



INDIANA UNIVERSITY

OFFICE OF RESEARCH ADMINISTRATION
RADIATION SAFETY - INDIANAPOLIS

September 27, 2010

Ms. Katherine Streit
United States Nuclear Regulatory Commission,
Region III Materials Licensing Branch
2443 Warrenville Road, Suite 210
Lisle, IL 60532-4352

Subject: Addendum to Decommissioning Report to Remove the Environmental Management Facility from NRC License Number 13-02752-03

Dear Ms. Streit:

This letter is intended to provide the results from surveys performed by the Chase Environmental Group (CEG) following the removal of the radioactive waste incinerator from our Environmental Management Facility (EMF). As indicated in the attachments, no residual contamination was detected in previously inaccessible areas under the incinerator. This letter and attachments should be considered an addendum to the Final Status Report submitted to Ms. Patricia Pelke on July 27, 2010.

As best we can tell, this information should finalize the information required by the NRC to release the EMF for ultimate demolition. If you have any questions or concerns, please contact me at (317) 274-4797 or via electronic mail at mrichar@iupui.edu.

Sincerely,

Mack L. Richard, MS, CHP
Radiation Safety Officer

Attachments: 5



September 17, 2010

Mr. Mack L. Richard, MS, CHP
Radiation Safety Officer
ORA/Radiation Safety - Indianapolis
mrichar@iupui.edu

Subject: EMF Final Status Report, Addendum 1

Dear Mr. Richard:

This letter is to present the final status survey data obtained during our site visit on September 14 and 15, 2010. The purpose of the visit was to oversee removal of incinerator equipment from the Environmental Management Facility (EMF) located at 640 Union Drive, Indianapolis, IN. After removal of incinerator equipment, Chase performed final status surveys of previously inaccessible surfaces of the EMF facility to augment final status survey data presented in the EMF Final Status Report.

Chase performed total and removable surface activity measurements of previously inaccessible floor surfaces after removal of the incinerator. Floor surfaces within the footprint of the incinerator equipment received a 100% scan survey, as well as total activity and removable activity measurements at 24 discreet locations determined using a systematic square grid pattern with a one-meter spacing.

Incinerator removal activities and final status surveys were conducted under the provisions of the Indiana University (IU) radioactive materials license number 13-02752-03. Final status surveys were conducted in accordance with a MARSSIM-based Decommissioning Work Plan and as described in the Final Status Report previously submitted to the US NRC. The attached radiological survey data are meant to augment the original final status survey data. The attached data provide conclusive evidence that previously inaccessible floor surfaces encompassing the footprint of the incinerator equipment meet the criteria for unrestricted use specified in 10 CFR 20 Subpart E. For data management purposes, the previously inaccessible floor surfaces were assigned survey unit number 1202 and survey locations were determined by a one-meter square grid pattern resulting in 24 measurement locations. The background count rate for direct measurements, measured outside the southwest corner of the building, was 501 cpm. All survey unit 1202 results were less than the project investigation levels.

Dose modeling indicates that the TEDE to an average member of the critical group from previously inaccessible areas is < 3.2 mrem/year (< 13% of the NRC release criterion of 25 mrem/yr).

If you have any questions or concerns, please contact me at 865-207-3664 or dculp@chaseenv.com.

Sincerely yours,

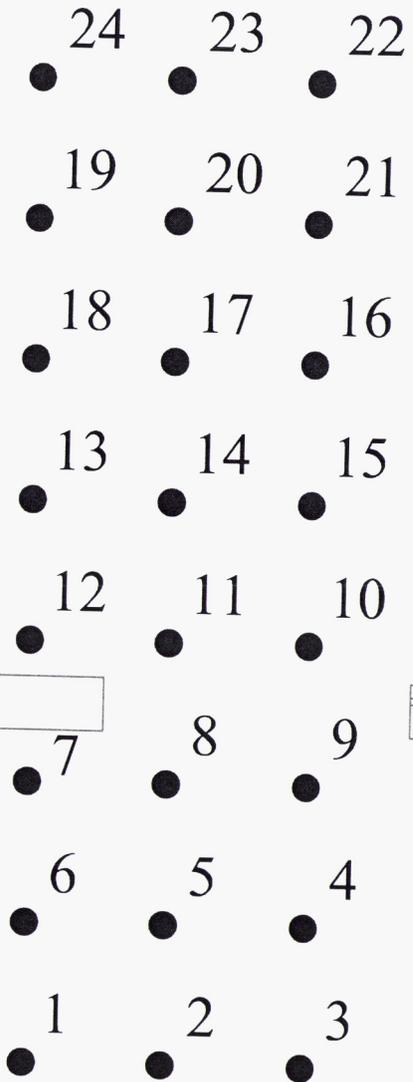


Dave Culp
Chase Environmental Group, Inc.

- Attachment 1: Addendum 1, Survey Locations Map
- Attachment 2: Addendum 1, Survey Results
- Attachment 3: Addendum 1, 4-Plot Graphs
- Attachment 4: Addendum 1, Instrument Calibration Certificate

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Structural Surfaces Survey Results

Building	EMF	Survey Unit 1202				Class 2			
Location Code	<u>Total Activity Measurements</u>		<u>Removable Activity Measurements</u>						
	Activity	MDC	<u>Channel 1</u>		<u>Channel 2</u>		<u>Channel 3</u>		
			Activity	MDC	Activity	MDC	Activity	MDC	
EMF-1202-F1-C-001	901 ± 1,864	420	14 ± 7	24	8 ± 6	26	14 ± 7	22	
EMF-1202-F1-C-002	702 ± 1,754	420	12 ± 7	24	7 ± 5	26	11 ± 7	22	
EMF-1202-F1-C-003	886 ± 1,855	420	11 ± 7	24	12 ± 7	26	11 ± 7	22	
EMF-1202-F1-C-004	565 ± 1,674	420	17 ± 8	24	5 ± 4	26	9 ± 6	22	
EMF-1202-F1-C-005	1,008 ± 1,920	420	8 ± 6	24	10 ± 6	26	8 ± 6	22	
EMF-1202-F1-C-006	779 ± 1,797	420	18 ± 8	24	13 ± 7	26	11 ± 7	22	
EMF-1202-F1-C-007	763 ± 1,789	420	10 ± 6	24	8 ± 6	26	11 ± 7	22	
EMF-1202-F1-C-008	718 ± 1,763	420	9 ± 6	24	9 ± 6	26	9 ± 6	22	
EMF-1202-F1-C-009	993 ± 1,912	420	9 ± 6	24	10 ± 6	26	12 ± 7	22	
EMF-1202-F1-C-010	748 ± 1,780	420	7 ± 5	24	8 ± 6	26	15 ± 8	22	
EMF-1202-F1-C-011	656 ± 1,728	420	13 ± 7	24	9 ± 6	26	8 ± 6	22	
EMF-1202-F1-C-012	748 ± 1,780	420	14 ± 7	24	8 ± 6	26	11 ± 7	22	
EMF-1202-F1-C-013	901 ± 1,864	420	14 ± 7	24	10 ± 6	26	13 ± 7	22	
EMF-1202-F1-C-014	1,207 ± 2,020	420	14 ± 7	24	11 ± 7	26	9 ± 6	22	
EMF-1202-F1-C-015	886 ± 1,855	420	7 ± 5	24	12 ± 7	26	11 ± 7	22	
EMF-1202-F1-C-016	947 ± 1,888	420	9 ± 6	24	15 ± 8	26	7 ± 5	22	
EMF-1202-F1-C-017	1,620 ± 2,215	420	10 ± 6	24	11 ± 7	26	12 ± 7	22	
EMF-1202-F1-C-018	702 ± 1,754	420	14 ± 7	24	11 ± 7	26	10 ± 6	22	
EMF-1202-F1-C-019	993 ± 1,912	420	10 ± 6	24	9 ± 6	26	12 ± 7	22	
EMF-1202-F1-C-020	595 ± 1,692	420	16 ± 8	24	9 ± 6	26	17 ± 8	22	
EMF-1202-F1-C-021	962 ± 1,896	420	14 ± 7	24	14 ± 7	26	10 ± 6	22	
EMF-1202-F1-C-022	855 ± 1,839	420	12 ± 7	24	9 ± 6	26	15 ± 8	22	
EMF-1202-F1-C-023	1,024 ± 1,928	420	9 ± 6	24	12 ± 7	26	17 ± 8	22	
EMF-1202-F1-C-024	901 ± 1,864	420	10 ± 6	24	9 ± 6	26	13 ± 7	22	

Notes: All total activity results reported in net dpm/100cm². All removable activity results reported in gross cpm/100cm².
 Results above MDC are in bold print.

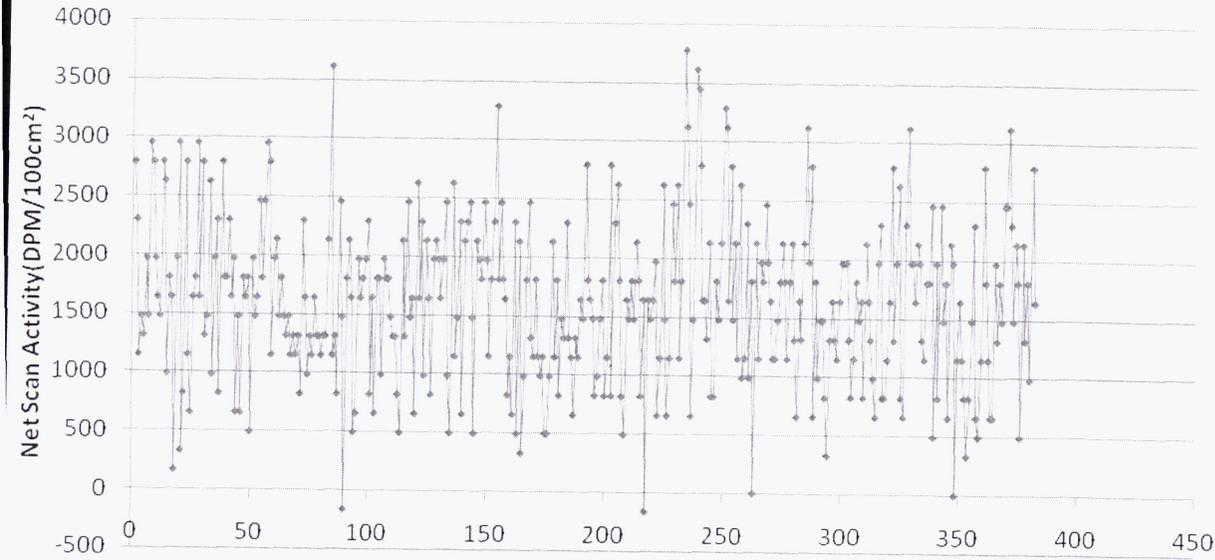
Structural Surfaces Survey Results

Building	EMF	Survey Unit 1202				Class	2
Location Code	<u>Total Activity Measurements</u>		<u>Removable Activity Measurements</u>				
	Activity	MDC	<u>Channel 1</u> Activity MDC	<u>Channel 2</u> Activity MDC	<u>Channel 3</u> Activity MDC		
Summary for Survey Unit # 1202 (24 detail records)							
Average	878		12	10		12	
Minimum	565		7	5		7	
Maximum	1,620		18	15		17	
Standard Deviation	220		3	2		3	

Notes: All total activity results reported in net dpm/100cm². All removable activity results reported in gross cpm/100cm².
 Results above MDC are in bold print.

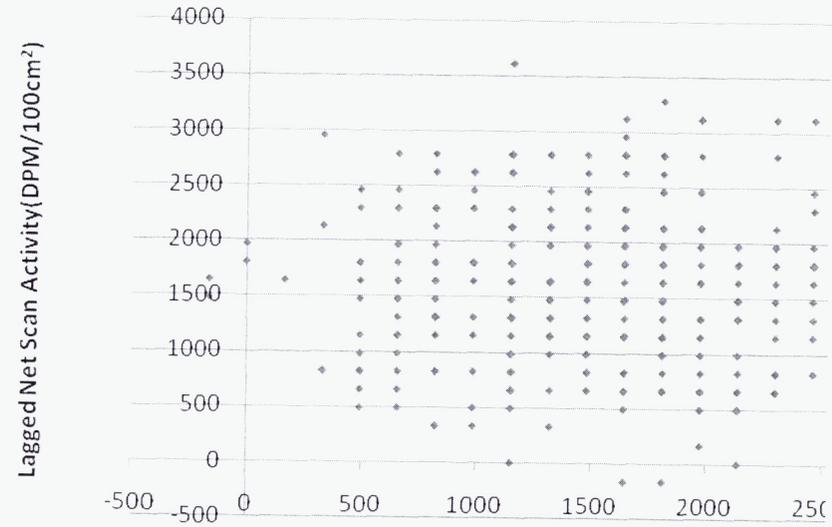
Scan Data

Bldg :EMF Survey Unit : 1202



Lagged Scan Data

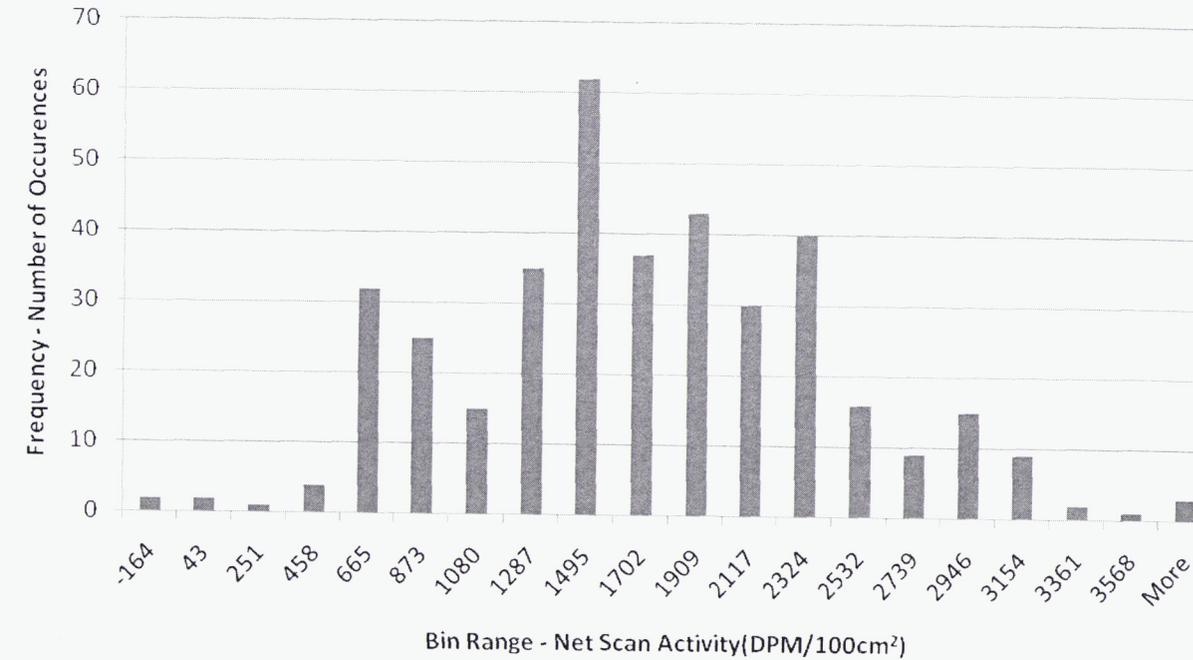
Bldg :EMF Survey Unit : 1202



Elapsed Survey Time (s)

Histogram of Scan Data

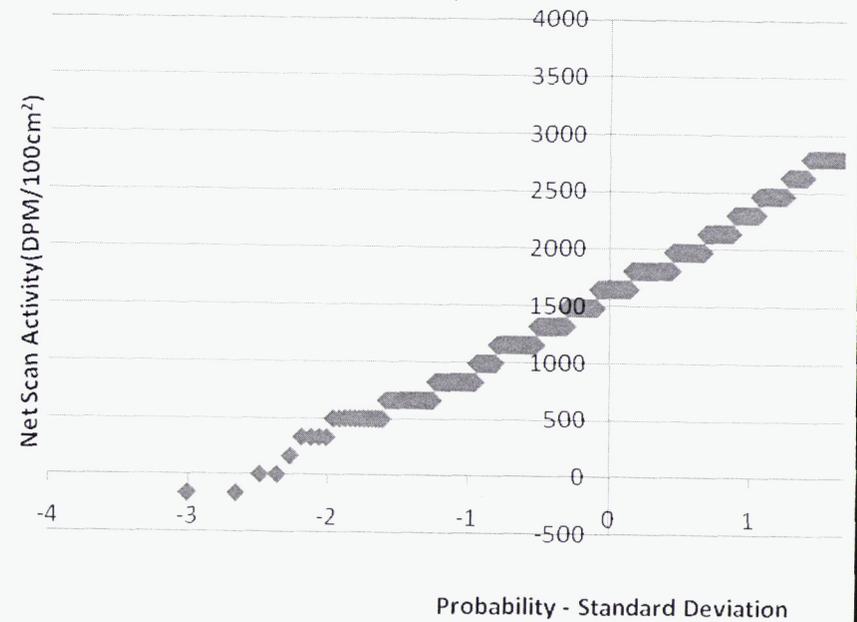
Bldg :EMF Survey Unit : 1202



Net Scan Activity(DPM/100cm²)

Normal Probability Plot of Data

Bldg :EMF Survey Unit : 1202



CALIBRATION CERTIFICATE FOR

2241-3

SERIAL# 253351

Owner: CHASE ENV

DATE: 04/20/10

LOCATION:

Griffin Inst

TECH: Joanne Glenn

DATE LAST CAL EXPIRES:

08/04/10

Reason For Calibration:

- Due For Calibration Repair (See Remarks)
 Other (See Remarks) Due and Repair (See Remarks)

NIST TRACEABLE EQUIPMENT USED DURING CALIBRATION

MODEL: M-500

SERIAL #: 114512

CAL. DUE: 09/05/10

MODEL:

SERIAL #:

CAL DUE:

- Fast/Slow Switch working properly Audio Response Geotropism CABLE LENGTH 5'

CONDITION: Sat

NEW BATTERIES: Yes No

BATTERY CHECK: Sat

HV TEST N/A Sat Unsat

AF INPUT SENSITIVITY (mV) #1:	4 mV	AL INPUT SENSITIVITY (mV) #1:	A.F.
AF INPUT SENSITIVITY (mV) #2:	4 mV	AL INPUT SENSITIVITY (mV) #2:	A.F.
AF INPUT SENSITIVITY (mV) #3:	4 mV	AL INPUT SENSITIVITY (mV) #3:	A.F.
AF INPUT SENSITIVITY (mV) #4:	4 mV	AL INPUT SENSITIVITY (mV) #4:	A.F.

RATE CPM AS FOUND % ERROR AS LEFT % ERROR

RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
250	250	0.0%	A.F.	
2500	2499	0.0%	A.F.	
25K	24,994 K	0.0%	A.F.	
250K	249,918 K	0.0%	A.F.	

Is the As Found Data Within 2% of the Set Point?

- Yes No

DETECTOR 1:

DETECTOR 2:

DETECTOR 3:

DETECTOR 4:

DETECTOR 1:		DETECTOR 2:		DETECTOR 3:		DETECTOR 4:	
AF 1-6	AL 1-6						
0000 S-6	A.F.						
0100 -2	A.F.						
c/	A.F.	c/	A.F.	c/	A.F.	c/	A.F.
m	A.F.	m	A.F.	m	A.F.	m	A.F.
1	A.F.	1	A.F.	1	A.F.	1	A.F.
000s	A.F.	000s	A.F.	000s	A.F.	000s	A.F.

REMARKS: Det 1, 43-68, #PR216394, beta; Det 2, 43-37, #PR178300, beta; Det 3, 43-68, #PR216394, alpha; Det 4, 43-37, #PR178300, alpha. Adjusted off set scaler select switch.

Does Instrument Meet Final Acceptance Criteria? Yes No

Calibration Sticker Attached? Yes No

Date Instrument is Due For Next Calibration: 04/20/11

INSTRUMENT MARRIED WITH

#

Performed/Reviewed by:

Joanne Glenn

Date: 4/20/2010

Entered by: *[Signature]* Initials



GRIFFIN INSTRUMENTS



CALIBRATION CERTIFICATE FOR 43-68 PROBE # PR216394

Owner: CHASE ENV

DATE: 04/20/10

LOCATION: Griffin Inst

TECH: Joanne Glenn

DATE LAST CAL EXPIRES: 08/18/10

REASON FOR CALIBRATION:

- Due For Calibration
 Repair (See Remarks)
 Other (See Remarks)
 Due and Repair

CABLE LENGTH: 5'

INPUT SENSITIVITY: 4 mV

NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL: 22413 SERIAL #: 253351 CAL DUE: 04/20/11

NIST TRACEABLE SOURCES USED

Source Number	Isotope	4 pi Activity	Assay Date	2 pi Activity
00TC470-0654	Tc99 SS	17,300 dpm	06/15/09	10,800 cpm
94TH470-1593	Th230	16,700 dpm	06/16/09	8,170 cpm
2696-00	Pu239	18,500 dpm	12/02/09	9,370 cpm
2697-00	Sr90	12,200 dpm	03/01/00	8,530 cpm
PX 726	C14	48,780 dpm	01/21/08	18,660 cpm

Efficiencies from last cal.:

Condition: Sat Unsat

Pu: Th: 24.78% Sr:

Tc ss: 25.97% C14: 15.40% Tc Ni:

As Found (AF) Efficiencies:

HV / Vernier:	Tc-99 Source Response Nickel (CRM):			Pu-239 Source Response (CRM):			Background (CRM):		Tc-99 Source Response Stainless Steel (CRM):		
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.	A ch.	B ch.	Net Eff.
1250 a / 1650 b				4623		24.97%	4	175		5025	28.03%

Net A to B Xtalk: <10%	B to A Xtalk: <1%
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	Pu239	Tc99 Ni	Tc99 ss	Th-230	Sr90	C-14
AF CPM:	4623		5025	3788	3849	7008
AF 4 pi eff:	24.97%		28.03%	22.66%	38.39%	14.01%
AF 2 pi eff:	49.30%		44.91%	46.32%	54.91%	36.62%

Is as found efficiency within 20% of the efficiency from the last cal? Yes No (See Remarks)

Note: If the as found data 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 section and go directly to remarks.



GRIFFIN INSTRUMENTS



PROBE #: PR216394

Date: 04/20/10

PLATEAU AND SET POINT DATA

HV / Vernier	Tc-99 Source Response SS (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Net A to B Xtalk: <10%	B to A Xtalk: <1%
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.		
N/A										

Alpha / Beta Bkg (cpm)	4	175				
HV / Vernier	Pu-239	Tc-99 Ni	Tc-99 SS	Th-230	C-14	Sr-90
1250 a / 1650 b	CPM: 4623		5025	3788	7008	3849
	<i>4 pi AL Efficiencies:</i> 24.97%		28.03%	22.66%	14.01%	38.39%
	<i>2 pi AL Efficiencies:</i> 49.19%		44.91%	46.32%	36.62%	54.91%

REMARKS: Replaced mylar due to holes. Client requested calibration.

Does Instrument Meet Final Acceptance Criteria? Yes No

Calibration Sticker Attached? Yes No

Date Instrument is Due For Next Calibration: 04/20/11

INSTRUMENT MARRIED WITH 2241-3 # 253351

Performed/Reviewed by: Jeanne Glavin Date: 4/20/2010 Entered by: [Signature] Initials

2 pi efficiencies denoted in Italics.

Calibrations performed to ANSI N323A-1997 standards.



GRIFFIN INSTRUMENTS



CALIBRATION CERTIFICATE FOR 43-37 PROBE # PR178300

Owner: CHASE ENV

DATE: 04/20/10
TECH: Joanne Glenn

LOCATION: Griffin Inst
DATE LAST CAL EXPIRES: 08/04/10

REASON FOR CALIBRATION:
Due For Calibration Repair (See Remarks) Other (See Remarks) Due and Repair

CABLE LENGTH: 10' INPUT SENSITIVITY: 4 mV

NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL: 2241-3 SERIAL #: 253351 CAL DUE: 04/20/11

NIST TRACEABLE SOURCES USED

Table with 5 columns: Source Number, Isotope, 4 pi Activity, Assay Date, 2 pi Activity. Rows include sources like 00TC470-0654, 94TH470-1593, 2696-00, 2697-00, PX 726.

Efficiencies from last cal:

Condition: Sat Unsat
Pu: Th: 20.99% Sr: 38.37%
Tc ss: 26.71% C14: 12.79% Tc Ni:

As Found (AF) Efficiencies:

Table with 5 main columns: HV/Vernier, Tc-99 Source Response Nickel (CPM), Pu-239 Source Response (CPM), Background (CPM), Tc-99 Source Response Stainless Steel (CPM). Sub-columns include A ch, B ch, Net Eff.

Table with 2 columns: Net A to B Xtalk: <10%, B to A Xtalk: <1%

Table with 6 columns: Pu239, Tc99 Ni, Tc99 ss, Th-230, Sr90, C-14. Rows include AF CPM, AF 4 pi eff, AF 2 pi eff.

Is as found efficiency within 20% of the efficiency from the last cal? Yes No (See Remarks)

Note: If the as found data 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 section and go directly to remarks.

GRIFFIN INSTRUMENTS

PROBE #: PR178300

Date: 04/20/10

PLATEAU AND SET POINT DATA

HV / Vernier:	Tc-99 Source Response SS (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Net A to B Xtalk: <10%	B to A Xtalk: <1%
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.		
1100				116		10.6%	0			
1150				2222		12.0%	7			
1200				3572		19.2%	13			
1250				3937		21.3%	5			
1300				4144		22.3%	18			

HV / Vernier	Alpha / Beta Bkg (cpm)		7		548		Pu-239	Tc-99 Ni	Tc-99 SS	Th-230	C-14	Sr-90
	1250 a / 1800 b	CPM:	4203		4541	3579						
	4 pi AL Efficiencies:	22.68%			23.08%	21.39%	13.50%	29.92%				
	2 pi AL Efficiencies:	44.69%			36.97%	43.72%	35.28%	42.79%				

REMARKS: Client requested cal.

Does Instrument Meet Final Acceptance Criteria? Yes No

Calibration Sticker Attached? Yes No

Date Instrument is Due For Next Calibration: 04/20/11

INSTRUMENT MARRIED WITH 2241-3 # 253351

Performed/Reviewed by: *Jeanne Glenn* Date: 4/20/2010 Entered by: *JG* Initials

2 pi efficiencies denoted in Italics. Calibrations performed to ANSI N323A-1997 standards.

Packing List for CHASE ENV

20-Apr-10

From: Griffin Instruments, 977 Hamilton Lane, Kingston, TN 37763

SERIAL #	MODEL	BARCODE #	LOCATION	SPEC LOCATION	OWNER	CAL DUE
253351	2241-3		CHASE ENV		CHASE ENV	04/20/11
PR178300	43-37		CHASE ENV		CHASE ENV	04/20/11
PR216394	43-68		CHASE ENV		CHASE ENV	04/20/11

Physical Condition SAT / UNSAT

Calibration Stickers ~~SAT~~ UNSAT

Proper Packaging SAT / UNSAT

Calibration Certificates ~~SAT~~ / UNSAT

1 ^{10'} 39" Cables 1 5' Cables

N Regulators

N Software

/ Floor Monitor Cart access., straps, tygon, 6' cable

/ Download Cables

A Manuals

LA Power Cables

Other: CASE,

Person Inspecting/Transferring Signature

[Handwritten Signature]

Date: 4/20/10

Person Accepting Signature _____

Date: _____