (Z) direction.

UANT: Temperature, as measured by tri-axial anemometer with this facility.

RUN UP MEAN: The mean value of the appropriate sensor output averaged over the run up period i.e. in the period 4457 to 4157 seconds before the gas container release.

RUN DOWN MEAN: The mean value of the appropriate sensor output averaged over the run down period i.e. in the period 1136 to 1436 seconds after the gas container release.

4 GAS SENSORS

The readings of the GAS and HGAS sensors are in terms of the % concentration of the released gas mixture with an associated error band of either 10% of reading or as determined by calibration checks with a standard gas mixture. An estimate of the accuracy of each sensor for each test will be sent out separately. Note that the SMOK sensors have no absolute calibration in terms of gas concentration but have been included because of the potential high frequency information their outputs contain. An approximate calibration may be obtained by comparing their output to that of the nearest oxygen deficiency sensor.

5 SONIC ANEMOMETERS

Prints of the sonic anemometer outputs are included for completeness but it will be appreciated that analysis of records can only be performed using the data tapes. The three wind velocity components A, B and W can be transposed into components corresponding with the X, Y and Z coordinates of the mast array as follows:

$$X = \frac{1}{\sqrt{3}} (A - B)$$

$$Y = A + B$$

$$Z = W$$

RMS turbulence values measured at 10 m height on 'A' mast are given below. The values are non-dimensionalised i.e. original values have been divided by U_{10}, the mean wind speed at 10 m height during the main data collection period which was 5.013 m/s.

Turbulence intensity (U) = 10.5% (component in the wind direction)
Turbulence intensity (V) = 10.3% (crosswind component)
Turbulence intensity (W) = 9.3% (vertical component)

6 RUNNING MEANS

In order to assist analysis, a three minute running mean has been superimposed on all environmental records except the sonic anemometers. The points plotted represent the mean of 300 values (0.6 second averages) and are plotted at 0.6 second intervals.

NOTES ON VALIDATION OF GAS SENSOR DATA FOR TRIAL 015

1 The standard gas sensors at 0.4 and 2.4 metres on the mast at (500, 600) and at 6.4 metres on the mast at (450, 250) were functioning correctly but did not detect gas, implying a gas concentration of much less than 0.1% at these positions.

2 Plots obtained from standard gas sensors sited inside the gas container are included at pages GB1 to GB5. It should be noted that these sensors are intended to assist NMI Limited in determining the release conditions and do not form part of the dispersion field. Any interpretation of the output from these sensors should take account of the following:-

a) No validation of the gas bag sensor data has been carried out and no corrections have been made to take account of offset or drift before and after the release;

b) The sensors are mounted within the central gantry of the gas container which has horizontal platforms at various heights;

c) Sensors in the lower and central part of the gas container are always in 100% gas immediately before release;

d) The performance of the sensors is adversely affected by exposure to high concentrations (in the region of 30%) of Freon 12. Specifically, the presence of high concentrations of Freon 12 reduces the sensitivity of the electrochemical cells in the sensors to oxygen.

The cells recover in about four minutes and the effect is manifested by a zero undershoot and slow recovery after the gas has been released.

NOTES ON RAPID RESPONSE PLATINUM RESISTANCE THERMOMETERS FOR TRIAL 015

The rapid response platinum resistance thermometers at positions (400, 250, 2), (325, 275, 2) and (325, 275, 5) were not functioning correctly. The plots at pages E32, E41 and E46 should consequently be ignored.

M J LECK
Special Instruments & Techniques Section
Safety Engineering Laboratory
20 December 1983

INSTRUMENT STATIONS AND DISTRIBUTIONS (EFFECTIVE FOR TRIAL 015)

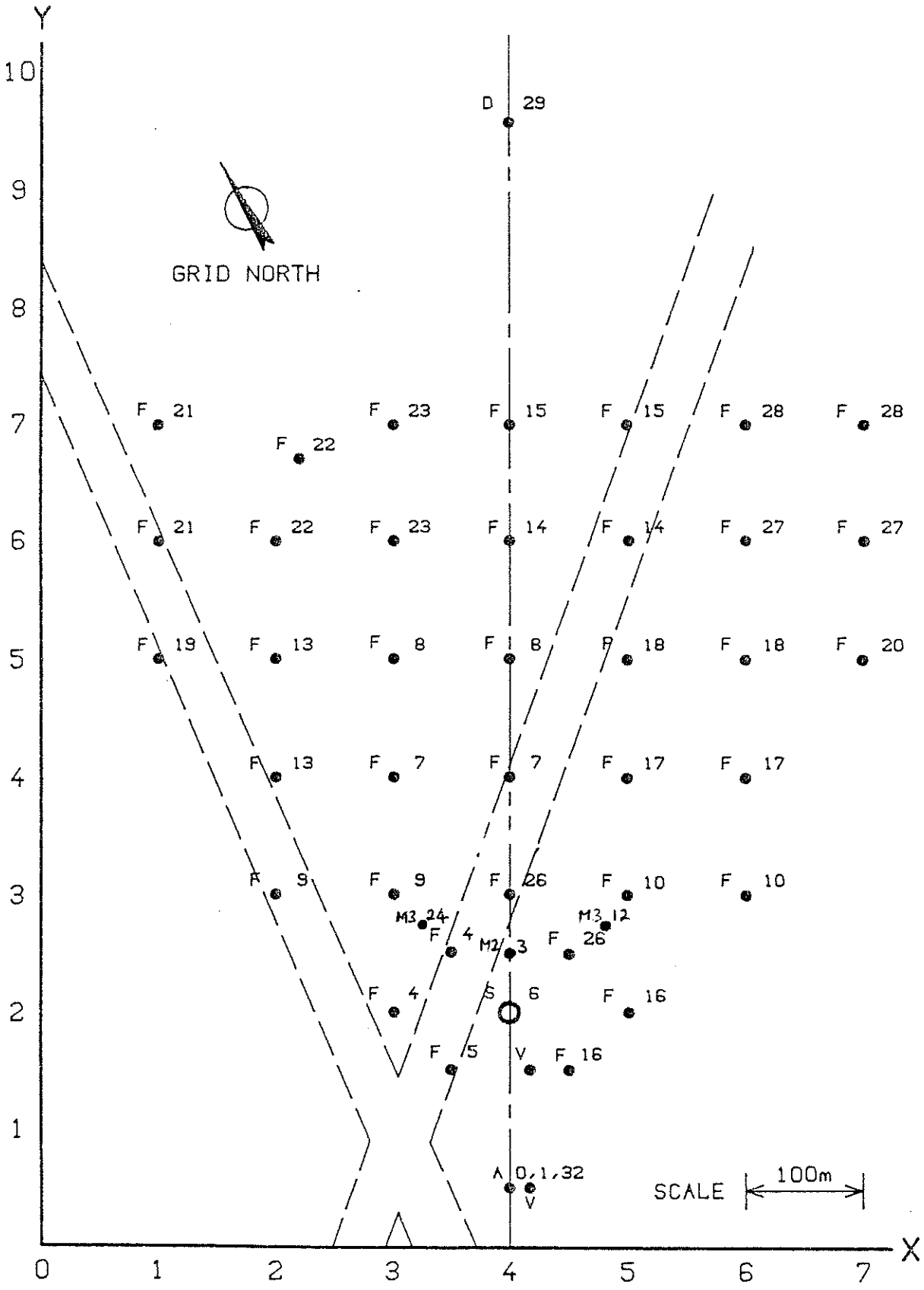
Note: The Location Coordinates are the X, Y coordinates in metres at 1/100 scale. The source is at (4.0, 2.0).
The table scans the layout by successive rows (i.e. at constant Y) of masts.

LOCATION COORDINATES	TYPE OF MAST	DATA TERMINAL NUMBER	CHANNEL NUMBER	HEIGHT ABOVE GROUND m	TYPE OF SENSOR	REMARKS	PAGE NUMBER
4.0, 0.5	A	32	5	0.4	Solarimeter		E01
		32	6	0.4	Barometric Pressure		E02
		0	0	2.0	Cup Anemometer		E03
		0	1	2.0	Thermometer		E04
		0	4	2.0	Sonic Anemometer - XY		E05
		0	5	2.0	Sonic Anemometer - XY		E06
		0	6	2.0	Sonic Anemometer - Z		E07
		0	7	2.0	Sonic Anemometer - Temp		E08
		0	2	4.5	Cup Anemometer		E09
		0	3	9.0	Thermometer		E10
		1	0	10.0	Cup Anemometer		E11
		32	0	10.0	Sonic Anemometer - XY		E12
		32	1	10.0	Sonic Anemometer - XY		E13
		32	2	10.0	Sonic Anemometer - Z		E14
		32	3	10.0	Sonic Anemometer - Temp		E15
		32	7	10.0	Relative Humidity		E16
		1	6	10.0	Wind Vane		E17
		1	1	16.0	Thermometer		E18
		1	2	17.3	Cup Anemometer		E19
		1	3	22.0	Thermometer		E20
		1	4	30.0	Cup Anemometer		E21
		1	5	30.0	Thermometer		E22
		32	4	30.0	Relative Humidity		E23
4.2, 0.5	V	1	7	10.0	Wind Vane		E24
3.5, 1.5	F	5	0	0.4	Gas Sensor		
		5	1	1.0	Gas Sensor		
		5	2	1.4	Gas Sensor		
		5	3	2.4	Gas Sensor		
4.0, 1.5	V	6	4	10.0	Wind Vane		E25
4.5, 1.5	F	16	0	0.4	Gas Sensor		
		16	1	1.0	Gas Sensor		
		16	2	1.4	Gas Sensor		
		16	3	2.4	Gas Sensor		
3.0, 2.0	F	4	0	0.4	Gas Sensor		
		4	1	1.0	Gas Sensor		
		4	2	1.4	Gas Sensor		
		4	3	2.4	Gas Sensor		
4.0, 2.0	S	6	0	0.4	Thermometer		E26
		6	1	0.4	Gas Sensor		
		6	2	12.0	Thermometer		E27
		6	3	12.0	Gas Sensor		
		34	0	4.5	Gas Sensor		
		34	1	9.0	Gas Sensor		
		34	2	13.5	Gas Sensor		
5.0, 2.0	F	16	4	0.4	Gas Sensor		
		16	5	1.0	Gas Sensor		
		16	6	1.4	Gas Sensor		
		16	7	2.4	Gas Sensor		
3.5, 2.5	F	4	4	0.4	Gas Sensor		
		4	5	2.4	Gas Sensor		
		4	6	4.4	Gas Sensor		
		4	7	6.4	Gas Sensor		
4.0, 2.5	M2	3	0	0.4	Gas Sensor		G01
		3	5	2.0	High Speed Gas Sensor		G02
		2	0	2.0	Sonic Anemometer - XY		E28
		2	1	2.0	Sonic Anemometer - XY		E29
		2	2	2.0	Sonic Anemometer - Z		E30
		2	3	2.0	Sonic Anemometer - Temp		E31
		3	4	2.0	Thermometer		E32
		3	1	2.4	Gas Sensor		G03
		3	2	4.4	Gas Sensor		G04
		3	3	6.4	Gas Sensor		G05
		2	4	15.0	Sonic Anemometer - XY		E33
		2	5	15.0	Sonic Anemometer - XY		E34
		2	6	15.0	Sonic Anemometer - Z		E35
		2	7	15.0	Sonic Anemometer - Temp		E36
4.5, 2.5	F	26	0	0.4	Gas Sensor		G06
		26	1	2.4	Gas Sensor		G07
		26	2	4.4	Gas Sensor		G08
		26	3	6.4	Gas Sensor		

LOCATION COORDINATES	TYPE OF MAST	DATA TERMINAL NUMBER	CHANNEL NUMBER	HEIGHT ABOVE GROUND m	TYPE OF SENSOR	REMARKS	PAGE NUMBER
3.25, 2.75	ME	24	0	0.4	Gas Sensor		
		31	0	2.0	High Speed Gas Sensor		
		25	0	2.0	Sonic Anemometer - XY		E37
		25	1	2.0	Sonic Anemometer - XY		E38
		25	2	2.0	Sonic Anemometer - Z		E39
		25	3	2.0	Sonic Anemometer - Temp		E40
		31	2	2.0	Thermometer		E41
		24	1	2.4	Gas Sensor		
		24	2	4.4	Gas Sensor		
		31	1	5.0	High Speed Gas Sensor		
		25	4	5.0	Sonic Anemometer - XY		E42
		25	5	5.0	Sonic Anemometer - XY		E43
		25	6	5.0	Sonic Anemometer - Z		E44
		25	7	5.0	Sonic Anemometer - Temp		E45
		31	3	5.0	Thermometer		E46
		24	4	14.5	Sonic Anemometer - XY		E47
		24	5	14.5	Sonic Anemometer - XY		E48
		24	6	14.5	Sonic Anemometer - Z		E49
		24	7	14.5	Sonic Anemometer - Temp		E50
4.75, 2.75	ME	12	0	0.4	Gas Sensor		
		12	5	2.0	High Speed Gas Sensor		
		33	0	2.0	Sonic Anemometer - XY		E51
		33	1	2.0	Sonic Anemometer - XY		E52
		33	2	2.0	Sonic Anemometer - Z		E53
		33	3	2.0	Sonic Anemometer - Temp		E54
		12	4	2.0	Thermometer		E55
		12	1	2.4	Gas Sensor		
		12	2	4.4	Gas Sensor		
		11	0	5.0	Sonic Anemometer - XY		E56
		11	1	5.0	Sonic Anemometer - XY		E57
		11	2	5.0	Sonic Anemometer - Z		E58
		11	3	5.0	Sonic Anemometer - Temp		E59
		11	7	5.0	Thermometer		E60
		12	3	6.4	Gas Sensor		
		11	4	14.5	Sonic Anemometer - XY		E61
		11	5	14.5	Sonic Anemometer - XY		E62
		11	6	14.5	Sonic Anemometer - Z		E63
2.0, 3.0	F	9	0	0.4	Gas Sensor		
		9	1	2.4	Gas Sensor		
		9	2	4.4	Gas Sensor		
		9	3	6.4	Gas Sensor		
3.0, 3.0	F	9	4	0.4	Gas Sensor		
		9	5	2.4	Gas Sensor		
		9	6	4.4	Gas Sensor		
		9	7	6.4	Gas Sensor		
4.0, 3.0	F	26	4	0.4	Gas Sensor		G09
		26	5	2.4	Gas Sensor		G10
		26	6	4.4	Gas Sensor		G11
		26	7	6.4	Gas Sensor		G12
5.0, 3.0	F	10	0	0.4	Gas Sensor		
		10	1	2.4	Gas Sensor		
		10	2	4.4	Gas Sensor		
		10	3	6.4	Gas Sensor		
6.0, 3.0	F	10	4	0.4	Gas Sensor		
		10	5	2.4	Gas Sensor		
		10	6	4.4	Gas Sensor		
		10	7	6.4	Gas Sensor		
2.0, 4.0	F	13	0	0.4	Gas Sensor		
		13	1	2.4	Gas Sensor		
		13	2	4.4	Gas Sensor		
		13	3	6.4	Gas Sensor		
3.0, 4.0	F	7	0	0.4	Gas Sensor		
		7	1	2.4	Gas Sensor		
		7	2	4.4	Gas Sensor		
		7	3	6.4	Gas Sensor		
4.0, 4.0	F	7	4	0.4	Gas Sensor		G13
		7	5	2.4	Gas Sensor		G14
		7	6	4.4	Gas Sensor		G15
		7	7	6.4	Gas Sensor		G16
5.0, 4.0	F	17	0	0.4	Gas Sensor		
		17	1	2.4	Gas Sensor		
		17	2	4.4	Gas Sensor		
		17	3	6.4	Gas Sensor		
6.0, 4.0	F	17	4	0.4	Gas Sensor		
		17	5	2.4	Gas Sensor		
		17	6	4.4	Gas Sensor		
		17	7	6.4	Gas Sensor		

LOCATION COORDINATES	TYPE OF MAST	DATA TERMINAL NUMBER	CHANNEL NUMBER	HEIGHT ABOVE GROUND m	TYPE OF SENSOR	REMARKS	PAGE NUMBER
1.0, 5.0	F	19	0	0.4	Gas Sensor		
		19	1	2.4	Gas Sensor		
		19	2	4.4	Gas Sensor		
		19	3	6.4	Gas Sensor		
2.0, 5.0	F	13	4	0.4	Gas Sensor		
		13	5	2.4	Gas Sensor		
		13	6	4.4	Gas Sensor		
		13	7	6.4	Gas Sensor		
3.0, 5.0	F	8	0	0.4	Gas Sensor		
		8	1	2.4	Gas Sensor		
		8	2	4.4	Gas Sensor		
		8	3	6.4	Gas Sensor		
4.0, 5.0	F	8	4	0.4	Gas Sensor		G17
		8	5	2.4	Gas Sensor		G18
		8	6	4.4	Gas Sensor		G19
		8	7	6.4	Gas Sensor		G20
5.0, 5.0	F	18	0	0.4	Gas Sensor		
		18	1	2.4	Gas Sensor		
		18	2	4.4	Gas Sensor		
		18	3	6.4	Gas Sensor		
6.0, 5.0	F	18	4	0.4	Gas Sensor		
		18	5	2.4	Gas Sensor		
		18	6	4.4	Gas Sensor		
		18	7	6.4	Gas Sensor		
7.0, 5.0	F	20	4	0.4	Solarimeter		E64
		20	0	0.4	Gas Sensor		
		20	1	2.4	Gas Sensor		
		20	2	4.4	Gas Sensor		
		20	3	6.4	Gas Sensor		
1.0, 6.0	F	21	0	0.4	Gas Sensor		
		21	1	2.4	Gas Sensor		
		21	2	4.4	Gas Sensor		
		21	3	6.4	Gas Sensor		
2.0, 6.0	F	22	0	0.4	Gas Sensor		
		22	1	2.4	Gas Sensor		
		22	2	4.4	Gas Sensor		
		22	3	6.4	Gas Sensor		
3.0, 6.0	F	23	0	0.4	Gas Sensor		
		23	1	2.4	Gas Sensor		
		23	2	4.4	Gas Sensor		
		23	3	6.4	Gas Sensor		
4.0, 6.0	F	14	0	0.4	Gas Sensor		G21
		14	1	2.4	Gas Sensor		G22
		14	2	4.4	Gas Sensor		G23
		14	3	6.4	Gas Sensor		G24
5.0, 6.0	F	14	4	0.4	Gas Sensor		
		14	5	2.4	Gas Sensor		
		14	6	4.4	Gas Sensor		G25
		14	7	6.4	Gas Sensor		G26
6.0, 6.0	F	27	0	0.4	Gas Sensor		
		27	1	2.4	Gas Sensor		
		27	2	4.4	Gas Sensor		
		27	3	6.4	Gas Sensor		
7.0, 6.0	F	27	4	0.4	Gas Sensor		
		27	5	2.4	Gas Sensor		
		27	6	4.4	Gas Sensor		
		27	7	6.4	Gas Sensor		
1.0, 7.0	F	21	4	0.4	Gas Sensor		
		21	5	2.4	Gas Sensor		
		21	6	4.4	Gas Sensor		
		21	7	6.4	Gas Sensor		
2.2, 6.7	F	22	4	0.4	Gas Sensor		
		22	5	2.4	Gas Sensor		
		22	6	4.4	Gas Sensor		
		22	7	6.4	Gas Sensor		
3.0, 7.0	F	23	4	0.4	Gas Sensor		
		23	5	2.4	Gas Sensor		
		23	6	4.4	Gas Sensor		
		23	7	6.4	Gas Sensor		
4.0, 7.0	F	15	0	0.4	Gas Sensor		G27
		15	1	2.4	Gas Sensor		G28
		15	2	4.4	Gas Sensor		G29
		15	3	6.4	Gas Sensor		G30

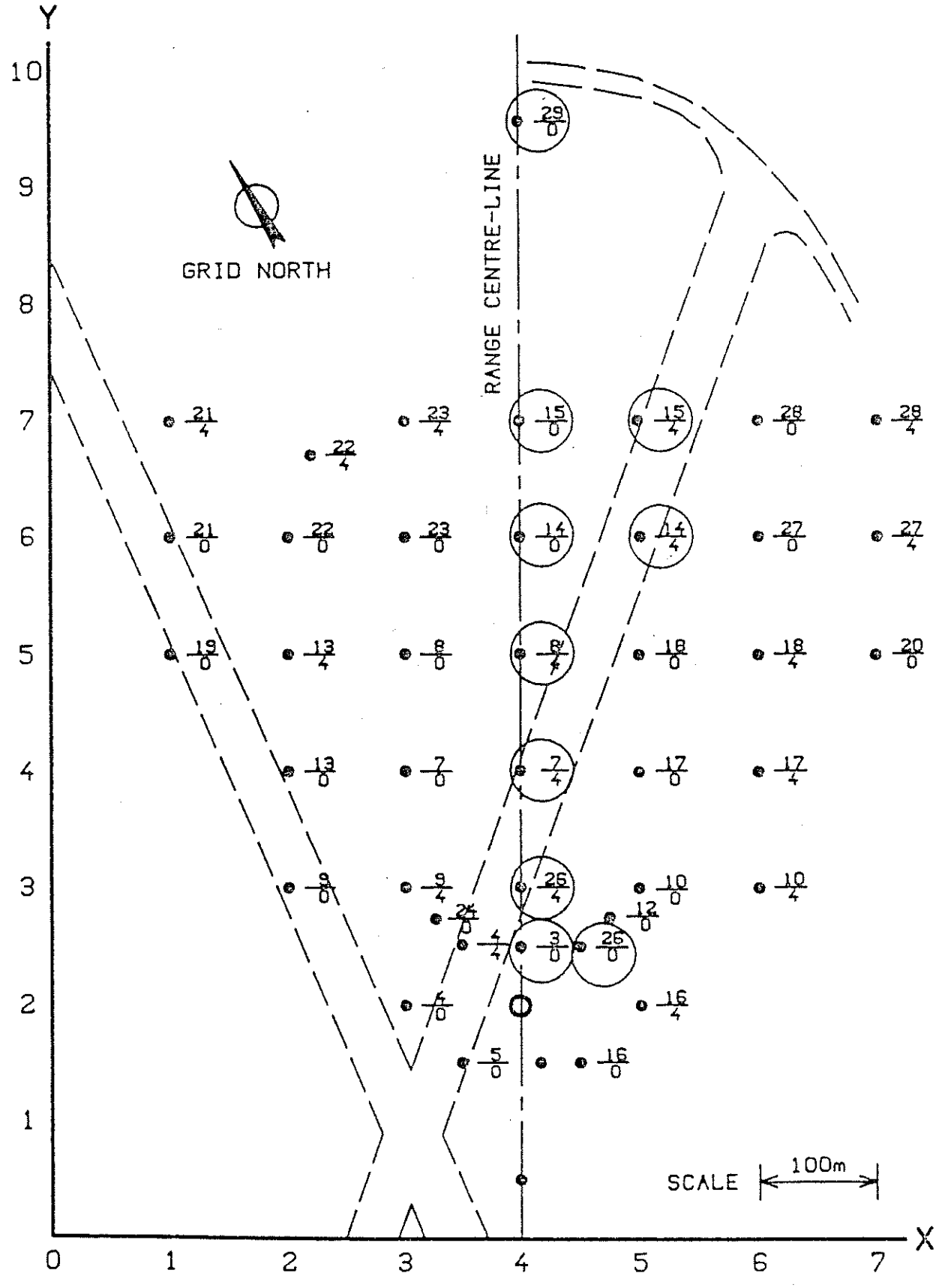
LOCATION COORDINATES	TYPE OF MAST	DATA TERMINAL NUMBER	CHANNEL NUMBER	HEIGHT ABOVE GROUND m	TYPE OF SENSOR	REMARKS	PAGE NUMBER
5.0, 7.0	F	15	4	0.4	Gas Sensor		G31
		15	5	2.4	Gas Sensor		G32
		15	6	4.4	Gas Sensor		G33
		15	7	6.4	Gas Sensor		G34
6.0, 7.0	F	28	0	0.4	Gas Sensor		
		28	1	2.4	Gas Sensor		
		28	2	4.4	Gas Sensor		
		28	3	6.4	Gas Sensor		
7.0, 7.0	F	28	4	0.4	Gas Sensor		
		28	5	2.4	Gas Sensor		
		28	6	4.4	Gas Sensor		
		28	7	6.4	Gas Sensor		
4.0, 9.5	D	29	0	0.4	Gas Sensor		G35
		29	1	2.4	Gas Sensor		G36
		29	2	4.4	Gas Sensor		G37
		29	3	6.4	Gas Sensor		G38
		29	4	10.0	Wind Speed		E65
		29	5	10.0	Relative Humidity		E66
		29	6	10.0	Thermometer		E67
		29	7	10.0	Wind Vane		E68



LAYOUT OF MASTS
ALPHABETIC CODE = MAST TYPE
NUMERIC CODE = DATA TERMINAL NUMBER

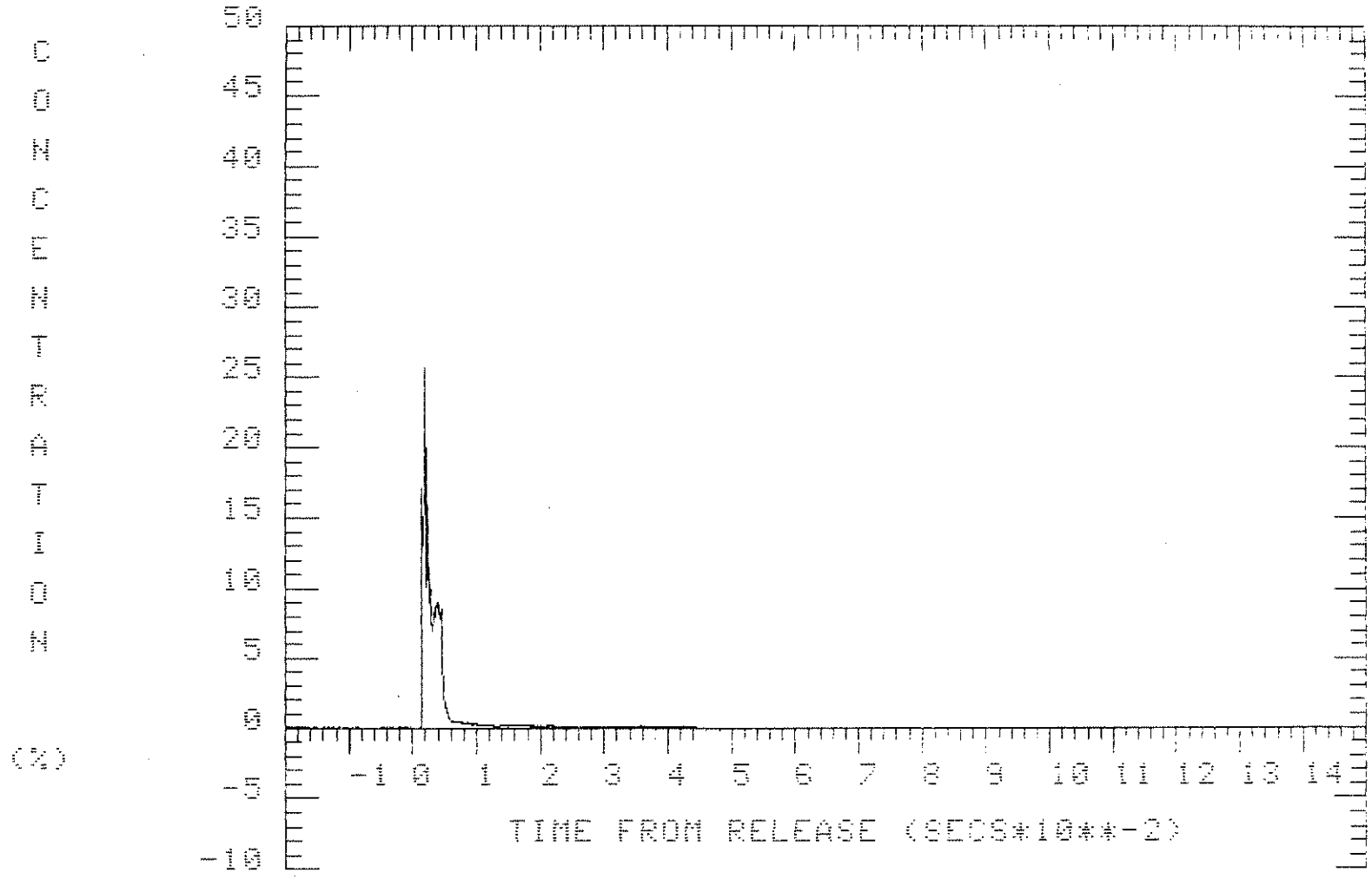
TRIAL No. - 015 DATE 28/4/83 38 SENSORS SAW GAS

WIND SPEED (U_{10}) 5-6 m/sec PASQUILL CATEGORY D/E



$\frac{21}{4}$ = $\frac{\text{DATA TERMINAL}}{\text{CHANNEL NUMBER}}$ OF GAS SENSORS AT 0.4m HEIGHT

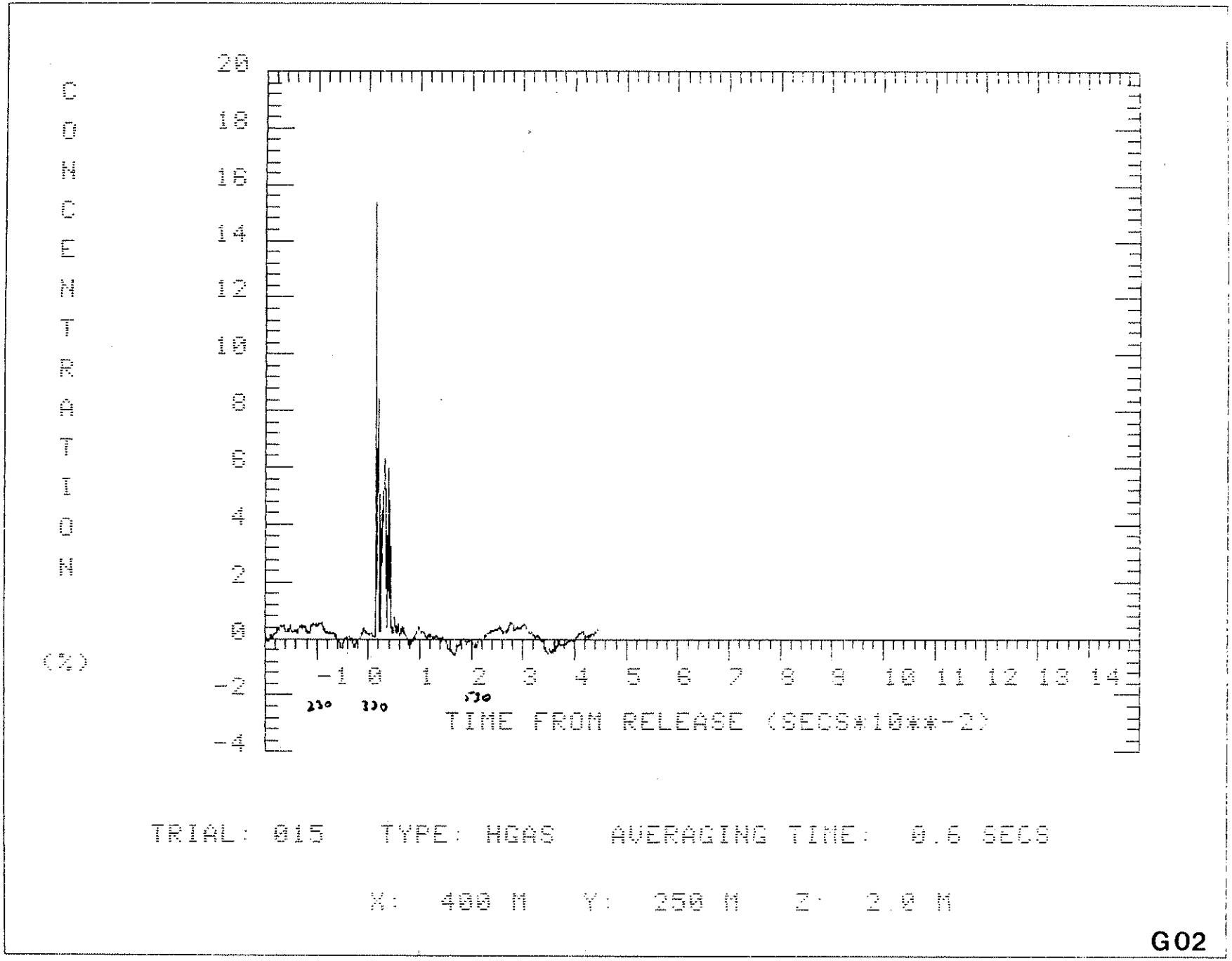
○ = SENSORS AT 0.1m HEIGHT VERIFIED TO HAVE SEEN GAS



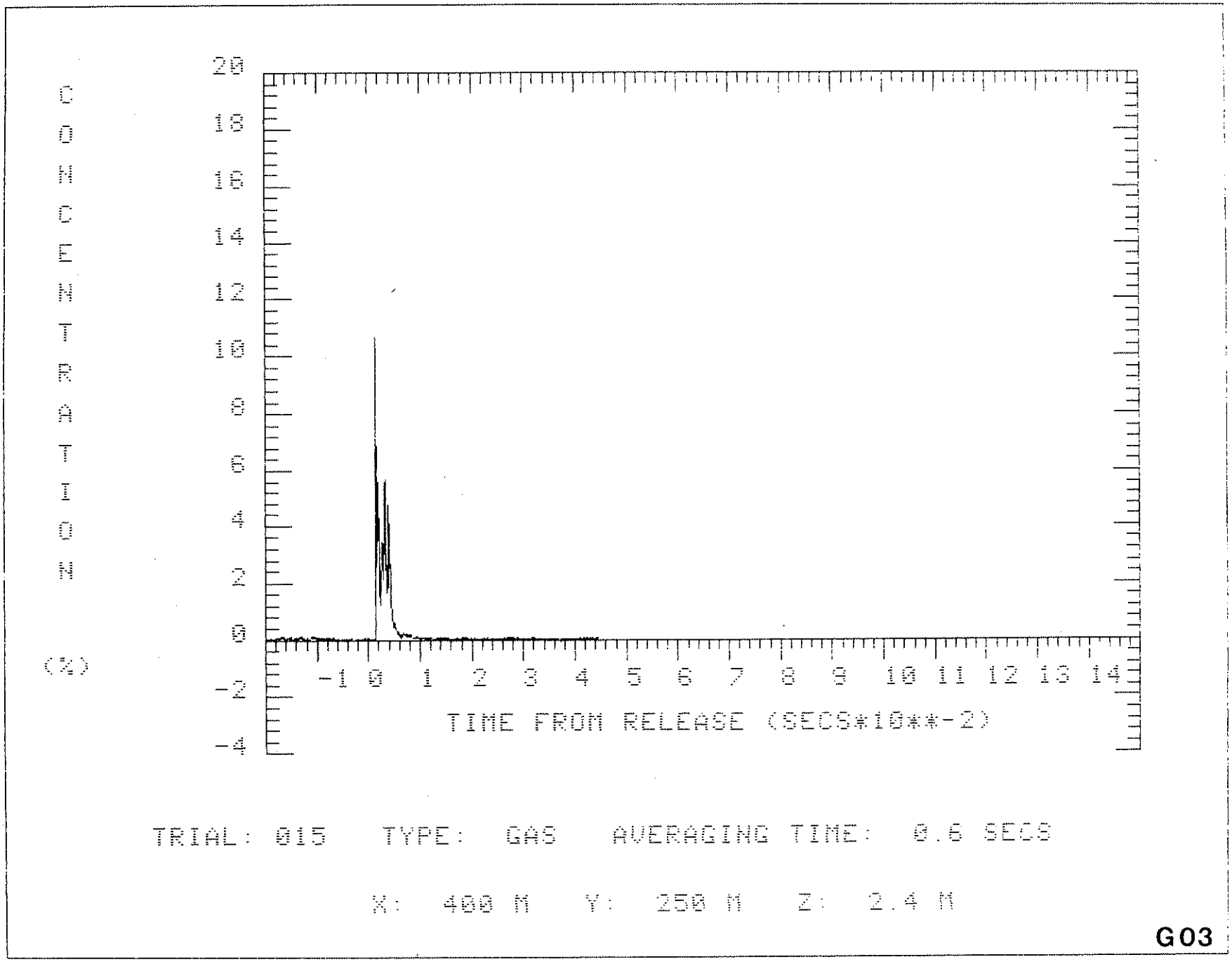
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.8 SECS

X: 400 M Y: 250 M Z: 0.4 M

G 01


CONCENTRATION
(%)
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: HGAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 250 M Z: 2.0 M

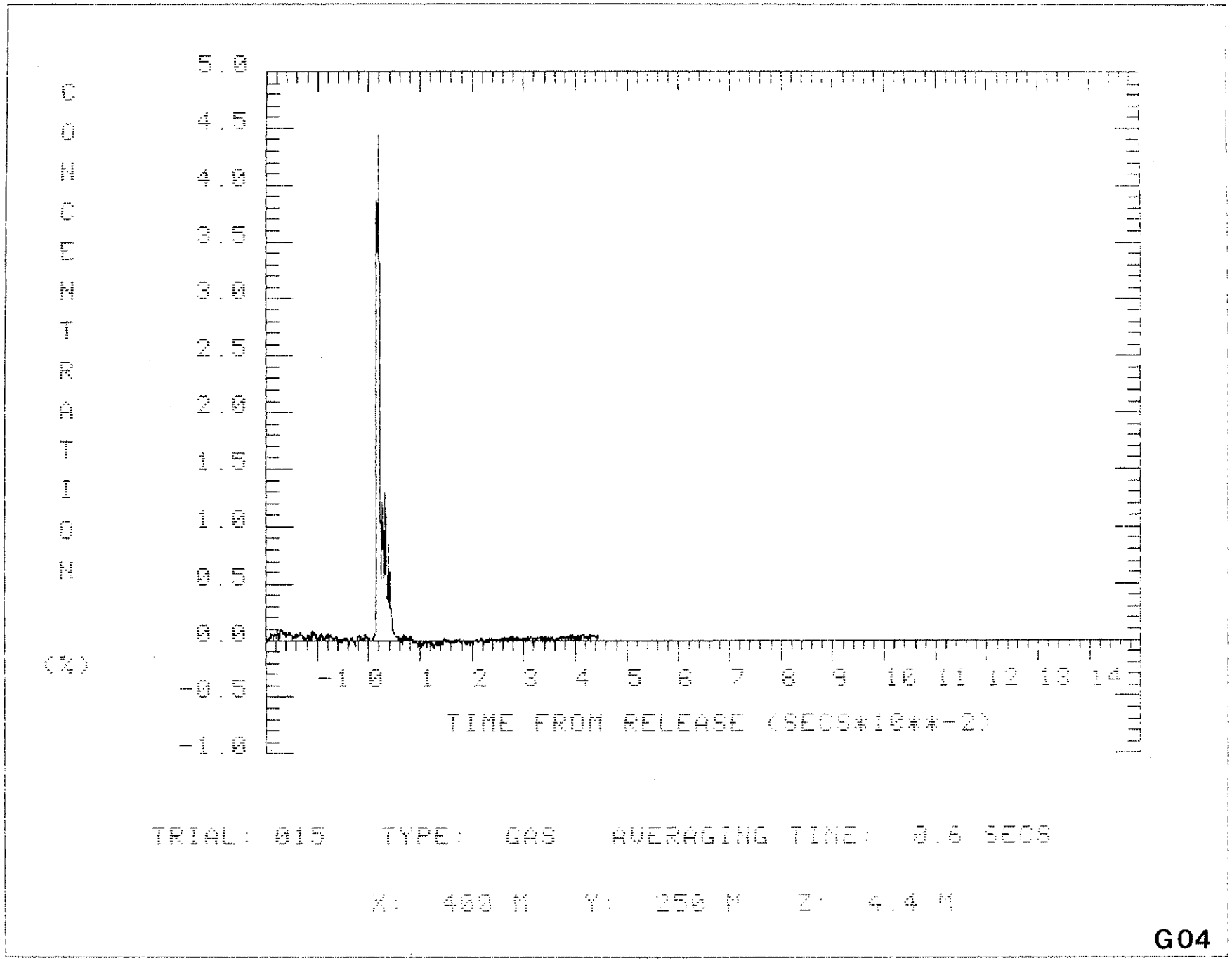
G02

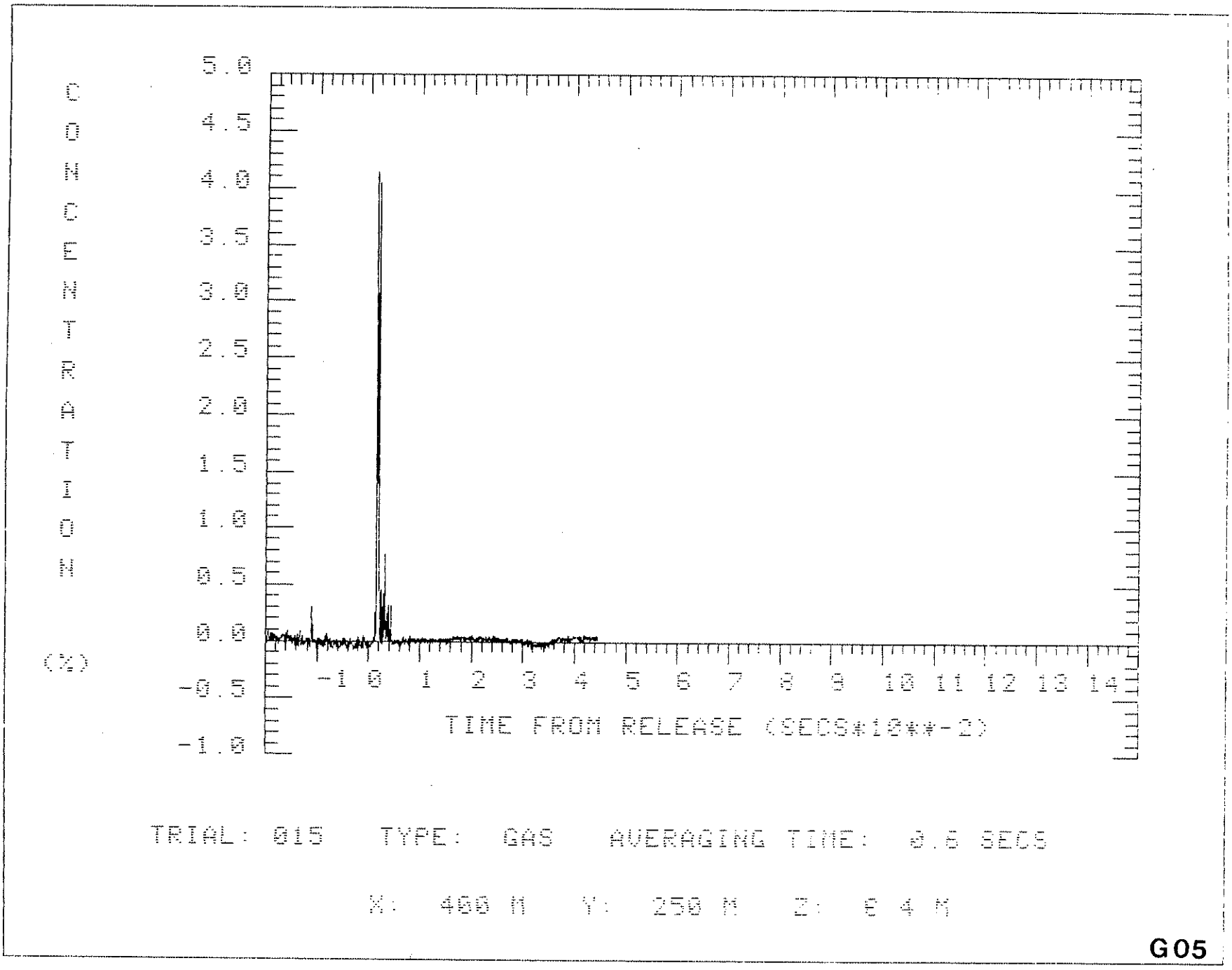


TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS

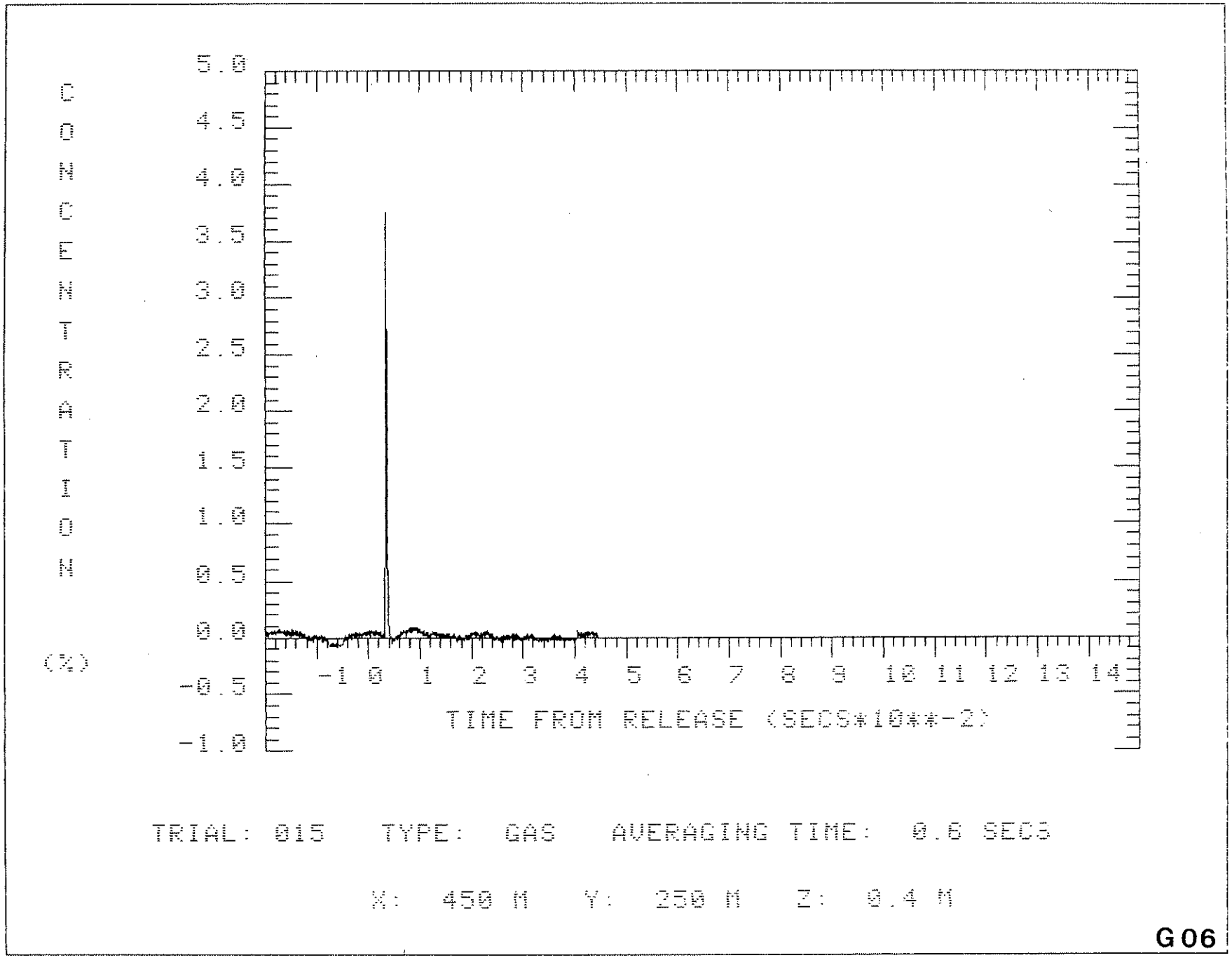
X: 400 M Y: 250 M Z: 2.4 M

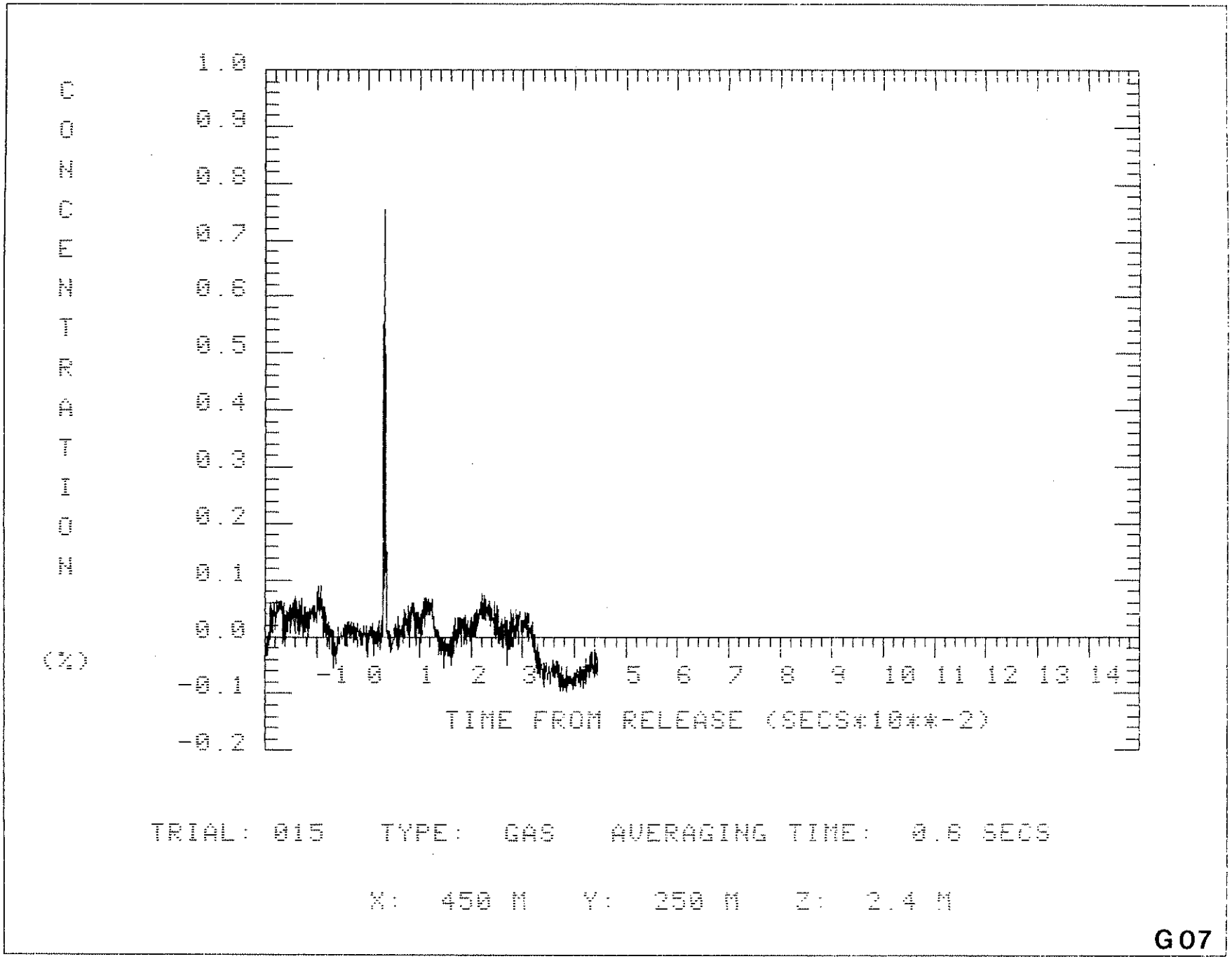
G03

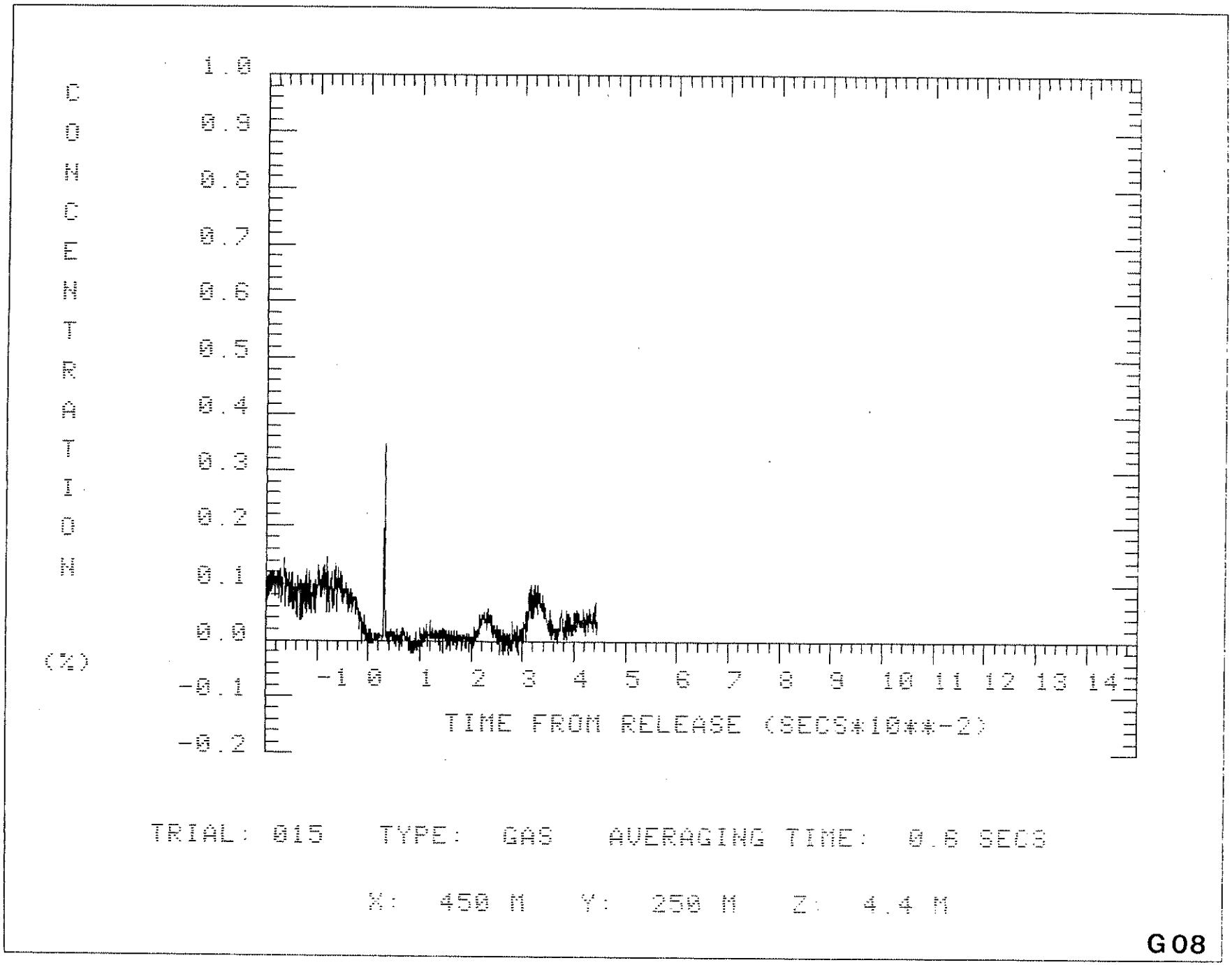

CONCENTRATION
(%)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 250 M Z: 4.4 M
G04


CONCENTRATION
(%)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.5 SECS
X: 400 M Y: 250 M Z: 0 4 M

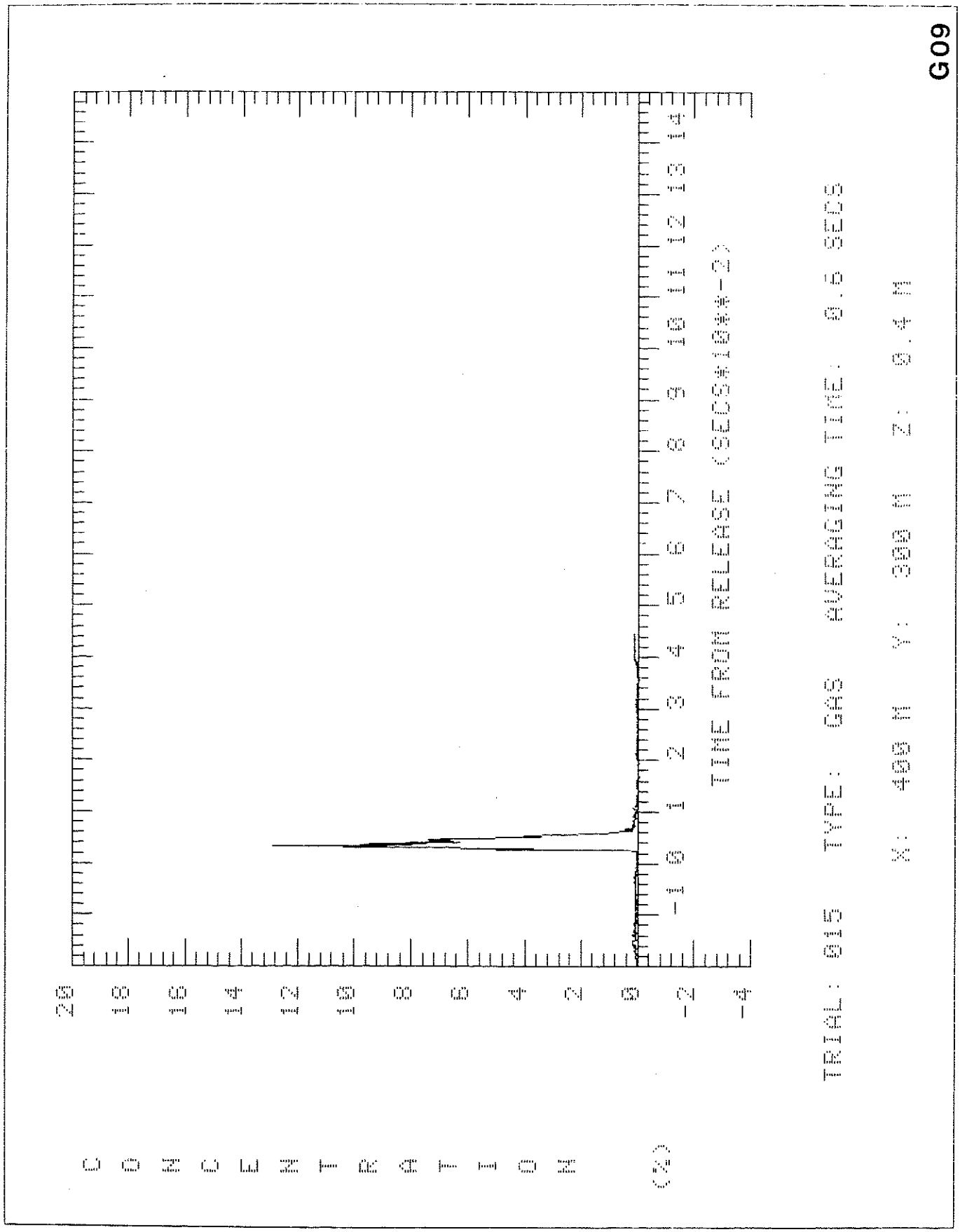
G05


CONCENTRATION (%)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 450 M Y: 250 M Z: 0.4 M
G06

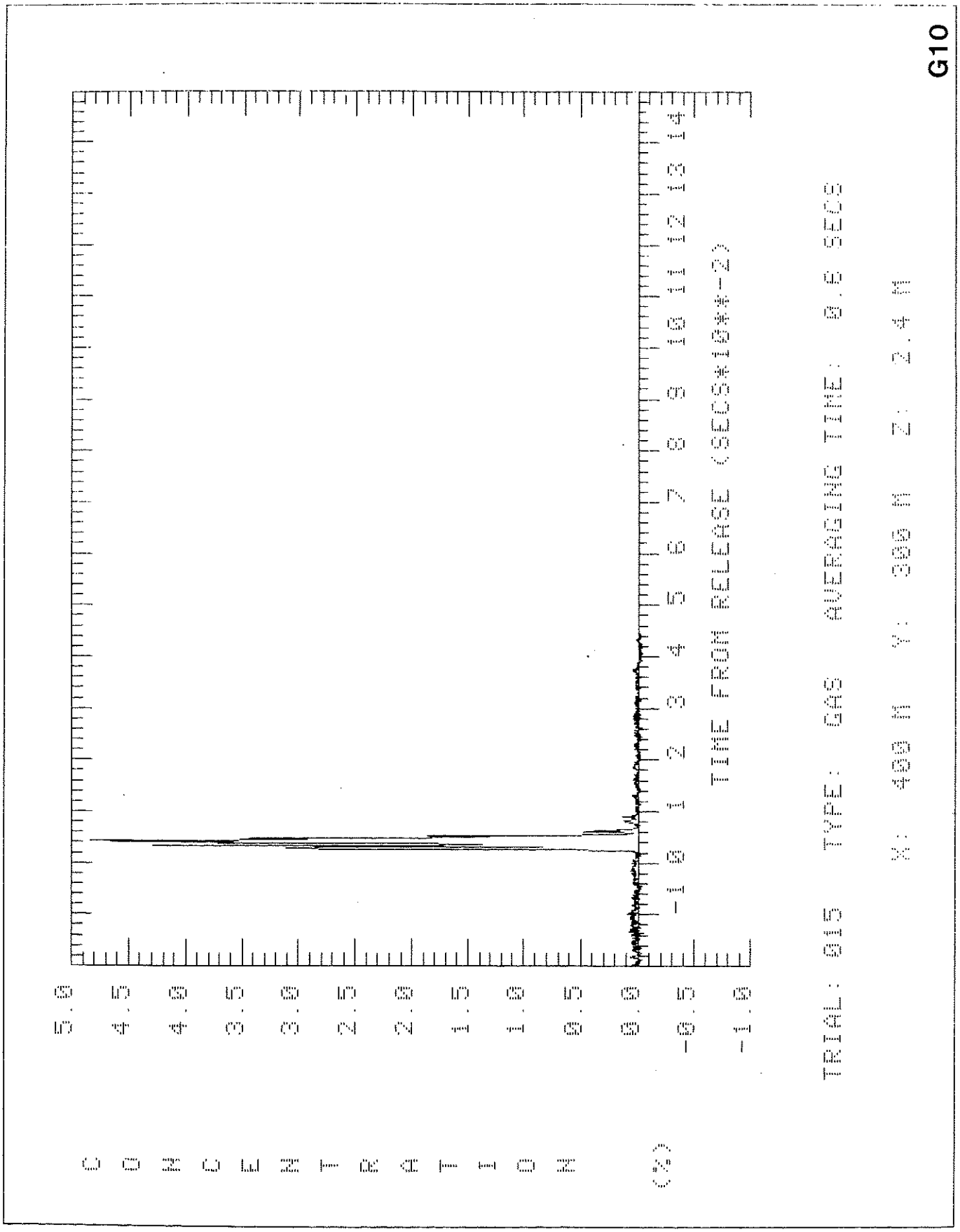

CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 450 M Y: 250 M Z: 2.4 M
G07


CONCENTRATION (%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.8 SECS
X: 450 M Y: 250 M Z: 4.4 M
G08

C_{max} = 12·88

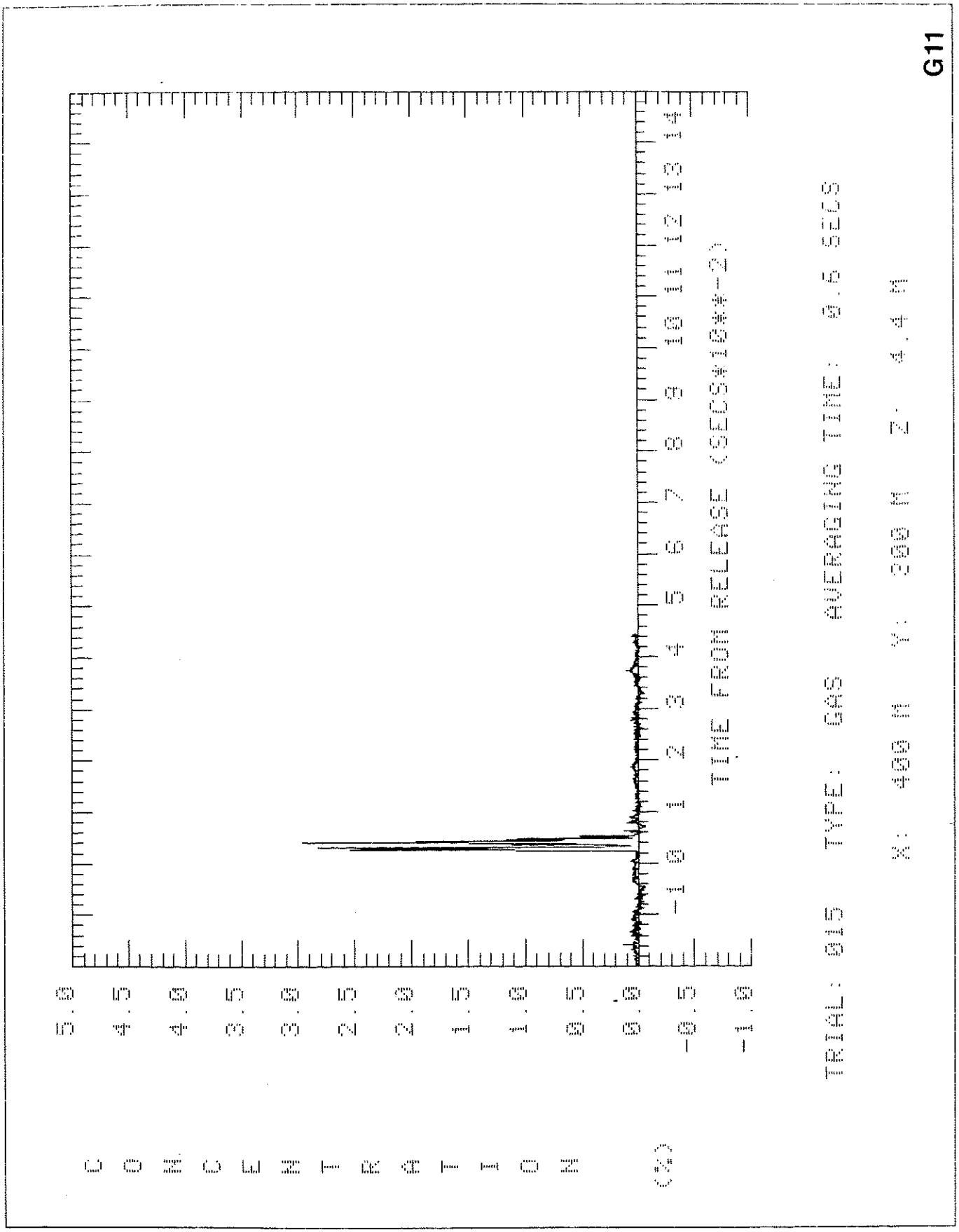

G09
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.5 SECS
X: 400 M Y: 300 M Z: 0.4 M
TIME FROM RELEASE (SECS*10**-2)
CONCENTRATION (%)

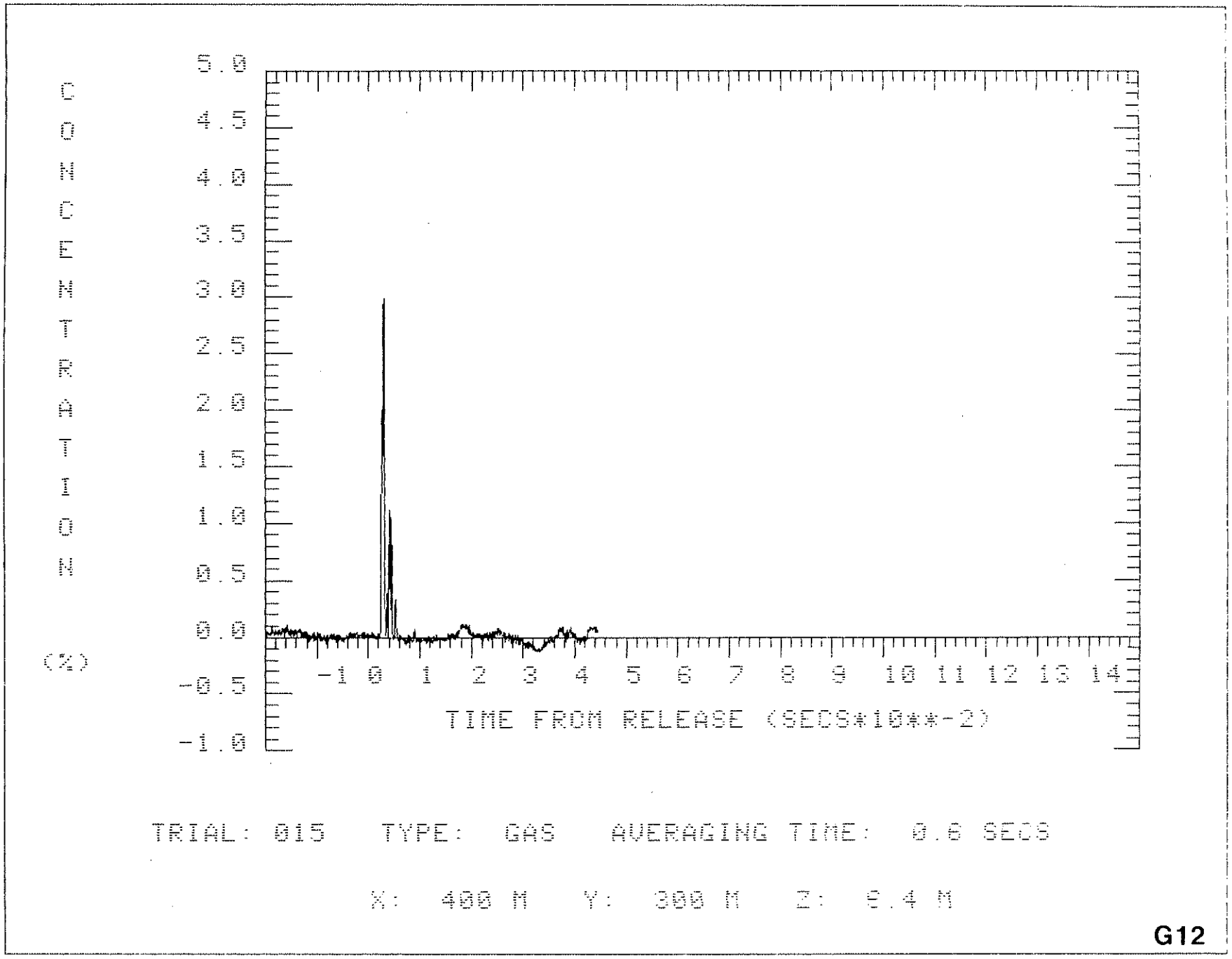
$C_{decay} = 4.827$

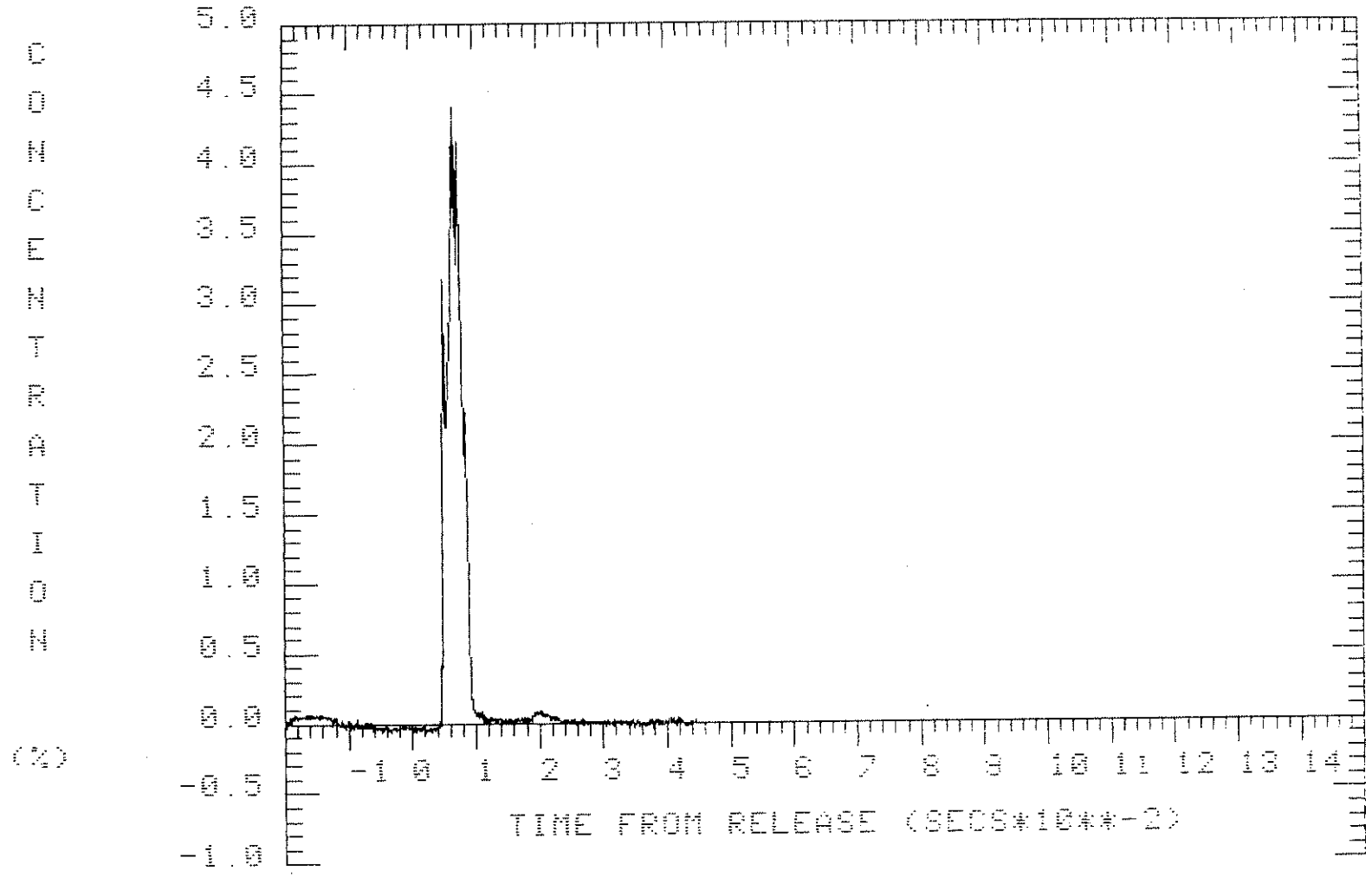

G10
TRIAL: 915 TYPE: GAS AVERAGING TIME: 8.8 SECS
X: 498 M Y: 985 M Z: 2.4 M
TIME FROM RELEASE (SECS*10**-2)
CONCENTRATION (%)

24/6

C_{max} = 2.946



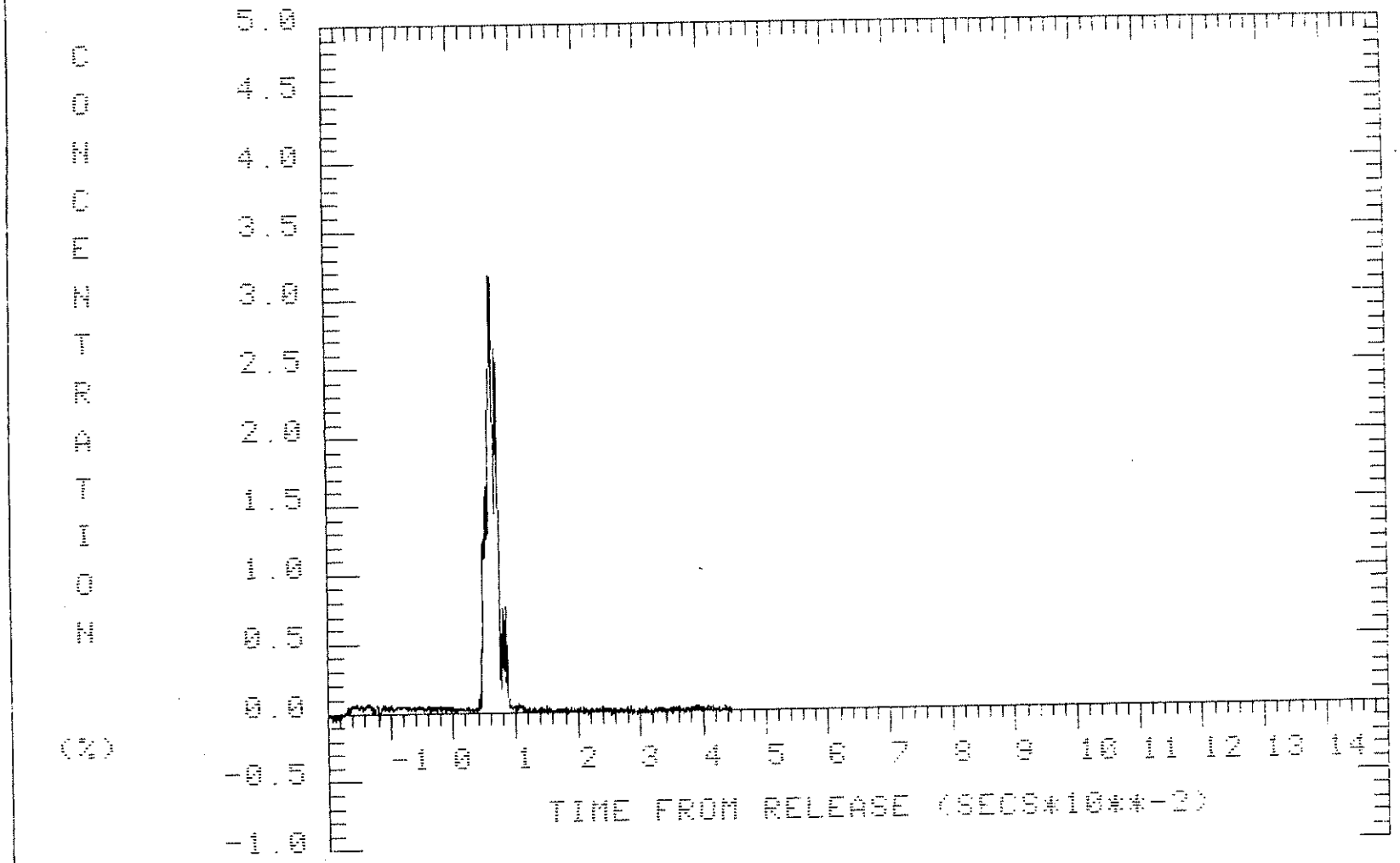

CONCENTRATION (%)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 300 M Z: 0.4 M
G12



TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS

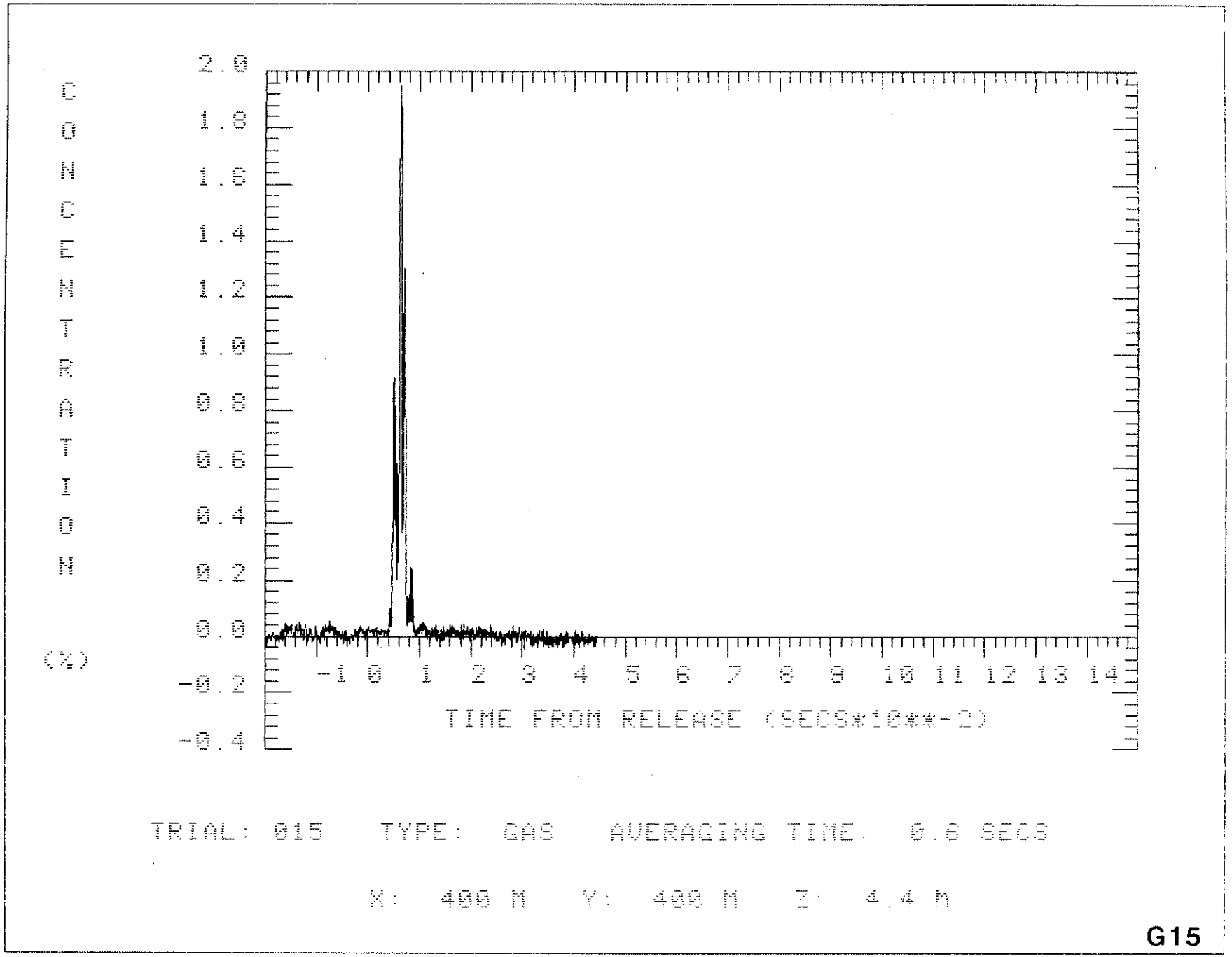
X: 400 M Y: 400 M Z: 0.4 M

G13

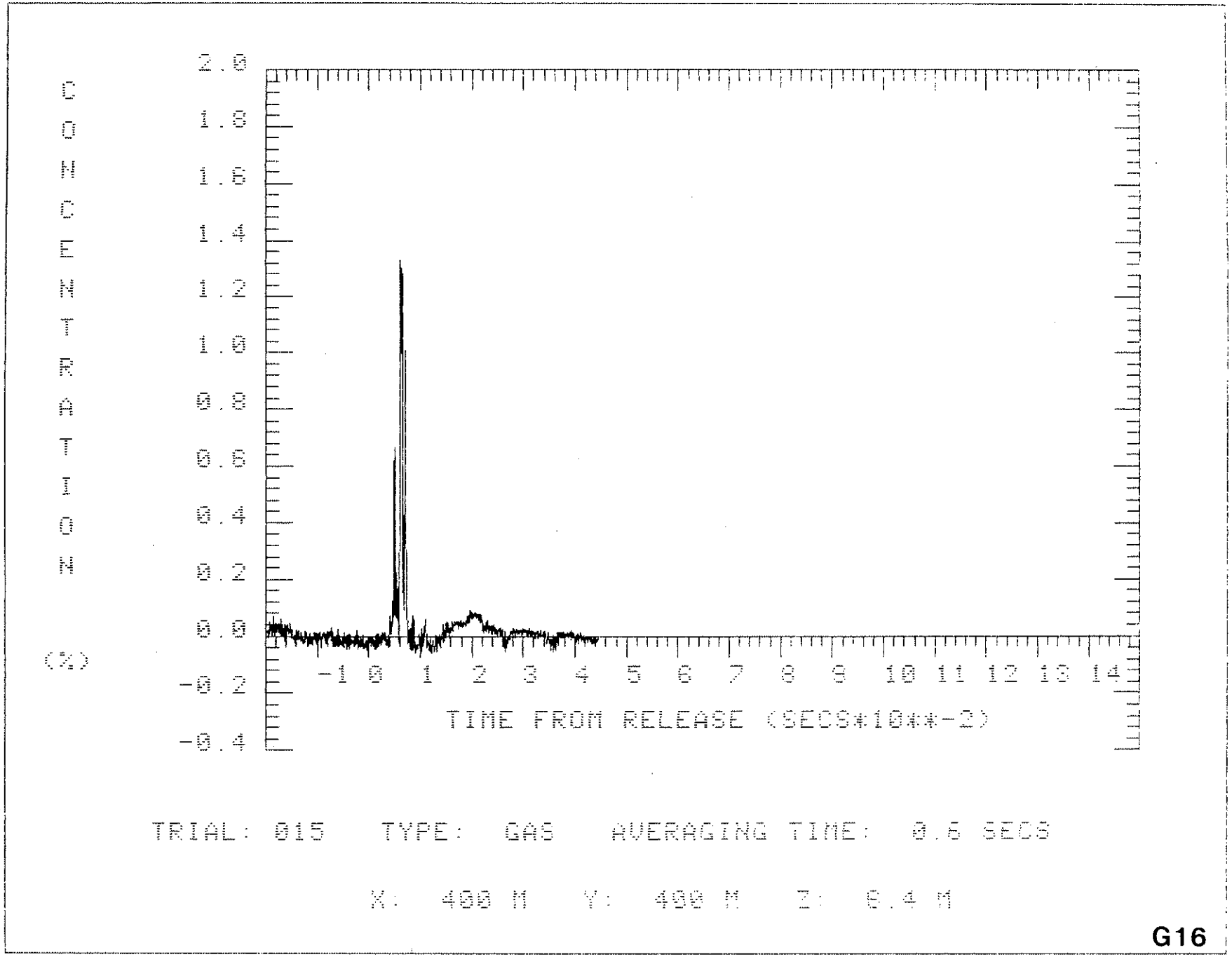


TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.5 SECS

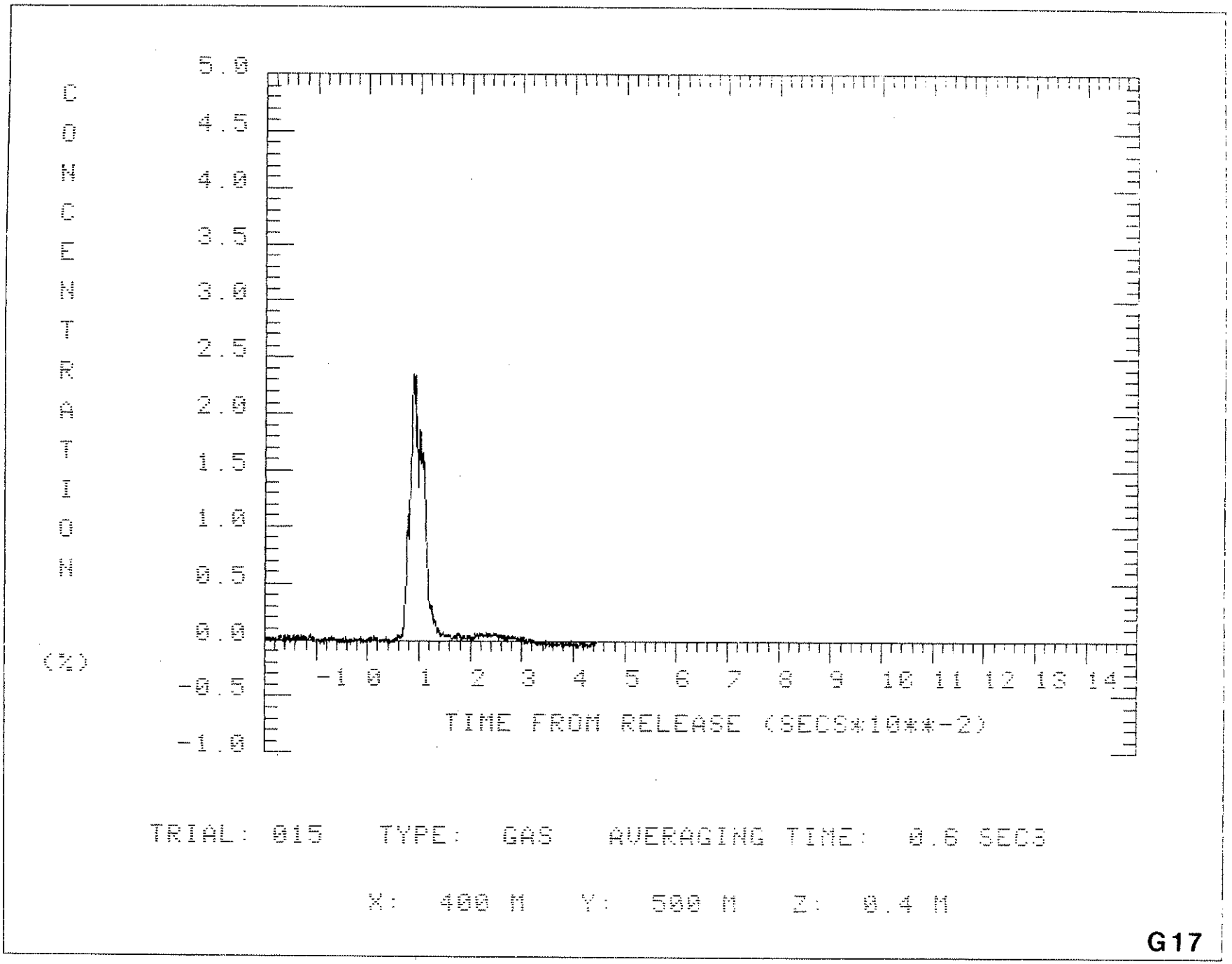
X: 400 M Y: 400 M Z: 2.4 M

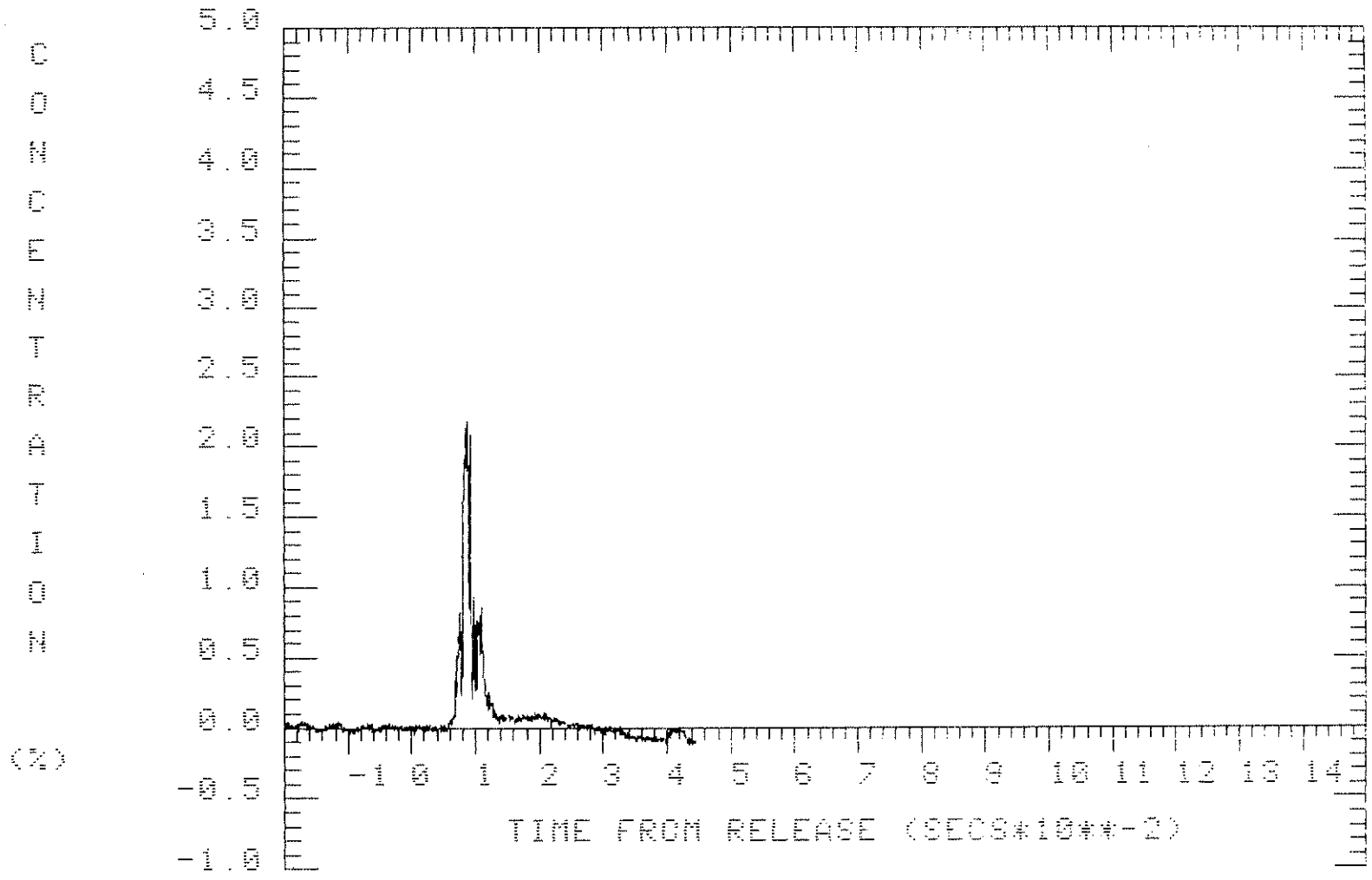

CONCENTRATION
(%)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 400 M Z: 4.4 M

G15


CONCENTRATION (%)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 400 M Z: 0.4 M

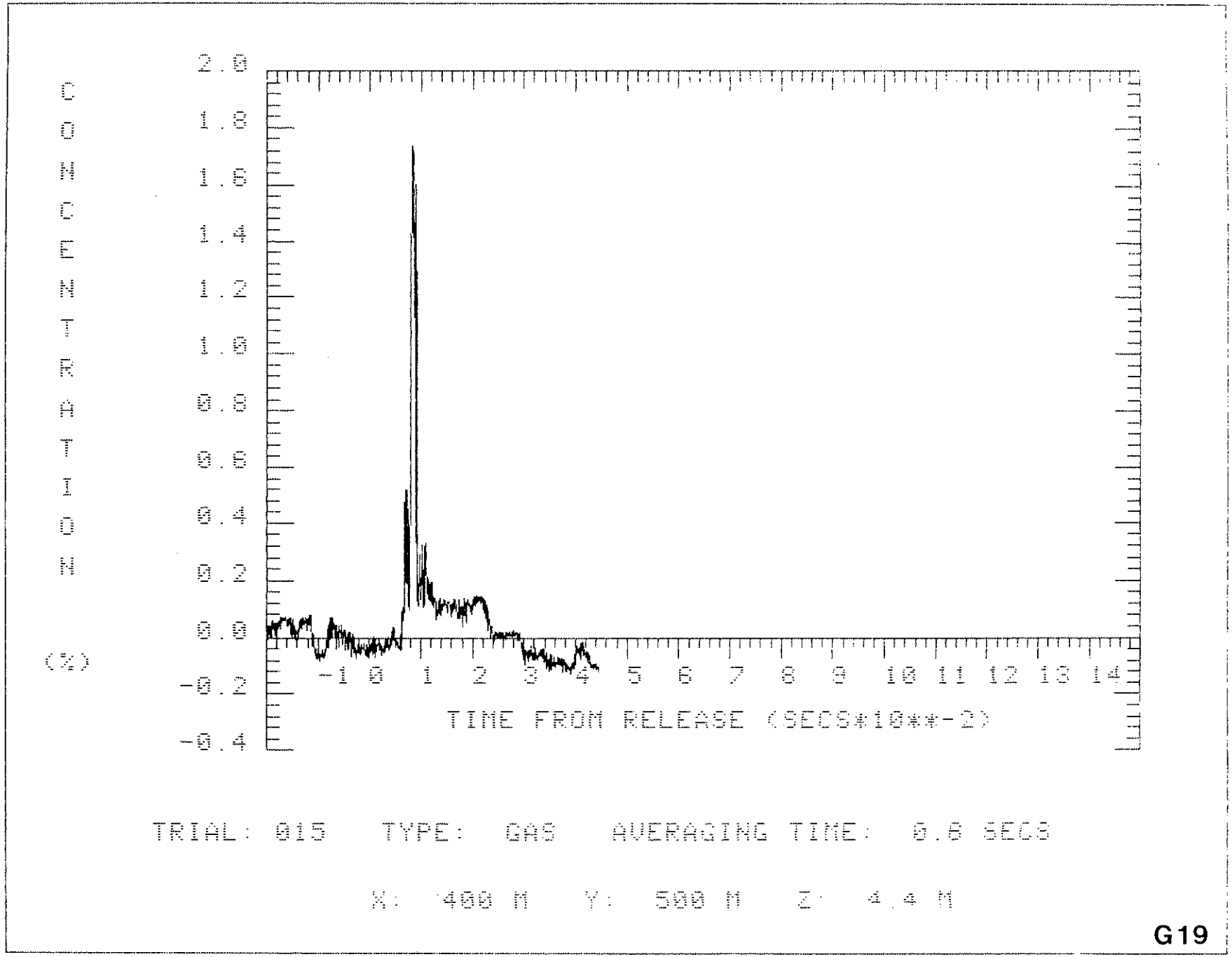
G16


CONCENTRATION (%)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 500 M Z: 0.4 M
G17

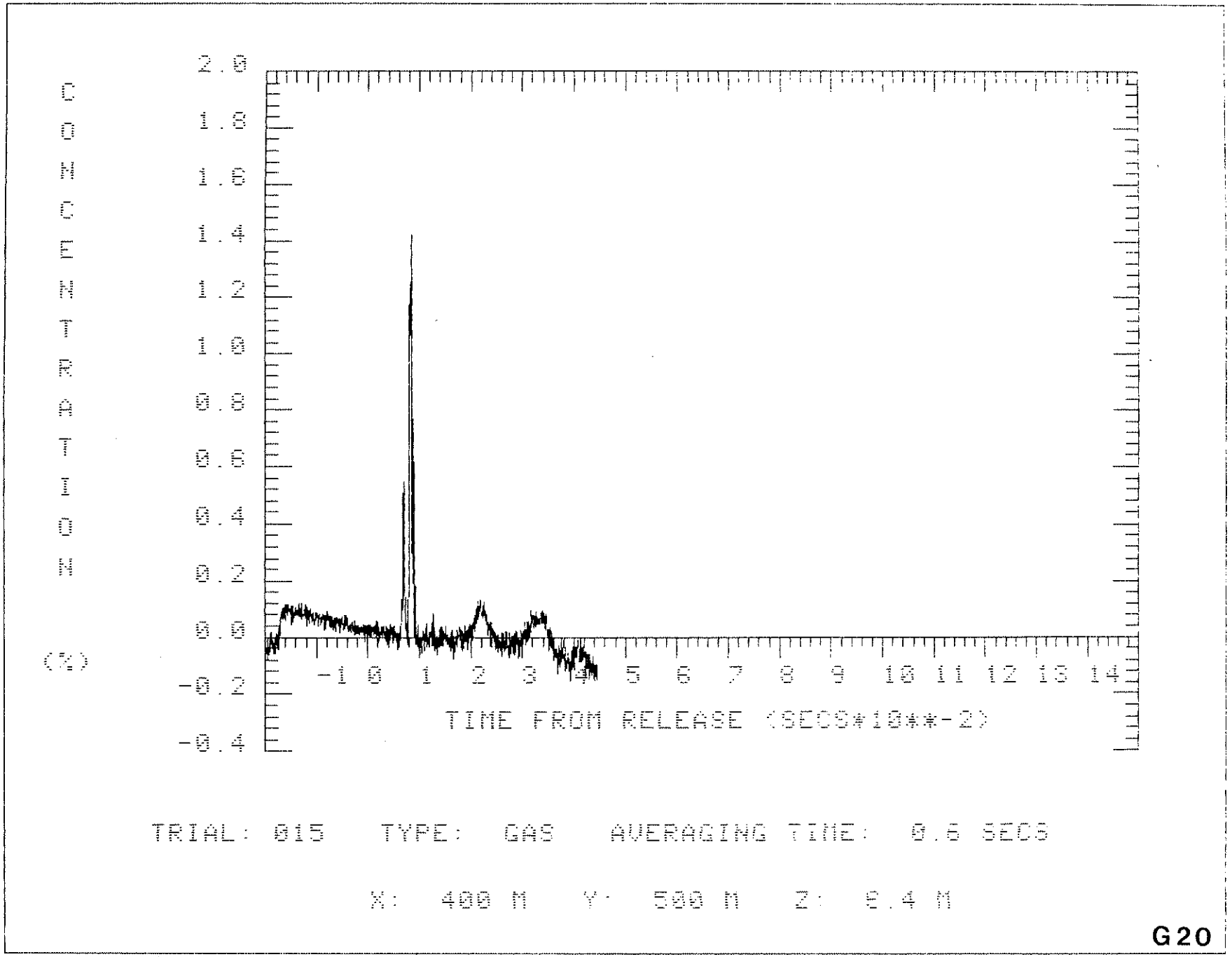


TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS

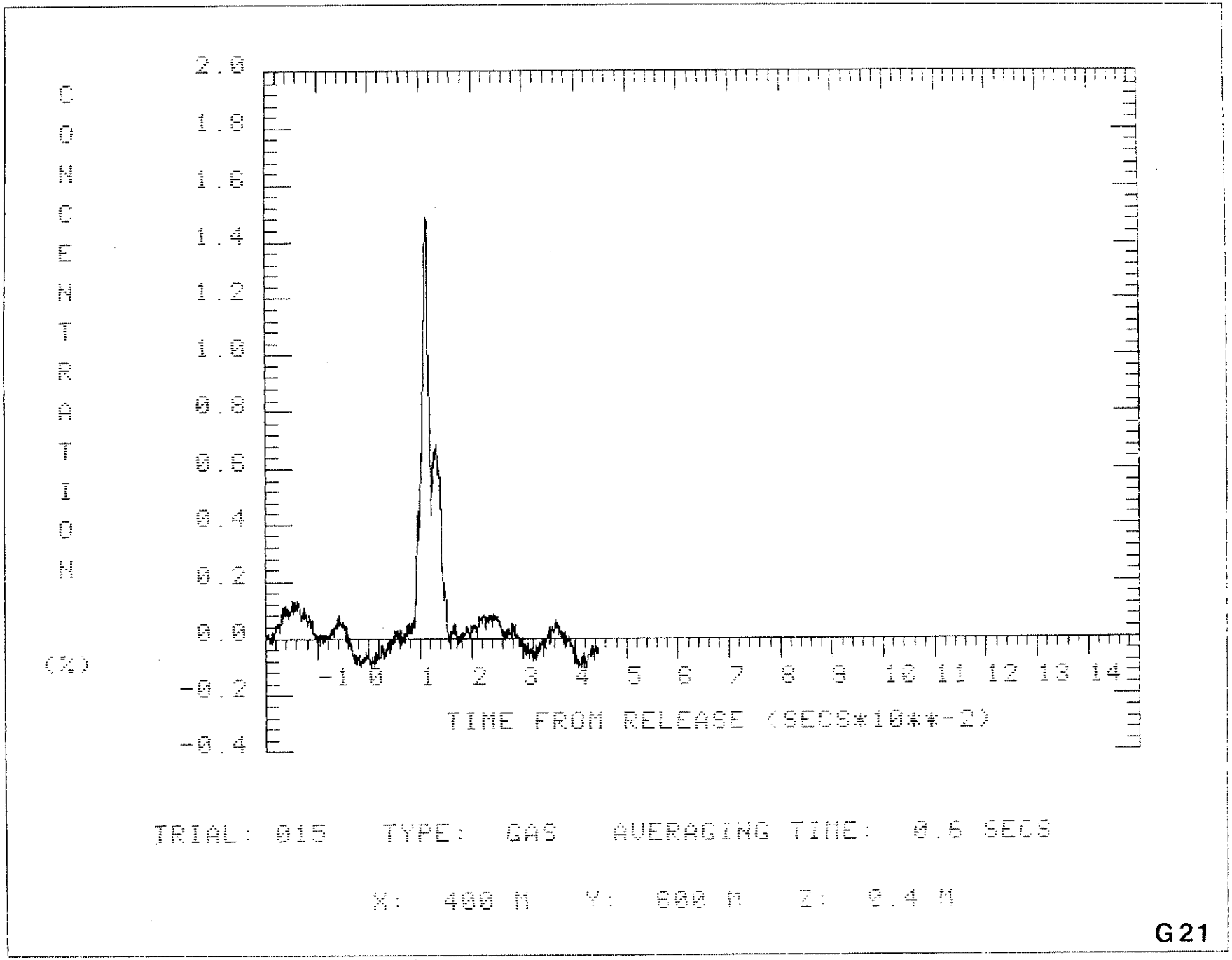
X: 400 M Y: 500 M Z: 2.4 M

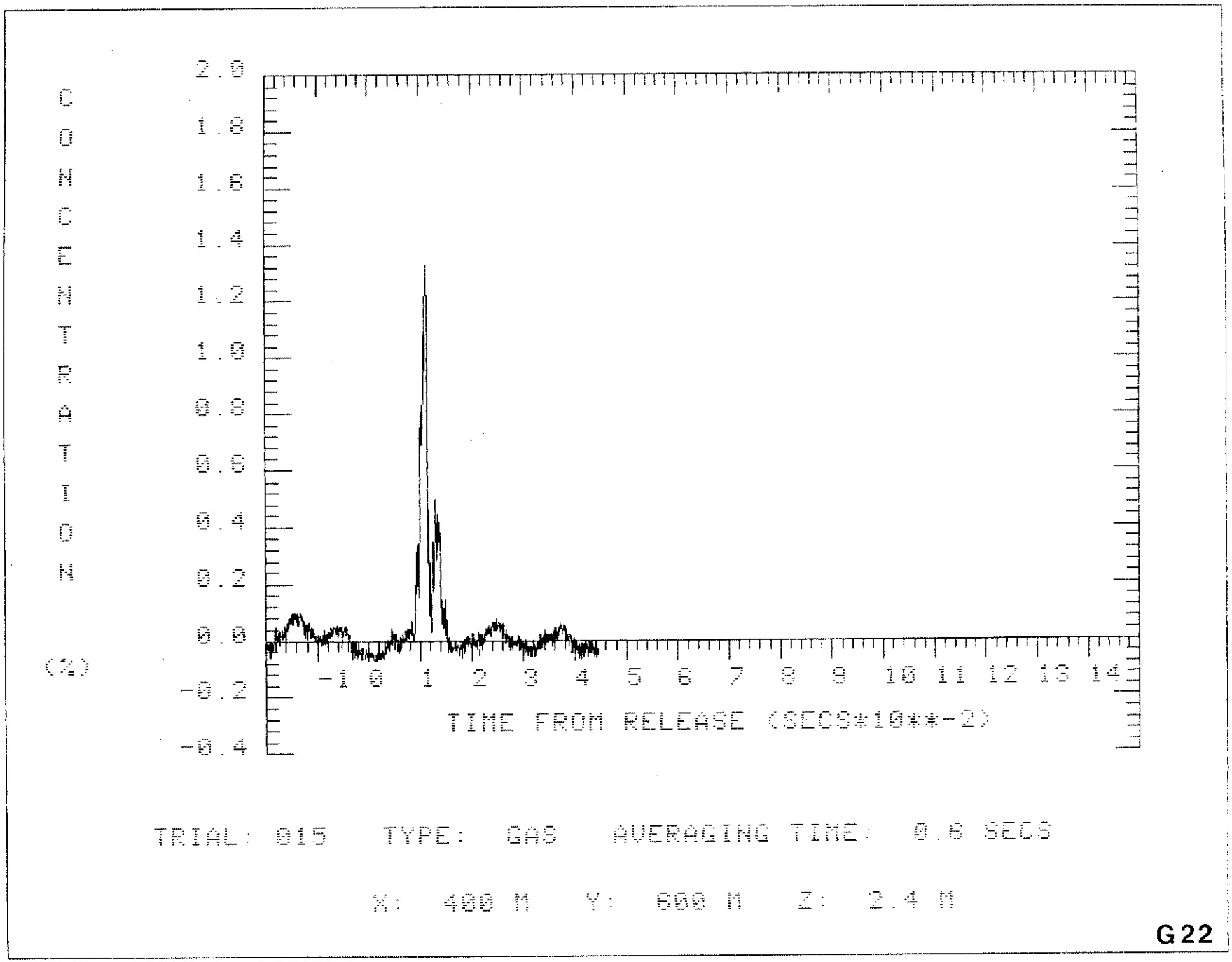

CONCENTRATION
(%)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 500 M Z: 4.4 M

G19

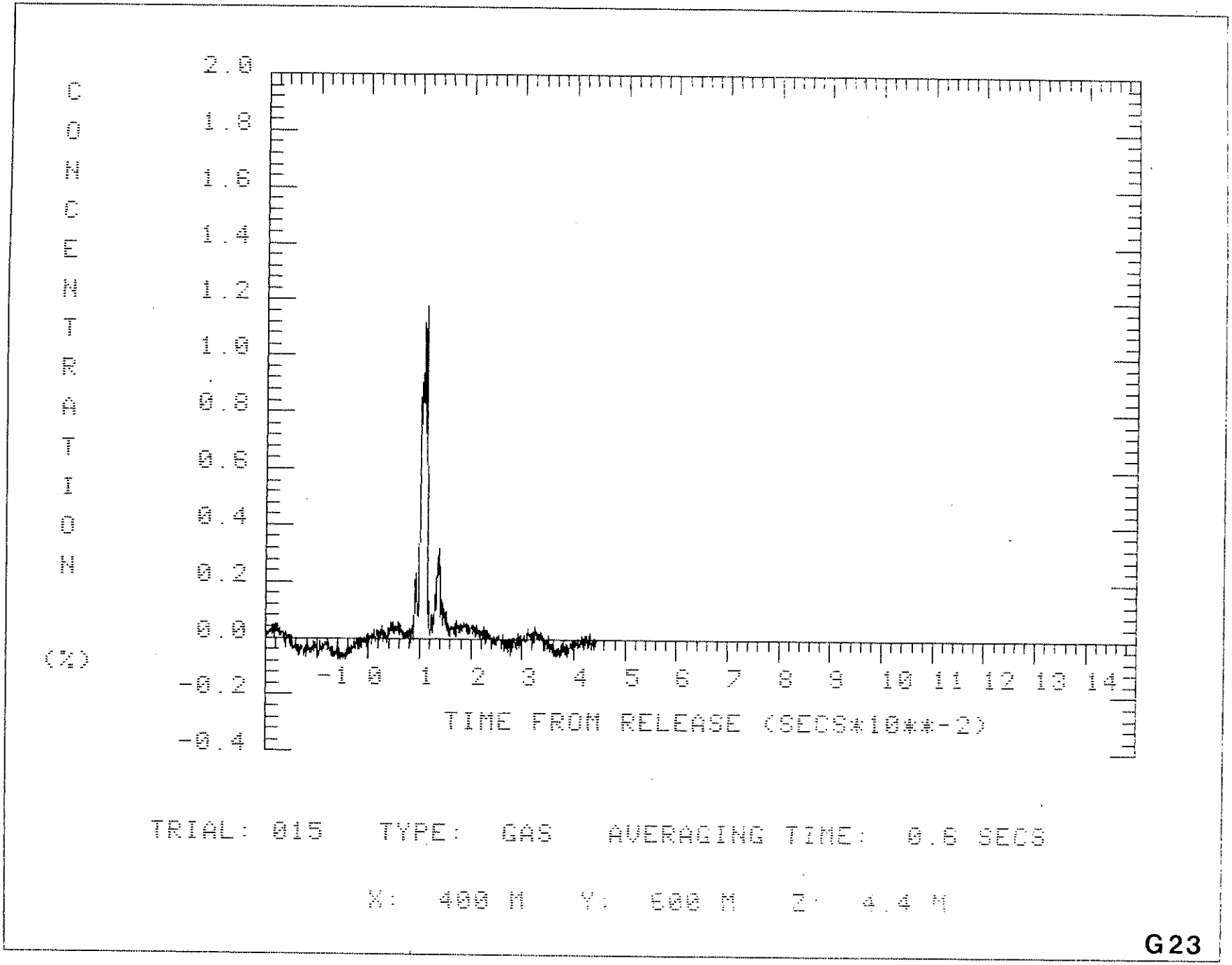

CONCENTRATION
(%)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 500 M Z: 0.4 M

G20

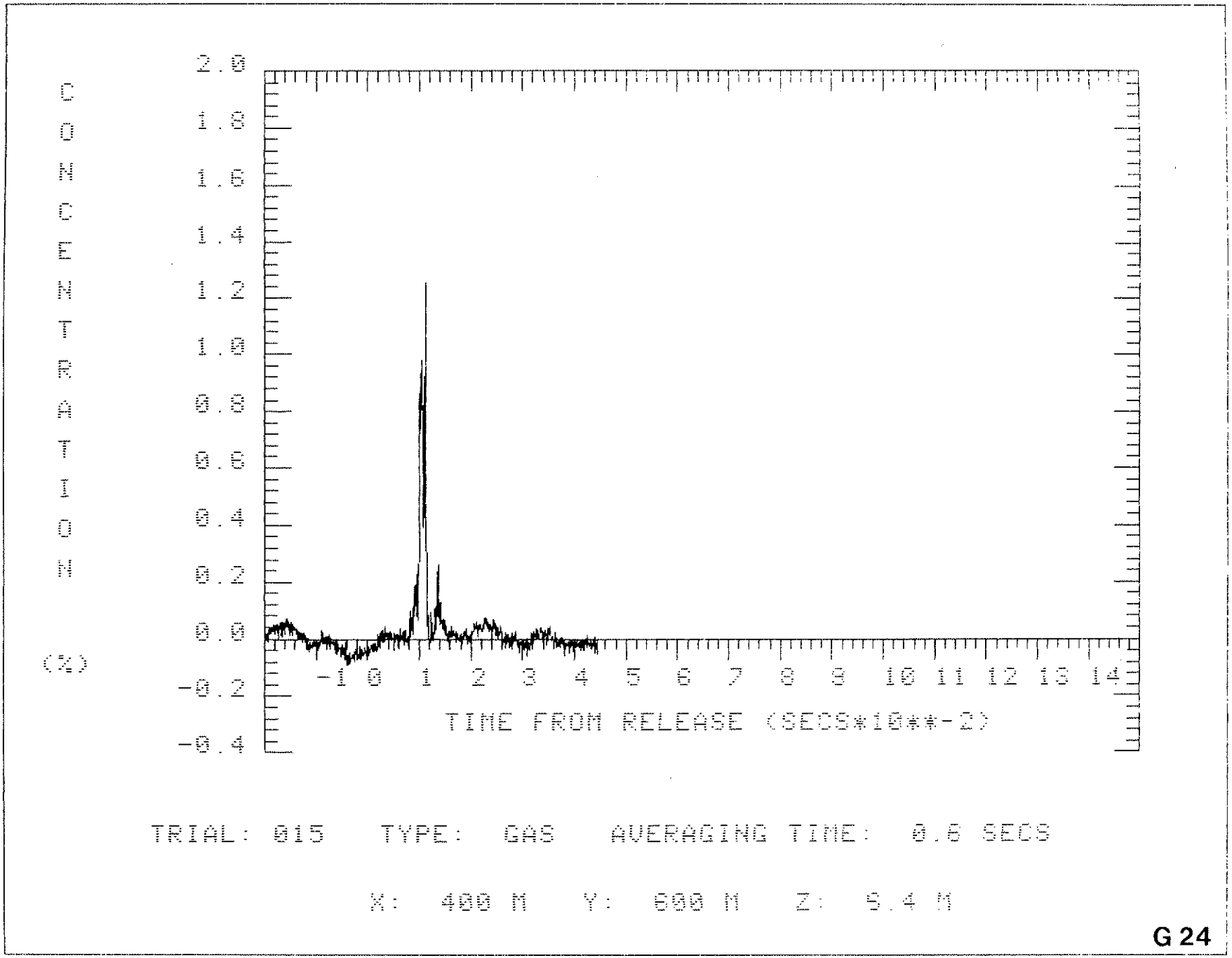

CONCENTRATION
(%)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 800 M Z: 0.4 M
G21


CONCENTRATION (%)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 600 M Z: 2.4 M

G22

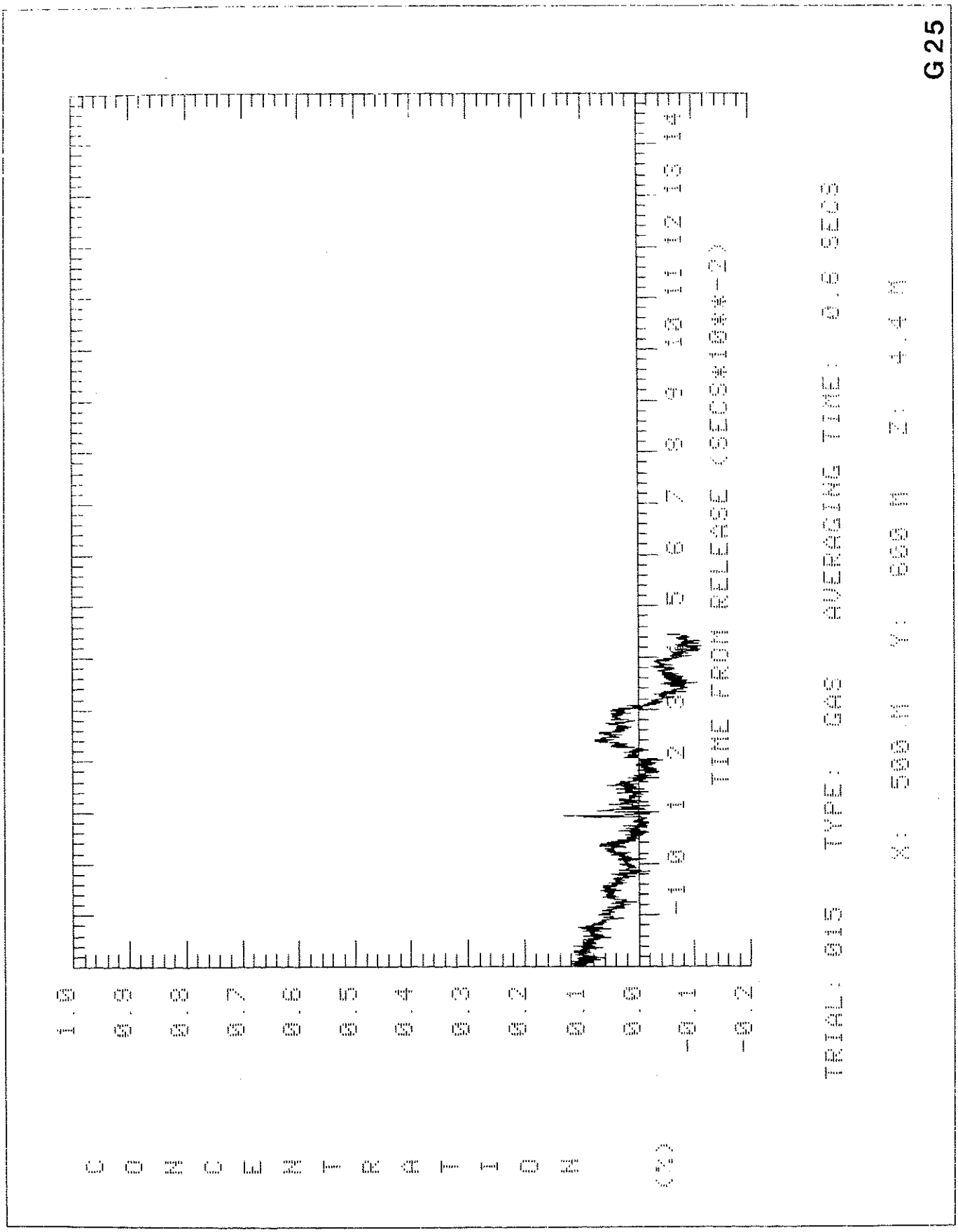

CONCENTRATION
(%)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 500 M Z: 4.4 M

G23

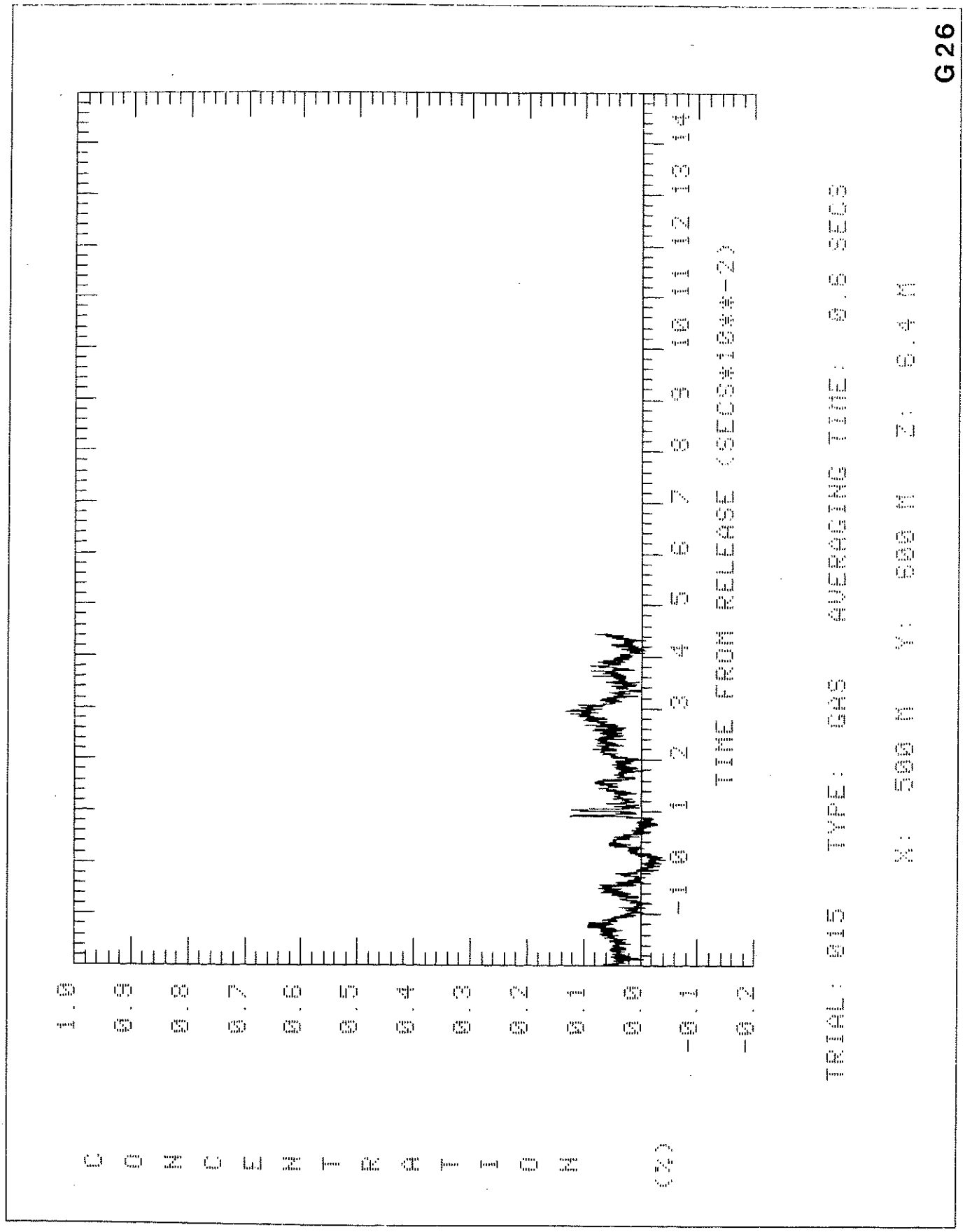

CONCENTRATION
(%)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.8 SECS
X: 400 M Y: 600 M Z: 5.4 M

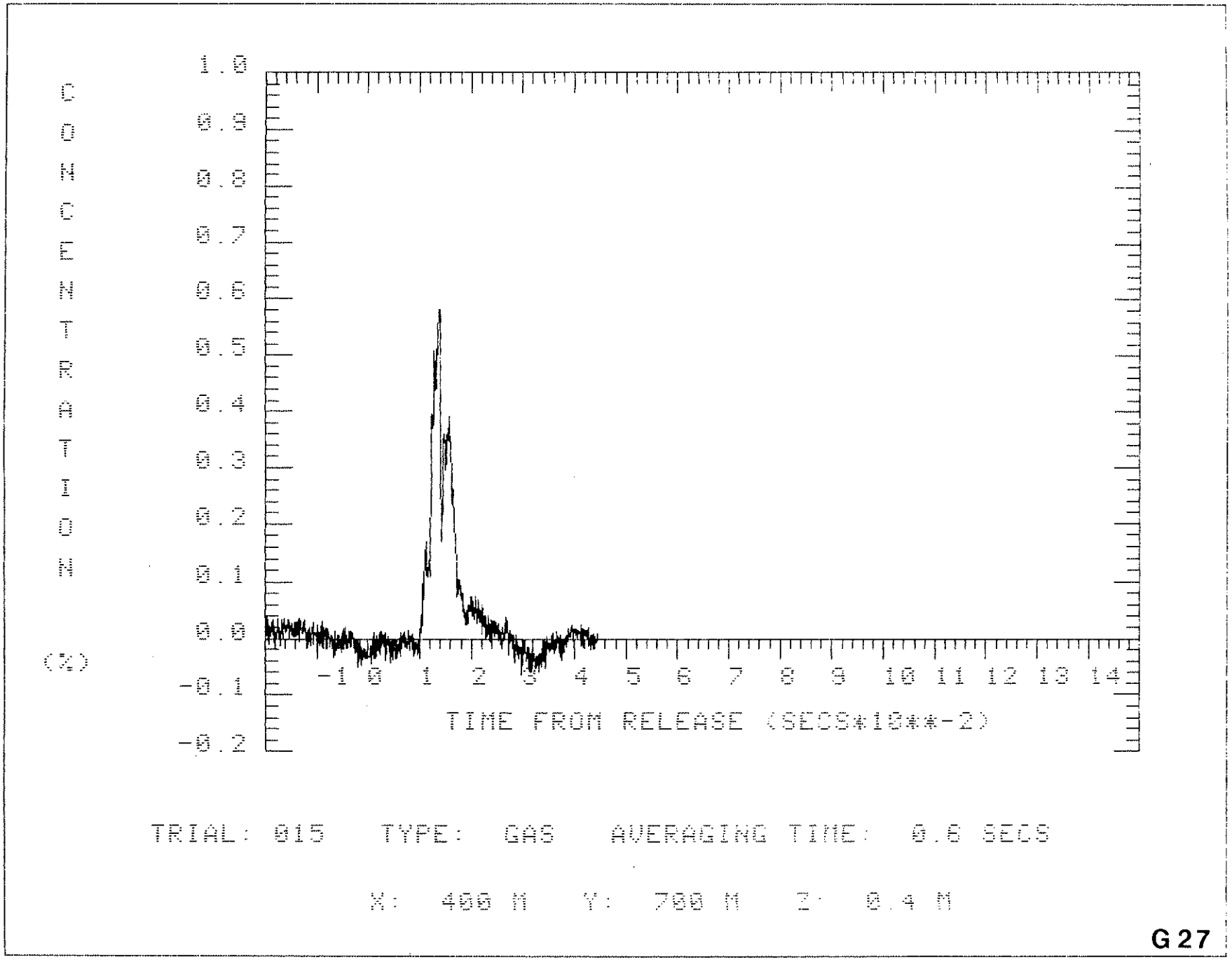
G 24

$C_{max} = 0.1295$

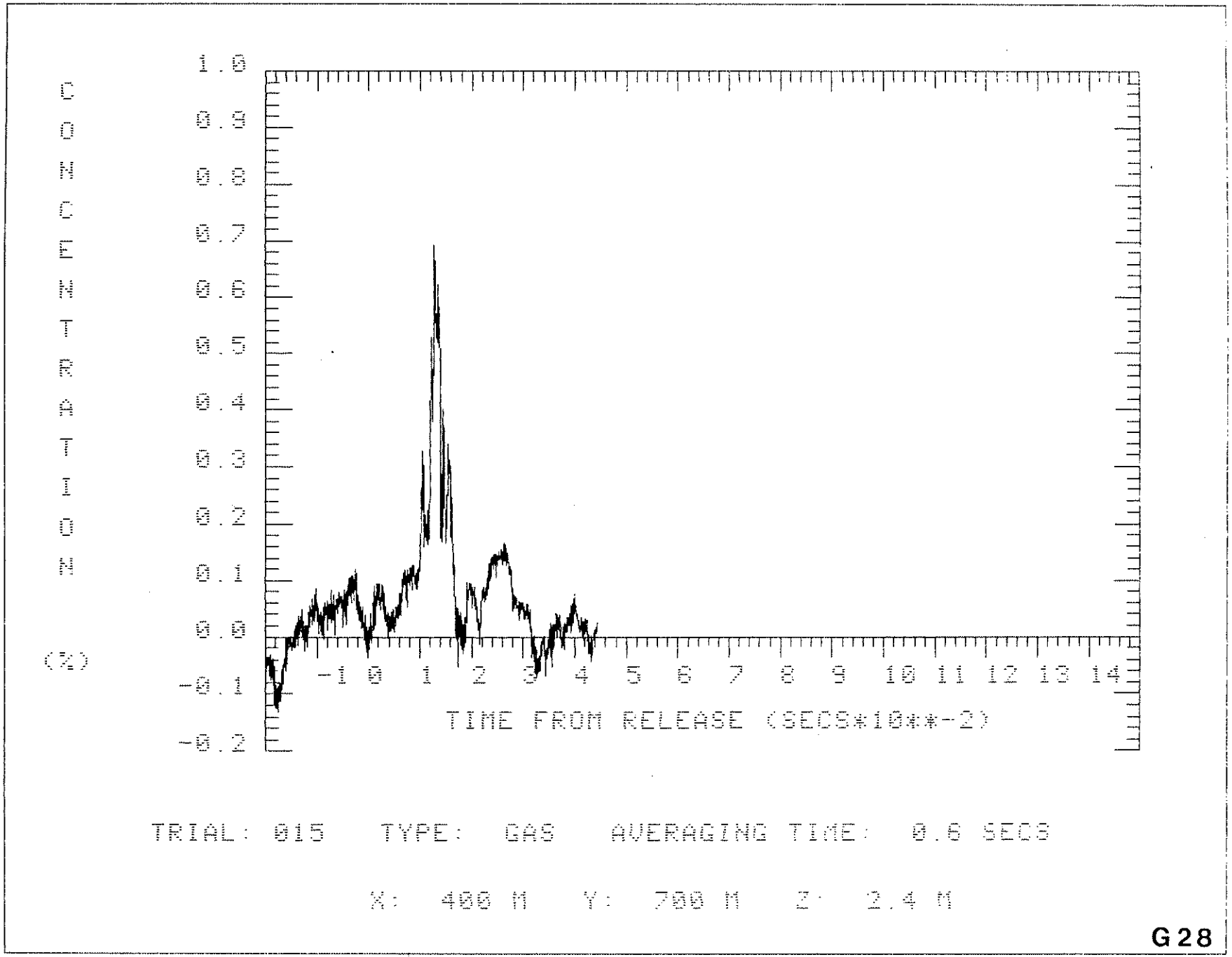

G25
TRIAL: 615 TYPE: GAS AVERAGING TIME: 5.6 SECS
X: 505 M Y: 655 M Z: 4.4 M
TIME FROM RELEASE (SECS*10**-2)
CONCENTRATION (%)

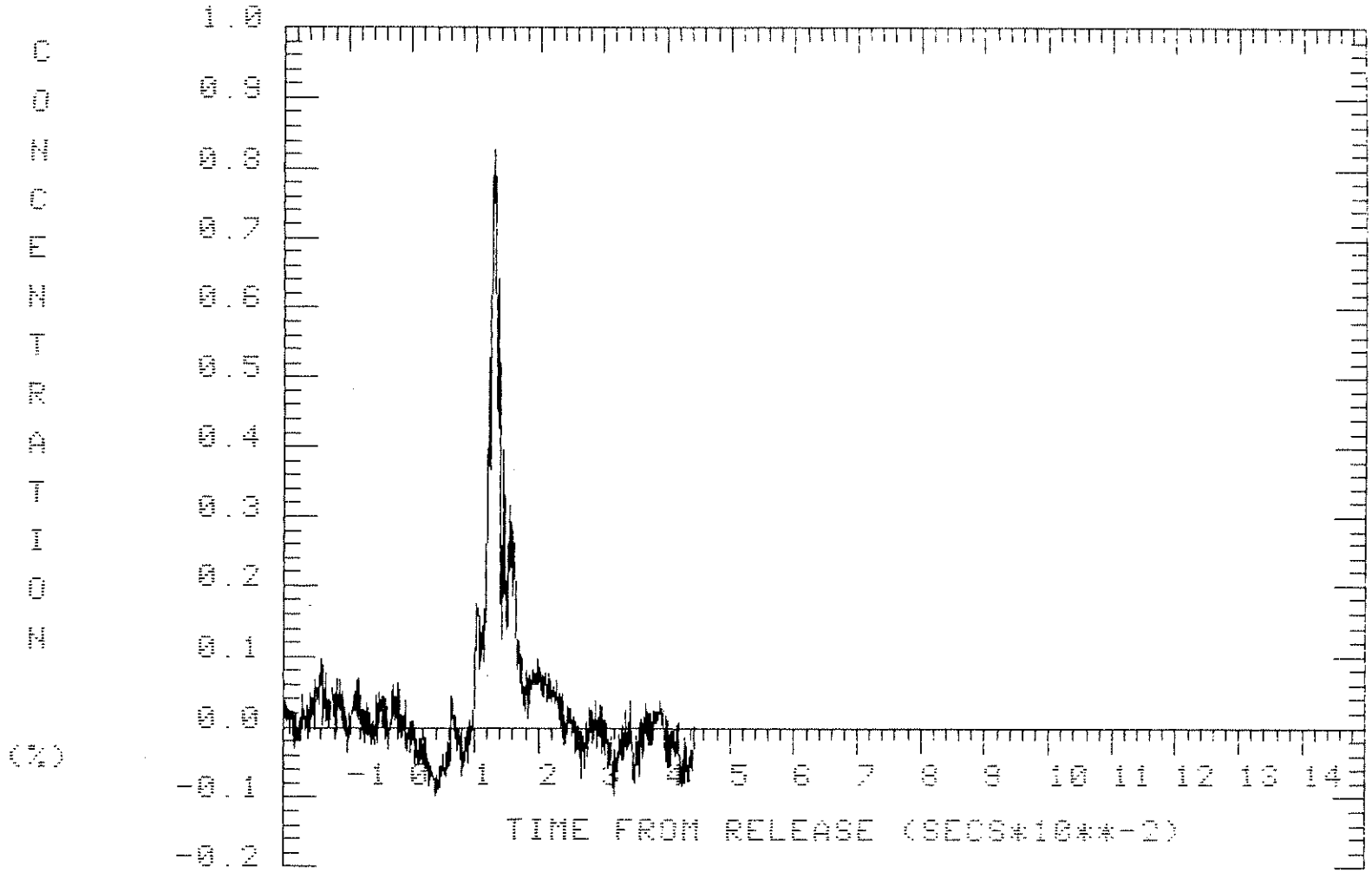
C_{max} = 0.132(


G26
TRIAL: 615 TYPE: GAS AVERAGING TIME: 0.5 SECS
X: 500 M Y: 600 M Z: 0.4 M
TIME FROM RELEASE (SECS*10**-2)
CONCENTRATION (%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14


CONCENTRATIONS (%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 700 M Z: 0.4 M

G 27

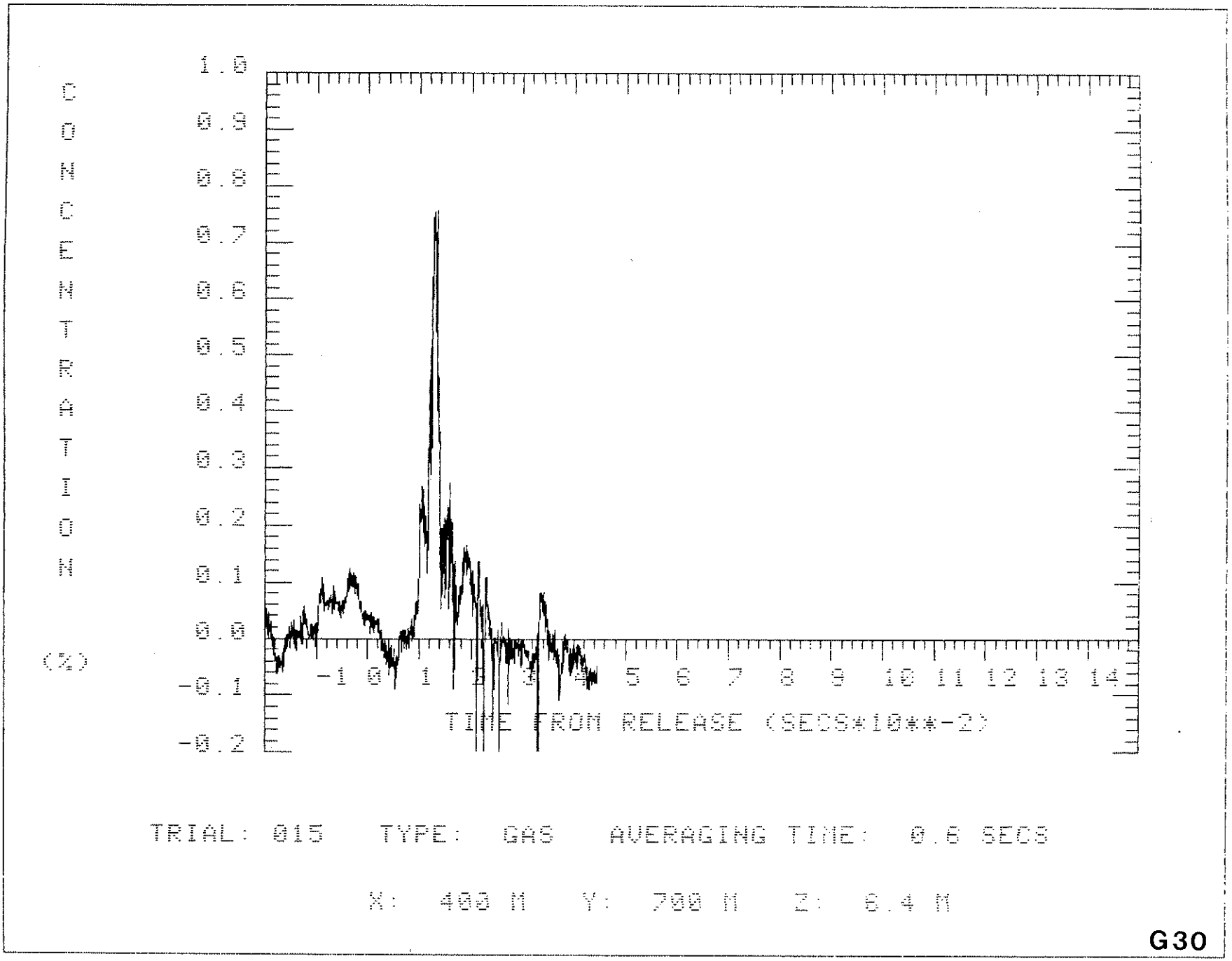

CONCENTRATION (%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 700 M Z: 2.4 M
G28



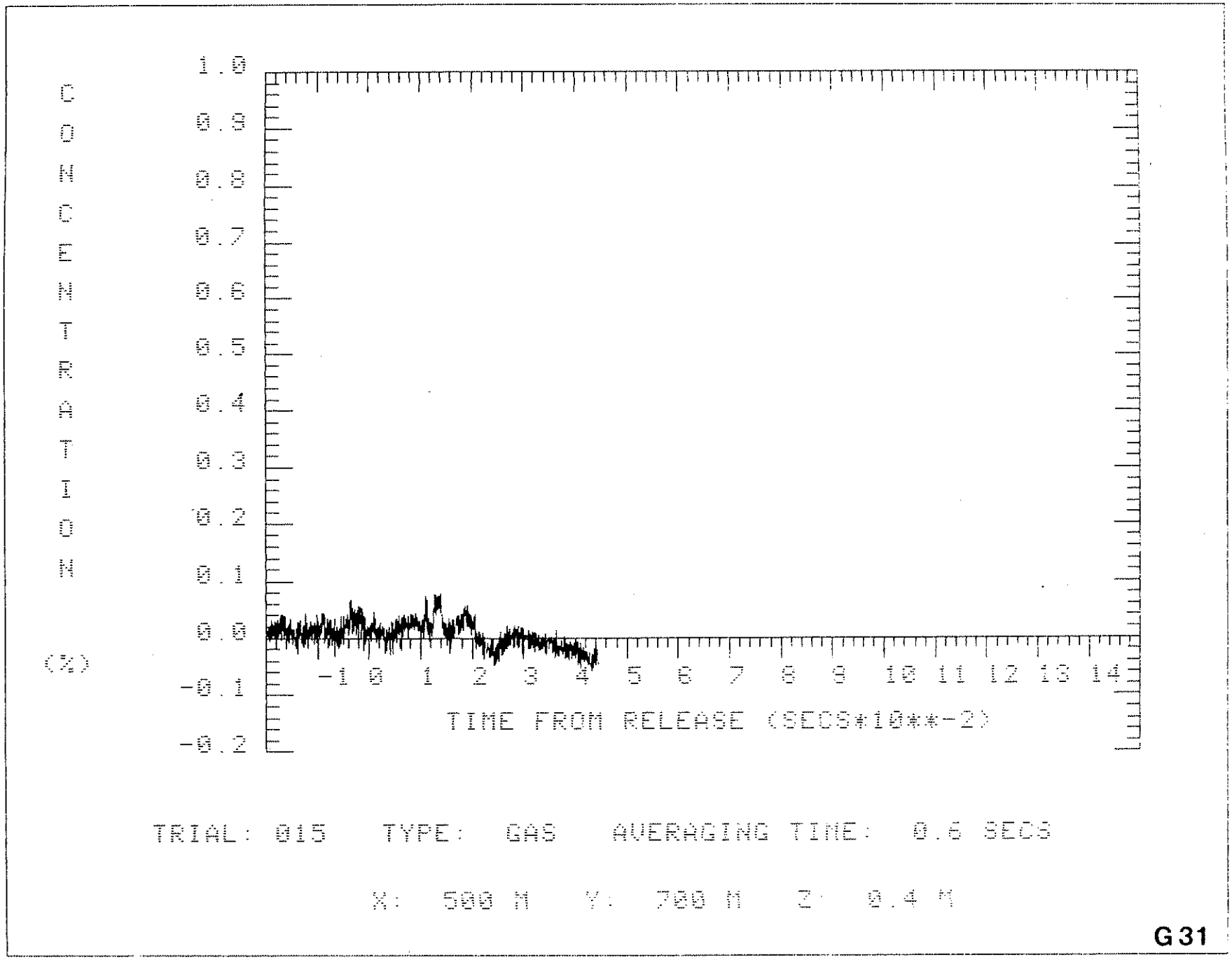
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS

X: 400 M Y: 700 M Z: 4.4 M

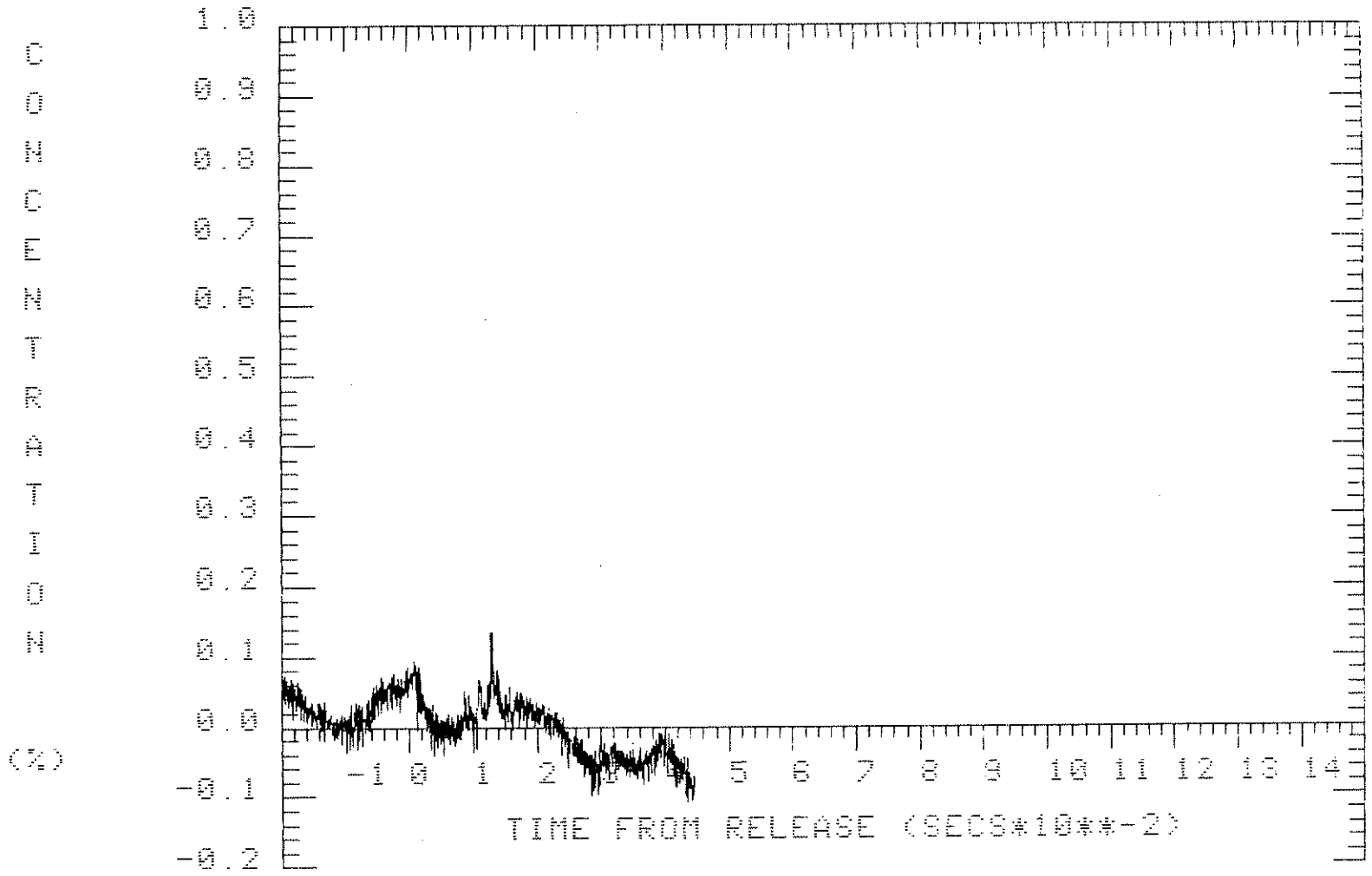
G29


CONCENTRATION (%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 700 M Z: 6.4 M

G30


CONCENTRATION (%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 500 M Y: 700 M Z: 0.4 M

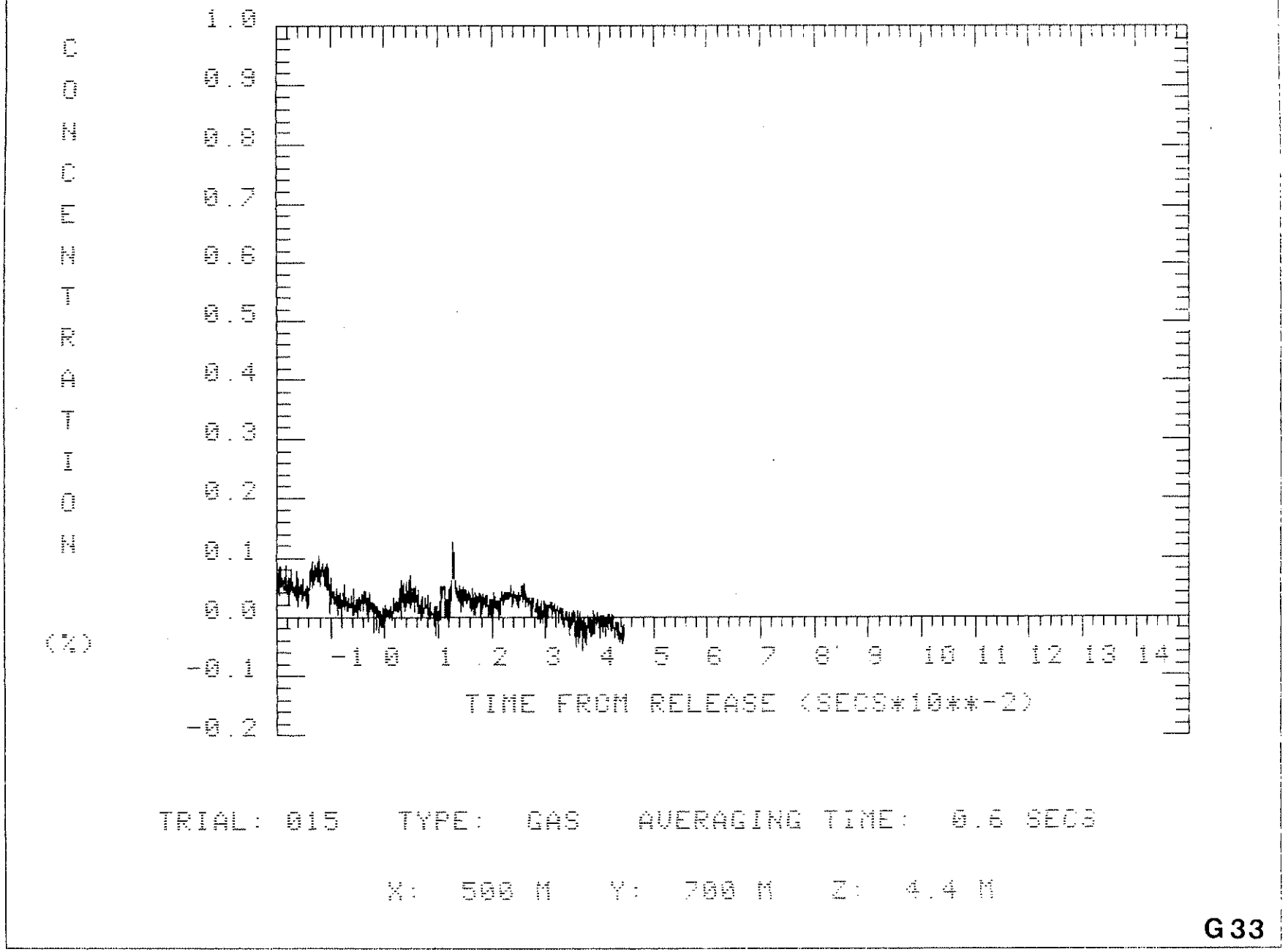
G31



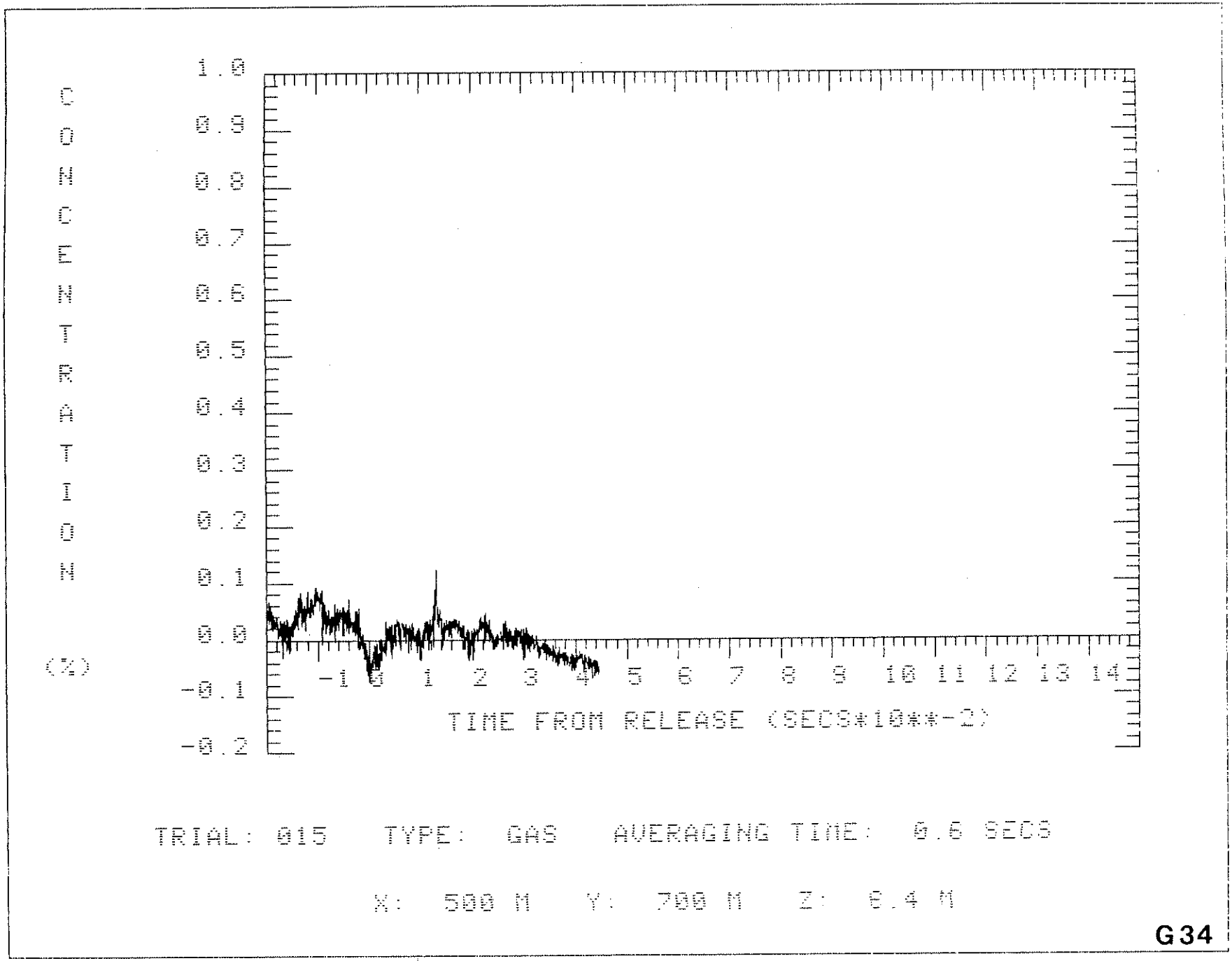
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS

X: 500 M Y: 700 M Z: 2.4 M

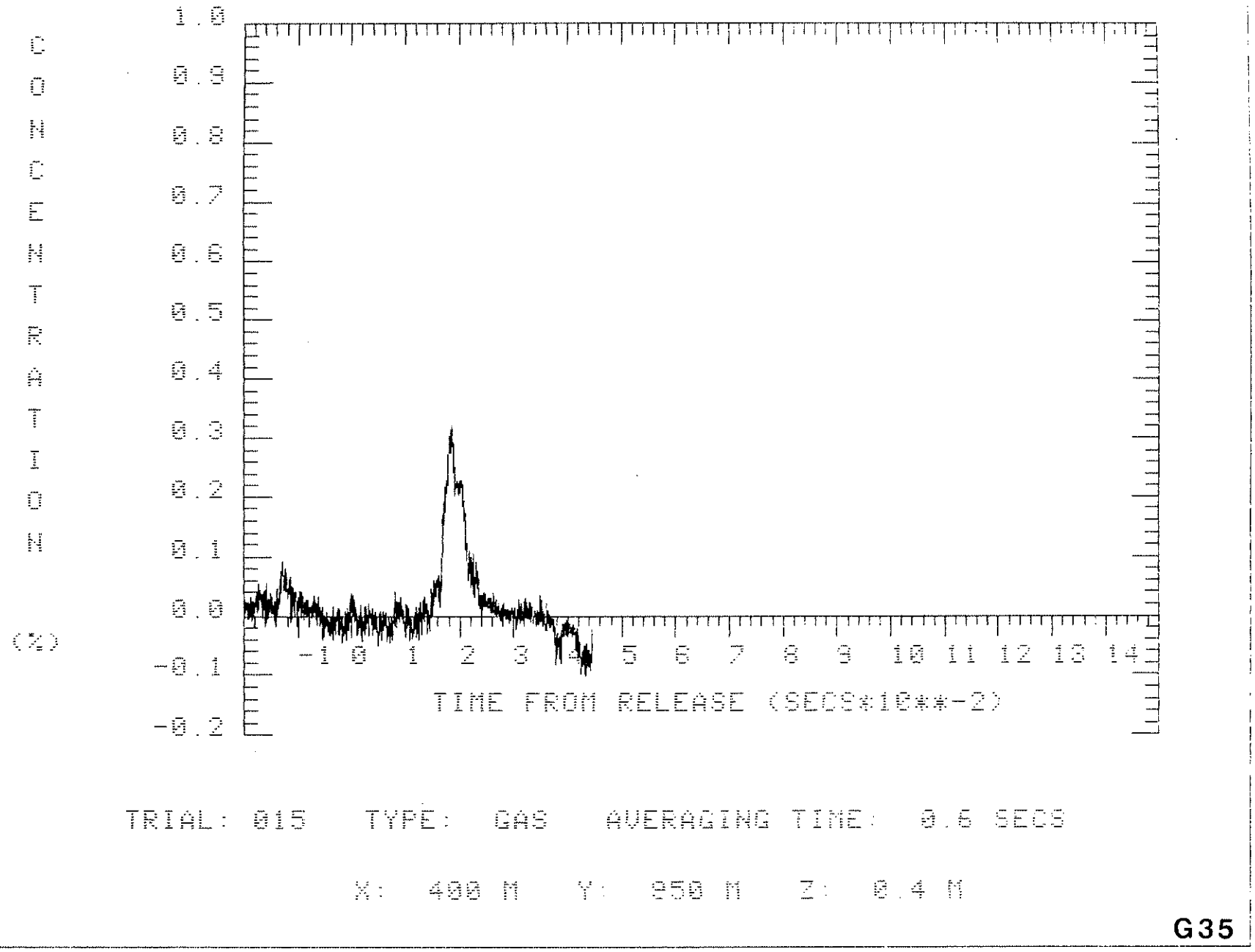
G32


CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 500 M Y: 700 M Z: 4.4 M

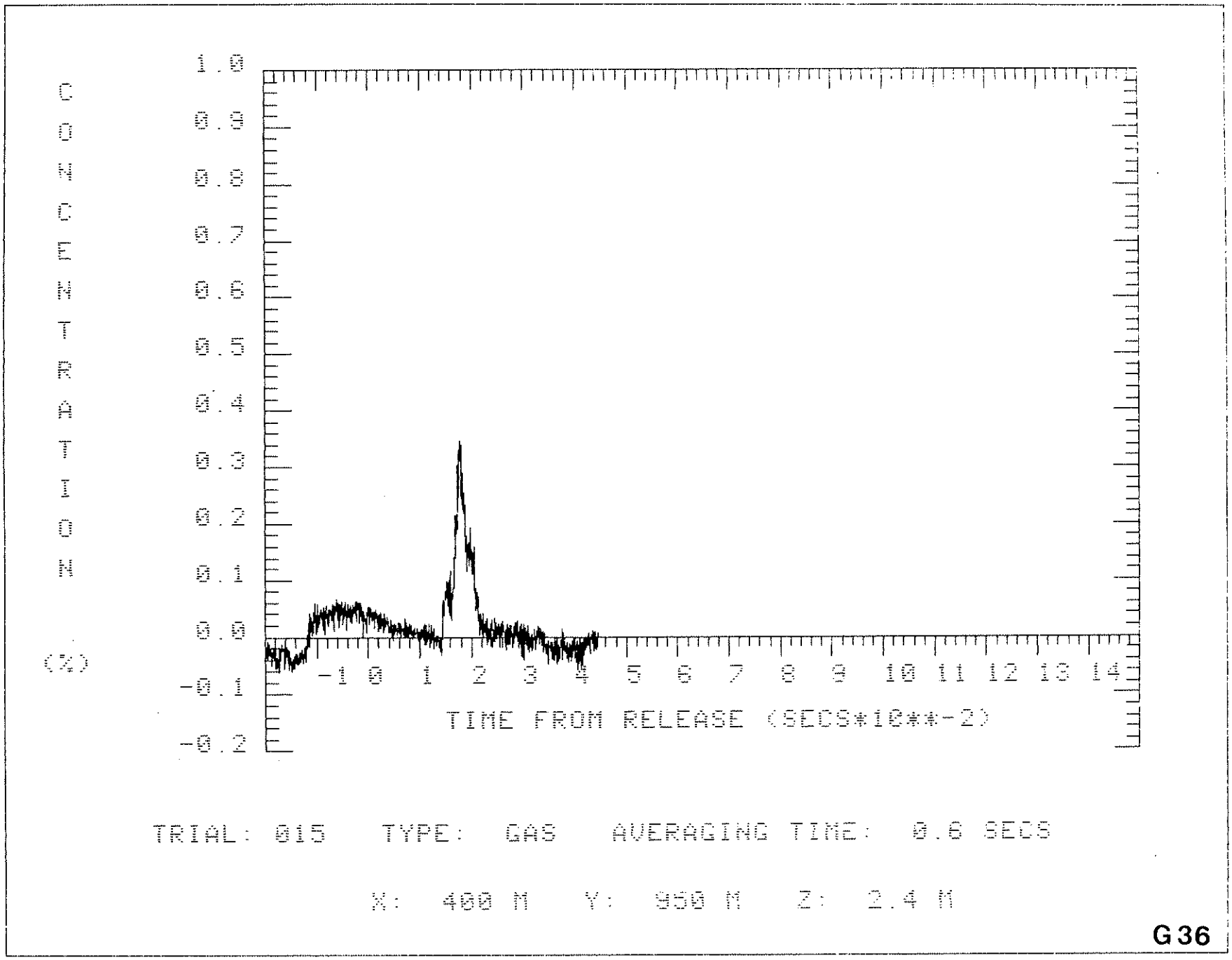
G 33


CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 500 M Y: 700 M Z: 0.4 M

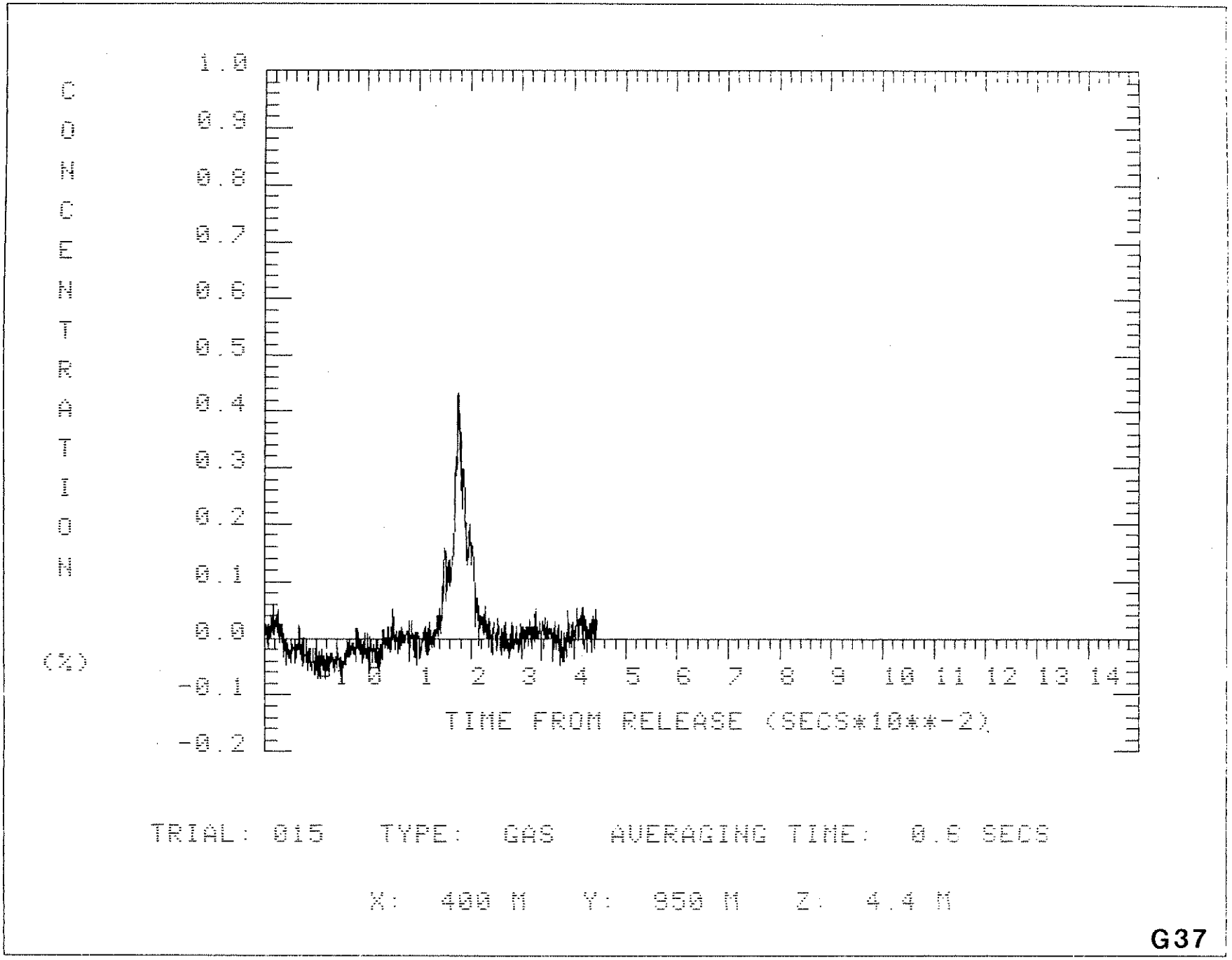
G34


CONCENTRATION
(%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 950 M Z: 0.4 M

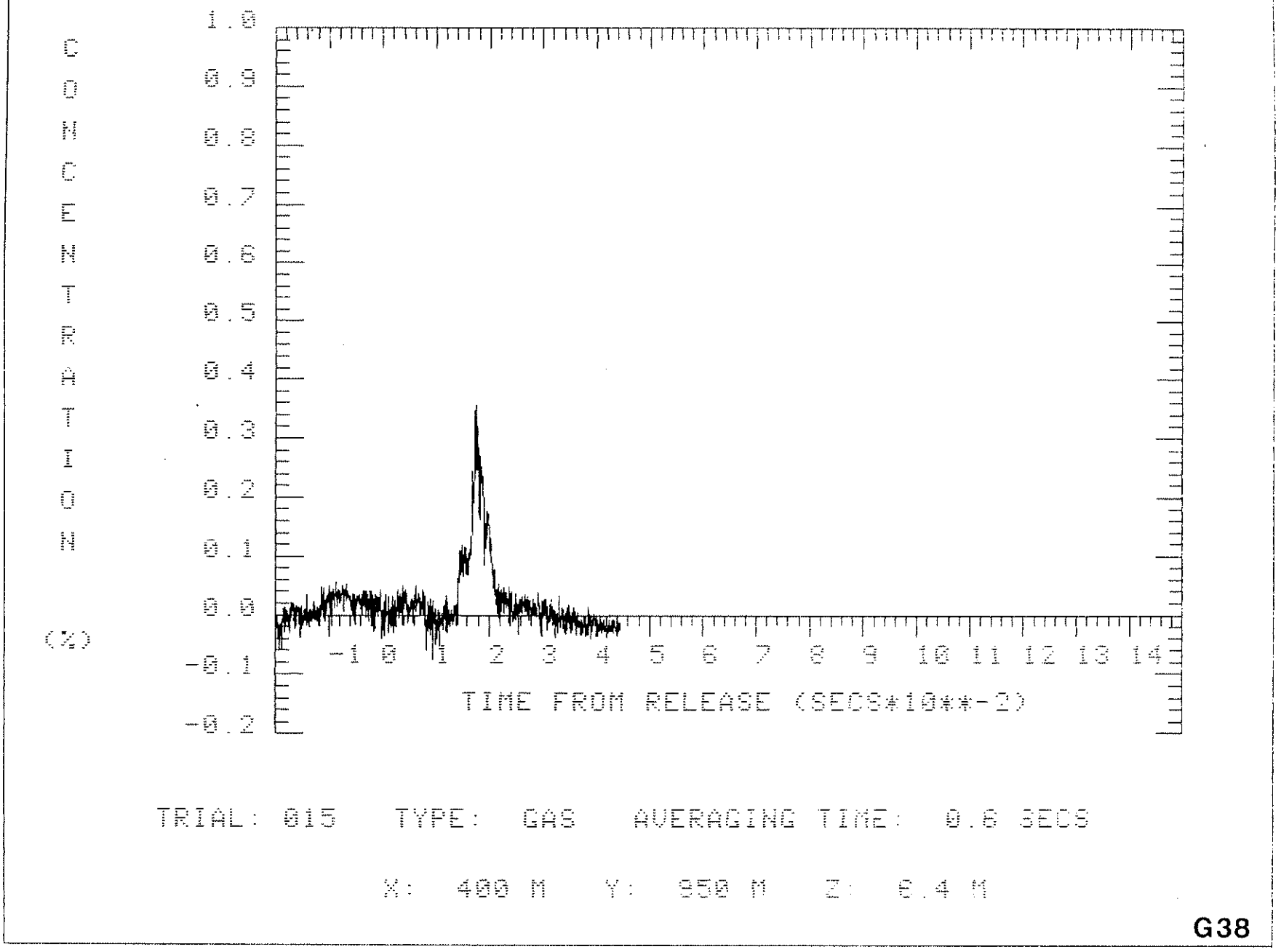
G35


CONCENTRATION (%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 950 M Z: 2.4 M

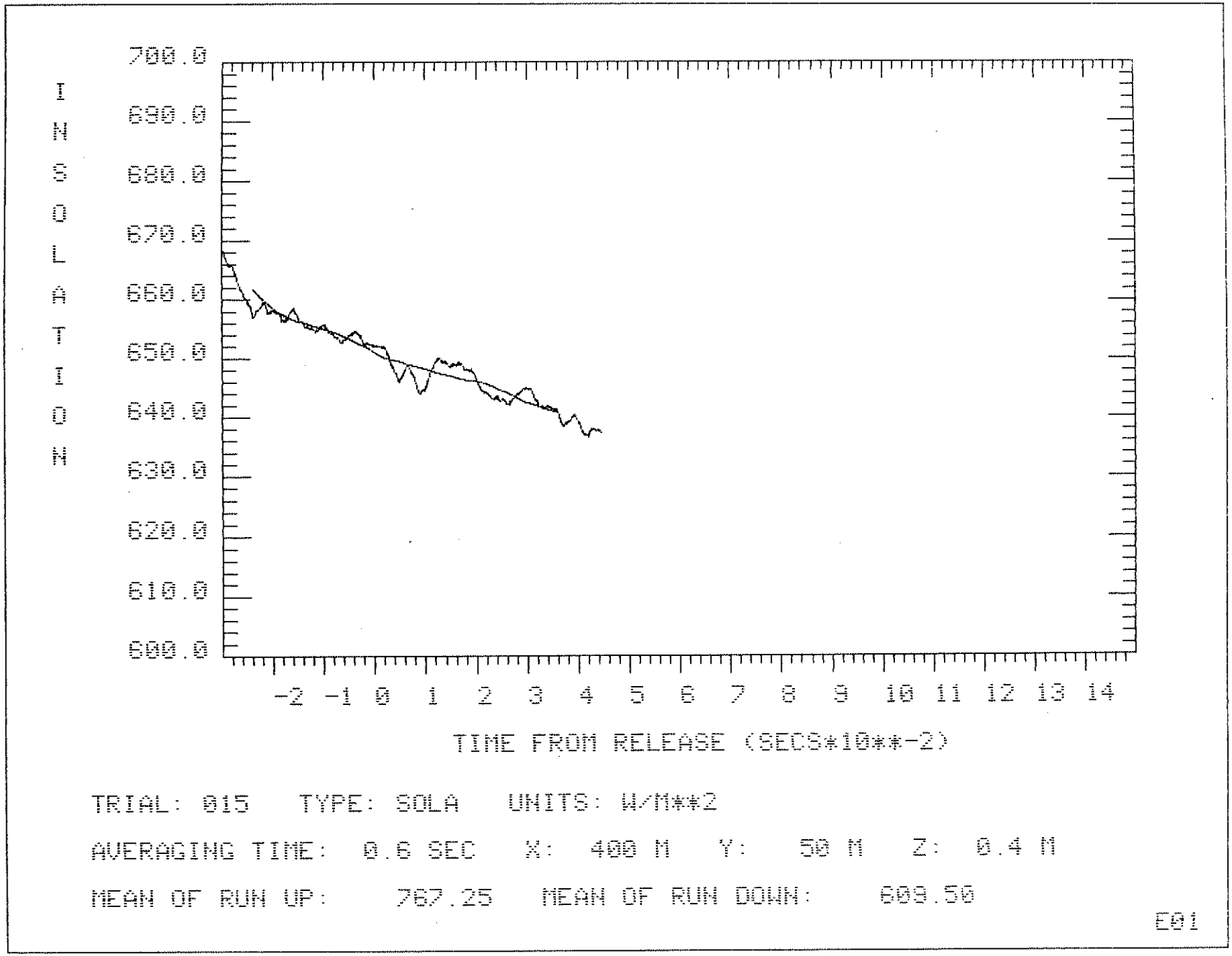
G36


CONCENTRATION (%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.8 SECS
X: 400 M Y: 950 M Z: 4.4 M

G37


CONCENTRATION (%)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GAS AVERAGING TIME: 0.6 SECS
X: 400 M Y: 950 M Z: 0.4 M

G38

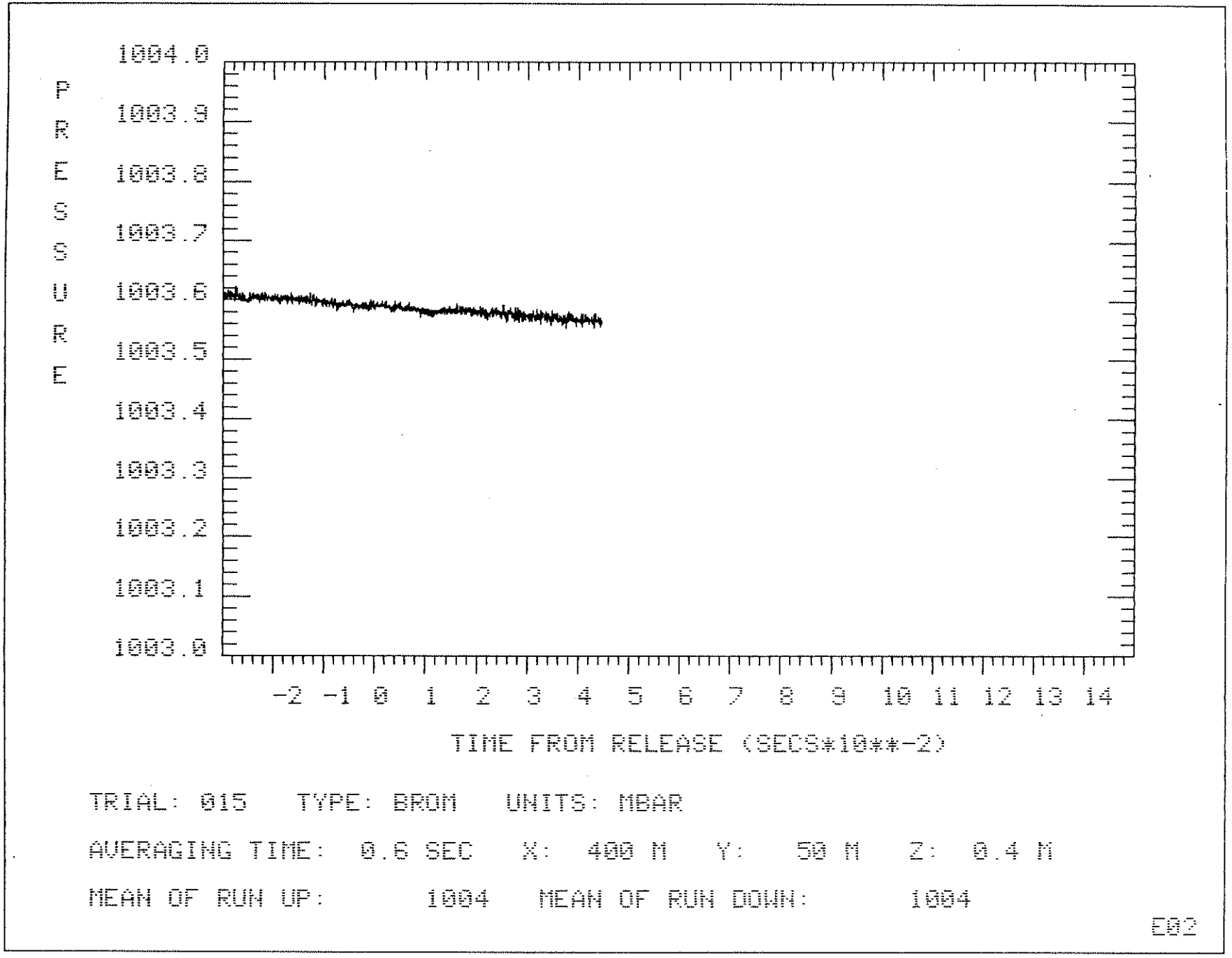


TRIAL: 015 TYPE: SOLA UNITS: W/M**2

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 0.4 M

MEAN OF RUN UP: 787.25 MEAN OF RUN DOWN: 609.50

E01

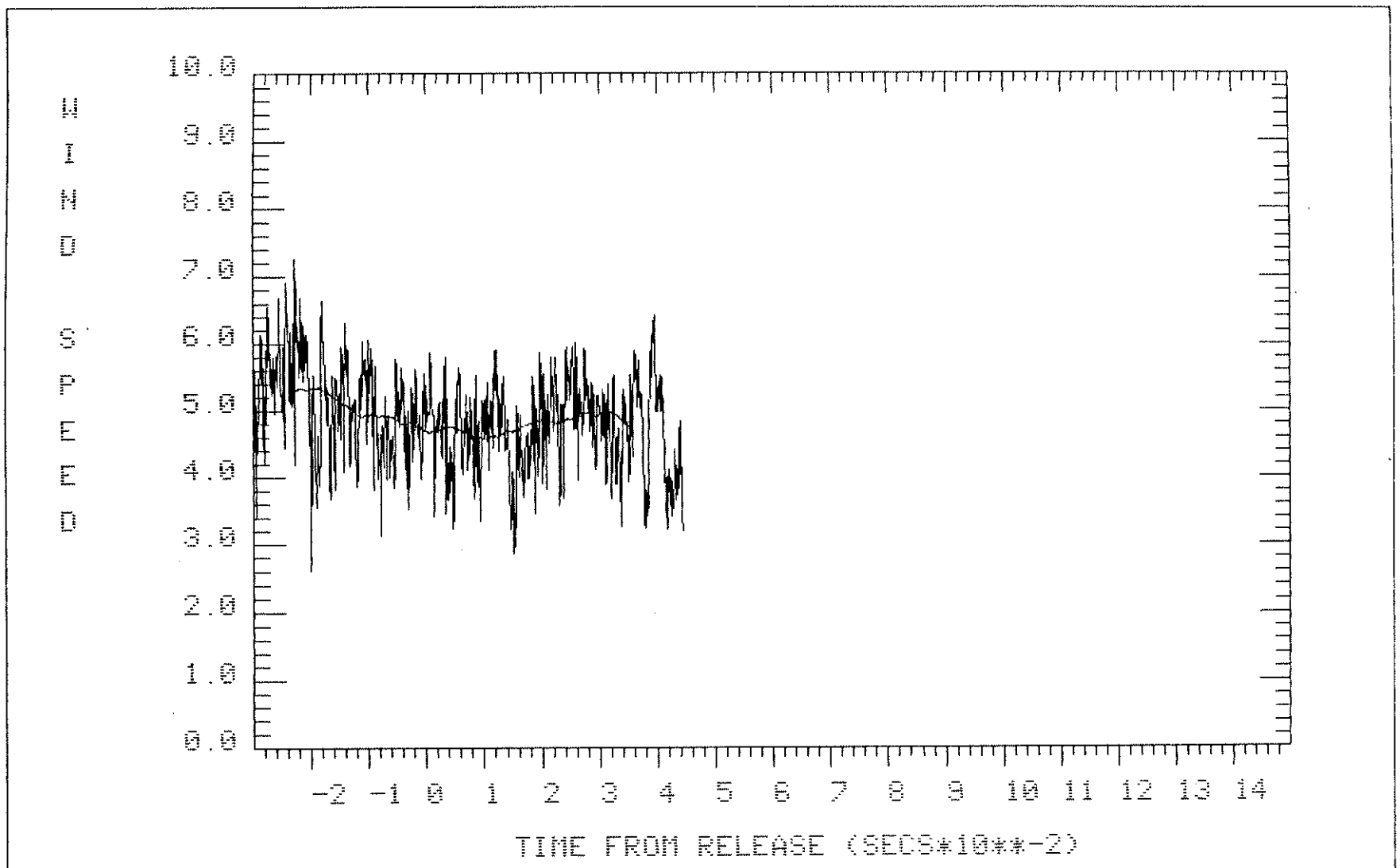


TRIAL: 015 TYPE: BROM UNITS: MBAR

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 0.4 M

MEAN OF RUN UP: 1004 MEAN OF RUN DOWN: 1004

E02

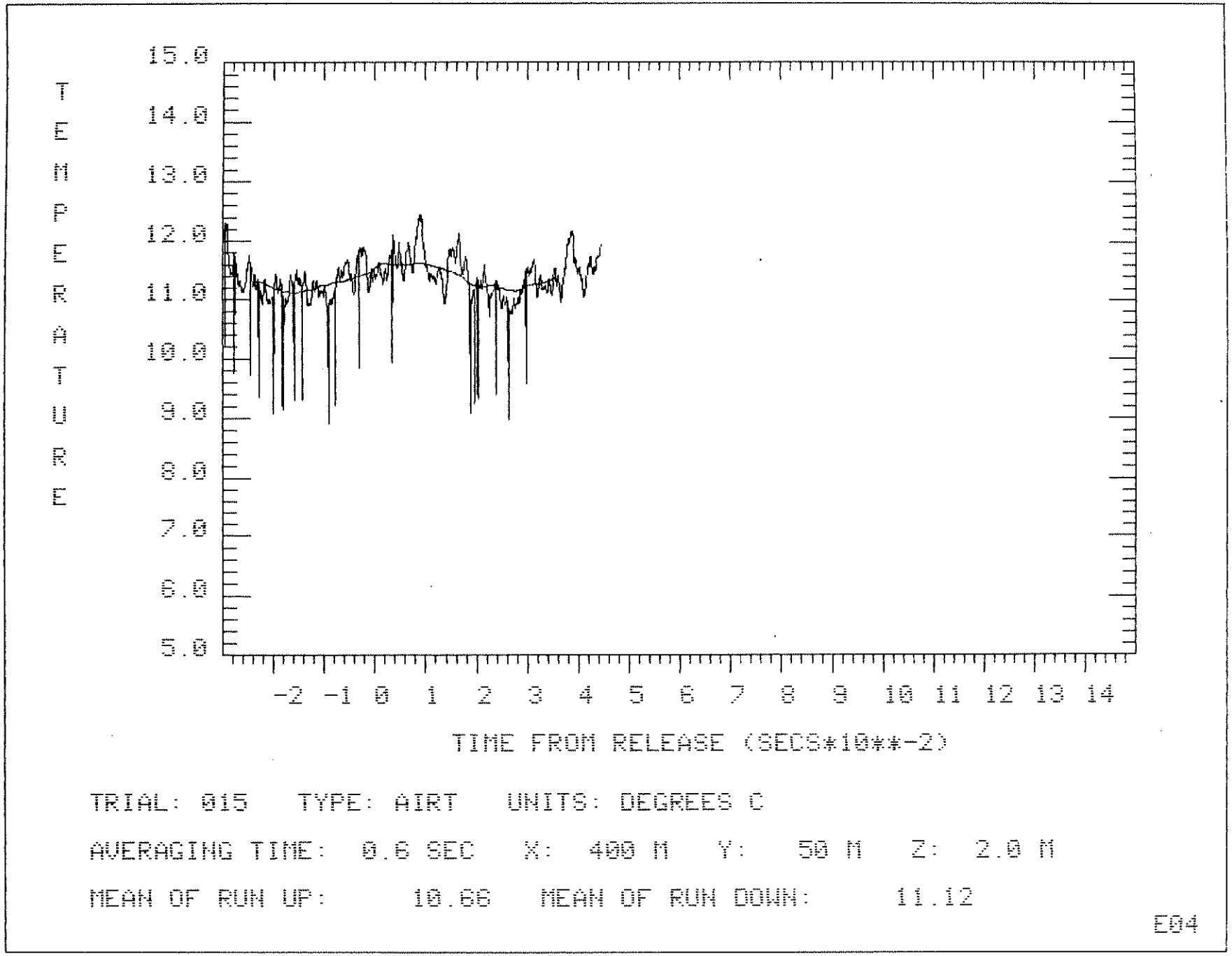


TRIAL: 015 TYPE: WSPD UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 2.0 M

MEAN OF RUN UP: 4.40 MEAN OF RUN DOWN: 4.88

E03

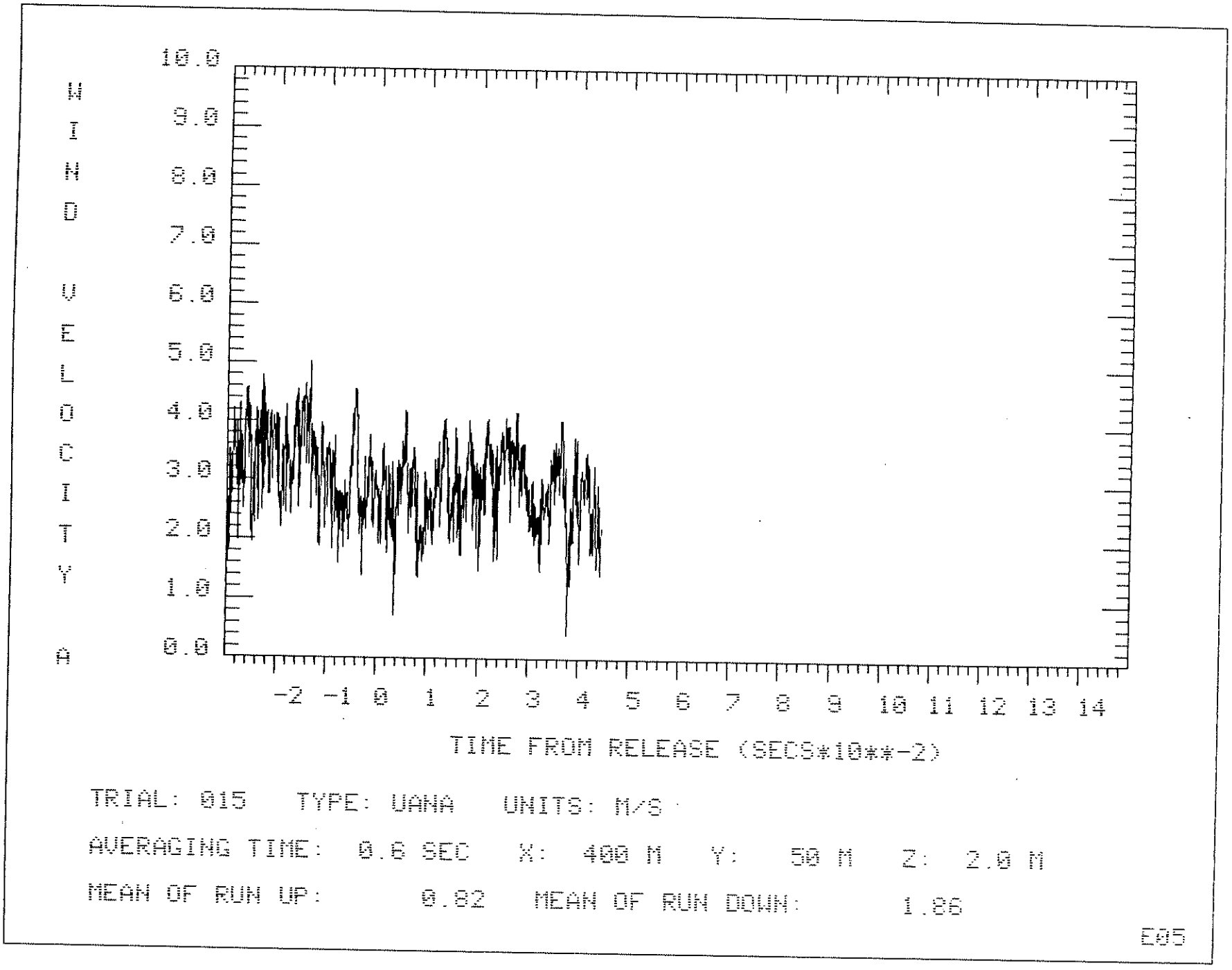


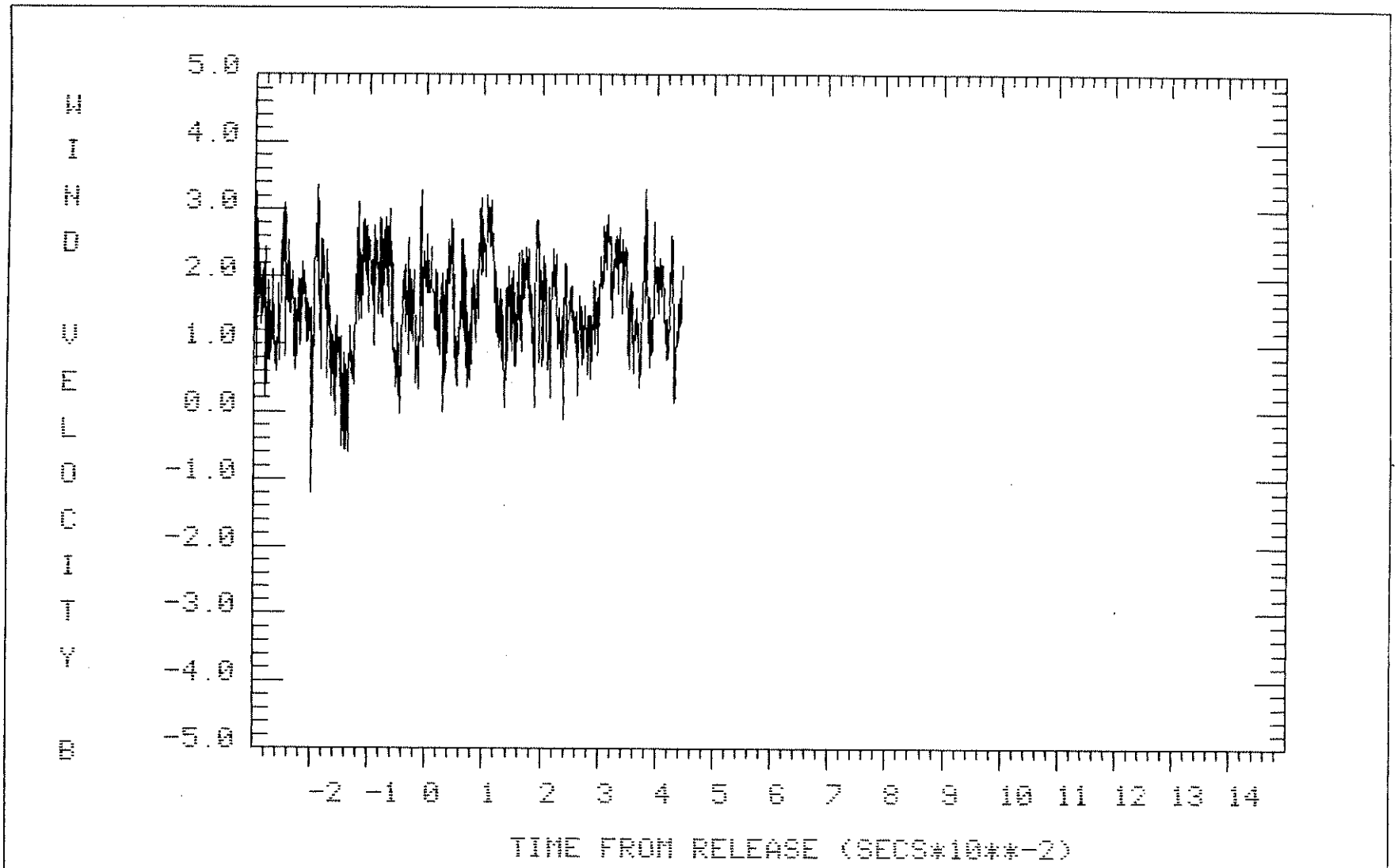
TRIAL: 015 TYPE: AIRT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 2.0 M

MEAN OF RUN UP: 10.66 MEAN OF RUN DOWN: 11.12

E04


WIND VELOCITY M/S
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: UANA UNITS: M/S
AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 2.0 M
MEAN OF RUN UP: 0.82 MEAN OF RUN DOWN: 1.86
E05

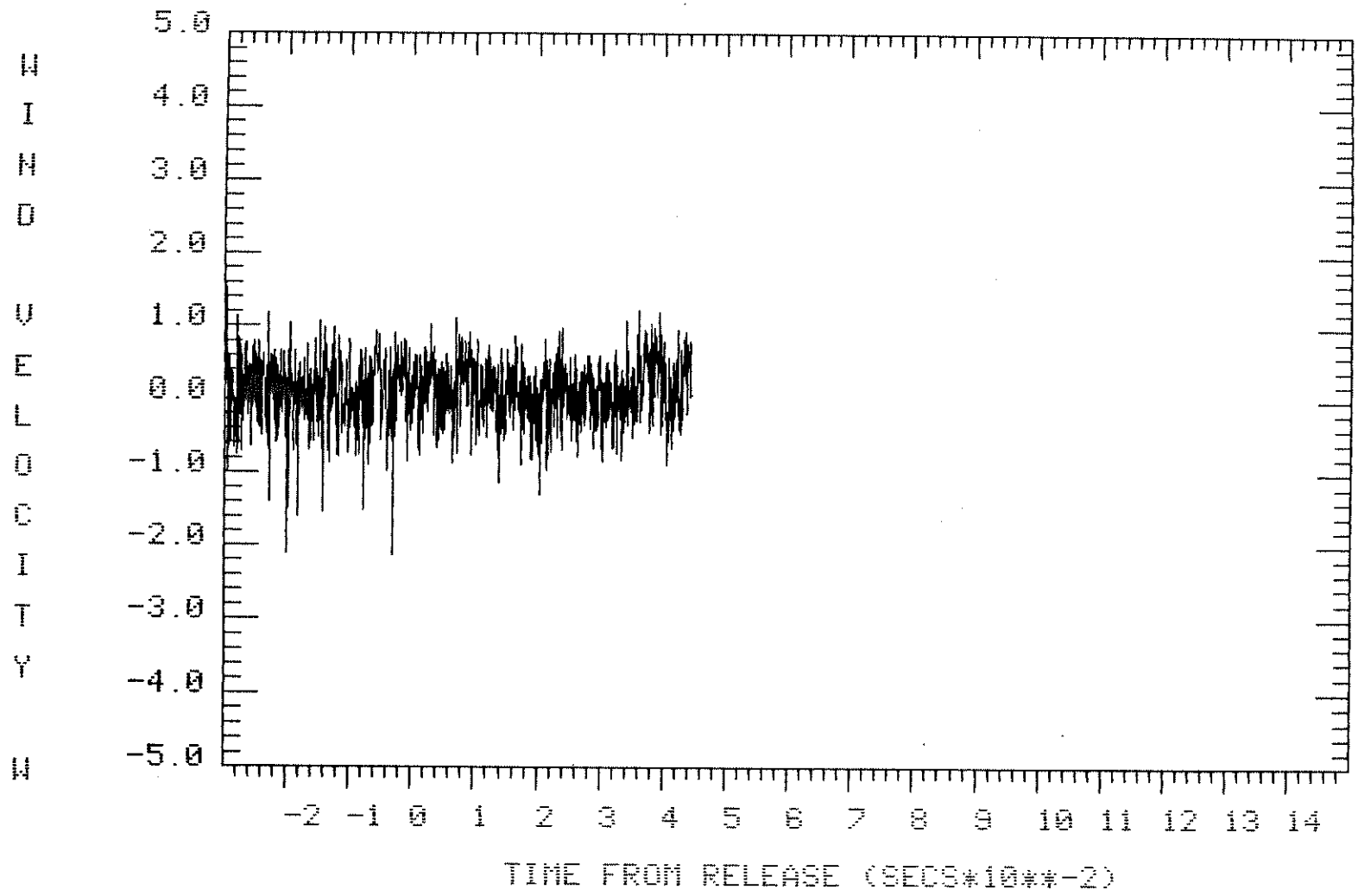


TRIAL: 015 TYPE: UANB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 2.0 M

MEAN OF RUN UP: 3.25 MEAN OF RUN DOWN: 2.65

E05

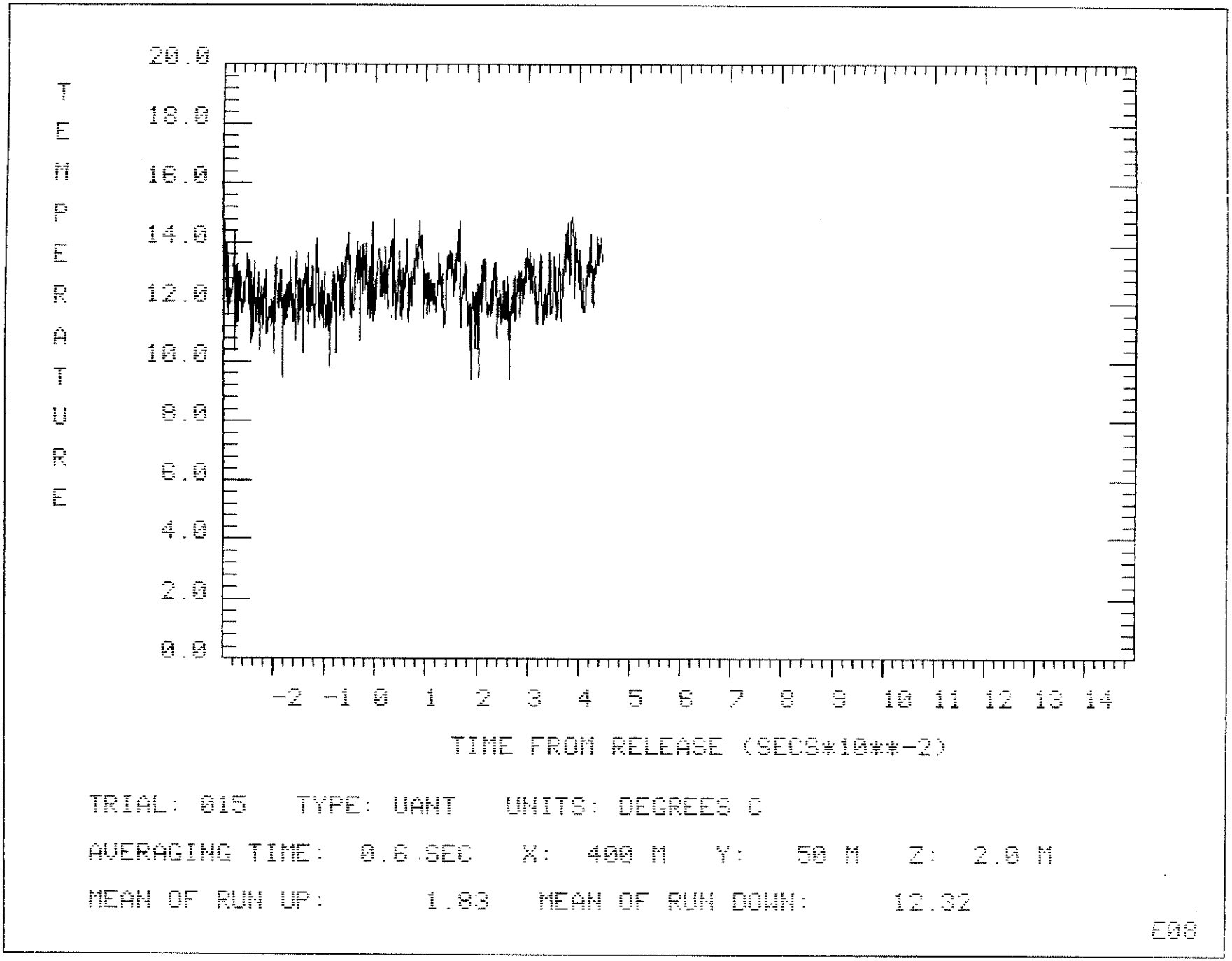


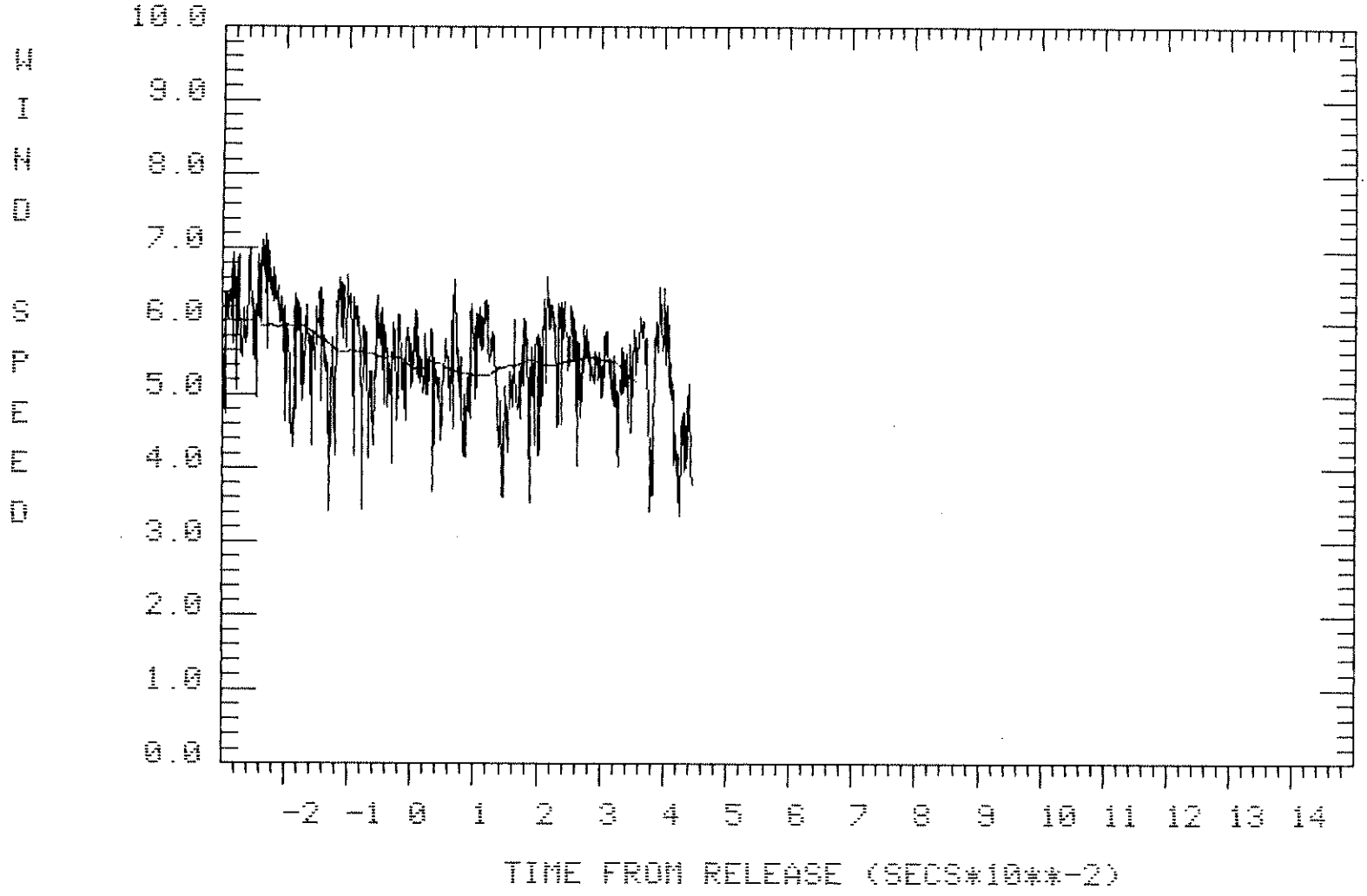
TRIAL: 015 TYPE: UANW UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 2.0 M

MEAN OF RUN UP: -0.19 MEAN OF RUN DOWN: 0.08

E07


TEMPERATURE
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: UANT UNITS: DEGREES C
AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 2.0 M
MEAN OF RUN UP: 1.83 MEAN OF RUN DOWN: 12.32
E08

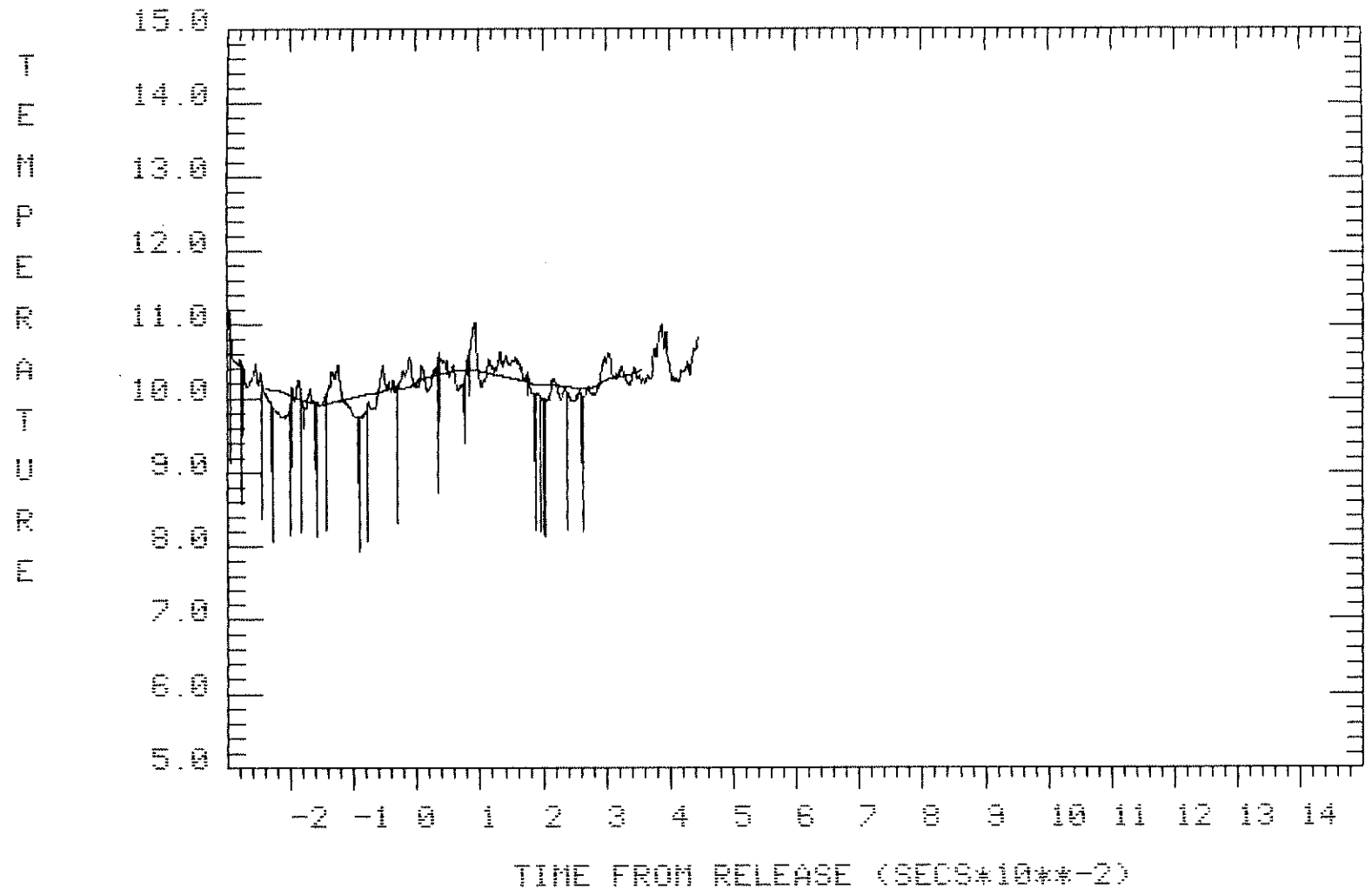


TRIAL: 015 TYPE: WSPD UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 4.5 M

MEAN OF RUN UP: 4.87 MEAN OF RUN DOWN: 5.13

E09

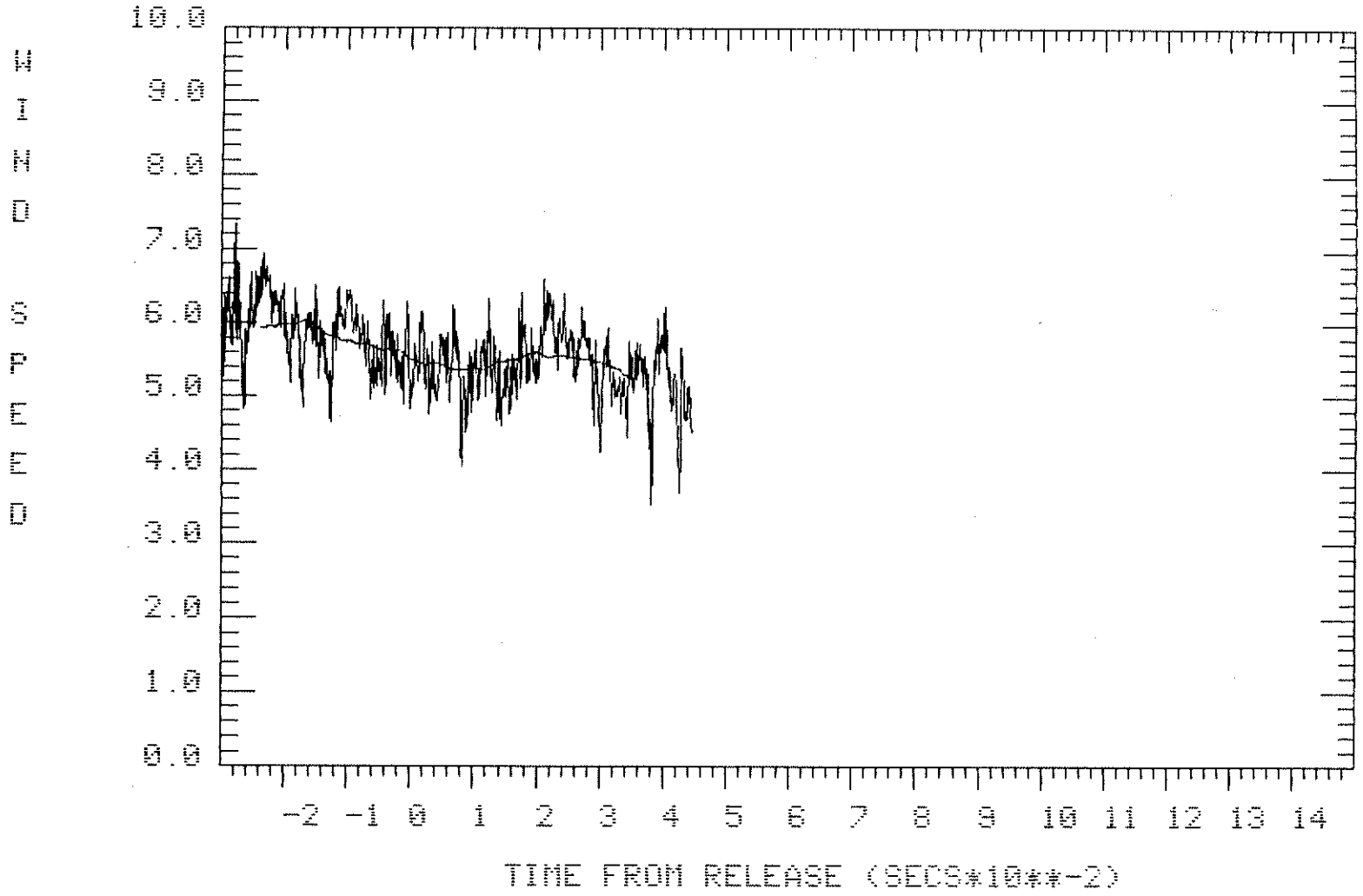


TRIAL: 015 TYPE: AIRT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 9.0 M

MEAN OF RUN UP: 9.44 MEAN OF RUN DOWN: 10.13

E10

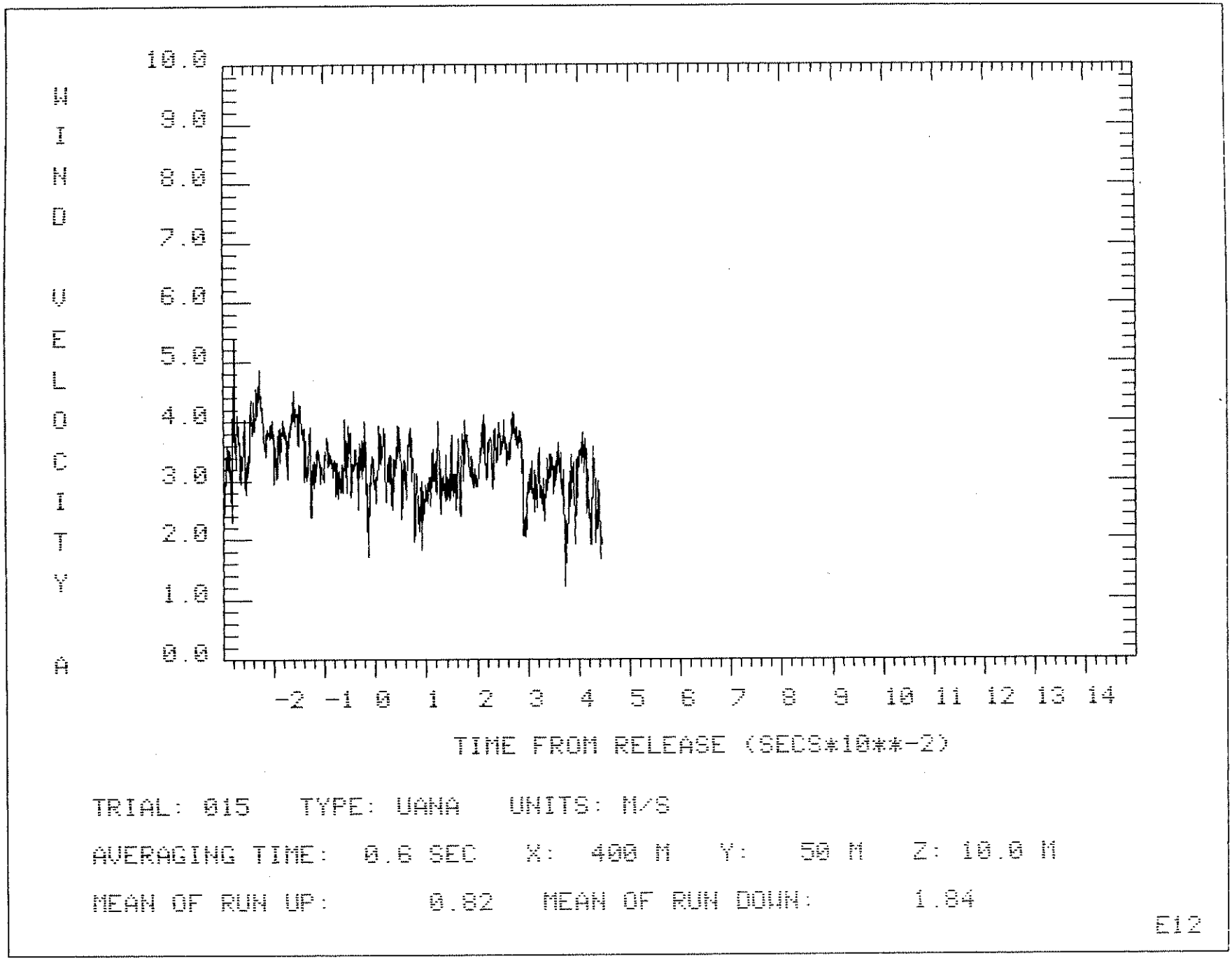


TRIAL: 015 TYPE: WSPD UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: 4.96 MEAN OF RUN DOWN: 5.23

E11

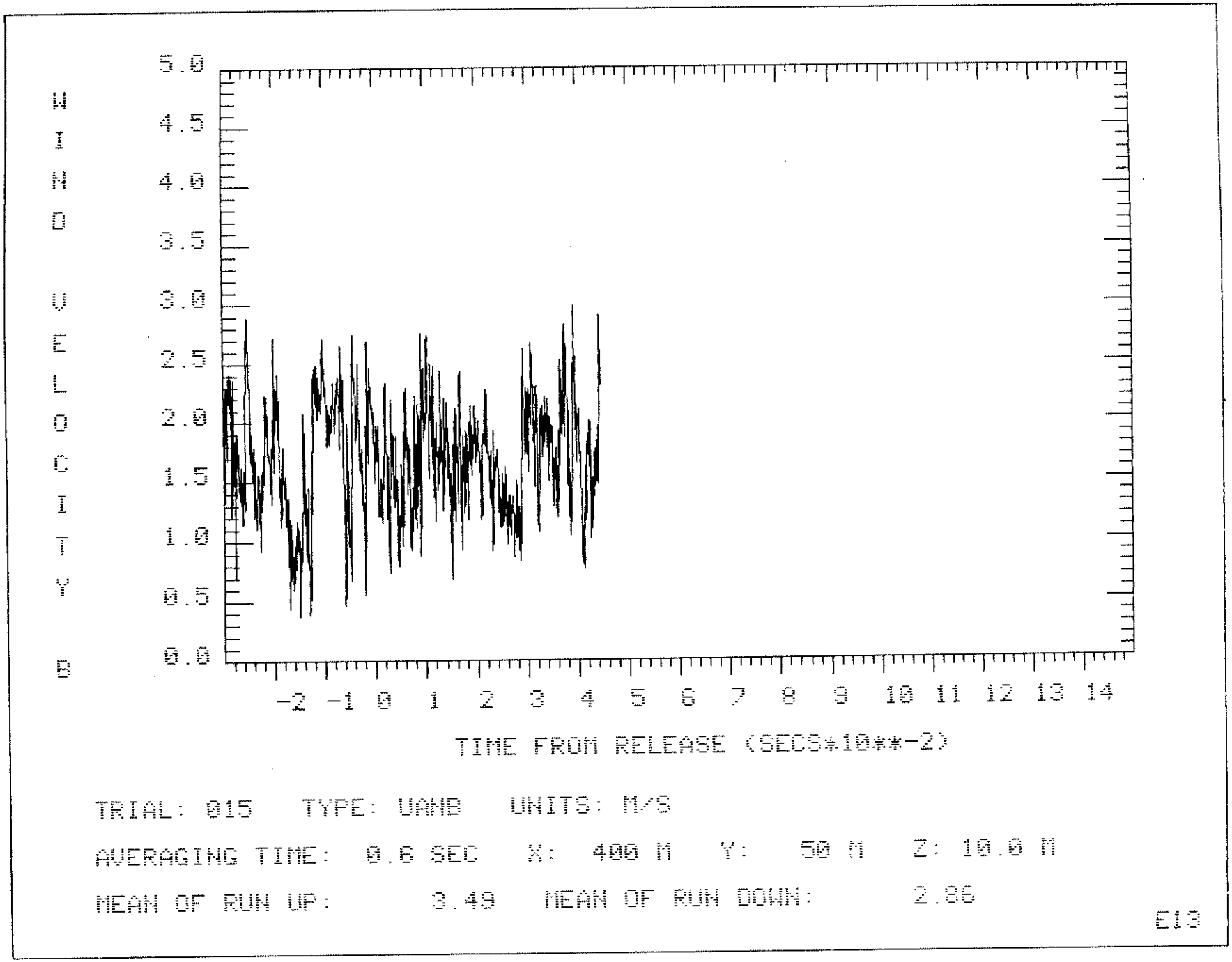


TRIAL: 015 TYPE: UANA UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: 0.82 MEAN OF RUN DOWN: 1.84

E12

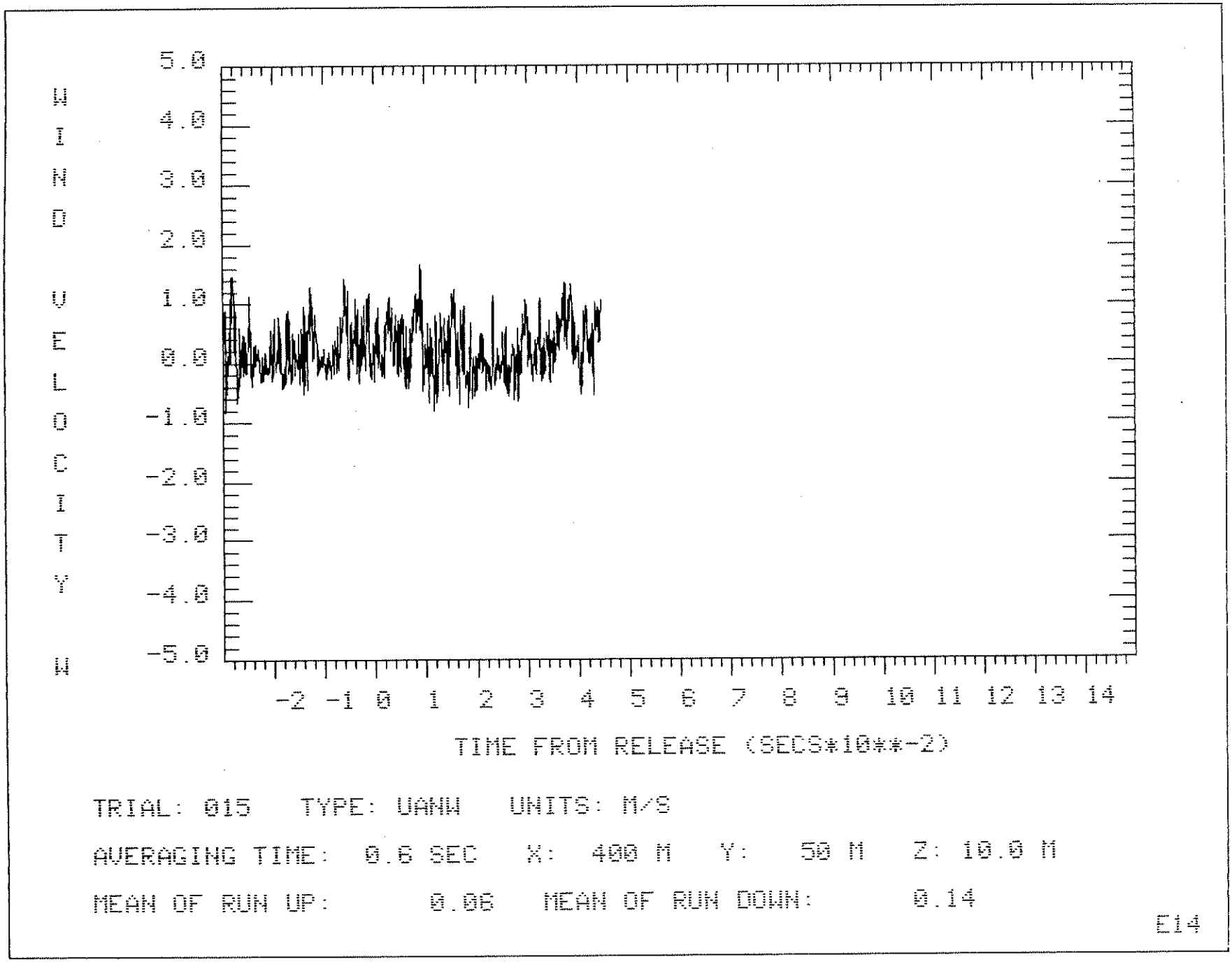


TRIAL: 015 TYPE: UANB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: 3.49 MEAN OF RUN DOWN: 2.86

E13

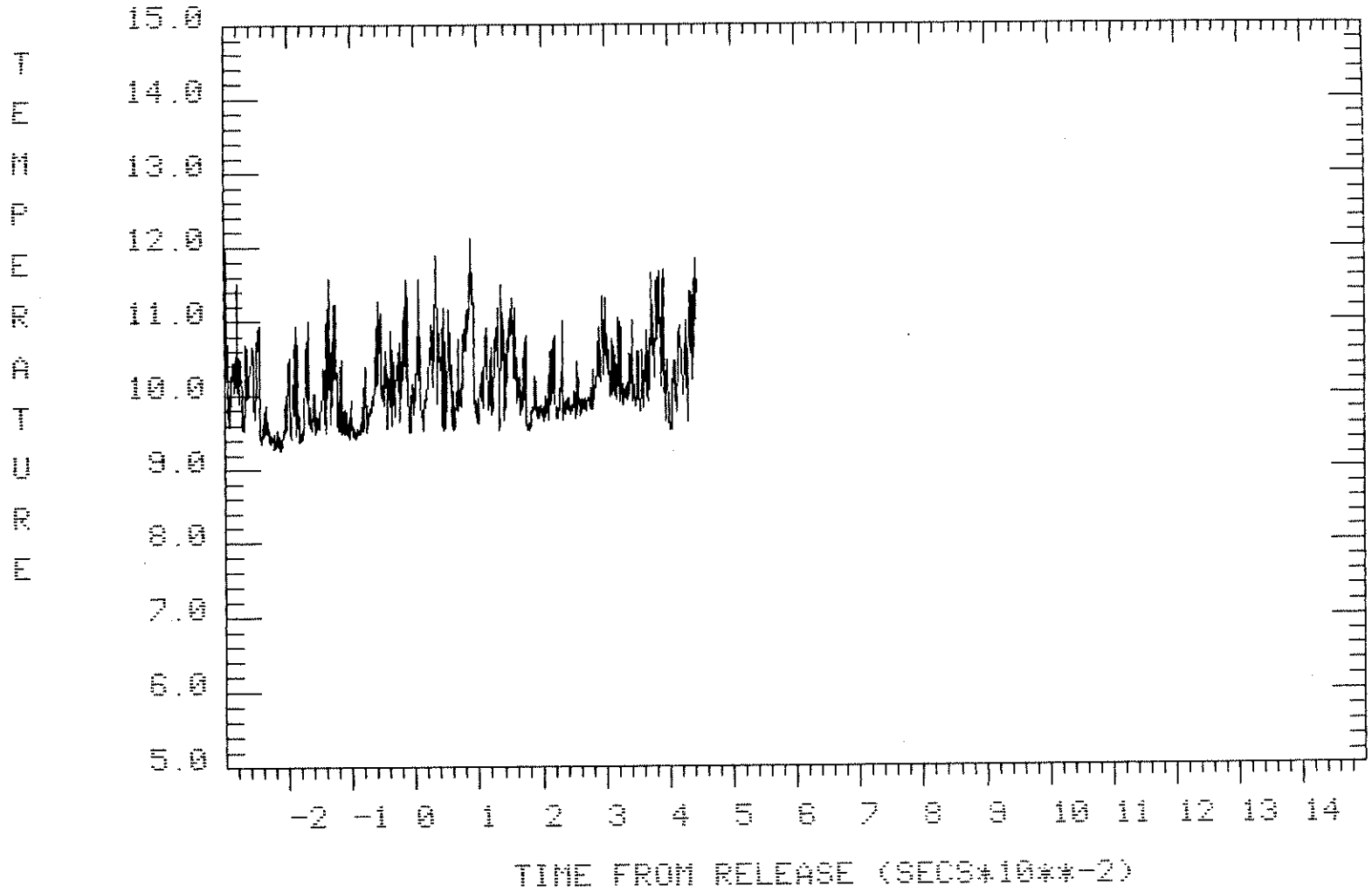


TRIAL: 015 TYPE: UANW UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: 0.06 MEAN OF RUN DOWN: 0.14

E14

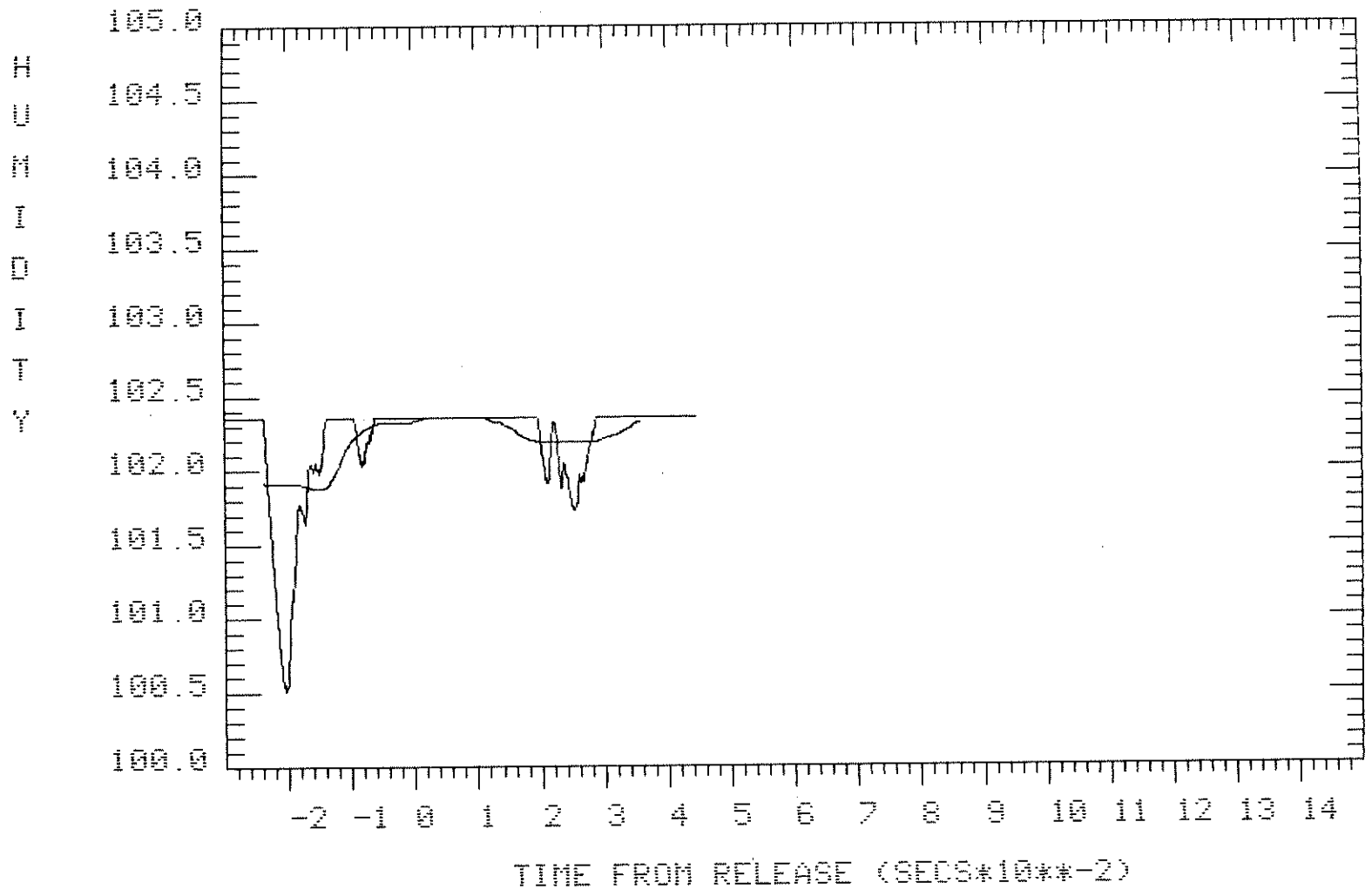


TRIAL: 015 TYPE: UANT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: 9.36 MEAN OF RUN DOWN: 10.01

E15

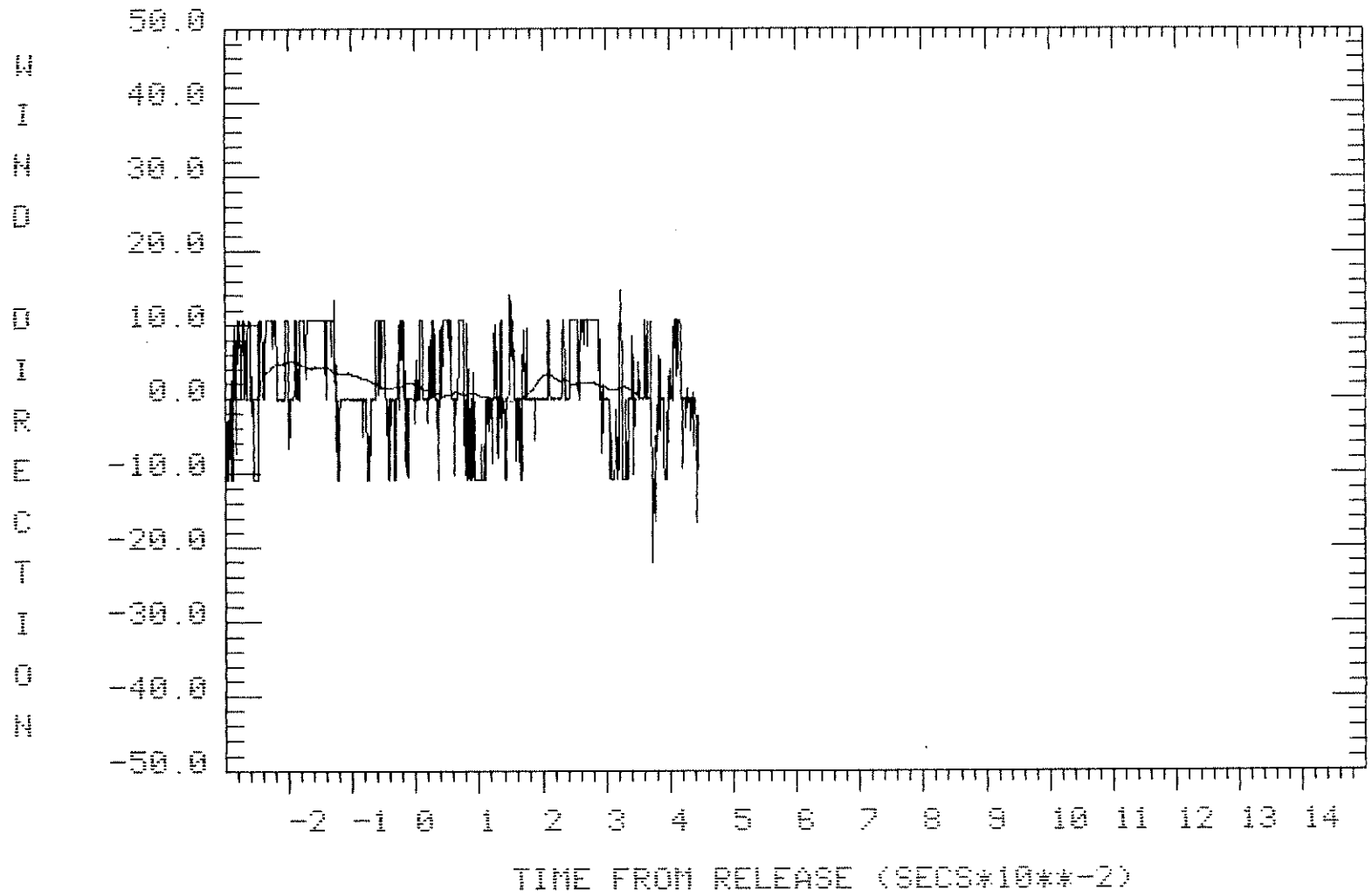


TRIAL: 015 TYPE: RHUM UNITS: PER CENT

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: 102.35 MEAN OF RUN DOWN: 102.35

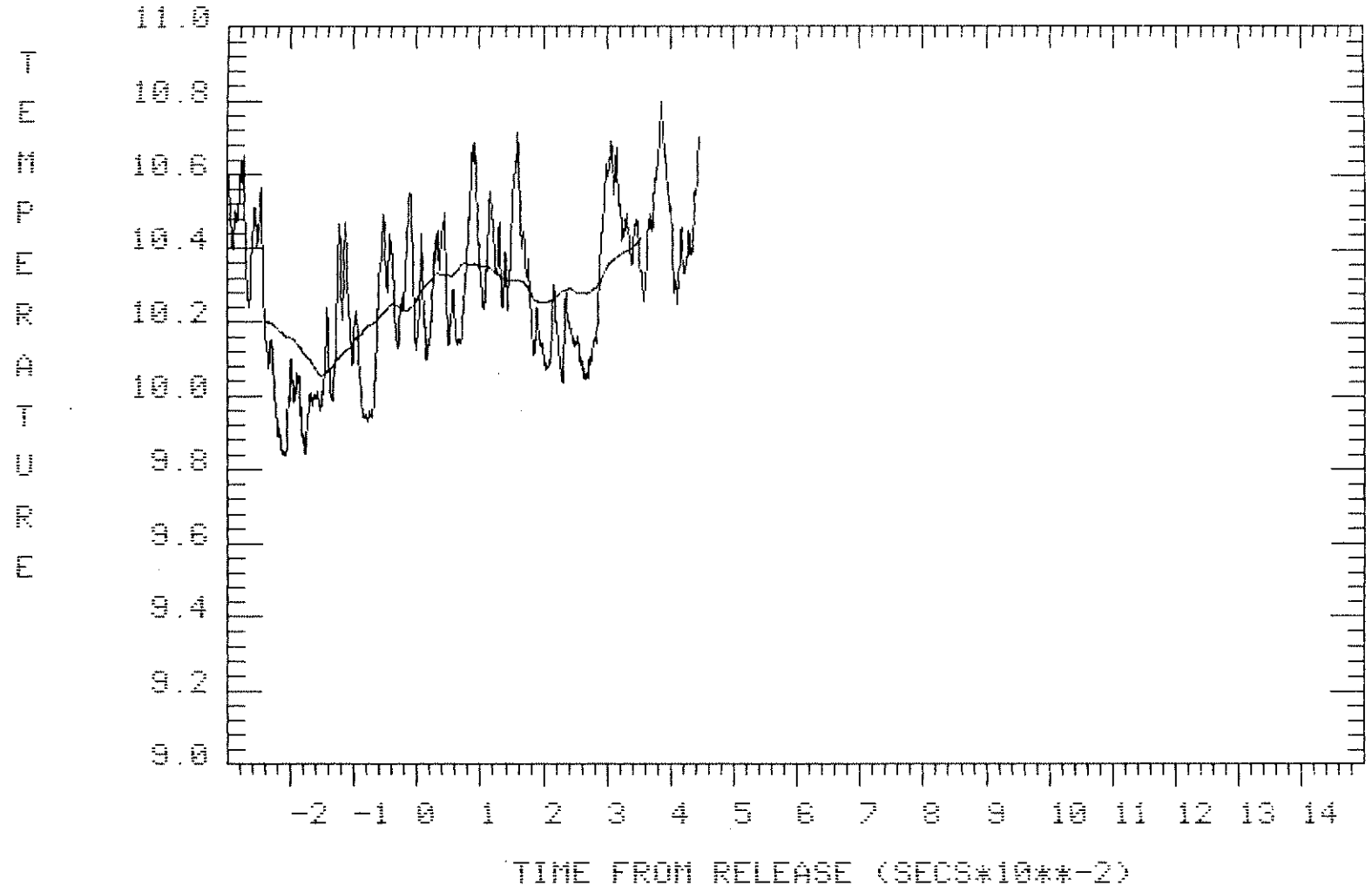
E16



TRIAL: 015 TYPE: WHDG UNITS: DEGREES

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: -28.43 MEAN OF RUN DOWN: -16.64

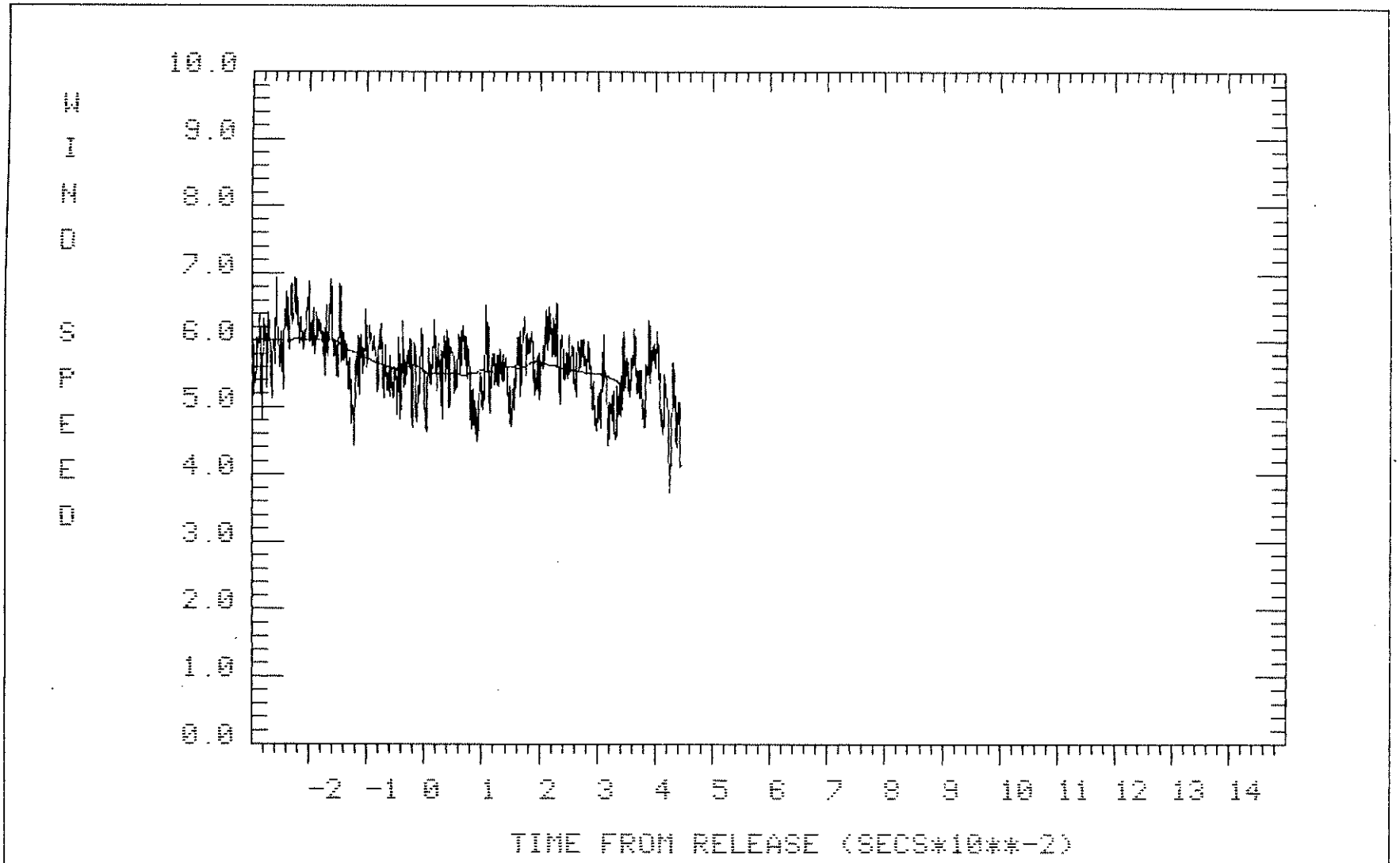


TRIAL: 015 TYPE: AIRT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 16.0 M

MEAN OF RUN UP: 9.51 MEAN OF RUN DOWN: 10.16

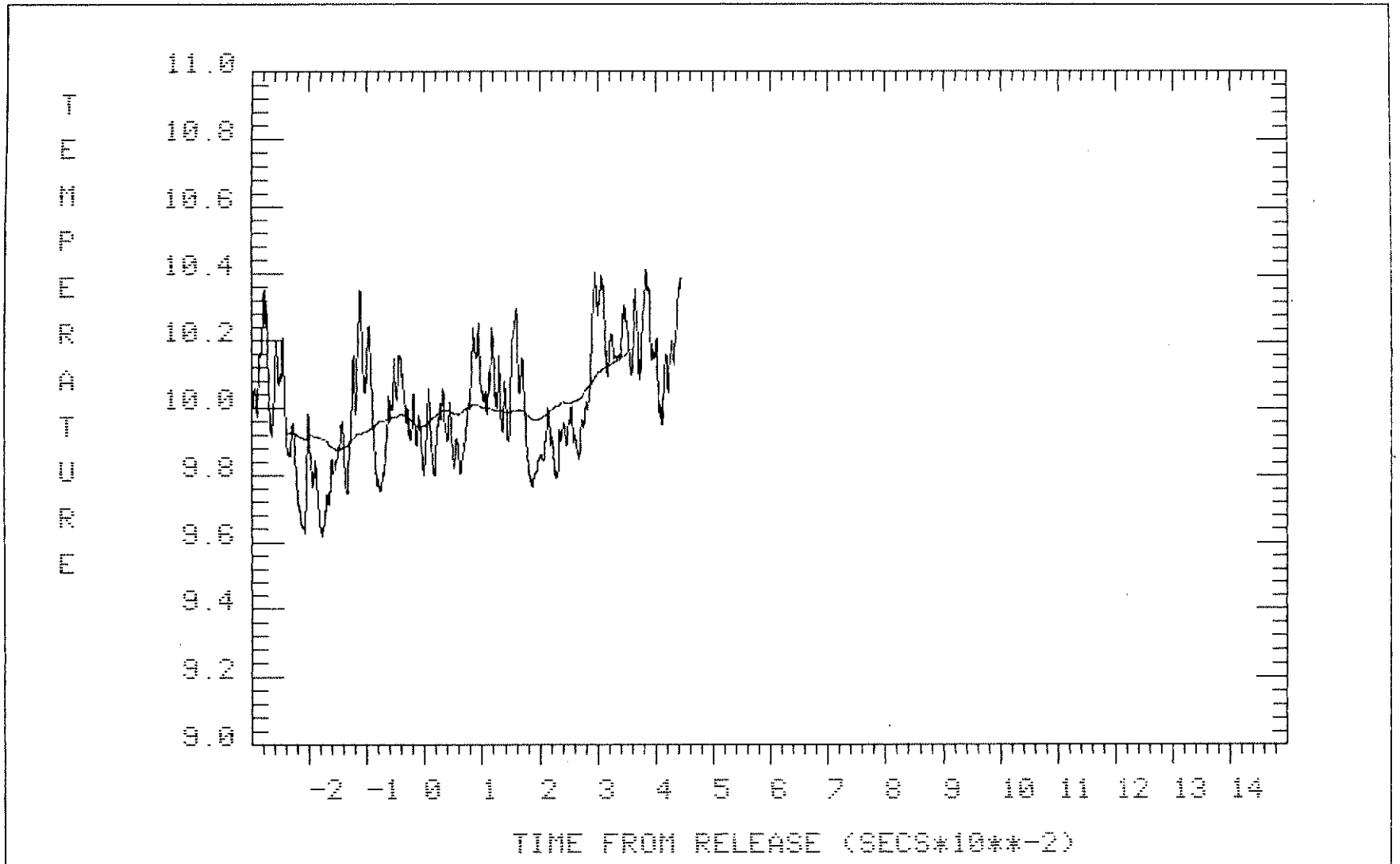
E18



TRIAL: 015 TYPE: WSPD UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 17.3 M

MEAN OF RUN UP: 5.04 MEAN OF RUN DOWN: 5.40

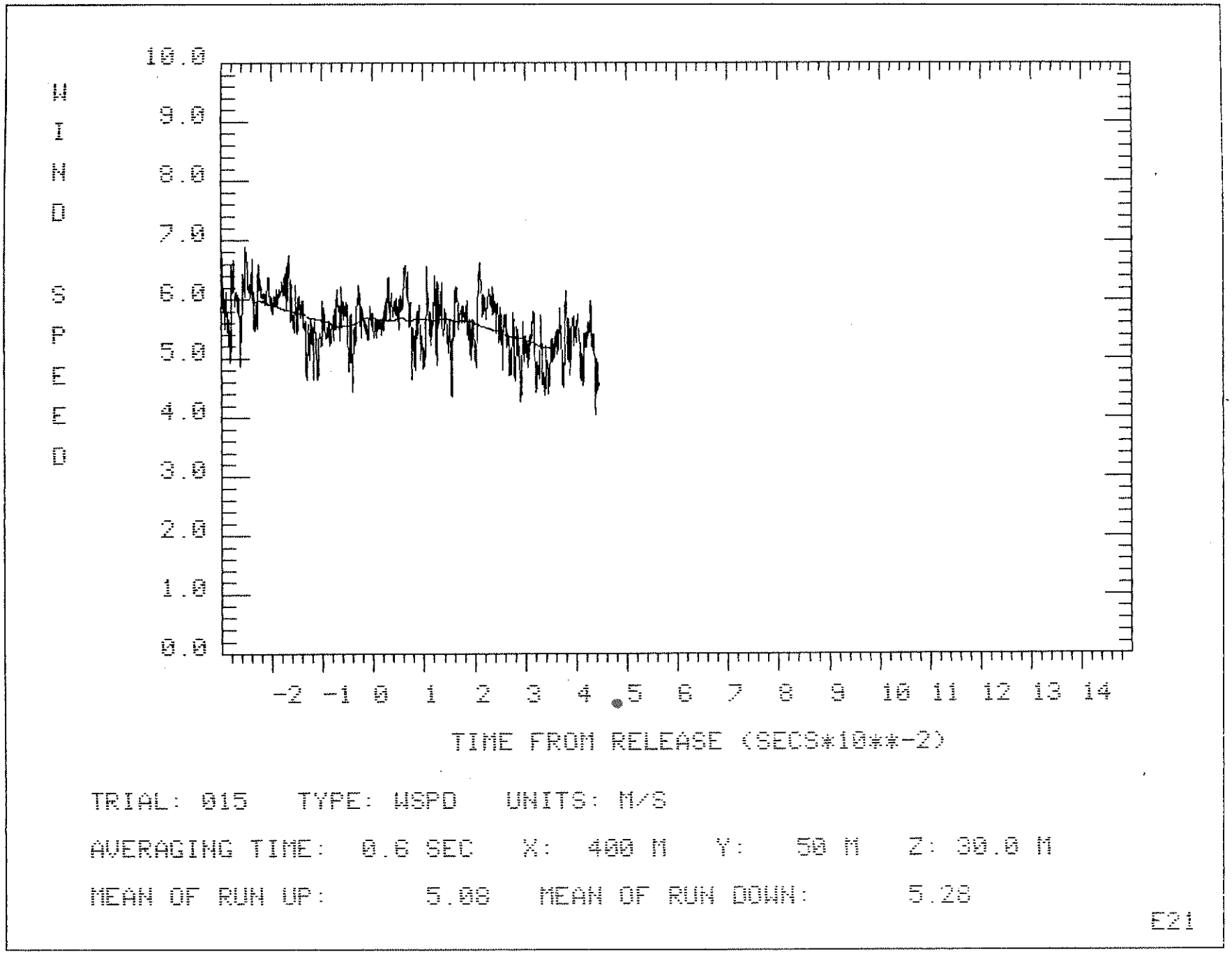


TRIAL: 015 TYPE: AIRT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 22.0 M

MEAN OF RUN UP: 9.29 MEAN OF RUN DOWN: 9.88

E20

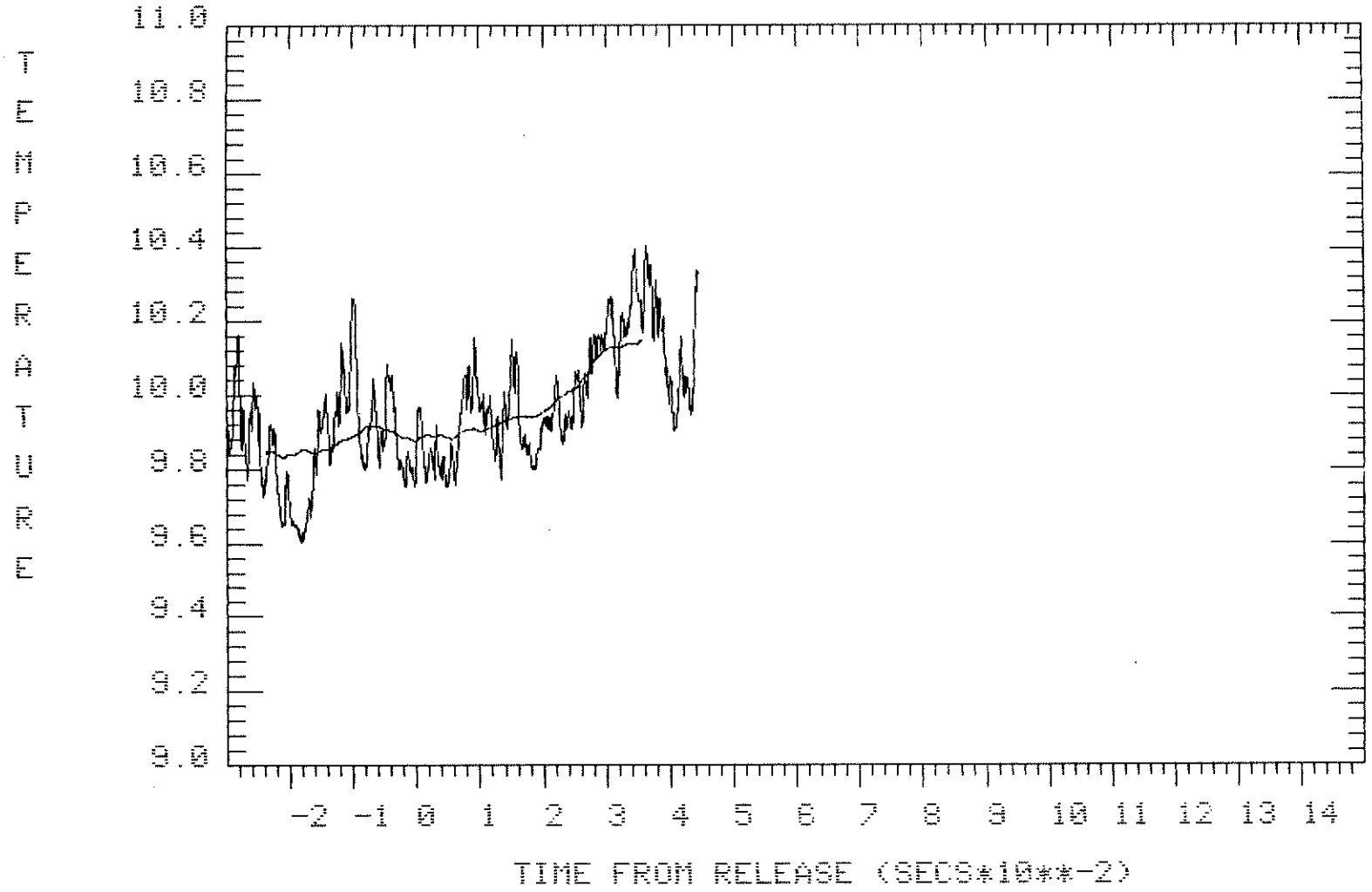


TRIAL: 015 TYPE: WSPD UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 30.0 M

MEAN OF RUN UP: 5.08 MEAN OF RUN DOWN: 5.28

E21

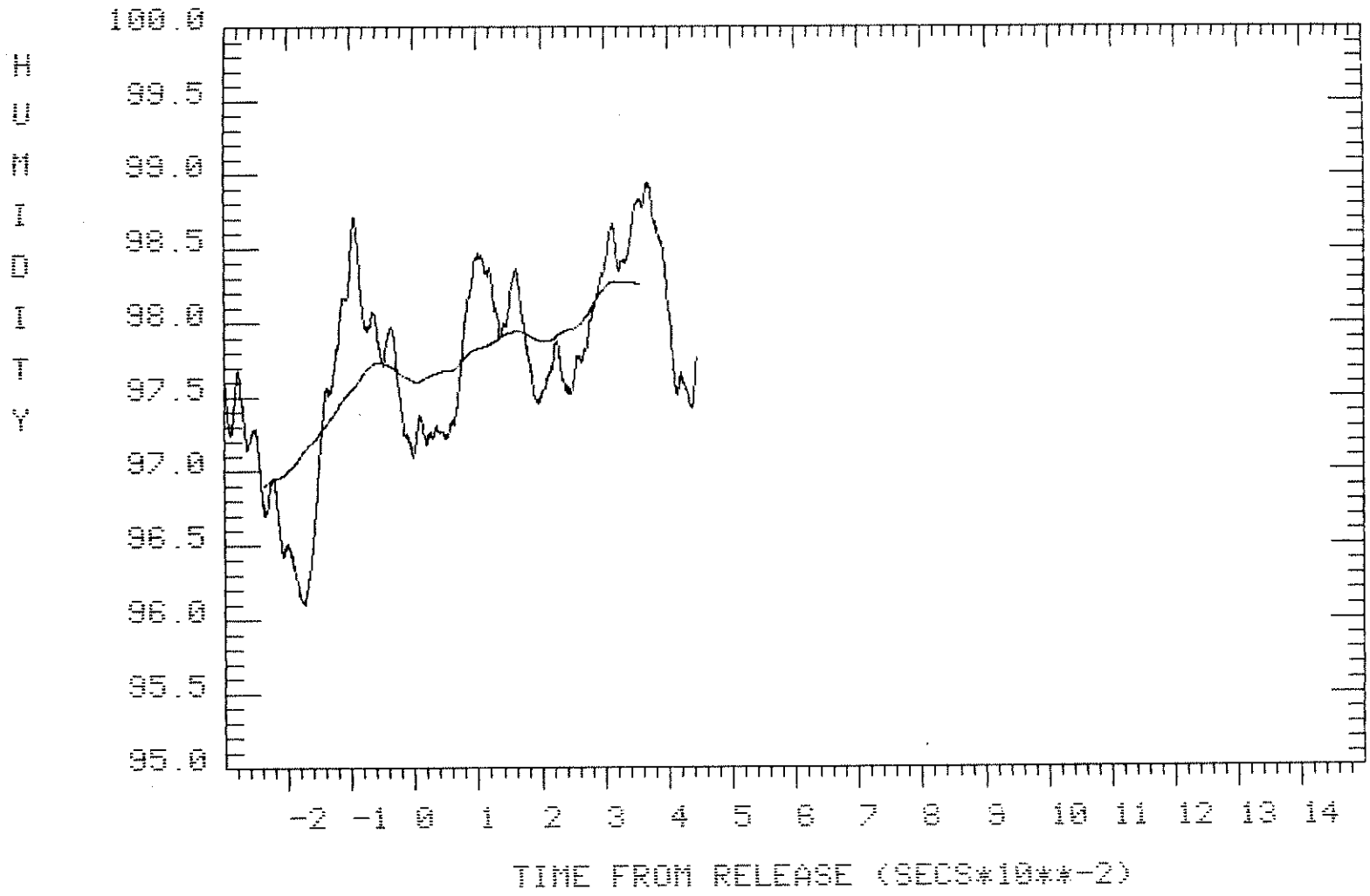


TRIAL: 015 TYPE: AIRT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 30.0 M

MEAN OF RUN UP: 9.86 MEAN OF RUN DOWN: 9.86

E22

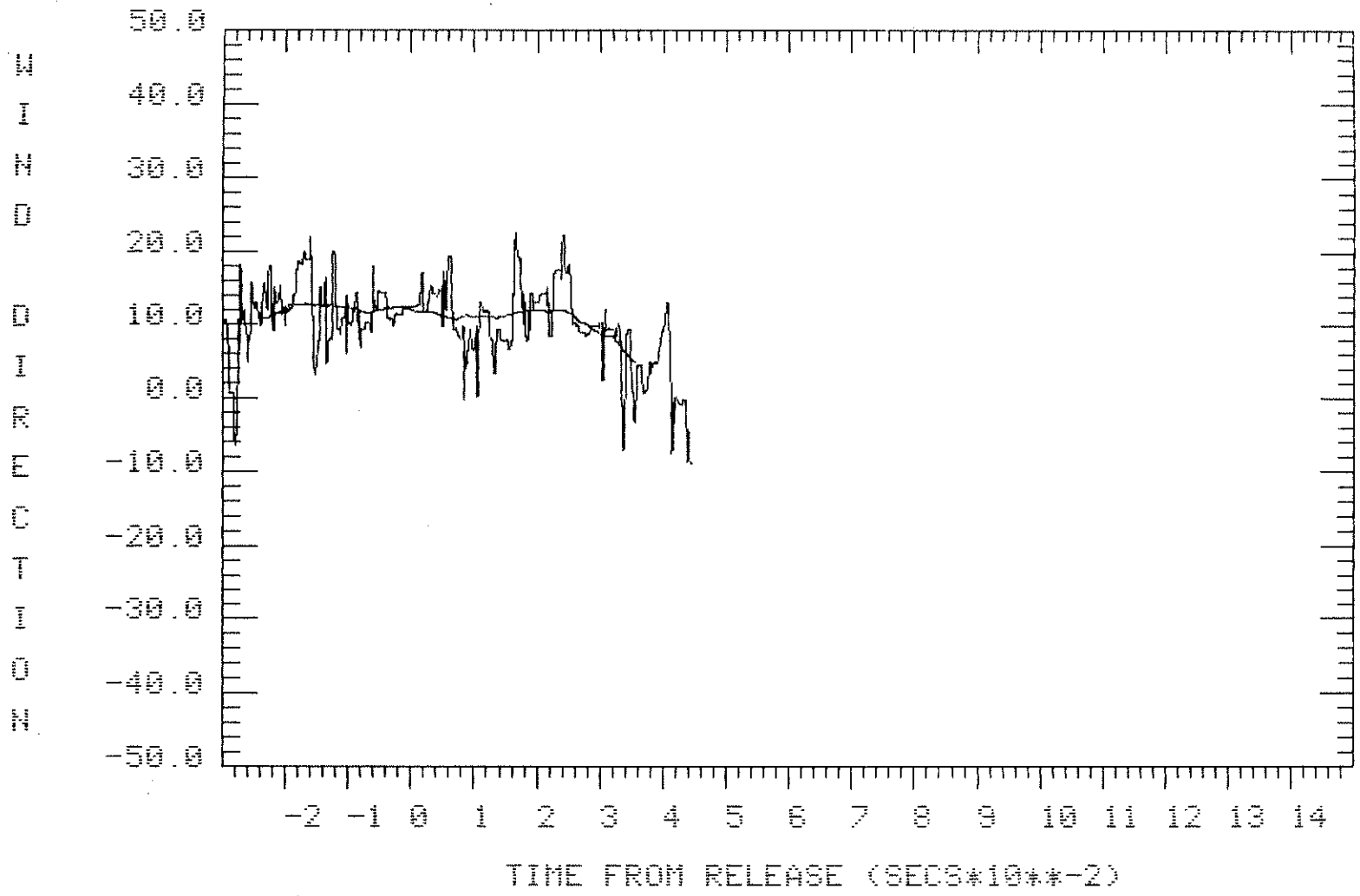


TRIAL: 015 TYPE: RHUM UNITS: PER CENT

AVERAGING TIME: 0.6 SEC X: 400 M Y: 50 M Z: 30.0 M

MEAN OF RUN UP: 100.85 MEAN OF RUN DOWN: 98.00

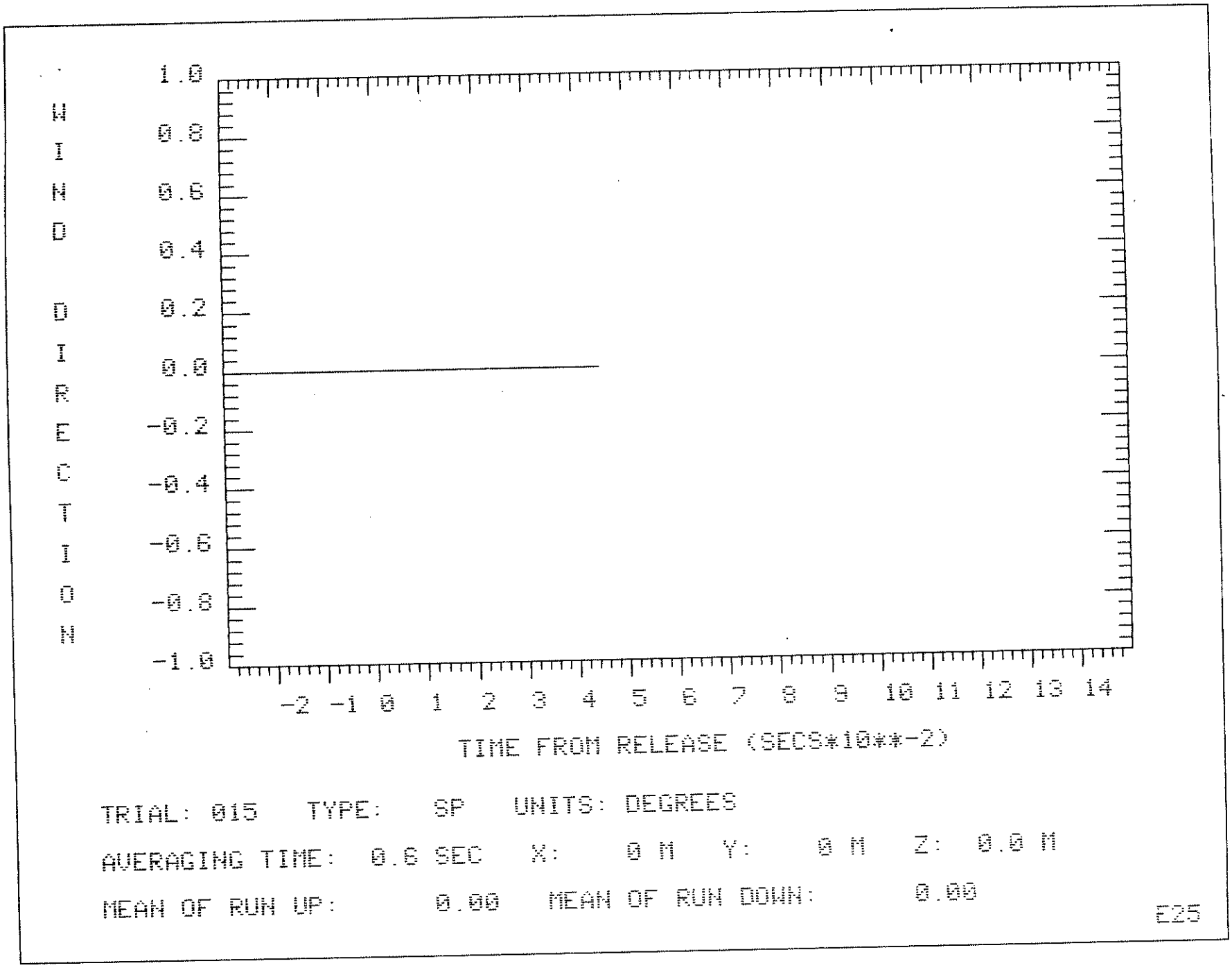
E29



TRIAL: 015 TYPE: WHDG UNITS: DEGREES

AVERAGING TIME: 0.6 SEC X: 425 M Y: 50 M Z: 10.0 M

MEAN OF RUN UP: -20.57 MEAN OF RUN DOWN: -7.86

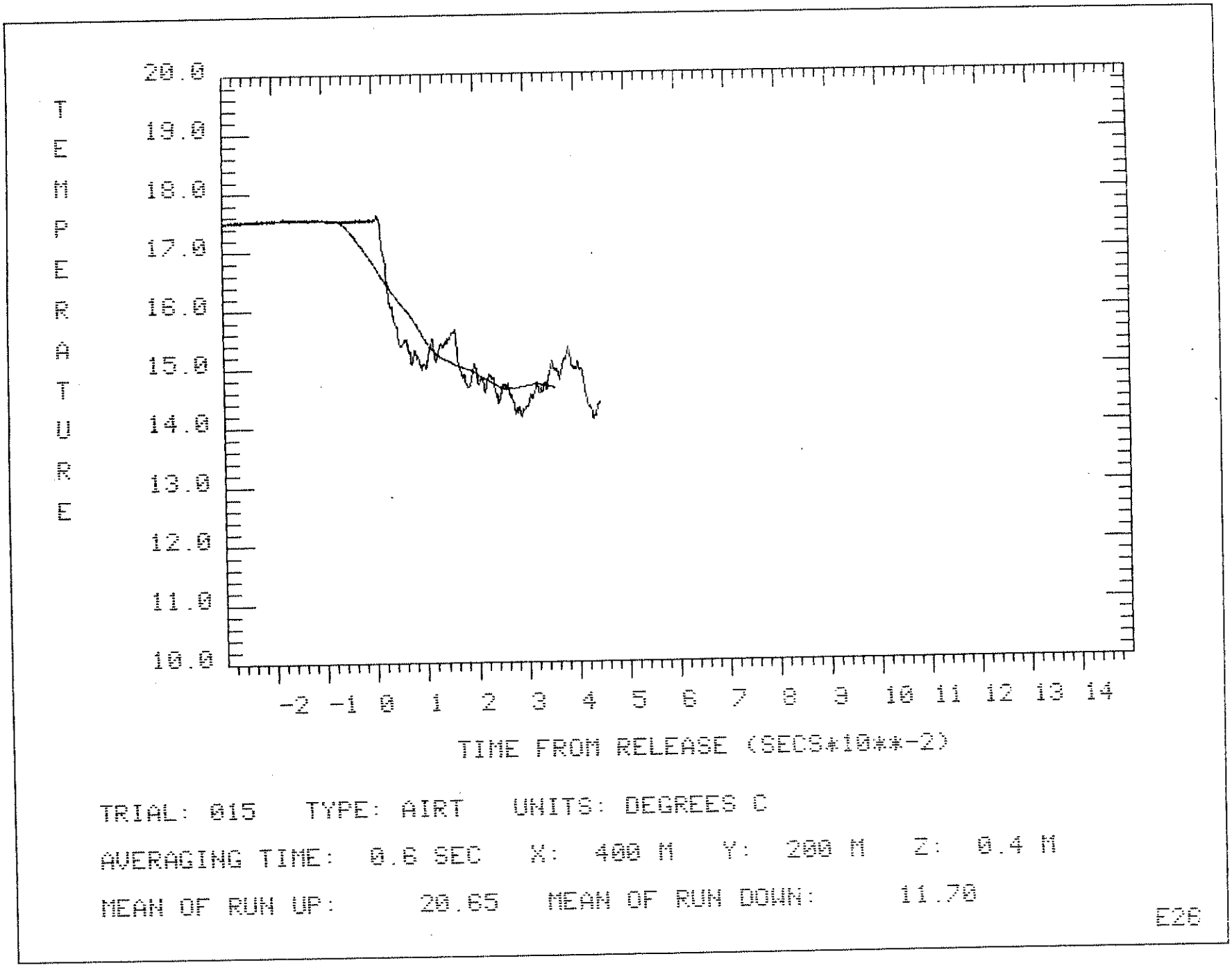


TRIAL: 015 TYPE: SP UNITS: DEGREES

AVERAGING TIME: 0.6 SEC X: 0 M Y: 0 M Z: 0.0 M

MEAN OF RUN UP: 0.00 MEAN OF RUN DOWN: 0.00

E25

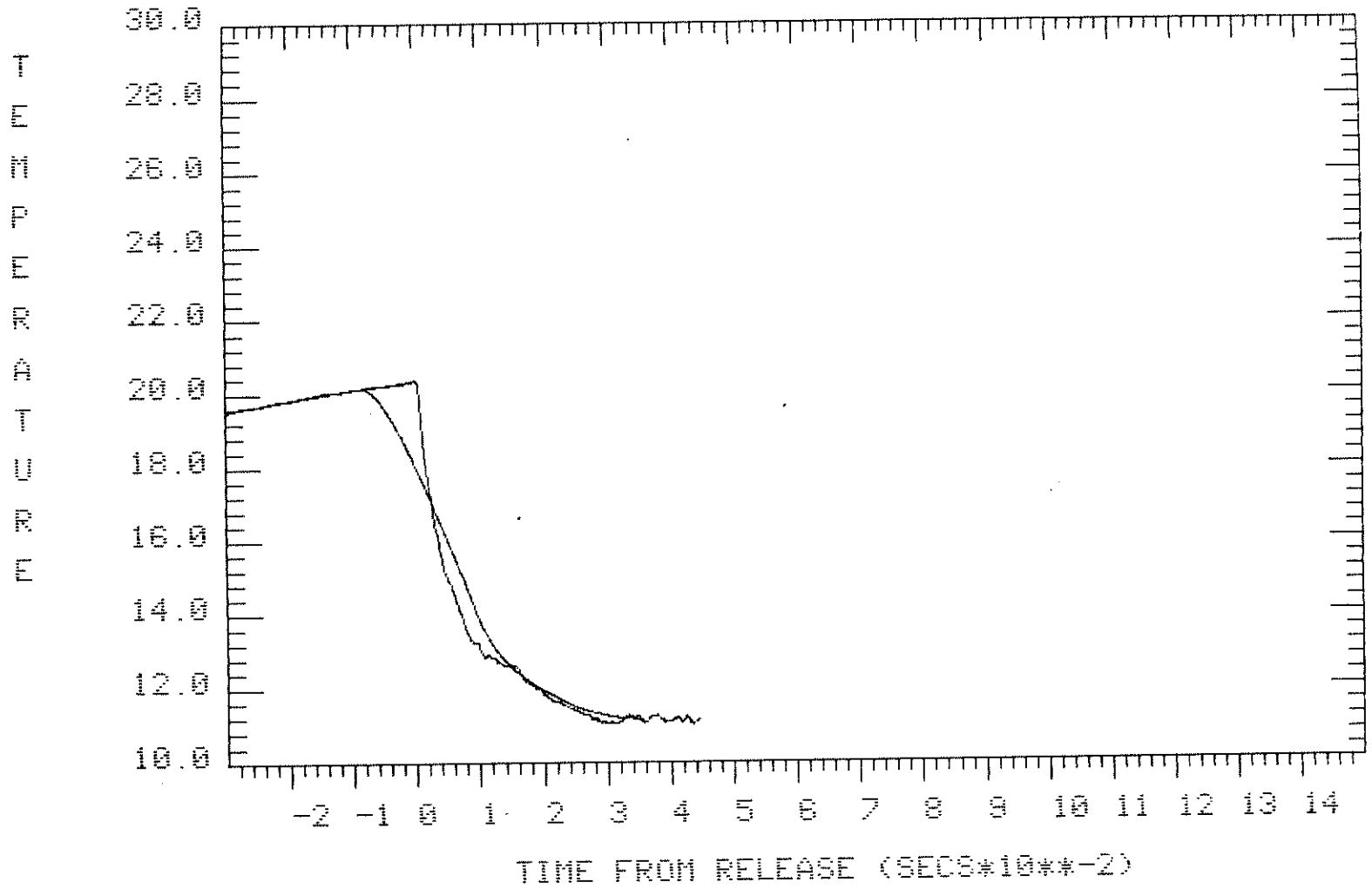


TRIAL: 015 TYPE: AIRT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 200 M Z: 0.4 M

MEAN OF RUN UP: 20.65 MEAN OF RUN DOWN: 11.70

E20

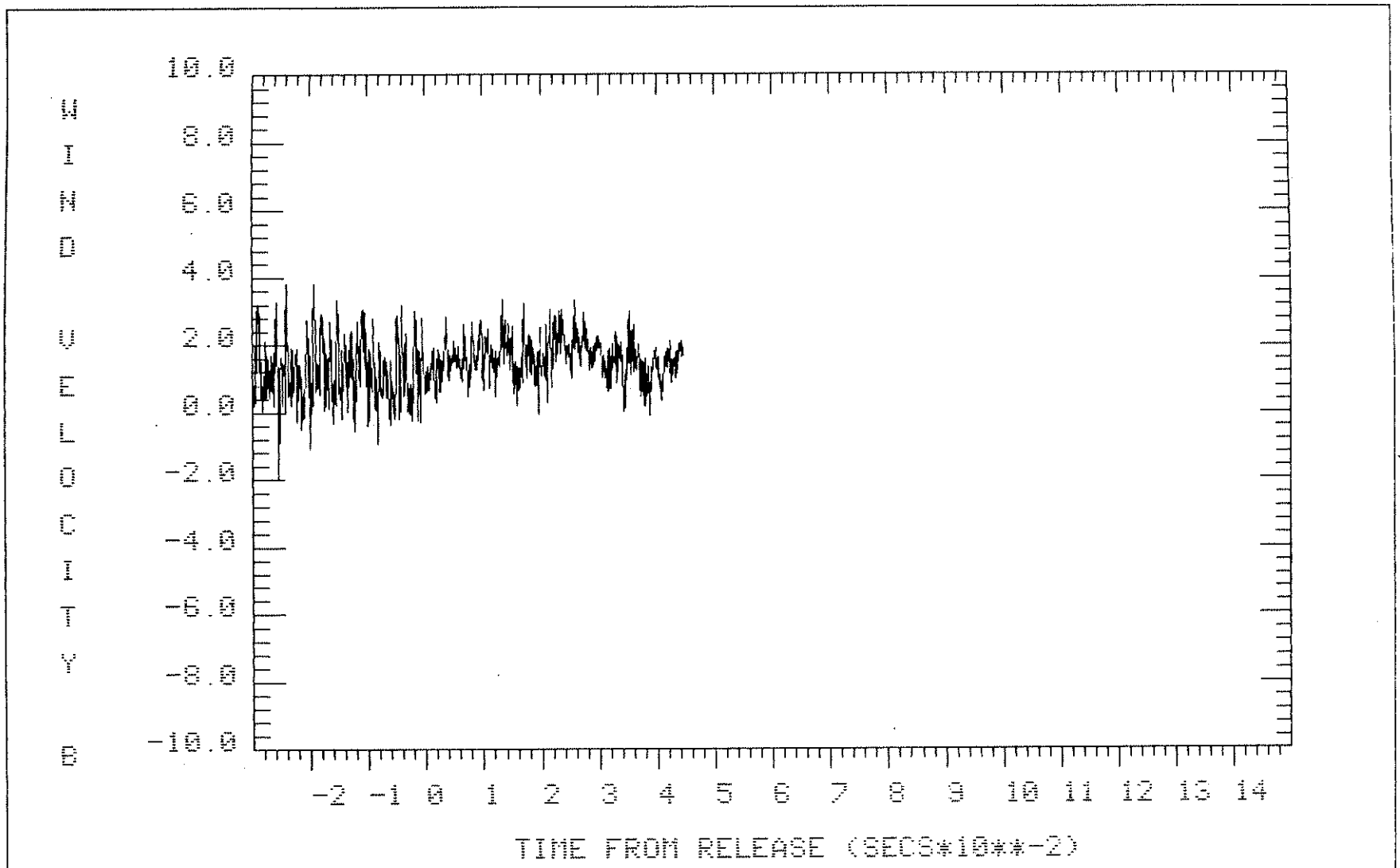


TRIAL: 015 TYPE: AIRT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 200 M Z: 12.0 M

MEAN OF RUN UP: 19.89 MEAN OF RUN DOWN: 16.64

E27

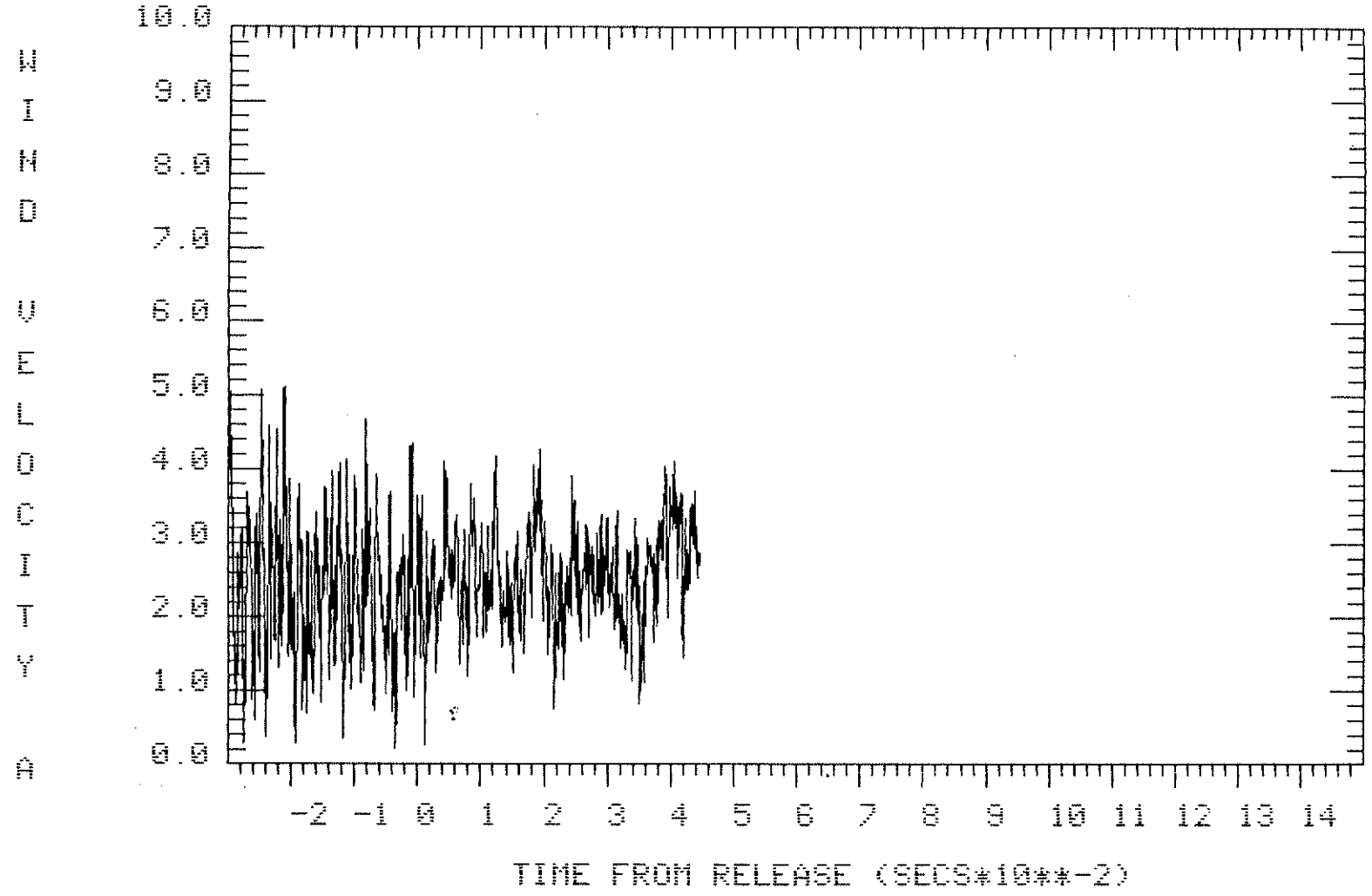


TRIAL: 015 TYPE: UANB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 250 M Z: 2.0 M

MEAN OF RUN UP: 2.35 MEAN OF RUN DOWN: 1.97

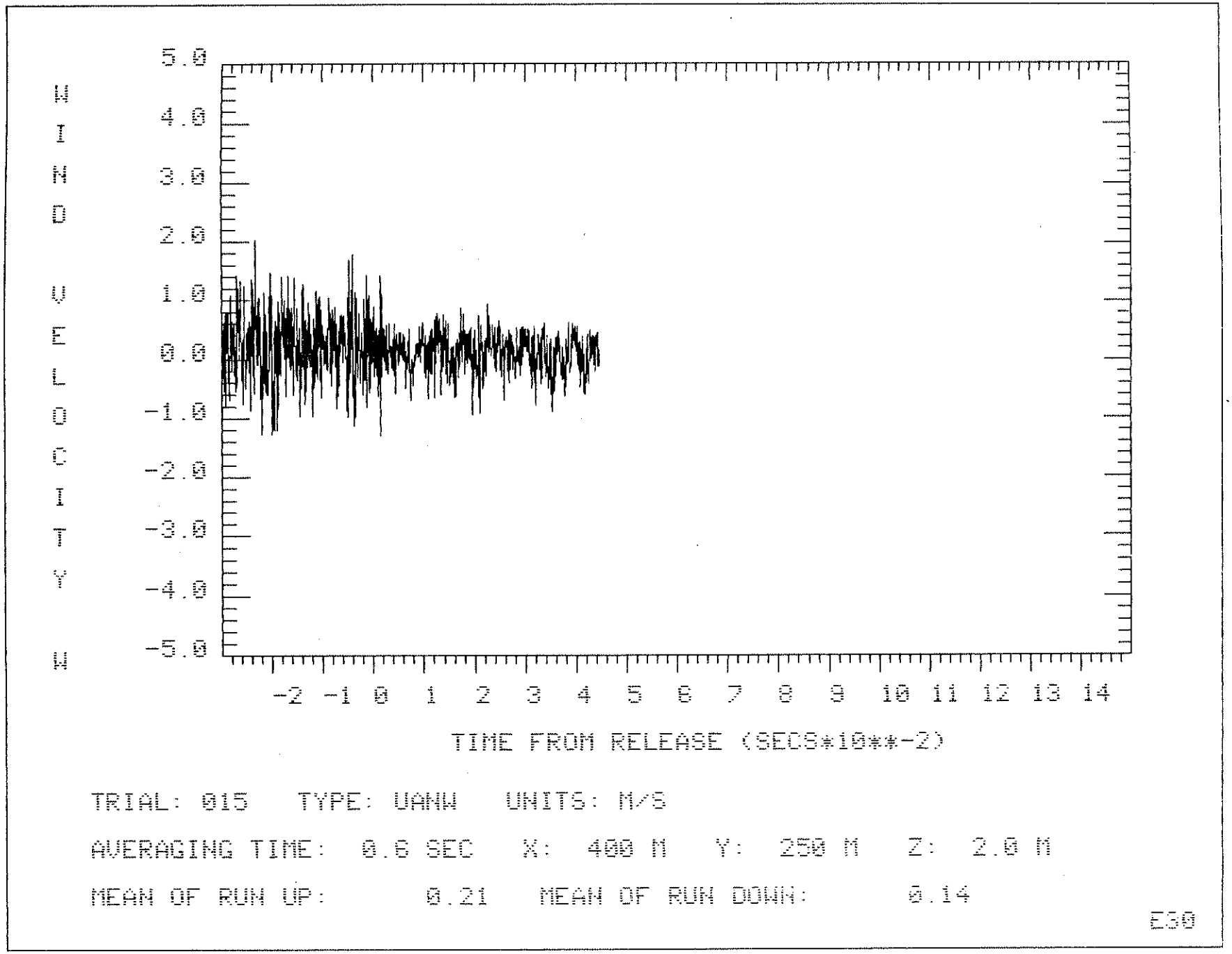
E28



TRIAL: 015 TYPE: UANA UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 250 M Z: 2.0 M

MEAN OF RUN UP: 0.97 MEAN OF RUN DOWN: 1.74

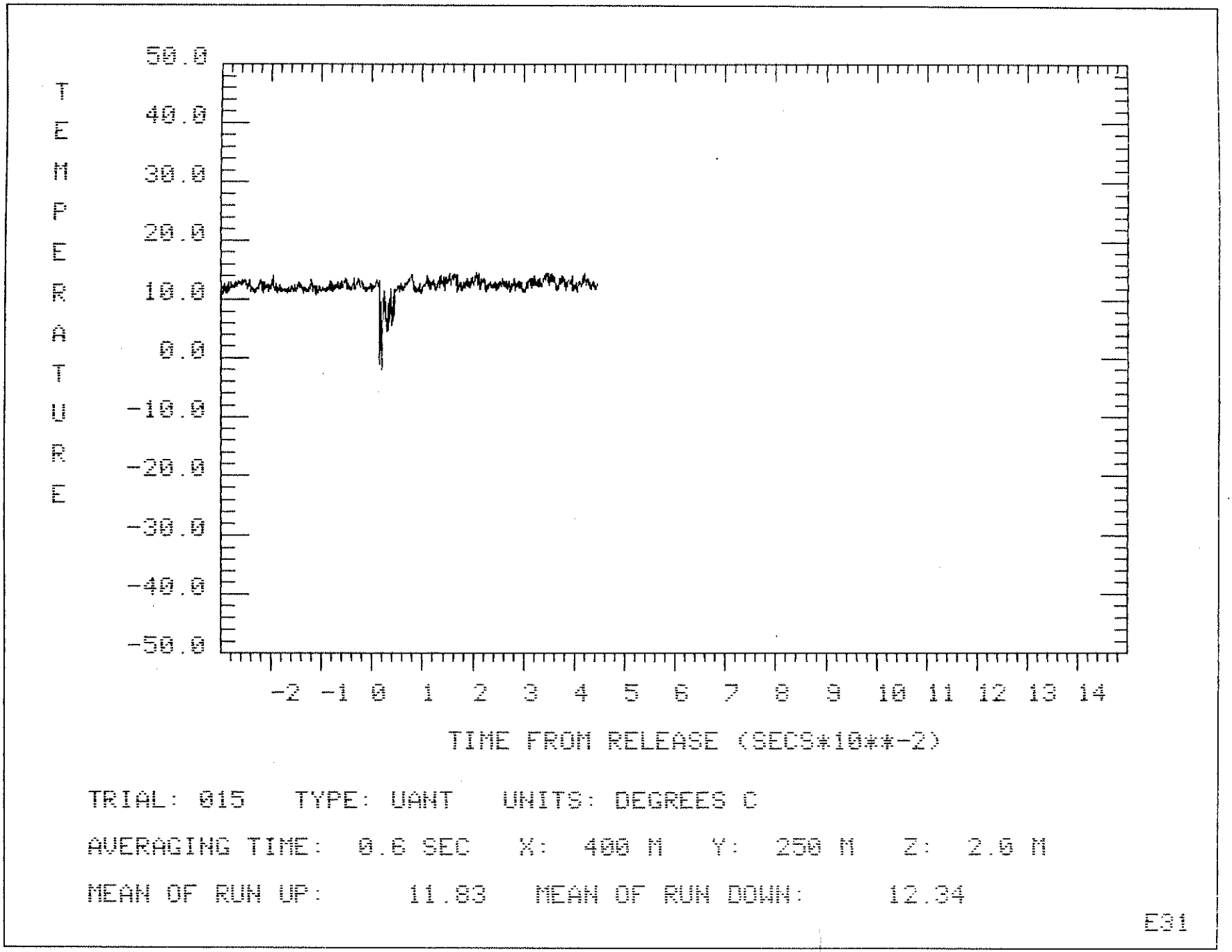


TRIAL: 015 TYPE: UANW UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 250 M Z: 2.0 M

MEAN OF RUN UP: 0.21 MEAN OF RUN DOWN: 0.14

E30

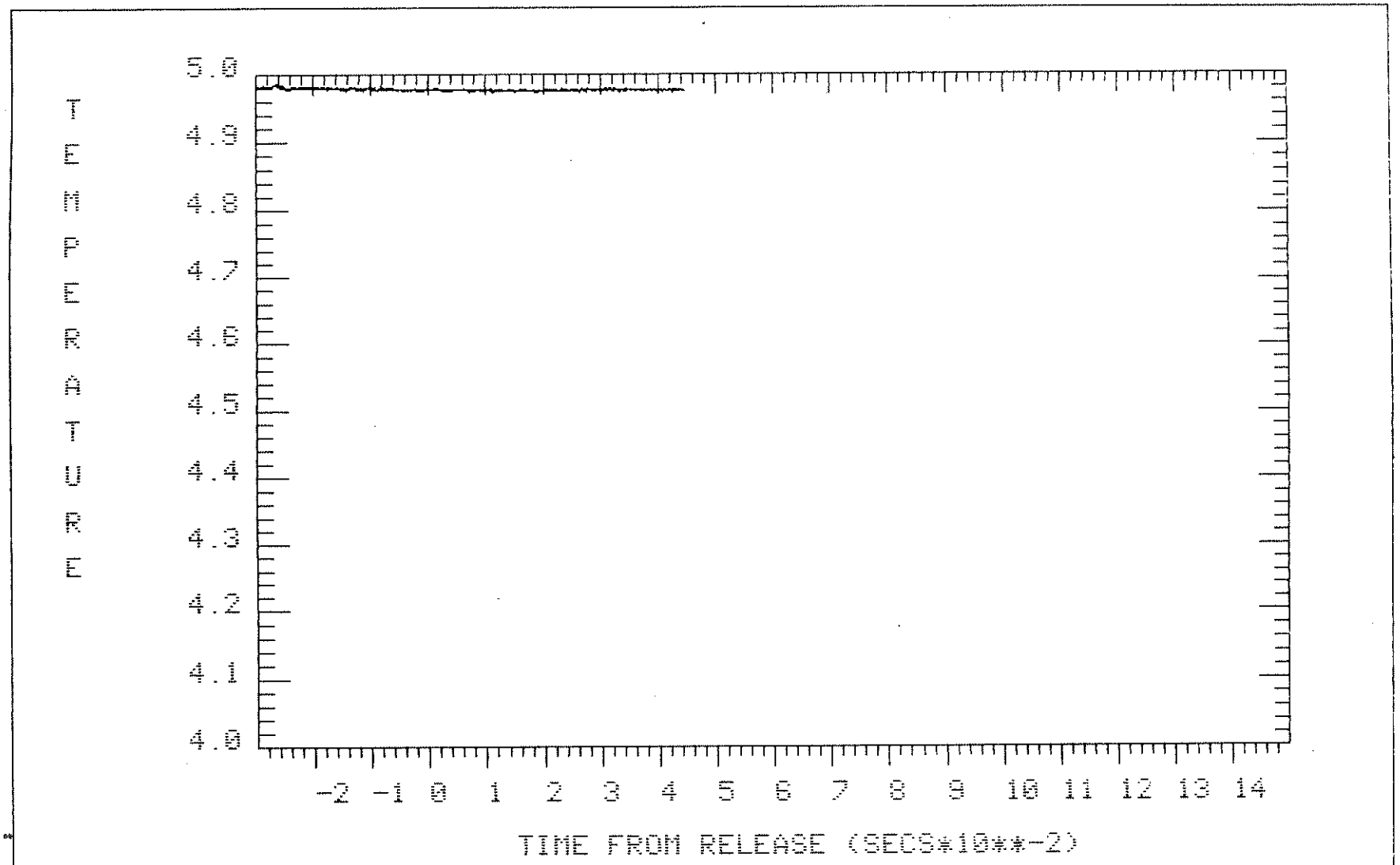


TRIAL: 015 TYPE: UANT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 250 M Z: 2.0 M

MEAN OF RUN UP: 11.83 MEAN OF RUN DOWN: 12.34

E31

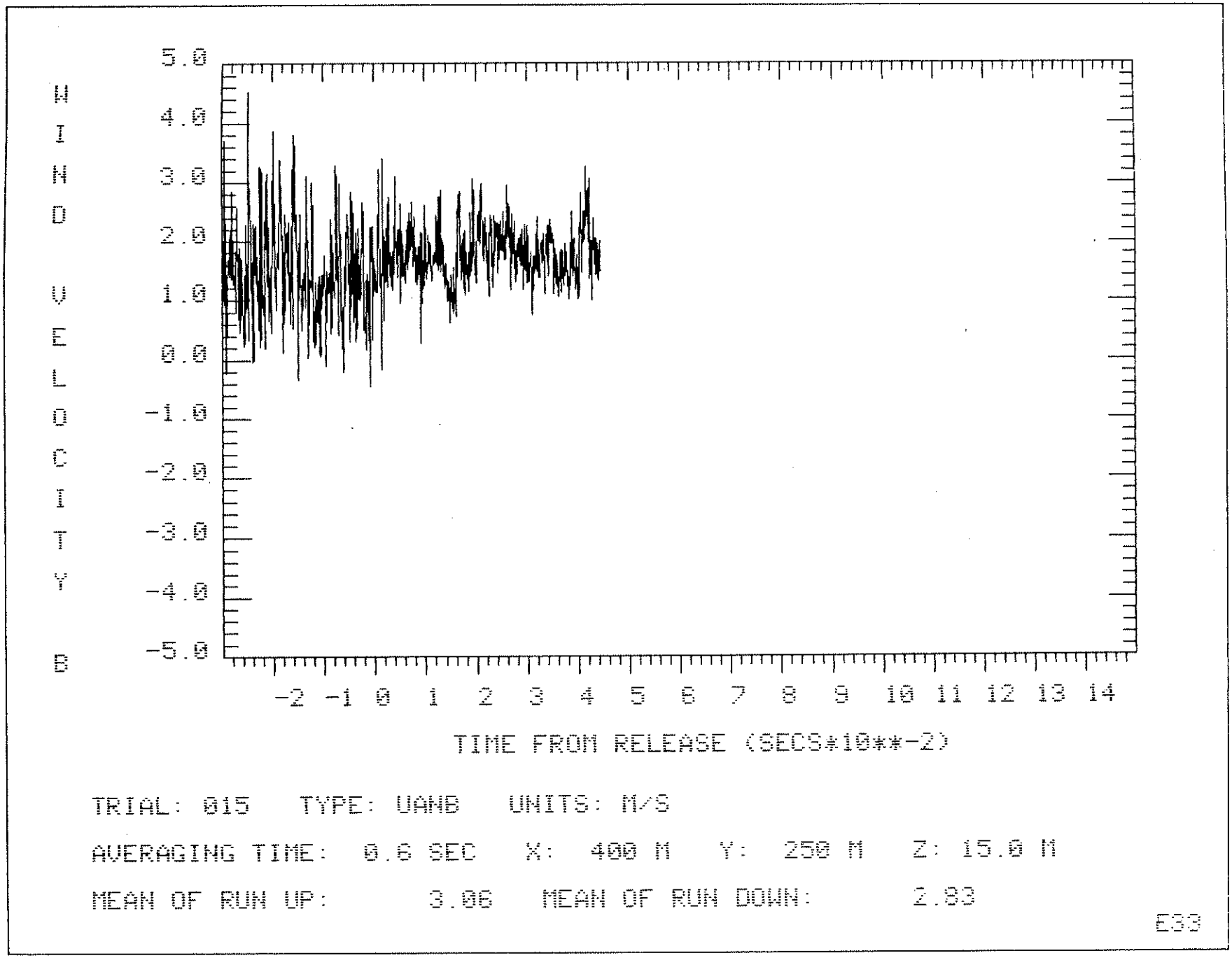


TRIAL: 015 TYPE: TEMP UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 250 M Z: 2.0 M

MEAN OF RUN UP: 4.98 MEAN OF RUN DOWN: 4.97

E32

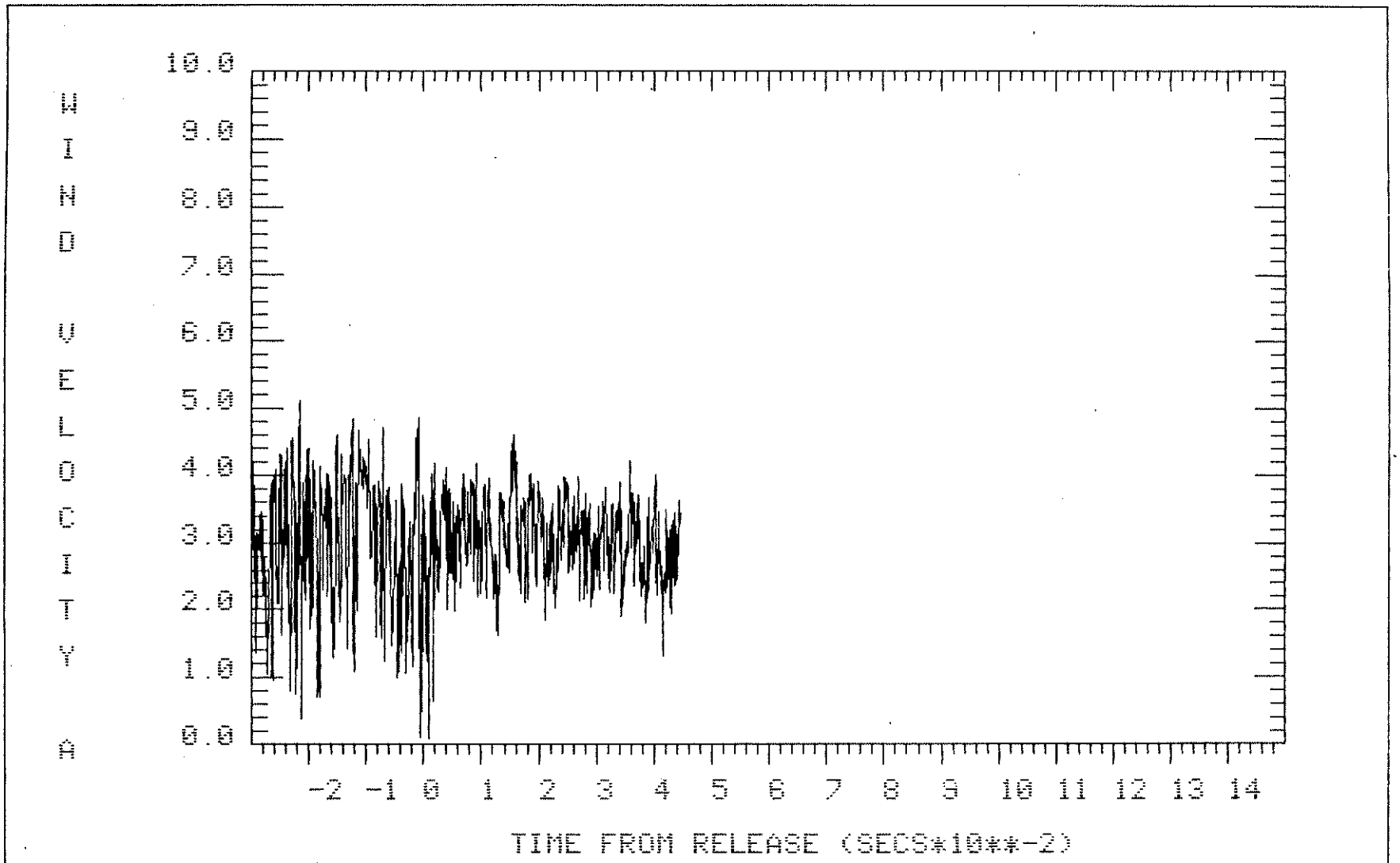


TRIAL: 015 TYPE: UANB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 250 M Z: 15.0 M

MEAN OF RUN UP: 3.06 MEAN OF RUN DOWN: 2.83

E33

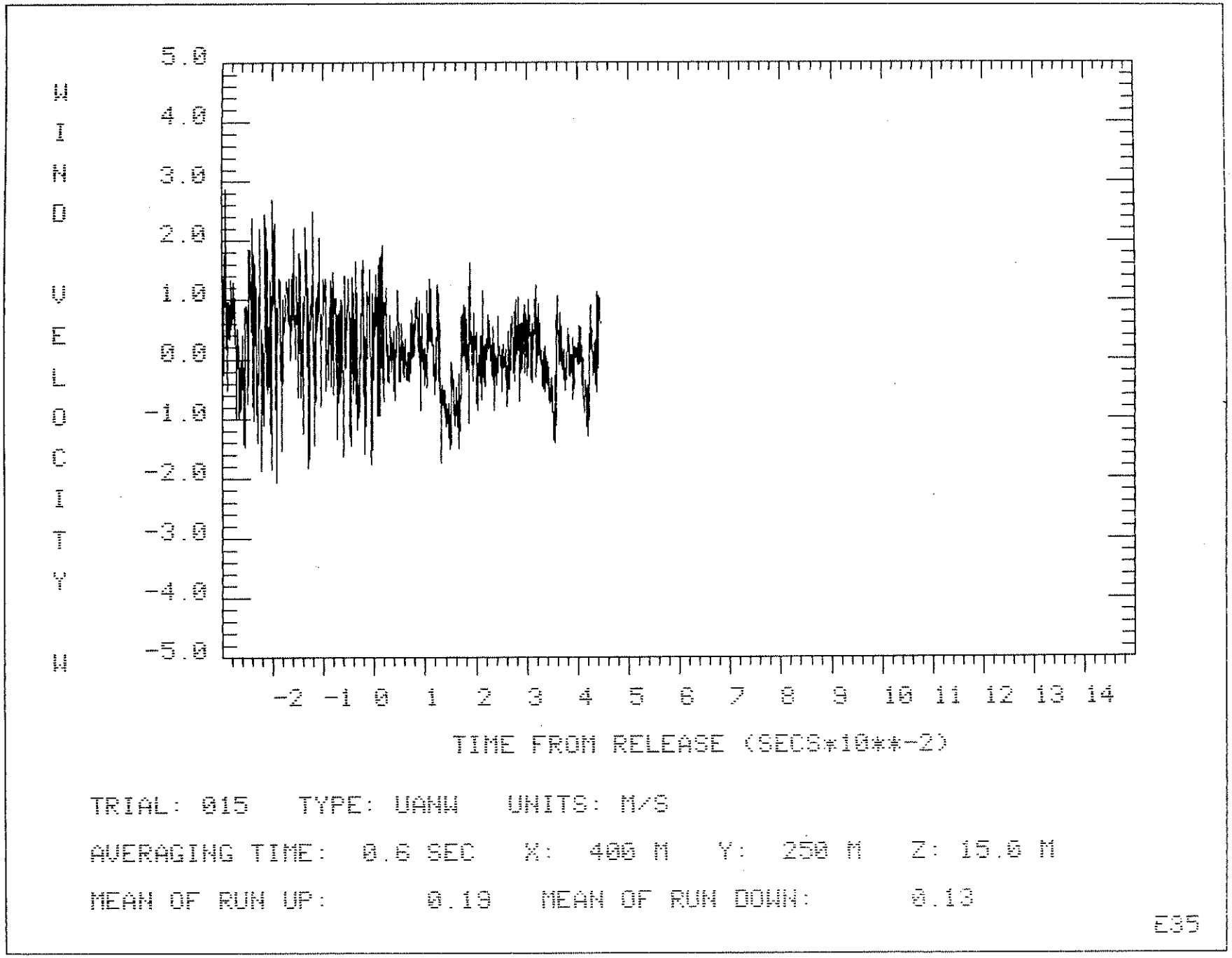


TRIAL: 015 TYPE: UANA UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 250 M Z: 15.0 M

MEAN OF RUN UP: 1.14 MEAN OF RUN DOWN: 2.08

E34

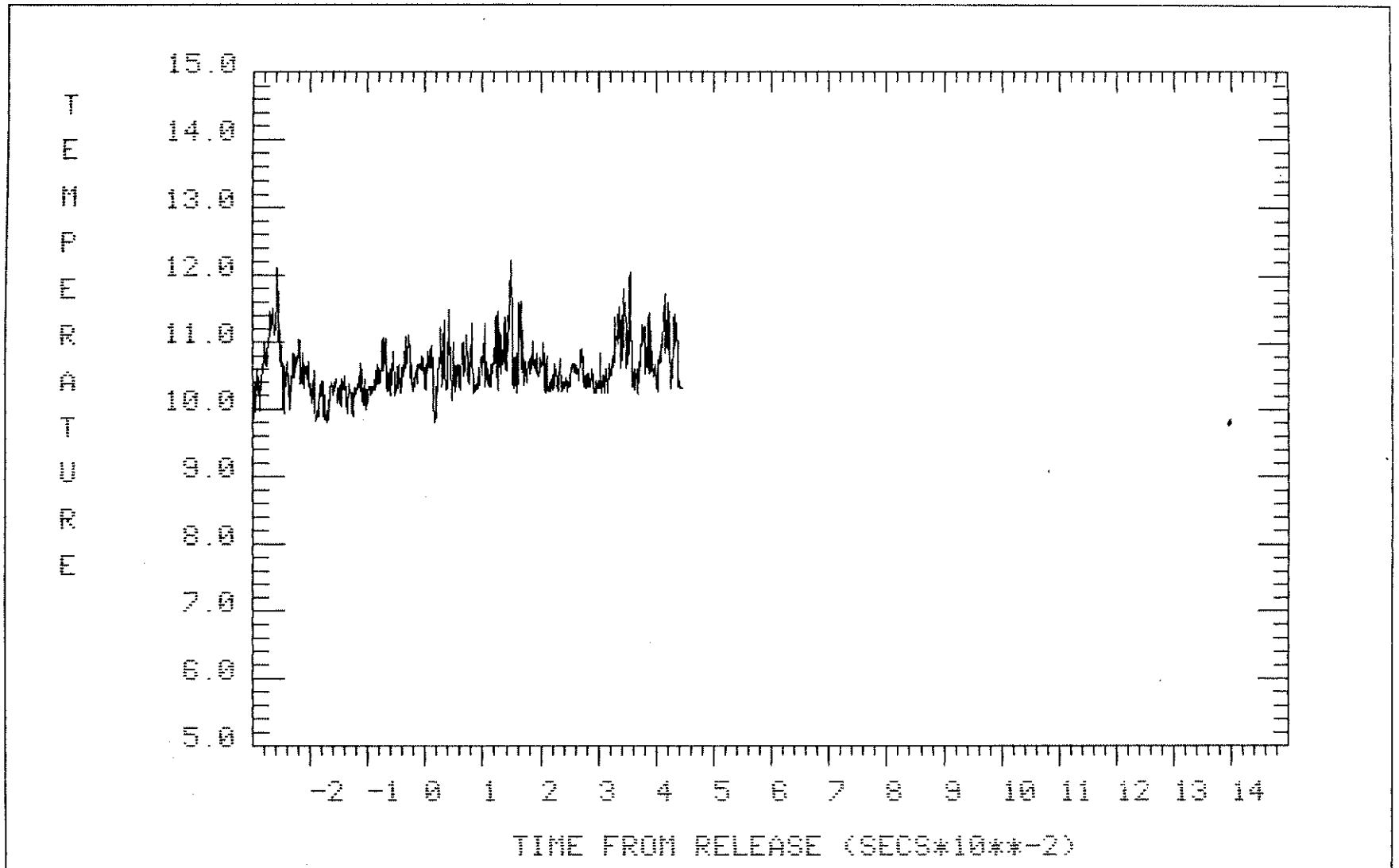


TRIAL: 015 TYPE: UANN UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 250 M Z: 15.0 M

MEAN OF RUN UP: 0.19 MEAN OF RUN DOWN: 0.13

E35

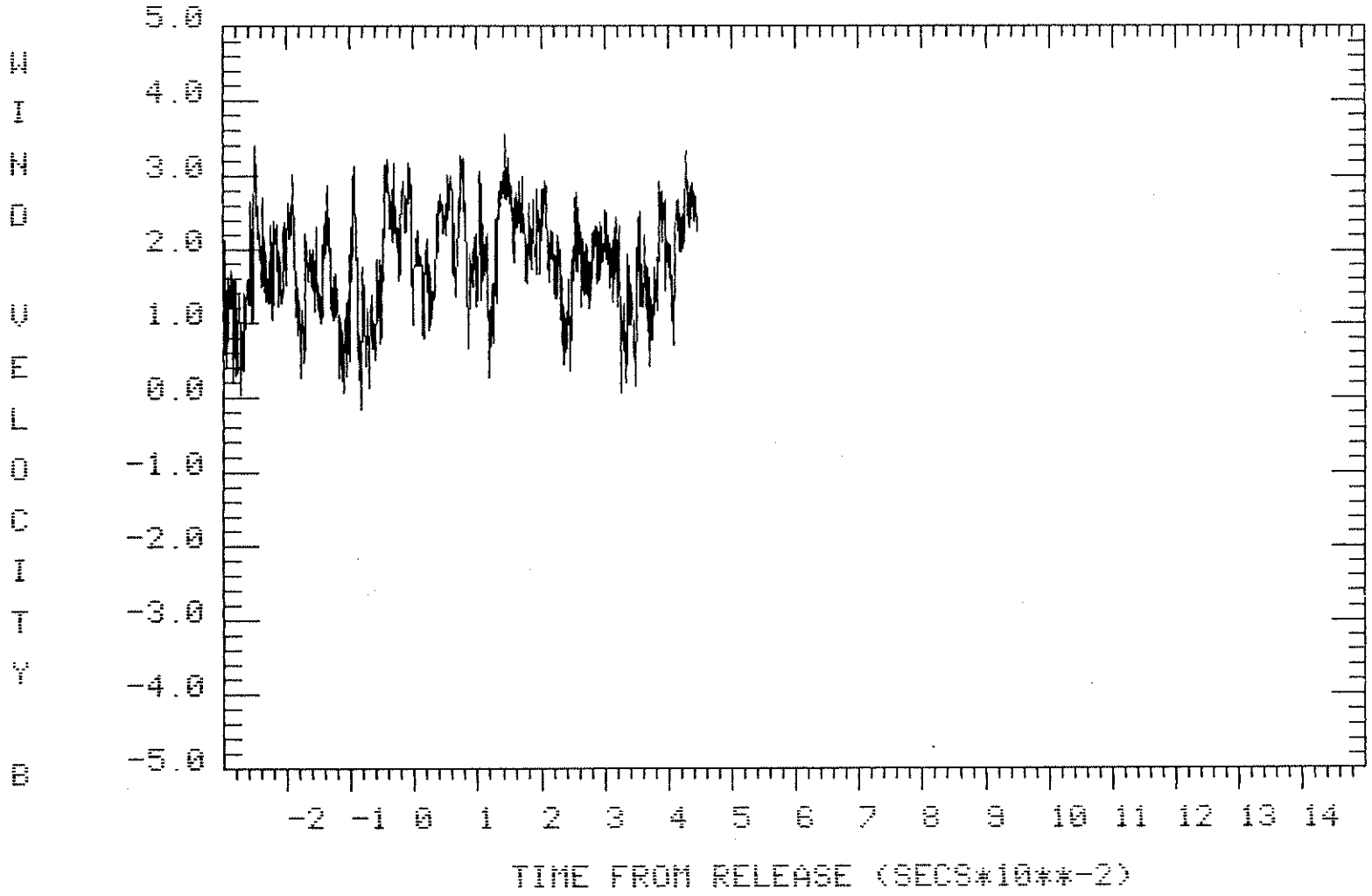


TRIAL: 015 TYPE: UANT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 250 M Z: 15.0 M

MEAN OF RUN UP: 10.78 MEAN OF RUN DOWN: 10.48

ES6

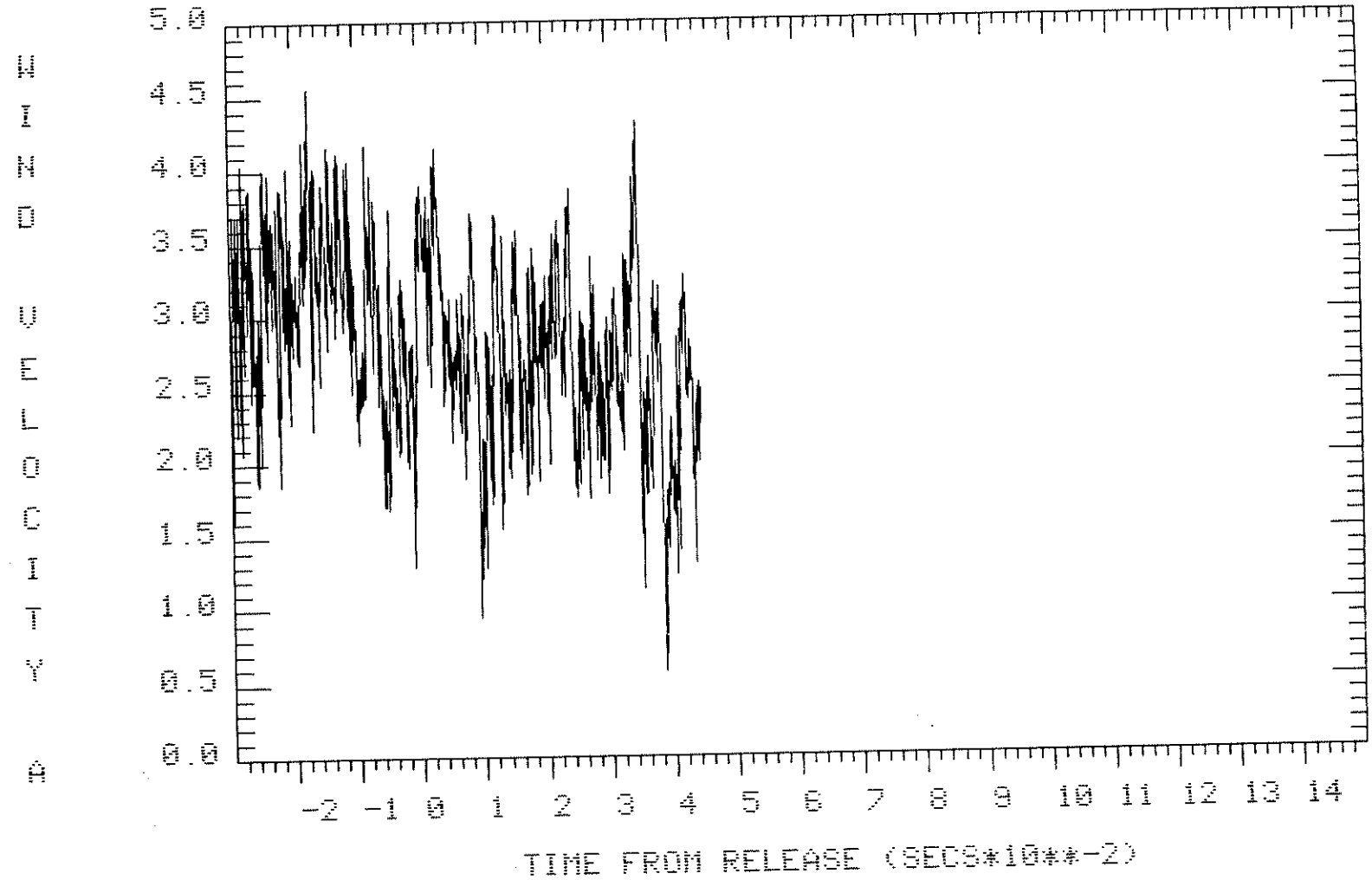


TRIAL: 015 TYPE: UANB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 325 M Y: 275 M Z: 2.0 M

MEAN OF RUN UP: 3.16 MEAN OF RUN DOWN: 2.82

E37

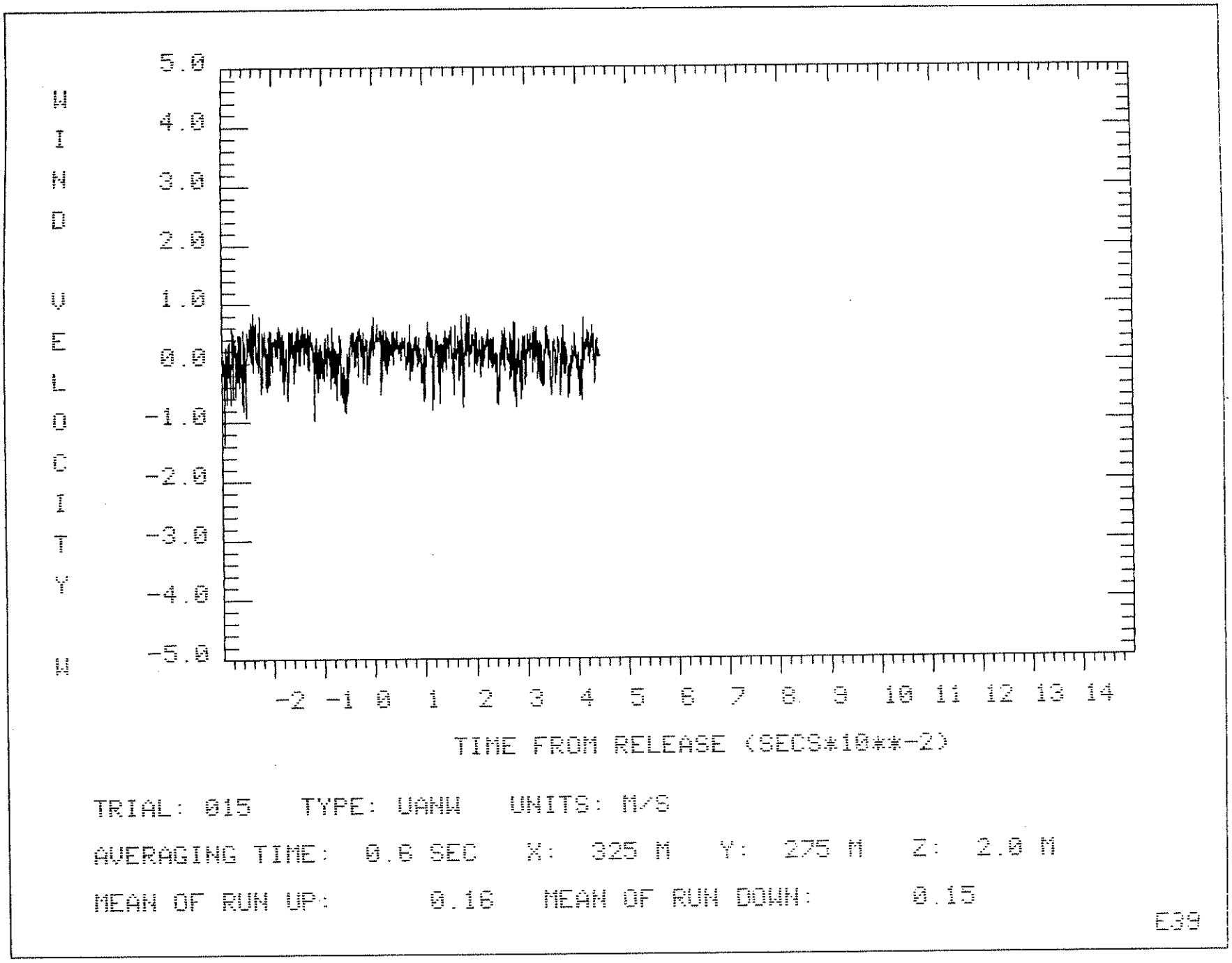


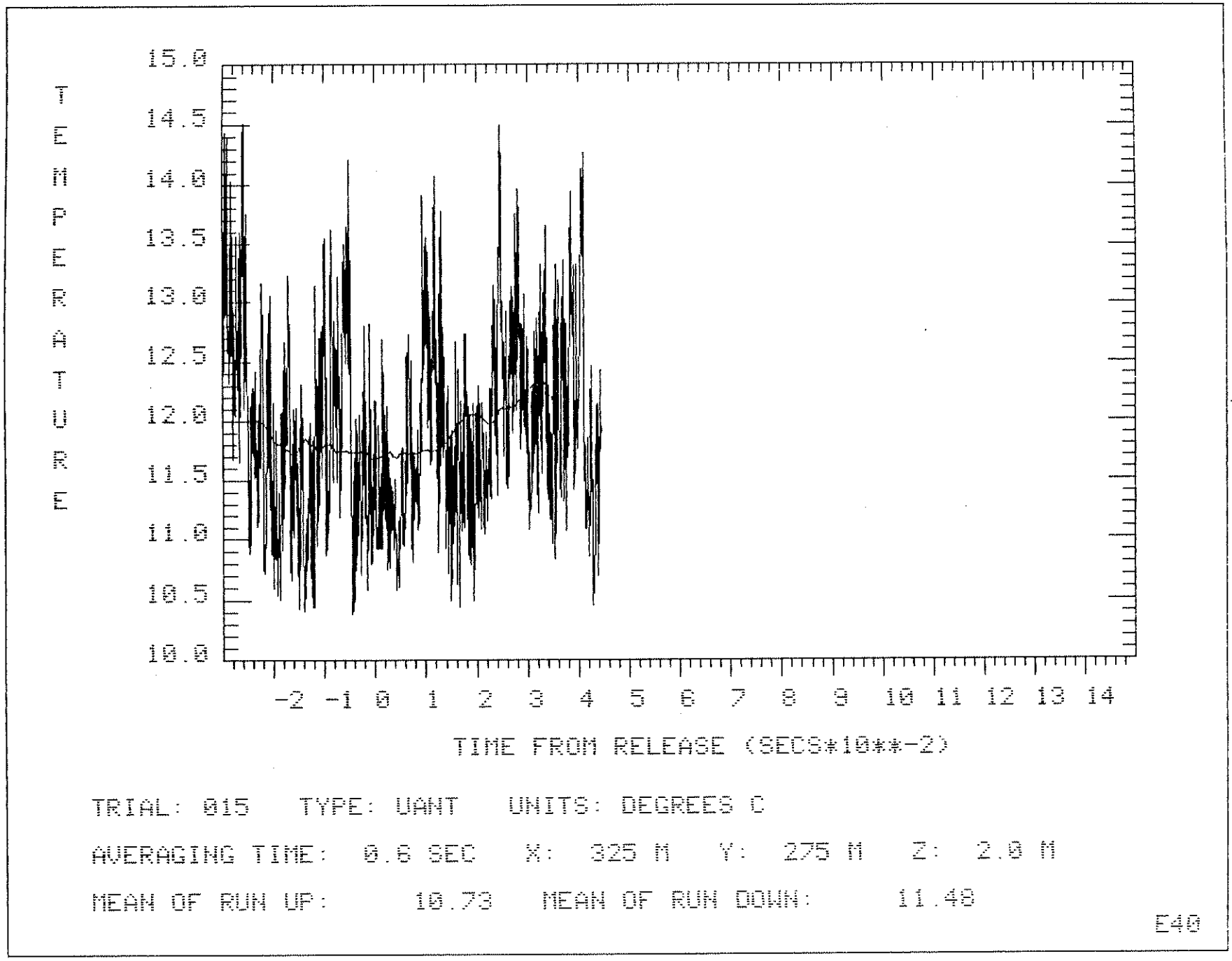
TRIAL: 015 TYPE: UANA UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 325 M Y: 275 M Z: 2.0 M

MEAN OF RUN UP: 0.84 MEAN OF RUN DOWN: 1.73

E38

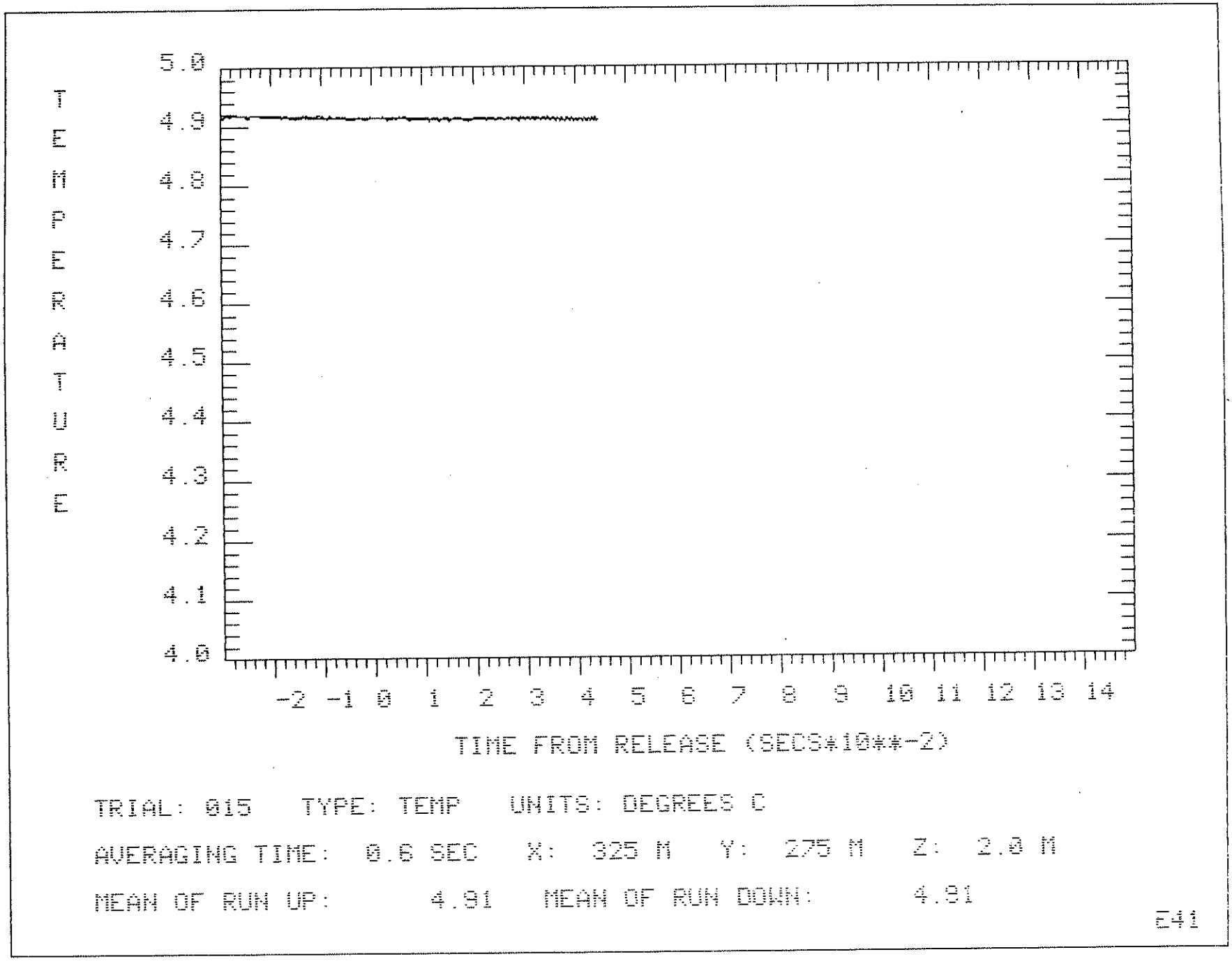

WINDVELOCITY W
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: UANW UNITS: M/S
AVERAGING TIME: 0.6 SEC X: 325 M Y: 275 M Z: 2.0 M
MEAN OF RUN UP: 0.16 MEAN OF RUN DOWN: 0.15
E39



TRIAL: 015 TYPE: UANT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 325 M Y: 275 M Z: 2.0 M

MEAN OF RUN UP: 10.73 MEAN OF RUN DOWN: 11.48

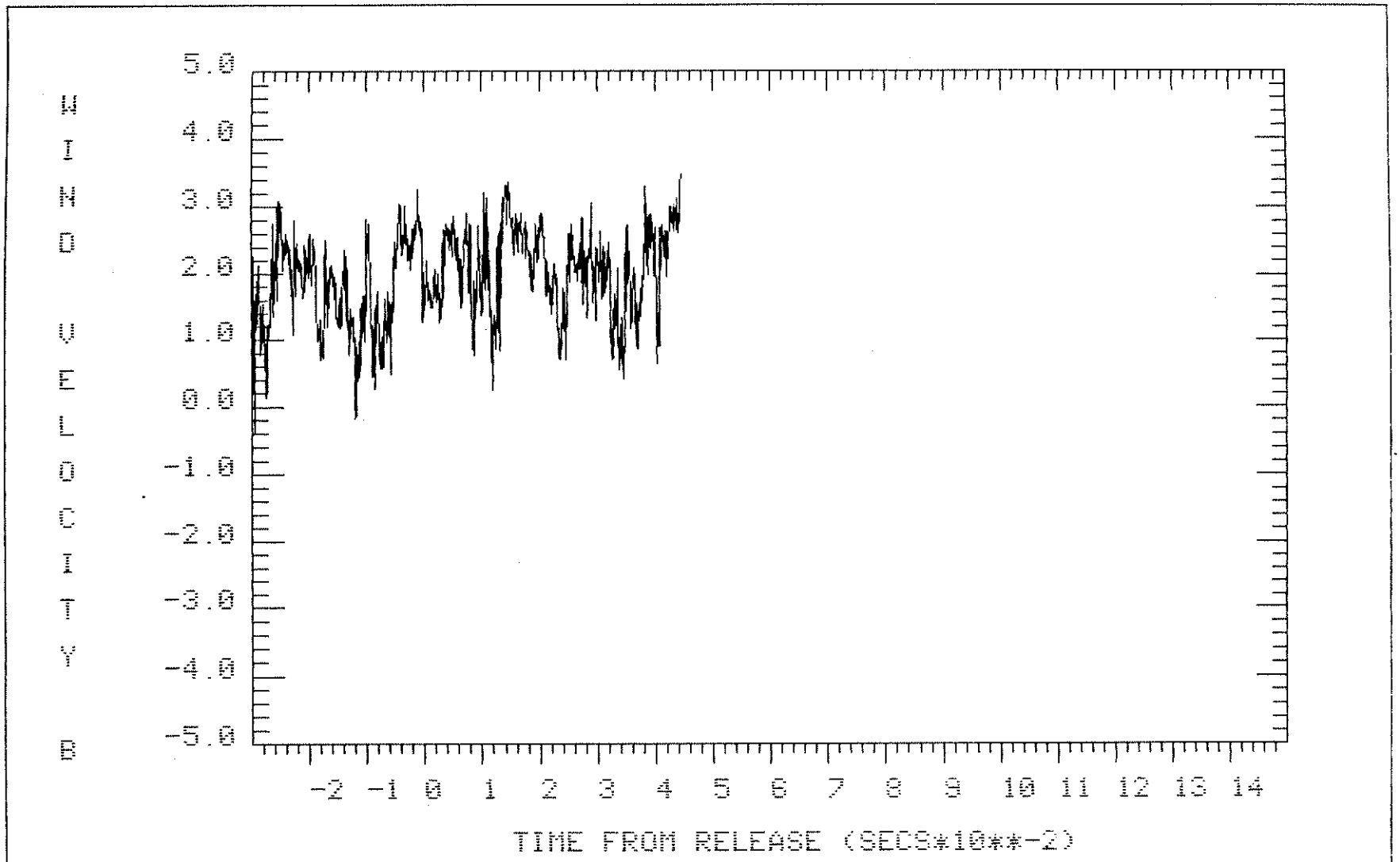


TRIAL: 015 TYPE: TEMP UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 325 M Y: 275 M Z: 2.0 M

MEAN OF RUN UP: 4.91 MEAN OF RUN DOWN: 4.91

E41

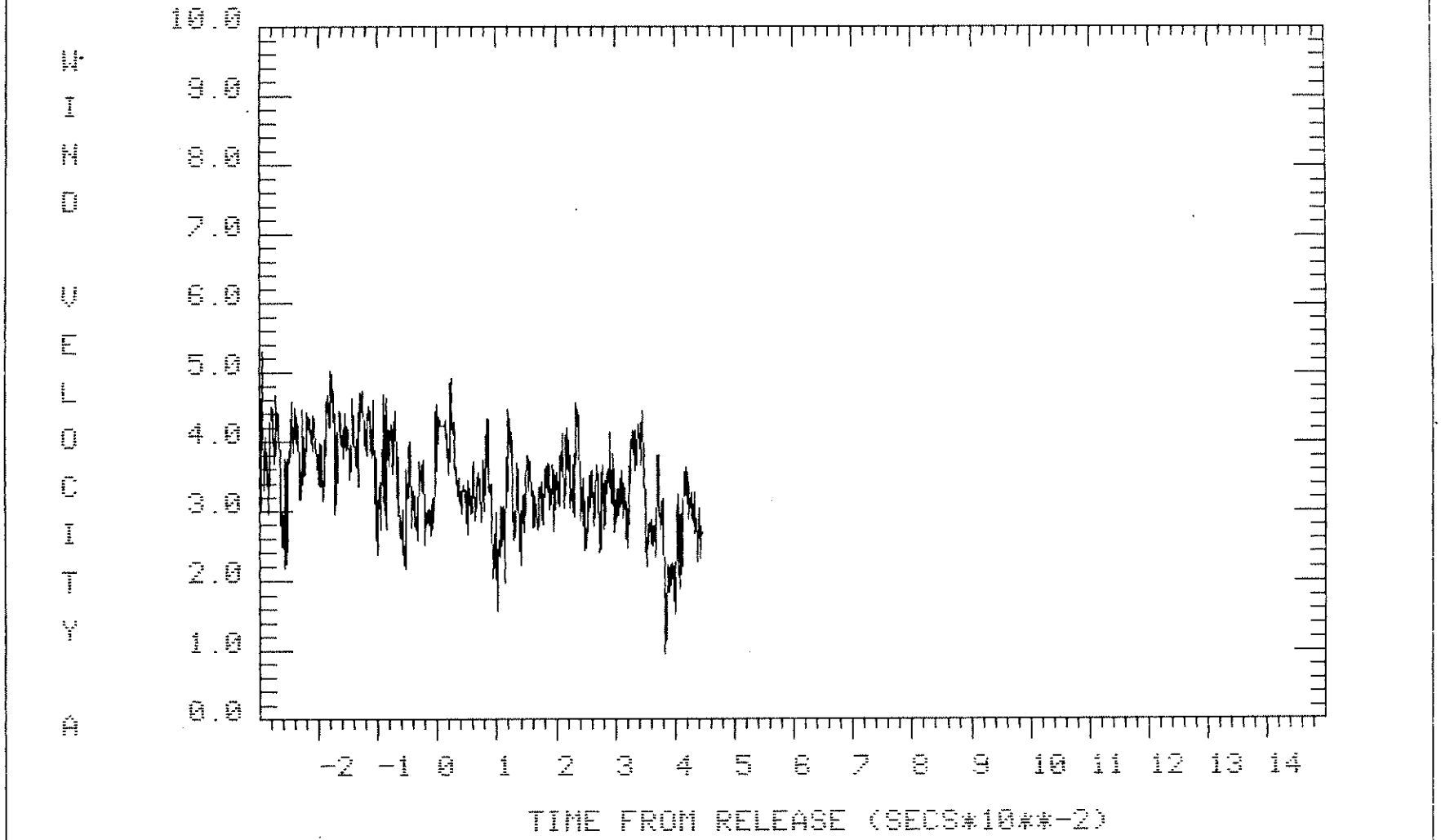


TRIAL: 015 TYPE: UANB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 325 M Y: 275 M Z: 5.0 M

MEAN OF RUN UP: 3.41 MEAN OF RUN DOWN: 3.01

E42

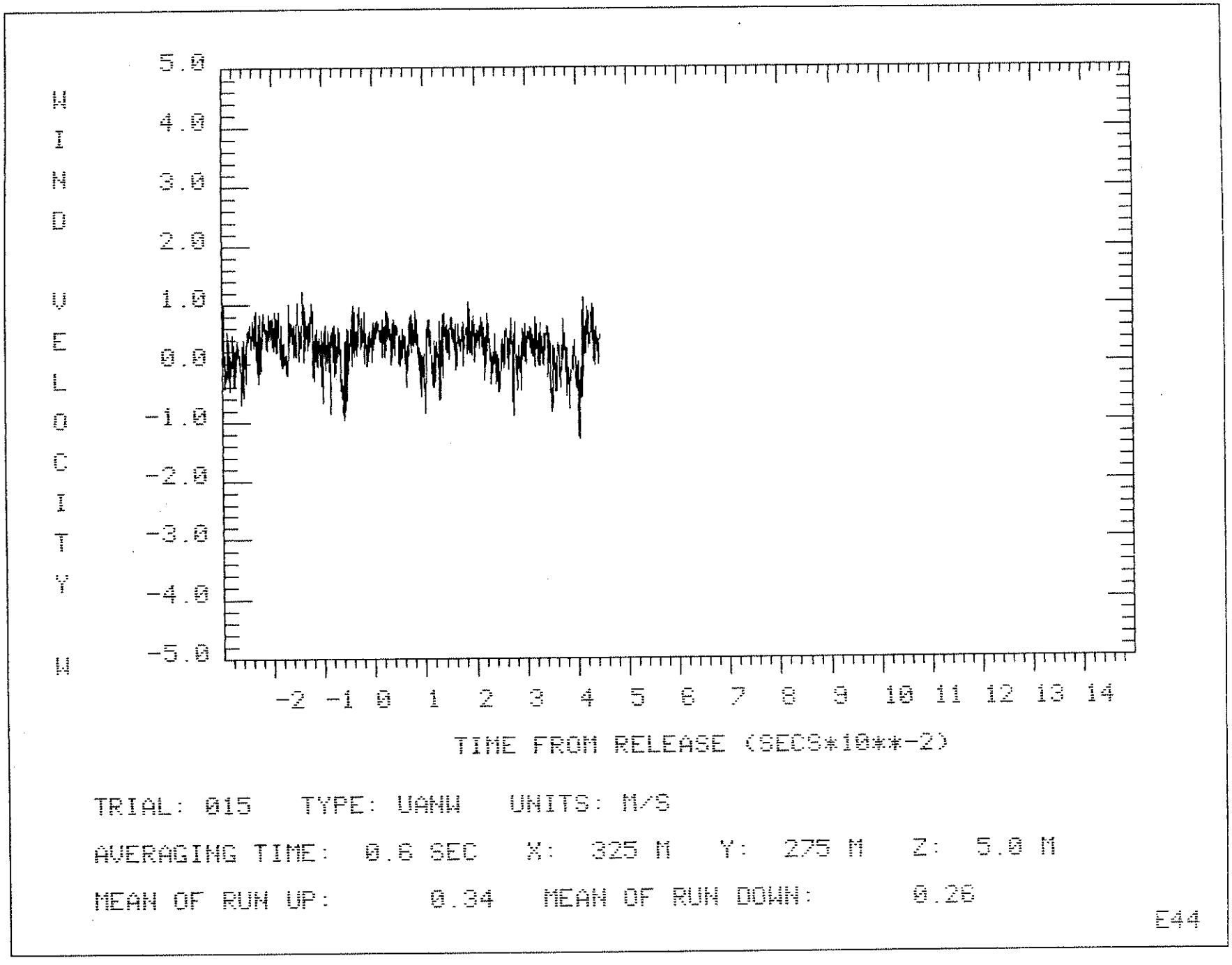


TRIAL: 015 TYPE: UANA UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 325 M Y: 275 M Z: 5.0 M

MEAN OF RUN UP: 1.04 MEAN OF RUN DOWN: 2.10

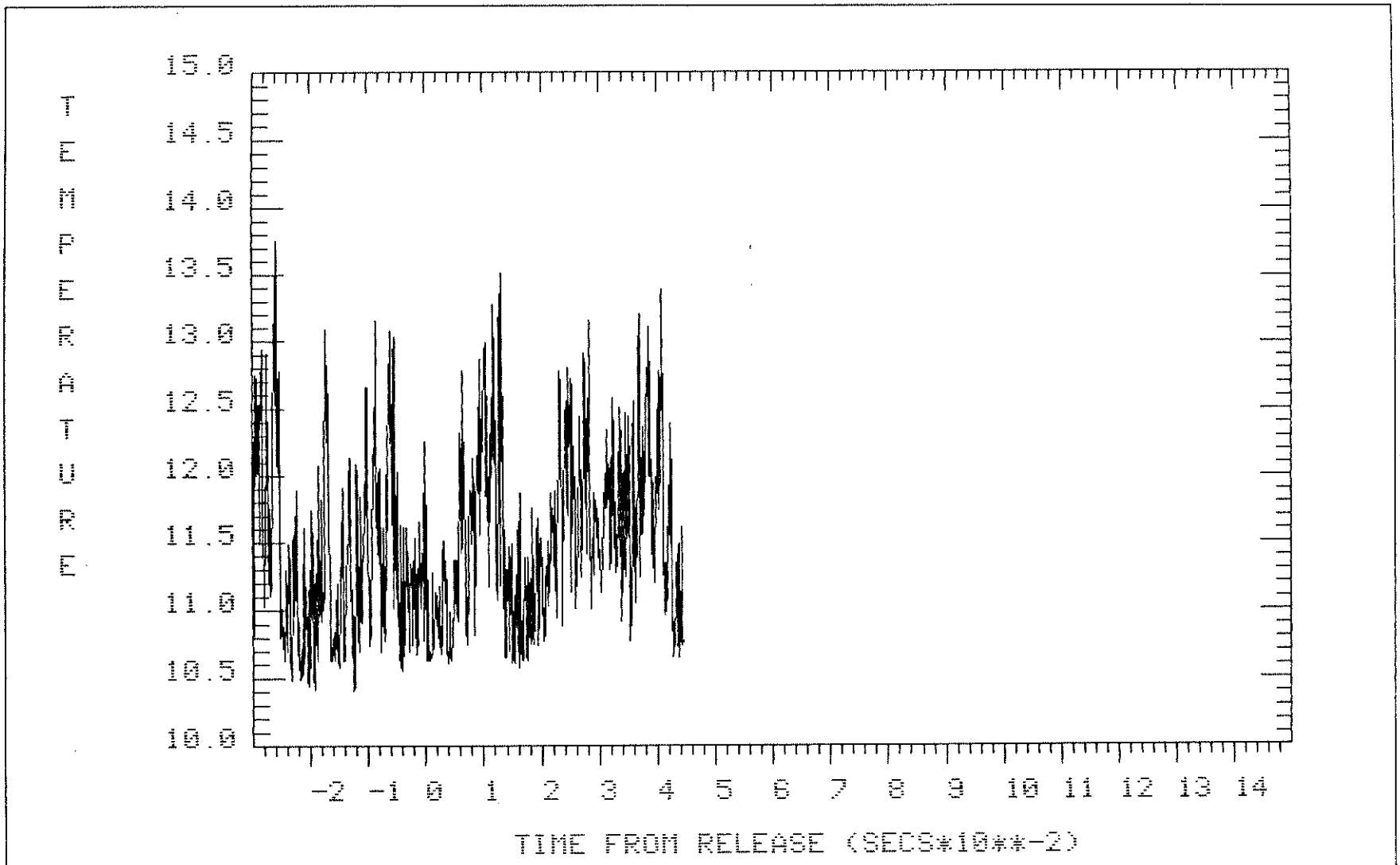
E43



TRIAL: 015 TYPE: UANW UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 325 M Y: 275 M Z: 5.0 M

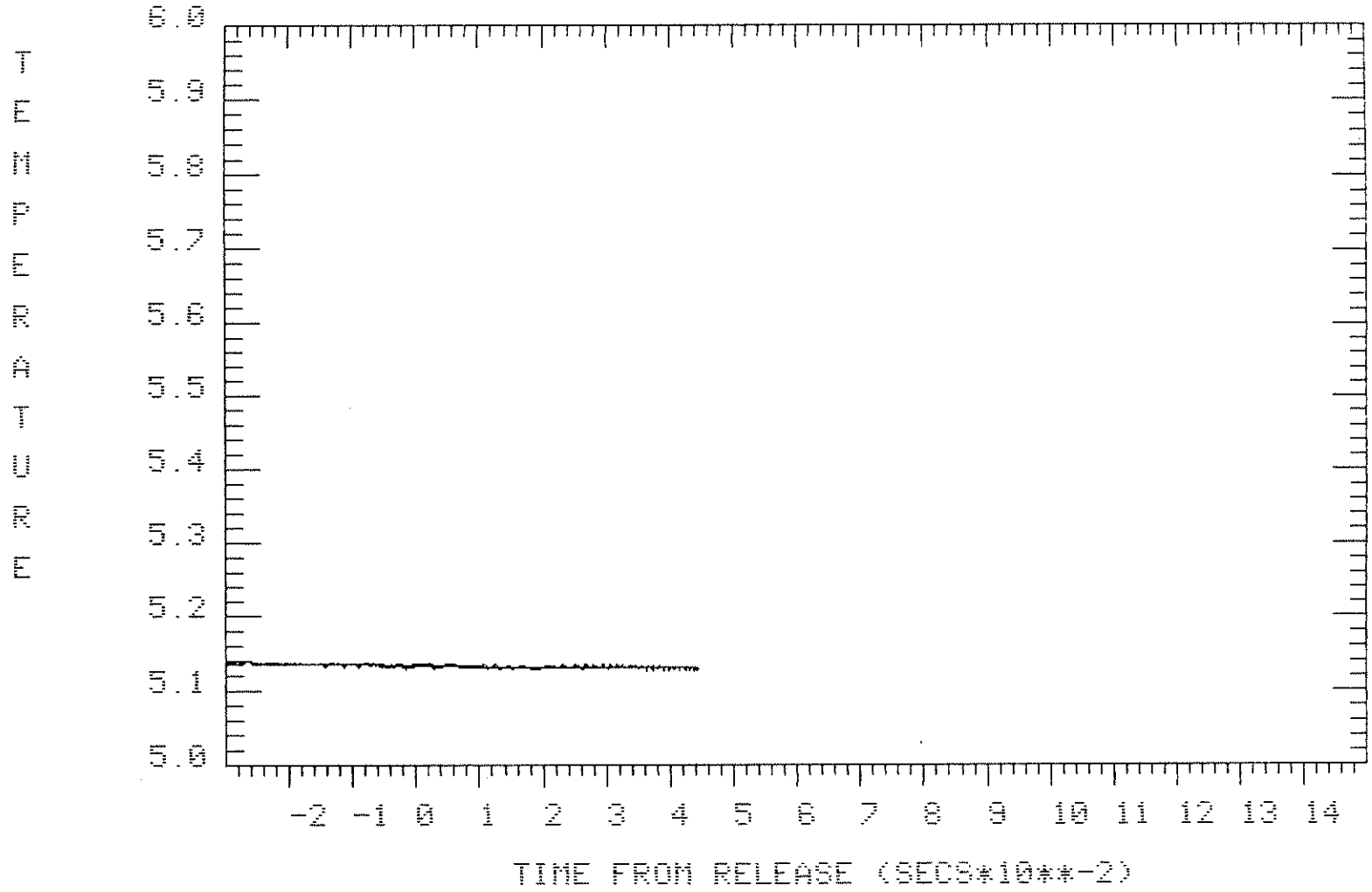
MEAN OF RUN UP: 0.34 MEAN OF RUN DOWN: 0.26



TRIAL: 015 TYPE: UANT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 325 M Y: 275 M Z: 5.0 M

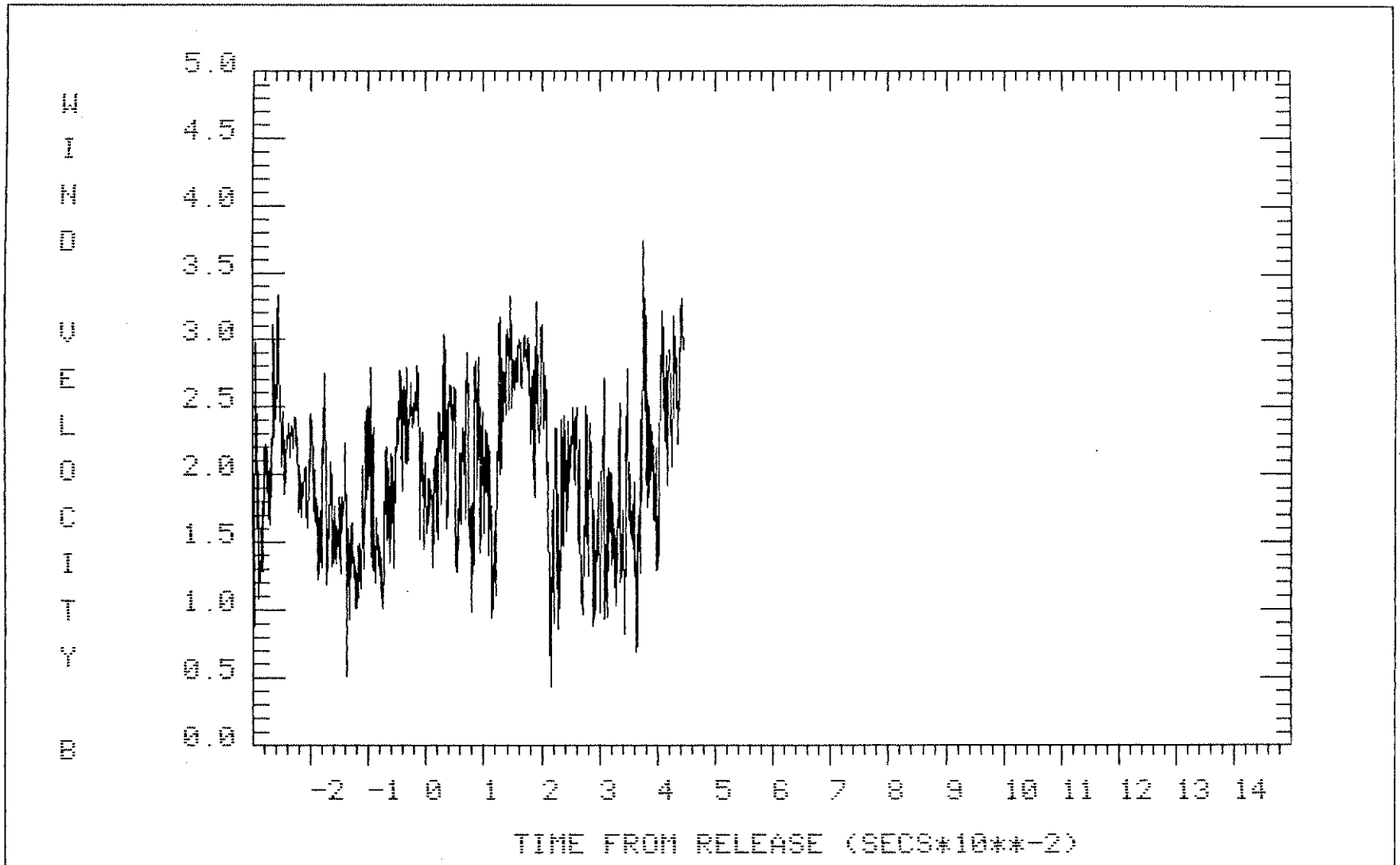
MEAN OF RUN UP: 10.58 MEAN OF RUN DOWN: 11.10



TRIAL: 015 TYPE: TEMP UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 325 M Y: 275 M Z: 5.0 M

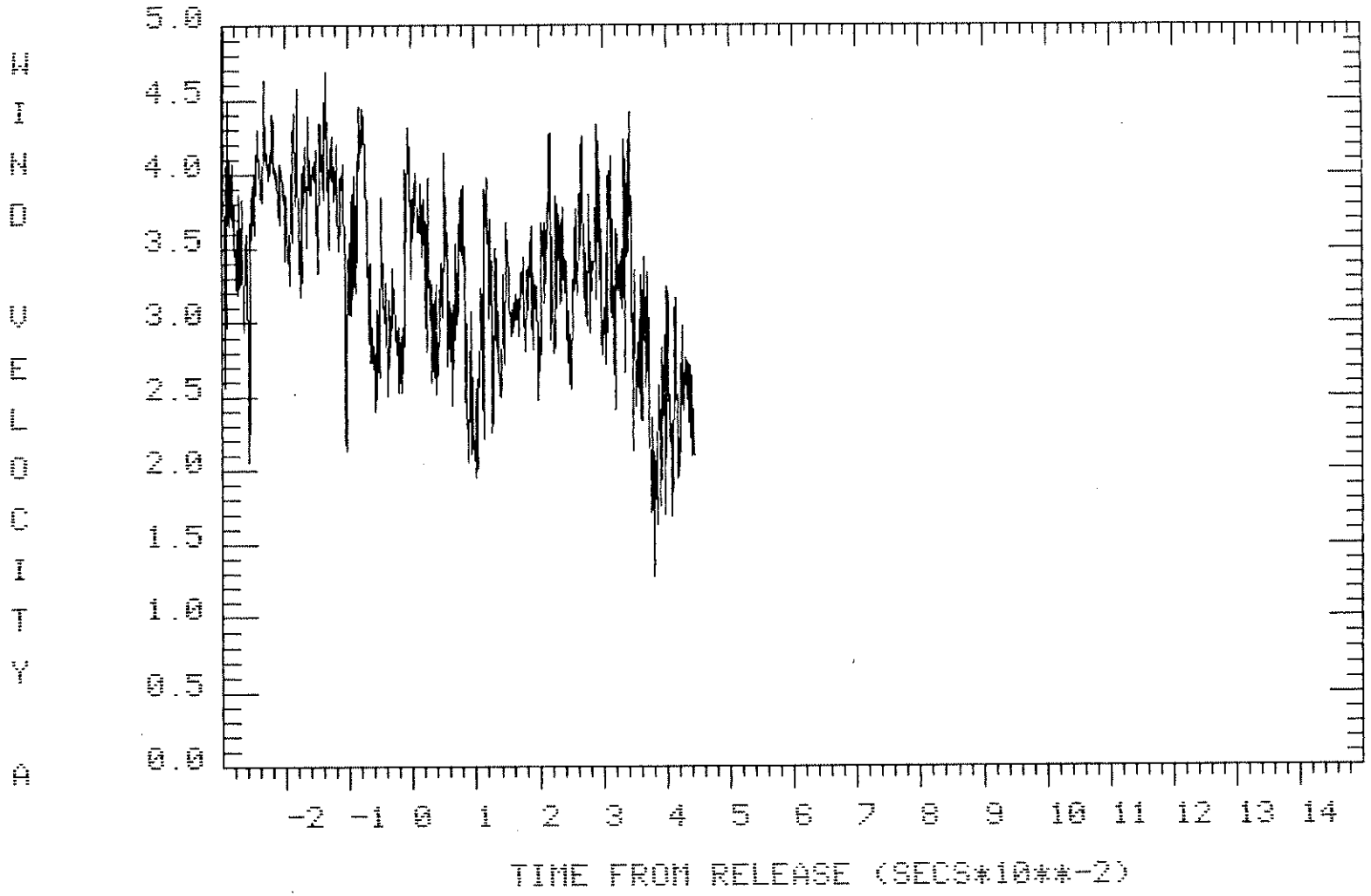
MEAN OF RUN UP: 5.13 MEAN OF RUN DOWN: 5.13



TRIAL: 015 TYPE: UANB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 325 M Y: 275 M Z: 14.5 M

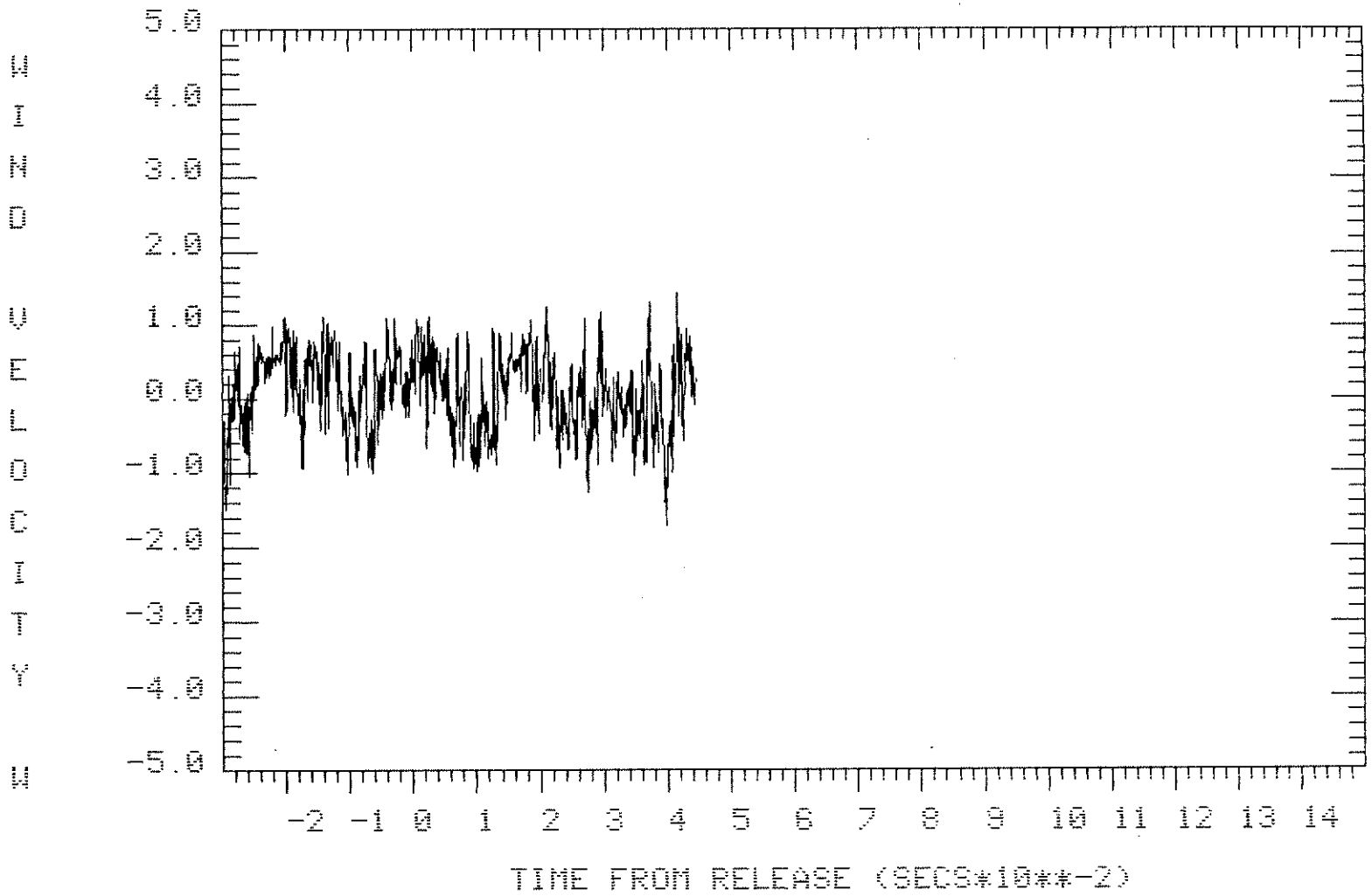
MEAN OF RUN UP: 3.62 MEAN OF RUN DOWN: 3.10



TRIAL: 015 TYPE: UANA UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 325 M Y: 275 M Z: 14.5 M

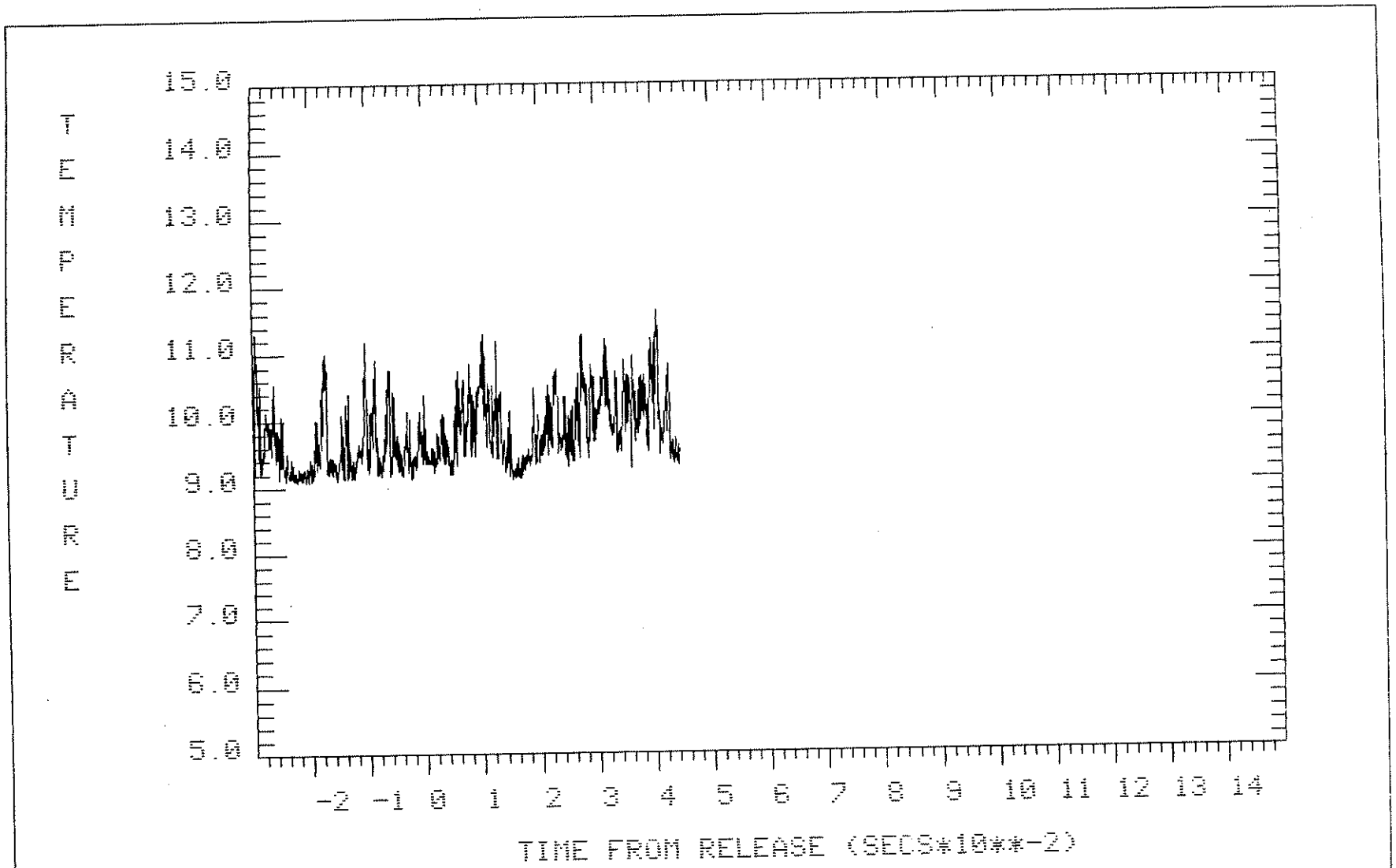
MEAN OF RUN UP: 0.89 MEAN OF RUN DOWN: 2.02



TRIAL: 015 TYPE: UANW UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 325 M Y: 275 M Z: 14.5 M

MEAN OF RUN UP: 0.28 MEAN OF RUN DOWN: 0.04

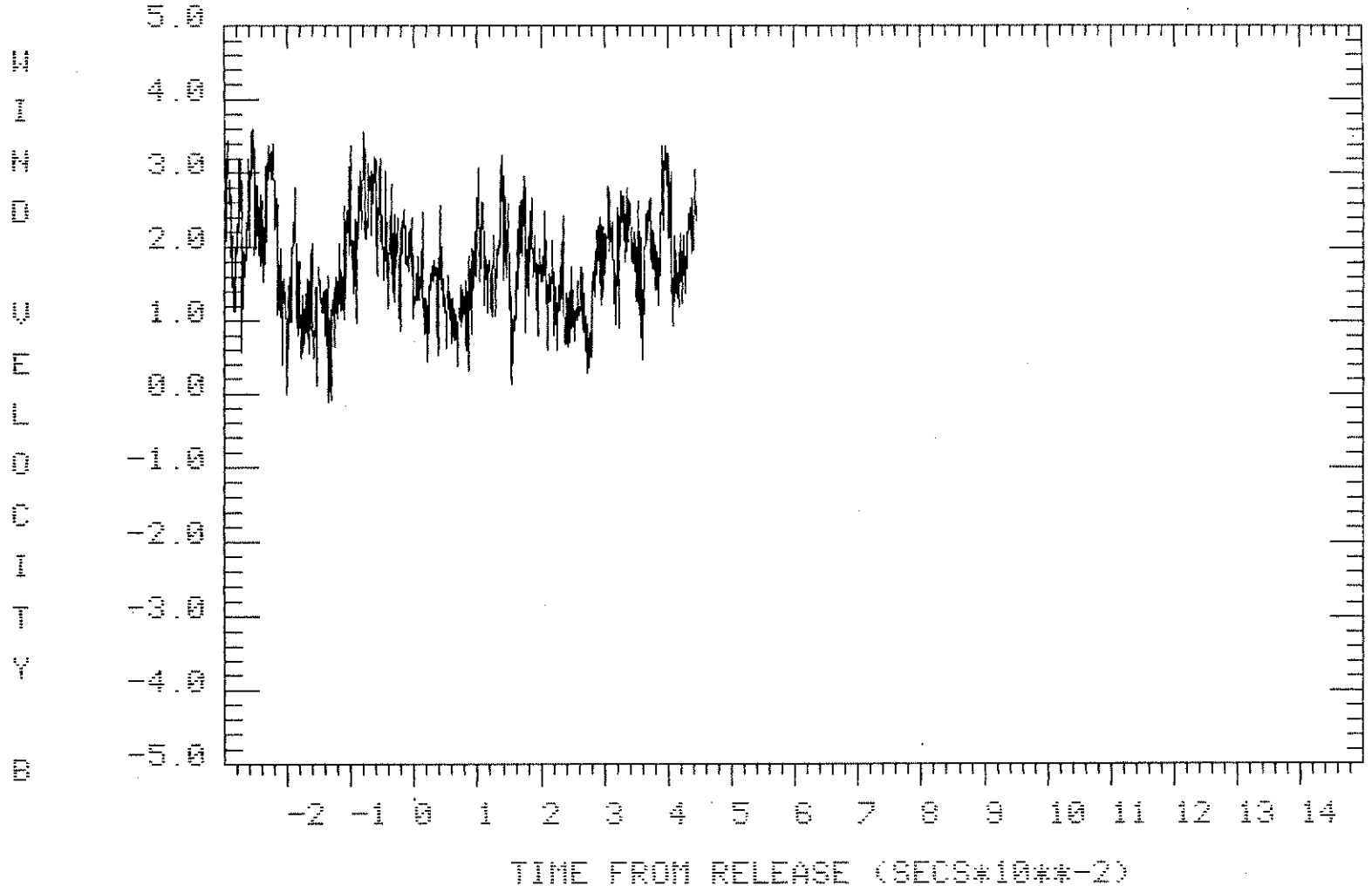


TRIAL: 015 TYPE: UANT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 325 M Y: 275 M Z: 14.5 M

MEAN OF RUN UP: 9.36 MEAN OF RUN DOWN: 9.58

E50

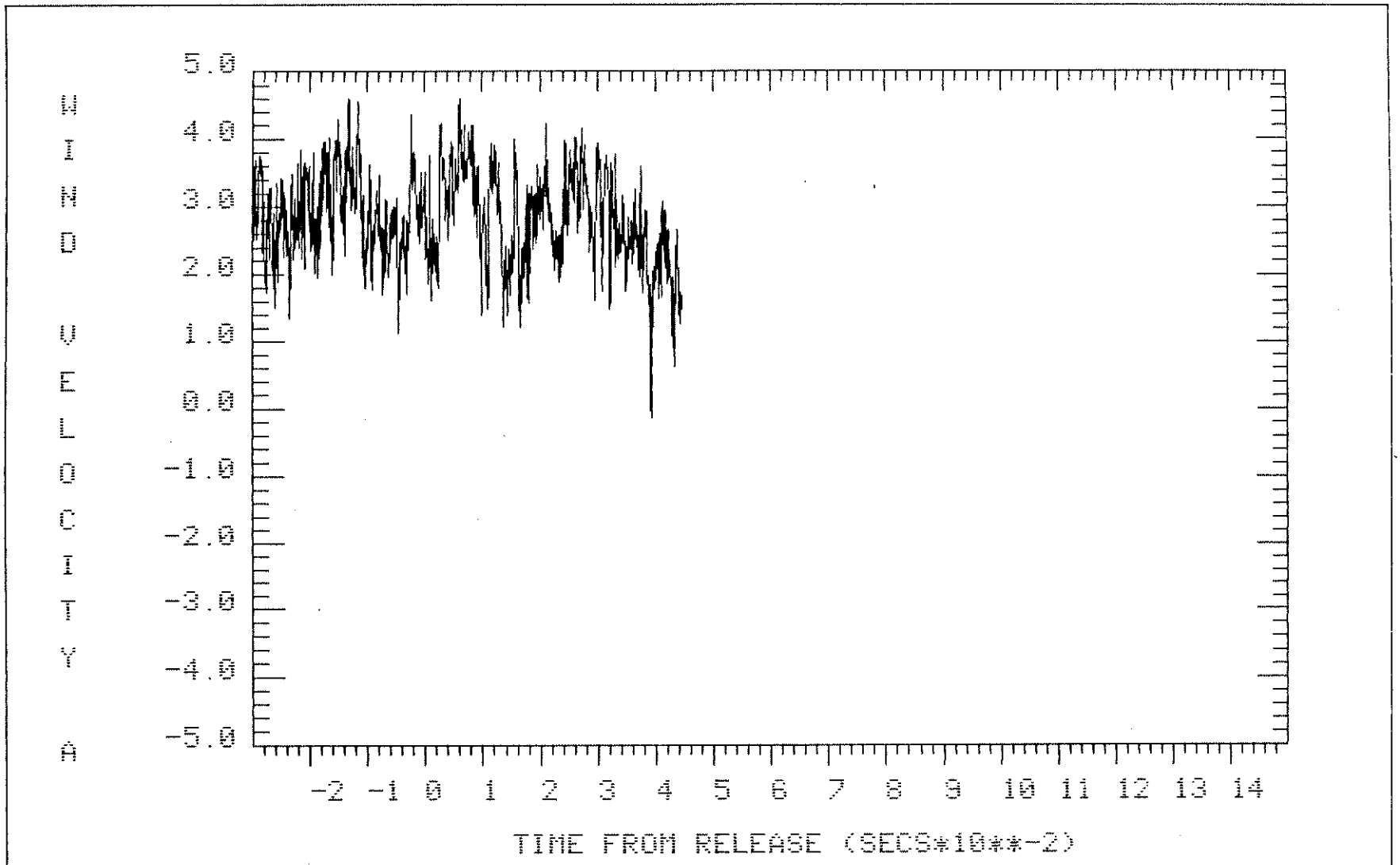


TRIAL: 015 TYPE: UANB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 475 M Y: 275 M Z: 2.0 M

MEAN OF RUN UP: 3.16 MEAN OF RUN DOWN: 2.55

E51

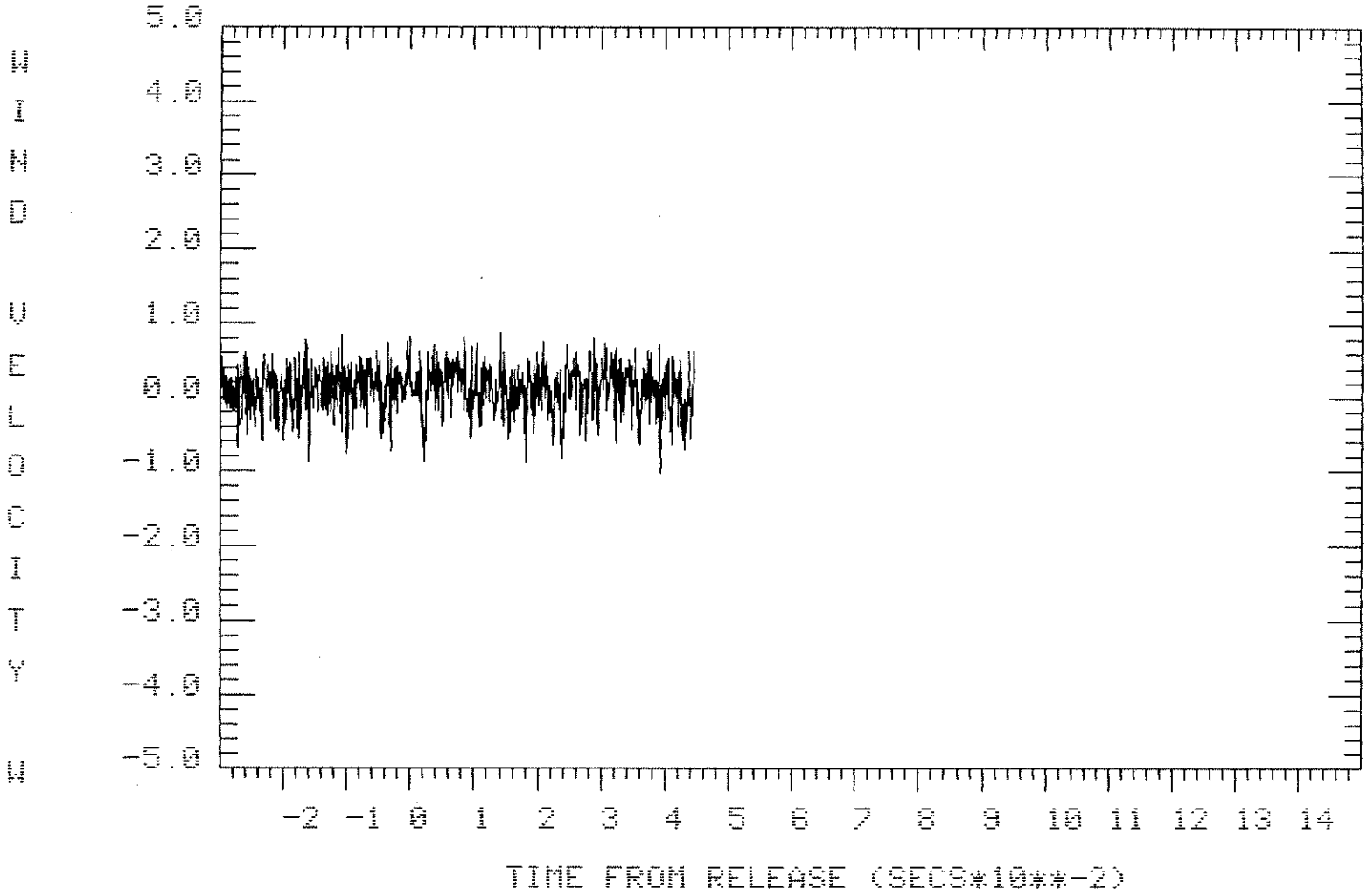


TRIAL: 015 TYPE: UANA UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 475 M Y: 275 M Z: 2.0 M

MEAN OF RUN UP: 0.34 MEAN OF RUN DOWN: 1.76

E52

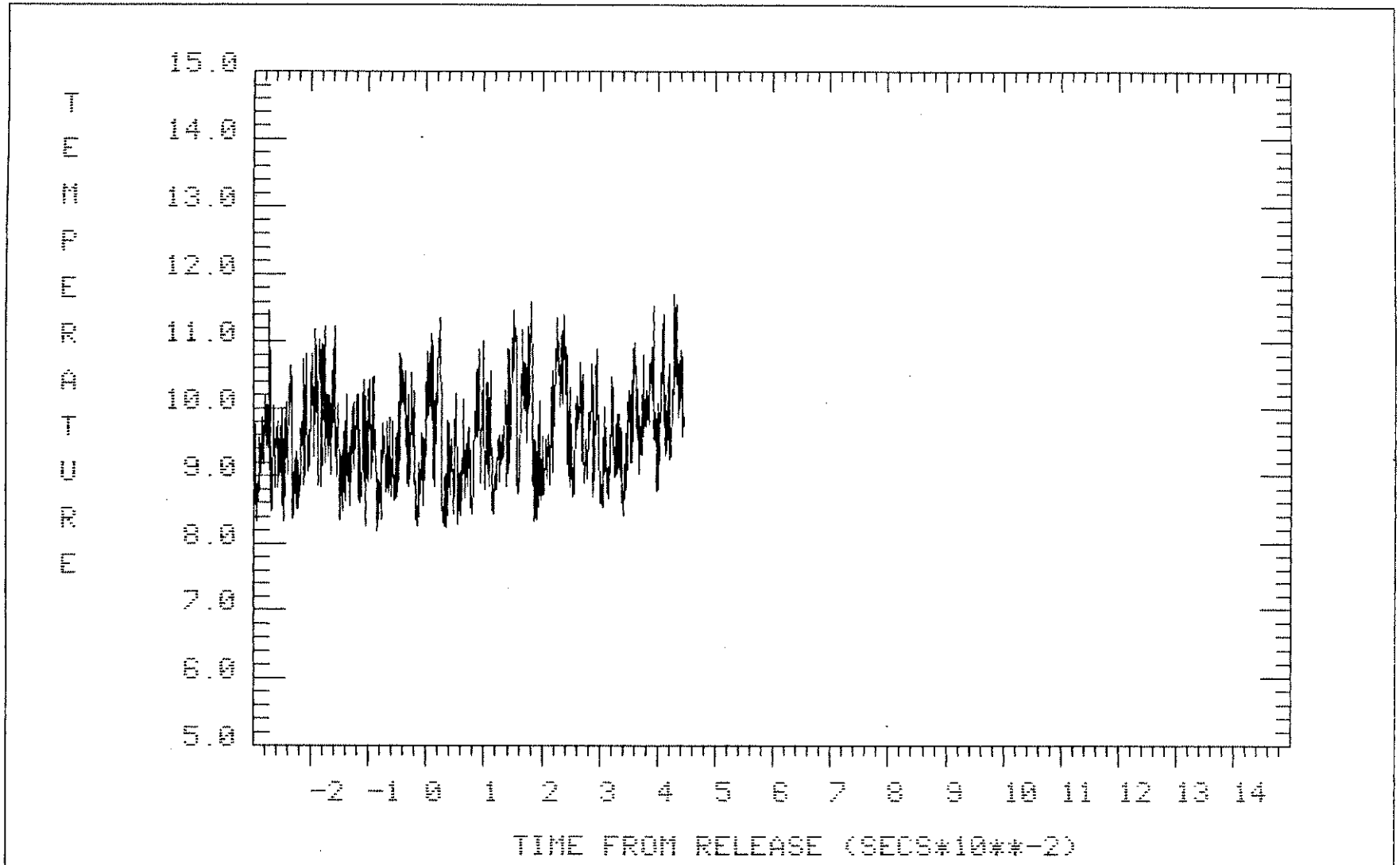


TRIAL: 015 TYPE: UANW UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 475 M Y: 275 M Z: 2.0 M

MEAN OF RUN UP: 0.02 MEAN OF RUN DOWN: 0.09

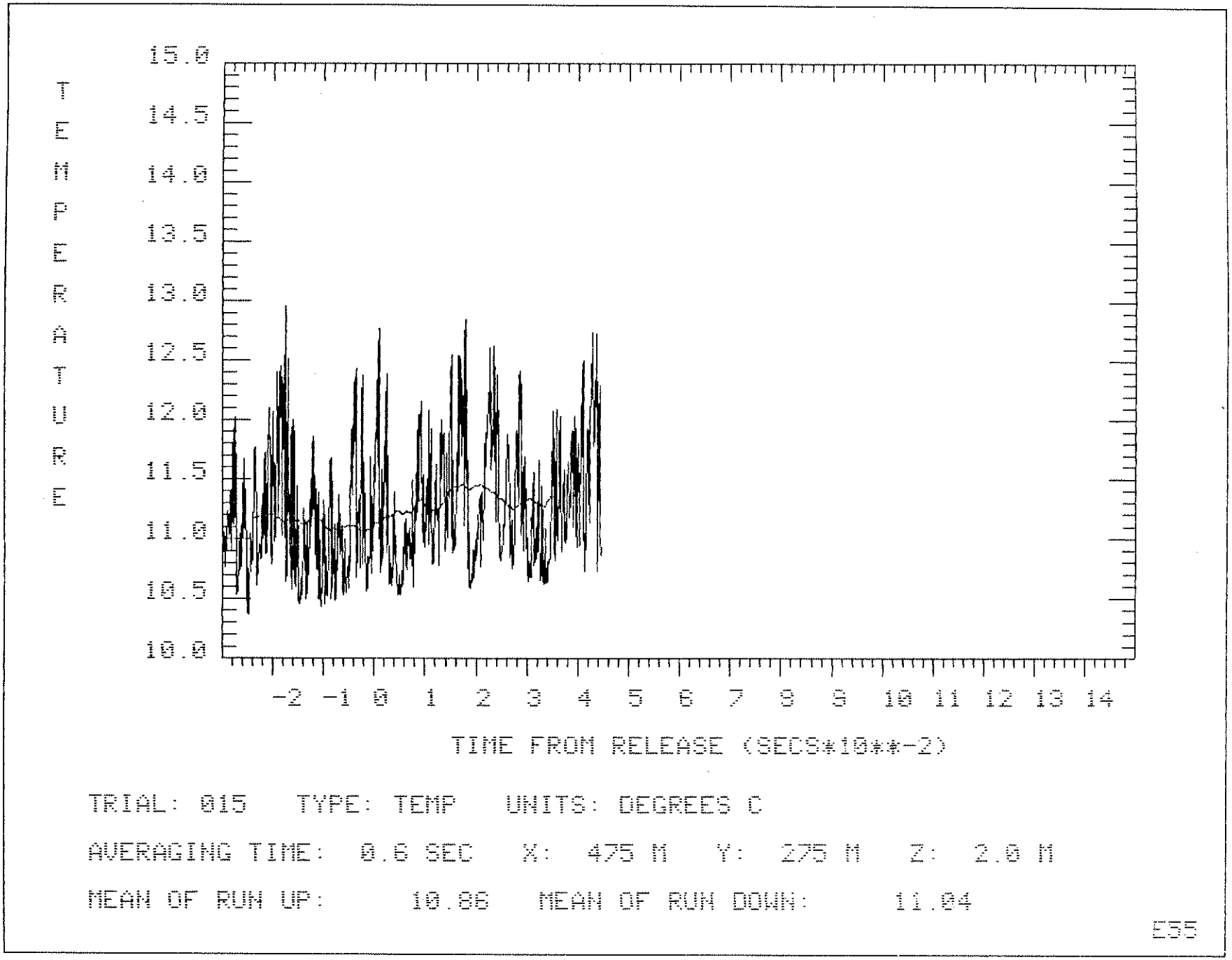
E53



TRIAL: 015 TYPE: UANT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 475 M Y: 275 M Z: 2.0 M

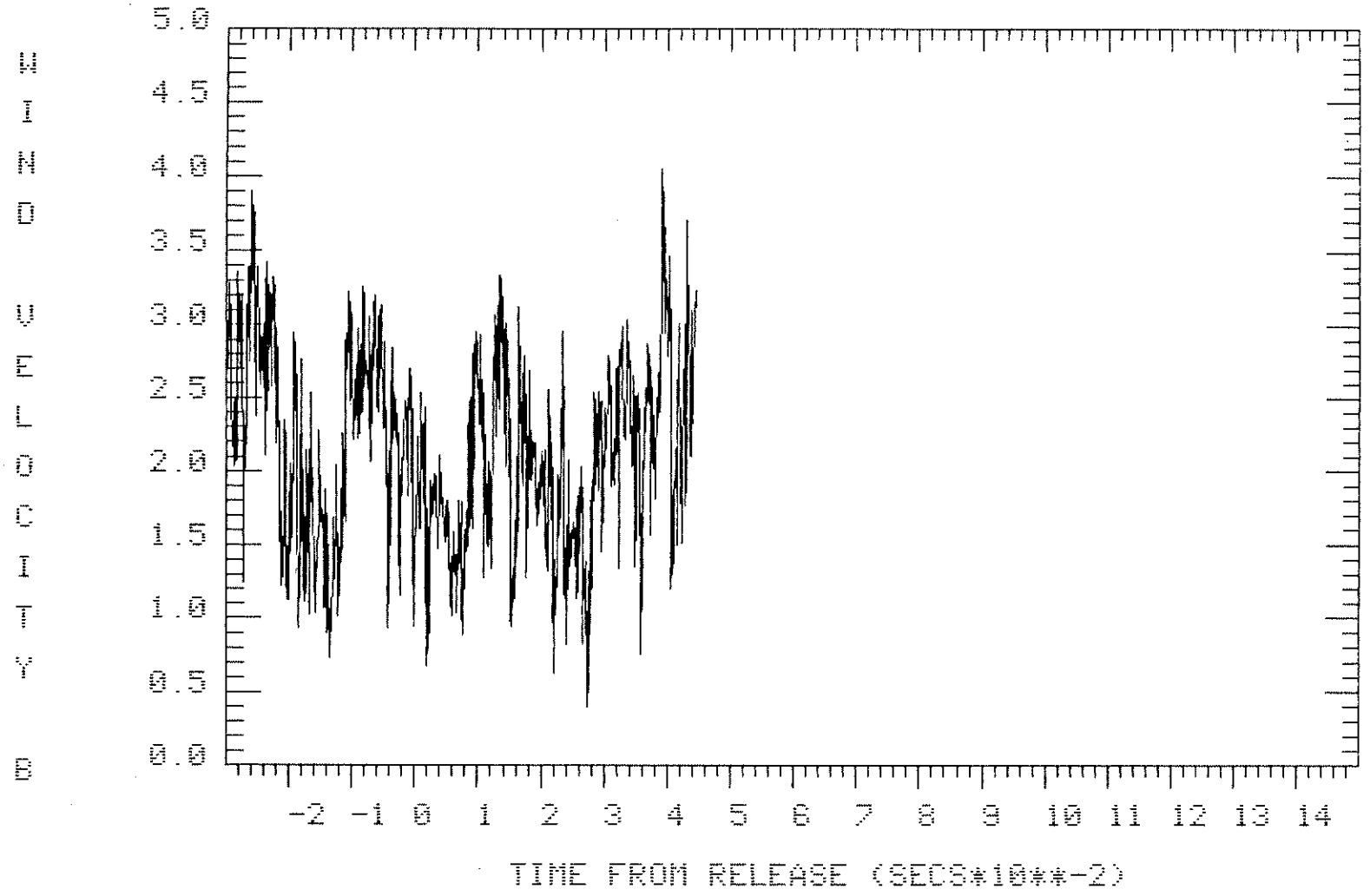
MEAN OF RUN UP: 9.16 MEAN OF RUN DOWN: 9.35



TRIAL: 015 TYPE: TEMP UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 475 M Y: 275 M Z: 2.0 M

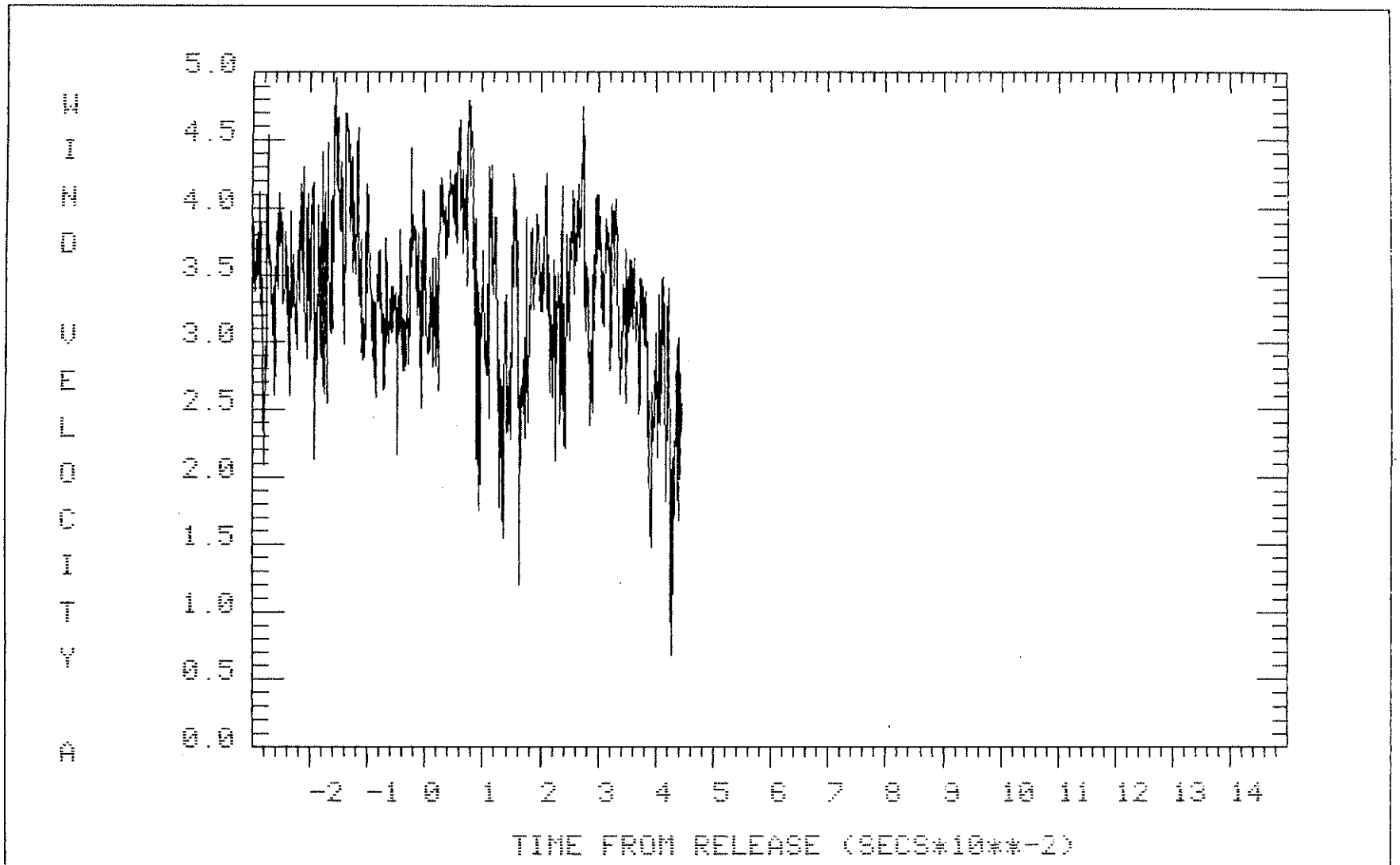
MEAN OF RUN UP: 10.86 MEAN OF RUN DOWN: 11.04



TRIAL: 015 TYPE: UANB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 475 M Y: 275 M Z: 5.0 M

MEAN OF RUN UP: 3.62 MEAN OF RUN DOWN: 2.96

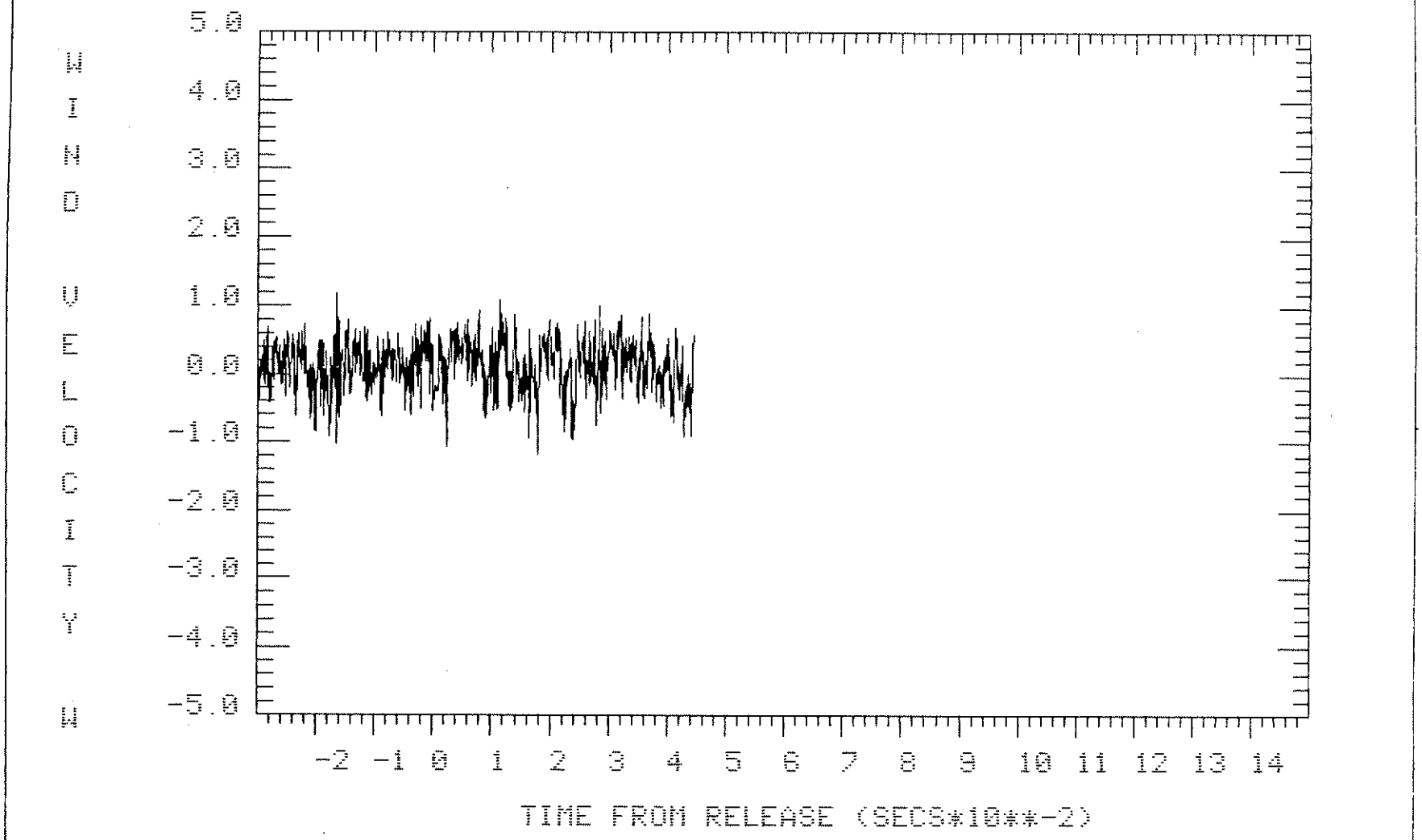


TRIAL: 015 TYPE: UANA UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 475 M Y: 275 M Z: 5.0 M

MEAN OF RUN UP: 0.60 MEAN OF RUN DOWN: 2.18

E57

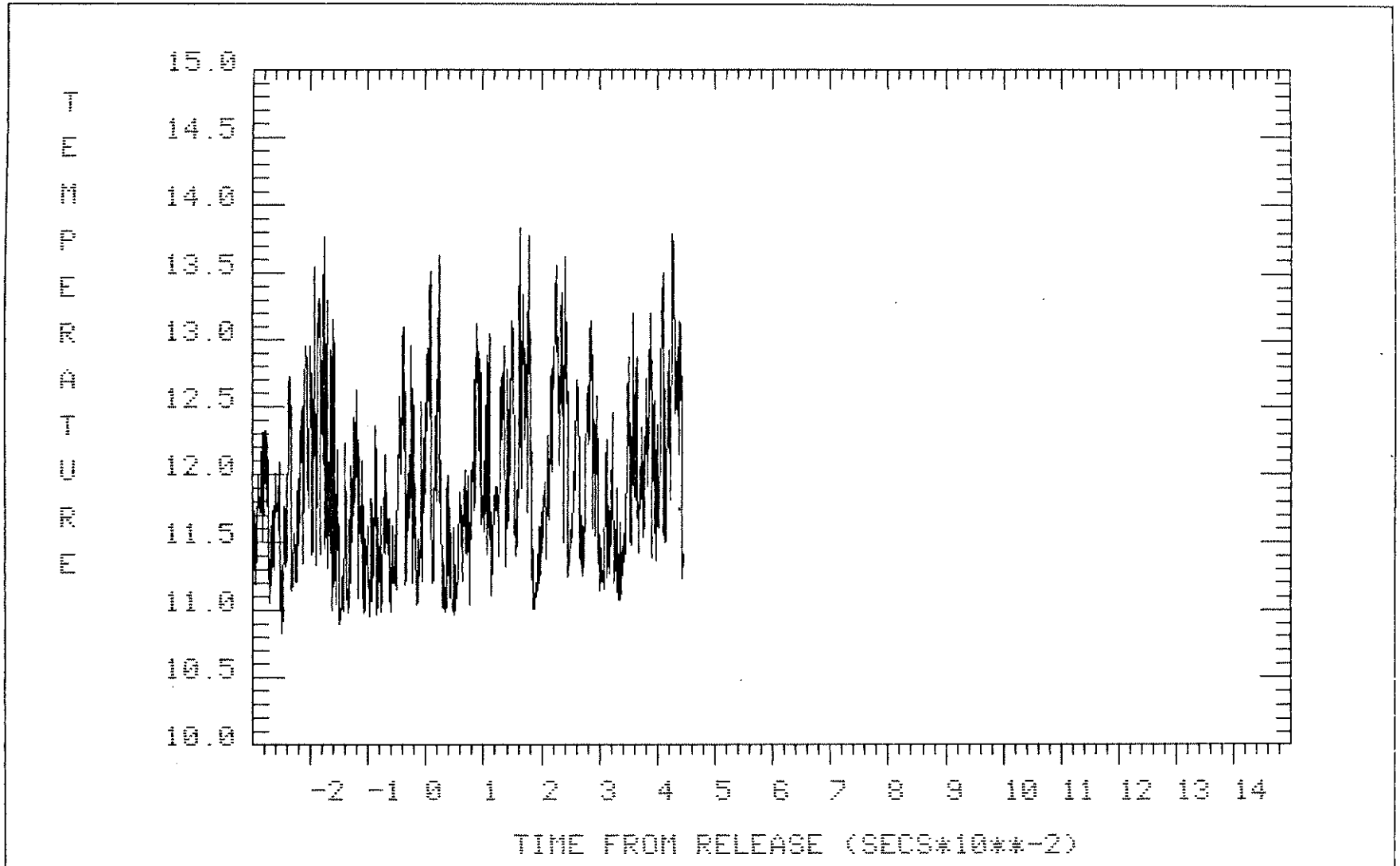


TRIAL: 015 TYPE: UANW UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 475 M Y: 275 M Z: 5.0 M

MEAN OF RUN UP: 0.10 MEAN OF RUN DOWN: 0.16

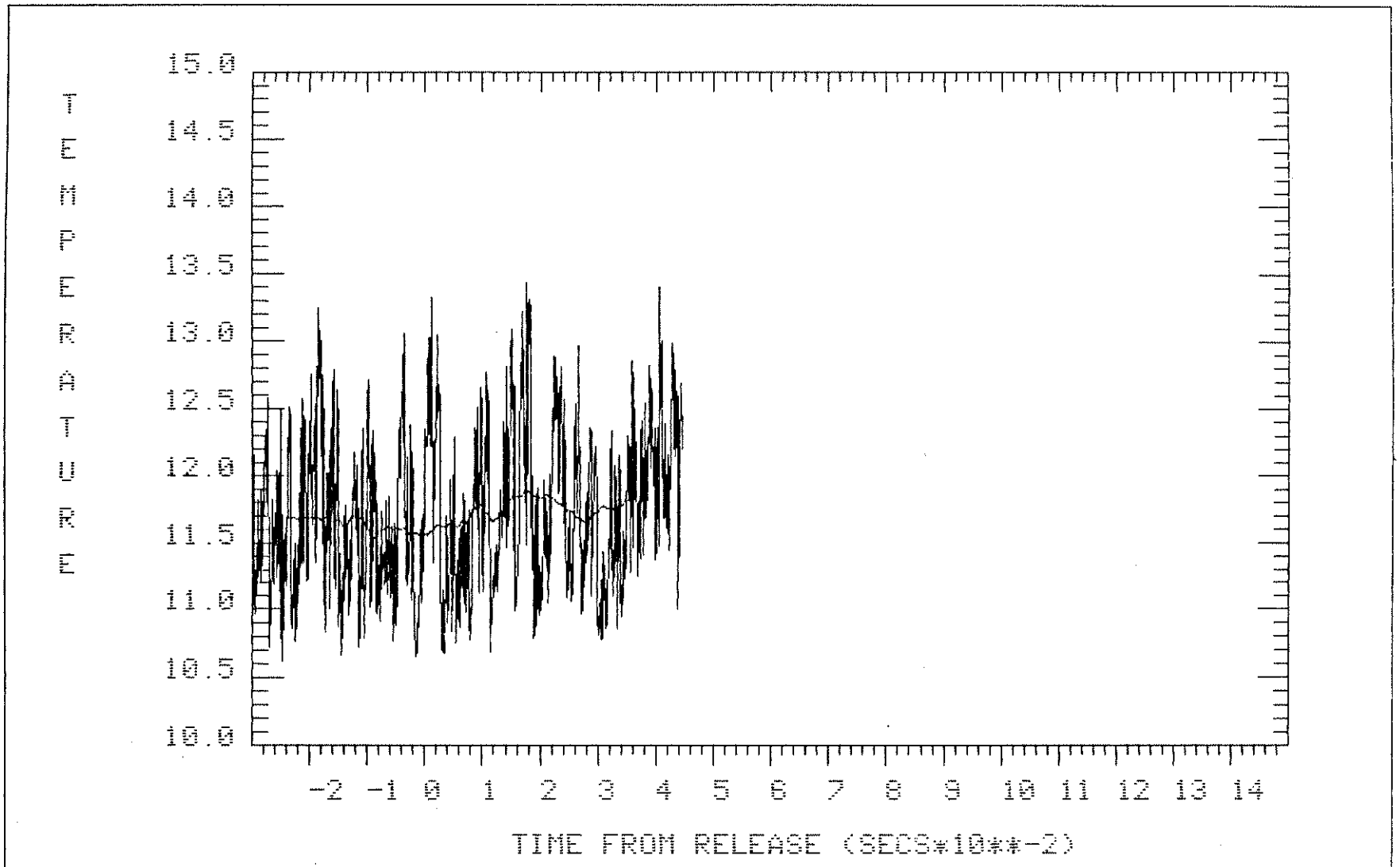
E58



TRIAL: 015 TYPE: UANT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 475 M Y: 275 M Z: 5.0 M

MEAN OF RUN UP: 11.53 MEAN OF RUN DOWN: 11.64

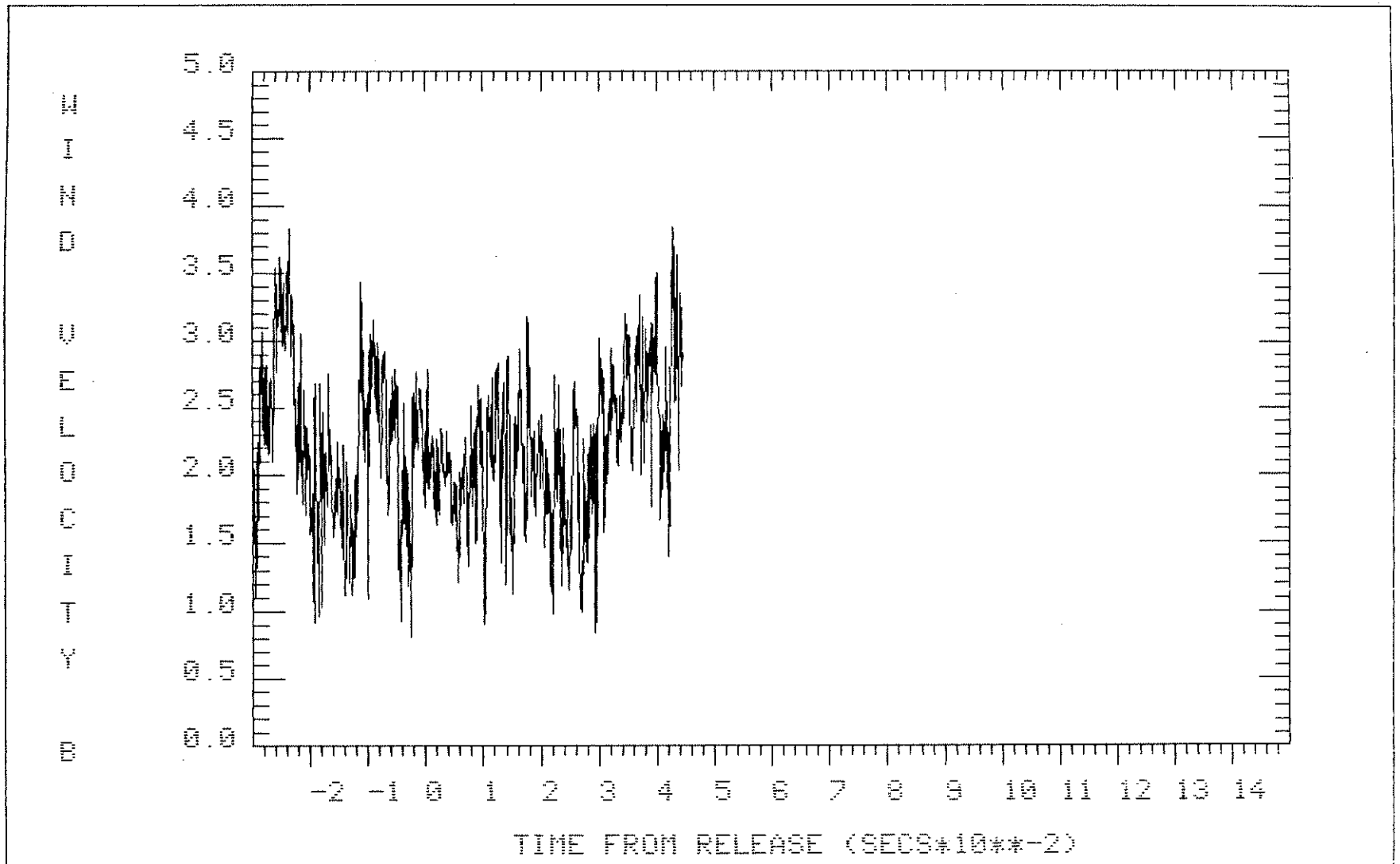


TRIAL: 015 TYPE: TEMP UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 475 M Y: 275 M Z: 5.0 M

MEAN OF RUN UP: 11.36 MEAN OF RUN DOWN: 11.52

E60

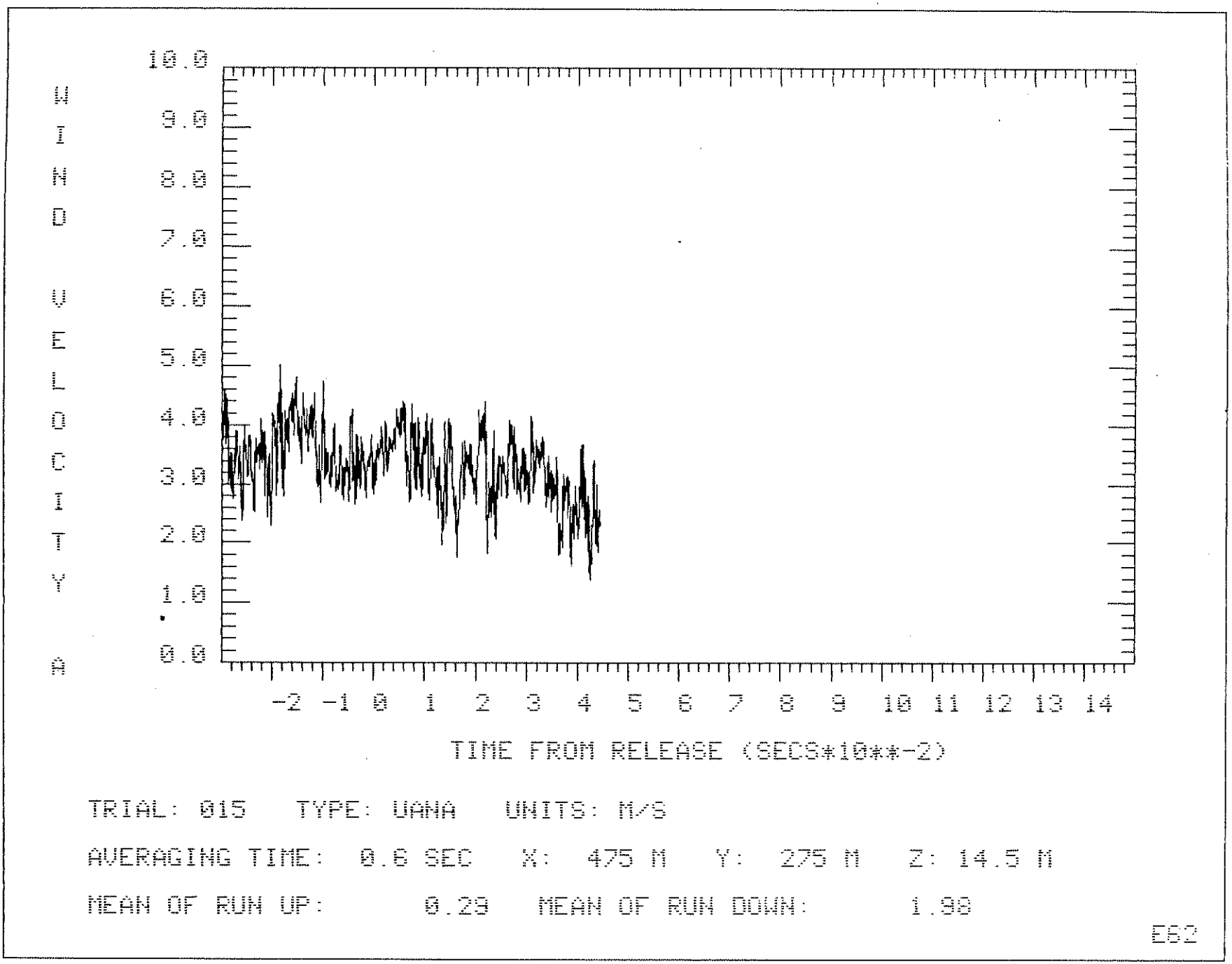


TRIAL: 015 TYPE: UAMB UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 475 M Y: 275 M Z: 14.5 M

MEAN OF RUN UP: 3.81 MEAN OF RUN DOWN: 3.10

E61

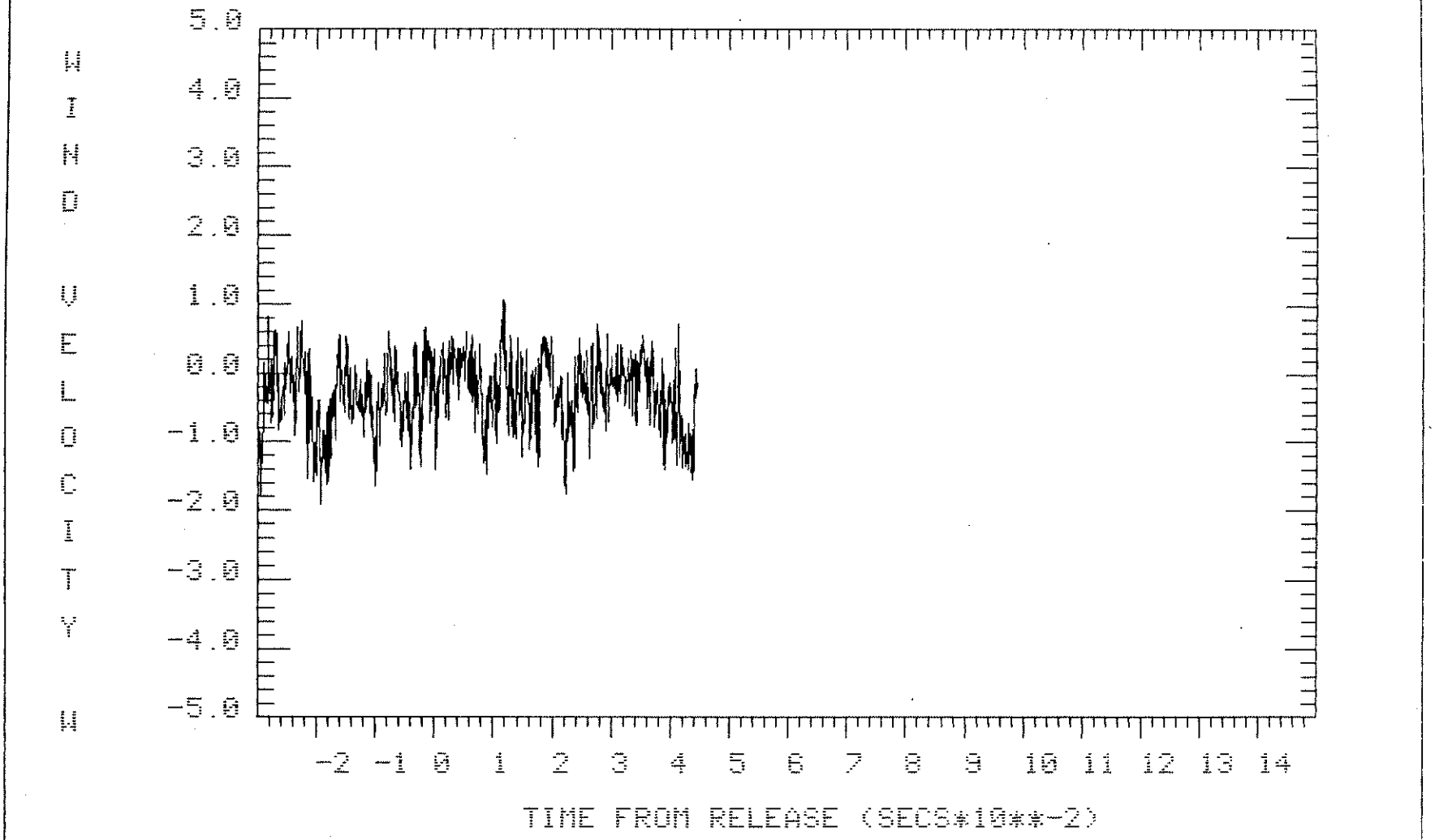


TRIAL: 015 TYPE: UANA UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 475 M Y: 275 M Z: 14.5 M

MEAN OF RUN UP: 0.29 MEAN OF RUN DOWN: 1.98

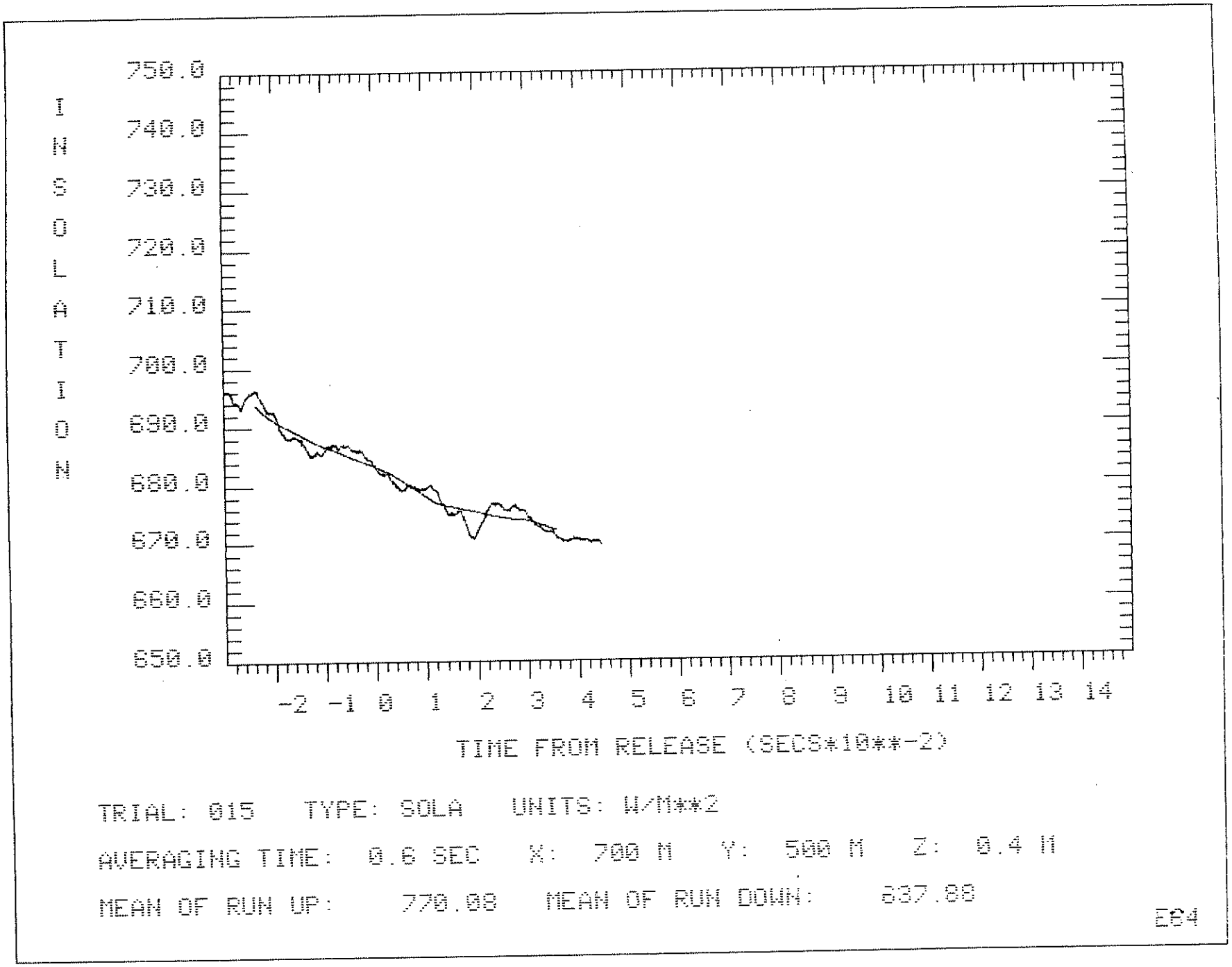
E52



TRIAL: 015 TYPE: UANW UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 475 M Y: 275 M Z: 14.5 M

MEAN OF RUN UP: -0.26 MEAN OF RUN DOWN: -0.12

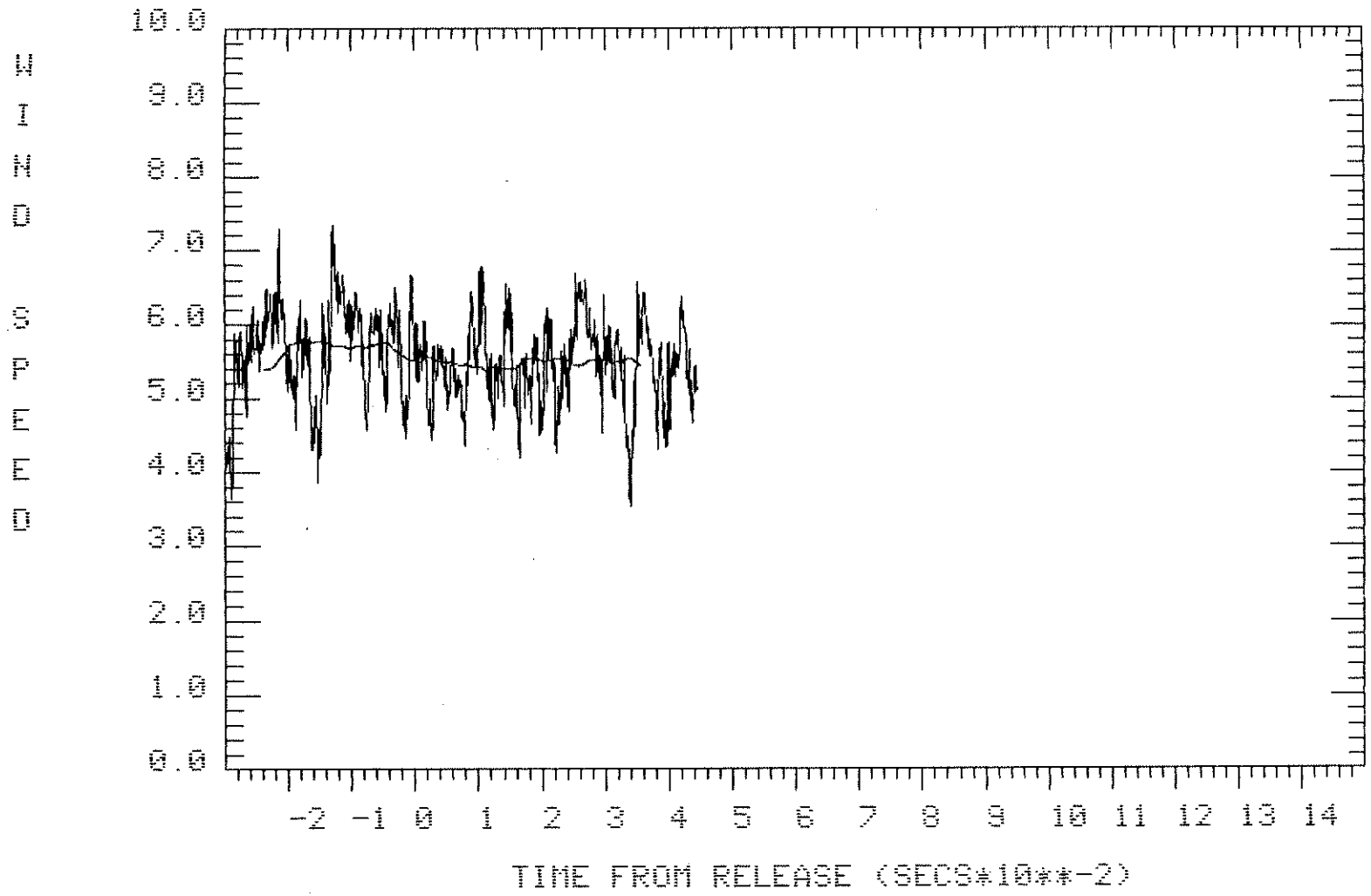


TRIAL: 015 TYPE: SOLA UNITS: W/M**2

AVERAGING TIME: 0.6 SEC X: 700 M Y: 500 M Z: 0.4 M

MEAN OF RUN UP: 770.08 MEAN OF RUN DOWN: 637.88

E64

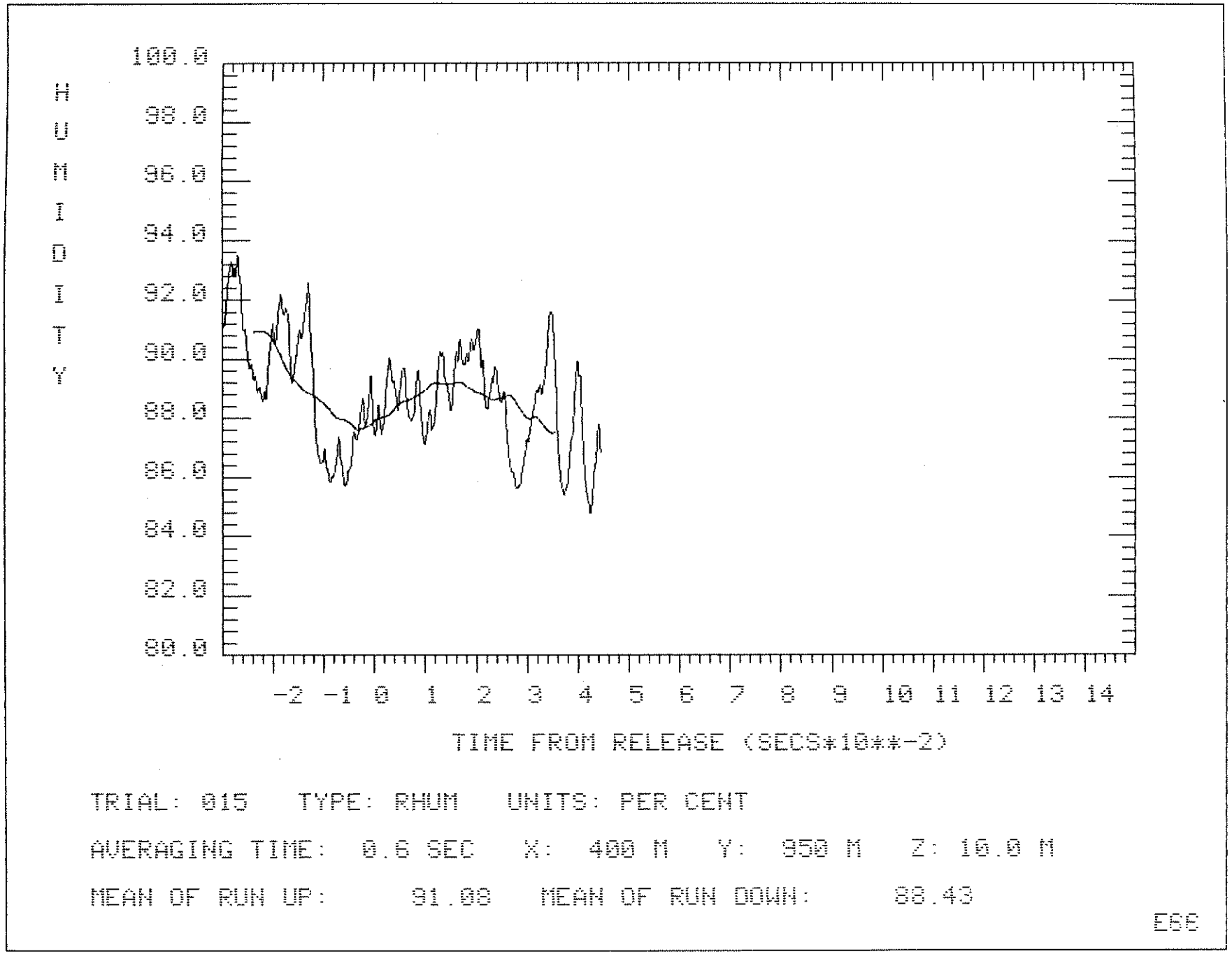


TRIAL: 015 TYPE: WSPD UNITS: M/S

AVERAGING TIME: 0.6 SEC X: 400 M Y: 950 M Z: 10.0 M

MEAN OF RUN UP: 5.14 MEAN OF RUN DOWN: 5.10

E65

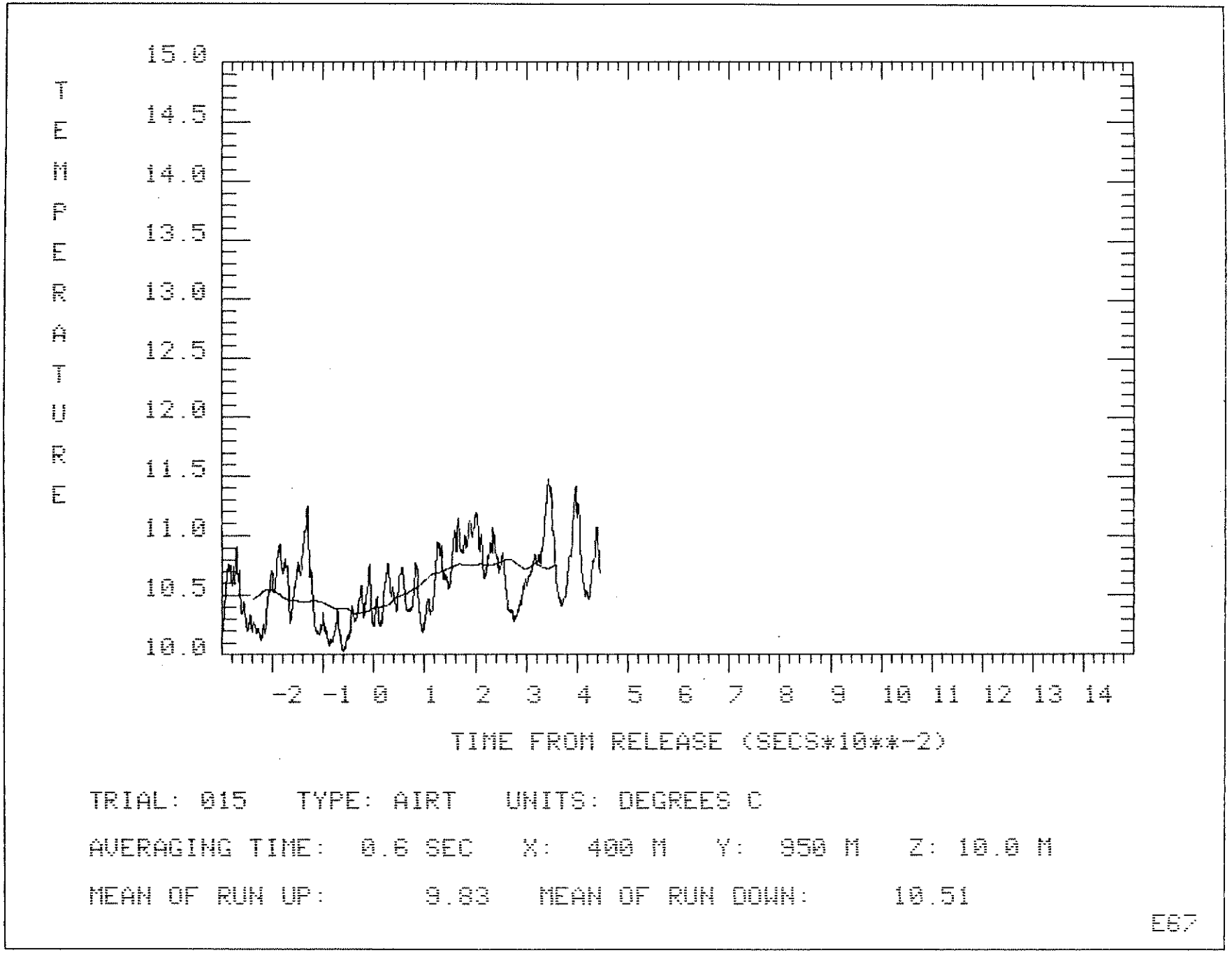


TRIAL: 015 TYPE: RHUM UNITS: PER CENT

AVERAGING TIME: 0.6 SEC X: 400 M Y: 950 M Z: 10.0 M

MEAN OF RUN UP: 91.08 MEAN OF RUN DOWN: 88.43

E66

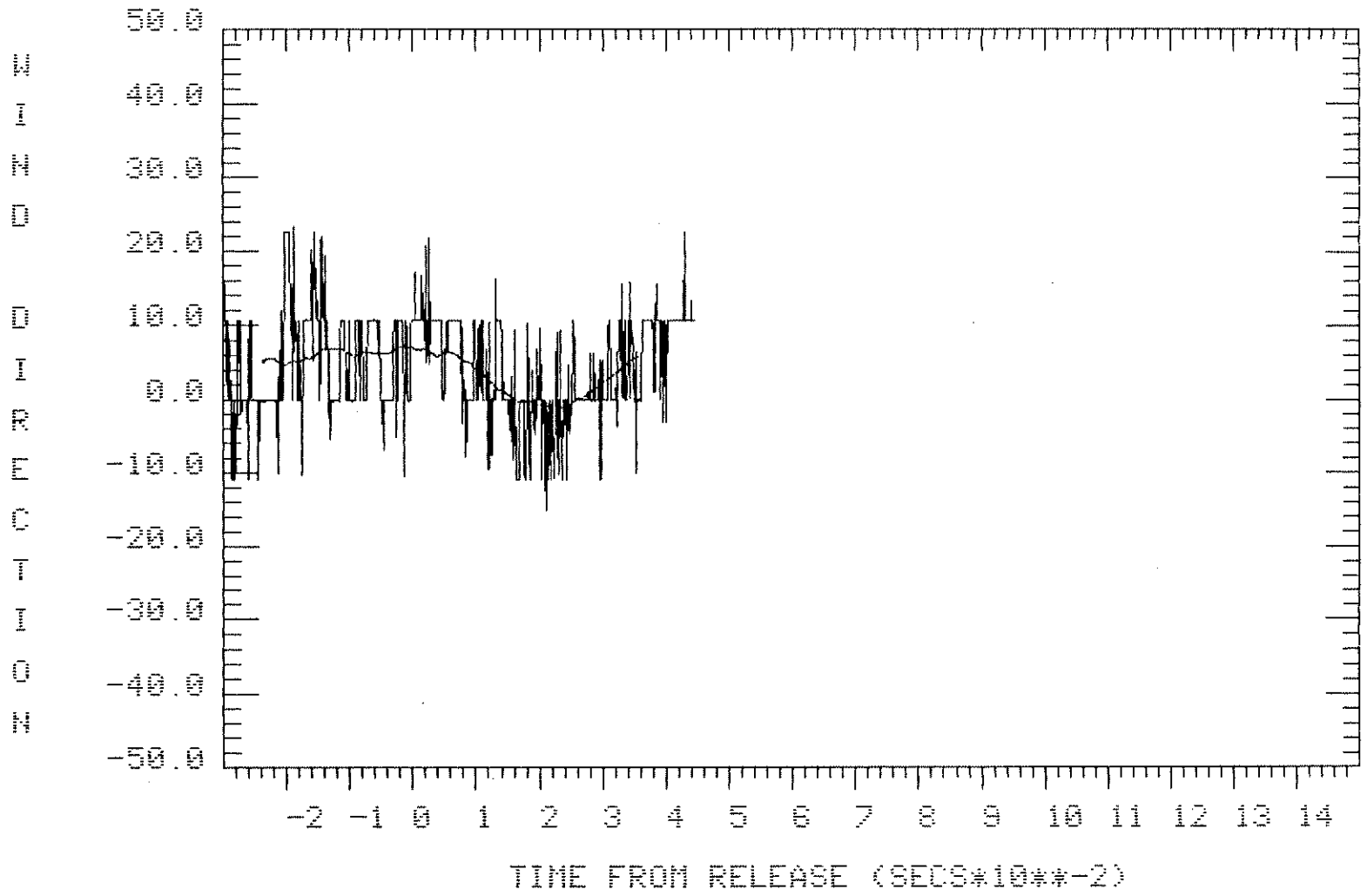


TRIAL: 015 TYPE: AIRT UNITS: DEGREES C

AVERAGING TIME: 0.6 SEC X: 400 M Y: 950 M Z: 10.0 M

MEAN OF RUN UP: 9.83 MEAN OF RUN DOWN: 10.51

E67

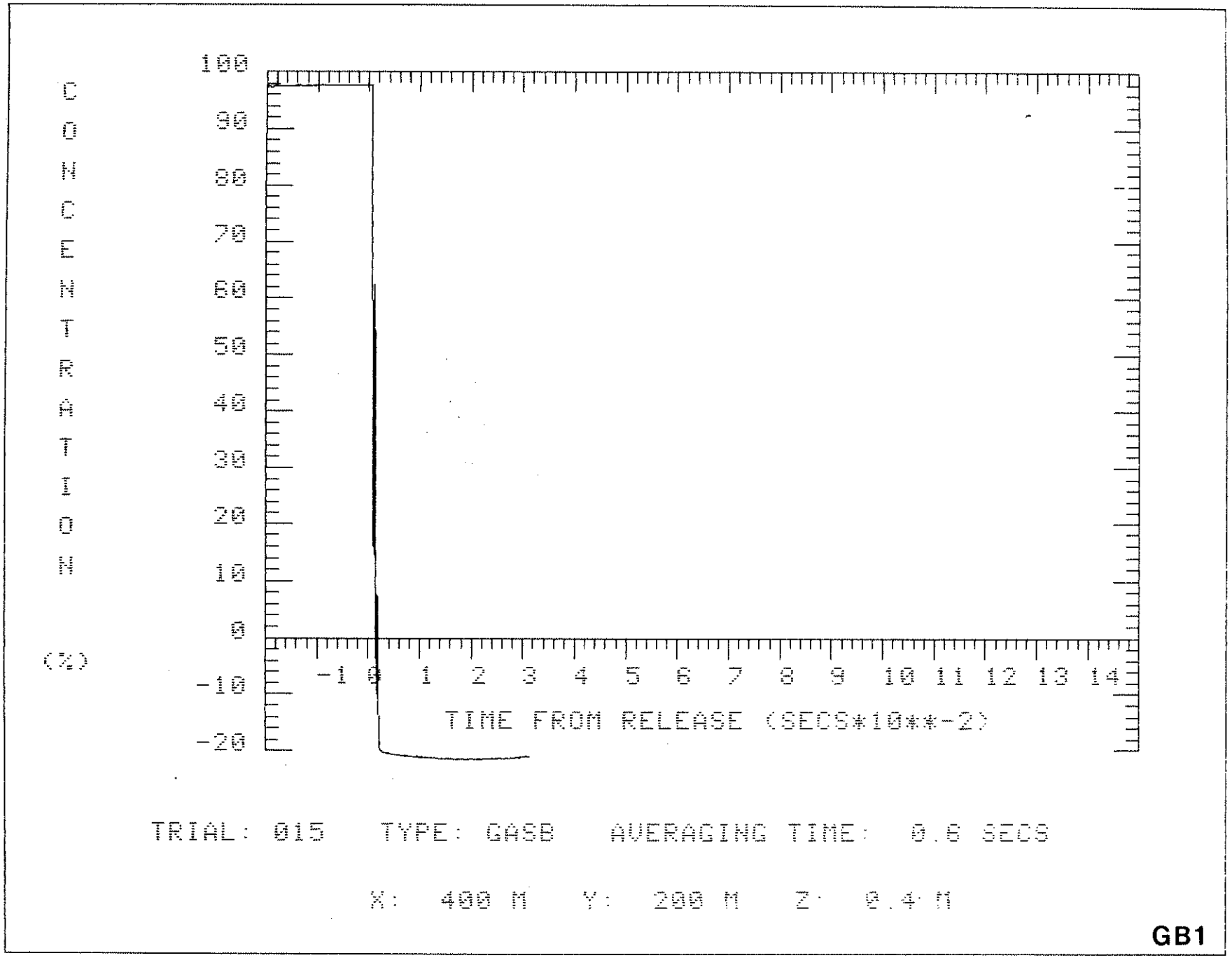


TRIAL: 015 TYPE: WHDG UNITS: DEGREES

AVERAGING TIME: 0.6 SEC X: 400 M Y: 950 M Z: 10.0 M

MEAN OF RUN UP: -14.82 MEAN OF RUN DOWN: -5.52

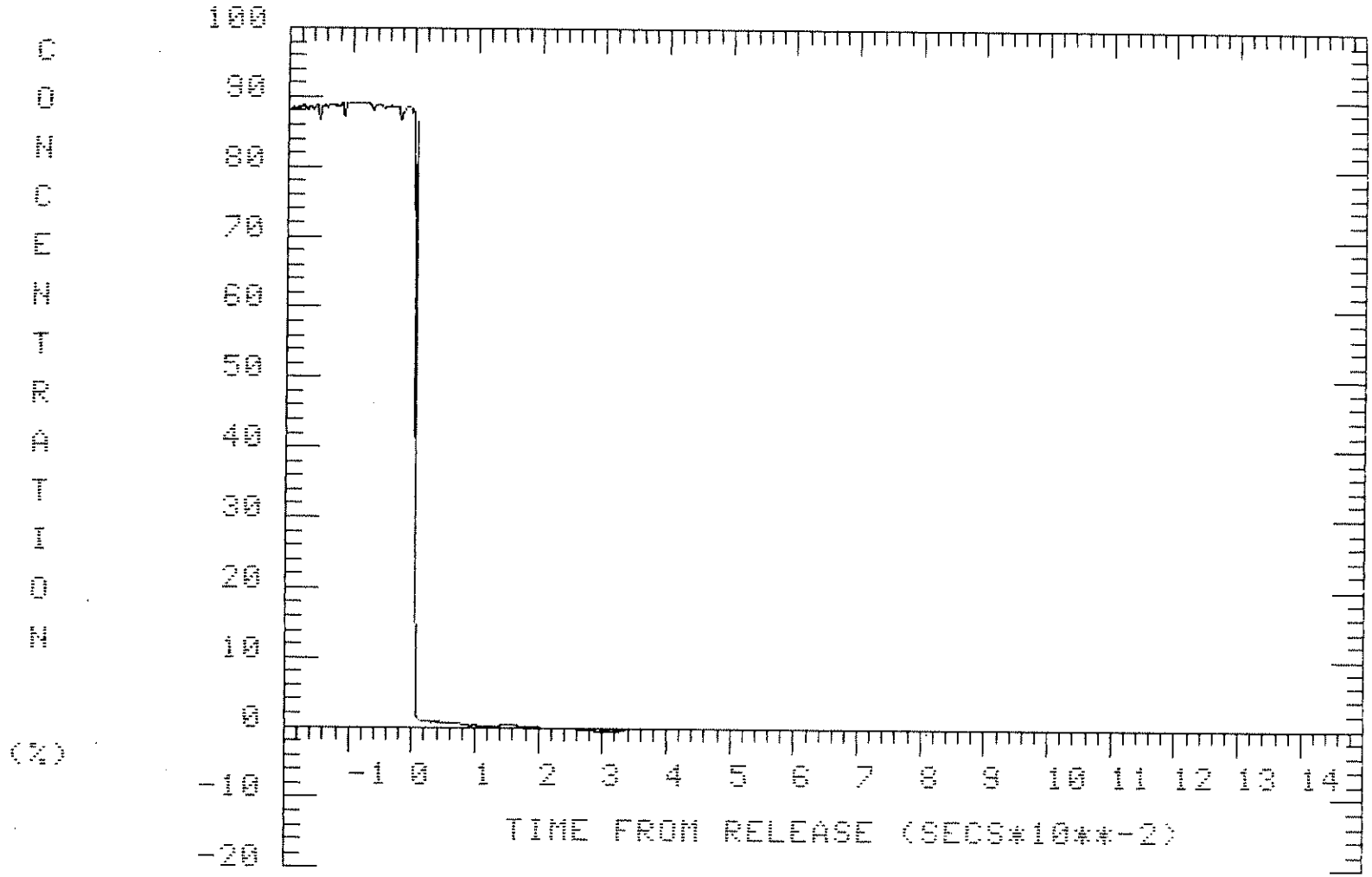
E68



TRIAL: 015 TYPE: GASB AVERAGING TIME: 0.6 SECS

X: 400 M Y: 200 M Z: 0.4 M

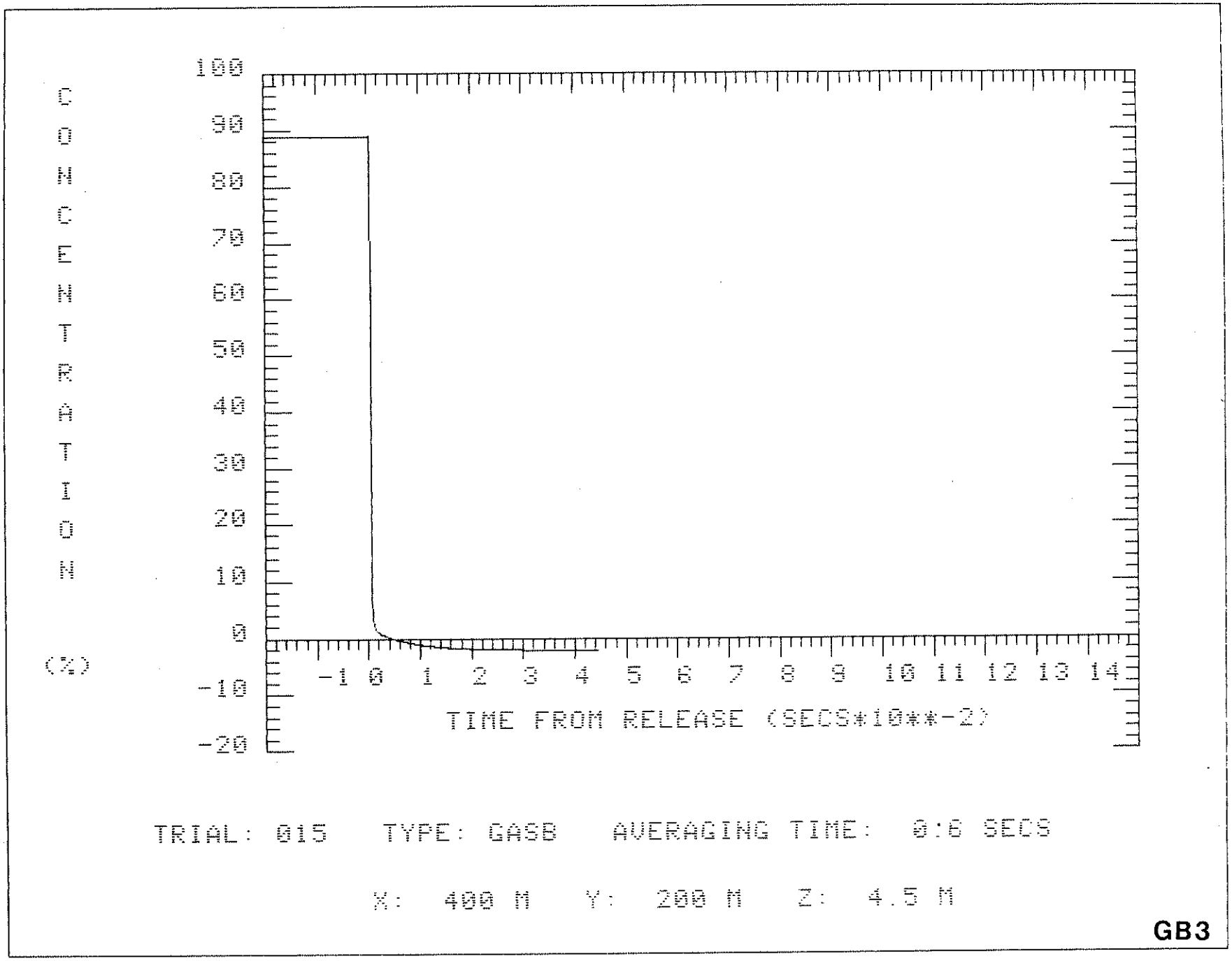
GB1



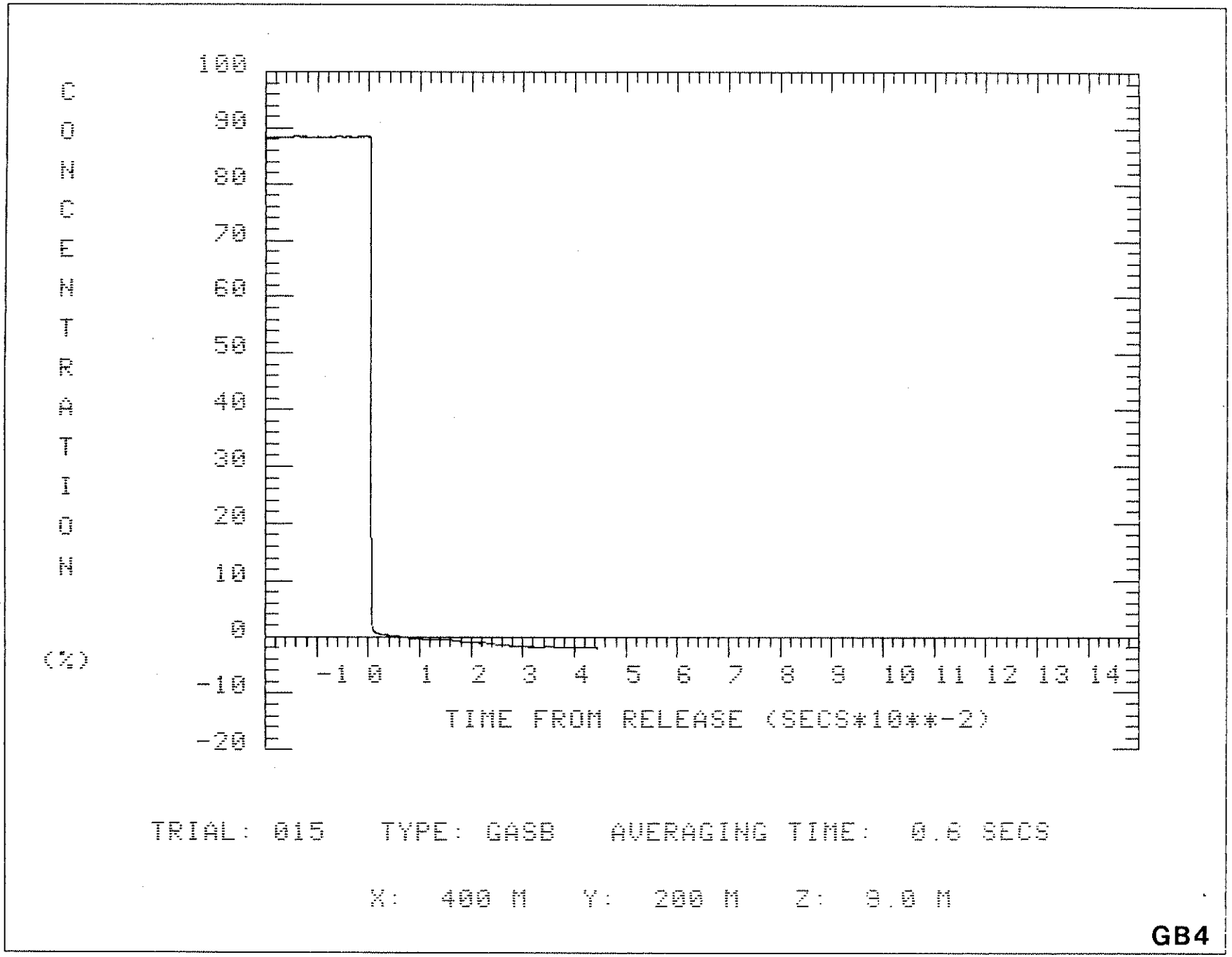
TRIAL: 015 TYPE: GASB AVERAGING TIME: 0.8 SECS

X: 400 M Y: 200 M Z: 12.0 M

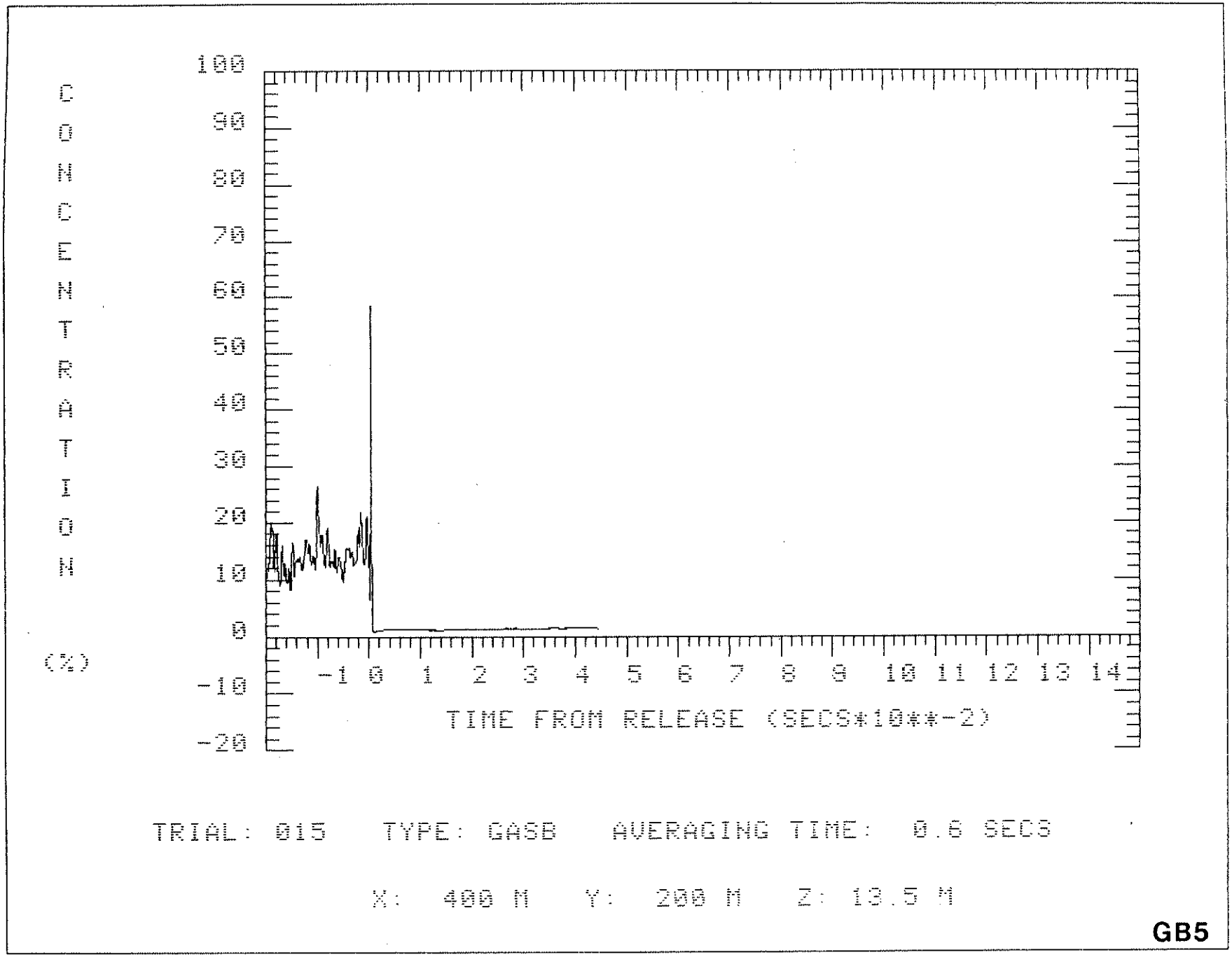
GB2


CONCENTRATION
(%)
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GASB AVERAGING TIME: 0:6 SECS
X: 400 M Y: 200 M Z: 4.5 M

GB3


CONCENTRATION
(%)
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GASB AVERAGING TIME: 0.8 SECS
X: 400 M Y: 200 M Z: 9.0 M

GB4


CONCENTRATION (%)
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
TIME FROM RELEASE (SECS*10**-2)
TRIAL: 015 TYPE: GASB AVERAGING TIME: 0.6 SECS
X: 400 M Y: 200 M Z: 13.5 M
GB5