Operation

DOMINIC

FISH BOWL SERIES

PROJECT OFFICERS REPORT—PROJECT 6.13

RF MEASUREMENTS AND OPTICAL MEASUREMENTS, SHOT STAR FISH PRIME

J. E. Hagefstration, Project Officer

Army Missile Command
Redstone Arsenal, Alabama

and personnel of:

Radio Corporation of America
Missile and Surface Radar Division
Moorestown, New Jersey

and

Barnes Engineering Company
30 Commerce Road
Stamford, Connecticut

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VOLUME 2

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DEPARTMENT OF DEFENSE
WASHINGTON, D.C. 20301

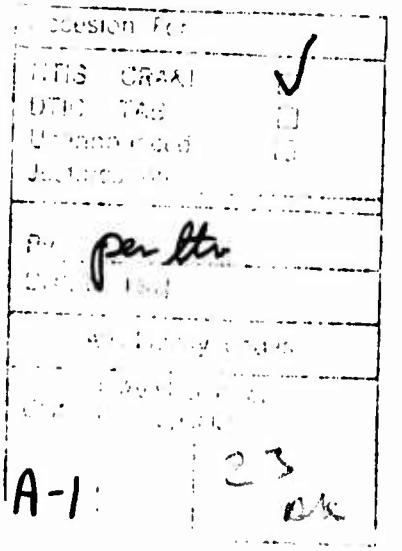
[redacted]

PREFACE

The reduction and compilation of the data presented in Part 2 are joint efforts. The efforts of Mr. C. Vaugh and Mr. R. Aldrich, who determined the major portions of fireball growth and altitude data, are particularly mentioned.

In addition, acknowledgement is made of the many helpful suggestions contributed by Dr. S. Stone of Los Alamos Scientific Laboratory. Without him, pretest predictions would have been difficult.

The XR triple-layer film was furnished and processed through the generosity of Edgerton, Germeshausen, and Grier, specifically Charles W. Wyckoff. Its performance exceeded the anticipations, and considerable data were obtained from the record.



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PART 1

RF MEASUREMENTS [redacted]

J. E. Hagefstration, Project Officer

Contributors:

E. Austein
R. Bachinsky
A. Gold
R. E. Kansas
E. Phelan

Radio Corporation of America
Missile and Surface Radar Division
Moorestown. New Jersey

[redacted]

[redacted]

CHAPTER 1

OBJECTIVES AND OPERATIONAL DESCRIPTION

1.1 OBJECTIVES

The primary DAMP Star Fish Prime objective was the measurement of C-band angular jitter. A total of nine rockets, equipped with DAMP C-band beacons, was originally scheduled for launch during the Star Fish Prime event. However, the toll of probes taken during the previous aborts in the Fish Bowl series, the desire to reserve several probe missiles for training to achieve reliable acquisition procedures, and the requirement for a probe control flight in a non-nuclear environment necessitated reserving the two late-time Speedball rockets originally scheduled for Star Fish Prime (probes 8 and 9) for test firings between Star Fish Prime and Blue Gill Triple Prime.

Of the seven resulting DAMP C-band rockets fired, three were Speedballs. The other four rockets were launched by projects 9.1a, 6.2, and 6.7. A list of firing times, projects, and tracked intervals is provided in the trajectory section of this report.

An operator error involving power programming prohibited acquisition of the project 6.7 rocket. Since it was

[redacted]

of paramount importance to have a tracked target in the air at burst time, the Speedball backup was fired at H-50 seconds, and no further attempts were made to acquire the 6.7 rocket. Of the remaining six rockets fired, all were tracked for most of their flight, with the exception of the H-50 second Speedball, which was lost shortly after burst and never re-acquired.

All Speedball rockets were equipped with Daisy flares. This flare package was designed to measure the target RF optical bias by ejecting intense flares which would enable comparison of the radar line of sight to the rocket with the optical position. However, due to complete overcast at the DAMP ship position, no flares were seen during Star Fish Prime.

Three radars were used for clutter and fireball reflection measurements. These were the second C-band tracker, the UHF and the L-band radars. The UHF and L-band frequencies were radiated from the same 28-foot parabolic antenna. The C-band tracker used was the Starboard 16-foot FPQ-4. The shipboard digital computer was used to program the C-band tracker through a series of eight different regions of antenna directions, with combinations of five

[redacted]

different scan patterns, with the UHF/L-band system slaved to the C-band tracker.

Possible interference with the destruct mechanism of the warhead prevented the UHF/L-band system from observing burst at H-0. Auroral-type clutter measurements, however, were obtained after H + 1 minute. UHF interference may have invalidated the radiometric measurements.

In addition to these objectives, the Thor booster was skin-tracked to burnout, and the composite telemetry and signal strength of the 246.3-Mc Thor health link was recorded. Riometer data was recorded for project 6.8 during the entire Fish Bowl series. Transit measurements are presented in Volume 7.

1.2 OPERATIONAL PARAMETERS

Date 9 July 1962

Time 0900; 09.0290 GMT

Altitude 400.15 km.

Yield 1.4 Mt

Position of burst with respect to Johnston Island

33.34-km ground range

200.31 degrees azimuth

Carrier vehicle Thor

Ships position at H-0

360 km from Johnston

Azimuth from Johnston = 10.3 degrees

Geodetic Latitude: 19.91 degrees N

Longitude: 168.91 degrees W

Ship's Maneuvers

10 degrees heading at H-33 min, 10 knots

Turn to Starboard at H-24 min, arriving at 330 degrees at H-17 min

Turn to Starboard at H-700 sec, arriving 280 degrees at H-340 sec

280 degrees heading at 4 knots until H+50 min

Turn to starboard to 100 degrees at H+50 min

Total probes, DAMP ship

C-band track: eight

Flare pack probe = four

Telemetry track = one (Thor)

1.3 FREQUENCY SUMMARY

C-band tracker 1 (Port)

Interrogate	5700 Mc
Receive	5775 - beacon
	5700 - skin

[redacted]

C-band tracker 2 (Starboard)

Transmit	5795 Mc
Receive	5795 Mc
L-band radar	1300 Mc
UHF radar	430 Mc
Telemetry tracker	246.3 (Thor booster)
Radiometer	442 Mc
Riometer	30, 60, 120 Mc
Transit	400, 324, 150 Mc

1.4 DATA SUMMARY

For this report a separate data volume has been prepared for each Fish Bowl test in which the DAMP project was engaged (Star Fish Prime, Check Mate, Blue Gill Triple Prime, King Fish, and Tight Rope). It is the intent of each volume to present only the most pertinent and readily available data within the limited time scale available. Each test report volume contains less than 1 percent of the total recorded data accumulated during each mission, including calibrations.

Apologies must be presented for the lack of equipment block diagrams, sub-system parameters, calibration, and alignment procedures, etc. Equipment-related considerations are covered in detail in the following standard DAMP volumes:

1. System Function Manual (Equipment)
2. Equipment Operation Manual (Calibration, and Alignment procedures)
3. Data Processing Procedures Manual

The interested reader is referred to these documents for most questions concerning the nature of the equipment or the calibration methods.

Table 1.1 provides a tabulation of the various quantities recorded by each instrumentation system. The program followed by the port C-band radar is detailed in Table 1.2, and UHF/L-band slave intervals are given in Table 1.3.

TABLE 1.1 EQUIPMENT AND RECORDING DESCRIPTION

Type of Recording	Quantity Recorded	Speed of Recording
Digital (three recorders)	1. Range, azimuth, elevation AGC voltage elevation error, azimuth error and range errors for tracking radars #1 and #2	16 in/sec 100 samples per second per channel
	2. Pitch, roll, ships heading for gyros No. 1 and No. 2	
	3. Azimuth, error, elevation error and AGC voltage for UHF/L-band radar	
	4. Azimuth, elevation and AGC voltage for telemetry tracker	
	5. Azimuth and elevation angles for slave pedestals No. 1, No. 3 and No. 4	
	6. Twenty-four bit real time and sync. pulses	
Ampex (analog) (two recorders) Recorders #1 and #2	1. AGC voltage, AUDAR, azimuth error, elevation error and range error for tracking radars No. 1 and No. 2	7½ in/sec
	2. AGC voltage, azimuth error and elevation error for UHF/L-band radar	
	3. AGC voltage, azimuth error and elevation error for telemetry tracker	
	4. Audio commentary (operations net)	
	5. Tracking radar No. 1 analog range recorded on Ampex No. 1	
	6. Thirteen bit time and control track	
Sanborn (analog) (two recorders)	1. AGC voltage for tracking radars No. 1	10mm/sec
	2. AGC voltage for UHF/L-band radar	
	3. Time	
	4. Tracking radar No. 1 analog range	
	5. Telemetry AGC	
Video No. 1	1. Reference and non-normalized bi-polar video from WDR	N/A
	2. Audio commentary (operations net)	
	3. Time	

[redacted]

TABLE 1.1 (CONTINUED)

Type of Recording	Quantity Recorded	Speed of Recording
Video No. 2	1. Reference, and non-normalized error and elevation error video signals from WDR receivers for tracking radar No. 2	N/A
	2. Reference video from UHF/L-band radar	
	3. Audio commentary (operations net)	
	4. Time	
Boresight camera	1. Tracking radar No. 2 (1000 ft reel)	20 frames per second
	2. Tracking radar No. 1 (400 ft reel)	
Four channel audio recorder	1. Commentary	3-3/4 in/sec
X-Y plotter	Probe 2 only 1. X_E versus Y_E of tracking radar No. 1	N/A
	2. R_C versus H of tracking radar No. 1	
Minicom video recorder	A. H-851 seconds to H-600 seconds: telemetry composite video cyclelock, 13 bit real time, and operations net commentary	60 in/sec
	B. H-190 seconds to end of test: tracking radar No. 1 and No. 2 video, UHF/L-band radar video, 13 bit real time, and operations net commentary	120 in/sec
Time and events recorders (brush strip chart - two recorders)	switching events, 200 channels	10mm/sec
Vidicon TV monitor	1. Photographs during 6.13 probe flare firing sequences	12½ frames per sec
Events recorder (portable)	1. Riometer and radiometer events	
Riometer recordings	1. Three AGC channels 2. Three audio channels 3. Time	N/A
UHF radiometer	1. UHF noise temperature 2. Time	15 in/min
CEC/digital punch	1. Transit print-outs of satelite passes	N/A

[redacted]

TABLE 1.2 EDITED TIME AND EVENTS RECORD PORT C-BAND (RADAR NO. 1)

Time (H+sec)	GMT	Events	Notes
Initial mission conditions		MGC	Manual gain control
		External designate mode	The radar servos were directed by computers.
		285 PRF	Pulse repetition frequency
		1-microsecond pulse width	
		Receiver bandwidth 8 megacycles	
		Slave pedestal three unassigned	
		Boresight camera off	
		Azimuth bandwidth 3 cps	These figures refer to the three tracking servos.
		Elevation bandwidth 3 cps	
		Range bandwidth 4 cps	
		Beacon local oscillator on, MFC	Manual frequency control
		Skin local oscillator	Status not recoverable from the raw time and events records for this mission
-1754.4	08:30:54.6	Lockon automatic track mode, AGC	Start of probe 1 beacon track. Azimuth, elevation, and range servos commenced tracking the beacon return.
-1752.0	08:30:57	Slave pedestal 3 assigned to radar 1.	Slave pedestal 3 carried the vidicon camera
-1749.0	08:31:00	Beacon local oscillator, AFC	Automatic frequency control
-1747.0	08:31:02	Receiver bandwidth 2 megacycles	
-1449.5	08:35:39.5	Manual mode, MGC	Azimuth, elevation, and range servos were now under the operator's manual control.
Starting conditions probe 3		Receiver bandwidth 8 megacycles	Only the changes from the last conditions above are noted.
		External designate mode	
		Boresight camera off	
		Beacon local oscillator, MFC	
		Slave pedestal 3 unassigned	

TABLE 1.2 (CONTINUED)

Time (H+sec)	GMT	Events	Notes
-30.3	08:59:35.7	Boresight camera on	
-14.0	08:59:55	Lockon automatic track mode, AGC	Start of probe 3 beacon track
+24.0	09:00:33	External designate mode, MGC	Radar designated by computers, disabling automatic track
Starting conditions probe 4		Receiver bandwidth 8 megacycles	
		Boresight camera off	
		Beacon local oscillator, MFC	
		Slave pedestal 3 unassigned	
781.3	09:13:10.3	Lockon automatic track mode	Start of probe 4 beacon track
		AGC	
784.0	09:13:13	Slave pedestal 3 assigned to radar 1	
795.1	09:13:24.1	Receiver bandwidth 2 megacycles	
797.5	09:13:26.5	Beacon local oscillator, AFC	
946.0	09:15:55	External designate mode, MGC	
Starting conditions probe 5		Receiver bandwidth 8 megacycles	
		Beacon local oscillator, MFC	
		Slave pedestal 3 unassigned	
1291.9	09:21:40.9	Lockon automatic track mode	Start of probe 5 beacon track
		AGC	
1293.0	09:21:42.0	Slave pedestal 3 assigned to radar 1	
1294.6	09:21:43.6	Receiver bandwidth 2 megacycles	
1295.5	09:21:44.5	Beacon local oscillator, AFC	
1810.0	09:30:19	Slave pedestal 3 unassigned	
1810.3	09:30:19.3	Manual mode, MGC	
1813.5	09:30:22.5	External designate mode	
1817.9	09:30:26.9	Receiver bandwidth 8 megacycles	
1819.4	09:30:28.4	Beacon local oscillator, MFC	
1900.1	09:31:49.1	Lockon automatic track mode, AGC	Start of probe 6 beacon track

[redacted]

TABLE 1.2 (CONTINUED)

Time (H+sec)	GMT	Events	Notes
1901.2	09:31:50.2	Slave pedestal 3 assigned to radar 1	
1903.0	09:31:52	Beacon local oscillator, AFC	
1904.2	09:31:53.2	Receiver bandwidth 2 megacycles	
2142.7	09:35:51.7	External designate mode, MGC	Lost track; attempted to re-acquire
2143.4	09:35:52.4	Slave pedestal 3 unassigned	
2187.6	09:36:36.6	Lockon automatic track mode, AGC	Re-acquired probe 6
2189.0	09:36:38	Slave pedestal 3 assigned to radar 1	
2309.0	09:38:38	Slave pedestal 3 unassigned	
2309.5	09:38:38.5	Manual mode, MGC	
Starting conditions probe 7		Beacon local oscillator, MFC Receiver bandwidth 8 megacycles	
2440.6	09:40:49.6	Lockon automatic track mode, AGC	Start of probe 7 track
2442.1	09:40:51.1	Receiver bandwidth 2 megacycles	
2442.3	09:40:51.3	Slave pedestal 3 assigned to radar 1	
2443.0	09:40:52	Beacon local oscillator, AFC	
3285.0	09:54:54	Slave pedestal 3 unassigned	
3286.2	09:54:55.2	Manual mode, MGC	

TABLE 1.3 UHF/L-BAND SLAVE INTERVALS,
SLAVED TO STARBOARD C-BAND RADAR NO. 2

From (H +, Sec)	To
81	116
133	166
183	218
235	289
309	362
378	431
447	566
597	715
730	806
820	after 900

[redacted]

CHAPTER 2

EQUIPMENT SUMMARY

The following equipment listings are intended to convey the important parameters of the various sensors and recorders contained on the DAMP ship applicable to the Fish Bowl measurement:

AN/FPQ-4 (2 each)	Tracking Radar
Antenna	16-foot parabolic reflector 46.9-db gain 4-horn monopulse feed 14-mil (=0.8 degree) beam-width (one way)
Repetition rate	142, 285, 855 pps
Pulse duration	1.7, 1.0, 0.25 μsec
Receiver bandwidth	1.2 Mc, 2.2 Mc, 8 Mc
Noise figure	6 db
Frequency	C-band (5400 to 5900 Mc)
Peak power	3 megawatts
Pedestal	Azimuth-elevation mount
Track rates	Range 10k yds/sec Azimuth 720 mils/sec Elevation 400 mils/sec
Pedestal data output	Digital and synchros
Polarization	1 horizontal, 1 vertical For Fish Bowl tests, tracking radar is vertically polarized radar (Port radar).

Unambiguous range	1000 naut mi (TR 1 Port) 500 naut mi (TR 2 Starboard)

2.1 L-BAND/UHF RADARS

The L-band and UHF radars, which share a common antenna, permit observation of the target by illumination other than C-band. These radars are not automatic tracking radars and are normally slaved to one of the AN/FPQ-4 tracking radars.

Antenna	28-foot reflector, paraboloid	
	Gain L-band 38.3 db UHF 29 db	
	Beamwidth L-band 2 degrees UHF 6 degrees	
	Polarization vertical	
	Sidelobes: UHF 14 db L-band 17 db	
	L-Band	UHF
Range (1-m^2 target, S/N = 1)	266 naut mi	204 naut mi
Repetition rates	285 pps	285 pps
Pulse duration	1.7 μsec	1.7 μsec
Receiver bandwidth	1.2 Mc	1.2 Mc
Noise figure	8 db	5 db
Frequency	1250 to 1350 Mc	406 to 450 Mc
Peak power	2 Mw	2 Mw
Pedestal	Modified 5-inch Mark 38 gun-mount on 10-foot tower	

[redacted]

Track rate	Slaved to AN/FPQ-4 radar
	Azimuth 0.43 radian/sec Elevation 0.25 radian/sec
Pedestal data:	Synchros
Travel:	Azimuth ± 135 degrees with respect to stern Elevation -50 degrees to +85 degrees with respect to deck

2.2 TELEMETRY TRACKER

The telemetry tracker is an acquisition aid operating on the interferometer principle which gives angular position of the telemetry target from the ship.

General characteristics include:

Purpose	Telemetry recording and acquisition vectoring
Antenna	12-foot-square ground plane with four antenna assemblies (Vought Electronics CVAT-162-4)
Frequency	215 to 260 Mc
Polarization	Vertical, horizontal, circular (left or right)
Gain	18 db
Receiver	Nems-Clark 1432
Beamwidth	20 degrees
Side-lobe level	-12 db
VSWR	1.5 maximum

Power capacity	200 watts (continuous)
Pedestal	Canoga Electronic Corporation Model 8417, modified by RCA
Tracking rates	Azimuth 10 degrees/sec Elevation 10 degrees/sec Slew 30 degrees/sec

Tracking receiver preamp threshold: -160 dbw

Pedestal output	Synchros, digitally encoded
Discriminators	EMR 67-D

2.3 VIDICON

Objective lens: Wollensak 20-inch Mirrotel F16-3

Field of view: 2 degrees

Resolving power: 2 seconds of arc

Image converter: 3-stage, electrostatic focused. RCA C-73491

TV monitor: TM - 9N (twin)

Cameras (2) flight: Research IV-C 30 frames/sec 35 mm

2.4 SLAVE PEDESTALS

Four modified Talos AN/FPW-2 guidance pedestals may be slaved to either or both of the AN/FPQ-4 tracking radars. Dynamic and other characteristics of these slave pedestals are as follows:

[redacted]

	Azimuth	Elevation
Travel	Unlimited	-10 to 180 degrees
Angular velocity maximum	15 rpm	6 rpm
Angular acceleration maximum	9 radians/sec^2	6 radians/sec^2
Data output	Synchros, digitally encoded	

2.5 RECORDERS

Operating parameters of the various recorders used in conjunction with the above equipment are given in Table 2.1.

TABLE 2.1 RECORDER TABULATION

Recorder	Channels	Normal Speed	Information Capacity per Channel	Length	Model
CEC Digital	48	16 inches sec	100 samples sec 24 bits sample	45 minutes	CEC #PM050h
Ampex	42	Direct and FM 7½ inches sec	10-[illegible] AM 100 [illegible] FM at 60 in sec	96 minutes	FR -1003
Mincom Video	7	120 inches sec	1.2 Mc	12 minutes	CM -100
RCA Video	9	Multiplexed	4 Mc	30 minutes	Special
Sanborn	38	1 cm sec	low frequency		Sanborn 156-100 series
Time and Events	200	1 cm sec		215 minutes	Brush, RE 3610 00
Audio	4	7½ inches sec	Audio	96 minutes	RCA Audio Tape Deck
Vidicon Cameras	2	12½ frames sec		20 minutes	Flight Research IV-C
Boresight Cameras	2	20 frames sec		12 minutes	Flight Research IV-C
CEC, Digital Punch	4				
Chart Recorders	8	Variable	Low		Esterline Angus 43006

CHAPTER 3

TRACKING RADAR TRAJECTORY

3.1 INTRODUCTION

All trajectory data was reduced from raw digital tapes of range, azimuth, elevation, roll, pitch, and own ship's heading (OSH) according to the IBM 709 digital program outlined below. Although the raw data was obtained and is available at 100 points per second, it was reduced and is presented, for obvious reasons, at 1 point per second during periods of valid FPQ-4 automatic track.

The following launcher locations were assumed:

1. Star Fish: All rocket launchers

   Latitude 16.7350° (GEOD.)

   Longitude 169.5255°

This assumption was made since the expected error in all Star Fish Prime trajectory printouts is of the order of the dimensions of Johnston Island.

2. Check Mate, Blue Gill Triple Prime, and King Fish: 6.13 Probes longitude 169.5208°W

   Latitude 16.7350° (GEOD.)

   6.2 Probes longitude 169.5148°W

   Latitude 16.7350° (GEOD.)

3. Tight Rope:

N-Hercules Longitude 169.5255° W

Latitude 16.7350° (GEOD.)

Firing azimuths listed were computed generally from the X- and Y-values near the last point of track. They are therefore not corrected for Coriolis force.

3.2 DESCRIPTION OF TRAJECTORY LISTING

The sequence of the listing (reading across from left to right is:

1. Time in seconds relative to H-time
2. Target range from ship, kilometers
3. Target azimuth with respect to true North, degrees
4. Target geodetic elevation, degrees

These four quantities are raw data referenced to the ship, obtained by removing the effects of raw recorded roll, pitch, and OSH data from the raw range and pedestal angle information.

The next eight quantities involve translation to the launcher position and require that the ship and launcher position be used in computation. These quantities are:

5. X-distance East relative to launcher, kilometers

6. Y-distance North, kilometers

7. Z-vertical at launcher site. kilometers

8. $\sqrt{X^2 + Y^2}$. kilometers

9. Height over surface of earth, kilofeet

10. Height over surface of earth, kilometers

11. Latitude of target (geodetic), degrees

12. Longitude of target, - degrees

The X - Y - Z coordinate system is therefore an orthogonal system tangent to the earth surface at the launcher.

At the end of each printed interval of track, a number of input parameters are printed out. These parameters are:

1st Line:

1. Code

2. Code

3. Code

4. Code

5. Ship heading, degrees true

6. Ship velocity, knots

7. Code

2nd Line:

8. Launcher latitude (geodetic), degrees

9. Launcher longitude, degrees

10. Launcher height, feet

11. Earth semi-major axis, feet

12. Earth semi-minor axis, feet

3rd Line:

13. Start latitude of ship, degrees

14. Start longitude of ship, degrees

15. Height of radar, feet

16. Starting time

17. Stopping time

4th Line:

18. Final latitude of ship, degrees

19. Final longitude of ship, degrees

No data printed for those portions of track below 3 degrees with respect to the DAMP ship is considered reliable. It is included only to establish a minimum time-of-flight and impact range.

3.3 DESCRIPTION OF TRAJECTORY PROGRAM

The following symbols and equations were used in the development of the trajectory program. The drawings in Figure 3.1 show the geometry of the problem and indicate the location of the symbols used.

a Equatorial radius of the earth: 20,926,428 feet

A_1 Angle measured positive clockwise from the Y-axis, in the X - X plane, to the projection of the target position vector in the X - Y plane (See A, Figure 3.1.)

A_2 Same as A_1 but all references are made to the $X_e - Y_e - Z_e$ coordinate system rather than the X - Y - Z (See E, Figure 3.1.)

b Polar radius of the earth: 20,855,968 feet

E_1 Angle measured positive upward from the X - Y plane to the target position vector (See A, Figure 3.1.)

E_2 Same as E_1 but referenced to the $X_e - Y_e - Z_e$ coordinate system rather than the X - Y - Z (See E, Figure 3.5.)

h_1 Height above mean sea level of the sensor at position 1

h_2 Height above mean sea level of the sensor at position 2

h_t Height (geocentric) of the target above mean sea level

R_1 Radar range of the target from position 1

R_2 Radar range of the target from position 2

R_{E1} Radius of the earth at position 1

R_{E2} Radius of the earth of position 2

R_E Radius of the earth at position of the target

$\alpha 1$ Angle measured clockwise in the tangent plane at position 1 from true North to the Y-axis (See A, Figure 3.1.)

$\alpha 2$ Angle measured clockwise in the tangent plane at position 2 from true North to the Y-axis (See E, Figure 3.5.)

$\lambda 1$ Longitude of position 1 (positive East)

$\lambda 2$ Longitude of position 2 (positive East)

λ_T Longitude of position of the target (positive East)

$\phi 1$ Geocentric latitude of position 1 (positive North)

$\phi 1^V$ Geodetic latitude of position 1 (positive North)

$\phi 2$ Geocentric latitude of position 2 (positive North)

$\phi 2^V$ Geodetic latitude of position 2 (positive North)

ϕ_T Geocentric latitude of position of the target (positive North)

ϕ_{TV} Geodetic latitude of position of the target (positive North)

3.4 TRAJECTORY ACCURACY

A numerical estimate of typical tracking errors of the DAMP system was obtained (Reference 1) by comparison of seven spans of tracking data with Atlantic Missile Range (AMR) station 12 FPS-16 tracking data during six ICBM tests in the Ascension area in 1961. Station 12 data was assumed perfect. The tracking noise and bias errors in DAMP data (due to uncertainty in ship's position, and gyro noise and bias, including radar range, azimuth, and elevation errors) thus determined are presented in Table 3.1 for four of these spans. These four spans are considered to be more representative of the tracking geometry of the Fish Bowl DAMP tracking intervals since they are end-aspect shots (DAMP ship positioned downrange from impact). The other three tests were side-aspect shots involving high angular rates and cannot be considered pertinent.

To obtain the noise in the Johnston Island referenced portion of the listing, the noise estimate in Table 3.1 may be used

with the range, azimuth, and elevation data referenced to the ship. Caution must be used in applying any bias error estimates to the data referenced to Johnston Island or the earth (latitude, longitude, and altitude) in the trajectory listings included in Appendix A. Bias was removed in part by forcing the ship position, within limits, to make the X - Y portion of the trajectory meet at X = 0 and Y = 0. The bias errors tabulated in Table 3.1 are therefore pessimistic for the present purpose.

The transformation equations are as follows:

[redacted]

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} R_1 \cos E_1 \sin A_1 \\ R_1 \cos E_1 \cos A_1 \\ R_1 \sin E_1 \end{pmatrix} \qquad (3.1)$$

See A, Figure 3.1

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix}_1 = \begin{pmatrix} \cos \alpha_1 & \sin \alpha_1 & 0 \\ -\sin \alpha_1 & \cos \alpha_1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix} \qquad (3.2)$$

See A, Figure 3.1

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix}_2 = \begin{pmatrix} 1 & 0 & 0 \\ 0 & \cos(\sigma_1^V - \varphi_1) & \sin(\phi_1^V - \phi_1) \\ 0 & -\sin(\sigma_1^V - \varphi_1) & \cos(\phi_1^V - \phi_1) \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix}_1 \qquad (3.3)$$

See B, Figure 3.1

Where: $\sigma_1 = \tan^{-1} \left\{ \left(\frac{b}{a} \right)^2 \tan \phi_1^V \right\}$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix}_3 = \begin{pmatrix} x \\ y \\ z \end{pmatrix}_2 + \begin{pmatrix} 0 \\ 0 \\ R_{E_1} + h_1 \end{pmatrix} \qquad (3.4)$$

See B, Figure 3.1

Where: $R_{E_1} = ab \left[(b \cos \phi_1)^2 + (a \sin \phi_1)^2 \right]^{-\frac{1}{2}}$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix}_4 = \begin{pmatrix} 1 & 0 & 0 \\ 0 & \cos \phi_1 & \sin \phi_1 \\ 0 & -\sin \phi_1 & \cos \phi_1 \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix}_3 \qquad (3.5)$$

See B, Figure 3.1

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix}_5 = \begin{pmatrix} \cos(\lambda_2 - \lambda_1) & 0 & -\sin(\lambda_2 - \lambda_1) \\ 0 & 1 & 0 \\ \sin(\lambda_2 - \lambda_1) & 0 & \cos(\lambda_2 - \lambda_1) \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix}_4 \qquad (3.6)$$

See C, Figure 3.1

$$\begin{pmatrix} \\ \\ z \end{pmatrix}_6 \begin{pmatrix} 1 & 0 & 0 \\ 0 & \cos\phi_2 & -\sin\phi_2 \\ 0 & \sin\phi_2 & \cos\phi_2 \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix}_5 \qquad (3.7)$$

See L, Figure 3.1

Where: $\phi_2 = \tan^{-1}\left\{\left(\frac{b}{a}\right)^2 \tan\phi_2^V\right\}$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix}_7 = \begin{pmatrix} x \\ y \\ z \end{pmatrix}_6 - \begin{pmatrix} 0 \\ 0 \\ R_{E_2} + h_2 \end{pmatrix} \qquad (3.8)$$

See D, Figure 3.1

Where: $R_{E_2} = ab\left[(b\cos\phi_2)^2 + (a\sin\phi_2)^2\right]^{-\frac{1}{2}}$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix}_8 = \begin{pmatrix} 1 & 0 & 0 \\ 0 & \cos(\phi_2^V - \phi_2) & \sin(\phi_2^V - \phi_2) \\ 0 & -\sin(\phi_2^V - \phi_2) & \cos(\phi_2^V - \phi_2) \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix}_7 \qquad (3.9)$$

See D, Figure 3.1

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix}_9 = \begin{pmatrix} -\sin\alpha_2 & \cos\alpha_2 & 0 \\ \cos\alpha_2 & \sin\alpha_2 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix}_8 \qquad (3.10)$$

See E, Figure 3.1

[redacted]

See E, Figure 3.1, for all quantities defined by the following equations:

$$A_2 = \tan^{-1}\left\{\frac{x_9}{y_9}\right\} \tag{3.11}$$

$$R_2 = \left[(x_9)^2 + (y_9)^2 + (z_9)^2\right]^{\frac{1}{2}} \tag{3.12}$$

$$E_2 = \sin^{-1}\left\{\frac{z_9}{R_2}\right\} \tag{3.13}$$

See F, Figure 3.1, for all quantities defined by the following equations:

$$\phi_T^v = \tan^{-1}\left\{\left(\frac{a}{b}\right)^2 \tan \phi_T\right\} \tag{3.14}$$

Where: $\phi_T = \tan^{-1}\left\{y_4\left[(x_4)^2 + (z_4)^2\right]^{-\frac{1}{2}}\right\}$

$$\lambda_T = \lambda_1 + \tan^{-1}\left\{\frac{x_4}{z_4}\right\} \tag{3.15}$$

$$h_T = \left[(x_4)^2 + (y_4)^2 + (z_4)^2\right]^{\frac{1}{2}} - R_{ET} \tag{3.16}$$

Where: $R_{ET} = ab\left[(b \cos \phi_T)^2 + (a \sin \phi_T)^2\right]^{-\frac{1}{2}}$

The plan trajectories of the probes, the ship movement, and a general plan view of the Star Fish Prime geometry are shown in Figures 3.2 through 3.4. Figures 3.5 through 3.7 show the probe trajectories for Star Fish Prime.

TABLE 3.1 NUMERICAL ESTIMATE OF TYPICAL TRACKING ERRORS

Test	Geometry Aspect[a]	Tracking Period	Tracking Differences								
			Azimuth			Elevation			Range		
			Mean	Std	RMS	Mean	Std	RMS	Mean	Std	RMS
		sec	deg	deg	deg	deg	deg	deg	feet	feet	feet
5462	End	1802-1882	-0.287	0.086	0.300	-0.050	0.056	0.075	7220	1183	7316
3212	End	1882-1956	-0.055	0.047	0.072	0.067	0.064	0.093	2949	406	2978
6203	End	1812-1904	0.063	0.285	0.292	0.169	0.074	0.184	-3733	411	3756
6203	End	1888-1911	0.828	0.467	0.950	0.260	0.094	0.277	-4520	149	4522

[a]End aspect, ship position in trajectory plane downrange from impact point.

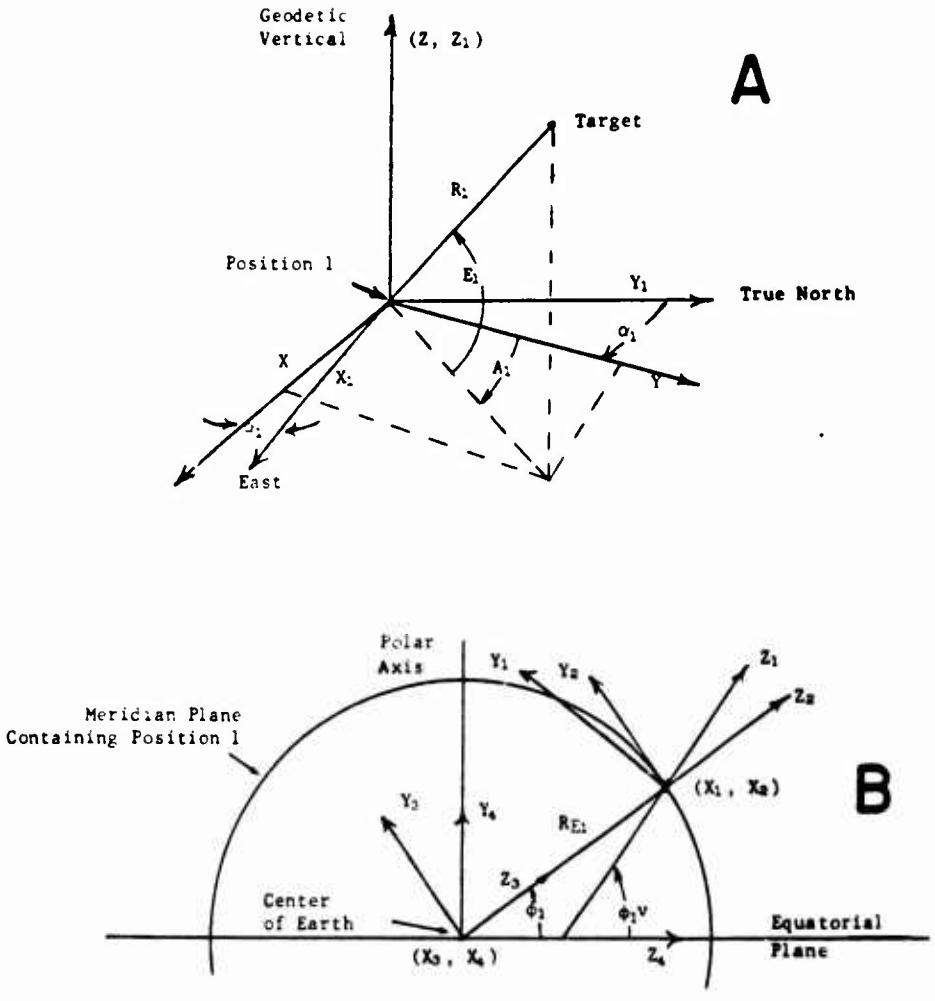
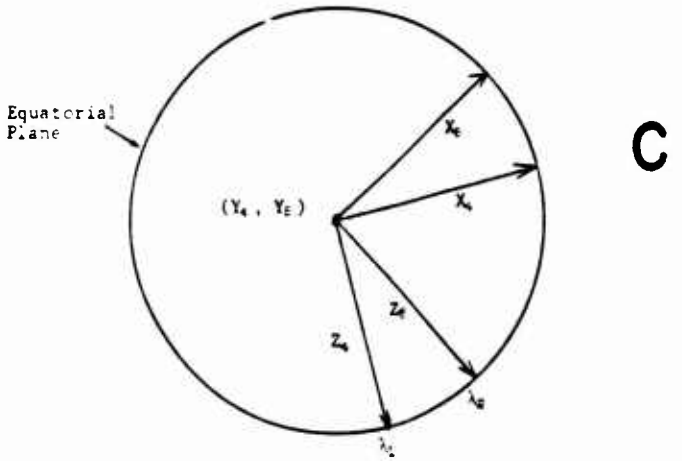


Figure 3.1 Geometrical figures used in derivation of trajectory equations.



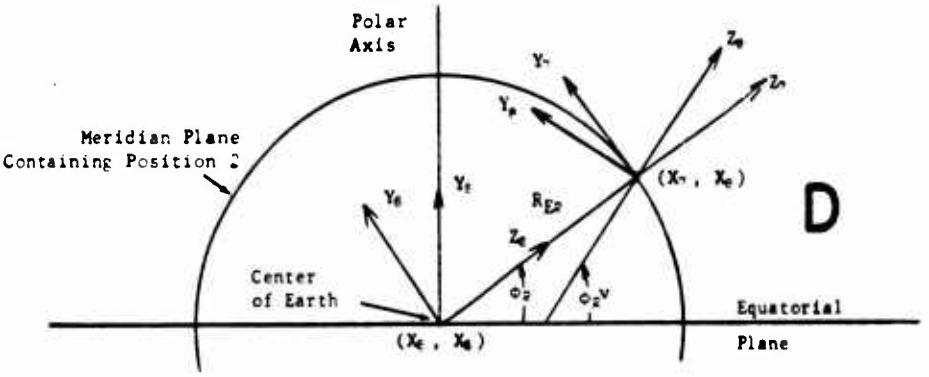


Figure 3.1 Continued

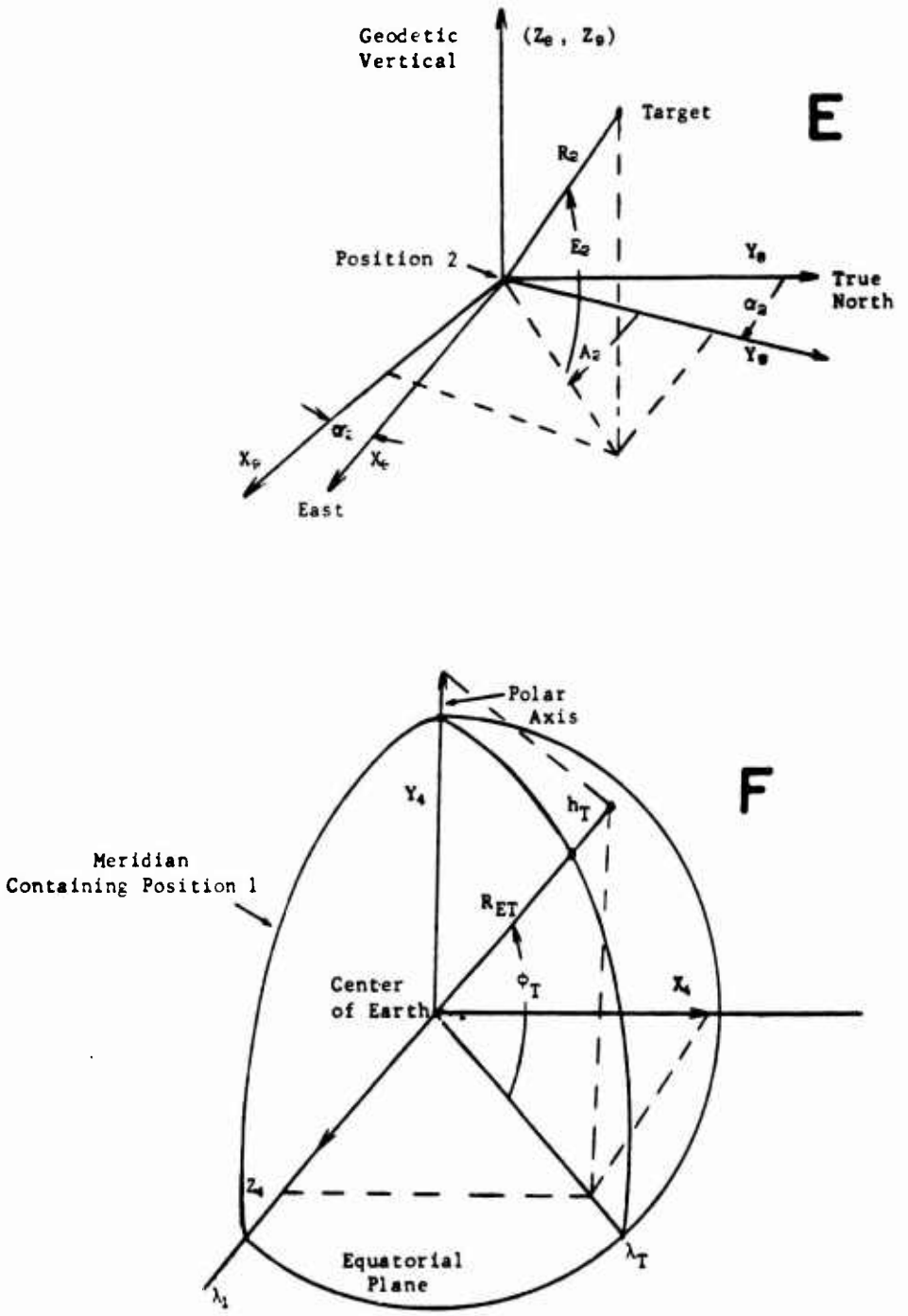


Figure 3.1 Continued

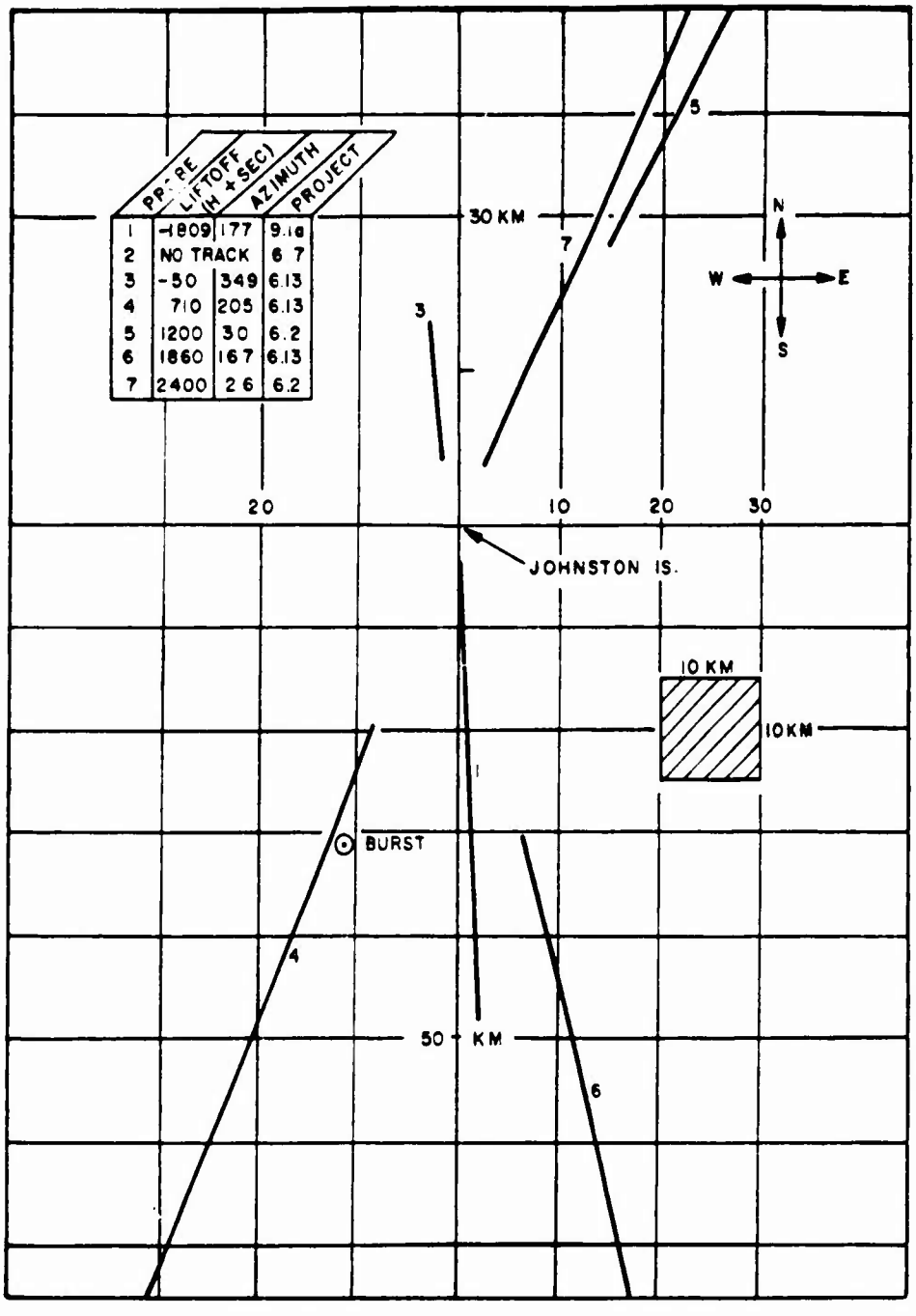


Figure 3.2 Star Fish Prime plan trajectories.

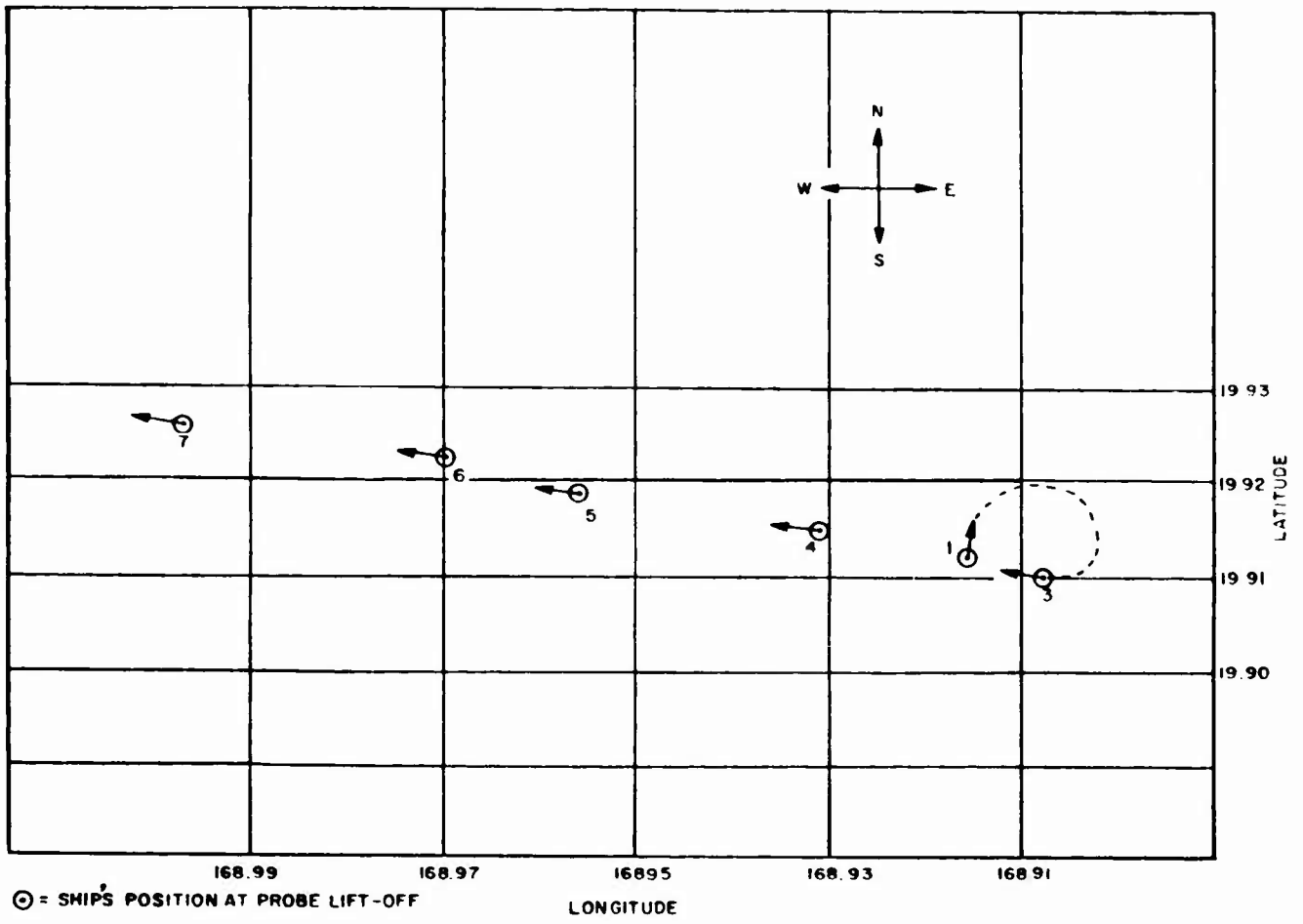


Figure 3.3 Star Fish Prime ship movement for six tracked probes.

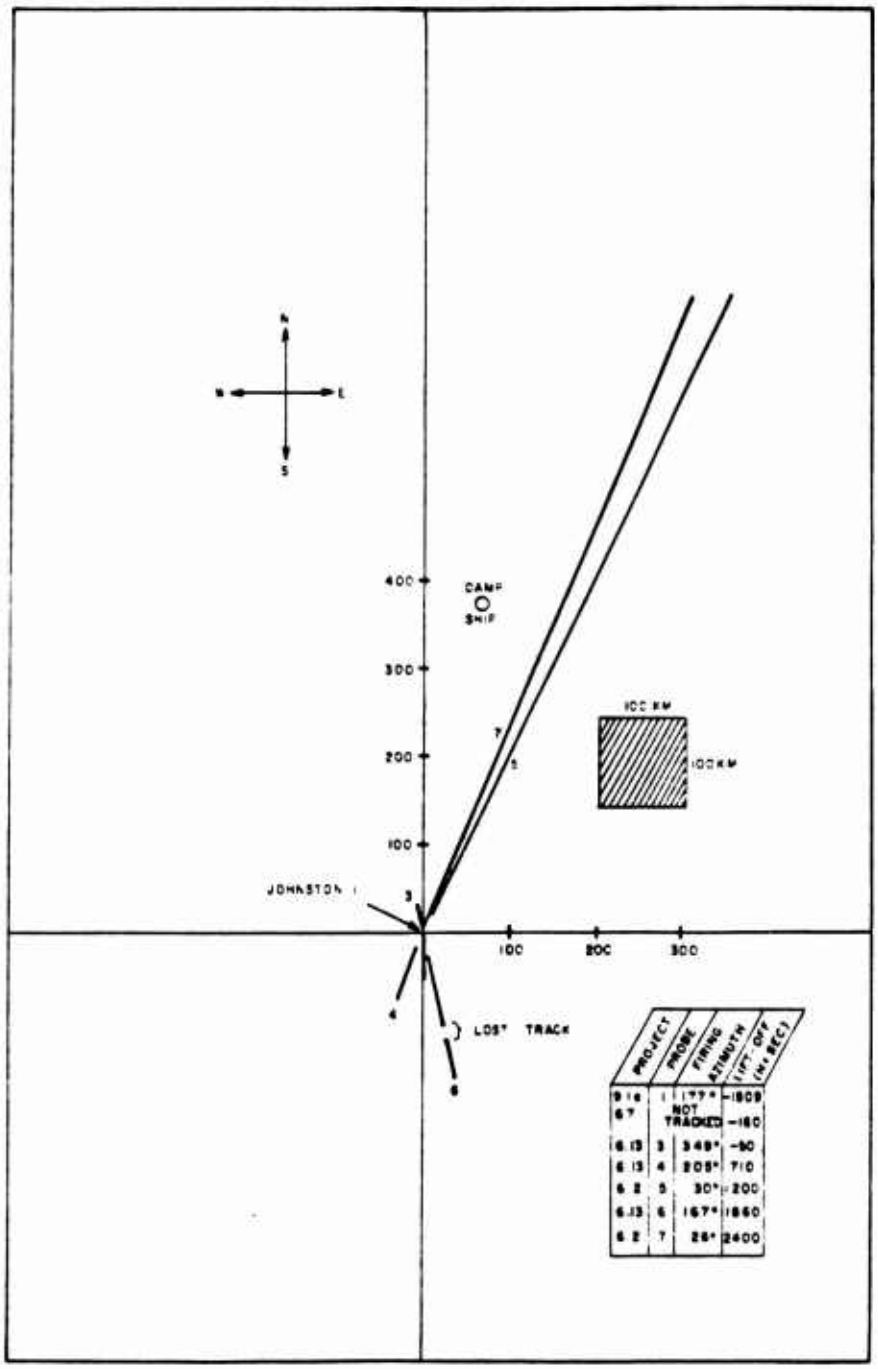


Figure 3.4 Star Fish Prime plan view.

[redacted]

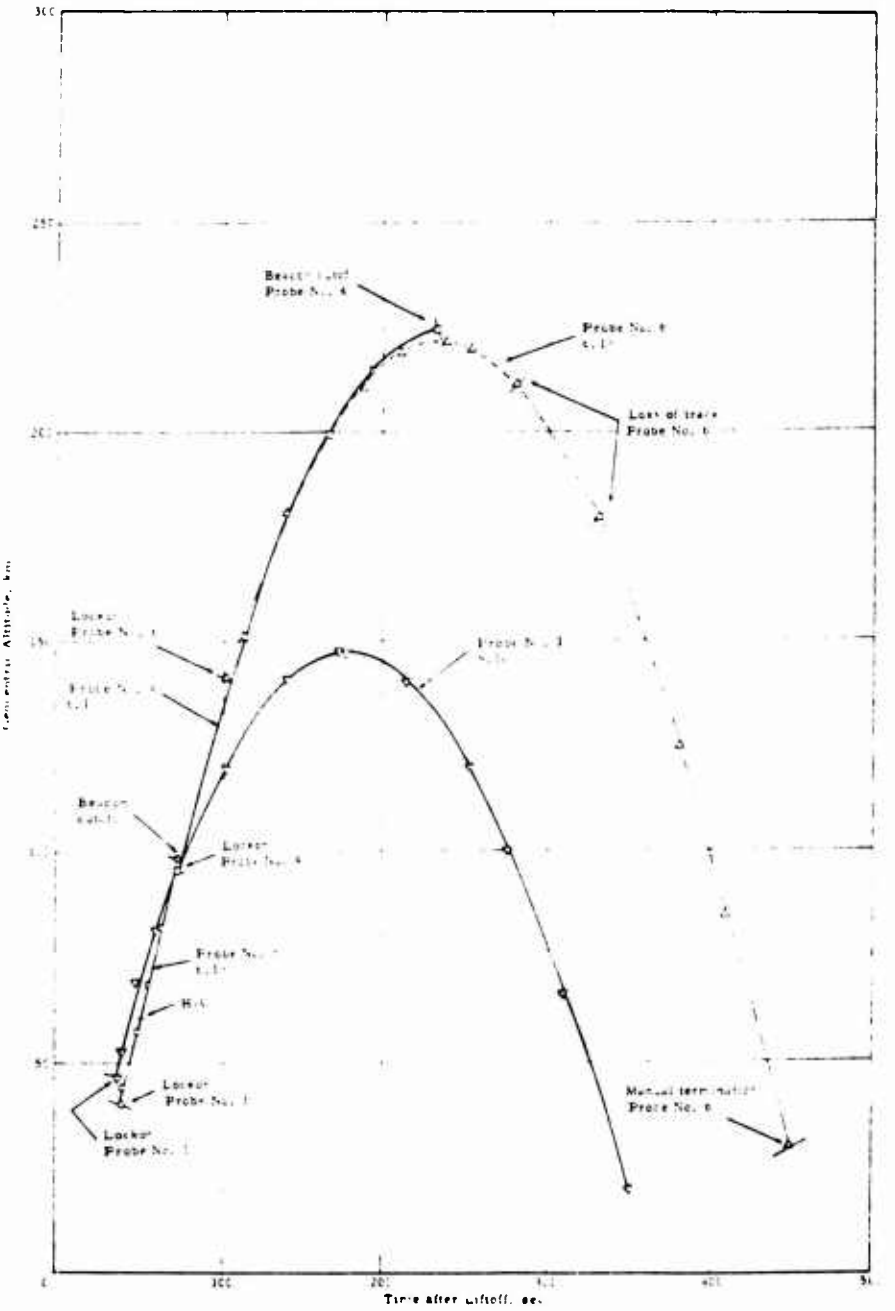


Figure 3.5 Star Fish Prime time-altitude trajectories, 6.13 and 9.1a probes.

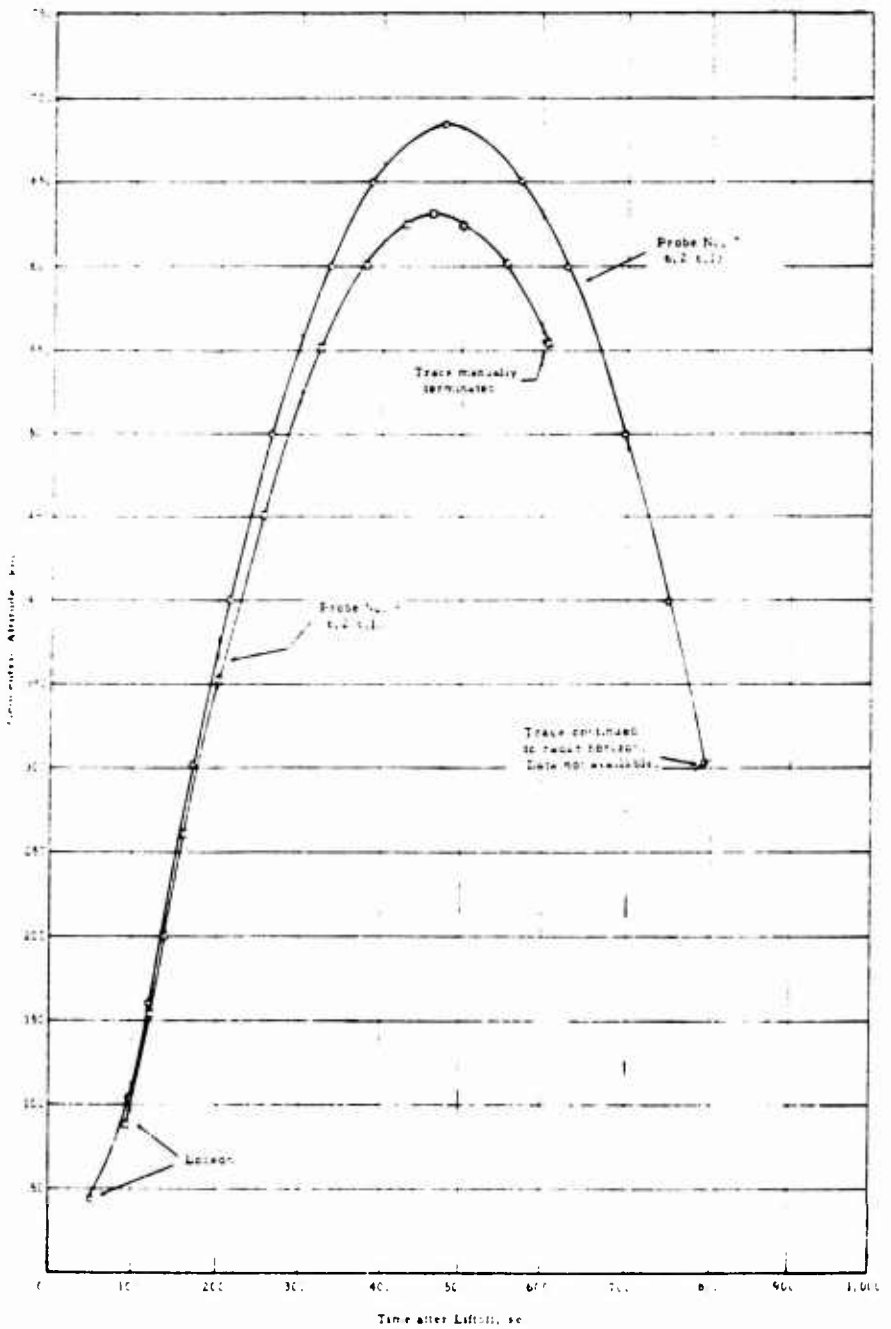


Figure 3.6 Star Fish Prime time-altitude trajectories, 6.2 and 6.13 probes.

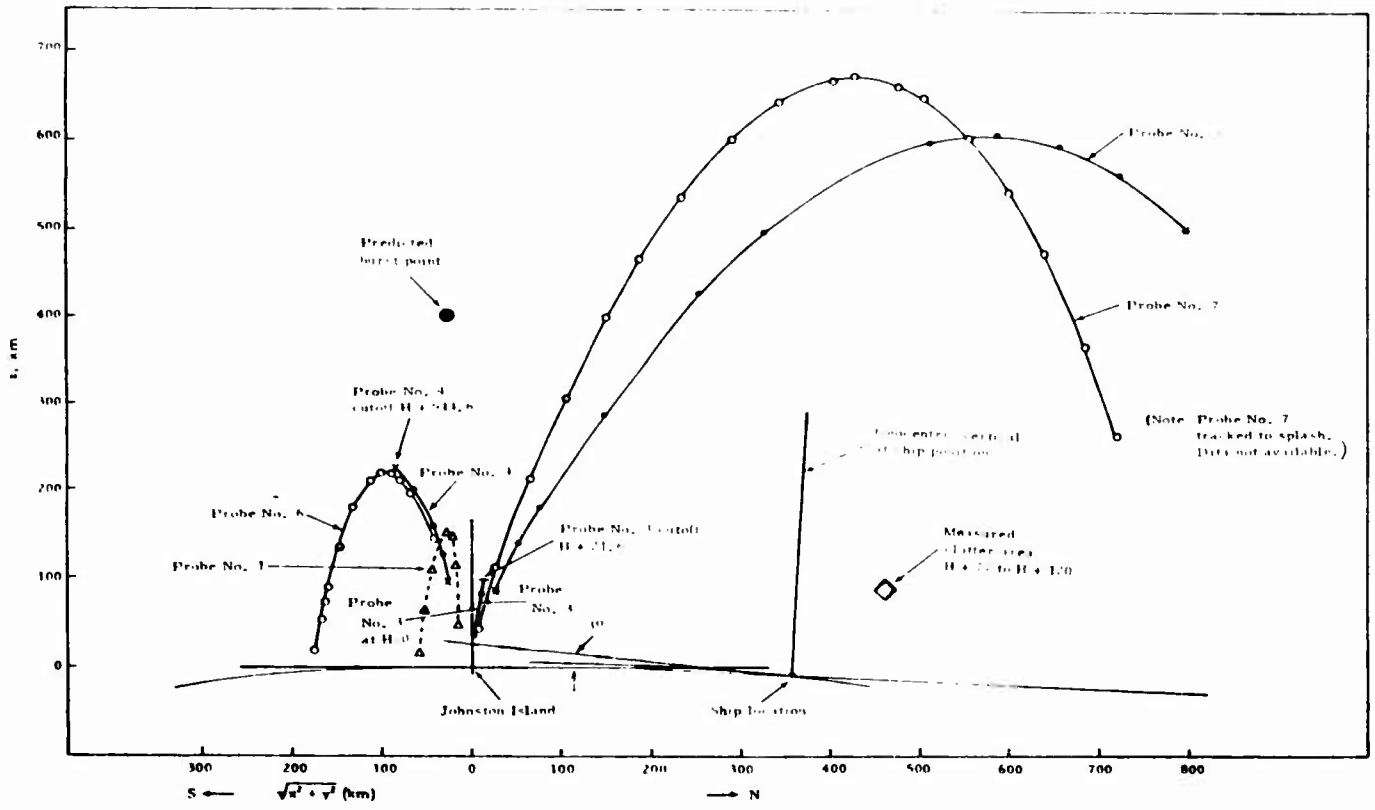


Figure 3.7 Star Fish Prime probe trajectories.

CHAPTER 4

C-BAND SIGNAL STRENGTH AND ERRORS (BEACON)

Appendix B contains the Sanborn records for all mission Radar 1 beacon tracking and acquisition intervals. The signal strength presented is the automatic gain control voltage of the tracking receivers of the FPQ-4. The records are annotated with events taken from the edited time and events records. Calibration of signal strength is presented in db/m units. This refers to the peak output power level of an RF pulsed signal generator. This signal generator output was fed to a waveguide run of several hundred feet, thence to the foremast horn from which the RF signal was radiated about 300 feet to the FPQ-4 antenna. When parameters were changed (bandwidth changes, local oscillators, etc.) during a mission, signal strength calibrations are included for each combination.

Angle error calibrations were obtained by moving the antenna from the foremast horn 10 mils in each of four directions.

Pre-mission and post-mission calibrations were available. However, for this report, the calibration occurring closer to the mission was included (Figure B.1).

The Sanborn records include a real-time GMT 13-bit digital 1-pulse/second code, repeated every 15 seconds. The pulses are of three different widths. The thickest pulse is the reference pulse. The left edge of this pulse signifies the beginning of a 15-second GMT interval. The next 13 bits designate which 15-second interval of the day begins at that reference pulse. Medium width pulses designate a "1," and thin pulses designate a "0." The two pulses following the reference pulse signify which 15-second interval of the minute, the following six signify which minute of the hour, and the following five signify the particular hour of the day. Thus, the pulse train 10, 100100, 10010 after the reference pulse means that the reference pulse left edge corresponds to 9 hours, 9 minutes, and 0 seconds GMT. The last pulse prior to the next reference pulse is a dummy pulse.

CHAPTER 5

UHF/L-BAND TRAJECTORY

Trajectory data for the UHF/L-band radar (Appendix C) has been reduced in the same manner as the trajectory data presented in the Port C-band tracking radar listings. The UHF-L listings, however, were derived from the Starboard C-band radar to which the UHF-L band radar was slaved during most of the mission.

Under conditions of UHF-L band slaving to the Starboard radar, the antenna will follow the C-band radar to within 6 milliradians in angle, provided the following angular rates are not exceeded:

Azimuth Velocity	25 degrees/sec
Elevation Velocity	14 degrees/sec
Azimuth Acceleration	110 degrees/sec
Elevation Acceleration	85 degrees/sec

It is believed that these rates were not exceeded during any mission.

Due to equipment limitations, the UHF-L band antenna cannot be slaved to the Starboard C-band radar during discontinuities in designation data (for example, when a point chosen for scanning is suddenly changed). These periods

during which the UHF-L antenna is slaved to the C-band radar are tabulated in the time and event record. For the remainder of the time, angles presented pertain only to the Starboard C-band radar.

It must be emphasized that the range (column 2) and all quantities transferred to Johnston Island refer to the range gate, although tracking was not employed. The position of the range gate on the intensity-modulated photographs is 21 Kyds after the pre-trigger; the position of the range gate on the amplitude versus range presentation is 21 Kyds after the pre-trigger, unless otherwise noted.

Although the mapping was generally continued for hours, only 900 seconds of look angles are presented, since the observed effects decreased rapidly (preliminary examination of the records reveals that, in general, nothing was seen after 5 minutes).

[redacted]

CHAPTER 6

TELEMETRY TRACKING POINTING ANGLES

There were no telemetry rockets utilized by DAMP during this event.

[redacted]

CHAPTER 7

VIDEO-DERIVED CROSS SECTION AND BEACON POWER (NEAR H-0)

Magnetic tape records were taken in each mission of ungated video from each of the radars. The video was supplied by special receivers intended solely for that purpose, and operating outside the radar tracking loops. The receivers had roughly logarithmic transfer characteristics, compressing 80-decibel input variations to the 32-decibel dynamic range of the video recorders. They contained no AGC loop. In data reduction, the amplitude of each received pulse was recovered from the video tapes, and by applying calibration information, it was converted to received peak power relative to an arbitrary reference. The video bandwidth used during playback was 0.6 megacycle.

For the beacon returns, power variation with changing distance between the radar and the beacon was removed by dividing the received power by the square of the slant range. The resulting normalized received beacon power (in decibels) was plotted versus time in the vicinity of H-O (Figure 7.1).

For Tight Rope, the echo return from the DAMP Nike-Hercules was discernible in the video records, and its C-band radar cross section was computed and plotted.

The calculation was

$$\sigma = \sigma_r \frac{SR^4}{S_r R_r^4}$$

where: $\sigma \equiv$ radar cross section

$S \equiv$ received power relative to a common (arbitrary) reference

$R \equiv$ slant range to the target

The quantities without subscripts refer to the Nike-Hercules. The quantities with subscript r refer to the post-mission track of a balloon-borne 6-inch-diameter aluminum sphere, whose cross section was calculated to be σ_r.

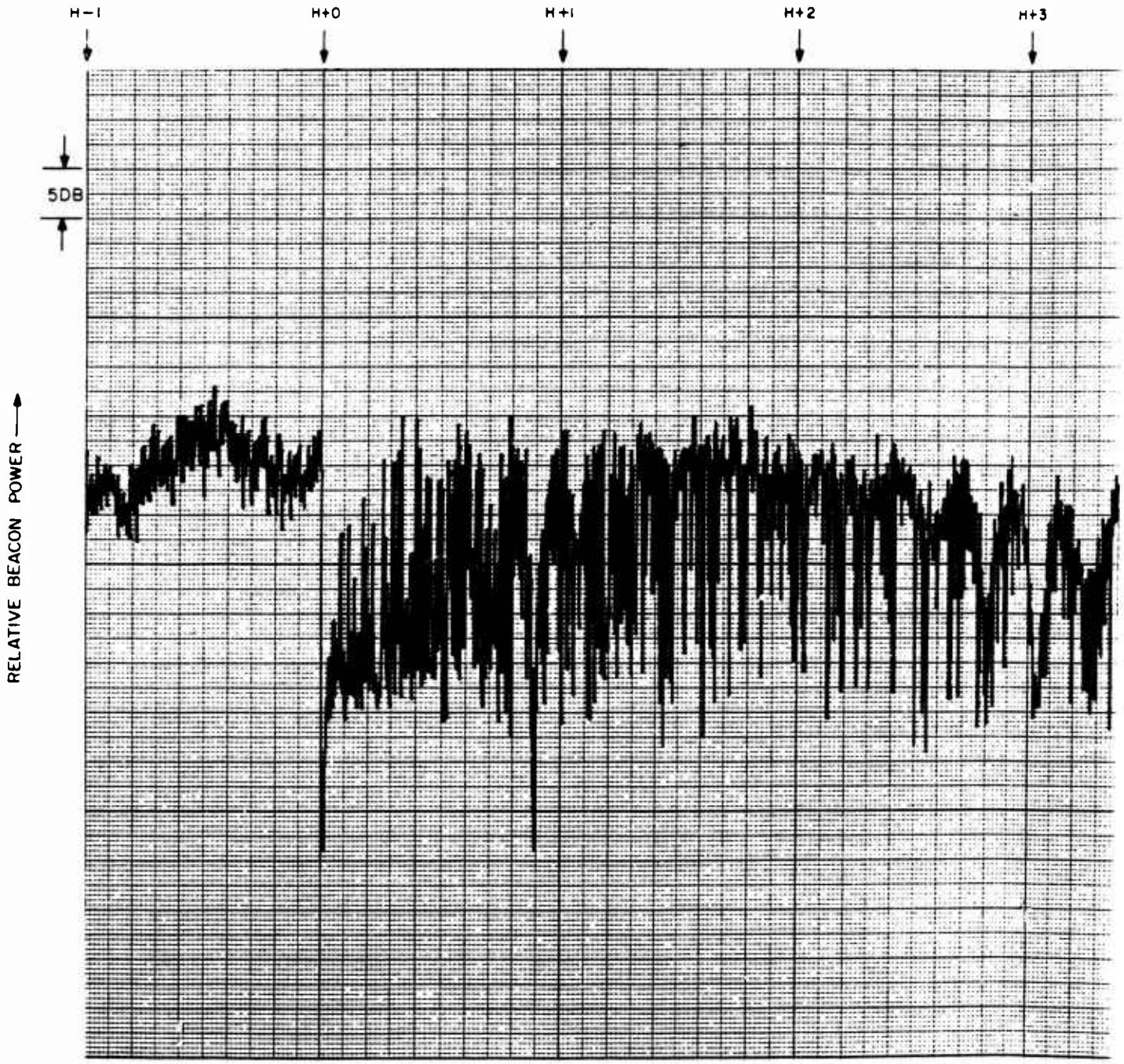
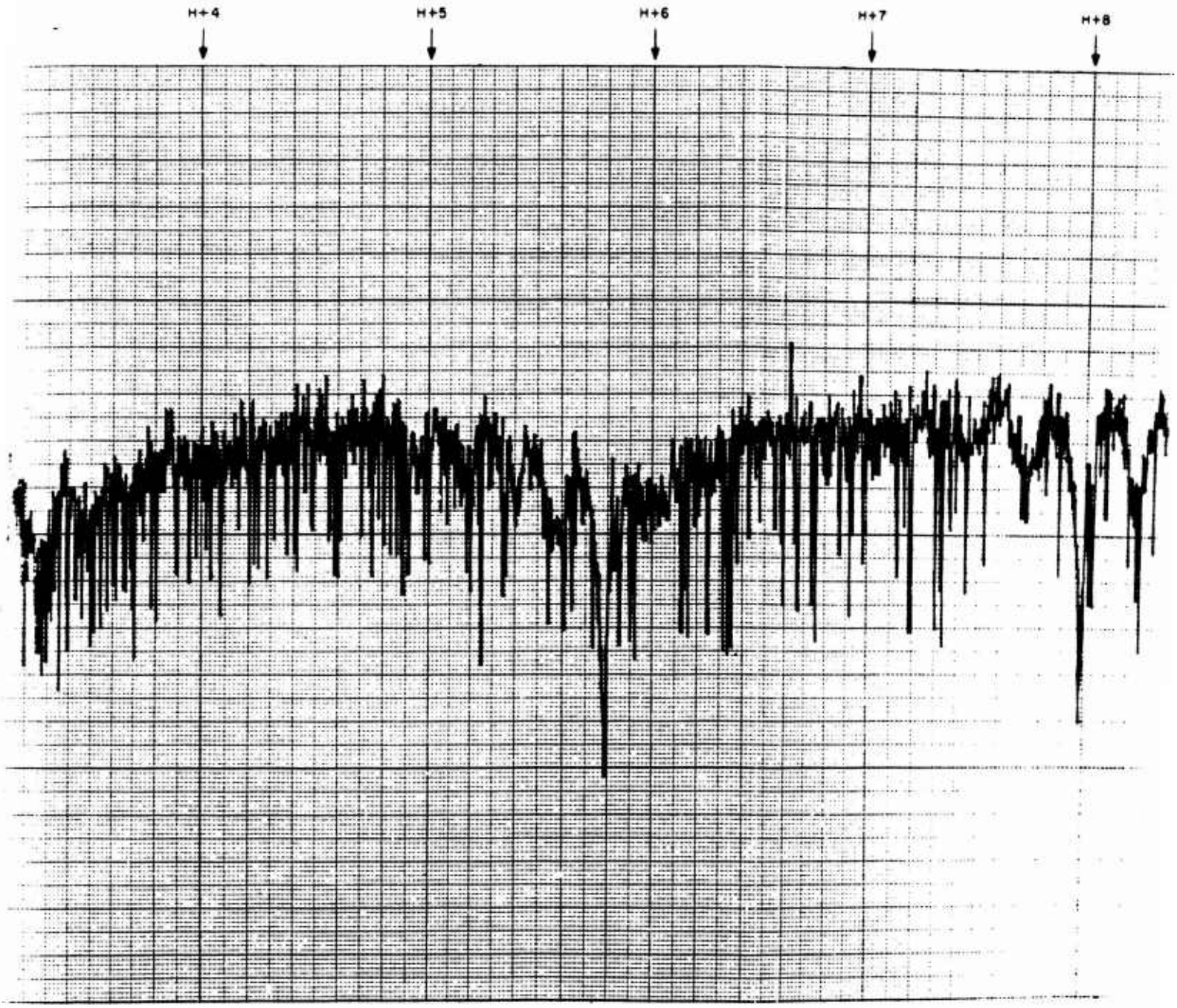


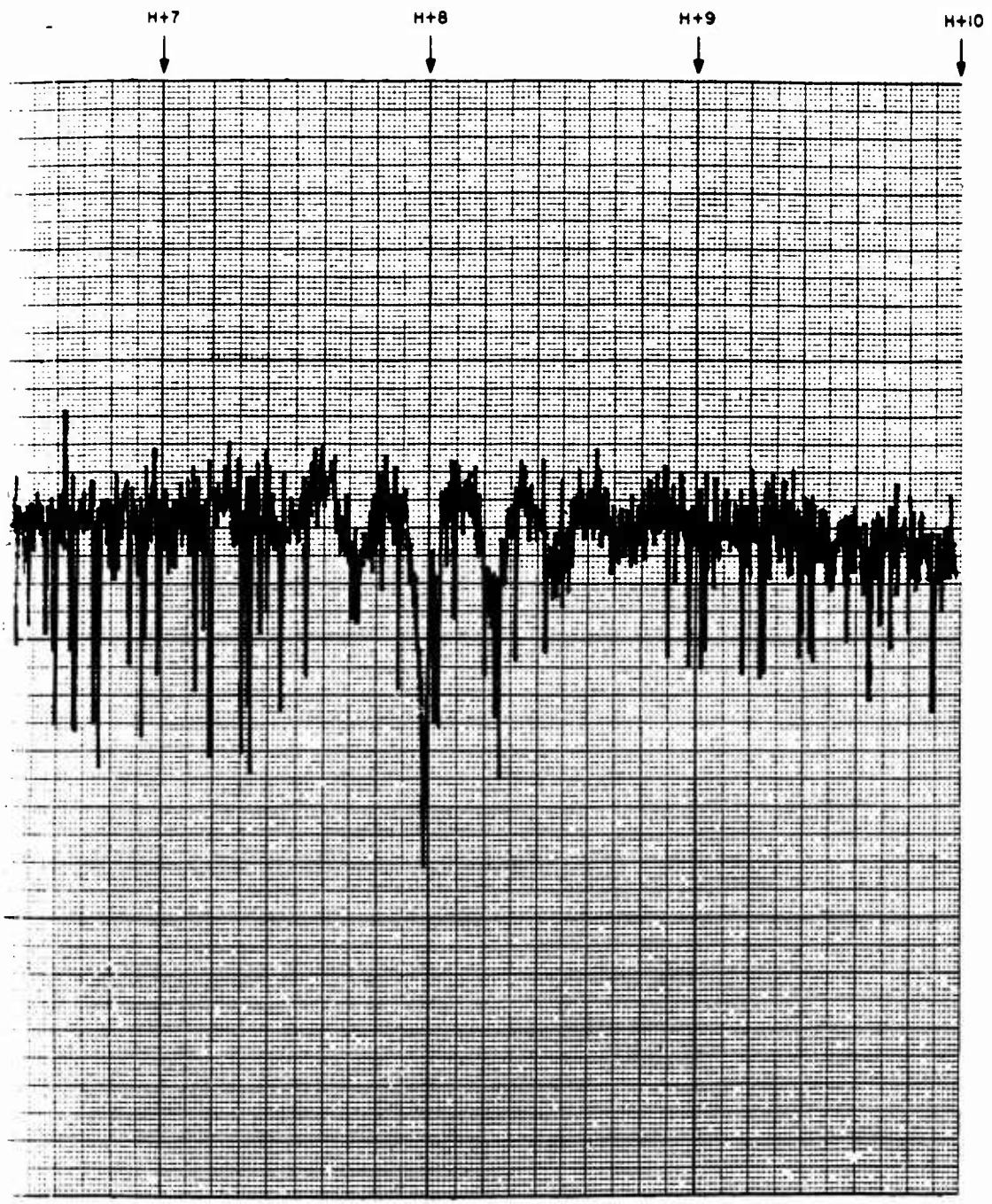
Figure 7.1



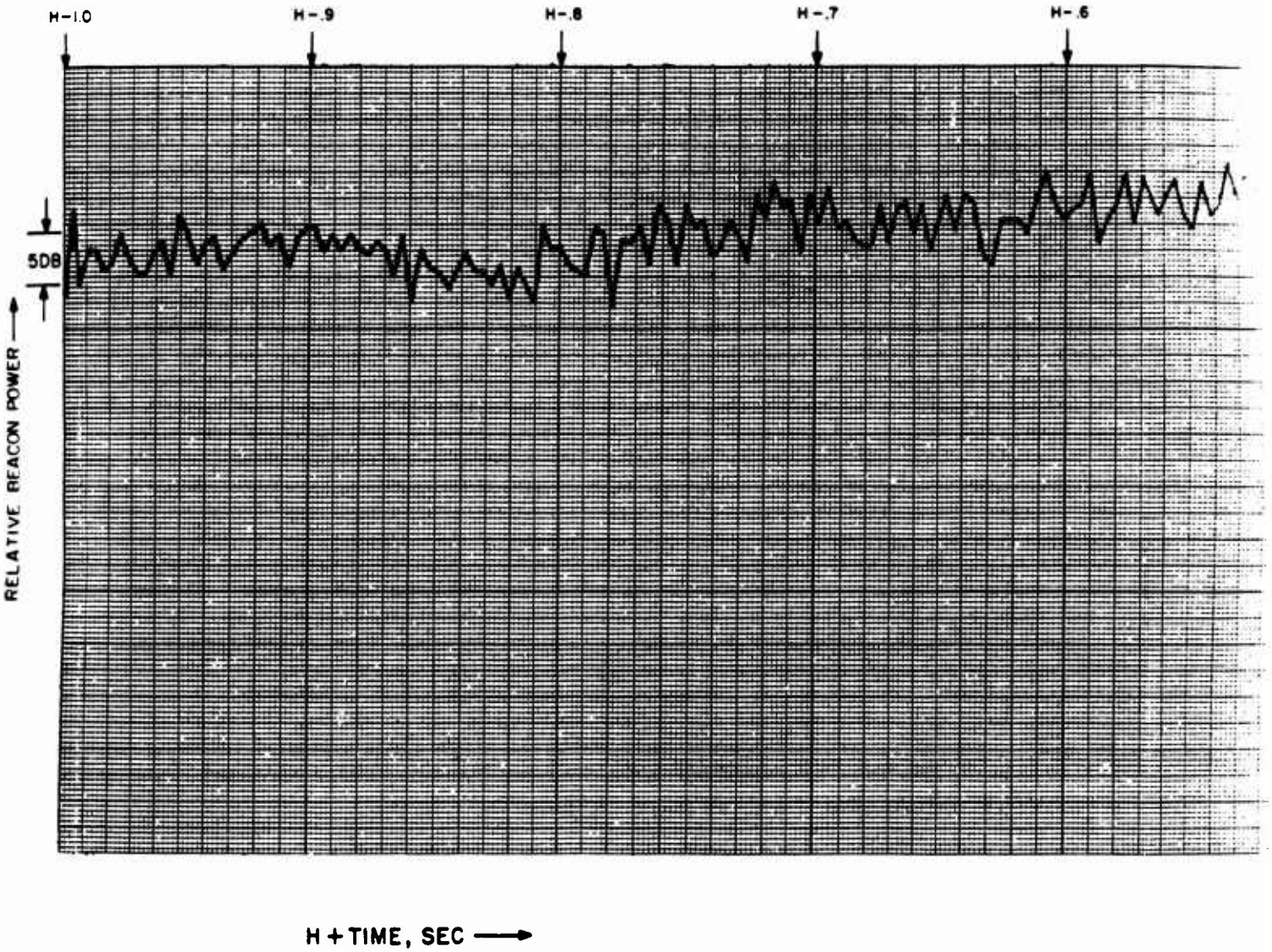
...re 7.1 Star Fish Prime video-derived beacon power.

[redacted]

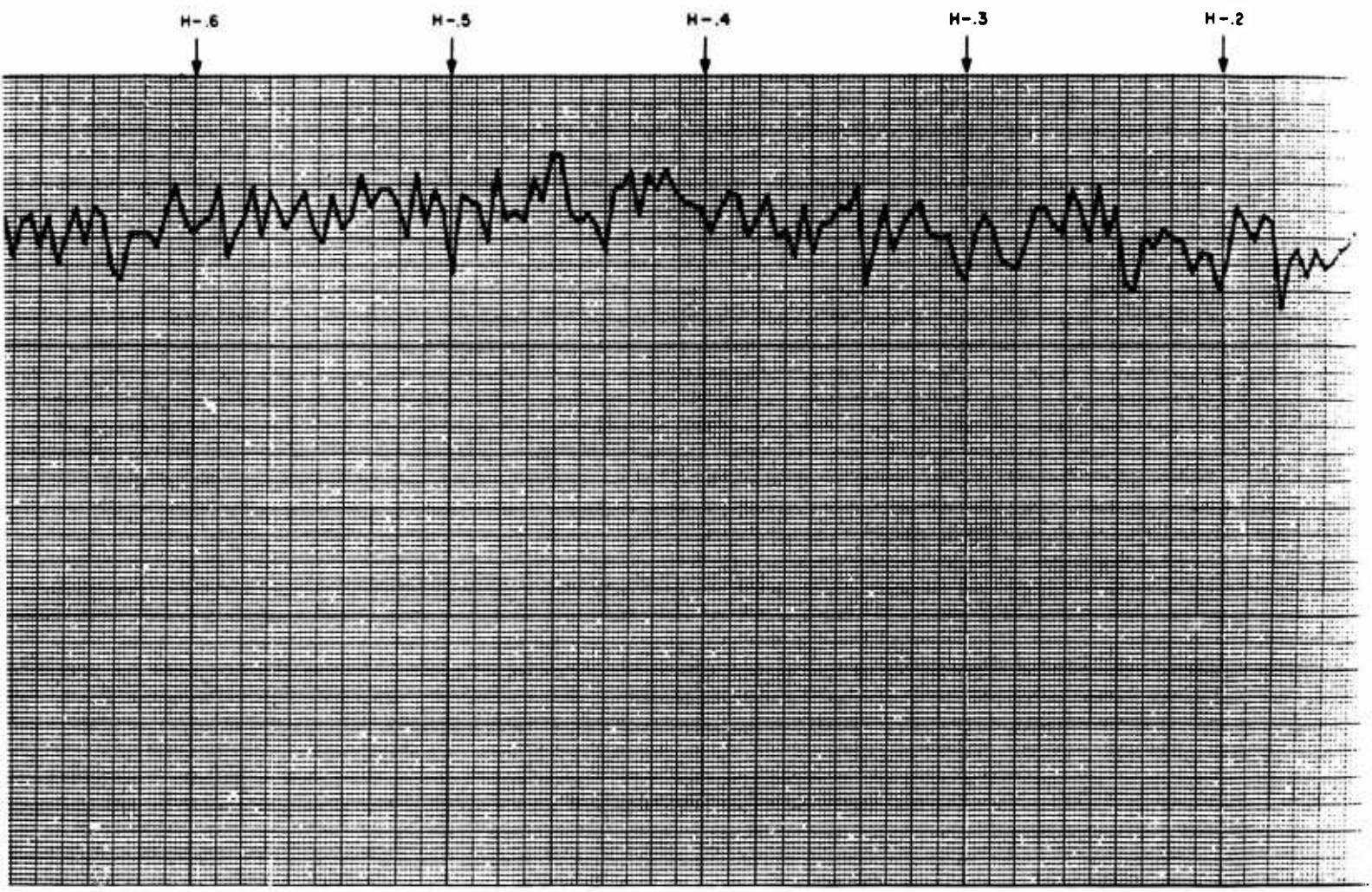
[redacted]



55-3



56-1



56-2

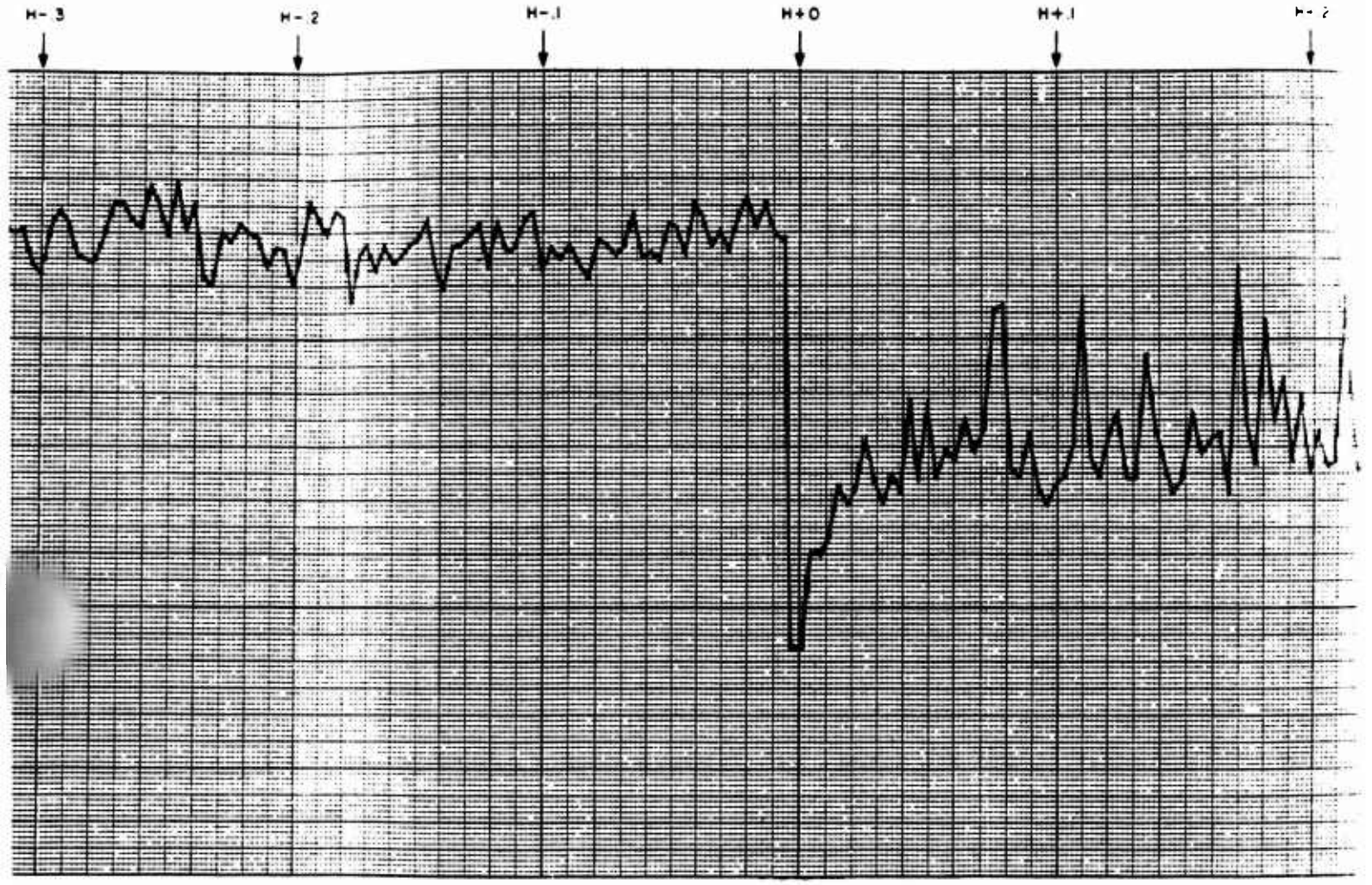
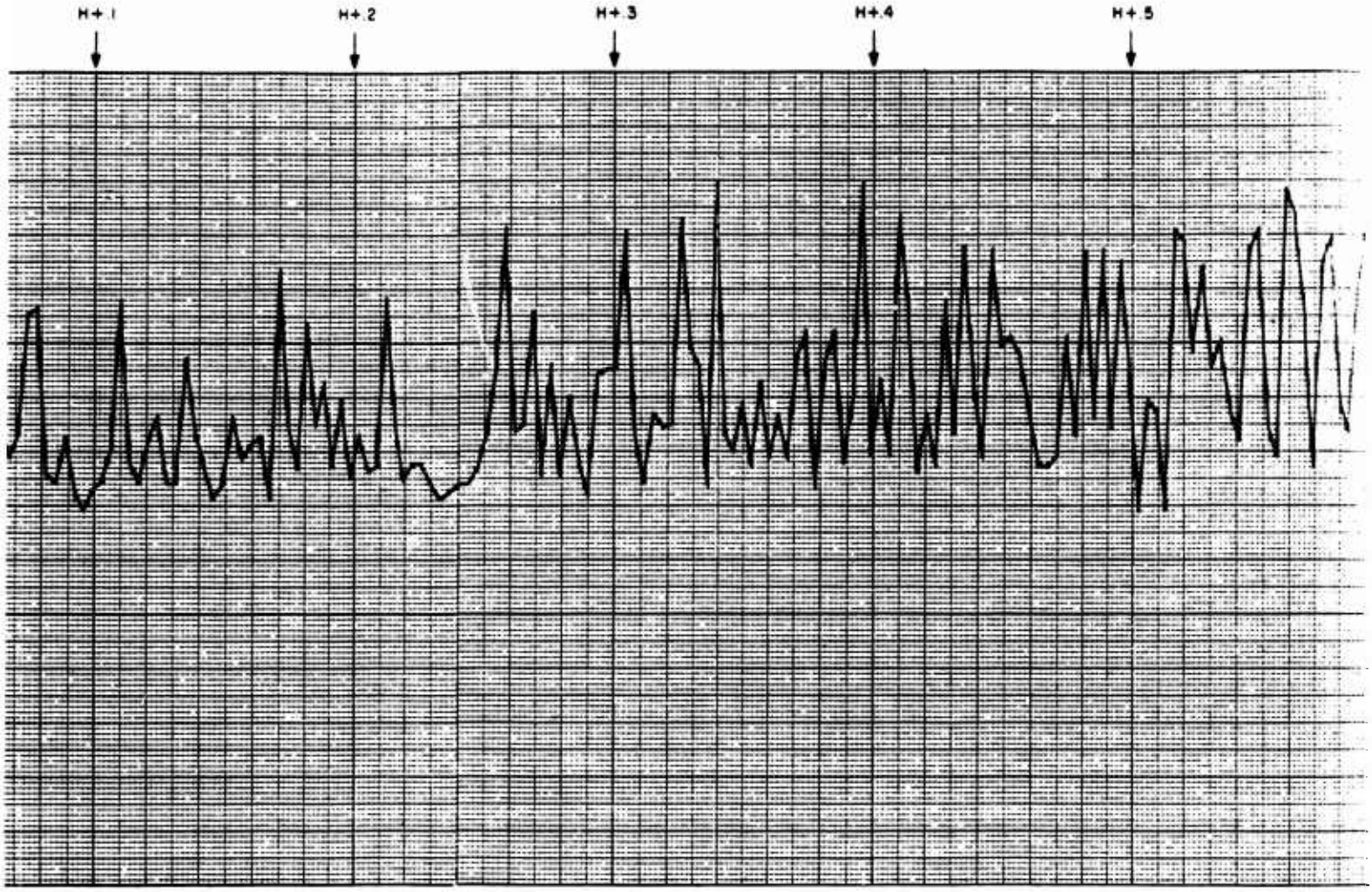
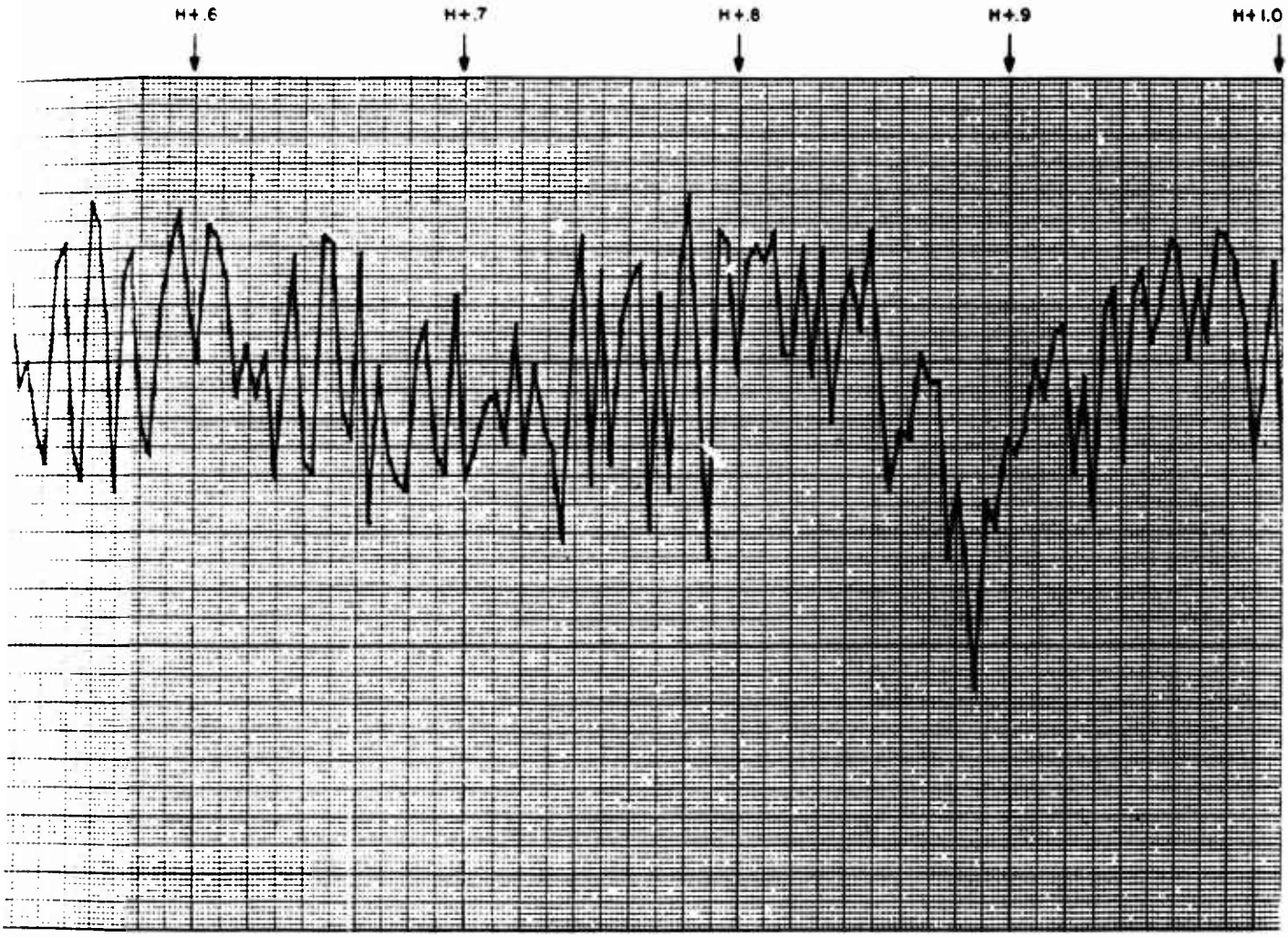


Figure 7.1 Continued.


H+.1
H+.2
H+.3
H+.4
H+.5


H+.6
H+.7
H+.8
H+.9
H+1.0

CHAPTER 8

TELEMETRY TRACKER SIGNAL STRENGTH AND ANGLE ERRORS

No rocket-borne telemetry transmitters were scheduled by DAMP during this event to monitor the nuclear effects at UHF or to monitor C-band beacon performance. The Thor booster telemetry health transmitter was tracked by the telemetry tracker, and sub-carrier modulations were recorded to provide backup data in the event of Thor malfunctions. However, since burnout of the Thor booster occurred approximately 15 minutes prior to burst, no telemetry data is presented for the Thor telemetry tracking interval.

CHAPTER 9

VIDICON MEASUREMENTS

All Speedball rockets launched during the Star Fish Prime event were equipped with a Daisy flare ejector system, so that optical measurement of the Speedball target could be used for comparison with the radar line of sight to provide a concurrent estimate of refractive anomalies at optical frequencies. However, due to the inclement weather during Star Fish Prime in the vicinity of the DAMP ship, no optical measurement attempts yielded data.

[redacted]

CHAPTER 10

FIREBALL AND DEBRIS RADAR REFLECTIONS; AURORAL-TYPE CLUTTER RETURNS; RADIOMETER AND RIOMETER BACKGROUND MEASUREMENTS

10.1 FIREBALL AND DEBRIS REFLECTIONS AND AURORAL-TYPE CLUTTER RETURNS

The shipboard digital computer was used to designate the Starboard tracking radar to various angles and ranges at which radar returns were expected, and to scan the radar about each of these points using scan dimensions which increased with elapsed time after burst. The 28-foot-parabola UHF/L-band radar was slaved to the Starboard C-band radar during these scanning periods, which have been referred to as clutter mapping. The general sequence employed was to first examine the burst area to provide a three-frequency measurement of the absorption and reflection properties of the expanding fireball, and then to observe the geomagnetically aligned auroral-backscatter areas expected to the north of the ship when viewing the ionosphere perpendicularly to the field lines.

A general summary of this data is given in Volume 1. A more detailed presentation of the data on a single radar pulse basis is given in Volume 7.

10.2 RADIOMETER MEASUREMENTS

A Dicke-type comparison radiometer was used in the expectation of deriving background radio noise temperatures. This radiometer was used in conjunction with the UHF/L-band 28-foot dish, but derived its RF signal from the horizontally polarized portion of the feed horn rather than the vertically polarized portion used by the UHF/L-band radar for normal receive and transmit.

Generally speaking, the data derived from the radiometer is inconclusive. Heavy interference was noticed on all tests, and on one test the fluctuations due to interference just prior to H-0 can be seen to encompass the entire dynamic range of the instrument.

10.3 RIOMETER DATA

At the request of Stanford Research Institute (SRI), riometers operating on frequency assignments of 30, 60, and 120 Mc were installed on the American Mariner to be included in the DAMP experiments. The equipment collected data during each of the five Fish Bowl events, and during some low-altitude, air-drop tests near Johnston Island. In this experiment, however, DAMP provided only the technician services required to maintain, monitor, and

service the sensing and recording equipment connected with the riometer system. All riometer data obtained by the DAMP ship was delivered to SRI, and inquiries concerning the data are referred to that organization. The presentation and analysis of this data and the correlation of the data with other riometer sensors may be found in Reference 2.

CHAPTER 11

TRANSIT AND PROJECT 6.1 COHERENT MEASUREMENTS

Doppler measurements of the very stable 150-megacycle and 400-megacycle Transit 4A satellite CW transmissions were performed for every usable satellite pass occurring within several weeks of the Fish Bowl events. The system used to record the data was the actual DAMP shipboard Transit navigation system, which normally gives ship's position from the difference between predicted and observed satellite doppler curves, using reiterative digital computations. Based on either the navigator's normal measurement of ship's position, or, utilizing the radar tracking data during a mission to obtain ship's position, a measurement of the absolute doppler shift could be inferred from the measured doppler curve. It was hoped that a Transit pass would occur at H - 0 during at least one event so that the early time pronounced effects could be measured. However, the closest pass available occurred at H + 1 hour, during Star Fish Prime.

The Transit measurements are presented in Volume 7.

No Project 6.1 rockets were tracked by the DAMP ship during this event, since all available 6.1 transmitting frequencies were outside the frequency range of the DAMP measurement system.

[redacted]

PART 2

OPTICAL MEASUREMENTS

J. E. Hagefstration, Project Officer

Contributors:

A. F. Wiebe
H.W. Yates
W. Planet

Barnes Engineering Company
30 Commerce Road
Stamford, Connecticut

PART 2

OPTICAL MEASUREMENTS

CHAPTER 12

DATA PRESENTATION

The targets during these tests were extended and generally covered fully the fields of view of the photometers and radiometer. It is therefore convenient to express the data in terms of brightness (radiance) (watts cm^{-2} Ω^{-1}) rather than irradiance. (All quoted values are absolute, not brightnesses above adjacent background.) The relationship between brightness and irradiance, for the instruments under discussion, when the fields of view are totally covered, is:

irradiance = brightness (radiance) x subtended solid angle

or

$$H = N.\Omega$$

The solid angle of the source when the field of view is filled is simply the solid angle of the instrument. For the photometer (1° circular field of view) this is:

$\Omega = \pi \tan^2(\theta/2)$ ($\theta/2$ = half angle of field)

$= 2.39 \times 10^{-4}$ steradian

Similarly, for the radiometer (2° x 2° square field of view) it is:

$$\Omega = 4\tan^2(\theta/2)$$

$$= 1.22 \times 10^{-3} \text{ steradian}$$

It follows, then, that:

$$N = H.\Omega^{-1}$$

$$= H \times 4.18 \times 10^{3} \text{ (photometers)}$$

$$= H \times 8.21 \times 10^{2} \text{ (radiometer)}$$

The fields of view are not totally filled at all times, and as a result some of the data presented are integrated (intensity and spatially) values. When the fields of view are fully covered, such as on the major portion of the fireball mappings, notations will be made.

Instrument malfunctions, insensitivity, pedestal pointing inaccuracies, weather, and over-exposures all contributed to a reduction of the amount of data gathered. In some cases, the instruments mechanically malfunctioned, and in others the exposure level was too low (or too high) to be recorded satisfactorily. Ballistic cameras in particular did not contribute to the data as a result of the low flare intensities. In the following pages, when an instrument is not discussed, it should be understood that either no significant data were recorded or a malfunction occurred.

CHAPTER 13

PROCEDURE

13.1 TEST PARTICIPATION

The DANP ship, USAS American Mariner, participated in five tests during Fish Bowl. The important parameters of the tests are shown in Table 13.1. It is informative to note that they can conveniently be divided into high-altitude tests (Star Fish Prime, Check Mate, and King Fish) and low-altitude tests (Blue Gill Triple Prime and Tight Rope). Additionally, high- and low-yield devices were detonated at both altitudes, further contributing to data cross-correlation.

13.2 INSTRUMENTATION DESCRIPTION

As a result of experience obtained during each test, the instrumentation was under constant modification during the series. Table 13.2 lists all of the instruments utilized during the tests, and Figure 13.1 shows the instrumentation shipboard placement for the individual tests.

13.3 USE OF INSTRUMENTATION

Instrumentation was divided into three major groups according to their usage: (1) burst measurement equipment,

(2) long-term (mapping) measurement equipment, and (3) support equipment.

Excessively high radiation levels were anticipated during the initial seconds after detonation, and it was necessary to protect the sensitive electronic equipment (photometers and radiometer) from damage. As they were all positioned on Pedestal 1, the pedestal was directed away to nearly a right angle (in azimuth) from the predicted burst co-ordinates and was trained on the burst only when the levels had decayed sufficiently. The additional burst measurement equipment was under control of the TV-monitored optical director. As a consequence of the protection precautions, it was not possible to view early burst events with the photometers or radiometers. Individual instruments in each of the major divisions are listed below.

13.3.1 Burst Measurement Equipment. This equipment consisted of the following instruments: (1) total-thermal-power-time radiometer; (2) 70mm high-resolution camera; (3) 16mm DBM-5 cameras; (4) 70mm streak objective spectrograph; and (5) 35mm Flight Research camera (XR emulsion).

13.3.2 Long-Term Measurement Equipment. The equipment, operated during mapping periods, consisted of the following instrumentation: (1) thermograph and

complementary K-24 Star camera (used only on Check Mate and Blue Gill Triple Prime); (2) two 35mm Flight Research boresight cameras; (3) four-channel photometer; (4) R4K1 PbS radiometer; (5) R4K1 thermistor radiometer; (6) all-sky camera operated for Stanford Research Institute (SRI).

13.3.3 Support Equipment. The following equipment supported the gathering of optical flare data from the 6.13 Speedball probes: (1) eight K-19 ballistic cameras located on Johnston Island, and (2) K-24 ballistic (probe) camera operated aboard the DAMP ship.

Another instrument that was utilized as support equipment throughout the entire experiment was the modified Kintel acquisition television system. This system, in conjunction with Optical Director No. 2. was designed to provide pointing information to the slave pedestal carrying instruments committed to the burst phase of the experiments.

13.4 CALIBRATION

Premission background measurements were recorded by H - 60 minutes. All quantitative measurement instruments were calibrated using as a source of radiation either a standard blackbody (up to 1000° K) or National Bureau of Standards (NBS) calibrated tungsten ribbon lamp. The full dynamic range of the instrument outputs (film density or voltage) were covered in the calibration. Also, preburst background mappings were completed to aid in data analysis.

[redacted]

TABLE 13.1 TEST PARAMETERS

Test	DATE 1962	Yield	Altitude	H - 0	Slant Range	Elevation	Remarks
	ZULU	kt	km	GMT	km		
Star Fish Prime	9 Jul	1.4 (Mt)	400	09:00:09	560 (Pred.)	44.4° (Pred.)	Obscured by clouds
Check Mate	20 Oct	[redacted]	147.3	08:30:00	315	27.8°	Partially obscured by clouds
Blue Gill Triple Prime	26 Oct		48.3	09:59:48	144	19.6°	Detonated behind cloud but rose above. Excellent coverage.
King Fish	1 Nov		97.4	12:10:06	190	30.8°	Excellent coverage. Clouds formed at H + 15 minutes
Tight Rope	4 Nov		21.0	07:30:00	28	48.6°	Low altitude, close range

[redacted]

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(3)(c) 8,10.

TABLE 13.2 FISH BOWL INSTRUMENTATION

Instrument	Field of View	Spectral Sensitivity	Emulsion/ Detector	Chop or Frame Rate	Exposure Time	Remarks
35mm Camera						
No. 1	7° x 9°	.38 - .65μ	Super Hypan	12/sec	1/36 sec	Optical Director Boresight
No. 2	7° x 9°	.38 - .65μ	Super Hypan	12/sec	1/36 sec	Pedestal 1 Boresight
No. 3	13.7° x 18.2°	.38 - .65μ	XR (Wyckoff)	32/sec	1/320 sec	Pedestal 2 Boresight. Triple layer Emulsion
70mm Camera						
High Resolution	3.2° x 3.2°	.38 - .65μ	Tri-X Pan	32/sec	1/720 sec	
Streak Spectro-graph	11° x 12°	.38 - .70μ	Plus-X Aerecon	144 in./sec	N/A	
Long Focus	5.4° x 12°	.38 - .65μ	Tri-X Pan	30/sec	1/1020 sec	Used only on Tight Rope
Long Focus (Spectral)	5.4° x 12°	.38 - .9μ	Infrared	15/sec	1/1020 sec	Used only on King Fish
16mm Camera	10.7° x 8.3°	.38 - .65μ	Tri-X Pan	400/sec	1/4000 sec	High Speed Record of Tests

TABLE 13.2 (CONTINUED)

Instrument	Field of View	Spectral Sensitivity	Emulsion/ Detector	Chop or Frame Rate	Exposure Time	Remarks
Ballistic Cameras						
K-24 (Star)	40° x 40°	.38 - .70μ	Tri-X Aerecon	Sequenced	10, 30 sec	To obtain star background for thermograph
K-24 (Probe)	40° x 40°	.48 - .53μ	Tri-X Aerecon	Sequenced	45 sec	To obtain speedball flare positions
K-24 (Spectral)	40° x 40°	.38 - .70μ	Tri-X Aerecon	Sequenced		Used on Blue Gill Triple Prime and King Fish
K-19 (Probe)(4)	37° x 45°	.48 - .53μ	103-F	Plate	Variable	Positioned on Johnston Island. Probe-flare data
All-Sky Camera	160°	.38 - .65μ	Royal-X Pan	53 sec	53 sec	Stanford Research Institute received data
Photometer						
1	1°circular	4036 Å	6810 PMT	1/50 sec resolution	N/A	Photometers used on all tests. Filters chosen to record selected nitrogen aurora Nominal half bandwidths of 100 Å
2	1°circular	7000 Å	7102 PMT	1/50 sec resolution	N/A	
3	1°circular	8846 Å	6217 PMT	1/50 sec resolution		
4	1°circular	3892 Å	6903 PMT	1/50 sec		

TABLE 13.2 (CONTINUED)

Instrument	Field of View	Spectral Sensitivity	Emulsion/ Detector	Chop or Frame Rate	Exposure Time	Remarks
Radiometer						
1	2° x 2°	1.8 - 2.8μ	Lead Sulphide	1/50 sec resolution	N/A	Total chop mode
2	2° x 2°	1.8 - 15μ	Thermistor	1/50 sec resolution	N/A	Did not record data
Total Thermal Radiometer	~35°	.3 - 15μ	Thermistor	1000 cycle/ sec	N/A	Two channel 5, no optics
Thermo-graph	5° x 20°	1.8 - 15μ	Thermistor	50 sec/ picture	N/A	Pr[illegible]s photo- g[illegible]ecord of [illegible]kgrounds

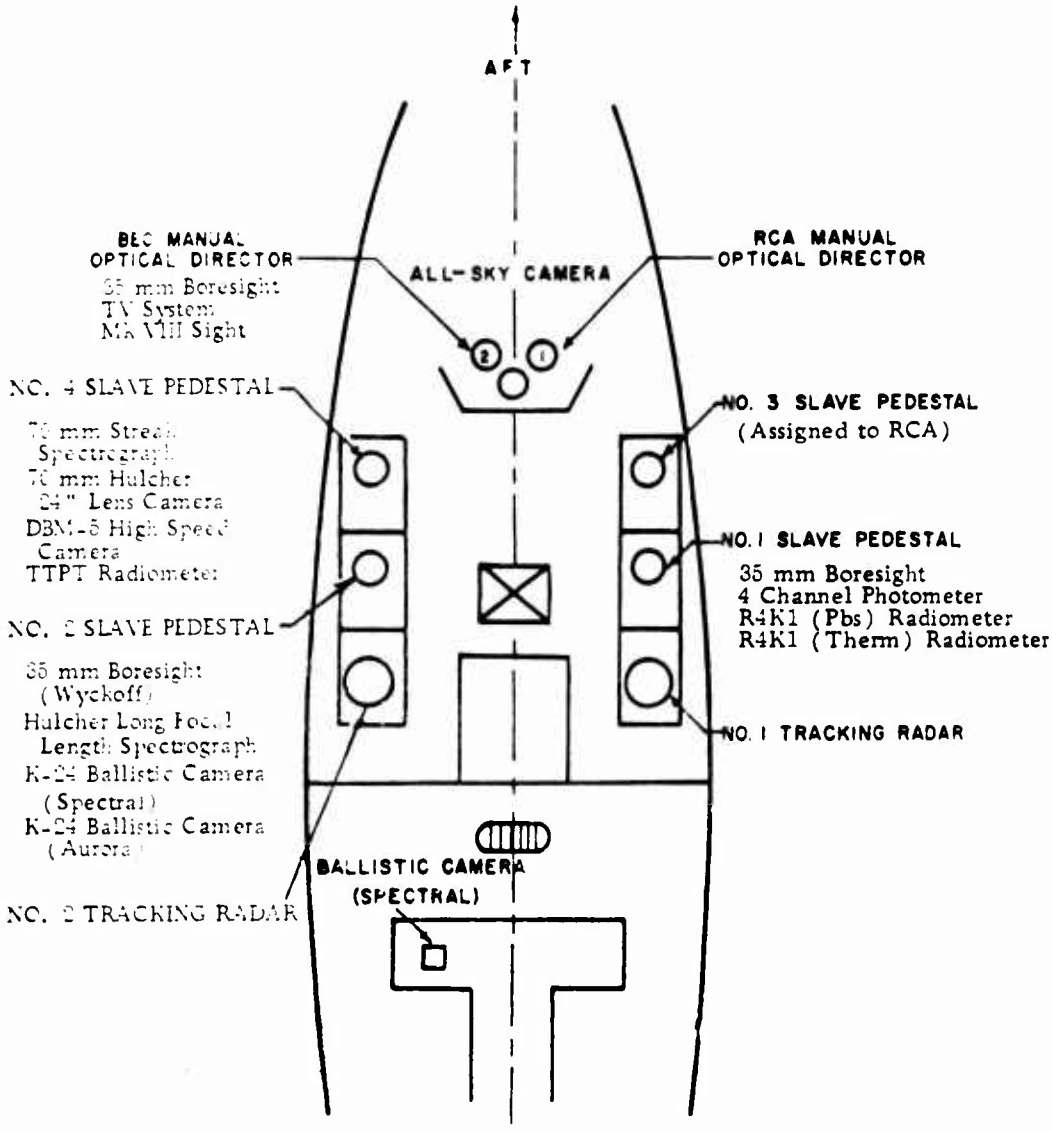


Figure 13.1 Instrumentation layout. DAMP ship.

CHAPTER 14

RESULTS

14.1 BURST MEASUREMENTS

Inclement weather prevented the gathering of satisfactory data in support of pretest objectives. Photographic instrumentation recorded an opalescent background produced by a dense layer of clouds uniformly illuminated by the burst. Burst instrumentation was directed to the point of detonation by Optical Director No. 2. The following descriptions are those of data obtained by each burst instrument.

The 70mm high-resolution camera started 10 seconds prior to burst and operated for 60 seconds. Data were recorded from H - 0 to H + 0.3 second and consisted of 10 frames of evenly exposed, unimaged intensities. At H - 0 the frame containing the burst was totally opaque, and each successive frame became less dense with time.

The 16mm DBM-5 high-speed camera was started 10 seconds prior to detonation and operated for 37 seconds. Data were recorded from H - 0 to H + 0.01 second, and consisted of 4 frames of evenly exposed, unimaged intensities. At H - 0 the frame containing the burst was totally opaque, and each of the three successive frames became less dense with time.

The 70mm streak objective spectrograph was started 10 seconds prior to detonation and operated for 39 seconds. Burst data were recorded from H - 0 to H + 4 seconds and consisted of a 48-foot length of dense exposed film. The remaining length of film decreased in density with time.

The TTPT Radiometer—Channel A and Channel B—was started 120 seconds prior to H - 0. This instrument was operated until H + 379 seconds, during which time Channel A recorded a pulse width of 0.5 msec with an amplitude of 4 volts, and Channel B recorded a pulse width of 0.2 msec with an amplitude of 0.5 volt. Both pulses were recorded at H - 0, and their amplitudes decay with time. Although highly attenuated by dense clouds, results from this instrument are tentatively positive.

The 35mm flight research Wycoff camera was started 10 seconds prior to detonation and operated for 200 seconds. The results were expected to be similar to the 70mm high-resolution camera.

14.2 LONG-TERM MEASUREMENTS

A long-term period of surveillance was conducted in support of the pretest objectives. However, inclement weather resulted in a serious degradation of recorded information. This surveillance consisted of mapping an area surrounding the burst point, the

conjugate point, and large azimuth and elevation scan patterns covering the operational limits of the optical director and the instrumented slave pedestals.

Post-mission mapping was started at H + 323 seconds and continued intermittently until sunrise on D + 1 day. The sampling periods were taken every half-hour with a duration of from 5 to 10 minutes. A 5-minute final mapping mission was conducted after sunset on D + 1 day.

During the mapping periods, almost total cloud coverage persisted. No auroral phenomena were observed at any time. In addition, no long-term effects were believed to have been recorded which could be directly attributed to the nuclear detonation. It is significant to note that little, if any, long-term effects were recorded in the monitored wavelength regions. In this respect, the severe attenuations imposed on the selected wavelength regions by intermittent precipitation and heavy cloud coverage must be considered. Individual instruments with their preliminary results are listed below:

R4K-1 Thermistor Radiometer. The results from this instrument are unknown due to low levels of recorded signal, but results are believed to be negative.

R4K-1 Lead Sulfide (PbS) Radiometer. The results from this instrument are unknown due to low levels of recorded

[redacted]

signal, but the results are believed to be negative.

4-Channel Photometer. The results from this instrument are unknown due to low levels of recorded signal, but results are believed to be negative.

35mm Boresight Camera (Slave Pedestal 1). Due to heavy rains, this camera was started after burst at H + 447 seconds and stopped at H + 1245 seconds. No positive results were obtained.

After burst, the thermograph and star camera were directed at the detonation point by the operator. Four thermograph exposures and a sequence series of 3-star exposures for each thermograph exposure were made. The results were negative.

35mm Boresight Camera (Optical Director 2). This camera was not operated due to the lack of recordable optical phenomena.

The all-sky camera was operated for Stanford Research Institute and the film delivered to that organization for review. Recording commenced prior to Thor lift-off and ceased at sunrise on D + 1 day.

14.3 SUPPORT INSTRUMENTATION

Eight K-19 aerial ballistic cameras were mounted on Johnston Island to record optical flare data from the Speedball probes. These probes

ejected 14 flares at designated points along the trajectory. Positive results were obtained from four of the eight K-19 cameras.

Because of total cloud coverage, the K-24 ballistic (probe) camera mounted on the DAMP Ship yield negative results with respect to flare data.

[redacted]

APPENDIX A

PROBE SUMMARY

The trajectory listings are time referenced to the beginning of the GMT second in which burst occurred. Therefore, H + 0 in the listings corresponds to H - 0.029 second for Star Fish Prime, to an accuracy of 50 milliseconds.

	Approximate Tracking Records			
Project	Lift-Off	Begin	End	Azimuth
	sec	sec	sec	deg
9.1a	H-1809	H-1754	H-1451	177
6.7	-100			NOT TRACKED
6.13	-50	H-13	H+22	349
6.13	+710	H+782	+945	205
6.2	+1200	+1292	+1810	30
6.13	+1860	1900[a]	2140	167
		2188	2303	26
6.2	+2400	2441	3283	

[a]Digital recorder tapes were being changed in the interval H+1900 to H+1951, and no recorded trajectory is available for this interval.

Probe No. 1; lift-off time: H-1809 seconds; and project No. 9.1a

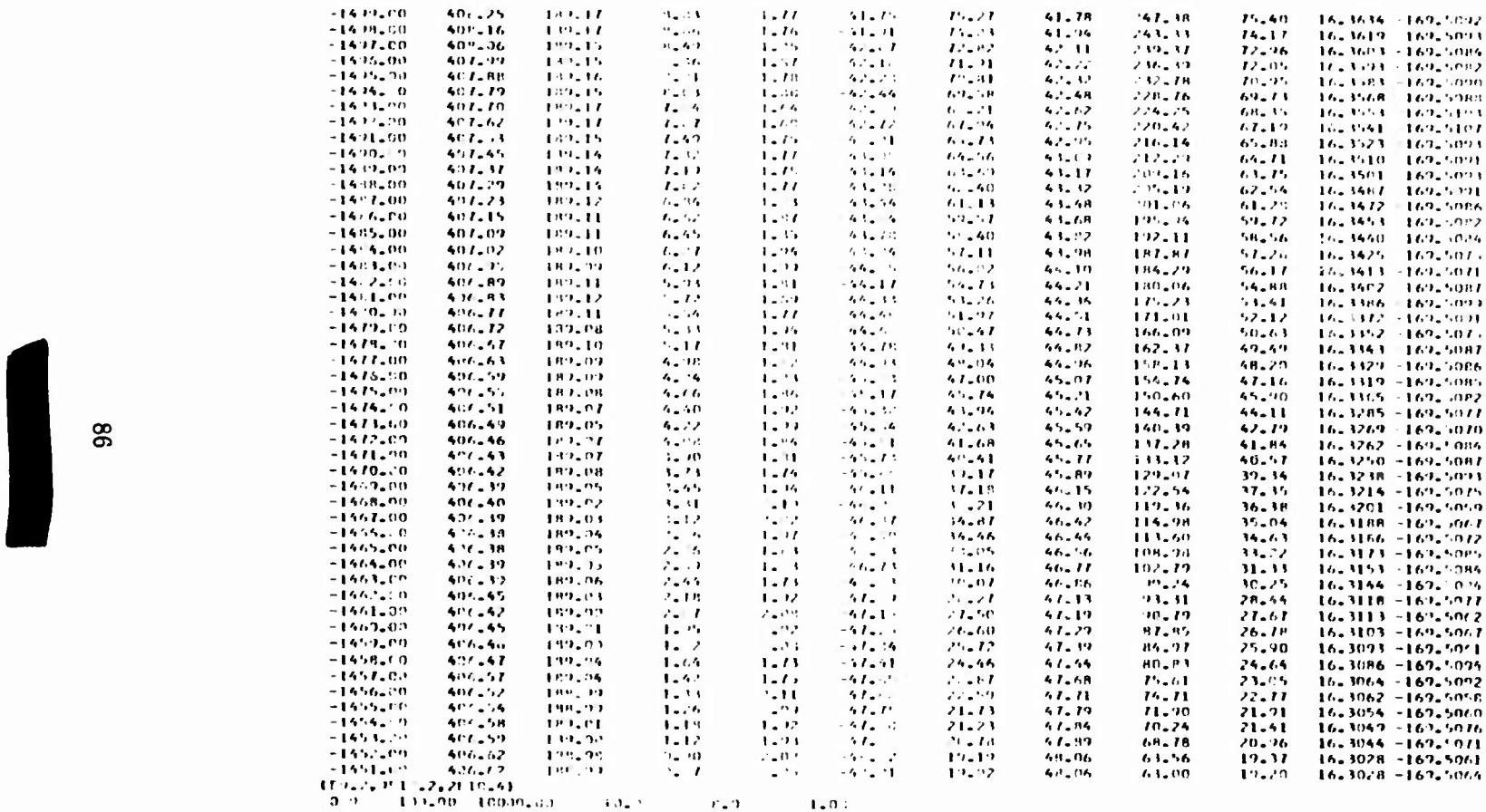
Raw data referenced to the ship				Quantities have been translated to the launcher position							
Time, sec	Range, km	Azimuth, deg T	Elevation, deg Geod.	x, km distance east	y, km distance north	z at launcher	$\sqrt{x^2 + y^2}$, km	Height above earth, kft	Height above earth, km	Latitude of target, deg	Longitude of target, deg

-1754.00	369.99	190.31	9.03	0.32	-4.37	68.48	4.38	224.70	68.49	16.6970 -169.[illegible]
-1753.00	370.19	190.32	9.11	0.18	-4.42	69.12	4.42	226.78	69.12	16.6949 -169.5238
-1752.00	370.79	190.35	9.14	0.07	-4.45	70.66	4.45	231.82	70.66	16.6946 -169.5251
-1751.00	371.18	190.30	9.53	0.27	-4.81	71.93	4.82	236.01	71.93	16.6932 -169.5240
-1750.00	371.59	190.35	9.75	-0.06	-4.83	73.40	4.83	240.83	73.40	16.6931 -169.5259
-1749.00	371.98	190.31	9.96	0.13	-5.00	74.21	5.09	243.48	74.21	16.6907 -169.5238
-1748.00	372.39	190.31	10.09	0.16	-5.18	75.15	5.28	246.55	75.15	16.6891 -169.5242
-1747.00	372.80	190.27	10.17	0.36	-5.46	76.31	5.47	250.37	76.31	16.6875 -169.5222
-1746.00	373.21	190.27	10.34	0.33	-5.59	77.51	5.60	254.29	77.51	16.6864 -169.5214
-1745.00	373.62	190.30	10.47	0.16	-5.75	78.43	5.75	257.32	78.43	16.6849 -169.5242
-1744.00	374.03	190.29	10.71	0.18	-5.78	80.04	5.78	262.62	80.05	16.6848 -169.5239
-1743.00	374.45	190.28	10.86	0.22	-5.96	81.12	5.96	266.16	81.12	16.6832 -169.5234
-1742.00	374.84	190.30	10.97	0.03	-6.13	81.89	6.13	268.68	81.89	16.6816 -169.5247
-1741.00	375.25	190.29	11.22	0.11	-6.13	83.57	6.13	274.18	83.57	16.6817 -169.5245
-1740.00	375.66	190.25	11.26	0.16	-6.30	84.02	6.51	275.15	83.93	16.6784 -169.5223
-1739.00	376.09	190.22	11.51	0.03	-6.34	85.61	6.56	280.89	85.61	16.6781 -169.5206
-1738.00	376.48	190.24	11.64	0.38	-6.67	86.52	6.68	283.88	86.53	16.6770 -169.5220
-1737.00	376.89	190.23	11.84	0.43	-6.72	87.94	6.74	288.54	87.95	16.6765 -169.5215
-1736.00	377.30	190.23	11.94	0.40	-6.95	88.65	6.97	290.86	88.65	16.6745 -169.5218
-1735.00	377.72	190.23	12.09	0.33	-7.07	89.75	7.08	294.48	89.76	16.6735 -169.5224
-1734.00	378.12	190.22	12.23	0.33	-7.22	90.75	7.23	297.75	90.75	16.6722 -169.5220
-1733.00	378.55	190.24	12.41	0.29	-7.29	92.00	7.30	301.85	92.00	16.6716 -169.5232
-1732.00	378.95	190.23	12.47	0.25	-7.56	92.50	7.57	303.50	92.51	16.6692 -169.5232
-1731.00	379.37	190.22	12.66	0.33	-7.65	93.79	7.65	307.73	93.80	16.6685 -169.5224
-1730.00	379.77	190.21	12.73	0.34	-7.90	94.38	7.91	309.67	94.39	16.6662 -169.5224
-1729.00	380.20	190.19	12.92	.43	-7.94	95.71	7.99	314.01	95.71	16.6655 -169.5215
-1728.00	380.60	190.17	13.06	0.54	-8.11	96.72	8.13	317.35	96.73	16.6644 -169.5206
-1727.00	381.02	190.17	13.20	0.54	-8.27	97.67	8.28	320.47	97.68	16.6630 -169.5205
-1726.00	381.42	190.15	13.32	0.65	-8.44	98.57	8.46	323.42	98.58	16.6616 -169.5195
-1725.00	381.83	190.12	13.42	[illegible].81	-8.67	99.33	8.71	325.90	99.33	16.6595 -169.5181
-1724.00	382.23	190.14	13.54	0.62	-8.78	100.22	8.80	328.83	100.23	16.6585 -169.5198
-1723.00	382.65	190.14	13.72	0.65	-8.94	101.47	8.86	332.94	101.48	16.6580 -169.5195
-1722.00	383.05	190.14	13.85	0.60	-8.96	102.42	8.98	336.03	102.42	16.6570 -169.5200
-1721.00	383.46	190.17	13.96	0.41	-9.10	103.25	9.11	338.76	103.25	16.6558 -169.5218
-1720.00	383.86	190.14	14.07	0.57	-9.27	104.06	9.30	341.44	104.07	16.6541 -169.5202
-1719.00	384.27	190.14	14.17	0.56	-9.47	104.87	9.48	344.09	104.88	16.6526 -169.5205
-1718.00	384.69	190.10	14.35	0.80	-9.55	106.12	9.58	348.19	106.13	16.6519 -169.5181
-1717.00	385.08	190.10	14.45	0.73	-9.70	106.89	9.73	350.71	106.90	16.6506 -169.5188
-1716.00	385.47	190.11	14.60	0.68	-9.76	107.97	9.78	354.25	107.97	16.6501 -169.5192
-1715.00	385.88	190.10	14.68	0.68	-9.98	108.61	10.00	356.36	108.62	16.6482 -169.5192
-1714.00	386.27	190.08	14.86	0.84	-10.00	109.98	10.04	360.52	109.89	16.6480 -169.5178
-1713.00	386.67	190.10	14.89	0.64	-10.28	110.20	10.30	361.57	110.21	16.6455 -169.5176
-1712.00	387.07	190.06	15.00	0.87	-10.47	111.00	10.51	364.20	111.01	16.6438 -169.5175
-1711.00	387.46	190.03	15.15	1.07	-10.56	112.09	10.61	367.79	112.10	16.6431 -169.5157
-1710.00	387.85	190.06	15.23	0.82	-10.70	112.77	10.73	370.02	112.78	16.6418 -169.5180
-1709.00	388.25	190.08	15.30	0.70	-10.92	113.30	10.94	371.75	113.31	16.6399 -169.5191
-1708.00	388.66	190.10	15.47	0.53	-10.90	114.55	10.92	375.85	114.56	16.6401 -169.5206
-1707.00	389.03	190.08	15.54	0.64	-11.10	115.13	11.12	377.77	115.14	16.6383 -169.5196
-1706.00	389.42	190.07	15.64	0.65	-11.26	115.88	11.28	380.22	115.89	16.6369 -169.5195
-1705.00	389.80	190.05	15.73	0.77	-11.45	116.58	11.47	382.50	116.59	16.6353 -169.5184
-1704.00	390.18	190.06	15.86	0.69	-11.49	117.56	11.51	385.74	117.58	16.6349 -169.5192

-1703.00	390.56	190.03	15.74	[illegible]	-11.73	118.17	11.73	387.73	119.18	16.6331 -169.5178
-1702.00	390.36	190.05	15.75	[illegible]	-11.7[illegible]	118.01	11.84	390.48	119.02	16.6321 -169.5187
-1701.00	391.32	190.02	15.70	[illegible]	-12.[illegible]7	118.45	12.10	391.95	119.47	16.6299 -169.5174
-1700.00	391.70	190.02	15.71	[illegible]	-12.[illegible]7	120.30	12.20	394.71	120.31	16.6290 -169.5177
-1699.00	392.06	190.03	15.73	[illegible]	-12.[illegible]	121.19	12.40	396.64	120.89	16.6274 -169.5167
-1698.00	392.44	190.01	15.77	[illegible]	-12.[illegible]	121.47	12.53	398.89	121.59	16.6262 -169.5177
-1697.00	392.80	190.01	15.65	[illegible]	-12.[illegible]	122.11	12.63	401.11	122.32	16.6252 -169.5189
-1696.00	393.17	190.03	15.56	[illegible]	-12.[illegible]	123.08	12.73	403.85	123.10	16.6243 -169.5189
-1695.00	393.54	189.99	15.65	[illegible]	-12.[illegible]	123.73	12.96	405.98	123.74	16.6227 -169.5159
-1694.00	393.91	190.02	15.76	[illegible]	-12.[illegible]	124.58	12.97	408.79	124.60	16.6223 -169.5156
-1693.00	394.25	190.01	15.[illegible]	[illegible]	-13.[illegible]	125.[illegible]	13.08	411.12	125.31	16.6214 -169.5185
-1692.00	394.62	190.01	15.72	[illegible]	-13.[illegible]	125.87	13.25	413.00	125.88	16.6198 -169.5187
-1691.00	394.98	189.93	15.74	[illegible]	-13.[illegible]	126.76	13.43	415.91	126.77	16.6186 -169.5162
-1690.00	395.33	189.98	15.83	[illegible]	-13.[illegible]	127.[illegible]	13.66	416.17	126.85	16.6163 -169.5182
-1689.00	395.67	189.97	15.[illegible]	[illegible]	-13.[illegible]	127.61	13.86	418.06	127.43	16.6147 -169.5163
-1688.00	396.01	189.97	15.[illegible]	[illegible]	-13.[illegible]	128.08	13.97	420.26	128.10	16.6137 -169.5171
-1687.00	396.37	189.99	15.[illegible]	[illegible]	-13.[illegible]	129.[illegible]	13.91	423.48	129.04	16.6140 -169.5189
-1686.00	396.72	189.97	15.61	[illegible]	-14.[illegible]	129.72	14.07	425.65	129.74	16.6127 -169.5176
-1685.00	397.10	190.00	15.61	[illegible]	-14.15	130.[illegible]	14.17	427.86	130.41	16.6118 -169.5199
-1684.00	397.39	189.96	15.63	[illegible]	-14.[illegible]	130.53	14.47	429.32	130.55	16.6092 -169.5177
-1683.00	397.75	189.95	15.56	[illegible]	-14.[illegible]	131.[illegible]	14.69	429.80	131.00	16.6073 -169.5175
-1682.00	398.06	189.94	15.50	[illegible]	-14.[illegible]	131.50	14.85	431.49	131.52	16.6060 -169.5166
-1681.00	398.39	189.93	15.72	[illegible]	-14.[illegible]	132.15	14.89	434.28	132.37	16.6057 -169.5163
-1680.00	398.72	189.91	15.77	[illegible]	-15.[illegible]	133.[illegible]	15.07	435.89	132.86	16.6042 -169.5152
-1679.00	399.04	189.92	15.86	[illegible]	-15.[illegible]	133.56	15.[illegible]	438.19	133.56	16.6037 -169.5161
-1678.00	399.35	189.92	15.89	[illegible]	-15.[illegible]	133.[illegible]	15.33	439.07	133.83	16.6018 -169.5167
-1677.00	399.68	189.94	15.95	[illegible]	-15.[illegible]	134.17	15.44	440.30	134.19	16.6007 -169.5178
-1676.00	400.00	189.91	15.98	[illegible]	-15.[illegible]	134.65	15.70	441.84	134.67	16.5985 -169.5162
-1675.00	400.31	189.94	15.97	[illegible]	-15.[illegible]	135.[illegible]	15.[illegible]	444.02	135.34	16.5982 -169.5181
-1674.00	400.61	189.91	15.[illegible]	[illegible]	-16.[illegible]	135.75	15.93	445.43	135.77	16.5966 -169.5165
-1673.00	400.93	189.91	15.[illegible]	[illegible]	-16.[illegible]	136.[illegible]	16.10	446.67	136.14	16.5950 -169.5172
-1672.00	401.21	189.86	15.[illegible]	[illegible]	-16.[illegible]	136.67	16.30	448.14	136.59	16.5935 -169.5165
-1671.00	401.55	189.87	15.[illegible]	[illegible]	-15.[illegible]	137.06	16.45	449.74	137.08	16.5921 -169.5169
-1670.00	401.84	189.87	15.[illegible]	[illegible]	-16.[illegible]	137.71	16.50	451.89	137.74	16.5916 -169.5151
-1669.00	402.17	189.88	15.42	[illegible]	-16.[illegible]	137.[illegible]	16.55	453.79	138.31	16.5912 -169.5161
-1668.00	402.41	189.91	15.45	[illegible]	-17.[illegible]	13[illegible].64	16.68	454.91	138.66	16.5899 -169.5176
-1667.00	402.69	189.88	15.45	[illegible]	-16.[illegible]	138.69	16.98	455.09	138.71	16.5873 -169.5147
-1666.00	402.97	189.84	15.53	[illegible]	-17.[illegible]	139.10	17.10	457.10	139.32	16.5865 -169.5143
-1665.00	403.27	189.86	15.52	[illegible]	-17.[illegible]	139.[illegible]	17.35	457.40	139.42	16.5842 -169.5156
-1664.00	403.56	189.85	15.64	[illegible]	-17.[illegible]	140.27	17.32	460.30	140.30	16.5845 -169.5152
-1663.00	403.83	189.84	15.67	[illegible]	-17.[illegible]	140.[illegible]	17.50	461.25	140.59	16.5829 -169.5147
-1662.00	404.13	189.86	15.73	[illegible]	-17.[illegible]	140.[illegible]	17.65	462.33	140.92	16.5815 -169.5163
-1661.00	404.35	189.84	15.[illegible]	[illegible]	-17.[illegible]	140.[illegible]	17.89	462.36	140.93	16.5794 -169.5157
-1660.00	404.67	189.84	15.76	[illegible]	-17.[illegible]	141.45	18.02	464.15	141.47	16.5783 -169.5156
1659.00	404.88	189.85	15.78	[illegible]	-16.11	141.66	18.14	464.85	141.69	16.5772 -169.5161
-1658.00	405.18	189.85	15.[illegible]	[illegible]	-1[illegible].13	142.42	1[illegible].15	467.34	142.44	16.5771 -169.5164
-1657.00	405.42	189.84	15.85	[illegible]	-16.[illegible]	142.36	18.43	467.15	142.39	16.5746 -169.5163
-1656.00	405.66	189.83	15.[illegible]	[illegible]	-15.[illegible]	142.71	18.56	468.29	142.74	16.5736 -169.5160
-1655.00	405.90	189.81	15.75	[illegible]	-15.[illegible]	143.16	18.66	469.76	143.19	16.5729 -169.5145
-1654.00	406.15	189.80	15.73	[illegible]	-16.[illegible]	143.14	1[illegible].94	469.71	143.17	16.5703 -169.5166
-1653.00	406.37	189.79	15.72	[illegible]	-15.[illegible]	143.56	19.02	471.08	143.59	16.5697 -169.5141

-1652.00	406.62	189.81	19.00	1.08	-19.13	143.77	19.16	471.78	143.80	16.5683 -169.5156
-1651.00	406.87	189.82	19.02	0.99	-19.40	143.96	19.33	472.41	143.99	16.5668 -169.5164
-1650.00	407.12	189.80	19.04	1.00	-19.48	144.25	19.51	473.35	144.28	16.5652 -169.5155
-1649.00	407.34	189.80	19.08	1.10	-19.59	144.54	19.62	474.11	144.57	16.5642 -169.5155
-1648.00	407.57	189.80	19.07	1.07	-19.80	144.61	19.83	474.54	144.64	16.5624 -169.5157
-1647.00	407.77	189.78	19.14	1.17	-19.83	145.17	19.86	476.23	145.15	16.5622 -169.5148
-1646.00	407.99	189.78	19.16	1.15	-19.97	145.33	20.01	476.90	145.36	16.5609 -169.5149
-1645.00	408.20	189.79	19.24	1.07	-19.97	145.94	19.95	478.92	145.98	16.5614 -169.5158
-1644.00	408.40	189.79	19.18	1.05	-20.28	145.62	20.30	477.86	145.65	16.5583 -169.5159
-1643.00	408.62	189.81	19.23	0.90	-20.31	146.04	20.33	479.24	146.07	16.5580 -169.5173
-1642.00	408.83	189.79	19.29	1.01	-20.45	146.54	20.38	480.87	146.57	16.5576 -169.5161
-1641.00	409.07	189.79	19.28	0.97	-20.60	146.53	20.62	480.84	146.56	16.5554 -169.5166
-1640.00	409.24	189.76	19.21	1.13	-20.96	146.17	20.99	479.68	146.21	16.5523 -169.5152
-1639.00	409.48	189.77	19.19	1.00	-21.22	146.11	21.24	479.50	146.15	16.5500 -169.5164
-1638.00	409.60	189.75	19.23	1.17	-21.26	146.39	21.29	480.41	146.43	16.5496 -169.5148
-1637.00	409.86	189.74	19.22	1.15	-21.51	146.44	21.54	480.58	146.48	16.5474 -169.5150
-1636.00	409.97	189.75	19.26	1.12	-21.49	146.79	21.52	481.71	146.83	16.5476 -169.5153
-1635.00	410.20	189.77	19.31	0.94	-21.53	147.19	21.56	483.04	147.23	16.5472 -169.5169
-1634.00	410.37	189.72	19.29	1.23	-21.80	147.08	21.84	482.67	147.12	16.5448 -169.5142
-1633.00	410.54	189.72	19.31	1.24	-21.90	147.30	21.93	483.39	147.34	16.5440 -169.5142
-1632.00	410.69	189.75	19.29	1.02	-22.04	147.25	22.07	483.23	147.29	16.5427 -169.5162
-1631.00	410.86	189.74	19.31	1.08	-22.17	147.41	22.20	483.77	147.45	16.5416 -169.5156
-1630.00	411.01	189.72	19.30	1.14	-22.34	147.40	22.37	483.73	147.44	16.5401 -169.5151
-1629.00	411.16	189.72	19.28	1.12	-22.53	147.34	22.56	483.51	147.38	16.5384 -169.5153
-1628.00	411.32	189.72	19.29	1.10	-22.64	147.49	22.66	484.01	147.53	16.5375 -169.5155
-1627.00	411.48	189.68	19.27	1.36	-22.89	147.38	22.93	483.66	147.42	16.5353 -169.5131
-1626.00	411.62	189.69	19.29	1.30	-22.93	147.62	22.97	484.44	147.66	16.5349 -169.5136
-1625.00	411.79	189.71	19.30	1.13	-23.05	147.72	23.07	484.78	147.76	16.5339 -169.5152
-1624.00	411.90	189.74	19.33	0.92	-23.02	147.97	23.04	485.61	148.02	16.5341 -169.5171
-1623.00	412.05	189.71	19.31	1.10	-23.25	147.87	23.28	485.29	147.92	16.5321 -169.5154
-1622.00	412.19	189.73	19.28	0.93	-23.44	147.70	23.46	484.74	147.75	16.5304 -169.5170
-1621.00	412.30	189.69	19.24	1.13	-23.68	147.51	23.71	484.09	147.55	16.5283 -169.5151
-1620.00	412.46	189.67	19.25	1.29	-23.80	147.67	23.83	484.63	147.72	16.5272 -169.5137
-1619.00	412.56	189.65	19.26	1.39	-23.90	147.75	23.94	484.88	147.79	16.5264 -169.5128
-1618.00	412.67	189.68	19.28	1.16	-23.89	147.94	23.92	485.52	147.99	16.5265 -169.5149
-1617.00	412.80	189.65	19.19	1.31	-24.28	147.40	24.31	483.75	147.45	16.5230 -169.5135
-1616.00	412.91	189.64	19.21	1.40	-24.35	147.56	24.39	484.28	147.61	16.5224 -169.5127
-1615.00	413.01	189.64	19.15	1.34	-24.60	147.19	24.64	483.04	147.23	16.5201 -169.5133
-1614.00	413.16	189.53	19.12	2.04	-24.94	147.03	25.02	482.56	147.08	16.5172 -169.5069
-1613.00	413.22	189.64	19.11	1.27	-24.88	147.02	24.91	482.52	147.07	16.5177 -169.5139
-1612.00	413.34	189.65	19.10	1.22	-25.01	146.99	25.04	482.41	147.04	16.5165 -169.5144
-1611.00	413.42	189.67	19.10	1.08	-25.07	146.99	25.10	482.40	147.04	16.5160 -169.5156
-1610.00	413.51	189.64	19.07	1.20	-25.24	146.86	25.27	481.99	146.91	16.5145 -169.5145
-1609.00	413.60	189.63	19.03	1.27	-25.44	146.62	25.48	481.19	146.67	16.5126 -169.5139
-1608.00	413.74	189.63	19.03	1.24	-25.56	146.69	25.59	481.42	146.74	16.5116 -169.5141
-1607.00	413.77	189.63	18.97	1.20	-25.76	146.26	25.79	480.02	146.31	16.5099 -169.5145
-1606.00	413.87	189.60	18.95	1.43	-25.93	146.17	25.97	479.73	146.22	16.5084 -169.5125
-1605.00	413.97	189.60	18.94	1.40	-26.00	146.12	26.04	479.58	146.18	16.5077 -169.5127
-1604.00	413.99	189.60	18.92	1.38	-26.12	146.01	26.16	479.21	146.06	16.5066 -169.5129
-1603.00	414.08	189.61	18.87	1.29	-26.28	145.75	26.31	478.34	145.80	16.5052 -169.5137
-1602.00	414.14	189.63	18.82	1.10	-26.46	145.43	26.49	477.33	145.49	16.5036 -169.5154

-1550.00	413.40	189.42	15.46	1.35	-34.14	122.69	36.16	401.88	122.49	16.4144 -169.5140
-1549.00	413.31	189.41	15.39	1.36	-34.23	121.89	36.26	400.18	121.98	16.4135 -169.5140
-1548.00	413.24	189.40	15.36	1.35	-34.47	120.38	36.47	397.15	121.05	16.4113 -169.5141
-1547.00	413.17	189.36	15.22	1.62	-34.51	12 .71	36.55	396.34	120.81	16.4109 -169.5106
-1546.00	413.08	189.39	15.09	1.44	-34.73	119.79	36.73	394.41	119.88	16.4092 -169.5123
-1545.00	412.98	189.39	15.02	1.40	-34.75	119.28	36.78	391.64	119.37	16.4087 -169.5126
-1544.00	412.90	189.38	14.86	1.43	-34.85	118.13	36.87	387.89	118.23	16.4060 -169.5127
-1543.00	412.82	189.41	14.77	1.18	-34.89	117.61	36.91	386.19	117.71	16.4056 -169.5147
-1542.00	412.72	189.36	14.63	1.50	-34.93	116.54	36.91	382.66	116.64	16.4030 -169.5117
-1541.00	412.64	189.36	14.53	1.46	-34.92	115.82	36.95	380.30	115.92	16.4017 -169.5121
-1540.00	412.54	189.35	14.44	1.40	-34.94	115.14	36.97	378.08	115.24	16.4006 -169.5117
-1539.00	412.44	189.39	14.40	1.26	-34.93	114.82	36.91	377.05	114.92	16.4010 -169.5132
-1538.00	412.34	189.35	14.21	1.49	-34.93	113.82	36.96	373.78	113.62	16.4179 -169.5118
-1537.00	412.27	189.38	14.15	1.27	-34.96	113.05	36.99	371.24	113.15	16.4176 -169.5134
-1536.00	412.15	189.34	13.96	1.52	-34.93	111.77	36.91	367.03	111.87	16.4156 -169.5116
-1535.00	412.07	189.33	13.83	1.50	-34.98	110.93	36.91	364.96	110.94	16.4128 -169.5117
-1534.00	411.96	189.33	13.75	1.43	-34.93	110.23	36.96	361.99	110.33	16.4124 -169.5119
-1533.00	411.86	189.36	13.66	1.31	-34.99	109.61	36.92	359.96	109.71	16.4117 -169.5134
-1532.00	411.76	189.34	13.56	1.39	-34.93	108.87	36.96	357.52	108.97	16.4105 -169.5128
-1531.00	411.65	189.33	13.42	1.43	-34.92	107.49	36.96	354.32	108.00	16.4087 -169.5123
-1530.00	411.53	189.33	13.30	1.44	-37.04	107.05	37.06	351.58	107.16	16.4076 -169.5123
-1529.00	411.45	189.33	13.13	1.37	-37.31	106.82	37.36	347.53	105.93	16.4051 -169.5129
-1528.00	411.35	189.33	13.06	1.43	-37.34	106.42	37.36	345.90	105.43	16.4048 -169.5128
-1527.00	411.23	189.32	12.84	1.43	-37.40	104.04	37.43	341.70	104.15	16.4024 -169.5123
-1526.00	411.12	189.32	12.84	1.43	-37.43	101.65	37.42	340.42	103.76	16.4025 -169.5124
-1525.00	411.02	189.31	12.61	1.43	-37.32	102.13	37.35	345.46	102.25	16.3994 -169.5124
-1524.00	410.91	189.30	12.56	1.47	-37.32	101.75	37.35	336.21	101.87	16.3994 -169.5118
-1523.00	410.80	189.28	12.47	1.57	-38.20	100.41	38.23	329.80	100.52	16.3969 -169.5110
-1522.00	410.69	189.30	12.26	1.46	-38.27	99.64	38.30	327.28	99.76	16.3962 -169.5120
-1521.00	410.58	189.28	12.11	1.53	-38.46	98.58	38.49	323.80	98.69	16.3944 -169.5114
-1520.00	410.47	189.31	12.01	1.35	-38.52	97.87	38.54	321.46	97.98	16.3938 -169.5130
-1519.00	410.36	189.27	11.95	1.56	-38.74	96.71	38.78	317.67	96.83	16.3917 -169.5112
-1518.00	410.27	189.30	11.74	1.32	-38.76	96.32	38.86	315.10	96.04	16.3908 -169.5134
-1517.00	410.13	189.27	11.71	1.50	-38.87	94.56	39.10	310.62	94.68	16.3887 -169.5117
-1516.00	410.03	189.25	11.46	1.67	-38.86	93.89	39.20	308.44	94.01	16.3878 -169.5101
-1515.00	409.92	189.25	11.3	1.64	-38.92	92.44	39.46	303.69	92.56	16.3854 -169.5104
-1514.00	409.82	189.24	11.18	1.67	-38.96	91.91	39.49	301.95	92.04	16.3851 -169.5101
-1513.00	409.70	189.24	11.14	1.63	-38.97	90.93	39.60	298.73	91.05	16.3840 -169.5105
-1512.00	409.62	189.26	10.99	1.57	-39.71	90.05	39.74	295.52	90.08	16.3827 -169.5120
-1511.00	409.49	189.24	10.76	1.62	-39.77	88.86	39.90	291.94	88.98	16.3812 -169.5106
-1510.00	409.40	189.22	10.59	1.70	-40.07	87.73	40.11	288.24	87.85	16.3793 -169.5098
-1509.00	409.27	189.20	10.42	1.58	-40.25	86.55	40.29	284.37	86.67	16.3776 -169.5086
-1508.00	409.18	189.23	10.22	1.55	-40.45	85.11	40.48	279.64	85.23	16.3757 -169.5112
-1507.00	409.06	189.22	10.12	1.64	-40.61	84.36	40.55	277.19	84.49	16.3751 -169.5104
-1506.00	408.96	189.21	9.96	1.65	-40.63	83.23	40.71	273.49	83.36	16.3735 -169.5103
-1505.00	408.85	189.20	9.87	1.52	-40.86	82.61	40.68	271.46	82.74	16.3737 -169.5134
-1504.00	408.76	189.21	9.80	1.69	-41.04	80.72	41.07	265.27	80.86	16.3701 -169.5107
-1503.00	408.65	189.20	9.67	1.68	-41.15	79.80	41.18	262.24	79.93	16.3691 -169.5100
-1502.00	408.55	189.20	9.52	1.66	-41.21	78.70	41.32	258.63	78.8.	16.3678 -169.5101
-1501.00	408.47	189.22	9.39	1.50	-41.37	77.82	41.40	255.76	77.95	16.3669 -169.5117
-1500.00	408.35	189.13	9.32	1.66	-41.54	76.61	41.57	251.78	76.74	16.3654 -169.5102



Probe No. 3; lift-off time: H-50 seconds; and project No. 6.13

[redacted]

Raw data referenced to the ship				Quantities have been translated to the launcher position							
Time, sec	Range, km	Azimuth, deg T	Elevation, deg Geod.	x, km distance east	y, km distance north	z at launcher	$\sqrt{x^2 + y^2}$, km	Height above earth, kft	Height above earth, km	Latitude of target, deg	Longitude of target, deg

-13.00	354.82	191.05	5.04	-1.55	6.45	40.98	6.63	134.47	40.99	16.7936 -169.5400
-12.00	354.80	191.08	5.34	-1.63	6.83	42.81	7.02	140.48	42.82	16.7970 -169.5407
-11.00	354.77	191.11	5.66	-1.76	7.24	44.74	7.45	146.82	44.75	16.8007 -169.5419
-10.00	354.65	191.12	5.96	-1.71	7.58	46.45	7.77	152.42	46.46	16.8037 -169.5414
-9.00	354.59	191.14	6.25	-1.73	7.95	48.32	8.13	158.54	48.32	16.8071 -169.5413
-8.00	354.54	191.15	6.53	-1.77	8.32	50.03	8.53	164.18	50.04	16.8104 -169.5420
-7.00	354.49	191.15	6.80	-1.76	8.65	51.66	8.82	169.53	51.67	16.8134 -169.5417
-6.00	354.45	191.18	7.11	-1.84	9.05	53.56	9.24	175.73	53.56	16.8170 -169.5427
-5.00	354.42	191.22	7.39	-2.00	9.43	55.27	9.64	181.37	55.28	16.8204 -169.5441
-4.00	354.40	191.24	7.67	-2.07	9.80	56.97	10.02	186.94	56.98	16.8237 -169.5448
-3.00	354.39	191.26	7.97	-2.12	10.19	58.79	10.40	192.93	58.80	16.8272 -169.5452
-2.00	354.38	191.26	8.25	-2.04	10.52	60.47	10.71	198.43	60.48	16.8302 -169.5444
-1.00	354.39	191.27	8.52	-2.07	10.87	62.11	11.06	203.81	62.12	16.8333 -169.5447
0.	354.39	191.30	8.81	-2.16	11.26	63.88	11.46	209.62	63.89	16.8368 -169.5455
1.00	354.40	191.31	9.08	-2.14	11.60	65.51	11.80	214.96	65.52	16.8398 -169.5454
2.00	354.42	191.34	9.36	-2.26	11.99	67.21	12.20	220.55	67.22	16.8433 -169.5465
3.00	354.45	191.37	9.63	-2.41	12.36	68.84	12.59	225.89	68.85	16.8466 -169.5479
4.00	354.48	191.39	9.90	-2.43	12.71	70.47	12.95	231.24	70.48	16.8498 -169.5481
5.00	354.53	191.41	10.20	-2.51	13.11	72.25	13.35	237.08	72.26	16.8533 -169.5488
6.00	354.57	191.41	10.44	-2.48	13.41	73.71	13.64	241.87	73.72	16.8560 -169.5485
7.00	354.63	191.44	10.75	-2.53	13.85	75.63	14.08	248.19	75.65	16.8600 -169.5489
8.00	354.68	191.45	11.02	-2.56	14.20	77.21	14.43	253.39	77.23	16 8631 -169.5492
9.00	354.75	191.48	11.30	-2.66	14.60	78.92	14.84	258.99	78.94	16 8666 -169.5501
10.00	354.82	191.52	11.54	-2.86	14.96	80.41	15.23	263.88	80.43	16.8698 -169.5520
11.00	354.89	191.53	11.80	-2.84	15.31	81.97	15.57	269.00	81.99	16.8729 -169.5518
12.00	354.97	191.56	12.08	-2.91	15.70	83.66	15.97	274.53	83.68	16.8764 -169.5525
13.00	355.06	191.58	12.33	-2.97	16.04	85.16	16.31	279.46	85.18	16.8795 -169.5530
14.00	355.15	191.60	12.57	-3.05	16.39	86.65	16.67	284.34	86.67	16.8825 -169.5537
15.00	355.25	191.61	12.83	-3.02	16.74	88.20	17.01	289.44	88.22	16.8856 -169.5535
16.00	355.35	191.65	13.14	-3.19	17.22	90.08	17.51	295.63	90.11	16.8899 -169.5550
17.00	355.46	191.66	13.41	-3.22	17.63	91.13	17.72	299.08	91.16	16.8918 -169.5553
18.00	355.56	191.69	13.64	-3.33	17.94	93.11	18.25	305.56	93.13	16.8963 -169.5563
19.00	355.68	191.72	13.91	-3.43	18.35	94.74	18.67	310.92	94.77	16.8999 -169.5572
20.00	355.80	191.74	14.13	-3.50	18.66	96.10	18.99	315.38	96.13	16.9027 -169.5578
21.00	355.92	191.75	14.38	-3.69	19.02	97.63	19.34	320.39	97.66	16.9059 -169.5578
22.00	356.01	191.66	14.64	-2.88	19.42	99.19	19.53	325.52	99.22	16.9085 -169.5522
23.00	356.04	191.29	14.67	-0.66	18.89	99.36	18.93	326.07	99.39	16.9047 -169.5316

(E3.2,9F10.2,2F10.4)

0 2 100.00 -10000.00 280.00 3.00 1.00

16.7350 -169.5255 3.3000 20926428.00 20955968.50

19.9100 -168.9080 40.0000 998700.00 1002300.00

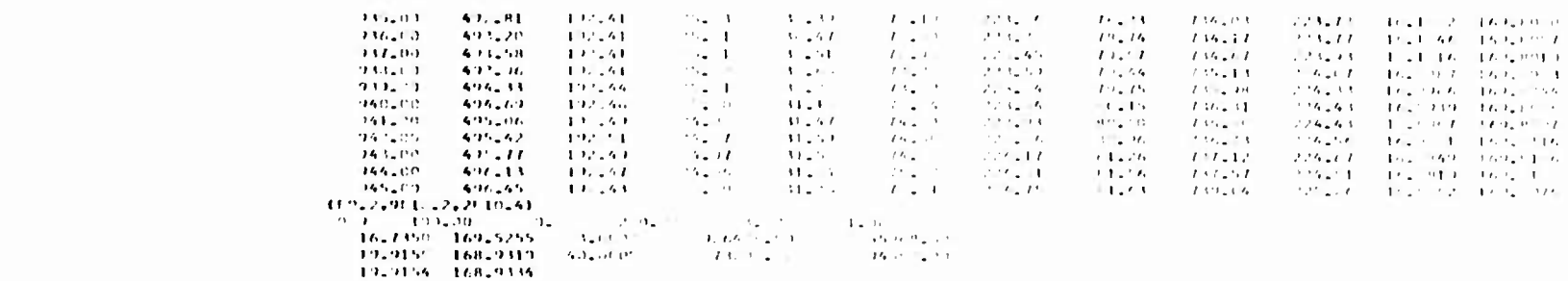
13.9101 -168.9085

Probe No. 4; lift-off time: H+710 seconds; and project No. 6.13

Raw data referenced to the ship				Quantities have been translated to the launcher position							
Time, sec	Range, km	Azimuth, deg T	Elevation, deg Geod.	x, km distance east	y, km distance north	z at launcher	$\sqrt{x^2 + y^2}$, km	Height above earth, kft	Height above earth, km	Latitude of target, deg	Longitude of target, deg

[illegible]	391.65	191.00	12.54	[illegible]	[illegible]	99.16	21.57	311.32	95.07	16.5703	169.6052
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.72	317.87	96.89	16.5667	[illegible]
[illegible]	393.23	190.91	12.76	-.12	1.57	2.27	21.12	322.51	98.33	16.5633	169.6010
[illegible]	393.96	190.84	12.88	-.22	-13.74	99.93	21.46	327.97	99.96	16.5606	-169.6022
[illegible]	394.76	190.76	13.10	-.40	[illegible]	101.67	21.96	333.02	101.50	16.5577	169.[illegible]
[illegible]	395.56	190.96	13.43	-.48	-2.96	103.10	22.17	337.38	103.14	16.5549	169.6056
[illegible]	396.33	190.96	13.67	-.78	-[illegible]	104.49	22.59	342.35	104.53	16.5517	169.6064
[illegible]	397.12	190.98	13.76	-.96	-11.13	10[illegible].88	23.00	347.50	105.92	16.5484	169.6073
790.00	397.91	191.00	13.93	-.91	-21.53	107.12	23.41	352.26	107.47	16.5455	169.[illegible]
791.00	398.69	191.00	14.03	-1.06	-31.92	108.65	23.83	356.68	108.63	16.5420	169.[illegible]
[illegible]	399.43	191.02	14.[illegible]	-1.63	[illegible]	110.11	24.20	361.39	110.15	16.5388	-169.[illegible]
793.00	400.28	191.01	14.63	-1.63	-42.[illegible]	111.73	24.50	366.22	111.78	16.5361	169.[illegible]
795.00	401.07	191.02	14.67	-1.57	-52.[illegible]	113.29	24.86	371.55	113.25	16.5331	169.6136
795.00	401.86	191.02	14.[illegible]	-1.60	-[illegible]	114.65	25.23	376.31	114.70	16.5301	169.6156
796.00	402.67	191.07	14.[illegible]	[illegible]	-73.[illegible]	116.01	25.63	380.79	116.07	16.5271	169.[illegible]
797.00	403.47	191.07	14.[illegible]	[illegible]	-83.[illegible]	117.56	26.03	385.81	117.60	16.5244	169.[illegible]
798.00	404.27	191.09	14.[illegible]	[illegible]	-[illegible]	118.94	26.42	390.39	118.99	16.5214	169.[illegible]
799.00	405.07	191.11	14.[illegible]	[illegible]	-104.65	120.33	26.81	394.88	120.36	16.5183	-169.[illegible]
800.00	405.86	191.10	14.71	-1.[illegible]	-[illegible]	121.70	27.16	399.45	121.75	16.5152	169.[illegible]
801.00	406.66	191.11	14.[illegible]	[illegible]	-[illegible]	123.07	27.53	403.35	123.13	16.5120	169.[illegible]
802.00	407.46	191.11	16.[illegible]	[illegible]	-[illegible]	124.31	27.92	408.26	124.44	16.5088	-169.[illegible]
803.00	408.26	191.10	16.18	-1.[illegible]	-[illegible]	125.62	28.31	412.34	125.68	16.5051	-169.[illegible]
804.00	409.06	191.11	16.34	[illegible]	-[illegible]	126.92	28.71	416.61	126.98	16.5019	-169.[illegible]
805.00	409.86	191.13	16.49	-11.13	-[illegible]	128.24	29.10	420.96	128.31	16.4989	-169.6277
806.00	410.66	191.15	16.[illegible]	-11.[illegible]	-27.[illegible]	129.46	29.53	424.96	129.53	16.4957	-169.6297
807.00	411.46	191.17	16.78	-11.[illegible]	[illegible]	130.71	29.96	429.06	130.78	16.4926	169.[illegible]
808.00	412.26	191.19	16.97	-11.74	-27.[illegible]	132.31	30.23	434.31	132.38	16.4895	-169.6332
809.00	413.06	191.21	17.14	-11.98	-[illegible]	133.72	30.59	438.94	133.79	16.4860	-169.6354
810.00	413.86	191.21	17.30	-12.02	-[illegible]	135.04	30.94	443.28	135.11	16.4849	-169.6357
811.00	414.66	191.20	17.45	-12.[illegible]	[illegible]	136.39	31.26	447.74	136.47	16.4819	-169.6358
812.00	415.46	191.20	17.60	-12.[illegible]	-[illegible]	137.68	31.63	451.96	137.76	16.4788	-169.6364
813.00	416.25	191.21	17.74	-12.[illegible]	-[illegible]	138.89	32.03	456.91	138.96	16.4755	-169.6377
814.00	417.04	191.24	17.[illegible]	-12.[illegible]	-[illegible]	140.01	32.47	459.69	140.11	16.4724	-169.[illegible]
815.00	417.84	191.25	18.01	-12.63	-[illegible]	141.33	32.82	463.95	141.41	16.4695	169.[illegible]
816.00	418.64	191.27	18.15	-12.89	-[illegible]	142.52	33.24	467.87	142.61	16.4665	-169.6436
817.00	419.43	191.29	18.[illegible]	-13.[illegible]	-[illegible]	143.77	33.62	471.97	143.86	16.4636	-169.[illegible]
818.00	420.22	191.26	18.42	-13.[illegible]	-[illegible]	144.99	33.95	476.00	145.08	16.4603	-169.6446
819.00	421.01	191.27	18.[illegible]	-13.12	-[illegible]	146.06	34.37	479.51	146.16	16.4567	-169.6456
820.00	421.81	191.26	18.76	-13.16	-[illegible]	147.19	34.76	483.23	147.29	16.4532	-169.6460
821.00	422.59	191.31	18.[illegible]	-13.[illegible]	-[illegible]	148.41	35.17	487.24	148.51	16.4507	-169.6491
822.00	423.38	191.33	18.[illegible]	-13.[illegible]	-[illegible]	149.67	35.54	491.37	149.77	16.4482	-169.6517
823.00	424.17	191.35	19.[illegible]	-13.[illegible]	-[illegible]	151.01	35.86	495.78	151.11	16.4458	-169.[illegible]
824.00	424.96	191.33	19.21	-13.[illegible]	-[illegible]	152.12	36.22	499.42	152.22	16.4422	-169.6529
825.00	425.74	191.33	19.31	-14.[illegible]	-[illegible]	153.16	36.63	502.82	153.26	16.4387	-169.[illegible]
826.00	426.52	191.34	19.45	-14.[illegible]	-[illegible]	154.39	36.97	506.88	154.50	16.4360	-169.6544
827.00	427.30	191.37	19.[illegible]	-14.42	-[illegible]	155.49	37.40	510.49	155.60	16.4331	-169.6571
828.00	428.08	191.39	19.68	-14.63	-[illegible]	156.53	37.80	514.10	156.70	16.4302	-169.6592
829.00	428.86	191.41	19.78	-14.81	-[illegible]	157.59	38.23	517.41	157.71	16.4268	-169.6609
830.00	429.63	191.40	19.[illegible]	-14.86	-[illegible]	158.65	38.60	520.89	158.77	16.4234	-169.6613
831.00	430.41	191.41	20.00	-15.08	-[illegible]	159.66	39.01	524.22	159.78	16.4200	-169.6623
832.00	431.18	191.41	20.13	-15.06	-[illegible]	160.87	39.33	528.17	160.99	16.4173	-169.6630

884.00	467.39	191.93	24.13	-22.75	-54.41	204.75	58.98	672.62	205.01	16.2618	-169.7317
885.00	467.99	191.94	24.18	-22.86	-54.75	205.38	59.33	674.71	205.65	16.2590	-169.7327
886.00	468.59	191.94	24.21	-22.99	-55.17	205.84	59.77	676.21	206.11	16.2553	-169.7339
887.00	469.19	191.97	24.23	-23.29	-55.56	206.28	60.24	677.67	206.56	16.2519	-169.7350
888.00	469.78	191.96	24.26	-23.34	-55.96	206.78	60.64	679.44	207.06	16.2484	-169.7370
889.00	470.36	191.98	24.31	-23.55	-56.28	207.48	61.01	681.31	207.66	16.2457	-169.7389
890.00	470.95	191.99	24.46	-23.65	-56.58	208.03	61.33	683.47	208.32	16.2431	-169.7397
891.00	471.53	192.00	24.41	-23.83	-56.86	208.70	61.65	685.66	208.99	16.2408	-169.7414
892.00	472.10	192.02	24.45	-24.02	-57.19	209.24	62.03	687.43	209.53	16.2379	-169.7430
893.00	472.67	192.03	24.48	-24.19	-57.57	209.69	62.45	688.95	209.99	16.2347	-169.7446
894.00	473.24	192.02	24.52	-24.15	-57.91	210.26	62.76	690.80	210.56	16.2316	-169.7462
895.00	473.80	192.03	24.56	-24.35	-58.24	210.80	63.13	692.60	211.10	16.2289	-169.7460
896.00	474.36	192.04	24.60	-24.49	-58.57	211.34	63.49	694.39	211.65	16.2260	-169.7472
897.00	474.92	192.07	24.62	-24.78	-58.91	211.79	63.91	695.86	212.10	16.2231	-169.7498
898.00	475.47	192.06	24.65	-24.80	-59.28	212.27	64.26	697.45	212.58	16.2199	-169.7500
899.00	476.01	192.07	24.67	-24.92	-59.68	212.66	64.67	698.75	212.98	16.2165	-169.7511
900.00	476.56	192.07	24.70	-25.01	-60.03	213.14	65.03	700.36	213.46	16.2135	-169.7519
901.00	477.09	192.10	24.72	-25.31	-60.37	213.52	65.47	701.61	213.85	16.2105	-169.7546
902.00	477.63	192.13	24.76	-25.63	-60.63	214.07	65.83	703.41	214.40	16.2083	-169.7574
903.00	478.16	192.14	24.78	-25.78	-60.98	214.51	66.20	704.86	214.84	16.2053	-169.7587
904.00	478.68	192.13	24.83	-25.80	-61.26	215.08	66.47	706.76	215.42	16.2028	-169.7589
905.00	479.20	192.12	24.84	-25.75	-61.68	215.44	66.84	707.95	215.78	16.1993	-169.7585
906.00	479.72	192.13	24.85	-25.91	-62.08	215.76	67.27	708.99	216.10	16.1958	-169.7599
907.00	480.23	192.15	24.87	-26.21	-62.41	216.12	67.69	710.21	216.47	16.1930	-169.7626
908.00	480.74	192.17	24.88	-26.40	-62.78	216.44	68.10	711.28	216.80	16.1898	-169.7643
909.00	481.24	192.16	24.91	-26.42	-63.12	216.87	68.43	712.69	217.23	16.1867	-169.7645
910.00	481.75	192.18	24.90	-26.65	-63.55	217.06	68.91	713.33	217.42	16.1830	-169.7665
911.00	482.24	192.19	24.92	-26.83	-63.87	217.46	69.27	714.65	217.83	16.1803	-169.7681
912.00	482.73	192.21	24.92	-27.07	-64.26	217.68	69.73	715.40	218.05	16.1769	-169.7703
913.00	483.21	192.21	24.95	-27.12	-64.56	218.14	70.03	716.91	218.51	16.1743	-169.7707
914.00	483.70	192.22	24.97	-27.23	-64.90	218.51	70.38	718.13	218.89	16.1714	-169.7717
915.00	484.18	192.22	25.00	-27.17	-65.19	218.94	70.70	719.57	219.33	16.1689	-169.7729
916.00	484.65	192.24	25.01	-27.56	-65.53	219.24	71.09	720.57	219.63	16.1659	-169.7746
917.00	485.12	192.23	25.02	-27.59	-65.90	219.56	71.44	721.62	219.95	16.1627	-169.7748
918.00	485.59	192.26	25.04	-27.86	-66.19	219.90	71.82	722.76	220.30	16.1602	-169.7773
919.00	486.04	192.27	25.04	-28.01	-66.57	220.13	72.22	723.51	220.53	16.1570	-169.7786
920.00	486.50	192.28	25.04	-28.20	-66.92	220.37	72.62	724.32	220.77	16.1539	-169.7803
921.00	486.95	192.30	25.05	-28.40	-67.25	220.64	73.00	725.23	221.05	16.1510	-169.7821
922.00	487.40	192.30	25.05	-28.48	-67.65	220.84	73.40	725.90	221.25	16.1476	-169.7829
923.00	487.84	192.30	25.06	-28.57	-67.97	221.15	73.73	726.92	221.57	16.1448	-169.7837
924.00	488.28	192.29	25.06	-28.60	-68.39	221.30	74.13	727.43	221.72	16.1412	-169.7839
925.00	488.71	192.31	25.05	-28.86	-68.74	221.49	74.54	728.08	221.92	16.1382	-169.7861
926.00	489.14	192.33	25.05	-29.08	-69.07	221.70	74.95	728.76	222.13	16.1353	-169.7882
927.00	489.57	192.36	25.07	-29.35	-69.33	222.02	75.29	729.83	222.45	16.1331	-169.7907
928.00	489.99	192.36	25.09	-29.42	-69.62	222.36	75.58	730.96	222.80	16.1306	-169.7913
929.00	490.41	192.34	25.09	-29.32	-70.04	222.53	75.93	731.54	222.97	16.1269	-169.7904
930.00	490.82	192.35	25.08	-29.53	-70.39	222.66	76.34	731.96	223.10	16.1238	-169.7923
931.00	491.23	192.36	25.08	-29.63	-70.74	222.86	76.69	732.64	223.31	16.1208	-169.7932
932.00	491.63	192.37	25.07	-29.79	-71.09	223.01	77.08	733.13	223.46	16.1178	-169.7945
933.00	492.02	192.39	25.09	-30.04	-71.33	223.30	77.40	734.12	223.76	16.1157	-169.7968
934.00	492.42	192.42	25.06	-30.34	-71.74	223.28	77.89	734.07	223.74	16.1122	-169.7995



Probe No. 5; lift-off time: H+1200 seconds; and project No. 6.2

Raw data referenced to the ship				Quantities have been translated to the launcher position							
Time, sec	Range, km	Azimuth, deg T	Elevation, deg Geod.	x, km distance east	y, km distance north	z at launcher	$\sqrt{x^2 + y^2}$, km	Height above earth, kft	Height above earth, km	Latitude of target, deg	Longitude of target, deg

1292.00	343.60	188.21	12.63	14.44	24.91	83.81	28.79	275.17	83.87	16.9585 -169.3917
1293.00	343.22	188.19	13.25	14.73	26.28	87.26	30.13	286.54	87.34	16.9707 -169.3890
1294.00	342.84	188.17	13.61	15.04	27.25	89.26	31.12	293.11	89.34	16.9792 -169.3864
1295.00	342.47	188.10	13.99	15.53	28.21	91.32	32.20	299.88	91.40	16.9877 -169.3818
1296.00	342.08	188.03	14.37	16.10	29.19	93.37	33.33	306.60	93.45	16.9964 -169.3765
1297.00	341.68	187.94	14.75	16.76	30.16	95.37	34.51	313.19	95.46	17.0051 -169.3706
1298.00	341.29	187.83	15.14	17.52	31.17	97.47	35.76	320.12	97.57	17.0140 -169.3614
1299.00	340.90	187.76	15.56	18.09	32.28	99.74	37.00	327.58	99.85	17.0238 -169.3581
1300.00	340.51	187.71	16.00	18.52	33.45	102.05	38.23	335.19	102.17	17.0341 -169.3541
1301.00	340.12	187.64	16.46	19.13	34.67	104.54	39.60	343.17	104.66	17.0448 -169.3487
1302.00	339.75	187.54	16.92	19.83	35.86	106.97	40.98	351.17	107.10	17.0554 -169.3423
1303.00	339.38	187.46	17.41	20.46	37.15	109.56	42.41	359.91	109.70	17.0667 -169.3365
1304.00	339.03	187.38	17.92	21.09	38.48	112.24	43.88	368.75	112.39	17.0785 -169.3308
1305.00	338.69	187.27	18.42	21.89	39.77	114.88	45.41	377.43	115.04	17.0900 -169.3235
1306.00	338.37	187.18	18.95	22.56	41.19	117.66	46.96	386.58	117.83	17.1022 -169.3174
1307.00	338.07	187.08	19.50	23.30	42.62	120.54	48.57	396.09	120.73	17.1148 -169.3107
1308.00	337.80	186.99	20.05	24.03	44.07	123.44	50.19	405.63	123.64	17.1275 -169.3040
1309.00	337.56	186.90	20.63	24.72	45.59	126.48	51.86	415.64	126.69	17.1409 -169.2977
1310.00	337.34	186.81	21.16	25.35	46.99	129.22	53.39	424.67	129.44	17.1532 -169.2921
1311.00	337.16	186.72	21.72	26.05	48.65	132.10	55.01	434.18	132.34	17.1659 -169.2856
1312.00	337.00	186.59	22.24	26.92	49.82	134.83	56.63	443.15	135.07	17.1779 -169.2778
1313.00	336.86	186.47	22.80	27.73	51.29	137.74	58.31	452.76	138.00	17.1908 -169.2704
1314.00	336.76	186.36	[illegible]	28.49	52.73	140.55	59.93	462.03	140.83	17.2033 -169.2635
1315.00	336.68	186.2[illegible]	[illegible]	29.16	54.11	143.25	61.47	470.95	143.55	17.2154 -169.2574
1316.00	336.63	186.		29.87	55.57	146.09	63.09	480.30	146.40	17.2281 -169.2510
1317.00	336.61	186		30.57	57.05	148.92	64.69	489.64	149.24	17.2409 -169.2451
1318.00	336.61	185		31.26	58.42	151.59	66.26	498.45	151.93	17.2529 -169.2384
1319.00	336.64	185.		32.02	59.93	154.50	67.95	508.05	154.86	17.2660 -169.2315
1320.00	336.70	185.[illegible]		32.76	61.40	157.32	69.59	517.38	157.70	17.2788 -169.2248
1321.00	336.78	185.69	[illegible]	33.39	62.83	160.05	71.15	526.39	160.44	17.2912 -169.2192
1322.00	336.89	185.54	[illegible].66	34.12	64.30	162.85	72.79	535.62	163.26	17.3039 -169.2126
1323.00	337.02	185.44	28.20	34.77	65.77	165.63	74.40	544.80	166.06	17.3167 -169.2067
1324.00	337.18	185.30	28.71	35.64	67.15	168.28	76.02	553.57	168.73	17.3286 -169.1989
1325.00	337.37	185.17	29.24	36.48	68.57	171.00	77.67	562.53	171.46	17.3409 -169.1913
1326.00	337.58	185.05	29.76	37.22	70.01	173.71	79.28	571.50	174.19	17.3533 -169.1847
1327.00	337.82	184.95	30.29	37.86	71.45	176.41	80.86	580.43	176.92	17.3658 -169.1789
1328.00	338.07	184.86	30.81	38.43	72.89	179.10	82.40	589.30	179.62	17.3782 -169.1739
1329.00	338.36	184.75	31.31	39.15	74.28	181.70	83.96	597.92	182.25	17.3902 -169.1674
1330.00	338.67	184.62	31.83	39.93	75.73	184.42	85.61	606.90	184.98	17.4027 -169.1603
1331.00	339.00	184.48	32.35	40.75	77.16	187.08	87.26	615.70	187.67	17.4150 -169.1529
1332.00	339.35	184.35	32.87	41.50	78.62	189.78	88.90	624.63	190.39	17.4276 -169.1463
1333.00	339.73	184.23	33.39	42.23	80.11	192.50	90.56	633.64	193.13	17.4404 -169.1397
1334.00	340.13	184.11	33.91	42.94	81.60	195.21	92.20	642.59	195.86	17.4531 -169.1334
1335.00	340.55	183.99	34.40	43.64	82.98	197.77	93.76	651.05	198.44	17.4650 -169.1270
1336.00	340.99	183.87	34.90	44.33	84.42	200.40	95.35	659.77	201.10	17.4774 -169.1210
1337.00	341.46	183.75	35.39	45.03	85.83	202.98	96.92	668.29	203.70	17.4894 -169.1147
1338.00	341.95	183.64	35.89	45.67	87.29	205.61	98.52	677.01	206.35	17.5019 -169.1089
1339.00	342.46	183.51	36.38	46.37	88.71	208.20	100.10	685.57	208.96	17.5141 -169.1027
1340.00	342.99	183.35	36.89	47.27	90.20	210.85	101.83	694.36	211.64	17.5268 -169.0946
1341.00	343.54	183.20	37.37	48.06	91.59	213.39	103.43	702.77	214.21	17.5387 -169.0876
1342.00	344.11	183.07	37.85	48.76	93.01	215.94	105.01	711.22	216.78	17.5508 -169.0814

1343.00	344.70	182.35	[illegible]	47.44	94.42	215.47	106.58	719.62	219.34	17.5629	-169.0751
1344.00	345.31	182.43	58.31	52.03	97.37	221.04	108.17	728.12	221.03	17.5752	-169.0635
1345.00	345.94	182.72	54.93	50.63	97.43	223.63	109.75	736.70	224.55	17.5878	-169.0642
1346.00	346.59	182.58	53.77	51.41	98.59	226.19	111.38	745.19	227.13	17.6002	-169.0579
1347.00	347.26	183.44	50.26	[illegible]	100.42	228.80	113.05	753.85	229.78	17.6131	-169.0516
1348.00	347.94	182.97	50.74	53.00	101.1	231.38	114.78	762.41	232.38	17.6258	-169.0436
1349.00	348.65	182.99	51.13	52.88	103.17	233.83	116.39	770.92	234.86	17.6374	-169.0359
1350.00	349.37	181.98	51.65	56.43	104.60	236.32	117.92	779.79	237.37	17.6495	-169.0310
1351.00	350.12	181.98	52.12	56.93	106.12	238.89	119.52	787.32	239.98	17.6624	-169.0262
1352.00	350.87	181.74	52.57	55.64	107.62	241.34	121.07	795.44	242.45	17.6742	-169.0202
1353.00	351.65	181.55	52.98	56.58	109.25	243.82	122.59	803.81	244.76	17.6866	-169.0120
1354.00	352.44	181.38	53.46	57.36	111.27	246.16	124.29	811.46	247.33	17.6975	-169.0050
1355.00	353.25	181.24	53.98	58.10	111.66	248.58	125.87	819.50	249.78	17.7092	-168.9984
1356.00	354.07	181.09	54.33	59.73	113.19	251.08	127.50	827.80	252.31	17.7219	-168.9936
1357.00	354.91	180.95	54.79	59.60	114.66	253.59	129.13	836.13	254.85	17.7347	-168.9870
1358.00	355.76	180.81	55.25	59.07	116.21	256.13	130.82	844.57	257.43	17.7478	-168.9811
1359.00	356.63	180.54	55.73	60.14	117.62	258.52	132.42	852.53	259.85	17.7597	-168.9743
1360.00	357.52	180.50	56.23	61.31	118.73	260.88	133.94	860.37	262.24	17.7712	-168.9684
1361.00	358.42	180.33	56.53	62.35	120.48	263.33	135.61	868.52	264.73	17.7837	-168.9618
1362.00	359.33	180.18	56.94	62.33	121.81	265.70	137.16	876.39	267.13	17.7955	-168.9559
1363.00	360.23	179.99	57.35	63.75	123.25	268.00	138.76	884.03	269.45	17.8071	-168.9486
1364.00	361.20	179.92	57.76	64.0	124.64	270.38	140.34	891.96	271.87	17.8188	-168.9420
1365.00	362.16	179.63	58.18	64.29	126.11	272.78	142.01	899.94	274.30	17.8311	-168.9351
1366.00	363.13	179.58	58.59	65.04	127.56	275.14	143.58	907.81	276.70	17.8431	-168.9291
1367.00	364.11	179.32	58.98	66.61	128.93	277.46	145.17	915.51	279.05	17.8548	-168.9234
1368.00	365.11	179.18	59.40	67.20	130.41	279.85	146.71	923.47	281.48	17.8673	-168.9182
1369.00	366.12	179.03	59.80	67.81	131.88	282.21	148.29	931.33	283.87	17.8795	-168.9130
1370.00	367.13	178.83	60.23	69.03	133.47	284.65	150.08	939.47	286.35	17.8929	-168.9057
1371.00	368.17	178.64	60.70	69.37	134.99	286.89	151.60	946.93	288.62	17.9060	-168.8992
1372.00	369.20	178.45	61.23	70.14	136.4	289.20	153.24	954.62	290.97	17.9161	-168.8924
1373.00	370.26	178.21	61.87	71.03	137.63	291.46	154.90	962.17	293.27	17.9276	-168.8841
1374.00	371.32	178.03	61.75	71.71	139.17	293.76	156.50	969.83	295.61	17.9397	-168.8780
1375.00	372.40	177.96	62.12	72.43	140.66	296.02	158.04	977.36	297.90	17.9513	-168.8723
1376.00	373.49	177.69	62.47	73.13	141.77	298.20	159.52	984.64	300.12	17.9622	-168.8662
1377.00	374.59	177.55	62.96	73.61	143.76	300.53	161.07	992.38	302.48	17.9747	-168.8620
1378.00	375.70	177.39	63.22	74.20	144.65	302.76	162.57	999.82	304.75	17.9862	-168.8569
1379.00	376.81	177.13	63.59	74.15	146.19	304.99	164.28	1007.29	307.02	17.9982	-168.8485
1380.00	377.94	176.91	63.97	74.75	147.63	307.31	166.02	1015.03	309.38	18.0111	-168.8415
1381.00	379.08	176.72	64.34	75.64	149.11	309.57	167.65	1022.58	311.68	18.0234	-168.8356
1382.00	380.22	176.56	64.73	75.28	150.69	311.90	169.36	1030.35	314.05	18.0366	-168.8299
1383.00	381.38	176.15	65.09	77.04	152.10	314.09	170.91	1037.68	316.29	18.0483	-168.8241
1384.00	382.54	176.13	65.40	78.10	153.53	316.22	172.31	1044.78	318.45	18.0591	-168.8193
1385.00	383.70	175.96	65.74	77.22	154.98	318.39	173.92	1052.03	320.66	18.0707	-168.8125
1386.00	384.89	175.76	66.09	77.95	156.24	320.59	175.51	1059.39	322.90	18.0827	-168.8066
1387.00	386.08	175.47	66.42	80.17	157.61	322.72	177.19	1066.51	325.07	18.0940	-168.7976
1388.00	387.27	175.27	66.75	81.63	158.99	324.86	178.72	1073.66	327.25	18.1055	-168.7919
1389.00	388.47	175.10	67.09	82.16	160.46	327.05	180.27	1081.00	329.49	18.1176	-168.7874
1390.00	389.68	174.90	67.42	83.73	161.87	329.20	181.81	1088.17	331.67	18.1293	-168.7819
1391.00	390.89	174.72	67.76	83.34	163.26	331.39	183.39	1095.49	333.91	18.1417	-168.7771
1392.00	392.12	174.45	68.06	84.22	164.66	333.44	184.94	1102.37	336.00	18.1524	-168.7694
1393.00	393.35	174.19	68.40	84.96	166.19	335.61	186.68	1109.63	338.22	18.1650	-168.7621

1396.00	394.59	173.98	64.74	8[illegible]	167.72	337.50	188.33	1116.96	340.45	18.1778	-168.7569
1395.00	395.06	173.72	64.[illegible]	8[illegible]	1[illegible]	337.90	189.99	1124.02	342.60	18.1996	-168.7496
1396.00	397.09	173.45	64.[illegible]	87.[illegible]	17[illegible]	338.00	191.66	1131.06	344.75	18.2216	-168.74[illegible]
1397.00	398.36	173.27	64.67	87.[illegible]	171.[illegible]	338.08	193.30	1138.02	346.87	18.2430	-168.7393
1398.00	399.60	173.06	64.57	8[illegible]	173.[illegible]	338.14	194.60	1144.91	348.97	18.2643	-168.7319
1399.00	400.87	172.82	64.[illegible]	88.12	174.[illegible]	338.23	196.22	1151.93	351.11	18.2862	-168.7[illegible]
1400.00	402.14	172.56	64.[illegible]	88.[illegible]	176.[illegible]	338.28	197.80	1158.81	353.26	18.3078	-168.7[illegible]
1401.00	403.41	172.35	64.[illegible]	89.[illegible]	177.[illegible]	338.36	199.34	1165.75	355.32	18.3296	-168.7[illegible]
1402.00	404.70	172.07	64.17	89.32	179.[illegible]	338.48	200.94	1172.55	357.39	18.3511	-168.7086
1403.00	405.98	171.81	64.05	89.96	180.[illegible]	338.59	202.49	1179.28	359.45	18.3723	-168.7012
1404.00	407.27	171.56	63.94	90.60	181.32	338.61	204.09	1186.06	361.51	18.3939	-168.6936
1405.00	408.57	171.35	63.82	91.24	183.21	338.61	205.67	1192.80	363.57	18.4154	-168.6861
1406.00	409.87	171.11	63.71	91.[illegible]	184.77	338.50	207.32	1199.80	365.70	18.4367	-168.6861
1407.00	411.19	170.77	63.62	92.71	186.29	338.55	208.97	1206.68	367.80	18.4576	-168.6786
1408.00	412.48	170.46	63.51	93.[illegible]	187.[illegible]	338.57	210.[illegible]	1213.51	369.88	18.4783	-168.6708
1409.00	413.79	170.22	63.43	94.11	189.23	338.57	212.24	1220.22	371.92	18.4988	-168.6633
1410.00	415.11	170.02	63.36	94.[illegible]	190.[illegible]	338.54	213.63	1226.81	373.93	18.5187	-168.6559
1411.00	416.43	169.70	63.21	95.60	191.91	338.46	215.21	1233.29	375.91	18.5388	-168.6482
1412.00	417.75	169.39	63.[illegible]	96.[illegible]	193.26	338.38	216.78	1239.76	377.88	18.5589	-168.6402
1413.00	419.08	169.07	63.[illegible]	96.[illegible]	194.76	338.36	218.48	1246.41	379.91	18.5801	-168.6412
1414.00	420.41	168.76	62.90	97.[illegible]	196.[illegible]	338.23	220.07	1252.91	381.89	18.6116	-168.[illegible]46
1415.00	421.74	168.47	62.76	98.43	197.[illegible]	338.24	221.67	1259.47	383.89	18.6235	-168.6382
1416.00	423.07	168.15	62.[illegible]	99.[illegible]	199.30	338.33	223.10	1265.96	385.87	18.6446	-168.6243
1417.00	424.41	167.77	62.[illegible]	100.56	200.[illegible]	338.05	224.57	1272.30	387.80	18.6654	-168.6194
1418.00	425.75	167.66	62.[illegible]	101.[illegible]	202.[illegible]	337.97	226.15	1278.76	389.77	18.6871	-168.6134
1419.00	427.09	167.32	62.78	102.[illegible]	203.[illegible]	337.92	227.90	1285.35	391.78	18.7089	-168.6067
1420.00	428.43	166.96	62.63	103.[illegible]	204.91	338.83	229.62	1291.81	393.75	18.7303	-168.5996
1421.00	429.78	166.62	62.47	104.[illegible]	206.[illegible]	491.71	231.23	1298.15	395.68	18.7519	-168.5931
1422.00	431.13	166.33	62.49	105.[illegible]	207.[illegible]	339.56	232.71	1304.32	397.56	18.7045	-168.5869
1423.00	432.48	166.01	62.74	105.[illegible]	208.[illegible]	339.43	234.27	1310.70	399.50	18.7163	-168.5819
1424.00	433.83	165.73	62.[illegible]	107.[illegible]	210.[illegible]	339.31	235.79	1317.04	401.43	18.7379	-168.5771
1425.00	435.18	165.45	62.22	108.[illegible]	211.[illegible]	339.18	237.27	1323.33	403.35	18.7594	-168.5721
1426.00	436.53	165.11	62.45	107.[illegible]	213.[illegible]	401.02	238.86	1329.53	405.24	18.7809	-168.5667
1427.00	437.89	164.68	62.65	110.[illegible]	214.56	402.79	240.49	1335.55	407.08	18.8018	-168.5584
1428.00	439.25	164.30	62.87	111.[illegible]	215.91	404.58	242.05	1341.59	408.92	18.8227	-168.5514
1429.00	440.61	163.96	63.[illegible]	112.[illegible]	217.35	406.41	243.63	1347.79	410.81	18.8444	-168.5458
1430.00	441.97	163.63	63.32	113.[illegible]	218.81	408.25	245.21	1353.99	412.70	18.8663	-168.5407
1431.00	443.33	163.31	63.57	114.[illegible]	220.41	410.13	246.87	1360.35	414.63	18.8094	-168.5362
1432.00	444.68	162.93	63.77	115.[illegible]	221.75	411.88	248.41	1366.28	416.44	18.8202	-168.5296
1433.00	446.04	162.53	63.99	117.[illegible]	223.20	411.66	250.04	1372.33	418.29	18.8320	-168.5231
1434.00	447.41	162.07	64.20	118.[illegible]	224.69	415.44	251.79	1378.35	420.12	18.8441	-168.5151
1435.00	448.77	161.67	64.40	119.[illegible]	226.11	417.19	253.39	1384.31	421.94	18.8556	-168.5087
1436.00	450.13	161.32	64.62	119.[illegible]	227.54	418.99	254.85	1390.39	423.79	18.8673	-168.5035
1437.00	451.49	161.02	64.83	119.[illegible]	228.32	420.76	256.27	1396.37	425.61	18.8785	-168.5019
1438.00	452.86	160.74	65.02	119.[illegible]	230.23	422.49	257.70	1402.20	427.39	18.8890	-168.4968
1439.00	454.22	160.23	65.[illegible]	116.81	231.63	424.17	259.42	1407.94	429.14	18.7004	-168.4879
1440.00	455.58	159.79	65.29	117.61	232.98	425.86	260.98	1413.68	430.89	18.7113	-168.4810
1441.00	456.94	159.35	65.53	118.34	234.39	427.57	262.59	1419.47	432.65	18.7227	-168.4744
1442.00	458.30	158.98	65.78	119.02	235.86	429.41	264.14	1425.17	434.45	18.7346	-168.4698
1443.00	459.66	158.59	65.96	119.[illegible]	237.16	431.28	265.59	1431.05	436.19	18.7451	-168.4643
1444.00	461.02	158.17	66.16	120.[illegible]	238.65	432.70	267.20	1436.89	437.96	18.7572	-168.4589

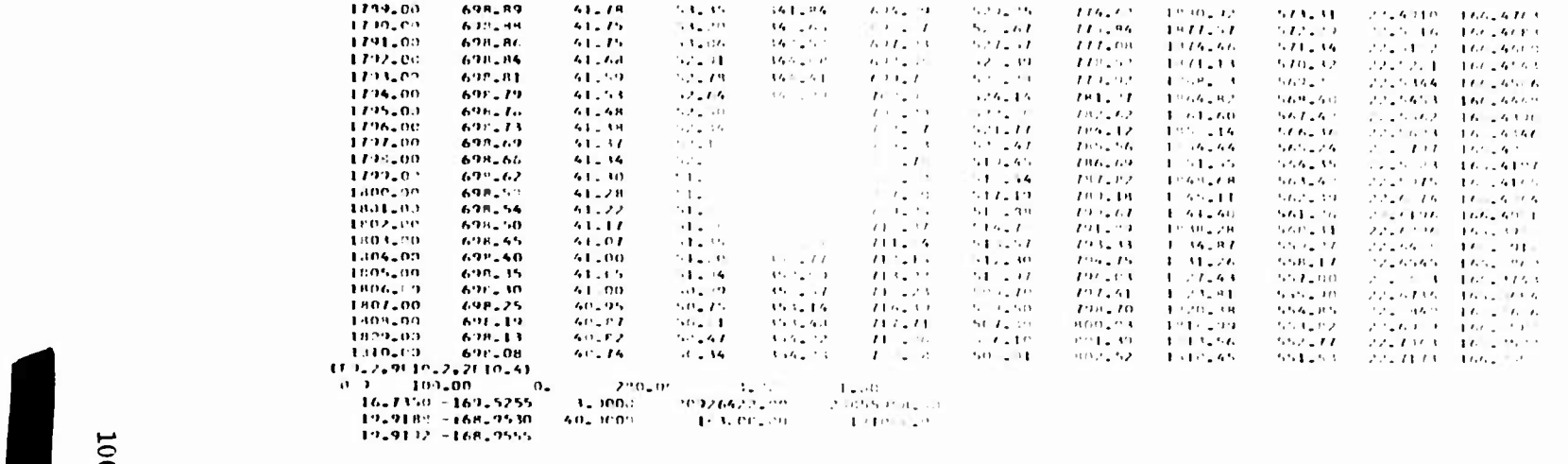
1445.00	462.48	157.[illegible]	71.[illegible]	121.07	240.13	436.39	268.98	1442.65	439.72	18.7697	-168.4513
1446.00	463.75	157.12	71.52	121.38	241.66	438.05	270.69	1448.31	441.44	18.7816	-168.4414
1447.00	465.11	156.84	71.72	121.24	243.23	437.76	272.04	1454.10	443.21	18.7927	-168.4313
1448.00	466.46	156.46	71.91	121.73	244.47	437.44	273.54	1459.82	444.96	18.8063	-168.4172
1449.00	467.82	155.94	72.[illegible]	123.65	245.72	441.02	275.08	1465.21	446.60	18.8144	-168.4052
1450.00	469.18	155.33	72.22	124.56	247.17	442.64	276.78	1470.73	448.28	18.8261	-168.4211
1451.00	470.53	154.84	72.37	125.43	248.56	444.23	278.45	1476.18	449.94	18.8373	-168.4132
1452.00	471.89	154.40	72.55	126.24	250.[illegible]	445.89	279.99	1481.80	451.65	18.8491	-168.4086
1453.00	473.24	154.08	72.72	126.96	251.34	447.53	281.31	1487.38	453.35	18.8597	-168.4041
1454.00	474.59	153.55	72.[illegible]	127.16	252.55	449.21	282.66	1492.41	454.89	18.8677	-168.3975
1455.00	475.94	153.23	73.05	127.42	254.[illegible]	450.76	284.22	1498.14	456.69	18.8816	-168.3920
1456.00	477.29	152.52	73.20	127.[illegible]	255.43	452.31	286.15	1503.69	458.33	18.8943	-168.3868
1457.00	478.64	151.90	73.36	127.53	256.[illegible]	453.88	287.96	1509.11	459.98	18.9068	-168.3787
1458.00	479.98	151.23	73.50	13[illegible].44	258.63	455.43	289.66	1514.60	461.59	18.9185	-168.3709
1459.00	481.32	150.70	73.65	130.86	259.21	457.00	290.99	1519.76	463.22	18.9288	-168.3643
1460.00	482.67	150.51	73.[illegible]	131.24	261.33	458.59	292.34	1525.14	464.86	18.9394	-168.3642
1461.00	484.01	150.18	73.99	131.37	262.68	460.23	293.70	1530.71	466.56	18.9511	-168.3632
1462.00	485.35	149.80	74.13	131.73	263.53	461.76	294.92	1535.30	468.14	18.9603	-168.3537
1463.00	486.68	149.00	74.24	133.09	265.35	463.22	296.86	1540.05	469.68	18.9726	-168.3491
1464.00	488.02	148.38	74.38	133.90	266.96	464.74	298.57	1546.19	471.28	18.9847	-168.3414
1465.00	489.35	147.68	74.[illegible]	134.93	268.33	466.21	300.35	1551.26	472.83	18.9966	-168.3376
1466.00	490.68	147.09	74.73	135.69	269.76	467.71	301.96	1556.41	474.39	19.0081	-168.3300
1467.00	492.01	146.54	74.[illegible]	136.24	271.31	469.24	303.59	1561.68	476.00	19.0205	-168.3213
1468.00	493.34	146.11	74.92	136.63	272.56	470.76	304.89	1566.83	477.57	19.0305	-168.3181
1469.00	494.66	145.58	75.05	137.22	273.99	472.23	306.34	1571.88	479.11	19.0412	-168.3130
1470.00	495.98	145.01	75.18	137.84	275.31	473.72	307.89	1576.99	480.67	19.0526	-168.3078
1471.00	497.30	144.46	75.30	138.43	276.64	475.19	309.37	1582.02	482.20	19.0636	-168.3027
1472.00	498.62	143.84	75.40	139.24	277.77	476.61	310.89	1586.91	483.69	19.0739	-168.2957
1473.00	499.94	143.24	75.[illegible]	139.92	279.35	478.04	312.43	1591.87	485.20	19.0850	-168.2899
1474.00	501.25	142.57	75.[illegible]	140.78	280.74	479.46	314.06	1596.72	486.68	19.0962	-168.2825
1475.00	502.56	141.91	75.73	141.[illegible]	282.21	480.89	315.71	1601.66	488.19	19.1080	-168.2762
1476.00	503.86	141.25	75.[illegible]	142.21	283.73	482.33	317.37	1606.61	489.70	19.1202	-168.2702
1477.00	505.16	140.60	75.[illegible]	143.06	285.25	483.76	319.02	1611.56	491.21	19.1324	-168.2647
1478.00	506.47	140.10	77.10	144.17	286.63	485.22	320.40	1616.57	492.73	19.1435	-168.2621
1479.00	507.77	139.49	76.19	144.93	287.[illegible]	486.58	321.79	1621.23	494.15	19.1529	-168.2556
1480.00	509.06	138.76	76.27	144.81	289.24	487.94	323.46	1625.94	495.59	19.1643	-168.2491
1481.00	510.35	138.05	76.36	145.[illegible]	290.65	489.29	325.09	1630.63	497.02	19.1756	-168.2410
1482.00	511.64	137.47	76.45	145.13	291.94	490.67	326.50	1635.38	498.46	19.1859	-168.2362
1483.00	512.93	136.84	76.[illegible]	145.85	293.[illegible]	492.03	327.97	1640.05	499.89	19.1964	-168.2306
1484.00	514.21	136.07	76.63	146.70	294.77	493.37	329.70	1644.72	501.31	19.2086	-168.2233
1485.00	515.49	135.37	76.71	147.45	296.18	494.70	331.30	1649.34	502.72	19.2199	-168.2169
1486.00	516.77	134.59	76.82	148.27	297.73	496.03	332.92	1654.14	504.18	19.2324	-168.2125
1487.00	518.04	134.12	76.91	149.40	299.[illegible]	497.45	334.25	1658.80	505.60	19.2425	-168.2088
1488.00	519.31	133.45	77.01	149.[illegible]	300.47	498.80	335.81	1663.47	507.03	19.2543	-168.2042
1489.00	520.59	132.67	77.[illegible]	150.86	301.87	500.09	337.47	1667.94	508.39	19.2655	-168.1963
1490.[illegible]	521.84	131.95	77.14	151.58	303.28	501.37	339.05	1672.41	509.75	19.2767	-168.1902
1491.00	523.11	131.25	77.21	152.31	304.60	502.66	340.56	1676.89	511.12	19.2873	-168.1839
1492.00	524.37	130.71	77.31	152.52	305.[illegible]	503.02	341.86	1681.57	512.54	19.2980	-168.1823
1493.[illegible]	525.62	130.01	77.37	153.26	307.24	505.28	343.35	1685.93	513.87	19.3083	-168.1759
1494.00	526.87	129.22	77.44	154.03	308.76	506.56	344.05	1690.39	515.23	19.3205	-168.1693
1495.00	528.12	128.47	77.[illegible]	154.71	310.21	507.82	346.65	1694.79	516.57	19.3321	-168.1615

1547.00	567.49	91.48	77.2	133.41	551.35	562.29	425.79	1987.73	575.38	19.8930	-167.8762
1548.00	568.52	90.78	77.78	130.03	552.30	563.11	427.46	1990.50	576.32	19.9114	-167.8903
1549.00	569.54	90.03	77.67	127.58	553.64	563.36	429.27	1993.87	577.25	19.9295	-167.9041
1550.00	570.56	89.34	77.71	125.13	554.75	564.76	430.89	1996.89	578.17	19.9476	-167.9180
1551.00	571.57	88.78	77.62	122.26	555.65	566.47	432.58	1999.57	579.09	19.9658	-167.9316
1552.00	572.57	88.23	77.6	119.44	556.68	567.25	434.91	2002.60	579.85	19.9769	-167.9436
1553.00	573.58	87.74	77.7	117.55	557.80	567.06	436.36	2005.35	580.75	19.9873	-167.9537
1554.00	574.57	87.02	77.56	115.21	558.91	567.84	437.10	2008.27	581.66	19.9988	-167.9649
1555.00	575.57	86.66	77.65	112.66	560.34	568.67	438.51	2011.26	582.55	20.0116	-167.9760
1556.00	576.55	86.03	77.54	110.15	561.69	569.66	439.79	2014.13	583.43	20.0236	-167.9870
1557.00	577.54	85.53	77.56	107.94	562.94	570.22	441.39	2016.95	584.29	20.0373	-167.9980
1558.00	578.52	84.76	77.7	105.65	564.11	570.93	443.14	2019.64	585.11	20.0509	-168.0089
1559.00	579.49	84.23	77.54	103.26	565.23	571.70	444.46	2022.43	585.96	20.0652	-168.0197
1560.00	580.46	83.36	77.13	101.00	566.23	572.65	445.61	2025.13	586.78	20.0813	-168.0303
1561.00	581.42	82.58	77.11	98.85	567.21	573.16	446.89	2027.72	587.57	20.0993	-168.0409
1562.00	582.38	82.03	77.16	96.53	568.11	573.86	448.83	2030.43	588.40	20.0646	-168.0502
1563.00	583.34	81.23	77.10	94.00	569.55	574.58	450.39	2033.11	589.21	20.0771	-168.0590
1564.00	584.29	81.79	76.98	91.73	570.88	575.24	452.08	2035.65	583.99	20.0883	-168.0686
1565.00	585.23	81.13	76.7	89.41	572.16	575.93	453.63	2038.-	590.77	20.0994	-168.0767
1566.00	586.17	80.65	76.62	87.21	573.29	576.64	455.13	2040.89	591.59	20.1108	-168.0884
1567.00	587.11	80.12	76.77	84.44	574.32	577.35	456.65	2043.51	592.38	20.1222	-168.0959
1568.00	588.04	79.65	76.99	82.26	575.44	577.98	458.19	2045.92	593.12	20.1327	-168.1047
1569.00	588.96	79.28	76.8	80.14	576.49	578.61	459.62	2048.28	593.84	20.1419	-168.1131
1570.00	589.88	78.93	76.5	78.04	577.4	579.29	460.84	2050.79	594.60	20.1502	-168.1216
1571.00	590.80	78.69	76.50	76.33	578.24	580.01	461.81	2053.35	595.38	20.1562	-168.1284
1572.00	591.71	78.03	76.65	74.23	579.33	580.68	463.50	2055.92	596.17	20.1699	-168.1353
1573.00	592.62	77.43	76.59	72.27	580.27	581.30	465.33	2058.36	596.91	20.1843	-168.1408
1574.00	593.52	76.82	76.31	70.31	581.27	581.88	467.19	2060.67	597.61	20.1984	-168.1453
1575.00	594.41	76.41	76.20	68.47	582.23	582.39	468.88	2062.69	598.23	20.2093	-168.1500
1576.00	595.30	76.12	76.13	66.76	583.24	583.00	470.13	2064.96	598.92	20.2173	-168.1551
1577.00	596.19	75.71	76.05	65.03	584.22	583.59	471.62	2067.22	599.61	20.2277	-168.1603
1578.00	597.07	75.24	75.99	63.36	585.07	584.21	473.12	2069.60	600.33	20.2391	-168.1657
1579.00	597.95	74.76	75.93	61.51	586.05	585.80	474.69	2071.89	601.03	20.2510	-168.1710
1580.00	598.82	74.47	75.87	59.81	586.95	585.43	475.85	2074.20	601.74	20.2588	-168.1768
1581.00	599.69	74.13	75.80	58.23	587.80	586.07	477.17	2076.43	602.42	20.2679	-168.1830
1582.00	600.55	73.66	75.73	56.59	588.68	586.59	478.72	2078.66	603.10	20.2778	-168.1886
1583.00	601.41	73.33	75.66	55.03	589.53	587.17	480.04	2080.86	603.77	20.2890	-168.1941
1584.00	602.26	72.97	75.58	53.62	590.27	587.68	481.72	2082.89	604.39	20.3013	-168.1991
1585.00	603.10	72.31	75.52	52.00	591.02	588.23	483.47	2085.08	605.05	20.3154	-168.2037
1586.00	603.95	71.93	75.49	50.14	591.90	588.61	485.29	2086.75	605.56	20.3273	-168.2078
1587.00	604.78	71.53	75.41	48.52	592.62	589.10	486.87	2088.74	606.17	20.3387	-168.2129
1588.00	605.62	71.21	75.34	47.44	593.62	589.64	488.22	2090.80	606.80	20.3482	-168.2175
1589.00	606.46	70.90	75.29	46.01	594.71	590.22	489.41	2092.98	607.46	20.3569	-168.2215
1590.00	607.29	70.63	75.10	44.76	595.73	590.71	490.66	2094.87	608.04	20.3646	-168.2260
1591.00	608.08	70.39	75.02	43.43	596.84	591.23	491.98	2096.86	608.66	20.3716	-168.2303
1592.00	608.89	69.91	74.95	42.03	597.91	591.69	493.70	2098.79	609.23	20.3772	-168.2339
1593.00	609.70	69.48	74.89	40.76	598.97	592.22	495.17	2000.86	609.86	20.3829	-168.2378
1594.00	610.50	69.00	74.81	39.73	599.77	592.69	496.89	2002.77	610.45	20.4126	-168.2409
1595.00	611.30	68.69	74.78	38.80	600.77	593.26	498.88	2004.16	610.87	20.4203	-168.2445
1596.00	612.09	68.50	74.61	37.57	601.78	593.59	499.78	2007.11	611.46	20.4310	-168.2478
1597.00	612.88	68.26	74.53	36.39	602.73	593.93	501.08	2007.83	611.99	20.4393	-168.2507

1636.00	659.35	57.88	71.05	247.77	501.14	604.49	558.60	2056.74	626.90	20.8592	-167.3661
1637.00	659.94	57.80	70.96	247.58	501.14	604.66	559.17	2057.61	627.16	20.8664	-167.3590
1638.00	660.52	57.58	70.87	248.14	501.39	604.79	561.22	2058.41	627.40	20.8773	-167.3540
1639.00	661.11	57.38	70.77	248.83	504.72	604.89	562.71	2059.11	627.62	20.8861	-167.3491
1640.00	661.68	57.20	70.68	249.56	505.39	604.99	564.02	2059.94	627.87	20.8976	-167.3432
1641.00	662.26	57.04	70.61	250.24	506.06	605.24	565.18	2060.93	628.17	20.9061	-167.3390
1642.00	662.82	56.90	70.54	250.93	507.36	605.43	566.32	2061.85	628.45	20.9141	-167.3341
1643.00	663.39	56.73	70.47	251.63	508.53	605.62	567.49	2062.79	628.74	20.9229	-167.3302
1644.00	663.94	56.56	70.31	252.04	510.68	605.43	569.49	2063.69	628.71	20.9363	-167.3134
1645.00	664.50	56.29	70.20	252.64	512.32	605.42	571.22	2064.11	628.84	20.9496	-167.3140
1646.00	665.05	56.05	70.09	253.22	513.87	605.43	572.87	2063.58	628.98	20.9623	-167.3081
1647.00	665.59	55.86	69.99	253.82	515.27	605.45	574.40	2064.08	629.13	20.9737	-167.3036
1648.00	666.13	55.68	69.90	254.43	516.59	605.52	575.75	2064.67	629.31	20.9845	-167.2989
1649.00	666.66	55.55	69.79	255.24	517.67	605.52	577.18	2065.05	629.43	20.9952	-167.2907
1650.00	667.22	55.33	69.71	255.60	519.02	605.65	578.55	2065.86	629.68	21.0041	-167.2876
1651.00	667.71	55.18	69.63	256.15	520.14	605.70	579.79	2066.17	629.83	21.0132	-167.2817
1652.00	668.23	54.98	69.52	256.84	521.44	605.63	581.44	2066.59	629.90	21.0254	-167.2764
1653.00	668.75	54.76	69.42	257.34	523.11	605.62	582.98	2066.98	630.02	21.0375	-167.2719
1654.00	669.26	54.62	69.32	257.99	524.26	605.65	584.30	2067.43	630.16	21.0468	-167.2661
1655.00	669.76	54.64	69.22	258.08	524.33	605.66	585.38	2067.70	630.25	21.0522	-167.2565
1656.00	670.26	54.40	69.12	258.53	526.20	605.61	586.99	2068.05	630.34	21.0650	-167.2524
1657.00	670.75	54.29	69.03	260.26	527.59	605.60	588.30	2068.37	630.44	21.0739	-167.2453
1658.00	671.24	54.08	68.92	260.86	529.11	605.61	589.91	2068.53	630.49	21.0803	-167.2406
1659.00	671.73	53.96	68.82	261.48	530.32	605.49	591.28	2068.82	630.58	21.0862	-167.2359
1660.00	672.21	53.74	68.72	261.98	531.73	605.44	592.76	2069.08	630.66	21.1176	-167.2304
1661.00	672.69	53.55	68.63	262.43	533.07	605.42	594.17	2069.41	630.76	21.1186	-167.2253
1662.00	673.16	53.29	68.52	262.89	534.82	605.26	595.96	2069.40	630.75	21.1330	-167.2221
1663.00	673.63	52.98	68.39	263.35	536.94	605.02	597.95	2069.17	630.68	21.1406	-167.2177
1664.00	674.09	52.99	68.27	264.57	537.72	604.86	599.28	2069.01	630.64	21.1568	-167.2069
1665.00	674.55	52.92	68.18	265.30	538.60	604.83	600.44	2069.25	630.71	21.1644	-167.2004
1666.00	675.00	52.88	68.10	266.04	539.37	604.96	601.43	2069.62	630.82	21.1723	-167.1939
1667.00	675.44	52.74	68.02	266.48	540.54	604.85	602.66	2069.93	630.92	21.1797	-167.1879
1668.00	675.89	52.55	67.93	266.83	541.85	604.81	604.00	2070.17	630.99	21.1904	-167.1805
1669.00	676.32	52.40	67.84	267.34	543.15	604.71	605.39	2070.25	631.01	21.2011	-167.1817
1670.00	676.76	52.17	67.71	267.99	544.02	604.43	607.25	2069.86	630.90	21.2156	-167.1761
1671.00	677.19	51.94	67.59	268.50	546.60	604.20	608.99	2069.60	630.82	21.2295	-167.1713
1672.00	677.61	51.92	67.47	269.61	547.61	603.97	610.38	2069.26	630.71	21.2378	-167.1615
1673.00	678.04	51.88	67.36	270.54	548.53	603.82	611.62	2069.14	630.67	21.2453	-167.1541
1674.00	678.45	51.74	67.26	271.15	549.83	603.65	613.06	2068.98	630.63	21.2560	-167.1476
1675.00	678.86	51.47	67.16	271.32	551.53	603.59	614.66	2068.95	630.62	21.2700	-167.1453
1676.00	679.27	51.18	67.08	271.31	553.28	603.38	616.22	2069.02	630.64	21.2744	-167.1458
1677.00	679.67	51.12	66.94	272.44	554.53	603.02	617.84	2068.32	630.42	21.2947	-167.1356
1678.00	680.06	51.09	66.83	273.33	555.48	602.82	619.11	2068.01	630.33	21.3025	-167.1271
1679.00	680.46	50.99	66.73	274.03	556.61	602.66	620.41	2067.87	630.29	21.3118	-167.1213
1680.00	680.85	50.92	56.64	274.71	557.97	602.53	621.57	2067.78	630.26	21.3197	-167.1152
1681.00	681.23	50.83	66.53	275.46	559.71	602.31	622.92	2067.45	630.16	21.3290	-167.1085
1682.00	681.60	50.61	56.41	275.79	560.16	602.05	624.55	2067.09	630.05	21.3427	-167.1053
1683.00	681.98	50.43	66.33	276.21	561.77	601.83	626.01	2066.81	629.97	21.3544	-167.1013
1684.00	682.35	50.27	66.21	276.81	563.25	601.53	627.59	2066.28	629.80	21.3666	-167.0951
1685.00	682.71	50.21	66.10	277.66	564.35	601.24	628.97	2065.76	629.65	21.3758	-167.0881
1686.00	683.07	50.13	66.01	278.31	565.17	601.07	630.16	2065.53	629.58	21.3841	-167.0813

1687.00	683.41	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1688.00	683.79	46.06	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1689.00	684.14	46.76	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1690.00	684.47	46.56	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1691.00	684.80	46.43	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1692.00	685.14	46.36	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1693.00	685.47	46.31	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1694.00	685.79	46.23	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1695.00	686.11	46.02	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1696.00	686.43	45.98	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1697.00	686.76	45.91	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1698.00	687.05	45.78	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1699.00	687.35	45.66	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1700.00	687.65	45.51	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1701.00	687.94	45.51	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1702.00	688.23	45.22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1703.00	688.52	45.16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1704.00	688.80	45.08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1705.00	689.07	45.06	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1706.00	689.35	45.96	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1707.00	689.61	45.78	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1708.00	689.88	45.67	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1709.00	690.14	45.66	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1710.00	690.39	45.58	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1711.00	690.65	45.46	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1712.00	690.89	45.32	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1713.00	691.14	45.15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1714.00	691.38	46.97	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1715.00	691.61	46.88	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1716.00	691.84	46.93	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1717.00	692.07	46.99	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1718.00	692.29	46.86	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1719.00	692.51	46.73	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1720.00	692.72	46.60	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1721.00	692.94	46.46	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1722.00	693.14	46.31	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1723.00	693.34	46.31	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1724.00	693.54	46.29	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1725.00	693.74	46.20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1726.00	693.93	46.06	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1727.00	694.12	45.92	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1728.00	694.30	45.76	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1729.00	694.47	45.68	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1730.00	694.65	45.60	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1731.00	694.82	45.57	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1732.00	694.99	45.60	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1733.00	695.16	45.61	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1734.00	695.32	45.66	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1735.00	695.47	45.76	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1736.00	695.61	45.19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1737.00	695.77	45.07	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

1738.00	696.92	44.97	[illegible]	[illegible]	[illegible]	575.87	704.12	2006.45	611.57	21.9460	-166.7840
1739.00	696.06	44.98	[illegible]	[illegible]	[illegible]	[illegible]	705.50	2004.45	610.93	21.9526	-166.7738
1740.00	696.20	44.91	57.78	311.32	644.22	574.45	706.78	2002.73	610.43	21.9624	-166.7686
1741.00	696.33	44.86	[illegible]	[illegible]	[illegible]	573.33	707.86	2001.39	610.02	21.9705	-166.7647
1742.00	696.46	44.78	[illegible]	[illegible]	[illegible]	573.29	709.12	1999.72	609.52	21.9794	-166.7597
1743.00	696.58	44.73	57.44	313.74	647.69	572.48	710.60	1997.53	608.87	21.9912	-166.7533
1744.00	696.71	44.68	57.32	314.04	648.35	571.74	712.13	1995.66	608.28	22.0065	-166.7502
1745.00	696.83	44.61	57.21	314.57	649.22	571.03	713.48	1993.96	607.76	22.0142	-166.7441
1746.00	696.94	44.45	[illegible]	[illegible]	641.36	570.43	714.61	1992.24	607.24	22.0235	-166.7376
1747.00	697.06	44.37	58.96	[illegible]	642.73	569.53	716.13	1989.99	606.55	22.0352	-166.7319
1748.00	697.16	44.34	58.83	316.71	643.53	568.74	717.57	1987.71	605.86	22.0452	-166.7247
1749.00	697.27	44.29	58.70	317.43	645.03	567.95	718.96	1985.59	605.21	22.0556	-166.7159
1750.00	697.43	44.19	58.50	317.45	645.09	566.72	721.11	1982.32	604.11	22.0720	-166.7092
1751.00	697.53	44.06	58.33	318.21	646.63	565.77	722.81	1979.79	603.44	22.0861	-166.7011
1752.00	697.62	43.98	58.24	319.42	649.08	565.02	724.14	1977.82	602.86	22.0968	-166.6965
1753.00	697.71	43.88	58.12	319.81	651.14	564.31	725.43	1975.92	602.26	22.1076	-166.6916
1754.00	697.80	43.80	58.01	320.23	652.35	563.56	726.73	1973.95	601.66	22.1181	-166.6877
1755.00	697.89	43.78	57.86	321.23	654.56	562.60	728.23	1971.32	600.86	22.1285	-166.6830
1756.00	697.96	43.74	57.74	321.97	656.61	561.80	729.50	1969.14	600.20	22.1377	-166.6790
1757.00	698.04	43.71	57.62	322.69	658.63	561.01	730.75	1967.00	599.54	22.1467	-166.6751
1758.00	698.11	43.67	57.48	323.47	656. 5	560.10	732.18	1964.51	598.78	22.1572	-166.6677
1759.00	699.18	43.55	57.36	323.90	658.24	559.29	733.57	1962.35	598.13	22.1662	-166.6543
1760.00	698.25	43.50	57.25	324.35	659.23	558.65	734.76	1960.35	597.51	22.1783	-166.6489
1761.00	698.31	43.43	57.12	324.97	660.52	557.69	736.11	1958.03	596.81	22.1889	-166.6434
1762.00	698.37	43.34	56.99	325.42	661.93	556.77	737.60	1955.53	596.05	22.2012	-166.6384
1763.00	698.43	43.24	56.86	325.89	663.32	555.86	739.05	1953.06	595.29	22.2132	-166.6336
1764.00	698.48	43.24	56.71	326.85	664.38	554.88	740.43	1950.37	594.47	22.2225	-166.6245
1765.00	698.53	43.20	56.56	327.74	665.65	553.82	741.95	1947.44	593.58	22.2336	-166.6181
1766.00	698.58	43.14	56.42	327.43	666.39	552.80	743.46	1944.63	592.73	22.2453	-166.6093
1767.00	698.63	43.03	56.32	329.61	668.15	552.13	744.58	1942.83	592.18	22.2553	-166.6073
1768.00	698.67	42.93	56.20	329.93	669.53	551.24	745.97	1940.44	591.45	22.2673	-166.6039
1769.00	698.71	42.86	56.05	32 .49	670.91	550.40	747.36	1937.85	590.66	22.2786	-166.5984
1770.00	698.74	42.84	55.89	33 .60	672.09	549.08	749.00	1934.45	589.62	22.2898	-166.5878
1771.00	698.77	42.84	55.78	331.36	672.90	548.28	750.06	1932.22	588.94	22.2970	-166.5806
1772.00	698.80	42.77	55.64	331.35	674.20	547.28	751.49	1929.47	588.10	22.3084	-166.5747
1773.00	698.83	42.68	55.54	332.16	675.35	546.54	752.62	1927.47	587.49	22.3184	-166.5724
1774.00	698.86	42.61	55.40	33 .76	676. 7	545.51	754.06	1924.63	586.63	22.3299	-166.5665
1775.00	698.88	42.54	55.27	333.29	677.93	544.54	755.43	1921.94	585.81	22.3410	-166.5611
1776.00	698.90	42.49	55.13	333.90	679.29	543.52	756.84	1919.12	584.95	22.3521	-166.5552
1777.00	698.91	42.44	54.97	334.76	6 [illegible]	542.32	758.42	1915.75	583.92	22.3640	-166.5467
1778.00	698.93	42.40	54.85	335.42	681.55	541.41	759.61	1913.22	583.15	22.3729	-166.5404
1779.00	698.94	42.37	54.72	336.11	682.54	540.42	760.90	1910.47	582.31	22.3826	-166.5337
1780.00	698.94	42.31	54.58	336.72	683.66	539.38	762.27	1907.56	581.43	22.3933	-166.5276
1781.00	698.93	42.21	54.43	337.18	684.36	538.23	763.82	1904.36	580.45	22.4066	-166.5228
1782.00	698.94	42.14	54.31	337.62	686.07	537.28	765.10	1901.73	579.69	22.4172	-166.5184
1783.00	698.95	42.11	54.17	33 .37	687.29	536.22	766.43	1898.76	578.74	22.4271	-166.5119
1784.00	698.95	42.06	54.03	338.98	688.37	535.19	767.76	1895.84	577.85	22.4376	-166.5050
1785.00	698.95	42.02	53.90	339.57	689.35	534.19	769.01	1893.09	577.02	22.4474	-166.4991
1786.00	698.94	41.94	53.73	339.94	691.17	533.22	770.26	1890.37	576.19	22.4579	-166.4949
1787.00	698.93	41.87	53.61	340.67	692.19	532.31	771.93	1886.71	575.07	22.4714	-166.4873
1788.00	698.90	41.84	53.47	341.36	693.73	530.82	773.22	1883.64	574.14	22.4812	-166.4812



Probe No. 6; lift-off time: H+1860 seconds; and project No. 6.13

Raw data referenced to the ship				Quantities have been translated to the launcher position							
Time, sec	Range, km	Azimuth, deg T	Elevation, deg Geod.	x, km distance east	y, km distance north	z at launcher	$\sqrt{x^2 + y^2}$, km	Height above earth, kft	Height above earth, km	Latitude of target, deg	Longitude of target, deg

1951.00	410.25	187.95	16.47	[illegible]	[illegible]	127.57	30.96	418.77	127.64	16.4687	169.4668
1952.00	411.05	187.93	16.47	[illegible]	[illegible]	128.09	31.32	423.46	129.07	16.4658	169.4661
1953.00	411.84	187.90	16.43	[illegible]	[illegible]	[illegible]	31.68	428.35	130.56	16.4629	169.4654
1954.00	412.63	187.89	16.39	[illegible]	[illegible]	[illegible]	32.26	436.55	133.23	16.4576	169.4647
1955.00	413.42	187.84	16.37	[illegible]	[illegible]	[illegible]	32.66	435.48	132.74	16.4567	169.4617
1956.00	414.22	187.81	17.13	7.09	[illegible]	134.06	33.03	440.09	134.14	16.4516	169.4609
1957.00	415.01	187.84	17.16	[illegible]	[illegible]	135.31	33.11	446.17	135.99	16.4507	169.4606
1958.00	415.80	187.77	17.60	7.46	[illegible]	136.45	33.97	451.98	136.56	16.4445	169.4591
1959.00	416.59	187.77	17.66	7.75	[illegible]	137.81	34.19	452.44	137.91	16.4417	-169.4591
1960.00	417.38	187.74	17.71	7.90	[illegible]	139.17	34.61	456.59	139.17	16.4383	169.4577
1961.00	418.18	187.71	17.85	7.92	[illegible]	140.34	[illegible]	460.74	140.43	16.4350	169.4567
1962.00	418.96	187.70	17.89	7.95	[illegible]	141.58	35.38	466.82	141.68	16.4318	-169.4564
1963.00	419.75	187.68	18.09	7.97	[illegible]	142.53	35.87	467.95	142.63	16.4275	169.4550
1964.00	420.54	187.64	18.24	7.97	[illegible]	143.93	36.18	472.21	143.93	16.4247	169.4542
1965.00	421.32	187.64	18.37	7.95	[illegible]	145.00	36.65	476.06	145.10	16.4210	-169.4537
1966.00	422.11	187.62	18.51	7.91	[illegible]	146.27	37.01	480.24	146.38	16.4180	169.4532
1967.00	422.89	187.59	18.61	[illegible]	[illegible]	147.28	37.50	483.55	147.39	16.4140	169.4516
1968.00	423.67	187.53	18.77	[illegible]	[illegible]	148.60	37.82	487.90	148.71	16.4112	169.4511
1969.00	424.45	187.58	18.89	[illegible]	[illegible]	149.77	38.17	491.74	149.88	16.4081	-169.4515
1970.00	425.24	187.57	19.02	[illegible]	[illegible]	150.91	38.55	495.49	151.02	16.4048	-169.4515
1971.00	426.01	187.55	19.12	[illegible]	[illegible]	151.91	39.01	498.76	152.02	16.4009	169.4506
1972.00	426.79	187.53	19.25	[illegible]	[illegible]	153.12	39.36	502.77	153.25	16.3979	169.4501
1973.00	427.56	187.48	19.39	[illegible]	[illegible]	154.34	39.79	506.76	154.46	16.3947	-169.4475
1974.00	428.33	187.46	19.50	[illegible]	[illegible]	155.40	40.21	510.25	155.52	16.3911	-169.4464
1975.00	429.11	187.45	19.60	[illegible]	[illegible]	156.40	40.64	513.55	156.53	16.3874	-169.4460
1976.00	429.87	187.43	19.72	[illegible]	[illegible]	157.53	41.00	517.25	157.66	16.3843	-169.4456
1977.00	430.64	187.41	19.85	[illegible]	[illegible]	158.73	41.35	521.20	158.86	16.3814	-169.4448
1978.00	431.40	187.40	19.95	[illegible]	[illegible]	159.74	41.76	524.52	159.87	16.3779	169.4445
1979.00	432.15	187.36	20.04	[illegible]	[illegible]	160.63	42.26	527.45	160.77	16.3739	169.4423
1980.00	432.93	187.35	20.13	[illegible]	[illegible]	161.59	42.70	530.61	161.73	16.3700	-169.4421
1981.00	433.69	187.34	20.24	[illegible]	[illegible]	162.66	43.06	534.13	162.80	16.3669	-169.4422
1982.00	434.45	187.31	20.38	[illegible]	[illegible]	163.91	43.40	538.25	164.06	16.3643	-169.4403
1983.00	435.20	187.29	20.47	[illegible]	[illegible]	164.88	43.82	541.42	165.03	16.3607	-169.4397
1984.00	435.95	187.27	20.62	[illegible]	[illegible]	166.14	44.12	545.65	166.31	16.3584	-169.4383
1985.00	436.70	187.28	20.71	[illegible]	[illegible]	167.12	44.45	548.81	167.28	16.3551	-169.4379
1986.00	437.45	187.26	20.79	[illegible]	[illegible]	167.99	44.92	551.66	168.15	16.3512	-169.4389
1987.00	438.20	187.23	20.88	[illegible]	[illegible]	168.91	45.38	554.68	169.07	16.3475	-169.4373
1988.00	438.94	187.21	20.96	[illegible]	[illegible]	169.78	45.82	557.54	169.94	16.3437	-169.4367
1989.00	439.68	187.18	21.06	[illegible]	[illegible]	170.76	46.24	560.79	170.93	16.3403	-169.4352
1990.00	440.42	187.16	21.16	[illegible]	[illegible]	171.81	46.61	564.24	171.98	16.3373	-169.4340
1991.00	441.16	187.13	21.26	[illegible]	[illegible]	172.82	47.00	567.55	172.99	16.3341	-169.4327
1992.00	441.89	187.12	21.34	[illegible]	[illegible]	173.66	47.43	570.30	173.83	16.3304	-169.4322
1993.00	442.61	187.11	21.43	[illegible]	[illegible]	174.59	47.81	573.37	174.76	16.3271	-169.4321
1994.00	443.34	187.11	21.51	[illegible]	[illegible]	175.47	48.18	576.28	175.65	16.3238	-169.4324
1995.00	444.07	187.10	21.63	[illegible]	[illegible]	176.59	48.46	579.97	176.78	16.3214	-169.4323
1996.00	444.79	187.08	21.68	[illegible]	[illegible]	177.27	48.97	582.21	177.46	16.3171	-169.4315
1997.00	445.51	187.06	21.76	[illegible]	[illegible]	178.14	49.37	585.07	178.33	16.3136	-169.4308
1998.00	446.22	187.03	21.84	[illegible]	[illegible]	179.02	49.81	587.95	179.21	16.3101	-169.4291
1999.00	446.93	186.99	21.93	[illegible]	[illegible]	179.94	50.24	590.98	180.13	16.3068	-169.4268
2000.00	447.64	186.97	22.02	[illegible]	[illegible]	180.75	50.68	593.67	180.95	16.3032	-169.4257
2001.00	448.35	186.95	22.09	11.04	-49.84	181.66	51.05	596.66	181.86	16.3001	-169.4251

2002.00	449.05	186.96	22.17	10.96	-50.22	182.50	51.46	599.40	182.70	16.2968 -169.4259
2003.00	449.75	186.95	22.25	10.99	-50.55	183.43	51.73	602.47	183.63	16.2940 -169.4256
2004.00	450.45	186.92	22.30	11.10	-51.06	184.02	52.25	604.42	184.23	16.2895 -169.4246
2005.00	451.14	186.90	22.40	11.24	-51.35	185.04	52.57	607.79	185.26	16.2870 -169.4233
2006.00	451.83	186.88	22.46	11.33	-51.76	185.81	52.99	610.12	186.03	16.2835 -169.4225
2007.00	452.52	186.87	22.55	11.49	-52.03	186.74	53.32	613.39	186.96	16.2807 -169.4220
2008.00	453.21	186.84	22.62	11.52	-52.48	187.54	53.73	616.02	187.76	16.2774 -169.4208
2009.00	453.85	186.84	22.70	11.49	-52.82	188.33	54.05	618.62	188.56	16.2745 -169.4211
2010.00	454.57	186.82	22.76	11.61	-53.25	189.09	54.51	621.12	189.32	16.2707 -169.4200
2011.00	455.24	186.78	22.83	11.82	-53.65	189.87	54.93	623.70	190.10	16.2673 -169.4181
2012.00	455.91	186.75	22.85	12.01	-54.19	190.34	55.51	625.24	190.57	16.2626 -169.4164
2013.00	456.58	186.76	22.93	11.91	-54.51	191.19	55.80	628.04	191.43	16.2599 -169.4173
2014.00	457.24	186.75	22.96	11.93	-55.00	191.71	56.28	629.76	191.95	16.2556 -169.4172
2015.00	457.90	186.70	23.07	12.29	-55.24	192.79	56.59	633.33	193.04	16.2536 -169.4139
2016.00	458.55	186.70	23.11	12.23	-55.67	193.40	56.99	635.33	193.65	16.2499 -169.4145
2017.00	459.21	186.68	23.18	12.30	-56.05	194.12	57.38	637.72	194.38	16.2467 -169.4139
2018.00	459.85	186.68	23.26	12.29	-56.31	195.05	57.63	640.75	195.30	16.2444 -169.4141
2019.00	460.50	186.68	23.26	12.19	-56.71	195.29	58.20	641.55	195.55	16.2392 -169.4149
2020.00	461.14	186.66	23.35	12.48	-57.16	196.27	58.51	644.81	196.54	16.2371 -169.4123
2021.00	461.78	186.62	23.39	12.57	-57.63	196.80	58.98	646.56	197.07	16.2330 -169.4115
2022.00	462.41	186.61	23.44	12.63	-58.02	197.45	59.38	648.68	197.72	16.2297 -169.4110
2023.00	463.05	186.60	23.49	12.67	-58.40	198.11	59.76	650.87	198.39	16.2264 -169.4106
2024.00	463.68	186.58	23.56	12.79	-58.71	198.92	60.09	653.52	199.19	16.2237 -169.4095
2025.00	464.29	186.56	23.59	12.84	-59.18	199.39	60.56	655.08	199.67	16.2197 -169.4091
2026.00	464.91	186.54	23.63	12.94	-59.60	199.94	60.99	656.97	200.23	16.2160 -169.4082
2027.00	465.53	186.52	23.68	13.09	-59.98	200.61	61.39	659.11	200.90	16.2128 -169.4069
2028.00	466.14	186.52	23.74	13.02	-60.32	201.28	61.71	661.32	201.57	16.2099 -169.4075
2029.00	466.75	186.50	23.79	13.14	-60.69	201.92	62.09	663.42	202.21	16.2067 -169.4064
2030.00	467.35	186.49	23.82	13.16	-61.10	202.46	62.50	665.21	202.76	16.2032 -169.4061
2031.00	467.95	186.47	[illegible]	13.26	-61.49	203.03	62.90	667.11	203.33	16.1998 -169.4054
2032.00	468.55	186.45		13.37	-61.77	203.81	63.20	669.68	204.12	16.1974 -169.4044
2033.00	469.14	186.42		13.55	-62.21	204.30	63.67	671.29	204.61	16.1936 -169.4027
2034.00	467.73	186.39		13.72	-62.61	204.86	64.09	673.13	205.17	16.1902 -169.4012
2035.00	470.36	186.33		13.70	-63.05	205.36	64.52	674.81	205.68	16.1864 -169.4014
2036.00	470.90	186.31		13.73	-63.39	205.88	64.86	676.52	206.20	16.1834 -169.4012
2037.00	471.47	186.31		13.80	-63.79	206.39	65.26	678.20	206.72	16.1800 -169.4005
2038.00	472.04	186.36	24.13	13.80	-64.20	206.84	65.67	679.70	207.17	16.1764 -169.4005
2039.00	472.61	186.35	24.16	13.87	-64.61	207.30	66.08	681.21	207.63	16.1729 -169.4000
2040.00	473.18	186.34	24.17	13.88	-65.07	207.65	66.53	682.39	207.99	16.1689 -169.3999
2041.00	473.74	186.30	24.22	14.16	-65.41	208.27	66.92	684.44	208.62	16.1660 -169.3973
2042.00	474.29	186.27	24.26	14.30	-65.75	208.85	67.29	686.36	209.20	16.1631 -169.3960
2043.00	474.84	186.25	24.30	14.42	-66.12	209.37	67.67	688.06	209.72	16.1599 -169.3950
2044.00	475.39	186.24	24.33	14.50	-66.50	209.84	68.06	689.61	210.19	16.1566 -169.3943
2045.00	475.93	186.24	24.36	14.47	-66.86	210.32	68.41	691.20	210.68	16.1535 -169.3946
2046.00	476.47	186.23	24.38	14.46	-67.25	210.75	68.79	692.62	211.11	16.1502 -169.3946
2047.00	477.01	186.21	24.40	14.56	-67.67	211.12	69.22	693.85	211.49	16.1465 -169.3938
2048.00	477.54	186.21	24.43	14.52	-68.02	211.59	69.55	695.40	211.96	16.1435 -169.3942
2049.00	478.07	186.18	24.47	14.73	-68.38	212.08	69.95	697.04	212.46	16.1404 -169.3923
2050.00	478.59	186.15	24.49	14.90	-68.75	212.54	70.35	698.54	212.92	16.1372 -169.3907
2051.00	479.11	186.12	24.47	15.11	-69.12	212.61	70.95	698.80	212.99	16.1322 -169.3888
2052.00	479.62	186.09	24.52	15.31	-69.60	213.23	71.26	700.86	213.62	16.1299 -169.3871

2053.00		186.07	24.50	15.21	-73.13	213.30	71.76	701.10	213.70	16.1253	-169.3880
2054.00		186.08	24.54	15.25	-73.53	213.83	72.06	702.84	214.23	16.1227	-169.3876
2055.00	[illegible]	186.07	24.58	15.30	-73.76	214.33	72.37	704.50	214.73	16.1200	-169.3871
2056.00	481.64	186.15	24.62	14.71	-[illegible]	215.65	72.06	708.83	216.05	16.1219	-169.3925
2057.00	482.13	186.09	24.62	15.11	-73.66	215.19	73.02	707.04	215.51	16.1140	-169.3889
2058.00	482.61	186.06	24.63	15.32	-73.33	215.42	73.45	708.11	215.83	16.1106	-169.3870
2059.00	483.10	186.00	24.65	15.67	-72.23	215.90	74.01	709.39	216.22	16.1072	-169.3849
2060.00	483.58	185.93	24.64	15.91	-73.29	216.11	74.28	710.68	216.62	16.1041	-169.3825
2061.00	484.06	186.00	24.58	15.97	-73.36	215.69	74.99	709.07	216.13	16.0973	-169.3847
2062.00	484.53	185.93	24.62	15.91	-73.69	216.56	75.24	711.90	216.99	16.0962	-169.3801
2063.00	485.00	185.94	24.65	15.96	-73.34	216.70	75.64	712.38	217.14	16.0924	-169.3813
2064.00	485.46	185.94	24.65	15.91	-74.15	216.33	76.02	713.16	217.37	16.0889	-169.3817
2065.00	485.92	185.96	24.65	15.74	-74.75	217.12	76.38	713.81	217.57	16.0854	-169.3832
2066.00	486.37	185.91	24.69	15.83	-74.83	217.60	76.74	715.39	218.05	16.0829	-169.3799
2067.00	486.82	185.88	24.70	15.97	-74.41	217.98	77.15	716.32	218.33	16.0796	-169.3785
2068.00	487.27	185.87	24.71	16.16	-74.76	218.19	77.50	717.34	218.65	16.0766	-169.3779
2069.00	487.72	185.93	24.69	15.91	-76.16	218.29	77.79	717.69	218.75	16.0741	-169.3807
2070.00	488.15	185.86	24.73	16.38	-76.65	218.77	78.19	719.28	219.24	16.0706	-169.3775
2071.00	488.58	185.81	24.72	16.68	-76.91	218.89	78.70	719.70	219.36	16.0666	-169.3748
2072.00	489.01	185.81	24.72	16.69	-77.30	219.08	79.08	720.32	219.55	16.0642	-169.3748
2073.00	489.44	185.77	24.70	16.93	-77.77	219.15	79.59	720.59	219.64	16.0592	-169.3726
2074.00	489.85	185.76	24.72	16.97	-78.07	219.47	79.90	721.66	219.76	16.0565	-169.3722
2075.00	490.27	185.77	24.74	16.86	-78.16	219.83	80.14	722.84	220.32	16.0542	-169.3732
2076.00	490.68	185.77	24.72	16.83	-78.80	219.85	80.58	722.91	220.34	16.0502	-169.3735
2077.00	491.09	185.76	24.70	16.85	-79.23	219.91	81.00	723.13	220.41	16.0464	-169.3731
2078.00	491.49	185.73	24.70	17.08	-79.60	220.12	81.42	723.83	220.62	16.0432	-169.3712
2079.00	491.89	185.70	24.70	17.21	-79.97	220.31	81.80	724.49	220.83	16.0401	-169.3699
2080.00	492.28	185.67	24.68	17.46	-80.46	220.35	82.31	724.46	220.81	16.0359	-169.3680
2081.00	492.67	185.67	24.66	17.42	-80.89	220.30	82.74	724.50	220.83	16.0321	-169.3682
2082.00	493.06	185.65	24.67	17.53	-81.13	220.58	83.06	725.42	221.11	16.0295	-169.3672
2083.00	493.44	185.67	24.67	17.36	-81.43	220.79	83.32	726.10	221.32	16.0268	-169.3688
2084.00	493.82	185.65	24.68	17.41	-81.73	221.05	83.64	726.99	221.59	16.0243	-169.3676
2085.00	494.19	185.62	24.66	17.63	-82.25	221.02	84.11	726.89	221.56	16.0203	-169.3663
2086.00	494.56	185.61	24.63	17.47	-82.63	220.99	84.55	726.81	221.53	16.0164	-169.3660
2087.00	494.93	185.59	24.64	17.79	-83.11	220.49	85.26	725.20	221.04	16.0103	-169.3649
2088.00	495.28	185.58	24.59	17.66	-83.50	221.04	85.39	727.02	221.60	16.0093	-169.3642
2089.00	495.64	185.56	24.59	17.96	-83.91	221.22	85.71	727.61	221.78	16.0066	-169.3635
2090.00	495.99	185.53	24.58	18.19	-84.29	221.28	86.14	727.83	221.84	16.0032	-169.3613
2091.00	496.34	185.51	24.53	18.32	-84.71	221.09	86.67	727.24	221.66	15.9987	-169.3601
2092.00	496.68	185.51	24.52	18.25	-85.05	221.17	86.99	727.52	221.75	15.9958	-169.3607
2093.00	497.02	185.52	24.50	18.13	-85.42	221.17	87.32	727.55	221.76	15.9926	-169.3618
2094.00	497.35	185.50	24.48	18.23	-85.74	221.11	87.76	727.35	221.70	15.9889	-169.3609
2095.00	497.69	185.50	24.46	18.24	-86.21	221.12	88.12	727.40	221.71	15.9856	-169.3609
2096.00	498.01	185.47	24.44	18.41	-86.59	221.14	88.53	727.47	221.73	15.9823	-169.3593
2097.00	498.33	185.44	24.41	18.59	-87.01	221.07	88.97	727.26	221.67	15.9787	-169.3577
2098.00	498.65	185.46	24.46	18.42	-87.05	221.62	88.99	729.08	222.23	15.9783	-169.3592
2099.00	498.96	185.40	24.37	18.06	-87.75	221.05	89.76	727.24	221.66	15.9721	-169.3553
2100.00	499.27	185.41	24.35	18.27	-88.11	221.02	90.09	727.16	221.64	15.9690	-169.3561
2101.00	499.58	185.40	24.32	18.26	-88.50	220.94	90.47	726.91	221.56	15.9656	-169.3561
2102.00	499.89	186.24	23.97	11.74	-91.09	215.29	91.85	708.42	215.93	15.9423	-169.4194
2103.00	500.18	185.67	23.91	16.46	-90.41	218.01	91.97	717.36	218.65	15.9479	-169.3769

2104.00	501.47	185.39	24.23	18.77	-99.06	223.66	91.60	726.05	221.38	15.0955	169.3560
2105.00	501.76	185.42	24.22	18.81	-99.13	223.73	91.84	726.30	221.48	15.0926	169.3541
2106.00	501.04	185.30	24.19	18.84	-99.19	223.61	92.44	725.92	221.26	15.0891	169.3505
2107.00	501.32	185.31	24.18	18.86	-99.68	223.62	92.71	725.96	221.27	15.0865	169.3516
2108.00	501.60	185.27	24.11	18.86	-91.15	223.58	93.22	725.19	221.04	15.0824	169.3485
2109.00	501.87	185.27	24.08	18.85	-91.05	223.14	93.64	726.44	220.81	15.0786	169.3490
2110.00	502.14	185.26	24.05	18.84	-91.05	220.01	94.01	726.01	220.68	15.0756	169.3490
2111.00	502.40	185.26	23.99	18.87	-92.41	219.70	94.46	723.03	220.50	15.0713	169.3481
2112.00	502.66	185.26	23.97	18.87	-92.72	219.63	94.75	722.83	220.32	15.0686	169.3436
2113.00	502.92	185.22	23.95	18.91	-93.09	219.55	95.17	722.59	220.25	15.0654	169.3467
2114.00	503.17	185.21	23.92	18.94	-93.42	219.46	95.50	722.30	220.16	15.0625	169.3465
2115.00	503.42	185.17	23.87	20.11	-93.87	219.14	96.00	721.41	219.99	15.0585	169.3440
2116.00	503.66	185.16	23.85	20.14	-94.09	219.11	96.36	721.18	219.82	15.0556	169.3420
2117.00	503.90	185.18	23.83	19.98	-94.44	219.11	96.53	721.19	219.82	15.0535	169.3451
2118.00	504.14	185.16	23.79	20.10	-94.94	218.87	96.94	720.42	219.58	15.0500	169.3441
2119.00	504.37	185.16	23.73	20.05	-95.25	218.56	97.34	719.43	219.28	15.0464	169.3445
2120.00	504.60	184.91	23.89	20.21	-95.58	219.84	97.80	723.66	220.57	15.0479	169.3393
2121.00	504.82	185.14	23.56	20.19	-96.17	217.16	98.45	715.54	218.10	15.0464	169.3460
2122.00	505.04	185.08	23.58	20.61	-96.14	217.63	98.70	716.45	218.38	15.0451	-169.1834
2123.00	505.26	185.06	23.53	20.74	-96.32	217.35	99.12	715.54	218.10	15.0416	-169.1838
2124.00	505.47	185.05	23.47	20.74	-97.33	217.01	99.52	714.46	217.77	15.0379	-169.1843
2125.00	505.68	185.04	23.44	20.83	-97.68	216.79	99.88	713.76	217.56	15.0348	-169.1874
2126.00	505.89	185.04	23.40	20.77	-98.01	216.59	100.19	713.11	217.36	15.0319	-169.1880
2127.00	506.08	185.02	23.36	20.93	-98.44	216.21	100.64	711.87	216.98	15.0281	-169.1865
2128.00	506.28	185.02	23.29	20.89	-98.81	215.90	101.00	710.89	216.68	15.0248	-169.1869
2129.00	506.47	185.00	23.23	20.93	-99.17	215.52	101.42	709.68	216.31	15.0212	-169.1860
2130.00	506.67	184.97	23.19	21.15	-99.59	215.25	101.82	708.80	216.04	15.0179	-169.1843
2131.00	506.85	184.97	23.13	21.14	-99.96	214.91	102.17	707.70	215.71	15.0146	-169.1846
2132.00	507.03	184.96	23.10	21.47	-100.27	214.75	102.53	707.20	215.56	15.0119	-169.1821
2133.00	507.22	184.90	23.05	21.65	-100.65	214.43	102.95	706.16	215.24	15.0085	-169.1800
2134.00	507.39	184.90	22.98	21.63	-101.08	213.94	103.37	704.57	214.75	15.0047	-169.1801
2135.00	507.56	184.90	22.91	21.53	-101.49	213.48	103.77	703.09	214.30	15.0010	-169.1806
2136.00	507.73	184.94	22.91	21.26	-102.00	212.79	104.20	700.83	213.61	14.9965	-169.1835
2137.00	507.89	184.90	22.85	21.58	-102.05	213.12	104.30	701.92	213.95	14.9961	-169.1806
2138.00	508.05	184.85	22.75	21.49	-102.49	212.62	104.90	699.67	213.26	14.9913	-169.1778
2139.00	508.21	184.83	22.63	21.00	-103.04	211.90	105.36	697.99	212.75	14.9873	-169.1767
2140.00	508.37	184.84	22.58	21.05	-103.53	211.77	105.83	696.78	212.08	14.9829	-169.1773

(F9.2,9F10.2,2I10.4)

0 0	100.00	0.	200.00	1.00	1.00
16.7350	-169.5255	3.0000	209264	8.00	20855768.50
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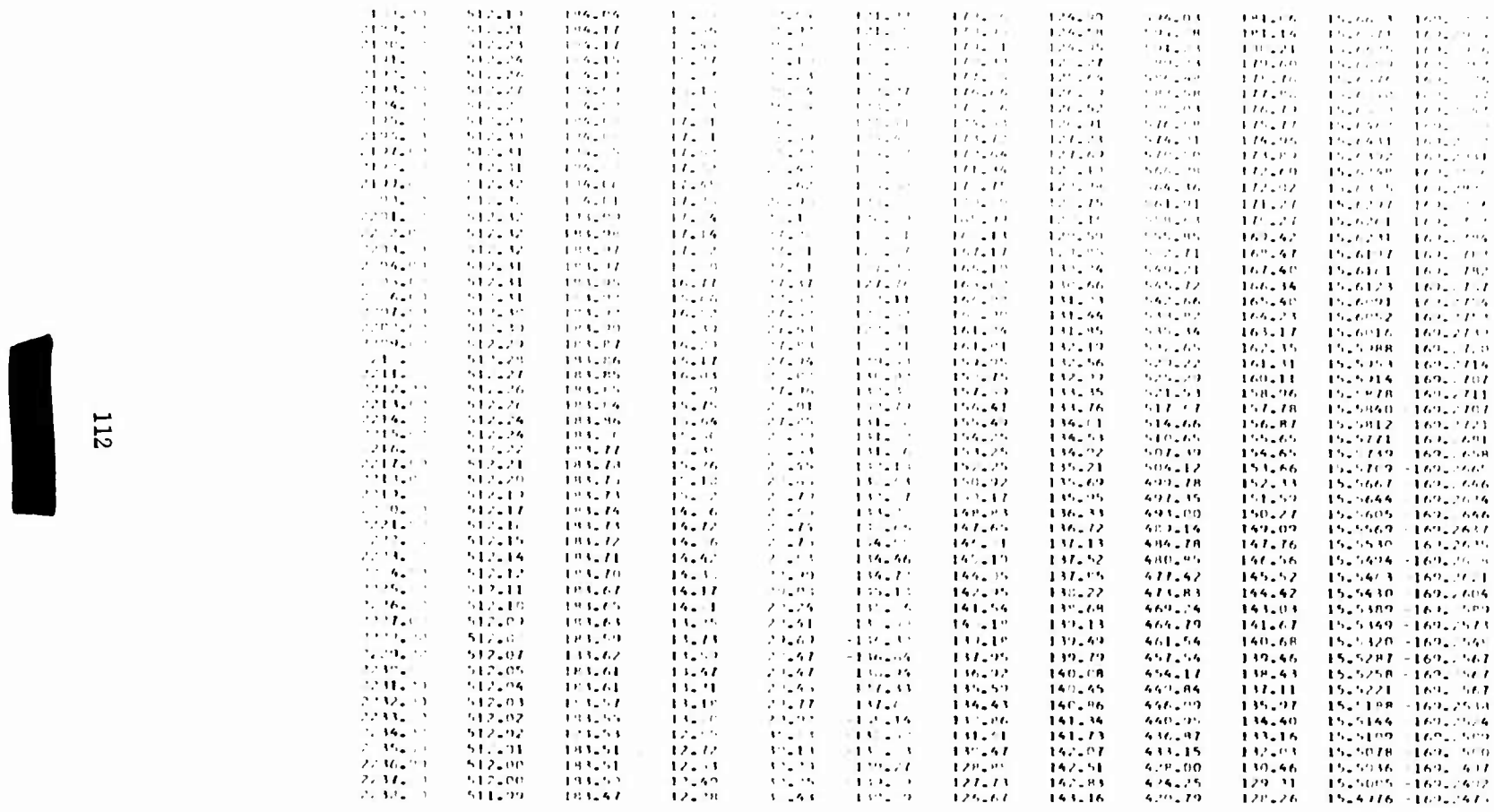
19.9225	-168.9697				

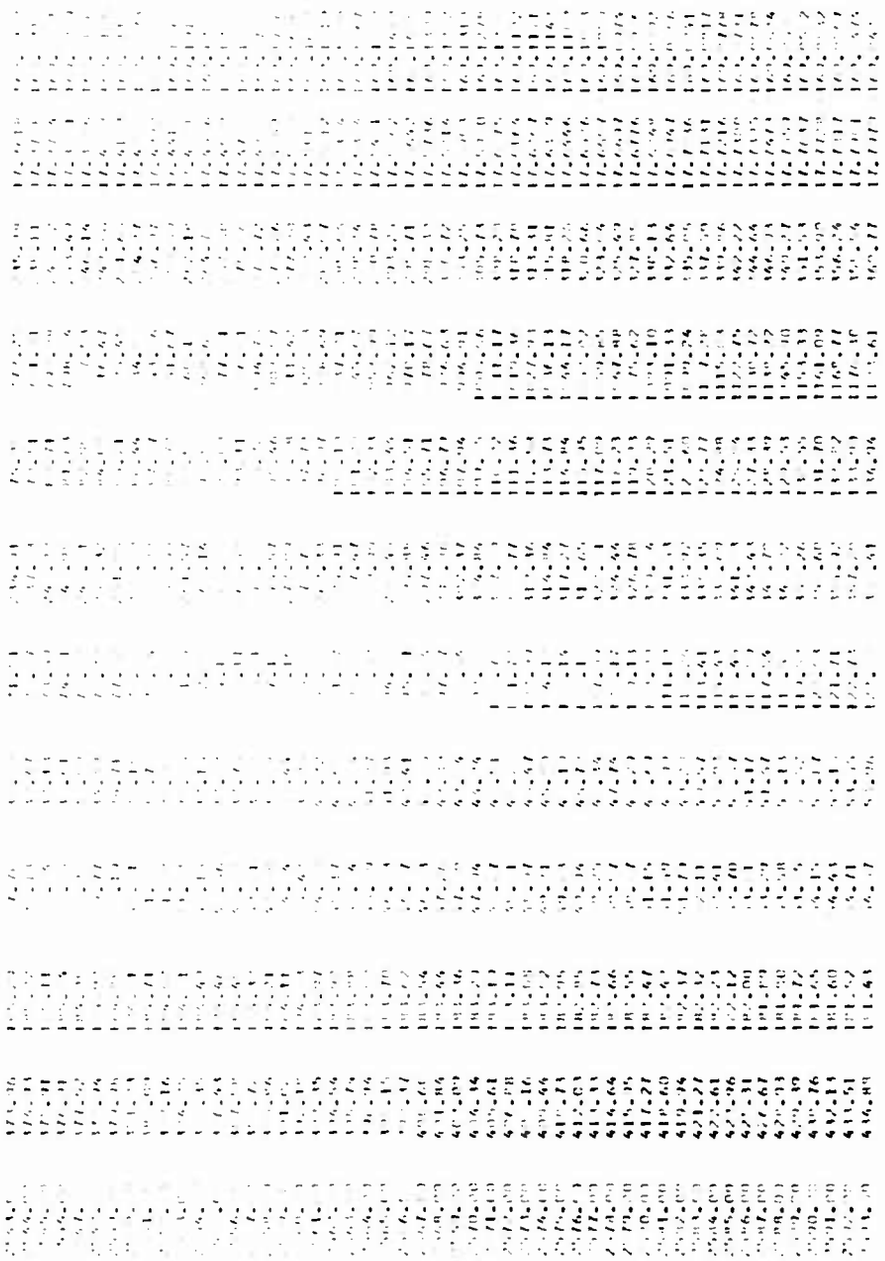


2239.00	511.99	183.47	12.11	33.45	-160.22	125.5	143.55	416.16	126.84	15.4339	169.2472
2240.00	511.99	183.47	11.99	33.57	-160.47	124.19	143.81	412.68	125.79	15.4311	169.2479
2241.00	511.98	183.46	11.90	33.69	-160.7	122.54	144.07	407.31	124.15	15.4268	169.2489
2242.00	511.98	183.43	11.85	33.65	-160.55	121.26	144.05	403.16	122.88	15.4234	169.2483
2243.00	511.98	183.43	11.91	33.61	-160.39	120.03	144.02	399.13	121.66	15.4203	169.2477
2244.00	511.99	183.38	11.96	33.53	-160.16	118.26	143.97	393.42	119.91	15.4158	169.2468
2245.00	511.99	183.42	11.92	33.71	-160.53	117.54	143.62	391.02	119.18	15.4139	169.2466
2246.00	512.00	183.37	11.82	33.82	-160.67	115.79	143.38	385.31	117.44	15.4093	169.2457
2247.00	512.00	183.36	11.71	33.83	-160.7	114.06	143.36	379.65	115.63	15.4048	169.2449
2248.00	512.02	183.36	11.62	33.83	-160.69	112.35	143.03	374.21	114.06	15.4009	169.2405
2249.00	512.02	183.33	11.47	33.85	-160.64	111.07	142.41	369.92	112.75	15.3975	169.2395
2250.00	512.04	183.29	11.34	33.84	-160.55	109.91	142.78	366.14	111.60	15.3945	169.2387
2251.00	512.05	183.28	11.19	33.76	-160.3	108.61	142.12	361.93	110.32	15.3911	169.2366
2252.00	512.07	183.31	11.01	33.61	-160.1	107.02	142.42	356.71	108.73	15.3870	169.2377
2253.00	512.08	183.30	10.85	33.56	-159.93	105.68	142.27	352.36	107.40	15.3835	169.2368
2254.00	512.10	183.30	10.75	33.49	-159.73	104.76	142.09	349.34	106.48	15.3811	169.2371
2255.00	512.13	183.22	10.60	33.42	-159.46	103.65	142.65	345.67	104.39	15.3768	169.2411
2256.00	512.15	183.26	10.60	33.37	-159.37	103.75	142.78	345.55	103.50	15.3748	169.2402
2257.00	512.18	183.21	10.38	33.20	-158.95	102.84	142.14	343.32	101.60	15.3702	169.2383
2258.00	512.21	183.20	10.01	33.16	-158.1	98.35	142.30	328.45	100.11	15.3266	169.2396
2259.00	512.24	183.18	9.84	33.07	-157.77	96.95	141.97	323.57	98.62	15.3230	169.2391
2260.00	512.28	183.17	9.66	33.05	-157.34	95.29	141.46	318.48	97.07	15.3194	-169.2377
2261.00	512.32	183.16	9.48	33.08	-157.31	93.74	141.82	313.41	95.53	15.3158	-169.2374
2262.00	512.36	183.15	9.31	33.05	-156.95	92.29	142.17	308.65	94.08	15.3125	-169.2377
2263.00	512.40	183.14	9.14	33.00	-156.5	90.78	142.53	303.77	92.59	15.3090	-169.2382
2264.00	512.45	183.11	7.97	32.85	-156.36	89.28	142.93	298.90	91.10	15.3055	-169.2388
2265.00	512.50	183.10	7.82	32.92	-156.69	87.96	143.25	294.57	89.79	15.3024	-169.2391
2266.00	512.56	183.08	7.63	33.04	-156.95	86.34	143.65	289.30	88.18	15.2986	-169.2393
2267.00	512.61	183.05	7.45	33.08	-156.92	84.76	144.06	284.14	86.61	15.2950	-169.2396
2268.00	512.67	183.07	7.32	33.12	-157.09	83.64	144.28	280.50	85.50	15.2924	-169.2411
2269.00	512.74	183.04	7.11	33.16	-157.12	81.80	144.76	274.48	83.66	15.2883	-169.2419
2270.00	512.81	183.03	6.93	33.22	-157.27	80.17	145.11	269.18	82.05	15.2846	-169.2432
2271.00	512.88	183.02	6.75	33.27	-157.3	78.65	145.44	264.23	80.54	15.2811	-169.2441
2272.00	512.95	183.00	6.58	33.27	-157.16	77.14	145.82	259.28	79.03	15.2776	-169.2447
2273.00	513.03	183.00	6.34	33.28	-157.08	75.03	146.25	252.39	76.93	15.2736	-169.2464
2274.00	513.11	182.97	6.13	33.27	-156.98	73.19	146.68	246.36	75.09	15.2694	-169.2467
2275.00	513.20	182.97	5.96	33.23	-156.82	71.74	147.00	241.67	73.66	15.2662	-169.2464
2276.00	513.29	182.95	5.76	33.22	-156.71	69.92	147.40	235.75	71.86	15.2623	-169.2472
2277.00	513.38	182.95	5.59	33.20	-156.65	68.37	147.73	230.67	70.31	15.2589	-169.2482
2278.00	513.48	182.93	5.41	34.07	-156.37	66.91	148.09	225.93	68.86	15.2556	-169.2486
2279.00	513.58	182.91	5.25	34.09	-156.21	65.44	148.44	221.14	67.40	15.2523	-169.2493
2280.00	513.69	182.94	5.12	33.91	-156.06	64.36	148.63	217.61	66.33	15.2498	-169.2490
2281.00	513.80	182.87	4.84	34.45	-155.46	61.83	149.23	209.37	63.81	15.2447	-169.2479
2282.00	513.92	182.87	4.66	34.50	-155.80	60.27	149.57	204.25	62.26	15.2413	-169.2476
2283.00	514.04	182.86	4.46	34.56	-156.16	58.52	149.94	198.54	60.51	15.2377	-169.2467
2284.00	514.16	182.84	4.27	34.68	-156.52	56.83	150.31	193.04	58.84	15.2341	-169.2456
2285.00	514.29	182.83	4.07	34.70	-156.88	55.10	150.67	187.38	57.11	15.2305	-169.2452
2286.00	514.43	182.81	3.87	34.86	-157.25	53.40	151.06	181.53	55.33	15.2268	-169.2447
2287.00	514.57	182.79	3.67	35.00	-157.61	51.52	151.45	175.72	53.56	15.2231	-169.2424
2288.00	514.71	182.78	3.48	35.07	-157.95	49.88	151.80	170.38	51.93	15.2196	-169.2416
2289.00	514.86	182.76	3.31	35.23	-158.28	48.40	152.15	165.56	50.46	15.2163	-169.2400

Probe No. 7; lift-off time: H+2400 seconds; and project No. 6.2

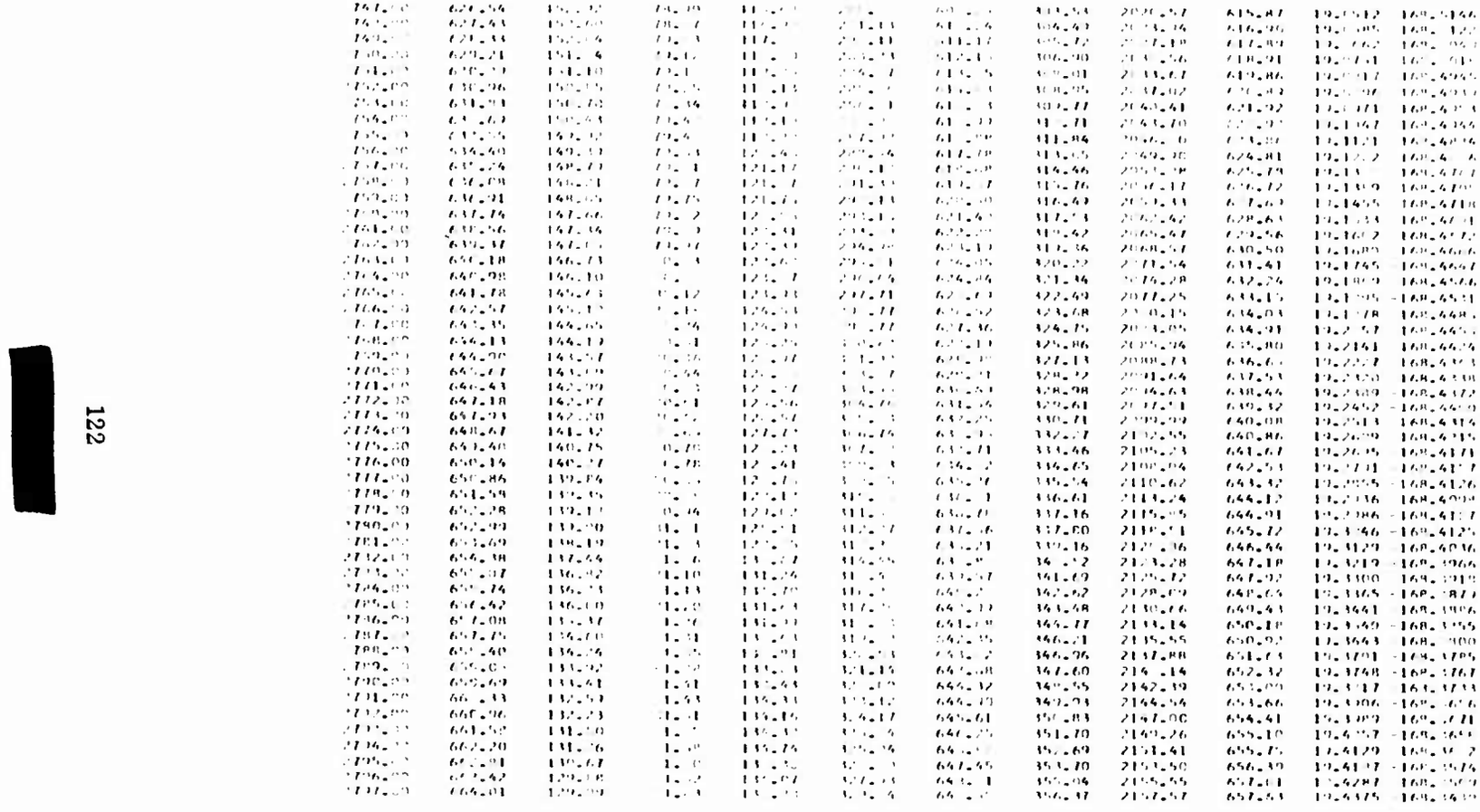
Raw data referenced to the ship				Quantities have been translated to the launcher position							
Time, sec	Range, km	Azimuth, deg T	Elevation, deg Geod.	x, km distance east	y, km distance north	z at launcher	$\sqrt{x^2 + y^2}$, km	Height above earth, kft	Height above earth, km	Latitude of target, deg	Longitude of target, deg

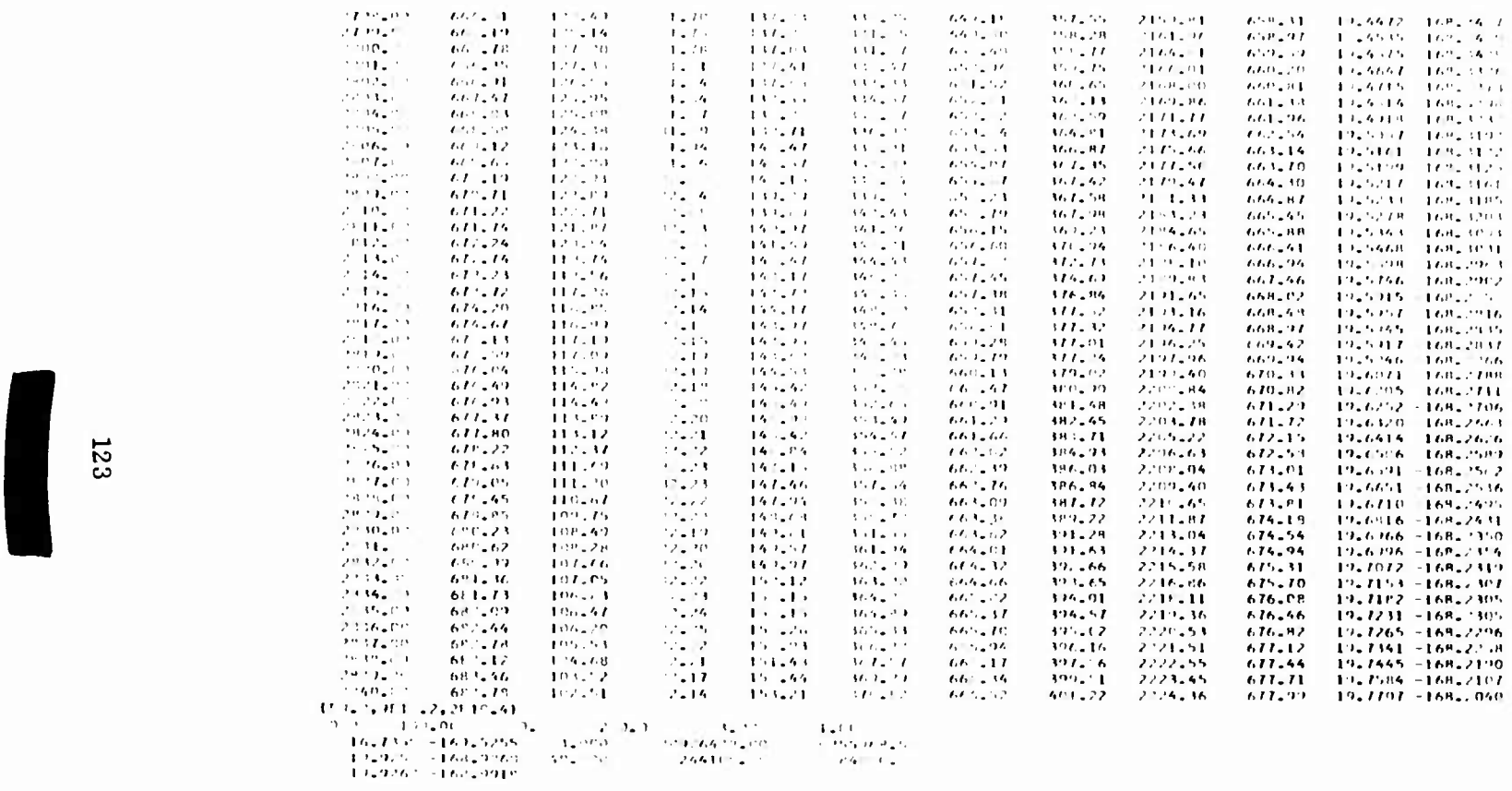
2492.00	351.14	188.15	13.06	[illegible]	[illegible]	[illegible]	22.82	535.36	33.57	16.0147	169.6761	
2493.00	351.06	188.11	14.52	1.11	1.31	11.20	23.60	542.67	35.24	16.0202	169.6716	
2494.00	350.98	188.09	14.58	1.57	[illegible]	11.25	24.38	550.23	37.39	16.0256	169.6672	
2495.00	350.91	188.06	14.64	1.73	[illegible]	11.25	25.16	557.85	39.53	16.0311	169.662	
2496.00	350.86	188.03	15.36	11.66	[illegible]	11.25	25.92	565.47	41.68	16.0365	169.6573	
2497.00	350.82	187.99	1.77	11.61	[illegible]	1.16	26.69	573.21	43.82	16.0422	169.6529	
2498.00	350.80	187.96	14.83	11.[illegible]	[illegible]	11.25	27.47	580.89	45.96	16.0476	169.6485	
2499.00	350.80	187.93	14.89	11.[illegible]	[illegible]	11.25	28.25	588.61	48.11	16.0531	169.6441	
2500.00	350.81	187.89	14.97	1.[illegible]	[illegible]	111.23	29.03	596.36	50.25	16.0586	169.6397	
2501.00	350.85	187.86	15.02	11.[illegible]	11.27	114.23	29.79	604.01	52.39	16.0641	169.6353	
2502.00	350.91	187.83	15.08	1.[illegible]	[illegible]	114.27	30.56	611.77	54.53	16.0695	169.6309	
2503.00	350.99	187.79	15.14	1.[illegible]	[illegible]	114.24	31.34	619.50	56.68	16.0750	169.6265	
2504.00	351.10	187.76	15.20	16.67	[illegible]	[illegible]	32.11	627.21	58.82	16.0805	169.6221	
2505.00	351.24	187.73	15.26	1.[illegible]	[illegible]	11.[illegible]	32.87	634.89	60.97	16.0860	169.6177	
2506.00	351.41	187.69	15.32	1.[illegible]	[illegible]	11.[illegible]	33.64	642.66	63.11	16.0915	169.6133	
2507.00	351.61	187.67	15.38	1.[illegible]	[illegible]	111.[illegible]	34.41	650.41	65.25	16.0970	169.6089	
2508.00	351.84	187.62	15.45	1.[illegible]	[illegible]	111.[illegible]	35.17	658.02	67.39	16.1025	169.6045	
2509.00	352.09	187.59	15.[illegible]	1.[illegible]	[illegible]	111.[illegible]	35.94	665.79	69.54	16.1080	169.6001	
2510.00	352.37	187.56	[illegible]	1.[illegible]	[illegible]	16.[illegible]	[illegible]	673.57	71.68	16.1135	169.5957	
2511.00	352.68	187.52	[illegible]	1.[illegible]	[illegible]	16.[illegible]	37.48	681.27	73.82	16.1190	169.5913	
2512.00	353.00	187.49	[illegible]	1.[illegible]	[illegible]	16.[illegible]	38.25	688.95	75.97	16.1245	169.5869	
2513.00	353.36	187.46	[illegible]	1.[illegible]	[illegible]	16.[illegible]	39.02	696.71	78.11	16.1300	169.5825	
2514.00	353.74	187.42	[illegible]	1.[illegible]	[illegible]	15.[illegible]	39.78	704.39	80.25	16.1355	169.5781	
2515.00	354.14	187.39	[illegible]	1.[illegible]	[illegible]	15.[illegible]	40.55	712.08	82.40	16.1410	169.5737	
2516.00	354.57	187.36	[illegible]	1.[illegible]	[illegible]	15.[illegible]	41.32	719.84	84.54	16.1465	169.5693	
2517.00	355.02	187.32	[illegible]	[illegible]	[illegible]	15.[illegible]	42.08	727.52	86.68	16.1520	169.5649	
2518.00	355.49	187.29	[illegible]	[illegible]	[illegible]	15.[illegible]	42.85	735.21	88.83	16.1575	169.5605	
2519.00	355.99	187.26	[illegible]	[illegible]	[illegible]	15.[illegible]	43.62	742.97	90.97	16.1630	169.5561	
2520.00	356.50	187.22	[illegible]	[illegible]	[illegible]	15.[illegible]	44.38	750.65	93.11	16.1685	169.5517	
2521.00	357.05	187.19	[illegible]	[illegible]	[illegible]	15.[illegible]	45.15	758.34	95.26	16.1740	169.5473	
2522.00	357.61	187.16	[illegible]	[illegible]	[illegible]	15.[illegible]	45.92	766.10	97.40	16.1795	169.5429	
2523.00	358.20	187.12	[illegible]	[illegible]	[illegible]	15.[illegible]	46.68	773.78	99.54	16.1850	169.5385	
2524.00	358.81	187.09	[illegible]	[illegible]	[illegible]	15.[illegible]	47.45	781.47	101.69	16.1905	169.5341	
2525.00	359.44	187.06	[illegible]	[illegible]	[illegible]	15.[illegible]	48.22	789.23	103.83	16.1960	169.5297	
2526.00	360.08	187.02	[illegible]	[illegible]	[illegible]	15.[illegible]	48.98	796.91	105.97	16.2015	169.5253	
2527.00	360.75	186.99	[illegible]	[illegible]	[illegible]	15.[illegible]	49.75	804.60	108.12	16.2070	169.5209	
2528.00	361.44	186.95	[illegible]	[illegible]	[illegible]	15.[illegible]	50.52	812.36	110.26	16.2125	169.5165	
2529.00	362.15	186.92	[illegible]	[illegible]	[illegible]	15.[illegible]	51.28	820.04	112.40	16.2180	169.5121	
2530.00	362.88	186.88	[illegible]	[illegible]	[illegible]	15.[illegible]	52.05	827.73	114.55	16.2235	169.5077	
2531.00	363.62	186.85	[illegible]	[illegible]	[illegible]	15.[illegible]	52.82	835.49	116.69	16.2290	169.5033	
2532.00	364.39	186.82	[illegible]	[illegible]	[illegible]	15.[illegible]	53.58	843.17	118.83	16.2345	169.4989	
2533.00	365.18	186.78	[illegible]	[illegible]	[illegible]	15.[illegible]	54.35	850.86	120.98	16.2400	169.4945	
2534.00	365.98	186.75	[illegible]	[illegible]	[illegible]	15.[illegible]	55.12	858.62	123.12	16.2455	169.4901	
2535.00	366.80	186.72	[illegible]	[illegible]	[illegible]	15.[illegible]	55.88	866.30	125.26	16.2510	169.4857	
2536.00	367.64	186.68	[illegible]	[illegible]	[illegible]	15.[illegible]	56.65	873.99	127.41	16.2565	169.4813	
2537.00	368.49	186.65	[illegible]	[illegible]	[illegible]	15.[illegible]	57.42	881.75	129.55	16.2620	169.4769	
2538.00	369.36	186.62	[illegible]	[illegible]	[illegible]	15.[illegible]	58.18	889.43	131.69	16.2675	169.4725	
2539.00	370.25	186.58	[illegible]	[illegible]	[illegible]	15.[illegible]	58.95	897.12	133.84	16.2730	169.4681	
2540.00	371.16	186.55	[illegible]	[illegible]	[illegible]	15.[illegible]	59.72	904.88	135.98	16.2785	169.4637	
2541.00	372.08	186.52	[illegible]	[illegible]	[illegible]	15.[illegible]	60.48	912.56	138.12	16.2840	169.4593	
2542.00	373.01	186.48	[illegible]	[illegible]	[illegible]	15.[illegible]	61.25	920.25	140.27	16.2895	169.4549	

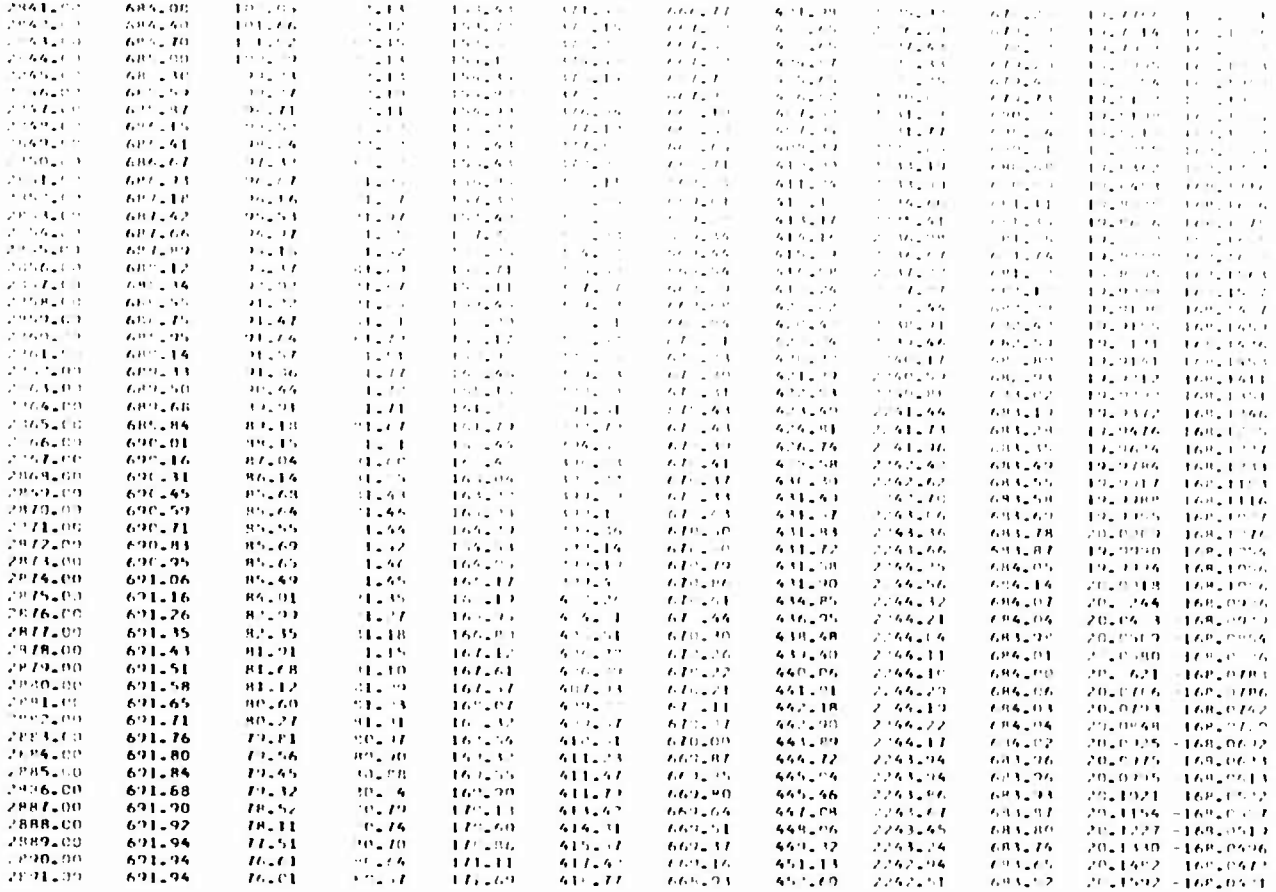


2594.00	434.26	181.34	[illegible]	[illegible]	176.24	561.70	136.09	1191.20	363.08	17.2067	169.9660
2595.00	437.65	181.21	[illegible]	[illegible]	176.21	565.00	137.34	1198.82	365.40	17.2158	169.9650
2596.00	439.03	181.09	[illegible]	[illegible]	176.24	566.16	138.38	1205.98	367.38	17.2231	169.9642
2597.00	440.43	180.93	[illegible]	[illegible]	176.21	566.35	139.46	1213.25	369.80	17.2302	169.9637
2598.00	441.82	180.85	[illegible]	[illegible]	176.21	570.62	140.69	1220.77	372.09	17.2379	169.9630
2599.00	443.21	180.86	[illegible]	[illegible]	176.21	572.98	141.97	1228.62	374.48	17.2505	169.9626
2600.00	444.61	180.76	[illegible]	[illegible]	176.21	575.30	143.18	1236.32	376.83	17.2606	169.9619
2601.00	446.00	180.65	[illegible]	[illegible]	176.21	577.64	144.16	1243.38	378.98	17.2671	169.9614
2602.00	447.41	180.56	[illegible]	[illegible]	176.21	579.64	145.33	1250.71	381.22	17.2747	169.9606
2603.00	448.81	180.43	[illegible]	[illegible]	176.21	581.91	146.63	1258.21	383.50	17.2823	169.9605
2604.00	450.21	180.33	[illegible]	[illegible]	176.21	584.02	147.65	1265.21	385.64	17.2898	169.9602
2605.00	451.62	180.27	[illegible]	[illegible]	176.21	586.25	148.82	1272.61	387.89	17.2982	169.9594
2606.00	453.02	180.20	[illegible]	[illegible]	176.21	588.46	149.81	1279.62	390.03	17.3110	169.9590
2607.00	454.43	180.05	[illegible]	[illegible]	176.21	590.69	150.98	1286.69	392.19	17.3191	169.9586
2608.00	455.84	179.94	[illegible]	[illegible]	176.21	592.73	152.26	1294.12	394.45	17.3290	169.9583
2609.00	457.25	179.80	[illegible]	[illegible]	176.21	594.96	153.46	1301.20	396.61	17.3374	169.9581
2610.00	458.66	179.69	[illegible]	[illegible]	176.21	597.03	154.66	1308.40	398.80	17.3466	169.9572
2611.00	460.07	179.61	[illegible]	[illegible]	176.21	599.20	155.85	1315.63	401.01	17.3560	169.9561
2612.00	461.48	179.55	[illegible]	[illegible]	176.21	601.41	156.89	1322.61	403.13	17.3644	169.9546
2613.00	462.90	179.44	[illegible]	[illegible]	176.21	603.53	157.88	1329.32	405.18	17.3715	169.9536
2614.00	464.31	179.34	[illegible]	[illegible]	176.21	605.60	158.95	1336.18	407.27	17.3795	169.9530
2615.00	465.72	179.26	[illegible]	[illegible]	176.21	607.52	160.09	1343.23	409.42	17.3885	169.9523
2616.00	467.14	179.14	[illegible]	[illegible]	176.21	609.57	161.19	1350.05	411.50	17.3966	169.9511
2617.00	468.55	179.06	[illegible]	[illegible]	176.21	611.58	162.31	1356.71	413.53	18.0060	169.9500
2618.00	469.97	178.97	[illegible]	[illegible]	176.21	613.67	163.47	1363.69	415.65	18.0130	169.9491
2619.00	471.38	178.75	[illegible]	[illegible]	176.21	615.62	164.42	1370.14	417.62	18.0197	169.9484
2620.00	472.79	178.63	[illegible]	[illegible]	176.21	617.74	165.71	1377.21	419.77	18.0295	169.9469
2621.00	474.20	178.55	[illegible]	[illegible]	176.21	619.82	166.86	1384.11	421.88	18.0386	169.9463
2622.00	475.62	178.46	[illegible]	[illegible]	176.21	621.92	168.08	1391.10	424.01	18.0483	169.9457
2623.00	477.03	178.40	[illegible]	[illegible]	176.21	623.97	169.17	1397.90	426.08	18.0572	169.9450
2624.00	478.44	178.21	[illegible]	[illegible]	176.21	625.86	170.19	1404.21	428.00	18.0637	169.9437
2625.00	479.86	178.09	[illegible]	[illegible]	176.21	627.81	171.23	1410.68	429.98	18.0712	169.9432
2626.00	481.25	177.96	[illegible]	[illegible]	176.21	629.83	172.43	1417.40	432.02	18.0801	169.9426
2627.00	482.67	177.84	[illegible]	[illegible]	176.21	631.86	173.63	1424.15	434.08	18.0893	169.9420
2628.00	484.07	177.71	[illegible]	[illegible]	176.21	633.89	174.74	1430.92	436.15	18.0987	169.9412
2629.00	485.48	177.71	[illegible]	[illegible]	176.21	635.81	175.70	1437.28	438.08	18.1060	169.9405
2630.00	486.88	177.60	[illegible]	[illegible]	176.21	637.68	176.64	1443.50	439.98	18.1127	169.9389
2631.00	488.28	177.46	[illegible]	[illegible]	176.21	639.56	177.78	1449.71	441.87	18.1197	169.9384
2632.00	489.68	177.20	[illegible]	[illegible]	176.21	641.47	178.94	1456.13	443.83	18.1279	169.8379
2633.00	491.08	177.10	[illegible]	[illegible]	176.21	643.47	180.03	1462.80	445.86	18.1374	169.8373
2634.00	492.48	177.15	[illegible]	[illegible]	176.21	645.56	181.29	1469.69	447.96	18.1484	169.8359
2635.00	493.88	177.02	[illegible]	[illegible]	176.21	647.63	182.72	1476.67	450.09	18.1603	169.8341
2636.00	495.27	176.86	[illegible]	[illegible]	176.21	649.65	184.01	1482.73	451.94	18.1670	169.8323
2637.00	496.66	176.62	[illegible]	[illegible]	176.21	651.65	184.67	1488.17	453.66	18.1715	169.8310
2638.00	498.06	176.47	[illegible]	[illegible]	176.21	653.68	185.72	1494.52	455.53	18.1789	169.8295
2639.00	499.44	176.43	[illegible]	[illegible]	176.21	655.75	186.84	1501.03	457.51	18.1855	169.8280
2640.00	500.83	176.38	[illegible]	[illegible]	176.21	656.99	187.98	1507.51	459.49	18.1921	169.8261
2641.00	502.22	176.21	[illegible]	[illegible]	176.21	658.68	188.75	1513.10	461.20	18.2027	169.8249
2642.00	503.60	176.07	[illegible]	[illegible]	176.21	660.44	189.91	1519.33	463.09	18.2113	169.8232
2643.00	504.98	175.98	[illegible]	[illegible]	176.21	662.25	191.03	1525.38	464.94	18.2189	169.8598
2644.00	506.36	175.74	[illegible]	[illegible]	176.21	664.15	192.27	1531.69	466.86	18.2284	169.8561

2696.00	573.35	167.28	73.32	9 .60	233.12	548.27	248.57	1813.47	552.75	18.6471	-168.6867
2697.00	574.53	167.00	74.02	97.52	23 .33	55 .44	249.66	1818.11	554.16	18.6544	-168.6794
2698.00	575.70	166.66	74.14	97.76	233.11	551.02	250.96	1822.80	555.59	18.6630	-168.6732
2699.00	576.87	166.41	74.27	9 .21	233.33	552.45	252.23	1827.62	557.06	18.6726	-168.6696
2700.00	578.03	166.14	74.39	9 .72	233.56	553.81	253.37	1832.23	558.47	18.6807	-168.6650
2701.00	579.17	166.06	74.51	9 .76	234.11	555.19	254.27	1836.86	559.88	18.6883	-168.6640
2702.00	580.33	165.82	74.61	9 .21	235.26	556.54	255.32	1841.46	561.26	18.6959	-168.6611
2703.00	581.47	165.64	74.73	99.47	236.23	557.90	256.37	1846.01	562.66	18.7040	-168.6589
2704.00	582.62	165.56	74.87	11.42	237.44	559.31	257.42	1850.75	564.11	18.7132	-168.6595
2705.00	583.75	165.29	74.96	99.97	238.26	560.60	258.38	1855.07	565.43	18.7196	-168.6548
2706.00	584.87	164.95	75.06	10 .73	239.24	561.84	259.40	1859.29	566.71	18.7258	-168.6484
2707.00	586.00	164.67	75.14	101.23	240.20	563.15	260.48	1863.70	568.06	18.7334	-168.6441
2708.00	587.12	164.39	75.26	101.76	241.10	564.47	261.69	1868.17	569.42	18.7421	-168.6398
2709.00	588.24	164.19	75.39	101.96	242.02	565.82	262.88	1872.77	570.82	18.7516	-168.6380
2710.00	589.35	163.95	75.49	102.55	243.27	567.11	263.93	1877.11	572.15	18.7593	-168.6347
2711.00	590.45	163.68	75.60	10 .09	244.23	568.39	265.04	1881.46	573.47	18.7674	-168.6309
2712.00	591.55	163.46	75.73	103.06	245.55	569.72	266.29	1885.99	574.85	18.7774	-168.6290
2713.00	592.64	163.22	75.81	103.49	246.31	570.94	267.17	1890.09	576.10	18.7854	-168.6252
2714.00	593.73	163.06	75.93	103.69	247.35	572.23	268.20	1894.44	577.43	18.7916	-168.6236
2715.00	594.81	162.84	76.04	103.93	248.36	573.49	269.23	1898.72	578.73	18.7996	-168.6216
2716.00	595.89	162.56	76.15	104.14	249.47	574.76	270.43	1903.01	580.04	18.8086	-168.6182
2717.00	596.96	162.18	76.20	10 .19	250.37	575.98	271.29	1906.81	581.20	18.8131	-168.6110
2718.00	598.03	161.92	76.31	105.51	251.36	577.14	272.46	1911.09	582.50	18.8220	-168.6084
2719.00	599.09	161.67	76.41	105.83	252.13	578.35	273.46	1915.18	583.75	18.8293	-168.6052
2720.00	600.14	161.43	76. 1	106.21	253.13	579.57	274.51	1919.31	585.01	18.8372	-168.6025
2721.00	601.19	161.13	76.60	106.68	254.13	58 .76	275.61	1923.36	586.24	18.8451	-168.5985
2722.00	602.24	160.78	76.71	107.20	255.26	581.97	276.85	1927.48	587.50	18.8541	-168.5941
2723.00	603.27	160.18	76.81	107.32	256.56	583.13	278.48	1931.52	588.73	18.8644	-168.5844
2724.00	604.31	160.09	76.91	107.25	257.47	584.35	279.30	1935.60	589.97	18.8717	-168.5852
2725.00	605.34	160.02	77.01	108.15	258.32	585.54	280.04	1939.60	591.19	18.8783	-168.5861
2726.00	606.36	159.88	77.12	108.15	259.36	586.74	281.00	1943.67	592.43	18.8866	-168.5843
2727.00	607.38	159.69	77.22	108.30	260.35	587.91	281.97	1947.64	593.64	18.8944	-168.5852
2728.00	608.39	157.25	77.27	108.16	261.08	588.98	282.98	1951.27	594.75	18.9001	-168.5778
2729.00	609.40	158.94	77.38	108.51	262.22	590.14	284.16	1955.24	595.96	18.9091	-168.5749
2730.00	610.40	158.51	77.46	11 .21	263.26	591.25	285.40	1959.04	597.12	18.9174	-168.5689
2731.00	611.39	158.05	77.55	109.93	264.33	592.35	286.71	1962.85	598.28	18.9262	-168.5627
2732.00	612.38	157.80	77.65	111.17	265.45	593.50	287.79	1966.74	599.46	18.9347	-168.5609
2733.00	613.37	157.42	77.71	111.41	266.23	594.55	288.75	1970.33	600.56	18.9438	-168.5551
2734.00	614.34	157.18	77.82	111.36	267.44	595.69	289.87	1974.21	601.74	18.9499	-168.5542
2735.00	615.32	156.98	77.92	112.05	268.40	596.81	290.85	1978.03	602.90	18.9581	-168.5535
2736.00	616.28	156.82	78.04	112.21	269.46	597.95	291.83	1981.88	604.08	18.9666	-168.5539
2737.00	617.24	156.45	78.10	112.56	270.33	598.99	292.83	1985.42	605.16	18.9733	-168.5523
2738.00	618.20	155.97	78.18	113.23	271.41	600.33	294.11	1989.02	606.26	18.9818	-168.5431
2739.00	619.15	155.48	78.29	114.14	272.27	601.02	295.18	1992.41	607.29	18.9881	-168.5358
2740.00	620.09	155.35	78.36	114.93	273.33	602.13	296.11	1996.19	608.44	18.9967	-168.5322
2741.00	621.03	155.02	78.48	114.53	274.35	603.19	296.85	1997.48	609.44	19.0010	-168.5335
2742.00	621.96	154.61	78.46	115.06	274.74	604.13	298.04	2003.02	610.52	19.0095	-168.5282
2743.00	622.89	154.19	78.54	115.61	275.37	605.15	299.21	2006.52	611.59	19.0177	-168.5235
2744.00	623.81	153.79	78.74	11 .04	277.11	606.13	300.47	2010.09	612.68	19.0271	-168.5199
2745.00	624.72	153.34	78.71	11 .64	276.11	607.17	301.62	2013.49	613.71	19.0350	-168.5147
2746.00	625.64	153.20	78.33	116.38	277.33	608.27	302.66	2017.24	614.86	19.0449	-168.5171







2892.00	691.94	75.94	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2893.00	691.93	75.62	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2894.00	691.91	75.28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2895.00	691.89	74.97	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2896.00	691.86	74.69	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2897.00	691.82	74.47	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2898.00	691.78	74.60	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2899.00	691.73	74.52	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2900.00	691.68	74.33	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2901.00	691.61	73.78	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2902.00	691.54	73.19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2903.00	691.47	73.05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2904.00	691.39	73.49	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2905.00	691.30	73.87	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2906.00	691.21	73.91	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2907.00	691.11	73.89	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2908.00	691.00	73.95	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2909.00	690.89	73.87	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2910.00	690.77	73.50	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2911.00	690.65	73.10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2912.00	690.52	68.79	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2913.00	690.38	68.42	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2914.00	690.23	68.09	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2915.00	690.08	68.00	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2916.00	689.93	67.85	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2917.00	689.76	67.26	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2918.00	689.60	66.86	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2919.00	689.42	66.42	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2920.00	689.24	66.06	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2921.00	689.05	66.05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2922.00	688.86	65.77	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2923.00	688.66	65.34	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2924.00	688.46	64.74	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2925.00	688.24	64.26	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2926.00	688.06	64.36	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2927.00	687.80	64.27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2928.00	687.57	64.27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2929.00	687.33	64.23	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2930.00	687.08	63.60	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2931.00	686.84	63.13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2932.00	686.53	62.73	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2933.00	686.32	62.48	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2934.00	686.06	62.27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2935.00	685.78	61.94	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2936.00	685.50	61.42	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2937.00	685.22	61.25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2938.00	684.92	61.36	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2939.00	684.63	61.36	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2940.00	684.32	61.02	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2941.00	684.01	60.53	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2942.00	683.69	60.03	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

2994.00	659.06	50.82	73.71	21.[illegible]	561.[illegible]	611.14	551.[illegible]	[illegible].66	633.97	21.[illegible]	167.[illegible]
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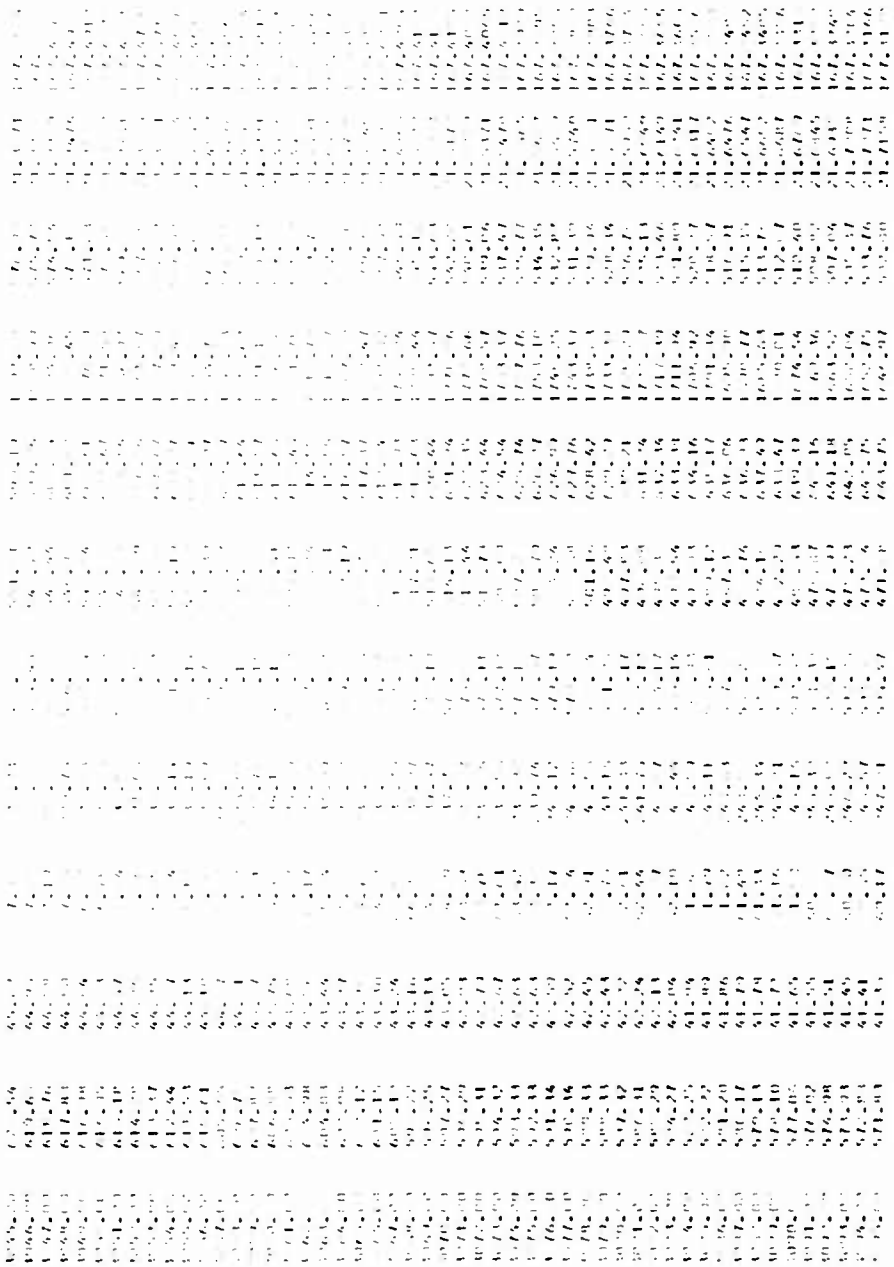
2999.00	655.88	49.92	73.[illegible]	21.[illegible]	561.[illegible]	611.[illegible]	552.91	[illegible].62	632.[illegible]	21.[illegible]	167.[illegible]
3000.00	655.23	49.96	73.60	21.[illegible]	561.[illegible]	611.[illegible]	553.[illegible]	[illegible].[illegible]	632.[illegible]	21.[illegible]	167.[illegible]
3001.00	654.57	49.92	73.51	21.[illegible]	561.11	611.[illegible]	553.[illegible]	[illegible].[illegible]	632.[illegible]	21.[illegible]	167.[illegible]
3002.00	653.90	49.83	73.[illegible]	21.[illegible]	561.03	611.[illegible]	553.[illegible]	[illegible].[illegible]	632.[illegible]	21.[illegible]	167.[illegible]
3003.00	653.24	49.69	73.[illegible]	21.[illegible]	560.[illegible]	611.[illegible]	553.90	[illegible].31	631.[illegible]	21.[illegible]	167.[illegible]
3004.00	652.56	49.52	73.[illegible]	21.[illegible]	560.[illegible]	611.03	554.[illegible]	[illegible].[illegible]	631.[illegible]	21.[illegible]	167.[illegible]
3005.00	651.89	49.32	73.32	21.[illegible]	560.76	610.[illegible]	554.[illegible]	[illegible].[illegible]	631.[illegible]	21.[illegible]	167.[illegible]
3006.00	651.20	49.11	73.[illegible]	21.[illegible]	560.[illegible]	610.[illegible]	554.89	[illegible].[illegible]	631.[illegible]	21.[illegible]	167.[illegible]
3007.00	650.51	48.98	73.71	21.[illegible]	560.[illegible]	610.77	555.[illegible]	[illegible].[illegible]	630.[illegible]	21.[illegible]	167.[illegible]
3008.00	649.82	48.85	73.[illegible]	21.[illegible]	560.[illegible]	610.[illegible]	555.[illegible]	[illegible].[illegible]	630.[illegible]	21.[illegible]	167.[illegible]
3009.00	649.10	48.65	73.56	21.[illegible]	560.[illegible]	610.[illegible]	556.[illegible]	[illegible].[illegible]	630.[illegible]	21.[illegible]	167.[illegible]
3010.00	648.41	48.41	73.[illegible]	21.[illegible]	559.[illegible]	610.47	556.[illegible]	[illegible].[illegible]	629.[illegible]	21.[illegible]	167.[illegible]
3011.00	647.70	48.20	73.[illegible]	21.[illegible]	559.[illegible]	610.31	557.[illegible]	[illegible].[illegible]	629.[illegible]	21.[illegible]	167.[illegible]
3012.00	646.97	48.01	73.[illegible]	21.[illegible]	559.[illegible]	610.[illegible]	557.[illegible]	[illegible].[illegible]	629.[illegible]	21.[illegible]	167.[illegible]
3013.00	646.26	47.87	73.[illegible]	21.[illegible]	559.[illegible]	610.[illegible]	558.[illegible]	[illegible].[illegible]	628.[illegible]	21.[illegible]	167.[illegible]
3014.00	645.51	47.75	73.[illegible]	21.[illegible]	559.[illegible]	609.[illegible]	558.[illegible]	[illegible].[illegible]	628.[illegible]	21.[illegible]	167.[illegible]
3015.00	644.80	47.[illegible]	73.[illegible]	21.[illegible]	558.[illegible]	609.[illegible]	559.[illegible]	[illegible].[illegible]	627.[illegible]	21.[illegible]	167.[illegible]
3016.00	644.06	47.96	73.[illegible]	21.[illegible]	558.[illegible]	609.[illegible]	559.[illegible]	[illegible].[illegible]	627.[illegible]	21.[illegible]	167.[illegible]
3017.00	643.31	47.78	73.66	21.[illegible]	558.[illegible]	608.[illegible]	560.[illegible]	[illegible].[illegible]	627.[illegible]	21.[illegible]	167.[illegible]
3018.00	642.58	47.67	73.56	21.[illegible]	557.[illegible]	608.[illegible]	560.[illegible]	[illegible].[illegible]	626.[illegible]	21.[illegible]	167.[illegible]
3019.00	641.81	47.61	73.41	21.[illegible]	557.[illegible]	608.[illegible]	561.[illegible]	[illegible].[illegible]	626.[illegible]	21.[illegible]	167.[illegible]
3020.00	641.06	47.54	73.29	21.[illegible]	557.[illegible]	608.[illegible]	561.[illegible]	[illegible].[illegible]	625.[illegible]	21.[illegible]	167.[illegible]
3021.00	640.30	47.40	73.21	220.01	556.[illegible]	607.[illegible]	562.[illegible]	[illegible].[illegible]	625.[illegible]	21.[illegible]	167.[illegible]
3022.00	639.52	47.28	73.10	220.28	556.[illegible]	607.[illegible]	562.[illegible]	[illegible].[illegible]	624.[illegible]	21.[illegible]	167.[illegible]
3023.00	638.76	47.18	73.01	220.55	555.[illegible]	606.[illegible]	563.[illegible]	[illegible].[illegible]	624.[illegible]	21.[illegible]	167.[illegible]
3024.00	637.96	47.06	72.90	220.88	555.[illegible]	606.[illegible]	563.[illegible]	[illegible].[illegible]	623.[illegible]	21.[illegible]	167.[illegible]
3025.00	637.20	46.98	69.79	221.26	554.[illegible]	606.[illegible]	564.[illegible]	[illegible].[illegible]	623.[illegible]	21.[illegible]	167.[illegible]
3026.00	636.41	46.93	69.68	221.72	554.[illegible]	605.[illegible]	564.[illegible]	[illegible].[illegible]	622.[illegible]	21.[illegible]	167.[illegible]
3027.00	635.61	46.79	69.56	222.03	553.[illegible]	605.[illegible]	565.[illegible]	[illegible].[illegible]	622.[illegible]	21.[illegible]	167.[illegible]
3028.00	634.83	46.59	69.45	222.23	553.[illegible]	604.[illegible]	565.[illegible]	[illegible].[illegible]	621.[illegible]	21.[illegible]	167.[illegible]
3029.00	634.01	46.49	69.32	222.69	552.[illegible]	604.[illegible]	566.[illegible]	[illegible].[illegible]	621.[illegible]	21.[illegible]	167.[illegible]
3030.00	633.21	46.44	69.18	223.31	551.[illegible]	603.[illegible]	566.[illegible]	[illegible].[illegible]	620.[illegible]	21.[illegible]	167.[illegible]
3031.00	632.39	46.39	69.06	223.79	551.[illegible]	603.[illegible]	567.[illegible]	[illegible].[illegible]	620.[illegible]	21.[illegible]	167.[illegible]
3032.00	631.56	46.34	68.96	224.24	550.[illegible]	602.[illegible]	567.[illegible]	[illegible].[illegible]	619.[illegible]	21.[illegible]	167.[illegible]
3033.00	630.77	46.12	68.87	224.03	549.[illegible]	602.[illegible]	568.[illegible]	[illegible].[illegible]	619.[illegible]	21.[illegible]	167.[illegible]
3034.00	629.92	46.01	68.75	225.43	549.[illegible]	601.[illegible]	569.[illegible]	[illegible].[illegible]	618.[illegible]	21.[illegible]	167.[illegible]
3035.00	629.10	45.92	68.63	226.86	548.[illegible]	601.[illegible]	569.[illegible]	[illegible].[illegible]	618.[illegible]	21.[illegible]	167.[illegible]
3036.00	628.26	45.83	68.50	225.33	548.[illegible]	600.[illegible]	570.[illegible]	[illegible].[illegible]	617.[illegible]	21.[illegible]	167.[illegible]
3037.00	627.42	45.88	68.37	226.17	547.[illegible]	600.[illegible]	571.[illegible]	[illegible].[illegible]	617.[illegible]	21.[illegible]	167.[illegible]
3038.00	626.59	45.73	68.27	226.27	547.[illegible]	599.[illegible]	571.[illegible]	[illegible].[illegible]	616.[illegible]	21.[illegible]	167.[illegible]
3039.00	625.72	45.58	68.14	226.43	546.[illegible]	599.[illegible]	572.[illegible]	[illegible].[illegible]	616.[illegible]	21.[illegible]	167.[illegible]
3040.00	624.88	45.47	67.99	227.23	546.[illegible]	598.[illegible]	573.[illegible]	[illegible].[illegible]	615.[illegible]	21.[illegible]	167.[illegible]
3041.00	624.02	45.36	67.89	227.21	545.[illegible]	598.[illegible]	573.[illegible]	[illegible].[illegible]	615.[illegible]	21.[illegible]	167.[illegible]
3042.00	623.14	45.26	67.74	227.71	545.[illegible]	597.[illegible]	574.[illegible]	[illegible].[illegible]	614.[illegible]	21.[illegible]	167.[illegible]
3043.00	622.29	45.15	67.64	227.86	544.[illegible]	597.[illegible]	575.[illegible]	[illegible].[illegible]	614.[illegible]	21.[illegible]	167.[illegible]
3044.00	621.40	45.12	67.51	228.45	544.[illegible]	596.[illegible]	575.[illegible]	[illegible].[illegible]	613.[illegible]	21.[illegible]	167.[illegible]



3096.00	570.78	41.21	50.42	247.05	635.44	469.33	646.65	1641.53	500.34	21.7251	-167.1109
3097.00	569.72	41.17	50.32	247.62	633.17	467.79	645.69	1635.53	498.51	21.7338	-167.1054
3098.00	568.67	41.13	50.62	248.19	637.25	466.02	646.77	1629.43	496.65	21.7429	-167.0997
3099.00	567.61	41.09	50.67	248.76	637.80	464.28	647.50	1623.96	494.98	21.7494	-167.0951
3100.00	566.55	41.02	50.30	249.33	638.33	462.46	648.36	1618.28	493.25	21.7573	-167.0914
3101.00	565.48	40.98	50.15	249.15	639.23	460.77	649.01	1612.96	491.63	21.7635	-167.0887
3102.00	564.42	40.93	50.38	249.56	640.56	458.31	649.88	1607.18	489.87	21.7712	-167.0842
3103.00	563.34	40.80	50.29	249.73	641.15	456.96	650.95	1601.14	488.04	21.7817	-167.0810
3104.00	562.27	40.79	50.63	250.15	641.87	455.22	651.60	1595.64	486.35	21.7873	-167.0775
3105.00	561.20	40.72	50.43	250.57	643.62	453.26	652.63	1589.52	484.49	21.7966	-167.0731
3106.00	560.13	40.66	50.26	250.98	643.38	451.40	653.46	1583.76	482.73	21.8042	-167.0696
3107.00	559.06	40.63	50.07	251.40	644.11	449.47	654.33	1577.74	480.90	21.8117	-167.0662
3108.00	557.98	40.53	49.91	251.52	644.98	447.64	655.18	1572.02	479.15	21.8202	-167.0624
3109.00	556.90	40.52	49.71	252.11	645.69	445.67	656.07	1566.87	477.28	21.8276	-167.0584
3110.00	555.83	40.44	49.60	252.54	646.73	443.59	657.19	1560.43	475.32	21.8377	-167.0536
3111.00	554.75	40.42	49.31	253.09	647.42	441.64	658.03	1554.35	473.46	21.8448	-167.0489
3112.00	553.67	40.33	49.15	253.86	648.17	439.86	658.75	1547.75	471.75	21.8524	-167.0446
3113.00	552.58	40.23	48.98	254.25	649.00	438.01	659.56	1541.95	469.99	21.8607	-167.0401
3114.00	551.50	40.21	48.78	254.79	649.77	436.09	660.49	1535.67	468.07	21.8685	-167.0355
3115.00	550.42	40.17	48.60	255.18	650.61	434.09	661.24	1529.71	466.26	21.8774	-167.0312
3116.00	549.33	40.14	48.40	255.66	651.15	432.10	662.11	1523.48	464.36	21.8831	-167.0282
3117.00	548.25	40.09	48.21	256.02	651.96	430.14	662.95	1517.35	462.49	21.8909	-167.0241
3118.00	547.16	40.06	48.03	256.45	652.61	428.20	663.73	1511.25	460.63	21.8978	-167.0195
3119.00	546.08	39.99	47.82	256.80	653.56	426.17	664.73	1504.80	458.66	21.9071	-167.0155
3120.00	544.99	39.90	47.62	257.04	654.45	424.11	665.65	1498.52	456.75	21.9162	-167.0121
3121.00	543.90	39.89	47.42	256.53	655.11	422.11	666.46	1492.25	454.84	21.9232	-167.0074
3122.00	542.81	39.80	47.23	256.70	655.96	420.14	667.31	1486.10	452.96	21.9318	-167.0051
3123.00	541.72	39.75	47.03	257.09	656.73	418.11	668.17	1479.74	451.03	21.9397	-167.0008
3124.00	540.63	39.75	46.84	257.62	657.30	416.13	668.90	1473.49	449.12	21.9459	-167.0952
3125.00	539.54	39.70	46.63	258.00	658.16	414.02	669.84	1466.94	447.12	21.9546	-167.1909
3126.00	538.46	39.61	46.42	258.22	659.19	411.94	670.79	1460.46	445.15	21.9640	-167.1881
3127.00	537.37	39.56	46.22	258.57	659.91	409.93	671.59	1454.13	443.22	21.9715	-167.1841
3128.00	536.27	39.51	46.00	258.98	660.65	407.80	672.51	1447.48	441.19	21.9801	-167.1796
3129.00	535.19	39.47	45.80	259.32	661.38	405.77	673.32	1441.12	439.25	21.9877	-167.1757
3130.00	534.09	39.47	45.59	259.91	662.31	403.66	674.13	1434.49	437.23	21.9946	-167.1696
3131.00	533.01	39.42	45.38	260.26	662.77	401.58	674.97	1427.98	435.25	22.0025	-167.1656
3132.00	531.92	39.36	45.19	260.48	663.66	399.63	675.66	1421.82	433.37	22.0095	-167.1628
3133.00	530.84	39.33	44.97	260.96	664.22	397.45	676.57	1415.03	431.30	22.0177	-167.1576
3134.00	529.75	39.27	44.73	261.33	665.16	395.23	677.56	1408.10	429.19	22.0271	-167.1533
3135.00	528.66	39.18	44.52	261.52	666.05	393.10	678.47	1401.43	427.16	22.0363	-167.1507
3136.00	527.58	39.12	44.31	261.78	666.84	391.00	679.31	1394.87	425.16	22.0446	-167.1476
3137.00	526.49	39.06	44.09	262.11	667.66	388.85	680.18	1388.12	423.10	22.0529	-167.1437
3138.00	525.41	39.01	43.87	262.70	668.21	386.72	680.93	1381.42	421.06	22.0593	-167.1375
3139.00	524.33	39.02	43.64	263.05	669.03	384.54	681.81	1374.59	418.97	22.0678	-167.1335
3140.00	523.25	39.00	43.42	263.50	669.69	382.40	682.59	1367.86	416.92	22.0749	-167.1285
3141.00	522.16	38.97	43.20	263.88	670.35	380.27	683.36	1361.17	414.89	22.0822	-167.1242
3142.00	521.07	38.90	42.97	264.21	671.23	378.03	684.29	1354.17	412.77	22.0912	-167.1203
3143.00	520.01	38.82	42.74	264.38	672.14	375.84	685.20	1347.31	410.66	22.1005	-167.1178
3144.00	518.94	38.79	42.51	264.82	672.82	373.65	686.00	1340.43	408.56	22.1080	-167.1129
3145.00	517.86	38.74	42.27	265.20	673.71	371.34	686.96	1333.22	406.37	22.1172	-167.1086
3146.00	516.80	38.72	42.02	265.72	674.46	369.04	687.86	1326.02	404.17	22.1253	-167.1029

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1150.00	512.53	38.53	43.13	664.35	637.36	460.19	691.01	1398.53	395.79	22.1394	-166.0931
1151.00	511.47	38.50	43.08	665.23	638.19	459.74	691.74	1391.72	393.72	22.1418	-166.0942
1152.00	510.41	38.41	43.02	666.5	639.12	459.76	692.76	1384.25	391.44	22.1439	-166.0919
1153.00	509.36	38.40	42.98	667.37	639.97	459.53	693.54	1377.18	389.28	22.1461	-166.0898
1154.00	508.31	38.42	43.11	668.26	640.81	459.07	694.61	1369.52	387.06	22.1486	-166.0878
1155.00	507.25	38.36	42.97	669.13	641.63	458.79	695.25	1362.60	384.78	22.1508	-166.0855
1156.00	506.20	38.33	42.80	669.93	642.33	458.13	696.16	1354.89	382.49	22.1535	-166.0836
1157.00	505.17	38.38	42.95	670.81	643.02	456.95	697.03	1347.56	380.25	22.1556	-166.0965
1158.00	504.13	38.26	42.82	671.67	643.79	456.[illegible]	697.72	1340.62	378.14	22.2207	-166.0917
1159.00	503.09	38.18	42.78	672.54	644.47	455.63	698.63	1333.62	376.01	22.2231	-166.0930
1160.00	502.06	38.16	42.63	673.42	645.25	455.35	699.34	1326.93	373.79	22.2255	-166.0951
1161.00	501.03	38.09	42.56	674.27	646.02	454.90	700.12	1319.50	371.49	22.2264	-166.0969
1162.00	500.01	38.06	42.43	675.17	646.77	454.71	700.89	1311.96	369.38	22.2512	-166.0912
1163.00	498.99	38.01	42.35	676.04	647.56	454.26	701.53	1304.53	367.02	22.2535	-166.0938
1164.00	497.97	37.96	42.31	676.93	648.25	453.82	702.12	1296.55	364.71	22.2713	-166.0982
1165.00	496.95	37.97	42.31	677.63	648.92	453.39	703.69	1288.88	362.37	22.2780	-166.0917
1166.00	495.95	37.88	42.01	678.51	649.67	452.84	704.41	1280.87	359.93	22.2859	-166.0965
1167.00	494.94	37.92	42.24	679.38	650.37	452.41	705.30	1273.18	357.59	22.2931	-166.0809
1168.00	493.94	37.87	42.48	680.25	651.11	451.88	706.05	1265.90	355.37	22.3029	-166.0874
1169.00	492.95	37.86	42.21	681.14	651.81	451.68	706.82	1258.14	353.06	22.3101	-166.0819
1170.00	491.96	37.79	42.25	682.03	652.56	451.29	707.66	1250.84	350.78	22.3183	-166.9995
1171.00	490.98	37.72	42.68	682.89	653.24	450.89	708.50	1243.31	348.48	22.3283	-166.9968
1172.00	490.00	37.66	42.40	683.81	653.92	450.45	709.36	1235.66	346.14	22.3376	-166.9936
1173.00	489.03	37.63	42.33	684.72	654.60	450.05	710.13	1228.06	343.83	22.3450	-166.9891
1174.00	488.06	37.62	42.84	685.58	655.26	449.57	710.93	1220.28	341.46	22.3525	-166.9835
1175.00	487.11	37.60	42.55	686.49	655.93	449.03	711.79	1212.26	339.02	22.3608	-166.9778
1176.00	486.15	37.60	42.24	687.40	656.66	448.62	712.65	1204.05	336.52	22.3696	-166.9711
1177.00	485.20	37.55	41.98	688.31	657.37	448.09	713.38	1196.71	334.28	22.3766	-166.9665
1178.00	484.26	37.53	41.68	689.23	658.05	447.53	714.20	1188.67	331.83	22.3844	-166.9626
1179.00	483.33	37.49	41.38	690.15	658.86	447.06	715.09	1180.57	329.36	22.3934	-166.9591
1180.00	482.39	37.44	41.10	691.09	659.63	446.49	715.89	1172.80	326.99	22.4019	-166.9568
1181.00	481.48	37.40	40.80	692.02	660.39	445.98	716.71	1164.92	324.59	22.4104	-166.9507
1182.00	480.55	37.36	40.51	692.95	661.09	445.49	717.49	1157.06	322.19	22.4184	-166.9466
1183.00	479.65	37.32	40.23	693.86	661.79	444.93	718.25	1149.31	319.83	22.4264	-166.9427
1184.00	478.75	37.30	39.91	694.84	662.52	444.39	719.11	1141.00	317.30	22.4348	-166.9371
1185.00	477.85	37.28	39.63	695.78	663.17	443.93	719.85	1133.23	314.93	22.4424	-166.9329
1186.00	476.96	37.22	39.33	696.73	663.96	443.40	720.66	1125.27	312.50	22.4510	-166.9295
1187.00	476.09	37.19	39.00	697.67	664.73	442.70	721.56	1116.77	309.91	22.4600	-166.9242
1188.00	475.22	37.17	38.70	698.61	665.39	442.16	722.31	1108.79	307.48	22.4677	-166.9195
1189.00	474.36	37.14	38.39	699.45	666.10	441.57	723.12	1100.60	304.98	22.4759	-166.9147
1190.00	473.51	37.12	38.08	700.34	666.80	440.97	723.92	1092.62	302.49	22.4840	-166.9100
1191.00	472.66	37.07	37.77	701.14	667.57	440.35	724.74	1084.18	299.98	22.4928	-166.9061
1192.00	471.82	37.05	37.43	702.04	668.29	439.62	725.60	1075.57	297.36	22.5012	-166.9003
1193.00	471.00	37.02	37.10	702.81	669.08	439.01	726.47	1067.05	294.76	22.5102	-166.8956
1194.00	470.18	36.99	36.80	703.34	669.71	438.41	727.18	1059.13	292.34	22.5177	-166.8914
1195.00	469.37	36.94	36.49	703.56	670.49	437.81	727.98	1050.96	289.85	22.5266	-166.8882
1196.00	468.57	36.90	36.17	703.88	671.24	437.16	728.80	1042.60	287.30	22.5352	-166.8861
1197.00	467.78	36.87	35.84	704.31	671.93	436.47	729.61	1034.12	284.72	22.5434	-166.8789

3198.00	467.00	36.85	35.51	285.71	672.[illegible]	241.90	730.39	925.71	282.16	22.5515	166.8760
3199.00	466.23	36.85	35.13	285.22	671.13	233.16	731.12	917.37	279.61	22.5586	166.8681
3200.00	465.47	36.81	34.77	284.56	673.02	236.62	731.84	909.32	277.16	22.5661	166.8638
3201.00	466.72	36.77	34.54	284.23	674.06	233.80	732.68	900.77	274.55	22.5755	166.8604
3202.00	467.98	36.74	34.40	284.14	675.5[illegible]	231.17	733.50	892.15	271.93	22.5842	166.8560
3203.00	461.26	36.71	33.16	280.64	676.01	228.43	734.27	883.53	269.30	22.5919	166.8500
3204.00	462.54	36.69	33.21	280.28	676.79	225.63	735.12	874.71	266.61	22.6009	166.8496
3205.00	461.83	36.67	33.17	279.36	677.67	222.33	735.89	866.17	266.01	22.6071	166.8508

[illegible] 10.2.2[illegible] 10.41

0 [illegible] 100.00 0. 280.[illegible] 3.00 1.00

16.7150 -169.5255 1.0000 [illegible] [illegible]

19.9269 -168.9918 49.0000 [illegible] [illegible]

19.9269 -168.9971

3206.00	461.15	36.64	32.52	287.78	678.20	220.12	736.73	857.33	261.31	22.6178	-166.8456
3207.00	460.47	36.61	32.46	288.15	678.97	217.29	737.58	848.60	258.59	22.6267	-166.8309
3208.00	459.80	36.55	32.42	288.35	679.76	214.57	738.39	839.84	255.98	22.6359	-166.8178
3209.00	459.16	36.54	31.78	288.77	680.53	211.86	739.14	831.28	253.37	22.6446	-166.8026
3210.00	458.49	36.52	31.44	289.19	681.32	209.13	739.88	822.63	250.74	22.6534	-166.8175
3211.00	457.86	36.53	31.09	289.76	681.96	206.37	740.60	813.91	248.08	22.6584	-166.8103
3212.00	457.24	36.49	30.73	290.04	682.53	203.56	741.42	805.04	245.38	22.6675	-166.8070
3213.00	456.53	36.45	30.40	290.34	683.23	200.91	742.14	796.66	242.82	22.6754	-166.8040
3214.00	456.04	36.41	30.02	290.67	683.89	197.95	743.02	787.35	239.98	22.6851	-166.7996
3215.00	455.45	36.39	29.66	291.04	684.50	195.11	743.81	778.40	237.26	22.6935	-166.7938
3216.00	454.89	36.34	29.30	291.32	685.25	192.31	744.60	769.56	234.56	22.7024	-166.7899
3217.00	454.33	36.33	28.94	291.74	685.89	189.49	745.36	760.64	231.84	22.7104	-166.7866
3218.00	453.79	36.32	28.57	292.24	686.51	186.62	746.13	751.57	229.08	22.7183	-166.7786
3219.00	453.26	36.28	28.18	292.55	687.31	183.64	746.98	742.19	226.22	22.7278	-166.7743
3220.00	452.75	36.26	27.82	292.93	687.96	180.83	747.73	733.30	223.51	22.7358	-166.7694
3221.00	452.25	36.25	27.44	293.44	688.53	177.88	748.51	723.98	220.67	22.7439	-166.7633
3222.00	451.77	36.22	27.05	293.71	689.26	175.16	749.23	715.38	218.05	22.7520	-166.7595
3223.00	451.30	36.17	26.71	293.98	689.86	172.23	750.05	706.14	215.23	22.7614	-166.7556
3224.00	450.85	36.16	26.32	294.43	690.73	169.22	750.86	696.63	212.33	22.7700	-166.7499
3225.00	450.41	36.12	25.96	294.69	691.42	166.45	751.60	687.86	209.66	22.7784	-166.7462
3226.00	449.98	36.10	25.57	295.07	692.12	163.49	752.39	678.52	206.81	22.7871	-166.7412
3227.00	449.58	36.09	25.20	295.55	692.70	160.61	753.11	669.43	204.04	22.7946	-166.7353
3228.00	449.19	36.07	24.82	295.90	693.35	157.72	753.88	660.28	201.25	22.8031	-166.7306
3229.00	448.81	36.06	24.39	296.44	694.09	154.46	754.76	649.99	198.12	22.8121	-166.7241
3230.00	448.46	36.03	24.03	296.76	694.73	151.67	755.46	641.15	195.42	22.8202	-166.7197
3231.00	448.11	35.99	23.64	297.00	695.48	148.74	756.24	631.92	192.61	22.8293	-166.7161
3232.00	447.79	35.97	23.25	297.39	696.16	145.73	757.02	622.41	189.71	22.8379	-166.7109
3233.00	447.48	35.94	22.88	297.69	696.83	142.88	757.75	614.60	186.96	22.8463	-166.7067
3234.00	447.19	35.91	22.48	298.05	697.52	139.88	758.53	603.92	184.07	22.8550	-166.7019
3235.00	446.92	35.87	22.08	298.35	698.26	136.85	759.33	594.33	181.15	22.8642	-166.6976
3236.00	446.66	35.85	21.67	298.74	698.97	133.71	760.14	584.42	178.13	22.8732	-166.6924
3237.00	446.43	35.86	21.28	299.27	699.50	130.75	760.86	575.05	175.28	22.8804	-166.6858
3238.00	446.21	35.85	20.87	299.73	700.13	127.70	761.59	565.39	172.33	22.8886	-166.6801
3239.00	446.01	35.82	20.47	300.10	700.81	124.64	762.36	555.72	169.38	22.8973	-166.6752
3240.00	445.83	35.78	20.08	300.36	701.52	121.72	763.11	546.68	166.57	22.9062	-166.6713
3241.00	445.67	35.74	19.71	300.57	702.24	118.85	763.86	537.41	163.80	22.9151	-166.6679
3242.00	445.52	35.72	19.30	300.97	702.90	115.80	764.60	527.77	160.87	22.9234	-166.6626
3243.00	445.40	35.72	18.87	301.51	703.43	112.56	765.38	517.53	157.74	22.9317	-166.6559
3244.00	445.29	35.72	18.45	302.03	704.09	109.37	766.14	507.40	154.66	22.9398	-166.6495
3245.00	445.20	35.70	18.01	302.45	704.80	106.05	766.95	496.90	151.46	22.9491	-166.6439
3246.00	445.14	35.65	17.61	302.64	705.57	103.01	767.73	487.33	148.54	22.9586	-166.6405
3247.00	445.09	35.62	17.21	302.91	706.27	100.00	768.49	477.79	145.63	22.9675	-166.6365
3248.00	445.07	35.60	16.80	303.32	706.90	96.90	769.23	468.00	142.65	22.9759	-166.6311
3249.00	445.06	35.57	16.40	303.59	707.51	93.85	769.99	458.33	139.70	22.9847	-166.6270
3250.00	445.07	35.55	15.99	303.97	708.24	90.80	770.72	448.69	136.76	22.9933	-166.6219
3251.00	445.10	35.53	15.59	304.35	708.87	87.76	771.44	439.07	133.83	23.0015	-166.6168
3252.00	445.16	35.53	15.16	304.86	709.46	84.63	772.19	428.72	130.67	23.0098	-166.6103
3253.00	445.23	35.51	14.75	305.23	710.10	81.60	772.92	418.93	127.69	23.0182	-166.6052
3254.00	445.33	35.51	14.34	305.69	710.69	78.30	773.64	409.11	124.70	23.0262	-166.5993
3255.00	445.45	35.50	13.93	306.11	711.23	75.22	774.35	399.35	121.72	23.0343	-166.5937
3256.00	445.59	35.45	13.50	306.34	712.07	71.90	775.17	388.87	118.53	23.0444	-166.5899

3257.00	445.75	35.43	13.07	806.71	713.73	69.67	779.93	378.66	115.41	23.0532	166.5947
3259.00	445.94	35.41	12.94	807.03	713.41	67.41	780.68	368.11	112.27	23.0621	166.5795
3260.00	446.15	35.37	12.81	807.17	713.13	66.09	781.47	357.83	109.07	23.0717	166.5758
3261.00	446.37	35.36	11.76	807.23	713.76	58.71	778.23	347.11	105.80	23.0814	166.5691
3261.00	446.63	35.36	11.35	807.33	713.32	55.58	778.93	337.21	102.78	23.0882	166.5670
3262.00	446.90	35.36	10.94	807.37	713.[illegible]	52.48	779.63	327.37	99.78	23.0960	166.5569
3264.00	447.20	35.33	10.51	807.26	713.47	49.29	780.38	317.26	96.70	23.1052	-166.5525
3264.00	447.52	35.30	10.11	807.36	713.25	46.08	781.14	307.11	93.61	23.1145	-166.5481
3265.00	447.86	35.27	9.67	807.43	713.34	42.75	781.89	296.60	90.40	23.1235	166.5430
3266.00	448.23	35.27	9.[illegible]	807.[illegible]	713.[illegible]	39.33	782.60	285.83	87.09	23.1335	166.5375
3267.00	448.62	35.25	8.96	807.53	713.16	35.94	783.33	276.03	84.11	23.1401	-166.5322
3268.00	449.01	35.25	8.44	807.98	713.23	33.27	784.04	266.58	81.25	23.1482	166.5259
3269.00	449.46	35.21	8.13	808.26	712.94	30.09	784.79	256.53	78.19	23.1576	166.5217
3270.00	449.92	35.26	7.64	808.60	713.73	27.04	785.42	246.85	75.24	23.1635	166.5129
3271.00	450.40	35.21	7.13	808.93	713.[illegible]	23.80	786.24	235.00	71.63	23.1742	-166.5088
3272.00	450.91	35.21	6.77	809.69	713.14	20.32	786.91	225.56	68.75	23.1819	-166.5027
3273.00	451.44	35.18	6.33	809.94	712.[illegible]	16.89	787.69	214.70	65.44	23.1915	166.4972
3.74.00	451.99	35.19	5.96	810.52	713.34	14.04	788.36	205.68	62.69	23.1986	166.4915
3275.00	452.56	35.15	5.54	810.75	713.07	10.76	789.12	195.25	59.51	23.2083	-166.4876
3276.00	453.14	35.11	5.14	811.07	713.71	7.66	789.87	185.53	56.55	23.2176	-166.4818
3277.00	453.75	35.18	4.77	811.27	713.43	3.91	790.62	173.63	52.92	23.2274	-166.4759
3278.00	454.37	35.09	4.29	811.79	713.17	0.91	791.28	164.12	50.02	23.2346	-166.4723
3.79.00	455.00	35.07	3.94	811.89	712.69	-1.81	791.98	155.56	47.41	23.2429	-166.4680
3280.00	455.62	35.05	3.58	812.62	713.17	-4.65	792.64	146.57	44.67	23.2508	-166.4633
3281.00	456.27	35.04	3.25	812.83	713.71	-7.35	793.29	138.07	42.08	23.2582	-166.4579
3282.00	457.00	35.03	2.93	813.24	713.32	-10.65	794.02	127.62	38.90	23.2668	-166.4522
3283.00	457.72	35.01	2.62	813.57	713.96	-13.11	794.73	119.88	36.54	23.2749	-166.4477

[illegible]2.91 13.2.21 10.41
0 7 100.00 0. 280.00 3.00 1.00
16.7350 -169.5255 3.000 [illegible]2642E.00 [illegible]5968.50
19.9269 -169.9971 40.0000 32C600.00 328800.00
19.9271 -168.9982

Appendix B

CALIBRATIONS AND PROBE TRACKS, C-BAND

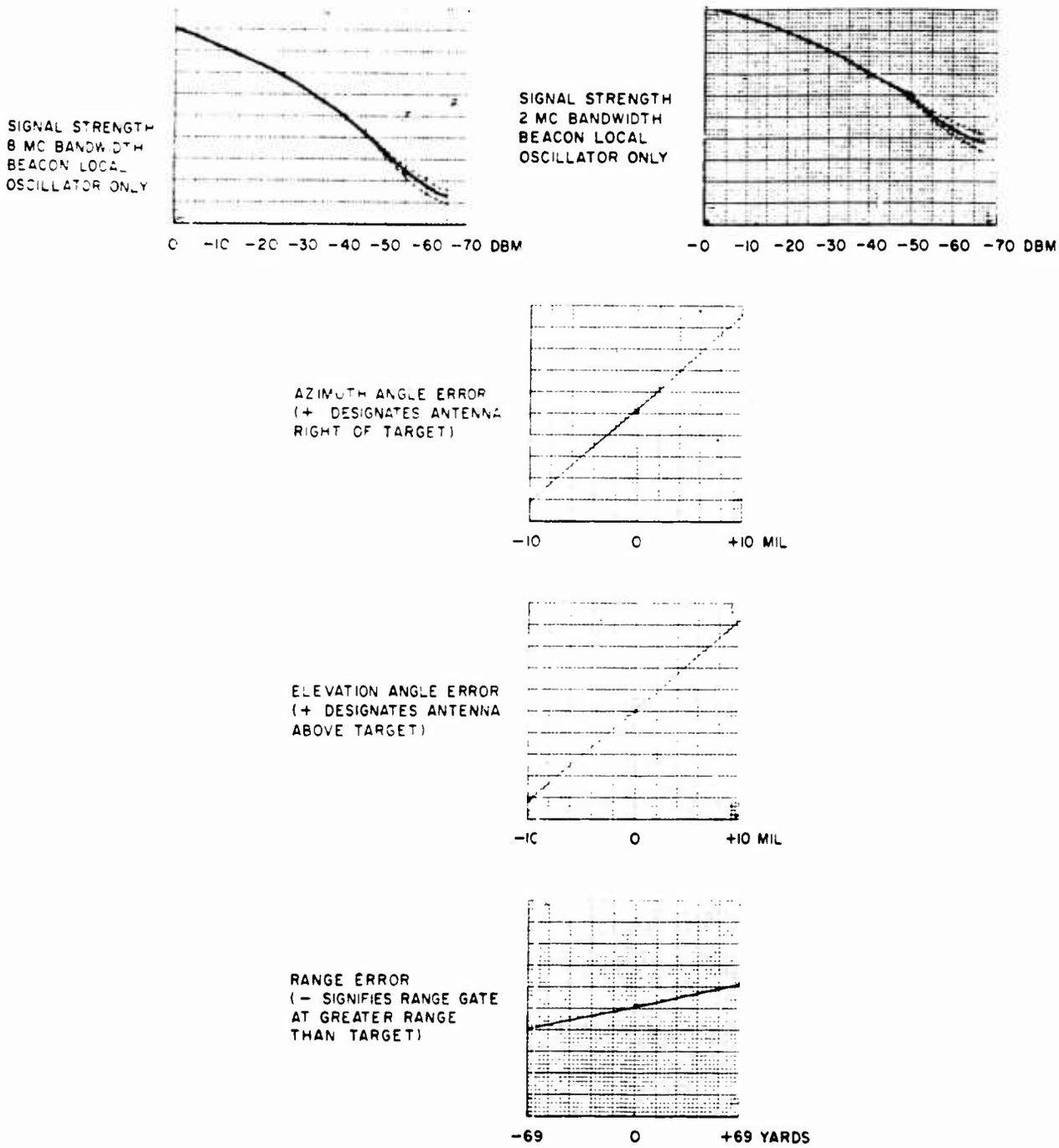


Figure B.1 Calibrations.

1 - AGC
2 - AZ ERROR
3 - EL ERROR
4 - RANGE ERROR

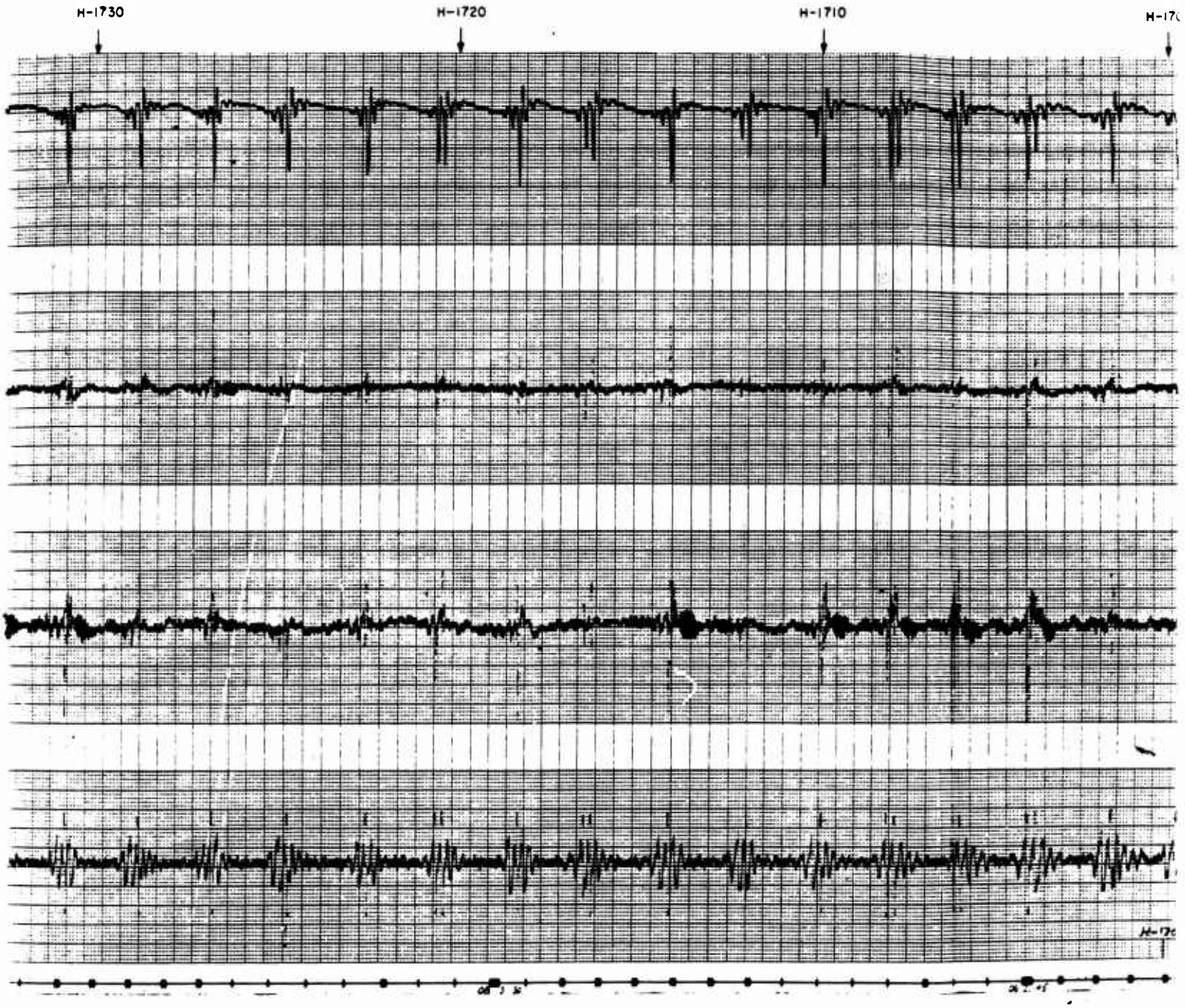
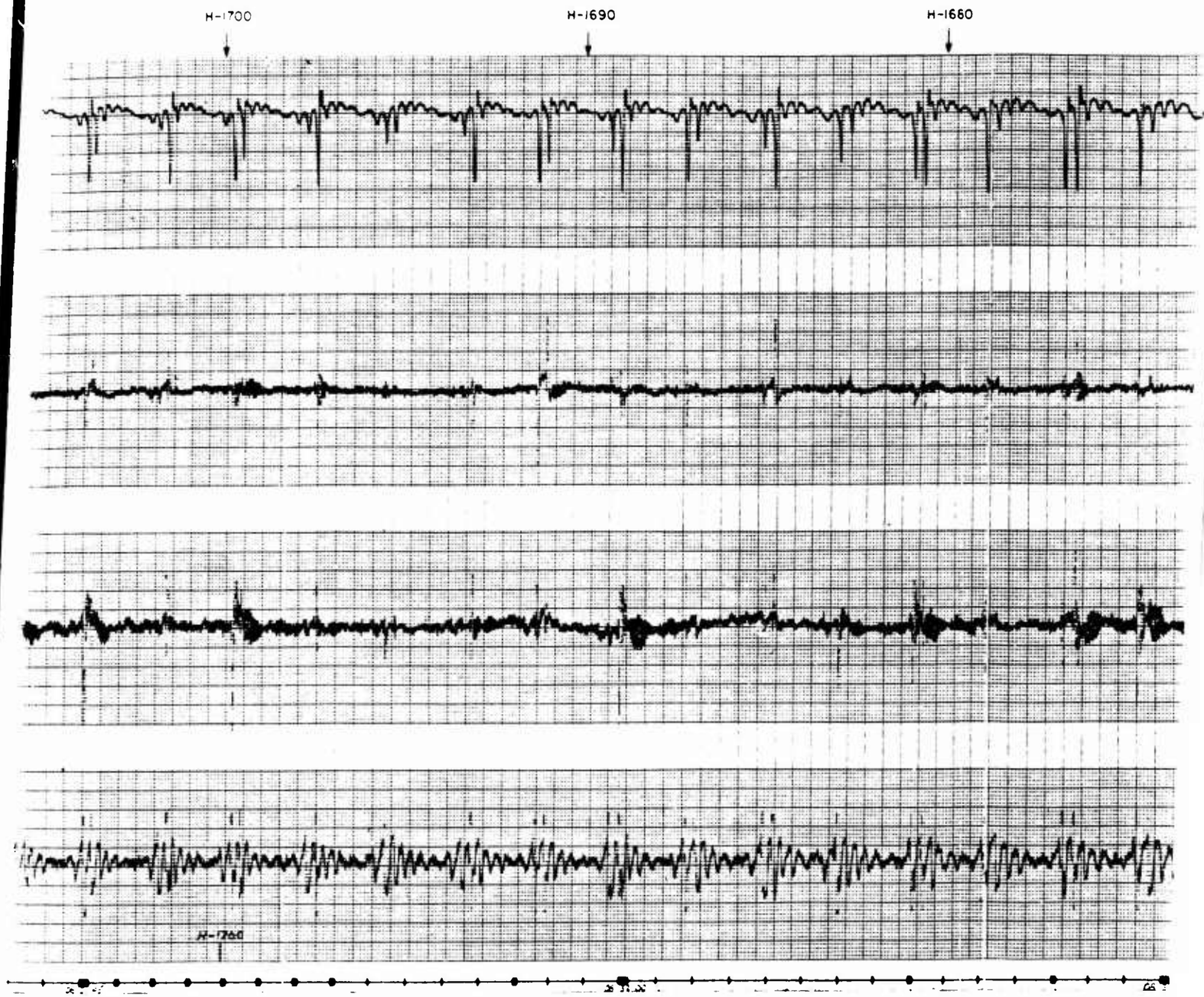
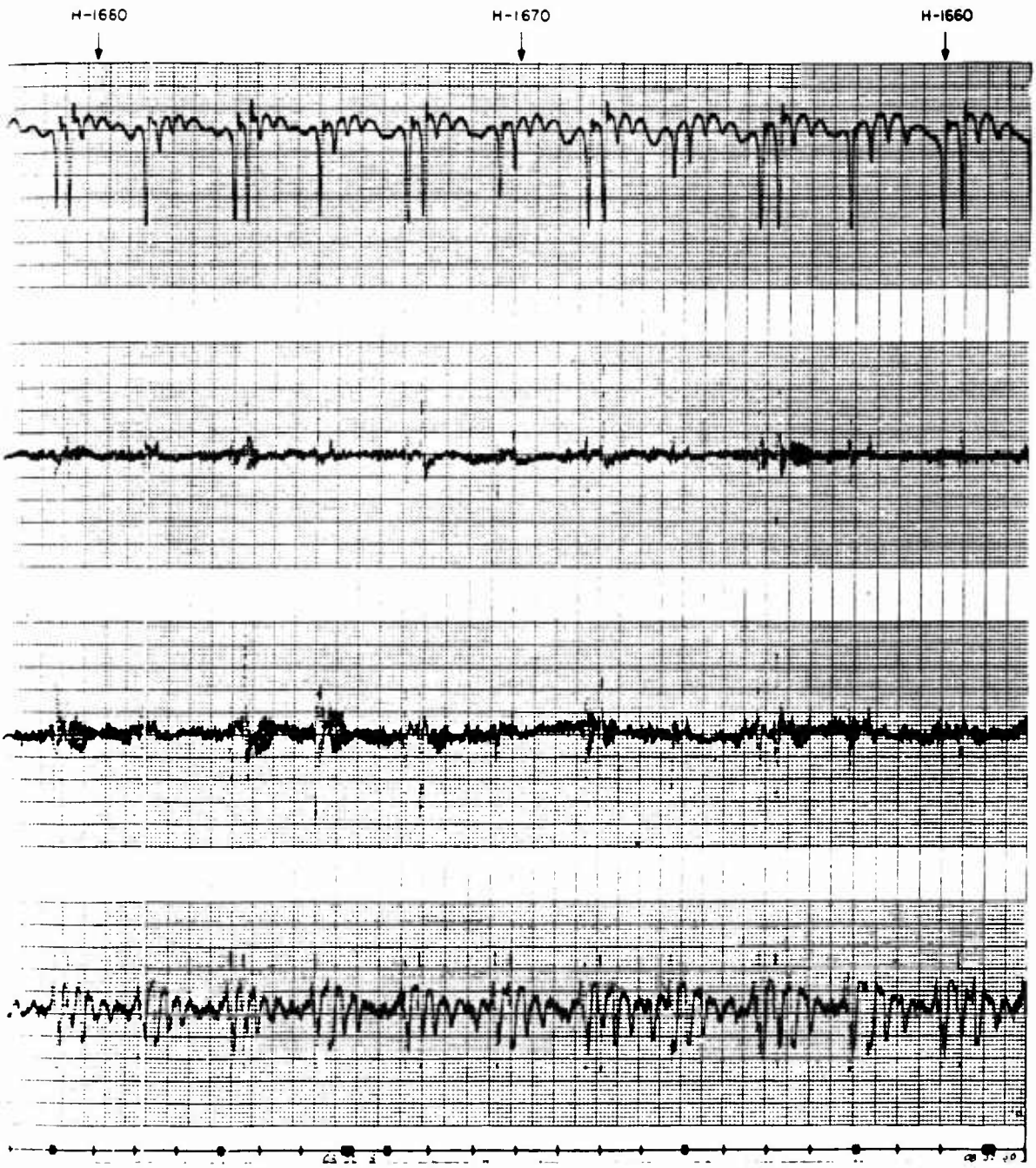
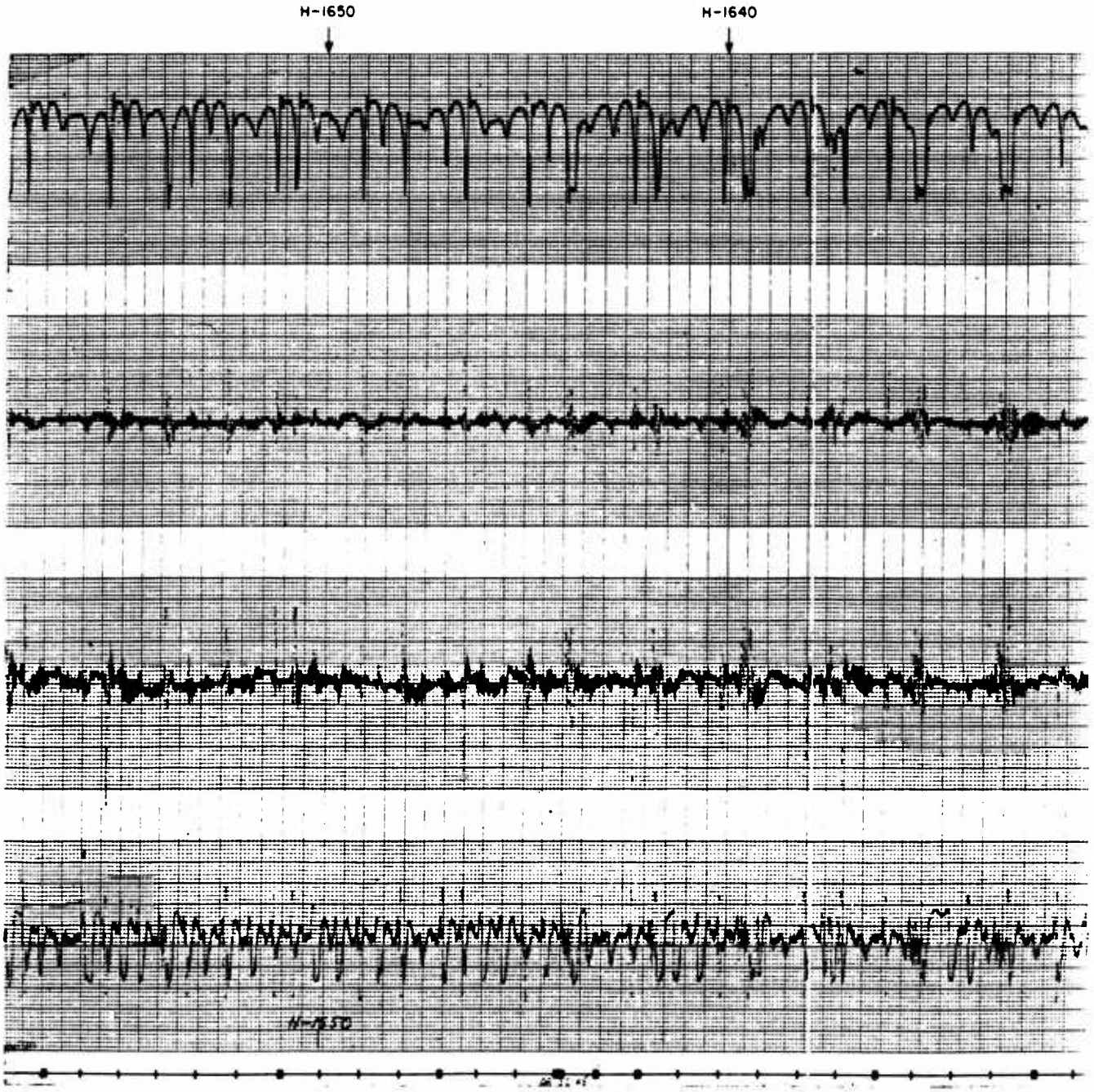


Figure B.2 Track, Probe 1.



Tube 1.


H-1650
H-1670
H-1660



1-AGC
2-AZ ERROR
3-EL ERROR
4-RANGE ERROR

136-1

[redacted]

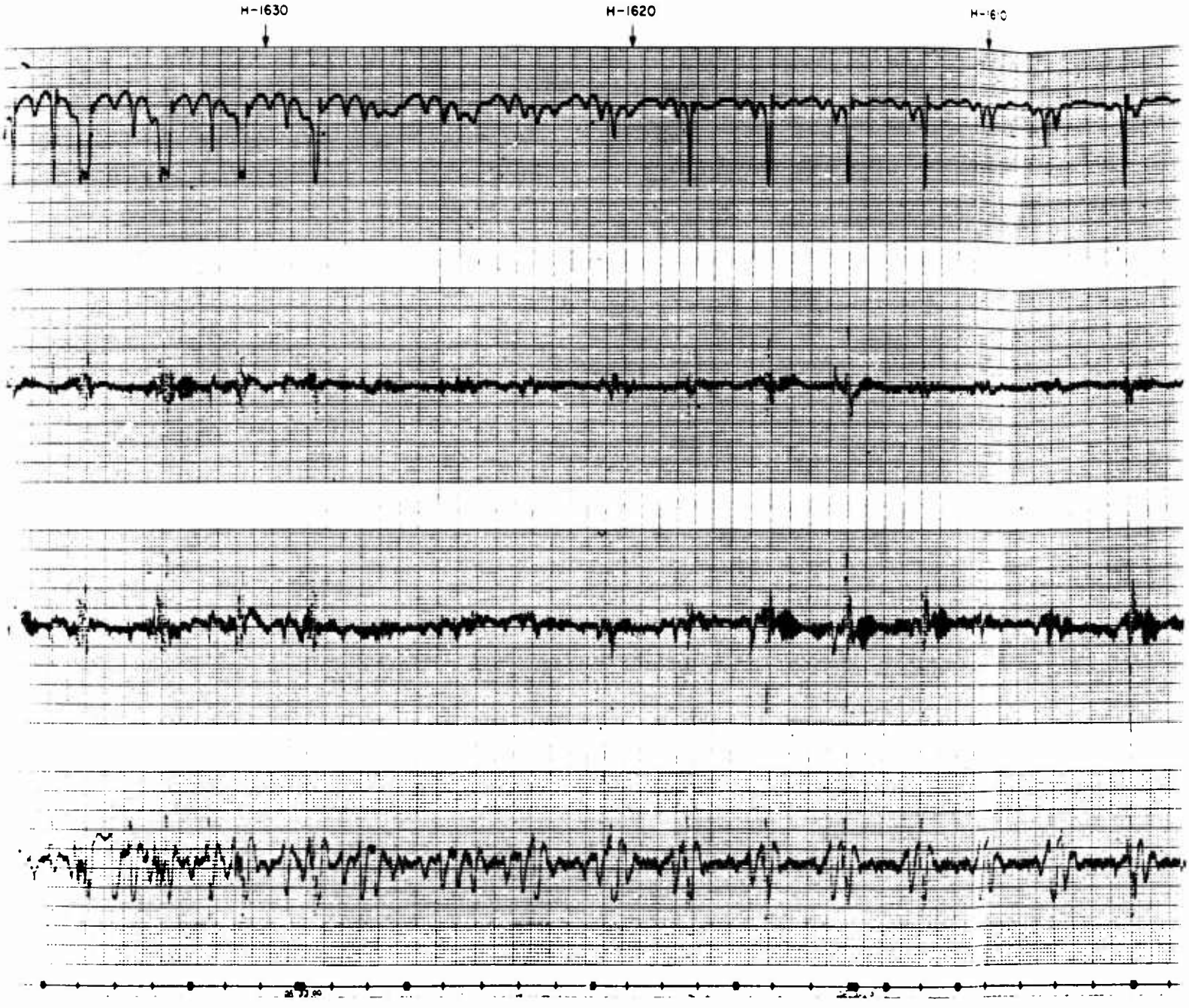
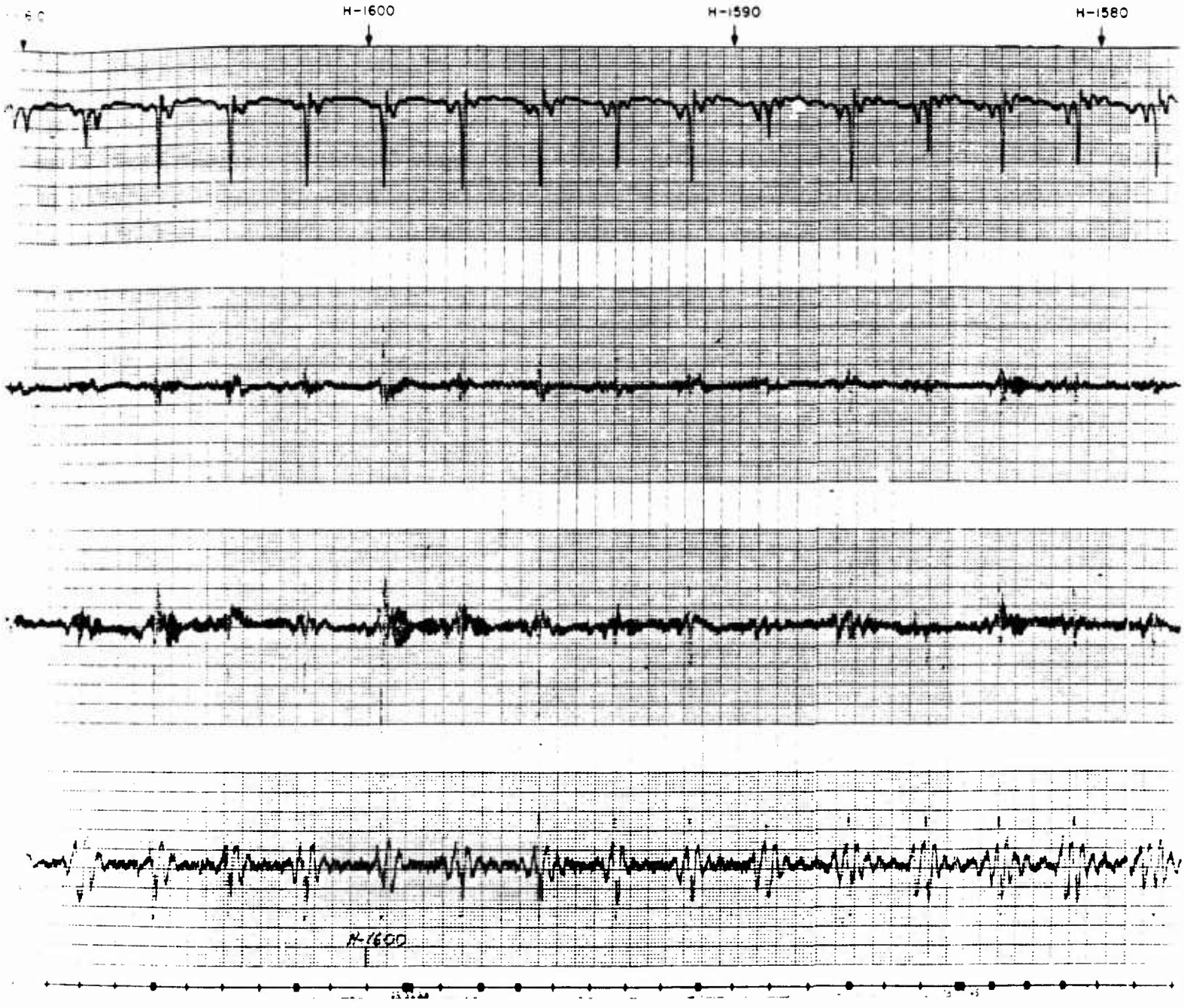
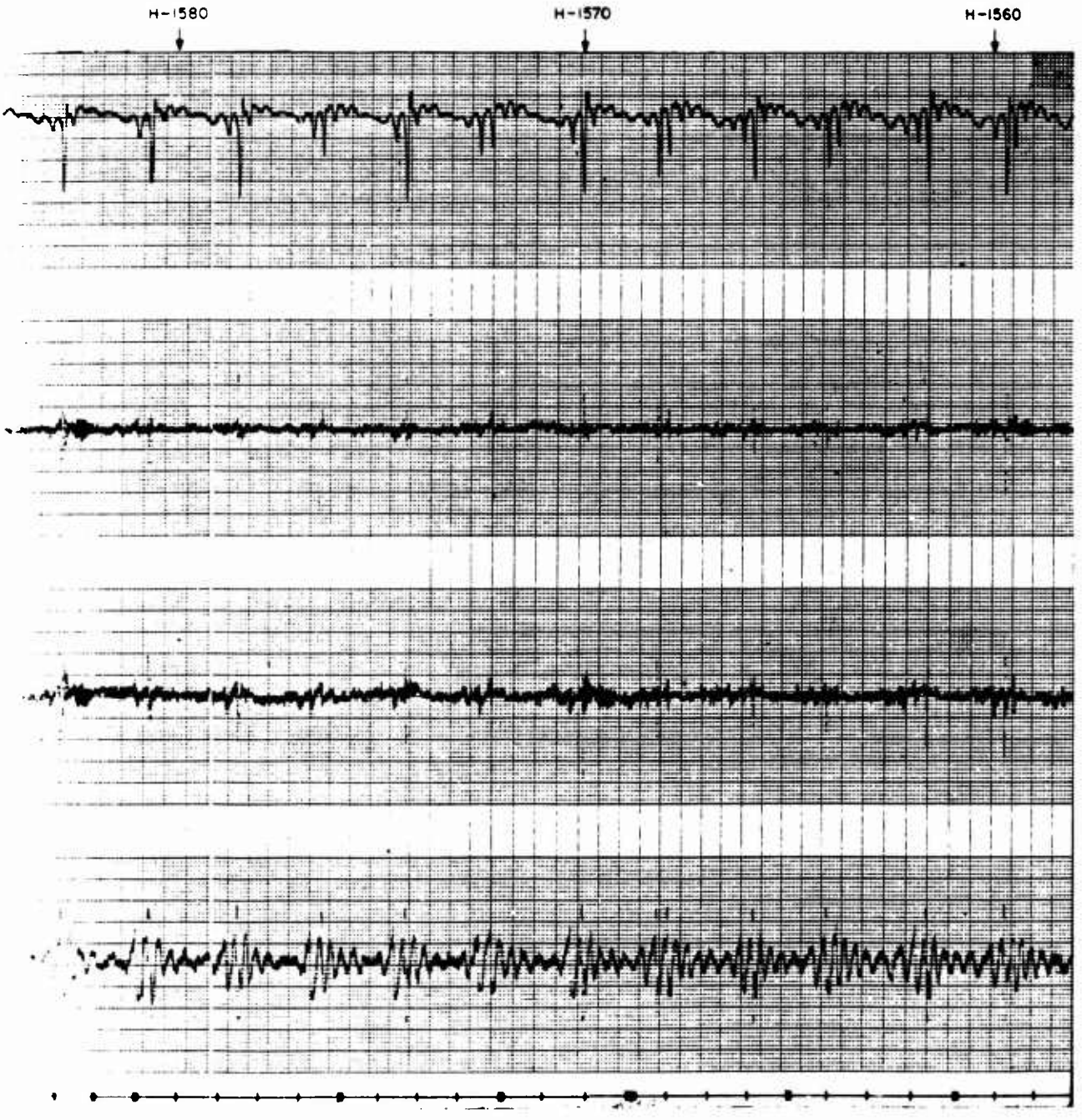
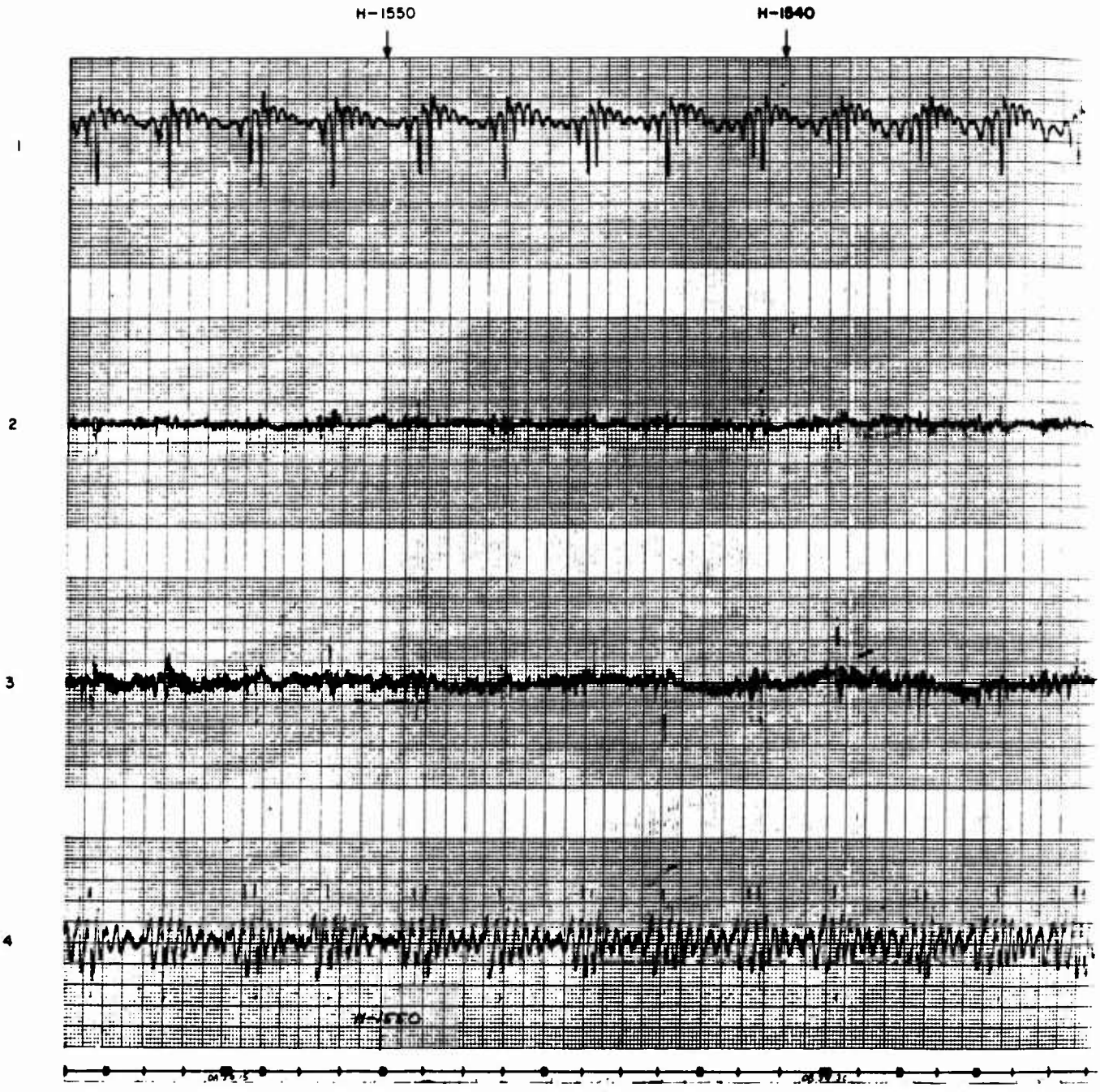


Figure B.2 Continued.

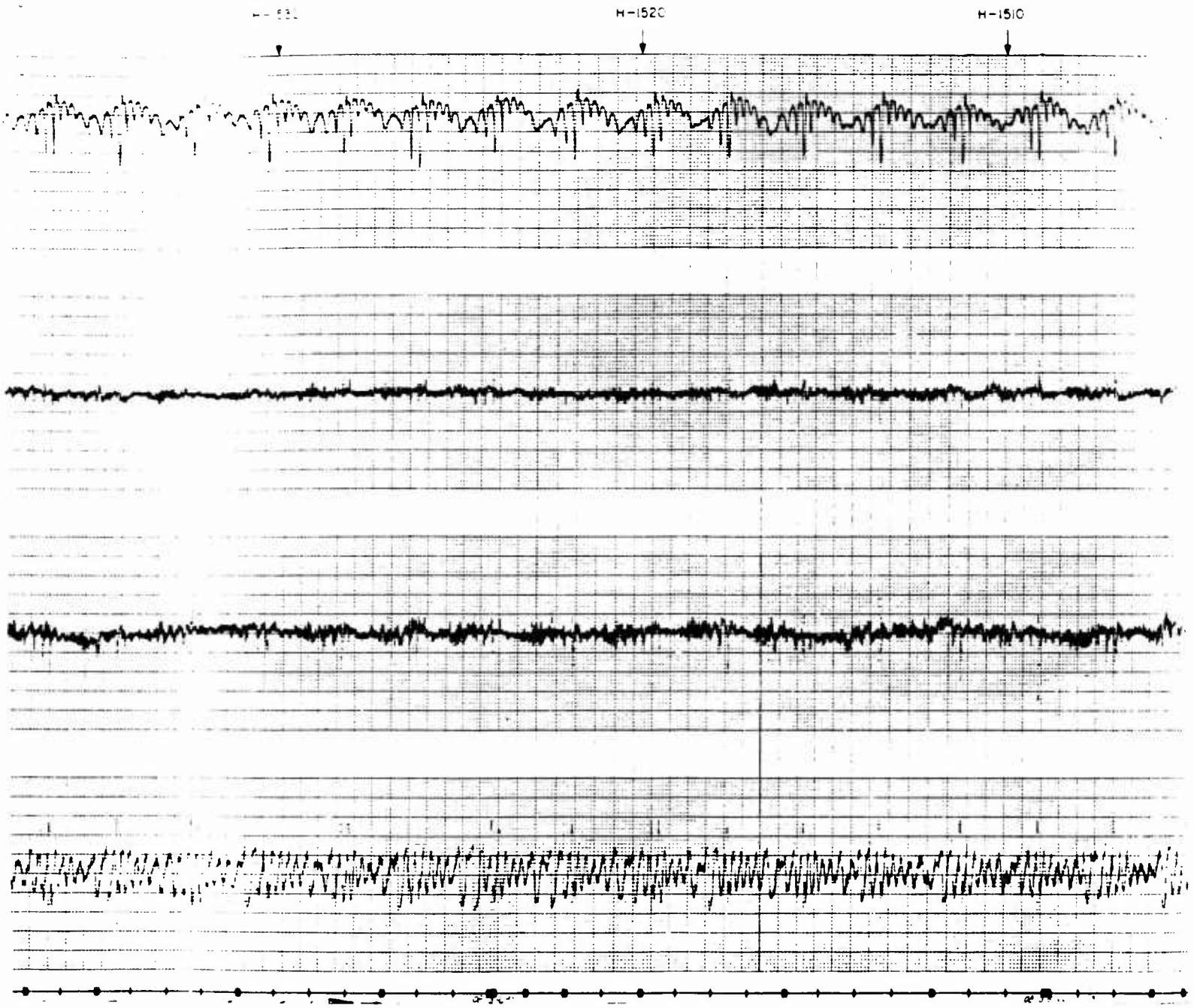


-3


H-1580
H-1570
H-1560



1-AGC
2-AZ ERROR
3-EL ERROR
4-RANGE ERROR



137-2

[redacted]

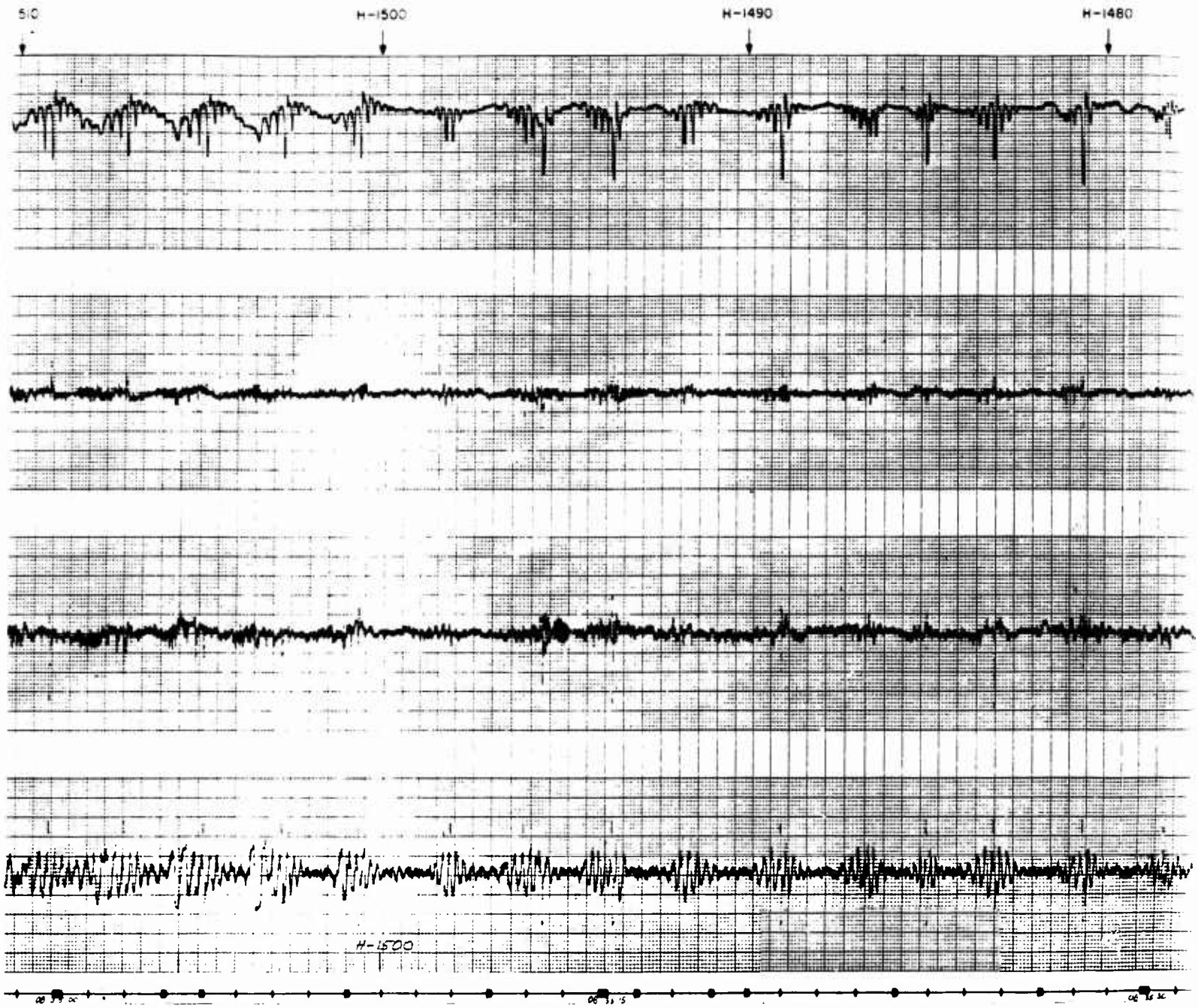
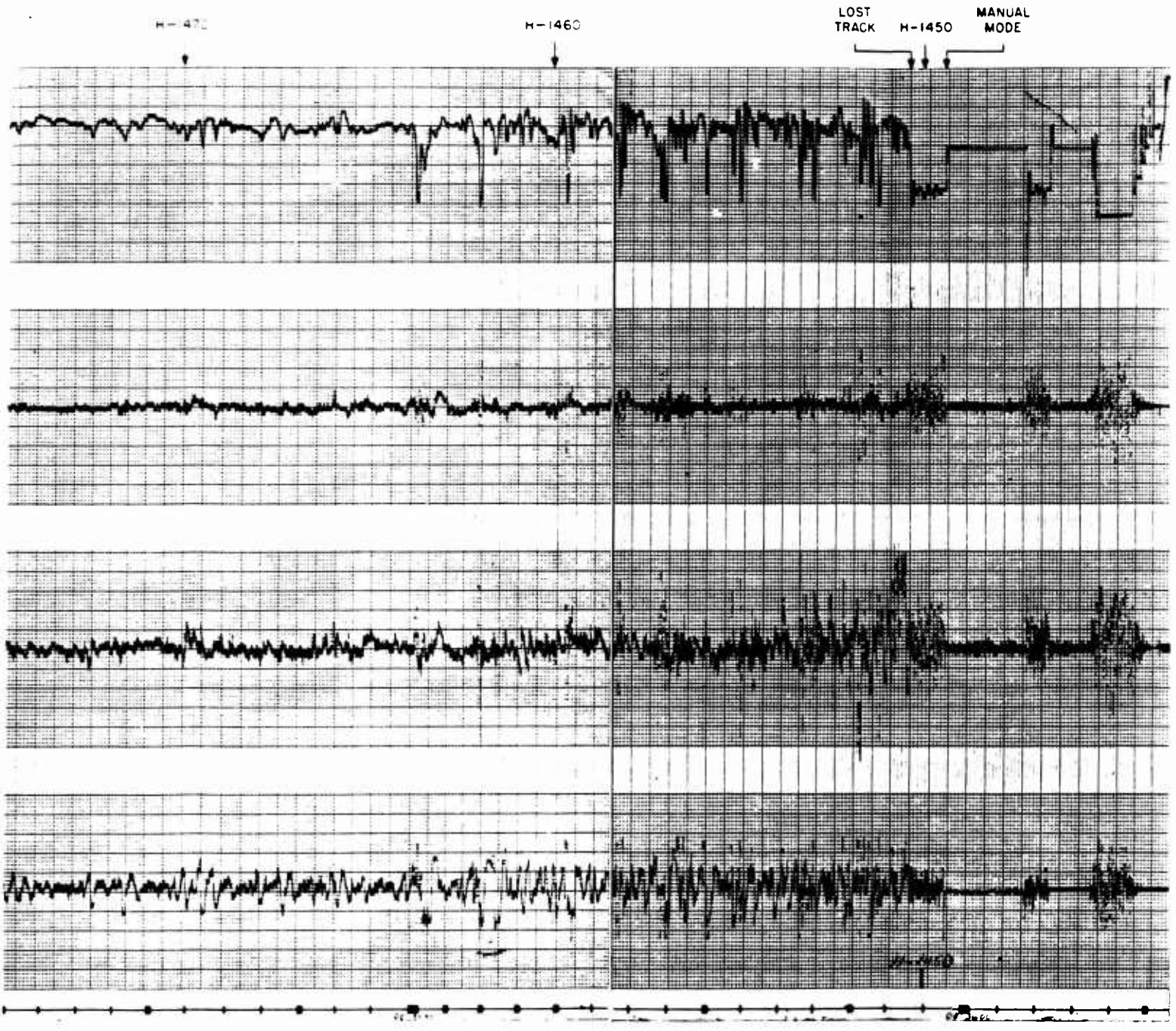
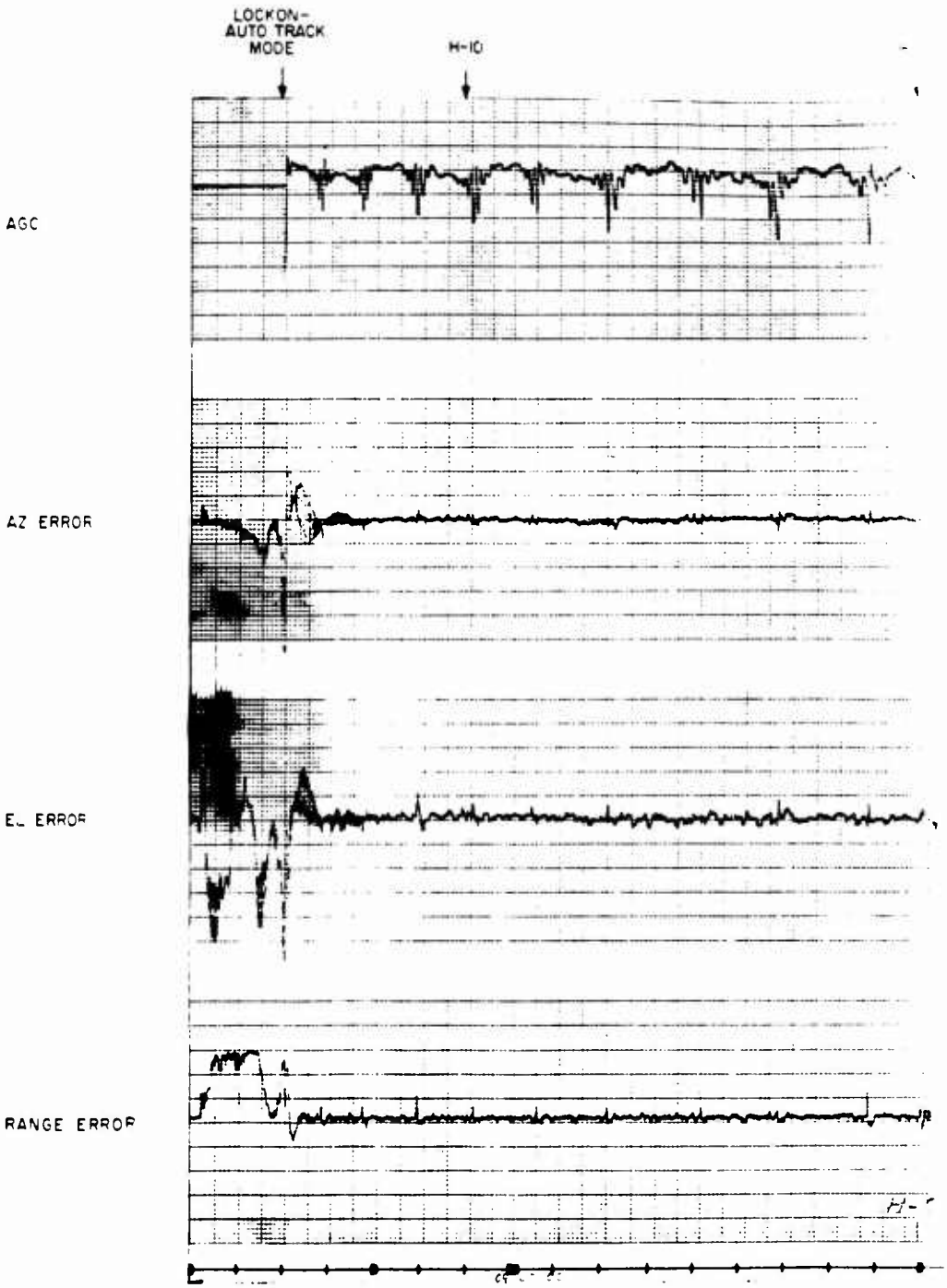


Figure B.2 Continued.


H-1460
LOST TRACK
H-1450
MANUAL MODE



Figur

138-1

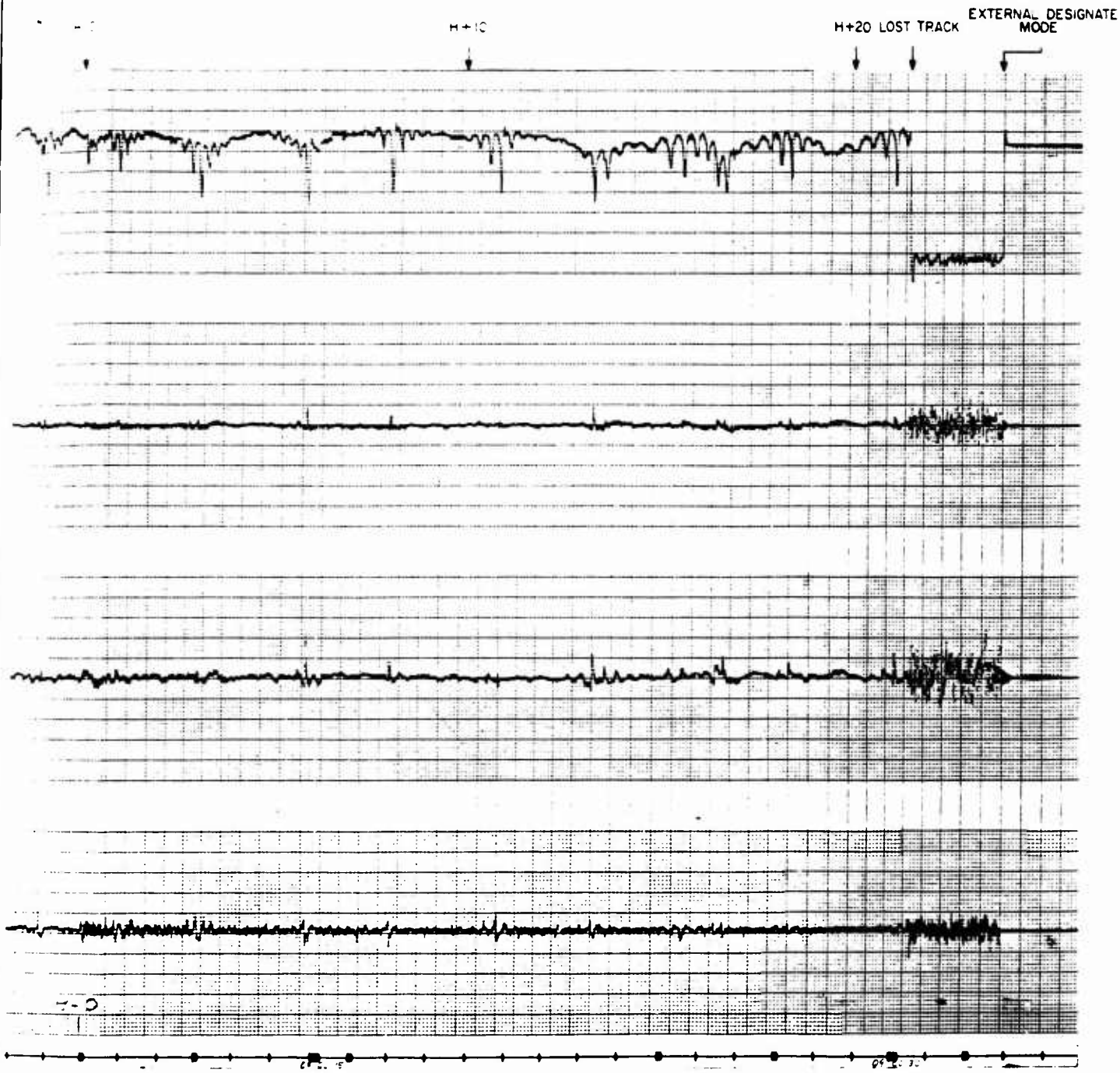
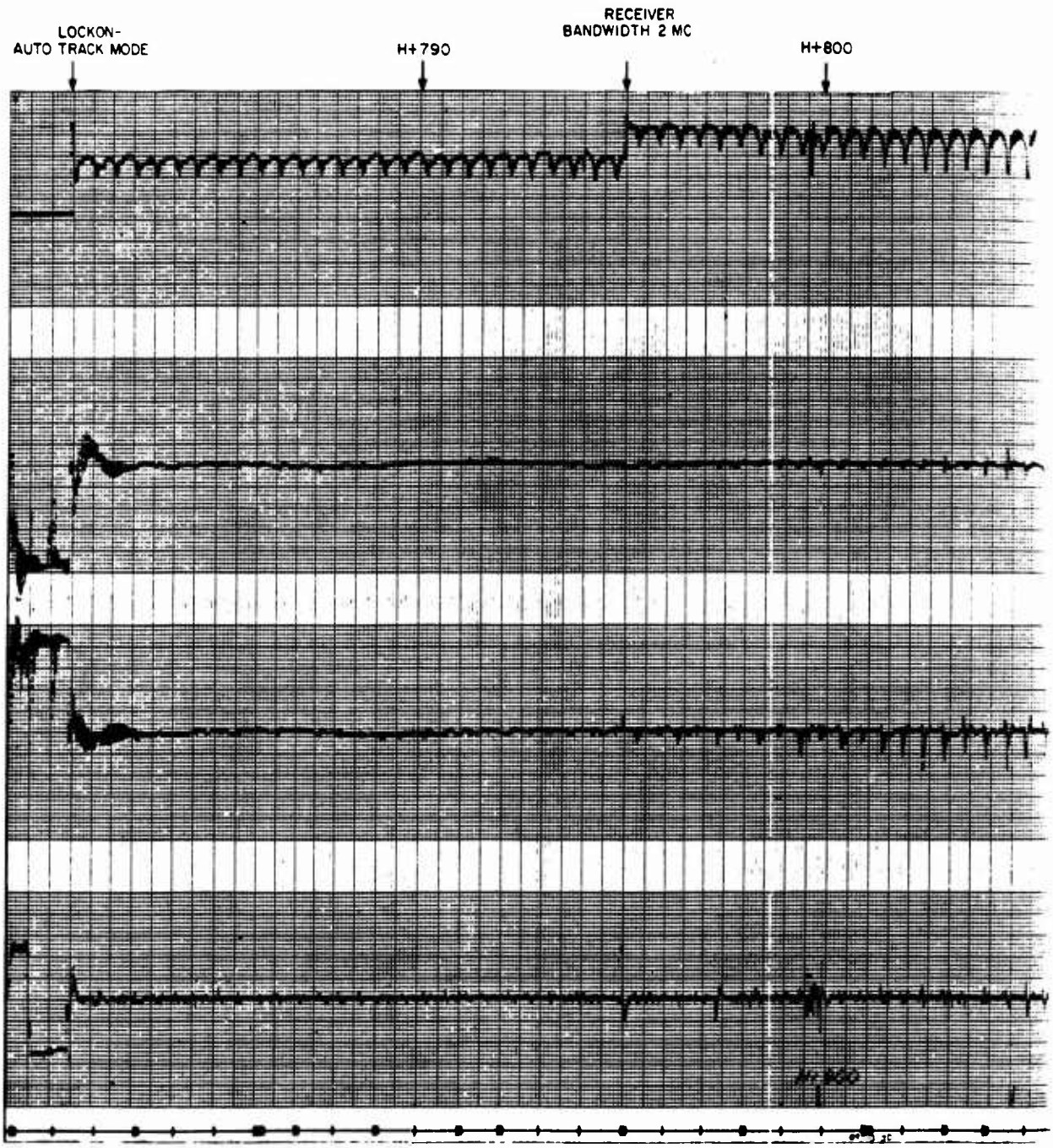


Figure B.3 Track, Probe 3.



1 - AGC
2 - AZ ERROR
3 - EL ERROR
4 - RANGE ERROR

139-1

[redacted]

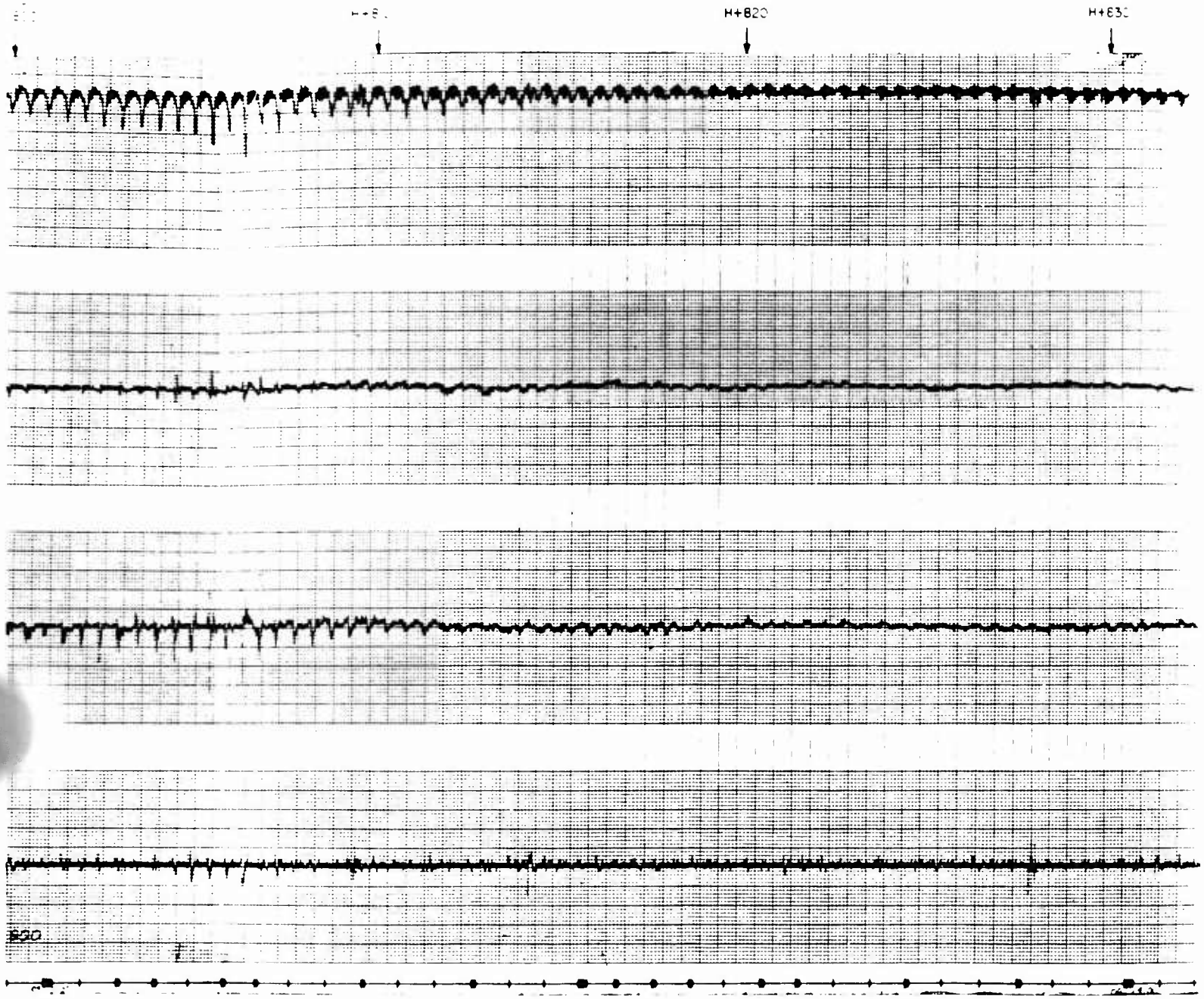
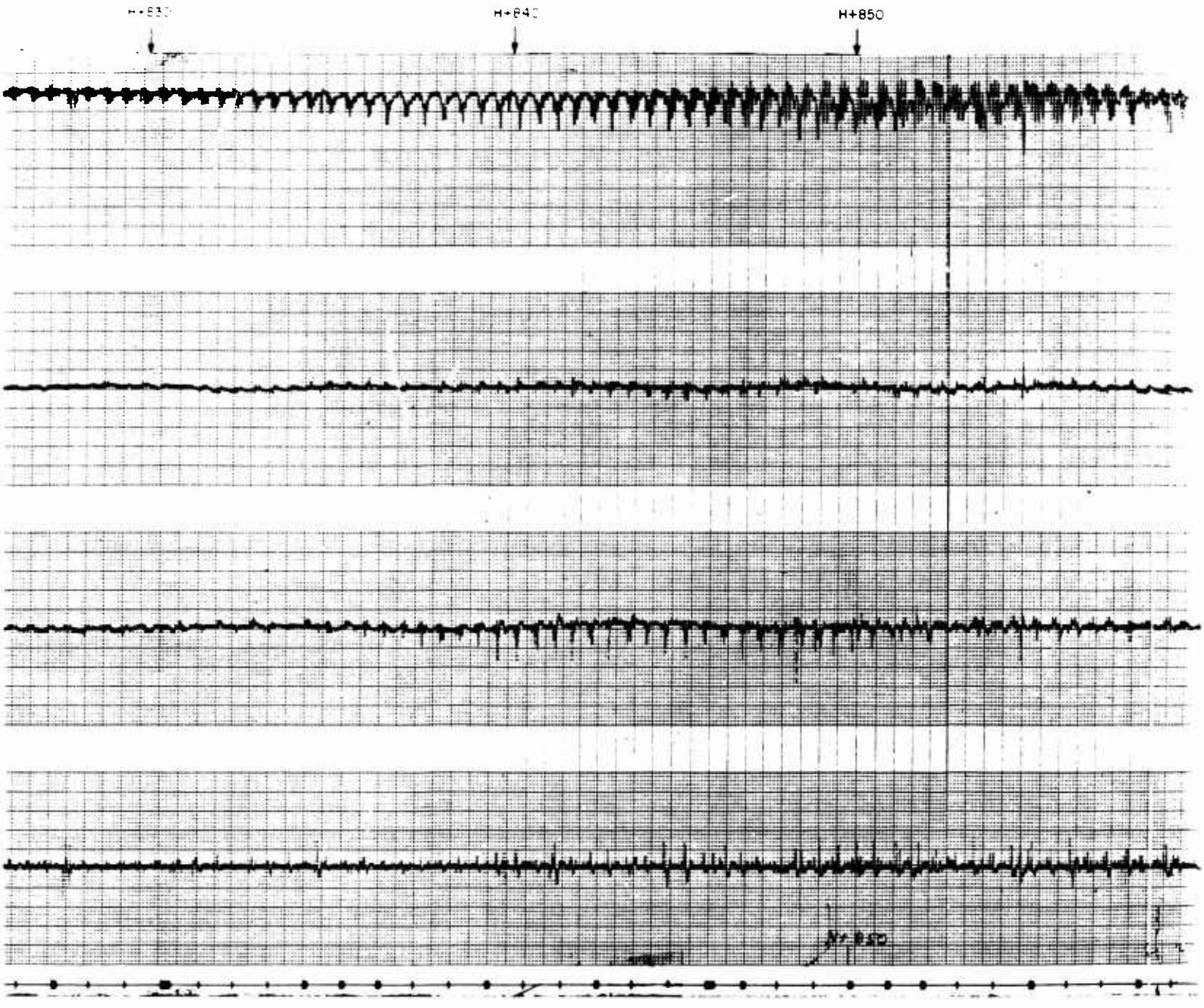


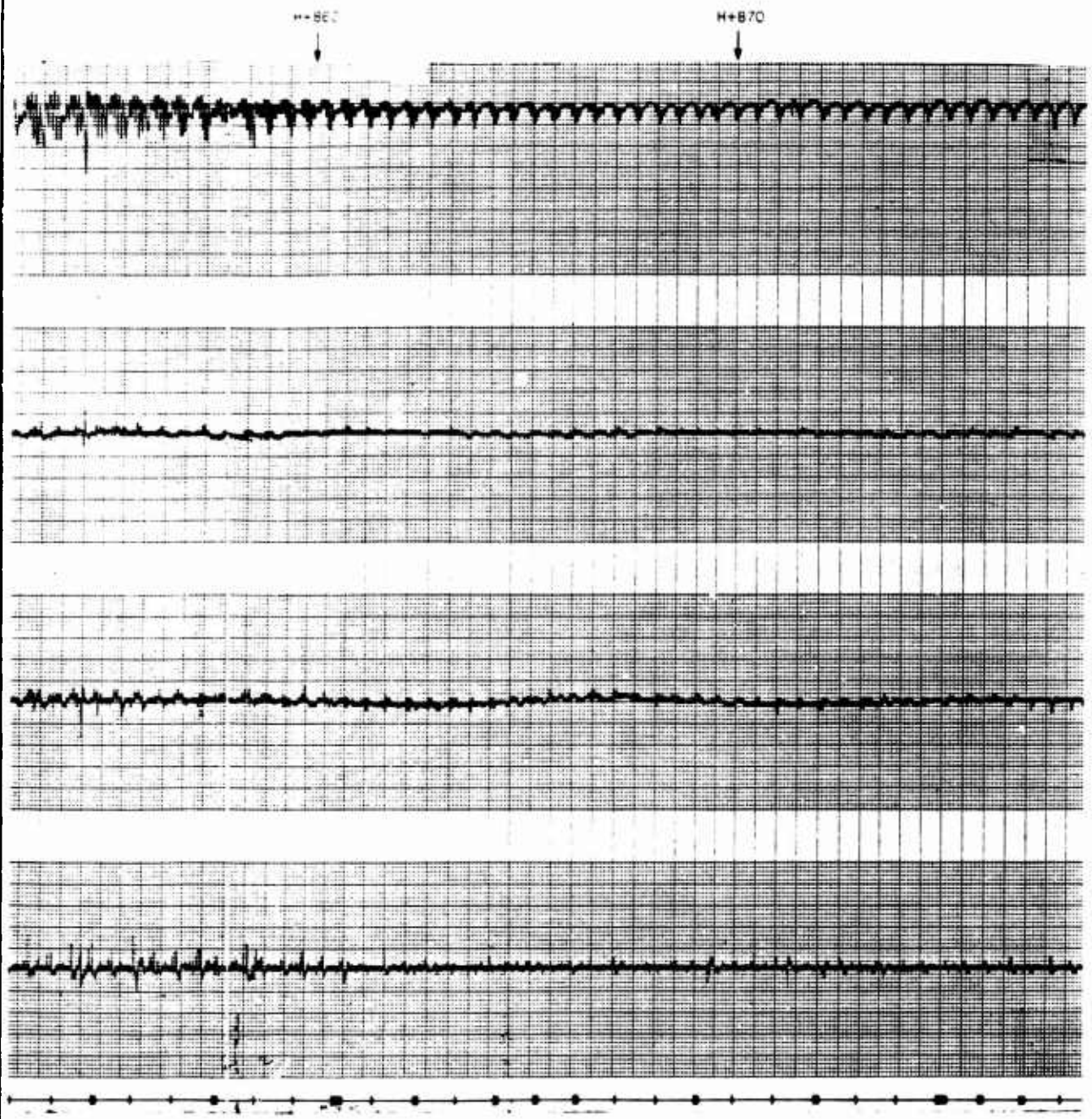
Figure B.4 Track, Probe

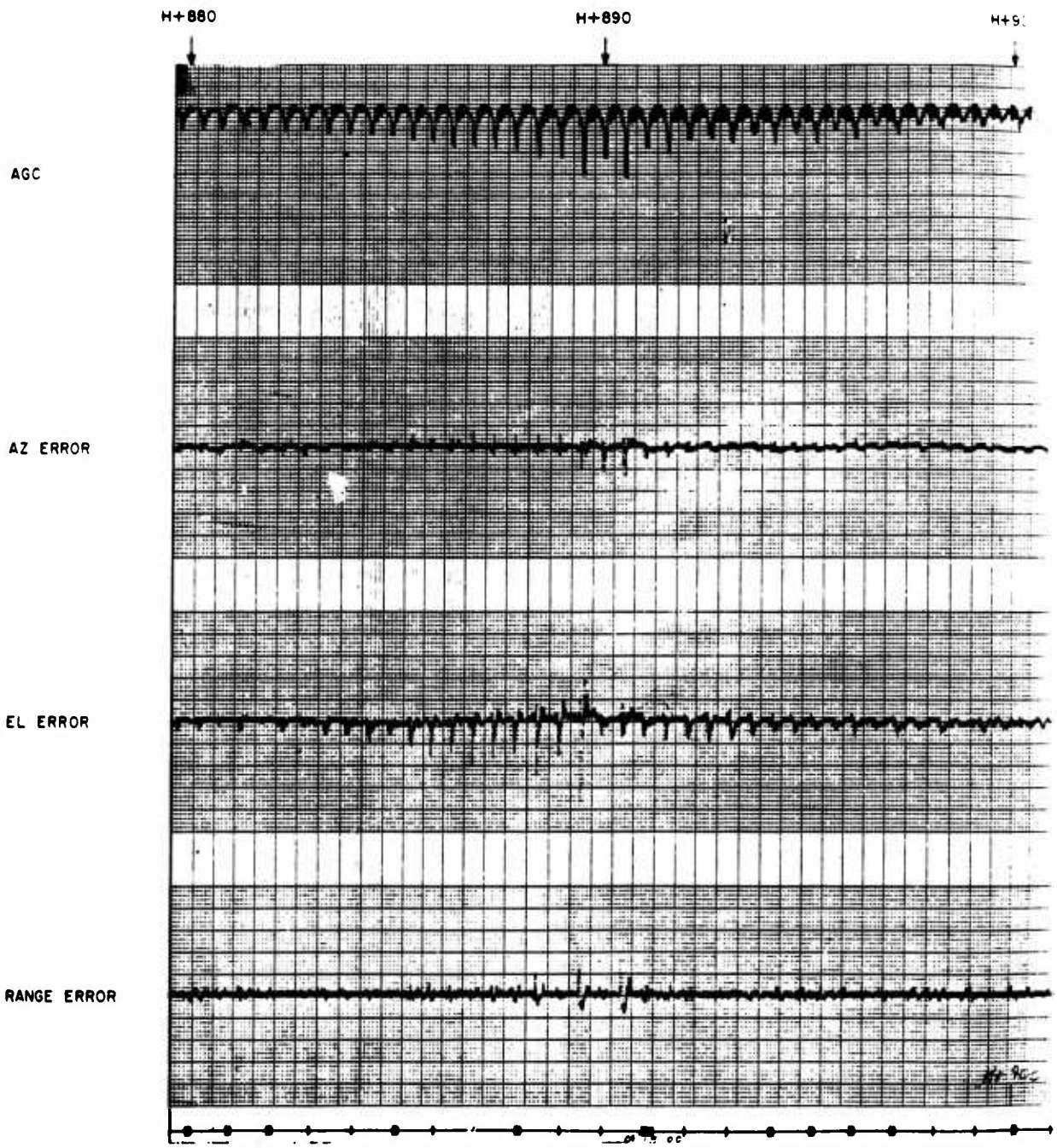


'e B.4 Track, Probe 4.

[redacted]

139-3


H+870


H+880
H+890
AGC
AZ ERROR
EL ERROR
RANGE ERROR

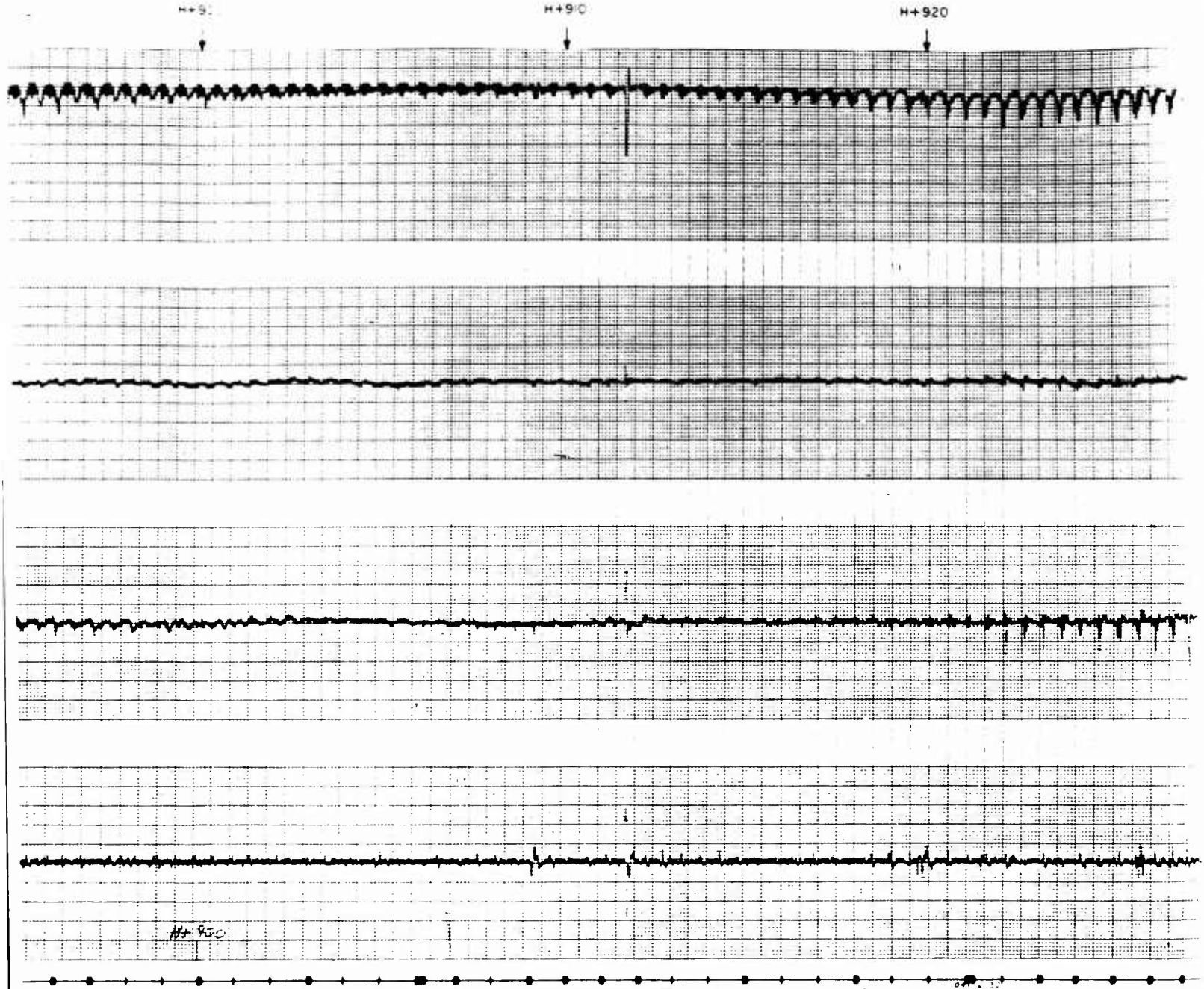
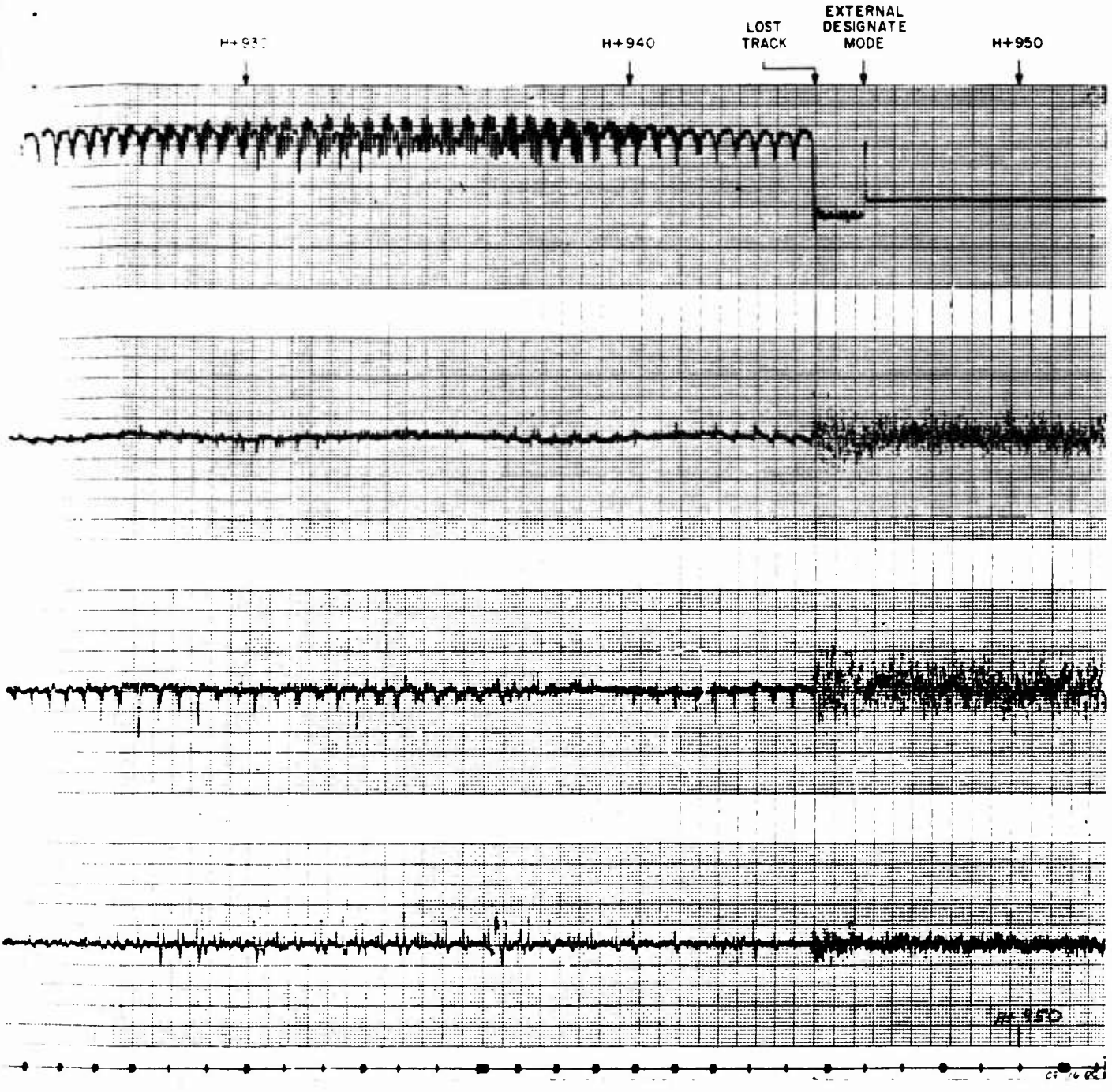
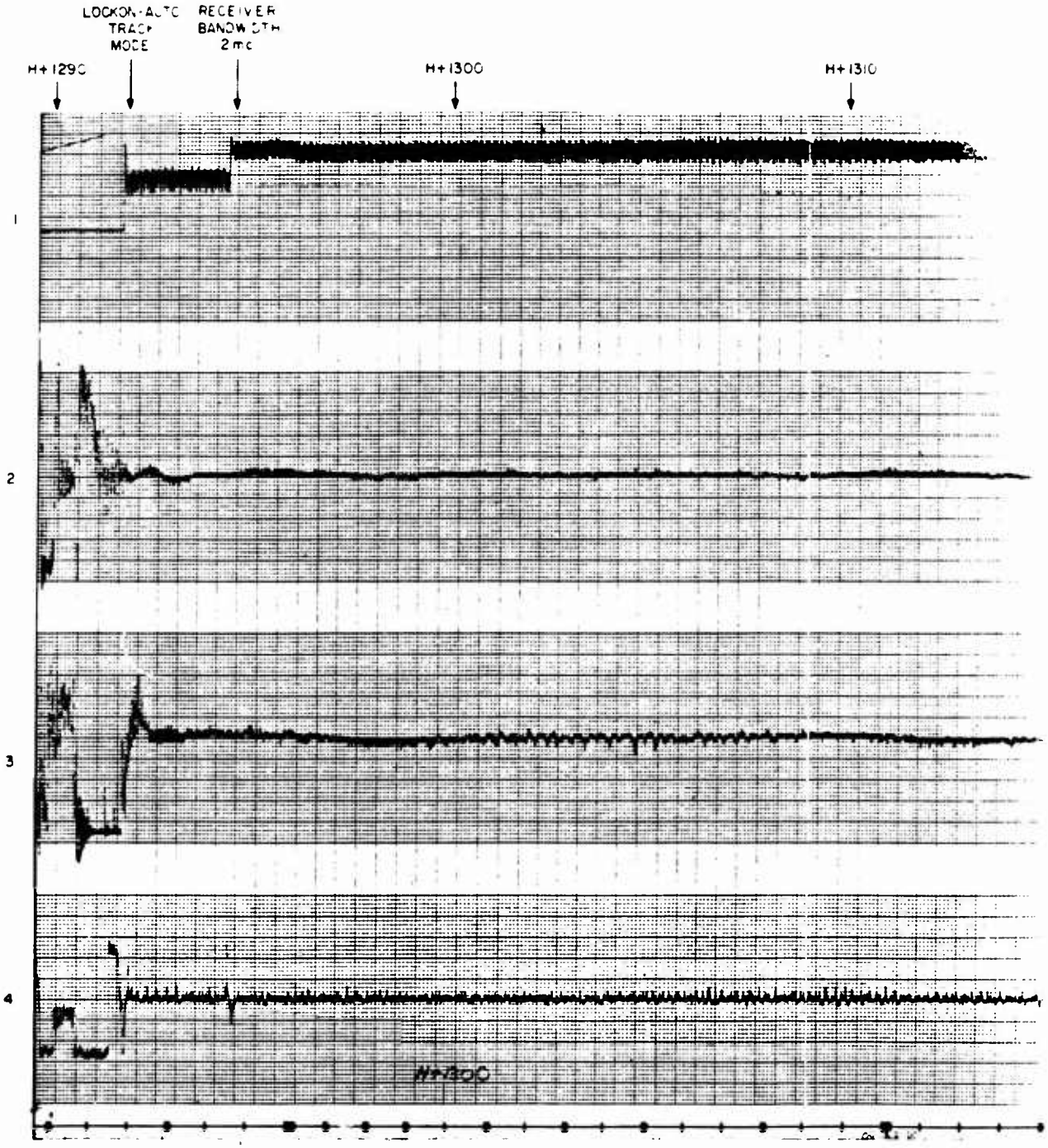


Figure B.4 Continued.


H+940
LOST TRACK
EXTERNAL DESIGNATE MODE
H+950



1 - AGC
2 - AZ ERROR
3 - EL ERROR
4 - RANGE ERROR

141-1

[redacted]

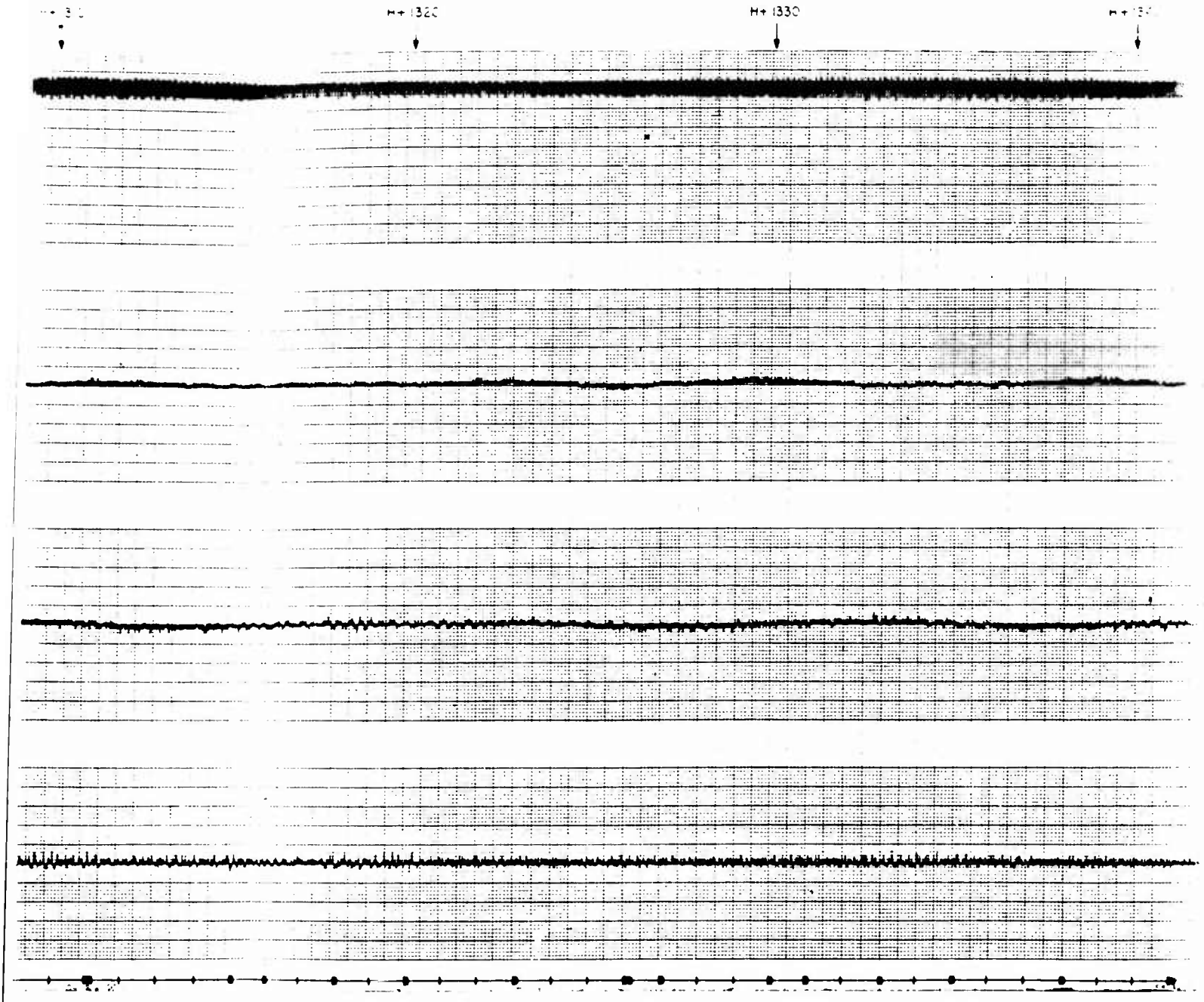
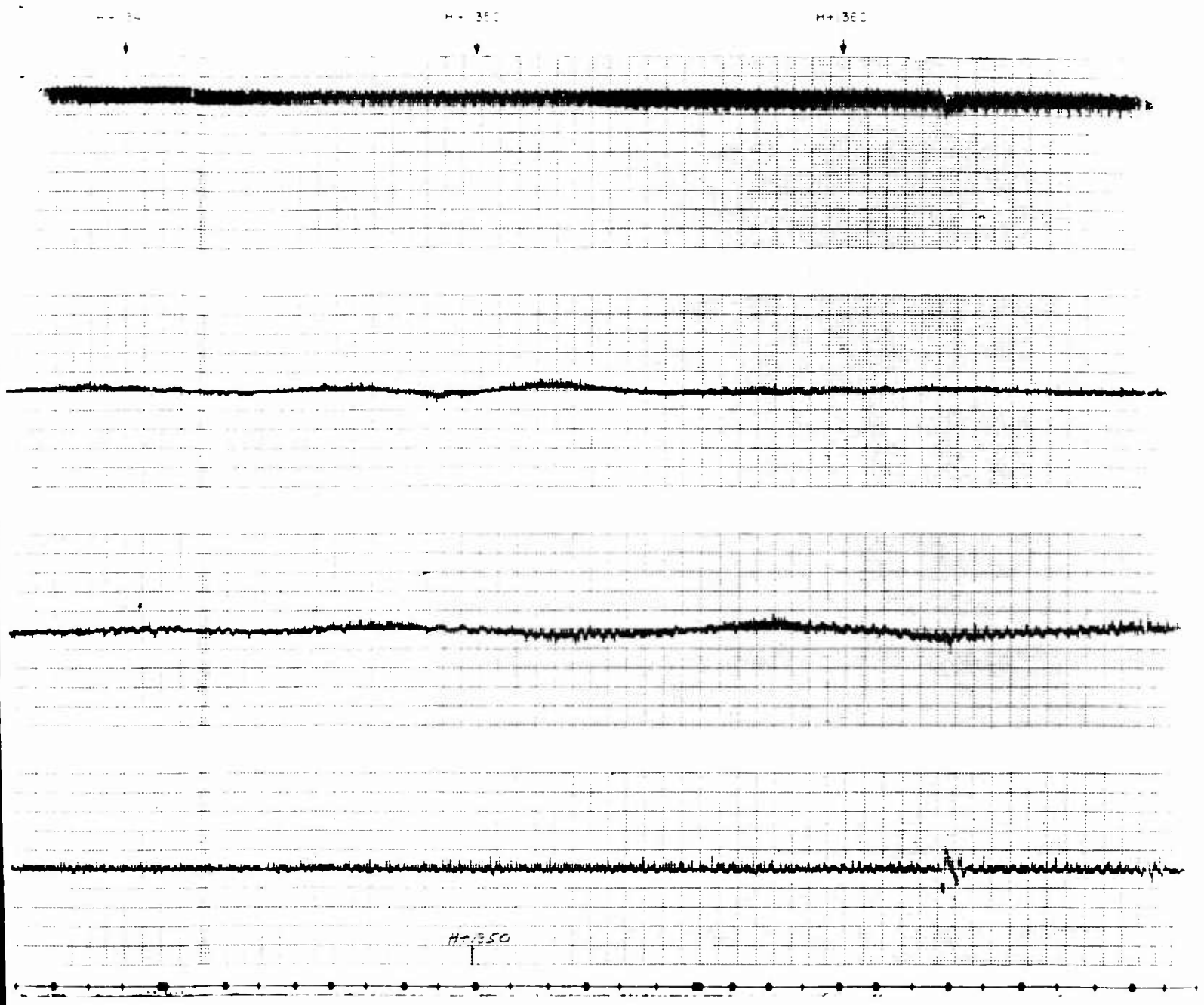
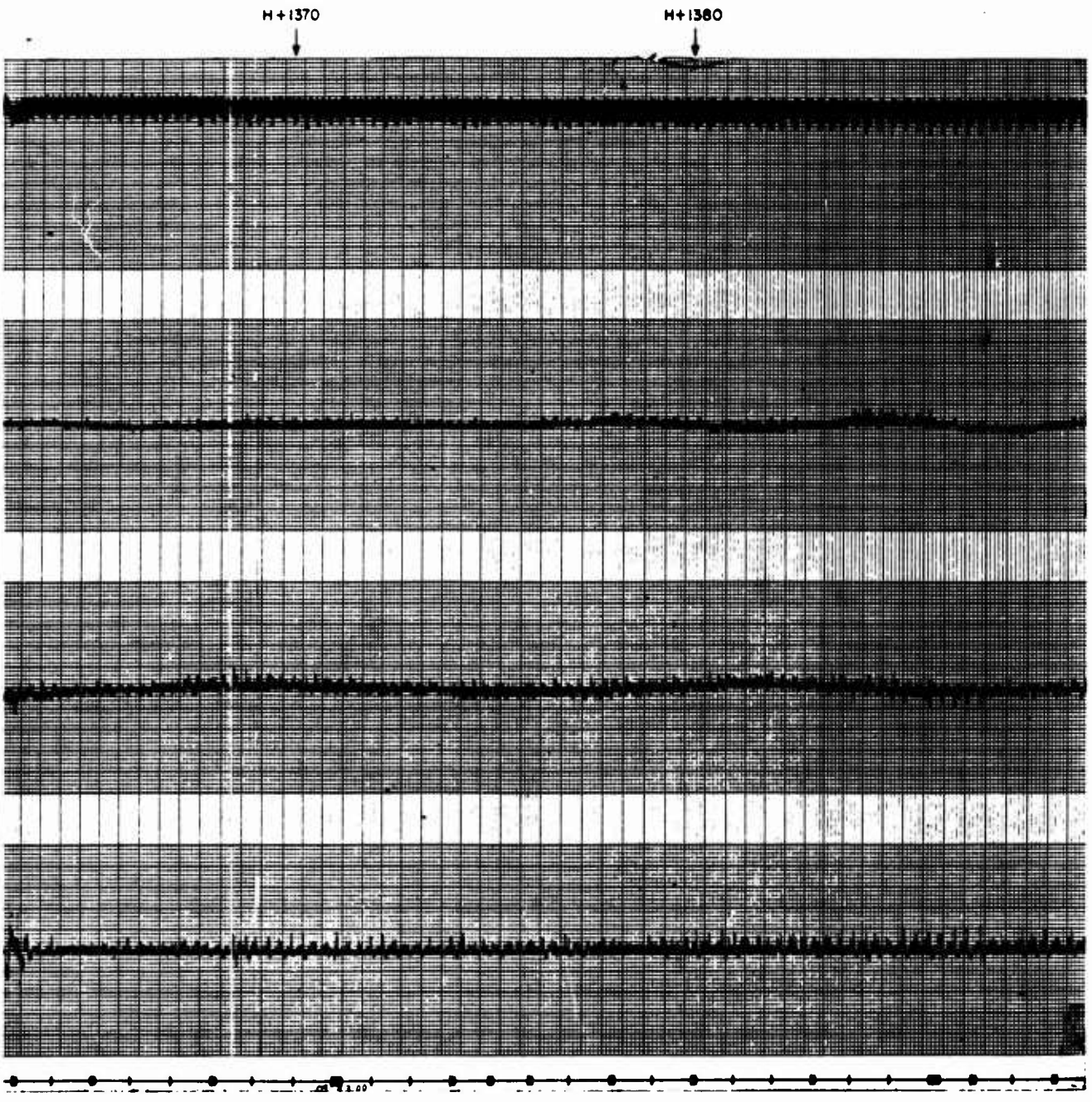
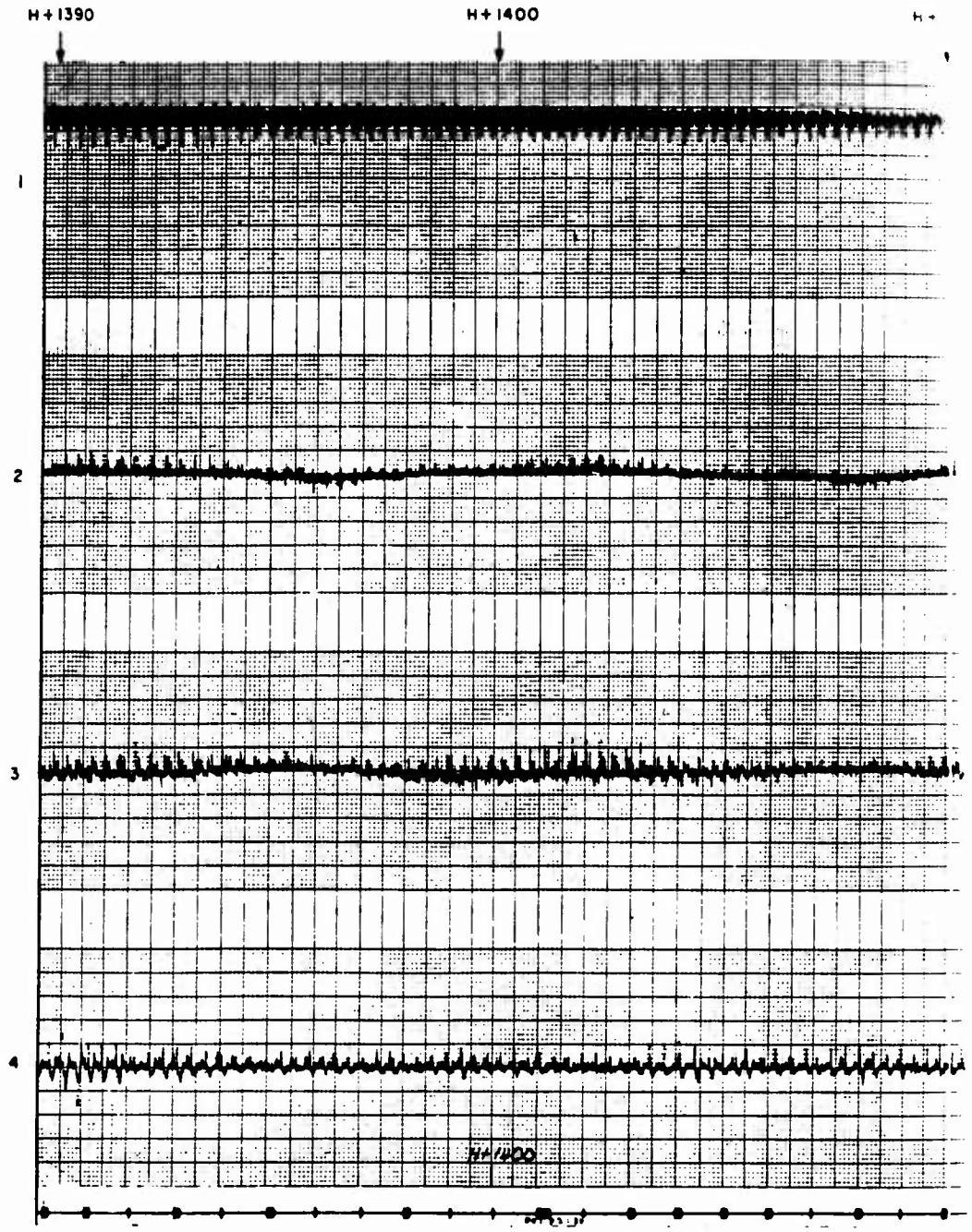


Figure B.5 Track, Probe 5.



...Probe 5.


H+1370
H+1380



1 – AGC
2 – AZ ERROR
3 – EL ERROR
4 – RANGE ERROR

142-1

[redacted]

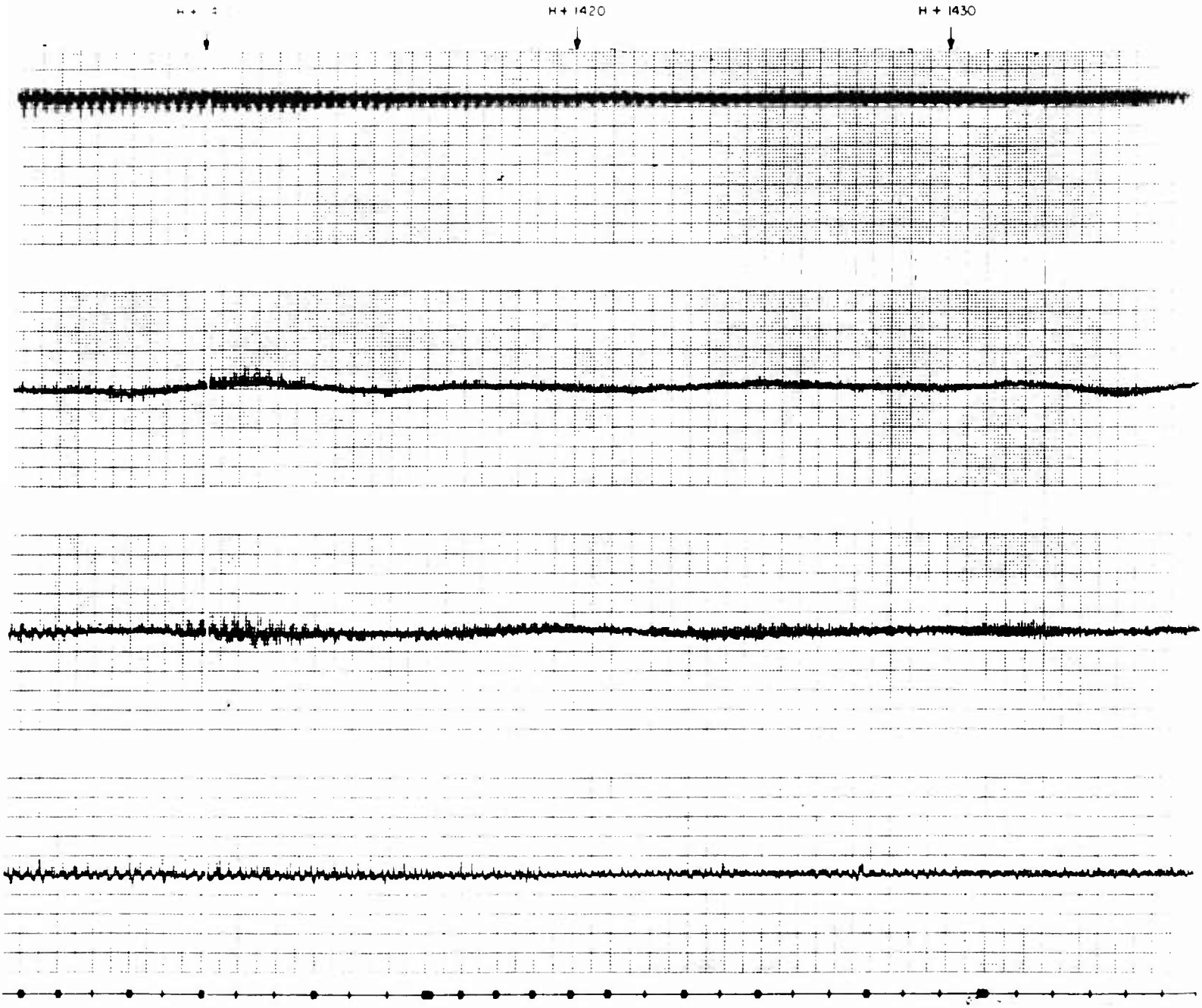


Figure B.3

142-2

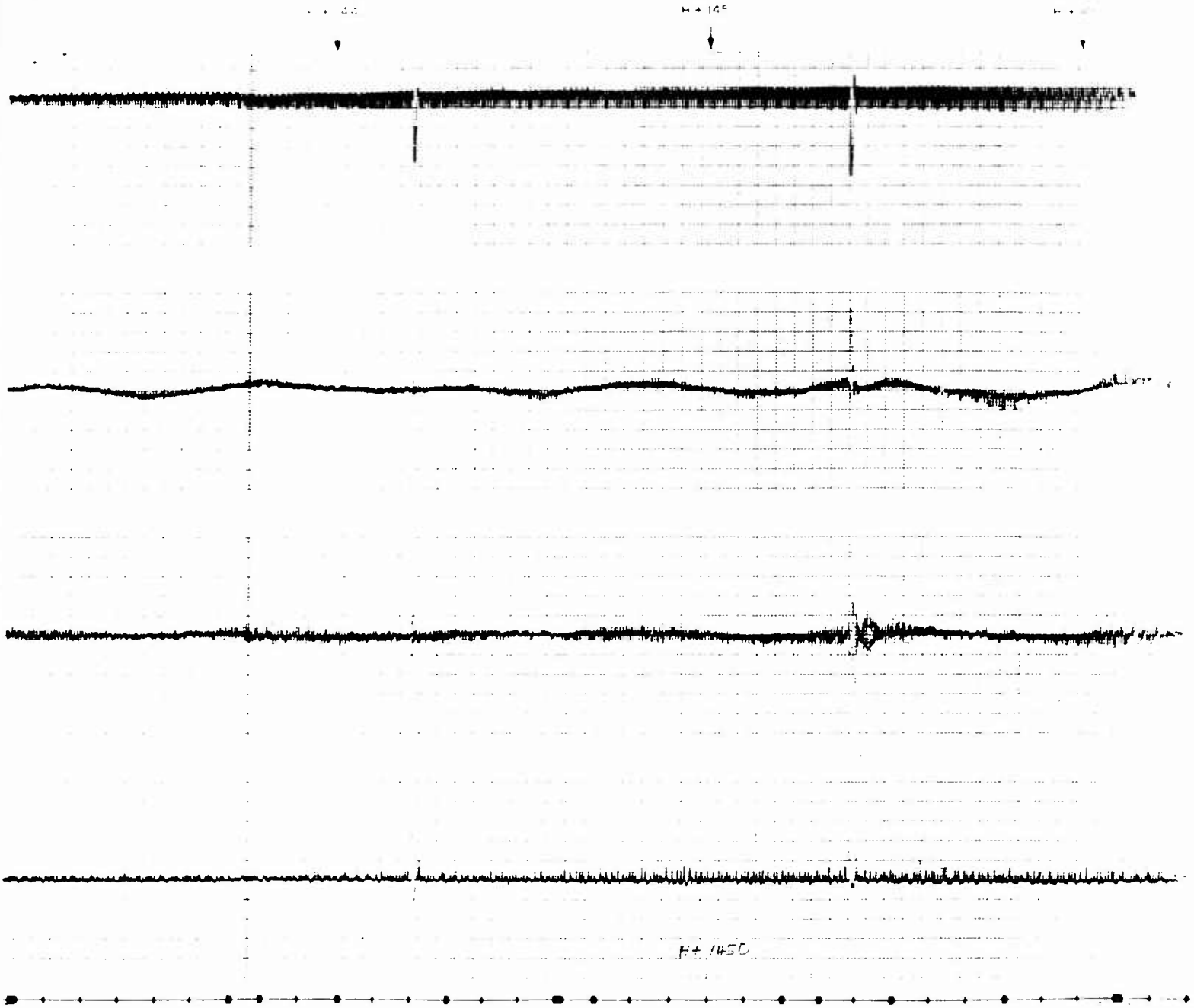
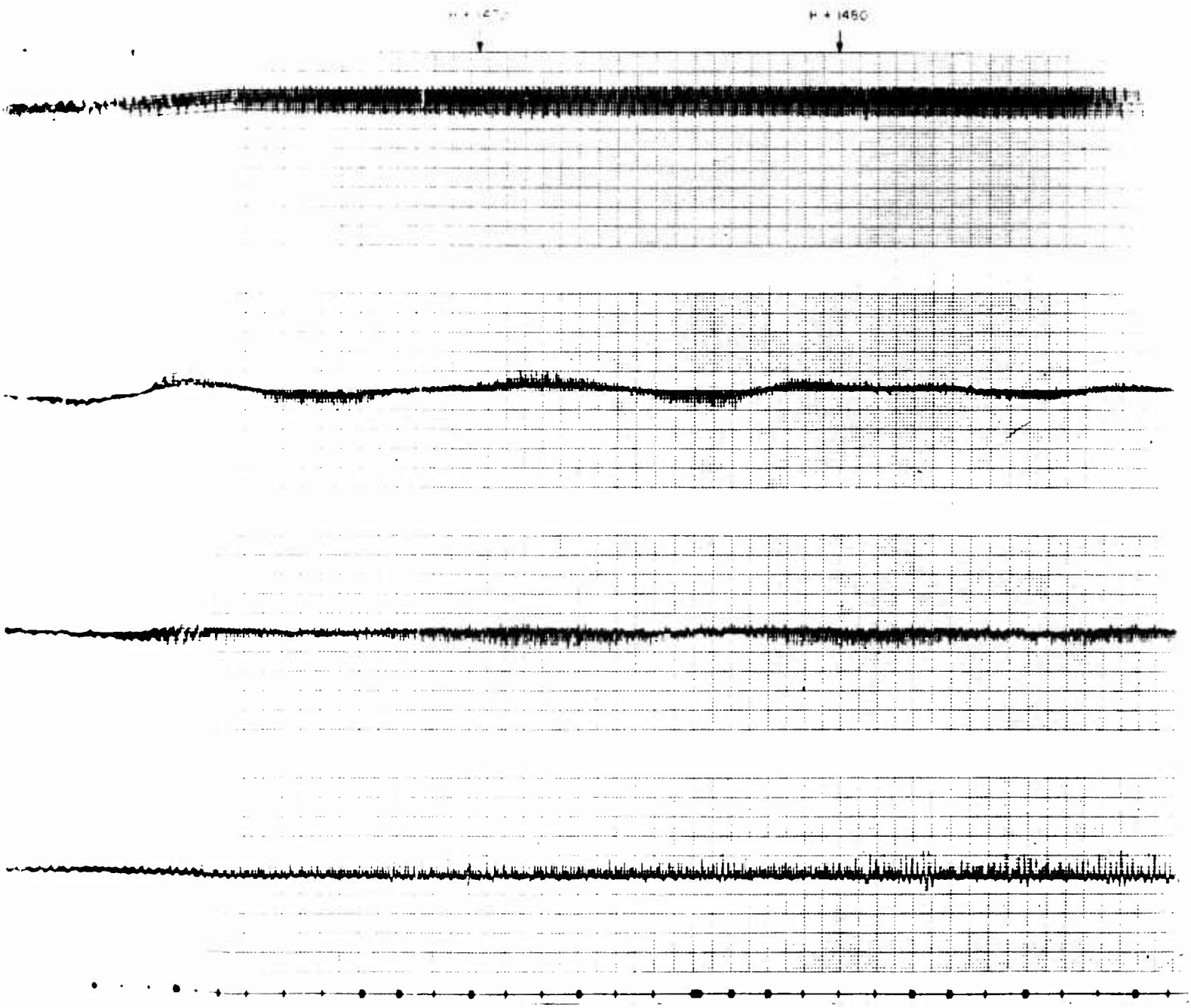
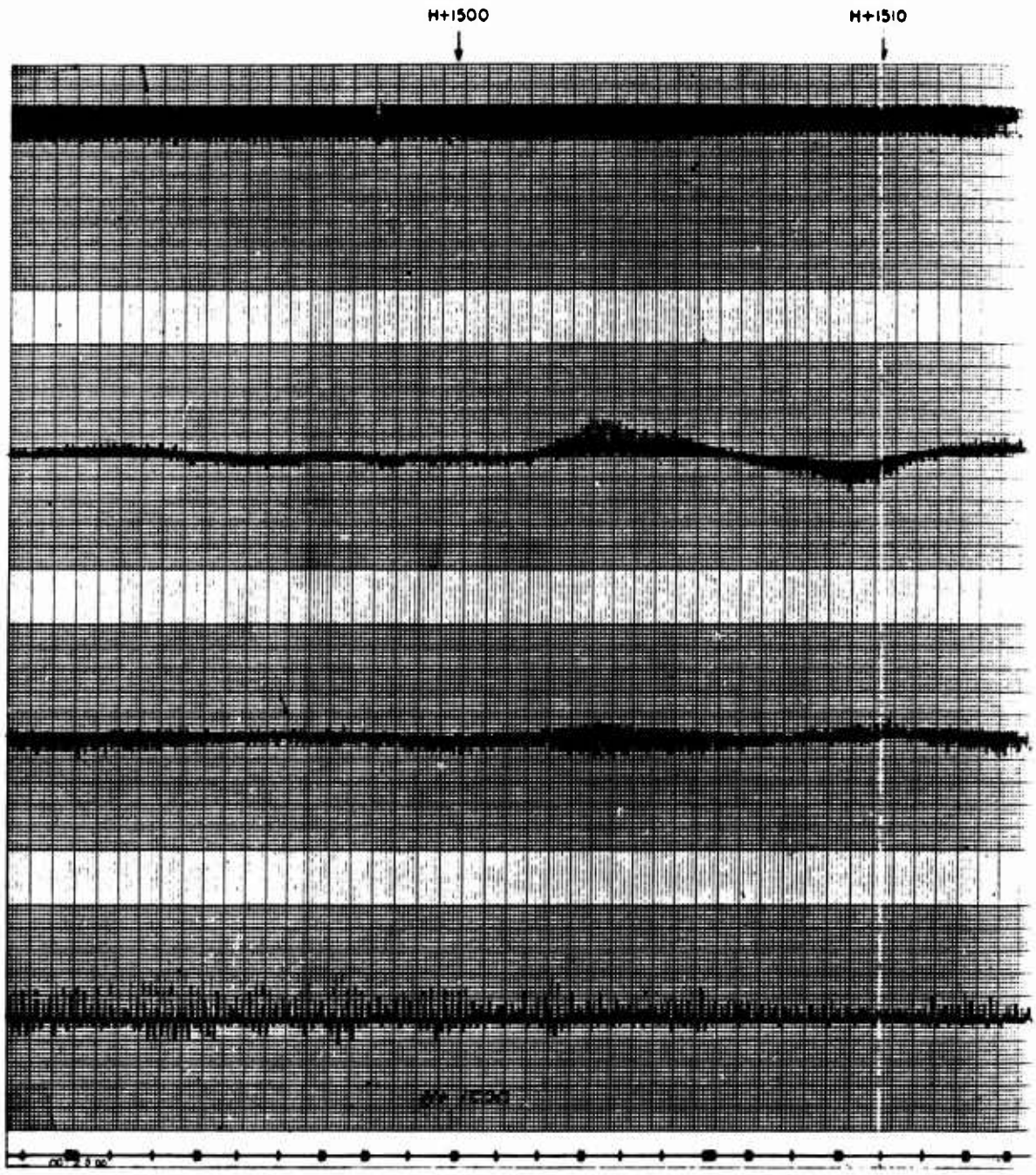


Figure B.5 Continued.

[redacted]


H + 1450



1 - AGC
2 - AZ ERROR
3 - EL ERROR
4 - RANGE ERROR

143-1

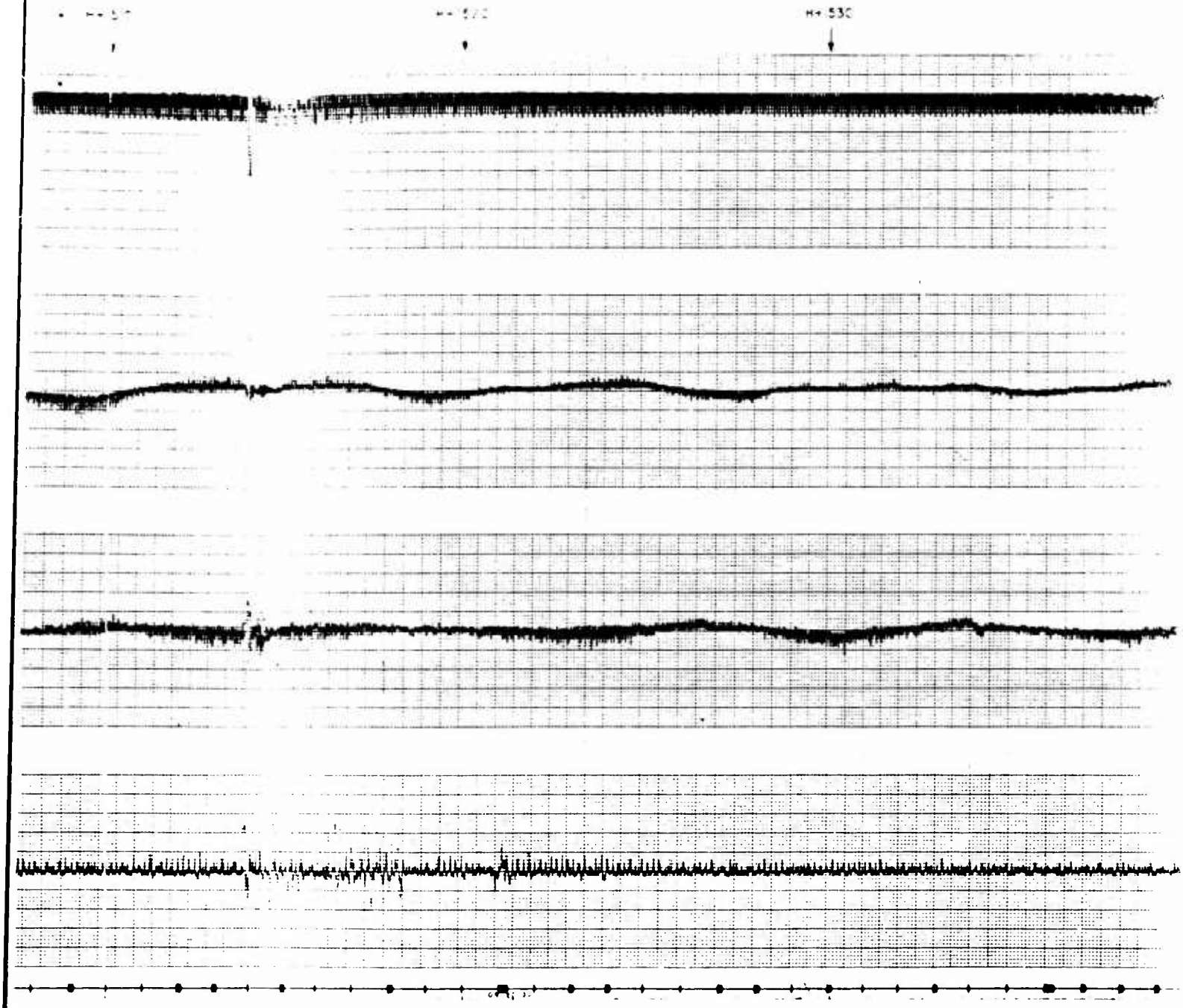
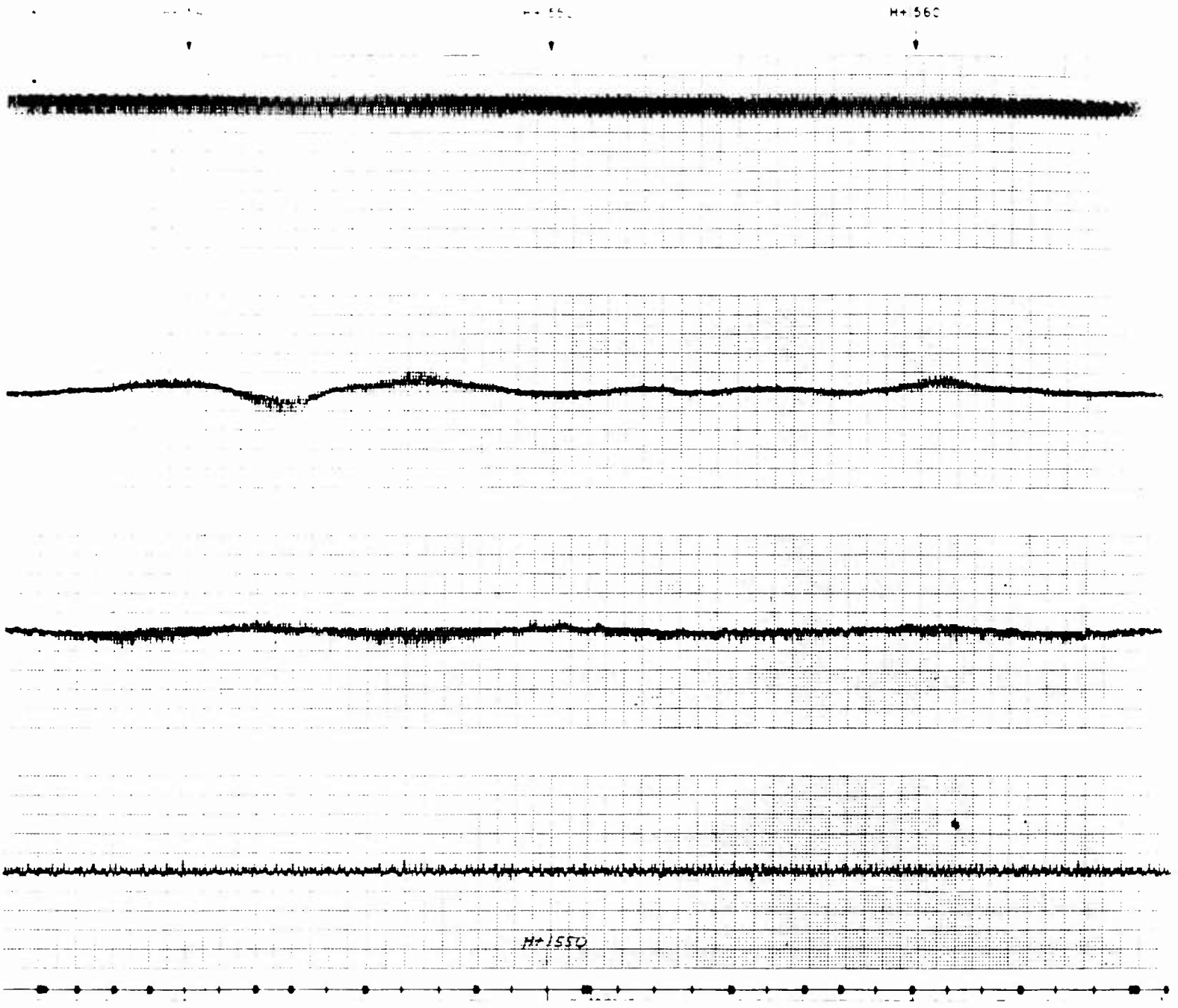
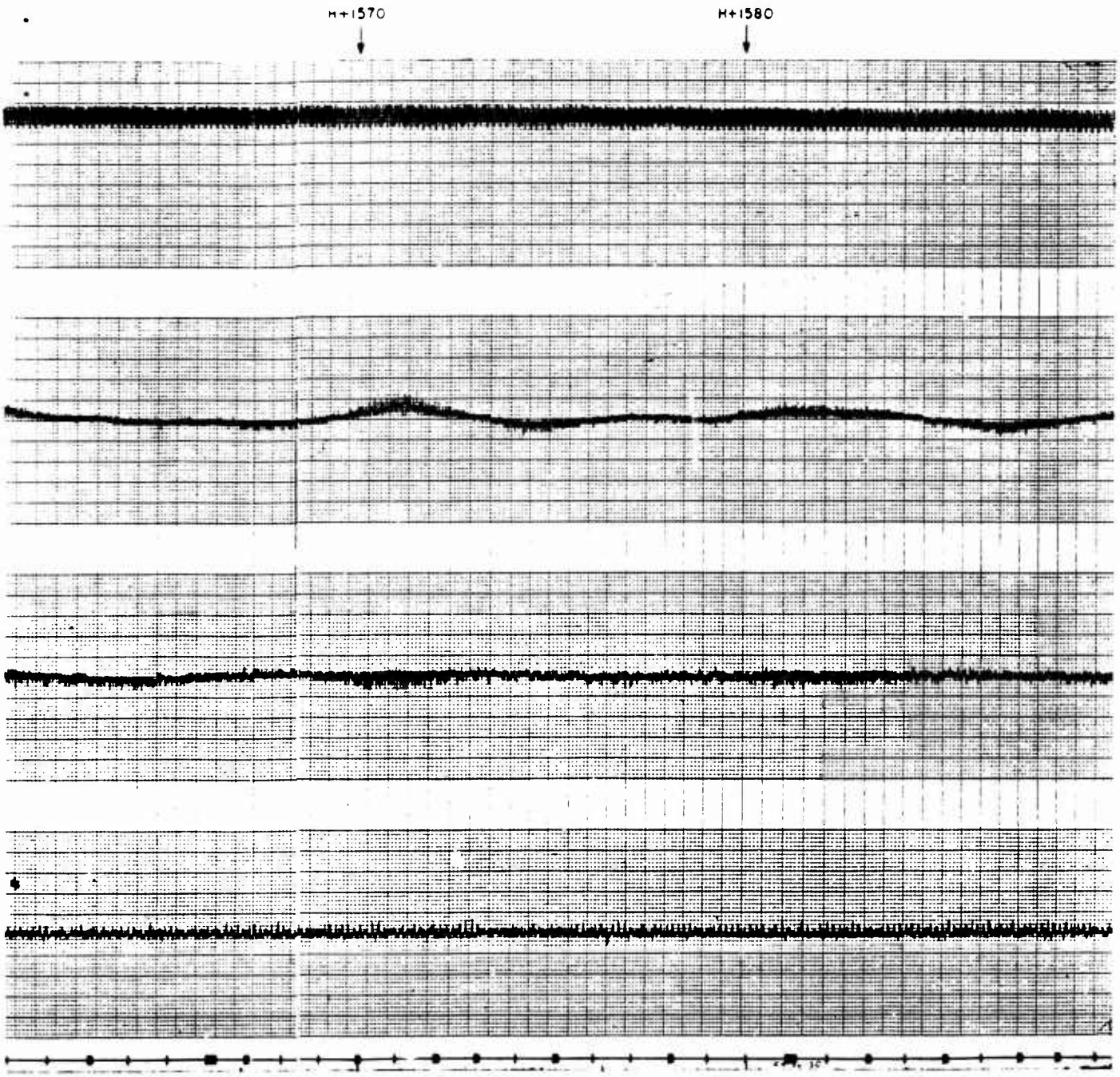
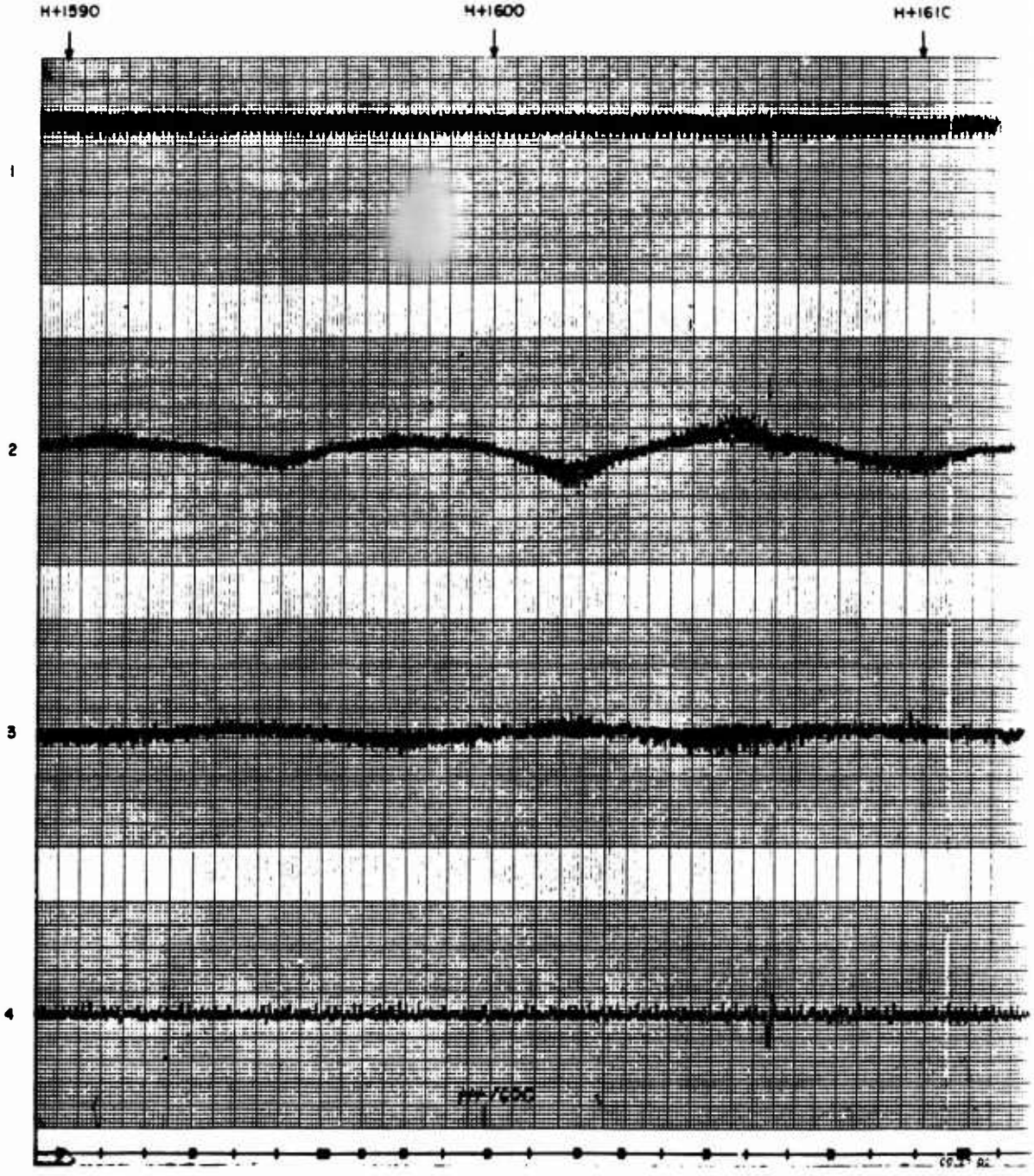


Figure B.5 Continued.



RET


H+1570
H+1580



1 - AGC
2 - AZ ERROR
3 - EL ERROR
4 - RANGE ERROR

144-1

[redacted]

[redacted]

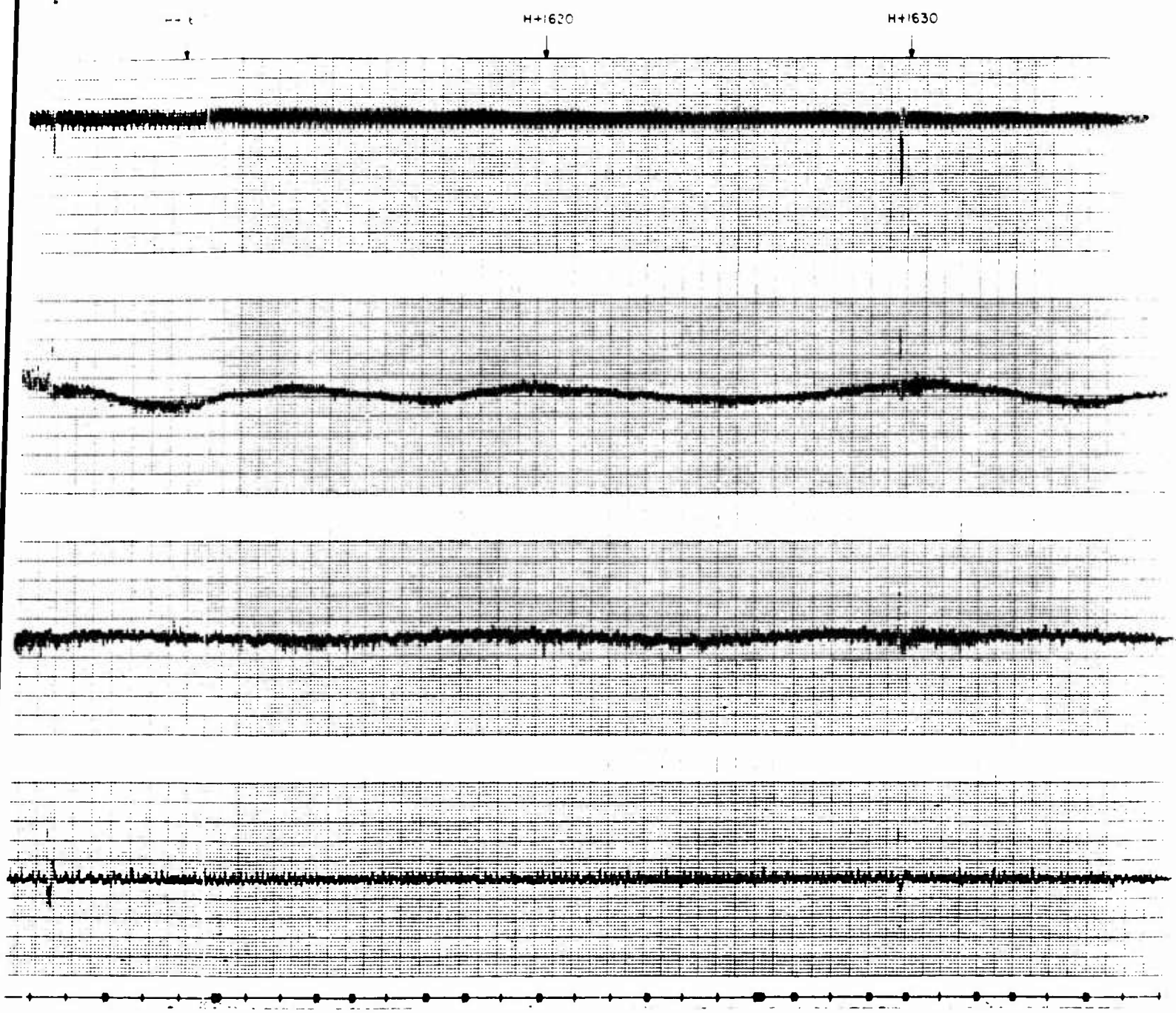
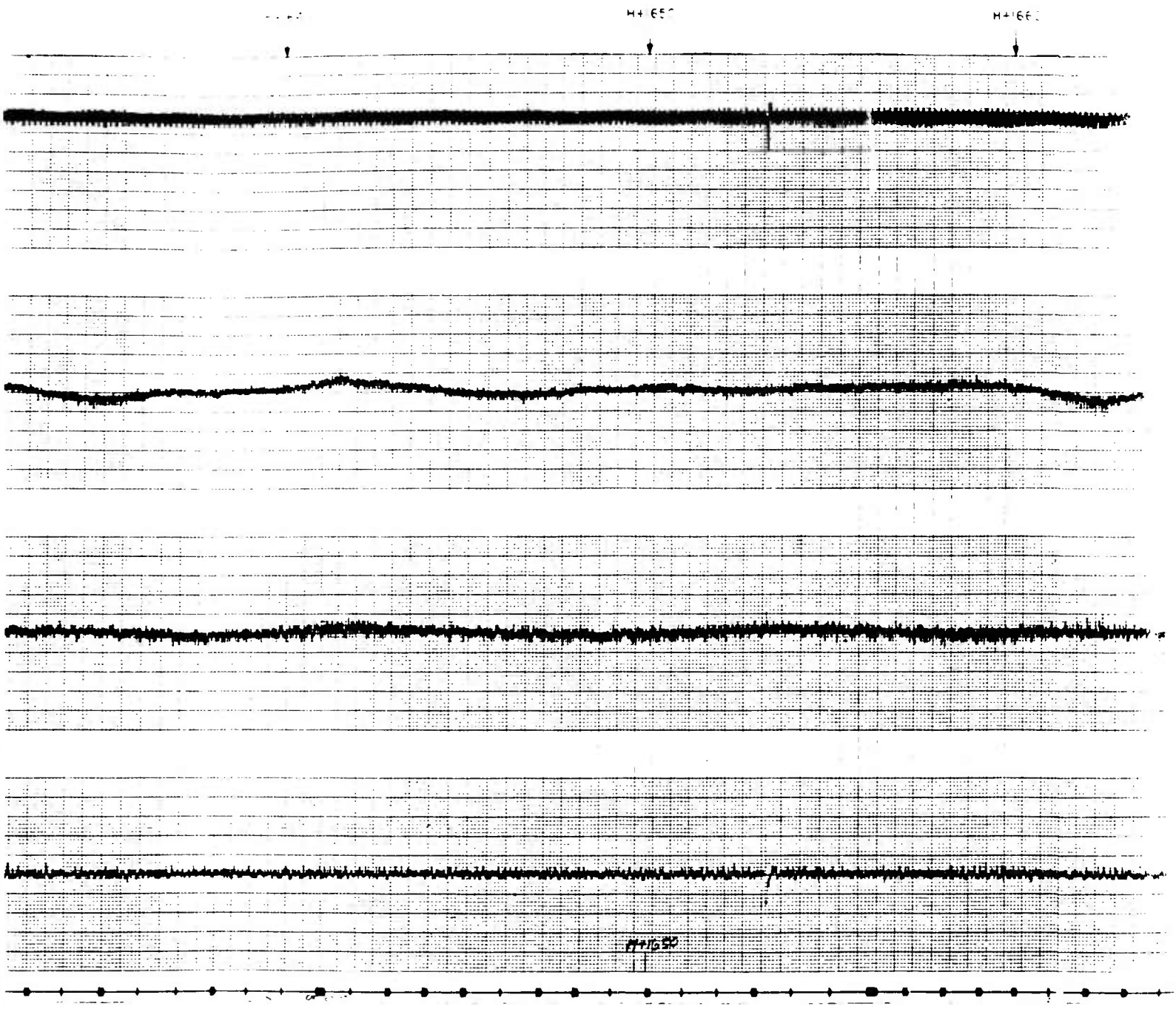
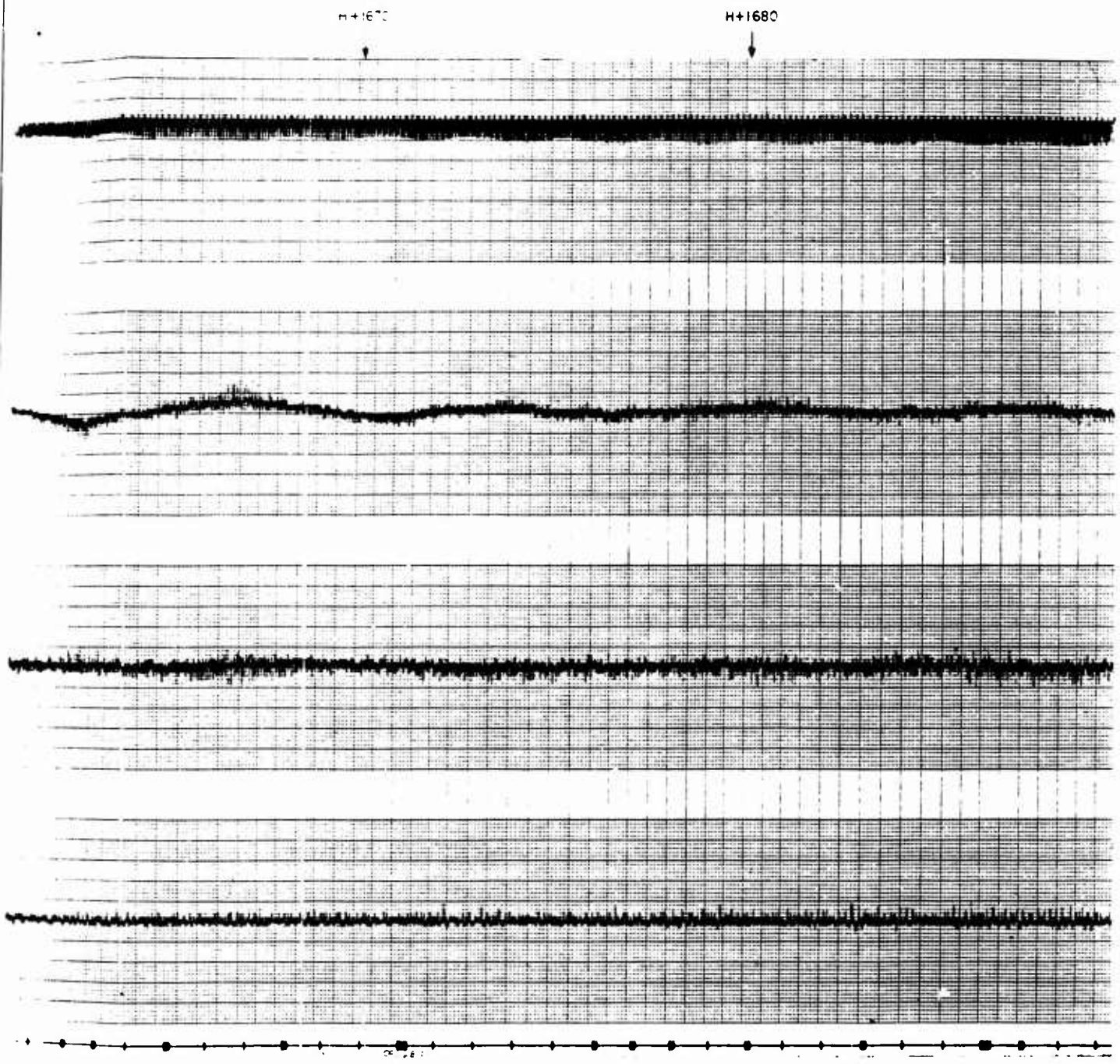


Figure B.5 Conti

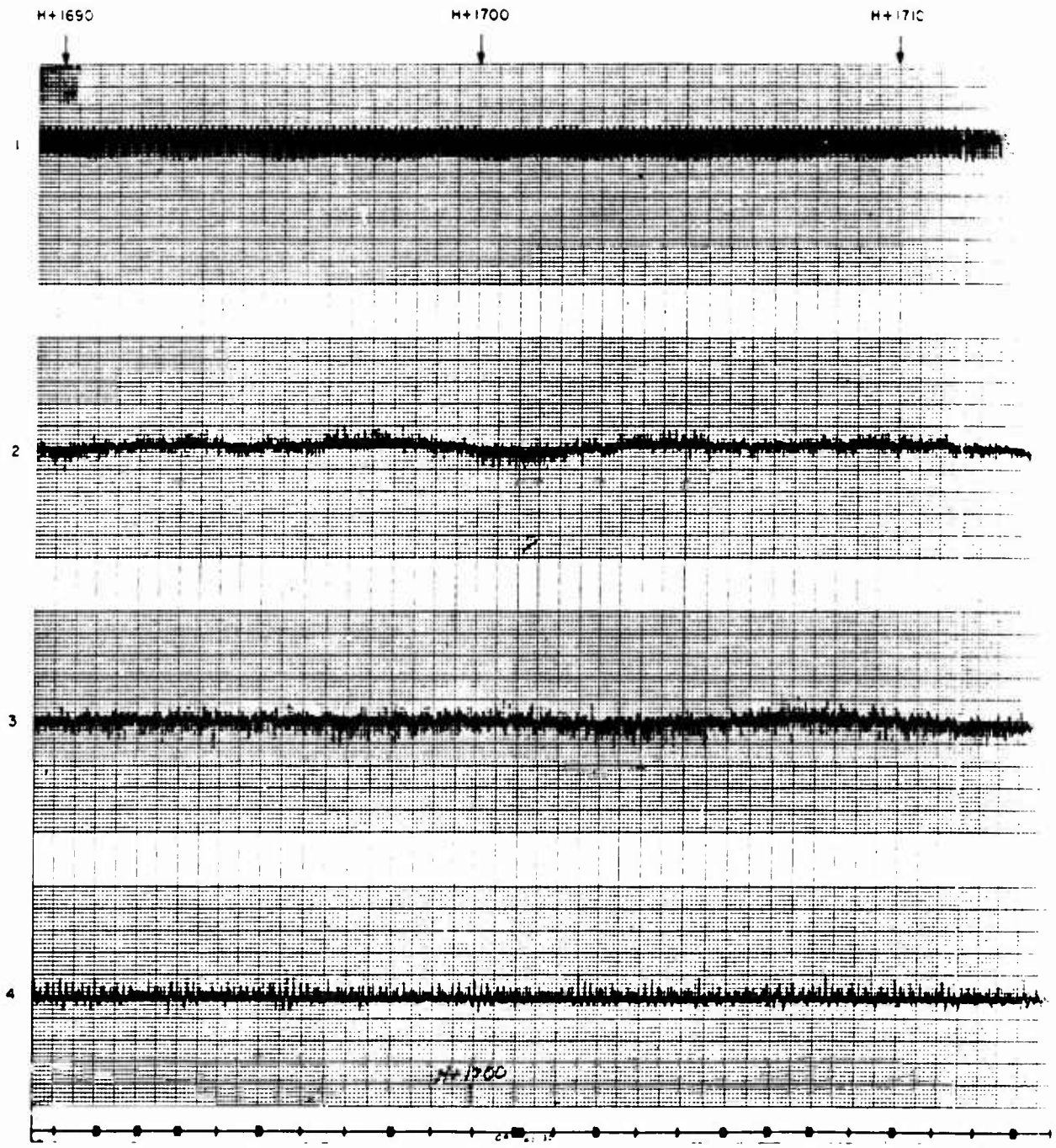


gure B.5 Contin



144-4

[redacted]



1 - AGC
2 - AZ ERROR
3 - EL ERROR
4 - RANGE ERROR

145-1

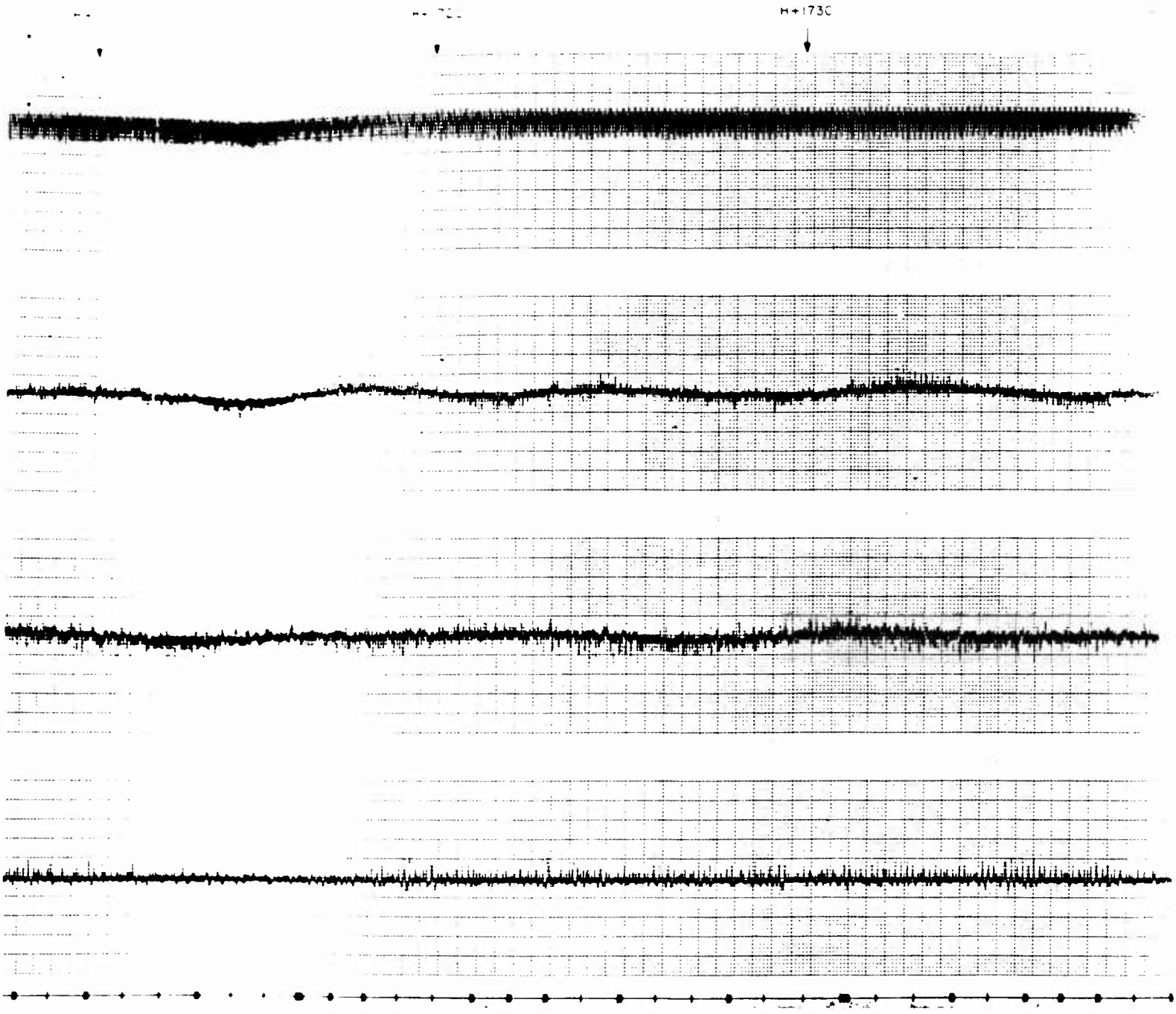
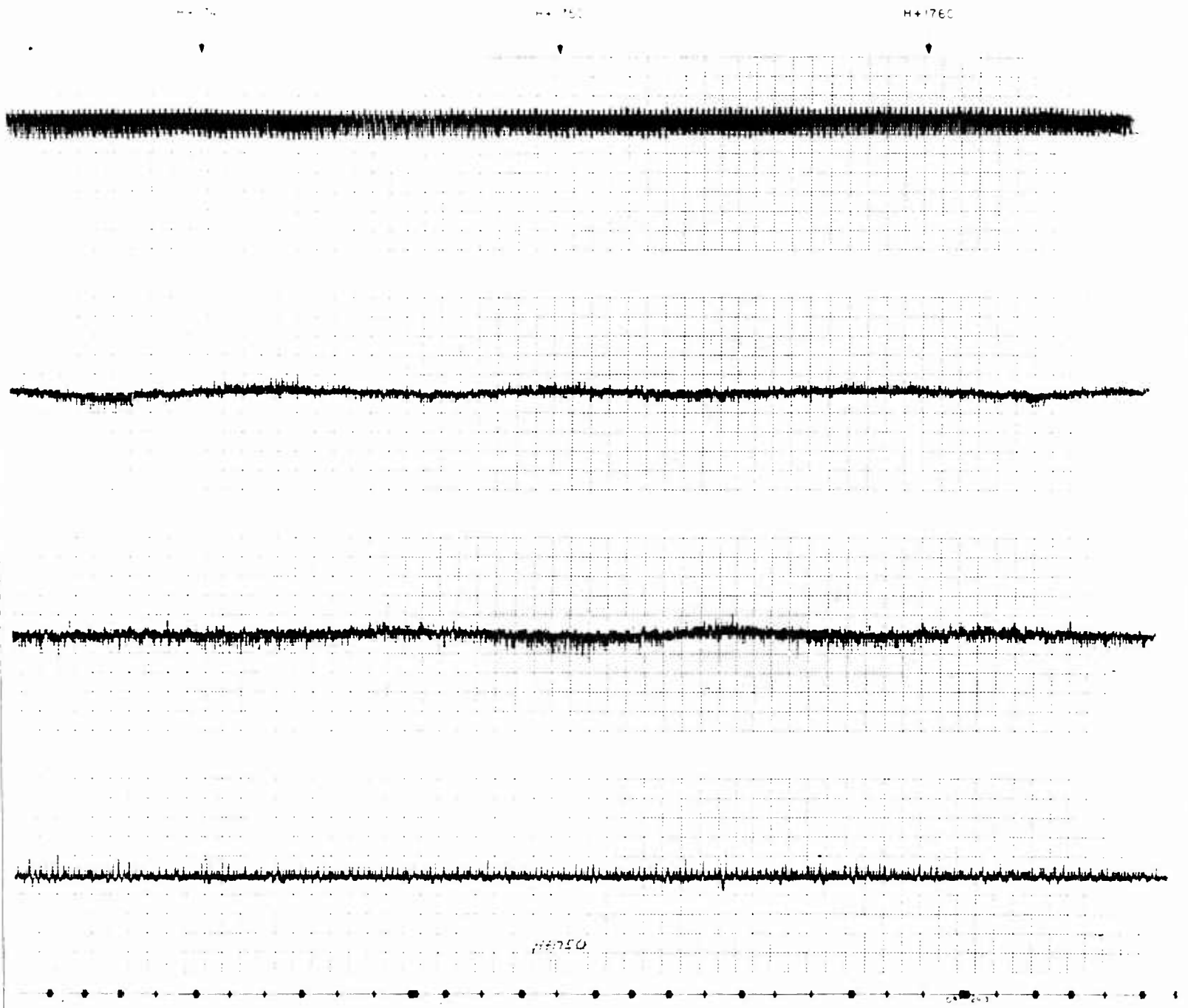


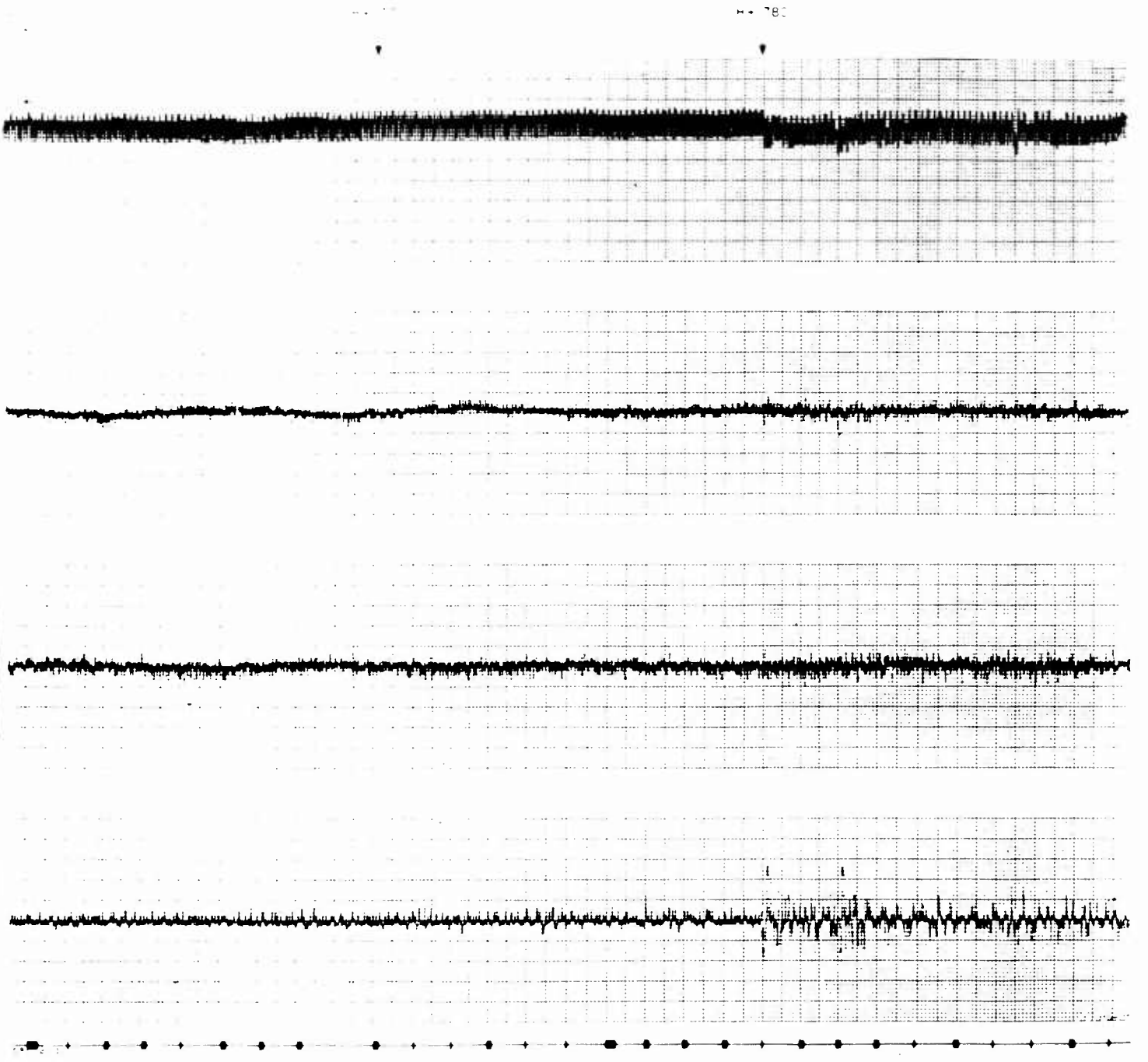
Figure B.5 Continued.



Continued

5

RET



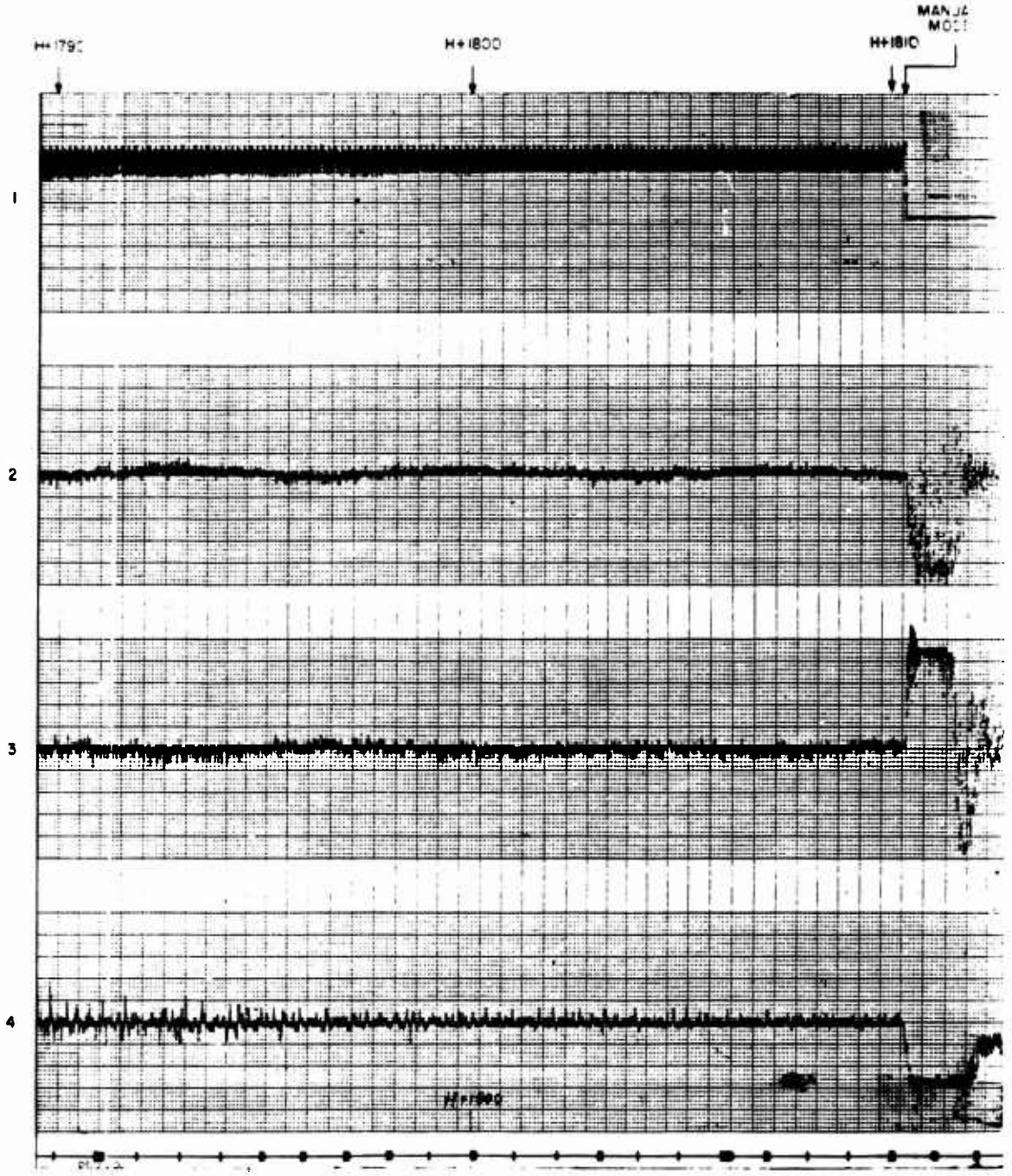
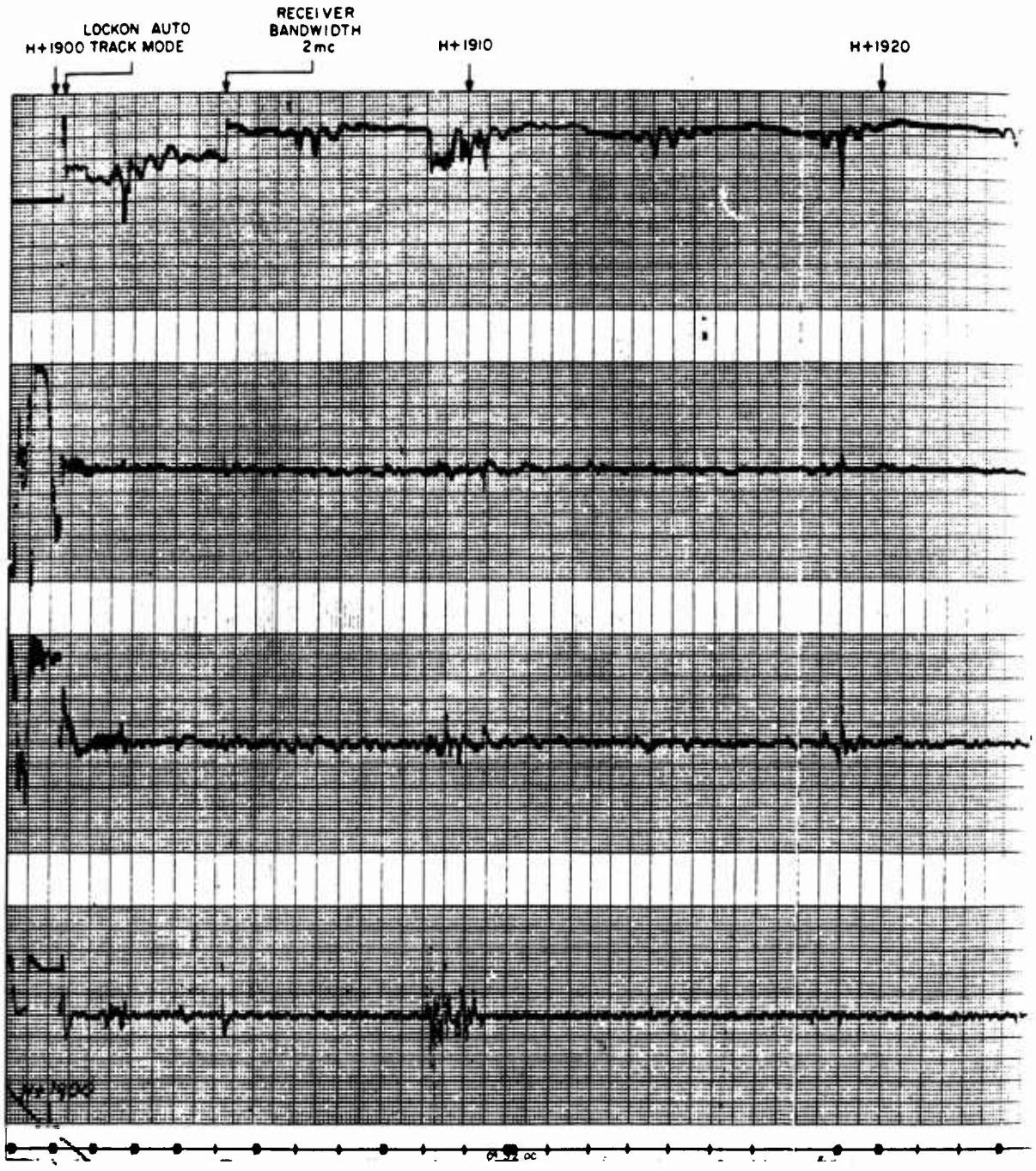


Figure B.5 Continued.



1-AGC
2-AZ ERROR
3-EL ERROR
4-RANGE ERROR

147-1

Figure B.6 Trac

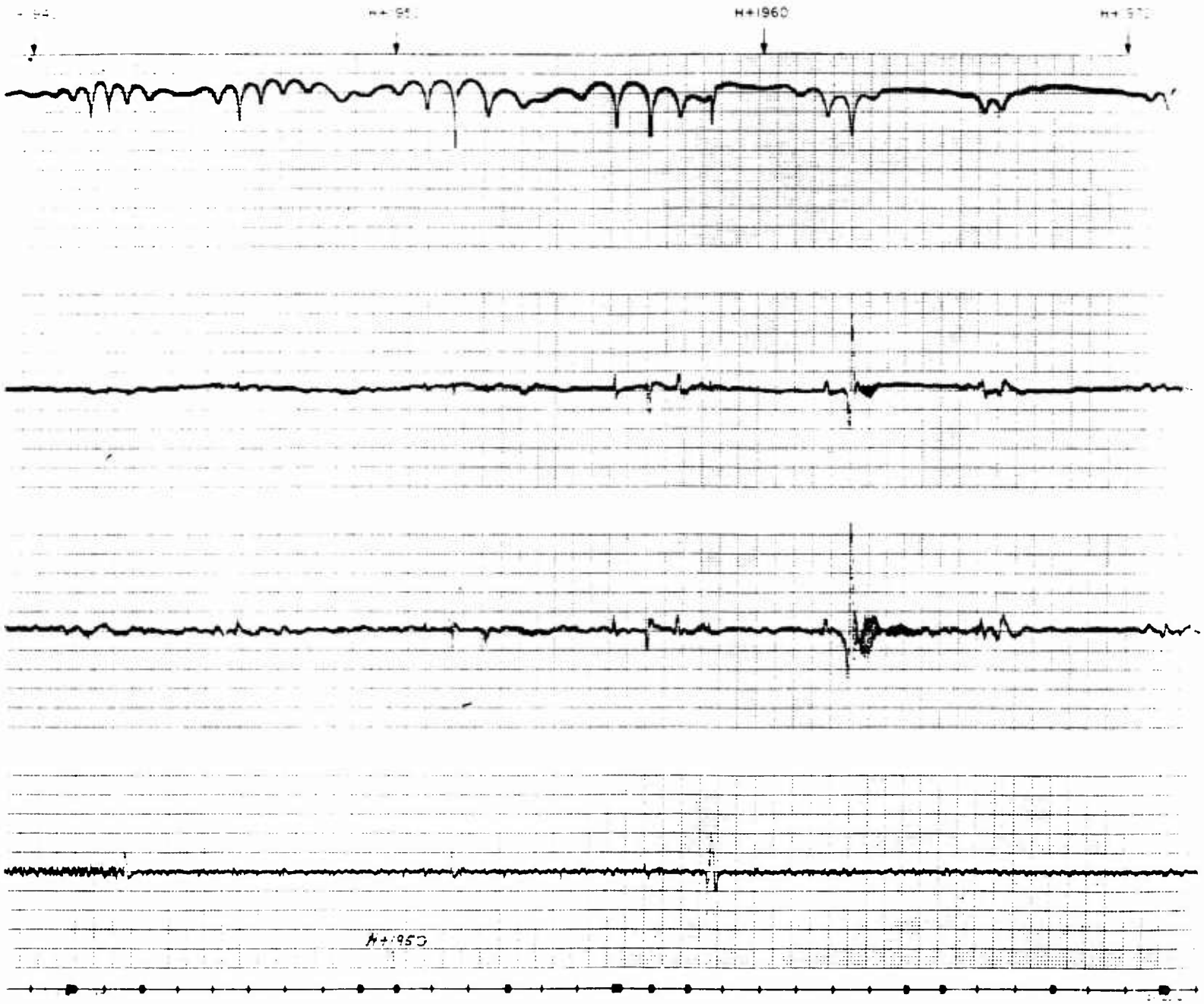
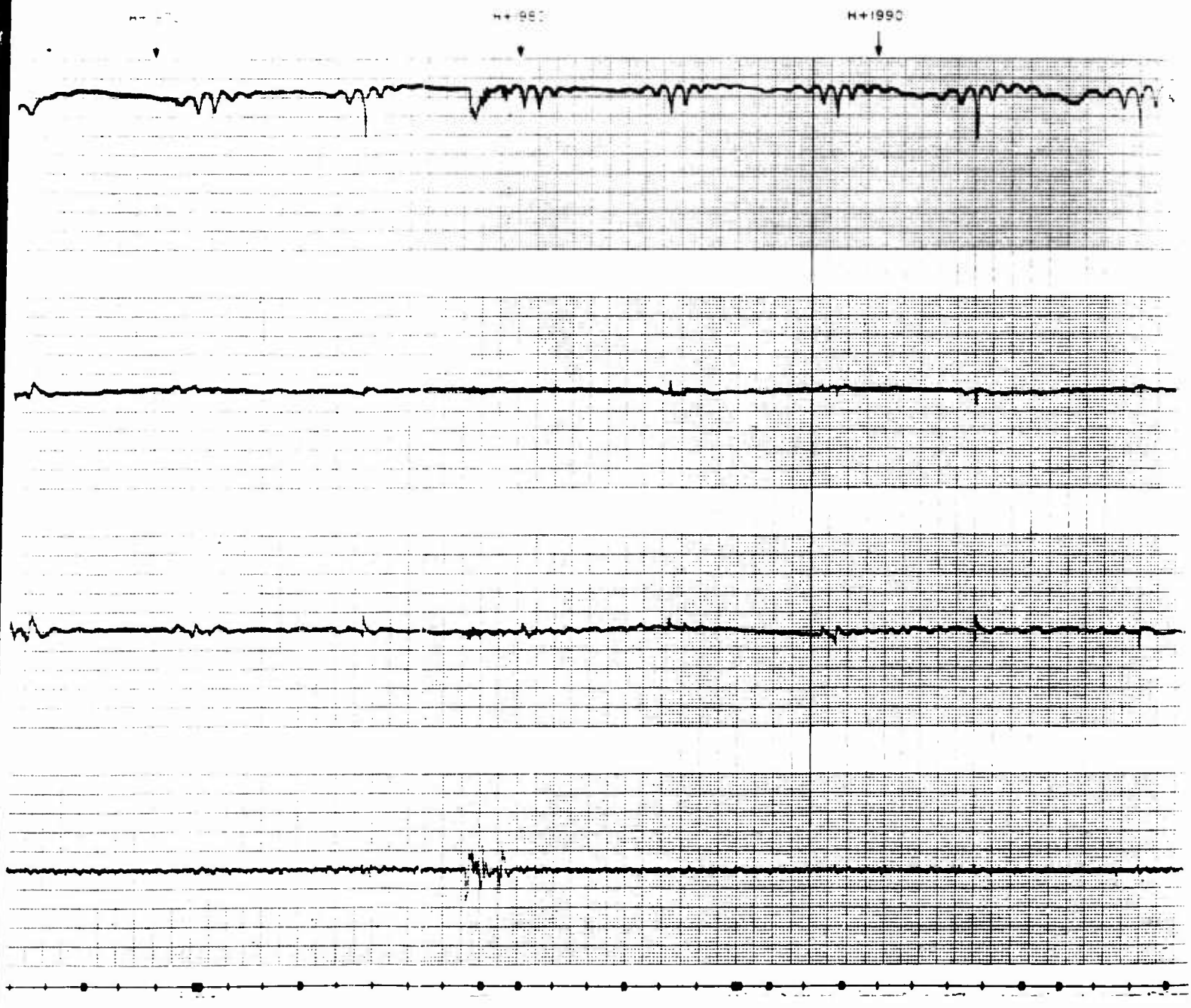
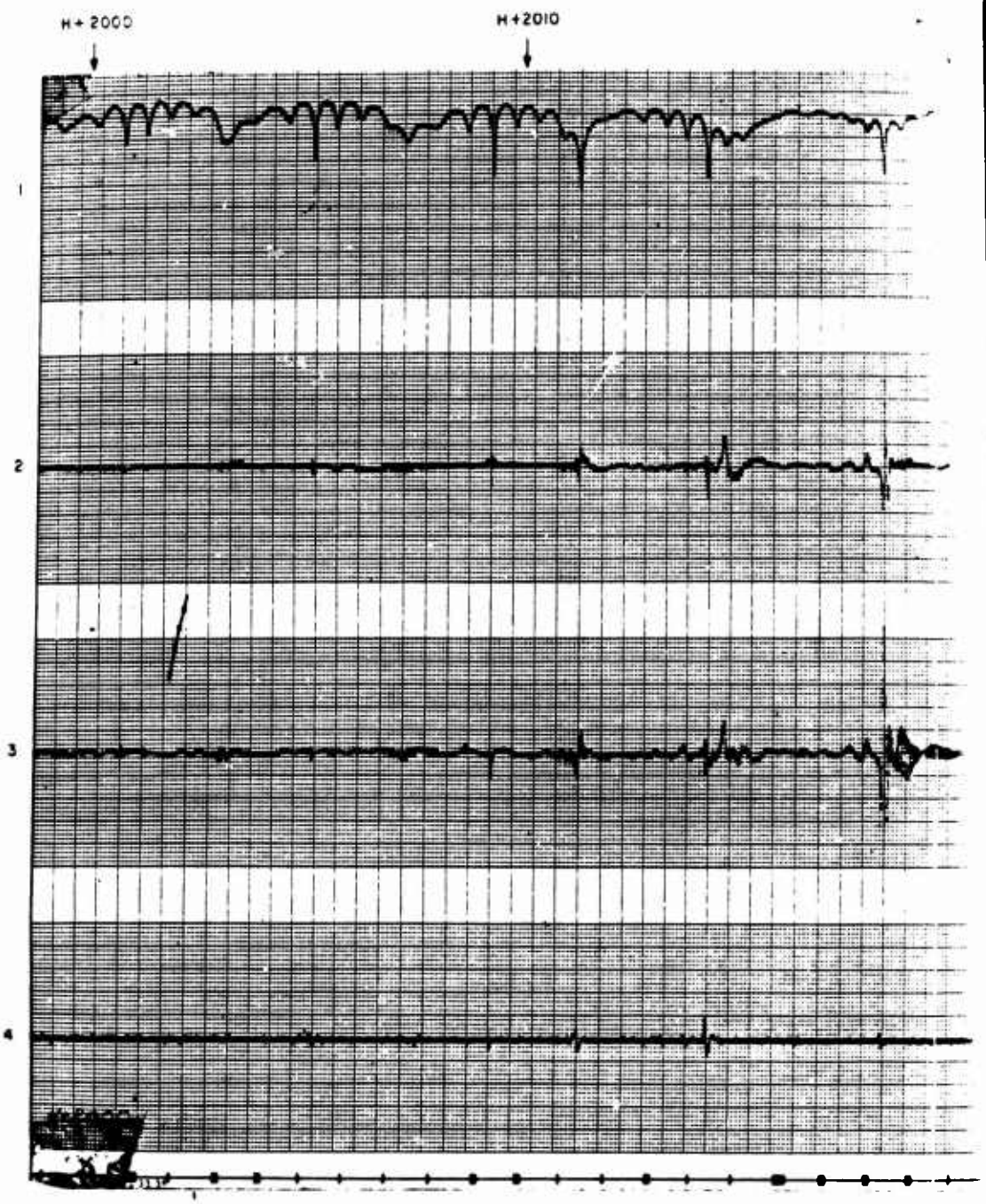


Figure B.6 Track, Probe 6.



147-4



1 – AGC
2 – AZ ERROR
3 – EL. ERROR
4 – RANGE ERROR

148 - 1

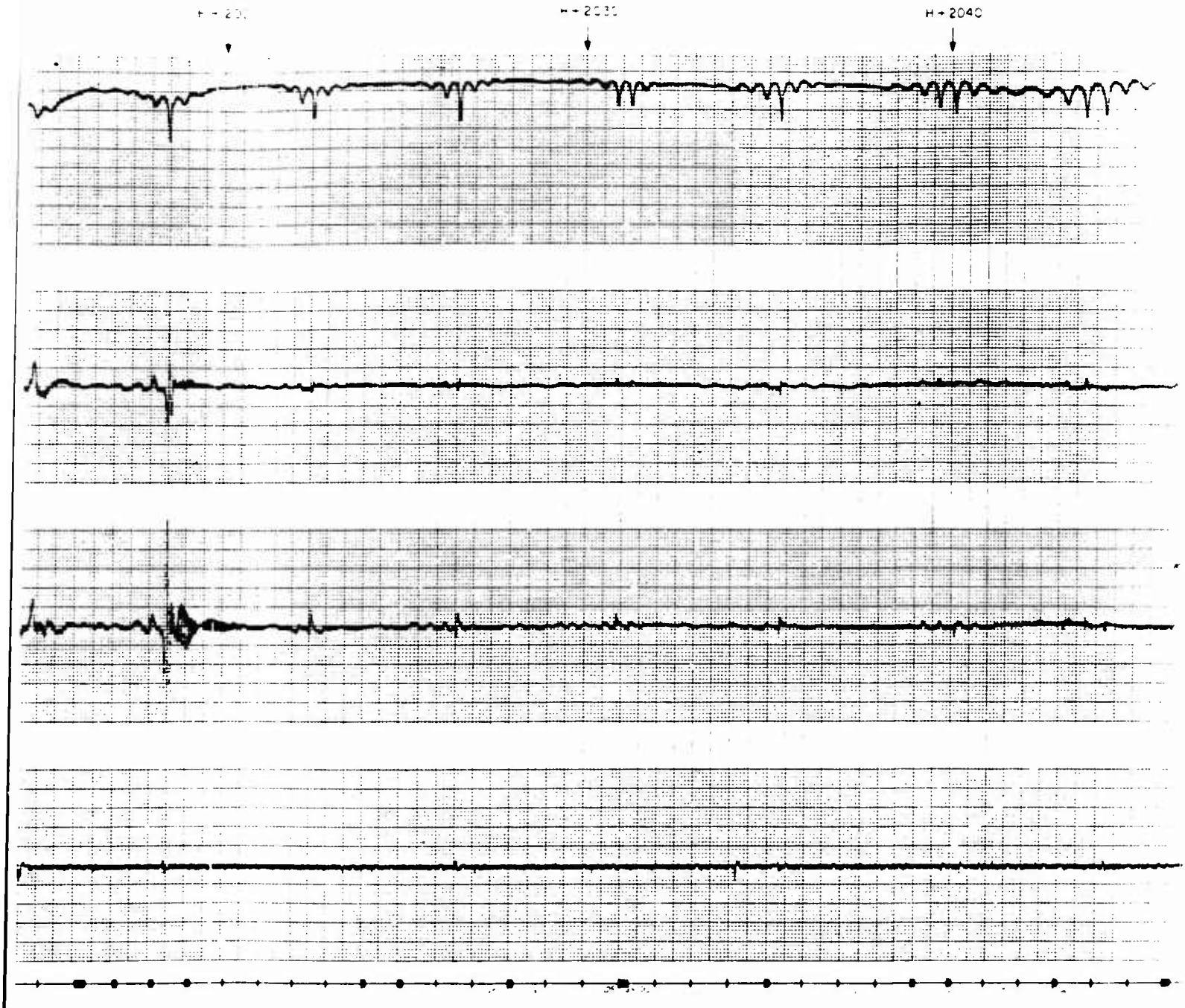
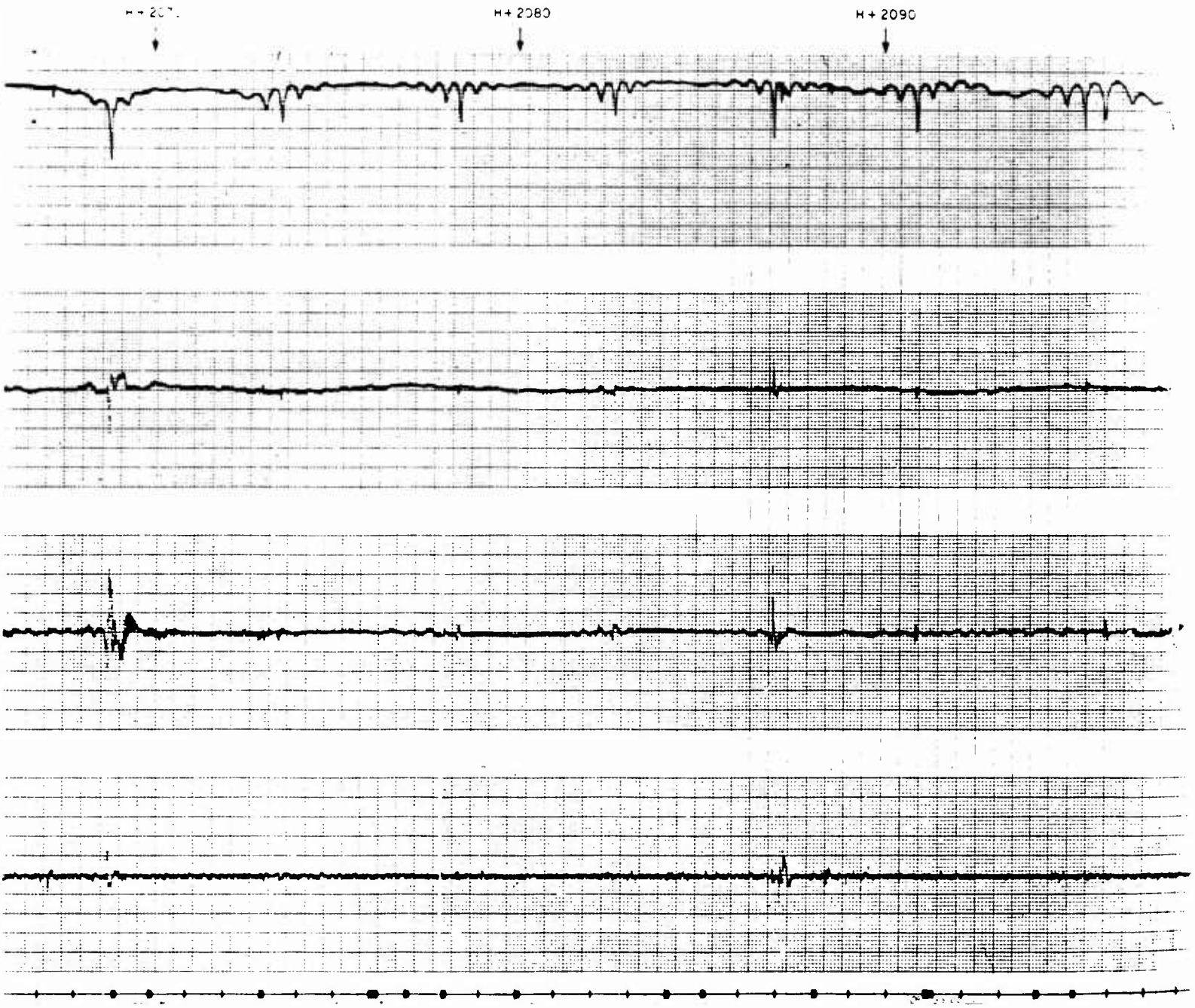


Figure B.6 Cont.

Figure B.6 Continued.



148-4

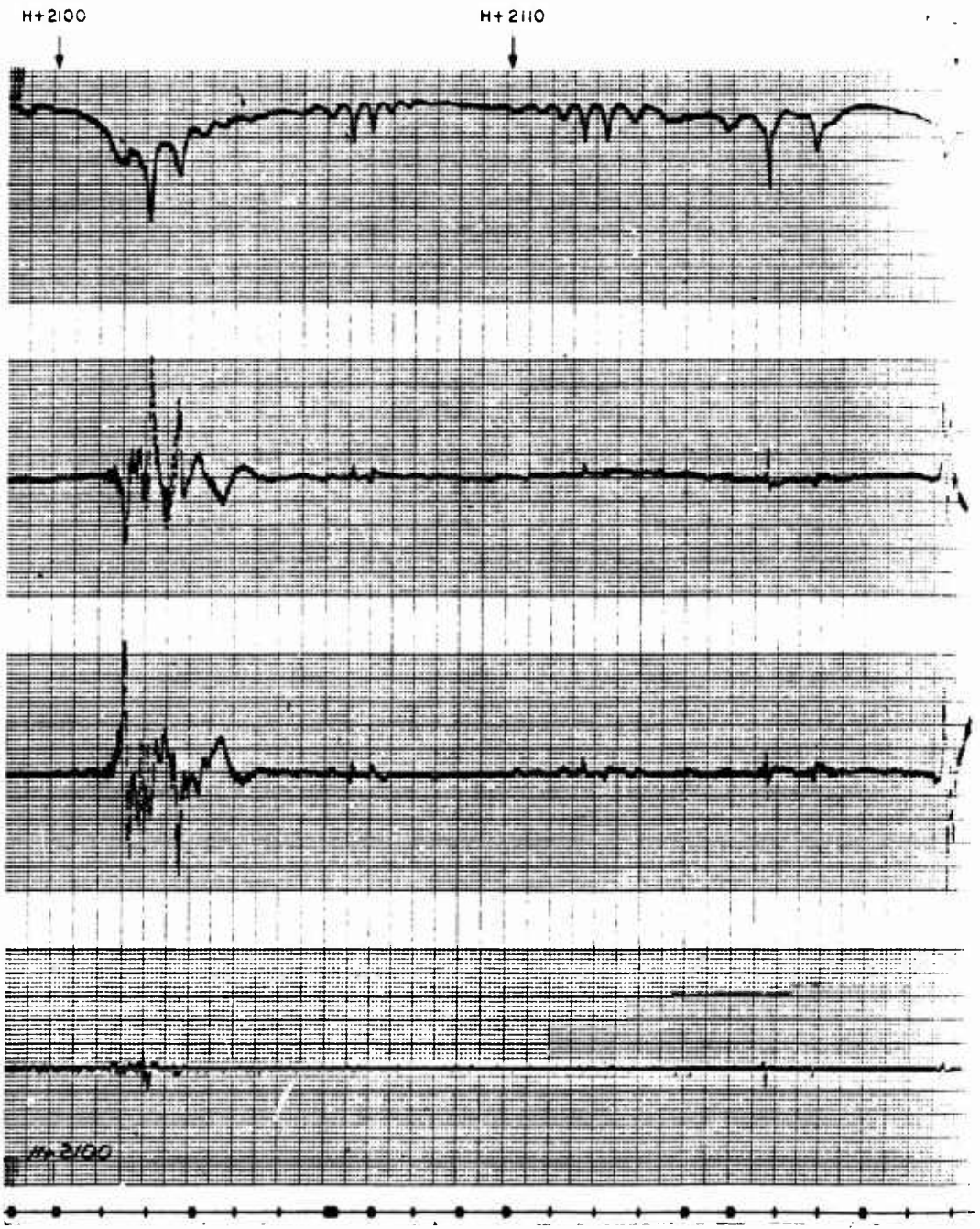


Figure B.6

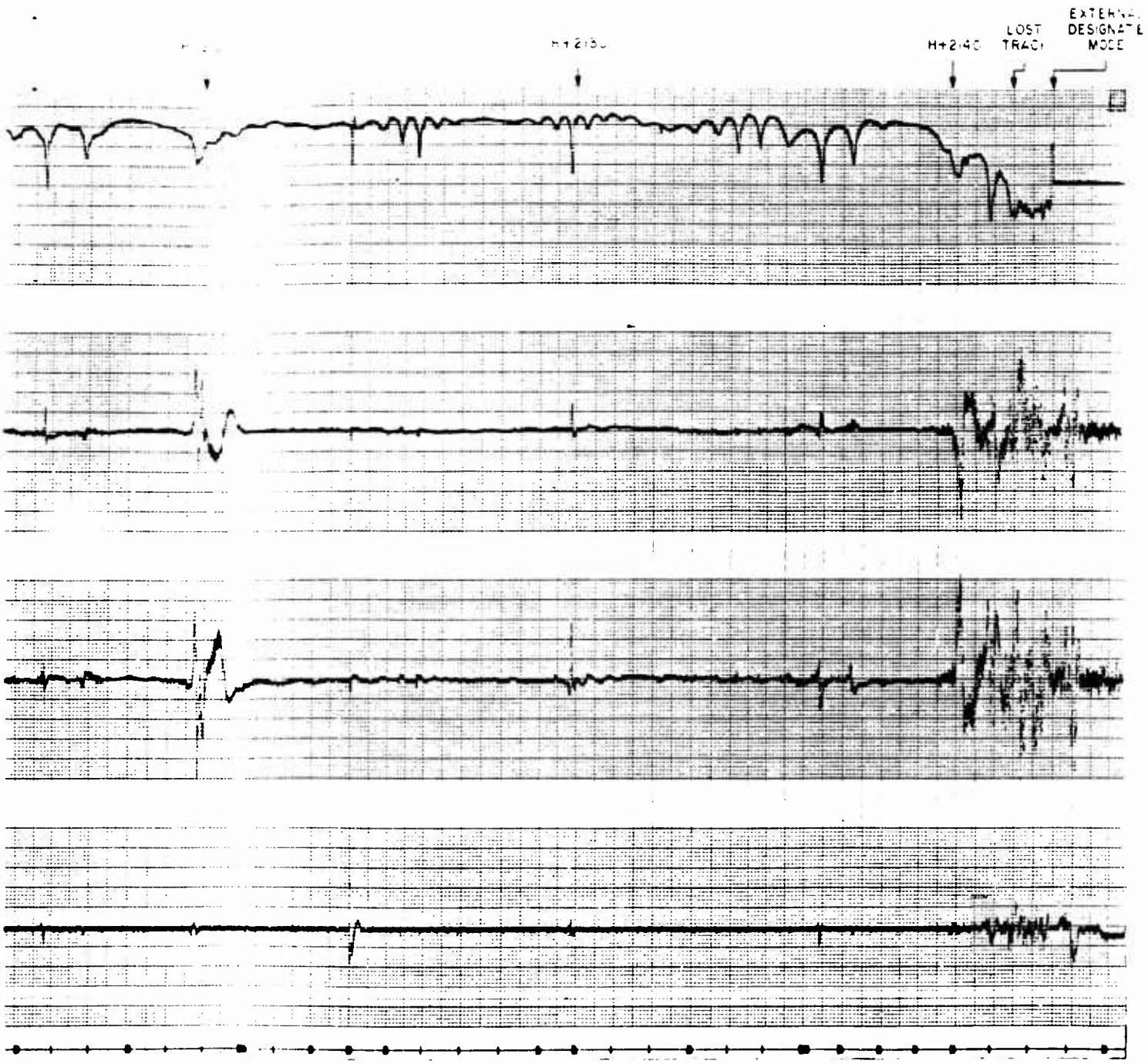


Figure B.6 Continued.


LOCKON-AUTO
TRACK MODE
H+2 90
H+2200
1
2
3
4
H+2200
1-AGC
2-AZ ERROR
3-EL ERROR
4-RANGE ERROR

150-1

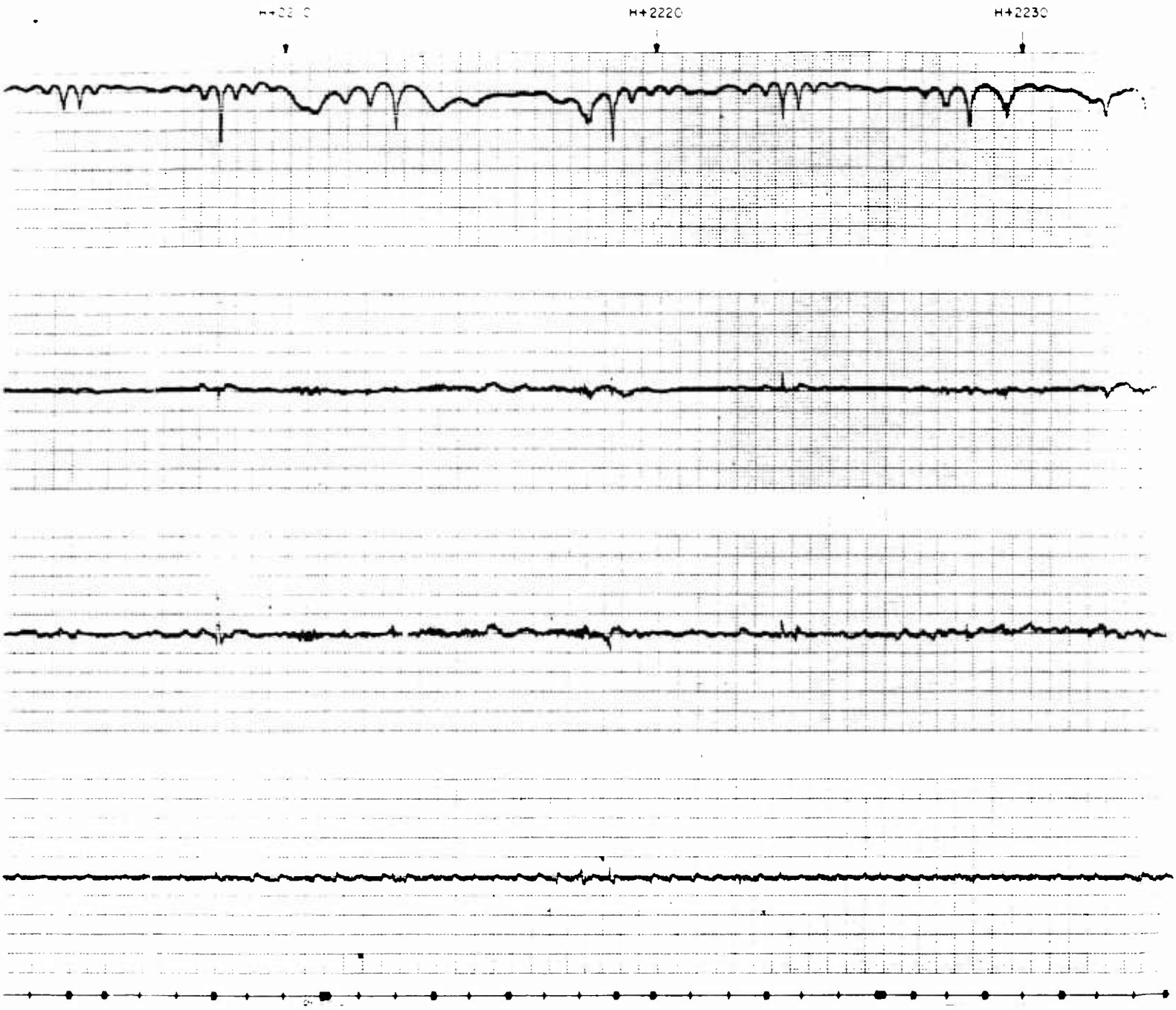
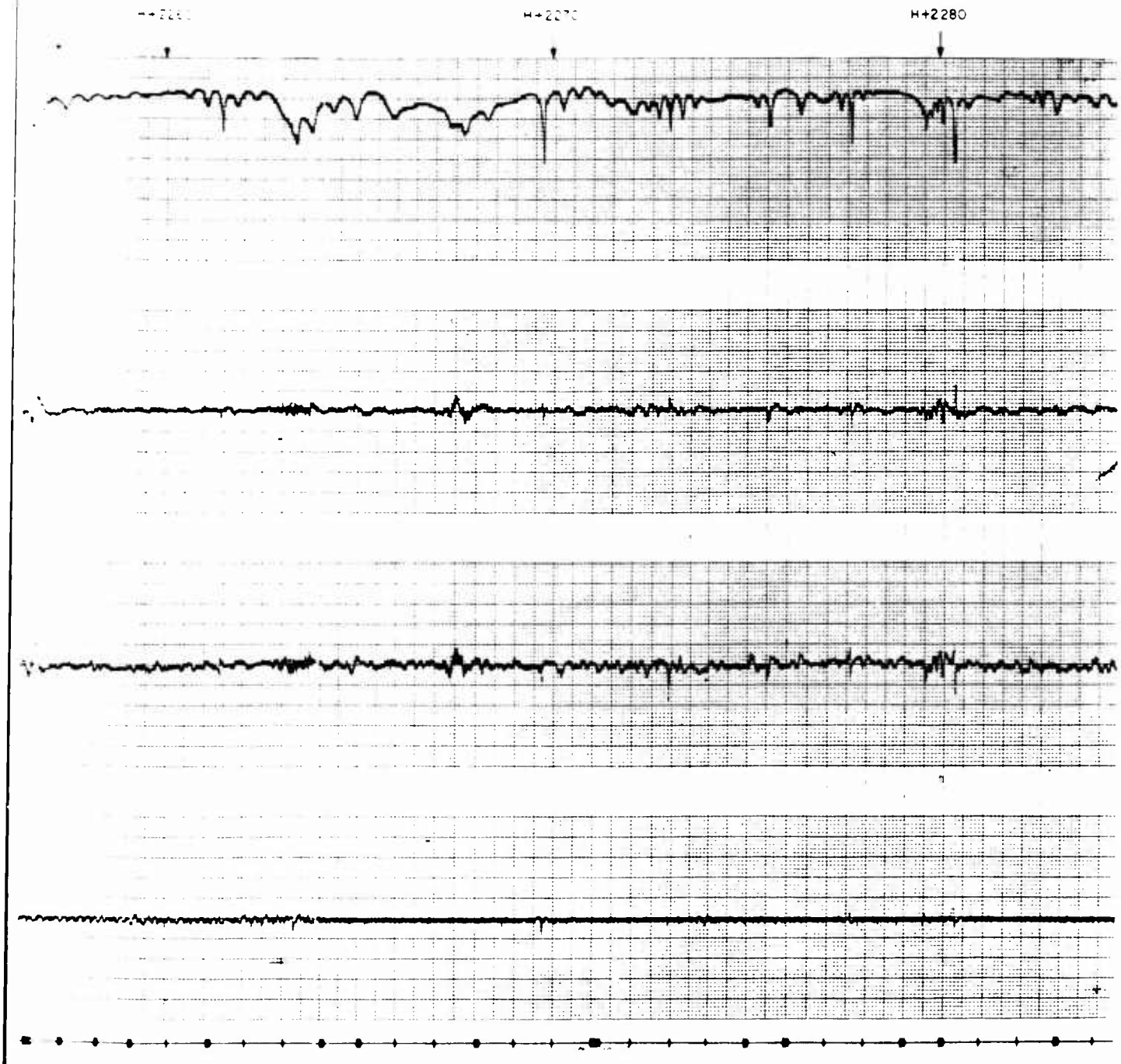


Figure B.6 Continued.

Figure B.6 Continued.



150-4

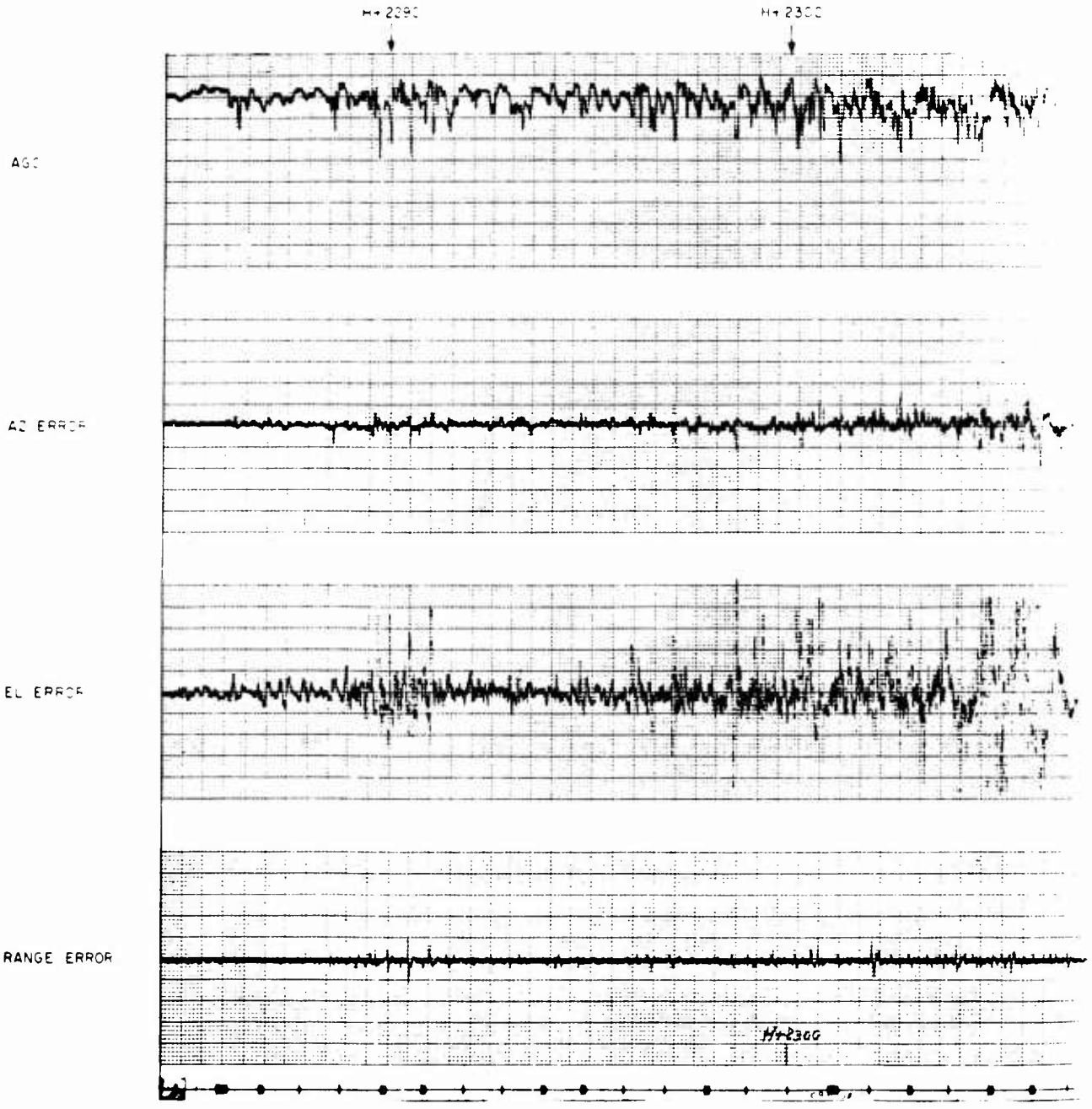
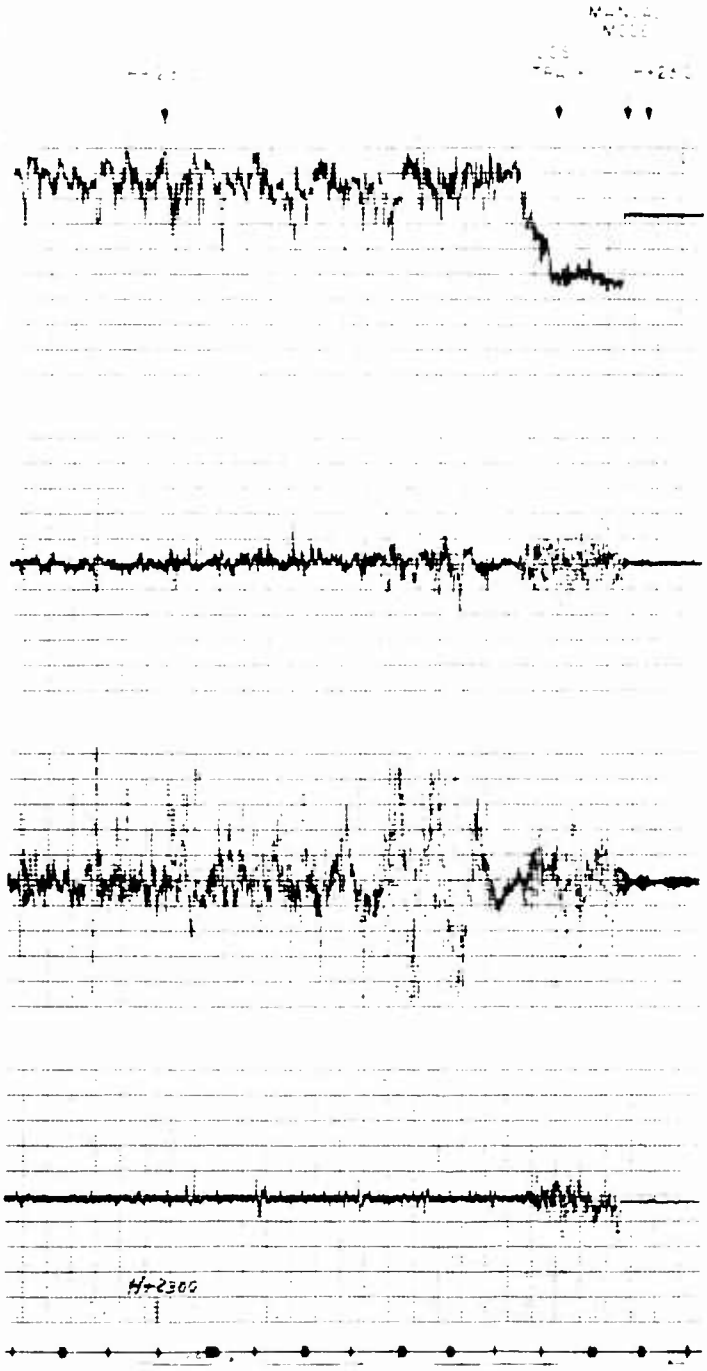
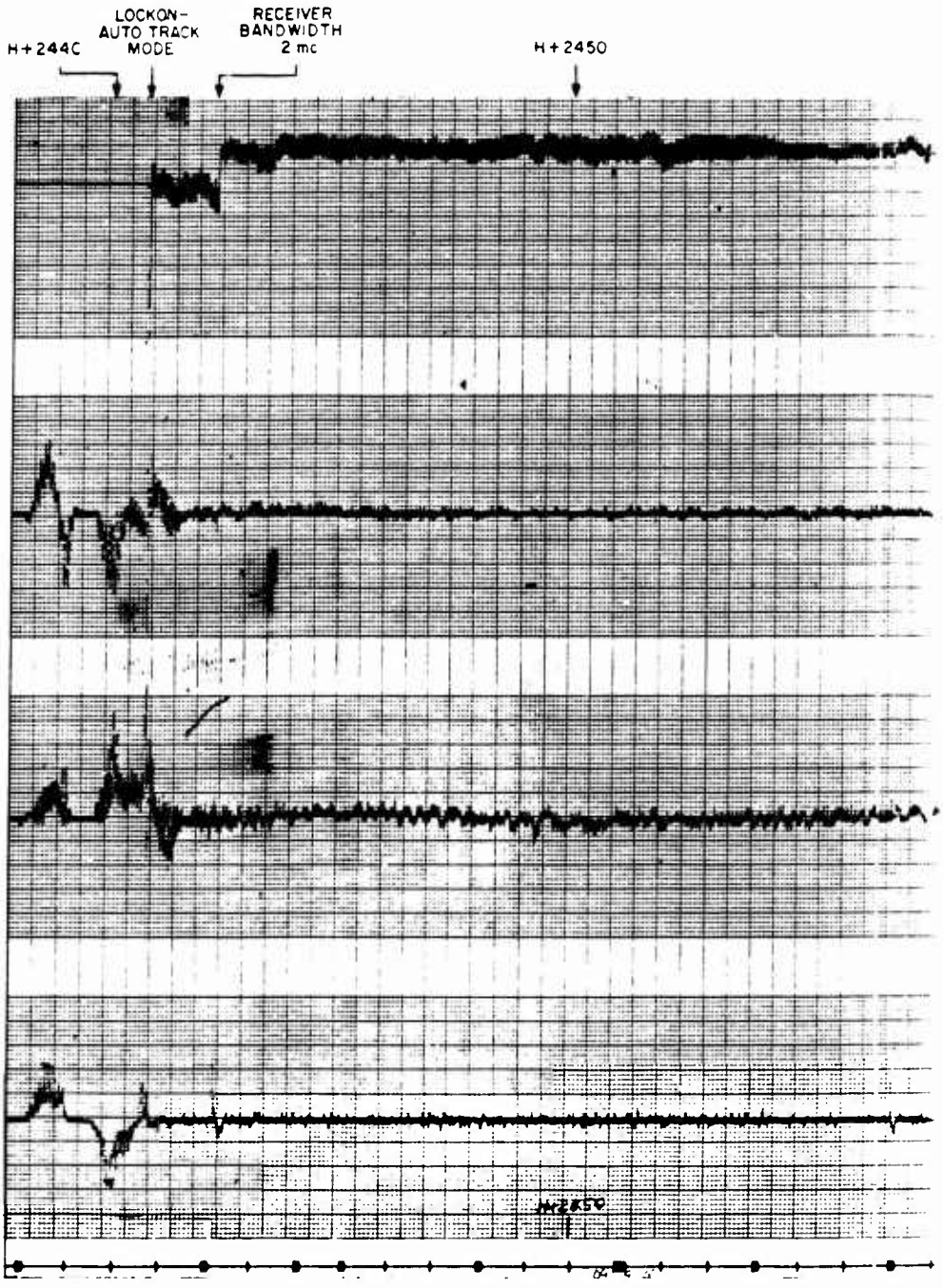


Figure B.6 Continued.

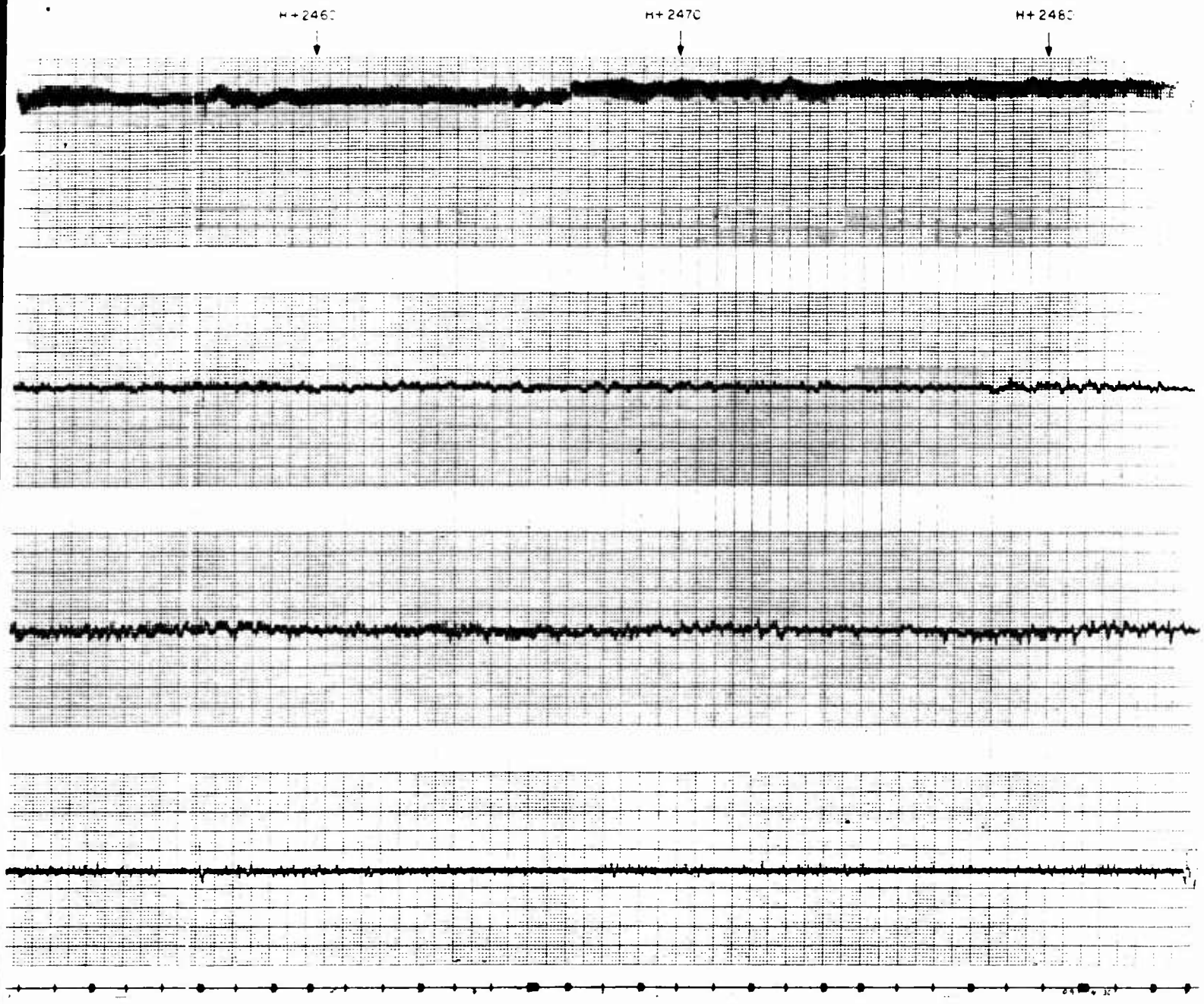


ontinued.



1- AGC
2- AZ ERROR
3- EL ERROR
4- RANGE ERROR

152-1



Figu

152-2

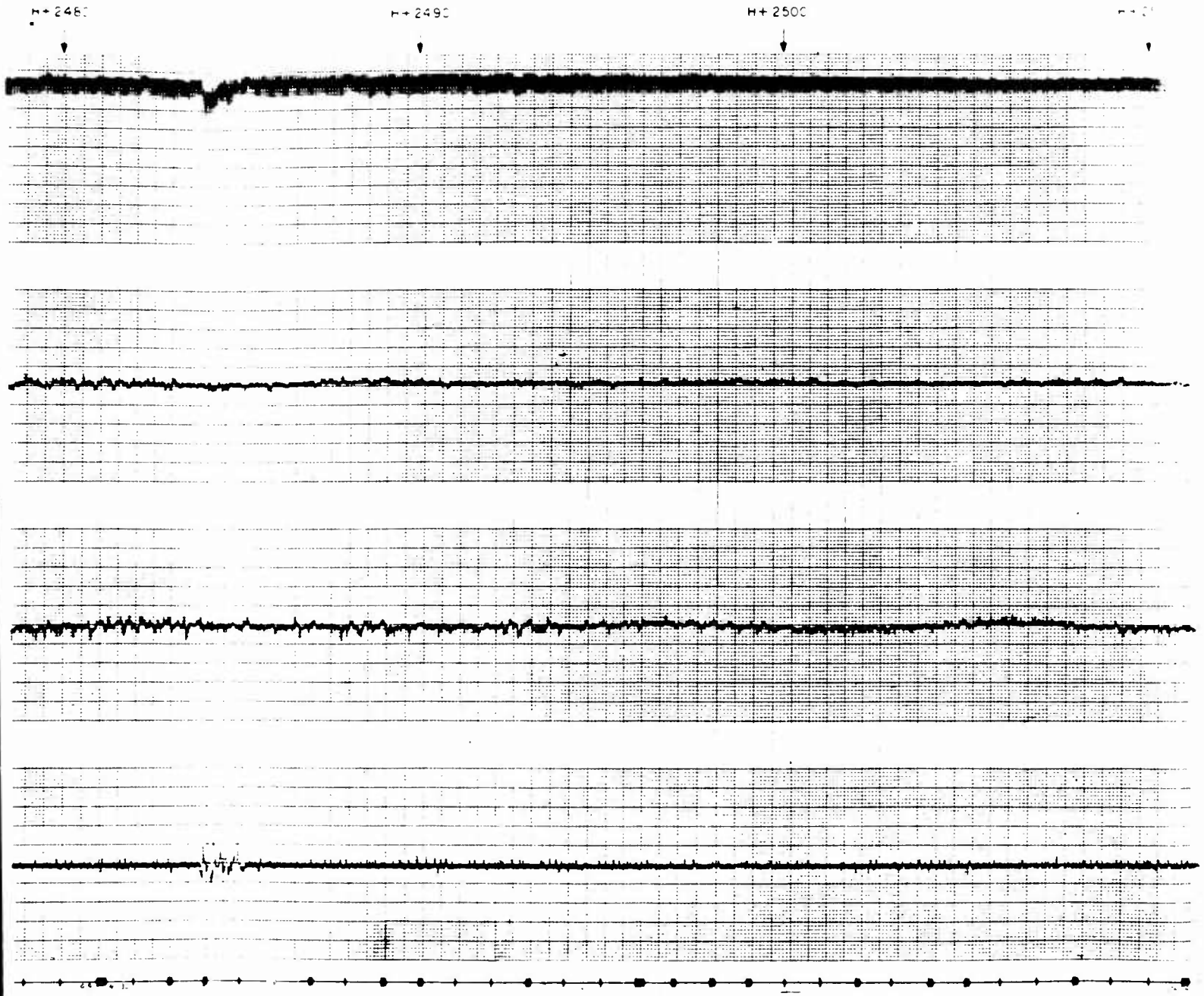
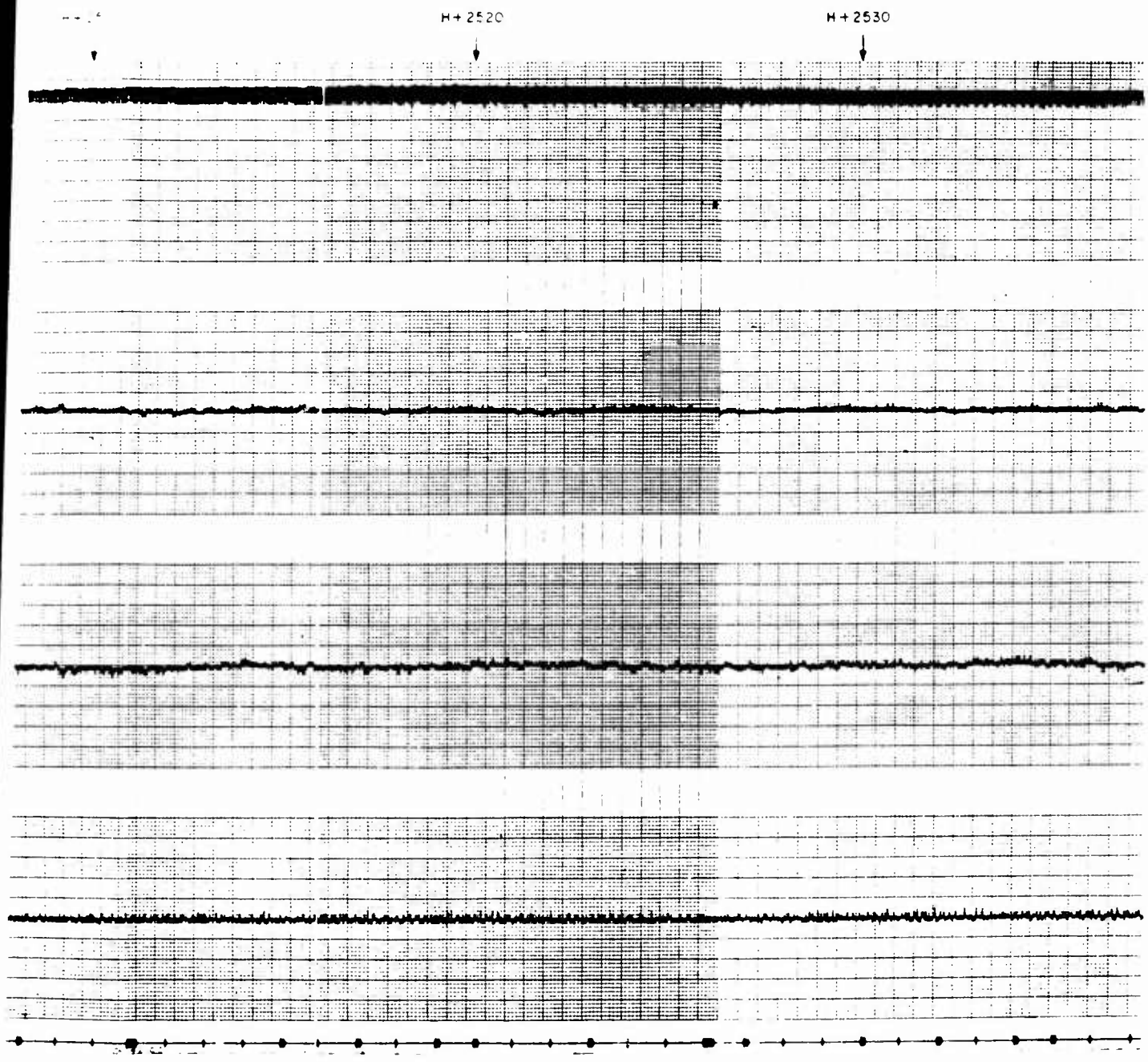
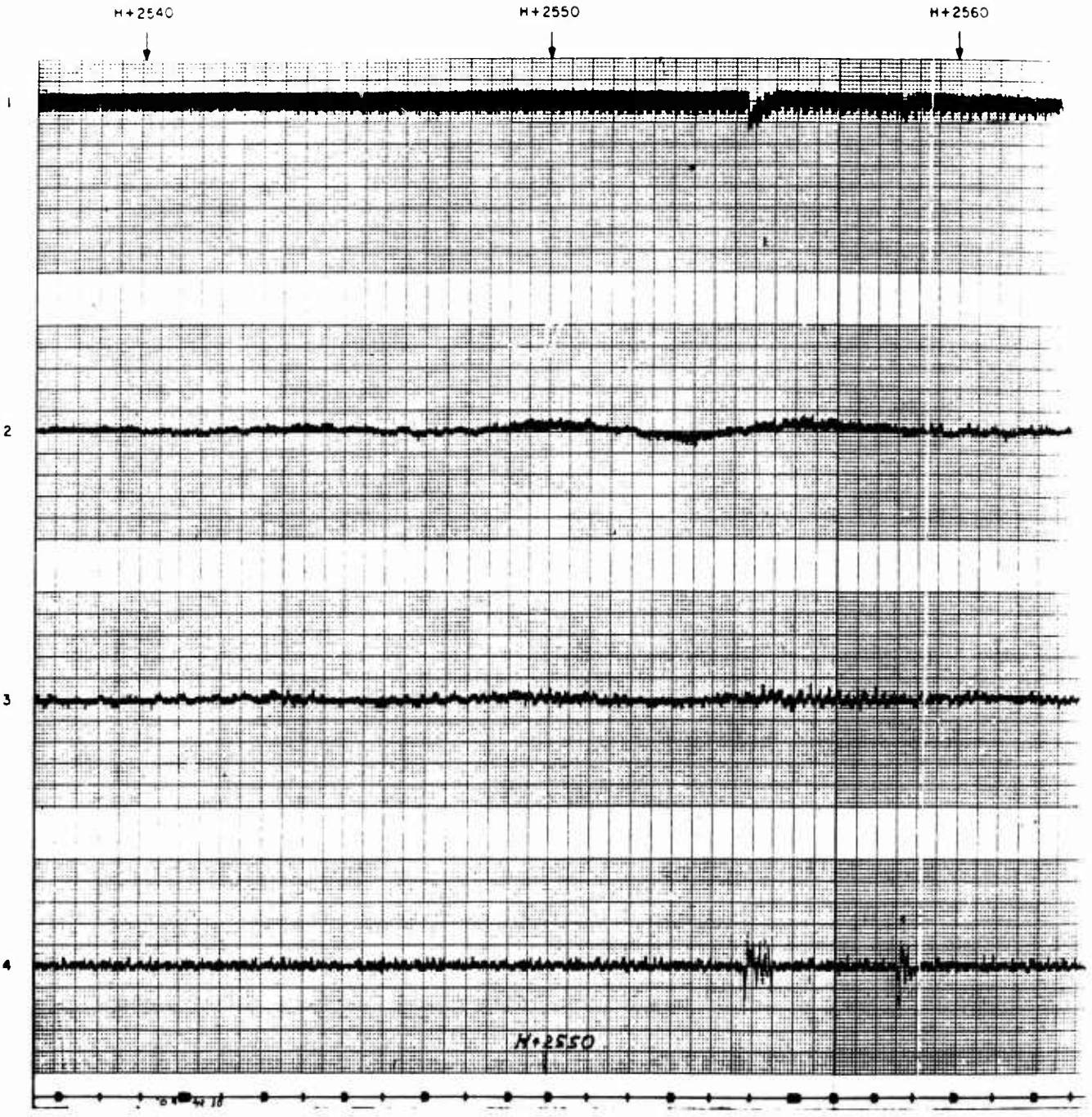


Figure B.7 Track, Probe 7.



152-4



1 – AGC
2 – AZ ERROR
3 – EL ERROR
4 – RANGE ERROR

153-1

[redacted]

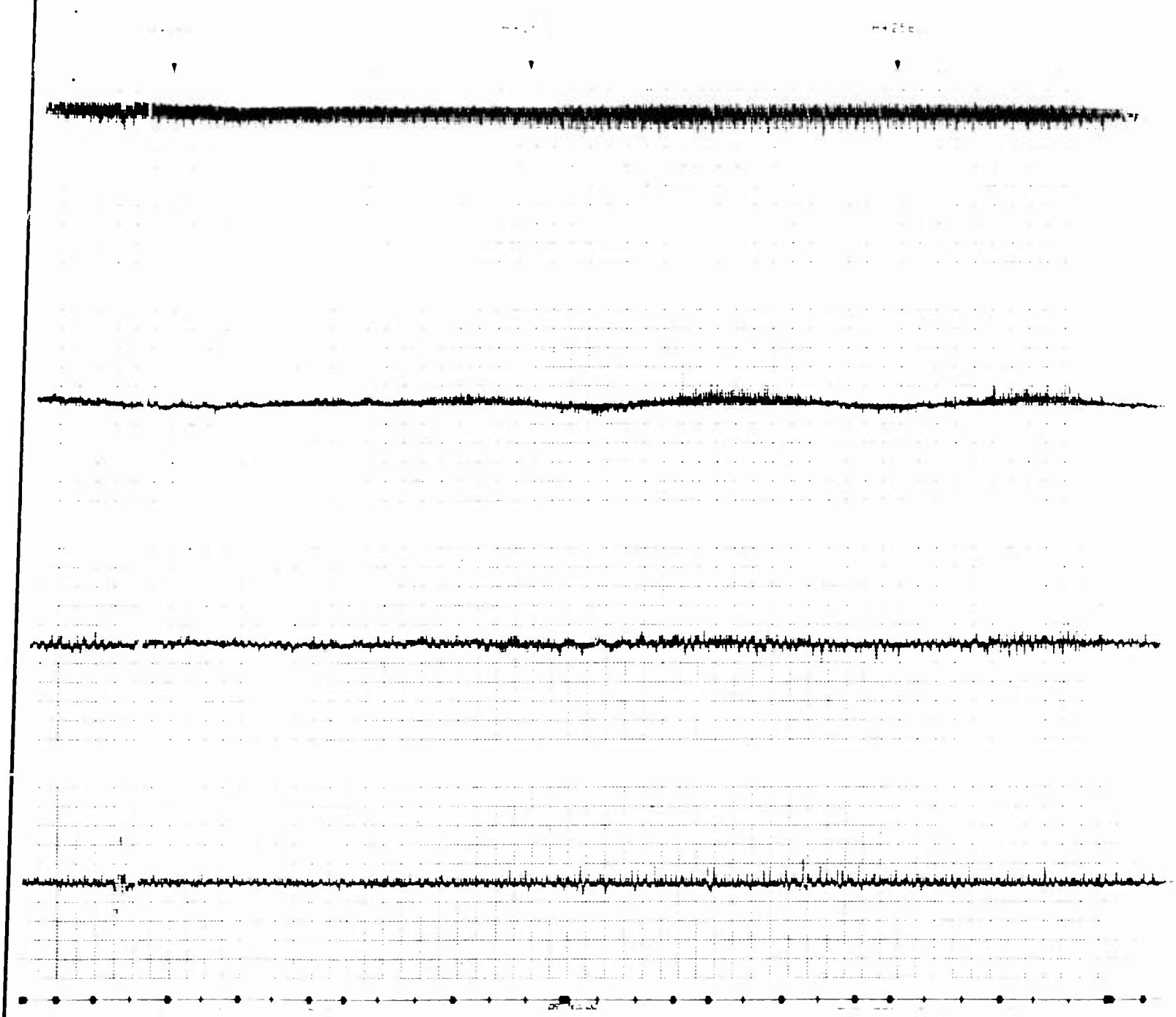
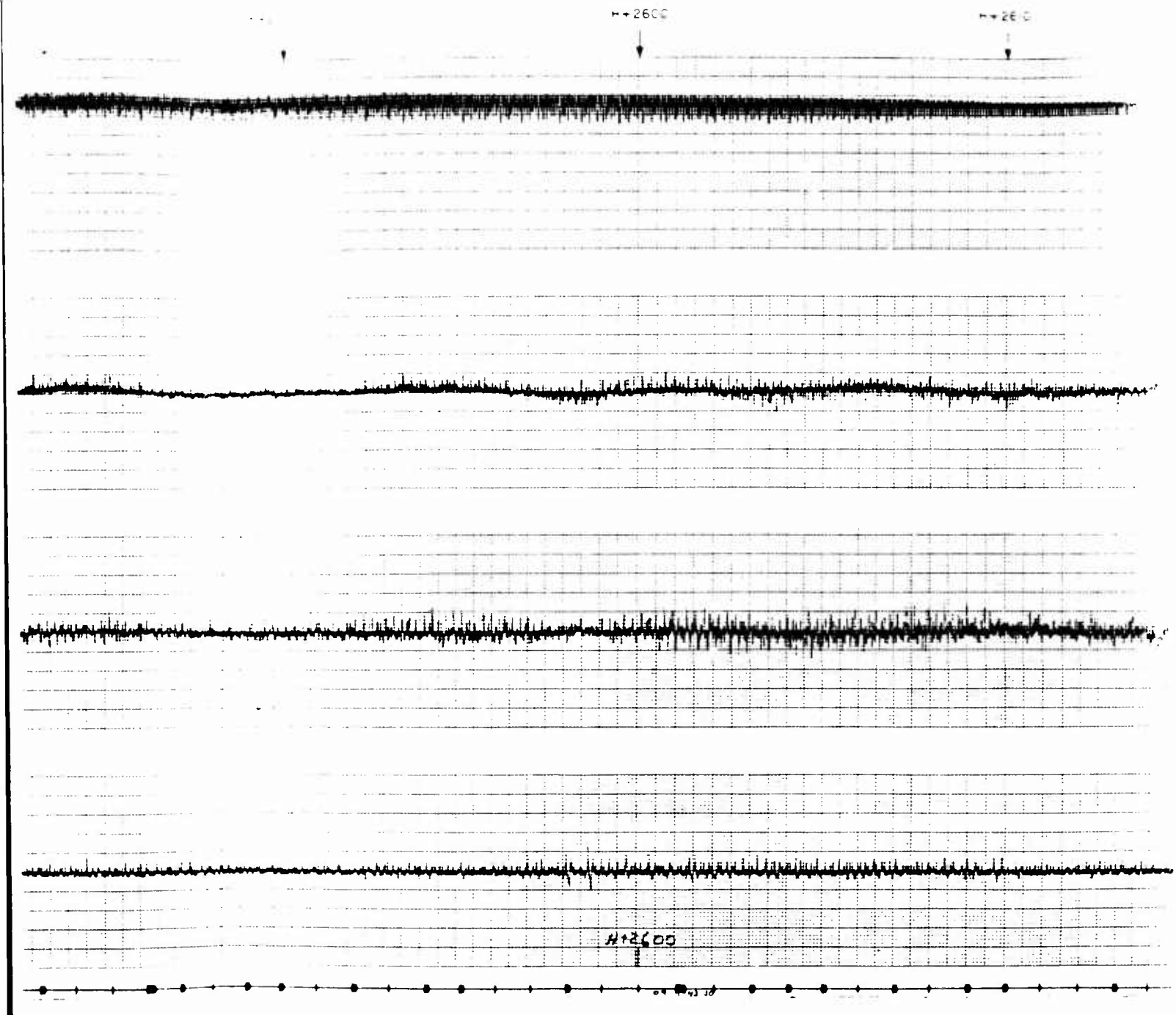
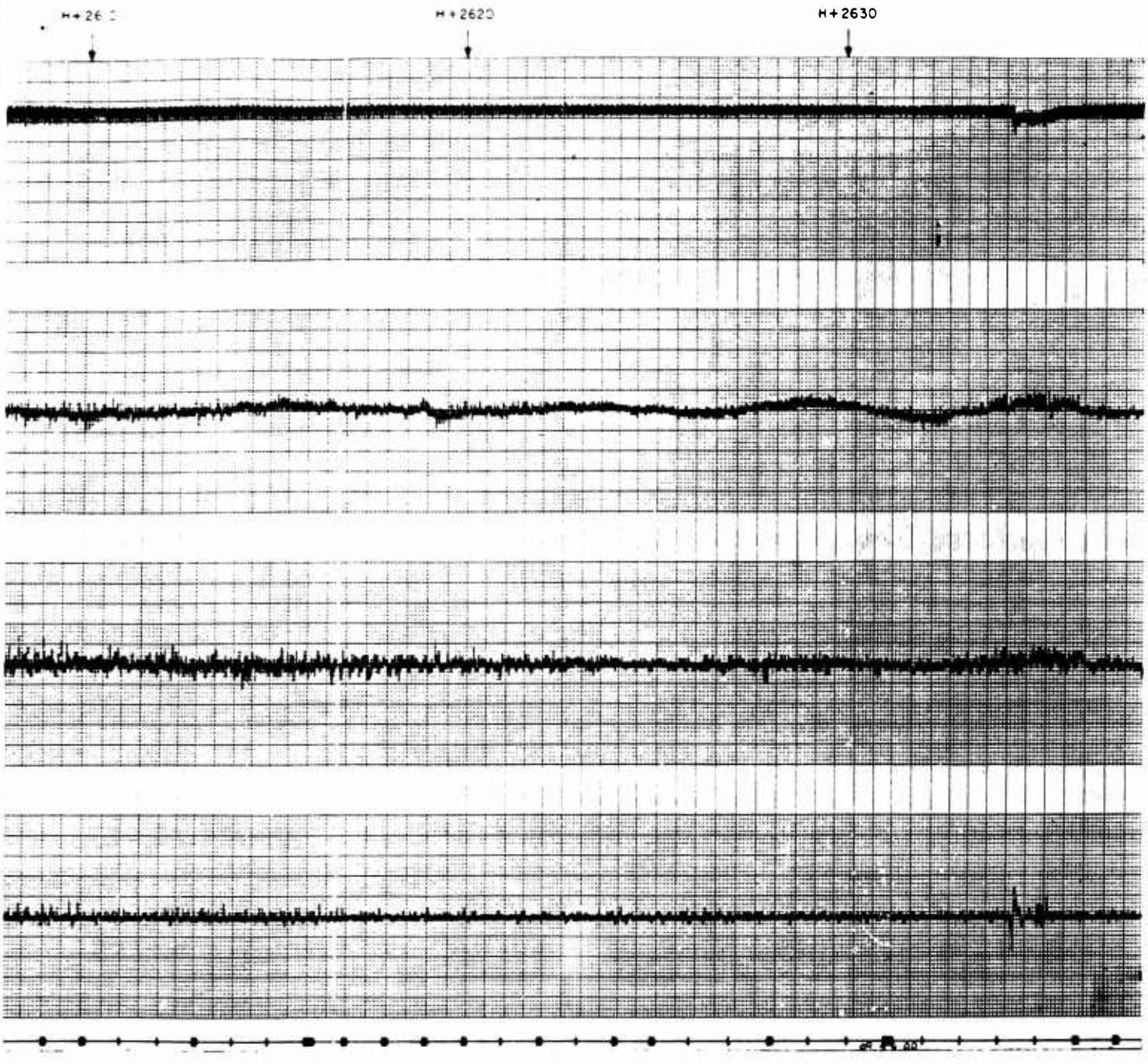


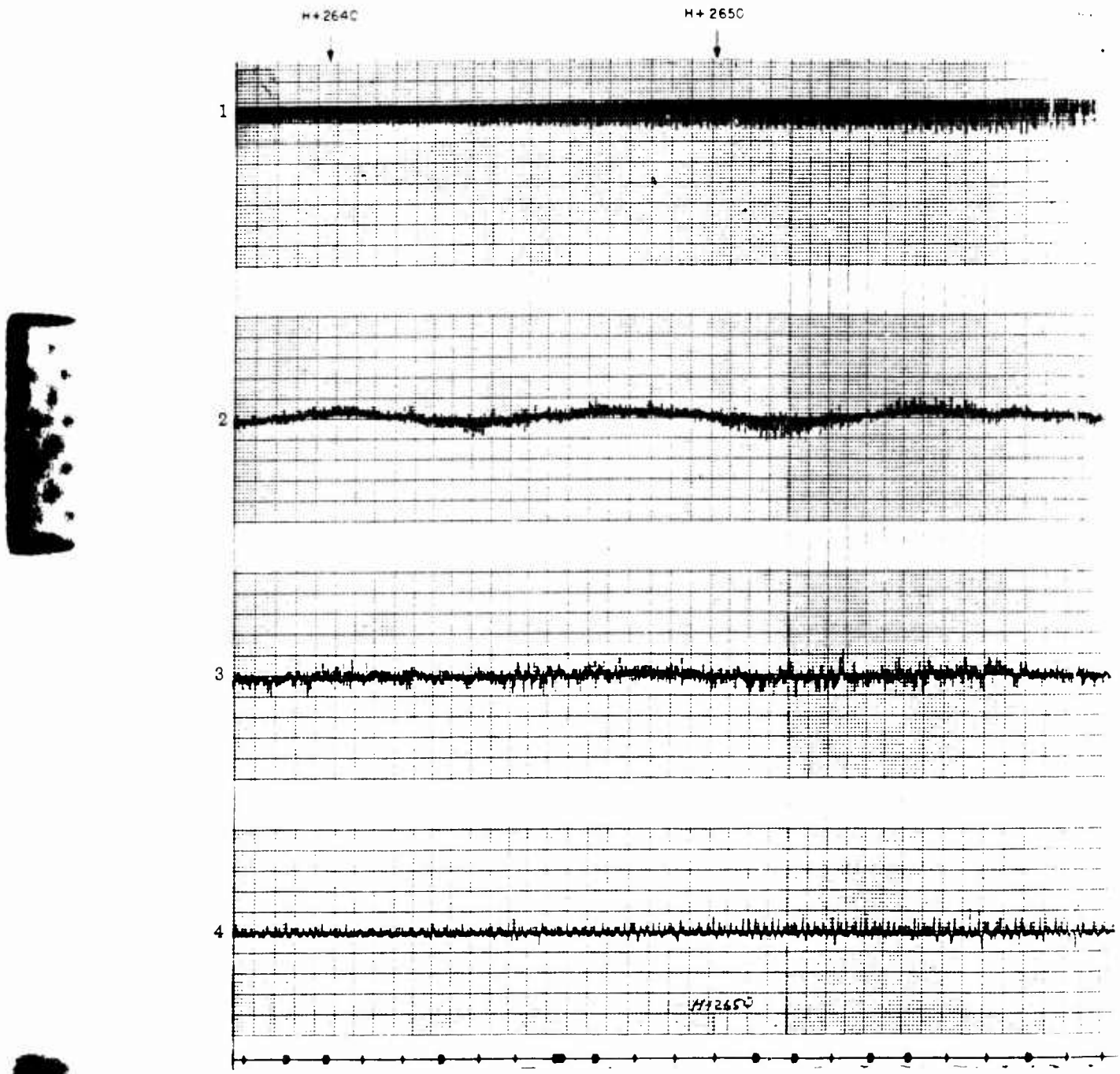
Figure B.7 Continued...



3.7 Continued...



153-4



1 - AGC
2 - AZ ERROR
3 - EL ERROR
4 - RANGE ERROR

154-1

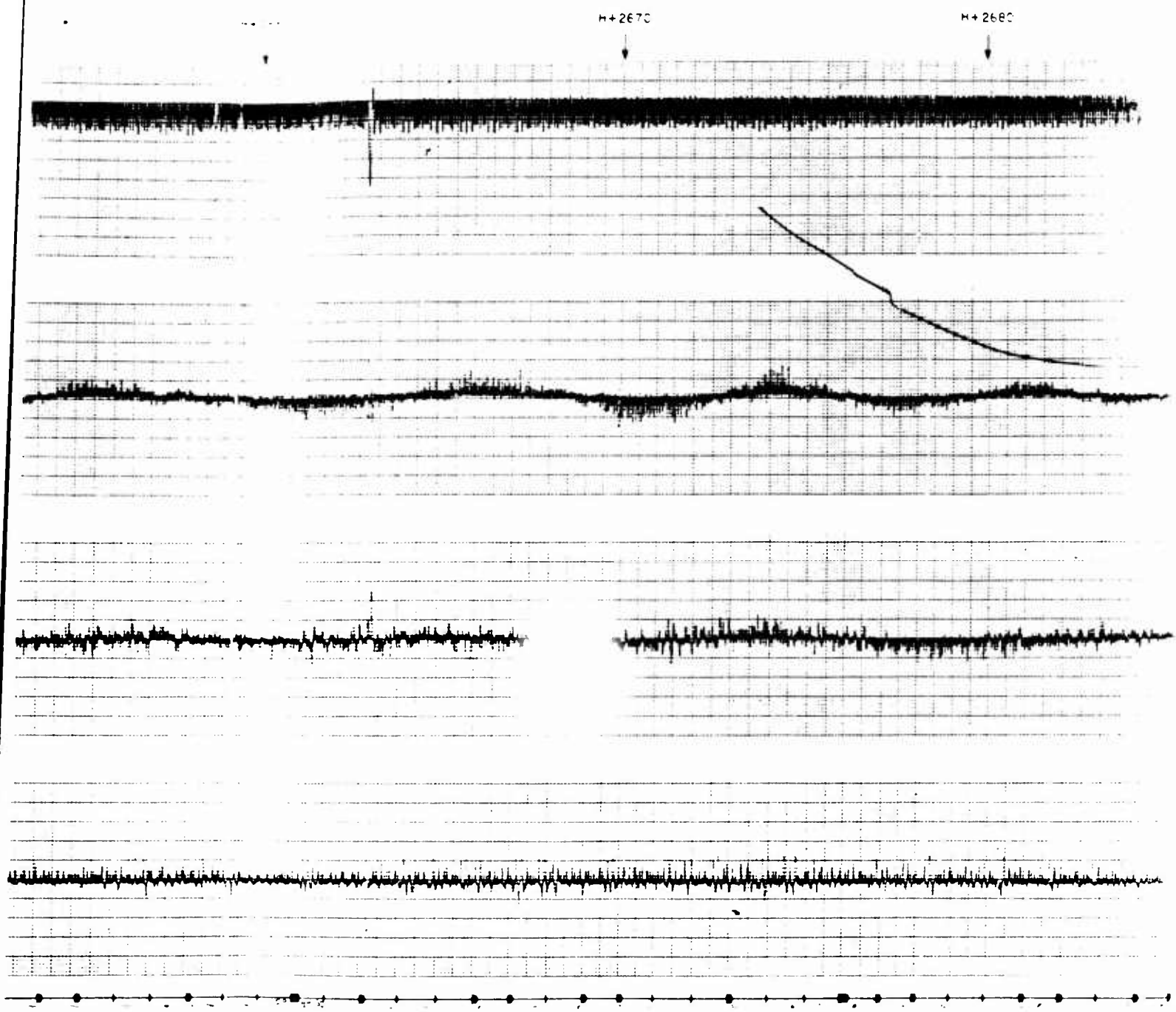


Figure B.7 Co

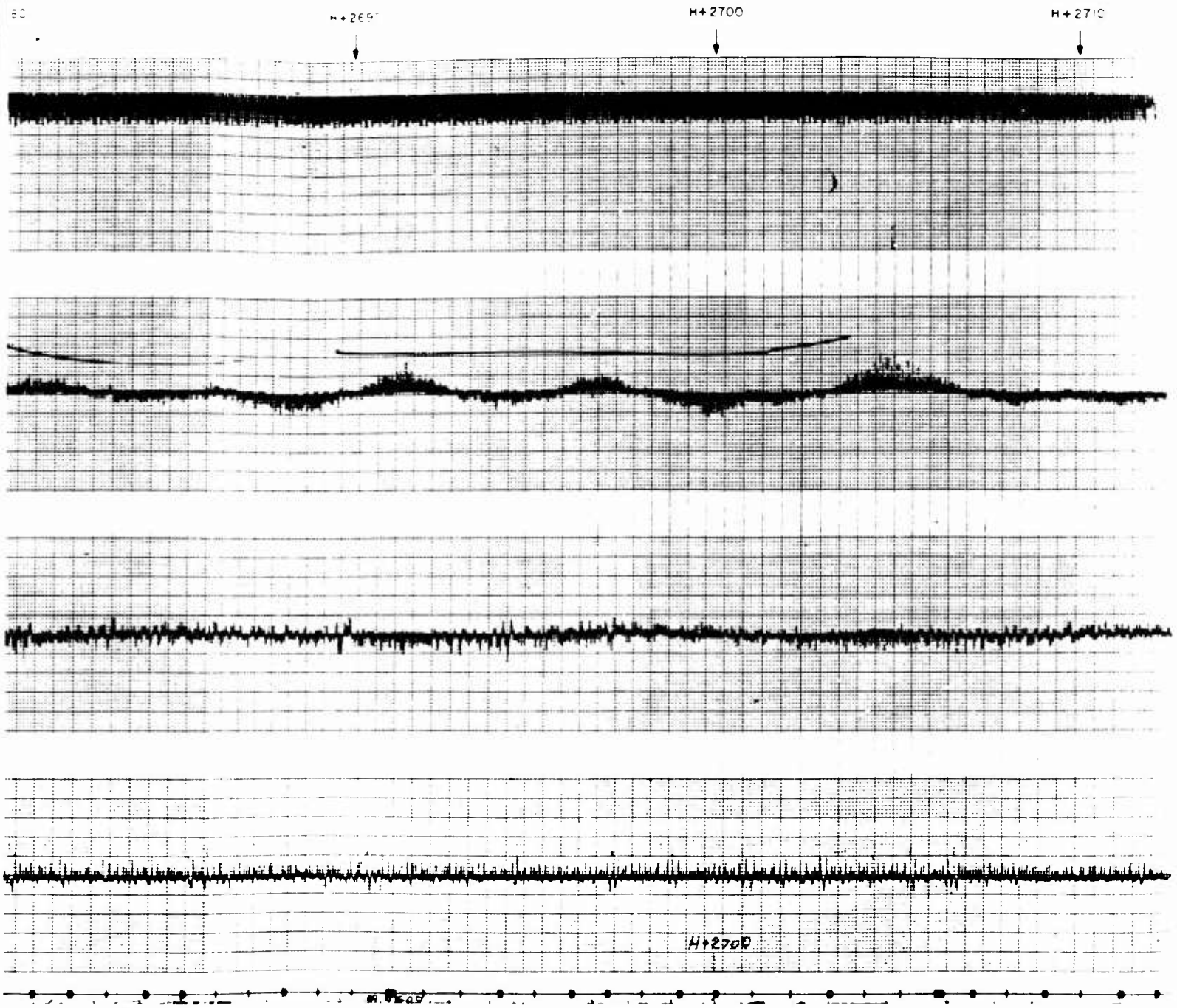
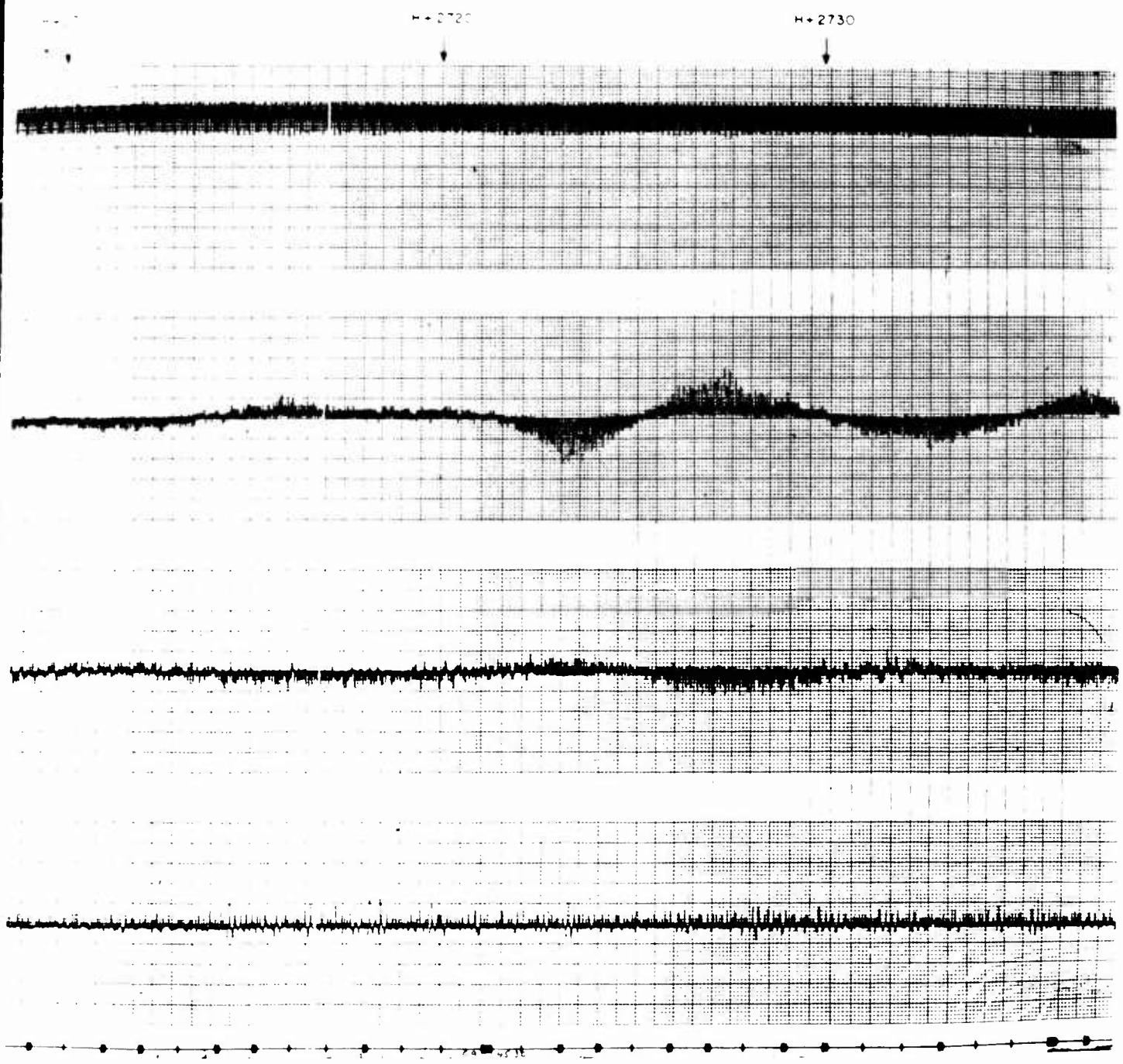
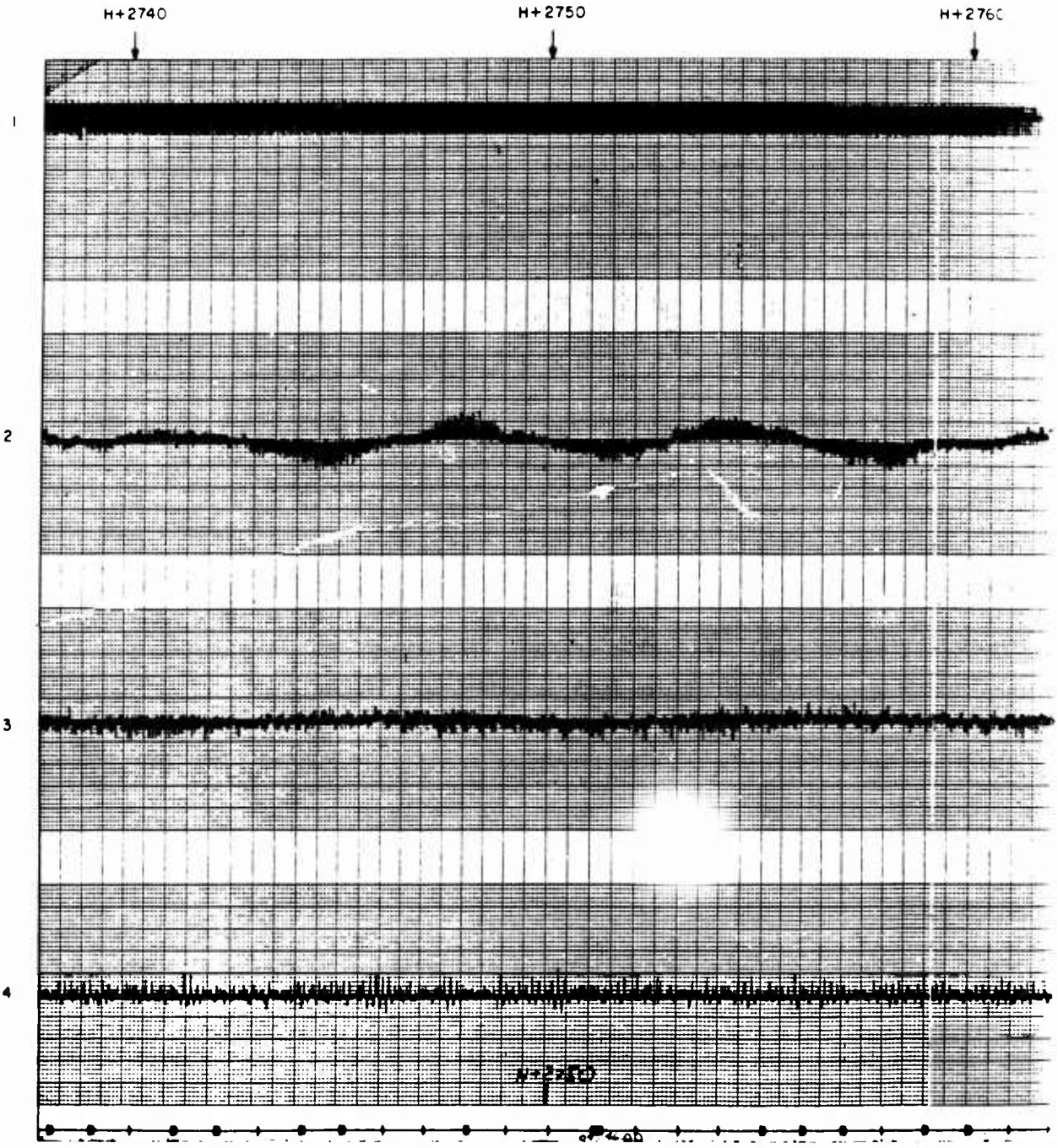


Figure B.7 Continued.



4



1-AGC
2-AZ ERROR
3-EL ERROR
4-RANGE ERROR

155-1

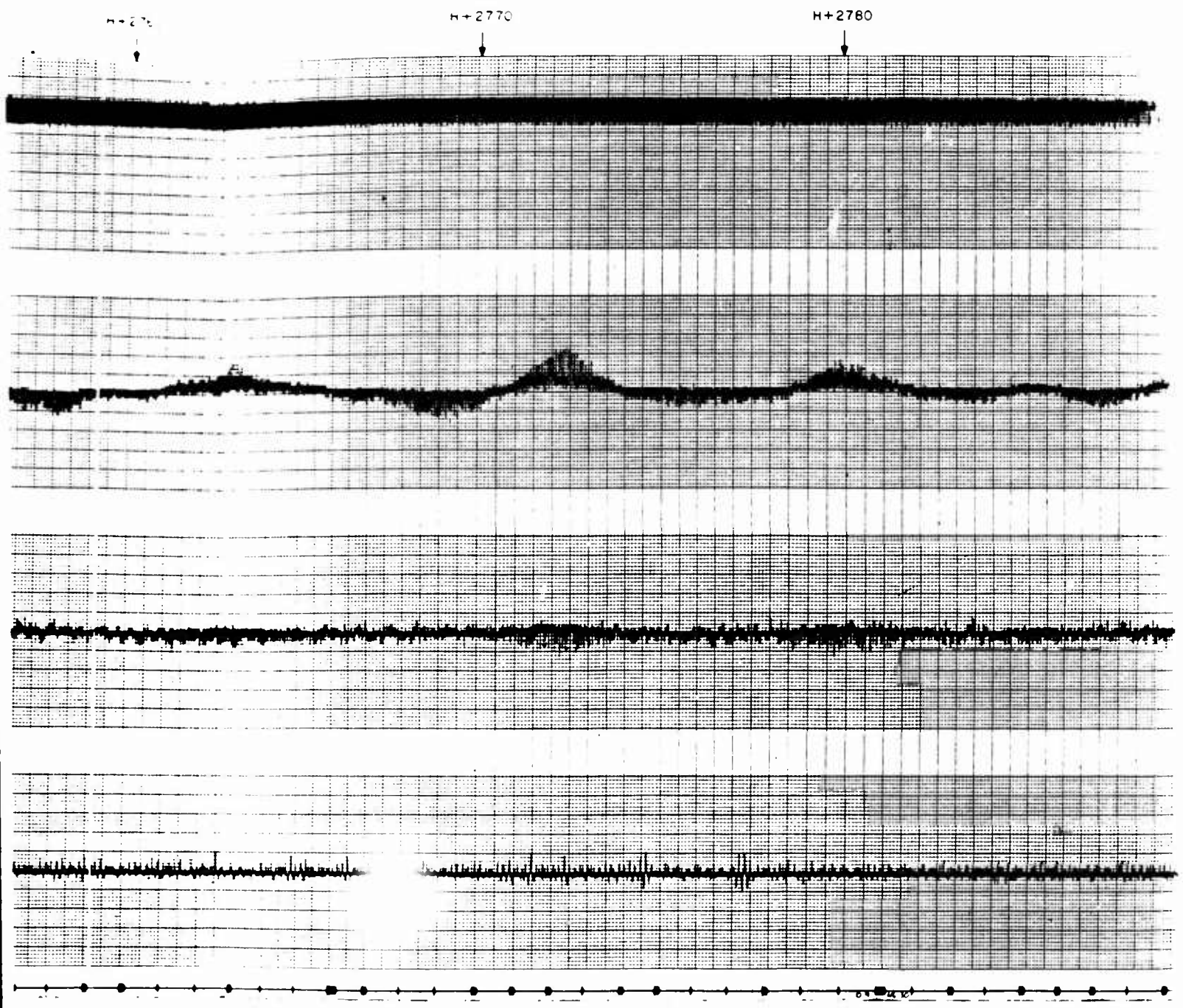
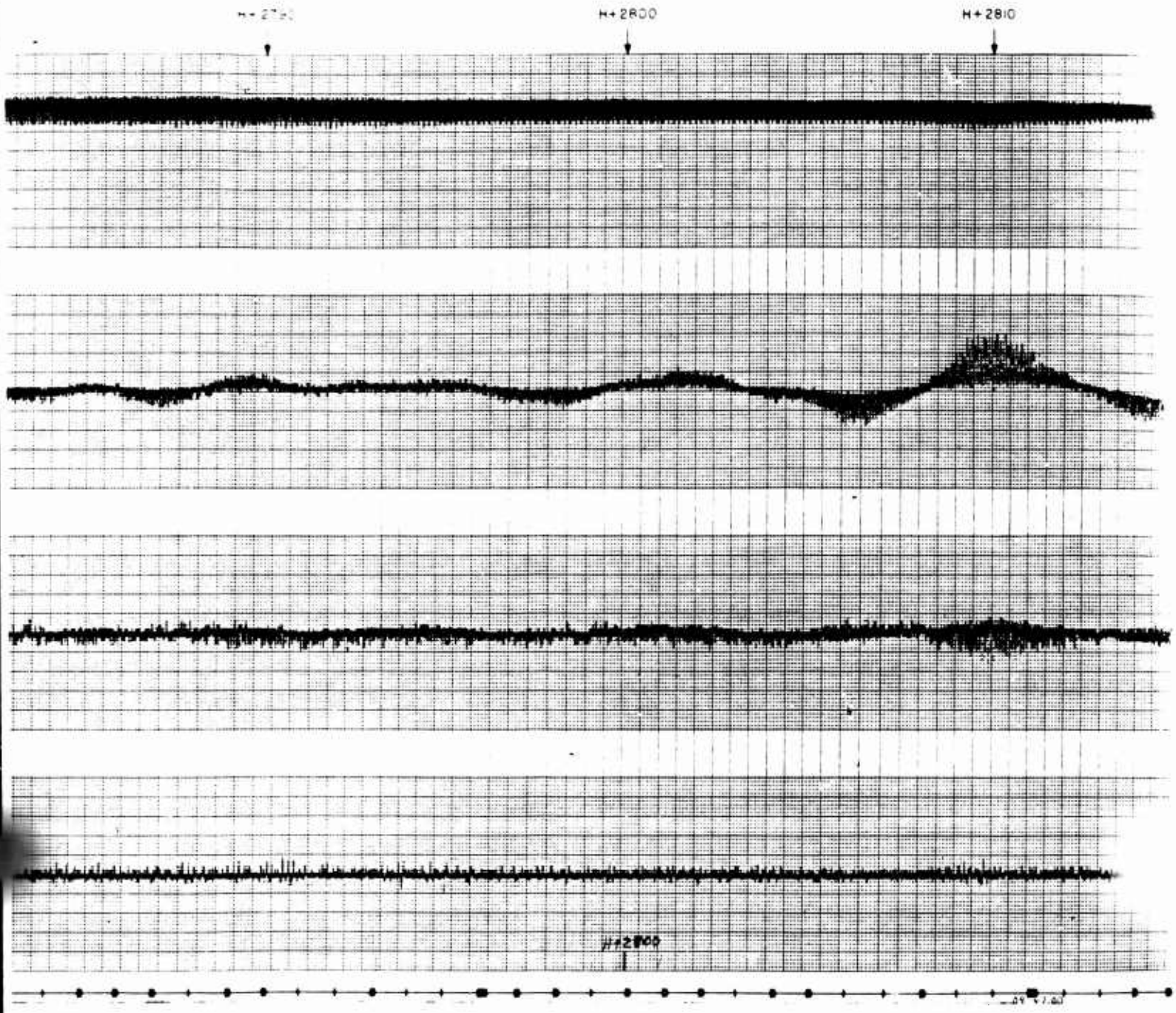


Figure B.7 Continued.



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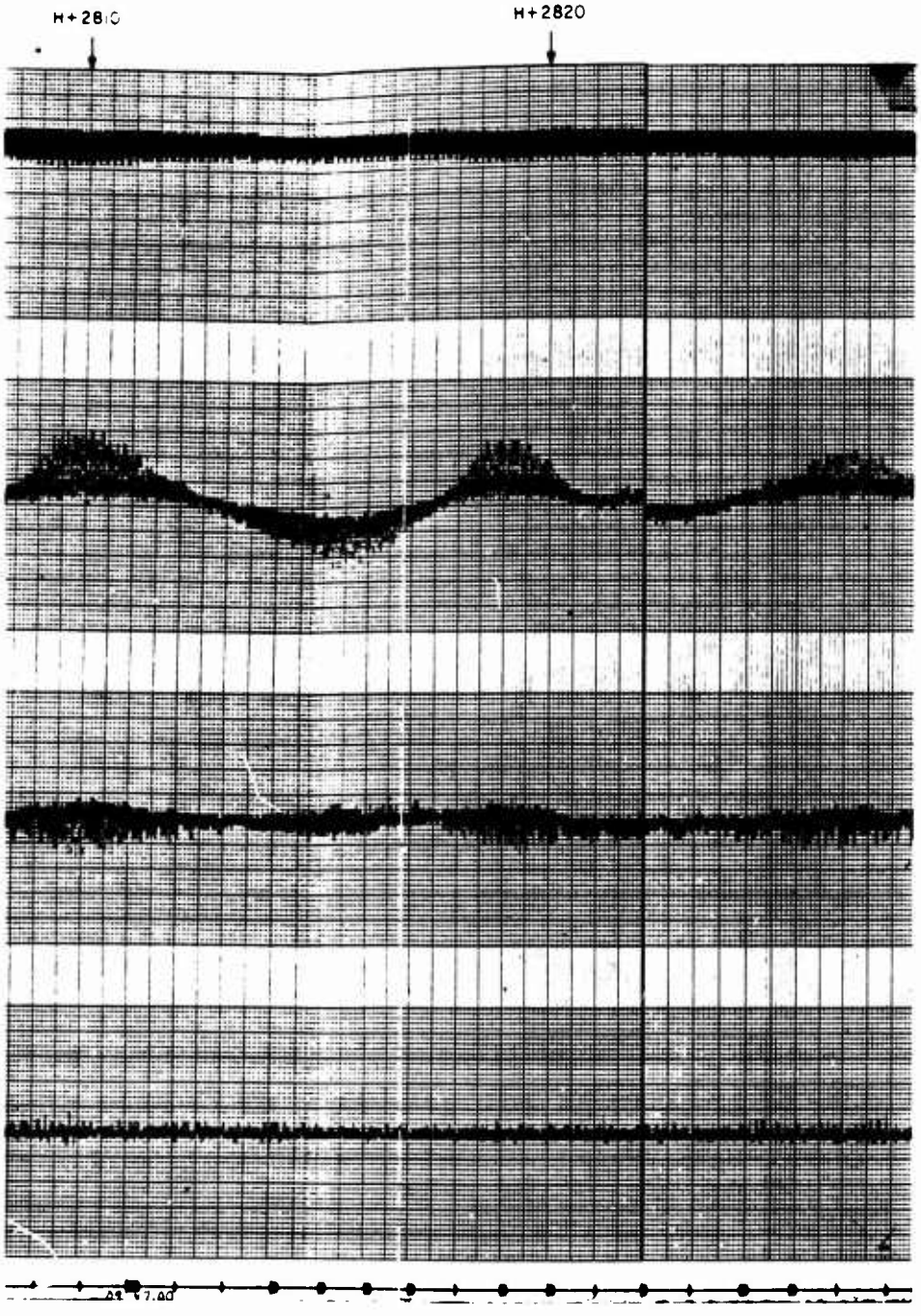
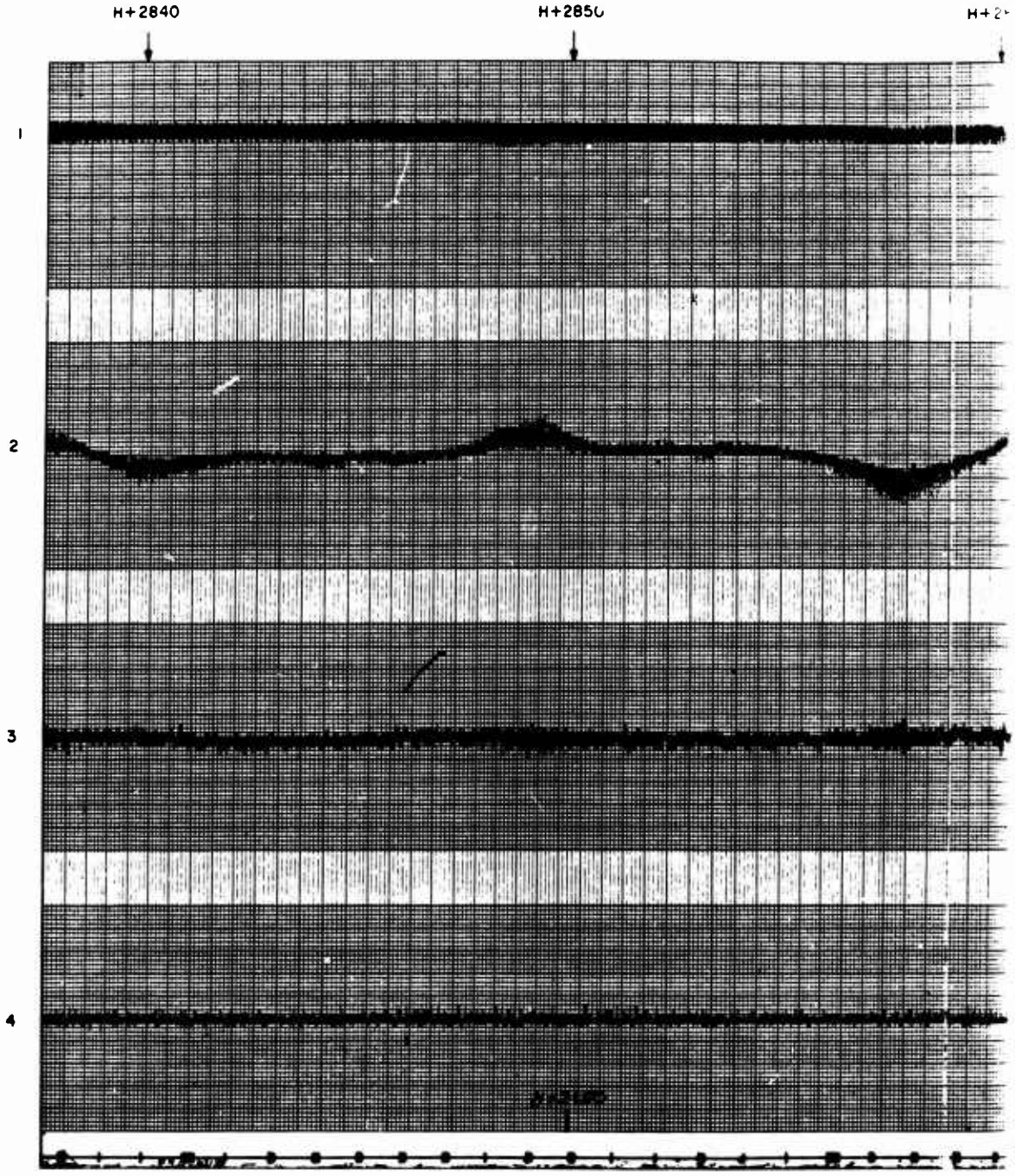

H+2810
H+2820



1-AGC
2-AZ ERROR
3-EL ERROR
4-RANGE ERROR

156-1

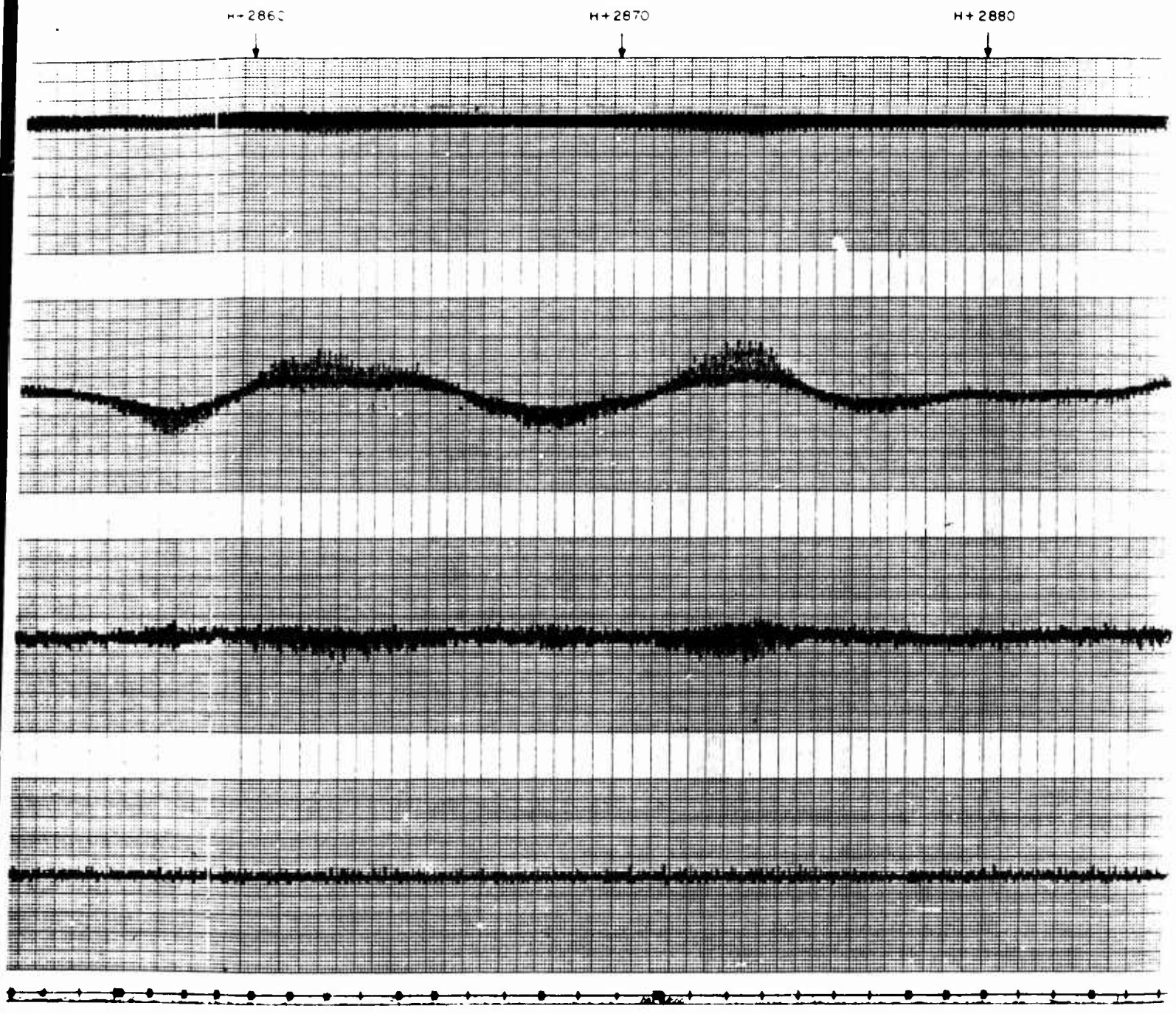


Figure B.7 Conti

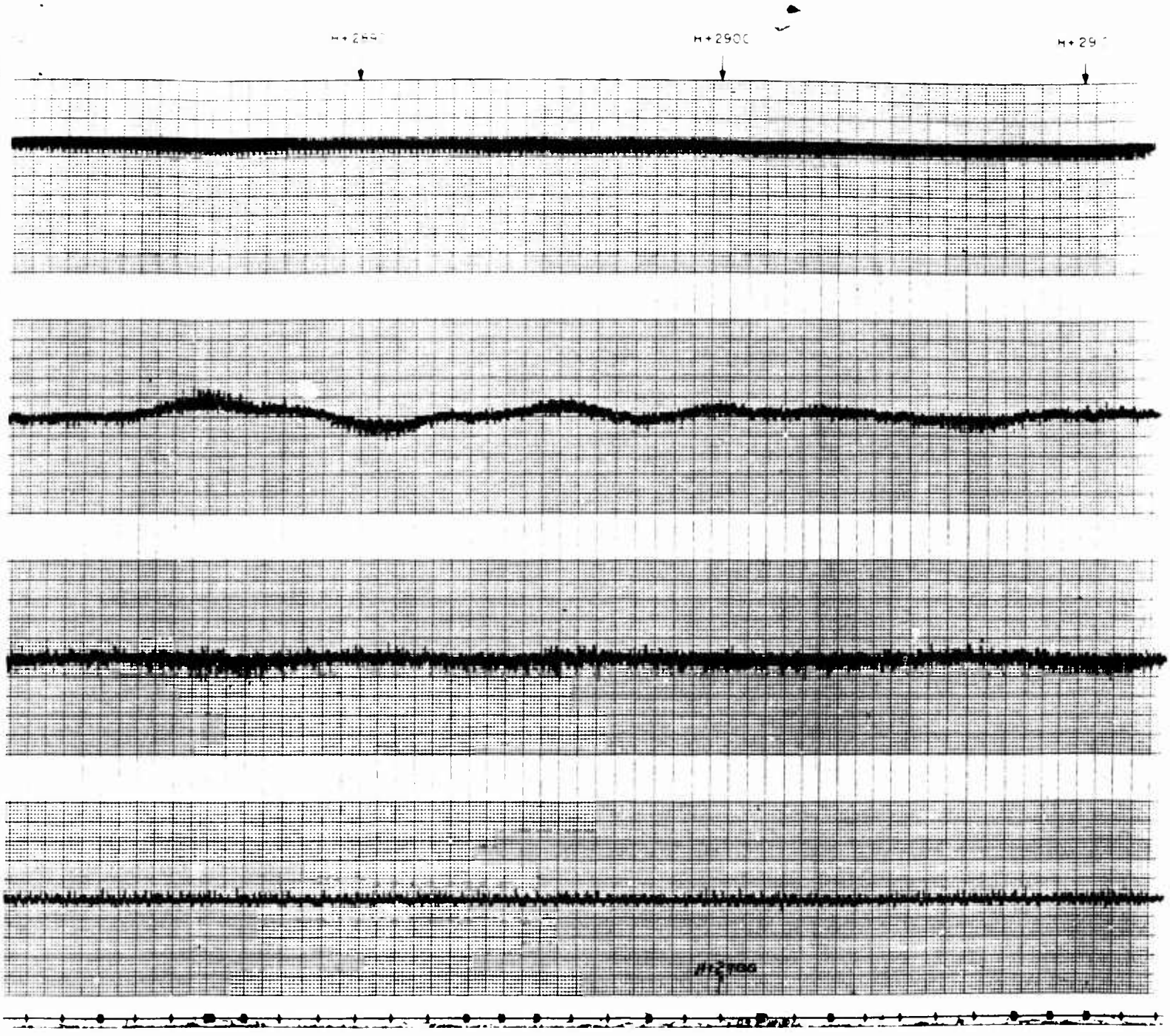
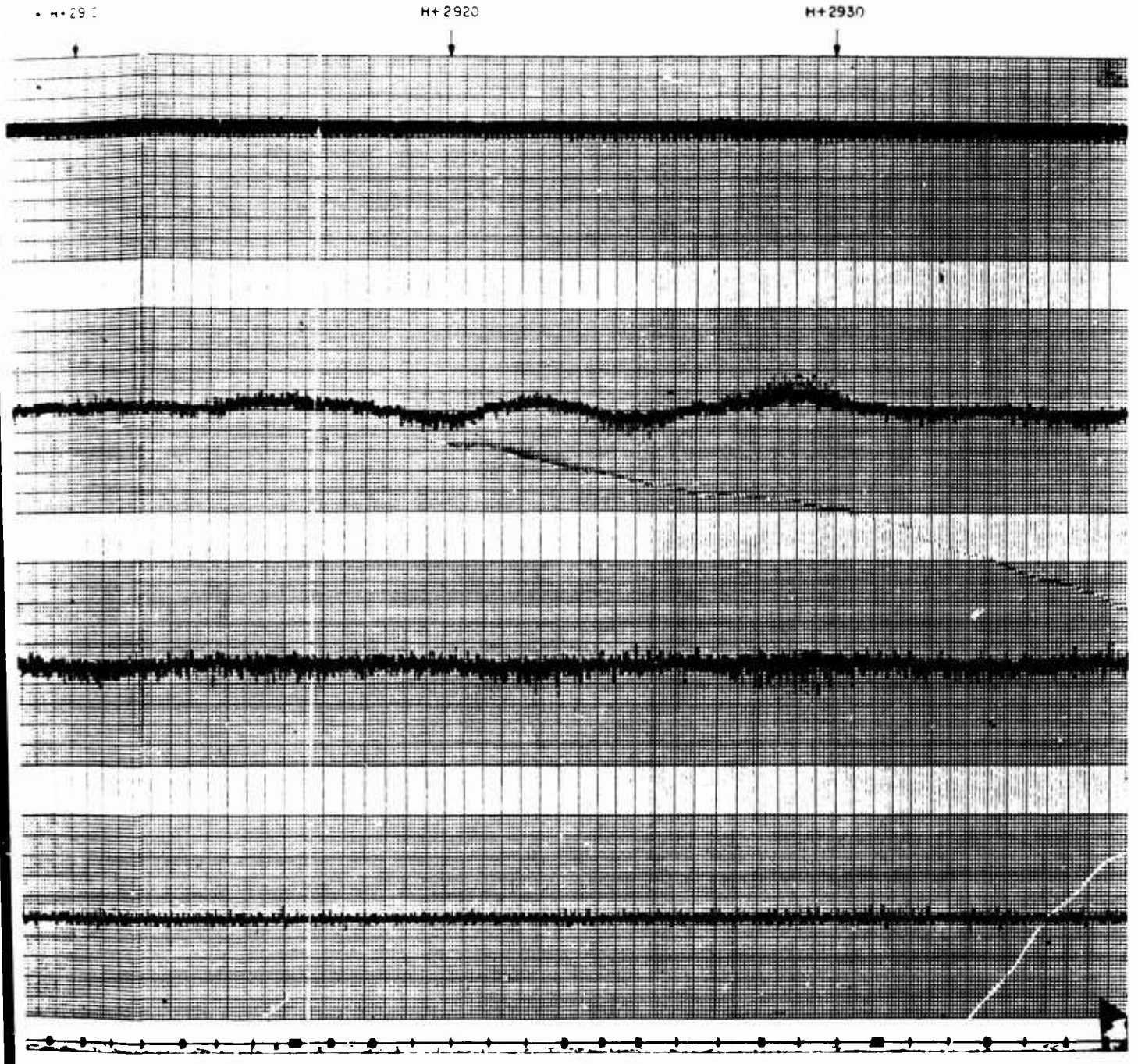
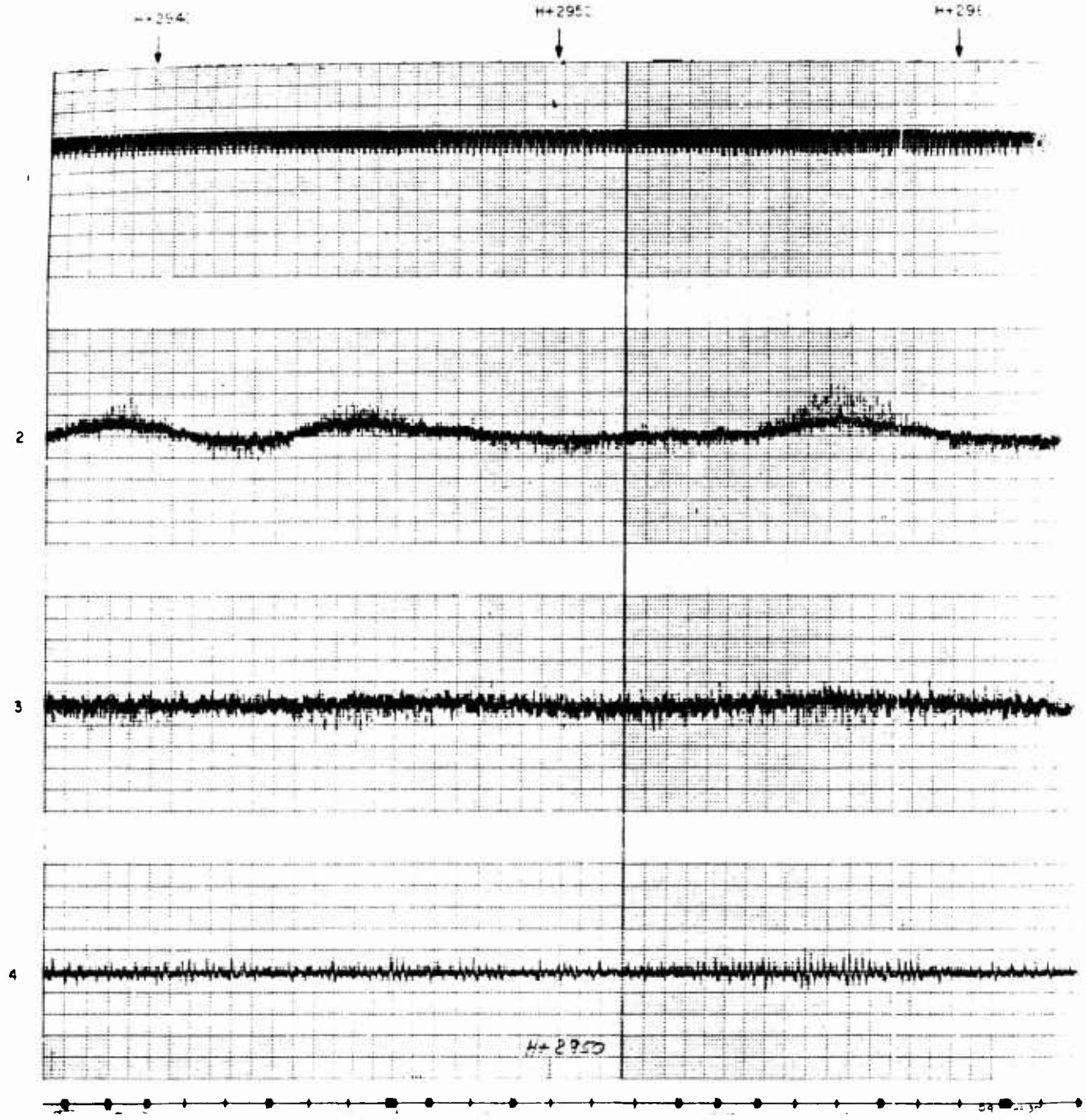


Figure B.7 Continued.



156-4



1- AGC
2- AZ ERROR
3- EL ERROR
4- RANGE ERROR

157-1

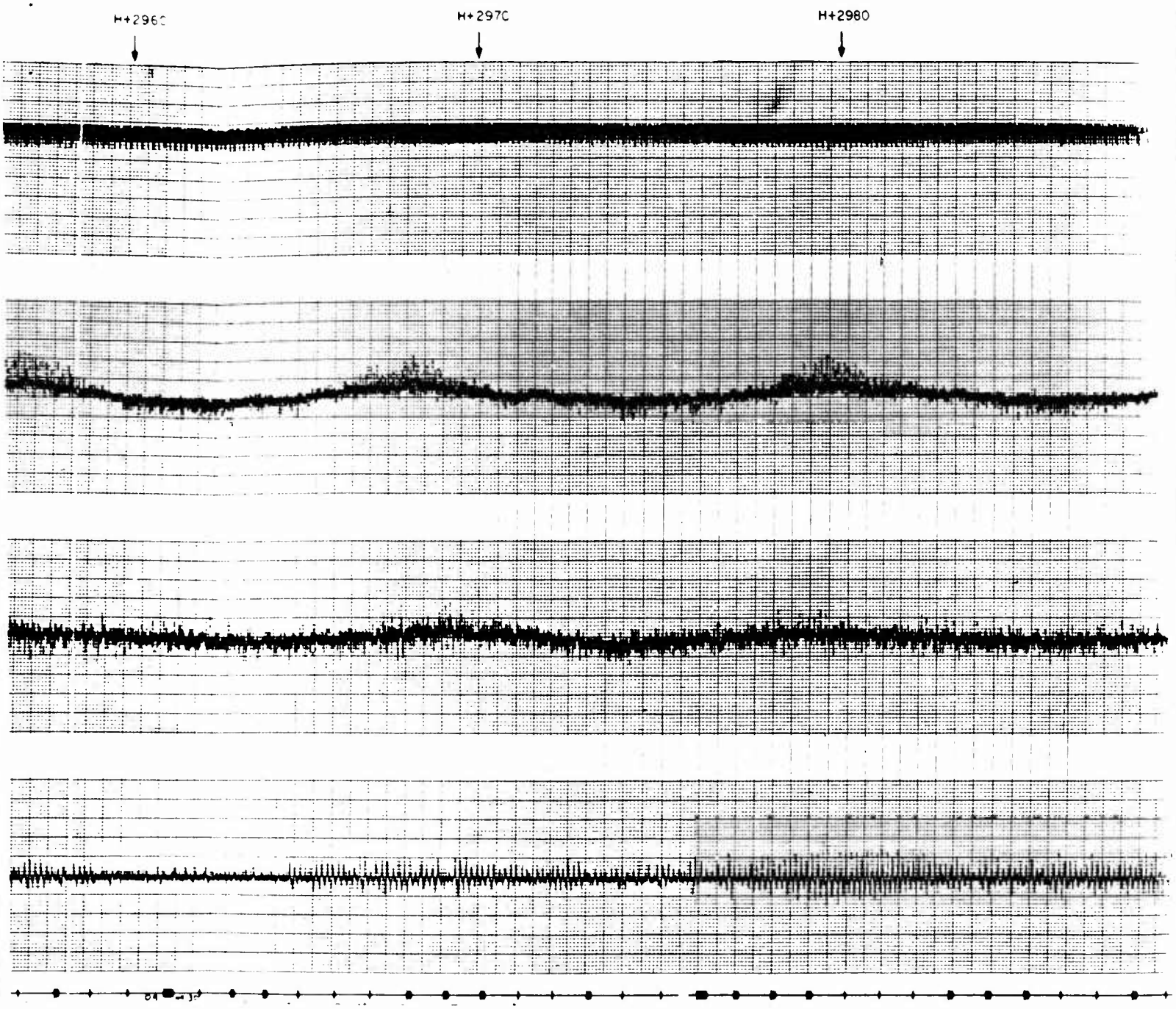
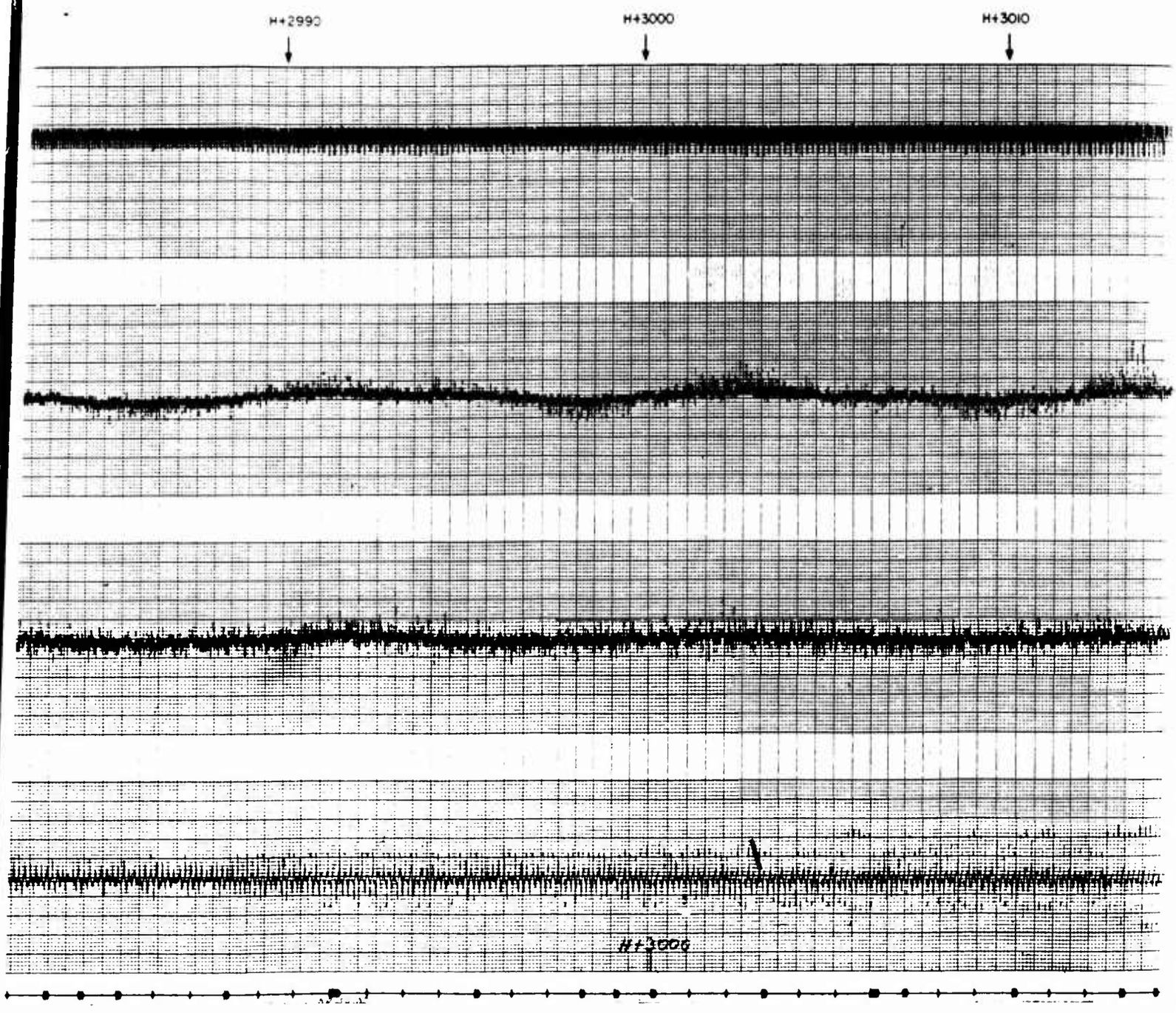
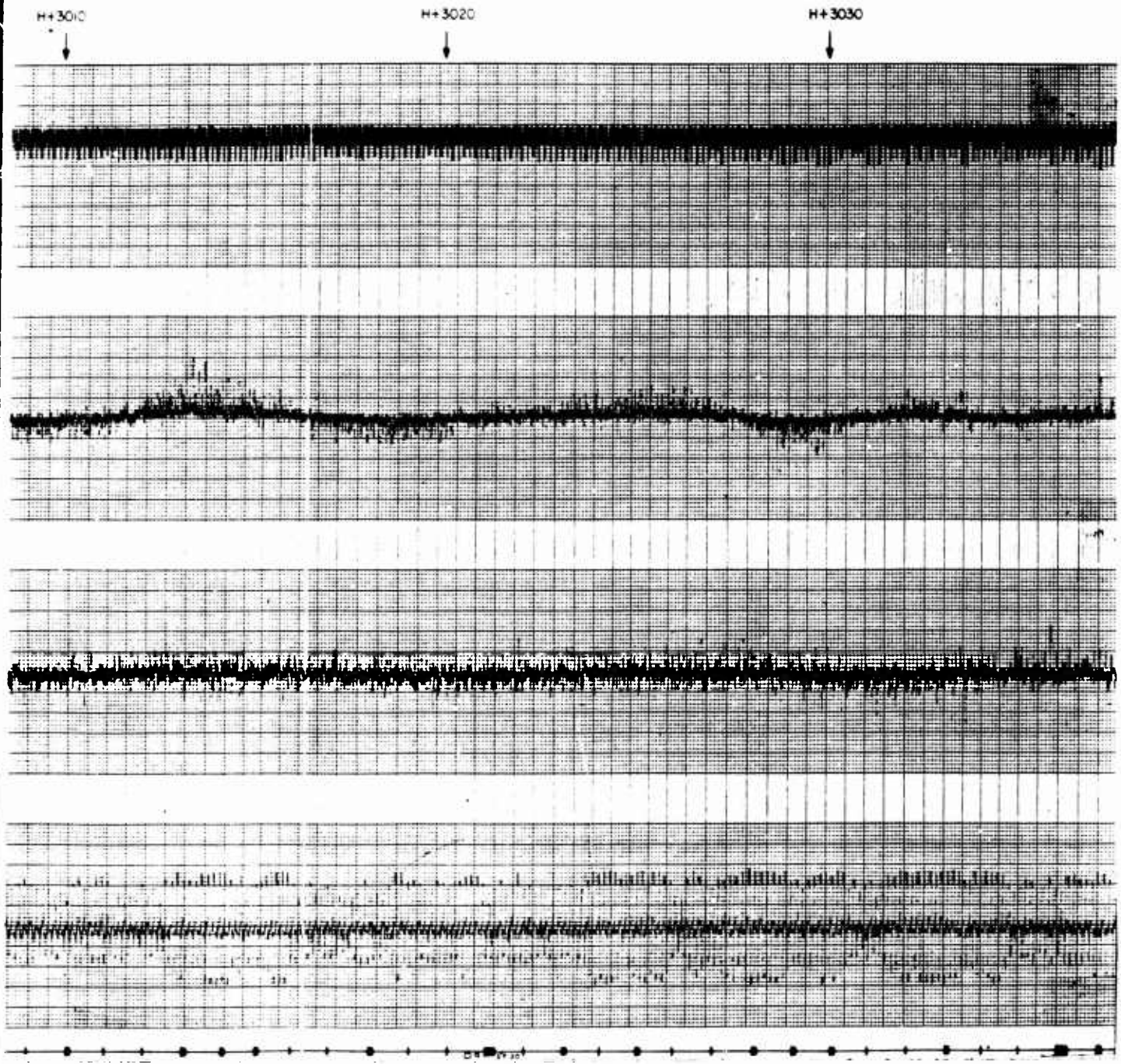
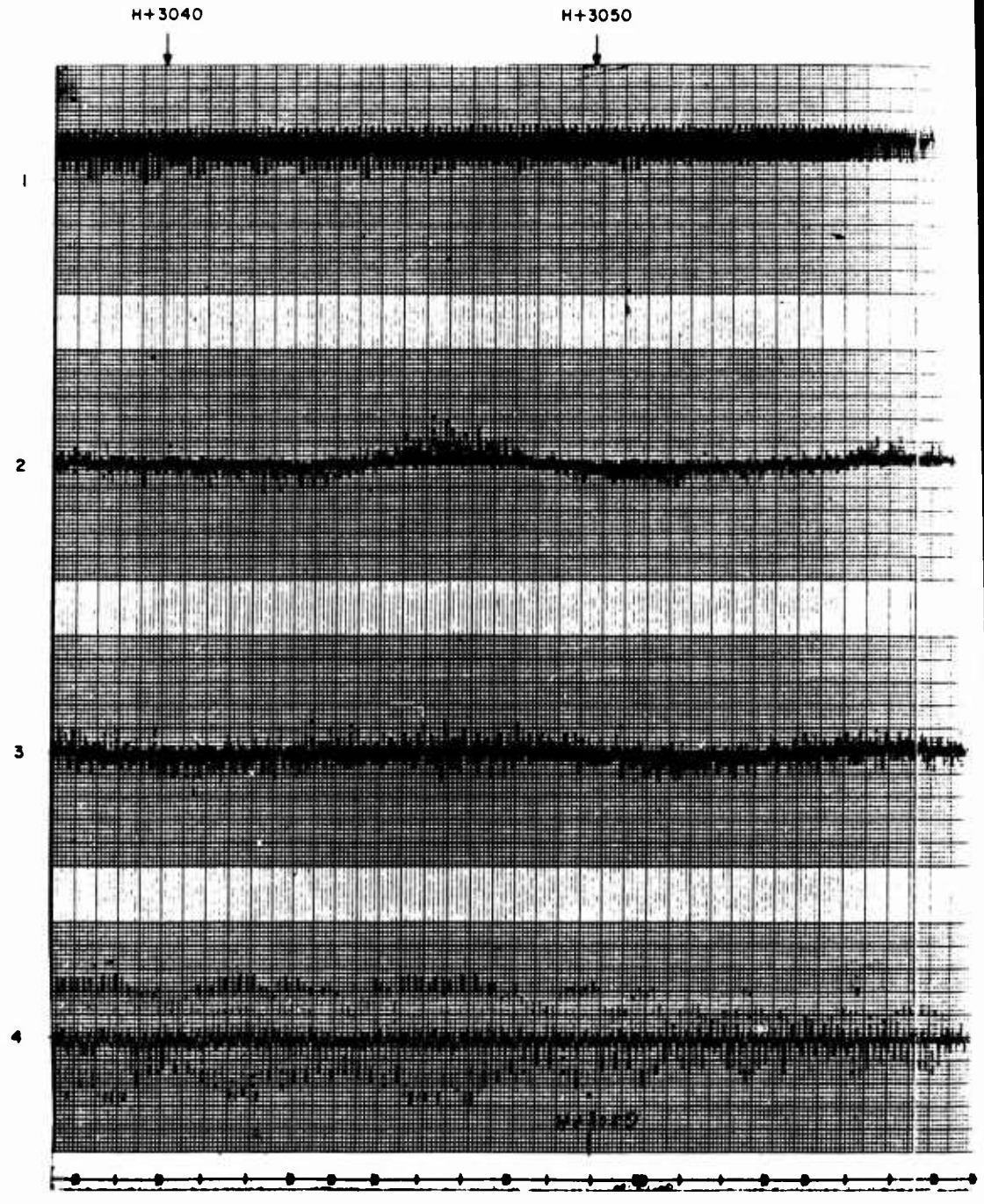


Figure B.7 Continued.



B.7 Continued.


H+3010
H+3020
H+3030



1 - AGC
2 - AZ ERROR
3 - EL ERROR
4 - RANGE ERROR

158-1

[redacted]

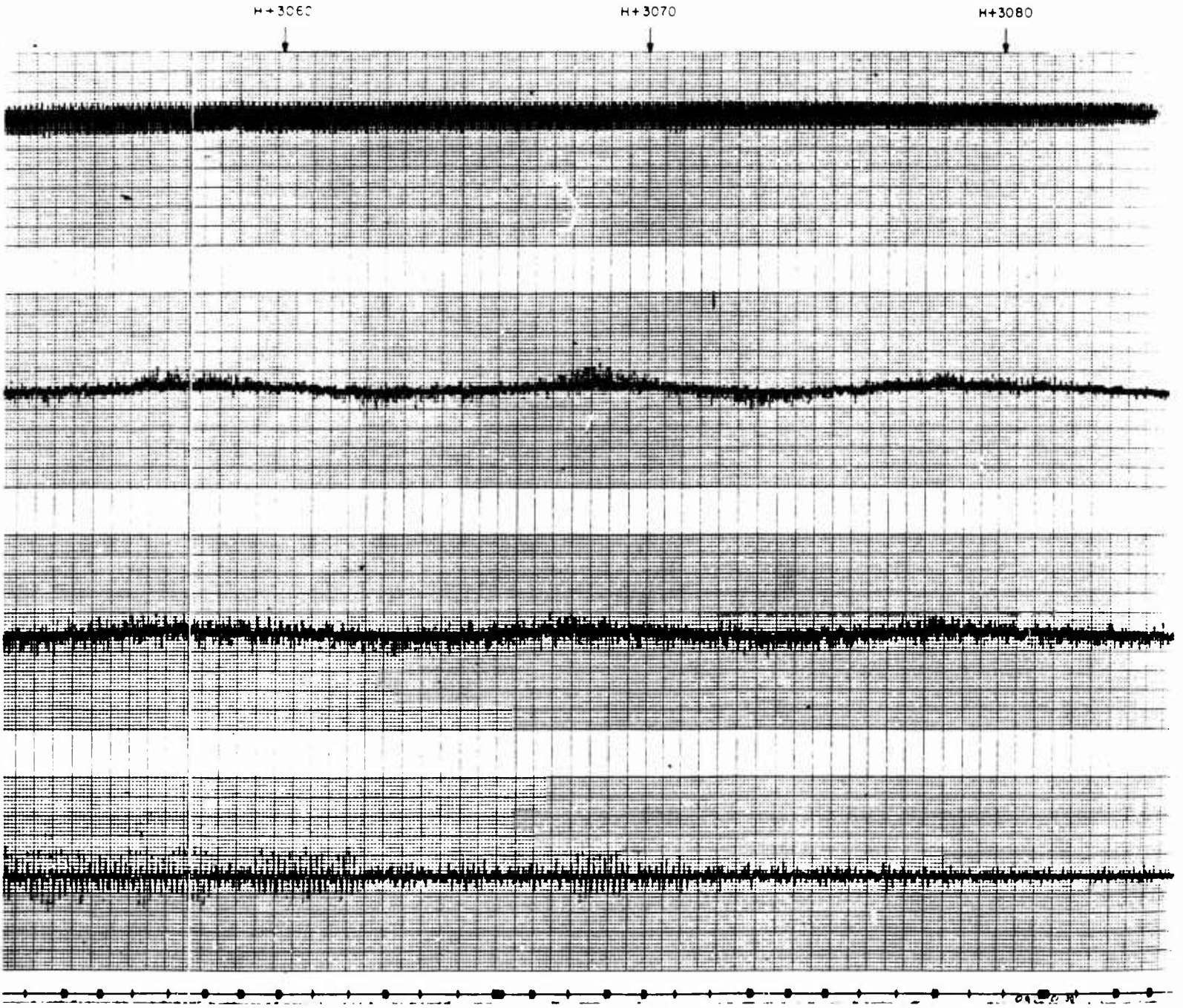


Figure B.7 Conti

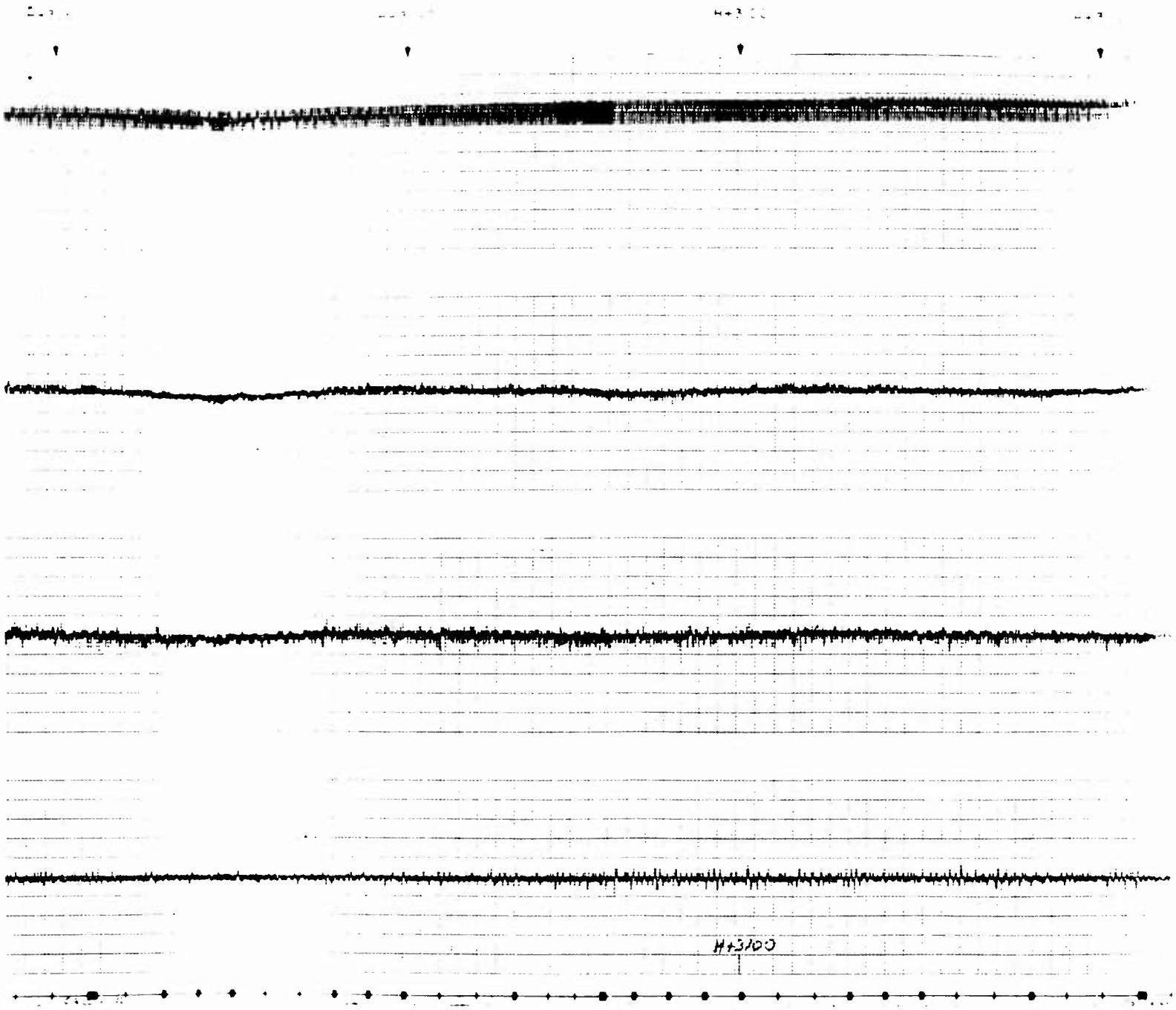
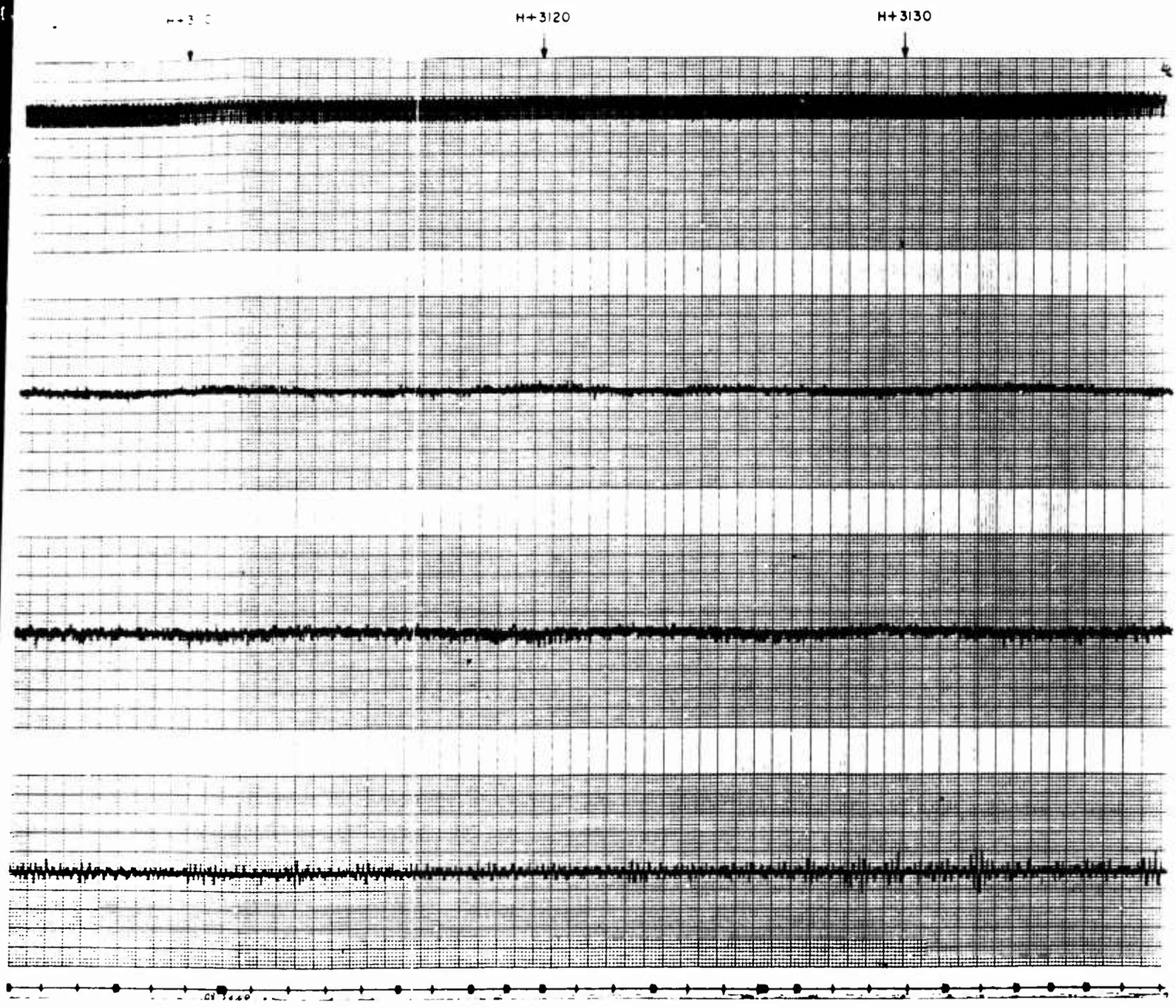
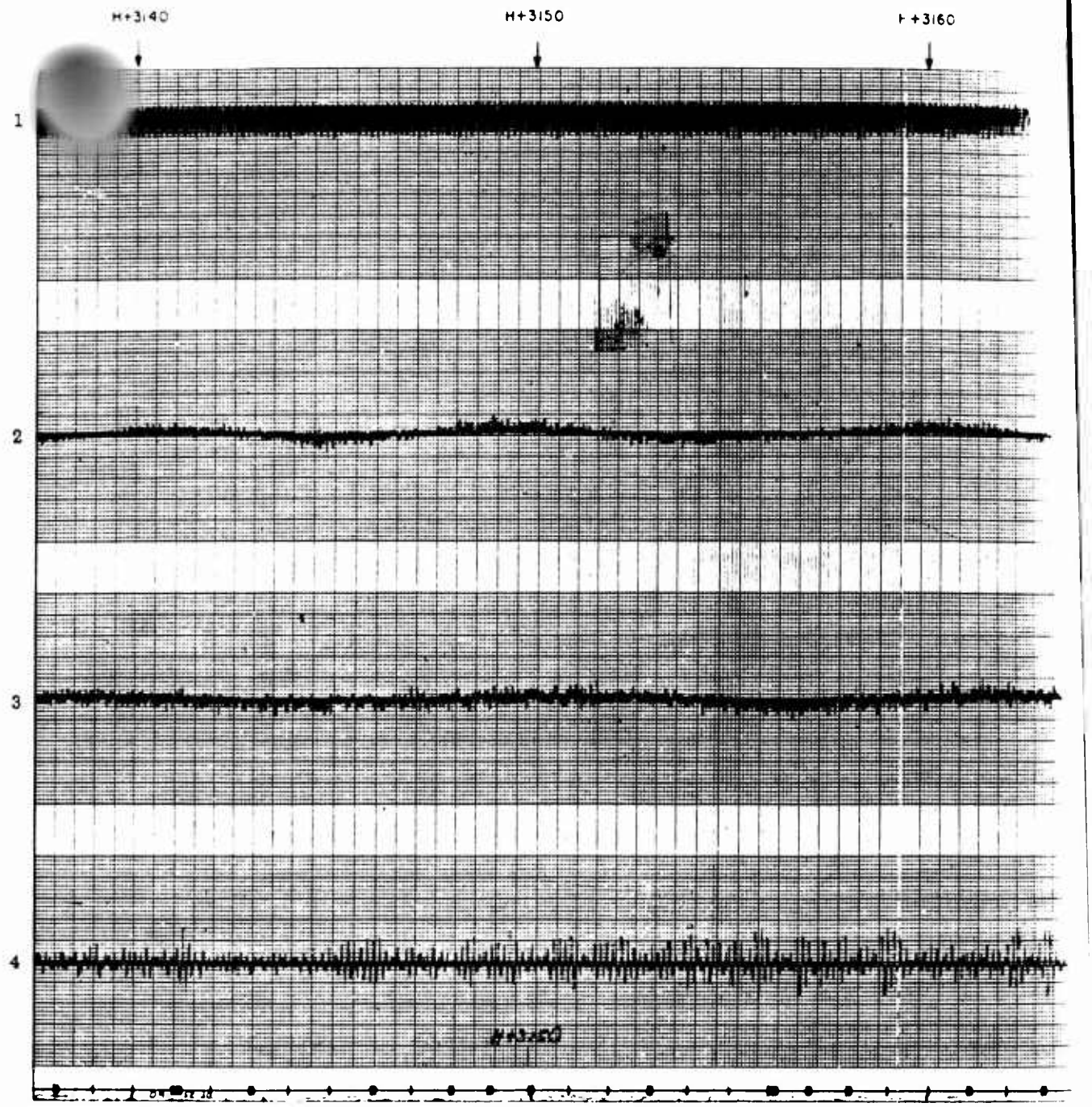


Figure B.7 (



55-4



1 – AGC
2 – AZ ERROR
3 – EL ERROR
4 – RANGE ERROR

159-1

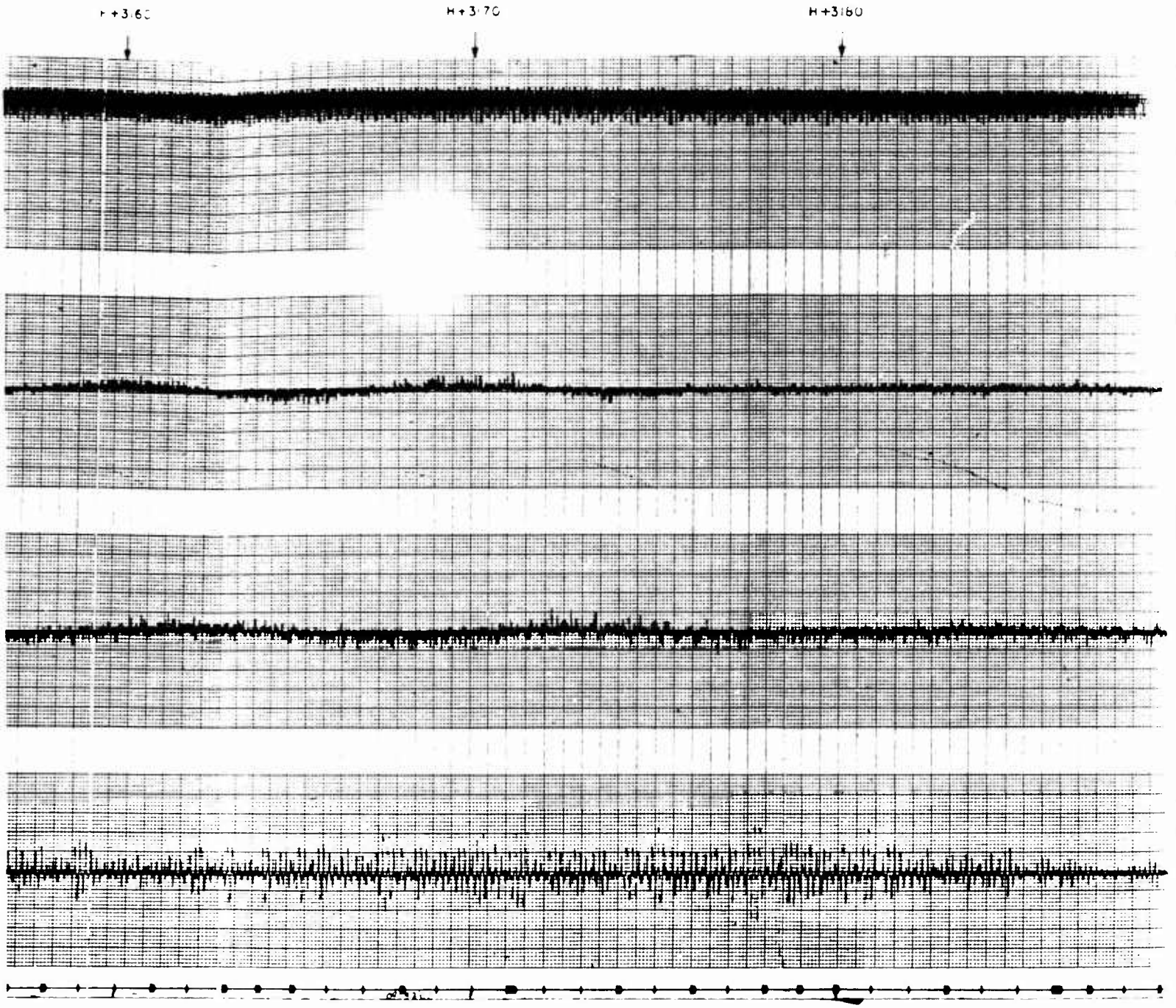


Figure B.7 Cont

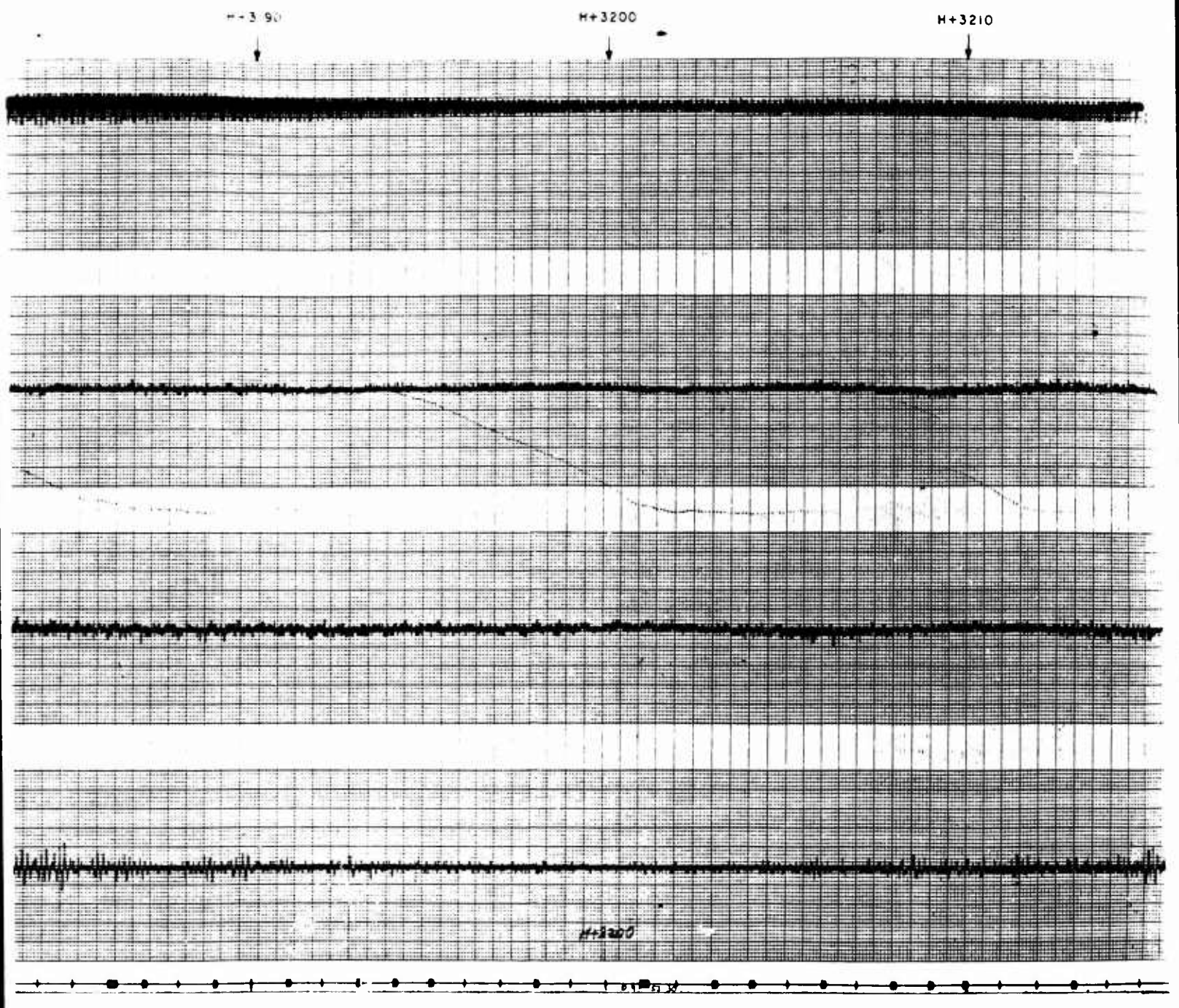
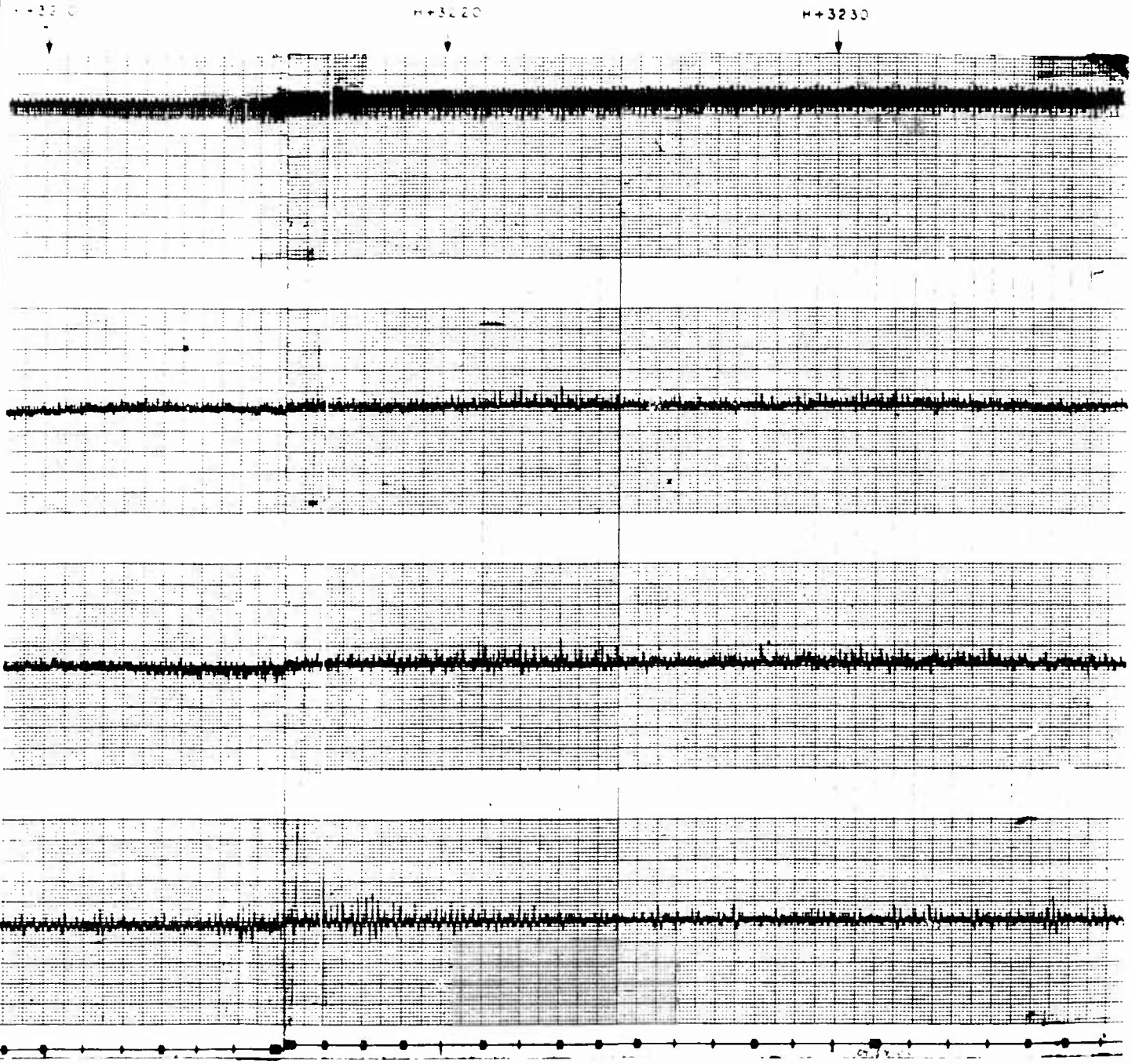


Figure B.7 Continued.


H+3220
H+3230

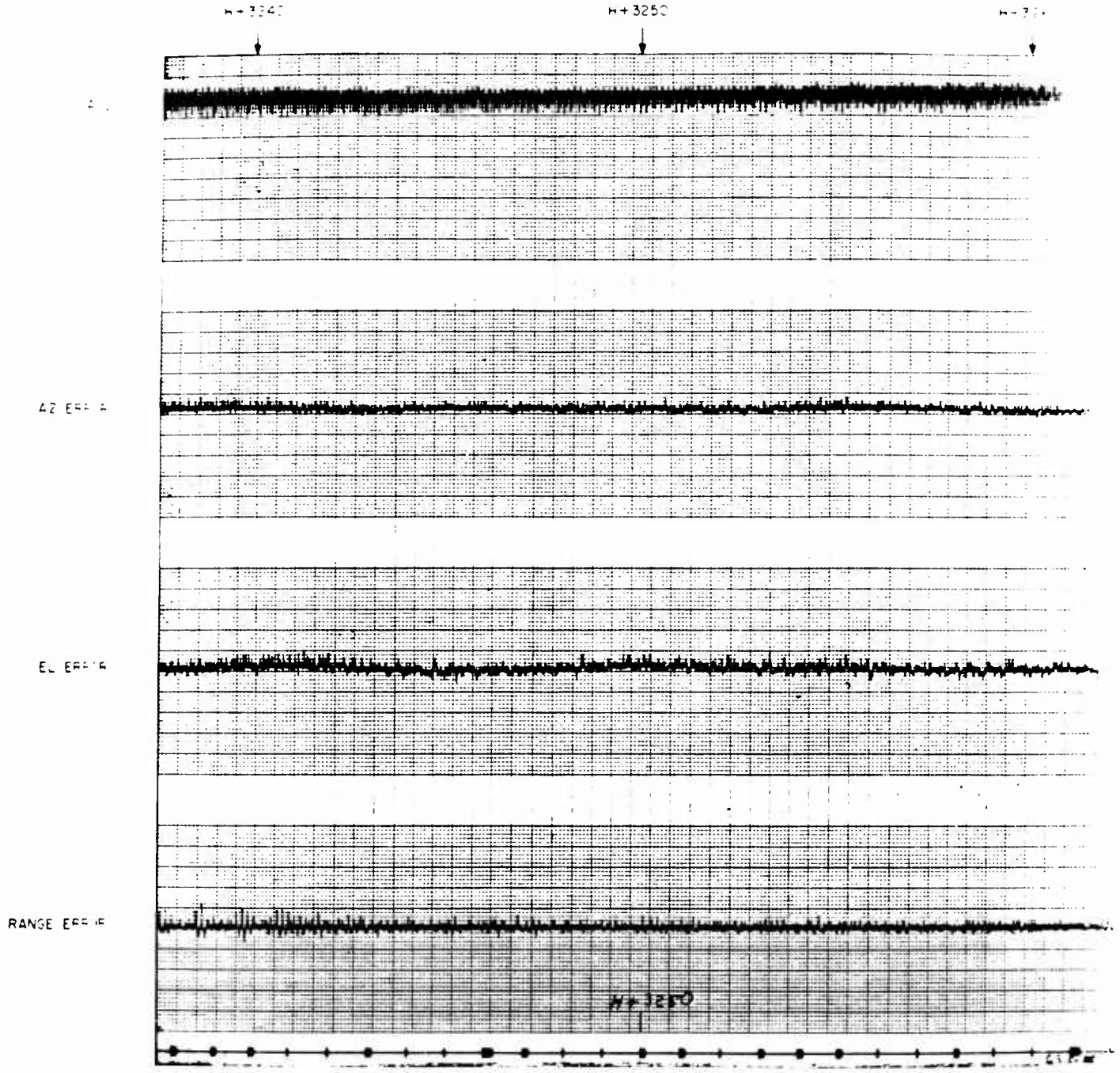
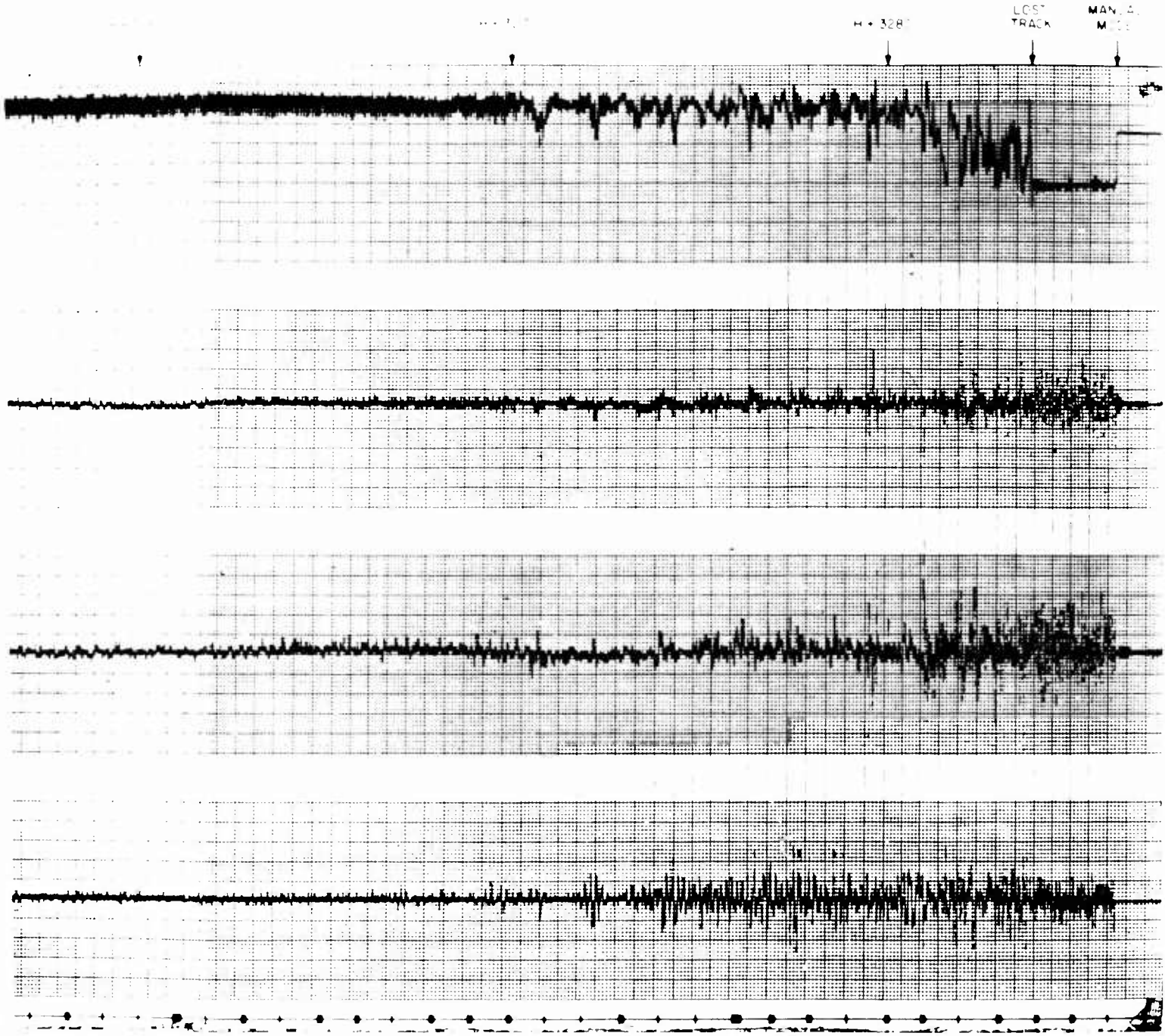


Figure B.7 Cont



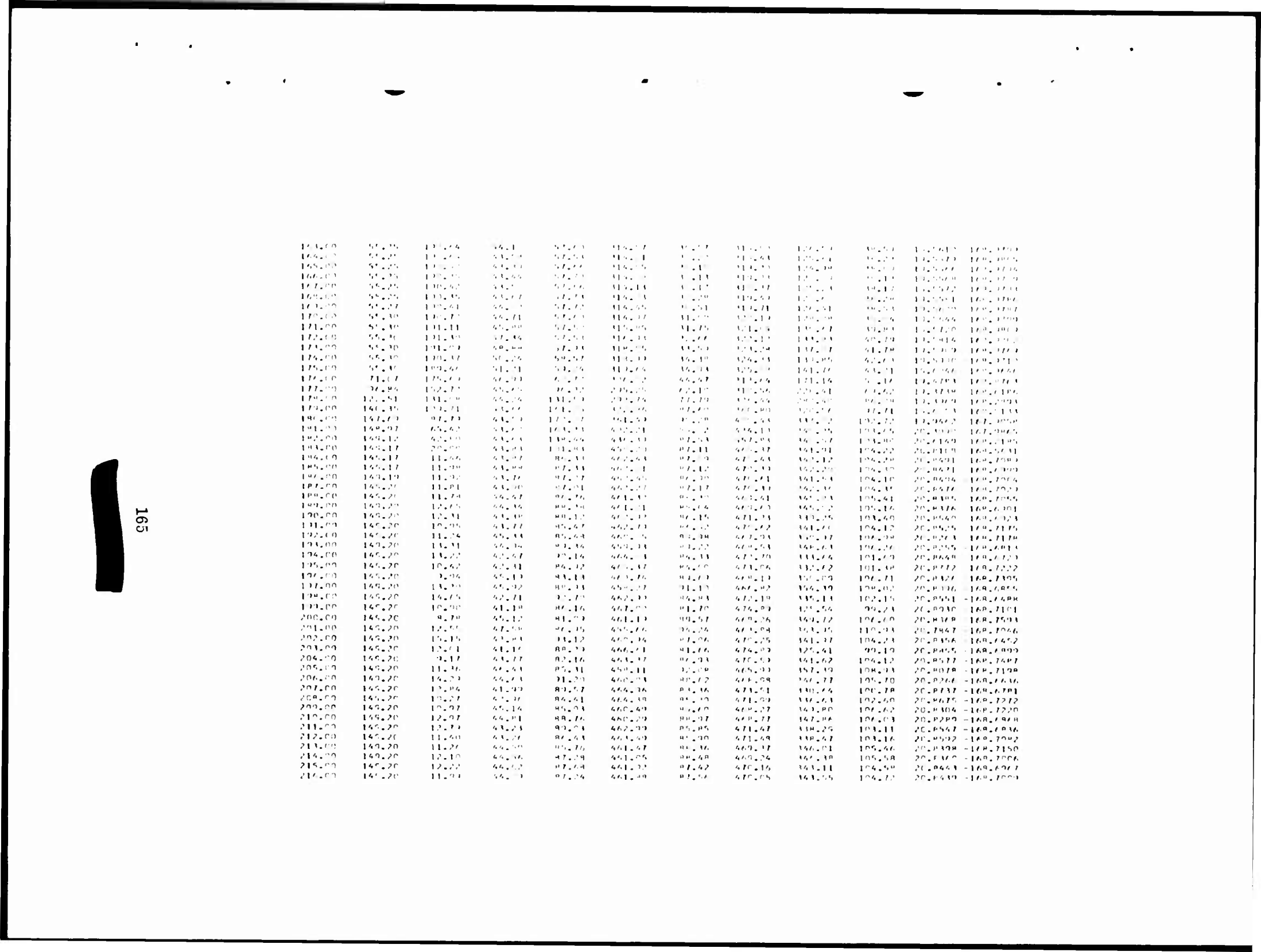
160 -2

APPENDIX C

TRAJECTORY DATA, UHF/L-BAND

Star Fish Prime clutter mapping look angles

Raw data referenced to the ship				Quantities have been translated to the launcher position							
Time, sec	Range, km	Azimuth, deg T	Elevation, deg Geod.	x, km distance east	y, km distance north	z at launcher	$\sqrt{x^2 + y^2}$, km	Height above earth, kft	Height above earth, km	Latitude of target, deg	Longitude of target, deg



325.00	149.20	14.44	43.27	95.54	461.51	85.67	471.03	118.57	1 3.20	[illegible]	[illegible]
326.00	149.20	15.14	40.22	94.44	464.47	74.75	472.13	97.17	[illegible]	[illegible]	[illegible]
327.00	149.20	11.63	39.91	88.52	47 .46	76.77	470.76	81.30	36.28	[illegible]	[illegible]
328.00	149.20	7.23	[illegible]	85.76	463.77	71.61	470.56	81.64	[illegible]	[illegible]	[illegible]
329.00	149.20	5.81	43.26	79.44	463.31	67.23	47 .76	80.67	1 4.65	[illegible]	[illegible]
330.00	149.20	7.33	40.19	77.51	464.16	70.37	471.23	82.17	111.27	[illegible]	[illegible]
331.00	149.20	11.58	50.31	84.32	461.25	73.21	471.6	87.64	117.54	[illegible]	[illegible]
332.00	149.20	14.09	43.03	91.31	461.15	77.53	472.69	93.46	113.46	[illegible]	[illegible]
333.00	149.20	18.09	45.22	98.51	464.07	81.11	472.32	98.23	109.77	[illegible]	[illegible]
334.00	149.20	18.33	40.21	100.54	464.87	74.77	472.43	101.61	97.35	[illegible]	[illegible]
335.00	149.21	14.24	36.88	93.06	472.53	70.63	471.74	97.66	9.29	[illegible]	[illegible]
336.00	149.21	8.80	47.37	83.74	471.51	73.17	470.71	91.03	91.77	[illegible]	[illegible]
337.00	149.20	5.29	41.50	75.02	468.06	81.43	474.52	83.51	89.85	[illegible]	[illegible]
338.00	149.20	5.23	46.44	74.21	463.65	90.17	469.21	87.66	103.00	[illegible]	[illegible]
339.00	149.20	8.87	43.75	73.73	462.30	98.22	469.87	92.12	114.21	[illegible]	[illegible]
340.00	149.20	13.55	43.31	87.44	461.10	96.51	469.63	97.03	114.83	[illegible]	[illegible]
341.00	149.20	16.95	47.00	96.52	456.77	94.13	470.69	98.27	109.03	[illegible]	[illegible]
342.00	149.20	17.49	42.95	97.59	461.18	84.33	471.33	98.60	102.23	[illegible]	[illegible]
343.00	149.20	15.25	39.87	96.73	467.14	78.02	470.66	91.20	96.64	[illegible]	[illegible]
344.00	149.20	11.68	38.93	88.14	470.10	77.01	470.13	81.05	96.81	[illegible]	[illegible]
345.00	149.20	8.80	40.81	81.36	468.32	80.35	471.44	73.22	88.52	[illegible]	[illegible]
346.00	149.21	7.81	43.84	79.33	463.68	87.04	470.42	76.02	104.25	[illegible]	[illegible]
347.00	149.21	8.92	46.55	80.74	458.71	92.32	469.76	84.56	109.15	[illegible]	[illegible]
348.00	149.20	11.35	47.78	84.53	455.77	96.63	468.55	85.16	111.23	[illegible]	[illegible]
349.00	149.21	13.84	48.84	88.25	454.59	93.87	469.14	89.78	109.68	[illegible]	[illegible]
350.00	149.21	14.96	44.78	92.14	459.51	88.24	468.65	93.71	105.38	[illegible]	[illegible]
351.00	149.20	14.45	42.71	92.09	463.14	84.82	472.21	93.11	102.14	[illegible]	[illegible]
352.00	149.20	12.80	41.62	89.38	465.51	82.76	474.31	92.75	100.20	[illegible]	[illegible]
353.00	149.21	11.21	41.91	86.38	465.79	81.13	473.72	90.13	100.62	[illegible]	[illegible]
354.00	149.21	10.40	43.09	84.41	464.14	80.56	471.78	87.45	102.85	[illegible]	[illegible]
355.00	149.21	10.48	44.31	84.17	462.11	81.09	469.71	86.89	105.12	[illegible]	[illegible]
356.00	149.21	11.27	44.94	85.62	460.76	82.22	468.62	86.68	106.27	[illegible]	[illegible]
357.00	149.21	12.05	44.31	86.83	460.53	82.17	468.44	86.48	106.22	[illegible]	[illegible]
358.00	149.21	12.35	44.40	87.56	461.27	82.18	469.51	85.66	105.29	[illegible]	[illegible]
359.00	149.21	12.23	44.91	87.64	461.97	81.41	470.14	84.15	104.58	[illegible]	[illegible]
360.00	149.21	12.00	44.05	87.04	462.09	81.68	470.12	84.11	104.65	[illegible]	[illegible]
361.00	149.20	11.93	44.66	86.31	462.21	81.49	470.11	84.36	104.66	[illegible]	[illegible]
362.00	149.21	11.94	43.95	86.08	462.18	81.29	470.29	84.75	104.67	[illegible]	[illegible]
363.00	149.21	12.01	43.91	87.14	462.21	81.22	470.36	84.52	104.40	[illegible]	[illegible]
364.00	149.21	18.19	43.89	98.32	459.29	81.21	469.61	84.34	104.35	[illegible]	[illegible]
365.00	149.21	11.16	43.89	120.43	460.22	81.56	469.58	84.18	104.34	[illegible]	[illegible]
366.00	150.45	32.49	43.76	121.16	468.90	88.16	469.63	84.42	104.38	[illegible]	[illegible]
367.00	150.46	32.84	43.67	123.80	468.68	88.00	469.45	84.31	104.32	[illegible]	[illegible]
368.00	150.46	32.95	43.56	124.08	468.73	81.78	469.17	84.20	104.41	[illegible]	[illegible]
369.00	150.46	32.73	43.45	123.84	469.10	81.57	469.86	84.57	104.42	[illegible]	[illegible]
370.00	150.46	32.85	43.39	123.28	469.58	81.41	469.18	84.15	104.23	[illegible]	[illegible]
371.00	145.13	35.88	44.31	125.64	461.26	85.88	458.80	84.40	102.23	[illegible]	[illegible]
372.00	118.76	57.79	44.45	136.47	491.39	66.75	423.96	274.75	83.76	[illegible]	[illegible]
373.00	92.34	80.31	44.77	129.30	364.27	53.60	398.42	214.50	65.38	[illegible]	[illegible]
374.00	66.58	102.72	44.52	110.87	343.74	41.66	371.19	153.77	46.97	[illegible]	[illegible]
375.00	58.52	124.24	43.86	99.65	330.03	31.37	344.74	133.64	40.29	[illegible]	[illegible]
376.00	55.57	144.83	43.24	87.89	320.98	24.55	332.61	125.36	34.21	[illegible]	[illegible]
377.00	55.27	165.36	43.23	76.77	314.47	23.79	323.43	124.65	37.9	[illegible]	[illegible]
378.00	55.24	186.06	43.52	66.36	313.77	30.17	319.53	125.25	48.19	[illegible]	[illegible]

423.00	55.25	189.17	41.73	57.95	412.00	73.01	414.73	171.51	97.7	13.5665	168.1765
424.00	55.25	188.85	41.33	58.34	413.31	73.06	413.29	170.[illegible]	98.[illegible]	13.5651	168.[illegible]
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426.00	55.25	190.50	44.09	57.33	415.19	73.[illegible]7	415.36	173.34	97.15	13.5624	168.1911
427.00	55.25	190.93	44.33	56.39	415.95	73.[illegible]5	415.36	173.[illegible]2	96.78	13.5615	168.1857
428.00	55.25	190.92	44.[illegible]5	56.17	416.56	73.63	415.44	173.13	96.66	13.5609	168.1854
429.00	55.25	190.36	44.44	57.36	416.83	73.[illegible]7	415.63	173.[illegible]	96.[illegible]	13.5608	168.1854
430.00	55.25	190.22	44.53	57.63	416.[illegible]	73.13	415.59	173.[illegible]	96.13	13.5593	168.1910
431.00	55.25	190.47	44.[illegible]3	57.25	416.[illegible]	73.[illegible]5	415.47	173.[illegible]	96.[illegible]	13.5583	168.[illegible]33
432.00	55.25	190.45	43.42	57.[illegible]3	416.[illegible]	73.[illegible]2	415.33	173.[illegible]	96.11	13.5581	168.[illegible]36
433.00	55.25	187.56	42.90	58.11	413.[illegible]	73.[illegible]	413.02	171.[illegible]	97.75	13.5619	168.[illegible]60
434.00	55.25	174.84	42.10	60.17	412.[illegible]	73.15	410.12	169.[illegible]	97.13	13.5652	168.[illegible]74
435.00	56.08	174.01	41.40	60.33	411.76	73.[illegible]6	410.23	169.[illegible]	97.24	13.5641	-168.[illegible]79
436.00	56.15	173.96	40.37	60.38	411.66	73.[illegible]3	410.38	169.[illegible]	97.27	13.5632	-168.[illegible]71
437.00	56.18	173.76	41.01	60.11	411.45	73.06	411.03	169.[illegible]	97.02	13.5634	168.[illegible]69
438.00	56.21	173.64	41.42	60.17	411.72	73.[illegible]6	410.30	169.[illegible]	97.33	13.5637	168.[illegible]75
439.00	56.21	173.65	41.37	60.13	412.10	73.72	410.26	169.[illegible]	97.23	13.5643	168.[illegible]77
440.00	76.72	156.02	44.04	87.13	406.13	65.76	414.61	175.[illegible]	93.59	13.6607	168.[illegible]23
441.00	102.45	132.70	44.04	118.33	395.72	63.27	429.06	235.[illegible]	71.46	13.6657	168.[illegible]68
442.00	128.19	109.84	43.83	152.25	385.20	75.10	451.08	282.41	99.13	13.6654	168.[illegible]11
443.00	142.67	87.18	44.47	168.91	362.33	87.96	390.14	329.[illegible]	99.34	13.6656	167.9669
444.00	148.47	64.27	44.14	160.74	403.65	86.56	436.68	361.[illegible]	104.21	20.[illegible]17	168.[illegible]10
445.00	149.06	41.10	44.40	146.73	437.53	84.31	451.87	365.[illegible]	105.18	20.8221	168.[illegible]18
446.00	149.17	18.56	44.12	98.72	458.70	81.45	465.28	363.44	104.75	20.8151	168.[illegible]35
447.00	149.20	11.74	43.93	86.45	462.22	81.16	470.23	362.96	104.53	20.8121	168.[illegible]42
448.00	149.20	11.99	44.01	86.31	462.10	81.19	470.33	363.01	104.56	20.8120	168.[illegible]43
449.00	149.20	12.03	43.85	87.04	462.35	81.08	470.47	363.08	104.57	20.8121	168.[illegible]37
450.00	149.20	11.86	43.59	86.80	462.86	80.56	470.31	362.51	103.79	20.8040	168.[illegible]48
451.00	149.20	11.63	43.24	86.51	463.50	80.86	471.11	362.38	103.13	20.8036	-168.[illegible]74
452.00	149.20	11.45	43.17	87.13	463.60	80.73	471.22	362.38	103.01	20.8010	-168.[illegible]94
453.00	149.20	11.32	43.25	85.93	463.61	80.88	471.50	362.41	103.15	20.8001	-168.[illegible]90
454.00	149.20	11.20	43.52	85.60	463.20	80.43	[illegible]1.65	362.10	103.07	20.8004	-168.[illegible]81
455.00	149.20	10.94	44.08	84.34	462.47	80.53	471.11	361.47	104.03	20.8006	-168.[illegible]75
456.00	149.20	10.81	44.47	84.53	461.61	80.70	469.93	361.26	105.78	20.8031	-168.[illegible]74
457.00	149.20	10.81	45.35	84.33	460.25	80.62	467.91	361.10	107.02	20.8051	168.[illegible]83
458.00	149.20	10.85	45.98	84.14	459.15	81.23	466.83	360.73	108.14	20.8176	168.[illegible]85
459.00	149.20	11.15	46.65	84.47	457.98	82.51	465.69	359.69	109.33	20.8355	168.[illegible]78
460.00	149.20	11.55	47.19	84.98	456.93	83.51	464.63	361.75	110.26	20.7353	-168.[illegible]75
461.00	149.20	12.11	47.56	85.82	455.37	84.18	463.87	363.78	110.88	20.7375	-168.7154
462.00	149.21	12.62	47.69	86.64	455.53	84.45	463.73	366.59	111.13	20.7434	-168.[illegible]77
463.00	149.21	13.05	47.56	87.42	455.59	84.21	464.33	368.34	110.91	20.7461	-168.[illegible]84
464.00	149.21	13.41	47.19	88.13	456.11	83.52	466.55	369.74	110.26	20.7430	-168.[illegible]29
465.00	149.21	13.73	46.77	88.91	456.79	82.74	469.27	370.39	109.54	20.7367	-168.[illegible]59
466.00	149.21	14.06	45.97	89.83	457.35	81.21	472.68	370.71	108.12	20.7067	-168.[illegible]70
467.00	149.21	14.47	44.89	91.03	459.53	80.14	468.52	368.38	104.19	20.8225	-168.[illegible]61
468.00	149.21	14.96	43.50	92.52	461.66	84.41	470.84	366.00	103.43	20.8624	-168.[illegible]50
469.00	149.21	14.92	41.98	93.10	464.11	83.36	473.36	335.[illegible]	100.77	20.8960	-168.[illegible]47
470.00	149.21	14.55	40.41	93.03	466.73	80.14	475.31	320.[illegible]	97.74	20.9312	-168.[illegible]49
471.00	149.21	13.93	39.07	92.35	469.03	77.33	478.04	312.02	95.10	20.9135	168.[illegible]50
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473.00	149.21	12.70	37.11	90.56	472.45	73.13	481.05	303.02	91.16	20.9465	-168.[illegible]71
474.00	149.21	11.81	36.56	88.93	473.64	71.88	481.52	235.15	93.91	20.9589	-168.[illegible]83
475.00	149.21	10.94	36.33	87.17	474.21	71.55	481.16	234.13	89.65	20.9633	-168.[illegible]89
476.00	149.21	9.93	36.87	84.27	473.90	72.60	481.46	307.33	90.64	20.9609	-168.7139

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512.00	149.22	6.76	45.19	76.30	461.69	83.71	468.65	350.12	104.72	20.8611	-168.7388
513.00	149.22	7.34	47.73	77.24	457.26	84.15	463.76	346.27	111.33	20.7332	-168.7364
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540.00	149.22	14.50	51.11	88.10	448.56	101.66	457.18	383.33	114.84	20.7180	-168.7049
541.00	149.22	15.04	49.63	89.67	451.08	99.02	459.00	379.61	114.42	20.7417	-168.6787
542.00	149.22	15.28	47.98	90.91	454.07	96.98	462.98	366.16	111.60	20.7691	-168.6675
543.00	149.22	15.30	46.23	91.77	456.36	93.74	466.09	356.28	108.60	20.7775	-168.6588
544.00	149.22	15.31	44.52	92.58	459.86	89.44	469.06	346.20	105.52	20.8250	-168.6566
545.00	149.22	15.32	42.99	93.27	462.34	85.40	471.66	336.88	102.68	20.8430	-168.6633
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574.00	149.23	9.45	39.71	83.16	469.93	78.66	477.23	316.18	96.37	20.9210	-168.7380
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639.00	55.25	199.28	47.68	51.32	318.69	32.79	322.59	134.46	40.97	19.5372	-168.9338
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641.00	55.25	202.28	45.63	49.66	317.71	31.25	321.93	129.12	39.35	19.5341	-168.9532
642.00	55.25	203.06	45.03	48.94	317.39	30.76	321.69	127.66	38.90	19.5323	-168.9556
643.00	55.25	203.06	45.05	48.95	317.31	29.83	321.35	127.60	37.88	19.5322	-168.9613
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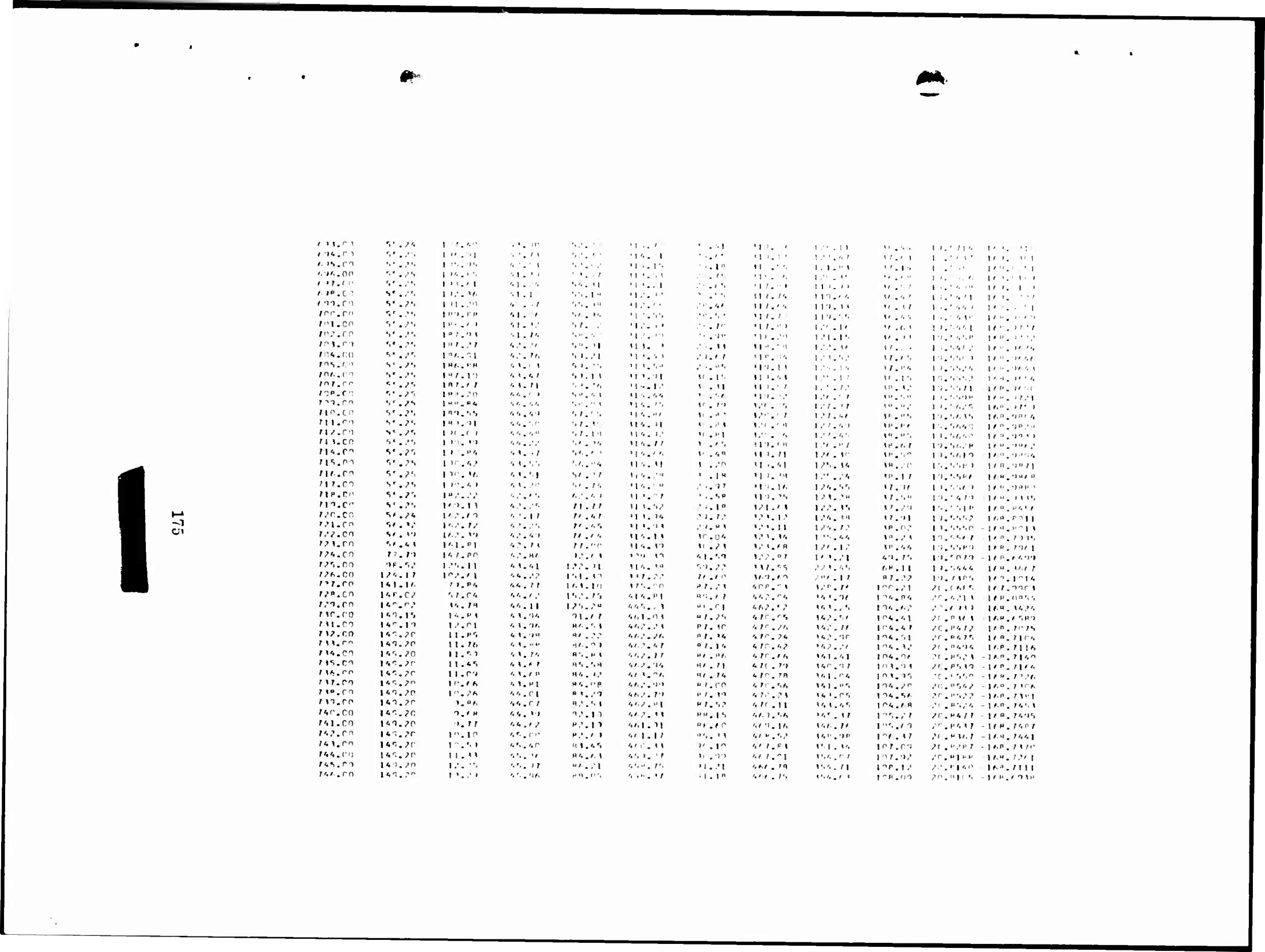

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805.00	149.20	22.24	39.95	108.03	460.38	75.19	474.05	332.70	148.43	20.2456	169.4536
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807.00	149.20	19.45	38.46	102.64	466.25	76.95	471.41	319.63	144.03	20.2455	169.4466
808.00	149.20	18.57	39.23	102.66	465.85	77.73	478.83	313.06	141.61	20.2454	169.4436
809.00	149.20	18.63	39.58	102.71	467.06	78.66	478.27	315.29	142.17	20.2455	169.4441
810.00	149.20	21.75	39.60	106.57	463.58	78.55	475.67	315.46	142.15	20.2456	169.4466
811.00	149.20	21.56	44.06	103.65	457.01	87.61	468.58	343.18	154.44	20.2459	169.4489
812.00	149.20	20.92	58.47	92.26	431.47	112.60	441.22	418.83	127.66	20.2457	169.4501
813.00	149.20	19.00	72.62	79.18	401.57	129.43	409.91	467.71	162.56	20.2460	169.4561
814.00	149.20	17.71	78.35	73.92	388.35	136.16	395.32	479.69	167.21	20.2462	169.4584
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816.00	149.20	3.55	78.18	66.63	390.13	136.04	395.78	479.60	166.12	20.2462	169.4583
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824.00	77.55	346.04	79.81	60.80	369.08	65.44	374.06	250.50	76.35	20.0324	168.4513
825.00	77.55	354.00	79.26	62.58	371.15	65.23	375.60	250.05	76.22	20.0419	168.4366
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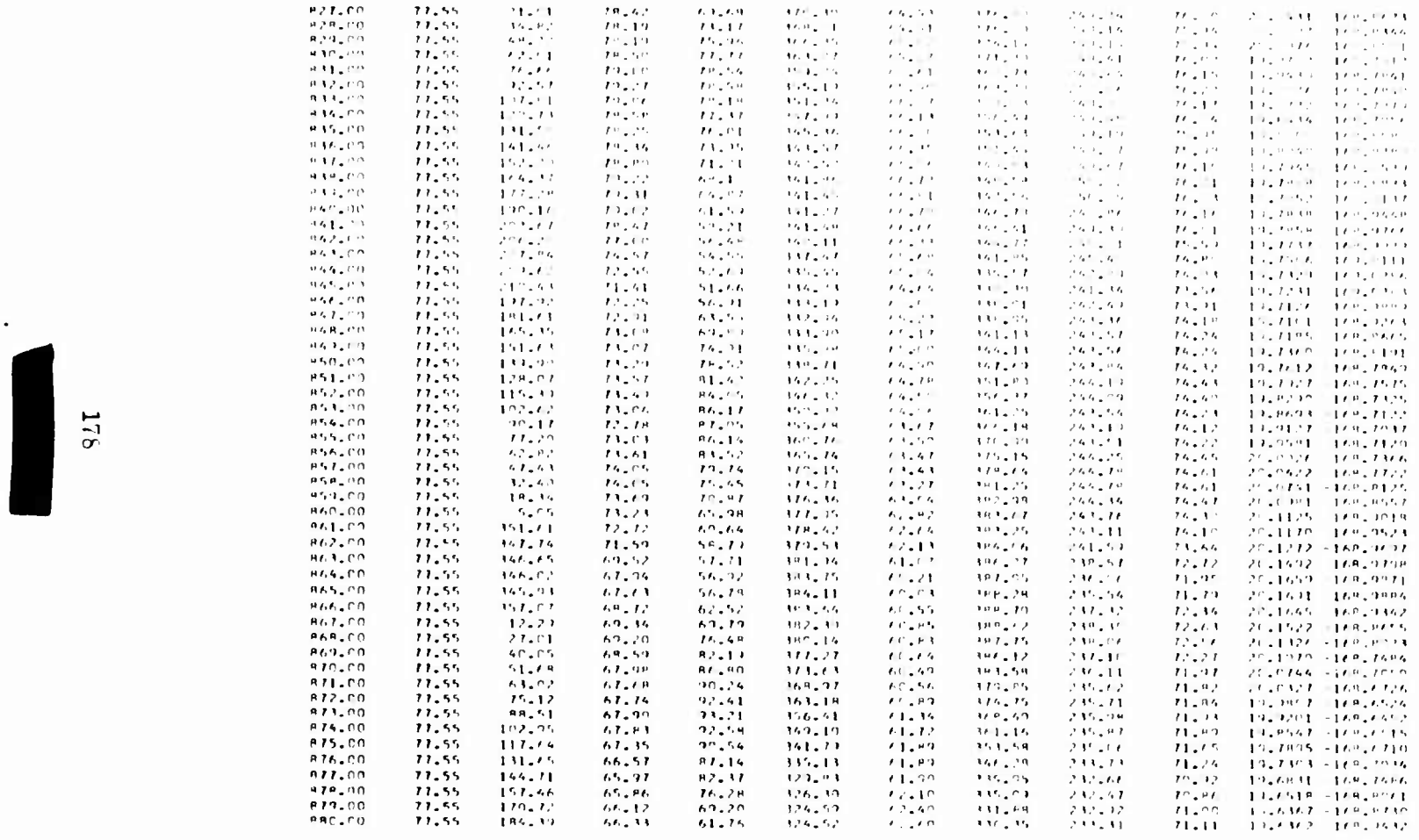

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   885.00     77.55    211.37     66.43     46.63    329.87     61.56    330.19    233.82     71.05    13.2600   -168.4055
   886.00     77.55    211.31     62.73     65.66    325.05     61.23    328.53    229.91     68.06    13.2561   -168.4031
   887.00     77.55    200.56     61.98     51.26    321.16     60.24    325.31    226.71     66.50    13.2522   -168.4006
   888.00     77.55    197.47     60.35     51.03    319.36     59.74    323.91    225.31     67.31    13.2483   -168.3982
   889.00     77.55    175.00     60.50     67.46    317.96     59.61    326.66    221.85     67.62    13.2443   -168.3958
   890.00     77.55    161.53     60.55     75.96    319.18     59.25    328.01    223.37     67.65    13.2404   -168.3934
   891.00     77.55    147.97     60.86     84.12    321.43     59.14    330.13    225.61     67.85    13.2365   -168.3910
   892.00     77.55    133.65     61.13     91.25    323.72     59.09     96.11    223.29     68.03    13.2326   -168.3885
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   894.00     77.55    104.28     61.52     93.84    326.37     58.14     97.47    224.21     68.28    13.2248   -168.3837
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   898.00     77.55     56.15     61.57     93.82    327.05     57.53     88.55    226.11     68.31    13.2091   -168.3740
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   900.00     77.55     28.08     62.13     80.32    327.47     56.44     95.73    226.29     68.47    13.2012   -168.3691
   901.00     77.55     16.86     62.85     72.93    330.53     56.85     96.36    226.76     69.11    13.1973   -168.3667
   902.00     77.55      0.47     63.52     64.14    330.36     57.32     95.29    228.04     69.51    13.1933   -168.3642
   903.00     77.55    345.15     63.61     55.02    328.68     57.54     92.95    228.25     69.57    13.1894   -168.3618
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   905.00     77.55    344.19     59.16     52.97    331.63     54.61     98.09    218.89     66.72    13.1815   -168.3569
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   907.00     77.55    354.44     56.49     59.62    337.70     52.18     97.16    212.65     64.82    13.1736   -168.3520
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