

CABRERA ALPHA-BETA COUNTING INSTRUMENT (Rev 6)

Counting Instrument:		Ludlum 2360		Detector:		Ludlum 43-93		Calibration Date:		7/12/2011								
Serial #:		193667		Serial #:		PR238112		12 month calibration:		OK								
Detector Active Area or Area Covered by Smear (cm ²):						100												
	Efficiency (fraction)	Source Nuclide	Source Number	Original Source Activity (DPM)	Source Creation Date	T _{1/2} (yr)	Source Decayed Activity	Required MDA (DPM/100cm ²)	Control Chart & Daily Bkg Count Time	Control Chart & Daily Source-Sample Count Time	Control Chart bkg Average α/β cpm	Control Chart bkg 1 sigma, cpm	Control Chart Source-bkg Average α/β cpm	Control Chart source 1 sigma, cpm				
Alpha	0.1027	Th-230	7104-10	-	-	-	#VALUE!	500	1	1	1.20	1.40	3822.3	67.91				
Beta	0.1268	Tc-99	7102-10	-	-	-	#VALUE!	1000	1	1	156.30	8.43	1834.6	43.38				
Date	Daily Bkg Counts		Daily Check Source Counts		Daily Bkg Rate (cpm)		Net Daily Source Rate (cpm)		Bkg QC Pass/Fail		Source QC Pass/Fail		MDA α (dpm)	MDA β (dpm)	α MDA OK?	β MDA OK?	H.P. Technician	Technician Initials
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta						
8/31/2011	3	164	3797	2006	3.0	164.0	3794.0	1842.0	PASS	PASS	PASS	PASS	107.68	494	Yes	Yes	B. Gardner	B.G.
9/1/2011	0	152	3768	1931	0.0	152.0	3768.0	1779.0	PASS	PASS	PASS	PASS	29.21	476	Yes	Yes	B. Gardner	B.G.
9/2/2011	1	160	3796	2024	1.0	160.0	3795.0	1864.0	PASS	PASS	PASS	PASS	74.52	488	Yes	Yes	B. Gardner	B.G.

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Initial Background and Source Counts for Control Chart								
#	Initial bkg counts				Initial source plus bkg counts			
	Alpha	cpm	Beta	cpm	Alpha	cpm	Beta	cpm
1	3	3	164	164	3797	3797	2006	2006
2	0	0	168	168	3768	3768	2008	2008
3	1	1	163	163	3815	3815	2032	2032
4	0	0	146	146	3755	3755	2064	2064
5	3	3	145	145	3854	3854	1899	1899
6	0	0	163	163	3893	3893	2011	2011
7	3	3	148	148	3978	3978	1990	1990
8	0	0	152	152	3787	3787	1976	1976
9	0	0	153	153	3816	3816	1952	1952
10	2	2	161	161	3772	3772	1971	1971
Mean		1.20		156.3		3823.5		1990.9
S _(n-1)		1.40		8.43		68.49		45.38
-3 sigma		-3.00		131.00		3618.03		1854.76
+3 sigma		5.40		181.60		4028.97		2127.04
-2 sigma		-1.60		139.43		3686.52		1900.14
+2 sigma		4.00		173.17		3960.48		2081.66
					Mean-bkg	3822.3		1834.6
					S _(n-1)	67.91		43.38
				Mean-bkg	-3 sigma	3618.56		1704.45
				Mean-bkg	+3 sigma	4026.04		1964.75
				Mean-bkg	-2 sigma	3686.48		1747.83
				Mean-bkg	+2 sigma	3958.12		1921.37
						3794		1842
						3768		1840
						3814		1869
						3755		1918
						3851		1754
						3893		1848
						3975		1842
						3787		1824
						3816		1799
						3770		1810

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Counting Instrument:		Ludlum 2360		Detector:		Ludlum 43-93		Calibration Date:		7/12/2011								
Serial #:		193647		Serial #:		PR238107		12 month calibration:		OK								
Detector Active Area or Area Covered by Smear (cm ²):						100												
	Efficiency (fraction)	Source Nuclide	Source Number	Original Source Activity (DPM)	Source Creation Date	T _{1/2} (yr)	Source Decayed Activity	Required MDA (DPM/100cm ²)	Control Chart & Daily Bkg Count Time	Control Chart & Daily Source-Sample Count Time	Control Chart bkg Average α/β cpm	Control Chart bkg 1 sigma, cpm	Control Chart Source-bkg Average α/β cpm	Control Chart source 1 sigma, cpm				
Alpha	0.1027	Th-230	7104-10	-	-	-	#VALUE!	500	1	1	0.30	0.48	3635.7	65.41				
Beta	0.1268	Tc-99	7102-10	-	-	-	#VALUE!	1000	1	1	151.20	15.46	1968.4	53.21				
Date	Daily Bkg Counts		Daily Check Source Counts		Daily Bkg Rate (cpm)		Net Daily Source Rate (cpm)		Bkg QC Pass/Fail		Source QC Pass/Fail		MDA α (dpm)	MDA β (dpm)	α MDA OK?	β MDA OK?	H.P. Technician	Technician Initials
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta						
8/18/2011	0	154	3692	2111	0.0	154.0	3692.0	1957.0	PASS	PASS	PASS	PASS	29.21	479	Yes	Yes		
8/19/2011	0	151	3623	2123	0.0	151.0	3623.0	1972.0	PASS	PASS	PASS	PASS	29.21	475	Yes	Yes		
8/22/2011	0	150	3525	2121	0.0	150.0	3525.0	1971.0	PASS	PASS	PASS	PASS	29.21	473	Yes	Yes		
8/23/2011	0	160	3645	2172	0.0	160.0	3645.0	2012.0	PASS	PASS	PASS	PASS	29.21	488	Yes	Yes		

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#	Initial bkg counts				Initial source plus bkg counts			
	Alpha	cpm	Beta	cpm	Alpha	cpm	Beta	cpm
1	0	0	150	150	3721	3721	2090	2090
2	0	0	139	139	3535	3535	2079	2079
3	0	0	144	144	3604	3604	2130	2130
4	1	1	163	163	3639	3639	2197	2197
5	0	0	164	164	3560	3560	2089	2089
6	0	0	132	132	3732	3732	2121	2121
7	0	0	164	164	3610	3610	2043	2043
8	0	0	132	132	3683	3683	2192	2192
9	1	1	146	146	3671	3671	2128	2128
10	1	1	178	178	3605	3605	2127	2127
Mean		0.30		151.2		3636.0		2119.6
S _(n-1)		0.48		15.46		65.42		48.07
-3 sigma		-1.15		104.81		3439.73		1975.39
+3 sigma		1.75		197.59		3832.27		2263.81
-2 sigma		-0.67		120.28		3505.15		2023.46
+2 sigma		1.27		182.12		3766.85		2215.74
					Mean-bkg	3635.7		1968.4
					S _(n-1)	65.41		53.21
				Mean-bkg	-3 sigma	3439.46		1808.78
				Mean-bkg	+3 sigma	3831.94		2128.02
				Mean-bkg	-2 sigma	3504.87		1861.99
				Mean-bkg	+2 sigma	3766.53		2074.81
						3721		1940
						3535		1940
						3604		1986
						3638		2034
						3560		1925
						3732		1989
						3610		1879
						3683		2060
						3670		1982
						3604		1949

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Serial #:		193667		Serial #:		PR238112		12 month calibration:		OK								
Detector Active Area or Area Covered by Smear (cm ²):						100												
	Efficiency (fraction)	Source Nuclide	Source Number	Original Source Activity (DPM)	Source Creation Date	T _{1/2} (yr)	Source Decayed Activity	Required MDA (DPM/100cm ²)	Control Chart & Daily Bkg Count Time	Control Chart & Daily Source-Sample Count Time	Control Chart bkg Average α/β cpm	Control Chart bkg 1 sigma, cpm	Control Chart Source-bkg Average α/β cpm	Control Chart source 1 sigma, cpm				
Alpha	0.1027	Th-230	7104-10	-	-	-	#VALUE!	500	1	1	0.60	0.70	2833.6	77.89				
Beta	0.1268	Tc-99	7102-10	-	-	-	#VALUE!	1000	1	1	150.10	11.60	1566.3	38.33				
Date	Daily Bkg Counts		Daily Check Source Counts		Daily Bkg Rate (cpm)		Net Daily Source Rate (cpm)		Bkg QC Pass/Fail		Source QC Pass/Fail		MDA α (dpm)	MDA β (dpm)	α MDA OK?	β MDA OK?	H.P. Technician	Technician Initials
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta						
9/6/2011	1	132	2802	1680	1.0	132.0	2801.0	1548.0	PASS	PASS	PASS	PASS	74.52	445	Yes	Yes	B. Gardner	B.G.
9/7/2011	1	150	2885	1715	1.0	150.0	2884.0	1565.0	PASS	PASS	PASS	PASS	74.52	473	Yes	Yes	B. Gardner	B.G.
9/8/2011	2	163	2719	1682	2.0	163.0	2717.0	1519.0	QUESTION	PASS	PASS	PASS	93.28	492	Yes	Yes	B. Gardner	B.G.
9/9/2011	1	160	2687	1687	1.0	160.0	2686.0	1527.0	PASS	PASS	PASS	PASS	74.52	488	Yes	Yes	B. Gardner	B.G.
9/12/2011	0	145	2837	1707	0.0	145.0	2837.0	1562.0	PASS	PASS	PASS	PASS	29.21	466	Yes	Yes	B. Gardner	B.G.
9/13/2011	0	167	2723	1759	0.0	167.0	2723.0	1592.0	PASS	PASS	PASS	PASS	29.21	498	Yes	Yes	B. Gardner	B.G.
9/14/2011	0	157	2722	1722	0.0	157.0	2722.0	1565.0	PASS	PASS	PASS	PASS	29.21	483	Yes	Yes	B. Gardner	B.G.
9/15/2011	1	176	2739	1758	1.0	176.0	2738.0	1582.0	PASS	QUESTION	PASS	PASS	74.52	510	Yes	Yes	B. Gardner	B.G.

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Initial Background and Source Counts for Control Chart								
#	Initial bkg counts				Initial source plus bkg counts			
	Alpha	cpm	Beta	cpm	Alpha	cpm	Beta	cpm
1	0	0	132	132	2985	2985	1786	1786
2	0	0	174	174	2871	2871	1717	1717
3	1	1	155	155	2762	2762	1727	1727
4	1	1	154	154	2741	2741	1688	1688
5	1	1	137	137	2864	2864	1720	1720
6	1	1	148	148	2852	2852	1725	1725
7	0	0	146	146	2755	2755	1736	1736
8	0	0	151	151	2858	2858	1695	1695
9	0	0	146	146	2762	2762	1668	1668
10	2	2	158	158	2892	2892	1702	1702
Mean		0.60		150.1		2834.2		1716.4
S _(n-1)		0.70		11.60		77.88		32.05
-3 sigma		-1.50		115.30		2600.55		1620.26
+3 sigma		2.70		184.90		3067.85		1812.54
-2 sigma		-0.80		126.90		2678.43		1652.31
+2 sigma		2.00		173.30		2989.97		1780.49
					Mean-bkg	2833.6		1566.3
					S _(n-1)	77.89		38.33
				Mean-bkg	-3 sigma	2599.93		1451.31
				Mean-bkg	+3 sigma	3067.27		1681.29
				Mean-bkg	-2 sigma	2677.82		1489.64
				Mean-bkg	+2 sigma	2989.38		1642.96
						2985		1654
						2871		1543
						2761		1572
						2740		1534
						2863		1583
						2851		1577
						2755		1590
						2858		1544
						2762		1522
						2890		1544