



Carbon-14, Nickel-63, and Iodine-129 Case Narrative

Cabrera Services Inc.

Forest Glen Rad Scoping Survey – 08-3800.04

Work Order Number: 1004226

1. This report consists of the raw instrument data and supporting information for 104 swipe samples. These samples are a relog of work order #'s 0911225, 0911226, 0911227, 0911227, 0911228, 0911229, and 0912056. ALS received work order 0912056 on 12/07/2009. All other work orders were received on 11/23/2009.
2. These samples were prepared according to procedure SOP700R10.
3. The samples were analyzed for the presence of ^{14}C , ^{63}Ni , and ^{129}I . The analyses were completed on 05/01/2010.
4. Three calibration blanks and a method blank were run with each set of 20 samples. Duplicates, matrix spikes, and Laboratory Control Samples were not analyzed.
5. Per PM instructions, there will be no activity calculations reported. Only the instrument raw data will be given to the client.
6. In order to determine an appropriate analysis window that would be applicable to the analysis of the three requested nuclides, an energy calibration was performed. Upon determination of the energy calibration, an analysis window was set up that correlated to the client requested analysis range of ~20 – 175 keV. The resulting calibrated efficiencies for these nuclides are as follows: ^{14}C : 0.5996 counts/disintegration, ^{63}Ni : 0.2444 cts/dis, ^{129}I : 0.5555 cts/dis. Please refer to the accompanying calibration packet for further information and supporting data for the analysis window determination and efficiency determinations.
7. A standard addition was performed on samples 1004226-16, -36, and -39. These three samples had three of the highest quench factors (H#). In order to determine a sample specific efficiency for the samples with higher quench factors, various amounts of spiking solution were added to each sample; 0.1 ml ^{14}C spike solution was added to 1004226-16, 0.1 ml of ^{63}Ni spike solution was added to sample 1004226-36, and 1.0 ml of ^{129}I spike solution was added to sample 1004226-39. Method blank 7 was quenched into the range of



the samples by adding approximately 35 μL nitromethane. The following efficiencies were obtained from these standard additions: ^{14}C : 0.4980, ^{63}Ni : 0.1018, ^{129}I : 0.4384. The background obtained at this quenched value for Method Blank 7 was 19.72 cpm. Thus, the expected efficiency range for application to these analyses for each respective nuclide is as follows; ^{14}C : 0.4980 – 0.5996 cts/dis, ^{63}Ni : 0.1018 – 0.2444 cts/dis, ^{129}I : 0.4384 – 0.5555 cts/dis. Please refer to the accompanying spreadsheets for each nuclide specific standard addition efficiency determination.

8. Review of the observed count rates in the high-energy beta contaminant window (Window 2) for these analyses did not indicate any presence of any significant high-energy beta interferences.
9. No further anomalous situations were encountered during the preparation or analysis of these samples. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Handwritten signature of Derek Caduff in black ink.

Derek Caduff
Radiochemistry Primary Data Reviewer

5-4-10

Date

Handwritten signature of the Radiochemistry Final Data Reviewer in black ink.

Radiochemistry Final Data Reviewer

05-04-10

Date

ALS Laboratory Group -- FC

Sample Number(s) Cross-Reference Table

Paragon OrderNum: 1004226

Client Name: Cabrera Services Inc.

Client Project Name: Forest Glen Rad Scoping Survey

Client Project Number: 08-3800.04

Client PO Number: 10-30322

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
SU01-01	1004226-1		WIPE	17-Nov-09	9:00
SU01-01-DUP	1004226-2		WIPE	17-Nov-09	9:05
SU01-02	1004226-3		WIPE	17-Nov-09	9:10
SU01-03	1004226-4		WIPE	17-Nov-09	9:15
SU01-04	1004226-5		WIPE	17-Nov-09	9:20
SU01-05	1004226-6		WIPE	17-Nov-09	9:25
SU01-06	1004226-7		WIPE	17-Nov-09	9:30
SU01-06-DUP	1004226-8		WIPE	17-Nov-09	9:35
SU01-07	1004226-9		WIPE	17-Nov-09	9:40
SU01-08	1004226-10		WIPE	17-Nov-09	9:45
SU01-09	1004226-11		WIPE	17-Nov-09	9:50
SU01-10	1004226-12		WIPE	17-Nov-09	9:55
SU01-11	1004226-13		WIPE	17-Nov-09	10:00
SU01-12	1004226-14		WIPE	17-Nov-09	10:05
SU01-12-DUP	1004226-15		WIPE	17-Nov-09	10:10
SU01-13	1004226-16		WIPE	17-Nov-09	10:15
SU01-14	1004226-17		WIPE	17-Nov-09	10:20
SU01-15	1004226-18		WIPE	17-Nov-09	10:25
SU01-16	1004226-19		WIPE	17-Nov-09	10:30
SU01-17	1004226-20		WIPE	17-Nov-09	10:35
SU01-18	1004226-21		WIPE	17-Nov-09	10:40
SU01-19	1004226-22		WIPE	17-Nov-09	10:45
SU01-20	1004226-23		WIPE	17-Nov-09	10:50
SU01-21	1004226-24		WIPE	17-Nov-09	10:55
SU01-22	1004226-25		WIPE	17-Nov-09	11:00
SU01-23	1004226-26		WIPE	17-Nov-09	11:05
SU01-24	1004226-27		WIPE	17-Nov-09	11:10
SU01-25	1004226-28		WIPE	17-Nov-09	11:15
SU01-26	1004226-29		WIPE	17-Nov-09	11:20
SU01-27	1004226-30		WIPE	17-Nov-09	11:25

ALS Laboratory Group -- FC

Sample Number(s) Cross-Reference Table

Paragon OrderNum: 1004226

Client Name: Cabrera Services Inc.

Client Project Name: Forest Glen Rad Scoping Survey

Client Project Number: 08-3800.04

Client PO Number: 10-30322

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
SU01-28	1004226-31		WIPE	17-Nov-09	11:30
SU01-29	1004226-32		WIPE	17-Nov-09	11:35
SU01-30	1004226-33		WIPE	17-Nov-09	11:40
SU01-BIAS	1004226-34		WIPE	17-Nov-09	11:45
SU02-31	1004226-35		WIPE	17-Nov-09	9:00
SU02-32	1004226-36		WIPE	17-Nov-09	9:05
SU02-33	1004226-37		WIPE	17-Nov-09	9:10
SU02-34	1004226-38		WIPE	17-Nov-09	9:15
SU02-35	1004226-39		WIPE	17-Nov-09	9:20
SU02-36	1004226-40		WIPE	17-Nov-09	9:25
SU02-37	1004226-41		WIPE	17-Nov-09	9:30
SU02-37-DUP	1004226-42		WIPE	17-Nov-09	9:35
SU02-38	1004226-43		WIPE	17-Nov-09	9:40
SU02-38-DUP	1004226-44		WIPE	17-Nov-09	9:45
SU02-39	1004226-45		WIPE	17-Nov-09	9:50
SU02-40	1004226-46		WIPE	17-Nov-09	9:55
SU02-41	1004226-47		WIPE	17-Nov-09	10:00
SU02-42	1004226-48		WIPE	17-Nov-09	10:05
SU02-43	1004226-49		WIPE	17-Nov-09	10:10
SU02-44	1004226-50		WIPE	17-Nov-09	10:15
SU02-45	1004226-51		WIPE	17-Nov-09	10:20
SU02-46-DUP	1004226-52		WIPE	17-Nov-09	10:25
SU02-47	1004226-53		WIPE	17-Nov-09	10:30
SU02-48	1004226-54		WIPE	17-Nov-09	10:35
SU02-49	1004226-55		WIPE	17-Nov-09	10:40
SU02-50	1004226-56		WIPE	17-Nov-09	10:45
SU02-51	1004226-57		WIPE	17-Nov-09	10:50
SU02-52	1004226-58		WIPE	17-Nov-09	10:55
SU02-53	1004226-59		WIPE	17-Nov-09	11:00
SU02-54	1004226-60		WIPE	17-Nov-09	11:05

ALS Laboratory Group -- FC

Sample Number(s) Cross-Reference Table

Paragon OrderNum: 1004226

Client Name: Cabrera Services Inc.

Client Project Name: Forest Glen Rad Scoping Survey

Client Project Number: 08-3800.04

Client PO Number: 10-30322

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
SU02-46	1004226-61		WIPE	17-Nov-09	
SU02-55	1004226-62		WIPE	17-Nov-09	11:10
SU02-56	1004226-63		WIPE	17-Nov-09	11:15
SU02-57	1004226-64		WIPE	17-Nov-09	11:20
SU02-58	1004226-65		WIPE	17-Nov-09	11:25
SU02-59	1004226-66		WIPE	17-Nov-09	11:30
SU02-60	1004226-67		WIPE	17-Nov-09	11:35
SU02-BIAS	1004226-68		WIPE	18-Nov-09	11:40
SU03-61	1004226-69		WIPE	18-Nov-09	10:00
SU03-62	1004226-70		WIPE	18-Nov-09	10:05
SU03-63	1004226-71		WIPE	18-Nov-09	10:10
SU03-64	1004226-72		WIPE	18-Nov-09	10:15
SU03-65	1004226-73		WIPE	18-Nov-09	10:20
SU03-66	1004226-74		WIPE	18-Nov-09	10:25
SU03-67	1004226-75		WIPE	18-Nov-09	10:30
SU03-68	1004226-76		WIPE	18-Nov-09	10:35
SU03-69	1004226-77		WIPE	18-Nov-09	10:40
SU03-70	1004226-78		WIPE	18-Nov-09	10:45
SU03-71	1004226-79		WIPE	18-Nov-09	10:50
SU03-72	1004226-80		WIPE	18-Nov-09	10:55
SU03-73	1004226-81		WIPE	18-Nov-09	11:00
SU03-74	1004226-82		WIPE	18-Nov-09	11:05
SU03-75	1004226-83		WIPE	18-Nov-09	11:10
SU03-76	1004226-84		WIPE	18-Nov-09	11:15
SU03-77	1004226-85		WIPE	18-Nov-09	11:20
SU03-78	1004226-86		WIPE	18-Nov-09	11:25
SU03-79	1004226-87		WIPE	18-Nov-09	11:30
SU03-80	1004226-88		WIPE	18-Nov-09	11:35
SU03-81	1004226-89		WIPE	18-Nov-09	11:40
SU03-82	1004226-90		WIPE	18-Nov-09	11:45

ALS Laboratory Group -- FC

Sample Number(s) Cross-Reference Table

Paragon OrderNum: 1004226

Client Name: Cabrera Services Inc.

Client Project Name: Forest Glen Rad Scoping Survey

Client Project Number: 08-3800.04

Client PO Number: 10-30322

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
SU03-83	1004226-91		WIPE	18-Nov-09	11:50
SU03-83-DUP	1004226-92		WIPE	18-Nov-09	11:55
SU03-84	1004226-93		WIPE	18-Nov-09	12:00
SU03-85	1004226-94		WIPE	18-Nov-09	12:05
SU03-85-DUP	1004226-95		WIPE	18-Nov-09	12:10
SU03-86	1004226-96		WIPE	18-Nov-09	12:15
SU03-86-DUP	1004226-97		WIPE	18-Nov-09	12:20
SU03-87	1004226-98		WIPE	18-Nov-09	12:25
SU03-88	1004226-99		WIPE	18-Nov-09	12:30
SU03-89	1004226-100		WIPE	18-Nov-09	12:35
SU03-90	1004226-101		WIPE	18-Nov-09	12:40
SU03-BIAS	1004226-102		WIPE	18-Nov-09	12:45
SU03-BIAS-02	1004226-103		WIPE	18-Nov-09	12:50
SU03-BIAS-03	1004226-104		WIPE	18-Nov-09	12:55

341225

225 Commerce Drive Fort Collins, CO 80524
 800-443-1511 or (970) 490-1511 (970) 490-1522 Fax

Accession Number (LAB ID)

Chain-of-Custody Date 11/20/09 Page 11 of 11

ALS Laboratory Group

Project Name / No.: Forest Glen Rad Scoping Survey (circle one) Turnaround Standard or Rush (Blue) Dispose of Return to Client

Report To: Michael Barsa
 Phone: 410-332-8177
 Fax: 410-332-8183
 Company: Cabrera Services
 Address: 103 E. Mount Royal Ave, Suite 2B
 Baltimore, MD 21202

← 1064226

H-3 via Liquid Scintillation F906.0

Circle method or specify under comments

Sample ID	Date	Time *	Lab ID	Matrix	No. of Containers
SU01-01	11/17/09	9:00	①	SM	1
SU01-01-DUP	11/17/09	9:05	②	SM	1
SU01-02	11/17/09	9:10	③	SM	1
SU01-03	11/17/09	9:15	④	SM	1
SU01-04	11/17/09	9:20	⑤	SM	1
SU01-05	11/17/09	9:25	⑥	SM	1
SU01-06	11/17/09	9:30	⑦	SM	1
SU01-06-DUP	11/17/09	9:35	⑧	SM	1
SU01-07	11/17/09	9:40	⑨	SM	1
SU01-08	11/17/09	9:45	⑩	SM	1

Comments: 08-3800.04, Task 2
 WRAMC Forest Glen Annex Radiological Survey
 SM=Smear

Total number of containers: 10

Relinquished By: (1)
 Signature: *[Signature]*
 Printed Name: M. David Barsa
 Date: 11/20 Time: 1400
 Company: Cabresca

Relinquished By: (2)
 Signature: _____
 Printed Name: _____
 Date: _____ Time: _____
 Company: _____

Received By: (1)
 Signature: *[Signature]*
 Printed Name: Lauren Schwab
 Date: 11/23/09 Time: 0915
 Company: ALS

Received By: (2)
 Signature: _____
 Printed Name: _____
 Date: _____ Time: _____
 Company: _____

Distribution: white / yellow (Paragon); pink retained by originator.

** Indicate specific analytes under comments.

Time Zone (circle one): EDT ODT MDT PDT

Form 2027-4/x/s (1/3/01)

Accession Number (LAB ID) 0911225

225 Commerce Drive Fort Collins, CO 80524
800-443-1511 or (970) 490-1511 (970) 490-1522 Fax

Chain-of-Custody
Date 11/20/09 Page 2 of 11

ALS Laboratory Group

Project Name / No.: Forest Glen Rad Scoping Survey Sampler(s): KK, AC, MB, AW Turnaround Standard or Rush Fee: Dispose Return to Client

Report To: Michael Batsa
Phone: 410-332-8177
Fax: 410-332-8183
Company: Cabrera Services
Address: 103 E. Mount Royal Ave, Suite 2B
Baltimore, MD 21202

circle method or specify under comments
F1004226 mk 4/23/10

H-3 via Liquid Scintillation E905.0

Sample ID	Date	Time *	Lab ID	Matrix	No. of Containers
SU01-09	11/17/09	9:50	(11) SM		1
SU01-10	11/17/09	9:55	(12) SM		1
SU01-11	11/17/09	10:00	(13) SM		1
SU01-12	11/17/09	10:05	(14) SM		1
SU01-12-DUP	11/17/09	10:10	(15) SM		1
SU01-13	11/17/09	10:15	(16) SM		1
SU01-14	11/17/09	10:20	(17) SM		1
SU01-15	11/17/09	10:25	(18) SM		1
SU01-16	11/17/09	10:30	(19) SM		1
SU01-17	11/17/09	10:35	(20) SM		1

Comments: 08-3800.04, Task 2
WRAMC Forest Glen Annex Radiological Survey
SM=Smear

Total number of containers: 10

Relinquished By: (1)
Signature Michael Batsa
Printed Name Michael Batsa
Date 11/20 Time 1400
Company Cabrera

Relinquished By: (2)
Signature _____
Printed Name _____
Date _____ Time _____
Company _____

Received By: (1)
Signature Jane Schuch
Printed Name Jane Schuch
Date 11/23/09 Time 0915
Company ALS

Received By: (2)
Signature _____
Printed Name _____
Date _____ Time _____
Company _____

Form 202r4.xls (12-01)

0911226

225 Commerce Drive Fort Collins, CO 80524
800-443-1511 or (970) 490-1511 (970) 490-1522 Fax

Accession Number (LAB ID) 0911226 Date 11/20/09 Page 3 of 11

ALS Laboratory Group

Chain-of-Custody

Project Name / No.: Forest Glen Rad Scoping Survey Sampler(s): KK, AC, MB, AW Turnaround Standard or Retest (Due) Dispose or Return to Client

Report To: Michael Barsa
Phone: 410-332-8177
Fax: 410-332-8183
Company: Cabrera Services
Address: 103 E. Mount Royal Ave, Suite 2B
Baltimore, MD 21202

circle method or specify under comments
K1004226 and 44310

Sample ID	Date	Time *	Lab ID	Matrix	No. of Containers
SU01-18	21	11/17/09	1	SM	1
SU01-19	22	11/17/09	2	SM	1
SU01-20	23	11/17/09	3	SM	1
SU01-21	24	11/17/09	4	SM	1
SU01-22	25	11/17/09	5	SM	1
SU01-23	26	11/17/09	6	SM	1
SU01-24	27	11/17/09	7	SM	1
SU01-25	28	11/17/09	8	SM	1
SU01-26	29	11/17/09	9	SM	1
SU01-27	30	11/17/09	10	SM	1

H-3 via Liquid Scintillation E906 0

Comments: 08-3800.04, Task 2
WRAMC Forest Glen Annex Radiological Survey
SM=Smeat

Total number of containers: 10

Relinquished By: Signature <u>Michael Barsa</u> Printed Name <u>Michael Barsa</u> Date <u>11/20</u> Time <u>1400</u> Company <u>Cabrera</u>	Relinquished By: Signature _____ Printed Name _____ Date _____ Time _____ Company _____
Received By: Signature <u>Lauren Schmitz</u> Printed Name <u>Lauren Schmitz</u> Date <u>11/23/09</u> Time <u>0815</u> Company <u>ALS</u>	Received By: Signature _____ Printed Name _____ Date _____ Time _____ Company _____

Form 2024.xls (1/3/01) Distribution: white / yellow (Paragon); pink retained by originator.

0911226

ALS Laboratory Group

Chain-of-Custody

Project Name / No.: Forest Glen Rad Scoping Survey Sampler(s): KK, AC, MB, AW Turnaround Standard or Resub (Date) Dispose or Return to Client

Report To: Michael Barsa
Phone: 410-332-8177
Fax: 410-332-8183
Company: Cabrera Services
Address: 103 E. Mount Royal Ave, Suite 2B
Baltimore, MD 21202

Sample ID	Date	Time*	Lab ID	Matrix	No. of Containers	Method
31	11/17/09	11:30	11	SM	1	X
32	11/17/09	11:35	12	SM	1	X
33	11/17/09	11:40	13	SM	1	X
34	11/17/09	11:45	14	SM	1	X
35	11/17/09	9:00	15	SM	1	X
36	11/17/09	9:05	16	SM	1	X
37	11/17/09	9:10	17	SM	1	X
38	11/17/09	9:15	18	SM	1	X
39	11/17/09	9:20	19	SM	1	X
40	11/17/09	9:25	20	SM	1	X

circle method or specify under comments
E906.0 H-3 Via Liquid Scintillation

4104256
4/23/10 mb
+ 1004256

Comments: 08-3800.04, Task 2
WRAMC Forest Glen Annex Radiological Survey
SM=Smear

Total number of containers: 10

Relinquished By: (1) Signature: [Signature] Printed Name: Michael Barsa Date: 11/20 Time: 1400 Company: Cabera
Received By: (2) Signature: [Signature] Printed Name: [Name] Date: [Date] Time: [Time] Company: [Company]

Chain-of-Custody

Project Name / No.: Forest Glen Rad Scoping Survey Sampler(s): KK, AC, MB, AW (circle one) Turnaround Standard or Test (Date) Dispose or Return to Client

Report To: Michael Barsa
 Phone: 410-332-8177
 Fax: 410-332-8183
 Company: Cabrera Services
 Address: 103 E. Mount Royal Ave, Suite 2B
 Baltimore, MD 21202

Sample ID	Date	Time *	Lab ID	Matrix	No. of Containers	circle method or specify under comments
SU02-37	11/17/09	9:30	①	SM	1	
SU02-37-DUP	11/17/09	9:35	②	SM	1	
SU02-38	11/17/09	9:40	③	SM	1	
SU02-38-DUP	11/17/09	9:45	④	SM	1	
SU02-39	11/17/09	9:50	⑤	SM	1	
SU02-40	11/17/09	9:55	⑥	SM	1	
SU02-41	11/17/09	10:00	⑦	SM	1	
SU02-42	11/17/09	10:05	⑧	SM	1	
SU02-43	11/17/09	10:10	⑨	SM	1	
SU02-44	11/17/09	10:15	⑩	SM	1	

H-3 via Liquid Scintillation E906.0

Comments: 08-3800.04, Task 2
 WRAMC Forest Glen Annex Radiological Survey
 SM=Smeat

Total number of containers: 10

Relinquished By: (1) Signature Michael Barsa Printed Name Michael Barsa Date 11/20 Time 1400 Company Carboran

Relinquished By: (2) Signature _____ Printed Name _____ Date _____ Time _____ Company _____

Received By: (1) Signature Larsen Schmitz Printed Name Larsen Schmitz Date 11/23/09 Time 0915 Company ACS

Received By: (2) Signature _____ Printed Name _____ Date _____ Time _____ Company _____

Chain-of-Custody

Project Name / No.: Forest Glen Rad Scoping Survey Sampler(s): KK, AC, MB, AW Turnaround Standard or Reah-Date: Dispose or Return to Client

Report To: Michael Barsa
Phone: 410-332-8177
Fax: 410-332-8183
Company: Cabrera Services
Address: 103 E. Mount Royal Ave, Suite 2B
 Baltimore, MD 21202

Sample ID	Date	Time *	Lab ID	Matrix	No. of Containers	Remarks
SU02-45	11/17/09	10:20	(11) SM	SM	1	
SU02-46-DUP	11/17/09	10:25	(12) SM	SM	1	
SU02-47	11/17/09	10:30	(13) SM	SM	1	
SU02-48	11/17/09	10:35	(14) SM	SM	1	
SU02-49	11/17/09	10:40	(15) SM	SM	1	
SU02-50	11/17/09	10:45	(16) SM	SM	1	
SU02-51	11/17/09	10:50	(17) SM	SM	1	
SU02-52	11/17/09	10:55	(18) SM	SM	1	
SU02-53	11/17/09	11:00	(19) SM	SM	1	
SU02-54	11/17/09	11:05	(20) SM	SM	1	

H-3 via Liquid Scintillation E906.0

circle method or specify under comments

← 1004226 NW 4/23/10

Comments: 08-3800.04, Task 2
 WRAMC Forest Glen Annex Radiological Survey
 SM=Smeat

Total number of containers: 10

Relinquished By: Michael Barsa (1)
 Signature: [Signature]
 Printed Name: Michael Barsa
 Date: 11/20 Time: 1400
 Company: Cabrera

Relinquished By: [Signature] (2)
 Signature: _____
 Printed Name: _____
 Date: _____ Time: _____
 Company: _____

Received By: [Signature] (1)
 Signature: [Signature]
 Printed Name: JANIS SCHMIDT
 Date: 11/23/09 Time: 0915
 Company: HLS

Received By: _____ (2)
 Signature: _____
 Printed Name: _____
 Date: _____ Time: _____
 Company: _____

ALS Laboratory Group

225 Commerce Drive Fort Collins, CO 80524
 800-443-1511 or (970) 490-1511 (970) 490-1522 Fax

Accession Number (LAB ID) 0911228

Chain-of-Custody

Date 11/20/09 Page 7 of 11

Project Name / No.:	Forest Glen Rad Scoping Survey	Sampler(s):	KK, AC, MB, AW	Turnaround Standard or Rush (Date)	Dispose or Return to Client
Report To:	Michael Barsa				
Phone:	410-332-8177				
Fax:	410-332-8183				
Company:	Cabrera Services				
Address:	103 E. Mount Royal Ave, Suite 2B Baltimore, MD 21202				
Sample ID	Date	Time*	Lab ID	Matrix	No. of Containers
SU02-55	11/17/09	11:10	①	SM	1
SU02-56	11/17/09	11:15	②	SM	1
SU02-57	11/17/09	11:20	③	SM	1
SU02-58	11/17/09	11:25	④	SM	1
SU02-59	11/17/09	11:30	⑤	SM	1
SU02-60	11/17/09	11:35	⑥	SM	1
SU02-BIAS	11/17/09	11:40	⑦	SM	1
SU03-61	11/18/09	10:00	⑧	SM	1
SU03-62	11/18/09	10:05	⑨	SM	1
SU03-63	11/18/09	10:10	⑩	SM	1
Comments: Total number of containers: <u>10</u> 08-3800.04, Task 2 WRAMC Forest Glen Annex Radiological Survey SM=Smear					
Relinquished By: (1) Signature: <u>Michael Barsa</u> Printed Name: <u>Michael Barsa</u> Date: <u>11/20</u> Time: <u>1400</u> Company: <u>Cabrera</u>					
Relinquished By: (2) Signature: _____ Printed Name: _____ Date: _____ Time: _____ Company: _____					
Received By: (1) Signature: <u>Michael Barsa</u> Printed Name: <u>Michael Barsa</u> Date: <u>11/23/09</u> Time: <u>0915</u> Company: <u>ALS</u>					
Received By: (2) Signature: _____ Printed Name: _____ Date: _____ Time: _____ Company: _____					

ALS Laboratory Group

Chain-of-Custody

Project Name / No.: Forest Glen Rad Scoping Survey Sampler(s): KK, AC, MB, AW Turnaround Standard or Rush (Date): (circle one) Dispose of Return to Client

Report To: Michael Barsa
 Phone: 410-332-8177
 Fax: 410-332-8183
 Company: Cabrera Services
 Address: 103 E. Mount Royal Ave, Suite 2B
 Baltimore, MD 21202

Sample ID	Date	Time *	Lab ID	Matrix	No. of Containers	circle method or specify under comments															
						1	2	3	4	5	6	7	8	9	10						
SU03-64	11/18/09	10:15	11	SM	1																
SU03-65	11/18/09	10:20	12	SM	1																
SU03-66	11/18/09	10:25	13	SM	1																
SU03-67	11/18/09	10:30	14	SM	1																
SU03-68	11/18/09	10:35	15	SM	1																
SU03-69	11/18/09	10:40	16	SM	1																
SU03-70	11/18/09	10:45	17	SM	1																
SU03-71	11/18/09	10:50	18	SM	1																
SU03-72	11/18/09	10:55	19	SM	1																
SU03-73	11/18/09	11:00	20	SM	1																

Relinquished By: Michael Barsa (1)
 Signature: [Signature]
 Printed Name: Michael Barsa
 Date: 11/20 Time: 1400
 Company: Cabrera

Relinquished By: _____ (2)
 Signature: _____
 Printed Name: _____
 Date: _____ Time: _____
 Company: _____

Received By: Lauren Schmitt (1)
 Signature: [Signature]
 Printed Name: Lauren Schmitt
 Date: 11/23/09 Time: 1215
 Company: ALS

Received By: _____ (2)
 Signature: _____
 Printed Name: _____
 Date: _____ Time: _____
 Company: _____

Total number of containers: 10

Form 202r4.xls (1/3/01)

0911229

Accession Number (LAB ID)

Date 11/20/09 Page 9 of 11

225 Commerce Drive Fort Collins, CO 80524
300-443-1511 or (970) 490-1511 (970) 490-1522 Fax

ALS Laboratory Group

Chain-of-Custody

Project Name / No.: Forest Glen Rad Scoping Survey

Sampler(s): KK, AC, MB, AW

Turnaround Standard or Request Due

Dispose Return to Client

Report To: Michael Barsa
Phone: 410-332-8177
Fax: 410-332-8183
Company: Cabrera Services
Address: 103 E. Mount Royal Ave, Suite 2B
Baltimore, MD 21202

H-3 via Liquid Scintillation E906.0

circle method or specify under comments

Sample ID	Date	Time *	Lab ID	Matrix	No. of Containers
81	11/18/09	11:05	①	SM	1
82	11/18/09	11:10	②	SM	1
83	11/18/09	11:15	③	SM	1
84	11/18/09	11:20	④	SM	1
85	11/18/09	11:25	⑤	SM	1
86	11/18/09	11:30	⑥	SM	1
87	11/18/09	11:35	⑦	SM	1
88	11/18/09	11:40	⑧	SM	1
89	11/18/09	11:45	⑨	SM	1
90	11/18/09	11:50	⑩	SM	1

Relinquished By: (1) Michael Barsa
Signature: [Signature]
Printed Name: Michael Barsa
Date: 11/20 Time: 1:40
Company: Cabrera

Relinquished By: (2) _____
Signature: _____
Printed Name: _____
Date: _____ Time: _____
Company: _____

Received By: (1) David Schuch
Signature: [Signature]
Printed Name: David Schuch
Date: 11/20/09 Time: 6:45
Company: ALS

Received By: (2) _____
Signature: _____
Printed Name: _____
Date: _____ Time: _____
Company: _____

Comments: 08-3600.04, Task 2
WRAMC Forest Glen Annex Radiological Survey
SM=Smeared

Total number of containers: 10

Form 202-4.xls (1/3-01)

Distribution: white / yellow (Paragon); pink retained by originator.

** Indicate specific analytes under comments.

Time Zone (circle one): EDT OOT MDT PDT

0911229

Accession Number (LAB ID)

225 Commerce Drive Fort Collins, CO 80524
 800-443-1511 or (970) 490-1511 (970) 490-1522 Fax

ALS Laboratory Group

Chain-of-Custody

Date 11/20/09 Page 10 of 11

Project Name / No.: Forest Glen Rad Scoping Survey
 Sampler(s): KK, AC, MB, AW (circle one) Turnaround Standard or Rush (Date) Dispose of Return to Client

Report To: Michael Barse
 Phone: 410-332-8177
 Fax: 410-332-8183
 Company: Cabrera Services
 Address: 103 E. Mount Royal Ave, Suite 2B
 Baltimore, MD 21202

Sample ID	Date	Time *	Lab ID	Matrix	No. of Containers	circle method or specify under comments
SU03-83-DUP	11/18/09	11:55	(11) SM	SM	1	
SU03-84	11/18/09	12:00	(12) SM	SM	1	
SU03-85	11/18/09	12:05	(13) SM	SM	1	
SU03-85-DUP	11/18/09	12:10	(14) SM	SM	1	
SU03-86	11/18/09	12:15	(15) SM	SM	1	
SU03-86-DUP	11/18/09	12:20	(16) SM	SM	1	
SU03-87	11/18/09	12:25	(17) SM	SM	1	
SU03-88	11/18/09	12:30	(18) SM	SM	1	
SU03-89	11/18/09	12:35	(19) SM	SM	1	
SU03-90	11/18/09	12:40	(20) SM	SM	1	

← K049336
 4/23/10

H-3 via Liquid Scintillation E906.0

Relinquished By: (1) Signature: Michael Barse, Date: 11/20, Time: 1400, Company: Cabrera
 Relinquished By: (2) Signature: [Blank], Date: [Blank], Time: [Blank], Company: [Blank]

Received By: (1) Signature: Lauren Schmitt, Date: 11/27/09, Time: 0915, Company: ALS
 Received By: (2) Signature: [Blank], Date: [Blank], Time: [Blank], Company: [Blank]

Comments: 08-3800.04, Task 2
 WRAMC Forest Glen Annex Radiological Survey
 SM-Smear

Total number of containers: 10

Form 2024.xls (1/3/01)

Distribution: white / yellow (Paragon); pink retained by originator.

** Indicate specific analytes under comments.

Time Zone (circle one): EDT MDT PDT

ALS Laboratory Group

Chain-of-Custody

Project Name / No.: Forest Glen Rad Scoping Survey Turnaround Standard or Rush (Due) _____ Disposed or Return to Client

Sampler(s): KK, AC, MB, AW (circle one)

Report To: Michael Barisa
410-332-8177
410-332-8183
Cabrera Services
Company: 103 E. Mount Royal Ave, Suite 2B
Address: Baltimore, MD 21202

Sample ID	Date	Time *	Lab ID	Matrix	No. of Containers	Method
SU03-BIAS 101 ← 1004226 4/23/10	11/18/09	12:45	SM	SM	1	H-3 via Liquid Scintillation E905.0

Comments:
08-3800.04, Task 2
WRAMC Forest Glen Annex Radiological Survey
SM=Smeared

Total number of containers: 1

Relinquished By: (1)
Signature *[Signature]*
Printed Name Michael Barisa
Date 11/20 Time 1400
Company Caloria

Received By: (1)
Signature *[Signature]*
Printed Name Karen Schmitt
Date 11/23/09 Time 0915
Company ALS

Relinquished By: (2)
Signature _____
Printed Name _____
Date _____ Time _____
Company _____

Received By: (2)
Signature _____
Printed Name _____
Date _____ Time _____
Company _____

Project Name / No.: Forest Glen Rad Scoping Survey
Sampler(s): KK, AC, MB, AW Turnaround **Standard or Retest (Date):** Return to Client
Report To: Michael Barsa
Phone: 410-332-8177
Fax: 410-332-8183
Company: Cabrera Services
Address: 103 E. Mount Royal Ave, Suite 2B
 Baltimore, MD 21202

Sample ID	Date	Time*	Lab ID	Matrix	No. of Containers	Methods															
						H-3 via Liquid Scintillation E906.0															
SU03-BIAS-02	11/18/09	12:50	(1)	SM	1	X															
SU03-BIAS-03	11/18/09	12:55	(2)	SM	1	X															
						X															
						X															
						X															
						X															
						X															
						X															
						X															

Comments:
 08-3800.04, Task 2
 WRAMC Forest Glen Annex Radiological Survey
 SM=Smear
 Additional bias samples collected 11/18, held until necessity of analysis was determined
 Submitted to lab - 12/4/2009
 Total number of containers: 2
 Form 20274.xls (1/3/07)

Relinquished By: Signature <u>Michael Barsa</u> Printed Name <u>Michael Barsa</u> Date <u>12/4/09</u> Time <u>1400</u> Company <u>CCS/CSA</u>	Relinquished By: Signature _____ Printed Name _____ Date _____ Time _____ Company _____
Received By: Signature <u>Cheryl Trumbull</u> Printed Name <u>Cheryl Trumbull</u> Date <u>12-7-09</u> Time <u>1140</u> Company <u>ALS</u>	Received By: Signature _____ Printed Name _____ Date _____ Time _____ Company _____



CONDITION OF SAMPLE UPON RECEIPT FORM

Client: CABRERIA

Workorder No: 011225

Project Manager: LRS

Initials: LAS Date: 11/23/09

1. Does this project require any special handling in addition to standard Paragon procedures?		YES	<input checked="" type="radio"/> NO
2. Are custody seals on shipping containers intact?	NONE	<input checked="" type="radio"/> YES	NO
3. Are Custody seals on sample containers intact?	<input checked="" type="radio"/> NONE	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		<input checked="" type="radio"/> YES	NO
5. Are the COC and bottle labels complete and legible?		<input checked="" type="radio"/> YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		<input checked="" type="radio"/> YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF	<input checked="" type="radio"/> YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	<input checked="" type="radio"/> N/A	YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	<input checked="" type="radio"/> N/A	YES	NO
10. Is there sufficient sample for the requested analyses?		<input checked="" type="radio"/> YES	NO
11. Were all samples placed in the proper containers for the requested analyses?		<input checked="" type="radio"/> YES	NO
12. Are all samples within holding times for the requested analyses?		<input checked="" type="radio"/> YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		<input checked="" type="radio"/> YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ___ < green pea ___ > green pea	<input checked="" type="radio"/> N/A	YES	NO
15. Do perchlorate LCMS-MS samples have headspace? (at least 1/3 of container required)	<input checked="" type="radio"/> N/A	YES	NO
16. Were samples checked for and free from the presence of residual chlorine? (Applicable when PM has indicated samples are from a chlorinated water source; note if field preservation with sodium thiosulfate was not observed.)	<input checked="" type="radio"/> N/A	YES	NO
17. Were the samples shipped on ice?		YES	<input checked="" type="radio"/> NO
18. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: <input checked="" type="radio"/> #2 #4		RAD ONLY	<input checked="" type="radio"/> YES <input checked="" type="radio"/> NO
Cooler #: <u>1</u>			
Temperature (°C): <u>Ambient (18.4°)</u>			
No. of custody seals on cooler: <u>2</u>			
External µR/hr reading: <u>16</u>			
Background µR/hr reading: <u>12</u>			
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? <input checked="" type="radio"/> YES / NO / NA (If no, see Form 008.)			

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16

* samples will be kept cool in-house.

If applicable, was the client contacted? YES / NO / NA Contact: AS Date/Time: _____

Project Manager Signature / Date: AS 11/23/09

*IR Gun #2: Oakton, SN 29922500201-0066

*IR Gun #4: Oakton, SN 2372220101-0002



CONDITION OF SAMPLE UPON RECEIPT FORM

Client: Cabrera

Workorder No: 0911226

Project Manager: LRS

Initials: LRS Date: 11/23/09

1. Does this project require any special handling in addition to standard Paragon procedures?		YES	<input checked="" type="radio"/> NO
2. Are custody seals on shipping containers intact?	NONE	<input checked="" type="radio"/> YES	NO
3. Are Custody seals on sample containers intact?	<input checked="" type="radio"/> NONE	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		<input checked="" type="radio"/> YES	NO
5. Are the COC and bottle labels complete and legible?		<input checked="" type="radio"/> YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		<input checked="" type="radio"/> YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF	<input checked="" type="radio"/> YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	<input checked="" type="radio"/> N/A	YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	<input checked="" type="radio"/> N/A	YES	NO
10. Is there sufficient sample for the requested analyses?		<input checked="" type="radio"/> YES	NO
11. Were all samples placed in the proper containers for the requested analyses?		<input checked="" type="radio"/> YES	NO
12. Are all samples within holding times for the requested analyses?		<input checked="" type="radio"/> YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		<input checked="" type="radio"/> YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ___ < green pea ___ > green pea	<input checked="" type="radio"/> N/A	YES	NO
15. Do perchlorate LCMS-MS samples have headspace? (at least 1/3 of container required)	<input checked="" type="radio"/> N/A	YES	NO
16. Were samples checked for and free from the presence of residual chlorine? (Applicable when PM has indicated samples are from a chlorinated water source; note if field preservation with sodium thiosulfate was not observed.)	<input checked="" type="radio"/> N/A	YES	NO
17. Were the samples shipped on ice?		YES	<input checked="" type="radio"/> NO
18. Were cooler temperatures measured at 0.1-6.0°C? IR gun used* <input checked="" type="radio"/> #2 #4		RAD ONLY	YES <input checked="" type="radio"/> NO
Cooler #: <u>1</u>			
Temperature (°C): <u>Ambient (18.4)</u>			
No. of custody seals on cooler: <u>2</u>			
External µR/hr reading: <u>16</u>			
Background µR/hr reading: <u>12</u>			
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? <input checked="" type="radio"/> YES / NO / NA (If no, see Form 008.)			

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16

* Samples will be cooled in-house

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: [Signature]

*IR Gun #2: Oakton, SN 29922500201-0066

*IR Gun #4: Oakton, SN 2372220101-0002



CONDITION OF SAMPLE UPON RECEIPT FORM

Client: Cabrera

Workorder No: 0911227

Project Manager: LRS

Initials: LAS Date: 11/23/09

1	Does this project require any special handling in addition to standard Paragon procedures?		YES	<u>NO</u>
2	Are custody seals on shipping containers intact?	NONE	<u>YES</u>	NO
3	Are Custody seals on sample containers intact?	<u>NONE</u>	YES	NO
4	Is there a COC (Chain-of-Custody) present or other representative documents?		<u>YES</u>	NO
5	Are the COC and bottle labels complete and legible?		<u>YES</u>	NO
6	Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)	US	<u>11/23/09</u> <u>YES</u>	<u>NO</u> *
7	Were airbills / shipping documents present and/or removable?	DROP OFF	<u>YES</u>	NO
8	Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	<u>N/A</u>	YES	NO
9	Are all aqueous non-preserved samples pH 4-9?	<u>N/A</u>	YES	NO
10	Is there sufficient sample for the requested analyses?		<u>YES</u>	NO
11	Were all samples placed in the proper containers for the requested analyses?		<u>YES</u>	NO
12	Are all samples within holding times for the requested analyses?		<u>YES</u>	NO
13	Were all sample containers received intact? (not broken or leaking, etc.)		<u>YES</u>	NO
14	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: <u> </u> < green pea <u> </u> > green pea	<u>N/A</u>	YES	NO
15	Do perchlorate LCMS-MS samples have headspace? (at least 1/3 of container required)	<u>N/A</u>	YES	NO
16	Were samples checked for and free from the presence of residual chlorine? (Applicable when PM has indicated samples are from a chlorinated water source; note if field preservation with sodium thiosulfate was not observed.)	<u>N/A</u>	YES	NO
17	Were the samples shipped on ice?		YES	<u>NO</u>
18	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: <u>#2</u> #4		RAD ONLY	YES <u>NO</u>
Cooler #: <u>1</u>				
Temperature (°C): <u>Ambient (18.4)</u>				
No. of custody seals on cooler: <u>2</u>				
DOT Survey/ Acceptance Information	External µR/hr reading: <u>16</u>			
	Background µR/hr reading: <u>12</u>			
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? <u>YES</u> / NO / NA (If no, see Form 008.1)				

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16

* Samples will be cooled in-house
⑥* an extra sample was received → (S002-46 from 11/17) and was not marked on COC → added as sample #21

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: [Signature] 11/24/09

*IR Gun #2: Oakton, SN 29922500201-0066 *IR Gun #4: Oakton, SN 2372220101-0002



CONDITION OF SAMPLE UPON RECEIPT FORM

Client: Cabrera
Project Manager: LRS

Workorder No: 0911228
Initials: LAS Date: 11/23/09

1. Does this project require any special handling in addition to standard Paragon procedures?		YES	<input checked="" type="radio"/> NO
2. Are custody seals on shipping containers intact?	NONE	<input checked="" type="radio"/> YES	NO
3. Are Custody seals on sample containers intact?	<input checked="" type="radio"/> NONE	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		<input checked="" type="radio"/> YES	NO
5. Are the COC and bottle labels complete and legible ?		<input checked="" type="radio"/> YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		<input checked="" type="radio"/> YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF	<input checked="" type="radio"/> YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	<input checked="" type="radio"/> N/A	YES	NO
9. Are all aqueous non-preserved samples pH 4-9 ?	<input checked="" type="radio"/> N/A	YES	NO
10. Is there sufficient sample for the requested analyses?		<input checked="" type="radio"/> YES	NO
11. Were all samples placed in the proper containers for the requested analyses?		<input checked="" type="radio"/> YES	NO
12. Are all samples within holding times for the requested analyses?		<input checked="" type="radio"/> YES	NO
13. Were all sample containers received intact ? (not broken or leaking, etc.)		<input checked="" type="radio"/> YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: _____ < green pea _____ > green pea	<input checked="" type="radio"/> N/A	YES	NO
15. Do perchlorate LCMS-MS samples have headspace ? (at least 1/3 of container required)	<input checked="" type="radio"/> N/A	YES	NO
16. Were samples checked for and free from the presence of residual chlorine ? (Applicable when PM has indicated samples are from a chlorinated water source; note if field preservation with sodium thiosulfate was not observed.)	<input checked="" type="radio"/> N/A	YES	NO
17. Were the samples shipped on ice ?		YES	<input checked="" type="radio"/> NO
18. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: <input checked="" type="radio"/> #2 #4 RAD ONLY		YES	<input checked="" type="radio"/> NO
Cooler #: <u>1</u>			
Temperature (°C): <u>Ambient (18.1)</u>			
No. of custody seals on cooler: <u>2</u>			
DOT Survey/Acceptance Information	External µR/hr reading: <u>16</u>		
	Background µR/hr reading: <u>12</u>		
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? <input checked="" type="radio"/> YES / NO / NA (If no, see Form 008.)			

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16

* Samples will be collected in-house

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: [Signature] - 11/24/09

*IR Gun #2: Oakton, SN 29922500201-0066

*IR Gun #4: Oakton, SN 2372220101-0002



CONDITION OF SAMPLE UPON RECEIPT FORM

Client: Cabrera

Workorder No: 0911229

Project Manager: LRS

Initials: LAS Date: 11/23/09

1. Does this project require any special handling in addition to standard Paragon procedures?		YES	<input checked="" type="radio"/> NO
2. Are custody seals on shipping containers intact?	NONE	<input checked="" type="radio"/> YES	NO
3. Are Custody seals on sample containers intact?	NONE	<input checked="" type="radio"/> YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		<input checked="" type="radio"/> YES	NO
5. Are the COC and bottle labels complete and legible ?		<input checked="" type="radio"/> YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		<input checked="" type="radio"/> YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF	<input checked="" type="radio"/> YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	<input checked="" type="radio"/> N/A	YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	<input checked="" type="radio"/> N/A	YES	NO
10. Is there sufficient sample for the requested analyses?		<input checked="" type="radio"/> YES	NO
11. Were all samples placed in the proper containers for the requested analyses?		<input checked="" type="radio"/> YES	NO
12. Are all samples within holding times for the requested analyses?		<input checked="" type="radio"/> YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		<input checked="" type="radio"/> YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: <u> </u> < green pea <u> </u> > green pea	<input checked="" type="radio"/> N/A	YES	NO
15. Do perchlorate LCMS-MS samples have headspace? (at least 1/3 of container required)	<input checked="" type="radio"/> N/A	YES	NO
16. Were samples checked for and free from the presence of residual chlorine? (Applicable when PM has indicated samples are from a chlorinated water source; note if field preservation with sodium thiosulfate was not observed.)	<input checked="" type="radio"/> N/A	YES	NO
17. Were the samples shipped on ice?		YES	<input checked="" type="radio"/> NO
18. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: <input checked="" type="radio"/> #2 <input type="radio"/> #4		RAD ONLY	YES <input checked="" type="radio"/> NO
Cooler #: <u>1</u>			
Temperature (°C): <u>Ambient (18.4°)</u>			
No. of custody seals on cooler: <u>2</u>			
External µR/hr reading: <u>16</u>			
Background µR/hr reading: <u>12</u>			
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? <input checked="" type="radio"/> YES <input type="radio"/> NO <input type="radio"/> NA (If no, see Form 008.)			

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16

*Samples will be cooled in-house

If applicable, was the client contacted? YES / NO / NA Contact: [Signature] Date/Time: 11/24/09

Project Manager Signature / Date: [Signature] 11/24/09

*IR Gun #2: Oakton, SN 29922500201-0066

*IR Gun #4: Oakton, SN 2372220101-0002



CONDITION OF SAMPLE UPON RECEIPT FORM

Client: Cabrera

Workorder No: 0912056

Project Manager: LS

Initials: CDT Date: 12-7-09

1. Does this project require any special handling in addition to standard Paragon procedures?		YES	<input checked="" type="radio"/> NO
2. Are custody seals on shipping containers intact?	NONE	<input checked="" type="radio"/> YES	NO
3. Are Custody seals on sample containers intact?	<input checked="" type="radio"/> NONE	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		<input checked="" type="radio"/> YES	NO
5. Are the COC and bottle labels complete and legible ?		<input checked="" type="radio"/> YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		<input checked="" type="radio"/> YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF	<input checked="" type="radio"/> YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	<input checked="" type="radio"/> N/A	YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	<input checked="" type="radio"/> N/A	YES	NO
10. Is there sufficient sample for the requested analyses?		<input checked="" type="radio"/> YES	NO
11. Were all samples placed in the proper containers for the requested analyses?		<input checked="" type="radio"/> YES	NO
12. Are all samples within holding times for the requested analyses?		<input checked="" type="radio"/> YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		<input checked="" type="radio"/> YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ___ < green pea ___ > green pea	<input checked="" type="radio"/> N/A	YES	NO
15. Do perchlorate LCMS-MS samples have headspace? (at least 1/3 of container required)	<input checked="" type="radio"/> N/A	YES	NO
16. Were samples checked for and free from the presence of residual chlorine? (Applicable when PM has indicated samples are from a chlorinated water source; note if field preservation with sodium thiosulfate was not observed.)	<input checked="" type="radio"/> N/A	YES	NO
17. Were the samples shipped on ice?		YES	<input checked="" type="radio"/> NO
18. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4		YES	<input checked="" type="radio"/> NO
Cooler #: <u>1</u>			
Temperature (°C): <u>11.2</u>			
No. of custody seals on cooler: <u>1</u>			
External µR/hr reading: <u>12</u>			
Background µR/hr reading: <u>12</u>			
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? <input checked="" type="radio"/> YES / NO / NA (If no, see Form 008.)			

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16

If applicable, was the client contacted? YES / NO / NA Contact: LS Date/Time: _____

Project Manager Signature / Date: LS 12/7/09

*IR Gun #2: Oakton, SN 29922500201-0066

*IR Gun #4: Oakton, SN 2372220101-0002

From: Origin ID: ODMA (410) 332-8177
Mike Barsa
CABRERA SERVICES
103 E. Mount Royal Ave
Ste 2B
Baltimore, MD 21202



Ship Date: 20NOV09
ActWgt: 10.0 LB
CAD: 4239785/INET9090
Account#: S *****

0911225

Delivery Address Bar Code



Ref # 08-3800.04-T2
Invoice #
PO #
Dept #

6

SHIP TO: (800) 443-1511 BILL SENDER

Lance Steere
Paragon Analytics
225 Commerce Dr.

Fort Collins, CO 80524

1 of 2

MON - 23NOV

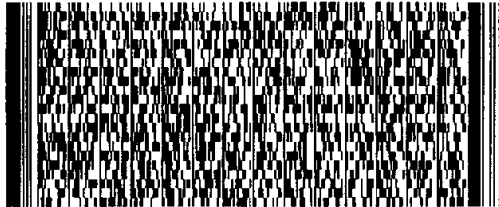
A2

STANDARD OVERNIGHT

TRK# 7930 3751 2435

0201

MASTER



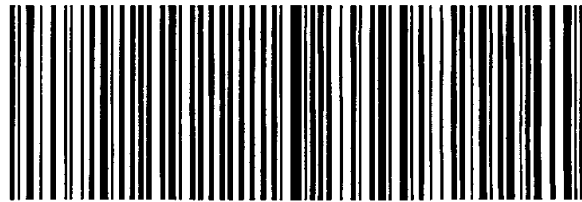
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From: Origin ID: ODMA (410) 332-8177
 Mike Barsa
 CABRERA SERVICES
 103 E. Mount Royal Ave
 Ste 2B
 Baltimore, MD 21202



J3570698731233

Ship Date: 20NOV09
 ActWgt: 10.0 LB
 CAD: 4239785/INET9090
 Account#: S *****

Delivery Address Bar Code



Ref # 06-3800.04-T2
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 PO #
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BILL SENDER

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 Paragon Analytics
 225 Commerce Dr.

Fort Collins, CO 80524

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TRK# 7930 3751 2435
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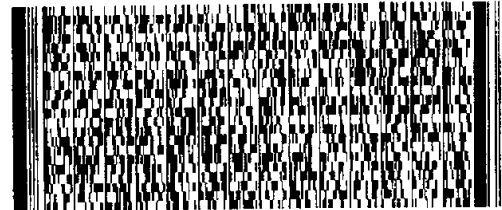
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From: Origin ID: ODMA (410) 332-8177
Mike Barsa
CABRERA SERVICES
103 E. Mount Royal Ave
Ste 2B
Baltimore, MD 21202



Ship Date: 20NOV09
ActWgt: 10.0 LB
CAD: 4239785/NET9090
Account#: S *****

0911227

SHIP TO: (800) 443-1511 BILL SENDER
Lance Steere
Paragon Analytics
225 Commerce Dr.

Fort Collins, CO 80524

Delivery Address Bar Code



Ref # 08-3800.04-T2
Invoice #
PO #
Dept #

TRK# 7930 3751 2435
0201

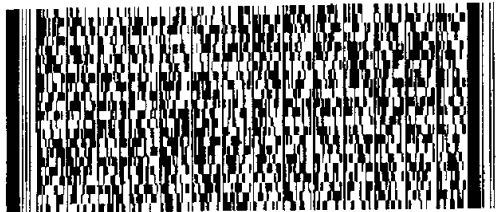
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0911228

From: Origin ID: ODMA (410) 332-8177
Mike Barsa
CABRERA SERVICES
103 E. Mount Royal Ave
Ste 2B
Baltimore, MD 21202



J03790597312623

Ship Date: 20NOV09
ActWgt: 10.0 LB
CAD: 4239785/NET9090
Account#: S *****

Delivery Address Bar Code



Ref # 08-3800.04-T2
Invoice #
PO #
Dept #

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Lance Steere
Paragon Analytics
225 Commerce Dr.

Fort Collins, CO 80524

1 of 2

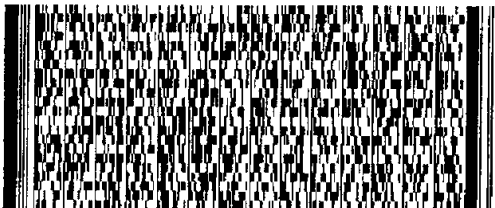
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0911229

From: Origin ID: ODMA (410) 332-8177
Mike Barsa
CABRERA SERVICES
103 E. Mount Royal Ave
Ste 2B
Baltimore, MD 21202



Ship Date: 20NOV09
ActWgt: 10.0 LB
CAD: 4239785/INET9090
Account#: S *****

Delivery Address Bar Code



Ref # 08-3800.04-T2
Invoice #
PO #
Dept #

SHIP TO: (800) 443-1511 BILL SENDER

Lance Steere
Paragon Analytics
225 Commerce Dr.

Fort Collins, CO 80524

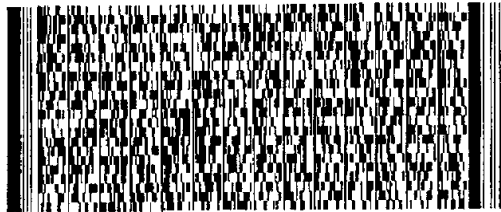
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0912056

From: Origin ID: ODMA (410) 332-8177
Mike Barsa
CABRERA SERVICES
103 E. Mount Royal Ave
Ste 2B
Baltimore, MD 21202



Ship Date: 04DEC09
ActWgt: 2.0 LB
CAD: 4239785/INET9090
Account#: S *****

12
1-

Delivery Address Bar Code



Ref # 08-3800.04, Task 200
Invoice #
PO #
Dept #

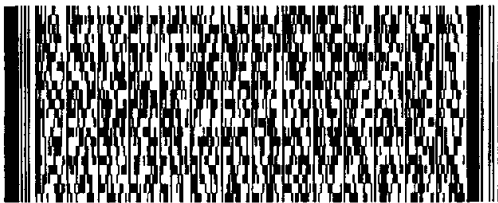
SHIP TO: (970) 490-1511 BILL SENDER
Lance Steere
ALS-Paragon
225 COMMERCE DR

FORT COLLINS, CO 80524

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FieldID	LabID	Matrix	DateCollected	TimeCollected	Rack	Pos	CPM
SU01-01	1004226-1	WIPE	17-Nov-09	9:00	38	2	13.5
SU01-01-DUP	1004226-2	WIPE	17-Nov-09	9:05	38	3	12
SU01-02	1004226-3	WIPE	17-Nov-09	9:10	38	4	15.5
SU01-03	1004226-4	WIPE	17-Nov-09	9:15	38	5	12
SU01-04	1004226-5	WIPE	17-Nov-09	9:20	38	6	11.5
SU01-05	1004226-6	WIPE	17-Nov-09	9:25	38	7	15.5
SU01-06	1004226-7	WIPE	17-Nov-09	9:30	38	8	18
SU01-06-DUP	1004226-8	WIPE	17-Nov-09	9:35	38	9	16.5
SU01-07	1004226-9	WIPE	17-Nov-09	9:40	38	10	18.5
SU01-08	1004226-10	WIPE	17-Nov-09	9:45	38	11	12.5
SU01-09	1004226-11	WIPE	17-Nov-09	9:50	46	1	16.5
SU01-10	1004226-12	WIPE	17-Nov-09	9:55	46	2	16.5
SU01-11	1004226-13	WIPE	17-Nov-09	10:00	46	3	14.5
SU01-12	1004226-14	WIPE	17-Nov-09	10:05	46	4	22.5
SU01-12-DUP	1004226-15	WIPE	17-Nov-09	10:10	46	5	20
SU01-13	1004226-16	WIPE	17-Nov-09	10:15	46	6	19
SU01-14	1004226-17	WIPE	17-Nov-09	10:20	46	7	22.5
SU01-15	1004226-18	WIPE	17-Nov-09	10:25	46	8	12.5
SU01-16	1004226-19	WIPE	17-Nov-09	10:30	46	9	15.5
SU01-17	1004226-20	WIPE	17-Nov-09	10:35	46	10	19
SU01-18	1004226-21	WIPE	17-Nov-09	10:40	48	2	18.5
SU01-19	1004226-22	WIPE	17-Nov-09	10:45	48	3	17.5
SU01-20	1004226-23	WIPE	17-Nov-09	10:50	48	4	16.5
SU01-21	1004226-24	WIPE	17-Nov-09	10:55	48	5	13.5
SU01-22	1004226-25	WIPE	17-Nov-09	11:00	48	6	16.5

FieldID	LabID	Matrix	DateCollected	TimeCollected	Rack	Pos	CPM
SU01-23	1004226-26	WIPE	17-Nov-09	11:05	48	7	14
SU01-24	1004226-27	WIPE	17-Nov-09	11:10	48	8	19
SU01-25	1004226-28	WIPE	17-Nov-09	11:15	48	9	17
SU01-26	1004226-29	WIPE	17-Nov-09	11:20	48	10	18
SU01-27	1004226-30	WIPE	17-Nov-09	11:25	48	11	16
SU01-28	1004226-31	WIPE	17-Nov-09	11:30	55	1	14
SU01-29	1004226-32	WIPE	17-Nov-09	11:35	55	2	17.5
SU01-30	1004226-33	WIPE	17-Nov-09	11:40	55	3	18.5
SU01-BIAS	1004226-34	WIPE	17-Nov-09	11:45	55	4	16.5
SU02-31	1004226-35	WIPE	17-Nov-09	9:00	55	5	15
SU02-32	1004226-36	WIPE	17-Nov-09	9:05	55	6	21
SU02-33	1004226-37	WIPE	17-Nov-09	9:10	55	7	17.5
SU02-34	1004226-38	WIPE	17-Nov-09	9:15	55	8	18
SU02-35	1004226-39	WIPE	17-Nov-09	9:20	55	9	15.5
SU02-36	1004226-40	WIPE	17-Nov-09	9:25	55	10	17
SU02-37	1004226-41	WIPE	17-Nov-09	9:30	39	2	14
SU02-37-DUP	1004226-42	WIPE	17-Nov-09	9:35	39	3	13.5
SU02-38	1004226-43	WIPE	17-Nov-09	9:40	39	4	23.5
SU02-38-DUP	1004226-44	WIPE	17-Nov-09	9:45	39	5	16
SU02-39	1004226-45	WIPE	17-Nov-09	9:50	39	6	20.5
SU02-40	1004226-46	WIPE	17-Nov-09	9:55	39	7	17
SU02-41	1004226-47	WIPE	17-Nov-09	10:00	39	8	16
SU02-42	1004226-48	WIPE	17-Nov-09	10:05	39	9	17
SU02-43	1004226-49	WIPE	17-Nov-09	10:10	39	10	13
SU02-44	1004226-50	WIPE	17-Nov-09	10:15	39	11	14.5

FieldID	LabID	Matrix	DateCollected	TimeCollected	Rack	Pos	CPM
SU02-45	1004226-51	WIPE	17-Nov-09	10:20	3	1	17.5
SU02-46-DUP	1004226-52	WIPE	17-Nov-09	10:25	3	2	17
SU02-47	1004226-53	WIPE	17-Nov-09	10:30	3	3	17
SU02-48	1004226-54	WIPE	17-Nov-09	10:35	3	4	21
SU02-49	1004226-55	WIPE	17-Nov-09	10:40	3	5	24
SU02-50	1004226-56	WIPE	17-Nov-09	10:45	3	6	23
SU02-51	1004226-57	WIPE	17-Nov-09	10:50	3	7	18.5
SU02-52	1004226-58	WIPE	17-Nov-09	10:55	3	8	16.5
SU02-53	1004226-59	WIPE	17-Nov-09	11:00	3	9	22
SU02-54	1004226-60	WIPE	17-Nov-09	11:05	3	10	15.5
SU02-46	1004226-61	WIPE	17-Nov-09		59	2	15.5
SU02-55	1004226-62	WIPE	17-Nov-09	11:10	59	3	13
SU02-56	1004226-63	WIPE	17-Nov-09	11:15	59	4	16.5
SU02-57	1004226-64	WIPE	17-Nov-09	11:20	59	5	16.5
SU02-58	1004226-65	WIPE	17-Nov-09	11:25	59	6	19
SU02-59	1004226-66	WIPE	17-Nov-09	11:30	59	7	22.5
SU02-60	1004226-67	WIPE	17-Nov-09	11:35	59	8	14
SU02-BIAS	1004226-68	WIPE	18-Nov-09	11:40	59	9	16.5
SU03-61	1004226-69	WIPE	18-Nov-09	10:00	59	10	20
SU03-62	1004226-70	WIPE	18-Nov-09	10:05	59	11	17.5
SU03-63	1004226-71	WIPE	18-Nov-09	10:10	62	1	12.5
SU03-64	1004226-72	WIPE	18-Nov-09	10:15	62	2	15.5
SU03-65	1004226-73	WIPE	18-Nov-09	10:20	62	3	19
SU03-66	1004226-74	WIPE	18-Nov-09	10:25	62	4	19
SU03-67	1004226-75	WIPE	18-Nov-09	10:30	62	5	12.5

FieldID	LabID	Matrix	DateCollected	TimeCollected	Rack	Pos	GPM
SU03-68	1004226-76	WIPE	18-Nov-09	10:35	62	6	18.5
SU03-69	1004226-77	WIPE	18-Nov-09	10:40	62	7	17.5
SU03-70	1004226-78	WIPE	18-Nov-09	10:45	62	8	20
SU03-71	1004226-79	WIPE	18-Nov-09	10:50	62	9	16.5
SU03-72	1004226-80	WIPE	18-Nov-09	10:55	62	10	16.5
SU03-73	1004226-81	WIPE	18-Nov-09	11:00	8	2	17
SU03-74	1004226-82	WIPE	18-Nov-09	11:05	8	3	16
SU03-75	1004226-83	WIPE	18-Nov-09	11:10	8	4	15.5
SU03-76	1004226-84	WIPE	18-Nov-09	11:15	8	5	15
SU03-77	1004226-85	WIPE	18-Nov-09	11:20	8	6	15.5
SU03-78	1004226-86	WIPE	18-Nov-09	11:25	8	7	10.5
SU03-79	1004226-87	WIPE	18-Nov-09	11:30	8	8	20
SU03-80	1004226-88	WIPE	18-Nov-09	11:35	8	9	20.5
SU03-81	1004226-89	WIPE	18-Nov-09	11:40	8	10	19.5
SU03-82	1004226-90	WIPE	18-Nov-09	11:45	8	11	21.5
SU03-83	1004226-91	WIPE	18-Nov-09	11:50	33	1	18.5
SU03-83-DUP	1004226-92	WIPE	18-Nov-09	11:55	33	2	16
SU03-84	1004226-93	WIPE	18-Nov-09	12:00	33	3	15
SU03-85	1004226-94	WIPE	18-Nov-09	12:05	33	4	19
SU03-85-DUP	1004226-95	WIPE	18-Nov-09	12:10	33	5	16.5
SU03-86	1004226-96	WIPE	18-Nov-09	12:15	33	6	14.5
SU03-86-DUP	1004226-97	WIPE	18-Nov-09	12:20	33	7	15.5
SU03-87	1004226-98	WIPE	18-Nov-09	12:25	33	8	17
SU03-88	1004226-99	WIPE	18-Nov-09	12:30	33	9	14.5
SU03-89	1004226-100	WIPE	18-Nov-09	12:35	33	10	19.5

FieldID	LabID	Matrix	DateCollected	TimeCollecte	Rack	Pos	CPM	
SU03-90	1004226-101	WIPE	18-Nov-09	12:40	11	2	16	
SU03-BIAS	1004226-102	WIPE	18-Nov-09	12:45	11	3	16	
SU03-BIAS-02	1004226-103	WIPE	18-Nov-09	12:50	11	5	14	
SU03-BIAS-03	1004226-104	WIPE	18-Nov-09	12:55	11	6	14.5	
Calibration Blanks								average
1-1	na	na	na	na	38	1	18	
1-2	na	na	na	na	38	12	16.5	
1-3	na	na	na	na	46	12	19	17.83
2-1	na	na	na	na	48	1	12.5	
2-2	na	na	na	na	48	12	15.5	
2-3	na	na	na	na	55	12	22	16.67
3-1	na	na	na	na	39	1	18	
3-2	na	na	na	na	39	12	17.5	
3-3	na	na	na	na	3	12	16	17.17
4-1	na	na	na	na	59	1	18.5	
4-2	na	na	na	na	59	12	16	
4-3	na	na	na	na	62	12	18.5	17.67
5-1	na	na	na	na	8	1	13.5	
5-2	na	na	na	na	8	12	22	
5-3	na	na	na	na	33	12	18	17.83
6-1	na	na	na	na	11	1	20	
6-2	na	na	na	na	11	4	15	
6-3	na	na	na	na	11	8	17	17.33
Method Blanks								
1	na	na	na	na	46	11	20	
2	na	na	na	na	55	11	16.5	
3	na	na	na	na	3	11	15.5	
4	na	na	na	na	62	11	16	
5	na	na	na	na	33	11	15.5	
6	na	na	na	na	11	7	16.5	
7	na	na	na	na	25	4	19.72	
Standard Additions								
SU01-13	1004226-16	WIPE	17-Nov-09	10:15	25	1	11349.5	C-14
SU02-32	1004226-36	WIPE	17-Nov-09	9:05	25	2	272.9	Ni-63
SU02-35	1004226-39	WIPE	17-Nov-09	9:20	25	3	983.12	I-129

Entries added by: Derek Caduff 5/3/2010
Reviewed by: Mike Clemmer 5/4/2010

ID: C14, NI63, I129

26 APR 2010 23:02

USER: 6 COMMENT: LS6500

PRESET TIME : 2.00
 DATA CALC : CPM H# : YES SAMPLE REPEATS: 1 PRINTER : STD
 COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 : EDIT
 TWO PHASE : NO AGC : NO CYCLE REPEATS : 1 DISK : EDIT
 SCINTILLATOR: LIQUID LUMEX: NO LOW SAMPLE REJ: 0
 LOW LEVEL : YES HALF LIFE CORRECTION DATE: none

CHAN: 300.0 - 600.0 %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0
 CHAN: 650.0 - 900.0 %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

SAM NO	POS	TIME MIN	H#	WINDL		WINDR		LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR		
- 1	38-1	2.00	141.8	18.00	33.33	19.50	32.03	0.18	2.55
2	38-2	2.00	125.8	13.50	38.49	17.50	33.81	0.25	5.20
3	38-3	2.00	135.0	12.00	40.82	15.00	36.51	0.19	7.83
4	38-4	2.00	123.8	15.50	35.92	13.00	39.22	0.18	10.47
5	38-5	2.00	127.9	12.00	40.82	19.50	32.03	0.12	13.12
6	38-6	2.00	133.7	11.50	41.70	10.00	44.72	0.16	15.74
7	38-7	2.00	136.2	15.50	35.92	13.50	38.49	0.16	18.39
8	38-8	2.00	125.6	18.00	33.33	20.50	31.23	0.16	21.03
9	38-9	2.00	144.5	16.50	34.82	15.00	36.51	0.23	23.68
10	38-10	2.00	139.5	18.50	32.88	15.00	36.51	0.12	26.33
11	38-11	2.00	133.6	12.50	40.00	15.00	36.51	0.15	28.98
- 12	38-12	2.00	142.6	16.50	34.82	14.50	37.14	0.16	31.63
13	46-1	2.00	141.1	16.50	34.82	11.50	41.70	0.15	34.37
14	46-2	2.00	137.6	16.50	34.82	22.00	30.15	0.08	37.03
15	46-3	2.00	138.2	14.50	37.14	16.50	34.82	0.09	39.69
16	46-4	2.00	143.6	22.50	29.81	12.50	40.00	0.22	42.35
17	46-5	2.00	122.5	20.00	31.62	19.00	32.44	0.20	44.99
18	46-6	2.00	177.6	19.00	32.44	12.50	40.00	0.18	47.64
19	46-7	2.00	130.2	22.50	29.81	10.00	44.72	0.20	50.30
20	46-8	2.00	137.2	12.50	40.00	16.00	35.36	0.19	52.95
21	46-9	2.00	133.7	15.50	35.92	15.00	36.51	0.12	55.61
22	46-10	2.00	126.5	19.00	32.44	17.50	33.81	0.13	58.27
23	46-11	2.00	142.2	20.00	31.62	14.50	37.14	0.13	60.93
- 24	46-12	2.00	143.2	19.00	32.44	18.00	33.33	0.12	63.59
25	48-1	2.00	143.5	12.50	40.00	11.00	42.64	0.20	66.35
26	48-2	2.00	149.6	18.50	32.88	14.00	37.80	0.18	68.99
27	48-3	2.00	139.4	17.50	33.81	21.50	30.50	0.21	71.65
28	48-4	2.00	131.9	16.50	34.82	16.50	34.82	0.18	74.31
29	48-5	2.00	146.6	13.50	38.49	15.50	35.92	0.16	76.97
30	48-6	2.00	140.9	16.50	34.82	14.50	37.14	0.29	79.63
31	48-7	2.00	125.4	14.00	37.80	18.00	33.33	0.13	82.28
32	48-8	2.00	135.0	19.00	32.44	18.00	33.33	0.16	84.94
33	48-9	2.00	127.9	17.00	34.30	19.50	32.03	0.14	87.58
34	48-10	2.00	127.7	18.00	33.33	19.50	32.03	0.13	90.25
35	48-11	2.00	169.3	16.00	35.36	15.50	35.92	0.10	92.89
- 36	48-12	2.00	140.2	15.50	35.92	16.50	34.82	0.14	95.56
37	55-1	2.00	152.8	14.00	37.80	12.50	40.00	0.03	98.48
38	55-2	2.00	138.7	17.50	33.81	13.00	39.22	0.20	101.12
39	55-3	2.00	160.2	18.50	32.88	18.50	32.88	0.06	103.78
40	55-4	2.00	141.4	16.50	34.82	14.00	37.80	0.14	106.43
41	55-5	2.00	136.7	15.00	36.51	16.00	35.36	0.14	109.08
42	55-6	2.00	184.2	21.00	30.86	11.00	42.64	0.18	111.73
43	55-7	2.00	139.5	17.50	33.81	16.00	35.36	0.17	114.38
44	55-8	2.00	146.6	18.00	33.33	18.00	33.33	0.25	117.04
45	55-9	2.00	177.9	15.50	35.92	12.50	40.00	0.12	119.68

DL
 5-3-10

SAM NO	POS	TIME MIN	H#	WINDO1		WINDO2		LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR		
46	55-10	2.00	168.8	17.00	34.30	11.50	41.70	0.15	122.34
47	55-11	2.00	142.1	16.50	34.82	14.50	37.14	0.18	125.00
48	55-12	2.00	140.3	22.00	30.15	18.50	32.88	0.14	127.64
49	39-1	2.00	139.7	18.00	33.33	13.00	39.22	0.14	130.40
50	39-2	2.00	137.1	14.00	37.80	15.50	35.92	0.22	133.05
51	39-3	2.00	137.8	13.50	38.49	14.00	37.80	0.31	135.71
52	39-4	2.00	146.9	23.50	29.17	13.00	39.22	0.13	138.36
53	39-5	2.00	144.2	16.00	35.36	14.50	37.14	0.18	141.01
54	39-6	2.00	133.5	20.50	31.23	16.50	34.82	0.13	143.67
55	39-7	2.00	133.5	17.00	34.30	14.50	37.14	0.13	146.33
56	39-8	2.00	133.6	16.00	35.36	17.00	34.30	0.21	148.98
57	39-9	2.00	139.9	17.00	34.30	12.50	40.00	0.22	151.63
58	39-10	2.00	162.1	13.00	39.22	18.50	32.88	0.59	154.30
59	39-11	2.00	131.7	14.50	37.14	14.00	37.80	0.17	156.97
60	39-12	2.00	139.0	17.50	33.81	14.00	37.80	0.13	159.64
61	3-1	2.00	150.0	17.50	33.81	17.00	34.30	0.11	162.40
62	3-2	2.00	131.1	17.00	34.30	22.00	30.15	0.27	165.05
63	3-3	2.00	148.4	17.00	34.30	13.50	38.49	0.17	167.70
64	3-4	2.00	132.7	21.00	30.86	17.00	34.30	0.17	170.37
65	3-5	2.00	145.3	24.00	28.87	17.00	34.30	0.22	173.02
66	3-6	2.00	141.8	23.00	29.49	12.00	40.82	0.18	175.66
67	3-7	2.00	158.1	18.50	32.88	17.50	33.81	0.45	178.32
68	3-8	2.00	150.9	16.50	34.82	19.50	32.03	0.37	180.98
69	3-9	2.00	139.2	22.00	30.15	20.50	31.23	0.19	183.63
70	3-10	2.00	136.9	15.50	35.92	12.50	40.00	0.12	186.28
71	3-11	2.00	141.6	15.50	35.92	18.50	32.88	0.15	188.95
72	3-12	2.00	138.7	16.00	35.36	17.00	34.30	0.13	191.62

DC
5-3-10

ID: C14, NI 63, I 129

30 APR 2010 11:38

USER: 6 COMMENT: LS6500

PRESET TIME : 2.00
 DATA CALC : CPM H# : YES SAMPLE REPEATS: 1 PRINTER : STD
 COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 : EDIT
 TWO PHASE : NO AQC : NO CYCLE REPEATS : 1 DISK : EDIT
 SCINTILLATOR: LIQUID LUMEX: NO LOW SAMPLE REJ: 0
 LOW LEVEL : YES HALF LIFE CORRECTION DATE: none

CHAN: 300.0 - 600.0 %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0
 CHAN: 650.0 - 900.0 %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

SAM NO	POS	TIME MIN	H#	WINDJ		WINDP		LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR		
1	59-1	2.00	140.6	18.50	32.88	16.00	35.36	0.11	2.58
2	59-2	2.00	151.9	15.50	35.92	23.00	29.49	0.18	5.23
3	59-3	2.00	129.2	13.00	39.22	21.50	30.50	0.14	7.87
4	59-4	2.00	142.6	16.50	34.82	13.50	38.49	0.29	10.51
5	59-5	2.00	147.5	16.50	34.82	18.50	32.88	0.06	13.14
6	59-6	2.00	149.5	19.00	32.44	18.00	33.33	0.14	15.78
7	59-7	2.00	125.0	22.50	29.81	17.50	33.81	0.06	18.44
8	59-8	2.00	164.2	14.00	37.80	19.00	32.44	0.11	21.08
9	59-9	2.00	170.8	16.50	34.82	18.50	32.88	0.13	23.71
10	59-10	2.00	130.8	20.00	31.62	15.50	35.92	0.12	26.34
11	59-11	2.00	130.0	17.50	33.81	15.00	36.51	0.12	28.97
12	59-12	2.00	143.5	16.00	35.36	15.50	35.92	0.21	31.62
13	62-1	2.00	129.2	12.50	40.00	14.00	37.80	0.17	34.37
14	62-2	2.00	150.0	15.50	35.92	16.50	34.82	0.10	37.03
15	62-3	2.00	130.8	19.00	32.44	16.00	35.36	0.12	39.67
16	62-4	2.00	131.2	19.00	32.44	19.00	32.44	0.17	42.32
17	62-5	2.00	127.5	12.50	40.00	15.00	36.51	0.24	44.95
18	62-6	2.00	123.7	18.50	32.88	13.00	39.22	0.09	47.59
19	62-7	2.00	131.0	17.50	33.81	15.00	36.51	0.14	50.23
20	62-8	2.00	129.9	20.00	31.62	21.00	30.86	0.14	52.87
21	62-9	2.00	127.0	16.50	34.82	12.00	40.82	0.14	55.52
22	62-10	2.00	135.2	16.50	34.82	16.00	35.36	0.12	58.15
23	62-11	2.00	144.7	16.00	35.36	16.50	34.82	0.19	60.80
24	62-12	2.00	140.5	18.50	32.88	21.50	30.50	0.12	63.43
25	8-1	2.00	143.7	13.50	38.49	22.50	29.81	0.14	66.18
26	8-2	2.00	151.3	17.00	34.30	14.50	37.14	0.13	68.83
27	8-3	2.00	133.0	16.00	35.36	17.00	34.30	0.11	71.47
28	8-4	2.00	132.7	15.50	35.92	17.50	33.81	0.10	74.10
29	8-5	2.00	129.1	15.00	36.51	23.00	29.49	0.11	76.74
30	8-6	2.00	128.2	15.50	35.92	13.50	38.49	0.16	79.38
31	8-7	2.00	127.0	10.50	43.64	19.00	32.44	0.08	82.01
32	8-8	2.00	167.0	20.00	31.62	12.50	40.00	0.09	84.66
33	8-9	2.00	127.1	20.50	31.23	12.50	40.00	0.13	87.28
34	8-10	2.00	131.9	19.50	32.03	15.00	36.51	0.10	89.92
35	8-11	2.00	124.9	21.50	30.50	12.50	40.00	0.21	92.56
36	8-12	2.00	143.0	22.00	30.15	21.00	30.86	0.12	95.20
37	33-1	2.00	134.8	18.50	32.88	12.50	40.00	0.35	97.96
38	33-2	2.00	137.3	16.00	35.36	15.50	35.92	0.22	100.60
39	33-3	2.00	135.8	15.00	36.51	15.00	36.51	0.21	103.25
40	33-4	2.00	139.1	19.00	32.44	13.50	38.49	0.12	105.88
41	33-5	2.00	145.0	16.50	34.82	16.00	35.36	0.19	108.52
42	33-6	2.00	129.2	14.50	37.14	16.00	35.36	0.20	111.16
43	33-7	2.00	124.8	15.50	35.92	21.00	30.86	0.14	113.80
44	33-8	2.00	128.2	17.00	34.30	16.50	34.82	0.12	116.45
45	33-9	2.00	129.2	14.50	37.14	19.50	32.03	0.24	119.08

DL
5-3-10

SAM NO	POS	TIME MIN	HW	WLND1		WLND2		LUMEX %	ELAPSED TIME
				CFM	%ERROR	CFM	%ERROR		
46	33-10	2.00	137.3	19.50	32.03	15.50	35.92	0.16	121.74
47	33-11	2.00	143.3	15.50	35.92	22.50	29.81	0.15	124.39
48	33-12	2.00	147.0	18.00	33.33	17.50	33.81	0.16	127.04
49	11-1	2.00	139.6	20.00	31.62	16.00	35.36	0.15	129.80
50	11-2	2.00	118.1	16.00	35.36	18.00	33.33	0.15	132.44
51	11-3	2.00	138.4	16.00	35.36	19.00	32.44	0.18	135.09
52	11-4	2.00	141.7	15.00	36.51	15.50	35.92	0.16	137.74
53	11-5	2.00	129.4	14.00	37.80	13.00	39.22	0.10	140.38
54	11-6	2.00	127.0	14.50	37.14	21.50	30.50	0.09	143.01
55	11-7	2.00	143.7	16.50	34.82	13.00	39.22	0.19	145.67
56	11-8	2.00	141.9	17.00	34.30	16.00	35.36	0.13	148.30

K
5-3-10

1 MAY 2010 02:32

ID: C14, NI63, I129

USER: 6 COMMENT: LS6500

PRESET TIME : 180.00
 DATA CALC : CPM H# : YES SAMPLE REPEATS: 1 PRINTER : STD
 COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 : EDIT
 TWO PHASE : NO AGC : NO CYCLE REPEATS : 1 DISK : EDIT
 SCINTILLATOR: LIQUID LUMEX: NO LOW SAMPLE REJ: 0
 LOW LEVEL : YES HALF LIFE CORRECTION DATE: none

CHAN: 300.0 - 600.0 %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0
 CHAN: 650.0 - 900.0 %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

SAM NO	POS	TIME MIN	H#	WJND1		WJND2		LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR		
1	25-1	180.00	175.1	11349.46	0.14	15.18	3.83	0.00	184.52
2	25-2	180.00	189.8	272.90	0.90	15.71	3.76	0.02	366.94
3	25-3	180.00	186.4	983.12	0.48	15.83	3.75	0.02	549.61
4	25-4	180.00	192.7	19.72	3.36	15.75	3.76	0.30	731.90

Standard Additions

*OK
5-3-10*

Instrument ID: LS65000

LSC Run Log

Date	Sample ID	CountTime (min.)	Rack & Position	Test	User #	Batch ID	Position Check	Initials	Comments
4-26-10	1003284-3	10	23-1	3H-10ml	3	3H100421-1	DBK	DBK	Recount under correct User ID
	-33		2						
	-34		3						
	-36		4						
	-36.0		5						
	-38		6						
	-38.05		7						
	3H100422-1 DB		8						
	US		9						
	CB3		10						
9-26-10	Calibration blank 1-1	2	38-1	614/2163/118	6		DBK	DBK	
	1004226-1		2						
	-2		3						
	-3		4						
	-4		5						
	-5		6						
	-6		7						
	-7		8						
	-8		9						
	-9		10						
	-10		11						
	Calibration blank 1-2		12						
	1004226-1		1						
	-11		2						
	-12		3						
	-13		4						
	-14		5						
	-15		6						
	-16		7						
	-17		8						
	-18		8						

FORM 762r6.xls (3/7/09)

Analyst / Date AC 5-3-0

Note: Each page is copied as completed and included with the workorder/run documentation; reviewed subsequently.

385754

Instrument ID: LS65000

LSC Run Log

Date	Sample ID	Count Time (min.)	Rack & Position	Test	User #	Batch ID	Position Check	Initials	Comments
4-16-0	1004226-19	2	46-9	C-14/M-31/F-4	6		OK	ABC	MA
	Method blank 1		46-10						
	Calibration blank 1-3		46-11						
	1004226-21	2	48-1	C-14/M-31/F-4	6				
			48-2						
			48-3						
			48-4						
			48-5						
			48-6						
			48-7						
			48-8						
			48-9						
			48-10						
			48-11						
			48-12						
	Calibration blank 2-2		48-13						
	1004226-31		48-14						
			48-15						
			48-16						
			48-17						
			48-18						
			48-19						
			48-20						
			48-21						
			48-22						
			48-23						
			48-24						
			48-25						
			48-26						
			48-27						
			48-28						
			48-29						
			48-30						
	Method blank 2		48-31						
	Calibration blank 2-3		48-32						
	1004226-46		48-33						
			48-34						
			48-35						
			48-36						
			48-37						
			48-38						
			48-39						
			48-40						
	Method blank 2		48-41						
	Calibration blank 2-3		48-42						
			48-43						
			48-44						
			48-45						
			48-46						
			48-47						
			48-48						
			48-49						
			48-50						

Analyst / Date DL 5-3-0
 Note: Each page is copied and included with the workorder/run documentation; reviewed subsequently.

385755

Date	Sample ID	CountTime (min.)	Rack & Position	Test	User #	Batch ID	Position Checker	Initials	Comments
4-26-10	1004226-42	2	39-3	C14/K63109	6		DBC	DBC	YHA
	-43		1-4						
	-44		1-3						
	-45		1-6						
	-46		1-7						
	-47		1-8						
	-48		1-9						
	-49		1-10						
	-50		1-11						
	Calibration blank 32		3-12						
	1004226-51		3-1						
	-52		3-2						
	-53		3-3						
	-54		3-4						
	-55		3-5						
	-56		3-6						
	-57		3-7						
	-58		3-8						
	-59		3-9						
	-60		3-10						
	Method blank 3		1-11						
	Calibration blank 33		60-12						
4-27-10	3H100421-5-C81	90	60-1	3H-10ml	7	3H100421-3	DBC	DBC	NA
	1004058-1		1-2						
	-10		1-3						
	1004089-5		1-4						
	-50		1-5						
	3H100421-3-C82		1-6						
	1004089-10		1-7						
	-1075		1-8						

Analyst / Date AC 5-3-10 FORM 762r6.xls (3/7/09)

Note: Each page is copied as completed and included with the workorder/run documentation; reviewed subsequently.

385756

Instrument ID: LS65000

LSC Run Log

Date	Sample ID	Count Time (min.)	Rack & Position	Test	User #	Batch ID	Position Check	Initials	Comments
4-28-10	1007046-25	80	56-6	3H-5m	5	3H160413-2	OK	DK	NA
	-26		-7						
	-27		-8						
	-28		-9						
	-29		-10						
	-30		-11						
	-31		-12						
	-32		-1						
	-33		-2						
	3H160413-2 C62		-3						
	1007046-33		-4						
	-34		-5						
	-35		-6						
	-36		-7						
	-37		-8						
	-37D		-9						
	-38		-10						
	-39		-11						
	-39D		-12						
	-40		-1						
	3H160413-2 216		33-1						
	603	44.55	-3						
	683	80	-3						
4-30-10	Daily OC	40	123-13/12		113		OK	DK	NA
4-30-10	Calibration Blank 41	2	59-1	CY/MS/229	6		OK	DK	NA
	1007046-61		-2						
	-61		-3						
	-63		-4						
	-64		-5						
	-65		-6						
	-66		-7						

FORM 762r6.xls (3/7/09)

Analyst / Date DK 5-3-10

Note: Each page is copied as completed and included with the workorder/run documentation; reviewed subsequently.

385758

Instrument ID: L565000

LSC Run Log

Date	Sample ID	CountTime (min.)	Rack & Position	Test	User #	Batch ID	Position Check	Initials	Comments
4-30-10	1004216-67	2	59-8	C14/1013/EA9	6		OK	OK	
	-68		-9						
	-69		-10						
	-70		-11						
	Calibration Blank 4-2		-12						
	1004216-71		62-1						
	-72		-2						
	-73		-3						
	-74		-4						
	-75		-5						
	-76		-6						
	-77		-7						
	-78		-8						
	-79		-9						
	-80		-10						
	Method Blank 4		-11						
	Calibration Blank 43		-12						
	5-1		8-1	C14/1013/EA9	6				
	1004216-81		-3						
	-82		-3						
	-83		-4						
	-84		-5						
	-85		-6						
	-86		-7						
	-87		-8						
	-88		-9						
	-89		-10						
	-90		-11						
	Calibration Blank 5-2		-12						
	1004216-91		33-1						

Analyst / Date OC 5-3-10

Note: Each page is copied as completed and included with the workorder/run documentation, reviewed subsequently.

385759

Instrument ID: LS65000

LSC Run Log

Date	Sample ID	Count Time (min.)	Rack & Position	Test	User #	Batch ID	Position Check	Initials	Comments
4-30-10	1004226-92	2	33-2	C14/10/16/218	6		OK	ABC	NA
	93		3						
	94		4						
	95		5						
	96		6						
	97		7						
	98		8						
	99		9						
	100		10						
	Method Blank 5		11						
	Calibration Blank 5-3		12						
4-30-10	1004226-101		1						
	102		2						
	Calibration Blank 6-2		3						
	1004226-103		4						
	104		5						
	Method Blank 6		6						
	Calibration Blank 6-3		7						
4-30-10	RM100428-1 CB1	70	10	Rn-222	19	RM100428-1	OK	ABC	
	LC5		1						
	281		2						
	1004274-1		3						
	1 Rn		4						
	RM100418-1 282		5						
	LC50		6						
	CB2		7						
4-30-10	Daily QC	10	113-13/13		113		OK	ABC	NA
5-1-10	RM100428-1 CB1	10	32-1	Rn-222	3	RM100428-1	OK	ABC	Verify user card! Record
	LC5		2						

FORM 762r6.xls (3/7/09)

Analyst / Date AC 5-3-10

Note: Each page is copied as completed and included with the workorder/run documentation; reviewed subsequently.

385760

Instrument ID: LS65000

LSC Run Log

Date	Sample ID	CountTime (min.)	Rack & Position	Test	User #	Batch ID	Position Check	Initials	Comments
5-1-10	RN100429-1701	10	32-3	Rn-111	3	RN100429-1	DBC	DBC	Wrong User Cacl Request
	1004284-1								
	-1Rep								
	-3								
	-3Rep								
	RN100429-1702								
	LSD								
	CB2								
5-1-10	1004226-16	180	25-1	CIVN163E09	10				C-14 Std. Addition
	-36								M-63 Std. Addition
	-39								F-129 Std. Addition
	Method blank								N/A
5-1-10	ME100413-CB1	60	53-1	M-63	17	ME100413-1			
	CB2								
	CB3								
5-1-10	3H100420-1CB1	30	27-1	3H-10A1	7	3H100420-1			
	1002900-1								
	-3								
	-3								
	-4								
	-5								
	-50								
	-6								
	-7								
	-8								
	-9								
	-10								
	1002900-11								
	3H100420-1CB2								
	1002900-110								

Analyst / Date DK 5-3-10

Note: Each page is copied as completed and included with the workorder/run documentation; reviewed subsequently.

385761

Standard Addition Working Benchsheet

Work Order: 1004226-16 ~~-16 C~~ MC 04/30/10

Analyte: C-14

Standard ID: 712,2613.23 EXP. 05/21/2010 MC 04/30/10

Spike Amount: 0.1 ml

Spike Analyst/ Date: DC / 4-30-10

Spike Witness/ Date: MC / 04/30/10

Pipette: RS-013

Standard Addition Working Benchsheet

Work Order: 1004226-36 ~~16-113~~ MC 04/30/10

Analyte: Ni-63

Standard ID: 63d, 238d, 23 EXP. 05/08/2010
MC 04/30/10

Spike Amount: 0.1 ml

Spike Analyst/ Date: DC/4-30-10

Spike Witness/ Date: MC/04/30/10

Pipette: RS-013

Standard Addition Working Benchsheet

Work Order: 1004226-39 ~~19-113~~ MC 04/30/10

Analyte: I-09

Standard ID: ~~S-109~~ S-109 EXP. 01/04/2011
DC 4-30-10 MC 04/30/10

Spike Amount: 1 ml

Spike Analyst/ Date: DC/ 4-30-10

Spike Witness/ Date: MC 04/30/10

Pipette: RS-005

Standard Addition Calculations

Work Order # 1004226
 Instrument : LS6500
 Nuclide: Ni-63

Standard: 632.2382.23
 Initial Activity: 27372.00 dpm/mL
 Ref. Date: 8/15/1995
 Count date: 5/1/2010
 1/2 Life: 1.01E+02 y
 Spike Vol.: 0.1 mL

Sample ID	Count 1 Position	Count 2 Position	Count 1 CPM	Count 2 CPM	Net Ct. 1	Count 2 CPM	Net Ct. 2	Spike Act. Added	Efficiency
1004226-36	55-6	25-2	21	272.90	1.28	272.90	253.18	2,474.36	0.1018

Quenched calibration blank data

Blank ID	H#	Bkgd ct. rate
METHOD BLANK 7	192.70	19.720

Per client request, a standard addition was performed on samples that exhibited the maximum quench in the workorder in order to estimate the approximate efficiency for quenched samples.
 The count rate of the method blank is used as a reference for the approximate background count rate expected at the observed quench # (H#=192.7).

Spiked by DBC on 4/30/2010
 Witnessed by MC on 4/30/2010
 Pipet: RS-013
 Equation used to determine standard addition: $(\text{Net spiked cpm} - \text{net unspiked cpm}) / (\text{dpm added to sample})$

Standard Addition Calculations

Work Order # 1004226
 Instrument : LS6500
 Nuclide: I-129

Standard: S-109
 Initial Activity: 2207.00 dpm/mL
 Ref. Date: 4/15/1993
 Count date: 5/1/2010
 1/2 Life: 1.57E+07 y
 Spike Vol.: 1.0 mL

Sample ID	Count 1 Position	Count 2 Position	Count 1 CPM	Count 2 CPM	Quenched BCPM	Net Ct. 1	Count 2 CPM	Net Ct. 2	Spike Act. Added	Efficiency
1004226-39	55-9	25-3	15.5	19.720	19.720	-4.22	983.12	963.40	2,207.00	0.4384

Quenched calibration blank data

Blank ID	H#	Bkgd ct. rate
METHOD BLANK 7	192.70	19.720

Per client request, a standard addition was performed on samples that exhibited the maximum quench in the workorder in order to estimate the approximate efficiency for quenched samples.
 The count rate of the method blank is used as a reference for the approximate background count rate expected at the observed quench # (H#=192.7).

Spiked by DBC on 4/30/2010
 Witnessed by MC on 4/30/2010
 Pipet: RS-005
 Equation used to determine standard addition: (Net spiked cpm - net unspiked cpm)/(cpm added to sample)

Standard Addition Calculations

Work Order # 1004226
 Instrument : LS6500
 Nuclide: C-14

Standard: 712.2613.23
 Initial Activity: 227723.94 dpm/mL
 Ref. Date: 7/22/2003
 Count date: 5/1/2010
 1/2 Life: 5.73E+03 y
 Spike Vol.: 0.1 mL

Sample ID	Count 1 Position	Count 2 Position	Count 1 CPM	Count 2 CPM	Quenched BCPM	Net Ct. 1	Count 2 CPM	Net Ct. 2	Spike Act. Added	Efficiency
1004226-16	46-6	25-1	19	11349.46	19.720	-0.72	11329.74	22,753.74	0.4980	

Quenched calibration blank data

Blank ID	H#	Bkgd ct rate
METHOD BLANK 7	192.70	19.720

Per client request, a standard addition was performed on samples that exhibited the maximum quench in the workorder in order to estimate the approximate efficiency for quenched samples.
 The count rate of the method blank is used as a reference for the approximate background count rate expected at the observed quench # (H#=192.7).

Spiked by DBC on 4/30/2010
 Witnessed by MC on 4/30/2010
 Pipet: RS-013
 Equation used to determine standard addition: (Net spiked cpm - net unspiked cpm)/(dpm added to sample)

C-14/Ni-63/I-129 Swipes "Window 2" Control Limits (LS 6500)

The background count rate is determined from the average of the reagent blanks for the batch. Window 2 control limits are established using the average count rate from the three reagent blanks associated with each prep batch +/- 3X the estimated poisson uncertainty.

UPDATED 5/3/2010 DC

OBS #	COUNT DATE	Sample ID	Count Duration (min.)	Average count Duration (min.)	Count Rate (CPM)	Batch Average Reagent Blank	Lower Control Limit	Upper Control Limit
1	4/26/2010	Calibration Blank 1-1	2	2	19.5			
2	4/26/2010	Calibration Blank 1-2	2	2	14.5			
3	4/27/2010	Calibration Blank 1-3	2	2	18	17.33	8.50	26.17
4	4/27/2010	Calibration Blank 2-1	2	2	11			
5	4/27/2010	Calibration Blank 2-2	2	2	16.5			
6	4/27/2010	Calibration Blank 2-3	2	2	18.5	15.33	7.03	23.64
7	4/27/2010	Calibration Blank 3-1	2	2	13			
8	4/27/2010	Calibration Blank 3-2	2	2	14			
9	4/27/2010	Calibration Blank 3-3	2	2	17	14.67	6.54	22.79
10	4/30/2010	Calibration Blank 4-1	2	2	16			
11	4/30/2010	Calibration Blank 4-2	2	2	15.5			
12	4/30/2010	Calibration Blank 4-3	2	2	21.5	17.67	8.75	26.58
13	4/30/2010	Calibration Blank 5-1	2	2	22.5			
14	4/30/2010	Calibration Blank 5-2	2	2	21			
15	4/30/2010	Calibration Blank 5-3	2	2	17.5	20.33	10.77	29.90
16	4/30/2010	Calibration Blank 6-1	2	2	16			
17	4/30/2010	Calibration Blank 6-2	2	2	15.5			
18	4/30/2010	Calibration Blank 6-3	2	2	16	15.83	7.39	24.27

DAILY CHECK LL ON ⁹⁹Tc SOURCE- LS6500

⁹⁹ Tc standard		SPIKE	
836.3020.70	KNOWN ACTIVITY AS OF 2/26/07	58000.38	dpm/g
1/29/2010	REF	58000.38	dpm
1/29/2011	EXP	58000.38	dpm

HISTORICAL CONTROL LIMITS 4/21/09 JP

	blank	Blank Quench #	spike
UCL	22.48	72.8	13863.24
Mean Value	17.55	63.7	12700.34
LGL	14.06	52.9	12212.16

Obs #	Date	Blank C.R.	Pass ?	Quench #	Pass	Spiked C.R.	Pass ?
328	4/26/2010	18.1	OK	62	OK	12522.6	OK
329	4/27/2010	15.2	OK	62.7	OK	12996.9	OK
330	4/28/2010	18.4	OK	62.7	OK	13443.6	OK
331	4/28/2010	19.7	OK	63.1	OK	12691.6	OK
332	4/30/2010	15.9	OK	63.4	OK	12382	OK
333	4/30/2010	16	OK	63.3	OK	13382.3	OK
334	5/2/2010	14.7	OK	64	OK	12801.6	OK

DAILY INSTRUMENT PERFORMANCE CHECKS - LS6500 (LL OFF, LUMEX OFF)

Daily IPCs consist of the following standards;

Efficiency Check - Beckman Tritium Standard			Beckman C-14 Standard		
Lot HPE0410			Lot CPE2711		
104700.00	dpm		100100.00	dpm	
3/19/2008	REF		3/19/2008	REF	
3/19/2013	EXP		3/19/2013	EXP	

Historical Control Limits	as of 04/21/09 JP	
	Decay Corrected Tritium	Carbon-14
UCL	67328.94	82488.98
Mean Value	64185.15	78542.61
LCL	60916.66	74632.89

Instrument re-calibrated for all tests starting 12/29/2009.

Obs	Date	Decay Corrected				
		H-3 CPM	H-CPM	PASS?	C-14 CPM	PASS?
328	4/26/2010	55812.70	62845.99	OK	78219.1	OK
329	4/27/2010	55631.80	62651.97	OK	78047.6	OK
330	4/28/2010	55566.70	62588.33	OK	78279.4	OK
331	4/28/2010	55646.60	62678.32	OK	78349.6	OK
332	4/30/2010	55707.80	62766.65	OK	78335.6	OK
333	4/30/2010	55782.70	62851.04	OK	78336.2	OK
334	5/2/2010	55659.30	62731.39	OK	78292.6	OK



Liquid Scintillation Counter

Instrumentation Calibration

Initial Efficiency Calibration Standards Traceability

Carbon-14 Swipe Efficiency Calibration LS6500

DefensAP swipe + 5.0 ml Water + 15.0 ml Ultima Gold LLT

4/23/2010

LS6500

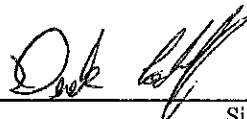
Standard used: 712.2613.23

227723.94 dpm/ml as of 7/22/2003
 1/2 life = 5.73E+03 yrs.
 current activity = 227537.95 dpm/ml
 volume = 0.1 ml
 Spike Activity = 22753.80 dpm

<u>Sample ID</u>	(300-600) <u>WIND1 cpm</u>	(650-900) <u>WIND2 cpm</u>	<u>%LUMEX</u>	<u>H #</u>	
1016005-1	13723.35	16.47	0.00	125.0	
1016005-2	13631.17	17.40	0.00	123.1	
1016005-3	13621.65	17.77	0.00	121.4	
C100415-1CB1	17.05	17.60	0.11	122.5	
C100415-1CB2	16.73	17.62	0.11	121.9	
C100415-1CB3	16.27	17.77	0.11	121.0	
average LCS=	13658.72	17.66	0.06	122.5	averages
average bkg=	16.68				

net cpm=	13642.04	WIND2 cpm	%LUMEX	H #	
/known dpm=	22753.80	19.29	5.00	137.5	UCL
		16.04	0.00	107.5	LCL
efficiency=	0.5996	See Tech. Mgr.	See Tech. Mgr.	Std. Addition	Corrective Action

Instrument Technician:



5-4-10

Signature & Date

Supervisory Review:



05-04-10

Signature & Date

Nickel-63 Swipe Efficiency Calibration LS6500

DefensAP swipe + 5.0 ml Water + 15.0 ml Ultima Gold LLT
 4/23/2010
 LS6500


Standard used: 632.2382.23

27372.00 dpm/ml as of 8/15/1995
 1/2 life = 1.01E+02 yrs.
 current activity = 24747.27 dpm/ml
 volume = 0.1 ml
 Average Spike Activity = 2474.73 dpm

Sample ID	(300-600)	(650-900)	%LUMEX	H #
	WIND1 cpm	WIND2 cpm		
C100415-1CB1	17.05	17.60	0.11	122.5
C100415-1CB2	16.73	17.62	0.11	121.9
C100415-1CB3	16.27	17.77	0.11	121.0
1016005-4	621.55	18.22	0.00	124.9
1016005-5	627.17	18.08	0.01	125.6
1016005-6	615.73	17.80	0.00	125.5

average LCS= 621.48 17.66 0.06 123.6 averages
 average bkg= 16.68

net cpm=	WIND2 cpm	%LUMEX	H #
604.80	19.29	5.00	138.6 UCL
/known dpm= 2474.73	16.04	0.00	108.6 LCL
efficiency= 0.2444	See Tech. Mgr.	See Tech. Mgr.	Std. Addition Corrective Action

Instrument Technician:  5-4-10
 Signature & Date

Supervisory Review:  05-04-10
 Signature & Date

I-129 Swipe Efficiency Calibration LS6500

DefensAP swipe + 5.0 ml Water + 15.0 ml Ultima Gold LLT

4/23/2010

LS6500

Standard used: S-109

2207.00 dpm/ml as of 4/15/1993

1/2 life = 1.57E+07 yrs.

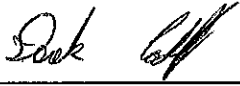
current activity = 2207.00 dpm/ml

volume = 1.0 ml

Average Spike Activity = 2207.00 dpm

<u>Sample ID</u>	(300-600)	(650-900)	<u>%LUMEX</u>	<u>H #</u>	
	<u>WIND1 cpm</u>	<u>WIND2 cpm</u>			
C100415-1CB1	17.05	17.60	0.11	122.5	
C100415-1CB2	16.73	17.62	0.11	121.9	
C100415-1CB3	16.27	17.77	0.11	121.0	
1016005-7	1260.83	17.27	0.01	123.9	
1016005-8	1229.83	15.98	0.01	121.5	
1016005-9	1237.22	17.07	0.01	125.0	
average LCS=	1242.63	17.66	0.06	122.6	averages
average bkg=	16.68				

	<u>WIND2 cpm</u>	<u>%LUMEX</u>	<u>H #</u>	
net cpm=	1225.94	5.00	137.6	UCL
/known dpm=	2207.00	0.00	107.6	LCL
efficiency=	0.5555	See Tech. Mgr.	Std. Addition	Corrective Action

Instrument Technician:  5-4-10
Signature & Date

Supervisory Review:  05-04-10
Signature & Date

ID: C14, NI 63, I 129

23 APR 2010 08:05

USER: 6 COMMENT: LS6500

PRESET TIME : 60.00
 DATA CALC : CPM H# : YES SAMPLE REPEATS: 1 PRINTER : STD
 COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 : EDIT
 TWO PHASE : NO AGC : NO CYCLE REPEATS : 1 DISK : EDIT
 SCINTILLATOR: LIQUID LUMEX: NO LOW SAMPLE REJ: 0
 LOW LEVEL : YES HALF LIFE CORRECTION DATE: none

CHAN: 300.0 - 600.0 %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0
 CHAN: 650.0 - 900.0 %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

SAM NO	POS	TIME MIN	H#	WITNDL		WITNDR		LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR		
1	38-1	60.00	125.0	13723.35	0.22	16.47	6.36	0.00	61.94
2	38-2	60.00	123.1	13631.17	0.22	17.40	6.19	0.00	123.93
3	38-3	60.00	121.4	13621.65	0.22	17.77	6.13	0.00	185.89
4	38-4	60.00	124.9	621.55	1.04	18.22	6.05	0.00	247.08

INTERRUPTING TO PRINT INTERRUPT DATA 23 APR 2010 12:43

OK
4-26-10

RESUMING AUTOCOUNT PRINTOUT 23 APR 2010 12:43

SAM NO	POS	TIME MIN	MH	WINDL		WINDR		LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR		
5	38-5	60.00	125.6	627.17	1.03	18.08	6.07	0.01	320.71
6	38-6	60.00	125.5	615.73	1.04	17.80	6.12	0.00	381.91
7	38-7	60.00	123.9	1260.83	0.73	17.27	6.21	0.01	443.14
8	38-8	60.00	121.5	1229.83	0.74	15.98	6.46	0.01	504.38
9	38-9	60.00	125.0	1237.22	0.73	17.07	6.25	0.01	565.62
10	38-10	60.00	122.5	17.05	6.25	17.60	6.15	0.11	626.77
11	38-11	60.00	121.9	16.73	6.31	17.62	6.15	0.11	687.91
12	38-12	60.00	121.0	16.27	6.40	17.77	6.13	0.11	749.04

Instrument ID: LS65000

LSC Run Log

Date	Sample ID	CountTime (min.)	Rack & Position	Test	User #	Batch ID	Position Check	Initials	Comments
4-21-10	RM100411-1 LGS	60	5 - 9	Ro-223	19	RM100412-1	DBL	DBL	MA
4-21-10	Daily QC	10	13 - 13/12		13		DBL	DBL	MA
4-21-10	ME100415-1 CB1	180	3 - 1	ME-03	17	ME100413-1	DBL	DBL	
	1003171-1	33.6	1 - 2						4-26-10
	ME100410-1 CB1	33.7	1 - 3						
	11B	180	1 - 4						
	LCS		1 - 5						
	183		1 - 6						
4-21-10	Daily QC	10	13 - 13/12		13		DBL	DBL	MA
4-23-10	1014005-1	60	38 - 1	C14M103/005	6	C10048-1	DBL	DBL	Swipe Calibration
			1 - 2						
			1 - 3						
			1 - 4						
			1 - 5						
			1 - 6						
			1 - 7						
			1 - 8						
			1 - 9						
4-23-10	C100415-1 CB1	60	38 - 10						
	CB2		1 - 10						
	CB3		1 - 11						
4-23-10	Daily QC	10	13 - 13/12		13		DBL	DBL	MA
4-23-10	RM100412-1 CB1	60	39 - 1	Ro-223	19	RM100411-1	DBL	DBL	MA
	LCS		1 - 12						
	11B		1 - 13						
	100415-1		1 - 14						
	-1800		1 - 15						
	-3		1 - 16						

Analyst / Date DBL 4-26-10

Note: Each page is copied as completed and included with the workorder/run documentation; reviewed subsequently.

385752



ALS Laboratory Group - Fort Collins

QUALITY ASSURANCE SUMMARY SHEET

PAR W.O. # / BATCH 1016005 / C100415-1
 TEST C-14 / Ni-63 / I-129 Swipes
 METHOD CS
 SOP/REV (PREP) N/A
 SOP/REV (ANAL) 704

Briefly document any QA or other problems or deviations associated with the analysis of samples. Problems could result from: log-in, color, odor, dilution, consistency, scheduling, equipment, or instrumentation, or may include documentation of minor deviations necessary due to unique DQO's or sample characteristics.

Workorder 1004226 consisted of several ^{DC 5-4-10} defensap swipes originally analyzed in November of 2009 for tritium. Per client request, a re-analysis of these samples for ¹⁴C, ⁶³Ni, and ¹²⁹I was performed. Due to similar beta emission energies in combination with the current instrument resolution, separate analysis windows could not be established to accurately determine each individual nuclide activity.

^α Per discussion with the client, a single analysis window was to be determined to analyze for all three nuclides. Three sets of three vials were prepared; each set was spiked with a known amount of one of the requested nuclides for analysis. From these three sets, one of the vials from each set was initially counted to obtain a spectral output to aid in an approximate energy calibration. This energy calibration was then used to establish the client requested analysis range of ~20 – 175 keV. This resulted in an analogous instrument analysis window of channel 300 – 600. Based on the energy calibration, this equates to an ^{DC 5-4-10} energy range of roughly 20 – 163 keV. This analysis range is entirely dependent on the associated quench (H#) of the vials used to determine the energy calibration. Any difference in quench observed for analysis of samples will result in a shift in the established calibration energy range.

Once the analysis window was established, a single point efficiency calibration was performed for each nuclide to determine the nuclide specific efficiencies. It is believed that the calibrated efficiency can be accurately applied to samples that have quench #'s (H#'s) that correlate to the average calibrated H#; current convention is to apply the calibrated efficiency for samples having an H# within +/- 15 H#'s of the calibrated average. A verification run is typically performed using an independently verified and prepared source to confirm the calibrated efficiency. However, per client request, a calibration verification was not performed. The calibrated efficiencies are submitted without any assessment as to the usability and acceptability as it applies to the sample analyses in workorder 1004226.

Please refer to the section in the accompanying calibration packet titled "Supporting Information" for the data used in the analysis window determination and projected analysis detection limits for each nuclide.

TECHNICIAN/ANALYST ^{DC 5-4-10} Dick [Signature] DATE 5-4-10
 DEPARTMENT MANAGER [Signature] DATE 05/04/10

381840

FORM 302r6b.doc (4/22/04)

Radiochemistry Instrument Worksheet

ALS Laboratory Group -- FC

Prep Batch: C100415-1

Prep Procedure: C14 / Ni-63 / T129

Analytical QASS / NCR? *OK* *38/18/40*

Prep Num	LabID	QC Type	Init Aliq	Fin Aliq	Units	Report Units	Cnt 1 File/Inst	Cnt 1 Rack-Pos	Cnt 1 Pos Chk By	Cnt 2 File/Inst	Cnt 2 Rack-Pos	Cnt 2 Pos Chk By	Cnt 3 File/Inst	Cnt 3 Rack-Pos	Cnt 3 Pos Chk By	Notes
1	1016005-1	SMP	1	1	sample	pCi/l	LS-6500	52-2	OK 4-26-10	LS-6500	38-1	OK				
1	1016005-2	SMP	1	1	sample	pCi/l					-2					
1	1016005-3	SMP	1	1	sample	pCi/l					-3					
1	1016005-4	SMP	1	1	sample	pCi/l	LS-6500	52-3	OK		-4					
1	1016005-5	SMP	1	1	sample	pCi/l					-5					
1	1016005-6	SMP	1	1	sample	pCi/l					-6					
1	1016005-7	SMP	1	1	sample	pCi/l	LS-6500	52-4	OK		-7					
1	1016005-8	SMP	1	1	sample	pCi/l					-8					
1	1016005-9	SMP	1	1	sample	pCi/l					-9					
1	C100415-1CB1	MB	1	1	sample	pCi/l	LS-6500	52-1	OK		-10					
1	C100415-1CB2	MB	1	1	sample	pCi/l					-11					
1	C100415-1CB3	MB	1	1	sample	pCi/l					-12					

* Window determination. *OK 4-16-10*

Spike Solution Information						
Solin #	Nuclide	SolinID	Prep Conc	Units	Prep Date	Aliquot Units
S1	Ni-63	632.2382.23	24,725.678	DPM/ml	04/15/10	0.1 ml
S2	C-14	712.2613.23	227,538.601	DPM/ml	04/15/10	0.1 ml
S3	I-129	S-109	2,206.998	DPM/g	04/15/10	1 g

Radiochemistry Instrument Worksheet

Prep Batch: C100415-1

ALS Laboratory Group -- FC

Reporting Units

LabID:	IstGrpName:	RptUnits:
1016005-1	C14	pCi/l
1016005-2	C14	pCi/l
1016005-3	C14	pCi/l
1016005-4	C14	pCi/l
1016005-5	C14	pCi/l
1016005-6	C14	pCi/l
1016005-7	C14	pCi/l
1016005-8	C14	pCi/l
1016005-9	C14	pCi/l

Sample Barcodes

1016005-1 C100415-1PS1		1016005-2 C100415-1PS2	
1016005-3 C100415-1PS3		1016005-4 C100415-1PS4	
1016005-5 C100415-1PS5		1016005-6 C100415-1PS6	
1016005-7 C100415-1PS7		1016005-8 C100415-1PS8	
1016005-9 C100415-1PS9		C100415-1CB1MB C100415-1PS10	
C100415-1CB2MB C100415-1PS11		C100415-1CB3MB C100415-1PS12	

Radiochemistry Prep Worksheet

ALS Laboratory Group -- FC

Prep Batch: C100415-1

Prep Procedure: C14

Reviewed By: JRK Review Date: 4/15/2010

Non-Routine Pre-Treatment? Y / N Batch: 14

Re-Prep? Y / N

Batch: 14

Prep QASS / NCR? Y / N

Prep Analyst: Jeff Kujawa

Prep Date: 4/15/2010

Prep Dept: RS

Balance:

Cocktail: UG LLT

Prep SOP: NONE

Prep Date: 4/15/2010

Prep Dept: RS

Balance:

Cocktail Pipet: T-002

Matrix Class: liquid

Prep Dept: RS

Balance:

Aliquot Pipet:

Sample Num	Prep Num	LabID	QC Type	Dish No.	Init Aliq sample	Fin Aliq sample	Prep Basis	Trap Vol.(ml)	Analysis Vol.(ml)	Standards	Prep Notes
1	1	1016005-1	SMP		1	1	As Received			S2	
2	1	1016005-2	SMP		1	1	As Received			S2	
3	1	1016005-3	SMP		1	1	As Received			S2	
4	1	1016005-4	SMP		1	1	As Received			S1	
5	1	1016005-5	SMP		1	1	As Received			S1	
6	1	1016005-6	SMP		1	1	As Received			S1	
7	1	1016005-7	SMP		1	1	As Received			S3	
8	1	1016005-8	SMP		1	1	As Received			S3	
9	1	1016005-9	SMP		1	1	As Received			S3	
10	1	C100415-1CB1	MB		1	1	As Received				
11	1	C100415-1CB2	MB		1	1	As Received				
12	1	C100415-1CB3	MB		1	1	As Received				

Comments

UG LLT Lot# 97-090701.
Single point swipe calibrations for C-14, Ni-63 and I-129 in 5 mL DI.

Spiked By: Jeff Kujawa Date: 4/15/2010
Witnessed By: Jeffrey T. Lee Date: 4/15/2010

Spike Solution Information						
Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Pipet ID
S1	Ni-63	632.2382.23	24,725.678	DFM/ml	04/15/10	RS-013
S2	C-14	712.2613.23	227,538.601	DFM/ml	04/15/10	RS-013
S3	I-129	S-109	2,206.998	DFM/g	04/15/10	RS-006

Radiochemistry Prep Worksheet

Prep Batch: C100415-1

ALS Laboratory Group -- FC

Prep Procedure: C14

Prep Batch Not Validated!!!

Reviewed By: _____ Review Date: _____

Non-Routine Pre-Treatment? Y / N Batch: _____

Prep QASS / NCR? Y / N _____

Prep SOP: PAI 772 Rev: 4

Prep Analyst: Jeff Kujawa

JK

Cocktail: UG LLT

Prep Date: 4/15/2010

Cocktail Pipet: T-002

Prep SOP: NONE

Matrix Class: liquid

Prep Dept: RS

Aliquot Pipet: _____

Prep Num	LabID	QC Type	Dish No.	Init Aliq sample	Fin Aliq sample	Prep Basis	Trap Vol.(ml)	Analysis Vol.(ml)	Standards	Prep Notes
1	1016005-1	SMP	1	1	1	As Received			S2	
2	1016005-2	SMP	1	1	1	As Received			S2	
3	1016005-3	SMP	1	1	1	As Received			S2	
4	1016005-4	SMP	1	1	1	As Received			S1	
5	1016005-5	SMP	1	1	1	As Received			S1	
6	1016005-6	SMP	1	1	1	As Received			S1	
7	1016005-7	SMP	1	1	1	As Received			S3	
8	1016005-8	SMP	1	1	1	As Received			S3	
9	1016005-9	SMP	1	1	1	As Received			S3	
10	C100415-1CB1	MB	1	1	1	As Received				
11	C100415-1CB2	MB	1	1	1	As Received				
12	C100415-1CB3	MB	1	1	1	As Received				

Comments

UG LLT Lot# 97-090701.
Single point swipe calibrations for C-14, Ni-63 and I-129 in 5 mL DI.

Spiked By: *JK* Date: 4/15/10
Witnessed By: *SN* Date: 4/15/10

Spike Solution Information						
Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Pipet ID
S1	Ni-63	632.2382.23	24,725.678	DPW/ml	04/15/10	RS-013
S2	C-14	712.2613.23	227,538.601	DPW/ml	04/15/10	RS-013
S3	I-129	S-109	2,206.998	DPW/g	04/15/10	RS-006

S1 exp: 5/8/10
S2 exp: 5/20/10
S3 exp: 1/4/11

PROJECT C-14 712 2613.23

Continued From Page

Transfer contents of ampoule # 712 to a 40ml amber VOA vial.

To do the density a 1ml pipet was calibrated with DI water. 1ml of DI water was pipetted and found to weigh 1.0018g. 1ml of Std. 712.2613.23 was pipetted and found to weigh 1.0020g. The weights are equivalent and we will assume the density is equal to 1.0g/ml

1.) Transfer contents of ampoule #712 to a 40ml amber VOA vial.

Mass of empty VOA vial w/o lid	24.5288g	Bel #12
Mass of open ampoule + 100ml beaker	121.9501g	↓
Mass of empty ampoule + 100ml beaker	82.0070g	↓
Net mass of Std. Transferred	39.9431g	

Std ID: 712.2613.23
 Description: C-14
 Expiration: 4/6/06
 Activity: 227723.94 dpm/mL

2s Uncertainty: 7514.89 dpm/mL
 Ref. Date: 7/22/03
 Ref Time: N/A
 Prep Date: 8/18/03 rep by: CRW
 Matrix/Comp. Glc & Form In H2O
 Half Life (y): 5.73E+03

2) Activity Calculations

151600 dps (60 $\frac{DPM}{DPS}$)

~~226,631.719~~ $\frac{DPM}{g}$ or $\frac{DPM}{mL}$

~~40.1356g~~ $\frac{DPM}{g}$
~~39.9431g~~

227,723.937 $\frac{dpm}{g}$ or $\frac{dpm}{mL}$

ANALYTICS

1380 Seaboard Ind Blvd * Atlanta, GA 30318 * USA * 404-352-8677

C-14

SRS 66576A-307 Amount 4.097 μ CI QA E1

Date 07/22/03 12:00 EST Exp. XXXXXX

PO # EW0070303, Item 1

40.1366 grams In H2O

CAUTION RADIOACTIVE MATERIAL

Std ID: 712.2613.23

Description: C-14
 Expiration: ~~8/19/04~~ 9/11/05 = EXPI
 Activity: 227723.94 dpm/mL

2s Uncertainty: 7514.89 dpm/mL

Ref. Date: 7/22/03

Ref Time: N/A

Prep Date: 8/18/03

Prep by: CRW

Matrix/Comp. Glc & Formald. In H2O

Half Life (y): 5.73E+03

Std. re-verified and exp. date extended to 9/1/05

Reverification Log	Analysis Date	Initials	Expiration Date
	12/5/06	RG	12/5/07
	12/11/07	MC	12/11/08
	5/21/09	RG	5/21/2010

Chris Wray
Signed

8/18/03
Date

[Signature]
Signed

Date

PAT. IO 712
rec'd 7-24-03

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

66576A-307

C-14 40 mL Liquid in 50 mL Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by the Department Des Applications Et De La Metrologie Des Rayonnements Ionisants (DAMRI), Paris, France, as Number 25932.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	C-14
ACTIVITY (dps):	1.516 E5
CALIBRATION DATE:	July 22, 2003 12:00 EST
HALF-LIFE:	5730 years
RELATIVE EXPANDED UNCERTAINTY (k=2):	3.3%

Impurities: γ -impurities <0.05%

40.1356 grams 50 μ g/g glucose + 1 mg/g formaldehyde in H₂O solution.

P O NUMBER EW0070303, Item 1

SOURCE PREPARED BY: M. Taskaeva
M. Taskaeva, Radiochemist

Q A APPROVED:

[Signature] 07-22-2003



U.S. DEPARTMENT OF COMMERCE
National Institute of Standards & Technology
Gaithersburg, MD 20899

Certificate of Participation

Analytics, Incorporated
Atlanta, Georgia

is a participant for the period January 1, 2003, through December 31, 2003, in a radioactivity measurements assurance program conducted by the National Institute of Standards and Technology, in cooperation with the Nuclear Energy Institute. Continued participation is evidenced by dated Reports of Traceability issued for particular radionuclides, which indicate the deviation of the participant's reported value from that measured by the National Institute of Standards and Technology. The significance of these Reports is addressed on the back of this certificate.

For the Director,

A handwritten signature in cursive script, appearing to read "Lisa R. Karam".

Lisa R. Karam, Group Leader
Radioactivity Group
Physics Laboratory
(over)

PRIMARY DILUTION of Ni-63 standard, RSO# 632; NIST SRM 4226C!

1) Determine the density of 0.9 N HCl prepared from LOT # 42119 (EM Source)

Mass of 100 ml std. flask = 68.2945 g Bal 12
 Flask + 0.9 N HCl = 169.3839 g
 Net Mass of 0.9 N HCl = 101.0894 g
 = 100 ml. $\rho = 1.0109 \text{ g/ml.}$

Reverification Log		
Analysis Date	Initials	Expiration Date
8/26/06	RG	8/26/07
8/12/07	RG	8/12/08
8/16/08	MB	8/15/09
5/27/09	RG	5/28/2010

2) Transfer contents of ampoule to 500 ml Nalgene bottle

Mass of 500 ml Nalgene (w/o lid) = 48.3887 g Bal 12
 Mass of opened ampoule + 50 ml. beaker = 37.1869 g
 Mass of beaker + empty ampoule = 32.2480 g
 Net mass of std. transferred = 4.9189 g

3) Dilute to approx 500 ml. w/ 0.9 M HCl

Mass of 500 ml Nalgene (w/o lid) = 48.3887 g from above
 Mass of bottle + std + 0.9 M HCl = 599.16 g Bal 26.
 Net Mass of Std. Sol. = 550.77 g

4) Final Activity Calc.

$$\frac{(4.9189 \text{ g}) (50,530 \text{ Bq/g}) (60 \frac{\text{sec}}{\text{min}})}{(550.77 \text{ g})} = 27,076.9 \frac{\text{dpm}}{\text{g}}$$

SD 9/1/03
Std ID: 632.2382.23

$$\times 1.0109 \text{ g/ml} = 27,372.0 \frac{\text{dpm}}{\text{ml}}$$

27,372.0 dpm/ml.

Description: Ni-63
Expiration: 8/30/04
Activity: 27372.00 dpm/mL

Std ID: 632.2382.23

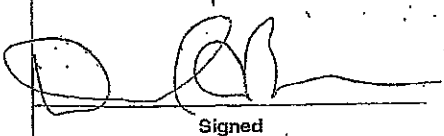
2s Uncertainty: 251.82 dpm/mL
Ref. Date: 8/15/95
Ref Time: NIA
Prep Date: 7/22/02 Prep by: DCB
Matrix/Comp. 0.9 N HCl
Half Life (y): 1.01E+02

Description: Ni-63
Expiration: 8/16/06
Activity: 27372.00 dpm/mL

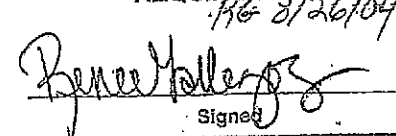
2s Uncertainty: 251.82 dpm/mL
Ref. Date: 8/15/95
Ref Time: NIA
Prep Date: 7/22/02 Prep by: DCB
Matrix/Comp. 0.9 M HCl
Half Life (y): 1.01E+02

Requires NCR for ICPT work.

REQUIRES NCR FOR ICPT WORK

Signed: 

Date: 7/27/02

Signed: 

Date: 7/29/02



National Institute of Standards & Technology

Certificate

Standard Reference Material 4226C Nickel-63 Radioactivity Standard

PAI ID 0632

recd 7-20-02

This Standard Reference Material (SRM) consists of radioactive nickel-63 chloride, non-radioactive nickel chloride, and hydrochloric acid dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of beta-particle counting instruments and for the monitoring of radiochemical procedures.

Radiological Hazard

The SRM ampoule contains nickel-63 with a total activity of approximately 260 kBq. Nickel-63 decays by beta-particle emission. None of the beta particles escape from the SRM ampoule. During the decay process no photons are emitted. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. There is no detectable external radiation. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains hydrochloric acid (HCl) with a concentration of 0.9 mole per liter of water. The solution is corrosive and represents a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2. The ampoule should be opened only by persons qualified to handle both radioactive material and strong acid solution.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least August 2005. The long-term stability of these solutions is discussed in references [9] and [10].

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) both because of the radioactivity and because of the strong acid.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by R. Collé and B.E. Zimmerman of the Radioactivity Group.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
December 1995 (Text only revised November 1997)

Thomas E. Gills, Chief
Standard Reference Materials Program

Recommended Procedure for Opening the SRM Ampoule

- 1) If the SRM solution is to be diluted, it is recommended that the diluting solution have a composition comparable to that of the SRM solution.
- 2) Wear eye protection, gloves, and protective clothing and work over a tray with absorbent paper in it. Work in a fume hood. In addition to the radioactive material, the solution contains strong acid and is corrosive.
- 3) Shake the ampoule to wet all of the inside surface of the ampoule. Return the ampoule to the upright position.
- 4) Check that all of the liquid has drained out of the neck of the ampoule. If necessary, gently tap the neck to speed the process.
- 5) Holding the ampoule upright, score the narrowest part of the neck with a scribe or diamond pencil.
- 6) Lightly wet the scored line. This reduces the crack propagation velocity and makes for a cleaner break.
- 7) Hold the ampoule upright with a paper towel, a wiper, or a support jig. Position the scored line away from you. Using a paper towel or wiper to avoid contamination, snap off the top of the ampoule by pressing the narrowest part of the neck away from you while pulling the tip of the ampoule towards you.
- 8) Transfer the solution from the ampoule using a pycnometer or a pipet with dispenser handle. **NEVER PIPETTE BY MOUTH.**
- 9) Seal any unused SRM solution in a flame-sealed glass ampoule, if possible, to minimize the evaporation loss. See also reference [4]*.

PROPERTIES OF SRM 4226C
(Certified values are shown in bold type)

Source identification number	NIST SRM 4226C		
Physical Properties:			
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule		
Ampoule specifications	Body outside diameter	(16.5 ± 0.5) mm	
	Wall Thickness	(0.60 ± 0.04) mm	
	Barium content	Less than 2.5%	
	Lead-oxide content	Less than 0.02%	
	Other heavy elements	Trace quantities	
Solution density	(1.014 ± 0.004) g·mL ⁻¹ at 22 °C [b]*		
Solution mass	(5.080 ± 0.002) g [b]		
Chemical Properties:			
Solution composition	Chemical Formula	Concentration (mol·L ⁻¹)	Mass Fraction (g·g ⁻¹)
	H ₂ O	54	0.96
	HCl	0.9	0.04
	NiCl ₂	0.0017	0.00022
	⁶³ NiCl ₂	4 × 10 ⁻⁷	5 × 10 ⁻⁸
Radiological Properties:			
Radionuclide	Nickel-63		
Reference time	1200 EST, 15 August 1995		
Massic activity of the solution [c]	50.53 kBq·g ⁻¹		
Relative expanded uncertainty (k=2)	0.92% [d] [e]		
Photon-emitting impurities	None detected [f]		
Half lives used in the decay corrections	Hydrogen-3: (12.33 ± 0.06) a [g] Nickel-63: (101.1 ± 1.4) a [h]		
Beta-particle maximum energies used in the EFFY4 computations	Hydrogen-3: (18.594 ± 0.008) keV [g] Nickel-63: (66.945 ± 0.004) keV [g]		
Calibration method	Two 4πβ liquid-scintillation counters. The Ni-63 detection efficiency was calculated using the CIEMAT/NIST method with H-3 as the detection-efficiency monitor. [s]		

EVALUATION OF THE UNCERTAINTY OF THE MASSIC ACTIVITY [d]*

Input Quantity x_i , the source of uncertainty (and individual uncertainty components where appropriate)	Method Used To Evaluate $u(x_i)$, the standard uncertainty of x_i (A) denotes evaluation by statistical methods (B) denotes evaluation by other methods	Relative Uncertainty Of Input Quantity, $u(x_i)/x_i$, (%) [i]	Relative Sensitivity Factor, $ \partial y/\partial x_i \cdot$ (x_i/y) [j]	Relative Uncertainty Of Output Quantity, $u_i(y)/y$, (%) [k]
Massic liquid-scintillation count rate of the Ni-63 solution, corrected for background and decay, divided by the computed detection efficiency [m]	Standard deviation of the mean (typical) for 10 repeated measurements on a single sample (A)	0.06	1.0	0.06
	Typical standard deviation for measurements on 4 differently quenched samples (A)	0.15	1.0	0.15
	Typical standard deviation for 18 computed detection efficiency curves (A)	0.18	1.0	0.18
Quench-indicating- parameter (QIP) measurements	Standard deviation of the mean (typical) for 10 repeated measurements on a single sample (A)	0.48	0.27	0.13
Live-time [n]	Estimated (B)	0.08	1.0	0.08
Gravimetric measurements	Estimated (B)	0.05	1.0	0.05
Photon-emitting impurities	Limit of detection (B) [p]	100.	0.00004	0.004
Half life of hydrogen-3 Half life of nickel-63	Standard uncertainty of the half life (A)	0.49 [q] 1.4 [q]	0.006 [r] 0.0007 [r]	0.003 0.001
Liquid-scintillation cocktail effects	Estimated (B)	0.08	1.0	0.08
Computed detection efficiency for Ni-63	Estimated (B) [s]	0.35	1.0	0.35
Relative Combined Standard Uncertainty of the Output Quantity, $u_c(y)/y$, (%)				0.46
Coverage Factor, k				<u>x 2</u>
Relative Expanded Uncertainty of the Output Quantity, U/y , (%)				0.92

NOTES

- [a] The Sievert is the SI unit for dose equivalent. See reference [1]. One μSv is equal to 0.1 mrem.
 Distance from Ampoule (cm): 1 30 100
 Approximate Dose Rate ($\mu\text{Sv/h}$): <0.1 (Not detectable)
- [b] The stated uncertainty is two times the standard uncertainty.
- [c] **Massic activity** is the preferred name for the quantity activity divided by the total mass of the sample. See reference [1].
- [d] The reported value, y , of massic activity (activity per unit mass) at the reference time was not measured directly but was derived from measurements and calculations of other quantities. This can be expressed as $y = f(x_1, x_2, x_3, \dots, x_n)$, where f is a mathematical function derived from the assumed model of the measurement process.
- The value, x_i , used for each input quantity i has a **standard uncertainty**, $u(x_i)$, that generates a corresponding uncertainty in y , $u_i(y) = |\partial y / \partial x_i| \cdot u(x_i)$, called a **component of combined standard uncertainty** of y .
- The **combined standard uncertainty** of y , $u_c(y)$, is the positive square root of the sum of the squares of the components of combined standard uncertainty.
- The combined standard uncertainty is multiplied by a **coverage factor** of $k = 2$ to obtain U , the **expanded uncertainty** of y .
- Since it can be assumed that the possible estimated values of the massic activity are approximately normally distributed with approximate standard deviation $u_c(y)$, the unknown value of the massic activity is believed to lie in the interval $y \pm U$ with a level of confidence of approximately 95 percent.
- For further information on the expression of uncertainties, see references [2] and [3].
- [e] The value of each standard uncertainty component, and hence the value of the expanded uncertainty itself, is a best estimate based upon all available information, but is only approximately known. That is to say, the "uncertainty of the uncertainty" is large and not well known. This is true for uncertainties evaluated by statistical methods (e.g., the relative standard deviation of the standard deviation of the mean for the liquid-scintillation counting is approximately 50%) and for uncertainties evaluated by other methods (which could easily be over estimated or under estimated by substantial amounts). The unknown value of the expanded uncertainty is believed to lie in the interval $U/2$ to $2U$ (i.e., within a factor of 2 of the estimated value).
- [f] Estimated limits of detection for photon-emitting impurities are:
 $5 \times 10^{-6} \gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$ for energies between 12 and 88 keV,
 $2 \times 10^{-6} \gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$ for energies between 96 and 507 keV,
 $8 \times 10^{-7} \gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$ for energies between 515 and 1456 keV, and
 $3 \times 10^{-7} \gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$ for energies between 1465 and 1900 keV.
- [g] The stated uncertainty is the standard uncertainty. See reference [5].
- [h] The stated uncertainty is the standard uncertainty. The half life of nickel-63 was reevaluated as part of the calibration of this SRM. See reference [10].

- [i] Relative standard uncertainty of the input quantity x_i .
- [j] The relative change in the output quantity y divided by the relative change in the input quantity x_i . If $|\partial y/\partial x_i| \cdot (x_i/y) = 1.0$, then a 1% change in x_i results in a 1% change in y . If $|\partial y/\partial x_i| \cdot (x_i/y) = 0.05$, then a 1% change in x_i results in a 0.05% change in y .
- [k] Relative component of combined standard uncertainty of output quantity y , rounded to two significant figures or less. The relative component of combined standard uncertainty of y is given by $u_i(y)/y = |\partial y/\partial x_i| \cdot u(x_i)/y = |\partial y/\partial x_i| \cdot (x_i/y) \cdot u(x_i)/x_i$. The numerical values of $u(x_i)/x_i$, $|\partial y/\partial x_i| \cdot (x_i/y)$, and $u_i(y)/y$, all dimensionless quantities, are listed in columns 3, 4, and 5, respectively. Thus, the value in column 5 is equal to the value in column 4 multiplied by the value in column 3. The input quantities are independent, or very nearly so. Hence the covariances are zero or negligible.
- [m] The Ni-63 massic activity of SRM 4226C is gravimetrically related to the massic activity of SRM 4226 (issued in 1969) and SRM 4226B (issued in 1984). The calibrations of SRM 4226 and SRM 4226B were based upon microcalorimetric measurements made in 1968. The calibration of SRM 4226C differs by less than 0.2 percent from the previous calibrations, after revision of the calorimetry data by a factor of 17.23/17.426 to account for a change in the assumed mean beta-particle energy of Ni-63 and after correction for decay using a half life of 101.1 years. See references [9], [10], and [11].
- [n] The live time is determined by counting the pulses from a gated crystal-controlled oscillator.
- [p] The standard uncertainty for each undetected impurity that might reasonably be expected to be present is estimated to be equal to the estimated limit of detection for that impurity, i.e. $u(x_i)/x_i = 100\%$. $|\partial y/\partial x_i| \cdot (x_i/y) = \{(\text{response per Bq of impurity})/(\text{response per Bq of Ni-63})\} \cdot \{(\text{Bq of impurity})/(\text{Bq of Ni-63})\}$. Thus $u_i(y)/y$ is the relative change in y if the impurity were present with a massic activity equal to the estimated limit of detection.
- [q] The relative standard uncertainty of $\lambda \cdot t$ is determined by the relative standard uncertainty of λ (i.e., of the half life). The relative standard uncertainty of t is negligible.
- [r] $|\partial y/\partial x_i| \cdot (x_i/y) = |\lambda \cdot t|$, multiplied by other sensitivity factors where appropriate.
- [s] The relationship between the detection efficiency for Ni-63 and the detection efficiency for H-3 was computed using the CIEMAT/NIST method as embodied in the computer program EFFY4. See references [6, 7, 8]. The program computes the detection efficiency for each radionuclide based upon an assumed model. No estimate is made of the uncertainty associated with this model.

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PROJECT I-129 Intermediate Std Solution

Continued From Page

Primary Standard

ATI isotope # 0052 from Isotope Products Lab

activity = 1.008 μ Ci in 5.002 g of solution
date of calib 4-15-93

catalog no. 7129
"source no" 425-5-1

half life $1.57 \pm 0.04 \times 10^7$ years

expiration date: not given

chemical form: "NaI in basic sulfite"

RG 8/25/04
Std ID: S-109
Description: I-129
Expiration: 8/18/05
Activity: 2207.00 dpm/mL
2s Uncertainty: 33.84 dpm/mL
Ref. Date: 4/15/93
Ref Time: N/A
Prep Date: 8/18/04
Matrix/Comp: 0.1N NaOH
Half Life (y): 1.57E+07
Prep by: JRK

Std ID: S-109

Description: I-129
Expiration: 8/25/06
Activity: 2207.00 dpm/mL

2s Uncertainty: 33.84 dpm/mL
Ref. Date: 4/15/93
Ref Time: N/A
Prep Date: 1/5/94
Matrix/Comp: 0.1 M NaOH
Half Life (y): 1.57E+07
Prep by: RJ

Preparation of Intermediate Solution:

12.9038 wt syringe + solution

- 7.9714 wt syringe after dispensing

= 4.9324 total grams of radioisotope std dispensed

$$\frac{1.008 \mu\text{Ci}}{5.002 \text{ g}} \times 4.9324 \text{ g} = \frac{0.994 \mu\text{Ci}}{1000 \text{ mL}} \times \frac{10^6 \mu\text{Ci}}{\mu\text{Ci}} = 994 \mu\text{Ci/mL}$$

solution diluted in
0.1 M NaOH / 0.5 mg Na₂S₂O₄

$$= 2,207 \text{ dpm/mL}$$

Reverification Log		
Analysis Date	Initials	Expiration Date
10/16/06	RG	10/13/07
01/04/10	MBC	01/04/2011
05/12/10		

SD 4/18/03
This is a re-verification of this standard

Std ID: S109

Description: I-129
Activity: 2207.00 dpm/ml
2s Uncertainty: 33.84 dpm/ml
Ref. Date: 4/15/93
Ref Time: na
Prep Date: 6/17/03
Expiration: 6/17/04
Matrix/Comp: 0.1M NaOH
Half Life (y): 1.57E+07
Prep by: CDM

Requires NCR for ICPT work.

Standard re-verified
10/1/99
11/21/99 per
Bob Shannon
JCS
2/5/99

SD 4/15/00

Std Re-Verified 4/5/00 JCS 4/5/00
Expires 4/5/01 RG 5/11/00

Continued on Page

Std re-verified 7/13/02
Expires 7/13/03
Read and Understood By

RG 12/20/02

Robert [Signature]
Signed

1-5-94
Date

LAS
Signed

1/17/94
Date

CERTIFICATE OF CALIBRATION

BETA STANDARD SOLUTION

APR 02 1993

Radionuclide	I-129	Customer:	ANALYTICAL TECHNOLOGIES, INC.
Half Life:	$(1.57 \pm 0.04) \times 10^7$ years	P.O.No.:	31807
Catalog No.:	7129	Reference Date:	April 15 1993 12:00 PST.
Source No.:	425-5-1	Contained Radioactivity:	1.008 μ Cl
		Contained Radioactivity:	37.3 kBq

Description of Solution

a. Mass of solution: 5.002 g (in a 5 ml Flame Sealed Ampoule)

b. Chemical form: NaI in basic sulfite

c. Carrier content: None added

d. Density: 1.002 g/ml @ 20°C.

Radioimpurities None detected

Radioactive Daughters None

Radionuclide Concentration 0.202 μ Cl/g.

Method of Calibration
 Weighed aliquots of the solution were assayed using a liquid scintillation counter.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration: $\pm 2.2\%$

b. Random uncertainty in assay: $\pm 0.8\%$

c. Random uncertainty in weighing(s): $\pm 0.0\%$

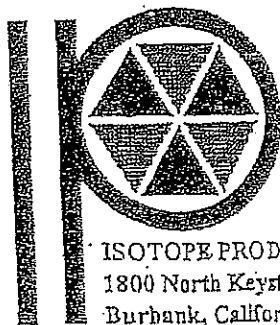
d. Total uncertainty at the 99% confidence level: $\pm 2.3\%$

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. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. 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).



ISOTOPE PRODUCTS LABORATORIES
 1800 North Keystone Street
 Burbank, California 91504
 (818) 843-7000

Anna H. Khan

 QUALITY CONTROL

March 31, 1993

 Date Signed

DAILY INSTRUMENT PERFORMANCE CHECKS - LS6500 (LL OFF, LUMEX OFF)

Daily IPCs consist of the following standards;

Efficiency Check -

Beckman Tritium Standard

Lot HPE0410

104700.00 dpm

3/19/2008 REF

3/19/2013 EXP

Beckman C-14 Standard

Lot CPE2711

100100.00 dpm

3/19/2008 REF

3/19/2013 EXP

Historical Control Limits

as of 04/21/09 JP

Decay Corrected Tritium

Carbon-14

UCL 67328.94

82488.98

Mean Value 64185.15

78542.61

LCL 60916.66

74632.89

Instrument re-calibrated for all tests starting 12/29/2009.

Decay Corrected

<u>Obs</u>	<u>Date</u>	<u>H-3 CPM</u>	<u>H-CPM</u>	<u>PASS?</u>	<u>C-14 CPM</u>	<u>PASS?</u>
325	4/22/2010	55800.10	62792.97	OK	78462.0	OK
326	4/23/2010	55857.70	62867.50	OK	78365.6	OK

DAILY CHECK LL ON ⁹⁹Tc SOURCE- LS6500

⁹⁹ Tc standard		SPIKE	
836.3020.70	KNOWN ACTIVITY AS OF 2/26/07		
1/29/2010	REF	58000.38	dpm/g
1/29/2011	EXP	58000.38	dpm

HISTORICAL CONTROL LIMITS 4/21/09 JP

	<u>blank</u>	<u>Blank Quench #</u>	<u>spike</u>
UCL	22.48	72.8	13863.24
Mean Value	17.55	63.7	12700.34
LCL	14.06	52.9	12212.16

Obs #	Date	Blank C.R.	Pass ?	Quench #	Pass	Spiked C.R.	Pass ?
325	4/22/2010	16.8	OK	63.1	OK	13075.9	OK
326	4/23/2010	16.5	OK	63.2	OK	12762.3	OK

Supporting Information

- Window 1 Determination
- Projected Efficiencies and MDC's
- Energy vs Channel Determination

Window Settings
300-600

	CHANNEL	ENERGY(KEV)
C14 Average Energy	409	49.47
C14 Maximum Energy	600	156.478
I129 Average Energy	396	40.9
I129 Maximum Energy	590	152
N63 Average Energy	292	17.13
N63 Maximum Energy	480	65.87

Projected Efficiency

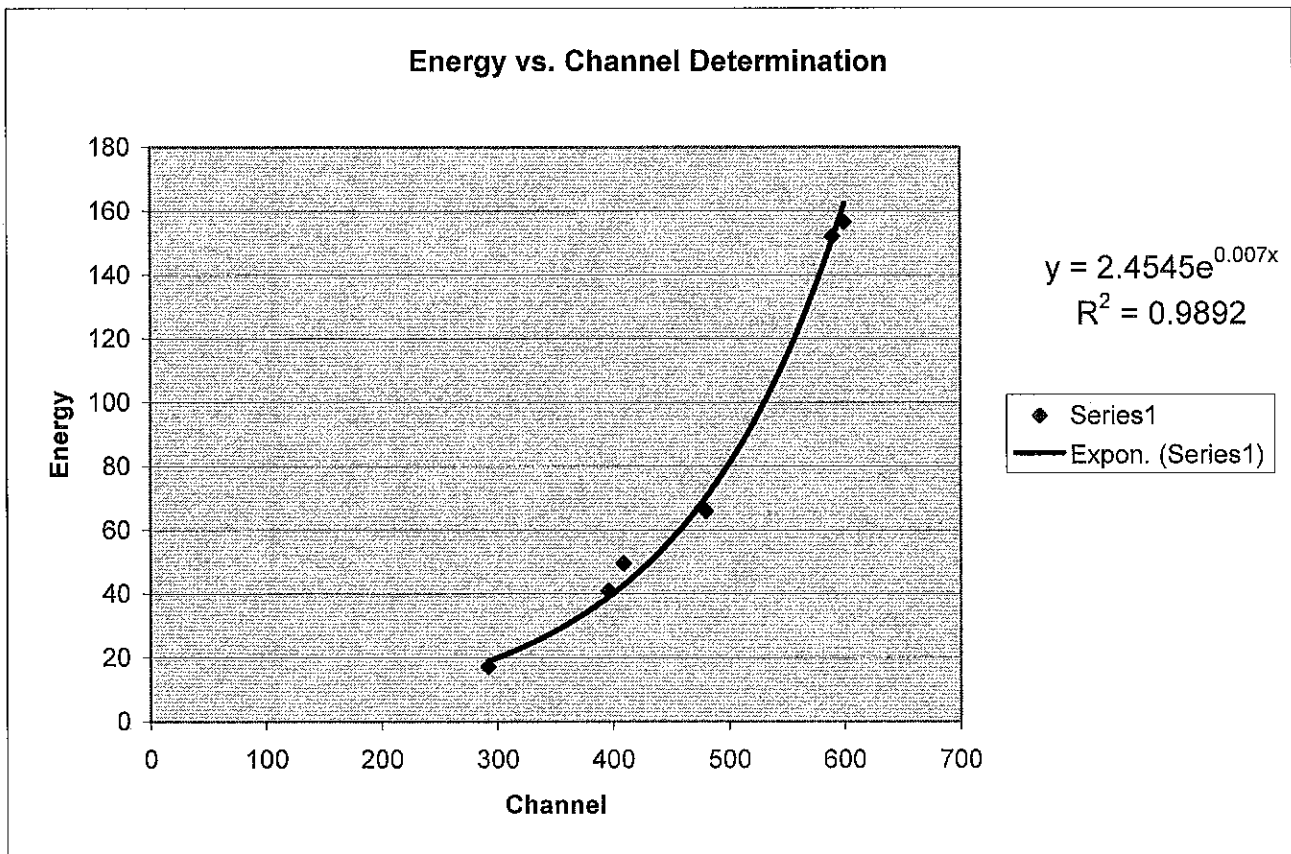
C-14	0.61
I-129	0.57
Ni-63	0.18

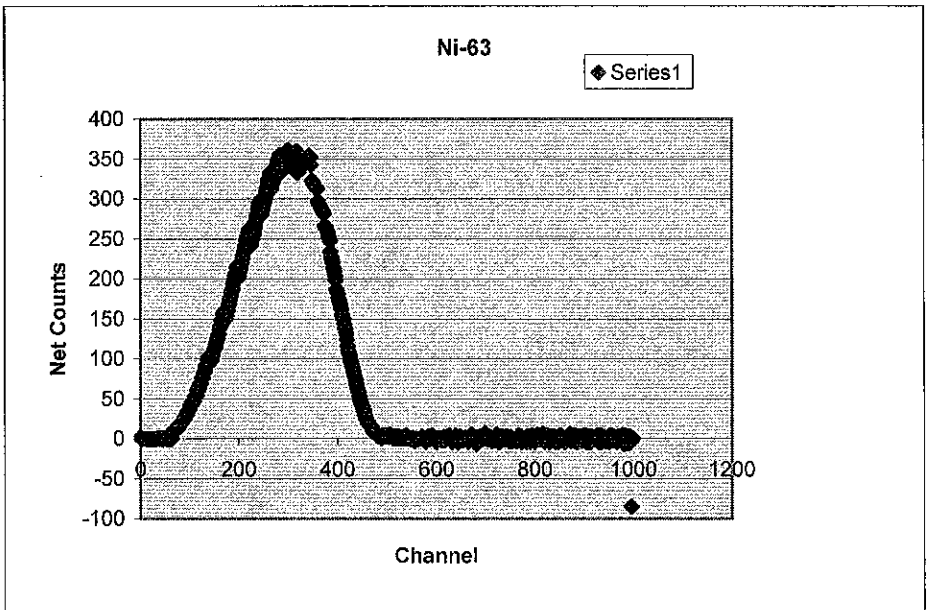
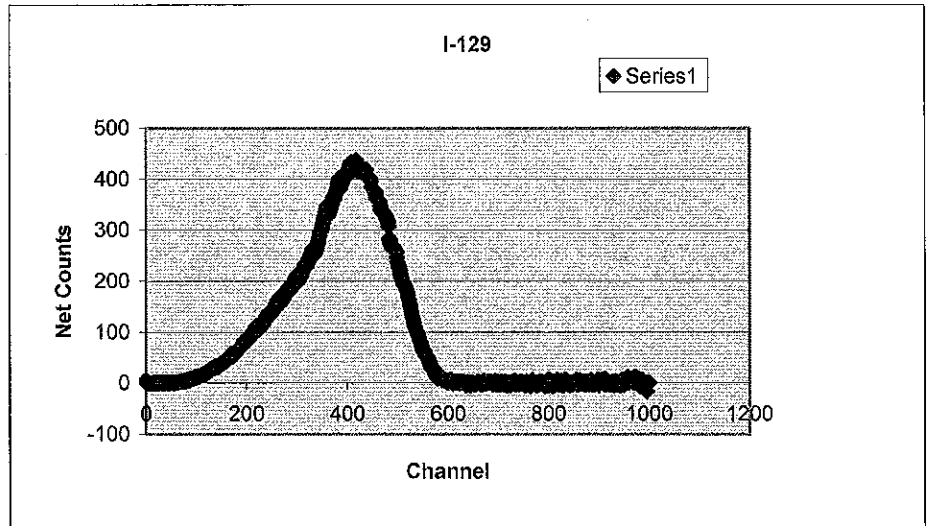
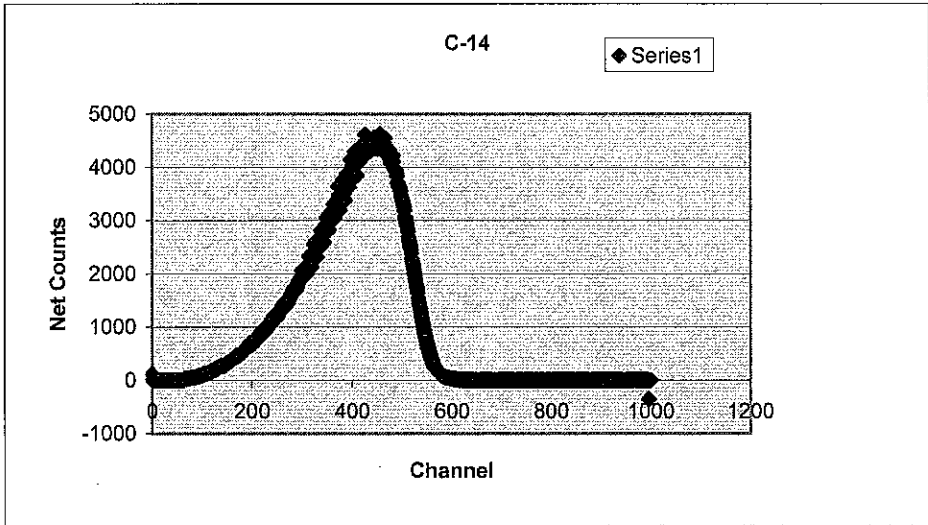
Projected MDC
(2 minute count)

C-14	11.25 pCi/S
I-129	11.85 pCi/S
Ni-63	36.65 pCi/S

Energy/Channel
Determination

Channel	Energy
0	2.4545
25	2.923914
50	3.483101
75	4.149231
100	4.942756
200	9.953488
250	14.12467
300	20.04386
325	23.87718
350	28.4436
400	40.36339
450	57.27837
500	81.28188
550	115.3445
600	163.6816
605	169.5119
610	175.5499
615	181.8029
620	188.2787
625	194.9851
630	201.9304
650	232.2752





ID: 3H: 5ML, 10ML

18 APR 2010 05:14

USER: 6 COMMENT: LS6500
 PRESET TIME : 60.00
 DATA CALC : CPM H# : YES SAMPLE REPEATS: 1 PRINTER : EDIT
 COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 : EDIT
 TWO PHASE : NO AQC : NO CYCLE REPEATS : 1 DISK : EDIT
 SCINTILLATOR: LIQUID LUMEX: NO LOW SAMPLE REJ: 0
 LOW LEVEL : YES HALF LIFE CORRECTION DATE: none

WIDE OPEN WINDOW %ERROR: 0.00 FACTOR: 1.000000 BKS. SUB: 0

SAM NO	POS	TIME MIN	H#	WIDE		LUMEX %	ELAPSED TIME
				CPM	%ERROR		
1	52-1	60.00	123.6	61.45	3.29	0.13	61.08
2	52-2	60.00	124.6	16545.42	0.20	0.00	123.51
3	52-3	60.00	127.0	1368.27	0.70	0.01	185.20
4	52-4	60.00	121.3	1637.37	0.64	0.01	246.91

Initial Window Determination

*PC
4-26-10*

```

cf1\lang1033\f0\fs20 BSF Version          : 3
Data Capture Date                        : 18 Apr 2010 06:15:35
User Filename                            : C:\...\LS WINCONNECTION\DATA2\USER06\SG041801.BSF
User Number                              : 06
User Id                                  : 3H:5ML,10ML
User Comment                              : LS6500
File Type                                 : Sample Spectrum
Spectrum Type                             : Log Counts
Isotope Name                              :
Scintillator                              : LIQUID
Sample Number                             : 1
Rack Position                             : 52-1
Counting Time                             : 60.00
Quench (H#)                              : 123.6
CPM                                       : 61.45
Count Error                               : 3.29
Lumex Corr                               : 0.13
Start Channel                             : 0
End Channel                               : 1000
X-Axis Title                             : Channel Number
Y-Axis Title                              : Counts
    
```

C100415-1CB1
PC
4-27-10

Chan:	0	1	2	3	4	5	6	7	8	9
0:	0	0	0	0	0	0	0	0	0	0
10:	0	0	0	0	0	0	0	0	0	0
20:	0	0	0	0	0	0	0	0	0	0
30:	0	0	0	0	0	0	0	0	0	0
40:	0	0	0	0	0	0	0	0	0	0
50:	0	0	0	0	0	0	0	0	0	0
60:	0	0	0	0	0	0	0	0	0	0
70:	0	1	0	0	0	0	1	0	0	0
80:	0	0	1	0	1	0	0	1	0	1
90:	1	0	1	1	1	0	1	1	1	1
100:	1	1	1	1	1	1	1	2	1	1
110:	1	1	2	1	1	2	1	2	1	2
120:	1	2	1	2	2	1	2	2	2	2
130:	2	3	2	2	2	2	3	2	3	2
140:	3	2	2	2	2	3	2	2	2	2
150:	3	2	2	3	2	3	2	3	3	2
160:	3	3	2	3	3	3	3	3	3	3
170:	3	3	2	3	2	3	2	3	2	3
180:	2	3	2	3	3	2	3	2	3	2
190:	2	3	2	3	2	3	2	2	3	2
200:	3	3	3	2	3	3	3	3	3	3
210:	2	3	3	3	3	3	4	3	3	3
220:	3	3	4	3	3	3	3	3	3	3
230:	3	3	3	4	3	3	4	3	3	3
240:	2	3	3	3	2	4	3	4	3	4
250:	3	3	4	3	4	3	4	4	3	4
260:	4	3	4	4	3	3	4	4	3	4
270:	4	3	4	4	4	3	3	3	3	3
280:	3	4	3	3	3	3	3	3	3	3
290:	3	4	3	3	3	2	3	3	2	3
300:	2	3	2	2	3	2	2	3	3	4
310:	3	3	4	4	3	4	3	4	4	4
320:	4	4	4	4	4	5	4	5	5	5
330:	5	5	6	5	4	5	5	4	5	4
340:	5	4	3	4	4	4	3	4	3	3
350:	3	3	3	3	3	3	3	3	2	3
360:	2	4	4	4	5	5	5	5	5	5
370:	5	5	5	5	5	4	4	4	4	4
380:	3	3	4	3	2	3	3	4	3	3
390:	4	3	4	3	5	4	4	4	4	3
400:	4	3	4	3	3	3	2	3	2	3
410:	3	3	3	3	3	3	4	4	4	3
420:	3	3	4	3	3	3	3	3	4	3
430:	2	2	3	2	3	2	3	3	4	2
440:	3	2	3	2	3	3	4	3	4	3
450:	4	3	4	3	4	5	4	4	3	3
460:	2	1	2	2	1	1	2	3	3	3
470:	3	3	5	5	4	3	4	4	4	4
480:	4	4	4	4	4	4	4	4	4	5
490:	3	2	3	3	3	3	3	4	3	3
500:	3	3	4	3	5	5	3	3	4	3
510:	4	5	4	2	2	3	4	3	4	3
520:	2	3	2	3	5	5	4	3	3	4
530:	4	3	4	4	3	4	4	3	1	2
540:	2	3	2	3	4	4	3	4	4	5
550:	5	6	3	2	4	4	4	4	3	3
560:	3	4	4	4	3	2	3	4	5	3
570:	3	3	2	4	5	4	4	5	5	6
580:	4	4	3	3	2	2	3	3	3	4

590:	3	3	3	3	3	4	3	4	5	4
600:	6	5	4	4	3	2	3	4	4	5
610:	4	5	5	6	6	3	4	5	6	4
620:	4	3	4	4	2	2	2	4	3	4
630:	4	4	6	4	6	5	6	4	4	4
640:	6	6	6	5	7	7	6	5	3	3
650:	4	4	6	5	4	4	6	4	2	3
660:	5	4	6	6	8	7	5	3	3	4
670:	4	2	1	4	5	5	3	3	5	4
680:	5	4	7	3	4	5	3	3	4	7
690:	6	7	7	5	3	5	5	4	5	2
700:	3	5	5	6	5	4	1	3	5	4
710:	3	6	8	5	5	7	3	6	5	2
720:	4	5	0	5	5	7	8	9	8	4
730:	3	3	3	2	3	5	3	2	3	3
740:	4	6	3	3	5	4	6	4	5	6
750:	3	6	6	6	10	7	4	1	3	5
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780:	6	3	3	3	5	2	4	3	4	3
790:	7	7	6	7	4	3	3	8	5	7
800:	9	5	2	3	5	4	5	7	9	7
810:	1	4	5	4	5	2	4	1	4	3
820:	6	4	8	1	4	0	4	2	7	6
830:	9	6	0	0	3	2	3	4	6	4
840:	4	6	4	4	1	4	4	3	4	5
850:	5	1	3	0	2	3	2	4	2	3
860:	4	2	4	1	3	3	3	5	1	3
870:	2	1	4	5	2	2	2	5	6	2
880:	6	5	1	2	0	2	7	4	3	4
890:	0	4	4	3	4	4	4	1	1	1
900:	4	5	4	3	2	3	5	3	3	3
910:	6	2	2	6	0	4	4	3	1	4
920:	3	4	2	2	4	4	0	3	3	4
930:	10	1	3	3	4	6	1	3	5	5
940:	3	2	5	6	6	6	6	2	5	3
950:	7	5	3	7	3	3	2	2	5	3
960:	5	6	5	6	3	4	5	7	5	6
970:	5	7	5	6	8	9	6	4	4	10
980:	4	12	11	9	5	11	8	8	10	6
990:	14	15	8	8	12	29	698	0	0	0
1000:	0									

Total Counts: 4071

```

cf1\langl033\#0\fs20 BSF Version           : 3
Data Capture Date       : 18 Apr 2010 07:18:03
User Filename           : C:\...\LS WINCONNECTION\DATA2\USER06\SG041802.BSF
User Number            : 06
User Id                : 3H:5ML,10ML
User Comment           : LS6500
File Type              : Sample Spectrum
Spectrum Type          : Log Counts
Isotope Name           :
Scintillator           : LIQUID
Sample Number          : 2
Rack Position          : 52-2
Counting Time          : 60.00
Quench (H#)           : 124.6
CPM                    : 16545.42
Count Error            : 0.20
Lumex Corr             : 0.00
Start Channel          : 0
End Channel            : 1000
X-Axis Title           : Channel Number
Y-Axis Title           : Counts
    
```

1016005-1 (C-14)

DC
4-27-10

Chan:	0	1	2	3	4	5	6	7	8	9
0:	118	0	0	0	0	0	0	0	0	0
10:	0	0	0	0	0	0	2	3	3	3
20:	4	3	3	4	3	3	4	3	4	3
30:	4	3	4	4	3	4	4	4	4	4
40:	4	4	4	4	4	4	5	4	4	4
50:	5	4	5	4	5	4	5	4	5	5
60:	5	4	5	5	5	10	25	25	26	25
70:	26	28	34	33	34	34	34	40	43	43
80:	44	44	47	54	54	55	55	57	66	67
90:	67	68	71	80	81	81	82	89	95	97
100:	97	98	112	113	115	115	118	120	121	123
110:	123	132	138	140	142	142	155	159	160	162
120:	166	179	181	182	184	197	202	204	205	215
130:	225	227	228	237	249	250	253	262	274	276
140:	279	269	262	265	267	275	287	290	292	299
150:	314	317	319	326	343	345	348	357	372	375
160:	378	393	403	407	410	433	436	440	454	467
170:	472	472	449	452	456	467	482	487	490	509
180:	518	522	530	551	554	560	579	588	594	607
190:	623	628	638	659	664	671	695	701	707	657
200:	661	666	684	697	702	716	733	740	750	771
210:	778	788	811	817	828	852	859	871	895	901
220:	918	938	946	917	901	908	928	943	951	973
230:	988	995	1020	1032	1042	1069	1078	1093	1115	1125
240:	1147	1163	1173	1202	1212	1180	1142	1151	1174	1188
250:	1200	1225	1236	1255	1274	1285	1312	1325	1342	1365
260:	1376	1406	1418	1439	1461	1455	1383	1395	1418	1435
270:	1451	1478	1489	1518	1533	1555	1579	1594	1625	1639
280:	1669	1687	1713	1736	1708	1668	1684	1716	1730	1761
290:	1779	1805	1828	1852	1877	1899	1928	1922	1917	2060
300:	1937	2076	1959	1946	1970	1967	2122	1987	2135	2002
310:	2160	2160	2178	2323	2195	2197	2358	2363	2121	2233
320:	2250	2251	2266	2552	2285	2284	2589	2300	2610	2318
330:	2628	2629	2643	2560	2493	2505	2511	2525	2807	2547
340:	2828	2563	2852	2864	2592	2881	2904	2876	3048	2780
350:	2790	2804	3087	2828	3109	3124	3138	3140	3160	3165
360:	3174	3064	3022	3312	3318	3047	3333	3338	3348	3353
370:	3354	3367	3646	3372	3480	3196	3471	3474	3474	3483
380:	3484	3486	3764	3497	3769	3776	3377	3600	3604	3866
390:	3614	3616	3882	3890	3631	3901	3908	4139	3757	3761
400:	4020	4019	3779	4028	4034	4035	4291	4039	4263	4084
410:	3845	4325	4081	4085	4087	4327	4323	4328	4333	4244
420:	4180	4408	4176	4408	4402	4392	4389	4609	4370	4503
430:	4370	4359	4340	4545	4316	4515	4495	4479	4462	4322
440:	4444	4424	4409	4395	4378	4561	4354	4531	4475	4559
450:	4351	4527	4512	4489	4476	4457	4620	4544	4409	4385
460:	4360	4507	4476	4451	4415	4548	4412	4306	4280	4245
470:	4358	4330	4293	4249	4335	4194	4158	4116	4083	4184
480:	4141	4225	4111	4001	3990	3977	3964	3947	3927	3905
490:	3837	3709	3685	3660	3635	3610	3585	3559	3476	3426
500:	3399	3370	3336	3298	3263	3186	3071	3032	2990	2948
510:	2906	2860	2796	2691	2647	2602	2556	2509	2457	2387
520:	2284	2235	2188	2140	2086	2035	1968	1899	1853	1799
530:	1747	1696	1645	1539	1477	1429	1382	1334	1281	1229
540:	1179	1134	1089	1046	1004	944	881	843	798	758
550:	721	679	634	603	568	536	506	470	438	413
560:	384	361	335	309	287	265	248	231	215	207
570:	196	186	171	162	149	138	129	121	111	102
580:	94	87	82	75	69	66	63	60	57	54

590:	51	51	48	48	45	43	40	38	34	32
600:	31	29	28	26	26	25	26	24	23	24
610:	21	22	18	18	17	18	15	16	14	14
620:	16	13	12	11	8	7	5	4	5	8
630:	8	9	9	7	8	5	5	6	5	8
640:	8	7	6	5	4	3	4	5	6	5
650:	4	4	4	5	2	2	2	3	4	6
660:	9	6	7	4	2	3	4	4	5	4
670:	4	7	4	4	5	4	5	4	5	5
680:	4	2	2	1	3	4	4	5	4	5
690:	2	2	2	4	5	5	6	2	5	5
700:	3	5	7	6	7	8	6	5	5	1
710:	4	5	6	5	3	1	5	4	1	3
720:	6	5	5	6	8	6	4	1	2	3
730:	2	3	4	5	3	4	4	4	5	4
740:	4	6	4	2	2	3	3	6	6	10
750:	8	9	8	4	4	4	6	8	2	3
760:	5	6	8	5	3	1	3	5	3	5
770:	4	5	7	3	5	3	3	4	3	5
780:	7	8	8	5	3	7	7	4	4	6
790:	8	9	4	2	7	8	3	6	1	2
800:	2	4	6	3	8	6	2	5	8	5
810:	2	4	6	4	5	1	6	6	8	7
820:	2	0	4	4	7	4	6	1	4	4
830:	5	1	3	0	5	6	4	3	2	6
840:	2	5	1	4	2	3	4	3	4	3
850:	4	2	3	3	3	2	3	5	3	3
860:	5	1	5	2	4	2	1	5	5	3
870:	3	2	4	3	2	4	0	3	5	2
880:	4	4	3	4	4	5	4	2	2	4
890:	3	3	3	4	2	2	5	1	2	3
900:	1	6	5	4	5	5	6	1	3	5
910:	1	4	4	3	1	3	4	7	6	2
920:	4	3	1	2	1	1	5	8	5	4
930:	2	2	2	3	5	3	2	3	3	8
940:	6	6	1	2	5	4	3	2	2	2
950:	5	3	4	4	6	6	1	4	3	7
960:	10	6	7	5	12	12	12	11	11	9
970:	4	12	15	13	8	6	16	9	16	9
980:	12	12	12	4	14	9	4	5	10	11
990:	11	13	13	12	11	19	341	0	0	0
1000:	0									

Total Counts: 992901

```

cf1\langl033\fs0\fs20 BSF Version           : 3
Data Capture Date                          : 18 Apr 2010 08:19:43
User Filename                              : C:\...\LS WINCONNECTION\DATA2\USER06\SG041803.BSF
User Number                                : 06
User Id                                    : 3H:5ML,10ML
User Comment                               : LS6500
File Type                                  : Sample Spectrum
Spectrum Type                             : Log Counts
Isotope Name                              :
Scintillator                              : LIQUID
Sample Number                             : 3
Rack Position                             : 52-3
Counting Time                             : 60.00
Quench (H#)                              : 127.0
CPM                                        : 1368.27
Count Error                               : 0.70
Lumex Corr                               : 0.01
Start Channel                             : 0
End Channel                               : 1000
X-Axis Title                              : Channel Number
Y-Axis Title                              : Counts
    
```

1016005-4 (Ni-63)

PC
4-27-10

Chan:	0	1	2	3	4	5	6	7	8	9
0:	2	0	0	0	0	0	0	0	0	0
10:	0	0	0	0	0	0	0	0	0	0
20:	0	0	0	0	0	0	0	0	0	0
30:	0	0	0	0	0	0	1	0	0	0
40:	0	0	1	0	0	0	0	0	1	0
50:	0	0	0	0	1	0	0	0	0	1
60:	0	0	0	0	0	8	9	10	9	10
70:	9	12	13	12	13	13	13	16	16	16
80:	16	16	20	20	20	20	21	23	25	26
90:	25	26	29	30	31	31	31	36	36	37
100:	37	40	43	43	44	44	47	47	48	48
110:	48	54	54	55	56	56	62	62	62	63
120:	66	69	70	71	71	77	78	78	79	84
130:	86	86	87	92	94	94	96	101	102	104
140:	105	98	97	99	99	103	105	107	107	111
150:	114	115	116	120	122	124	125	129	132	133
160:	134	140	142	143	145	150	152	153	158	160
170:	162	159	151	152	153	157	160	162	163	169
180:	170	171	175	178	180	182	187	189	190	195
190:	198	200	202	207	209	211	216	218	217	202
200:	205	206	210	213	215	218	221	223	227	229
210:	232	235	238	240	243	246	249	251	255	257
220:	261	263	266	248	244	246	249	252	254	257
230:	259	262	265	268	270	274	276	279	283	284
240:	289	291	295	298	300	290	283	285	289	291
250:	294	298	300	303	306	308	313	315	318	320
260:	324	327	330	333	336	332	316	319	321	324
270:	326	329	331	334	336	339	341	345	346	349
280:	351	354	355	358	346	335	337	338	341	343
290:	345	346	348	350	352	354	355	358	359	361
300:	363	362	343	346	346	349	350	352	352	355
310:	355	356	358	359	359	362	361	364	338	337
320:	337	339	339	341	341	343	344	346	346	349
330:	350	351	354	349	348	349	351	352	353	354
340:	356	355	357	357	356	357	355	346	325	325
350:	325	322	323	320	320	319	318	318	315	315
360:	314	301	299	297	297	296	294	295	292	291
370:	291	288	287	286	271	270	269	267	266	263
380:	262	260	257	255	253	250	237	232	230	227
390:	224	223	218	216	214	208	207	202	191	188
400:	186	184	180	177	175	172	170	167	164	159
410:	156	154	152	148	146	142	141	137	134	127
420:	120	118	114	111	109	107	102	100	98	95
430:	92	91	87	86	83	80	79	76	73	69
440:	66	64	62	60	56	56	52	50	49	46
450:	45	43	41	40	38	35	33	30	27	26
460:	25	23	21	20	18	18	18	19	19	17
470:	17	15	14	13	13	12	12	10	10	9
480:	8	8	7	8	8	7	7	7	6	6
490:	5	6	6	6	6	7	6	7	6	6
500:	7	6	7	8	7	8	8	7	8	5
510:	6	6	6	5	5	5	5	3	4	3
520:	4	3	5	4	5	5	5	5	4	5
530:	5	5	6	4	3	4	5	5	5	4
540:	2	3	3	4	4	4	3	4	4	4
550:	5	5	4	2	3	1	1	2	1	3
560:	2	3	3	3	3	2	3	4	5	4
570:	4	5	4	5	6	4	3	3	3	2
580:	3	3	3	4	5	2	2	3	5	5

590:	4	6	7	6	6	6	5	4	3	1
600:	2	3	3	4	3	3	3	4	3	6
610:	4	3	4	4	5	5	4	3	4	3
620:	4	4	6	7	4	4	6	5	5	6
630:	5	4	2	4	5	5	6	6	7	8
640:	7	7	4	4	2	3	4	4	6	6
650:	4	4	4	3	4	4	4	3	3	4
660:	5	4	4	4	5	3	4	4	5	4
670:	4	7	6	7	6	7	5	4	5	6
680:	4	2	0	0	1	2	2	5	4	8
690:	5	5	7	5	5	5	5	4	6	9
700:	7	8	7	8	5	3	3	3	5	6
710:	5	5	5	3	2	5	2	4	5	3
720:	6	5	5	4	2	3	5	5	3	6
730:	4	3	5	5	6	5	4	4	5	4
740:	3	6	6	6	4	3	5	3	2	4
750:	3	6	8	6	7	5	3	1	3	3
760:	4	3	5	3	3	5	3	6	2	3
770:	3	6	7	3	5	4	5	6	4	6
780:	7	3	4	5	1	3	7	3	6	3
790:	4	3	4	7	6	7	4	8	4	6
800:	5	4	5	6	8	7	10	7	9	6
810:	1	4	7	4	5	2	4	7	2	0
820:	2	4	6	1	4	4	4	2	4	4
830:	4	3	3	2	3	3	4	5	6	7
840:	6	3	0	4	1	3	5	4	4	1
850:	3	5	5	4	3	5	1	3	2	3
860:	0	1	0	1	4	4	2	5	2	3
870:	3	7	7	2	4	5	6	5	5	1
880:	3	4	5	4	2	2	2	2	3	4
890:	3	5	4	3	1	3	3	1	2	5
900:	3	8	8	7	1	1	0	3	4	3
910:	1	2	5	2	3	2	6	4	2	3
920:	4	3	3	3	4	2	4	4	3	3
930:	6	4	6	7	4	2	3	2	2	4
940:	5	3	3	3	5	3	3	3	3	2
950:	3	2	7	9	7	2	6	4	3	4
960:	8	5	2	5	4	5	6	3	5	9
970:	6	5	8	6	8	12	6	7	9	5
980:	4	5	8	8	9	5	8	4	8	8
990:	14	9	8	11	9	25	613	0	0	0
1000:	0									

Total Counts: 82312

```

cfl\lang1033\fs0\fs20 BSF Version           : 3
Data Capture Date       : 18 Apr 2010 09:21:26
User Filename           : C:\...\LS WINCONNECTION\DATA2\USER06\SG041804.BSF
User Number             : 06
User Id                 : 3H:5ML,10ML
User Comment            : LS6500
File Type               : Sample Spectrum
Spectrum Type           : Log Counts
Isotope Name            :
Scintillator            : LIQUID
Sample Number           : 4
Rack Position           : 52-4
Counting Time           : 60.00
Quench (H#)             : 121.3
CPM                     : 1637.37
Count Error             : 0.64
Lumex Corr              : 0.01
Start Channel           : 0
End Channel             : 1000
X-Axis Title            : Channel Number
Y-Axis Title            : Counts
    
```

10/6005-7 (I-129)
DC
4-27-10

Chan:	0	1	2	3	4	5	6	7	8	9
0:	6	0	0	0	0	0	0	0	0	0
10:	0	0	0	0	0	0	0	0	0	0
20:	1	0	0	0	1	0	1	0	1	0
30:	0	1	0	1	0	1	0	1	0	1
40:	0	1	0	1	0	1	0	1	0	1
50:	0	1	0	1	0	1	0	1	0	1
60:	1	0	1	0	1	1	2	3	3	2
70:	3	3	4	3	4	4	4	4	5	5
80:	4	5	5	7	6	6	7	6	8	8
90:	8	9	8	10	10	9	10	11	12	11
100:	12	12	14	14	14	14	14	16	15	15
110:	16	16	18	18	18	18	19	20	21	20
120:	21	23	23	23	23	25	26	26	27	27
130:	29	29	29	31	32	32	32	33	36	35
140:	36	35	33	34	34	35	37	37	38	37
150:	40	41	41	41	43	44	44	45	47	48
160:	47	50	51	51	51	55	55	55	57	59
170:	59	60	55	55	56	56	59	59	59	62
180:	63	64	64	67	68	68	70	72	72	74
190:	75	77	77	81	80	82	85	86	87	83
200:	83	83	86	88	88	90	92	93	94	97
210:	97	99	101	102	104	105	107	108	111	112
220:	113	115	117	111	107	108	110	111	112	115
230:	116	116	120	120	122	125	125	128	130	131
240:	134	135	137	140	141	139	135	137	139	141
250:	142	146	146	149	150	152	155	156	159	160
260:	162	165	166	168	170	170	158	159	161	163
270:	165	167	168	171	172	174	177	178	180	183
280:	184	187	188	191	187	182	184	186	188	190
290:	193	194	196	199	201	203	206	208	210	212
300:	214	216	200	203	205	207	209	211	215	216
310:	220	222	224	227	230	232	236	238	232	232
320:	236	238	241	244	248	249	253	256	259	261
330:	265	268	270	260	254	257	259	263	265	269
340:	273	277	280	285	290	293	299	300	300	304
350:	308	314	317	323	326	330	335	337	343	347
360:	349	334	331	334	337	340	344	348	352	356
370:	359	364	368	372	363	366	370	374	378	382
380:	385	389	393	397	400	404	390	386	390	393
390:	396	398	402	406	408	412	416	415	406	409
400:	413	416	419	422	425	428	431	435	435	424
410:	427	429	431	433	435	437	439	440	441	429
420:	419	420	420	422	422	424	423	425	426	422
430:	415	418	418	419	420	421	422	422	422	412
440:	407	407	408	406	406	406	406	404	399	387
450:	387	385	384	383	382	381	380	374	365	364
460:	364	362	360	359	358	356	348	343	341	341
470:	339	339	338	336	336	332	331	329	327	325
480:	322	318	311	288	284	281	277	274	272	269
490:	269	270	270	267	266	265	261	260	249	241
500:	239	235	231	228	225	219	211	209	207	203
510:	201	199	196	196	193	191	189	187	185	181
520:	174	170	167	164	160	156	150	143	138	134
530:	131	126	122	117	114	110	108	104	101	99
540:	98	96	92	91	88	86	80	78	75	72
550:	70	68	66	65	61	60	58	57	56	55
560:	52	49	48	45	41	39	37	34	33	33
570:	33	29	29	27	24	21	19	18	16	15
580:	19	19	19	17	17	15	14	13	10	10

590:	10	11	10	8	8	8	8	6	7	6
600:	6	9	8	8	9	9	5	5	4	4
610:	4	5	6	7	9	6	7	7	7	7
620:	5	6	4	3	4	5	5	6	4	4
630:	5	6	6	5	6	4	2	4	4	6
640:	6	6	5	5	2	2	3	4	4	4
650:	4	4	4	3	2	2	4	4	4	4
660:	8	6	7	6	8	5	4	3	1	2
670:	4	6	4	4	5	4	3	2	7	6
680:	6	6	8	5	5	6	6	5	4	5
690:	5	6	7	8	7	5	2	2	4	5
700:	3	4	5	3	3	5	4	3	5	4
710:	3	4	6	6	8	7	4	3	1	2
720:	3	4	0	4	5	3	6	8	5	6
730:	5	6	5	6	5	2	1	4	5	2
740:	3	4	3	4	7	3	6	7	6	5
750:	2	3	3	3	8	3	3	3	3	6
760:	6	4	3	6	4	1	5	7	8	7
770:	5	5	1	5	7	7	4	3	4	7
780:	4	5	5	1	6	3	7	5	4	3
790:	7	8	5	0	4	5	3	5	3	3
800:	4	7	9	4	2	4	4	4	7	1
810:	4	0	2	0	4	3	7	7	3	3
820:	6	1	5	4	7	4	7	5	3	4
830:	5	4	4	7	6	4	4	6	3	4
840:	1	4	0	3	1	5	4	3	2	5
850:	7	3	3	1	4	9	1	1	1	6
860:	5	7	2	0	3	4	2	4	0	3
870:	4	2	4	2	2	4	2	3	5	3
880:	4	5	5	6	5	4	4	3	3	3
890:	2	6	4	0	3	5	6	3	6	6
900:	0	2	4	2	2	8	6	4	3	7
910:	4	6	10	3	0	3	6	6	2	2
920:	1	4	2	3	1	1	3	3	3	3
930:	6	4	5	6	6	3	0	5	3	2
940:	2	3	1	1	2	6	6	9	7	5
950:	3	10	5	7	9	8	8	13	7	9
960:	5	7	10	13	11	9	8	10	12	6
970:	10	12	17	12	9	20	13	8	13	11
980:	8	6	14	10	9	12	10	14	13	10
990:	10	10	4	9	11	13	326	0	0	0
1000:	0									

Total Counts: 98426