CALIBRATION RECORDS

FOR INSTRUMENTS USED FOR

RADIOLOGICAL SURVEYS

JUNE 27, 2000

VOLUME 1 OF 7

WESTINGHOUSE ELECTRIC CORPORATION

BLAIRSVILLE, PA

CALIBRATION RECORDS

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Purpose

The Westinghouse Blairsville Site utilized nuclear materials during the period of the mid to late 1950's to the early part of the 1960's. Work was performed both under licenses with the atomic Energy Commission and for the Bettis Atomic Power Laboratory. Although all work ceased during the 1960's, subsequent radiological surveys and investigations, starting in 1993, established that some residual radioactivity, primarily in underground piping and subsurface soil contamination, existed on the site. During the period of 1993 through the present, additional remediation work and radiological surveys have been conducted to establish that the site can be released for unrestricted use. This series of reports documents the results of the final status radiological surveys subsequent to the various remediation efforts.

Scope

This report compiles information on the calibration of the radiological survey instruments, which were used to measure the radiation levels presented in the other reports issued for this project. In each report, which documents a final radiological survey, the data sheets that record the measured radiation levels also provide specific information with respect to the specific instrument used to make the measurement. This report provides the necessary information to establish the entire calibration history of each specific instrument. These instruments have been used for the Westinghouse sites at Blairsville, Cheswick, and Forest Hills (now Viacom, Inc.). Therefore these calibration records are applicable to all these sites.

Discussion

All instruments used for radiological surveys on this project were calibrated on a frequency depending on the specific instrument. The calibration history for every instrument used on the project is summarized in appendix A, which cover the years 1993 through 1999. These summaries also provide a reference to a "Code Number." Included with this report in Appendix B are sheets labeled "Code Number 1" through "Code Number 70." Each of these "codes" incorporates the calibration records as appropriate for the specific instrument.

The certification sheets for each of the source standards used by the project to calibrate the instruments for conversion of CPM to DPM are included in Appendix C. Other calibrations were performed at other licensed operations as noted by the calibration records and no information on Source Certification is provided here.

CALIBRATION RECORDS

FOR INSTRUMENTS USED FOR

RADIOLOGICAL SURVEYS

List of Volume Contents

APPENDIX A

INSTRUMENT CALIBRATION SUMMARY SHEETS

FOR PERIOD 1993 THROUGH 1999

REPORT #001

INSTRUMENT CALIBRATION SUMMARY

1993

IH & S . rm #200 Forest Hills Site 1993 Ins umentation Calibration Summary

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC. TYPE
1	Eberline	SAC-4	1128	A
2	Tennelec	LB5100	13295	A
3	Tennelec	LB5100	13295	B
4	Eberline	BC-4	808	B
5	Eberline	BC-4	862	B
6	Eberline	ESP-2	1510	A
7	Eberline	ESP-2	1517	A
8	Eberline	ESP-2	1588	A
9	Eberline	PAC-4G	4478	A
10	Eberline	PAC-4G	4478	B
11	Eberline	ESP-2	1593	B
12	Eberline	ESP-2	1595	B
13	Eberline	ESP-2	1601	B
14	Eberline	E-520	4195	B/G
15	Eberline	E-520	5242	B
16	Eberline	E-520	5242	B/G

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
1	Yes No Yes Yes	7-29-93	7-28-93 11-9-93 2-4-94
2 & 3	Yes Yes Yes		9-14-93 12-14-93 3-13-94
4	No Yes No Yes	5-16-93 11-10-93	11-9-93 2-12-94
5	Yes No	8-4-93	8-3-93
6	Yes Yes Yes		7-15-93 10-12-93 1-6-94
7	Yes Yes Yes Yes		7-14-93 10-12-93 1-4-94 3-30-94
8	Yes Yes Yes		8-27-93 11-19-93 2-17-94

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
9 & 10	No		
11	Yes Yes Yes		7-15-93 10-15-93 1-4-94
12	Yes No Yes No Yes	7-7-93 11-19-93	9-1-93 11-18-93 4-3-94
13	Yes Yes Yes		8-27-93 11-19-93 2-17-94
14	Yes No Yes No Yes	7-10-93 10-15-93	4-13-93 10-14-93 1-8-94
15 & 16	Yes No Yes Yes	7-10-93	7-27-93 11-12-93 2-4-94

IH & S . rm #200 Forest Hills Site 1993 In: ımentation Calibration Summary

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETECT. TYPE
17	Eberline	E-520	5245	B
18	Eberline	E-520	5245	B/G
19	Eberline	E-140	1376	B/G
20	Ludlum	2221	91943	A
21	Ludlum	2221	91943	B
22	Eberline	ESP-2	1522	B/G
23	Eberline	PRM-7	234	G
24	Eberline	PRS-1	346 (SPA-3)	LEG/NW
25	Reuter Stokes	ERM	L-2088	G
26	Eberline	RM-14	4469	B
27	Eberline	RM-20	1986	A
28	Eberline	RM-20	1987	B
29	Dosim. Corp.	3032	190-884	B/G
30	Eberline	RM-14	7588	B
31	Eberline	ESP-2	1522	A
32	Ludlum	2221	91943 (44-3)	LEG-W
33	Ludlum	2221	91943 (44-2)	HEG-NW

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta Gamma; LEG/W - Low Energy Gamma With Window; LEG/NW - Low Energy Gamma Without Window; HEG/NW - High Energy Gamma No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
17 & 18	Yes No Yes Yes	7-28-93	7-28-93 11-13-93 2-12-94
19	Yes No Yes No Yes	7-10-93 10-15-93	7-13-93 10-14-93 1-25-94
20 & 21	Yes Yes Yes Yes		8-26-93 8-24-93 11-24-93 2-22-94
22	Yes No Yes No	6-30-93 10-15-93	6-30-93 10-14-93
23	Yes No Yes Yes	8-1-93	7-30-93 11-12-93 2-12-94
24	Yes No Yes No Yes	7-10-93 10-15-93	7-15-93 10-14-93 1-25-94
25	Yes No Yes	7-22-93	7-21-93 8-31-94

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
26	Yes No Yes	7-14-93	7-13-93 2-23-94
27	Yes No Yes	10-13-93	10-12-93 1-8-94
28	Yes No	5-2-93	2-2-94
29	Yes Yes No Yes Yes	7-12-93	4-13-93 7-12-93 10-20-93 1-27-94
30	Yes		3-1-94
31	Yes No	12-16-93	12-15-93
32	Yes		1-14-94
33	Yes		12-30-93

INSTRUMENT CALIBRATION SUMMARY

1994

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC. TYPE
1	Eberline	SAC-4	1128	A
2	Tennelec	LB5100	13295	A
3	Tennelec	LB5100	13295	B
4	Eberline	BC-4	808	B
5	Eberline	BC-4	862	B
6	Eberline	ESP-2	1510	A
7	Eberline	ESP-2	1517	A
8	Eberline	ESP-2	1588	A
9	Eberline	PAC-4G	4478	A
10	Eberline	PAC-4G	4478	B
11	Eberline	ESP-2	1593	B
12	Eberline	ESP-2	1595	B
13	Eberline	ESP-2	1601	B
14	Eberline	E-520	4195	B/G
15	Eberline	E-520	5242	B
16	Eberline	E-520	5242	B/G

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
1	Yes		2-4-94
	No	2-5-94	
	Yes		5-9-94
	No	5-10-94	
	Yes		8-23-94
	Yes		11-29-94
	No	11-30-94	
	Yes		3-9-95
2 & 3	Yes		3-13-94
	Yes		8-14-94
	Yes		9-14-94
	Yes		12-15-94
	Yes		3-15-95
4	Yes		2-12-94
	Yes		5-14-94
	No	5-15-94	
	Yes		8-23-94
	Yes		11-28-94
	No	11-27-94	
	Yes		3-9-95
5	No	8-4-93	
6	Yes		1-8-94
	Yes		4-3-94
	Yes		7-4-94
	Yes		10-11-94
	Yes		1-5-95
	Yes		4-4-95
7	Yes		4-3-94
	Yes		7-4-94
	Yes		9-30-94
	Yes		12-29-94
	Yes		3-16-95
8	Yes		2-17-94
	Yes		5-21-94
	Yes		8-19-94
	No	8-20-94	
	Yes		10-28-94
	No	10-29-94	
	Yes		2-21-95

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
9 & 10	No		
11	Yes		1-4-94
	Yes		4-3-94
	Yes		7-4-94
	Yes		10-11-94
	Yes		1-5-95
	Yes		4-4-95
12	Yes		4-3-94
	Yes		7-4-94
	Yes		9-30-94
	Yes		12-29-94
	Yes		3-16-95
13	Yes		2-17-94
	Yes		5-21-94
	No	4-11-94	
	Yes		11-18-94
	Yes		3-21-94
14	Yes		1-8-94
	No	1-9-94	
	Yes		4-30-94
	No	5-1-94	
	Yes		8-11-94
	Yes		11-11-94
	Yes		2-21-95
15 & 16	Yes		2-4-94
	No	2-5-94	
	Yes		5-9-94
	No	5-10-94	
	Yes		8-24-94
	Yes		11-28-94
	No	11-27-94	
	Yes		3-19-95

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETECT. TYPE
17	Eberline	E-520	5245	B
18	Eberline	E-520	5245	B/G
19	Eberline	E-140	1376	B/G
20	Ludlum	2221	91943	A
21	Ludlum	2221	91943	B
22	Eberline	ESP-2	1522	B/G
23	Eberline	PRM-7	234	G
24	Eberline	PRS-1	346 (SPA-3)	LEG/NW
25	Reuter Stokes	ERM	L-2088	G
26	Eberline	RM-14	4469	B
27	Eberline	RM-20	1986	A
28	Eberline	RM-20	1987	B
29	Dosim. Corp.	3032	190-884	B/G
30	Eberline	RM-14	7588	B
31	Eberline	ESP-2	1522	A
32	Ludlum	2221	91943 (44-3)	LEG-W
33	Ludlum	2221	91943 (44-2)	HEG-NW

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta Gamma; LEG/W - Low Energy Gamma With Window; LEG/NW - Low Energy Gamma Without Window; HEG/NW - High Energy Gamma No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
17 & 18	Yes Yes No Yes Yes Yes	5-45-94	2-12-94 5-14-94 8-23-94 11-28-94 2-28-95
19	Yes No Yes No Yes Yes No	1-26-94 5-1-94 11-12-94	1-25-94 4-30-94 8-11-94 11-11-94
20 & 21	Yes Yes No Yes Yes Yes	5-25-94	2-22-94 5-24-94 8-2-94 12-8-94 3-14-95
22	No Yes Yes No Yes Yes	10-15-93 8-4-94	4-30-94 8-3-94 11-11-94 2-8-95
23	Yes No Yes No Yes No Yes Yes	2-13-94 5-24-94 8-3-94	2-12-94 5-22-94 8-2-94 12-18-94 3-19-95
24	Yes No Yes No Yes Yes Yes	1-26-94 5-1-94	1-25-94 4-30-94 8-11-94 11-26-94 2-28-95
25	Yes No Yes	8-1-94	8-31-94 10-6-95

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
26	Yes No Yes Yes No Yes Yes	2-24-94 6-8-94	2-23-94 3-7-94 6-7-94 9-28-94 2-28-95
27	Yes No yes No Yes Yes No	1-9-94 5-1-94 11-17-94	1-8-94 4-30-94 8-11-94 11-18-94
28	No Yes No Yes Yes	5-2-93 5-1-94	4-30-94 8-11-94 11-28-91
29	Yes No Yes No	1-28-94 5-1-94	1-27-94 4-30-94
30	Yes Yes No Yes Yes No Yes	5-1-94 11-12-94	3-1-94 4-30-94 8-11-94 11-11-94 2-28-95
31	No Yes No Yes No Yes Yes	12-18-93 4-19-94 8-4-94	4-18-94 8-3-94 11-11-94 2-8-95
32	Yes No	4-14-94	1-14-94
33	No Yes No Yes Yes Yes	1-1-94 4-4-94	4-30-94 7-18-94 11-4-94 2-8-95

Instrument Inventory				
CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC./AS TYPE
34	Radeco	HD-28	1944	LV
35	Radeco	H-809V1	6992	LV
36	Radeco	H-809V1	6994	LV
37	Radeco	H-809V1	6996	LV
38	Radeco	H-809V1	6997	LV
39	SKC	224	4	BZ
40	SKC	224	5	BZ
41	SKC	224	6	BZ
42	SKC	224	7	BZ
43	SKC	224	8	BZ
44	Eberline	E-520	4195	Beta
45	Eberline	MP-2	125	N/A
46	Eberline	MS-1	173	N/A
47	Eberline	RM-14	3248	Beta

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window
AIR SAMPLE TYPE: LV - Low Vol; BZ - Breathing Zone

Calibration Dates and Current Status				Calibration Dates and Current Status			
Code Number	In Service Yes/No	D.O.S. Date	Cal Due Date	Code Number	In Service Yes/No	D.O.S. Date	Cal Due Date
34	Yes No Yes No Yes	4-20-94 11-12-94	4-19-93 11-11-94 3-20-95	41	Yes No Yes	7-20-94	7-19-94 2-28-95
35	No Yes No	7-25-94	7-24-94	42	No	1-19-94	
36	Yes No Yes	7-14-94	7-13-94 1-25-95	43	Yes No Yes	7-20-94	7-19-94 2-28-95
37	No Yes No	7-25-94	7-24-94	44	Yes Yes Yes		8-11-94 11-11-94 3-5-95
38	Yes No Yes	7-14-94	7-13-94 1-25-95	45	Yes		6-28-95
39	Yes No Yes	7-20-94	7-19-94 2-28-95	46	Yes No Yes	1-19-94	11-18-94 3-19-95
40	Yes No Yes	7-20-94	7-19-94 2-28-94	47			

INSTRUMENT CALIBRATION SUMMARY

1995

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC. TYPE
1	Eberline	SAC-4	1128	A
2	Tennelec	LB5100	13295	A
3	Tennelec	LB5100	13295	B
4	Eberline	BC-4	808	B
5	Eberline	BC-4	862	B
6	Eberline	ESP-2	1510	A
7	Eberline	ESP-2	1517	A
8	Eberline	ESP-2	1588	A
9	Eberline	PAC-4G	4478	A
10	Eberline	PAC-4G	4478	B
11	Eberline	ESP-2	1593	B
12	Eberline	ESP-2	1595	B
13	Eberline	ESP-2	1601	B
14	Eberline	E-520	4195	B/G
15	Eberline	E-520	5242	B
16	Eberline	E-520	5242	B/G

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
1	Yes		3-8-95
	No	3-10-95	
	Yes		8-16-95
	No	8-17-95	
	Yes		11-24-95
	No	11-25-95	
	Yes		3-4-96
2 & 3	Yes		3-15-95
	Yes		8-13-95
	Yes		9-19-95
	Yes		12-20-95
	Yes		3-19-96
4	Yes		3-9-95
	No	3-10-95	
	Yes		8-16-95
	No	8-17-95	
	Yes		11-24-95
	No	11-25-95	
	Yes		3-4-96
5	No	8-4-93	
6	Yes		1-5-95
	Yes		4-4-95
	Yes		6-6-95
	Yes		9-5-95
	Yes		12-5-95
	Yes		2-13-96
	No	12-13-95	
	Yes		5-11-96
7	Yes		3-16-95
	Yes		6-21-95
	No	8-22-95	
	Yes		11-30-95
	Yes		2-27-96
8	Yes		2-21-95
	Yes		7-11-95
	No	5-8-95	
	Yes		8-18-95
	Yes		9-20-95
	Yes		1-3-96
	Yes		3-22-96

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
9 & 10	No		
11	Yes		1-5-95
	Yes		4-4-95
	Yes		6-3-95
	Yes		9-5-95
	Yes		12-6-95
	Yes		2-13-96
12	Yes		3-16-95
	Yes		5-21-95
	Yes		8-22-95
	No	8-23-95	
	Yes		11-30-95
	Yes		2-27-96
	Yes		5-11-96
13	Yes		2-21-95
	Yes		6-3-95
	No	6-4-95	
	Yes		9-26-95
	Yes		1-2-96
	Yes		3-22-96
14	Yes		2-21-95
	No	2-22-95	
	Yes		5-27-95
	Yes		8-16-95
	No	8-17-95	
	Yes		11-24-95
	No	11-25-95	
	Yes		3-4-96
15 & 16	Yes		3-19-95
	Yes		6-23-95
	Yes		10-26-95
	Yes		12-26-95
	No	12-27-95	
	Yes		4-10-96

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETECT. TYPE
17	Eberline	E-520	5245	B
18	Eberline	E-520	5245	B/G
19	Eberline	E-140	1376	B/G
20	Ludlum	2221	91943	A
21	Ludlum	2221	91943	B
22	Eberline	ESP-2	1522	B/G
23	Eberline	PRM-7	234	G
24	Eberline	PRS-1	346 (SPA-3)	LEG/NW
25	Reuter Stokes	ERM	L-2088	G
26	Eberline	RM-14	4469	B
27	Eberline	RM-20	1986	A
28	Eberline	RM-20	1987	B
29	Dosim. Corp.	3032	190-884	B/G
30	Eberline	RM-14	7588	B
31	Eberline	ESP-2	1522	A
32	Ludlum	2221	91943 (44-3)	LEG-W
33	Ludlum	2221	91943 (44-2)	HEG-NW

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta Gamma; LEG/W - Low Energy Gamma With Window; LEG/NW - Low Energy Gamma Without Window; HEG/NW - High Energy Gamma No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
17 & 18	Yes		2-28-95
	Yes		3-23-95
	Yes		6-23-95
	Yes		10-10-95
	No	10-11-95	
	Yes		1-24-96
	No	1-25-96	
	Yes		4-30-96
19	No	11-12-94	
	Yes		4-9-95
	No	4-10-95	
	Yes		9-5-95
	No	9-6-95	
	Yes		1-24-96
20 & 21	Yes		3-14-95
	Yes		6-18-95
	Yes		9-19-95
	No	9-20-95	
	Yes		12-27-95
	Yes		3-20-96
22	Yes		2-9-95
	Yes		5-15-95
	Yes		8-18-95
	No	8-17-95	
	Yes		11-24-95
	No	11-25-95	
	Yes		3-5-96
23	Yes		3-19-95
	Yes		3-29-95
	Yes		6-29-95
	Yes		9-21-95
	Yes		12-27-95
	Yes		3-20-96
24	Yes		2-28-95
	No	3-1-95	
	Yes		8-18-95
	No	8-17-95	
	Yes		11-24-95
	No	11-25-95	
	Yes		3-5-96
25	Yes		10-4-95
	No	10-5-95	

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
26	Yes		2-28-95
	No	3-1-95	
	Yes		8-18-95
	No	8-17-95	
	Yes		11-24-95
	No	11-25-95	
	Yes		3-4-96
27	No	11-17-94	
	Yes		4-9-95
	No	4-10-95	
	Yes		9-5-95
	Yes		12-27-95
	No	12-28-95	
	Yes		4-24-96
28	No	5-1-94	
	Yes		9-5-95
	Yes		12-27-95
	Yes		
	No	12-28-95	
	Yes		4-10-96
29	No	5-1-94	
30	Yes		2-28-95
	No	3-1-95	
	Yes		9-5-95
	Yes		12-27-95
	No	12-28-95	
	Yes		4-10-96
31	Yes		2-9-95
	Yes		5-15-95
	Yes		8-18-95
	No	8-17-95	
	Yes		12-27-95
32	No	4-14-94	
33	Yes		2-9-95
	No	2-10-95	
	Yes		5-27-95
	No	5-28-95	
	Yes		9-1-95
	Yes		12-27-95
	No	12-28-95	
	Yes		4-24-96

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC./AS TYPE
34	Radeco	HD-28	1944	LV
35	Radeco	H-809V1	6992	LV
36	Radeco	H-809V1	6994	LV
37	Radeco	H-809V1	6696	LV
38	Radeco	H-809V1	6997	LV
39	SKC	224	4	BZ
40	SKC	224	5	BZ
41	SKC	224	6	BZ
42	SKC	224	7	BZ
43	SKC	224	8	BZ
44	Eberline	E-520	4195	Beta
45	Eberline	MP-2	125	N/A
46	Eberline	MS-1	173	N/A
47	Eberline	RM-14	3248	Beta

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window
AIR SAMPLE TYPE: LV - Low Vol; BZ - Breathing Zone

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
34	Yes Yes Yes		6-20-95 11-19-95 6-19-96
35	No	7-25-94	
36	Yes No Yes Yes	1-26-95	1-25-95 11-16-95 6-5-96
37	No	7-25-94	
38	Yes No Yes Yes	1-26-95	1-25-95 11-16-95 6-5-96
39	Yes No Yes No	3-1-95 12-21-95	2-28-95 12-20-95
40	Yes No Yes No	3-1-95 12-21-95	2-28-95 12-20-95

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
41	Yes No Yes No	3-1-95 12-21-95	2-28-95 12-20-95
42	No Yes No	1-19-94 12-21-95	12-20-95
43	Yes No	3-1-95	2-28-95
44	Yes Yes Yes No Yes No Yes	8-19-95 11-25-95	3-5-95 6-1-95 8-18-95 11-24-95 3-6-96
45	Yes		8-28-95
46	Yes No Yes No Yes No Yes	3-20-95 8-17-95 11-25-95	3-19-95 8-16-95 11-24-95 3-4-96
47	Yes No Yes	8-6-95	8-5-95 1-24-96

1995 ' strumentation Calibration Summary

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC. TYPE
48	Eberline	ESP-2	1578	A
49	Eberline	ESP-2	1641	A
51	Bicron	Micro Rem	142	Gamma
52	Eberline	E-140	1487	Gamma
53				
54				
55				
56				
57				
58				
59				
60				
61				
62				
63				

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
48	Yes No Yes	9-2-95	8-1-95 3-11-96
49	Yes No	9-2-95 (rental unit returned)	8-1-95
50			
51	Yes No Yes No Yes	9-15-95 12-21-95	9-14-95 12-20-95 4-11-96
52	Yes No	1-28-96	1-24-96
53			
54			

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
55			
56			
57			
58			
59			
60			
61			

INSTRUMENT CALIBRATION SUMMARY

1996

IH & S Form #200 Forest Hills Site 1996 Instrumentation Calibration Summary

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC. TYPE
1	Eberline	SAC-4	1128	A
2	Tennelec	LB5100	13295	A
3	Tennelec	LB5100	13295	B
4	Eberline	BC-4	808	B
5	Eberline	BC-4	862	B
6	Eberline	ESP-2	1510	A
7	Eberline	ESP-2	1517	A
8	Eberline	ESP-2	1588	A
9	Eberline	PAC-4G	4478	A
10	Eberline	PAC-4G	4478	B
11	Eberline	ESP-2	1593	B
12	Eberline	ESP-2	1595	B
13	Eberline	ESP-2	1601	B
14	Eberline	E-520	4195	B/G
15	Eberline	E-520	5242	B
16	Eberline	E-520	5242	B/G

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
1	No Yes Yes No Yes Yes Yes	11-25-95 6-9-96	3-4-96 6-8-96 10-22-96 1-21-97 4-21-97
2 & 3	Yes Yes Yes Yes No Yes	11-7-96 11-7-96	3-19-96 6-14-96 8-7-96 11-6-96 3-2-97
4	No Yes Yes No Yes Yes Yes	11-25-95 6-9-96	3-4-96 6-8-96 10-25-96 1-21-97 4-21-97
5	No Yes	8-4-93	10-2-96
6	No Yes Yes No Yes Yes	1-12-96 8-3-96	5-11-96 8-2-96 11-19-96 2-12-97
7	Yes No Yes No Yes	2-28-96 11-30-96	2-27-96 11-29-96 3-20-97
8	Yes Yes No Yes Yes Yes Yes	3-23-96	1-3-96 3-22-96 7-2-96 10-1-96 1-1-97 4-6-97

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
9 & 10	No		
11	Yes No Yes No Yes Yes	2-14-96 8-9-96	2-13-96 8-8-96 11-19-96 2-12-97
12	Yes Yes Yes No Yes No Yes	8-10-96 11-27-96	2-27-96 5-11-96 8-9-96 11-26-96 3-20-97
13	Yes Yes No Yes Yes Yes No Yes	3-23-96 1-2-97	1-2-96 3-22-96 7-1-96 10-1-96 1-1-97 4-6-97
14	Yes No Yes Yes No Yes Yes	3-5-96 10-2-96	3-4-96 6-27-96 10-1-96 2-4-97 5-3-97
15 & 16	No Yes No Yes No Yes Yes	12-27-95 4-11-96 7-24-96	4-10-96 7-23-96 11-30-96 2-4-97

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETECT. TYPE
17	Eberline	E-520	5245	B
18	Eberline	E-520	5245	B/G
19	Eberline	E-140	1376	B/G
20	Ludlum	2221	91943	A
21	Ludlum	2221	91943	B
22	Eberline	ESP-2	1522	B/G
23	Eberline	PRM-7	234	G
24	Eberline	PRS-1	346 (SPA-3)	LEG/NW
25	Reuter Stokes	ERM	L-2088	G
26	Eberline	RM-14	4469	B
27	Eberline	RM-20	1986	A
28	Eberline	RM-20	1987	B
29	Dosim. Corp.	3032	190-884	B/G
30	Eberline	RM-14	7588	B
31	Eberline	ESP-2	1522	A
32	Ludlum	2221	125429	HEG-NW
33	Ludlum	2221	91943 (44-2)	HEG-NW

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta Gamma; LEG/W - Low Energy Gamma With Window; LEG/NW - Low Energy Gamma Without Window; HEG/NW - High Energy Gamma No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
17 & 18	Yes No Yes No Yes No Yes no Yes	1-25-96 5-1-96 8-1-96 12-5-96	1-24-96 4-30-96 8-30-96 12-4-96 4-9-97
19	Yes No Yes no Yes No	1-25-96 6-9-96 10-2-96	1-24-96 6-8-96 10-1-96
20 & 21	Yes No Yes No Yes No Yes	3-21-96 7-31-96 11-20-96	3-20-96 7-30-96 11-19-96 4-6-97
22	Yes Yes No Yes No Yes Yes	6-12-96 10-2-96	3-5-96 6-11-96 10-1-96 1-8-97 3-30-96
23	Yes No Yes No Yes No Yes	3-21-96 7-2-96 10-10-96	3-20-96 7-1-96 10-9-96 1-29-97
24	Yes Yes No Yes No	6-12-96 10-12-96	3-5-96 6-11-96 10-11-96
25	No Yes	10-5-95	7-22-97

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
26	Yes Yes No Yes No Yes	6-12-96 12-1-96	3-4-96 6-11-96 11-30-96 4-9-97
27	Yes No Yes Yes No Yes	4-25-96 12-5-96	4-24-96 8-30-96 12-4-96 4-9-97
28	Yes No Yes Yes No	4-11-96 12-5-96	4-10-96 8-30-96 12-4-96
29	No Yes No	5-1-94 10-2-96	10-1-96
30	Yes No Yes No Yes No Yes	4-11-96 8-31-96 12-11-96	4-10-96 8-30-96 12-10-96 4-9-97
31	No Yes	12-28-95	6-11-96
32	No Yes Yes	4-14-94	11-5-96 2-4-97
33	Yes No Yes	4-25-96	4-24-96 8-28-96

Instrument Inventory				
CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC./AS TYPE
34	Radeco	HD-28	1944	LV
35	Radeco	H-809V1	6992	LV
36	Radeco	H-809V1	6994	LV
37	Radeco	H-809V1	6696	LV
38	Radeco	H-809V1	6997	LV
39	SKC	224	4	BZ
40	SKC	224	5	BZ
41	SKC	224	6	BZ
42	SKC	224	7	BZ
43	SKC	224	8	BZ
44	Eberline	E-520	4195	Beta
45	Eberline	MP-2	125	N/A
46	Eberline	MS-1	173	N/A
47	Eberline	RM-14	3248	Beta

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window
AIR SAMPLE TYPE: LV - Low Vol; BZ - Breathing

Calibration Dates and Current Status				Calibration Dates and Current Status			
Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date	Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
34	Yes No Yes No	6-20-96 1-22-97	6-19-96 1-11-97	41	No	12-21-95	
35	No	7-25-94		42	No	12-21-95	
36	Yes No Yes No	6-7-96 1-24-97	6-5-96 1-23-97	43	Yes No	3-1-95	2-28-95
37	No	7-25-94		44	Yes No Yes Yes No Yes Yes	3-7-96 10-4-96	3-6-96 8-8-96 10-3-96 2-6-97 5-4-97
38	Yes No Yes	6-7-96	6-5-96 1-24-97	45	Yes No Yes No	8-29-95 3-9-97	8-28-95 3-8-97
39	No	12-21-95		46	Yes Yes No	6-12-96	3-4-96 6-11-96
40	No	12-21-95		47	Yes No Yes No Yes No Yes Yes	1-25-96 6-9-96 10-2-96	1-24-96 6-8-96 10-1-96 2-4-97 5-3-97

1996 Instrumentation Calibration Summary

Instrument Inventory				
CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC. TYPE
48	Eberline	ESP-2	1578	A
49	Eberline	ESP-2	1641	A
51	Bicron	Micro Rem	142	Gamma
52	Eberline	E-140	1487	Gamma
53	Eberline	PAC-4G	4105	Alpha
54	Eberline	E-140	1333	Gamma
55				
56				
57				
58				
59				
60				
61				
62				
63				

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window

Calibration Dates and Current Status				Calibration Dates and Current Status			
Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date	Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
48	Yes No Yes No Yes	3-12-96 11-30-96	3-11-96 11-29-96 5-5-97	55			
49	No	9-2-95 (rental unit returned)		56			
50				57			
51	Yes No Yes No Yes No Yes	4-12-96 8-23-96 12-5-96	4-11-96 8-22-96 12-4-96 4-2-97	58			
52	No Yes No Yes No	1-26-96 6-28-96 10-23-96	6-27-96 10-22-96	59			
53	Yes No	12-5-96	12-4-96	60			
54	Yes No	12-5-96	12-4-96	61			

INSTRUMENT CALIBRATION SUMMARY

1997

IH & S Form #200 Forest Hills Site 1997 Instrumentation Calibration Summary

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER
1	Eberline	SAC-4	1128
2	Tennelec	LB5100	13295
3	Tennelec	LB5100	13295
4	Eberline	BC-4	808
5	Eberline	BC-4	862
6	Eberline	ESP-2	1510
7	Eberline	ESP-2	1517
8	Eberline	ESP-2	1588
9	Eberline	PAC-4G	4478
10	Eberline	PAC-4G	4478
11	Eberline	ESP-2	1593
12	Eberline	ESP-2	1595
13	Eberline	ESP-2	1601
14	Eberline	E-520	4195
15	Eberline	E-520	5242
16	Eberline	E-520	5242

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
1	Yes Yes Yes Yes Yes		1-21-97 4-21-97 7-9-97 9-10-97 12-8-97
2 & 3	Yes Yes Yes		3-2-97 6-9-97 9-11-97
4	Yes Yes No Yes	2-24-97	1-21-97 4-21-97 6-11-97
5	Yes Yes		5-25-97 11-21-97
6	Yes No Yes	2-13-97	2-12-97 9-10-97
7	Yes No Yes	3-21-97	3-20-97 8-5-97
8	Yes Yes Yes No Yes	7-10-97	1-1-97 4-6-97 7-9-97 10-16-97

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
9 & 10	No		
11	Yes No Yes	2-13-97	2-12-97 9-10-97
12	Yes Yes		3-20-97 6-25-97
13	Yes No Yes Yes	1-2-97	1-1-97 4-6-97 7-15-97
14	Yes Yes No	5-4-97	2-4-97 5-3-97
15 & 16	Yes No	5-6-97	2-4-97

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETECT. TYPE
17	Eberline	E-520	5245	B
18	Eberline	E-520	5245	B/G
19	Eberline	E-140	1376	B/G
20	Ludlum	2221	91943	A
21	Ludlum	2221	91943	B
22	Eberline	ESP-2	1522	B/G
23	Eberline	PRM-7	234	G
24	Eberline	PRS-1	346 (SPA-3)	LEG/NW
25	Reuter Stokes	ERM	L-2088	G
26	Eberline	RM-14	4469	B
27	Eberline	RM-20	1986	A
28	Eberline	RM-20	1987	B
29	Dosim. Corp.	3032	190-884	B/G
30	Eberline	RM-14	7588	B
31	Eberline	ESP-2	1522	A
32	Ludlum	2221	125429	HEG-NW
33	Ludlum	2221	91943 (44-2)	HEG-NW

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta Gamma; LEG/W - Low Energy Gamma With Window; LEG/NW - Low Energy Gamma Without Window; HEG/NW - High Energy Gamma No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
17 & 18	No Yes Yes Yes	12-5-96	4-9-97 7-9-97 10-14-97
19	No Yes No Yes	10-2-96 5-22-97	5-21-97 9-9-97
20 & 21	No Yes	11-20-96	4-6-97 7-9-97
22	Yes Yes Yes		1-8-97 3-30-96 7-1-97
23	Yes No Yes No Yes	1-30-97 5-28-97	1-29-97 5-27-97 9-9-97
24	No	10-12-96	
25	No Yes	10-5-95	7-22-97

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
26	No Yes No Yes	12-1-96 4-10-97	4-9-97 10-16-97
27	No Yes Yes	12-5-96	4-9-97 7-9-97
28	No Yes	12-5-96	6-4-97
29	No	10-2-96	
30	No Yes No Yes No Yes	12-11-96 4-10-97 7-15-97	4-9-97 7-14-97 11-20-97
31	No	6-12-96	
32	Yes No Yes No Yes	2-5-97 7-2-97	2-4-97 7-1-97 11-20-97
33	No	8-29-96	

Instrument Inventory				
CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC./AS TYPE
34	Radeco	HD-28	1944	LV
35	Radeco	H-809V1	6992	LV
36	Radeco	H-809V1	6994	LV
37	Radeco	H-809V1	6696	LV
38	Radeco	H-809V1	6997	LV
39	SKC	224	4	BZ
40	SKC	224	5	BZ
41	SKC	224	6	BZ
42	SKC	224	7	BZ
43	SKC	224	8	BZ
44	Eberline	E-520	4195	Beta
45	Eberline	MP-2	125	N/A
46	Eberline	MS-1	173	N/A
47	Eberline	RM-14	3248	Beta

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window
AIR SAMPLE TYPE: LV - Low Vol; BZ - Breathing

Calibration Dates and Current Status				Calibration Dates and Current Status			
Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date	Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
34	Yes No Yes	1-22-97	1-11-97 10-1-97	41	No	12-21-95	
35	No	7-25-94		42	No	12-21-95	
36	Yes No Yes	1-24-97	1-23-97 10-1-97	43	No	3-1-95	
37	No	7-25-94		44	Yes Yes No Yes	5-5-97	2-6-97 5-4-97 8-21-97
38	Yes No	1-24-97	1-24-97	45	Yes No		3-8-97
39	No	12-21-95		46	No	6-12-96	
40	No	12-21-95		47	Yes Yes No Yes	5-4-97	2-4-97 5-3-97 8-21-97

1997 Instrumentation Calibration Summary

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC. TYPE
48	Eberline	ESP-2	1578	A
49	Eberline	ESP-2	1641	A
51	Bicron	Micro Rem	142	Gamma
52	Eberline	E-140	1487	Gamma
53	Eberline	PAC-4G	4105	Alpha
54	Eberline	E-140	1333	Gamma
55				
56	Eberline	PAC-4S	4034	Alpha
57	Eberline	RM-14	137	Beta
58	Eberline	RM-14	247	Beta
59	Eberline	E-530	210	Gamma
60	Eberline	ESP-1	275	Gamma
61	Eberline	ESP-1	276	Alpha/Beta
62				
63				

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
48	No Yes Yes No Yes	11-30-96 8-8-97	5-5-97 8-7-97 11-20-97
49	No	9-2-95 (rental unit returned)	
50			
51	Yes Yes		4-2-97 7-1-97
52	No Yes No Yes	10-24-96 6-5-97	6-4-97 10-1-97
53	Yes No Yes	12-5-96	12-4-96 7-17-97
54	Yes No Yes	12-5-96	12-4-96 7-17-97

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
55			
56	Yes No	12-25-96	12-24-96
57	Yes No Yes	12-25-96	12-24-96 6-25-97
58	Yes No Yes	12-25-96	12-24-96 6-25-97
59	Yes No Yes	12-26-96	12-25-96 7-17-97
60	Yes No	12-26-96	12-25-96
61	Yes No	12-26-96	12-25-96

IH & S Form #200 Forest Hills Site

1997 Instrumentation Calibration Summary

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC. TYPE
62	Eberline	RM-14	936	Beta
63	Eberline	ASP-1	420	Gamma
64	Eberline	PAC-45	4035	Alpha
65	Ludlum	2221	102049	LEG
66	BICRON			
67				
68				
69				
70				
71				
72				
73				
74				

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date	Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
62	Yes No Yes	12-31-96	12-30-96 6-25-97	69			
63	Yes No	12-31-97	12-30-96	70			
64	Yes		7-17-97	71			
65	Yes		9-10-97	72			
66				73			
67				74			
68				75			

INSTRUMENT CALIBRATION SUMMARY

1998

IH & S Form #200 Cheswick Site 1998 Instrumentation Calibration Summary

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER
1	Eberline	SAC-4	1128
2	Tennelec	LB5100	13295
3	Tennelec	LB5100	13295
4	Eberline	BC-4	808
5	Eberline	BC-4	862
6	Eberline	ESP-2	1510
7	Eberline	ESP-2	1517
8	Eberline	ESP-2	1588
9	Eberline	PAC-4G	4478
10	Eberline	PAC-4G	4478
11	Eberline	ESP-2	1593
12	Eberline	ESP-2	1595
13	Eberline	ESP-2	1601
14	Eberline	E-520	4195
15	Eberline	E-520	5242
16	Eberline	E-520	5242

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
1	Yes Yes No Yes Yes	5-25-98	2-19-98 5-24-98 10-8-98 1-19-99
2 & 3	Yes Yes Yes Yes Yes		3-11-98 6-11-98 7-1-98 10-28-98 1-5-99
4	No Yes	6/12/97	 8-17-98
5	Yes Yes No Yes Yes	5-25-98	2-19-98 5-24-98 10-8-98 1-19-99
6	Yes Yes Yes No Yes No	 9-17-98 1-8-99	3-16-98 6-16-98 9-16-98 1-7-99
7	Yes Yes No Yes No Yes No	 4-30-98 5-12-98 11-19-99	1-28-98 4-29-98 5-11-98 11-18-98
8	Yes Yes Yes No	 9-17-98	3-16-98 6-17-98 9-16-98

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
9 & 10	No		
11	Yes Yes Yes No Yes No	 9-17-98 1-8-99	3-16-98 6-16-98 9-16-98 1-7-99
12	Yes Yes No Yes	 9-10-98 	4-5-98 7-9-98 11-18-98
13	Yes Yes No Yes No Yes	 4-29-98 5-12-98 	1-28-98 4-28-98 5-11-98 11-18-98
14	Yes No Yes No Yes Yes	 4-27-98 8-12-98 	4-26-98 8-11-98 12-14-98 3-17-99
15 & 16	No Yes No Yes No	4-9-97 8-30-98 3-18-99	 8-29-98 3-17-99

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETECT. TYPE
17	Eberline	E-520	5245	B
18	Eberline	E-520	5245	B/G
19	Eberline	E-140	1376	B/G
20	Ludlum	2221	91943	A
21	Ludlum	2221	91943	B
22	Eberline	ESP-2	1522	B/G
23	Eberline	PRM-7	234	G
24	Eberline	PRS-1	346 (SPA-3)	LEG/NW
25	Reuter Stokes	ERM	L-2088	G
26	Eberline	RM-14	4469	B
27	Eberline	RM-20	1986	A
28	Eberline	RM-20	1987	B
29	Dosim. Corp.	3032	190-884	B/G
30	Eberline	RM-14	7588	B
31	Eberline	ESP-2	1522	A
32	Ludlum	2221	125429	HEG-NW
33	Ludlum	2221	91943 (44-2)	HEG-NW

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta Gamma; LEG/W - Low Energy Gamma With Window; LEG/NW - Low Energy Gamma Without Window; HEG/NW - High Energy Gamma No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
17 & 18	Yes No Yes Yes No Yes No Yes	2-4-98 9-11-98 1-27-99	2-3-98 5-13-98 9-10-98 1-26-99 5-24-99
19	No Yes No Yes No Yes Yes	12-26-97 5-14-98 8-30-98	5-13-98 8-29-98 1-26-99 5-1-99
20 & 21	Yes		4-13-98
22	Yes No Yes Yes No Yes No	2-4-98 9-11-98 1-30-99	2-3-98 5-13-98 9-10-98 1-29-99
23	No Yes Yes No Yes Yes No	12-23-97 8-12-98 3-18-99	5-5-98 8-11-98 12-14-98 3-17-99
24	No	10-12-96	
25	No	7-23-97	

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
26	Yes Yes No Yes No Yes No Yes	7-4-98 11-5-98 3-15-99	3-1-98 7-3-98 11-4-98 3-14-99 6-24-99
27	Yes Yes Yes No Yes No	9-11-98 1-27-99	3-1-98 7-3-98 9-10-98 1-26-99
28	Yes No Yes No	4-27-98 8-12-99	4-26-98 8-11-98
29	No	10-2-96	
30	Yes No Yes No Yes Yes No Yes	4-27-98 8-12-98 3-18-99	4-26-98 8-11-98 12-15-98 3-17-99 6-24-99
31	No	6-12-96	
32	Yes No Yes No Yes No Yes Yes	4-1-98 7-24-98 11-5-98	3-31-98 7-23-98 11-4-98 4-11-99 6-24-99
33	No	8-29-96	

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC./AS TYPE
34	Radeco	HD-28	1944	LV
35	Radeco	H-809V1	6992	LV
36	Radeco	H-809V1	6994	LV
37	Radeco	H-809V1	6696	LV
38	Radeco	H-809V1	6997	LV
39	SKC	224	4	BZ
40	SKC	224	5	BZ
41	SKC	224	6	BZ
42	SKC	224	7	BZ
43	SKC	224	8	BZ
44	Eberline	E-520	4195	Beta
45	Eberline	MP-2	125	N/A
46	Eberline	MS-1	173	N/A
47	Eberline	RM-14	3248	Beta

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window
AIR SAMPLE TYPE: LV - Low Vol; BZ - Breathing

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
34	Yes Yes No Yes	12-10-98	6-4-98 12-9-98 6-17-99
35	No	7-25-94	
36	Yes No Yes	6-5-98	6-4-98 6-17-99
37	No	7-25-94	
38	No Yes No Yes	1-24-97 8-13-98	8-12-98 6-17-99
39	No	12-21-95	
40	No	12-21-95	

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
41	No	12-21-95	
42	No	12-21-95	
43	No	3-1-95	
44	Yes No Yes No Yes Yes No Yes	4-27-98 8-13-98 3-18-99	4-28-98 8-12-98 12-14-98 3-17-99 6-25-99
45	Yes No	3-9-97	3-8-97
46	No	6-12-96	
47	Yes No Yes No Yes	4-27-98 1-28-99	4-26-98 8-29-98 6-16-99

1998 Instrumentation Calibration Summary

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC. TYPE
48	Eberline	ESP-2	1578	A
49	Eberline	ESP-2	1641	A
51	Bicron	Micro Rem	142	Gamma
52	Eberline	E-140	1487	Gamma
53	Eberline	PAC-4G	4105	Alpha
54	Eberline	E-140	1333	Gamma
55				
56	Eberline	PAC-4S	4034	Alpha
57	Eberline	RM-14	137	Beta
58	Eberline	RM-14	247	Beta
59	Eberline	E-530	210	Gamma
60	Eberline	ESP-1	275	Gamma
61	Eberline	ESP-1	276	Alpha/Beta
62				
63				

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
48	No	12-19-97 (rental unit returned)	
49	No	9-2-95 (rental unit returned)	
50			
51	No	7-1-97 (Removed from service)	
52	Yes No Yes No Yes Yes No Yes	4-6-98 7/24/98 3-18-99	4-5-98 7/23/98 12-15-98 3-17-99 6-24-99
53	Yes No Yes No Yes Yes	4-6-98 7-24-98	4-5-98 7-23-98 12-14-98 3-17-99
54	No Yes No Yes No Yes	7-17-97 8-30-98 1-30-99	8-29-98 1-29-99 5-24-99

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
55			
56	No	12-25-96	
57	No	6-24-97	
58	No	6-25-97	
59	No	7-17-98	
60	No	12-26-96	
61	No	12-26-96	

1998 Instrumentation Calibration Summary

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC. TYPE
62	Eberline	RM-14	936	Beta
63	Eberline	ASP-1	420	Gamma
64	Eberline	PAC-45	4035	Alpha
65	Ludlum	2221	102049	LEG
66	Bicron	MicroRem	B698G	Gamma
67	Eberline	MS-2	999	NaI
68	Eberline	RAS-1	0885	n/a
69	Eberline	RO-2	3644	Gamma Beta
70	Ludlum	2221	99136 (225)	LEG
71				
72				
73				
74				

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
62	No Yes No	6-25-97 8-29-98	8-28-98
63	No	12-31-97	
64	No	7-17-97	
65	No	1-2-98	
66	No Yes No Yes No Yes	2-3-98 5-14-98 9-11-98	5-13-98 9-10-98 1-29-99
67	Yes		8-20-98
68	Yes No Yes No	11-7-98 6-18-99	11-6-98 6-17-99

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
69	Yes		3-4-99
70	Yes		8-23-99
71			
72			
73			
74			
75			

INSTRUMENT CALIBRATION SUMMARY

1999

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER
1	Eberline	SAC-4	1128
2	Tennelec	LB5100	13295
3	Tennelec	LB5100	13295
4	Eberline	BC-4	808
5	Eberline	BC-4	862
6	Eberline	ESP-2	1510
7	Eberline	ESP-2	1517
8	Eberline	ESP-2	1588
9	Eberline	PAC-4G	4478
10	Eberline	PAC-4G	4478
11	Eberline	ESP-2	1593
12	Eberline	ESP-2	1595
13	Eberline	ESP-2	1601
14	Eberline	E-520	4195
15	Eberline	E-520	5242
16	Eberline	E-520	5242

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
1	Yes Yes Yes		1-19-99 4-19-99 7-21-99
2 & 3	Yes Yes Yes		1-5-99 3-28-99 7-24-99
4	No	8-18-98	
5	Yes Yes Yes		1-19-99 4-19-99 7-21-99
6	Yes No	1-8-99	1-7-99
7	No	11-19-98	
8	No	9-17-98	

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
9 & 10	No		
11	Yes No Yes No	1-8-99 4-20-99	1-7-99 4-14-99
12	No	11-19-98	
13	No	11-19-98	
14	Yes No	3-18-99	3-17-99
15 & 16	Yes No	3-18-99	3-17-99

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETECT. TYPE
17	Eberline	E-520	5245	B
18	Eberline	E-520	5245	B/G
19	Eberline	E-140	1376	B/G
20	Ludlum	2221	91943	A
21	Ludlum	2221	91943	B
22	Eberline	ESP-2	1522	B/G
23	Eberline	PRM-7	234	G
24	Eberline	PRS-1	346 (SPA-3)	LEG/NW
25	Reuter Stokes	ERM	L-2088	G
26	Eberline	RM-14	4469	B
27	Eberline	RM-20	1986	A
28	Eberline	RM-20	1987	B
29	Dosim. Corp.	3032	190-884	B/G
30	Eberline	RM-14	7588	B
31	Eberline	ESP-2	1522	A
32	Ludlum	2221	125429	HEG-NW
33	Ludlum	2221	91943 (44-2)	HEG-NW

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta Gamma; LEG/W - Low Energy Gamma With Window; LEG/NW - Low Energy Gamma Without Window; HEG/NW - High Energy Gamma No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
17 & 18	Yes No Yes	1-27-99	1-26-99 5-24-99
19	Yes No Yes	1-27-99	1-26-99 5-1-99
20 & 21	Yes		4-13-98
22	Yes No	1-30-99	1-29-99
23	Yes No	3-18-99	3-17-99
24	No	10-12-96	
25	No	7-23-97	

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
26	Yes No Yes	3-15-99	3-14-99 6-24-99
27	Yes No	1-27-99	1-26-99
28	No	8-12-99	
29	No	10-2-96	
30	Yes No Yes	3-18-99	3-17-99 6-24-99
31	No	6-12-96	
32	Yes Yes		4-11-99 6-24-99
33	No	8-29-96	

Instrument Inventory				
CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC./AS TYPE
34	Radeco	HD-28	1944	LV
35	Radeco	H-809V1	6992	LV
36	Radeco	H-809V1	6994	LV
37	Radeco	H-809V1	6696	LV
38	Radeco	H-809V1	6997	LV
39	SKC	224	4	BZ
40	SKC	224	5	BZ
41	SKC	224	6	BZ
42	SKC	224	7	BZ
43	SKC	224	8	BZ
44	Eberline	E-520	4195	Beta
45	Eberline	MP-2	125	N/A
46	Eberline	MS-1	173	N/A
47	Eberline	RM-14	3248	Beta

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window
AIR SAMPLE TYPE: LV - Low Vol; BZ - Breathing

Calibration Dates and Current Status				Calibration Dates and Current Status			
Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date	Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
34	Yes		6-17-99	41	No	12-21-95	
35	No	7-25-94		42	No	12-21-95	
36	Yes		6-17-99	43	No	3-1-95	
37	No	7-25-94		44	Yess No Yes	3-18-99	3-17-99 6-25-99
38	Yes		6-17-99	45	Yes No	3-9-97	3-8-97
39	No	12-21-95		46	No	6-12-96	
40	No	12-21-95		47	No Yes	1-28-99	6-16-99

1999 Instrumentation Calibration Summary

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC. TYPE
48	Eberline	ESP-2	1578	A
49	Eberline	ESP-2	1641	A
51	Bicron	Micro Rem	142	Gamma
52	Eberline	E-140	1487	Gamma
53	Eberline	PAC-4G	4105	Alpha
54	Eberline	E-140	1333	Gamma
55				
56	Eberline	PAC-4S	4034	Alpha
57	Eberline	RM-14	137	Beta
58	Eberline	RM-14	247	Beta
59	Eberline	E-530	210	Gamma
60	Eberline	ESP-1	275	Gamma
61	Eberline	ESP-1	276	Alpha/Beta
62				
63				

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
48	No	12-19-97 (rental unit returned)	
49	No	9-2-95 (rental unit returned)	
50			
51	No	7-1-97 (Removed from service)	
52	Yes No Yes No Yes Yes No Yes	4-6-98 7/24/98 3-18-99	4-5-98 7/23/98 12-15-98 3-17-99 6-24-99
53	Yes No	6-17-99	3-17-99
54	No Yes No Yes No Yes No	7-17-97 8-30-98 1-30-99 5-25-99	8-29-98 1-29-99 5-24-99

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
55			
56	No	12-25-96	
57	No	12-24-97	
58	No	6-25-97	
59	No	7-17-98	
60	No	12-26-96	
61	No	12-26-96	

1999 Instrumentation Calibration Summary

Instrument Inventory

CODE NUMBER	INST. MANUF.	MODEL	SERIAL NUMBER	DETEC. TYPE
62	Eberline	RM-14	936	Beta
63	Eberline	ASP-1	420	Gamma
64	Eberline	PAC-45	4035	Alpha
65	Ludlum	2221	102049	LEG
66	Bicron	MicroRem	B698G	Gamma
67	Eberline	MS-2	999	NaI
68	Eberline	RAS-1	0885	n/a
69	Eberline	RO-2	3644	Gamma Beta
70	Ludlum	2221	99136 (225)	LEG
71				
72				
73				
74				

DETECTOR TYPE: A - Alpha; B - Beta; G - Gamma; B/G - Beta/Gamma; LEG/W - Low Energy Gamma/With Window; LEG/NW - Low Energy Window with no Window; HEG/NW - High Energy Gamma/No Window

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
62	Yes No	8-30-98	8-29-98
63	No	12-31-97	
64	No	7-17-97	
65	No	1-2-98	
66	Yes No	1-30-99	1-29-99
67	Yes		8-20-98
68	Yes No	6-18-99	6-17-99

Calibration Dates and Current Status

Code Number	In Service Yes/No	O.O.S. Date	Cal Due Date
69	Yes		3-4-99
70	Yes		8-23-99
71			
72			
73			
74			
75			

APPENDIX B

CERTIFICATES OF CALIBRATION

FOR SOURCE STANDARDS

EBERLINE INSTRUMENT CORPORATION

PLUTONIUM ALPHA STANDARD

CERTIFICATE

SERIAL NO. 7345

The alpha particle emission rate from the active surface of the source is:

1,120 ± 20 *Alpha particles/minute (2 Pi)*

The total disintegration rate is:

2,210 ± 40 *Disintegrations/minute (4 Pi)*

The source was standardized by counting the alpha particles emitted from the active surface with internal, proportional, standardization chamber. The backscatter of alpha particles from the surface was assumed to be **1.5 %** *in calculating the total (4 Pi) disintegration rate.*

0.0010 uCi

DATE: September 24, 1974

Isotopic Content:

99.23 %	Pu-239
0.75	Pu-240
0.015	Pu-241

SIGNED: J. Donald Rodriguez

J. Donald Rodriguez, Head
Isotope Section

Re-standardization is advised after one year.

EBERLINE INSTRUMENT CORPORATION

PLUTONIUM ALPHA STANDARD

CERTIFICATE

SERIAL NO. 5308

The alpha particle emission rate from the active surface of the source is:

15,900 ± 300 *Alpha particles/minute (2 Pi)*

The total disintegration rate is:

31,300 ± 600 *Disintegrations/minute (4 Pi)*

The source was standardized by counting the alpha particles emitted from the active surface with internal, proportional, standardization chamber. The backscatter of alpha particles from the surface was assumed to be 1.5 % *in calculating the total (4 Pi) disintegration rate.*

0.0141 uCi

DATE: September 24, 1974

Isotopic Content:

99.23 %	Pu-239
0.75	Pu-240
0.015	Pu-241

SIGNED: J. Donald Rodriguez

J. Donald Rodriguez, Head
Isotope Section

Re-standardization is advised after one year.

EBERLINE INSTRUMENT CORPORATION

PLUTONIUM ALPHA STANDARD

CERTIFICATE

SERIAL NO. 7346

The alpha particle emission rate from the active surface of the source is:

117,300 ± 2300 *Alpha particles/minute (2 Pi)*

The total disintegration rate is:

231,100 ± 4600 *Disintegrations/minute (4 Pi)*

The source was standardized by counting the alpha particles emitted from the active surface with internal, proportional, standardization chamber. The backscatter of alpha particles from the surface was assumed to be 1.5 % *in calculating the total (4 Pi) disintegration rate.*

0.1042 uCi

DATE: September 24, 1974

Isotopic Content:

99.23 %	Pu-239
0.75	Pu-240
0.015	Pu-241

SIGNED: J. Donald Rodriguez

J. Donald Rodriguez, Head
Isotope Section

Re-standardization is advised after one year.

EBERLINE INSTRUMENT CORPORATION

PLUTONIUM ALPHA STANDARD

CERTIFICATE

SERIAL NO. 7347

The alpha particle emission rate from the active surface of the source is:

1,133,000 ± 22,700 *Alpha particles/minute (2 Pi)*

The total disintegration rate is:

2,232,000 ± 44,600 *Disintegrations/minute (4 Pi)*

The source was standardized by counting the alpha particles emitted from the active surface with internal, proportional, standardization chamber. The backscatter of alpha particles from the surface was assumed to be 1.5 % *in calculating the total (4 Pi) disintegration rate.*

1.0066 uCi

DATE: September 24, 1974

Isotopic Content:

99.23 %	Pu-239
0.75	Pu-240
0.015	Pu-241

SIGNED: J. Donald Rodriguez

J. Donald Rodriguez, Head
Isotope Section

Re-standardization is advised after one year.

REPORT OF CALIBRATION

Electroplated Beta Source Serial # 761/84

Description of Source:

Principal radionuclide Technetium 99

Electroplated on polished Ni (type of metal) disc, approximately 0.79 mm thick.

Diameter, 2.54 cm active, 3.18 cm total.

Radioactive material permanently fixed to the disc by heat treatment, without any covering over the active surface.

Calibration Date: September 10, 1984

Measurement Method:

The 2π beta emission rate was measured using an internal gas flow proportional chamber. Traceability to NBS has been demonstrated, the most recent intercomparison with NBS being May 1981 when the EIC–NBS agreement was within 0.3%.

Measurement Result:

The total number of beta particles emitted from the surface of the disc per minute on the above date was

101 ± 15

The total disintegration rate, assuming 25 % backscatter of beta particles from the surface of the disc, was

162 ± 24 (0.000073 uCi)

The uncertainty of the measurement is 15%* which is the sum of random counting error at the 99% confidence level and the estimated upper limit of conceivable systematic error in this measurement.

Information on isotopic composition or radioactive impurities:

* Based on 100 minute counts

Calibrated by: Jim Arellano
(please print or type)

(signature)

eberline
Eberline Instrument Corporation
P.O. Box 3874
Albuquerque, New Mexico 87110

REPORT OF CALIBRATION

Electroplated Beta Source Serial # 762/84

Description of Source:

Principal radionuclide Technetium 99

Electroplated on polished Ni (type of metal) disc, approximately 0.79 mm thick.

Diameter, 2.54 cm active, 3.18 cm total.

Radioactive material permanently fixed to the disc by heat treatment, without any covering over the active surface.

Calibration Date: September 11, 1984

Measurement Method:

The 2π beta emission rate was measured using an internal gas flow proportional chamber. Traceability to NBS has been demonstrated, the most recent intercomparison with NBS being May 1981 when the EIC–NBS agreement was within 0.3%.

Measurement Result:

The total number of beta particles emitted from the surface of the disc per minute on the above date was

822 ± 90

The total disintegration rate, assuming 25 % backscatter of beta particles from the surface of the disc, was

1,310 ± 140 (0.000592 uCi)

The uncertainty of the measurement is 11% which is the sum of random counting error at the 99% confidence level and the estimated upper limit of conceivable systematic error in this measurement.

Information on isotopic composition or radioactive impurities:

Calibrated by: Jim Arellano
(please print or type)

(signature)

eberline
Eberline Instrument Corporation
P.O. Box 3874
Albuquerque, New Mexico 87110

REPORT OF CALIBRATION

Electroplated Beta Source Serial # 763/84

Description of Source:

Principal radionuclide Technetium 99

Electroplated on polished Ni (type of metal) disc, approximately 0.79 mm thick.

Diameter, 2.54 cm active, 3.18 cm total.

Radioactive material permanently fixed to the disc by heat treatment, without any covering over the active surface.

Calibration Date: September 11, 1984

Measurement Method:

The 2π beta emission rate was measured using an internal gas flow proportional chamber. Traceability to NBS has been demonstrated, the most recent intercomparison with NBS being May 1981 when the EIC–NBS agreement was within 0.3%.

Measurement Result:

The total number of beta particles emitted from the surface of the disc per minute on the above date was

11,700 ± 400

The total disintegration rate, assuming 25 % backscatter of beta particles from the surface of the disc, was

18,700 ± 700 (0.00843 uCi)

The uncertainty of the measurement is 3% which is the sum of random counting error at the 99% confidence level and the estimated upper limit of conceivable systematic error in this measurement.

Information on isotopic composition or radioactive impurities:

Calibrated by: Jim Arellano
(please print or type)

(signature)

eberline
Eberline Instrument Corporation
P.O. Box 3874
Albuquerque, New Mexico 87110

REPORT OF CALIBRATION

Electroplated Beta Source Serial # 764/84

Description of Source:

Principal radionuclide Technetium 99

Electroplated on polished Ni (type of metal) disc, approximately 0.79 mm thick.

Diameter, 2.54 cm active, 3.18 cm total.

Radioactive material permanently fixed to the disc by heat treatment, without any covering over the active surface.

Calibration Date: September 14,1984

Measurement Method:

The 2π beta emission rate was measured using an internal gas flow proportional chamber. Traceability to NBS has been demonstrated, the most recent intercomparison with NBS being May 1981 when the EIC–NBS agreement was within 0.3%.

Measurement Result:

The total number of beta particles emitted from the surface of the disc per minute on the above date was

91,200 ± 2,700

The total disintegration rate, assuming 25 % backscatter of beta particles from the surface of the disc, was

146,000 ± 4,000 (0.0657 uCi)

The uncertainty of the measurement is 3% which is the sum of random counting error at the 99% confidence level and the estimated upper limit of conceivable systematic error in this measurement.

Information on isotopic composition or radioactive impurities:

Calibrated by: Jim Arellano
(please print or type)

(signature)

eberline
Eberline Instrument Corporation
P.O. Box 3874
Albuquerque, New Mexico 87110

CERTIFICATE OF CALIBRATION
BETA STANDARD SOURCE

Radionuclide:	Cs-137	Customer:	OXFORD/TENNELEC	
Half Life:	30.0 ± 0.2 years	P.O.No.:	TR 9209-0082	
Catalog No.:	EAB-137	Reference Date:	September 15 1992	12:00 PST.
Source No.:	T-993	Contained Radioactivity:	29,900	dpm.
		Contained Radioactivity:	0.498	kBq.

Description of Source

a. Capsule type:	PL
b. Nature of active deposit:	Distributed and evaporated metallic salts
c. Active area/ diameter/volume:	45 mm
d. Backing:	0.254 mm stainless steel
e. Cover:	0.9 mg/cm² aluminized mylar

Radioimpurities

None detected

Method of Calibration

The source was prepared from a weighed aliquot of solution whose concentration in µCi/gram was determined by by gamma spectometry.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	± 1.1%
b. Random uncertainty in assay:	± 1.0%
c. Random uncertainty in weighing(s):	± 0.4%
d. Total uncertainty at the 99% confidence level:	± 2.5%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Notes

1. Nuclear data were taken from "Table of Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

Anna M. Allen

QUALITY CONTROL

Sept. 11, 1992

Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 No. Keystone Street.,
Burbank, California 91504
(818) 843 - 7000

IPL Ref. No.: 408-26-1

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOURCE

Radionuclide:	Po-210	Customer:	OXFORD/TENNELEC	
Half Life:	138.376 ± 0.002 days	P.O.No.:	TR 9209-0082	
Catalog No.:	EAB-210	Reference Date:	September 15 1992	12:00 PST.
Source No.:	U-295	Contained Radioactivity:	30,600	dpm.
		Contained Radioactivity:	0.511	kBq.

Description of Source

a. Capsule type:	PL
b. Nature of active deposit:	Electroless deposited polonium
c. Active area/ diameter/volume:	45 mm
d. Backing:	0.254 mm silver
e. Cover:	100 μg/cm² gold

CAUTION!
DELICATE SURFACE
DO NOT WIPE
ACTIVE AREA

Radioimpurities

None detected

Method of Calibration

The source was assayed using a windowless internal gas flow proportional counter.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±	1.3%
b. Random uncertainty in assay:	±	1.0%
c. Random uncertainty in weighing(s):	±	0.0%
d. Total uncertainty at the 99% confidence level:	±	2.3%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Notes

1. Nuclear data were taken from "Table of Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

Aman U-Khan

QUALITY CONTROL

Sept. 11, 1992

Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 No. Keystone Street.,
Burbank, California 91504
(818) 843 - 7000

IPL Ref. No.: 408-26-2

CALIBRATION RECORDS

FOR INSTRUMENTS USED FOR

RADIOLOGICAL SURVEYS

JUNE 27, 2000

VOLUME 2 OF 7

WESTINGHOUSE ELECTRIC CORPORATION

BLAIRSVILLE, PA

CALIBRATION RECORDS

FOR INSTRUMENTS USED FOR

RADIOLOGICAL SURVEYS

TABLE OF CONTENTS

CALIBRATION RECORDS

FOR INSTRUMENTS USED FOR

RADIOLOGICAL SURVEYS

Purpose

The Westinghouse Blairsville Site utilized nuclear materials during the period of the mid to late 1950's to the early part of the 1960's. Work was performed both under licenses with the atomic Energy Commission and for the Bettis Atomic Power Laboratory. Although all work ceased during the 1960's, subsequent radiological surveys and investigations, starting in 1993, established that some residual radioactivity, primarily in underground piping and subsurface soil contamination, existed on the site. During the period of 1993 through the present, additional remediation work and radiological surveys have been conducted to establish that the site can be released for unrestricted use. This series of reports documents the results of the final status radiological surveys subsequent to the various remediation efforts.

Scope

This report compiles information on the calibration of the radiological survey instruments, which were used to measure the radiation levels presented in the other reports issued for this project. In each report, which documents a final radiological survey, the data sheets that record the measured radiation levels also provide specific information with respect to the specific instrument used to make the measurement. This report provides the necessary information to establish the entire calibration history of each specific instrument. These instruments have been used for the Westinghouse sites at Blairsville, Cheswick, and Forest Hills (now Viacom, Inc.). Therefore these calibration records are applicable to all these sites.

Discussion

All instruments used for radiological surveys on this project were calibrated on a frequency depending on the specific instrument. The calibration history for every instrument used on the project is summarized in appendix A, which cover the years 1993 through 1999. These summaries also provide a reference to a "Code Number." Included with this report in Appendix B are sheets labeled "Code Number 1" through "Code Number 70." Each of these "codes" incorporates the calibration records as appropriate for the specific instrument.

The certification sheets for each of the source standards used by the project to calibrate the instruments for conversion of CPM to DPM are included in Appendix C. Other calibrations were performed at other licensed operations as noted by the calibration records and no information on Source Certification is provided here.

CALIBRATION RECORDS

FOR INSTRUMENTS USED FOR

RADIOLOGICAL SURVEYS

List of Volume Contents

APPENDIX C

CALIBRATION RECORDS FOR

RADIOLOGICAL SURVEY INSTRUMENTS

REPORT #001

CODE NUMBER 1

REPORT #001

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [✓] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	9/1/99	ACTIVITY DPM	31278

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
26,269	26,184
26,306	26,564
26,492	26,104
25,920	26,315
26,072	26,108
TOTAL / 10: (average)	26,233
Sq. Root of average: (Sigma)	162
3 Sigma:	486
Average + 3 Sigma:	26719
Average - 3 Sigma:	25747

EFFICIENCY DATA	
2 MIINUTE COUNT:	26,108
GROSS CPM (Count/min)	13,054
NET CPM (Gross count -Bkg.)	13,054
EFFICIENCY (Net CPM /DPM)	41.7
CORR. FACTOR (1 / Eff)	2.4

BACKGROUND DATA	
TOTAL COUNTS;	1
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	.05

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: Jim Gemza SIGNATURE: Jim Gemza
DATE PERFORMED:	9-1-99

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [✓] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	1·26·99	ACTIVITY DPM	31,278

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
26125	26223
26172	25953
26450	25994
26096	25928
26402	26394
TOTAL / 10: (average)	26174
Sq. Root of average: (Sigma)	161
3 Sigma:	483
Average + 3 Sigma:	26604
Average - 3 Sigma:	25638

EFFICIENCY DATA	
2 MIINUTE COUNT:	26,394
GROSS CPM (Count/min)	13,197
NET CPM (Gross count -Bkg.)	13,197
EFFICIENCY (Net CPM /DPM)	42.2
CORR. FACTOR (1 / Eff)	2.4

BACKGROUND DATA	
TOTAL COUNTS;	4
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	0.2

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: Clyde Schall SIGNATURE: Clyde Schall
DATE PERFORMED:	4·21·99

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [X] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5-14-99	ACTIVITY DPM	31279

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
26285	26127
26082	26152
25951	26205
26093	26288
25939	26088
TOTAL / 10: (average)	26121
Sq. Root of average: (Sigma)	161
3 Sigma:	483
Average + 3 Sigma:	26604
Average - 3 Sigma:	25638

EFFICIENCY DATA	
2 MIINUTE COUNT:	26088
GROSS CPM (Count/min)	13044
NET CPM (Gross count -Bkg.)	13044
EFFICIENCY (Net CPM /DPM)	41.7%
CORR. FACTOR (1 / Eff)	2.4

BACKGROUND DATA	
TOTAL COUNTS;	2
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	0.1

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	6-9-97

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: [signature]
DATE PERFORMED:	1-19-99

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [X] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5-14-98	ACTIVITY DPM	31278.75

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
25593	26198
25915	25973
25745	25669
26056	25724
25835	25978
TOTAL / 10: (average)	25868
Sq. Root of average: (Sigma)	160.8
3 Sigma:	482.5
Average + 3 Sigma:	26350
Average - 3 Sigma:	25385

EFFICIENCY DATA	
2 MIINUTE COUNT:	26046
GROSS CPM (Count/min)	13023
NET CPM (Gross count -Bkg.)	13022.9
EFFICIENCY (Net CPM /DPM)	41.6
CORR. FACTOR (1 / Eff)	2.4

BACKGROUND DATA	
TOTAL COUNTS;	2
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	0.1

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	6/9/97

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: V. TAYLOR SIGNATURE: V. Taylor
DATE PERFORMED:	10-19-98

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [X] Pu 239 # 5308	[ ] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5-14-98	ACTIVITY DPM	31278.75

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
25511	25430
25472	25523
25703	25637
25374	25780
25705	25454
TOTAL / 10: (average)	25559
Sq. Root of average: (Sigma)	160 ~~506~~
3 Sigma:	480
Average + 3 Sigma:	26039
Average - 3 Sigma:	25079

EFFICIENCY DATA	
2 MIINUTE COUNT:	25532
GROSS CPM (Count/min)	12766
NET CPM (Gross count -Bkg.)	12766
EFFICIENCY (Net CPM /DPM)	40.8
CORR. FACTOR (1 / Eff)	2.5

BACKGROUND DATA	
TOTAL COUNTS;	4
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	0.2

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	6/9/97

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: A. V. TAYLOR SIGNATURE: A. V. Taylor
DATE PERFORMED:	7-8-98

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [X] Pu 239 # 5308	[ ] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	3/12/97	ACTIVITY DPM	31280

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
25611	25663
25513	25653
25535	25458
25528	25443
25818	25510
TOTAL / 10: (average)	25,573
Sq. Root of average: (Sigma)	160
3 Sigma:	480
Average + 3 Sigma:	26,053
Average - 3 Sigma:	25,093

EFFICIENCY DATA	
2 MIINUTE COUNT:	25,510
GROSS CPM (Count/min)	12,755
NET CPM (Gross count -Bkg.)	12,755
EFFICIENCY (Net CPM /DPM)	40.8
CORR. FACTOR (1 / Eff)	2.6

BACKGROUND DATA	
TOTAL COUNTS;	4
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	.2

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	6-9-97

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
DATE PERFORMED:	2-24-98

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [X] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	3/12/97	ACTIVITY DPM	31280

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
25562	25555
25394	25524
25711	25606
25630	25719
25591	25791
TOTAL / 10: (average)	25608
Sq. Root of average: (Sigma)	160
3 Sigma:	480
Average + 3 Sigma:	26088
Average - 3 Sigma:	25128

EFFICIENCY DATA	
2 MIINUTE COUNT:	25716
GROSS CPM (Count/min)	12858
NET CPM (Gross count -Bkg.)	12858
EFFICIENCY (Net CPM /DPM)	41.1%
CORR. FACTOR (1 / Eff)	2.43

BACKGROUND DATA	
TOTAL COUNTS;	4
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	.2

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	6/9/97

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: Jim Gemza SIGNATURE: Jim Gemza
DATE PERFORMED:	11/19/97

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [X] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	3-12-97	ACTIVITY DPM	31280

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
26385	26289
26159	26426
26294	26206
25920	26178
26331	26254
TOTAL / 10: (average)	26244
Sq. Root of average: (Sigma)	162
3 Sigma:	486
Average + 3 Sigma:	26730
Average - 3 Sigma:	25758

EFFICIENCY DATA	
2 MIINUTE COUNT:	26562
GROSS CPM (Count/min)	13281
NET CPM (Gross count -Bkg.)	13280.9
EFFICIENCY (Net CPM /DPM)	42.4
CORR. FACTOR (1 / Eff)	2.4

BACKGROUND DATA	
TOTAL COUNTS;	2
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	0.1

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	6/9/97

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: C. VERGARI SIGNATURE: Carmen Vergari
DATE PERFORMED:	9-8-97

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [X] Pu 239 # 5308	[ ] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	3-12-97	ACTIVITY DPM	31280

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
25847	25579
25649	25705
25955	25530
25795	26017
25547	25886
TOTAL / 10: (average)	25751
Sq. Root of average: (Sigma)	160
3 Sigma:	480
Average + 3 Sigma:	26231
Average - 3 Sigma:	25271

EFFICIENCY DATA	
2 MIINUTE COUNT:	2
GROSS CPM (Count/min)	12943
NET CPM (Gross count -Bkg.)	12943
EFFICIENCY (Net CPM /DPM)	41.4%
CORR. FACTOR (1 / Eff)	2.42

BACKGROUND DATA	
TOTAL COUNTS;	2
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	.10

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	6/9/97

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: Larry Smith SIGNATURE:
DATE PERFORMED:	6/10/97

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-97-05-209

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model SAC-4 Serial Number 1128
External Probe(s) _____ Serial # _____

Calibration Method Pulser s/n 101500

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	2,000 CPM	2,000 CPM	All Calibrations Btn. + & - 10%
2		80K	8,000	8,000	
3					Input Sensitivity = 10mV
4	1 MIN	20K	20,023	20,023	
5		80K	80,171	80,171	High Voltage = 754 Volts
6					
7	10 MIN	20K	200,293	200,293	Response Check to 230Th
8		80K	801,550	801,550	
9					Electronic calibration only
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: _____ (Signed)
Calibration Date: 06-09-97
Next Calibration Due: 09-09-97

I certify that the above information is correct:
_____ 06-09-97
Administrative Coordinator Date

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [X] Pu 239 # 5308	[ ] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	3-12-97	ACTIVITY DPM	31280

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
27666	27868
27677	27871
27640	27682
27816	27917
27728	27684
TOTAL / 10: (average)	27755
Sq. Root of average: (Sigma)	166.6
3 Sigma:	499.8
Average + 3 Sigma:	28255
Average - 3 Sigma:	27255

EFFICIENCY DATA:	
2 MINUTE COUNT:	27764
GROSS CPM (Count/min)	13882
NET CPM (Gross count - Bgk.)	13881.75
EFFICIENCY (Net CPM/DPM)	44.4
CORR. FACTOR (1 / Eff.)	2.3

BACKGROUND DATA:	
TOTAL COUNTS:	5
COUNT TIME:	20 Minutes
COUNTS PER MINUTE:	.25

CALIBRATED BY VENDER: (Electronical calibration only)	General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	7-22-96

SOURCE EFFICIENCY AND CHI SQUARE BY:	NAME: CARMEN VERGARI SIGNATURE: Carmen Vergari
CALIBRATION DATE:	4/9/97
CALIBRATION DUE:	7/9/97

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [X] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5/6/96	ACTIVITY DPM	31280

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
27211	27142
27178	26906
27481	26889
27306	27018
27235	27054
TOTAL / 10: (average)	27142
√. Root of average: (Sigma)	164.74
3 Sigma:	494.2
Average + 3 Sigma:	27636.2
Average - 3 Sigma:	26647.8

EFFICIENCY DATA:	
2 MINUTE COUNT:	27208
GROSS CPM (Count/min)	13604
NET CPM (Gross count - Bgk.)	13603.8
EFFICIENCY (Net CPM/DPM)	43.4%
CORR. FACTOR (1 / Eff.)	2.3

BACKGROUND DATA:	
TOTAL COUNTS:	3
COUNT TIME:	20 Minutes
COUNTS PER MINUTE:	.15

CALIBRATED BY VENDER: (Electronical calibration only)	General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	7-22-96

SOURCE EFFICIENCY AND CHI SQUARE BY:	NAME: CARMEN VERGARI SIGNATURE: Carmen Vergari
CALIBRATION DATE:	1-21-97
CALIBRATION DUE:	4-21-97

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [X] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5/6/96	ACTIVITY DPM	31,280

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
27279	27359
27357	27570
27676	27207
27228	27406
27411	27273
TOTAL / 10: (average)	27376
√. Root of average: (Sigma)	165
3 Sigma:	496
Average + 3 Sigma:	27872
Average - 3 Sigma:	26880

EFFICIENCY DATA:	
2 MINUTE COUNT:	27364
GROSS CPM (Count/min)	13682
NET CPM (Gross count - Bgk.)	13682
EFFICIENCY (Net CPM/DPM)	43.77
CORR. FACTOR (1 / Eff.)	2.29

BACKGROUND DATA:	
TOTAL COUNTS:	1
COUNT TIME:	20 Minutes
COUNTS PER MINUTE:	.05

CALIBRATED BY VENDER: (Electronical calibration only)	General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	7-22-96

SOURCE EFFICIENCY AND CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
CALIBRATION DATE:	10-21-96
CALIBRATION DUE:	1-21-97

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square) ADDENDUM FOR SOURCE RESPONCE

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[ ] Tc-99 # 763/84 [x] Pu 239 #~~7346~~ 7345	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5/1/96	ACTIVITY DPM	2208

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
1906	1906
1871	1979
1824	1878
2005	1847
1964	1902
TOTAL / 10: (average)	1908
Sq. Root of average: (Sigma)	43.68
3 Sigma:	131
Average + 3 Sigma:	2033
Average - 3 Sigma:	1777

EFFICIENCY DATA:	
2 MINUTE COUNT:	NA
GROSS CPM (Count/min)	NA
NET CPM (Gross count - Bgk.)	NA
EFFICIENCY (Net CPM/DPM)	NA
CORR. FACTOR (1 / Eff.)	NA

BACKGROUND DATA:	
TOTAL COUNTS:	3
COUNT TIME:	20 Minutes
COUNTS PER MINUTE:	.15

CALIBRATED BY VENDER: (Electronical calibration only)	General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	7-22-96

SOURCE EFFICIENCY AND CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
CALIBRATION DATE:	10-21-96
CALIBRATION DUE:	1-21-97

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [X] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5/6/96	ACTIVITY DPM	31281

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
27519	27418
27132	27672
27555	27644
27368	27690
27460	27,601
TOTAL / 10: (average)	27506
Sq. Root of average: (Sigma)	166
3 Sigma:	498
Average + 3 Sigma:	28004
Average - 3 Sigma:	27008

EFFICIENCY DATA:	
2 MINUTE COUNT:	27645
GROSS CPM (Count/min)	13823
NET CPM (Gross count - Bgk.)	13823
EFFICIENCY (Net CPM/DPM)	44.2%
CORR. FACTOR (1 / Eff.)	2.3

BACKGROUND DATA:	
TOTAL COUNTS:	1
COUNT TIME:	20 Minutes
COUNTS PER MINUTE:	.05

CALIBRATED BY VENDER: (Electronical calibration only)	General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	7-22-96

SOURCE EFFICIENCY AND CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
CALIBRATION DATE:	7-25-96
CALIBRATION DUE:	10-25-96

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-96-07-209

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model SAC-4 Serial Number 1128
External Probe(s) _____ Serial # _____
Calibration Method Pulser s/n 120935

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	2,000 CPM	2,000 CPM	All Calibrations Btn. + & - 10%
2		80K	8,003	8,003	
3					High Voltage = 758 Volts
4	1 MIN	20K	20,006	20,006	Input Sensitivity ≃ 10mV
5		80K	80,089	80,089	
6					Response Check to ^{230}Th
7	10 MIN	20K	200,280	200,280	
8		80K	800,800	800,800	Electronic Calibration only
9					per customer request
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: (Signed)
Calibration Date: 07-22-96
Next Calibration Due: 10-22-96

I certify that the above information is correct:
Administrative Coordinator — Date: 07-22-96

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [X] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5/6/96	ACTIVITY DPM	31,280

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
27279	27359
27357	27570
27676	27207
27228	27406
27411	27273
TOTAL / 10: (average)	27376
Sq. Root of average: (Sigma)	165
3 Sigma:	496
Average + 3 Sigma:	27872
Average - 3 Sigma:	26880

EFFICIENCY DATA:	
2 MINUTE COUNT:	27364
GROSS CPM (Count/min)	13682
NET CPM (Gross count - Bgk.)	13682
EFFICIENCY (Net CPM/DPM)	43.7%
CORR. FACTOR (1 / Eff.)	2.29

BACKGROUND DATA:	
TOTAL COUNTS:	1
COUNT TIME:	20 Minutes
COUNTS PER MINUTE:	.05

CALIBRATED BY VENDER: (Electronical calibration only)	General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	7-22-96

SOURCE EFFICIENCY AND CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
CALIBRATION DATE:	10-21-96
CALIBRATION DUE:	1-21-97

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square) ADDENDUM FOR SOURCE RESPONSE

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[ ] Tc-99 # 763/84 [X] Pu 239 #~~7346~~ 7345	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5/1/96	ACTIVITY DPM	2208

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
1906	1906
1871	1979
1824	1878
2005	1847
1964	1902
TOTAL / 10: (average)	1908
Sq. Root of average: (Sigma)	43.68
3 Sigma:	131
Average + 3 Sigma:	2033
Average - 3 Sigma:	1777

EFFICIENCY DATA:	
2 MINUTE COUNT:	NA
GROSS CPM (Count/min)	NA
NET CPM (Gross count - Bgk.)	NA
EFFICIENCY (Net CPM/DPM)	NA
CORR. FACTOR (1 / Eff.)	NA

BACKGROUND DATA:	
TOTAL COUNTS:	3
COUNT TIME:	20 Minutes
COUNTS PER MINUTE:	.15

CALIBRATED BY VENDER: (Electronical calibration only)	General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	7-22-96

SOURCE EFFICIENCY AND CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
CALIBRATION DATE:	10-21-96
CALIBRATION DUE:	1-21-97

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [x] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5/6/96	ACTIVITY DPM	31281

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
27519	27418
27132	27672
27555	27644
27368	27690
27460	27,601
TOTAL / 10: (average)	27506
Sq. Root of average: (Sigma)	166
3 Sigma:	498
Average + 3 Sigma:	28004
Average - 3 Sigma:	27008

EFFICIENCY DATA:	
2 MINUTE COUNT:	27645
GROSS CPM (Count/min)	13823
NET CPM (Gross count - Bgk.)	13823
EFFICIENCY (Net CPM/DPM)	44.2%
CORR. FACTOR (1 / Eff.)	2.3

BACKGROUND DATA:	
TOTAL COUNTS:	1
COUNT TIME:	20 Minutes
COUNTS PER MINUTE:	.05

CALIBRATED BY VENDER: (Electronical calibration only)	General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	7-22-96

SOURCE EFFICIENCY AND CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
CALIBRATION DATE:	7-25-96
CALIBRATION DUE:	10-25-96

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-96-03-210

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model SAC-4 Serial Number 1128
External Probe(s) _____ Serial # _____

Calibration Method ~~230~~ Pulser s/n 120935
Th s/n 11623

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	1,991 CPM	1,991 CPM	All Calibrations Btn. + & - 10%
2		80K	7,990	7,990	
3					Input Sensitivity = 10mV
4	1 MIN	20K	19,948	19,948	
5		80K	79,959	79,959	High Voltage = 760 Volts
6					
7	10 MIN	20K	199,569	199,569	~~230~~ Th Efficiency = 29.1%
8		80K	799,467	799,467	
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: (Signed)
Calibration Date: 03-08-96
Next Calibration Due: 06-08-96

I certify that the above information is correct:
Administrative Coordinator
03-08-96
Date

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

ELECTRONIC CALIBRATION

Electronic Calibration

1. Test Instrument: SEE
2. Pulse Rate: CAL
3. Amplitude: CERT.
4. Time Period: ↳
5. Time Base: ↓
6. Counting Time:
7. High Voltage:
8. Counts:

Background Determination

9. Instrument Model: SAC-4
10. Serial Number: 1128
11. Location: PGH PA.
12. Date: 3-8-96
13. Time: 1115
14. Test By: RRM
15. Time Period: X10
16. Time Base: 1
17. Counting Time: 10 MIN
18. Purge Time: N/A
19. Type of Radiation: [X] Alpha [ ] Beta
20. Background: 0.3 @ 760 V

Efficiency Determination

21. Source & S/N: Th230 #11623
22. Source DPM: 17400
23. Time Base: 1
24. Time Period: X1
25. Counting Time: 1 MIN

Trial #	CPM (A)	Difference from Ave. Count (B)	Difference Squared (C)
1	5051	12.6	158.8
2	5066	2.4	5.8
3	4970	93.6	8761.0
4	5169	105.4	11109.2
5	5002	61.6	3794.6
6	5090	26.4	697.0
7	5051	12.6	158.8
8	5182	118.4	14018.6
9	5012	51.6	2662.6
10	5043	20.6	424.4

TOTALS:
A 50636
B n/a
C 41790.1

26. Average Count Rate $\left(\frac{\text{sum total A}}{10}\right)$ = 5063.6 CPM
27. 2 σ ($2\sqrt{\text{average count rate}}$) = 142.3
28. Chi Square Number $\left(\frac{\text{sum total C}}{\text{line 26}}\right)$ = 8.3
29. Chi Square Fit (2-22) = [X] Yes

    If "NO" Contact Foreman [ ] No
30. Net Count Rate (line 26-line 20) 5063.3
31. Efficiency:

    $\frac{\text{Net CPM (line 30)}}{\text{Source DPM (line 22)}} \times 100 =$ 29.1%

IH & S Form #B- 203
Blairsville Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[ ] Tc-99 # 763/84 [X] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	11/17/95	ACTIVITY DPM	230959

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
197952	197082
197412	197140
197329	197726
197491	198136
197327	197708
TOTAL / 10: (average)	197530
Sq. Root of average: (Sigma)	444.4
3 Sigma:	1333
Average + 3 Sigma:	198863
Average - 3 Sigma:	196197

CALIBRATED BY VENDER: General Technical Services, Inc.	
CALIBRATION DATE:	3-8-96

CHECK SOURCE CHI SQUARE BY:	NAME: Larry-Smith SIGNATURE: Larry Smith
DATE PERFORMED:	3-18-96

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15221

Customer P.O.# MB-14027-S
Work Order # I-95-11-210

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model SAC-4 Serial Number 1128
External Probe(s) _____ Serial # _____

Calibration Method Pulser s/n 298 & 12093!
230Th s/n 11623

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	1,999 CPM	1,999 CPM	All Calibrations Btn. + & - 10%
2		80K	7,997	7,997	
3					Input Sensitivity = 10mV
4	1 MIN	20K	20,000	20,000	
5		80K	79,993	79,993	High Voltage = 760 Volts
6					
7	10 MIN	20K	200,029	200,029	230Th Efficiency = 29.2%
8		80K	799,976	799,976	
9					see attached sheet for additional
10					information
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: _____ (Signed)
Calibration Date: 12-05-95
Next Calibration Due: 03-05-96

I certify that the above information is correct:
_____ Administrative Coordinator
12-05-95 Date

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

ELECTRONIC CALIBRATION

Electronic Calibration

1. Test Instrument: SEE
2. Pulse Rate: CAL
3. Amplitude: CER-7
4. Time Period: L
5. Time Base:
6. Counting Time:
7. High Voltage:
8. Counts:

Background Determination

9. Instrument Model: SAC-4
10. Serial Number: 1128
11. Location: PGH, PA
12. Date: 12-5-95
13. Time: 1350
14. Test By: RRM
15. Time Period: X10
16. Time Base: 1
17. Counting Time: 10min
18. Purge Time: N/A
19. Type of Radiation: [X] Alpha [ ] Beta
20. Background: 0.1 @ 760 V

Efficiency Determination

21. Source & S/N: Th230 11623
22. Source DPM: 17400
23. Time Base: 1
24. Time Period: X1
25. Counting Time: 1min
26. Average Count Rate $\left(\frac{\text{sum total A}}{10}\right)$ = 5073.7 CPM
27. 2 σ $(2\sqrt{\text{average count rate}})$ = 142.5
28. Chi Square Number $\left(\frac{\text{sum total C}}{\text{line 26}}\right)$ = 5.8
29. Chi Square Fit (2-22) = [X] Yes

If "NO" Contact Foreman [ ] No

30. Net Count Rate (line 26-line 20) 5073.6
31. Efficiency:

$\frac{\text{Net CPM (line 30)}}{\text{Source DPM (line 22)}} \times 100 =$ 29.2%

Trial #	CPM (A)	Difference from Ave. Count (B)	Difference Squared (C)
1	5007	66.7	4448.9
2	5019	54.7	2992.1
3	5196	122.3	14957.3
	5055	18.7	349.7
5	5120	46.3	2143.7
6	5079	5.3	28.1
7	5118	44.3	1962.5
8	5042	31.7	1004.9
9	5066	7.7	59.3
10	5035	38.7	1497.7

TOTALS
A 5073
B n/a
C 29444

IH & S Form #B- 203
Blairsville Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[ ] Tc-99 # 763/84 [X] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	12-7-94	ACTIVITY DPM	230965

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
195547	196384
196170	197290
196802	196767
196989	196668
196268	196849
TOTAL / 10: (average)	196493
Sq. Root of average: (Sigma)	443
3 Sigma:	1329
Average + 3 Sigma:	197822
Average - 3 Sigma:	195164

CALIBRATED BY VENDER: General Technical Services, Inc.	
CALIBRATION DATE:	12-5-95

CHECK SOURCE CHI SQUARE BY:	NAME: 12-2-95 Larry Smith SIGNATURE: Larry Smith
DATE PERFORMED:	12-7-95

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-95-08-211

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model SAC-4 Serial Number 1128
External Probe(s) _____ Serial # _____

Calibration Method ~~230~~ Pulser s/n 101500
Th s/n 11623

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	1,998 CPM	1,998 CPM	All Calibrations Btn. + & - 10%
2		80K	7,990	7,990	
3					High Voltage = 760 Volts
4	1 MIN	20K	19,991	19,991	
5		80K	80,007	80,007	~~230~~ Th Efficiency = 30.0%
6					
7	10 MIN	20K	200,018	200,018	See attached sheet for additional
8		80K	800,136	800,136	information
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: (Signed)
Calibration Date: 08-24-95
Next Calibration Due: 11-24-95

I certify that the above information is correct:
Administrative Coordinator
08-24-95
Date

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

ELECTRONIC CALIBRATION

Electronic Calibration

1. Test Instrument: SEE
2. Pulse Rate: CAL
3. Amplitude: CERT.
4. Time Period: ↳
5. Time Base: ↓
6. Counting Time:
7. High Voltage:
8. Counts:

Background Determination

9. Instrument Model: SAC-4
10. Serial Number: 1128
11. Location: Pitts. Pa.
12. Date: 8-24-95
13. Time: 1420
14. Test By: RRM
15. Time Period: X10
16. Time Base: 1
17. Counting Time: 10MIN
18. Purge Time: N/A
19. Type of Radiation: [X] Alpha [ ] Beta
20. Background: 0.2 @ 760 V

Efficiency Determination

21. Source & S/N: Th^{230} #11623
22. Source DPM: 17400
23. Time Base: 1
24. Time Period: x1
25. Counting Time: 1MIN
26. Average Count Rate $\left(\frac{\text{sum total A}}{10}\right)$ = 5214 CPM
27. 2σ $(2\sqrt{\text{average count rate}})$ = 144.4
28. Chi Square Number $\left(\frac{\text{sum total C}}{\text{line 26}}\right)$ = 9.1
29. Chi Square Fit (2-22) = [X] Yes

    If "NO" Contact Foreman = [ ] No
30. Net Count Rate (line 26-line 20) 5213.8
31. Efficiency:

    $\frac{\text{Net CPM (line 30)}}{\text{Source DPM (line 22)}}$ X 100= 30.0%

Trial #	CPM (A)	Difference from Ave. Count (B)	Difference Squared (C)
1	5330	116	13456
2	5089	25	625
3	5263	49	2401
1	5236	22	484
5	5196	18	324
6	5075	139	19321
7	5216	2	4
8	5207	7	49
9	5141	73	5329
10	5287	73	5329

TOTALS:
A 52140
B n/a
C 47322

IH & S Form #B- 203
Blairsville Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [ ] Pu 239 # 5308 [X] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	12-7-94	ACTIVITY DPM	230965

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
196027	197029
196466	196112
196233	196252
196502	197013
197258	197049
TOTAL / 10: (average)	196599
Sq. Root of average: (Sigma)	443 ~~1330~~ 22
3 Sigma:	1330
Average + 3 Sigma:	197929
Average - 3 Sigma:	195269

CALIBRATED BY VENDER: General Technical Services, Inc.	
CALIBRATION DATE:	8-24-95

CHECK SOURCE CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
DATE PERFORMED:	8-26-95

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-95-05-220

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model SAC-4 Serial Number 1128
External Probe(s) _____ Serial # _____

Calibration Method ~~230~~Pusler s/n 101500
Th s/n 11623

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	2,002 CPM	2,002 CPM	All Calibrations Btn. + & - 10%
2		80K	8,024	8,024	
3					Input sensitivity ≅ 10mV
4	1 MIN	20K	20,043	20,043	
5		80K	80,310	80,310	High Voltage = 760 Volts
6					
7	10 MIN	20K	200,384	200,384	~~230~~Th Efficiency = 30.0%
8		80K	803,122	803,122	
9					See attached sheet for additional
10					information
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: _____ (Signed)
Calibration Date: 05-16-95
Next Calibration Due: 08-16-95

I certify that the above information is correct:
_____ Administrative Coordinator
05-16-95 Date

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

ELECTRONIC CALIBRATION

Electronic Calibration

1. Test Instrument: SEE
2. Pulse Rate: CAL
3. Amplitude: CERT
4. Time Period: ↳
5. Time Base: ↓
6. Counting Time:
7. High Voltage:
8. Counts:

Background Determination

9. Instrument Model: SAC-4
10. Serial Number: 1128
11. Location: PGH PA
12. Date: 5-16-95
13. Time: 1105
14. Test By: RRM
15. Time Period: X10
16. Time Base: 1
17. Counting Time: 10MIN
18. Purge Time: N/A
19. Type of Radiation: [X] Alpha [ ] Beta
20. Background: 0.3 @ 760 V

Efficiency Determination

21. Source & S/N: Th230 #11623
22. Source DPM: 17400
23. Time Base: 1
24. Time Period: X1
25. Counting Time: 1MIN
26. Average Count Rate $\left(\frac{\text{sum total A}}{10}\right)$ = 5214.1 CPM
27. 2 σ $(2\sqrt{\text{average count rate}})$ = 144.4
28. Chi Square Number $\left(\frac{\text{sum total C}}{\text{line 26}}\right)$ = 5.5
29. Chi Square Fit (2-22) = [X] Yes

    If "NO" Contact Foreman [ ] No
30. Net Count Rate (line 26-line 20) 5213.8
31. Efficiency:

    $\frac{\text{Net CPM (line 30)}}{\text{Source DPM (line 22)}} \times 100 =$ 30.0%

Trial #	CPM (A)	Difference from Ave. Count (B)	Difference Squared (C)
1	5214	0.1	0.0
2	5125	89.1	7938.8
3	5183	31.1	967.2
4	5272	57.9	3352.4
5	5181	33.1	1095.6
6	5213	1.1	1.2
7	5309	94.9	9006.0
8	5158	56.1	3147.2
9	5270	55.9	3124.8
10	5216	1.9	3.6

TOTALS
A 52141
B n/a
C 28636.0

IH & S Form #B- 203
Blairsville Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[ ] Tc-99 # 763/84 [X] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	12-7-94	ACTIVITY DPM	230965

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
197836	197268
196700	197206
196929	196836
197496	196041
196884	197125
TOTAL / 10: (average)	197032
Sq. Root of average: (Sigma)	444
3 Sigma:	1332
Average + 3 Sigma:	198364
Average - 3 Sigma:	195700

CALIBRATED BY VENDER: General Technical Services, Inc.	
CALIBRATION DATE:	5-16-95

CHECK SOURCE CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
DATE PERFORMED:	5-18-95

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-94-12-219

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model SAC-4 Serial Number 1128
External Probe(s) _____ Serial # _____

Calibration Method ^{230}Pulser s/n 101500
^{230}Th s/n 11623

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	1,999 CPM	1,999 CPM	All Calibrations btn. + & - 10%
2		80K	7,997	7,997	
3					
4	1 MIN	20K	19,978	19,978	Input Sensitivity = 10mV
5		80K	79,964	79,964	
6					High Voltage = 760 Volts
7	10 MIN	20K	199,794	199,794	
8		80K	801,286	801,286	^{230}Th Efficinecy = 30.6%
9					
10					See attached sheet for more
11					information
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: (Signed)
Calibration Date: 12-09-94
Next Calibration Due: 03-09-95

I certify that the above information is correct:
Administrative Coordinator — Date: 12-09-94

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

ELECTRONIC CALIBRATION

Electronic Calibration

1. Test Instrument: SEE
2. Pulse Rate: CAL
3. Amplitude: CEL.
4. Time Period: L
5. Time Base:
6. Counting Time:
7. High Voltage:
8. Counts:

Background Determination

9. Instrument Model: SAC-4
10. Serial Number: 1128
11. Location: PGH PA
12. Date: 12-9-94
13. Time: 1300
14. Test By: RRM
15. Time Period: 1
16. Time Base: X10
17. Counting Time: 10MIN
18. Purge Time: N/A
19. Type of Radiation: [X] Alpha [ ] Beta
20. Background: 0.2 @ 760 V

Efficiency Determination

21. Source & S/N: Th^{230} #11623
22. Source DPM: 17400
23. Time Base: X1
24. Time Period: 1
25. Counting Time: 1MIN
26. Average Count Rate $\left(\frac{\text{sum total A}}{10}\right)$ = 5327.2 CPM
27. 2 σ $(2\sqrt{\text{average count rate}})$ = 146.0
28. Chi Square Number $\left(\frac{\text{sum total C}}{\text{line 26}}\right)$ = 10.7
29. Chi Square Fit (2-22) = [X] Yes
    If "NO" Contact Foreman [ ] No
30. Net Count Rate (line 26-line 20) 5327.0
31. Efficiency:

$$\frac{\text{Net CPM (line 30)}}{\text{Source DPM (line 22)}} \times 100 = 30.6\%$$

Trial #	CPM (A)	Difference from Ave. Count (B)	Difference Squared (C)
1	5307	20.2	408.0
2	5377	49.8	2480.0
3	5319	8.2	67.2
4	5226	101.2	10241.4
5	5284	43.2	1866.2
6	5258	69.2	4788.6
7	5401	73.8	5446.4
8	5232	95.2	9063.0
9	5428	100.8	10160.6
10	5440	112.8	12723.8

TOTALS
A 5327
B n/a
C 5724

IH & S Form #B- 203
Blairsville Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[ ] Tc-99 # 763/84 [X] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	9/30/94	ACTIVITY DPM	231,100

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
195,030	194,756
194,861	194,930
195,577	194,739
195,280	195,767
195,681	195,222
TOTAL / 10: (average)	195,184
Sq. Root of average: (Sigma)	441
3 Sigma:	1323
Average + 3 Sigma:	196507
Average - 3 Sigma:	193861

CALIBRATED BY VENDER: General Technical Services, Inc.	
CALIBRATION DATE:	12-9-94

CHECK SOURCE CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
DATE PERFORMED:	12-14-94

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: Avenue A & West Street
Pittsburgh, PA 15221

Customer P.O.# MB-14027-S
Work Order # I-94-08-218

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model SAC-4 Serial Number 1128
External Probe(s) _____ Serial # _____

Calibration Method ^{230}Pulser s/n 101500
^{230}Th s/n 11623

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	1,994 CPM	1,994 CPM	All Calibrations Btn. + & - 10%
2		80K	7,991	7,991	
3					Input Sensitivity ≅ 10 mV
4	1 MIN	20K	19,954	19,954	
5		80K	79,986	79,986	High Voltage = 750 Volts
6					
7	10 MIN	20K	199,512	199,512	All counts based on 1 minute
8		80K	799,844	799,844	
9					^{230}Th Efficinecy = 30.6%
10					
11					See attached sheet for additional
12					information
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: _____ (Signed)
Calibration Date: 08-29-94
Next Calibration Due: 11-29-94

I certify that the above information is correct:
_____ Administrative Coordinator
08-29-94 Date

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

ELECTRONIC CALIBRATION

Electronic Calibration

1. Test Instrument: SEE
2. Pulse Rate: CAL
3. Amplitude: CERT.
4. Time Period: ↳
5. Time Base: ↓
6. Counting Time: ↓
7. High Voltage: ↓
8. Counts: ↓

Background Determination

9. Instrument Model: SAC-4
10. Serial Number: 1128
11. Location: PGH, PA.
12. Date: 8-29-94
13. Time: 0830
14. Test By: RRM
15. Time Period: 1
16. Time Base: x10
17. Counting Time: 10 MIN
18. Purge Time: N/A
19. Type of Radiation: [X] Alpha [ ] Beta
20. Background: 0.2 @ 750 V

Efficiency Determination

21. Source & S/N: Th^{230} #11623
22. Source DPM: 17400
23. Time Base: x1
24. Time Period: 1
25. Counting Time: 1 MIN
26. Average Count Rate $\left(\frac{\text{sum total A}}{10}\right)$ = 5331.5 CPM
27. 2 σ $(2\sqrt{\text{average count rate}})$ = 146.0
28. Chi Square Number $\left(\frac{\text{sum total C}}{\text{line 26}}\right)$ = 12.4
29. Chi Square Fit (2-22) = [X] Yes

If "NO" Contact Foreman [ ] No

30. Net Count Rate (line 26-line 20) 5331.3
31. Efficiency:

$\frac{\text{Net CPM (line 30)}}{\text{Source DPM (line 22)}}$ X 100= 30.6%

Trial #	CPM (A)	Difference from Ave. Count (B)	Difference Squared (C)
1	5345	13.5	182.3
2	5289	42.5	1806.3
3	5308	23.5	552.3
	5283	48.5	2352.3
5	5527	195.5	38220.3
6	5433	101.5	10302.3
7	5282	49.5	2450.3
8	5327	4.5	20.3
9	5254	77.5	6006.3
10	5267	64.5	4160.3

TOTALS
A 53315
B n/a
C 6605

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [X] Pu 239 # 5308	[ ] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	~~4-20-94~~ TSB 8-30-94 7-26-94	ACTIVITY DPM	31282

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
27308	27195
27328	27553
27451	27238
27405	27554
27433	27224
TOTAL / 10: (average)	27368.9
Sq. Root of average: (Sigma)	165.4
3 Sigma:	496.3
Average + 3 Sigma:	27865.2
Average - 3 Sigma:	26872.6

CALIBRATED BY VENDER: General Technical Services, Inc.	
CALIBRATION DATE:	8-29-94

CHECK SOURCE CHI SQUARE BY:	NAME: Todd Brautigam SIGNATURE: T Brautigam
DATE PERFORMED:	8-30-94

IH & S Form #B- 203
Blairsville Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[ ] Tc-99 # 763/84 [x] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	9/30/94	ACTIVITY DPM	231,100

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
196221	195542
196481	195799
196755	195914
196821	195856
195962	196548
TOTAL / 10: (average)	196190
Sq. Root of average: (Sigma)	443
3 Sigma:	1329
Average + 3 Sigma:	197519
Average - 3 Sigma:	194861

CALIBRATED BY VENDER: General Technical Services, Inc.	
CALIBRATION DATE:	8/26/94

CHECK SOURCE CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
DATE PERFORMED:	10/17/94

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: Avenue A & West Street
Pittsburgh, PA 15221

Customer P.O.# MB-14027-S
Work Order # I-94-05-222

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model SAC-4 Serial Number 1128
External Probe(s) _____ Serial # _____

Calibration Method ~~230~~Pulser s/n 101500
Th s/n 11623

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	1,999 CPM	1,999 CPM	All Calibrations Btn. + & - 10%
2		80K	8,002	8,002	
3					High Voltage = 750 Volts
4	1 MIN	20K	20,018	20,018	
5		80K	80,062	80,062	~~230~~Th Efficiency = 30.3%
6					
7	10 MIN	20K	200,247	200,247	See attached sheet for additional
8		80K	800,080	800,080	information
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: _____ (Signed)
Calibration Date: 05-23-94
Next Calibration Due: 08-23-94

I certify that the above information is correct:
Theresa M DeBe — Administrative Coordinator — 05-23-94 Date

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

ELECTRONIC CALIBRATION

Electronic Calibration

1. Test Instrument: SEE
2. Pulse Rate: CAL
3. Amplitude: CERT
4. Time Period: ↳
5. Time Base: ↓
6. Counting Time:
7. High Voltage:
8. Counts:

Background Determination

9. Instrument Model: SAC-4
10. Serial Number: 1128
11. Location: ~~TGH, PA~~
12. Date: 5-23-94
13. Time: 0900
14. Test By: RRM
15. Time Period: 1
16. Time Base: x10
17. Counting Time: 10 MIN
18. Purge Time: N/A
19. Type of Radiation: [X] Alpha [ ] Beta
20. Background: 0.5 @ 750 V

Efficiency Determination

21. Source & S/N: Th^{230} 11623
22. Source DPM: 17400
23. Time Base: x1
24. Time Period: 1
25. Counting Time: 1 MIN
26. Average Count Rate $\left(\frac{\text{sum total A}}{10}\right)$ = 5267.3 CPM
27. 2 σ $(2\sqrt{\text{average count rate}})$ = 145.2
28. Chi Square Number $\left(\frac{\text{sum total C}}{\text{line 26}}\right)$ = 7.9
29. Chi Square Fit (2-22) = [X] Yes

If "NO" Contact Foreman [ ] No

30. Net Count Rate (line 26-line 20) 5266.8
31. Efficiency:

$\frac{\text{Net CPM (line 30)}}{\text{Source DPM (line 22)}}$ X 100= 30.3%

Trial #	CPM (A)	Difference from Ave. Count (B)	Difference Squared (C)
1	5333	65.7	4316.5
2	5192	75.3	5670.1
3	5308	40.7	1656.5
	5238	29.3	858.5
5	5375	107.7	11599.3
6	5213	54.3	2948.5
7	5353	85.7	7344.5
8	5237	30.3	918.1
9	5209	58.3	3398.9
10	5215	52.3	2735.3

TOTALS
A 5267
B n/a
C 41446

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [X] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	4/20/84	ACTIVITY DPM	31282

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
27095	27064
26962	27309
27190	27096
27198	27210
27345	27264
TOTAL / 10: (average)	27173
Sq. Root of average: (Sigma)	165
3 Sigma:	495
Average + 3 Sigma:	27668
Average - 3 Sigma:	26678

CALIBRATED BY VENDER: General Technical Services, Inc.	
CALIBRATION DATE:	5/23/94

CHECK SOURCE CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
DATE PERFORMED:	5/25/94

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse Electric Corp.
Customer Address: Avenue A & West Street
Pittsburgh, PA 15221

Customer P.O.# MB-14027-S
Work Order # I-94-02-215

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model SAC-4 Serial Number 1128
External Probe(s) _____ Serial # _____

Calibration Method ^{230}MP-1 s/n 301
^{230}Th s/n 11625
Electrostatic s/n ES-8295

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	X0.1	20K CPM	2,000 CPM	2,000 CPM	All Calibrations Btn. + & - 10%
2		80K	7,992	7,992	
3					All counts based on 1 minute
4	X1	20K	20,000	20,000	
5		80K	79,981	79,981	Input sensitivity = 10 mV
6					
	X10	20K	200,007	200,007	High Voltage = 760 Volts
8		80K	800,059	800,059	
9					^{230}Th Efficiency = 30.5%
10					
11					See attached sheet for additional
12					information
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: James Christopher (Signed)
Calibration Date: 02-09-94
Next Calibration Due: 05-09-94

I certify that the above information is correct:
Theresa M DeBa 02-09-94
Administrative Coordinator Date

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

ELECTRONIC CALIBRATION

Electronic Calibration

1. Test Instrument: SCE
2. Pulse Rate: CAL
3. Amplitude: Cont
4. Time Period: N
5. Time Base: ↓
6. Counting Time: ↓
7. High Voltage: ↓
8. Counts: N

Background Determination

9. Instrument Model: SAC-4
10. Serial Number: 1128
11. Location: PGH
12. Date: 2-9-94
13. Time: 10:00
14. Test By: J. Christopher
15. Time Period: 1 min
16. Time Base: X 10
17. Counting Time: 10 min
18. Purge Time: N/A
19. Type of Radiation: [X] Alpha [ ] Beta
20. Background: .3 @ 760 V

Efficiency Determination

21. Source & S/N: Th230 S/N 11623
22. Source DPM: 17,400
23. Time Base: X1
24. Time Period: 1 min
25. Counting Time: 1 min
26. Average Count Rate $\left(\frac{\text{sum total A}}{10}\right)$ = 5312 CPM
27. 2 σ $(2\sqrt{\text{average count rate}})$ = 145.7
28. Chi Square Number $\left(\frac{\text{sum total C}}{\text{line 26}}\right)$ = 9.53
29. Chi Square Fit (2-22) = [X] Yes [ ] No

If "NO" Contact Foreman

30. Net Count Rate (line 26-line 20) 5311.7
31. Efficiency:

$\frac{\text{Net CPM (line 30)}}{\text{Source DPM (line 22)}}$ X 100= 30.5%

Trial #	CPM (A)	Difference from Ave. Count (B)	Difference Squared (C)
1	5389	77	5929
2	5324	12	144
3	5348	36	1296
4	5226	86	7396
5	5290	22	484
6	5197	115	13225
7	5420	108	11664
8	5388	76	5776
9	5249	63	3969
10	5284	28	784

TOTA
A 5311
B n/
C 50[illegible]

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square, Bkg, Efficiency)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [X] Pu 239 # 5308 [ ] Pu 239 #7346	DATE OF SOURCE DECAY:	10/4/94	ACTIVITY DPM	31283

CHI SQUARE DATA (2 minute counts)	
27099	27138
26815	27245
27133	27345
27186	27265
27050	27212
TOTAL / 10: (average)	27166
Sq. Root of average: (Sigma)	164.8
3 Sigma:	494.5
Average + 3 Sigma:	27660
Average - 3 Sigma:	26672

EFFICIENCY DATA:	
2 MINUTE COUNT:	
GROSS CPM (Count / min)	
NET CPM (Gross count - bkg cpm)	
EFFICIENCY (Net cpm / dpm)	
CORR. FACTOR (1 / Eff)	

BACKGROUND DATA:	
TOTAL COUNTS:	
COUNT TIME	Minutes
COUNTS PER MINUTE	

CALIBRATED BY VENDER: ~~Applied Health Physics,~~ G.T.S.	BY: (Signature): Larry Smith
CALIBRATION DATE: 2-9-94	CHI SQ. FOR SOURCE RESPONSE DATE PERFORMED: 2-9-94

Applied HEALTH PHYSICS inc.

2986 Industrial Blvd. — Bethel Park, Pa. 15102 — Phone 412 — 835-9555 — Fax No. 412 — 835-9559

CERTIFICATE OF CALIBRATION

SHIPPING ADDRESS	BILLING ADDRESS (If Different)
W. E. C.	SAME
Ave A & West St.	
Pgh, PA 15112	

CONTACT: L. SMITH PHONE: ( ) DATE: 11/4/93 P.O.# MA 89328S

Receiving Comments: Good Condition, No Power Cord

Instrument Received: [X] Within Toler. ±10% [ ] ±10-20% [ ] Out Toler. [ ] Requires Repair

Mfg. Inst. Eberline Model # SAC-4 Serial # 1128
Detector INT-A5 Model # — Serial # —

[X] CALIBRATION [ ] REPAIR [ ] SALE [ ] LOAN By: [signature]

scale	source	reading	scale	source	reading	scale	source	reading
	~~mR/hr~~ CPM	CPM		~~mR/hr~~ CPM	CPM		mR/hr	
on	100	100	on	10000	9964			
	400	400		40000	39954			
	1000	993		100000	99662			
	4000	3995		400000	399467			

Calibration Source: [ ] GAMMA [X] ALPHA [ ] BETA [ ] ELECTRONIC [ ] OTHER

Description: [ ] ra-226 [ ] cs-137 [X] pu-239 [ ] sr-90 [X] mp-1 [ ]

RESPONSE GRAPH N/A

TEMP/HUMIDITY 69.4°F/ 38 %

PROBE EFFICIENCIES 2π
Alpha 60-90 % Beta — %
Check Source Reading N/A
Battery Check Reading N/A
Detector Angle Perpendicular
Corrections N/A ± 10% Elect.

Maintenance & Comments HV-OK @ 750, Timer OK

CALIBRATION	Contract		40.00
LABOR			
MATERIALS & SALES			
SHIPPING	UPS	2 units	15.71

QA Dept. TY Warranty —
Shipping UPS Date 11/4/93
Pick-Up — Date -/-/-
This Certificate Expires In 3 Months
Re-Calibrate On Or Before 2/4/94
Job ID #

NOTICE: Applied Health Physics, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology under Nuclear Regulatory Commission License #37-09135-01 and PA State License #PA-0228. This calibration system conforms to the requirements of NRC regulation 10-CFR-34, 10-CFR-35, MIL-STD 45662A and ANSI-STD N323-1978.

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square, Bkg, Efficiency)

COUNTER S/N:	1128	INSTRUMENT CODE:	1

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [X] Pu 239 # 5308 [ ] Pu 239 #7346	DATE OF SOURCE DECAY:	10/4/93	ACTIVITY DPM	31283

CHI SQUARE DATA (2 minute counts)	
24350	24331
24603	24548
24172	24151
24621	24309
24306	24288
TOTAL / 10: (average)	24368
Sq. Root of average: (Sigma)	156
3 Sigma:	468
Average + 3 Sigma:	24836
Average - 3 Sigma:	23900

EFFICIENCY DATA:	
2 MINUTE COUNT:	24183
GROSS CPM (Count / min)	12091
NET CPM (Gross count - bkg cpm)	12090
EFFICIENCY (Net cpm / dpm)	38.6%
CORR. FACTOR (1 / Eff)	2.59

BACKGROUND DATA:	
TOTAL COUNTS:	14
COUNT TIME	20 Minutes
COUNTS PER MINUTE	0.7

CALIBRATED BY VENDER: Applied Health Physics,	
CALIBRATION DATE:	11/4/93

CHI SQ., BKG., EFF.	Jerry [illegible]
DATE PERFORMED:	11/9/93

Applied HEALTH PHYSICS inc.

2986 Industrial Blvd. — Bethel Park, Pa. 15102 — Phone 412 — 835-9555 — Fax No. 412 — 835-9559

CERTIFICATE OF CALIBRATION

SHIPPING ADDRESS	BILLING ADDRESS (If Different)
W. E. C.	SAME
Ave. "A" & West St.	
Pgh., PA 15112	

CONTACT: L. Smith PHONE: (—) — DATE: 8/9/93 P.O.# AA 293285

Receiving Comments: Calibration, No line cable!

Instrument Received: [X] Within Toler. ±10% [ ] ±10-20% [ ] Out Toler. [ ] Requires Repair

Mfg. Inst. Eberline Model # SAC-4 Serial # 1128
Detector Int-AS Model # — Serial # —

[X] CALIBRATION [ ] REPAIR [ ] SALE [ ] LOAN By: J. Douglas

scale	source	reading	scale	source	reading	scale	source	reading
	~~mR/hr~~ cpm	cpm		~~mR/hr~~ cpm	cpm		mR/hr	
	100	100		10000	9961			
	400	399		40000	39941			
on	1000	996	on	100000	99610			
	4000	3994		400000	399428			

53# UPS 8-11-93

Calibration Source: [ ] GAMMA [X] ALPHA [ ] BETA [X] ELECTRONIC [ ] OTHER

Description: [ ] ra-226 [ ] cs-137 [X] pu-239 [ ] sr-90 [X] mp-1

RESPONSE GRAPH N/A

TEMP/HUMIDITY 74.2°F / 48%

PROBE EFFICIENCIES 2π

✓ Alpha 60-90 % Beta — %
Check Source Reading N/A
Battery Check Reading N/A
Detector Angle Perpendicular
Corrections N/A ± 10% Eff.

Maintenance & Comments HV - OK @ 610 Volts, Timer - OK.

Tested, Inspected & Calibrated

CALIBRATION	Contract		40.00
LABOR			
MATERIALS & SALES			
SHIPPING	UPS	(2) Units	20.00

QA Dept. JW Warranty —
Shipping UPS Date 8/9/93
Pick-Up — Date / /
This Certificate Expires In 3 Months
Re-Calibrate On Or Before 11/9/93
Job ID # 52445

NOTICE: Applied Health Physics, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology under Nuclear Regulatory Commission License #37-09135-01 and PA State License #PA-0228. This calibration system conforms to the requirements of NRC regulation 10-CFR-34, 10-CFR-35, MIL-STD 45662A and ANSI-STD N323-1978.

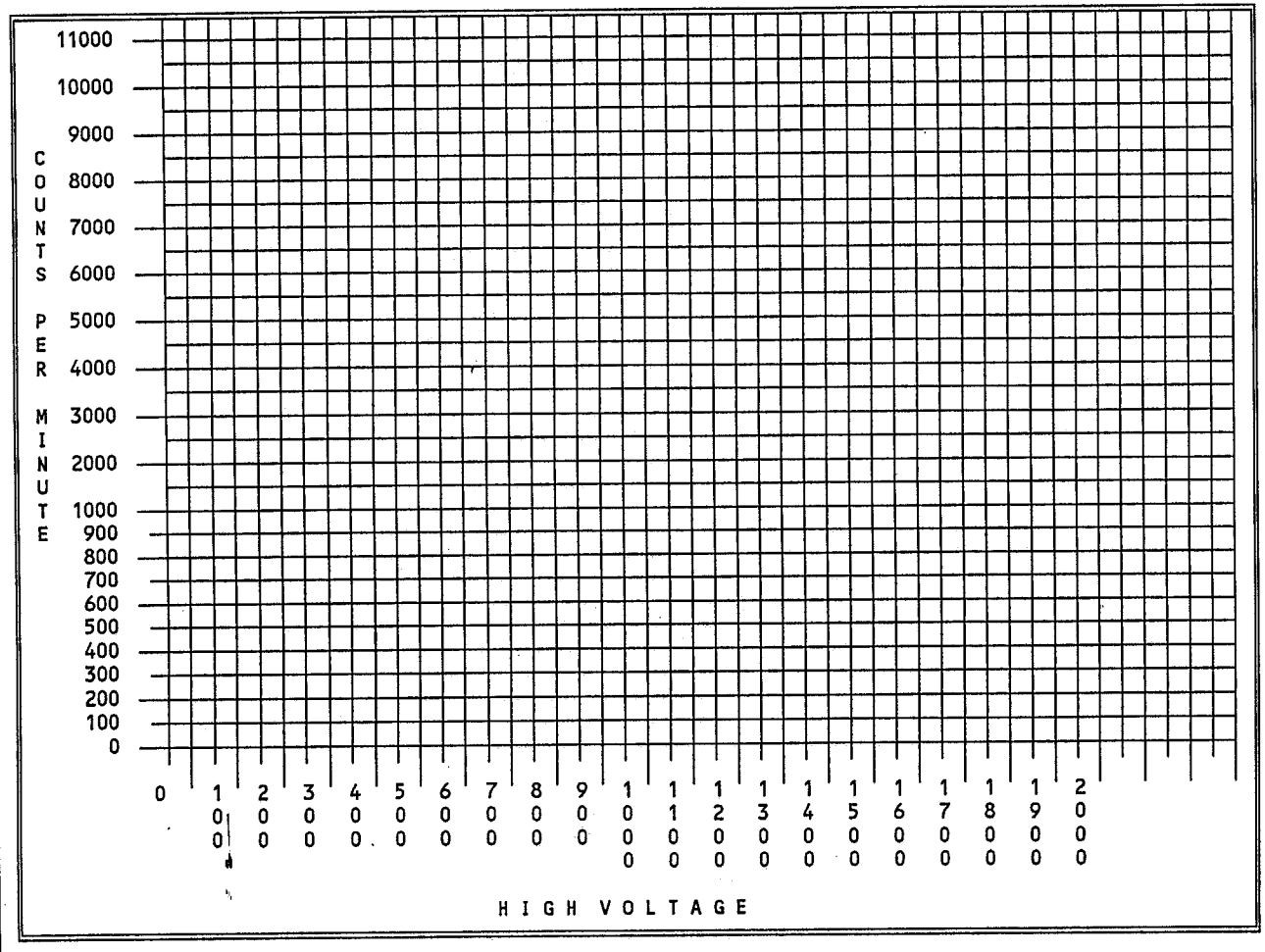
I H & S FORM #20_
FOREST HILLS SITE

****
* MANUAL LAB COUNTER *
* CALIBRATION *
****

COUNTER & S/N: 1128	CAP. #: 8419A	MANUFACTURER: FIBERLINE	LOCATION: A HP LAB	VOLT METER TYPE & S/N USED FOR CALIBRATION: By Vender
SOURCE USED: (Check one) [ ] Cs 137 #: 84-9 [ ] Tc 99 #: Activity dpm as of (Date)				VOLT METER EXPIRATION DATE: By Vender
[X] Pu 239 #: 5308 [ ] Pu 239#: Activity 31,300 dpm as of 8/12/93 .(Date)				

PLATEAU DATA

PLATEAU 1 MIN CTS.	
H. V.	COUNTS



CHI SQUARE DATA		
TOTAL / 10 (Avg.) : 7104	2 MIN. COUNTS	
SQ. ROOT AVG: 84.3 (Sigma)	7140	7012
3 Sigma: 253	7041	7064
AVG. + 3 Sigma 7357	7121	7013
AVG. - 3 Sigma 6851	7028	7234
CHECK SOURCE # 1276	7199	7189

BACKGROUND DATA	
Total Counts: 10	Count Time: (Minutes) 10
Counts Per Min: (Counts / Min) 1.0	

EFFICIENCY DATA	
2 Minute count: 22,590	(Gross Ct.)
Count / 2 : 11,295	(Gross CPM)
CPM - Bkg.: 11,294	(Net CPM)
Net CPM / Activity: (dpm) 36.1%	(Eff)
1 / Eff.: 2.77	(Correction Fac)

COMMENTS
High Voltage set at 1610 volts by
Vender (Applied Health Physic, Inc)

CALIBRATED BY: John Douglas, Applied H. P.	SIGNATURE: (See Vender Cal certificate)	DATE: 8/9/93
CHI SQUARE BY: Larry Smith, Forest Hills HP	SIGNATURE: Larry Smith	DATE: 8/12/93

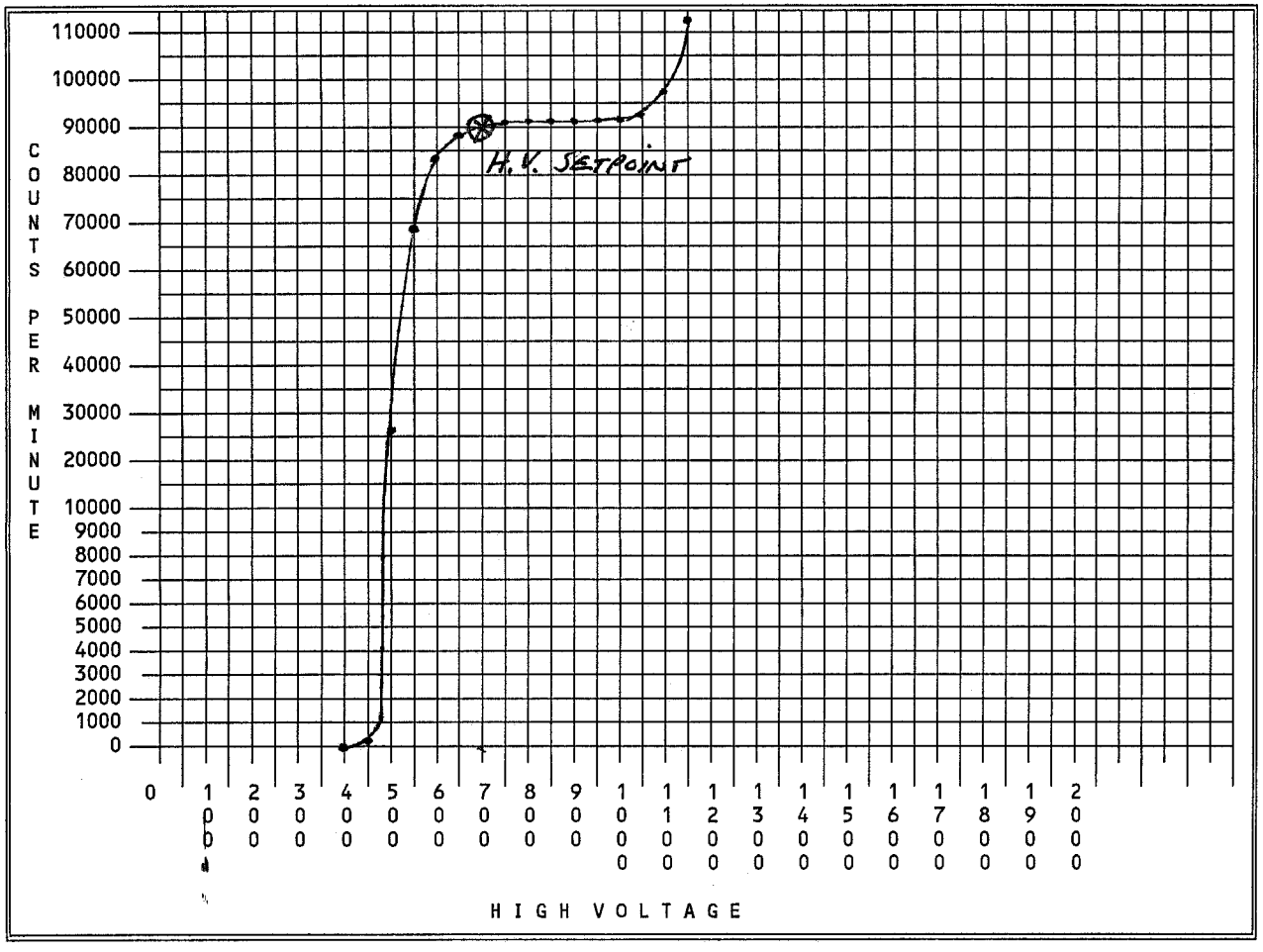
I H & S FORM #203
FOREST HILLS SITE

```
********   ***********
* MANUAL LAB COUNTER *
*    CALIBRATION     *
**********************
```

COUNTER & S/N: SAC-4 #1128	CAP. #:	MANUFACTURER: Eberline	LOCATION: Forest Hills H.P. Lab	VOLT METER TYPE & S/N: Electro Static USED FOR CALIBRATION: Volt meter
SOURCE USED: (Check one) [ ] Cs 137 #: 84-9 [ ] Tc 99 #: Activity dpm as of (Date) [ ] Pu 239 #: 5308 [X] Pu 239#: 7346 Activity 231000 dpm as of 4/28/93 .(Date)				VOLT METER EXPIRATION DATE:

PLATEAU DATA

PLATEAU 1 MIN CTS.	
H. V.	COUNTS
400	0
450	101
500	26842
550	68319
600	83259
650	88241
700	90005
750	91129
800	91264
850	91386
900	91068
950	91044
1000	92192
1050	92750
1100	97598
1150	113182



CHI SQUARE DATA		
TOTAL / 10 : (Avg.)	2 MIN. COUNTS	
SQ. ROOT AVG: (Sigma)	7859	7927
3 Sigma:	8035	7866
AVG. + 3 Sigma	8116	7906
AVG. - 3 Sigma	7903	7895
	7986	8028

BACKGROUND DATA

Total Counts: 2 Count Time: 20 (Minutes)

Counts Per Min: .10 (Counts / Min)

EFFICIENCY DATA

2 Minute count: 182773 (Gross Ct.)

Count / 2 : 91386.5 (Gross CPM)

CPM - Bkg.: 91386.4 (Net CPM)

Net CPM / Activity: 39.6% (Eff) (dpm)

1 / Eff.: 2.53 (Correction Fac)

COMMENTS

High Voltage set at 700 volts

CALIBRATED BY: Larry Smith	SIGNATURE: Larry Smith	DATE: 4/28/93
CHI SQUARE BY: Larry Smith	SIGNATURE: Larry Smith	DATE: 4/28/93

IH& ORM #1111 LRD - 6/88

MANUAL B COUNTER CALIBRATION

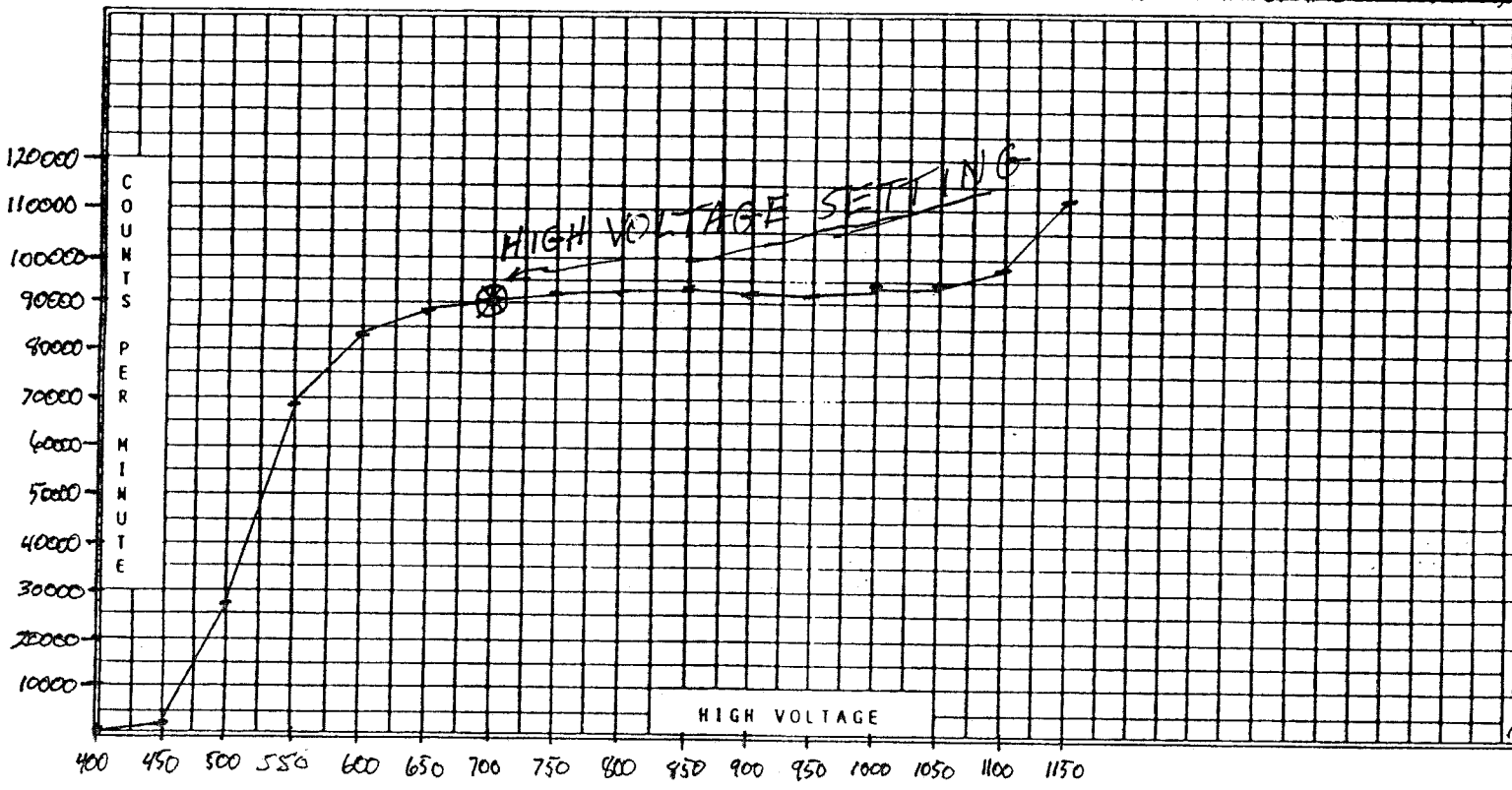
CALIBRATED BY L Smith DATE 4 / 28 / 93

COUNTER NO. α 1	SERIAL NO. 1128	CAP. NO.	SHIELD NO.	MODEL NO. SAC-4	MFG EBERLINE

LOCATION : ☐ G BLDG ☐ T BLDG ☐ R BLDG ☒ OTHER Forest Hills

SOURCE NO. : ☐ Cs137 NO.84-13 ☐ Cs137 NO.84-15 ACTIVITY ____ DPM DATE / /

: ☐ Pu239 NO.814 ☒ Pu239 ~~Pu242~~ NO. 7346 ~~9701~~ ACTIVITY 231,000 DPM DATE 4 / 28 / 93



HV	CTS	HV	CTS
400	0	1100	97598
450	101	1150	113182
500	26842		
550	68319		
600	83259		
650	88241		
700	90005		
750	91129		
800	91264		
850	91386		
900	91068		
950	91044		
1000	92192		
1050	92750		

BACKGROUND DATA		
TOTAL COUNTS	0	
COUNT TIME	5	MIN.
COUNTS ÷ MINUTES	0	CPM

EFFICIENCY DATA	1st SHELF	2nd SHELF
2 MIN. COUNT	182773	N/A
COUNTS ÷ MINUTES = CPM	91386.5	
CPM - BKG = NET CPM	91386.5	
NET CPM ÷ ACTIVITY = EFF	39.6 %	
1 ÷ EFF. = CF	2.53	

CHI SQUARE DATA

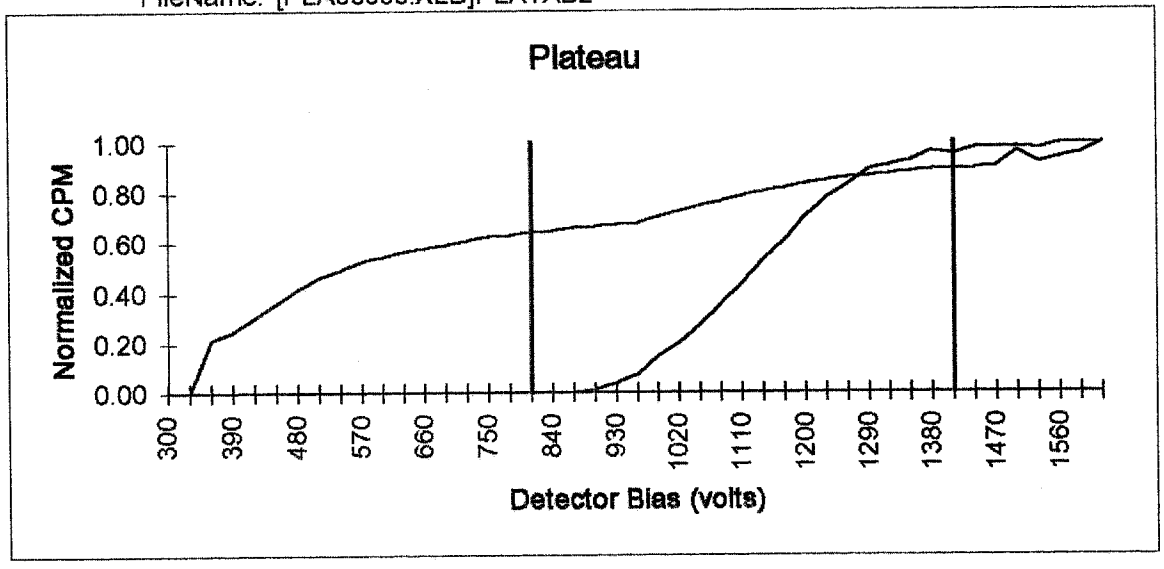
		2 MIN. COUNTS	
TOTAL ÷ 10	7954	7879	7927
√ AVG.	89.2	8035	7866
σ * 3	268	8116	7906
AVG. + 3 σ	8222	7903	7895
AVG. - 3 σ	7686	7986	8028

CODE NUMBER 2 & 3

REPORT #001

Unit Id: 1
Date Performed: 3/24/99 7:27:50
FileName: [PLA00000.XLD]PLATAB2

Application Revision: 2.1.3
Application Version: Standard



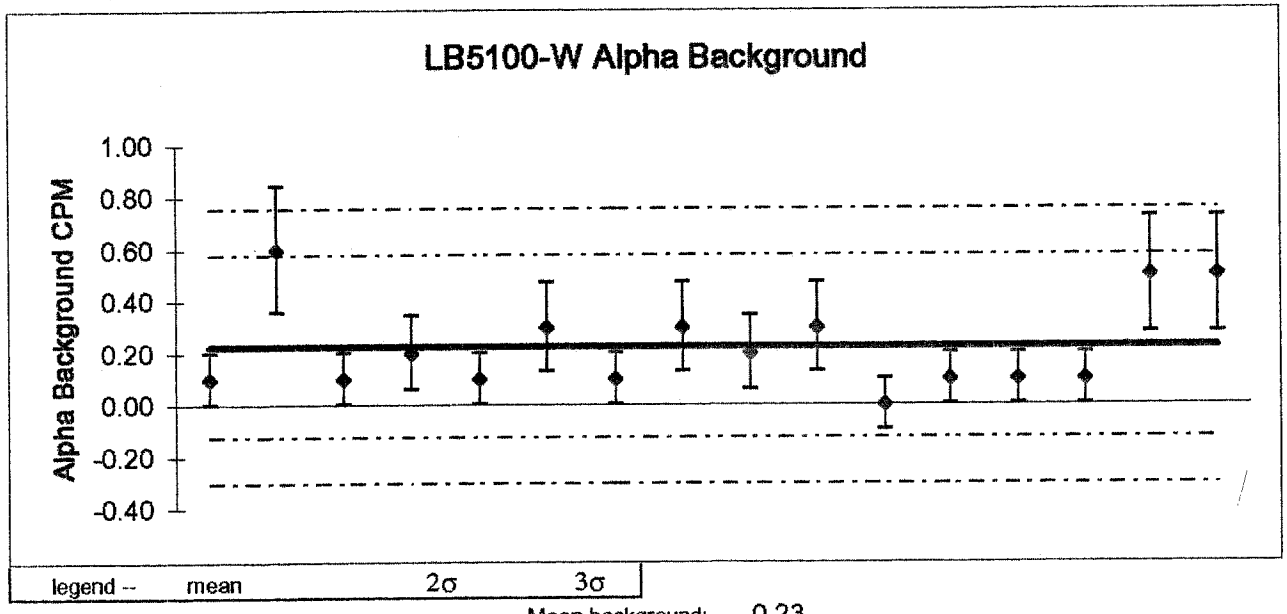
Optimum alpha & beta simultaneous operating voltage: **1410**
Beta slope per 100 volts at beta voltage: 4.08%
Alpha slope per 100 volts at beta voltage: 2.06%

Optimum alpha only operating voltage: **810**
Alpha slope per 100 volts at alpha voltage: 4.36%

BAC00000.XLD

Unit Id: 1
Date Performed: 3/25/99 7:49:35

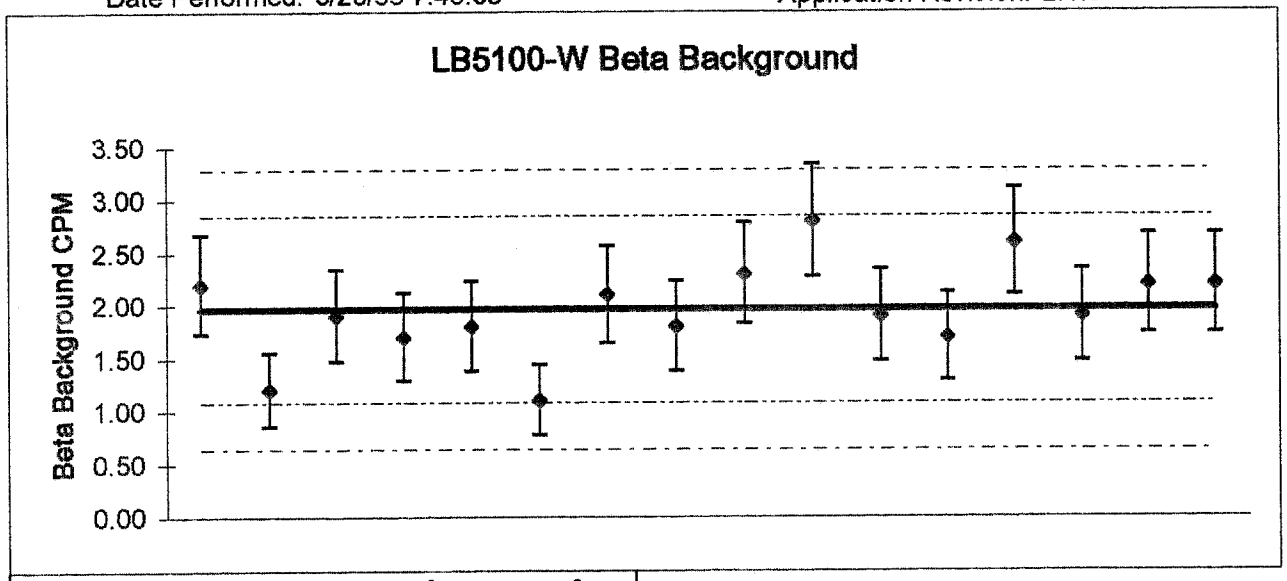
Background Archive File: bkgab
Application Revision: 2.1.5



Mean background:	0.23	
Error for mean background:	0.04	1σ
Actual standard deviation:	0.18	
Predicted standard deviation:	0.15	
Number of individual measurements:	16	
Chi-square:	20.89	
Reduced chi-square:	1.39	

Unit Id: 1
Date Performed: 3/25/99 7:49:35

Background Archive File: bkgab
Application Revision: 2.1.5



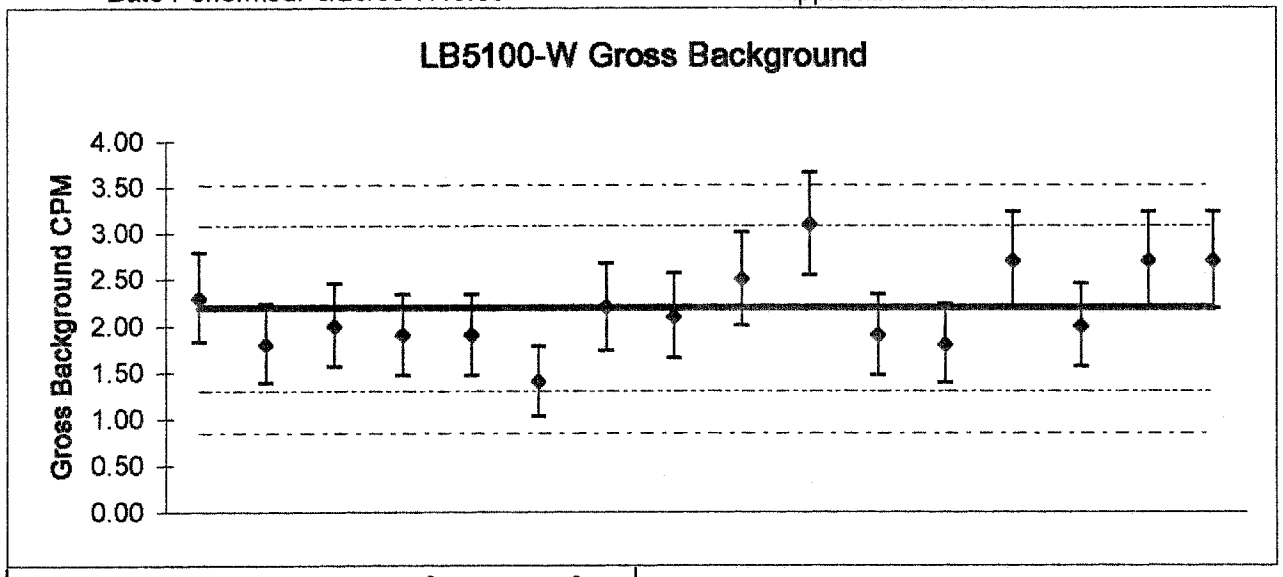
legend -- mean 2σ 3σ

Mean background:	1.96	
Error for mean background:	0.11	1σ
Actual standard deviation:	0.44	
Predicted standard deviation:	0.44	
Number of individual measurements:	16	
Chi-square:	14.97	
Reduced chi-square:	1.00	

BAC00000.XLD

Unit Id: 1
Date Performed: 3/25/99 7:49:35

Background Archive File: bkgab
Application Revision: 2.1.5

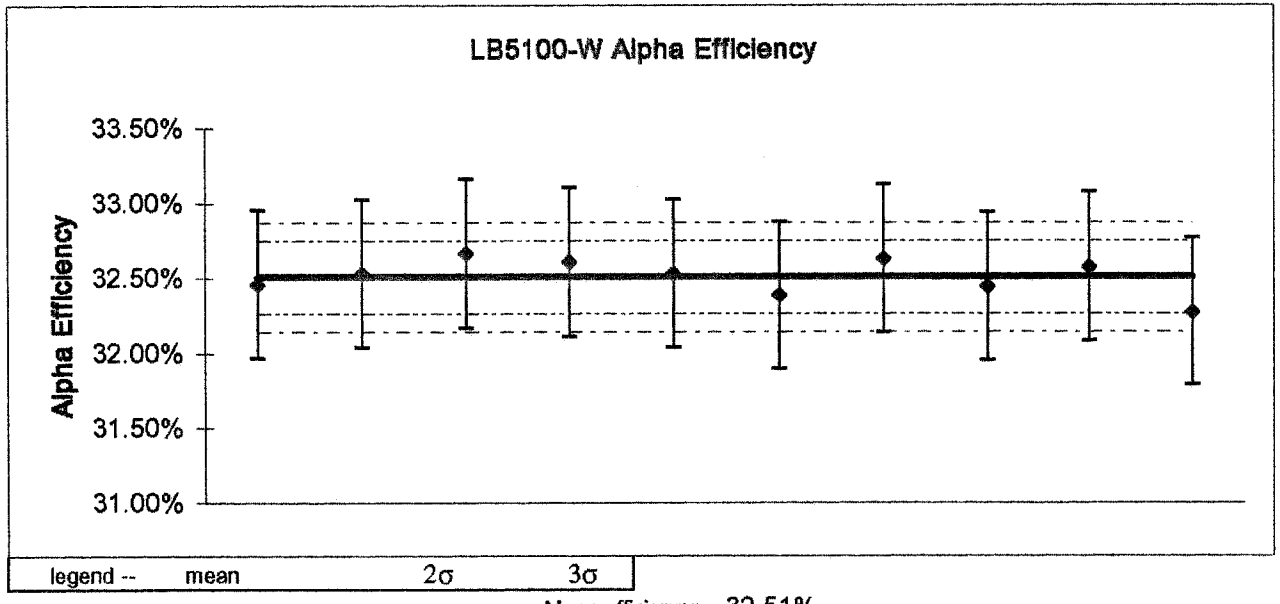


legend -- mean 2σ 3σ

Mean background:	2.19	
Error for mean background:	0.12	1σ
Actual standard deviation:	0.45	
Predicted standard deviation:	0.47	
Number of individual measurements:	16	
Chi-square:	13.61	
Reduced chi-square:	0.91	

Unit Id: 1
Date Performed: 3/25/99 6:39:19

Background Archive File: bkgab
Application Revision: 2.1.4



Mean efficiency:	32.51%	
Error for mean efficiency:	0.12%	1σ
Actual standard deviation:	0.12%	
Predicted standard deviation:	0.18%	
Number of individual measurements:	10	
Chi-square:	4.05	
Reduced chi-square:	0.45	

Unit Id: 1
Date Performed: 3/25/99
File Name: [SOU00000.XLD]EFFAB2

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

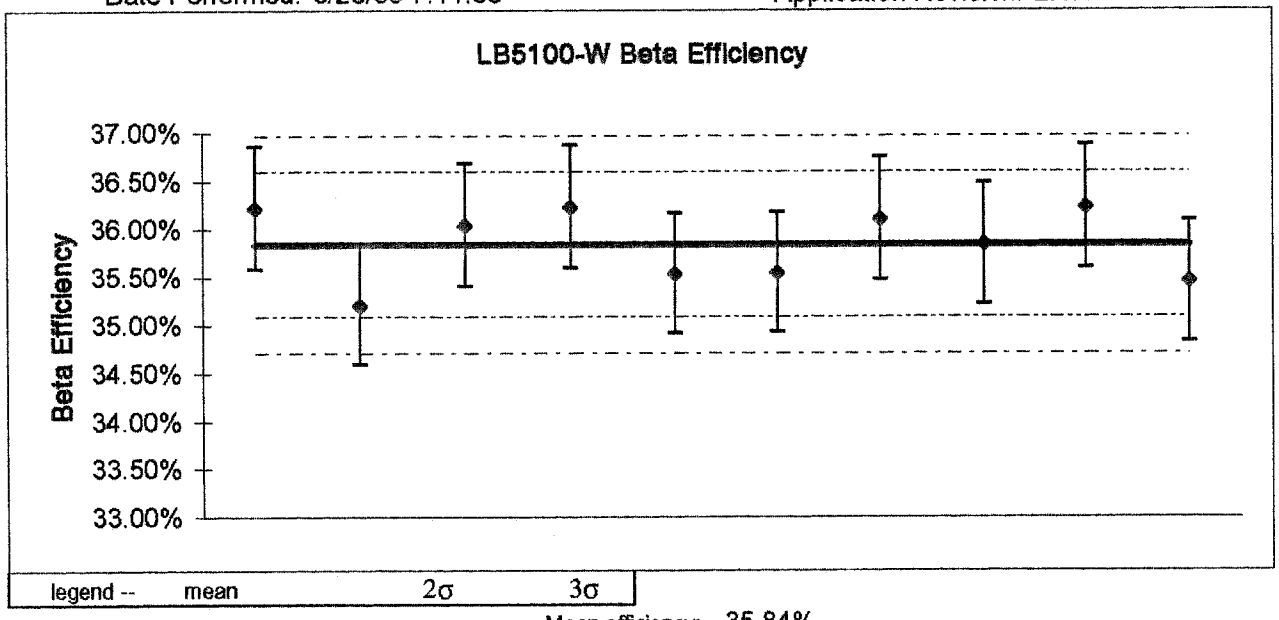
Source Control ID: S-1736

Isotope	Th-230	**Half-Life**	28105000	**days**
Type	Alpha			
Calibration Date	3/28/78	**Custodian**	WEST.	
DPM @ calibration date	33390.00	**Error**	333.90	
Decay Corrected DPM	33383.69	**Error**	333.84	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	32.51%	0.12%	4.05	10852.36	10	25.27%
Beta	10.99%	0.07%	4.51	3669.74		A into B
Gross	43.50%	0.15%	4.77	14522.10		

Unit Id: 1
Date Performed: 3/25/99 7:11:08

Background Archive File: bkgab
Application Revision: 2.1.4



Mean efficiency:	35.84%	
Error for mean efficiency:	0.38%	1σ
Actual standard deviation:	0.38%	
Predicted standard deviation:	0.38%	
Number of individual measurements:	10	
Chi-square:	8.99	
Reduced chi-square:	1.00	

Unit Id: 1
Date Performed: 3/25/99
File Name: [SOU00001.XLD]EFFAB2

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

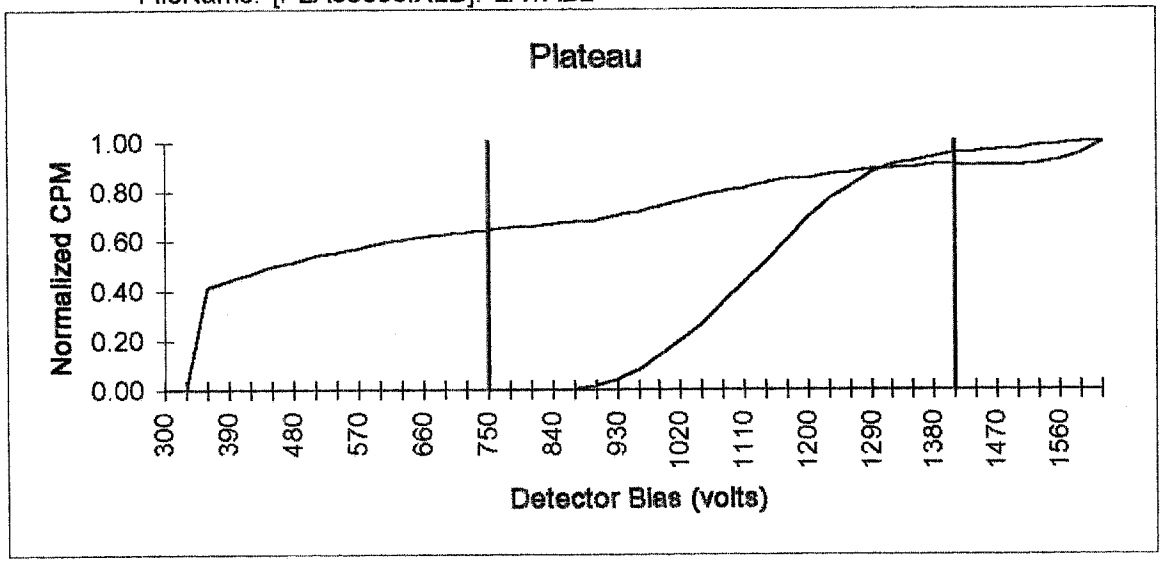
Source Control ID: 767/84

Isotope	Tc-99	**Half-Life**	77740000	**days**
Type	Beta			
Calibration Date	9/17/84	**Custodian**	WEST.	
DPM @ calibration date	8400.00	**Error**	84.00	
Decay Corrected DPM	8399.60	**Error**	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.01%	0.01%	14.81	0.73	10	B into A
Beta	35.84%	0.38%	8.99	3010.47		0.02%
Gross	35.85%	0.38%	9.05	3011.20		

Unit Id: 1
Date Performed: 12/28/98 12:38:44
FileName: [PLA00000.XLD]PLATAB2

Application Revision: 2.1.3
Application Version: Standard



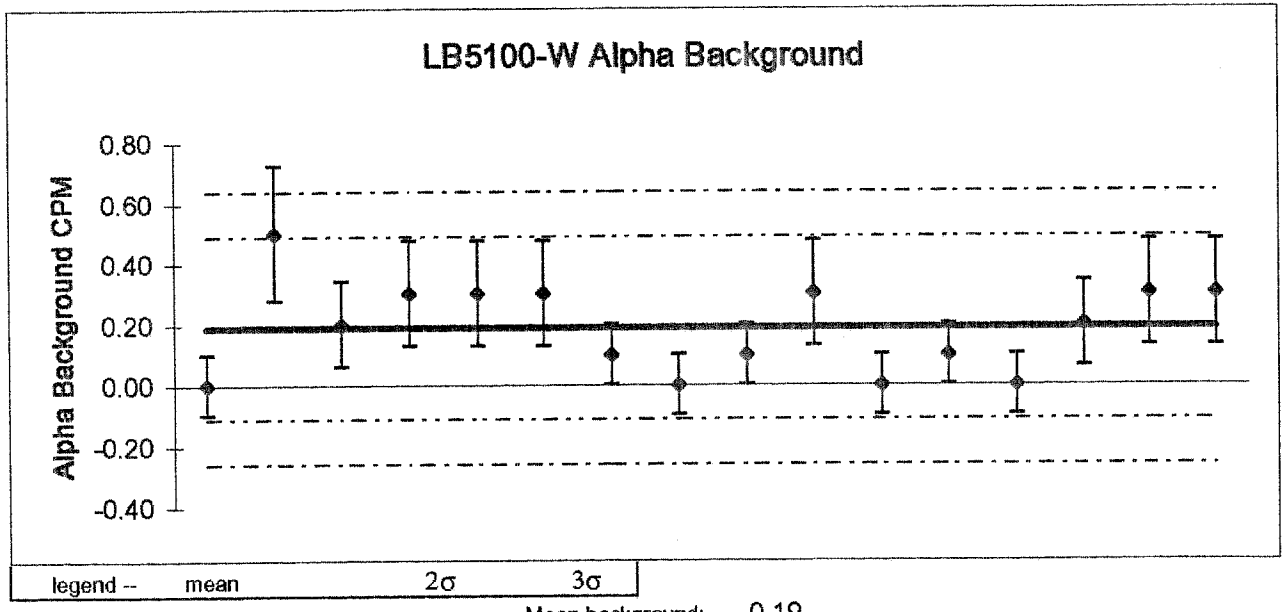
Optimum alpha & beta simultaneous operating voltage: **1410**
Beta slope per 100 volts at beta voltage: 4.00%
Alpha slope per 100 volts at beta voltage: 0.69%

Optimum alpha only operating voltage: **750**
Alpha slope per 100 volts at alpha voltage: 4.46%

BAC00000.XLD

Unit Id: 1
Date Performed: 12/29/98 5:47:37

Background Archive File: bkgab
Application Revision: 2.1.5

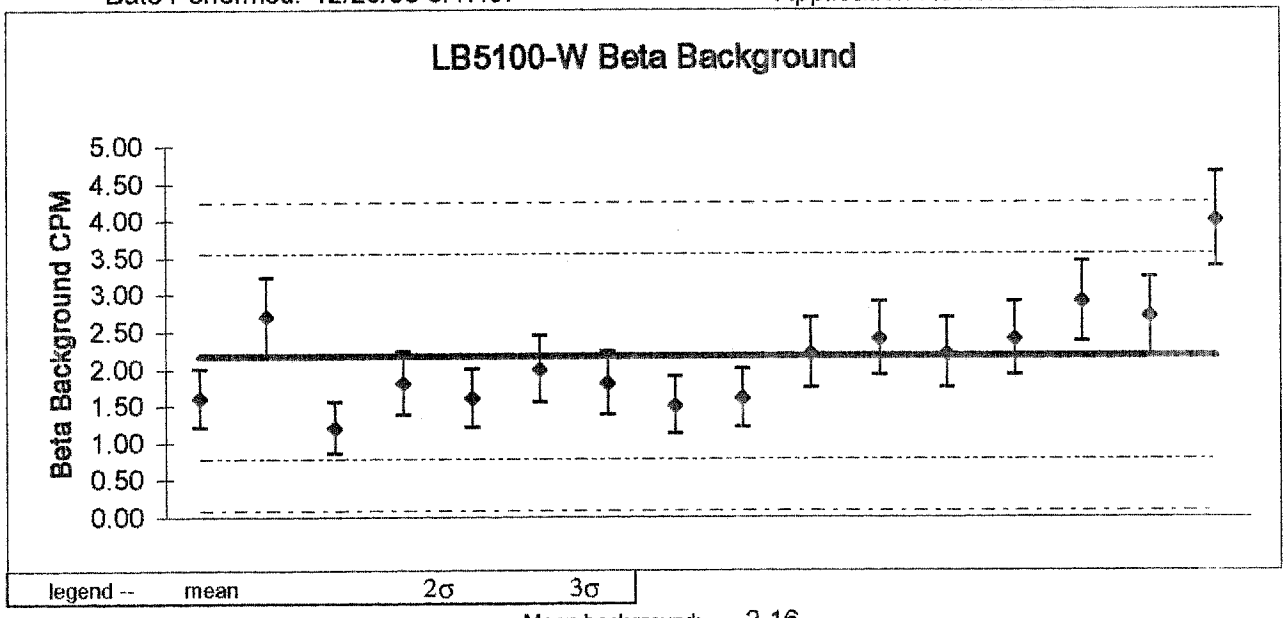


Mean background:	0.19	
Error for mean background:	0.03	1σ
Actual standard deviation:	0.15	
Predicted standard deviation:	0.14	
Number of individual measurements:	16	
Chi-square:	18.00	
Reduced chi-square:	1.20	

BAC00000.XLD

Unit Id: 1
Date Performed: 12/29/98 5:47:37

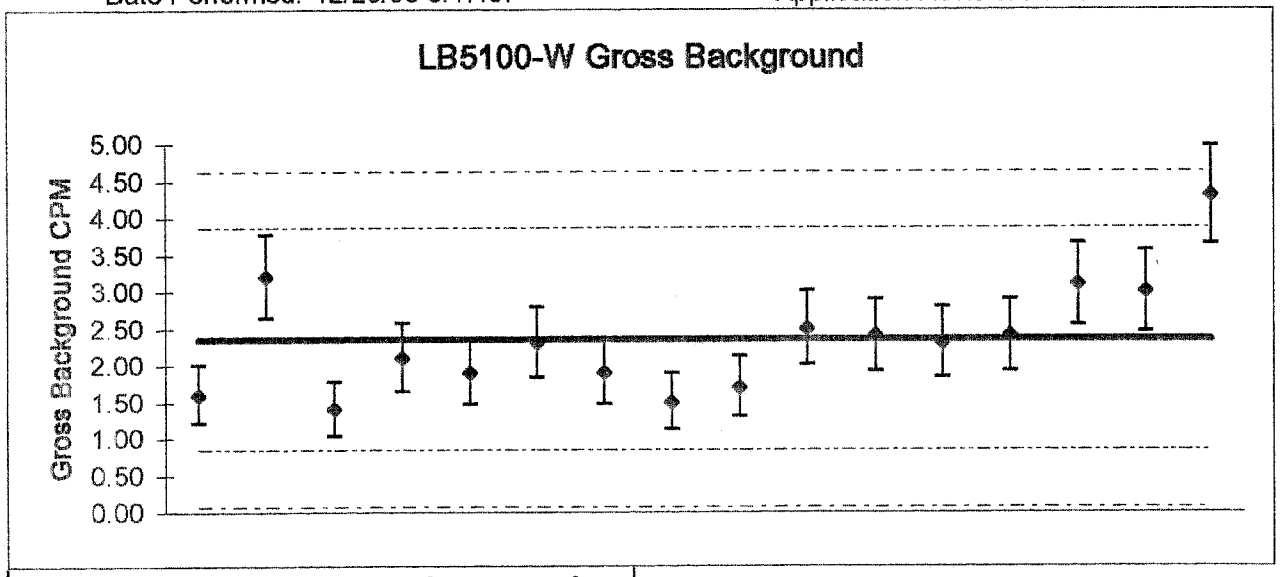
Background Archive File: bkgab
Application Revision: 2.1.5



Mean background:	2.16	
Error for mean background:	0.12	1σ
Actual standard deviation:	0.69	
Predicted standard deviation:	0.47	
Number of individual measurements:	16	
Chi-square:	33.38	
Reduced chi-square:	2.23	

Unit Id: 1
Date Performed: 12/29/98 5:47:37

Background Archive File: bkgab
Application Revision: 2.1.5

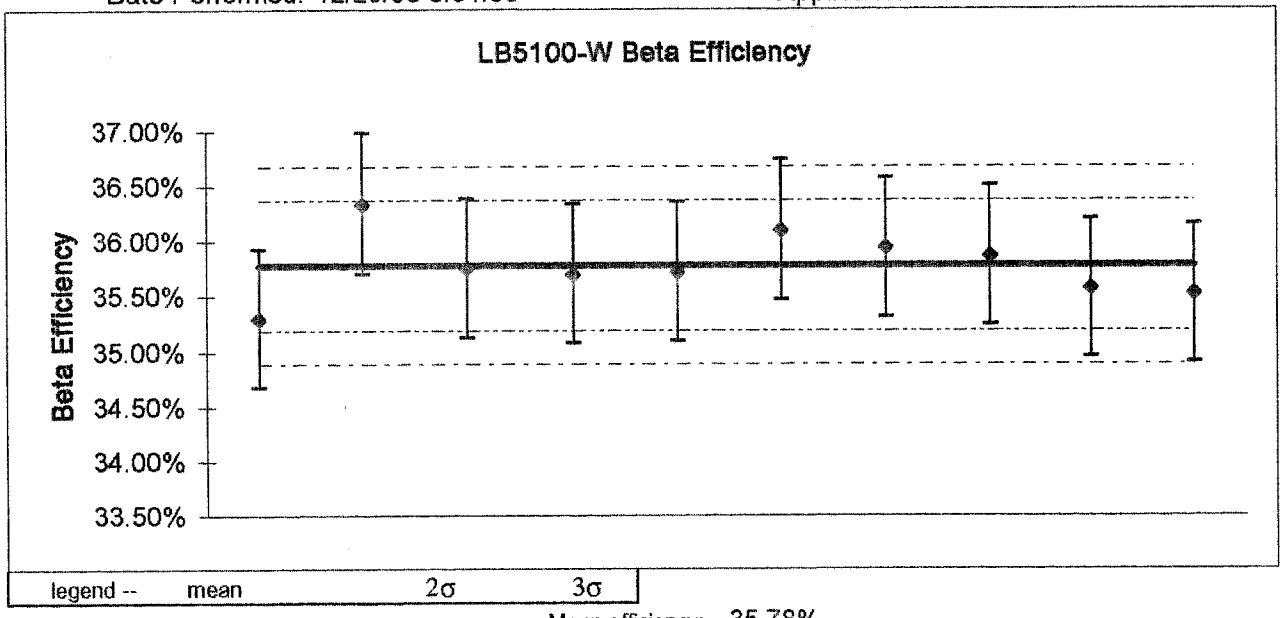


legend -- mean 2σ 3σ

Mean background:	2.35	
Error for mean background:	0.12	1σ
Actual standard deviation:	0.76	
Predicted standard deviation:	0.48	
Number of individual measurements:	16	
Chi-square:	36.68	
Reduced chi-square:	2.45	

Unit Id: 1
Date Performed: 12/29/98 8:54:58

Background Archive File: bkgab
Application Revision: 2.1.4



Mean efficiency:	35.78%	
Error for mean efficiency:	0.30%	1σ
Actual standard deviation:	0.30%	
Predicted standard deviation:	0.38%	
Number of individual measurements:	10	
Chi-square:	5.61	
Reduced chi-square:	0.62	

Unit Id: 1
Date Performed: 12/29/98
File Name: [BETAEFF.XLD]EFFAB2

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: 767/84

Isotope	Tc-99	**Half-Life**	77740000	**days**
Type	Beta			
Calibration Date	9/17/84	**Custodian**	WEST.	
DPM @ calibration date	8400.00	**Error**	84.00	
Decay Corrected DPM	8399.61	**Error**	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.01%	0.01%	32.90	1.11	10	B into A
Beta	35.78%	0.30%	5.61	3005.60		0.04%
Gross	35.80%	0.30%	5.73	3006.71		

Unit Id: 1
Date Performed: 12/29/98
File Name: [ALFAEFF.XLD]EFFAB2

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

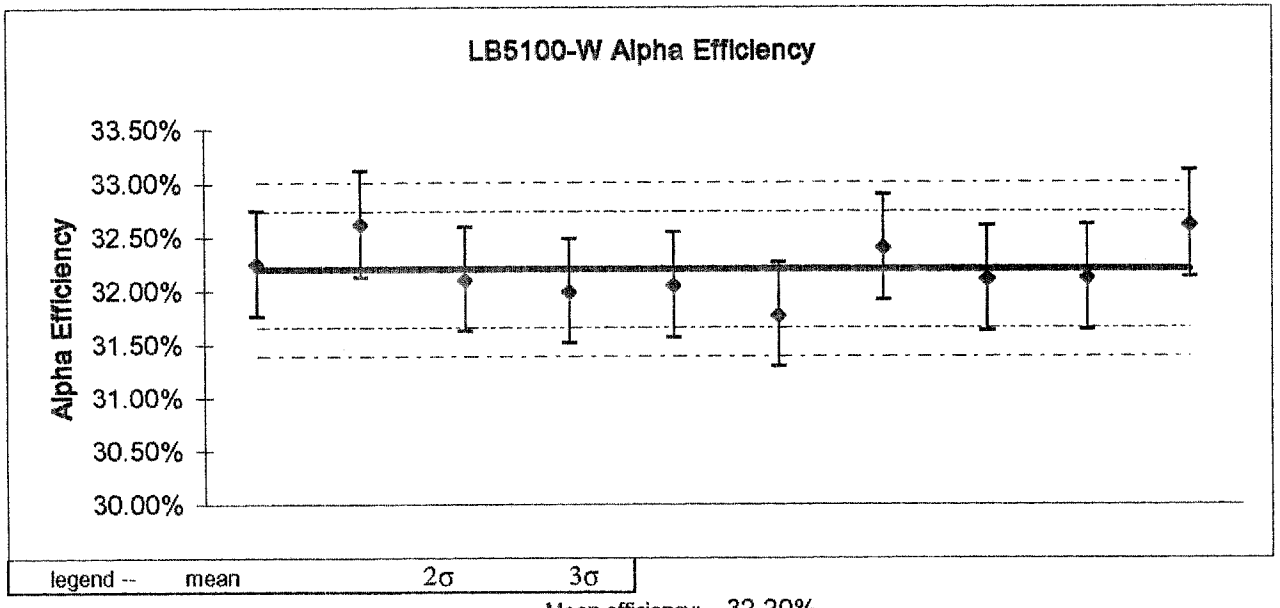
Source Control ID: S-1736

Isotope	Th-230	**Half-Life**	28105000	**days**
Type	Alpha			
Calibration Date	3/28/78	**Custodian**	WEST.	
DPM @ calibration date	33390.00	**Error**	333.90	
Decay Corrected DPM	33383.76	**Error**	333.84	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	32.20%	0.27%	20.49	10750.45	10	25.27%
Beta	10.89%	0.09%	6.46	3635.40		A into B
Gross	43.09%	0.27%	14.82	14385.84		

Unit Id: 1
Date Performed: 12/29/98 8:23:17

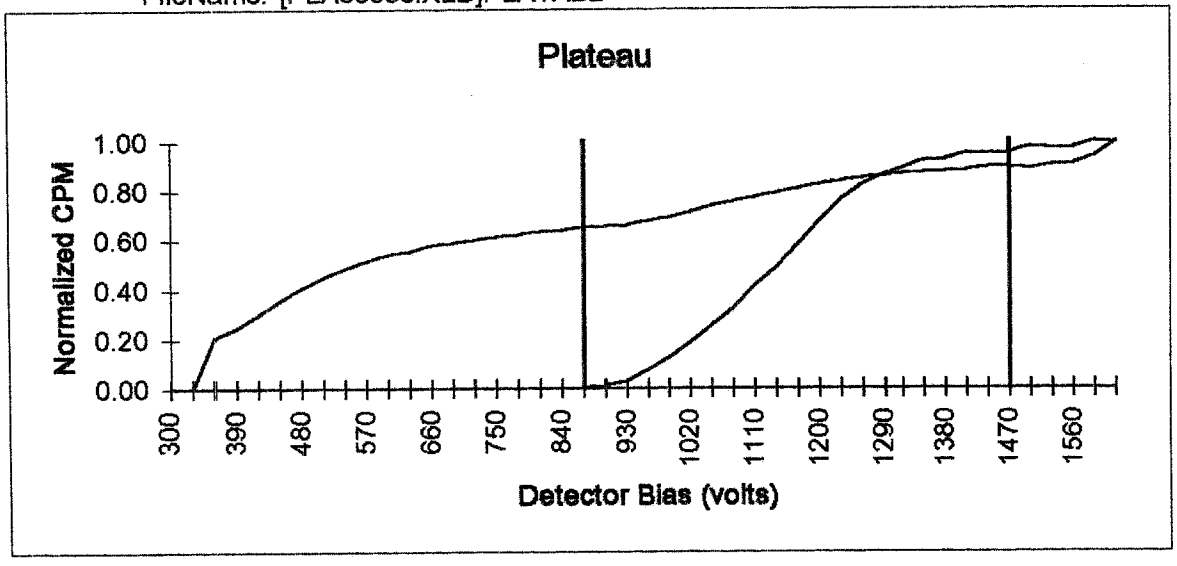
Background Archive File: bkgab
Application Revision: 2.1.4



Mean efficiency:	32.20%	
Error for mean efficiency:	0.27%	1σ
Actual standard deviation:	0.27%	
Predicted standard deviation:	0.18%	
Number of individual measurements:	10	
Chi-square:	20.49	
Reduced chi-square:	2.28	

Unit Id: 1
Date Performed: 10/5/98 23:05:17
FileName: [PLA00000.XLD]PLATAB2

Application Revision: 2.1.3
Application Version: Standard



Optimum alpha & beta simultaneous operating voltage: **1470**
Beta slope per 100 volts at beta voltage: 2.20%
Alpha slope per 100 volts at beta voltage: 1.23%

Optimum alpha only operating voltage: **870**
Alpha slope per 100 volts at alpha voltage: 3.33%

Unit Id: 1
Date Performed: 10/6/98
File Name: [SOU00000.XLD]EFFAB2

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: S-1736

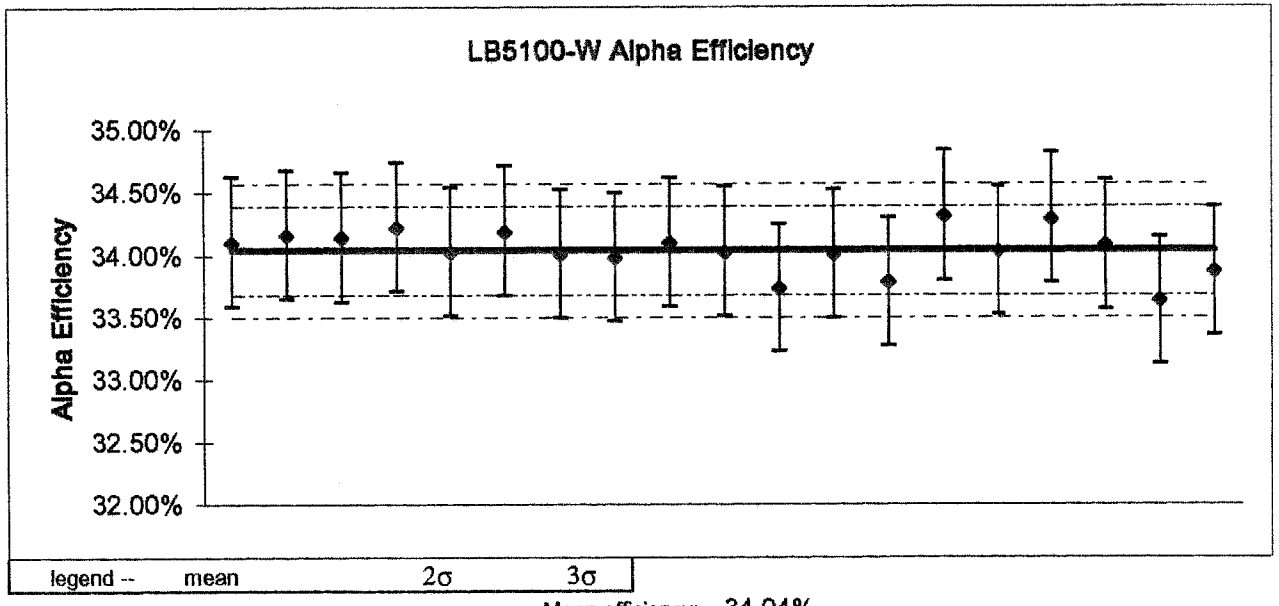
Isotope	Th-230	**Half-Life**	28105000	**days**
Type	Alpha			
Calibration Date	3/28/78	**Custodian**	WEST.	
DPM @ calibration date	33390.00	**Error**	333.90	
Decay Corrected DPM	33383.83	**Error**	333.84	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	34.04%	0.18%	17.12	11362.49	19	24.25%
Beta	10.89%	0.12%	24.93	3636.67		A into B
Gross	44.93%	0.20%	16.06	14999.17		

SOU00000.XLD

Unit Id: 1
Date Performed: 10/6/98 7:33:27

Background Archive File: bkgab
Application Revision: 2.1.4



Mean efficiency:	34.04%	
Error for mean efficiency:	0.18%	1σ
Actual standard deviation:	0.18%	
Predicted standard deviation:	0.18%	
Number of individual measurements:	19	
Chi-square:	17.12	
Reduced chi-square:	0.95	

Unit Id: 1
Date Performed: 10/6/98
File Name: [SOU00001.XLD]EFFAB2

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

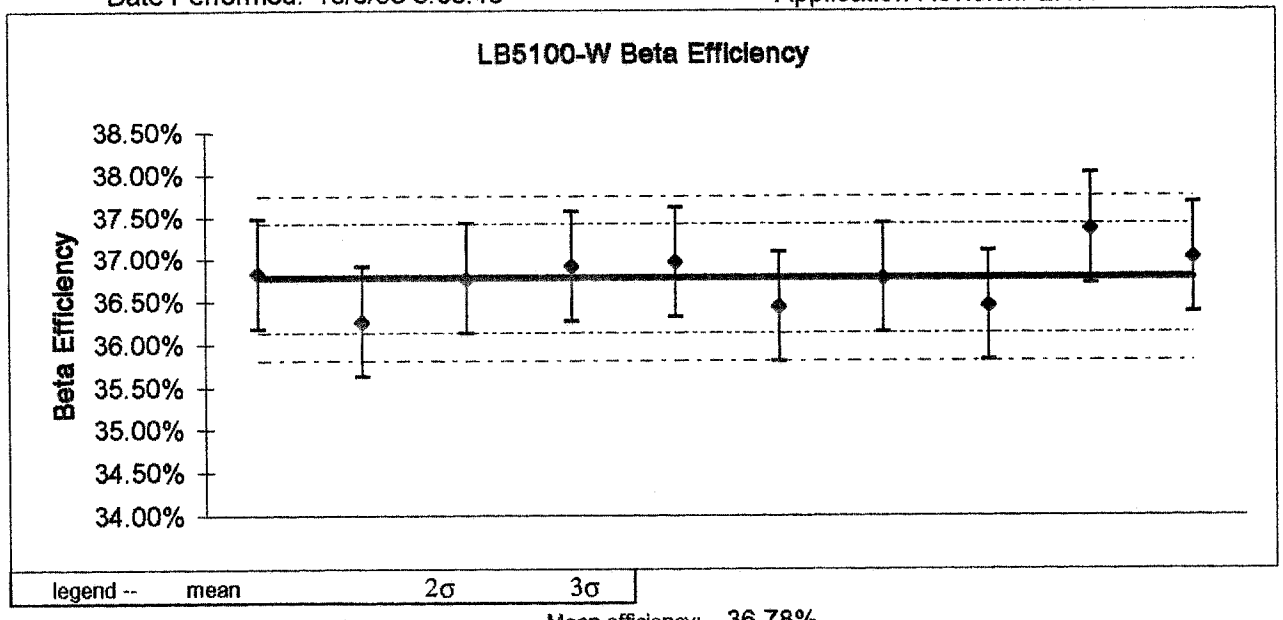
Source Control ID: 767/84

Isotope	Tc-99	**Half-Life**	77740000	**days**
Type	Beta			
Calibration Date	9/17/84	**Custodian**	WEST.	
DPM @ calibration date	8400.00	**Error**	84.00	
Decay Corrected DPM	8399.62	**Error**	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.24%	0.03%	5.84	20.56	10	B into A
Beta	36.78%	0.32%	6.38	3089.10		0.66%
Gross	37.02%	0.33%	6.55	3109.65		

Unit Id: 1
Date Performed: 10/6/98 8:36:40

Background Archive File: bkgab
Application Revision: 2.1.4

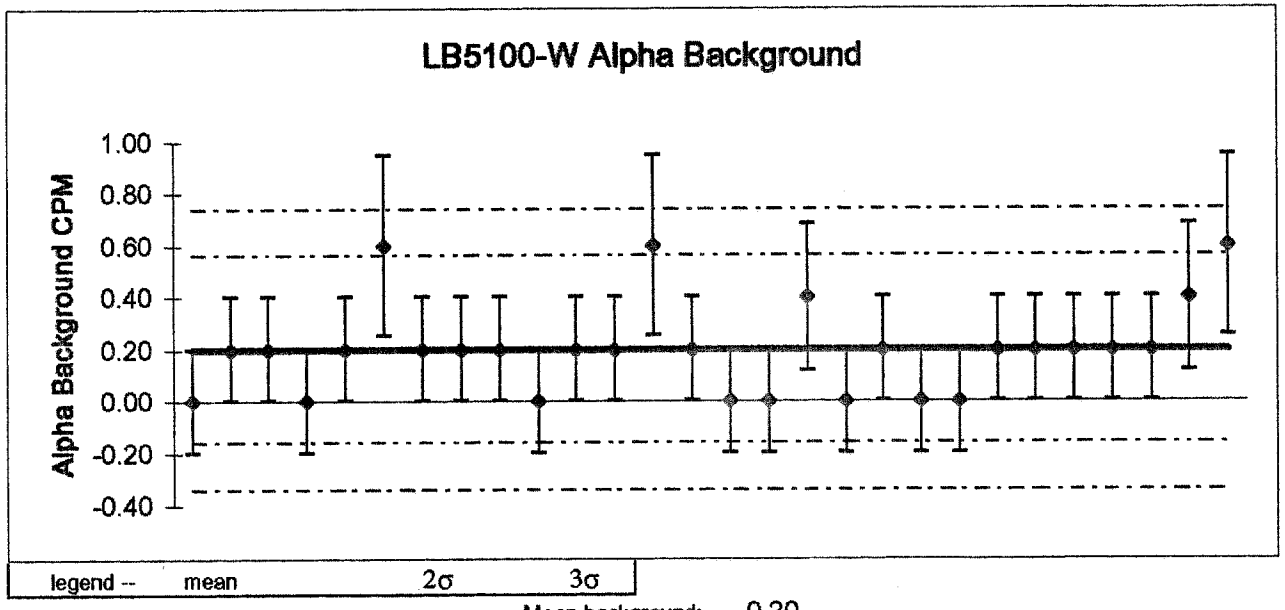


Mean efficiency:	36.78%	
Error for mean efficiency:	0.32%	1σ
Actual standard deviation:	0.32%	
Predicted standard deviation:	0.38%	
Number of individual measurements:	10	
Chi-square:	6.38	
Reduced chi-square:	0.71	

BAC00000.XLD

Unit Id: 1
Date Performed: 10/6/98 5:10:54

Background Archive File: bkgab
Application Revision: 2.1.5

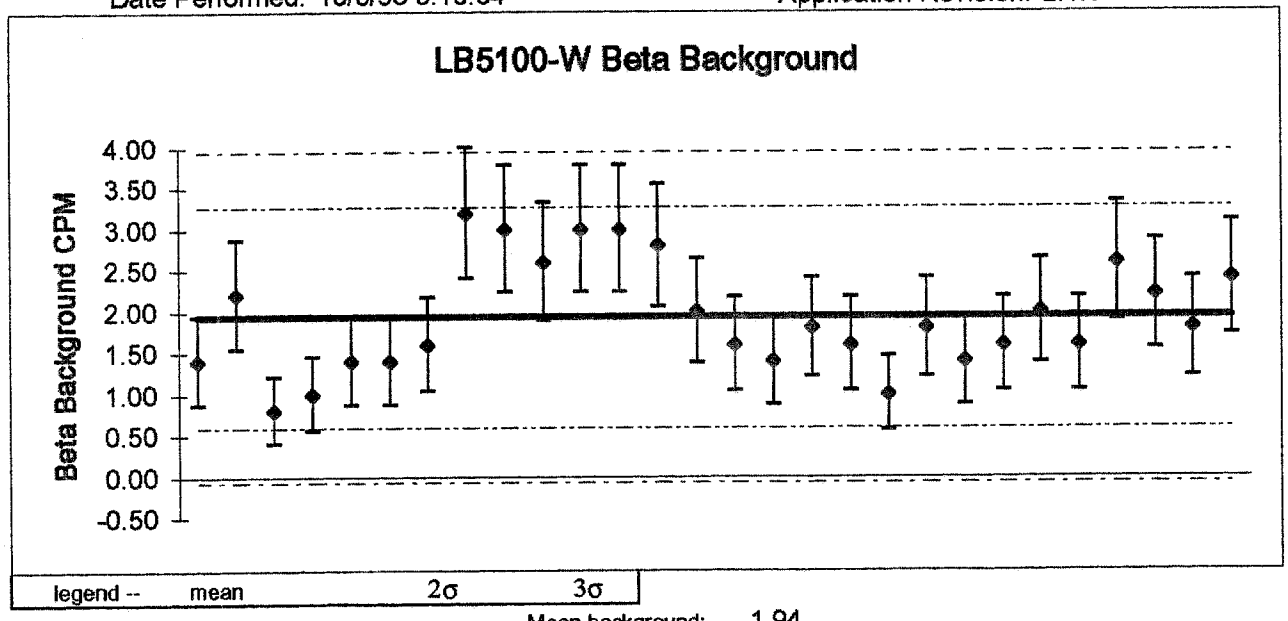


Mean background:	0.20	
Error for mean background:	0.04	1σ
Actual standard deviation:	0.18	
Predicted standard deviation:	0.20	
Number of individual measurements:	28	
Chi-square:	22.00	
Reduced chi-square:	0.81	

BAC00000.XLD

Unit Id: 1
Date Performed: 10/6/98 5:10:54

Background Archive File: bkgab
Application Revision: 2.1.5

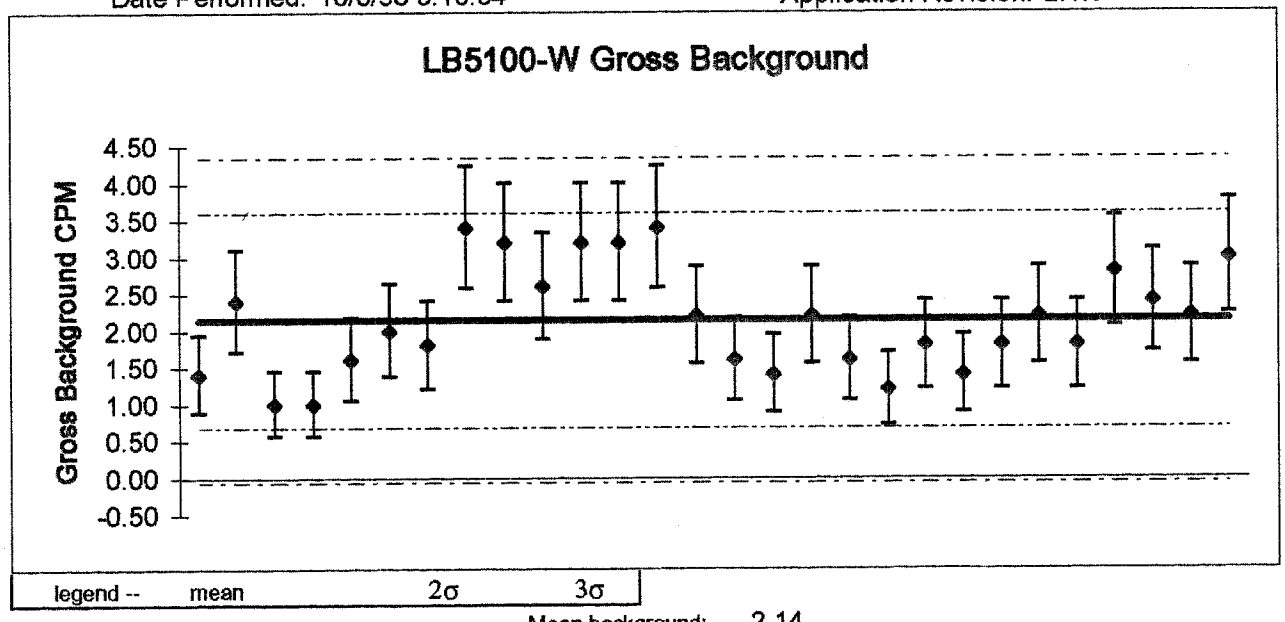


Mean background:	1.94	
Error for mean background:	0.12	1σ
Actual standard deviation:	0.67	
Predicted standard deviation:	0.62	
Number of individual measurements:	28	
Chi-square:	31.21	
Reduced chi-square:	1.16	

BAC00000.XLD

Unit Id: 1
Date Performed: 10/6/98 5:10:54

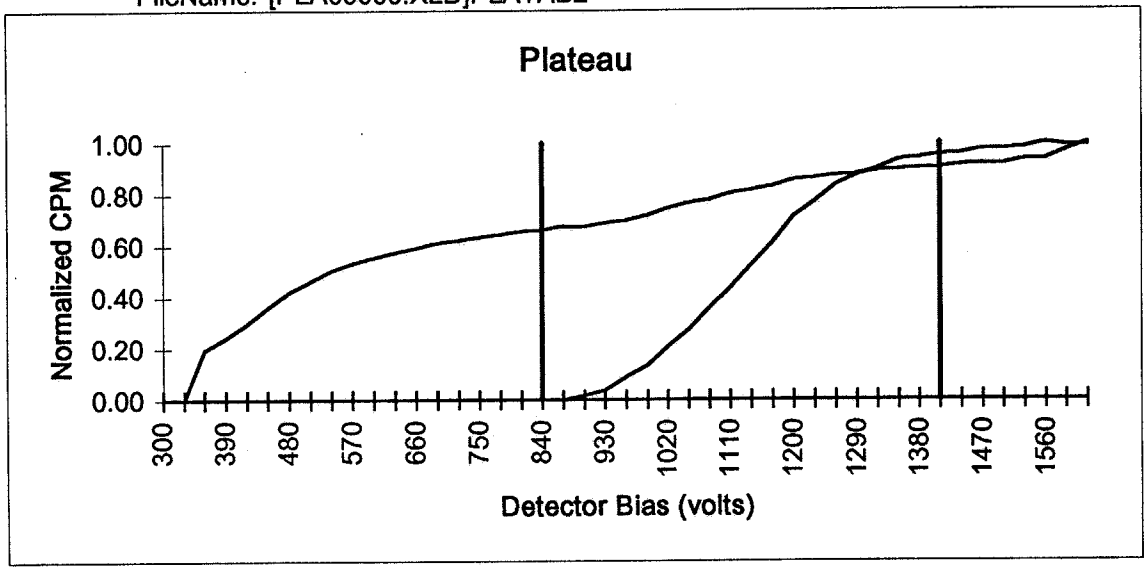
Background Archive File: bkgab
Application Revision: 2.1.5



Mean background:	2.14	
Error for mean background:	0.12	1σ
Actual standard deviation:	0.73	
Predicted standard deviation:	0.65	
Number of individual measurements:	28	
Chi-square:	34.10	
Reduced chi-square:	1.26	

Unit Id: 1
Date Performed: 7/27/98 5:23:34
FileName: [PLA00000.XLD]PLATAB2

Application Revision: 2.1.3
Application Version: Standard

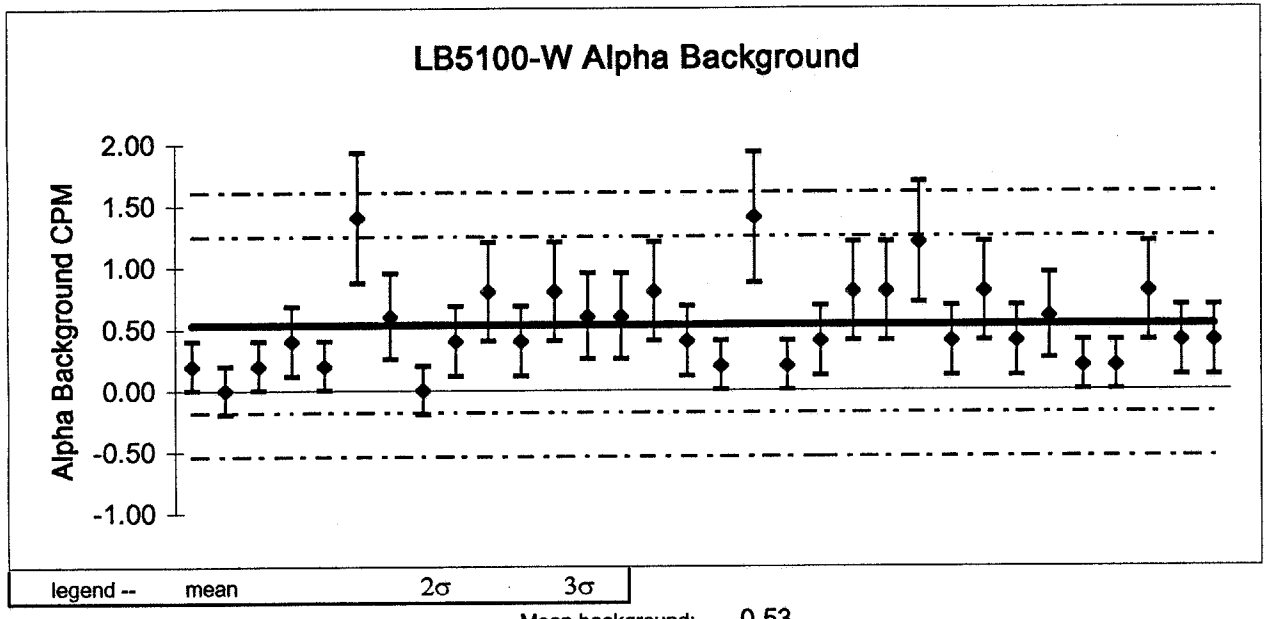


Optimum alpha & beta simultaneous operating voltage: 1410
Beta slope per 100 volts at beta voltage: 3.45%
Alpha slope per 100 volts at beta voltage: 2.13%

Optimum alpha only operating voltage: 840
Alpha slope per 100 volts at alpha voltage: 3.93%

Unit Id: 1
Date Performed: 7/27/98 11:56:33

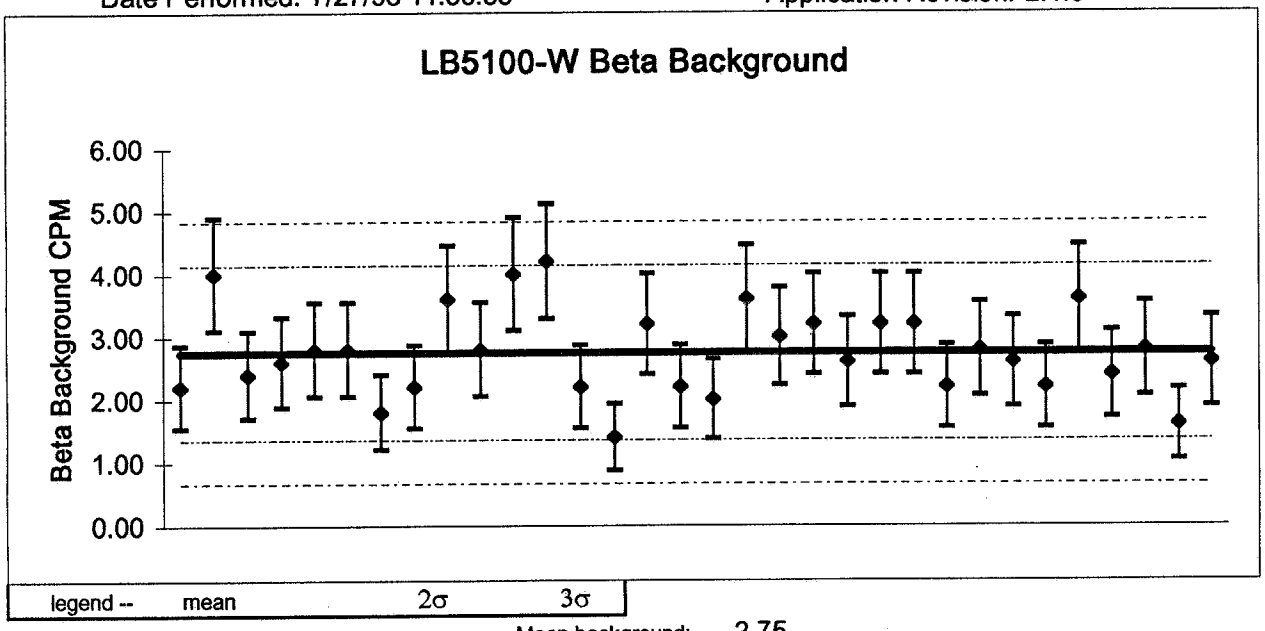
Background Archive File: bkgab
Application Revision: 2.1.5



Mean background:	0.53	
Error for mean background:	0.06	1σ
Actual standard deviation:	0.36	
Predicted standard deviation:	0.33	
Number of individual measurements:	32	
Chi-square:	37.35	
Reduced chi-square:	1.20	

Unit Id: 1
Date Performed: 7/27/98 11:56:33

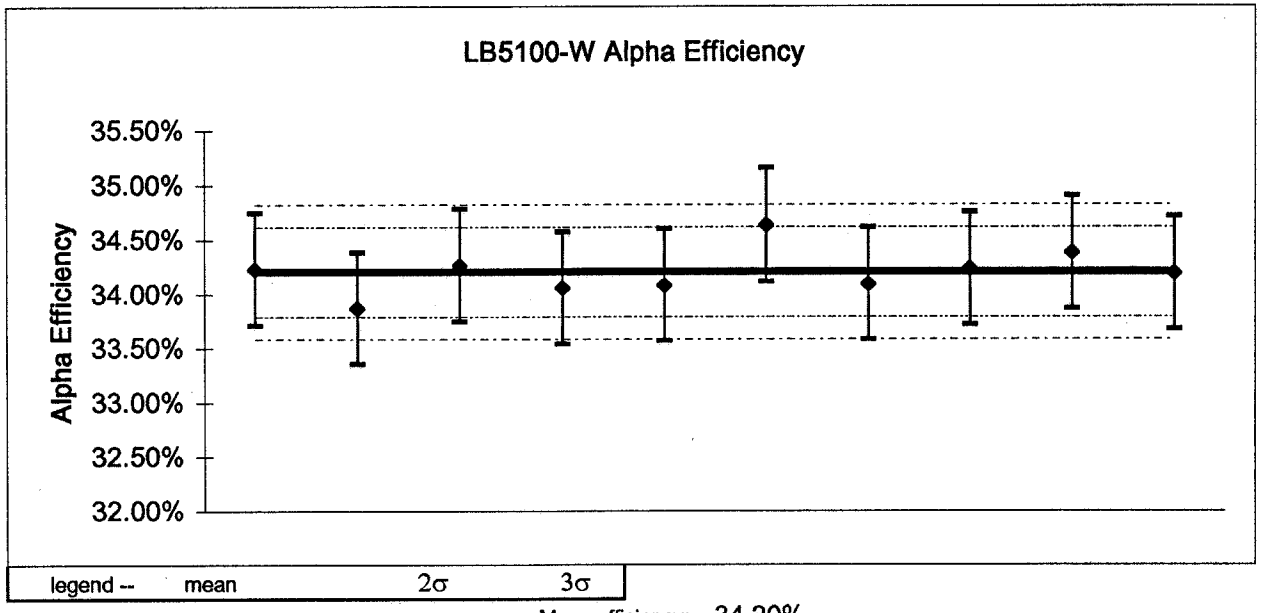
Background Archive File: bkgab
Application Revision: 2.1.5



Mean background:	2.75	
Error for mean background:	0.13	1σ
Actual standard deviation:	0.70	
Predicted standard deviation:	0.74	
Number of individual measurements:	32	
Chi-square:	27.35	
Reduced chi-square:	0.88	

Unit Id: 1
Date Performed: 7/27/98 14:39:42

Background Archive File: bkgab
Application Revision: 2.1.4



Mean efficiency:	34.20%	
Error for mean efficiency:	0.21%	1σ
Actual standard deviation:	0.21%	
Predicted standard deviation:	0.18%	
Number of individual measurements:	10	
Chi-square:	11.18	
Reduced chi-square:	1.24	

Unit Id: 1
Date Performed: 7/27/98
File Name: [SOU00000.XLD]EFFAB2

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

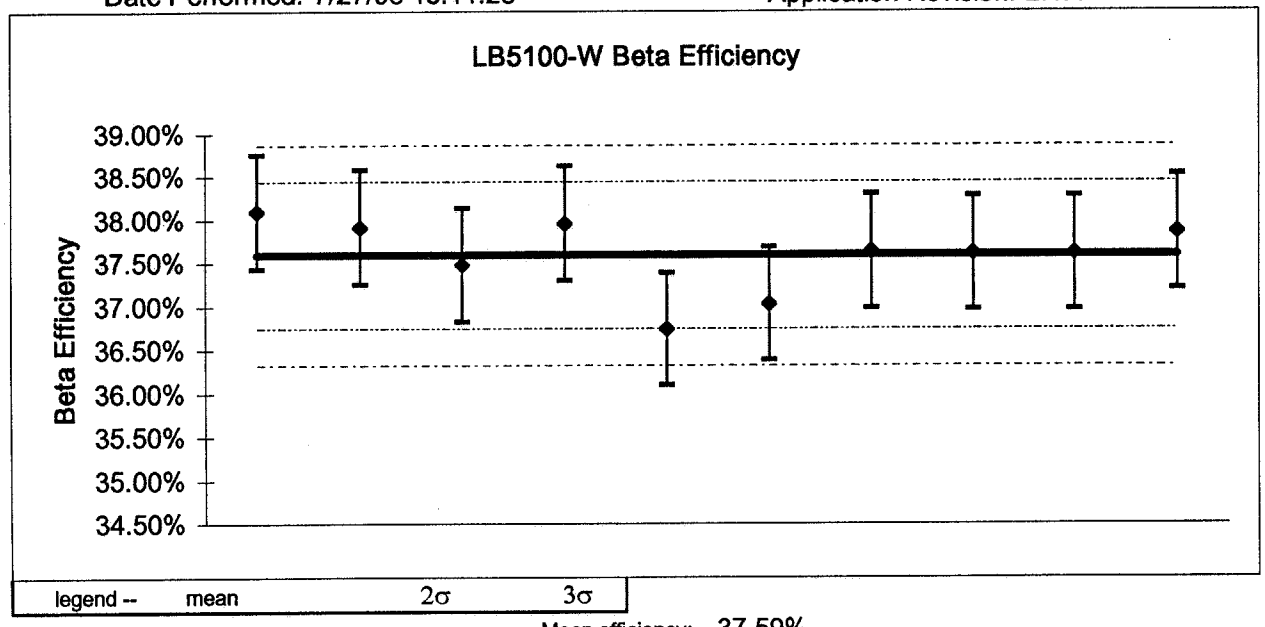
Source Control ID: S-1736

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	3/28/78	Custodian	WEST.	
DPM @ calibration date	33390.00	Error	333.90	
Decay Corrected DPM	33383.88	Error	333.84	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	34.20%	0.21%	11.18	11418.00	10	24.59%
Beta	11.15%	0.07%	3.66	3723.08		A into B
Gross	45.35%	0.24%	11.07	15141.08		

Unit Id: 1
Date Performed: 7/27/98 15:11:23

Background Archive File: bkgab
Application Revision: 2.1.4



Mean efficiency:	37.59%	
Error for mean efficiency:	0.42%	1σ
Actual standard deviation:	0.42%	
Predicted standard deviation:	0.39%	
Number of individual measurements:	10	
Chi-square:	10.85	
Reduced chi-square:	1.21	

Unit Id: 1
Date Performed: 7/27/98
File Name: [SOU00001.XLD]EFFAB2

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

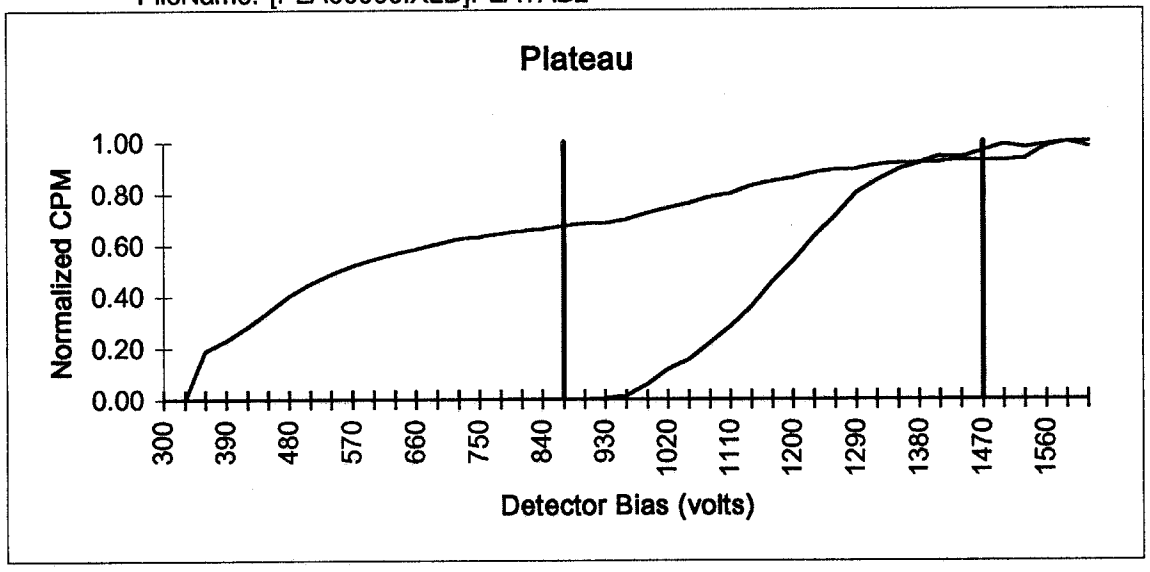
Source Control ID: 767/84

Isotope	Tc-99	**Half-Life**	77740000	**days**
Type	Beta			
Calibration Date	9/17/84	**Custodian**	WEST.	
DPM @ calibration date	8400.00	**Error**	84.00	
Decay Corrected DPM	8399.62	**Error**	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.02%	0.01%	7.06	1.84	10	B into A
Beta	37.59%	0.42%	10.85	3157.71		0.06%
Gross	37.62%	0.42%	10.70	3159.54		

Unit Id: 1
Date Performed: 3/31/98 9:13:41
FileName: [PLA00000.XLD]PLATAB2

Application Revision: 2.1.3
Application Version: Standard

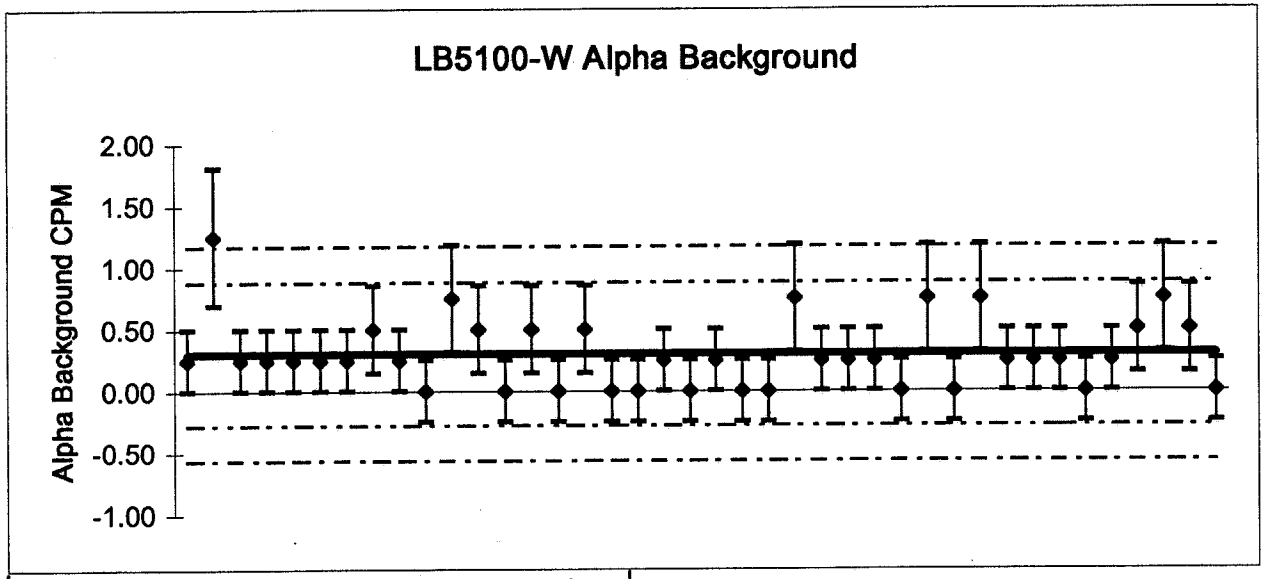


Optimum alpha & beta simultaneous operating voltage: **1470**
Beta slope per 100 volts at beta voltage: 3.89%
Alpha slope per 100 volts at beta voltage: 0.88%

Optimum alpha only operating voltage: **870**
Alpha slope per 100 volts at alpha voltage: 4.10%

Unit Id: 1
Date Performed: 3/31/98 14:57:07

Background Archive File: bkg21
Application Revision: 2.1,5

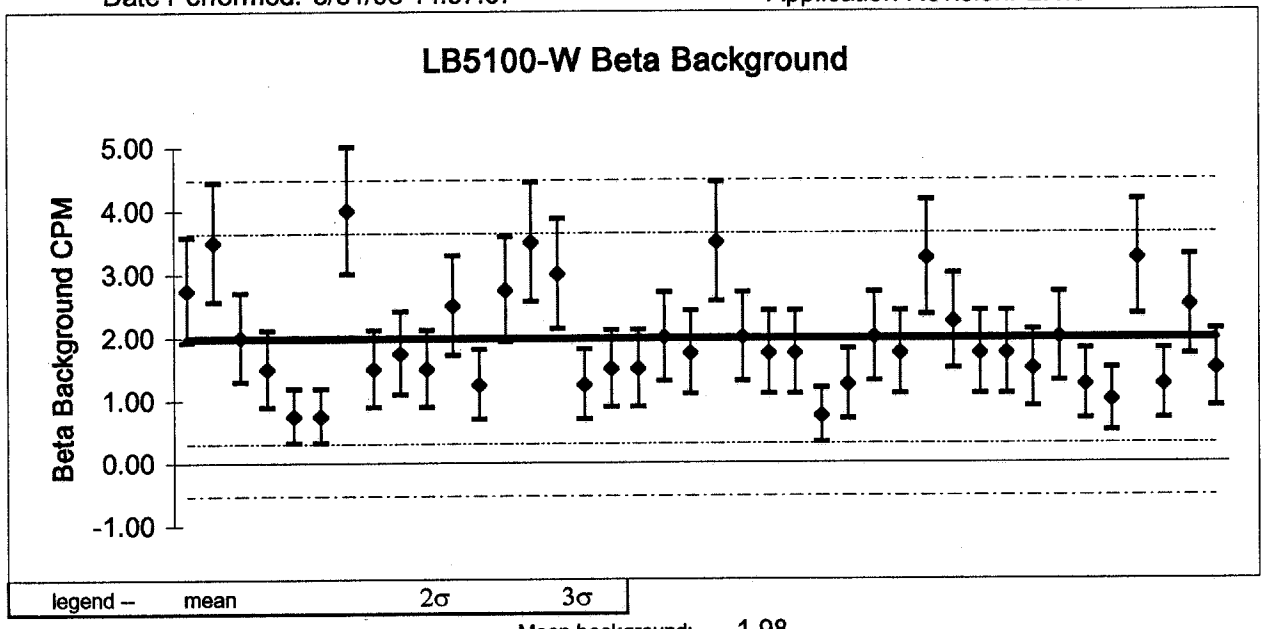


legend -- mean 2σ 3σ

Mean background:	0.30	
Error for mean background:	0.04	1σ
Actual standard deviation:	0.29	
Predicted standard deviation:	0.27	
Number of individual measurements:	40	
Chi-square:	43.67	
Reduced chi-square:	1.12	

Unit Id: 1
Date Performed: 3/31/98 14:57:07

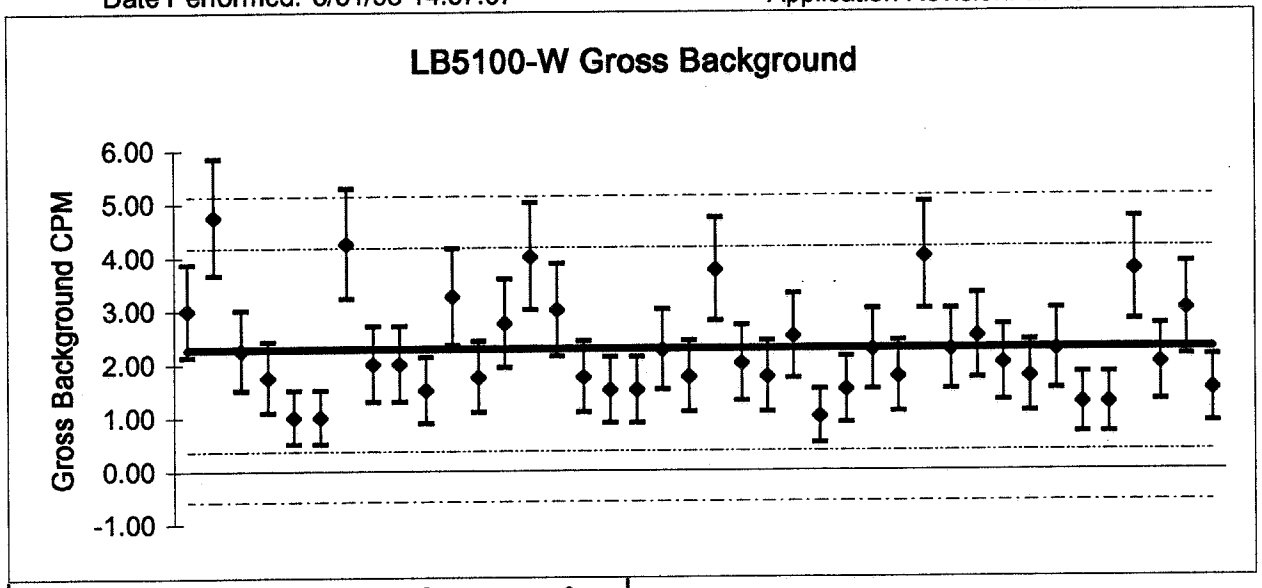
Background Archive File: bkg21
Application Revision: 2.1.5



Mean background:	1.98	
Error for mean background:	0.11	1σ
Actual standard deviation:	0.84	
Predicted standard deviation:	0.70	
Number of individual measurements:	40	
Chi-square:	55.14	
Reduced chi-square:	1.41	

Unit Id: 1
Date Performed: 3/31/98 14:57:07

Background Archive File: bkg21
Application Revision: 2.1.5

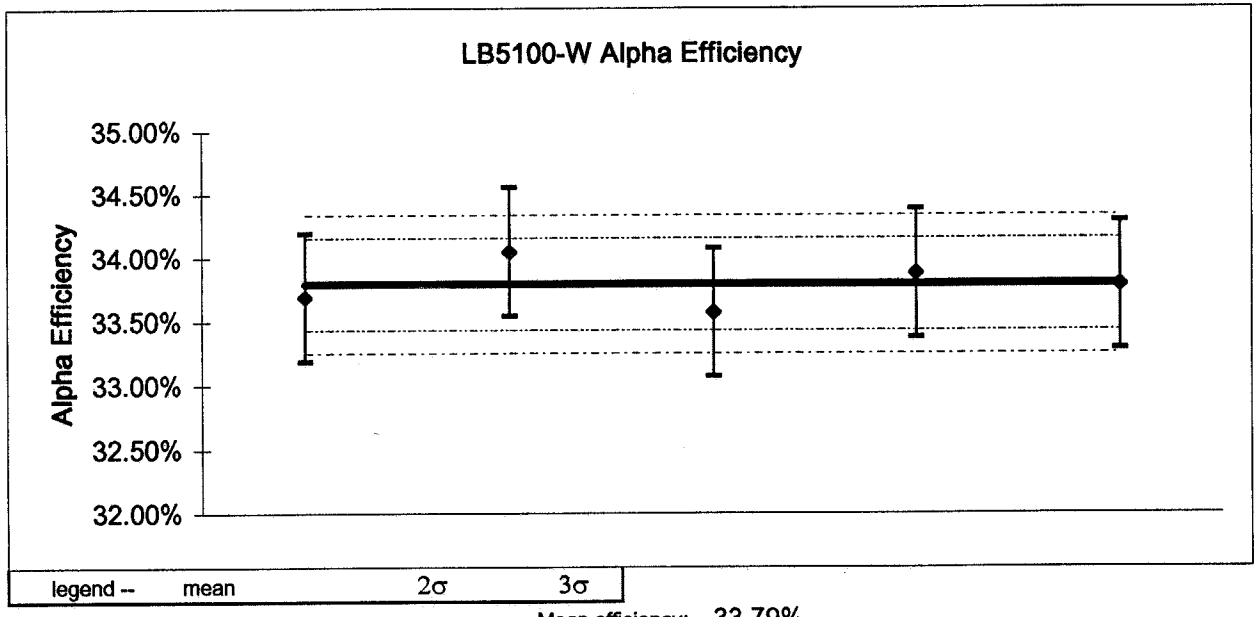


legend -- mean 2σ 3σ

Mean background:	2.28	
Error for mean background:	0.12	1σ
Actual standard deviation:	0.95	
Predicted standard deviation:	0.75	
Number of individual measurements:	40	
Chi-square:	62.37	
Reduced chi-square:	1.60	

Unit Id: 1
Date Performed: 3/31/98 17:43:09

Background Archive File: bkg21
Application Revision: 2.1.4



Mean efficiency:	33.79%	
Error for mean efficiency:	0.18%	1σ
Actual standard deviation:	0.18%	
Predicted standard deviation:	0.16%	
Number of individual measurements:	5	
Chi-square:	5.18	
Reduced chi-square:	1.29	

Unit Id: 1
Date Performed: 3/31/98
File Name: [SOU00000.XLD]EFFAB2

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

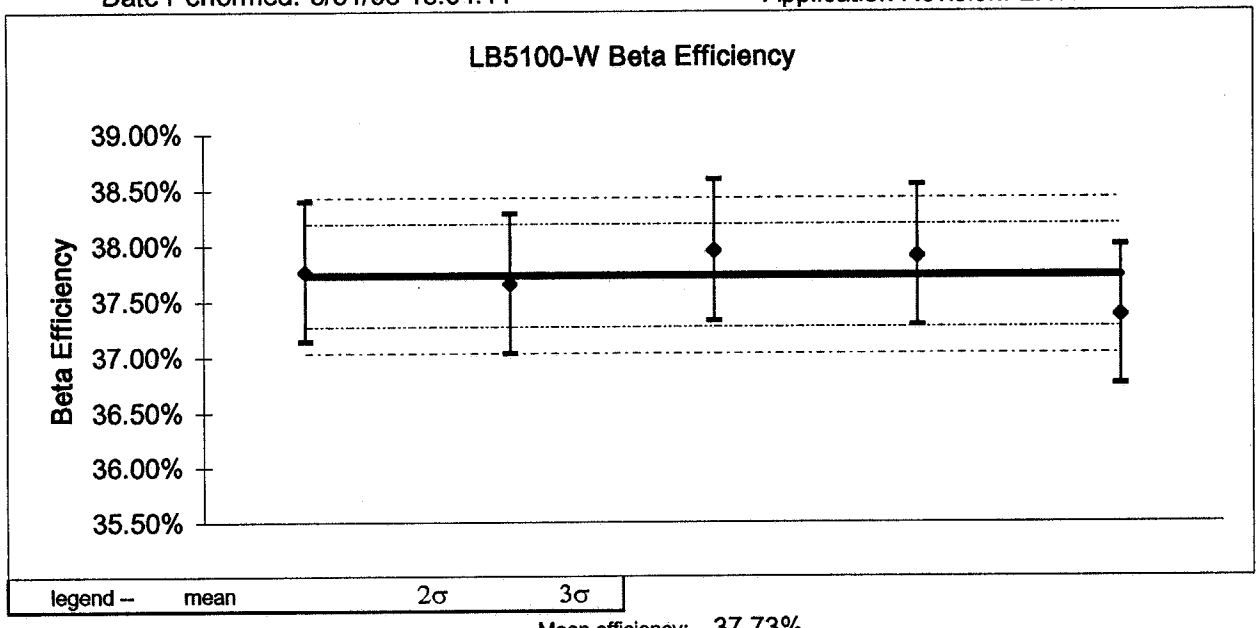
Source Control ID: S-1736

Isotope	Th-230	**Half-Life**	28105000	**days**
Type	Alpha			
Calibration Date	3/28/78	**Custodian**	WEST.	
DPM @ calibration date	33390.00	**Error**	333.90	
Decay Corrected DPM	33383.98	**Error**	333.84	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	33.79%	0.18%	5.18	11282.00	5	25.38%
Beta	11.49%	0.11%	5.86	3837.05		A into B
Gross	45.29%	0.13%	2.01	15119.05		

Unit Id: 1
Date Performed: 3/31/98 18:04:11

Background Archive File: bkg21
Application Revision: 2.1.4



Mean efficiency:	37.73%	
Error for mean efficiency:	0.23%	1σ
Actual standard deviation:	0.23%	
Predicted standard deviation:	0.34%	
Number of individual measurements:	5	
Chi-square:	1.93	
Reduced chi-square:	0.48	

Unit Id: 1
Date Performed: 3/31/98
File Name: [SOU00001.XLD]EFFAB2

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

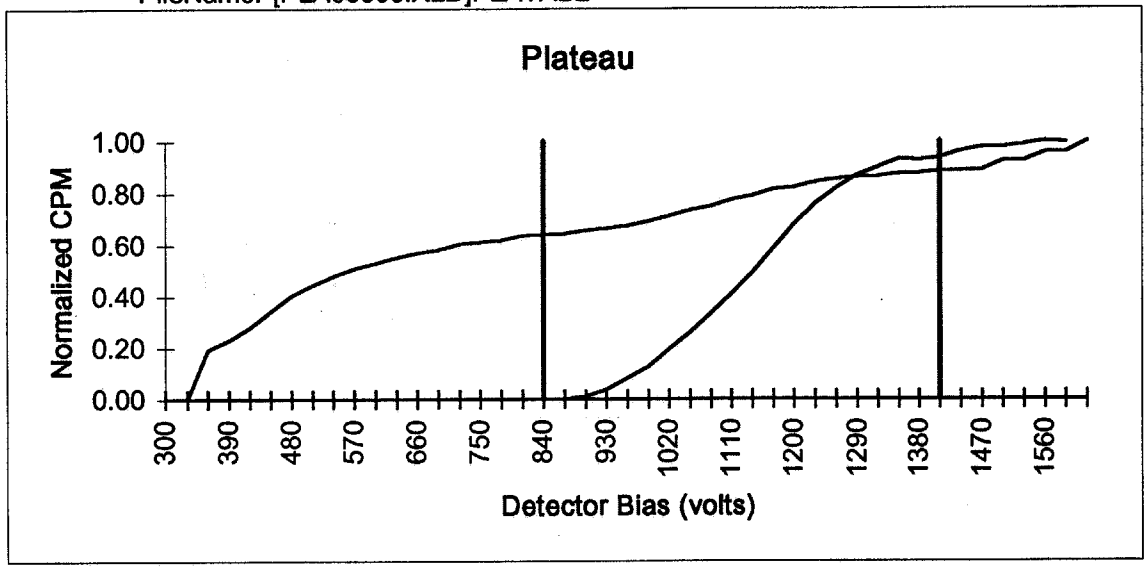
Source Control ID: 767/84

Isotope	Tc-99	**Half-Life**	77740000	**days**
Type	Beta			
Calibration Date	9/17/84	**Custodian**	WEST.	
DPM @ calibration date	8400.00	**Error**	84.00	
Decay Corrected DPM	8399.63	**Error**	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.03%	0.01%	3.17	2.30	5	B into A
Beta	37.73%	0.23%	1.93	3169.45		0.07%
Gross	37.76%	0.23%	1.83	3171.75		

Unit Id: 1
Date Performed: 3/11/98 2:12:29
FileName: [PLA00000.XLD]PLATAB2

Application Revision: 2.1.3
Application Version: Standard

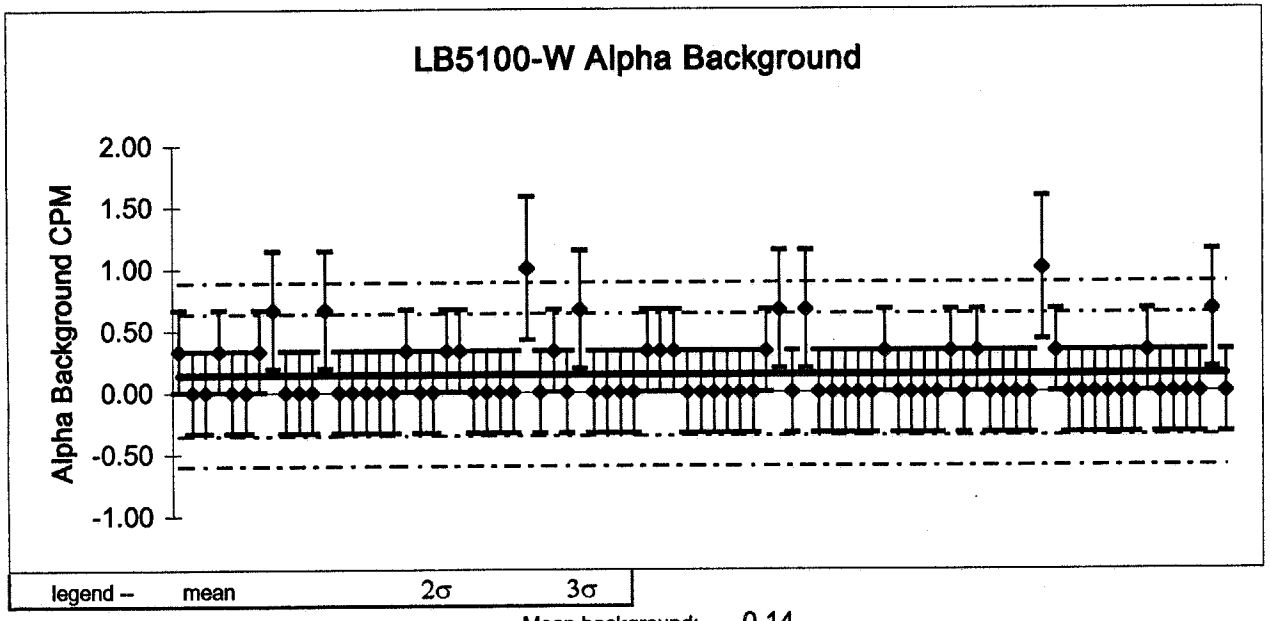


Optimum alpha & beta simultaneous operating voltage: **1410**
Beta slope per 100 volts at beta voltage: 3.67%
Alpha slope per 100 volts at beta voltage: 1.47%

Optimum alpha only operating voltage: **840**
Alpha slope per 100 volts at alpha voltage: 4.25%

Unit Id: 1
Date Performed: 3/11/98 9:04:28

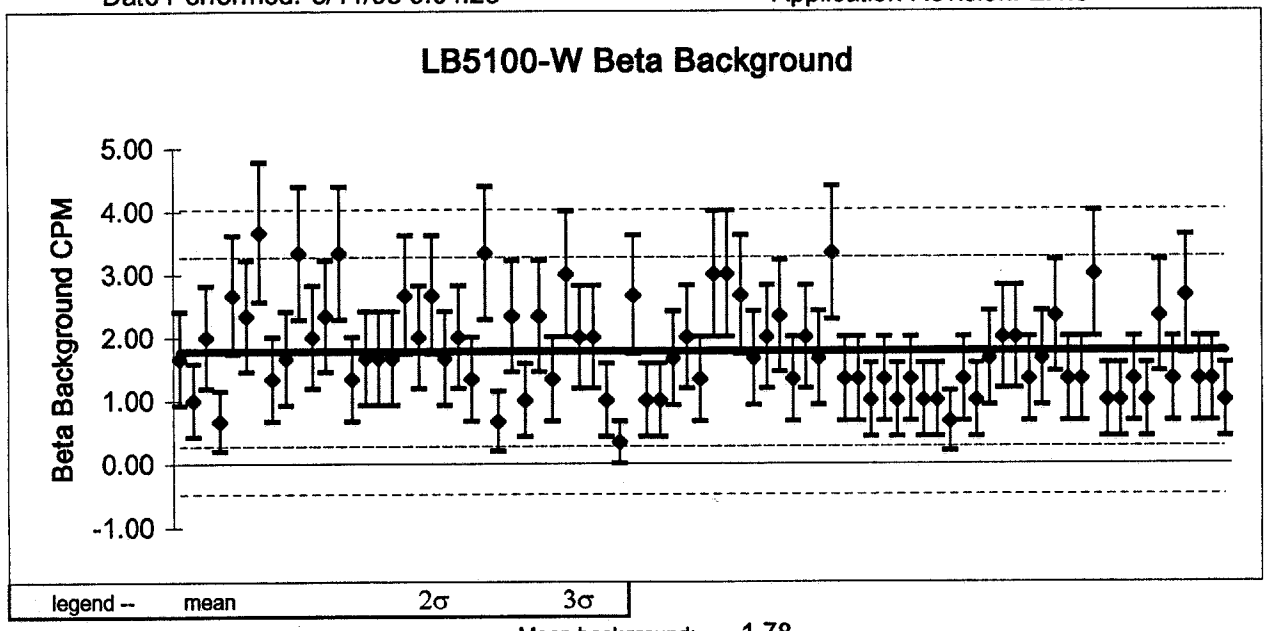
Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	0.14	
Error for mean background:	0.02	1σ
Actual standard deviation:	0.25	
Predicted standard deviation:	0.22	
Number of individual measurements:	80	
Chi-square:	102.47	
Reduced chi-square:	1.30	

Unit Id: 1
Date Performed: 3/11/98 9:04:28

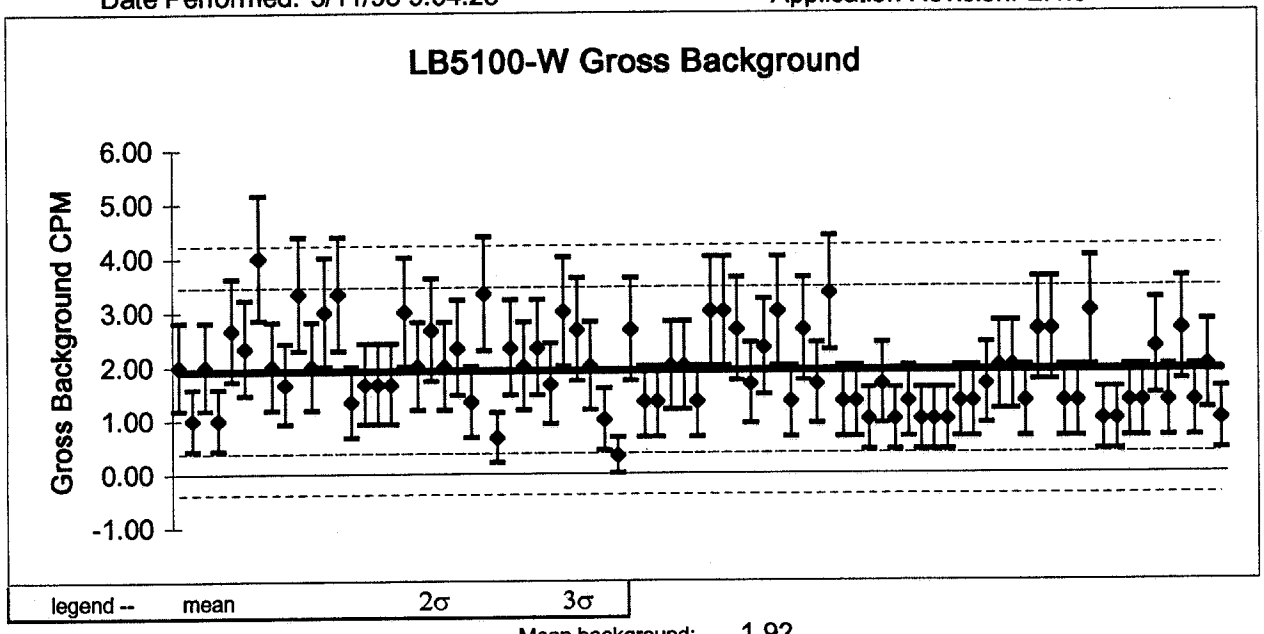
Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	1.78	
Error for mean background:	0.09	1σ
Actual standard deviation:	0.75	
Predicted standard deviation:	0.77	
Number of individual measurements:	80	
Chi-square:	75.41	
Reduced chi-square:	0.95	

Unit Id: 1
Date Performed: 3/11/98 9:04:28

Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	1.92	
Error for mean background:	0.09	1σ
Actual standard deviation:	0.77	
Predicted standard deviation:	0.80	
Number of individual measurements:	80	
Chi-square:	73.22	
Reduced chi-square:	0.93	

Unit Id: 1
Date Performed: 3/11/98
File Name:

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: S-1736

Isotope	Th-230	**Half-Life**	28105000	**days**
Type	Alpha			
Calibration Date	3/28/78	**Custodian**	WEST.	
DPM @ calibration date	33390.00	**Error**	333.90	
Decay Corrected DPM	33384.00	**Error**	333.84	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	33.56%	0.13%	4.51	11204.68	6	25.45%
Beta	11.46%	0.12%	11.34	3824.63		A into B
Gross	45.02%	0.24%	10.84	15029.32		

Unit Id: 1
Date Performed: 3/11/98
File Name:

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: 767/84

Isotope	Tc-99	**Half-Life**	77740000	**days**
Type	Beta			
Calibration Date	9/17/84	**Custodian**	WEST.	
DPM @ calibration date	8400.00	**Error**	84.00	
Decay Corrected DPM	8399.63	**Error**	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.01%	0.01%	4.38	1.05	5	B into A
Beta	37.65%	0.48%	4.16	3162.10		0.03%
Gross	37.66%	0.48%	4.04	3163.15		

Unit Id: 1
Date Performed: 12/11/97
File Name:

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: 767/84

Isotope	Tc-99	**Half-Life**	77740000	**days**
Type	Beta			
Calibration Date	9/17/84	**Custodian**	WEST.	
DPM @ calibration date	8400.00	**Error**	84.00	
Decay Corrected DPM	8399.64	**Error**	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.07%	0.02%	7.42	5.71	6	B into A
Beta	38.33%	0.26%	3.59	3219.46		0.18%
Gross	38.40%	0.24%	3.20	3225.17		

Unit Id: 1
Date Performed: 12/11/97
File Name: [EFF00000.XLD]EFFAB2

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

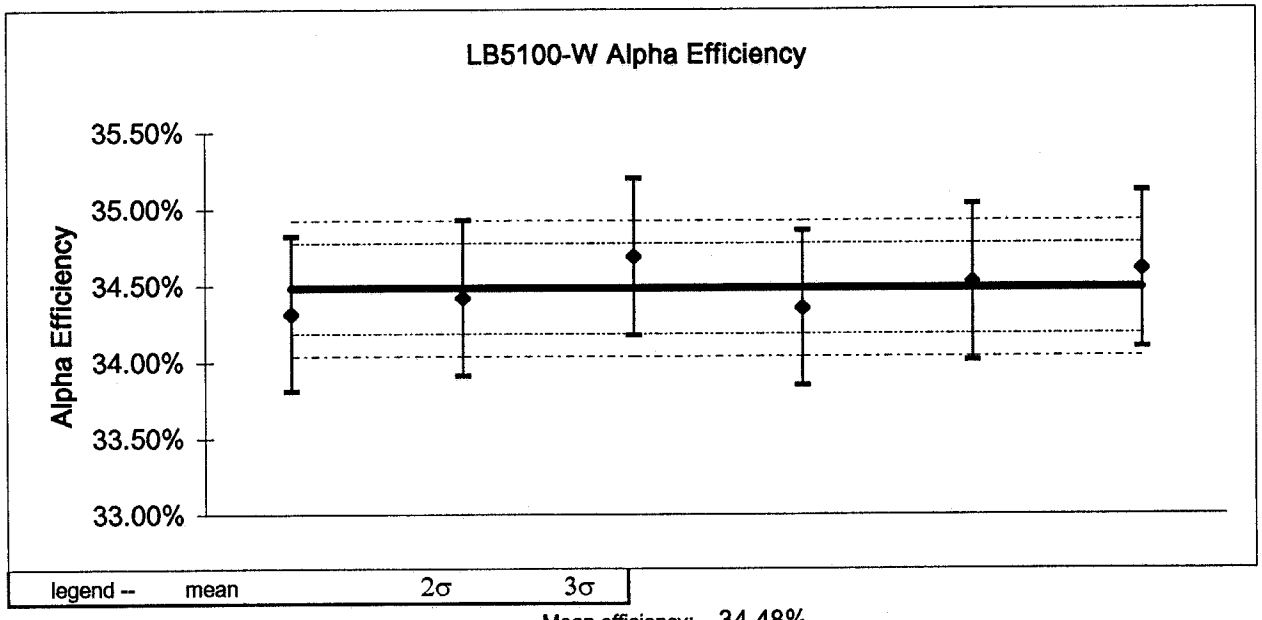
Source Control ID: S-1736

Isotope	Th-230	**Half-Life**	28105000	**days**
Type	Alpha			
Calibration Date	3/28/78	**Custodian**	WEST.	
DPM @ calibration date	33390.00	**Error**	333.90	
Decay Corrected DPM	33384.07	**Error**	333.84	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	34.48%	0.15%	5.21	11511.38	6	23.97%
Beta	10.87%	0.15%	17.20	3628.99		A into B
Gross	45.35%	0.23%	9.85	15140.37		

Unit Id: 1
Date Performed: 12/11/97 10:34:36

Background Archive File: BKGAB
Application Revision: 2.1.4



Mean efficiency:	34.48%	
Error for mean efficiency:	0.15%	1σ
Actual standard deviation:	0.15%	
Predicted standard deviation:	0.14%	
Number of individual measurements:	6	
Chi-square:	5.21	
Reduced chi-square:	1.04	

Unit Id: 1
Date Performed: 12/11/97
File Name:

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

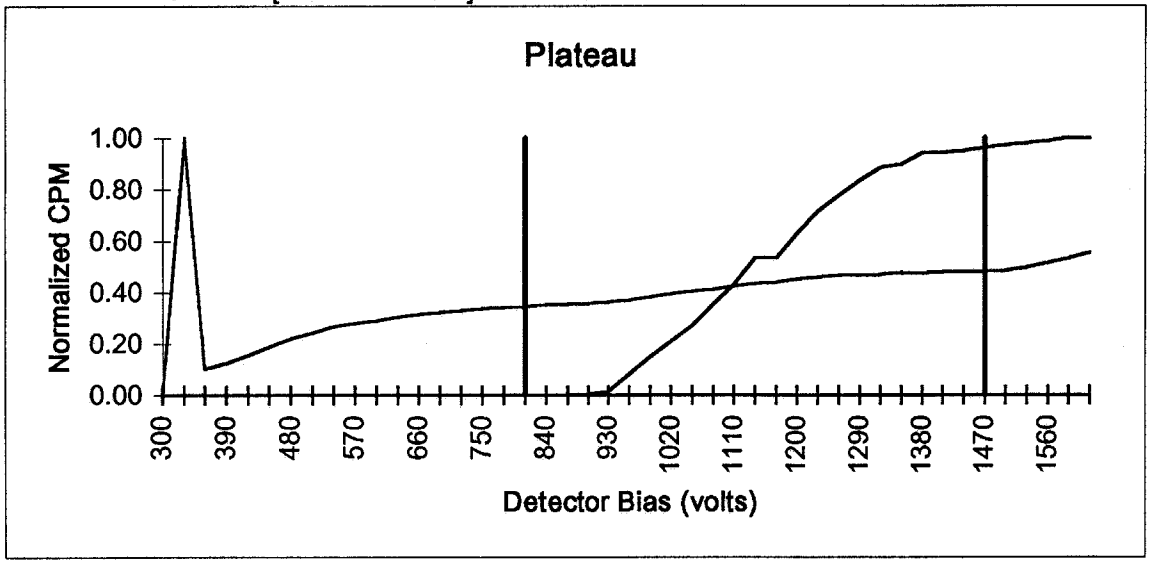
Source Control ID: S-1736

Isotope	Th-230	**Half-Life**	28105000	**days**
Type	Alpha			
Calibration Date	3/28/78	**Custodian**	WEST.	
DPM @ calibration date	33390.00	**Error**	333.90	
Decay Corrected DPM	33384.07	**Error**	333.84	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	34.48%	0.15%	5.21	11511.38	6	23.97%
Beta	10.87%	0.15%	17.20	3628.99		A into B
Gross	45.35%	0.23%	9.85	15140.37		

Unit Id: 1
Date Performed: 12/11/97 0:20:53
FileName: [PLA00000.XLD]PLATAB2

Application Revision: 2.1.3
Application Version: Standard

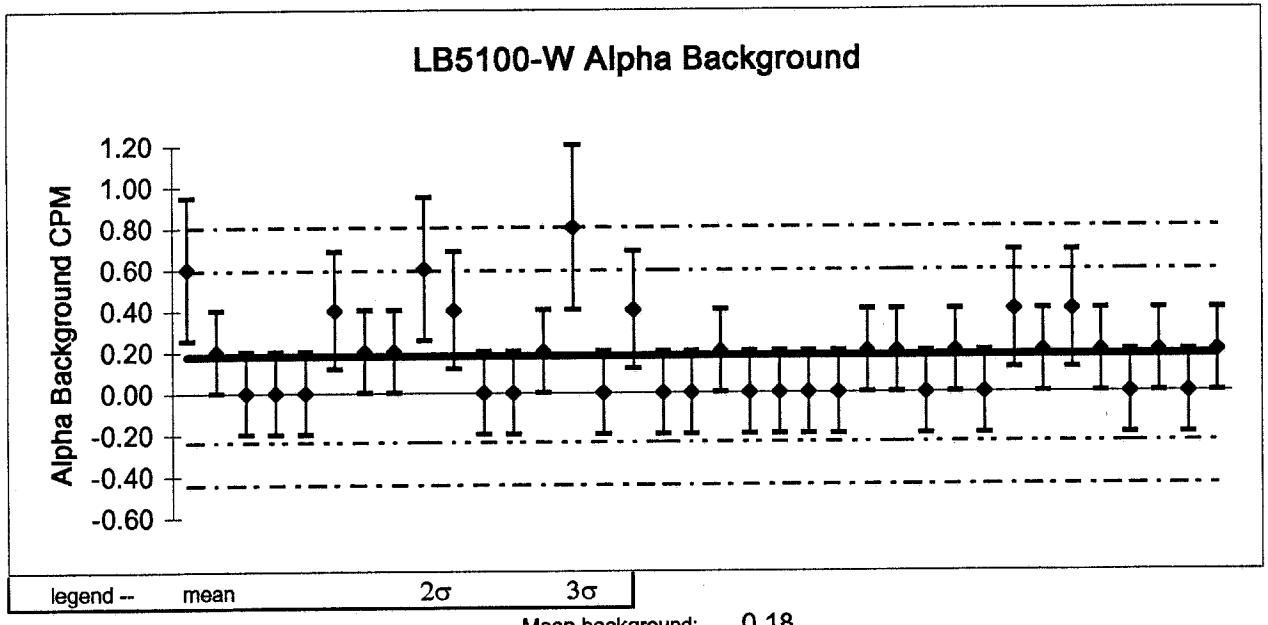


Optimum alpha & beta simultaneous operating voltage: **1440**
Beta slope per 100 volts at beta voltage: 2.78%
Alpha slope per 100 volts at beta voltage: 1.06%

Optimum alpha only operating voltage: **810**
Alpha slope per 100 volts at alpha voltage: 4.44%

Unit Id: 1
Date Performed: 12/11/97 7:29:25

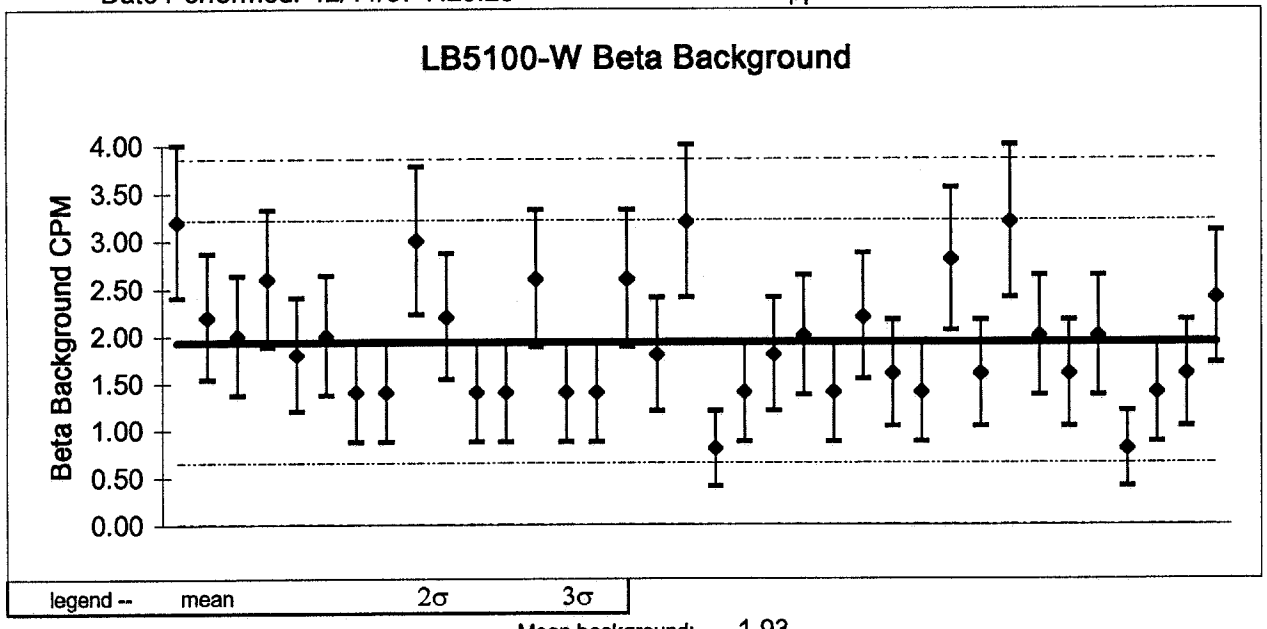
Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	0.18	
Error for mean background:	0.03	1σ
Actual standard deviation:	0.21	
Predicted standard deviation:	0.19	
Number of individual measurements:	36	
Chi-square:	42.25	
Reduced chi-square:	1.21	

Unit Id: 1
Date Performed: 12/11/97 7:29:25

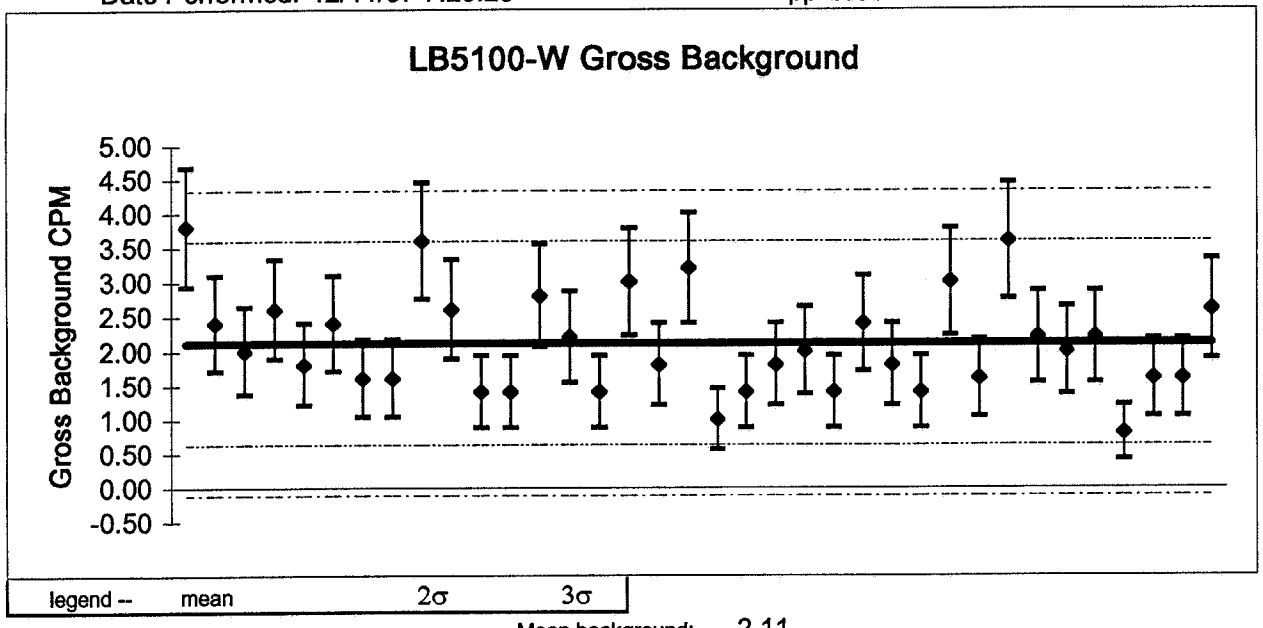
Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	1.93	
Error for mean background:	0.10	1σ
Actual standard deviation:	0.64	
Predicted standard deviation:	0.62	
Number of individual measurements:	36	
Chi-square:	37.24	
Reduced chi-square:	1.06	

Unit Id: 1
Date Performed: 12/11/97 7:29:25

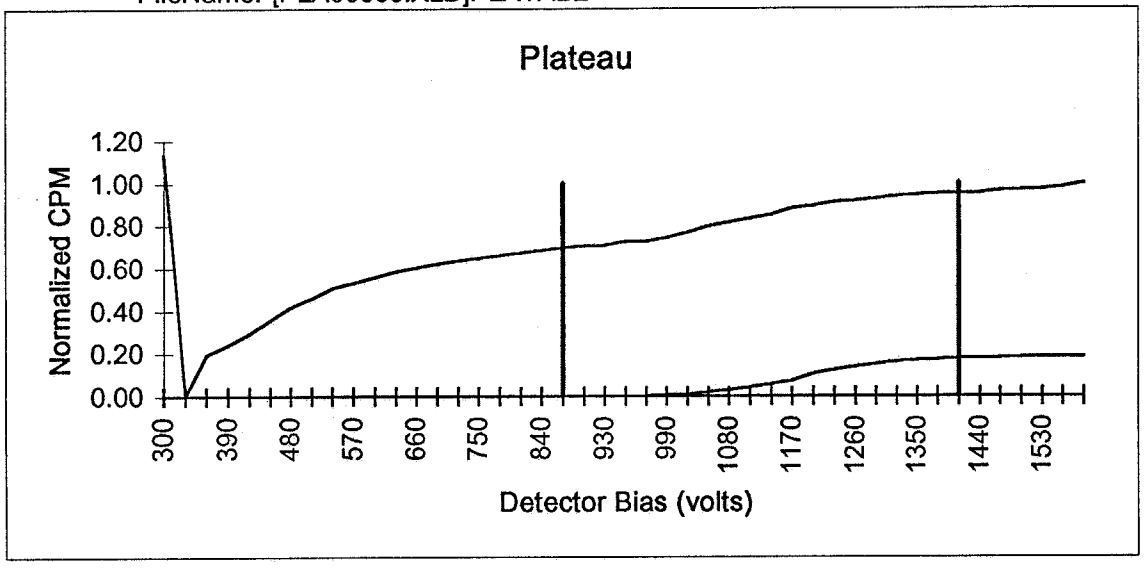
Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	2.11	
Error for mean background:	0.11	1σ
Actual standard deviation:	0.74	
Predicted standard deviation:	0.65	
Number of individual measurements:	36	
Chi-square:	45.56	
Reduced chi-square:	1.30	

Unit Id: 1
Date Performed: 9/10/97 23:29:02
FileName: [PLA00000.XLD]PLATAB2

Application Revision: 2.1.3
Application Version: Standard

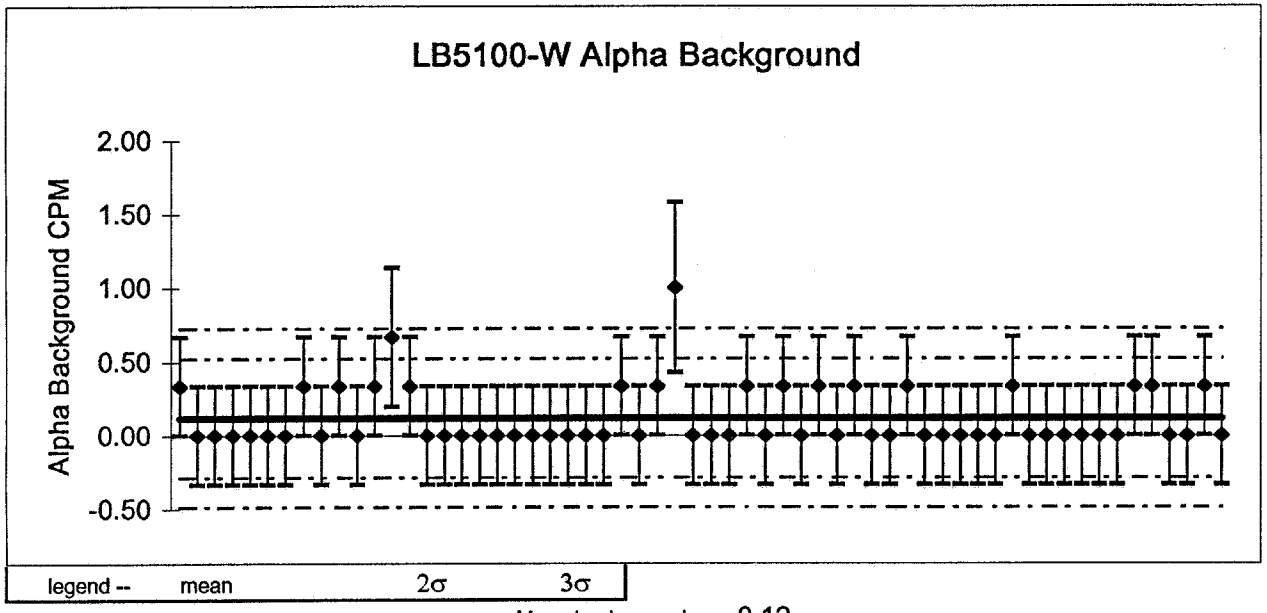


Optimum alpha & beta simultaneous operating voltage: 1410
Beta slope per 100 volts at beta voltage: 6.10%
Alpha slope per 100 volts at beta voltage: 1.39%

Optimum alpha only operating voltage: 870
Alpha slope per 100 volts at alpha voltage: 4.40%

Unit Id: 1
Date Performed: 9/11/97 6:01:52

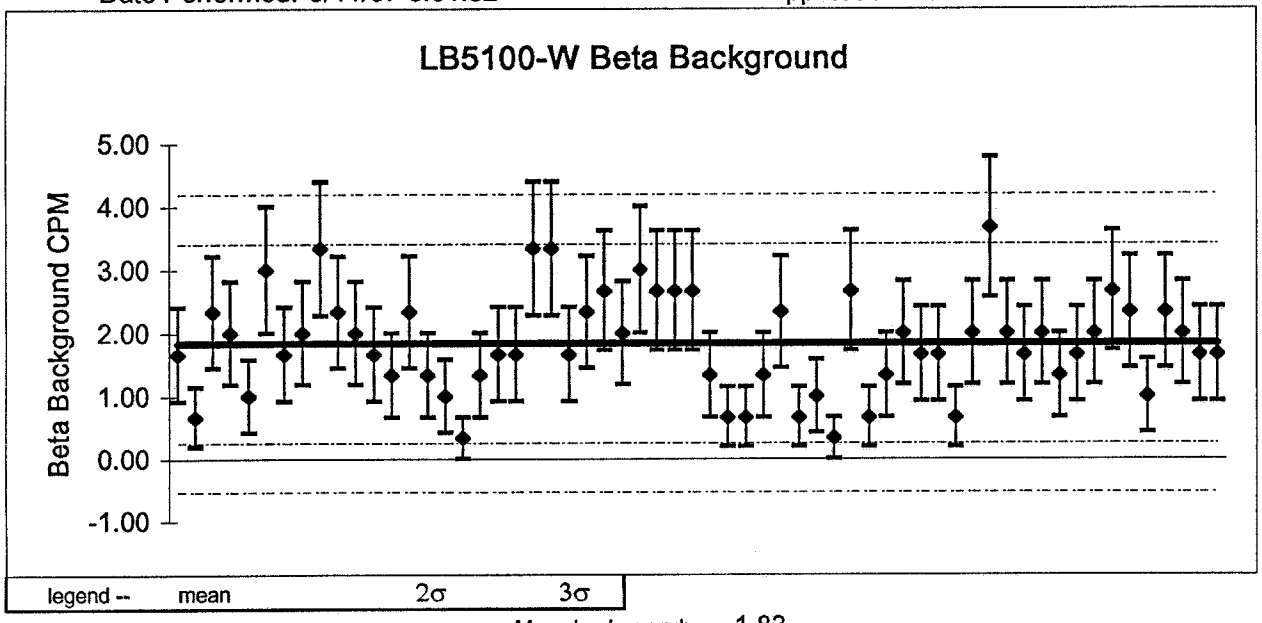
Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	0.12	
Error for mean background:	0.03	1σ
Actual standard deviation:	0.20	
Predicted standard deviation:	0.20	
Number of individual measurements:	60	
Chi-square:	61.86	
Reduced chi-square:	1.05	

Unit Id: 1
Date Performed: 9/11/97 6:01:52

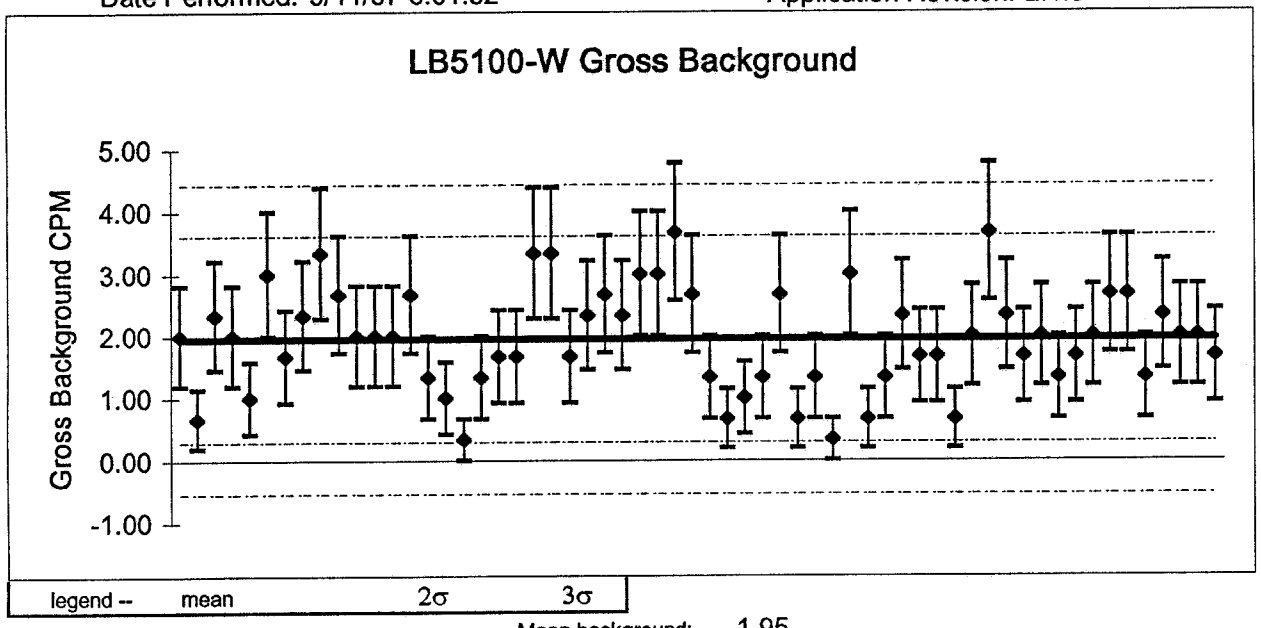
Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	1.83	
Error for mean background:	0.10	1σ
Actual standard deviation:	0.79	
Predicted standard deviation:	0.78	
Number of individual measurements:	60	
Chi-square:	59.82	
Reduced chi-square:	1.01	

Unit Id: 1
Date Performed: 9/11/97 6:01:52

Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	1.95	
Error for mean background:	0.10	1σ
Actual standard deviation:	0.83	
Predicted standard deviation:	0.81	
Number of individual measurements:	60	
Chi-square:	62.50	
Reduced chi-square:	1.06	

Unit Id: 1
Date Performed: 9/11/97
File Name:

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: S-1736

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	3/28/78	Custodian	WEST.	
DPM @ calibration date	33390.00	Error	333.90	
Decay Corrected DPM	33384.15	Error	333.84	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	32.63%	0.19%	9.56	10893.73	6	27.39%
Beta	12.31%	0.15%	14.99	4109.64		A into B
Gross	44.94%	0.25%	11.86	15003.37		

Unit Id: 1
Date Performed: 9/11/97
File Name:

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

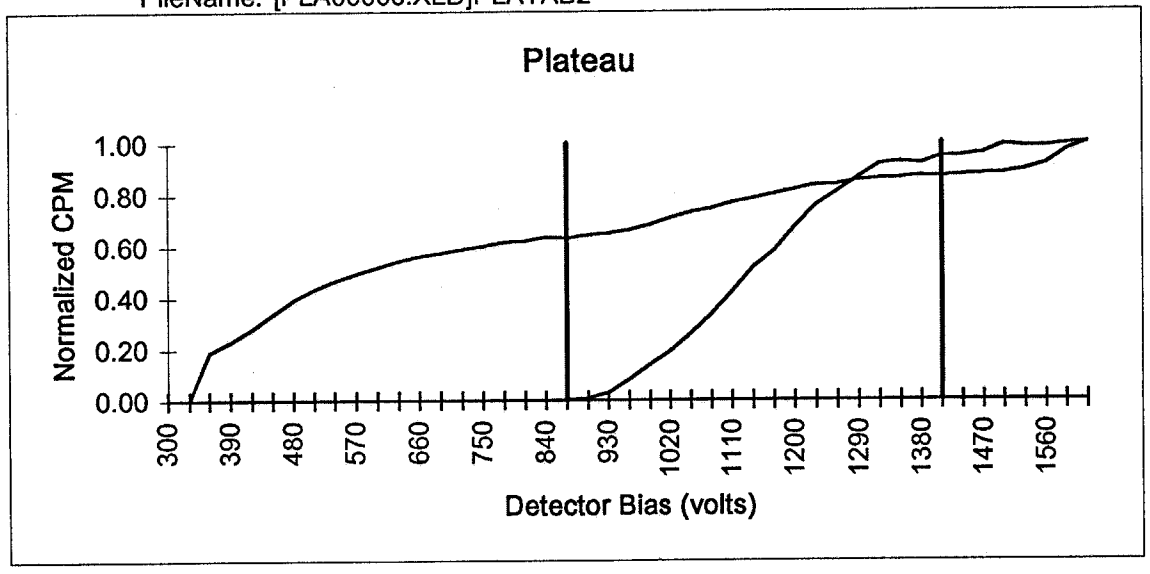
Source Control ID: 767/84

Isotope	Tc-99	Half-Life	77740000	days
Type	Beta			
Calibration Date	9/17/84	Custodian	WEST.	
DPM @ calibration date	8400.00	Error	84.00	
Decay Corrected DPM	8399.64	Error	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.00%	0.00%	6.50	0.33	6	B into A
Beta	36.79%	0.22%	2.88	3090.54		0.01%
Gross	36.80%	0.23%	2.95	3090.87		

Unit Id: 1
Date Performed: 6/10/97 23:06:26
FileName: [PLA00000.XLD]PLATAB2

Application Revision: 2.1.3
Application Version: Standard

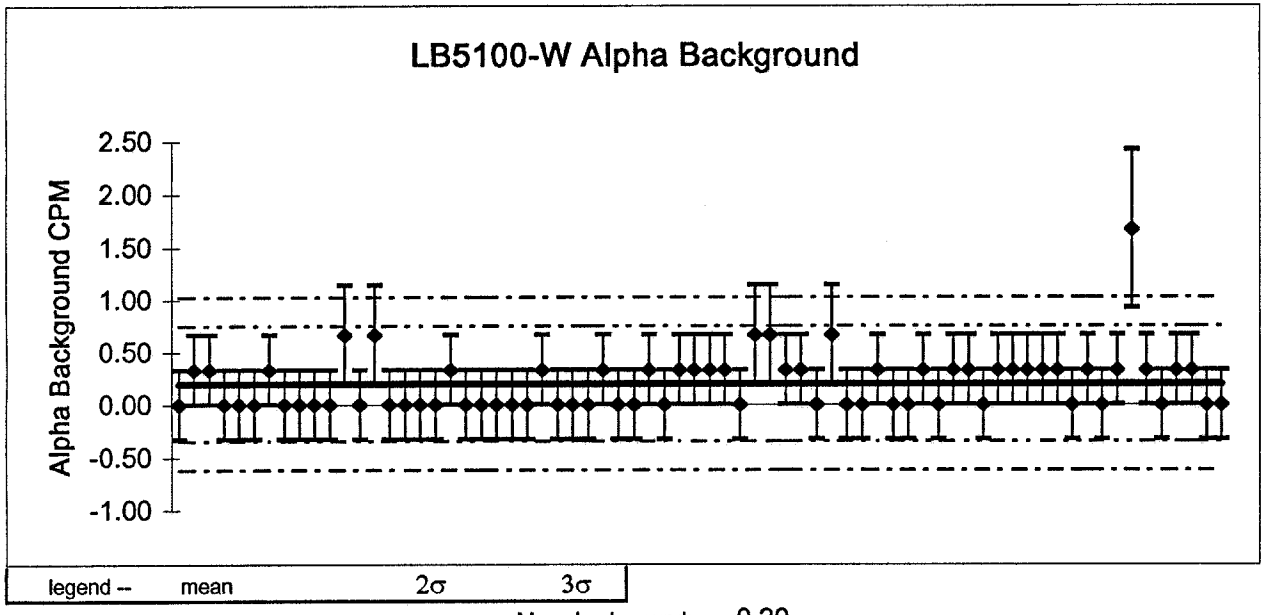


Optimum alpha & beta simultaneous operating voltage: 1410
Beta slope per 100 volts at beta voltage: 3.42%
Alpha slope per 100 volts at beta voltage: 1.37%

Optimum alpha only operating voltage: 870
Alpha slope per 100 volts at alpha voltage: 3.67%

Unit Id: 1
Date Performed: 6/11/97 5:26:44

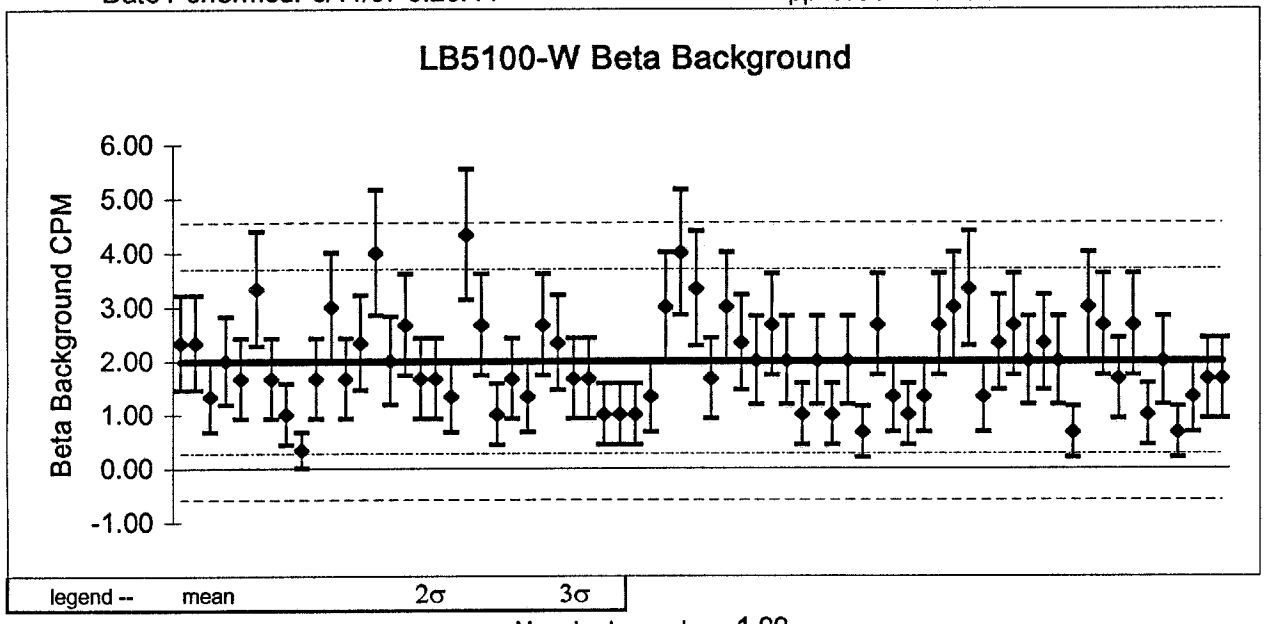
Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	0.20	
Error for mean background:	0.03	1σ
Actual standard deviation:	0.27	
Predicted standard deviation:	0.26	
Number of individual measurements:	70	
Chi-square:	78.00	
Reduced chi-square:	1.13	

Unit Id: 1
Date Performed: 6/11/97 5:26:44

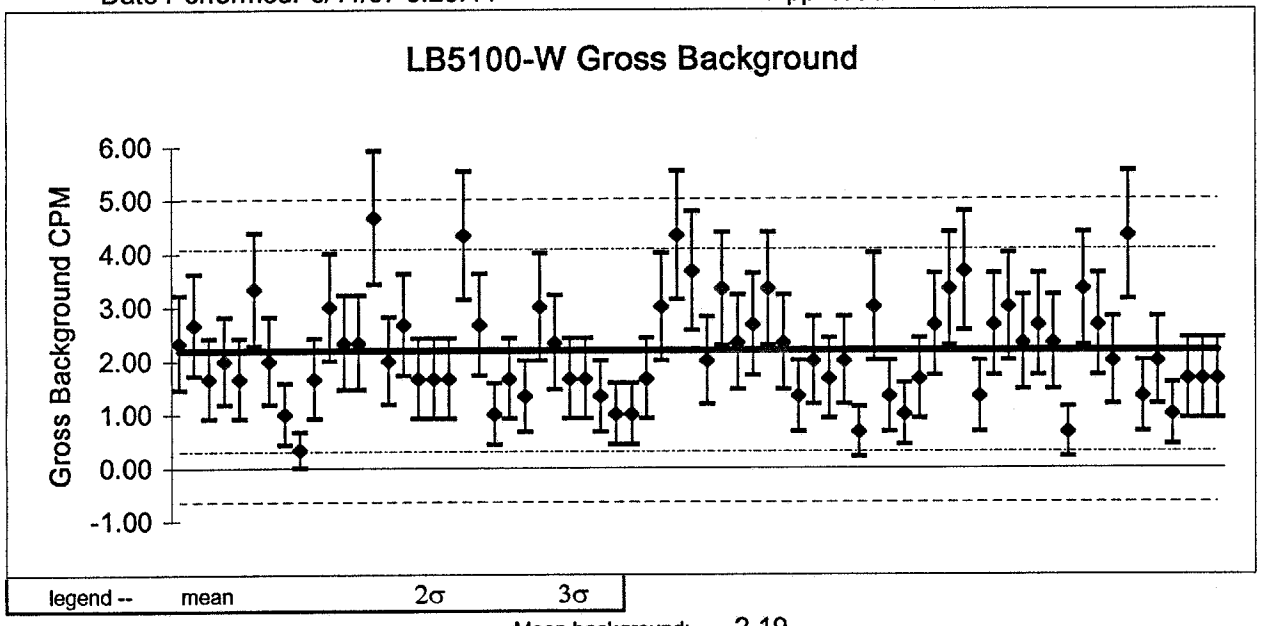
Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	1.99	
Error for mean background:	0.10	1σ
Actual standard deviation:	0.86	
Predicted standard deviation:	0.81	
Number of individual measurements:	70	
Chi-square:	76.35	
Reduced chi-square:	1.11	

Unit Id: 1
Date Performed: 6/11/97 5:26:44

Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	2.19	
Error for mean background:	0.10	1σ
Actual standard deviation:	0.94	
Predicted standard deviation:	0.85	
Number of individual measurements:	70	
Chi-square:	84.17	
Reduced chi-square:	1.22	

Unit Id: 1
Date Performed: 6/11/97
File Name:

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: S-1736

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	3/28/78	Custodian	WEST.	
DPM @ calibration date	33390.00	Error	333.90	
Decay Corrected DPM	33384.22	Error	333.84	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	33.10%	0.28%	19.18	11050.25	6	25.71%
Beta	11.45%	0.08%	4.77	3824.14		A into B
Gross	44.56%	0.29%	16.22	14874.40		

Unit Id: 1
Date Performed: 6/11/97
File Name:

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

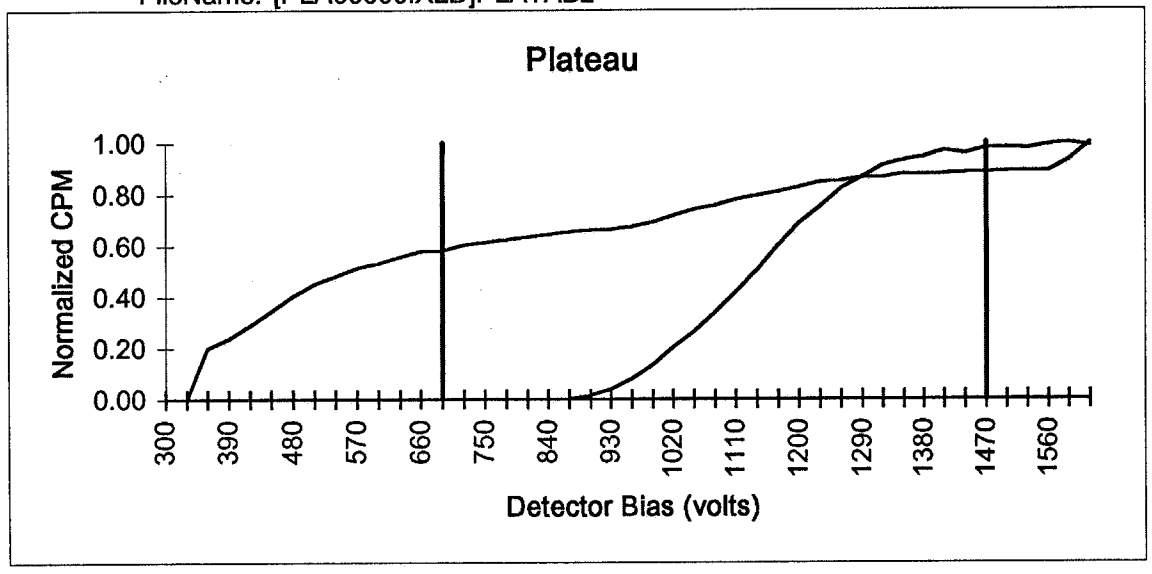
Source Control ID: 767/84

Isotope	Tc-99	Half-Life	77740000	days
Type	Beta			
Calibration Date	9/17/84	Custodian	WEST.	
DPM @ calibration date	8400.00	Error	84.00	
Decay Corrected DPM	8399.65	Error	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.01%	0.00%	4.05	1.05	6	B into A
Beta	37.16%	0.19%	2.13	3121.21		0.03%
Gross	37.17%	0.19%	2.06	3122.26		

Unit Id: 1
Date Performed: 3/9/97 1:02:47
FileName: [PLA00000.XLD]PLATAB2

Application Revision: 2.1.3
Application Version: Standard

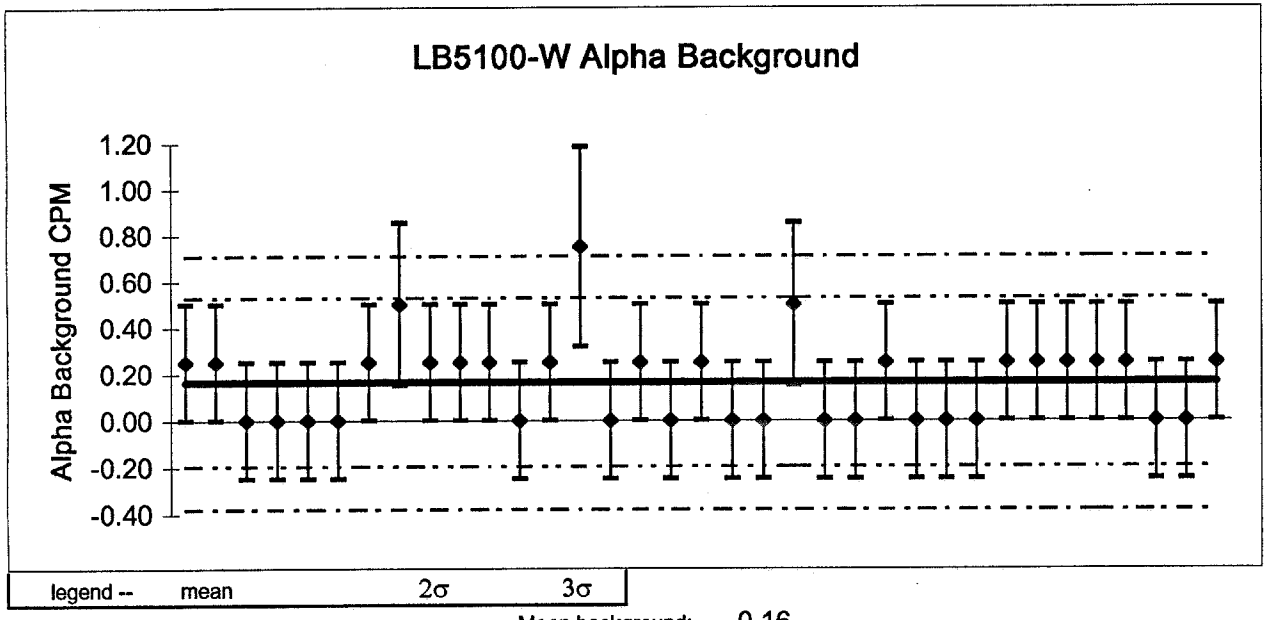


Optimum alpha & beta simultaneous operating voltage: **1470**
Beta slope per 100 volts at beta voltage: 1.50%
Alpha slope per 100 volts at beta voltage: 1.05%

Optimum alpha only operating voltage: **675**
Alpha slope per 100 volts at alpha voltage: 7.99%

Unit Id: 1
Date Performed: 3/10/97 7:18:29

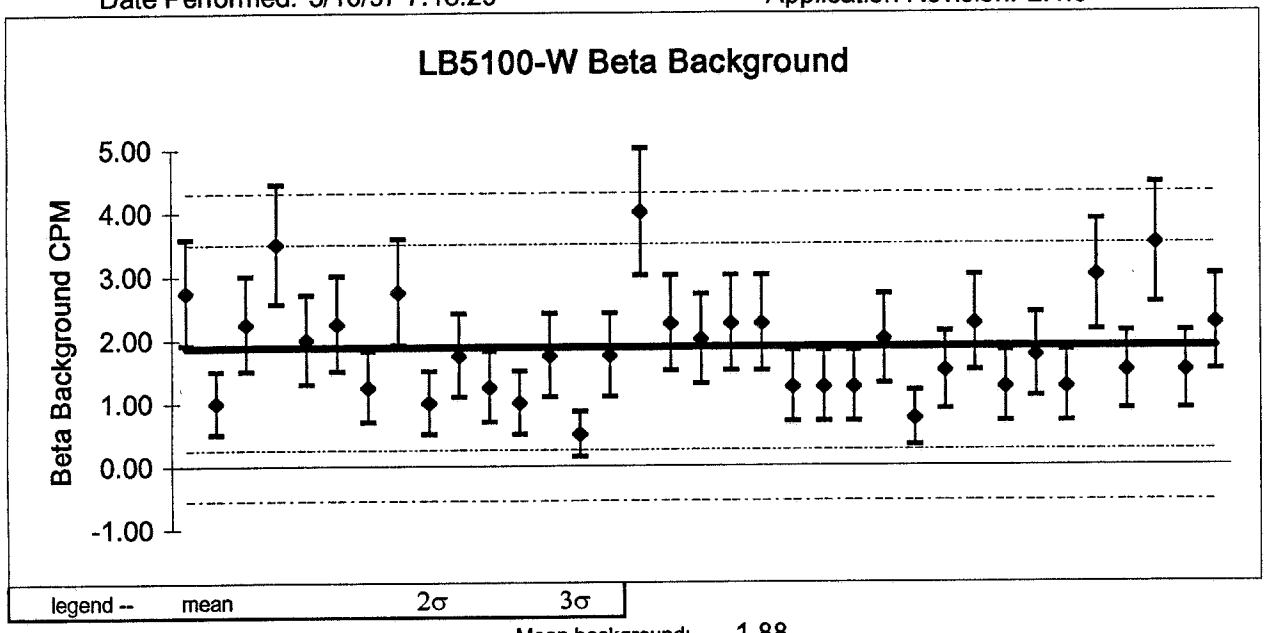
Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	0.16	
Error for mean background:	0.03	1σ
Actual standard deviation:	0.18	
Predicted standard deviation:	0.20	
Number of individual measurements:	35	
Chi-square:	27.22	
Reduced chi-square:	0.80	

Unit Id: 1
Date Performed: 3/10/97 7:18:29

Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	1.88	
Error for mean background:	0.12	1σ
Actual standard deviation:	0.81	
Predicted standard deviation:	0.69	
Number of individual measurements:	35	
Chi-square:	47.48	
Reduced chi-square:	1.40	

Unit Id: 1
Date Performed: 3/10/97
File Name:

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: S-1736

Isotope	Th-230	**Half-Life**	28105000	**days**
Type	Alpha			
Calibration Date	3/28/78	**Custodian**	WEST.	
DPM @ calibration date	33390.00	**Error**	333.90	
Decay Corrected DPM	33384.30	**Error**	333.84	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	34.92%	0.13%	3.91	11656.58	6	23.28%
Beta	10.59%	0.04%	1.34	3536.90		A into B
Gross	45.51%	0.11%	2.06	15193.48		

Unit Id: 1
Date Performed: 3/10/97
File Name:

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

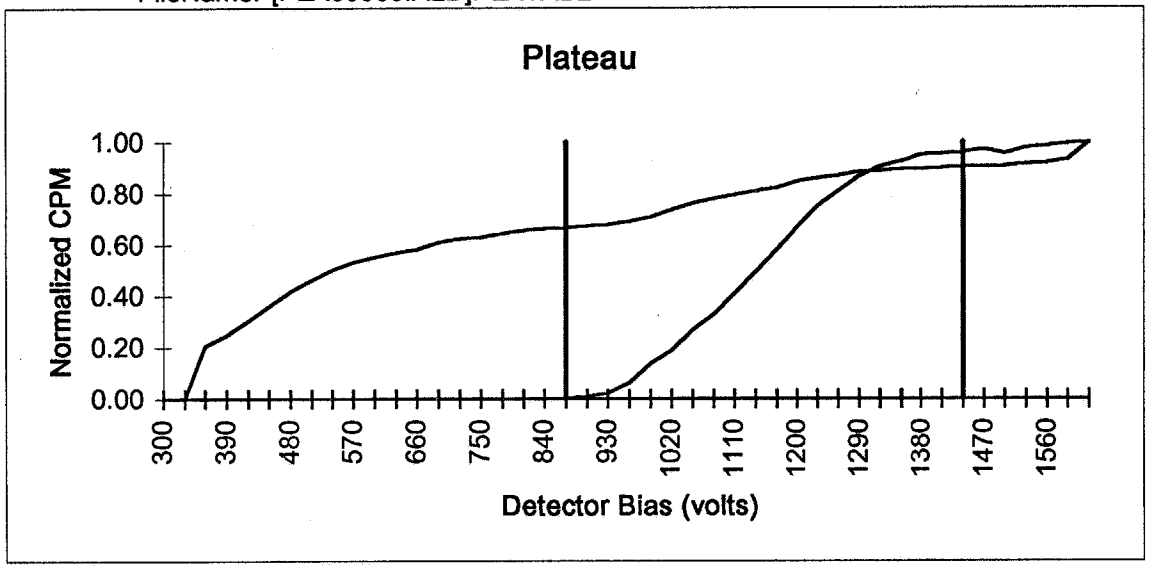
Source Control ID: 767/84

Isotope	Tc-99	Half-Life	77740000	days
Type	Beta			
Calibration Date	9/17/84	Custodian	WEST.	
DPM @ calibration date	8400.00	Error	84.00	
Decay Corrected DPM	8399.66	Error	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.54%	0.05%	8.12	45.65	6	B into A
Beta	37.59%	0.44%	10.58	3157.40		1.43%
Gross	38.13%	0.44%	10.78	3203.05		

Unit Id: 1
Date Performed: 12/2/96 11:00:49
FileName: [PLA00000.XLD]PLATAB2

Application Revision: 2.1.3
Application Version: Standard

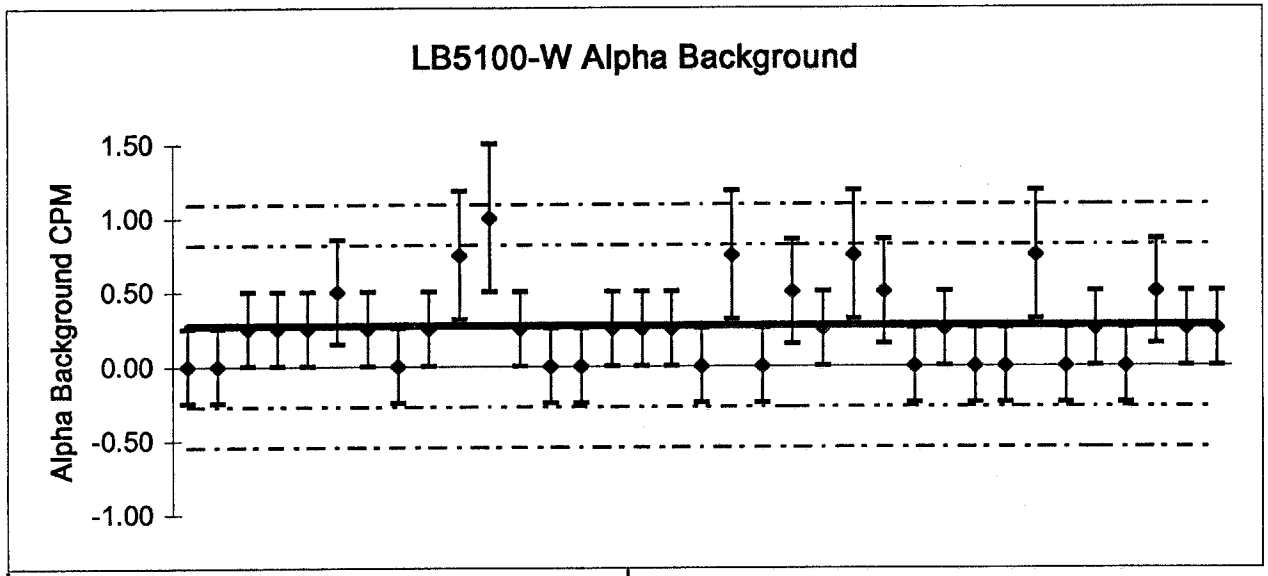


Optimum alpha & beta simultaneous operating voltage: 1440
Beta slope per 100 volts at beta voltage: 1.10%
Alpha slope per 100 volts at beta voltage: 1.13%

Optimum alpha only operating voltage: 870
Alpha slope per 100 volts at alpha voltage: 2.81%

Unit Id: 1
Date Performed: 12/3/96 7:03:39

Background Archive File: BKGAB
Application Revision: 2.1.5

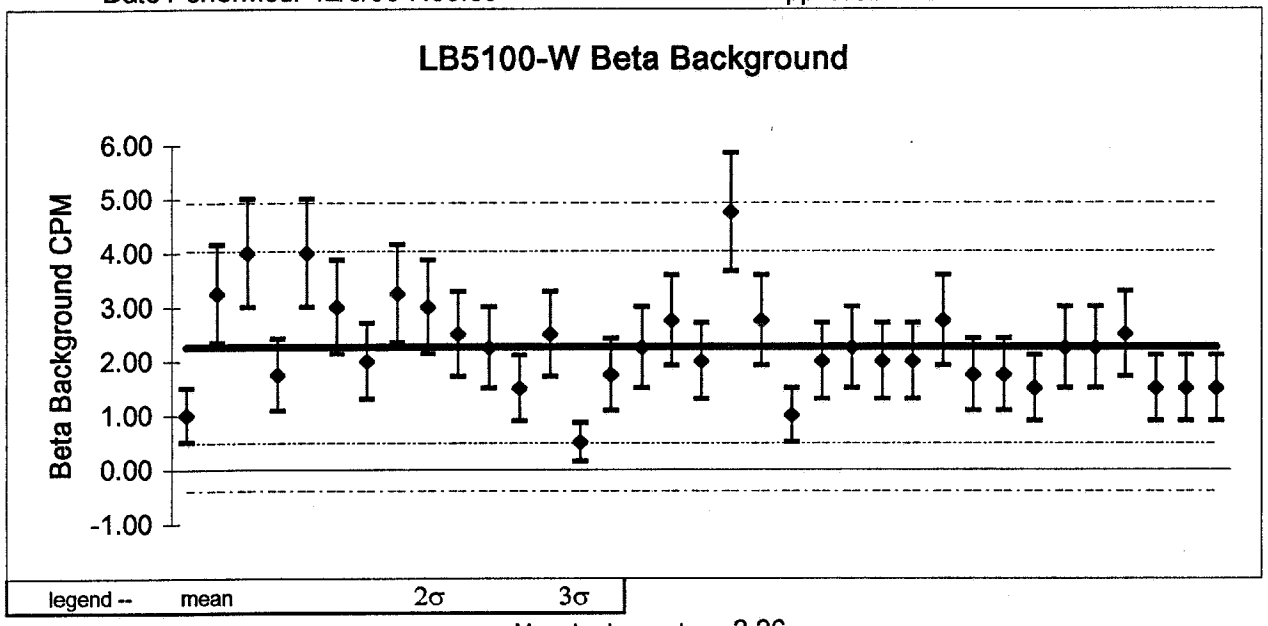


legend -- mean 2σ 3σ

Mean background:	0.27	
Error for mean background:	0.04	1σ
Actual standard deviation:	0.27	
Predicted standard deviation:	0.26	
Number of individual measurements:	35	
Chi-square:	37.53	
Reduced chi-square:	1.10	

Unit Id: 1
Date Performed: 12/3/96 7:03:39

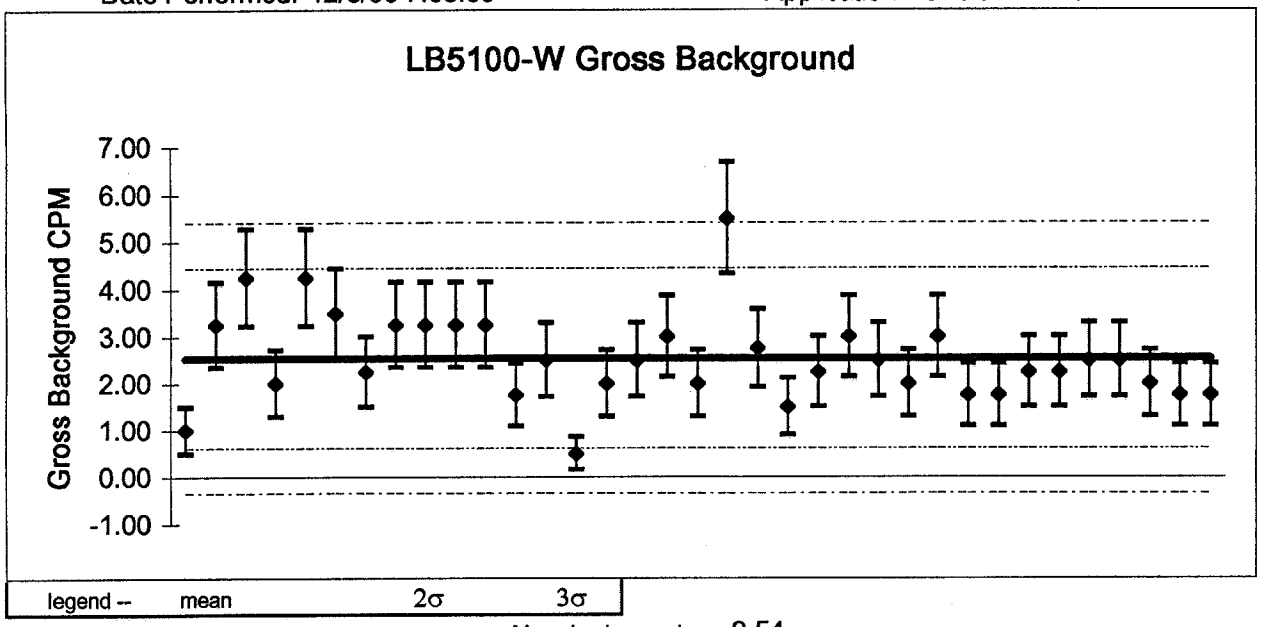
Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	2.26	
Error for mean background:	0.13	1σ
Actual standard deviation:	0.89	
Predicted standard deviation:	0.75	
Number of individual measurements:	35	
Chi-square:	47.24	
Reduced chi-square:	1.39	

Unit Id: 1
Date Performed: 12/3/96 7:03:39

Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	2.54	
Error for mean background:	0.13	1σ
Actual standard deviation:	0.96	
Predicted standard deviation:	0.80	
Number of individual measurements:	35	
Chi-square:	49.32	
Reduced chi-square:	1.45	

Unit Id: 1
Date Performed: 12/3/96
File Name:

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: S-1736

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	3/28/78	Custodian	WEST.	
DPM @ calibration date	33390.00	Error	333.90	
Decay Corrected DPM	33384.38	Error	333.84	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	33.86%	0.19%	9.21	11305.00	6	24.33%
Beta	10.89%	0.08%	5.04	3634.11		A into B
Gross	44.75%	0.19%	6.97	14939.11		

Unit Id: 1
Date Performed: 12/3/96
File Name:

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

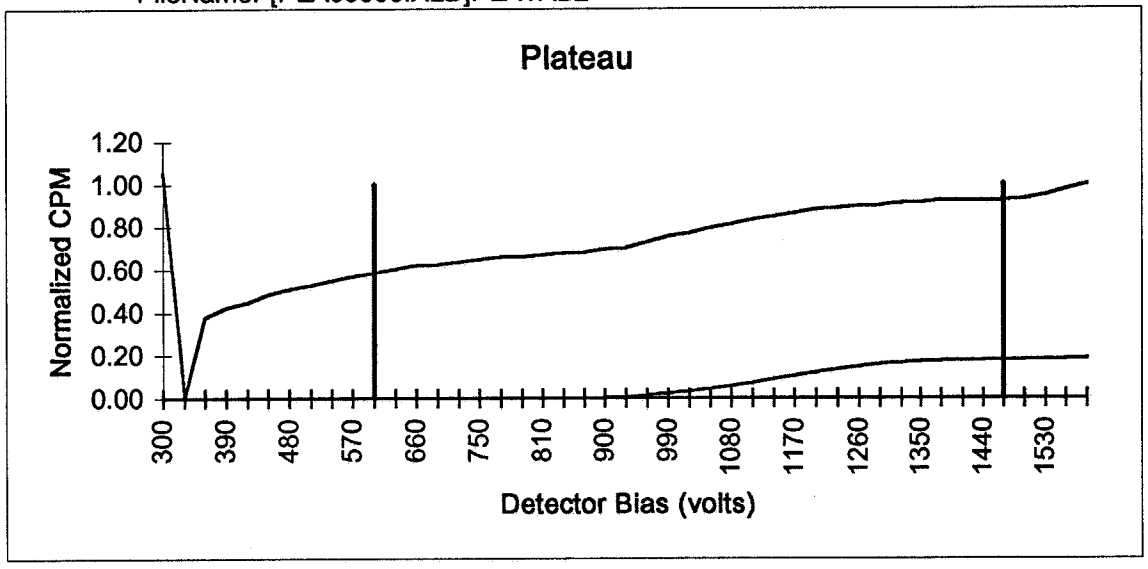
Source Control ID: 767/84

Isotope	Tc-99	Half-Life	77740000	days
Type	Beta			
Calibration Date	9/17/84	Custodian	WEST.	
DPM @ calibration date	8400.00	Error	84.00	
Decay Corrected DPM	8399.67	Error	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.06%	0.01%	4.60	5.14	6	B into A
Beta	37.70%	0.36%	7.17	3166.47		0.16%
Gross	37.76%	0.36%	7.18	3171.61		

Unit Id: 1
Date Performed: 8/6/96 23:54:49
FileName: [PLA00000.XLD]PLATAB2

Application Revision: 2.1.3
Application Version: Standard

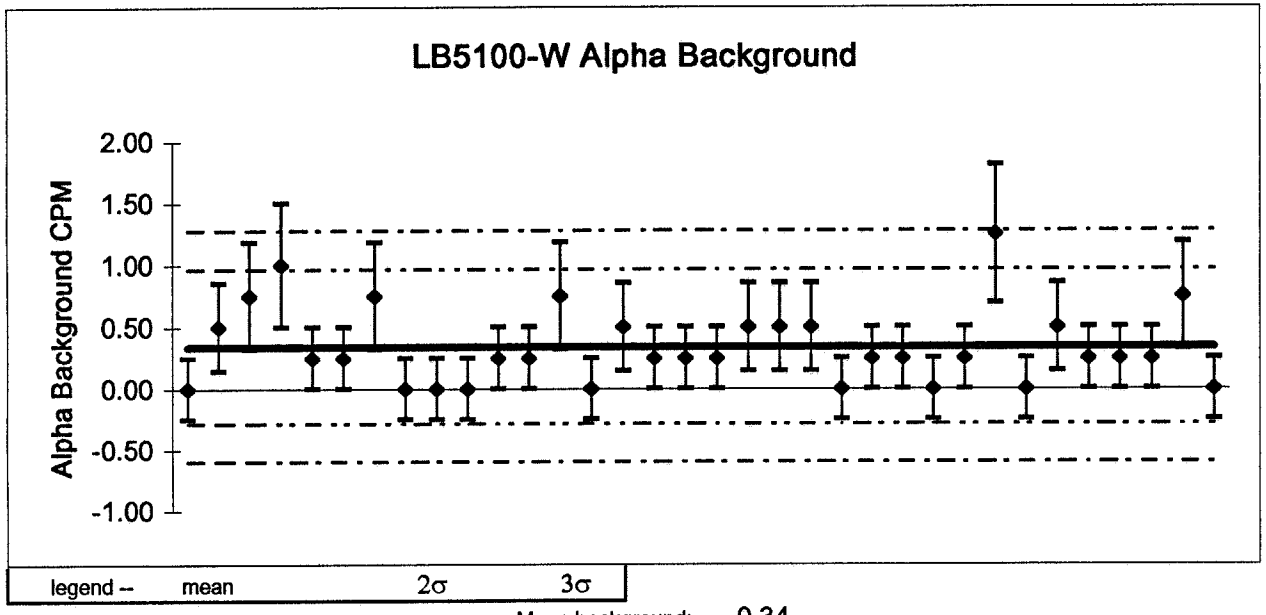


Optimum alpha & beta simultaneous operating voltage: 1470
Beta slope per 100 volts at beta voltage: 2.50%
Alpha slope per 100 volts at beta voltage: 0.50%

Optimum alpha only operating voltage: 600
Alpha slope per 100 volts at alpha voltage: 10.24%

Unit Id: 1
Date Performed: 8/7/96 8:08:18

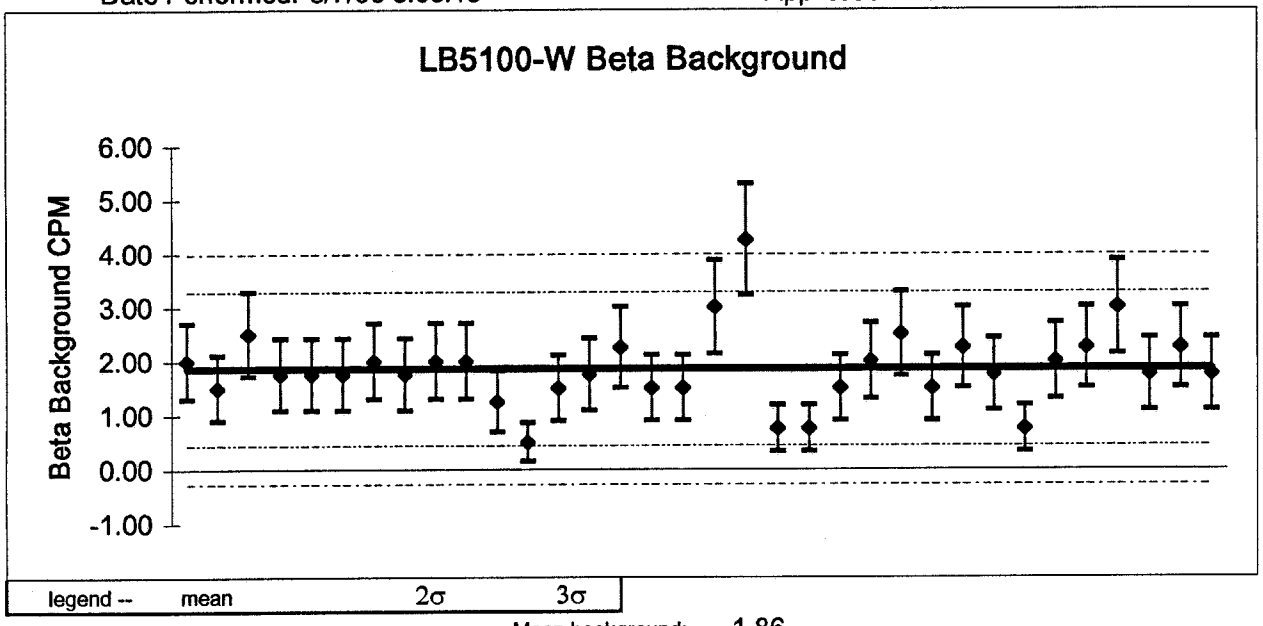
Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	0.34	
Error for mean background:	0.05	1σ
Actual standard deviation:	0.31	
Predicted standard deviation:	0.29	
Number of individual measurements:	34	
Chi-square:	38.26	
Reduced chi-square:	1.16	

Unit Id: 1
Date Performed: 8/7/96 8:08:18

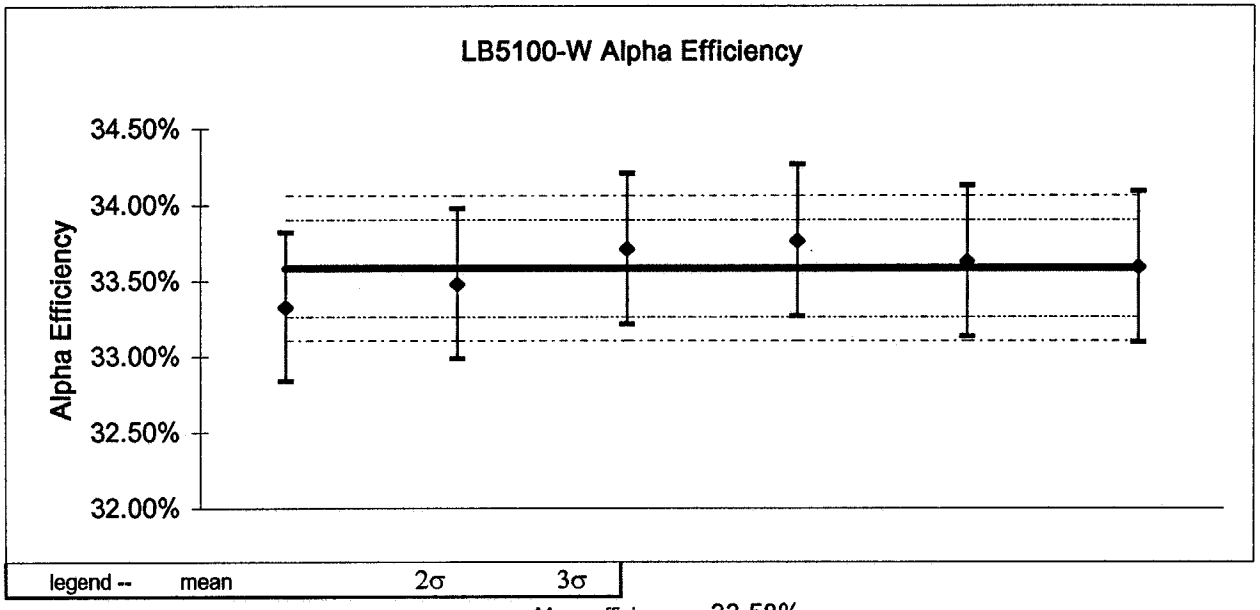
Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	1.86	
Error for mean background:	0.12	1σ
Actual standard deviation:	0.71	
Predicted standard deviation:	0.68	
Number of individual measurements:	34	
Chi-square:	35.80	
Reduced chi-square:	1.08	

Unit Id: 1
Date Performed: 8/7/96 10:34:36

Background Archive File: BKGAB
Application Revision: 2.1.4



Mean efficiency:	33.58%	
Error for mean efficiency:	0.16%	1σ
Actual standard deviation:	0.16%	
Predicted standard deviation:	0.14%	
Number of individual measurements:	6	
Chi-square:	6.33	
Reduced chi-square:	1.27	

Unit Id: 1
Date Performed: 8/7/96
File Name: [EFF00000.XLD]EFFAB2

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

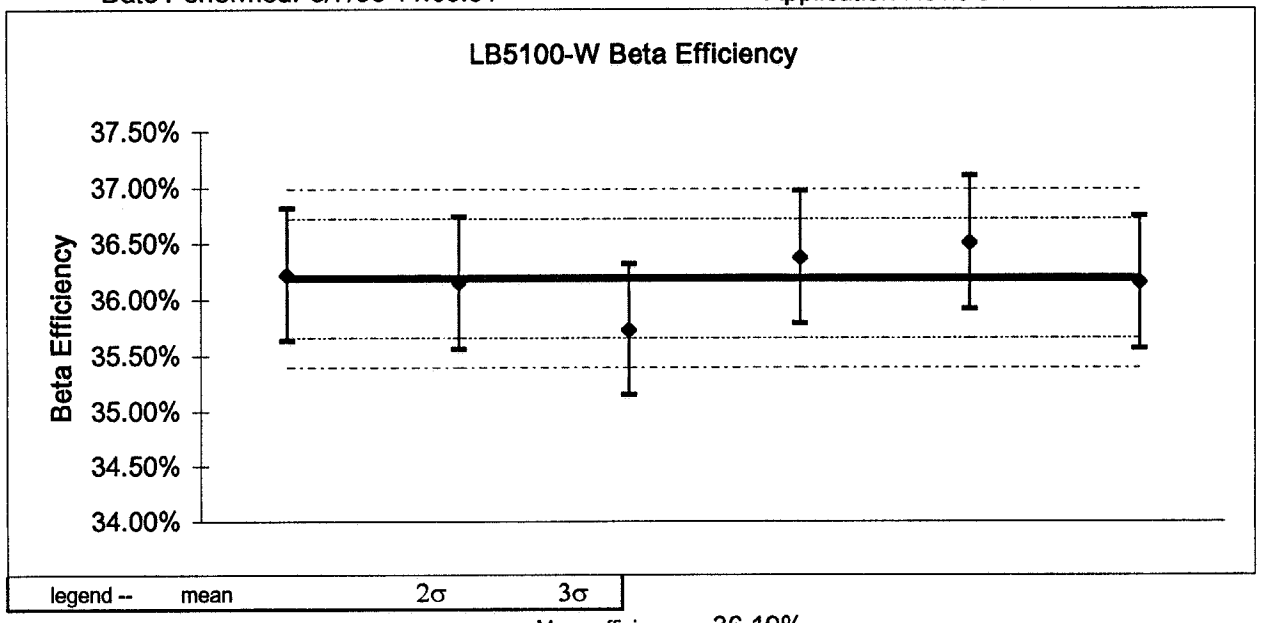
Source Control ID: S-1736

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	3/28/78	Custodian	WEST.	
DPM @ calibration date	33390.00	Error	333.90	
Decay Corrected DPM	33384.48	Error	333.84	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	33.58%	0.16%	6.33	11211.74	6	24.43%
Beta	10.86%	0.06%	2.89	3623.97		A into B
Gross	44.44%	0.14%	3.47	14835.70		

Unit Id: 1
Date Performed: 8/7/96 11:05:51

Background Archive File: BKGAB
Application Revision: 2.1.4



Mean efficiency:	36.19%	
Error for mean efficiency:	0.26%	1σ
Actual standard deviation:	0.26%	
Predicted standard deviation:	0.29%	
Number of individual measurements:	6	
Chi-square:	4.06	
Reduced chi-square:	0.81	

Unit Id: 1
Date Performed: 8/7/96
File Name: [EFF00001.XLD]EFFAB2

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

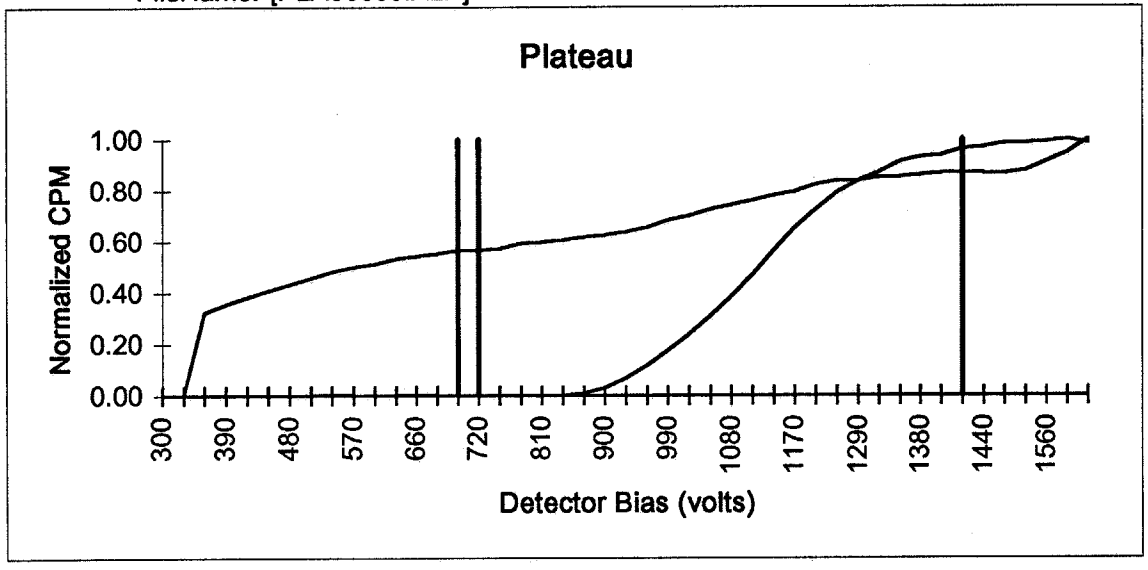
Source Control ID: 767/84

Isotope	Tc-99	Half-Life	77740000	days
Type	Beta			
Calibration Date	9/17/84	Custodian	WEST.	
DPM @ calibration date	8400.00	Error	84.00	
Decay Corrected DPM	8399.67	Error	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chl ^2	CPM	Events	X-Talk
Alpha	0.27%	0.02%	3.47	22.50	6	B into A
Beta	36.19%	0.26%	4.06	3039.87		0.73%
Gross	36.46%	0.26%	3.82	3062.37		

Unit Id: 1
Date Performed: 5/7/96 0:06:20
FileName: [PLA00000.XLD]PLATAB2

Application Revision: 2.1.3
Application Version: Standard

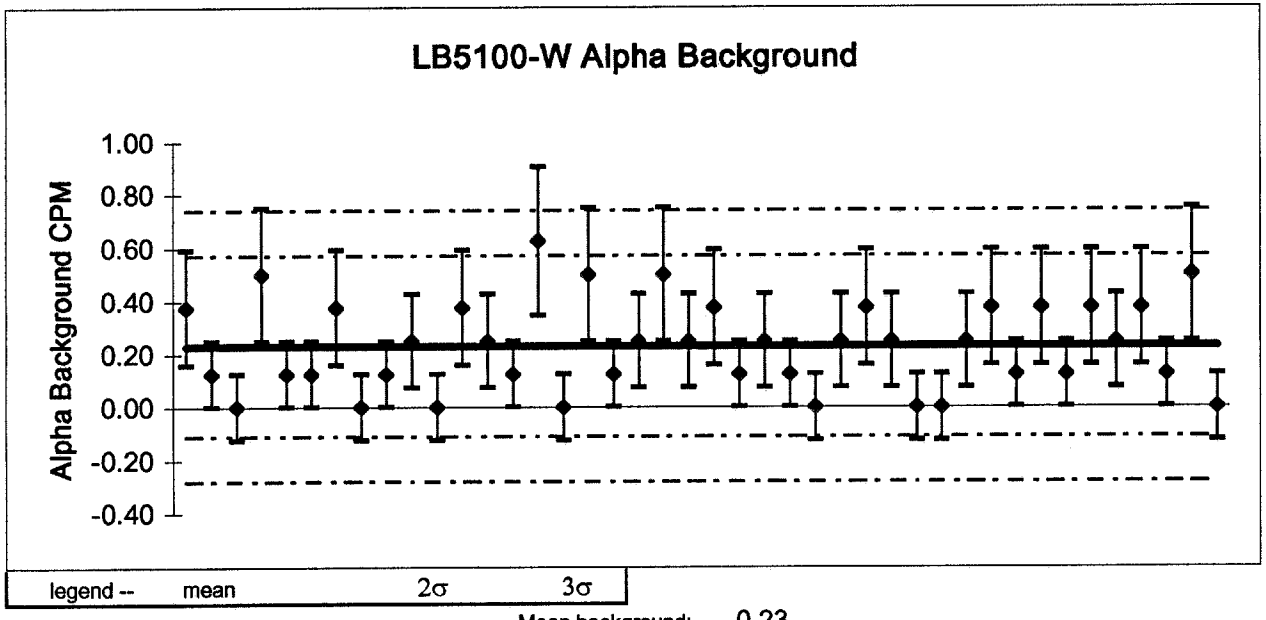


Optimum alpha & beta simultaneous operating voltage: 1440
Beta slope per 100 volts at beta voltage: 4.08%
Alpha slope per 100 volts at beta voltage: 1.37%

Optimum alpha only operating voltage: 705
Alpha slope per 100 volts at alpha voltage: 7.05%

Unit Id: 1
Date Performed: 5/7/96 6:45:48

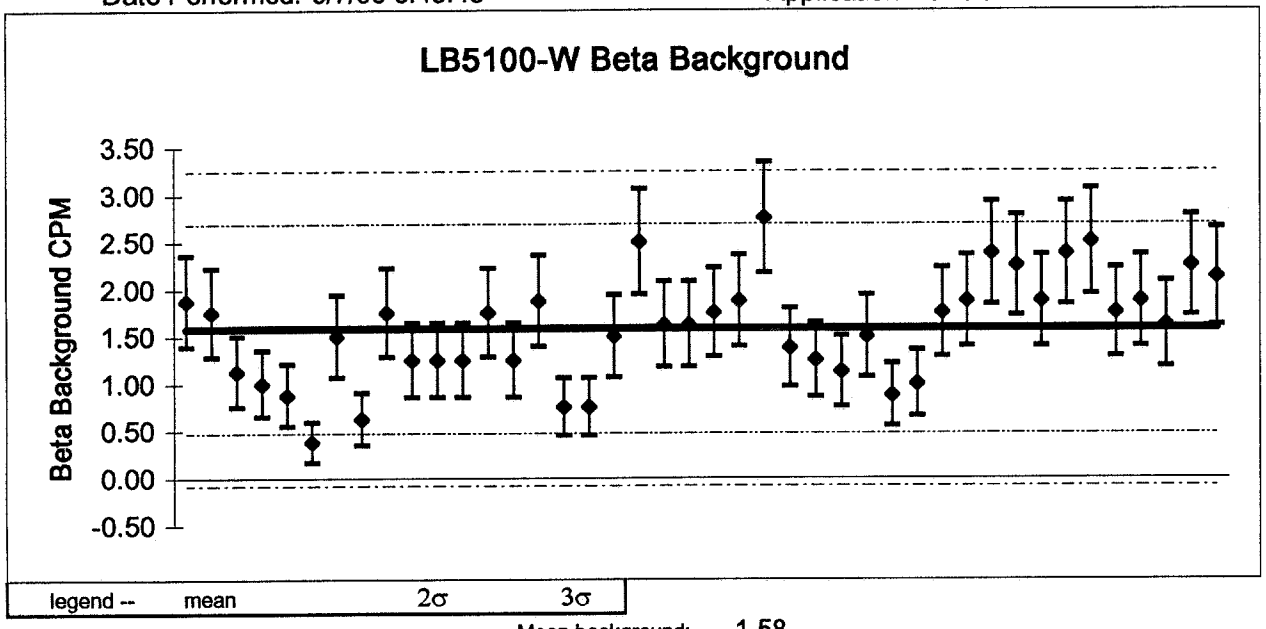
Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	0.23	
Error for mean background:	0.03	1σ
Actual standard deviation:	0.17	
Predicted standard deviation:	0.17	
Number of individual measurements:	42	
Chi-square:	41.36	
Reduced chi-square:	1.01	

Unit Id: 1
Date Performed: 5/7/96 6:45:48

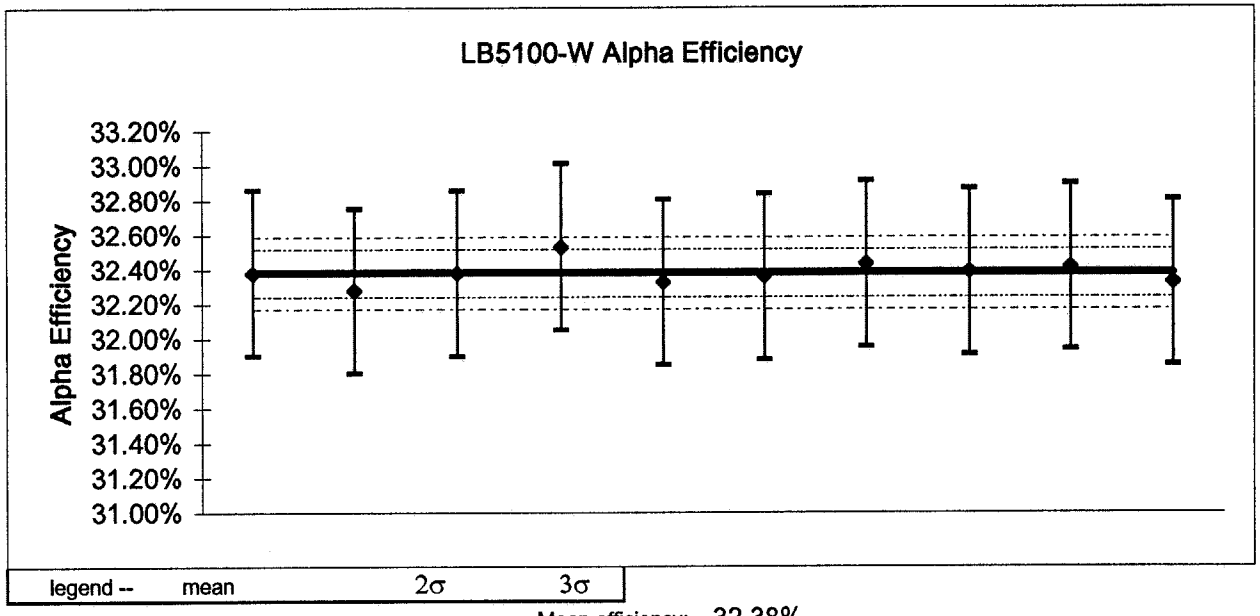
Background Archive File: BKGAB
Application Revision: 2.1.5



Mean background:	1.58	
Error for mean background:	0.07	1σ
Actual standard deviation:	0.56	
Predicted standard deviation:	0.44	
Number of individual measurements:	42	
Chi-square:	64.04	
Reduced chi-square:	1.56	

Unit Id: 1
Date Performed: 5/7/96 12:24:37

Background Archive File: BKGAB
Application Revision: 2.1.4



Mean efficiency:	32.38%	
Error for mean efficiency:	0.07%	1σ
Actual standard deviation:	0.07%	
Predicted standard deviation:	0.14%	
Number of individual measurements:	10	
Chi-square:	2.26	
Reduced chi-square:	0.25	

Unit Id: 1
Date Performed: 5/7/96
File Name: [EFF00000.XLD]EFFAB2

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

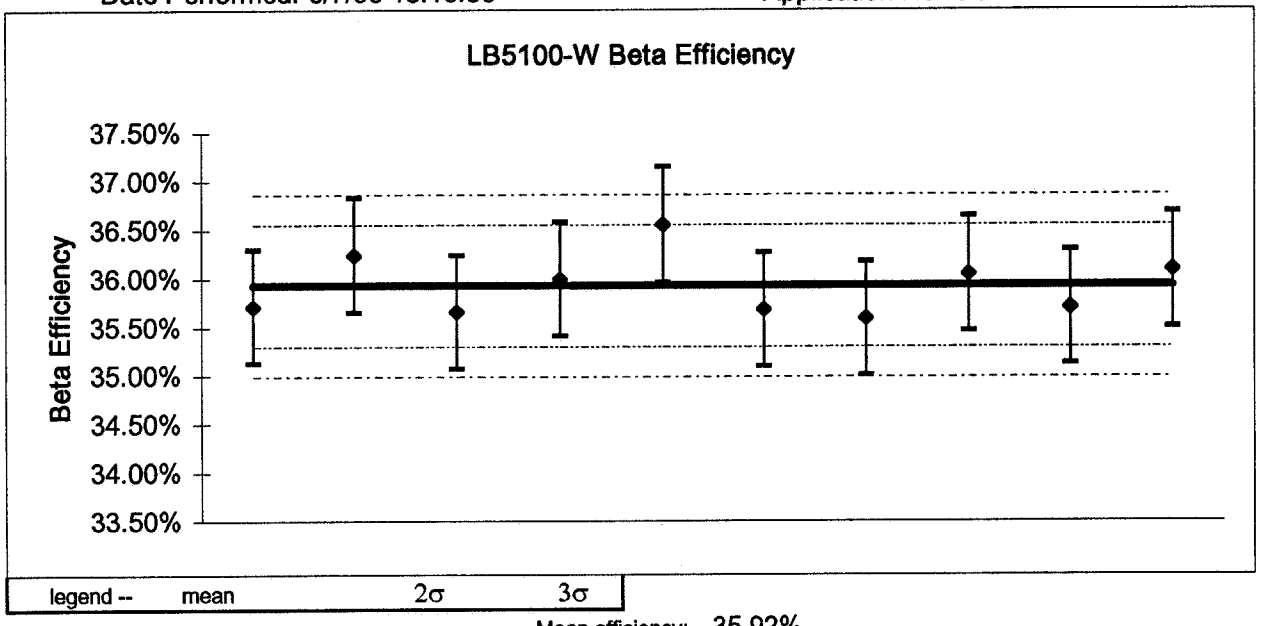
Source Control ID: S-1736

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	3/28/78	Custodian	WEST.	
DPM @ calibration date	33390.00	Error	333.90	
Decay Corrected DPM	33384.55	Error	333.85	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	32.38%	0.07%	2.26	10810.10	10	26.69%
Beta	11.79%	0.13%	21.02	3935.94		A into B
Gross	44.17%	0.18%	10.69	14746.04		

Unit Id: 1
Date Performed: 5/7/96 13:16:36

Background Archive File: BKGAB
Application Revision: 2.1.4



Mean efficiency:	35.92%	
Error for mean efficiency:	0.31%	1σ
Actual standard deviation:	0.31%	
Predicted standard deviation:	0.29%	
Number of individual measurements:	10	
Chi-square:	10.29	
Reduced chi-square:	1.14	

Unit Id: 1
Date Performed: 5/7/96
File Name: [EFF00001.XLD]EFFAB2

Application Revision: 2.1.4
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

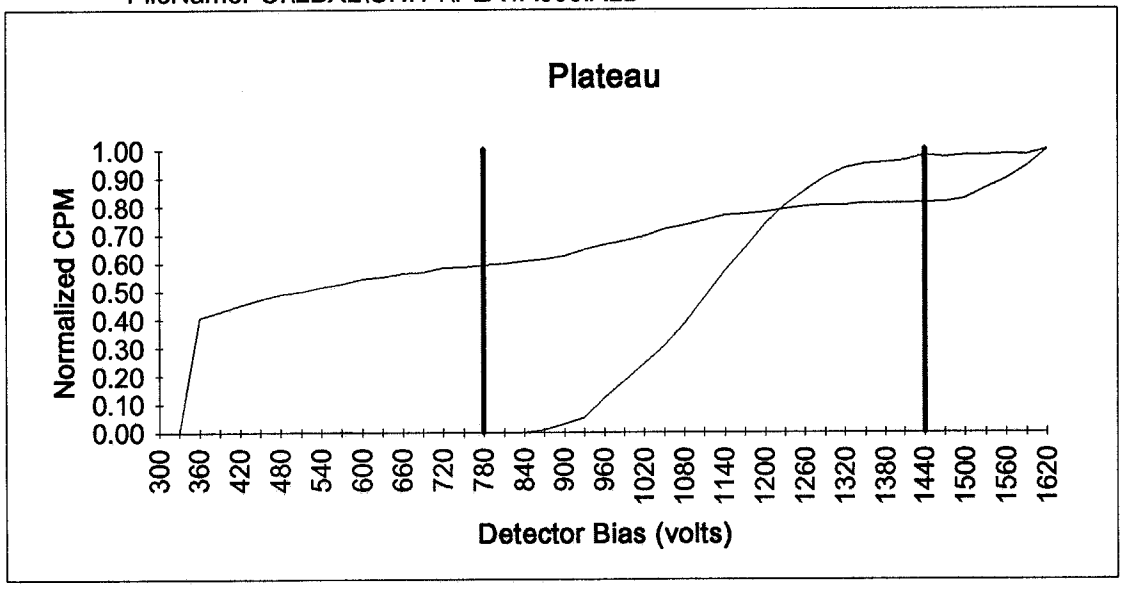
Source Control ID: 767/84

Isotope	Tc-99	Half-Life	77740000	days
Type	Beta			
Calibration Date	9/17/84	Custodian	WEST.	
DPM @ calibration date	8400.00	Error	84.00	
Decay Corrected DPM	8399.68	Error	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.04%	0.01%	5.78	3.58	10	B into A
Beta	35.92%	0.31%	10.29	3017.52		0.12%
Gross	35.97%	0.31%	10.19	3021.10		

Unit Id: 1
Date Performed: 3/14/96 0:02:44
FileName: C:\LBXL\UNIT1\PLA1A000.XLD

Application Revision: 2
Application Version: Standard

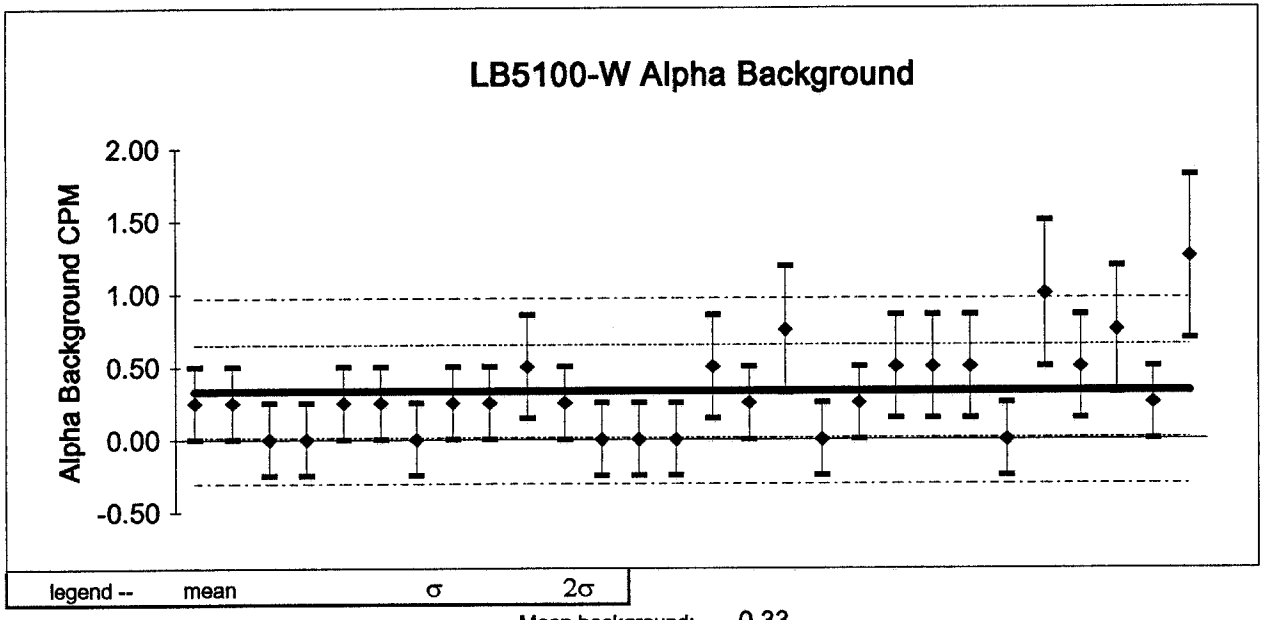


Optimum alpha & beta simultaneous operating voltage: **1440**
Beta slope per 100 volts at beta voltage: 2.19%
Alpha slope per 100 volts at beta voltage: 1.49%

Optimum alpha only operating voltage: **780**
Alpha slope per 100 volts at alpha voltage: 3.12%

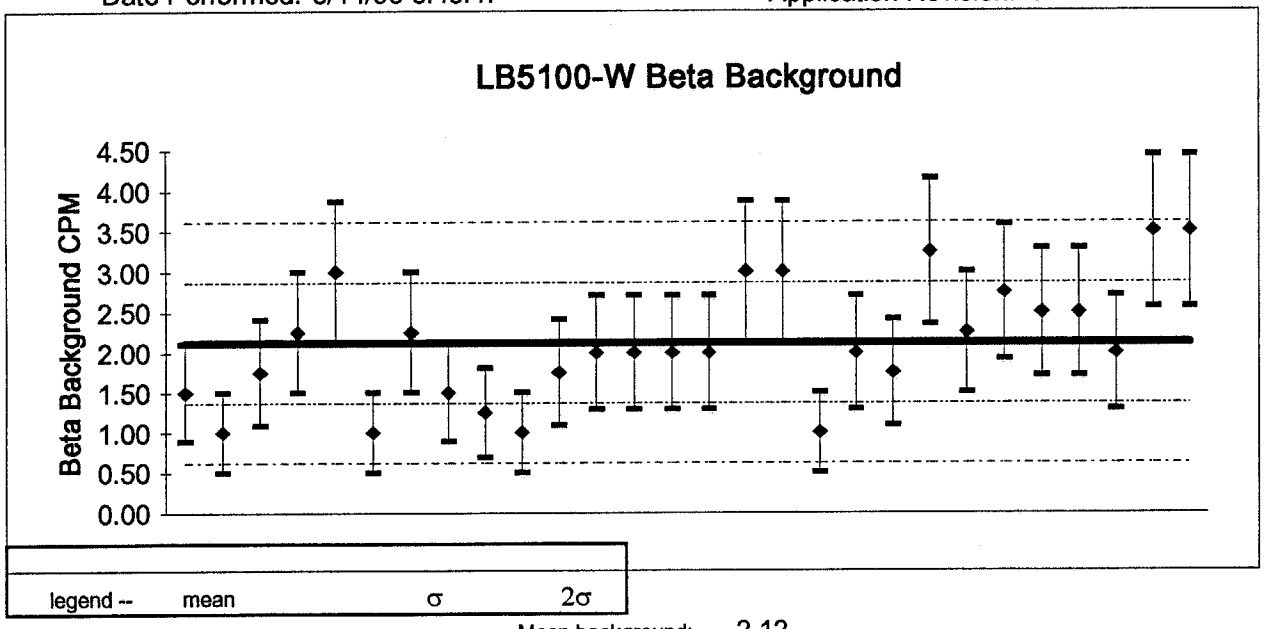
Unit Id: 1
Date Performed: 3/14/96 6:43:47

Application Revision: 4



Mean background:	0.33
Error for mean background:	0.05
Actual standard deviation:	0.32
Predicted standard deviation:	0.29
Number of individual measurements:	28
Chi-square:	33.38
Reduced chi-square:	1.24

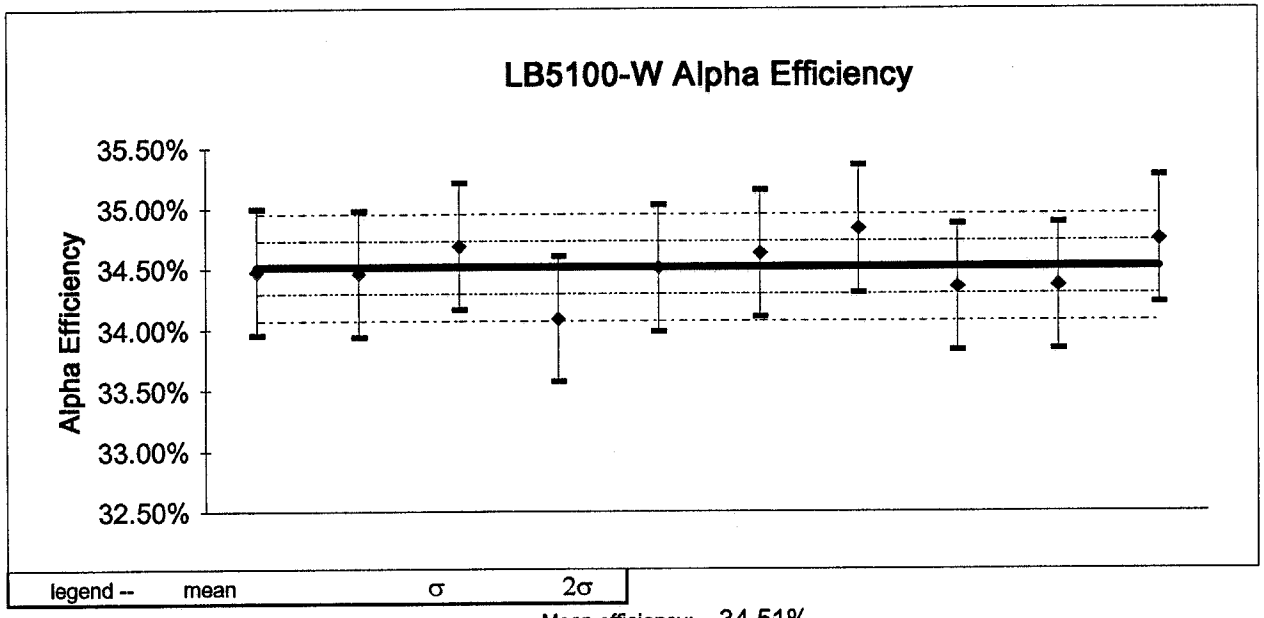
Unit Id: 1
Date Performed: 3/14/96 6:43:47 Application Revision: 4



Mean background:	2.12
Error for mean background:	0.14
Actual standard deviation:	0.75
Predicted standard deviation:	0.73
Number of individual measurements:	28
Chi-square:	28.70
Reduced chi-square:	1.06

Unit Id: 1
Date Performed: 3/14/96 8:36:32

Application Revision: 3



Mean efficiency:	34.51%
Error for mean efficiency:	0.49%
Actual standard deviation:	0.22%
Predicted standard deviation:	0.19%
Number of individual measurements:	10
Chi-square:	12.57
Reduced chi-square:	1.40

Unit Id: 1
Date Performed: 3/14/96
File Name: C:\LBXL\UNIT1\EFF1A000.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

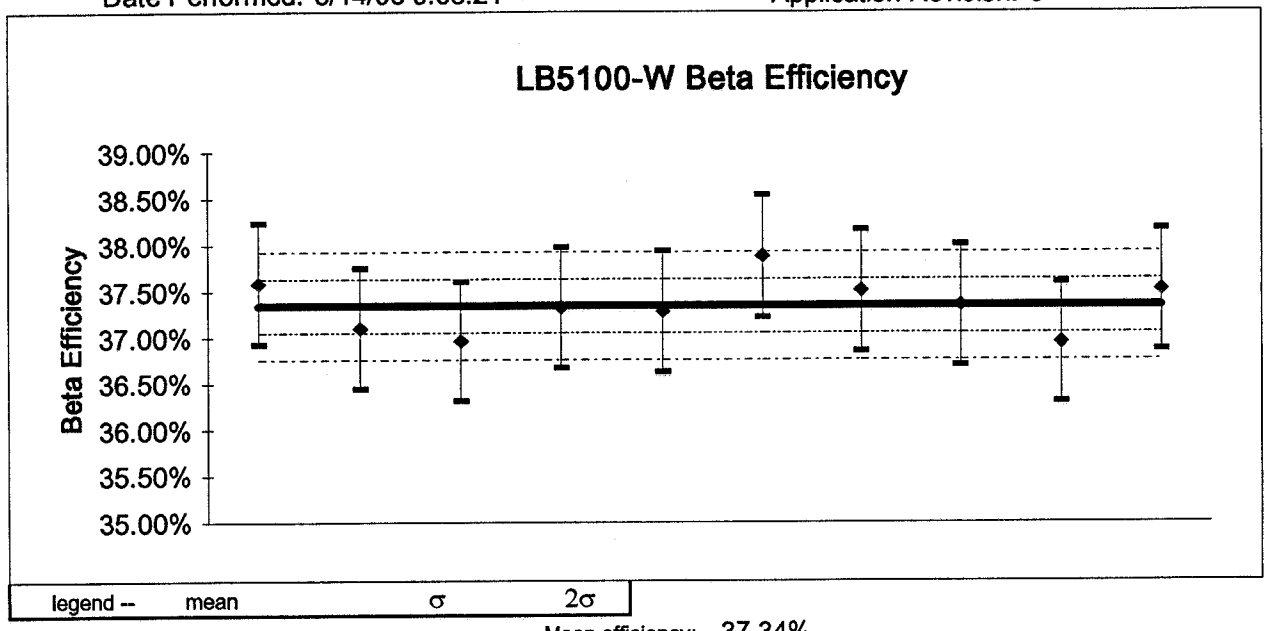
Source Control ID: S-1736

Isotope	Th-230	**Half-Life**	28105000	**days**
Type	Alpha			
Calibration Date	3/28/78	**Custodian**	WEST.	
DPM @ calibration date	33390.00	**Error**	333.90	
Decay Corrected DPM	33384.60	**Error**	333.85	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	34.51%	0.49%	12.57	11521.21	10	23.70%
Beta	10.72%	0.16%	18.10	3578.88		A into B
Gross	45.23%	0.64%	17.95	15100.08		

Unit Id: 1
Date Performed: 3/14/96 9:08:21

Application Revision: 3



Mean efficiency:	37.34%
Error for mean efficiency:	0.54%
Actual standard deviation:	0.29%
Predicted standard deviation:	0.38%
Number of individual measurements:	10
Chi-square:	5.19
Reduced chi-square:	0.58

Unit Id: 1
Date Performed: 3/14/96
File Name: C:\LBXL\UNIT1\EFF1B000.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

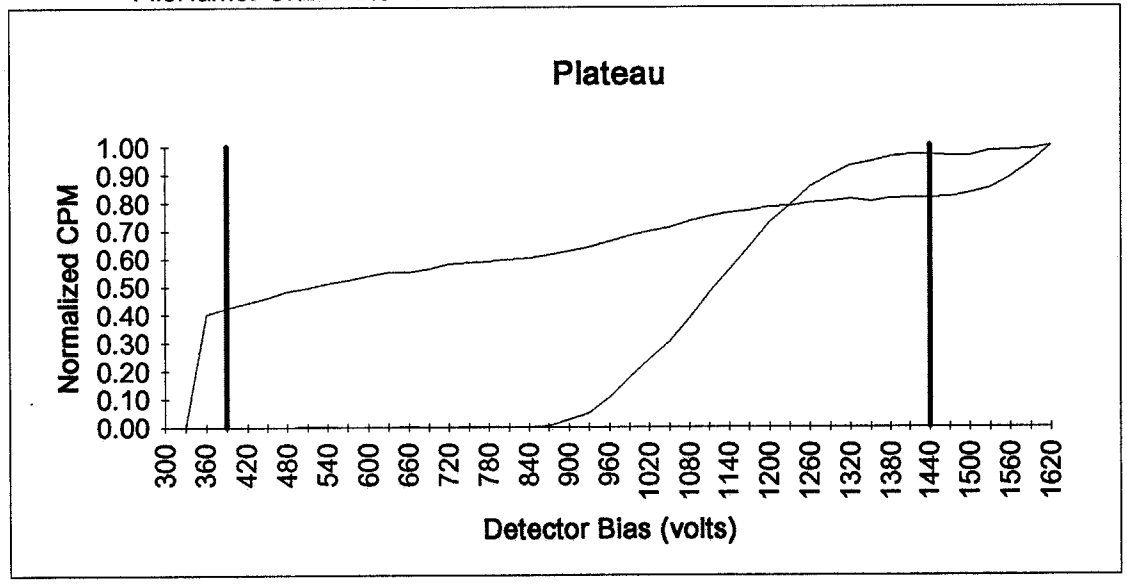
Source Control ID: 767/84

Isotope	Tc-99	Half-Life	77740000	days
Type	Beta			
Calibration Date	9/17/84	Custodian	WEST.	
DPM @ calibration date	8400.00	Error	84.00	
Decay Corrected DPM	8399.69	Error	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.07%	0.01%	4.31	5.91	10	B into A
Beta	37.34%	0.54%	5.19	3136.71		0.19%
Gross	37.41%	0.54%	5.07	3142.62		

Unit Id: 1
Date Performed: 12/19/95 0:04:36
FileName: C:\LBXL\UNIT1\PLA1A000.XLD

Application Revision: 2
Application Version: Standard

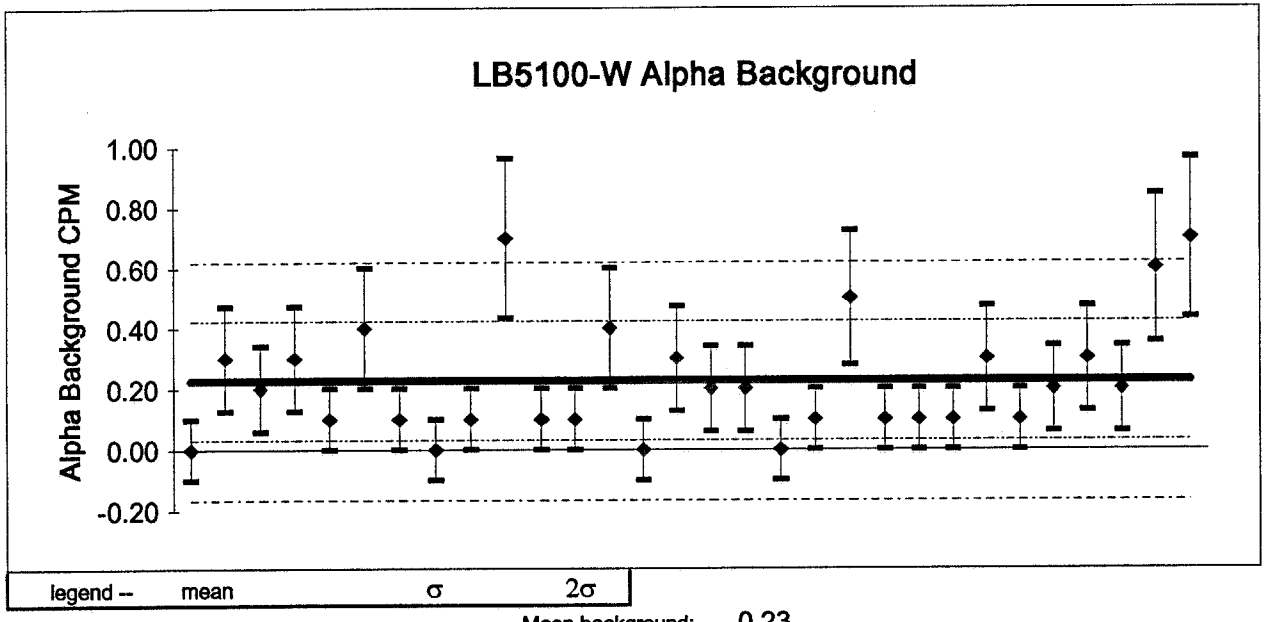


Optimum alpha & beta simultaneous operating voltage: **1440**
Beta slope per 100 volts at beta voltage: -0.01%
Alpha slope per 100 volts at beta voltage: 1.57%

Optimum alpha only operating voltage: **390**
Alpha slope per 100 volts at alpha voltage: 92.80%

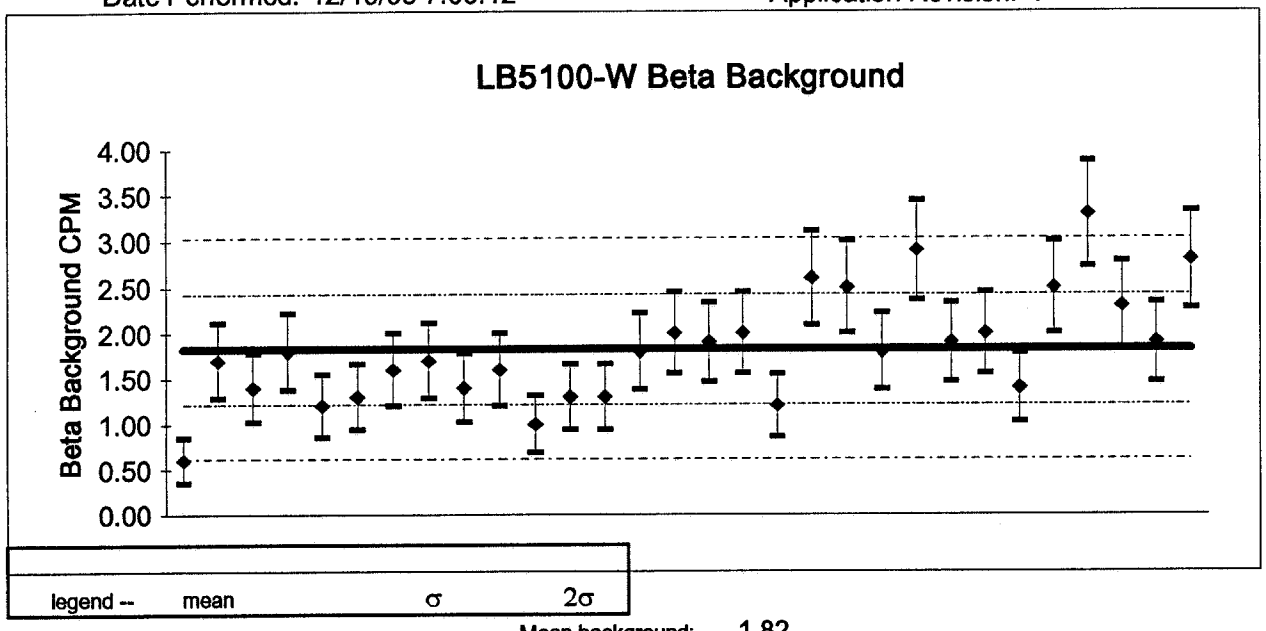
Unit Id: 1
Date Performed: 12/19/95 7:00:12

Application Revision: 4



Mean background:	0.23
Error for mean background:	0.03
Actual standard deviation:	0.20
Predicted standard deviation:	0.15
Number of individual measurements:	30
Chi-square:	49.35
Reduced chi-square:	1.70

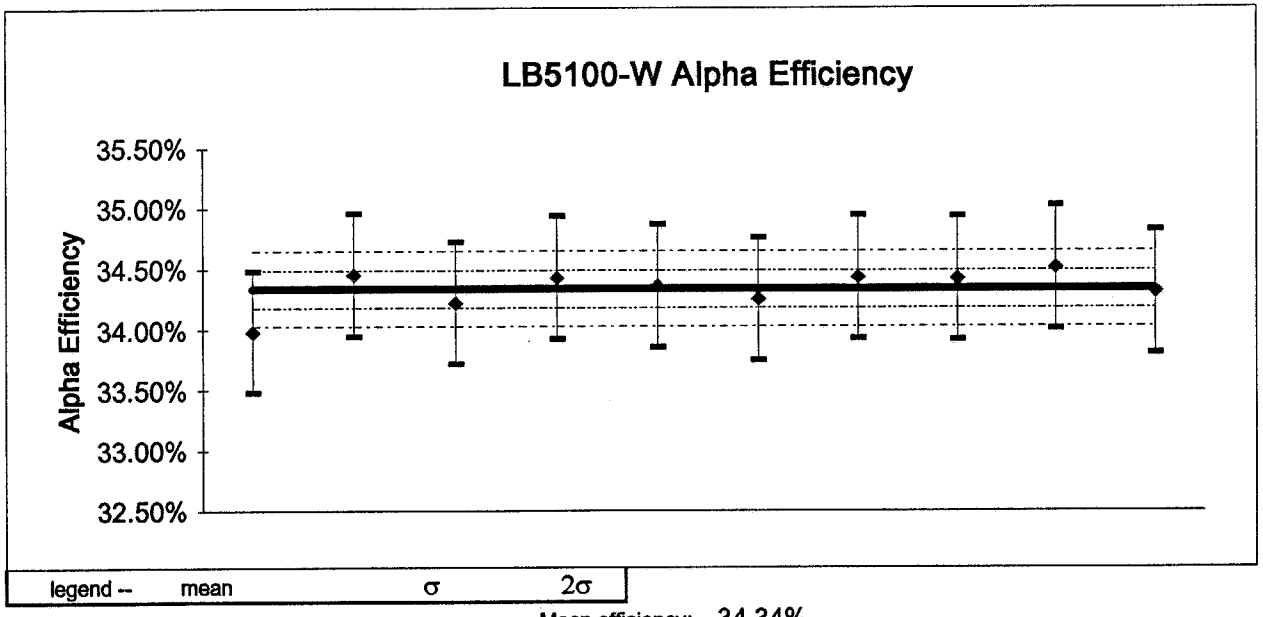
Unit Id: 1
Date Performed: 12/19/95 7:00:12 Application Revision: 4



Mean background:	1.82
Error for mean background:	0.08
Actual standard deviation:	0.60
Predicted standard deviation:	0.43
Number of individual measurements:	30
Chi-square:	58.10
Reduced chi-square:	2.00

Unit Id: 1
Date Performed: 12/19/95 11:57:42

Application Revision: 3



Mean efficiency:	34.34%
Error for mean efficiency:	0.49%
Actual standard deviation:	0.16%
Predicted standard deviation:	0.14%
Number of individual measurements:	10
Chi-square:	10.59
Reduced chi-square:	1.18

Unit Id: 1
Date Performed: 12/19/95
File Name: C:\LBXL\UNIT1\EFF1A000.XLD

Application Revision: 3
Application Version: Standard

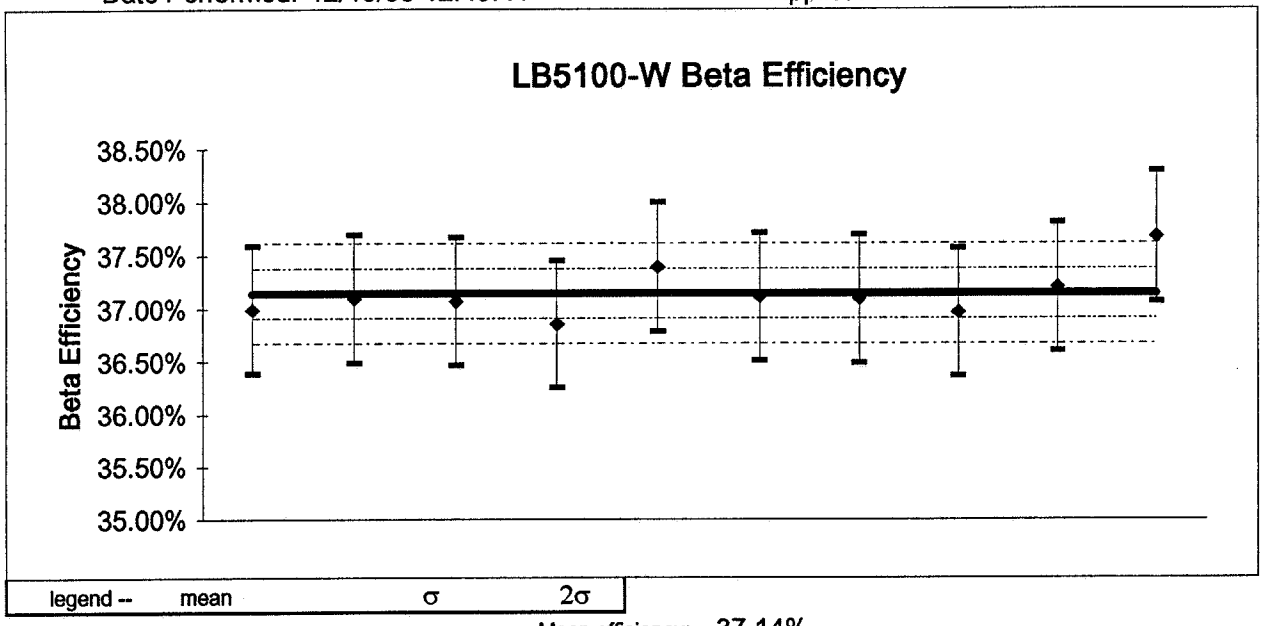
LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **S-1736**

Isotope	Th-230	**Half-Life**	28105000	**days**
Type	Alpha			
Calibration Date	3/28/78	**Custodian**	WEST.	
DPM @ calibration date	33390.00	**Error**	333.90	
Decay Corrected DPM	33384.67	**Error**	333.85	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	34.34%	0.49%	10.59	11463.42	10	23.95%
Beta	10.82%	0.16%	5.11	3610.80		A into B
Gross	45.15%	0.64%	7.15	15074.22		

Unit Id: 1
Date Performed: 12/19/95 12:49:41 Application Revision: 3



Mean efficiency:	37.14%
Error for mean efficiency:	0.53%
Actual standard deviation:	0.24%
Predicted standard deviation:	0.30%
Number of individual measurements:	10
Chi-square:	5.66
Reduced chi-square:	0.63

Unit Id: 1
Date Performed: 12/19/95
File Name: C:\LBXL\UNIT1\EFF1B000.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

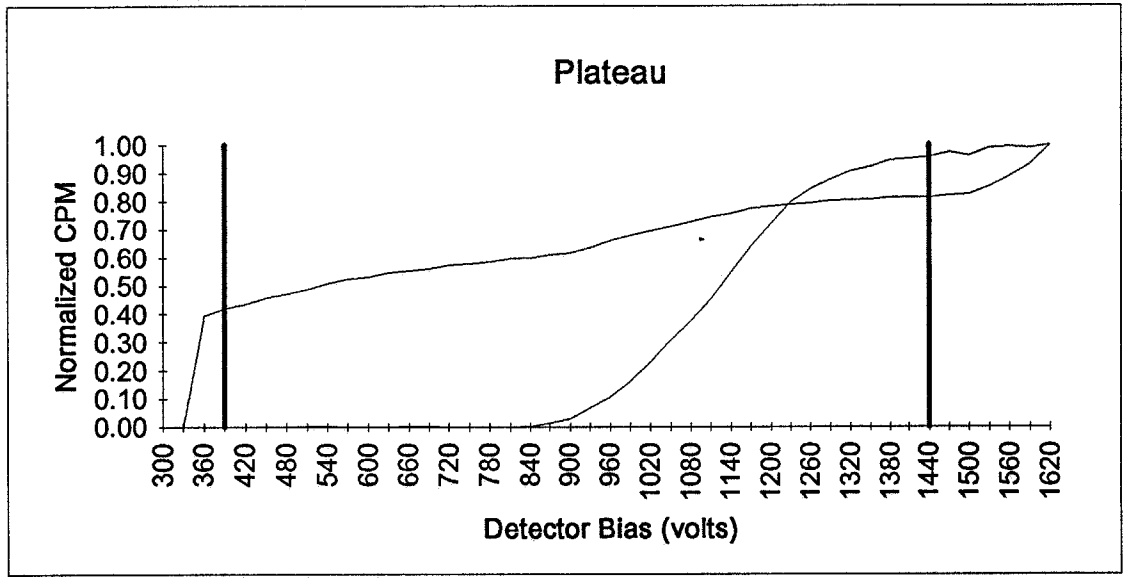
Source Control ID: **767/84**

Isotope	Tc-99	**Half-Life**	77740000	**days**
Type	Beta			
Calibration Date	9/17/84	**Custodian**	WEST.	
DPM @ calibration date	8400.00	**Error**	84.00	
Decay Corrected DPM	8399.69	**Error**	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.06%	0.00%	4.90	5.30	10	B into A
Beta	37.14%	0.53%	5.66	3119.92		0.17%
Gross	37.21%	0.53%	5.62	3125.22		

Unit Id: 1
Date Performed: 9/19/95 6:58:19
FileName: C:\LBXL\UNIT1\PLA1A000.XLD

Application Revision: 2
Application Version: Standard

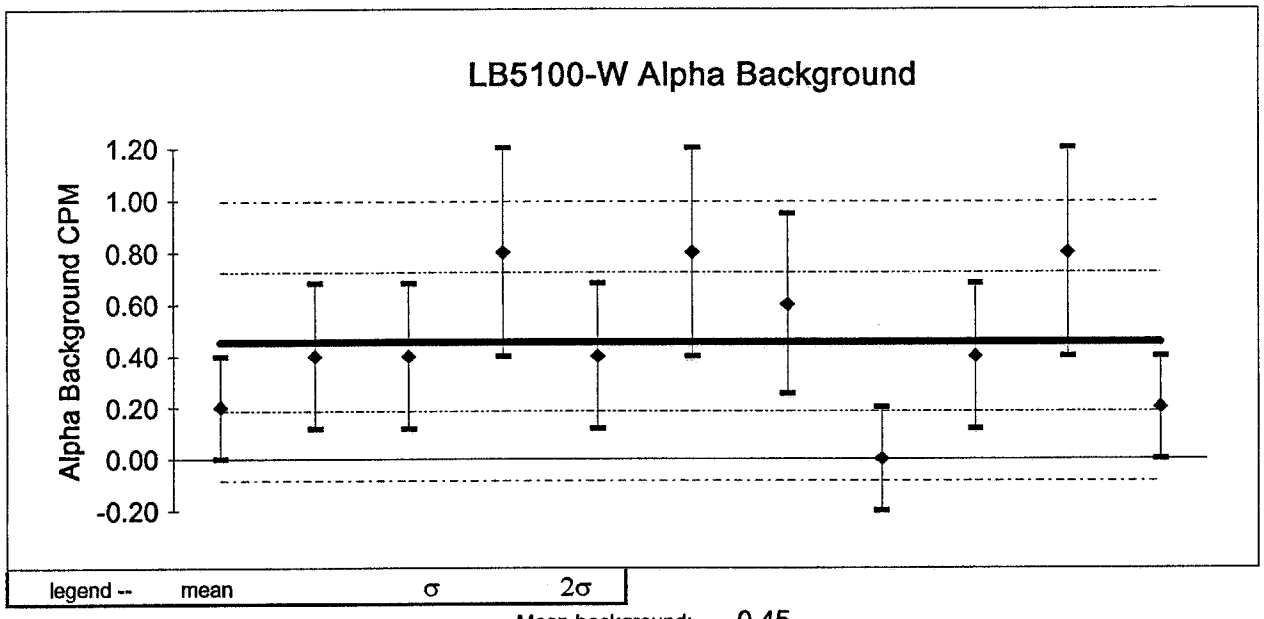


Optimum alpha & beta simultaneous operating voltage: **1440**
Beta slope per 100 volts at beta voltage: 1.97%
Alpha slope per 100 volts at beta voltage: 1.32%

Optimum alpha only operating voltage: **375**
Alpha slope per 100 volts at alpha voltage: 93.29%

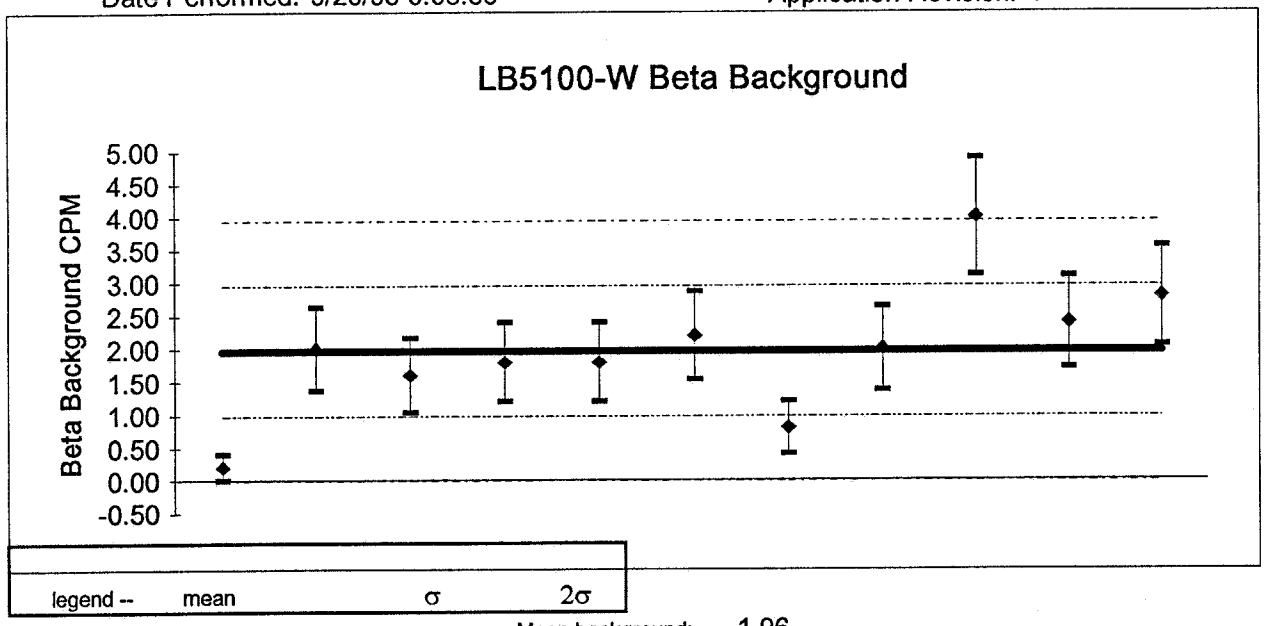
Unit Id: 1
Date Performed: 9/20/95 0:08:30

Application Revision: 4



Mean background:	0.45
Error for mean background:	0.09
Actual standard deviation:	0.27
Predicted standard deviation:	0.30
Number of individual measurements:	11
Chi-square:	8.00
Reduced chi-square:	0.80

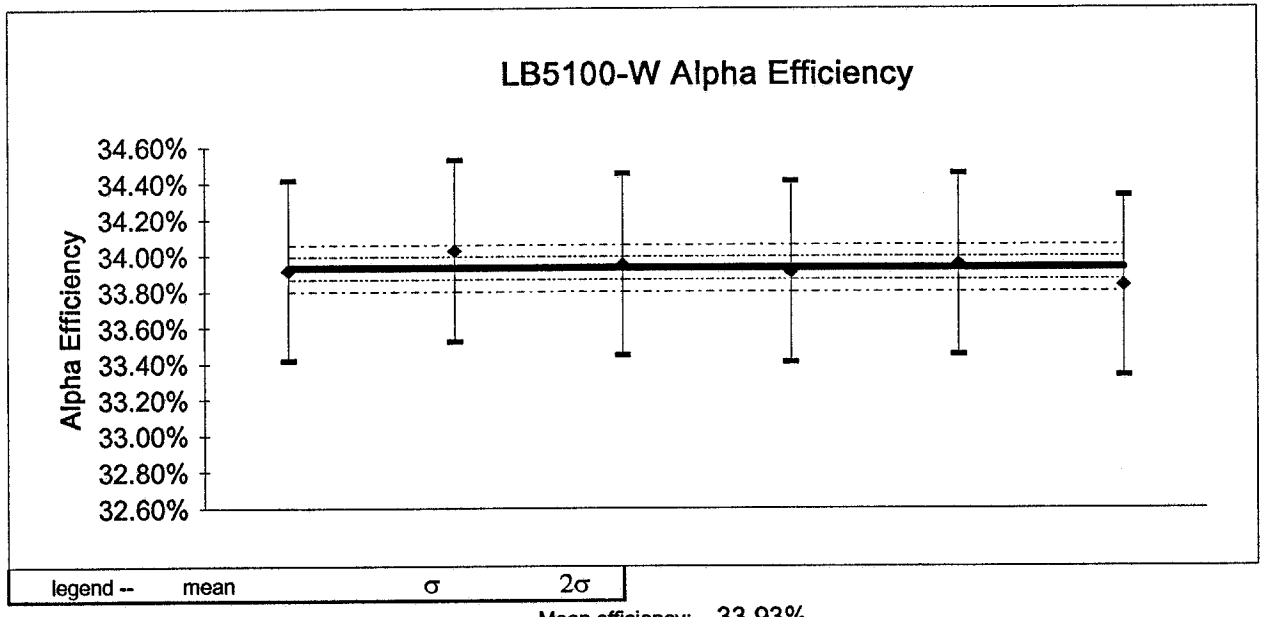
Unit Id: 1
Date Performed: 9/20/95 0:08:30 Application Revision: 4



Mean background:	1.96
Error for mean background:	0.19
Actual standard deviation:	0.99
Predicted standard deviation:	0.63
Number of individual measurements:	11
Chi-square:	24.81
Reduced chi-square:	2.48

Unit Id: 1
Date Performed: 9/20/95 3:30:58

Application Revision: 3



Mean efficiency:	33.93%
Error for mean efficiency:	0.48%
Actual standard deviation:	0.06%
Predicted standard deviation:	0.14%
Number of individual measurements:	6
Chi-square:	1.01
Reduced chi-square:	0.20

Unit Id: 1
Date Performed: 9/20/95
File Name: C:\LBXL\UNIT1\EFF1A000.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

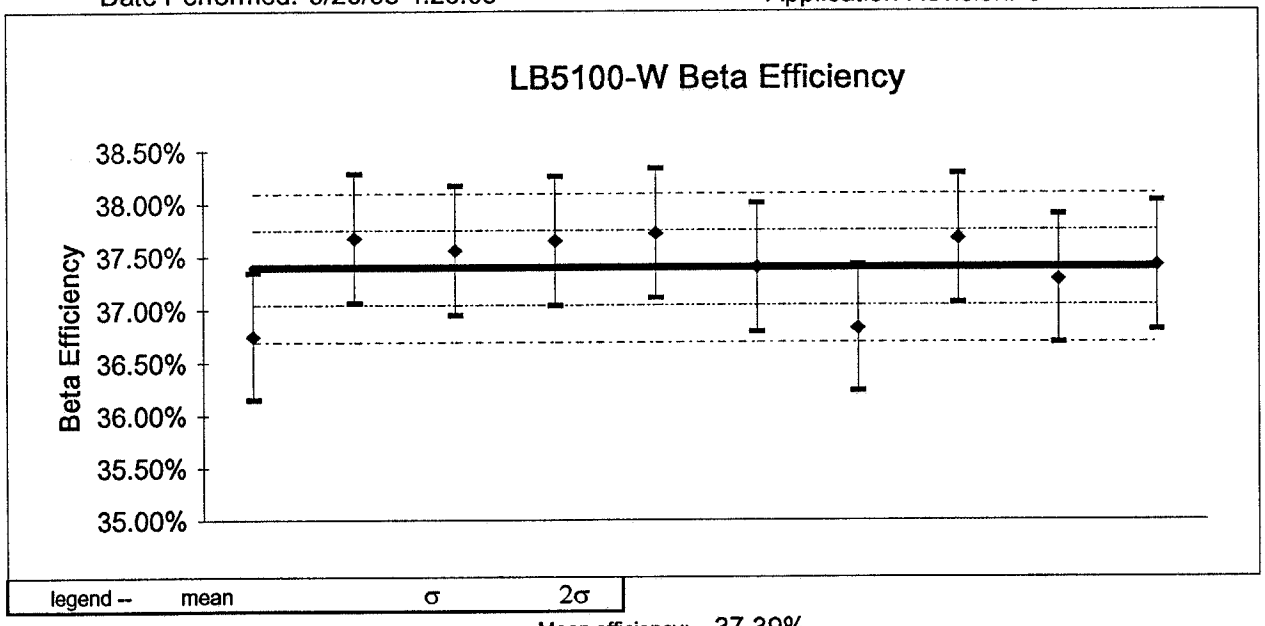
Source Control ID: S-1736

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	3/28/78	Custodian	WEST.	
DPM @ calibration date	33390.00	Error	333.90	
Decay Corrected DPM	33384.74	Error	333.85	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	33.93%	0.48%	1.01	11327.16	6	24.49%
Beta	11.00%	0.16%	10.41	3673.15		A into B
Gross	44.93%	0.64%	4.34	15000.32		

Unit Id: 1
Date Performed: 9/20/95 4:23:05

Application Revision: 3



Mean efficiency:	37.39%
Error for mean efficiency:	0.54%
Actual standard deviation:	0.35%
Predicted standard deviation:	0.30%
Number of individual measurements:	10
Chi-square:	12.46
Reduced chi-square:	1.38

Unit Id: 1
Date Performed: 9/20/95
File Name: C:\LBXL\UNIT1\EFF1B000.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

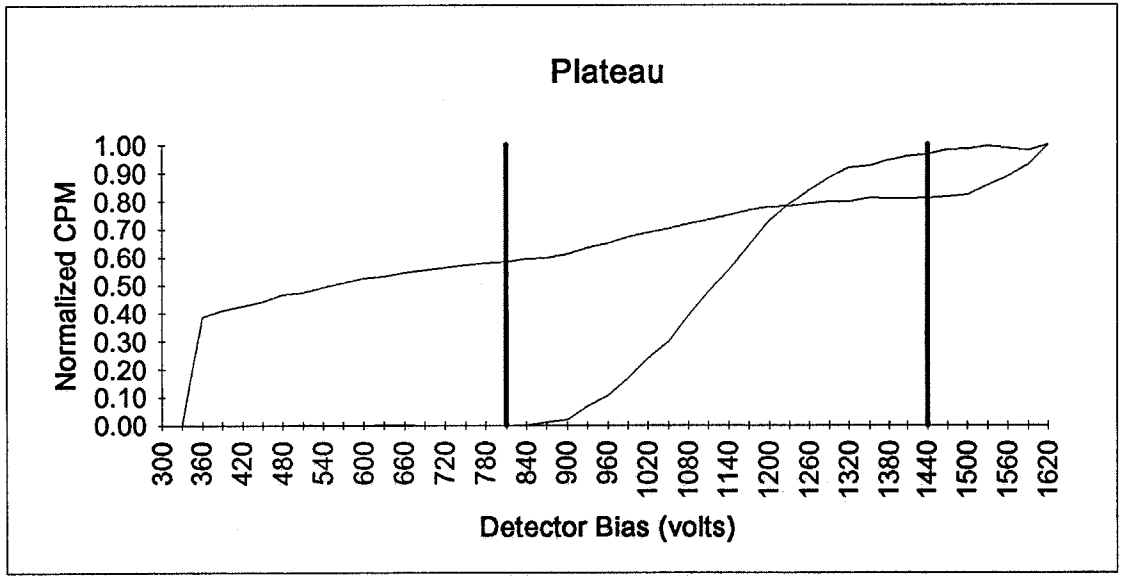
Source Control ID: 767/84

Isotope	Tc-99	Half-Life	77740000	days
Type	Beta			
Calibration Date	9/17/84	Custodian	WEST.	
DPM @ calibration date	8400.00	Error	84.00	
Decay Corrected DPM	8399.70	Error	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.05%	0.00%	10.34	4.18	10	B into A
Beta	37.39%	0.54%	12.46	3140.98		0.13%
Gross	37.44%	0.54%	12.43	3145.17		

Unit Id: 1
Date Performed: 6/19/95 1:05:14
FileName: C:\LBXL\UNIT1\PLA1A000.XLD

Application Revision: 2
Application Version: Standard

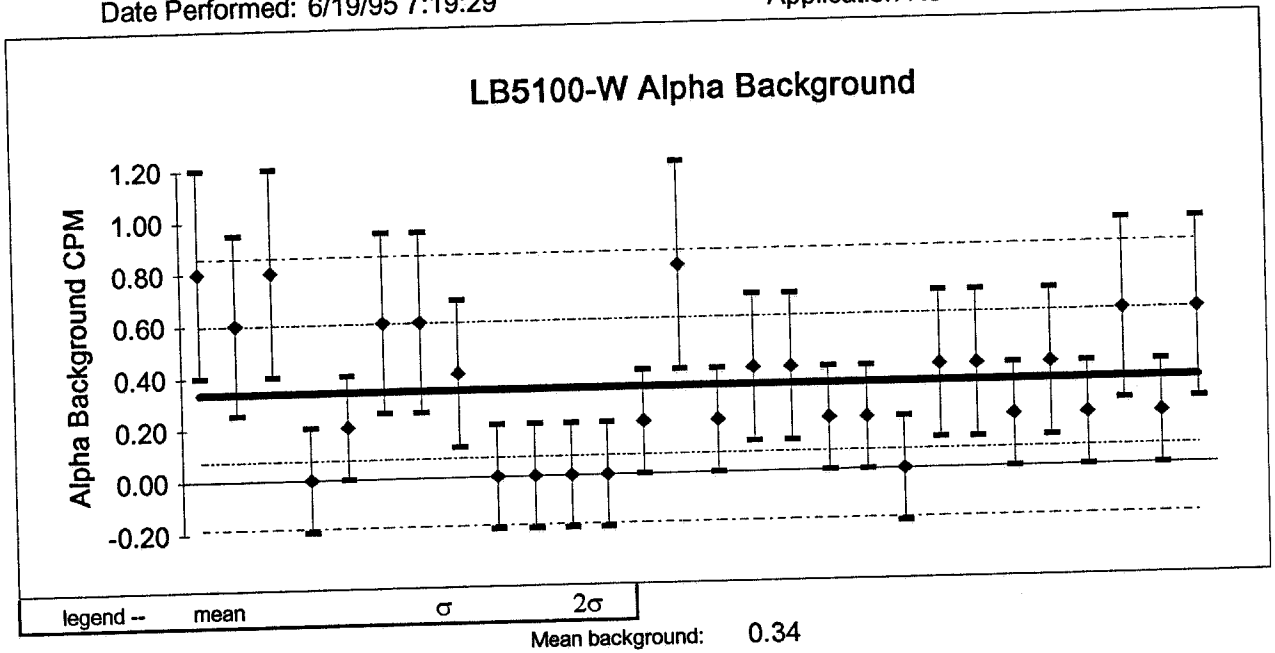


Optimum alpha & beta simultaneous operating voltage: 1440
Beta slope per 100 volts at beta voltage: 3.53%
Alpha slope per 100 volts at beta voltage: 1.40%

Optimum alpha only operating voltage: 810
Alpha slope per 100 volts at alpha voltage: 3.68%

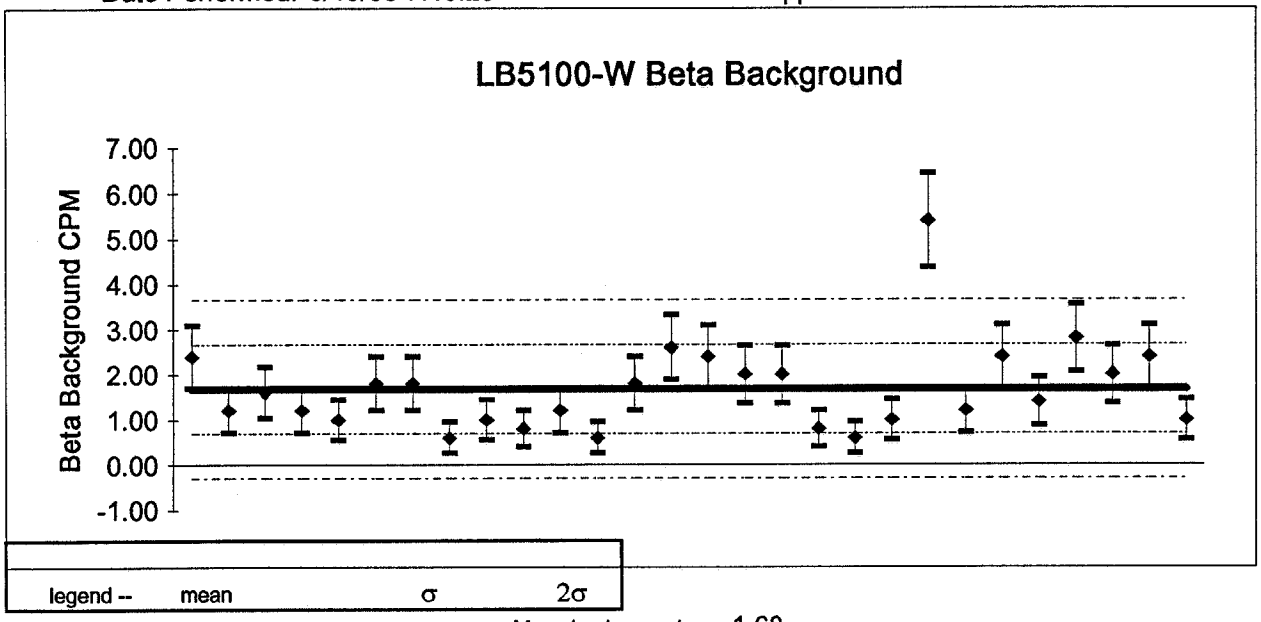
Unit Id: 1
Date Performed: 6/19/95 7:19:29

Application Revision: 4



Mean background:	0.34
Error for mean background:	0.05
Actual standard deviation:	0.26
Predicted standard deviation:	0.26
Number of individual measurements:	28
Chi-square:	27.47
Reduced chi-square:	1.02

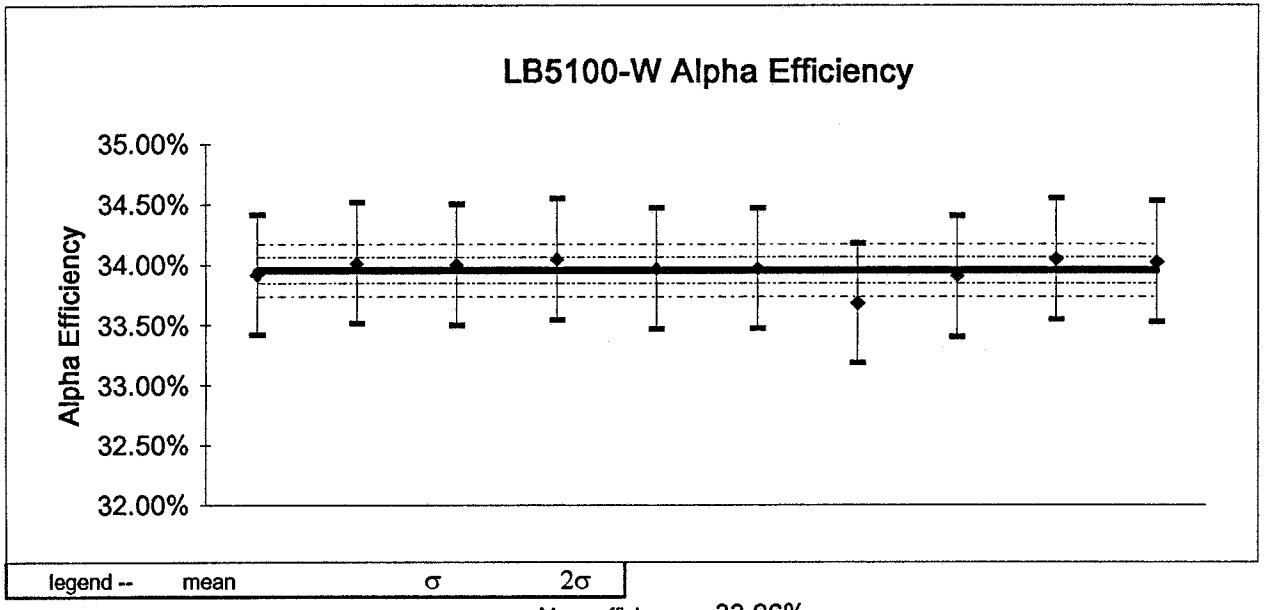
Unit Id: 1
Date Performed: 6/19/95 7:19:29 Application Revision: 4



Mean background:	1.68
Error for mean background:	0.11
Actual standard deviation:	0.99
Predicted standard deviation:	0.58
Number of individual measurements:	28
Chi-square:	78.24
Reduced chi-square:	2.90

Unit Id: 1
Date Performed: 6/19/95 9:41:11

Application Revision: 3



Mean efficiency:	33.96%
Error for mean efficiency:	0.48%
Actual standard deviation:	0.11%
Predicted standard deviation:	0.14%
Number of individual measurements:	10
Chi-square:	5.26
Reduced chi-square:	0.58

Unit Id: 1
Date Performed: 6/19/95
File Name: C:\LBXL\UNIT1\EFF1A000.XLD

Application Revision: 3
Application Version: Standard

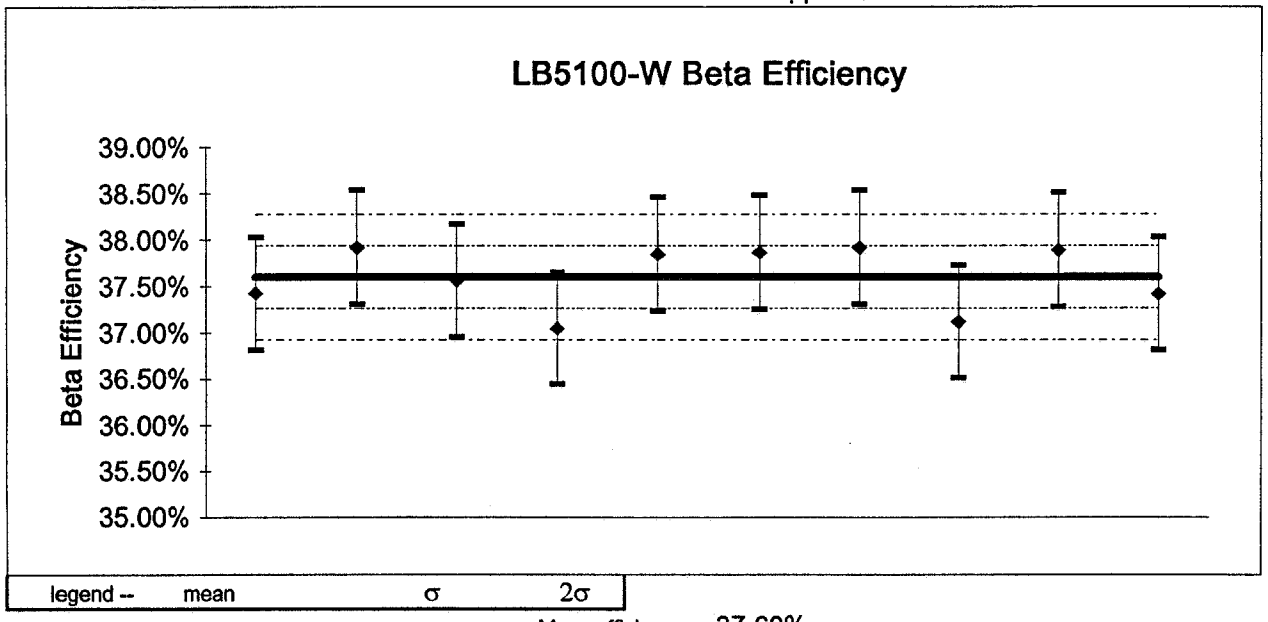
LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: S-1736

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	3/28/78	Custodian	WEST.	
DPM @ calibration date	33390.00	Error	333.90	
Decay Corrected DPM	33384.82	Error	333.85	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	33.96%	0.48%	5.26	11336.03	10	24.36%
Beta	10.94%	0.16%	4.50	3651.49		A into B
Gross	44.89%	0.64%	5.16	14987.52		

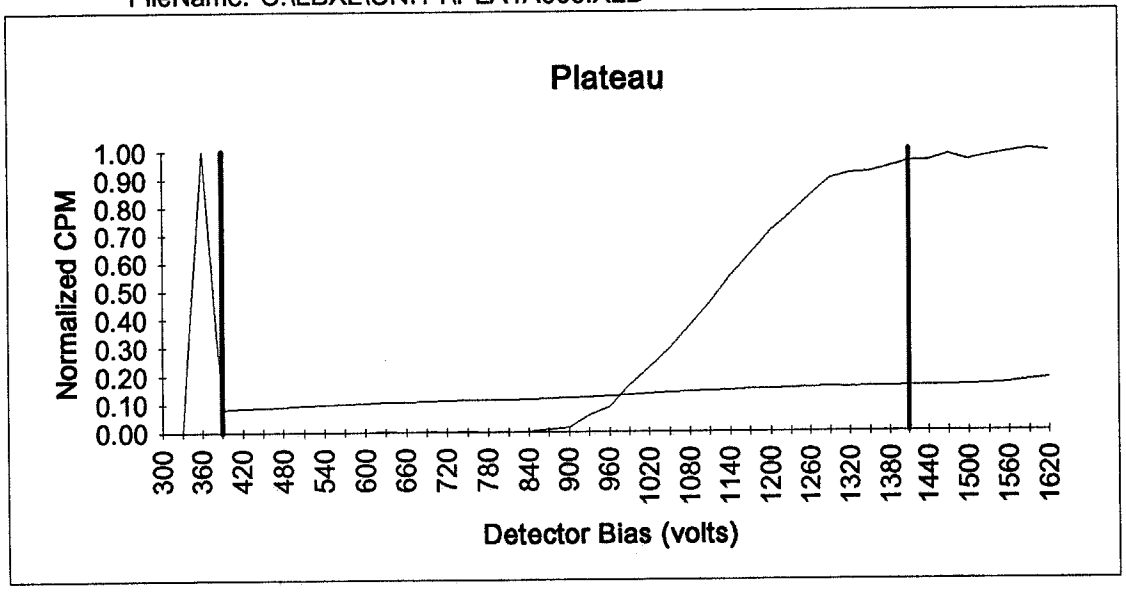
Unit Id: 1
Date Performed: 6/19/95 10:33:19 Application Revision: 3



Mean efficiency:	37.60%
Error for mean efficiency:	0.54%
Actual standard deviation:	0.34%
Predicted standard deviation:	0.30%
Number of individual measurements:	10
Chi-square:	11.46
Reduced chi-square:	1.27

Unit Id: 1
Date Performed: 3/13/95 0:53:00
FileName: C:\LBXL\UNIT1\PLA1A000.XLD

Application Revision: 2
Application Version: Standard

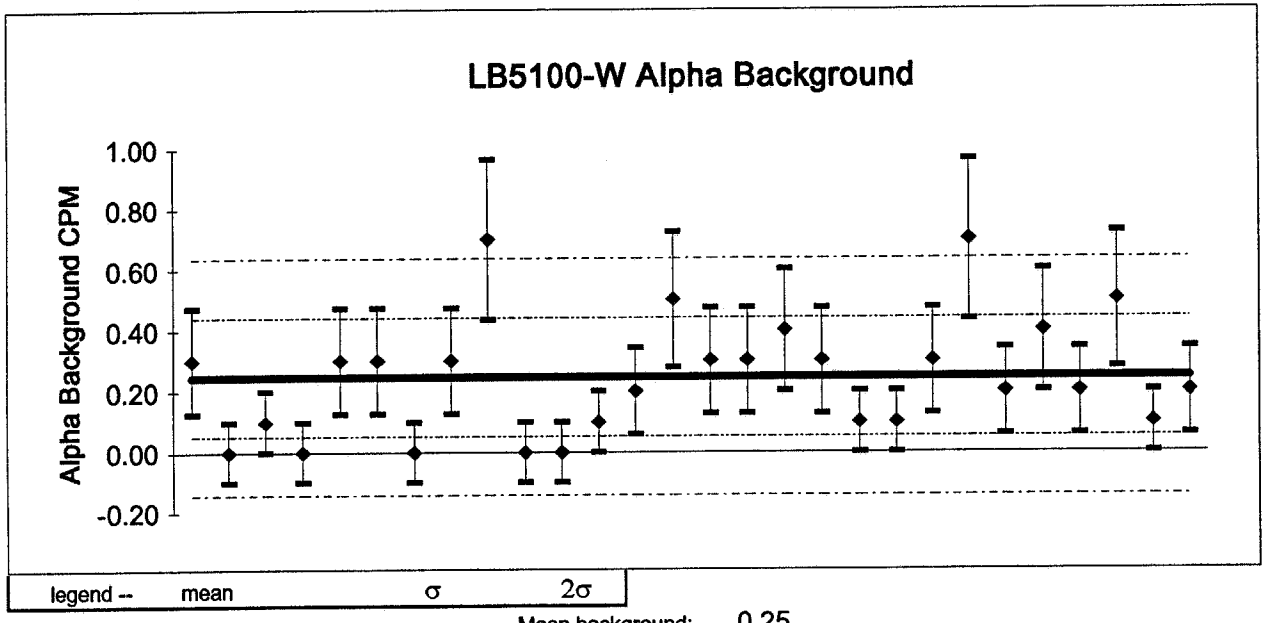


Optimum alpha & beta simultaneous operating voltage: **1410**
Beta slope per 100 volts at beta voltage: 5.06%
Alpha slope per 100 volts at beta voltage: 0.94%

Optimum alpha only operating voltage: **390**
Alpha slope per 100 volts at alpha voltage: -97.68%

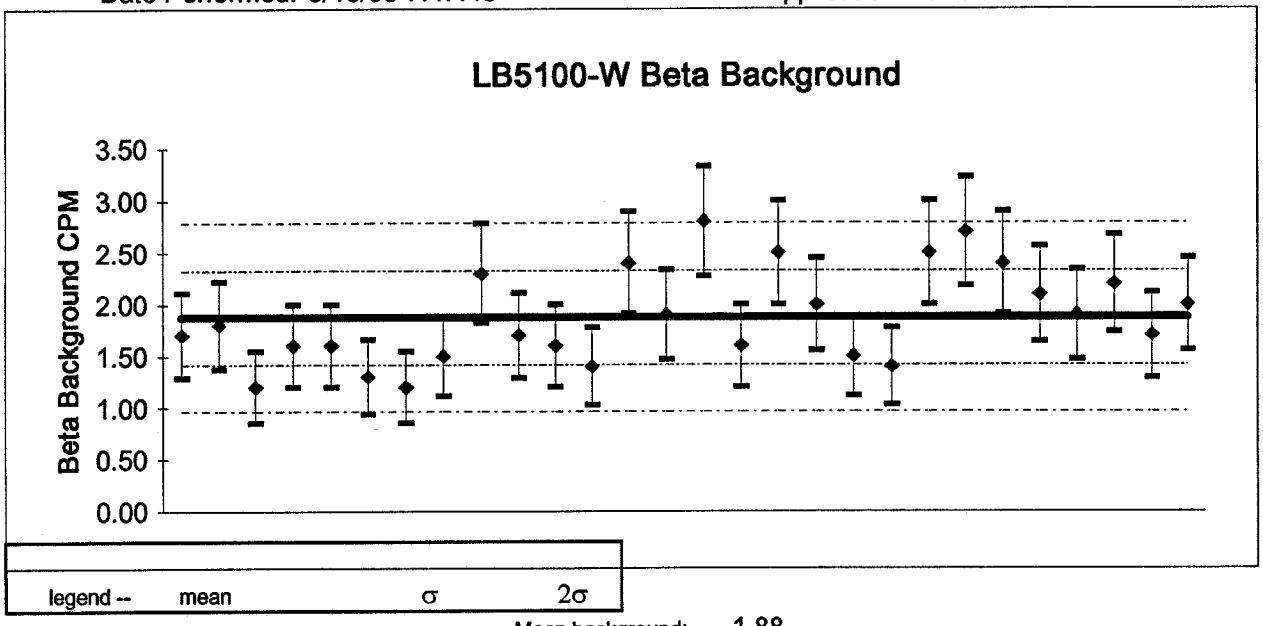
Unit Id: 1
Date Performed: 3/13/95 7:47:43

Application Revision: 4



Mean background:	0.25
Error for mean background:	0.03
Actual standard deviation:	0.20
Predicted standard deviation:	0.16
Number of individual measurements:	28
Chi-square:	41.78
Reduced chi-square:	1.55

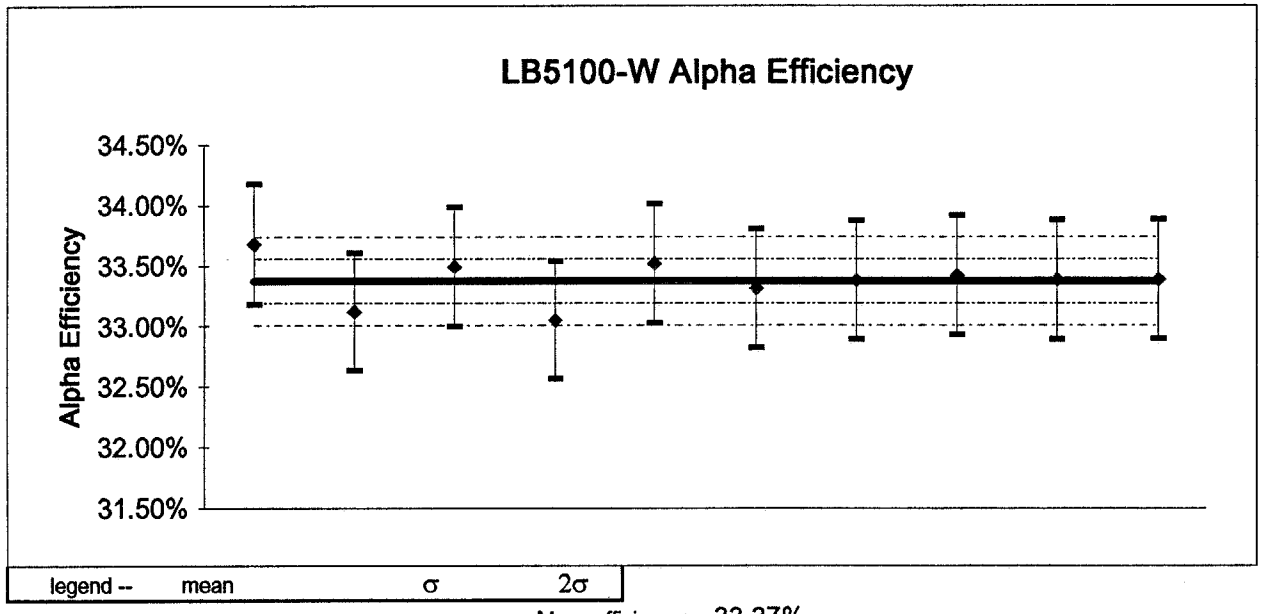
Unit Id: 1
Date Performed: 3/13/95 7:47:43 Application Revision: 4



Mean background:	1.88
Error for mean background:	0.08
Actual standard deviation:	0.46
Predicted standard deviation:	0.43
Number of individual measurements:	28
Chi-square:	29.93
Reduced chi-square:	1.11

Unit Id: 1
Date Performed: 3/13/95 12:24:37

Application Revision: 3



Mean efficiency:	33.37%
Error for mean efficiency:	0.47%
Actual standard deviation:	0.18%
Predicted standard deviation:	0.14%
Number of individual measurements:	10
Chi-square:	15.12
Reduced chi-square:	1.68

Unit Id: 1
Date Performed: 3/13/95
File Name: C:\LBXL\UNIT1\EFF1A000.XLD

Application Revision: 3
Application Version: Standard

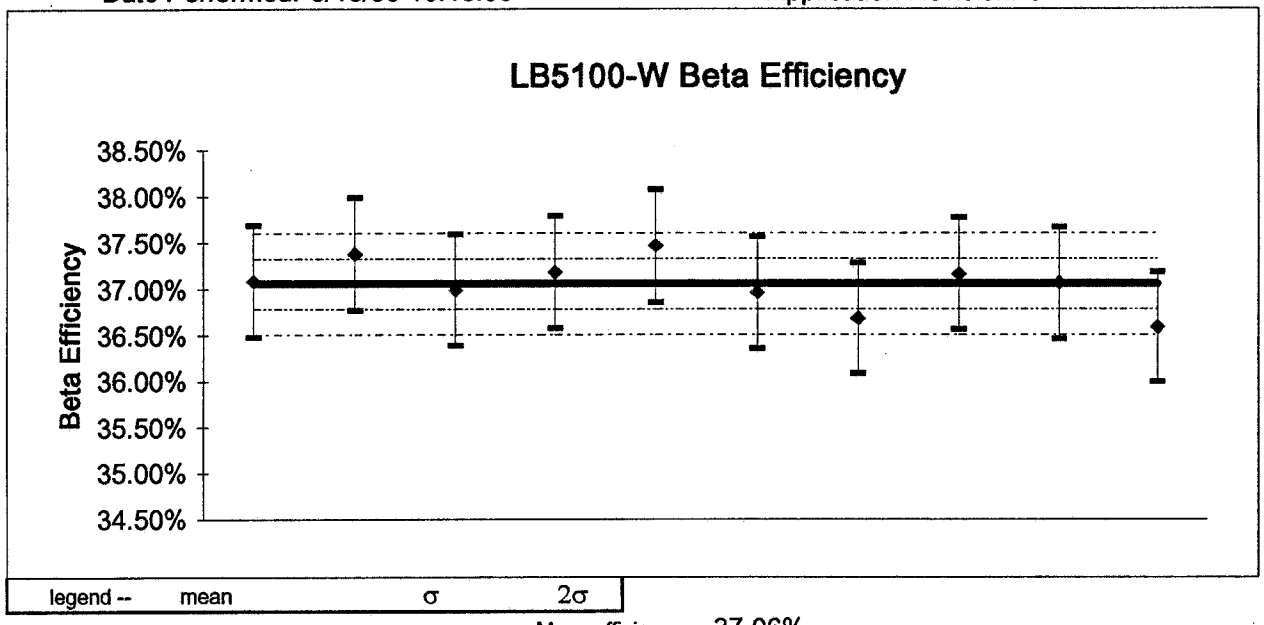
LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **S-1736**

Isotope	Th-230	**Half-Life**	28105000	**days**
Type	Alpha			
Calibration Date	3/28/78	**Custodian**	WEST.	
DPM @ calibration date	33390.00	**Error**	333.90	
Decay Corrected DPM	33384.90	**Error**	333.85	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	33.37%	0.47%	15.12	11142.06	10	24.79%
Beta	11.00%	0.16%	11.03	3671.58		A into B
Gross	44.37%	0.63%	8.27	14813.64		

Unit Id: 1
Date Performed: 3/13/95 13:16:36 Application Revision: 3



Mean efficiency:	37.06%
Error for mean efficiency:	0.53%
Actual standard deviation:	0.27%
Predicted standard deviation:	0.30%
Number of individual measurements:	10
Chi-square:	7.62
Reduced chi-square:	0.85

Unit Id: 1
Date Performed: 3/13/95
File Name: C:\LBXL\UNIT1\EFF1B000.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

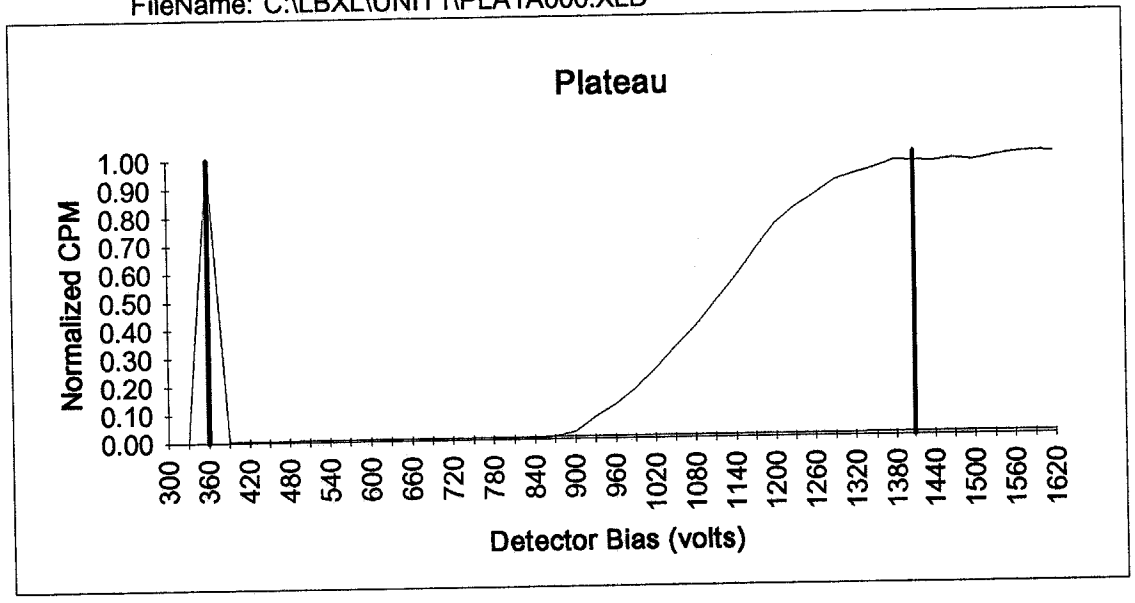
Source Control ID: **767/84**

Isotope	Tc-99	**Half-Life**	77740000	**days**
Type	Beta			
Calibration Date	9/17/84	**Custodian**	WEST.	
DPM @ calibration date	8400.00	**Error**	84.00	
Decay Corrected DPM	8399.71	**Error**	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.01%	0.00%	6.95	0.92	10	B into A
Beta	37.06%	0.53%	7.62	3112.64		0.03%
Gross	37.07%	0.53%	7.57	3113.56		

Unit Id: 1
Date Performed: 12/14/94 0:23:37
FileName: C:\LBXL\UNIT1\PLA1A000.XLD

Application Revision: 2
Application Version: Standard

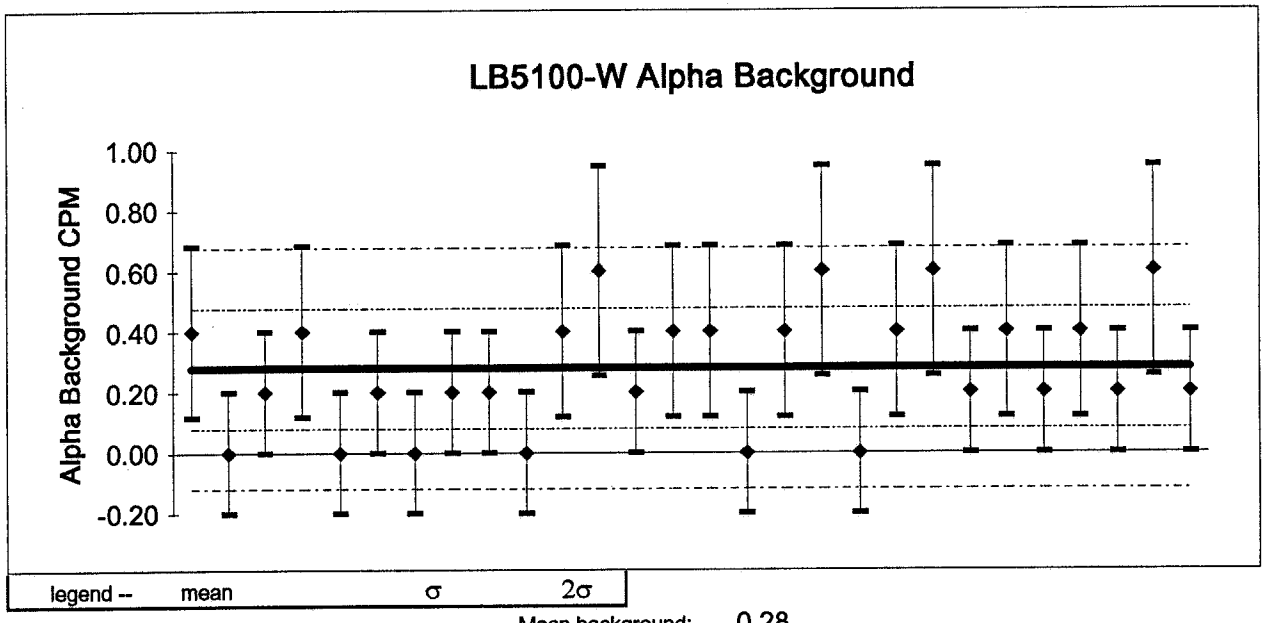


Optimum alpha & beta simultaneous operating voltage: **1410**
Beta slope per 100 volts at beta voltage: 1.92%
Alpha slope per 100 volts at beta voltage: 1.21%

Optimum alpha only operating voltage: **360**
Alpha slope per 100 volts at alpha voltage: 2.09%

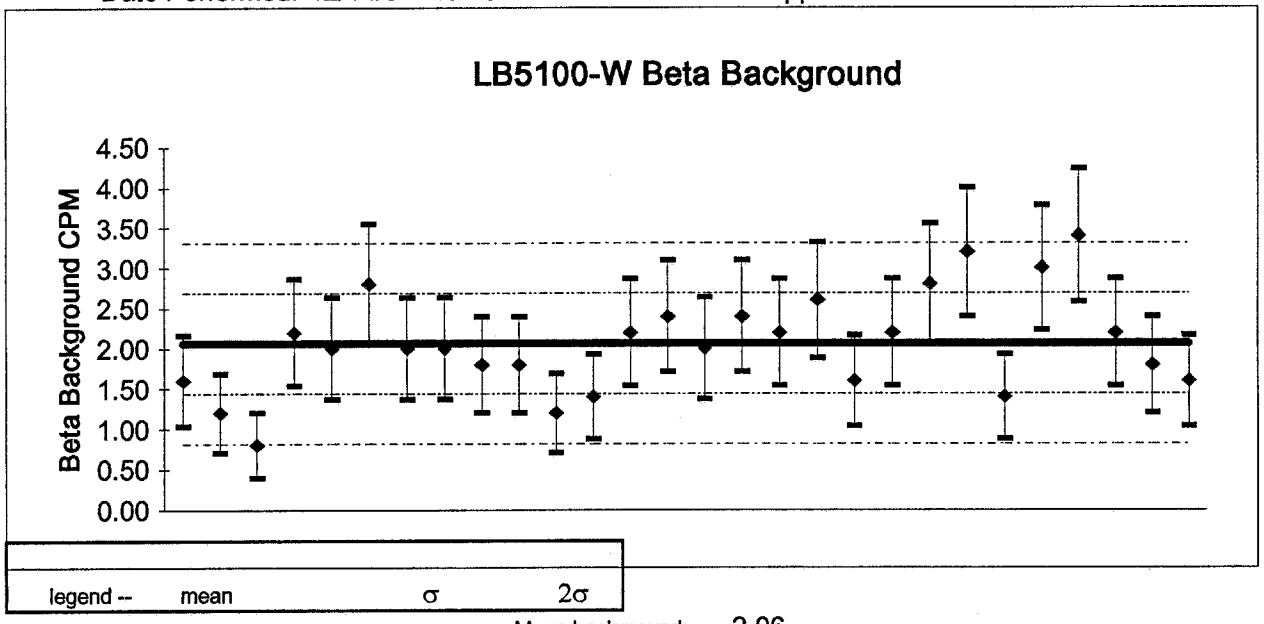
Unit Id: 1
Date Performed: 12/14/94 7:51:01

Application Revision: 4



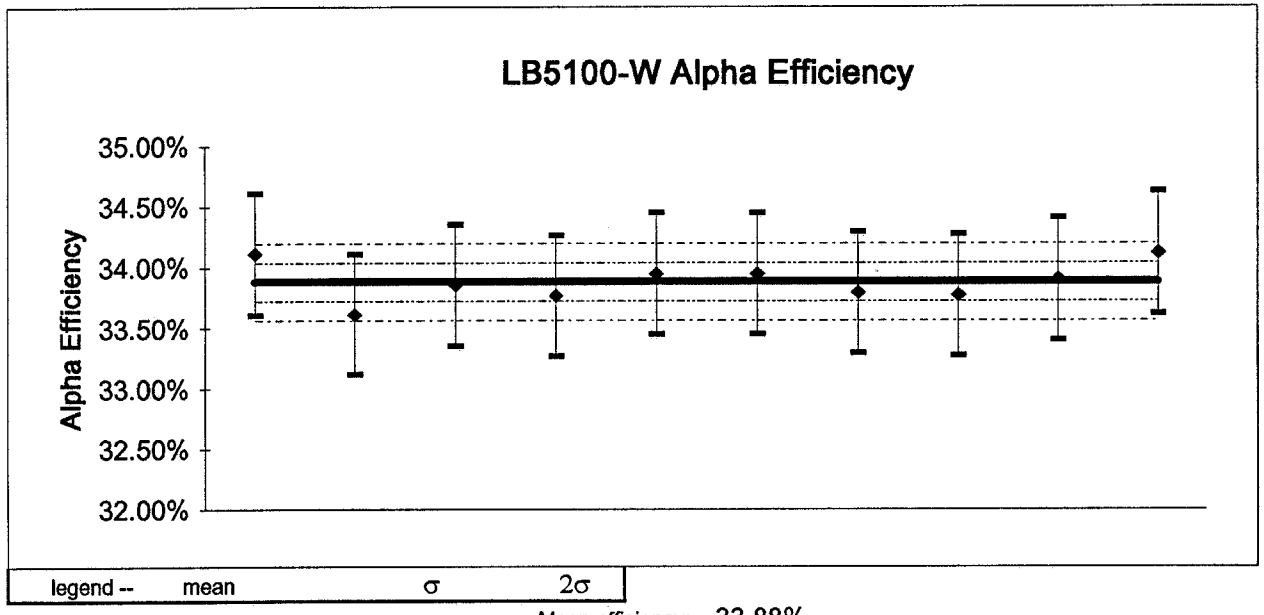
Mean background:	0.28
Error for mean background:	0.04
Actual standard deviation:	0.20
Predicted standard deviation:	0.24
Number of individual measurements:	28
Chi-square:	19.15
Reduced chi-square:	0.71

Unit Id: 1
Date Performed: 12/14/94 7:51:01 Application Revision: 4



Mean background:	2.06
Error for mean background:	0.12
Actual standard deviation:	0.62
Predicted standard deviation:	0.64
Number of individual measurements:	28
Chi-square:	25.39
Reduced chi-square:	0.94

Unit Id: 1
Date Performed: 12/14/94 10:12:52 Application Revision: 3



Mean efficiency:	33.88%
Error for mean efficiency:	0.48%
Actual standard deviation:	0.16%
Predicted standard deviation:	0.14%
Number of individual measurements:	10
Chi-square:	11.03
Reduced chi-square:	1.23

Unit Id: 1
Date Performed: 12/14/94
File Name: C:\LBXL\UNIT1\EFF1A000.XLD

Application Revision: 3
Application Version: Standard

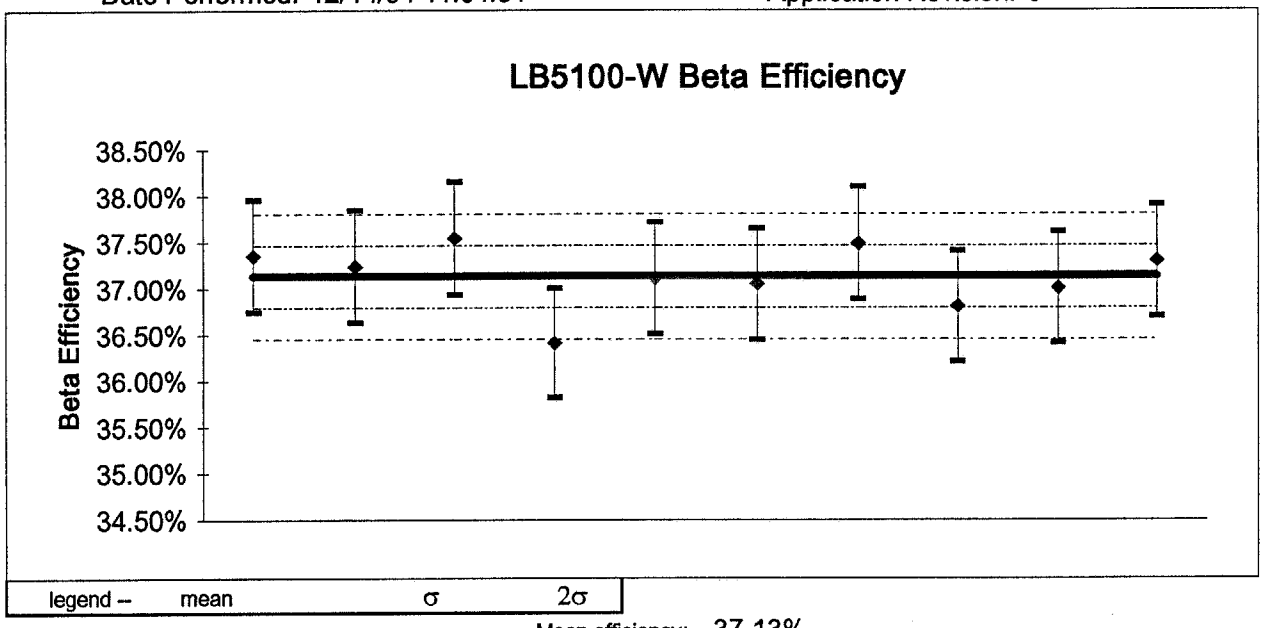
LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **S-1736**

Isotope	Th-230	**Half-Life**	28105000	**days**
Type	Alpha			
Calibration Date	3/28/78	**Custodian**	WEST.	
DPM @ calibration date	33390.00	**Error**	333.90	
Decay Corrected DPM	33384.97	**Error**	333.85	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	33.88%	0.48%	11.03	11311.81	10	24.12%
Beta	10.77%	0.15%	12.93	3596.65		A into B
Gross	44.66%	0.63%	7.45	14908.46		

Unit Id: 1
Date Performed: 12/14/94 11:04:51 Application Revision: 3



Mean efficiency:	37.13%
Error for mean efficiency:	0.53%
Actual standard deviation:	0.34%
Predicted standard deviation:	0.30%
Number of individual measurements:	10
Chi-square:	11.68
Reduced chi-square:	1.30

Unit Id: 1
Date Performed: 12/14/94
File Name: C:\LBXL\UNIT1\EFF1B000.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **767/84**

Isotope	Tc-99	**Half-Life**	77740000	**days**
Type	Beta			
Calibration Date	9/17/84	**Custodian**	WEST.	
DPM @ calibration date	8400.00	**Error**	84.00	
Decay Corrected DPM	8399.72	**Error**	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.01%	0.00%	8.63	0.99	10	B into A
Beta	37.13%	0.53%	11.68	3118.97		0.03%
Gross	37.14%	0.53%	11.79	3119.96		

IH & S Form #206
Forest Hills Site

Tennelec Calibration Summary

Tennelec #1	Calibration Date:	09/15/1994	Signature:	[illegible]

High Voltage Bias Setting

1410

Detection Thresholds

Alpha / Beta Channel:	.252%	Guard Channel:	.132%

Alpha / Beta Channel setup

Alpha Lower Level:	50%	Beta Upper Level:	50%

Source Response Crosstalk

Alpha to Beta:	5.85%	Beta to Alpha:	.03%

Efficiency Summary

Source	Source S/N	Geometry	Simultaneous Efficiency	Correction Factor
Alpha	5308	Shallow Dish	42.75%	2.34
Beta	767/84	Shallow Dish	36.84%	2.71
Alpha		Deep Dish		
Beta		Deep Dish		

Background Means

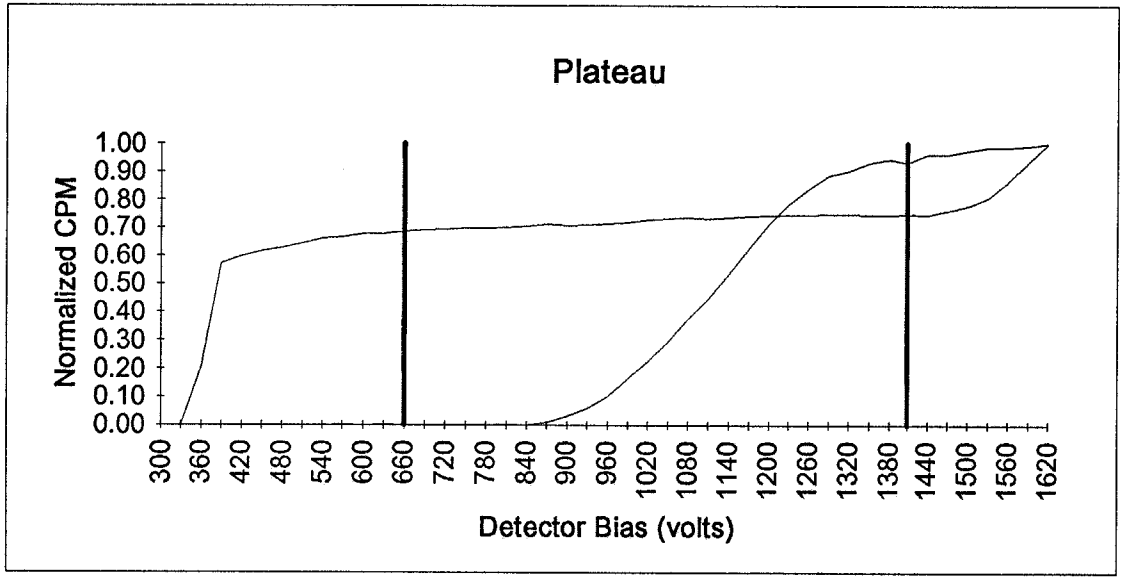
	Alpha	Beta
Mean Background CPM	.19	1.39
Standard Deviation CPM	.19	.53

Typical daily source check setup:

Use Group "G" for time delay with 1 planchet.
Use group "A" for Alpha source check. 5 minute count time with 1 planchet.
Use group "B" for Beta source check. 5 minute count time with 1 planchet.
Use group " I" for background check. 20 minute count time with 5 to 10 planchets.

Unit Id: 1
Date Performed: 9/14/94 6:20:01
FileName: C:\LBXL\UNIT1\PLA1A000.XLD

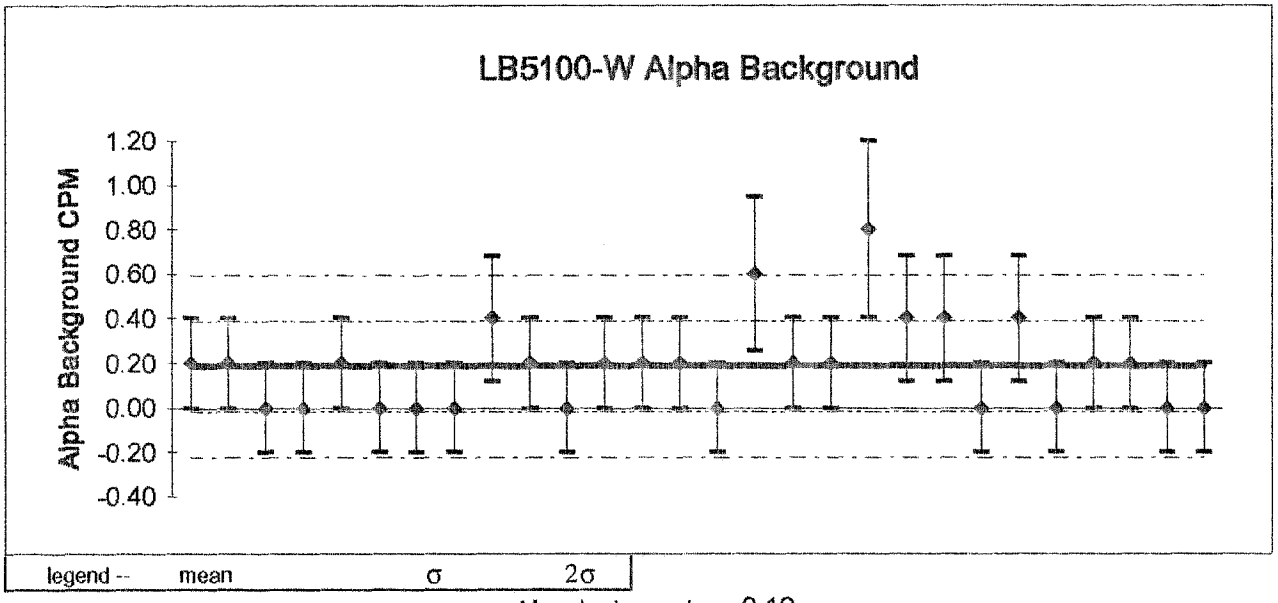
Application Revision: 2
Application Version: Standard



Optimum alpha & beta simultaneous operating voltage: **1410**
Beta slope per 100 volts at beta voltage: 2.82%
Alpha slope per 100 volts at beta voltage: 1.46%

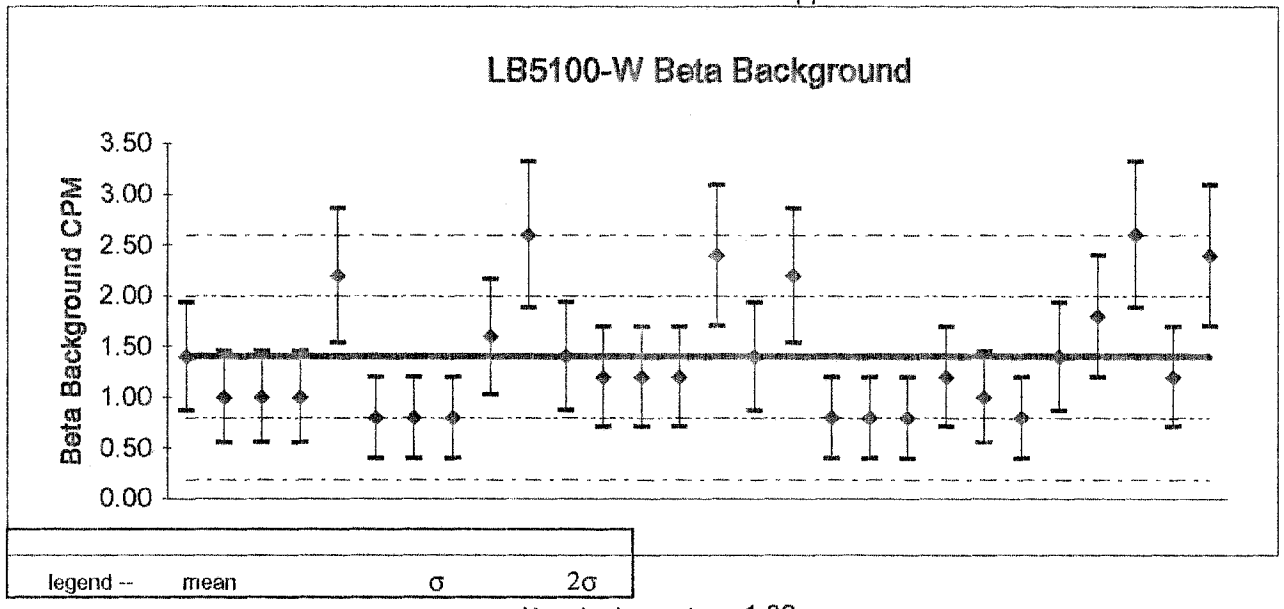
Optimum alpha only operating voltage: **660**
Alpha slope per 100 volts at alpha voltage: 2.21%

Unit Id: 1
Date Performed: 9/14/94 13:52:02 Application Revision: 4



Mean background:	0.19
Error for mean background:	0.04
Actual standard deviation:	0.20
Predicted standard deviation:	0.19
Number of individual measurements:	28
Chi-square:	30.00
Reduced chi-square:	1.11

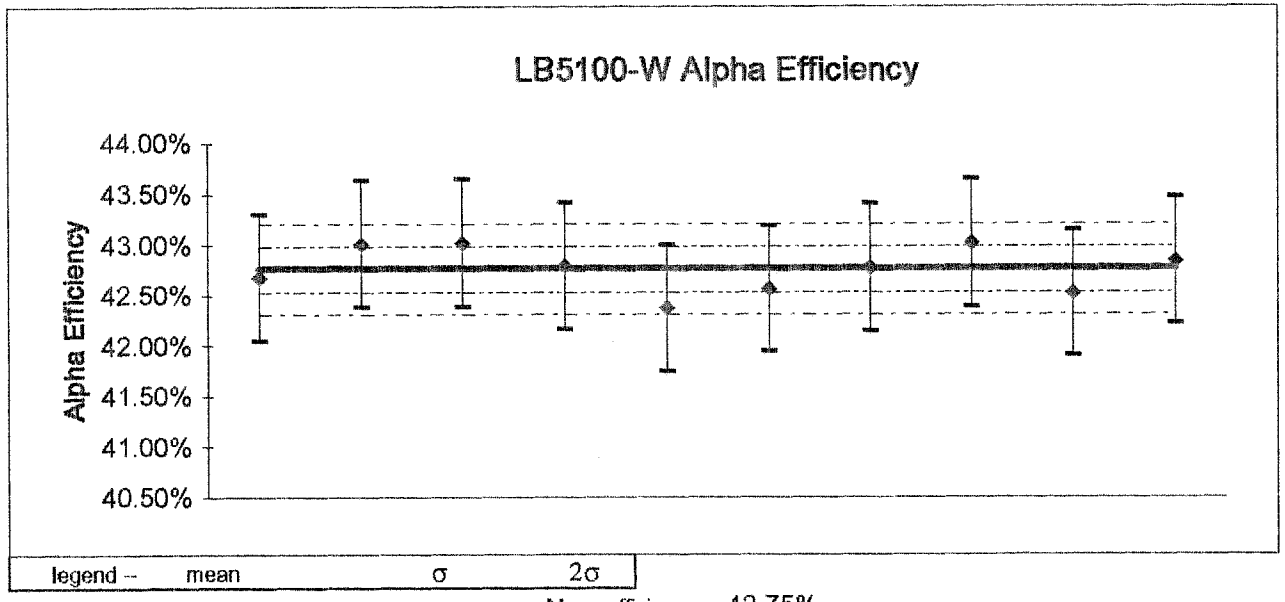
Unit Id: 1
Date Performed: 9/14/94 13:52:02 Application Revision: 4



Mean background:	1.39
Error for mean background:	0.10
Actual standard deviation:	0.60
Predicted standard deviation:	0.53
Number of individual measurements:	28
Chi-square:	34.89
Reduced chi-square:	1.29

Unit Id: 1
Date Performed: 9/14/94 16:13:52

Application Revision: 3



Mean efficiency:	42.75%
Error for mean efficiency:	0.61%
Actual standard deviation:	0.23%
Predicted standard deviation:	0.17%
Number of individual measurements:	10
Chi-square:	16.70
Reduced chi-square:	1.86

Unit Id: 1
Date Performed: 9/14/94
File Name: C:\LBXL\UNIT1\EFF1A000.XLD

Application Revision: 3
Application Version: Standard

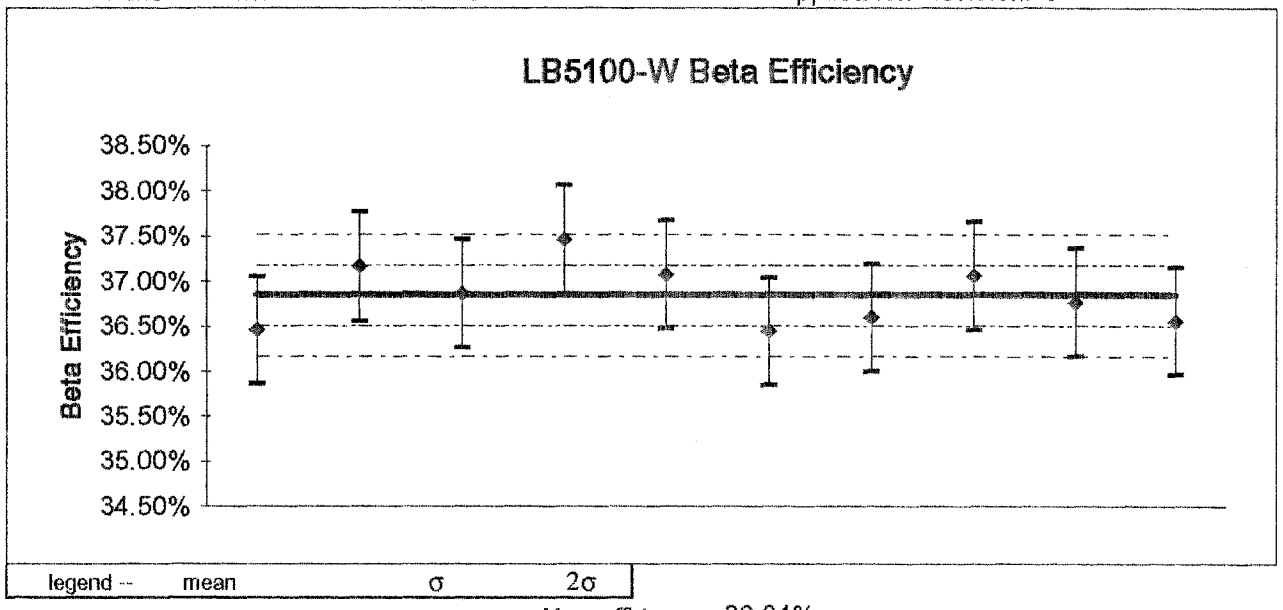
LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **5308**

Isotope	Pu-239	**Half-Life**	8807815	**days**
Type	Alpha			
Calibration Date	9/24/74	**Custodian**	WEST.	
DPM @ calibration date	31300.00	**Error**	313.00	
Decay Corrected DPM	31282.03	**Error**	312.82	
Archive File	PU239AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	42.75%	0.61%	16.70	13374.37	10	5.85%
Beta	2.65%	0.04%	7.36	830.53		A into B
Gross	45.41%	0.64%	13.80	14204.90		

Unit Id: 1
Date Performed: 9/14/94 17:05:51 Application Revision: 3



Mean efficiency:	36.84%
Error for mean efficiency:	0.53%
Actual standard deviation:	0.34%
Predicted standard deviation:	0.30%
Number of individual measurements:	10
Chi-square:	11.86
Reduced chi-square:	1.32

Unit Id: 1
Date Performed: 9/14/94
File Name: C:\LBXL\UNIT1\EFF1B000.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **767/84**

Isotope	Tc-99	**Half-Life**	77740000	**days**
Type	Beta			
Calibration Date	9/17/84	**Custodian**	WEST.	
DPM @ calibration date	8400.00	**Error**	84.00	
Decay Corrected DPM	8399.73	**Error**	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.01%	0.00%	6.72	1.07	10	B into A
Beta	36.84%	0.53%	11.86	3094.85		0.03%
Gross	36.86%	0.53%	12.05	3095.92		

IH & S Form #206
Forest Hills Site

Tennelec Calibration Summary

Tennelec #1	Calibration Date:	06/14/1994	Signature:

High Voltage Bias Setting

1410

Detection Thresholds

Alpha / Beta Channel:	.252%	Guard Channel:	.132%

Alpha / Beta Channel setup

Alpha Lower Level:	40.0%	Beta Upper Level:	40.0%

Source Response Crosstalk

Alpha to Beta:	5.68	Beta to Alpha:	.07%

Efficiency Summary

Source	Source S/N	Geometry	Simultaneous Efficiency	Correction Factor
Alpha	5308	Shallow Dish	42.75%	2.34
Beta	767/84	Shallow Dish	36.77%	2.72
Alpha		Deep Dish		
Beta		Deep Dish		

Background Means

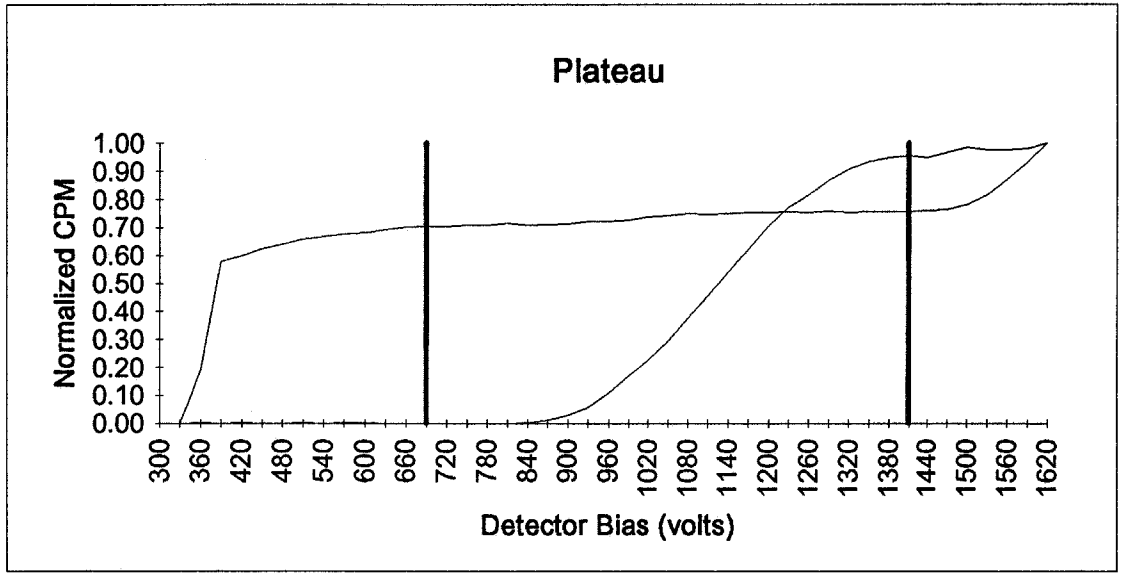
	Alpha	Beta
Mean Background CPM	.19	1.27
Standard Deviation CPM	.17	.46

Typical daily source check setup:

Use Group "G" for time delay with 1 planchet.
Use group "A" for Alpha source check. 5 minute count time with 1 planchet.
Use group "B" for Beta source check. 5 minute count time with 1 planchet.
Use group " I" for background check. 20 minute count time with 5 to 10 planchets.

Unit Id: 1
Date Performed: 6/14/94 5:52:22
FileName: C:\LBXL\UNIT1\PLA1A000.XLD

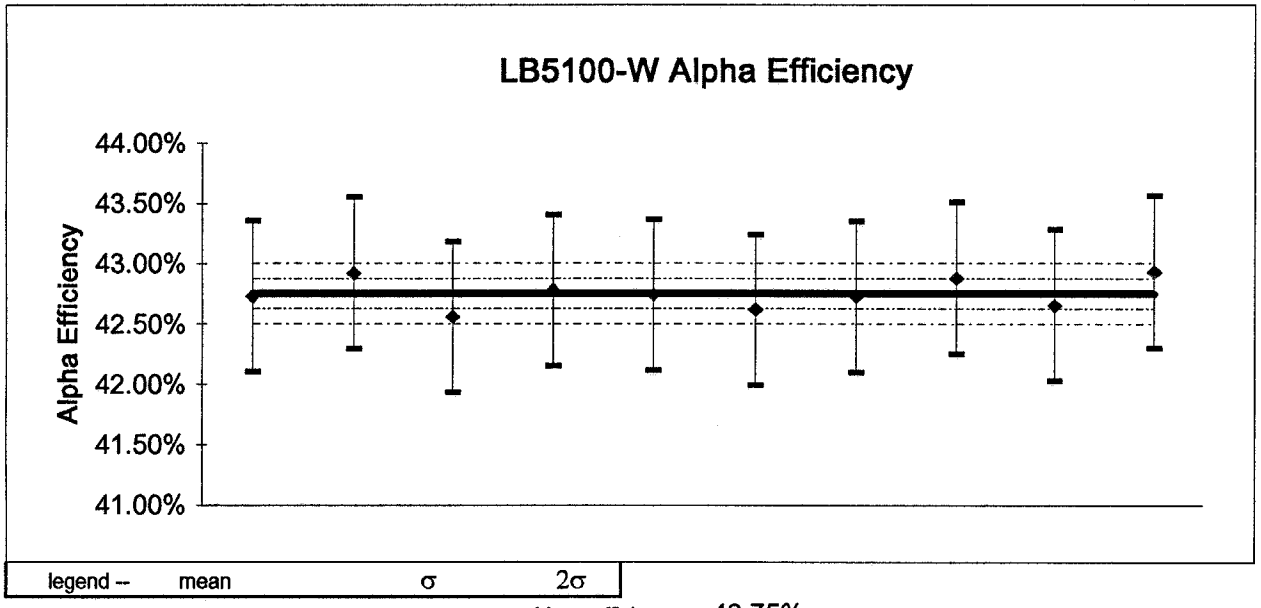
Application Revision: 2
Application Version: Standard



Optimum alpha & beta simultaneous operating voltage: **1410**
Beta slope per 100 volts at beta voltage: 2.33%
Alpha slope per 100 volts at beta voltage: 0.90%

Optimum alpha only operating voltage: **690**
Alpha slope per 100 volts at alpha voltage: 1.72%

Unit Id: 1
Date Performed: 6/14/94 12:14:07 Application Revision: 3



Mean efficiency:	42.75%
Error for mean efficiency:	0.61%
Actual standard deviation:	0.13%
Predicted standard deviation:	0.17%
Number of individual measurements:	10
Chi-square:	5.32
Reduced chi-square:	0.59

Unit Id: 1
Date Performed: 6/14/94
File Name: C:\LBXL\UNIT1\EFF1A000.XLD

Application Revision: 3
Application Version: Standard

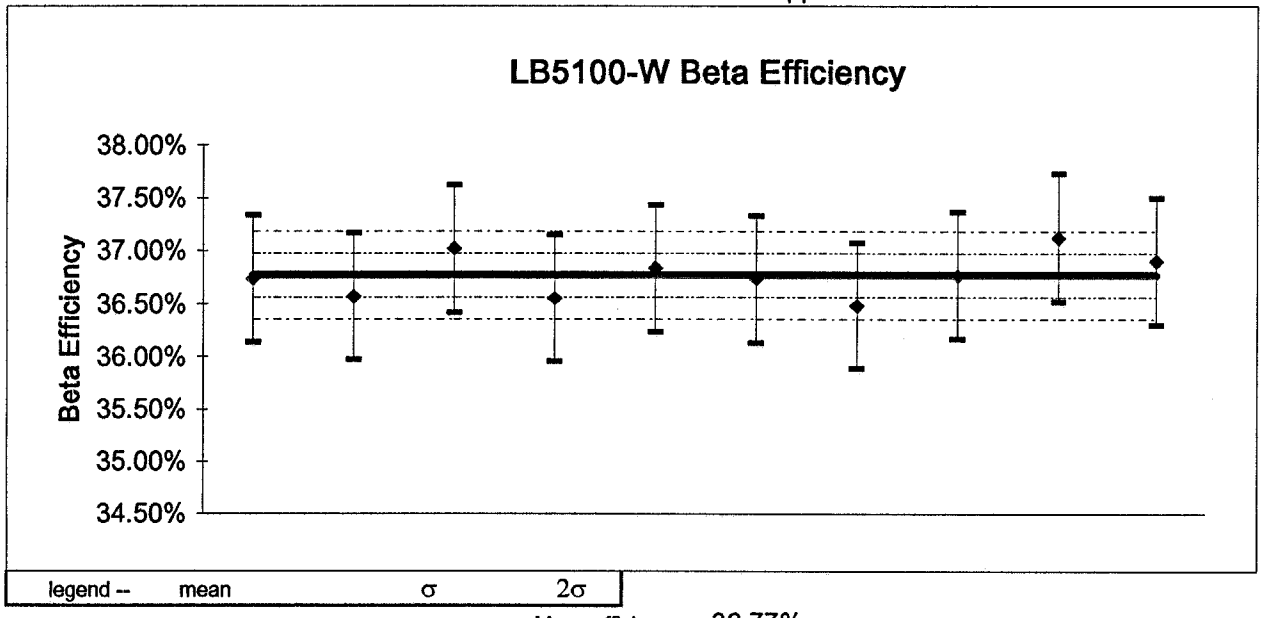
LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: 5308

Isotope	Pu-239	Half-Life	8807815	days
Type	Alpha			
Calibration Date	9/24/74	Custodian	WEST.	
DPM @ calibration date	31300.00	Error	313.00	
Decay Corrected DPM	31282.26	Error	312.82	
Archive File	PU239AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	42.75%	0.61%	5.32	13374.35	10	5.68%
Beta	2.57%	0.04%	8.79	804.70		A into B
Gross	45.33%	0.64%	4.18	14179.05		

Unit Id: 1
Date Performed: 6/14/94 13:06:06 Application Revision: 3



Mean efficiency:	36.77%
Error for mean efficiency:	0.53%
Actual standard deviation:	0.21%
Predicted standard deviation:	0.30%
Number of individual measurements:	10
Chi-square:	4.39
Reduced chi-square:	0.49

Unit Id: 1
Date Performed: 6/14/94
File Name: C:\LBXL\UNIT1\EFF1B000.XLD

Application Revision: 3
Application Version: Standard

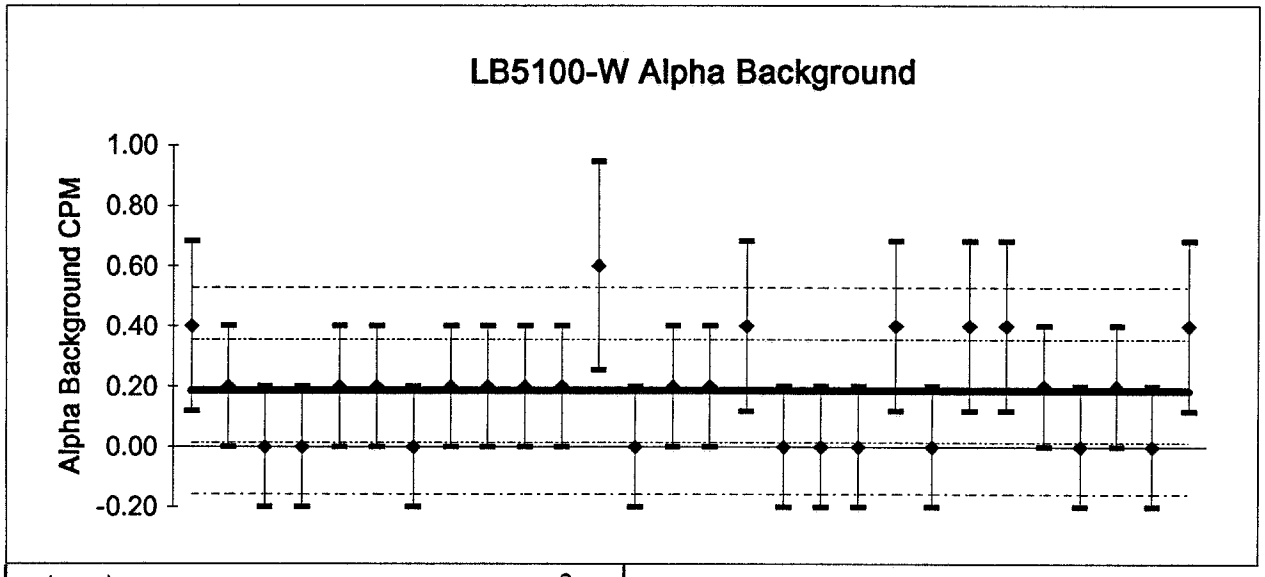
LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: 767/84

Isotope	Tc-99	**Half-Life**	77740000	**days**
Type	Beta			
Calibration Date	9/17/84	**Custodian**	WEST.	
DPM @ calibration date	8400.00	**Error**	84.00	
Decay Corrected DPM	8399.73	**Error**	84.00	
Archive File	TC99AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.03%	0.00%	5.78	2.15	10	B into A
Beta	36.77%	0.53%	4.39	3088.54		0.07%
Gross	36.80%	0.53%	4.50	3090.69		

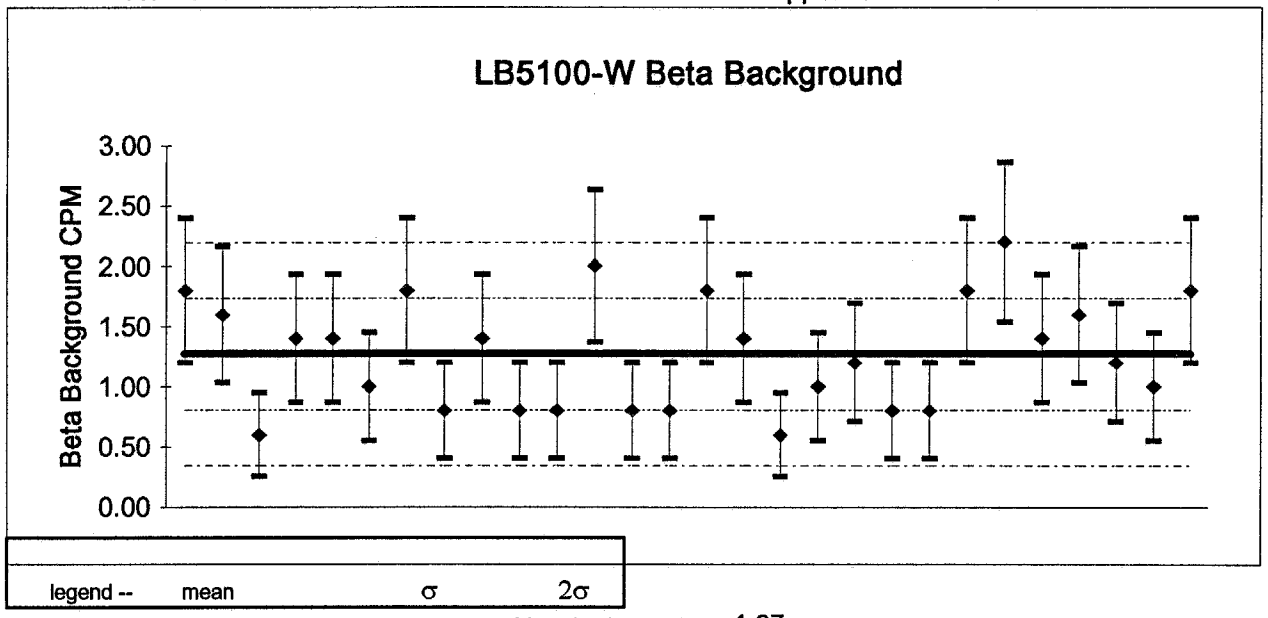
Unit Id: 1
Date Performed: 6/14/94 13:57:30 Application Revision: 4



legend -- mean σ 2σ

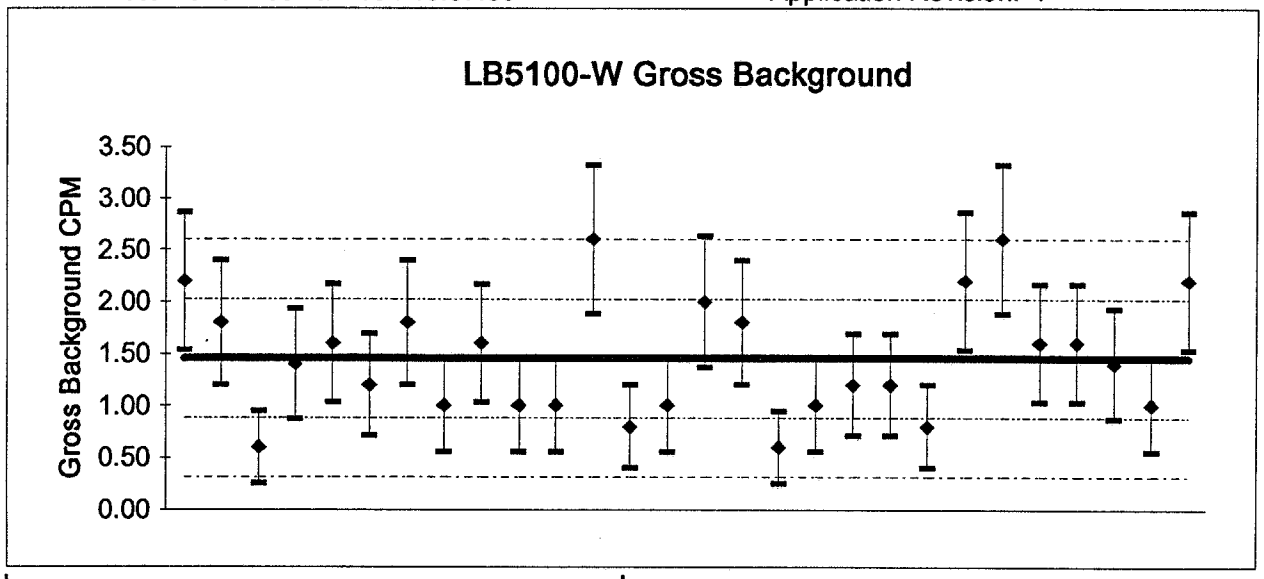
Mean background:	0.19
Error for mean background:	0.04
Actual standard deviation:	0.17
Predicted standard deviation:	0.19
Number of individual measurements:	28
Chi-square:	21.38
Reduced chi-square:	0.79

Unit Id: 1
Date Performed: 6/14/94 13:57:30 Application Revision: 4



Mean background:	1.27
Error for mean background:	0.10
Actual standard deviation:	0.46
Predicted standard deviation:	0.50
Number of individual measurements:	28
Chi-square:	22.72
Reduced chi-square:	0.84

Unit Id: 1
Date Performed: 6/14/94 13:57:30 Application Revision: 4



legend -- mean σ 2σ

Mean background:	1.46
Error for mean background:	0.10
Actual standard deviation:	0.57
Predicted standard deviation:	0.54
Number of individual measurements:	28
Chi-square:	30.16
Reduced chi-square:	1.12

IH & S Form #206
Forest Hills Site

Tennelec Calibration Summary

Tennelec #1	Calibration Date:	03/14/1994	Signature:	

High Voltage Bias Setting

1410

Detection Thresholds

Alpha / Beta Channel:	.252%	Guard Channel:	.132%

Alpha / Beta Channel setup

Alpha Lower Level:	40.0%	Beta Upper Level:	40.0%

Source Response Crosstalk

Alpha to Beta:	5.54%	Beta to Alpha:	.25%

Efficiency Summary

Source	Source S/N	Geometry	Simultaneous Efficiency	Correction Factor
Alpha	5308	Shallow Dish	42.71%	2.34
Beta	767/84	Shallow Dish	37.11%	2.7
Alpha		Deep Dish		
Beta		Deep Dish		

Background Means

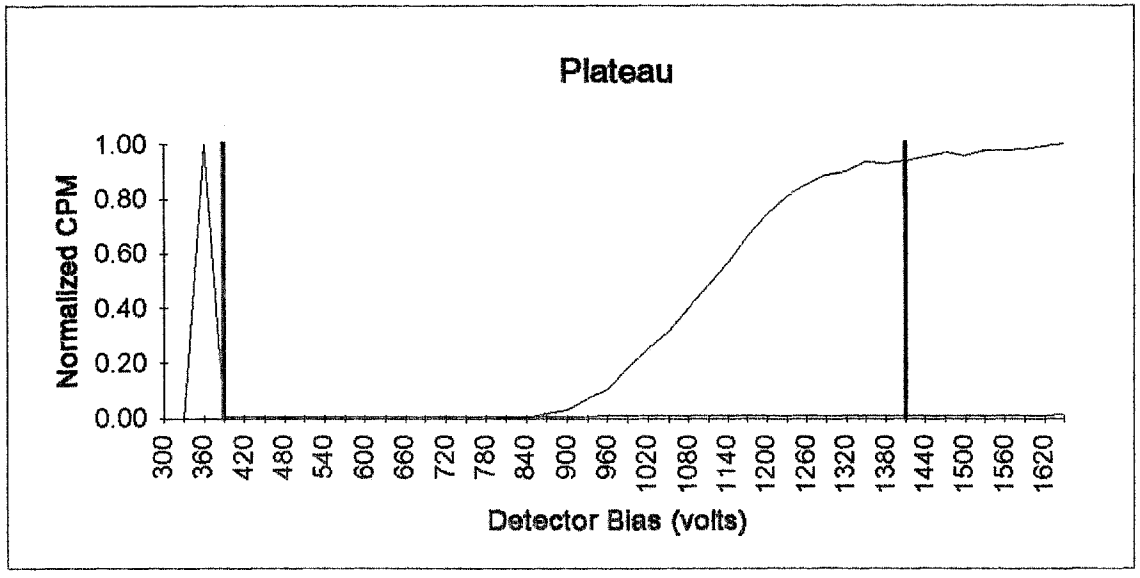
	Alpha	Beta
Mean Background CPM	.193	1.68
Standard Deviation CPM	.098	.29

Typical daily source check setup:

Use Group "G" for time delay with 1 planchet.
Use group "A" for Alpha source check. 5 minute count time with 1 planchet.
Use group "B" for Beta source check. 5 minute count time with 1 planchet.
Use group " I" for background check. 20 minute count time with 5 to 10 planchets.

Unit Id: 1
Date Performed: 3/14/94 9:35:08
FileName: C:\LBXL\UNIT1\PLA1A0.XLD

Application Revision: 1
Application Version: Standard

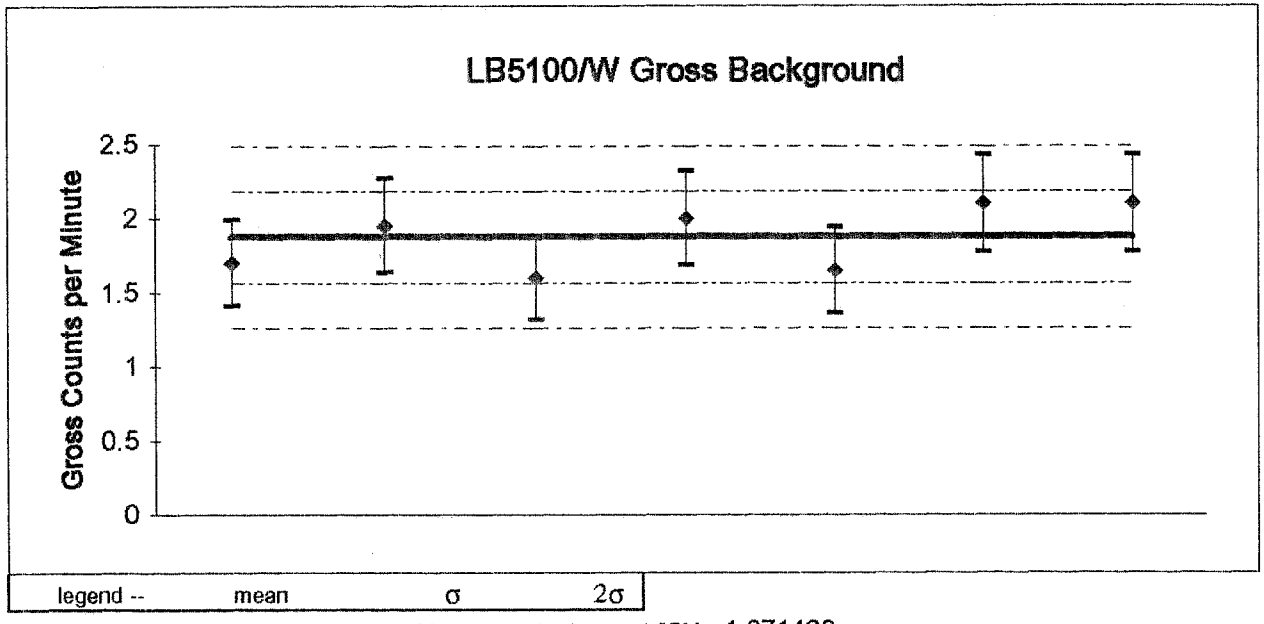


Optimum alpha & beta simultaneous operating voltage: **1410**
Beta slope per 100 volts at beta voltage: 3.00%
Expected alpha to beta crosstalk at simultaneous voltage: 5.81%
Expected beta to alpha crosstalk at simultaneous voltage: 0.24%

Optimum alpha only operating voltage: **390**
Alpha slope per 100 volts at alpha voltage: -160.94%

Unit Id: 1
Date Performed: 3/14/94 16:39:22
File Name: C:\LBXL\UNIT1\BAC1I0.XLD

Application Revision: 2
Application Version: Standard

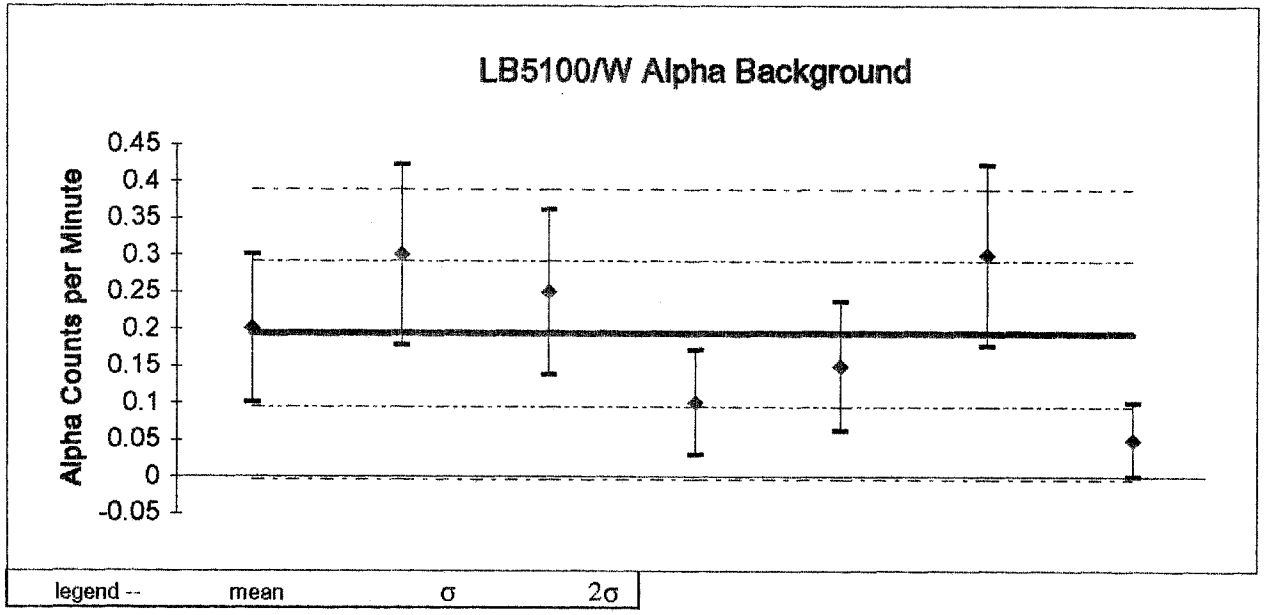


Mean gross background CPM: 1.871429
Actual standard deviation for gross background CPM: 0.215749
Predicted standard deviation for gross background CPM: 0.306466

Number of individual measurments: 7
Chi-square: 2.984733
Reduced chi-square: 0.497455

Unit Id: 1
Date Performed: 3/14/94 16:39:22
File Name: C:\LBXL\UNIT1\BAC1I0.XLD

Application Revision: 2
Application Version: Standard

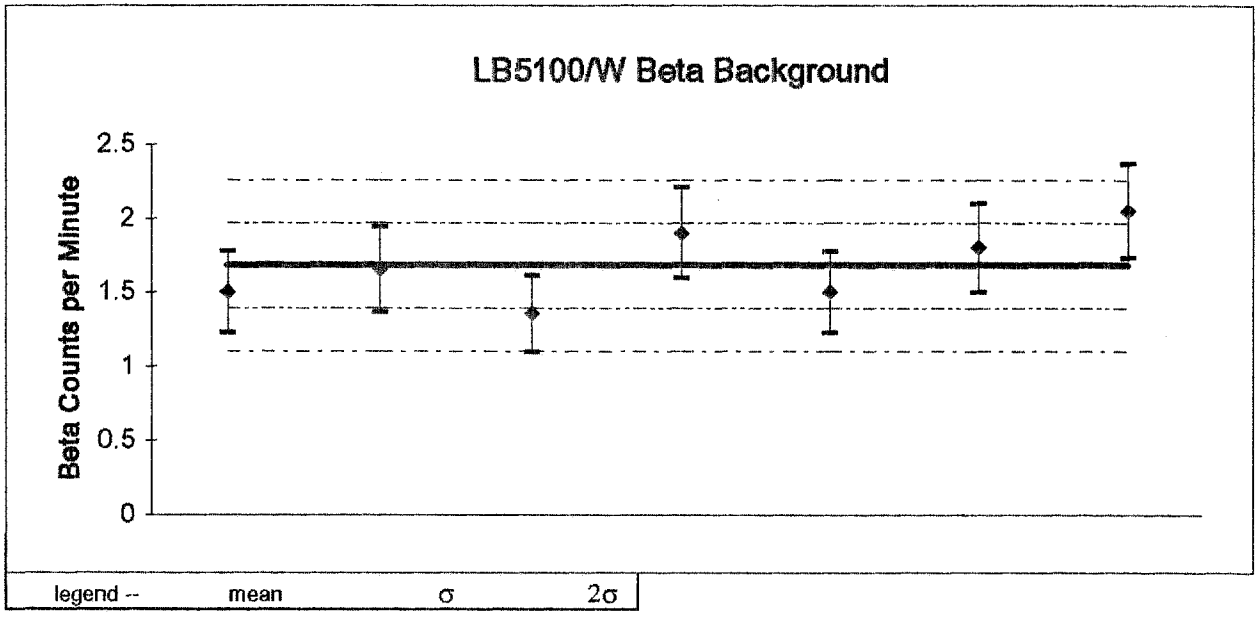


Mean alpha background CPM: 0.192857
Actual standard deviation for alpha background CPM: 0.09759
Predicted standard deviation for alpha background CPM: 0.098217

Number of individual measurments: 7
Chi-square: 5.925926
Reduced chi-square: 0.987654

Unit Id: 1
Date Performed: 3/14/94 16:39:22
File Name: C:\LBXL\UNIT1\BAC1I0.XLD

Application Revision: 2
Application Version: Standard



Mean beta background CPM: 1.678571
Actual standard deviation for beta background CPM: 0.249762
Predicted standard deviation for beta background CPM: 0.29019

Number of individual measurments: 7
Chi-square: 4.459574
Reduced chi-square: 0.743262

Unit Id: 1
Date Performed: 3/14/94
File Name: C:\LBXL\UNIT1\EFF1A0.XLD

Application Revision: 0
Application Version: Standard

LB5100/W Alpha-Beta Efficiency Data Entry and Output

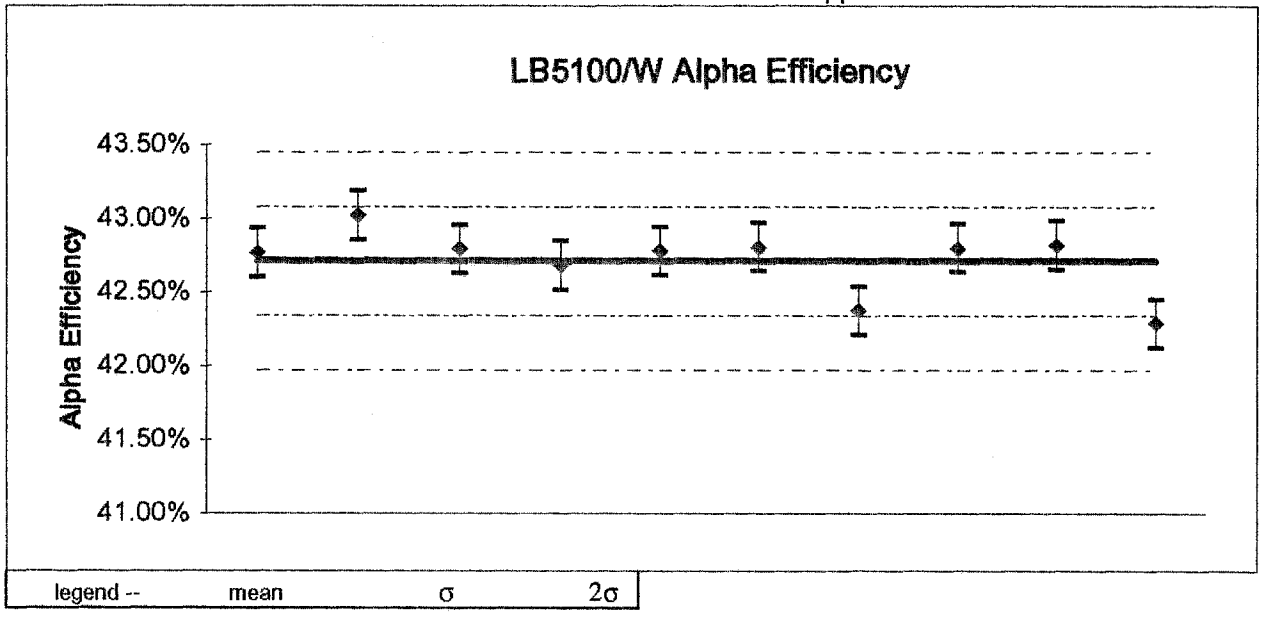
Source Control Number: **5308**

Isotope	Pu-239	**Half-Life**	8807815	**days**
Type	Alpha			
Calibration Date	9/24/74	**Status**	WEST.	
DPM @ calibration date	31300	**Error**	313.00	
Decay Corrected DPM	31282.4868	**Error**	312.82	
Archive File	PU239AB			

	Efficiency	Error	Chi ^2	Events	CPM	X-Talk
Alpha	42.71%	0.37%	15.86	10	13361.4	5.54%
Beta	2.50%	0.09%	8.31		785	A into B
Gross	45.22%	0.38%	13.58		14146.4	

Unit Id: 1
Date Performed: 3/14/94 21:29:23
File Name: C:\LBXL\UNIT1\EFF1A0.XLD

Application Revision: 0
Application Version: Standard



Mean Alpha Efficiency: 42.71%
Actual standard deviation for Alpha Efficiency: 0.22%
Predicted standard deviation for Alpha Efficiency: 0.46%

Number of individual measurments: 10
Chi-square: 15.86
Reduced chi-square: 1.76

Unit Id: 1
Date Performed: 3/14/94
File Name: C:\LBXL\UNIT1\EFF1B0.XLD

Application Revision: 0
Application Version: Standard

LB5100/W Alpha-Beta Efficiency Data Entry and Output

Source Control Number: **767/84**

Isotope	Tc-99	**Half-Life**	77740000	**days**
Type	Beta			
Calibration Date	9/17/84	**Status**	WEST.	
DPM @ calibration date	8400	**Error**	84.00	
Decay Corrected DPM	8399.74042	**Error**	84.00	
Archive File	TC99AB			

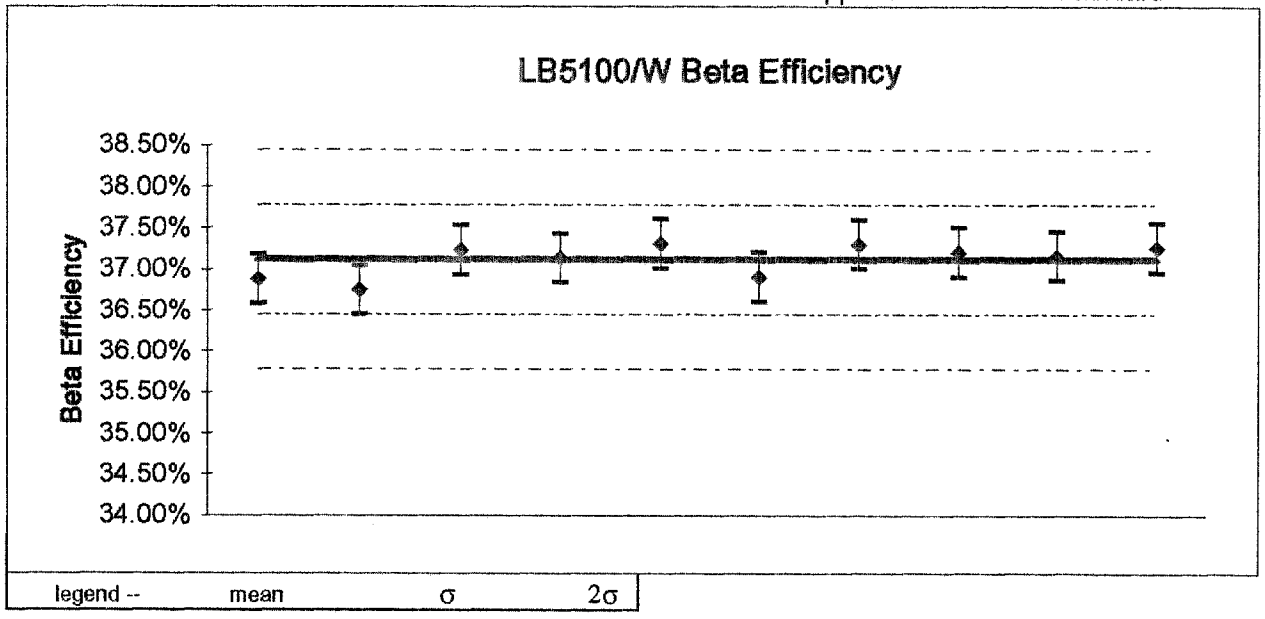
	Efficiency	Error	Chi ^2	Events	CPM	X-Talk
Alpha	0.09%	0.03%	12.24	10	7.88	B into A
Beta	37.11%	0.66%	3.99		3119.16	0.25%
Gross	37.21%	0.67%	4.19		3127.04	

Source Control Number: 767/84

Unit Id: 1

Date Performed: 3/14/94 22:20:21 Application Revision: 0

File Name: C:\LBXL\UNIT1\EFF1B0.XLD Application Version: Standard



Mean Beta Efficiency: 37.11%

Actual standard deviation for Beta Efficiency: 0.20%

Predicted standard deviation for Beta Efficiency: 0.48%

Number of individual measurments: 10

Chi-square: 3.99

Reduced chi-square: 0.44

IH & S Form #206
Forest Hills Site

Tennelec Calibration Summary

Tennelec #1	Calibration Date:	12/13/1993	Signature:	[illegible]

High Voltage Bias Setting

1440

Detection Thresholds

Alpha / Beta Channel:	.252%	Guard Channel:	.132%

Alpha / Beta Channel setup

Alpha Lower Level:	38.8%	Beta Upper Level:	38.8%

Source Response Crosstalk

Alpha to Beta:	5.46%	Beta to Alpha:	.57%

Efficiency Summary

Source	Source S/N	Geometry	Simultaneous Efficiency	Correction Factor
Alpha	5308	Shallow Dish	42.81%	2.34
Beta	T-993	Shallow Dish	49.61%	2.02
Alpha		Deep Dish		
Beta		Deep Dish		

Background Means

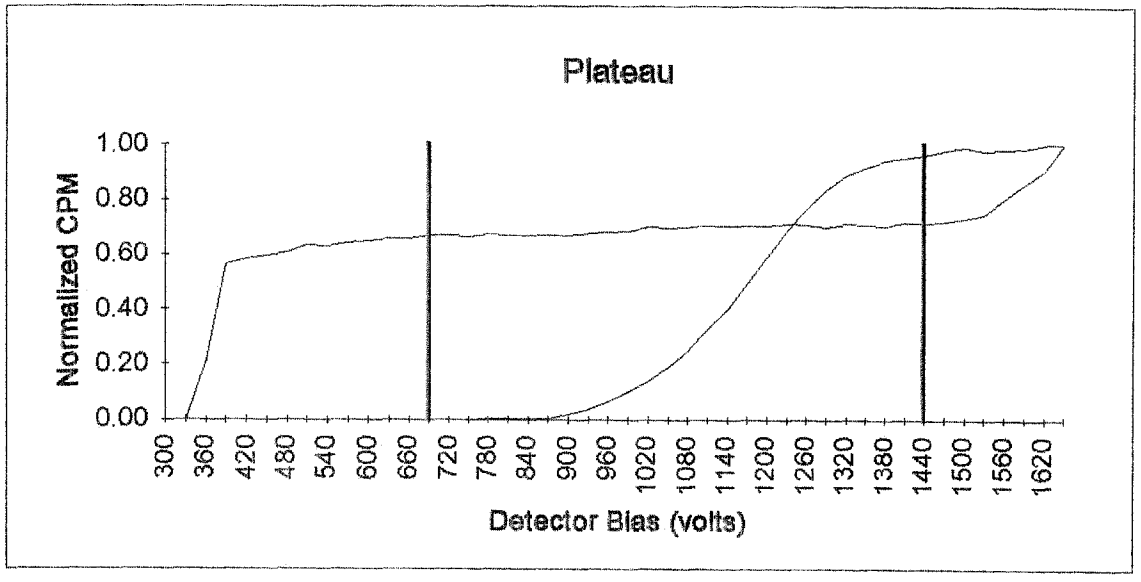
	Alpha	Beta
Mean Background CPM	.321	1.82
Standard Deviation CPM	.129	.302

Typical daily source check setup:

Use Group "G" for time delay with 1 planchet.
Use group "A" for Alpha source check. 2 minute count time with 1 planchet.
Use group "B" for Beta source check. 2 minute count time with 1 planchet.
Use group " I" for background check. 20 minute count time with 5 to 10 planchets.

Unit Id: 1
Date Performed: 12/13/93 1:50:27
FileName: C:\LBXL\UNIT1\PLA1A0.XLD

Application Revision: 1
Application Version: Standard

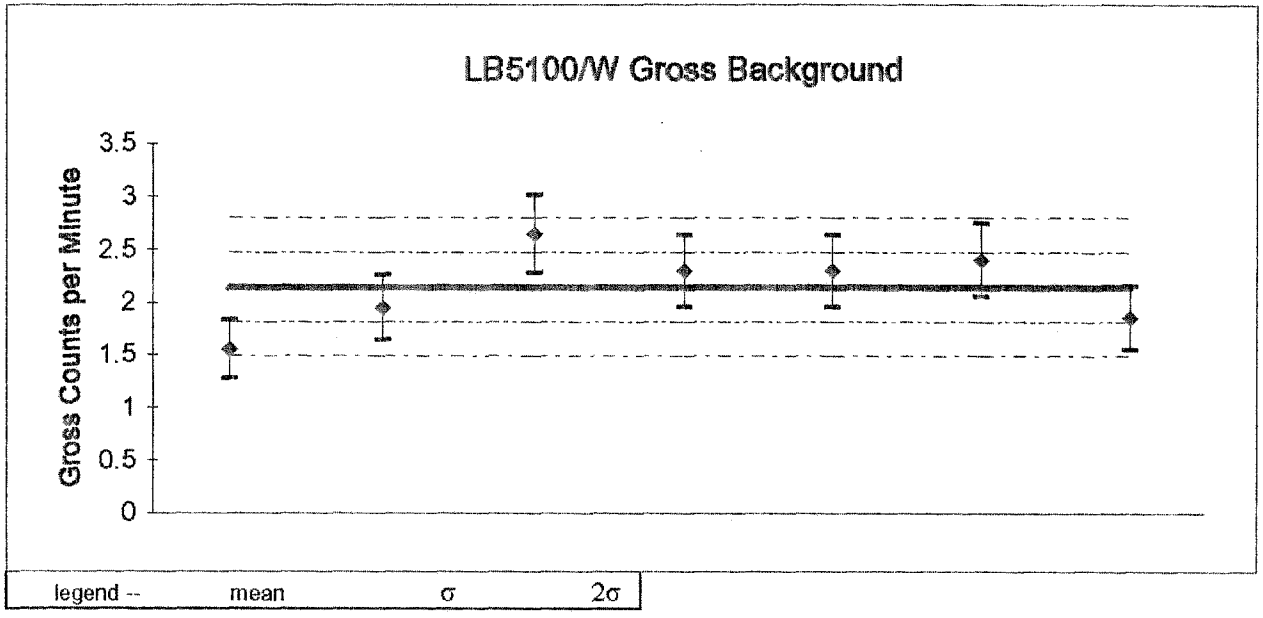


Optimum alpha & beta simultaneous operating voltage: **1440**
Beta slope per 100 volts at beta voltage: 4.13%
Expected alpha to beta crosstalk at simultaneous voltage: 5.37%
Expected beta to alpha crosstalk at simultaneous voltage: 0.69%

Optimum alpha only operating voltage: **690**
Alpha slope per 100 volts at alpha voltage: 1.45%

Unit Id: 1
Date Performed: 12/13/93 7:30:26
File Name: C:\LBXL\UNIT1\BAC1I0.XLD

Application Revision: 2
Application Version: Standard

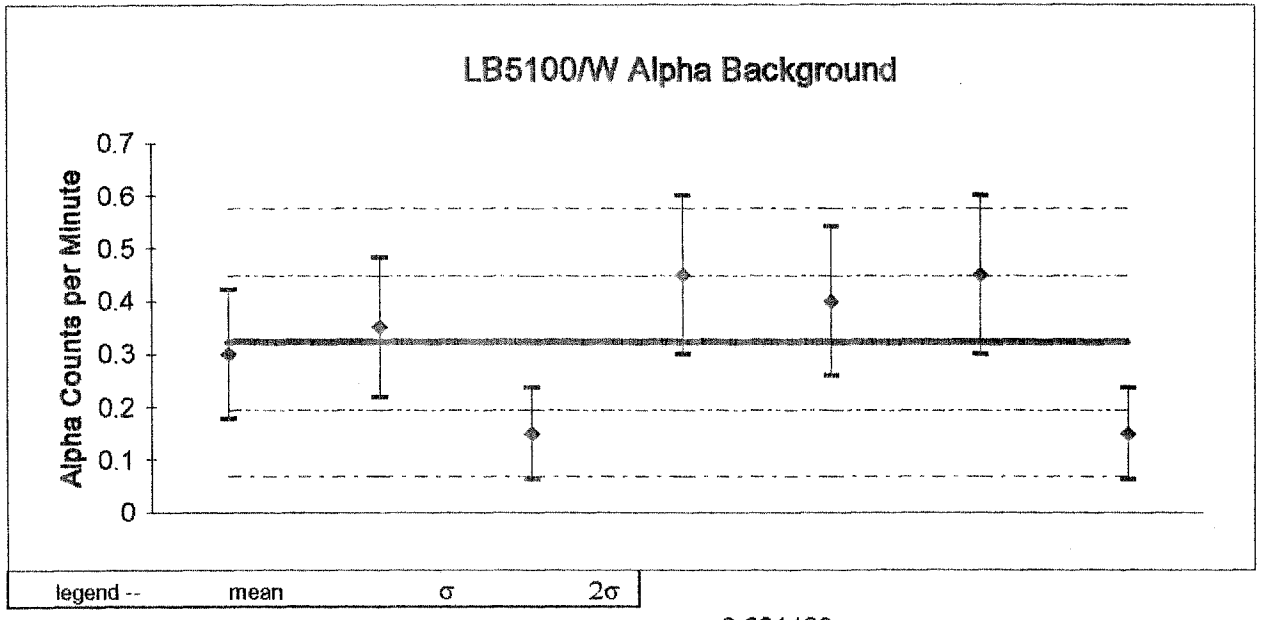


Mean gross background CPM: 2.142857
Actual standard deviation for gross background CPM: 0.375753
Predicted standard deviation for gross background CPM: 0.328028

Number of individual measurments: 7
Chi-square: 7.906667
Reduced chi-square: 1.317778

Unit Id: 1
Date Performed: 12/13/93 7:30:26
File Name: C:\LBXL\UNIT1\BAC1I0.XLD

Application Revision: 2
Application Version: Standard

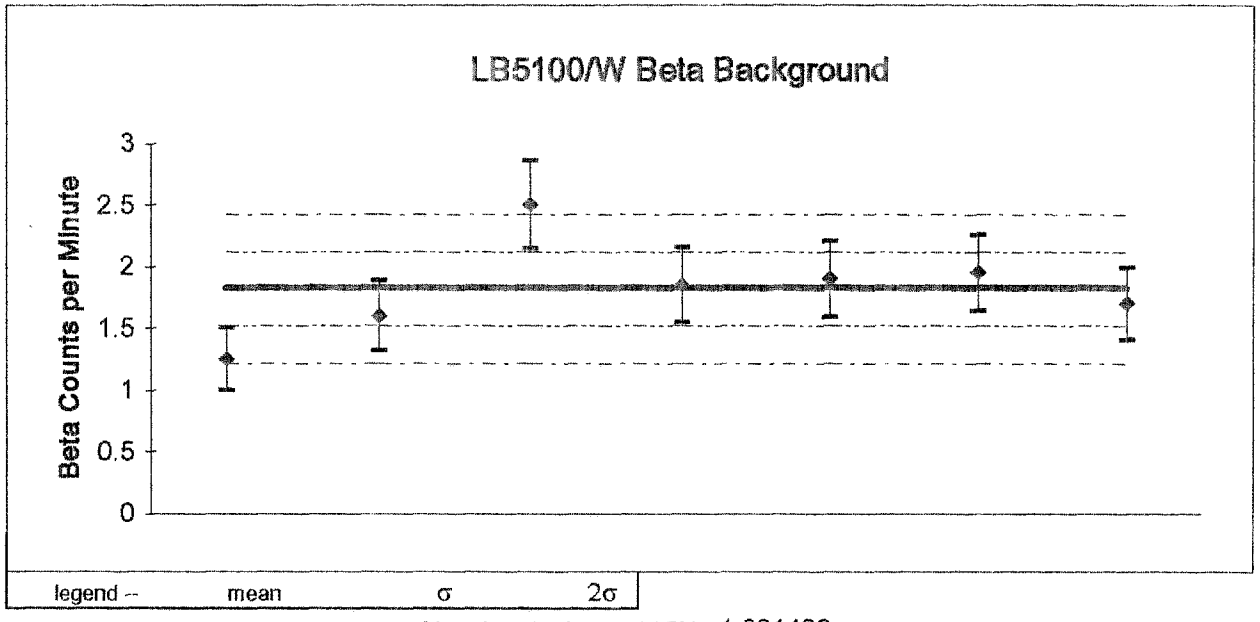


Mean alpha background CPM: 0.321429
Actual standard deviation for alpha background CPM: 0.128638
Predicted standard deviation for alpha background CPM: 0.126814

Number of individual measurments: 7
Chi-square: 6.177778
Reduced chi-square: 1.02963

Unit Id: 1
Date Performed: 12/13/93 7:30:26
File Name: C:\LBXL\UNIT1\BAC1I0.XLD

Application Revision: 2
Application Version: Standard



Mean beta background CPM: 1.821429
Actual standard deviation for beta background CPM: 0.381725
Predicted standard deviation for beta background CPM: 0.30233

Number of individual measurments: 7
Chi-square: 9.6
Reduced chi-square: 1.6

Unit Id: 1
Date Performed: 12/13/93
File Name: C:\LBXL\UNIT1\EFF1A0.XLD

Application Revision: 0
Application Version: Standard

LB5100/W Alpha-Beta Efficiency Data Entry and Output

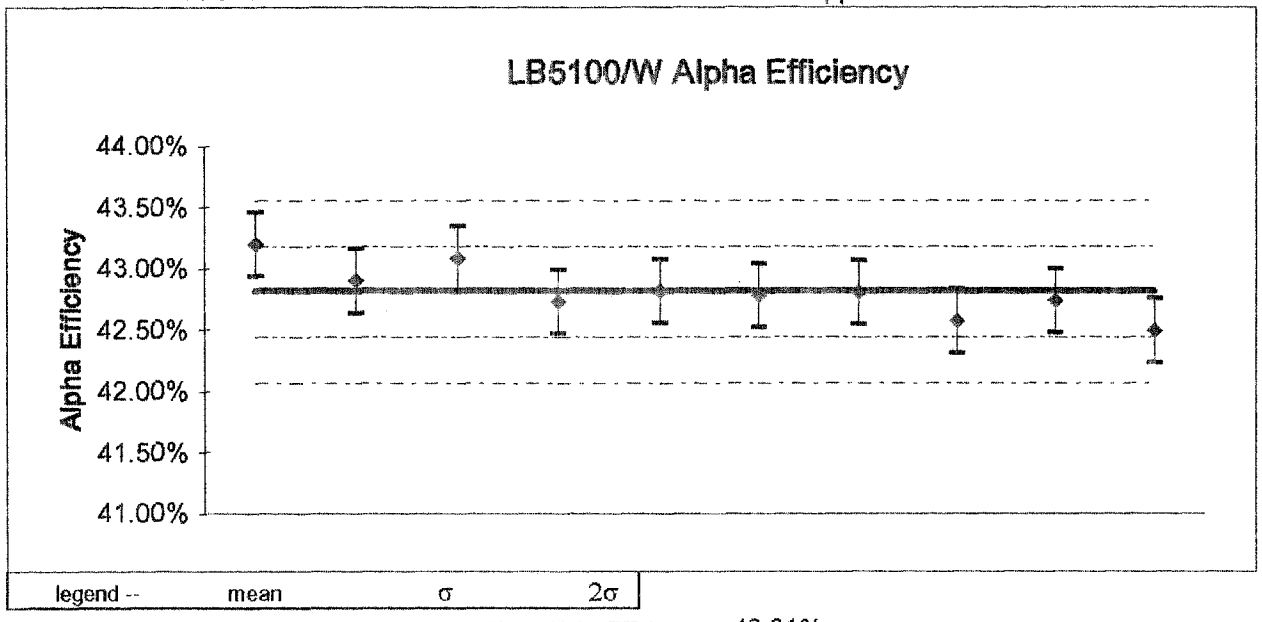
Source Control Number: **5308**

Isotope	Pu-239	**Half-Life**	8807815	**days**
Type	Alpha			
Calibration Date	9/24/74	**Status**	WEST.	
DPM @ calibration date	31300	**Error**	313.00	
Decay Corrected DPM	31282.7121	**Error**	312.83	
Archive File	PU239AB			

	Efficiency	Error	Chi ^2	Events	CPM	X-Talk
Alpha	42.81%	0.37%	5.92	10	13392.7	5.41%
Beta	2.45%	0.09%	10.89		767.55	A into B
Gross	45.26%	0.38%	7.15		14160.25	

Unit Id: 1
Date Performed: 12/13/93 9:35:17
File Name: C:\LBXL\UNIT1\EFF1A0.XLD

Application Revision: 0
Application Version: Standard



Mean Alpha Efficiency: 42.81%
Actual standard deviation for Alpha Efficiency: 0.21%
Predicted standard deviation for Alpha Efficiency: 0.50%

Number of individual measurments: 10
Chi-square: 5.92
Reduced chi-square: 0.66

Unit Id: 1
Date Performed: 12/13/93
File Name: C:\LBXL\UNIT1\EFF1B0.XLD

Application Revision: 0
Application Version: Standard

LB5100/W Alpha-Beta Efficiency Data Entry and Output

Source Control Number: **T-993**

Isotope	Cs-137	**Half-Life**	11021.05	**days**
Type	Beta			
Calibration Date	9/15/92	**Status**	WEST.	
DPM @ calibration date	29900	**Error**	299.00	
Decay Corrected DPM	29057.5694	**Error**	290.58	
Archive File	CS137AB			

	Efficiency	Error	Chi ^2	Events	CPM	X-Talk
Alpha	0.27%	0.03%	19.74	10	78.05	B into A
Beta	49.61%	0.41%	2.59		14417.65	0.54%
Gross	49.88%	0.41%	2.62		14495.7	

Source Control Number: T-993

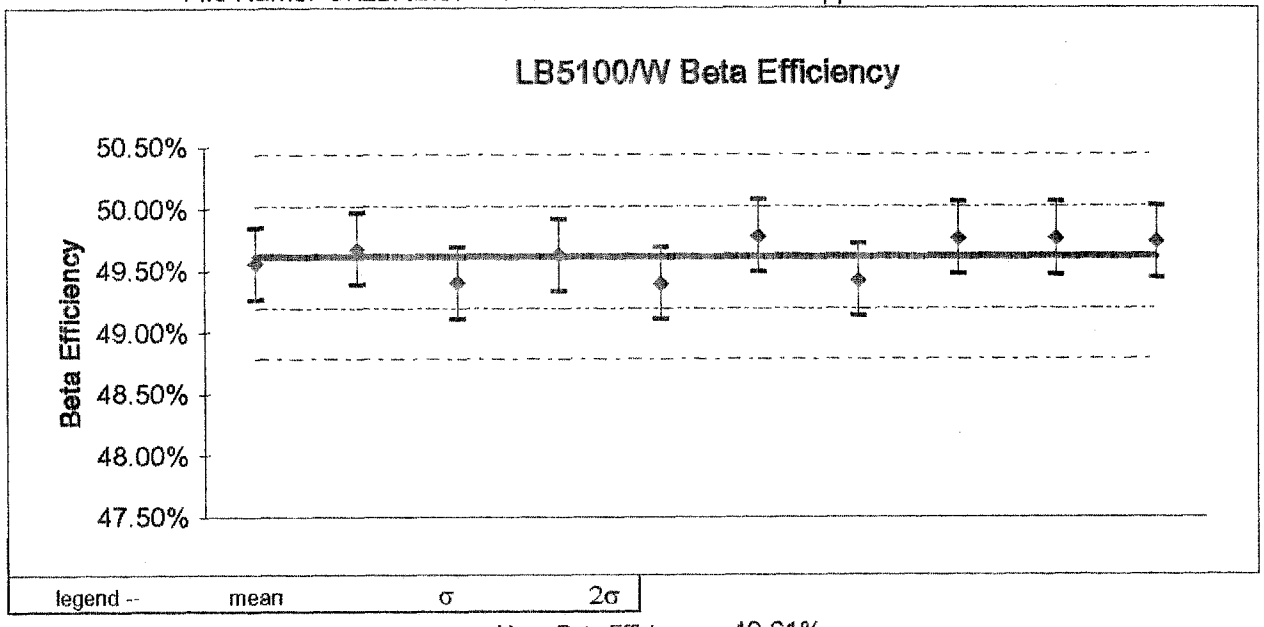
Unit Id: 1

Date Performed: 12/13/93 9:56:01

File Name: C:\LBXL\UNIT1\EFF1B0.XLD

Application Revision: 0

Application Version: Standard



Mean Beta Efficiency: 49.61%

Actual standard deviation for Beta Efficiency: 0.16%

Predicted standard deviation for Beta Efficiency: 0.59%

Number of individual measurments: 10

Chi-square: 2.59

Reduced chi-square: 0.29

IH & S Form #206
Forest Hills Site

Tennelec Calibration Summary

Tennelec #1	Calibration Date:	09/14/1993	Signature:	

High Voltage Bias Setting

1440

Detection Thresholds

Alpha / Beta Channel:	.252%	Guard Channel:	.132%

Alpha / Beta Channel setup

Alpha Lower Level:	38%	Beta Upper Level:	38%

Source Response Crosstalk

Alpha to Beta:	5.55%	Beta to Alpha:	.52%

Efficiency Summary

Source	Source S/N	Geometry	Simultaneous Efficiency	Correction Factor
Alpha	5308	Shallow Dish	42.71%	2.34
Beta	T-993	Shallow Dish	49.25%	2.03
Alpha		Deep Dish		
Beta		Deep Dish		

Background Means

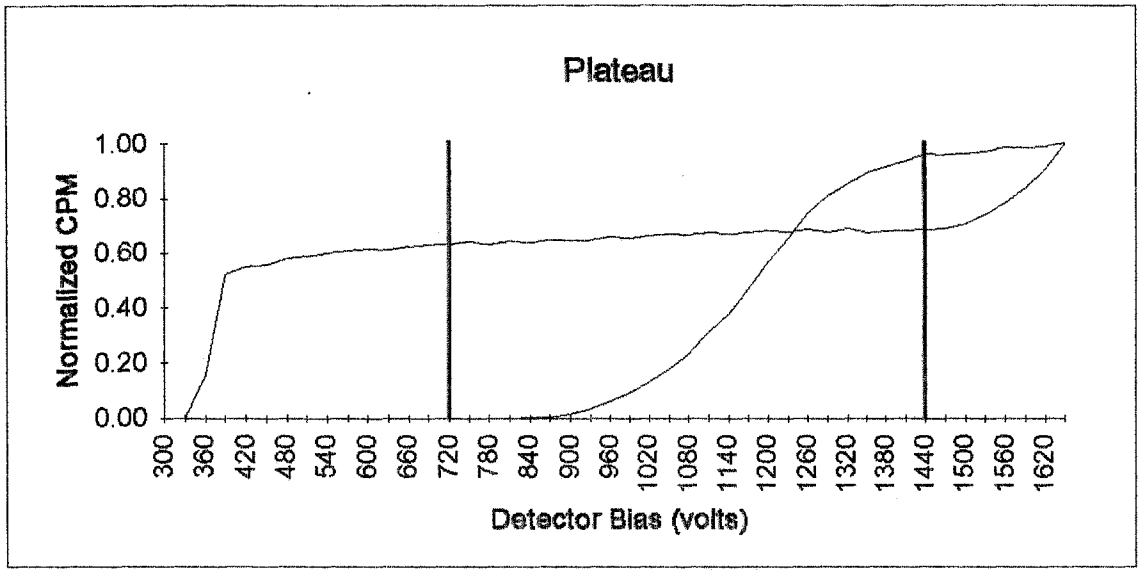
	Alpha	Beta
Mean Background CPM	.295	2.16
Standard Deviation CPM	.149	.339

Typical daily source check setup:

Use Group "G" for time delay with 1 planchet.
Use group "A" for Alpha source check. 2 minute count time with 1 planchet.
Use group "B" for Beta source check. 2 minute count time with 1 planchet.
Use group " I" for background check. 20 minute count time with 5 to 10 planchets.

Unit Id: 1
Date Performed: 9/14/93 0:35:51
FileName: C:\LBXL\UNIT1\PLA1A0.XLD

Application Revision: 1
Application Version: Standard

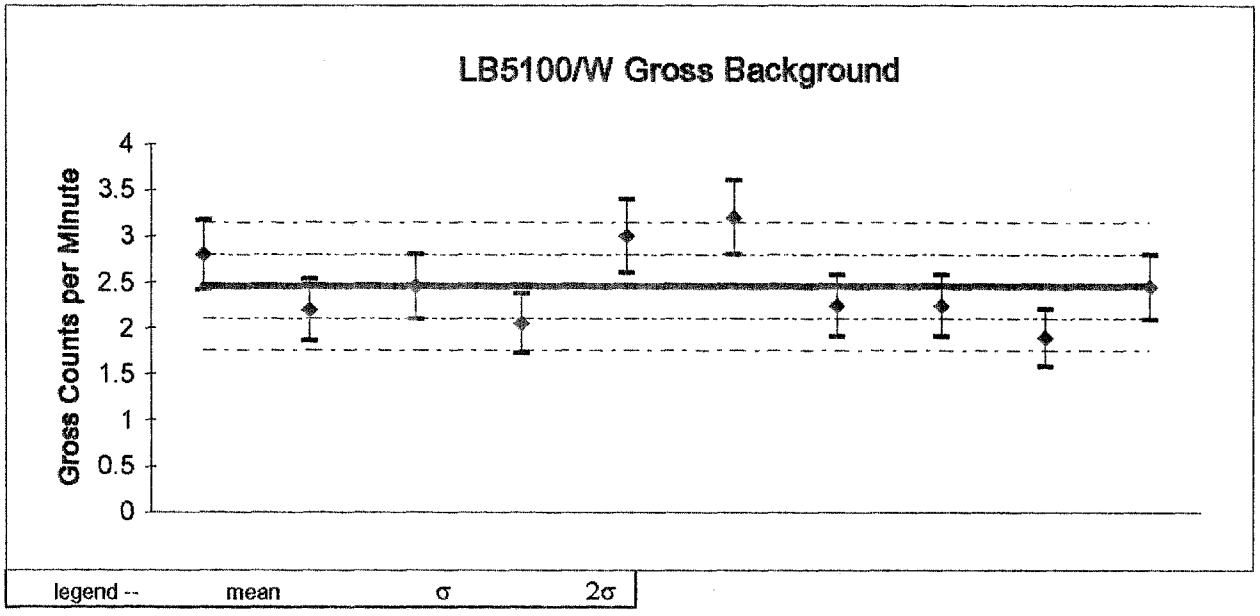


Optimum alpha & beta simultaneous operating voltage: **1440**
Beta slope per 100 volts at beta voltage: 3.92%
Expected alpha to beta crosstalk at simultaneous voltage: 5.60%
Expected beta to alpha crosstalk at simultaneous voltage: 0.60%

Optimum alpha only operating voltage: **720**
Alpha slope per 100 volts at alpha voltage: 1.18%

Unit Id: 1
Date Performed: 9/14/93 6:41:20
File Name: C:\LBXL\UNIT1\BAC1I0.XLD

Application Revision: 2
Application Version: Standard

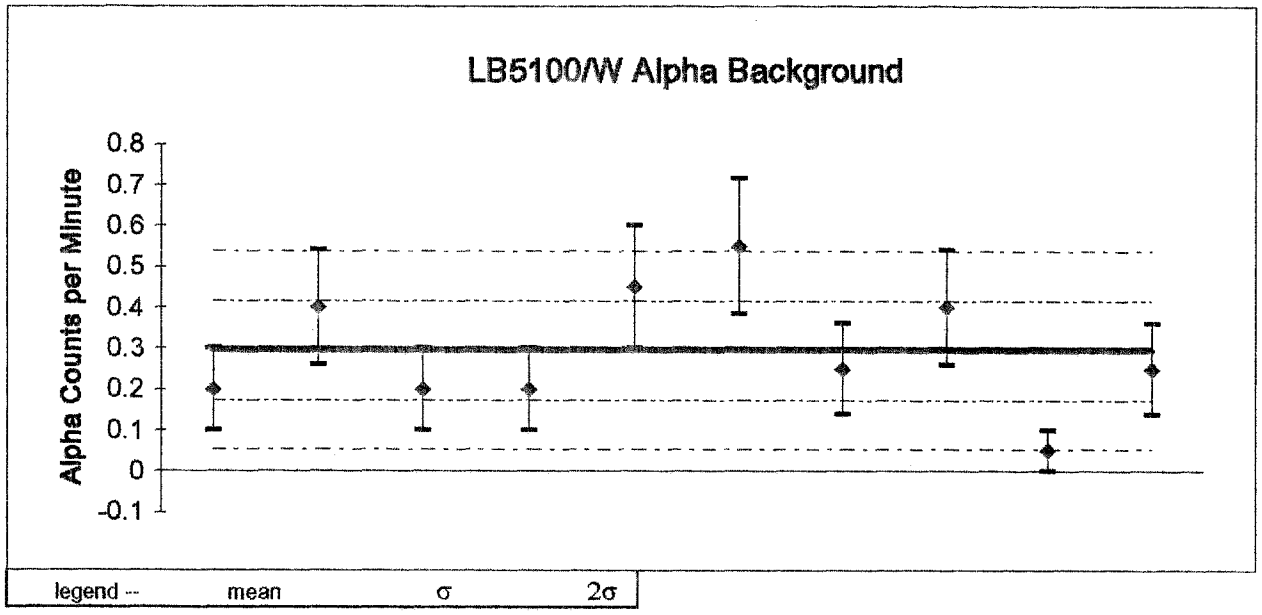


Mean gross background CPM: 2.455
Actual standard deviation for gross background CPM: 0.420615
Predicted standard deviation for gross background CPM: 0.351216

Number of individual measurments: 10
Chi-square: 12.97149
Reduced chi-square: 1.441276

Unit Id: 1
Date Performed: 9/14/93 6:41:20
File Name: C:\LBXL\UNIT1\BAC1I0.XLD

Application Revision: 2
Application Version: Standard

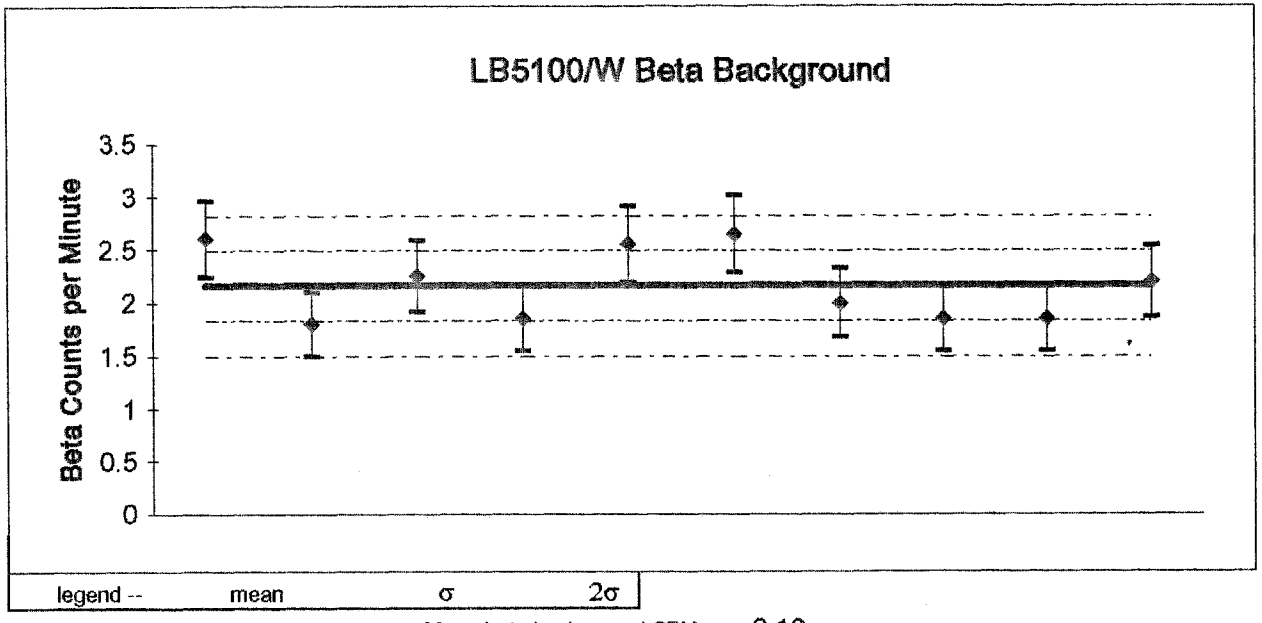


Mean alpha background CPM: 0.295
Actual standard deviation for alpha background CPM: 0.149907
Predicted standard deviation for alpha background CPM: 0.121485

Number of individual measurments: 10
Chi-square: 13.71186
Reduced chi-square: 1.52354

Unit Id: 1
Date Performed: 9/14/93 6:41:20
File Name: C:\LBXL\UNIT1\BAC1I0.XLD

Application Revision: 2
Application Version: Standard



Mean beta background CPM: 2.16
Actual standard deviation for beta background CPM: 0.339771
Predicted standard deviation for beta background CPM: 0.329343

Number of individual measurments: 10
Chi-square: 9.62037
Reduced chi-square: 1.06893

Unit Id: 1
Date Performed: 9/14/93
File Name: C:\LBXL\UNIT1\EFALPHA.XLD

Application Revision: 0
Application Version: Standard

LB5100/W Alpha-Beta Efficiency Data Entry and Output

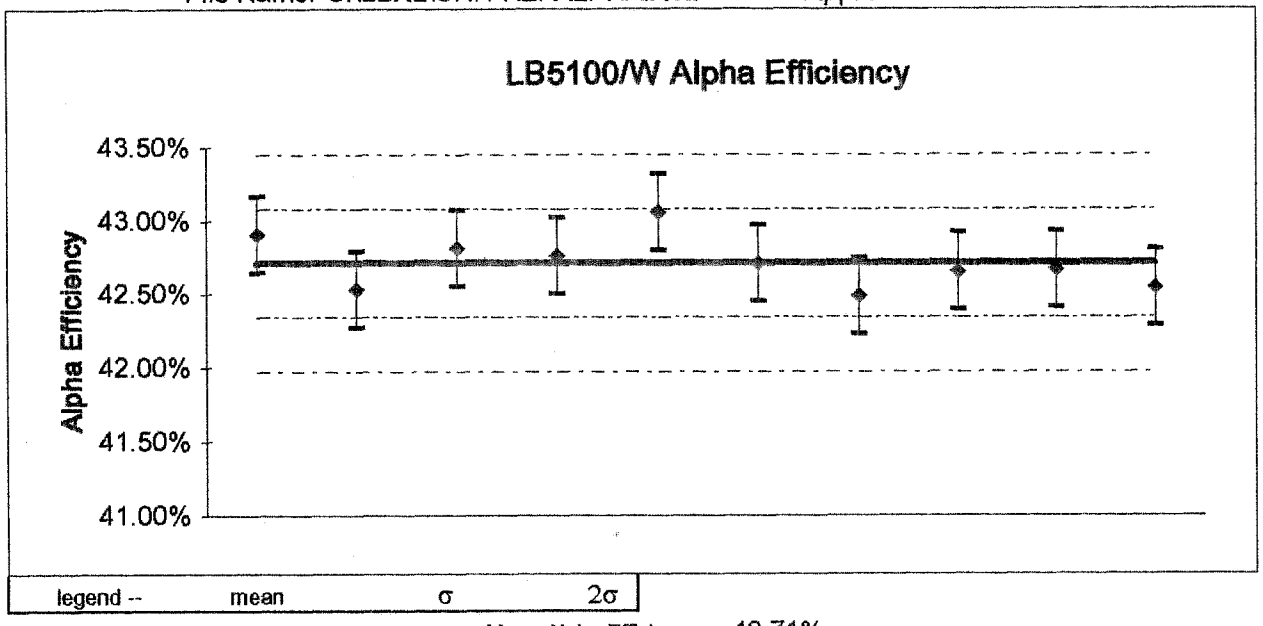
Source Control Number: **5308**

Isotope	Pu-239	**Half-Life**	8807815	**days**
Type	Alpha			
Calibration Date	9/24/74	**Status**	WEST.	
DPM @ calibration date	31300	**Error**	313.00	
Decay Corrected DPM	31282.9336	**Error**	312.83	
Archive File	PU239AB			

	Efficiency	Error	Chi ^2	Events	CPM	X-Talk
Alpha	42.71%	0.37%	4.21	10	13361.4	5.55%
Beta	2.51%	0.09%	15.75		786.55	A into B
Gross	45.22%	0.38%	6.38		14147.95	

Unit Id: 1
Date Performed: 9/14/93 9:47:31
File Name: C:\LBXL\UNIT1\EFALPHA.XLD

Application Revision: 0
Application Version: Standard



Mean Alpha Efficiency:	42.71%
Actual standard deviation for Alpha Efficiency:	0.18%
Predicted standard deviation for Alpha Efficiency:	0.50%
Number of individual measurments:	10
Chi-square:	4.21
Reduced chi-square:	0.47

Unit Id: 1
Date Performed: 9/14/93
File Name: C:\LBXL\UNIT1\EFBETA.XLD

Application Revision: 0
Application Version: Standard

LB5100/W Alpha-Beta Efficiency Data Entry and Output

Source Control Number: **T-993**

Isotope	Cs-137	**Half-Life**	11021.05	**days**
Type	Beta			
Calibration Date	9/15/92	**Status**	WEST.	
DPM @ calibration date	29900	**Error**	299.00	
Decay Corrected DPM	29222.497	**Error**	292.22	
Archive File	CS137AB			

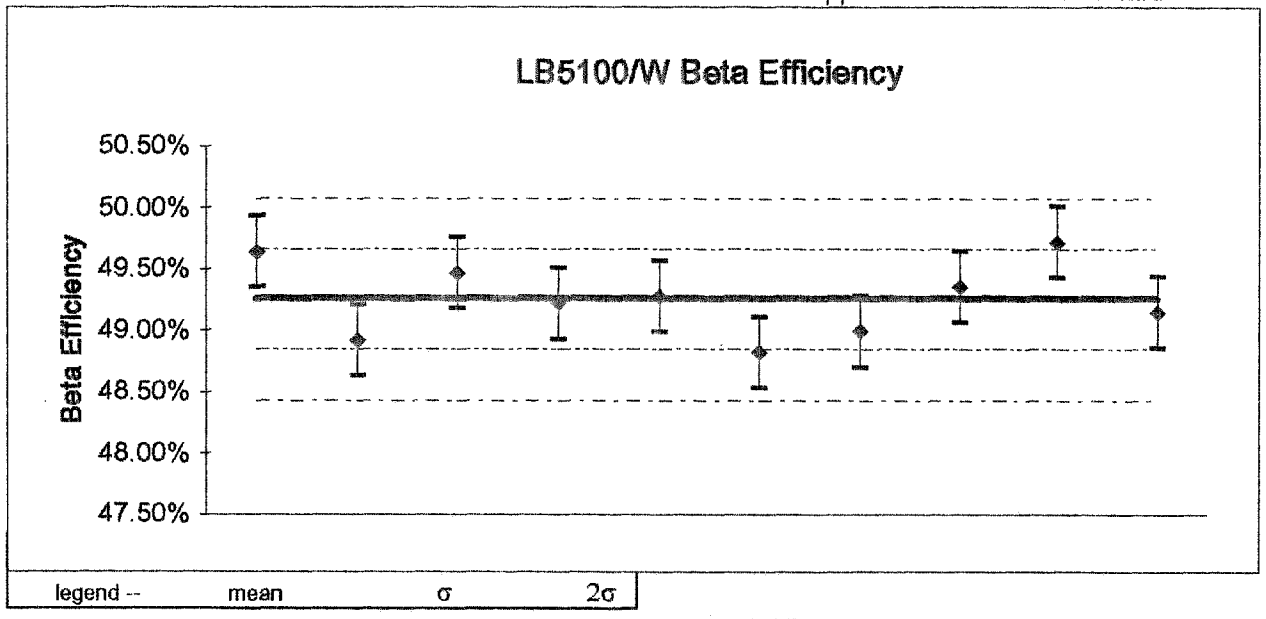
	Efficiency	Error	Chi ^2	Events	CPM	X-Talk
Alpha	0.26%	0.03%	14.34	10	75.6	B into A
Beta	49.25%	0.41%	9.50		14394.7	0.52%
Gross	49.51%	0.41%	8.84		14470.3	

Source Control Number: T-993

Unit Id: 1

Date Performed: 9/14/93 10:08:07 Application Revision: 0

File Name: C:\LBXL\UNIT1\EFBETA.XLD Application Version: Standard



Mean Beta Efficiency: 49.25%

Actual standard deviation for Beta Efficiency: 0.30%

Predicted standard deviation for Beta Efficiency: 0.58%

Number of individual measurments: 10

Chi-square: 9.50

Reduced chi-square: 1.06

IH & S FORM#206
FOREST HILL SITE

TENNELEC CALIBRATION SUMMARY
LB5100/W

TENNELEC # 1	CALIBRATION DATE: 6/14/93	SIGNATURE: L.S.

H.V. BIAS: 1440 THRESHHOLDS (ALPHA/BETA CHANNEL): .252%

GUARD CHANNEL: .132%	ALPHA/BETA CHANNEL SETUP: ALPHA LOWER LEVEL: 38% BETA UPPER LEVEL: 38%

SOURCE RESPONSE CROSSTALK	
ALPHA TO BETA: 5.68%	BETA TO ALPHA: 1.11%

EFFICIENCY SUMMARY

SOURCE	SOURCE S/N	GEOMETRY	SIMULTANEOUS EFF	CORR. FAC.
BETA	T-993	SHALLOW DISH	49.94%	2.0
ALPHA	5308	SHALLOW DISH	42.8%	2.34
BETA		DEEP DISH		
ALPHA		DEEP DISH		

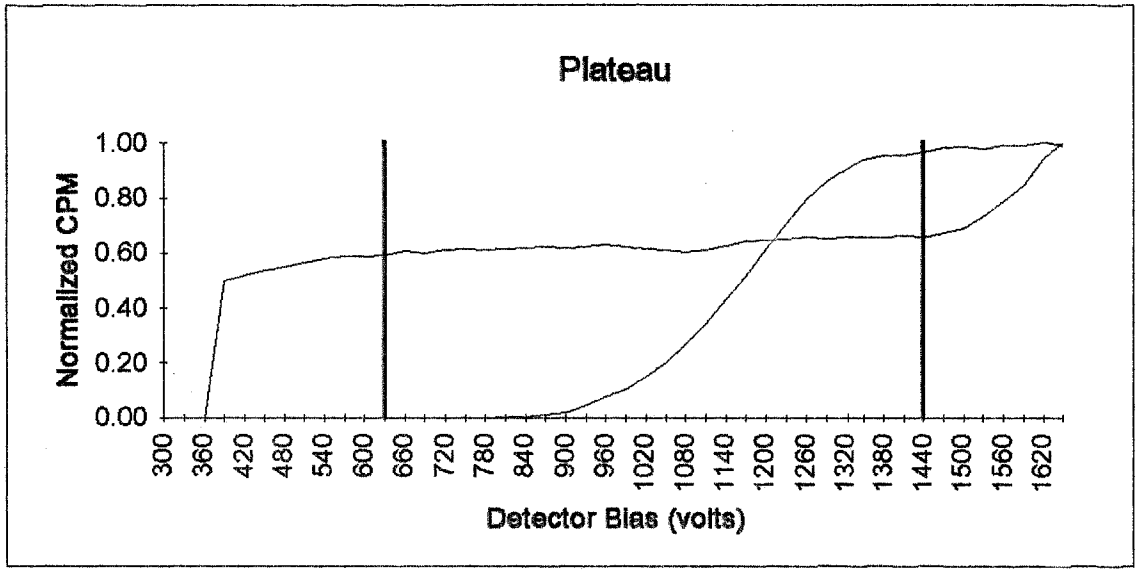
BACKGROUND MEANS

	ALPHA	BETA
MEAN BKG CPM	.15	1.66
STD. DIVIATION CPM	.10	.47

GROUP #	PREFERRED OR PREDETERMINED USE	FORMAT
A	ALPHA SOURCE CHECKS	2 Min ct.
B	BETA SOURCE CHECKS	2 Min ct.
C	OPEN	
D	OPEN	
E	OPEN	
F	OPEN	
G	GENERIC (Time delay)	
H	OPEN	
I	BACKGROUNDS	10 Min ct.

Unit Id: 1
Date Performed: 6/14/93 10:06:06
FileName: C:\LBXL\UNIT1\PLA1A0.XLD

Application Revision: 1
Application Version: Standard

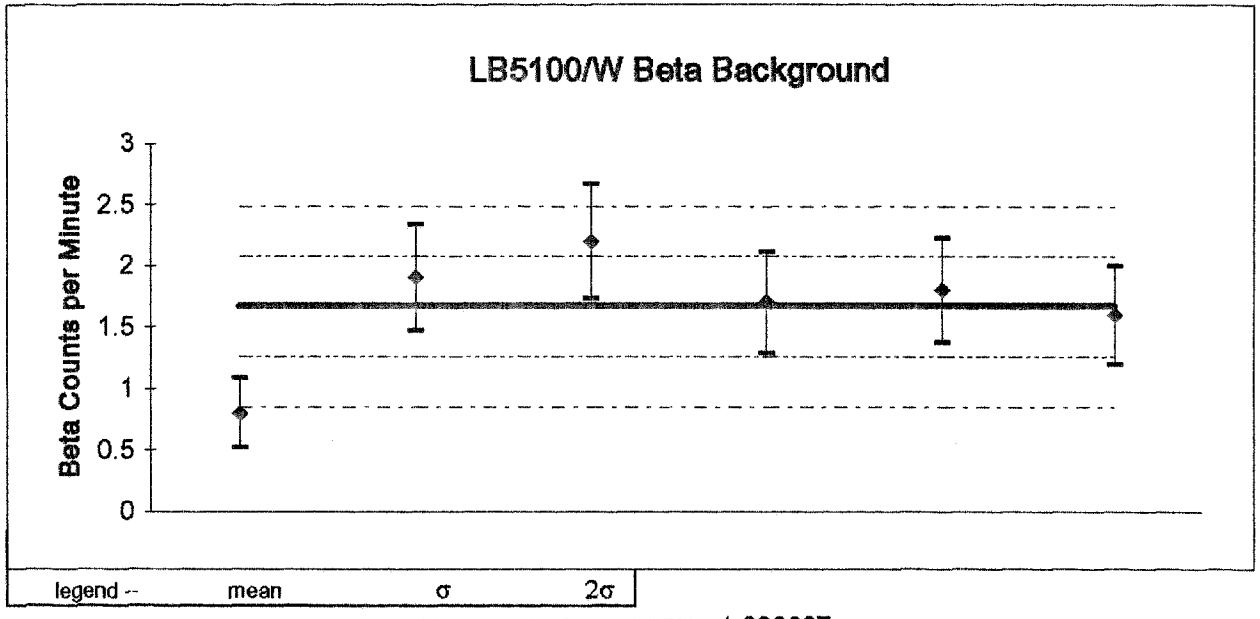


Optimum alpha & beta simultaneous operating voltage: **1440**
Beta slope per 100 volts at beta voltage: 3.13%
Expected alpha to beta crosstalk at simultaneous voltage: 5.54%
Expected beta to alpha crosstalk at simultaneous voltage: 1.21%

Optimum alpha only operating voltage: **630**
Alpha slope per 100 volts at alpha voltage: 2.45%

Unit Id: 1
Date Performed: 6/14/93 13:43:58
File Name: C:\LBXL\UNIT1\BAC1A0.XLD

Application Revision: 2
Application Version: Standard

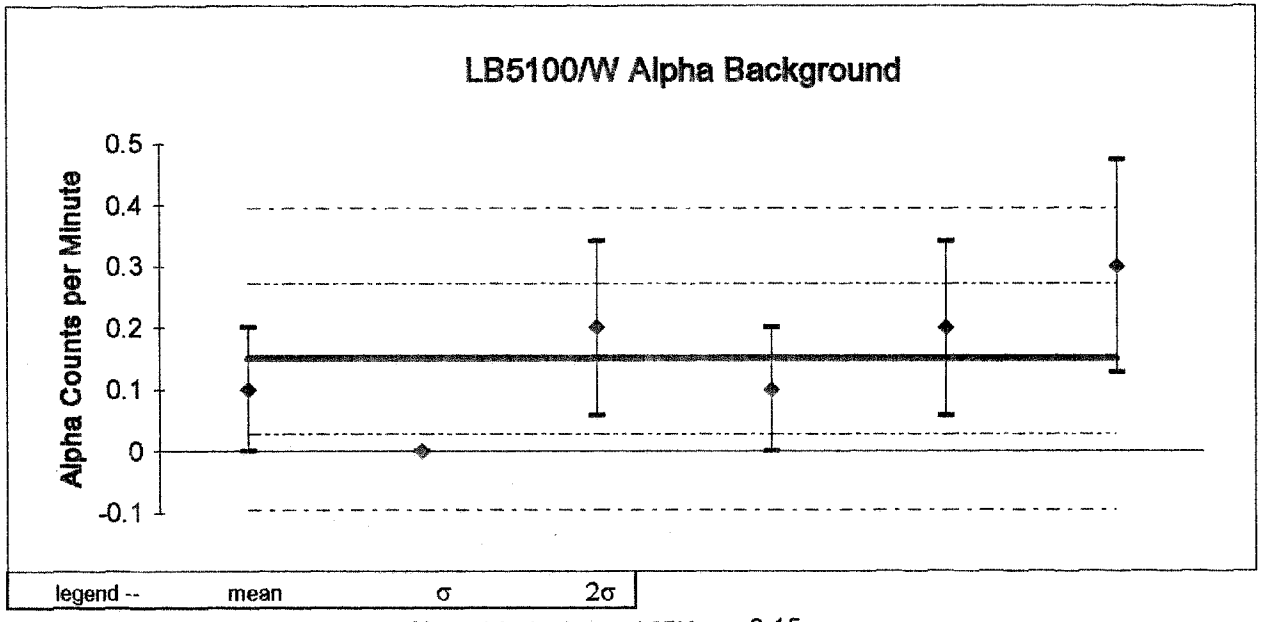


Mean beta background CPM: 1.666667
Actual standard deviation for beta background CPM: 0.471876
Predicted standard deviation for beta background CPM: 0.408588

Number of individual measurments: 6
Chi-square: 6.68
Reduced chi-square: 1.336

Unit Id: 1
Date Performed: 6/14/93 13:43:58
File Name: C:\LBXL\UNIT1\BAC1A0.XLD

Application Revision: 2
Application Version: Standard

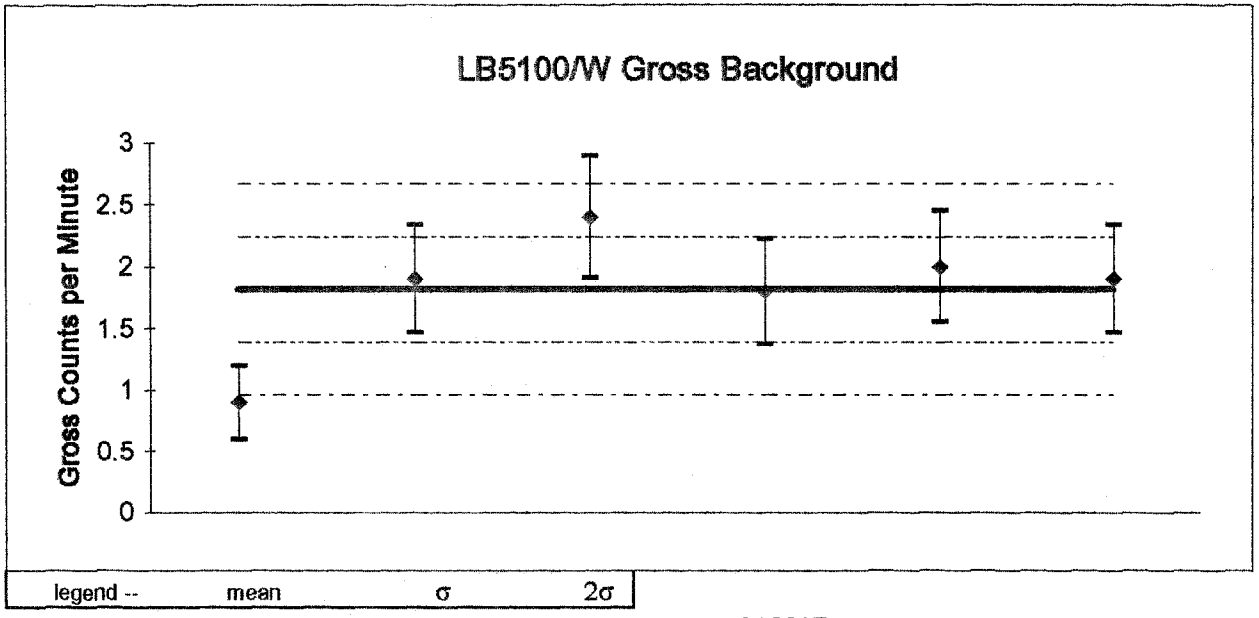


Mean alpha background CPM: 0.15
Actual standard deviation for alpha background CPM: 0.104881
Predicted standard deviation for alpha background CPM: 0.122484

Number of individual measurments: 6
Chi-square: 3.666667
Reduced chi-square: 0.733333

Unit Id: 1
Date Performed: 6/14/93 13:43:58
File Name: C:\LBXL\UNIT1\BAC1A0.XLD

Application Revision: 2
Application Version: Standard



Mean gross background CPM: 1.816667
Actual standard deviation for gross background CPM: 0.495648
Predicted standard deviation for gross background CPM: 0.426611

Number of individual measurments: 6
Chi-square: 6.761468
Reduced chi-square: 1.352294

Unit Id: 1
Date Performed: 6/14/93
File Name: C:\LBXL\UNIT1\ALPHA.XLD

Application Revision: 0
Application Version: Standard

LB5100/W Alpha-Beta Efficiency Data Entry and Output

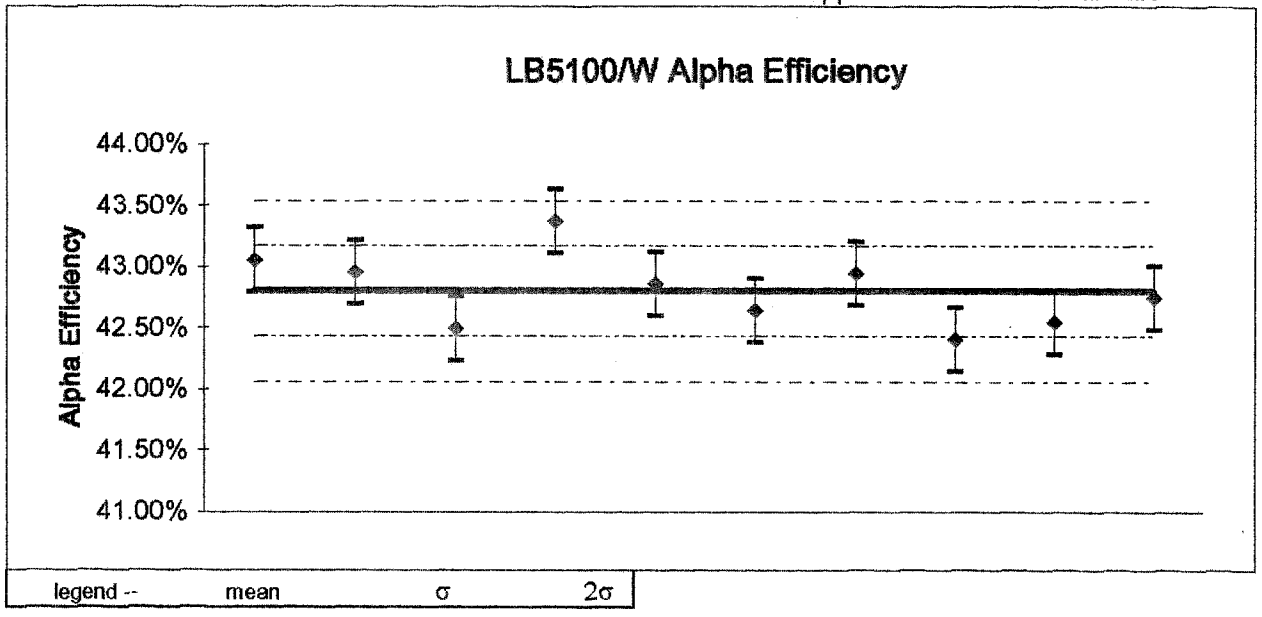
Source Control Number: **5308**

Isotope	Pu-239	**Half-Life**	8807815	**days**
Type	Alpha			
Calibration Date	9/24/74	**Status**	WEST.	
DPM @ calibration date	31300	**Error**	313.00	
Decay Corrected DPM	31283.1596	**Error**	312.83	
Archive File	PU239AB			

	Efficiency	Error	Chi ^2	Events	CPM	X-Talk
Alpha	42.80%	0.37%	11.43	10	13389.65	5.68%
Beta	2.58%	0.09%	3.54		808.15	A into B
Gross	45.38%	0.38%	11.29		14197.8	

Unit Id: 1
Date Performed: 6/14/93 14:38:15
File Name: C:\LBXL\UNIT1\ALPHA.XLD

Application Revision: 0
Application Version: Standard



Mean Alpha Efficiency:	42.80%
Actual standard deviation for Alpha Efficiency:	0.29%
Predicted standard deviation for Alpha Efficiency:	0.50%
Number of individual measurments:	10
Chi-square:	11.43
Reduced chi-square:	1.27

Unit Id: 1
Date Performed: 6/14/93
File Name: C:\LBXL\UNIT1\BETA.XLD

Application Revision: 0
Application Version: Standard

LB5100/W Alpha-Beta Efficiency Data Entry and Output

Source Control Number: **T-993**

Isotope	Cs-137	**Half-Life**	11021.05	**days**
Type	Beta			
Calibration Date	9/15/92	**Status**	WEST.	
DPM @ calibration date	29900	**Error**	299.00	
Decay Corrected DPM	29391.6998	**Error**	293.92	
Archive File	CS137AB			

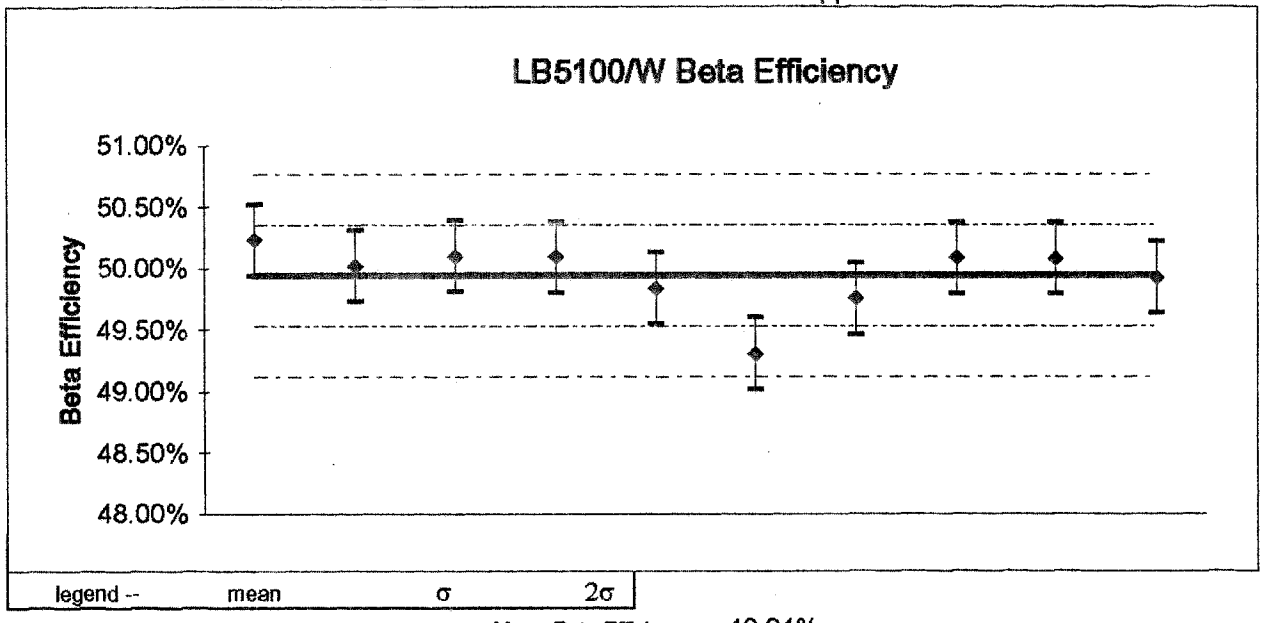
	Efficiency	Error	Chi ^2	Events	CPM	X-Talk
Alpha	0.56%	0.04%	2.66	10	164.4	B into A
Beta	49.94%	0.41%	7.35		14679.55	1.11%
Gross	50.50%	0.41%	7.69		14843.95	

Source Control Number: T-993

Unit Id: 1

Date Performed: 6/14/93 14:59:00 Application Revision: 0

File Name: C:\LBXL\UNIT1\BETA.XLD Application Version: Standard



Mean Beta Efficiency: 49.94%

Actual standard deviation for Beta Efficiency: 0.26%

Predicted standard deviation for Beta Efficiency: 0.59%

Number of individual measurments: 10

Chi-square: 7.35

Reduced chi-square: 0.82

CALIBRATION RECORDS

FOR INSTRUMENTS USED FOR

RADIOLOGICAL SURVEYS

JUNE 27, 2000

VOLUME 3 OF 7

WESTINGHOUSE ELECTRIC CORPORATION

BLAIRSVILLE, PA

CALIBRATION RECORDS

FOR INSTRUMENTS USED FOR

RADIOLOGICAL SURVEYS

TABLE OF CONTENTS

CALIBRATION RECORDS

FOR INSTRUMENTS USED FOR

RADIOLOGICAL SURVEYS

Purpose

The Westinghouse Blairsville Site utilized nuclear materials during the period of the mid to late 1950's to the early part of the 1960's. Work was performed both under licenses with the atomic Energy Commission and for the Bettis Atomic Power Laboratory. Although all work ceased during the 1960's, subsequent radiological surveys and investigations, starting in 1993, established that some residual radioactivity, primarily in underground piping and subsurface soil contamination, existed on the site. During the period of 1993 through the present, additional remediation work and radiological surveys have been conducted to establish that the site can be released for unrestricted use. This series of reports documents the results of the final status radiological surveys subsequent to the various remediation efforts.

Scope

This report compiles information on the calibration of the radiological survey instruments, which were used to measure the radiation levels presented in the other reports issued for this project. In each report, which documents a final radiological survey, the data sheets that record the measured radiation levels also provide specific information with respect to the specific instrument used to make the measurement. This report provides the necessary information to establish the entire calibration history of each specific instrument. These instruments have been used for the Westinghouse sites at Blairsville, Cheswick, and Forest Hills (now Viacom, Inc.). Therefore these calibration records are applicable to all these sites.

Discussion

All instruments used for radiological surveys on this project were calibrated on a frequency depending on the specific instrument. The calibration history for every instrument used on the project is summarized in appendix A, which cover the years 1993 through 1999. These summaries also provide a reference to a "Code Number." Included with this report in Appendix B are sheets labeled "Code Number 1" through "Code Number 70." Each of these "codes" incorporates the calibration records as appropriate for the specific instrument.

The certification sheets for each of the source standards used by the project to calibrate the instruments for conversion of CPM to DPM are included in Appendix C. Other calibrations were performed at other licensed operations as noted by the calibration records and no information on Source Certification is provided here.

CALIBRATION RECORDS

FOR INSTRUMENTS USED FOR

RADIOLOGICAL SURVEYS

List of Volume Contents

CODE NUMBER 4

REPORT #001

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	808	INSTRUMENT CODE:	4

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308 [ ] Tc-99 # 763/84 [ ] Pu 239 #7346 [ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5-14-98	ACTIVITY DPM	26,256

137Cs #T993

CHECK SOURCE CHI SQUARE DATA 1 (2 minute counts)	
5803	5881
5889	5893
5945	5926
5859	5810
5887	5850
TOTAL / 10: (average)	5874.3
Sq. Root of average: (Sigma)	76.6
3 Sigma:	229.8
Average + 3 Sigma:	
Average - 3 Sigma:	

EFFICIENCY DATA:	
~~2~~ MINUTE COUNT: 20	117895
GROSS CPM (Count/min)	5895
NET CPM (Gross count - Bgk.)	5867
EFFICIENCY (Net CPM/DPM)	22.4%
CORR. FACTOR (1 / Eff.)	4.46

BACKGROUND DATA:	
TOTAL COUNTS:	556
COUNT TIME: 20	Minutes
COUNTS PER MINUTE:	28

CALIBRATED BY VENDER: (Electronical calibration only)	General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	N/A

SOURCE EFFICIENCY AND CHI SQUARE BY:	NAME: John Shoemaker SIGNATURE: John M Shoe
CALIBRATION DATE:	5-17-98
CALIBRATION DUE:	8-17-98

IH & S Form # 203
Site: Blairsville

Manual Lab Counter

(Chi Square)

	COUNTER S/N:	808	INSTRUMENT CODE:	4	
SOURCE USED Isotope / Serial Number	Cs-137 / T-993		DATE OF SOURCE DECAY:	9-12-96	ACTIVITY DPM 27,280

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
12686	12740
12123	12777
12091	12577
12031	12774
12759	12316
TOTAL / 10: (average)	12487.4
Sq. Root of average: (Sigma)	111.75
3 Sigma:	335.24
Average + 3 Sigma:	12822.64
Average - 3 Sigma:	12152.16

10 min. background = 259

CALIBRATED BY VENDER: General Technical Services, Inc.	
CALIBRATION DATE:	~~N/A~~

TAB 3-11-97

CHECK SOURCE CHI SQUARE BY:	NAME: Todd Brautigam SIGNATURE: Todd A. Brautigam
DATE PERFORMED:	3-12-97

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-97-03-209

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model BC-4 Serial Number 808
External Probe(s) _____ Serial # _____

Calibration Method ^{99}Pulser s/n 101500
^{99}Tc s/n S1256

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	2,002 CPM	2,002 CPM	All Calibrations Btn. + & - 10%
2		80K	8,001	8,001	
3					High Voltage = 904 Volts
4	1 MIN	20K	19,999	19,999	
5		80K	79,996	79,996	Response Check to ^{99}Tc
6					
7	10 MIN	20K	200,195	200,195	Electronic Calibration only
8		80K	799,942	799,942	
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: _____ (Signed)
Calibration Date: 03-11-97
Next Calibration Due: 06-11-97

I certify that the above information is correct:
_____ Administrative Coordinator
03-11-97 Date

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	808	INSTRUMENT CODE:	4

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [X] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [ ] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5/6/96	ACTIVITY DPM	18699

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
6161	5932
6068	6190
6032	5982
6104	6073
6014	6073
TOTAL / 10: (average)	6063
Sq. Root of average: (Sigma)	77.86
3 Sigma:	233.6
Average + 3 Sigma:	6296.6
Average - 3 Sigma:	5829.4

EFFICIENCY DATA:	
2 MINUTE COUNT:	6059
GROSS CPM (Count/min)	3029.5
NET CPM (Gross count - Bgk.)	3003.1
EFFICIENCY (Net CPM/DPM)	16.1%
CORR. FACTOR (1 / Eff.)	6.2

BACKGROUND DATA:	
TOTAL COUNTS:	527
COUNT TIME:	20 Minutes
COUNTS PER MINUTE:	26.35

CALIBRATED BY VENDER: (Electronical calibration only)	General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	1-22-96

SOURCE EFFICIENCY AND CHI SQUARE BY:	NAME: CARMEN VERGARI SIGNATURE: Carmen Vergari
CALIBRATION DATE:	1-21-97
CALIBRATION DUE:	4-21-97

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square) ADDENDUM FOR SOURCE RESPONSE

COUNTER S/N:	808	INSTRUMENT CODE:	4

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[ ] Tc-99 # 763/84 [ ] Pu 239 #7346	[X] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5/1/96	ACTIVITY DPM	145994

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
46035	45696
46136	45553
45760	45867
45870	45741
45782	45790
TOTAL / 10: (average)	45823
Sq. Root of average: (Sigma)	214
3 Sigma:	642
Average + 3 Sigma:	46465
Average - 3 Sigma:	45181

EFFICIENCY DATA:	
2 MINUTE COUNT:	NA
GROSS CPM (Count/min)	NA
NET CPM (Gross count - Bgk.)	NA
EFFICIENCY (Net CPM/DPM)	NA
CORR. FACTOR (1 / Eff.)	NA

BACKGROUND DATA:	
TOTAL COUNTS:	516
COUNT TIME:	20 Minutes
COUNTS PER MINUTE:	25.8

CALIBRATED BY VENDER: (Electronical calibration only)	General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	7-22-96

SOURCE EFFICIENCY AND CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
CALIBRATION DATE:	10-21-96
CALIBRATION DUE:	1-21-97

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	808	INSTRUMENT CODE:	4

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[X] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5/6/96	ACTIVITY DPM	18699

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
6091	6099
6204	6093
5977	6067
6193	6169
5930	6237
TOTAL / 10: (average)	6186
Sq. Root of average: (Sigma)	78
3 Sigma:	234
Average + 3 Sigma:	6346
Average - 3 Sigma:	5872

EFFICIENCY DATA:	
2 MINUTE COUNT:	6240
GROSS CPM (Count/min)	3120
NET CPM (Gross count - Bgk.)	3094
EFFICIENCY (Net CPM/DPM)	16.5%
CORR. FACTOR (1 / Eff.)	6.06

BACKGROUND DATA:	
TOTAL COUNTS:	526
COUNT TIME:	20 Minutes
COUNTS PER MINUTE:	26.3

CALIBRATED BY VENDER: (Electronical calibration only)	General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	7/22/96

SOURCE EFFICIENCY AND CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
CALIBRATION DATE:	10/21/96
CALIBRATION DUE:	1/21/97

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	808	INSTRUMENT CODE:	4

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[X] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5/6/96	ACTIVITY DPM	18699

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
5970	6032
6253	6062
5994	6136
6176	6151
6018	6070
TOTAL / 10: (average)	6086
Sq. Root of average: (Sigma)	78
3 Sigma:	234
Average + 3 Sigma:	6320
Average - 3 Sigma:	5852

EFFICIENCY DATA:	
2 MINUTE COUNT:	6035
GROSS CPM (Count/min)	3017
NET CPM (Gross count - Bgk.)	2992
EFFICIENCY (Net CPM/DPM)	16%
CORR. FACTOR (1 / Eff.)	6.25

BACKGROUND DATA:	
TOTAL COUNTS:	499
COUNT TIME:	20 Minutes
COUNTS PER MINUTE:	24.95

CALIBRATED BY VENDER: (Electronical calibration only)	General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	7-22-96

SOURCE EFFICIENCY AND CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
CALIBRATION DATE:	7-25-96
CALIBRATION DUE:	10-25-96

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-96-07-209

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model BC-4 Serial Number 808
External Probe(s) _____ Serial # _____

Calibration Method Pulser s/n 120935

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	2,001 CPM	2,001 CPM	All Calibrations Btn. + & - 10%
2		80K	8,009	8,009	
3					High Voltage = 908 Volts
4	1 MIN	20K	20,025	20,025	
5		80K	80,131	80,131	Response Check to ^{99}Tc
6					
7	10 MIN	20K	200,296	200,296	Electronic Calibration only
8		80K	801,627	801,627	per customer request
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: (Signed)
Calibration Date: 07-22-96
Next Calibration Due: 10-22-96

I certify that the above information is correct:
Administrative Coordinator — Date: 07-22-96

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-96-03-210

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model BC-4 Serial Number 808
External Probe(s) _____ Serial # _____

Calibration Method ^{99}Pulser s/n 120935
^{99}Tc s/n S1256

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	2,001 CPM	2,001 CPM	All Calibrations Btn. + & - 10%
2		80K	8,019	8,019	
3					High Voltage = 904 Volts
4	1 MIN	20K	20,047	20,047	
5		80K	80,410	80,410	^{99}Tc Efficiency = 8.0%
6					
7	10 MIN	20K	200,542	200,542	see attached sheet for additional
8		80K	804,005	804,005	information
9					
10					
11					
12					
13					
14					
15					
16					
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18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: (Signed)
Calibration Date: 03-08-96
Next Calibration Due: 06-08-96

I certify that the above information is correct:
Administrative Coordinator — Date: 03-08-96

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

ELECTRONIC CALIBRATION

Electronic Calibration

1. Test Instrument: SEE
2. Pulse Rate: Cal
3. Amplitude: Cert.
4. Time Period: ↳
5. Time Base:
6. Counting Time:
7. High Voltage:
8. Counts:

Background Determination

9. Instrument Model: BC-4
10. Serial Number: 808
11. Location: PGH, PA
12. Date: 3-8-96
13. Time: 1445
14. Test By: RBM
15. Time Period: X10
16. Time Base: 1
17. Counting Time: 10MIN
18. Purge Time: N/A
19. Type of Radiation: [ ] Alpha [X] Beta
20. Background: 26.6 @ 904 V

Efficiency Determination

21. Source & S/N: Tc99 S-1256
22. Source DPM: 14260
23. Time Base: 1
24. Time Period: X1
25. Counting Time: 1MIN
26. Average Count Rate $\left(\frac{\text{sum total A}}{10}\right)$ = 1172.9 CPM
27. 2 σ $(2\sqrt{\text{average count rate}})$ = 68.5
28. Chi Square Number $\left(\frac{\text{sum total C}}{\text{line 26}}\right)$ = 10.8
29. Chi Square Fit (2-22) = [X] Yes

    If "NO" Contact Foreman [ ] No
30. Net Count Rate (line 26-line 20) 1146.3
31. Efficiency:

    $\frac{\text{Net CPM (line 30)}}{\text{Source DPM (line 22)}}$ X 100= 8.0%

Trial #	CPM (A)	Difference from Ave. Count (B)	Difference Squared (C)
1	1205	32.1	1030.4
2	1175	2.1	4.4
3	1209	36.1	1303.2
4	1203	30.1	906.0
5	1202	29.1	846.8
6	1143	29.9	894.0
7	1206	33.1	1095.6
8	1150	22.9	524.4
9	1117	55.9	3124.8
10	1119	53.9	2905.2

TOTALS:
A 11729
B n/a
C 12634.8

IH & S Form #B- 203
Blairsville Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	808	INSTRUMENT CODE:	4

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[X] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	11/17/95	ACTIVITY DPM	18699

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
6075	6057
6111	6035
6017	5937
6029	5936
5826	6058
TOTAL / 10: (average)	6007
Sq. Root of average: (Sigma)	77.5
3 Sigma:	233
Average + 3 Sigma:	6240
Average - 3 Sigma:	5774

CALIBRATED BY VENDER: General Technical Services, Inc.	
CALIBRATION DATE:	3-8-96

CHECK SOURCE CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
DATE PERFORMED:	3-18-96

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15221

Customer P.O.# MB-14027-S
Work Order # I-95-11-210

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model BC-4 Serial Number 808
External Probe(s) _____ Serial # _____

Calibration Method ^{99}Pulser s/n 298 & 120935
^{99}Tc s/n S1256

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	1,995 CPM	1,995 CPM	All Calibrations Btn. + & - 10%
2		80K	7,993	7,993	
3					High Voltage = 895 Volts
4	1 MIN	20K	19,996	19,996	
5		80K	79,969	79,969	^{99}Tc Efficiency = 8.2%
6					
7	10 MIN	20K	199,955	199,955	See attached sheet for additional
8		80K	799,859	799,859	information
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: _____ (Signed)
Calibration Date: 12-05-95
Next Calibration Due: 03-05-96

I certify that the above information is correct:
_____ Administrative Coordinator
12-05-95 Date

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

ELECTRONIC CALIBRATION

Electronic Calibration

1. Test Instrument: SEE
2. Pulse Rate: CAL
3. Amplitude: CERT.
4. Time Period: ↳
5. Time Base: ↓
6. Counting Time:
7. High Voltage:
8. Counts:

Background Determination

9. Instrument Model: BC-4
10. Serial Number: 8080
11. Location: ~~Volta~~
12. Date: 12-5-95
13. Time: 1300
14. Test By: RRM
15. Time Period: X10
16. Time Base: 1
17. Counting Time: 10MIN
18. Purge Time: N/A
19. Type of Radiation: [ ] Alpha [X] Beta
20. Background: 27.8 @ _____ V

Efficiency Determination

21. Source & S/N: Tc^{99} S1256
22. Source DPM: 14260
23. Time Base: 1
24. Time Period: X1
25. Counting Time: 1MIN
26. Average Count Rate $\left(\frac{\text{sum total A}}{10}\right)$ = 1184.2 CPM
27. 2 σ $\left(2\sqrt{\text{average count rate}}\right)$ = 69.1
28. Chi Square Number $\left(\frac{\text{sum total C}}{\text{line 26}}\right)$ = 8.1
29. Chi Square Fit (2-22) = [X] Yes

If "NO" Contact Foreman [ ] No

30. Net Count Rate (line 26-line 20) 1164.6
31. Efficiency:

$\frac{\text{Net CPM (line 30)}}{\text{Source DPM (line 22)}} \times 100 =$ 8.2%

Trial #	CPM (A)	Difference from Ave. Count (B)	Difference Squared (C)
1	1215	30.8	948.6
2	1213	28.8	829.4
3	1128	56.2	3158.4
4	1209	24.8	615.0
5	1155	29.2	852.6
6	1164	20.2	408.0
7	1229	44.8	2007.0
8	1157	27.2	739.8
9	1176	8.2	67.2
10	1196	3.6	13.0

TOTALS
A 11842
B n/a
C 9639

IH & S Form #B- 203
Blairsville Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	808	INSTRUMENT CODE:	4

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [X] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [ ] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	12-7-94	ACTIVITY DPM	18699

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
6136	5930
6052	5914
5939	5911
5969	5979
6036	6095
TOTAL / 10: (average)	5995
Sq. Root of average: (Sigma)	77.4
3 Sigma:	232
Average + 3 Sigma:	6227
Average - 3 Sigma:	5763

CALIBRATED BY VENDER: General Technical Services, Inc.	
CALIBRATION DATE:	12-5-95

CHECK SOURCE CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
DATE PERFORMED:	12-7-95

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-95-08-211

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model BC-4 Serial Number 808
External Probe(s) _____ Serial # _____

Calibration Method ^{99}Pulser s/n 101500
^{99}Tc s/n S1256

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	1,999 CPM	1,999 CPM	All Calibrations Btn. + & - 10%
2		80K	8,003	8,003	
3					
4	1 MIN	20K	19,991	19,991	High Voltage = 905 Volts
5		80K	80,063	80,063	
6					^{99}Tc Efficiency = 8.0
7	10 MIN	20K	199,921	199,921	
8		80K	800,665	800,665	See attached sheet for additional
9					information
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: _____ (Signed)
Calibration Date: 08-24-95
Next Calibration Due: 11-24-95

I certify that the above information is correct:
_____ Administrative Coordinator
08-24-95 Date

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

ELECTRONIC CALIBRATION

Electronic Calibration

1. Test Instrument: SEE
2. Pulse Rate: CAL
3. Amplitude: CERT.
4. Time Period: ↳
5. Time Base: ↓
6. Counting Time:
7. High Voltage:
8. Counts:

Background Determination

9. Instrument Model: BC-4
10. Serial Number: 8098
11. Location: Pgh, PA
12. Date: 8-24-85
13. Time: 1300
14. Test By: RRM
15. Time Period: x10
16. Time Base: 1
17. Counting Time: 10 MIN
18. Purge Time: N/A
19. Type of Radiation: [ ] Alpha [X] Beta
20. Background: 23.9 @ 905 V

Efficiency Determination

21. Source & S/N: Tc99 S-1256
22. Source DPM: 14260
23. Time Base: 1
24. Time Period: x1
25. Counting Time: 1 MIN

Trial #	CPM (A)	Difference from Ave. Count (B)	Difference Squared (C)
1	1188	28.4	806.6
2	1190	30.4	924.2
3	1226	66.4	4409.0
4	1096	63.6	4045.0
5	1137	22.6	510.8
6	1122	37.6	1413.8
7	1160	0.4	0.2
8	1093	66.6	4435.6
9	1218	58.4	3410.6
10	1166	6.4	41.0

TOTALS:
A 11596
B n/a
C 19996.8

26. Average Count Rate $\left(\frac{\text{sum total A}}{10}\right)$ = 1159.6 CPM
27. 2 σ ($2\sqrt{\text{average count rate}}$) = 68.1
28. Chi Square Number $\left(\frac{\text{sum total C}}{\text{line 26}}\right)$ = 17.2
29. Chi Square Fit (2-22) = [X] Yes

If "NO" Contact Foreman [ ] No

30. Net Count Rate (line 26-line 20) 1135.7
31. Efficiency:

$\frac{\text{Net CPM (line 30)}}{\text{Source DPM (line 22)}}$ X 100= 8.0%

IH & S Form #B- 203
Blairsville Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	868	INSTRUMENT CODE:	4

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[X] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	12-7-94	ACTIVITY DPM	18699

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
5904	6075
5960	6066
6104	6163
6048	5901
5951	6022
TOTAL / 10: (average)	6019
Sq. Root of average: (Sigma)	78
3 Sigma:	234
Average + 3 Sigma:	6331
Average - 3 Sigma:	5785

CALIBRATED BY VENDER: General Technical Services, Inc.	
CALIBRATION DATE:	8/24/95

CHECK SOURCE CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: [signature]
DATE PERFORMED:	8-26-95

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-95-05-220

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model BC-4 Serial Number 808
External Probe(s) _____ Serial # _____

Calibration Method ^{99}Pusler s/n 101500
^{99}Tc s/n S-1256

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	1,999 CPM	1,999 CPM	All Calibrations Btn. + & - 10%
2		80K	8,028	8,028	
3					High Voltage = 907 Volts
4	1 MIN	20K	20,004	20,004	
5		80K	80,364	80,364	^{99}Tc Efficiency = 8.1%
6					
7					See attached sheet for additional
8	10 MIN	20K	200,007	200,007	information
9		80K	802,986	802,986	
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: _____ (Signed)
Calibration Date: 05-16-95
Next Calibration Due: 08-16-95

I certify that the above information is correct:
Theresa M. DeBas 05-16-95
Administrative Coordinator Date

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

ELECTRONIC CALIBRATION

Electronic Calibration

1. Test Instrument: SEE
2. Pulse Rate: CAL
3. Amplitude: CERT.
4. Time Period: L
5. Time Base: 7
6. Counting Time:
7. High Voltage:
8. Counts:

Background Determination

9. Instrument Model: BC-4
10. Serial Number: 808
11. Location: PGH, PA
12. Date: 5-16-95
13. Time: 1020
14. Test By: RBM
15. Time Period: X10
16. Time Base: 1
17. Counting Time: 10 MIN
18. Purge Time: N/A
19. Type of Radiation: [ ] Alpha [X] Beta
20. Background: 31.0 @ 907 V

Efficiency Determination

21. Source & S/N: Tc^{99} S-1256
22. Source DPM: 14260
23. Time Base: 1
24. Time Period: X1
25. Counting Time: 1 MIN

Trial #	CPM (A)	Difference from Ave. Count (B)	Difference Squared (C)
1	1167	19.8	392.0
2	1217	30.2	912.0
3	1188	1.2	1.4
4	1211	24.2	585.6
5	1203	16.2	262.4
6	1174	12.8	163.8
7	1159	27.8	772.8
8	1101	85.8	7361.8
9	1216	29.2	852.6
10	1232	45.2	2043.0

26. Average Count Rate $\left(\frac{\text{sum total A}}{10}\right)$ = 1186.8 CPM
27. 2σ ($2\sqrt{\text{average count rate}}$) = 68.9
28. Chi Square Number $\left(\frac{\text{sum total C}}{\text{line 26}}\right)$ = 1.2
29. Chi Square Fit (2-22) = [X] Yes

If "NO" Contact Foreman [ ] No

30. Net Count Rate (line 26-line 20) 1155.8
31. Efficiency:

$\frac{\text{Net CPM (line 30)}}{\text{Source DPM (line 22)}}$ X 100= 8.1%

TOTALS
A 1186.8
B n/a
C 13347.

IH & S Form #B- 203
Blairsville Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	808	INSTRUMENT CODE:	4

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[X] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	12-7-94	ACTIVITY DPM	18699

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
6141	6223
6198	6001
6025	6199
6060	6063
6029	6082
TOTAL / 10: (average)	6095
Sq. Root of average: (Sigma)	78
3 Sigma:	234
Average + 3 Sigma:	6329
Average - 3 Sigma:	5861

CALIBRATED BY VENDER: General Technical Services, Inc.	
CALIBRATION DATE:	5-16-95

CHECK SOURCE CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
DATE PERFORMED:	5-18-95

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-94-12-219

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model BC-4 Serial Number 808
External Probe(s) _____ Serial # _____

Calibration Method ^{99}Pulser s/n 101500
^{99}Tc s/n S1256

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	1,993 CPM	1,993 CPM	All Calibrations Btn. + & - 10%
2		80K	7,994	7,994	
3					
4	1 MIN	20K	19,954	19,954	High Voltage = 908 Volts
5		80K	79,949	79,949	
6					^{99}Tc Efficiency = 8.1%
7	10 MIN	20K	199,447	199,447	
8		80K	799,748	799,748	See attached sheet for more information
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: _____ (Signed)
Calibration Date: 12-09-94
Next Calibration Due: 03-09-95

I certify that the above information is correct:
Theresa M. Cebus — 12-09-94
Administrative Coordinator — Date

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

ELECTRONIC CALIBRATION

Electronic Calibration

1. Test Instrument: SEE
2. Pulse Rate: CAL
3. Amplitude: CERT.
4. Time Period: ↳
5. Time Base:
6. Counting Time:
7. High Voltage:
8. Counts:

Background Determination

9. Instrument Model: BC-4
10. Serial Number: 808
11. Location: PGH, PA
12. Date: 12-8-94
13. Time: 1145
14. Test By: RRM
15. Time Period: 1
16. Time Base: X10
17. Counting Time: 10 MIN
18. Purge Time: N/A
19. Type of Radiation: [ ] Alpha [X] Beta
20. Background: 26.4 @ 908 V

Efficiency Determination

21. Source & S/N: Tc^{99} S-1256
22. Source DPM: 14260
23. Time Base: X1
24. Time Period: 1
25. Counting Time: 1 MIN
26. Average Count Rate $\left(\frac{\text{sum total A}}{10}\right)$ = 1187 CPM
27. 2 σ $\left(2\sqrt{\text{average count rate}}\right)$ = 68.9
28. Chi Square Number $\left(\frac{\text{sum total C}}{\text{line 26}}\right)$ = 11.1
29. Chi Square Fit (2-22) = [X] Yes

If "NO" Contact Foreman [ ] No

30. Net Count Rate (line 26-line 20) 1160.6
31. Efficiency:

$\frac{\text{Net CPM (line 30)}}{\text{Source DPM (line 22)}}$ X 100= 8.1%

Trial #	CPM (A)	Difference from Ave. Count (B)	Difference Squared (C)
1	1128	59	3481
2	1173	14	196
3	1204	17	289
4	1162	25	625
5	1271	84	7056
6	1179	8	64
7	1170	17	289
8	1189	2	4
9	1175	12	144
10	1219	32	1024

TOTALS
A 11870
B n/a
C 1317

IH & S Form #B- 203
Blairsville Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	808	INSTRUMENT CODE:	4

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [X] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [ ] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	9/30/94	ACTIVITY DPM	18699

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
5923	5998
6057	6112
5984	6145
6089	6174
6165	6057
TOTAL / 10: (average)	6100
Sq. Root of average: (Sigma)	78
3 Sigma:	234
Average + 3 Sigma:	6334
Average - 3 Sigma:	5860

CALIBRATED BY VENDER: General Technical Services, Inc.	
CALIBRATION DATE:	12-9-94

CHECK SOURCE CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
DATE PERFORMED:	12-14-94

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: Avenue A & West Street
Pittsburgh, PA 15221

Customer P.O.# MB-14027-S
Work Order # I-94-08-218

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model BC-4 Serial Number 808
External Probe(s) _____ Serial # _____

Calibration Method 230 Pulser s/n 101500
Th s/n S-1256

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	200 CPM	200 CPM	All Calibrations Btn. + & - 10%
2		80K	800	800	
3					High Votlage = 905 Volts
4	1 MIN	20K	1,999	1,999	
5		80K	7,997	7,997	^{99}Tc Efficinecy = 8.1%
6					
7	10 MIN	20K	19,998	19,998	See attached sheet for additional
8		80K	79,986	79,996	information
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: _____ (Signed)
Calibration Date: 08-26-94
Next Calibration Due: 11-26-94

I certify that the above information is correct:
_____ Administrative Coordinator
11-26-94 Date

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

ELECTRONIC CALIBRATION

Electronic Calibration

1. Test Instrument: SEE
2. Pulse Rate: CAL
3. Amplitude: CENT
4. Time Period: ↳
5. Time Base: ?
6. Counting Time:
7. High Voltage:
8. Counts:

Background Determination

9. Instrument Model: BC-4
10. Serial Number: 808
11. Location: Pgh, PA.
12. Date: 8-26-94
13. Time: 0830
14. Test By: RRM
15. Time Period: 1
16. Time Base: X10
17. Counting Time: 10MIN
18. Purge Time: N/A
19. Type of Radiation: [ ] Alpha [X] Beta
20. Background: 25.9 @ 905 V

Efficiency Determination

21. Source & S/N: Tc^{99} S-1256
22. Source DPM: 14260
23. Time Base: X1
24. Time Period: 1
25. Counting Time: 1MIN
26. Average Count Rate $\left(\frac{\text{sum total A}}{10}\right)$ = 1181 CPM
27. 2 σ $(2\sqrt{\text{average count rate}})$ = 68.7
28. Chi Square Number $\left(\frac{\text{sum total C}}{\text{line 26}}\right)$ = 4.3
29. Chi Square Fit (2-22) = [X] Yes

    If "NO" Contact Foreman [ ] No
30. Net Count Rate (line 26-line 20) 1155.1
31. Efficiency:

    $\frac{\text{Net CPM (line 30)}}{\text{Source DPM (line 22)}}$ X 100= 8.1%

Trial #	CPM (A)	Difference from Ave. Count (B)	Difference Squared (C)
1	1173	8	64
2	1169	12	144
3	1194	13	169
	1188	7	49
5	1218	37	1369
6	1167	14	196
7	1151	30	900
8	1176	5	25
9	1219	38	1444
10	1155	26	676

TOTALS
A 11810
B n/a
C 5036

H & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	808	INSTRUMENT CODE:	4

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[ ] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [X] Tc99 #767/84	DATE OF SOURCE DECAY:	7-26-94	ACTIVITY DPM	8400

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
1500	1572
1539	1461
1419	1483
1510	1427
1421	1479
TOTAL / 10: (average)	1481.1
Sq. Root of average: (Sigma)	38.5
3 Sigma:	115.5
Average + 3 Sigma:	1596.6
Average - 3 Sigma:	1365.6

CALIBRATED BY VENDOR: General Technical Services, Inc.	
CALIBRATION DATE:	8-26-94

CHECK SOURCE CHI SQUARE BY:	NAME: Todd Brautigam SIGNATURE: T. Brautigam
DATE PERFORMED:	8-30-94

IH & S Form #B- 203
Blairsville Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	808	INSTRUMENT CODE:	4

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[X] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	9/30/94	ACTIVITY DPM	18,699

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
6191	6257
6147	6244
6151	6240
6187	6019
6128	6221
TOTAL / 10: (average)	6179
Sq. Root of average: (Sigma)	78.6
3 Sigma:	236
Average + 3 Sigma:	6415
Average - 3 Sigma:	5943

CALIBRATED BY VENDER:	General Technical Services, Inc.
CALIBRATION DATE:	8/29/94

CHECK SOURCE CHI SQUARE BY:	NAME: LARRY SMITH SIGNATURE: Larry Smith
DATE PERFORMED:	10/17/94

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: Avenue A & West Street
Pittsburgh, PA 15221

Customer P.O.# MB-14027-S
Work Order # I-94-05-222

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model BC-4 Serial Number 808
External Probe(s) _____ Serial # _____

Calibration Method ^{99}Pulser s/n 101500
^{99}Tc s/n S1256

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	1,999 CPM	1,999 CPM	All Calibrations Btn. + & - 10%
2		80K	7,998	7,998	
3					
4	1 MIN	20K	20,011	20,011	High Voltage = 905 Volts
5		80K	80,055	80,055	
6					^{99}Tc Efficiency = 8.2%
	10 MIN	20K	200,079	200,079	
8		80K	800,425	800,425	See attached sheet for additional information
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: _____ (Signed)
Calibration Date: 05-23-94
Next Calibration Due: 08-23-94

I certify that the above information is correct:
Theresa M DeBar — Administrative Coordinator — 05-23-94 Date

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

ELECTRONIC CALIBRATION

Electronic Calibration

1. Test Instrument: SEE
2. Pulse Rate: Cal
3. Amplitude: CERT.
4. Time Period: ↳
5. Time Base: ↓
6. Counting Time:
7. High Voltage:
8. Counts:

Background Determination

9. Instrument Model: BC-4
10. Serial Number: 808
11. Location: PGH, PA
12. Date: 5-23-94
13. Time: 1030
14. Test By: RRM
15. Time Period: 1
16. Time Base: x10
17. Counting Time: 10 MIN
18. Purge Time: N/A
19. Type of Radiation: [ ] Alpha [X] Beta
20. Background: 26.5 @ 905 V

Efficiency Determination

21. Source & S/N: Tc99 S-1256
22. Source DPM: 14260
23. Time Base: x1
24. Time Period: 1
25. Counting Time: 1 MIN
26. Average Count Rate $\left(\frac{\text{sum total A}}{10}\right)$ = 1197.5 CPM
27. 2 σ $(2\sqrt{\text{average count rate}})$ = 69.2
28. Chi Square Number $\left(\frac{\text{sum total C}}{\text{line 26}}\right)$ = 10.0
29. Chi Square Fit (2-22) = [X] Yes

If "NO" Contact Foreman [ ] No

30. Net Count Rate (line 26-line 20) ~~10.0~~ REM 1171
31. Efficiency:

$\frac{\text{Net CPM (line 30)}}{\text{Source DPM (line 22)}}$ X 100= 8.2%

Trial #	CPM (A)	Difference from Ave. Count (B)	Difference Squared (C)
1	1204	6.5	42.3
2	1212	14.5	210.3
3	1223	25.5	650.3
	1209	11.5	132.3
5	1195	2.5	6.3
6	1131	66.5	4422.3
7	1181	16.5	272.3
8	1270	72.5	5256.3
9	1178	19.5	380.3
10	1172	25.5	650.3

TOTALS
A 1197
B n/a
C 12023

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	808	INSTRUMENT CODE:	4

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[ ] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [X] Tc99 #767/84	DATE OF SOURCE DECAY:	4/20/94	ACTIVITY DPM	8400

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
1538	1529
1451	1479
1533	1521
1473	1419
1458	1508
TOTAL / 10: (average)	1490
Sq. Root of average: (Sigma)	38.6
3 Sigma:	116
Average + 3 Sigma:	1606
Average - 3 Sigma:	1374

CALIBRATED BY VENDER: General Technical Services, Inc.	
CALIBRATION DATE:	5/23/94

CHECK SOURCE CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
DATE PERFORMED:	5/25/94

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse Electric Corp.
Customer Address: Avenue A & West Street
Pittsburgh, PA 15221

Customer P.O.# MB-14027-S
Work Order # I-94-02-215

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model BC-4 Serial Number 808
External Probe(s) _____ Serial # _____

Calibration Method 99 Pulser s/n 101500
Tc s/n S1256

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	0.1 MIN	20K CPM	1,998 CPM	1,998 CPM	All Calibrations Btn. + & - 10%
2		80K	7,984	7,984	
3					High Voltage = 905 Volts
4	1 MIN	20K	19,997	19,997	
5		80K	79,979	79,979	See attached sheet for additional
6					information
	10 MIN	20K	199,975	199,975	
8		80K	799,990	799,990	99 Tc Efficiency = 8.3%
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: _____ (Signed)
Calibration Date: 02-14-94
Next Calibration Due: 05-14-94

I certify that the above information is correct:
Theresa M. DeBas 02-14-94
Administrative Coordinator Date

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

ELECTRONIC CALIBRATION

Electronic Calibration

1. Test Instrument: SEE
2. Pulse Rate: CAL
3. Amplitude: CERT.
4. Time Period: ↳
5. Time Base: ↓
6. Counting Time:
7. High Voltage:
8. Counts:

Background Determination

9. Instrument Model: BC-4
10. Serial Number: 808
11. Location: PGH, PA
12. Date: 2-14-94
13. Time: 1045
14. Test By: RRM
15. Time Period: 1
16. Time Base: x10
17. Counting Time: 10MIN
18. Purge Time: N/A
19. Type of Radiation: [ ] Alpha [X] Beta
20. Background: 26.1 @ 905 V

Efficiency Determination

21. Source & S/N: Tc^{99} / S-1256
22. Source DPM: 14260
23. Time Base: x1
24. Time Period: 1
25. Counting Time: 1MIN
26. Average Count Rate $\left(\frac{\text{sum total A}}{10}\right)$ = 1207.2 CPM
27. 2 σ $(2\sqrt{\text{average count rate}})$ = 69.5
28. Chi Square Number $\left(\frac{\text{sum total C}}{\text{line 26}}\right)$ = 21.3
29. Chi Square Fit (2-22) = [X] Yes

If "NO" Contact Foreman [ ] No

30. Net Count Rate (line 26-line 20) 1181.1
31. Efficiency:

$\frac{\text{Net CPM (line 30)}}{\text{Source DPM (line 22)}}$ X 100= 8.3%

Trial #	CPM (A)	Difference from Ave. Count (B)	Difference Squared (C)
1	1244	36.8	1354.2
2	1168	39.2	1536.6
3	1211	3.8	14.4
4	1156	51.2	2621.4
5	1240	32.8	1075.8
6	1256	48.8	2381.4
7	1131	76.2	5806.4
8	1254	46.8	2190.2
9	1272	64.8	4199.0
10	1140	67.2	4515.8

TOTALS
A 12072
B n/a
C 25685.

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	808	INSTRUMENT CODE:	4

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[ ] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [X] Tc99 #767/84	DATE OF SOURCE DECAY:	9-17-84	ACTIVITY DPM	8400

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
1429	1473
1443	1416
1477	1372
1362	1409
1397	1457
TOTAL / 10: (average)	1424
Sq. Root of average: (Sigma)	37.7
3 Sigma:	113
Average + 3 Sigma:	1537
Average - 3 Sigma:	1311

CALIBRATED BY VENDER: General Technical Services, Inc.	
CALIBRATION DATE:	2-14-94

CHECK SOURCE CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
DATE PERFORMED:	2-14-94

Applied HEALTH PHYSICS inc.

2986 Industrial Blvd. — Bethel Park, Pa. 15102 — Phone 412 — 835-9555 — Fax No. 412 — 835-9559

CERTIFICATE OF CALIBRATION

SHIPPING ADDRESS	BILLING ADDRESS (If Different)
WEC	
AVE "A" & WEST ST	SAME
PITTSBURGH PA 15112	

CONTACT: L. SMITH PHONE: (412) 826-3674 DATE: 11/12/93 P.O.# MA09328 5

Receiving Comments:

Instrument Received: [X] Within Toler. ±10% [ ] ±10-20% [ ] Out Toler. [ ] Requires Repair

Mfg. Inst. EBERLINE Model # RC-4 Serial # 808
Detector " Model # — Serial # INTEGM

[ ] [X] CALIBRATION [ ] REPAIR [ ] SALE [ ] LOAN By: [signature]

scale	source	reading	scale	source	reading	scale	source	reading
	~~mR/hr~~ CPM			~~mR/hr~~ CPM			~~mR/hr~~ CPM	
ON	100	100	ON	4000	4019	ON	100000	99981
	400	404		10000	10105		400000	401092
	1000	1010		40000	40090			

Calibration Source: [X] GAMMA [ ] ALPHA [X] BETA [X] ELECTRONIC [ ] OTHER

Description: [ ] ra-226 [ ] cs-137 [ ] pu-239 [X] sr-90 [X] mp-1/500 [ ]

RESPONSE GRAPH N/A

TEMP/HUMIDITY 71.9 °F/ 37 %

PROBE EFFICIENCIES
Alpha — % Beta 35% %
Check Source Reading N/A
Battery Check Reading N/A
Detector Angle PERPENDICULAR
Corrections N/A ± 10% ELECT.

Maintenance & Comments HV-OK TIMER OK

CALIBRATION		40.00	QA Dept. [signature] Warranty
LABOR			Shipping UPS Date 11/12/93
MATERIALS			Pick-Up Date / /
&			This Certificate Expires In 3 Months
SALES			Re-Calibrate On Or Before 2/12/94
SHIPPING UPS	1 UNIT	23.88	Job ID #

NOTICE: Applied Health Physics, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology under Nuclear Regulatory Commission License #37-09135-01 and PA State License #PA-0228. This calibration system conforms to the requirements of NRC regulation 10-CFR-34, 10-CFR-35, MIL-STD 45662A and ANSI-STD N323-1978.

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square, Bkg, Efficiency)

COUNTER S/N:	808	INSTRUMENT CODE:	4

SOURCE USED: (Check one)	[✓] Cs 137 # 84-9 [ ] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [ ] Pu 239 # 5308 [ ] Pu 239 #7346	DATE OF SOURCE DECAY:	11-16-93	ACTIVITY DPM	32,051

CHI SQUARE DATA (2 minute counts)	
10,192	9997
9936	10093
9947	10011
10039	9976
10022	9945
TOTAL / 10: (average)	10015.8
Sq. Root of average: (Sigma)	100.07
3 Sigma:	300.2
Average + 3 Sigma:	10316
Average - 3 Sigma:	9716

EFFICIENCY DATA:	
2 MINUTE COUNT:	9938
GROSS CPM (Count / min)	4969
NET CPM (Gross count - bkg cpm)	4945
EFFICIENCY (Net cpm / dpm)	15.4
CORR. FACTOR (1 / Eff)	6.49

BACKGROUND DATA:	
TOTAL COUNTS:	474
COUNT TIME	20 Minutes
COUNTS PER MINUTE	24

CALIBRATED BY VENDER: Applied Health Physics,	
CALIBRATION DATE:	11-12-93

CHI SQ., BKG., EFF.	—
CATE PERFORMED:	11-16-93

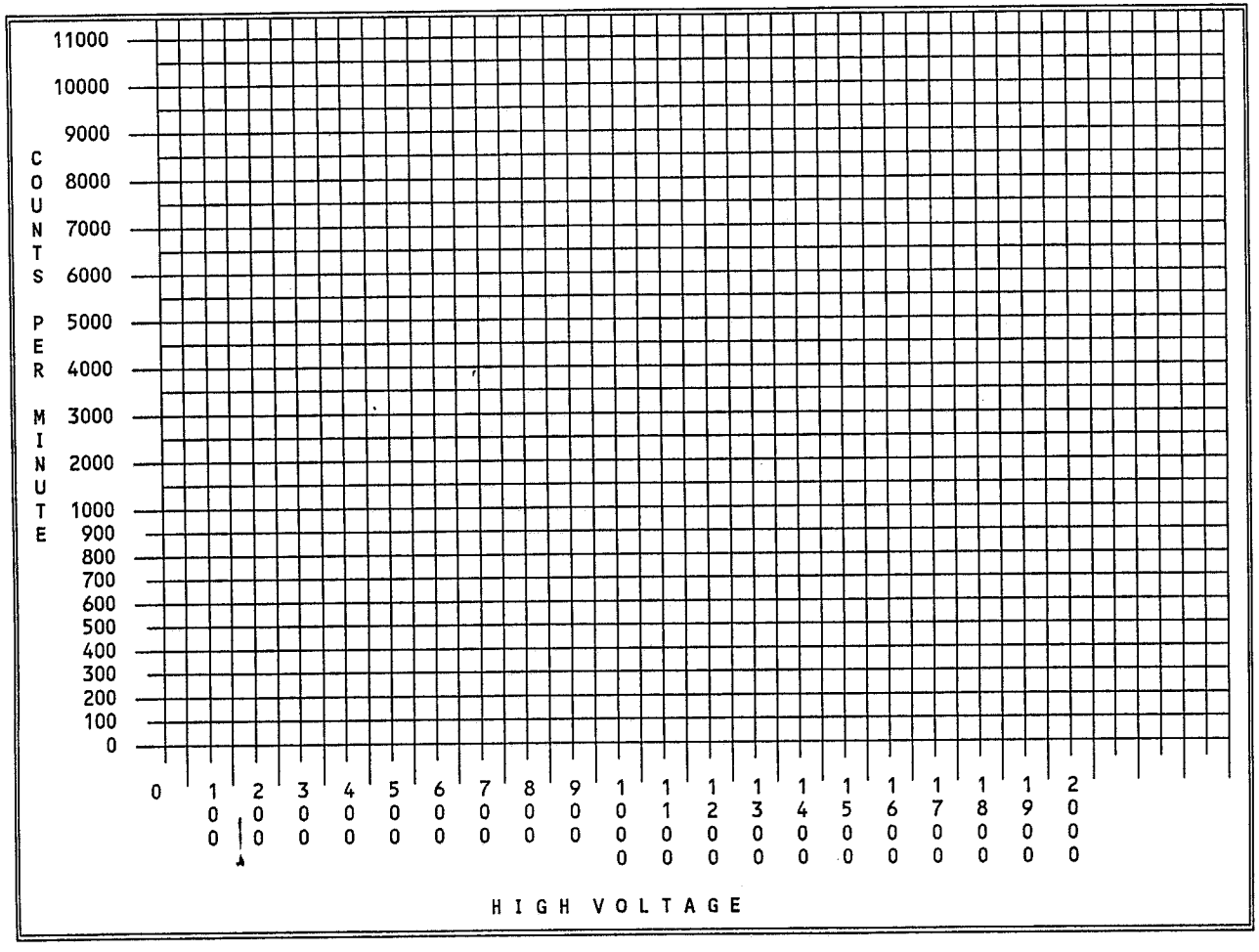
I H & S FORM #203
FOREST HILLS SITE

****
* MANUAL LAB COUNTER *
* CALIBRATION *
****

COUNTER & S/N: 808	CAP. #: 8420 A	MANUFACTURER: EBERLINE	LOCATION: A HP LAB	VOLT METER TYPE & S/N USED FOR CALIBRATION: By Vender
SOURCE USED: (Check one) [X] Cs 137 #: 84-9 [ ] Pu 239 #: 5308	[ ] Tc 99 #: [ ] Pu 239#:	Activity 32245 dpm as of 8/12/93 (Date) Activity _____ dpm as of _____.(Date)		VOLT METER EXPIRATION DATE: By Vender

PLATEAU DATA

PLATEAU 1 MIN CTS.	
H. V.	COUNTS



CHI SQUARE DATA	2 MIN. COUNTS	
TOTAL / 10 (Avg.) : 5105		
SQ. ROOT AVG: (Sigma) 71.4	5072	5111
3 Sigma: 214	5257	5207
AVG. + 3 Sigma 5319	5095	5031
AVG. - 3 Sigma 4891	5093	5088
CHECK SOURCE # 12	5040	5060

BACKGROUND DATA	
Total Counts: 260	Count Time: (Minutes) 10
Counts Per Min: (Counts / Min) 26.0	

EFFICIENCY DATA	
2 Minute count: 10,129	(Gross Ct.)
Count / 2 : 5065	(Gross CPM)
CPM - Bkg.: 5039	(Net CPM)
Net CPM / Activity: (dpm) 15.6 %	(Eff)
1 / Eff.: 6.4	(Correction Fac)

COMMENTS
High Voltage set at 900 volts by
Vender (Applied Health Physic, Inc)

CALIBRATED BY: John Douglas, Applied H. P.	SIGNATURE: (See Vender Cal certificate)	DATE: 8/9/93
CHI SQUARE BY: Larry Smith, Forest Hills HP	SIGNATURE: Larry Smith	DATE: 8/12/93

Applied HEALTH PHYSICS inc.

2986 Industrial Blvd. — Bethel Park, Pa. 15102 — Phone 412 — 835-9555 — Fax No. 412 — 835-9559

CERTIFICATE OF CALIBRATION

SHIPPING ADDRESS	BILLING ADDRESS (If Different)
W. E. C.	SAME
Ave. "A" & West St.	
Pgh., PA 15112	

CONTACT: L. Smith PHONE: (—) — DATE: 2/9/93 P.O.# MA 893285

Receiving Comments: Calibration, No line Cable!

Instrument Received: [X] Within Toler. ±10% [ ] ±10-20% [ ] Out Toler. [ ] Requires Repair

Mfg. Inst. Eberline Model # BC-4 Serial # 208

Detector Int-PNG-M Model # — Serial # —

[X] CALIBRATION [ ] REPAIR [ ] SALE [ ] LOAN By: D. Douglas

scale	source	reading	scale	source	reading	scale	source	reading
	~~mR/hr~~ cpm	cpm		~~mR/hr~~ cpm	cpm		mR/hr	
On	100	99	On	10000	9941			
	400	400		40000	39958			
	1000	995		100000	99390			
	4000	3996		400000	399161			

Calibration Source: [ ] GAMMA [ ] ALPHA [X] BETA [X] ELECTRONIC [ ] OTHER

Description: [ ] ra-226 [ ] cs-137 [ ] pu-239 [X] sr-90 [X] mp-1 (500)

RESPONSE GRAPH N/A

TEMP/HUMIDITY 74.2°F / 49 %

PROBE EFFICIENCIES 2π

Alpha — % Beta 30 - 50 %

Check Source Reading N/A

Battery Check Reading N/A

Detector Angle Perpendicular

Corrections N/A ± 10% Elect

Maintenance & Comments HV - OK @ 900 Volts, Timer - OK, FS - 300mV.

Tested, Inspected & Calibrated

CALIBRATION	Contract	40.00
LABOR		
MATERIALS & SALES		
SHIPPING	UPS	—

QA Dept. DD Warranty —

Shipping UPS Date 2/9/93

Pick-Up — Date — / —

This Certificate Expires In 3 Months

Re-Calibrate On Or Before 11/9/93

Job ID # 52445

NOTICE: Applied Health Physics, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology under Nuclear Regulatory Commission License #37-09135-01 and PA State License #PA-0226. This calibration system conforms to the requirements of NRC regulation 10-CFR-34, 10-CFR-35, MIL-STD 45662A and ANSI-STD N323-1978.

CODE NUMBER 5

REPORT #001

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	862	INSTRUMENT CODE:	5

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [✓] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [ ] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	9/1/99	ACTIVITY DPM	18,699

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
6,167	6,174
6,173	6,140
6,100	6,108
6,159	6,056
6,260	6,109
TOTAL / 10: (average)	6145
Sq. Root of average: (Sigma)	78
3 Sigma:	235
Average + 3 Sigma:	6380
Average - 3 Sigma:	5910

EFFICIENCY DATA	
2 MIINUTE COUNT:	6109
GROSS CPM (Count/min)	3055
NET CPM (Gross count -Bkg.)	3034
EFFICIENCY (Net CPM /DPM)	16.2
CORR. FACTOR (1 / Eff)	6.1

BACKGROUND DATA	
TOTAL COUNTS;	538
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	26.9

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: Jim Gemza SIGNATURE: Jim Gemza
DATE PERFORMED:	9-1-99

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	862	INSTRUMENT CODE:	5

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[✓] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	1-26-99	ACTIVITY DPM	18,700

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
6088	6117
6093	6111
6179	6174
6164	6161
6086	6200
TOTAL / 10: (average)	6137
Sq. Root of average: (Sigma)	78
3 Sigma:	234
Average + 3 Sigma:	6371
Average - 3 Sigma:	5903

EFFICIENCY DATA	
2 MIINUTE COUNT:	6200
GROSS CPM (Count/min)	3100
NET CPM (Gross count -Bkg.)	3076
EFFICIENCY (Net CPM /DPM)	16.4
CORR. FACTOR (1 / Eff)	6.1

BACKGROUND DATA	
TOTAL COUNTS;	474
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	23.7

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: Clyde Schall SIGNATURE: Clyde Schall
DATE PERFORMED:	4.21.99

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	862	INSTRUMENT CODE:	5

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [X] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [ ] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5-14-99	ACTIVITY DPM	18699

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
6054	6174
6172	6103
6152	6170
6174	6161
6155	6203
TOTAL / 10: (average)	6152
Sq. Root of average: (Sigma)	78
3 Sigma:	234
Average + 3 Sigma:	6386
Average - 3 Sigma:	5918

EFFICIENCY DATA	
2 MIINUTE COUNT:	6203
GROSS CPM (Count/min)	3102
NET CPM (Gross count -Bkg.)	3075
EFFICIENCY (Net CPM /DPM)	16.4
CORR. FACTOR (1 / Eff)	6.1

BACKGROUND DATA	
TOTAL COUNTS;	538
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	26.9

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: LARRY SMITH SIGNATURE: [signature]
DATE PERFORMED:	1/19/98

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	862	INSTRUMENT CODE:	5

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[X] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5-14-98	ACTIVITY DPM	18699.17

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
6083	6041
6091	6173
6084	6111
6069	6170
6133	6210
TOTAL / 10: (average)	6116
Sq. Root of average: (Sigma)	78.2
3 Sigma:	234.6
Average + 3 Sigma:	6350
Average - 3 Sigma:	5881

EFFICIENCY DATA	
2 MIINUTE COUNT:	6137
GROSS CPM (Count/min)	3068.5
NET CPM (Gross count -Bkg.)	3044.9
EFFICIENCY (Net CPM /DPM)	16.2
CORR. FACTOR (1 / Eff)	6.2

BACKGROUND DATA	
TOTAL COUNTS;	471
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	23.6

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	6/9/97

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: V. TAYLOR SIGNATURE: V. Taylor
DATE PERFORMED:	10-19-98

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	862	INSTRUMENT CODE:	5

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [✓] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [ ] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5-14-98	ACTIVITY DPM	18692.17

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
5657	6025
5881	6027
5862	6208
5812	6011
5866	6021
TOTAL / 10: (average)	5937
Sq. Root of average: (Sigma)	77.05
3 Sigma:	231.15
Average + 3 Sigma:	6168
Average - 3 Sigma:	5706

EFFICIENCY DATA	
2 MIINUTE COUNT:	6063
GROSS CPM (Count/min)	3031
NET CPM (Gross count -Bkg.)	3007
EFFICIENCY (Net CPM /DPM)	16.08
CORR. FACTOR (1 / Eff)	6.2

BACKGROUND DATA	
TOTAL COUNTS;	461
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	23.5

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	6/9/97

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: A. U. TAYLOR SIGNATURE: A. U. Taylor
DATE PERFORMED:	7-8-98

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	862	INSTRUMENT CODE:	5

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [X] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [ ] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	3/12/97	ACTIVITY DPM	18699

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
6091	6082
6258	6117
6050	6129
6042	6001
6111	6143
TOTAL / 10: (average)	6102
Sq. Root of average: (Sigma)	78
3 Sigma:	234
Average + 3 Sigma:	6336
Average - 3 Sigma:	5868

EFFICIENCY DATA	
2 MIINUTE COUNT:	6143
GROSS CPM (Count/min)	3072
NET CPM (Gross count -Bkg.)	3047
EFFICIENCY (Net CPM /DPM)	16.3%
CORR. FACTOR (1 / Eff)	6.1

BACKGROUND DATA	
TOTAL COUNTS;	508
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	25.4

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	7-1-96

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
DATE PERFORMED:	2-24-98

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	862	INSTRUMENT CODE:	5

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [X] Tc-99 # 763/84 [ ] Tc 99 # 764/84 [ ] Pu 239 # 5308 [ ] Pu 239 #7346 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	3/12/97	ACTIVITY DPM	18699

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
6197	6270
6266	6186
6190	6115
6267	6210
5939	6094
TOTAL / 10: (average)	6173
Sq. Root of average: (Sigma)	78.6
3 Sigma:	236
Average + 3 Sigma:	6409
Average - 3 Sigma:	5937

EFFICIENCY DATA	
2 MIINUTE COUNT:	6054
GROSS CPM (Count/min)	3027
NET CPM (Gross count -Bkg.)	3001
EFFICIENCY (Net CPM /DPM)	16%
CORR. FACTOR (1 / Eff)	6.23

BACKGROUND DATA	
TOTAL COUNTS;	511
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	25.6

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	7-1-96

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: Jim GEMZA SIGNATURE: Jim Gemza
DATE PERFORMED:	11-19-97

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	862	INSTRUMENT CODE:	5

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[X] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5/96	ACTIVITY DPM	18,699

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
6148	6233
6142	6209
6168	6131
6079	5962
6157	6060
TOTAL / 10: (average)	6129
Sq. Root of average: (Sigma)	78.3
3 Sigma:	235
Average + 3 Sigma:	6364
Average - 3 Sigma:	5894

EFFICIENCY DATA	
2 MIINUTE COUNT:	6012
GROSS CPM (Count/min)	3006
NET CPM (Gross count -Bkg.)	2979
EFFICIENCY (Net CPM /DPM)	15.9
CORR. FACTOR (1 / Eff)	6.3

BACKGROUND DATA	
TOTAL COUNTS;	532
COUNT TIME:	20 Minutes
COUNTS PER MINUTE	26.6

CALIBRATED BY VENDER (Electronical calibration only)	: General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	7-1-96

CHECK SOURCE CALIBRATION AND CHI SQUARE BY:	NAME: CARMEN VERGARI SIGNATURE: Carmen Vergari
DATE PERFORMED:	8-21-97

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	862	INSTRUMENT CODE:	5

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[X] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5/96	ACTIVITY DPM	18699

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
6021	5972
6150	6060
6036	6302
6199	6149
5856	6139
TOTAL / 10: (average)	6088.4
Sq. Root of average: (Sigma)	78
3 Sigma:	234
Average + 3 Sigma:	6322
Average - 3 Sigma:	5854

EFFICIENCY DATA:	
2 MINUTE COUNT:	5921
GROSS CPM (Count/min)	2960.5
NET CPM (Gross count - Bgk.)	2936.1
EFFICIENCY (Net CPM/DPM)	15.7
CORR. FACTOR (1 / Eff.)	6.4

BACKGROUND DATA:	
TOTAL COUNTS:	488
COUNT TIME:	20 Minutes
COUNTS PER MINUTE:	24.4

CALIBRATED BY VENDER: (Electronical calibration only)	General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	

SOURCE EFFICIENCY AND CHI SQUARE BY:	NAME: A. V. TAYLOR SIGNATURE: A. V. Taylor
CALIBRATION DATE:	5-22-97
CALIBRATION DUE:	8-22-97

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	862	INSTRUMENT CODE:	5

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[X] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5/96	ACTIVITY DPM	18699

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
5945	6011
6102	6152
6043	6154
6054	6142
6187	6162
TOTAL / 10: (average)	6095
q. Root of average: (Sigma)	78
3 Sigma:	234
Average + 3 Sigma:	6329
Average - 3 Sigma:	5861

EFFICIENCY DATA:	
2 MINUTE COUNT:	6071
GROSS CPM (Count/min)	3035.5
NET CPM (Gross count - Bgk.)	27
EFFICIENCY (Net CPM/DPM)	16.1
CORR. FACTOR (1 / Eff.)	6.2

BACKGROUND DATA:	
TOTAL COUNTS:	539
COUNT TIME:	20 Minutes
COUNTS PER MINUTE:	27

CALIBRATED BY VENDER: (Electronical calibration only)	General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	

SOURCE EFFICIENCY AND CHI SQUARE BY:	NAME: Larry Smith SIGNATURE: Larry Smith
CALIBRATION DATE:	2-25-96
CALIBRATION DUE:	5-25-97

IH & S Form # 203
Forest Hills Site

Manual Lab Counter

(Chi Square)

COUNTER S/N:	862	INSTRUMENT CODE:	5

SOURCE USED: (Check one)	[ ] Cs 137 # 84-9 [ ] Pu 239 # 5308	[X] Tc-99 # 763/84 [ ] Pu 239 #7346	[ ] Tc 99 # 764/84 [ ] Tc99 #767/84	DATE OF SOURCE DECAY:	5/6/96	ACTIVITY DPM	18699.29

CHECK SOURCE CHI SQUARE DATA (2 minute counts)	
6098	6123
6146	6071
6083	6077
6176	6120
6208	6053
TOTAL / 10: (average)	6115.5
Sq. Root of average: (Sigma)	78.2
3 Sigma:	234.6
Average + 3 Sigma:	6350.1
Average - 3 Sigma:	5880.9

EFFICIENCY DATA:	
2 MINUTE COUNT:	6177
GROSS CPM (Count/min)	3088
NET CPM (Gross count - Bgk.)	3064
EFFICIENCY (Net CPM/DPM)	16.4
CORR. FACTOR (1 / Eff.)	6.1

BACKGROUND DATA:	
TOTAL COUNTS:	408
COUNT TIME:	20 Minutes
COUNTS PER MINUTE:	20.4

CALIBRATED BY VENDER: (Electronical calibration only)	General Technical Services, Inc.
ELECTRONIC CALIBRATION DATE:	7/1/96

SOURCE EFFICIENCY AND CHI SQUARE BY:	NAME: CARMEN VERGARI SIGNATURE: Carmen Vergari
CALIBRATION DATE:	7-2-96
CALIBRATION DUE:	10-2-96

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

#FIVE

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15221

Customer P.O.# MB-14027-S
Work Order # I-96-06-209

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model BC-4 Serial Number 862
External Probe(s) _____ Serial # _____

Calibration Method Pulser s/n 120935

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response: Before Calib.	Instrument Response: After Calib.	Comment
1	0.1 MIN	20K CPM	Initial	2,005 CPM	All Calibrations Btn. + & - 10%
2		80K	Calibration	8,009	
3					
4	1 MIN	20K		20,078	High Voltage = 912 Volts
5		80K		80,380	
6					NOTE: NO Efficiencies per custome
7	10 MIN	20K		200,548	request; response check to ^{99}Tc
8		80K		801,509	
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: (Signed)
Calibration Date: 07-01-96
Next Calibration Due: 10-01-96

I certify that the above information is correct:
Administrative Coordinator — Date: 07-01-96

Applied HEALTH PHYSICS inc.

2986 Industrial Blvd. — Bethel Park, Pa. 15102 — Phone 412 — 835-9555 — Fax No. 412 — 835-9559

CERTIFICATE OF CALIBRATION

SHIPPING ADDRESS	BILLING ADDRESS (If Different)
WEC	
AVE "A" & WEST ST	SAME
PITS PA 15112	

CONTACT: L. Smith PHONE: ( ) DATE: 11/1/93 P.O.# MA6932E-S

Receiving Comments:

Instrument Received: [X] Within Toler. ±10% [ ] ±10-20 [ ] Out Toler. [ ] Requires Repair

Mfg. Inst. EBERLINE Model # BE-4 Serial # 862

Detector " Model # — Serial # INT PGM

[X] CALIBRATION [ ] REPAIR [ ] SALE [ ] LOAN By: [signature]

scale	source	reading	scale	source	reading	scale	source	reading
	~~mR/hr~~			~~mR/hr~~			~~mR/hr~~	
	CPM			CPM			CPM	
ON	100	102	ON	4000	4010		100000	99902
	400	401		10000	9978		400000	400564
	1000	1011		40000	40102			

Calibration Source: [ ] GAMMA [ ] ALPHA [X] BETA [X] ELECTRONIC [ ] OTHER

Description: [ ] ra-226 [ ] cs-137 [ ] pu-239 [X] sr-90 [X] mp-1/500 [ ]

RESPONSE GRAPH N/A

TEMP/HUMIDITY 69.8 °F / 44 %

PROBE EFFICIENCIES

Alpha — % Beta 60 2π %

Check Source Reading N/A

Battery Check Reading N/A

Detector Angle PERPENDICULAR

Corrections N/A ± 10% FLEX.

Maintenance & Comments HV OK 930 VOLTS TIMER OK

CALIBRATION		40.00	QA Dept. [signature] Warranty
LABOR			Shipping UPS Date 11/1/93
MATERIALS			Pick-Up Date / /
&			This Certificate Expires In 3 Months
SALES			Re-Calibrate On Or Before 2/1/94
SHIPPING	UPS	(1) UNIT 13.00	Job ID #

NOTICE: Applied Health Physics, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology under Nuclear Regulatory Commission License #37-09135-01 and PA State License #PA-0228. This calibration system conforms to the requirements of NRC regulation 10-CFR-34, 10-CFR-35, MIL-STD 45662A and ANSI-STD N323-1978.

Applied HEALTH PHYSICS inc.

2986 Industrial Blvd. — Bethel Park, Pa. 15102 — Phone 412 — 835-9555 — Fax No. 412 — 835-9559

CERTIFICATE OF CALIBRATION

SHIPPING ADDRESS	BILLING ADDRESS (If Different)
WEC	SAME
Avenue A & West St.	
Pghy, PA 15112	

CONTACT: J. Flanigan PHONE: (—) —— DATE: 5/3/93 P.O.# MA293285

Receiving Comments: Calibration - Poor Package - Unit Dented!

Instrument Received: [X] Within Toler. ±10% [ ] ±10-20% [ ] Out Toler. [ ] Requires Repair

Mfg. Inst. Eberline Model # BC-4 Serial # 862

Detector Int-PWGM Model # —— Serial # ——

[ ] [X] CALIBRATION [ ] REPAIR [ ] SALE [ ] LOAN By: J. Douglas

scale	source	reading	scale	source	reading	scale	source	reading
	~~mR/hr~~ cpm	cpm		~~mR/hr~~ cpm	cpm		~~mR/hr~~ cpm	cpm
	100	99		4000	4021		100000	99463
on	400	400	on	10000	9965	on	400000	400731
	1000	996		40000	40098			

Calibration Source: [ ] GAMMA [ ] ALPHA [X] BETA [X] ELECTRONIC [ ] OTHER

Description: [ ] ra-226 [ ] cs-137 [ ] pu-239 [X] sr-90 [X] mp-1 /500 [ ]

RESPONSE GRAPH N/A

TEMP/HUMIDITY 74.1°F/ 45 %

PROBE EFFICIENCIES QTI

Alpha —— % Beta 51 %

Check Source Reading N/A

Battery Check Reading N/A

Detector Angle Perpendicular

Corrections N/A ± 10%

Maintenance & Comments Straightened Case / Tightened Detector, HV-OK @ 900 Volts, Timer OK, Efficiency Taken at minimum Distance with Ring Stop.

Tested, Inspected & Calibrated

CALIBRATION	Contract	$40.00
LABOR		
MATERIALS & SALES		
SHIPPING	UPS	(1) Unit 12.00

QA Dept. JD Warranty ——

Shipping UPS Date 5/4/94

Pick-Up —— Date —/—

This Certificate Expires In 3 Months

Re-Calibrate On Or Before 8/3/93

Job ID # 52240

Rec'd UPS

NOTICE: Applied Health Physics, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology under Nuclear Regulatory Commission License #37-09135-01 and PA State License #PA-0228. This calibration system conforms to the requirements of NRC regulation 10-CFR-34, 10-CFR-35, MIL-STD 45662A and ANSI-STD N323-1978.

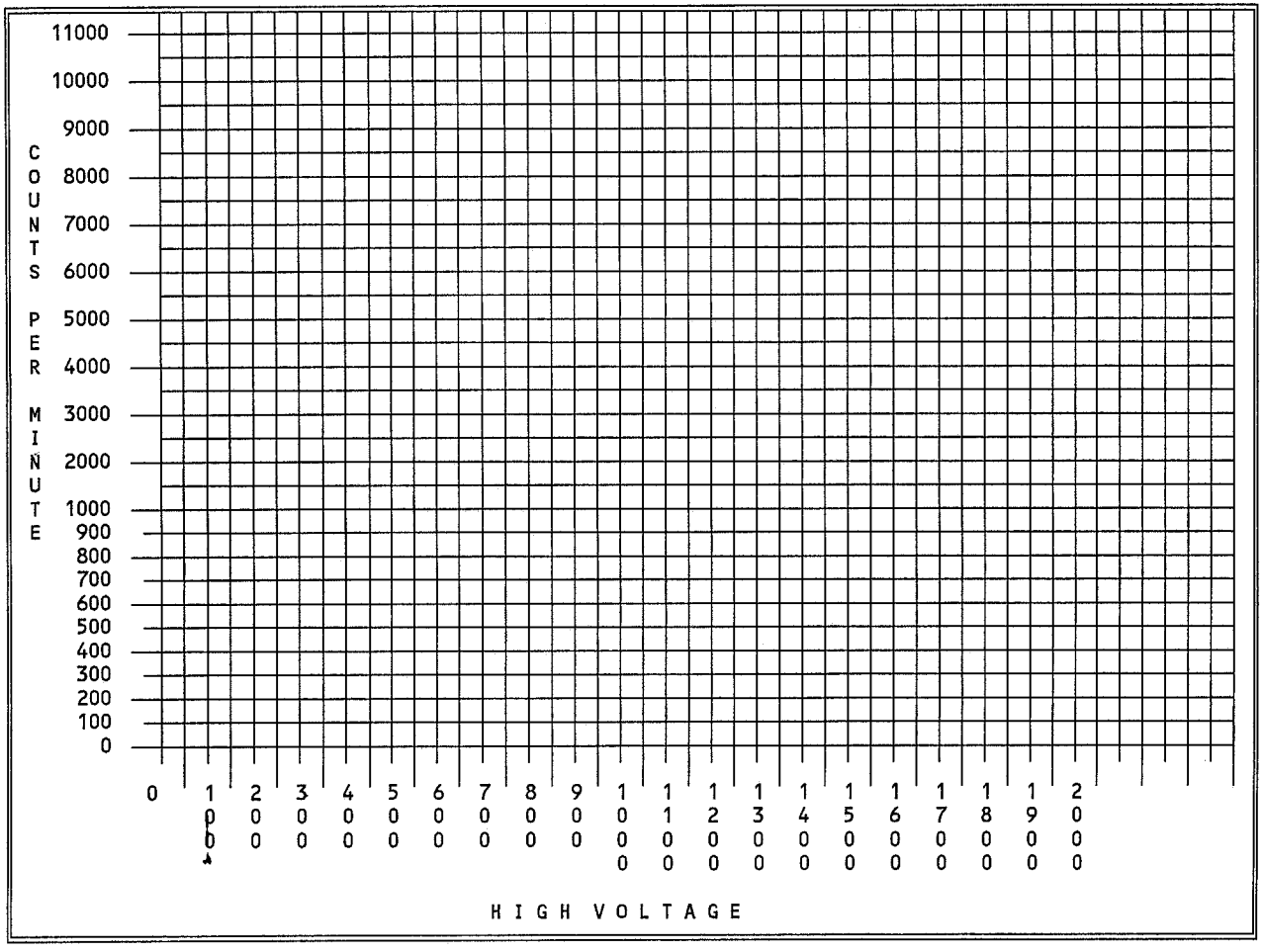
I H & S FORM #203
FOREST HILLS SITE

* MANUAL LAB COUNTER * CALIBRATION *

COUNTER & S/N: GM-1 / 862	TAB #: 4	MANUFACTURER: Eberline	LOCATION: HPO A HP LAB	VOLT METER TYPE & S/N USED FOR CALIBRATION: By Vendor
SOURCE USED: (Check one) [ ] Cs 137 #: 84-9 [X] Tc 99 #: 763/84 Activity 18700 dpm as of 5/27/93 (Date)				VOLT METER EXPIRATION DATE: By Vendor
[ ] Pu 239 #: 5308 [ ] Pu 239#: Activity _____ dpm as of _____.(Date)				

PLATEAU DATA

PLATEAU 1 MIN CTS.	
H. V.	COUNTS



CHI SQUARE DATA		
TOTAL / 10 (Avg.) : 5731	2 MIN. COUNTS	
SQ. ROOT AVG: (Sigma) 75.7	5731	5717
3 Sigma: 227.1	5800	5681
AVG. + 3 Sigma 5958	5902	5671
AVG. - 3 Sigma 5504	5902	5660
	5810	5619

BACKGROUND DATA	
Total Counts: 226	Count Time: 10 (Minutes)
Counts Per Min: 22.6 (Counts / Min)	

EFFICIENCY DATA		
2 Minute count:	5940	(Gross Ct.)
Count / 2 :	2970	(Gross CPM)
CPM - Bkg.:	2947	(Net CPM)
Net CPM / Activity: (dpm)	15.8%	(Eff)
1 / Eff.:	6.33	(Correction Fac)

COMMENTS
High Voltage set at 900 volts by
Vendor (Applied Health Physic, Inc)

CALIBRATED BY: John Douglas, Applied H. P.	SIGNATURE: (See Vendor Cal certificate)	DATE: 5/3/93
CHI SQUARE BY: Larry Smith, Forest Hills HP	SIGNATURE: Larry Smith	DATE: 5/27/93

CODE NUMBER 6

REPORT #001

ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	10/7/98

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31279	36900	5	7380	3	7377
	BACKGROUND	13	2.6			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7377	23.6%	4.24	23.6%	4.24

HIGH VOLTAGE:	1050

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	7360		3 HOURS	7230	98.2%
1 HOUR	7230	98.2%	3.5 HOURS	7460	101.4%
1.5 HOURS	7250	98.5%	4 HOURS	7300	99.2%
2 HOURS	7240	98.4%	4.5 HOURS	7320	99.5%
2.5 HOURS	7370	100%	5 HOURS	7290	99%

CALIBRATED BY:	Larry Smith
SIGNATURE:	

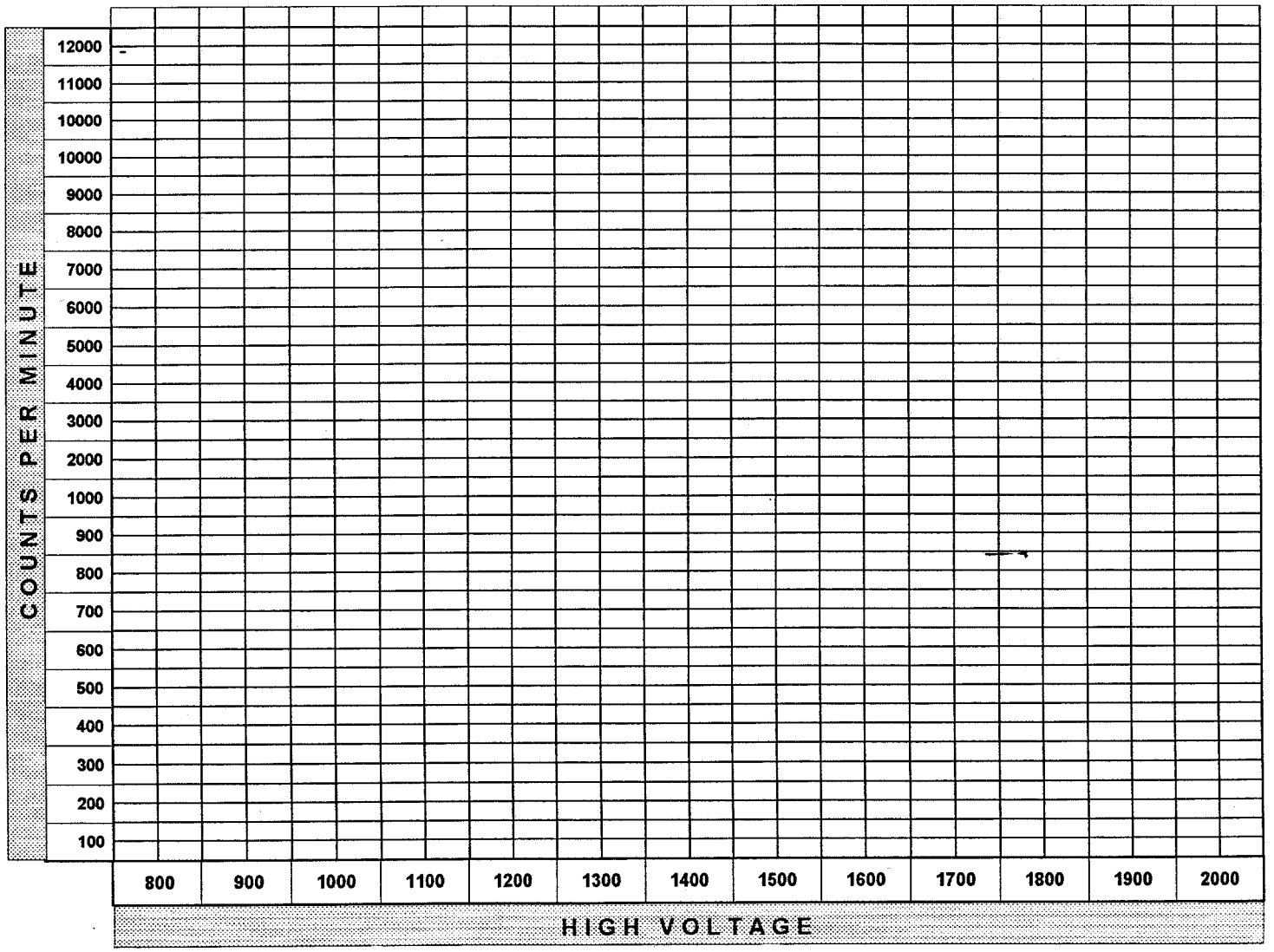
DATE:	10/7/98

COMMENTS: Calibrated with Eberline HP-100A probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	1	1250	8130	1650	-
900	2	1300	7970	1700	-
950	2280	1350	8120	1750	-
1000	6790	1400	8000	1800	-
1050	7530	1450	8090	1850	-
1100	7630	1500	8090	1900	-
1150	7770	1550	-	1950	-
1200	8040	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	6/16/98

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31279	37300	5	7460	.2	7460
	BACKGROUND	1	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7460	23.8	4.2	23.8%	4.2

HIGH VOLTAGE:	1050

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	7800	-	3 HOURS	7660	98.2%
1 HOUR	7600	97.4%	3.5 HOURS	7700	98.7%
1.5 HOURS	7710	98.8%	4 HOURS	7800	100%
2 HOURS	7600	97.4%	4.5 HOURS	7710	98.8%
2.5 HOURS	7640	97.9%	5 HOURS	7720	98.9%

CALIBRATED BY:	Carmen Vergari
SIGNATURE:	Carmen Vergari

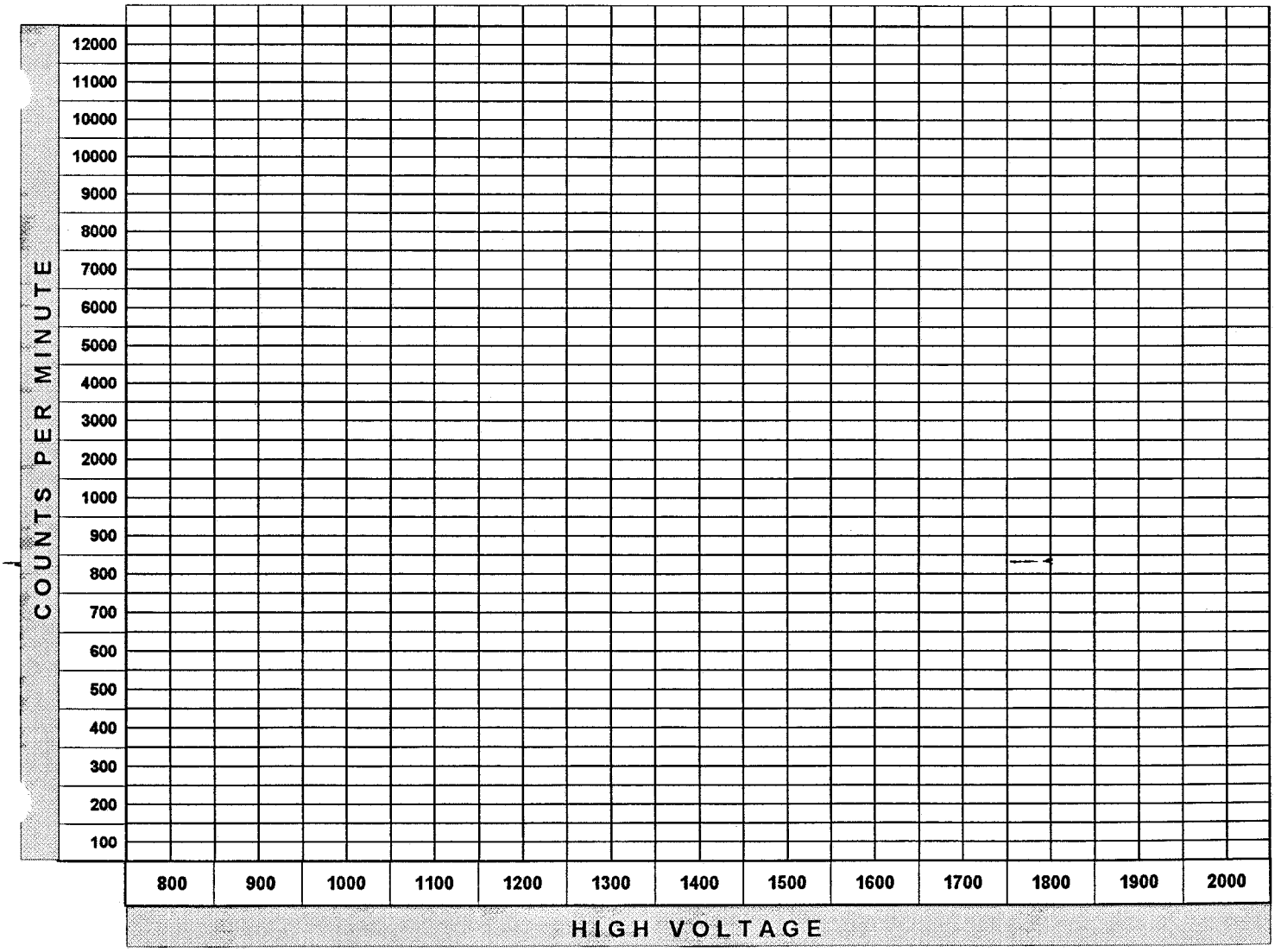
DATE:	6/16/98

COMMENTS:

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	7860	1650	-
900	3	1300	7940	1700	-
950	2860	1350	8150	1750	-
1000	6840	1400	8140	1800	-
1050	7410	1450	8330	1850	-
1100	7720	1500	8290	1900	-
1150	7780	1550	-	1950	-
1200	8000	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	3/16/98

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31279	38200	5	7640	.8	7639
	BACKGROUND	4	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7639	24.4%	4.1	24.4%	4.1

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	7480	-	3 HOURS	7630	102%
1 HOUR	7660	102.4%	3.5 HOURS	7660	102.4%
1.5 HOURS	7480	100%	4 HOURS	7680	103%
2 HOURS	7630	102%	4.5 HOURS	7660	102.4%
2.5 HOURS	7630	102%	5 HOURS	7840	105%

CALIBRATED BY:	Carmen Vergari
SIGNATURE:	Carmen Vergari

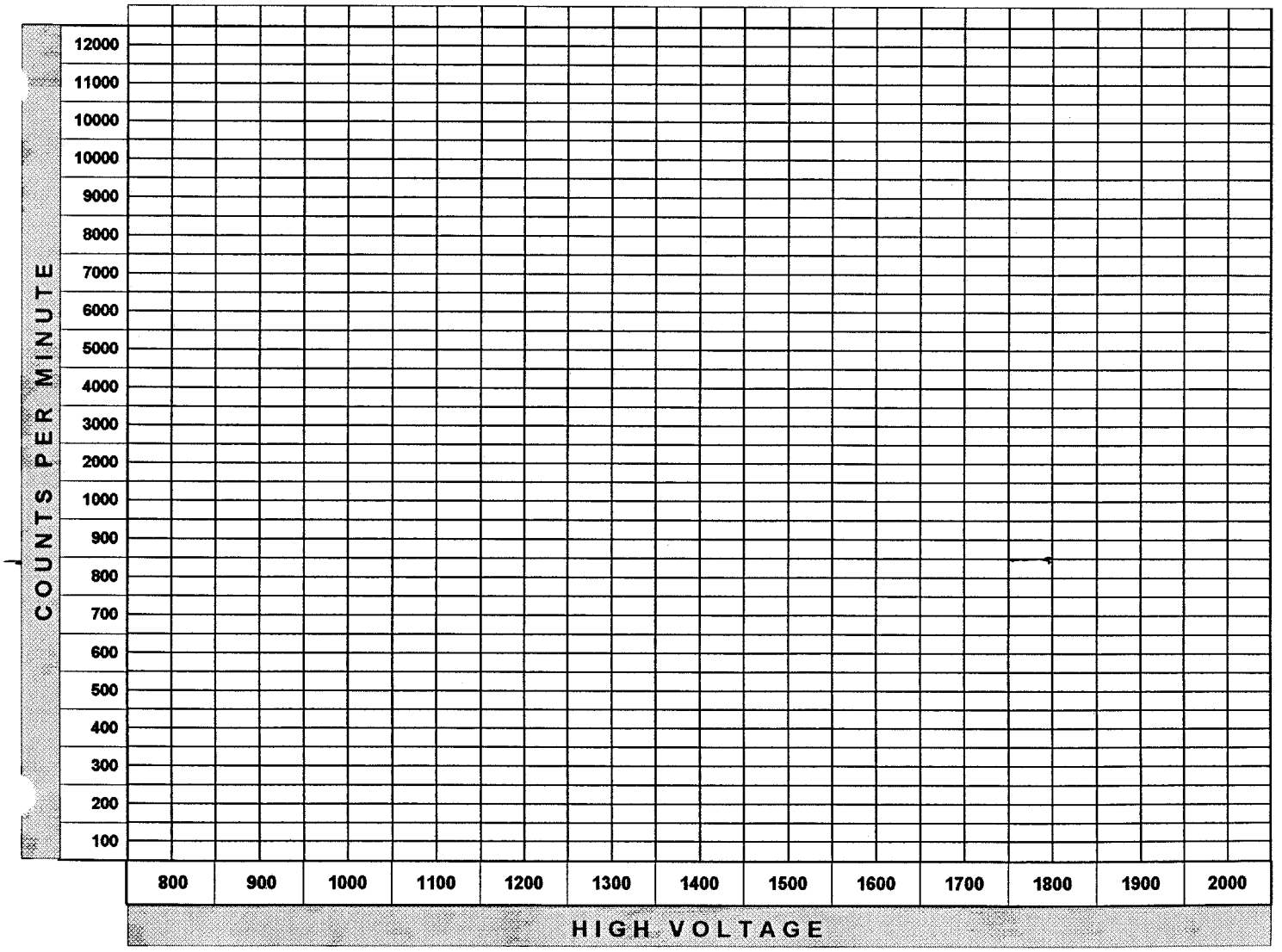
DATE:	3/16/98

COMMENTS: Calibrated wiith Eberline HP-100A probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	7790	1650	-
900	0	1300	8100	1700	-
950	1440	1350	8110	1750	-
1000	6700	1400	8150	1800	-
1050	7310	1450	8040	1850	-
1100	7490	1500	8190	1900	-
1150	7820	1550	-	1950	-
1200	7900	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	12/16/97

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31279	37300	5	7460	1	7459
	BACKGROUND	5	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7459	23.8%	4.2	23.8%	4.2

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	7330	-	3 HOURS	7160	97.7%
1 HOUR	7320	99.9%	3.5 HOURS	7260	99%
1.5 HOURS	7260	99%	4 HOURS	7490	102.2%
2 HOURS	7170	97.8%	4.5 HOURS	7320	99.9%
2.5 HOURS	7140	97.4%	5 HOURS	7310	99.7%

CALIBRATED BY:	Carmen Vergari
SIGNATURE:	Carmen Vergari

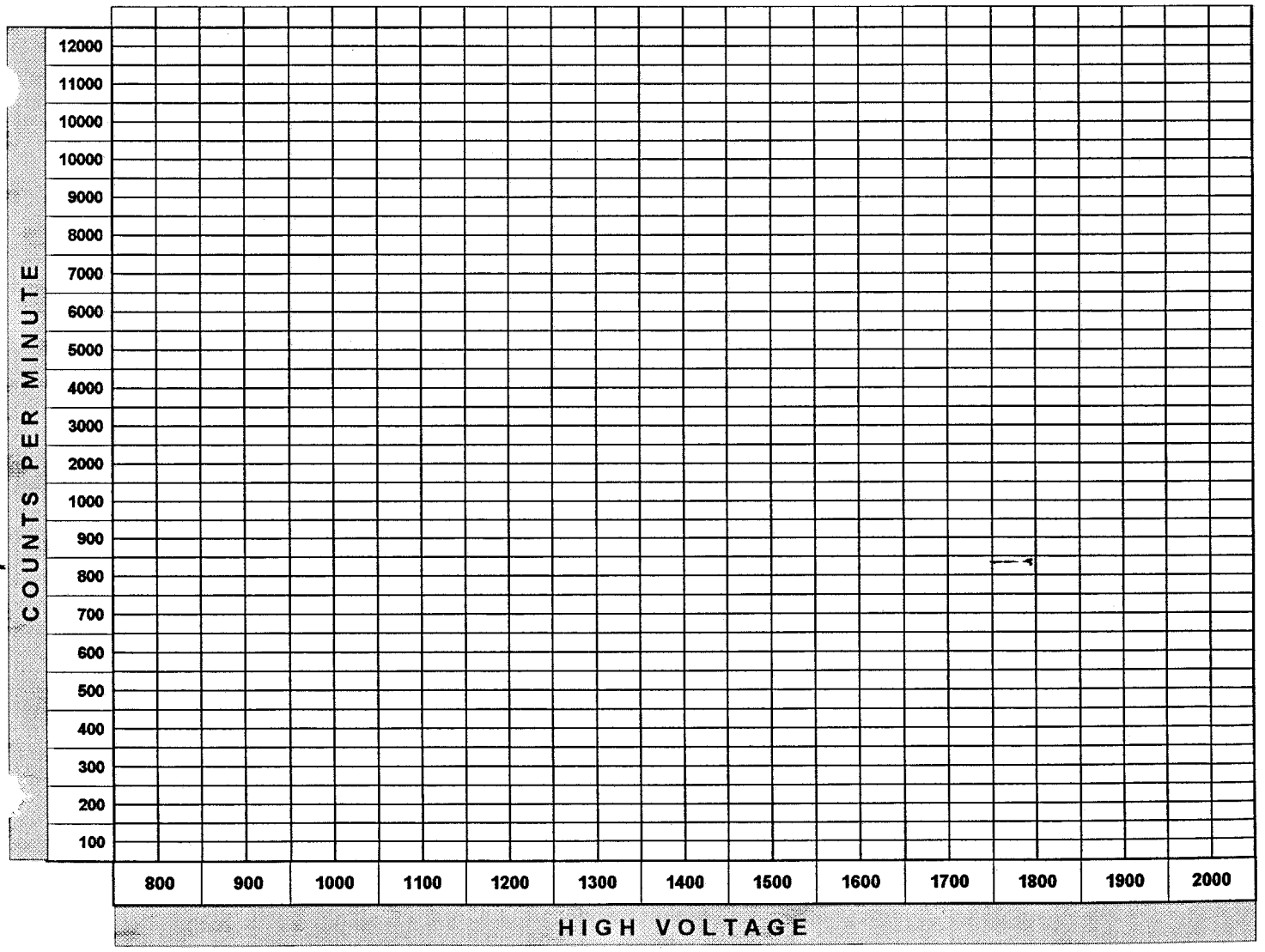
DATE:	12/16/97

COMMENTS: Calibrated with Eberline HP -100A Probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	7760	1650	-
900	1	1300	7840	1700	-
950	2820	1350	7910	1750	-
1000	6520	1400	8030	1800	-
1050	7230	1450	7920	1850	-
1100	7570	1500	7900	1900	-
1150	7640	1550	-	1950	-
1200	7730	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	9/16/97

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31280	39100	5	7820	.8	7819
	BACKGROUND	4	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7819	25%	4	25%	4

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	8010	-	3 HOURS	7810	97.5%
1 HOUR	7910	98.7%	3.5 HOURS	7910	98.7%
1.5 HOURS	8000	99.9%	4 HOURS	7900	98.6%
2 HOURS	7850	98%	4.5 HOURS	7850	98%
2.5 HOURS	7860	98.1%	5 HOURS	7870	98.2%

CALIBRATED BY:	Carmen A. Vergari
SIGNATURE:	Carmen A. Vergari

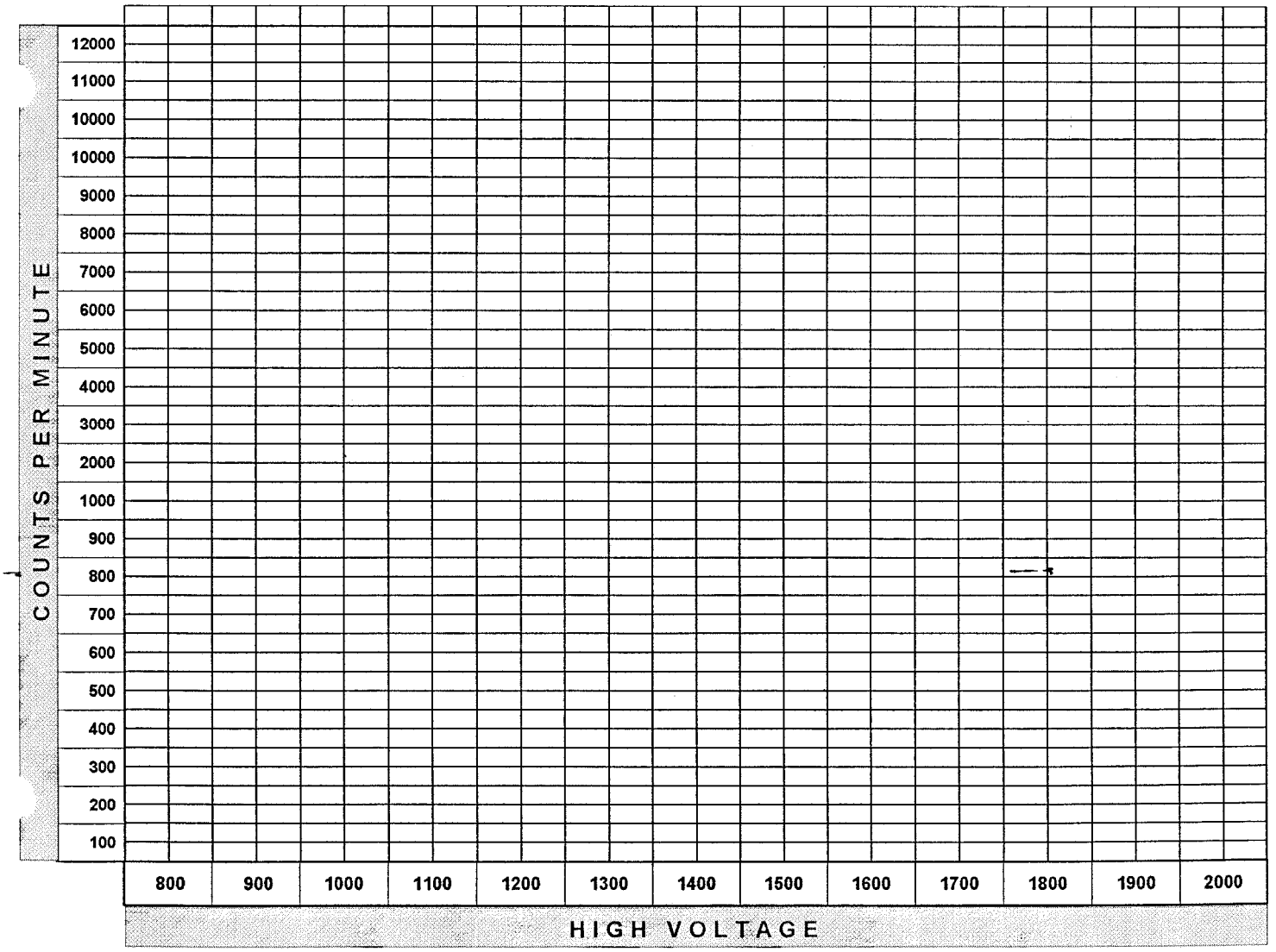
DATE:	9/16/97

COMMENTS: Calibrated With Eberline HP 100 A probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	8160	1650	-
900	2	1300	8250	1700	-
950	2980	1350	8320	1750	-
1000	7150	1400	8220	1800	-
1050	7770	1450	8400	1850	-
1100	7970	1500	8440	1900	-
1150	8000	1550	-	1950	-
1200	8060	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	6/10/97

ALPHA / BETA:	Alpha

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31280	39100	5	7820	1	7819
	BACKGROUND	4	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7819	25.0%	4.0	25.0%	4.0

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	8040	--------	3 HOURS	8190	101.9%
1 HOUR	8010	99.6%	3.5 HOURS	8150	101.4%
1.5 HOURS	8000	99.0%	4 HOURS	8160	101.5%
2 HOURS	8060	100.2%	4.5 HOURS	8100	100.7%
2.5 HOURS	8090	100.6%	5 HOURS	8050	100.1%

CALIBRATED BY:	Larry Smith
SIGNATURE:	

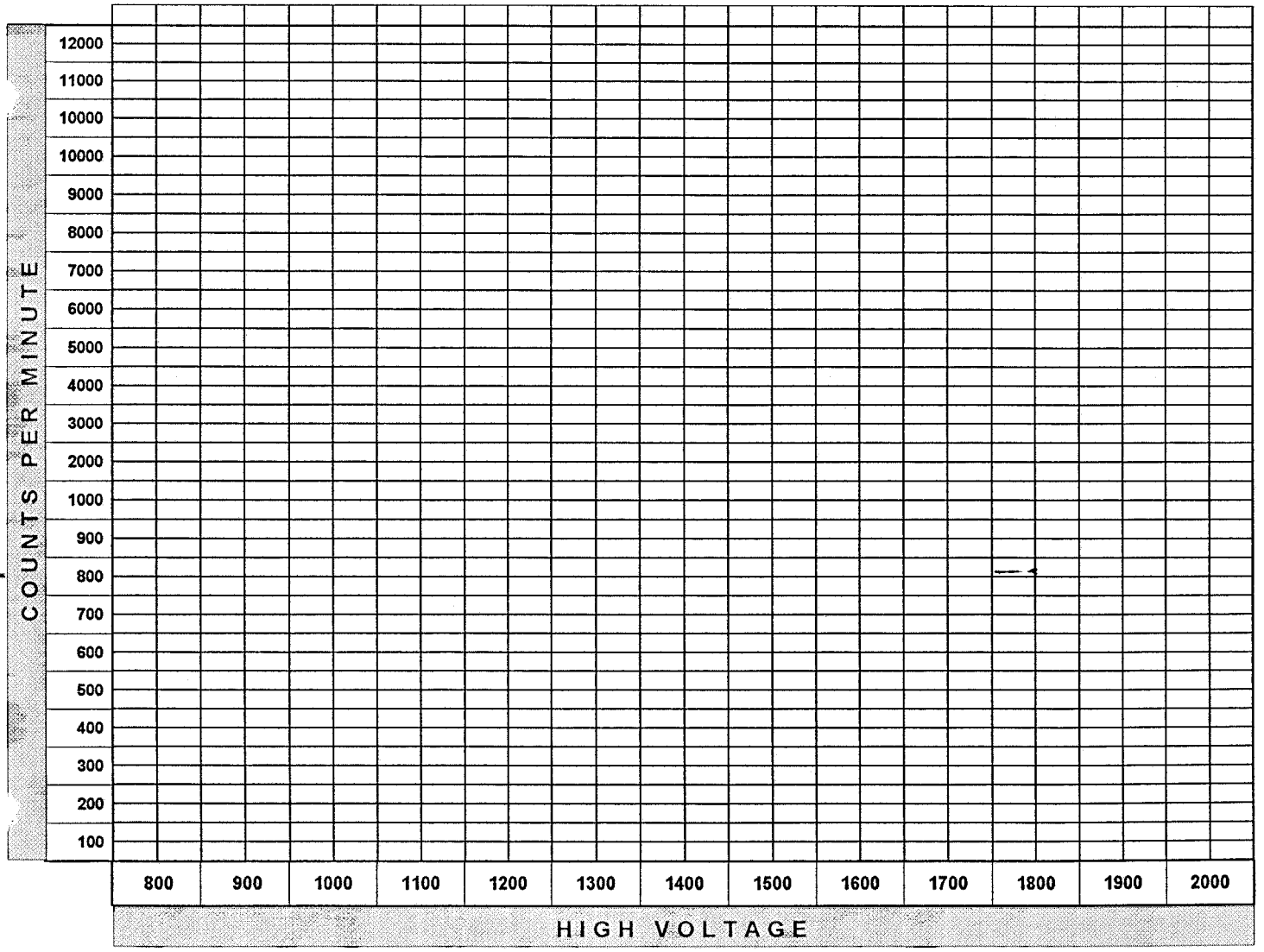
DATE:	6/10/97

COMMENTS: Calibrated with HP-100A probe

ESP-2 PLATEAU

ALPHA / BETA:	Alpha

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	1	1250	8020	1650	-------
900	2	1300	8150	1700	--------
950	5	1350	8460	1750	---------
1000	6240	1400	8330	1800	--------
1050	7480	1450	8200	1850	--------
1100	7800	1500	8470	1900	---------
1150	7970	1550	--------	1950	--------
1200	8100	1600	--------	2000	---------



ESP-2 CALIBRATION

ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	11/12/96

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7347	2,318,559	2,790,000	5	558,000	.8	557,999
	BACKGROUND	4	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
557,999	24%	4.17	24%	4.17

HIGH VOLTAGE:	1150

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	559000	-	3 HOURS	556000	99.5%
1 HOUR	557000	99.6%	3.5 HOURS	557000	99.6%
1.5 HOURS	558000	99.8%	4 HOURS	556000	99.5%
2 HOURS	556000	99.5%	4.5 HOURS	558000	99.8%
2.5 HOURS	557000	99.6%	5 HOURS	556000	99.5%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

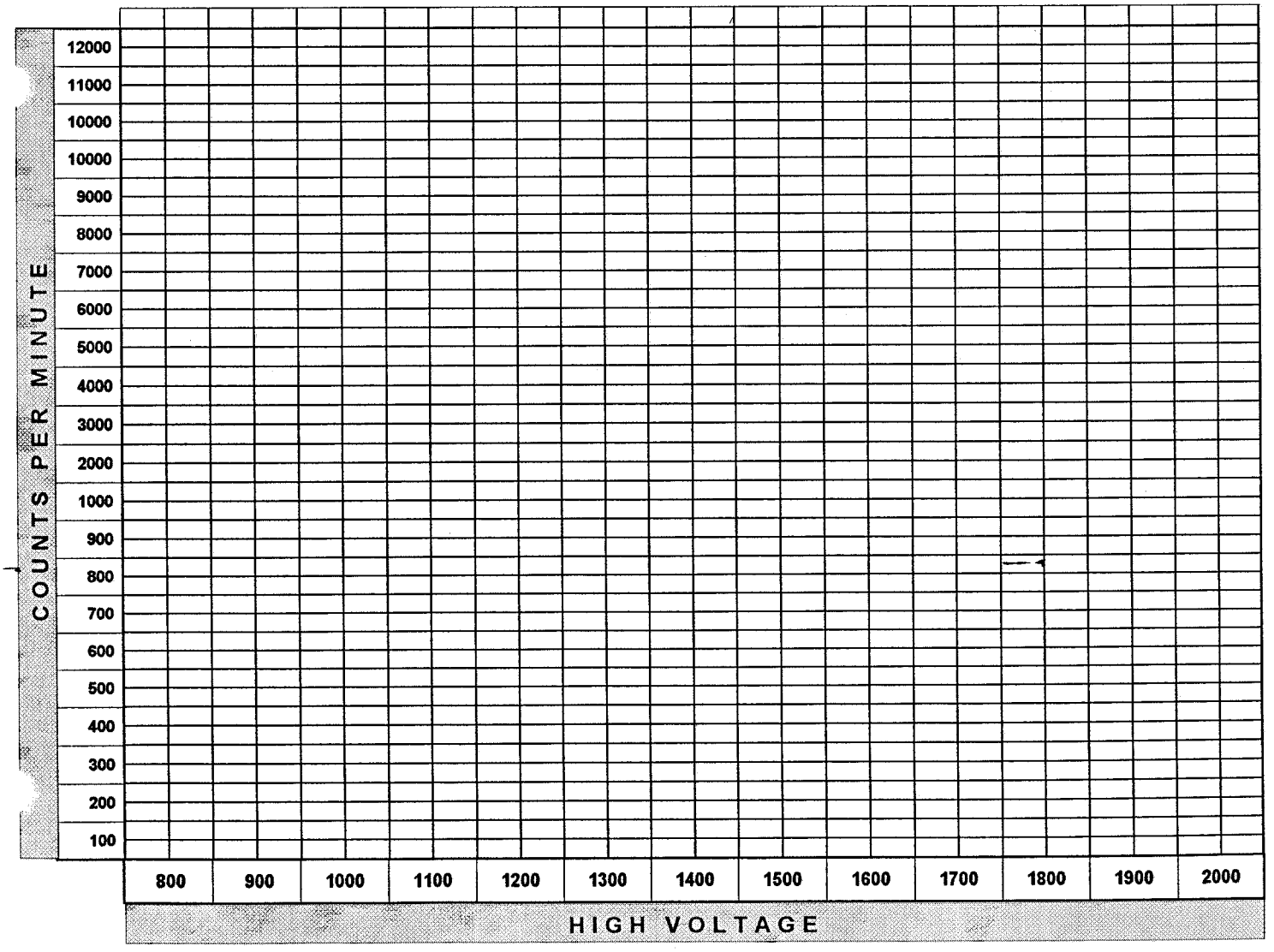
DATE:	11/12/96

COMMENTS: Calibrated with Eberline HP-100A probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	203	1250	568000	1650	-
900	6000	1300	569000	1700	-
950	27000	1350	570000	1750	-
1000	403000	1400	570000	1800	-
1050	520000	1450	569000	1850	-
1100	540000	1500	569000	1900	-
1150	558000	1550	-	1950	-
1200	565000	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	8/19/96

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31280	37300	5	7460	1	7459
	BACKGROUND	4	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7459	23.8%	4.2	23.8%	4.2

HIGH VOLTAGE:	1150

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	7460		3 HOURS	7430	99.6%
1 HOUR	7370	98.8%	3.5 HOURS	7400	99.2%
1.5 HOURS	7410	99.3%	4 HOURS	7390	99.1%
2 HOURS	7550	101.2%	4.5 HOURS	7420	99.5%
2.5 HOURS	7380	98.9%	5 HOURS	7440	99.7%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

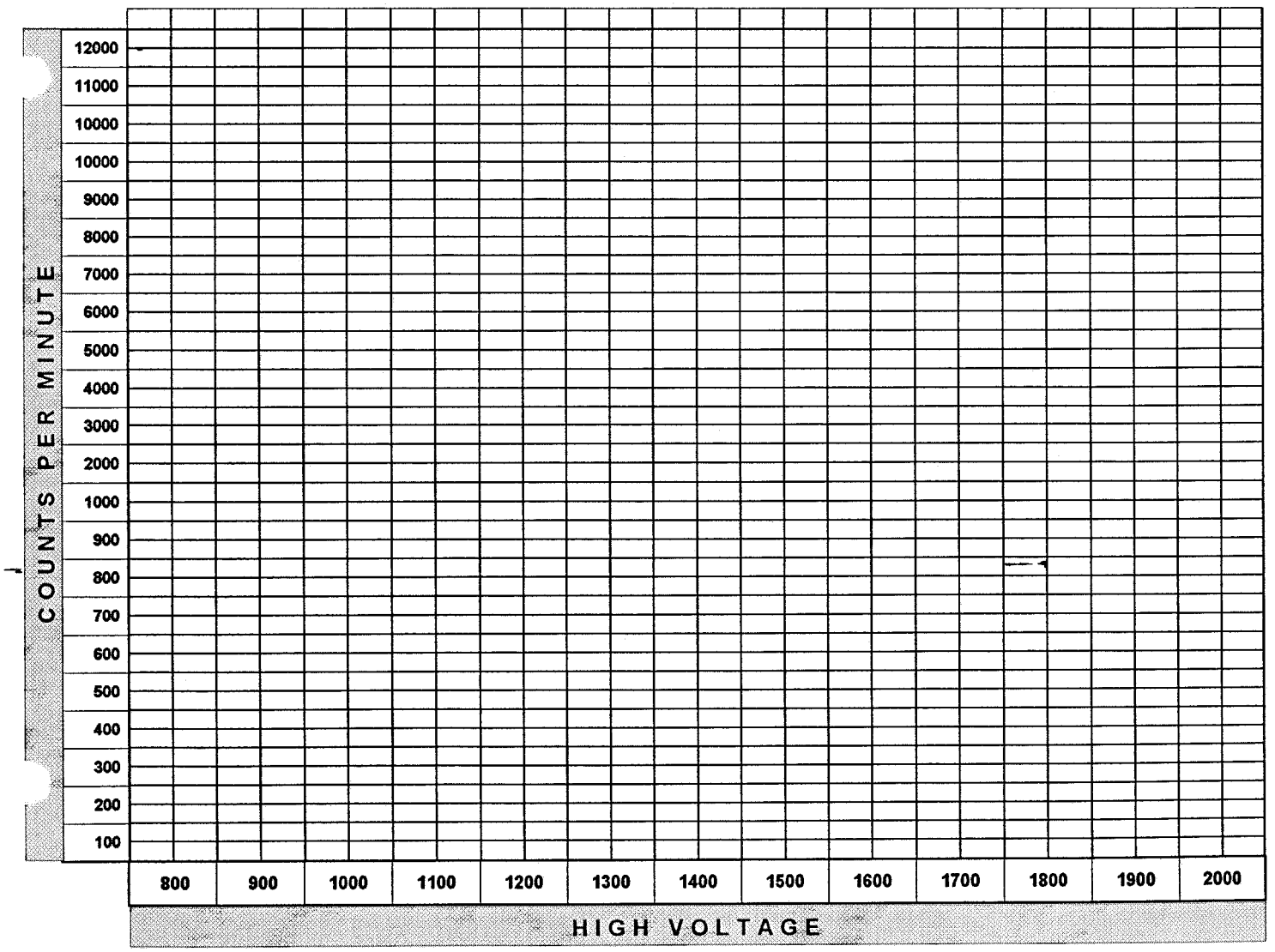
DATE:	8/19/96

COMMENTS: Calibrated with Eberline HP-100A probe

ESP-2 PLATEAU

ALPHA / BETA:	0

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	7920	1650	-
900	0	1300	7990	1700	-
950	0	1350	8170	1750	-
1000	640	1400	8150	1800	-
1050	5540	1450	8160	1850	-
1100	7120	1500	8200	1900	-
1150	7580	1550	-	1950	-
1200	7880	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	5/2/96

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	230966	256000	5	51200	.4	51200
	BACKGROUND	2	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
51200	22.2%	4.5	22.2%	4.5

HIGH VOLTAGE:	1150

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (In hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (In hours)	COUNTS	PERCENT (of original count)
INITIAL	50500	-	3 HOURS	50800	100.6%
1 HOUR	50300	99.6%	3.5 HOURS	49900	98.8%
1.5 HOURS	50600	100.1%	4 HOURS	50000	99%
2 HOURS	50600	100.1%	4.5 HOURS	49800	98.6%
2.5 HOURS	50700	100.3%	5 HOURS	50800	100.6%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

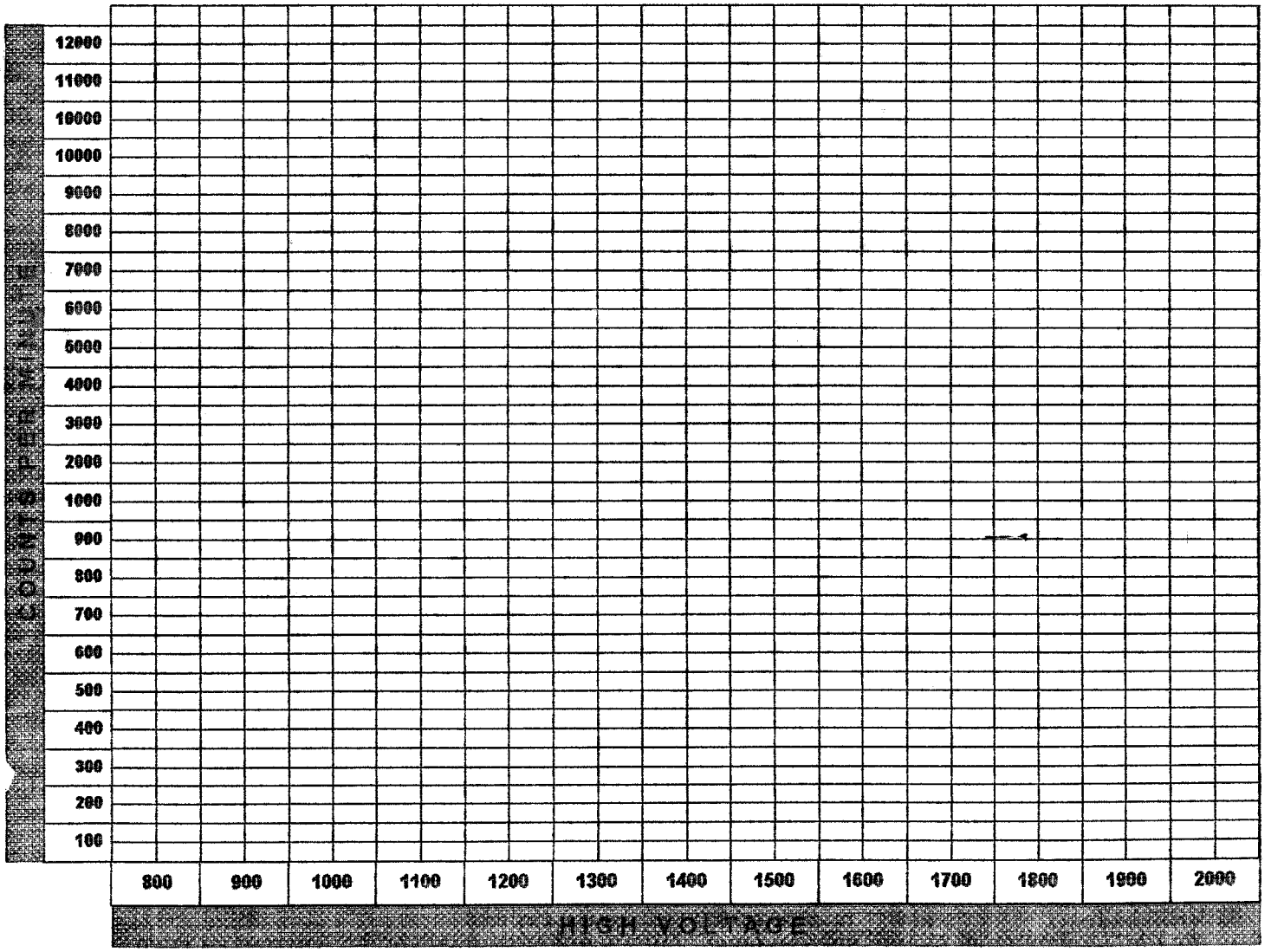
DATE:	5/2/96

COMMENTS: Calibrated with Eberline HP-100A probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	54400	1650	-
900	0	1300	55300	1700	-
950	33	1350	55600	1750	-
1000	3500	1400	56000	1800	-
1050	38400	1450	56400	1850	-
1100	47600	1500	57000	1900	-
1150	51000	1550	-	1950	-
1200	53200	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	2/12/96

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	230966	253000	5	50600	0.2	50600
	BACKGROUND	1	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
50600	21.9%	4.6	21.9%	4.6

HIGH VOLTAGE:	1150

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	50900	-	3 HOURS	51500	101.2%
1 HOUR	51100	100.4%	3.5 HOURS	51100	100.4%
1.5 HOURS	51400	101%	4 HOURS	51300	100.8%
2 HOURS	51000	100.2%	4.5 HOURS	51200	100.6%
2.5 HOURS	51100	100.4%	5 HOURS	51200	100.6%

CALIBRATED BY:	Larry Smith
SIGNATURE:	

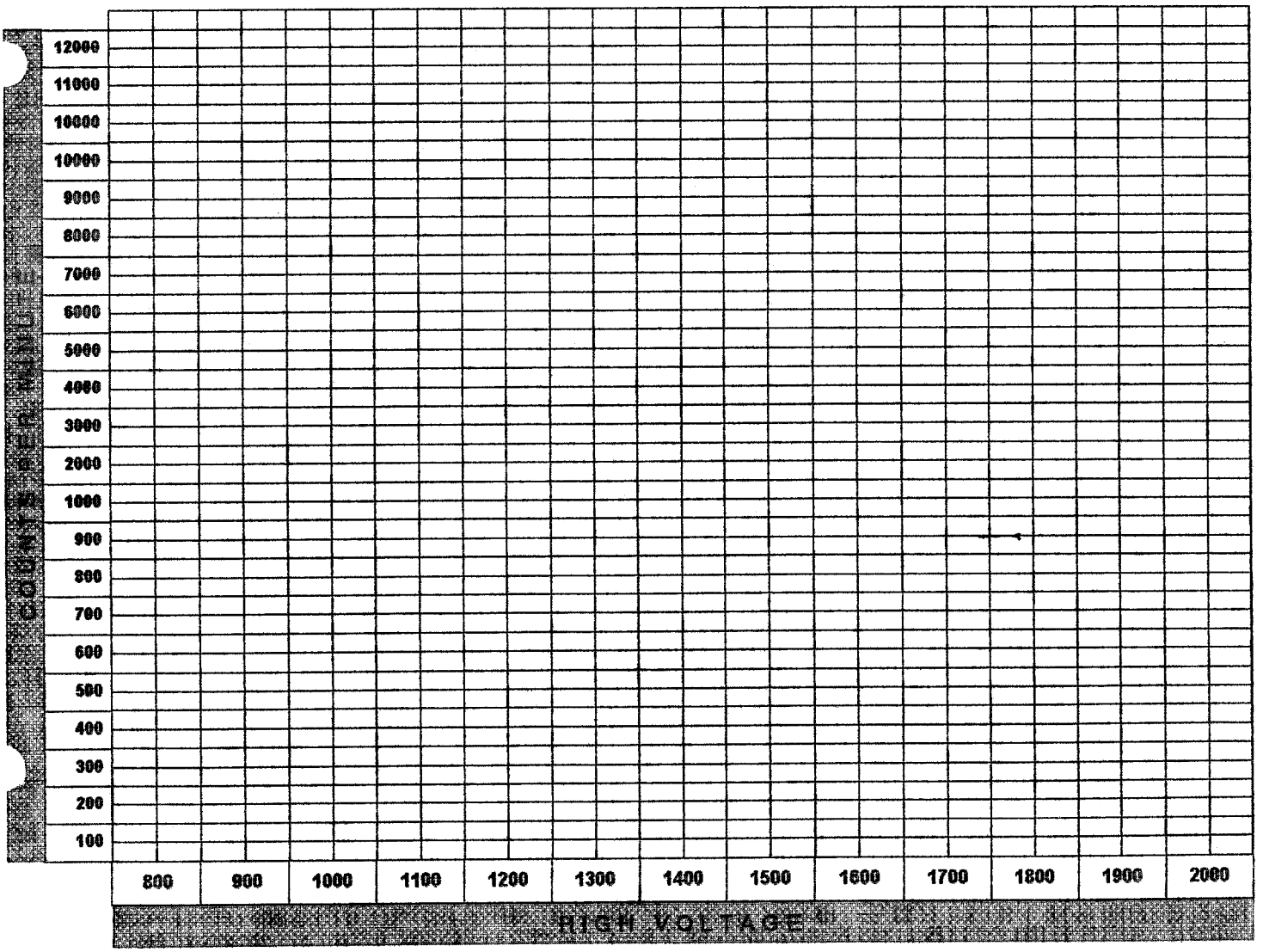
DATE:	2/12/96

COMMENTS: Calibrated with Eberline HP-100A probe.

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	5400	1650	-
900	0	1300	54600	1700	-
950	24	1350	54900	1750	-
1000	764	1400	55600	1800	-
1050	33500	1450	55800	1850	-
1100	45500	1500	56500	1900	-
1150	51100	1550	-	1950	-
1200	52900	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	11/13/95

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	230695	245000	5	49000	3	48997
	BACKGROUND	15	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
48997	21.2%	4.7	21.7%	4.7

HIGH VOLTAGE:	1200

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	48700		3 HOURS	48300	99.2%
1 HOUR	49100	100.8%	3.5 HOURS	48400	99.4%
1.5 HOURS	49400	101.8%	4 HOURS	47800	98.2%
2 HOURS	48900	100.4%	4.5 HOURS	48200	99%
2.5 HOURS	48400	99.4%	5 HOURS	48600	99.8%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

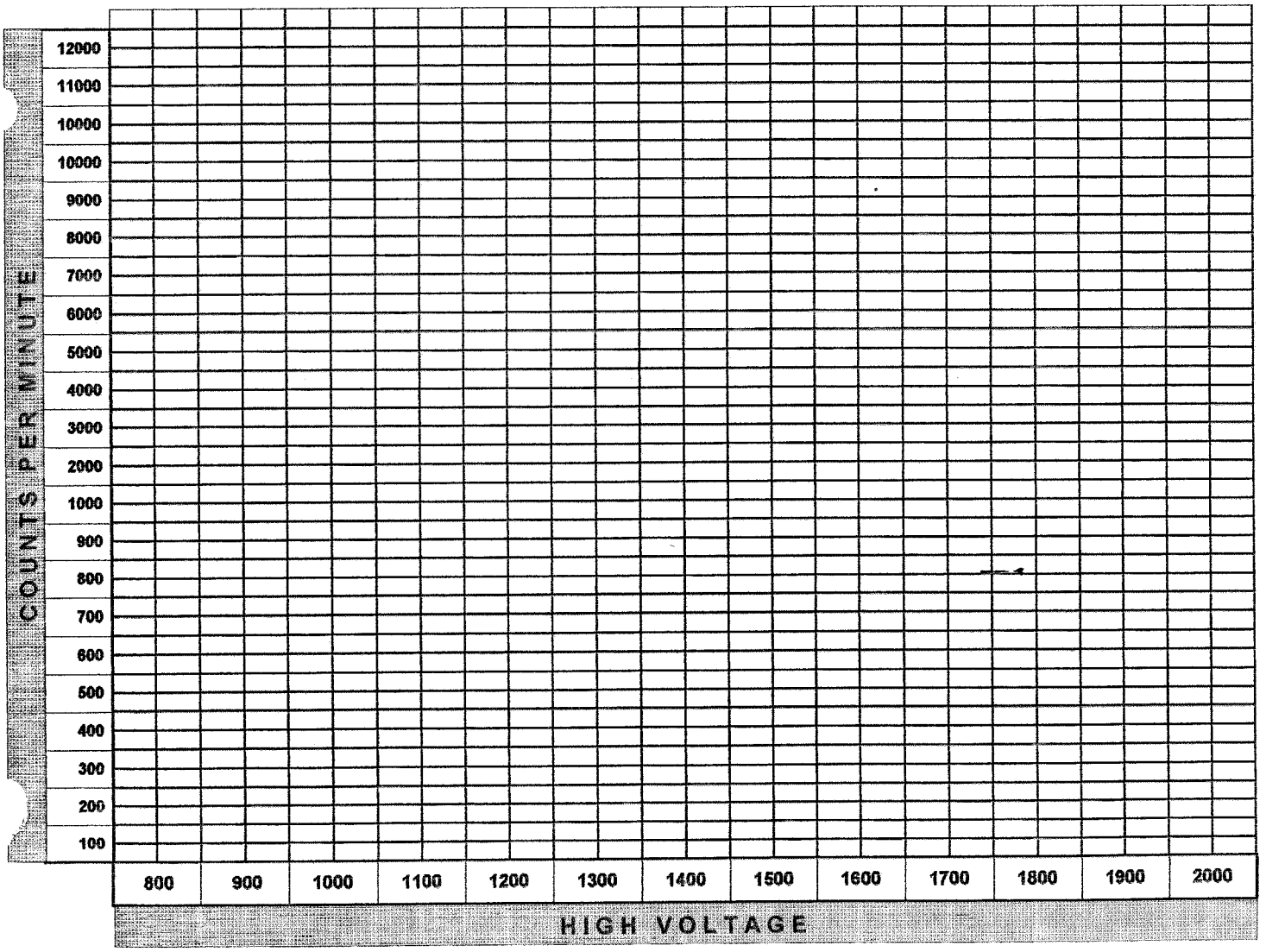
DATE:	11/13/95

COMMENTS: Calibrated with Eberline HP-100A probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	50,600	1650	---
900	0	1300	51,200	1700	---
950	3	1350	51,500	1750	---
1000	130	1400	52,300	1800	---
1050	20,000	1450	52,400	1850	---
1100	37,800	1500	53,100	1900	---
1150	46,600	1550	---	1950	---
1200	49,300	1600	---	2000	---



Eberline Instrument Corporation

CERTIFICATION OF CALIBRATION

Instrument ESP-2 / HP-100A

Serial Number 1510

Type of Source Th-230 S/N S-4704
Pu-239 S/N 7188
MP-2 S/N 192
FLUKE 8010A S/N 4530050

Range	Calibration Point	Reading
	Th-230	
CNT/MIN	7350 CPM (2π)	2.94+03 CNT/MIN(40.0%)
	Pu-239	
CNT/MIN	12600 CPM (2π)	5.69+03 CNT/MIN(45.2%)

When the Calibration Constant is 1.00, the 4 π counting efficiency is:

$$\frac{\text{READING}}{\text{Calibration Point CPM } (4\ \pi)} \times 100 = \text{Per Cent Efficiency}$$

Calibration Constant 1.00+00 High Voltage 1.38+03 volts

Dead Time (Sec.) 7.00-06 Input Sensitivity 2 mv

Overrange N/A

Calibration sources used have calibration traceable to N.I.S.T.

Date 1-29-96 Signature Victor M Johnson

EIS TEST 3

P.O. Number MB14039

2-5-96 J.C.

A subsidiary of
Thermo Instrument
Systems Inc.

INSTRUMENT SERVICE RECORD

CUSTOMER: WESTINGHOUSE (PITTSBURGH, PA.)
INSTRUMENT: ESP-2
SERIAL NUMBER: 1510

Date: 1-29-96
Job Number: 26183
Service performed:

Changed C11 and R2 to work better with gas proportional detectors. Reset the micro processor. Cleaned and calibrated.

Performed by: Victor M Johnson
Next Calibration Date: 4-29-96

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-95-12-210

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model ESP-2 Serial Number 1510
External Probe(s) HP100 Serial # 230 Pusler s/n 120935
Th s/n 11623

Calibration Method

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1		200 CPM	2.00 + 02 CPM	2.00 + 02 CPM	All Calibrations Btn. + & - 10%
2		800	8.00 + 02	8.00 + 02	
3					Battery: OK
4		2K	2.00 + 03	2.00 + 03	
5		8K	8.00 + 03	8.00 + 03	Reset: OK
6					
7		20K	2.00 + 04	2.00 + 04	Light: OK
8		80K	8.00 + 04	8.00 + 04	
9					Speaker: OK
10		200K	2.00 + 05	2.00 + 05	
11		800K	8.04 + 05	8.04 + 05	DT = 1.00- 06
12					CC = 1.00 + 00
13		2M	2.05 + 06	2.05 + 06	
14					High Voltage = 1200 Volts
15					
16	SCALER	200	2.00 + 02	2.00 + 02	Input Sensitivity ≅ 2mV
17	1 MIN COUNTS				
18		2K	2.00 + 03	2.00 + 03	230 Th Efficiency = 16.4%
19					
20		20K	2.00 + 04	2.00 + 04	
21					
22		200K	2.00 + 05	2.00 + 05	
23					
		2M	2.05 + 06	2.05 + 06	

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: (Signed)
Calibration Date: 12-20-95
Next Calibration Due: 03-20-96

I certify that the above information is correct:
Administrative Coordinator — Date 12-20-95

GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-95-10-209

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model ESP-2 Serial Number 1510 #1
External Probe(s) _____ Serial # _____

Calibration Method Pulser s/n 101500

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	RATE METER	200 CPM		2.00 + 02 CPM	All Calibrations Btn. + & - 10%
2		800		8.00 + 02	
3					Battery: OK
4		2K		2.00 + 03	
5		8K		8.00 + 03	Reset: OK
6					
7		20K		2.00 + 04	Light; OK
8		80K		8.00 + 04	
9					Speaker: OK
10		200K		2.00 + 05	
11		800K		8.01 + 05	Input Sensitivity ≅ 1.9mV
12		2M		2.00 + 06	
13	SCALER				DT = 1.75 - 07
14	INTEGRATING	200		2.00 + 02	CC = 1.00 + 00
15	1 MINUTE COUTS				
16		2K		1.99 + 03	High Voltage Check (900-1750): OK
17					
18		20K		2.00 + 04	Electronic Calibration Only
19					
20		200K		2.00 + 05	
21					
22		2M		2.00 + 06	
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: _____ (Signed)
Calibration Date: 10-24-95
Next Calibration Due: 01-24-96

I certify that the above information is correct:
_____ Administrative Coordinator
10-24-95 Date

ESP-2 CALIBRATION

ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	9/5/95

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	230695	240000	5	49200	0.6	49199
	BACKGROUND	3	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
49199	21.3%	4.7	21.3%	4.7

HIGH VOLTAGE:	1200

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	49700	- - -	3 HOURS	48200	97%
1 HOUR	49100	98.8%	3.5 HOURS	48200	97%
1.5 HOURS	48700	98%	4 HOURS	48000	96.7%
2 HOURS	48800	98.2%	4.5 HOURS	48100	97%
2.5 HOURS	48600	97.8%	5 HOURS	47400	95.4%

CALIBRATED BY:	Carmen Vergari
SIGNATURE:	Carmen Vergari

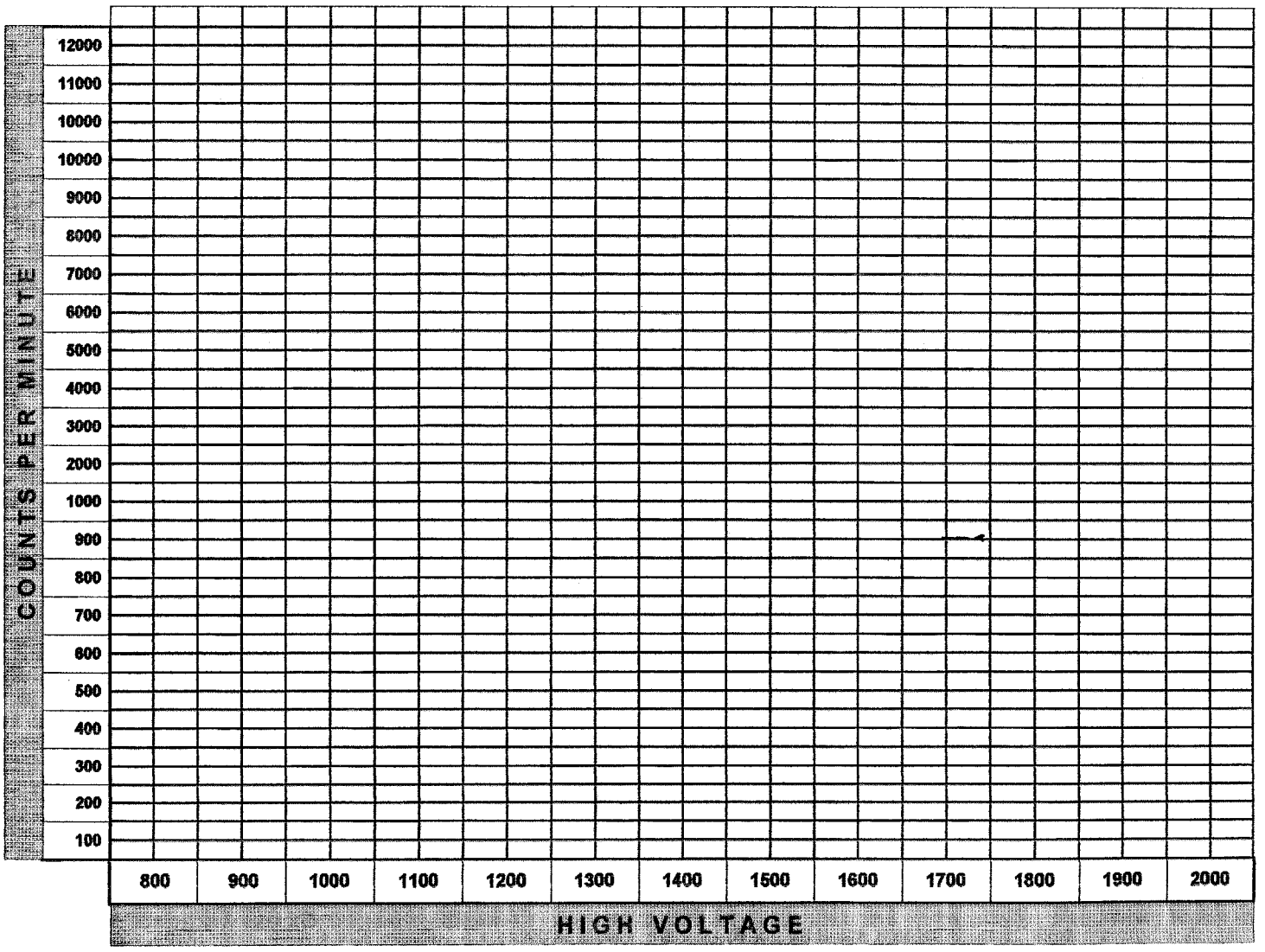
DATE:	9/5/95

COMMENTS: Calibrated with Eberline HP-100A probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	50400	1650	---
900	1	1300	51000	1700	---
950	26	1350	51500	1750	---
1000	3220	1400	52000	1800	---
1050	30800	1450	52000	1850	---
1100	42600	1500	52300	1900	---
1150	46900	1550	---	1950	---
1200	49500	1600	---	2000	---



ESP-2 CALIBRATION

ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	6/5/95

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	230695	240500	5	48100	2	48092
	BACKGROUND	10	2			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
48092	20.8%	4.8	20.8%	4.8

HIGH VOLTAGE:	1200

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	49200	---	3 HOURS	48600	98.8%
1 HOUR	49600	100.8%	3.5 HOURS	48900	99.4%
1.5 HOURS	49400	100.4%	4 HOURS	48500	98.6%
2 HOURS	49400	100.4%	4.5 HOURS	49200	100%
2.5 HOURS	49100	99.8%	5 HOURS	49900	101.4%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

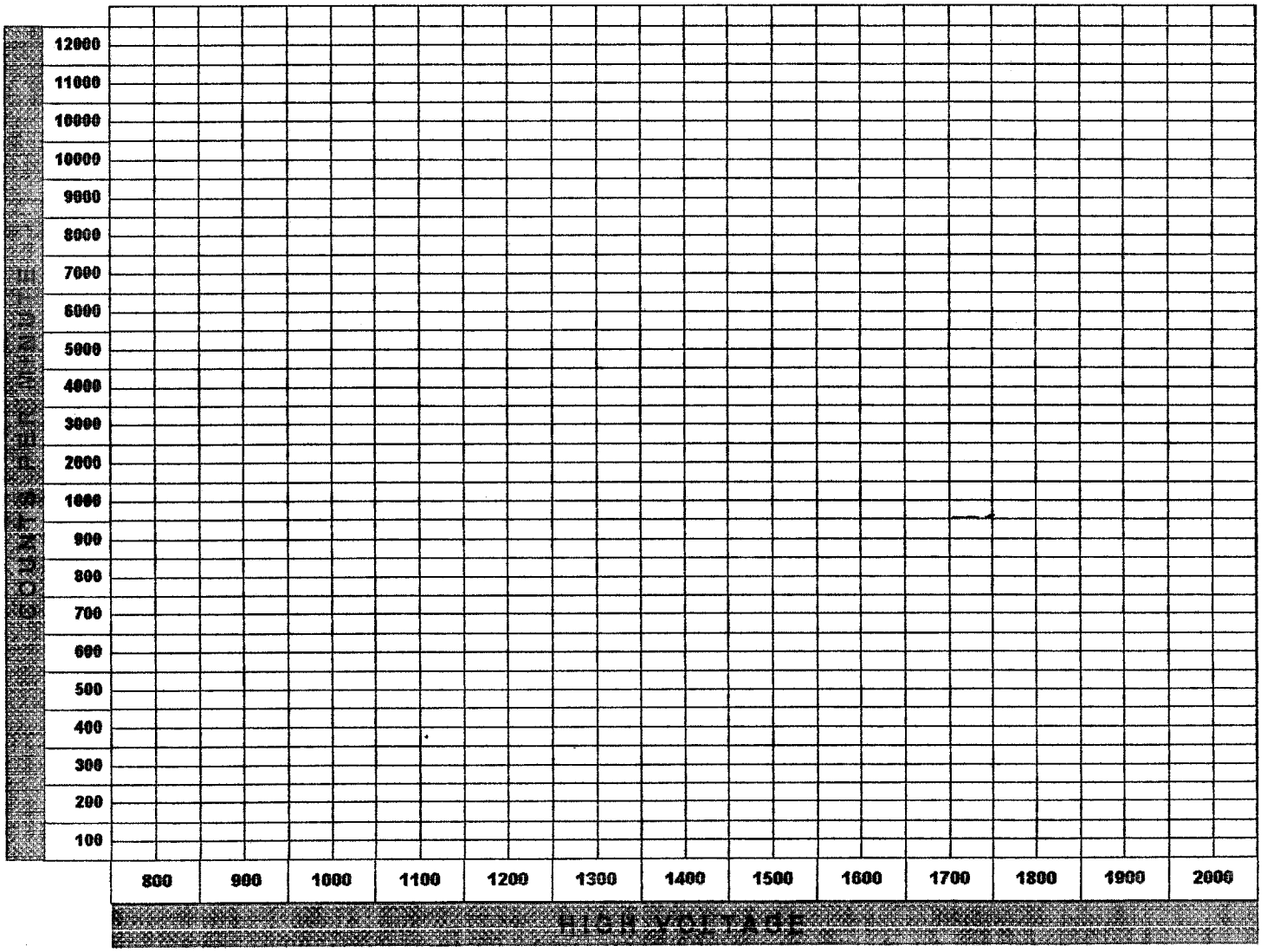
DATE:	6/5/95

COMMENTS:	Calibrated with Eberline HP-100A probe.

ESP-2 PLATEAU

ALPHA / BETA	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	50200	1650	---
900	0	1300	50800	1700	---
950	33	1350	51100	1750	---
1000	5550	1400	51400	1800	---
1050	35600	1450	52100	1850	---
1100	43900	1500	52300	1900	---
1150	47600	1550	---	1950	---
1200	49000	1600	---	2000	---



ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	3-6-95

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	230965	249500	5	49400	1	49399
	BACKGROUND	5	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
49399	21.4%	4.7	21.4%	4.7

HIGH VOLTAGE:	1200

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	49400		3 HOURS	48900	99%
1 HOUR	49400	100%	3.5 HOURS	49200	99.6%
1.5 HOURS	49200	99.6%	4 HOURS	49400	100%
2 HOURS	48800	98.8%	4.5 HOURS	49200	66.6%
2.5 HOURS	49400	100%	5 HOURS	49300	99.8%

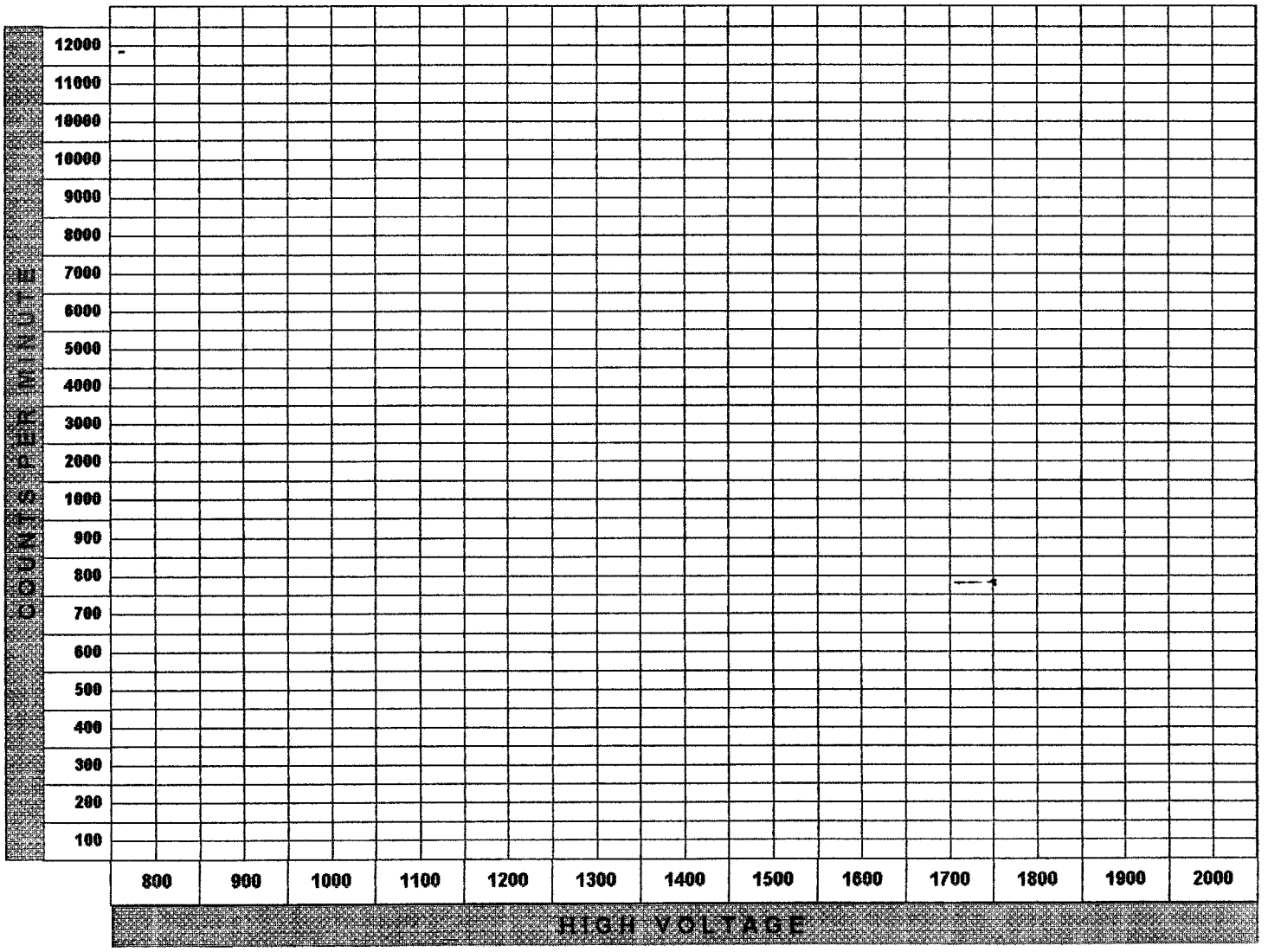
CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

DATE:	3-6-95

COMMENTS: Calibrated with Eberline HP-100A Probe.

ALPHA / BETA	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	50900	1650	-
900	0	1300	51500	1700	-
950	21	1350	5200	1750	-
1000	2700	1400	52700	1800	-
1050	34800	1450	52300	1850	-
1100	43800	1500	53100	1900	-
1150	47800	1550	-	1950	-
1200	49400	1600	-	2000	-



ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	1-4-95

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	230965	272000	5	54400	1.6	54400
	BACKGROUND	8	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
54400	23.6%	4.3	23.6%	4.3

HIGH VOLTAGE:	1200

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	54600	100%	3 HOURS	54800	100.3%
1 HOUR	54400	99.6%	3.5 HOURS	53900	98.7%
1.5 HOURS	55100	101%	4 HOURS	54700	100.2%
2 HOURS	54900	100.5%	4.5 HOURS	54500	99.8%
2.5 HOURS	55300	101.3%	5 HOURS	55000	100.7%

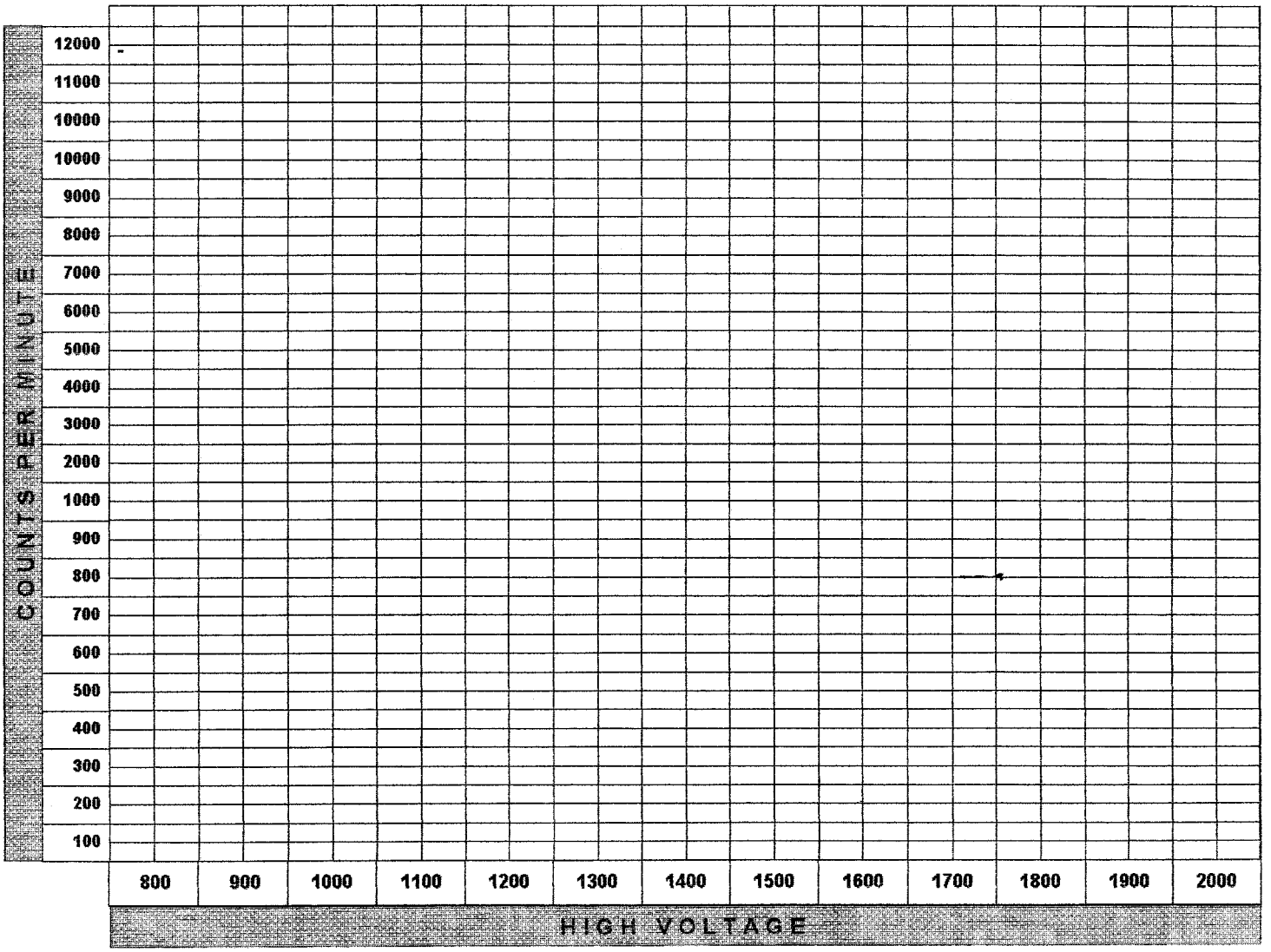
CALIBRATED BY:	John Shoemaker
SIGNATURE:	John M Shoemaker

DATE:	1-4-95

COMMENTS: Calibrated with ~~[illegible]~~ EBERLINE H.P. 100 A

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	8	1250	55300	1650	-
900	167	1300	55400	1700	-
950	18600	1350	55600	1750	-
1000	46300	1400	55900	1800	-
1050	50200	1450	56500	1850	-
1100	52100	1500	5700	1900	-
1150	53700	1550	57700	1950	-
1200	54500	1600	58100	2000	-



ESP-2 CALIBRATION

SP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	10/5/94

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31282	37600	5	7520	2	7518
	BACKGROUND	12	2.4			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7518	24%	4.2	24%	4.2

HIGH VOLTAGE:	1200

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	54000		3 HOURS	53900	99.3%
1 HOUR	53900	99.3%	3.5 HOURS	54400	100.7%
1.5 HOURS	53800	99.6%	4 HOURS	54600	101.1%
2 HOURS	54100	100.1%	4.5 HOURS	53500	99.1%
2.5 HOURS	53800	99.6%	5 HOURS	53700	99.4%

CALIBRATED BY:	John Shoemaker
SIGNATURE:	John M Shoemaker

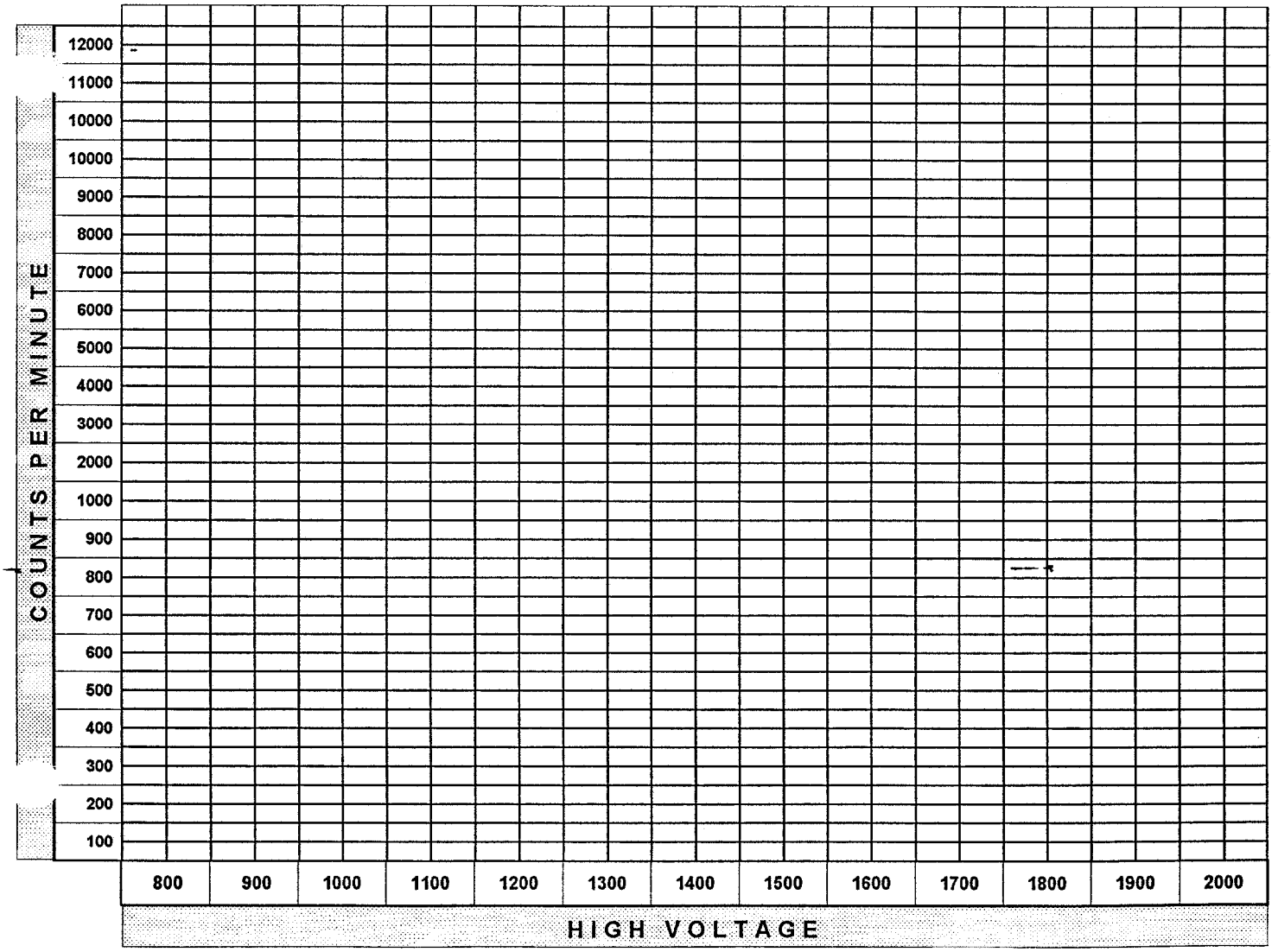
DATE:	10/5/94

COMMENTS: Calibrated with Eberline HP-100A probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	7460	1650	-
900	36	1300	7650	1700	-
950	2840	1350	7580	1750	-
1000	6160	1400	7510	1800	-
1050	6850	1450	7860	1850	-
1100	7160	1500	7830	1900	-
1150	7220	1550	-	1950	-
1200	7360	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	7-11-94

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31282	37000	5	7400	3.2	7397
	BACKGROUND	16	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7397	23.6	4.24	23.6	4.24

HIGH VOLTAGE:	1200

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	7390	100%	3 HOURS	7410	100.3%
1 HOUR	7420	100%	3.5 HOURS	7360	99.6%
1.5 HOURS	7380	99.9%	4 HOURS	7310	98.9%
2 HOURS	7360	99.6%	4.5 HOURS	7340	99.3%
2.5 HOURS	7400	100%	5 HOURS	7280	98.5%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

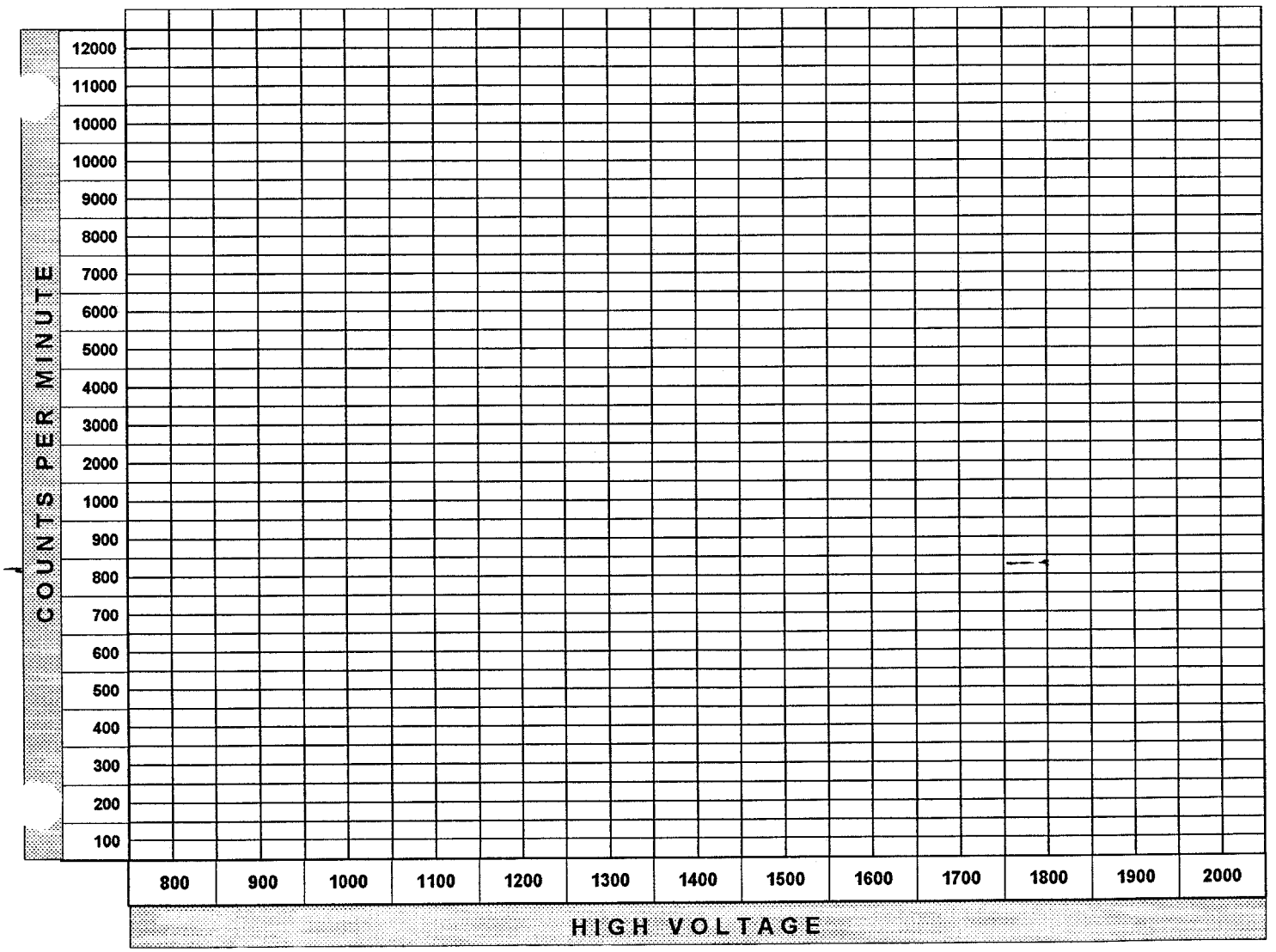
DATE:	7-11-94

COMMENTS: Calibrated with Eberline HP-100A Probe.

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	7310	1650	-
900	259	1300	7400	1700	-
950	606	1350	7560	1750	-
1000	5930	1400	7590	1800	-
1050	6910	1450	7770	1850	-
1100	6950	1500	7930	1900	-
1150	7210	1550	-	1950	-
1200	7370	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	4/4/94

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31283	31500	5	6300	1.4	6299
	BACKGROUND	7	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
6299	20.1%	4.98	20.1%	4.98

HIGH VOLTAGE:	1200

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	6370	INITIAL	3 HOURS	6250	98.1
1 HOUR	6270	98.4	3.5 HOURS	6130	96.2
1.5 HOURS	6220	97.6	4 HOURS		
2 HOURS	6170	96.9	4.5 HOURS		
2.5 HOURS	6320	99.2	5 HOURS		

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

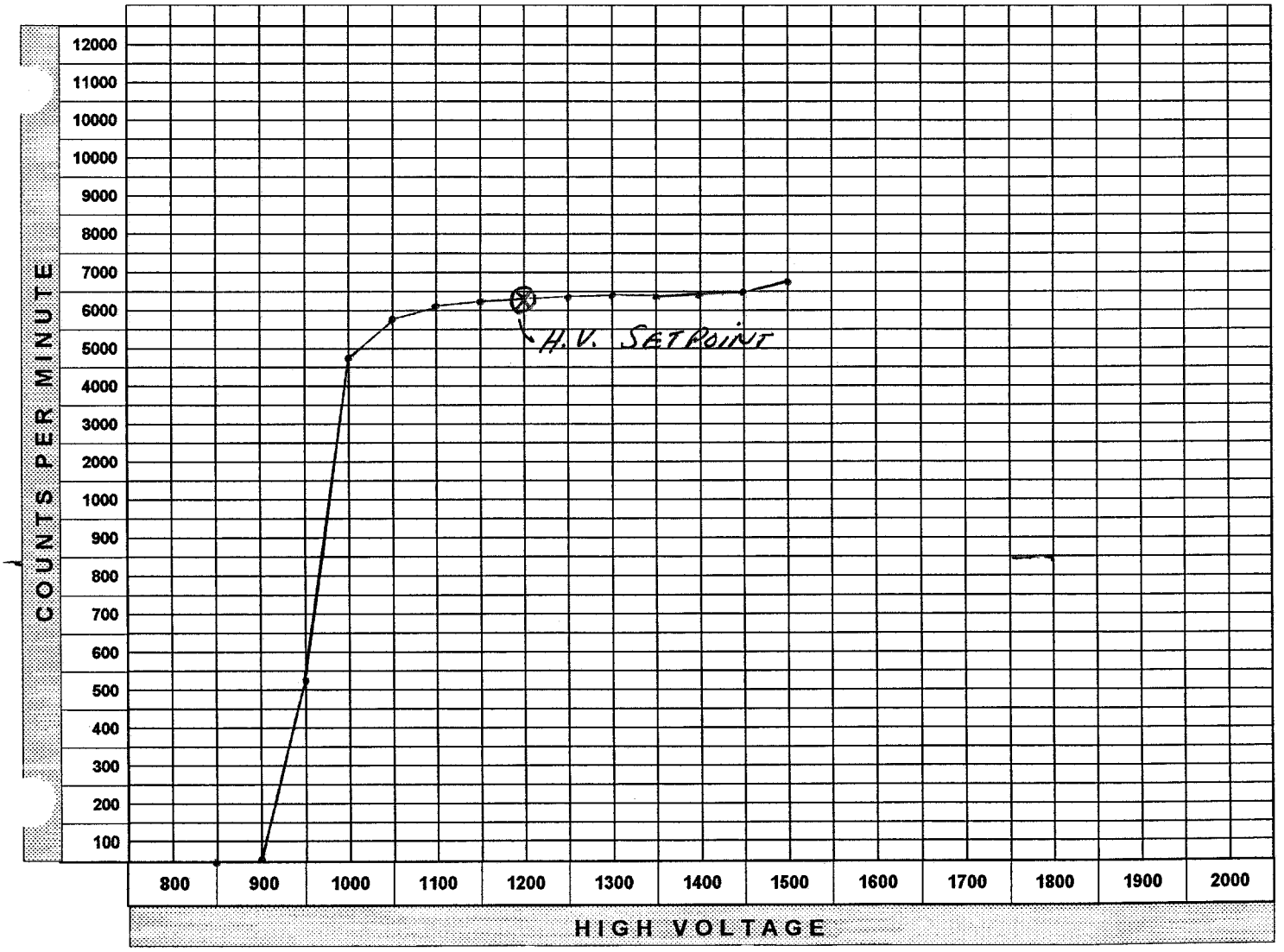
DATE:	4/4/94

COMMENTS:

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	1	1250	6380	1650	---
900	2	1300	6420	1700	---
950	523	1350	6360	1750	---
1000	4710	1400	6470	1800	---
1050	5750	1450	6500	1850	---
1100	6060	1500	6720	1900	---
1150	6140	1550	---	1950	---
1200	6330	1600	---	2000	---



ESP-2 CALIBRATION

ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	1-3-94

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31283	31800	5	6360	2.4	6358
	BACKGROUND	12	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
6358	20.3%	4.9	20.3%	4.9

HIGH VOLTAGE:	1200

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	6230	100%	3 HOURS	5910	94.9%
1 HOUR	6160	98.9%	3.5 HOURS	5720	91.8%
1.5 HOURS	6060	97.3%	4 HOURS	5760	92.4%
2 HOURS	6110	98.1%	4.5 HOURS	---	---
2.5 HOURS	5990	96.A%	5 HOURS	---	---

CALIBRATED BY:	M. Shaffer / L. Smith
SIGNATURE:	Larry Stt

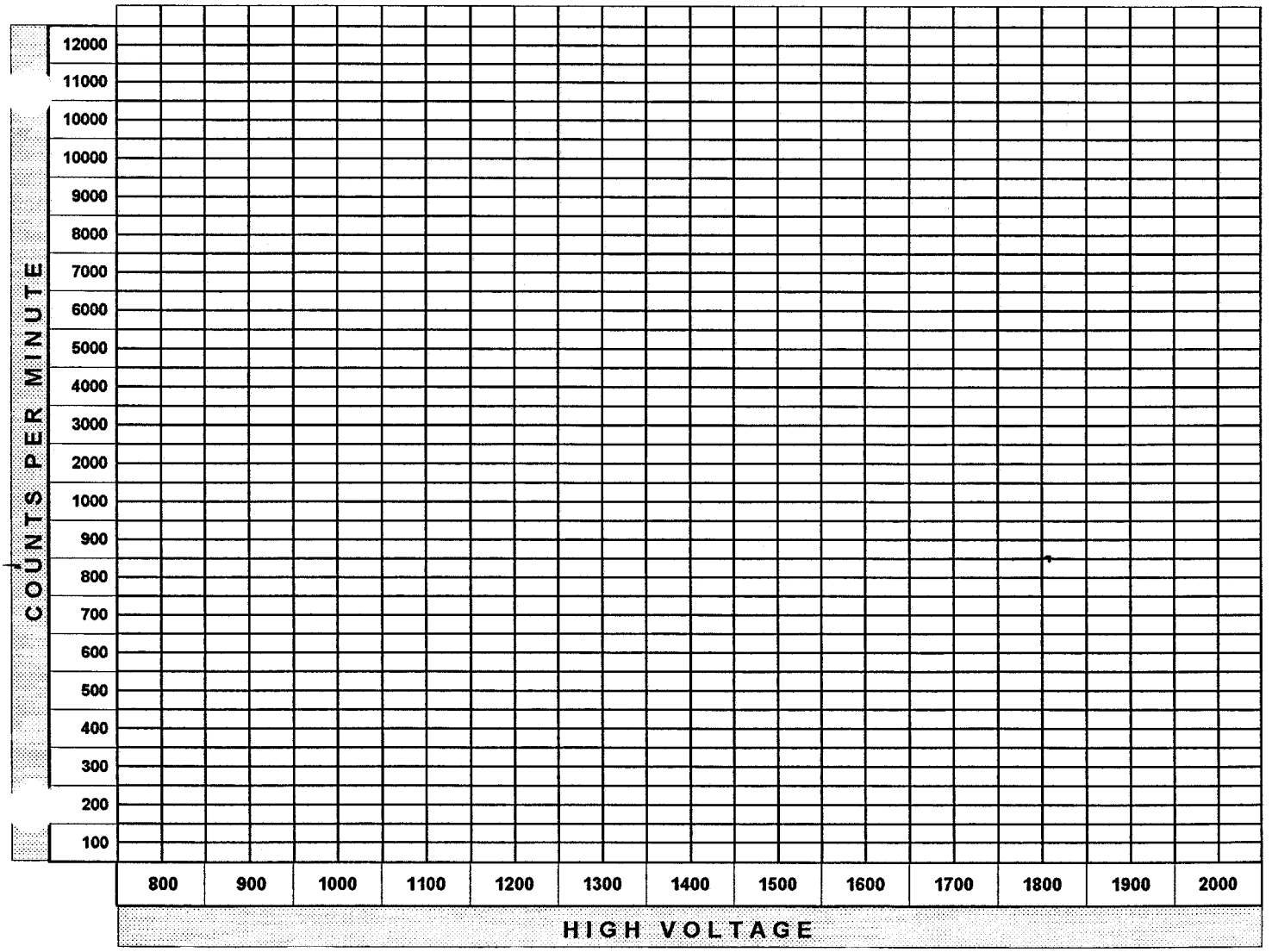
DATE:	1-3-94

COMMENTS:

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	6260	1650	---
900	0	1300	6340	1700	---
950	337	1350	6480	1750	---
1000	4740	1400	6500	1800	---
1050	5710	1450	6460	1850	---
1100	5880	1500	6580	1900	---
1150	6210	1550	---	1950	---
1200	6320	1600	---	2000	---



ESP-2 S/N:	1510	INSTRUMENT CODE:	6	DATE:	10/6/93

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31283	30800	5	6160	2.8	6157.2
7346	230974	225000	5	45000	2.8	44997.2
	BACKGROUND	14	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
6157.2	19.6	5.1	19.5	5.1
44997.2	19.4	5.1		

HIGH VOLTAGE:	1200

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	6360	100	3 HOURS	6240	98.1
1 HOUR	6420	100.9	3.5 HOURS	6050	95.1
1.5 HOURS	6430	101.1	4 HOURS	6130	96.3
2 HOURS	6280	98.7	4.5 HOURS	6070	95.4
2.5 HOURS	6240	98.1	5 HOURS	6150	96.6

CALIBRATED BY:	Michael Shaffer
SIGNATURE:	Michael T Shaffer

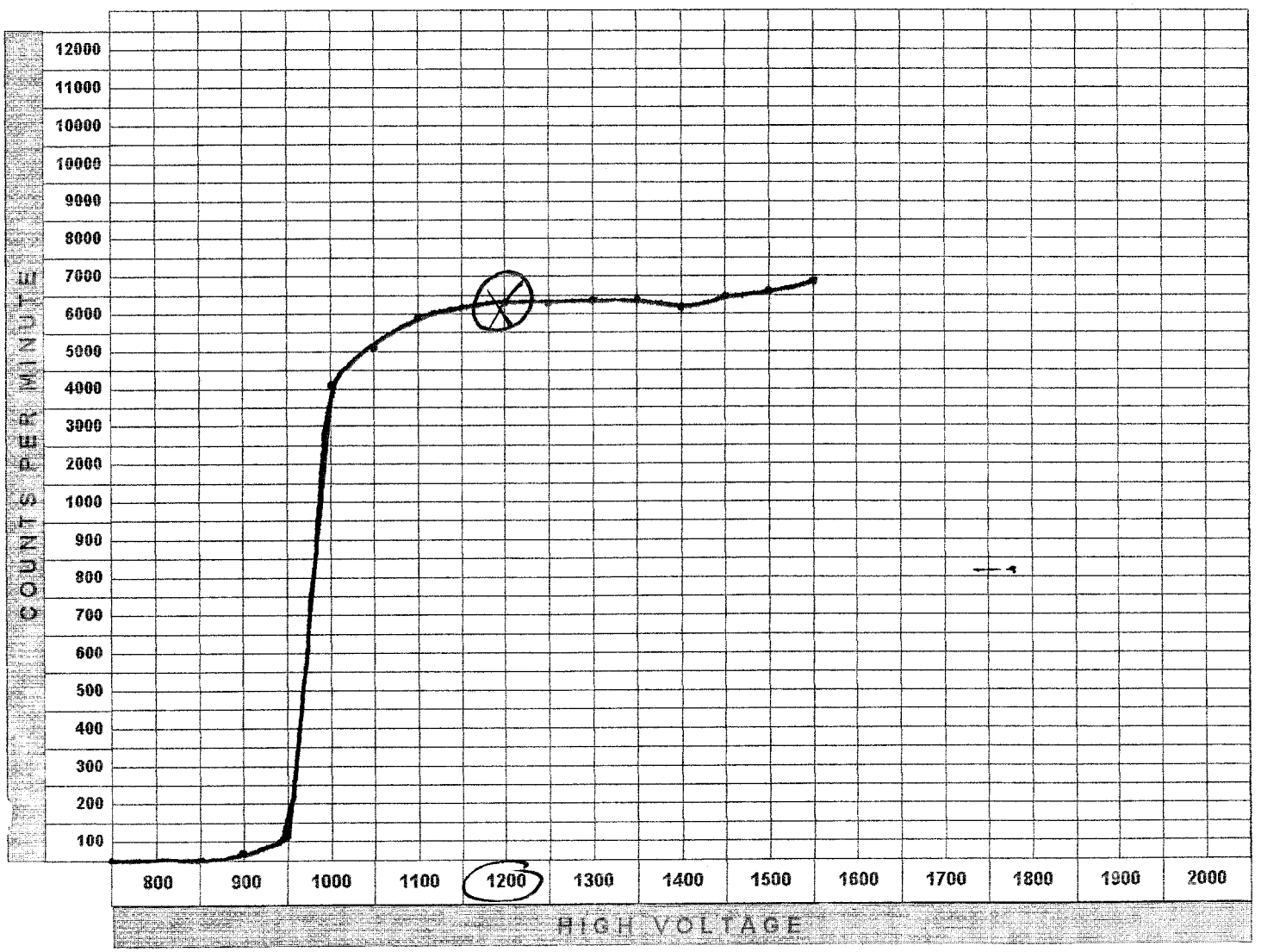
DATE:	10/6/93

COMMENTS:

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	6200	1650	
900	3	1300	6400	1700	
950	13	1350	6430	1750	
1000	4260	1400	6290	1800	
1050	5500	1450	6500	1850	
1100	5740	1500	6570	1900	
1150	6170	1550	6580	1950	
1200	6200	1600	6740	2000	



IH & S FORM#205F
FOREST HILLS SITE

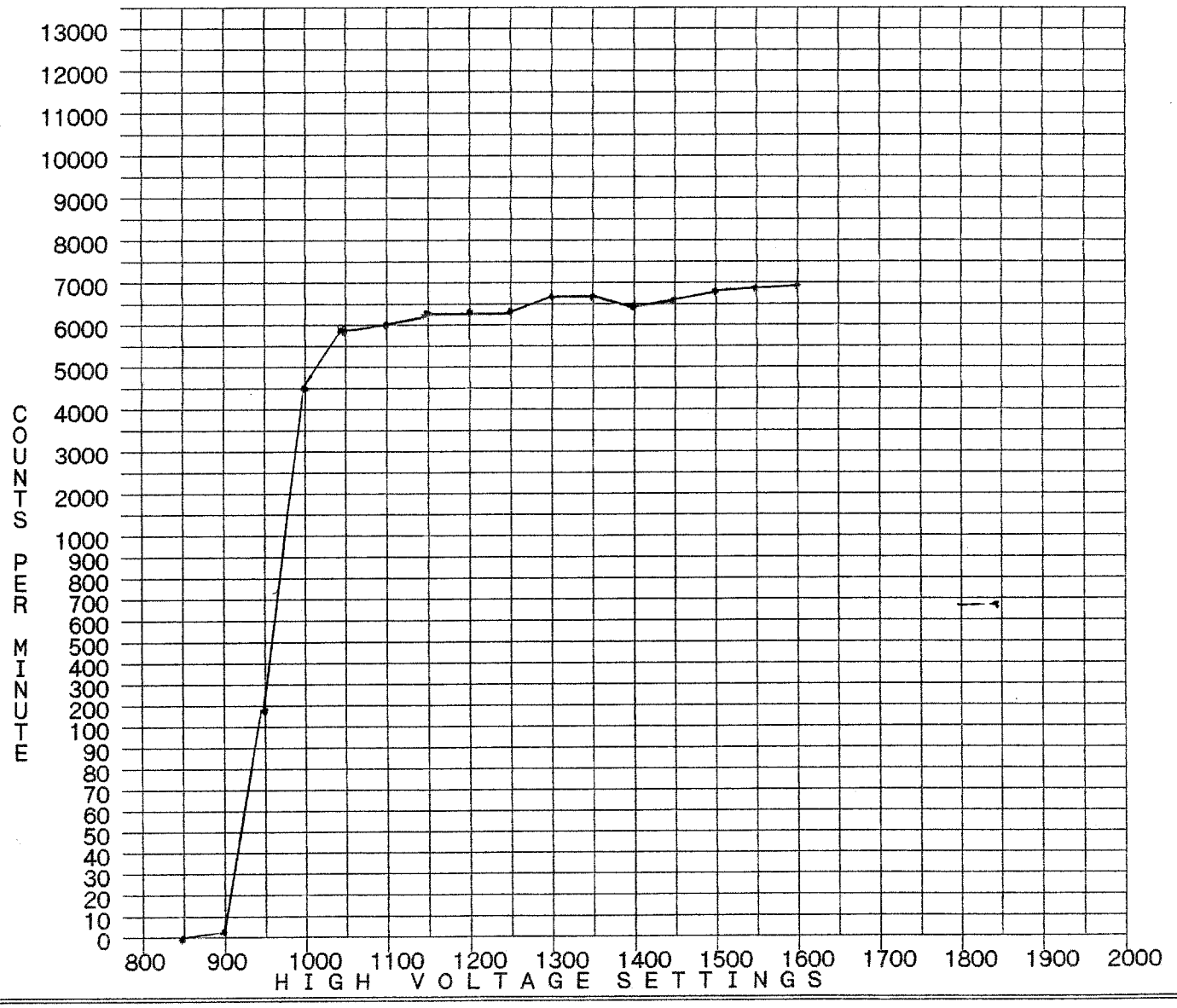
ESP-2 CALIBRATION DATA
(Front Page)

ESP-2 S/N: 1510	~~TAB #: 5~~ 22 Code # 6	DATE: 7/12/93

PLATEAU DATA

ALPHA				BETA			
HV	CTS	HV	CTS	HV	CTS	HV	CTS
850	0	1250	6260	1150		1550	
900	2	1300	6610	1200		1600	
950	190	1350	6590	1250		1650	
1000	4550	1400	6490	1300		1700	
1050	5860	1450	6570	1350		1750	
1100	6080	1500	6750	1400		1800	
1150	6290	1550	6860	1450		1850	
1200	6270	1600	6930	1500		1900	

PLATEAU PLOT



IH & S FRM#205B
FOREST HILLS SITE

ESP-2 CALIBRATION DATA
(Back Page)

ESP-2 S/N: 1510	~~TAB # 5~~ CODE # 6	DATE: 07/12/93

ALPHA EFFICIENCY DATA (Net cpm / dpm = Eff)(Coorection Factor = 1 / Eff)

SOURCE #	ACTIVITY	TOTAL CTS	TIME	GROSS CPM	BKG. CPM	NET CPM
5308	31300 dpm	12700	2 min	6350	1.6	6348
7346	231300 dpm	92000	2 min	46000	1.6	45998

NET CPM	EFF	C.F.	AVERAGE EFF	AVERAGE C.F.
6348	20.3%	4.9	20.1%	5.0
45998	19.9%	5.0		

BETA EFFICIENCY DATA

SOURCE #	ACTIVITY	TOTAL CTS	TIME	GROSS CPM	BKG. CPM	NET CPM
	dpm		min			
	dpm		min			

NET CPM	EFF	C.F.	AVERAGE EFF	AVERAGE C.F.

GAS DECAY CALIBRATION

TIME	CPM	PERCENT	TIME	CPM	PERCENT
INITIAL	45800	Initial	3.0 HOURS	45400	99.1%
1.0 HOUR	46000	100.4%	3.5 HOURS	45600	99.6%
1.5 HOURS	45900	100.2%	4.0 HOURS	46000	100.4%
2.0 HOURS	45800	100.0%	4.5 HOURS		
2.5 HOURS	45500	99.3%	5.0 HOURS		

DETECTOR DATA

ALPHA - HP 100A DETECTOR	BETA - HP 100A DETECTOR
HIGH VOLTAGE SETTING: 1200 Volts	HIGH VOLTAGE SETTING:
CC: 1.00 E+00	CC:
DT: 1.00 E-06	DT:
ALARM: Not Set	ALARM:

CALIBRATED BY: Larry Smith SIGNATURE:

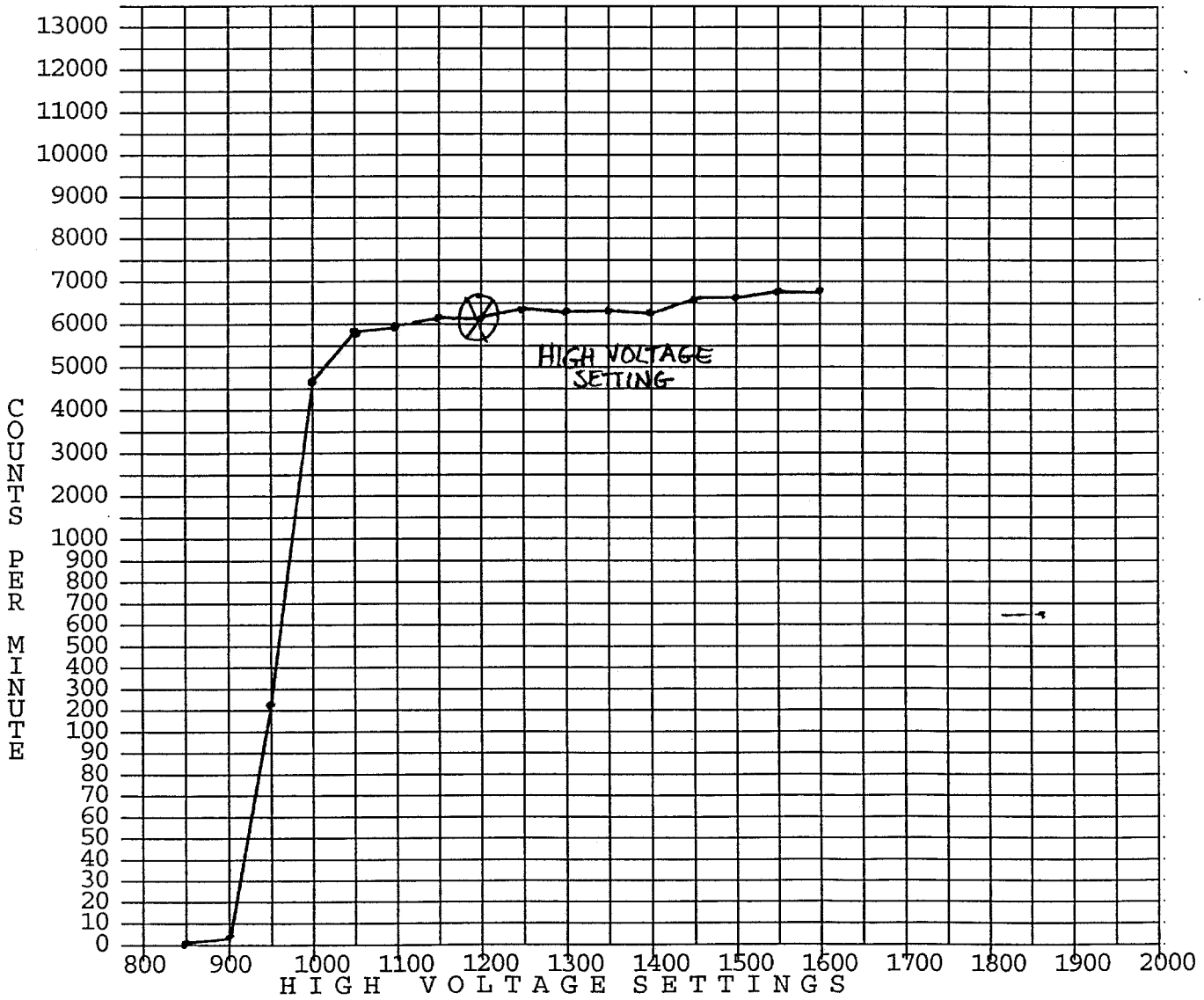
ESP-2 CALIBRATION (Front Page)

ESP-2 S/N: 1510	~~TAB #:~~ 5 CODE # 6	DATE: 4/15/93

PLATEAU DATA

ALPHA				BETA			
HV	CTS	HV	CTS	HV	CTS	HV	CTS
850	0	1250	6330	1150		1550	
900	3	1300	6230	1200		1600	
950	226	1350	6360	1250		1650	
1000	4630	1400	6310	1300		1700	
1050	5640	1450	6590	1350		1750	
1100	5830	1500	6670	1400		1800	
1150	6080	1550	6710	1450		1850	
1200	6050	1600	6650	1500		1900	

PLATEAU PLOT



ESP-2 CALIBRATION (Back Page)

ESP-2 SERIAL # 1510	~~TAB #:~~ 5 CODE #6	DATE: 4/15/93

ALPHA EFFICIENCY DATA						
SOURCE #	ACTIVITY	GROSS CTS	TIME	NET CTS	EFF.	C.F.
7345	2210 dpm	2020	5 min.	404	18.2%	5.4
5308	31300 dpm	31000	5 min.	6200	19.8%	5.0
7346	231100 dpm	225000	5 min.	45000	19.4%	5.1
BACKGROUND		3	5 min.	0.6	19.1% Average	5.1 Average

BETA EFFICIENCY DATA (Note: Eff= Net Cts - Bkg. / dpm)						
SOURCE #	ACTIVITY	GROSS CTS	TIME	NET CTS	EFF.	C.F.
	dpm					
	dpm					
	dpm					
BACKGROUND					Average	Average

GAS DECAY CALIBRATION					
TIME	ALPHA CPM	PERCENT	TIME	ALPHA CPM	PERCENT
INITIAL	6140		3.0 HOURS	6280	102.8%
1.0 HOUR	6230	101.4%	3.5 HOURS	6310	102.7%
1.5 HOURS	6340	103.3%	4.0 HOURS	6240	101.6%
2.0 HOURS	6310	102.7%	4.5 HOURS	6370	103.7%
2.5 HOURS	6130	100.0%	5.0 HOURS	6460	105.2%

DETECTOR DATA:	ALPHA HP-100A	BETA HP-100A
HIGH VOLTAGE SETTING:	1200	N/A
CC:	1.00 E +00	1.00 E +00
DT:	1.00 E +00	1.00 E -06
ALARM:	NOT SET	NOT SET

CALIBRATED BY: Larry Smith SIGNATURE: Larry Smith

CODE NUMBER 7

REPORT #001

ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	8/18/98

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31279	35700	5	7140	1.4	7139
	BACKGROUND	7	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7130	22.8%	4.4	22.8%	4.4

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	6800	-	3 HOURS	6990	102.8%
1 HOUR	6960	102.3%	3.5 HOURS	6980	102.6%
1.5 HOURS	6950	102.2%	4 HOURS	7050	103.7%
2 HOURS	6990	102.8%	4.5 HOURS	6950	102.2%
2.5 HOURS	7070	103.9%	5 HOURS	6880	101.1%

CALIBRATED BY:	Carmen A. Vergari
SIGNATURE:	Carmen A. Vergari

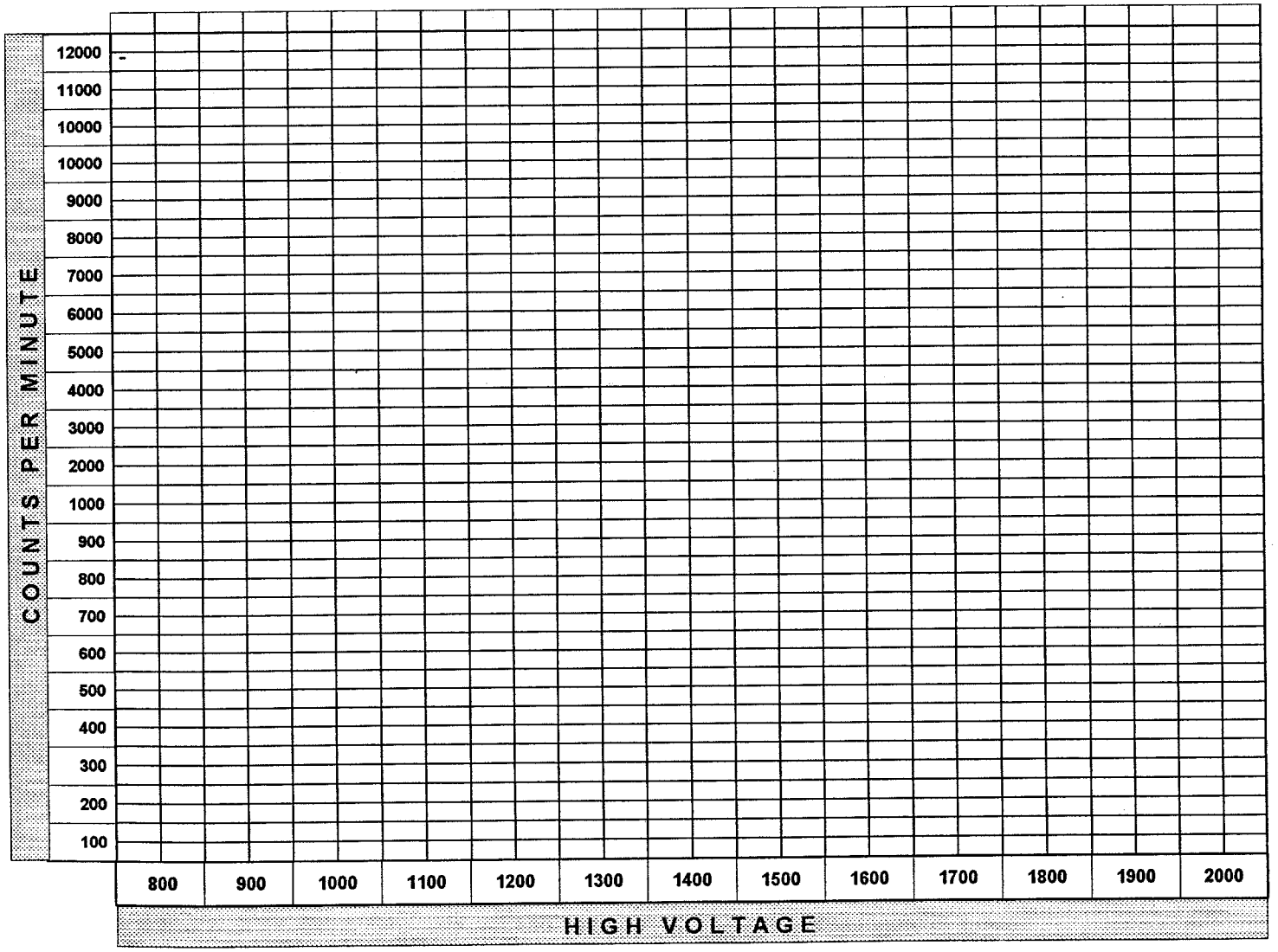
DATE:	8/18/98

COMMENTS: Calibrated with Ludlum 43-68 probe.

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	362	1250	7190	1650	-
900	4780	1300	7160	1700	-
950	6410	1350	7490	1750	-
1000	6920	1400	7460	1800	-
1050	6990	1450	7500	1850	-
1100	7080	1500	-	1900	-
1150	7100	1550	-	1950	-
1200	7210	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	5/17/98

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31279	35600	5	7120	2.2	7117.8
	BACKGROUND	11	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7117.8	22.7%	4.4	22.7%	4.4

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	6980		3 HOURS	7030	101%
1 HOUR	7040	101%	3.5 HOURS	7000	100%
1.5 HOURS	7020	100%	4 HOURS	6920	99%
2 HOURS	7040	101%	4.5 HOURS	6920	99%
2.5 HOURS	7020	100%	5 HOURS	6940	99%

CALIBRATED BY:	Carmen Vergari
SIGNATURE:	Carmen Vergari

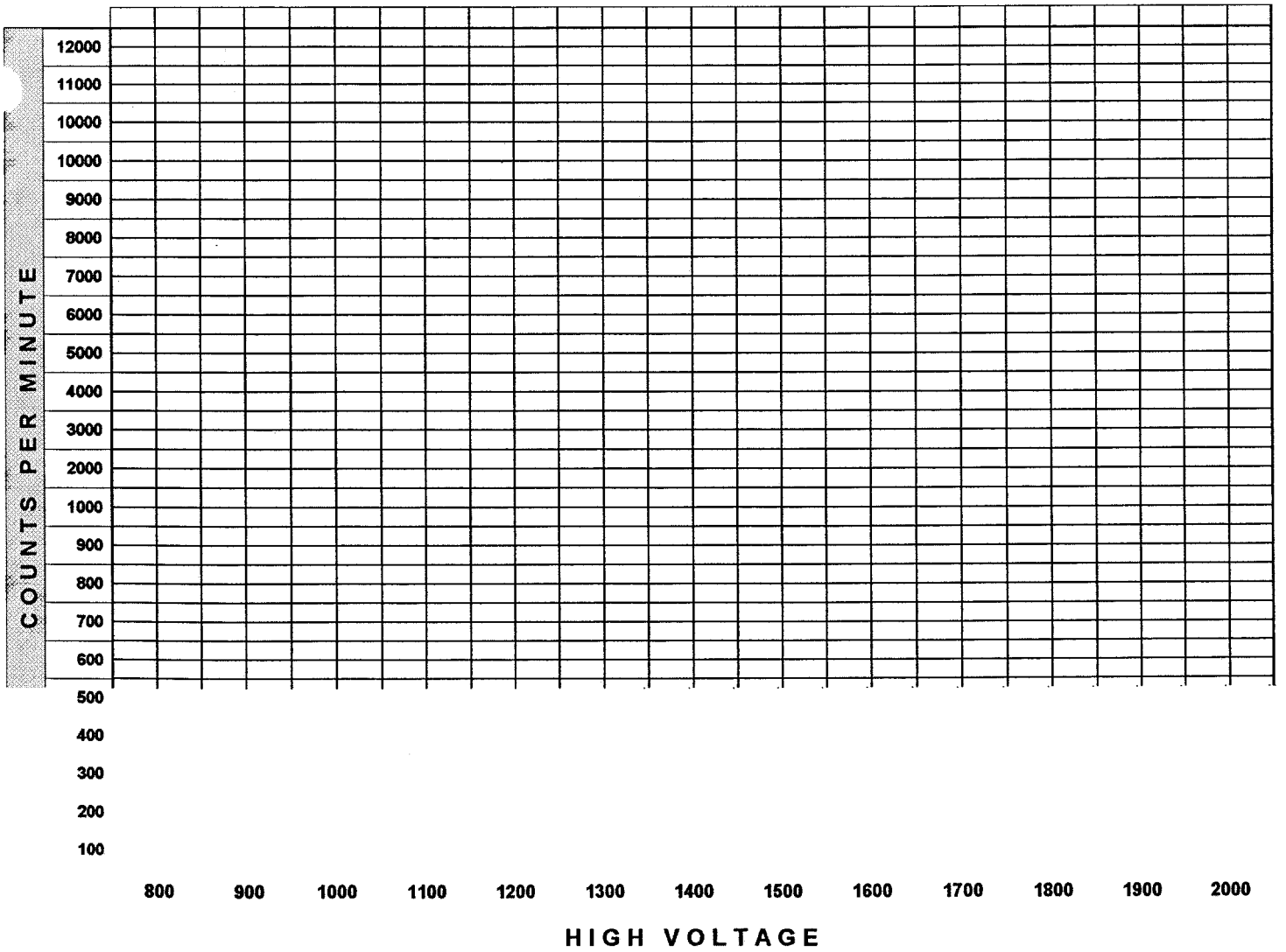
DATE:	5/11/98

COMMENTS: Calibrated with Ludlum 43-68 probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	456	1250	7310	1650	-
900	4590	1300	7230	1700	-
950	6230	1350	7250	1750	-
1000	6850	1400	7450	1800	-
1050	6920	1450	7530	1850	-
1100	7190	1500	-	1900	-
1150	7180	1550	-	1950	-
1200	7110	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	1/29/98

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31279	35600	5	7120	1.2	7118.8
	BACKGROUND	6	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7118.8	22.8%	4.4	22.8%	4.4

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	7120	-	3 HOURS	7040	98.9%
1 HOUR	7050	99%	3.5 HOURS	7070	99.3%
1.5 HOURS	7100	99.7%	4 HOURS	7170	100.7%
2 HOURS	7070	99.3%	4.5 HOURS	6960	97.8%
2.5 HOURS	7020	98.6%	5 HOURS	6980	98%

CALIBRATED BY:	Carmen Vergari
SIGNATURE:	Carmen Vergari

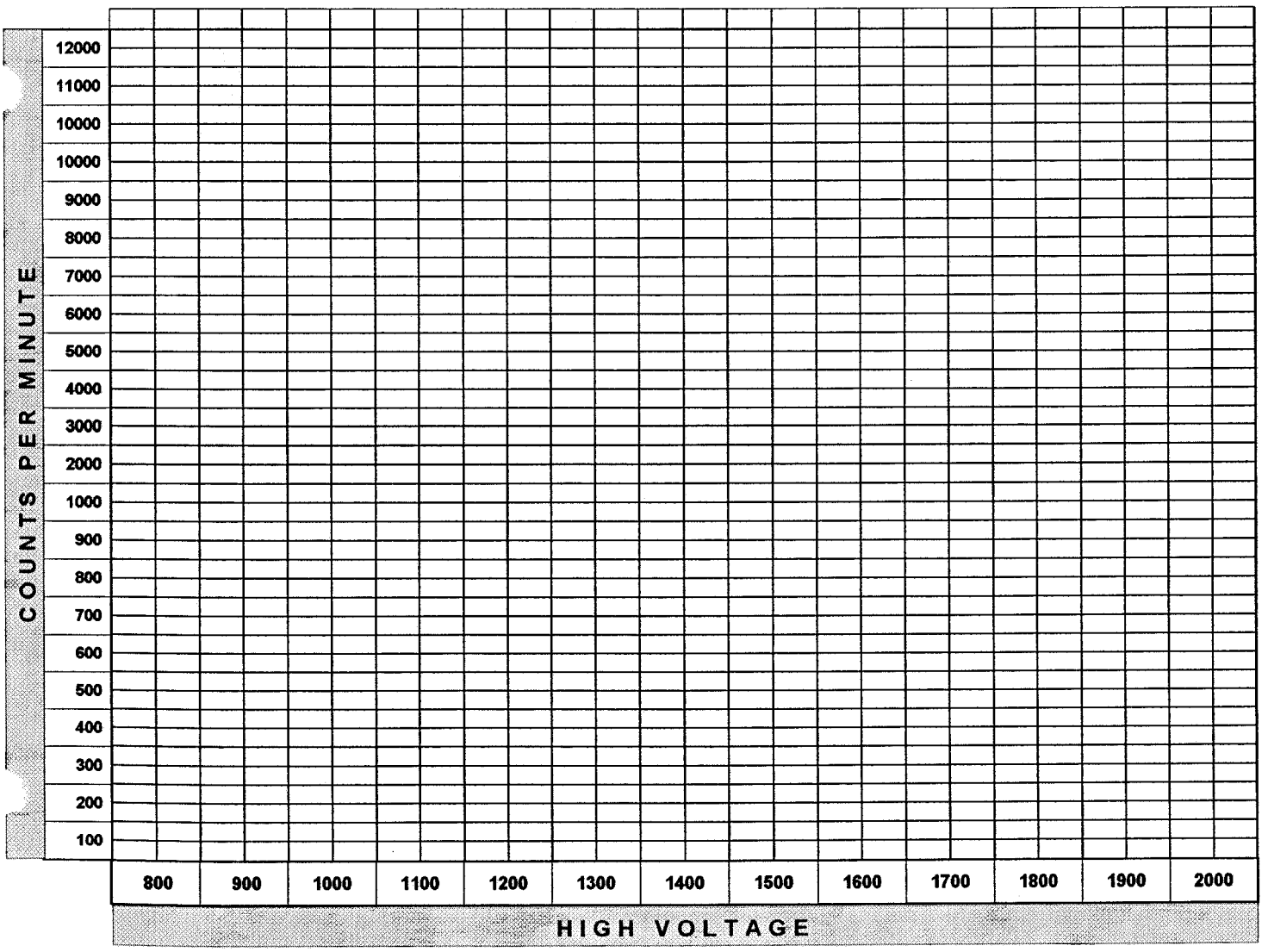
DATE:	1/29/98

COMMENTS: Calibrated with Ludlum 43-68 probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	473	1250	7210	1650	-
900	4430	1300	7230	1700	-
950	6590	1350	7400	1750	-
1000	6900	1400	7580	1800	-
1050	7050	1450	7720	1850	-
1100	7060	1500	-	1900	-
1150	7200	1550	-	1950	-
1200	7070	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	10/28/97

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY - dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31280	36100	5	7220	2.6	7217
	BACKGROUND	13	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7217	23.1%	4.33	23.1%	4.33

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	7110	-	3 HOURS	7060	99.3%
1 HOUR	7110	100%	3.5 HOURS	6890	96.9%
1.5 HOURS	7000	98.5%	4 HOURS	6990	98.3%
2 HOURS	6920	97.3%	4.5 HOURS	6910	97.2%
2.5 HOURS	6960	97.9%	5 HOURS	7050	99.2%

CALIBRATED BY:	Larry Smith
SIGNATURE:	

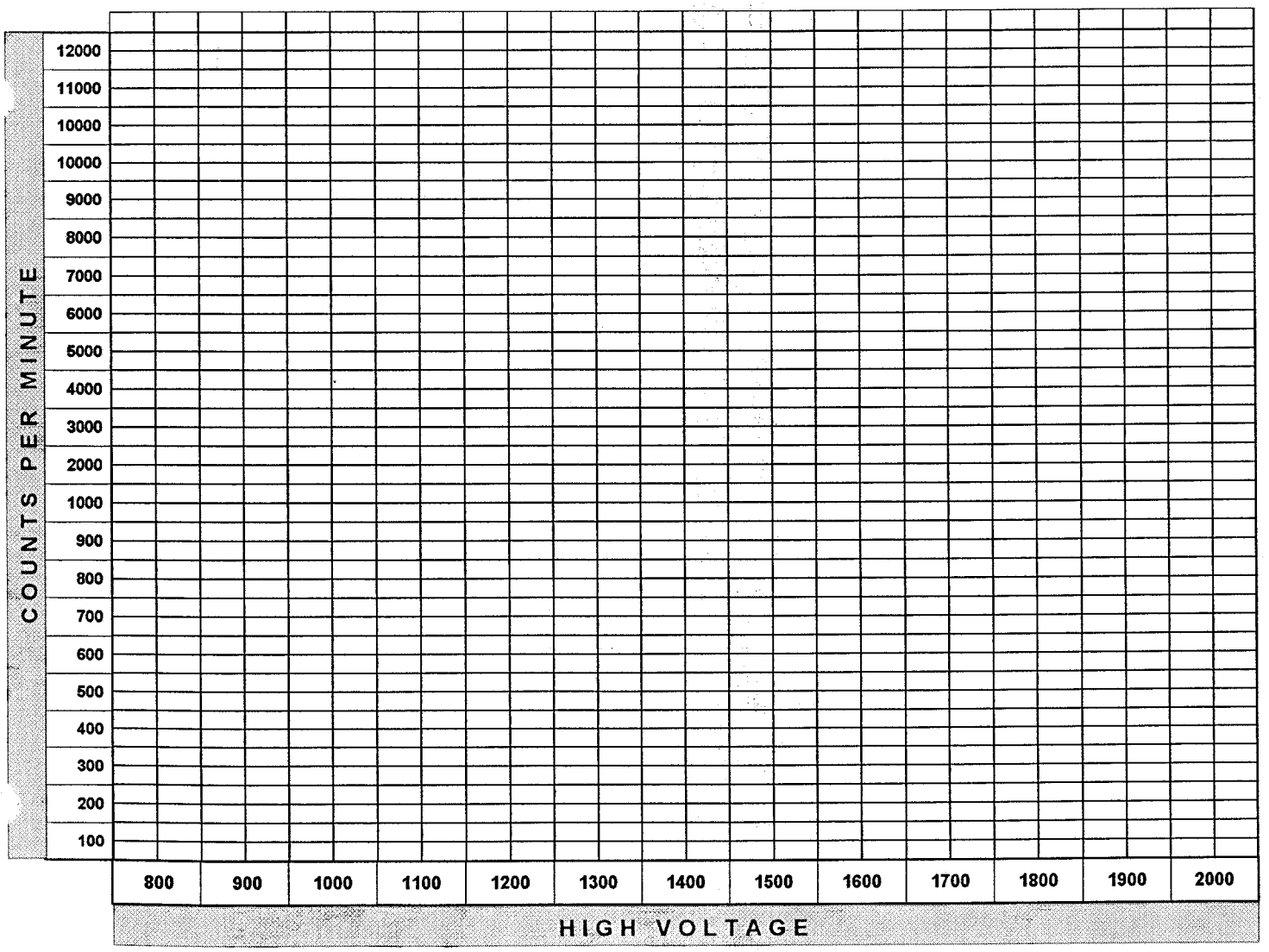
DATE:	10/28/97

COMMENTS: Calibrated with Ludlum 43-68 probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	9	1250	7500	1650	-
900	3650	1300	7440	1700	-
950	6360	1350	7430	1750	-
1000	6780	1400	7410	1800	-
1050	7160	1450	7700	1850	-
1100	7200	1500	7710	1900	-
1150	7460	1550	-	1950	-
1200	7430	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	8/5/97

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31300	35500	5	7100	4.2	7096
	BACKGROUND	21	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7096	22.7%	4.4	22.7%	4.4

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	6940	-	3 HOURS	6950	100.1%
1 HOUR	7010	101%	3.5 HOURS	6840	98.6%
1.5 HOURS	7020	101.1%	4 HOURS	6930	99.8%
2 HOURS	7000	100.9%	4.5 HOURS	6860	98.8%
2.5 HOURS	6910	99.6%	5 HOURS	6900	99.4%

CALIBRATED BY:	Carmen Vergari
SIGNATURE:	Carmen A. Vergari

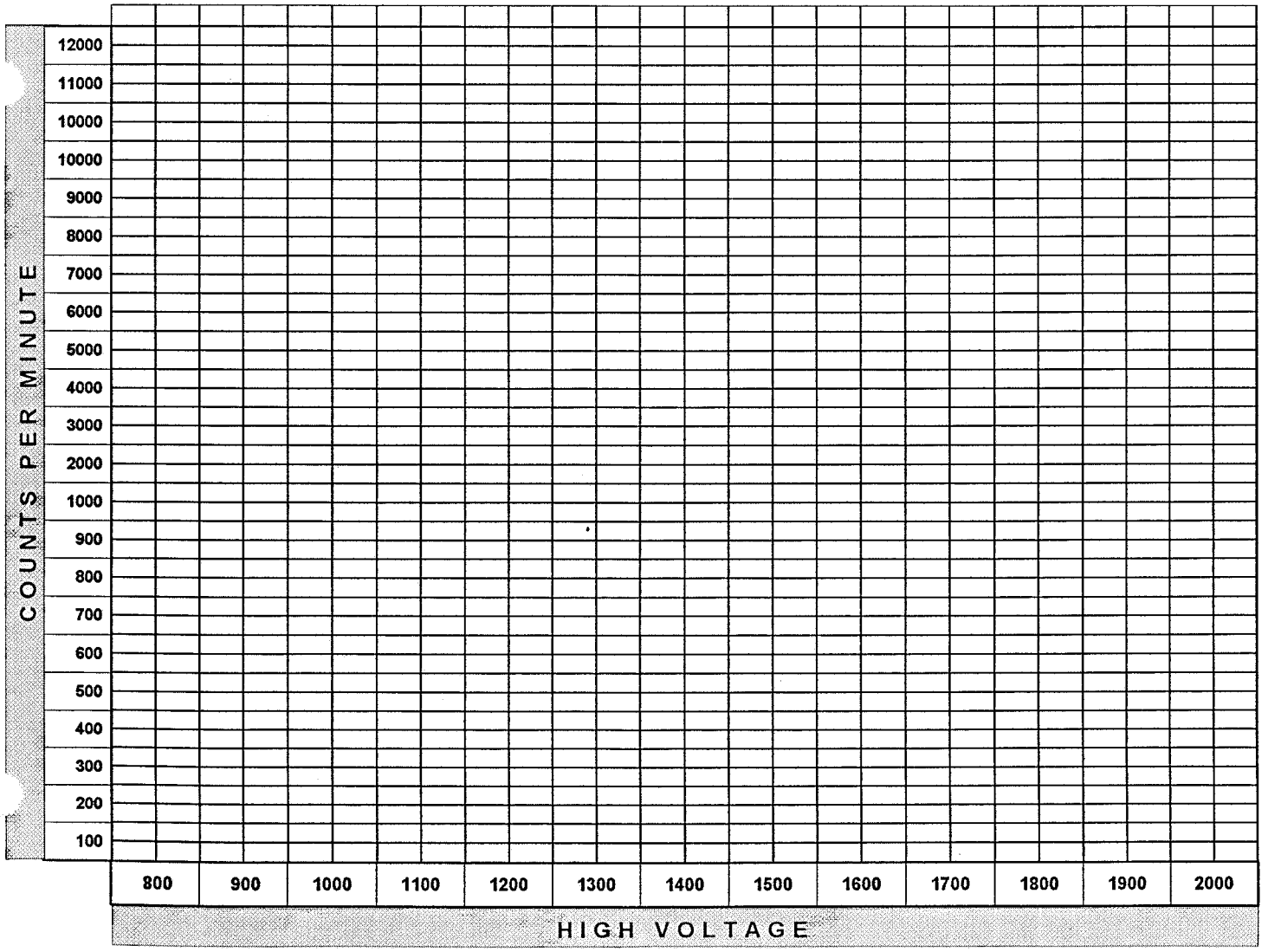
DATE:	8/5/97

COMMENTS: Calibrated with Ludlum 100 cm2 probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	440	1250	7040	1650	-
900	4930	1300	7360	1700	-
950	6450	1350	7390	1750	-
1000	6920	1400	7600	1800	-
1050	6900	1450	7490	1850	-
1100	6900	1500	7590	1900	-
1150	6990	1550	-	1950	-
1200	7260	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	5/5/97

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY * dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31300	35100	5	7020	3.4	7017
	BACKGROUND	17	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7017	22.4%	4.46	22.4%	4.46

HIGH VOLTAGE:	1050

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	7190	-	3 HOURS	7150	99.4%
1 HOUR	7110	98.9%	3.5 HOURS	7230	100.5%
1.5 HOURS	7030	97.8%	4 HOURS	7090	98.6%
2 HOURS	7000	97.4%	4.5 HOURS	7000	97.4%
2.5 HOURS	7100	98.7%	5 HOURS	6940	96.5%

CALIBRATED BY:	Larry J. Smith
SIGNATURE:	Larry Smith

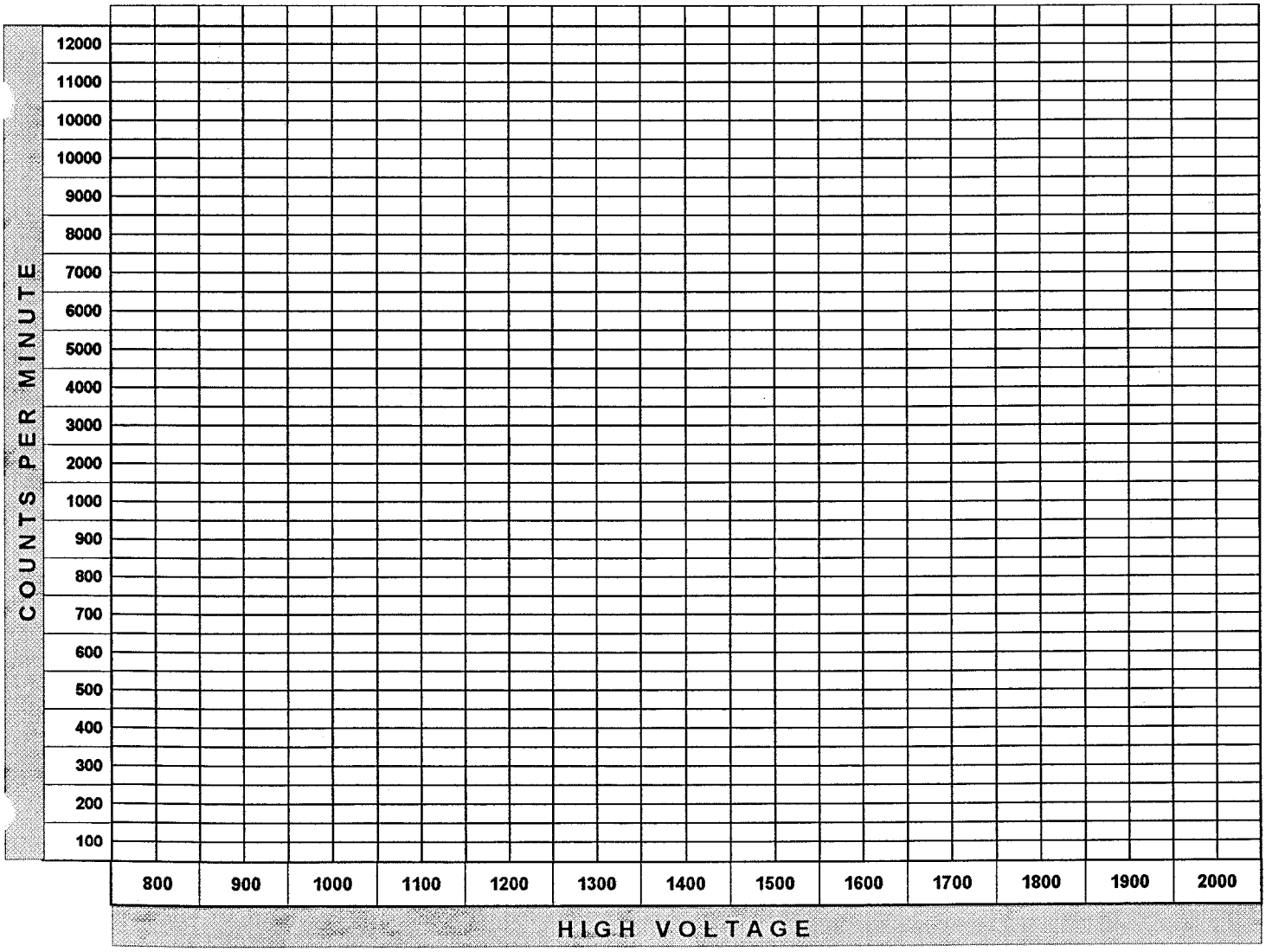
DATE:	5/5/97

COMMENTS: Calibrated with Ludlum 43-68 probe.

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	254	1250	7250	1650	-
900	3400	1300	7260	1700	-
950	5520	1350	7450	1750	-
1000	6480	1400	7410	1800	-
1050	6800	1450	7640	1850	-
1100	7030	1500	7920	1900	-
1150	7170	1550	-	1950	-
1200	7100	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	12/20/96

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY - dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31300	33100	5	6620	3.4	6617
	BACKGROUND	17	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
6617	20.9%	4.9	20.9%	4.9

HIGH VOLTAGE:	1000

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	6840	-	3 HOURS	6700	97.9%
1 HOUR	6700	67.9%	3.5 HOURS	6680	97.7%
1.5 HOURS	6720	68.2%	4 HOURS	6580	96.2%
2 HOURS	6750	98.7%	4.5 HOURS	6730	98.4%
2.5 HOURS	6720	98.2%	5 HOURS	6660	97.4%

CALIBRATED BY:	James Gemza
SIGNATURE:	James Gemza

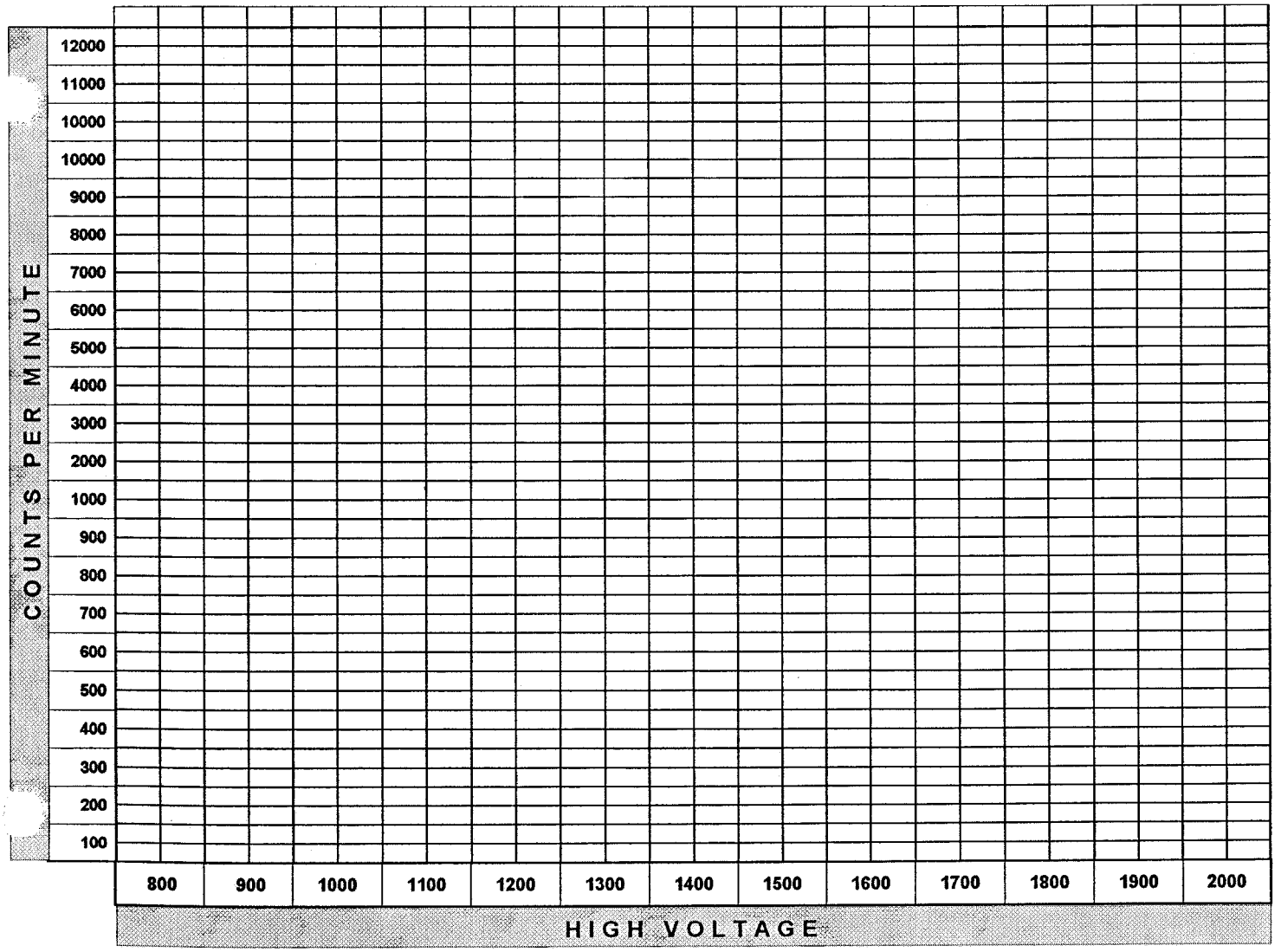
DATE:	12/20/96

COMMENTS: Calibrated with Ludlum 43-68 probe.

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	1790	1250	7110	1650	-
900	4900	1300	7110	1700	-
950	6290	1350	6960	1750	-
1000	6760	1400	7220	1800	-
1050	6760	1450	7460	1850	-
1100	6910	1500	7530	1900	-
1150	7050	1550	-	1950	-
1200	7260	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	8/29/96

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31300	33400	5	6680	3	6677
	BACKGROUND	17	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
6677	21.3%	4.7	21.3%	4.7

HIGH VOLTAGE:	1000

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	6780	-	3 HOURS	6830	100.7%
1 HOUR	6750	99.6%	3.5 HOURS	6720	99.1%
1.5 HOURS	6730	99.3%	4 HOURS	6700	98.8%
2 HOURS	6770	99.9%	4.5 HOURS	6710	98.9%
2.5 HOURS	6840	100.9%	5 HOURS	6680	98.5%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

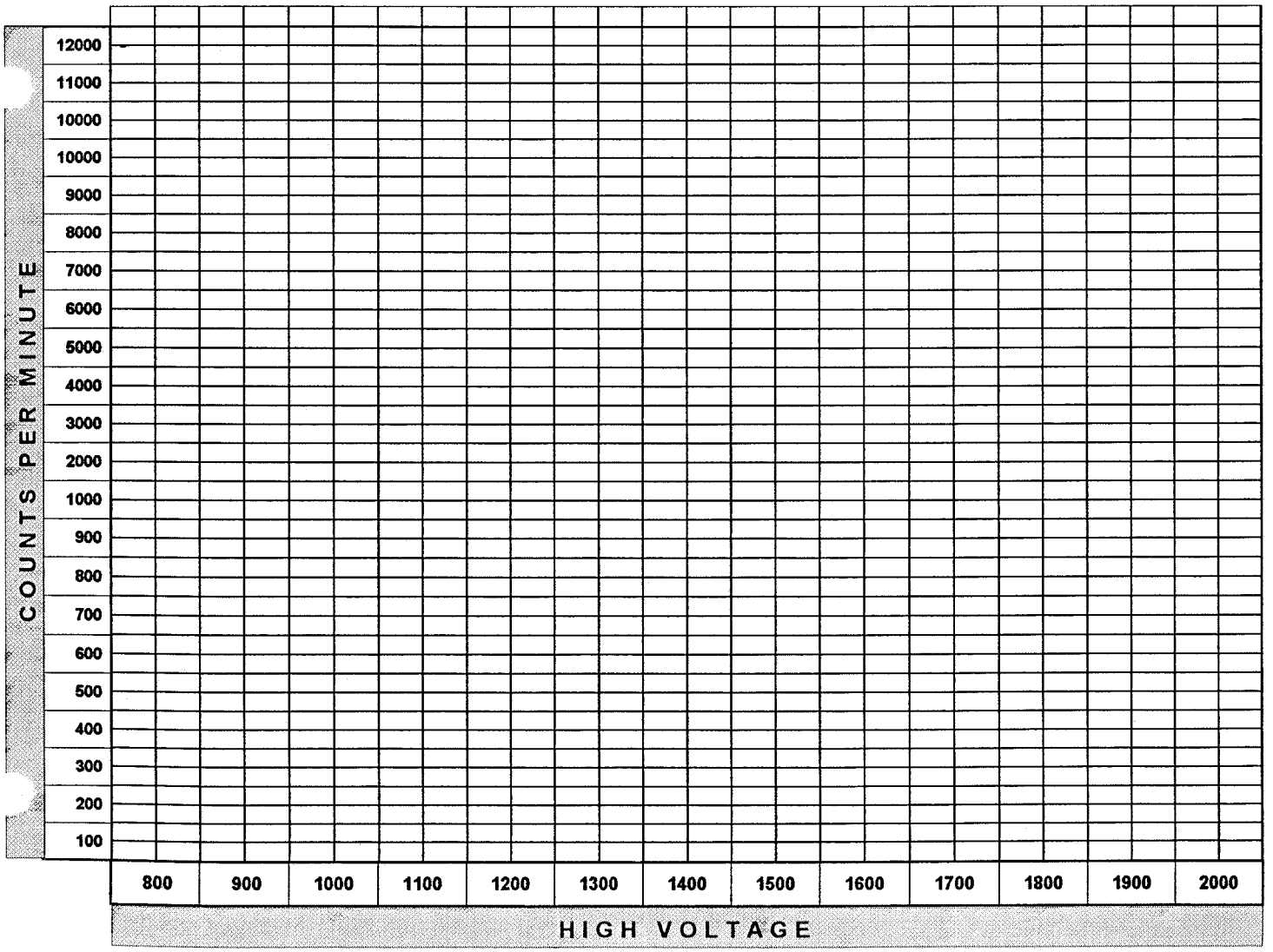
DATE:	8/29/96

COMMENTS: Calibrated with Ludlum 43-68 probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	1370	1250	6920	1650	-
900	5191	1300	7000	1700	-
950	6370	1350	7380	1750	-
1000	6640	1400	7380	1800	-
1050	6680	1450	7210	1850	-
1100	6860	1500	7330	1900	-
1150	7030	1550	-	1950	-
1200	7060	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	2-27-96

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	231100	232000	5	46400	1.8	46398
	BACKGROUND	9	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
46398	20%	5.0	20%	5.0

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	46500		3 HOURS	45800	98.5%
1 HOUR	46300	99.6%	3.5 HOURS	45900	98.7%
1.5 HOURS	46300	99.6%	4 HOURS	46100	99.1%
2 HOURS	46200	99.4%	4.5 HOURS	46100	99.1%
2.5 HOURS	45900	98.7%	5 HOURS	45900	98.7%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

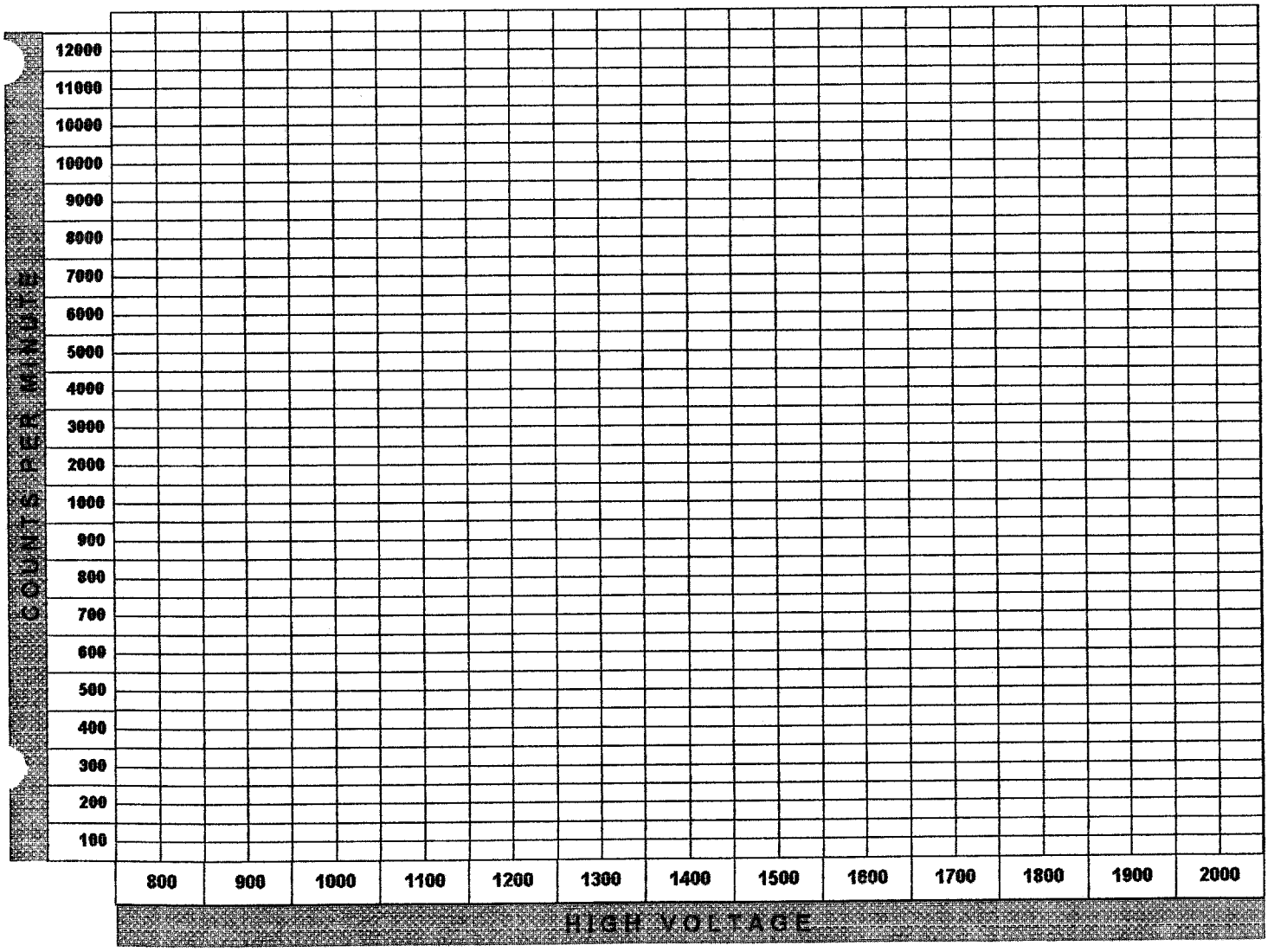
DATE:	2-27-96

COMMENTS: Calibrated with a Ludlum 43-68 probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	15	1250	47900	1650	-
900	6470	1300	48200	1700	-
950	31200	1350	48200	1750	-
1000	44100	1400	49000	1800	-
1050	45700	1450	49400	1850	-
1100	47100	1500	49500	1900	-
1150	46700	1550	-	1950	-
1200	47500	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	11/28/95

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	231100	225000	5	45000	2	44998
	BACKGROUND	10	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
44998	19.5%	5.1	19.5%	5.1

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	49100		3 HOURS	48800	99.4%
1 HOUR	48800	99.4%	3.5 HOURS	47800	97.4%
1.5 HOURS	48800	99.4%	4 HOURS	47900	97.6%
2 HOURS	48900	99.6%	4.5 HOURS	47800	97.4%
2.5 HOURS	48600	99%	5 HOURS	47200	96.1%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

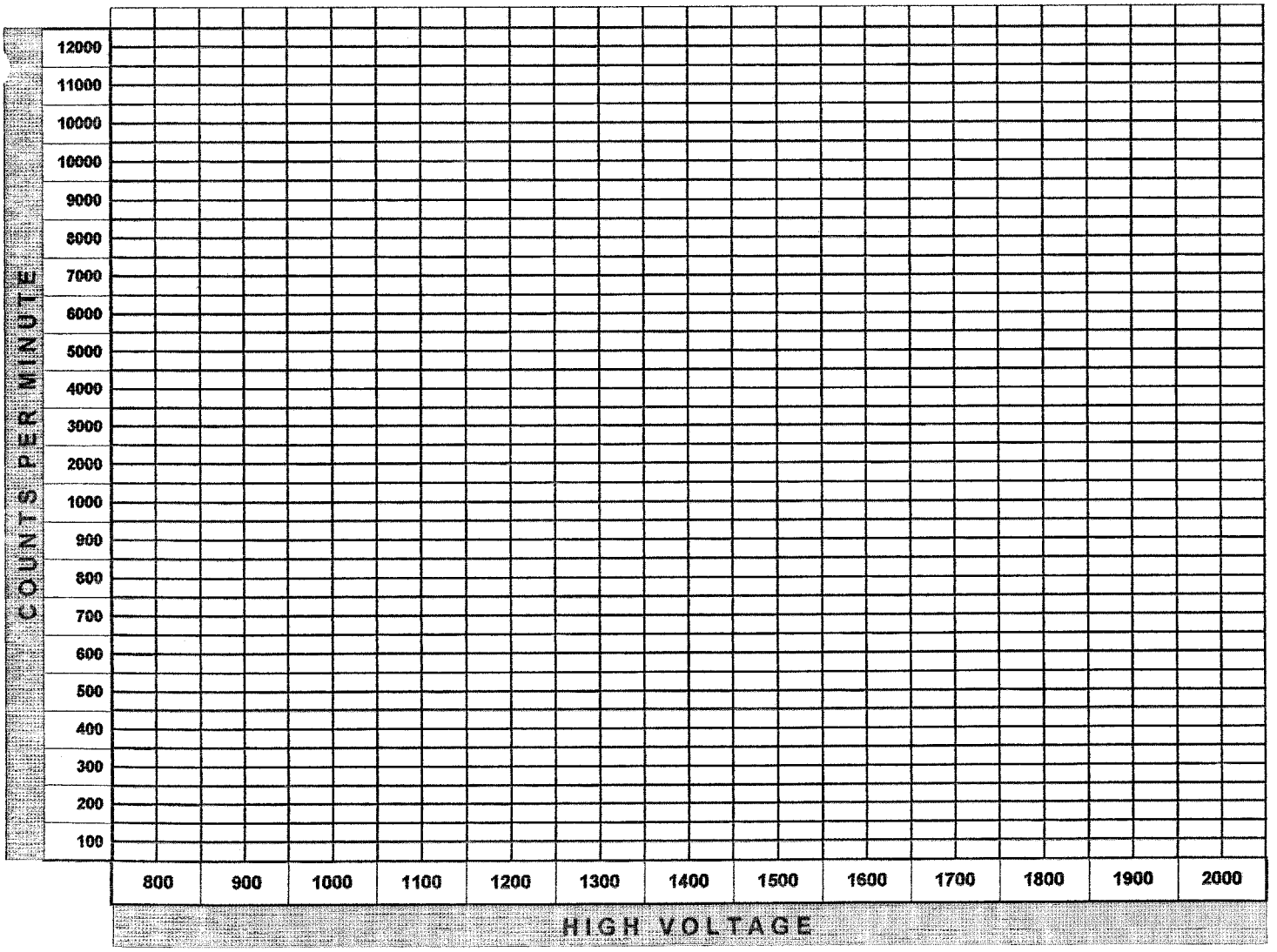
DATE:	11/28/95

COMMENTS: Calibrated with Ludlum 43-68 probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	50500	1650	-
900	10	1300	51100	1700	-
950	90	1350	51300	1750	-
1000	21700	1400	51100	1800	-
1050	42800	1450	51700	1850	-
1100	47500	1500	52000	1900	-
1150	48900	1550	-	1950	-
1200	50100	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	8/30/95

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	231100	255000	5	51000	2	50998
	BACKGROUND	10	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
50998	22.1%	4.5	22.1%	4.5

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	50700		3 HOURS	50300	99.2%
1 HOUR	50500	99.6%	3.5 HOURS	50400	99.4%
1.5 HOURS	50600	99.8%	4 HOURS	50500	99.6%
2 HOURS	50500	99.6%	4.5 HOURS	50500	99.6%
2.5 HOURS	50300	99.2%	5 HOURS	50400	99.4%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

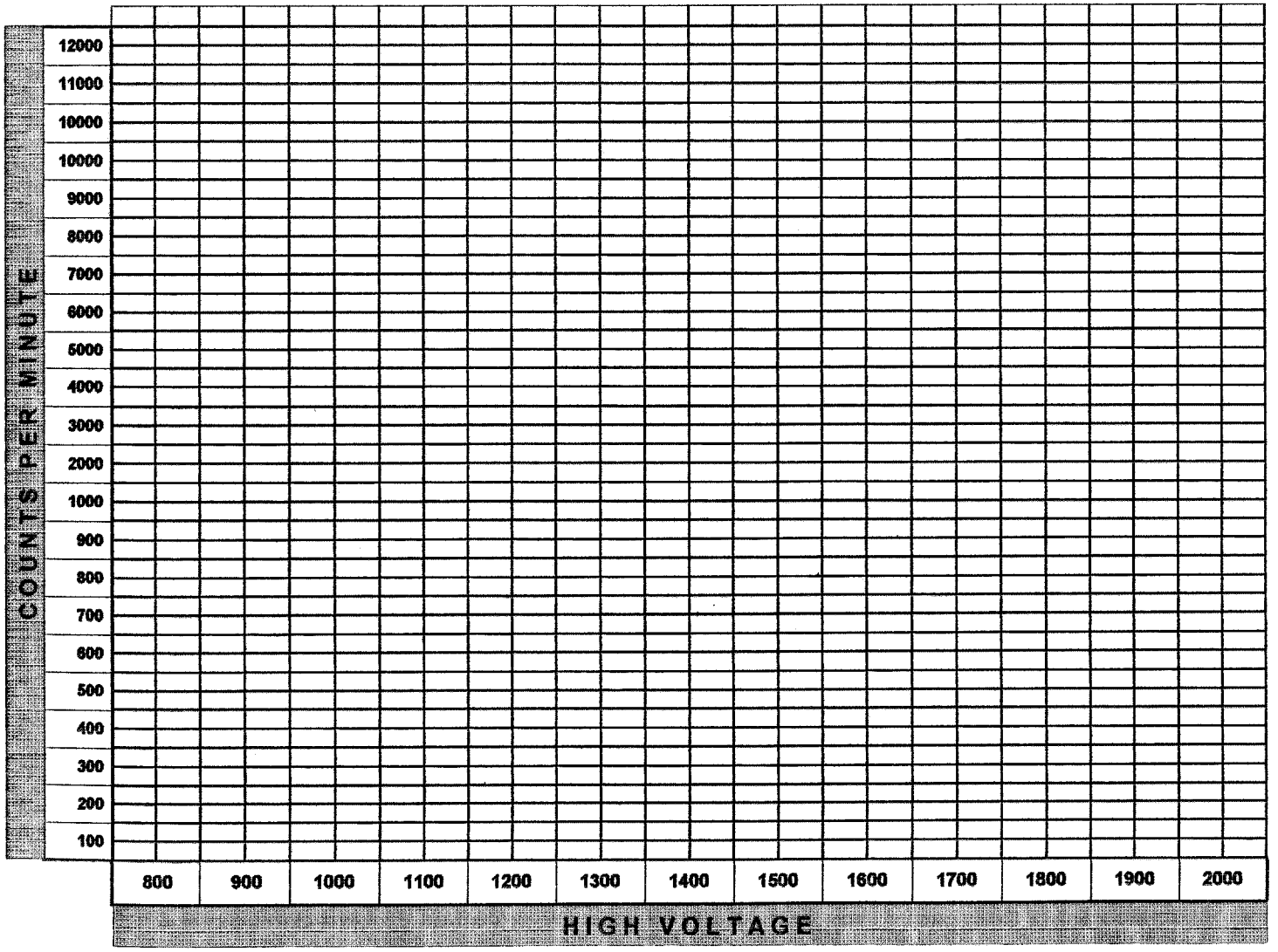
DATE:	8/30/95

COMMENTS: Calibrated with Ludlum 43-68 probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	53100	1650	---
900	26	1300	53200	1700	---
950	154	1350	53500	1750	---
1000	26900	1400	53300	1800	---
1050	46900	1450	54100	1850	---
1100	51700	1500	54500	1900	---
1150	52100	1550	---	1950	---
1200	52800	1600	---	2000	---



IH & S Form # 205 ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	3/21/95

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	231000	217000	5 min	46200	4	46196

BACKGROUND	19	5 min

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
46196	20	5	20%	5.0

HIGH VOLTAGE:	1150

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	47300	-	3 HOURS	46700	98.7%
1 HOUR	47000	99.4%	3.5 HOURS	46100	97.5%
1.5 HOURS	47100	99.6%	4 HOURS	46300	97.9%
2 HOURS	46200	97.7%	4.5 HOURS	46000	97.3%
2.5 HOURS	46800	98.9%	5 HOURS	46900	99.2%

CALIBRATED BY:	Larry Smith
SIGNATURE:	

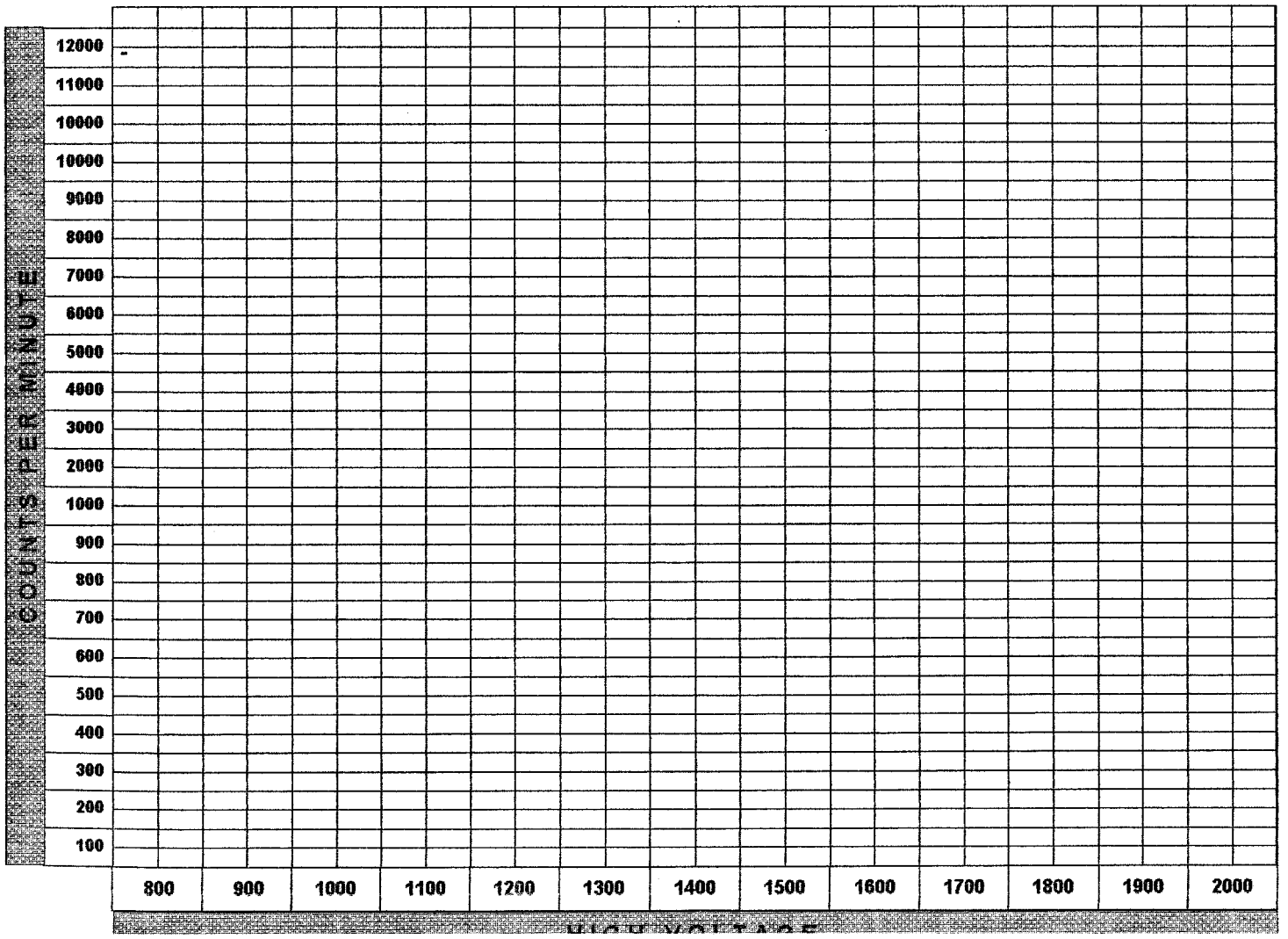
DATE:	3/21/95

COMMENTS:	Calibrated with Ludlum 43-68 probe.

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	1	1250	46500	1650	-
900	1	1300	46800	1700	-
950	9	1350	47600	1750	-
1000	152	1400	47500	1800	-
1050	21700	1450	48800	1850	-
1100	38500	1500	48800	1900	-
1150	43300	1550	-	1950	-
1200	45900	1600	-	2000	-



IH & S Form # 205 **ESP-2 CALIBRATION**

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	12-16-94

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	230966	221000	5	44200	.8	44199
	BACKGROUND	4	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
44199	19.1%	5.24	19.1%	5.24

HIGH VOLTAGE:	1150

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	46100	100%	3 HOURS	45500	98.7%
1 HOUR	45900	99.6%	3.5 HOURS	45600	98.9%
1.5 HOURS	45700	99.1%	4 HOURS	45200	98%
2 HOURS	45200	98%	4.5 HOURS	45500	98.7%
2.5 HOURS	45900	99.6%	5 HOURS	45100	97.8%

CALIBRATED BY:	Larry Smith/Carmen Vergari
SIGNATURE:	Larry Smith Carmen Vergari

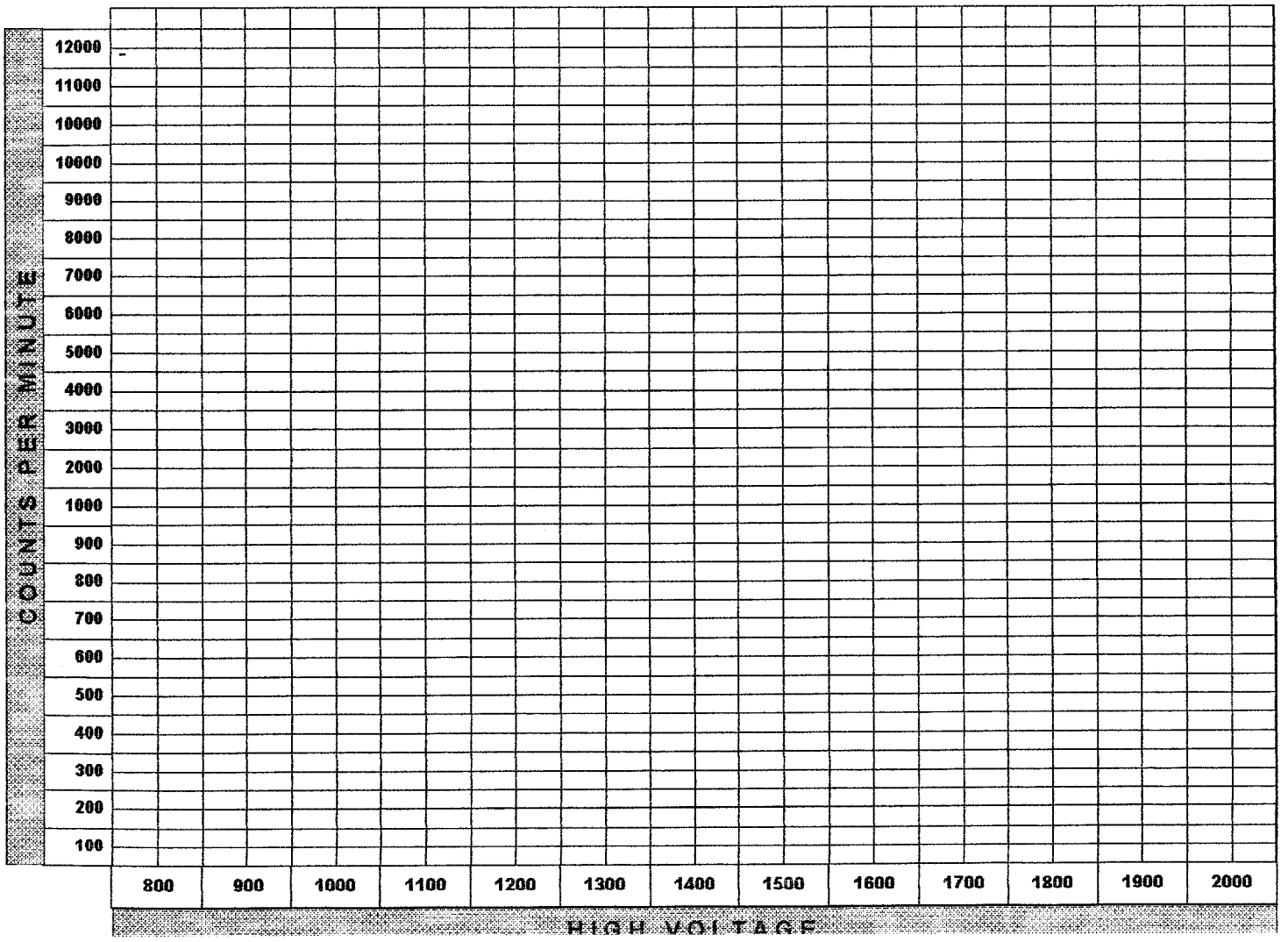
DATE:	12-16-94

COMMENTS:	Calibrated with Ludlum 44-68 Probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	45900	1650	-
900	11	1300	46100	1700	-
950	84	1350	46300	1750	-
1000	22100	1400	46800	1800	-
1050	39000	1450	47500	1850	-
1100	41700	1500	47300	1900	-
1150	44100	1550	-	1950	-
1200	45000	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	9-29-94

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	231,100	228,000	5	45,600	3	45,597
	BACKGROUND	15	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
45,597	19.7	5.1	19.7	5.1

HIGH VOLTAGE:	1150

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	45,400	100%	3 HOURS	44,200	97.4%
1 HOUR	45,200	99.6%	3.5 HOURS	45,100	99.3%
1.5 HOURS	44,800	98.7%	4 HOURS	44,200	97.4%
2 HOURS	44,700	98.5%	4.5 HOURS	44,800	98.7%
2.5 HOURS	44,900	98.9%	5 HOURS	44,200	99.3%

CALIBRATED BY:	C. Vergari
SIGNATURE:	Carmen Vergari

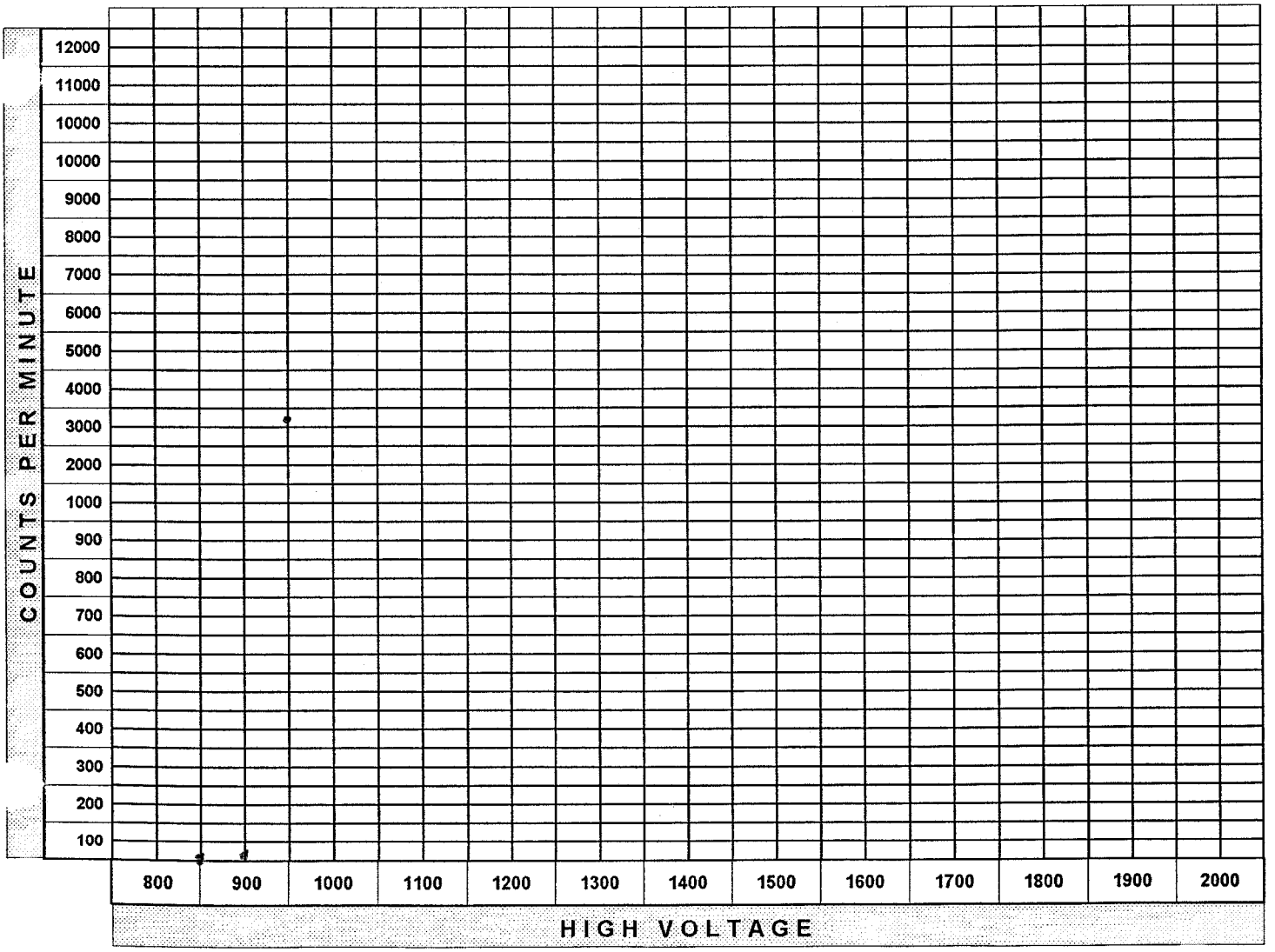
DATE:	9-29-94

OMMENTS: Calibrated with Ludlum probe.

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	46,700	1650	----------
900	37	1300	47,500	1700	----------
950	3270	1350	48,000	1750	----------
1000	33,600	1400	47,800	1800	----------
1050	42,400	1450	48,200	1850	----------
1100	44,200	1500	48,400	1900	----------
1150	45,800	1550	----------	1950	----------
1200	46,400	1600	----------	2000	----------



ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	6/30/94

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31282	32300	5	6460	3	3457
	BACKGROUND	15	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
6157	20.6%	4.85	20.6%	4.85

HIGH VOLTAGE:	1150

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	6160	100%	3 HOURS	6310	103%
1 HOUR	6280	102%	3.5 HOURS	6300	102%
1.5 HOURS	6430	104%	4 HOURS	6160	100%
2 HOURS	6310	103%	4.5 HOURS	6310	102%
2.5 HOURS	6260	102%	5 HOURS	6270	102%

CALIBRATED BY:	Todd Brautigam
SIGNATURE:	Todd Brautigam

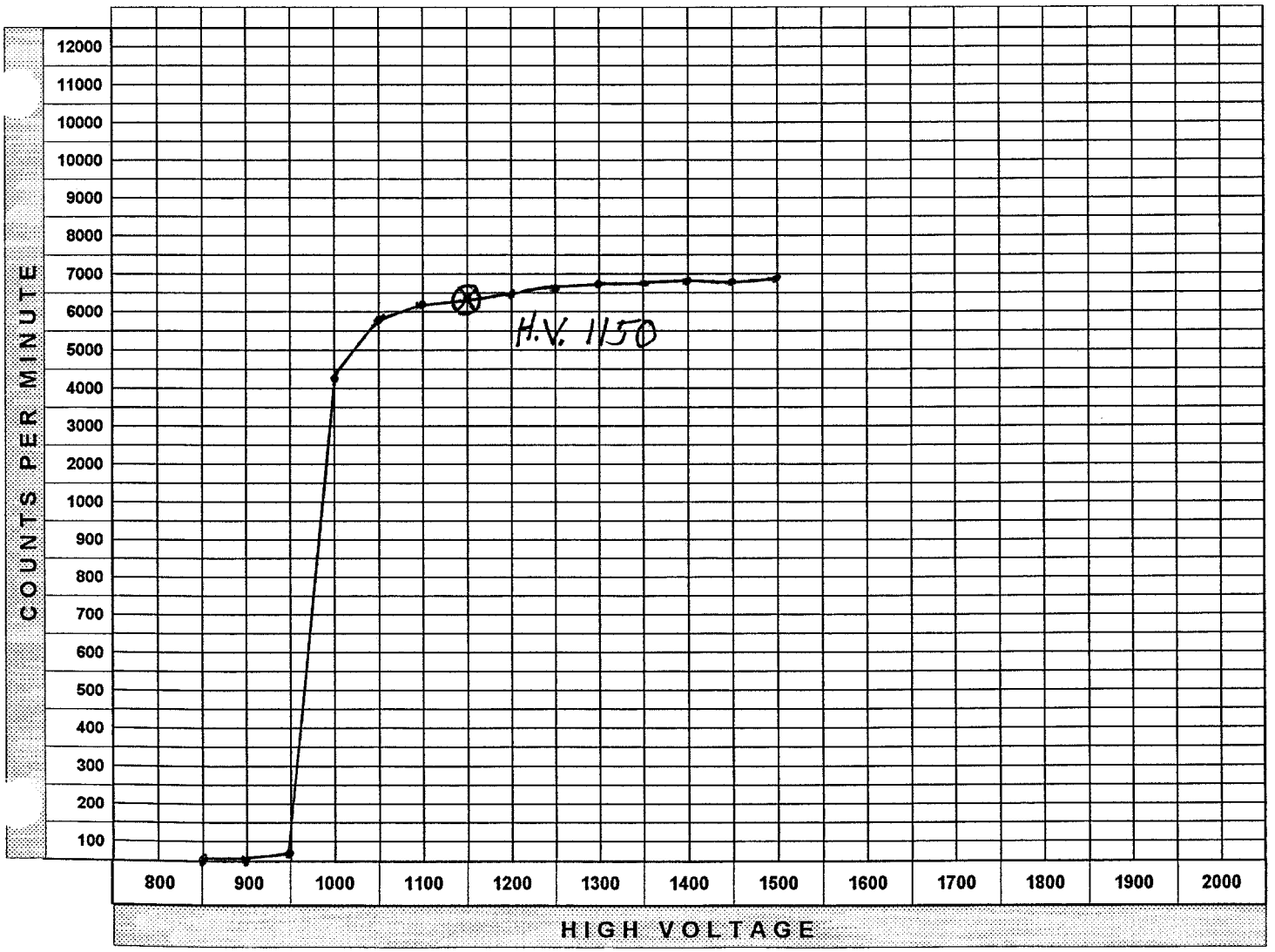
DATE:	6/30/94

COMMENTS: Calibrated with Ludlum 43-68 probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	6530	1650	-
900	0	1300	6670	1700	-
950	11	1350	6680	1750	-
1000	4280	1400	6790	1800	-
1050	5830	1450	6750	1850	-
1100	6180	1500	6840	1900	-
1150	6350	1550	-	1950	-
1200	6440	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	4/4/94

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY - dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31283	36300	5	7260	1	7259
	BACKGROUND	5	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7259	23.2%	4.31	23.2%	4.31

HIGH VOLTAGE:	1250

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	7280	INITIAL	3 HOURS	7330	100.6
1 HOUR	7250	99.6	3.5 HOURS	7400	101.6
1.5 HOURS	7400	101.6	4 HOURS	7310	100.4
2 HOURS	7230	99.3	4.5 HOURS		
2.5 HOURS	7200	98.9	5 HOURS		

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

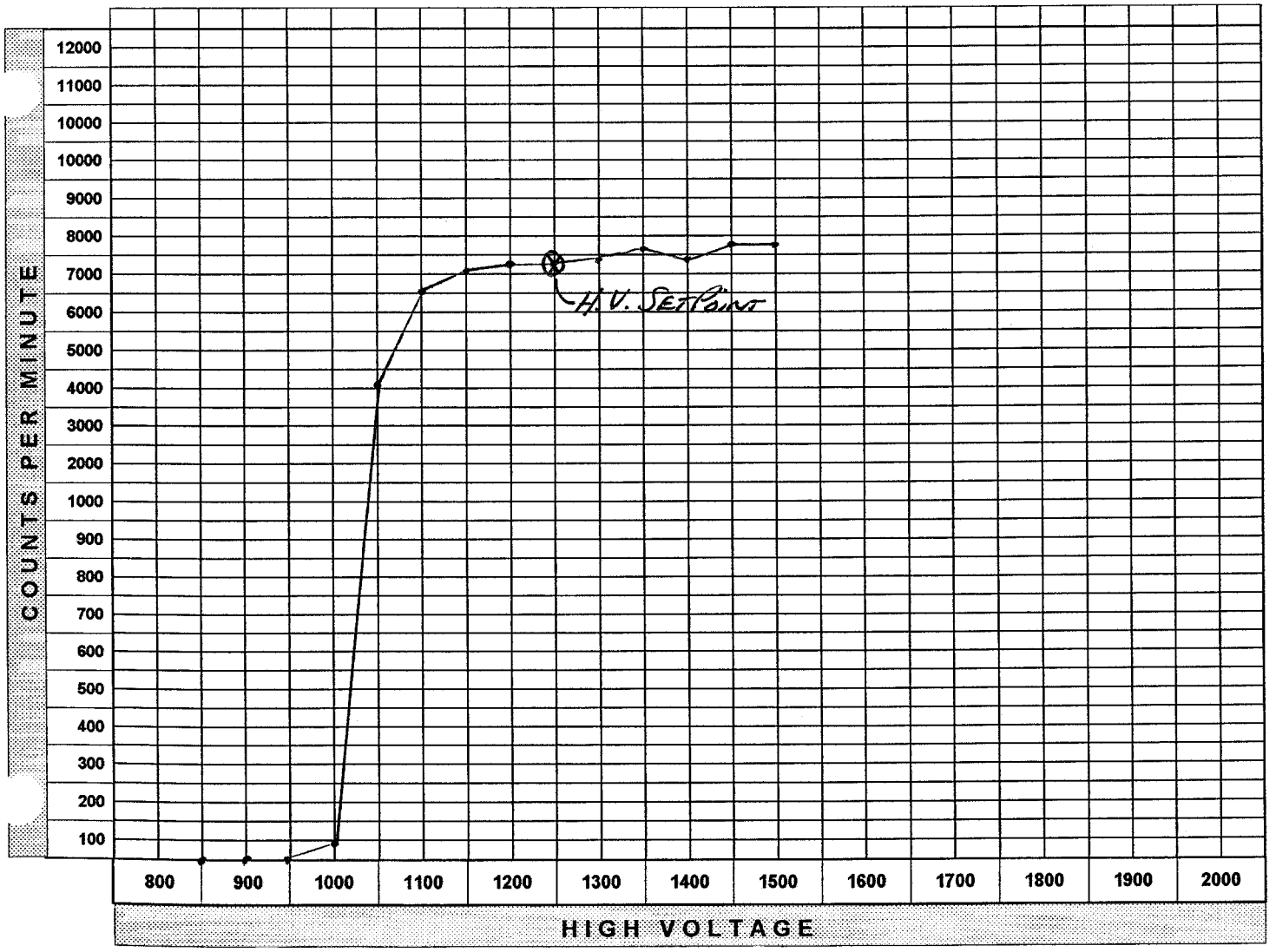
DATE:	4/4/94

COMMENTS:

ESP-2 PLATEAU

ALPHA / BETA:	0

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	7230	1650	---
900	0	1300	7480	1700	---
950	1	1350	7580	1750	---
1000	94	1400	7480	1800	---
1050	4030	1450	7750	1850	---
1100	6530	1500	7680	1900	---
1150	7030	1550	---	1950	---
1200	7230	1600	---	2000	---



ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	1-3-94

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31283	37000	5	7400	1	7399
	BACKGROUND	5	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7399	23.8%	4.2	23.7%	4.2

HIGH VOLTAGE:	1250

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	7320	100%	3 HOURS	7300	99.7%
1 HOUR	7120	97%	3.5 HOURS	7410	101%
1.5 HOURS	7120	97%	4 HOURS	7110	97.1%
2 HOURS	7230	99%	4.5 HOURS	7290	99.6%
2.5 HOURS	7270	99.3%	5 HOURS	7570	103.4%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

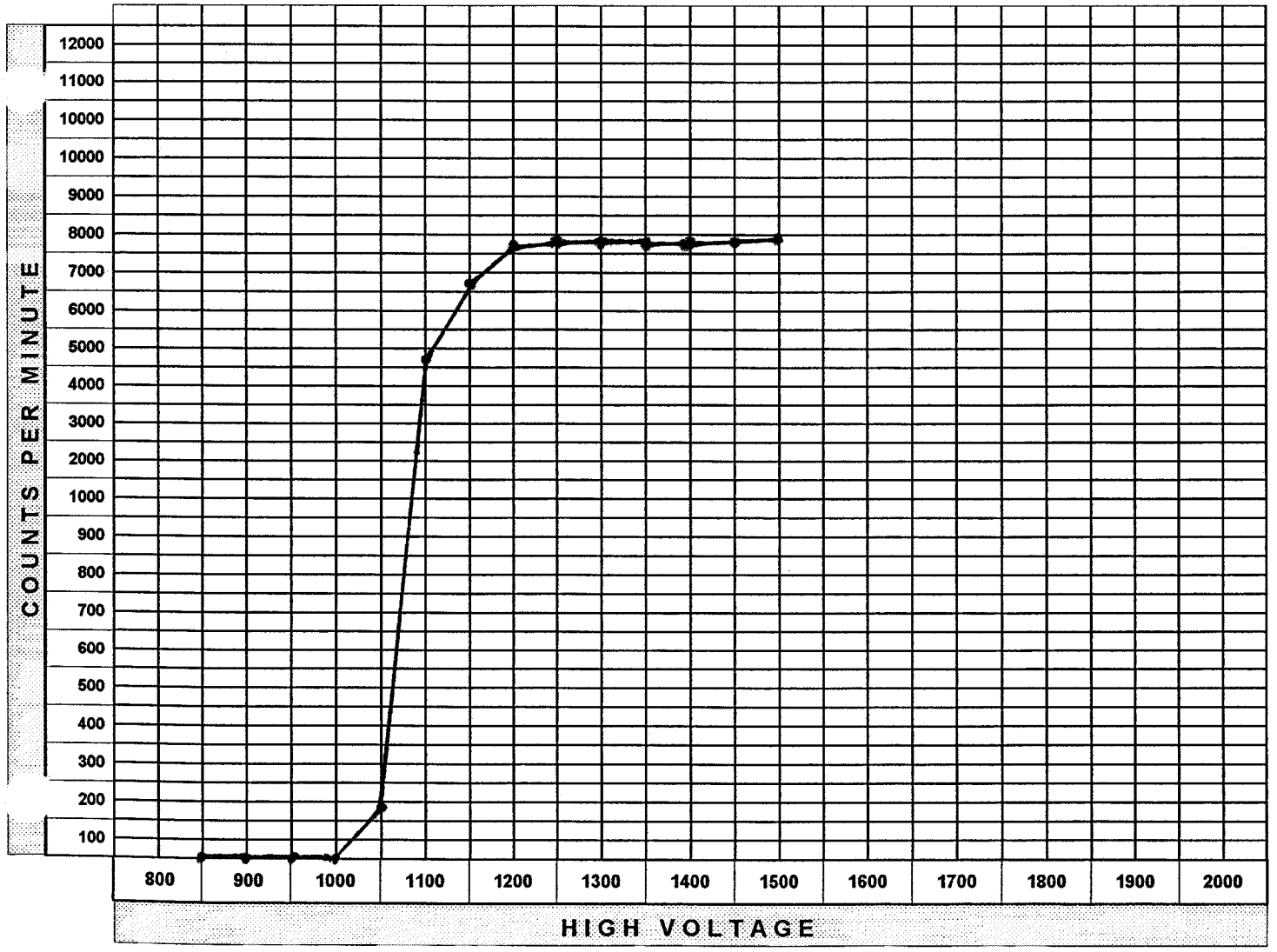
DATE:	1-3-94

COMMENTS:

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	7480	1650	---
900	0	1300	7450	1700	---
950	0	1350	7610	1750	---
1000	0	1400	7720	1800	---
1050	182	1450	7790	1850	---
1100	4330	1500	7980	1900	---
1150	6650	1550	---	1950	---
1200	7310	1600	---	2000	---



ESP-2 CALIBRATION

ESP-2 S/N:	1517	INSTRUMENT CODE:	7	DATE:	10/4/93

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31283	29000	5	5800	2.2	5797.8
7346	230974	22100	5	44200	2.2	44197.8
	BACKGROUND	11	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
5797.8	18.5	5.4	18.8	5.3
44197.8	19.1	5.2		

HIGH VOLTAGE	1200

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	6280	100	3 HOURS	6020	95.8
1 HOUR	5950	94.7	3.5 HOURS	6110	97.2
1.5 HOURS	6050	96.3	4 HOURS	5960	94.9
2 HOURS	6190	98.5	4.5 HOURS	5980	95.2
2.5 HOURS	6050	96.3	5 HOURS	5900	93.9

CALIBRATED BY:	Michael Shaffer
SIGNATURE:	MShaffer

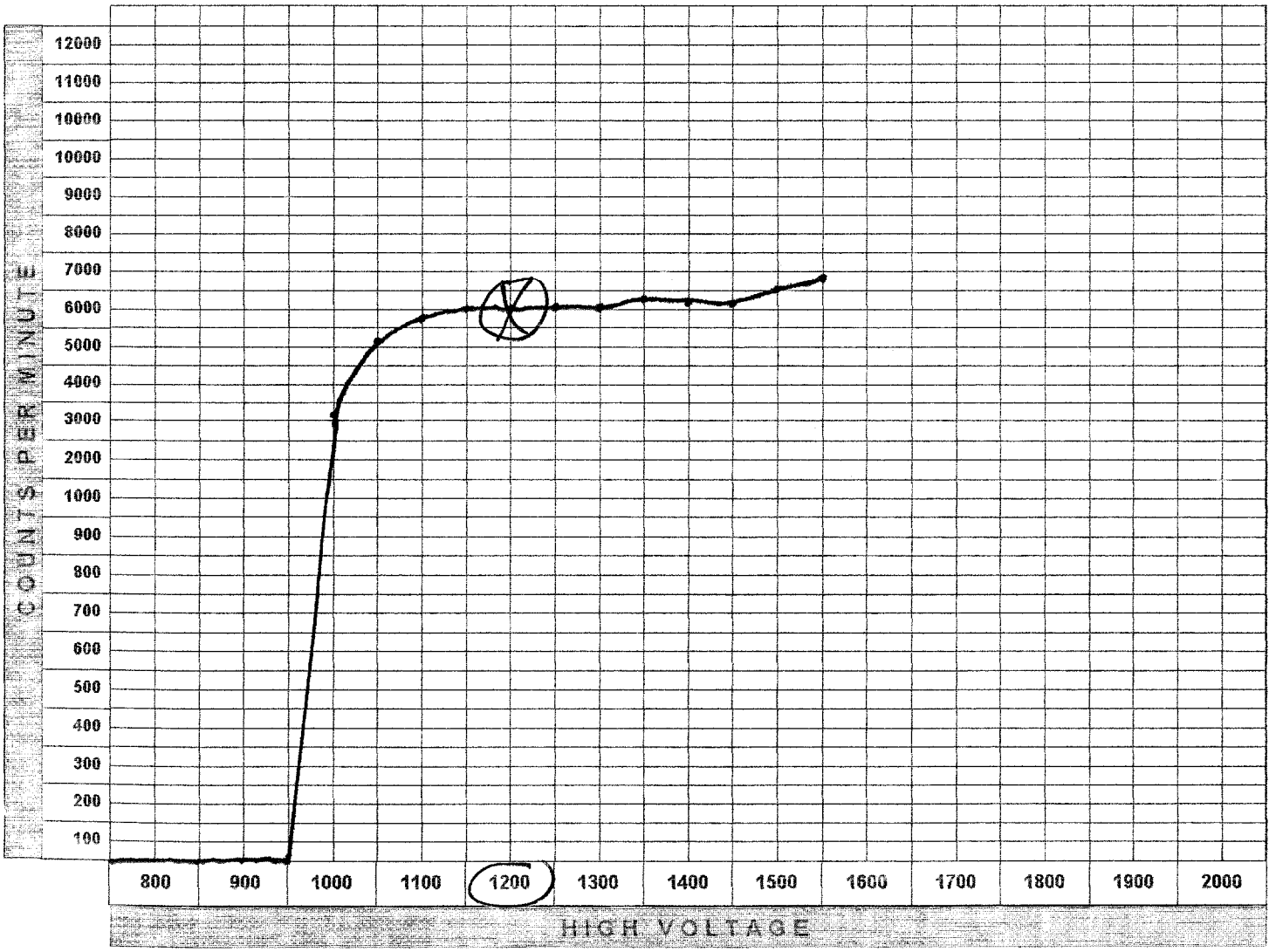
DATE:	10/4/93

COMMENTS:

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	6150	1650	
900	0	1300	6180	1700	
950	0	1350	6310	1750	
1000	3210	1400	6360	1800	
1050	5270	1450	6280	1850	
1100	5740	1500	6280	1900	
1150	5960	1550	6510	1950	
1200	5940	1600	6650	2000	



IH & S FORM#205F
FOREST HILLS SITE

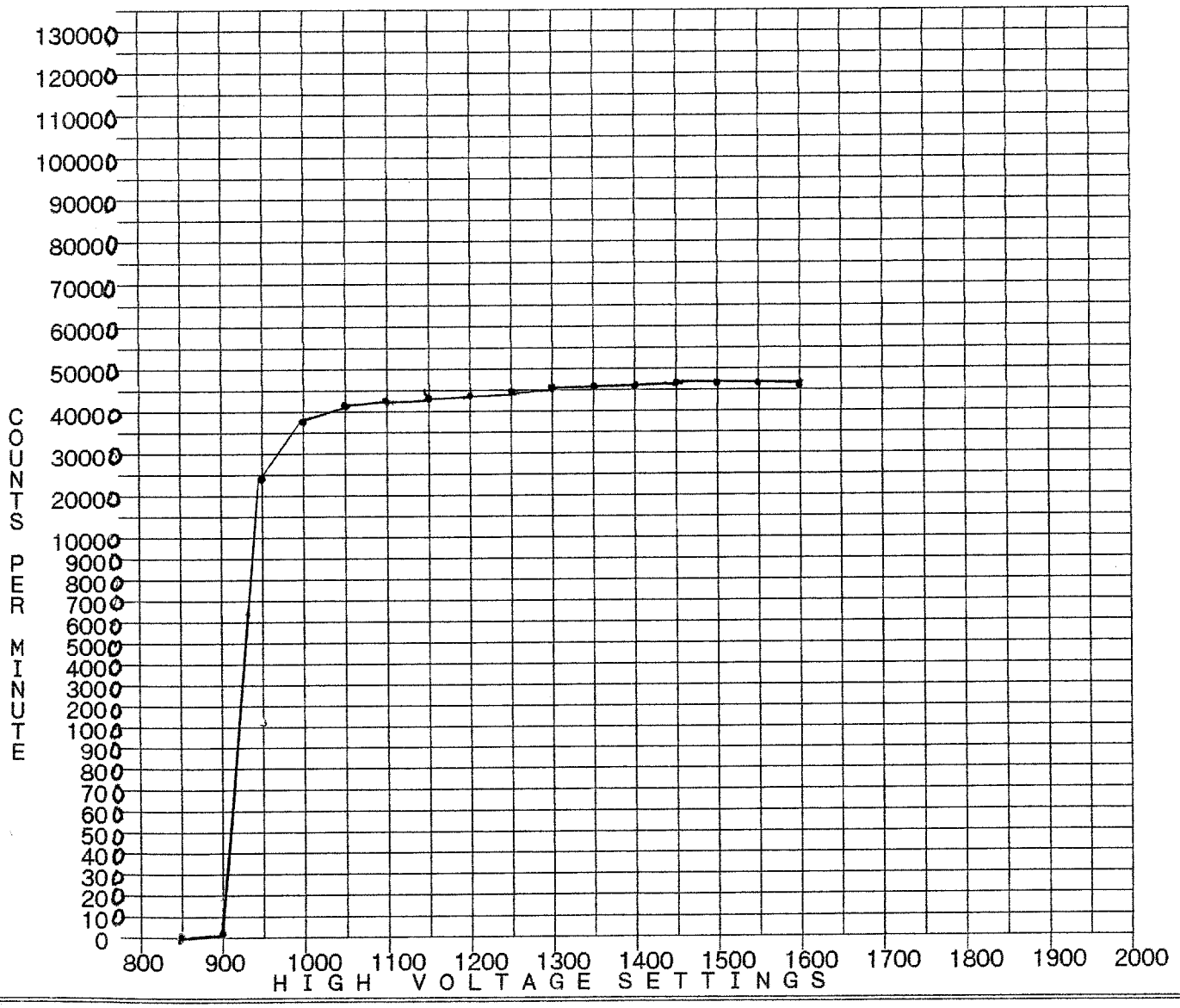
ESP-2 CALIBRATION DATA
(Front Page)

ESP-2 S/N: 1517	~~TAB #: 6~~ Code #7	DATE: 7/12/93

PLATEAU DATA

ALPHA				BETA			
HV	CTS	HV	CTS	HV	CTS	HV	CTS
850	0	1250	44600	1150		1550	
900	17	1300	45000	1200		1600	
950	120	1350	45400	1250		1650	
1000	24700	1400	45700	1300		1700	
1050	38700	1450	45900	1350		1750	
1100	41800	1500	46700	1400		1800	
1150	42700	1550	46400	1450		1850	
1200	43700	1600	46900	1500		1900	

PLATEAU PLOT



IH & S FRM#205B
FOREST HILLS SITE

ESP-2 CALIBRATION DATA
(Back Page)

ESP-2 S/N: 1517	~~TAB # 6~~ Code #7	DATE: 07/12/93

ALPHA EFFICIENCY DATA (Net cpm / dpm = Eff)(Coorection Factor = 1 / Eff)

SOURCE #	ACTIVITY	TOTAL CTS	TIME	GROSS CPM	BKG. CPM	NET CPM
5308	31300 dpm	12400	2 min	6200	1.6	6198
7346	231300 dpm	88300	2 min	44150	1.6	44148

NET CPM	EFF	C.F.	AVERAGE EFF	AVERAGE C.F.
6198	19.8%	5.1	19.5%	5.2
44148	19.1%	5.2		

BETA EFFICIENCY DATA

SOURCE #	ACTIVITY	TOTAL CTS	TIME	GROSS CPM	BKG. CPM	NET CPM
	dpm		min			
	dpm		min			

NET CPM	EFF	C.F.	AVERAGE EFF	AVERAGE C.F.

GAS DECAY CALIBRATION

TIME	CPM	PERCENT	TIME	CPM	PERCENT
INITIAL	6161	Initial	3.0 HOURS	6010	97.6%
1.0 HOUR	6120	99.4%	3.5 HOURS	6110	99.2%
1.5 HOURS	6030	97.9%	4.0 HOURS	6150	99.8%
2.0 HOURS	6010	97.6%	4.5 HOURS		
2.5 HOURS	6040	98.1%	5.0 HOURS		

DETECTOR DATA

ALPHA - HP 100A DETECTOR	BETA - HP 100A DETECTOR
HIGH VOLTAGE SETTING: 1200	HIGH VOLTAGE SETTING:
CC: 1.00 E+00	CC:
DT: 1.00 E-06	DT:
ALARM: Not Set	ALARM:

CALIBRATED BY: Larry Smith SIGNATURE: Larry Smith

ESP-2 CALIBRATION

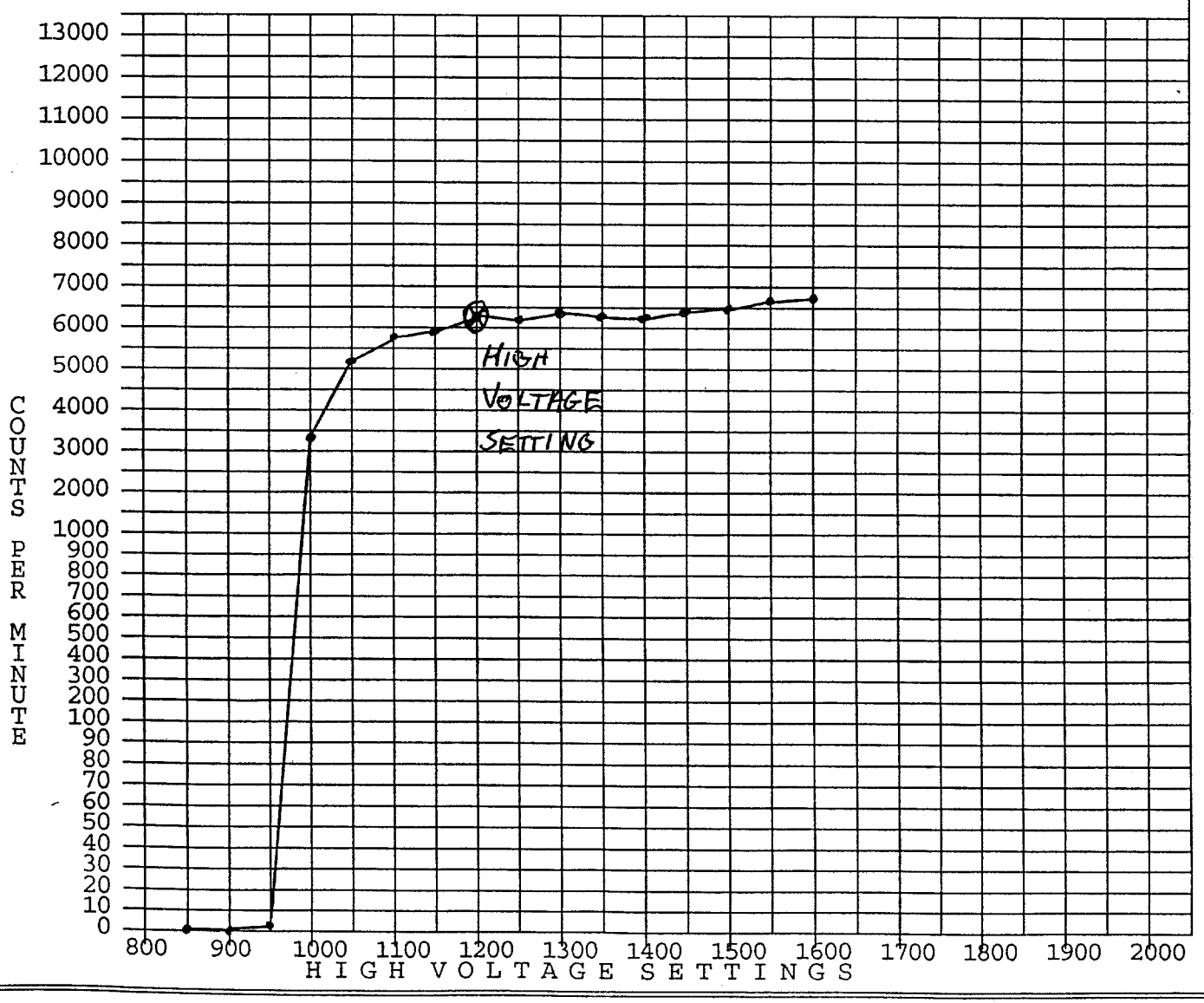
Front

ESP-2 SERIAL # 1517	~~TAB #: 6~~ 7 CODE # 7	DATE: 04/14/93

PLATEAU DATA

ALPHA				BETA			
HV	CTS	HV	CTS	HV	CTS	HV	CTS
850	0	1250	6190	1150		1550	
900	0	1300	6320	1200		1600	
950	2	1350	6290	1250		1650	
1000	3340	1400	6250	1300		1700	
1050	5183	1450	6400	1350		1750	
1100	5710	1500	6430	1400		1800	
1150	5990	1550	6640	1450		1850	
1200	6240	1600	6680	1500		1900	

PLATEAU PLOT



ESP-2 SERIAL # 1517	~~TAB #~~ 6 ~~CODE~~ CODE # 7	DATE: 4/14/93
CALIBRATED BY: Larry Smith	SIGNATURE: Larry Smith	

ALPHA EFFICIENCY

SOURCE #	ACTIVITY	GROSS CTS	TIME	NET CTS	EFF.	C.F.
7345	2210 dpm	2110	5 min.	422	19.1%	5.2
5308	31300 dpm	30800	5 min.	6160	19.7%	5.1
7346	2311~~00~~ dpm	220000	5 min.	44000	19.0%	5.3
BACKGROUND		7	5	1.4	19.3% AVERAGE	5.2 AVERAGE

BETA EFFICIENCY DATA

SOURCE #	ACTIVITY	GROSS CTS	TIME	NET CTS	EFF.	C.F.
BACKGROUND						

GAS DECAY CALIBRATION

TIME	ALPHA CPM	PERCENT	TIME	ALPHA CPM	PERCENT
INITIAL	6050		3.0 HOURS	5930	98.0%
1.0 HOUR	6100	101%	3.5 HOURS	6160	102%
1.5 HOURS	6220	103%	4.0 HOURS	6030	99.7%
2.0 HOURS	6090	101%	4.5 HOURS	6050	100%
2.5 HOURS	6180	102%	5.0 HOURS	6040	99.8%

DETECTOR DATA

ALPHA - HP 100A DETECTOR	BETA - HP 100A DETECTOR
HIGH VOLTAGE SETTING : 1200	HIGH VOLTAGE SETTING : N/A
CC: 1.00 E+00	CC: N/A
DT: 1.00 E-06	DT: N/A

CODE NUMBER 8

REPORT #001

ESP-2 CALIBRATION

ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	10/21/98

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY ← dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31279	33000	5	6600	1	6599
	BACKGROUND	7	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
6599	21.1%	4.74	21.1%	4.74

HIGH VOLTAGE:	1000

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	6750	-	3 HOURS	6600	97.8%
1 HOUR	6700	99.3%	3.5 HOURS	6560	97.2%
1.5 HOURS	6610	97.9%	4 HOURS	6520	96.6%
2 HOURS	6590	97.6%	4.5 HOURS	6500	96.3%
2.5 HOURS	6620	98.1%	5 HOURS	6490	96.1%

CALIBRATED BY:	Larry Smith
SIGNATURE:	

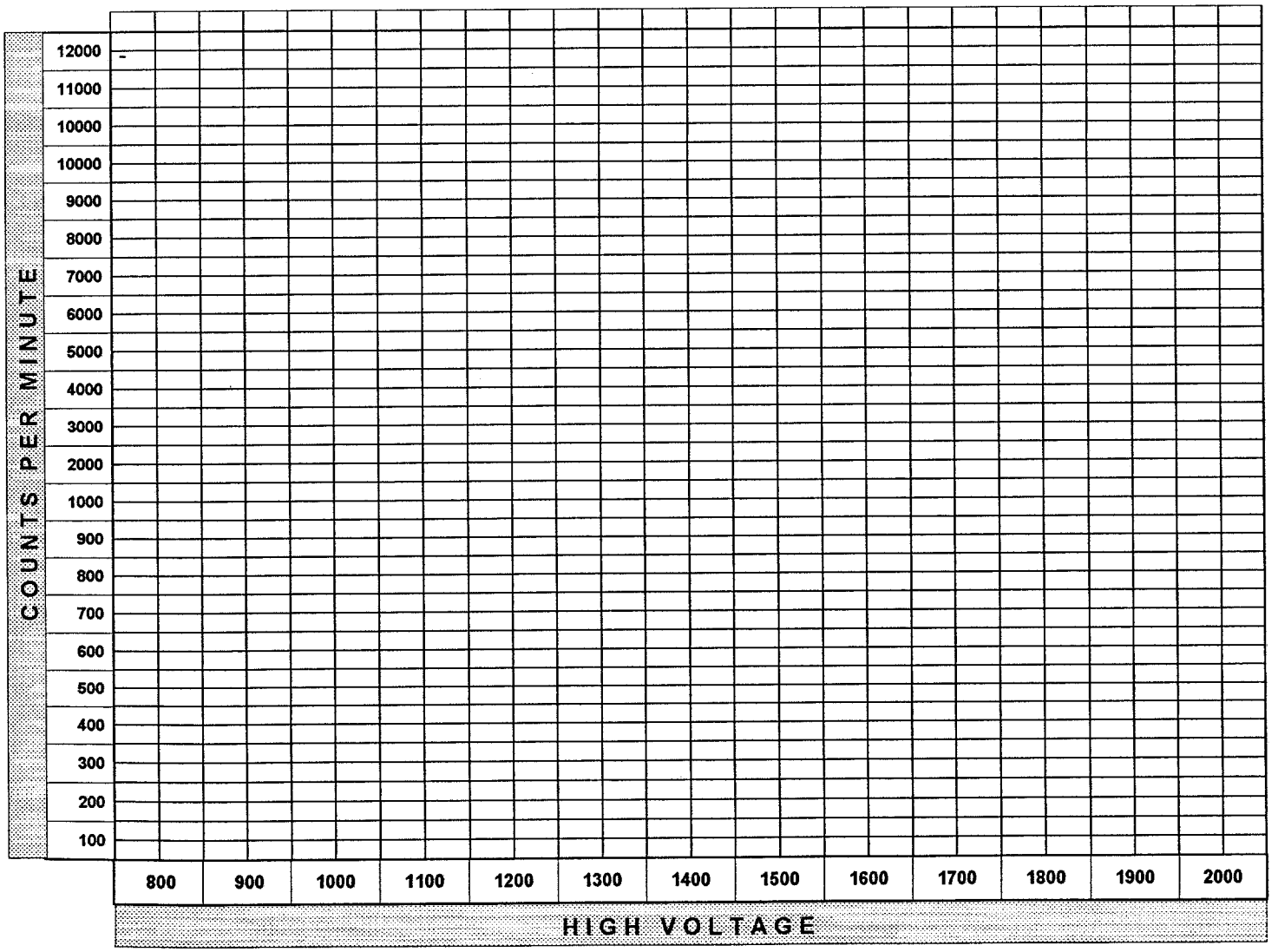
DATE:	10/21/98

COMMENTS: Calibrated with Ludlum 43-68 probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	890	1250	6890	1650	-
900	4330	1300	7080	1700	-
950	6180	1350	7080	1750	-
1000	6700	1400	7130	1800	-
1050	6650	1450	7140	1850	-
1100	6820	1500	7390	1900	-
1150	6910	1550	-	1950	-
1200	6990	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	6/16/98

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31279	33700	5	6740	1.8	6738
	BACKGROUND	9	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
6738	21.5	4.6	21.5%	4.6

HIGH VOLTAGE:	1000

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	7120	-	3 HOURS	6980	98%
1 HOUR	7100	99.7%	3.5 HOURS	6860	96.3%
1.5 HOURS	7080	99.4%	4 HOURS	6850	96.2%
2 HOURS	7000	98.3%	4.5 HOURS	6910	97%
2.5 HOURS	7020	98.6%	5 HOURS	6960	97.7%

CALIBRATED BY:	Carmen Vergari
SIGNATURE:	Carmen Vergari

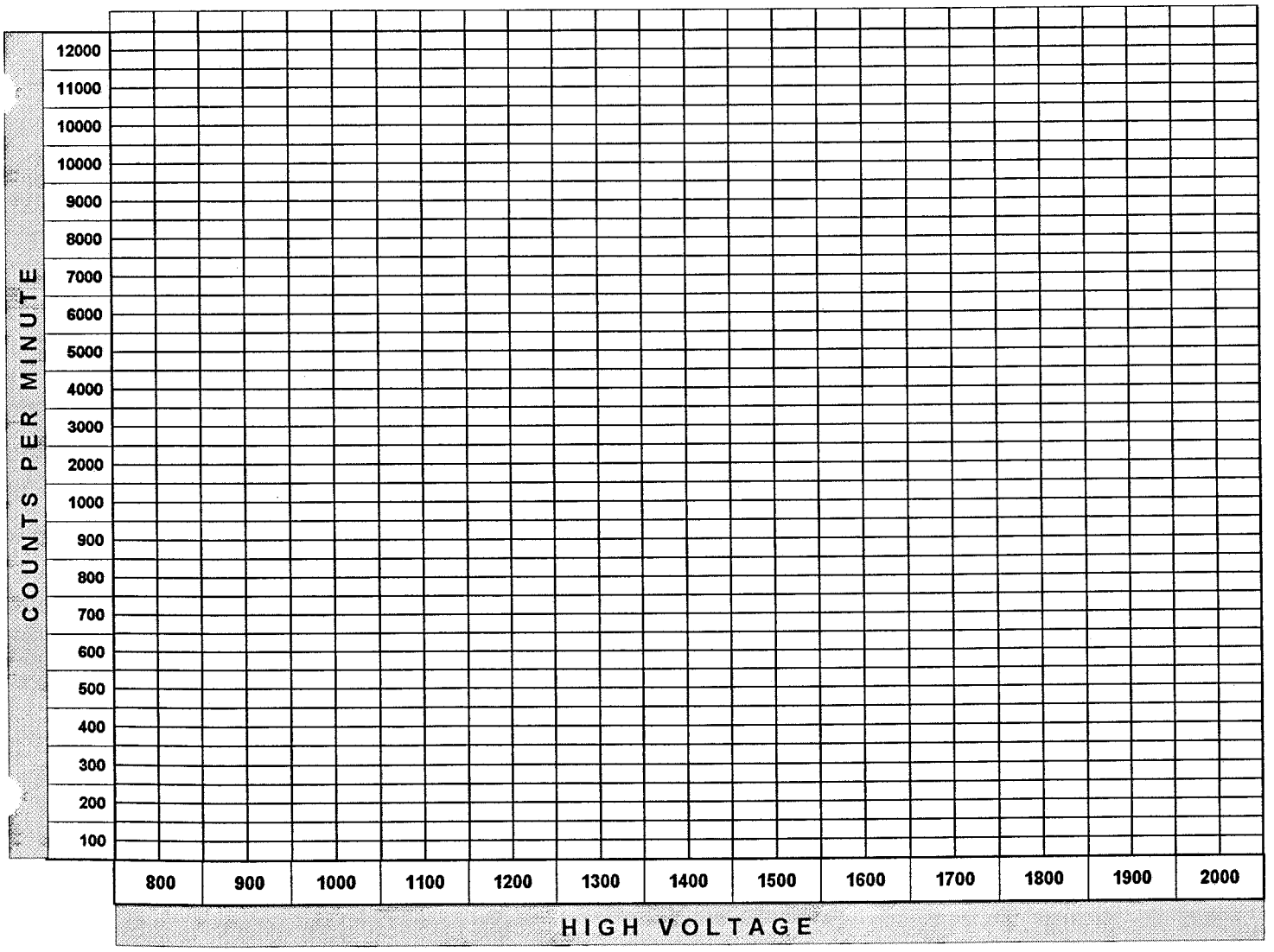
DATE:	6/16/98

COMMENTS:

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	1510	1250	7010	1650	-
900	5180	1300	7160	1700	-
950	6300	1350	7160	1750	-
1000	6770	1400	7310	1800	-
1050	6840	1450	7340	1850	-
1100	6930	1500	7330	1900	-
1150	7240	1550	-	1950	-
1200	7120	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	3/17/98

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY - dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31279	34100	5	6820	2.2	6818
	BACKGROUND	11	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
6818	21.8%	4.6	21.8%	4.6

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	6630	-	3 HOURS	6880	104%
1 HOUR	6660	100.5%	3.5 HOURS	6820	103%
1.5 HOURS	6610	99.7%	4 HOURS	6770	102%
2 HOURS	6740	101.7%	4.5 HOURS	6720	101.4%
2.5 HOURS	6660	100.5%	5 HOURS	6740	101.7%

CALIBRATED BY:	Carmen Vergari
SIGNATURE:	

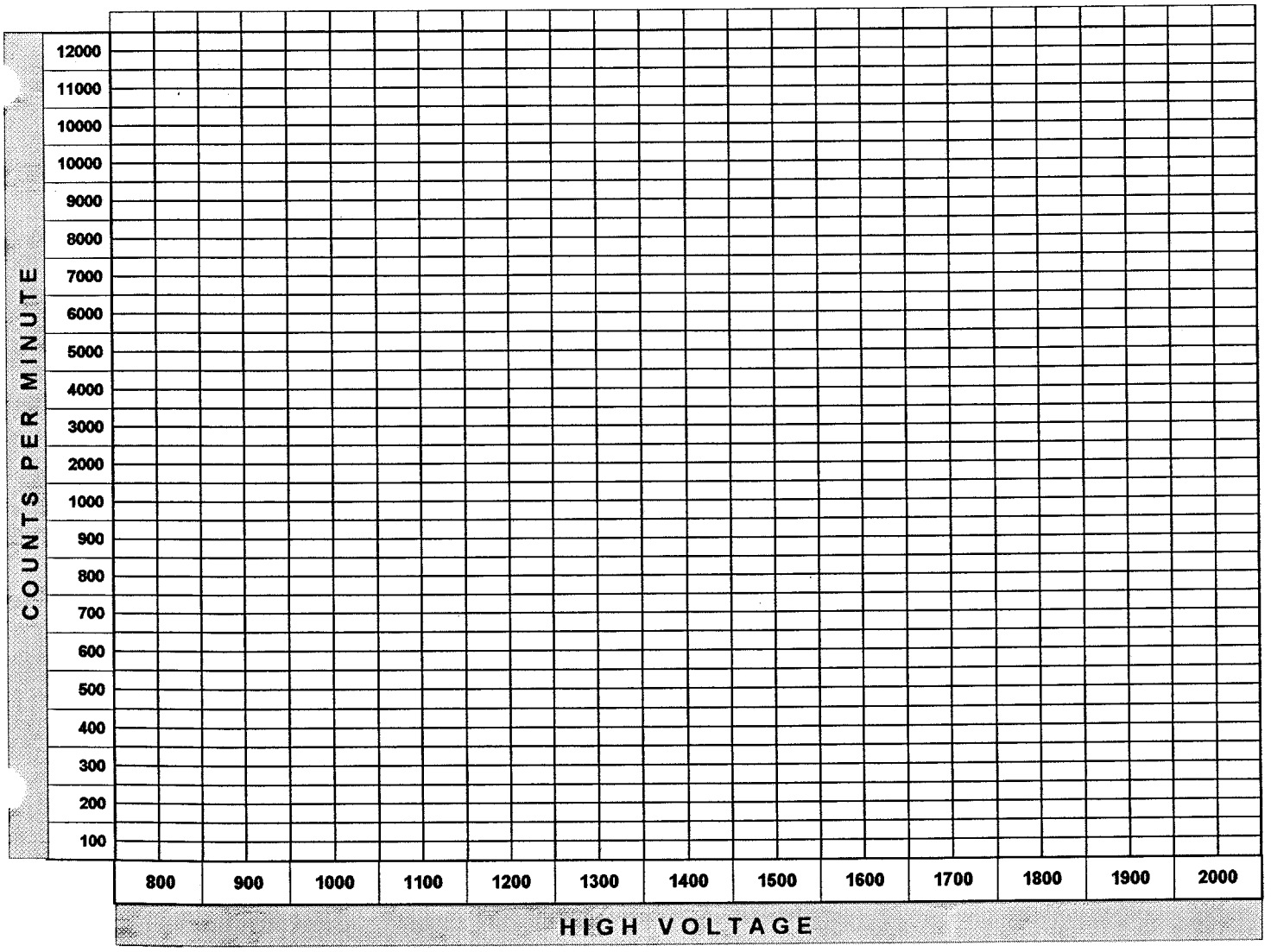
DATE:	3/17/98

COMMENTS: Calibrated with Ludlum 43-68 probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	281	1250	7000	1650	-
900	4200	1300	6890	1700	-
950	6180	1350	7000	1750	-
1000	6730	1400	7190	1800	-
1050	6820	1450	7130	1850	-
1100	6700	1500	7480	1900	-
1150	6950	1550	-	1950	-
1200	7050	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	12/16/97

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31279	34800	5	6960	1.2	6959
	BACKGROUND	6	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
6959	22.2%	4.5	22.2%	4.5

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	6790	-	3 HOURS	6720	99%
1 HOUR	6650	97.9%	3.5 HOURS	6800	100.1%
1.5 HOURS	6640	97.8%	4 HOURS	6820	100.4%
2 HOURS	6870	101.2%	4.5 HOURS	6740	99.3%
2.5 HOURS	6790	100%	5 HOURS	6870	101.2%

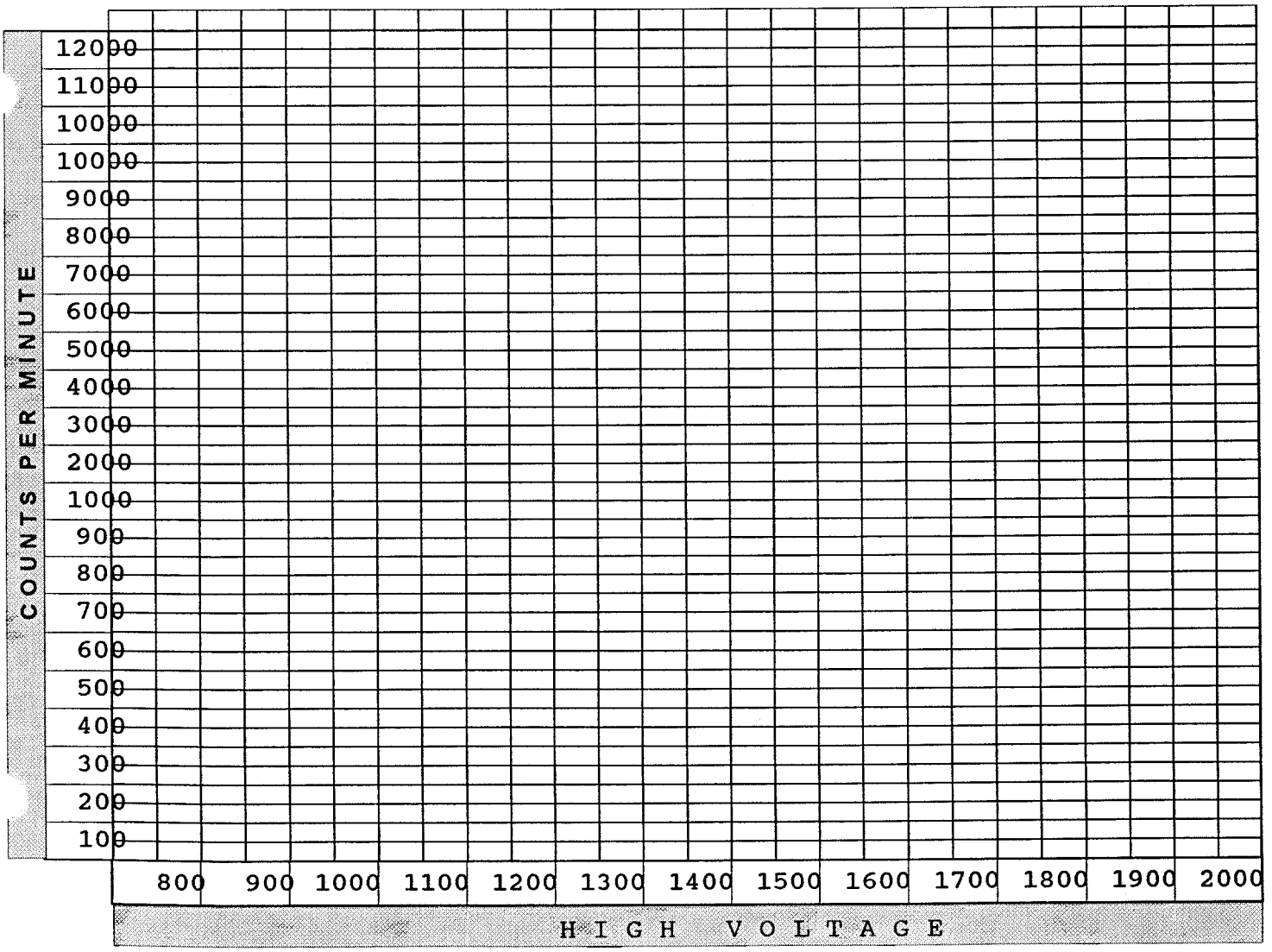
CALIBRATED BY:	Carmen Vergari
SIGNATURE:	Carmen A. Vergari

DATE:	12/16-97

COMMENTS: Calibrated with Ludlum 43-68 probe

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	792	1250	7110	1650	-
900	4360	1300	7060	1700	-
950	6260	1350	6980	1750	-
1000	6630	1400	7240	1800	-
1050	6850	1450	7250	1850	-
1100	6890	1500	7370	1900	-
1150	6970	1550	-	1950	-
1200	7150	1600	-	2000	-



GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-97-07-210

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model ESP Serial Number 01588
External Probe(s) _____ Serial # _____

Calibration Method Pulser s/n 120935

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	RATEMETER	200 CPM	2.00 + 02 CPM	2.00 + 02 CPM	All Calibrations Btn. + & - 10%
2		800	8.00 + 02	8.00 + 02	
3		2K	2.00 + 03	2.00 + 03	Battery: OK
4		8K	8.00 + 03	8.00 + 03	
5		20K	2.00 + 04	2.00 + 04	Reset: OK
6		80K	8.01 + 04	8.01 + 04	
7		200K	2.00 + 05	2.00 + 05	Light: OK
8		800K	8.02 + 05	8.02 + 05	
9					Speaker: OK
10	SCALER	200	2.00 + 02	2.00 + 02	
11	INTEGRATING	2K	2.00 + 03	2.00 + 03	Input Sensitivity = 2mV
12	1 MIN COUNTS	20K	2.00 + 04	2.00 + 04	
13		200K	2.00 + 05	2.00 + 05	DT = 2.00 - 07
14		2M	2.02 + 06	2.02 + 06	CC = 1.00 + 00
15					
16					Electronical calibration Only
17					
18					Alarm @ 1.00 + 06
19					
20					
21					
22					
23					

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: William Owen (Signed)
Calibration Date: 07-16-97
Next Calibration Due: 10-16-97

I certify that the above information is correct:
Administrative Coordinator — Date: 07-16-97

ESP-2 CALIBRATION

ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	4/9/97

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY - dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31279	34700	5	6940	1	6939
	BACKGROUND	6	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
6939	22.2%	4.5	22.2%	4.5

HIGH VOLTAGE:	1050

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	6870	-	3 HOURS	7030	102.3%
1 HOUR	6960	101.3%	3.5 HOURS	6990	101.7%
1.5 HOURS	6990	101.7%	4 HOURS	7000	101.8%
2 HOURS	6880	100.1%	4.5 HOURS	6810	99.1%
2.5 HOURS	7000	101.8%	5 HOURS	6660	96.9%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

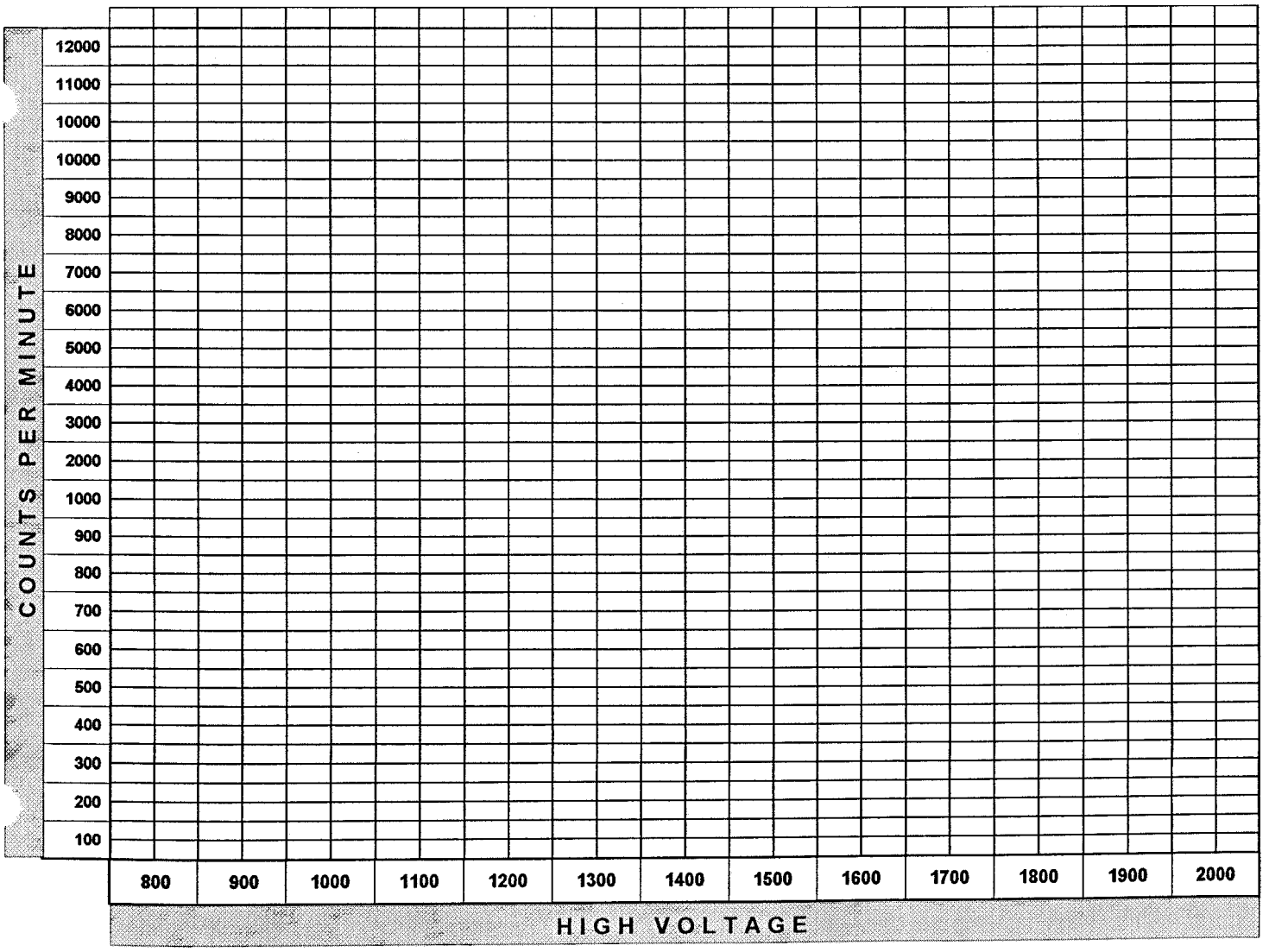
DATE:	4/9/97

COMMENTS: Calibrated with Ludlum 43-68 probe and short cable.
Source was decayed date effective 3/12/97.

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	640	1250	7200	1650	-
900	4230	1300	7140	1700	-
950	6330	1350	7200	1750	-
1000	6730	1400	7380	1800	-
1050	6960	1450	7390	1850	-
1100	6940	1500	7770	1900	-
1150	7140	1550	-	1950	-
1200	7200	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	1/6/97

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY - dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31300	33500	5	6700	7	6693
	BACKGROUND	34	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
6693	21.4%	4.7	21.4%	4.7

HIGH VOLTAGE:	1050

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	6800		3 HOURS	6600	97.1%
1 HOUR	6680	98.2%	3.5 HOURS	6610	97.2%
1.5 HOURS	6730	98.9%	4 HOURS	6720	98.8%
2 HOURS	6730	98.9%	4.5 HOURS	6720	98.8%
2.5 HOURS	6780	99.7%	5 HOURS	6760	99.4%

CALIBRATED BY:	Larry Smith
SIGNATURE:	

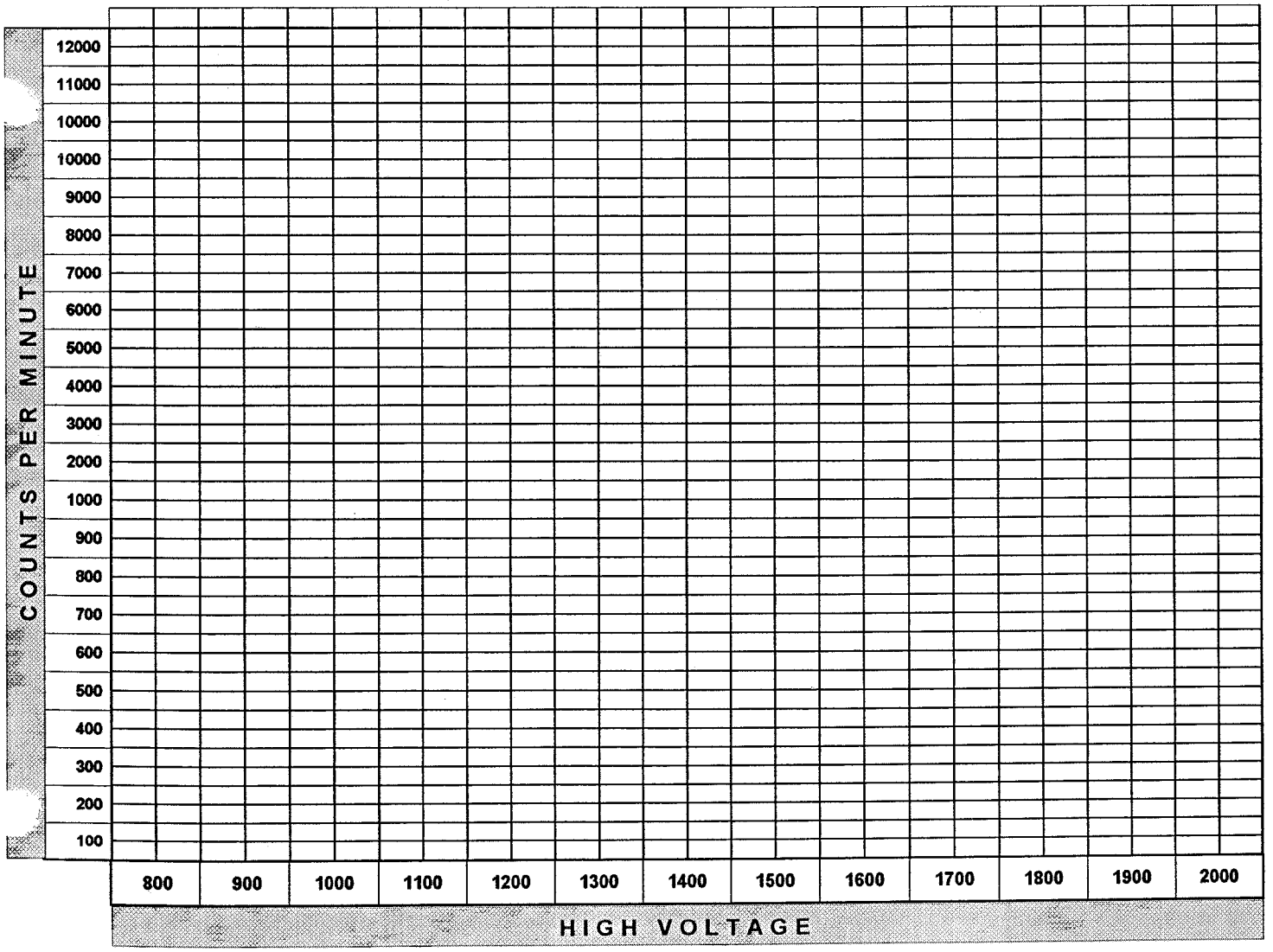
DATE:	1/6/97

COMMENTS: Calibrated with Ludlum 43-68 probe.

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	561	1250	7240	1650	-
900	4740	1300	7280	1700	-
950	6440	1350	7480	1750	-
1000	6880	1400	7580	1800	-
1050	7000	1450	7530	1850	-
1100	7070	1500	-	1900	-
1150	7080	1550	-	1950	-
1200	7220	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	10/1/96

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31300	34900	5	6980	3	6977
	BACKGROUND	16	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
6977	22.3	4.5	22.3%	4.5

HIGH VOLTAGE:	1250

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	7090	-	3 HOURS	7040	99.3%
1 HOUR	6910	97.5%	3.5 HOURS	7110	100.3%
1.5 HOURS	7010	98.9%	4 HOURS	7090	100%
2 HOURS	7090	100%	4.5 HOURS	7100	100.1%
2.5 HOURS	7050	99.4%	5 HOURS	7120	100.4%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

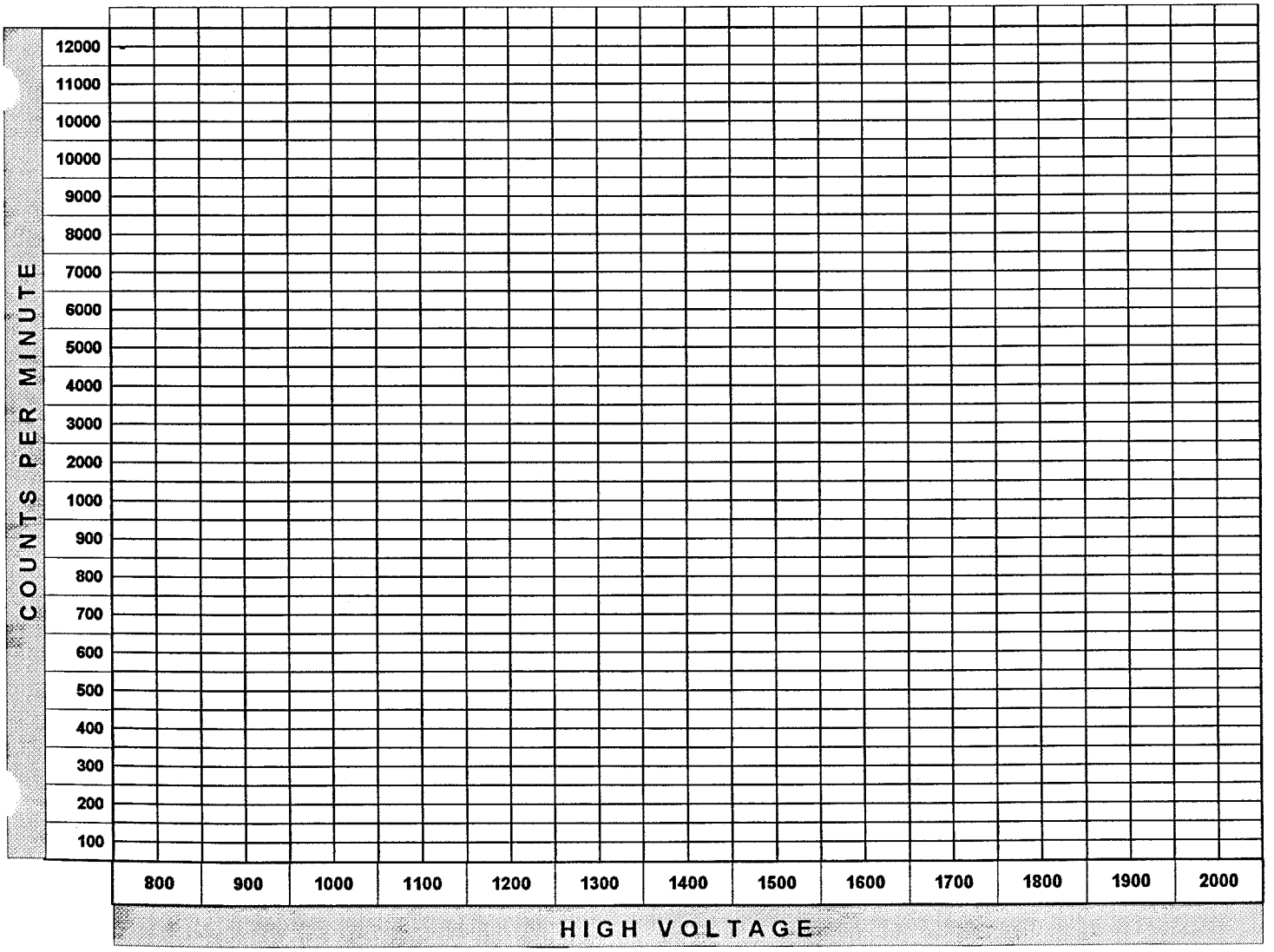
DATE:	10/1/96

COMMENTS: Calibrated with Ludlum 43-68 probe with 10 ft. cable.

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	7120	1650	-
900	0	1300	7200	1700	-
950	0	1350	7270	1750	-
1000	2640	1400	7250	1800	-
1050	5410	1450	7150	1850	-
1100	6510	1500	7090	1900	-
1150	6790	1550	-	1950	-
1200	6760	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	7-1-96

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31300	36400	5	7280	1.6	7278
	BACKGROUND	8	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7278	23.2%	4.3	23.2%	4.3

HIGH VOLTAGE:	1250

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	7040		3 HOURS	7010	99.6%
1 HOUR	7070	100.4%	3.5 HOURS	6960	98.9//5
1.5 HOURS	6910	98.1%	4 HOURS	6870	97.6%
2 HOURS	6890	97.9%	4.5 HOURS	6900	98%
2.5 HOURS	7020	99.7%	5 HOURS	6840	97.2%

CALIBRATED BY:	Carmen Vergari
SIGNATURE:	Carmen A. Vergari

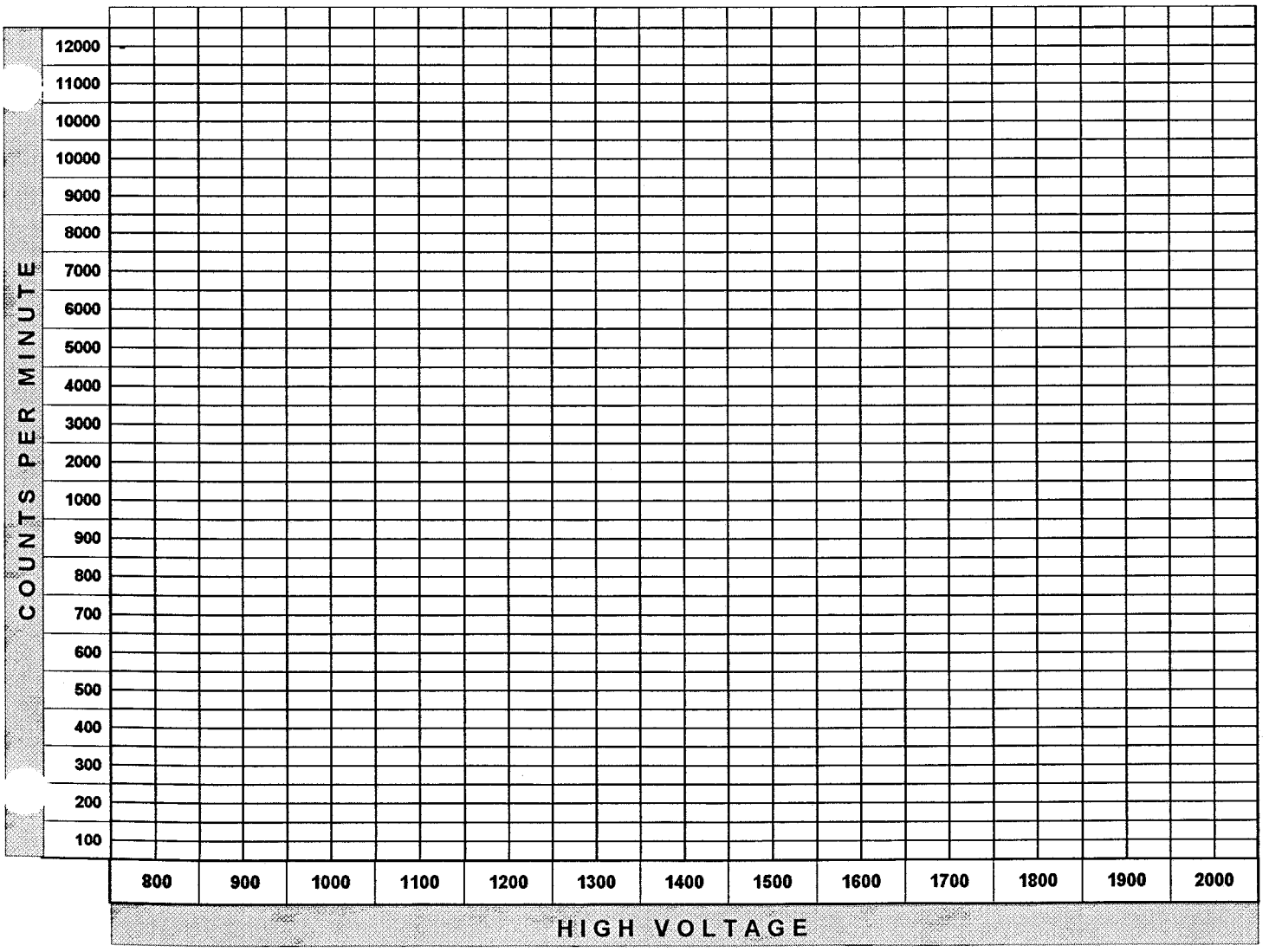
DATE:	7-1-96

COMMENTS: Calibrated with Ludlum 43-68 Probe.

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	123	1250	7560	1650	-
900	414	1300	7440	1700	-
950	6600	1350	7430	1750	-
1000	6860	1400	7580	1800	-
1050	7120	1450	7640	1850	-
1100	7000	1500	7770	1900	-
1150	7340	1550	-	1950	-
1200	7260	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	4/2/96

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	230966	238000	5	47600	1	47599
	BACKGROUND	9	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
47599	20.6%	4385	20.6%	4.85

HIGH VOLTAGE:	1050

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	47400	-	3 HOURS	46000	97%
1 HOUR	47500	100.2%	3.5 HOURS	45800	96.6%
1.5 HOURS	47400	100%	4 HOURS	45600	96.2%
2 HOURS	46900	98.9%	4.5 HOURS	45800	96.6%
2.5 HOURS	46200	97.5%	5 HOURS	45600	96.2%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

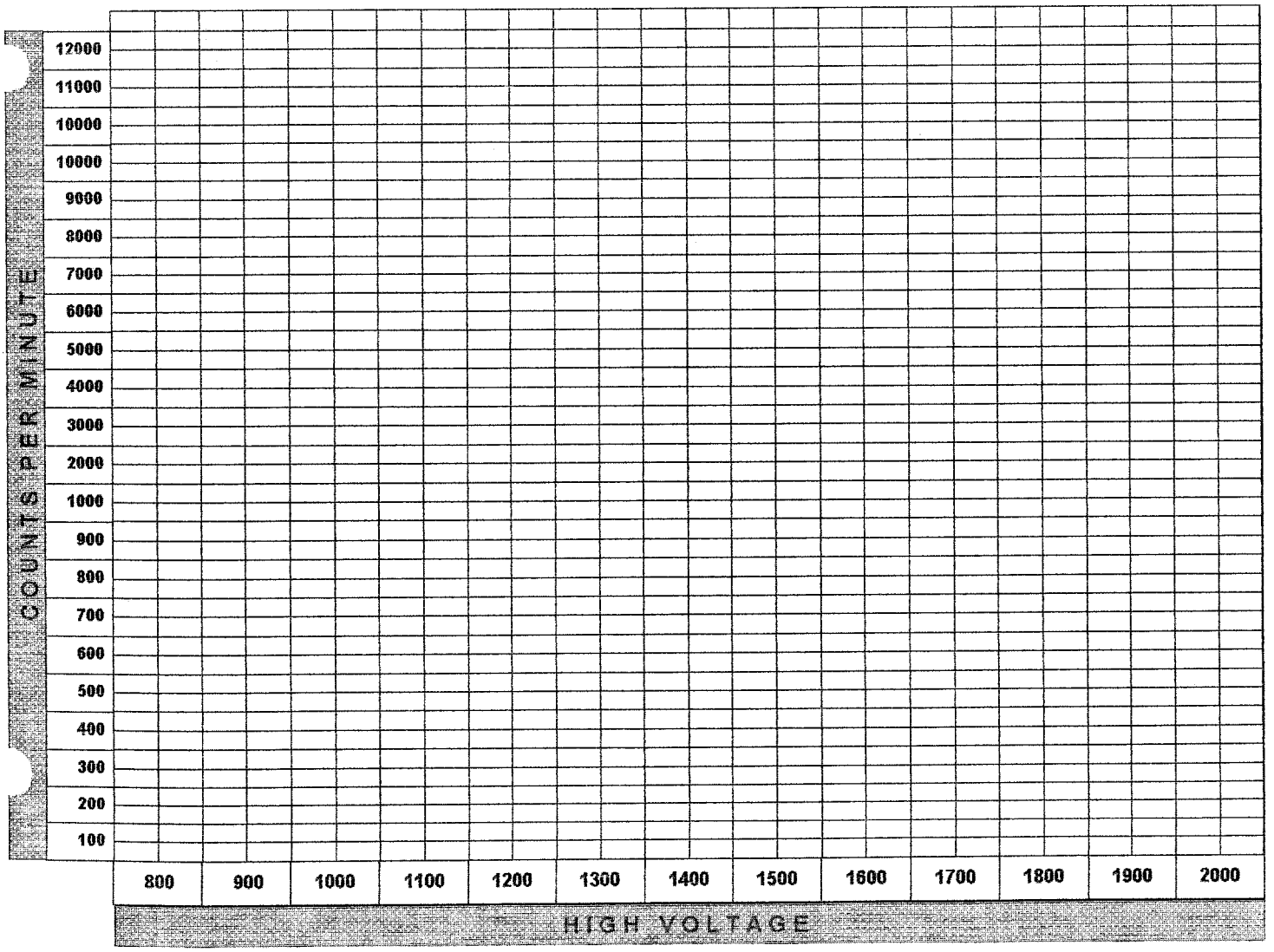
DATE:	4/2/96

COMMENTS: Calibrated with Ludlum 43-68 probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	6890	1250	49200	1650	-
900	30600	1300	49300	1700	-
950	44000	1350	49600	1750	-
1000	45900	1400	50500	1800	-
1050	47800	1450	50700	1850	-
1100	47800	1500	50600	1900	-
1150	48800	1550	-	1950	-
1200	49000	1600	-	2000	-



IH & S Form # 205 **ESP-2 CALIBRATION**

ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	12/23/95

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	230966	255000	5	51000	1	50999
	BACKGROUND	3	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
50999	22.1%	4.52	22.1%	4.52

HIGH VOLTAGE:	1050

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	50500	-	3 HOURS	50600	100.2%
1 HOUR	50800	100.6%	3.5 HOURS	50500	100%
1.5 HOURS	50600	100.2%	4 HOURS	50400	99.8%
2 HOURS	50600	100.2%	4.5 HOURS	50600	100.2%
2.5 HOURS	50400	99.8%	5 HOURS	50800	100.1%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry L. S

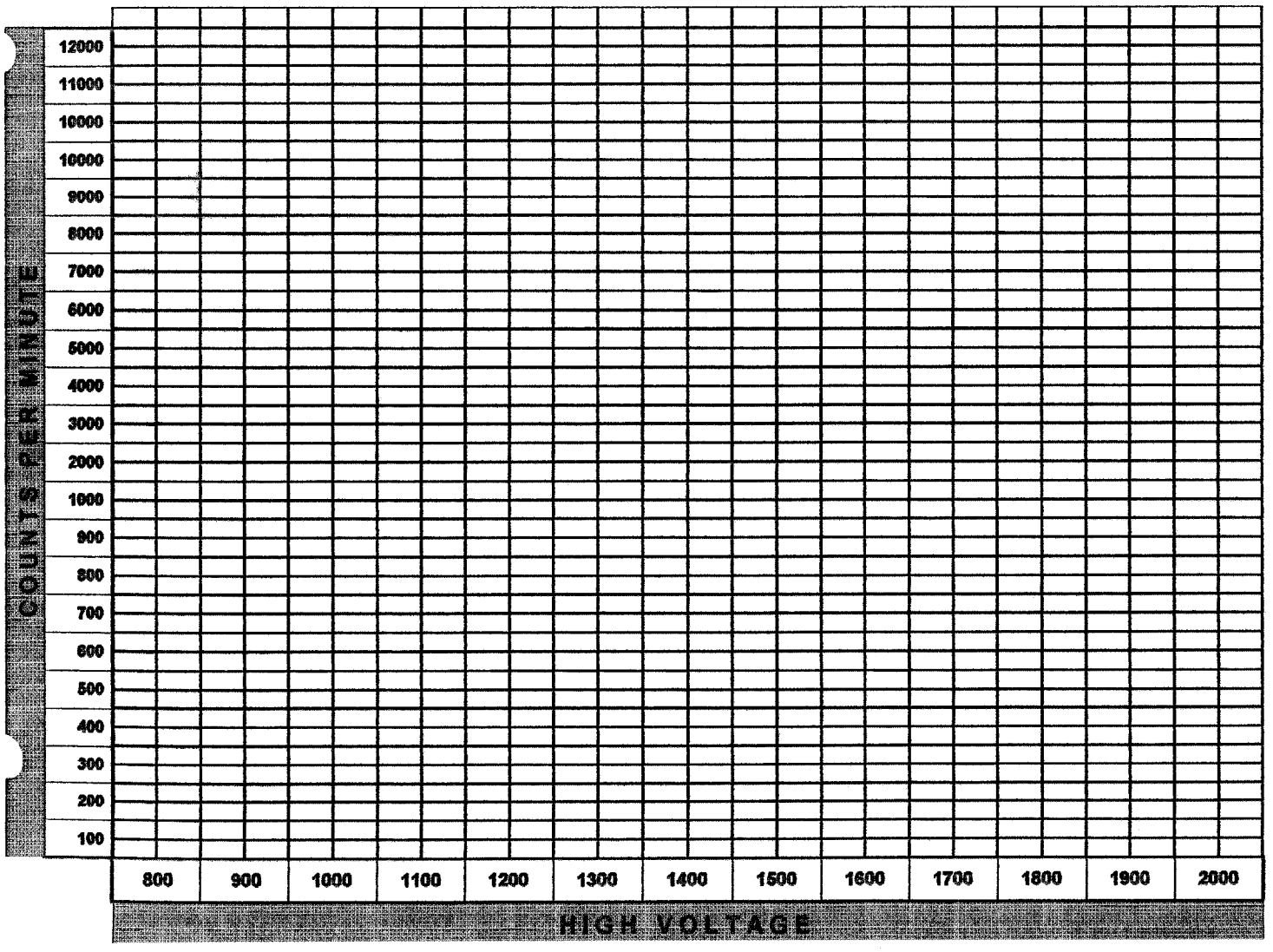
DATE:	12/23/95

COMMENTS: Calibrated with Ludlum 43-68 probe and 5 ft. cable.
(NOTE: DO NOT USE 10 ft. CABLE AS EFFICIENCY WILL DIFFER.

ESP-2 PLATEAU

ALPHA / BETA:	BETA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	2250	1250	52600	1650	-
900	28700	1300	52900	1700	-
950	46100	1350	53000	1750	-
1000	49900	1400	53900	1800	-
1050	51400	1450	54400	1850	-
1100	51900	1500	54400	1900	-
1150	52500	1550	-	1950	-
1200	52600	1600	-	2000	-



ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	10/3/95

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	230966	251000	5 min	50200	1	50199
	BACKGROUND	5	5 min			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
50199	21.7%	4.6	21.7%	4.6

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	50200	---	3 HOURS	49500	98.6%
1 HOUR	50500	100.5%	3.5 HOURS	49200	98%
1.5 HOURS	49500	98.6%	4 HOURS	48800	97.2%
2 HOURS	48600	96.8%	4.5 HOURS	48600	96.8%
2.5 HOURS	48600	96.8%	5 HOURS	48200	96%

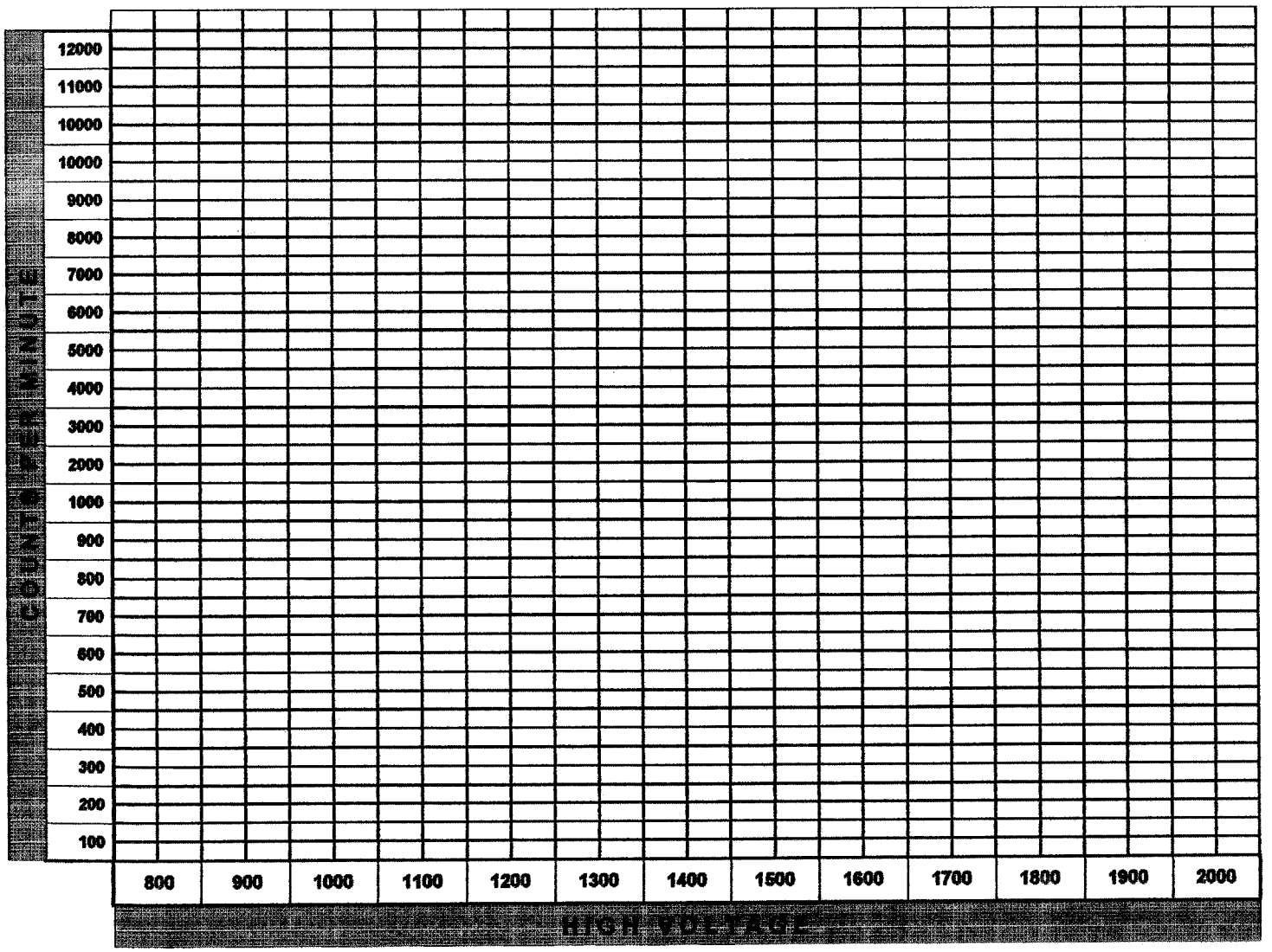
CALIBRATED BY:	Carmen Vergari
SIGNATURE:	Carmen A. Vergari

DATE:	10/3/95

COMMENTS: Calibrated with Ludlum 43-68 probe.

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	2	1250	52200	1650	---
900	92	1300	52300	1700	---
950	11600	1350	52200	1750	---
1000	39500	1400	52600	1800	---
1050	48700	1450	53200	1850	---
1100	50200	1500	53500	1900	---
1150	51000	1550	---	1950	---
1200	51700	1600	---	2000	---



GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-95-09-210

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model ESP-2 Serial Number 1588
External Probe(s) _____ Serial # _____

Calibration Method Pulser s/n 101500

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	RATE METER	200 CPM	2.00 + 02 CPM	2.00 + 02 CPM	All Calibrations Btn. + & - 10%
2		800	8.00 + 02	8.00 + 02	
3					Battery: OK
4		2K	2.00 + 03	2.00 + 03	
5		8K	8.00 + 03	8.00 + 03	Reset: OK
6					
7		20K	2.00 + 04	2.00 + 04	Light: OK
8		80K	8.00 + 04	8.00 + 04	
9					Speaker: OK
10		200K	2.00 + 05	2.00 + 05	
11		800K	8.10 + 05	8.03 + 05	Input Sensitivity = 2mV
12					
13		2M	2.07 + 06	2.02 + 06	DT = 3.00 - 07
14					CC = 1.00 + 00
15	SCALER	200	2.00 + 02	2.00 + 02	
16	Integrating				High Voltage: OK
17	1 Min Counts	2K	2.00 + 03	2.00 + 03	
18					Electronic calibration only
19		20K	2.00 + 04	2.00 + 04	
20					
21		200K	2.00 + 05	2.00 + 05	
22					
23		2M	2.01 + 06	2.01 + 06	

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by _____ (Signed)

Calibration Date: 09-27-95
Next Calibration Due: 12-27-95

I certify that the above information is correct:

Administrative Coordinator

09-27-95
Date

ESP-2 CALIBRATION

ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	6/20/95

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	230966	245000	5	49000	2	48998
	BACKGROUND	11	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
48998	21.2%	4.7	21.2%	4.7

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	50400	- - -	3 HOURS	49200	97.6%
1 HOUR	49500	98.2%	3.5 HOURS	48600	96.4%
1.5 HOURS	49600	98.4%	4 HOURS	48500	96.2%
2 HOURS	49100	97.4%	4.5 HOURS	48500	96.2%
2.5 HOURS	49400	98%	5 HOURS	47900	95%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

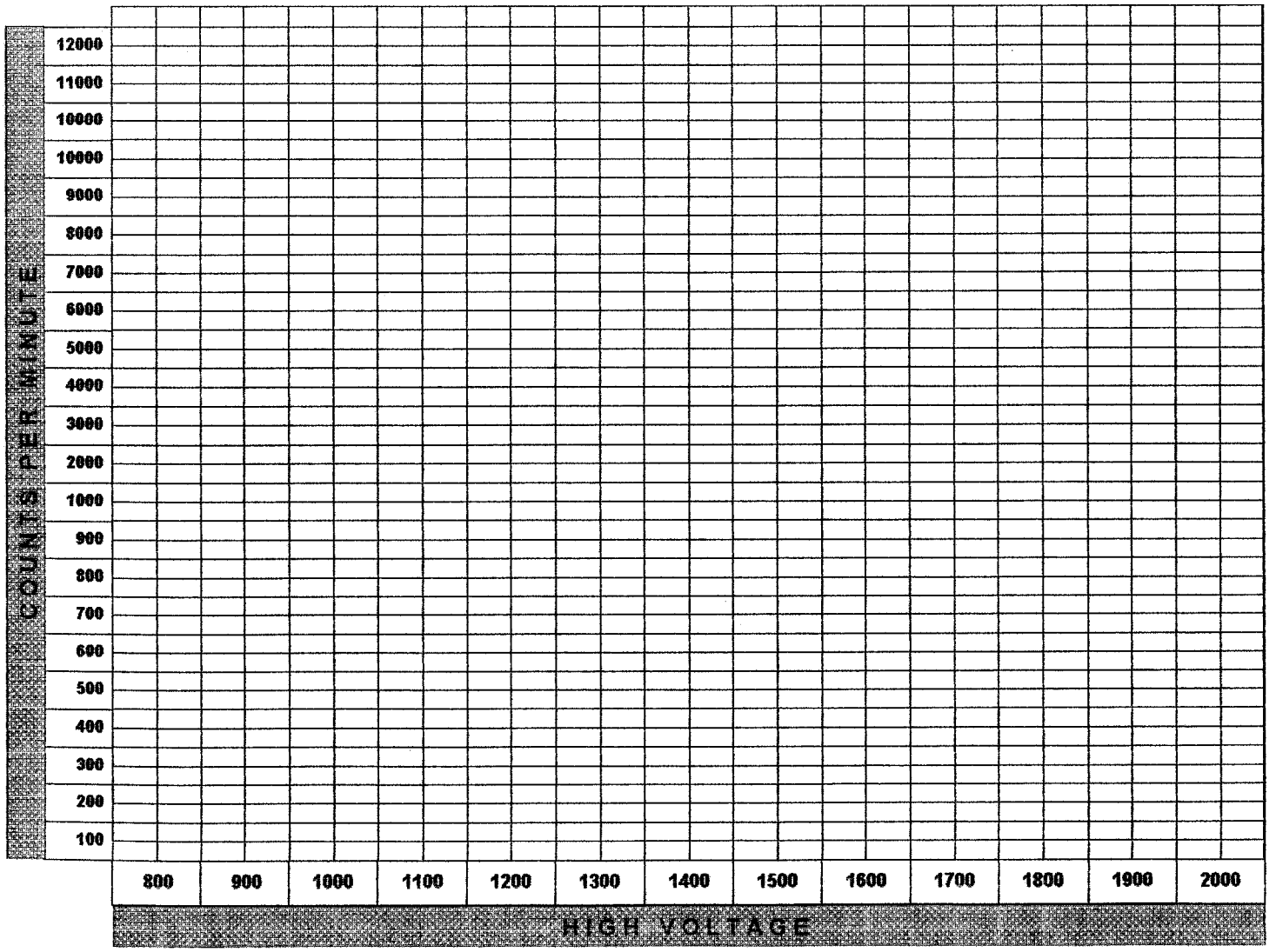
DATE:	6/20/95

COMMENTS: Calibrated with Ludlum 43-68 probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	10	1250	50600	1650	---
900	81	1300	51100	1700	---
950	8730	1350	51300	1750	---
1000	37100	1400	52300	1800	---
1050	47400	1450	52400	1850	---
1100	49000	1500	52500	1900	---
1150	50100	1550	---	1950	---
1200	50300	1600	---	2000	---



GTS Instrument Services
2045 Route 286
Pittsburgh, PA 15239-2839
412/733-1900 Fax: 412/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION

Customer Name: Westinghouse
Customer Address: P.O. Box 3700
Pittsburgh, PA 15230

Customer P.O.# MB-14027-S
Work Order # I-95-06-208

INSTRUMENT INFORMATION

Instrument Manufacturer Eberline
Model ESP-2 Serial Number 1588
External Probe(s) _____ Serial # _____

Calibration Method Pulser s/n 101500

INSTRUMENT CALIBRATION INFORMATION

	Instrument Range	Calibration Standard Value	Instrument Response Before Calib.	Instrument Response After Calib.	Comment
1	RATE METER	200 CPM	2.00 + 02 CPM	2.00 + 02 CPM	All Calibrations Btn. + & - 10%
2		800	8.00 + 02	8.00 + 02	
3					Battery: OK
4		2K	2.00 + 03	2.00 + 03	
5		8K	8.00 + 03	8.00 + 03	Reset: OK
6					
7		20K	2.00 + 04	2.00 + 04	Light: OK
8		80K	8.00 + 04	8.00 + 04	
9					Speaker: OK
10		200K	2.00 + 05	2.00 + 05	
11		800K	8.02 + 05	8.02 + 05	Input Sensitivity ≅ 2mV
12					
13		2M	2.01 + 06	2.01 + 06	DT = 2.00 - 07
14					
15	SCALER	200	2.00 + 02	2.00 + 02	CC = 1.00 + 00
16	INTEGRATING				
17	1 MIN COUNTS	2K	2.00 + 03	2.00 + 03	Electronic Cal Only
18					
19		20K	2.00 + 04	2.00 + 04	
20					
21		200K	2.00 + 05	2.00 + 05	
22					
23		2M	2.01 + 06	2.01 + 06	

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated by: _____ (Signed)
Calibration Date: 06-05-95
Next Calibration Due: 09-05-95

I certify that the above information is correct: _____ Administrative Coordinator
06-05-95 Date

IH & S Form # 205 ESP-2 CALIBRATION

ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	5/18/95

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	230966	215000	5	43000	3	42997
	BACKGROUND	17	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
42997	18.6	5.4	18.6%	5.4

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	42900	---	3 HOURS	42300	98.6^
1 HOUR	42400	98.8%	3.5 HOURS	42500	99.1%
1.5 HOURS	42500	99.1%	4 HOURS	42100	98.1%
2 HOURS	42900	100%	4.5 HOURS	42400	98.8%
2.5 HOURS	43000	100.2%	5 HOURS	41500	96.8%

CALIBRATED BY:	Larry Smith
SIGNATURE:	

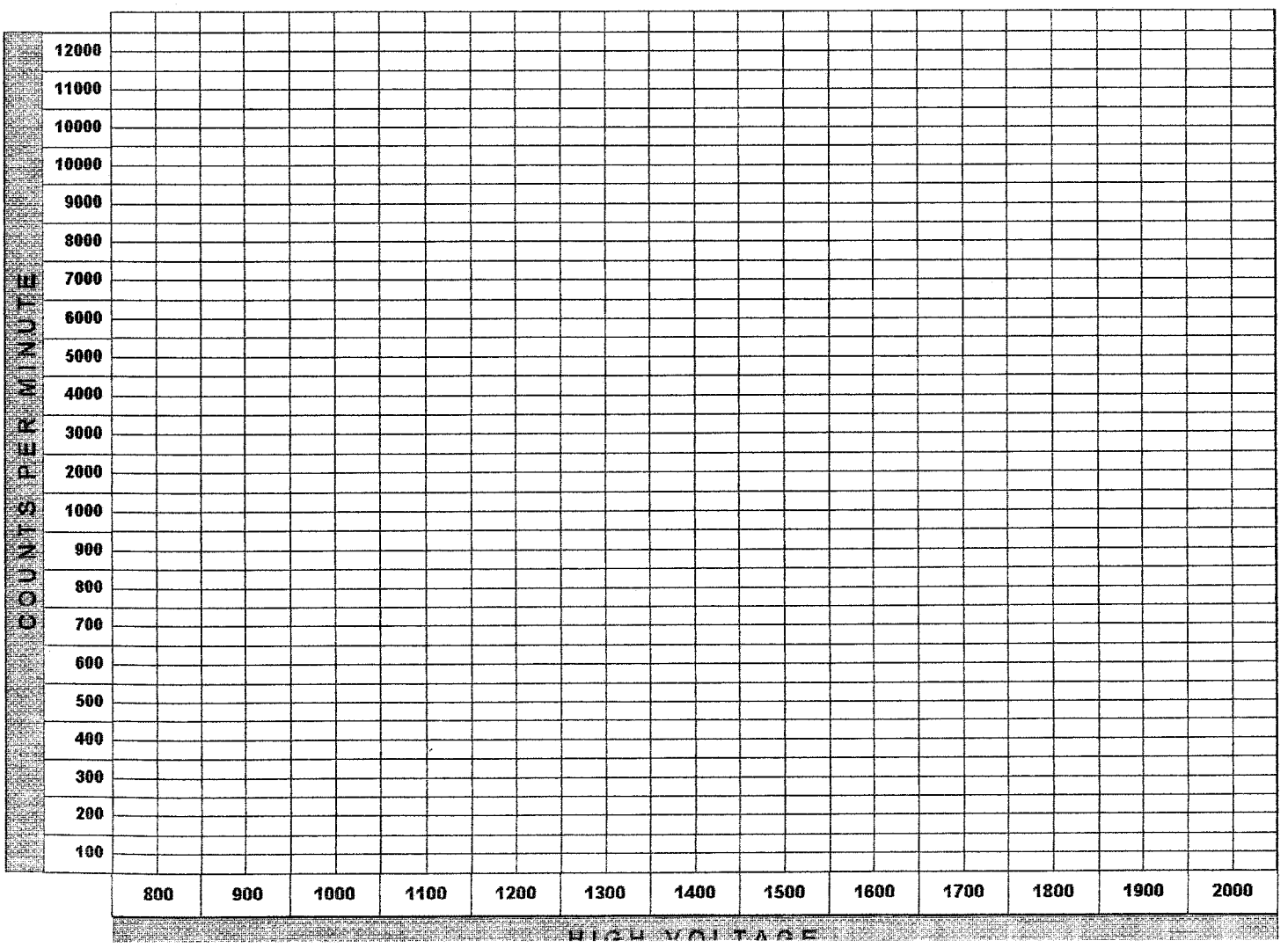
DATE:	5/18/95

COMMENTS: Calibrated with Ludlum 43-68 probe

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	20	1250	44700	1650	---
900	3510	1300	44800	1700	---
950	24700	1350	44900	1750	---
1000	39700	1400	45800	1800	---
1050	41500	1450	46400	1850	---
1100	42800	1500	46900	1900	---
1150	43700	1550	---	1950	---
1200	44200	1600	---	2000	---



ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	4/11/95

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	231100	237000	5	47400	3	47397
	BACKGROUND	17	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
47397	20.5	4.87	20.5%	4.87

HIGH VOLTAGE:	1150

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	47000		3 HOURS	45900	97.6
1 HOUR	47100	100.2	3.5 HOURS	45800	97.4
1.5 HOURS	47100	100.2	4 HOURS	46100	98.1
2 HOURS	46300	98.5	4.5 HOURS	46200	98.3
2.5 HOURS	46000	97.8	5 HOURS	46000	97.8

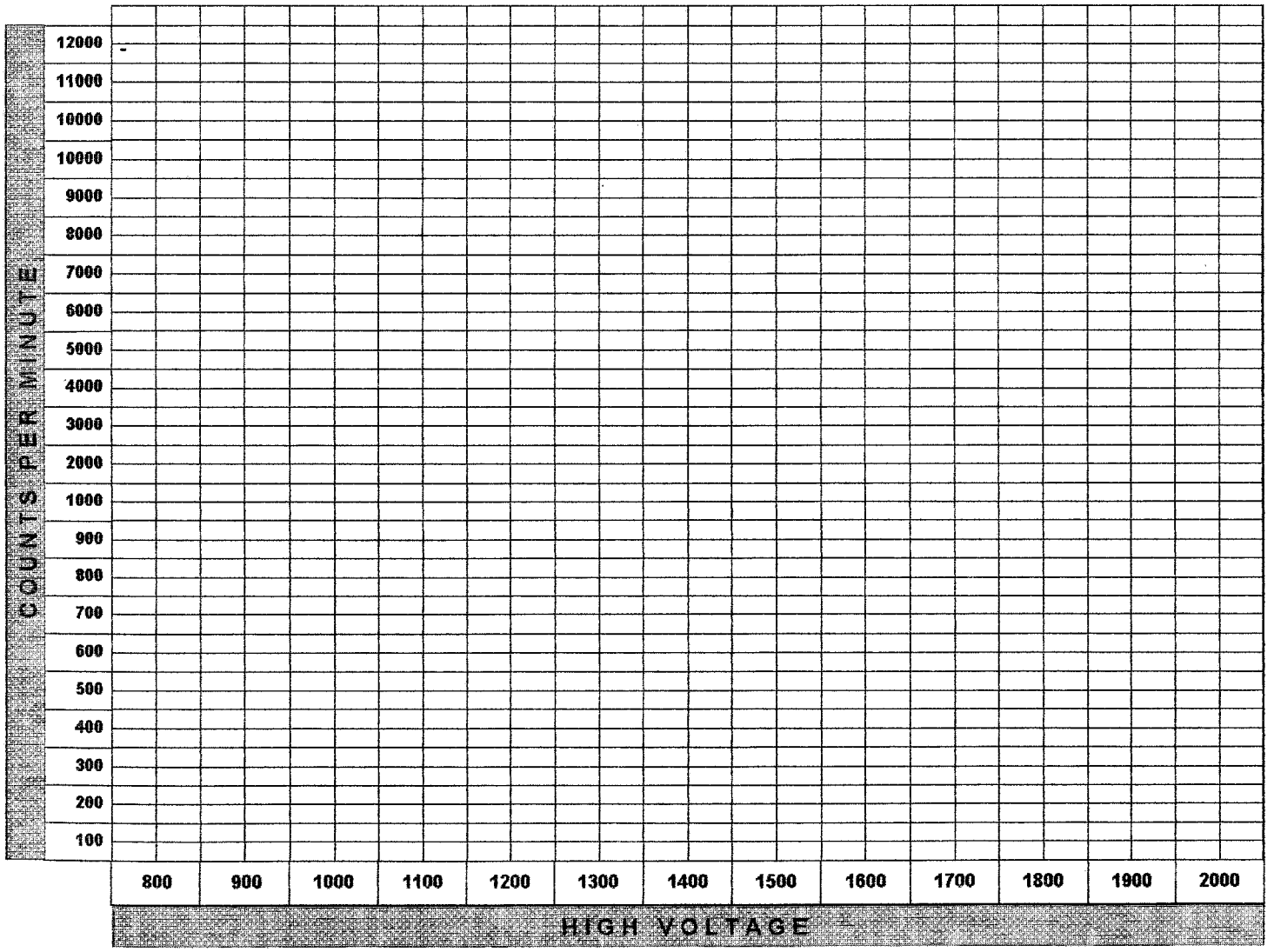
CALIBRATED BY:	Larry Smith
SIGNATURE:	

DATE:	4/11/95

COMMENTS:	Calibrated with Ludlum 43-68 probe

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	48	1250	48300	1650	-
900	6970	1300	48200	1700	-
950	30300	1350	48800	1750	-
1000	43200	1400	49100	1800	-
1050	45400	1450	49500	1850	-
1100	46800	1500	50200	1900	-
1150	47000	1550	-	1950	-
1200	47600	1600	-	2000	-



IH & S Form # 205 **ESP-2 CALIBRATION**

ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	2-21-95

ALPHA / BETA	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG dpm (Total / # min)	NET CPM
7346	231100	234000	5	46800	1	46799
	BACKGROUND	6	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
46799	20.3%	4.93	20.3%	4.93

HIGH VOLTAGE	1150

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	47200		3 HOURS	46400	98.3%
1 HOUR	46800	99.2%	3.5 HOURS	46200	97.9%
1.5 HOURS	47200	100%	4 HOURS	46300	98.1%
2 HOURS	46900	99.4%	4.5 HOURS	45700	96.8%
2.5 HOURS	47000	99.6%	5 HOURS	45600	96.6%

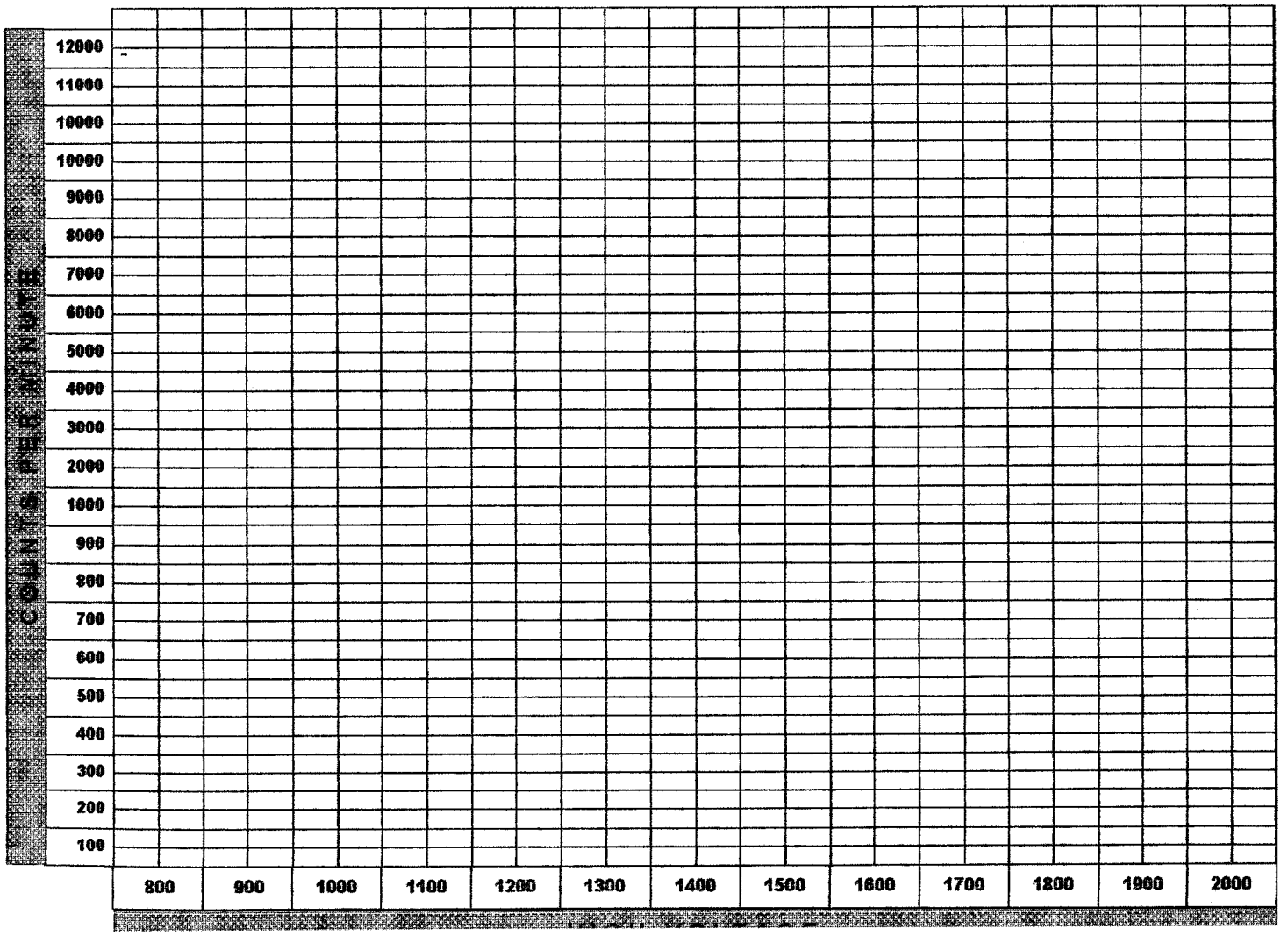
CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

DATE:	2-21-95

COMMENTS: Calibrated with a Ludlum 43-68 Probe

ALPHA / BETA	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	48200	1650	-
900	71	1300	48200	1700	-
950	16100	1350	48700	1750	-
1000	34200	1400	48500	1800	-
1050	43500	1450	49500	1850	-
1100	45400	1500	49900	1900	-
1150	46200	1550	-	1950	-
1200	47500	1600	-	2000	-



ESP-2 CALIBRATION

ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	11-21-94

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
7346	231000	241000	5	48200	1.2	48199
	BACKGROUND	6	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
48199	20.4%	4.9	20.4%	4.9

HIGH VOLTAGE:	1150

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	46000	100%	3 HOURS	44800	97.4%
1 HOUR	45800	99.6%	3.5 HOURS	45300	98.5%
1.5 HOURS	46200	100-4%	4 HOURS	45400	98.7%
2 HOURS	45500	98.9%	4.5 HOURS	44800	97.4%
2.5 HOURS	45600	99.2%	5 HOURS	45000	97.8%

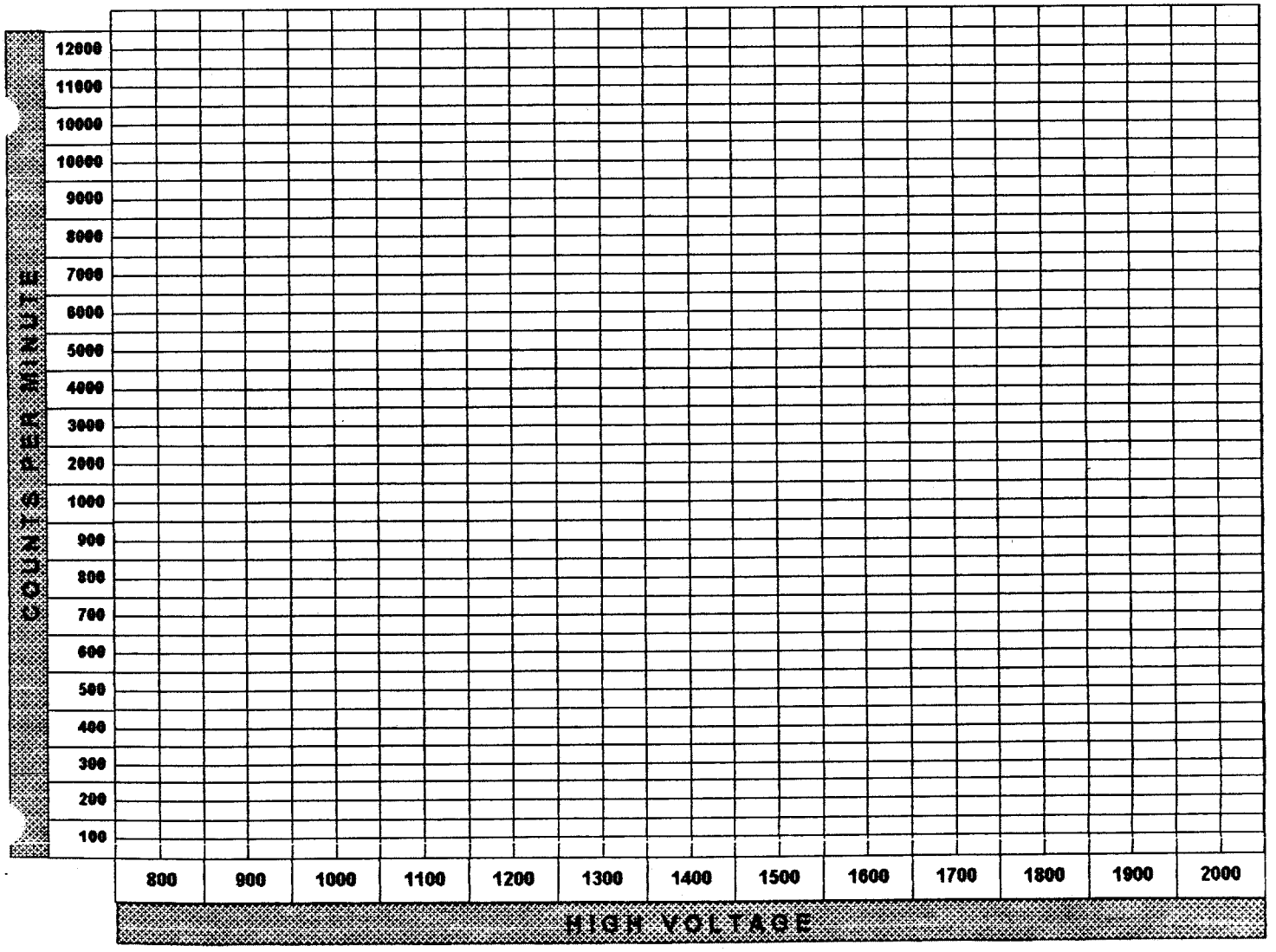
CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

DATE:	11-21-94

COMMENTS: Calibrated with Ludlum 44-68 probe

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	124	1250	49400	1650	-
900	18700	1300	49300	1700	-
950	38600	1350	49800	1750	-
1000	45400	1400	49900	1800	-
1050	46900	1450	50400	1850	-
1100	47500	1500	51200	1900	-
1150	48600	1550	-	1950	-
1200	48700	1600	-	2000	-



ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	7/28/94

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31283	29600	5	5920	3	5917
	BACKGROUND	14	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
5917	18.9%	5.3	18.9%	5.3

HIGH VOLTAGE:	1150

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	5980	100%	3 HOURS	5790	96.8%
1 HOUR	5910	98.8%	3.5 HOURS	5870	98.1%
1.5 HOURS	5910	98.8%	4 HOURS	5900	98.7%
2 HOURS	5870	98.2%	4.5 HOURS	5830	97.5%
2.5 HOURS	5920	99%	5 HOURS	5760	96.3%

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

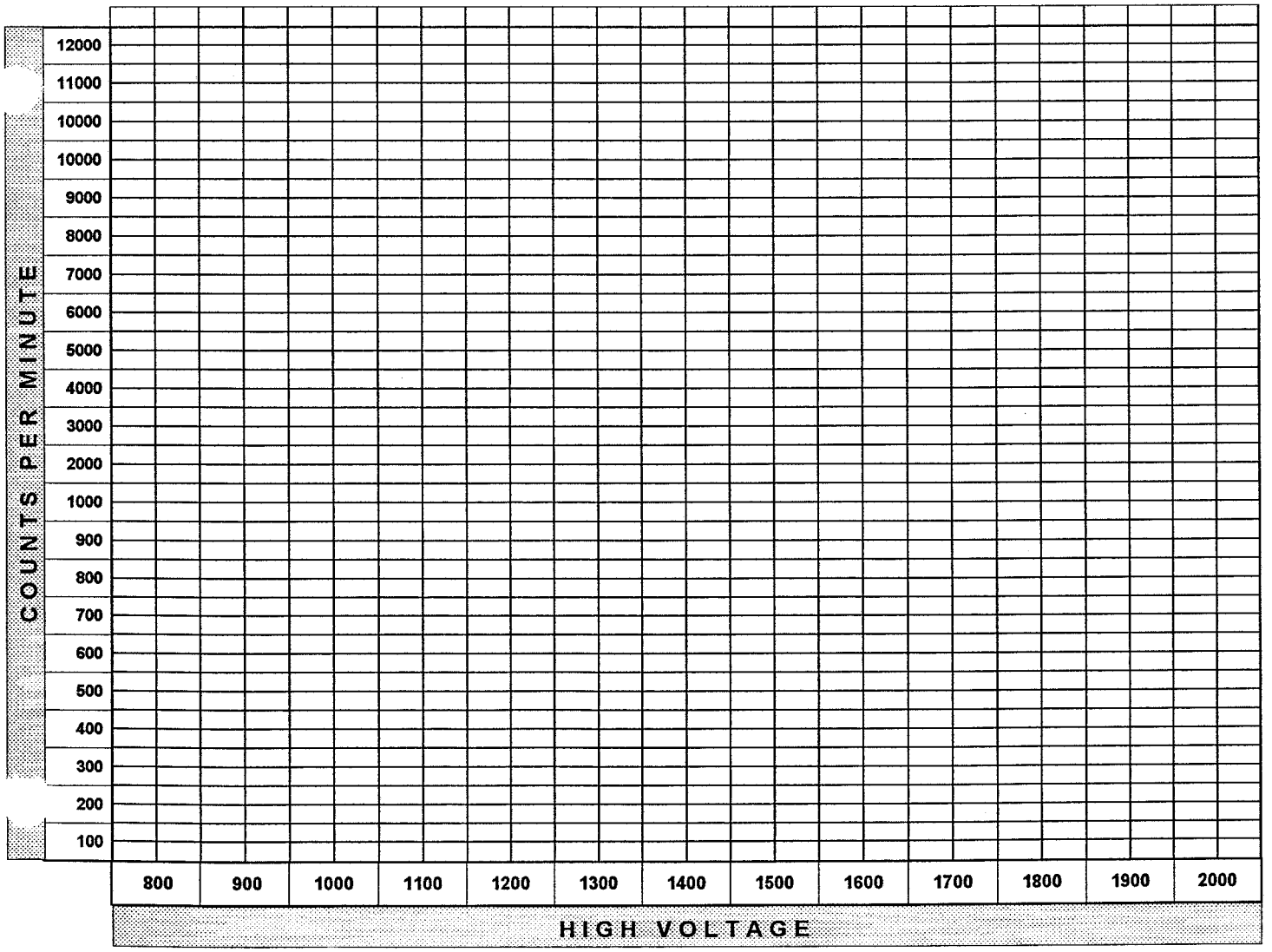
DATE:	7/28/94

COMMENTS: Calibrated with Ludlum 44-68 probe.

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	73	1250	6060	1650	-
900	2260	1300	6110	1700	-
950	4830	1350	6100	1750	-
1000	5420	1400	6220	1800	-
1050	5600	1450	6240	1850	-
1100	5790	1500	6510	1900	-
1150	5860	1550	-	1950	-
1200	5930	1600	-	2000	-



ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	5/19/94

ALPHA / BETA:	Alpha

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31283	30900	5	6180	.2	6180
	BACKGROUND	1	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
6180	19.8%	5.05	19.8%	5.05

HIGH VOLTAGE:	1150

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	6220	100%	3 HOURS	6150	98.9%
1 HOUR	6300	101.3%	3.5 HOURS	6100	98.1%
1.5 HOURS	6210	99.8%	4 HOURS	6200	99.7%
2 HOURS	6160	99%	4.5 HOURS	6150	98.9%
2.5 HOURS	6190	99.5%	5 HOURS		

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

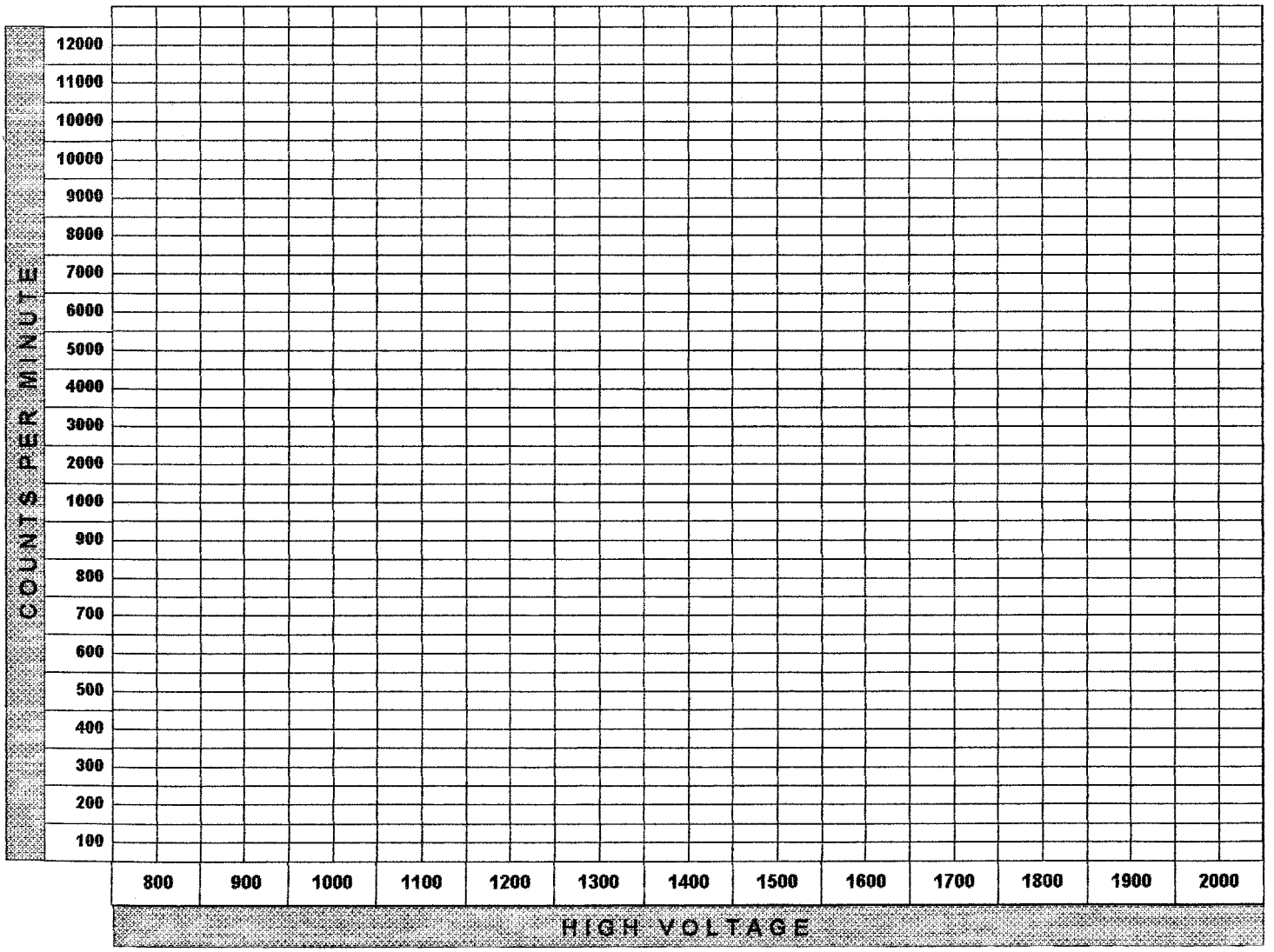
DATE:	5/19/94

COMMENTS: Calibrated with Ludlum 43-68 probe

ESP-2 PLATEAU

ALPHA / BETA:	Alpha

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	2	1250	6230	1650	---
900	1890	1300	6280	1700	---
950	4740	1350	6440	1750	---
1000	5610	1400	6330	1800	---
1050	6020	1450	6570	1850	---
1100	6130	1500	6630	1900	---
1150	6310	1550	---	1950	---
1200	6250	1600	---	2000	---



IH & S Form # 205 **ESP-2 CALIBRATION**

ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	2-21-94

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31283	35400	5	7080	1.6	7078
	BACKGROUND	8	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7088	22.7	4.41	22.7	4.41

HIGH VOLTAGE:	1150

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	7090	100.0%	3 HOURS	6490	91.5%
1 HOUR	7020	99.0%	3.5 HOURS	6440	90.8%
1.5 HOURS	6930	97.7%	4 HOURS	6390	90.1%
2 HOURS	6940	97.9%	4.5 HOURS		
2.5 HOURS	6690	94.4%	5 HOURS		

CALIBRATED BY:	Larry Smith
SIGNATURE:	Larry Smith

DATE:	2-21-94

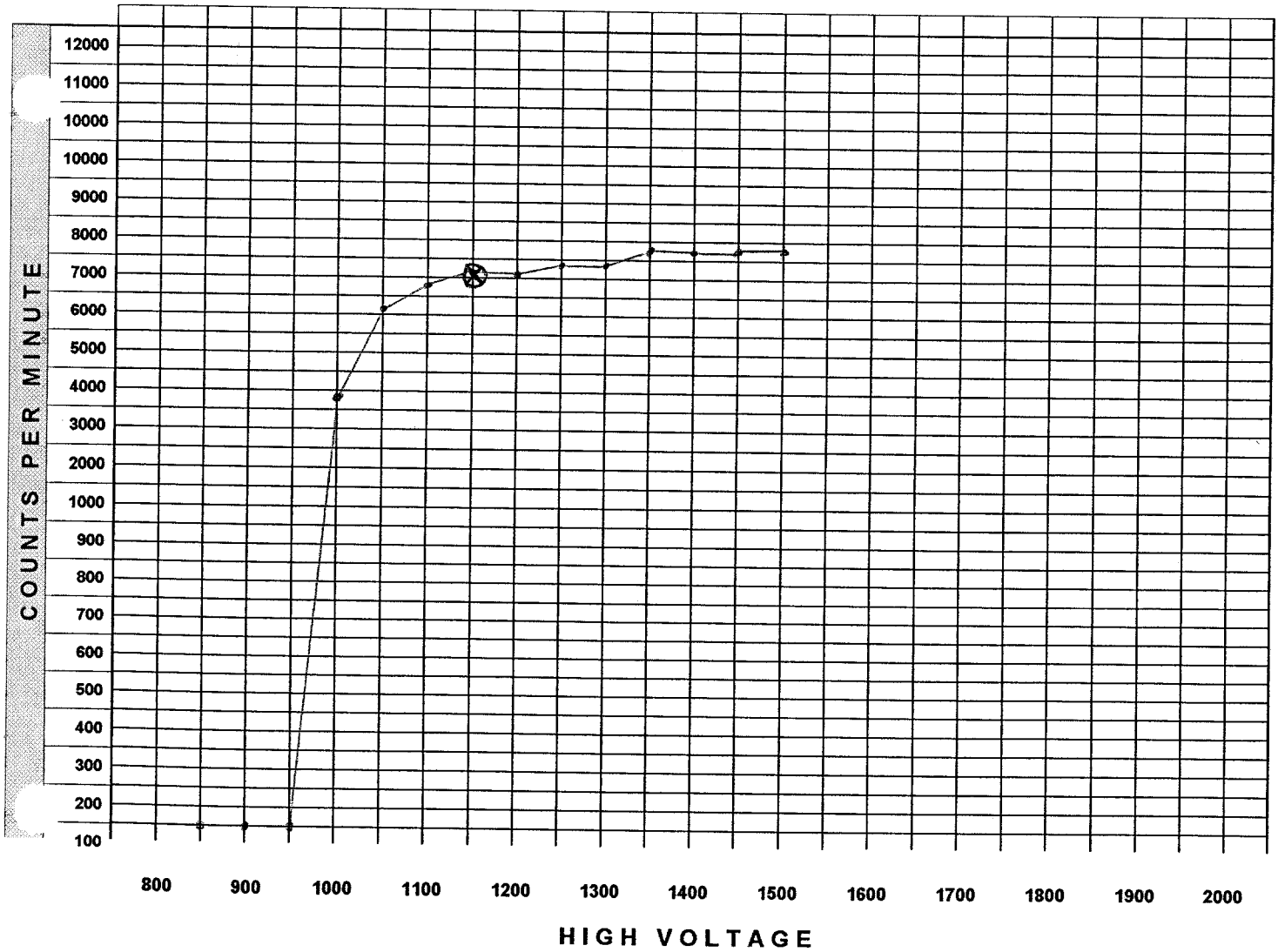
COMMENTS: DO NOT USE LONGER THAN 4 HOURS WITHOUT RECHARGING GAS.

IH & S Form # 205

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	0	1250	7410	1650	---
900	0	1300	7430	1700	---
950	2	1350	7730	1750	---
1000	3810	1400	7690	1800	---
1050	6140	1450	7730	1850	---
1100	6840	1500	7780	1900	---
1150	7130	1550	---	1950	---
1200	7070	1600	---	2000	---



ESP-2 CALIBRATION

ESP-2 S/N:	1588	INSTRUMENT CODE:	8	DATE:	11/17/93

ALPHA / BETA:	ALPHA

EFFICIENCY DATA: (Net cpm / dpm = Efficiency) (Correction Factor = 1 / Efficiency)

SOURCE #	ACTIVITY dpm	TOTAL COUNTS	TIME (in minutes)	GROSS CPM (Total / # min)	BKG cpm (Total / # min)	NET cpm
5308	31283	36300	5	7260	1.4	7259
7346	230973	266000	5	53200	1.4	53199
	BACKGROUND	7	5			

NET cpm	EFFICIENCY	CORRECTION FACTOR	AVERAGE EFFICIENCY	AVERAGE CORRECTION FACTOR
7259	23.2%	4.3	23.1	4.3
53199	23%	4.3		

HIGH VOLTAGE:	1100

GAS DECAY CALIBRATION WITH 100 cm2 PROBE

ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)	ELASPED TIME (in hours)	COUNTS	PERCENT (of original count)
INITIAL	53400		3 HOURS	51500	96.4
1 HOUR	52400	98.1	3.5 HOURS	50300	94.1
1.5 HOURS	52600	98.5	4 HOURS	50300	94.1
2 HOURS	52100	97.5	4.5 HOURS	49200	92.1
2.5 HOURS	52000	97.3	5 HOURS	49400	92.5

CALIBRATED BY:	M. Shaffer
SIGNATURE:	Michael Shaffer

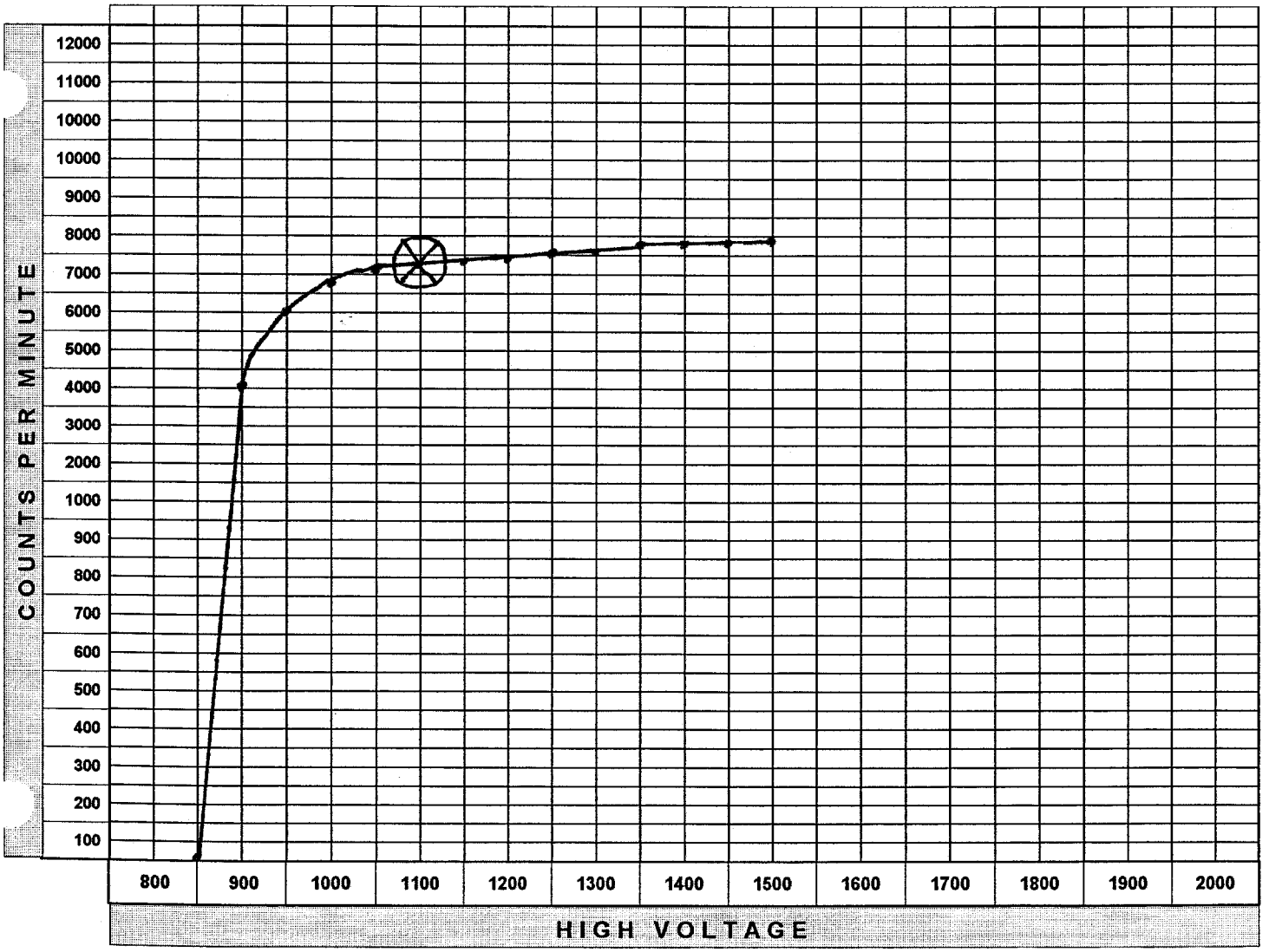
DATE:	11/17/93

COMMENTS:

ESP-2 PLATEAU

ALPHA / BETA:	ALPHA

HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS	HIGH VOLTAGE	COUNTS
850	7	1250	7630	1650	N/A
900	4080	1300	7570	1700	N/A
950	6000	1350	7800	1750	N/A
1000	6710	1400	7780	1800	N/A
1050	7140	1450	7750	1850	N/A
1100	7200	1500	7830	1900	N/A
1150	7230	1550	N/A	1950	N/A
1200	7470	1600	N/A	2000	N/A



IH & S FORM#205F
FOREST HILLS SITE

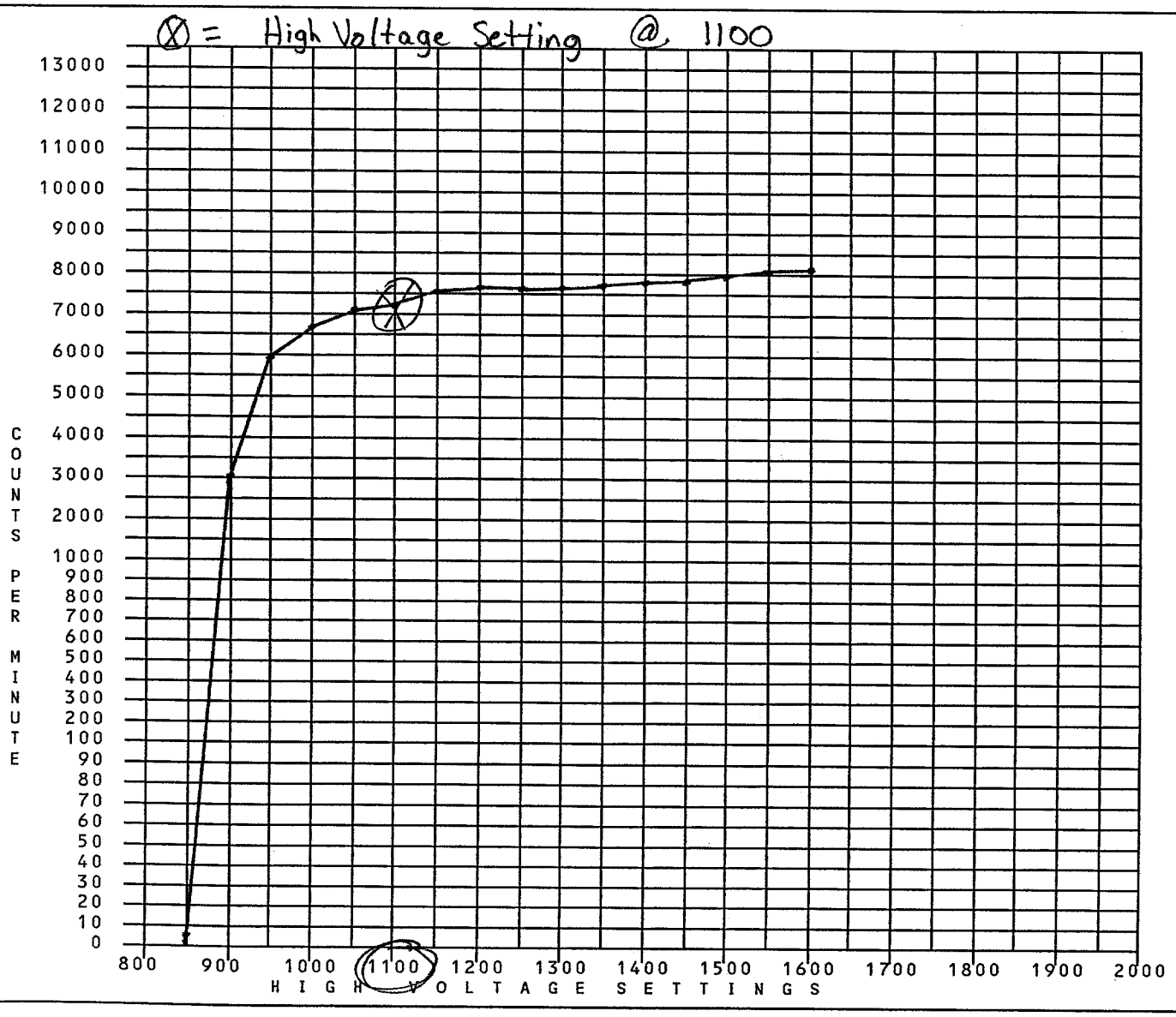
ESP-2 CALIBRATION DATA
(Front Page)

ESP-2 S/N: 1588	CODE #: 8	DATE: 8-19-93

PLATEAU DATA

ALPHA				BETA			
HV	CTS	HV	CTS	HV	CTS	HV	CTS
850	5	1250	7590	1150		1550	
900	3010	1300	7670	1200		1600	
950	5950	1350	7780	1250		1650	
1000	6690	1400	7760	1300		1700	
1050	7180	1450	7790	1350		1750	
1100	7290	1500	7960	1400		1800	
1150	7580	1550	8040	1450		1850	
1200	7630	1600	8110	1500		1900	

PLATEAU PLOT



IH & S FRM#205B
FOREST HILLS SITE

ESP-2 CALIBRATION DATA
(Back Page)

ESP-2 S/N: 1588	CODE #: 8	DATE: 8/19/93

ALPHA EFFICIENCY DATA (Net cpm / dpm = Eff)(Correction Factor = 1 / Eff)

SOURCE #	ACTIVITY	TOTAL CTS	TIME	GROSS CPM	BKG. CPM	NET CPM
5308	31283 dpm	36700	5 min	7340	3	7337
7346	230975 dpm	268000	5 min	53600	3	53597

NET CPM	EFF	C.F.	AVERAGE EFF	AVERAGE C.F.
7337	23.4%	4.2	23.3%	4.25
53597	23.2%	4.3		

BETA EFFICIENCY DATA (Net cpm / dpm = Eff)(Correction Factor = 1 / Eff)

SOURCE #	ACTIVITY	TOTAL CTS	TIME	GROSS CPM	BKG. CPM	NET CPM
	dpm		min			
	dpm		min			

NET CPM	EFF	C.F.	AVERAGE EFF	AVERAGE C.F.

GAS DECAY CALIBRATION

TIME	CPM	PERCENT	TIME	CPM	PERCENT
INITIAL	7340	100.0%	3.0 HOURS	7250	98.7%
1.0 HOUR	7130	97.1%	3.5 HOURS	7270	99.0%
1.5 HOURS	7330	99.8%	4.0 HOURS	7230	98.5%
2.0 HOURS	7250	98.7%	4.5 HOURS	7120	97.0%
2.5 HOURS	7230	98.5%	5.0 HOURS	7140	97.2%

DETECTOR DATA

ALPHA - HP 100A DETECTOR	BETA - HP 100A DETECTOR
HIGH VOLTAGE SETTING: 1100	HIGH VOLTAGE SETTING:
CC: 1.00 E+00	CC:
DT: 1.00 E-06	DT:
ALARM: 1.00 E+06	ALARM:

CALIBRATED BY: M. Shaffer/L. Smith SIGNATURE: M Shaffer Larry Smith

H & S FORM#205F
FOREST HILLS SITE

ESP-2 CALIBRATION DATA
(Front Page)

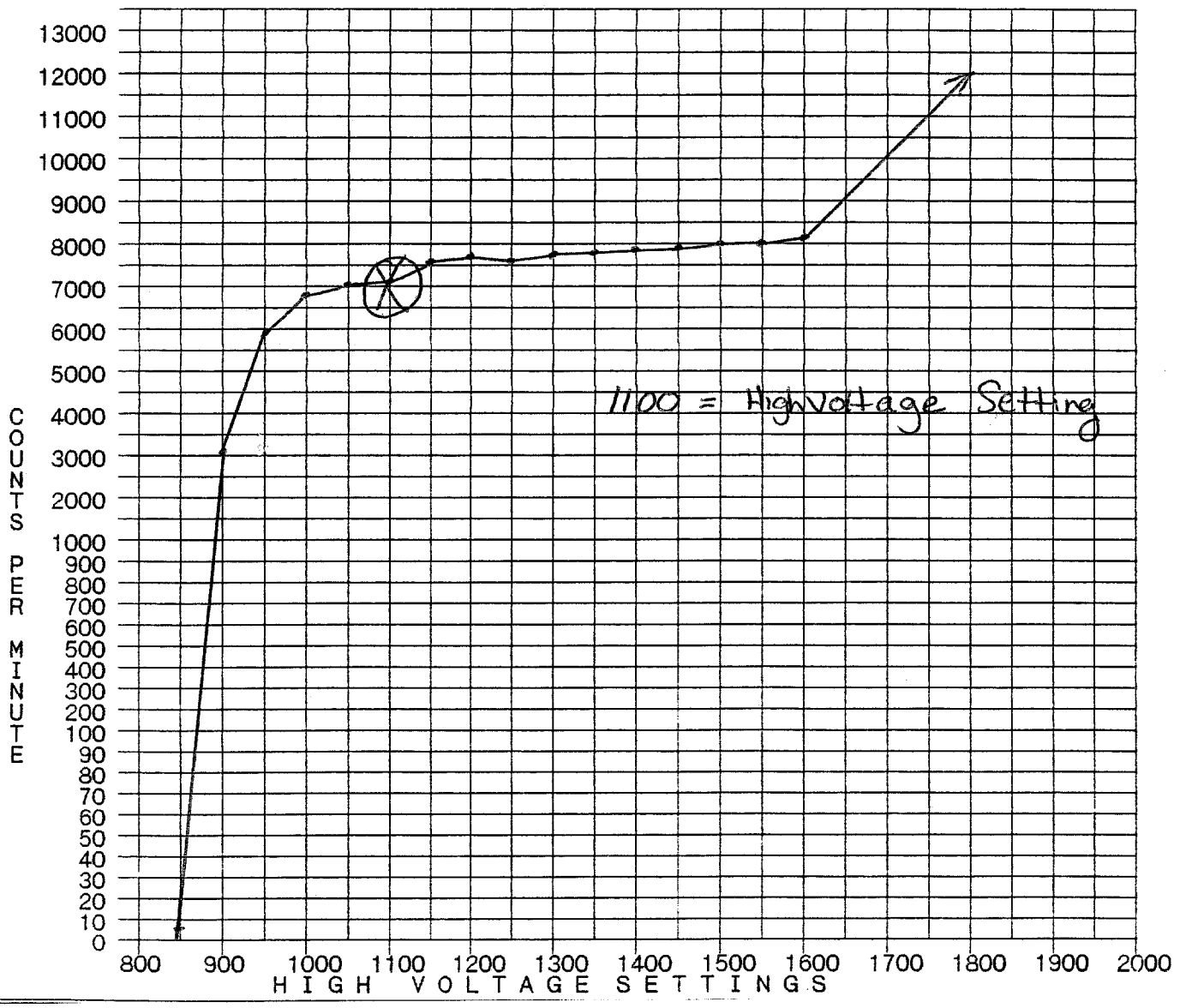
ESP-2 S/N: 1588	~~TAB #:~~ CODE 8	DATE: 8-19-93

PLATEAU DATA

ALPHA				BETA			
HV	CTS	HV	CTS	HV	CTS	HV	CTS
850	5	1250	7590	1150		1550	
900	3010	1300	7670	1200		1600	
950	5950	1350	7780	1250		1650	
1000	6690	1400	7760	1300		1700	
1050	7180	1450	7790	1350		1750	
1100	7290	1500	7960	1400		1800	
1150	7580	1550	8040	1450		1850	
1200	7630	1600	8110	1500		1900	

N/A

PLATEAU PLOT



IH & S FRM#205B
FOREST HILLS SITE

ESP-2 CALIBRATION DATA
(Back Page)

ESP-2 S/N: 1588	~~IAB~~ #: CODE 8	DATE: 8-19-93

ALPHA EFFICIENCY DATA (Net cpm / dpm = Eff)(Correction Factor = 1 / Eff)

SOURCE #	ACTIVITY	TOTAL CTS	TIME	GROSS CPM	BKG. CPM	NET CPM
5308	31,283 dpm	36,700	5 min	7340	3	7337
7346	230,975 dpm	268,000	5 min	53,600	3	53,597

NET CPM	EFF	C.F.	AVERAGE EFF	AVERAGE C.F.
7337	23.4%	4.2	23.3%	4.25
53,597	23.2%	4.3		

BETA EFFICIENCY DATA (Net cpm / dpm = Eff)(Correction Factor = 1 / Eff)

SOURCE #	ACTIVITY	TOTAL CTS	TIME	GROSS CPM	BKG. CPM	NET CPM
	dpm		min			
	dpm		min			

NET CPM	EFF	C.F.	AVERAGE EFF	AVERAGE C.F.

N

GAS DECAY CALIBRATION

TIME	CPM	PERCENT	TIME	CPM	PERCENT
INITIAL	7340	0945 100%	3.0 HOURS	7250	98.7%
1.0 HOUR	7130	97.1%	3.5 HOURS	7270	99.0%
1.5 HOURS	7330	99.8%	4.0 HOURS	7230	98.5%
2.0 HOURS	7250	98.7%	4.5 HOURS	7120	97.0%
2.5 HOURS	7230	98.5%	5.0 HOURS	7140	97.2%

DETECTOR DATA

ALPHA - HP 100A DETECTOR		BETA - HP 100A DETECTOR	
HIGH VOLTAGE SETTING:	1100	HIGH VOLTAGE SETTING:	
CC:	1.00 E 0	CC:	
DT:	1.00 E-6	DT:	
ALARM:	1.00 E6	ALARM:	

N

CALIBRATED BY: M. Shaffer SIGNATURE: M Shaffer

LH & S FORM#205F
FOREST HILLS SITE

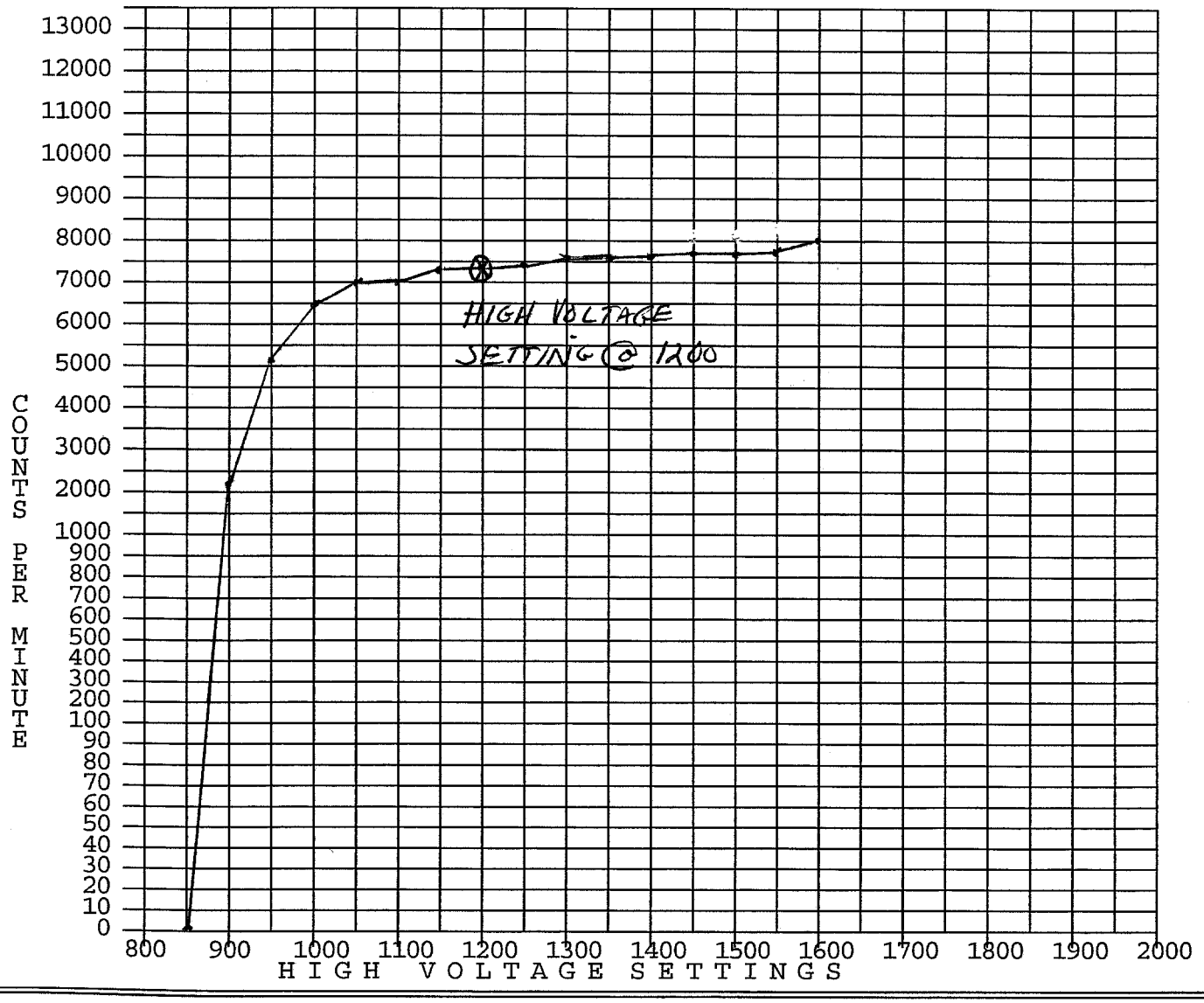
ESP-2 CALIBRATION DATA
(Front Page)

ESP-2 SERIAL # 1588	~~TAB #: 7~~ CODE #8	DATE: 5/27/93

PLATEAU DATA

ALPHA				BETA			
HV	CTS	HV	CTS	HV	CTS	HV	CTS
850	1	1250	7450	1150		1550	
900	2190	1300	7570	1200		1600	
950	5120	1350	7510	1250		1650	
1000	6500	1400	7580	1300		1700	
1050	7010	1450	7690	1350		1750	
1100	7030	1500	7650	1400		1800	
1150	7290	1550	7710	1450		1850	
1200	7340	1600	8030	1500		1900	

PLATEAU PLOT



IH & S FRM#205B
FOREST HILLS SITE

ESP-2 CALIBRATION DATA
(Back Page)

ESP-2 SERIAL # 1588	~~TAB # 7~~ CODE #8	DATE: 5/27/93

ALPHA EFFICIENCY DATA (Net cpm / dpm = Eff)(Correction Factor = 1 / Eff)

SOURCE #	ACTIVITY	TOTAL CTS	TIME	GROSS CPM	BKG. CPM	NET CPM
5308	31300 dpm	36800	5 min	7360	.8	7359
7346	231100 dpm	266000	5 min	53200	.8	53199

NET CPM	EFF	C.F.	AVERAGE EFF	AVERAGE C.F.
7359	23.5	4.26	23.25	4.3
53199	23	4.35		

BETA EFFICIENCY DATA (Net cpm / dpm = Eff)(Correction Factor = 1 / Eff)

SOURCE #	ACTIVITY	TOTAL CTS	TIME	GROSS CPM	BKG. CPM	NET CPM
	dpm		min			
	dpm		min			

NET CPM	EFF	C.F.	AVERAGE EFF	AVERAGE C.F.

(Check Source # 1276) GAS DECAY CALIBRATION

TIME	CPM	PERCENT	TIME	CPM	PERCENT
INITIAL	2320	100.0%	3.0 HOURS	2350	101.3%
1.0 HOUR	2310	99.6%	3.5 HOURS		
1.5 HOURS	2300	99.1%	4.0 HOURS		
2.0 HOURS	2320	100.0%	4.5 HOURS		
2.5 HOURS	2350	101.3%	5.0 HOURS		

DETECTOR DATA

	ALPHA - HP 100A	BETA - HP 100A
HIGH VOLTAGE SETTING:	1200	
CC:	1.00 E +00	
DT:	1.00 E -06	
ALARM:	not set	

CALIBRATED BY: Larry Smith SIGNATURE: Larry Smith