PARAGON ANALYTICS
Radiochemistry Data Package

Section 7

STANDARDS TRACEABILITY DOCUMENTS

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

PAID 0718 EW
recd 8-205-03

66352-307

1.0 Liter Solid in 138G GA-MA Beaker

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solution sources. The Am-241 was calibrated by 4 pi alpha liquid scintillation counting. All other radionuclides were calibrated using a germanium gamma spectrometer system. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Rev. 1, February, 1979.

US Patent 4,430,258; UK Patent GB2,149,194B; CA Patent 1,196,776.
Density of solid matrix 1.15 g/cc.

Calibration date: July 1, 2003 12:00 EST

ISOTOPE	GAMMA-RAY ENERGY	HALF-LIFE		GAMMA-RAYS PER SECOND	TOTAL UNCERTAINTY %
Am-241	59.5	432	y	1304	3.0
Cd-109	88	462.6	d	1862	3.3
Co-57	122	271.79	d	1032	2.8
Ce-139	166	137.6	d	1419	2.8
Hg-203	279	46.61	d	3194	2.7
Sn-113	392	115.1	d	1960	2.6
Cs-137	662	30.07	y	1260	3.0
Y-88	898	106.6	d	5060	2.6
Co-60	1173	5.2714	y	2402	2.7
Co-60	1332	5.2714	y	2427	2.6
Y-88	1836	106.6	d	5287	2.6

P O NUMBER EW060303, Item 2

SOURCE PREPARED BY: M. D. Currie
M. D. Currie, Radiochemist

Q A APPROVED: M. Mty 8-1-03

This standard will expire one year after the calibration date.

000081

PARAGON ANALYTICS
Radiochemistry Data Package

Section 8

CHAIN OF CUSTODY

Paragon Analytics

Sample Number(s) Cross-Reference Table

Paragon OrderNum: 0605177
Client Name: Cordilleran Compliance Services, Inc.
Client Project Name: Battlement Mesa
Client Project Number: E04243
Client PO Number:

Client Sample	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
BM3613 PW	0605177-1		WATER	17-May-06	8:58
BM2642	0605177-2		WATER	20-May-06	12:15

Date Printed: Thursday, May 25, 2006

Paragon Analytics
A Division of DataChem Laboratories, Inc.

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

Accession Number (LAB ID) 0605177 ~~0506177~~ jw 5/24/06

Chain-of-Custody Date _____ Page ___ of ___ Originator: Retain pink copy

Project Name / No.: PRESCO/E04243 Sampler(s): _____ Turnaround (circle one): Standard or Rush (Due _____) Dispose: Date _____ or Return to Client

Report To: James Hix
Phone: 303.237.2072
Fax: 303 237 2659
E-mail: jameshix@cordcomp.com
Company: Cordilleran Compliance Services
Address: 5550 Marshall street
Arvada, CO 80002

Circle method (right); provide additional information as needed (comments).

Sample ID	Date	Time *	Lab ID	Matrix	Preservative (indicate type)	No. of Containers	VOCs SW8260B E624 E524.2	BTEX (only) SW8021B	SVOCs SW8270C E625	OC Pesticides SW8081A E608	PCBs SW8082 E608	Herbicides SW8151A	Explosives SW8330	TCLP Organics SW1311 SW8260B 8270C 8081A 8151A	TCLP Metals SW1311 SW6010B SW7471	Total Metals by ICP SW6010B 7470 7471 E200 ILMO	Dissolved Metals by ICP SW6010B 7470 E200 ILMO	Total Metals by ICP/MS SW6020 E200.8 ILMO	Dissolved Metals by ICP/MS SW6020 E200.8 ILMO -	Hexavalent Chromium SW7196A Alkaline Digest? Y / N	Inorganic Anions SW9056 E300.0 (specify in comments)	Solids: Total E160.3 TDS E160.1 TSS E160.2	pH SW9040B SW9045C	TPH GRO DRO SW8015B (both)	Gross Alpha / Beta SW9310 E900.0	Actinides by Paragon SOP Pu / U / Am / Th / Cm / ___	Tritium E906.0	Total Alpha-Emitting Radium SW9315 E903.0	Radium 226 E903.1 Radium 228 SW9320 E904.0	Strontium 89 D5811-00 Strontium 90 D5811-00	Gamma Isotopes E901.1
BM2642	5/2/06	1215	(2)			2																				✓			✓

5/23/06

* Time Zone: EST CST MST PST Matrix Key: O = oil, S = soil NS = non-soil solid, W = water, L = liquid, E = extract, F = filter

Comments:

Form 202r5.xls (4/6/04)

Relinquished By: (1)	Relinquished By: (2)
Signature _____	Signature _____
Printed Name Travis Marshall	Printed Name _____
Date 5/23/06 Time 1630	Date _____ Time _____
Company Cord. Illeran	Company _____
Received By: (1)	**Received By:** (2)
Signature _____	Signature _____
Printed Name J. Kozlowski	Printed Name _____
Date 5/24/06 Time 0925	Date _____ Time _____
Company Paragon	Company _____

000084

Paragon Analytics
A Division of DataChem Laboratories, Inc.

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

Accession Number (LAB ID) 0605177

Chain-of-Custody Date ___ ___ Page __ of __

Originator: Retain pink copy

Project Name / No.: _ ___ _ ___ ___ _ Sampler(s): _ ___ ___ ___ Turnaround (circle one): Standard or Rush (Due _ ___ ___ _) Dispose: Date ___ or Return to Client

Report To: James Hix
Phone: 303.237.2072
Fax: 303.237.2659
E-mail: jameshix@cordcomp.com
Company: Cordilleran Compliance Services
Address: 5550 Marshall Street
Arvada, CO 80002

Circle method (right); provide additional information as needed (comments).

Sample ID	Date	Time *	Lab ID	Matrix	Preservative (indicate type)	No. of Containers	VOCs SW8260B E624 E524.2	BTEX (only) SW8021B	SVOCs SW8270C E625	OC Pesticides SW8081A E608	PCBs SW8082 E608	Herbicides SW8151A	Explosives SW8330	TCLP Organics SW1311 SW8260B 8270C 8081A 8151A	TCLP Metals SW1311 SW6010B SW7471	Total Metals by ICP SW6010B 7470 7471 E200 ILMO	Dissolved Metals by ICP SW6010B 7470 E200 ILMO	Total Metals by ICP/MS SW6020 E200.8 ILMO	Dissolved Metals by ICP/MS SW6020 E200.8 ILMO	Hexavalent Chromium SW7196A Alkaline Digest? Y / N	Inorganic Anions SW9056 E300.0 (specify in comments)	Solids: Total E160.3 TDS E160.1 TSS E160.2	pH SW9040B SW9045C	TPH GRO DRO SW8015B (both)	Gross Alpha / Beta SW9310 E900.0	Actinides by Paragon SOP Pu / U / Am / Th / Cm /	Tritium E906.0	Total Alpha-Emitting Radium SW9315 E903.0	Radium 226 E903.1 SW9320 E904.0	Strontium 89 D5811-00	Gamma Isotopes E901.1
BM3613 PW	5/17/06	858	(1)	W	HNO3 Ice	2																					✓				✓

* Time Zone: EST CST MST PST Matrix Key: O = oil, S = soil, NS = non-soil solid, W = water, L = liquid, E = extract F = filter

Comments:

Form 202r5.xls (4/6/04)

Relinquished By: (1)	Relinquished By: (2)
Signature James Hix	Signature
Printed Name James Hix	Printed Name
Date 05/12/06 Time	Date Time
Company Cordilleran Compliance	Company
Received By: (1)	**Received By:** (2)
Signature Sheri Lafferty	Signature
Printed Name Sheri Lafferty	Printed Name
Date 5.18.06 Time 0925	Date Time
Company paragon	Company

080085

CONDITION OF SAMPLE UPON RECEIPT FORM **Paragon Analytics**

Client: Cardi Heran Workorder No: 0605177

Project Manager: _____ Initials: _____ Date: _____

1. Does this project require any **special handling** in addition to standard Paragon procedures?		YES	(NO)
2. Are custody **seals** on **shipping containers** intact?	NONE	(YES)	NO
3. Are Custody seals on **sample containers** intact?	(NONE)	YES	NO
4. Is there a **COC (Chain-of-Custody) present** or other representative documents?		(YES)	NO
5. Are the **COC and bottle labels complete and legible?**		(YES)	NO
6. Is the **COC in agreement** with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		(YES)	NO
7. Were **airbills / shipping documents** present and/or removable?	DROP OFF	(YES)	NO
8. Are all aqueous samples **requiring preservation preserved correctly?** (excluding volatiles)	N/A	YES	(NO) △
9. Are all aqueous **non-preserved samples pH 4-9?**	N/A	(YES)	NO
10. Is there **sufficient sample** for the requested analyses?		YES	(NO) ★
11. Were all samples placed in the **proper containers** for the requested analyses?		(YES)	NO
12. Are all samples within **holding times** for the requested analyses?		(YES)	NO
13. Were all sample containers received **intact**? (not broken or leaking, etc.)		(YES)	NO
14. Are all samples requiring no headspace (VOC, GRO, Rx CN/S, radon), headspace free? **Size of bubble:** ____ < green pea ____ > green pea	(N/A)	YES	NO
15. 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.)	(N/A)	YES	NO
16. Were the samples **shipped on ice**?		(YES)	NO
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: (#2) #4	RAD ONLY	(YES)	NO

Cooler #:	1
Temperature (°C):	4.4
No. of custody seals on cooler:	2
DOT Survey/ Acceptance Information — External µR/hr reading:	14
DOT Survey/ Acceptance Information — Background µR/hr reading:	12

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? (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.

★ possible limited volume for tritium only 25ml recived Volume OK. /L

△ 1 liter Poly for RAD ANALYSIS recieved at PH 7 added 4ml HNO3 lot #B19075 @ 1000 5.18.06 final ph 1.6 SL

v. St. Sed in Y ...include?

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

Project Manager Signature / Date: 5/18/06

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

Form 201r19.xls (1/13/06)

000086

FedEx Express **US Airbill** FedEx Tracking Number 8573 0923 5636

Recipient's Copy

1 From

Date 3/17/06 [redacted]

Sender's Name James Hix Phone 303 ... 3072

Company [illegible]

Address 5??? Marshall Street Dept/Floor/Suite/Room

City Arvada State CO ZIP 80002

2 Your Internal Billing Reference E04243

3 To

Recipient's Name [illegible] Phone 800 443-1511 / 970 490-1511

Company Paragon Analytics

Recipient's Address 225 Commerce Drive Dept/Floor/Suite/Room

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address

To request a package be held at a specific FedEx location, print FedEx address here.

City Fort Collins State CO ZIP [illegible]

8573 0923 5636

4a Express Package Service *Packages up to 150 lbs.*

- [x] FedEx Priority Overnight — Next business morning.* Friday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- [ ] FedEx Standard Overnight — Next business afternoon.* Saturday Delivery NOT available.
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.* Saturday Delivery NOT available.
- [ ] FedEx 2Day — Second business day.* Thursday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- [ ] FedEx Express Saver — Third business day.* Saturday Delivery NOT available.

FedEx Envelope rate not available. Minimum charge: One-pound rate. * To most locations.

4.9

4b Express Freight Service *Packages over 150 lbs.*

- [ ] FedEx 1Day Freight* — Next business day.** Friday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- [ ] FedEx 2Day Freight — Second business day.** Thursday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- [ ] FedEx 3Day Freight — Third business day.** Saturday Delivery NOT available.

* Call for Confirmation. ** To most locations.

5 Packaging

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.
- [ ] FedEx Box
- [ ] FedEx Tube
- [x] Other

* Declared value limit $500.

6 Special Handling — Include FedEx address in Section 3.

- [ ] SATURDAY Delivery — Not available for FedEx Standard Overnight, FedEx First Overnight, FedEx Express Saver, or FedEx 3Day Freight.
- [ ] HOLD Weekday at FedEx Location — Not available for FedEx First Overnight.
- [ ] HOLD Saturday at FedEx Location — Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- [x] No
- [ ] Yes — As per attached Shipper's Declaration.
- [ ] Yes — Shipper's Declaration not required.
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging. [ ] Cargo Aircraft Only

7 Payment Bill to: Enter FedEx Acct. No. or Credit Card No. below. Obtain Recip. Acct. No. [ ]

- [ ] Sender — Acct. No. in Section 1 will be billed.
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

[redacted]

Total Packages	Total Weight	Total Declared Value†	Total Charges
1	22	$ .00	

Credit Card Auth.

†Our liability is limited to $100 unless you declare a higher value. See back for details.

8 NEW Residential Delivery Signature Options If you require a signature, check Direct or Indirect.

- [ ] No Signature Required — Package may be left without obtaining a signature for delivery.
- [ ] Direct Signature — Anyone at recipient's address may sign for delivery. *Fee applies.*
- [ ] Indirect Signature — If no one is available at recipient's address, anyone at a neighboring address may sign for delivery. *Fee applies.*

520

Rev. Date 8/05 • Part #158281 • ©1994–2005 FedEx • PRINTED IN U.S.A. SRY

000087

CONDITION OF SAMPLE UPON RECEIPT FORM **Paragon Analytics**

Client: Cordilleran Workorder No: ~~0605177~~ 0605177

Project Manager: LS Initials: JLR Date: 5/24/06

1.	Does this project require any **special handling** in addition to standard Paragon procedures?		YES	(NO)
2.	Are custody **seals** on **shipping containers** intact?	(NONE)	YES	NO
3	Are Custody seals on **sample containers** intact?	(NONE)	YES	NO
4.	Is there a **COC (Chain-of-Custody) present** or other representative documents?		(YES)	NO
5.	Are the **COC and bottle labels complete and legible**?		(YES)	NO
6.	Is the **COC in agreement** with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		YES	(NO) 2.
7	Were **airbills / shipping documents** present and/or removable?	DROP OFF	(YES)	NO
8.	Are all aqueous **samples requiring preservation preserved correctly?** (excluding volatiles)	N/A	YES	(NO) 1.
9.	Are all aqueous **non-preserved samples pH 4-9**?	N/A	(YES)	NO
10.	Is there **sufficient sample** for the requested analyses?		(YES)	NO
11.	Were all samples placed in the **proper containers** for the requested analyses?		(YES)	NO
12.	Are all samples within **holding times** for the requested analyses?		(YES)	NO
13.	Were all sample containers received **intact**? (not broken or leaking, etc.)		(YES)	NO
14.	Are all samples requiring no headspace (VOC, GRO, Rx CN/S, radon), headspace free? **Size of bubble**: ____ < green pea ____ > green pea	(N/A)	YES	NO
15.	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.)	(N/A)	YES	NO
16.	Were the samples **shipped on ice**?		(YES)	NO
17.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 (#4)	RAD ONLY	(YES)	NO

Cooler #:	1
Temperature (°C):	1.8
No. of custody seals on cooler:	0
DOT Survey/ Acceptance Information — External µR/hr reading:	12
DOT Survey/ Acceptance Information — Background µR/hr reading:	12

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? (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.

add on - sample # 2

1. See page 2
2. Bottle sent for tritium labelled as Gamma
Preserved bottle sent for Gamma labelled as tritium.

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

Project Manager Signature / Date: 5/25/06

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

000088

Form 201r19.xls (1/13/06)

CONDITION OF SAMPLE UPON RECEIPT FORM **Paragon Analytics**

Client: Cordilleran Workorder No: 0605177 ~~0505177~~ JM 5/24/06

Project Manager: LS Initials: JM Date: 5/24/06

Additional Information:

N/A

Was the laboratory directed to proceed with the analysis of any samples yielding the presence of residual chlorine? YES / NO / NA

NOTE:

No pH adjustments shall be made without prior consent of Project Manager. After pH adjustments, hold metals and radchem samples ≥ 16 hrs. before analysis.

Was the pH of any sample adjusted by the laboratory? **YES** (See Table below) / **NO**

pH Excursion:

Paragon Sample ID	Client Sample ID	Initial pH	Final pH	Reagent Used	Volume Added (mL)	Lot No. of Reagent	Requested Analysis	Initials / Date / Time
0605177-2-2	BM2642	7	1.6	HNO_3	3.0	B19075	Gamma	JM 5/24/06 1050

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

Project Manager Signature / Date: 5/25

0605177
~~0506177~~
5/24/06

ORIGIN ID: GJTA (97) 263-7800
CANDY SMITH
CORDILLERAN COMPLICE SVCS, INC
826 21 ROAD

GRAND JUNCTION, CO 1505
UNITED STATES US

Ship Date: 23MAY06
Actual Wgt: 25.0 LB MAN
System#: 144334/CAFE2285
Account: S 235727234

TO (800) 443-1511

PARAGON ANALYTICS
225 COMMERCE RIVE

FORT COLLINS, C(80524

FedEx Express

E

CLS091905/08/15

REF: E04243

12
1.8

Delivery Address Barcode

BILL SENDER

PRIORITY OVRNIGHT

TRK# 7290 1771 5077

Form 0201

WED
Deliver By:
24MAY06

DEN AA

:80524 -CO-US 72 FTCA

Part # 156148-434 NRIT 9-05

PARAGON ANALYTICS
Radiochemistry Data Package

Section 9

ADDITIONAL SUPPORTING DOCUMENTATION

9

Gamma Spectroscopy

Initial Calibration Standards Traceability

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

RSO# 781
Rec'd 1/24/05
DCB

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

69747-307

500 Grams of Sand in 16 Ounce PP MRP Jar

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solution sources. The Am-241 was calibrated by 4 pi alpha liquid scintillation counting. All other radionuclides were calibrated using a germanium gamma spectrometer system. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Rev. 1, February, 1979.

Calibration date: January 1, 2005 12:00 EST

ISOTOPE	GAMMA-RAY ENERGY	HALF-LIFE		GAMMA-RAYS PER SECOND	TOTAL UNCERTAINTY %
Am-241	59.5	432	y	1375	3.0
Cd-109	88	462.6	d	1874	3.3
Co-57	122	271.79	d	1025	3.0
Ce-139	166	137.6	d	1450	2.8
Hg-203	279	46.61	d	3334	2.7
Sn-113	392	115.1	d	1986	2.6
Cs-137	662	30.07	y	1280	3.0
Y-88	898	106.6	d	5053	2.6
Co-60	1173	5.2714	y	2419	2.7
Co-60	1332	5.2714	y	2440	2.6
Y-88	1836	106.6	d	5280	2.6

275 mL of customer supplied sand (to customer's mark).
P O NUMBER 71239, 11/18/04, Rel., Item 2

SOURCE PREPARED BY: M. D. Currie
M. D. Currie, Radiochemist

Q A APPROVED: 1-14-05

This standard will expire one year after the calibration date.

000093

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

RSO # 798
Rec'd 8/5/05

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

71035A-307

1.0 Liter Solid in 138G GA-MA Beaker

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solution sources. The Am-241 was calibrated by 4 pi alpha liquid scintillation counting. All other radionuclides were calibrated using a germanium gamma spectrometer system. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Rev. 1, February, 1979.

US Patent 4,430,258; UK Patent GB2,149,194B; CA Patent 1,196,776.
Density of solid matrix 1.15 g/cc.

Calibration date: July 1, 2005 12:00 EST

ISOTOPE	GAMMA-RAY ENERGY	HALF-LIFE		GAMMA-RAYS PER SECOND	TOTAL UNCERTAINTY %
Am-241	59.5	432	y	1353	3.0
Cd-109	88	462.6	d	1912	3.3
Co-57	122	271.79	d	1048	3.0
Ce-139	166	137.6	d	1426	2.8
Hg-203	279	46.61	d	3260	2.7
Sn-113	392	115.1	d	2038	2.6
Cs-137	662	30.07	y	1268	3.0
Y-88	898	106.6	d	5008	2.6
Co-60	1173	5.2714	y	2475	2.7
Co-60	1332	5.2714	y	2499	2.6
Y-88	1836	106.6	d	5224	2.6

P O NUMBER 71239, Rel. 5/20/05, Item 1

SOURCE PREPARED BY: M Tarkaeva for
M. D. Currie, Radiochemist

Q A APPROVED: M.M. 8-1-05

This standard will expire one year after the calibration date.

000094

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

RSO#817
Recd 3/10/06
803

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

72391-307

Sand in 16 Ounce PP MRP Jar

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solution sources. The Am-241 was calibrated by 4 pi alpha liquid scintillation counting. All other radionuclides were calibrated using a germanium gamma spectrometer system. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Rev. 1, February, 1979.

Calibration date: January 1, 2006 12:00 EST

ISOTOPE	GAMMA-RAY ENERGY	HALF-LIFE		GAMMA-RAYS PER SECOND	TOTAL UNCERTAINTY %
Am-241	59.5	432	y	1329	3.0
Cd-109	88	462.6	d	1875	3.3
Co-57	122	271.79	d	996.0	3.0
Ce-139	166	137.6	d	1400	2.8
Hg-203	279	46.61	d	3215	2.7
Sn-113	392	115.1	d	1939	2.6
Cs-137	662	30.07	y	1252	3.0
Y-88	898	106.6	d	4692	2.6
Co-60	1173	5.2714	y	2378	2.7
Co-60	1332	5.2714	y	2399	2.6
Y-88	1836	106.6	d	4875	2.6

500 grams/290 mL of customer supplied sand.
P O NUMBER 71239, Rev., 2/3/06 REL., Item 3

SOURCE PREPARED BY: M Taskaeva
M. Taskaeva, Radiochemist

Q A APPROVED: 03-07-2006

This standard will expire one year after the calibration date.

061202D02.SPC Analyzed by MC

****

SEEKER G A M M A A N A L Y S I S R E S U L T S PS Version 1.8.4

Paragon Analytics, Div. of DataChem Lab
GammaScan

****

Geo 13 / Solid

Sample ID: 0613003-2 FWHM CAL (817)

Sampling Start: 01/01/2006 12:00:00	Counting Start: 05/16/2006 20:43:28
Sampling Stop: 01/01/2006 12:00:00	Decay Time. . . . . 3.25E+003 Hrs
Buildup Time. . . . . 0.00E+000 Hrs	Live Time . . . . . 2700 Sec
Sample Size . . . . . 5.00E+002 g	Real Time . . . . . 2811 Sec
Collection Efficiency 1.0000	Spc. File 061202D02.SPC

Detector #: 2 (Detector 2)

Energy(keV) = -0.77 + 0.501*Ch + 3.48E-08*Ch^2 + 0.00E+00*Ch^3 05/16/2006
FWHM(keV) = 0.65 + 0.009*En + 1.05E-03*En^2 + 0.00E+00*En^3 03/27/2006
Where En = Sqrt(Energy in keV)

Search Sensitivity: 1.00 | Sigma Multiplier: 2.00 | Search Start/End: 80/4000

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)		FLAG
1	59.52	120.43	15714	364	217	9518	0.81	a	
2	70.81	142.98	389	247	201	8923	0.68	a	
3	72.86	147.07	779	250	201	8923	0.72	b	
4	82.54	166.41	2090	451	363	19473	1.54	a	HiResid Wide Pk
5	85.06	171.44	4401	687	554	32455	2.48	b	HiResid
6	87.96	177.24	72878	609	232	10818	0.83	c	HiResid
7	122.09	245.41	46605	523	243	10903	0.92	a	
8	136.52	274.22	6040	319	229	9690	0.96	a	
9	165.85	332.82	48502	510	212	8297	0.97	a	
10	255.14	511.16	1549	248	194	6400	1.12	a	
11	279.19	559.20	22194	369	179	5488	1.11	a	
12	391.73	783.97	34450	415	153	4302	1.27	a	
13	511.02	1022.22	730	230	184	4986	2.04	a	
14	565.63	1131.29	61	96	78	1506	0.73	a	NET< CL
15	661.72	1323.19	33826	408	145	3865	1.62	a	
16	813.63	1626.56	707	144	110	2366	1.44	a	HiResid
17	821.66	1642.61	222	190	155	3681	2.27	b	HiResid
18	898.12	1795.31	39719	432	136	3430	1.93	a	
19	1173.34	2344.89	38827	414	104	1854	2.26	a	
20	1325.10	2647.92	1131	168	126	1863	4.33	a	Wide Pk
21	1332.56	2662.82	35672	390	81	1075	2.50	b	
22	1836.13	3668.26	24519	319	48	326	3.10	a	HiResid

000096

061201D02.SPC Analyzed by

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SEEKER C A L I B R A T I O N R E S U L T S Version 2.0.4

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Sample ID: DAILY CHECK
Stds. Match Tolerance: 2.00 keV

Detector Number: 02 Calibration Date. . . 05/16/2006 20:14:57

Energy(keV) = -0.77 + 0.501*Ch + 3.48e-08*Ch^2 + 0.00e+00*Ch^3

Pk. #	Measured Centroid	Calculated Energy	Energy (keV)	% Difference
1	120.40	59.51	59.50	0.01
2	1322.99	661.62	661.64	-0.00
3	2344.74	1173.26	1173.21	0.00
4	2662.59	1332.45	1332.48	-0.00

Calibration Results Saved.

061202D02.SPC Analyzed by

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SEEKER C A L I B R A T I O N R E S U L T S Version 2.0.4

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Sample ID: 0613003-2 FWHM CAL (817)
Stds. Match Tolerance: 2.00 keV

Detector Number: 02 Calibration Date. . . 05/16/2006 20:43:28

FWHM(keV) = 0.69 + 0.006*En + 1.18e-03*En^2 + 0.00e+00*En^3
(Where En = SQR(Energy in keV))

Pk. #	Energy (kev)	Measured FWHM(keV)	% Diff.	Calculated FWHM(keV)	% Diff.	Prev.Calc. FWHM(kev)
1	59.50	0.808	-0.03	0.808	-2.65	0.787
2	88.04	0.833	2.18	0.851	-2.33	0.832
3	122.06	0.922	-2.25	0.901	-2.11	0.883
4	165.85	0.972	-0.89	0.964	-1.97	0.945
5	279.00	1.112	0.75	1.120	-1.95	1.099
6	391.68	1.269	0.18	1.271	-2.13	1.245
7	661.64	1.622	0.17	1.625	-2.73	1.581
8	898.02	1.929	-0.04	1.928	-3.25	1.868
9	1173.21	2.264	0.59	2.278	-3.79	2.195
10	1332.48	2.500	-0.85	2.479	-4.07	2.382
11	1836.01	3.104	0.18	3.109	-4.81	2.967

Calibration Results Saved.

051845D07.SPC Analyzed by MC

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SEEKER G A M M A A N A L Y S I S R E S U L T S PS Version 1.8.4

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Geo 13 / Solid

Sample ID: 0515007-7 FWHM (781)

Sampling Start: 01/01/2005 12:00:00	Counting Start: 12/04/2005 11:27:46
Sampling Stop: 01/01/2005 12:00:00	Decay Time. . . . . 8.09E+003 Hrs
Buildup Time. . . . . 0.00E+000 Hrs	Live Time . . . . . 3600 Sec
Sample Size . . . . . 5.00E+002 g	Real Time . . . . . 3736 Sec
Collection Efficiency 1.0000	Spc. File 051845D07.SPC

Detector #: 7 (Detector 7)

Energy(keV) = -2.30 + 0.501*Ch + 1.97E-07*Ch^2 + 0.00E+00*Ch^3 12/04/2005
FWHM(keV) = 0.72 + 0.010*En + 6.77E-04*En^2 + 0.00E+00*En^3 12/03/2004
Where En = Sqrt(Energy in keV)

Search Sensitivity: 1.00 | Sigma Multiplier: 2.00 | Search Start/End: 80/4000

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)		FLAG
1	49.37	103.20	2925	539	435	27910	1.45	a	Wide Pk
2	59.49	123.41	107180	737	279	15705	0.87	a	
3	66.50	137.41	1673	579	472	27416	1.91	a	Wide Pk
4	68.37	141.14	1070	538	439	25131	1.85	b	
5	88.01	180.36	101933	719	271	13588	0.90	a	
6	121.97	248.19	38299	441	167	5642	0.89	a	HiResid
7	136.37	276.95	4584	248	171	5416	0.93	a	
8	165.78	335.67	20364	357	176	5270	1.07	a	HiResid
9	168.45	341.01	10	117	96	2259	0.48	b	NET< CL HiResid
10	199.08	402.16	147	164	134	3598	0.78	a	
11	255.09	513.99	435	188	151	3897	1.07	a	
12	262.65	529.09	90	142	115	2683	0.82	a	NET< CL
13	279.08	561.91	1353	186	141	3380	1.14	a	
14	355.31	714.08	78	139	114	2385	0.92	a	NET< CL
15	391.57	786.47	10446	247	114	2565	1.22	a	
16	510.90	1024.65	262	198	161	3645	2.14	a	Wide Pk
17	661.61	1325.40	31838	380	107	1998	1.43	a	
18	814.15	1629.73	210	111	88	1591	1.24	a	
19	897.93	1796.84	10661	248	113	2367	1.64	a	
20	1173.18	2345.74	34021	379	72	995	1.88	a	
21	1325.85	2650.09	366	141	111	1146	5.93	a	HiResid Wide Pk
22	1332.40	2663.16	30640	354	45	382	2.01	b	HiResid

000099

051845D07.SPC Analyzed by

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
23	1835.95	3666.45	6314	161	22	79	2.44	a

051845D07.SPC Analyzed by

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SEEKER C A L I B R A T I O N R E S U L T S Version 2.0.4

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Sample ID: 0515007-7 FWHM (781)
Stds. Match Tolerance: 2.00 keV

Detector Number: 07 Calibration Date. . . 12/04/2005 11:27:46

FWHM(keV) = 0.77 + 0.008*En + 7.04e-04*En^2 + 0.00e+00*En^3
(Where En = SQR(Energy in keV))

Pk. #	Energy (kev)	Measured FWHM(keV)	% Diff.	Calculated FWHM(keV)	% Diff.	Prev.Calc. FWHM(kev)
1	59.50	0.871	0.98	0.879	-4.90	0.838
2	88.04	0.901	1.37	0.913	-4.40	0.875
3	122.06	0.894	6.06	0.951	-3.94	0.915
4	165.85	1.072	-7.46	0.997	-3.49	0.964
5	279.00	1.144	-3.20	1.109	-2.68	1.080
6	391.68	1.217	-0.29	1.213	-2.17	1.188
7	661.64	1.431	1.51	1.453	-1.47	1.432
8	898.02	1.636	1.10	1.654	-1.15	1.635
9	1173.21	1.877	0.36	1.883	-0.94	1.866
10	1332.48	2.012	0.13	2.014	-0.86	1.997
11	1836.01	2.436	-0.62	2.421	-0.74	2.403

Calibration Results Saved.

052043D08.SPC Analyzed by MC

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SEEKER G A M M A A N A L Y S I S R E S U L T S PS Version 1.8.4

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Geo 1 / Water

Sample ID: 0515007-8 FWHM CAL (798)

Sampling Start: 07/01/2005 12:00:00	Counting Start: 12/14/2005 11:17:00
Sampling Stop: 07/01/2005 12:00:00	Decay Time. . . . . 3.98E+003 Hrs
Buildup Time. . . . . 0.00E+000 Hrs	Live Time . . . . . 1800 Sec
Sample Size . . . . . 1.00E+000 L	Real Time . . . . . 1990 Sec
Collection Efficiency 1.0000	Spc. File 052043D08.SPC

Detector #: 8 (Detector 8)

Energy(keV) = -0.68 + 0.501*Ch +-2.75E-07*Ch^2 + 1.18E-10*Ch^3 12/14/2005
FWHM(keV) = 0.67 + 0.017*En + 4.57E-04*En^2 + 0.00E+00*En^3 12/14/2005
Where En = Sqrt(Energy in keV)

Search Sensitivity: 1.00 | Sigma Multiplier: 2.00 | Search Start/End: 80/4000

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)		FLAG
1	49.60	100.43	5270	601	480	31933	1.65	a	Wide Pk
2	59.47	120.16	89027	675	260	13658	0.84	a	
3	67.04	135.28	6497	702	562	33383	2.53	a	HiResid Wide Pk
4	70.40	142.00	4862	583	466	26706	1.91	b	HiResid
5	72.66	146.51	3545	463	368	20030	1.43	c	HiResid
6	88.01	177.16	106828	711	230	10673	0.85	a	HiResid
7	122.02	245.11	49107	489	170	5814	0.88	a	HiResid
8	136.45	273.94	6313	265	175	5650	0.98	a	
9	155.13	311.27	224	232	189	6105	1.15	a	
10	165.86	332.70	38349	440	164	4997	0.95	a	
11	199.20	399.31	873	238	190	5701	1.27	a	
12	203.72	408.34	203	210	171	4989	1.14	b	
13	255.14	511.09	1060	177	136	3407	0.97	a	
14	279.23	559.23	12123	268	126	2919	1.04	a	
15	380.61	761.81	90	106	86	1670	0.81	a	
16	391.76	784.08	25024	343	109	2342	1.16	a	
17	471.35	943.14	95	104	84	1603	0.85	a	
18	510.92	1022.20	465	159	126	2619	1.70	a	
19	661.78	1323.63	27044	353	105	2035	1.38	a	
20	814.01	1627.70	423	109	83	1409	1.28	a	
21	898.11	1795.65	27326	355	107	2110	1.57	a	
22	1173.44	2345.18	30677	363	77	1042	1.74	a	HiResid
23	1190.66	2379.52	31	56	45	464	0.91	a	NET< CL

000102

052043D08.SPC Analyzed by

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)		FLAG
24	1325.61	2648.62	649	113	83	947	3.19	a	HiResid Wide Pk
25	1332.78	2662.93	27817	339	52	521	1.87	b	HiResid
26	1837.57	3667.53	16042	256	30	158	2.20	a	HiResid

052043D08.SPC Analyzed by

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SEEKER C A L I B R A T I O N R E S U L T S Version 2.0.4

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Sample ID: 0515007-8 FWHM CAL (798)
Stds. Match Tolerance: 2.00 keV

Detector Number: 08 Calibration Date. . . 12/14/2005 11:17:00

FWHM(keV) = 0.68 + 0.014*En + 5.09e-04*En^2 + 0.00e+00*En^3
(Where En = SQR(Energy in keV))

Pk. #	Energy (kev)	Measured FWHM(keV)	% Diff.	Calculated FWHM(keV)	% Diff.	Prev.Calc. FWHM(kev)
1	59.50	0.841	-2.56	0.820	1.50	0.833
2	88.04	0.847	1.21	0.857	1.96	0.875
3	122.06	0.883	1.62	0.898	2.34	0.919
4	165.85	0.949	-0.44	0.945	2.67	0.971
5	279.00	1.044	1.04	1.055	3.12	1.090
6	391.68	1.160	-0.37	1.155	3.30	1.195
7	661.64	1.376	-0.11	1.374	3.31	1.422
8	898.02	1.567	-0.89	1.553	3.14	1.604
9	1173.21	1.738	0.81	1.752	2.86	1.804
10	1332.48	1.874	-0.51	1.864	2.69	1.916
11	1836.01	2.204	0.18	2.208	2.14	2.257

Calibration Results Saved.

061207D02.SPC Analyzed by CW

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SEEKER G A M M A A N A L Y S I S R E S U L T S PS Version 1.8.4

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Geo 1 / Water

Sample ID: 0613004-2 GEO 1 EFF CAL (798)

Sampling Start: 07/01/2005 12:00:00	Counting Start: 05/18/2006 09:12:40
Sampling Stop: 07/01/2005 12:00:00	Decay Time. . . . . 7.70E+003 Hrs
Buildup Time. . . . . 0.00E+000 Hrs	Live Time . . . . . 3600 Sec
Sample Size . . . . . 1.00E+000 L	Real Time . . . . . 3704 Sec
Collection Efficiency 1.0000	Spc. File 061207D02.SPC

Detector #: 2 (Detector 2)

Energy(keV)= -0.85 + 0.501*Ch + 0.00E+00*Ch^2 + 0.00E+00*Ch^3 05/18/2006
FWHM(keV) = 0.69 + 0.006*En + 1.18E-03*En^2 + 0.00E+00*En^3 05/16/2006
Where En = Sqrt(Energy in keV)

Search Sensitivity: 1.00 | Sigma Multiplier: 2.00 | Search Start/End: 80/4000

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)		FLAG
1	59.47	120.46	27378	422	215	9358	0.80	a	HiResid
2	69.30	140.11	727	471	385	20558	1.59	a	Wide Pk
3	87.94	177.34	81294	632	224	10141	0.85	a	
4	122.05	245.44	45606	480	179	6492	0.89	a	
5	136.50	274.32	5577	250	165	5456	0.80	a	HiResid
6	165.83	332.89	28936	404	180	5965	0.94	a	
7	255.13	511.23	862	223	177	5336	1.07	a	
8	279.18	559.26	2006	201	148	4041	1.01	a	
9	310.08	620.98	191	209	171	4619	1.34	a	
10	337.03	674.80	112	133	108	2661	0.76	a	
11	391.75	784.10	17389	317	144	3832	1.23	a	
12	511.32	1022.89	485	226	182	4669	2.05	a	
13	513.40	1027.05	52	109	89	1796	0.87	b	NET< CL
14	661.77	1323.35	47362	462	127	2989	1.57	a	
15	813.72	1626.83	267	140	112	2433	1.43	a	
16	898.19	1795.52	18141	315	134	3467	1.86	a	
17	1115.40	2229.34	132	119	96	1955	1.55	a	
18	1173.43	2345.22	52613	474	97	1671	2.20	a	
19	1332.63	2663.19	47485	443	66	726	2.38	a	HiResid
20	1836.11	3668.71	10531	210	37	198	2.97	a	HiResid

000105

061207D02.SPC Analyzed by

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SEEKER B A C K G R O U N D S U B T R A C T R E S U L T S Version 1.8.2

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Background File:. . . . . DET020517.BKG (060517-2 WEEKLY BKGD)

Bkg.File Detector #: 2

BACKGROUND SUBTRACT RESULTS

PK#	ENERGY (keV)	OLD NET COUNTS	OLD UN-CERTAINTY	OLD CR.LEVEL	NEW NET COUNTS	NEW UN-CERTAINTY	NEW CR.LEVEL	FLAG
1	59.47	27378	422	215	27376	422	216	
2	69.30	727	471	385	725	471	385	
3	87.94	81294	632	224	81288	632	224	
4	122.05	45606	480	179	45605	480	180	
10	337.03	112	133	108	109	133	108	
12	511.32	485	226	182	388	226	183	

061207D02.SPC Analyzed by

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SEEKER C A L I B R A T I O N R E S U L T S Version 2.0.4

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Sample ID: 0613004-2 GEO 1 EFF CAL (798)
Stds. Match Tolerance: 2.00 keV

Detector Number: 02 Calibration Date. . . 05/18/2006 09:12:40
Geometry File (D02)(Sh01).EFF ID. Geo 1 Eff Cal
Amount of Std. in Calib. Source: 1.000000 gm

Eff = 1 / [3.02e-03*En^-3.85e+00 + 1.33e+02*En^ 7.85e-01]
(Where En = Energy in MeV)) (Exponential)

Pk. #	Energy (kev)	Measured Efficiency	% Difference	Calculated Efficiency	% Difference	Prev.Calc. Efficiency
1	59.50	5.63e-03	3.56	5.84e-03	0.32	5.86e-03
2	88.04	1.91e-02	-3.95	1.84e-02	-0.41	1.83e-02
3	122.06	2.74e-02	3.19	2.83e-02	0.09	2.83e-02
4	165.85	2.84e-02	-0.48	2.82e-02	0.63	2.84e-02
5	279.00	2.02e-02	0.64	2.04e-02	0.79	2.05e-02
6	391.68	1.64e-02	-4.30	1.57e-02	0.68	1.58e-02
7	661.64	1.06e-02	-1.63	1.04e-02	0.46	1.05e-02
8	898.02	8.10e-03	1.14	8.20e-03	0.33	8.22e-03
9	1173.21	6.63e-03	0.25	6.64e-03	0.21	6.66e-03
10	1332.48	5.92e-03	1.46	6.01e-03	0.15	6.02e-03
11	1836.01	4.51e-03	3.48	4.67e-03	0.01	4.68e-03

Calibration Results Saved.

Geometry 01 Calibration Verification: Gamma Mixed Nuclide Source														
Std. #	718	Detector	2											
				REF DATE :	7/1/2003				count date		5/18/2006			
FROM CALIBRATION CERTIFICATE				FROM ANALYTICS.LIB			EXPECTED ACTIVITY							
					Mass of									# of half-lives
Isotope	KeV	Half Life(y)	Gammas/Sec.	Gamma Fraction:	Standard			DPS	pCi/L	Activity	Recovery	Pass/Fail		explred
Am-241	59.9	432.0000	1304	0.3590	1	L	Am-241	3632.3	98170.6	98900	101%	Pass		0.01
Cd-109	88	1.2666	1862	0.0361			Cd-109	51578.9	1394025.6	1440000	103%	Pass		2.27
Co-57	122	0.7441	1032	0.8551			Co-57	1206.9	32618.3	31900	98%	Pass		3.87
Ce-139	166	0.3768	1419	0.8035			Ce-139	1766.0	47730.4	>5 h-lives	>5 h-lives	>5 h-lives		7.64
Hg-203	279	0.1276	3194	0.7730			Hg-203	4132.0	111674.4	>5 h-lives	>5 h-lives	>5 h-lives		22.58
Sn-113	392	0.3151	1960	0.6490			Sn-113	3020.0	81622.5	>5 h-lives	>5 h-lives	>5 h-lives		9.14
Cs-137	662	30.0000	1260	0.8512			Cs-137	1480.3	40007.1	41100	103%	Pass		0.10
Y-88	898	0.2919	5060	0.9340			Y-88	5417.6	146420.5	>5 h-lives	>5 h-lives	>5 h-lives		9.87
Co-60	1173	5.2714	2402	1.0000			Co-60	2402.0	64918.9	64300	99%	Pass		0.55
Co-60	1332	5.2714	2427	1.0000			Co-60	2427.0	65594.6	64300	98%	Pass		0.55
Y-88	1836	0.2919	5287	0.9938			Y-88	5320.0	143783.3	>5 h-lives	>5 h-lives	>5 h-lives		9.87

061208D02.SPC Analyzed by CW

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SEEKER G A M M A A N A L Y S I S R E S U L T S PS Version 1.8.4

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Geo 1 / Water

Sample ID: 0613004-2A GEO 1 CAL VER (718)

Sampling Start: 07/01/2003 12:00:00	Counting Start: 05/18/2006 10:32:24
Sampling Stop: 07/01/2003 12:00:00	Decay Time. . . . . 2.52E+004 Hrs
Buildup Time. . . . . 0.00E+000 Hrs	Live Time . . . . . 1800 Sec
Sample Size . . . . . 1.00E+000 L	Real Time . . . . . 1829 Sec
Collection Efficiency 1.0000	Spc. File 061208D02.SPC

Detector #: 2 (Detector 2)

Energy(keV)= -0.85 + 0.501*Ch + 0.00E+00*Ch^2 + 0.00E+00*Ch^3 05/18/2006
FWHM(keV) = 0.69 + 0.006*En + 1.18E-03*En^2 + 0.00E+00*En^3 05/16/2006
Where En = Sqrt(Energy in keV)

Search Sensitivity: 1.00 | Sigma Multiplier: 2.00 | Search Start/End: 80/4000

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)		FLAG
1	42.76	87.09	92	115	93	1925	0.71	a	NET< CL
2	59.48	120.49	13766	274	116	2693	0.83	a	
3	66.05	133.61	95	87	69	1189	0.41	a	
4	87.93	177.31	13237	261	101	2052	0.83	a	
5	122.06	245.46	3486	157	85	1471	0.83	a	
6	136.40	274.10	473	125	96	1720	0.95	a	
7	165.84	332.91	358	119	92	1577	1.00	a	
8	175.42	352.04	76	98	79	1262	0.83	a	NET< CL
9	194.02	389.18	93	102	83	1382	0.80	a	
10	310.09	621.00	7	75	61	834	0.58	a	NET< CL
11	318.89	638.57	69	79	64	918	0.74	a	
12	343.65	688.02	40	87	71	1070	1.04	a	NET< CL
13	353.24	707.17	73	87	70	1046	0.99	a	
14	367.64	735.93	45	64	52	657	0.62	a	NET< CL
15	391.82	784.22	151	107	85	1350	1.34	a	
16	661.73	1323.28	22741	313	70	894	1.58	a	
17	762.31	1524.16	53	99	81	1050	2.21	a	NET< CL
18	1173.35	2345.07	19174	284	53	498	2.06	a	HiResid
19	1332.58	2663.08	17943	270	28	133	2.39	a	
20	1836.22	3668.92	31	17	11	21	1.91	a	

000109

061208D02.SPC Analyzed by

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SEEKER B A C K G R O U N D S U B T R A C T R E S U L T S Vers. 2.2.1

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Background File:. . . . . DET020517.BKG (060517-2 WEEKLY BKGD)

Bkg.File Detector #: 2

BACKGROUND SUBTRACT RESULTS

PK#	ENERGY (keV)	OLD NET COUNTS	OLD UN-CERTAINTY	OLD CR.LEVEL	NEW NET COUNTS	NEW UN-CERTAINTY	NEW CR.LEVEL	FLAG
2	59.48	13766	274	116	13765	274	116	
3	66.05	95	87	69	89	87	70	
4	87.93	13237	261	101	13234	261	101	
5	122.06	3486	157	85	3486	157	85	
13	353.24	73	87	70	68	87	71	NET<CL

061208D02.SPC Analyzed by

SEEKER F I N A L A C T I V I T Y R E P O R T Version 2.2.1

Paragon Analytics, Div. of DataChem Lab
GammaScan

Geo 1 / Water

Sample ID: 0613004-2A GEO 1 CAL VER (718)

Sampling Start: 07/01/2003 12:00:00	Counting Start: 05/18/2006 10:32:24
Sampling Stop: 07/01/2003 12:00:00	Decay Time. . . . . 2.52e+004 Hrs
Buildup Time. . . . . 0.00e+000 Hrs	Live Time . . . . . 1800 Sec
Sample Size . . . . . 1.00e+000 L	Real Time . . . . . 1829 Sec
Collection Efficiency 1.0000	Spectrum File 061208D02.SPC
Cr. Level Confidence Interval: 95 %	Det. Limit Confidence Interval: 95 %

Detector #: 2 (Detector 2)

Efficiency File: (D02)(Sh01).EFF (Geo 1 Eff Cal)
Eff.=1/[3.02E-03*En^-3.85E+00 + 1.33E+02*En^7.85E-01] 05/18/2006

Library File: . . . .ANALYTICAL.LIB (Analytical)

MEASURED or MDA CONCENTRATIONS

Nuclide	ENERGY (keV)	N E T	Concentration (pCi/L)	MDA	Critical Level	Halflife (hrs)
Am-241	59.54		9.89E+04 +- 1.96E+03	1.68E+03	8.31E+02	3.79E+06
Cd-109	88.02		1.44E+06 +- 2.84E+04	2.23E+04	1.10E+04	1.11E+04
Co-57	122.07		3.19E+04 +- 1.44E+03	1.59E+03	7.81E+02	6.50E+03
Ce-139	165.85		4.73E+04 +- 1.56E+04	2.47E+04	1.22E+04	3.30E+03
Cs-137	661.62		4.11E+04 +- 5.66E+02	2.56E+02	1.26E+02	2.64E+05
Co-60	Average:x		6.43E+04 +- 6.80E+02	. . . .	. . . .	4.62E+04
	1173.21		6.33E+04 +- 9.39E+02	3.59E+02	1.75E+02	4.62E+04
	1332.48		6.55E+04 +- 9.85E+02	2.17E+02	1.04E+02	4.62E+04
Hg-203	279.18		MDA	1.09E+09	5.37E+08	1.12E+03
Sn-113	391.68		MDA	8.95E+04r	4.36E+04	2.76E+03
Y-88	898.02		MDA	3.20E+05	1.58E+05	2.56E+03

MEASURED TOTAL: 1.73E+06 +- 4.87E+04 pCi/L

UNKNOWN, SUM or ESCAPE PEAKS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	42.76	87.09	92	115	93	1925	0.71	Deleted
3	66.05	133.61	89	87	70	1189	0.41	Unknown
6	136.40	274.10	473	125	96	1720	0.95	Unknown
8	175.42	352.04	76	98	79	1262	0.83	Deleted
9	194.02	389.18	93	102	83	1382	0.80	Unknown

000111

061208D02.SPC Analyzed by

UNKNOWN,SUM or ESCAPE PEAKS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
10	310.09	621.00	7	75	61	834	0.58	Deleted
11	318.89	638.57	69	79	64	918	0.74	Unknown
12	343.65	688.02	40	87	71	1070	1.04	Deleted
13	353.24	707.17	68	87	71	1046	0.99	Deleted
14	367.64	735.93	45	64	52	657	0.62	Deleted
15	391.82	784.22	151	107	85	1350	1.34	Unknown
17	762.31	1524.16	53	99	81	1050	2.21	Deleted
20	1836.22	3668.92	31	17	11	21	1.91	Unknown

051901D07.SPC Analyzed by MC

SEEKER G A M M A A N A L Y S I S R E S U L T S PS Version 1.8.4

Paragon Analytics, Div. of DataChem Lab
GammaScan

Geo 1 / Water

Sample ID: 0515008-7 GEO 1 EFF CAL (798)

Sampling Start:	07/01/2005 12:00:00	Counting Start:	12/13/2005 17:12:48
Sampling Stop:	07/01/2005 12:00:00	Decay Time.	3.97E+003 Hrs
Buildup Time.	0.00E+000 Hrs	Live Time	3600 Sec
Sample Size	1.00E+000 L	Real Time	3918 Sec
Collection Efficiency	1.0000	Spc. File	.051901D07.SPC

Detector #: 7 (Detector 7)

Energy(keV)= -2.54 + 0.501*Ch + 0.00E+00*Ch^2 + 0.00E+00*Ch^3 12/13/2005
FWHM(keV) = 0.77 + 0.008*En + 7.04E-04*En^2 + 0.00E+00*En^3 12/04/2005
Where En = Sqrt(Energy in keV)

Search Sensitivity: 1.00 | Sigma Multiplier: 2.00 | Search Start/End: 80/4000

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	49.33	103.46	9660	822	656	59698	1.60 a	Wide Pk
2	51.14	107.06	8135	1197	974	95517	2.60 b	
3	57.80	120.34	5357	1056	861	82092	2.33 a	Wide Pk
4	59.39	123.51	157589	900	349	24565	0.88 b	
5	66.83	138.36	10928	803	638	45106	2.23 a	HiResid Wide Pk
6	70.49	145.66	12596	762	599	41884	2.11 b	HiResid
7	72.71	150.07	9678	618	482	32218	1.62 c	HiResid
8	74.84	154.32	7601	795	638	45106	2.25 d	HiResid
9	78.21	161.05	9827	938	754	54771	2.71 e	HiResid
10	82.23	169.07	11803	851	677	48328	2.48 f	HiResid
11	85.19	174.97	13525	810	638	45106	2.37 g	HiResid
12	87.94	180.46	196703	991	364	22553	1.09 h	HiResid
13	121.93	248.25	81450	636	231	10746	0.85 a	HiResid
14	136.37	277.04	10256	356	241	10715	0.95 a	
15	165.79	335.72	64163	573	221	9026	0.97 a	
16	186.73	377.49	370	251	204	7680	1.06 a	
17	199.16	402.28	1109	258	205	7744	1.07 a	
18	203.67	411.27	286	282	230	9035	1.13 b	
19	255.13	513.91	1888	260	202	6955	1.07 a	
20	279.19	561.88	19116	344	168	5197	1.02 a	HiResid
21	391.76	786.40	38140	428	144	4089	1.15 a	HiResid
22	511.11	1024.42	868	332	269	8233	2.95 a	Wide Pk
23	549.84	1101.68	111	117	94	2026	0.76 a	

051901D07.SPC Analyzed by

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)		FLAG
24	661.92	1325.20	40466	444	154	4111	1.42	a	
25	814.39	1629.28	684	147	113	2621	1.28	a	
26	898.25	1796.54	40334	437	141	3684	1.60	a	HiResid
27	1132.96	2264.64	100	122	99	1962	1.61	a	
28	1173.37	2345.23	44549	438	95	1752	1.84	a	HiResid
29	1325.42	2648.49	1040	165	125	1974	3.77	a	HiResid Wide Pk
30	1332.50	2662.60	40348	412	75	1030	1.99	b	HiResid
31	1835.42	3665.63	23150	309	42	303	2.35	a	HiResid

051901D07.SPC Analyzed by

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SEEKER B A C K G R O U N D S U B T R A C T R E S U L T S Version 1.8.2

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Background File:. . . . . DET071209.BKG (0524004-17 WEEKLY BKGD)

Bkg.File Detector #: 7

BACKGROUND SUBTRACT RESULTS

PK#	ENERGY (keV)	OLD NET COUNTS	OLD UN-CERTAINTY	OLD CR.LEVEL	NEW NET COUNTS	NEW UN-CERTAINTY	NEW CR.LEVEL	FLAG
5	66.83	10928	803	638	10916	803	638	
6	70.49	12596	762	599	12593	762	599	
8	74.84	7601	795	638	7596	795	638	
9	78.21	9827	938	754	9821	938	754	
11	85.19	13525	810	638	13521	810	638	
16	186.73	370	251	204	351	251	204	
17	199.16	1109	258	205	1097	258	205	
22	511.11	868	332	269	793	333	270	

051901D07.SPC Analyzed by

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SEEKER C A L I B R A T I O N R E S U L T S Version 2.0.4

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Sample ID: 0515008-7 GEO 1 EFF CAL (798)
Stds. Match Tolerance: 2.00 keV

Detector Number: 07 Calibration Date. . . 12/13/2005 17:12:48
Geometry File (D07)(Sh01).EFF ID. Geo 1 Eff CaL
Amount of Std. in Calib. Source: 1.000000 gm

Eff = 1 / [1.72e-01*En^-1.65e+00 + 1.63e+02*En^ 9.06e-01]
(Where En = Energy in MeV)) (Exponential)

Pk. #	Energy (kev)	Measured Efficiency	% Difference	Calculated Efficiency	% Difference	Prev.Calc. Efficiency
1	59.50	3.24e-02	0.17	3.24e-02	-0.88	3.22e-02
2	88.04	3.66e-02	-0.89	3.63e-02	-0.99	3.59e-02
3	122.06	3.29e-02	1.91	3.35e-02	1.15	3.39e-02
4	165.85	2.87e-02	-1.62	2.83e-02	3.06	2.92e-02
5	279.00	1.90e-02	-0.34	1.90e-02	4.35	1.98e-02
6	391.68	1.41e-02	0.73	1.42e-02	4.10	1.48e-02
7	661.64	8.96e-03	-0.80	8.89e-03	2.82	9.14e-03
8	898.02	6.55e-03	2.94	6.75e-03	1.82	6.87e-03
9	1173.21	5.31e-03	-0.10	5.30e-03	0.86	5.35e-03
10	1332.48	4.76e-03	-0.75	4.72e-03	0.38	4.74e-03
11	1836.01	3.61e-03	-2.00	3.53e-03	-0.85	3.50e-03

Calibration Results Saved.

Geometry 01 Calibration Verification: Gamma Mixed Nuclide Source

Std. #	718	Detector	7									
				REF DATE :	7/1/2003				count date		12/14/2005	
FROM CALIBRATION CERTIFICATE				FROM ANALYTICS.LIB			EXPECTED ACTIVITY					
Isotope	KeV	Half Life(y)	Gammas/Sec.	Gamma Fraction:	Mass of Standard			DPS	pCi/L	Activity	Recovery	Pass/Fail	# of half-lives expired
Am-241	59.9	432.0000	1304	0.3590	1	L	Am-241	3632.3	98170.6	99500	101%	Pass	0.01
Cd-109	88	1.2666	1862	0.0361			Cd-109	51578.9	1394025.6	1330000	95%	Pass	1.94
Co-57	122	0.7441	1032	0.8551			Co-57	1206.9	32618.3	33000	101%	Pass	3.30
Ce-139	166	0.3768	1419	0.8035			Ce-139	1766.0	47730.4	51100	107%	Pass	6.52
Hg-203	279	0.1276	3194	0.7730			Hg-203	4132.0	111674.4	>5 h-lives	>5 h-lives	>5 h-lives	19.25
Sn-113	392	0.3151	1960	0.6490			Sn-113	3020.0	81622.5	>5 h-lives	>5 h-lives	>5 h-lives	7.79
Cs-137	662	30.0000	1260	0.8512			Cs-137	1480.3	40007.1	39800	99%	Pass	0.08
Y-88	898	0.2919	5060	0.9340			Y-88	5417.6	146420.5	>5 h-lives	>5 h-lives	>5 h-lives	8.41
Co-60	1173	5.2714	2402	1.0000			Co-60	2402.0	64918.9	64100	99%	Pass	0.47
Co-60	1332	5.2714	2427	1.0000			Co-60	2427.0	65594.6	64200	98%	Pass	0.47
Y-88	1836	0.2919	5287	0.9938			Y-88	5320.0	143783.3	>5 h-lives	>5 h-lives	>5 h-lives	8.41
											R:\inst\gamma\st718.xls		

000117

051911D07.SPC Analyzed by MC

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SEEKER G A M M A A N A L Y S I S R E S U L T S PS Version 1.8.4

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Geo 1 / Water

Sample ID: 0515008-7A GEO 1 CAL VER (718)

Sampling Start: 07/01/2003 12:00:00	Counting Start: 12/14/2005 17:40:57
Sampling Stop: 07/01/2003 12:00:00	Decay Time. . . . . 2.15E+004 Hrs
Buildup Time. . . . . 0.00E+000 Hrs	Live Time . . . . . 1800 Sec
Sample Size . . . . . 1.00E+000 L	Real Time . . . . . 1853 Sec
Collection Efficiency 1.0000	Spc. File 051911D07.SPC

Detector #: 7 (Detector 7)

Energy(keV)= -2.37 + 0.501*Ch + 0.00E+00*Ch^2 + 0.00E+00*Ch^3 12/14/2005
FWHM(keV) = 0.77 + 0.008*En + 7.04E-04*En^2 + 0.00E+00*En^3 12/04/2005
Where En = Sqrt(Energy in keV)

Search Sensitivity: 1.00 | Sigma Multiplier: 2.00 | Search Start/End: 80/4000

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)		FLAG
1	43.11	90.73	319	254	207	7899	0.96	a	
2	49.52	103.51	4570	510	405	22678	1.66	a	HiResid Wide Pk
3	59.53	123.48	76878	601	191	7317	0.89	a	
4	66.43	137.26	810	298	241	7557	1.78	a	Wide Pk
5	68.89	142.16	1403	408	330	10992	2.67	b	
6	88.07	180.43	30418	387	139	3552	0.90	a	
7	122.10	248.32	6350	203	103	1961	0.90	a	
8	136.49	277.01	810	129	96	1691	1.02	a	
9	165.97	335.83	845	124	90	1502	1.06	a	
10	391.81	786.37	280	97	75	1114	1.19	a	
11	484.62	971.53	46	58	46	523	0.65	a	
12	662.04	1325.49	18949	287	65	743	1.45	a	
13	898.37	1796.96	149	91	72	1005	1.46	a	
14	1173.49	2345.83	16375	262	47	429	1.86	a	HiResid
15	1332.60	2663.24	14620	244	25	116	2.03	a	
16	1835.44	3666.41	80	23	12	27	1.67	a	

000118

051911D07.SPC Analyzed by

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SEEKER B A C K G R O U N D S U B T R A C T R E S U L T S Vers. 2.2.1

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Background File:. . . . . DET071209.BKG (0524004-17 WEEKLY BKGD)

Bkg.File Detector #: 7

BACKGROUND SUBTRACT RESULTS

PK#	ENERGY (keV)	OLD NET COUNTS	OLD UN-CERTAINTY	OLD CR.LEVEL	NEW NET COUNTS	NEW UN-CERTAINTY	NEW CR.LEVEL	FLAG
4	66.43	810	298	241	804	298	241	
5	68.89	1403	408	330	1401	408	330	

051911D07.SPC Analyzed by

SEEKER F I N A L A C T I V I T Y R E P O R T Version 2.2.1

Paragon Analytics, Div. of DataChem Lab
GammaScan

Geo 1 / Water

Sample ID: 0515008-7A GEO 1 CAL VER (718)

Sampling Start: 07/01/2003 12:00:00	Counting Start: 12/14/2005 17:40:57
Sampling Stop: 07/01/2003 12:00:00	Decay Time. . . . . 2.15e+004 Hrs
Buildup Time. . . . . 0.00e+000 Hrs	Live Time . . . . . 1800 Sec
Sample Size . . . . . 1.00e+000 L	Real Time . . . . . 1853 Sec
Collection Efficiency 1.0000	Spectrum File 051911D07.SPC
Cr. Level Confidence Interval: 95 %	Det. Limit Confidence Interval: 95 %

Detector #: 7 (Detector 7)

Efficiency File: (D07)(Sh01).EFF (Geo 1 Eff CaL)
Eff.=1/[1.72E-01*En^-1.65E+00 + 1.63E+02*En^9.06E-01] 12/13/2005

Library File: . . . .ANALYTICAL.LIB (Analytical)

MEASURED or MDA CONCENTRATIONS

Nuclide	ENERGY (keV)	N E T	Concentration (pCi/L)	MDA	Critical Level	Halflife (hrs)
Am-241	59.54		9.95E+04 +- 7.78E+02	4.97E+02	2.47E+02	3.79E+06
Cd-109	88.02		1.33E+06 +- 1.70E+04	1.23E+04	6.07E+03	1.11E+04
Co-57	122.07		3.30E+04 +- 1.05E+03	1.08E+03	5.35E+02	6.50E+03
Ce-139	165.85		5.11E+04 +- 7.51E+03	1.11E+04	5.46E+03	3.30E+03
Sn-113	391.68		1.01E+05 +- 3.53E+04	5.55E+04	2.72E+04	2.76E+03
Cs-137	661.62		3.98E+04 +- 6.01E+02	2.80E+02	1.37E+02	2.64E+05
Co-60	Average:x		6.41E+04 +- 7.41E+02	. . . .	. . . .	4.62E+04
	1173.21		6.41E+04 +- 1.03E+03	3.80E+02	1.85E+02	4.62E+04
	1332.48		6.42E+04 +- 1.07E+03	2.32E+02	1.10E+02	4.62E+04
Hg-203	279.18		MDA	1.12E+08	5.52E+07	1.12E+03
Y-88	898.02		MDA	7.90E+04r	3.84E+04	2.56E+03

MEASURED TOTAL: 1.72E+06 +- 6.29E+04 pCi/L

UNKNOWN,SUM or ESCAPE PEAKS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	43.11	90.73	319	254	207	7899	0.96	Unknown
2	49.52	103.51	4570	510	405	22678	1.66	Unknown
4	66.43	137.26	804	298	241	7557	1.78	Unknown
5	68.89	142.16	1401	408	330	10992	2.67	Unknown
8	136.49	277.01	810	129	96	1691	1.02	Unknown

051911D07.SPC Analyzed by

UNKNOWN,SUM or ESCAPE PEAKS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
11	484.62	971.53	46	58	46	523	0.65	Unknown
13	898.37	1796.96	149	91	72	1005	1.46	Unknown
16	1835.44	3666.41	80	23	12	27	1.67	Unknown

052043D08.SPC Analyzed by MC

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SEEKER G A M M A A N A L Y S I S R E S U L T S PS Version 1.8.4

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Geo 1 / Water

Sample ID: 0515008-8 GEO 1 EFF CAL (798)

Sampling Start: 07/01/2005 12:00:00	Counting Start: 12/14/2005 11:17:00
Sampling Stop: 07/01/2005 12:00:00	Decay Time. . . . . 3.98E+003 Hrs
Buildup Time. . . . . 0.00E+000 Hrs	Live Time . . . . . 1800 Sec
Sample Size . . . . . 1.00E+000 L	Real Time . . . . . 1990 Sec
Collection Efficiency 1.0000	Spc. File 052043D08.SPC

Detector #: 8 (Detector 8)

Energy(keV)= -0.68 + 0.501*Ch +-2.75E-07*Ch^2 + 1.18E-10*Ch^3 12/14/2005
FWHM(keV) = 0.68 + 0.014*En + 5.09E-04*En^2 + 0.00E+00*En^3 12/14/2005
Where En = Sqrt(Energy in keV)

Search Sensitivity: 1.00 | Sigma Multiplier: 2.00 | Search Start/End: 80/4000

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)		FLAG
1	49.60	100.43	5270	601	480	31933	1.66	a	Wide Pk
2	59.47	120.16	89027	675	260	13658	0.84	a	
3	67.04	135.27	6464	702	562	33383	2.49	a	HiResid Wide Pk
4	70.41	142.01	4861	583	466	26706	1.88	b	HiResid
5	72.67	146.52	3579	463	368	20030	1.43	c	HiResid
6	88.01	177.16	106828	711	230	10673	0.85	a	HiResid
7	122.02	245.11	49107	489	170	5814	0.88	a	HiResid
8	136.45	273.94	6313	265	175	5650	0.98	a	
9	155.13	311.27	224	232	189	6105	1.15	a	
10	165.86	332.70	38349	440	164	4997	0.95	a	
11	199.19	399.29	781	239	191	5761	1.23	a	
12	203.75	408.41	173	211	172	5041	1.09	b	
13	255.14	511.09	1060	177	136	3407	0.97	a	
14	279.23	559.23	12123	268	126	2919	1.04	a	
15	380.56	761.70	71	97	78	1364	0.72	a	NET< CL
16	391.75	784.08	25016	347	118	2358	1.16	a	
17	471.36	943.14	95	104	84	1603	0.84	a	
18	510.92	1022.20	465	159	126	2619	1.71	a	
19	661.78	1323.63	27035	353	105	2036	1.38	a	
20	814.03	1627.74	394	105	80	1263	1.20	a	
21	898.11	1795.66	27339	355	107	2101	1.57	a	
22	1173.44	2345.18	30687	363	77	1032	1.74	a	HiResid
23	1190.66	2379.53	43	50	39	383	0.88	a	

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052043D08.SPC Analyzed by

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
24	1325.61	2648.62	649	113	83	947	3.20 a	HiResid Wide Pk
25	1332.78	2662.93	27817	339	52	521	1.87 b	HiResid
26	1837.57	3667.53	16042	256	30	158	2.20 a	HiResid

052043D08.SPC Analyzed by

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SEEKER B A C K G R O U N D S U B T R A C T R E S U L T S Version 1.8.2

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Background File:. . . . . DET081209.BKG (0524004-18 WEEKLY BKGD)

Bkg.File Detector #: 8

BACKGROUND SUBTRACT RESULTS

PK#	ENERGY (keV)	OLD NET COUNTS	OLD UN-CERTAINTY	OLD CR.LEVEL	NEW NET COUNTS	NEW UN-CERTAINTY	NEW CR.LEVEL	FLAG
3	67.04	6464	702	562	6458	702	562	
5	72.67	3579	463	368	3577	463	368	
6	88.01	106828	711	230	106826	711	230	
11	199.19	781	239	191	774	239	191	
18	510.92	465	159	126	412	160	127	
21	898.11	27339	355	107	27338	355	107	
24	1325.61	649	113	83	648	113	83	

052043D08.SPC Analyzed by

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SEEKER C A L I B R A T I O N R E S U L T S Version 2.0.4

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Sample ID: 0515008-8 GEO 1 EFF CAL (798)
Stds. Match Tolerance: 2.00 keV

Detector Number: 08 Calibration Date. . . 12/14/2005 11:17:00
Geometry File (D08)(Sh01).EFF ID. Geo 1 Eff Cal
Amount of Std. in Calib. Source: 1.000000 gm

Eff = 1 / [5.02e-01*En^-1.26e+00 + 1.19e+02*En^ 8.87e-01]
(Where En = Energy in MeV)) (Exponential)

Pk. #	Energy (kev)	Measured Efficiency	% Difference	Calculated Efficiency	% Difference	Prev.Calc. Efficiency
1	59.50	3.66e-02	-0.66	3.63e-02	-9.91	3.31e-02
2	88.04	3.98e-02	1.95	4.06e-02	0.12	4.06e-02
3	122.06	3.98e-02	-1.81	3.90e-02	2.10	3.99e-02
4	165.85	3.45e-02	-0.22	3.44e-02	1.41	3.49e-02
5	279.00	2.44e-02	0.10	2.44e-02	-0.42	2.43e-02
6	391.68	1.85e-02	0.79	1.87e-02	-0.88	1.85e-02
7	661.64	1.20e-02	0.11	1.20e-02	-0.56	1.19e-02
8	898.02	8.92e-03	2.83	9.18e-03	-0.02	9.18e-03
9	1173.21	7.31e-03	-0.70	7.26e-03	0.57	7.30e-03
10	1332.48	6.56e-03	-1.14	6.49e-03	0.87	6.55e-03
11	1836.01	5.02e-03	-2.69	4.89e-03	1.66	4.97e-03

Calibration Results Saved.

Geometry 01 Calibration Verification: Gamma Mixed Nuclide Source													
Std. #	718	Detector	8										
				REF DATE :	7/1/2003				count date		12/14/2005		
FROM CALIBRATION CERTIFICATE				FROM ANALYTICS.LIB			EXPECTED ACTIVITY						
					Mass of								# of half-lives
Isotope	KeV	Half Life(y)	Gammas/Sec.	Gamma Fraction:	Standard			DPS	pCi/L	Activity	Recovery	Pass/Fail	expired
Am-241	59.9	432.0000	1304	0.3590	1	L	Am-241	3632.3	98170.6	100000	102%	Pass	0.01
Cd-109	88	1.2666	1862	0.0361			Cd-109	51578.9	1394025.6	1350000	97%	Pass	1.94
Co-57	122	0.7441	1032	0.8551			Co-57	1206.9	32618.3	32900	101%	Pass	3.30
Ce-139	166	0.3768	1419	0.8035			Ce-139	1766.0	47730.4	50800	106%	Pass	6.52
Hg-203	279	0.1276	3194	0.7730			Hg-203	4132.0	111674.4	>5 h-lives	>5 h-lives	>5 h-lives	19.25
Sn-113	392	0.3151	1960	0.6490			Sn-113	3020.0	81622.5	>5 h-lives	>5 h-lives	>5 h-lives	7.79
Cs-137	662	30.0000	1260	0.8512			Cs-137	1480.3	40007.1	39300	98%	Pass	0.08
Y-88	898	0.2919	5060	0.9340			Y-88	5417.6	146420.5	>5 h-lives	>5 h-lives	>5 h-lives	8.41
Co-60	1173	5.2714	2402	1.0000			Co-60	2402.0	64918.9	64600	100%	Pass	0.47
Co-60	1332	5.2714	2427	1.0000			Co-60	2427.0	65594.6	65800	100%	Pass	0.47
Y-88	1836	0.2919	5287	0.9938			Y-88	5320.0	143783.3	>5 h-lives	>5 h-lives	>5 h-lives	8.41
											R:\Inst\gamma\sl718.xls		

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052044D08.SPC Analyzed by MC

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SEEKER G A M M A A N A L Y S I S R E S U L T S PS Version 1.8.4

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Geo 1 / Water

Sample ID: 0515008-8A GEO 1 CAL VER (718)

Sampling Start:	07/01/2003 12:00:00	Counting Start:	12/14/2005 12:00:11
Sampling Stop:	07/01/2003 12:00:00	Decay Time.	2.15E+004 Hrs
Buildup Time.	0.00E+000 Hrs	Live Time	1800 Sec
Sample Size	1.00E+000 L	Real Time	1877 Sec
Collection Efficiency	1.0000	Spc. File	.052044D08.SPC

Detector #: 8 (Detector 8)

Energy(keV)= -0.68 + 0.501*Ch +-2.75E-07*Ch^2 + 1.18E-10*Ch^3 12/14/2005
FWHM(keV) = 0.68 + 0.014*En + 5.09E-04*En^2 + 0.00E+00*En^3 12/14/2005
Where En = Sqrt(Energy in keV)

Search Sensitivity: 1.00 | Sigma Multiplier: 2.00 | Search Start/End: 80/4000

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)		FLAG
1	43.78	88.80	99	127	103	2933	0.40	a	NET< CL
2	49.48	100.19	5411	468	366	19759	1.54	a	HiResid Wide Pk
3	51.20	103.64	3252	518	416	23940	1.67	b	HiResid
4	59.48	120.18	86586	633	193	7479	0.83	a	
5	66.08	133.36	146	118	95	2233	0.43	a	
6	67.25	135.69	590	254	205	6654	1.35	b	
7	88.02	177.18	34553	400	122	3018	0.85	a	
8	103.16	207.43	86	80	64	1023	0.44	a	
9	122.02	245.12	7378	205	91	1680	0.90	a	
10	136.45	273.95	875	134	99	1820	0.91	a	
11	165.83	332.64	1023	131	94	1626	0.93	a	
12	391.59	783.76	221	97	76	1058	1.01	a	
13	418.14	836.80	21	67	54	727	0.59	a	NET< CL
14	637.35	1274.81	60	57	45	459	0.83	a	
15	661.71	1323.47	25255	328	65	789	1.38	a	
16	898.11	1795.65	201	90	70	1008	1.37	a	
17	1048.63	2096.16	50	68	55	657	1.11	a	NET< CL
18	1173.28	2344.87	22598	308	54	508	1.76	a	HiResid
19	1332.59	2662.54	20600	289	25	117	1.86	a	
20	1837.29	3666.98	114	27	13	32	1.96	a	

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052044D08.SPC Analyzed by

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SEEKER B A C K G R O U N D S U B T R A C T R E S U L T S Vers. 2.2.1

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Background File:. . . . . DET081209.BKG (0524004-18 WEEKLY BKGD)

Bkg.File Detector #: 8

BACKGROUND SUBTRACT RESULTS

PK#	ENERGY (keV)	OLD NET COUNTS	OLD UN-CERTAINTY	OLD CR.LEVEL	NEW NET COUNTS	NEW UN-CERTAINTY	NEW CR.LEVEL	FLAG
5	66.08	146	118	95	140	118	95	
7	88.02	34553	400	122	34551	400	122	
16	898.11	201	90	70	199	90	70	

052044D08.SPC Analyzed by

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SEEKER F I N A L A C T I V I T Y R E P O R T Version 2.2.1

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Geo 1 / Water

Sample ID: 0515008-8A GEO 1 CAL VER (718)

Sampling Start: 07/01/2003 12:00:00	Counting Start: 12/14/2005 12:00:11
Sampling Stop: 07/01/2003 12:00:00	Decay Time. . . . . 2.15e+004 Hrs
Buildup Time. . . . . 0.00e+000 Hrs	Live Time . . . . . 1800 Sec
Sample Size . . . . . 1.00e+000 L	Real Time . . . . . 1877 Sec
Collection Efficiency 1.0000	Spectrum File 052044D08.SPC
Cr. Level Confidence Interval: 95 %	Det. Limit Confidence Interval: 95 %

Detector #: 8 (Detector 8)

Efficiency File: (D08)(Sh01).EFF (Geo 1 Eff Cal)
Eff.=1/[5.02E-01*En^-1.26E+00 + 1.19E+02*En^8.87E-01] 12/14/2005

Library File: . . . .ANALYTICAL.LIB (Analytical)

MEASURED or MDA CONCENTRATIONS

Nuclide	ENERGY (keV)	N E T	Concentration (pCi/L)	MDA	Critical Level	Halflife (hrs)
Am-241	59.54		1.00E+05 +- 7.32E+02	4.48E+02	2.22E+02	3.79E+06
Cd-109	88.02		1.35E+06 +- 1.57E+04	9.68E+03	4.79E+03	1.11E+04
Co-57	122.07		3.29E+04 +- 9.12E+02	8.26E+02	4.07E+02	6.50E+03
Ce-139	165.85		5.08E+04 +- 6.50E+03	9.46E+03	4.66E+03	3.30E+03
Sn-113	391.68		6.05E+04 +- 2.65E+04	4.23E+04	2.08E+04	2.76E+03
Cs-137	661.62		3.93E+04 +- 5.10E+02	2.08E+02	1.02E+02	2.64E+05
Co-60	Average:x		6.52E+04 +- 6.36E+02	. . . .	. . . .	4.62E+04
	1173.21		6.46E+04 +- 8.79E+02	3.15E+02	1.54E+02	4.62E+04
	1332.48		6.58E+04 +- 9.22E+02	1.66E+02	7.88E+01	4.62E+04
Hg-203	279.18		MDA	8.34E+07	4.11E+07	1.12E+03
Y-88	898.02		MDA	6.24E+04r	3.04E+04	2.56E+03

MEASURED TOTAL: 1.70E+06 +- 5.15E+04 pCi/L

UNKNOWN,SUM or ESCAPE PEAKS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	43.78	88.80	99	127	103	2933	0.40	Deleted
2	49.48	100.19	5411	468	366	19759	1.54	Unknown
3	51.20	103.64	3252	518	416	23940	1.67	Unknown
5	66.08	133.36	140	118	95	2233	0.43	Unknown
6	67.25	135.69	590	254	205	6654	1.35	Unknown

052044D08.SPC Analyzed by

UNKNOWN,SUM or ESCAPE PEAKS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
8	103.16	207.43	86	80	64	1023	0.44	Unknown
10	136.45	273.95	875	134	99	1820	0.91	Unknown
13	418.14	836.80	21	67	54	727	0.59	Deleted
14	637.35	1274.81	60	57	45	459	0.83	Unknown
16	898.11	1795.65	199	90	70	1008	1.37	Unknown
17	1048.63	2096.16	50	68	55	657	1.11	Deleted
20	1837.29	3666.98	114	27	13	32	1.96	Unknown

c:\SEEKER\BIN\052044d08.res Analysis Results Saved.

Gamma Spectroscopy

Quality Control Data

Weekly Background Calibrations

Paragon Analytics

Gamma Spectrometer Calibration Log

Date: 06/02/06

Reviewed By/Date: LA 06/02/06

Det. No.	Out Of Service	Background Started	Background OK	Source Check Started	Source Check OK	Source Check Failed Parameter(s)	Repeat Source Check OK	Repeat Source Check Failed Parameter(s)	Corrective Action Taken **	Removed from Service
1.	LA			/	/					
2.		CW	CW	LA	LA					
3.	LA			/	/					
4.		CW	□ /	LA	/	662 Ctrd 1332 Ctrd	LA° / LA		gain adj	
5.	LA			/	/					
6.		CW	CW	LA	LA					
7.		↓	↓	LA	LA					
8.		↓	↓	LA	/	1332 eff	LA			
9.	LA			/	/					
10.		CW	△ /	LA	LA					
11.										
12.										

** Corrective Action:

° Gain shift during sample count. Daily Check rerun and is OK. CW 6/2/06

□ Gain shift. CW 6/3/06

△ Peak-fit error. CW 6/3/04

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061330D02.SPC Analyzed by LW

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SEEKER G A M M A A N A L Y S I S R E S U L T S PS Version 1.8.4

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Weekly Background Check

Sample ID: 060602-2 WEEKLY BKGD

Sampling Start:	06/02/2006 15:00:00	Counting Start:	06/02/2006 15:25:03
Sampling Stop:	06/02/2006 15:00:00	Decay Time.	4.17E-001 Hrs
Buildup Time.	0.00E+000 Hrs	Live Time	60000 Sec
Sample Size	1.00E+000 L	Real Time	60041 Sec
Collection Efficiency	1.0000	Spc. File	.061330D02.SPC

Detector #: 2 (Detector 2)

Energy(keV)= -0.79 + 0.500*Ch + 1.65E-08*Ch^2 + 0.00E+00*Ch^3 06/02/2006
FWHM(keV) = 0.69 + 0.006*En + 1.18E-03*En^2 + 0.00E+00*En^3 05/16/2006
Where En = Sqrt(Energy in keV)

Search Sensitivity: 1.00 | Sigma Multiplier: 2.00 | Search Start/End: 80/4000

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)		FLAG
1	44.37	90.24	52	72	58	670	0.77	a	NET< CL
2	46.43	94.36	92	63	49	536	0.71	b	
3	53.70	108.88	53	78	63	725	0.93	a	NET< CL
4	62.92	127.30	170	101	80	1019	1.28	a	
5	66.33	134.13	145	72	56	637	0.83	b	
6	74.36	150.17	89	105	85	1147	1.38	a	
7	74.90	151.23	35	52	42	430	0.44	b	NET< CL
8	77.03	155.49	160	57	42	430	0.42	c	
9	84.55	170.52	49	49	39	370	0.45	a	
10	92.66	186.72	444	84	60	670	1.03	a	
11	98.87	199.14	43	71	57	606	0.94	a	NET< CL
12	139.81	280.93	156	74	57	605	1.05	a	
13	143.80	288.90	51	45	35	303	0.54	b	
14	151.35	304.00	12	44	36	311	0.47	a	NET< CL
15	159.36	320.00	14	44	35	310	0.48	a	NET< CL
16	185.79	372.80	330	86	64	693	1.15	a	
17	198.30	397.79	226	67	49	487	0.89	a	
18	212.35	425.87	38	51	41	371	0.71	a	NET< CL
19	238.65	478.42	308	75	54	548	0.96	a	
20	295.29	591.58	135	70	54	504	1.15	a	
21	338.04	677.01	37	55	44	404	0.99	a	NET< CL
22	352.01	704.91	198	68	51	478	1.30	a	
23	510.94	1022.44	1490	126	81	784	2.72	a	Wide Pk
24	558.46	1117.38	189	57	41	297	1.48	a	

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061330D02.SPC Analyzed by

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
25	569.62	1139.68	65	47	36	284	1.16 a	
26	583.25	1166.91	96	46	34	251	1.18 a	
27	598.18	1196.75	134	110	89	972	3.22 a	Wide Pk
28	609.39	1219.15	149	64	49	466	1.45 a	
29	669.36	1338.95	34	39	30	202	1.07 a	
30	691.91	1384.01	27	34	27	177	0.83 a	Wide Pk
31	694.17	1388.52	187	89	69	635	2.99 b	
32	803.07	1606.08	112	43	31	198	1.28 a	
33	911.79	1823.29	38	36	28	164	1.52 a	
34	962.95	1925.51	123	77	61	421	4.46 a	Wide Pk
35	969.35	1938.30	50	37	28	156	1.68 b	
36	1461.36	2921.19	166	39	24	105	2.13 a	
37	1764.34	3526.44	34	43	34	137	4.26 a	NET< CL

061330D02.SPC Analyzed by

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SEEKER B A C K G R O U N D Q. C. A N A L Y S I S Version 2.2.2

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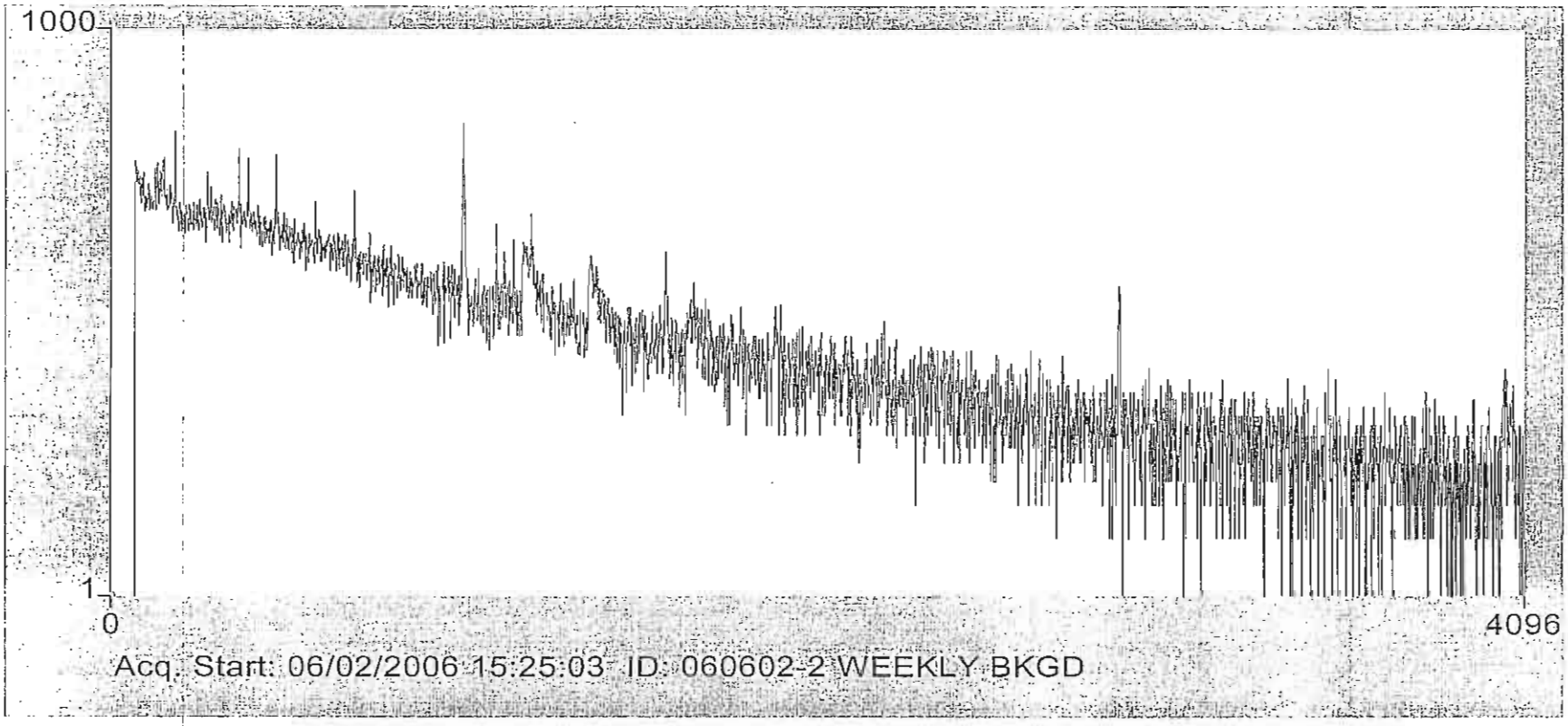
ID: 060602-2 WEEKLY BKGD

Detector # 2 Background Q.C. Analysis for 06/02/2006 15:25:03

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
10	50-> 150 keV Bkg	23.834	N.A.	Pass	N.A.
11	150-> 250 keV Bkg	19.951	N.A.	Pass	N.A.
12	250-> 500 keV Bkg	29.405	N.A.	Pass	N.A.
13	500->1000 keV Bkg	30.334	N.A.	Pass	N.A.
14	1000->2000 keV Bkg	17.047	N.A.	Pass	N.A.
15	40-> 50 keV Bkg	2.966	N.A.	Pass	N.A.

Q.C. Results Saved.


1000
1
0
4096
Acq. Start: 06/02/2006 15:25:03 ID: 060602-2 WEEKLY BKGD

061556D07.SPC Analyzed by MW

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SEEKER G A M M A A N A L Y S I S R E S U L T S PS Version 1.8.4

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Weekly Background Check

Sample ID: 060602-7 WEEKLY BKGD

Sampling Start: 06/02/2006 15:00:00	Counting Start: 06/02/2006 15:25:59
Sampling Stop: 06/02/2006 15:00:00	Decay Time. . . . . 4.33E-001 Hrs
Buildup Time. . . . . 0.00E+000 Hrs	Live Time . . . . . 60000 Sec
Sample Size . . . . . 1.00E+000 L	Real Time . . . . . 60796 Sec
Collection Efficiency 1.0000	Spc. File 061556D07.SPC

Detector #: 7 (Detector 7)

Energy(keV)= -2.20 + 0.501*Ch + 1.94E-07*Ch^2 + 0.00E+00*Ch^3 06/02/2006
FWHM(keV) = 0.77 + 0.008*En + 7.04E-04*En^2 + 0.00E+00*En^3 12/04/2005
Where En = Sqrt(Energy in keV)

Search Sensitivity: 1.00 | Sigma Multiplier: 2.00 | Search Start/End: 80/4000

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)		FLAG
1	46.45	97.19	364	82	60	728	0.83	a	
2	53.36	111.00	19	51	41	414	0.44	a	NET< CL
3	63.26	130.77	390	81	58	688	0.88	a	
4	66.17	136.59	153	85	67	826	1.05	b	
5	75.04	154.31	101	54	41	419	0.45	a	
6	77.10	158.41	95	54	41	419	0.49	b	
7	84.68	173.56	81	50	39	371	0.54	a	
8	87.33	178.85	49	78	63	741	0.97	b	NET< CL
9	92.55	189.28	521	80	54	597	0.89	a	
10	98.60	201.37	47	55	44	429	0.64	a	
11	106.50	217.14	29	71	58	622	0.93	a	NET< CL
12	139.67	283.41	139	64	49	490	0.87	a	
13	143.68	291.42	71	71	56	588	0.97	b	
14	185.65	375.24	303	76	56	579	1.03	a	
15	198.17	400.24	151	64	49	478	0.89	a	
16	238.45	480.68	183	69	52	499	1.01	a	
17	245.23	494.23	26	39	31	242	0.54	a	NET< CL
18	294.73	593.06	75	59	46	397	0.93	a	
19	351.72	706.86	139	50	36	299	0.89	a	
20	510.83	1024.53	1269	114	73	658	2.60	a	Wide Pk
21	558.32	1119.31	165	46	31	208	1.06	a	
22	569.70	1142.04	81	56	44	336	1.42	a	
23	583.03	1168.64	94	61	47	349	1.73	a	
24	609.40	1221.28	120	75	59	515	2.00	a	

000137

061556D07.SPC Analyzed by

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
25	802.80	1607.22	129	50	36	221	1.94	a
26	910.52	1822.13	28	32	25	139	1.20	a
27	961.56	1923.97	36	37	28	158	1.41	a
28	1460.54	2918.94	124	38	26	112	2.31	a

061556D07.SPC Analyzed by

****

SEEKER B A C K G R O U N D Q. C. A N A L Y S I S Version 2.2.2

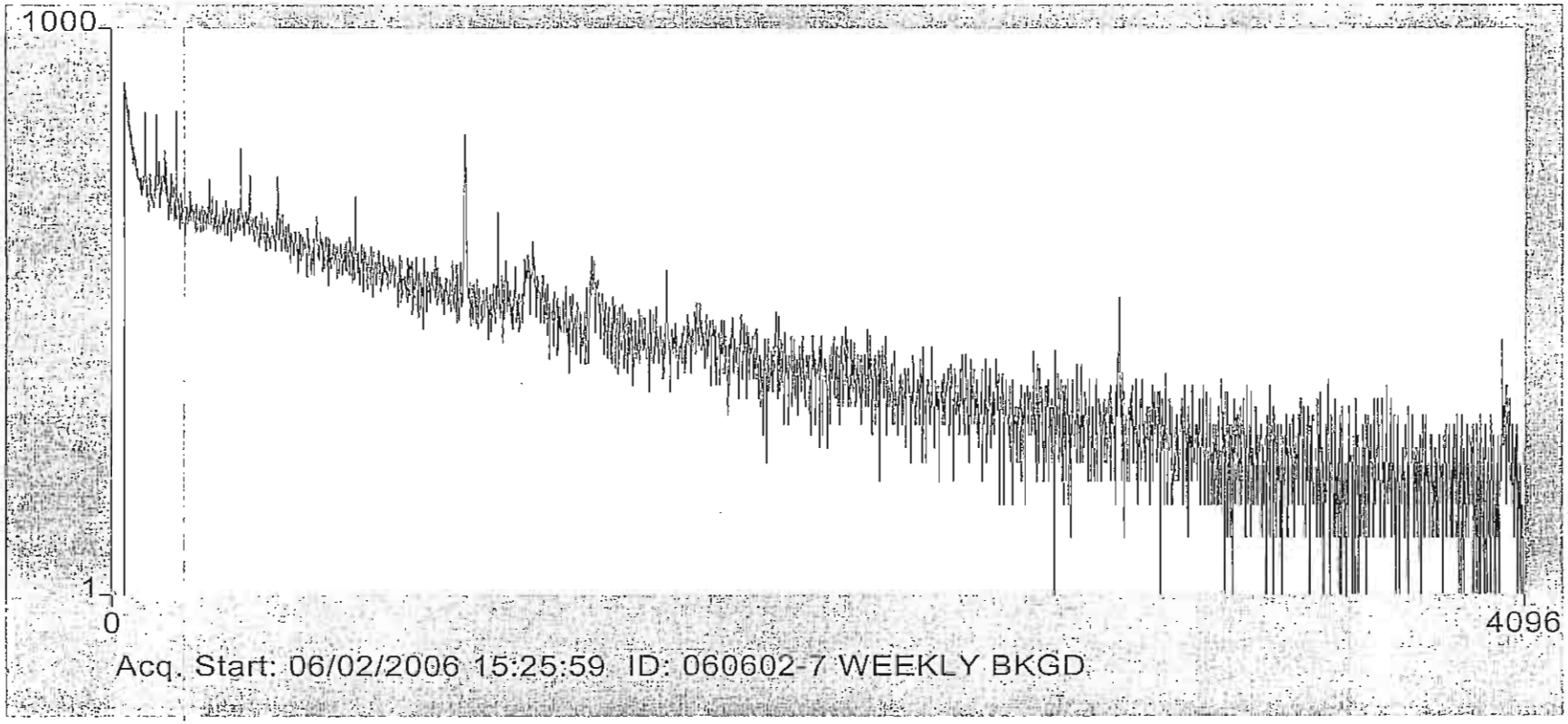
****

ID: 060602-7 WEEKLY BKGD

Detector # 7 Background Q.C. Analysis for 06/02/2006 15:25:59

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
10	50-> 150 keV Bkg	24.510	N.A.	Pass	N.A.
11	150-> 250 keV Bkg	18.536	N.A.	Pass	N.A.
12	250-> 500 keV Bkg	28.137	N.A.	Pass	N.A.
13	500->1000 keV Bkg	28.863	N.A.	Pass	N.A.
14	1000->2000 keV Bkg	16.583	N.A.	Pass	N.A.
15	40-> 50 keV Bkg	3.436	N.A.	Pass	N.A.

Q.C. Results Saved.


1000
1
0
4096
Acq. Start: 06/02/2006 15:25:59 ID: 060602-7 WEEKLY BKGD

061513D08.SPC Analyzed by LW

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SEEKER G A M M A A N A L Y S I S R E S U L T S PS Version 1.8.4

Paragon Analytics, Div. of DataChem Lab
GammaScan

****

Weekly Background Check

Sample ID: 060602-8 WEEKLY BKGD

Sampling Start:	06/02/2006 15:00:00	Counting Start:	06/02/2006 15:26:16
Sampling Stop:	06/02/2006 15:00:00	Decay Time.	4.38E-001 Hrs
Buildup Time.	0.00E+000 Hrs	Live Time	60000 Sec
Sample Size	1.00E+000 L	Real Time	60795 Sec
Collection Efficiency	1.0000	Spc. File	.061513D08.SPC

Detector #: 8 (Detector 8)

Energy(keV)= -0.44 + 0.500*Ch +-1.11E-08*Ch^2 + 5.70E-11*Ch^3 06/02/2006
FWHM(keV) = 0.68 + 0.014*En + 5.09E-04*En^2 + 0.00E+00*En^3 12/14/2005
Where En = Sqrt(Energy in keV)

Search Sensitivity: 1.00 | Sigma Multiplier: 2.00 | Search Start/End: 80/4000

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)		FLAG
1	46.40	93.68	498	93	67	822	1.02	a	
2	63.27	127.42	649	88	59	712	0.81	a	
3	66.49	133.86	234	88	68	854	0.92	b	
4	74.84	150.54	295	108	85	1132	1.33	a	
5	77.00	154.87	260	79	59	708	0.88	b	
6	84.16	169.20	170	123	99	1347	1.63	a	Wide Pk
7	87.15	175.18	75	72	58	673	0.75	b	
8	92.64	186.16	735	88	57	663	0.83	a	
9	108.76	218.40	38	47	37	341	0.45	a	
10	139.69	280.25	154	78	60	675	0.99	a	
11	143.80	288.47	105	58	45	450	0.62	b	
12	159.11	319.10	45	64	52	542	0.77	a	NET< CL
13	163.13	327.13	36	46	36	325	0.47	b	NET< CL
14	185.66	372.18	408	83	60	662	0.94	a	
15	198.26	397.39	197	77	59	648	0.98	a	
16	203.20	407.27	31	45	36	324	0.49	b	NET< CL
17	238.58	478.02	293	70	50	511	0.81	a	
18	295.30	591.47	85	65	51	482	1.05	a	
19	338.49	677.83	19	39	31	242	0.55	a	NET< CL
20	351.85	704.54	142	57	43	364	0.85	a	
21	357.31	715.46	31	60	49	437	0.94	b	NET< CL
22	510.91	1022.60	1649	127	81	840	2.38	a	Wide Pk
23	558.65	1118.06	196	58	42	323	1.36	a	
24	569.84	1140.42	82	56	43	349	1.23	a	

000141

061513D08.SPC Analyzed by

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)		FLAG
25	576.53	1153.80	37	39	31	215	0.84	a	
26	583.19	1167.11	130	56	42	331	1.26	a	
27	609.28	1219.27	136	55	41	350	0.98	a	
28	657.28	1315.23	34	45	35	247	1.08	a	NET< CL
29	692.98	1386.58	85	81	65	571	2.27	a	Wide Pk
30	802.76	1605.99	137	46	32	206	1.14	a	
31	880.46	1761.26	34	29	22	123	0.77	a	
32	898.50	1797.30	56	47	37	235	1.83	a	
33	911.02	1822.31	90	42	31	187	1.50	a	
34	1063.68	2127.26	38	38	30	172	1.50	a	
35	1460.58	2919.42	226	41	23	100	1.97	a	
36	1765.18	3526.56	38	26	19	73	1.56	a	

061513D08.SPC Analyzed by

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SEEKER B A C K G R O U N D Q. C. A N A L Y S I S Version 2.2.2

****

ID: 060602-8 WEEKLY BKGD

Detector # 8 Background Q.C. Analysis for 06/02/2006 15:26:16

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
10	50-> 150 keV Bkg	27.782	N.A.	Pass	N.A.
11	150-> 250 keV Bkg	21.660	N.A.	Pass	N.A.
12	250-> 500 keV Bkg	32.509	N.A.	Pass	N.A.
13	500->1000 keV Bkg	34.864	N.A.	Pass	N.A.
14	1000->2000 keV Bkg	20.276	N.A.	Pass	N.A.
15	40-> 50 keV Bkg	3.596	N.A.	Pass	N.A.

Q.C. Results Saved.

1000
1
0
4096
Acq. Start: 06/02/2006 15:26:16 ID: 060602-8 WEEKLY BKGD

Paragon Analytics

Gamma Spectrometer Calibration Log

Date: 6/9/06 Reviewed By/Date: LA 6/9/06

Det. No.	Out Of Service	Background		Source Check			Repeat Source Check			
		Started	OK	Started	OK	Failed Parameter(s)	OK	Failed Parameter(s)	Corrective Action Taken **	Removed from Service
1.	LA	/	/	/	/					
2.		LA	LA	LA	LA					
3.	LA	/	/	/	/					
4.		LA	LA	LA	/	662/1332 area	LA		gain adj	
5.	LA	/	/	/	/					
6.		LA	LA	LA	LA					
7.		LA	LA	LA	/	60 eff	LA			
8.		LA	LA	LA	LA					
9.	LA	/	/	/	/					
10.	LA	/	/	/	/					
11.										
12.										

** Corrective Action:

313862 A

061598D08.SPC Analyzed by LA

****

SEEKER G A M M A A N A L Y S I S R E S U L T S PS Version 1.8.4

Paragon Analytics, Div. of DataChem Lab
GammaScan

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Weekly Background Check

Sample ID: 060609-8 WEEKLY BKGD

Sampling Start:	06/09/2006 12:00:00	Counting Start:	06/09/2006 17:00:42
Sampling Stop:	06/09/2006 12:00:00	Decay Time.	5.01E+000 Hrs
Buildup Time.	0.00E+000 Hrs	Live Time	60000 Sec
Sample Size	1.00E+000 L	Real Time	60104 Sec
Collection Efficiency	1.0000	Spc. File	.061598D08.SPC

Detector #: 8 (Detector 8)

Energy(keV)= -0.38 + 0.500*Ch +-7.99E-08*Ch^2 + 7.06E-11*Ch^3 06/09/2006
FWHM(keV) = 0.68 + 0.014*En + 5.09E-04*En^2 + 0.00E+00*En^3 12/14/2005
Where En = Sqrt(Energy in keV)

Search Sensitivity: 1.00 | Sigma Multiplier: 2.00 | Search Start/End: 80/4000

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)		FLAG
1	46.43	93.55	538	86	59	708	0.89	a	
2	53.08	106.84	120	112	90	1207	1.51	a	Wide Pk
3	63.21	127.11	531	80	54	643	0.74	a	
4	66.28	133.23	175	81	63	803	0.77	b	
5	69.40	139.48	53	56	44	482	0.46	c	
6	74.93	150.53	181	70	53	634	0.72	a	
7	77.00	154.67	168	70	53	634	0.65	b	
8	84.55	169.76	127	73	58	668	0.87	a	
9	87.15	174.96	95	73	58	668	0.76	b	
10	89.88	180.40	65	52	40	401	0.48	c	
11	92.64	185.93	776	98	66	801	0.93	d	
12	94.10	188.84	64	62	49	534	0.70	e	
13	102.41	205.45	38	49	39	377	0.44	a	NET< CL
14	109.78	220.19	39	49	39	368	0.45	a	
15	139.83	280.25	181	80	62	703	1.05	a	
16	143.70	288.00	17	47	38	352	0.46	b	NET< CL
17	185.72	371.99	341	76	55	603	0.76	a	
18	198.24	397.01	241	77	58	619	1.04	a	
19	209.32	419.16	57	70	56	582	1.01	a	
20	238.60	477.69	308	69	49	483	0.90	a	
21	241.77	484.02	58	70	56	579	0.95	b	
22	295.27	590.97	79	64	51	480	0.91	a	
23	338.63	677.65	55	68	54	505	1.10	a	
24	352.01	704.39	180	62	46	388	0.98	a	

000146

061598D08.SPC Analyzed by LA

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
25	510.98	1022.12	1591	125	79	795	2.51 a	Wide Pk
26	558.44	1116.97	238	66	48	376	1.60 a	
27	569.78	1139.63	61	51	40	309	1.15 a	
28	583.10	1166.25	69	45	34	249	1.00 a	
29	609.35	1218.71	116	54	41	356	1.02 a	
30	650.87	1301.68	27	32	25	154	0.68 a	
31	669.82	1339.54	59	43	33	219	1.09 a	
32	803.03	1605.68	168	51	36	222	1.49 a	
33	911.23	1821.81	51	37	28	167	1.13 a	
34	961.74	1922.67	51	40	31	187	1.43 a	
35	1460.79	2918.44	170	43	28	143	2.11 a	

061598D08.SPC Analyzed by LA

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SEEKER B A C K G R O U N D Q. C. A N A L Y S I S Version 2.2.2

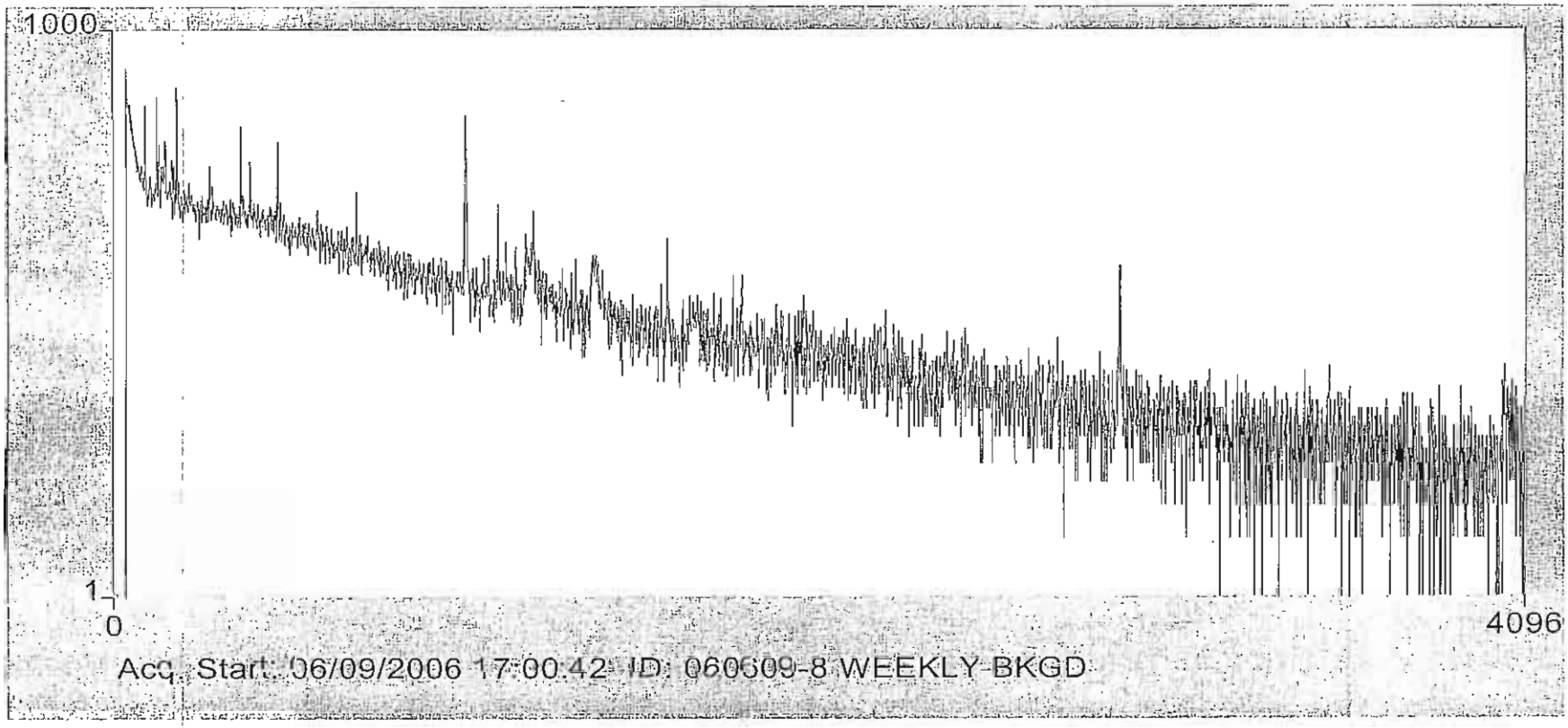
****

ID: 060609-8 WEEKLY BKGD

Detector # 8 Background Q.C. Analysis for 06/09/2006 17:00:42

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
10	50-> 150 keV Bkg	28.394	N.A.	Pass	N.A.
11	150-> 250 keV Bkg	21.892	N.A.	Pass	N.A.
12	250-> 500 keV Bkg	32.506	N.A.	Pass	N.A.
13	500->1000 keV Bkg	34.638	N.A.	Pass	N.A.
14	1000->2000 keV Bkg	20.424	N.A.	Pass	N.A.
15	40-> 50 keV Bkg	3.727	N.A.	Pass	N.A.

Q.C. Results Saved.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1
0
4096
Acq. Start: 06/09/2006 17:00:42 ID: 060609-8 WEEKLY-BKGD

Paragon Analytics

Gamma Spectrometer Calibration Log

Date: 6/16/06 Reviewed By/Date: CW 6/17/06

Det. No.	Out Of Service	Background		Source Check			Repeat Source Check			
		Started	OK	Started	OK	Failed Parameter(s)	OK	Failed Parameter(s)	Corrective Action Taken **	Removed from Service
1.	CW			/	/					
2.		CW	CW	CW	LA					
3.	CW			/	/					
4.		CW	CW	LA	/	1332 cntd	LA			
5.	CW			/	/					
6.		CW	CW	CW	LA					
7.		↓	↓	↓	/	662 ^{137}Cs eff	LA			
8.		↓	↓	↓	LA					
9.	CW			/	/					
10.	CW			/	/					
11.										
12.										

** Corrective Action:

313876 A

061691D08.SPC Analyzed by CW

****

SEEKER G A M M A A N A L Y S I S R E S U L T S PS Version 1.8.4

Paragon Analytics, Div. of DataChem Lab
GammaScan

****

Weekly Background Check

Sample ID: 060616-8 WEEKLY BKGD

Sampling Start:	06/16/2006 15:00:00	Counting Start:	06/16/2006 15:21:00
Sampling Stop:	06/16/2006 15:00:00	Decay Time.	3.50E-001 Hrs
Buildup Time.	0.00E+000 Hrs	Live Time	60000 Sec
Sample Size	1.00E+000 L	Real Time	60108 Sec
Collection Efficiency	1.0000	Spc. File	.061691D08.SPC

Detector #: 8 (Detector 8)

Energy(keV)= -0.39 + 0.500*Ch + 2.21E-07*Ch^2 + 0.00E+00*Ch^3 06/16/2006
FWHM(keV) = 0.68 + 0.014*En + 5.09E-04*En^2 + 0.00E+00*En^3 12/14/2005
Where En = Sqrt(Energy in keV)

Search Sensitivity: 1.00 | Sigma Multiplier: 2.00 | Search Start/End: 80/4000

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)		FLAG
1	46.44	93.69	415	75	52	590	0.73	a	
2	53.36	107.54	58	52	41	406	0.44	a	
3	63.18	127.18	587	89	61	758	0.78	a	
4	66.34	133.50	232	91	70	910	1.00	b	
5	74.81	150.43	150	60	45	504	0.47	a	
6	77.01	154.84	152	82	65	840	0.77	b	
7	84.33	169.49	170	91	72	873	1.12	a	
8	87.34	175.50	126	52	39	374	0.56	b	
9	89.58	179.98	87	89	72	873	1.12	c	
10	92.57	185.96	898	98	64	748	1.02	d	
11	98.42	197.65	42	67	54	593	0.79	a	NET< CL
12	139.83	280.49	191	70	53	568	0.89	a	
13	148.82	298.48	76	74	59	638	0.99	a	
14	159.13	319.09	32	45	36	323	0.47	a	NET< CL
15	167.16	335.15	28	45	36	318	0.47	a	NET< CL
16	185.58	371.99	362	81	59	639	0.94	a	
17	198.23	397.28	211	68	51	522	0.90	a	
18	238.47	477.76	307	70	50	507	0.79	a	
19	295.23	591.25	74	65	51	488	0.96	a	
20	323.53	647.84	25	38	30	223	0.55	a	NET< CL
21	337.96	676.70	32	68	55	524	1.22	a	NET< CL
22	351.78	704.32	168	68	52	456	1.16	a	
23	510.84	1022.29	1707	128	80	794	2.67	a	Wide Pk
24	558.37	1117.28	205	55	39	295	1.11	a	

000151

061691D08.SPC Analyzed by

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG	
25	569.80	1140.12	81	42	32	227	0.78	a	
26	583.16	1166.82	121	59	45	348	1.45	a	
27	609.12	1218.71	103	54	41	353	1.01	a	
28	669.82	1340.01	52	53	42	300	1.48	a	
29	802.84	1605.78	131	50	37	233	1.44	a	
30	839.31	1678.62	43	50	40	293	1.65	a	
31	881.37	1762.65	73	60	48	309	2.77	a	Wide Pk
32	910.82	1821.46	93	46	35	220	1.57	a	
33	961.69	1923.06	55	37	28	157	1.34	a	
34	969.10	1937.87	78	54	42	274	2.32	b	
35	1042.23	2083.90	35	30	23	118	0.92	a	
36	1460.20	2918.24	180	38	23	98	1.88	a	
37	1764.48	3525.23	26	27	20	79	1.80	a	

061691D08.SPC Analyzed by

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SEEKER B A C K G R O U N D Q. C. A N A L Y S I S Version 2.2.2

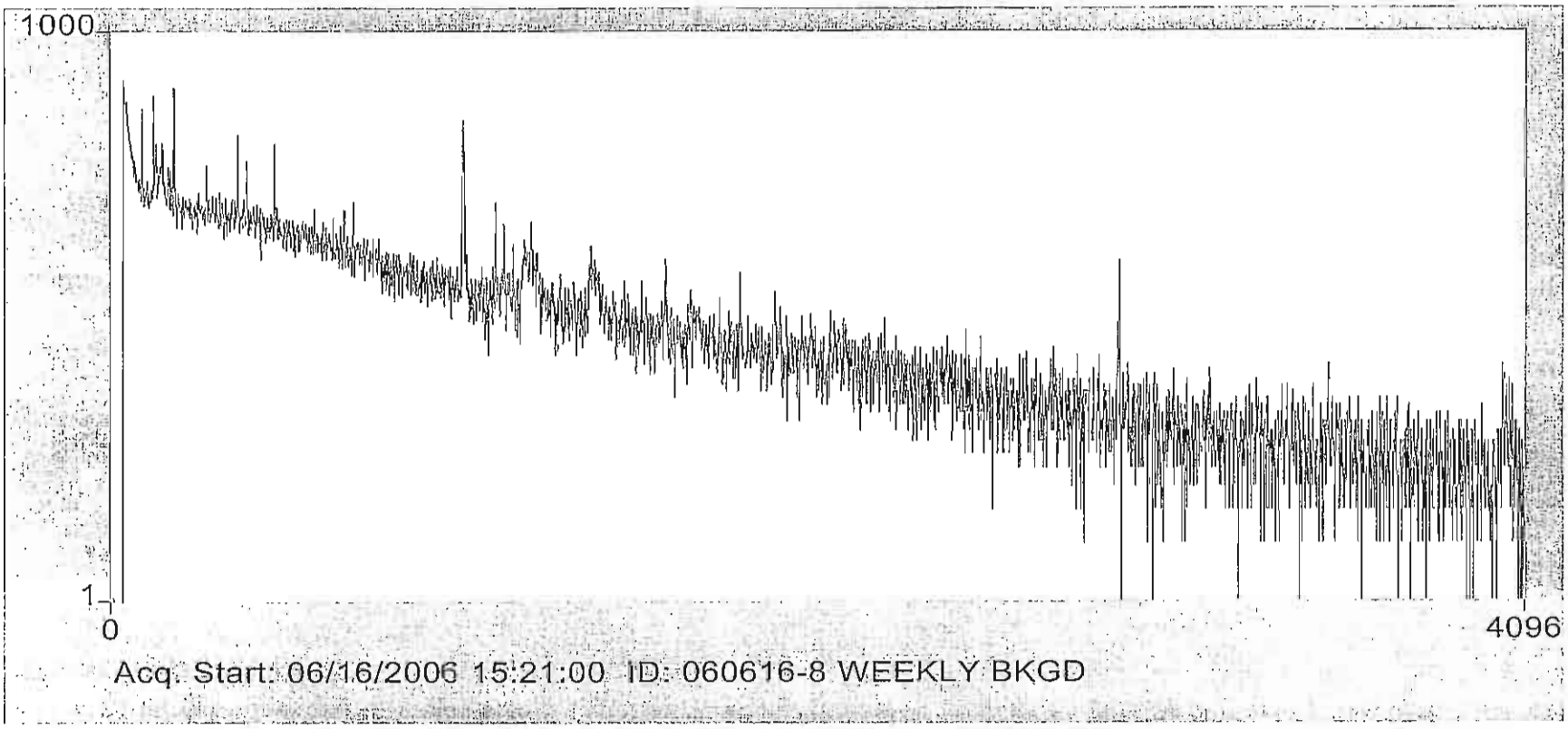
****

ID: 060616-8 WEEKLY BKGD

Detector # 8 Background Q.C. Analysis for 06/16/2006 15:21:00

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
10	50-> 150 keV Bkg	28.201	N.A.	Pass	N.A.
11	150-> 250 keV Bkg	21.585	N.A.	Pass	N.A.
12	250-> 500 keV Bkg	32.852	N.A.	Pass	N.A.
13	500->1000 keV Bkg	34.726	N.A.	Pass	N.A.
14	1000->2000 keV Bkg	20.440	N.A.	Pass	N.A.
15	40-> 50 keV Bkg	3.530	N.A.	Pass	N.A.

Q.C. Results Saved.


1000
1
0
4096
Acq. Start: 06/16/2006 15:21:00 ID: 060616-8 WEEKLY BKGD

Gamma Spectroscopy

Quality Control Data

Daily Instrument Performance Checks

ANALYTICS

ATD 0126

Analytics, Inc.
1380 Seaboard Industrial Boulevard
Atlanta, Georgia 30318
404 352-8677

recd 12-29-94

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

49500-307

50 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solution sources. The Am-241 was calibrated by 4 pi alpha liquid scintillation counting. All other radionuclides were calibrated using a germanium gamma spectrometer system. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Rev. 1, February, 1979.

Calibration date: October 1, 1994 12:00 EST

ISOTOPE	GAMMA-RAY ENERGY	HALF-LIFE		GAMMA-RAYS PER SECOND	TOTAL UNCERTAINTY %
Am-241	59.5	432	y	1759	5.0
Cd-109	88	462.6	d	2622	4.5
Co-57	122	271.79	d	1472	4.2
Ce-139	166	137.64	d	2037	4.6
Hg-203	279	46.595	d	3978	4.5
Sn-113	392	115.09	d	2862	4.7
Cs-137	662	30.0	y	1735	4.7
Y-88	898	106.63	d	7290	4.4
Co-60	1173	5.2714	y	3347	4.3
Co-60	1332	5.2714	y	3355	4.8
Y-88	1836	106.63	d	7630	4.3

50.8520 grams solution 4M HCl.
P O NUMBER 45864, Item 1

SOURCE PREPARED BY: H. W. Currie
H. W. Currie, Radiochemist

Q A APPROVED: D. M. Martin 12-23-94

This standard will expire one year after the calibration date.

000156

ANALYTICS

ATI ID 0126

Analytics, Inc.
1680 Seaboard Industrial Boulevard
Atlanta, Georgia 30318
404 352-8677

ANALYSIS OF UNCERTAINTY

BATCH 78 MIXED GAMMA STANDARDS WITH Am-241
CALIBRATION DATE: October 1, 1994 12:00 EST

GAMMA RAY ENERGY (keV)	RANDOM ERROR % (99 % CL)	SYSTEMATIC ERROR %	TOTAL %
59.5	2.0	3.0	5.0
88	1.5	3.0	4.5
122	1.6	2.6	4.2
166	2.1	2.5	4.6
279	1.5	3.0	4.5
392	1.9	2.8	4.7
662	1.9	2.8	4.7
898	1.4	3.0	4.4
1173	1.5	2.8	4.3
1332	2.0	2.8	4.8
1836	1.2	3.1	4.3

The systematic error includes the error in calibration standards, weighing error, and estimated counting corrections. All uncertainties are stated at the 99% confidence level.

No interfering gamma emitting impurities were detected during calibration. Depending on the resolution and energy dispersion (kev/channel) of the measuring system, the following spectral conflicts may occur: (1) between the 88 keV gamma-ray and the X-rays emitted in the decay of Hg-203, (2) between the 1333 keV gamma-ray and the 1325 keV single escape peak from the 1836 keV gamma-ray.

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, 1994, through December 31, 1994, in a radioactivity measurements assurance program conducted by the National Institute of Standards and Technology, in cooperation with the U.S. Council for Energy Awareness. 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,

J.M. Robin Hutchinson, Acting Group Leader
Radioactivity Group
Physics Laboratory

(over)

000158

(ATI ID 126)
Analytics Std. 49500-307 was diluted 12 ways to gamma spectrometer daily calibration standards. For each standard, 4 ml of 49500-307 was added to 100 ml in a 100 ml class A volumetric with DI water. The solution was agitated and transferred to a [illegible] 250 cc pre-cleaned [illegible]. Activity calculations (as of 10-1-94) are attached below. The remaining ~2 ml of standard was discarded down the drain. [signature]

Expiration Dates:
For primary calibration: 1-8-95
For instrument performance checks, daily calibration: 12-31-95
[initials]

1380 Seaboard Industrial Boulevard
Atlanta, Georgia
ANALYTICS Phone
Mixed Gamma
Type
SRS 49500-307
Amount 2.806 uCi
Expires
Date
Cal QA
PO
CAUTION
RADIOACTIVE MATERIAL

ATI Working Standards 178-A through L
ATI Inventory Number 126
Analytics Standard ID: 49500-307
Prepared 01/08/95

Isotope	Energy	GPS	Abn.	Original Vol. (ml)	Aliquot ml	Final ml	Final pCi/ml	Final pCi Total	Final pCi/l	Final GPS	Final DPS
Am-241	59.5	1759	0.359	50	4	100	105.9	10594	105940	140.7	392.0
Cd-109	88	2622	0.0372	50	4	100	1524.0	152398	1523976	209.8	5638.7
Co-57	122	1472	0.8551	50	4	100	37.2	3722	37220	117.8	137.7
Ce-139	166	2037	0.8035	50	4	100	54.8	5481	54814	163.0	202.8
Hg-203	279	3978	0.773	50	4	100	111.3	11127	111269	318.2	411.7
Sn-113	392	2862	0.649	50	4	100	95.3	9535	95348	229.0	352.8
Cs-137	662	1735	0.8512	50	4	100	44.1	4407	44071	138.8	163.1
Y-88	898	7290	0.934	50	4	100	168.8	16876	168760	583.2	624.4
Co-60	1173	3347	1	50	4	100	72.4	7237	72368	267.8	267.8
Co-60	1332	3355	1	50	4	100	72.5	7254	72541	268.4	268.4
Y-88	1836	7630	0.9938	50	4	100	166.0	16600	166002	610.4	614.2

Continued on Page

Read and Understood By

000159

[signature] Signed 1/8/95 Date [signature] Signed 2/6/01 Date

Paragon Analytics

Gamma Spectrometer Calibration Log

Date: 10/10/06 Reviewed By/Date: LA 10/11/06

Det. No.	Out Of Service	Background		Source Check			Repeat Source Check			
		Started	OK	Started	OK	Failed Parameter(s)	OK	Failed Parameter(s)	Corrective Action Taken **	Removed from Service
1.	CW			✓	✓					
2.				CW	CW					
3.	CW			✓	✓					
4.				CW	✓	662 1332 Cent.	CW		Gain Adj.	
5.	CW			✓	✓					
6.				CW	CW					
7.				↓	✓	1332 FWHM	CW			
8.				↓	CW					
9.	CW			✓	✓					
10.	CW			✓	✓					
11.										
12.										

** Corrective Action:

313855 A

061357D02.SPC Analyzed by CW

****

SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2.2

****

ID: DAILY CHECK

Detector # 2 Detector Q.C. Analysis for 06/06/2006 08:22:56

Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	120.485	N.A.	Pass	N.A.
2	60 keV FWHM	8.315E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	1.289E-02	N.A.	Pass	N.A.
4	662 keV Centroid	1323.704	N.A.	Pass	N.A.
5	662 keV FWHM	1.652	N.A.	Pass	N.A.
6	662 keV Efficiency	2.154E-02	N.A.	Pass	N.A.
7	1332 keV Centroid	2664.055	N.A.	Pass	N.A.
8	1332 keV FWHM	2.619	N.A.	Pass	N.A.
9	1332 keV Efficiency	1.074E-02	N.A.	Pass	N.A.

061580D07.SPC Analyzed by CW

****

SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2.2

****

ID: DAILY CHECK
Detector # 7 Detector Q.C. Analysis for 06/06/2006 08:23:04
Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	123.178	N.A.	Pass	N.A.
2	60 keV FWHM	8.928E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	7.057E-02	N.A.	Pass	N.A.
4	662 keV Centroid	1324.830	N.A.	Pass	N.A.
5	662 keV FWHM	1.455	N.A.	Pass	N.A.
6	662 keV Efficiency	1.621E-02	N.A.	Pass	N.A.
7	1332 keV Centroid	2662.201	N.A.	Pass	N.A.
8	1332 keV FWHM	2.128	N.A.	<FAIL>	N.A.
9	1332 keV Efficiency	7.522E-03	N.A.	Pass	N.A.

061581D07.SPC Analyzed by

****

SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2.2

****

ID: DAILY CHECK
Detector # 7 Detector Q.C. Analysis for 06/06/2006 08:52:15
Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	123.088	N.A.	Pass	N.A.
2	60 keV FWHM	9.112E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	7.204E-02	N.A.	Pass	N.A.
4	662 keV Centroid	1324.760	N.A.	Pass	N.A.
5	662 keV FWHM	1.445	N.A.	Pass	N.A.
6	662 keV Efficiency	1.565E-02	N.A.	Pass	N.A.
7	1332 keV Centroid	2662.131	N.A.	Pass	N.A.
8	1332 keV FWHM	1.970	N.A.	Pass	N.A.
9	1332 keV Efficiency	8.028E-03	N.A.	Pass	N.A.

061532D08.SPC Analyzed by: MW

****

SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2.2

****

ID: DAILY CHECK
Detector # 8 Detector Q.C. Analysis for 06/06/2006 08:23:06
Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	119.922	N.A.	Pass	N.A.
2	60 keV FWHM	8.139E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	7.130E-02	N.A.	Pass	N.A.
4	662 keV Centroid	1323.768	N.A.	Pass	N.A.
5	662 keV FWHM	1.364	N.A.	Pass	N.A.
6	662 keV Efficiency	1.757E-02	N.A.	Pass	N.A.
7	1332 keV Centroid	2663.623	N.A.	Pass	N.A.
8	1332 keV FWHM	1.856	N.A.	Pass	N.A.
9	1332 keV Efficiency	9.238E-03	N.A.	Pass	N.A.

Paragon Analytics

Gamma Spectrometer Calibration Log

Date: 6/7/06 Reviewed By/Date: LA 6/7/06

Det. No.	Out Of Service	Background		Source Check			Repeat Source Check			
		Started	OK	Started	OK	Failed Parameter(s)	OK	Failed Parameter(s)	Corrective Action Taken **	Removed from Service
1.	LA			/	/					
2.				LA	LA					
3.	LA			/	/					
4.				LA	/	662/1332 ctrd	LA			
5.	LA			/	/					
6.				LA	LA					
7.				LA	/	662 eff	LA			
8.				LA	LA					
9.	LA			/	/					
10.	LA			/	/					
11.										
12.										

** Corrective Action:

313857 A

061370D02.SPC Analyzed by LA

****

SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2.2

****

ID: DAILY CHECK

Detector # 2 Detector Q.C. Analysis for 06/07/2006 08:06:07

Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	120.438	N.A.	Pass	N.A.
2	60 keV FWHM	7.985E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	1.285E-02	N.A.	Pass	N.A.
4	662 keV Centroid	1323.253	N.A.	Pass	N.A.
5	662 keV FWHM	1.698	N.A.	Pass	N.A.
6	662 keV Efficiency	2.140E-02	N.A.	Pass	N.A.
7	1332 keV Centroid	2663.139	N.A.	Pass	N.A.
8	1332 keV FWHM	2.519	N.A.	Pass	N.A.
9	1332 keV Efficiency	1.016E-02	N.A.	Pass	N.A.

061593D07.SPC Analyzed by LA

****

SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2.2

****

ID: DAILY CHECK

Detector # 7 Detector Q.C. Analysis for 06/07/2006 08:06:37

Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	123.108	N.A.	Pass	N.A.
2	60 keV FWHM	8.979E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	7.111E-02	N.A.	Pass	N.A.
4	662 keV Centroid	1324.905	N.A.	Pass	N.A.
5	662 keV FWHM	1.488	N.A.	Pass	N.A.
6	662 keV Efficiency	1.632E-02	N.A.	<FAIL>	N.A.
7	1332 keV Centroid	2662.614	N.A.	Pass	N.A.
8	1332 keV FWHM	2.049	N.A.	Pass	N.A.
9	1332 keV Efficiency	7.806E-03	N.A.	Pass	N.A.

061594D07.SPC Analyzed by LA

****

SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2.2

****

ID: DAILY CHECK
Detector # 7 Detector Q.C. Analysis for 06/07/2006 08:35:56
Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	123.093	N.A.	Pass	N.A.
2	60 keV FWHM	8.915E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	7.237E-02	N.A.	Pass	N.A.
4	662 keV Centroid	1324.855	N.A.	Pass	N.A.
5	662 keV FWHM	1.431	N.A.	Pass	N.A.
6	662 keV Efficiency	1.607E-02	N.A.	Pass	N.A.
7	1332 keV Centroid	2662.444	N.A.	Pass	N.A.
8	1332 keV FWHM	1.932	N.A.	Pass	N.A.
9	1332 keV Efficiency	7.532E-03	N.A.	Pass	N.A.

061540D08.SPC Analyzed by LA

****

SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2.2

****

ID: DAILY CHECK
Detector # 8 Detector Q.C. Analysis for 06/07/2006 08:06:48
Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	119.770	N.A.	Pass	N.A.
2	60 keV FWHM	8.182E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	7.169E-02	N.A.	Pass	N.A.
4	662 keV Centroid	1323.054	N.A.	Pass	N.A.
5	662 keV FWHM	1.358	N.A.	Pass	N.A.
6	662 keV Efficiency	1.843E-02	N.A.	Pass	N.A.
7	1332 keV Centroid	2662.212	N.A.	Pass	N.A.
8	1332 keV FWHM	1.953	N.A.	Pass	N.A.
9	1332 keV Efficiency	9.549E-03	N.A.	Pass	N.A.

Paragon Analytics

Gamma Spectrometer Calibration Log

Date: 6/11/06 Reviewed By/Date: LA 6/11/06

Det. No.	Out Of Service	Background		Source Check			Repeat Source Check			
		Started	OK	Started	OK	Failed Parameter(s)	OK	Failed Parameter(s)	Corrective Action Taken **	Removed from Service
1.	LA			✓	✓					
2.				LA	LA					
3.	LA			✓	✓					
4.				LA	LA					
5.	LA			✓	✓					
6.				LA	LA					
7.				LA	✓	1332 ^{60}eff	LA			
8.				LA	✓	1332 ^{60}eff and/eff	LA			
9.	LA			✓	✓					
10.	LA			✓	✓					
11.										
12.										

** Corrective Action:

313866
A

061608D08.SPC Analyzed by

****

SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2.2

****

ID: DAILY CHECK
Detector # 8 Detector Q.C. Analysis for 06/11/2006 16:52:50
Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	119.828	N.A.	Pass	N.A.
2	60 keV FWHM	7.960E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	7.181E-02	N.A.	Pass	N.A.
4	662 keV Centroid	1323.731	N.A.	Pass	N.A.
5	662 keV FWHM	1.363	N.A.	Pass	N.A.
6	662 keV Efficiency	1.881E-02	N.A.	<FAIL>	N.A.
7	1332 keV Centroid	2663.557	N.A.	Pass	N.A.
8	1332 keV FWHM	1.895	N.A.	Pass	N.A.
9	1332 keV Efficiency	1.017E-02	N.A.	<FAIL>	N.A.

061606D08.SPC Analyzed by

****

SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2.2

****

ID: DAILY CHECK

Detector # 8 Detector Q.C. Analysis for 06/11/2006 15:40:06

Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	119.720	N.A.	Pass	N.A.
2	60 keV FWHM	7.966E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	7.158E-02	N.A.	Pass	N.A.
4	662 keV Centroid	1322.704	N.A.	Pass	N.A.
5	662 keV FWHM	1.386	N.A.	Pass	N.A.
6	662 keV Efficiency	1.781E-02	N.A.	Pass	N.A.
7	1332 keV Centroid	2661.525	N.A.	<FAIL>	N.A.
8	1332 keV FWHM	1.995	N.A.	Pass	N.A.
9	1332 keV Efficiency	1.009E-02	N.A.	<FAIL>	N.A.

061607D08.SPC Analyzed by

****

SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2.2

****

ID: DAILY CHECK
Detector # 8 Detector Q.C. Analysis for 06/11/2006 16:31:31
Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	119.837	N.A.	Pass	N.A.
2	60 keV FWHM	8.105E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	7.307E-02	N.A.	<FAIL>	N.A.
4	662 keV Centroid	1323.787	N.A.	Pass	N.A.
5	662 keV FWHM	1.321	N.A.	Pass	N.A.
6	662 keV Efficiency	1.843E-02	N.A.	Pass	N.A.
7	1332 keV Centroid	2663.596	N.A.	Pass	N.A.
8	1332 keV FWHM	1.852	N.A.	Pass	N.A.
9	1332 keV Efficiency	9.213E-03	N.A.	Pass	N.A.

061609D08.SPC Analyzed by

****

SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2.2

****

ID: DAILY CHECK
Detector # 8 Detector Q.C. Analysis for 06/11/2006 17:16:27
Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	119.840	N.A.	Pass	N.A.
2	60 keV FWHM	7.881E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	7.181E-02	N.A.	Pass	N.A.
4	662 keV Centroid	1323.747	N.A.	Pass	N.A.
5	662 keV FWHM	1.393	N.A.	Pass	N.A.
6	662 keV Efficiency	1.767E-02	N.A.	Pass	N.A.
7	1332 keV Centroid	2663.635	N.A.	Pass	N.A.
8	1332 keV FWHM	1.926	N.A.	Pass	N.A.
9	1332 keV Efficiency	9.068E-03	N.A.	Pass	N.A.

Paragon Analytics

Gamma Spectrometer Calibration Log

Date: 6/12/06 Reviewed By/Date: 6/12/06

Det. No.	Out Of Service	Background		Source Check			Repeat Source Check			
		Started	OK	Started	OK	Failed Parameter(s)	OK	Failed Parameter(s)	Corrective Action Taken **	Removed from Service
1.	LA									
2.				LA	LA					
3.	LA			/	/					
4.				LA	/	662/137a c+n2	LA			
5.	LA			/	/					
6.				LA	/	60 FWHM	LA			
7.				LA	LA					
8.				LA	/	60 Eff	LA			
9.	LA			/	/					
10.	LA			/	/					
11.										
12.										

** Corrective Action:

313867 A

061611D08.SPC Analyzed by LA

****

SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2.2

****

ID: DAILY CHECK
Detector # 8 Detector Q.C. Analysis for 06/12/2006 09:26:25
Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	119.747	N.A.	Pass	N.A.
2	60 keV FWHM	8.025E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	7.312E-02	N.A.	<FAIL>	N.A.
4	662 keV Centroid	1323.466	N.A.	Pass	N.A.
5	662 keV FWHM	1.367	N.A.	Pass	N.A.
6	662 keV Efficiency	1.853E-02	N.A.	Pass	N.A.
7	1332 keV Centroid	2663.043	N.A.	Pass	N.A.
8	1332 keV FWHM	1.910	N.A.	Pass	N.A.
9	1332 keV Efficiency	9.585E-03	N.A.	Pass	N.A.

061614D08.SPC Analyzed by LA

****

SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2.2

****

ID: DAILY CHECK
Detector # 8 Detector Q.C. Analysis for 06/12/2006 10:49:20
Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	119.738	N.A.	Pass	N.A.
2	60 keV FWHM	8.043E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	7.235E-02	N.A.	Pass	N.A.
4	662 keV Centroid	1323.473	N.A.	Pass	N.A.
5	662 keV FWHM	1.368	N.A.	Pass	N.A.
6	662 keV Efficiency	1.775E-02	N.A.	Pass	N.A.
7	1332 keV Centroid	2663.166	N.A.	Pass	N.A.
8	1332 keV FWHM	1.877	N.A.	Pass	N.A.
9	1332 keV Efficiency	9.326E-03	N.A.	Pass	N.A.

Paragon Analytics

Gamma Spectrometer Calibration Log

Date: 6/18/06 Reviewed By/Date: LA 6/19/06

Det. No.	Out Of Service	Background		Source Check			Repeat Source Check			
		Started	OK	Started	OK	Failed Parameter(s)	OK	Failed Parameter(s)	Corrective Action Taken **	Removed from Service
1.	CW			—	—					
2.				CW	CW					
3.	CW			—	—					
4.				CW	—	1332 Cent.	CW		Coarse Adj.	
5.	CW			—	—					
6.				CW	CW					
7.				↓	↓					
8.				↓	↓					
9.	CW			—	—					
10.	CW			—	—					
11.										
12.										

** Corrective Action:

313878 A

Form 754r11a.doc (6/13/2005)

061695D08.SPC Analyzed by LW

****

SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2.2

****

ID: DAILY CHECK

Detector # 8 Detector Q.C. Analysis for 06/18/2006 15:49:31

Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	119.798	N.A.	Pass	N.A.
2	60 keV FWHM	8.012E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	7.118E-02	N.A.	Pass	N.A.
4	662 keV Centroid	1323.427	N.A.	Pass	N.A.
5	662 keV FWHM	1.318	N.A.	Pass	N.A.
6	662 keV Efficiency	1.818E-02	N.A.	Pass	N.A.
7	1332 keV Centroid	2663.146	N.A.	Pass	N.A.
8	1332 keV FWHM	1.797	N.A.	Pass	N.A.
9	1332 keV Efficiency	9.383E-03	N.A.	Pass	N.A.

Paragon Analytics

Gamma Spectrometer Calibration Log

Date: 06/19/06 Reviewed By/Date: [illegible] 6/19/06

Det. No.	Out Of Service	Background		Source Check			Repeat Source Check			
		Started	OK	Started	OK	Failed Parameter(s)	OK	Failed Parameter(s)	Corrective Action Taken **	Removed from Service
1.	LA			/	/					
2.				LA	LA					
3.	LA			/	/					
4.				LA	/	662/1332 drift				
5.	LA			/	/					
6.				LA	LA					
7.				LA	LA					
8.				LA	LA					
9.	LA			/	/					
10.	LA			/	/					
11.										
12.										

** Corrective Action:

313879 A

Form 754r11a.doc (6/13/2005)

061698D08.SPC Analyzed by CW

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SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2.2

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ID: DAILY CHECK

Detector # 8 Detector Q.C. Analysis for 06/19/2006 09:26:45

Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	119.767	N.A.	Pass	N.A.
2	60 keV FWHM	8.064E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	7.244E-02	N.A.	Pass	N.A.
4	662 keV Centroid	1323.391	N.A.	Pass	N.A.
5	662 keV FWHM	1.367	N.A.	Pass	N.A.
6	662 keV Efficiency	1.785E-02	N.A.	Pass	N.A.
7	1332 keV Centroid	2662.883	N.A.	Pass	N.A.
8	1332 keV FWHM	1.818	N.A.	Pass	N.A.
9	1332 keV Efficiency	8.789E-03	N.A.	Pass	N.A.

Paragon Analytics

Gamma Spectrometer Calibration Log

Date: 6/20/06 Reviewed By/Date: LA 6/20/06

Det. No.	Out Of Service	Background		Source Check			Repeat Source Check			
		Started	OK	Started	OK	Failed Parameter(s)	OK	Failed Parameter(s)	Corrective Action Taken **	Removed from Service
1.	CW			—	—					
2.				LA	CW					
3.	CW			—	—					
4.				CW	CW					
5.	CW			—	—					
6.				LA	CW					
7.				CW	—	60 EFF	CW			
8.				†	CW					
9.	CW			—	—					
10.	CW			—	—					
11.										
12.										

** Corrective Action:

313881 A

061709D08.SPC Analyzed by

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SEEKER D E T E C T O R Q. C. A N A L Y S I S Version 2.2

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ID: DAILY CHECK
Detector # 8 Detector Q.C. Analysis for 06/20/2006 08:25:14
Standards File #: 98 (Daily Performance Check 49500-307)

#	Parameter	Value	n Sigma Test	Bounds Test	T-Test
1	60 keV Centroid	119.785	N.A.	Pass	N.A.
2	60 keV FWHM	7.968E-01	N.A.	Pass	N.A.
3	60 keV Efficiency	7.172E-02	N.A.	Pass	N.A.
4	662 keV Centroid	1323.414	N.A.	Pass	N.A.
5	662 keV FWHM	1.383	N.A.	Pass	N.A.
6	662 keV Efficiency	1.786E-02	N.A.	Pass	N.A.
7	1332 keV Centroid	2662.996	N.A.	Pass	N.A.
8	1332 keV FWHM	1.853	N.A.	Pass	N.A.
9	1332 keV Efficiency	9.098E-03	N.A.	Pass	N.A.