

Attachment M-1

Radiological Survey
Los Alamos National Laboratory
Former Technical Area 10, Bayo Canyon Aggregate Area
prepared by ERG
~~Function Check Forms and Calibration Sheets~~
(on CD included with this document)

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Daily Function Check Form

PMC Field
Site: Trinidad

Cal. Due Date 7-13-08
Cal. Due Date 7-13-08
Serial No. 5442-05

Serial No. 228808
Serial No. PR255841
Activity: 4370 spec @ 25-05

Ratemeter: 2221
Detector: 4494
Source: Sc Y-90
Distance to Source: ≈ 1"

Notes:

Date	Time	Battery	High Voltage	Threshold (mv)	Gross Counts (CPM)	Background (CPM)	Net Counts (CPM)	Efficiency (CPM/DPM)	Initials	Location
* 7-16-07	0720	5.3	900	400	646	218	428	0.10	PSH	
7-23-07	0917	6.3	900	400	668	251	417	0.10	SSH	Trinidad
7-23-07	1523	6.0	894	397	674	242	432	0.10	PSA	"
* 7-24-07	0731	6.1	902	400	644	265	379	0.09	PSH	"
* 7-25-07	0730	6.0	902	400	638	257	387	0.09	PSH	"
* 7-25-07	1337	5.5	895	399	661	265	356	0.09	PSA	"
* 7-25-07	1551	5.3	893	398	640	285	355	0.08	PSA	"
7-26-07	0739	5.7	901	400	641	263	378	0.09	PSH	"
7-26-07	1422	5.6	895	398	664	246	418	0.10	PSH	"
					652	254				

Date: 8/3/07

Reviewed By: Clayton
* Did not use
* X Broken GM Tube
N=9



H

PMC
Field
Site: Traylor

Daily Function Check Form

Ratemeter: 2221 Serial No. 225808 Cal. Due Date 7-13-08
 Detector: 4494 Serial No. 0255841 Cal. Due Date 7-13-08
 Source: Scv-90 Activity: 43 Ddpm @ 3.25'05 Serial No. 5442-05
 Distance to Source: ≈ 1'

Notes: _____

Date	Time	Battery	High Voltage	Threshold (mv)	Gross Counts (CPM)	Background (CPM)	Net Counts (CPM)	Efficiency (CPM/DPM)	Initials	Location
7-30-07	0747	5.8	902	400	646	246	400	6.0%	ASH	Traylor
7-30-07	1021	5.6	896	398	654	243	411	9.4%	ASH	"
8-27-07	0730	6.3	899	399	634	238	446	10.2%	ASH	"
8-27-07	1305	6.0	893	397	598	293/250	(31)	6.071	ASH	"
8-28-07	0655	6.1	900	400	597	259	367	0.604	ASH	"
8-28-07	1002	6.0	897	399	675	266	409	9.4%	ASH	"
10-10-07	0323	5.8	900	400	595	240	355	0.08	ASH	"
10-10-07	1132	5.7	897	399	611	287	324	0.074	ASH	"

Reviewed By: cm Date: 1/14/08



15

Daily Function Check Form

Site: 7.2.4 Trac. 1.4.5

Ratemeter: 2221
 Detector: 44-94
 Source: SeV-90
 Distance to Source: ~1"

Serial No. 218587 Cal. Due Date 7-13-08
 Serial No. PR255840 Cal. Due Date 7-13-08
 Activity: 4370 Serial No. 5442.05

Notes:

Date	Time	Battery	High Voltage	Threshold (mv)	Gross Counts (CPM)	Background (CPM)	Net Counts (CPM)	Efficiency (CPM/DPM)	Initials	Location
7-16-07	0730	6.2	895	400	619	246	373	0.09	PSH	TRAC. 1.4.5
7-23-07	0908	6.2	900	400	648	325	423	0.10	PSH	TRAC. 1.4.5
7-23-07	1518	6.1	895	398	609	240	369	0.08	PSH	"
7-24-07	0731	6.1	902	401	642	248	394	0.09	PSH	"
7-24-07	1251	6.0	900	401	637	254	383	0.09	PSH	"
7-24-07	1527	5.9	897	399	641	313	328	0.08	PSH	"
7-25-07	0730	6.0	902	402	636	264	372	0.09	PSH	"
7-25-07	1551	5.8	896	399	638	273	365	0.08	PSH	"
7-26-07	0737	5.9	901	401	642	238	404	0.09	PSH	"
7-26-07	1422	5.8	897	399	627	249	378	0.09	PSH	"
				4	634	255		1		

Reviewed By: Clayton Date: 8/3/07

* Did not use
 ** Broken GM Tube

Certificate of Calibration

Ratemeter / Scaler Certificate of Calibration



Environmental Restoration Group, Inc.
8809 Washington St. NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224

Manufacturer: Ludlum Model: 2221r Serial No.: 228808

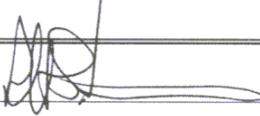
All Ranges Calibrated Electronically; Ludlum Pulsar Generator Serial No.: 97743 201932

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997
NMRCB Registration No. 481-3 • Calibration of Radiation Detection Instruments & Devices

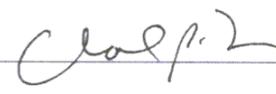
- Mechanical ck. Meter Zeroed Geotropism ck. F/S Response ck. Audio ck.
 THR/WIN ck. High Voltage ck.: 500v 1000v 1500v Battery ck. (min 4.4 vdc)
 Threshold Setting: 40 mV
 Instrument found within tolerance (+/- 10%) Yes No

Reference Calibration Point	Instrument "As Found Reading"	Instrument Meter Reading
400 Kcpm	+/- 10%	400 Kcpm
100 Kcpm	+/- 10%	100 Kcpm
40 Kcpm	+/- 10%	40 Kcpm
10 Kcpm	+/- 10%	10 Kcpm
4 Kcpm	+/- 10%	4 Kcpm
1 Kcpm	+/- 10%	1 Kcpm
400 cpm	+/- 10%	400 cpm
100 cpm	+/- 10%	100 cpm

Reference Calibration Point	Instrument "As Found Reading"	Log Scale Count Rate	Integrated Counts (1-minute count)
400 Kcpm	+/- 10%	400 Kcpm	399088
40 Kcpm	+/- 10%	40 Kcpm	39910
4 Kcpm	+/- 10%	4 Kcpm	3991
400 cpm	+/- 10%	400 cpm	399

Calibrated By: 

Calibration Date: 7-13-07

Reviewed By: 

Calibration Due: ~~7-13-08~~ ^{ESH} 7-13-08

Date: 7/13/07

Certificate of Calibration

Ratemeter / Scaler Certificate of Calibration



Environmental Restoration Group, Inc.
8809 Washington St. NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224

Manufacturer: Ludlum Model: 2221r Serial No.: 228808

All Ranges Calibrated Electronically; Ludlum Pulsar Generator Serial No.: 97743 201932

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997.
NMRCB Registration No. 481-3 • Calibration of Radiation Detection Instruments & Devices

- Mechanical ck. Meter Zeroed Geotropism ck. F/S Response ck. Audio ck.
 THR/WIN ck. High Voltage ck.: 500v 1000v 1500v Battery ck. (min 4.4 vdc)
 Threshold Setting: 40 mV
 Instrument found within tolerance (+/- 10%) Yes No

Reference Calibration Point	Instrument "As Found Reading"	Instrument Meter Reading
400 Kcpm	+/- 10%	<u>400 Kcpm</u>
100 Kcpm	+/- 10%	<u>100 Kcpm</u>
40 Kcpm	+/- 10%	<u>40 Kcpm</u>
10 Kcpm	+/- 10%	<u>10 Kcpm</u>
4 Kcpm	+/- 10%	<u>4 Kcpm</u>
1 Kcpm	+/- 10%	<u>1 Kcpm</u>
400 cpm	+/- 10%	<u>400 cpm</u>
100 cpm	+/- 10%	<u>100 cpm</u>

Reference Calibration Point	Instrument "As Found Reading"	Log Scale Count Rate	Integrated Counts (1-minute count)
400 Kcpm	+/- 10%	<u>400 Kcpm</u>	<u>399115</u>
40 Kcpm	+/- 10%	<u>40 Kcpm</u>	<u>39916</u>
4 Kcpm	+/- 10%	<u>4 Kcpm</u>	<u>3991</u>
400 cpm	+/- 10%	<u>400 cpm</u>	<u>399</u>

Calibrated By: [Signature]

Calibration Date: 10/5/07

Reviewed By: [Signature]

Calibration Due: 10/5/08

Date: 10/5/07

A

Efficiency Calibration



Environmental Restoration Group, Inc.
8809 Washington St. NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224

Detector Mfg.: Ludlum Model: 44-94 Serial No: PR255841 #1
Counter Mfg.: Ludlum Model: 2221 Serial No: 228808

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997
NMRCB Registration No 481-3 • Calibration of Radiation Detection Instruments & Devices

GM tube voltage: 900 volts Counter Threshold Setting: 40 mV
Cable Length: 39 inch, 5 foot, Other: Cuely
Detector geometry to source: Face, Planchet/In tray, Side, Other: _____
Distance to source: Contact, Planchet/In tray, 6 Inches, Other: _____
Source: Tc99 @ 17,800 dpm (1/15/07) sn: 4099-03 Other: SrY-90 #5443-05 3750 dpm @ 01/15/07

Gross Tc-99 counts: 2590 cpm Gross Sr/Y-90 counts: 1068 cpm
Background counts: 206/51.5 cpm Background counts: 206/51.5 cpm
Net Tc-99 counts: 2538.5 cpm Net Sr/Y-90 counts: 1016.5 cpm

Comments:

4π Efficiency for Tc-99 Source: 14 % 4π Efficiency for Sr/Y-90 Source: 27 %
Efficiency = Net source counts (cpm) / Source activity (cpm,dpm)

Calibrated By: [Signature]

Calibration Date: 7-13-07

Calibration Due: 7-13-08

Reviewed By: Chad P. L.

Date: 7/13/07

A

Efficiency Calibration



Environmental Restoration Group, Inc.
8809 Washington St. NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224

Detector Mfg.: Ludlum Model: 44-94 Serial No: PR255841 #2
Counter Mfg.: Ludlum Model: 2221 Serial No: 228808

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997
NMRCB Registration No. 481-3 • Calibration of Radiation Detection Instruments & Devices

GM tube voltage: 900 volts Counter Threshold Setting: 40 mV
Cable Length: 39 inch, 5 foot, Other: Cuoly
Detector geometry to source: Face, Planchett/In tray, Side, Other: _____
Distance to source: Contact, Planchett/In tray, 6 Inches, Other: _____
Source: Tc99 @ 17,800 dpm (1/15/07) sn: 4099-03 Other: SrY-90 #5443-05 3750 dpm @ 01/15/07

Gross Tc-99 counts: 2247 cpm Gross Sr/Y-90 counts: 1108 cpm
Background counts: 206/51.5 cpm Background counts: 206/51.5 cpm
Net Tc-99 counts: 2195.5 cpm Net Sr/Y-90 counts: 1056.5 cpm

Comments:
4π Efficiency for Tc-99 Source: 12 % 4π Efficiency for Sr/Y-90 Source: 28 %
Efficiency = Net source counts (cpm) / Source activity (cpm,dpm)

Calibrated By: [Signature] Calibration Date: 7-13-07

Reviewed By: [Signature] Calibration Due: 7-13-08
Date: 7/13/07

A

Efficiency Calibration



Environmental Restoration Group, Inc.
8809 Washington St. NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224

Detector Mfg.: Ludlum Model: 44-94 Serial No: PR255841 #3
Counter Mfg.: Ludlum Model: 2221 Serial No: 228808

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997
NMRCB Registration No. 481-3 • Calibration of Radiation Detection Instruments & Devices

GM tube voltage: 900 volts Counter Threshold Setting: 40 mV
Cable Length: 39 inch, 5 foot, Other: Cueley
Detector geometry to source: Face, Planchett/In tray, Side, Other: _____
Distance to source: Contact, Planchett/In tray, 6 Inches, Other: _____
Source: Tc99 @ 17,800 dpm (1/15/07) sn: 4099-03 Other: SrY-90 #5443-05 3750 dpm @ 01/15/07

Gross Tc-99 counts: 2581 cpm Gross Sr/Y-90 counts: 1109 cpm
Background counts: 206/51.5 cpm Background counts: 206/51.5 cpm
Net Tc-99 counts: 2129.5 cpm Net Sr/Y-90 counts: 1057.5 cpm

Comments:
4π Efficiency for Tc-99 Source: 14 % 4π Efficiency for Sr/Y-90 Source: 28 %
Efficiency = Net source counts (cpm) / Source activity (cpm,dpm)

Calibrated By: [Signature] Calibration Date: 7-13-07
Calibration Due: 7-13-08
Reviewed By: [Signature] Date: 7/13/07

H

Efficiency Calibration



Environmental Restoration Group, Inc.
8809 Washington St. NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224

Detector Mfg.: Ludlum Model: 44-94 Serial No: PR255841 #4
Counter Mfg.: Ludlum Model: 2221 Serial No: 228808

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997
NMRCB Registration No. 481-3 • Calibration of Radiation Detection Instruments & Devices

GM tube voltage: 900 volts Counter Threshold Setting: 40 mV
Cable Length: 39 inch, 5 foot, Other: Cuefy
Detector geometry to source: Face, Planchett/In tray, Side, Other: _____
Distance to source: Contact, Planchett/In tray, 6 Inches, Other: _____
Source: Tc99 @ 17,800 dpm (1/15/07) sn: 4099-03 Other: SrY-90 #5443-05 3750 dpm @ 01/15/07

Gross Tc-99 counts: 2685 cpm Gross Sr/Y-90 counts: 1129 cpm
Background counts: 206 / 51.5 cpm Background counts: 206 / 51.5 cpm
Net Tc-99 counts: 2633.5 cpm Net Sr/Y-90 counts: 1077.5 cpm

Comments:

4π Efficiency for Tc-99 Source: 15 % 4π Efficiency for Sr/Y-90 Source: 29 %
Efficiency = Net source counts (cpm) / Source activity (cpm,dpm)

Calibrated By:

Calibration Date: 7-13-07

Calibration Due: 7-13-08

Reviewed By: Clavel P. L.

Date: 7/14/07

Certificate of Calibration

Ratemeter / Scaler Certificate of Calibration



Environmental Restoration Group, Inc.
 8809 Washington St. NE, Suite 150
 Albuquerque, NM 87113
 (505) 298-4224

Manufacturer: Ludlum Model: 2221r Serial No.: 218587

All Ranges Calibrated Electronically; Ludlum Pulser Generator Serial No.: 97743 201932

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997.
 NMRCB Registration No. 481-3 • Calibration of Radiation Detection Instruments & Devices

- Mechanical ck. Meter Zeroed Geotropism ck. F/S Response ck. Audio ck.
 THR/WIN ck. High Voltage ck.: 500v 1000v 1500v Battery ck. (min 4.4 vdc)
 Threshold Setting: 40 mV
 Instrument found within tolerance (+/- 10%) Yes No

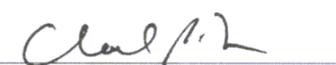
Reference Calibration Point	Instrument "As Found Reading"	Instrument Meter Reading
400 Kcpm	<u>+/- 10%</u>	<u>400 Kcpm</u>
100 Kcpm	<u>+/- 10%</u>	<u>100 Kcpm</u>
40 Kcpm	<u>+/- 10%</u>	<u>40 Kcpm</u>
10 Kcpm	<u>+/- 10%</u>	<u>10 Kcpm</u>
4 Kcpm	<u>+/- 10%</u>	<u>4 Kcpm</u>
1 Kcpm	<u>+/- 10%</u>	<u>1 Kcpm</u>
400 cpm	<u>+/- 10%</u>	<u>400 cpm</u>
100 cpm	<u>+/- 10%</u>	<u>100 cpm</u>

Reference Calibration Point	Instrument "As Found Reading"	Log Scale Count Rate	Integrated Counts (1-minute count)
400 Kcpm	<u>+/- 10%</u>	<u>400 Kcpm</u>	<u>399705</u>
40 Kcpm	<u>+/- 10%</u>	<u>40 Kcpm</u>	<u>39972</u>
4 Kcpm	<u>+/- 10%</u>	<u>4 Kcpm</u>	<u>3997</u>
400 cpm	<u>+/- 10%</u>	<u>400 cpm</u>	<u>400</u>

Calibrated By: 

Calibration Date: 7-13-07

Calibration Due: 7-13-08

Reviewed By: 

Date: 7/13/07

Efficiency Calibration



Environmental Restoration Group, Inc.
8809 Washington St. NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224

B

Detector Mfg.: Ludlum Model: 44-94 Serial No: PR255840 #1
Counter Mfg.: Ludlum Model: 2221 Serial No: 218587

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997
NMRCB Registration No. 481-3 • Calibration of Radiation Detection Instruments & Devices

GM tube voltage: 900 volts Counter Threshold Setting: 40 mV
Cable Length: 39 inch, 5 foot, Other: Cable
Detector geometry to source: Face, Planchett/In tray, Side, Other: _____
Distance to source: Contact, Planchett/In tray, 6 Inches, Other: _____
Source: Tc99 @ 17,800 dpm (1/15/07) sn: 4099-03 Other: SrY-90 #5443-05 3750 dpm @ 01/15/07

Gross Tc-99 counts: 2997 cpm Gross Sr/Y-90 counts: 1128 cpm
Background counts: 205 / 51.3 cpm Background counts: 205 / 51.3 cpm
Net Tc-99 counts: 2945.7 cpm Net Sr/Y-90 counts: 1076.7 cpm

Comments:
4π Efficiency for Tc-99 Source: 17 % 4π Efficiency for Sr/Y-90 Source: 29 %
Efficiency = Net source counts (cpm) / Source activity (cpm,dpm)

Calibrated By: [Signature] Calibration Date: 7-13-07
Calibration Due: 7-13-08
Reviewed By: [Signature] Date: 7/13/07

Efficiency Calibration



Environmental Restoration Group, Inc.
 8809 Washington St. NE, Suite 150
 Albuquerque, NM 87113
 (505) 298-4224

5

Detector Mfg.: Ludlum Model: 44-94 Serial No: PR255840 #2
 Counter Mfg.: Ludlum Model: 2221 Serial No: 218587

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997
 NMRCB Registration No. 481-3 • Calibration of Radiation Detection Instruments & Devices

GM tube voltage: 900 volts Counter Threshold Setting: 40 mV
 Cable Length: 39 inch, 5 foot, Other: Cuely
 Detector geometry to source: Face, Planchett/In tray, Side, Other: _____
 Distance to source: Contact, Planchett/In tray, 6 Inches, Other: _____
 Source: Tc99 @ 17,800 dpm (1/15/07) sn: 4099-03 Other: SrY-90 #5443-05 3750 dpm @ 01/15/07

~~Gross Tc-99 counts: 2847 cpm Gross Sr/Y-90 counts: 1168 cpm
 Background counts: 205/51.3 cpm Background counts: 205/51.3 cpm
 Net Tc-99 counts: 2795.7 cpm Net Sr/Y-90 counts: 116.7 cpm~~

Comments:

4π Efficiency for Tc-99 Source: 16 % 4π Efficiency for Sr/Y-90 Source: 30 %
 Efficiency = Net source counts (cpm) / Source activity (cpm,dpm)

Calibrated By: [Signature] Calibration Date: 7-13-07

Reviewed By: Cheryl #2 Calibration Due: 7-13-08
 Date: 7/13/07

B

Efficiency Calibration



Environmental Restoration Group, Inc.
8809 Washington St. NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224

Detector Mfg.: Ludlum Model: 44-94 Serial No: PR255840 #3
Counter Mfg.: Ludlum Model: 2221 Serial No: 218587

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997
NMRCB Registration No. 481-3 • Calibration of Radiation Detection Instruments & Devices

GM tube voltage: 900 volts Counter Threshold Setting: 40 mV
Cable Length: 39 inch, 5 foot, Other: Luely
Detector geometry to source: Face, Planchett/In tray, Side, Other: _____
Distance to source: Contact, Planchett/In tray, 6 Inches, Other: _____
Source: Tc99 @ 17,800 dpm (1/15/07) sn: 4099-03 Other: SrY-90 #5443-05 3750 dpm @ 01/15/07

Gross Tc-99 counts: 3014 cpm Gross Sr/Y-90 counts: 1292 cpm
Background counts: 205/51.3 cpm Background counts: 205/51.3 cpm
Net Tc-99 counts: 2962.7 cpm Net Sr/Y-90 counts: 1240.7 cpm

Comments:

4π Efficiency for Tc-99 Source: 17 % 4π Efficiency for Sr/Y-90 Source: 33 %
Efficiency = Net source counts (cpm) / Source activity (cpm,dpm)

Calibrated By: [Signature]

Calibration Date: 7-13-07

Calibration Due: 7-13-08

Reviewed By: Chap P. 2

Date: 7/13/07

B

Efficiency Calibration



Environmental Restoration Group, Inc.
8809 Washington St. NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224

Detector Mfg.: Ludlum Model: 44-94 Serial No: PR255840 #4
Counter Mfg.: Ludlum Model: 2221 Serial No: 218587

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997
NMRCB Registration No. 481-3 • Calibration of Radiation Detection Instruments & Devices

GM tube voltage: 900 volts Counter Threshold Setting: 40 mV
Cable Length: 39 inch, 5 foot, Other: Cuely
Detector geometry to source: Face, Planchett/In tray, Side, Other: _____
Distance to source: Contact, Planchett/In tray, 6 Inches, Other: _____
Source: Tc-99 @ 17,800 dpm (1/15/07) sn: 4099-03 Other: SrY-90 #5443-05 3750 dpm @ 01/15/07

Gross Tc-99 counts: 3060 cpm Gross Sr/Y-90 counts: 1150 cpm
Background counts: 205/51.3 cpm Background counts: 205/51.3 cpm
Net Tc-99 counts: 3008.7 cpm Net Sr/Y-90 counts: 1098.7 cpm

Comments:

4π Efficiency for Tc-99 Source: 17 % 4π Efficiency for Sr/Y-90 Source: 29 %
Efficiency = Net source counts (cpm) / Source activity (cpm,dpm)

Calibrated By: [Signature]

Calibration Date: 7-13-07

Calibration Due: 7-13-08

Reviewed By: [Signature]

Date: 7/13/07



CERTIFICATE OF CALIBRATION

Electroplated Beta Standard

S.O.# 6233
P.O.# 1093

Description of Standard:

Model No. DNS-14 Serial No. 5442-05 Isotope SrY-90
Electroplated on polished Ni disc, 0.79 mm thick.
Total diameter of 4.77 cm and an active diameter of 4.45 cm.

The radioactive material is permanently fixed to the disc by heat treatment without any covering over the active surface.

Measurement Method:

The 2pi beta emission rate was measured using an internal gas flow proportional chamber. Absolute counting of beta particles emitted in the hemisphere above the active surface was ~~verified by counting above, below, and at the operative voltage. The calibration is traceable to NIST by reference to an NIST calibrated beta source S/N 4002-02.~~

Measurement Result:

The observed beta count rate from the surface of the disc per minute (cpm) on the calibration date was:

3,050 + 122

The total disintegration rate (dpm) assuming 40 % backscatter of beta particles from the surface of the disc, was:

4,370 + 174 (0.00197 μ Ci)

The uncertainty of the measurement is 4 %, which is the sum of random counting error at the 99% confidence level, and the estimated upper limit of systematic error in this measurement.

Calibrated by: ART REUST Reviewed by: [Signature]

Calibration Technician: [Signature] Q.A. Representative: [Signature]

Calibration Date: 3-28-2005 Reviewed Date: 032805

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

**Leak Test for Sr/Y-90
Serial # 5442-05**

Counter & Standard			
	Model	2929	Serial No. 147736
	Model	43-10-1	Serial No. PR150788
Background:	Background Counts	2624	
	Background Count Time	60	min
	Standard Source:	Tc-99	Serial No. 4099-03
	Activity	17800	dpm
	Assay Date	01/15/07	mm/dd/yy
	Elapsed Time(yrs)	0.4	years
	Current Activity	17799.93	dpm

Efficiency			
	Source Counts	2969	cpm
	Source Count Time	1	min
	Efficiency	0.16	cpm/dpm

Leak Test Data	
Test Date (mm/dd/yy)	6/28/07
Isotope Half Life (years)	213000
Sample Counts (beta)	652
Sample Count Time (min)	10
Net sample count rate (cpm)	21.46666667
Net sample activity (dpm)	130.6228492
MDA (dpm)	46.9
MDA (µCi)	0.000021

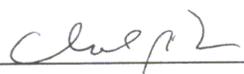
$$A_2 = A_1 \times e^{\frac{0.693(-\Delta T)}{HL}}$$

$$MDA_{cpm} = \frac{2.71 + 3.29[RbTs(1 + Ts/Tb)]^{1/2}}{EKTs}$$

$$MDA_{\mu Ci} = MDA_{cpm} / 2.22E+6$$

Leak Test Results Are ≤ MDA (0.0007 µCi)

Leak Test Performed By:  Date: 28 JUN 07

Leak Test Reviewed By:  Date: 6/28/07

