APPENDIX E: INSTRUMENTATION QUALITY CONTROL AND CALIBRATION DATA

(Provided on Accompanying Compact Disc)

Ins	Inst.#218559 PR215468							
	QC Daily Source							
Date	Result (µrem/hr)	P/F						
10/19/2006	176976	Pass						
10/20/2006	177677	Pass						
10/23/2006	170612	Pass						
10/24/2006	169416	Pass						
10/25/2006	181883	Pass						
10/26/2006	178301	Pass						
10/27/2006	172435	Pass						
10/30/2006	180896	Pass						
10/31/2006	176195	Pass						
11/1/2006	177228	Pass						
11/2/2006	181940	Pass						

Inst.#218	3559 PR215468	Source Ser. #	7
Initial So	urce Readings	Nuclide	Cs-137
Date	Result (µrem/hr)		
10/19/2006	176844		
10/19/2006	176997		
10/19/2006	178133		
10/19/2006	177205		
10/19/2006	177097		
10/19/2006	177692		
10/19/2006	177158		
10/19/2006	177621		
10/19/2006	177452		
10/19/2006	177190		
	Average		
	177339		

Inst.#97841 PR172581							
	QC Daily Source						
Date	Result (µrem/hr)	P/F					
10/19/2006	170135	Pass					
10/20/2006	186314	Pass					
10/23/2006	169553	Pass					
10/24/2006	181290	Pass					
10/25/2006	179835	Pass					
10/26/2006	182176	Pass					
10/27/2006	172511	Pass					
10/30/2006	180063	Pass					
10/31/2006	178401	Pass					
11/2/2006	177977	Pass					
11/3/2006	179140	Pass					

Inst.#97	841 PR172581	Source Ser. #	7
Initial So	urce Readings	Nuclide	Cs-137
Date	Result (µrem/hr)		
10/19/2006	170532		
10/19/2006	170175		
10/19/2006	169929		
10/19/2006	170143		
10/19/2006	169929		
10/19/2006	169906		
10/19/2006	170239		
10/19/2006	170473		
10/19/2006	169981		
10/19/2006	170226		
	Average		
	170153		

Inst.#216473 PR220900								
	QC Daily Source							
Date	Result (µrem/hr)	P/F						
10/19/2006	179772	Pass						
10/20/2006	177531	Pass						
10/23/2006	184729	Pass						
10/24/2006	183575	Pass						
10/25/2006	177235	Pass						
10/26/2006	186172	Pass						
10/27/2006	174948	Pass						
10/30/2006	175316	Pass						
10/31/2006	174452	Pass						
11/5/2006	175792	Pass						

In at #24/	2472 DD220000	Course Cor #	7
	6473 PR220900	Source Ser. #	•
Initial So	ource Readings	Nuclide	Cs-137
Date	Result (µrem/hr)		
10/19/2006	175074		
10/19/2006	177496		
10/19/2006	177043		
10/19/2006	177022		
10/19/2006	176233		
10/19/2006	176795		
10/19/2006	177202		
10/19/2006	177162		
10/19/2006	176958		
10/19/2006	177180		
	Average		
	176817		

Inst.#	Inst.#44-9 135696 PR145224							
	QC Daily Source							
Date	Result (cpm)	P/F						
10/20/2006	2800	Pass						
10/23/2006	2700	Pass						
10/24/2006	2600	Pass						
10/25/2006	2700	Pass						
10/26/2006	2800	Pass						
10/27/2006	2600	Pass						
10/30/2006	2600	Pass						
10/31/2006	2700	Pass						
11/1/2006	2650	Pass						
11/2/2006	2700	Pass						
11/6/2006	2650	Pass						
11/7/2006	2700	Pass						
11/8/2006	2600	Pass						
11/9/2006	2700	Pass						
11/13/2006	2600	Pass						
11/14/2006	2700	Pass						
11/15/2006	2700	Pass						

Inst.#44-9 1	35696 PR145224	Source Ser. #	1161
Initial So	urce Readings	Nuclide	Tc-99
Date	Result (cpm)		
10/19/2006	2600		
10/19/2006	2500		
10/19/2006	2700		
10/19/2006	2600		
10/19/2006	2600		
10/19/2006	2800		
10/19/2006	2500		
10/19/2006	2600		
10/19/2006	2700		
10/19/2006	2700		
	Average		
	2630		

Ins	Inst.#218559 PR215468							
	QC Daily Source							
Date	Result (µrem/hr)	P/F						
10/19/2006	176976	Pass						
10/20/2006	177677	Pass						
10/23/2006	170612	Pass						
10/24/2006	169416	Pass						
10/25/2006	181883	Pass						
10/26/2006	178301	Pass						
10/27/2006	172435	Pass						
10/30/2006	180896	Pass						
10/31/2006	176195	Pass						
11/1/2006	177228	Pass						
11/2/2006	181940	Pass						

Inst.#218	3559 PR215468	Source Ser. #	7
Initial So	urce Readings	Nuclide	Cs-137
Date	Result (µrem/hr)		
10/19/2006	176844		
10/19/2006	176997		
10/19/2006	178133		
10/19/2006	177205		
10/19/2006	177097		
10/19/2006	177692		
10/19/2006	177158		
10/19/2006	177621		
10/19/2006	177452		
10/19/2006	177190		
	Average		
	177339		

0.5	مما ممائمي			222	Detector			0-11			1							
Co	unting Inst			2929	Detector:	43-1			oration Date:	1/9/2006								1
		Serial #:		80830	Serial #:	2074	489 	12 month o		OK								
	Detec	tor Active	e Area or A	rea Covered b	y Smear (cm²):	100		NRC 6 Mo Ca	al. Due Date?	WARNING								
	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 Source-bkg Average α/β cpm	Control Chart source 1 sigma, cpm				
Alpha	0.3588	Th-230	1160	17,500	4/29/2002	7.54E+04	17,499	8	20	4	0.09	0.07	6279.3	67.97				
Beta	0.2849	Tc-99	1161	17,500	4/29/2002	2.13E+05	17,500	70	20	4	49.63	1.81	4986.5	85.75				
Date	Daily Bkg		Daily Check	Source Counts	Daily Bkg Ra		Net Daily So	ource Rate (cpm)	Bkg QC F		Source QC	Pass/Fail			α MDA	β MDA	H.P.	Technician
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	MDA α (dpm)	MDA β (dpm)	OK?	OK?	Technician	Initials
10/23/2006	4	1002	25004	19936	0.2	50.1	6250.8	4933.9	PASS	PASS	PASS	PASS	4.34	47	Yes	Yes	Gbright	GB
10/24/2006	1	1001	25048	20032	0.1	50.1	6262.0	4958.0	PASS	PASS	PASS	PASS	3.21	47	Yes	Yes	Gbright	GB
10/25/2006	3	961	25145	20096	0.2	48.1	6286.1	4976.0	PASS	PASS	PASS	PASS	4.04	46	Yes	Yes	Gbright	GB
10/26/2006	4	1014	24877	20168	0.2	50.7	6219.1	4991.3	PASS	PASS	PASS	PASS	4.34	48	Yes	Yes	Gbright	GB
10/27/2006	2	1042	25142	19822	0.1	52.1	6285.4	4903.4	PASS	PASS	PASS	PASS	3.68	48	Yes	Yes	DKately	DK
10/30/2006	2	1007	25208	20327	0.1	50.4	6301.9	5031.4	PASS	PASS	PASS	PASS	3.68	48	Yes	Yes	Gbright	GB
10/31/2006	3	976	25092	20234	0.2	48.8	6272.9	5009.7	PASS	PASS	PASS	PASS	4.04	47	Yes	Yes	Gbright	GB
11/1/2006	3	978	24921	19922	0.2	48.9	6230.1	4931.6	PASS	PASS	PASS	PASS	4.04	47	Yes	Yes	Gbright	GB
11/2/2006	3	1059	24986	20138	0.2	53.0	6246.4	4981.6	PASS	PASS	PASS	PASS	4.04	49	Yes	Yes	Gbright	GB
11/3/2006	3	977	24858	20201	0.2	48.9	6214.4	5001.4	PASS	PASS	PASS	PASS	4.04	47	Yes	Yes	Gbright	GB GB
11/6/2006 11/7/2006	3	1014 1002	24998 24993	20559 19803	0.2 0.2	50.7 50.1	6249.4 6248.1	5089.1 4900.7	PASS PASS	PASS PASS	PASS PASS	PASS PASS	4.04 4.04	48 47	Yes Yes	Yes Yes	Gbright Gbright	GB
11/8/2006	1	1002	24798	20158	0.2	51.1	6199.5	4988.5	PASS	PASS	PASS	PASS	3.21	48	Yes	Yes	Gbright	GB
11/9/2006	1	988	24660	19723	0.1	49.4	6165.0	4881.4	PASS	PASS	PASS	PASS	3.21	47	Yes	Yes	Gbright	GB
11/13/2006	4	1013	24946	19515	0.2	50.7	6236.3	4828.1	PASS	PASS	PASS	PASS	4.34	48	Yes	Yes	Gbright	GB
11/14/2006	4	924	24774	19655	0.2	46.2	6193.3	4867.6	PASS	PASS	PASS	PASS	4.34	46	Yes	Yes	Gbright	GB
11/15/2006	4	1000	24853	19625	0.2	50.0	6213.1	4856.3	PASS	PASS	PASS	PASS	4.34	47	Yes	Yes	DKately	DK
11/16/2006	2	1049	24828	19902	0.1	52.5	6206.9	4923.1	PASS	PASS	PASS	PASS	3.68	48	Yes	Yes	Iharris	IH
11/17/2006	3	1023	24846	19740	0.2	51.2	6211.4	4883.9	PASS	PASS	PASS	PASS	4.04	48	Yes	Yes	Iharris	IH
11/20/2006	4	1042	25220	20502	0.2	52.1	6304.8	5073.4	PASS	PASS	PASS	PASS	4.34	48	Yes	Yes	Iharris	IH
11/21/2006	4	934	25232	20154	0.2	46.7	6307.8	4991.8	PASS	PASS	PASS	PASS	4.34	46	Yes	Yes	Iharris	IH
						-											Page	1 of 5

										Trial MDA Calculator	α	β
										Sample Count Time (min)	1	,
		Initial B	Backgrou	nd and S	Source Co	ounts for	Control	Chart		Bkg Count Rate (cpm)	0.1	
			Initial bk				source p		counts	Bkg Count Time (min)	1	
	#	Alpha	cpm	Beta	cpm	Alpha	срт	Beta	cpm	Counter Efficiency	0.358833	0.28494
	1	2	0.1	1053	52.65	25088	6272	19936	4984	MDCR (cpm)	4.471333	
	2	0	0.1	1007	50.35	25116	6279	19876	4969	MDA (dpm)	12.46077	
	3	0	0	970	48.5	25248	6312	19820	4955	(24)		21170.
	4	4	0.2	969	48.45	24924	6231	20064	5016			
	5	3	0.15	964	48.2	24764	6191	20252	5063			
	6	2	0.1	961	48.05	25564	6391	20344	5086			
	7	1	0.05	980	49	25304	6326	20576	5144			
	8	1	0.05	1001	50.05	24684	6171	20684	5171			
	9	3	0.15	1056	52.8	25368	6342	19628	4907			
	10	1	0.05	964	48.2	25116	6279	20264	5066			
	Mean		0.09		49.6		6279.4		5036.1			
	S _(n-1)		0.07		1.81		67.96		84.86			
	-3 sigma		-0.12		44.19		6075.51		4781.52			
	+3 sigma		0.29		55.06		6483.29		5290.68			
	-2 sigma		-0.05		46.00		6143.47		4866.38			
	+2 sigma		0.22		53.25	Mean-bkg	6415.33 6279.3		5205.82 4986.5			
						Ü						
					N4 1 1 .	S _(n-1)	67.97		85.75			
					Mean-bkg	-3 sigma	6075.40		4729.21			
					Mean-bkg	+3 sigma -2 sigma	6483.23 6143.37		5243.74 4814.97			
					Mean-bkg	+2 sigma	6415.26		5157.98			
					wicanibkg	12 Sigilla	0710.20		0101.80			
							6271.9		4931.35			
							6279		4918.65			
							6312		4906.5			
							6230.8		4967.55			
-							6190.85		5014.8			
							6390.9		5037.95			
							6325.95		5095			
							6170.95		5120.95			
							6341.85		4854.2			
							6278.95		5017.8			

Cor	unting Inst	rument:	2:	224-1	Detector:	43-	89	Calib	oration Date:	11/23/2005								
		Serial #:	16	62420	Serial #:	PR17	1381	12 month c	alibration:	OK								
					y Smear (cm²):	125		NRC 6 Mo Ca		WARNING								
	Efficiency (fraction)	Source Nuclide	Source Number	Original Source Activity (DPM)		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 Source-bkg Average α/β cpm	Control Chart source 1 sigma, cpm				
Alpha	0.1785	Th-230	1160	17,500	4/29/2002	7.54E+04	17,499	100	1	1	5.40	1.17	3124.3	55.91				
Beta	0.1242	Tc-99	1161	17,500	4/29/2002	2.13E+05	17,500	1000	1	1	293.90	19.29	2172.7	36.99				
Date	Daily Bkg			Source Counts	Daily Bkg Ra			ource Rate (cpm)	Bkg QC I		Source QC				α MDA	βMDA	H.P.	Technician
40/07/0000	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	MDA α (dpm)		OK?	OK?	Technician	Initials
10/27/2006	5	316	3158	2480	5.0	316.0	3153.0	2164.0	PASS	PASS	PASS	PASS	60.06	552	Yes Yes	Yes Yes	DKately	DK
10/31/2006	4	310	3153	2492	4.0	310.0	3149.0	2182.0	PASS	PASS	PASS	PASS	55.14	547	Yes		DKately	DK
11/1/2006	4	263	3169	2459	4.0	263.0	3165.0	2196.0	PASS	PASS	PASS	PASS	55.14	506		Yes	DKately	DK
11/2/2006	1	301	3154	2482	7.0	301.0	3147.0	2181.0	PASS	PASS	PASS	PASS	68.60	539	Yes	Yes	DKately	DK
11/3/2006	4	284	3188	2417	4.0	284.0	3184.0	2133.0	PASS	PASS	PASS	PASS	55.14	525	Yes Yes	Yes Yes	Dalbert	DA
11/6/2006 11/7/2006	5 7	294 292	3151 3182	2513 2481	5.0 7.0	294.0 292.0	3146.0	2219.0	PASS	PASS	PASS	PASS	60.06	533	Yes	Yes	Dalbert	DA DK
11/7/2006	4	292 290	3182	2481	4.0	292.0	3175.0 3033.0	2189.0 2152.0	PASS PASS	PASS PASS	PASS PASS	PASS PASS	68.60 55.14	532 530	Yes	Yes	DKately DKately	DK DK
11/9/2006	4	313	3170	2442	4.0	313.0	3166.0	2129.0	PASS	PASS	PASS	PASS	55.14	550	Yes	Yes	DKately	DK
11/13/2006	5	287	3184	2406	5.0	287.0	3179.0	2119.0	PASS	PASS	PASS	PASS	60.06	527	Yes	Yes	DKately	DK
11/14/2006	5	304	3217	2428	5.0	304.0	3212.0	2124.0	PASS	PASS	PASS	PASS	60.06	542	Yes	Yes	DKately	DK
11/15/2006	5	321	3203	2426	5.0	321.0	3198.0	2105.0	PASS	PASS	PASS	PASS	60.06	556	Yes	Yes	DKately	DK
11/16/2006	4	330	3106	2549	4.0	330.0	3102.0	2219.0	PASS	PASS	PASS	PASS	55.14	564	Yes	Yes	DKately	DK
	<u> </u>								. 7.00	17.00	17.00	17100	30.1.1	55.			_ : ::::::	
																	Domo	

											`	
										Trial MDA Calculator		0
											α 1	β
	Initial E	Rackarou	nd and 9	Source C	ounts for	· Control	Chart			Sample Count Time (min) Bkg Count Rate (cpm)	0.1	
		Initial bk				source p		Counte		Bkg Count Time (min)	0.1	
#			Beta				Beta			Counter Efficiency	0.178539	0.124156
1	Alpha 5	cpm 5	286	cpm 286	Alpha 3211	cpm 3211	2455	cpm 2455		MDCR (cpm)	4.471333	#DIV/0!
2	4	4	269	269	3121	3121	2433	2435		MDA (dpm)	25.04404	#DIV/0!
3	5	5	311	311	3084	3084	2543	2543		WEA (apin)	20.07704	#DIV/U:
4	4	4	271	271	3043	3043	2417	2417				
5	6	6	284	284	3222	3222	2518	2518				
6	6	6	317	317	3139	3139	2502	2502				
7	7	7	284	284	3077	3077	2431	2431				
8	4	4	302	302	3149	3149	2457	2457				
9	7	7	289	289	3135	3135	2408	2408				
10	6	6	326	326	3116	3116	2508	2508				
Mean		5.40		293.9		3129.7		2466.6				
S _(n-1)		1.17		19.29		56.04		47.61				
-3 sigma		1.88		236.03		2961.59		2323.76				
+3 sigma		8.92		351.77		3297.81		2609.44				
-2 sigma		3.05		255.32		3017.62		2371.38				
+2 sigma		7.75		332.48	Moon bkg	3241.78		2561.82 2172.7				
					Mean-bkg							
				Magazia	S _(n-1)	55.91		36.99				
					-3 sigma +3 sigma			2061.74 2283.66				
					-2 sigma			2098.73				
				Mean-bkg	+2 sigma	3236.13		2246.67				
						3206		2169				
						3117		2158				
						3079		2232				
						3039		2146				
						3216		2234				
						3133 3070		2185 2147				
						3145		2155				
						3128		2119				
						3110		2182	1			

Cou	unting Inst	rument:	2	2224	Detector:	43-	68	Calik	oration Date:	9/8/2006								
	(Serial #:	11	16257	Serial #:	PR12:	2018	12 month c	alibration:	OK								
	Detect	tor Active			y Smear (cm ²):	126		NRC 6 Mo Ca	I. Due Date?	OK								
	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 Source-bkg Average α/β cpm	Control Chart source 1 sigma, cpm				
Alpha	0.1865	Th-230	1160	17,500	4/29/2002	7.54E+04	17,499	100	1	1	1.10	1.29	3263.7	45.46				
Beta	0.2380	Tc-99	1161	17,500	4/29/2002	2.13E+05	17,500	1000	1	1	112.90	7.43	4164.4	51.87				
		_								-								
Date	Daily Bkg			Source Counts	Daily Bkg Ra			ource Rate (cpm)	Bkg QC		Source QC				α MDA	β MDA	H.P.	Technician
44/7/2000	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta		MDA β (dpm)	OK?	OK?	Technician	Initials
11/7/2006	0	94	3177	4087	1.0	94.0	3176.0	3993.0	PASS	QUESTION	PASS	FAIL	32.57	160	Yes Yes	Yes Yes	IHarris	IH
11/8/2006	0	118	3341	4213	0.0	118.0	3341.0	4095.0	PASS	PASS	PASS	PASS	12.77	179	Yes	Yes	IHarris PCordpor	IH
11/9/2006	1	113	3328	4306	1.0	113.0	3327.0	4193.0	PASS	PASS	PASS	PASS	32.57	175			BGardner	BG
11/13/2006	0	107	3301 3330	4360 4339	0.0	107.0	3301.0	4253.0 4236.0	PASS	PASS	PASS	PASS	12.77	171	Yes Yes	Yes Yes	BGardner	BG BG
11/14/2006 11/15/2006	0	103 112	3289	4372	0.0	103.0 112.0	3330.0 3289.0	4236.0	PASS	PASS	PASS	PASS	12.77	167	Yes	Yes	BGardner BGardner	BG
11/16/2006	0	127	3267	4236	0.0	127.0	3267.0	4109.0	PASS PASS	PASS PASS	PASS PASS	PASS PASS	12.77 12.77	174 185	Yes	Yes	BGardner	BG
11/10/2000	U	121	3207	4230	0.0	127.0	3207.0	4109.0	PASS	PASS	PASS	PASS	12.77	100	103	103	bGalullei	ВС

										α	β
										1	
										0.1	
	nitial bk	g counts	}	Initial	source p	lus bkg (counts			1	
Alpha	cpm	Beta	cpm	Alpha	cpm	Beta	cpm		Counter Efficiency	0.186505	0.237969
3	3	123	123	3294	3294	4346	4346		MDCR (cpm)	4.471333	
0	0	99	99	3309	3309	4166	4166		MDA (dpm)	23.97434	#DIV/0!
3	3										
1	1										
0	0	120	120	3214	3214	4250	4250				
	4.40		440.0		0004.0		4077.0				
	3.07			Mean-bkg							
				_							
			Mean-bkg	-2 sigma	3172.78		4060.65				
			Mean-bkg	+2 sigma	3354.62		4268.15				
					3291		4223				
					3211		4159				
					3214		4130				
	Alpha 3 0 3	Initial bk	Initial bkg counts Alpha cpm Beta 3 3 123 0 0 99 3 3 111 1 1 106 0 0 118 2 2 110 2 2 119 0 0 108 0 0 115 0 0 120 1.10 1.29 -2.76 4.96 -1.47 3.67	Initial bkg counts	Initial bkg counts	Initial bkg counts	Alpha cpm Beta cpm Alpha cpm Beta 3 3 123 123 3294 3294 4346 0 0 99 99 3309 3309 4166 3 3 111 111 3233 3233 4344 1 1 106 106 3298 3298 4305 0 0 118 118 3303 3303 4266 2 2 110 110 3326 3221 4318 0 0 108 108 3248 3248 4281 0 0 115 115 3211 3211 4274 0 0 120 120 3214 3214 4250 110 112.9 3264.8 3248 4281 129 7.43 45.55 45.55 -2.76 90.61 3128.16 3128.16 4.96	Initial bkg counts	Initial bkg counts	Initial bkg counts	Sample Count Time (min) 1 1 1 1 1 1 1 1 1

Co	unting Inst	trument:		2224	Detector:	43-	68	Calik	oration Date:	6/14/2006								
		Serial #:		33048	Serial #:	PR16	1781	12 month c		OK								
					y Smear (cm²):	126		NRC 6 Mo Ca		OK								
	Efficiency (fraction)	Source Nuclide		Original Source		T _{1/2} (yr)	Source Decayed Activity		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	0.1427	Th-230	1160	17,500	4/29/2002	7.54E+04	17,499	100	1	1	0.80	0.92	2496.5	77.38				
Beta	0.2858	Tc-99	1161	17,500	4/29/2002	2.13E+05	17,500	1000	1	1	175.80	17.45	5002.3	47.06				
		_								-								
Date	Daily Bkg			Source Counts	Daily Bkg Ra			ource Rate (cpm)	Bkg QC I		Source QC		MDA (dama)	MDA O (da sa)	α MDA	β MDA	H.P. Technician	Technician
11/7/2006	Alpha 1	Beta 150	Alpha 2418	Beta 5111	Alpha 1.0	Beta 150.0	Alpha 2417.0	Beta 4961.0	Alpha PASS	Beta PASS	Alpha PASS	Beta PASS	42.57	MDA β (dpm)	OK? Yes	OK? Yes	IHarris	Initials IH
11/8/2006	1	195	2507	5271	1.0	195.0	2506.0	5076.0	PASS	PASS	PASS	PASS	42.57	189	Yes	Yes	IHarris	IH
11/9/2006	0	178	2566	5214	0.0	178.0	2566.0	5036.0	PASS	PASS	PASS	PASS	16.69	181	Yes	Yes	BGardner	BG
1, 5, 2000				<u></u>	0.0			1000.0	17.00	1 7.00	17.00	1 //00	10.00	101			_ 30. 0.10.	
																		4 0 5 5

										`	
											,
											1
											•
											•
											•
											·
									Trial MDA Calculator	α	β
									Sample Count Time (min)	1	
	Initial E	Backgrou	nd and S	Source C	ounts for	r Control	Chart		Bkg Count Rate (cpm)	0.1	
		Initial bk	g counts	3		source p		counts	Bkg Count Time (min)	1	
#	Alpha	cpm	Beta	cpm	Alpha	cpm	Beta	cpm	Counter Efficiency	0.142663	0.28585
1	0	0	171	171	2519	2519	5156	5156	MDCR (cpm)	4.471333	#DIV/0!
2	0	0	147	147	2503	2503	5227	5227	MDA (dpm)	31.3419	
3	1	1	173	173	2562	2562	5148	5148			
4	1	1	194	194	2386	2386	5259	5259			·
5	1	1	146	146	2406	2406	5111	5111			·
6	1	1	180	180	2533	2533	5179	5179			
7	0	0	195	195	2489	2489	5212	5212			
8	1	1	187	187	2645	2645	5222	5222			1
9	0	0	177	177	2424	2424	5106	5106			
10	3	3	188	188	2506	2506	5161	5161			
Mean		0.80		175.8		2497.3		5178.1			
S _(n-1)		0.92		17.45		77.47		50.99			
-3 sigma		-1.96		123.44		2264.88		5025.13			
+3 sigma		3.56		228.16		2729.72		5331.07			
-2 sigma		-1.04		140.89		2342.35		5076.12			
+2 sigma		2.64		210.71	Moon blea	2652.25		5280.08 5002.3			
					Mean-bkg						
					S _(n-1)	77.38		47.06			
				Mean-bkg				4861.12 5143.48			
				Mean-bkg	+3 sigma -2 sigma	2341 75		4908.18			
				Mean-bkg	+2 sigma	2651.25		5096.42			
				.vicari bitg	12 digitia	2001.20		0000.72			
						2519		4985			
						2503		5080			·
						2561		4975			
						2385		5065			
						2405		4965			
						2532		4999			
						2489		5017			
						2644		5035			
						2424 2503		4929 4973			
				<u> </u>		2000		4313			

Co	unting Inst	trument:		2360	Detector:	43-	37	Calib	oration Date:	3/23/2006								
		Serial #:		34938	Serial #:	PR178	8371	12 month c		OK								
					y Smear (cm ²):	582		NRC 6 Mo Ca		WARNING								
	Efficiency (fraction)			Original Source		T _{1/2} (yr)	Source Decayed Activity		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	0.1329	Th-230	1160	17,500	4/29/2002	7.54E+04	17,499	100	1	1	4.60	1.65	2324.8	42.71				
Beta	0.1812	Tc-99	1161	17,500	4/29/2002	2.13E+05	17,500	1000	1	1	554.30	24.29	3170.4	80.23				
											•							
Date	Daily Bkg			Source Counts	Daily Bkg Ra			ource Rate (cpm)	Bkg QC I		Source QC				α MDA	β MDA	H.P.	Technician
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta		MDA β (dpm)	OK?	OK?	Technician	Initials
11/9/2006	3	539	2350	3696	3.0	539.0	2347.0	3157.0	PASS	PASS	PASS	PASS	14.30	105	Yes Yes	Yes Yes	Gbright	GB
11/13/2006	7	509	2305	3755	7.0	509.0	2298.0	3246.0	PASS	PASS	PASS	PASS	19.80	102	Yes	Yes	Iharris Chright	IH CB
11/14/2006	6 7	508	2345	3773	6.0	508.0	2339.0	3265.0	PASS	PASS	PASS	PASS	18.62	102	Yes	Yes	Gbright	GB
11/15/2006 11/16/2006	7	522 541	2362 2344	3560 3854	7.0 7.0	522.0 541.0	2355.0 2337.0	3038.0 3313.0	PASS PASS	PASS PASS	PASS PASS	PASS PASS	19.80 19.80	104 105	Yes	Yes	Gbright Iharris	GB IH
11/10/2000	,	541	2344	3034	7.0	541.0	2337.0	3313.0	PASS	PASS	PASS	PASS	19.60	105	103	103	IIIaiiis	
																	Domo	

									Trial MDA Calculator	α	β
									Sample Count Time (min)	1	
	Initial E	Backgrou	nd and S	Source C	ounts for	^r Control	Chart	•	Bkg Count Rate (cpm)	0.1	
		Initial bk				source p		counts	Bkg Count Time (min)	1	
#	Alpha	cpm	Beta	cpm	Alpha	cpm .	Beta	cpm	Counter Efficiency	0.132851	0.181168
1	7	7	604	604	2366	2366	3743	3743	MDCR (cpm)	4.471333	
2	4	4	544	544	2292	2292	3785	3785	MDA (dpm)	33.65668	
3	3	3	576	576	2320	2320	3746	3746	, , ,		
4	6	6	538	538	2424	2424	3584	3584			
5	5	5	570	570	2315	2315	3769	3769			
6	3	3	549	549	2314	2314	3747	3747			
7	5	5	521	521	2308	2308	3711	3711			
8	3	3	545	545	2366	2366	3855	3855			
9	3	3	563	563	2305	2305	3611	3611			
10	7	7	533	533	2284	2284	3696	3696			
Mean		4.60		554.3		2329.4		3724.7			
S _(n-1)		1.65		24.29		43.04		80.00			
-3 sigma		-0.34		481.42		2200.27		3484.70			
+3 sigma		9.54		627.18		2458.53		3964.70			
-2 sigma		1.31		505.71		2243.31		3564.70			
+2 sigma		7.89		602.89		2415.49		3884.70			
					Mean-bkg			3170.4			
					S _(n-1)	42.71		80.23			
				Mean-bkg	-3 sigma	2196.66		2929.70			
				Mean-bkg	+3 sigma	2452.94		3411.10			
				Mean-bkg	-2 sigma	2239.37		3009.94			
				ivlean-bkg	+2 sigma	2410.23		3330.86			
						2359		3139			
						2359		3241			
						2317		3170			
						2418		3046			
						2310		3199			
						2311		3198			
						2303		3190			
						2363		3310			
						2302		3048			
						2277		3163			

Co	unting Inst	trument:		2221	Detector:	43-	37	Calik	oration Date:	12/6/2005								
		Serial #:		6286	Serial #:	PR17		12 month o		OK								
					y Smear (cm²):	582		NRC 6 Mo Ca		WARNING								
	Efficiency (fraction)			Original Source		T _{1/2} (yr)	Source Decayed Activity		Control Chart & Daily Bkg Count Time	Control Chart	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	0.1592	Th-230	1160	17,500	4/29/2002	7.54E+04	17,499	100	1	1	11.50	3.75	2786.3	131.84				
Beta							#DIV/0!				#DIV/0!	#DIV/0!	#DIV/0!	#VALUE!				
Date	Daily Bkg			Source Counts	Daily Bkg Ra			ource Rate (cpm)	Bkg QC I		Source QC				α MDA	βMDA	H.P.	Technician
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta		MDA β (dpm)	OK?	OK?	Technician	Initials
11/13/2006	12 17		2804		12.0 17.0		2792.0		PASS		PASS		20.63		Yes Yes		Gbright Gbright	GB GB
11/14/2006 11/15/2006	17		2637 2806		17.0		2620.0 2795.0		PASS		PASS		23.94		Yes		Gbright Gbright	GB
11/16/2006	10		2763		10.0		2753.0		PASS PASS		PASS PASS		19.89 19.11		Yes		Nberliner	NMB
11/10/2000	10		2100		10.0		2700.0		1 700		1 700		13.11		. 30		1450111101	TAIVID
																	Dogo	

										`	
									Trial MDA Calculator	α	β
									Sample Count Time (min)	1	•
'	Initial E	Backgrou	nd and S	Source C	ounts for	Control	Chart		Bkg Count Rate (cpm)	0.1	
		Initial bk				source p		counts	Bkg Count Time (min)	1	
#	Alpha	cpm	Beta	cpm	Alpha	cpm	Beta	cpm	Counter Efficiency	0.159224	0
1	14	14		- 1	2816	2816		- 1	MDCR (cpm)	4.471333	#DIV/0!
2	10	10			2740	2740			MDA (dpm)	28.08206	#DIV/0!
3	11	11			2692	2692			, , ,		
4	9	9			2839	2839					
5	11	11			2916	2916					
6	6	6			2883	2883					
7	12	12			2970	2970					
8	13	13			2908	2908					
9	20	20			2638	2638					
10	9	9			2576	2576					
Mean		11.50		#DIV/0!		2797.8		#DIV/0!			
S _(n-1)		3.75		#DIV/0!		130.95		#DIV/0!			
-3 sigma		0.25		#DIV/0!		2404.96		#DIV/0!			
+3 sigma		22.75		#DIV/0!		3190.64		#DIV/0!			
-2 sigma		4.00		#DIV/0!		2535.91		#DIV/0!			
+2 sigma		19.00		#DIV/0!	Maan blee	3059.69		#DIV/0!			
					Mean-bkg			#DIV/0!			
				N.A	S _(n-1)	131.84		#VALUE!			
				Mean-bkg		2390.77		#DIV/0!			
				Mean-bkg	+3 sigma -2 sigma	3181.83 2522.61		#DIV/0! #DIV/0!			
				Mean-bkg	+2 sigma	3049.99		#DIV/0!			
				our big	- Z olgina	00 10.00		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
						2802		#VALUE!			
						2730		#VALUE!			
						2681		#VALUE!			
						2830		#VALUE!			
						2905		#VALUE!			
						2877		#VALUE!			
						2958		#VALUE!			
						2895 2618		#VALUE!			
						2567		#VALUE!			
						2001		#VALUE!			



Cabrera Services, Inc.

Instrumentation Logbook For

Project# 06-3070.02

NEW HAVEN DEPOT CHARACTERIZATION



Source Data Page

Source	Activity	S/N	Half Life (years)	Generation Date	Vendor
C6-137	L	7	30.07 years		N/A
Th-230	X.	1160	1×108 years	4/27/02	Eberline
TC-99	B	1161	1×108 years 2.13×10 syears	4/21/02	Eberline
_					
			Land Ineres		

1

3



Instrument Inventory Log

Vendor	Make	Model / Probe	S/N	Cal Cert	Date Rec'd	Date Ret'd	Comments
abrera	Dudlum	2929/	180830/	Y	10/18/06		
abrera	Ludlum	3/44-9	135696/ PRIYS224	Y	10/18/06		
abrera	Ludlum	2221/44-20	218559 PR215468	Y	10/18/06		
abrera	Lidken	2221/44-20	97841/ PR172518	Y	10/18/06		
abrem	Ludium	2221/44-20	216473/ PR 220900	Y	10/18/06		
as rera	Ludlum	Bicon	C853 F	y	10/18/06		
abrera	Ludium	Bicron microren 2224/43-89	162420/ PR 171381	Y	10/20/06		
Souratek	Ludlum	2224/43-68	116257/	Y	10/26/06		
yrera	Ludlum	224/43-68	183048/ PR161781	Y	10/26/06		
abrerg	Ludlum	2360/43-37	187048/ PR161751 184938/ PR 17837/	Y	10/26/06		
) wratele	Lodlon	2221/43-37	86286/	Y	14/13/06		
				-44-27			
							- 1
BE I							

Project#	



DAILY F D LOG Instrument QC



Mak	е	Mo	del	S	/N	Pro	obe	S/N		DOC	
Ludlu	~	222		2185	59	44	-20	PR 21	5468	8/19/0	06
Bkgd C	ount	Source	Count	Source	#1 ID	Source	#2 ID	Source	#3 ID	CDI)
				Cs-137 #	7					Tally -	
Date	10/18/	06									
Intial QC's	1	2	3	4	5	6	7	8	9	10	Tech
Bkgd	14383	14343	14522	14480	13802	14062	13856	13914	13871	14074	
Source #1	176844	176997	178133	177205	177097	177692	177158	177621	177452	177190	
Source #2			1						THE REAL PROPERTY.	1/0	
Source #3									No.	000	

			Daily QC's			
Date	Bkgd	Source #1 (Cs-137) a / β (A)	Source #2 () α / β / λ	Source #3 () α / β / λ	Battery OK	Tech
10/19/06	14245	176976			Yes / No	
10/20/06	MABBAR 14074	177677			Yes / No	
	A STREET, STRE				Yes / No	
10/23/06	13982	170612			Yes / No	DA
10/24/06	14010	169416			Yes / No	
10/25/06	14157	181883			Yes / No	
10/26/06	14745	178301			Yes / No	DK
10/27/06	172435488	172435			(Yes)/No	DK
10/30/06	15319	180896			Yes? No	DK
10/31/06	14162	176195			Yes)/No	DK
11/1/06	15268	177228			Yes / No	DK
11/2/06	15219	181940			Yes / No	DK
					Yes / No	Toch
			naukoca:		Yes / No	
					Yes / No	
		N. Jan Market	erroment QC		Yes / No	a a su

DALLY FIELD LOG

Project#: 06-3170.02 Name: Now HAVEN



DAILY F. D LOG Instrument QC

Mak	e	Mo	del	S	/N	Pr	obe	S	/N	DO	С
Lodlo	n	2	221	978	11	44	- 20	PR 17	2518	6/5/	06
Bkgd Co	ount	Source	Count	Source	#1 ID	Sourc	e #2 ID	Source	#3 ID	CDI	
1 min		1	MIL	C5-1	37	NI	A	NI	A	6/5	107
Date	10-19	-06			4.1	18 18 19	En Hilly			1 10 miles	A T. J. A.
Intial QC's	1	2	3	4	5	6	7	8	9	10	Tech
Bkgd	13934	13741	13755	13602	14023	13636	13843	13875	13817	13761	JAY
Source #1	170532	170175	169929	170143	169929	169906	170239	170473	169981	170226	10
Source #2	NA						-		100		3
Source #3	SIA									- 10	2

			Daily QC's			
Date	Bkgd	Source #1 (CS/37) α/β/λ	Source #2 () α / β / λ	Source #3 () α / β / λ	Battery OK	Tech
10-19-06	13976	170135			des/No	6B
10-20-06	13572	186314			Yes / No	GB
10-23-06	13648,1	169533			Yes / No	DA
10-24-06	MANUMEN 13735	181290			Yes / No	DA.
10-25-06	13707	179835			Yes / No	GB
10-26-06	14620	182 176			Yes / No	DK.
10-27-06	15078	172511			(Yes) No	DK
10-30-06	15022	180063			(Yes)/ No	DK
10-31-06	13960	178406			Yes / No	DK
11-2-06	15038	177977			Ves / No	DE
11-3-06	13809	179140			Yes / No	GB
					Yes / No	
0048					Yes / No	
			anyth act		Yes / No	I Ly
					Yes / No	
	(17) (1)	Al- of the state	ec.musur.őc	, v	Yes / No	AT ANY PLANTS

Project#: 06-3070.02 Name: New Haven



DAILY F D LOG Instrument QC

Mak	е	Mo	del	S	/N	Pro	obe	S	/N	DO	
Ludlum		222	1	2164	73	44-1	20	PRZZ	-0900	0900 6/19	
Bkgd Co	ount	Source	Source Count		Source #1 ID		ource #2 ID Source		#3 ID		
1 min		1	mih	Cs-	137	J/A		2/	A	0/19	107
Date	10-19-	66								3.45	FEE
Intial QC's	1	2	3	4	5	6	7	8	9	10	Tech
Bkgd	14035	14256	14063	14012	14275	14283	14144	14146	14398	14047	JAM
Source #1	175074	177496	177043	177022	176233	176795	177202	177162	176958	177180	10
Source #2	N/A										2
Source #3	NA										-53

			Daily QC's		The State of the S	
Date	Bkgd	Source #1 (CS137) α / β / λ	Source #2 () α / β / λ	Source #3 () α / β / λ	Battery OK	Tech
10/19/04	14225	17977Z			Yes / No	Jin
10/20/06	13980	177531			Yes / No	Jm
10/23/16	13995	184729			Yes / No	GB
10/24/06	13793	183575			Yes / No	G-3
10/25/06	14589	177235			(Yes/ No	DA
10/26/06	14931	186172			Yes / No	DK
10/27/06	15072	1749 48			Yes/No	DE
10/30/06	15391	175316			(Yes / No	DK
10/3/106	14025	174452			(Yes.) No	DK
10/5/06	15093	175792			Yes No	DA
' /					Yes / No	
					Yes / No	
5.50	Epite .			Lillian Strategic and Tall	Yes / No	41.59
			nduk de R		Yes / No	4.50
					Yes / No	
	3670.07	No. 1 the sa-	annuaur die		Yes / No	and the same

Project#: 06-3070.02 Name: New Itwen



DAILY F D LOG Instrument QC

units are cpm or ur/hr

Mak	е 🔐	Mo	odel	S	/N	Pr	obe	military 1 and	5/N	DC	C
Ludlo	w	3	,	1356	96	44	-9	PK 143	5224	3/3/0	6
Bkgd C		Source	e Count		e #1 ID	Sourc	e #2 ID	THE RESERVE TO SHARE THE PARTY NAMED IN	ce #3 ID	CD	D
N/A		2/	A	3973	-02 N/A	39	75-02	N		5/3/0	7
Date	10/20	0-6	25-34-5		10 mm - 14				1000	100	
Intial QC's	1	2	3	4	5	6	7	8	9	10	Tech
Bkgd									10	2 180	
Source #1	2200	2100	2000	2200	2300	2000	2300	2100	2250	2300	GB
Source #2	2600	2500	2700	2600	7600	2800	2500	2600	2700	2700	GB
Source #3			-							2 183	

nonced for of

			Daily QC's			图画学信
Date	Bkgd	Source #1 (14-134) α/β/λ	Source #2 (Τκ-13%) α γ χ λ λ	Source #3 (Tc-99) α /β/λ	Battery OK	Tech
10/29/06		N/F	2100	2800	Yes / No	JOY
10/23/06			2200	2700	Yes / No	GB
10/24/06			Not Regured	2600	Yes / No	GB
10/25/06				2700	Yes LNo	60
10/26/06	÷			2800	Yes / No	DK
10/27/06				2600	Yes / No	DK
10/30/06				2600	Yes / No	DK
10/31/06				2700	Yes / No	DR
11/1/06				2600	(es) No	DŁ
11-2-06				2700	(Yes/No	DŁ
1-6-06			The same of the sa	2650	Yes /No	GB
11-7-06				2700	Yes / No	Da
11-8-06				2600	Yes / No	DK
11-4-06			Insufactor LU	2700	Yes No	DK
11-13-06			/	2600	Yes / No	DK
11-14-06		V	ephural oc	2700	Yes / No	DE

Project#: 06-3070.02 Name: New Haven

Page 1 of 6

DAILY FIELD LOG Instrument QC

units are cpm or ur/hr

				Daily Q	C's		THE PARTY.	
Date	Bkgd	Sour (ce #1) α / β / λ	Soul	rce #2) a / β / λ	Source #3 (Tc 9 9) α / (β)/ λ	Battery OK	Tech
11-15-06		N	A	N	A	2700	(Yes) No	DŁ
							Yes / No	
							Yes / No	
							Yes / No	
							Yes / No	
							Yes / No	
							Yes / No	
							Yes / No	
		_					Yes / No	
							Yes / No	
							Yes / No	
							Yes / No	
				- 1			Yes / No	
							Yes / No	
							Yes / No	
							Yes / No	
							Yes / No	
							Yes / No	
							Yes / No	
							Yes / No	
		,					Yes / No	
							Yes / No	1
							Yes / No	
			V				Yes / No	
							Yes / No	
							Yes / No	
			4				Yes / No	
		V					Yes / No	

Project

Name:



DAILY F D LOG Instrument QC

Make	e 7 di P	Mo	del	S	/N	Pro	obe	S	/N	DO	C
Bicror	Micharen	-9		C85.	3 F	1	/A	1	A	12/2	2/05
Bkgd Co	ount	Source	Count	Source	#1 ID	Source	#2 ID	Source	e #3 ID	CI	OD
NA		N/	A	Cs-13	7	2/	A	2/	A	12/22	106
Date	10/19/	06									
Intial QC's	1	2	3	4	5	6	7	8	9	10	Tech
Bkgd	4	5	4	4	5	5	4	4	4	5	
Source #1	40	35	35	40	50	45	35	45	40	35	124
Source #2	N/A										->
Source #3	NA								15		->

			Daily QC's			
Date	Bkgd	Source #1 (\$ - (37) a / β /(λ)	Source #2 () α / β / λ	Source #3 () α / β / λ	Battery OK	Tech
10/19/06	year 5	40	N/A	N/A	Yes / No	JDA
10/20/06	6 4	40			Yes / No	Dr
10/23/06	5	40			Yes / No	04
10/24/06	5	40			Yes/No	GB
0/25/06	5	40			Yes / No	as
10/26/06	Needs nee	7.1			Yes //No	JW
0/27/06	4	45			Mes/No	TW
					Yes / No	
					Yes / No	
					Yes / No	
_					Yes / No	
					Yes / No	
					Yes / No	100
			marine for all the		Yes / No	
			1		Yes / No	
	Jm 0.0	No the	Victor Victor	V	Yes / No	

Project#: 06-3070.02 Name: New Haver



DAILY F. D LOG Instrument QC

Make		Model		S/N		Probe		S/N		DOC	
Ludlum 2929		2929 Source Count				43- (0-) Source #2 ID		Source #3 ID		r/9/0/2 CDD	
Bkgd Count											
20		4		Th-2	2-30	Tc-0	79	1/1	+	1/9/0	7
Date	10/19/06					150			100	STATE OF	
Intial QC's	1	2	3	4	5	6	7	8	.9	10	Tech
Bkgd	2/1053	0/1007	0/970	4/969	3/964	2/961	1/980	1/1001	3/1056	1/964	66
Source #1	25088	25/16	25248	24924	24764	25564	25304	24684	25368	25116	aB
Source #2	19936	19376	19820	20064	20252	20344	20576	20694	19628	20264	GB
Source #3	N/A									110	->

Daily QC's								
Date	Bkgd	Source #1 (7.230) α / β / λ	Source #2 (7097) α //β/λ	Source #3 (N/k) α / β / λ	Battery OK	Tech		
16 23 /06	4/1002	25004	19936	N/A	WYES/ No MA	68		
10/24/06	1/1001	25048	20032		MYes / No	6B		
10/25/06	3/961	25145	20096		Yes / No	Cos		
10/26/06	4/1014	24877	20166		Yes / No	66 -		
10/21/06	2/1042	25142	19822		Yes No	DK		
10/30/06	2/1007	25208	20327		Yes No	GB.		
10/31/06	19783/97L	25092	20 234		Yes / No	CA		
11/1/06	3/978	24921	19922		Yes / No	GB		
1/2/06	3/1059	24986	20138		Yes / No	30		
1/3/06	3/977	24858	20201		Yes / No	GB.		
11/6/06	3/1014	24998	20SS9		Yes / No	GB		
11/7/06	3/102/3/1002	2-479 824983	She 20 158 19803		Yes / No	GB		
1/8/06	1/1021	24798	20158		Yes / No	GB		
1/9/06	1/988	24660	19723		Yes / No	GB		
11/13/06	4/1013 00	29946	19515		Yes / No	08		
11/14/06	4/1000 924	24774	19655	4	Yes / No V	n mie		

Project#: 06-3070.02 Name: New Haven



Daily QC's								
Date	Bkgd	Source #1 (Th-23°) 60/β/λ	Source #2 (^{Το 49}) α /(3) / λ	Source #3 () α / β / λ	Battery OK	Tech		
11/15/06	4/1000	24853	19625	H/IZ	Yes / No	DK		
	2/1049		19902		(Yes)/ No	IH		
1/16/06	2/1023	24846	19740		Yes / No	IH		
120/06	3/1023	24818 2484 6 25220	20502		Yes / No	IH		
1/21/06	4/934	25232	20154		Yes / No	IH		
12.10%	1/ (3)	00000			Yes / No			
					Yes / No			
					Yes / No			
					Yes / No			
					Yes / No			
		a distribution			Yes / No			
					Yes / No			
					Yes / No			
					Yes / No			
					Yes / No			
					Yes / No			
					Yes / No			
					Yes / No			
			-		Yes / No			
					Yes / No			
					Yes / No			
					Yes / No			
			ļ		Yes / No			
					Yes / No			
			0		Yes / No			
					Yes / No			
					Yes / No			
					Yes / No			

P7 2 of 6

Project

DAILY F D LOG Instrument QC

Mak			del	S/			be		N	DOC	
LUDLU		2224		16243		43-	- 4		81	11/23	4
Bkgd C			Count	Source			#2 ID	Source		CDI	
/ MIO		1 MI	N	1/1	H.	16-2	30 d	TC - 9	(B	11/23	106
Intial QC's	10/20+3	7 06	3	4	5	6	7	8	9	10	Tecl
Bkgd			5 311	4 271	6 1284	6 (317	7 1284	4 302	7 /289	6 326	
Source #1	NA -	1 1000	5 (51)	7 10 11	4 1201	8 (3(1	, 100	7 10-0	1001	0 1010	
Source #2		3121	3084	3043	3222	3139	3077	3149	3135	3116	DK
Source #3			3247	3217	3363	3287	3318.	3245	3159	33947	DK
	2455	2427	2543	12417	2518	2502	2431	2457	24.08	2508	DK
					Daily QC						
Date	e B	kgd _B		ce #1) α / β / λ		ce #2 (a)/β/λ		ce #3 α /(β)/ λ	Batte	ry OK	Tecl
10/27/06	5	316	N	14	3158		248		Ves	/ No	DK
10/3/106	43/	DK3 N376			315	3	0338	+2492	Yes	/ No	06
11/1/06	4	1263			316	9	D-252	+2459	Yes	/ No	DK
11-2-00	7/	301			315	1	2	482	Yes	/ No	DE
11-3-06	4 /	284.			318	8	2	117	Yes	/ No	DA
11-6-06	5/1	394			3151		251	3	Yes	/ No	DA
11-7-06	7/	292			3183	2	GB 22 8	2+2481	Yes	/ No	DK
11-8-06	481	290			DK328	53037	244	12	Yes	/ No	DK
11-9-06	4/	313			16	8 3170	0123	902442	Yes	/ No	DK
11-13-06	5/0	287			315	34	240	6	Yes	/ No	DK
11-14-06	5/	304			321	7	242	8	Yes	/ No	DK
11-15-06	5/	321			32 0	3	243	26	Yes) No	IK
11-16-06	4/	330	1 212		316	56	254	9	Yes	/ No	DK
					107/14 01				Yes	/ No	
									Yes	/ No	
			V		STUMBLI	CC			Yes	/ No	u mil

Instrument #8



DAILY F D LOG Instrument QC

122018

units are cpm or ur/hr

Mak	Make Mo		odel	S	/N	Pr	obe	وبرفعيه	S/N		DOC	
Cudla	m	22	24	1162	57	PR 43	-68	PRZY	1287	9/8	106	
Bkgd C	ount	Sourc	e Count	Source	e #1 ID	Source	e #2 ID	Source	e #3 ID	CD		
		1		Th-23	0	Tc-90	7	N/A		9.08.	07	
Date	10/6/	06	Harris Contract							A STATE OF		
Intial QC's	1	2	3	4	5	6	7	8	9	10	Tech	
Bkgd	123	99	[1]	106	118	110	110	10%	115	120	TH	
Source #1	3294	3309	3233	3298	3303	3326	3212	3248	3211	3214	14	
Source #2	4346	4166	4344	4305	4266	4223	4318	4281	4274	4250	IH	
Source #3									100	LIND		

			Daily QC's			
Date	Bkgd	Source #1 (†~23=)@/β/λ	Source #2 (Te-97) α / β/λ	Source #3 () α / β / λ	Battery OK	Tech
11/7/06	1/94	3177	4087		Yes/ No	14
11/8/06	0/118	3341	4213		YES/No	174
11/9/06	1/113	3328	4306		Yes/ No	13G
11/13/06	0/167	3301	4360		Yes No	BG
11-14-06	0/103	3330	4339		Yes No	186.
11-15-06	0/112	3289	4372		Yes/No	BG
11-16-06	0/127	3267	4236		Yes No	8.G.
					Yes / No	
					Yes / No	
					Yes / No	
					Yes / No	
					Yes / No	
					Yes / No	70.00
			envillance La		Yes / No	
					Yes / No	
			summer of		Yes / No	

Project#: 06-3070.02 Name: Greg Bright

Project#: 06-3070.02 Name: Greg Bright

Page 1 of 6

* Quantin for Bledd beta and failed Beta source count. Reason - used one QC, sheet with different forwards which said

Instrument # 9

Mak	e	Mo	del	S	/N	Pi	robe	S/N 1R16178)		DO	C
LuDlum		2230	1	18304	8	43-62	8			14 Jun	06
Bkgd Co	ount	Source	Count	Source	e #1 ID	Sourc	e #2 ID	Sourc	e #3 ID	CD	D
				Th-23	30	Te -	99	N/,	Δ.	14 20n	07
Date	11/61	66									100
Intial QC's	1	2	3	4	5	6	7	8	9	10	Tech
Bkgd	0/171	0/147	1/173	1/194	1/146	1/180	0/195	1/187	0/177	3/188	114
Source #1	2519	2503	2562	2386	2406	2533	2489	2645	2424	2506	14
Source #2	5156	S227	5148	5259	5/11	5/79	5212	5222	5106	5161	14
Source #3											

	Daily QC's											
Date	Bkgd	Source #1 (7h-230) α / β / λ	Source #2 (70-99) a / β/λ	Source #3 () α / β / λ	Battery OK	Tech						
11/7/06	1/150	2418	5111		Yes / No	7 (+						
11/8/06	1/195	2507	SZ7/		Yes / No	11+						
11/9/06	0/178	2566	5214		Yes I No	136						
					Yes / No							
					Yes / No							
					Yes / No							
					Yes / No							
			А.		Yes / No							
					Yes / No							
					Yes / No							
					Yes / No							
					Yes / No							
pape l	If editing				Yes / No							
			THE RESERVE OF THE PARTY OF THE		Yes / No							
					Yes / No							
			annuaur oc		Yes / No	a de la constant						

Project#: 06-3-70-02

Name:

Greg Bright

Page 1 of 6

Instrument # 10

DAILY F D LOG Instrument QC

Mak	e	Mo	del	S	/N	Pr	obe	S	S/N		C
Ludlu	M	236	0	1840	138	43-3	37	PR 178371 3		3/23/	106
Bkgd C	ount	Source	Count	Source	#1 ID	Source	e #2 ID			CDI	0
		1		Th-2	30	Tc-	99			1/5/0	7
Date	14/9/0	6									
Intial QC's	1	2	3	4	5	6	7	8	9	10	Tech
Bkgd	7/604	4/574	3/576	6/538	5/570	3/549	5/521	3/545	3 / 563	7/533	GB
Source #1	7366	2292	2320	2424	2315	2314	2308	2366	2305	2284	14
Source #2	3743	3785	3746	3584	3769	3747	3711	3855	3611	3696	IM
Source #3									1.44	1.390	

A STATE OF THE STA	Daily QC's											
Date	Bkgd	Source #1 (7,230)α/β/λ	Source #2 (Τε 49) α / (β) / λ	Source #3 () α / β / λ	Battery OK	Tech						
11/9/06	3/539	2390	3696		Yes / No	GG						
11/13/06	7/509	2305	37 55		Yes No	JH						
11/14/06	6/508	2345	3773		Yes / No	GB						
11/15/06	7/522	2362	3560		Yes / No	GB						
11/16/26	7/541	2344	3854		Yes / No	14						
					Yes / No							
					Yes / No							
					Yes / No							
					Yes / No							
					Yes / No							
					Yes / No							
					Yes / No							
Date	3964	The second second		L Brout work	Yes / No	3						
			bollo of z		Yes / No							
					Yes / No	4						
		4	zonusur őg	6	Yes / No	in a star						

Project#: 66-3070.02 Name: New Itaven

Instrument # 11



DAILY F D LOG Instrument QC

Mak	e	Mo	odel		/N	Pr	obe	S	/N	DO	C
Ludium		22	21	862	86	43	37	PR092501		12-6-6	
Bkgd C	ount	Source	e Count	Sourc	e #1 ID	Source	rce #2 ID Source #3 ID		Source #3 ID		D
1		1		Th-Z	30	to	1 100			1/9/	7
Date	11/13/0	6							To Bay	J. R. W. W.	
Intial QC's	1	2	3	4	5	6	7	8	9	10	Tech
Bkgd		10	11	9	111	6	12	13	20	9	OB
Source #1	2816	2740	2692	2839	2916	2863	2970	2908	2638	2576	GB
Source #2									ALE:	(10)	
Source #3											

Daily QC's											
Date	Bkgd	Source #1 (Th-230)(a)/β/λ	Source #2 () α / β / λ	Source #3 () α / β / λ	Battery OK	Tech					
11/13/06	12	2804			Yes / No	as					
11/14/06	17	2637			Yes / No	GB					
11/15/06	911 08/06	2806			Yes / No	66					
11/16/06	10	2763			Yes / No	NMB					
17 /					Yes / No						
			*		Yes / No						
					Yes / No						
					Yes / No						
					Yes / No						
					Yes / No						
					Yes / No						
				A LINE WAY	Yes / No						
DVIII-				A STATE OF THE STA	Yes / No	III Esth					
			DRING CO.		Yes / No						
					Yes / No						
		- 1	strument Q0		Yes / No	u du alla					

Project#:___

Name:

Page 1 of 6



CUSTOMER

Designer and Manufacturer of Scientific and Industrial Instruments

CABRERA SERVICES

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494

72

S ORDER NO. 252136/300508

01 OAK STREET	FAX NO.	325-235-467
WEETWATER, TEXAS	79556, U.S.A.	

Mfa	Ludlum Measurements, I	nc. Model		2360	Seri	al No	4938	
	Ludlum Measurements, I						-178371	
Cal. Date	e 23-Mar-06	Cal Due Do	ite23-	Mar-07	Cal. Interval _	1 Year N	Neterface 202-6	355
	rk applies to applicable in							
	Instrument Instrument Rec							
					Subtract		ut Sens. Linearity	
F/S R	esp. ck	Meter Zeroed Reset ck. Alarm Setting ck II SOP 14.8 rev 12		Window Ope Batt. ck. (Min	eration b. Volt)V accordance with l	DC Geo	otropism	
strument	Volt Set 1675 V							
CX H	V Readout (2 points) Ref./In	st. 500	1 500	/ Ref./Inst.	1500 /	1500	/	
					A Settings)			
	ware Version: 39010 A	121		User Time)		
	a Threshold: 90				larm: 05000			
(District)	Threshold: 4				rm: 05000			
	Window: 40 rload Checked box	1 . 4 .	0+	A/B Alan	6 0			
Inetra	ument calibrated with a	G' cable.	, C			3/23/	2001	
	voltage set with detector				ion Date Due:			
COMM		a some					7	
Ni-63sr	n:5279-04≈ 31.1 % n:4017 ≈ 4.8 % ation: GM detectors positioned perpendicula	or to source except for M 4	ENCE	12149 5 ≈ faces source.	20.7 % UMENT REC'D		UMENT	
	RANGE/MULTIPLIER	CAL.	POINT	"AS FO	OUND READING	MEIE	R READING*	
	X1000	400 kcpn		-	400	-	400	
	X1000	100 kcpn			400		400	
	X100	40 kcpn 10 kcpn			95		95	
	X100 X10	4 kcpn			400		400	
	X10	1 kcpr			8.5		95	
	X1	400 cpr	0 3		400	_	400	
	X1	100 cpr	n		90	_	90	
	*Uncertainty within ± 10% C.F.	within ± 20%) Calibrated Electron	
	REFERENCE INSTI	RUMENT	INSTRUMENT		FERENCE		INSTRUMEN'	
	CAL. POINT REC	EIVED	METER READING*		AL. POINT	RECEIVED	METER REAL	JING"
Digital Leadout	400 kcpm 400	359 102	40059 (0)	Log Scale			_	
.oudooi		756 (9956 L	-				
	4 kcpm 40	06 7	4006	_				
	400 cpm 9	765	40	-				
	40 cpm	40 -	TO E	accepte to the h	lational Institute of Stand	ards and Technolog	av. or to the calibration facil	lities of
					cal constants or have bee	en derived by the re	atio type of calibration tech Calibration License No.	niques. LO-1963
he calibrati	ion system conforms to the requiremen	its of ANSI/NCSL 2540-1	-1994 and ANSI N323-1978	3		State of Texas	Control Legistre	
Referer	nce Instruments and/or So	urces:	☐ T1008 ☐ T879 ☐	7E552 F	551 720 734	1616	Neutron Am-241 Be	S/N T-304
	amma S/N 1162 G112		To 97 SN: 527	79-04		7.55		
Al Al	pha S/N Th 230s N: 1214	95 V	eta S/N.Srgoygocu:	4016/NI-63	sw: 401/ 0	ther		
CZ m	500 S/N 50800	П	Oscilloscope S/N		✓ M	lultimeter S/N_	83990502	
	/	6	61	1:	1 500	13/	2000	9
	ated By:	7 1	INA'S	tist	Date 2	t - Mar	-06	
Review	ved By: //www.	0 900				1-1-1-		
	ficate shall not be reproduced except	in full, without the writt	en approval of Ludium Me	easurements, Inc.	AC Inst. Only	Passed Diele	ectric (Hi-Pot) and Contin	nuity Test



Designer and Manufacturer of Scientific and Industrial Instruments

Revised 9 May 06 By 5

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494 501 OAK STREET FAX NO. 325-235-4672 SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

Detector	43-37	Serial No	PR-178:	371		Order	#252	136/300508
Customer CAB	BRERA SERVI	CES			Alpha	Input Sensitivit	v	90 mv
Counter	2360	Serial No	18493	8		Input Sensitivi		4 mV
Count Time 1						Beta Windo	w 4	10 mv
Other		w/	15' cce	ble o	Distance Sou	rce to Detecto	or Sur	face
High Voltage	Bac Alpha	ckground Beta	Isotope Size _	Th 230 19800 dpr	Isotope J Size J	NI-63 291364 dp	Isotope M Size	5-90190 59453-lpm
1625	3	248	3.569	1345	3	11715	3	9856
1650	3	347	3772	1490	3	13277	O	12383
- 1675	1	394	4099	1660	6	14487	7	14567
1700	4	571	4073	1873	2	15589	13	16253
1725	4	731	4250	1996	3	15129	50	18101
						1 1 5 5 8 8 8		
				1 1 1 1 1 1 1		# # # # # # # # # # # # # # # # # # #		1 1 2 3 3 4 3 4 4 5 8
						T		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
*								
-								1
		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						
				# # #				

Signature

Charles.

Date 23 Mar 06

[☐] Gas Proportional detector count rate decreased ≤ 10% after 15 hour static test using 39" cable.

Gas proportional detector count rate decreased ≤ 10% after 5 hour static test using 39" cable and alpha/beta counter.



LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494

501 OAK STREET

FAX NO. 325-235-4672

SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

Detector				0.561	Alpha Ir	Order a	01	2m\
Counter	2360	Serial No	1849	38_		nput Sensitivity	1 4	m\
Count Time 11	Minute					Beta Windo	w 40	m'
Other			5 can	ble Di	stance Sourc	ce to Detecto	- Sur	Face
1 Vinda	Back	ground	Isotope .	Tc 99 28800dpr	Isotope Size		Isotope	
High Voltage	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
1625	3	248	9	7417				
1650	3	347	8	8421				
1675	l	394	16	9371				
1700	4	571	16	9511				
1725	4	731	44	9570				
	-							
			-					
			-					
	-							
					3		, , , , , , , , , , , , , , , , , , ,	
	-							

Gas proportional detector count rate decreased

10% after 5 hour static test using 39" cable and alpha/beta counter.

Signature Charles

Date 23 Mar 06



FORM C22A 11/26/2003

Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494

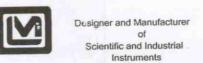
501 OAK STREET FAX NO. 325-235-4672

SWEETWATER, TEXAS 79556, U.S.A.

CUSTOM	ER CABRERA SEVICES					ORDE	R NO.	257311/30	3297
		Model		2224		Serial No.	18	3048	
Mfg	Ludium Measurements, Inc. Ludium Measurements, Inc.	Total College		13-68		Serial No.	PR	-16178	1
Cal. Date		Cal Due Date	14-Ju	n-07	Cal. Interv	ral 1 Ye	ar Met	terface 2	02-783
hack mark	√applies to applicable instr. a	nd/or detector IAW mf	a. spec.	T.	71 °F	RH	51 %	Alt 700.8	mm Hg
	Instrument Instrument Recei				Out of Tol.			Other-See comm	ents
☐ Mech	nanical ck. 🗸 N	leter Zeroed	☐ Ba	ckgroun	d Subtract	Г	Input S	Sens. Linearity	
F/S F	Resp. ck	eset ck. larm Setting ck.	✓ Wii	ndow Op tt. ck. (N	peration	2.2 VDC	Geotro		
	Volt Set V Input			1650	V at Comr	ments mV	Threshold Dial Ratio	=	mV
N H	IV Readout (2 points) Ref./In	st. 500	_150	0	_ V Ref./Inst	2000		2000	v
COMME	NTS:								
	hreshold=120mv				:1495 ,Eff		% 4pi		
	hreshold=3.5mv		Eff. Tc99) sn	:5296-04,Eff	€.≈ 26	% 4pi		
	a window=50mv		Eff. Ni-6	63 sr	:4017 ,Eff	E.≈ 6.4	% 4pi		
	ad was checked but not	set	Eff. Sr90	Ov90sr	:4016 ,Eff	E.≈ .30	% 4pi	Ĺ	
Overior	oltage set with detector	r disconnected							
		or disconnected	. See prace	sau ro	/L document.				
	re#390063								
Calibra	ated with a 5' cable.								
comma Cali	ibration: GM detectors positioned perp	endicular to source exced	t for M 44-9 in which	the front	of probe faces source	e.			
dillilla Cal	ioration. Givi detectors positioned perp				TRUMENT RE		INSTRU	IMENIT	
		REFEREN		100000000000000000000000000000000000000					
	RANGE/MULTIPLIER	CAL. POIN	T	"AS	FOUND REAL	DING"		READING*	
	x1000	400kcpm			400		۷	+00	
	The second secon	100kcpm			100			100	
	x1000	The state of the s		-			- 4	100	
	x100	40kcpm		_	400				_
	x100	10kcpm		-	100			1,00	
	x10	4kcpm			400		L	100	
	x10	1kcpm			100		1	100	
		400cpm			400		L	100	
				-	100			00	-
	X1	100cpm		_	100				
				_					
	*Uncertainty within ± 10% C.F. withi		DUMENT I		REFERENCE		ument	INSTRUI	2022/5/5/15
			RUMENT			RECEI			READING*
	CAL. POINT RECEI	VED MET	ER READING*		CAL. POINT	RECEI	VED	METER	KEADING
Digital	250	7/1/2 7	CC 71/ (N) 6	og cale					
Readout	400kcpm 379	17(0) 57	7/7 (0) 0	cale				-	
	40kcpm 39	97 / 3	99/						
	4kcpm 3	99 7 :	399						
	400cpm 4	106	40 5						
	40cpm	4	4						
udlum Meas	urements, Inc. certifies that the above instru- tional Standards Organization members, or h	ment has been calibrated by :	standards traceable to the	he National	I Institute of Standards a	and Technology, o	r to the calibrat	ration facilities of	
ther Internat	tional Standards Organization members, or no on system conforms to the requirements of Al	ave been derived from acceptions (NCS) 7540-1-1994 and (ANSI N323-1978	yaicai cons	statilis of flove been deri	State of	Texas Cali	ibration License No	LO-1963
Referen	nce Instruments and/or Sour			_		1500 1770		1	
Cs-137 Ga	amma S/N 1162 G112 G	M565 5105 T	1008 T879 E	E552	E551 720 L	734 161	6	Neutron Am-241 F	3e S/N T-304
		_/	Too	1/JT-12	127/ 90490SI	1:4016			
V Alp	oha S/N Th230sn:1495	✓ Beta S	N /c995N:5296-09	1/11-63	SW:4011/3510	Other _			
			201		,	V Multimator	C/N	8399050	12
V m	500 S/N 50800	Oscillo	scope S/N	- 27		Multimeter	3/14	0399030	12
		1 1	1	1/		11/ 1		7/	
Calibrate	ed By:	males	ALS	15	Date	17 V4	nc	160	
02.101.00	- 41					4.1			
р	ad Dia 1. KOMILIV				Date	14 Jun	1606		
Review	ed By:								
This said!	ficate shall not be reproduced except in full,	without the written approval o	Ludium Measurements	i, Inc.	AC Ins	t. Passed	Dielectric (Hi-Pot) and Continu	ity Test

Only

Failed:



LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494 501 OAK STREET

FAX NO. 325-235-4672

SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

ustomer CABF	RERA SEVIC		PR-161		Alabail	nput Sensitivity	1	20 mV
	2224	Serial No.	18304	18	,	Input Sensitivity	-	3,5 mV
	linute	Serial No	1000		Deta	Beta Window		50 mV
ount Time 1N	CONTRACTOR OF THE PROPERTY OF	W/5'	11	-			50	0
Other		W/5	cable		istance Sour	ce to Detector		rtace
High Voltage	Back	ground Beta	Isotope Size	Tc 99 33200 dp/	Isotope Size	590490 59120dpm Beta	Isotope Size	NI-63 290757q Beta
1550	0	149	10	10450	3	14688	2	19433
1575	3	198	12	11008	3	16889	2	21115
1600	3	247	19	10912	17	18070	3	20362
1625	7	289	91	10145	7.3	18773	3	19818
1650	3	1330	369	9034	296	18250	4	19026
1675	9	359	776	7809	762	16 490	79	16736
100						1		
		i i		1 1 1		t t		
		1		t.				
				1				1
		1		1				
		1		1				1
				1		1		
		1		1		i i		i i



LUDLUM MEASUREMENTS, INC. POST OFFICE BOX 810 PH. 325-235-5494 FAX NO. 325-235-4672 501 OAK STREET

SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

	BRERA SEVI	CES			Alpha In	put Sensitivity		m\
ounter	2224	Serial No	18304	18	Beta Ir	nput Sensitivity		5 m\
ount Time1	Minute					Beta Window	_50) m\
Other		w/5	cable		istance Source	e to Detector	Sur	face
			Isotope /	TI 230	Isotope		Isotope	
Lligh	Ba	ckground		19800 dp1	0:		Size	
High Voltage	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
1550	0	149	3668	1533			1	
1575	3	198	3882	1579				
11.00	3	1 247	4068	1553			1	
1625	1	289	4251	1361			E E	
1650	2	1320	4523	1259			1	
1171	9	359	4526	1114			1	
1615	(1220	1			1	
	_			I I			1	
				1		1		
	-	-		1				
	-			-				
			-			3	1	
				1		1	1 1	
		1					1	
				1			1	
				1		1	1	
		i		0% after 15 hour		1	1	





Duratek Instrument Services 628 Gallaher Road Kingston, TN 37763 Phone: (865) 376-8337

Fax: (865) 376-8331

(CUSTOMER	INFO	RMATION		INS	STRUMENT IN	FORMATION				
Customer Nar	ne: Duratek I	nstrume	ent Services	N	Manufacturer: Ludlum						
Address: 628	Gallaher Road	d, Kings	ton, TN 37763	N	odel: 2224	Serial Number: 116257					
Contact Name	: Tony Riggs			P	Probe: N/A Serial Number: N/A						
Customer Pur Number: N		Work Numb	Order er: 2006-03971	C	alibration Method: Electronic						
			INSTRUM	IENT CAL	BRATION INFORM	MATION					
Instrument	Calibrati			Ratemeter Response Calibration		Tolerances	Scaler Response				
Range	Standard V	alue	As Found	As Le	Standard Value	(cpm) ± 2%	As Found	As Left			
X 1	100		100	100	40	40	40	40			
X 1	200		200	200	400	392-408	400	400			
X 1	400		400	400	4,000	3,920-4,080	4,000	4,000			
X 10	1,000		1,000	1,000	40,000	39.2K-40.8K	40,001	40,001			
X 10	2,000		2,000	2,000	400,000	392K-408K	400,014	400,014			
X 10	4,000		4,000	4,000							
X 100	10,000		10,000	10,00							
X 100	20,000		20,000	20,00							
X 100	40,000		40,000	40,00							
X 1000	100,000		100,000	100,00	0			1			
X 1000	200,000		200,000	200,00)						
X 1000	400,000		400,000	400,00).						

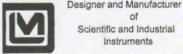
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible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

Calibrated By: Nike tank	Reviewed By: Off abin Date:	9/8/06
Calibration Date: 09/08/06	Calibration Due. 09/08/07	., 4

Model: 2224

Serial Number: 116257

	M&TE				Environmen	tal Condition	IS	
Volt Meter	ID# TW12662	Cal Due:	02/23/07	Barometer	ID#	2551	Cal Due: 10/13/0	
Pulser	ID# 101500	Cal Due:	09/28/06	Thermomete	er ID#	2551	Cal Due: 10/13/0	
Humidity	ID# 958670	Cal Due:	03/29/07	Temp: 23.2	°C Pressure:	742mHg	Humidity: 57%	
			Spec	rial Test				
Geotro	opism	Sat (√) Un	isat ()	As Found As Left				
Audio	Check	Sat (√) Un	nsat ()	Alpha Sens	itivity= 150mv	Alpha Se	ensitivity= 120mv	
Mechanic	cal Zero	Sat (√) Un	isat ()	Beta Sensi	tivity= 4.5mv	Beta Ser	nsitivity= 3.5mv	
Res	set	isat ()	Beta Window= 35mv Beta Window= 30mv					
HV Analo	g Display	Sat (√) Un	isat ()	See o	letector sheet for p	roper High V	oltage setting	
Batt. Ck. (Min.	Volt 2.2VDC)	Sat (√) Un	isat ()	Overlo	ad Not Set	Ove	erload Not Set	
	High Voltage Cali	bration			H.V. Set With Det	ector Not Co	nnected	
Voltage	Tolerance A	s Found	As Left					
500	450-550	489	489					
1000	900-1100	1,013	1,013					
1500	1350-1650	1,531	1,531					
			сом	MENTS		See all		
Calibrated with	5ft. Cable*			Calibrate	d in accordance wi	th OEM Tech	nnical Manual	
alibrated By:	Niketan	a,	Reviewed B	v: Jelli) a	benin ,	Date:	7/8/06	
alibration Date:				Due: 09/08/07		Date.	17010	



CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494 501 OAK STREET FAX NO. 325-235-4672 SWEETWATER, TEXAS 79556, U.S.A.

JSTOMER CABRERA SERV	TICES	Jakin and	ORDER NO. 261302/304997
g. Ludlum Measureme	ents, Inc. Model	2929	Serial No163827
g. Ludlum Measureme	ents, Inc. Model	43-10-1	Serial No
I. Date 16-Aug-0	6 Cal Due Date	16-Aug-07 Cal. I	Interval 1 Year Meterface 202-014
k mark applies to applicable	instr. and/or detector IAW mfg.	spec. T. <u>74</u> °F	RH 45 % Alt 700.8 mm Hg
	Window Operation	+-10%	☐ Requiring Repair ☐ Other-See comments mV Beta Window mV
Calibrated in accordance with L	.MI SOP 14.8 rev 12/05/89.	Calibrated in accordan	nce with LMI SOP 14.9 rev 02/07/97.
ment Volt Set 875	V = 3,58 on High Volt	age dial. High Voltage set w	ith detector connected.
HV Readout (2 points)	Ref./Inst. 500	/V Ref./lr	nst. 2000 / 2000 v
.for Th230 ≈39.5 %4p; .for Tc99 ≈33.5 %4pi, .for Sr90Y90 ≈48.6 %4		=290415dpm pm - 1cpm background =4400dpm n - 55cpm background	
ma Cambration. Ola detectora posic			INSTRUMENT METER READING*
Alpha Channel	REFERENCE CAL POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING
Digital Readout	400K cpm	40021 (0)	40021 (0)
	40K cpm	4002	4002
	4K cpm	400	400
	400 cpm	40 7	40 >
	40 cpm	4 (4 (
Beta/Gamma Channel	REFERENCE CAL POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout	400K cpm	40019 (0)	40019 (0)
	40K cpm	4002 5	4002 5
	4K cpm	400	400
	400 cpm	40 7	40 5
	40 cpm	4 (4
certainty within ± 10% C.F. within ±			
International Standards Organization men	ove instrument has been calibrated by stand abers, or have been derived from accepted v nents of ANSI/NCSL Z540-1-1994 and ANSI	alues of natural physical constants of have been	ards and Technology, or to the calibration facilities of n derived by the ratio type of calibration techniques. State of Texas Calibration License No. LO-1963
erence Instruments and/o			
		☐ T879 ☐ E552 ☐ E551 ☐ 720	734 1616 Neutron Am-241 Be S/N T-304
Tima	5020-03 Beta S/N	C995N: NI-EV/5,904905N:	5281-04 Other
m 500 S/N 5080	00 Oscilloscop	De S/N	▼ Multimeter S/N 83990502
alibrated By:	tharles	disk Date	16 Aug 06
eviewed By:	Mbn	Date	16 Any 06
		A	AC Inst. Passed Dielectric (Hi-Pot) and Continuity Test

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AC Inst. Passed Dielectric (Hi-Pot) and Continuity Test
Only Failed:



Designer and Manufacturer of Scientific and Industrial Instruments

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494 501 OAK STREET FAX NO. 325-235-4672 SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

	ABRERA SER\		11 20	~ ~		Input Sensitivity		7.5 mV
ounter	2929	Serial No	16382	2/	Beta	Input Sensitivit	,	4 mV
ount Time	1Minute	· · · · · · · · · · · · · · · · · · ·				Beta Windo	w5	Omv
Other					Distance Soul	rce to Detector	Tre	y
High	Bac	kground	Isotope _ Size _	Th 230	Isotope _ Size	Tc 99 22600dpr	n Size	Sr90190 113749dp
Voltage	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
825	0	49	1671	157	Ц	6321	2	56478
850	0	52	1684	215	2	6777	2	56274
875		55	1742	257	4	7641	17	55421
900	0	64	1768	294	3	8183	52	53324
925	0	85	1701	341	0	8852	156	51049
				1				
				2 2 8 8				
		8 9 9 8		8 8 9 9				
				8 8 8 8			. 1	
					=			

Signature Charles and Date 16 Aug 06



LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494 FAX NO. 325-235-4672 501 OAK STREET SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

unter unt Time _	2929 1Minute	Serial No	1638	27_	Beta Ir	nput Sensitivity Beta Window	50	
her					Distance Source	e to Detector	Tray	
High Voltage		kground	Size	NI 63 290415	1	Beta	Isotope Size	Beta
	Alpha	Beta	Alpha	Beta	Alpha	Deta		
825	0	49	1	734				
850	0	52	2	2102				
875	1	55	3	4396				
900	0	64	1	7948				
725	0	85	2	11462				
3			2010					
			=					
			+					
			1					



Designer and Manufacturer of Scientific and Industrial

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494

FAX NO. 325-235-4672

CUSTOMER CABRERA SERVICE	9			SWEETWATER, TEXAS	S 79556, U.S.A. 257115/303187
Mfg. Ludlum Measurements		2	221	ORDER NO. Serial No. 2 18	
			2	Serial No. PR	
Mfg. Ludlum Measurements			-20		
	Cal Due Date	19-Aug		erval 1 Year Me	
neck mark pplies to applicable ins					Alt 700.8 mm Hg
New Instrument Instrument R	eceived Within T	oler. +-10% 10-2	0% Out of Tol.	Requiring Repair	Other-See comments
F/S Resp. ck Audie-ck. Calibrated in accordance with LMI		₩ind Batt Calib		4.4 VDC th LMI SOP 14.9 rev 02/0	07/97.
strument Volt Set Comments V					
✓ HV Readout (2 points) Re	ef./Inst. 500		V Ref./Inst.	2000 /	_2008V
Peak settings High Voltage: 687 Threshold dial: 642 Window dial: 40 Window Position: "IN" Resolution for Cs137: >8.7% Calibrated with 5	Gross Counts 1050 100(10mv) n/a "OUT" n/a			t with detector	
RANGE/MULTIPLIEF	REFERE	NCE	INSTRUMENT R "AS FOUND REA	REC'D INSTRU	JMENT READING*
X 1K	400kcpm		400		400
X 1K	100kcpm		100		100
X 100	40kcpm		400		400
X 100	10kcpm		100		100
X 10	4kcpm		400		400
X 10	1kcpm		100		100
X1	400cpm	X	400		400
X1	100cpm		100		100
*Uncertainty within ± 10% C.F.	within ± 20%				Calibrated Electronically
		STRUMENT	REFERENCE	INSTRUMENT	INSTRUMENT
AND	CEIVED ME	TER READING*	CAL, POINT	RECEIVED	METER READING*
	02 156)	402156) See	lie 500kcpm 50kcpm	# A 1.	450K

dium Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of ner International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques.

State of Texas Calibration License No. LO-1963 Reference Instruments and/or Sources: 5105 T1008 T879 E552 E551 720 734 1616 Neutron Am-241 Be S/N T-304 Cs-137 Gamma S/N 1162 G112 M565 Other ☐ Beta S/N Alpha S/N ✓ Multimeter S/N 56110559R

Reviewed By:

4kcpm

400cpm

Date

5kcpm

500cpm

50cpm

Date _

Passed Dielectric (Hi-Pot) and Continuity Test Only

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LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494 501 OAK STREET FAX NO. 325-235-4672

SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

ustomer CAE	BRERA SERVIC	CES	Order #.	257115/303187
ounter	2221 5	Serial No. 218559	Counter Input Sensitivity	10 m
				Surface
ther		in a site of the s		
High Voltage	Background	Isotope Am-24/ Isotope Size 20.79uCi Siz	e Isotope ze Size	Isotope Size
700	1704	1745		
750	1823	14477		
800	2019	16053		
850	2008	18828		
900	2046	19983		نات بطالب بال
950	2024	21056		
1000	2020	20841		
1050	2137	20868		
1100	2043	26941		
1150	2160	20636		
1200	2249	20471		
1250	2651	21456		
		ψ		



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CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494

501 OAK STREET

FAX NO. 325-235-4672

SWEETWATER, TEXAS 79556, U.S.A.

CUSTON	MER CABRERA SE	RVICES				ORDER NO	257193/303229
Mfg.	Ludlum Measure	ements, Inc. M	odel	2221		Serial No. 216	473
Mfg.	Ludlum Measure		odel	44-20		Serial No. PR 22	
Cal. Date			e Date	19-Jun-07	Cal. Interva	1 Year Mete	rface 202-159
ack mar	k pplies to applica			т.	71 °F	RH 47 % A	Alt 700.8 mm Hg
			Within Toler. +-10%				ther-See comments
_		_					
F/S F	nanical ck. Resp. ck o ck. ated in accordance wit	✓ Meter Zeroe ✓ Reset ck. ☐ Alarm Settin th LMI SOP 14.8 rev 1.	g ck.	Window Batt. ck.		☐ Input Se ☐ Geotrop 4 VDC MI SOP 14.9 rev 02/07 Threshold	ism
strument	Volt Set Comment	V Input Sens.Co			ands V at Comm	mV Dial Ratio	100 = 10
✓ F	IV Readout (2 points)	Ref./Inst.	500 / 4	99	V Ref./Inst	2000 //	2004 v
OMME							
	Peak se			Mode	el 2221 currently se	t for Peak Se	Hings
	igh Voltage: 7/5			FIV	mware: 26	1028	
	eshold dial: 642	100(10m)	()				
	Vindow dial: 40	n/a				set or connect	1
	ow Position: "IN"	"OUT"		ω_{l}	th detecto	or connect	ed.
	on for Cs137: %9.2						
alibrate	d using 30 inch cab	le.					Y gardina
	5f+ TT						
ımma Cali	bration: GM detectors po:	sitioned perpendicular to s	ource except for M 44-9 in	which the fro	nt of probe faces source.		
			FERENCE		STRUMENT REC		MENT
	RANGE/MULTIF		AL. POINT		S FOUND READ		READING*
					400		400
	X 1K		cpm				100
	X 1K		cpm		100		The state of the s
	X 100		cpm		400		400
	X 100	10	cpm		100		100
	X 10	4	cpm		400		400
	X 10	1}	cpm		100		100
	X 1	400)cpm		400		400
	X 1	100)cpm		100		100
		17					· · · · · · · · · · · · · · · · · · ·
	*Uncertainty within ± 10%	C.F. within ± 20%				ALL Range(s) Cal	ibrated Electronically
	REFERENCE	INSTRUMENT	INSTRUMENT		REFERENCE	INSTRUMENT	INSTRUMENT
	CAL. POINT	RECEIVED	METER READIN	G*	CAL. POINT	RECEIVED	METER READING*
gital		1101000	diameters.	Log Scale		EARK	SANK
adout	400kcpm	401686	401686	Scale	500kcpm	500K	5001
	40kcpm	40146	4014(0)		50kcpm	50K	SOV
	4kcpm	4010	4010	'	5kcpm	-5 h	7.00
	400cpm	4000	40(0)		500cpm	300	500
	40cpm	4(0)	4(0)		50cpm	_55	55
Hum Moore	rements Inc certifies that the	ahove instrument has been	calibrated by standards traceal	ble to the Nation	nal Institute of Standards and	Technology, or to the calibration	on facilities of
or Internati	noal Standards Organization	members, or have been derive	ed from accepted values of hat	ural physical co	nstants or have been derived	d by the ratio type of calibration	techniques. ation License No. LO-1963
e calibration	n system conforms to the requ	irements of ANSI/NCSL Z540	-1-1994 and ANSI N323-1978			State of Texas Callon	ation Electise No. 20-1000
leferen	ce Instruments and	d/or Sources:		The same of the sa			
:s-137 Ga	mma S/N 1162	G112 M565 5	105 T1008 T879	E552	E551 720 7	734 1616 N	leutron Am-241 Be S/N T-304
			D 1 - ONI			Other Am-2	41 2 0.79ul
☐ Alp	ha S/N		Beta S/N			Oniei Chiri	11 0.114
[m	500 S/N57	78/81 A A G	Oscilloscope S/N			Multimeter S/N	56110559R
₩ m	000 0/14 07/	11/1/					
2-111-1	de MAC	11	hour		Date	9-June-00	9
Calibrate	su by.	- A	700,0			20 Junt 06	
D	100	615			Date	20 Jul 06	
Reviews	ou by.				D010		

AC Inst.

Only

Passed Dielectric (Hi-Pot) and Continuity Test



Designer and Manufacturer of Scientific and Industrial Instruments

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

Customer CAE	BRERA SERVIC	ES			Order #.	257193/303229
Counter	2221 S	Serial No. 21647	3	Cou	unter Input Sensitivity	10 m
Count Time	Gsec			Distance :	Source to Detector	Surface
Other						
High Voltage	Background	Isotope Am-241 Size 0.79uCi	Isotope Size		IsotopeSize	IsotopeSize
700	1421	1504				
750	1873	2046				
800	2026	15890				
850	2209	16451				
900	1904	19250				
950	1842	20441	H. H.			
1000	1834	20660				
1050	1948	20989				
1100	1989	20823	1 0			
1150	1925	21030				
1200	1915	20816		1		
1250	1940	20780				
1300	2087	21121			i de la	
	12.7					
	, and the					
14-11-11						
تعمالية						



CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494

501 OAK STREET

FAX NO. 325-235-4672

CUSTOMER	CABRERA SERVICES				ORDER NO.	
Vlfg. L	udlum Measurements, I	nc. Model		2221	Serial No. 9	7841
Vlfg. L	udlum Measurements, I	nc. Model	4	4-20	Serial No. PR-	172518
Cal. Date	5-Jun-06	Cal Due Date	5-Jur	n-07 Cal. In	terval 1 Year N	Meterface 202-159
	onlies to applicable instr	and/or detector AW mfg.	spec.	T. 74 °F	RH 35 %	Alt 697.8 mm Hg
☐ New Instrum					Requiring Repair	
		_	_			
Mechanical F/S Para	ck.	Meter Zeroed	-	ckground Subtract ndow Operation	✓ Geo	t Sens. Linearity
F/S Resp. c		Reset ck. Alarm Setting ck.	to Wash	t. ck. (Min. Volt)		a opisiii
Audio ck.	accordance with LMI So		See Mines		with LMI SOP 14.9 rev 0	2/07/97
_		put Sens. Comments mV			Thresh	old , mV
✓ HV Read	dout (2 points) Ref.	/Inst. 500	1 498	V Ref./Ins	t2000	1_1995_V
OMMENTS:						
	Peak Settin	gs Gross Counts	Firmwar	e: 26 10 27		
igh Voltage	e: 704V	1050V			The second second	
hreshold:	642	100 (10mV)		d checked but I		
indow:	40	N/A	The second of th	w/detector con		unte
IN Position	n: "IN"	"OUT"	Instrum	ent currently s	set for Gross Co	uncs.
esolution	for Cs137 ≈ 9.82	9				
esolucion .	101 03137 4 7.02					
alibrated	using 12' C-cabl	.e.				
mma Calibration:	GM detectors positioned p	erpendicular to source except for				RUMENT
DAN	JOE/MULTIPLIED	REFERENCI	=	"AS FOUND RE		R READING*
	NGE/MULTIPLIER	CAL. POINT		390	ADING WILTE	400
	1K	400kcpm		97		100
	1K	100kcpm 40kcpm		390		400
	100	10kcpm		97		100
	100	4kcpm		390		400
	10	1kcpm		97		100
	1	400cpm		390		400
	1	100cpm		97		(20
*Uncert		thin ± 20%				Calibrated Electronically
		RUMENT INSTRI	960	REFERENCE	INSTRUMENT RECEIVED	
	POINT REC	EIVED METER	READING*	CAL, POINT	RECEIVED	METER READING*
gital adout	400kcpm 3	9983 (0) 39	183(0) Sc	g ale 500kcpn	500K	550K
1			9951	50kcpn	n 45K	50 K
	4kcpm	400	400	5kcpn		5 K
	400cpm	40	40	500cpn		Soo
	40cpm	4 1	4 5	50cpn		
ar International Stan	dards Ornanization members, o	frument has been calibrated by stan or have been derived from accepted ANSI/NCSL Z540-1-1994 and ANS	values of natural phy	e National Institute of Standar sical constants or have been	delived by the rado type of callo	libration facilities of ration techniques. alibration License No. LO-1963
The second secon	truments and/or So					
s-137 Gamma S/I			3 T879 TE	552 E551 720	734 1616	Neutron Am-241 Be S/N T-304
					✓ Other	Am241 ≈ 0.83 μCi
☐ Alpha S/N						
m 500 S/N	81084	Uscillosco	pe S/N	. / / /	✓ Multimeter S/N _	70401000
Calibrated By:	Sebaste Cesa	llas		Date	05-Jun-06	
Seviewed By:	10 18600			Date	6 June 06	

This certificate shall not be reproduced except in full, without the written approval of Ludium Measurements, Inc.

FORM C22A 11/26/2003

AC Inst.

Only

Passed Dielectric (Hi-Pot) and Continuity Test



Designer and Manufacturer of Scientific and Industrial Instruments

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

Cus	tomer C	ABRERA SERVIC	ES		Order #.	256202 / 302712
Cou	inter	2221 5	Serial No. 97841	2	Counter Input Sensitivity	10m
Cou	ınt Time	6 Sec.		* 1	Distance Source to Detector	Surface
Oth						
Otri	ei	1				
	High Voltage	Background	Size ≈ 0.83 nc;	Isotope Size	Isotope Size	Isotope
	800V	2,391	17,749			
	850	2,337	20,434			
	900	2,446	22,778			
	950	2,393	23,358			
	1000	2,348	23,510			
*	1050	2,448	23,986			
	1100	2,524	23,335			
	1150	2,566	23,717			
	1200	2,530	24,534			
	1250	2,707	23,495			
			¥	T'TE		
	. 1 -					
					Middle, Marco (b. 177	
						ننب سيطا
					The treatments	
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						4

Scientific and Industrial Instruments

FORM C22A 11/26/2003

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494 501 OAK STREET FAX NO. 325-235-4672

SWEETWA	TED TEYAS	70554 1	A 21

A 108	CES			ORDER NO	246337/297322
Mfg. Ludlum Measureme	ents, Inc. Mo	del	2224-1	Serial No. 16	52420
Mfg. <u>Ludlum Measureme</u>				Serial No. PR	
Cal. Date23-Nov-0.					
heck mark 🗹 applies to applica	/				% Alt 697.8 mm Hg
New Instrument Instrumer	nt Received ✓ W	ithin Toler. +-10%	10-20% [Out of Tol. [Requiring Repair	Other-See comments
F/S Resp. ck	✓ Meter Zeroed ✓ Reset ck. ✓ Alarm Setting ith LMI SOP 14.8 rev	ock. ✓ V	Background Subtract Window Operation Batt. ck. (Min. Volt) Calibrated in accordance		
strument Volt Set 675	V Input Sens. <u>com</u>	ment mV Det. Oper.	675V at <u>cc</u>	omment mV Dial F	shold m Ratio =
✓ HV Readout (2 points)	Ref./Inst5	00 /_ 5/	7 V Ref./Ins	t1500	1_1495 V
Efficiencies for Th230,S Th230:16% Sr90Y90:25% Ni63:.11% Tc99:13% Alpha Sensitivity:120mv Beta Sensitivity:3.5mv Beta Window:30mv	I H	nstrument calibra			
Overload set to simulate					
amma Calibration: GM detectors positioned perpe					L
RANGE/MULTIPLIE	R CAL	ERENCE POINT	INSTRUMENT RE		RUMENT ER READING*
X1000 X1000	800kcr		200		200
X100	80kcr		800		800
X100	20kcr		200		200
X10	8kcr		800		800
X10	2kc;		780 300		800
X1	800cr		200		
X1	200cg	2m			200
				All Beneal	(a) Calibrated Flactonia allo
	C.F. within ± 20%	INICTOLIMENT	DESERVENCE		(s) Calibrated Electronically
REFERENCE I CAL. POINT	C.F. within ± 20% INSTRUMENT RECEIVED 198364 79885 7988 799	INSTRUMENT METER READING* 798364 79885 7988 799	REFERENCE CAL. POINT Log Scale	ALL Range(
REFERENCE CAL. POINT Igital eadout 800kcpm 80kcpm 8kcpm 800cpm 800cpm 60cpm 80cpm 80cpm 80cpm 80cpm 80cpm 6dlum Measurements, inc. certifies that the cher International Standards Organization me e calibration system conforms to the require	INSTRUMENT RECEIVED 198364 79835 7988 799 30 above instrument has been deembers, or have been deements of ANSI/NCSL Z546	METER READING* 798364 7985 7988 799 70 In calibrated by standards tractived from accepted values of	CAL. POINT Log Scale	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
REFERENCE CAL. POINT gital eadout 800kcpm 80kcpm 80kcpm 800cpm 800cpm 60cpm 80cpm dium Measurements, inc. certifies that the other international Standards Organization meacolibration system conforms to the require	INSTRUMENT RECEIVED 198364 79335 7933 799 30 above instrument has bee embers, or have been deements of ANSI/NCSL 2540 r Sources: 12 M565 510	METER READING* 798364 79885 7988 799 70 In calibrated by standards trac rived from accepted values of 0-1-1994 and ANSI N323-1978 5	CAL. POINT Log Scale	INSTRUMENT RECEIVED	INSTRUMENT METER READING* ogy, or to the calibration facilities of ratio type of calibration techniques. S Calibration License No. LO-1963
REFERENCE CAL. POINT gital eadout 800kcpm 80kcpm 80cpm 800cpm 60cpm 80cpm 80cpm 80cpm 80cpm 80cpm 80cpm 80cpm 10comer international Standards Organization mee calibration system conforms to the require Reference Instruments and/or Cs-137 Gamma S/N 1162 G1	INSTRUMENT RECEIVED 198364 7988 7988 799 30 above instrument has been determents of ANSI/NCSL Z540 r Sources: 12 M565 510	METER READING* 798364 79885 7988 799 70 In calibrated by standards trac rived from accepted values of 0-1-1994 and ANSI N323-1978 5	CAL. POINT Log Scale ceable to the National Institute of natural physical constants or I E552 F551 720 N162:99NIZZO	of Standards and Technolochave been derived by the State of Texas	INSTRUMENT METER READING* ogy, or to the calibration facilities of ratio type of calibration techniques. s Calibration License No. LO-1963 Neutron Am-241 Be S/N T-304
REFERENCE CAL. POINT igital eadout 800kcpm 80kcpm 80cpm 800cpm 80cpm conforms that the conforms to the require Reference Instruments and/or Cs-137 Gamma S/N 1162 G1 Alpha S/N 1/230: 16/	INSTRUMENT RECEIVED 198364 7988 7988 799 30 above instrument has been determents of ANSI/NCSL Z540 r Sources: 12 M565 510	METER READING* 798364 79885 7988 799 70 In calibrated by standards trac rived from accepted values of 0-1-1994 and ANSI N323-1978 5	CAL. POINT Log Scale ceable to the National Institute of natural physical constants or I E552 F551 720 N162:99NIZZO	of Standards and Technolochave been derived by the State of Texas	INSTRUMENT METER READING* ogy, or to the calibration facilities of ratio type of calibration techniques. s Calibration License No. LO-1963 Neutron Am-241 Be S/N T-304
REFERENCE CAL. POINT igital eadout 800kcpm 80kcpm 80cpm 800cpm 800cpm cher International Standards Organization mele calibration system conforms to the require Reference Instruments and/or Cs-137 Gamma S/N 1162 G1 Alpha S/N 16230: 16/	INSTRUMENT RECEIVED 198364 7988 7988 799 30 above instrument has been determents of ANSI/NCSL Z540 r Sources: 12 M565 510	METER READING* 798364 79885 7988 799 70 In calibrated by standards trac rived from accepted values of 0-1-1994 and ANSI N323-1978 5	CAL. POINT Log Scale Ceable to the National Institute of natural physical constants or to E552 F551 720 F64/S13079 523/-94 Date	of Standards and Technolohave been derived by the State of Texas	INSTRUMENT METER READING* ogy, or to the calibration facilities of ratio type of calibration feethniques. s Calibration License No. LO-1963 Neutron Am-241 Be S/N T-304

Only

Failed:



LUDLUM MEASUREMENTS, INC.

Date 23 - NOV-05

POST OFFICE BOX 810 PH. 325-235-5494 501 OAK STREET

FAX NO. 325-235-4672

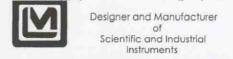
SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

. 420	D		Beta Windo	w30	mv
	D	oistance Sou			
	D	istance Sou			
Isotope Size	Te 99 28, 8000lpm	Isotope Size 1	20,000 Spy		305,000 20
Alpha	Beta	Alpha	Beta	Alpha	Beta
9	1577	5	17885	6	90
16	2664	1	24227		163
14	3798	7	30111	6	358
13	4816	12	34204	7	852
		. HAR			
		'			
9					
	Size Alpha 9 16	Size 28, 80 00/py Alpha Beta 9 1577 16 2664 14 3798	Size 28, 80 00 Size 1 Alpha Beta Alpha 9 1577 5 16 2664 1 14 3798 7	Size 28,8000fpy Size 120,000 dpy Alpha Beta Alpha Beta 9 1577 5 17885 16 2664 1 24227 14 3798 7 30111	Size 28, 30 colpy Size 120,000 dpy Size 3 Alpha Beta Alpha Beta Alpha 9 1577 5 17885 6 16 2664 1 24227 4 14 3798 7 30111 6

Signature 5 car 5

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LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494 501 OAK STREET FAX NO. 325-235-4672 SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

	RERA SERVIC	ES			Alphali	nput Sensitivity	120		
ounter 2		Serial No/	62420			nput Sensitivity	7 -		
ount Time1A				2			30		
					D:-t	ce to Detector			
ther		-			Distance Source	e to Detector	JUITA		
			Isotope _	Thzzo	Isotope	And annual of	Isotope		
High	Back	ground	Size <u>s</u>	5,390 day	Size		Size		
Voltage	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Bet	
625	3	78	726	125					
650	3	145	355	197					
675	3	201	377	798					
700	7	292	872	417					
		*							
		#						_	
		1							



Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494 FAX NO. 325-235-46 501 OAK STREET

SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER CABRERA SER	VICES			ORDER NO	254788 / 301922
Mfg. <u>Ludlum Measure</u>	ements, Inc. Model	3	Serio	INO. 13569	76
Mfg. <u>Ludlum Measure</u>	ements, Inc. Model	44-9	Serio	NO. PR145	224
	y-06 Cal Due Date _			1 Year Meterf	ace 202-002
heck mark 🗹 applies to app	olicable instr. and/or detector	IAW mfg. spec. T	74°F RH	39 % Alt	698.8 mm H
☐ New Instrument Instrum	ment Received Within Tol	er. +-10% 🔲 10-20%	Out of Tol. Requir	ing Repair 🗌 Oth	er-See comments
	✓ Meter Zeroed ✓ Reset ck. ☐ Alarm Setting ck. e with LMI SOP 14.8 rev 12/05/4	☐ Window ☐ Batt. ck. 89. ☐ Calibrate		DC MI SOP 14.9 rev 02/	o7/97.
	Ref./Inst				
COMMENTS:					
RANGE/MULTIP X 100 X 100 X 100 X 10 X 1 X 1	REFERENC LIER CAL. POIN 400kcpm 100kcpm 40kcpm 10kcpm 10kcpm 4kcpm 1kcpm 400cpm	E INS	STRUMENT REC'D S FOUND READING" 4 K 1 K 4 K 1 K 1 K 1 K 1 K 1 K	INSTRUMEN METER REA 1 K 1 K 1 K 1 K 1 K	DING*
			Δ	II Range(s) Calib	rated Electronically
*Uncertainty within ± 10		RUMENT		NSTRUMENT	INSTRUMENT
REFERENCE CAL. POINT Digital eadout		ER READING* Log Scale		RECEIVED	METER READING
74					
ther International Standards Organization	the above instrument has been calibrated in members, or have been derived from equirements of ANSI/NCSL Z540-1-1994 a	n accepted values of natural p	physical constants or have been	rds and Technology, or to a derived by the ratio type State of Texas Calibra	of calibration technique
Reference Instruments and	d/or Sources:				
Cs-137 Gamma S/N 1162	G112 M565 5105 T10				itron Am-241 Be S/N T-3
Alpha S/N	Beta S/	N	Oth	er	
✓ m 500 S/N189	1/1 .		✓ Mul		
Calibrated By: Weng	eff py flums		Date <u>3- h</u>	1A4.06	
Reviewed By: Mich	1 Thomas		Date 3-11	1 ay-06	

AC Inst.

Passed Dielectric (Hi-Pot) and Continuity Test



LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494 501 OAK STREET FAX NO. 325-235-46 SWEETWATER, TEXAS 79556, U.S.A.

CONVERSION CHART

5/37,1162,	E552		High Voltage	900
			Input Sensitivity _	3.4 r
Reference Point	"As Found" Re Meter Reading	eadings (CPM): Range/Scale	After Adjustment Re Meter Reading	eadings (CPM): Range/Scale
150 mR/hr	4.21	X 100	4.2/	x100
50 mR/hr	2 H	X100	2 H	1 100
15 mR/hr	0.7 K	X100	0.7K	X 100
5 mR/hr	2.1 K	X10	2.1 1	110
1.5 mR/hr	0.55K	210	0.55K	X10
1.0 mR/hr	3 H	×1	3 K	XI
	, i i			ساسا
				احسنانا
	#rtech			
			Table Erect	
	Marian Car		انىنى يىلا	



Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494 501 OAK STREET FAX NO. 325-235-46

SWEETWATER, TEXAS 79556, U.S.A. 247655/298001 CUSTOMER CABRERA SERVICES __ ORDER NO.____ Mfg. Bicron Model MICRO REM Serial No. Model Serial No.__ Mfg. Cal. Date ______ 22-Dec-05 ___ Cal Due Date ______ 22-Dec-06 ___ Cal. Interval ___ 1 Year __ Meterface ___ 0-200µrem RH 23 % Alt 705.8 mm H New Instrument Instrument Received ₩Within Toler. +-10% 10-20% 0ut of Tol. Requiring Repair 0ther-See comments Background Subtract
Window Operation
Batt. ck. (Min. Volt) _______VDC Meter Zeroed Input Sens. Linearity ✓ Mechanical ck. Reset ck. F/S Resp. ck Geotropism Alarm Setting ck. · Audio ck. Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. nstrument Volt Set ______ V Input Sens. _____ mV Det. Oper. _____ V at _____ mV Dial Ratio_ COMMENTS: Samma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source. INSTRUMENT REC'D INSTRUMENT REFERENCE METER READING* RANGE/MULTIPLIER CAL. POINT "AS FOUND READING" 160 150 x1000 150 mR/hr x1000 50 mR/hr x100 15 mR/hr x100 5 mR/hr x10 1500 µR/hr x10 500 µR/hr 150 µR/hr x1 100 uR/hr 15 uR/hr x0.1 Range(s) Calibrated Electronically *Uncertainty within ± 10% C.F. within ± 20% INSTRUMENT INSTRUMENT INSTRUMENT INSTRUMENT REFERENCE REFERENCE CAL. POINT METER READING CAL. POINT METER READING* RECEIVED RECEIVED Digital udium Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration technique he calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978 State of Texas Calibration License No. LO-19 Reference Instruments and/or Sources: Cs-137 Gamma S/N 162 G112 M565 5105 T1008 17879 E552 E551 720 734 1616 Neutron Am-241 Be S/N T-3 Beta S/N _____ Other __ Alpha S/N_ Oscilloscope S/N Multimeter S/N m 500 S/N_ Date 22-Dec 05 ACKSON uainel Calibrated By: _ ______ Date _ 73 10cm Reviewed By: This certificate shall not be reproduced except in full, without the written approval of Ludium Measurements, Inc. AC Inst. Passed Dielectric (Hi-Pot) and Continuity Test

CERTIFICATE OF CALIBRATION

(AIR SAMPLER)

RSA Laboratories, Inc.

21 Pendleton Drive, P.O. Box 61 Hebron, Connecticut 06248 (860) 228-0721 Fax (860) 228-4402

Customer and Contact: Cabrera Services, Inc., Attn: Larry Pawlus (860) 289-1885

Customer Address: 809 Main Street, East Hartford, CT 06108

Inst. Mfr. F&J Specialty Products Reference Inst. F&J Venturi D-812 Inst. Model LV-1

Inst. s/n 2591

Inst. s/n 2541

Cal. Date 14 March 2006

Due Date 14 March 2007

Cal. Interval 1 year

Barometric Press: Actual 29.30 in. Hg

Corrected to: 28.86 in. Hg

Temperature: Actual 70°F

Corrected to: 69.7°F

Filters Used: ■Particulate □Charcoal/silver zeolite □Other:

Measurement	Air Sampler Flow Rate (LPM)	Ref. Inst. Flow Rate (LPM)	Percent Deviation
1	19.30	18.67	-3,42
2	38.61	36.35	-6.22
3	48.26	45.19	-6.80
4	57.91	54.03	-7.18
5	77.22	70.73	-9.17
6	4	4 PAP P. A.	
7		1	Terre
8			
9			
10			
11			
12			

**Average percent deviation across the range = -6.56

This is to certify that RSA Laboratories, Inc. of Hebron, Connecticut, has on this date certified this air sampler to be within the accuracy specified above. The Reference Flow Device bears Letters of Certification traceable to the National Institute of Science and Technology. RSA Laboratories, Inc. ID# 10400.

Date: 14 March 2006 Calibrated by: Kurt D. Newton

CERTIFICATE OF CALIBRATION

(AIR SAMPLER)

Customer: Cabrera Services, Inc. Facility: RSA Laboratories, Inc.

Calibrator Model F&J Venturi D-812 Air Sampler Model F&J LV-1

Air Sampler Serial No. 2591 Calibrator Serial No. 2541

			AIR SAMPLER	~				CALIBRATOR	
Measurement	Inlet Temp. (°F)	Inlet Press (In-Hg)	Gauge Press (In-Hg)	Indicated Flow (LPN)	Temp/Press Correction Factor	Corrected Flow (LPW)	Indicated Flow (LPM)	Temp/Press Correction Factor	Corrected Flow (LPM)
-	7.69	28.86	-	20	0.965	19.30	19	0.982	18.67
2	2.69	28.86	-	07	0.965	38.61	37	0.982	36.35
м	2.69	28.86	-	20	0.965	48.26	94	0.982	45.19
7	7.69	28.86	-	09	0.965	57.91	55	0.982	54.03
5	7.69	28.86	-	80	0.965	77.22	72	0.982	70.73
9									
7						×			
8									
6									
10							+1		
. 11									
12							U	81	

Air Sampler Temp/Press Corr Factor = \(\frac{530^\circ R}{\text{Inlet temp (°F)} + 460^\circ R} \) \(\frac{\text{(Inlet Press - Gauge Press)}}{29.92 \text{ in. Hg}} \)

Calibrator Temp/Press Corr Factor = \langle Inlet temp (°F) + 460°R x 29.92 in. Hg Inlet Press 530°R

% Deviation = Corrected Flow - Sampler Flow x 100 Corrected Flow Corrected Flow = (Indicated Flow) x (Temp/Press Corr Factor)

Calibrated by: Kurt D. Newton

Date: 14 March 2006

CERTIFICATE OF CALIBRATION

(AIR SAMPLER)

RSA Laboratories, Inc.

21 Pendleton Drive, P.O. Box 61 Hebron, Connecticut 06248 (860) 228-0721 Fax (860) 228-4402

Customer and Contact: Cabrera Services, Inc., Attn: Larry Pawlus (860) 289-1885

Customer Address: 809 Main Street, East Hartford, CT 06108

Inst. Mfr. F&J Specialty Products Reference Inst. F&J Venturi D-812 Inst. Model LV-1

Inst. s/n 2773

Inst. s/n 2541

Cal. Date 14 March 2006

Due Date 14 March 2007

Cal. Interval 1 year

Barometric Press: Actual 29.30 in. Hg

Corrected to: 28.86 in. Hg Corrected to: 69.5°F

Temperature: Actual 70°F

Filters Used:

■Particulate □Charcoal/silver zeolite □Other:

Measurement	Air Sampler Flow Rate (LPM)	Ref. Inst. Flow Rate (LPM)	Percent Deviation
1	19.31	19.65	1.75
2	38.62	37.34	-3.42
3	48.27	46.18	-4.52
4	57.92	55.02	-5.27
5	77.23	72.71	-6.22
6			
7			
8			
9			
10			
11			
12			

**Average percent deviation across the range = -3.54

This is to certify that RSA Laboratories, Inc. of Hebron, Connecticut, has on this date certified this air sampler to be within the accuracy specified above. The Reference Flow Device bears Letters of Certification traceable to the National Institute of Science and Technology. RSA Laboratories, Inc. ID# 10399.

Date: 14 March 2006 Calibrated by: Kurt D. Newton

CERTIFICATE OF CALIBRATION

(AIR SAMPLER)

Facility: RSA Laboratories, Inc.

Customer: Cabrera Services, Inc.

Air Sampler Model F&J LV-1 Calibrator Model F&J Venturi D-812 Air Sampler Serial No. 2773 Calibrator Serial No. 2541

AIR SAMPLER							
Measurement	Inlet Temp. (°F)	Inlet Press (In-Hg)	Gauge Press (In-Hg)	Indicated Flow (LPM)	Temp/Press Correction Factor	Corrected Flow (LPM)	Indicate Flow (LPM)
1	69.5	28.86	1	20	0.965	19.31	20
2	69.5	28.86	1	40	0.965	38.62	38
3	69.5	28.86	1	50	0.965	48.27	47
4	69.5	28.86	1	60	0.965	57.92	56
5	69.5	28.86	1	80	0.965	77.23	74
6							
7							
8							
9							
10							
11							
12							

Air Sampler Temp/Press Corr Factor =	530°R Inlet temp (°F) + 460°R	x (Inlet Press - Gauge Press) 29.92 in. Hg	% Deviation = $\frac{C}{C}$
	530°R Inlet temp (°F) + 460°R x	Inlet Press	Corrected Flow = (Indic:

Calibrated by: Kurt D. Newton_

Date: 14 March 2006



CERTIFICATE OF CALIBRATION

	Electrop	lated Alpha Sta	andard	*	
				s.o.	# 3863
Description of Standard:				P.O.	# 02-055
Model No. DNS-11	Serial No	3973-02	I:	sotope	Th-230
Electroplated on polished	SS	disc,0.79	9	mm	thick.
Total diameter of 4.77	cm	and an active	diameter	of4.45	cm.
The radioactive material is pecovering over the active surfa	ermanently	y fixed to the	disc by he	eat treatme	ent without any
Measurement Method:					
The 2pi alpha emission rate was chamber. Absolute counting of active surface was verified by The calibration is traceable to S/N_2393/91 Measurement Result: The observed alpha particles ethe calibration date was:	alpha pay counting to NIST by	rticles emitte above, below, reference to	d in the h and at th an NIST ca	nemisphere ne operativalibrated a	above the re voltage. alpha source
8,860	+	265			
The total disintegration rate the surface of the disc, was:	(dpm) ass	uming 1.5% bac	kscatter o	f alpha pa	rticles from
17,500	±	523	(0.00786	μCi)
The uncertainty of the measure error at the 99% confidence le this measurement.	ment is vel, and	3 %, which the estimated	is the su upper limi	m of rando t of syste	m counting matic error in
Calibrated by: ART REUST		Reviewed by	Men	Shore	
Calibration Technician:		un Q.A.		/	Milseralle
Calibration Date: 4-2	9-2002	Revie	wed Date:	4-2	9-02

Analytical Services 7021 Pan American Freeway NE Albuquerque, New Mexico 87109-4238 (505) 345-3461 Fax (505) 761-5416 Toll Free (866) RAD-LABS (723-5227) www.eberlineservices.com

4-29-02



CERTIFICATE OF CALIBRATION

	Electroplated	Beta Stand	ard	
				S.O.# 3863 P.O.# 02-055
Description of Standard:		*		
Model No. DNS-12	Serial No	3975-02	Isotope	Tc-99
Electroplated on polished	SS ·	disc,	0.79	mm thick.
Total diameter of 4.77	cm an	d an active	diameter of	4.45 cm.
The radioactive material is covering over the active sur		ed to the d	disc by heat to	reatment without any
Measurement Method:				
The 2pi beta emission rate was Absolute counting of beta par verified by counting above, traceable to NIST by reference	ticles emitted below, and at	in the hemis	sphere above the	e active surface was The calibration is
Measurement Result:				
The observed beta count rat calibration date was:	te from the su	rface of t	he disc per m	ninute (cpm) on the
11,000	+	441	T23 0.5	
The total disintegration rate the surface of the disc, was	(dpm) assuming	25 %	backscatter of	beta particles from
17,700		706	(0.0	0796 μCi)
The uncertainty of the measur at the 99% confidence level, measurement.	ement is 4 and the estim	_%, which i ated upper	s the sum of r limit of syste	andom counting error ematic error in this
Calibrated by: ART REUST	R	eviewed by:	They floors	
Calibration Technician:	Kunt	€ Q.A. R	epresentation	UNDSCHOOLSCHOOL
Calibration Date: 4-25-2	002	Review	ed Date:	4-29-02

Analytical Service:

www.eberlineservices.com

7021 Pan American Freeway NE Albuquerque, New Mexico 87109-4238 (505) 345-3461 Fax (505) 761-5416 Toll Free (866) RAD-LABS (723-5227)



Duratek Instrument Services 628 Gallaher Road Kingston, TN 37763 Phone: (865) 376-8337 Fax: (865) 376-8331

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

This Certificate will be accompanied by Calibration Ch CUSTOMER INFORMATION					DETECTOR INFORMATION		
Customer Nam	e: Duratek	Instrume	nt Services		Manufacturer: Ludlum		
Address: 628 G	allaher Rd	Kingston,	TN 37763		Detector Model: 43-	-37A	
Contact Name: Tony Riggs					Serial Number: 092	2501	
Customer Purc Number: N/A			Work Ord Number:	er 2006-03612	Evaluation Method: Source		
DETECTOR EFFICIENCY/RESPONSE/PRE				ECISION INFORMATI	ON		
Source Nuclide	: Th ²³⁰	Serial N	umber: 119709	Activity (dpm): 2,442	Certifi	cation Date: 10/14/97	
Parame	ter	As Four	nd As Left	Precisi	Precision Test		
Count	1	510	510	Count	1 (Heel)	510	
Count	2	501	501	Count 2	(Center)	519	
Count	3	519	519	Count	3 (Toe)	507	
Count	4	517	517	Ave	rage	512	
Count	5	507	507	Tolerance		±10%	
Count	6	557	557	Pass/Fail		Pass	
Averag	ge	518.5	518.5				
Background	(CPM)	6.4	6.4				
Net Cou	nts	512.1	512.1				
Efficien	cy	21.0%	21.0%				
	mple Activ			Sample Activity: ource #: N/A	Dead Time (DT): N/A	Calibration Constant (CC): N/A	
SC	ALER INF	ORMATI	ON		DETECTOR INFOR	MATION	
Model	Serial N	<u>Number</u>	Due Date	Background (cpm)	Operating Voltage	Threshold	
2221	862	286	12/06/2006	6.4	1300V	40 = 4 mV	
Detector Set	tup Report	YES	s No√	Barcode Report	YES NO √	Voltage Plateau YES √ NO	
Calibrated in a	acondon	with CD II	1 N/I 220	COMMENTS			
Calibrated in a 0 minute backs			N-W1-239		Efficiency performed	d on contact with 6Ft. cable	
			ST	ATEMENT OF CERTIFI		The state of the capit	
We Certify that the pecifications. We lamage incurred du	further certify	y that our Ca	s evaluated for prop libration Measurem	er operation prior to shipment	and that it met all the Manufa	acturers published operating Technology. (We are not responsible for	
Detector	1		accept fr		,		
Certified By:	(not)	ly	Reviewed E	sy: Jeff Out	Date Date	:: 1119/06	
Certification Da	te: 3/16/20	006		001	Certification Due: 3/1	6/2007	

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900
          0
 950
          0
 1000
          0
 1050
          0
 1100
          2
          1
 1150
 1200
          3
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          1
          1 2
1300
1350
          3
 1400
 1450
          3
1500
          4
1550
         42
1600 .
         74
1650
         147
1700
         278
1750
         593
1800
         819
1850
         925
1900
         1040
1950
         1147
ALPHA PLATEAU Th230 #119708 2,610DPM
900
         0
950
         0
1000
         0
1050
         0
1100
         69
1150
         381
1200
         495
1250
         458
1300
1350
         486
         552
1400
         506
1450
         529
1500
         537
BETA PLATEAU Tc99 #119718 20,520DPM
         7
1400
        19
1450
1500
         186
1550
         799
1600
         1789
1650
         2748
1700
         3885
1750
         5042
1800
         5292
1850
         5246
1900
         5590
1950
         5816
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A



Duratek Instrument Services 628 Gallaher Road Kingston, TN 37763 Phone: (865) 376-8337

Phone: (865) 376-8337 Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable CUSTOMER INFORMATION DETECTOR INFORMATION Customer Name: Duratek Instrument Services Manufacturer: Ludlum Address: 628 Gallaher Rd Kingston, TN 37763 Detector Model: 43-37B Contact Name: Tony Riggs Serial Number: 092501 Customer Purchase Order Work Order **Evaluation Method:** Number: N/A Number: 2006-03612 Source DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION Source Nuclide: Tc99 Serial Number: 119718 Activity (dpm): 20,520 Certification Date: 10/14/97 Parameter As Found As Left Precision Test **CPM** Count 1 5548 5548 Count 1 (Heel) 5405 Count 2 5405 5405 Count 2 (Center) 5538 Count 3 5502 5502 Count 3 (Toe) 5466 Count 4 5538 5538 Average 5469.7 Count 5 5588 5588 Tolerance ±10% Count 6 5466 5466 Pass/Fail Pass 5507.8 5507.8 Average Background (CPM) 830 830 **Net Counts** 4677.8 4677.8 22.8% Efficiency 22.8% Low Sample Activity: High Sample Activity: Dead Time (DT): Calibration Constant (CC): Source #: N/A Source #: N/A N/A SCALER INFORMATION DETECTOR INFORMATION Model Serial Number Operating Voltage **Due Date** Background (cpm) Threshold 2221 86286 12/06/2006 830 1850V 40 = 4 mVDetector Setup Report YES NO √ Barcode Report YES NO √ Voltage Plateau YES √ NO COMMENTS Calibrated in accordance with CP-IN-WI-239 10 minute background performed Efficiency performed on contact with 6Ft, cable STATEMENT OF CERTIFICATION We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all 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 detector). Detector Certified By: Reviewed By: Certification Date: 3/16/2006 Certification Due: 3/16/2007

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900
         0
950
         0
1000
         0
1050
         0
1100
        2
1150
        1
1200
        3
1250
        1
1300
        1
        2
1350
        3
1400
1450
        3
1500
        - 4
1550
       42
1600
        74
1650
        147
1700
        278
1750
       593
1800
        819
1850
        925
        1040 '
1900
        1147
1950
ALPHA PLATEAU Th230 #119708 2,610DPM
900
        0
950
        0
1000
        0
1050
        0
1100
        69
        381
1150
1200
        495
1250
        458
1300
        486
1350
        552
1400
        506
1450
        529
1500
        537
BETA PLATEAU Tc99 #119718 20,520DPM
1400
        7
1450
        19
1500
        186
1550
        799
1600
        1789
1650
        2748
1700
        3885
1750
        5042
1800
        5292
1850
        5246
1900
        5590
1950
        5816
```

M





Duratek Instrument Services 628 Gallaher Road Kingston, TN 37763 Phone: (865) 376-8337

Fax: (865) 376-8331

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

	CUSTOMER INFO	INSTRUMENT INFORMATION							
Customer Nan	ne: Duratek Instrument S	ervices		Manufacturer	ufacturer: Ludlum				
Address: 628	Gallaher Road, Kingston	, TN 37763		Model: 2221		Serial Number: 86286			
Contact Name:	Tom Scott			Probe: N/A Serial Number: N/A Calibration Method: Electronic					
Customer Puro Number: N/A	chase Order	Work Order Number: 2005-0	03393						
		INSTRUM	ENT CALIBR	ATION INFORM	MATION				
		Rater Resp		Calibration Time		Tolerances		Scaler Response	
Instrument Range	Calibration Standard Value CPM	As Found	As Left	Standard Value CPM	Base (min)	(cpm) ± 10%	As Found	As Left	
X 1	100	100	100	1,000 CPM	.1	90 – 110	100	100	
X 1	250	250	250	1,000 CPM	.2	180 - 220	198	198	
X 1	400	390	400	1,000 CPM	.5	450 - 550	497	497	
X 10	1,000	1,000	1,000	1,000 CPM	1	900 - 1,100	994	994	
X 10	2,500	2,450	2,500	1,000 CPM	2	1.8K-2.2K	1,987	1,987	
X 10	4,000	3,900	4,000	1,000 CPM	5	4.5K-5.5K	4,968	4,968	
X 100	10,000	10,000	10,000						
X 100	25,000	24,000	25,000						
X 100	40,000	39,000	40,000				T.		
X 1000	100,000	100,000	100,000						
X 1000	250,000	240,000	250,000						
X 1000	400,000	380,000	400,000						

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all 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: M. Taul

Calibration Date: 12/06/05

Reviewed By:

Calibration Due: 12/06/06

Date: 12-6-08

Model: 2221 Serial Number: 86286

	M	&TE				Environmen	ital Condition	IS	
Volt Meter	Due Date:	03/30/06	ID	TW12663	D-812	Due Date:	04/19/06	ID:	2816
Pulser	Due Date:	09/28/06	ID	101500	Humidity	Due Date:	03/22/06	ID:	958670
Timer	Due Date:	02/16/06	ID	22226011	Temp: 24.2 °	C Pressure:	746 mmHg	Hur	nidity: 18%
		INS	TRUM	MENT CALIBRAT	TON INFORM.	ATION			
Designation of the second second				Special 7	rest				
Geotro	oism	Sat	(√) Un	sat ()	Но	d	Sat	(√) Unsa	at ()
BAT >	4.5	Sat	(√) Un	sat ()	Volume	Test	Sat	(√) Unsa	at ()
Mechanica	l Zero	Sat	(√) Un	sat ()	Audio I	Divide	Sat	(√) Unsa	at ()
Digital 2	Zero	Sat	(√) Un	sat ()	Window	Switch	Sat	(√) Unsa	at ()
Cour	nt	Sat	(√) Un	sat ()	Lan	ıp	Sat	(√) Unsa	at ()
				High Voltage C	alibration				
Voltage			olerano	e		As Found		As I	eft
400			± 2%	1		405			
1,000			30-1,020 1,003			1,003			
1,500			70-1,5			1,502			
1,900			62-1,9				1,9		
		ALCOHOLD STREET	and the state of	in Calibration (De	sired Ratio 10	1,901 mV/100)			
Input	A	s Found Val		As Found Ratio	STATE OF THE PARTY	As Left Value	Asl	Left Rat	io (mV/100
10		86		11.6		94).6
20		182	-	11.0		201	10.0		
30		278		10.8		306		9.8	
40		373		10.7		417		9.6	
			(4. 20)	Logmeter Scale Lin	CALL DAY OF THE STATE OF THE				
	Input	ALL PROPERTY OF THE PERSON		±20% Tole		As Found	STOCKS COMMENT	As	Left
LOG		400		320-48		400			00
LOG		4,000		3,200-4,	800	4,000		4,0	000
LOG		40,000		32,000-48		37,500		-	500
LOG		400,000		320,000-48	30,000	375,000		375	,000
	A True Hate S	9 16 96 9		COMME	CONTRACTOR SEASONS		740 000 310		
librated in acco	rdance with the	OEM Techni	ical Ma						
trument					α	7	_	-	
librated By:	Mitan	t'		Reviewed By:	(luncol	Thould	Da	te: / 2	2-6-05
libration Date:	12/06/05			Calibration D	ue: 12/06/06	1			



Day/Date: Wednesday, October 18,

2006

DAILY QUALITY CONTROL REPORT

		l each day that field activities a ary, to adequately complete ea			/ Haven Site. Attach an
JMC PM:	Mike Pecullan		•	u <i>y.</i> N/A	
Cabrera PM:	John Eberlin		Wind:	East to we	est, 5 mph
		Ter	nperature:	High 50, l	ow 34
SUBCONTRACTO	ORS ON SITE (Id	lentify subcontractors onsite by co			
N/A					
WODK DEDEODI	MED (Briefly decor	ibo project tooks that were perfer	mad Dafaranaa		to logo if dotails personny
Greg B. and Joe N		ibe project tasks that were perford idday and begin mobilization fo			
instruments					
PROJECT SCHE	OULE (Describe im	pact of day's work, if any, on over	all project sched	dule):	
IV/A					
PROBLEMS, NO	N-CONFORMAN	CES, CORRECTIVE ACTIONS	S. NOTIFICAT	TIONS (D	escribe any hazards, injuries.
regulatory or proce	dural issues, items	of non-compliance, etc. Identify in ed/and a summary of content of d	ndividuals conta		
N/A					
		entify any non-project personnel the me of contact/ and any other pert			
DQCR prepared	by:				
Print I	lame	Signatu	re		Title
Greg E	Bright				Field Site Manager



Day/Date: Thursday, October 19,

2006

DAILY QUALITY CONTROL REPORT

-	•	l each day that field activit. ary, to adequately comple	•		v Haven Site. Attach an
	Mike Pecullan		Precipitation:	N/A	
Cabrera PM:			Wind:	East to w	est, 5 mph
			Temperature:	High 50,	low 34
SUBCONTRACT	ORS ON SITE (Id	dentify subcontractors onsite			
N/A					
WORK PERFOR	MED (Briefly descr	ibe project tasks that were p	erformed. Reference	ce appropria	ite logs if details necessary
Greg B., Joe M., a	and Derrick A. arri		bilization for the p	project, inc	luding setup in the garage and
PROJECT SCHEI Working on Tasks		pact of day's work, if any, on	overall project sch	edule):	
regulatory or proce	dural issues, items		tify individuals con		escribe any hazards, injuries, result of these items. Include
N/A		,	,		
Include names/title		entify any non-project person me of contact/ and any other			e contact with project personnel. sation):
N/A					
DQCR prepared	by:				
Print I	Name	Sigr	ature		Title
Greg E	Bright				Field Site Manager



Greg Bright

Day/Date: Friday, October 20, 2006

Field Site Manager

DAILY QUALITY CONTROL REPORT

New Haven Depot Characterization – Project No. 06-3070.02 Task 20

This field report shall be completed each day that field activities are performed at the New Haven Site. Attach an additional sheet of paper, if necessary, to adequately complete each required entry. Precipitation: N/A Mike Pecullan JMC PM: Wind: East to west, 5 mph Cabrera PM: John Eberlin Temperature: High 45, low 30 SUBCONTRACTORS ON SITE (Identify subcontractors onsite by company name): N/A WORK PERFORMED (Briefly describe project tasks that were performed. Reference appropriate logs if details necessary Greg B., Joe M., and Derrick A. arrive at site. Joe M. and Greg B. continue locating Class 1 soil sample locations, while Derrick A. and Joe M. continue gamma walkover surveys. PROJECT SCHEDULE (Describe impact of day's work, if any, on overall project schedule): Working on Tasks 1-4 currently. PROBLEMS, NON-CONFORMANCES, CORRECTIVE ACTIONS, NOTIFICATIONS (Describe any hazards, injuries, regulatory or procedural issues, items of non-compliance, etc. Identify individuals contacted as a result of these items. Include name/title/organization/time contacted/and a summary of content of discussion): N/A SITE VISITORS, CONTACTS (Identify any non-project personnel that visited the site or made contact with project personnel. Include names/titles/organizations/time of contact/ and any other pertinent details of the conversation): N/A DQCR prepared by: **Print Name Signature Title**



Day/Date: Monday, October 23, 2006

DAILY QUALITY CONTROL REPORT

		l each day that field activities ary, to adequately complete e			v Haven Site. Attach an
JMC PM:	Mike Pecullan		•	N/A	
Cabrera PM:	John Eberlin		Wind:	East to w	rest, 5 mph
		Te	emperature:	High 45,	low 30
	ORS ON SITE (Id	dentify subcontractors onsite by o			
N/A					
WORK PERFORI	MFD (Briefly descr	ibe project tasks that were perfo	rmed Deferen	e annronria	ate lone if details necessary
	ınd Derrick A. arri	ve at site. Joe M. and Derrick			over surveys. Joe W. arrives at
site and heips wit	ii QC, GW3, and S	son sampling.			
Tasks 1 and 2 cor		pact of day's work, if any, on oven on 3-4 currently.	erall project sch	edule):	
		•			
regulatory or proce	dural issues, items	CES, CORRECTIVE ACTION of non-compliance, etc. Identify ed/and a summary of content of	individuals con		
There was a prob	lem with the GWS	S; the sensor records were tur		e were not	getting a rad meter reading for
every GPS location	n. 11 gets fixed at	1:00 PM			
		entify any non-project personnel me of contact/ and any other per			e contact with project personnel. sation):
N/A	<u> </u>				
	_				
DQCR prepared	by:				
Print I	Name	Signati	ıre		Title
Greg E	Bright				Field Site Manager



Greg Bright

Day/Date: Tuesday, October 24, 2006

Field Site Manager

DAILY QUALITY CONTROL REPORT

New Haven Depot Characterization – Project No. 06-3070.02 Task 20

This field report shall be completed each day that field activities are performed at the New Haven Site. Attach an additional sheet of paper, if necessary, to adequately complete each required entry. Precipitation: N/A Mike Pecullan JMC PM: Wind: East to west, 5 mph John Eberlin Cabrera PM: Temperature: High 45, low 30 SUBCONTRACTORS ON SITE (Identify subcontractors onsite by company name): N/A WORK PERFORMED (Briefly describe project tasks that were performed. Reference appropriate logs if details necessary Greg B., Joe M., Derrick A., Dave K. and Joe W. arrive at site. Joe M. and Derrick A. continue gamma walkover surveys. Joe W., Dave K., and Greg B. continues soil sampling. PROJECT SCHEDULE (Describe impact of day's work, if any, on overall project schedule): Tasks 1 and 2 completed, working on 3-4 currently. PROBLEMS, NON-CONFORMANCES, CORRECTIVE ACTIONS, NOTIFICATIONS (Describe any hazards, injuries, regulatory or procedural issues, items of non-compliance, etc. Identify individuals contacted as a result of these items. Include name/title/organization/time contacted/and a summary of content of discussion): N/A SITE VISITORS, CONTACTS (Identify any non-project personnel that visited the site or made contact with project personnel. Include names/titles/organizations/time of contact/ and any other pertinent details of the conversation): N/A DQCR prepared by: **Print Name Signature** Title



Day/Date: Wednesday, October 25,

2006

DAILY QUALITY CONTROL REPORT

•	•	l each day that field activities are ary, to adequately complete each	•		Haven Site. Attach an
JMC PM:	Mike Pecullan		pitation:		
Cabrera PM:	John Eberlin			East to we	est, 5 mph
		Temp	perature: _	High 50, Id	ow 34
SUBCONTRACT	ORS ON SITE (Id	lentify subcontractors onsite by com			
N/A					
WORK DEDEOD	MED (p.: d.)				
Derrick A. and Joe	e M. performed G	ibe project tasks that were performed WS over remainder of 7A, most o	f the buffer	around 7A,	, the eastern reference area,
		ave K. performed sampling at bia prepared COCs for shipping bias			
		pact of day's work, if any, on overall			
lasks 1,2, and 4 schedule as of no		nainder of bias samples to be ser	it offsite Thu	ırsday (tasl	k 3). On schedule or ahead of
regulatory or proce	dural issues, items	CES, CORRECTIVE ACTIONS, of non-compliance, etc. Identify ind	ividuals conta		
N/A	ation/time contacte	ed/and a summary of content of disc	ussion):		
		entify any non-project personnel that me of contact/ and any other pertine			
Mike Pecullan visi	ted during soil sar	npling today. Normal project-rela er, Terry Romanko, with 5-day to	ted discussion	on ensued.	Greg B. discussed sending
Samples to STE W	itti project manag	er, reny komanko, with 5-day to	iriai ouriu ai	ia receivini	g additional sample coolers.
DQCR prepared	by:				
Print I	Name	Signature			Title
Greg E	Bright				Field Site Manager



Day/Date: Thursday, October 26,

2006

DAILY QUALITY CONTROL REPORT

•	•	l each day that field activities are perfo ary, to adequately complete each requ		w Haven Site. Attach an
JMC PM:	Bill Metcalf	Precipitat	On and	off showers (in afternoon)
Cabrera PM:	John Eberlin	w	ind: East to v	vest, 5 mph
		Temperat	ure: High 47,	low 34
SUBCONTRACTO	ORS ON SITE (Id	lentify subcontractors onsite by company r	name):	
N/A				
WORK PERFORI	MED (Briefly descr	ibe project tasks that were performed. Re	ference appropri	ate logs if details necessary
	K. performed sam	pling remainder of 7A locations. Greg		
PROJECT SCHEI	DULE (Describe im	pact of day's work, if any, on overall proje	ct schedule):	
	are complete. Ren	nainder of bias samples to be sent offs		3). On schedule or ahead of
Some date de la crime	•••			
regulatory or proce	dural issues, items	CES, CORRECTIVE ACTIONS, NOT of non-compliance, etc. Identify individuated/and a summary of content of discussion	s contacted as a	
N/A	ation, time contact	sar and a summary of content of discussion		
CITE WAITORS	CONTACTO			
		entify any non-project personnel that visite me of contact/ and any other pertinent det		
DQCR prepared	by:			
Print I	Name	Signature		Title
Greg E	Bright			Field Site Manager



Day/Date: Friday, October 27, 2006

DAILY QUALITY CONTROL REPORT

		l each day that field activit ary, to adequately comple			v Haven Site. Attach an
JMC PM:	Bill Metcalf	, , ,	Precipitation:	Rain all d	ay
Cabrera PM:			Wind:	From the	east 10 mph
			Temperature:	High 47,	low 34
SUBCONTRACTO	ORS ON SITE (Id	lentify subcontractors onsite	by company name)	:	
N/A	·	•			
WORK PERFORI	MED (Briefly descr	ibe project tasks that were p	erformed. Reference	e appropria	te logs if details necessary
					ove Joe to airport at 9:30 AM. while Greg shipped off samples
PRO IECT SCHEI	OIII F (Describe im	pact of day's work, if any, on	overall project sch	edule):	
					schedule or ahead of schedule
regulatory or proce	dural issues, items		tify individuals con		escribe any hazards, injuries, result of these items. Include
		ete walkovers or soil samp		both on Mo	onday.
		entify any non-project person me of contact/ and any other			e contact with project personnel. sation):
DQCR prepared	by:				
Print I	Name	Sigr	ature		Title
Grea F	Briaht				Field Site Manager



Day/Date: Monday, October 30, 2006

DAILY QUALITY CONTROL REPORT

-	•	l each day that field activities are perfo ary, to adequately complete each requi		w Haven Site. Attach an
JMC PM:	Bill Metcalf	Precipitati	on: N/A	
Cabrera PM:	John Eberlin	 Wi	nd: From the	e east 15 mph
		Temperati	ure: High 65,	low 43
SUBCONTRACT	ORS ON SITE (Id	lentify subcontractors onsite by company n	ame):	
N/A				
		ibe project tasks that were performed. Ref		
		i. soil samples in buffer area (SU 4) all rail scale, paved road to rail scale, shri		
and storage/trans		ran souls, parou road to ran souls, sint	interrupting and	a, storago, transport area south
		pact of day's work, if any, on overall projec		
	•	I continue to work on Task 14 (outdoor or warehouse surveys.	sampling) and	I finish this week most likely. If
we mish that, wii	Tillove off to illido	or warehouse surveys.		
regulatory or proce	dural issues, items	CES, CORRECTIVE ACTIONS, NOTI of non-compliance, etc. Identify individual ed/and a summary of content of discussion	s contacted as a	
N/A		,	,-	
SITE VISITORS Include names/title	, CONTACTS (Ide	entify any non-project personnel that visite me of contact/ and any other pertinent det	d the site or mad ails of the conver	le contact with project personnel. rsation):
Contacted by Airg	as Fort Wayne re	oresentative. 200 ft^3 tanks are ordere	ed and set for d	elivery on Friday of this week. A
rush order to get	4 smaller P-10 tai	nks (80 ft^3) is issued to receive on Mo	inday in two we	eks.
DQCR prepared	by:			
Print I	Name	Signature		Title
Grea E	Briaht			Field Site Manager



Day/Date: Tuesday, October 31, 2006

DAILY QUALITY CONTROL REPORT

		l each day that field activities are perfor ary, to adequately complete each requir		w Haven Site. Attach an
	Bill Metcalf	Precipitation		
Cabrera PM:			nd: From the	east 15 mph
			re: High 55,	
SUBCONTRACTO N/A	ORS ON SITE (Ic	lentify subcontractors onsite by company na	nme):	
	K. onsite. Dave K	ibe project tasks that were performed. Refe (. soil samples in reference area. Greg B		
Tasks 1-5 and 13	are complete. Wil	pact of day's work, if any, on overall project Il continue to work on Task 14 (outdoor or warehouse surveys.		finish this week most likely. If
regulatory or proce	dural issues, items	CES, CORRECTIVE ACTIONS, NOTII of non-compliance, etc. Identify individuals ed/and a summary of content of discussion)	contacted as a	
N/A				
		entify any non-project personnel that visited me of contact/ and any other pertinent deta		
N/A				
DQCR prepared	by:			
Print N	Name	Signature		Title
Greg B	Bright			Field Site Manager



Day/Date: Wednesday, November 1,

2006

DAILY QUALITY CONTROL REPORT

		l each day that field activit ary, to adequately comple			v Haven Site. Attach an	
JMC PM:	Bill Metcalf		Precipitation:	N/A		
Cabrera PM:	John Eberlin		Wind:	From the	east 15 mph	
			Temperature:	High 50,	ow 34	
SUBCONTRACT	ORS ON SITE (Id	dentify subcontractors onsite	by company name)	:		
N/A						
WORK PERFOR	MED (Briefly descr	ibe project tasks that were p	erformed. Referen	ce appropria	te logs if details necessary	
Greg B. and Dave	K. onsite. Dave K	C. continues to soil sample	in reference area	and perfor	ms biased samples in entry ns paved road measurements.	
PROJECT SCHE	DULE (Describe im	pact of day's work, if any, or	overall project sch	edule):		
Tasks 1-5 and 13	are complete. Wil				finish this week most likely. If	
regulatory or proce	dural issues, items		ntify individuals con		escribe any hazards, injuries, esult of these items. Include	
		Should be fine to use 11/2				
		entify any non-project persor me of contact/ and any other			e contact with project personnel. sation):	
Contacted Paul S. conference call to		brera concerning surveys i	n potentially unsa	fe buildings	s. Will talk over with people in	
DQCR prepared by:						
Print I	Name	Sign	nature		Title	
Greg E	Bright				Field Site Manager	



Day/Date: Thursday, November 2,

2006

DAILY QUALITY CONTROL REPORT

	,	reach day that held activities are performed ary, to adequately complete each required		N HAVEN SILE. ALLACTI ATI
JMC PM:	Bill Metcalf	Precipitation:	N/A	
Cabrera PM:		Wind:	From the	east 5 mph
		Temperature:	High 50,	low 34
SUBCONTRACTO	ORS ON SITE (Id	dentify subcontractors onsite by company name		
N/A	<u> </u>	territy subcontractors on site by company name	<i>,</i>	
		ibe project tasks that were performed. Referen		
		C. continues to soil sample in reference areaB. and Dave K. performs alpha/beta survey		
storage and trans	port areas.		•	
		pact of day's work, if any, on overall project scl Il continue to work on Task 14 (outdoor sar		finish this week most likely. If
	•	or warehouse surveys.	ripiirig) ariu	Tillisti tilis week tilost likely. Il
DDODI EMS NO	NI CONEODMAN	CES, CORRECTIVE ACTIONS, NOTIFIC	ATIONS (F	Describe any hororde injuries
regulatory or proce	dural issues, items	of non-compliance, etc. Identify individuals cored/and a summary of content of discussion):		
Looked inside 210). Sections 3 and 4	4 are largely clear, although some windblow		
1 and parts of Secondary	ction 2 are covere	d in ceiling tile, which may or may not be t	ransite tile.	Will collect a sample to send to
		entify any non-project personnel that visited the		
Include names/title	es/organizations/ti	me of contact/ and any other pertinent details of	of the conver	rsation):
DQCR prepared	by:			
Print I	Name	Signature		Title
Greg E	Bright			Field Site Manager



Day/Date: Friday, November 3, 2006

DAILY QUALITY CONTROL REPORT

		l each day that field activition ary, to adequately completo			w Haven Site. Attach an		
	Bill Metcalf		Precipitation:	•			
Cabrera PM:					east 5 mph		
			Temperature:	High 50,	low 34		
SUBCONTRACTO	ORS ON SITE (Id	lentify subcontractors onsite b	by company name)	•			
N/A							
		ibe project tasks that were pe					
Greg B. onsite. Gr Prepare soil samp		WS of Building 145 pad and	I gets measuremo	ents of bui	ldings 136, 146, 141, and 124.		
PROJECT SCHEI	OULE (Describe im	pact of day's work, if any, on	overall project sch	edule):			
Tasks 1-5 and 13	are complete. Wil				finish this week most likely. If		
regulatory or proce	dural issues, items	CES, CORRECTIVE ACTION of non-compliance, etc. Idented a summary of content	ify individuals conf		Describe any hazards, injuries, result of these items. Include		
SITE VISITORS, CONTACTS (Identify any non-project personnel that visited the site or made contact with project personnel. Include names/titles/organizations/time of contact/ and any other pertinent details of the conversation):							
Talked with Terry at STL. Going to recount biased samples after grinding and sieving the samples to determine if contamination in the soil or just in the rock.							
DQCR prepared by:							
Print I	Name	Sign	ature		Title		
Greg E	Bright				Field Site Manager		



Day/Date: Moday, November 6, 2006

DAILY QUALITY CONTROL REPORT

		l each day that field activit ary, to adequately comple			v Haven Site. Attach an
JMC PM:	Bill Metcalf		Precipitation:	N/A	
Cabrera PM:	John Eberlin		Wind:	From the	east 15 mph
			Temperature:	High 55,	low 42
SUBCONTRACTO	ORS ON SITE (Id	dentify subcontractors onsite	by company name)	:	
Ian Harris and Bil	l Gardener				
WORK PERFORI	MED (Briefly descr	ibe project tasks that were p	erformed. Reference	e appropria	ite logs if details necessary
Greg B., Derrick A surveys smears (instruments at 11	A., Ian H. and Bill especially new Wa :30 and work on G	G. spend morning getting arehouse 215 locations). G QC and counting smears. (acquainted with s reg B. picks up Da Greg B. and Ian H	ite and per ave K. fron . go shoppi	
PRO IFCT SCHEI	DIII F (Describe im	pact of day's work, if any, on	overall project sch	adula):	
					ded. Now focusing on scans in
regulatory or proce	dural issues, items		tify individuals con		Describe any hazards, injuries, result of these items. Include
Only have large g regulator. Will ma			me (at least for a	day or two	o) due to lack of a splitter on the
		entify any non-project person me of contact/ and any other			e contact with project personnel. sation):
DQCR prepared	by:				
Print I	Name	Sigr	nature		Title
Greg E	Bright				Field Site Manager



Day/Date: Tuesday, November 7,

2006

DAILY QUALITY CONTROL REPORT

			w Haven Sile. Allach an
Bill Metcalf	Precipitation:	N/A	
John Eberlin	Wind:	From the	east 5 mph
OPS ON SITE (16			
	definity subcontractors offsite by company frame)	<u>' • </u>	
MED (Briefly descr	ibe project tasks that were performed. Reference	ce appropria	ate logs if details necessary
			dod Now focusing on scans in
are complete. Tas	sk 14 is flearly complete, just building surve	ys are need	ued. Now locusing on scalls in
	AFA AARRESTWE AATIONS NOTIFIC		
dural issues, items	of non-compliance, etc. Identify individuals con		
as tanks that can	run one instrument at a time (at least for a		b) due to lack of a splitter on the
esolved this by tak	king two tanks out to warehouses during the	e day.	
, CONTACTS (Ide	entify any non-project personnel that visited the	site or mad	le contact with project personnel.
es/organizations/ti	me of contact/ and any other pertinent details o	f the conver	rsation):
l by:			
Name	Signature		Title
	DULE (Describe im are complete. Tarks tanks that can esolved this by taken, CONTACTS (Idea, In page 14.)	Bill Metcalf John Eberlin Wind: Temperature: ORS ON SITE (Identify subcontractors onsite by company name) I Gardener MED (Briefly describe project tasks that were performed. Reference A., Ian H., Bill G., and Dave K. go to Warehouse 215 and confin warehouse. After that, spend rest of morning scanning was of 2 while GB ships remaining soil samples off and counts of a complete. Task 14 is nearly complete, just building surve are complete. Task 14 is nearly complete, just building surve attactor/time contacted/and a summary of content of discussion): a tanks that can run one instrument at a time (at least for a sesolved this by taking two tanks out to warehouses during the es/organizations/time of contact/ and any other pertinent details of the ses/organizations/time of contact/ and any other pertinent details of the ses/organizations/time of contact/ and any other pertinent details of the ses/organizations/time of contact/ and any other pertinent details of the ses/organizations/time of contact/ and any other pertinent details of the ses/organizations/time of contact/ and any other pertinent details of the ses/organizations/time of contact/ and any other pertinent details of the ses/organizations/time of contact/ and any other pertinent details of the ses/organizations/time of contact/ and any other pertinent details of the ses/organizations/time of contact/ and any other pertinent details of the ses/organizations/time of contact/ and any other pertinent details of the ses/organizations/time of contact/ and any other pertinent details of the ses/organizations/time of contact/ and any other pertinent details of the ses/organizations/time of contact/ and any other pertinent details of the ses/organizations/time of contact/ and any other pertinent details of the ses/organizations/time of contact/ and any other pertinent details of the ses/organizations/time of contact/	Temperature: High 50,



Day/Date: Wednesday, November 8,

2006

DAILY QUALITY CONTROL REPORT

additional shoot of	of nanor if nacace	ary, to adequately complete each required (N HAVEN SILE. ALLACTI AN
JMC PM:	Bill Metcalf	Precipitation:	N/A	
Cabrera PM:	John Eberlin			east 5 mph
		Temperature:	High 60,	low 45
SUBCONTRACT	ORS ON SITE (16	lentify subcontractors onsite by company name		
Ian Harris and Bil		some by sometimes of the boundary manner	, <u>, </u>	
		ibe project tasks that were performed. Referen		
		211, while Bill G., and Dave K. scan walls in 13. Greg B. enters data into data sheets and		
		pact of day's work, if any, on overall project sch sk 14 is nearly complete, just building surve		ded. Now focusing on scans in
warehouses.	•	3	•	J
PROBLEMS, NO	N-CONFORMAN	CES, CORRECTIVE ACTIONS, NOTIFIC	ATIONS (D	Describe any hazards, injuries,
regulatory or proce	dural issues, items	of non-compliance, etc. Identify individuals cored/and a summary of content of discussion):		
Heard from Airgas	s that smaller tanl	ks of P-10 gas are coming tomorrow.		
		entify any non-project personnel that visited the me of contact/ and any other pertinent details o		
Therade Harries/ title	es/ organizations/ til	me of contact/ and any other pertinent details of	i the conver	sation).
DQCR prepared	by:			
Print I	Name	Signature		Title
Greg E	Bright			Field Site Manager
L				



Day/Date: Thursday, November 9,

2006

DAILY QUALITY CONTROL REPORT

New Haven Depot Characterization - Project No. 06-3070.02 Task 20

This field report shall be completed each day that field activities are performed at the New Haven Site. Attach an

additional sheet o	of paper, if necess	ary, to adequately comple	te each required e	entry.	
JMC PM:	Bill Metcalf		Precipitation:	N/A	
Cabrera PM:	John Eberlin				east 5 mph
			Temperature:	High 60,	low 45
SUBCONTRACT	ORS ON SITE (Id	dentify subcontractors onsite			
Ian Harris and Bil			<u> </u>		
		ibe project tasks that were p			
					213 Section 1, until 213 scans
		begin biased measuremen	its on overhead co	olumns in 2	15. With 1 floor monitor
delivered today, [Derrick and Ian sta	art floor scans in 215.			
PROJECT SCHEI	DULE (Describe im	npact of day's work, if any, or	n overall project sch	edule):	
					ded. Now focusing on scans in
warehouses.	•			•	G
regulatory or proce	dural issues, items		ntify individuals con		Describe any hazards, injuries, result of these items. Include
N/A	ation time contact	ear and a sammary or conten	t or ursuussiony.		
SITE VISITORS	, CONTACTS (Ide	entify any non-project persor	nnel that visited the	site or mad	e contact with project personnel.
Include names/title	es/organizations/ti	me of contact/ and any other	r pertinent details o	f the conver	sation):
N/A					
DQCR prepared	by:				
Print I	Name	Sigi	nature		Title
Greg E	Bright				Field Site Manager



Day/Date: Monday, November 13,

2006

DAILY QUALITY CONTROL REPORT

		l each day that field activities ary, to adequately complete			Haven Site. Attach an
JMC PM:	Bill Metcalf	. 3	recipitation:	N/A	
Cabrera PM:	John Eberlin		Wind:	From the e	east 5 mph
		т	emperature:	High 4, low	v 30
SUBCONTRACTO	ORS ON SITE (Id	dentify subcontractors onsite by			
Ian Harris and Bill	I Gardener				
WORK PERFORI	MED (Briefly descr	ibe project tasks that were perf	ormed. Reference	e appropriate	e logs if details necessary
Dave K. and Bill G	6. perform biased	measurements on overhead	columns in 212	, 211, and 2	
		cond floor monitor that arrive		215. Gleg E	5. Continued Counting Sinears
		pact of day's work, if any, on ov			al Nava facusina en casa in
warehouses.	are complete. Tas	sk 14 is nearly complete, just	building surve	ys are neede	ed. Now focusing on scans in
regulatory or proce	dural issues, items	CES, CORRECTIVE ACTIO of non-compliance, etc. Identified/and a summary of content of	y individuals con		
N/A		•	,		
		entify any non-project personne me of contact/ and any other pe			
N/A					
DQCR prepared	by:				
Print I	Name	Signat	ture		Title
Greg E	Bright				Field Site Manager



Day/Date: Tuesday, November 14,

2006

DAILY QUALITY CONTROL REPORT

New Haven Depot Characterization - Project No. 06-3070.02 Task 20

This field report shall be completed each day that field activities are performed at the New Haven Site. Attach an

additional sheet of	of paper, if necess	ary, to adequately complete	each required e	ntry.		
JMC PM:	Bill Metcalf	1	Precipitation:	N/A		
Cabrera PM:	John Eberlin		Wind:	From the	east 5 mph	
			Temperature:	High 50,	low 30	
SUBCONTRACTO	ORS ON SITE (Id	dentify subcontractors onsite b	y company name)	:		
		ibe project tasks that were per				
		measurements statics/smea k Berliner nearly completes t				
completes hall of	Scalls III 211. Nici	k beriiner nearry completes i	IOOI SCAIIS III 2 I.	z. Greg b.	continued counting smears.	
		pact of day's work, if any, on o			Lilliana AMaria Irana a anno 19an	
		Now focusing on scans in w npleted ahead of schedule b		smaller bui	ldings. Warehouse sampling	
(other than 210 a	nd 214) to be con	ilpleted affead of scriedule b	y mursuay.			
regulatory or proce	dural issues, items	CES, CORRECTIVE ACTION of non-compliance, etc. Identiced/and a summary of content of	fy individuals conf			
		orrow and then flying home		acation. D	ave K. will be completing	
DQCRs for the res	st of the week.					
SITE VISITORS	, CONTACTS (Ide	entify any non-project personno	el that visited the	site or mad	e contact with project personnel.	
Include names/title		me of contact/ and any other p				
N/A						
DQCR prepared by:						
Print I	Name	Signa	ture		Title	
Greg E	Bright				Field Site Manager	
L						



Day/Date: Wednesday, November 15,

2006

DAILY QUALITY CONTROL REPORT

		l each day that field activiti ary, to adequately complet		l at the New Haven Site. Attach an entry.
JMC PM:	Bill Metcalf		Precipitation:	N/A
Cabrera PM:			Wind:	From the east 20 mph
			Temperature:	High 40, low 30
SUBCONTRACTO	ORS ON SITE (Id	dentify subcontractors onsite l	oy company name)	:
None				
WORK PERFORI	MED (Briefly descr	ibe project tasks that were pe	rformed. Referen	ce appropriate logs if details necessary
				13. Ian finishes floor scans in 211 and started in 213. Greg B. continued counting
		pact of day's work, if any, on		
		Now focusing on scans in a scans in a schedule		smaller buildings. Warehouse sampling
regulatory or proce	dural issues, items	CES, CORRECTIVE ACTI of non-compliance, etc. Idented/and a summary of content	ify individuals con	ATIONS (Describe any hazards, injuries, tacted as a result of these items. Include
	orking all day tome			vacation. Dave K. will be completing
		entify any non-project personr me of contact/ and any other		site or made contact with project personnel. f the conversation):
N/A				
DQCR prepared	by:			
Print I	Name	Sign	ature	Title
Dave K	ateley			Temp Field Site Manager



Day/Date: Tursday, November 16,

2006

DAILY QUALITY CONTROL REPORT

•	•	l each day that field activit ary, to adequately comple	•		v Haven Site. Attach an
JMC PM:	D:II Mataclf		Precipitation:	•	1
Cabrera PM:	John Eberlin				east 20 mph
			Temperature:	High 40, I	ow 28
SUBCONTRACT	ORS ON SITE (Id	lentify subcontractors onsite	by company name)	:	
None					
		ibe project tasks that were p			
	•	floor scans in Bldgs 124, 1 13. Dave K. counting smea		continues fl	oor scans in B-213. Nick
PROJECT SCHE	DULE (Describe im	pact of day's work, if any, on	overall project sch	edule):	
Tasks 1-5 and 12	-14 are complete.		warehouses and		dings. Warehouse sampling
regulatory or proce	dural issues, items		tify individuals con		escribe any hazards, injuries, result of these items. Include
		s for Greg B. Thursday and			
Include names/title		entify any non-project person me of contact/ and any other			e contact with project personnel. sation):
N/A					
DQCR prepared	by:				
Print I	Name	Sigr	ature		Title
Dave K	ateley				Temp Field Site Manager



Dave Kateley

Day/Date: Friday, November 17, 2006

Temp Field Site Manager

DAILY QUALITY CONTROL REPORT

New Haven Depot Characterization – Project No. 06-3070.02 Task 20

This field report shall be completed each day that field activities are performed at the New Haven Site. Attach an additional sheet of paper, if necessary, to adequately complete each required entry. **Precipitation:** Overcast Bill Metcalf JMC PM: Wind: From the east 5 mph John Eberlin Cabrera PM: High 40, low 28 Temperature: SUBCONTRACTORS ON SITE (Identify subcontractors onsite by company name): None WORK PERFORMED (Briefly describe project tasks that were performed. Reference appropriate logs if details necessary Ian H. and Dave K. clean work area and prep equipment for demob. Nick Berliner finishes floor scan in B 213. Dave K. counting smears. PROJECT SCHEDULE (Describe impact of day's work, if any, on overall project schedule): Small buildings and warehouse scans (other than 210 and 214) completed ahead of schedule on Friday morning. PROBLEMS, NON-CONFORMANCES, CORRECTIVE ACTIONS, NOTIFICATIONS (Describe any hazards, injuries, regulatory or procedural issues, items of non-compliance, etc. Identify individuals contacted as a result of these items. Include name/title/organization/time contacted/and a summary of content of discussion): . Dave K. will be completing DQCRs for Greg B. Wed. Thursday and Firday. SITE VISITORS, CONTACTS (Identify any non-project personnel that visited the site or made contact with project personnel. Include names/titles/organizations/time of contact/ and any other pertinent details of the conversation): N/A DQCR prepared by: **Print Name Signature** Title



Day/Date: Monday, November 20,

2006

DAILY QUALITY CONTROL REPORT

		each day that field activities are arry, to adequately complete each		
JMC PM:	Bill Metcalf	Preci	pitation: C	vercast
Cabrera PM:	John Eberlin		Wind: F	rom the east 5 mph
		Temp	erature: H	ligh 50, low 28
	ORS ON SITE (Id	lentify subcontractors onsite by com	pany name):	
None				
		ibe project tasks that were performe		
Ian H. and Greg E	3. onsite. Count sr	nears and prepare Cabrera equip	ment for ship	ment.
PROJECT SCHEI	OULE (Describe im	pact of day's work, if any, on overall	project schedu	ıle):
		210 and 214 surveys, which will		
regulatory or proce	dural issues, items		viduals contac	ONS (Describe any hazards, injuries, ted as a result of these items. Include
Include names/title		entify any non-project personnel that me of contact/ and any other pertine		e or made contact with project personnel. ee conversation):
N/A				
DQCR prepared	by:			
Print N	lame	Signature		Title
Greg B	right			Field Site Manager



Day/Date: Tuesday, November 21,

2006

DAILY QUALITY CONTROL REPORT

		l each day that field activities ary, to adequately complete e			v Haven Site. Attach an
JMC PM:	Bill Metcalf	, , , ,	recipitation:	Overcast	
Cabrera PM:	John Eberlin		Wind:	From the	east 5 mph
		Te	emperature:	High 50, l	ow 28
SUBCONTRACTO	ORS ON SITE (Id	lentify subcontractors onsite by	company name)		
None					
WORK PERFORI	MED (Briefly descr	ibe project tasks that were perfo	ormed. Reference	e appropria	te logs if details necessary
		nears and prepare Cabrera ed			
PROJECT SCHEI	DULE (Describe im	pact of day's work, if any, on ove	erall project sch	edule):	
All tasks complete	d except Building	210 and 214 surveys, which	will be complet	ed in the S	Spring.
regulatory or proce	dural issues, items	CES, CORRECTIVE ACTION of non-compliance, etc. Identify	individuals conf		
name/title/organiz	ation/time contacte	ed/and a summary of content of	discussion):		
		entify any non-project personnel me of contact/ and any other pe			e contact with project personnel. sation):
N/A					
DQCR prepared	by:				
Print N	lame	Signat	ure		Title
Greg B	Bright				Field Site Manager

Dup SU ¹	Dup Component	(pCi/g)		Dup TPU ² (pCi/g)	SU ¹	Component	Result (pCi/g)		TPU ² (pCi/g)	NAD ³ =	>NAD ³ ?
SU4-77-SS-S-1	Actinium 228			0.34	SU4-77-SS-S-0	Actinium 228	0.94	+/-	0.2	0.53	
SU4-77-SS-S-1	Bismuth 214	1.94	+/-	0.32	SU4-77-SS-S-0	Bismuth 214	1.61	+/-	0.27	0.79	
SU4-77-SS-S-1	Cesium 137	0.39	+/-	0.11	SU4-77-SS-S-0	Cesium 137	0.268	+/-	80.0	0.90	
SU4-77-SS-S-1	Lead 212	1.09	+/-	0.2	SU4-77-SS-S-0	Lead 212	1.05	+/-	0.18	0.15	
SU4-77-SS-S-1	Lead 214	2.07	+/-	0.29	SU4-77-SS-S-0	Lead 214	1.79	+/-	0.25	0.73	
SU4-77-SS-S-1	Potassium 40	17.7	+/-	3.2	SU4-77-SS-S-0	Potassium 40	17	+/-	2.9	0.16	
SU4-77-SS-S-1	Radium (226)	1.94	+/-	0.32	SU4-77-SS-S-0	Radium (226)	1.61	+/-	0.27	0.79	
SU4-77-SS-S-1	Thallium 208	0.356	+/-	0.099	SU4-77-SS-S-0	Thallium 208	0.335	+/-	0.091	0.16	
SU4-77-SS-S-1	Thorium 232	1.15	+/-	0.34	SU4-77-SS-S-0	Thorium 232	0.94	+/-	0.2	0.53	
					SU4-77-SS-S-0	Thorium 234	1.25	+/-	0.42		
SU4-77-SS-S-1	Uranium 235	0.08	+/-	0.32	SU4-77-SS-S-0	Uranium 235	0.03	+/-	0.23	0.13	
SU4-77-SS-S-1	Uranium 238	1.72	+/-	8.0	SU4-77-SS-S-0	Uranium 238	1.25	+/-	0.42	0.52	
SU4-77-SB-S-1	Actinium 228			0.29							
SU4-77-SB-S-1	Bismuth 212	0.82	+/-	0.41							
SU4-77-SB-S-1	Bismuth 214	1.7	+/-	0.31	SU4-77-SB-S-0	Bismuth 214	1.23	+/-	0.28	1.13	
SU4-77-SB-S-1	Lead 212	1.2	+/-	0.21	SU4-77-SB-S-0	Lead 212	0.98	+/-	0.2	0.76	
SU4-77-SB-S-1	Lead 214			0.26	SU4-77-SB-S-0	Lead 214	1.23	+/-	0.21	2.03	Χ
SU4-77-SB-S-1	Potassium 40	21.4	+/-	3.5	SU4-77-SB-S-0	Potassium 40	19.3	+/-	3.5	0.42	
SU4-77-SB-S-1	Radium (226)	1.7	+/-	0.31	SU4-77-SB-S-0	Radium (226)	1.23	+/-	0.28	1.13	
SU4-77-SB-S-1	Thallium 208	0.366	+/-	0.098	SU4-77-SB-S-0	Thallium 208	0.4	+/-	0.12	0.22	
SU4-77-SB-S-1	Thorium 232	1.06	+/-	0.29	SU4-77-SB-S-0	Thorium 232	1.02	+/-	0.5	0.07	
SU4-77-SB-S-1	Uranium 235	0.002	+/-	0.28	SU4-77-SB-S-0	Uranium 235	0.15	+/-	0.31	0.35	
SU4-77-SB-S-1	Uranium 238	1.6	+/-	1.1	SU4-77-SB-S-0	Uranium 238	1.5		1.1	0.06	
SU4-82-SS-S-1	Actinium 228	1.15	+/-	0.33	SU4-82-SS-S-0	Actinium 228	0.89	+/-	0.38	0.52	
					SU4-82-SS-S-0	Bismuth 212	0.66	+/-	0.4		
SU4-82-SS-S-1	Bismuth 214	1.35	+/-	0.25	SU4-82-SS-S-0	Bismuth 214	1.46		0.26	0.30	
					SU4-82-SS-S-0	Cesium 137	0.156	+/-	0.069		
SU4-82-SS-S-1	Lead 212	0.81	+/-	0.17	SU4-82-SS-S-0	Lead 212	0.92	+/-	0.16	0.47	
SU4-82-SS-S-1	Lead 214	1.46	+/-	0.22	SU4-82-SS-S-0	Lead 214	1.61	+/-	0.23	0.47	
SU4-82-SS-S-1	Potassium 40	13.1	+/-	2.6	SU4-82-SS-S-0	Potassium 40	15		2.7	0.51	
SU4-82-SS-S-1	Radium (226)	1.35	+/-	0.25	SU4-82-SS-S-0	Radium (226)	1.46	+/-	0.26	0.30	
SU4-82-SS-S-1	Thallium 208	0.315	+/-	0.095	SU4-82-SS-S-0	Thallium 208	0.332	+/-	0.093	0.13	
SU4-82-SS-S-1	Thorium 232	1.15	+/-	0.33	SU4-82-SS-S-0	Thorium 232			0.38	0.52	
SU4-82-SS-S-1	Uranium 235	-0.17	+/-	0.29	SU4-82-SS-S-0	Uranium 235	0.04	+/-	0.24	0.56	
SU4-82-SS-S-1	Uranium 238	0.9	+/-	0.97	SU4-82-SS-S-0	Uranium 238	1.88	+/-	0.95	0.72	
SU4-82-SB-S-1	Actinium 228	1.21	+/-	0.27	SU4-82-SB-S-0	Actinium 228			0.42	0.12	
SU4-82-SB-S-1	Bismuth 214	1.55	+/-	0.29	SU4-82-SB-S-0	Bismuth 214	1.44	+/-	0.32	0.25	
SU4-82-SB-S-1	Lead 212			0.19	SU4-82-SB-S-0	Lead 212			0.21	0.04	
SU4-82-SB-S-1	Lead 214			0.22	SU4-82-SB-S-0	Lead 214			0.25	0.09	
SU4-82-SB-S-1	Potassium 40	21.4	+/-	3.6	SU4-82-SB-S-0	Potassium 40	20.8			0.11	
SU4-82-SB-S-1	Radium (226)			0.29	SU4-82-SB-S-0	Radium (226)			0.32	0.25	
SU4-82-SB-S-1	Thallium 208			0.095	SU4-82-SB-S-0	Thallium 208			0.12	0.69	
SU4-82-SB-S-1	Thorium 232			0.27	SU4-82-SB-S-0	Thorium 232			0.42	0.12	
SU4-82-SB-S-1	Uranium 235	0.41			SU4-82-SB-S-0	Uranium 235	-0.26			1.50	
SU4-82-SB-S-1	Uranium 238		+/-		SU4-82-SB-S-0	Uranium 238	0.3	+/-	1.2	0.58	
SU4-86-SS-S-1	Actinium 228			0.25							
SU4-86-SS-S-1	Bismuth 214			0.28	SU4-86-SS-S-0	Bismuth 214	1.25	+/-	0.29	0.92	
SU4-86-SS-S-1	Cesium 137			0.087							
SU4-86-SS-S-1	Lead 212			0.18	SU4-86-SS-S-0	Lead 212			0.21	0.04	
SU4-86-SS-S-1	Lead 214	1.6	+/-	0.23	SU4-86-SS-S-0	Lead 214	1.06	+/-	0.2	1.77	

Dup SU ¹	Dup Component	Dup Result (pCi/g)		Dup TPU ² (pCi/g)	SU ¹	Component	Result (pCi/g)		TPU ² (pCi/g)	NAD ³ =	>NAD ³ ?
SU4-86-SS-S-1	Potassium 40	20.5	+/-	3.4	SU4-86-SS-S-0	Potassium 40	17.9	+/-	3.4	0.54	
SU4-86-SS-S-1	Radium (226)			0.28	SU4-86-SS-S-0	Radium (226)	1.25		0.29	0.92	
SU4-86-SS-S-1	Thallium 208			0.097	SU4-86-SS-S-0	Thallium 208	0.33		0.11	0.29	
SU4-86-SS-S-1	Thorium 232	1.12	+/-	0.25	SU4-86-SS-S-0	Thorium 232	1.44	+/-	0.62	0.48	
SU4-86-SS-S-1	Uranium 235	0.51	+/-	0.27	SU4-86-SS-S-0	Uranium 235	0.33	+/-	0.33	0.42	
SU4-86-SS-S-1	Uranium 238	1.29	+/-	0.65	SU4-86-SS-S-0	Uranium 238	1.5	+/-	1.2	0.15	
SU4-86-SB-S-1	Actinium 228	1.28	+/-	0.27	SU4-86-SB-S-0	Actinium 228	1.49	+/-	0.37	0.46	
SU4-86-SB-S-1	Bismuth 214	1.77	+/-	0.31	SU4-86-SB-S-0	Bismuth 214	1.64	+/-	0.33	0.29	
SU4-86-SB-S-1	Lead 212	1.13	+/-	0.21	SU4-86-SB-S-0	Lead 212	1.06	+/-	0.21	0.24	
SU4-86-SB-S-1	Lead 214	1.52	+/-	0.24	SU4-86-SB-S-0	Lead 214	1.87	+/-	0.28	0.95	
SU4-86-SB-S-1	Potassium 40	21.9	+/-	3.7	SU4-86-SB-S-0	Potassium 40	20.7	+/-	3.8	0.23	
SU4-86-SB-S-1	Radium (226)	1.77	+/-	0.31	SU4-86-SB-S-0	Radium (226)	1.64	+/-	0.33	0.29	
SU4-86-SB-S-1	Thallium 208	0.52	+/-	0.13	SU4-86-SB-S-0	Thallium 208	0.4	+/-	0.11	0.70	
SU4-86-SB-S-1	Thorium 232	1.28	+/-	0.27	SU4-86-SB-S-0	Thorium 232	1.49	+/-	0.37	0.46	
SU4-86-SB-S-1	Uranium 235			0.32	SU4-86-SB-S-0	Uranium 235	0.14		0.35	0.04	
SU4-86-SB-S-1	Uranium 238		+/-		SU4-86-SB-S-0	Uranium 238		+/-	1.2	0.55	
SU4-87-SS-S-1	Actinium 228			0.24	SU4-87-SS-S-0	Actinium 228	1.16		0.27	0.14	
SU4-87-SS-S-1	Bismuth 214			0.29	SU4-87-SS-S-0	Bismuth 214	1.26		0.26	0.92	
SU4-87-SS-S-1	Cesium 137			0.081	SU4-87-SS-S-0	Cesium 137	0.139	+/-	0.072	0.90	
SU4-87-SS-S-1	Lead 210		+/-								
SU4-87-SS-S-1	Lead 212			0.21	SU4-87-SS-S-0	Lead 212	1.22		0.21	0.00	
SU4-87-SS-S-1	Lead 214			0.23	SU4-87-SS-S-0	Lead 214	1.69		0.24	0.36	
SU4-87-SS-S-1	Potassium 40	21.5			SU4-87-SS-S-0	Potassium 40	19.5		3.3	0.42	
SU4-87-SS-S-1	Radium (226)			0.29	SU4-87-SS-S-0	Radium (226)	1.26		0.26	0.92	
SU4-87-SS-S-1	Thallium 208	0.44			SU4-87-SS-S-0	Thallium 208	0.48		0.12	0.25	
SU4-87-SS-S-1	Thorium 232			0.24	SU4-87-SS-S-0	Thorium 232	1.16		0.27	0.14	
SU4-87-SS-S-1	Uranium 235			0.26	SU4-87-SS-S-0	Uranium 235	0.07		0.25	0.14	
SU4-87-SS-S-1	Uranium 238			0.42	SU4-87-SS-S-0	Uranium 238	1.2		1	0.44	
SU4-87-SB-S-1	Actinium 228			0.29	SU4-87-SB-S-0	Actinium 228	1.36		0.34	0.38	
SU4-87-SB-S-1	Bismuth 214			0.28	SU4-87-SB-S-0	Bismuth 214	1.14		0.27	0.67	
SU4-87-SB-S-1	Lead 212			0.22	SU4-87-SB-S-0	Lead 212	1.05		0.21	0.33	
SU4-87-SB-S-1	Lead 214			0.26	SU4-87-SB-S-0	Lead 214			0.21	1.47	
SU4-87-SB-S-1	Potassium 40	19.4			SU4-87-SB-S-0		17.6			0.36	
SU4-87-SB-S-1	Radium (226)			0.28	SU4-87-SB-S-0	\ /			0.27	0.67	
SU4-87-SB-S-1	Thallium 208			0.11	SU4-87-SB-S-0	Thallium 208			0.12	0.06	
SU4-87-SB-S-1	Thorium 232			0.29	SU4-87-SB-S-0	Thorium 232			0.34	0.38	
SU4-87-SB-S-1	Uranium 235			0.33	SU4-87-SB-S-0	Uranium 235	-0.13			0.43	
SU4-87-SB-S-1	Uranium 238	1.61	+/-	0.86	SU4-87-SB-S-0	Uranium 238			1.3	0.57	
CLUE 00 CC C 4	Diameruth 04.4	4 47	. /	0.00	SU5-98-SS-S-0	Actinium 228			0.29	0.40	
SU5-98-SS-S-1	Bismuth 214			0.28	SU5-98-SS-S-0	Bismuth 214	1.42	+/-	0.28	0.13	
SU5-98-SS-S-1	Cesium 137			0.078	CLIE OO CC C O	Lood 040	0.05	. /	0.40	0.22	
SU5-98-SS-S-1	Lead 212	1.04			SU5-98-SS-S-0	Lead 212			0.19	0.33	
SU5-98-SS-S-1	Lead 214			0.25	SU5-98-SS-S-0	Lead 214			0.25	0.23	
SU5-98-SS-S-1	Potassium 40	22.5			SU5-98-SS-S-0	Potassium 40	22.1			0.07	
SU5-98-SS-S-1	Radium (226)			0.28	SU5-98-SS-S-0	Radium (226)			0.28	0.13	
SU5-98-SS-S-1	Thallium 208	0.38			SU5-98-SS-S-0	Thallium 208			0.13	0.65	
SU5-98-SS-S-1 SU5-98-SS-S-1	Thorium 232 Uranium 235	-0.04		0.48	SU5-98-SS-S-0 SU5-98-SS-S-0	Thorium 232 Uranium 235			0.29	0.05 0.16	
SU5-98-SS-S-1	Uranium 238			1.2	SU5-98-SS-S-0	Uranium 238			1.2	0.16	
SU5-98-SB-S-1	Actinium 228			0.23	SU5-98-SB-S-0	Actinium 228			0.25	0.24	
303-30-3D-3-1	AGUITIUITI ZZŐ	1.07	Τ/-	U.ZJ	0-6-de-66-coe	AUIIIIIIII ZZÖ	1.22	T/-	0.20	0.44	

Dup SU ¹	Dup Component	Dup Result (pCi/g)		Dup TPU ² (pCi/g)	SU ¹	Component	Result (pCi/g)		TPU ² (pCi/g)	NAD ³ =	>NAD ³ ?
SU5-98-SB-S-1	Bismuth 212	1.12	+/-	0.48							
SU5-98-SB-S-1	Bismuth 214			0.27	SU5-98-SB-S-0	Bismuth 214	1.5	+/-	0.28	0.18	
SU5-98-SB-S-1	Lead 212			0.23	SU5-98-SB-S-0	Lead 212			0.23	0.03	
SU5-98-SB-S-1	Lead 214			0.25	SU5-98-SB-S-0	Lead 214			0.25	0.14	
SU5-98-SB-S-1	Potassium 40	22.4			SU5-98-SB-S-0	Potassium 40	21.7			0.14	
SU5-98-SB-S-1	Radium (226)			0.27	SU5-98-SB-S-0	Radium (226)	1.5	+/-	0.28	0.18	
SU5-98-SB-S-1	Thallium 208			0.097	SU5-98-SB-S-0	Thallium 208	0.48		0.12	0.78	
SU5-98-SB-S-1	Thorium 232			0.23	SU5-98-SB-S-0	Thorium 232	1.22	+/-	0.25	0.44	
SU5-98-SB-S-1	Thorium 234	1.01	+/-	0.43							
SU5-98-SB-S-1	Uranium 235	0.28	+/-	0.28	SU5-98-SB-S-0	Uranium 235	0.2	+/-	0.26	0.21	
SU5-98-SB-S-1	Uranium 238			0.43	SU5-98-SB-S-0	Uranium 238	1.02	+/-	0.45	0.02	
SU5-99-SS-S-1	Actinium 228	1.16	+/-	0.29							
SU5-99-SS-S-1	Bismuth 214	1.46			SU5-99-SS-S-0	Bismuth 214	1.46	+/-	0.28	0.00	
SU5-99-SS-S-1	Cesium 137	0.138	+/-	0.073							
SU5-99-SS-S-1	Lead 212	1.19	+/-	0.23	SU5-99-SS-S-0	Lead 212	1.12	+/-	0.22	0.22	
SU5-99-SS-S-1	Lead 214	1.65	+/-	0.26	SU5-99-SS-S-0	Lead 214	1.55	+/-	0.26	0.27	
SU5-99-SS-S-1	Potassium 40	21.5	+/-	3.8	SU5-99-SS-S-0	Potassium 40	19.2	+/-	3.5	0.45	
SU5-99-SS-S-1	Radium (226)	1.46	+/-	0.3	SU5-99-SS-S-0	Radium (226)	1.46	+/-	0.28	0.00	
SU5-99-SS-S-1	Thallium 208	0.29	+/-	0.1	SU5-99-SS-S-0	Thallium 208	0.46	+/-	0.12	1.09	
SU5-99-SS-S-1	Thorium 232	1.16	+/-	0.29	SU5-99-SS-S-0	Thorium 232	0.96	+/-	0.48	0.36	
SU5-99-SS-S-1	Uranium 235	0.18	+/-	0.33	SU5-99-SS-S-0	Uranium 235	0.07	+/-	0.31	0.24	
SU5-99-SS-S-1	Uranium 238	1.4	+/-	1.2	SU5-99-SS-S-0	Uranium 238	1.3	+/-	1.2	0.06	
SU5-99-SB-S-1	Actinium 228	1.29	+/-	0.3	SU5-99-SB-S-0	Actinium 228	1.18	+/-	0.29	0.26	
SU5-99-SB-S-1	Bismuth 214	1.71	+/-	0.31							
SU5-99-SB-S-1	Lead 212	1.28	+/-	0.22	SU5-99-SB-S-0	Bismuth 212	1.3	+/-	0.51	0.04	
SU5-99-SB-S-1	Lead 214	1.93	+/-	0.27	SU5-99-SB-S-0	Bismuth 214	1.42	+/-	0.27	1.34	
					SU5-99-SB-S-0	Lead 212	1.06	+/-	0.2		
					SU5-99-SB-S-0	Lead 214	1.68	+/-	0.26		
SU5-99-SB-S-1	Potassium 40	17.8	+/-	3.2	SU5-99-SB-S-0	Potassium 40	20.8	+/-	3.6	0.62	
SU5-99-SB-S-1	Radium (226)	1.71	+/-	0.31	SU5-99-SB-S-0	Radium (226)	1.42	+/-	0.27	0.71	
SU5-99-SB-S-1	Thallium 208			0.12	SU5-99-SB-S-0	Thallium 208	0.42	+/-	0.11	0.18	
SU5-99-SB-S-1	Thorium 232	1.29			SU5-99-SB-S-0	Thorium 232	1.18	+/-	0.29	0.26	
SU5-99-SB-S-1	Uranium 235	0.001	+/-	0.33	SU5-99-SB-S-0	Uranium 235	0.11	+/-	0.32	0.24	
SU5-99-SB-S-1	Uranium 238		+/-		SU5-99-SB-S-0	Uranium 238			1.1	0.45	
SU5-102-SS-S-1	Actinium 228			0.25	SU5-102-SS-S-0	Actinium 228			0.29	0.47	
SU5-102-SS-S-1	Bismuth 214			0.25	SU5-102-SS-S-0	Bismuth 214	1.47			0.18	
SU5-102-SS-S-1	Cesium 137			0.085	SU5-102-SS-S-0	Cesium 137	0.198			0.40	
SU5-102-SS-S-1	Lead 212	1.17			SU5-102-SS-S-0	Lead 212			0.21	0.31	
SU5-102-SS-S-1	Lead 214	1.42			SU5-102-SS-S-0	Lead 214			0.26	0.48	
SU5-102-SS-S-1	Potassium 40	22.4			SU5-102-SS-S-0		19.2			0.65	
SU5-102-SS-S-1	Radium (226)			0.25	SU5-102-SS-S-0	Radium (226)	1.47			0.18	
SU5-102-SS-S-1	Thallium 208		_	0.098	SU5-102-SS-S-0	Thallium 208			0.11	0.20	
SU5-102-SS-S-1	Thorium 232			0.25	SU5-102-SS-S-0	Thorium 232			0.29	0.47	
SU5-102-SS-S-1	Uranium 235	-0.06			SU5-102-SS-S-0	Uranium 235			0.32	0.53	
SU5-102-SS-S-1	Uranium 238		+/-		SU5-102-SS-S-0	Uranium 238			1.1	1.08	
SU5-102-SB-S-1	Actinium 228			0.24	SU5-102-SB-S-0	Actinium 228			0.32	0.38	
SU5-102-SB-S-1	Bismuth 214			0.25	SU5-102-SB-S-0	Bismuth 214	1.57			0.85	
SU5-102-SB-S-1	Lead 212			0.18	SU5-102-SB-S-0	Lead 212			0.21	0.80	
SU5-102-SB-S-1	Lead 214			0.22	SU5-102-SB-S-0	Lead 214			0.24	0.77	
SU5-102-SB-S-1	Potassium 40	17.8	+/-	3.2	SU5-102-SB-S-0	Potassium 40	22.2	+/-	3.7	0.90	

Dup SU ¹	Dup Component	Dup Result (pCi/g)		Dup TPU ² (pCi/g)	SU ¹	Component	Result (pCi/g)		TPU ² (pCi/g)	NAD ³ =	>NAD ³ ?
SU5-102-SB-S-1	Radium (226)	1.24	+/-	0.25	SU5-102-SB-S-0	Radium (226)	1.57	+/-	0.3	0.85	
SU5-102-SB-S-1	Thallium 208	0.42	+/-	0.11	SU5-102-SB-S-0	Thallium 208	0.317	+/-	0.094	0.71	
SU5-102-SB-S-1	Thorium 232	1.05	+/-	0.24	SU5-102-SB-S-0	Thorium 232	1.2	+/-	0.32	0.38	
SU5-102-SB-S-1	Uranium 235	0.03	+/-	0.3	SU5-102-SB-S-0	Uranium 235	0.11	+/-	0.32	0.18	
SU5-102-SB-S-1	Uranium 238	0.4	+/-	1	SU5-102-SB-S-0	Uranium 238	1	+/-	1.1	0.40	
SU5-115-SS-S-1	Actinium 228	1.51	+/-	0.55	SU5-115-SS-S-0	Actinium 228	1	+/-	0.22	0.86	
					SU5-115-SS-S-0	Bismuth 212	0.93		0.44		
SU5-115-SS-S-1	Bismuth 214	1.37	+/-	0.26	SU5-115-SS-S-0	Bismuth 214	1.27	+/-	0.24	0.28	
SU5-115-SS-S-1	Cesium 137	0.213	+/-	0.075	SU5-115-SS-S-0	Cesium 137	0.199	+/-	0.07	0.14	
SU5-115-SS-S-1	Lead 212	0.97	+/-	0.19	SU5-115-SS-S-0	Lead 212	1.19	+/-	0.2	0.80	
SU5-115-SS-S-1	Lead 214	1.6	+/-	0.25	SU5-115-SS-S-0	Lead 214	1.7	+/-	0.24	0.29	
SU5-115-SS-S-1	Potassium 40	23	+/-	3.8	SU5-115-SS-S-0	Potassium 40	21.2	+/-	3.4	0.35	
SU5-115-SS-S-1	Radium (226)	1.37	+/-	0.26	SU5-115-SS-S-0	Radium (226)	1.27	+/-	0.24	0.28	
SU5-115-SS-S-1	Thallium 208	0.38	+/-	0.11	SU5-115-SS-S-0	Thallium 208	0.39	+/-	0.1	0.07	
SU5-115-SS-S-1	Thorium 232	1.51	+/-	0.55	SU5-115-SS-S-0	Thorium 232	1	+/-	0.22	0.86	
					SU5-115-SS-S-0	Thorium 234	0.98	+/-	0.41		
SU5-115-SS-S-1	Uranium 235	0.02	+/-	0.31	SU5-115-SS-S-0	Uranium 235	0.12	+/-	0.26	0.25	
SU5-115-SS-S-1	Uranium 238	1.3	+/-	1.1	SU5-115-SS-S-0	Uranium 238	0.98	+/-	0.41	0.27	
SU5-116-SS-S-1	Actinium 228	1.13	+/-	0.25	SU5-116-SS-S-0	Actinium 228	1.1	+/-	0.26	0.08	
SU5-116-SS-S-1	Bismuth 214	1.53	+/-	0.27	SU5-116-SS-S-0	Bismuth 214	1.73	+/-	0.29	0.50	
SU5-116-SS-S-1	Cesium 137	0.175	+/-	0.077	SU5-116-SS-S-0	Cesium 137	0.104	+/-	0.065	0.70	
SU5-116-SS-S-1	Lead 212	1.23	+/-	0.21	SU5-116-SS-S-0	Lead 212	1.16	+/-	0.2	0.24	
SU5-116-SS-S-1	Lead 214	1.65	+/-	0.25	SU5-116-SS-S-0	Lead 214	1.76	+/-	0.26	0.30	
SU5-116-SS-S-1	Potassium 40	22.7	+/-	3.7	SU5-116-SS-S-0	Potassium 40	22.6	+/-	3.6	0.02	
SU5-116-SS-S-1	Radium (226)	1.53	+/-	0.27	SU5-116-SS-S-0	Radium (226)	1.73	+/-	0.29	0.50	
SU5-116-SS-S-1	Thallium 208	0.342	+/-	0.098	SU5-116-SS-S-0	Thallium 208	0.39	+/-	0.1	0.34	
SU5-116-SS-S-1	Thorium 232	1.13	+/-	0.25	SU5-116-SS-S-0	Thorium 232	1.1	+/-	0.26	0.08	
SU5-116-SS-S-1	Thorium 234	1.49	+/-	0.48							
SU5-116-SS-S-1	Uranium 235	0.03	+/-	0.26	SU5-116-SS-S-0	Uranium 235	0.15	+/-	0.25	0.33	
SU5-116-SS-S-1	Uranium 238	1.49	+/-	0.48	SU5-116-SS-S-0	Uranium 238	1.19	+/-	0.96	0.28	

NOTES:

Sample Locations are in the format SU#-WW-XX-Y-Z, where SU = Survey Unit #, WW = Location, XX = SS or SB

^{1) (}Surface Soil or Subsurface Soil), Y = S or B (Systematic or Bias), and Z = 0 or 1 (Normal or Duplicate Sample)

²⁾ TPU = Total Propagated Uncertainty

³⁾ NAD = Normalized Absolute Difference