UCRL-ID-125524

Pike Event - EG&G Report

Edgerton, Germeshausen & Grier, Inc.

June 22, 1964

[redacted]

UNIVERSITY OF CALIFORNIA
LOS ALAMOS SCIENTIFIC LABORATORY
(CONTRACT W-7405-ENG-36)
P.O. Box 1663
LOS ALAMOS, NEW MEXICO

84/410

IN REPLY
REFER TO: JDO-1692

June 29, 1964

Dr. Gerald W. Johnson
University of California
Lawrence Radiation Laboratory
P. O. Box 808
Livermore, California

Dear Jerry:

As I promised in my letter of June 23, 1964, I am enclosing for your information a draft report from the EG&G ARMS group on the Pike event.

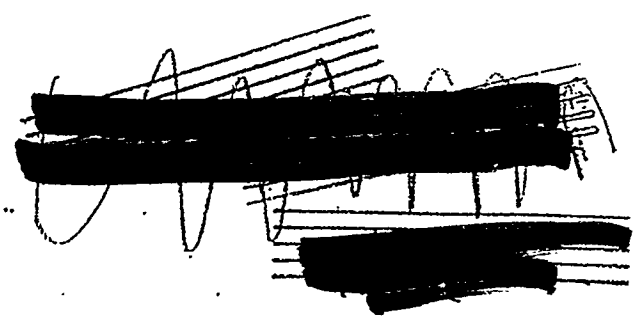
Sincerely,

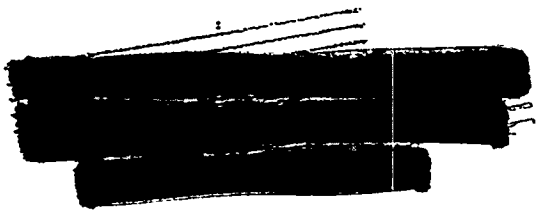
Al

Alvin C. Graves

ACG:CIB:mp

Enclosure





[redacted]

[redacted]

AEC Contract No. AT(29-1)-1183

98/410

[redacted]

AERIAL RADIOLOGICAL MONITORING
NEVADA TEST SITE

PIKE ARMS SURVEYS
Preliminary Data - DRAFT
22 June 1964

[redacted]

[redacted]

EDGERTON, GERMESHAUSEN & GRIER, INC.

[redacted]

[redacted]

PIKE EVENT - NASL

Preliminary Data

March 13, 1964

PRE EVENT DATA (D-2)

On March 11 the ARMS aircraft flew one mission over the Pike location (Hole U3cy) for pre-event data. A spectrum was taken over G. Z. and is shown on page 16 . A background spectrum was also taken and is shown on page 17.

POST EVENT DATA (D-DAY)

At H + 15 minutes (8:15 a.m. Friday, March 13, 1964) a telephone call was received from CP-1 alerting the ARMS aircraft and stating the Pike event had resulted in an immediate venting. At H + 2:45 a telephone call was received from CP-1 ordering the aircraft into the air at H + 2:30 the cloud was reported to be 7 miles southeast of Indian Springs at 6,000 feet MSL with traces to 11,000 feet MSL. The plan at this time was to fly to the west of the approaching debris, come in behind it and begin mapping the fallout pattern behind the cloud.

The aircraft took off from McCarran Field at H + 3:07 on a northerly course into the wind. The equipment was turned on at H + 3:09 and within three minutes (warm-up time) the gross-count "background" was observed to be 15,000 cps (150 ur/hr.) rather than the normal 350 to 400 cps (3.5 to 4 ur/hr) at an approximate position indicated by "A" on figure (1) at an altitude of about 7,000 feet. MSL. Spectrum #1 page 18 was collected at this time before balancing the detector's PM tubes or calibrating the equipment; although the resolution is poor due to unbalance of the PM tubes, the .86 mev I-134 peak is clearly present. The aircraft continued its climb on a westerly course. At an approximate location indicated by "B" figure (1) a reading of 14,000 cps (140 ur/hr) at 12,000 feet MSL. Between these two points, readings as low as 3,500 cps (35 ur/hr) were observed. At point "C" the

[redacted]

[redacted]

count rate rapidly decreased to 1,000 cps (10 ur/hr) at H + 3:30. By H + 3:58 the count rate had further decreased to 900 cps (9 ur/hr). Between these last two readings it is believed that the aircraft was outside the path of the debris. During this time the equipment was calibrated and background spectrum #3 on page 19 was taken; this spectrum confirms that the increase in gross-count background was due to contamination by fission products.

The aircraft then made several passes over ground zero beginning at 10,000 feet MSL and working down to 500 feet above the ground. At 8,000 feet MSL the output of the 9" x 3" detector saturated the gross-count system, and the 3/4" x 3/4" detector was used. Spectrum #4 was taken over G. Z. with the 3" x 3" detector. The intensity of the ground contamination necessitated this spectra be taken at an altitude of 2,000 feet above the ground. This spectrum is shown on page 20.

At H + 5:16 a spectrum #8 was taken to record the aircraft background (contamination). This spectrum was taken at an altitude of 8,000 feet MSL in an area five miles west of G. Z. and is shown on page 21. Again this spectrum and the gross-count background confirmed that the aircraft was contaminated.

The flight proceeded from NTS east 500 feet over Highway 91 to measure levels of ground contamination. A maximum reading of 35,000 cps (approximately 1.4 mr/hr at 3 feet using a conversion factor of 25 cps equal to 1 ur/hr for 500 to 3 feet) was observed at Cactus Springs at H + 5:35. The aircraft descended to 200 feet to collect spectral data. The gross-count dropped to 1,000 cps at this altitude. Believing that this indicated airborne radioactivity an altitude spiral (number 1 on figure 1) was made; these data are listed on page 10. On-the-spot evaluation of this data indicated that there was a large amount of airborne radioactivity, and it

[redacted]

was decided to return to McCarran Field by flying west of the Spring Mountains to avoid further contamination of the aircraft. A later analysis of the data shows that the radioactivity was indeed on the ground at this time and that the decrease in count rate below 500 feet was caused by overloading of the counting circuits in the gross-count computer.

While west of the Spring Mountains the background was 1,200 cps. Immediately upon flying to the east of these mountains at 7,500 feet MSL at H + 6:00, the cloud was again encountered and an altitude spiral was made upward from this altitude (number 2 on figure 1); these data are listed on page 11. Since it was impossible to land at McCarran Field without entering the cloud it was decided to make a deliberate pass through the cloud on an easterly track to determine its width before landing. This track was made at 7,000 feet MSL, and a peak of 23,000 cps was observed immediately south of Las Vegas. Spectrum #10 was taken at this time and is shown on page 22 . The cloud was found to extend eastward to a point over the western end of Lake Mead; during this pass through the cloud, the background was increased by about 900 cps. The aircraft then returned to McCarran Field landing at H + 6:45. Upon landing, locations and approximate count rate levels from flight notes were telephoned to CP-1. Although the aircraft was appreciably contaminated at this time, the high levels of activity in the cloud would be clearly detectable above background. The aircraft was ordered by CP-1 to continue tracking the cloud during the afternoon, but to remain at the airfield until the arrival of representatives of USPHS in order to coordinate the two operations. Being advised at H + 7:35 that USPHS was unable to come to the airfield, the aircraft took off at H + 7:42.

The aircraft proceeded south for about 45 miles and then turned eastward into the cloud at 8,000 feet MSL in an effort to locate the axis of the cloud. This was found to be about 20 miles east of Searchlight Ferry at H + 8:20. An altitude spiral was made at this point (number 3 on figure 1); these data are listed on page 12, and spectrum #11 was taken during this spiral and is shown on page 23. Peaks occurred at 2,500, 4,800 and 10,500; because of the terrain it was decided to track the higher of these. The aircraft then proceeded to the west and south in an effort to get ahead of the cloud; at this time the aircraft background (natural plus contamination) was 2,600 cps. A track was flown east from Needles at 10,500 feet MSL and the cloud was encountered reaching a peak of 600 cps above background at a point 32 miles east of Needles at H + 9:10. This track was continued east until passing out of the cloud, and a box-pattern was then flown to the south again in an effort to get ahead of the cloud. The cloud was not encountered on the eastern, southern and western legs of this box; during this time the background decreased from 2,600 cps to 2,300 cps.

Having determined the southern-most extent of the cloud, it was decided to return to McCarran Field along the axis of the cloud in order to locate its center. This was done by picking up the axis on a track east from Needles at 10,000 feet MSL at H + 10:15 with a level of 1,000 cps above background. Slow turns were made back across the axis whenever the level began to fall off. A peak reading of 19,000 cps was observed at a point 52 miles southwest of McCarran Field. Spectra #12 page 24 was taken at H + 10:15 at the southern end of this track, #13 page 25 was taken at H + 10:20 just southeast of the center, and #15 page 27 was taken over McCarran

Field at H + 11:00; this latter spectrum may be considered as background although there may have been a small contribution from the cloud. The aircraft landed at H + 11:12.

After terminating the second flight of March 13 at 1912 hours the ARMS aircraft was decontaminated as much as possible by a superficial washing and engine oil change. The ARMS group debriefed at 2030 hours, considered the events of the last flight and reported findings to CP-1.

POST EVENT DATA (D +1)

It had been previously agreed that the ARMS aircraft would not attempt any tracking effort during the hours of darkness but reconsideration of the last known mean altitude of the effluent (10,000 feet) and highest probable terrain south and southeast of Las Vegas (8,400 feet maximum) made a night tracking effort appear possible. Further consideration of the fact that the leading edge of the effluent had moved from G. Z. to a point south of Needles, California, a distance of 160 nautical miles in approximately 9 hours (or an average speed of 18 knots), led to a conclusion that if the path of the effluent continued its southerly travel down the Colorado River valley, it would cross the Mexican Border (an additional 130 nautical miles) at approximately 0015 hours or H + 16:15. Using 18 knots as an average speed, the center of the effluent, which was located approximately 45 nautical miles behind the leading edge of the effluent, would have crossed the border at 0245 hours or H + 18:15.

On March 14 the ARMS aircraft made three flights in an effort to relocate the Pike effluent. The first flight was off the ground at 0303 hours with instructions to phone in findings to NVOO no later than 0845 hours, March 14. A track was started at 10,000 feet altitude and followed a path as shown in figure 2. At a point 30 miles east of Parker, California and at the 9,000 feet level, 0500 hours, Doppler radar wind information indicated the wind to be from 010° magnetic and at 34 knots. From this wind information it was decided to continue the tracking effort in an area 100 miles to either side of the Colorado River. At 0512 hours the flight arrived over Parker, California and with daylight approaching made a spiralling decent to investigate lower flight levels. Initial contact with the radioactive effluent was made at the 7,000 feet level of this spiral and remained approximately the same down to the 2,200 foot level (1200 ft. above the ground). Subsequent tracking and altitude spirals detected only spotty pockets of radioactivity in the Blyth, California, area; 20 miles east of Blyth; in the Yuma, Arizona, area; and El Centro, California, area. The altitude spirals are indicated on the track in figure 2 and these data tabulated on page 13. No spectral data was taken.

This first flight was terminated at Palm Springs, California at 0833 hours and findings telephoned to NVOO at 0845 hours.

At 1006 hours the ARMS aircraft took off from Palm Springs, California, and continued a track to the east and north. The only contact made with radioactivity during this flight back to Las Vegas was in the Twenty Nine Palms, California, area. This track is shown on figure 2 and the altitude data tabulated on page 10. This second flight terminated at Las Vegas at 1206 hours.

The third ARMS flight of March 14 covered much of the same area as the first flight. Extensive altitude investigations were conducted all with negative results. The flight path of this flight is shown in figure 2 with altitude spiral data tabulated on pages 15 . This flight took off from Las Vegas at 1305 hours and landed back at Las Vegas at 1833 hours. Results of the March 14 effort by ARMS was telephoned to CP-1 at 1900 hours. ARMS was instructed to proceed to El Paso, Texas, at daylight the next morning to continue the search from there.

POST EVENT (D + 2 to D + 4)

March 15, 16 and 17, the ARMS aircraft flew a total of 19.2 hours along the southern border of Texas, New Mexico, Arizona, and California without detecting any radioactivity other than background. Background spectra taken during these flights show the slow decay of the aircraft contamination. Figure 3 shows the flight paths flown on these three days.

POST EVENT (D + 6)

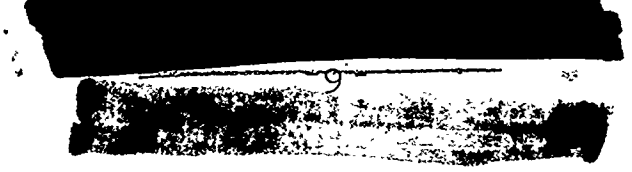
On March 19 ARMS flew a ground deposition pattern in the Vegas Valley between Mercury, Nevada, and Las Vegas, Nevada. This pattern is shown in figure 4.

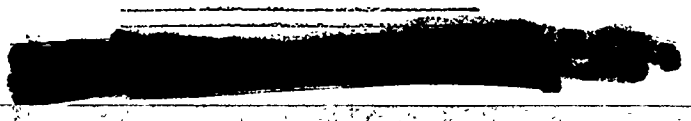
POST EVENT (D + 7)

During the early morning of March 20 numerous spectra and gross-count data were collected over a point in Area 11, NTS, at altitude from 90 to 1,000 feet. Detailed ground measurements were being made at the same time; the dose rate at 3 feet was measured to be 1.04 mr/hr. Typical spectra are shown on pages 32 through 35. These data will be further analyzed in order to obtain better conversion factors between count rate, measured energy flux and dose rate.

POST EVENT (D + 18)

USPHS reported finding iodine in milk and vegetation samples in the Yuma, Arizona area. The aircraft was therefore dispatched to this area on March 31. Spectra were taken at an altitude of 200 feet over selected open fields in the area. None of the spectra show any positive evidnece of fission products. Spectrum # 81 on page 36 is typical. Spectrum #78 on page 37 is a background taken at 7,500 feet MSL.





[redacted]

ALTITUDE SPIRAL NO. 1

TIME: H + 5:40

LOCATION: Cactus Springs

DETECTOR: 9 x 3 NaI

Background Corrected

Altitude	Count Rate
200 feet	1,000 cps
400 "	15,000 "
500 "	25,000 "
700 "	20,000 "
800 "	17,000 "
1,000 "	12,000 "
1,200 "	9,000 "
1,400 "	5,000 "
2,000 "	2,500 "
2,500 "	1,600 "
3,000 "	1,300 "
3,500 "	600 "
4,000 "	200 "

[redacted]

[redacted]

ALTITUDE SPIRAL NO. 2

TIME: H + 6:00

LOCATION: Blue Diamond Mountain Mine

DETECTOR: 9 x 3 NaI

Background Corrected

APPROX: Conversion factor 100 cps = 1 ur/hr

Altitude	Count Rate
7,500 ft MSL	7,000 cps
7,600 " "	1,600 "
7,800 " "	700 "
7,900 " "	700 "
8,000 " "	700 "
8,100 " "	1,000 "
8,200 " "	3,700 "
8,300 " "	3,400 "
8,500 " "	1,100 "
8,700 " "	1,200 "
8,800 " "	1,400 "
8,900 " "	1,500 "
9,000 " "	1,300 "
9,200 " "	1,800 "
9,300 " "	5,300 "
9,500 " "	3,000 "
9,700 " "	4,700 "
9,800 " "	7,600 "
9,900 " "	7,900 "

[redacted]

[redacted] SPIRAL NO. 2 (Continued)

[redacted]

Altitude	Count Rate
10 K MSL	6,700 cps
10.2 K "	6,600 "
10.3 K "	2,100 "
10.4 K "	1,900 "
10.5 K "	3,600 "
10.6 K "	5,500 "
10.7 K "	4,900 "
10.8 K "	2,200 "
10.9 K "	1,300 "
11.0 K "	1,200 "
11.2 K	1,100 "
11.3 K "	900 "
11.4 K "	700 "
11.5 K "	800 "
11.6 K "	1,100 "
11.7 K "	1,300 "
11.8 K "	1,800 "
11.9 K "	2,500 "
12.0 K "	5,300 "
12.2 K "	5,700 "
12.3 K "	3,600 "
12.4 K "	3,300 "
12.5 K "	3,000 "

[redacted]

[redacted]

ALTITUDE SPIRAL NO. 2 (Continued)

Altitude	Count Rate
12.6 K ft MSL	3,400 CPS
12.7 K " "	3,000 "
12.8 K " "	2,400 "
12.9 K " "	1,600 "
13.0 K " "	1,300 "
13.1 K " "	1,000 "

essentially constant to 14 K

[redacted]

ALTITUDE SPIRAL NO. 3

TIME: H + 8:30

LOCATION: East of Searchlight Ferry

DETECTOR: 9 x 3 NaI

Background Corrected

Approx. Conversion factor: 100 cps = 1 ur/hr

Altitude	Count Rate
1,000 feet MSL	3,500 cps
1,300 " "	3,500 "
1,500 " "	4,000 "
1,800 " "	4,500 "
2,000 " "	4,500 "
2,300 " "	6,000 "
2,500 " "	6,000 "
2,700 " "	6,000 "
3,000 " "	4,500 "
3,300 " "	4,000 "
3,500 " "	4,500 "
3,700 " "	3,500 "
4,000 " "	3,000 "
4,200 " "	2,700 "
4,500 " "	3,300 "
4,700 " "	3,900 "
4,800 " "	5,500 "
5,000 " "	4,500 "
5,100 " "	3,500 "

[redacted]

Altitude	Count Rate
5,300 feet MSL	3,000 cps
5,500 " "	2,500 "
5,700 " "	2,000 "
5,900 " "	1,500 "
6,200 " "	2,000 "
6,500 " "	1,700 "
6,700 " "	700 "
7,000 " "	500 "
7,300 " "	1,000 "
7,500 " "	1,500 "
7,700 " "	1,500 "
7,800 " "	3,000 "
8,000 " "	2,000 "
8,100 " "	1,000 "
8,300 " "	700 "
8,500 " "	600 "
8,700 " "	500 "
9,300 " "	600 "
9,500 " "	600 "
9,700 " "	800 "
9,900 " "	1,100 "
10,000 " "	1,500 "
10,200 " "	2,000 "
10,300 " "	2,500 "
10,400 " "	5,000 "

[redacted]

[redacted]

Altitude	Count Rate
10,500 feet MSL	5,500 cps
10,600 " "	5,500 "
10,700 " "	4,500 "
10,800 " "	3,500 "
11,000 " "	3,000 "
11,100 " "	2,000 "
11,200 " "	1,700 "
11,300 " "	1,000 "
11,500 " "	1,100 "
11,600 " "	1,500 "
11,800 " "	1,500 "
12,000 " "	1,500 "
12,300 " "	1,500 "
12,500 " "	1,200 "
12,800 " "	1,300 "
13,000 " "	1,100 "
13,300 " "	800 "
13,500 " "	700 "
13,700 " "	600 "
14,000 " "	500 "
15,000 " "	500 "

[redacted]

ALTITUDE SPIRAL NO. 4

TIME: H + 21:12

LOCATION: Parker, California

DETECTOR: 9 x 3 NaI

Background Corrected

Altitude	Count Rate
9,000 Feet	Neg.
8,000 "	Neg.
7,000 "	300 CPS
5,500 "	200 CPS
4,000 "	200 CPS
3,000 "	200 CPS
2,700 "	300 CPS
2,200 "	400 CPS

Altitude Spiral No. 5

2200 Feet to 10,000 feet - Negative

Altitude Spiral No. 6

2000 Feet to 10,000 feet - Negative

Altitude Spiral No. 7

400 Feet to 10,000 feet - Negative

Altitude Spiral No. 8

2000 Feet to 10,000 feet - Negative

Altitude Spiral No. 9

2000 Feet to 10,000 feet - Negative

[redacted]

ALTITUDE SPIRAL No. 10

TIME: H + 23:17 LOCATION: Yuma, Arizona

DETECTOR: 9 x 3 NaI Background Corrected

Altitude	Count Rate
2000 Feet	Neg.
3000 "	Neg.
3500 "	125 CPS
4000 Feet to 10,000 Feet	Neg.

ALTITUDE SPIRAL No. 11

TIME: H + 24:03 LOCATION: El Centro, California

DETECTOR: 9 x 3 NaI Background Corrected

Altitude	Count Rate
2000 Feet	Neg.
3000 "	Neg.
3200 "	110 CPS
3500 Feet to 10,000 Feet	Neg.

ALTITUDE SPIRAL No. 12

2500 Feet to 10,000 Feet - Negative.

ALTITUDE SPIRAL No. 13

3000 Feet to 12,000 Feet - Negative.

[redacted]

[redacted]

ALTITUDE SPIRAL No. 14

TIME: H + 26:51

LOCATION: Twenty Nine Palms, Cali

DETECTOR: 9 x 3 NaI

Background Corrected

Altitude	Count Rate
3500 Feet	Neg.
4000 Feet	400 CPS
4500 Feet to 17,000 Feet	Neg.

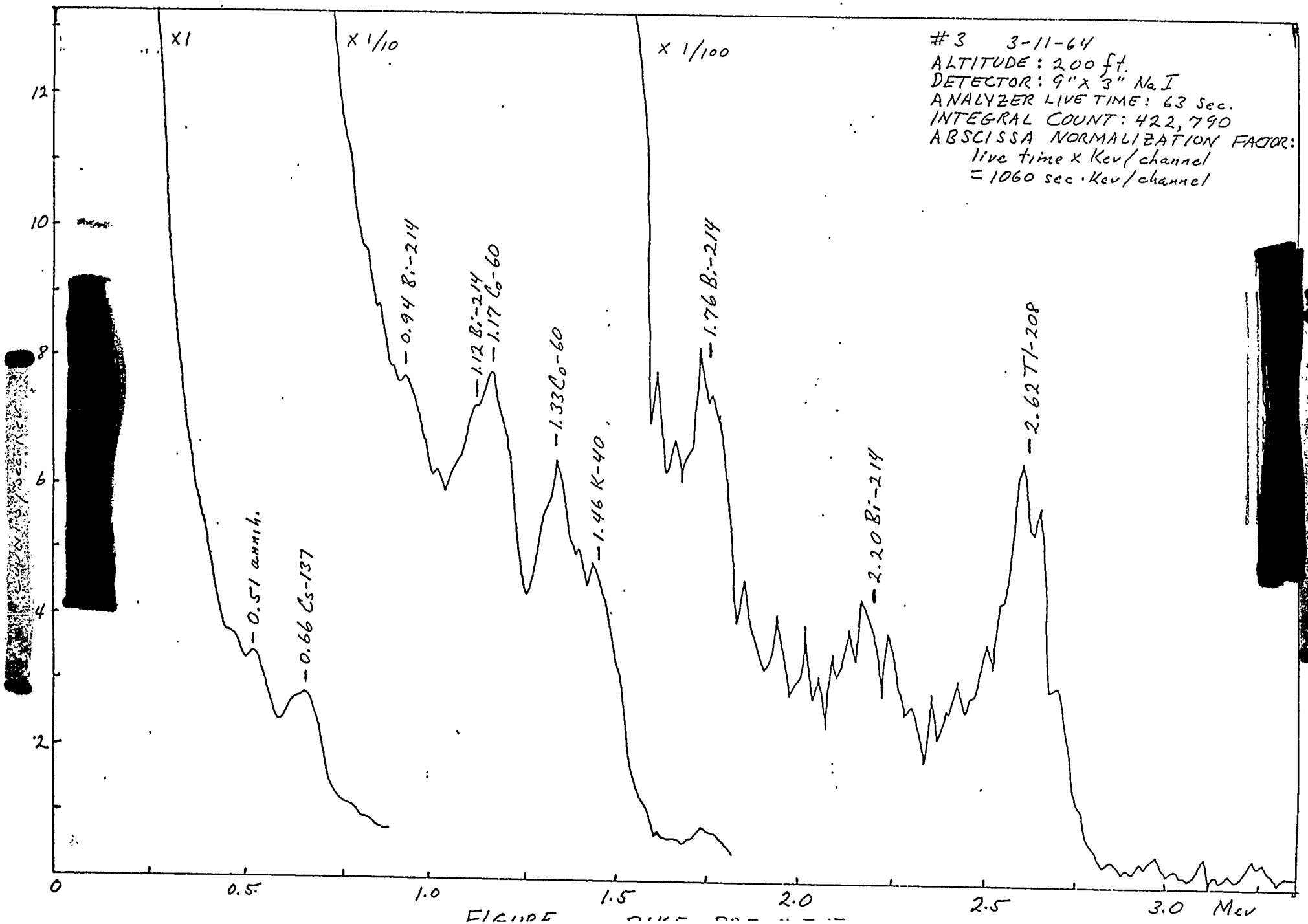
ALTITUDE SPIRAL No. 15

3000 Feet to 15000 Feet - Negative

ALTITUDE SPIRAL No. 16

10,000 Feet to 20,000 Feet - Negative

[redacted]


#3 3-11-64
ALTITUDE: 200 ft.
DETECTOR: 9" x 3" NaI
ANALYZER LIVE TIME: 63 sec.
INTEGRAL COUNT: 422,790
ABSCISSA NORMALIZATION FACTOR:
live time x Kev/channel
= 1060 sec · Kev/channel
X1
X 1/10
X 1/100
0.51 annih.
0.66 Cs-137
0.94 Bi-214
1.12 Bi-214
1.17 Co-60
1.33 Co-60
1.46 K-40
1.76 Bi-214
2.20 Bi-214
2.62 Tl-208
12
10
8
6
4
2
0
0.5
1.0
1.5
2.0
2.5
3.0
Mev

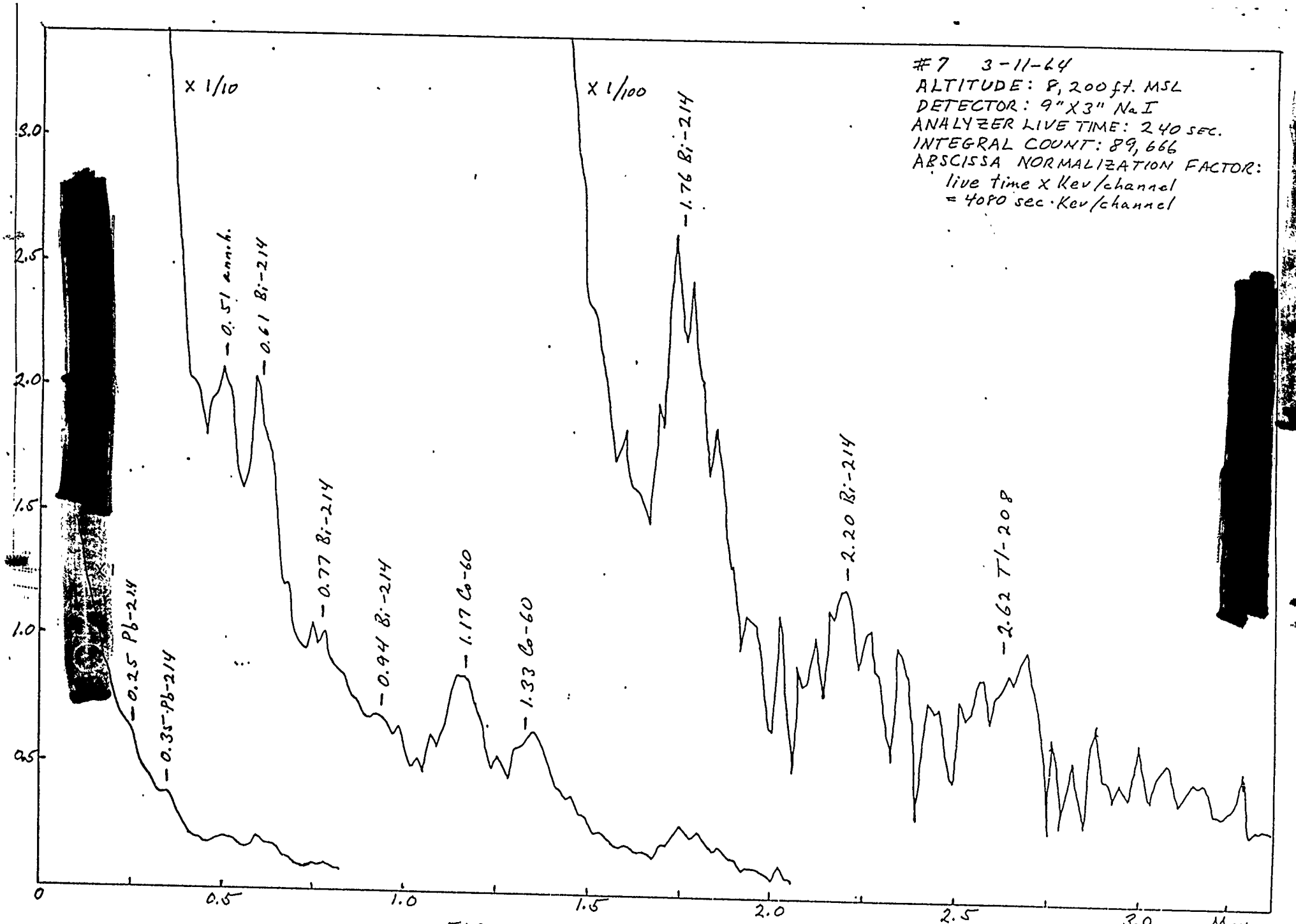
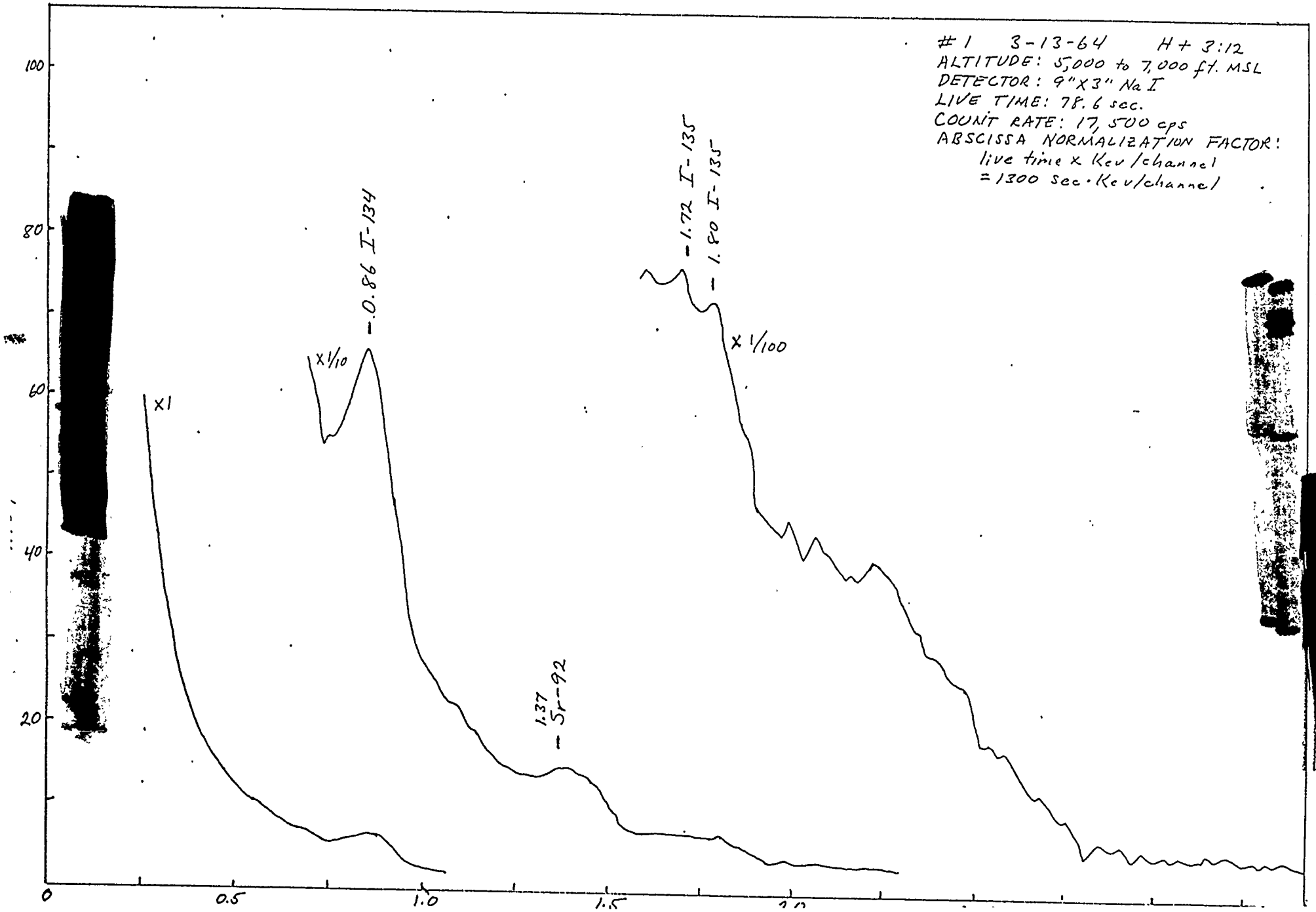
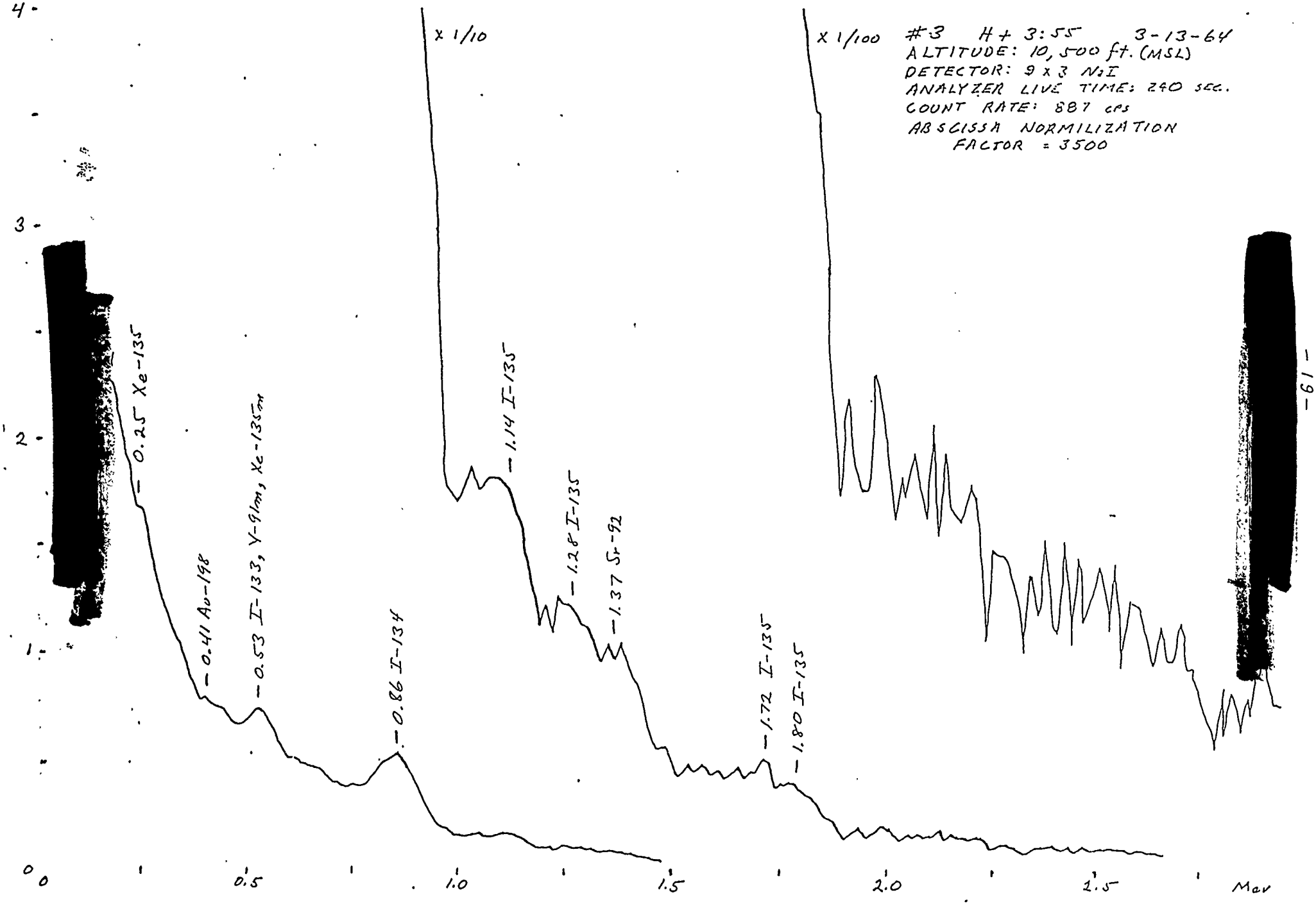
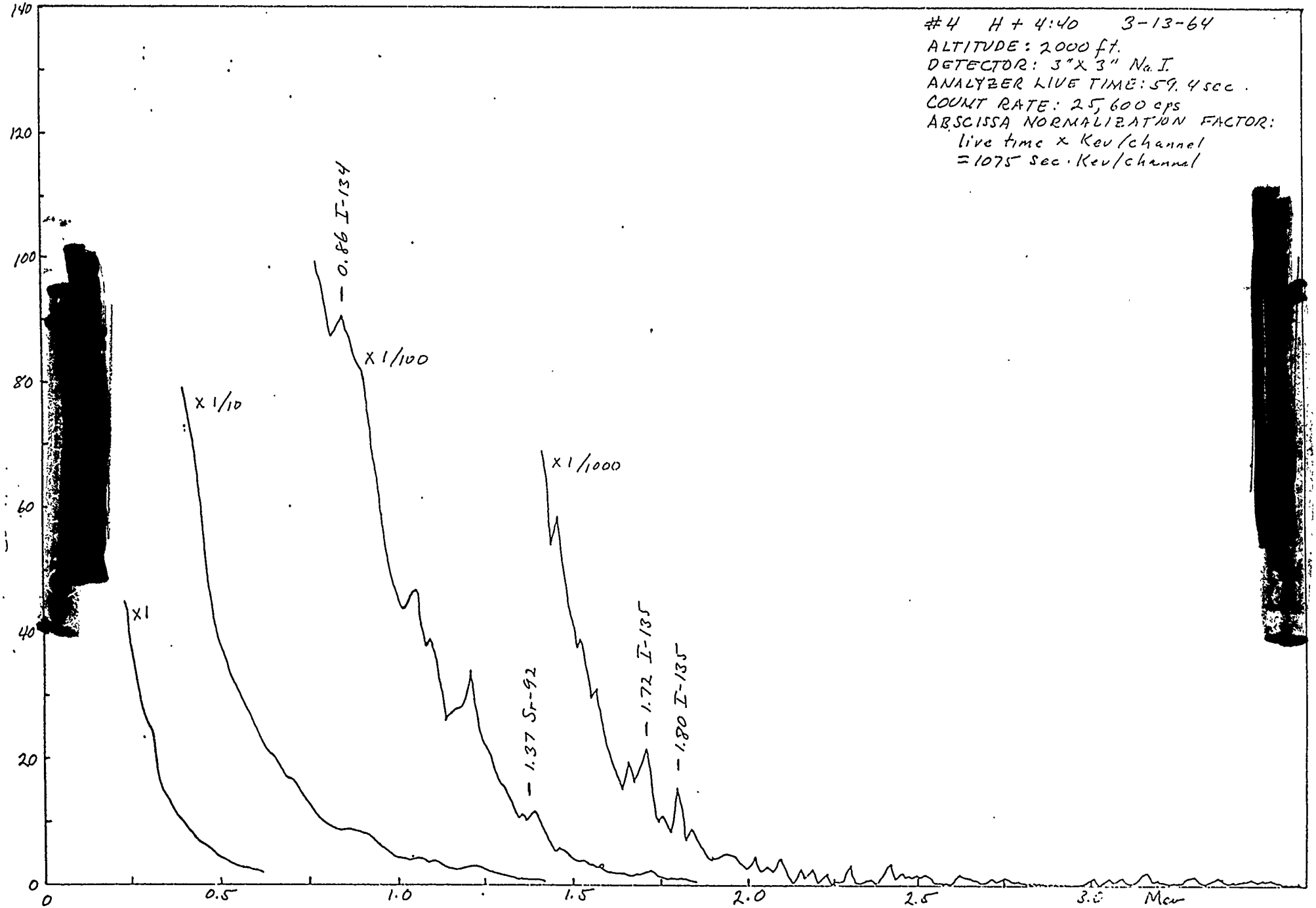


FIGURE PIKE PRE-EVENT, BACKGROUND


#1 3-13-64 H+3:12
ALTITUDE: 5,000 to 7,000 ft. MSL
DETECTOR: 9"X3" Na I
LIVE TIME: 78.6 sec.
COUNT RATE: 17,500 cps
ABSCISSA NORMALIZATION FACTOR:
live time x Kev/channel
= 1300 sec·Kev/channel
100
80
60
40
20
0
0.5
1.0
1.5
X1
X1/10
X1/100
-0.86 I-134
-1.72 I-135
-1.90 I-135
1.37
-Sr-92

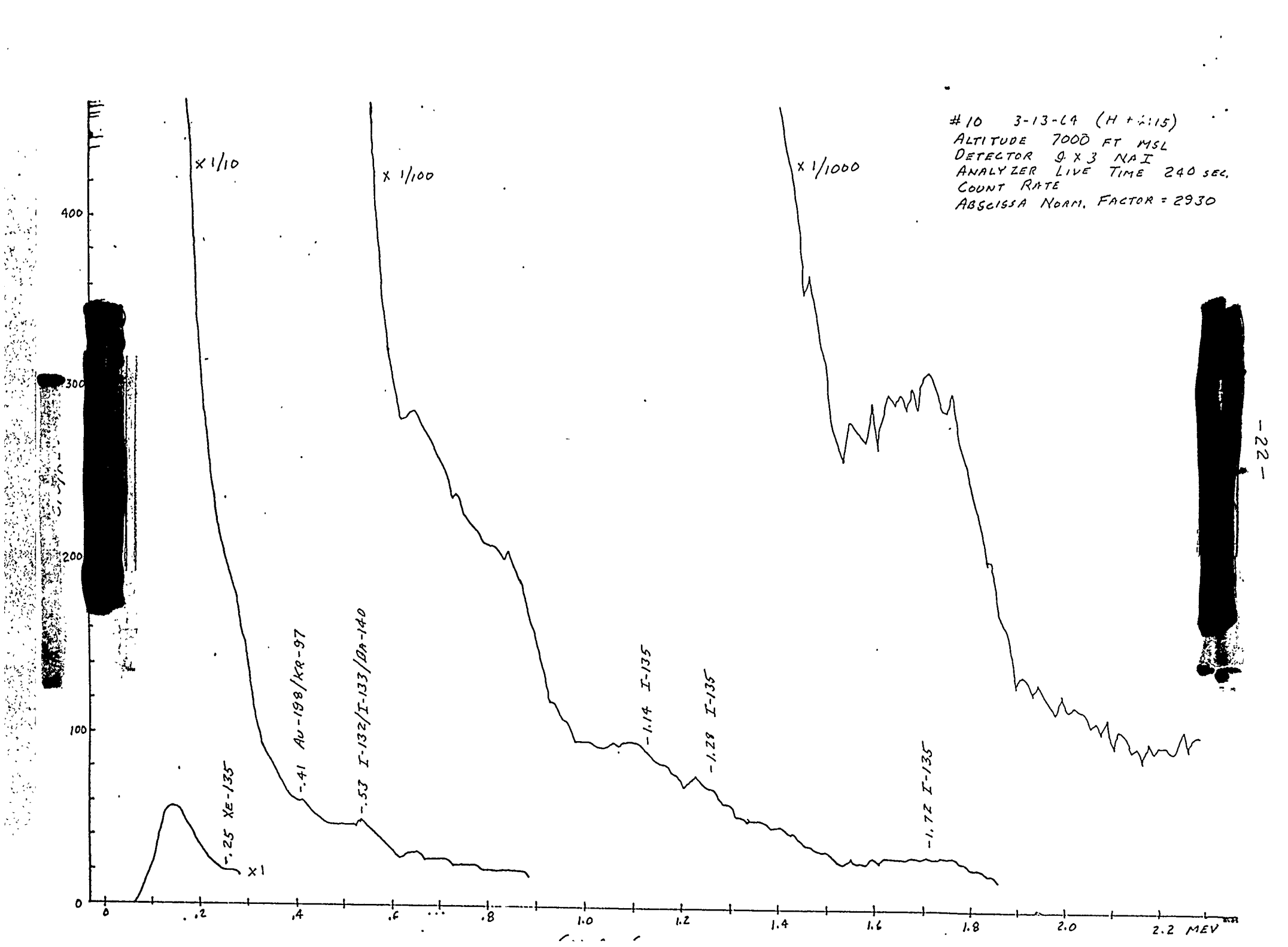

x 1/10
x 1/100
#3 H + 3:55 3-13-64
ALTITUDE: 10,500 ft. (MSL)
DETECTOR: 9 x 3 NaI
ANALYZER LIVE TIME: 240 sec.
COUNT RATE: 887 cps
ABSCISSA NORMILIZATION FACTOR = 3500
0.25 Xe-135
0.411 Au-198
0.53 I-133, Y-91m, Xe-135m
0.86 I-134
1.14 I-135
1.28 I-135
1.37 Sr-92
1.72 I-135
1.80 I-135
4
3
2
1
0
0.5
1.0
1.5
2.0
2.5
Mev
- 19 -


#4 H + 4:40 3-13-64
ALTITUDE: 2000 ft.
DETECTOR: 3" X 3" Na. I.
ANALYZER LIVE TIME: 59.4 sec.
COUNT RATE: 25,600 cps
ABSCISSA NORMALIZATION FACTOR:
live time x Kev/channel
= 1075 sec · Kev/channel
X1
X 1/10
X 1/100
X 1/1000
- 0.86 I-134
- 1.37 Sr-92
- 1.72 I-135
- 1.80 I-135
140
120
100
80
60
40
20
0
0
0.5
1.0
1.5
2.0
2.5
3.0
Mev

[redacted]

[redacted]

[redacted]


#10 3-13-64 (H + 4:15)
ALTITUDE 7000 FT MSL
DETECTOR 9 X 3 NAI
ANALYZER LIVE TIME 240 SEC.
COUNT RATE
ABSCISSA NORM. FACTOR = 2930
X 1/10
X 1/100
X 1/1000
X1
.25 XE-135
.41 AU-198/KR-97
.53 I-132/I-133/BA-140
1.14 I-135
1.28 I-135
1.72 I-135
400
300
200
100
0
0
.2
.4
.6
.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2 MEV

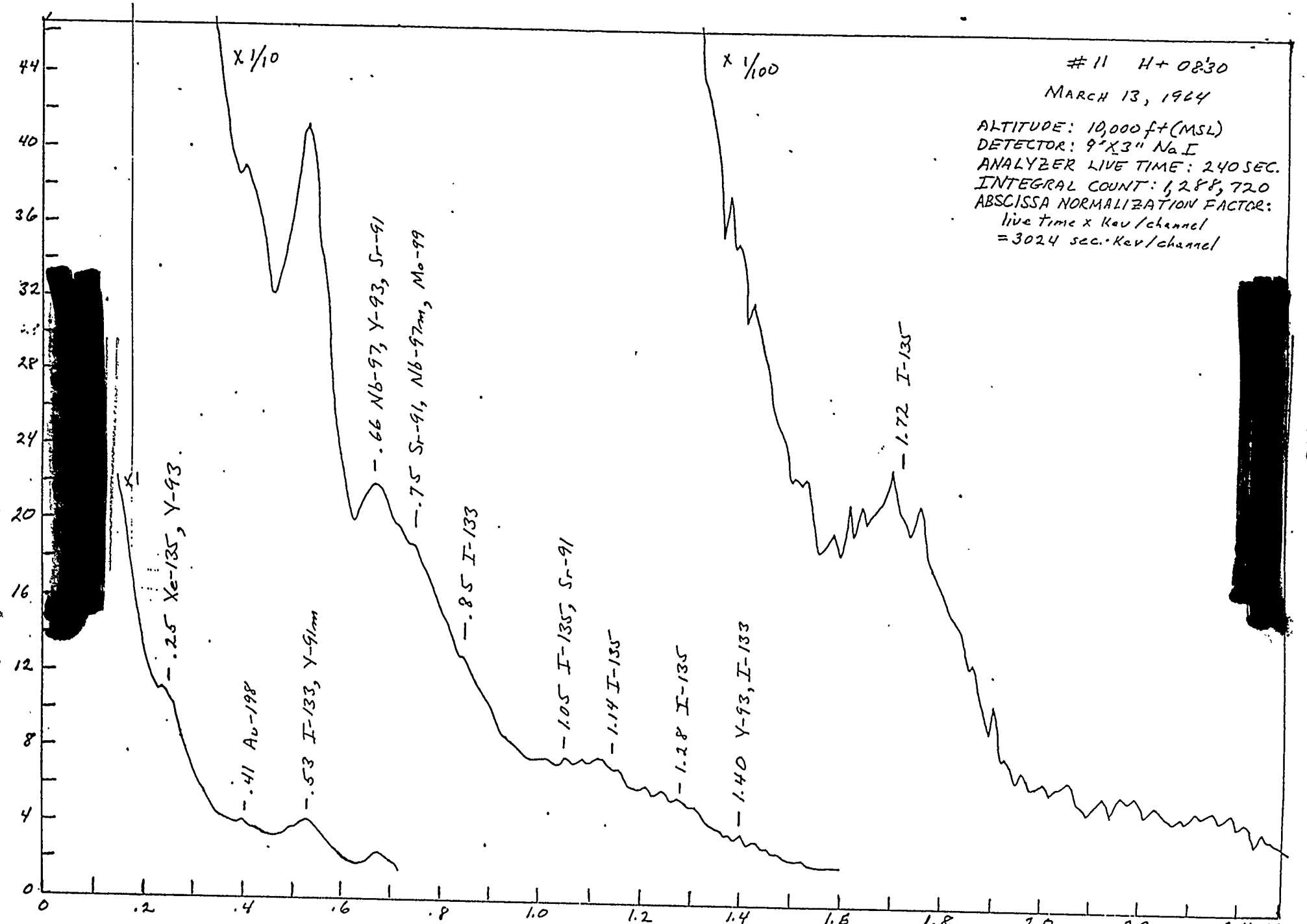
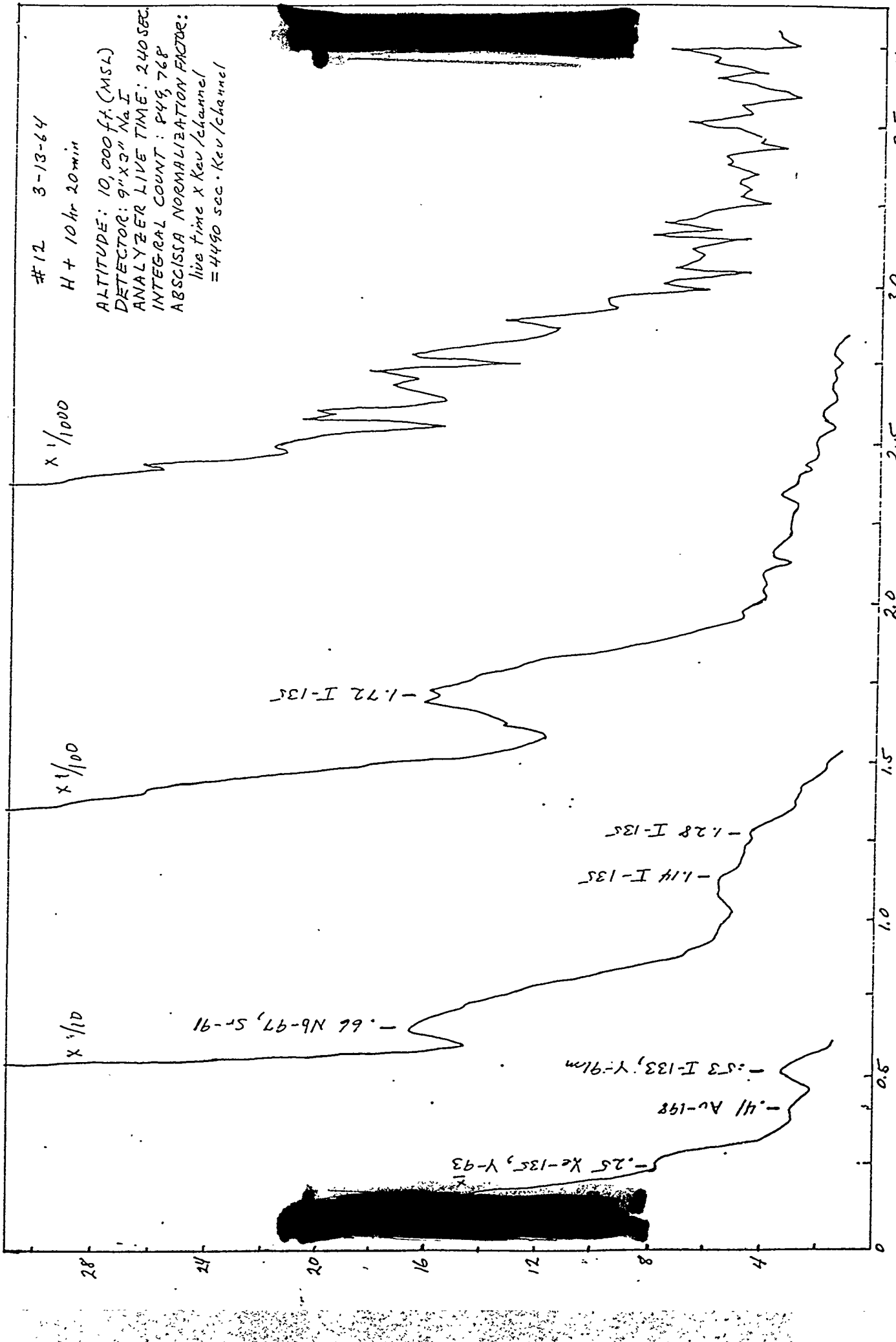


FIGURE PIKE CLOUD, D


#12 3-13-64
H + 10 hr 20 min
ALTITUDE: 10,000 ft. (MSL)
DETECTOR: 9"x3" NaI
ANALYZER LIVE TIME: 240 sec.
INTEGRAL COUNT: 845,768
ABSCISSA NORMALIZATION FACTOR:
live time x Kev/channel
= 4490 sec · Kev/channel
x 1/1000
x 1/100
x 1/10
-1.72 I-135
-1.14 I-135
-1.28 I-135
-.66 Nb-97, Sr-91
-.53 I-133, Y-91m
-.41 Au-198
-.25 Xe-135, Y-93
Mev

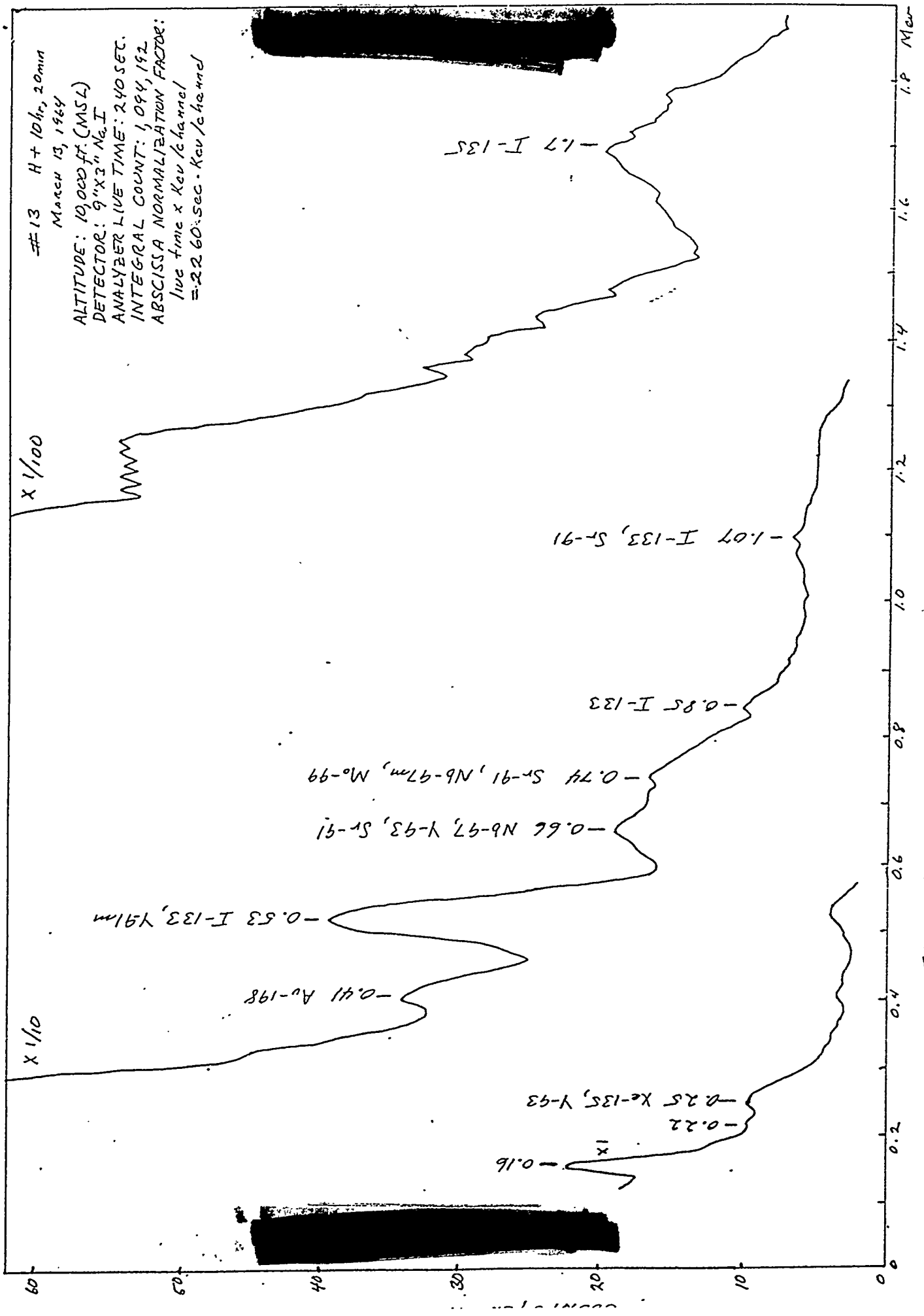
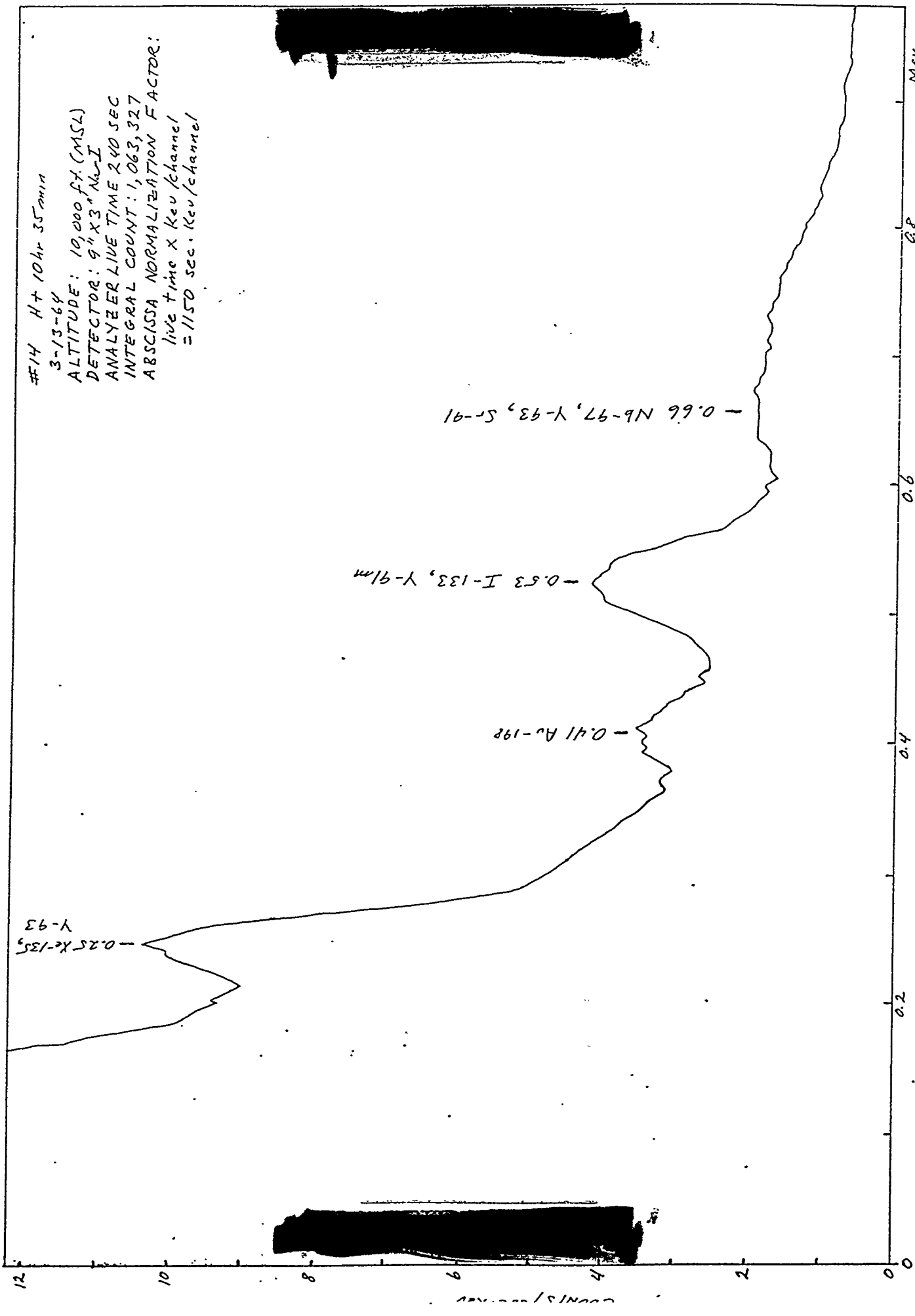


FIGURE PIKE CLOUD, 20 MILES NE. OF NEEDLES, ARIZ.


#14 H+ 10hr 35min
3-13-64
ALTITUDE: 10,000 FT. (MSL)
DETECTOR: 4" x 3" NaI
ANALYZER LIVE TIME 240 SEC
INTEGRAL COUNT: 1,063,327
ABSCISSA NORMALIZATION FACTOR:
live time x Kev/channel
=1150 sec. Kev/channel
0.25 Xe-135, Y-93
0.41 Au-198
0.63 I-133, Y-91m
0.66 Nb-97, Y-93, Sr-91
COUNTS/sec-KEV
MEV
0
2
4
6
8
10
12
0.2
0.4
0.6

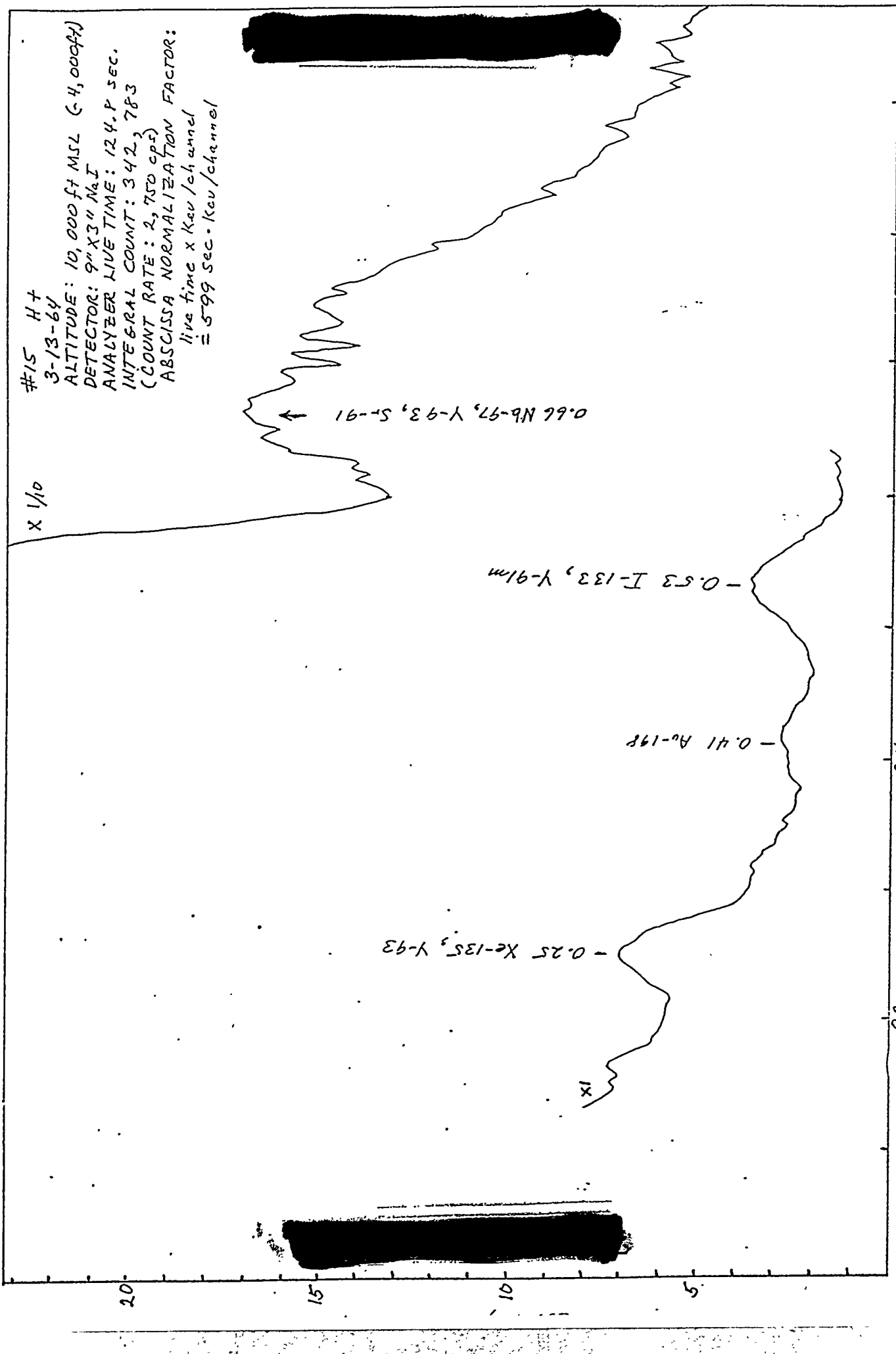
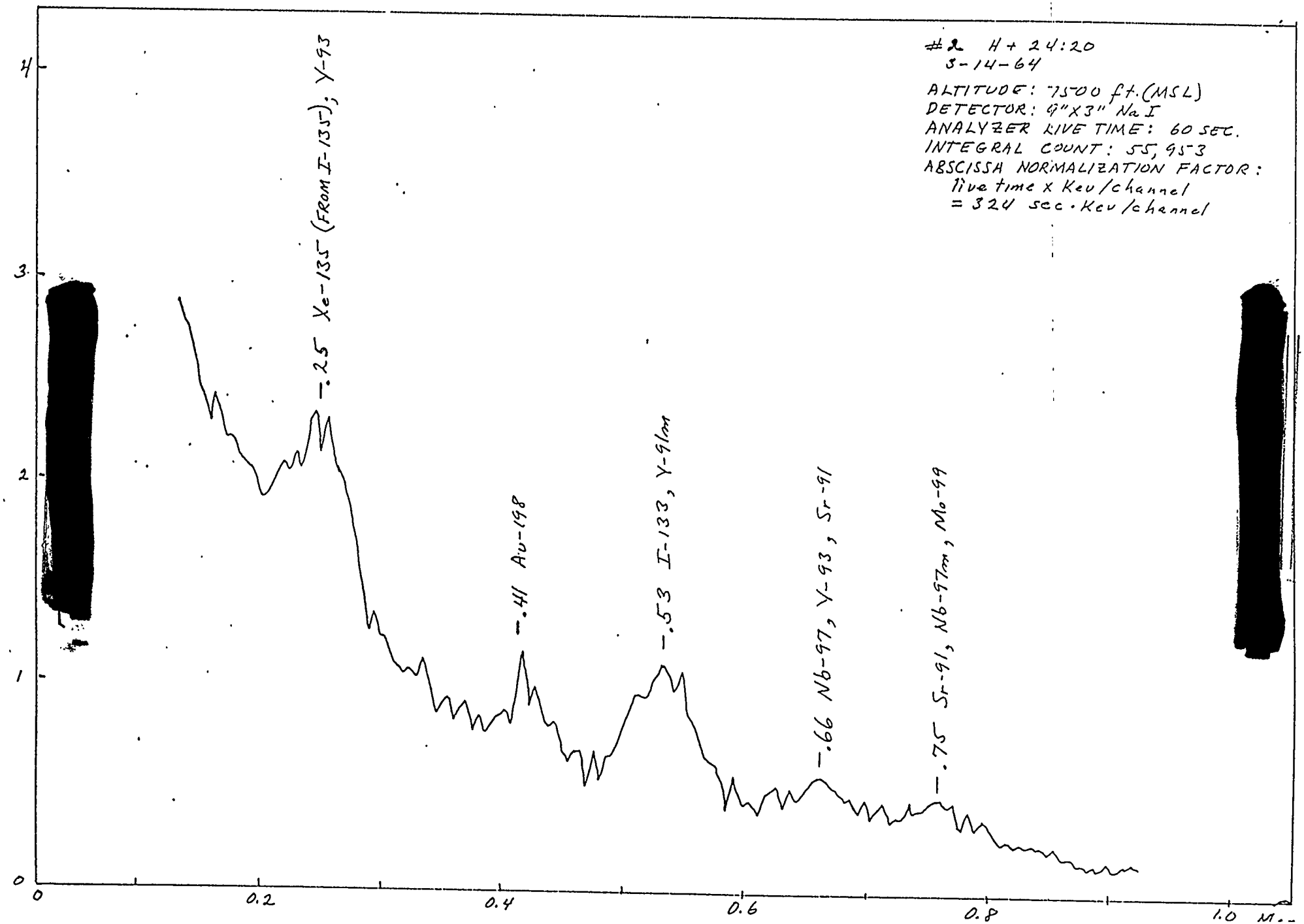


FIGURE PIKE CLOUD


#2 H + 24:20
3-14-64
ALTITUDE: 7500 ft. (MSL)
DETECTOR: 9"X3" NaI
ANALYZER LIVE TIME: 60 SEC.
INTEGRAL COUNT: 55, 95-3
ABSCISSA NORMALIZATION FACTOR:
live time x Kev/channel
= 324 sec · Kev/channel
.25 Xe-135 (FROM I-135); Y-93
.41 Au-198
.53 I-133, Y-91m
.66 Nb-97, Y-93, Sr-91
.75 Sr-91, Nb-97m, Mo-99
0
1
2
3
4
0
0.2
0.4
0.6
0.8
1.0

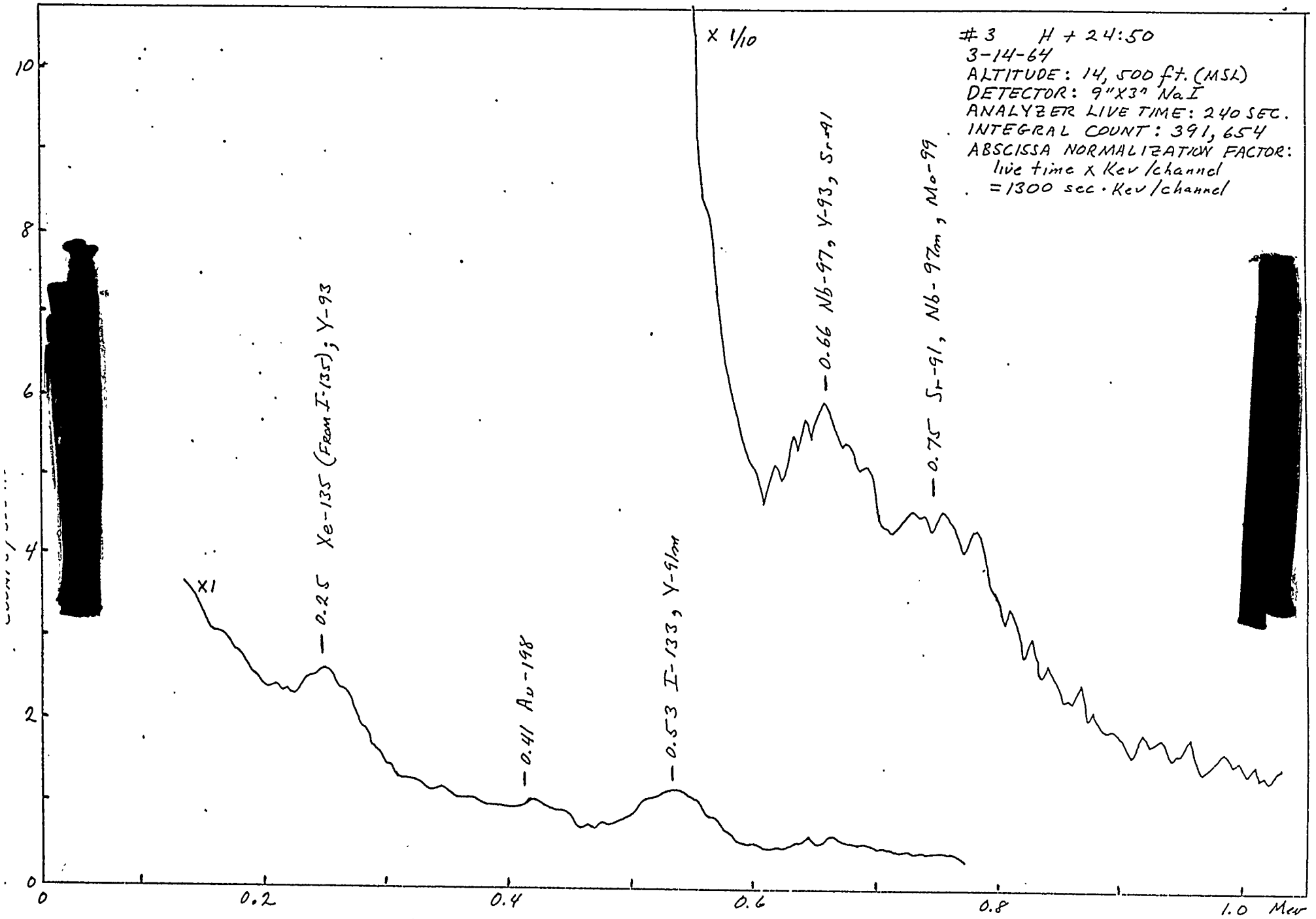
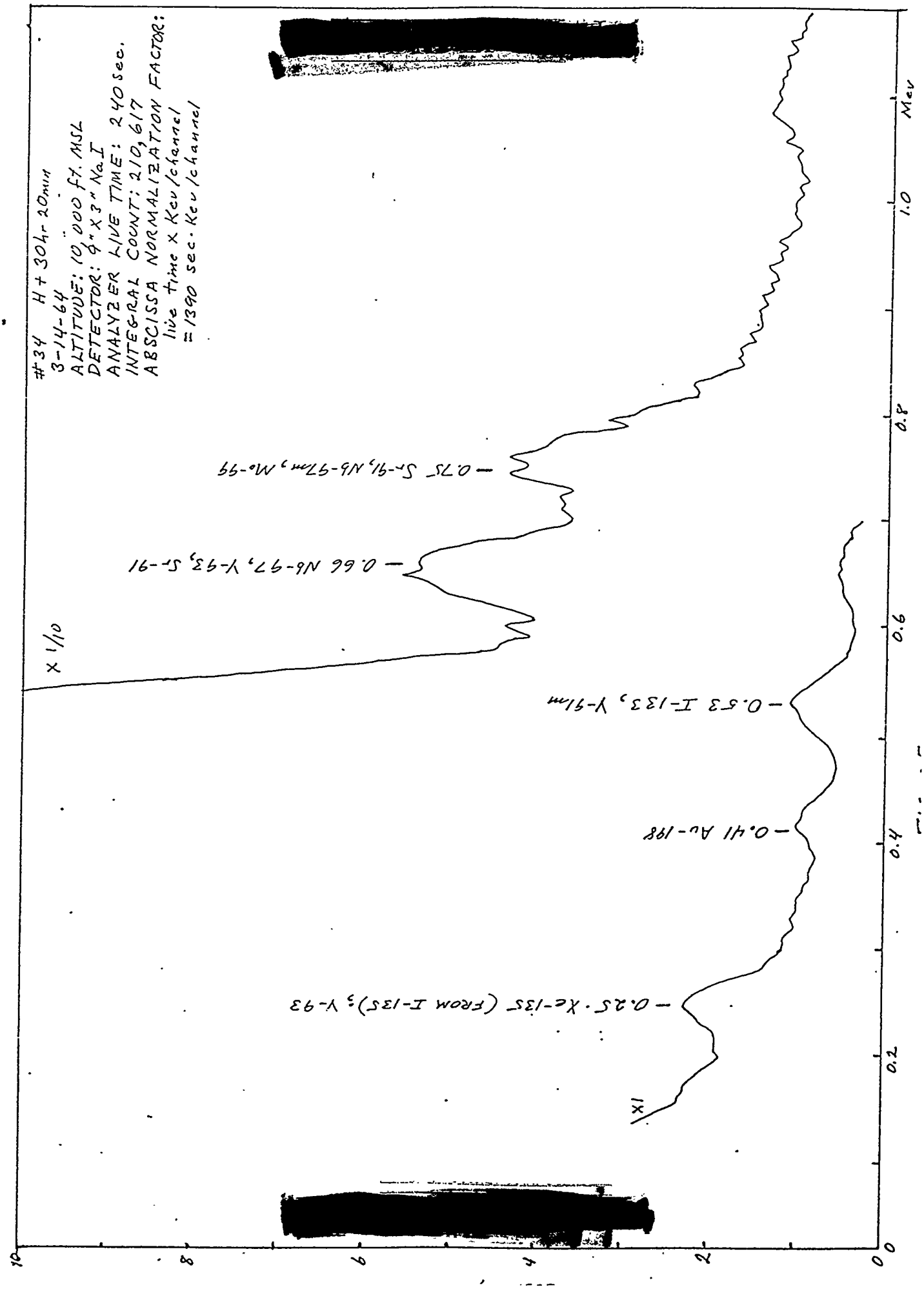


FIGURE PIKE EVENT; LOCATION: TWENTY NINE PALMS


#34 H+30 4-20 min
3-14-64
ALTITUDE: 10,000 FT. MSL
DETECTOR: 4" x 3" NaI
ANALYZER LIVE TIME: 240 sec.
INTEGRAL COUNT: 210,617
ABSCISSA NORMALIZATION FACTOR:
live time x Kev/channel
= 1390 sec · Kev/channel
0.75 Sr-91, Nb-97m, Mo-99
0.66 Nb-97, Y-93, Sr-91
0.53 I-133, Y-91m
0.41 Au-198
0.25 · Xe-135 (FROM I-135); Y-93
x 1/10
x1
0
0.2
0.4
0.6
0.8
1.0
Mev
0
2
4
6
8
10

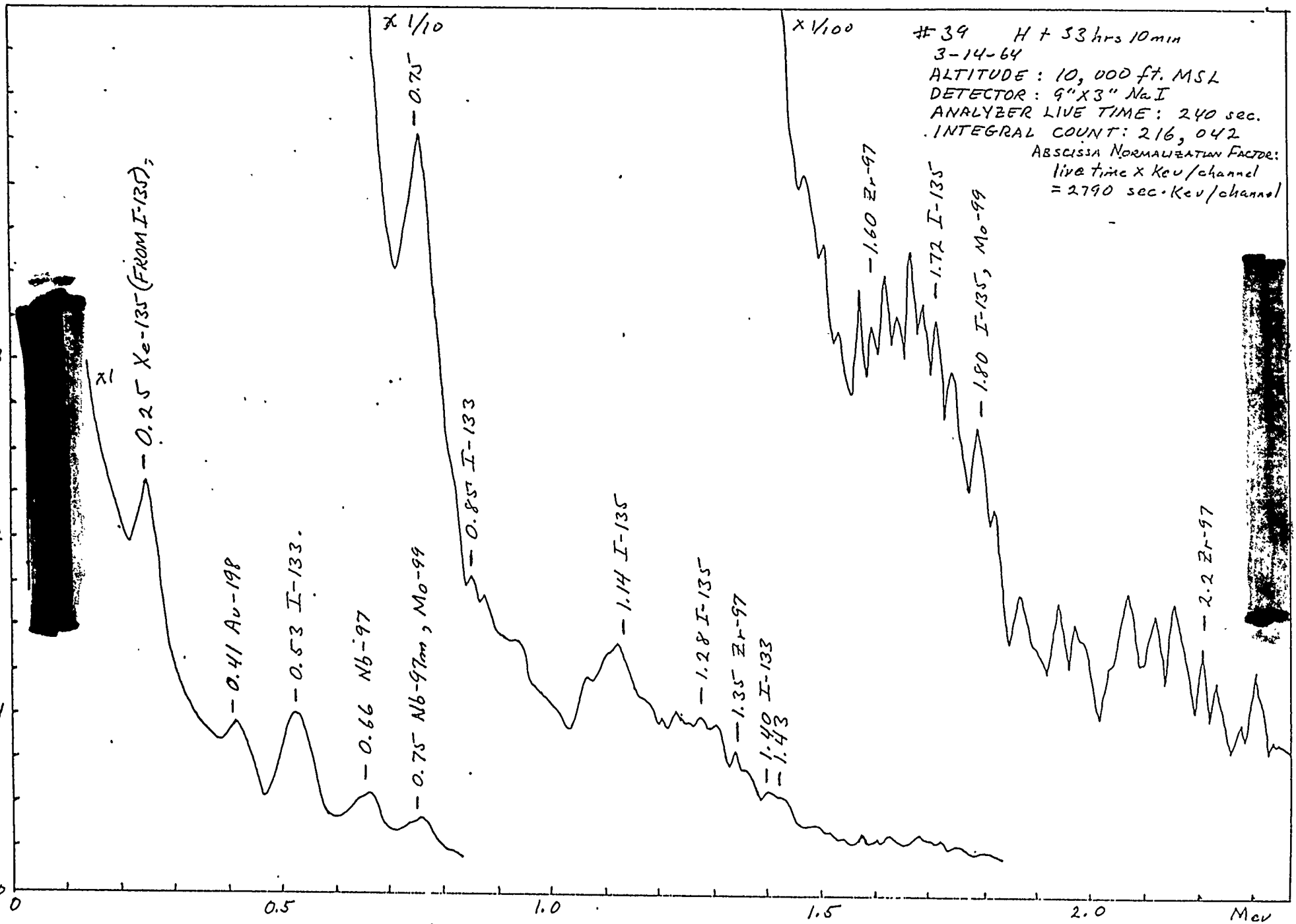
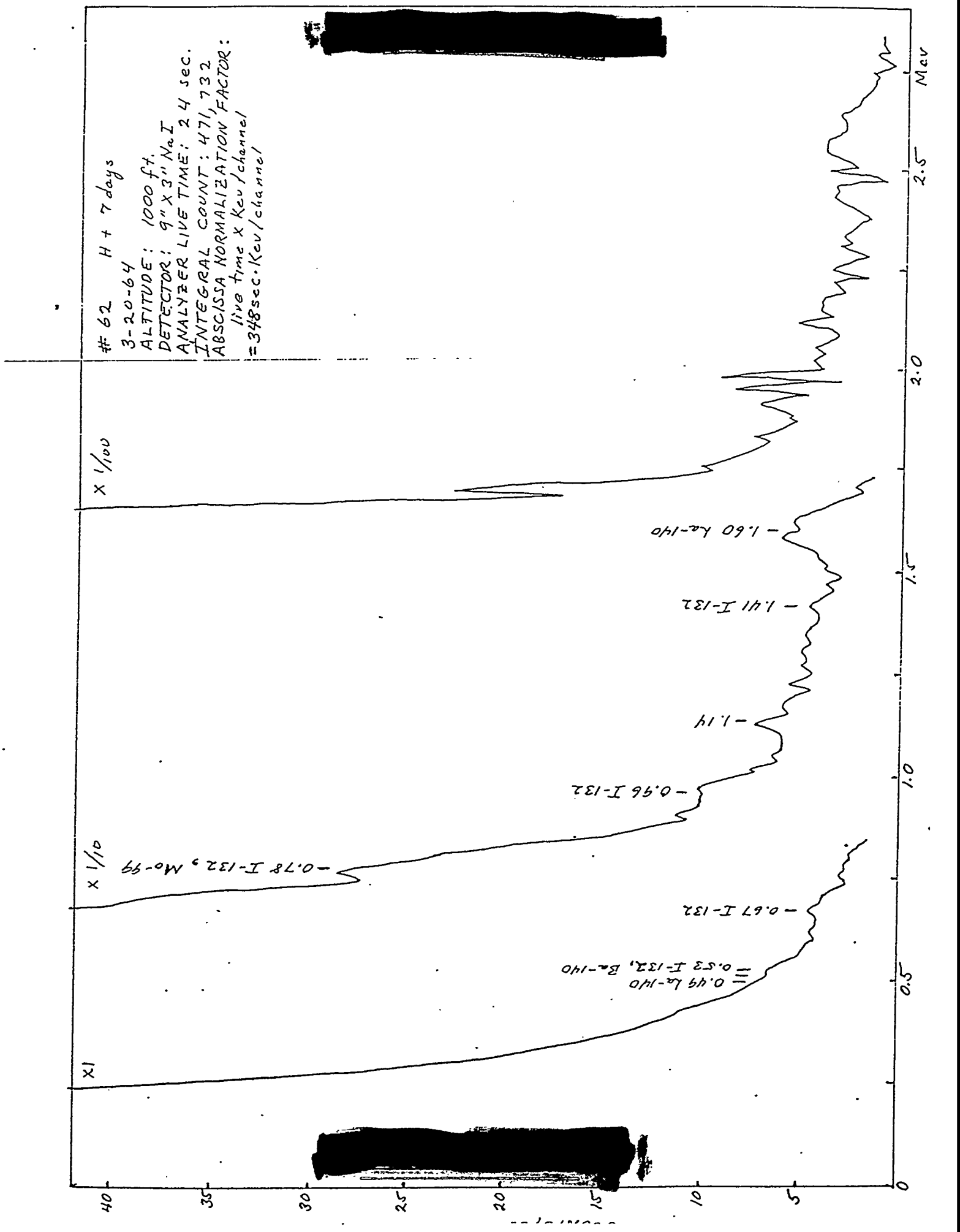


FIGURE PIKE, BACKGROUND PLUS AIRCRAFT CONTAMINATION


#62 H + 7 days
3-20-64
ALTITUDE: 1000 ft.
DETECTOR: 9" X 3" NaI
ANALYZER LIVE TIME: 24 sec.
INTEGRAL COUNT: 471,732
ABSCISSA NORMALIZATION FACTOR:
live time x Kev/channel
= 348 sec·Kev/channel
X 1/100
X 1/10
X1
0.49 La-140
= 0.53 I-132, Ba-140
0.67 I-132
0.78 I-132, Mo-99
0.96 I-132
1.14
1.41 I-132
1.60 La-140
Mev
0.5
1.0
1.5
2.0
2.5
0
5
10
15
20
25
30
35
40

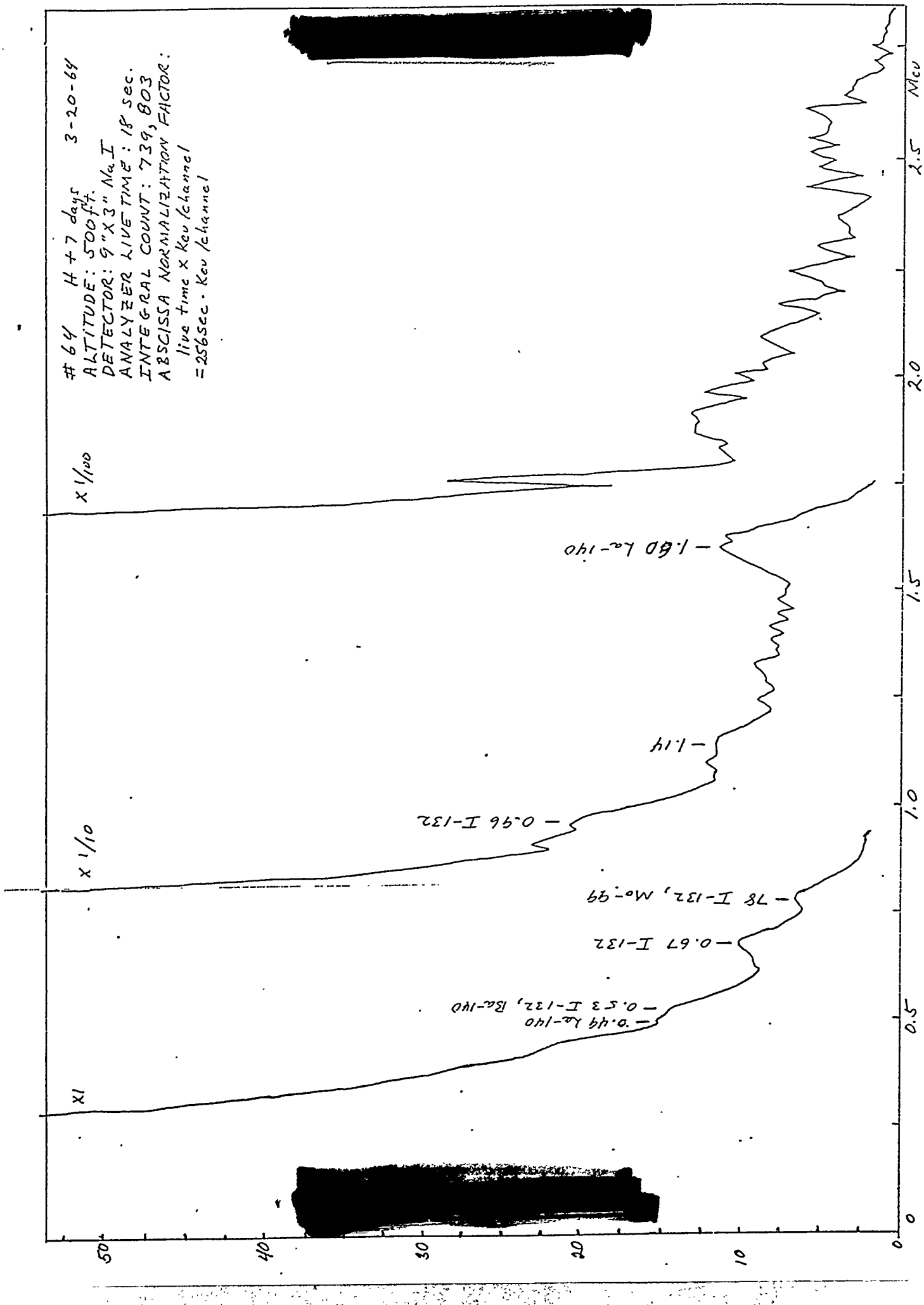
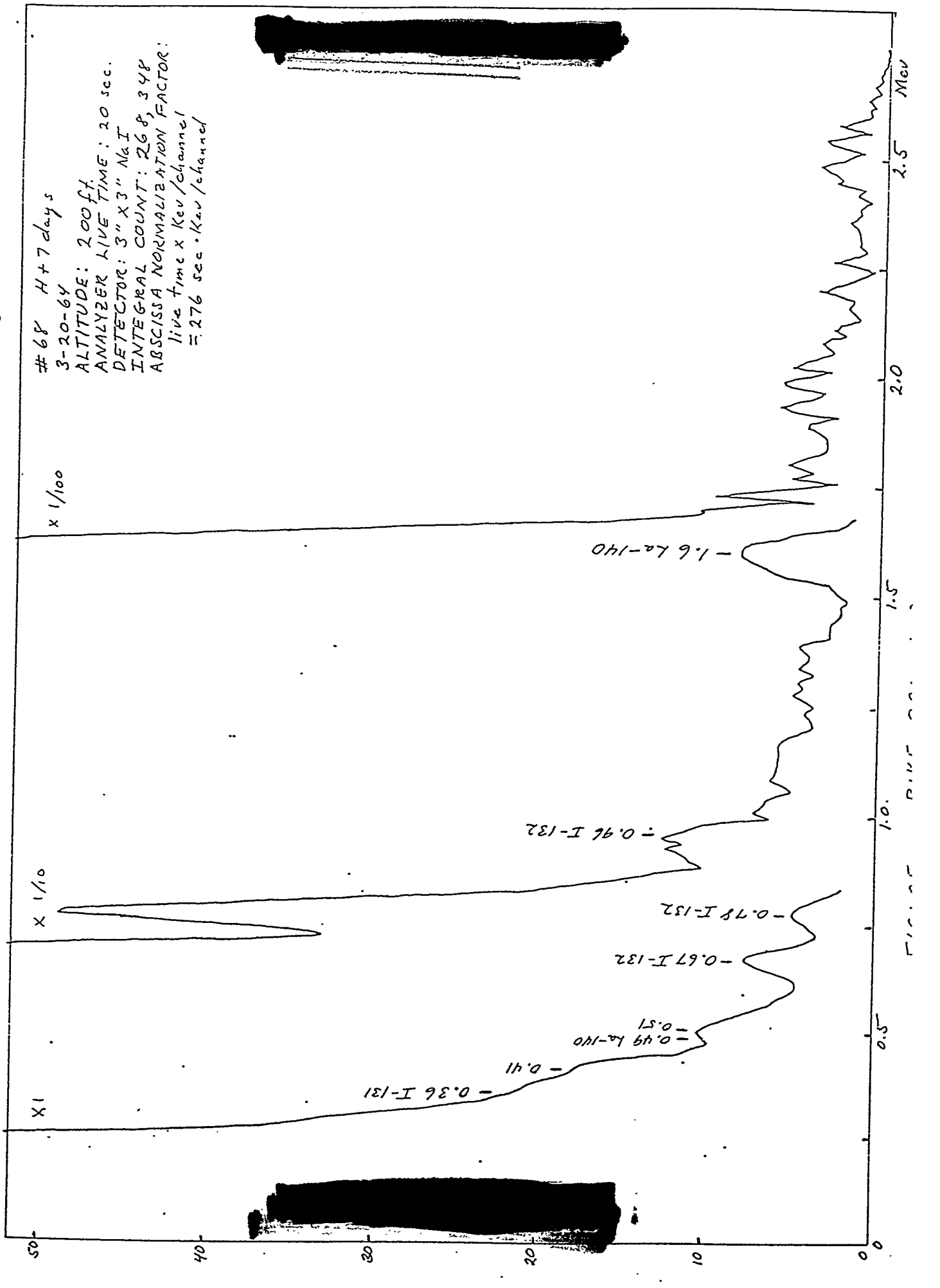


FIGURE PIKE GROUND DEPOSITION, PLUTONIUM VALLEY


#68 H+7 days
3-20-64
ALTITUDE: 200 ft.
ANALYZER LIVE TIME: 20 sec.
DETECTOR: 3" x 3" NaI
INTEGRAL COUNT: 26 8, 348
ABSCISSA NORMALIZATION FACTOR:
live time x Kev/channel
= 276 sec · Kev/channel
x 1/100
x 1/10
x 1
- 1.6 La-140
- 0.96 I-132
- 0.78 I-132
- 0.67 I-132
- 0.49 La-140
- 0.51
- 0.41
- 0.36 I-131
0.5
1.0
1.5
2.0
2.5
Mev
0
10
20
30
40
50

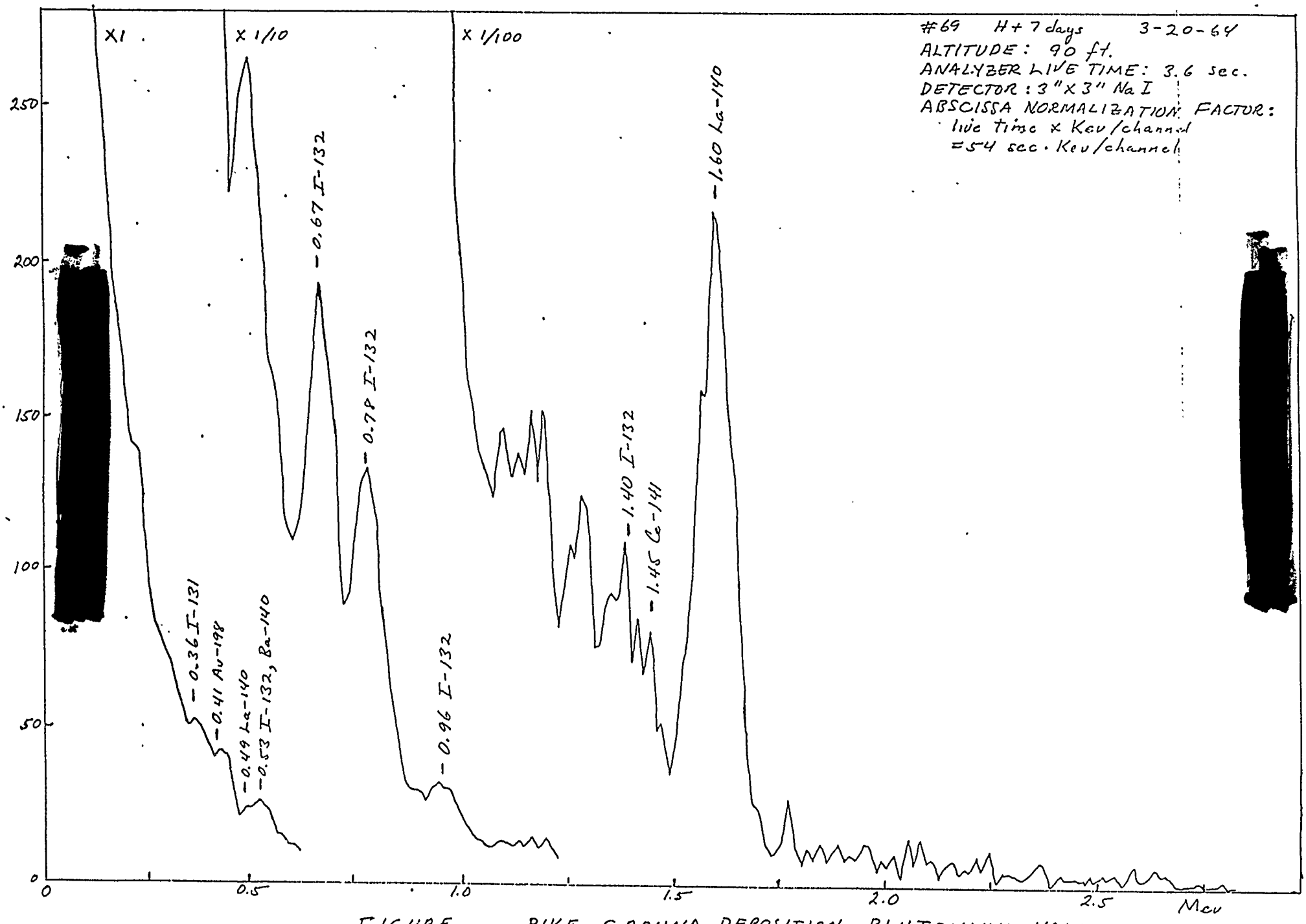
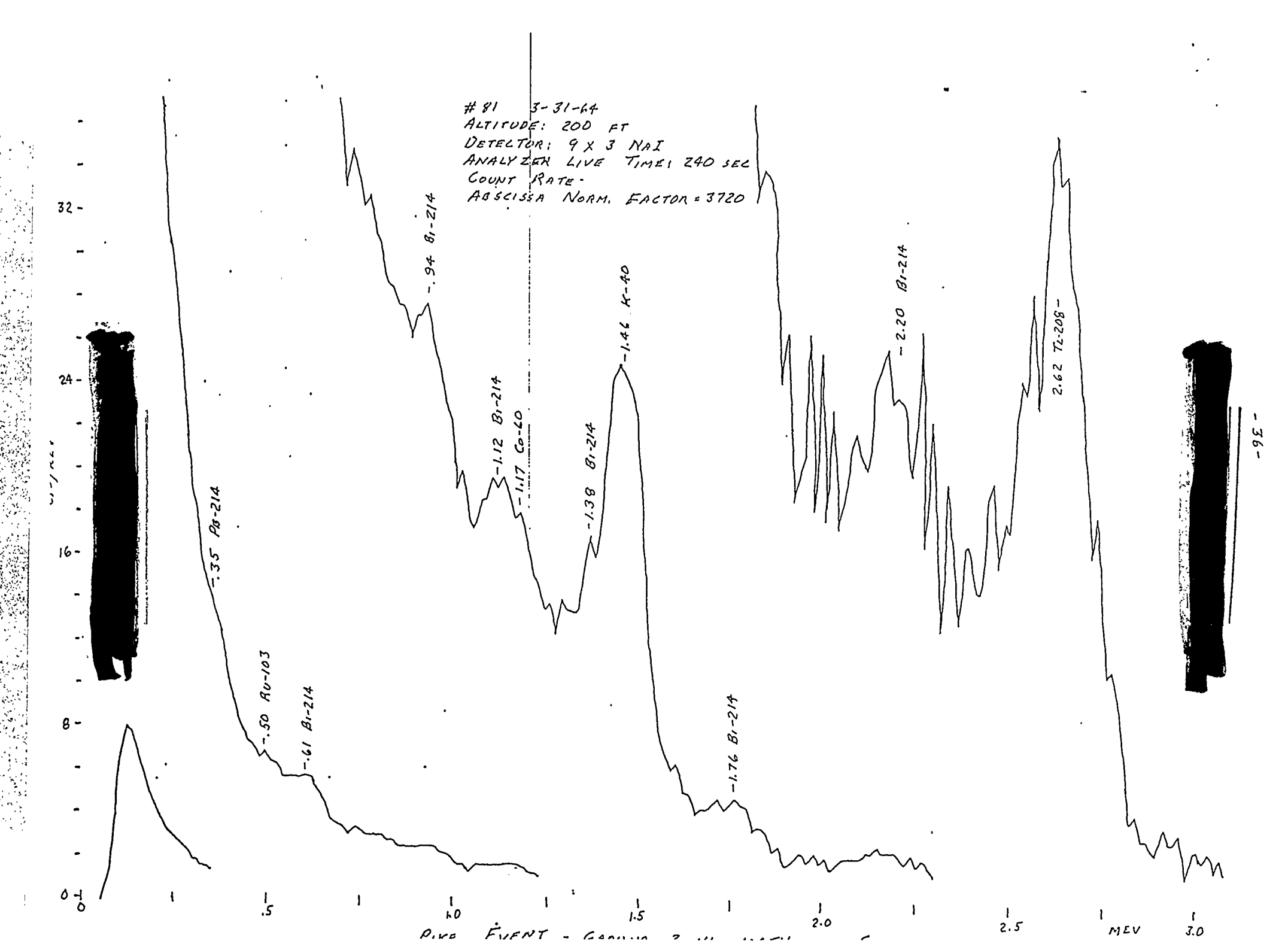
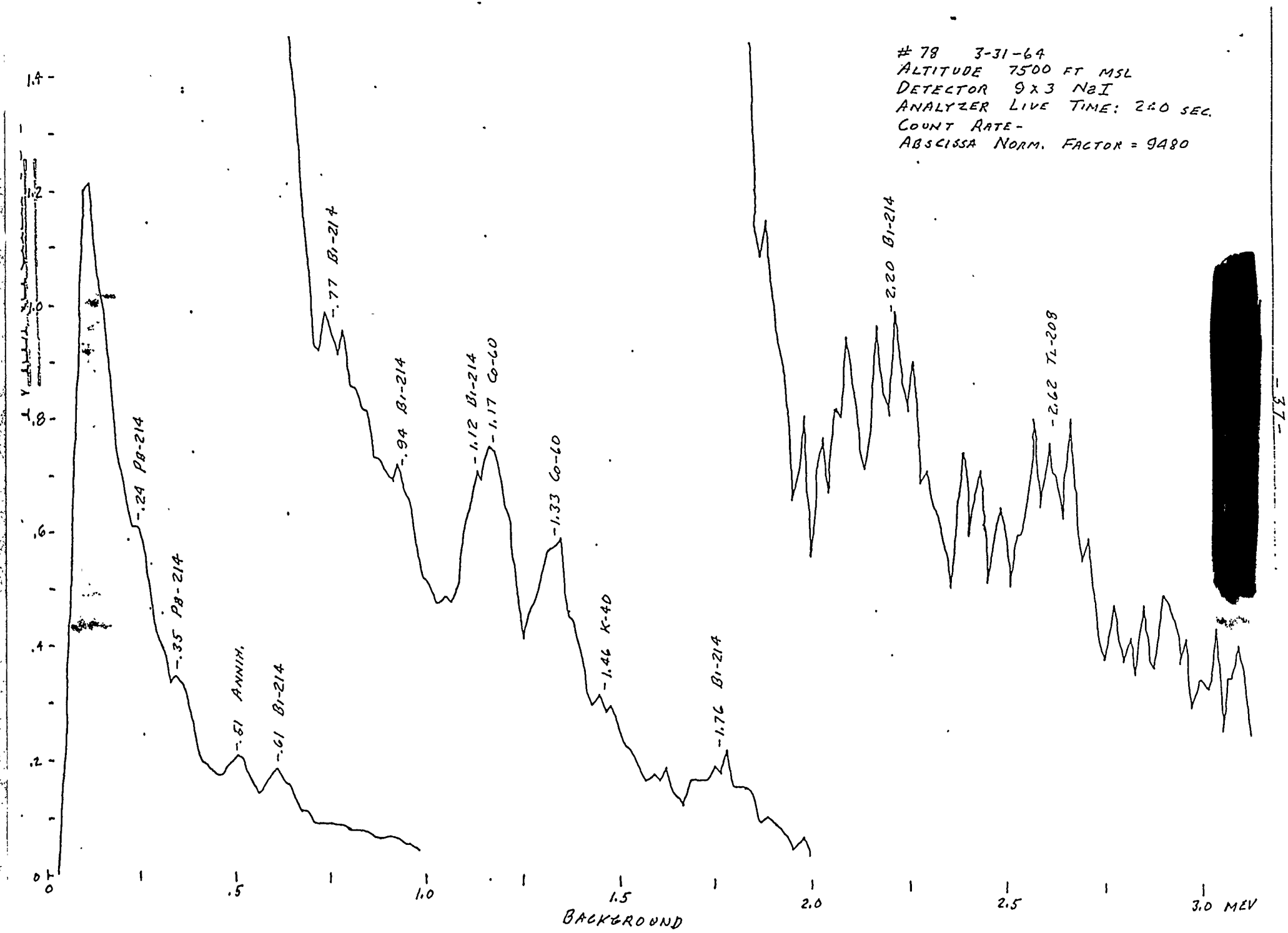


FIGURE PIKE GROUND DEPOSITION, PLUTONIUM VALLEY


#81 3-31-64
ALTITUDE: 200 FT
DETECTOR: 9 X 3 NAI
ANALYZER LIVE TIME: 240 SEC
COUNT RATE-
ABSCISSA NORM. FACTOR = 3720
32
24
16
8
0
.35 Pb-214
.50 Ru-103
.61 Bi-214
.94 Bi-214
1.12 Bi-214
1.17 Co-60
1.38 Bi-214
1.46 K-40
1.76 Bi-214
2.20 Bi-214
2.62 Tl-208
0
.5
1.0
1.5
2.0
2.5
MEV
3.0


#78 3-31-64
ALTITUDE 7500 FT MSL
DETECTOR 9 x 3 NaI
ANALYZER LIVE TIME: 200 SEC.
COUNT RATE-
ABSCISSA NORM. FACTOR = 9480
-.24 Pb-214
-.35 Pb-214
-.51 ANNIH.
-.61 Bi-214
-.77 Bi-214
-.94 Bi-214
-1.12 Bi-214
-1.17 Co-60
-1.33 Co-60
-1.46 K-40
-1.76 Bi-214
-2.20 Bi-214
-2.62 Tl-208
0
.5
1.0
1.5
2.0
2.5
3.0 MEV
BACKGROUND