Appendix A

Memorandum of Understanding

New World Environmental Inc., d.b.a.
New World Technology *Bringing you the Technology of the New World*
Phone: 925-443-7967 **Fax:** 925-443-0119

MEMORANDUM OF UDERSTANDING

Date: September 17, 2007

RE: US NRC License Use at Naval Air Warfare Center China Lake, China Lake, CA

Background

The U. S. Navy has requested New World Environmental Inc, dba as New World Technology, Inc provide radiological services to survey equipment and building areas and dispose of any resultant low level radioactive wastes (LLRW) in Room 1613 of Building 5 at the Naval Air Warfare Center China Lake, China Lake, CA. A requirement of the contract is that radiological activities performed at enter by NWT, be performed under NWTs NRC Broad Scope Radioactive Materials License 04-22745-01.

The Naval Air Warfare Center China Lake was issued a Naval Radioactive Materials Permit No. 04-68307-W1NP on August 7, 2003. The NRMP authorized the use of Carbon-14 for preparation of radio-labeled derivatives of an energetic material for analysis by offsite laboratories.

The intent of this memorandum is to outline the general applicability and responsibilities of each organization as it applies to their scope of work and license implementation.

General Use of Individual Licenses

Each organization has distinct areas of operation and responsibility as defined by their respective functions. In performing the work, NWT will maintain controls over the following items or activities as applicable to their scope of work or license requirements.

- Performing work using radiologically sound work practices
- Training and dose record maintenance for employees of NWT
- Control of radioactive materials used for operational checks of radiation detection and laboratory equipment.

- Control of access to individual work areas contractually designated for activities where radioactive materials are known or suspected of being present
- Control of waste materials in areas designated by Navy as work or storage areas
- Issuance and maintenance of Radiation Work Permits for work controlled by NWT
- Inventories of radioactive materials, including waste, under NWTs control
- Reports and other administrative requirements concerning the work including reports to the Radiological Affairs Support Office (RASO) and or other regulatory agencies. Information will be provided regarding the "as left" radiological conditions of all work areas
- Navy will designate areas to be used for temporary storage of waste materials

Transfer of Radioactive Materials

The sole anticipated occasion for potential transfers of radioactive materials between the organizations is the accumulation of packaged and/or containerized waste prior to shipment for disposal. Primary storage areas have been established at the site and will be under the control of NWT. During the course of work, radioactive material may be accumulated by NWT. Any radioactive material designated as waste thus generated will require transport and transfer to a designated project storage area to await disposal. Transportation of radioactive material generated from the NWT activities to offsite disposal sites is the responsibility of NWT. However delays could occur which would require temporary storage of waste materials after NWT has completed site work. In that instance, temporary control of the stored materials would have to be returned to Navy. The minimum requirements for transfer of such waste materials between the organizations, should it become necessary, will consist of the following:

- A brief description of the waste
- An inventory of packages / containers to include total number and contents
- A label identifying dose rate, known or suspected isotope(s) and a curie content approximation for the package / container

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- Date, time and individual signatures of the personnel completing the transfer

Jurisdictional Issues and Changes

Jurisdictional issues or specific situations not covered under this agreement will be discussed between the Navy and NWT for resolution. The individual Radiation Safety Officers from the organizations will approve by signature any resultant agreement.

John Bradfrod, RSO Naval Air Warfare Center, China Lake — 17 Sep 07 Date

Daniel Spicuzza, Project Manager for Donald Dennis, NWT Radiation Safety Officer — 9-17-07 Date

Appendix B

Radiation Work Permit

RADIATION WORK PERMIT (RWP)

RWP #: CL-01 Regular ✓ Extended

SECTION I

Contract # GA00633	Date: 9/17/2007	Time: 1300

Location/Project: Chem Lab Bldg 5 Room 1613

Exposure Category: (D&D) Source Transfer Waste Processing Characterization

Job Description: Package & transport waste for disposal. Decon of items if necessary by wiping down surfaces. Perform final rad survey.

Estimated Start Date: 9/17/2007 Estimated End Date: 9/21/2007

SECTION II

Existing Radiological Conditions:

Radiation Survey No. NA Airborne Survey No. NA Contamination Survey No. NA

Existing General Area Radiation Level(s):	Existing General Contamination Levels:	Airborne DAC Level(s):
.008 mR/hr/γ		<10 % P
NA mrad/hr/corrected β	<100 dpm/100cm^2 α	<10 % P
NA mrem/hr/η	<1,000 dpm/100cm^2 βγ	NA % H_3
Existing Maximum Radiation Level(s):	**Existing Maximum Contamination Level(s)**	**Hot Particle?**
.008 mR/hr/γ		Yes
NA mrad/hr/corrected β	<100 dpm/100cm^2 α	(No)
NA mrem/hr/η	<1,000 dpm/100cm^2 βγ	

Remarks:

SECTION III

Radiological Limits:

Maximum Allowed WB Exposure Rate : 1 (mr/hr γ or) mrem/hr η

Corrected : NA mrad/hr Maximum Extremity Exposure Rate: 1 mr/hr

Maximum Allowed Contamination Level : 100 dpm/100cm^2 α : 1,000 dpm/100cm^2 βγ

Maximum Allowed Airborne Concentration Level: <10 % DAC

Remarks:

Industrial Hygiene/Safety Concerns: Hazardous materials & chemicals present in room

RADIATION WORK PERMIT (RWP)

RWP #: CL-01 Regular ☒ Extended

SECTION IV

WORKER REQUIREMENTS

CLOTHING:	DOSIMETRY:	INSTRUCTIONS:	RESPIRATORY:
☐ Coveralls	☒ TLD	☒ Contact HP for Line Breaks	☐ FFNP
☐ Lab Coat	☐ Film Badge	☒ Protect Cuts	☐ FFAL
☐ Cloth Hood	☐ SRD	☒ Pre-Job Briefing	☐ SCBA
☒ Paper Coveralls (1)	☒ Standard	☒ Post-Job Briefing	☐ PAPR
☐ Plastic Suit	☐ Elbows	☒ Contact HP Prior to Work In New Areas	☐ Dust Mask
☐ Plastic Booties	☐ Gonad Pack	☐ Modesty Required	☐ Half Face
☐ Rubber Shoe Covers	☐ Hot Cell Entry	☒ Site Specific Instructions	☐ Bubble Hood
☐ Canvas Shoe Covers	☐ Extremity	☒ Equipment Monitor at Job End	
☐ Cotton Gloves	☐ Head Pack	☒ Clean Up Work Area During and After Job	Cartridges:
☒ Rubber Gloves (1)	☐ Special	☒ Eating, Drinking, Smoking, Chewing Prohibited	☐ Particulate
☒ Leather Gloves (1)	☐ Knees	☒ Frisk Upon Exiting Contaminated Area	☐ Vapor
☐ Beta Goggles/Face Shield	☐ Varying Field	☒ Have Prescribed HP Coverage or Stop Work	☐ Combination
☐ Extra	☐ Upper Field	☒ Exit Area Immediately Upon Emergency or Injury. Notify HP Immediately	☐ Other
☐ Other Clothing	☐ Ground Field		
	☐ Alarming Dosimetry		
	☐ None		
Stay Time (Heat Stress, Radiaton, Exposure Limits, etc.): 6 hrs.			

Special Instructions: (1) Per H.P. Supervisor
(1) Per H.P. Supervisor

SECTION V

Health Physics Requirements

1. Job Coverage: Continuous ☐ Intermittent ☒ Start ☐ End of Job ☐
2. Air Sampling: General Area ☐ Breathing Zone ☐ Lapel ☐ AgZ ☐
   Tritium/C-14 ☐ Particulate ☐ Charcoal ☐ LoVol ☐ HiVol ☐
3. Exposure Rate Surveys: Start of Job ☐ Continuous Monitoring ☐ Area Monitoring ☐
   Intermittent Monitoring ☒ End of Job ☒
4. Contamination Surveys: Start of Job ☐ Continuous Monitoring ☐
   Intermittent Monitoring ☒ End of Job ☒
5. Is the ALARA Consideration Complete and Attached? Yes (No) Why? Low Dose Rate
6. Other: _____

RWP #: CL-01 Regular X Extended ___

SECTION VI

Personnel Authorized to Perform Work & Acceptance of Responsibility

*My signature verifies that I have read and fully understand the RWP Requirements

Date	Name (Print)	Signature*	SSN	HPS Init	Year Dose to Date (Rem) TEDE	TODE	LDE	SDE WB	SDE EX
9/17/07	JAMIE YOUNG	JCY	431-39-5555	JY	0	0	0	0	0
9/17/07	ALAN MCAMPBELL	A Campbell	208-36-9914	AMC	0	0	0	0	0
9-17-07	Richard KOUNTZ	R J Kountz	281-34-4198	RJ	0	0	0	0	0
9-17-07	Daniel Spicuzza	Dan Sp	190-54-[illegible]	DS	0	0	0	0	0

NA

H	Approvals/Reviews	I	Termination
Technician Generating RWP: R J Kountz Date/Time: 9-17-07 08:00		Date: 9-21-07 Time: 1500	
Industrial Hygiene Approval: Date/Time: NA		Health Physics Rep: Dan Sp	
HP Supervisor Approval: Date/Time: NA		Reason: (Job Complete) RWP Revision	
RSO Manager Approval: Dan Sp Date/Time: 9-17-07 1300		HP Supervisor Review: Dan Sp	

Appendix C

Background Reference Area Survey Data

Instrument Ambient Background Data

New World Technology
Background Determination Data Sheet

Project/Location:	China Lake Building 5		
Instrument Model:	2360	Instrument Serial No.	225305
Last Calibration Date:	9/13/2007		
Detector Model:	43-37	Detector Serial No.:	161295
Today's Date:	9/17/2007	Data Collected by:	Richard Kountz

X	Alpha		Beta-Gamma		Other

Remarks: Instrument Ambient Background

Type of Surface:			Count Time:	1	Minutes
Count Number	Count (x)	$(x - \overline{x})$		$(x - \overline{x})^2$	
1	9	-1.53		2.35	
2	11	0.47		0.22	
3	12	1.47		2.15	
4	10	-0.53		0.28	
5	9	-1.53		2.35	
6	11	0.47		0.22	
7	12	1.47		2.15	
8	8	-2.53		6.42	
9	9	-1.53		2.35	
10	10	-0.53		0.28	
11	12	1.47		2.15	
12	11	0.47		0.22	
13	10	-0.53		0.28	
14	8	-2.53		6.42	
15	13	2.47		6.08	
16	10	-0.53		0.28	
17	12	1.47		2.15	
18	11	0.47		0.22	
19	10	-0.53		0.28	
20	9	-1.53		2.35	
21	11	0.47		0.22	
22	9	-1.53		2.35	
23	12	1.47		2.15	
24	13	2.47		6.08	
25	10	-0.53		0.28	
26	11	0.47		0.22	
27	10	-0.53		0.28	
28	9	-1.53		2.35	
29	14	3.47		12.02	
30	10	-0.53		0.28	
Mean Count: $\overline{x}$	10.53		SUM	65.47	
Standard Deviation (σ)	1.50		Variance:	2.26	
Background Count Rate:		10.53	CPM + -	4.51	CPM

CPM Low	CPM High
6.03	15.04

Calculations Completed by:	Richard Kountz	Date:	9/17/2007
Reviewed by:	Daniel Spicuzza	Date:	9/17/2007

New World Technology
Background Determination Data Sheet

Project/Location:	China Lake Building 5		
Instrument Model:	2360	Instrument Serial No.	225305
Last Calibration Date:	9/13/2007		
Detector Model:	43-37	Detector Serial No.:	161295
Today's Date:	9/17/2007	Data Collected by:	Richard Kountz

	Alpha	X	Beta-Gamma		Other

Remarks: Instrument Ambient Background

Type of Surface:			Count Time:	1	Minutes
Count Number	Count (x)	$(x - \overline{x})$		$(x - \overline{x})^2$	
1	1123	-22.97		527.47	
2	1093	-52.97		2805.47	
3	1205	59.03		3484.93	
4	1157	11.03		121.73	
5	1128	-17.97		322.80	
6	1193	47.03		2212.13	
7	1212	66.03		4360.40	
8	1099	-46.97		2205.87	
9	1138	-7.97		63.47	
10	1194	48.03		2307.20	
11	1131	-14.97		224.00	
12	1129	-16.97		287.87	
13	1109	-36.97		1366.53	
14	1197	51.03		2604.40	
15	1142	-3.97		15.73	
16	1089	-56.97		3245.20	
17	1178	32.03		1026.13	
18	1146	0.03		0.00	
19	1139	-6.97		48.53	
20	1141	-4.97		24.67	
21	1123	-22.97		527.47	
22	1139	-6.97		48.53	
23	1162	16.03		257.07	
24	1138	-7.97		63.47	
25	1144	-1.97		3.87	
26	1123	-22.97		527.47	
27	1156	10.03		100.67	
28	1149	3.03		9.20	
29	1123	-22.97		527.47	
30	1179	33.03		1091.20	
Mean Count: $\overline{x}$	1145.97		SUM	30410.97	
Standard Deviation (σ)	32.38		Variance:	1048.65	
Background Count Rate:		1145.97	CPM + -	97.15	CPM

CPM Low	CPM High
1048.82	1243.12

Calculations Completed by:	Richard Kountz	Date:	9/17/2007
Reviewed by:	Daniel Spicuzza	Date:	9/17/2007

New World Technology
Background Determination Data Sheet

Project/Location:	China Lake Building 5		
Instrument Model:	2360	Instrument Serial No.	227399
Last Calibration Date:	9/12/2007		
Detector Model:	43-68	Detector Serial No.:	178075
Today's Date:	9/17/2007	Data Collected by:	Richard Kountz

X	Alpha		Beta-Gamma		Other

Remarks: Instrument Ambient Background

Type of Surface:			Count Time:	1	Minutes
Count Number	Count (x)	$(x - \overline{x})$		$(x - \overline{x})^2$	
1	3	0.23		0.05	
2	4	1.23		1.52	
3	0	-2.77		7.65	
4	4	1.23		1.52	
5	3	0.23		0.05	
6	2	-0.77		0.59	
7	3	0.23		0.05	
8	3	0.23		0.05	
9	5	2.23		4.99	
10	3	0.23		0.05	
11	1	-1.77		3.12	
12	3	0.23		0.05	
13	2	-0.77		0.59	
14	4	1.23		1.52	
15	2	-0.77		0.59	
16	4	1.23		1.52	
17	2	-0.77		0.59	
18	4	1.23		1.52	
19	2	-0.77		0.59	
20	1	-1.77		3.12	
21	2	-0.77		0.59	
22	5	2.23		4.99	
23	0	-2.77		7.65	
24	5	2.23		4.99	
25	3	0.23		0.05	
26	3	0.23		0.05	
27	3	0.23		0.05	
28	4	1.23		1.52	
29	2	-0.77		0.59	
30	1	-1.77		3.12	
Mean Count: $\overline{x}$	2.77		SUM	53.37	
Standard Deviation (σ)	1.36		Variance:	1.84	
Background Count Rate:		2.77	CPM + -	4.07	CPM

CPM Low	CPM High
-1.30	6.84

Calculations Completed by:	Richard Kountz	Date:	9/17/2007
Reviewed by:	Daniel Spicuzza	Date:	9/17/2007

New World Technology
Background Determination Data Sheet

Project/Location:	China Lake Building 5		
Instrument Model:	2360	Instrument Serial No.	227399
Last Calibration Date:	9/12/2007		
Detector Model:	43-68	Detector Serial No.:	178075
Today's Date:	9/17/2007	Data Collected by:	Richard Kountz

	Alpha	X	Beta-Gamma		Other

Remarks: Instrument Ambient Background

Type of Surface:			Count Time:	1	Minutes
Count Number	Count (x)	$(x - \overline{x})$		$(x - \overline{x})^2$	
1	317	-8.93		79.80	
2	338	12.07		145.60	
3	317	-8.93		79.80	
4	319	-6.93		48.07	
5	328	2.07		4.27	
6	312	-13.93		194.14	
7	312	-13.93		194.14	
8	346	20.07		402.67	
9	349	23.07		532.07	
10	304	-21.93		481.07	
11	311	-14.93		223.00	
12	329	3.07		9.40	
13	337	11.07		122.47	
14	318	-7.93		62.94	
15	339	13.07		170.74	
16	328	2.07		4.27	
17	341	15.07		227.00	
18	313	-12.93		167.27	
19	322	-3.93		15.47	
20	360	34.07		1160.54	
21	304	-21.93		481.07	
22	301	-24.93		621.67	
23	329	3.07		9.40	
24	308	-17.93		321.60	
25	395	69.07		4770.20	
26	331	5.07		25.67	
27	330	4.07		16.54	
28	329	3.07		9.40	
29	308	-17.93		321.60	
30	303	-22.93		525.94	
Mean Count: $\overline{x}$	325.93		SUM	11427.87	
Standard Deviation (σ)	19.85		Variance:	394.06	
Background Count Rate:		325.93	CPM + -	59.55	CPM

CPM Low	CPM High
266.38	385.49

Calculations Completed by:	Richard Kountz	Date:	9/17/2007
Reviewed by:	Daniel Spicuzza	Date:	9/17/2007

New World Technology
Background Determination Data Sheet

Project/Location:	China Lake Building 5		
Instrument Model:	2360	Instrument Serial No.	227415
Last Calibration Date:	9/12/2007		
Detector Model:	43-68	Detector Serial No.:	147404
Today's Date:	9/17/2007	Data Collected by:	Richard Kountz

X	Alpha		Beta-Gamma		Other

Remarks: Instrument Ambient Background

Type of Surface:			Count Time:	1	Minutes
Count Number	Count (x)	$(x - \overline{x})$		$(x - \overline{x})^2$	
1	6	2.57		6.59	
2	1	-2.43		5.92	
3	2	-1.43		2.05	
4	4	0.57		0.32	
5	3	-0.43		0.19	
6	4	0.57		0.32	
7	5	1.57		2.45	
8	3	-0.43		0.19	
9	3	-0.43		0.19	
10	5	1.57		2.45	
11	6	2.57		6.59	
12	2	-1.43		2.05	
13	3	-0.43		0.19	
14	3	-0.43		0.19	
15	4	0.57		0.32	
16	4	0.57		0.32	
17	4	0.57		0.32	
18	3	-0.43		0.19	
19	2	-1.43		2.05	
20	3	-0.43		0.19	
21	3	-0.43		0.19	
22	5	1.57		2.45	
23	5	1.57		2.45	
24	3	-0.43		0.19	
25	4	0.57		0.32	
26	2	-1.43		2.05	
27	3	-0.43		0.19	
28	2	-1.43		2.05	
29	2	-1.43		2.05	
30	4	0.57		0.32	
Mean Count: $\overline{x}$	3.43		SUM	45.37	
Standard Deviation (σ)	1.25		Variance:	1.56	
Background Count Rate:		3.43	CPM + -	3.75	CPM

CPM Low	CPM High
-0.32	7.19

Calculations Completed by:	Richard Kountz	Date:	9/18/2007
Reviewed by:	Daniel Spicuzza	Date:	9/18/2007

New World Technology
Background Determination Data Sheet

Project/Location:	China Lake Building 5		
Instrument Model:	2360	Instrument Serial No.	227415
Last Calibration Date:	9/12/2007		
Detector Model:	43-68	Detector Serial No.:	147404
Today's Date:	9/18/2007	Data Collected by:	Richard Kountz

	Alpha	X	Beta-Gamma		Other

Remarks: Instrument Ambient Background

Type of Surface:			Count Time:	1	Minutes
Count Number	Count (x)	$(x - \overline{x})$		$(x - \overline{x})^2$	
1	279	-20.30		412.09	
2	280	-19.30		372.49	
3	293	-6.30		39.69	
4	271	-28.30		800.89	
5	285	-14.30		204.49	
6	313	13.70		187.69	
7	306	6.70		44.89	
8	299	-0.30		0.09	
9	287	-12.30		151.29	
10	310	10.70		114.49	
11	316	16.70		278.89	
12	295	-4.30		18.49	
13	315	15.70		246.49	
14	285	-14.30		204.49	
15	294	-5.30		28.09	
16	287	-12.30		151.29	
17	306	6.70		44.89	
18	298	-1.30		1.69	
19	312	12.70		161.29	
20	303	3.70		13.69	
21	301	1.70		2.89	
22	294	-5.30		28.09	
23	319	19.70		388.09	
24	312	12.70		161.29	
25	304	4.70		22.09	
26	303	3.70		13.69	
27	311	11.70		136.89	
28	304	4.70		22.09	
29	298	-1.30		1.69	
30	299	-0.30		0.09	
Mean Count: $\overline{x}$	299.30		SUM	4254.30	
Standard Deviation (σ)	12.11		Variance:	146.70	
Background Count Rate:		299.30	CPM + -	36.34	CPM

CPM Low	CPM High
262.96	335.64

Calculations Completed by:	Richard Kountz	Date:	9/18/2007
Reviewed by:	Daniel Spicuzza	Date:	9/18/2007

New World Technology
Background Determination Data Sheet

Project/Location:	China Lake Building 5		
Instrument Model:	2929	Instrument Serial No.	143878
Last Calibration Date:	4/25/2007		
Detector Model:	43-10-1	Detector Serial No.:	147628
Today's Date:	9/17/2007	Data Collected by:	Jamie Young

X	Alpha		Beta-Gamma		Other

Remarks: Instrument Ambient Background

Type of Surface:			Count Time:	1	Minutes
Count Number	Count (x)	$(x - \overline{x})$		$(x - \overline{x})^2$	
1	0	-0.20		0.04	
2	0	-0.20		0.04	
3	0	-0.20		0.04	
4	0	-0.20		0.04	
5	0	-0.20		0.04	
6	0	-0.20		0.04	
7	0	-0.20		0.04	
8	0	-0.20		0.04	
9	0	-0.20		0.04	
10	0	-0.20		0.04	
11	0	-0.20		0.04	
12	0	-0.20		0.04	
13	0	-0.20		0.04	
14	0	-0.20		0.04	
15	0	-0.20		0.04	
16	0	-0.20		0.04	
17	0	-0.20		0.04	
18	1	0.80		0.64	
19	2	1.80		3.24	
20	1	0.80		0.64	
21	0	-0.20		0.04	
22	0	-0.20		0.04	
23	0	-0.20		0.04	
24	0	-0.20		0.04	
25	0	-0.20		0.04	
26	0	-0.20		0.04	
27	0	-0.20		0.04	
28	1	0.80		0.64	
29	0	-0.20		0.04	
30	1	0.80		0.64	
Mean Count: $\overline{x}$	0.20		SUM	6.80	
Standard Deviation (σ)	0.48		Variance:	0.23	
Background Count Rate:		0.20	CPM + -	1.45	CPM

CPM Low	CPM High
-1.25	1.65

Calculations Completed by:	Jamie Young	Date:	9/17/2007
Reviewed by:	Daniel Spicuzza	Date:	9/17/2007

New World Technology
Background Determination Data Sheet

Project/Location:	China Lake Building 5		
Instrument Model:	2929	Instrument Serial No.	143878
Last Calibration Date:	4/25/2007		
Detector Model:	43-10-1	Detector Serial No.:	147628
Today's Date:	9/17/2007	Data Collected by:	Jamie Young

	Alpha	X	Beta-Gamma		Other

Remarks: Instrument Ambient Background

Type of Surface:			Count Time:	1	Minutes
Count Number	Count (x)	$(x - \overline{x})$		$(x - \overline{x})^2$	
1	44	-9.10		82.81	
2	49	-4.10		16.81	
3	41	-12.10		146.41	
4	48	-5.10		26.01	
5	50	-3.10		9.61	
6	51	-2.10		4.41	
7	47	-6.10		37.21	
8	50	-3.10		9.61	
9	57	3.90		15.21	
10	54	0.90		0.81	
11	53	-0.10		0.01	
12	53	-0.10		0.01	
13	60	6.90		47.61	
14	55	1.90		3.61	
15	55	1.90		3.61	
16	59	5.90		34.81	
17	59	5.90		34.81	
18	55	1.90		3.61	
19	64	10.90		118.81	
20	45	-8.10		65.61	
21	64	10.90		118.81	
22	47	-6.10		37.21	
23	43	-10.10		102.01	
24	48	-5.10		26.01	
25	49	-4.10		16.81	
26	47	-6.10		37.21	
27	58	4.90		24.01	
28	71	17.90		320.41	
29	56	2.90		8.41	
30	61	7.90		62.41	
Mean Count: $\overline{x}$	53.10		SUM	1414.70	
Standard Deviation (σ)	6.98		Variance:	48.78	
Background Count Rate:		53.10	CPM + -	20.95	CPM

CPM Low	CPM High
32.15	74.05

Calculations Completed by:	Jamie Young	Date:	9/17/2007
Reviewed by:	Daniel Spicuzza	Date:	9/17/2007

Background Reference Area Data

New World Technology
Background Determination Data Sheet

Project/Location:		China Lake	Building 5			
Instrument Model:		2360		Instrument Serial No.	227415	
Last Calibration Date:		9/12/2007				
Detector Model:		43-68		Detector Serial No.:	147404	
Today's Date:		9/19/2007		Data Collected by:	Alan Campellone	
X	Alpha		Beta-Gamma		Other	
Remarks:	Background Reference Area		Bldg. 5 Room 1608			
Type of Surface:		Ceiling Tile		Count Time:	2	Minutes

Count Number	Gross Counts	CPM (x)
1	14	7
2	16	8
3	15	7.5
4	13	6.5
5	12	6
6	13	6.5
7	14	7
8	14	7
9	18	9
10	14	7
11	15	7.5
12	18	9
13	14	7
14	12	6
15	15	7.5
16	14	7
Mean Count: $\bar{x}$		7.22
Standard Deviation (σ)		0.88

Background Count Rate:	7.22	CPM		
Calculations Completed by:	Alan Campellone		Date:	9/19/2007
Reviewed by:	Daniel Spicuzza		Date:	9/19/2007

New World Technology
Background Determination Data Sheet

Project/Location:		China Lake	Building 5			
Instrument Model:		2360		Instrument Serial No.	227415	
Last Calibration Date:		9/12/2007				
Detector Model:		43-68		Detector Serial No.:	147404	
Today's Date:		9/19/2007		Data Collected by:	Alan Campellone	
	Alpha	X	Beta-Gamma		Other	
Remarks:	Background Reference Area		Bldg. 5 Room 1608			
Type of Surface:		Ceiling Tile		Count Time:	2	Minutes

Count Number	Gross Counts	CPM (x)
1	993	496.5
2	1023	511.5
3	1032	516
4	1027	513.5
5	1002	501
6	1016	508
7	1020	510
8	1011	505.5
9	995	497.5
10	1046	523
11	1034	517
12	1025	512.5
13	1013	506.5
14	1028	514
15	1064	532
16	1051	525.5
Mean Count: $\bar{x}$		511.88
Standard Deviation (σ)		9.71

Background Count Rate:	511.88	CPM		
Calculations Completed by:	Alan Campellone		Date:	9/19/2007
Reviewed by:	Daniel Spicuzza		Date:	9/19/2007

New World Technology
Background Determination Data Sheet

Project/Location:		China Lake	Building 5			
Instrument Model:		2360		Instrument Serial No.	227399	
Last Calibration Date:		9/12/2007				
Detector Model:		43-68		Detector Serial No.:	178075	
Today's Date:		9/18/2007		Data Collected by:	Jamie Young	
X	Alpha		Beta-Gamma		Other	
Remarks:	Background Reference Area		Bldg. 5 Room 1608			
Type of Surface:		Counter Top		Count Time:	2	Minutes

Count Number	Gross Counts	CPM (x)
1	9	4.5
2	5	2.5
3	3	1.5
4	5	2.5
5	5	2.5
6	8	4
7	5	2.5
8	5	2.5
9	7	3.5
10	8	4
11	7	3.5
12	5	2.5
13	6	3
14	3	1.5
15	8	4
16	3	1.5
Mean Count: $\bar{x}$		2.88
Standard Deviation (σ)		0.96

Background Count Rate:	2.88	CPM		
Calculations Completed by:	Jamie Young		Date:	9/18/2007
Reviewed by:	Daniel Spicuzza		Date:	9/18/2007

New World Technology
Background Determination Data Sheet

Project/Location:		China Lake	Building 5			
Instrument Model:		2360		Instrument Serial No.	227399	
Last Calibration Date:		9/12/2007				
Detector Model:		43-68		Detector Serial No.:	178075	
Today's Date:		9/18/2007		Data Collected by:	Jamie Young	
	Alpha	X	Beta-Gamma		Other	
Remarks:	Background Reference Area		Bldg. 5 Room 1608			
Type of Surface:		Counter Top		Count Time:	2	Minutes

Count Number	Gross Counts	CPM (x)
1	497	248.5
2	473	236.5
3	480	240
4	502	251
5	502	251
6	526	263
7	489	244.5
8	460	230
9	497	248.5
10	483	241.5
11	490	245
12	473	236.5
13	470	235
14	453	226.5
15	492	246
16	470	235
Mean Count: $\bar{x}$		242.41
Standard Deviation (σ)		9.18

Background Count Rate:	242.41	CPM		
Calculations Completed by:	Jamie Young		Date:	9/18/2007
Reviewed by:	Daniel Spicuzza		Date:	9/18/2007

New World Technology
Background Determination Data Sheet

Project/Location:		China Lake	Building 5			
Instrument Model:		2360		Instrument Serial No.	227399	
Last Calibration Date:		9/12/2007				
Detector Model:		43-68		Detector Serial No.:	178075	
Today's Date:		9/17/2007		Data Collected by:	Richard Kountz	
X	Alpha		Beta-Gamma		Other	
Remarks:	Background Reference Area		Bldg. 5 Room 1608			
Type of Surface:		Metal Wall		Count Time:	2	Minutes

Count Number	Gross Counts	CPM (x)
1	9	4.5
2	8	4
3	6	3
4	7	3.5
5	7	3.5
6	7	3.5
7	8	4
8	9	4.5
9	7	3.5
10	8	4
11	4	2
12	9	4.5
13	7	3.5
14	7	3.5
15	9	4.5
16	8	4
Mean Count: $\bar{x}$		3.75
Standard Deviation (σ)		0.66

Background Count Rate:	3.75	CPM	
Calculations Completed by:	Richard Kountz	Date:	9/17/2007
Reviewed by:	Daniel Spicuzza	Date:	9/17/2007

New World Technology
Background Determination Data Sheet

Project/Location:		China Lake	Building 5			
Instrument Model:		2360		Instrument Serial No.	227399	
Last Calibration Date:		9/12/2007				
Detector Model:		43-68		Detector Serial No.:	178075	
Today's Date:		9/17/2007		Data Collected by:	Richard Kountz	
	Alpha	X	Beta-Gamma		Other	
Remarks:	Background Reference Area		Bldg. 5 Room 1608			
Type of Surface:		Metal Wall		Count Time:	2	Minutes

Count Number	Gross Counts	CPM (x)
1	499	249.5
2	563	281.5
3	573	286.5
4	526	263
5	534	267
6	509	254.5
7	504	252
8	543	271.5
9	490	245
10	511	255.5
11	489	244.5
12	565	282.5
13	558	279
14	562	281
15	516	258
16	539	269.5
Mean Count: $\bar{x}$		265.03
Standard Deviation (σ)		14.24

Background Count Rate:	265.03	CPM		
Calculations Completed by:	Richard Kountz		Date:	9/17/2007
Reviewed by:	Daniel Spicuzza		Date:	9/17/2007

New World Technology
Background Determination Data Sheet

Project/Location:		China Lake	Building 5			
Instrument Model:		2360		Instrument Serial No.	227415	
Last Calibration Date:		9/12/2007				
Detector Model:		43-68		Detector Serial No.:	147404	
Today's Date:		9/17/2007		Data Collected by:	Alan Campellone	
X	Alpha		Beta-Gamma		Other	
Remarks:	Background Reference Area		Bldg. 5 Room 1608			
Type of Surface:		Metal Wall		Count Time:	2	Minutes

Count Number	Gross Counts	CPM (x)
1	14	7
2	11	5.5
3	11	5.5
4	14	7
5	10	5
6	5	2.5
7	14	7
8	14	7
9	15	7.5
10	11	5.5
11	13	6.5
12	12	6
13	11	5.5
14	14	7
15	12	6
16	11	5.5
Mean Count: $\bar{x}$		6.00
Standard Deviation (σ)		1.21

Background Count Rate:	6.00	CPM	
Calculations Completed by:	Alan Campellone	Date:	9/18/2007
Reviewed by:	Daniel Spicuzza	Date:	9/18/2007

New World Technology
Background Determination Data Sheet

Project/Location:		China Lake	Building 5			
Instrument Model:		2360		Instrument Serial No.	227415	
Last Calibration Date:		9/12/2007				
Detector Model:		43-68		Detector Serial No.:	147404	
Today's Date:		9/18/2007		Data Collected by:	Alan Campellone	
	Alpha	X	Beta-Gamma		Other	
Remarks:	Background Reference Area		Bldg. 5 Room 1608			
Type of Surface:		Metal Wall		Count Time:	2	Minutes

Count Number	Gross Counts	CPM (x)
1	470	235
2	494	247
3	468	234
4	452	226
5	451	225.5
6	443	221.5
7	486	243
8	447	223.5
9	449	224.5
10	452	226
11	491	245.5
12	492	246
13	493	246.5
14	469	234.5
15	466	233
16	511	255.5
Mean Count: $\bar{x}$		235.44
Standard Deviation (σ)		10.55
Background Count Rate:		235.44 CPM

Calculations Completed by:	Alan Campellone	Date:	9/18/2007
Reviewed by:	Daniel Spicuzza	Date:	9/18/2007

New World Technology
Background Determination Data Sheet

Project/Location:		China Lake	Building 5			
Instrument Model:		2360		Instrument Serial No.	225305	
Last Calibration Date:		9/13/2007				
Detector Model:		43-37		Detector Serial No.:	161295	
Today's Date:		9/17/2007		Data Collected by:	Richard Kountz	
X	Alpha		Beta-Gamma		Other	
Remarks:	Background Reference Area		Bldg. 5 Outside Room 1608			
Type of Surface:		Tiled Floor		Count Time:	2	Minutes

Count Number	Gross Counts	CPM (x)
1	23	11.5
2	24	12
3	25	12.5
4	30	15
5	22	11
6	22	11
7	20	10
8	29	14.5
9	22	11
10	18	9
11	23	11.5
12	18	9
13	24	12
14	23	11.5
15	17	8.5
16	15	7.5
Mean Count: $\bar{x}$		11.09
Standard Deviation (σ)		2.01

Background Count Rate:	11.09	CPM		
Calculations Completed by:	Richard Kountz		Date:	9/17/2007
Reviewed by:	Daniel Spicuzza		Date:	9/17/2007

New World Technology
Background Determination Data Sheet

Project/Location:		China Lake	Building 5			
Instrument Model:		2360		Instrument Serial No.	225305	
Last Calibration Date:		9/13/2007				
Detector Model:		43-37		Detector Serial No.:	161295	
Today's Date:		9/17/2007		Data Collected by:	Richard Kountz	
	Alpha	X	Beta-Gamma		Other	
Remarks:	Background Reference Area		Bldg. 5 Outside Room 1608			
Type of Surface:		Tiled Floor		Count Time:	2	Minutes

Count Number	Gross Counts	CPM (x)
1	2274	1137
2	2382	1191
3	2271	1135.5
4	2331	1165.5
5	2241	1120.5
6	2277	1138.5
7	2300	1150
8	2272	1136
9	2288	1144
10	2291	1145.5
11	2361	1180.5
12	2289	1144.5
13	2290	1145
14	2341	1170.5
15	2259	1129.5
16	2284	1142
Mean Count: $\bar{x}$		1148.47
Standard Deviation (σ)		18.99

Background Count Rate:	1148.47	CPM	
Calculations Completed by:	Richard Kountz	Date:	9/17/2007
Reviewed by:	Daniel Spicuzza	Date:	9/17/2007

Appendix D

Instrument Calibration Data

Safety and Ecology Corporation

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE #

9/13/2007

Calibration Certificate for 2360,Serial # 145484, Bar Code # ,Property # SEC-6042

Date: 09/13/07 Date Last Cal. Expires: 08/03/07 Technician: Carl Hall

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 132896 CAL DUE: 02/09/08

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

☐ New Batteries? Battery Check: SAT AS FOUND Mechanical Zero: 0 AS LEFT Mechanical Zero: 0

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	501 V	AF V
1000 V:	1002 V	AF V
1500 V:	1512 V	AF V
AF HV Setting:	1650 V	AL HV Setting: 1625 V

WINDOW SETTINGS	AS FOUND	AS LEFT
BT (4 mV +/- .4 mV):	3.5 mV	AF mV
BW (40 mV +/- 4 mV):	40.0 mV	AF mV
AT (120 mV +/- 10 mV):	120 mV	AF mV

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2501	% ERR: 0.04%	AL 2500:	AF	% ERR: 0.04%
AF 25K:	25.01 K	% ERR: 0.04%	AL 25K:	AF K	% ERR: 0.04%
AF 250K:	250.1 K	% ERR: 0.04%	AL 250K:	AF K	% ERR: 0.04%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT

Overload Light: SAT

Low Battery (2.2V): SAT

Comments: Married as a set with: Model: 43-37 Serial #: PR161368 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 09/13/08

Performed by: [signature] Reviewed by: [signature] Date: 9/13/07

Printed Name: Carl Hall

Entered in Computer Inventory By: [signature] Date: 9/13/07

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 43-37,Serial # PR161368, Bar Code # ,Property # SEC-5234

Date: 09/13/07 Date Last Cal. Expires: 08/03/07 Technician: Carl Hall

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION MODEL: 2360 SERIAL #: 145484 CAL DUE 09/13/08

MODEL: SERIAL #: CAL DUE

NIST TRACEABLE SOURCES USED	SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
	5744-06	Sr-90	21700 dpm	15,200 cpm	12/6/2006
	5746-06	Tc-99	34000 dpm	21,200 cpm	12/7/2006
	5747-06	Pu-239	27700 dpm	14,100 cpm	12/6/2006
	5748-06	Th-230	34700 dpm	17,600 cpm	12/6/2006

AS FOUND DATA

AS FOUND Instrument Condition: SAT

Calibration Setpoints

HV : 1650 V

Threshold Beta: 3.5 mV

Efficiencies from last calibration	
Pu:	%
Tc:	21.38 %
Th:	17.21 %
SrY:	%

	Alpha		Beta		A-B XTLK
Back ground:	1	CPM	590	CPM	
Pu-239:	5563	CPM	958	CPM	6.6%
Tc-99:	11	CPM	8772	CPM	
Th-230:	6011	CPM	N/A		
SrY-90:	N/A		6842	CPM	

AS FOUND Efficiencies: Pu-239: 20.08% Tc-99: 24.06% Th-230: 17.32% SrY-90: 28.81%

☑ Is the As Found Data Within 20% of the efficiency from the last cal.?

AS LEFT Instrument Condition: SAT

AS LEFT DATA after repair or HV adjust

HV : 1625 V EHH 9/13/07

	Alpha		Beta		A-B XTLK
Back ground:	2	CPM	446	CPM	
Pu-239:	5079	CPM	756	CPM	6.1%
Tc-99:	10	CPM	8486	CPM	
Th-230:	5868	CPM	N/A		
SrY-90:	N/A		6589	CPM	

AS LEFT Efficiencies: Pu-239: 18.33% Tc-99: 23.65% Th-230: 18.90% SrY-90: 28.31%

Reproducibility : Isotope: Sr-90 6544 6632 6572 Average: 6582.7 ☑ Are the individual counts within 10% of the average?

If the As Found data (even after repair) is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the Plateau Data and go directly to Comments. Geometry of source = flush to surface, except gas proportional probes = 1/8" from surface unless otherwise specified. Calibrated with a 5 foot cable unless otherwise specified.

PLATEAU DATA

Source 1: Tc-99 Source 2: Th-230

High Voltage	Response (CPM) A ch.	B ch.	Net Eff.	Response (CPM) A ch.	B ch.	Net Eff.	Background (CPM) A ch.	B ch.	Net A to B Xtalk: <10%
N/A									N/A
									N/A
									N/A
									N/A
									N/A
									N/A

	Alpha	Beta	Pu-239	Tc-99	Th-230	SrY-90
Background:			CPM	CPM	CPM	CPM
AL Efficiencies:						

Comments: Married as a set with: Model: 2360 Serial #: 145484 Bar Code #:

Lowered high voltage setpoint to 625 volts to match efficiencies on 43-37 PR161295. Alpha = 120mV threshold. Beta = 3.5 - 40mV. 2 Pi efficiencies are Tc-99 = 37.92% & Th-230 = 33.33%.

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 09/13/08

Performed by: Reviewed by: Date: 9/13/07

Printed Name: Carl Hall

Entered In Computer Inventory By: Date: 9/13/07

Safety and Ecology Corporation

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE #

9/13/2007

Calibration Certificate for 2360,Serial # 225305, Bar Code # ,Property # SEC-6110

Date: 09/13/07 Date Last Cal. Expires: 04/21/07 Technician: Carl Hall

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 132896 CAL DUE: 02/09/08

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

☐ New Batteries? Battery Check: SAT AS FOUND Mechanical Zero: 0 AS LEFT Mechanical Zero: 0

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	503 V	AF V
1000 V:	1004 V	AF V
1500 V:	1519 V	AF V
AF HV Setting:	1850 V	AL HV Setting: 1650 V

WINDOW SETTINGS	AS FOUND	AS LEFT
BT (4 mV +/- .4 mV):	3.5 mV	AF mV
BW (40 mV +/- 4 mV):	40.0 mV	AF mV
AT (120 mV +/- 10 mV):	120 mV	AF mV

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2502	% ERR: 0.08%	AL 2500:	AF	% ERR: 0.08%
AF 25K:	25.02 K	% ERR: 0.08%	AL 25K:	AF K	% ERR: 0.08%
AF 250K:	250.2 K	% ERR: 0.08%	AL 250K:	AF K	% ERR: 0.08%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT

Overload Light: SAT

Low Battery (2.2V): SAT

Comments: Married as a set with: Model: 43-37 Serial #: PR161295 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 09/13/08

Performed by: [signature] Reviewed by: [signature] Date: 9/13/07

Printed Name: Carl Hall

Entered in Computer Inventory By: [signature] Date: 9/13/07

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 43-37,Serial # PR161295, Bar Code # ,Property # SEC-6111

Date: 09/13/07 Date Last Cal. Expires: 04/21/07 Technician: Carl Hall

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION MODEL: 2360 SERIAL #: 225305 CAL DUE 09/13/08

MODEL: SERIAL #: CAL DUE

NIST TRACEABLE SOURCES USED	SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
	5744-06	Sr-90	21700 dpm	15,200 cpm	12/6/2006
	5746-06	Tc-99	34000 dpm	21,200 cpm	12/7/2006
	5747-06	Pu-239	27700 dpm	14,100 cpm	12/6/2006
	5748-06	Th-230	34700 dpm	17,600 cpm	12/6/2006

AS FOUND DATA

AS FOUND Instrument Condition: SAT

Calibration Setpoints

HV : 1850 V

Threshold Beta: 3.5 - mV

Efficiencies from last calibration	
Pu:	22.18 %
Tc:	21.93 %
Th:	19.22 %
SrY:	33.42 %

	Alpha		Beta		A-B XTLK
Back ground:	27	CPM	924	CPM	
Pu-239:	6429	CPM	1845	CPM	14.4%
Tc-99:	32	CPM	9122	CPM	
Th-230:		CPM	N/A		
SrY-90:	N/A			CPM	

AS FOUND Efficiencies: Pu-239: 23.11% Tc-99: 24.11% Th-230: SrY-90:

☐ Is the As Found Data Within 20% of the efficiency from the last cal.?

AS LEFT Instrument Condition: SAT

AS LEFT DATA after repair or HV adjust

HV : V

	Alpha		Beta		A-B XTLK
Back ground:		CPM		CPM	
Pu-239:		CPM		CPM	
Tc-99:		CPM		CPM	
Th-230:		CPM	N/A		
SrY-90:	N/A			CPM	

AS LEFT Efficiencies: Pu-239: Tc-99: Th-230: SrY-90:

Reproducibility : Isotope: Sr-90 6438 6497 6523 Average: 6486.0 ☑ Are the individual counts within 10% of the average?

If the As Found data (even after repair) is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the Plateau Data and go directly to Comments. Geometry of source = flush to surface, except gas proportional probes = 1/8" from surface unless otherwise specified. Calibrated with a 5 foot cable unless otherwise specified.

PLATEAU DATA Source 1: Tc-99 Source 2: Pu-239

High Voltage	Response (CPM) A ch.	B ch.	Net Eff.	Response (CPM) A ch.	B ch.	Net Eff.	Background (CPM) A ch.	B ch.	Net A to B Xtalk: <10%
1600	7	7946	21.91%	4899	726	17.66%	8	498	4.66%
1650	9	8101	22.26%	5072	812	18.28%	9	531	5.55%
1700	11	8234	22.31%	5590	1067	20.14%	12	648	7.51%

	Alpha	Beta		Pu-239	Tc-99	Th-230	SrY-90
Background:	9	547	1650	5094 CPM	8149 CPM	5694 CPM	6513 CPM
AL Efficiencies:				18.36%	22.36%	16.38%	27.49%

Comments: Married as a set with: Model: 2360 Serial #: 225305 Bar Code #:

Alpha = 120mV threshold. Beta = 3.5 - 40mV. 2 Pi efficiencies are Tc-99 = 35.86% & Th-230 = 32.30%.

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 09/13/08

Performed by: Reviewed by: Date: 9/13/07

Printed Name: Carl Hall

Entered in Computer Inventory By: Date: 9/13/07

Safety and Ecology Corporation

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE #

9/12/2007

Calibration Certificate for 2360,Serial # 227415, Bar Code # ,Property # SEC-6124

Date: 09/12/07 **Date Last Cal. Expires:** 08/30/08 **Technician:** Carl Hall

Location: 9999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 **SERIAL #:** 132896 **CAL DUE:** 02/09/08

MODEL: **SERIAL #:** **CAL DUE:**

AS FOUND DATA **Geotropism:** SAT **AS FOUND Instrument Condition:** SAT **AS LEFT Instrument Condition:** SAT

☐ New Batteries? **Battery Check:** SAT **AS FOUND Mechanical Zero:** 0 **AS LEFT Mechanical Zero:** 0

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	510 V	AF V
1000 V:	1005 V	AF V
1500 V:	1500 V	AF V
AF HV Setting:	1600 V	AL HV Setting: 1600 V

WINDOW SETTINGS	AS FOUND	AS LEFT
BT (4 mV +/- .4 mV):	3.5 mV	AF mV
BW (40 mV +/- 4 mV):	40.0 mV	AF mV
AT (120 mV +/- 10 mV):	120 mV	AF mV

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2502	% ERR: 0.08%	AL 2500:	AF	% ERR: 0.08%
AF 25K:	25.02 K	% ERR: 0.08%	AL 25K:	AF K	% ERR: 0.08%
AF 250K:	250.2 K	% ERR: 0.08%	AL 250K:	AF K	% ERR: 0.08%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT

Overload Light: SAT

Low Battery (2.2V): SAT

Comments: Married as a set with: Model: 43-68 Serial #: PR147404 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument Is Due For Next Calibration: 09/12/08

Performed by: _____ Reviewed by: _____ Date: 9/13/07

Printed Name: Carl Hall

Entered in Computer Inventory By: _____ Date: 9/12/07

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 43-68,Serial # PR147404, Bar Code # ,Property # SEC-6155

Date: 09/12/07 Date Last Cal. Expires: 05/16/07 Technician: Carl Hall

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION MODEL: 2360 SERIAL #: 227415 CAL DUE 09/12/08

MODEL: SERIAL #: CAL DUE

NIST TRACEABLE SOURCES USED	SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
	5746-06	Tc-99	34000 dpm	21,200 cpm	12/7/2006
	5748-06	Th-230	34700 dpm	17,600 cpm	12/6/2006

AS FOUND DATA AS FOUND Instrument Condition: SAT

Calibration Setpoints

HV : 1600 V

Threshold Beta: 3.5 - 40.0 mV, 120 mV

Efficiencies from last calibration	
Pu:	%
Tc:	21.44 %
Th:	18.06 %
SrY:	%

	Alpha		Beta		
Back ground:	2	CPM	179	CPM	A-B XTLK
Pu-239:		CPM		CPM	
Tc-99:		CPM	7551	CPM	
Th-230:	6791	CPM	N/A		
SrY-90:	N/A			CPM	

AS FOUND Efficiencies: Pu-239: Tc-99: 21.68% Th-230: 19.56% SrY-90:

☑ Is the As Found Data Within 20% of the efficiency from the last cal.?

AS LEFT Instrument Condition: SAT

AS LEFT DATA after repair or HV adjust

HV : V

	Alpha		Beta		
Back ground:		CPM		CPM	A-B XTLK
Pu-239:		CPM		CPM	
Tc-99:		CPM		CPM	
Th-230:		CPM	N/A		
SrY-90:	N/A			CPM	

AS LEFT Efficiencies: Pu-239: Tc-99: Th-230: SrY-90:

Reproducibility : Isotope: Tc-99 7478 7586 7503 Average: 7522.3 ☑ Are the individual counts within 10% of the average?

If the As Found data (even after repair) is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the Plateau Data and go directly to Comments. Geometry of source = flush to surface, except gas proportional probes = 1/8" from surface unless otherwise specified. Calibrated with a 5 foot cable unless otherwise specified.

PLATEAU DATA Source 1: Tc-99 Source 2: Th-230

High Voltage	Response (CPM) A ch.	B ch.	Net Eff.	Response (CPM) A ch.	B ch.	Net Eff.	Background (CPM) A ch.	B ch.	Net A to B Xtalk: <10%
N/A									N/A
									N/A
									N/A
									N/A
									N/A
									N/A

	Alpha	Beta	Pu-239	Tc-99	Th-230	SrY-90
Background:			CPM	CPM	CPM	CPM
AL Efficiencies:						

Comments: Married as a set with: Model: 2360 Serial #: 227415 Bar Code #:

Alpha = 120mV threshold. Beta = 3.5 - 40mV. 2 Pi efficiencies are Tc-99 = 34.77% & Th-230 = 38.57%.

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 09/12/08

Performed by: Reviewed by: Date: 9/13/07

Printed Name: Carl Hall

Entered in Computer Inventory By: Date: 9/12/07

Safety and Ecology Corporation

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE #

9/12/2007

Calibration Certificate for 2360,Serial # 227433, Bar Code # ,Property # SEC-6109

Date: 09/12/07 Date Last Cal. Expires: 02/26/08 Technician: Carl Hall

Location: 9999. Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 132896 CAL DUE: 02/09/08

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

☐ New Batteries? Battery Check: SAT AS FOUND Mechanical Zero: 0 AS LEFT Mechanical Zero: 0

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	492 V	AF V
1000 V:	997 V	AF V
1500 V:	1500 V	AF V
AF HV Setting:	1550 V	AL HV Setting: 1550 V

WINDOW SETTINGS	AS FOUND	AS LEFT
BT (4 mV +/- .4 mV):	3.5 mV	AF mV
BW (40 mV +/- 4 mV):	40.0 mV	AF mV
AT (120 mV +/- 10 mV):	120 mV	AF mV

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2503	% ERR: 0.12%	AL 2500:	AF	% ERR: 0.12%
AF 25K:	25.03 K	% ERR: 0.12%	AL 25K:	AF K	% ERR: 0.12%
AF 250K:	250.3 K	% ERR: 0.12%	AL 250K:	AF K	% ERR: 0.12%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT

Overload Light: SAT

Low Battery (2.2V): SAT

Comments: Married as a set with: Model: 43-68 Serial #: PR149770 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 09/12/08

Performed by: [signature] Reviewed by: [signature] Date: 9/13/07

Printed Name: Carl Hall

Entered in Computer Inventory By: [signature] Date: 9/12/07

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 43-68,Serial # PR149770, Bar Code # ,Property # SEC-6161

Date: 09/12/07 **Date Last Cal. Expires:** 06/22/07 **Technician:** Carl Hall

Location: 9999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION MODEL: 2360 SERIAL #: 227433 CAL DUE 09/12/08

MODEL: SERIAL #: CAL DUE

NIST TRACEABLE SOURCES USED	SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
	5746-06	Tc-99	34000 dpm	21,200 cpm	12/7/2006
	5748-06	Th-230	34700 dpm	17,600 cpm	12/6/2006

AS FOUND DATA AS FOUND Instrument Condition: SAT

Calibration Setpoints

HV : 1550 V

Threshold Beta: 3.5 - mV

Efficiencies from last calibration	
Pu:	%
Tc:	20.11 %
Th:	15.04 %
SrY:	%

	Alpha		Beta		
Back ground:	2	CPM	100	CPM	A-B XTLK
Pu-239:		CPM		CPM	
Tc-99:		CPM	6843	CPM	
Th-230:	5116	CPM	N/A		
SrY-90:	N/A			CPM	

AS FOUND Efficiencies: Pu-239: Tc-99: 19.83% Th-230: 14.74% SrY-90:

☑ Is the As Found Data Within 20% of the efficiency from the last cal.?

AS LEFT Instrument Condition: SAT

AS LEFT DATA after repair or HV adjust

HV : V

	Alpha		Beta		
Back ground:		CPM		CPM	A-B XTLK
Pu-239:		CPM		CPM	
Tc-99:		CPM		CPM	
Th-230:		CPM	N/A		
SrY-90:	N/A			CPM	

AS LEFT Efficiencies: Pu-239: Tc-99: Th-230: SrY-90:

Reproducibility : Isotope: Tc-99 | 6875 6821 6859 Average: 6851.7 ☑ Are the individual counts within 10% of the average?

If the As Found data (even after repair) is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the Plateau Data and go directly to Comments. Geometry of source = flush to surface, except gas proportional probes = 1/8" from surface unless otherwise specified. Calibrated with a 5 foot cable unless otherwise specified.

PLATEAU DATA Source 1: Tc-99 Source 2: Th-230

High Voltage	Response (CPM) A ch.	Response (CPM) B ch.	Response (CPM) Net Eff.	Response (CPM) A ch.	Response (CPM) B ch.	Response (CPM) Net Eff.	Background (CPM) A ch.	Background (CPM) B ch.	Net A to B Xtalk: <10%
N/A									N/A
									N/A
									N/A
									N/A
									N/A
									N/A

	Alpha	Beta	Pu-239	Tc-99	Th-230	SrY-90
Background:			CPM	CPM	CPM	CPM
AL Efficiencies:						

Comments: Married as a set with: Model: 2360 Serial #: 227433 Bar Code #:

Alpha = 120mV threshold. Beta = 3.5 - 40mV. 2 Pi efficiencies are Tc-99 = 31.81% & Th-230 = 29.06%.

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 09/12/08

Performed by: Reviewed by: Date: 7/13/07

Printed Name: Carl Hall

Entered in Computer Inventory By: Date: 9/12/07

Safety and Ecology Corporation

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE #

9/12/2007

Calibration Certificate for 2360,Serial # 227399, Bar Code # ,Property # SEC-6215

Date: 09/12/07 Date Last Cal. Expires: 05/31/08 Technician: Carl Hall

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 132896 CAL DUE: 02/09/08

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

☐ New Batteries? Battery Check: SAT AS FOUND Mechanical Zero: 0 AS LEFT Mechanical Zero: 0

HIGH VOLTAGE (+/- 10% tolerance)		AS FOUND HV	AS LEFT HV
	500 V:	512 V	AF V
	1000 V:	1009 V	AF V
	1500 V:	1500 V	AF V
	AF HV Setting:	1600 V	AL HV Setting: 1600 V

WINDOW SETTINGS	AS FOUND	AS LEFT
BT (4 mV +/- .4 mV):	3.5 mV	AF mV
BW (40 mV +/- 4 mV):	40.0 mV	AF mV
AT (120 mV +/- 10 mV):	120 mV	AF mV

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2502	% ERR: 0.08%	AL 2500:	AF	% ERR: 0.08%
AF 25K:	25.02 K	% ERR: 0.08%	AL 25K:	AF K	% ERR: 0.08%
AF 250K:	250.2 K	% ERR: 0.08%	AL 250K:	AF K	% ERR: 0.08%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT

Overload Light: SAT

Low Battery (2.2V): SAT

Comments: Married as a set with: Model: 43-68 Serial #: PR178075 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 09/12/08

Performed by: [signature] Reviewed by: [signature] Date: 9/13/07

Printed Name: Carl Hall

Entered in Computer Inventory By: [signature] Date: 9/12/07

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 43-68,Serial # PR178075, Bar Code # ,Property # SEC-6166

Date: 09/12/07 **Date Last Cal. Expires:** 06/21/07 **Technician:** Carl Hall

Location: 9999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION **MODEL:** 2360 **SERIAL #:** 227399 **CAL DUE** 09/12/08

MODEL: **SERIAL #:** **CAL DUE**

NIST TRACEABLE SOURCES USED	SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
	5746-06	Tc-99	34000 dpm	21,200 cpm	12/7/2006
	5748-06	Th-230	34700 dpm	17,600 cpm	12/6/2006

AS FOUND DATA **AS FOUND Instrument Condition:** SAT

Calibration Setpoints

HV : 1600 V

Threshold Beta: 3.5 - mV

Efficiencies from last calibration	
Pu:	%
Tc:	22.30 %
Th:	16.34 %
SrY:	%

	Alpha		Beta		A-B XTLK
Back ground:	1	CPM	165	CPM	
Pu-239:		CPM		CPM	
Tc-99:		CPM	8732	CPM	
Th-230:	6841	CPM	N/A		
SrY-90:	N/A			CPM	

AS FOUND Efficiencies: Pu-239: Tc-99: 25.20% Th-230: 19.71% SrY-90:

☑ Is the As Found Data Within 20% of the efficiency from the last cal.?

AS LEFT Instrument Condition: SAT

AS LEFT DATA after repair or HV adjust

HV : V

	Alpha		Beta		A-B XTLK
Back ground:		CPM		CPM	
Pu-239:		CPM		CPM	
Tc-99:		CPM		CPM	
Th-230:		CPM	N/A		
SrY-90:	N/A			CPM	

AS LEFT Efficiencies: Pu-239: Tc-99: Th-230: SrY-90:

Reproducibility : Isotope: Tc-99 | 8749 8672 8720 **Average:** 8713.7 ☑ **Are the individual counts within 10% of the average?**

If the As Found data (even after repair) is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the Plateau Data and go directly to Comments. Geometry of source = flush to surface, except gas proportional probes = 1/8" from surface unless otherwise specified. Calibrated with a 5 foot cable unless otherwise specified.

PLATEAU DATA

Source 1: Tc-99 Source 2: Th-230

High Voltage	Response (CPM) A ch.	B ch.	Net Eff.	Response (CPM) A ch.	B ch.	Net Eff.	Background (CPM) A ch.	B ch.	Net A to B Xtalk: <10%
N/A									N/A
									N/A
									N/A
									N/A
									N/A
									N/A

	Alpha	Beta	Pu-239	Tc-99	Th-230	SrY-90
Background:			CPM	CPM	CPM	CPM
AL Efficiencies:						

Comments: **Married as a set with:** **Model:** 2360 **Serial #:** 227399 **Bar Code #:**

Alpha = 120mV threshold. Beta = 3.5 - 40mV. 2 Pi efficiencies are Tc-99 = 40.41% & Th-230 = 38.86%.

☑ **Does Instrument Meet Final Acceptance Criteria?** ☑ **Calibration Sticker Attached?**

Date Instrument is Due For Next Calibration: 09/12/08

Performed by: **Reviewed by:** **Date:** 9/13/07

Printed Name: Carl Hall

Entered in Computer Inventory By: **Date:** 9/12/07

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 2350-1,Serial # 228693, Bar Code # ,Property # SEC-6330

Date: 09/13/07 **Date Last Cal. Expires:** 02/22/08 **Technician:** Carl Hall

Location: 9999. **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 **SERIAL #:** 132896 **CAL. DUE:** 02/09/08

MODEL: **SERIAL #:** **CAL DUE:**

AS FOUND DATA

AS FOUND Instrument Condition: SAT **AS LEFT Instrument Condition:** SAT

☐ New Batteries?

Battery Check: SAT

High Voltage (+/- 10% tolerance)	AS FOUND High Voltage	AS LEFT High Voltage
500 V:	504	AF
1000 V:	1002	AF
1500 V:	1497	AF

AS FOUND HV Setting: 950 V **AS LEFT HV Setting:** 950 V

AS FOUND THRESHOLD: 10.0 mV **AS LEFT THRESHOLD:** 10.0 mV

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ **Are the Individual Counts Within 10% of the Average?**

☑ **Fast / Slow Response Switch Functions Properly?**

Audio Response: SAT

DIGITAL SCALER

AF 250:	250	**% ERR:**	0.00%	**AL 250:**	AF	**% ERR:**	0.00%
AF 2500:	2502	**% ERR:**	0.08%	**AL 2500:**	AF	**% ERR:**	0.08%
AF 25K:	25.02 K	**% ERR:**	0.08%	**AL 25K:**	AF K	**% ERR:**	0.08%
AF 250K:	250.2 K	**% ERR:**	0.08%	**AL 250K:**	AF K	**% ERR:**	0.08%

☑ **Is the As Found Data Within 20% of the Set Point?**

Push Buttons: SAT **Lamp:** SAT **Audio/Divide:** SAT

Comments: **Married as a set with:** **Model:** 44-10 **Serial #:** PR245172 **Bar Code #:**

☑ **Does Instrument Meet Final Acceptance Criteria?**

☑ **Calibration Sticker Attached?**

Date Instrument is Due For Next Calibration: 09/13/08

Performed by: _____ **Reviewed by:** _____ **Date:** 9/13/07

Printed Name: Carl Hall

Entered in Computer Inventory By: _____ **Date:** 9/13/07

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 44-10,Serial # PR245172, Bar Code # ,Property # SEC-6341

Date: 09/13/07 **Date Last Cal. Expires:** 02/22/08 **Technician:** Carl Hall

Location: 9999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 2350-1 **SERIAL #:** 228693 **CAL DUE:** 09/13/08

MODEL: **SERIAL #:** **CAL DUE:**

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
99CS250-0288	Cs-137	7.5 uCi		3/18/1999

Efficiency from Last Calibration: 0.69 % **HV From Last Calibration:** 950 V **Calibration Threshold:** 10 mV

1 MINUTE COUNTS (CPM)

AS FOUND DATA

AS FOUND Instrument Condition: SAT

HV: 950 V

Center: 118612

Background: 3812

Probe Efficiency: Cs-137 0.69%

AS LEFT DATA after repair of HV adjust

AS LEFT Instrument Condition: SAT

HV: AF V

Heel:

Center:

Toe:

Background:

Uniformity:

Probe Efficiency: Cs-137

☑ **Is the As Found Efficiency Within 20% of the efficiency from the last cal.?**

Reproducibility: **Isotope:** Cs-137 118526 118576 118649 **Average:** 118584 ☑ **Are the individual counts within 10% of the average?**

* If As Found Efficiency (even after repair) is within 10% of the last calibration and uniformity is <10%, the technician may N/A the Plateau Data and proceed to Comments. Geometry = NaI probes are 4 1/2" from source. All other probes are in contact with surface unless otherwise specified. Calibrated with a 5 foot cable unless otherwise specified.

PLATEAU AND SET POINT DATA (CPM)

High Voltage	Source Response	Background	HV	CENTER	Background	Efficiency
N/A			V			Cs-137

Comments: Married as a set with: **Model:** 2350-1 **Serial #:** 228693 **Bar Code #:**

☑ **Does Instrument Meet Final Acceptance Criteria?** ☑ **Calibration Sticker Attached?**

Date Instrument is Due For Next Calibration: 09/13/08

Performed by: _____ **Reviewed by:** _____ **Date:** 9/13/07

Printed Name: Carl Hall

Entered in Computer Inventory By: _____ **Date:** 9/13/07

SAFETY AND ECOLOGY
CALIBRATION DATA SHEET

FORM 99-6
REV. 1

CUSTOMER NAME	: Safety and Ecology	INST. MANUFACTURER	: Ludlum Measurements	
PLANT NAME	:	TYPE	: NaI	
ADDRESS	: 10512 Lexington Drive Knoxville TN.	MODEL NO.	: 2350-1	44-10
		SERIAL NO.	: 228693	PR245172
CONTACT PERSON	: J DeGroodt			

SOURCES USED

CAL SOURCE USED: CESIUM-137 400 CURIE/130 MILLICURIE S/N 9115 CAL DUE : 08/28/2008

CALIBRATION DATA

	AS FOUND		AS LEFT
DEAD TIME	: 19.3 u Sec	**DEAD TIME**	: 19.0
CAL CONSTANT	: 6.302316 E10	**CAL CONSTANT**	: 5.925117 E10

DIGITAL READINGS	EXPOSURE RATE uR/HR	INSTRUMENT READING AS FOUND	INSTRUMENT READING AS LEFT	PER CENT ERROR AS FOUND	PER CENT ERROR AS LEFT
	150	143	150	-4.67	0.00
	500	477	500	-4.60	0.00
	1500	1440	1510	-4.00	0.67
	5000	4770	5000	-4.60	0.00

PRECISION

DIGITAL READINGS	EXPOSURE RATE	AS FOUND	MEAN VALUE	% DEV.
	1500 uR/HR	1440		0.00
		1440	1440	0.00
		1440		0.00

COMMENTS/REMARKS:

ALL CALIBRATION DONE WITH CALIBRATED TEST EQUIPMENT.
CALIBRATION POINTS ACCEPTANCE CRITERIA +/-10% OF ACTUAL INPUT RATE.
OUT OF TOLERANCE VALUES ARE CIRCLED AND CUSTOMER CONTACT NOTIFIED VERBALLY OF CONDITION.
CALIBRATION PERFORMED PER ICAL PROCEDURE NUMBER 99.

CALIBRATED BY : _____ REVIEWED BY : _____

DATE CALIBRATED : 9.13.07 DATE REVIEWED : 9/13/07

CALIBRATION DUE DATE : 9.13.2008

Safety and Ecology Corporation

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE #

4/25/2007

Calibration Certificate for 2929,Serial # 143878, Bar Code # ,Property # SEC-5329

Date: 04/25/07 **Date Last Cal. Expires:** 02/14/08 **Technician:** David Moyer

Location: 9999, **Reason For Calibration:** Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 **SERIAL #:** 209797 **CAL DUE:** 07/25/07

MODEL: **SERIAL #:** **CAL DUE:**

AS FOUND DATA

AS FOUND Instrument Condition: SAT **AS LEFT Instrument Condition:** SAT

AS FOUND Mechanical Zero: 0 **AS LEFT Mechanical Zero:** 0

Scaler Function Check	AS FOUND		AS LEFT		
Beta Channel Window (4-50 mV):	4.1-49.8	mV	4-50	mV	
Alpha Channel Threshold (175 mV):	176	mV	175	mV	
Alpha Counts w/Pulser @ 10,000 CPM:	10,000	CPM	AF	CPM	% Error: 0.00%
Beta Counts w/Pulser @ 10,000 CPM:	10,000	CPM	AF	CPM	% Error: 0.00%

If AS FOUND data in Scaler Function Check is within 10%, the technician may place AF in AS LEFT section and proceed to High Voltage power supply section

HIGH VOLTAGE POWER SUPPLY CALIBRATION	AS FOUND		AS LEFT	
Vernier Setting:	3.22		AF	
HV Setpoints:	806	V	800	V
500 V Reading:	500	V	AF	V
1000 V Reading:	1000	V	AF	V
1500 V Reading:	1515	V	AF	V
Max HV (1500 V +):				

DIGITAL SCALER

AF 250:	250	% ERR:	0.00%	AL 250:	AF	% ERR:	0.00%
AF 2500:	2500	% ERR:	0.00%	AL 2500:	AF	% ERR:	0.00%
AF 25K:	24.99 K	% ERR:	0.04%	AL 25K:	AF K	% ERR:	0.04%
AF 250K:	249.9 K	% ERR:	0.04%	AL 250K:	AF K	% ERR:	0.04%

☑ Is the As Found Data Within 20% of the Set Point?

Comments: Married as a set with: Model: 43-10-1 Serial #: PR147628 Bar Code #:

Short cycled due to probe damage.

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 04/25/08

Performed by: Reviewed by: Date: 4/25/07

Printed Name: David Moyer

Entered in Computer Inventory By: Date: 4.25.7

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE #

4/25/2007

Calibration Certificate for 43-10-1,Serial # PR147628, Bar Code # ,Property # SEC-5330

Date: 04/25/07 Date Last Cal. Expires: 02/14/08 Technician: David Moyer

Location: 9999, Reason For Calibration: Repair

EQUIPMENT USED DURING CALIBRATION MODEL: 2929 SERIAL #: 143878 CAL DUE: 04/25/08

MODEL: SERIAL #: CAL DUE:

NIST TRACEABLE SOURCES USED	SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
	4049-02	Th-230	30300 dpm	15,400 cpm	9/26/2002
	4050-02	Tc-99	36600 dpm	22,900 cpm	9/25/2002
	4052-02	Sr-90	22400 dpm	15,700 cpm	9/25/2002
	99PU470-0268	Pu-239	15400 dpm	7,820 cpm	5/2/2000

AS FOUND DATA

AS FOUND Instrument Condition: SAT

Calibration Setpoints: HV: 800 V Vernier: 3.22

Threshold: Beta: 4 - 40 mV; Alpha: 120 mV

Efficiencies from last calibration	
Pu:	38.72 %
Tc:	21.01 %
Th:	35.01 %
SrY:	42.71 %

	Alpha		Beta		
Back ground:	0	CPM	0	CPM	A-B XTLK
Pu-239:	0	CPM	0	CPM	#Div/0!
Tc-99:	0	CPM	0	CPM	B-A XTLK
Th-230:	0	CPM	N/A		#Div/0!
SrY-90:	N/A		0	CPM	

AS FOUND Efficiencies: Pu-239: 0.00% Tc-99: 0.00% Th-230: 0.00% SrY-90: 0.00%

AS LEFT Instrument Condition: SAT

AS LEFT DATA after repair or HV adjust: HV: 800 V Vernier: 3.22

	Alpha		Beta		
Back ground:	0	CPM	31	CPM	A-B XTLK
Pu-239:	5883	CPM	224	CPM	3.2%
Tc-99:	0	CPM	7553	CPM	B-A XTLK
Th-230:	10518	CPM	N/A		0.0%
SrY-90:	N/A		9415	CPM	

AS LEFT Efficiencies: Pu-239: 38.20% Tc-99: 20.55% Th-230: 34.71% SrY-90: 41.89%

☐ Is the As Found Data Within 20% of the efficiency from the last cal.?

Reproducibility: Isotope: Sr-90 9553 9423 9532 Average: 9502.7 ☑ Are the individual counts within 10% of the average?

If the As Found data (even after repair) is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the Plateau Data and go directly to Comments. Geometry = NaI probes are 4 1/2" from source. All other probes are in contact with surface unless otherwise specified. Calibrated with a 3 foot cable unless otherwise specified.

PLATEAU DATA

High Voltage	Source 1: Tc-99 Response (CPM) A ch.	B ch.	Net Eff.	Source 2: Th-230 Response (CPM) A ch.	B ch.	Net Eff.	Background (CPM) A ch.	B ch.	Net A to B Xtalk: <10%	Net B to A Xtalk: <1%
N/A									N/A	
									N/A	
									N/A	
									N/A	
									N/A	
									N/A	

	Alpha	Beta	HV/Vernier	Pu-239	Tc-99	Th-230	SrY-90
Background:				CPM	CPM	CPM	CPM
AL Efficiencies:							

Comments: Married as a set with: Model: 2929 Serial #: 143878 Bar Code #:

Replaced mylar. Repaired zinc.

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 04/25/08

Performed by: [signature] Reviewed by: [signature] Date: 4/25/07

Printed Name: David Moyer

Entered in Computer Inventory By: [illegible] Date: 4-25-7

SAFETY AND ECOLOGY CORP.
CALIBRATION DATA SHEET

FORM 73-1
REV. 0

CUSTOMER NAME	: SAFETY AND ECOLOGY	INST. MANUFACTURER	: LUDLUM INST.
PLANT NAME	: SEC LAB	TYPE	: SCINTILLATION
ADDRESS	: 10512 Lexington Dr.	MODEL NO.	: 19
	KNOXVILLE	SERIAL NO.	: **148206**
	TN		
CONTACT PERSON	: JERRY DEGROODT		

SOURCE USED

CAL SOURCE USED : CESIUM -137 400 CURIE/130 MILLICURIE S/N 9115 CAL DUE : 09/07/2007

M&TE

MINIPULSER S/N	: 314	CALIBRATION DUE DATE :	07/25/2007
DVM S/N	: 82730524	CALIBRATION DUE DATE :	02/28/2009
H.V. PROBE S/N	: 82630102	CALIBRATION DUE DATE :	03/02/2009

CALIBRATION DATA

		AS FOUND	AS LEFT	
HIGH VOLTAGE	:	950	950	VOLTS
INPUT SENSITIVITY	:	40	40	MILLIVOLTS

SCALE	EXPOSURE RATE uR/HR	(MR/HR)	INSTRUMENT READING AS FOUND	AS LEFT	PER CENT ERROR AS FOUND	AS LEFT
25	5	(PULSED = TO)	5.00	5.00	0.00	0.00
	12	(PULSED = TO)	12.00	12.00	0.00	0.00
	20	(PULSED = TO)	20.00	20.00	0.00	0.00
50	10	(PULSED = TO)	10.0	10.0	0.00	0.00
	25	(PULSED = TO)	25.0	25.0	0.00	0.00
	40	(PULSED = TO)	40.0	40.0	0.00	0.00
250	50	(PULSED = TO)	50.0	50.0	0.00	0.00
	120	(PULSED = TO)	120.0	120.0	0.00	0.00
	200	(PULSED = TO)	200.0	200.0	0.00	0.00
500	200	(0.2)	200	200	0.00	0.00
	250	(0.25)	250	250	0.00	0.00
	400	(0.4)	390	390	-2.50	-2.50
5000	1000	(1.0)	1000	1000	0.00	0.00
	2500	(2.5)	2500	2500	0.00	0.00
	4000	(4.0)	3900	3900	-2.50	-2.50

PRECISION

SCALE	EXPOSURE RATE		AS FOUND	MEAN VALUE	% DEV.
5000	2500	(2.5)	2500		0.00
			2500	2500	0.00
			2500		0.00

COMMENTS/REMARKS:

DOSE RATE CALIBRATION DONE WITH N.I.S.T. TRACEABLE SOURCES AND CALIBRATED TEST EQUIPMENT.
PULSE RATE CALIBRATION DONE AS REQUIRED DUE TO BACKGROUND RADIATION AND CORRELATED TO DOSE RATE CALIBRATION ON HIGHER SCALES.
CALIBRATION POINTS ACCEPTANCE CRITERIA +/-10% OF ACTUAL EXPOSURE RATE.
OUT OF TOLERANCE VALUES ARE CIRCLED AND CUSTOMER CONTACT NOTIFIED VERBALLY OF CONDITION
CALIBRATION PERFORMED PER ICAL PROCEDURE NUMBER 73.

CALIBRATED BY : [signature] REVIEWED BY : [signature]

DATE CALIBRATED : 6-12-07 DATE REVIEWED : 6/12/07

CALIBRATION DUE DATE : 6-12-08

Isotope Products Laboratories
An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661·309·1010
Fax 661·257·8303

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOURCE

Radionuclide:	Th-230	**Customer:**	NEW WORLD TECHNOLOGY			
Half-life:	(7.54 ± 0.03)E+04 years	**P.O. No.:**	20400			
Catalog No.:	LDS-230-100MM	**Reference Date:**	1-Sep-02	12:00	PST	
Source No.:	A7-267	**Contained Radioactivity:**	41.05	nCi	1519	**Bq**
		Contained Radioactivity: (Total Alpha)	91120	dpm		

Physical description:

A. Capsule type:	LDS (12.1 cm x 12.1 cm)
B. Nature of active deposit:	Electroplated and diffusion bonded oxide
C. Active Diameter:	10 cm x 10 cm
D. Backing:	Stainless steel
E. Cover:	None

Radioimpurities:

Ra-226 = 0.400% and Am-241 = 0.110% on 1 Sep 02.

CAUTION!
DELICATE SURFACE
DO NOT WIPE
ACTIVE AREA

Method of Calibration:

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

Uncertainty of Measnrement:

A. Type A (random) uncertainty:	± 0.5 %
B. Type B (systematic) uncertainty:	± 3.0 %
C. Uncertainty in aliquot weighing:	± 0.0 %
D. Total uncertainty at the 99% confidence level:	± 3.0 %

Notes:

- See reverse side for leak test(s) performed on this source.
- IPL participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986.
- This source has a working life of 2 years.
- This source had a total alpha surface emission rate of 43740 α/min in 2π on 20 Aug 02.

Jan U Khan
Quality Control

21-Aug-02
Date Signed

IPL Ref. No.: 943-61

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOURCE

Radionuclide:	Th-230	Customer:	NEW WORLD TECHNOLOGY
Half Life:	(7.54 ± 0.03) x 10^4 years	P.O.No.:	1367
Catalog No.:	EAB-230	Reference Date:	1 May 98 12:00 PST.
Source No.:	564-38-2	Contained Radioactivity:	21.43 nCi (792.9 Bq)
		Surface Emission rate (in 2π) :	22742 alphas/min

Description of Source

a. Capsule type:	EAB-LB
b. Nature of active deposit:	Th-230 incorporated into an anodized layer
c. Active diameter/volume:	41 mm
d. Backing:	Aluminum
e. Cover:	None

Radioimpurities

None detected

Method of Calibration

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

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	± 3.0%
b. Random uncertainty in assay:	± 1.0%
c. Random uncertainty in weighing(s):	± 0.0%
d. Total uncertainty at the 99% confidence level:	± 3.2%

NIST Traceability

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

Leak Test(s)

See reverse side for Leak Test(s) applied to this source

Notes

1. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

QUALITY CONTROL

5mA 1 97

Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 N. KEYSTONE STREET
BURBANK, CALIFORNIA 91504
818·843·7000 FAX 818·843·6168

IPL Ref. No.: 572-64

CERTIFICATE OF CALIBRATION
BETA STANDARD SOURCE

Radionuclide:	C-14	Customer:	NEW WORLD TECHNOLOGY
Half Life:	5730 ± 40 years	P.O.No.:	1180
Catalog No.:	EAB-014LB-13.5N	Reference Date:	1 May 97 12:00 PST.
Source No.:	525-83-5	Contained Radioactivity:	6.839 nCi.; 15,180 dpm.
		Surface Emission rate:	5314 betas/min/2pi.

Description of Source

a. Capsule type:	LB (47 mm OD x 3.18 mm THK)
b. Nature of active deposit:	Carbon-C-14 compound in polymeric membrane
c. Active diameter/volume:	41 mm
d. Backing:	Film
e. Cover:	1000 Å aluminum

Radioimpurities

None detected

Method of Calibration

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

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	± 3.0%
b. Random uncertainty in assay:	± 2.1%
c. Random uncertainty in weighing(s):	± 0.0%
d. Total uncertainty at the 99% confidence level:	± 3.7%

NIST Traceability

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

Leak Test(s)

See reverse side for Leak Test(s) applied to this source

Notes

1. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

8-20-00
Puerto Rico
Don Wadsworth

QUALITY CONTROL

30 Apr 97
Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 N. KEYSTONE STREET
BURBANK, CALIFORNIA 91504
818·843·7000 FAX 818·843·6168

IPL Ref. No.: 525-83-5

Isotope Products Laboratories
An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661·309·1010
Fax 661·257·8303

CERTIFICATE OF CALIBRATION
BETA STANDARD SOURCE

Radionuclide:	C-14	**Customer:**	NEW WORLD TECHNOLOGY
Half-life:	5730 ± 40 years	**P.O. No.:**	20497
Catalog No.:	LDS-014-100MM	**Reference Date:**	15-Nov-02 12:00 PST
Source No.:	A8-074	**Contained Radioactivity:**	45.23 **nCi** 1674 **Bq**
			100400 **dpm**

Physical description:

A. Capsule type:	LDS (121 mm x 121 mm)
B. Nature of active deposit:	Distributed and evaporated carbon compound on polymeric membrane
C. Active diameter/volume:	100 mm x 100 mm
D. Backing:	Acrylic
E. Cover:	0.9 mg/cm² aluminized mylar

Radioimpurities:

None detected

Method of Calibration:

This source was prepared from a weighed aliquot of solution whose activity in µCi/g was determined using a liquid scintillation counter.

Uncertainty of Measurement:

A. Type A (random) uncertainty:	± 0.6 %
B. Type B (systematic) uncertainty:	± 3.0 %
C. Uncertainty in aliquot weighing:	± 0.9 %
D. Total uncertainty at the 99% confidence level:	± 3.2 %

Notes:

- See reverse side for leak test(s) performed on this source.
- IPL participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).
- Nuclear data was taken from NCRP Report No. 58, 1985.
- This source has a working life of 2 years.
- This source had a surface emission rate of 26320 β/min in 2π on 14 Oct 02.

David James Van Dalsem
Quality Control

15-OCT-02
Date Signed

IPL Ref. No.: 948-52

Appendix E

Instrument Daily Response Check Data

Chi Square Test Data

China Lake Building 5 Survey
Floor Monitor Efficiency Data Sheet

Detector Region	Instrument S/N:	225305	145484	Source ID:	Th-230/A7-267	
	Detector S/N:	161295	161638	Source Activity:	43740	alphas/min
	Counts			Performed by:	Richard Kountz	
1	9980			Date:	9/17/2007	
	9955			Time:	1430	
	9918			Reviewed by:	Daniel Spicuzza	
	9902			Date:	9/17/2007	
	9995			Time:	1500	
2	13123					
	13156					
	13082					
	13025					
	13150					
3	13240					
	13160					
	13298					
	13411					
	13287					
4	10832					
	10808					
	10910					
	10718					
	10699					
5	10901					
	10935					
	10943					
	11012					
	10009					
6	13306					
	13300					
	13156					
	13172					
	13401					
7	13016					
	12804					
	12812					
	12966					
	12737					
8	9808					
	9795					
	9979					
	9859					
	9982					
Average:	**11738.55**					
Background:	**10.5**					
Efficiency:	**0.27**					

China Lake Building 5 Survey
Floor Monitor Efficiency Data Sheet

Detector Region	Instrument S/N:	225305	Source ID:	C-14/A8-074	
	Detector S/N:	161295	Source Activity:	26320	betas/min
	Counts		Performed by:	Richard Kountz	
1	6761		Date:	9/17/2007	
	6956		Time:	1430	
	6970		Reviewed by:	Daniel Spicuzza	
	6796		Date:	9/17/2007	
	6947		Time:	1500	
2	7694				
	7587				
	7653				
	7627				
	7693				
3	7445				
	7367				
	7450				
	7372				
	7263				
4	5993				
	6104				
	6096				
	6201				
	6185				
5	6330				
	6295				
	6456				
	6369				
	6432				
6	7557				
	7476				
	7516				
	7319				
	7374				
7	7699				
	7492				
	7393				
	7693				
	7644				
8	6740				
	6835				
	6790				
	6655				
	6888				
Average:	**7027.825**				
Background:	**1146**				
Efficiency:	**0.22**				

New World Technology
Chi-Squared Test of Reliability Data Sheet

Project/Location:		China Lake Building 5					
Instrument Model:		2929			Instrument Serial No.	143878	
Last Calibration Date:		4/25/2007			Background Count Rate:	0.2	C_B
Detector Model:		43-10-1			Detector Serial No.:	147628	
Today's Date:		9/17/2007			Data Collected by:	Jamie Young	
Source ID:	564-38-2	Activity	22742	Alphas/Min	Efficiency:	55.2 %	
Radionuclide:	Th-230	CPM	CPM				
Count Number		(Gross) C_G	(Net) C_I		$(C_I - \bar{c})$	$(C_I - \bar{c})^2$	
1		**12501**	12500.8		-51.00	2601.00	
2		**12652**	12651.8		100.00	10000.00	
3		**12602**	12601.8		50.00	2500.00	
4		**12464**	12463.8		-88.00	7744.00	
5		**12353**	12352.8		-199.00	39601.00	
6		**12594**	12593.8		42.00	1764.00	
7		**12510**	12509.8		-42.00	1764.00	
8		**12732**	12731.8		180.00	32400.00	
9		**12625**	12624.8		73.00	5329.00	
10		**12440**	12439.8		-112.00	12544.00	
11		**12254**	12253.8		-298.00	88804.00	
12		**12504**	12503.8		-48.00	2304.00	
13		**12643**	12642.8		91.00	8281.00	
14		**12364**	12363.8		-188.00	35344.00	
15		**12558**	12557.8		6.00	36.00	
16		**12516**	12515.8		-36.00	1296.00	
17		**12747**	12746.8		195.00	38025.00	
18		**12649**	12648.8		97.00	9409.00	
19		**12790**	12789.8		238.00	56644.00	
20		**12542**	12541.8		-10.00	100.00	
Total		251040	251036		SUM	356490	$\Sigma(C_I - c)^2$
Mean Count: $\bar{c}$			12552				
Chi Squared Value (C^2):		28.40	10.11 - 30.14	Standard Deviation:	137		
+ 20% Value:	15062	- 20% Value:	10041				
Calculations Completed by:			Jamie Young			Date:	9/17/2007
Reviewed by:			Daniel Spicuzza			Date:	9/17/2007

New World Technology
Chi-Squared Test of Reliability Data Sheet

Project/Location:		China Lake Building 5					
Instrument Model:		2929			Instrument Serial No.	143878	
Last Calibration Date:		4/25/2007			Background Count Rate:	53	C_B
Detector Model:		43-10-1			Detector Serial No.:	147628	
Today's Date:		9/17/2007			Data Collected by:	Jamie Young	
Source ID:	525-83-5	Activity	5314	Betas/Min	Efficiency:	11.2 %	
Radionuclide:	C-14	CPM	CPM				
Count Number		(Gross) C_G	(Net) C_I		$(C_I - \bar{c})$	$(C_I - \bar{c})^2$	
1		**652**	599		5.85	34.22	
2		**633**	580		-13.15	172.92	
3		**673**	620		26.85	720.92	
4		**677**	624		30.85	951.72	
5		**663**	610		16.85	283.92	
6		**698**	645		51.85	2688.42	
7		**658**	605		11.85	140.42	
8		**588**	535		-58.15	3381.42	
9		**631**	578		-15.15	229.52	
10		**635**	582		-11.15	124.32	
11		**613**	560		-33.15	1098.92	
12		**635**	582		-11.15	124.32	
13		**682**	629		35.85	1285.22	
14		**640**	587		-6.15	37.82	
15		**667**	614		20.85	434.72	
16		**653**	600		6.85	46.92	
17		**646**	593		-0.15	0.02	
18		**623**	570		-23.15	535.92	
19		**647**	594		0.85	0.72	
20		**609**	556		-37.15	1380.12	
Total		12923	11863		SUM	13672.55	$\Sigma(C_I - c)^2$
Mean Count: $\bar{c}$			593				
Chi Squared Value (C^2):		23.05	10.11 - 30.14	Standard Deviation:	27		
+ 20% Value:	712	- 20% Value:	475				
Calculations Completed by:			Jamie Young			Date:	9/17/2007
Reviewed by:			Daniel Spicuzza			Date:	9/17/2007

New World Technology
Chi-Squared Test of Reliability Data Sheet

Project/Location:		China Lake Building 5					
Instrument Model:		2360			Instrument Serial No.	225305	
Last Calibration Date:		9/13/2007			Background Count Rate:	10.5	C_B
Detector Model:		43-37			Detector Serial No.:	147628	
Today's Date:		9/17/2007			Data Collected by:	Richard Kountz	
Source ID:	A7-267	Activity	43740	Alphas/Min	Efficiency:	35.4 %	
Radionuclide:	Th-230	CPM	CPM				
Count Number		(Gross) C_G	(Net) C_I		$(C_I - \bar{c})$	$(C_I - \bar{c})^2$	
1		**15469**	15458.5		-12.00	144.00	
2		**15497**	15486.5		16.00	256.00	
3		**15292**	15281.5		-189.00	35721.00	
4		**15477**	15466.5		-4.00	16.00	
5		**15530**	15519.5		49.00	2401.00	
6		**15247**	15236.5		-234.00	54756.00	
7		**15542**	15531.5		61.00	3721.00	
8		**15568**	15557.5		87.00	7569.00	
9		**15474**	15463.5		-7.00	49.00	
10		**15578**	15567.5		97.00	9409.00	
11		**15272**	15261.5		-209.00	43681.00	
12		**15623**	15612.5		142.00	20164.00	
13		**15619**	15608.5		138.00	19044.00	
14		**15633**	15622.5		152.00	23104.00	
15		**15387**	15376.5		-94.00	8836.00	
16		**15537**	15526.5		56.00	3136.00	
17		**15487**	15476.5		6.00	36.00	
18		**15552**	15541.5		71.00	5041.00	
19		**15454**	15443.5		-27.00	729.00	
20		**15382**	15371.5		-99.00	9801.00	
Total		309620	309410		SUM	247614	$\Sigma(C_I - c)^2$
Mean Count: $\bar{c}$			15471				
Chi Squared Value (C^2):		16.01	10.11 - 30.14	Standard Deviation:	114		
+ 20% Value:	18565	- 20% Value:	12376				
Calculations Completed by:			Richard Kountz			Date:	9/17/2007
Reviewed by:			Daniel Spicuzza			Date:	9/17/2007

New World Technology
Chi-Squared Test of Reliability Data Sheet

Project/Location:		China Lake Building 5					
Instrument Model:		2360			Instrument Serial No.	225305	
Last Calibration Date:		9/13/2007			Background Count Rate:	1146	C_B
Detector Model:		43-37			Detector Serial No.:	147628	
Today's Date:		9/17/2007			Data Collected by:	Richard Kountz	
Source ID:	A8-074	Activity	26320	Betas/Min	Efficiency:	27.5 %	
Radionuclide:	C-14	CPM	CPM				
Count Number		(Gross) C_G	(Net) C_I		$(C_I - \bar{c})$	$(C_I - \bar{c})^2$	
1		**8398**	7252		24.50	600.25	
2		**8369**	7223		-4.50	20.25	
3		**8294**	7148		-79.50	6320.25	
4		**8373**	7227		-0.50	0.25	
5		**8299**	7153		-74.50	5550.25	
6		**8155**	7009		-218.50	47742.25	
7		**8473**	7327		99.50	9900.25	
8		**8248**	7102		-125.50	15750.25	
9		**8375**	7229		1.50	2.25	
10		**8288**	7142		-85.50	7310.25	
11		**8564**	7418		190.50	36290.25	
12		**8545**	7399		171.50	29412.25	
13		**8302**	7156		-71.50	5112.25	
14		**8468**	7322		94.50	8930.25	
15		**8445**	7299		71.50	5112.25	
16		**8351**	7205		-22.50	506.25	
17		**8462**	7316		88.50	7832.25	
18		**8331**	7185		-42.50	1806.25	
19		**8381**	7235		7.50	56.25	
20		**8349**	7203		-24.50	600.25	
Total		167470	144550		SUM	188855	$\Sigma(C_I - c)^2$
Mean Count: $\bar{c}$			7228				
Chi Squared Value (C^2):		26.13	10.11 - 30.14	Standard Deviation:	100		
+ 20% Value:	8673	- 20% Value:	5782				
Calculations Completed by:			Richard Kountz			Date:	9/17/2007
Reviewed by:			Daniel Spicuzza			Date:	9/17/2007

New World Technology
Chi-Squared Test of Reliability Data Sheet

Project/Location:		China Lake Building 5					
Instrument Model:		2360			Instrument Serial No.	227399	
Last Calibration Date:		9/12/2007			Background Count Rate:	2.77	C_B
Detector Model:		43-68			Detector Serial No.:	178075	
Today's Date:		9/17/2007			Data Collected by:	Richard Kountz	
Source ID:	A7-267	Activity	43740	Alphas/Min	Efficiency:	36.4 %	
Radionuclide:	Th-230	CPM	CPM				
Count Number		(Gross) C_G	(Net) C_I		$(C_I - \bar{c})$	$(C_I - \bar{c})^2$	
1		**15930**	15927.23		-11.60	134.56	
2		**16276**	16273.23		334.40	111823.36	
3		**15914**	15911.23		-27.60	761.76	
4		**15792**	15789.23		-149.60	22380.16	
5		**16045**	16042.23		103.40	10691.56	
6		**16120**	16117.23		178.40	31826.56	
7		**15790**	15787.23		-151.60	22982.56	
8		**15870**	15867.23		-71.60	5126.56	
9		**15963**	15960.23		21.40	457.96	
10		**15992**	15989.23		50.40	2540.16	
11		**15988**	15985.23		46.40	2152.96	
12		**16004**	16001.23		62.40	3893.76	
13		**15936**	15933.23		-5.60	31.36	
14		**16037**	16034.23		95.40	9101.16	
15		**15884**	15881.23		-57.60	3317.76	
16		**15725**	15722.23		-216.60	46915.56	
17		**15698**	15695.23		-243.60	59340.96	
18		**15893**	15890.23		-48.60	2361.96	
19		**15986**	15983.23		44.40	1971.36	
20		**15989**	15986.23		47.40	2246.76	
Total		318832	318776.6		SUM	340058.8	$\Sigma(C_I - c)^2$
Mean Count: $\bar{c}$			15939				
Chi Squared Value (C^2):		21.34	10.11 - 30.14	Standard Deviation:	134		
+ 20% Value:	19127	- 20% Value:	12751				
Calculations Completed by:			Richard Kountz			Date:	9/17/2007
Reviewed by:			Daniel Spicuzza			Date:	9/17/2007

New World Technology
Chi-Squared Test of Reliability Data Sheet

Project/Location:		China Lake Building 5					
Instrument Model:		2360			Instrument Serial No.	227399	
Last Calibration Date:		9/12/2007			Background Count Rate:	326	C_B
Detector Model:		43-68			Detector Serial No.:	178075	
Today's Date:		9/17/2007			Data Collected by:	Richard Kountz	
Source ID:	A8-074	Activity	26320	Betas/Min	Efficiency:	26.9 %	
Radionuclide:	C-14	CPM	CPM				
Count Number		(Gross) C_G	(Net) C_I		$(C_I - \bar{c})$	$(C_I - \bar{c})^2$	
1		**7406**	7080		-7.95	63.20	
2		**7473**	7147		59.05	3486.90	
3		**7545**	7219		131.05	17174.10	
4		**7155**	6829		-258.95	67055.10	
5		**7434**	7108		20.05	402.00	
6		**7478**	7152		64.05	4102.40	
7		**7338**	7012		-75.95	5768.40	
8		**7498**	7172		84.05	7064.40	
9		**7288**	6962		-125.95	15863.40	
10		**7387**	7061		-26.95	726.30	
11		**7402**	7076		-11.95	142.80	
12		**7492**	7166		78.05	6091.80	
13		**7548**	7222		134.05	17969.40	
14		**7377**	7051		-36.95	1365.30	
15		**7421**	7095		7.05	49.70	
16		**7371**	7045		-42.95	1844.70	
17		**7373**	7047		-40.95	1676.90	
18		**7401**	7075		-12.95	167.70	
19		**7422**	7096		8.05	64.80	
20		**7470**	7144		56.05	3141.60	
Total		148279	141759		SUM	154220.95	$\Sigma(C_I - c)^2$
Mean Count: $\bar{c}$			7088				
Chi Squared Value (C^2):		21.76	10.11 - 30.14	Standard Deviation:	90		
+ 20% Value:	8506	- 20% Value:	5670				
Calculations Completed by:			Richard Kountz			Date:	9/17/2007
Reviewed by:			Daniel Spicuzza			Date:	9/17/2007

New World Technology
Chi-Squared Test of Reliability Data Sheet

Project/Location:		China Lake Building 5					
Instrument Model:		2360			Instrument Serial No.	227415	
Last Calibration Date:		9/12/2007			Background Count Rate:	3.4	C_B
Detector Model:		43-68			Detector Serial No.:	147404	
Today's Date:		9/18/2007			Data Collected by:	Richard Kountz	
Source ID:	A7-267	Activity	43740	Alphas/Min	Efficiency:	36.4 %	
Radionuclide:	Th-230	CPM	CPM				
Count Number		(Gross) C_G	(Net) C_I		$(C_I - \bar{c})$	$(C_I - \bar{c})^2$	
1		**16092**	16088.6		184.50	34040.25	
2		**15878**	15874.6		-29.50	870.25	
3		**15921**	15917.6		13.50	182.25	
4		**15733**	15729.6		-174.50	30450.25	
5		**15893**	15889.6		-14.50	210.25	
6		**15900**	15896.6		-7.50	56.25	
7		**16071**	16067.6		163.50	26732.25	
8		**15902**	15898.6		-5.50	30.25	
9		**16032**	16028.6		124.50	15500.25	
10		**16061**	16057.6		153.50	23562.25	
11		**15970**	15966.6		62.50	3906.25	
12		**15943**	15939.6		35.50	1260.25	
13		**15852**	15848.6		-55.50	3080.25	
14		**15905**	15901.6		-2.50	6.25	
15		**15890**	15886.6		-17.50	306.25	
16		**15721**	15717.6		-186.50	34782.25	
17		**15992**	15988.6		84.50	7140.25	
18		**15912**	15908.6		4.50	20.25	
19		**15792**	15788.6		-115.50	13340.25	
20		**15690**	15686.6		-217.50	47306.25	
Total		318150	318082		SUM	242783	$\Sigma(C_I - c)^2$
Mean Count: $\bar{c}$			15904				
Chi Squared Value (C^2):		15.27	10.11 - 30.14	Standard Deviation:	113		
+ 20% Value:	19085	- 20% Value:	12723				
Calculations Completed by:			Richard Kountz			Date:	9/18/2007
Reviewed by:			Daniel Spicuzza			Date:	9/18/2007

New World Technology
Chi-Squared Test of Reliability Data Sheet

Project/Location:		China Lake Building 5					
Instrument Model:		2360			Instrument Serial No.	227415	
Last Calibration Date:		9/12/2007			Background Count Rate:	299	C_B
Detector Model:		43-68			Detector Serial No.:	147404	
Today's Date:		9/18/2007			Data Collected by:	Richard Kountz	
Source ID:	A8-074	Activity	26320	Betas/Min	Efficiency:	18.8 %	
Radionuclide:	C-14	CPM	CPM				
Count Number		(Gross) C_G	(Net) C_I		$(C_I - \bar{c})$	$(C_I - \bar{c})^2$	
1		**5295**	4996		35.40	1253.16	
2		**5235**	4936		-24.60	605.16	
3		**5190**	4891		-69.60	4844.16	
4		**5326**	5027		66.40	4408.96	
5		**5302**	5003		42.40	1797.76	
6		**5112**	4813		-147.60	21785.76	
7		**5321**	5022		61.40	3769.96	
8		**5224**	4925		-35.60	1267.36	
9		**5244**	4945		-15.60	243.36	
10		**5196**	4897		-63.60	4044.96	
11		**5326**	5027		66.40	4408.96	
12		**5335**	5036		75.40	5685.16	
13		**5289**	4990		29.40	864.36	
14		**5308**	5009		48.40	2342.56	
15		**5352**	5053		92.40	8537.76	
16		**5230**	4931		-29.60	876.16	
17		**5266**	4967		6.40	40.96	
18		**5227**	4928		-32.60	1062.76	
19		**5129**	4830		-130.60	17056.36	
20		**5285**	4986		25.40	645.16	
Total		105192	99212		SUM	85540.8	$\Sigma(C_I - c)^2$
Mean Count: $\bar{c}$			4961				
Chi Squared Value (C^2):		17.24	10.11 - 30.14	Standard Deviation:	67		
+ 20% Value:	5953	- 20% Value:	3968				
Calculations Completed by:			Richard Kountz			Date:	9/18/2007
Reviewed by:			Daniel Spicuzza			Date:	9/18/2007

Daily Instrument Performance Test Data

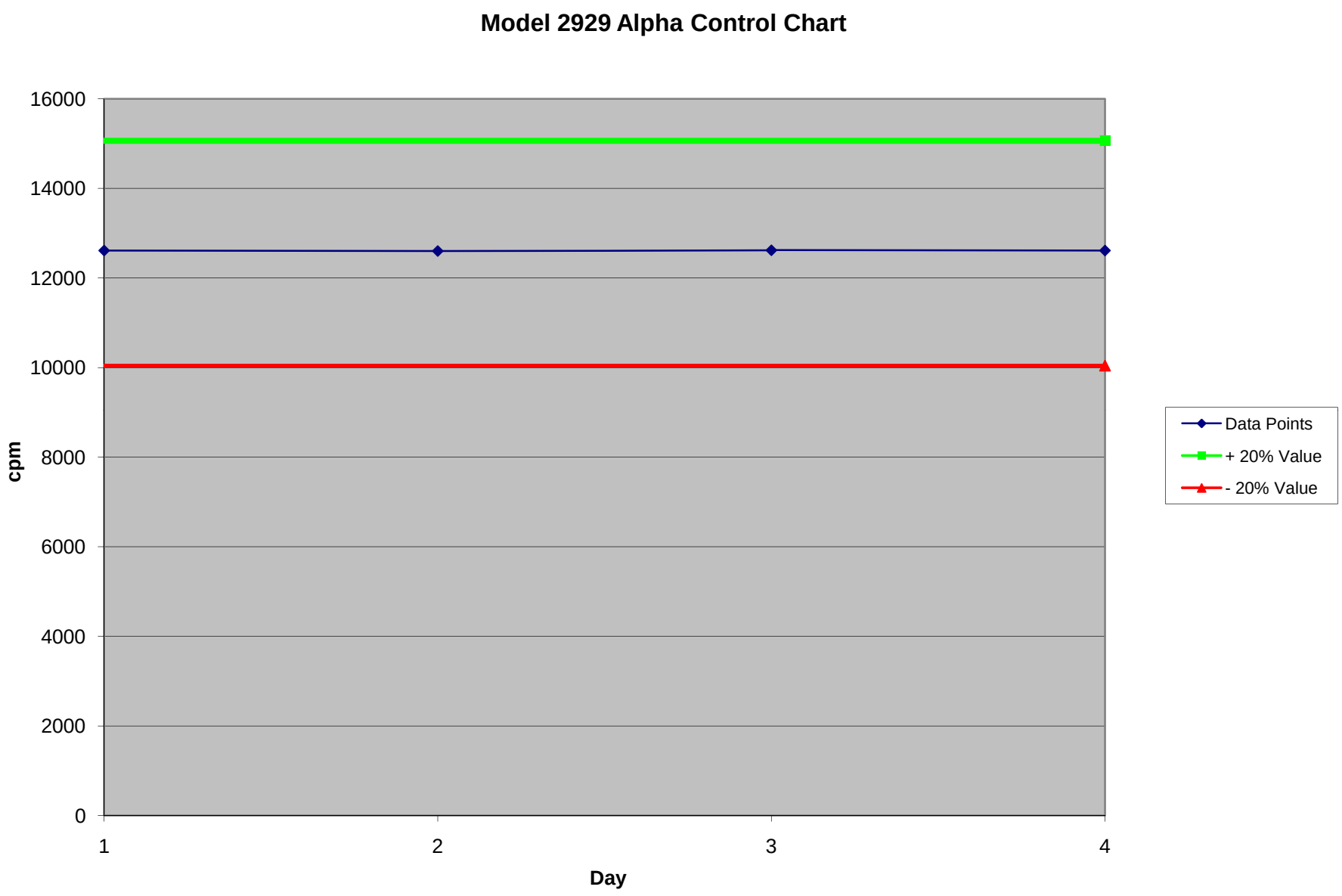
LUDLUM MODEL 2929
DAILY 20 MINUTE BACKGROUND AND EFFICIENCY

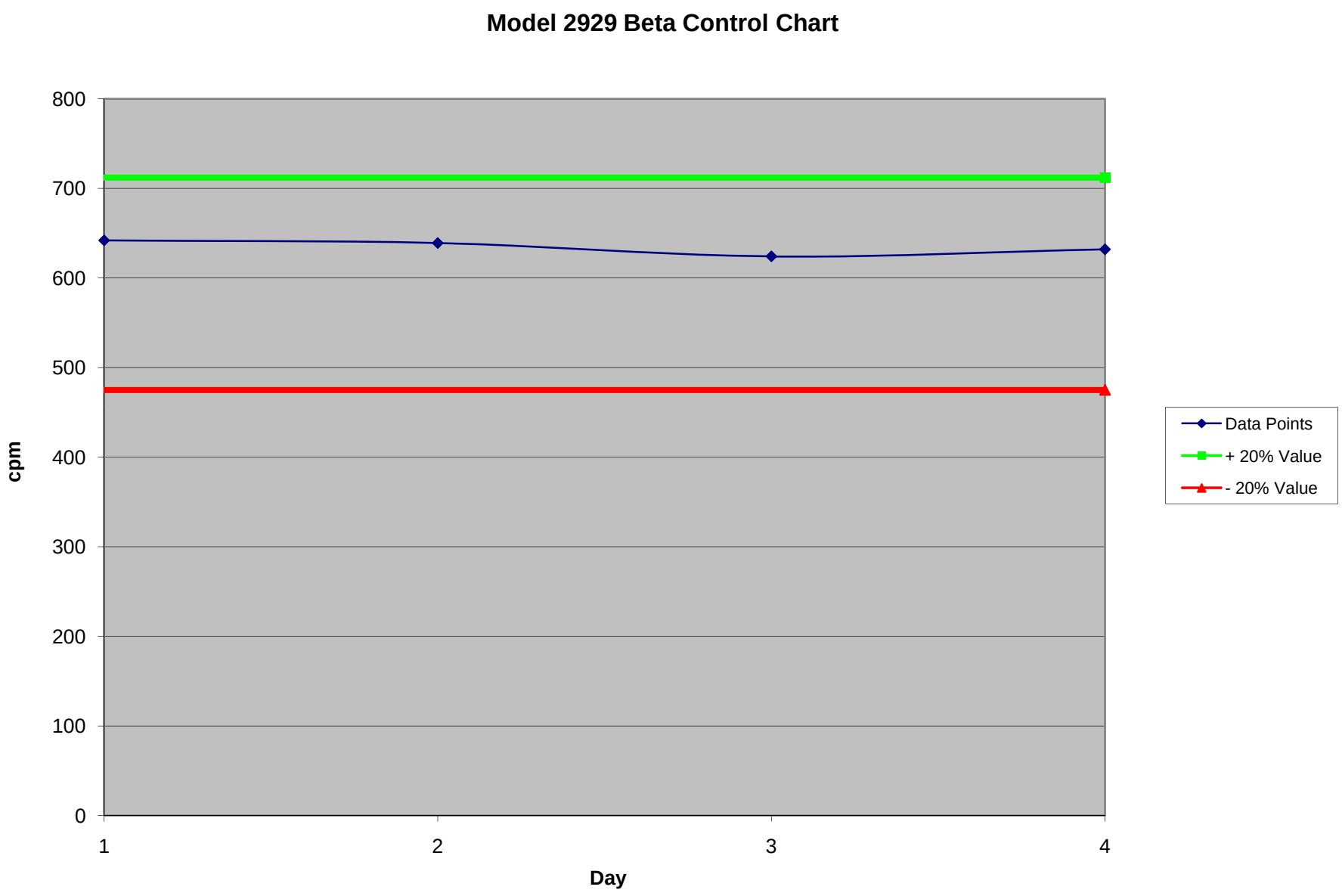
CHINA LAKE, BUILDING 5

For:	September, 2007								
Instrument ID:	143878						Detector ID:	147628	
Cal Due Date:	4/25/2008								
Sources Used:				Alpha S/N:	Th-230 564-38-2		Activity:	22,742	alphas/min
				Beta S/N:	C-14 525-83-5		Activity:	5,314	betas/min
				Acceptable Range of Background:		0	CPM to	1.65	CPM α
Background Count Time:		20	Minutes			32	CPM to	74	CPM βγ

Date	Total Counts α	Total Counts βγ	20-Minute Background (CPM) α	20-Minute Background (CPM) βγ	1-min α Source Counts	Eff. α	1- min βγ Source Counts	Eff. βγ	Initials
9/18/2007	13	1037	0.7	51.9	12612	55	642	11	JY
9/19/2007	9	1043	0.5	52.2	12599	55	639	11	JY
9/20/2007	3	1014	0.2	50.7	12618	55	624	11	JY
9/21/2007	5	1055	0.3	52.8	12609	55	632	11	JY

Reviewed by:	Daniel Spicuzza	Date:	9/21/2007

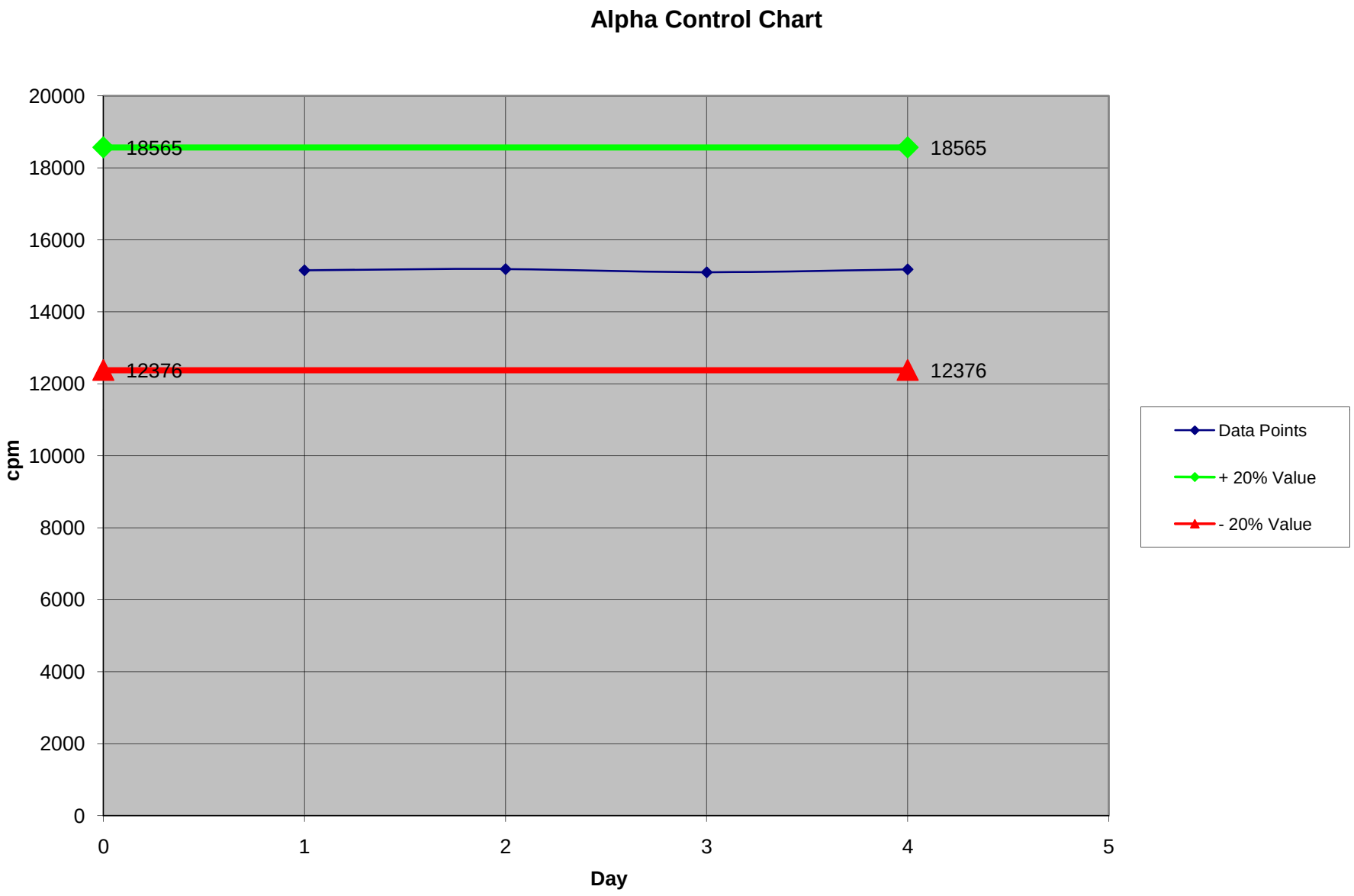

Model 2929 Alpha Control Chart
16000
14000
12000
10000
8000
6000
4000
2000
0
cpm
1
2
3
4
Day
Data Points
+ 20% Value
- 20% Value


Model 2929 Beta Control Chart
800
700
600
500
400
300
200
100
0
cpm
1
2
3
4
Day
Data Points
+ 20% Value
- 20% Value

DAILY INSTRUMENT PERFORMANCE TEST LOG SHEET

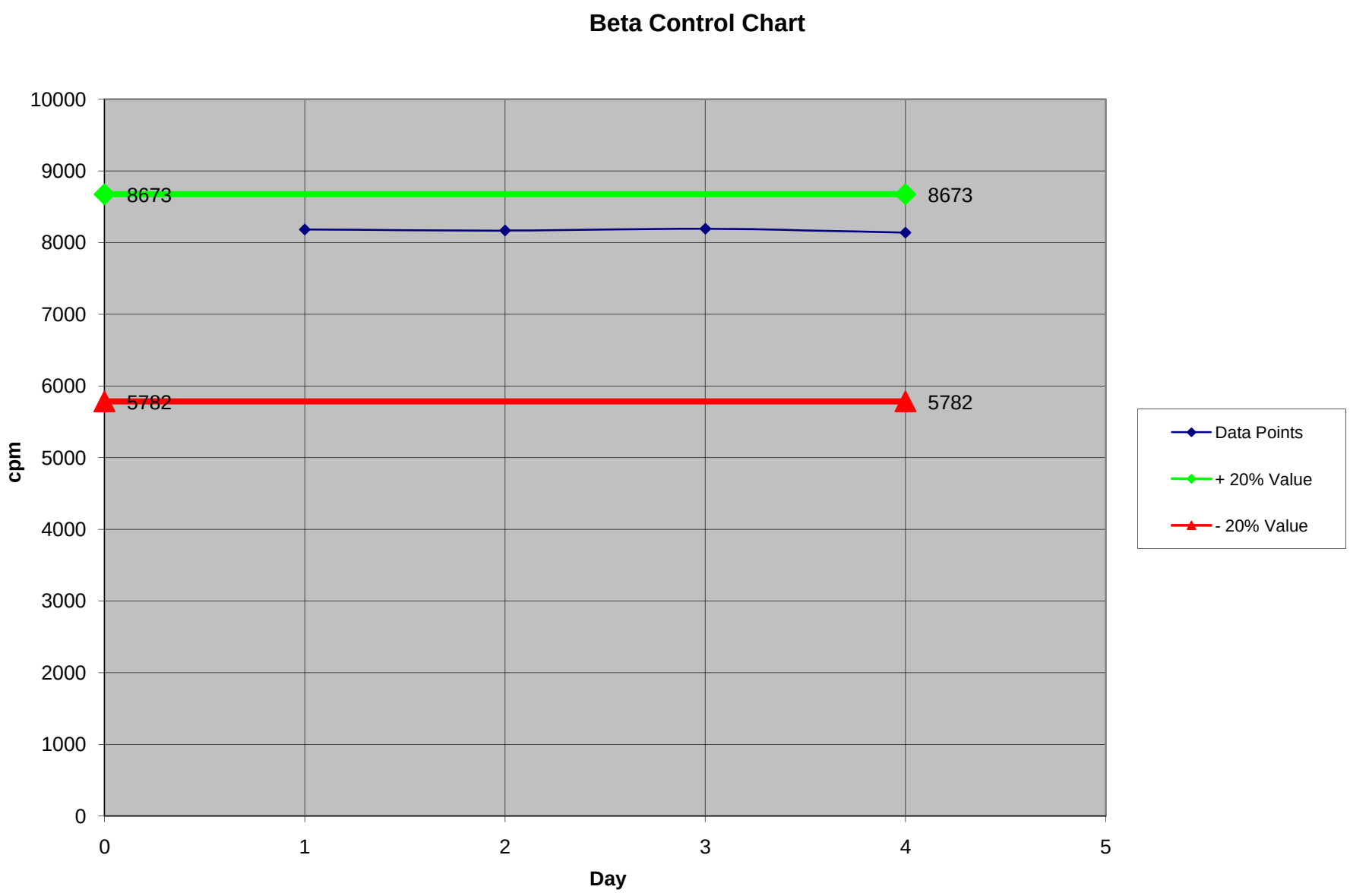
Project: China Lake Building 5 Room 1613

DATE	MODEL/TYPE (Meter/Detector)	S/N (Meter/Detector)	PHYSICAL DAMAGE Y/N	CAL. DUE DATE	SOURCE I.D Th-230	SOURCE ACTIVITY alphas/min	BACKGROUND CPM	READING CPM	Net CPM	EFF. %	PASS/ FAIL (P/F)	TECH. INIT.
9/18/2007	2360/43-37	225305/161295	N	9/13/2008	A7-267	43,740	9	15157	15148	35	P	RK
9/19/2007	2360/43-37	225305/161295	N	9/13/2008	A7-267	43,740	8	15193	15185	35	P	RK
9/21/2007	2360/43-37	225305/161295	N	9/13/2008	A7-267	43,740	9	15103	15094	35	P	RK
9/21/2007	2360/43-37	225305/161295	N	9/13/2008	A7-267	43,740	10	15183	15173	35	P	RK


Alpha Control Chart
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
cpm
18565
18565
12376
12376
0
1
2
3
4
5
Day
Data Points
+ 20% Value
- 20% Value

DAILY INSTRUMENT PERFORMANCE TEST LOG SHEET

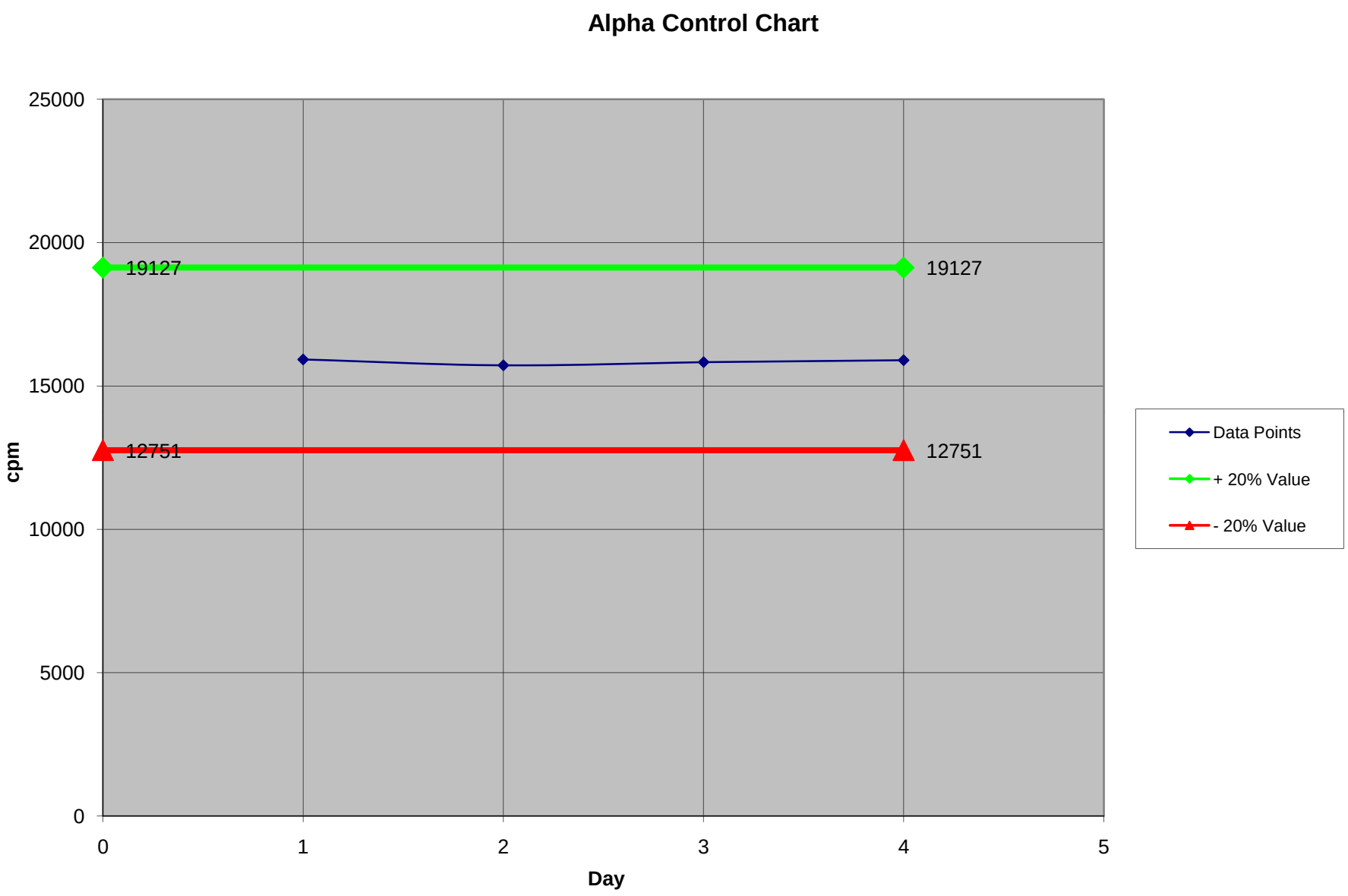
Project:	China Lake Building Room 1613											
DATE	MODEL/TYPE (Meter/Detector)	S/N (Meter/Detector)	PHYSICAL DAMAGE Y/N	CAL. DUE DATE	SOURCE I.D C-14	SOURCE ACTIVITY betas/min	BACKGROUND CPM	READING CPM	Net CPM	EFF. %	PASS/ FAIL (P/F)	TECH. INIT.
9/18/2007	2360/43-37	225305/161295	N	9/13/2008	A8-074	26,320	1094	9277	8183	31	P	RK
9/19/2007	2360/43-37	225305/161295	N	9/13/2008	A8-074	26,320	1023	9190	8167	31	P	RK
9/20/2007	2360/43-37	225305/161295	N	9/13/2008	A8-074	26,320	1013	9203	8190	31	P	RK
9/21/2007	2360/43-37	225305/161295	N	9/13/2008	A8-074	26,320	1086	9223	8137	31	P	RK


Beta Control Chart
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
cpm
8673
8673
5782
5782
0
1
2
3
4
5
Day
Data Points
+ 20% Value
- 20% Value

DAILY INSTRUMENT PERFORMANCE TEST LOG SHEET

Project: China Lake Building 5 Room 1613

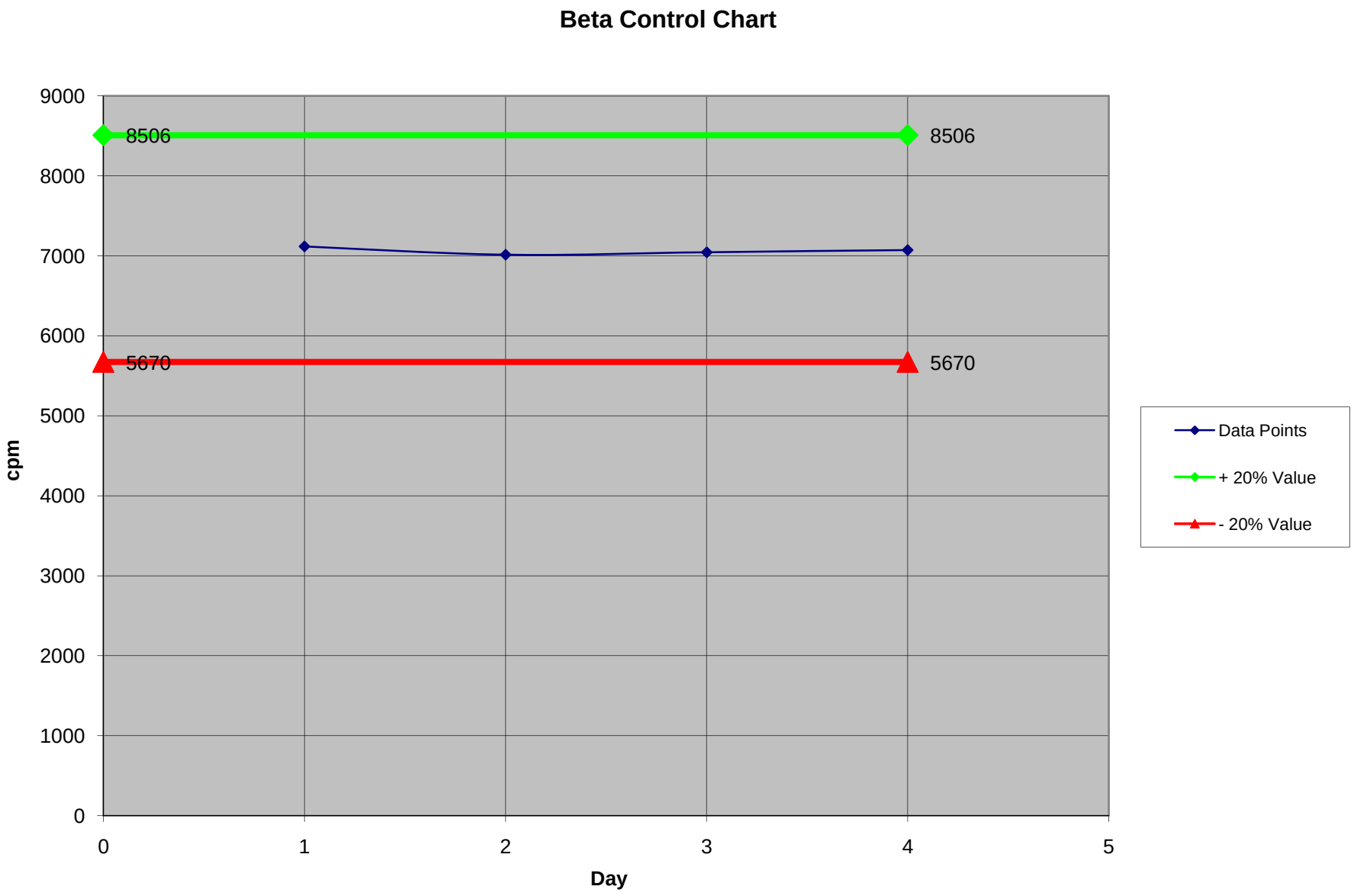
DATE	MODEL/TYPE (Meter/Detector)	S/N (Meter/Detector)	PHYSICAL DAMAGE Y/N	CAL. DUE DATE	SOURCE I.D Th-230	SOURCE ACTIVITY alphas/min	BACKGROUND CPM	READING CPM	Net CPM	EFF. %	PASS/ FAIL (P/F)	TECH. INIT.
9/18/2007	2360/43-68	227399/178075	N	9/12/2008	A7-267	43,740	2	15923	15921	36	P	RK
9/19/2007	2360/43-68	227399/178075	N	9/12/2008	A7-267	43,740	5	15721	15716	36	P	RK
9/20/2007	2360/43-68	227399/178075	N	9/12/2008	A7-267	43,740	2	15832	15830	36	P	RK
9/21/2007	2360/43-68	227399/178075	N	9/12/2008	A7-267	43,740	3	15901	15898	36	P	RK


Alpha Control Chart
25000
20000
15000
10000
5000
0
cpm
19127
19127
12751
12751
0
1
2
3
4
5
Day
Data Points
+ 20% Value
- 20% Value

DAILY INSTRUMENT PERFORMANCE TEST LOG SHEET

Project: China Lake Building Room 1613

DATE	MODEL/TYPE (Meter/Detector)	S/N (Meter/Detector)	PHYSICAL DAMAGE Y/N	CAL. DUE DATE	SOURCE I.D C-14	SOURCE ACTIVITY betas/min	BACKGROUND CPM	READING CPM	Net CPM	EFF. %	PASS/ FAIL (P/F)	TECH. INIT.
9/18/2007	2360/43-68	227399/178075	N	9/12/2008	A8-074	26,320	282	7397	7115	27	P	RK
9/19/2007	2360/43-68	227399/178075	N	9/12/2008	A8-074	26,320	279	7292	7013	27	P	RK
9/20/2007	2360/43-68	227399/178075	N	9/12/2008	A8-074	26,320	265	7309	7044	27	P	RK
9/21/2007	2360/43-68	227399/178075	N	9/12/2008	A8-074	26,320	254	7325	7071	27	P	RK

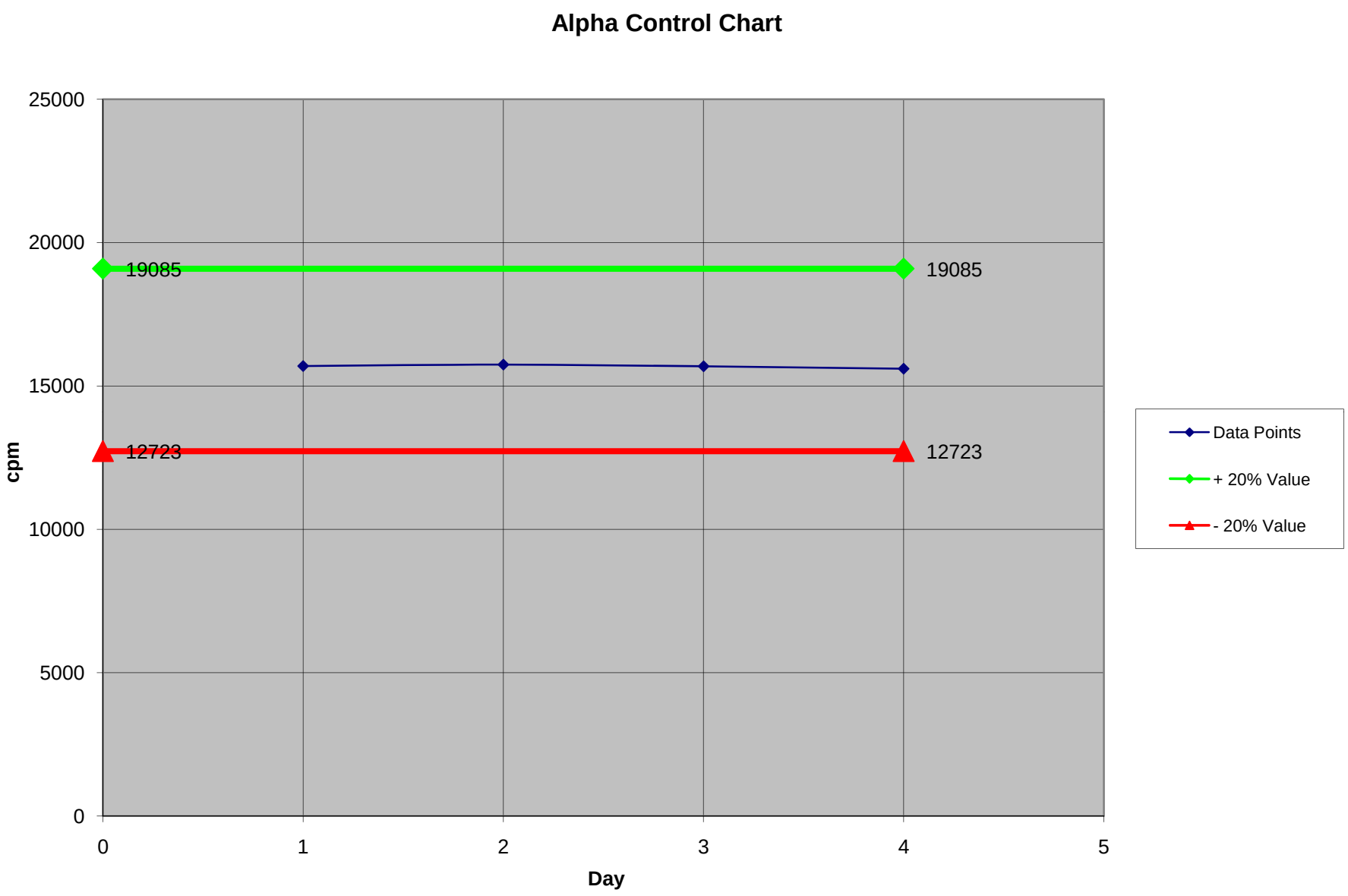

Beta Control Chart
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
cpm
8506
8506
5670
5670
0
1
2
3
4
5
Day
Data Points
+ 20% Value
- 20% Value

DAILY INSTRUMENT PERFORMANCE TEST LOG SHEET

Project: China Lake Building 5 Room 1613

DATE	MODEL/TYPE (Meter/Detector)	S/N (Meter/Detector)	PHYSICAL DAMAGE Y/N	CAL. DUE DATE	SOURCE I.D Th-230	SOURCE ACTIVITY alphas/min	BACKGROUND CPM	READING CPM	Net CPM	EFF. %	PASS/ FAIL (P/F)	TECH. INIT.
9/18/2007	2360/43-68	227415/147404	N	9/12/2008	A7-267	43,740	2	15693	15691	36	P	RK
9/19/2007	2360/43-68	227415/147404	N	9/12/2008	A7-267	43,740	2	15744	15742	36	P	RK
9/20/2007	2360/43-68	227415/147404	N	9/12/2008	A7-267	43,740	4	15683	15679	36	P	RK
9/21/2007	2360/43-68	227415/147404	N	9/12/2008	A7-267	43,740	4	15602	15598	36	P	RK

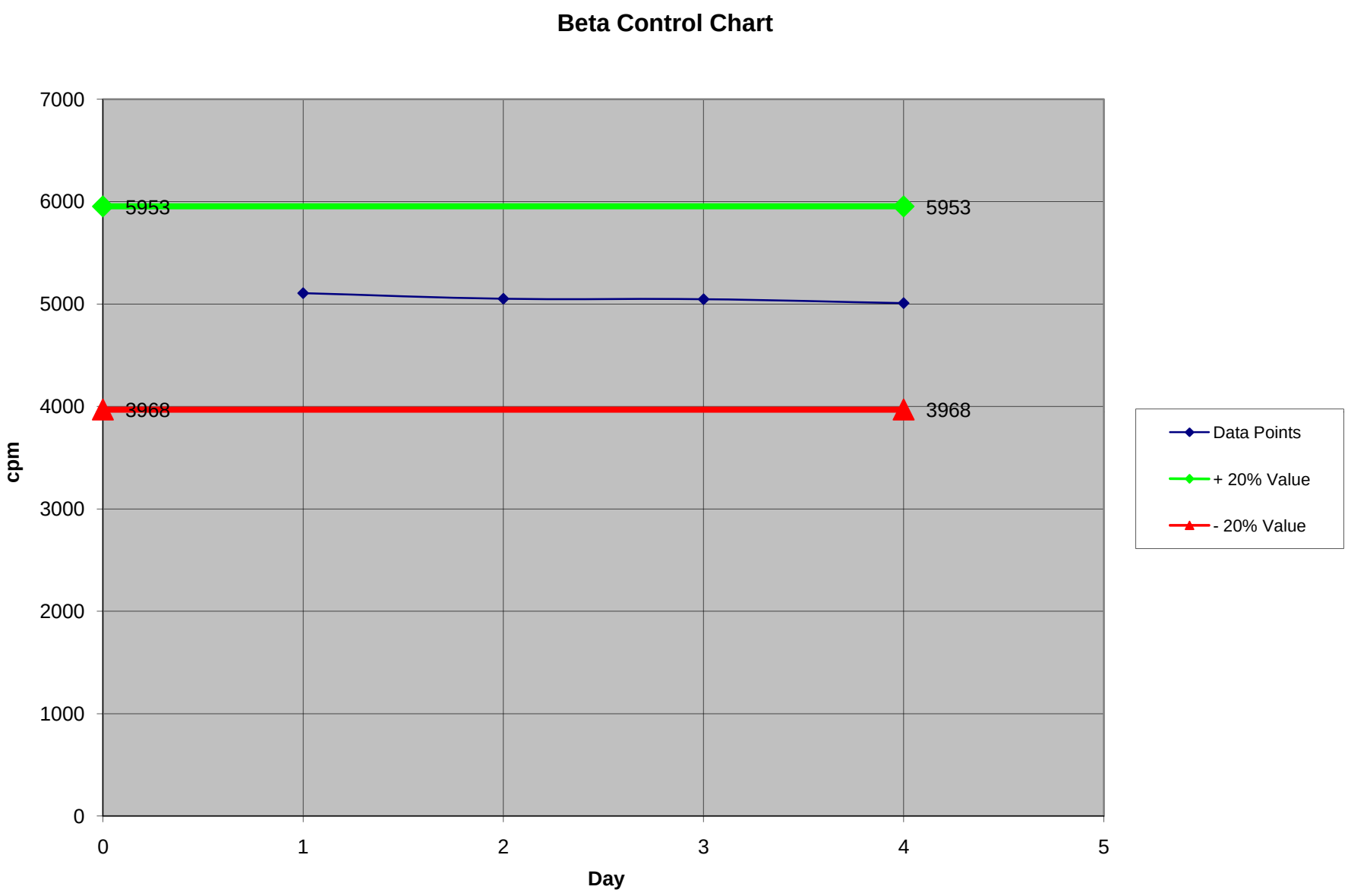
\


Alpha Control Chart
25000
20000
15000
10000
5000
0
cpm
19085
19085
12723
12723
0
1
2
3
4
5
Day
Data Points
+ 20% Value
- 20% Value

DAILY INSTRUMENT PERFORMANCE TEST LOG SHEET

Project: China Lake Building Room 1613

DATE	MODEL/TYPE (Meter/Detector)	S/N (Meter/Detector)	PHYSICAL DAMAGE Y/N	CAL. DUE DATE	SOURCE I.D C-14	SOURCE ACTIVITY betas/min	BACKGROUND CPM	READING CPM	Net CPM	EFF. %	PASS/ FAIL (P/F)	TECH. INIT.
9/18/2007	2360/43-68	227415/147404	N	9/12/2008	A8-074	26,320	225	5330	5105	19	P	RK
9/19/2007	2360/43-68	227415/147404	N	9/12/2008	A8-074	26,320	245	5295	5050	19	P	RK
9/20/2007	2360/43-68	227415/147404	N	9/12/2008	A8-074	26,320	238	5284	5046	19	P	RK
9/21/2007	2360/43-68	227415/147404	N	9/12/2008	A8-074	26,320	254	5261	5007	19	P	RK


Beta Control Chart
7000
6000
5000
4000
3000
2000
1000
0
cpm
5953
5953
3968
3968
0
1
2
3
4
5
Day
Data Points
+ 20% Value
- 20% Value

Appendix F

Waste Shipment Documentation

PermaFix Northwest, Inc.

Perma-Fix Northwest, Inc - FAX

Perma-Fix Northwest, Inc - 2025 Battelle Blvd. Richland WA. 99354
Business Phone (509) 375-7046
Materials Control Fax Number (509) 371-1040

To: NWT Fax Number: 925-443-0119

From: Larry Morin
Phone: 509-375-7046 Fax: 509-371-1040
E-Mail: lmorin@perma-fix.com

Date: 9-24-07 Number of pages including cover sheet: 3

SIGNED
xx Manifest ___ BOL ___ RSR
xx Low Level Pre-Shipment Notification Form
Shipment Authorization Number LLR07-108

Additional Remarks

Please note the e-mail address change.
Manifests should read: Until further notice.
PACIFIC ECOSOLUTIONS, fully owned by PERMA-FIX NORTHWEST INC
2025 BATTELLE BLVD.
RICHLAND, WA 99354
CONTACT: LARRY MORIN PHONE: 509-375-7046

CONFIDENTIALITY NOTICE: The document's accompanying this facsimile may contain confidential and/or legally privileged information. The information is intended for use of the individual or entity name on this transmittal sheet. If you are not the intended recipient, you are hereby notified that any disclosure, duplication or distribution of the information contained in and transmitted as part of this facsimile is strictly prohibited. If you receive this facsimile in error, notify us immediately by telephone and promptly return the received documents to us via U.S. Postal Service. Thank you.

ORIGINAL

CLR07-108

FORM 540

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): 888-999-2292

ORGANIZATION: New World Technology

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 2

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☐ YES ☑ NO. If Yes, provide Manifest Number: ____

EPA MANIFEST NUMBER

5. SHIPPER — NAME AND FACILITY: NWT for Naval Air Warfare Center, Building 6, China Lake, CA 93555-6001

SHIPPER I.D. NUMBER: USN 2007-002

☐ COLLECTOR ☐ PROCESSOR ☑ GENERATOR TYPE (Specify): G

SHIPMENT NUMBER: USN 2007-002

CONTACT: Richard Thatcher

TELEPHONE NUMBER (Include Area Code): 858-537-1529

6. CARRIER — Name and Address: R & R Trucking Inc., P.O. Box 545, Osceola, MO 64561

EPA ID. NUMBER: MOR000050473

SHIPPING DATE: 09/21/2007

CONTACT: Don Ritchie

TELEPHONE (Include Area Code): 800-825-6556

SIGNATURE: R Boon (Acknowledgment of receipt of waste received)

DATE: 9/21/07

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S); FORM 541 AND 541A — 1 PAGE(S); FORM 542 AND 542A — None PAGE(S); ADDITIONAL INFORMATION — None PAGE(S)

8. CONSIGNEE - Name and Facility: Perma-fix Northwest, Inc., 2025 Battelle Blvd., Richland, WA 99352

CONTACT: Larry Morin

TELEPHONE (Include Area Code): 509-375-5160

SIGNATURE — Authorized consignee acknowledgment of waste receipt

DATE: 9-24-07

9. MANIFEST NUMBER (Use this number on all continuation pages): USN 2007-002

10. CERTIFICATION: This is to certify that the above-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 30 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: Richard Thatcher

TITLE: Nat Sa. Beaver

DATE: 9/21/07

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (including proper shipping name, hazard class, UN Number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES	16. TOTAL PACKAGE ACTIVITY Bq	mCi	17. USA/DOD CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Radioactive material, excepted package-limited quantity of material, 7, UN 2910	NA	NA	Solid Oxides	C-14	7.0300E+01	(1.5930E+00)	NA	37 LBS; 7.5 FT3	CL-1
Radioactive material, excepted package-limited quantity of material, 7, UN 2910	NA	NA	Solid Oxides	Cs-137	5.6500E+01	(1.5000E+00)	NA	37 LBS; 7.5 FT3	CL-2

FOR CARRIER USE ONLY

20.

NWT
SHIPMENT ACKNOWLEDGMENT

Consignee: Please sign below after receiving and accepting this shipment. If a NRC form 540 or a Hazardous Waste manifest is included with this shipment, please sign Block 9, "Authorized consignee acknowledging waste receipt", or consignee block.

Please fax to: **New World Technology**

FAX No. 925-443-0119

Shipment No. :	USN 2007-002
Manifest No. :	USN 2007-002
Consignor:	NAVAL AIR WARFARE CTR CHINA LAKE, CA
Consignee:	PERMA-FIX NORTHWEST
Date of Shipment:	9/27/07
Signature of Consignee:	[signature]
Date of Receipt:	9-24-07

This above information is intended to satisfy the requirements of 10 CFR 20, appendix F.

Low Level Pre-Shipment Notification Form

Form

To: Larry Morin **Fax No. 509-371-1069**

Signature: [illegible] Date: 9-20-07

Phone Number: [illegible]

Rad Health Control Manager Signature

1. Broker/Shipper: New World Technology
2. Client: US Navy Naval Air Warfare Ctr
3. Carrier: R-R Trucking
4. Manifest Number: USN 2007-002
5. Ship Date: 9/21/2007
6. Scheduled Arrival Date: 9/24/2007
7. Material Description: Two 55 gallon drums of Compactible DAW (paper, plastic, metal, glass)

8. Broker/Shipper Telephone: [illegible]
9. Broker/Shipper FAX: [illegible]
10. Client Telephone: [illegible]
11. Client FAX: [illegible]
12. Broker/Vendor Name (Do not use acronyms): [illegible]

LAI ISAI ISAII LIB UIV
SCOI SCOII RAM HOS HMSII

Lab WASTE

13. List All Isotopes and Total Activity of Each:

Isotope	Activity		Isotope	Activity		Isotope	Activity
C-14	3.40E+00	mCi			mCi		
	DIC	mCi			mCi		
		mCi			mCi		
		mCi			mCi		
		mCi			mCi		
		mCi			mCi		
		mCi			mCi		
		mCi			mCi	Total	
		mCi			mCi		

14. Total SRM for Shipment (mCi): 0
15. Shipment Net Volume (ft³): 14
16. Total Curies for Shipment (mCi): [illegible]
17. Shipment Gross Weight (lb): 300
18. Container Type and Number: Two Metal drums
19. Carrier: Fiberbox
20. Fluids Bag: [illegible]
21. Cables: [illegible]
22. Metal (yes): [illegible]

23. Processing (list quantities and units, based on contracted billing category, for each waste stream processed)

Volume Reduction	Super Compaction	Metallic	Metal Shredding	Resin Thermal	Resin Solidification
	ESU				

Incineration Residuals	Sulfur	Batch Process Residuals	Other Residuals

24. Special processing or billing instructions: [illegible]

25. Have you completed a Washington State RHF 31 form? Yes
26. Are you exporting from the Rocky Mountain Compact? No
27. If block 26 is yes, do you have an export permit? [illegible]
28. Are you declaring any part of this waste to be NORM, NARM or exempt? No
29. If block 28 is yes, do you have a determination letter? [illegible]
30. End Disposition (single pass or more, if more than one facility is involved, attach a flow)

DOE Burial _____ Order generator _____ Order number

UG Redoxy _____ WA St. File Use Permit # _____ UG Energy Order #

Burial _____ Access Per Contract # _____ Order number

Evaporate _____ Sediment Contract Per # _____ Order number

Thermal Destruction (No disposal volume after processing)

Free Release _____

Return to Generator _____

Notice: The materials you are preparing to ship by Pacific Ecoindustries, Inc. are subject to a strict compliance audit. The driver will be required to stop for an inspection of his vehicle to ensure compliance with all State of the Union's and Department of Transportation requirements for vehicles carrying hazardous materials. The transport vehicle will not be allowed to enter the state until the vehicle passes this inspection. The shipment will not be accepted at PEI without the above, or special arrangements made at the time of the shipment.

1.) Weigh Station at Plymouth (I-82) Phone (509) 934-7000

2.) Weigh Station at Spokane (I-90) Phone (800) 220-4310

The driver must notify one of these disciplines by phone a hour prior to arriving PEI. Failure to stop at one of the above checkpoints. A penalty assessment will be imposed in addition to all other costs and charges for these requirements before leaving your facility.

21. I hereby certify this form is complete to the best of my knowledge.

Shipper Signature: _____ Date _____

Shipper Name (Print): Richard Thrasher Phone (801-307-1112 ext)

This form is to be completed and sent to Pacific EcoIndustries, Richland WA at least 24 hours prior to origination of your shipment. If a shipment arrives without a shipment approval number there may be delays and demurrage charges or possible return of the shipment to the generator.

To Larry Morin Fax No. 509-371-1546

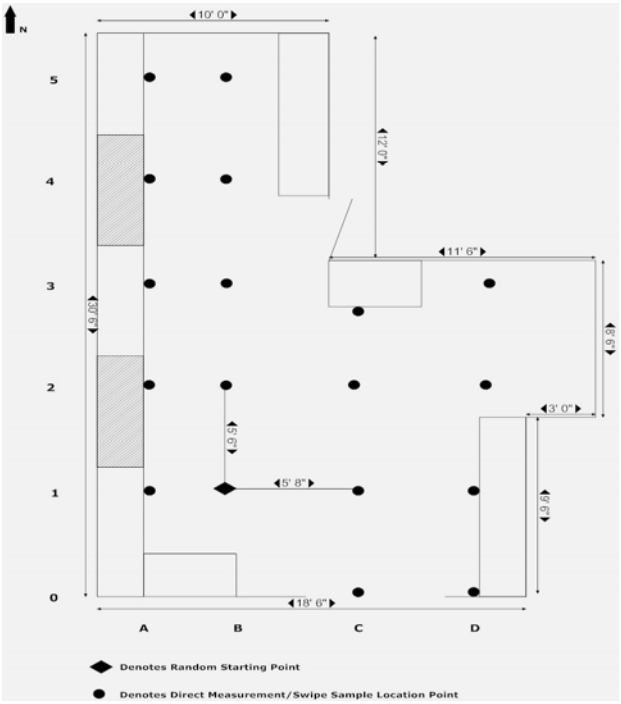
Appendix G

Room 1613 Survey Unit Survey Data

RADIATION/CONTAMINATION SURVEY FORM

DATE: 9/19/2007	TIME: 11:55	INSTRUMENTATION USED						
		Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm^2)	Background + (dpm/100cm^2)
SURVEY NUMBER: N/A		2360	225305	9/13/2008	α 27.00%	α 6.75%	α 31.58	α 28.00
		43-37	147628		βγ 22.00%	βγ 5.50%	βγ 352.80	βγ 3587.94
LOCATION: China Lake Building 5, Room 1613		2929	143878	4/25/2008	α 55.40%	α 13.85%	α 20.93	α 3.61
					βγ 11.10%	βγ 2.78%	βγ 735.02	βγ 1881.08
SURVEYOR: Jamie Young								
Reviewed By: Dan Spicuzza								
Isotopes of Concern: ^{232}Th ^{14}C		Static Count Time: 2 Minutes						

Description of drawing: Room 1613 Floor Survey Unit



Comments:

All LAW's were ≤ background α β

Scan Ranges 5-10 cpm alpha 800-1000 cpm beta.

No detectable alpha/beta activity over background was found.

100% of all accessible surface areas of the floor were scan surveyed.

Routine (Daily / Weekly / Monthly) ☐ **Non-routine** X

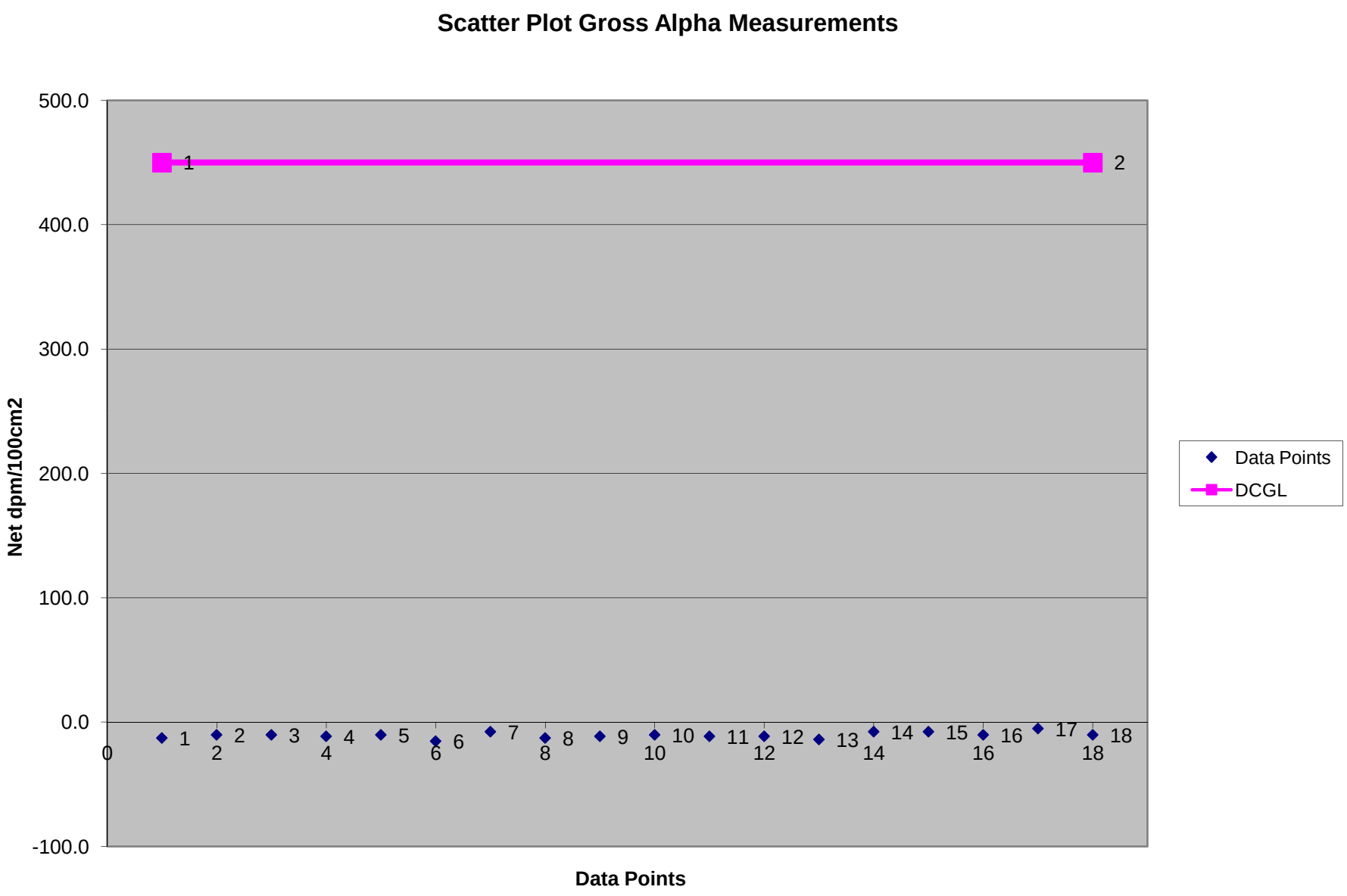
(#)	denotes swipe location and fixed α/β readings
#	denotes G/A radiation readings
# / #	denotes contact / 1 meter radiation readings.
*	denotes highest radiation reading on contact
LAW	denotes large area masslinn wipe
Δ	denotes static location.
+	Unless Otherwise Noted
	All readings in µr/hr unless otherwise noted
	K = 1000

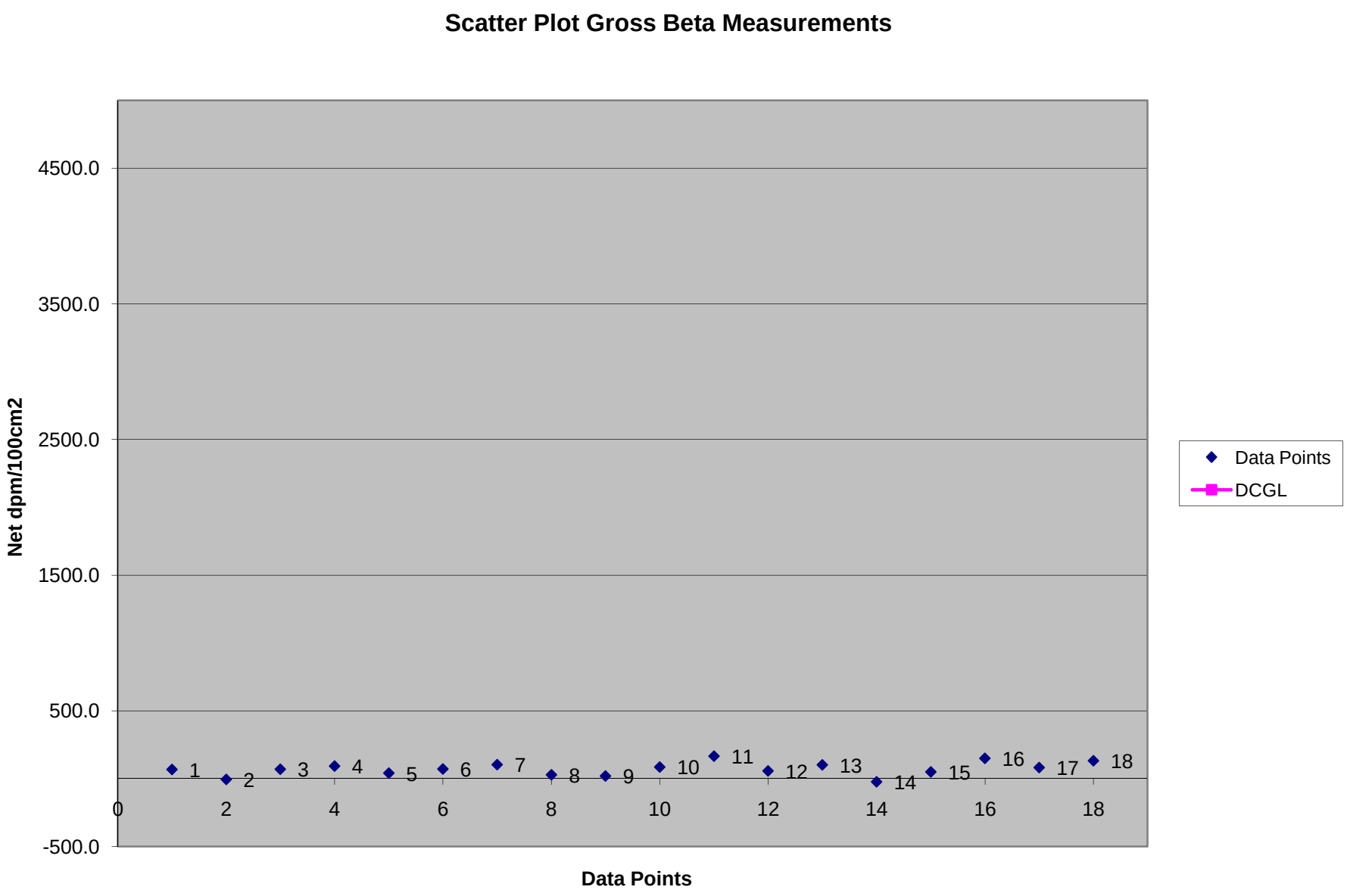
RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: N/A

SURVEYOR: Jamie Young | LOCATION: China Lake Building 5, Room 1613

Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	
A1				-12.7	67.2	-3.6	-103.3	
A2				-10.2	-6.2	-1.2	-91.3	
A3				-10.2	70.3	-1.2	-139.3	
A4				-11.5	92.2	6.0	-151.4	
A5				-10.2	40.6	-3.6	136.9	
B1				-15.3	71.9	1.2	-55.3	
B2				-7.6	103.1	-3.61	-55.26	
B3				-12.7	28.1	-3.61	-67.27	
B4				-11.5	18.7	-1.20	-115.32	
B5				-10.2	85.9	-1.20	-19.22	
C0				-11.5	165.6	-3.61	28.83	
C1				-11.5	57.8	-1.20	-19.22	
C2				-14.0	101.5	-3.61	-7.21	
C3				-7.6	-23.4	-3.61	4.80	
D0				-7.6	50.0	-1.20	-127.33	
D1				-10.2	150.0	-3.61	-43.24	
D2				-5.1	82.8	-3.61	-91.29	
D3				-10.2	131.2	-3.61	-151.35	
N/A								
N/A								
N/A						

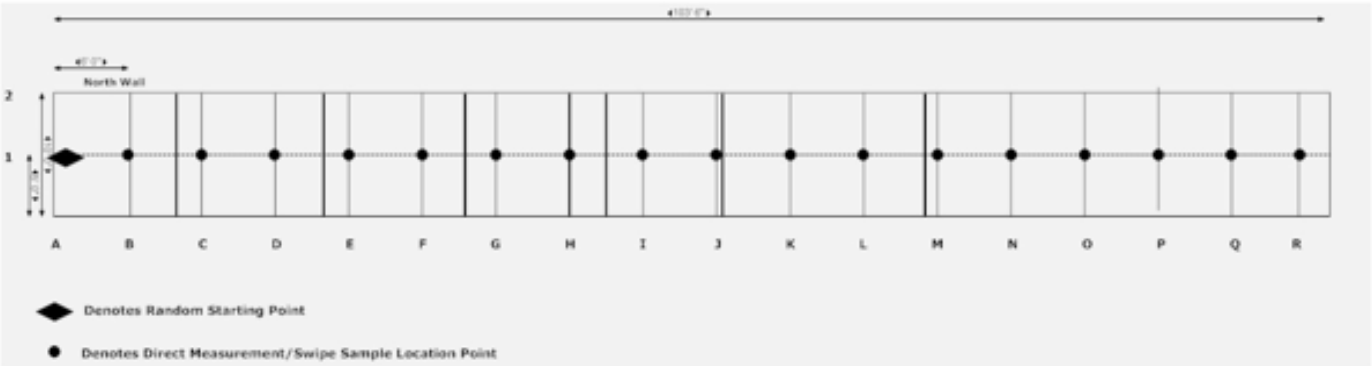

Scatter Plot Gross Alpha Measurements
500.0
400.0
300.0
200.0
100.0
0.0
-100.0
Net dpm/100cm2
Data Points
Data Points
DCGL
1
2


Scatter Plot Gross Beta Measurements
Net dpm/100cm2
4500.0
3500.0
2500.0
1500.0
500.0
-500.0
0
2
4
6
8
10
12
14
16
18
Data Points
Data Points
DCGL

RADIATION/CONTAMINATION SURVEY FORM

DATE: 9/19/2007	TIME: 14:00	INSTRUMENTATION USED						
		Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm^2)	Background + (dpm/100cm^2)
SURVEY NUMBER: N/A		2360	227415	9/12/2008	α 36.40%	α 9.10%	α 83.32	α 52.33
		43-68	147404		βγ 18.80%	βγ 4.70%	βγ 877.38	βγ 3976.70
LOCATION: China Lake Building 5, Room 1613		2929	143878	4/25/2008	α 55.40%	α 13.85%	α 20.93	α 3.61
					βγ 11.10%	βγ 2.78%	βγ 735.02	βγ 1881.08
SURVEYOR: Jamie Young/Alan Campellone								
Reviewed By: Dan Spicuzza								
Isotopes of Concern: ^{232}Th ^{14}C		Static Count Time: 2 Minutes						

Description of drawing: Room 1613 Lower Walls Survey Unit



Comments:

All LAW's were ≤ background α β

Scan Ranges 5-10 cpm alpha 200-300 cpm beta.

No detectable alpha/beta activity over background was found.

100% of all accessible surface areas of the lower walls were scan surveyed.

Routine (Daily / Weekly / Monthly) ☐ **Non-routine** X

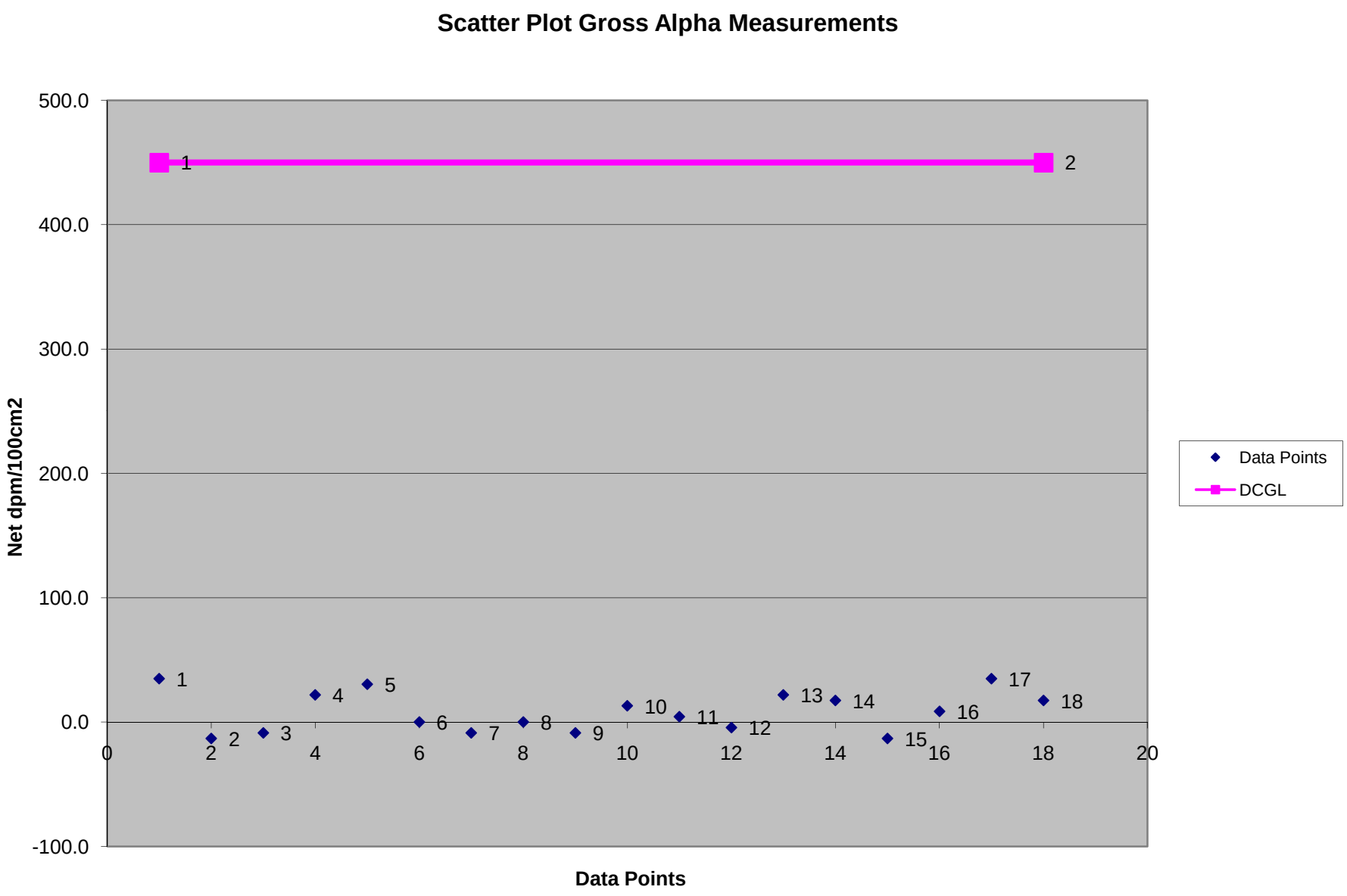
(#)	denotes swipe location and fixed α/β readings
#	denotes G/A radiation readings
# / #	denotes contact / 1 meter radiation readings.
*	denotes highest radiation reading on contact
LAW	denotes large area masslinn wipe
Δ	denotes static location.
+	Unless Otherwise Noted
	All readings in µr/hr unless otherwise noted
	K = 1000

RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: N/A

SURVEYOR: Jamie Young/Alan Campellone | LOCATION: China Lake Building 5, Room 1613

Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
A1				34.9	481.3	-1.2	-55.3	
B1				-13.1	1080.7	1.2	16.8	
C1				-8.7	937.2	-1.2	40.8	
D1				21.8	194.2	-3.6	76.9	
E1				30.5	304.0	-3.6	28.8	
F1				0.0	920.3	-3.6	76.9	
G1				-8.7	506.6	1.20	-19.22	
H1				0.0	751.4	1.20	28.83	
I1				-8.7	633.2	-3.61	88.89	
J1				13.1	683.9	-3.61	-7.21	
K1				4.4	751.4	-3.61	-43.24	
L1				-4.4	726.1	-1.20	-7.21	
M1				21.8	616.3	1.20	52.85	
N1				17.4	574.1	-1.20	-43.24	
O1				-13.1	878.1	-1.20	4.80	
P1				8.7	236.4	-3.61	64.86	
Q1				34.9	439.0	-1.20	4.80	
R1				17.4	430.6	-3.61	-31.23	
N/A								
N/A								
N/A						


Scatter Plot Gross Alpha Measurements
500.0
400.0
300.0
200.0
100.0
0.0
-100.0
Net dpm/100cm2
0
2
4
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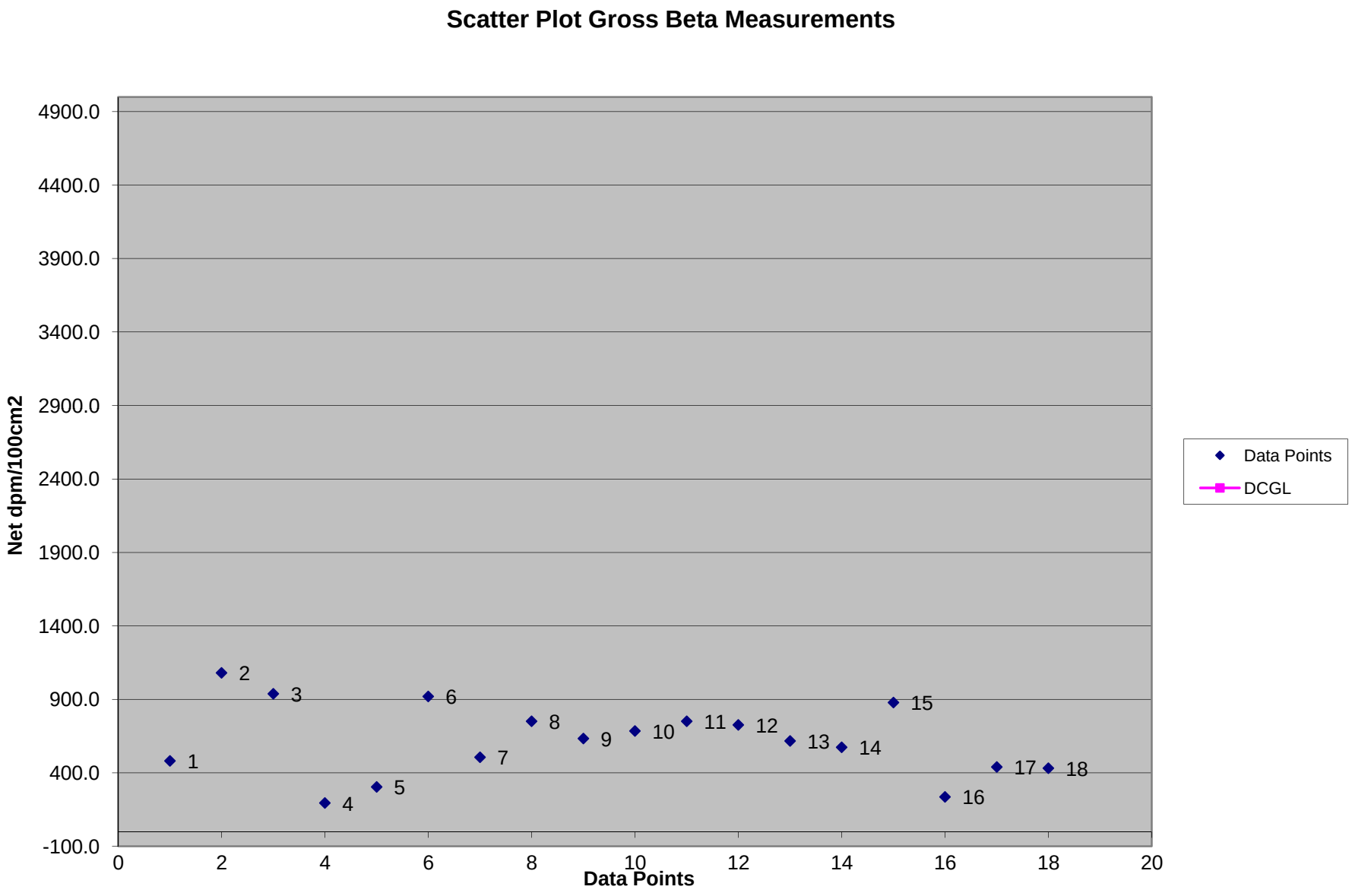
8
10
12
14
16
18
20
Data Points
1
2
Data Points
DCGL


Scatter Plot Gross Beta Measurements
Net dpm/100cm2
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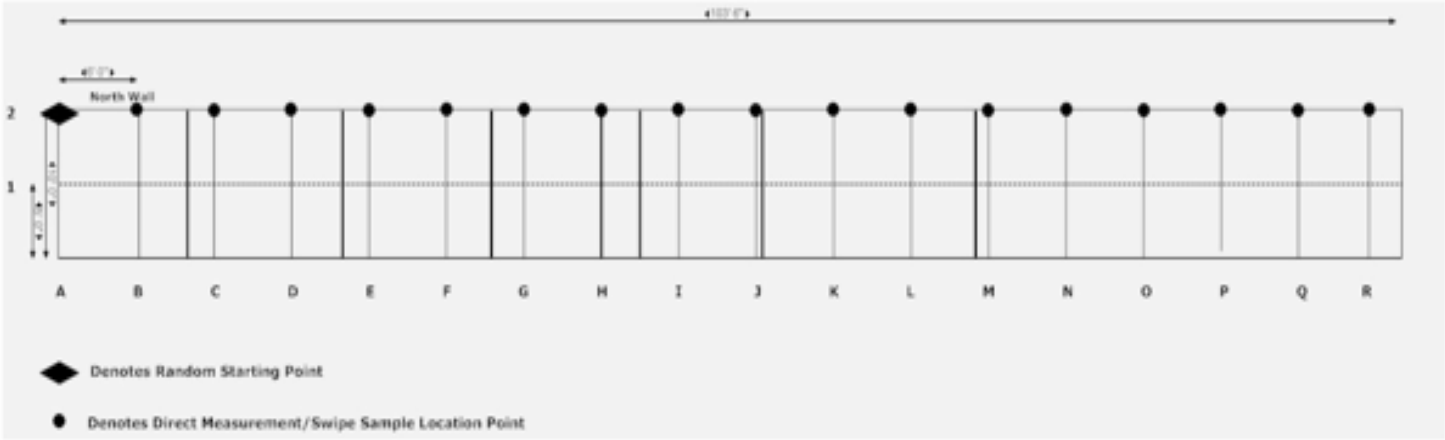
4400.0
3900.0
3400.0
2900.0
2400.0
1900.0
1400.0
900.0
400.0
-100.0
0
2
4
6
8
10
12
14
16
18
20
Data Points
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
Data Points
DCGL

RADIATION/CONTAMINATION SURVEY FORM

DATE: 9/19/2007	TIME: 16:50	INSTRUMENTATION USED						
		Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm^2)	Background + (dpm/100cm^2)
SURVEY NUMBER: N/A		2360	227415	9/12/2008	α 36.40%	α 9.10%	α 83.32	α 52.33
		43-68	147404		βγ 18.80%	βγ 4.70%	βγ 877.38	βγ 3976.70
LOCATION: China Lake Building 5, Room 1613		2929	143878	4/25/2008	α 55.40%	α 13.85%	α 20.93	α 3.61
					βγ 11.10%	βγ 2.78%	βγ 735.02	βγ 1881.08
SURVEYOR: Jamie Young/Alan Campellone								
Reviewed By: Dan Spicuzza								
Isotopes of Concern: ^{232}Th ^{14}C		Static Count Time: 2 Minutes						

Description of drawing: Room 1613 Upper Walls Survey Unit



Comments:

All LAW's were ≤ background α β

Scan Ranges 5-10 cpm alpha 200-300 cpm beta.

No detectable alpha/beta activity over background was found.

50% of all accessible surface areas of the upper walls were scan surveyed.

Routine (Daily / Weekly / Monthly) ☐ **Non-routine** X

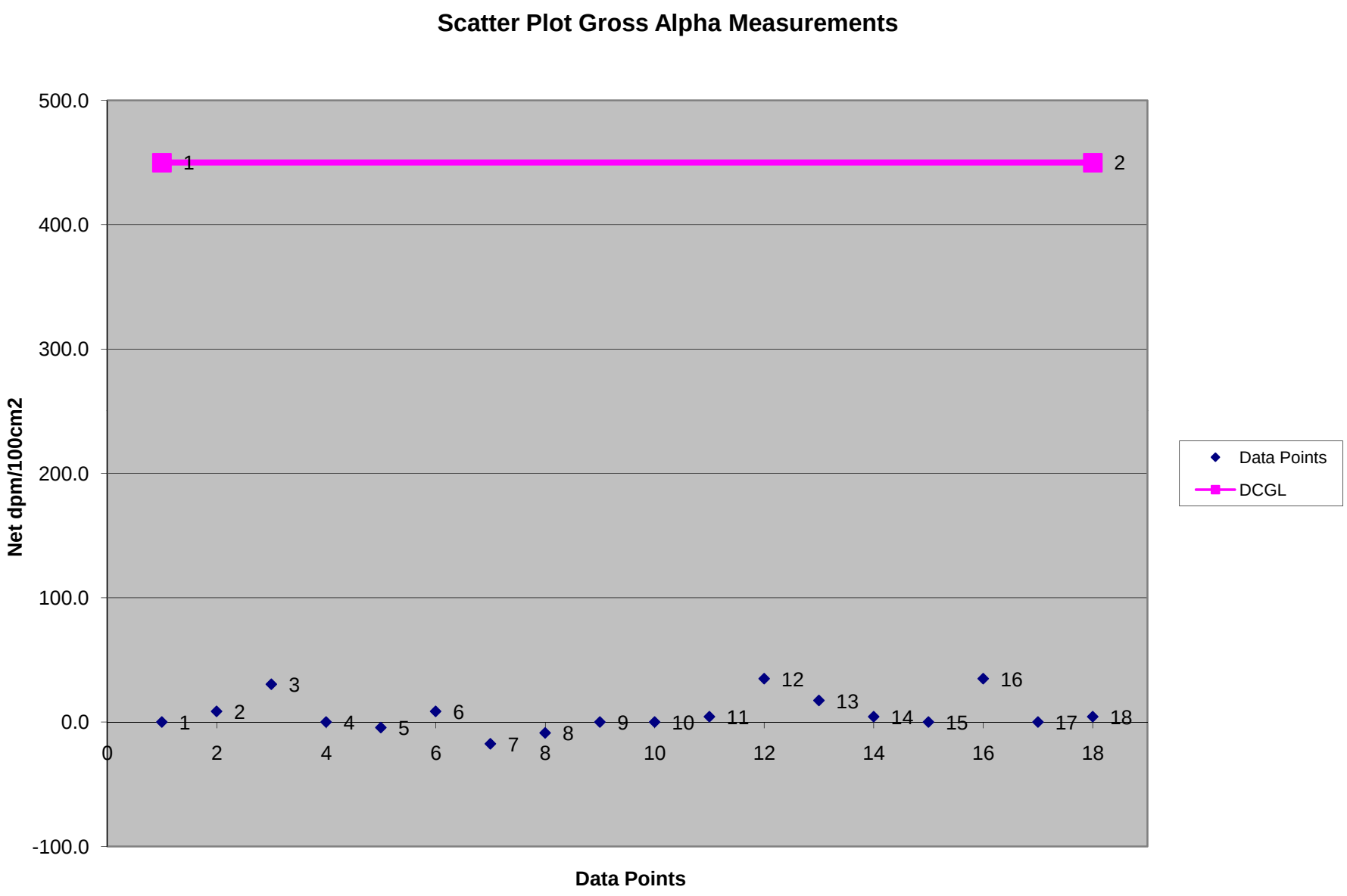
(#)	denotes swipe location and fixed α/β readings
#	denotes G/A radiation readings
# / #	denotes contact / 1 meter radiation readings.
*	denotes highest radiation reading on contact
LAW	denotes large area masslinn wipe
Δ	denotes static location.
+	Unless Otherwise Noted
	All readings in µr/hr unless otherwise noted
	K = 1000

RADIATION/CONTAMINATION SURVEY SUPPLEMENT **Page 2 of 2**

SURVEY NUMBER: N/A

SURVEYOR: Jamie Young/Alan Campellone | LOCATION: China Lake Building 5, Room 1613

Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
A2				0.0	844.3	-1.2	-43.2	
B2				8.7	1511.3	-3.6	-79.3	
C2				30.5	2406.3	-3.6	4.8	
D2				0.0	827.4	-3.6	-43.2	
E2				-4.4	270.2	1.2	16.8	
F2				8.7	886.5	-1.2	52.9	
G2				-17.4	1832.2	-1.20	4.80	
H2				-8.7	717.7	-3.61	40.84	
I2				0.0	582.6	-3.61	16.82	
J2				0.0	515.0	-1.20	4.80	
K2				4.4	1089.2	-1.20	-55.26	
L2				34.9	971.0	1.20	-19.22	
M2				17.4	624.8	-3.61	16.82	
N2				4.4	616.3	-3.61	52.85	
O2				0.0	168.9	1.20	-31.23	
P2				34.9	1089.2	-1.20	-43.24	
Q2				0.0	540.4	-1.20	76.88	
R2				4.4	878.1	-1.20	64.86	
N/A								
N/A								
N/A						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300.0
200.0
100.0
0.0
-100.0
Net dpm/100cm2
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8
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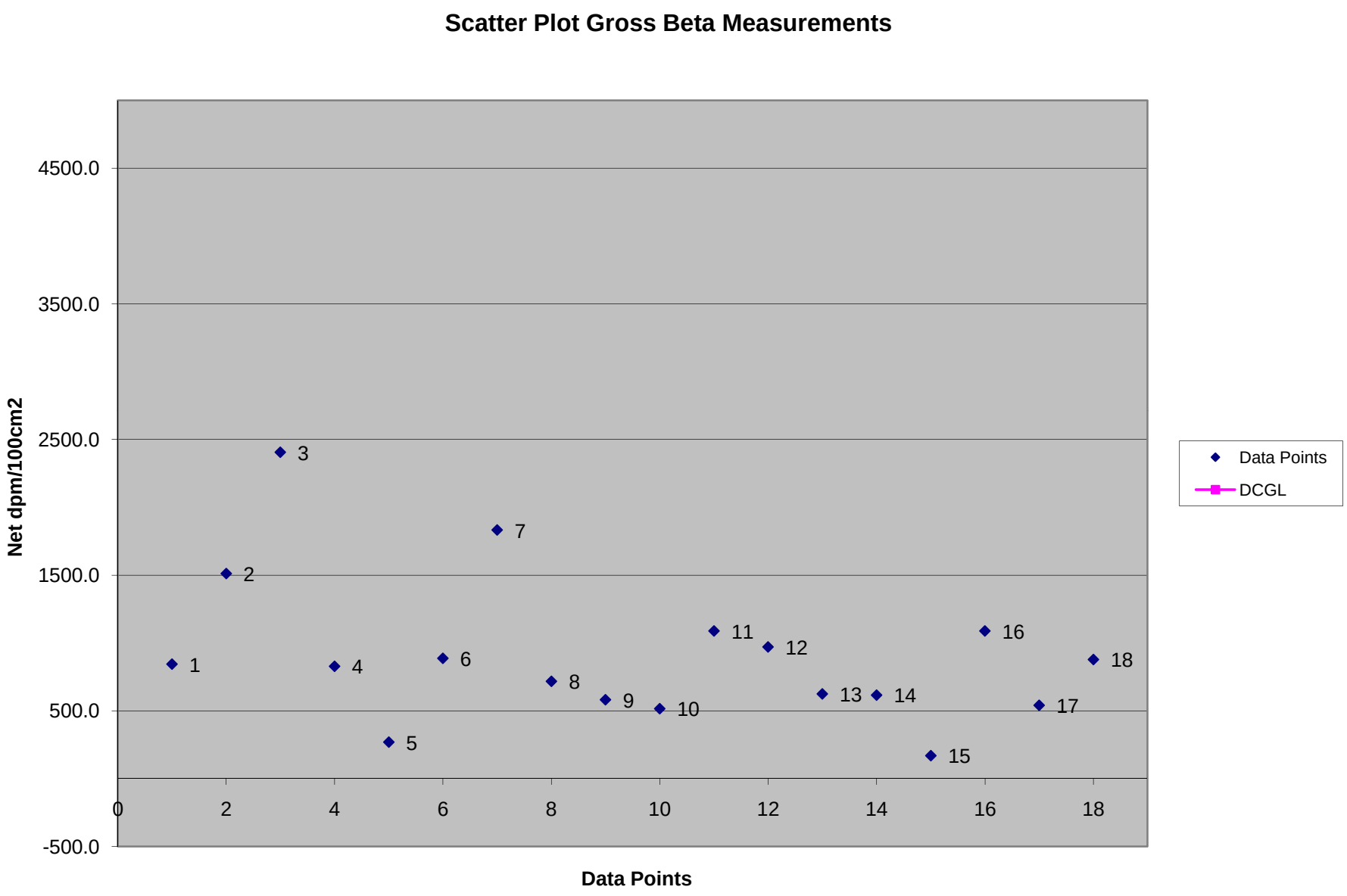
12
14
16
18
Data Points
Data Points
DCGL


Scatter Plot Gross Beta Measurements
Net dpm/100cm2
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2500.0
1500.0
500.0
-500.0
0
2
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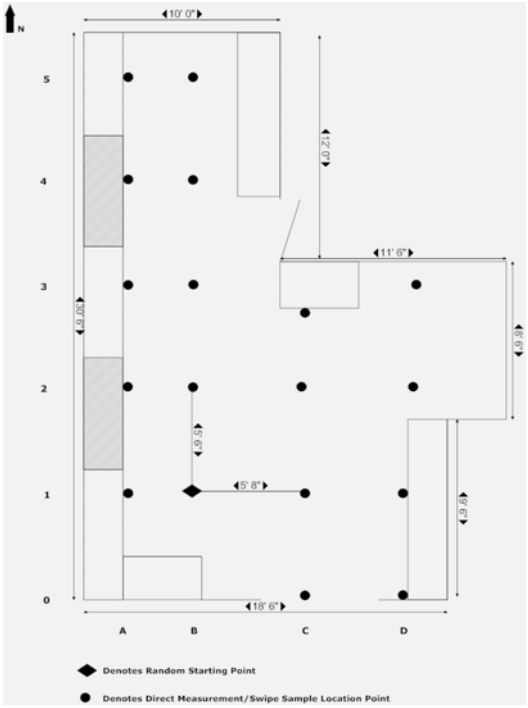
12
14
16
18
Data Points
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
Data Points
DCGL

RADIATION/CONTAMINATION SURVEY FORM

DATE: 9/20/2007	TIME: 11:30	INSTRUMENTATION USED						
		Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm^2)	Background + (dpm/100cm^2)
SURVEY NUMBER: N/A		2360	227415	9/12/2008	α 36.40%	α 9.10%	α 90.14	α 62.97
		43-68	147404		βγ 18.80%	βγ 4.70%	βγ 1281.51	βγ 8643.62
LOCATION: China Lake Building 5, Room 1613		2929	143878	4/25/2008	α 55.40%	α 13.85%	α 15.89	α 1.44
					βγ 11.10%	βγ 2.78%	βγ 724.90	βγ 1827.03
SURVEYOR: Jamie Young								
Reviewed By: Dan Spicuzza								
Isotopes of Concern: ^{232}Th ^{14}C		Static Count Time: 2 Minutes						

Description of drawing: Room 1613 Ceiling Survey Unit



Comments:

All LAW's were ≤ background α β

Scan Ranges 5-10 cpm alpha 400-500 cpm beta.

No detectable alpha/beta activity over background was found.

50% of all accessible surface areas of the ceiling were scan surveyed.

Routine (Daily / Weekly / Monthly) ☐ **Non-routine** X

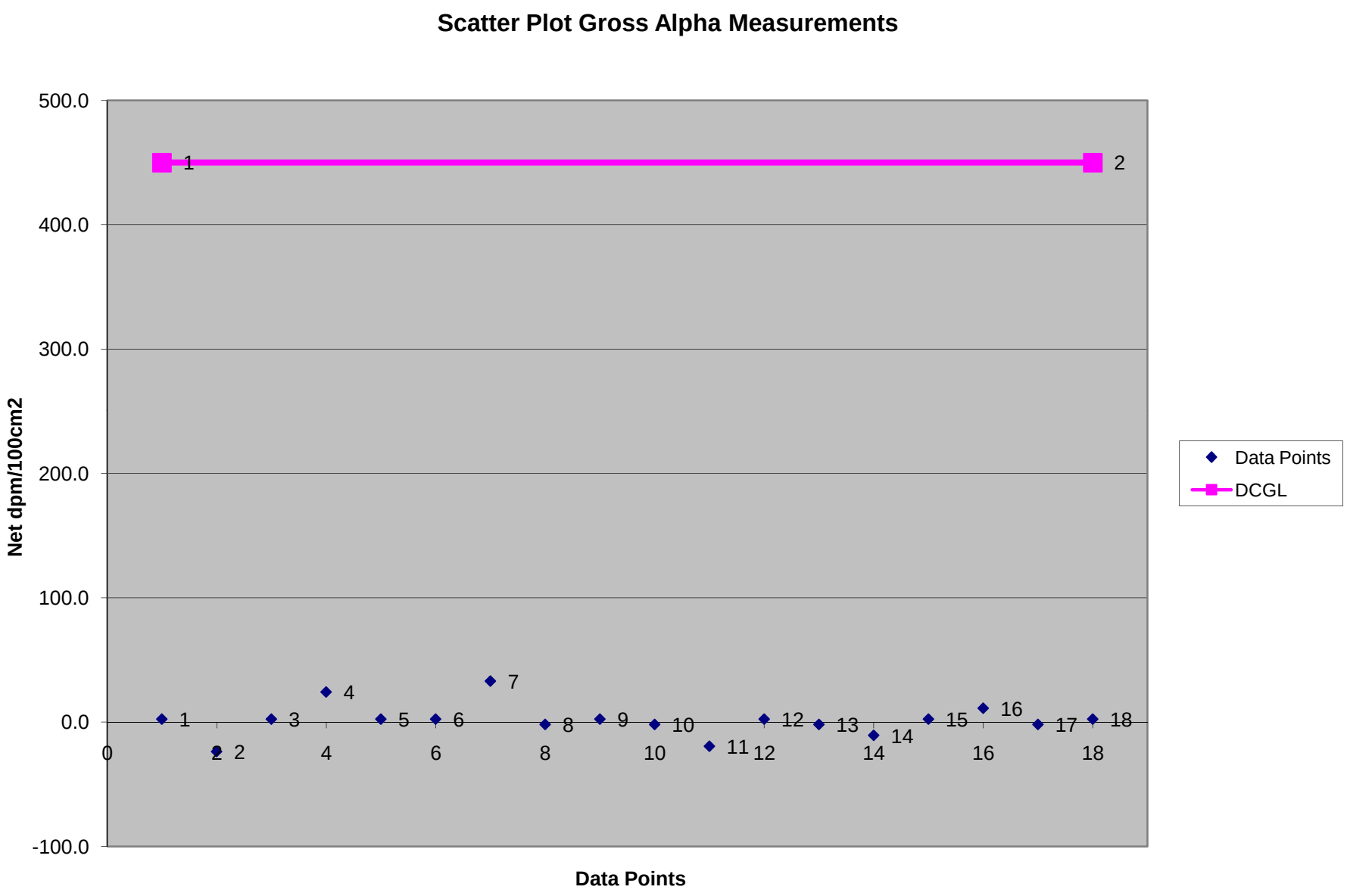
(#)	denotes swipe location and fixed α/β readings
#	denotes G/A radiation readings
# / #	denotes contact / 1 meter radiation readings.
*	denotes highest radiation reading on contact
LAW	denotes large area masslinn wipe
Δ	denotes static location.
+	Unless Otherwise Noted
	All readings in µr/hr unless otherwise noted
	K = 1000

RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: N/A

SURVEYOR: Jamie Young | LOCATION: China Lake Building 5, Room 1613

Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
A1				2.4	466.5	3.4	82.9	
A2				-23.7	610.0	-1.4	-1.2	
A3				2.4	-73.9	-1.4	70.9	
A4				24.2	525.6	1.0	-61.3	
A5				2.4	441.2	1.0	-85.3	
B1				2.4	390.5	1.0	-25.2	
B2				33.0	27.4	-1.44	-37.24	
B3				-1.9	-276.5	-1.44	-49.25	
B4				2.4	382.0	-1.44	46.85	
B5				-1.9	10.6	0.96	46.85	
C0				-19.4	-310.3	-1.44	-73.27	
C1				2.4	525.6	-1.44	-1.20	
C2				-1.9	-149.9	-1.44	-13.21	
C3				-10.6	-209.0	-1.44	-37.24	
D0				2.4	373.6	-1.44	-1.20	
D1				11.2	441.2	-1.44	-37.24	
D2				-1.9	179.4	-1.44	-61.26	
D3				2.4	-183.6	-1.44	-49.25	
N/A								
N/A								
N/A						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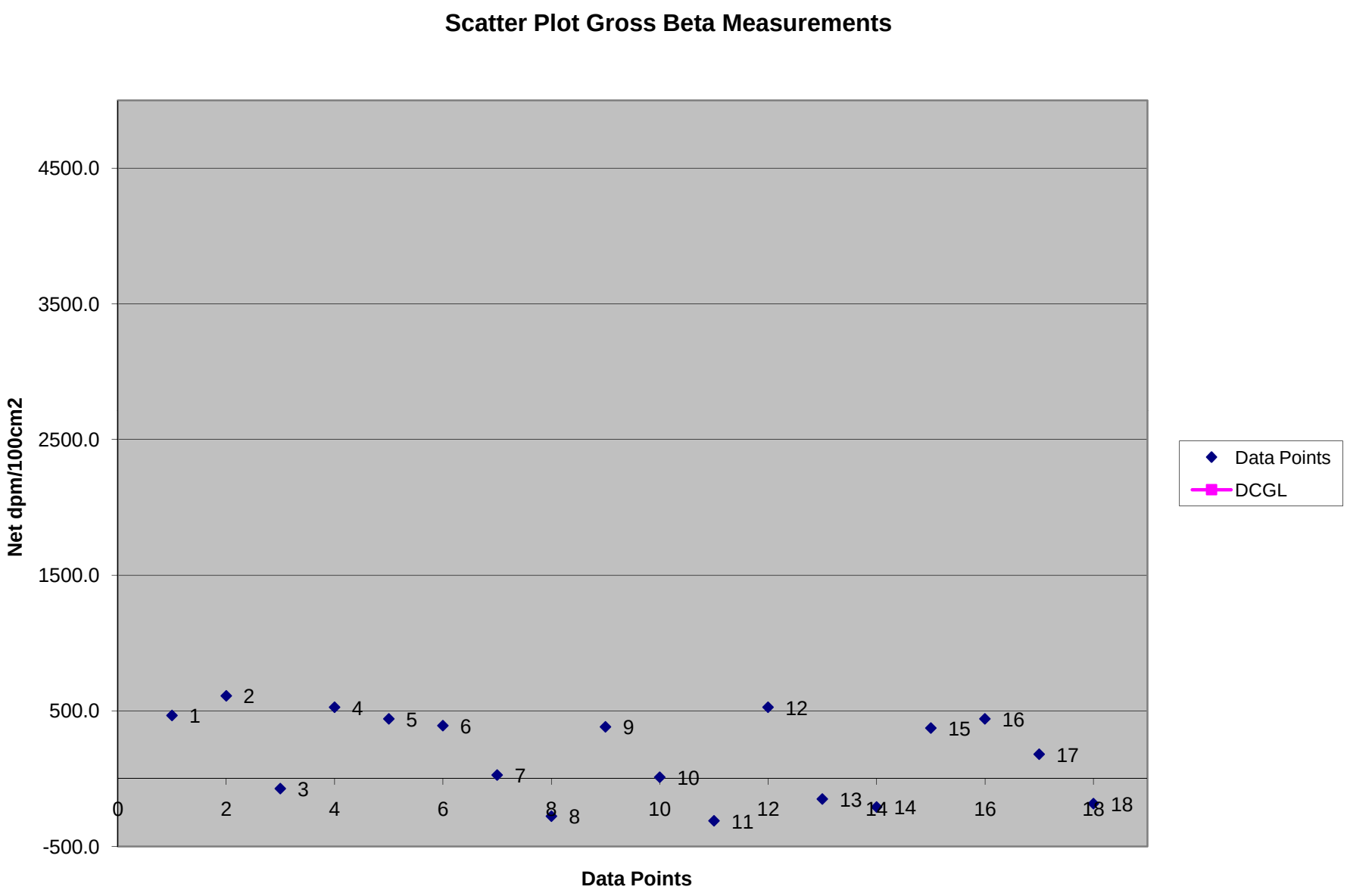
400.0
300.0
200.0
100.0
0.0
-100.0
Net dpm/100cm2
0
2
4
6
8
10
12
14
16
18
Data Points
Data Points
DCGL


Scatter Plot Gross Beta Measurements
Net dpm/100cm2
4500.0
3500.0
2500.0
1500.0
500.0
-500.0
0
2
4
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Data Points
Data Points
DCGL

Appendix H

Room 1613 Survey Unit Swipe Sample Data

DATE:	9/19/2007	NWTS#	N/A	ANALYSIS PERFORMED BY:		Richard Kountz	
COUNTING SYSTEM DATA							
INSTRUMENT I.D.:	α 143878	β 143878		DETECTOR I.D.:	α 147628	β 147628	
MODEL NUMBER:	α 2929	β 2929		MODEL NUMBER:	α 43-10-1	β 43-10-1	
EFFICIENCIES: α:	0.554			MDA: α: 20.9	dpm	Cal DueDate:	4/25/2008
βγ:	0.111			βγ: 735.0	dpm		
SMEARS COLLECTED BY:	Alan Campellone			SURFACE EFFICIENCY FACTOR (α): 0.25			
				SURFACE EFFICIENCY FACTOR (β): 0.25			
SAMPLE COUNT TIME:		3 Minute		ACTIVITY REPORT IN:	dpm/100 cm^2		
α BACKGROUND:	0.5	CPM		βγ BACKGROUND:	52.2	CPM	

SAMPLE I.D./DESCRIPTION	GROSS COUNTS α	GROSS COUNTS βγ	NET CPM α	NET CPM βγ	NET ACTIVITY in dpm/100cm^2 α	NET ACTIVITY in dpm/100cm^2 βγ
A1	0	148	-0.5	-2.9	-3.6	-103.3
A2	1	149	-0.2	-2.5	-1.2	-91.3
A3	1	145	-0.2	-3.9	-1.2	-139.3
A4	4	144	0.8	-4.2	6.0	-151.4
A5	0	168	-0.5	3.8	-3.6	136.9
B1	2	152	0.2	-1.5	1.2	-55.3
B2	0	152	-0.5	-1.5	-3.6	-55.3
B3	0	151	-0.5	-1.9	-3.6	-67.3
B4	1	147	-0.2	-3.2	-1.2	-115.3
B5	1	155	-0.2	-0.5	-1.2	-19.2
C0	0	159	-0.5	0.8	-3.6	28.8
C1	1	155	-0.2	-0.5	-1.2	-19.2
C2	0	156	-0.5	-0.2	-3.6	-7.2
C3	0	157	-0.5	0.1	-3.6	4.8
D0	1	146	-0.2	-3.5	-1.2	-127.3
D1	0	153	-0.5	-1.2	-3.6	-43.2
D2	0	149	-0.5	-2.5	-3.6	-91.3
D3	0	144	-0.5	-4.2	-3.6	-151.4
Remarks: China Lake Room 1613 Floor Survey Unit				**Maximum:**	**6.0**	**136.9**
				Minimum:	**-3.6**	**-151.4**
				Average:	**-2.0**	**-59.3**
Reviewed by:	Daniel Spicuzza				Date:	9/21/2007

DATE:	9/19/2007	NWTS#	N/A	ANALYSIS PERFORMED BY:		Richard Kountz	
COUNTING SYSTEM DATA							
INSTRUMENT I.D.:	α 143878	β 143878		DETECTOR I.D.:	α 147628	β 147628	
MODEL NUMBER:	α 2929	β 2929		MODEL NUMBER:	α 43-10-1	β 43-10-1	
EFFICIENCIES: α:	0.554			MDA: α: 20.9	dpm	Cal DueDate:	4/25/2008
βγ:	0.111			βγ: 735.0	dpm		
SMEARS COLLECTED BY:	Alan Campellone			SURFACE EFFICIENCY FACTOR (α): 0.25			
				SURFACE EFFICIENCY FACTOR (β): 0.25			
SAMPLE COUNT TIME:		3		ACTIVITY REPORT IN:	dpm/100 cm^2		
		Minute					
α BACKGROUND:	0.5	CPM		βγ BACKGROUND:	52.2	CPM	

SAMPLE I.D./DESCRIPTION	GROSS COUNTS α	GROSS COUNTS βγ	NET CPM α	NET CPM βγ	NET ACTIVITY in dpm/100cm^2 α	NET ACTIVITY in dpm/100cm^2 βγ
A1	1	152	-0.2	-1.5	-1.2	-55.3
B1	2	158	0.2	0.5	1.2	16.8
C1	1	160	-0.2	1.1	-1.2	40.8
D1	0	163	-0.5	2.1	-3.6	76.9
E1	0	159	-0.5	0.8	-3.6	28.8
F1	0	163	-0.5	2.1	-3.6	76.9
G1	2	155	0.2	-0.5	1.2	-19.2
H1	2	159	0.2	0.8	1.2	28.8
I1	0	164	-0.5	2.5	-3.6	88.9
J1	0	156	-0.5	-0.2	-3.6	-7.2
K1	0	153	-0.5	-1.2	-3.6	-43.2
L1	1	156	-0.2	-0.2	-1.2	-7.2
M1	2	161	0.2	1.5	1.2	52.9
N1	1	153	-0.2	-1.2	-1.2	-43.2
O1	1	157	-0.2	0.1	-1.2	4.8
P1	0	162	-0.5	1.8	-3.6	64.9
Q1	1	157	-0.2	0.1	-1.2	4.8
R1	0	154	-0.5	-0.9	-3.6	-31.2
Remarks: China Lake Room 1613 Lower Wall Survey Unit				**Maximum:**	**1.2**	**88.9**
				Minimum:	**-3.6**	**-55.3**
				Average:	**-1.7**	**15.5**
Reviewed by:	Daniel Spicuzza				Date:	9/21/2007

DATE:	9/19/2007	NWTS#	N/A	ANALYSIS PERFORMED BY:		Richard Kountz	
COUNTING SYSTEM DATA							
INSTRUMENT I.D.:	α 143878	β 143878		DETECTOR I.D.:	α 147628	β 147628	
MODEL NUMBER:	α 2929	β 2929		MODEL NUMBER:	α 43-10-1	β 43-10-1	
EFFICIENCIES: α:	0.554			MDA: α: 20.9	dpm	Cal DueDate:	4/25/2008
βγ:	0.111			βγ: 735.0	dpm		
SMEARS COLLECTED BY:	Alan Campellone			SURFACE EFFICIENCY FACTOR (α): 0.25			
				SURFACE EFFICIENCY FACTOR (β): 0.25			
SAMPLE COUNT TIME:		3		ACTIVITY REPORT IN:	dpm/100 cm^2		
		Minute					
α BACKGROUND:	0.5	CPM		βγ BACKGROUND:	52.2	CPM	

SAMPLE I.D./DESCRIPTION	GROSS COUNTS α	GROSS COUNTS βγ	NET CPM α	NET CPM βγ	NET ACTIVITY in dpm/100cm^2 α	NET ACTIVITY in dpm/100cm^2 βγ
A2	1	153	-0.2	-1.2	-1.2	-43.2
B2	0	150	-0.5	-2.2	-3.6	-79.3
C2	0	157	-0.5	0.1	-3.6	4.8
D2	0	153	-0.5	-1.2	-3.6	-43.2
E2	2	158	0.2	0.5	1.2	16.8
F2	1	161	-0.2	1.5	-1.2	52.9
G2	1	157	-0.2	0.1	-1.2	4.8
H2	0	160	-0.5	1.1	-3.6	40.8
I2	0	158	-0.5	0.5	-3.6	16.8
J2	1	157	-0.2	0.1	-1.2	4.8
K2	1	152	-0.2	-1.5	-1.2	-55.3
L2	2	155	0.2	-0.5	1.2	-19.2
M2	0	158	-0.5	0.5	-3.6	16.8
N2	0	161	-0.5	1.5	-3.6	52.9
O2	2	154	0.2	-0.9	1.2	-31.2
P2	1	153	-0.2	-1.2	-1.2	-43.2
Q2	1	163	-0.2	2.1	-1.2	76.9
R2	1	162	-0.2	1.8	-1.2	64.9
Remarks: China Lake Room 1613 Upper Wall Survey Unit				**Maximum:**	**1.2**	**76.9**
				Minimum:	**-3.6**	**-79.3**
				Average:	**-1.7**	**2.1**
Reviewed by:	Daniel Spicuzza				Date:	9/21/2007

DATE:	9/20/2007	NWTS#	N/A	ANALYSIS PERFORMED BY:		Richard Kountz	
COUNTING SYSTEM DATA							
INSTRUMENT I.D.:	α 143878	β 143878		DETECTOR I.D.:	α 147628	β 147628	
MODEL NUMBER:	α 2929	β 2929		MODEL NUMBER:	α 43-10-1	β 43-10-1	
EFFICIENCIES: α:	0.554			MDA: α: 15.9	dpm	Cal DueDate:	4/25/2008
βγ:	0.111			βγ: 724.9	dpm		
SMEARS COLLECTED BY:	Alan Campellone			SURFACE EFFICIENCY FACTOR (α): 0.25			
				SURFACE EFFICIENCY FACTOR (β): 0.25			
SAMPLE COUNT TIME:		3 Minute		ACTIVITY REPORT IN:	dpm/100 cm^2		
α BACKGROUND:	0.2	CPM		βγ BACKGROUND:	50.7	CPM	

SAMPLE I.D./DESCRIPTION		GROSS COUNTS α	GROSS COUNTS βγ	NET CPM α	NET CPM βγ	NET ACTIVITY in dpm/100cm^2 α	NET ACTIVITY in dpm/100cm^2 βγ
A1		2	159	0.5	2.3	3.4	82.9
A2		0	152	-0.2	0.0	-1.4	-1.2
A3		0	158	-0.2	2.0	-1.4	70.9
A4		1	147	0.1	-1.7	1.0	-61.3
A5		1	145	0.1	-2.4	1.0	-85.3
B1		1	150	0.1	-0.7	1.0	-25.2
B2		0	149	-0.2	-1.0	-1.4	-37.2
B3		0	148	-0.2	-1.4	-1.4	-49.2
B4		0	156	-0.2	1.3	-1.4	46.8
B5		1	156	0.1	1.3	1.0	46.8
C0		0	146	-0.2	-2.0	-1.4	-73.3
C1		0	152	-0.2	0.0	-1.4	-1.2
C2		0	151	-0.2	-0.4	-1.4	-13.2
C3		0	149	-0.2	-1.0	-1.4	-37.2
D0		0	152	-0.2	0.0	-1.4	-1.2
D1		0	149	-0.2	-1.0	-1.4	-37.2
D2		0	147	-0.2	-1.7	-1.4	-61.3
D3		0	148	-0.2	-1.4	-1.4	-49.2
Remarks: China Lake Room 1613 Ceiling Survey Unit					**Maximum:**	**3.4**	**82.9**
					Minimum:	**-1.4**	**-85.3**
					Average:	**-0.6**	**-15.9**
Reviewed by:	Daniel Spicuzza					Date:	9/21/2007

Appendix I

Room 1613 Drawers, Cabinets, Shelves, Counter Tops Survey Data

RADIATION/CONTAMINATION SURVEY FORM

DATE: 9/18/2007	TIME: 11:00	INSTRUMENTATION USED						
		Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm^2)	Background + (dpm/100cm^2)
SURVEY NUMBER: N/A		2360	227399	9/12/2008	α 36.40%	α 9.10%	α 68.61	α 32.71
		43-68	178075		βγ 26.90%	βγ 6.73%	βγ 649.38	βγ 3127.40
LOCATION: China Lake Building 5, Room 1613		2929	143878	4/25/2008	α 55.40%	α 13.85%	α 23.44	α 5.05
					βγ 11.10%	βγ 2.78%	βγ 733.00	βγ 1870.27
SURVEYOR: Jamie Young								
Reviewed By: Dan Spicuzza								
Isotopes of Concern: ^{232}Th ^{14}C		Static Count Time: 2 Minutes						

Description of drawing: Room 1613 Drawers

See Appendix M for Pictures

Comments:

All LAW's were ≤ background α β

Scan Ranges 5-10 cpm alpha 200-300 cpm beta.

No detectable alpha/beta activity over background was found.

100% of all accessible surface areas of the drawers were scan surveyed.

Routine (Daily / Weekly / Monthly) ☐ **Non-routine** ☒

#	denotes swipe location and fixed α/β readings
#	denotes G/A radiation readings
# / #	denotes contact / 1 meter radiation readings.
*	denotes highest radiation reading on contact
LAW	denotes large area masslinn wipe
Δ	denotes static location.
+	Unless Otherwise Noted
	All readings in µr/hr unless otherwise noted
	K = 1000

RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: N/A

SURVEYOR: Jamie Young | LOCATION: China Lake Building 5, Room 1613

Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	
D1				-19.6	-106.2	-5.1	-80.5	
D2				-24.0	-147.5	-5.1	207.8	
D3				-2.2	-377.6	-5.1	231.8	
D4				-6.5	-306.8	-2.6	-56.5	
D5				-15.3	566.5	-2.6	-68.5	
D6				-24.0	218.3	-5.1	-92.5	
D7				-10.9	-153.4	-2.65	135.74	
D8				-24.0	-64.9	-5.05	315.92	
D9				-19.6	-389.4	-2.65	-68.47	
D10				-19.6	76.7	-5.05	-68.47	
D11				-28.3	-218.3	-5.05	-56.46	
D12				-24.0	-224.2	-2.65	207.81	
D13				-24.0	171.1	-5.05	39.64	
D14				-24.0	-194.7	-5.05	-80.48	
D15				-2.2	29.5	-5.05	-44.44	
D16				-15.3	153.4	-5.05	231.83	
D17				-19.6	-64.9	-2.65	-8.41	
D18				-28.3	-194.7	-5.05	-20.42	
D19				-10.9	-129.8	-2.65	-32.43	
D20				-19.6	70.8	-2.65	-44.44	
D21				-24.0	-70.8	-2.65	87.69	
D22				-19.6	-106.2	-2.65	-80.48	
D23				-28.3	-100.3	-2.65	-56.46	
D24				-19.6	-64.9	-5.05	39.64	
D25				-19.6	-171.1	-5.05	-20.42	
D26				-19.6	407.2	-5.05	-56.46	
D27				-15.3	224.2	-5.05	-44.44	
D28				2.2	206.5	-0.24	3.60	
D29				-10.9	236.0	-5.05	159.76	
D30				-6.5	-5.9	-5.05	27.63	
D31				-15.3	230.1	2.17	-32.43	
D32				-10.9	82.6	-5.05	472.07	
D33				-15.3	241.9	6.98	3.60	
D34				-23.98	271.43	-5.05	39.64	
D35				-2.18	236.03	-5.05	-68.47	
D36				-23.98	123.92	2.17	-32.43	
D37				-10.90	141.62	-5.05	183.78	
D38				-6.54	271.43	-5.05	-68.47	
D39				-10.90	165.22	-5.05	327.93	
D40				-28.34	271.43	2.17	-140.54	
D41				-6.54	354.04	6.98	-44.44	
D42				-15.26	118.01	-5.05	75.68	
N/A								
N/A								
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Reviewer
Daniel Spicuzza

Date: 9/19/2007

Time: 1000

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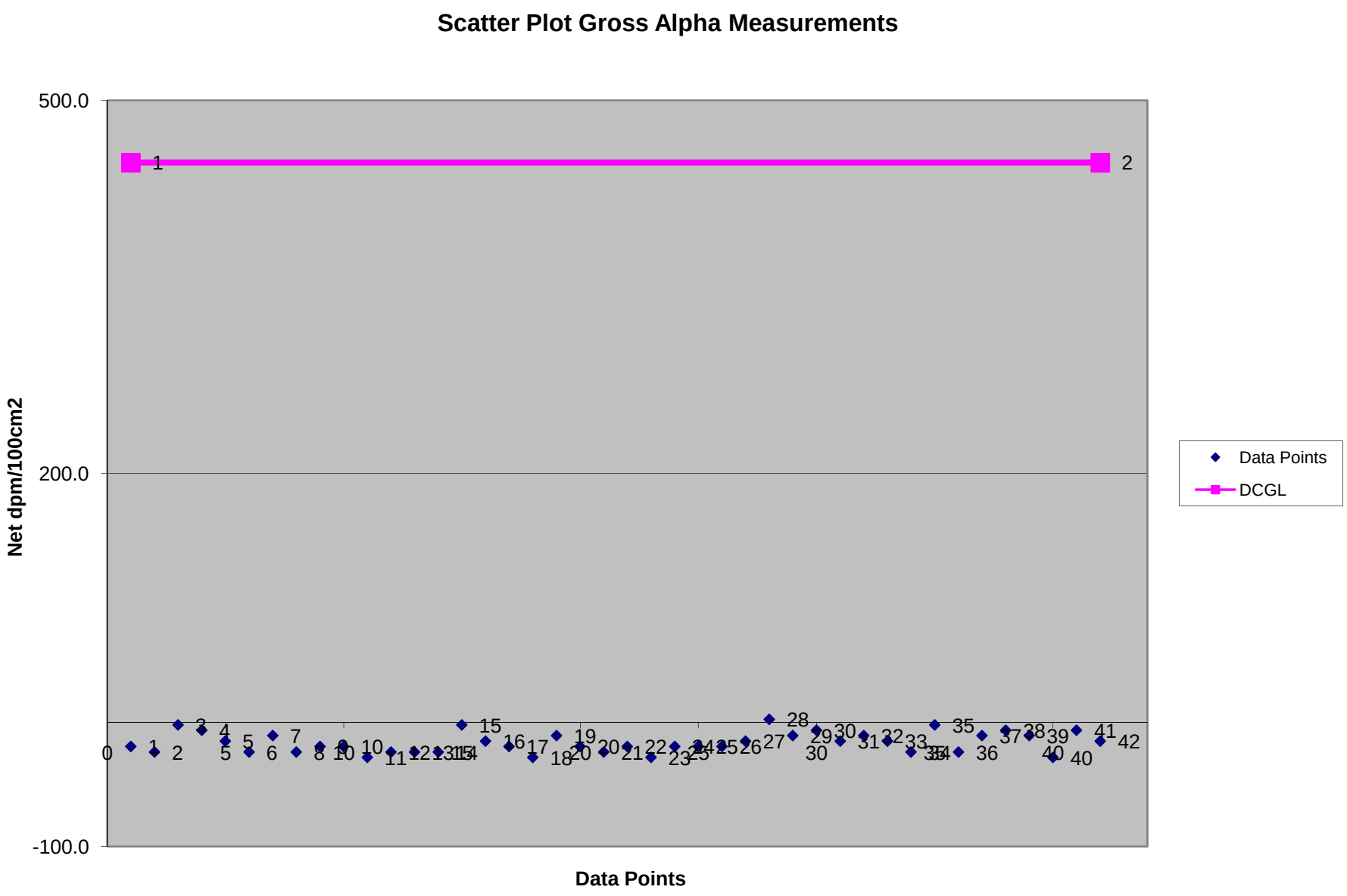
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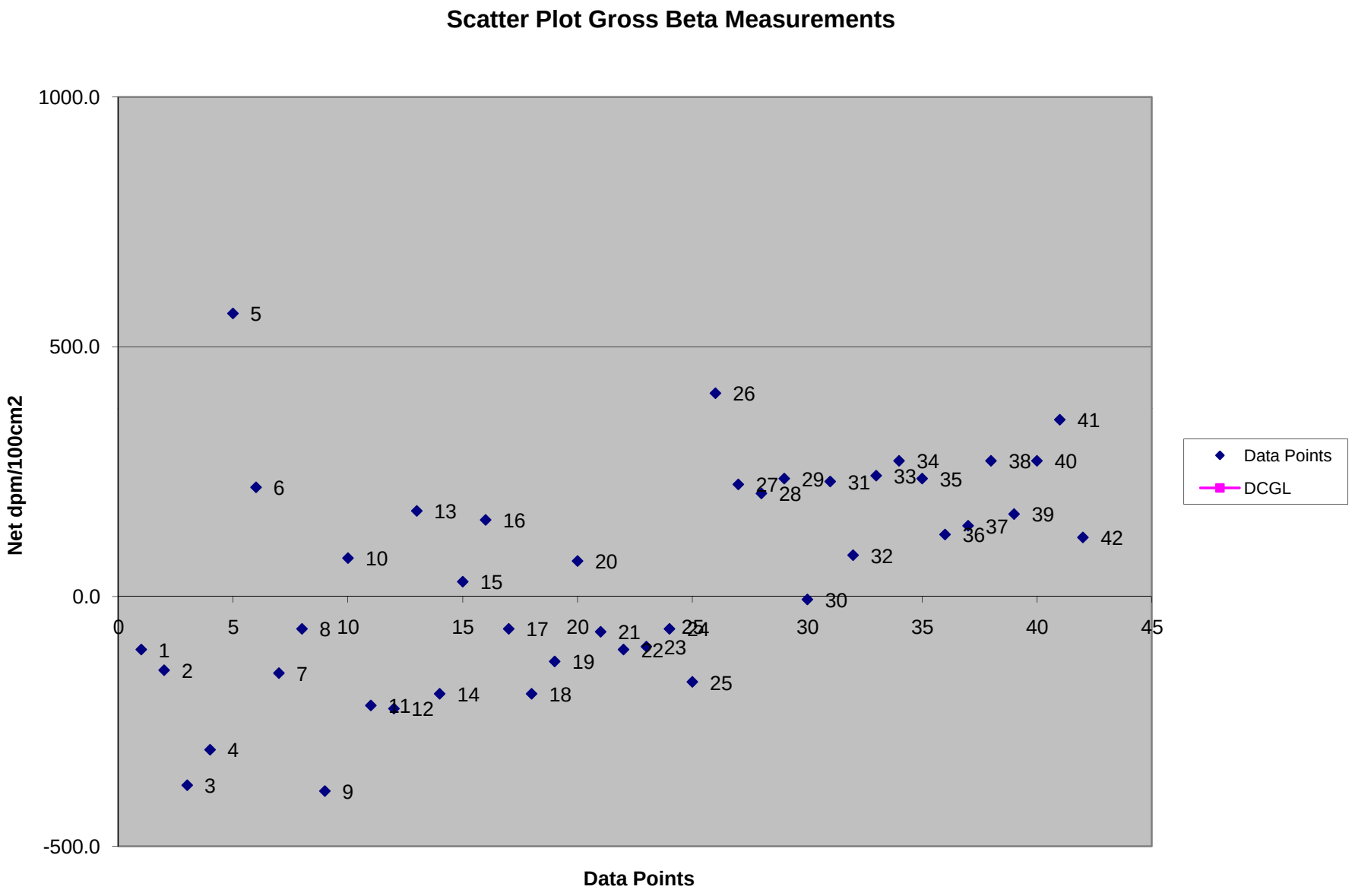
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UNCONDITIONAL RELEASE OF EQUIPMENT OR MATERIALS FORM

Survey # N/A	Date : 9/18/2007
Project Location : China Lake Building 5, Room 1613	
Description of Equipment or Materials: Room 1613 Drawers	

Survey Equipment:

Model #	Serial #	Cal Due Date	Efficiency		Background	
2929	143878	4/25/2008	α	13.85%	α	5.05
			β	2.78%	β	1870.27
2360 43-68	227399	9/12/2008	α	9.10%	α	32.71
			β	6.73%	β	3127.40

Contamination Levels:

2.18	dpm / 100cm^2	α	**Maximum Fixed**
566.47	dpm / 100cm^2	β	
6.98	dpm / 100cm^2	α	**Maximum Removable**
472.07	dpm / 100cm^2	β	

THIS IS TO CERTIFY THAT THE ABOVE DESCRIBED EQUIPMENT OR MATERIALS HAS/HAVE BEEN SURVEYED AND BEEN FOUND TO BE WITHIN ACCEPTABLE SURFACE CONTAMINATION LEVELS FOR UNCONDITIONAL RELEASE AS REQUIRED BY NUCLEAR REGULATORY GUIDE 1.86.

Radiological Control Technician: Jamie Young	Date: 9/18/2007
	Time: 1100
Disposition of Equipment or Materials: Free Release.	
Reviewed by: Daniel Spicuzza	Date: 9/19/2007 1000

RADIATION/CONTAMINATION SURVEY FORM

DATE: 9/18/2007	TIME: 13:00	INSTRUMENTATION USED						
		Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm^2)	Background + (dpm/100cm^2)
SURVEY NUMBER: N/A		2360	227399	9/12/2008	α 36.40%	α 9.10%	α 68.61	α 32.71
		43-68	178075		βγ 26.90%	βγ 6.73%	βγ 649.38	βγ 3127.40
LOCATION: China Lake Building 5, Room 1613		2929	143878	4/25/2008	α 55.40%	α 13.85%	α 23.44	α 5.05
					βγ 11.10%	βγ 2.78%	βγ 733.00	βγ 1870.27
SURVEYOR: Jamie Young								
Reviewed By: Dan Spicuzza								
Isotopes of Concern: ^{232}Th ^{14}C		Static Count Time: 2 Minutes						

Description of drawing: Room 1613 Cabinets

See Appendix M for Pictures

Comments:

All LAW's were ≤ background α β

Scan Ranges 5-10 cpm alpha 200-300 cpm beta.

No detectable alpha/beta activity over background was found.

100% of all accessible surface areas of the cabinets were scan surveyed.

Routine (Daily / Weekly / Monthly) ☐ **Non-routine** ☒

#	denotes swipe location and fixed α/β readings
#	denotes G/A radiation readings
# / #	denotes contact / 1 meter radiation readings.
*	denotes highest radiation reading on contact
LAW	denotes large area masslinn wipe
Δ	denotes static location.
+	Unless Otherwise Noted
	All readings in µr/hr unless otherwise noted
	K = 1000

RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: N/A

SURVEYOR: Jamie Young

LOCATION: China Lake Building 5, Room 1613

Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	
C1				-15.3	714.0	4.6	-68.5	
C2				-15.3	59.0	-2.6	-32.4	
C3				-15.3	-82.6	-2.6	15.6	
C4				-15.3	253.7	-5.1	-104.5	
C5				-2.2	-259.6	-2.6	-332.7	
C6				6.5	625.5	-2.6	-128.5	
C7				-15.3	684.5	-2.65	-92.49	
C8				-24.0	342.2	-2.65	183.78	
C9				-6.5	584.2	-2.65	99.70	
C10				-10.9	212.4	-5.05	-116.52	
C11				-24.0	106.2	-2.65	87.69	
C12				2.2	861.5	-2.65	-260.66	
C13				-6.5	873.3	-2.65	-128.53	
C14				-6.5	684.5	-0.24	-308.71	
C15				-15.3	-123.9	-0.24	-176.58	
C16				-24.0	5.9	-5.05	-104.50	
C17				-6.5	29.5	-2.65	-68.47	
C18				-19.6	218.3	-5.05	-20.42	
C19				-10.9	0.0	-2.65	-140.54	
C20				-19.6	-100.3	-5.05	-392.79	
C21				-10.9	-35.4	-5.05	-164.56	
C22				10.9	855.6	-2.65	87.69	
C23				2.2	123.9	4.57	-128.53	
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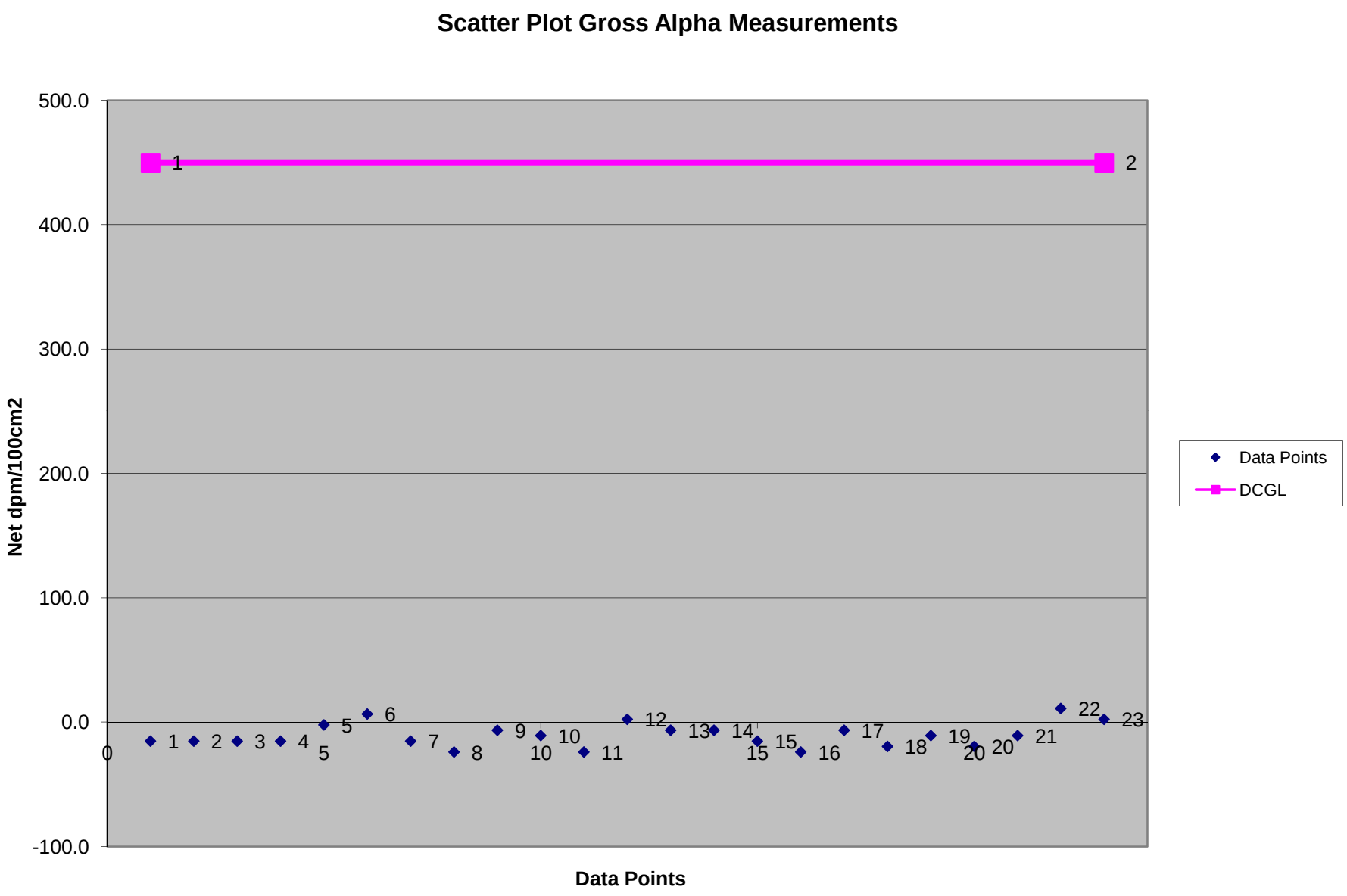
N/A								
N/A						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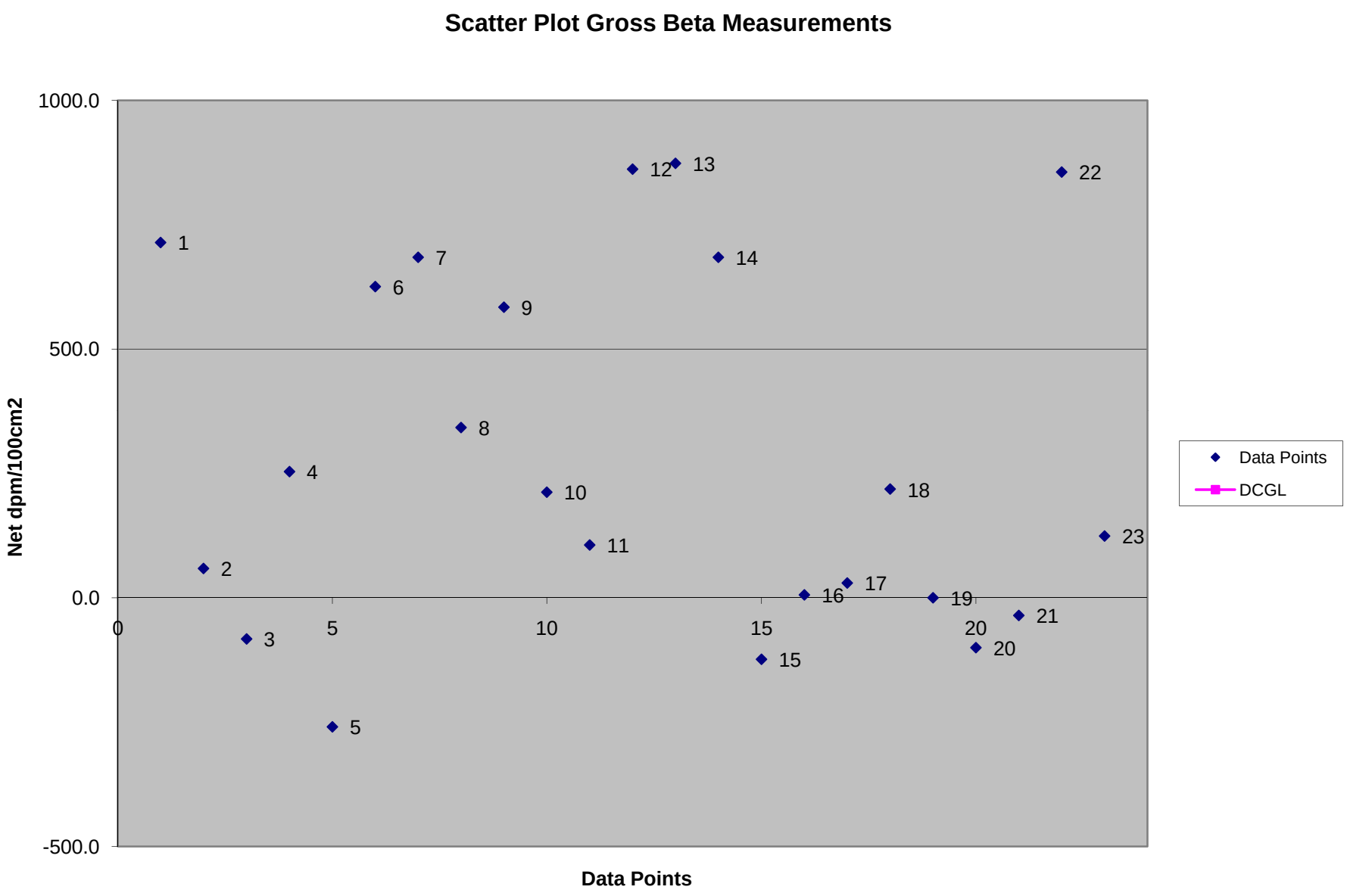
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Data Points
DCGL

UNCONDITIONAL RELEASE OF EQUIPMENT OR MATERIALS FORM

Survey # N/A	Date : 9/18/2007
Project Location : China Lake Building 5, Room 1613	
Description of Equipment or Materials: Room 1613 Cabinets	

Survey Equipment:

Model #	Serial #	Cal Due Date	Efficiency		Background	
2929	143878	4/25/2008	α	13.85%	α	5.05
			β	2.78%	β	1870.27
2360 43-68	227399	9/12/2008	α	9.10%	α	32.71
			β	6.73%	β	3127.40

Contamination Levels:

10.90	dpm / 100cm^2	α	**Maximum Fixed**
873.31	dpm / 100cm^2	β	
4.57	dpm / 100cm^2	α	**Maximum Removable**
183.78	dpm / 100cm^2	β	

THIS IS TO CERTIFY THAT THE ABOVE DESCRIBED EQUIPMENT OR MATERIALS HAS/HAVE BEEN SURVEYED AND BEEN FOUND TO BE WITHIN ACCEPTABLE SURFACE CONTAMINATION LEVELS FOR UNCONDITIONAL RELEASE AS REQUIRED BY NUCLEAR REGULATORY GUIDE 1.86.

Radiological Control Technician: Jamie Young	Date: 9/18/2007
	Time: 1300
Disposition of Equipment or Materials: Free Release.	
Reviewed by: Daniel Spicuzza	Date: 9/19/2007 1000

RADIATION/CONTAMINATION SURVEY FORM

DATE: 9/18/2007	TIME: 13:15	INSTRUMENTATION USED						
		Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm^2)	Background + (dpm/100cm^2)
SURVEY NUMBER: N/A		2360	227399	9/12/2008	α 36.40%	α 9.10%	α 68.61	α 32.71
		43-68	178075		βγ 26.90%	βγ 6.73%	βγ 649.38	βγ 3127.40
LOCATION: China Lake Building 5, Room 1613		2929	143878	4/25/2008	α 55.40%	α 13.85%	α 23.44	α 5.05
					βγ 11.10%	βγ 2.78%	βγ 733.00	βγ 1870.27
SURVEYOR: Jamie Young								
Reviewed By: Dan Spicuzza								
Isotopes of Concern: ^{232}Th ^{14}C		Static Count Time: 2 Minutes						

Description of drawing: Room 1613 Shelves

See Appendix M for Pictures

Comments:

All LAW's were ≤ background α β

Scan Ranges 5-10 cpm alpha 200-300 cpm beta.

No detectable alpha/beta activity over background was found.

100% of all accessible surface areas of the shelves scan surveyed.

Routine (Daily / Weekly / Monthly) ☐ **Non-routine** ☒

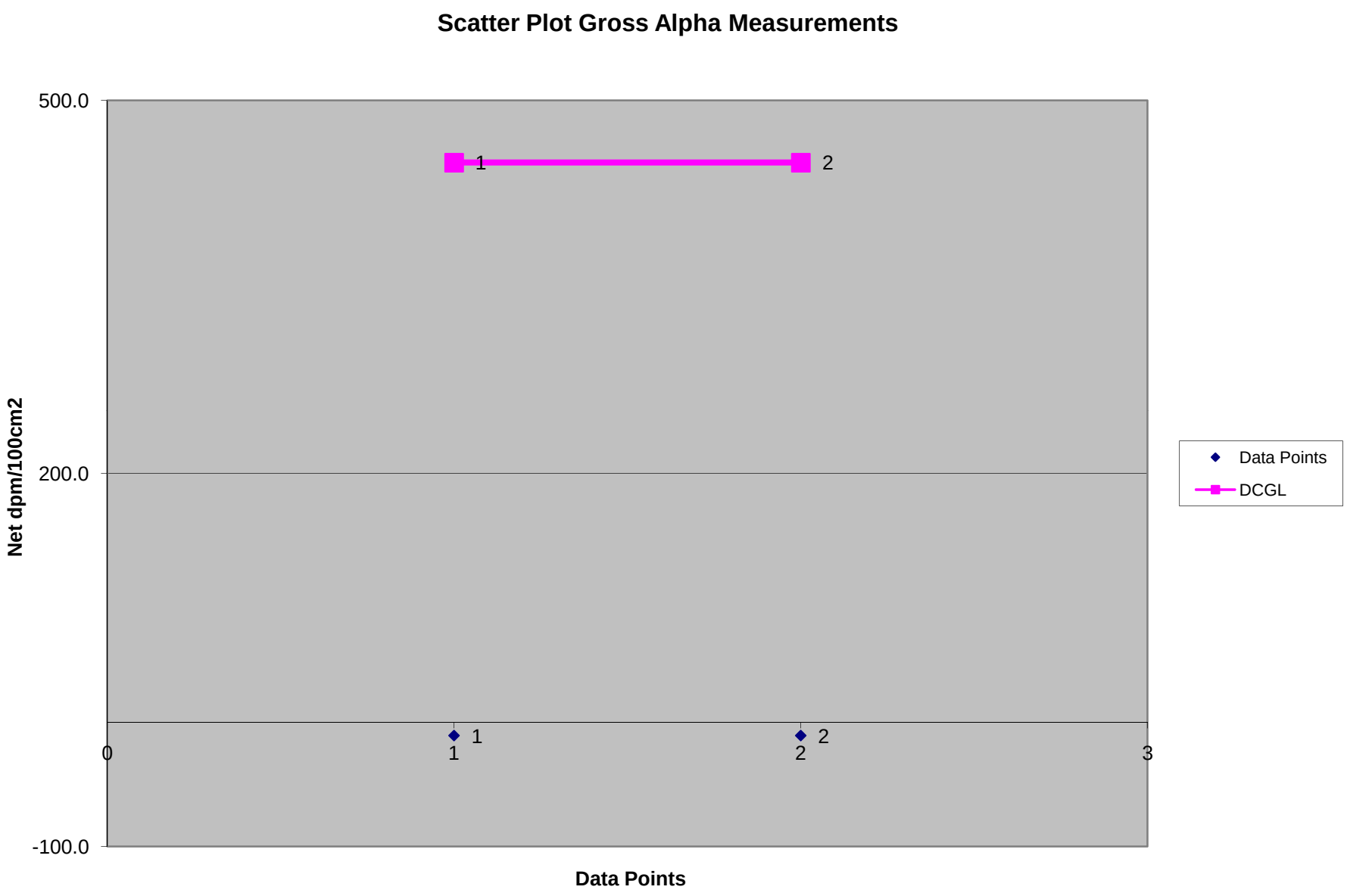
#	denotes swipe location and fixed α/β readings
#	denotes G/A radiation readings
# / #	denotes contact / 1 meter radiation readings.
*	denotes highest radiation reading on contact
LAW	denotes large area masslinn wipe
Δ	denotes static location.
+	Unless Otherwise Noted
	All readings in µr/hr unless otherwise noted
	K = 1000

RADIATION/CONTAMINATION SURVEY SUPPLEMENT **Page 2 of 2**

SURVEY NUMBER: N/A

SURVEYOR: Jamie Young | LOCATION: China Lake Building 5, Room 1613

Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	
SH-1				-10.9	395.4	-5.1	-128.5	
SH-2				-10.9	-112.1	4.6	39.6	
N/A								
N/A								
N/A						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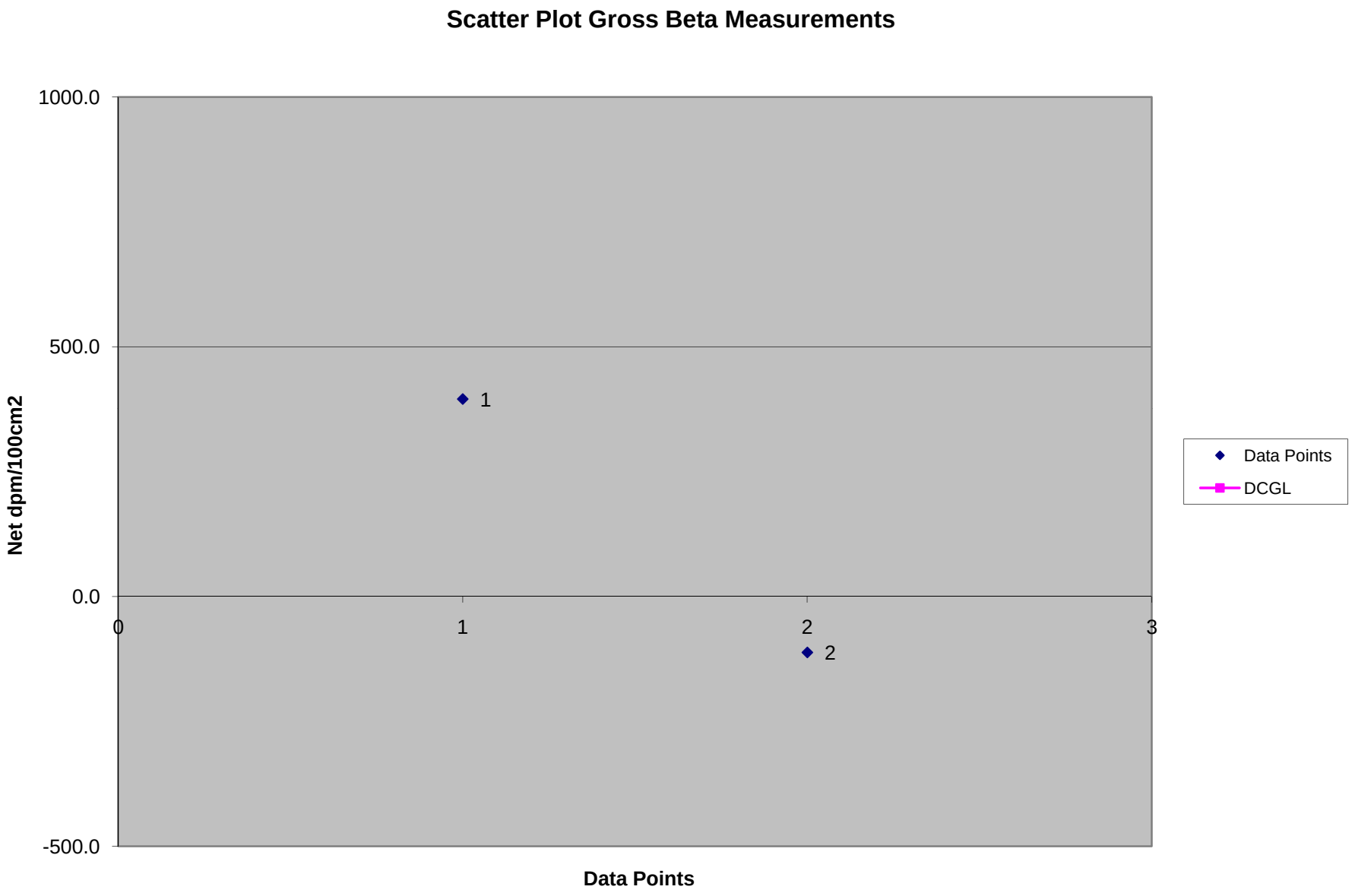
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Data Points
Data Points
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UNCONDITIONAL RELEASE OF EQUIPMENT OR MATERIALS FORM

Survey # N/A	Date : 9/18/2007
Project Location : China Lake Building 5, Room 1613	
Description of Equipment or Materials: Room 1613 Shelves	

Survey Equipment:

Model #	Serial #	Cal Due Date	Efficiency		Background	
2929	143878	4/25/2008	α	13.85%	α	5.05
			β	2.78%	β	1870.27
2360 43-68	227399	9/12/2008	α	9.10%	α	32.71
			β	6.73%	β	3127.40

Contamination Levels:

-10.90	dpm / 100cm^2	α	**Maximum Fixed**
395.35	dpm / 100cm^2	β	
4.57	dpm / 100cm^2	α	**Maximum Removable**
39.64	dpm / 100cm^2	β	

THIS IS TO CERTIFY THAT THE ABOVE DESCRIBED EQUIPMENT OR MATERIALS HAS/HAVE BEEN SURVEYED AND BEEN FOUND TO BE WITHIN ACCEPTABLE SURFACE CONTAMINATION LEVELS FOR UNCONDITIONAL RELEASE AS REQUIRED BY NUCLEAR REGULATORY GUIDE 1.86.

Radiological Control Technician: Jamie Young	Date: 9/18/2007 Time: 1315
Disposition of Equipment or Materials: Free Release.	
Reviewed by: Daniel Spicuzza	Date: 9/19/2007 1000

RADIATION/CONTAMINATION SURVEY FORM

DATE: 9/18/2007	TIME: 14:30	INSTRUMENTATION USED						
		Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm^2)	Background + (dpm/100cm^2)
SURVEY NUMBER: N/A		2360	227399	9/12/2008	α 36.40%	α 9.10%	α 61.71	α 25.07
		43-68	178075		βγ 26.90%	βγ 6.73%	βγ 621.35	βγ 2855.96
LOCATION: China Lake Building 5, Room 1613		2929	143878	4/25/2008	α 55.40%	α 13.85%	α 23.44	α 5.05
					βγ 11.10%	βγ 2.78%	βγ 733.00	βγ 1870.27
SURVEYOR: Jamie Young								
Reviewed By: Dan Spicuzza								
Isotopes of Concern: ^{232}Th ^{14}C		Static Count Time: 2 Minutes						

Description of drawing: Room 1613 Counter Tops

See Appendix M for Pictures

Comments:

All LAW's were ≤ background α β

Scan Ranges 5-10 cpm alpha 200-300 cpm beta.

No detectable alpha/beta activity over background was found.

100% of all accessible surface areas of the counter tops were scan surveyed.

Routine (Daily / Weekly / Monthly) ☐ **Non-routine** ☒

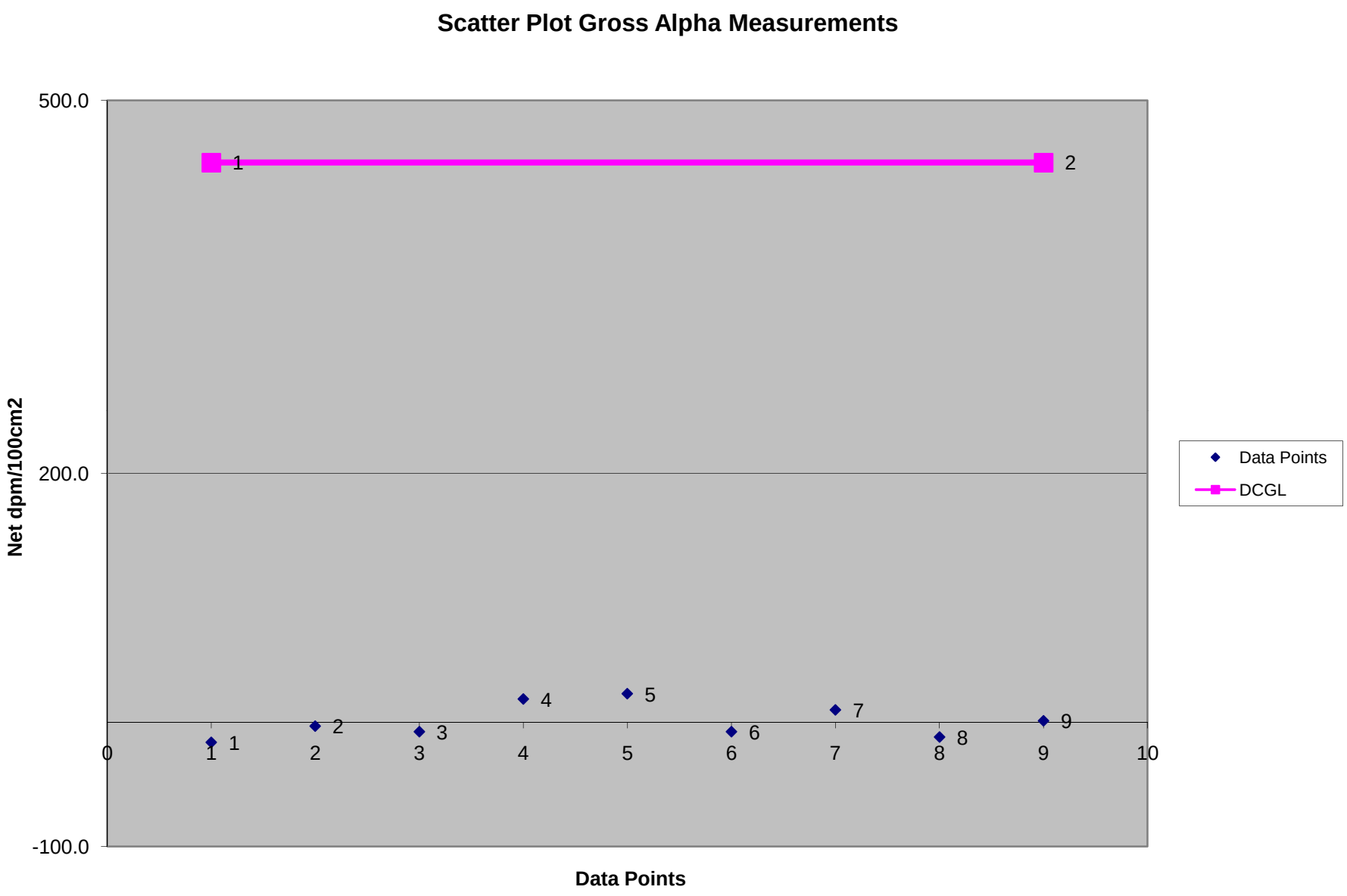
(#)	denotes swipe location and fixed α/β readings
#	denotes G/A radiation readings
# / #	denotes contact / 1 meter radiation readings.
*	denotes highest radiation reading on contact
LAW	denotes large area masslinn wipe
Δ	denotes static location.
+	Unless Otherwise Noted
	All readings in µr/hr unless otherwise noted
	K = 1000

RADIATION/CONTAMINATION SURVEY SUPPLEMENT **Page 2 of 2**

SURVEY NUMBER: N/A

SURVEYOR: Jamie Young | LOCATION: China Lake Building 5, Room 1613

Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
CT1				-16.4	29.5	-5.1	255.9	
CT2				-3.3	123.9	-5.1	39.6	
CT3				-7.6	448.5	-2.6	159.8	
CT4				18.5	1321.8	-0.2	-80.5	
CT5				22.9	365.8	-2.6	-8.4	
CT6				-7.6	554.7	-2.6	123.7	
CT7				9.8	123.9	-0.24	-8.41	
CT8				-12.0	41.3	-2.65	207.81	
CT9				1.1	855.6	-2.65	231.83	
N/A								
N/A								
N/A						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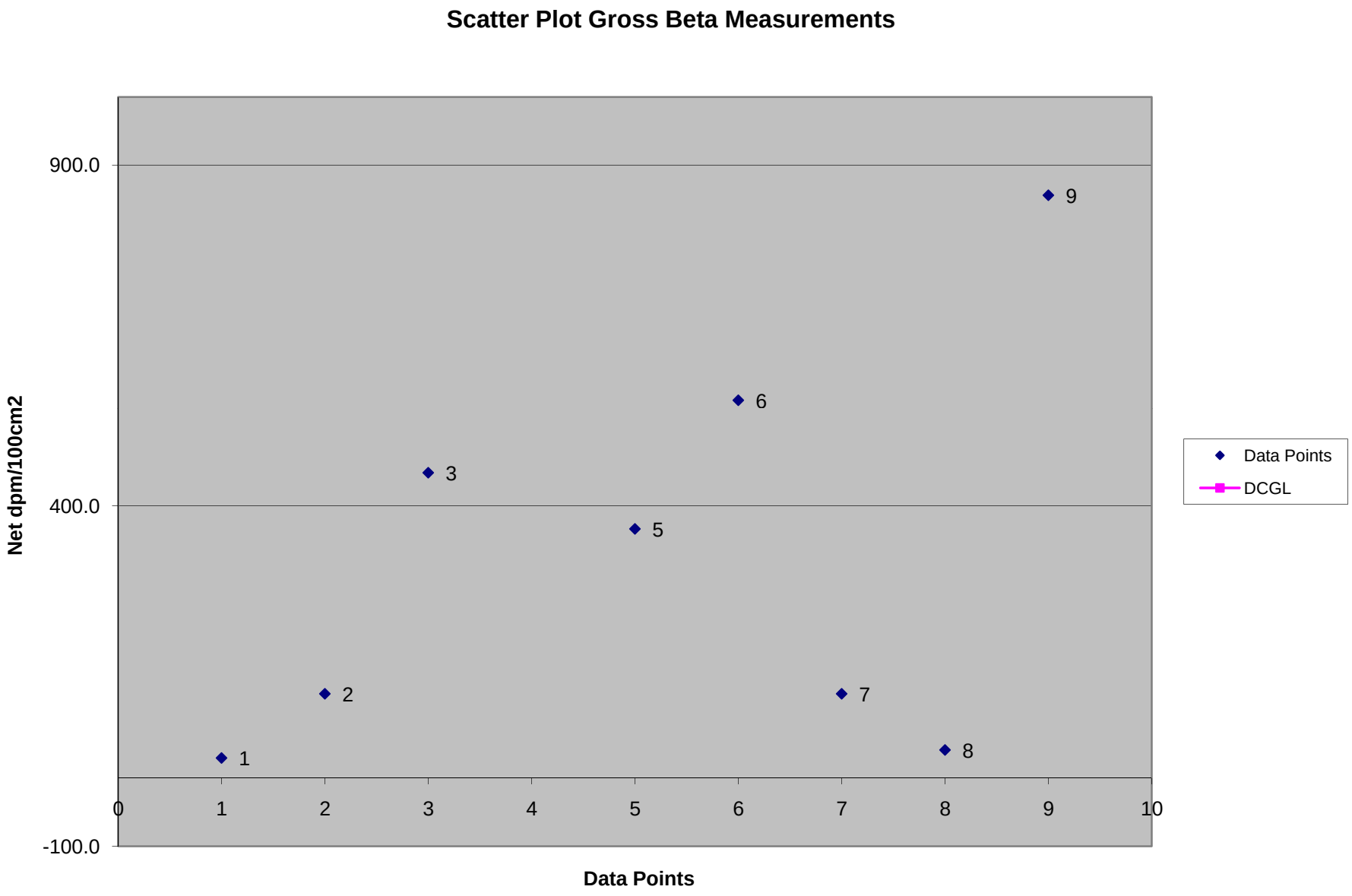
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UNCONDITIONAL RELEASE OF EQUIPMENT OR MATERIALS FORM

Survey # N/A	Date : 9/18/2007
Project Location : China Lake Building 5, Room 1613	
Description of Equipment or Materials: Room 1613 Counter Tops	

Survey Equipment:

Model #	Serial #	Cal Due Date	Efficiency		Background	
2929	143878	4/25/2008	α	13.85%	α	5.05
			β	2.78%	β	1870.27
2360 43-68	227399	9/12/2008	α	9.10%	α	25.07
			β	6.73%	β	2855.96

Contamination Levels:

22.89	dpm / 100cm^2	α	**Maximum Fixed**
1321.77	dpm / 100cm^2	β	
-0.24	dpm / 100cm^2	α	**Maximum Removable**
255.86	dpm / 100cm^2	β	

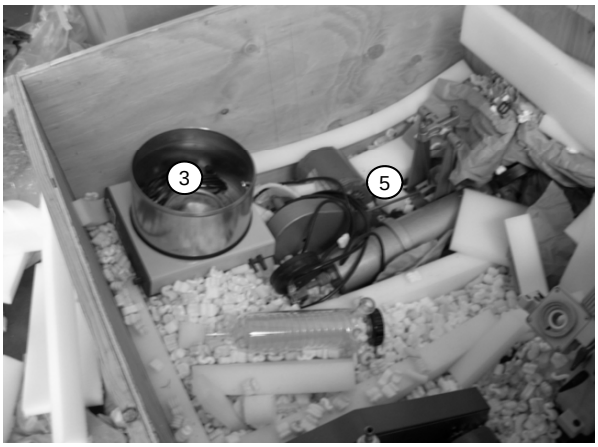
THIS IS TO CERTIFY THAT THE ABOVE DESCRIBED EQUIPMENT OR MATERIALS HAS/HAVE BEEN SURVEYED AND BEEN FOUND TO BE WITHIN ACCEPTABLE SURFACE CONTAMINATION LEVELS FOR UNCONDITIONAL RELEASE AS REQUIRED BY NUCLEAR REGULATORY GUIDE 1.86.

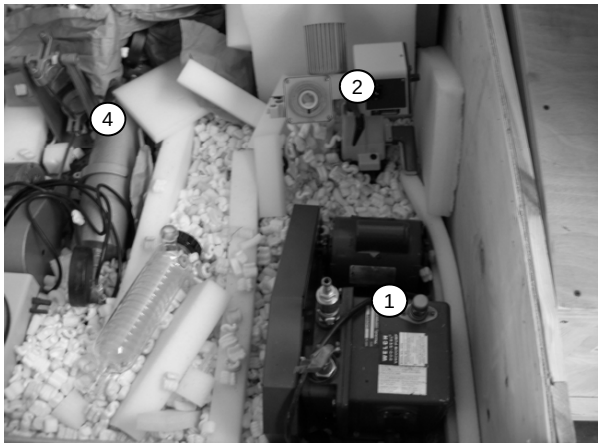
Radiological Control Technician: Jamie Young	Date: 9/18/2007
	Time: 1430
Disposition of Equipment or Materials: Free Release.	
Reviewed by: Daniel Spicuzza	Date: 9/19/2007 1000

RADIATION/CONTAMINATION SURVEY FORM

DATE:	TIME:	INSTRUMENTATION USED						
9/19/2007	13:30	Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm^2)	Background + (dpm/100cm^2)
		2360	227415	9/12/2008	α 36.40%	α 9.10%	α 83.32	α 52.33
SURVEY NUMBER:	N/A	43-68	147404		βγ 18.80%	βγ 4.70%	βγ 876.47	βγ 3968.25
		2929	143878	4/25/2008	α 55.40%	α 13.85%	α 23.44	α 5.05
LOCATION:	China Lake Building 5				βγ 11.10%	βγ 2.78%	βγ 733.00	βγ 1870.27
SURVEYOR:	Richard Kountz							
Reviewed By:	Dan Spicuzza							
Isotopes of Concern: ^{232}Th ^{14}C		Static Count Time: 2 Minutes						

Description of drawing: Misc. Equipment in Wooden Crate





Comments:

All LAW's were ≤ background α β

Scan Ranges 5-10 cpm alpha 200-250 cpm beta.

No detectable alpha/beta activity over background was found.

100% of all accessible surface areas of the equipment were scan surveyed.

Routine (Daily / Weekly / Monthly) [ ] **Non-routine** [X]

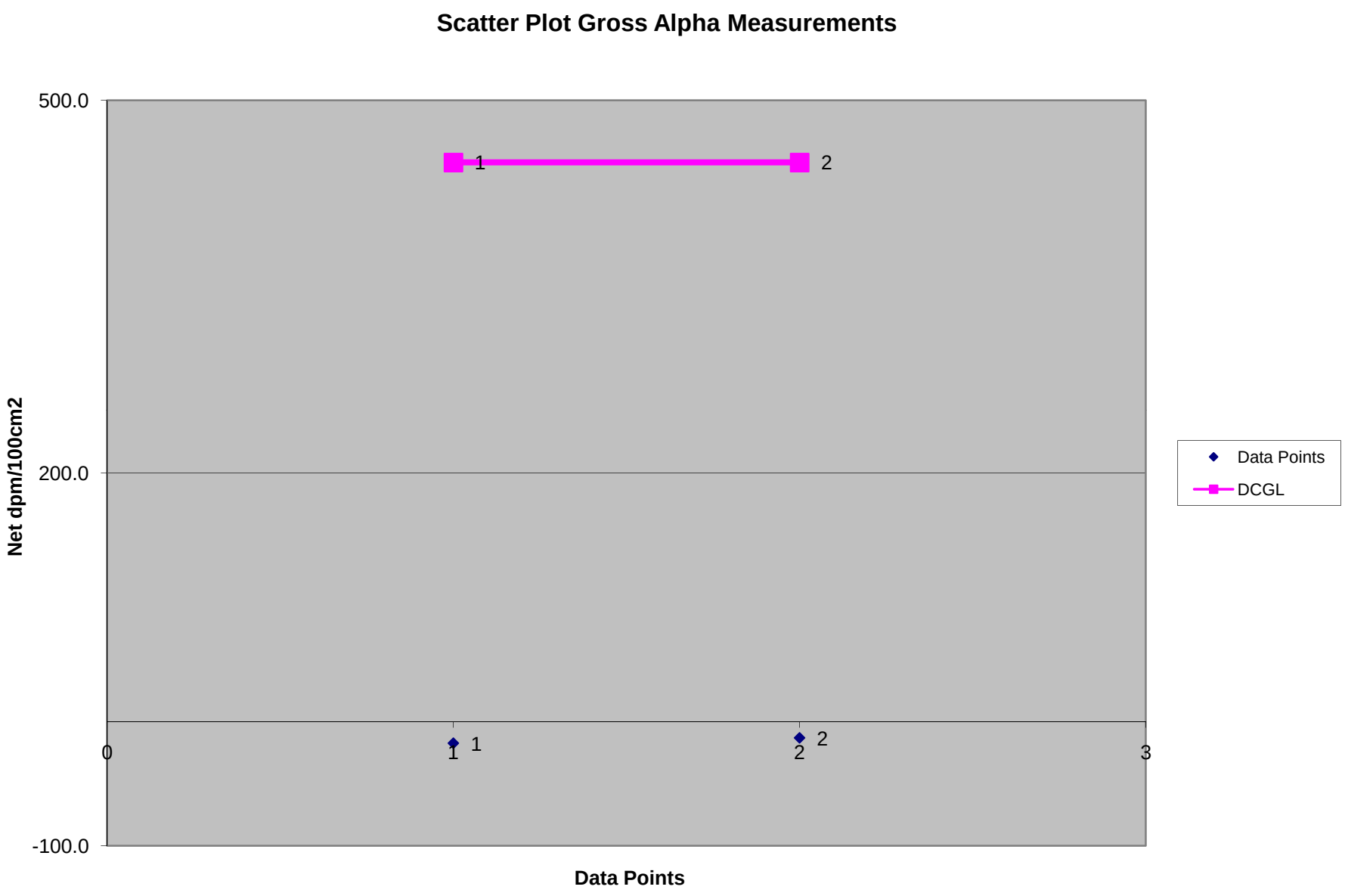
(#)	denotes swipe location and fixed α/β readings
#	denotes G/A radiation readings
# / #	denotes contact / 1 meter radiation readings.
*	denotes highest radiation reading on contact
LAW	denotes large area masslinn wipe
Δ	denotes static location.
+	Unless Otherwise Noted
	All readings in µr/hr unless otherwise noted
	K = 1000

RADIATION/CONTAMINATION SURVEY SUPPLEMENT **Page 2 of 2**

SURVEY NUMBER: N/A

SURVEYOR: Richard Kountz | LOCATION: China Lake Building 5

Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
1				-17.4	-118.2	-5.1	-44.4	Vacuum Pump
2				-13.1	25.3	-5.1	-20.4	Tank with Gauge
3				-8.7	261.7	-2.6	-56.5	Water Bath
4				-8.7	236.4	-5.1	-116.5	Pump with Gauges
5				0.0	152.0	-5.1	-68.5	Pump
N/A								
N/A								
N/A							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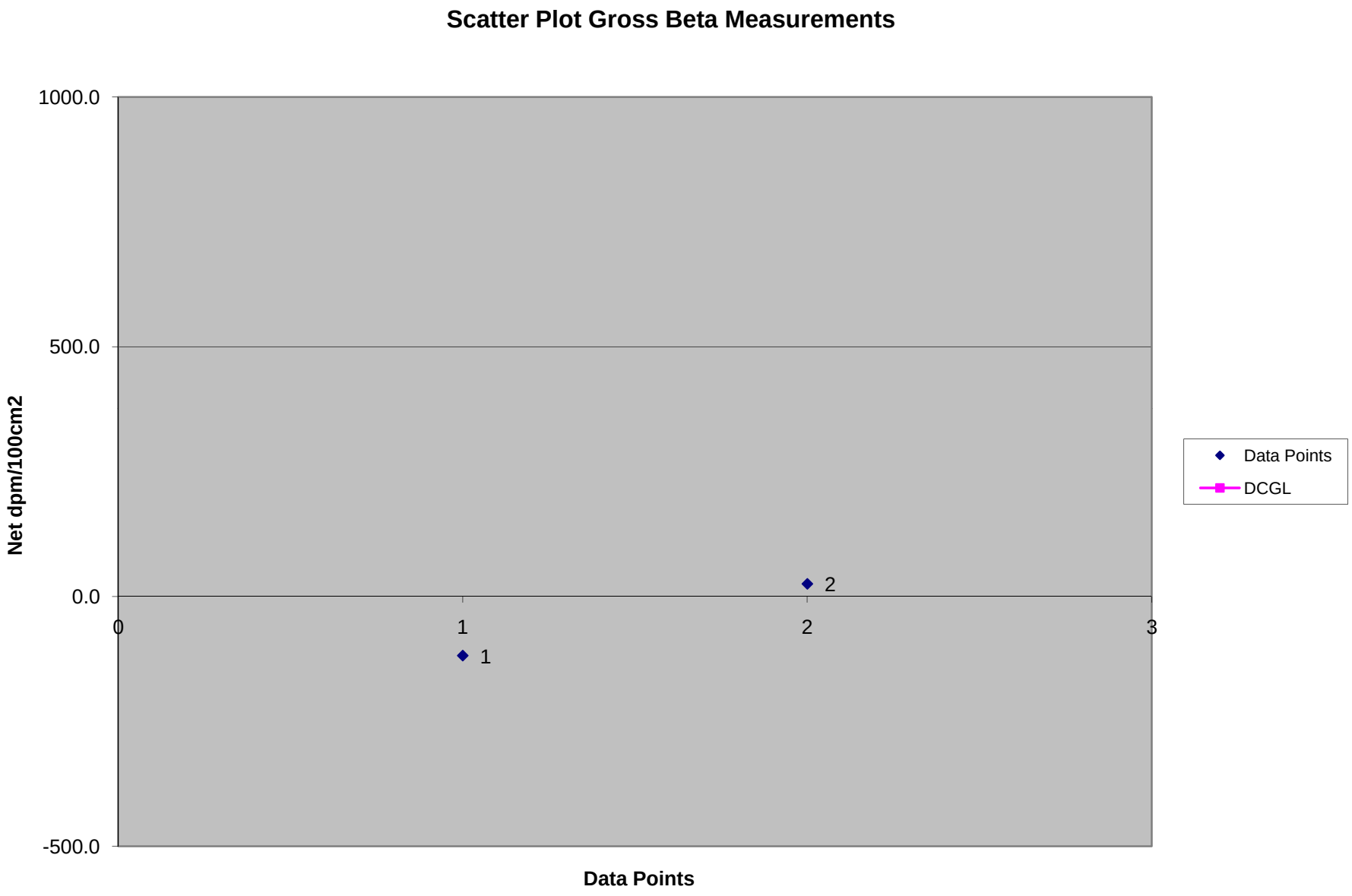
Data Points
DCGL


Scatter Plot Gross Beta Measurements
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500.0
0.0
-500.0
Net dpm/100cm2
0
1
2
3
1
2
Data Points
Data Points
DCGL

UNCONDITIONAL RELEASE OF EQUIPMENT OR MATERIALS FORM

Survey # N/A	Date : 9/19/2007
Project Location : China Lake Building 5	
Description of Equipment or Materials: Misc. Equipment in Wooden Crate	

Survey Equipment:

Model #	Serial #	Cal Due Date	Efficiency		Background	
2929	143878	4/25/2008	α	13.85%	α	5.05
			β	2.78%	β	1870.27
2360 43-68	227415	9/12/2008	α	9.10%	α	52.33
			β	4.70%	β	3968.25

Contamination Levels:

0.00	dpm / 100cm^2	α	**Maximum Fixed**
261.74	dpm / 100cm^2	β	
-2.65	dpm / 100cm^2	α	**Maximum Removable**
-20.42	dpm / 100cm^2	β	

THIS IS TO CERTIFY THAT THE ABOVE DESCRIBED EQUIPMENT OR MATERIALS HAS/HAVE BEEN SURVEYED AND BEEN FOUND TO BE WITHIN ACCEPTABLE SURFACE CONTAMINATION LEVELS FOR UNCONDITIONAL RELEASE AS REQUIRED BY NUCLEAR REGULATORY GUIDE 1.86.

Radiological Control Technician: Richard Kountz	Date: 9/19/2007
	Time: 1330
Disposition of Equipment or Materials: Free Release.	
Reviewed by: Daniel Spicuzza	Date: 9/19/2007 1000

Appendix J

Room 1613 Drawers, Cabinets, Shelves, Counter Tops Swipe Sample Data

DATE:	9/18/2007	NWTS#	N/A	ANALYSIS PERFORMED BY:		Richard Kountz	
COUNTING SYSTEM DATA							
INSTRUMENT I.D.:	α 143878	β 143878		DETECTOR I.D.:	α 147628	β 147628	
MODEL NUMBER:	α 2929	β 2929		MODEL NUMBER:	α 43−10−1	β 43−10−1	
EFFICIENCIES: α:	0.554			MDA: α:	23.4 dpm	Cal DueDate:	4/25/2008
βγ:	0.111			βγ:	733.0 dpm		
SMEARS COLLECTED BY:	Alan Campellone			SURFACE EFFICIENCY FACTOR (α): 0.25			
				SURFACE EFFICIENCY FACTOR (β): 0.25			
SAMPLE COUNT TIME:		3 Minute		ACTIVITY REPORT IN:	dpm/100 cm^2		
α BACKGROUND:	0.7	CPM		βγ BACKGROUND:	51.9	CPM	

SAMPLE I.D./DESCRIPTION	GROSS COUNTS α	GROSS COUNTS βγ	NET CPM α	NET CPM βγ	NET ACTIVITY in dpm/100cm^2 α	NET ACTIVITY in dpm/100cm^2 βγ
C-1	4	150	0.6	-1.9	4.6	-68.5
C-2	1	153	-0.4	-0.9	-2.6	-32.4
C-3	1	157	-0.4	0.4	-2.6	15.6
C-4	0	147	-0.7	-2.9	-5.1	-104.5
C-5	1	128	-0.4	-9.2	-2.6	-332.7
C-6	1	145	-0.4	-3.6	-2.6	-128.5
C-7	1	148	-0.4	-2.6	-2.6	-92.5
C-8	1	171	-0.4	5.1	-2.6	183.8
C-9	1	164	-0.4	2.8	-2.6	99.7
C-10	0	146	-0.7	-3.2	-5.1	-116.5
C-11	1	163	-0.4	2.4	-2.6	87.7
C-12	1	134	-0.4	-7.2	-2.6	-260.7
C-13	1	145	-0.4	-3.6	-2.6	-128.5
C-14	2	130	0.0	-8.6	-0.2	-308.7
C-15	2	141	0.0	-4.9	-0.2	-176.6
C-16	0	147	-0.7	-2.9	-5.1	-104.5
C-17	1	150	-0.4	-1.9	-2.6	-68.5
C-18	0	154	-0.7	-0.6	-5.1	-20.4
C-19	1	144	-0.4	-3.9	-2.6	-140.5
C-20	0	123	-0.7	-10.9	-5.1	-392.8
C-21	0	142	-0.7	-4.6	-5.1	-164.6
C-22	1	163	-0.4	2.4	-2.6	87.7
C-23	4	145	0.6	-3.6	4.6	-128.5

Remarks: China Lake Room 1613 Cabinets

Reviewed by:	Daniel Spicuzza	Date:	9/18/2007

DATE:	9/18/2007	NWTS#	N/A	ANALYSIS PERFORMED BY:		Richard Kountz	
COUNTING SYSTEM DATA							
INSTRUMENT I.D.:	α 143878	β 143878		DETECTOR I.D.:	α 147628	β 147628	
MODEL NUMBER:	α 2929	β 2929		MODEL NUMBER:	α 43−10−1	β 43−10−1	
EFFICIENCIES: α:	0.554			MDA: α: 23.4	dpm	Cal DueDate:	4/25/2008
βγ:	0.111			βγ: 733.0	dpm		
SMEARS COLLECTED BY:	Alan Campellone			SURFACE EFFICIENCY FACTOR (α): 0.25			
				SURFACE EFFICIENCY FACTOR (β): 0.25			
SAMPLE COUNT TIME:		3		ACTIVITY REPORT IN:	dpm/100 cm^2		
		Minute					
α BACKGROUND:	0.7	CPM		βγ BACKGROUND:	51.9	CPM	

SAMPLE I.D./DESCRIPTION	GROSS COUNTS		NET CPM		NET ACTIVITY in dpm/100cm^2	
	α	βγ	α	βγ	α	βγ
SH-1	0	145	-0.7	-3.6	-5.1	-128.5
SH-2	4	159	0.6	1.1	4.6	39.6

Remarks: China Lake Room 1613 Shelves

Reviewed by:	Daniel Spicuzza	Date:	9/18/2007

SMEAR COUNTING ANALYSIS REPORT

DATE:	9/18/2007	NWTS#	N/A	ANALYSIS PERFORMED BY:		Richard Kountz	
COUNTING SYSTEM DATA							
INSTRUMENT I.D.:	α 143878	β 143878		DETECTOR I.D.:	α 147628	β 147628	
MODEL NUMBER:	α 2929	β 2929		MODEL NUMBER:	α 43-10-1	β 43-10-1	
EFFICIENCIES: α:	0.554			MDA: α: 23.4	dpm	Cal DueDate:	4/25/2008
βγ:	0.111			βγ: 733.0	dpm		
SMEARS COLLECTED BY:	Alan Campellone			SURFACE EFFICIENCY FACTOR (α): 0.25			
				SURFACE EFFICIENCY FACTOR (β): 0.25			
SAMPLE COUNT TIME:		3 Minute		ACTIVITY REPORT IN:	dpm/100 cm^2		
α BACKGROUND:	0.7	CPM		βγ BACKGROUND:	51.9	CPM	

SAMPLE I.D./DESCRIPTION	GROSS COUNTS α	GROSS COUNTS βγ	NET CPM α	NET CPM βγ	NET ACTIVITY in dpm/100cm^2 α	NET ACTIVITY in dpm/100cm^2 βγ
D-1	0	149	-0.7	-2.2	-5.1	-80.5
D-2	0	173	-0.7	5.8	-5.1	207.8
D-3	0	175	-0.7	6.4	-5.1	231.8
D-4	1	151	-0.4	-1.6	-2.6	-56.5
D-5	1	150	-0.4	-1.9	-2.6	-68.5
D-6	0	148	-0.7	-2.6	-5.1	-92.5
D-7	1	167	-0.4	3.8	-2.6	135.7
D-8	0	182	-0.7	8.8	-5.1	315.9
D-9	1	150	-0.4	-1.9	-2.6	-68.5
D-10	0	150	-0.7	-1.9	-5.1	-68.5
D-11	0	151	-0.7	-1.6	-5.1	-56.5
D-12	1	173	-0.4	5.8	-2.6	207.8
D-13	0	159	-0.7	1.1	-5.1	39.6
D-14	0	149	-0.7	-2.2	-5.1	-80.5
D-15	0	152	-0.7	-1.2	-5.1	-44.4
D-16	0	175	-0.7	6.4	-5.1	231.8
D-17	1	155	-0.4	-0.2	-2.6	-8.4
D-18	0	154	-0.7	-0.6	-5.1	-20.4
D-19	1	153	-0.4	-0.9	-2.6	-32.4
D-20	1	152	-0.4	-1.2	-2.6	-44.4
D-21	1	163	-0.4	2.4	-2.6	87.7
D-22	1	149	-0.4	-2.2	-2.6	-80.5
D-23	1	151	-0.4	-1.6	-2.6	-56.5
D-24	0	159	-0.7	1.1	-5.1	39.6
D-25	0	154	-0.7	-0.6	-5.1	-20.4
D-26	0	151	-0.7	-1.6	-5.1	-56.5
D-27	0	152	-0.7	-1.2	-5.1	-44.4
D-28	2	156	0.0	0.1	-0.2	3.6
D-29	0	169	-0.7	4.4	-5.1	159.8
D-30	0	158	-0.7	0.8	-5.1	27.6
D-31	3	153	0.3	-0.9	2.2	-32.4
D-32	0	195	-0.7	13.1	-5.1	472.1
D-33	5	156	1.0	0.1	7.0	3.6
D-34	0	159	-0.7	1.1	-5.1	39.6
D-35	0	150	-0.7	-1.9	-5.1	-68.5
D-36	3	153	0.3	-0.9	2.2	-32.4
D-37	0	171	-0.7	5.1	-5.1	183.8
D-38	0	150	-0.7	-1.9	-5.1	-68.5
D-39	0	183	-0.7	9.1	-5.1	327.9
D-40	3	144	0.3	-3.9	2.2	-140.5
D-41	5	152	1.0	-1.2	7.0	-44.4
D-42	0	162	-0.7	2.1	-5.1	75.7
Blank	0	154	-0.7	-0.6	-5.1	-20.4

Remarks: China Lake Room 1613 Drawers

Reviewed by: Daniel Spicuzza Date: 9/18/2007

DATE:	9/18/2007	NWTS#	N/A	ANALYSIS PERFORMED BY:		Richard Kountz	
COUNTING SYSTEM DATA							
INSTRUMENT I.D.:	α 143878	β 143878		DETECTOR I.D.:	α 147628	β 147628	
MODEL NUMBER:	α 2929	β 2929		MODEL NUMBER:	α 43−10−1	β 43−10−1	
EFFICIENCIES: α:	0.554			MDA: α: 23.4	dpm	Cal DueDate:	4/25/2008
βγ:	0.111			βγ: 733.0	dpm		
SMEARS COLLECTED BY:	Alan Campellone			SURFACE EFFICIENCY FACTOR (α): 0.25			
				SURFACE EFFICIENCY FACTOR (β): 0.25			
SAMPLE COUNT TIME:		3 Minute		ACTIVITY REPORT IN:	dpm/100 cm^2		
α BACKGROUND:	0.7	CPM		βγ BACKGROUND:	51.9	CPM	

SAMPLE I.D./DESCRIPTION	GROSS COUNTS α	GROSS COUNTS βγ	NET CPM α	NET CPM βγ	NET ACTIVITY in dpm/100cm^2 α	NET ACTIVITY in dpm/100cm^2 βγ
CT-1	0	177	-0.7	7.1	-5.1	255.9
CT-2	0	159	-0.7	1.1	-5.1	39.6
CT-3	1	169	-0.4	4.4	-2.6	159.8
CT-4	2	149	0.0	-2.2	-0.2	-80.5
CT-5	1	155	-0.4	-0.2	-2.6	-8.4
CT-6	1	166	-0.4	3.4	-2.6	123.7
CT-7	2	155	0.0	-0.2	-0.2	-8.4
CT-8	1	173	-0.4	5.8	-2.6	207.8
CT-9	1	175	-0.4	6.4	-2.6	231.8

Remarks: China Lake Room 1613 Counter Tops

Reviewed by:	Daniel Spicuzza	Date:	9/18/2007

DATE:	9/19/2007	NWTS#	N/A	ANALYSIS PERFORMED BY:		Richard Kountz	
COUNTING SYSTEM DATA							
INSTRUMENT I.D.:	α 143878	β 143878		DETECTOR I.D.:	α 147628	β 147628	
MODEL NUMBER:	α 2929	β 2929		MODEL NUMBER:	α 43-10-1	β 43-10-1	
EFFICIENCIES: α:	0.554			MDA: α: 20.9	dpm	Cal DueDate:	4/25/2008
βγ:	0.111			βγ: 735.0	dpm		
SMEARS COLLECTED BY:	Alan Campellone			SURFACE EFFICIENCY FACTOR (α): 0.25			
				SURFACE EFFICIENCY FACTOR (β): 0.25			
SAMPLE COUNT TIME:		3		ACTIVITY REPORT IN:	dpm/100 cm^2		
		Minute					
α BACKGROUND:	0.5	CPM		βγ BACKGROUND:	52.2	CPM	

SAMPLE I.D./DESCRIPTION			GROSS COUNTS α	GROSS COUNTS βγ	NET CPM α	NET CPM βγ	NET ACTIVITY in dpm/100cm^2 α	NET ACTIVITY in dpm/100cm^2 βγ
	1	Vacuum Pump	0	152	-0.5	-1.5	-3.6	-55.3
	2	Tank with Gauge	0	154	-0.5	-0.9	-3.6	-31.2
	3	Water Bath	1	151	-0.2	-1.9	-1.2	-67.3
	4	Pump with Gauges	0	146	-0.5	-3.5	-3.6	-127.3
	5	Pump	0	150	-0.5	-2.2	-3.6	-79.3
Remarks: China Lake Room Building 5 Misc. Equipment in Wooden Crate						**Maximum:**	**-1.2**	**-31.2**
						Minimum:	**-3.6**	**-127.3**
						Average:	**-3.1**	**-72.1**
Reviewed by:	Daniel Spicuzza						Date:	9/21/2007

Appendix K

Room 1613 Fume Hoods, Vent Ducts, Sink Drains Survey Data

RADIATION/CONTAMINATION SURVEY FORM

DATE: 9/18/2007	TIME: 15:15	INSTRUMENTATION USED						
		Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm^2)	Background + (dpm/100cm^2)
SURVEY NUMBER: N/A		2360	227399	9/12/2008	α 36.40%	α 9.10%	α 61.71	α 25.07
		43-68	178075		βγ 26.90%	βγ 6.73%	βγ 621.35	βγ 2855.96
LOCATION: China Lake Building 5, Room 1613		2929	143878	4/25/2008	α 55.40%	α 13.85%	α 23.44	α 5.05
					βγ 11.10%	βγ 2.78%	βγ 733.00	βγ 1870.27
SURVEYOR: Jamie Young								
Reviewed By: Dan Spicuzza								
Isotopes of Concern: ^{232}Th ^{14}C		Static Count Time: 2 Minutes						

Description of drawing: Room 1613 Fume Vent Hoods

See Appendix M for Pictures

Comments:

All LAW's were ≤ background α β

Scan Ranges 5-10 cpm alpha 200-300 cpm beta.

No detectable alpha/beta activity over background was found.

100% of all accessible surface areas of the fume hoods were scan surveyed.

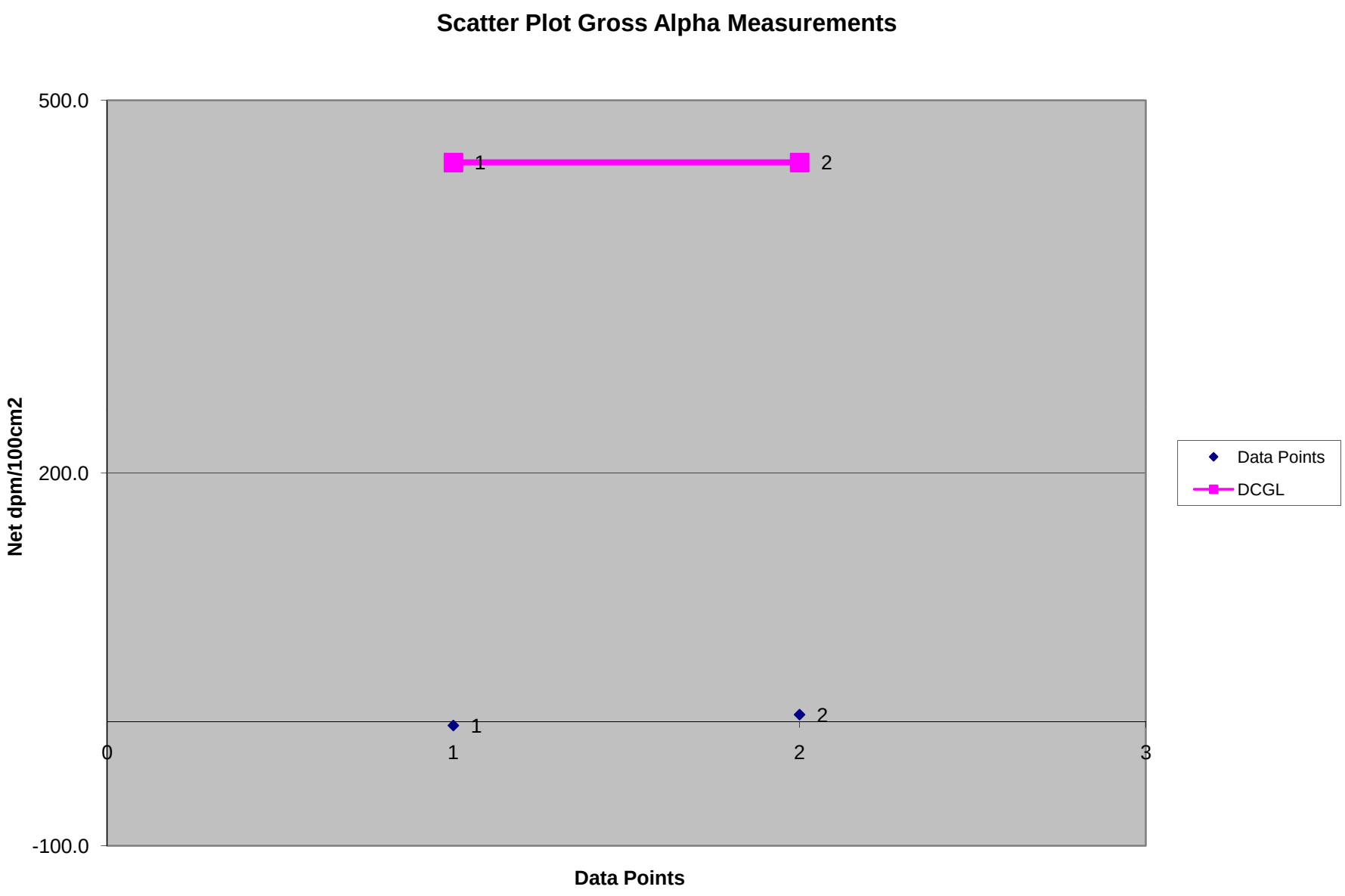
Routine (Daily / Weekly / Monthly) [ ] **Non-routine** [X]

(#)	denotes swipe location and fixed α/β readings
#	denotes G/A radiation readings
# / #	denotes contact / 1 meter radiation readings.
*	denotes highest radiation reading on contact
LAW	denotes large area masslinn wipe
Δ	denotes static location.
+	Unless Otherwise Noted
	All readings in µr/hr unless otherwise noted
	K = 1000

SURVEY NUMBER: N/A

SURVEYOR: Jamie Young | LOCATION: China Lake Building 5, Room 1613

Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	
FV1				-3.3	601.9	-0.2	3.6	
FV2				5.5	236.0	-2.6	15.6	
N/A								
N/A								
N/A						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Net dpm/100cm2
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Data Points
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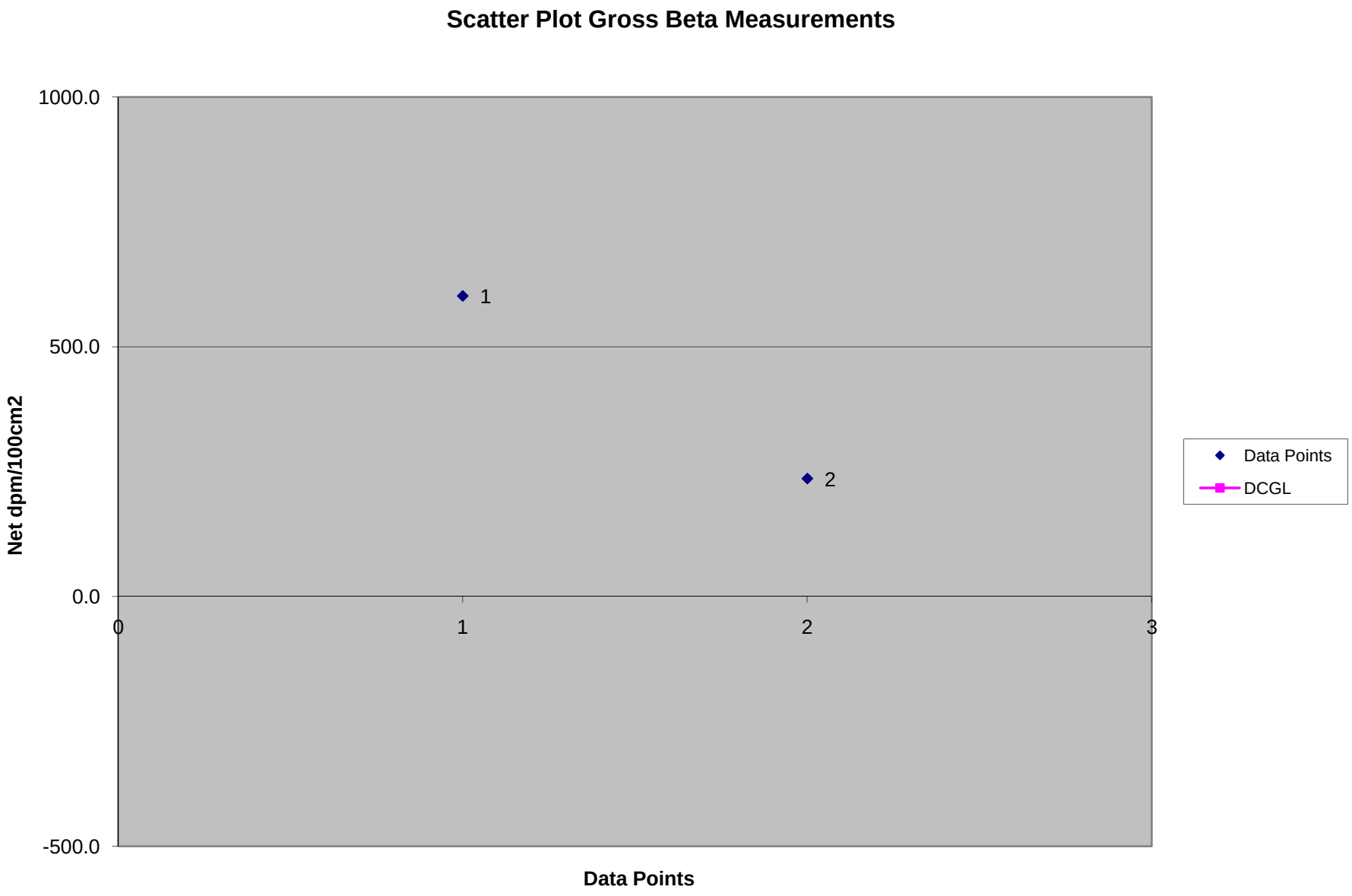
Data Points
DCGL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500.0
0.0
-500.0
Net dpm/100cm2
0
1
2
3
1
2
Data Points
Data Points
DCGL

UNCONDITIONAL RELEASE OF EQUIPMENT OR MATERIALS FORM

Survey # N/A	Date : 9/18/2007
Project Location : China Lake Building 5, Room 1613	
Description of Equipment or Materials: Room 1613 Fume Vent Hoods	

Survey Equipment:

Model #	Serial #	Cal Due Date	Efficiency		Background	
2929	143878	4/25/2008	α	13.85%	α	5.05
			β	2.78%	β	1870.27
2360 43-68	227399	9/12/2008	α	9.10%	α	25.07
			β	6.73%	β	2855.96

Contamination Levels:

5.45	dpm / 100cm^2	α	**Maximum Fixed**
601.88	dpm / 100cm^2	β	
-0.24	dpm / 100cm^2	α	**Maximum Removable**
15.62	dpm / 100cm^2	β	

THIS IS TO CERTIFY THAT THE ABOVE DESCRIBED EQUIPMENT OR MATERIALS HAS/HAVE BEEN SURVEYED AND BEEN FOUND TO BE WITHIN ACCEPTABLE SURFACE CONTAMINATION LEVELS FOR UNCONDITIONAL RELEASE AS REQUIRED BY NUCLEAR REGULATORY GUIDE 1.86.

Radiological Control Technician: Jamie Young	Date: 9/18/2007
	Time: 1515
Disposition of Equipment or Materials: Free Release.	
Reviewed by: Daniel Spicuzza	Date: 9/19/2007 1000

RADIATION/CONTAMINATION SURVEY FORM

DATE: 9/18/2007	TIME: 15:50	INSTRUMENTATION USED						
		Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm^2)	Background + (dpm/100cm^2)
SURVEY NUMBER: N/A		2360	227399	9/12/2008	α 36.40%	α 9.10%	α 68.61	α 32.71
		43-68	178075		βγ 26.90%	βγ 6.73%	βγ 649.38	βγ 3127.40
LOCATION: China Lake Building 5, Room 1613		2929	143878	4/25/2008	α 55.40%	α 13.85%	α 23.44	α 5.05
					βγ 11.10%	βγ 2.78%	βγ 733.00	βγ 1870.27
SURVEYOR: Jamie Young								
Reviewed By: Dan Spicuzza								
Isotopes of Concern: ^{232}Th ^{14}C		Static Count Time: 2 Minutes						

Description of drawing: Room 1613 Air Vents

See Appendix M for Pictures

Comments:

All LAW's were ≤ background α β

Scan Ranges 5-10 cpm alpha 200-300 cpm beta.

No detectable alpha/beta activity over background was found.

100% of all accessible surface areas of the air vents were scan surveyed.

Routine (Daily / Weekly / Monthly) ☐ **Non-routine** ☒

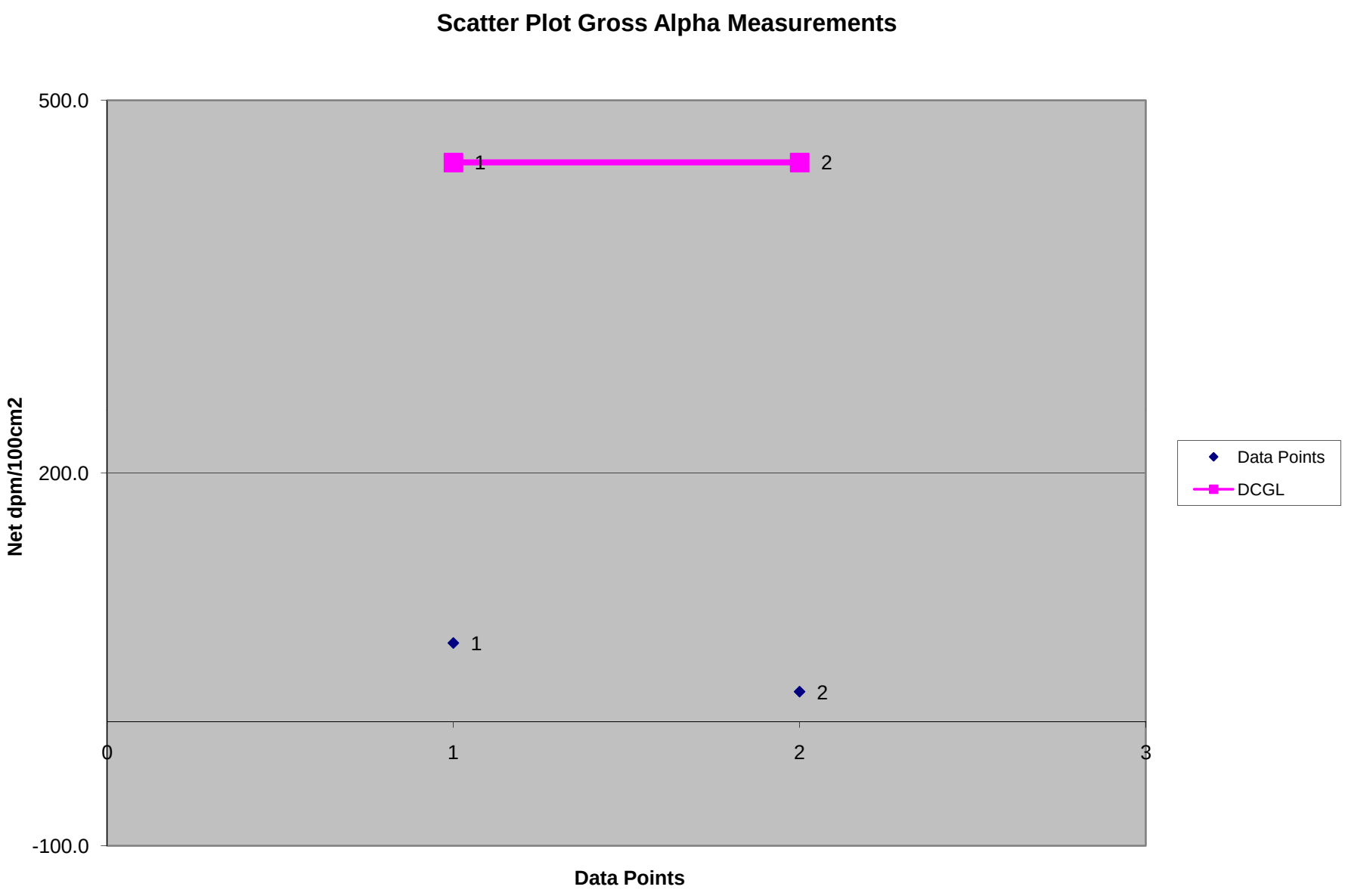
#	denotes swipe location and fixed α/β readings
#	denotes G/A radiation readings
# / #	denotes contact / 1 meter radiation readings.
*	denotes highest radiation reading on contact
LAW	denotes large area masslinn wipe
Δ	denotes static location.
+	Unless Otherwise Noted
	All readings in µr/hr unless otherwise noted
	K = 1000

RADIATION/CONTAMINATION SURVEY SUPPLEMENT **Page 2 of 2**

SURVEY NUMBER: N/A

SURVEYOR: Jamie Young | LOCATION: China Lake Building 5, Room 1613

Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
AV1				63.2	306.8	-2.6	27.6	
AV2				24.0	29.5	9.4	195.8	
N/A								
N/A								
N/A						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Data Points
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1
2
Data Points
DCGL

Scatter Plot Gross Beta Measurements
500.0
400.0
300.0
200.0
100.0
0.0
-100.0
Net dpm/100cm2
0
1
2
3
Data Points
1
2
Data Points
DCGL

UNCONDITIONAL RELEASE OF EQUIPMENT OR MATERIALS FORM

Survey # N/A	Date : 9/18/2007
Project Location : China Lake Building 5, Room 1613	
Description of Equipment or Materials: Room 1613 Air Vents	

Survey Equipment:

Model #	Serial #	Cal Due Date	Efficiency		Background	
2929	143878	4/25/2008	α	13.85%	α	5.05
			β	2.78%	β	1870.27
2360 43-68	227399	9/12/2008	α	9.10%	α	32.71
			β	6.73%	β	3127.40

Contamination Levels:

63.23	dpm / 100cm^2	α	**Maximum Fixed**
306.84	dpm / 100cm^2	β	
9.39	dpm / 100cm^2	α	**Maximum Removable**
195.80	dpm / 100cm^2	β	

THIS IS TO CERTIFY THAT THE ABOVE DESCRIBED EQUIPMENT OR MATERIALS HAS/HAVE BEEN SURVEYED AND BEEN FOUND TO BE WITHIN ACCEPTABLE SURFACE CONTAMINATION LEVELS FOR UNCONDITIONAL RELEASE AS REQUIRED BY NUCLEAR REGULATORY GUIDE 1.86.

Radiological Control Technician: Jamie Young	Date: 9/18/2007
	Time: 1550
Disposition of Equipment or Materials: Free Release.	
Reviewed by: Daniel Spicuzza	Date: 9/19/2007 1000

RADIATION/CONTAMINATION SURVEY FORM

DATE: 9/18/2007	TIME: 14:50	INSTRUMENTATION USED						
		Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm^2)	Background + (dpm/100cm^2)
SURVEY NUMBER: N/A		2360	227399	9/12/2008	α 36.40%	α 9.10%	α 61.71	α 25.07
		43-68	178075		βγ 26.90%	βγ 6.73%	βγ 621.35	βγ 2855.96
LOCATION: China Lake Building 5, Room 1613		2929	143878	4/25/2008	α 55.40%	α 13.85%	α 23.44	α 5.05
					βγ 11.10%	βγ 2.78%	βγ 733.00	βγ 1870.27
SURVEYOR: Jamie Young								
Reviewed By: Dan Spicuzza								
Isotopes of Concern: ^{232}Th ^{14}C		Static Count Time: 2 Minutes						

Description of drawing: Room 1613 Sinks

See Appendix M for Pictures

Comments:

All LAW's were ≤ background α β

Scan Ranges 5-10 cpm alpha 200-300 cpm beta.

No detectable alpha/beta activity over background was found.

100% of all accessible surface areas of the sinks were scan surveyed.

Routine (Daily / Weekly / Monthly) ☐ **Non-routine** X

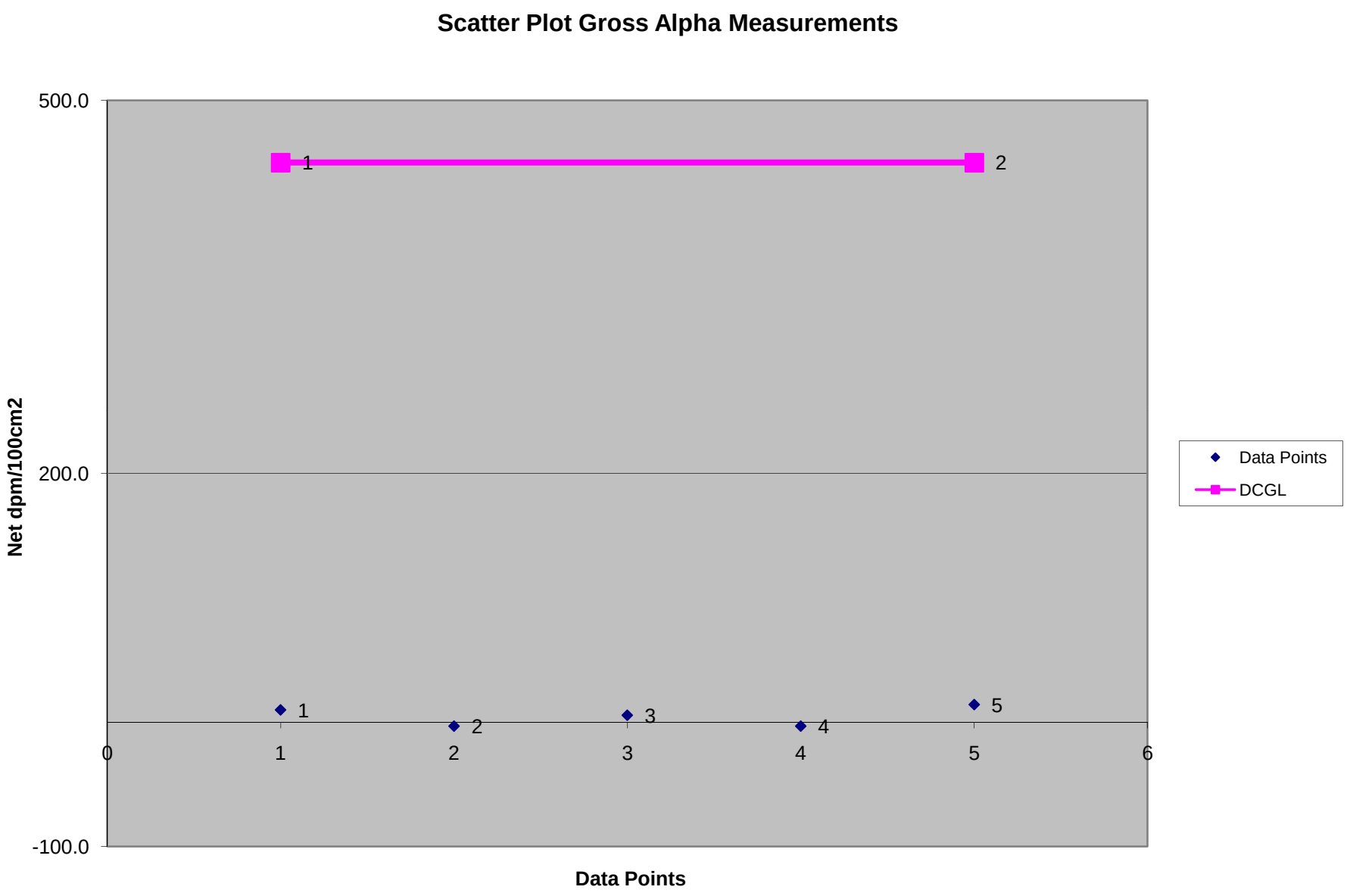
#	denotes swipe location and fixed α/β readings
#	denotes G/A radiation readings
# / #	denotes contact / 1 meter radiation readings.
*	denotes highest radiation reading on contact
LAW	denotes large area masslinn wipe
Δ	denotes static location.
+	Unless Otherwise Noted
	All readings in µr/hr unless otherwise noted
	K = 1000

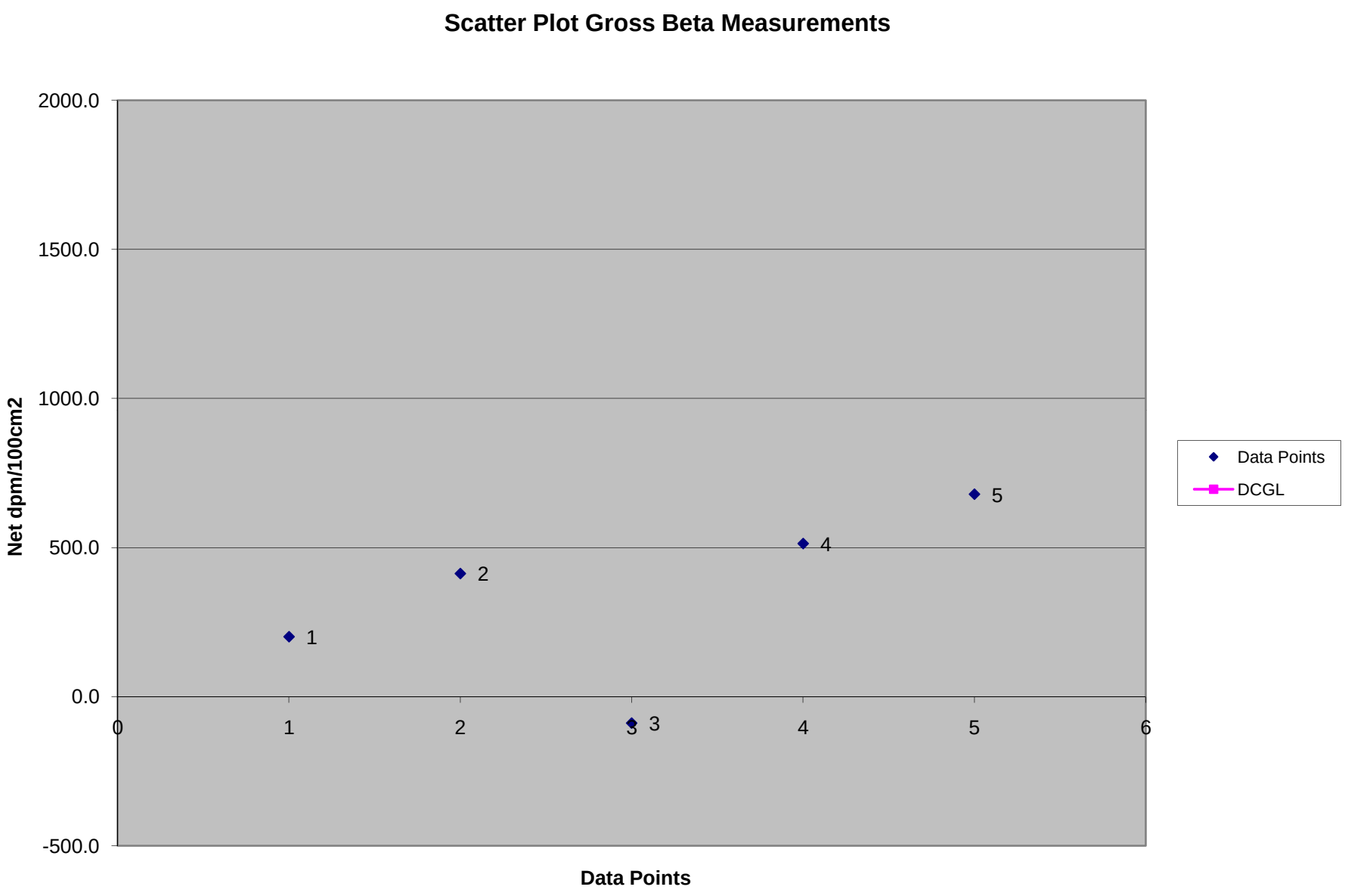
RADIATION/CONTAMINATION SURVEY SUPPLEMENT **Page 2 of 2**

SURVEY NUMBER: N/A

SURVEYOR: Jamie Young | LOCATION: China Lake Building 5, Room 1613

Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	
SK1				9.8	200.6	-2.6	3.6	
SK2				-3.3	413.1	-2.6	-44.4	
SK3				5.5	-88.5	-5.1	352.0	
SK4				-3.3	513.4	-5.1	219.8	
SK5				14.2	678.6	-2.6	39.6	
N/A								
N/A								
N/A						


Scatter Plot Gross Alpha Measurements
500.0
200.0
-100.0
Net dpm/100cm2
0
1
2
3
4
5
6
Data Points
Data Points
DCGL


Scatter Plot Gross Beta Measurements
2000.0
1500.0
1000.0
500.0
0.0
-500.0
Net dpm/100cm2
0
1
2
3
4
5
6
1
2
3
4
5
Data Points
Data Points
DCGL

UNCONDITIONAL RELEASE OF EQUIPMENT OR MATERIALS FORM

Survey # N/A	Date : 9/18/2007
Project Location : China Lake Building 5, Room 1613	
Description of Equipment or Materials: Room 1613 Sinks	

Survey Equipment:

Model #	Serial #	Cal Due Date	Efficiency		Background	
2929	143878	4/25/2008	α	13.85%	α	5.05
			β	2.78%	β	1870.27
2360 43-68	227399	9/12/2008	α	9.10%	α	25.07
			β	6.73%	β	2855.96

Contamination Levels:

14.17	dpm / 100cm^2	α	**Maximum Fixed**
678.59	dpm / 100cm^2	β	
-2.65	dpm / 100cm^2	α	**Maximum Removable**
351.95	dpm / 100cm^2	β	

THIS IS TO CERTIFY THAT THE ABOVE DESCRIBED EQUIPMENT OR MATERIALS HAS/HAVE BEEN SURVEYED AND BEEN FOUND TO BE WITHIN ACCEPTABLE SURFACE CONTAMINATION LEVELS FOR UNCONDITIONAL RELEASE AS REQUIRED BY NUCLEAR REGULATORY GUIDE 1.86.

Radiological Control Technician: Jamie Young	Date: 9/18/2007
	Time: 1450
Disposition of Equipment or Materials: Free Release.	
Reviewed by: Daniel Spicuzza	Date: 9/19/2007 1000

Appendix L

Room 1613 Fume Hoods, Vent Ducts, Sink Drains Swipe Sample Data

DATE:	9/18/2007	NWTS#	N/A	ANALYSIS PERFORMED BY:		Richard Kountz	
COUNTING SYSTEM DATA							
INSTRUMENT I.D.:	α 143878	β 143878		DETECTOR I.D.:	α 147628	β 147628	
MODEL NUMBER:	α 2929	β 2929		MODEL NUMBER:	α 43–10–1	β 43–10–1	
EFFICIENCIES: α:	0.554			MDA: α: 23.4	dpm	Cal DueDate:	4/25/2008
βγ:	0.111			βγ: 733.0	dpm		
SMEARS COLLECTED BY:	Alan Campellone			SURFACE EFFICIENCY FACTOR (α): 0.25			
				SURFACE EFFICIENCY FACTOR (β): 0.25			
SAMPLE COUNT TIME:		3		ACTIVITY REPORT IN:	dpm/100 cm^2		
		Minute					
α BACKGROUND:	0.7	CPM		βγ BACKGROUND:	51.9	CPM	

SAMPLE I.D./DESCRIPTION	GROSS COUNTS		NET CPM		NET ACTIVITY in dpm/100cm^2	
	α	βγ	α	βγ	α	βγ
FV-1	2	156	0.0	0.1	-0.2	3.6
FV-2	1	157	-0.4	0.4	-2.6	15.6

Remarks: China Lake Room 1613 Fume Hoods

Reviewed by:	Daniel Spicuzza	Date:	9/18/2007

DATE:	9/18/2007	NWTS#	N/A	ANALYSIS PERFORMED BY:		Richard Kountz	
COUNTING SYSTEM DATA							
INSTRUMENT I.D.:	α 143878	β 143878		DETECTOR I.D.:	α 147628	β 147628	
MODEL NUMBER:	α 2929	β 2929		MODEL NUMBER:	α 43–10–1	β 43–10–1	
EFFICIENCIES: α:	0.554			MDA: α: 23.4	dpm	Cal DueDate:	4/25/2008
βγ:	0.111			βγ: 733.0	dpm		
SMEARS COLLECTED BY:	Alan Campellone			SURFACE EFFICIENCY FACTOR (α): 0.25			
				SURFACE EFFICIENCY FACTOR (β): 0.25			
SAMPLE COUNT TIME:		3 Minute		ACTIVITY REPORT IN:	dpm/100 cm^2		
α BACKGROUND:	0.7	CPM		βγ BACKGROUND:	51.9	CPM	

SAMPLE I.D./DESCRIPTION	GROSS COUNTS		NET CPM		NET ACTIVITY in dpm/100cm^2	
	α	βγ	α	βγ	α	βγ
AV-1	1	158	-0.4	0.8	-2.6	27.6
AV-2	6	172	1.3	5.4	9.4	195.8

Remarks: China Lake Room 1613 Air Vents

Reviewed by:	Daniel Spicuzza	Date:	9/18/2007

DATE:	9/18/2007	NWTS#	N/A	ANALYSIS PERFORMED BY:		Richard Kountz	
COUNTING SYSTEM DATA							
INSTRUMENT I.D.:		α 143878	β 143878	DETECTOR I.D.:	α 147628	β 147628	
MODEL NUMBER:		α 2929	β 2929	MODEL NUMBER:	α 43−10−1	β 43−10−1	
EFFICIENCIES: α:		0.554		MDA: α: 23.4	dpm	Cal DueDate:	4/25/2008
βγ:		0.111		βγ: 733.0	dpm		
SMEARS COLLECTED BY:		Alan Campellone		SURFACE EFFICIENCY FACTOR (α): 0.25			
				SURFACE EFFICIENCY FACTOR (β): 0.25			
SAMPLE COUNT TIME:			3 Minute	ACTIVITY REPORT IN:	dpm/100 cm^2		
α BACKGROUND:		0.7	CPM	βγ BACKGROUND:	51.9	CPM	

SAMPLE I.D./DESCRIPTION		GROSS COUNTS α	GROSS COUNTS βγ	NET CPM α	NET CPM βγ	NET ACTIVITY in dpm/100cm^2 α	NET ACTIVITY in dpm/100cm^2 βγ
SK-1		1	156	-0.4	0.1	-2.6	3.6
SK-2		1	152	-0.4	-1.2	-2.6	-44.4
SK-3		0	185	-0.7	9.8	-5.1	352.0
SK-4		0	174	-0.7	6.1	-5.1	219.8
SK-5		1	159	-0.4	1.1	-2.6	39.6

Remarks: China Lake Building 5 Room 1613 Sinks

Reviewed by:	Daniel Spicuzza	Date:	9/18/2007

Appendix M

Room 1613 Drawers, Cabinets, Shelves, Counter Tops, Fume Hoods, Vent Ducts, Sink Drains Pictures

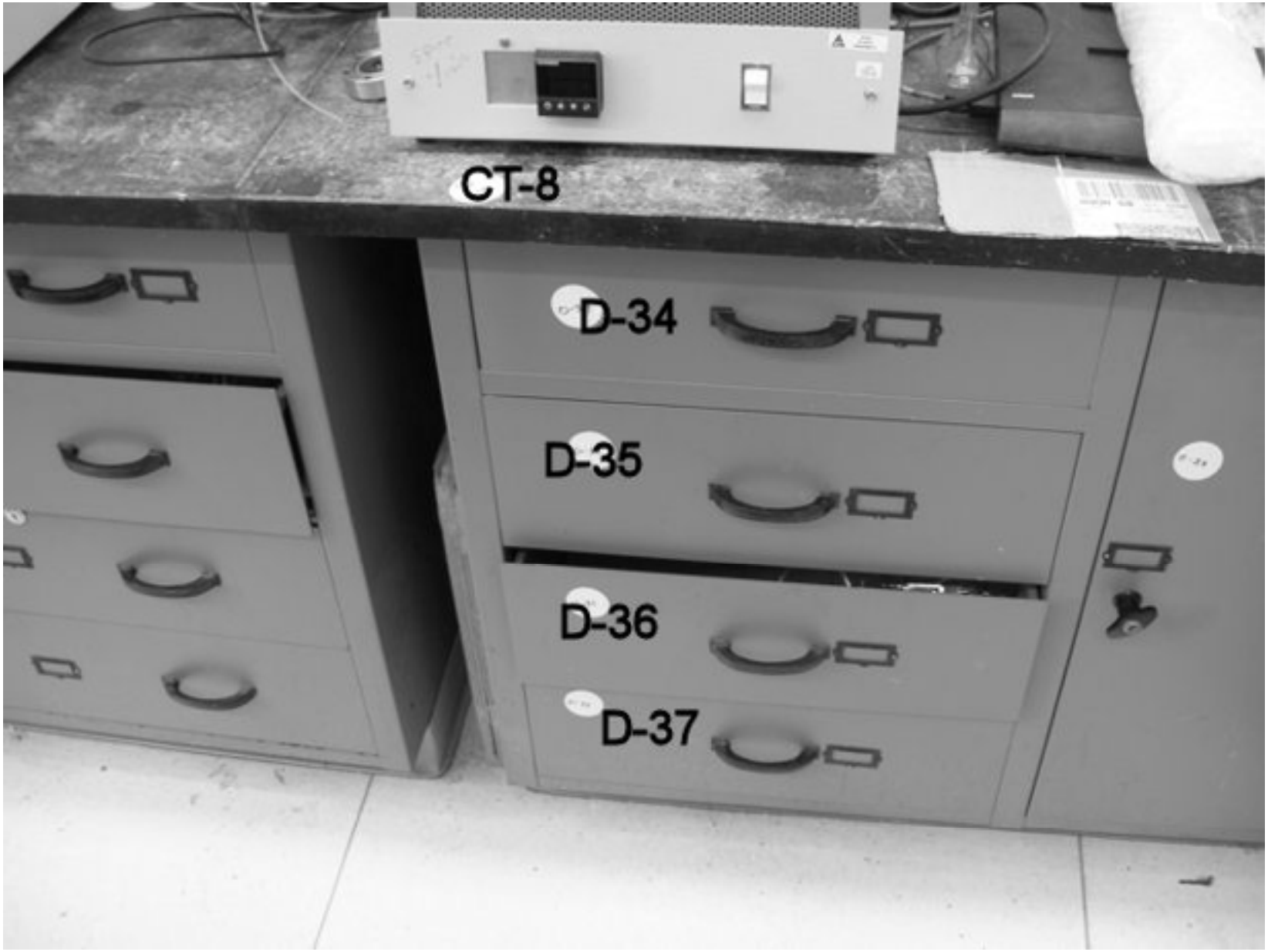
Drawers

D-7
D-8
D-3
C-15
D-4
D-5
D-6
GER
CID

D-38
D-39
D-40
D-41
D-42

CT-5
D-9
C-16
D-10
D-11
D-12

LINDBERG/BLUE M
CT-8
D-34
C-23
D-33
D-35
D-29
D-36
D-37
D-30
D-31
D-32


CT-8
D-34
D-35
D-36
D-37

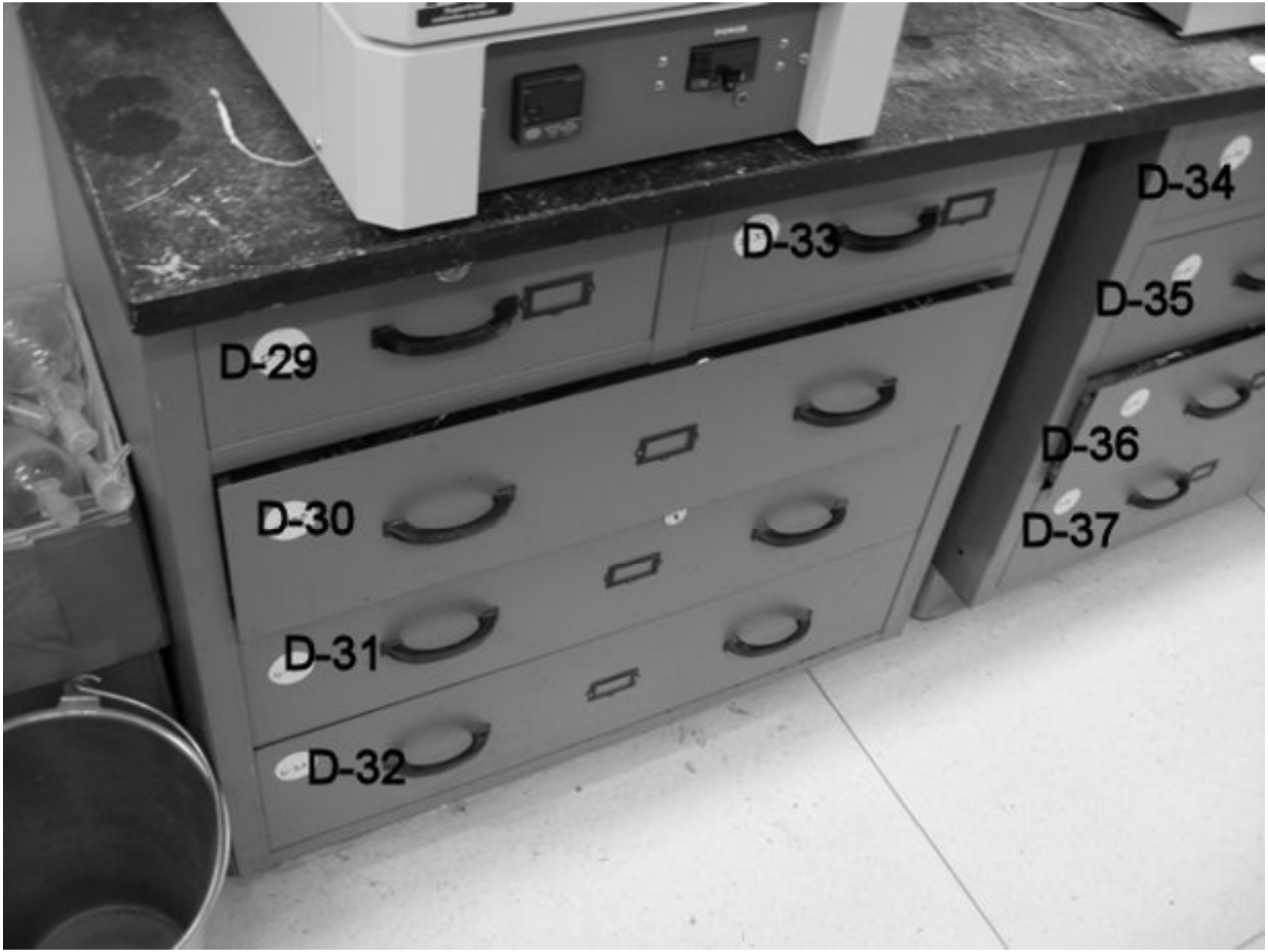
D-7
D-8
D-3
C-14
D-4
D-5
D-6

LINDBERG/BLUE M
D-29
D-33
CT-8
D-30
D-34
D-31
D-32
D-35
D-36
D-37

D-38
D-39
D-40
D-41
D-42

CT-6
C-17
D-13
D-14
D-15
D-16

D-17
D-18
D-19
D-20


D-29
D-33
D-34
D-35
D-36
D-37
D-30
D-31
D-32

D-21
D-22
D-23
D-24

CT-7
D-25
D-26
D-27
D-28
C-18

D-3
D-4
D-5
D-6
D-7
D-8