



# Paragon Analytics

## Radiochemistry Case Narrative Gamma Spectroscopy

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### Cordilleran Compliance Services, Inc.

Battlement Mesa / E04243

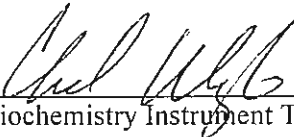
Paragon Work Order 0605177

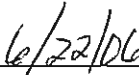
1. This report consists of analysis results for two water samples received by Paragon Analytics on 05/24/2006. The analysis results for these samples are reported in units of pCi/L. Due to the presence of sediment, the sample BM3613 PW (PA ID 0605177-1) was filtered prior to analysis. The remaining sample was not filtered.
2. These samples were prepared according to Paragon Analytics procedure PA SOP739R8, with modifications outlined in QASS #313628.
3. The samples were analyzed for the presence of gamma emitting radionuclides according to Paragon Analytics procedure PA SOP713R8. The analyses were completed on 06/19/2006.
4. Activity concentrations above the calculated MDC are reported in some instances where minimum nuclide identification criteria are not met. Such tentative identifications result when the software attempts to calculate net activity concentrations for analytes where either one or both of the following criteria are not satisfied: the 'diagnostic' peak for a nuclide must be identified above the critical level, or the minimum library peak abundance must be attained. Nuclides not meeting these requirements have been flagged with a "TI" qualifier.
5. Paragon Analytics has found there to be a significant low bias to  $^{214}\text{Pb}$  and  $^{214}\text{Bi}$  results when using a mixed nuclide gamma source for efficiency calibrations. The magnitude of this bias has been determined to be approximately 32% for  $^{214}\text{Bi}$ , and 23% for  $^{214}\text{Pb}$ . Therefore, any reported results for  $^{214}\text{Pb}$  and  $^{214}\text{Bi}$  are flagged with a "J" qualifier, indicating the activity values to be an estimated value. Results are reported without further qualification.
6. Technical considerations made in the creation of the gamma spectroscopy library used in this analysis are detailed in the document "Technical Comments Regarding Gamma Spectroscopy Libraries" found in Section 4.
7. There are cases where the magnitude of negative activity is greater than the  $2\sigma$  TPU. Under typical conditions, where background data is normally distributed and analyzed by paired observations, this event is likely to occur at least 2.5% of the time. Review of the data does not indicate a problem with the instrument or reporting systems and results are reported without further qualification.

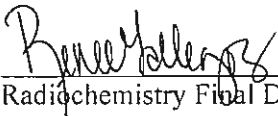


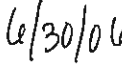
8. No further problems were encountered with either the client samples or the associated quality control samples. All remaining quality control criteria were met.

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

  
\_\_\_\_\_  
Radiochemistry Instrument Technician

  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Radiochemistry Final Data Review

  
\_\_\_\_\_  
Date

PARAGON ANALYTICS  
Radiochemistry Data Package

Section 1

**SAMPLE RESULTS  
SUMMARY**

**Due to the nature of gamma spectroscopy  
data a summary report is not provided.**

**Please refer to the individual sample results  
in Section 3.**

**2**

PARAGON ANALYTICS  
Radiochemistry Data Package

Section 2

**QC RESULTS  
SUMMARY**

**000005**

# Gamma Spectroscopy Results

PAI 713 Rev 9

## Method Blank Results

Lab Name: Paragon Analytics

Work Order Number: 0605177

Client Name: Cordilleran Compliance Services, Inc.

ClientProject ID: Battlement Mesa E04243

Lab ID: GS060522-2MB

Library: FANP

Sample Matrix: WATER  
Prep SOP: PAI 739 Rev 8

Date Collected: 22-May-06  
Date Prepared: 22-May-06  
Date Analyzed: 06-Jun-06

Prep Batch: GS060522-2  
QCBatchID: GS060522-2-1  
Run ID: GS060522-2A  
Count Time: 400 minutes

Final Aliquot: 1000 ml  
Result Units: pCi/l  
File Name: 061539d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
14331-83-0	Ac-228	2.24 +/- 21.4	36.4	U
14391-76-5	Ag-110m	0.244 +/- 4.80	8.15	U
14682-66-7	Al-26	0.703 +/- 4.13	7.28	U
14596-10-2	Am-241	1.19 +/- 4.54	7.62	U
13966-02-4	Be-7	-2.03 +/- 25.4	43.8	U
14913-49-6	Bi-212	63.2 +/- 50.1	79.0	U
14733-03-0	Bi-214	-0.443 +/- 11.0	18.6	U,J
13982-30-4	Ce-139	0.245 +/- 2.16	3.65	U
14762-78-8	Ce-144	-14.8 +/- 14.3	25.0	U
14093-03-9	Co-56	1.86 +/- 5.50	9.42	U
13981-50-5	Co-57	0.893 +/- 1.63	2.70	U
13981-38-9	Co-58	-0.0424 +/- 3.18	5.54	U
10198-40-0	Co-60	1.55 +/- 3.69	6.28	U
14392-02-0	Cr-51	19.3 +/- 23.1	37.8	U
13967-70-9	Cs-134	-2.58 +/- 3.46	6.13	U

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits

LT - Result is less than Requested MDC, greater than sample specific MDC.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 half-lives.

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: GSW0605177-1

# Gamma Spectroscopy Results

PAI 713 Rev 9

## Method Blank Results

Lab Name: Paragon Analytics

Work Order Number: 0605177

Client Name: Cordilleran Compliance Services, Inc.

ClientProject ID: Battlement Mesa E04243

Lab ID: GS060522-2MB

Library: FANP

Sample Matrix: WATER

Prep SOP: PAI 739 Rev 8

Date Collected: 22-May-06

Date Prepared: 22-May-06

Date Analyzed: 06-Jun-06

Prep Batch: GS060522-2

QCBatchID: GS060522-2-1

Run ID: GS060522-2A

Count Time: 400 minutes

Final Aliquot: 1000 ml

Result Units: pCi/l

File Name: 061539d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	-0.331 +/- 3.36	5.86	U
14683-23-9	Eu-152	20.0 +/- 18.4	29.1	U
15585-10-1	Eu-154	11.3 +/- 28.0	46.0	U
14391-16-3	Eu-155	4.18 +/- 4.54	7.38	U
14596-12-4	Fe-59	-2.60 +/- 6.78	12.2	U
10043-66-0	I-131	-2.18 +/- 2.96	5.21	U
13966-00-2	K-40	17.9 +/- 73.8	125	U
13966-31-9	Mn-54	-1.13 +/- 3.39	6.00	U
13966-32-0	Na-22	-1.28 +/- 4.05	7.29	U
14681-63-1	Nb-94	-1.19 +/- 3.87	6.74	U
13967-76-5	Nb-95	-0.321 +/- 3.22	5.62	U
15100-28-4	Pa-234m	458 +/- 572	937	U
15092-94-1	Pb-212	0.204 +/- 7.00	11.8	U
15067-28-4	Pb-214	1.69 +/- 9.23	15.5	U,J
13967-48-1	Ru-106	-5.45 +/- 29.3	51.2	U

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

T1 - Nuclide identification is tentative.

R - Nuclide has exceeded 8 half-lives.

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: GSW0605177-1

# Gamma Spectroscopy Results

PAI 713 Rev 9

## Method Blank Results

Lab Name: Paragon Analytics

Work Order Number: 0605177

Client Name: Cordilleran Compliance Services, Inc.

ClientProject ID: Battlement Mesa E04243

Lab ID: GS060522-2MB

Library: FANP

Sample Matrix: WATER

Prep SOP: PAI 739 Rev 8

Date Collected: 22-May-06

Date Prepared: 22-May-06

Date Analyzed: 06-Jun-06

Prep Batch: GS060522-2

QC Batch ID: GS060522-2-1

Run ID: GS060522-2A

Count Time: 400 minutes

Final Aliquot: 1000 ml

Result Units: pCi/l

File Name: 061539d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
14683-10-4	Sb-124	2.21 +/- 3.40	5.62	U
14234-35-6	Sb-125	3.22 +/- 7.52	12.6	U
13967-63-0	Sc-46	-1.42 +/- 3.13	5.65	U
15623-47-9	Th-227	9.62 +/- 22.2	36.4	U
15065-10-8	Th-234	32.2 +/- 49.6	81.6	U
14913-50-9	Tl-208	5.39 +/- 3.67	5.70	U
15117-96-1	U-235	8.37 +/- 14.9	24.7	U
13982-39-3	Zn-65	1.17 +/- 6.99	12.1	U

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110% Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 half-lives

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: GSW0605177-1



# Gamma Spectroscopy Results

PAI 713 Rev 9

## Method Blank Results

Lab Name: Paragon Analytics

Work Order Number: 0605177

Client Name: Cordilleran Compliance Services, Inc.

ClientProject ID: Battlement Mesa E04243

Lab ID: GS060606-3BMB

Library: FANP

Sample Matrix: WATER

Prep SOP: PAI 739 Rev 8

Date Collected: 06-Jun-06

Date Prepared: 06-Jun-06

Date Analyzed: 18-Jun-06

Prep Batch: GS060606-3

QCBatchID: GS060606-3-3

Run ID: GS060606-3A

Count Time: 600 minutes

Final Aliquot: 1000 ml

Result Units: pCi/l

File Name: 061697d08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
14331-83-0	Ac-228	3.00 +/- 21.8	36.7	U
14391-76-5	Ag-110m	2.54 +/- 2.47	3.97	U
14682-66-7	Al-26	0.988 +/- 3.44	5.93	U
14596-10-2	Am-241	0.547 +/- 3.65	6.12	U
13966-02-4	Be-7	8.13 +/- 19.5	32.6	U
14913-49-6	Bi-212	-9.43 +/- 41.1	71.2	U
14733-03-0	Bi-214	10.4 +/- 6.08	9.39	J, TI
13982-30-4	Ce-139	0.140 +/- 2.24	3.75	U
14762-78-8	Ce-144	-2.68 +/- 11.7	19.8	U
14093-03-9	Co-56	-0.868 +/- 4.68	8.23	U
13981-50-5	Co-57	-0.461 +/- 1.27	2.18	U
13981-38-9	Co-58	-0.0188 +/- 2.81	4.83	U
10198-40-0	Co-60	-2.48 +/- 2.94	5.43	U
14392-02-0	Cr-51	-8.76 +/- 18.7	32.2	U
13967-70-9	Cs-134	-1.96 +/- 2.78	4.86	U

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 half-lives

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: GSW0605177-1

# Gamma Spectroscopy Results

PAI 713 Rev 9

## Method Blank Results

Lab Name: Paragon Analytics

Work Order Number: 0605177

Client Name: Cordilleran Compliance Services, Inc.

ClientProject ID: Battlement Mesa E04243

Lab ID: GS060606-3BMB

Library: FANP

Sample Matrix: WATER

Prep SOP: PAI 739 Rev 8

Date Collected: 06-Jun-06

Date Prepared: 06-Jun-06

Date Analyzed: 18-Jun-06

Prep Batch: GS060606-3

QC Batch ID: GS060606-3-3

Run ID: GS060606-3A

Count Time: 600 minutes

Final Aliquot: 1000 ml

Result Units: pCi/l

File Name: 061697d08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.0736 +/- 2.64	4.53	U
14683-23-9	Eu-152	4.63 +/- 15.8	27.0	U
15585-10-1	Eu-154	-13 +/- 16.8	30.1	U
14391-16-3	Eu-155	-0.498 +/- 5.10	8.65	U
14596-12-4	Fe-59	8.15 +/- 5.83	9.08	U
10043-66-0	I-131	-1.28 +/- 2.53	4.37	U
13966-00-2	K-40	48.2 +/- 67.0	110	U
13966-31-9	Mn-54	-1.59 +/- 2.71	4.80	U
13966-32-0	Na-22	0.456 +/- 3.22	5.55	U
14681-63-1	Nb-94	-2.34 +/- 3.13	5.47	U
13967-76-5	Nb-95	1.38 +/- 2.55	4.25	U
15100-28-4	Pa-234m	61.0 +/- 505	865	U
15092-94-1	Pb-212	-2.37 +/- 6.50	10.9	U
15067-28-4	Pb-214	3.44 +/- 5.30	8.74	U,J
13967-48-1	Ru-106	5.45 +/- 25.4	43.0	U

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 half-lives.

M - Requested MDC not met.

B - Analyte concentration greater than MDC

B3 - Analyte concentration greater than MDC but less than Requested MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: GSW0605177-1

# Gamma Spectroscopy Results

PAI 713 Rev 9

## Method Blank Results

Lab Name: Paragon Analytics

Work Order Number: 0605177

Client Name: Cordilleran Compliance Services, Inc.

ClientProject ID: Battlement Mesa E04243

Lab ID: GS060606-3BMB

Library: FANP

Sample Matrix: WATER

Prep SOP: PAI 739 Rev 8

Date Collected: 06-Jun-06

Date Prepared: 06-Jun-06

Date Analyzed: 18-Jun-06

Prep Batch: GS060606-3

QCBatchID: GS060606-3-3

Run ID: GS060606-3A

Count Time: 600 minutes

Final Aliquot: 1000 ml

Result Units: pCi/l

File Name: 061697d08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
14683-10-4	Sb-124	1.12 +/- 2.68	4.47	U
14234-35-6	Sb-125	2.65 +/- 5.75	10.8	U
13967-63-0	Sc-46	-0.114 +/- 2.56	4.44	U
15623-47-9	Th-227	11.3 +/- 18.3	29.8	U
15065-10-8	Th-234	-15.6 +/- 47.6	79.5	U
14913-50-9	Tl-208	-0.00106 +/- 5.45	9.15	U
15117-96-1	U-235	10.7 +/- 10.9	20.0	U
13982-39-3	Zn-65	-0.978 +/- 6.22	10.9	U

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

T1 - Nuclide identification is tentative.

R - Nuclide has exceeded 8 half-lives

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: GSW0605177-1

# Gamma Spectroscopy Results

PAI 713 Rev 9

## Laboratory Control Sample(s)

Lab Name: Paragon Analytics

Work Order Number: 0605177

Client Name: Cordilleran Compliance Services, Inc.

ClientProject ID: Battlement Mesa E04243

Lab ID: GS060522-2LCS

Library: ANALYTICAL

Sample Matrix: WATER  
Prep SOP: PAI 739 Rev 8  
Date Collected: 22-May-06  
Date Prepared: 22-May-06  
Date Analyzed: 06-Jun-06

Prep Batch: GS060522-2  
QCBatchID: GS060522-2-1  
Run ID: GS060522-2A  
Count Time: 30 minutes

Final Aliquot: 1000 ml  
Result Units: pCi/l  
File Name: 061585d07

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14596-10-2	Am-241	97100 +/- 11400	534	97700	99.3	75 - 125	P
10198-40-0	Co-60	43200 +/- 5070	173	44400	97.3	75 - 125	P
10045-97-3	Cs-137	36300 +/- 4280	262	37400	97.1	75 - 125	P

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.  
Y2 - Chemical Yield outside default limits.  
L - LCS Recovery below lower control limit.  
H - LCS Recovery above upper control limit.  
P - LCS Recovery within control limits.  
M - The requested MDC was not met.  
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC

#### Abbreviations

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

SQ - Spectral quality prevents accurate quantitation.  
SI - Nuclide identification and/or quantitation is tentative.  
TI - Nuclide identification is tentative.  
R - Nuclide has exceeded 8 halfives.

Data Package ID: GSW0605177-1

# Gamma Spectroscopy Results

PAI 713 Rev 9

## Laboratory Control Sample(s)

Lab Name: Paragon Analytics

Work Order Number: 0605177

Client Name: Cordilleran Compliance Services, Inc.

ClientProject ID: Battlement Mesa E04243

Lab ID: GS060606-3LCS

Library: ANALYTICAL

Sample Matrix: WATER  
Prep SOP: PAI 739 Rev 8

Date Collected: 06-Jun-06

Date Prepared: 06-Jun-06

Date Analyzed: 19-Jun-06

Prep Batch: GS060606-3  
QCBatchID: GS060606-3-3

Run ID: GS060606-3A

Count Time: 30 minutes

Final Aliquot: 1000 ml

Result Units: pCi/l

File Name: 061700d08

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14596-10-2	Am-241	99100 +/- 11600	477	97700	101	75 - 125	P
10198-40-0	Co-60	43500 +/- 5100	118	44200	98.5	75 - 125	P
10045-97-3	Cs-137	36500 +/- 4300	184	37400	97.8	75 - 125	P

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed

Y2 - Chemical Yield outside default limits

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 half-lives.

Data Package ID: GSW0605177-1

PARAGON ANALYTICS  
Radiochemistry Data Package

**3**

Section 3

**INDIVIDUAL  
SAMPLE RESULTS**

**000014**

# Gamma Spectroscopy Results

PAI 713 Rev 9

## Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0605177

Client Name: Cordilleran Compliance Services, Inc.

ClientProject ID: Battlement Mesa E04243

Field ID: BM3613 PW	Sample Matrix: WATER	Prep Batch: GS060522-2	Final Aliquot: 1000 ml
Lab ID: 0605177-1	Prep SOP: PAI 739 Rev 8	QCBatchID: GS060522-2-3	Prep Basis: Filtered
Library: FANP	Date Collected: 17-May-06	Run ID: GS060522-2A	Moisture(%): NA
	Date Prepared: 22-May-06	Count Time: 400 minutes	Result Units: pCi/l
	Date Analyzed: 06-Jun-06	Report Basis: Filtered	File Name: 061369d02

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
14331-83-0	Ac-228	10 +/- 23	38	U
14391-76-5	Ag-110m	-3.5 +/- 4.0	7.2	U
14682-66-7	Al-26	-2.8 +/- 5.2	9.6	U
14596-10-2	Am-241	2 +/- 25	42	U
13966-02-4	Be-7	10 +/- 37	62	U
14913-49-6	Bi-212	29 +/- 57	95	U
14733-03-0	Bi-214	-4 +/- 15	25	U,J
13982-30-4	Ce-139	-1.4 +/- 2.7	4.7	U
14762-78-8	Ce-144	11 +/- 19	31	U
14093-03-9	Co-56	-1.0 +/- 8.8	15.4	U
13981-50-5	Co-57	1.2 +/- 2.6	4.3	U
13981-38-9	Co-58	0 +/- 4.7	8.2	U
10198-40-0	Co-60	2.2 +/- 4.8	8.1	U
14392-02-0	Cr-51	15 +/- 40	68	U
13967-70-9	Cs-134	-3.2 +/- 4.3	7.7	U

Comments: This sample was filtered prior to analysis.

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

SQ - Spectral quality prevents accurate quantitation

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 half-lives

G - Sample density differs by more than 15% of LCS density

Data Package ID: GSW0605177-1

# Gamma Spectroscopy Results

PAI 713 Rev 9  
Sample Results

Lab Name: Paragon Analytics  
Work Order Number: 0605177  
Client Name: Cordilleran Compliance Services, Inc.  
ClientProject ID: Battlement Mesa E04243

Field ID: BM3613 PW	Sample Matrix: WATER	Prep Batch: GS060522-2	Final Aliquot: 1000 ml
Lab ID: 0605177-1	Prep SOP: PAI 739 Rev 8	QCBatchID: GS060522-2-3	Prep Basis: Filtered
Library: FANP	Date Collected: 17-May-06	Run ID: GS060522-2A	Moisture(%): NA
	Date Prepared: 22-May-06	Count Time: 400 minutes	Result Units: pCi/l
	Date Analyzed: 06-Jun-06	Report Basis: Filtered	File Name: 061369d02

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	1.3 +/- 4.2	7.1	U
14683-23-9	Eu-152	5 +/- 22	37	U
15585-10-1	Eu-154	-4 +/- 24	42	U
14391-16-3	Eu-155	0.8 +/- 9.7	16.4	U
14596-12-4	Fe-59	7.8 +/- 9.8	16.1	U
10043-66-0	I-131	5 +/- 19	33	U
13966-00-2	K-40	112 +/- 87	138	U
13966-31-9	Mn-54	2.4 +/- 4.0	6.7	U
13966-32-0	Na-22	-1.6 +/- 4.6	8.2	U
14681-63-1	Nb-94	2.3 +/- 4.1	6.8	U
13967-76-5	Nb-95	-0.2 +/- 4.9	8.4	U
15100-28-4	Pa-234m	100 +/- 710	1230	U
15092-94-1	Pb-212	-2.2 +/- 9.2	15.5	U
15067-28-4	Pb-214	10.9 +/- 7.4	11.6	U,J
13967-48-1	Ru-106	40 +/- 39	63	U

**Comments:** This sample was filtered prior to analysis.

**Qualifiers/Flags:**

U - Result is less than the sample specific MDC or less than the associated TPU  
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed  
Y2 - Chemical Yield outside default limits.  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.  
M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.  
SI - Nuclide identification and/or quantitation is tentative.  
TI - Nuclide identification is tentative.  
R - Nuclide has exceeded 8 half-lives.  
G - Sample density differs by more than 15% of LCS density.

**Abbreviations:**

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)  
BDL - Below Detection Limit

**Data Package ID: GSW0605177-1**



# Gamma Spectroscopy Results

PAI 713 Rev 9

## Sample Results

Lab Name: Paragon Analytics  
Work Order Number: 0605177  
Client Name: Cordilleran Compliance Services, Inc.  
ClientProject ID: Battlement Mesa E04243

Field ID: BM3613 PW	Sample Matrix: WATER	Prep Batch: GS060522-2	Final Aliquot: 1000 ml
Lab ID: 0605177-1	Prep SOP: PAI 739 Rev 8	QCBatchID: GS060522-2-3	Prep Basis: Filtered
Library: FANP	Date Collected: 17-May-06	Run ID: GS060522-2A	Moisture(%): NA
	Date Prepared: 22-May-06	Count Time: 400 minutes	Result Units: pCi/l
	Date Analyzed: 06-Jun-06	Report Basis: Filtered	File Name: 061369d02

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
14683-10-4	Sb-124	-0.1 +/- 5.4	9.2	U
14234-35-6	Sb-125	4.2 +/- 9.7	16.3	U
13967-63-0	Sc-46	0.8 +/- 4.5	7.8	U
15623-47-9	Th-227	-24 +/- 25	45	U
15065-10-8	Th-234	-28 +/- 87	146	U
14913-50-9	Tl-208	1.4 +/- 5.9	10.0	U
15117-96-1	U-235	14 +/- 22	37	U
13982-39-3	Zn-65	11.4 +/- 9.3	14.6	U

**Comments:** This sample was filtered prior to analysis.

**Qualifiers/Flags:**

U - Result is less than the sample specific MDC or less than the associated TPU  
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.  
Y2 - Chemical Yield outside default limits.  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.  
M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.  
SI - Nuclide identification and/or quantitation is tentative.  
TI - Nuclide identification is tentative.  
R - Nuclide has exceeded 8 half-lives  
G - Sample density differs by more than 15% of LCS density.

**Abbreviations:**

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)  
BDL - Below Detection Limit

**Data Package ID:** GSW0605177-1

# Gamma Spectroscopy Results

PAI 713 Rev 9

## Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0605177

Client Name: Cordilleran Compliance Services, Inc.

ClientProject ID: Battlement Mesa E04243

Field ID: BM2642  
Lab ID: 0605177-2

Library: FANP

Sample Matrix: WATER  
Prep SOP: PAI 739 Rev 8  
Date Collected: 20-May-06  
Date Prepared: 06-Jun-06  
Date Analyzed: 11-Jun-06

Prep Batch: GS060606-3  
QCBatchID: GS060606-3-1  
Run ID: GS060606-3A  
Count Time: 400 minutes  
Report Basis: Unfiltered

Final Aliquot: 845 ml  
Prep Basis: Unfiltered  
Moisture(%): NA  
Result Units: pCi/l  
File Name: 061610d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
14331-83-0	Ac-228	18 +/- 24	40	U
14391-76-5	Ag-110m	-0.6 +/- 3.9	6.8	U
14682-66-7	Al-26	2.2 +/- 4.9	8.4	U
14596-10-2	Am-241	-0.8 +/- 5.4	9.2	U
13966-02-4	Be-7	-28 +/- 40	70	U
14913-49-6	Bi-212	54 +/- 63	102	U
14733-03-0	Bi-214	12 +/- 13	21	U,J
13982-30-4	Ce-139	-0.2 +/- 2.9	4.9	U
14762-78-8	Ce-144	0 +/- 18	31	U
14093-03-9	Co-56	8.1 +/- 8.8	14.2	U
13981-50-5	Co-57	-0.1 +/- 2.0	3.5	U
13981-38-9	Co-58	2.7 +/- 5.0	8.3	U
10198-40-0	Co-60	-0.9 +/- 4.4	8.0	U
14392-02-0	Cr-51	27 +/- 50	83	U
13967-70-9	Cs-134	-2.8 +/- 4.2	7.4	U

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110% Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 9 half-lives

G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSW0605177-1

# Gamma Spectroscopy Results

PAI 713 Rev 9

## Sample Results

Lab Name: Paragon Analytics  
Work Order Number: 0605177  
Client Name: Cordilleran Compliance Services, Inc.  
ClientProject ID: Battlement Mesa E04243

Field ID: BM2642	Sample Matrix: WATER	Prep Batch: GS060606-3	Final Aliquot: 845 ml
Lab ID: 0605177-2	Prep SOP: PAI 739 Rev 8	QCBatchID: GS060606-3-1	Prep Basis: Unfiltered
Library: FANP	Date Collected: 20-May-06	Run ID: GS060606-3A	Moisture(%): NA
	Date Prepared: 06-Jun-06	Count Time: 400 minutes	Result Units: pCi/l
	Date Analyzed: 11-Jun-06	Report Basis: Unfiltered	File Name: 061610d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	-1.0 +/- 4.0	7.0	U
14683-23-9	Eu-152	9 +/- 23	39	U
15585-10-1	Eu-154	-1 +/- 25	44	U
14391-16-3	Eu-155	9.2 +/- 8.0	12.9	U
14596-12-4	Fe-59	3 +/- 12	21	U
10043-66-0	I-131	-20 +/- 26	45	U
13966-00-2	K-40	68 +/- 90	148	U
13966-31-9	Mn-54	-0.6 +/- 4.2	7.4	U
13966-32-0	Na-22	0.1 +/- 5.0	8.7	U
14681-63-1	Nb-94	-1.5 +/- 4.3	7.6	U
13967-76-5	Nb-95	-3.1 +/- 5.2	9.3	U
15100-28-4	Pa-234m	-110 +/- 770	1350	U
15092-94-1	Pb-212	0.9 +/- 9.5	16.0	U
15067-28-4	Pb-214	5 +/- 13	22	U,J
13967-48-1	Ru-106	-13 +/- 39	68	U

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU  
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.  
Y2 - Chemical Yield outside default limits.  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.  
M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.  
SI - Nuclide identification and/or quantitation is tentative.  
TI - Nuclide identification is tentative.  
R - Nuclide has exceeded 8 half-lives.  
G - Sample density differs by more than 15% of LCS density.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)  
BDL - Below Detection Limit

Data Package ID: GSW0605177-1

# Gamma Spectroscopy Results

PAI 713 Rev 9

## Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0605177

Client Name: Cordilleran Compliance Services, Inc.

ClientProject ID: Battlement Mesa E04243

Field ID: BM2642	Sample Matrix: WATER	Prep Batch: GS060606-3	Final Aliquot: 845 ml
Lab ID: 0605177-2	Prep SOP: PAI 739 Rev 8	QCBatchID: GS060606-3-1	Prep Basis: Unfiltered
Library: FANP	Date Collected: 20-May-06	Run ID: GS060606-3A	Moisture(%): NA
	Date Prepared: 06-Jun-06	Count Time: 400 minutes	Result Units: pCi/l
	Date Analyzed: 11-Jun-06	Report Basis: Unfiltered	File Name: 061610d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
14683-10-4	Sb-124	1.9 +/- 5.3	8.9	U
14234-35-6	Sb-125	-4.3 +/- 9.6	16.9	U
13967-63-0	Sc-46	0.1 +/- 4.7	8.2	U
15623-47-9	Th-227	11 +/- 27	45	U
15065-10-8	Th-234	17 +/- 65	107	U
14913-50-9	Tl-208	1.9 +/- 5.3	8.9	U
15117-96-1	U-235	-4 +/- 22	38	U
13982-39-3	Zn-65	0 +/- 9.6	16.8	U

### Comments:

#### Qualifiers/Flags:

- U - Result is less than the sample specific MDC or less than the associated TPU
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- M - The requested MDC was not met.

- SQ - Spectral quality prevents accurate quantitation.
- SI - Nuclide identification and/or quantitation is tentative.
- TI - Nuclide identification is tentative.
- R - Nuclide has exceeded 8 half-lives.
- G - Sample density differs by more than 15% of LCS density.

#### Abbreviations:

- TPU - Total Propagated Uncertainty (see PAI SOP 743)
- MDC - Minimum Detectable Concentration (see PAI SOP 709)
- BDL - Below Detection Limit

Data Package ID: GSW0605177-1

PARAGON ANALYTICS  
Radiochemistry Data Package

Section 4



**RAW DATA**

**000021**

\*\*\*\*\*

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: 0605177-1 GS060522-2

```
-----
Sampling Start:   05/17/2006 12:00:00 | Counting Start:   06/06/2006 17:18:07
Sampling Stop:   05/17/2006 12:00:00 | Decay Time. . . . . 4.85E+002 Hrs
Buildup Time. . . . . 0.00E+000 Hrs | Live Time . . . . . 24000 Sec
Sample Size . . . . . 1.00E+000 L | Real Time . . . . . 24015 Sec
Collection Efficiency . . . . . 1.0000 | Spc. File . . . . . 061369D02.SPC
-----
```

Detector #: 2 (Detector 2)

Energy(keV) = -0.79 + 0.500\*Ch + 2.12E-08\*Ch^2 + 0.00E+00\*Ch^3 06/06/2006

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	46.40	94.32	44	47	37	278	0.87	a
2	53.54	108.58	80	61	48	394	1.17	a
3	63.05	127.59	72	58	46	388	0.97	a
4	65.30	132.08	54	58	46	388	0.90	b
5	66.51	134.50	154	55	40	323	0.75	c
6	92.52	186.46	150	54	39	314	0.86	a
7	116.48	234.36	35	45	36	257	0.81	a NET< CL
8	139.81	280.98	183	57	42	321	0.94	a
9	162.77	326.84	34	52	41	315	1.00	a NET< CL
10	185.68	372.63	122	53	40	295	1.02	a
11	198.23	397.72	161	54	39	284	0.91	a
12	238.48	478.14	104	51	39	277	0.97	a
13	351.79	704.56	43	29	21	111	0.61	a
14	447.73	896.26	25	27	21	99	0.82	a
15	510.83	1022.36	554	72	45	286	2.16	a
16	558.34	1117.28	148	37	23	107	1.13	a
17	582.73	1166.02	50	34	26	135	1.31	a
18	595.65	1191.85	64	42	32	200	1.39	a
19	651.86	1304.16	27	27	21	92	1.17	a
20	802.79	1605.74	55	34	25	112	1.85	a
21	1460.65	2920.12	128	35	22	74	2.81	a

061369D02.SPC Analyzed by

SEEKER BACKGROUND SUBTRACT RESULTS Vers. 2.2.1

Paragon Analytics, Div. of DataChem Lab  
GammaScan

Background File: . . . . . DET020602.BKG (060602-2 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	46.40	44	47	37	7	69	56	NET<CL
2	53.54	80	61	48	59	87	71	NET<CL
3	63.05	72	58	46	4	100	82	NET<CL
4	65.30	54	58	46	-4	82	67	NET<CL
6	92.52	150	54	39	-28	86	72	NET<CL
8	139.81	183	57	42	121	82	65	
10	185.68	122	53	40	-9	87	72	NET<CL
11	198.23	161	54	39	71	76	61	
12	238.48	104	51	39	-19	79	65	NET<CL
13	351.79	43	29	21	-36	62	52	NET<CL
15	510.83	554	72	45	-42	124	102	NET<CL
16	558.34	148	37	23	72	59	47	
17	582.73	50	34	26	12	50	41	NET<CL
20	802.79	55	34	25	10	49	40	NET<CL
21	1460.65	128	35	22	61	47	36	

Paragon Analytics, Div. of DataChem Lab  
GammaScan

Geo 1 / Water

Sample ID: 0605177-1 GS060522-2

```

-----
Sampling Start:    05/17/2006 12:00:00 | Counting Start:    06/06/2006 17:18:07
Sampling Stop:    05/17/2006 12:00:00 | Decay Time. . . . . 4.85e+002 Hrs
Buildup Time. . . . . 0.00e+000 Hrs | Live Time . . . . . 24000 Sec
Sample Size . . . . . 1.00e+000 L | Real Time . . . . . 24015 Sec
Collection Efficiency . . . . . 1.0000 | Spectrum File . . . . . 061369D02.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: . . . . .FANP.LIB (FANP (Fiss. Act. and Nat. Products))

MEASURED or MDA CONCENTRATIONS

Nuclide	ENERGY E (keV)	N T	Concentration (pCi/L)	MDA	Critical Level	Halflife (hrs)
Th-234	92.50	N-2.80E+01	+ - 8.65E+01	1.46E+02	7.17E+01	3.92E+13
Pb-212	238.63	N-2.22E+00	+ - 9.18E+00	1.55E+01	7.60E+00	1.67E+04
Tl-208	583.14	N 1.43E+00	+ - 5.92E+00	9.97E+00	4.82E+00	1.67E+04
K-40	1460.75	1.12E+02	+ - 8.60E+01	1.38E+02	6.67E+01	1.12E+13
Am-241	59.54	N 2.06E+00	+ - 2.50E+01	4.24E+01	2.05E+01	3.80E+06
Eu-155	105.31	N 8.23E-01	+ - 9.66E+00	1.64E+01	7.92E+00	4.35E+04
Co-57	122.07	N 1.18E+00	+ - 2.60E+00	4.33E+00	2.10E+00	6.48E+03
Ce-144	133.53	N 1.13E+01	+ - 1.89E+01	3.13E+01	1.51E+01	6.82E+03
U-235	143.76	N 1.43E+01	+ - 2.21E+01	3.66E+01b	1.78E+01	6.17E+12
Ce-139	165.85	N-1.43E+00	+ - 2.72E+00	4.72E+00	2.29E+00	3.30E+03
Th-227	236.00	N-2.43E+01	+ - 2.53E+01	4.51E+01R	2.20E+01	1.90E+05
Cr-51	320.07	N 1.49E+01	+ - 4.04E+01	6.79E+01	3.26E+01	6.65E+02
Pb-214	351.99	N 1.09E+01	+ - 7.29E+00	1.16E+01	5.54E+00	1.40E+07
I-131	364.48	N 4.80E+00	+ - 1.93E+01	3.27E+01	1.57E+01	1.93E+02
Sb-125	427.95	N 4.16E+00	+ - 9.69E+00	1.63E+01	7.79E+00	2.43E+04
Be-7	477.56	N 1.04E+01	+ - 3.67E+01	6.23E+01	2.97E+01	1.28E+03
Sb-124	602.71	N-7.76E-02	+ - 5.38E+00	9.21E+00	4.43E+00	1.44E+03
Cs-134	604.66	N-3.20E+00	+ - 4.33E+00	7.66E+00	3.69E+00	1.81E+04
Bi-214	609.32	N-4.10E+00	+ - 1.49E+01	2.53E+01	1.23E+01	1.40E+07
Ru-106	621.84	N 4.04E+01	+ - 3.86E+01	6.26E+01	2.98E+01	8.84E+03
Ag-110M	657.75	N-3.55E+00	+ - 3.98E+00	7.23E+00b	3.45E+00	6.00E+03
Cs-137	661.62	N 1.27E+00	+ - 4.16E+00	7.06E+00	3.36E+00	2.64E+05
Nb-94	702.50	N 2.31E+00	+ - 4.06E+00	6.78E+00	3.23E+00	1.78E+08
Bi-212	727.17	N 2.89E+01	+ - 5.69E+01	9.54E+01	4.52E+01	1.67E+04
Nb-95	765.82	N-1.81E-01	+ - 4.85E+00	8.41E+00	4.00E+00	1.54E+03



## MEASURED or MDA CONCENTRATIONS

Nuclide	ENERGY (keV)	E T	Concentration (pCi/L)	MDA	Critical Level	Halflife (hrs)
Co-58	810.75	N	0.00E+00 +- 4.73E+00	8.20E+00	3.89E+00	1.70E+03
Mn-54	834.81	N	2.38E+00 +- 4.01E+00	6.69E+00	3.16E+00	7.49E+03
Sc-46	889.26	N	8.07E-01 +- 4.53E+00	7.79E+00	3.68E+00	2.01E+03
Ac-228	911.07	N	9.56E+00 +- 2.29E+01	3.84E+01	1.85E+01	5.04E+04
Pa-234m	1001.03	N	9.72E+01 +- 7.14E+02	1.23E+03	5.81E+02	3.92E+13
Eu-154	1004.80	N	3.84E+00 +- 2.37E+01	4.17E+01	1.97E+01	7.45E+04
Fe-59	1099.22	N	7.76E+00 +- 9.78E+00	1.61E+01	7.52E+00	1.08E+03
Zn-65	1115.52	N	1.14E+01 +- 9.22E+00	1.46E+01	6.85E+00	5.85E+03
Co-56	1238.28	N	9.94E-01 +- 8.80E+00	1.54E+01	7.30E+00	1.86E+03
Na-22	1274.54	N	1.56E+00 +- 4.57E+00	8.22E+00	3.86E+00	2.28E+04
Co-60	1332.51	N	2.22E+00 +- 4.79E+00	8.09E+00	3.79E+00	4.62E+04
Eu-152	1408.08	N	4.98E+00 +- 2.15E+01	3.72E+01	1.74E+01	1.17E+05
Al-26	1808.65	N	2.79E+00 +- 5.21E+00	9.63E+00	4.49E+00	6.31E+09

MEASURED TOTAL: 3.98E+02 +- 1.18E+03 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	46.40	94.32	7	69	56	278	0.87	Deleted
2	53.54	108.58	59	87	71	394	1.17	Deleted
3	63.05	127.59	4	100	82	388	0.97	Deleted
4	65.30	132.08	-4	82	67	388	0.90	Deleted
5	66.51	134.50	154	55	40	323	0.75	Unknown
7	116.48	234.36	35	45	36	257	0.81	Deleted
8	139.81	280.98	121	82	65	321	0.94	Unknown
9	162.77	326.84	34	52	41	315	1.00	Deleted
10	185.68	372.63	-9	87	72	295	1.02	Deleted
11	198.23	397.72	71	76	61	284	0.91	Unknown
13	351.79	704.56	-36	62	52	111	0.61	Deleted
14	447.73	896.26	25	27	21	99	0.82	Unknown
15	510.83	1022.36	-42	124	102	286	2.16	Deleted
16	558.34	1117.28	72	59	47	107	1.13	Unknown
18	595.65	1191.85	64	42	32	200	1.39	Unknown
19	651.86	1304.16	27	27	21	92	1.17	Unknown
20	802.79	1605.74	10	49	40	112	1.85	Deleted

c:\SEEKER\BIN\061369d02.res Analysis Results Saved.

000025

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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: <sup>CL</sup>0605177-2 GS060606-3  
<sub>u/s/06</sub>

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 Sampling Start:    05/20/2006 12:00:00 | Counting Start:    06/11/2006 17:39:26  
 Sampling Stop:    05/20/2006 12:00:00 | Decay Time. . . . . 5.34E+002 Hrs  
 Buildup Time. . . . . 0.00E+000 Hrs | Live Time . . . . . 24000 Sec  
 Sample Size . . . . . 8.45E-001 L | Real Time . . . . . 24047 Sec  
 Collection Efficiency . . . . . 1.0000 | Spc. File . . . . . 061610D08.SPC  
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Detector #: 8 (Detector 8)

Energy (keV) = -0.39 + 0.500\*Ch +-1.99E-07\*Ch^2 + 1.01E-10\*Ch^3 06/11/2006

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)

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

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PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	46.42	93.59	188	52	36	288	0.60	a
2	53.11	106.96	78	55	43	366	0.86	a
3	63.29	127.32	242	50	32	257	0.49	a
4	66.35	133.43	254	72	53	513	1.03	b
5	70.07	140.86	42	57	46	428	0.80	c NET< CL
6	74.88	150.48	76	42	31	238	0.47	a
7	76.97	154.66	59	41	31	238	0.43	b
8	84.33	169.38	66	68	55	509	1.13	a
9	87.72	176.16	24	37	30	218	0.45	b NET< CL
10	89.86	180.44	51	39	30	218	0.44	c
11	92.64	185.99	339	76	55	509	1.06	d
12	139.72	280.13	174	55	39	313	0.79	a
13	185.70	372.07	197	66	49	412	1.13	a
14	191.17	383.00	10	33	27	174	0.49	a NET< CL
15	198.39	397.44	277	58	39	287	0.96	a
16	213.20	427.06	8	32	26	166	0.50	a NET< CL
17	238.75	478.16	131	62	47	383	1.12	a
18	250.45	501.55	30	31	24	137	0.52	a
19	298.18	596.99	28	46	37	252	0.91	a NET< CL
20	338.35	677.32	55	48	37	237	1.09	a
21	351.73	704.07	98	56	43	273	1.42	a
22	450.32	901.21	24	24	18	82	0.60	a
23	510.95	1022.45	675	86	56	386	2.54	a Wide Pk
24	558.24	1117.01	163	42	27	137	1.36	a

## =====

## PEAK SEARCH RESULTS

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PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
25	583.11	1166.72	44	25	17	74	0.66	a
26	595.94	1192.37	78	36	25	137	0.99	a
27	609.15	1218.79	102	39	27	148	1.11	a
28	650.89	1302.23	28	42	34	175	1.72	a NET< CL
29	802.66	1605.62	37	24	17	63	0.74	a
30	835.68	1671.60	20	29	23	105	1.33	a NET< CL
31	910.92	1821.94	52	30	22	95	1.46	a
32	968.54	1937.05	22	30	24	105	1.72	a NET< CL
33	1305.36	2609.51	22	21	15	49	1.43	a
34	1460.15	2918.22	102	28	16	49	1.70	a

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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: . . . . . DET080609.BKG (060609-8 WEEKLY BKGD)

Bkg.File Detector #: 8

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BACKGROUND SUBTRACT RESULTS

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PK#	ENERGY (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	OLD CR.LEVEL	NEW NET COUNTS	NEW UN- CERTAINTY	NEW CR.LEVEL	FLAG
1	46.42	188	52	36	-27	86	71	NET<CL
2	53.11	78	55	43	30	105	86	NET<CL
3	63.29	242	50	32	30	81	66	NET<CL
4	66.35	254	72	53	184	97	76	
5	70.07	42	57	46	21	73	59	NET<CL
6	74.88	76	42	31	3	70	57	NET<CL
7	76.97	59	41	31	-8	69	57	NET<CL
8	84.33	66	68	55	16	90	74	NET<CL
9	87.72	24	37	30	-15	69	57	NET<CL
10	89.86	51	39	30	25	57	46	NET<CL
11	92.64	339	76	55	29	109	89	NET<CL
12	139.72	174	55	39	102	84	67	
13	185.70	197	66	49	60	90	73	NET<CL
15	198.39	277	58	39	180	85	66	
17	238.75	131	62	47	8	83	68	NET<CL
20	338.35	55	48	37	33	72	59	NET<CL
21	351.73	98	56	43	26	75	61	NET<CL
23	510.95	675	86	56	39	131	108	NET<CL
24	558.24	163	42	27	67	67	54	
25	583.11	44	25	17	16	44	35	NET<CL
27	609.15	102	39	27	56	58	46	
28	650.89	28	42	34	18	49	40	NET<CL
29	802.66	37	24	17	-30	47	40	NET<CL
31	910.92	52	30	22	32	42	33	NET<CL
34	1460.15	102	28	16	34	44	35	NET<CL

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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: 07605177-2 GS060606-3

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 Sampling Start:        05/20/2006 12:00:00 | Counting Start:        06/11/2006 17:39:26  
 Sampling Stop:        05/20/2006 12:00:00 | Decay Time. . . . . 5.34e+002 Hrs  
 Buildup Time. . . . . 0.00e+000 Hrs | Live Time . . . . . 24000 Sec  
 Sample Size . . . . . 8.45e-001 L | Real Time . . . . . 24047 Sec  
 Collection Efficiency . . . . . 1.0000 | Spectrum File . . . . . 061610D08.SPC  
 Cr. Level Confidence Interval:    95 % | Det. Limit Confidence Interval:    95 %  
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Detector #: 8 (Detector 8)

Efficiency File: (D08)(Sh01).EFF (Geo 1 Eff Cal)

Eff.=1/[5.02E-01\*En<sup>-1.26E+00</sup> + 1.19E+02\*En<sup>8.87E-01</sup>] 12/14/2005

Library File: . . . . . FANP.LIB (FANP (Fiss. Act. and Nat. Products))  
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MEASURED or MDA CONCENTRATIONS  
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Nuclide	ENERGY E (keV)	N T	Concentration		MDA	Critical Level	Halflife (hrs)
			(pCi/L	)			
Th-234	92.50	N	1.73E+01	+- 6.45E+01	1.07E+02	5.28E+01	3.92E+13
Pb-212	238.63	N	9.14E-01	+- 9.53E+00	1.60E+01	7.83E+00	1.67E+04
Pb-214	351.99	N	4.66E+00	+- 1.32E+01	2.19E+01	1.07E+01	1.40E+07
Tl-208	583.14	N	1.93E+00	+- 5.27E+00	8.85E+00	4.26E+00	1.67E+04
Bi-214	609.32		1.25E+01	+- 1.31E+01	2.15E+01	1.04E+01	1.40E+07
Ac-228	911.07	N	1.81E+01	+- 2.42E+01	4.00E+01	1.92E+01	5.04E+04
K-40	1460.75	N	6.82E+01	+- 8.96E+01	1.48E+02	7.12E+01	1.12E+13
Am-241	59.54	N	8.34E-01	+- 5.39E+00	9.19E+00	4.46E+00	3.80E+06
Eu-155	105.31	N	9.20E+00	+- 7.96E+00	1.29E+01	6.24E+00	4.35E+04
Co-57	122.07	N	1.34E-01	+- 2.04E+00	3.48E+00	1.68E+00	6.48E+03
Ce-144	133.53	N	3.35E-01	+- 1.83E+01	3.09E+01	1.50E+01	6.82E+03
U-235	143.76	N	3.95E+00	+- 2.23E+01	3.77E+01b	1.84E+01	6.17E+12
Ce-139	165.85	N	2.16E-01	+- 2.91E+00	4.94E+00	2.40E+00	3.30E+03
Th-227	236.00	N	1.06E+01	+- 2.72E+01	4.47E+01R	2.18E+01	1.90E+05
Cr-51	320.07	N	2.67E+01	+- 4.99E+01	8.31E+01	4.01E+01	6.65E+02
I-131	364.48	N	2.01E+01	+- 2.54E+01	4.48E+01	2.16E+01	1.93E+02
Sb-125	427.95	N	4.32E+00	+- 9.62E+00	1.69E+01	8.10E+00	2.43E+04
Be-7	477.56	N	2.78E+01	+- 3.94E+01	7.02E+01	3.36E+01	1.28E+03
Sb-124	602.71	N	1.89E+00	+- 5.28E+00	8.89E+00	4.26E+00	1.44E+03
Cs-134	604.66	N	2.80E+00	+- 4.21E+00	7.44E+00B	3.58E+00	1.81E+04
Ru-106	621.84	N	1.34E+01	+- 3.86E+01	6.77E+01	3.24E+01	8.84E+03
Ag-110M	657.75	N	6.32E-01	+- 3.86E+00	6.76E+00	3.21E+00	6.00E+03
Cs-137	661.62	N	1.05E+00	+- 3.95E+00	6.97E+00	3.31E+00	2.64E+05
Nb-94	702.50	N	1.54E+00	+- 4.34E+00	7.60E+00	3.64E+00	1.78E+08
Bi-212	727.17	N	5.44E+01	+- 6.25E+01	1.02E+02	4.87E+01	1.67E+04

## MEASURED or MDA CONCENTRATIONS

Nuclide	ENERGY (keV)	N T	Concentration		MDA	Critical Level	Halflife (hrs)
			(pCi/L	)			
Nb-95	765.82	N-3.14E+00	+-	5.17E+00	9.25E+00	4.41E+00	1.54E+03
Co-58	810.75	N 2.68E+00	+-	4.97E+00	8.33E+00	3.94E+00	1.70E+03
Mn-54	834.81	N-5.58E-01	+-	4.25E+00	7.43E+00	3.52E+00	7.49E+03
Sc-46	889.26	N 1.21E-01	+-	4.69E+00	8.17E+00	3.85E+00	2.01E+03
Pa-234m	1001.03	N-1.08E+02	+-	7.69E+02	1.35E+03	6.38E+02	3.92E+13
Eu-154	1004.80	N-8.94E-01	+-	2.55E+01	4.44E+01	2.10E+01	7.45E+04
Fe-59	1099.22	N 3.03E+00	+-	1.21E+01	2.08E+01	9.81E+00	1.08E+03
Zn-65	1115.52	N 0.00E+00	+-	9.58E+00	1.68E+01	7.88E+00	5.85E+03
Co-56	1238.28	N 8.07E+00	+-	8.72E+00	1.42E+01	6.63E+00	1.86E+03
Na-22	1274.54	N 8.03E-02	+-	4.97E+00	8.70E+00	4.08E+00	2.28E+04
Co-60	1332.51	N-8.97E-01	+-	4.44E+00	8.01E+00	3.72E+00	4.62E+04
Eu-152	1408.08	N 9.27E+00	+-	2.30E+01	3.93E+01	1.82E+01	1.17E+05
Al-26	1808.65	N 2.22E+00	+-	4.91E+00	8.39E+00	3.83E+00	6.31E+09

MEASURED TOTAL: 2.52E+02 +- 4.54E+02 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	46.42	93.59	-27	86	71	288	0.60	Deleted
2	53.11	106.96	30	105	86	366	0.86	Deleted
3	63.29	127.32	30	81	66	257	0.49	Deleted
4	66.35	133.43	184	97	76	513	1.03	Unknown
5	70.07	140.86	21	73	59	428	0.80	Deleted
6	74.88	150.48	3	70	57	238	0.47	Deleted
7	76.97	154.66	-8	69	57	238	0.43	Deleted
8	84.33	169.38	16	90	74	509	1.13	Deleted
9	87.72	176.16	-15	69	57	218	0.45	Deleted
10	89.86	180.44	25	57	46	218	0.44	Deleted
12	139.72	280.13	102	84	67	313	0.79	Unknown
13	185.70	372.07	60	90	73	412	1.13	Deleted
14	191.17	383.00	10	33	27	174	0.49	Deleted
15	198.39	397.44	180	85	66	287	0.96	Unknown
16	213.20	427.06	8	32	26	166	0.50	Deleted
18	250.45	501.55	30	31	24	137	0.52	Unknown
19	298.18	596.99	28	46	37	252	0.91	Deleted
20	338.35	677.32	33	72	59	237	1.09	Deleted
22	450.32	901.21	24	24	18	82	0.60	Unknown
23	510.95	1022.45	39	131	108	386	2.54	Deleted
24	558.24	1117.01	67	67	54	137	1.36	Unknown
26	595.94	1192.37	78	36	25	137	0.99	Unknown
28	650.89	1302.23	18	49	40	175	1.72	Deleted
29	802.66	1605.62	-30	47	40	63	0.74	Deleted
30	835.68	1671.60	20	29	23	105	1.33	Deleted
32	968.54	1937.05	22	30	24	105	1.72	Deleted
33	1305.36	2609.51	22	21	15	49	1.43	Unknown

061610D08.SPC Analyzed by

c:\SEEKER\BIN\061610d08.res Analysis Results Saved.

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: GS060522-2MB GS060522-2

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Sampling Start: 06/06/2006 17:00:00 | Counting Start: 06/06/2006 17:41:20
Sampling Stop: 06/06/2006 17:00:00 | Decay Time. . . . . 6.89E-001 Hrs
Buildup Time. . . . . 0.00E+000 Hrs | Live Time . . . . . 24000 Sec
Sample Size . . . . . 1.00E+000 L | Real Time . . . . . 24043 Sec
Collection Efficiency . . . . . 1.0000 | Spc. File . . . . . 061539D08.SPC
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Detector #: 8 (Detector 8)
Energy(keV) = -0.45 + 0.500*Ch + 1.99E-07*Ch^2 + 0.00E+00*Ch^3 06/06/2006
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)
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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	46.38	93.67	201	51	35	271	0.73	a
2	53.04	107.00	97	75	59	556	1.37	a
3	63.15	127.23	272	82	62	604	1.27	a
4	66.14	133.20	248	75	56	529	1.12	b
5	74.48	149.87	64	55	43	378	0.78	a
6	76.79	154.51	54	40	30	227	0.43	b
7	92.55	186.02	358	69	47	413	0.90	a
8	105.21	211.36	32	34	27	175	0.44	a
9	113.04	227.00	53	56	45	372	0.92	a
10	139.56	280.05	220	55	38	293	0.80	a
11	143.38	287.70	38	35	27	176	0.47	b
12	185.59	372.11	127	51	38	287	0.79	a
13	198.18	397.29	218	45	28	180	0.70	a
14	238.48	477.88	119	48	35	248	0.83	a
15	351.83	704.53	68	42	32	187	1.04	a
16	499.58	999.90	37	36	28	158	1.14	a
17	510.64	1021.99	710	83	53	342	2.64	a Wide Pk
18	558.16	1116.97	184	42	27	132	1.25	a
19	569.60	1139.84	37	30	23	112	0.91	a
20	582.85	1166.32	45	30	22	103	1.00	a
21	595.59	1191.78	89	35	24	121	0.95	a
22	650.92	1302.36	36	31	24	110	1.13	a
23	692.96	1386.38	40	36	28	128	1.65	a Wide Pk
24	694.94	1390.33	55	54	43	217	2.72	b



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## PEAK SEARCH RESULTS

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PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
25	802.33	1604.90	58	33	24	102	1.50	a
26	910.60	1821.20	41	29	21	89	1.45	a
27	961.10	1922.07	46	35	26	111	2.05	a
28	1000.44	2000.66	20	25	19	75	1.34	a
29	1459.90	2917.98	101	28	16	50	1.61	a

061539D08.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: . . . . . DET080602.BKG (060602-8 WEEKLY BKGD)

Bkg.File Detector #: 8

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BACKGROUND SUBTRACT RESULTS  
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PK#	ENERGY (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	OLD CR.LEVEL	NEW NET COUNTS	NEW UN- CERTAINTY	NEW CR.LEVEL	FLAG
1	46.38	201	51	35	2	90	74	NET<CL
3	63.15	272	82	62	12	108	89	NET<CL
4	66.14	248	75	56	154	103	82	
5	74.48	64	55	43	-54	103	85	NET<CL
6	76.79	54	40	30	-50	75	62	NET<CL
7	92.55	358	69	47	64	99	80	NET<CL
10	139.56	220	55	38	158	83	65	
11	143.38	38	35	27	-4	58	48	NET<CL
12	185.59	127	51	38	-36	84	70	NET<CL
13	198.18	218	45	28	139	77	60	
14	238.48	119	48	35	2	74	61	NET<CL
15	351.83	68	42	32	11	62	51	NET<CL
17	510.64	710	83	53	50	132	108	NET<CL
18	558.16	184	42	27	105	63	49	
19	569.60	37	30	23	4	54	44	NET<CL
20	582.85	45	30	22	-7	54	45	NET<CL
23	692.96	40	36	28	6	74	61	NET<CL
25	802.33	58	33	24	3	49	41	NET<CL
26	910.60	41	29	21	5	44	36	NET<CL
29	1459.90	101	28	16	10	43	35	NET<CL

Paragon Analytics, Div. of DataChem Lab  
 GammaScan

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Geo 1 / Water

Sample ID: GS060522-2MB GS060522-2

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Sampling Start:   06/06/2006 17:00:00 | Counting Start:   06/06/2006 17:41:20
Sampling Stop:   06/06/2006 17:00:00 | Decay Time. . . . . 6.89e-001 Hrs
Buildup Time. . . . . 0.00e+000 Hrs | Live Time . . . . . 24000 Sec
Sample Size . . . . . 1.00e+000 L | Real Time . . . . . 24043 Sec
Collection Efficiency . . . . . 1.0000 | Spectrum File . . . . . 061539D08.SPC
Cr. Level Confidence Interval: 95 % | Det. Limit Confidence Interval: 95 %
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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: . . . . . FANP.LIB (FANP (Fiss. Act. and Nat. Products))

MEASURED or MDA CONCENTRATIONS

Nuclide	ENERGY (keV)	E T	Concentration (pCi/L)	MDA	Critical Level	Half-life (hrs)
Th-234	92.50	N	3.22E+01 +- 4.94E+01	8.16E+01	4.01E+01	3.92E+13
Eu-155	105.31		4.18E+00 +- 4.52E+00	7.38E+00	3.51E+00	4.35E+04
Pb-212	238.63	N	2.04E-01 +- 7.00E+00	1.18E+01	5.76E+00	1.67E+04
Pb-214	351.99	N	1.69E+00 +- 9.22E+00	1.55E+01	7.54E+00	1.40E+07
Ce-144	Average:		x-1.48E+01 +- 1.42E+01	. . . . .	. . . . .	6.82E+03
	696.49		4.13E+02 +- 4.09E+02	6.68E+02	3.24E+02	6.82E+03
	133.53	N	-1.53E+01 +- 1.42E+01	2.50E+01	1.21E+01	6.82E+03
Ac-228	911.07	N	2.24E+00 +- 2.14E+01	3.64E+01	1.75E+01	5.04E+04
Pa-234m	1001.03		4.58E+02 +- 5.70E+02	9.37E+02	4.38E+02	3.92E+13
K-40	1460.75	N	1.79E+01 +- 7.38E+01	1.25E+02	6.00E+01	1.12E+13
Am-241	59.54	N	1.19E+00 +- 4.54E+00	7.62E+00B	3.69E+00	3.80E+06
Co-57	122.07	N	8.93E-01 +- 1.63E+00	2.70E+00	1.31E+00	6.48E+03
U-235	143.76	N	8.37E+00 +- 1.49E+01	2.47E+01b	1.20E+01	6.17E+12
Ce-139	165.85	N	2.45E-01 +- 2.16E+00	3.64E+00	1.77E+00	3.30E+03
Th-227	236.00	N	9.62E+00 +- 2.22E+01	3.64E+01R	1.78E+01	1.90E+05
Cr-51	320.07	N	1.93E+01 +- 2.30E+01	3.78E+01	1.82E+01	6.65E+02
I-131	364.48	N	2.18E+00 +- 2.95E+00	5.21E+00	2.51E+00	1.93E+02
Sb-125	427.95	N	3.22E+00 +- 7.51E+00	1.26E+01	6.03E+00	2.43E+04
Be-7	477.56	N	2.03E+00 +- 2.54E+01	4.38E+01	2.10E+01	1.28E+03
Tl-208	583.14	N	5.39E+00 +- 3.61E+00	5.70E+00	2.72E+00	1.67E+04
Sb-124	602.71	N	2.21E+00 +- 3.39E+00	5.62E+00	2.69E+00	1.44E+03
Cs-134	604.66	N	2.58E+00 +- 3.45E+00	6.13E+00	2.95E+00	1.81E+04
Bi-214	609.32	N	4.43E-01 +- 1.10E+01	1.86E+01	9.04E+00	1.40E+07
Ru-106	621.84	N	5.45E+00 +- 2.93E+01	5.12E+01	2.44E+01	8.84E+03
Ag-110M	657.75	N	2.44E-01 +- 4.80E+00	8.15E+00	3.94E+00	6.00E+03

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## MEASURED or MDA CONCENTRATIONS

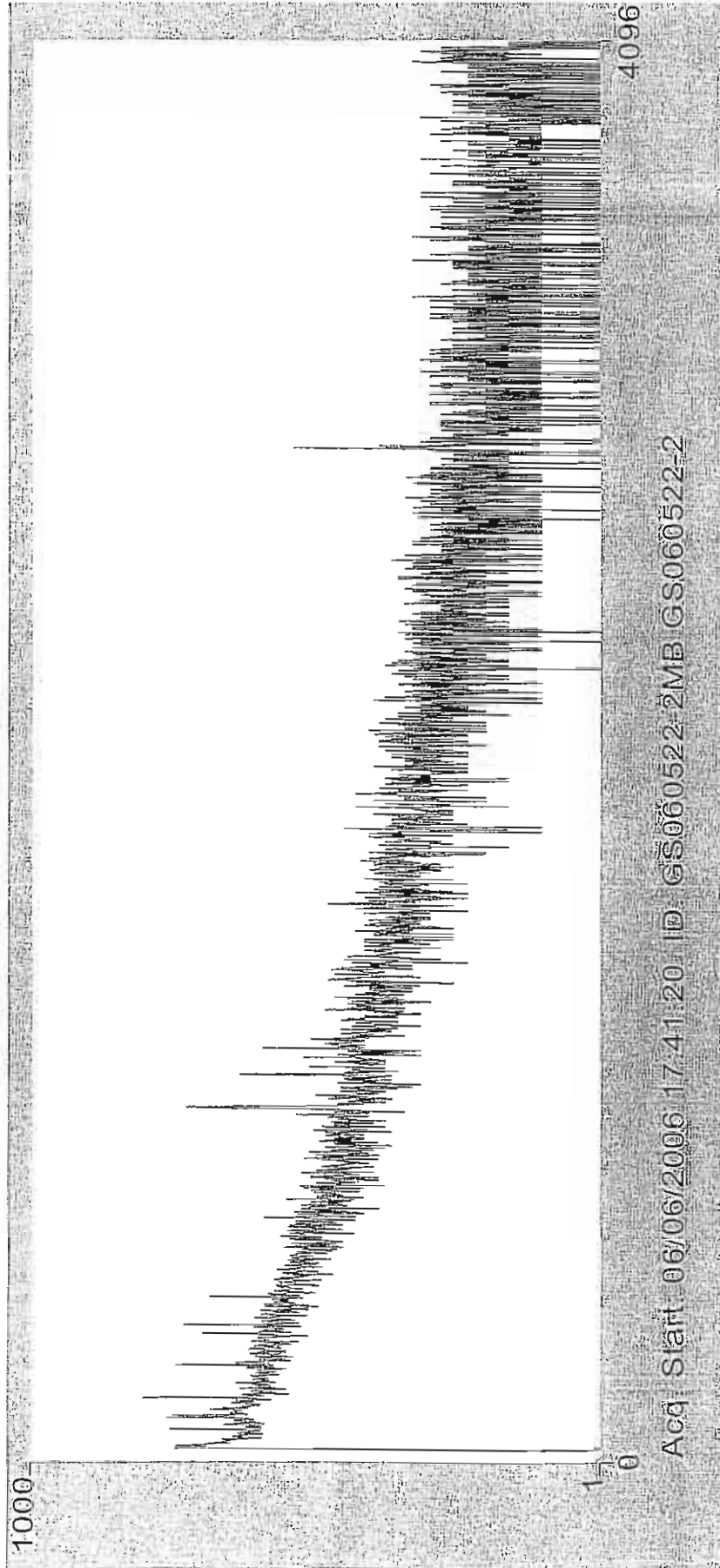
Nuclide	ENERGY E (keV)	N T	Concentration		MDA	Critical Level	Halflife (hrs)
			(pCi/L	)			
Cs-137	661.62	N-3.31E-01	+-	3.36E+00	5.86E+00	2.78E+00	2.64E+05
Nb-94	702.50	N-1.19E+00	+-	3.87E+00	6.74E+00b	3.23E+00	1.78E+08
Bi-212	727.17	N 6.32E+01	+-	4.96E+01	7.90E+01	3.74E+01	1.67E+04
Nb-95	765.82	N-3.21E-01	+-	3.22E+00	5.62E+00	2.66E+00	1.54E+03
Co-58	810.75	N-4.24E-02	+-	3.18E+00	5.54E+00	2.62E+00	1.70E+03
Mn-54	834.81	N-1.13E+00	+-	3.38E+00	6.00E+00	2.85E+00	7.49E+03
Sc-46	889.26	N-1.42E+00	+-	3.12E+00	5.65E+00	2.66E+00	2.01E+03
Eu-154	1004.80	N 1.13E+01	+-	2.80E+01	4.60E+01r	2.20E+01	7.45E+04
Fe-59	1099.22	N-2.60E+00	+-	6.78E+00	1.22E+01	5.74E+00	1.08E+03
Zn-65	1115.52	N 1.17E+00	+-	6.99E+00	1.21E+01	5.67E+00	5.85E+03
Co-56	1238.28	N 1.86E+00	+-	5.50E+00	9.42E+00	4.39E+00	1.86E+03
Na-22	1274.54	N-1.29E+00	+-	4.05E+00	7.28E+00	3.42E+00	2.28E+04
Co-60	1332.51	N 1.55E+00	+-	3.68E+00	6.28E+00	2.91E+00	4.62E+04
Eu-152	1408.08	N 2.00E+01	+-	1.83E+01	2.91E+01	1.34E+01	1.17E+05
Al-26	1808.65	N 7.03E-01	+-	4.13E+00	7.28E+00	3.33E+00	6.31E+09

MEASURED TOTAL: 6.66E+02 +- 9.39E+02 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	46.38	93.67	2	90	74	271	0.73	Deleted
2	53.04	107.00	97	75	59	556	1.37	Unknown
3	63.15	127.23	12	108	89	604	1.27	Deleted
4	66.14	133.20	154	103	82	529	1.12	Unknown
5	74.48	149.87	-54	103	85	378	0.78	Deleted
6	76.79	154.51	-50	75	62	227	0.43	Deleted
9	113.04	227.00	53	56	45	372	0.92	Unknown
10	139.56	280.05	158	83	65	293	0.80	Unknown
11	143.38	287.70	-4	58	48	176	0.47	Deleted
12	185.59	372.11	-36	84	70	287	0.79	Deleted
13	198.18	397.29	139	77	60	180	0.70	Unknown
16	499.58	999.90	37	36	28	158	1.14	Unknown
17	510.64	1021.99	50	132	108	342	2.64	Deleted
18	558.16	1116.97	105	63	49	132	1.25	Unknown
19	569.60	1139.84	4	54	44	112	0.91	Deleted
20	582.85	1166.32	-7	54	45	103	1.00	Deleted
21	595.59	1191.78	89	35	24	121	0.95	Unknown
22	650.92	1302.36	36	31	24	110	1.13	Unknown
23	692.96	1386.38	6	74	61	128	1.65	Deleted
25	802.33	1604.90	3	49	41	102	1.50	Deleted
27	961.10	1922.07	46	35	26	111	2.05	Unknown

c:\SEEKER\BIN\061539d08.res Analysis Results Saved.



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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: GS060522-2LCS GS060522-2

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Sampling Start:   06/06/2006 12:00:00 | Counting Start:   06/06/2006 12:44:04
Sampling Stop:   06/06/2006 12:00:00 | Decay Time. . . . . 7.34E-001 Hrs
Buildup Time. . . . . 0.00E+000 Hrs | Live Time . . . . . 1800 Sec
Sample Size . . . . . 1.00E+000 L | Real Time . . . . . 1841 Sec
Collection Efficiency . . . . . 1.0000 | Spc. File . . . . . 061585D07.SPC
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Detector #: 7 (Detector 7)

Energy(keV) = -2.14 + 0.501\*Ch + 2.09E-07\*Ch^2 + 0.00E+00\*Ch^3 06/06/2006  
 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

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PEAK SEARCH RESULTS

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PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	42.73	89.59	565	334	272	10923	1.45	a Wide Pk
2	48.76	101.64	4840	474	373	19270	1.71	a Wide Pk
3	50.66	105.43	4867	651	523	28905	2.41	b
4	52.79	109.70	686	346	281	13489	1.15	c
5	59.23	122.55	75299	603	206	7810	1.05	a HiResid
6	65.72	135.51	381	208	168	4487	1.36	a Wide Pk
7	67.40	138.85	785	290	234	6730	1.99	b
8	69.93	143.90	690	308	250	7291	2.17	c
9	88.02	180.02	23144	341	127	2989	0.91	a
10	107.54	219.00	22	73	60	878	0.47	a NET< CL
11	122.00	247.88	3992	173	98	1767	0.96	a
12	136.37	276.55	447	121	94	1618	0.95	a
13	141.69	287.19	43	71	57	809	0.49	b NET< CL
14	145.83	295.44	42	86	70	1079	0.59	c NET< CL
15	165.84	335.39	315	115	90	1488	0.92	a
16	210.76	425.07	67	99	80	1303	0.78	a NET< CL
17	372.28	747.46	82	62	49	584	0.63	a
18	391.62	786.04	88	82	65	899	0.93	a
19	661.57	1324.65	18311	282	65	730	1.44	a
20	897.79	1795.73	115	116	94	1355	2.31	a
21	1173.15	2344.65	15301	254	49	438	1.92	a HiResid
22	1332.39	2661.98	13523	235	26	118	2.05	a HiResid
23	1835.94	3664.87	33	16	9	15	2.27	a

061585D07.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: . . . . . DET070602.BKG (060602-7 WEEKLY BKGD)

Bkg.File Detector #: 7

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BACKGROUND SUBTRACT RESULTS  
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PK#	ENERGY (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	OLD CR.LEVEL	NEW NET COUNTS	NEW UN- CERTAINTY	NEW CR.LEVEL	FLAG
4	52.79	686	346	281	686	346	281	
6	65.72	381	208	168	376	208	168	
9	88.02	23144	341	127	23143	341	127	
10	107.54	22	73	60	21	73	60	NET<CL
13	141.69	43	71	57	41	71	57	NET<CL

Paragon Analytics, Div. of DataChem Lab  
 GammaScan

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Geo 1 / Water

Sample ID: GS060522-2LCS GS060522-2

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Sampling Start: 06/06/2006 12:00:00 | Counting Start: 06/06/2006 12:44:04
Sampling Stop: 06/06/2006 12:00:00 | Decay Time. . . . . 7.34e-001 Hrs
Buildup Time. . . . . 0.00e+000 Hrs | Live Time . . . . . 1800 Sec
Sample Size . . . . . 1.00e+000 L | Real Time . . . . . 1841 Sec
Collection Efficiency . . . . . 1.0000 | Spectrum File . . . . . 061585D07.SPC
Cr. Level Confidence Interval: 95 % | Det. Limit Confidence Interval: 95 %
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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)

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MEASURED or MDA CONCENTRATIONS

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Nuclide	ENERGY E (keV)	Concentration (pCi/L)	MDA	Critical Level	Halflife (hrs)
Am-241	59.54	9.71E+04 +- 7.77E+02	5.34E+02	2.65E+02	3.79E+06
Cd-109	88.02	2.65E+05 +- 3.91E+03	2.95E+03	1.46E+03	1.11E+04
Co-57	122.07	2.09E+03 +- 9.07E+01	1.04E+02	5.11E+01	6.50E+03
Ce-139	165.85	2.08E+02 +- 7.59E+01	1.20E+02	5.93E+01	3.30E+03
Sn-113	391.68	1.44E+02 +- 1.33E+02	2.18E+02	1.07E+02	2.76E+03
Cs-137	661.62	3.63E+04 +- 5.59E+02	2.62E+02	1.28E+02	2.64E+05
Y-88	Average:x	1.49E+02 +- 6.72E+01	. . . .	. . . .	2.56E+03
	898.02	2.73E+02 +- 2.76E+02	4.54E+02	2.24E+02	2.56E+03
	1836.01	1.42E+02 +- 6.93E+01	9.22E+01	4.03E+01	2.56E+03
Co-60	Average:x	4.32E+04 +- 5.18E+02	. . . .	. . . .	4.62E+04
	1173.21	4.34E+04 +- 7.21E+02	2.84E+02	1.38E+02	4.62E+04
	1332.48	4.30E+04 +- 7.46E+02	1.73E+02	8.20E+01	4.62E+04
Hg-203	279.18	MDA . . . .	1.75E+02	8.64E+01	1.12E+03

MEASURED TOTAL: 4.44E+05 +- 6.13E+03 pCi/L

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UNKNOWN, SUM or ESCAPE PEAKS

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PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	42.73	89.59	565	334	272	10923	1.45	Unknown
2	48.76	101.64	4840	474	373	19270	1.71	Unknown
3	50.66	105.43	4867	651	523	28905	2.41	Unknown



061585D07.SPC Analyzed by

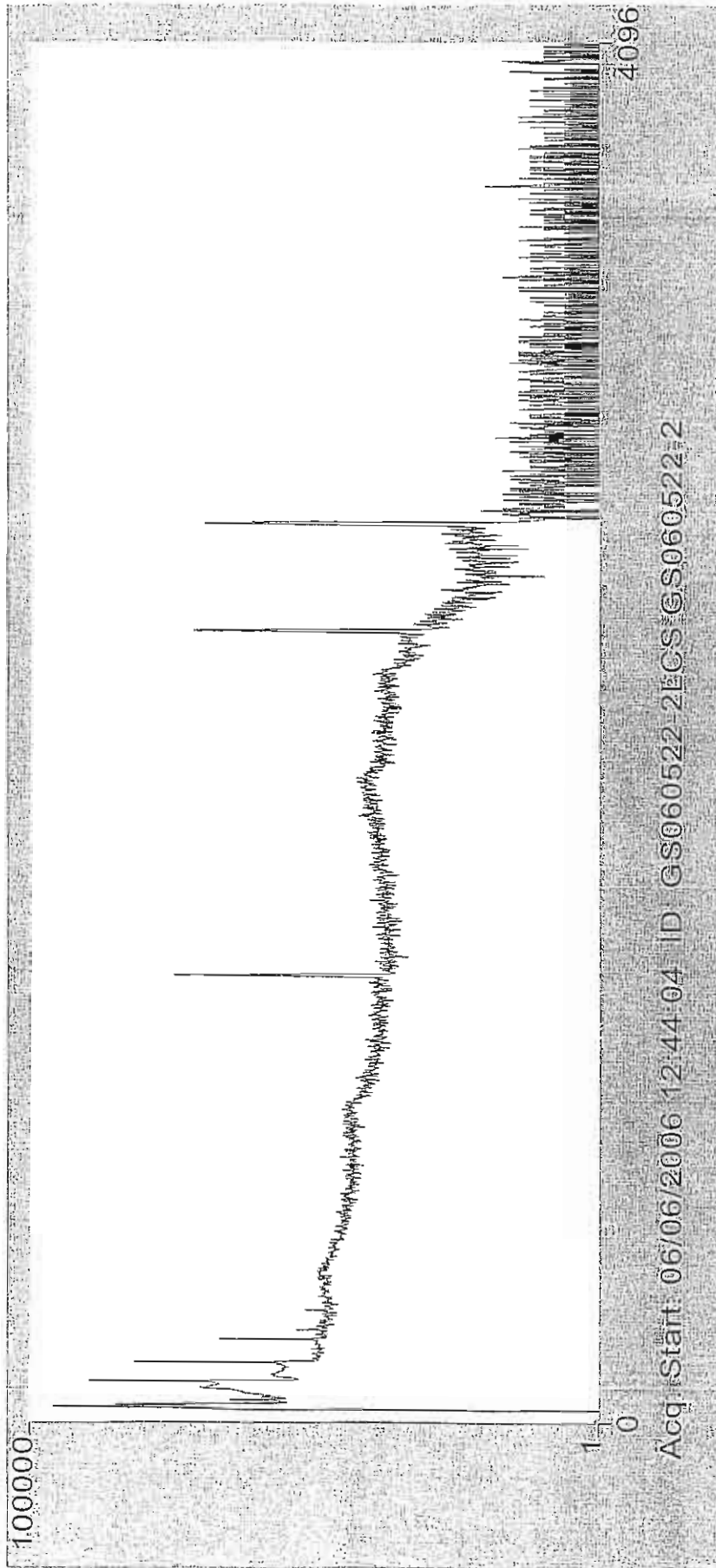
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UNKNOWN, SUM or ESCAPE PEAKS

=====

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
4	52.79	109.70	686	346	281	13489	1.15	Unknown
6	65.72	135.51	376	208	168	4487	1.36	Unknown
7	67.40	138.85	785	290	234	6730	1.99	Unknown
8	69.93	143.90	690	308	250	7291	2.17	Unknown
10	107.54	219.00	21	73	60	878	0.47	Deleted
12	136.37	276.55	447	121	94	1618	0.95	Unknown
13	141.69	287.19	41	71	57	809	0.49	Deleted
14	145.83	295.44	42	86	70	1079	0.59	Deleted
16	210.76	425.07	67	99	80	1303	0.78	Deleted
17	372.28	747.46	82	62	49	584	0.63	Unknown

c:\SEEKER\BIN\061585d07.res Analysis Results Saved.



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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    P S Version 1.8.4

Paragon Analytics, Div. of DataChem Lab  
 GammaScan

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Geo 1 / Water

Sample ID: GS060606-3MB GS060606-3

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Sampling Start: 06/18/2006 17:00:00 | Counting Start: 06/18/2006 17:10:11
Sampling Stop: 06/18/2006 17:00:00 | Decay Time. . . . . 1.70E-001 Hrs
Buildup Time. . . . . 0.00E+000 Hrs | Live Time . . . . . 36000 Sec
Sample Size . . . . . 1.00E+000 L | Real Time . . . . . 36084 Sec
Collection Efficiency . . . . . 1.0000 | Spc. File . . . . . 061697D08.SPC
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Detector #: 8 (Detector 8)

Energy(keV) = -0.40 + 0.500\*Ch + 1.84E-07\*Ch^2 + 0.00E+00\*Ch^3 06/18/2006

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)

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

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PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	46.36	93.51	315	71	51	515	0.82	a
2	53.19	107.17	151	105	84	968	1.62	a Wide Pk
3	63.22	127.23	401	77	54	583	0.82	a
4	66.24	133.28	382	93	69	816	1.12	b
5	74.86	150.51	102	76	60	675	0.97	a
6	77.08	154.95	88	67	53	563	0.76	b
7	84.48	169.75	118	122	99	1202	1.91	a Wide Pk
8	92.49	185.76	492	80	55	564	1.02	a
9	99.23	199.24	37	77	63	671	1.17	a NET< CL
10	139.60	279.97	311	66	46	428	0.84	a
11	159.19	319.14	54	58	46	430	0.89	a
12	162.53	325.83	67	58	46	430	0.89	b
13	174.83	350.42	70	43	32	256	0.49	a
14	185.64	372.02	282	91	69	709	1.42	a
15	198.18	397.10	295	71	51	481	0.92	a
16	224.91	450.54	23	38	30	229	0.51	a NET< CL
17	238.52	477.75	147	58	44	384	0.86	a
18	288.34	577.36	33	34	26	167	0.54	a
19	294.87	590.42	25	53	43	342	0.99	a NET< CL
20	325.60	651.84	59	45	35	248	0.83	a
21	351.93	704.49	49	31	23	133	0.57	a
22	374.70	750.01	8	28	23	128	0.57	a NET< CL
23	458.33	917.16	25	39	31	204	0.97	a NET< CL
24	510.79	1022.01	931	97	62	509	2.33	a Wide Pk

## =====

## PEAK SEARCH RESULTS

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PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET/MDA COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
25	558.18	1116.70	245	50	32	200	1.07	a
26	569.53	1139.40	51	30	22	115	0.65	a
27	582.97	1166.26	72	42	32	185	1.37	a
28	595.79	1191.88	109	45	33	209	1.18	a
29	608.77	1217.80	68	51	40	276	1.44	a
30	802.67	1605.22	41	32	24	121	1.04	a
31	867.87	1735.45	34	33	25	130	1.32	a
32	910.49	1820.58	65	40	30	148	1.91	a
33	1460.03	2917.77	150	36	22	86	2.09	a

SEEKER BACKGROUND SUBTRACT RESULTS Vers. 2.2.1

Paragon Analytics, Div. of DataChem Lab  
GammaScan

Background File: . . . . . DET080616.BKG (060616-8 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
1	46.36	315	71	51	66	114	93	NET<CL
2	53.19	151	105	84	116	122	98	
3	63.22	401	77	54	49	131	107	NET<CL
4	66.24	382	93	69	243	143	115	
5	74.86	102	76	60	12	105	86	NET<CL
6	77.08	88	67	53	-3	119	98	NET<CL
7	84.48	118	122	99	16	164	134	NET<CL
8	92.49	492	80	55	-47	142	118	NET<CL
9	99.23	37	77	63	12	112	92	NET<CL
10	139.60	311	66	46	197	107	85	
11	159.19	54	58	46	35	80	65	NET<CL
14	185.64	282	91	69	65	133	109	NET<CL
15	198.18	295	71	51	168	108	87	
17	238.52	147	58	44	-37	103	85	NET<CL
19	294.87	25	53	43	-20	94	78	NET<CL
21	351.93	49	31	23	-52	87	73	NET<CL
24	510.79	931	97	62	-94	181	150	NET<CL
25	558.18	245	50	32	122	83	66	
26	569.53	51	30	22	3	59	48	NET<CL
27	582.97	72	42	32	-0	82	67	NET<CL
29	608.77	68	51	40	7	82	68	NET<CL
30	802.67	41	32	24	-38	68	57	NET<CL
32	910.49	65	40	30	9	68	56	NET<CL
33	1460.03	150	36	22	42	59	47	NET<CL

Paragon Analytics, Div. of DataChem Lab  
GammaScan

Geo 1 / Water

Sample ID: GS060606-3MB GS060606-3

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Sampling Start: 06/18/2006 17:00:00 | Counting Start: 06/18/2006 17:10:11
Sampling Stop: 06/18/2006 17:00:00 | Decay Time: . . . . . 1.70e-001 Hrs
Buildup Time: . . . . . 0.00e+000 Hrs | Live Time . . . . . 36000 Sec
Sample Size . . . . . 1.00e+000 L | Real Time . . . . . 36084 Sec
Collection Efficiency . . . . . 1.0000 | Spectrum File . . . . . 061697D08.SPC
Cr. Level Confidence Interval: 95 % | Det. Limit Confidence Interval: 95 %
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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: . . . . . FANP.LIB (FANP (Fiss. Act. and Nat. Products))

MEASURED or MDA CONCENTRATIONS

Nuclide	ENERGY E (keV)	N T	Concentration (pCi/L)	MDA	Critical Level	Halflife (hrs)
Th-234	92.50	N-1.56E+01	+- 4.75E+01	7.95E+01	3.93E+01	3.92E+13
U-235	Average:x	1.07E+01	+- 1.08E+01	. . . .	. . . .	6.17E+12
	163.35	2.86E+01	+- 2.49E+01	4.05E+01	1.97E+01	6.17E+12
	143.76	N 6.51E+00	+- 1.20E+01	2.00E+01	9.73E+00	6.17E+12
Sb-125	Average:x	2.65E+00	+- 5.74E+00	. . . .	. . . .	2.43E+04
	176.29	2.32E+01	+- 1.41E+01	2.22E+01	1.07E+01	2.43E+04
	427.95	N-1.44E+00	+- 6.29E+00	1.08E+01	5.23E+00	2.43E+04
Pb-212	238.63	N-2.37E+00	+- 6.49E+00	1.09E+01	5.38E+00	1.67E+04
Tl-208	583.14	N-1.06E-03	+- 5.45E+00	9.15E+00	4.48E+00	1.67E+04
Ac-228	911.07	N 3.00E+00	+- 2.18E+01	3.66E+01	1.79E+01	5.04E+04
K-40	1460.75	N 4.82E+01	+- 6.67E+01	1.10E+02	5.35E+01	1.12E+13
Am-241	59.54	N 5.46E-01	+- 3.65E+00	6.12E+00	2.98E+00	3.80E+06
Eu-155	105.31	N-4.98E-01	+- 5.10E+00	8.65E+00	4.21E+00	4.35E+04
Co-57	122.07	N-4.61E-01	+- 1.27E+00	2.18E+00	1.06E+00	6.48E+03
Ce-144	133.53	N-2.68E+00	+- 1.17E+01	1.98E+01	9.68E+00	6.82E+03
Ce-139	165.85	N 1.40E-01	+- 2.24E+00	3.75E+00b	1.84E+00	3.30E+03
Th-227	236.00	N 1.13E+01	+- 1.83E+01	2.98E+01R	1.46E+01	1.90E+05
Cr-51	320.07	N-8.76E+00	+- 1.87E+01	3.22E+01	1.56E+01	6.65E+02
Pb-214	351.99	N 3.44E+00	+- 5.28E+00	8.74E+00	4.24E+00	1.40E+07
I-131	364.48	N-1.28E+00	+- 2.53E+00	4.37E+00	2.12E+00	1.93E+02
Be-7	477.56	N 8.13E+00	+- 1.95E+01	3.26E+01	1.57E+01	1.28E+03
Sb-124	602.71	N 1.12E+00	+- 2.67E+00	4.47E+00	2.16E+00	1.44E+03
Cs-134	604.66	N-1.96E+00	+- 2.77E+00	4.86E+00	2.35E+00	1.81E+04
Bi-214	609.32	N 1.04E+01	+- 5.96E+00	9.39E+00	4.52E+00	1.40E+07
Ru-106	621.84	N 5.45E+00	+- 2.54E+01	4.30E+01	2.07E+01	8.84E+03

## MEASURED or MDA CONCENTRATIONS

Nuclide	ENERGY (keV)	N T	Concentration		MDA	Critical Level	Halflife (hrs)
			(pCi/L	)			
Ag-110M	657.75	N	2.54E+00	+ - 2.45E+00	3.97E+00	1.90E+00	6.00E+03
Cs-137	661.62	N	7.36E-02	+ - 2.64E+00	4.53E+00	2.17E+00	2.64E+05
Nb-94	702.50	N	2.34E+00	+ - 3.12E+00	5.47E+00	2.64E+00	1.78E+08
Bi-212	727.17	N	9.43E+00	+ - 4.11E+01	7.12E+01	3.42E+01	1.67E+04
Nb-95	765.82	N	1.38E+00	+ - 2.54E+00	4.25E+00	2.03E+00	1.54E+03
Co-58	810.75	N	1.88E-02	+ - 2.81E+00	4.83E+00	2.32E+00	1.70E+03
Mn-54	834.81	N	1.59E+00	+ - 2.70E+00	4.80E+00	2.29E+00	7.49E+03
Sc-46	889.26	N	1.14E-01	+ - 2.56E+00	4.44E+00	2.11E+00	2.01E+03
Pa-234m	1001.03	N	6.10E+01	+ - 5.05E+02	8.65E+02	4.12E+02	3.92E+13
Eu-154	1004.80	N	1.30E+01	+ - 1.67E+01	3.01E+01	1.44E+01	7.45E+04
Fe-59	1099.22	N	8.15E+00	+ - 5.75E+00	9.08E+00	4.31E+00	1.08E+03
Zn-65	1115.52	N	9.78E-01	+ - 6.22E+00	1.09E+01	5.17E+00	5.85E+03
Co-56	1238.28	N	8.68E-01	+ - 4.68E+00	8.23E+00	3.90E+00	1.86E+03
Na-22	1274.54	N	4.56E-01	+ - 3.22E+00	5.55E+00	2.63E+00	2.28E+04
Co-60	1332.51	N	2.48E+00	+ - 2.92E+00	5.43E+00	2.56E+00	4.62E+04
Eu-152	1408.08	N	4.63E+00	+ - 1.58E+01	2.69E+01	1.27E+01	1.17E+05
Al-26	1808.65	N	9.87E-01	+ - 3.44E+00	5.93E+00	2.76E+00	6.31E+09

MEASURED TOTAL: 1.84E+02 +- 7.29E+02 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	46.36	93.51	66	114	93	515	0.82	Deleted
2	53.19	107.17	116	122	98	968	1.62	Unknown
3	63.22	127.23	49	131	107	583	0.82	Deleted
4	66.24	133.28	243	143	115	816	1.12	Unknown
5	74.86	150.51	12	105	86	675	0.97	Deleted
6	77.08	154.95	-3	119	98	563	0.76	Deleted
7	84.48	169.75	16	164	134	1202	1.91	Deleted
9	99.23	199.24	12	112	92	671	1.17	Deleted
10	139.60	279.97	197	107	85	428	0.84	Unknown
11	159.19	319.14	35	80	65	430	0.89	Deleted
14	185.64	372.02	65	133	109	710	1.42	Deleted
15	198.18	397.10	168	108	87	481	0.92	Unknown
16	224.91	450.54	23	38	30	229	0.51	Deleted
18	288.34	577.36	33	34	26	167	0.54	Unknown
19	294.87	590.42	-20	94	78	342	0.99	Deleted
20	325.60	651.84	59	45	35	248	0.83	Unknown
21	351.93	704.49	-52	87	73	133	0.57	Deleted
22	374.70	750.01	8	28	23	128	0.57	Deleted
23	458.33	917.16	25	39	31	204	0.97	Deleted
24	510.79	1022.01	-94	181	150	509	2.33	Deleted
25	558.18	1116.70	122	83	66	200	1.07	Unknown
26	569.53	1139.40	3	59	48	115	0.65	Deleted
28	595.79	1191.88	109	45	33	209	1.18	Unknown

061697D08.SPC Analyzed by

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UNKNOWN,SUM or ESCAPE PEAKS

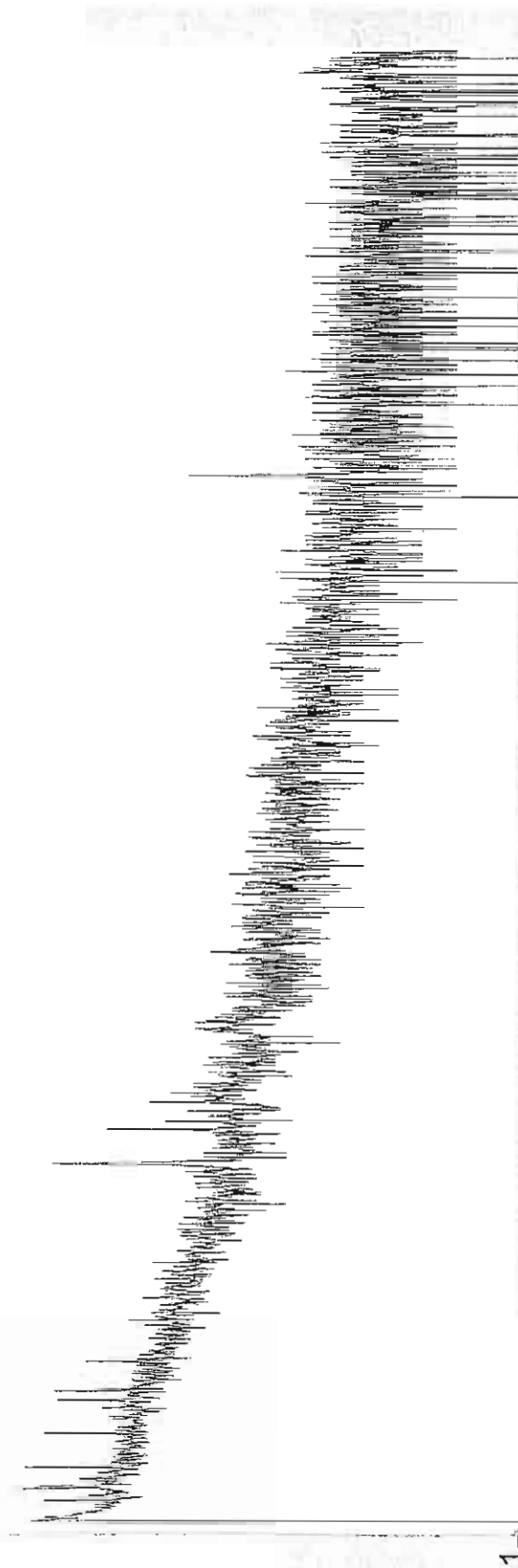
=====

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
29	608.77	1217.80	7	82	68	276	1.44	Deleted
30	802.67	1605.22	-38	68	57	121	1.04	Deleted
31	867.87	1735.45	34	33	25	130	1.32	Unknown

c:\SEEKER\BIN\061697d08.res Analysis Results Saved.



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4096

Acq. Start: 06/18/2006 17:10:11 ID: GS060606-3MB GS060606-3

000049

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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    P S Version 1.8.4

Paragon Analytics, Div. of DataChem Lab  
 GammaScan

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Geo 1 / Water

Sample ID: GS060606-3LCS GS060606-3

```
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Sampling Start: 06/19/2006 10:00:00 | Counting Start: 06/19/2006 10:42:38
Sampling Stop: 06/19/2006 10:00:00 | Decay Time. . . . . 7.11E-001 Hrs
Buildup Time. . . . . 0.00E+000 Hrs | Live Time . . . . . 1800 Sec
Sample Size . . . . . 1.00E+000 L | Real Time . . . . . 1895 Sec
Collection Efficiency . . . . . 1.0000 | Spc. File . . . . . 061700D08.SPC
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Detector #: 8 (Detector 8)

Energy(keV) = -0.46 + 0.500\*Ch + 0.00E+00\*Ch^2 + 0.00E+00\*Ch^3 06/19/2006  
 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	43.40	87.62	465	283	230	9053	1.11	a Wide Pk
2	49.42	99.65	9540	651	511	27539	2.42	b
3	51.33	103.46	1997	443	357	18845	1.45	c
4	52.69	106.18	1522	460	373	20587	1.42	d
5	59.47	119.73	86107	638	206	8550	0.81	a
6	88.02	176.77	26425	355	116	2728	0.84	a
7	112.15	224.98	47	76	61	925	0.51	a NET< CL
8	121.97	244.61	4368	171	89	1607	0.82	a HiResid
9	126.67	254.00	11	76	63	964	0.45	b NET< CL HiResid
10	136.48	273.60	520	111	83	1405	0.82	a
11	140.00	280.63	97	89	71	1124	0.58	b
12	142.42	285.48	-0	71	58	843	0.46	c NET< CL
13	158.84	318.28	35	71	57	806	0.49	a NET< CL
14	165.90	332.39	328	105	81	1321	0.86	a
15	193.77	388.07	101	89	71	1115	0.69	a
16	310.36	621.02	18	60	49	595	0.54	a NET< CL
17	391.63	783.40	98	103	83	1170	1.11	a
18	661.94	1323.46	24847	324	61	696	1.35	a
19	1058.08	2114.97	65	83	67	831	1.65	a NET< CL
20	1173.33	2345.23	21140	297	49	448	1.72	a HiResid
21	1332.38	2663.02	18696	275	24	112	1.82	a
22	1835.54	3668.34	33	19	13	30	1.79	a

061700D08.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: . . . . . DET080616.BKG (060616-8 WEEKLY BKGD)

Bkg.File Detector #: 8

=====  
BACKGROUND SUBTRACT RESULTS  
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PK#	ENERGY (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	OLD CR.LEVEL	NEW NET COUNTS	NEW UN- CERTAINTY	NEW CR.LEVEL	FLAG
4	52.69	1522	460	373	1520	460	373	
6	88.02	26425	355	116	26421	355	116	
11	140.00	97	89	71	92	89	71	
13	158.84	35	71	57	34	71	57	NET<CL
14	165.90	328	105	81	327	105	81	

Paragon Analytics, Div. of DataChem Lab  
 GammaScan

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Geo 1 / Water

Sample ID: GS060606-3LCS GS060606-3

```
-----
Sampling Start: 06/19/2006 10:00:00 | Counting Start: 06/19/2006 10:42:38
Sampling Stop: 06/19/2006 10:00:00 | Decay Time: . . . . . 7.11e-001 Hrs
Buildup Time: . . . . . 0.00e+000 Hrs | Live Time . . . . . 1800 Sec
Sample Size . . . . . 1.00e+000 L | Real Time . . . . . 1895 Sec
Collection Efficiency . . . . . 1.0000 | Spectrum File . . . . . 061700D08.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)

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MEASURED or MDA CONCENTRATIONS

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Nuclide	ENERGY E (keV)	Concentration (pCi/L)	MDA	Critical Level	Halflife (hrs)
Am-241	59.54	9.91E+04 +- 7.34E+02	4.77E+02	2.37E+02	3.79E+06
Cd-109	88.02	2.71E+05 +- 3.63E+03	2.41E+03	1.19E+03	1.11E+04
Co-57	122.07	1.96E+03 +- 7.68E+01	8.14E+01	4.01E+01	6.50E+03
Ce-139	165.85	1.78E+02 +- 5.70E+01	8.95E+01	4.40E+01	3.30E+03
Sn-113	391.68	1.22E+02 +- 1.27E+02	2.09E+02	1.03E+02	2.76E+03
Cs-137	661.62	3.65E+04 +- 4.76E+02	1.84E+02	9.02E+01	2.64E+05
Co-60	Average:x	4.35E+04 +- 4.42E+02	. . . .	. . . .	4.62E+04
	1173.21	4.37E+04 +- 6.14E+02	2.09E+02	1.02E+02	4.62E+04
	1332.48	4.33E+04 +- 6.36E+02	1.18E+02	5.57E+01	4.62E+04
Y-88	1836.01	1.02E+02 +- 5.89E+01	8.58E+01	3.87E+01	2.56E+03
Hg-203	279.18	MDA . . . .	1.30E+02	6.42E+01	1.12E+03
Y-88	898.02	MDA . . . .	2.55E+02	1.25E+02	2.56E+03

MEASURED TOTAL: 4.52E+05 +- 5.61E+03 pCi/L

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UNKNOWN, SUM or ESCAPE PEAKS

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PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	43.40	87.62	465	283	230	9053	1.11	Unknown
2	49.42	99.65	9540	651	511	27539	2.42	Unknown
3	51.33	103.46	1997	443	357	18845	1.45	Unknown
4	52.69	106.18	1520	460	373	20587	1.42	Unknown

061700D08.SPC Analyzed by

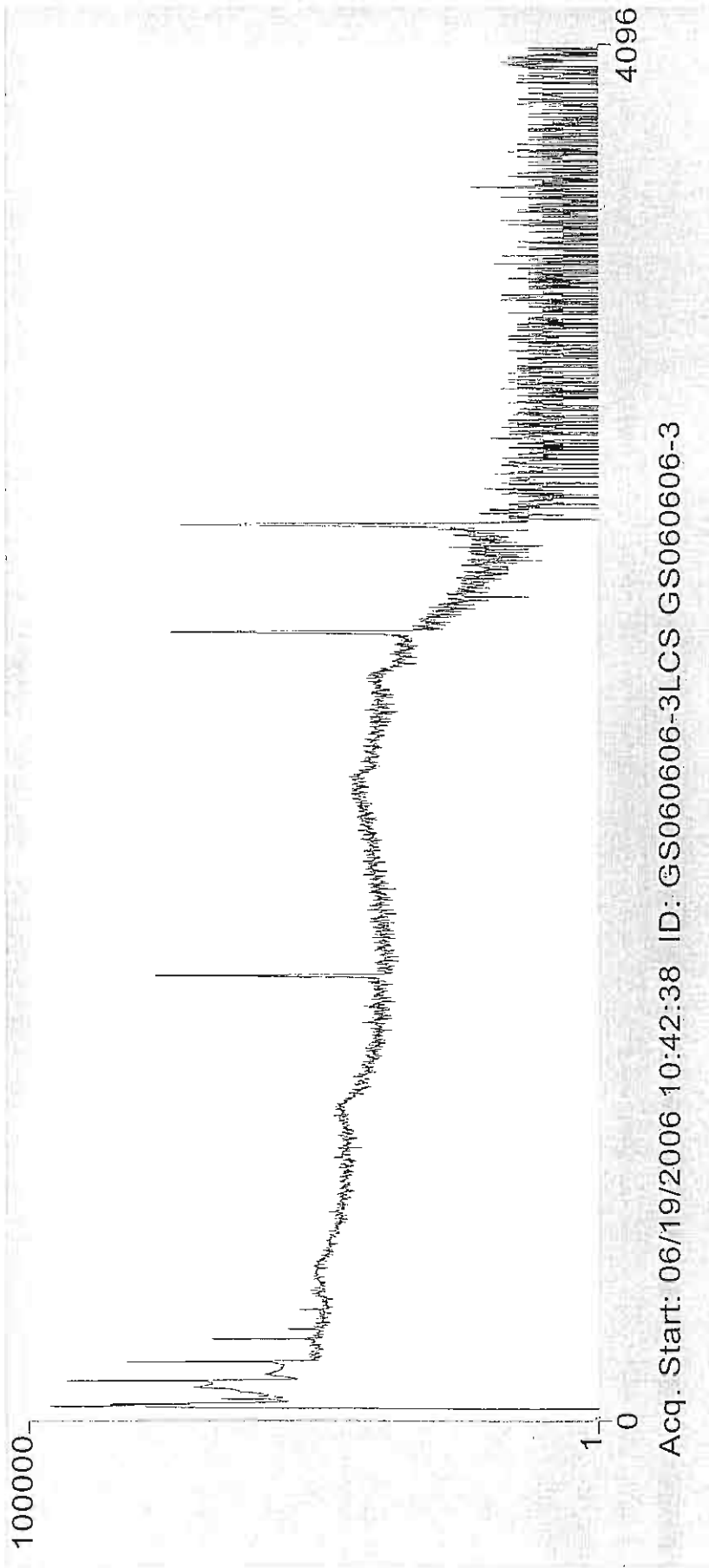
=====

UNKNOWN,SUM or ESCAPE PEAKS

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PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
7	112.15	224.98	47	76	61	925	0.51	Deleted
9	126.67	254.00	11	76	63	964	0.45	Deleted
10	136.48	273.60	520	111	83	1405	0.82	Unknown
11	140.00	280.63	92	89	71	1124	0.58	Unknown
12	142.42	285.48	0	71	59	843	0.46	Deleted
13	158.84	318.28	34	71	57	806	0.49	Deleted
15	193.77	388.07	101	89	71	1115	0.69	Unknown
16	310.36	621.02	18	60	49	595	0.54	Deleted
19	1058.08	2114.97	65	83	67	831	1.65	Deleted

c:\SEEKER\BIN\061700d08.res Analysis Results Saved.



000054

## Gamma Spectrometer Run Log

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

Sample ID	Ver <sup>1</sup>	Det. No.	Geo <sup>2</sup>	Count Dur. (min.) <sup>3</sup>	Start Time	Analyst	File ID/Comments	Saved?
0605082-5	W	2	11	150	0855	W	061360D02.SPC	W
0605083-1	↓	6	↓	150	↓	↓	061525D06.SPC	W
↓ -2	W	8	↓	60	↓	↓	061533D08.SPC	W
0605083-3	W	4	11	60	0917	W	061231D04.SPC	W
↓ -4	W	7	↓	150	↓	↓	061583D07.SPC	W
G5060518-1MB	LA	8	11	240	1002	W	061534D08.SPC	LA
↓ -1CS	W	4	11	30	1023	W	061232D04.SPC	W
0606002-2	W	4	11	30	1107	W	061233D04.SPC	W
↓ -2D	LA	4	11	30	1159	W	061334D04.SPC 061361D02.SPC	LA
↓ -3	LA	2	11	↓	↓	↓	061361D02.SPC	LA
↓ -4	LA	6	↓	↓	↓	↓	061526D06.SPC	LA
↓ -5	LA	7	↓	↓	↓	↓	061584D07.SPC	LA
↓ -6	LA	2	↓	30	1244	LA	061362D02.SPC	W
↓ -7	LA	4	↓	↓	↓	↓	061235D04.SPC	W
↓ -8	LA	6	↓	↓	↓	↓	061527D06.SPC	W
G5060522-2LCS	LA	7	↓	↓	↓	↓	061585D07.SPC	W
G5060603-1MB	LA	2	11	30	1334	W	061363D02.SPC	W
↓ -1CS	LA	4	↓	↓	↓	↓	061236D04.SPC	W
0605256-1	LA	6	↓	60	↓	↓	061529D06.SPC	LA
G5060606-2MB	LA	7	↓	↓	↓	↓	061586D07.SPC	LA
G5060525-1MB	LA	2	11	30	1422	LA	061364D02.SPC	LA
0605248-2	LA	4	↓	↓	↓	↓	061237D04.SPC	LA
↓ -2D	LA	8	↓	↓	↓	↓	061535D08.SPC	LA
G5060606-2LCS	LA	6	11	30	1502	LA	061530D06.SPC	LA

- Analyst will verify the position, detector, and geometry when the sample is removed from the detector.
- Calibration geometry.
- Count duration.

## KEY:

- \* sample was counted on a puck
- ↑ sample was counted with air flow arrow pointing up
- ↓ sample was counted with air flow arrow pointing down

313855

B

000055

Gamma Spectrometer Run Log

Date: 6/6/06

Reviewed By/Date: 6/14/06

LA  
6/6/06

Sample ID	Ver <sup>1</sup>	Det. No.	Geo <sup>2</sup>	Count Dur (min.) <sup>3</sup>	Start Time	Analyst	File ID/Comments	Saved?
0605256-1D	LA	7	11	60	1502	LA	061587007.SPC	LA
0605248-3	LA	2	↓	30	1512	↓	061365002.SPC	LA
↓ -4	LA	4	↓	↓	↓	↓	061238004.SPC	LA
↓ -5	LA	8	↓	↓	↓	↓	061536008.SPC	LA
G5060525-1LCS	LA	6	11	30	1536	LA	061531006.SPC	LA
<del>0615002-2</del> 17002-2 (816)	LW	2	86	30	1551	LA	061367002.SPC	LW
G5060605-2M13	LA	4	11	30	1559	LA	061239004.SPC	LA
0605131-1D	LA	8	13	30	↓	LA	061537008.SPC	LA
G5060605-2LCS	LA	6	11	30	1612	LA	061532006.SPC	LA
0605131-4	LA	7	13	30	↓	LA	061588007.SPC	LA
0618002-2A <sup>(740)</sup>	LA	2	6	30	1635	LW	061368002.SPC	LA
0605131-5	LA	4	13	30	1655	LA	061241004.SPC	LA
↓ -6	LA	6	↓	30	↓	↓	061534006.SPC	LA
↓ -7	LA	7	↓	30	↓	↓	061589007.SPC	LA
↓ -8	LA	8	↓	30	↓	↓	061538008.SPC	LA
0605199-1	LA	2	1	400	1718	LA	061369002.SPC	LA
0605091-28D	LA	7	↓	↓	1741	LA	061591009.SPC	LA
G5060522-2M13	LA	8	↓	↓	↓	LA	061537008.SPC	LA
0605109-1	LA	4	↓	↓	1757	↓	061242004.SPC	LA
↓ -2	LA	6	↓	↓	↓	↓	061535006.SPC	LA
LA 6/9/06								

LA  
6/7/06

- 1 Analyst will verify the position, detector, and geometry when the sample is removed from the detector.
- 2 Calibration geometry.
- 3 Count duration.

KEY:

- \* sample was counted on a puck
- ↑ sample was counted with air flow arrow pointing up
- ↓ sample was counted with air flow arrow pointing down

313856  
B

000056



Gamma Spectrometer Run Log

Date: 6/11/06

Reviewed By/Date: LA 6/12/06

Sample ID	Ver <sup>1</sup>	Det. No.	Geo <sup>2</sup>	Count Dur. (min.) <sup>3</sup>	Start Time	Analyst	File ID/Comments	Saved?
0604238-57	LA	2	4	500	1724	LA	061431002.SPC	LA
0605026-10	LA	4	1	400	1733	↓	061294004.SPC	LA
0605044-20	LA	6	1	400	↓	↓	061582206.SPC	LA
65060306-3MB	LA	7	1	400	↓	↓	061641009.SPC	LA
0605177-2	LA	8	1	400	↓	↓	061610008.SPC	LA
LA 6/11/06								

- 1 Analyst will verify the position, detector, and geometry when the sample is removed from the detector.
- 2 Calibration geometry.
- 3 Count duration.

**KEY:**

- \* sample was counted on a puck
- ↑ sample was counted with air flow arrow pointing up
- ↓ sample was counted with air flow arrow pointing down

313866 B

Gamma Spectrometer Run Log

Date: 6/18/06

Reviewed By/Date: \_\_\_\_\_

Sample ID	Ver <sup>1</sup>	Det. No.	Geo <sup>2</sup>	Count Dur. (min.) <sup>3</sup>	Start Time	Analyst	File ID/Comments	Saved?
65060511-106CS	CW	8	6	30	1612	CW	0616961008.SPC	CW
0605209-3	LA	6	1	1000	1615	CW	061640006.SPC	LA
↓ -1D	LA	7	↓	↓	↓	↓	061704009.SPC	LA
0613006-2A <sup>(768)</sup>	CW	2	8	30	1640	CW	0614991002.SPC	CW
65060606-5AMB	LA	8	1	600	1710	CW	061697008.SPC	LA
↓ -3BMB	↓	↓	↓	↓	↓	↓	↓	↓
↓ -3MB	↓	↓	↓	↓	↓	↓	↓	↓
0605250-38	LA	2	6	500	1728	CW	0615001002.SPC	LA
↓ -47	LA	4	6	500	1834	CW	0613521004.SPC	LA
<p>CW 6/18/06</p>								

- 1 Analyst will verify the position, detector, and geometry when the sample is removed from the detector.
- 2 Calibration geometry.
- 3 Count duration.

**KEY:** \* sample was counted on a puck  
 ↑ sample was counted with air flow arrow pointing up  
 ↓ sample was counted with air flow arrow pointing down

**313878**  
 \_\_\_\_\_ B

**000058**

Gamma Spectrometer Run Log

Date: 06/19/06

Reviewed By/Date: LA 6/19/06

Sample ID	Ver <sup>1</sup>	Det. No.	Geo <sup>2</sup>	Count Dur. (min.) <sup>3</sup>	Start Time	Analyst	File ID/Comments	Saved?
0618002 - 7 (740)	LW	7	6	30	1005	LA	061707D07.SPC	LW
6506010-1 LCS	LW	8	13	30			061699D08.SPC	LW
0606034 - 1	LW	2	7*	90			061503D02.SPC	LW
↓ - 2	LW	6	↓	60			0616042D06.SPC	LW
65060606-3 LCS	LW	8	1	30	1042	LW	061700D08.SPC	LW
0613006-4 (777)	LA	4	8	30	1135	LW	061357D04.SPC	LA
06060034-3	LA	6	7*	48*			061644D06.SPC	LA
↓ - 4	LA	7	↓	90			061709D07.SPC	LA
↓ - 5	LA	8	↓	60			061701D08.SPC	LA
65060612-1 LCS	LW	2	7*	30	1155	LW	061504D02.SPC	LW
↓ - 1MB	LA	2	7*	90	1232	LW	061505D02.SPC	LA
<del>0606021-5</del>		<del>6</del>	<del>11</del>			<del>LA</del>		
<del>0605238-1</del>		<del>8</del>	<del>NA</del>			<del>LA</del>		
REF060606-1 Ref 1A	LA	8	NA	30	1306	LA	061703D08.SPC	LA
0605238-2 D	LA	6	13	30	1314		061645D06.SPC	LA
↓ - 3		7	↓					
REF060606-1 Ref 1B	LA	8	NA	30	1342	LA	061704D08.SPC	LA
<del>0613006-4 (768)</del>		<del>4</del>	<del>8</del>					
0605238-3	LA	6	13	30	1402	LA	061646D06.SPC	LA
0605238-11	LA	7	13	30			061712D07.SPC	LA
0606034 - 10	LA	2	7*	60	1408		061506D02.SPC	LA
REF060606-1 Ref 1C	LA	8	NA	30	1501		061705D08.SPC	LA
0605239-7	LA	6	13	30		LA	061647D06.SPC	LA
0606021-5	LA	7	11	60			061713D07.SPC	LA

LA  
6/19/06

LA  
6/20/06

LA  
6/19/06

LA  
6/19/06

LA  
6/19/06

LA  
6/19/06

- Analyst will verify the position, detector, and geometry when the sample is removed from the detector.
- Calibration geometry.
- Count duration.

**KEY:**

- \* sample was counted on a puck
- ↑ sample was counted with air flow arrow pointing up
- ↓ sample was counted with air flow arrow pointing down

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## Technical Comments Regarding Analysis using the FANP Gamma Spectroscopic Library

Analysis using the FANP (Fission, Activation, and Natural Products) library is limited to the list of gamma emitting radionuclides specified by Paragon Analytical Services. Paragon Analytical Services specifies all values assigned to the nuclides in this library. In cases where multiple gamma emissions are used to quantify activity, the most abundant emission is used for quantification in the absence of any supporting gamma emissions. It should be noted that the current software program used for gamma spectroscopic analysis is limited to a +/- 2.0 keV photo-peak resolution tolerance. Thus, any gamma emissions occurring within the same +/- 2.0 keV range will suffer interference, consequently preventing accurate quantification. Nuclide specific information regarding analysis using the FANP library is as follows:

Nuclide:  $^{228}\text{Ac}$  Energy: various Photon Abundance: various

All activity values for  $^{228}\text{Ac}$  are calculated using the half-life,  $t_{1/2}=5.75$  years, of the long-lived  $^{228}\text{Ra}$  parent. It is assumed that secular equilibrium is achieved between the  $^{228}\text{Ra}$  parent and the  $^{228}\text{Ac}$  progeny.

Nuclide:  $^{212}\text{Bi}$ ,  $^{212}\text{Pb}$ ,  $^{208}\text{Tl}$  Energy: various Photon Abundance: various

All activity values for  $^{212}\text{Bi}$ ,  $^{212}\text{Pb}$ , and  $^{208}\text{Tl}$  are calculated using the half-life,  $t_{1/2}=1.91$  years, of the long-lived  $^{228}\text{Th}$  parent. It is assumed that secular equilibrium is achieved between the  $^{228}\text{Th}$  parent and the  $^{212}\text{Bi}$ ,  $^{212}\text{Pb}$ ,  $^{208}\text{Tl}$  progeny.

Nuclide:  $^{214}\text{Bi}$ ,  $^{214}\text{Pb}$  Energy: various Photon Abundance: various

All activity values for  $^{214}\text{Bi}$  and  $^{214}\text{Pb}$  are calculated using the half-life,  $t_{1/2}=1600$  years, of the long-lived  $^{226}\text{Ra}$  parent. It is assumed that secular equilibrium is achieved between the  $^{226}\text{Ra}$  parent and the  $^{214}\text{Bi}$  and  $^{214}\text{Pb}$  progeny.

Nuclide:  $^{56}\text{Co}$  Energy: 1175.13 keV Photon Abundance: 0.0228

This emission for this nuclide suffers from possible resolution interference due to the  $^{60}\text{Co}$  gamma emission occurring at 1173.23 keV (0.9997, abundance). Therefore, this emission will be used as an identifier only and not in the activity calculations for this nuclide.

Nuclides:  $^{57}\text{Co}$  Energy: 122.07 Photon Abundance: 0.8560

The most abundant gamma emission specified for quantification of this nuclide suffers from possible resolution interference due to the  $^{152}\text{Eu}$  gamma emission occurring at 121.78 keV (0.2050, abundance). Therefore, a possibility of a high bias to the  $^{57}\text{Co}$  results may occur in the presence of elevated  $^{152}\text{Eu}$  activity.

Nuclide:  $^{134}\text{Cs}$  Energy: 604.66 Photon Abundance: 0.9762

The most abundant gamma emission specified for quantification of this nuclide suffers from possible resolution interference due to the  $^{124}\text{Sb}$  gamma emission occurring at 602.71 keV (0.9826, abundance). Therefore, a possibility of a high bias to the  $^{134}\text{Cs}$  results may occur in the presence of elevated  $^{124}\text{Sb}$  activity.

Other gamma emissions used for quantification of this nuclide suffer from possible resolution interference due to multiple gamma emissions of  $^{228}\text{Ac}$ . Therefore, a possible high bias to the  $^{134}\text{Cs}$  activity results may occur in the presence of elevated  $^{228}\text{Ac}$  activity.

Nuclide:  $^{137}\text{Cs}$  Energy: 661.62 keV Photon Abundance: 0.8512

Cesium-137 does not emit any gamma photons useful for quantification. However, it can be assumed to be in secular equilibrium with the short-lived  $^{137\text{m}}\text{Ba}$  daughter product. Therefore, the activity for  $^{137}\text{Cs}$  is determined from the 661.62 keV gamma emission of the  $^{137\text{m}}\text{Ba}$  daughter product. The calculated gamma photon abundance used in the library is the product of the 0.8998 abundance of the 661.62 keV  $^{137\text{m}}\text{Ba}$  photon and the 0.946 branching ratio between  $^{137}\text{Ba}$  and  $^{137\text{m}}\text{Ba}$ .

Nuclide:  $^{155}\text{Eu}$  Energy: 105.31 Photon Abundance: 0.2120

The only gamma emission useful for quantification of this nuclide suffers from possible resolution interference due to the  $^{235}\text{U}$  gamma emission occurring at 105 keV (0.0210, abundance). Therefore, a possibility of a high bias to the  $^{155}\text{Eu}$  results may occur in the presence of elevated  $^{235}\text{U}$  activity.

Nuclide:  $^{40}\text{K}$  Energy: 1460.75 Photon Abundance: 0.1100

The only gamma emission useful for quantification of this nuclide suffers from possible resolution interference due to the  $^{228}\text{Ac}$  gamma emission occurring at 1459.2 keV (0.0104, abundance). Therefore, a possibility of a high bias to the  $^{40}\text{K}$  results may occur in the presence of elevated  $^{228}\text{Ac}$  activity.

Nuclide:  $^{54}\text{Mn}$  Energy: 834.81 Photon Abundance: 0.9997

The only gamma emission useful for quantification of this nuclide suffers from possible resolution interference due to the  $^{228}\text{Ac}$  gamma emission occurring at 835.6 keV (0.0182, abundance). Therefore, a possibility of a high bias to the  $^{54}\text{Mn}$  results may occur in the presence of elevated  $^{228}\text{Ac}$  activity.

000061

Nuclide:  $^{95}\text{Nb}$  Energy: 765.82 Photon Abundance: 0.9999

All activity values for  $^{95}\text{Nb}$  are calculated using the half-life,  $t_{1/2}=64.02$  days, of the  $^{95}\text{Zr}$  parent. It is assumed that a transient equilibrium is achieved between the  $^{95}\text{Zr}$  parent and the  $^{95}\text{Nb}$  progeny.

The only gamma emission useful for quantification of this nuclide suffers from possible resolution interference due to the  $^{234\text{m}}\text{Pa}$  gamma emission occurring at 766.6 keV (0.0020, abundance). Therefore, a possibility of a high bias to the  $^{95}\text{Nb}$  results may occur in the presence of elevated  $^{234\text{m}}\text{Pa}$  activity.

Nuclide:  $^{234\text{m}}\text{Pa}$  Energy: 1001.03 Photon Abundance: 0.0059

All activity values for  $^{234\text{m}}\text{Pa}$  are calculated using the half-life,  $t_{1/2}=4.468\text{E}+09$  yrs, of the long-lived  $^{238}\text{U}$  parent. It is assumed that secular equilibrium is achieved between the  $^{238}\text{U}$  parent and the  $^{234\text{m}}\text{Pa}$  progeny.

Nuclide:  $^{106}\text{Ru}$  Energy: various Photon Abundance: various

Ru-106 does not emit any gamma photons. Therefore, all activity values for  $^{106}\text{Ru}$  are calculated using the gamma emissions of the short-lived  $^{106}\text{Rh}$  daughter. The half-life,  $t_{1/2}=368.2$  days, of the  $^{106}\text{Ru}$  parent is used in the activity calculations. It is assumed that a secular equilibrium is achieved between the  $^{106}\text{Ru}$  parent and the  $^{106}\text{Rh}$  progeny.

Nuclide:  $^{124}\text{Sb}$  Energy: 602.71 Photon Abundance: 0.9826

The most abundant gamma emission specified for quantification of this nuclide suffers from possible resolution interference due to the  $^{134}\text{Cs}$  gamma emission occurring at 604.66 keV (0.9762, abundance). Therefore, a possibility of a high bias to the  $^{124}\text{Sb}$  results may occur in the presence of elevated  $^{134}\text{Cs}$  activity.

Nuclide:  $^{125}\text{Sb}$  Energy: 600.77 Photon Abundance: 0.1786

The gamma emission specified for quantification of this nuclide that occurs at 600.77 keV suffers from possible resolution interference due to the  $^{124}\text{Sb}$  gamma emission occurring at 602.71 keV (0.9826, abundance). Therefore, this photo-peak will be used as an identifier only and not in the activity calculations for this nuclide.

Nuclide:  $^{227}\text{Th}$  Energy: 236.00 Photon Abundance: 0.1230

All activity values for  $^{227}\text{Th}$  are calculated using the half-life,  $t_{1/2}=21.7$  yrs, of the long-lived  $^{227}\text{Ac}$  parent. It is assumed that secular equilibrium is achieved between the  $^{227}\text{Ac}$  parent and the  $^{227}\text{Th}$  progeny.

000062

Nuclide:  $^{234}\text{Th}$

Energy: 92.50

Photon Abundance: 0.0553

The 92.50 keV photo-peak used in this library for Th-234 quantification is actually two separate photo-peaks, occurring at 92.4 keV and 92.8 keV. The current software used for gamma spectroscopic analysis cannot resolve two photo-peaks that occur within the 2-keV resolution tolerance. Therefore, these two photopeaks are observed as a single photo-peak. Therefore, the average of the two photo-peak energies is used in this library. Also, the sum of the two photo-peak abundances, 0.0553, is used in the activity calculations for this observed 'single' photo-peak.

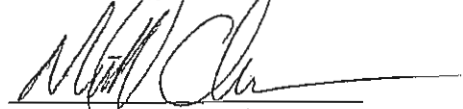
All activity values for  $^{234}\text{Th}$  are calculated using the half-life,  $t_{1/2}=4.468\text{E}+09$  yrs, of the long-lived  $^{238}\text{U}$  parent. It is assumed that secular equilibrium is achieved between the  $^{238}\text{U}$  parent and the  $^{234}\text{Th}$  progeny.

Nuclide:  $^{235}\text{U}$

Energy: 185.70

Photon Abundance: 0.5720

Quantifying  $^{235}\text{U}$  activity using the 185.70 keV photo-peak is vulnerable to a significant high bias due to interference from gamma emissions from  $^{226}\text{Ra}$  occurring at 186.21 keV (0.0328, abundance). Therefore, this emission will be used as an identifier only and not in the activity calculations for this nuclide.



Gamma Spectroscopist  
Radiochemistry Instrumentation Laboratory

2-23-05  
Date



Radiochemistry Manager

2/23/05  
Date

000063

*OKB*  
*2/23/05*

Pk. #	Energy (keV)	Isotope Name	2ndary Pk #	Type	Gamma Fraction	Halflife
24	338.40	Ac-228	61	QUANT	0.1127	5.7500E+00 yrs
61	911.07	Ac-228	63	NET	0.2580	5.7500E+00 yrs
63	968.90	Ac-228	24	QUANT	0.1580	5.7500E+00 yrs
41	657.75	Ag-110M	43	NET	0.9314	2.4990E+02 dys
43	677.71	Ag-110M	46	QUANT	0.1054	2.4990E+02 dys
46	706.67	Ag-110M	49	QUANT	0.1646	2.4990E+02 dys
49	763.93	Ag-110M	59	QUANT	0.2198	2.4990E+02 dys
59	884.67	Ag-110M	62	QUANT	0.7163	2.4990E+02 dys
62	937.48	Ag-110M	84	QUANT	0.3375	2.4990E+02 dys
84	1384.27	Ag-110M	87	QUANT	0.2394	2.4990E+02 dys
87	1505.00	Ag-110M	41	QUANT	0.1289	2.4990E+02 dys
90	1808.65	Al-26	0	NET	0.9973	7.2000E+05 yrs
1	59.54	Am-241	0	NET	0.3590	4.3310E+02 yrs
30	477.56	Be-7	0	NET	0.1052	5.3440E+01 dys
48	727.17	Bi-212	0	NET	0.0658	1.9100E+00 yrs
38	609.32	Bi-214	73	NET	0.4609	1.6000E+03 yrs
73	1120.28	Bi-214	38	QUANT	0.1510	1.6000E+03 yrs
11	165.85	Ce-139	0	NET	0.8035	1.3766E+02 dys
7	133.53	Ce-144	44	NET	0.1109	2.8414E+02 dys
44	696.49	Ce-144	7	QUANT	0.0130	2.8414E+02 dys
56	846.81	Co-56	67	QUANT	0.9999	7.7300E+01 dys
67	1037.83	Co-56	76	QUANT	0.1400	7.7300E+01 dys
76	1175.13	Co-56	77	ID	0.0228	7.7300E+01 dys
77	1238.28	Co-56	81	NET	0.6760	7.7300E+01 dys
81	1360.22	Co-56	89	QUANT	0.0429	7.7300E+01 dys
89	1771.49	Co-56	56	QUANT	0.1570	7.7300E+01 dys
6	122.07	Co-57	8	NET	0.8560	2.7000E+02 dys
8	136.43	Co-57	6	QUANT	0.1068	2.7000E+02 dys
54	810.75	Co-58	0	NET	0.9945	7.0780E+01 dys
75	1173.23	Co-60	80	QUANT	0.9997	5.2721E+00 yrs
80	1332.51	Co-60	75	NET	0.9998	5.2721E+00 yrs
23	320.07	Cr-51	0	NET	0.1000	2.7700E+01 dys
31	563.26	Cs-134	32	QUANT	0.0835	2.0623E+00 yrs
32	569.29	Cs-134	37	QUANT	0.1538	2.0623E+00 yrs
37	604.66	Cs-134	52	NET	0.9762	2.0623E+00 yrs
52	795.76	Cs-134	53	QUANT	0.8553	2.0623E+00 yrs
53	801.84	Cs-134	74	QUANT	0.0869	2.0623E+00 yrs
74	1167.86	Cs-134	82	QUANT	0.0180	2.0623E+00 yrs
82	1365.13	Cs-134	31	QUANT	0.0304	2.0623E+00 yrs
42	661.62	Cs-137	0	NET	0.8512	3.0104E+01 yrs
25	344.30	Eu-152	51	QUANT	0.2650	1.3330E+01 yrs
51	778.90	Eu-152	69	QUANT	0.1294	1.3330E+01 yrs
69	1085.80	Eu-152	71	QUANT	0.1021	1.3330E+01 yrs
71	1112.07	Eu-152	85	QUANT	0.1364	1.3330E+01 yrs
85	1408.08	Eu-152	25	NET	0.2100	1.3330E+01 yrs
18	248.04	Eu-154	34	QUANT	0.0660	8.5019E+00 yrs
34	591.70	Eu-154	58	QUANT	0.0460	8.5019E+00 yrs
58	873.20	Eu-154	64	QUANT	0.1227	8.5019E+00 yrs
64	996.30	Eu-154	66	QUANT	0.1030	8.5019E+00 yrs
66	1004.80	Eu-154	18	NET	0.1801	8.5019E+00 yrs
4	105.31	Eu-155	0	NET	0.2120	4.9600E+00 yrs



Pk. #	Energy (keV)	Isotope Name	2ndary Pk #	Type	Gamma Fraction	Halflife
14	192.34	Fe-59	70	QUANT	0.0308	4.5100E+01 dys
70	1099.22	Fe-59	79	NET	0.5650	4.5100E+01 dys
79	1291.56	Fe-59	14	QUANT	0.4320	4.5100E+01 dys
20	284.29	I-131	27	QUANT	0.0614	8.0405E+00 dys
27	364.48	I-131	20	NET	0.8170	8.0405E+00 dys
86	1460.75	K-40	0	NET	0.1100	1.2800E+09 yrs
55	834.81	Mn-54	0	NET	0.9997	3.1220E+02 dys
78	1274.54	Na-22	0	NET	0.9994	2.6000E+00 yrs
45	702.50	Nb-94	0	NET	0.9790	2.0300E+04 yrs
50	765.82	Nb-95	0	NET	0.9999	6.4020E+01 dys
65	1001.03	Pa-234m	0	NET	0.0059	4.4680E+09 yrs
5	115.18	Pb-212	17	QUANT	0.0059	1.9100E+00 yrs
17	238.63	Pb-212	22	NET	0.4330	1.9100E+00 yrs
22	300.09	Pb-212	5	QUANT	0.0327	1.9100E+00 yrs
21	295.22	Pb-214	26	QUANT	0.1920	1.6000E+03 yrs
26	351.99	Pb-214	21	NET	0.3710	1.6000E+03 yrs
39	621.84	Ru-106	68	NET	0.0981	3.6820E+02 dys
68	1050.47	Ru-106	39	QUANT	0.0173	3.6820E+02 dys
36	602.71	Sb-124	40	NET	0.9826	6.0200E+01 dys
40	645.84	Sb-124	47	QUANT	0.0745	6.0200E+01 dys
47	713.82	Sb-124	83	QUANT	0.0238	6.0200E+01 dys
83	1368.21	Sb-124	88	QUANT	0.0251	6.0200E+01 dys
88	1691.04	Sb-124	36	QUANT	0.4779	6.0200E+01 dys
12	176.29	Sb-125	28	QUANT	0.0682	2.7702E+00 yrs
28	427.95	Sb-125	29	NET	0.3000	2.7702E+00 yrs
29	463.51	Sb-125	35	QUANT	0.1049	2.7702E+00 yrs
35	600.77	Sb-125	12	ID	0.1786	2.7702E+00 yrs
60	889.26	Sc-46	0	NET	0.9998	8.3850E+01 dys
16	236.00	Th-227	0	NET	0.1230	2.1700E+01 yrs
2	63.29	Th-234	3	QUANT	0.0390	4.4680E+09 yrs
3	92.50	Th-234	2	NET	0.0553	4.4680E+09 yrs
19	277.36	Tl-208	33	QUANT	0.0631	1.9100E+00 yrs
33	583.14	Tl-208	57	NET	0.8450	1.9100E+00 yrs
57	860.47	Tl-208	19	QUANT	0.1242	1.9100E+00 yrs
9	143.76	U-235	10	NET	0.1096	7.0379E+08 yrs
10	163.35	U-235	13	QUANT	0.0508	7.0379E+08 yrs
13	185.72	U-235	15	ID	0.5720	7.0379E+08 yrs
15	205.31	U-235	9	QUANT	0.0501	7.0379E+08 yrs
72	1115.52	Zn-65	0	NET	0.5060	2.4380E+02 dys

PARAGON ANALYTICS  
Radiochemistry Data Package

Section 5

**QUALITY ASSURANCE  
SUMMARY REPORTS**

**5**

**000066**

QUALITY ASSURANCE SUMMARY SHEET

PAI W.O. # / BATCH 65060606-3/0605177,06052  
TEST Gamma  
METHOD Prep  
SOP/REV (PREP) 73418  
SOP/REV (ANAL) \_\_\_\_\_

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

Due to insufficient client samples in work orders 0605177-2 and 0605248-6 they were diluted up to 1000 mL. See benchsheet for actual volumes.

JDD 6/6/06

TECHNICIAN/ANALYST [Signature]

DATE 6/6/06

DEPARTMENT MANAGER [Signature]

DATE 6/6/06

QUALITY ASSURANCE SUMMARY SHEET

PAI W.O. #/ BATCH 65060522-2  
TEST Gamma  
METHOD Prep  
SOP/REV (PREP) 739-8  
SOP/REV (ANAL) \_\_\_\_\_

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

1) Due to the presence of sediment in the samples 0605177-1 and 0605198-2 were filtered through qualitative fluted filter paper per SOP 721

*[A large diagonal line is drawn across the remaining lined area of the page.]*

JPD  
5/23/06

TECHNICIAN/ANALYST JPD DATE 5/23/06  
DEPARTMENT MANAGER Mark McNew DATE 5/23/06

PARAGON ANALYTICS  
Radiochemistry Data Package

Section 6

**LABORATORY  
BENCH SHEETS**

**6**

**000069**

# Radiochemistry Instrument Worksheet

Prep Batch: GS060522-2

Paragon Analytics

Prep Procedure: **GAMMASCAN**

Analytical QASS / NCR? Y (N) N/A

Prep Num	Lab ID Collection Date	QC Type	Init Aliq	Fin Aliq	Units Geo.	Cnt 1 File Cnt Dur (min)	Cnt 1 Inst/Det	Cnt 1 Count Date	Cnt 2 File Cnt Dur (min)	Cnt 2 Inst/Det	Cnt 2 Count Date	Cnt 3 File Cnt Dur (min)	Cnt 3 Inst/Det	Cnt 3 Count Date	Notes
1	0605091-28 04/28/06 09:00	SMP	1000	1000	ml 01	400	2	6/5/06							RG 6/30/06
1	0605091-28 04/28/06 09:00	DUP	1000	1000	ml 01		7	6/6/06							CT DUP
1	0605091-29 05/04/06 08:30	SMP	1000	1000	ml 01		6	6/5/06							<del>RG 6/30/06</del>
1	0605170-15 05/15/06 11:28	SMP	1000	1000	ml 01		7	6/1/06							<del>CT DUP</del>
1	0605170-15 05/15/06 11:28	DUP	1000	1000	ml 01		8	6/5/06							<del>RG 6/30/06</del>
1	0605170-26 05/15/06 12:22	SMP	1000	1000	ml 01		2	6/6/06							<del>RG 6/30/06</del>
1	0605177-1 05/17/06 08:58	SMP	960	960	ml 01		8	6/5/06							<del>RG 6/30/06</del>
1	GS060522-2 05/22/06 10:36	MB	1000	1000	ml 01		2	6/6/06							<del>RG 6/30/06</del>
1	GS060522-2 05/22/06 10:36	LCS	1000	1000	ml 01	30	8	6/6/06							<del>RG 6/30/06</del>
1	GS060522-2 05/22/06 10:36	LCS	1000	1000	ml 01		7								

**Spike Solution Information**

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	PipetID
S1	AM-241	718	216.929	DPM/ml	05/22/06	1000	ml	
S1	CO-60	718	99.040	DPM/ml	05/22/06	1000	ml	
S1	CS-137	718	83.099	DPM/ml	05/22/06	1000	ml	

**Fraction Barcodes**

0605177-1		0605170-15	
0605170-26		0605091-28	
0605091-29		0605170-15DUP	
0605091-28DUP		GS060522-2LCS	
GS060522-2LCS		GS060522-2LCS	
GS060522-2MB		GS060522-2MB	
GS060522-2MB		GS060522-2MB	

000070

# Radiochemistry Prep Worksheet

Prep Batch: GS060522-2

Paragon Analytics

Prep Procedure: **GAMMASCAN**

Reviewed By: CRW *CRW* Review Date: 6/7/2006

Non-Routine Pre-Treatment? **Y (N)** Batch: *N/A*

Prep (ASS) NCR? **X (N)** *3/3/16*

Prep SOP: PAI 739 Rev: 8  
 Prep SOP: NONE  
 Matrix Class: liquid

Prep Analyst: Joe D. Dauner  
 Prep Date: 5/22/2006  
 Prep Dept: GM

Balance:  
 Balance:

Samp Num	Prep Num	LabID	QC Type	Dish No.	Init Aliq ml	Fin Aliq ml	Prep Basis	Geometry	Standards	Prep Notes
1	1	0605091-28	SMP	1000	1000	1000	Unfiltered	01		
2	1	0605091-28	DUP	1000	1000	1000	Unfiltered	01		Count dup - insufficient sample
3	1	0605091-29	SMP	1000	1000	1000	Unfiltered	01		
4	1	0605170-15	SMP	1000	1000	1000	Unfiltered	01		
5	1	0605170-15	DUP	1000	1000	1000	Unfiltered	01		COUNT DUPLICATE
6	1	0605170-26	SMP	1000	1000	1000	Unfiltered	01		
7	1	0605177-1	SMP	960	960	960	Filtered	01		960 ml of sample, plus 40 ml DI Water
8	1	GS060522-2	MB	1000	1000	1000	Unfiltered	01		
9	1	GS060522-2	LCS	1000	1000	1000	Unfiltered	01	S1	

Spiked By: *N/A* Date: *N/A*  
 Witnessed By: *N/A* Date: *N/A*

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
S1	AM-241	718	216.929	DPM/ml	05/22/06	1000	ml	
S1	CO-60	718	99.040	DPM/ml	05/22/06	1000	ml	
S1	CS-137	718	83.099	DPM/ml	05/22/06	1000	ml	

000071

Comments

# SAMPLE CONDITION FORM (LIQUID)

ANALYST: JDD

ANALYSIS DATE: 5/22/06      METHOD: Prep

WORK ORDER	SAMPLE ID	SAMPLE CONDITION		
		pH	Color	Remarks
0605091	28	1.9	clear	<del>JDD 5/22/06</del>
L	29	1.6		
0605170	15	1.9		
L	26	1.9		
0605177	1	1.9	Tan	Filtered
<del>0605198</del>	<del>2</del>	<del>1.9</del>	<del>Tan</del>	<del>Filtered</del> w 6/7/06
<del>JDD 5/22/06</del>				



# Radiochemistry Instrument Worksheet

Prep Batch: GS060606-3

Prep Batch: GS060606-3

Prep Procedure: **GAMMASCAN**

Analytical QASS / NCR? Y / *N* *W/A*

Prep Num	Lab ID Collection Date	QC Type	Init Alq	Fin Alq	Units Geo.	Cnt 1 File Cnt Dur (min)	Cnt 1 Inst/Det	Cnt 1 Count Date	Cnt 2 File Cnt Dur (min)	Cnt 2 Inst/Det	Cnt 2 Count Date	Cnt 3 File Cnt Dur (min)	Cnt 3 Inst/Det	Cnt 3 Count Date	Notes
1	0605177-2	SMP	845	845	ml 01										
1	0605248-6	SMP	995	995	ml 01										
1	05/24/06 15:00	DUP	995	995	ml 01										
1	0605251-5	SMP	1000	1000	ml 01										
1	05/05/06 07:40	DUP	1000	1000	ml 01										
1	0606025-2	SMP	1000	1000	ml 01										
1	05/31/06 14:40	SMP	1000	1000	ml 01										
1	0606026-14	SMP	1000	1000	ml 01										
1	05/31/06 16:50	DUP	1000	1000	ml 01										
1	0601/06 08:40	DUP	1000	1000	ml 01										
1	0606027-2	SMP	1000	1000	ml 01										
1	06/01/06 11:50	SMP	1000	1000	ml 01										
1	0601/06 14:40	SMP	1000	1000	ml 01										
1	0601/06 16:50	SMP	1000	1000	ml 01										
1	0601/06 16:50	MB	1000	1000	ml 01										
1	GS060606-3A	MB	1000	1000	ml 01										
1	06/06/06 12:00	MB	1000	1000	ml 01										
1	GS060606-3B	MB	1000	1000	ml 01										
1	06/06/06 12:00	MB	1000	1000	ml 01										
1	GS060606-3	LCS	1000	1000	ml 01										
1	06/06/06 12:00	LCS	1000	1000	ml 01										

See Previous

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	PipetID
S1	AM-241	718	216.914	DPM/ml	06/06/06	1000	ml	
S1	CO-60	718	98.504	DPM/ml	06/06/06	1000	ml	
S1	CS-137	718	83.020	DPM/ml	06/06/06	1000	ml	

000073

*W/24/06*

# Radiochemistry Instrument Worksheet

Paragon Analytics

Prep Batch: GS060606-3

## Sample Barcodes

0605177-2		0606025-2	
0606027-2		0605251-5	
0605248-6		0606027-12	
0606026-14		0606027-15	
0606025-16		0605251-5DUP	
0605248-6DUP		0606026-14DUP	
GS060606-3LCS		GS060606-3AMB	
GS060606-3BMB		GS060606-3MB	

000074

# Radiochemistry Instrument Worksheet

Prep Batch: GS060606-3

Paragon Analytics

Prep Procedure: GAMMASCAN

Analytical QASS / NCR? Y / N

Prep Num	Lab ID	QC Type	Init Alq	Fin Alq	Units Geo.	Cnt 1 File Cnt L Dur (min)	Cnt 1 Ins/Det	Cnt 1 Count Date	Cnt 2 File Cnt L Dur (min)	Cnt 2 Ins/Det	Cnt 2 Count Date	Cnt 3 File Cnt L Dur (min)	Cnt 3 Ins/Det	Cnt 3 Count Date	Notes
1	0605177-2	SMP	845	1000	ml	400	8	6/11/06							
1	0605248-6	SMP	995	1000	ml		6	6/12/06							
1	0605248-6	DUP	995	1000	ml		7	6/13/06							CT DUP
1	0605251-5	SMP	1000	1000	ml		7	6/12/06							
1	0605251-5	DUP	1000	1000	ml		6	6/13/06							CT DUP
1	0606025-2	SMP	1000	1000	ml		7	6/14/06							
1	0606025-16	SMP	1000	1000	ml		8	6/15/06							
1	0606025-14	SMP	1000	1000	ml		8	6/12/06							
1	0606026-14	DUP	1000	1000	ml	330	7	6/15/06							Recount
1	0606027-2	SMP	1000	1000	ml	300	6								CT DUP
1	0606027-12	SMP	1000	1000	ml	400	7								
1	0606027-15	SMP	1000	1000	ml		6								
1	GS060606-3A	MB	1000	1000	ml	600	8	6/18/06							FANP. W.O. 0605177
1	GS060606-3B	MB	1000	1000	ml										Shaw - 802 W.O. 0605248, 0606025
1	GS060606-3	MB	1000	1000	ml										FANP W.O. 0605251, 0606026
1	GS060606-3	LCS	1000	1000	ml	30	8	6/19/06							

**Spike Solution Information**

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
S1	AM-241	718	216.914	DPM/ml	06/06/06	1000	ml	
S1	CO-60	718	98.504	DPM/ml	06/06/06	1000	ml	
S1	CS-137	718	83.020	DPM/ml	06/06/06	1000	ml	

Print Spectra!

Sample Barcodes:  Recount MDC not met (k-40, Cs-137) 6/19/06

000075

# Radiochemistry Prep Worksheet

Prep Batch: GS060606-3

Paragon Analytics

Prep Procedure: GAMMASCAN

Reviewed By: jdd *JDD* Review Date: 6/20/2006

Non-Routine Pre-Treatment? Y / *N* Batch: *N/A* Re-Prep? Y / *N* Batch: *N/A* Prep QASS / NCR? *Y* / *N* *313628*

Prep SOP: PAI 739 Rev: 8

Prep SOP: NONE

Matrix Class: liquid

Prep Analyst: Joe D. Dauner *JDD*

Prep Date: 6/6/2006

Prep Dept: GM

Balance:

Balance:

Samp Num	Prep Num	LabID	QC Type	Dish No.	Init Aliq ml	Fin Aliq ml	Prep Basis	Geometry	Standards	Prep Notes
1	1	0605177-2	SMP		845	845	Unfiltered	01		
2	1	0605248-6	SMP		995	995	Unfiltered	01		Insufficient Sample
3	1	0605248-6	DUP		995	995	Unfiltered	01		Insufficient Sample
4	1	0605251-5	SMP		1000	1000	Unfiltered	01		Count Duplicate, Insufficient Sample
5	1	0605251-5	DUP		1000	1000	Unfiltered	01		Count Duplicate
6	1	0606025-2	SMP		1000	1000	Unfiltered	01		Count Duplicate
7	1	0606025-16	SMP		1000	1000	Unfiltered	01		Count Duplicate
8	1	0606026-14	SMP		1000	1000	Unfiltered	01		Count Duplicate
9	1	0606026-14	DUP		1000	1000	Unfiltered	01		Count Duplicate
10	1	0606027-2	SMP		1000	1000	Unfiltered	01		Count Duplicate
11	1	0606027-12	SMP		1000	1000	Unfiltered	01		Count Duplicate
12	1	0606027-15	SMP		1000	1000	Unfiltered	01		Count Duplicate
13	1	GS060606-3A	MB		1000	1000	Unfiltered	01		Count Duplicate
14	1	GS060606-3B	MB		1000	1000	Unfiltered	01		Count Duplicate
15	1	GS060606-3	MB		1000	1000	Unfiltered	01		Count Duplicate
16	1	GS060606-3	LCS		1000	1000	Unfiltered	01	S1	Count Duplicate

Spiked By: N/A Date: N/A

Witnessed By: N/A Date: N/A

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
S1	AM-241	718	216.914	DPM/ml	06/06/06	1000	ml	
S1	CO-60	718	98.504	DPM/ml	06/06/06	1000	ml	
S1	CS-137	718	83.020	DPM/ml	06/06/06	1000	ml	

000076

Comments

# Radiochemistry Prep Worksheet

Prep Batch: GS060606-3

Paragon Analytics

Prep Procedure: **GAMMASCAN**

Reviewed By: CRW *CRW* Review Date: 6/18/2006

Non-Routine Pre-Treatment? **Y (N)** Batch: *N/A*

Re-Prep? **Y (N)** Batch: *N/A* Prep (QASS / NCR?) **(N)** *313028*

Prep SOP: PAI 739 Rev: 8  
Prep SOP: NONE  
Matrix Class: liquid

Prep Analyst: Joe D. Dauner  
Prep Date: 6/6/2006  
Prep Dept: GM

Balance:  
Balance:

Samp Num	Prep Num	LabID	QC Type	Dish No.	Init Alq ml	Fin Alq ml	Prep Basis	Geometry	Standards	Prep Notes
1	1	0605177-2	SMP	845	1000	1000	Unfiltered	01		Insufficient Sample
2	1	0605248-6	SMP	995	1000	1000	Unfiltered	01		Insufficient Sample
3	1	0605248-6	DUP	995	1000	1000	Unfiltered	01		Count Duplicate, Insufficient Sample
4	1	0605251-5	SMP	1000	1000	1000	Unfiltered	01		Count Duplicate
5	1	0605251-5	DUP	1000	1000	1000	Unfiltered	01		Count Duplicate
6	1	0606025-2	SMP	1000	1000	1000	Unfiltered	01		Count Duplicate
7	1	0606025-16	SMP	1000	1000	1000	Unfiltered	01		Count Duplicate
8	1	0606026-14	SMP	1000	1000	1000	Unfiltered	01		Count Duplicate
9	1	0606026-14	DUP	1000	1000	1000	Unfiltered	01		Count Duplicate
10	1	0606027-2	SMP	1000	1000	1000	Unfiltered	01		Count Duplicate
11	1	0606027-12	SMP	1000	1000	1000	Unfiltered	01		Count Duplicate
12	1	0606027-15	SMP	1000	1000	1000	Unfiltered	01		Count Duplicate
13	1	GS060606-3A	MB	1000	1000	1000	Unfiltered	01		Count Duplicate
14	1	GS060606-3B	MB	1000	1000	1000	Unfiltered	01		Count Duplicate
15	1	GS060606-3	MB	1000	1000	1000	Unfiltered	01		Count Duplicate
16	1	GS060606-3	LCS	1000	1000	1000	Unfiltered	01	S1	Count Duplicate

Spiked By: *N/A* Date: *N/A*  
Witnessed By: *N/A* Date: *N/A*

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
S1	AM-241	718	216.914	DPW/ml	06/06/06	1000	ml	
S1	CO-60	718	98.504	DPW/ml	06/06/06	1000	ml	
S1	CS-137	718	83.020	DPW/ml	06/06/06	1000	ml	

000077

Comments

# Radiochemistry Prep Worksheet

Prep Batch: GS060606-3

**Paragon Analytics**

Prep Procedure: **GAMMASCAN**

Reviewed By: jdd *JDD* Review Date: 6/6/2006

Non-Routine Pre-Treatment? Y / (N) Batch: *N/A* Re-Prep? Y / (N) Batch: *N/A* Prep QASS / NCR?  N *313628*

Prep SOP: PAI 739 Rev: 8  
 Prep SOP: NONE  
 Matrix Class: liquid

Prep Analyst: Joe D. Dauner *JDD*  
 Prep Date: 6/6/2006  
 Prep Dept: GM

Balance:  
 Balance:

Sam Num	Prep Num	LabID	QC Type	Dish No.	Init Aliq ml	Fin Aliq ml	Prep Basis	Geometry	Standards	Prep Notes
1	1	0605177-2	SMP		845	1000	Unfiltered	01		Insufficient Sample
2	1	0605248-6	SMP		995	1000	Unfiltered	01		Insufficient Sample
3	1	0605248-6	DUP		995	1000	Unfiltered	01		Count Duplicate, Insufficient Sample
4	1	0605251-5	SMP	<i>JDD</i>	1000	1000	Unfiltered	01		<i>6/6/06 JDD</i>
5	1	0605251-5	DUP	<i>6/6/06</i>	1000	1000	Unfiltered	01		Count Duplicate
6	1	0606025-2	SMP		1000	1000	Unfiltered	01		
7	1	0606025-16	SMP		1000	1000	Unfiltered	01		
8	1	0606026-14	SMP		1000	1000	Unfiltered	01		
9	1	0606026-14	DUP		1000	1000	Unfiltered	01		Count Duplicate
10	1	0606027-2	SMP		1000	1000	Unfiltered	01		
11	1	0606027-12	SMP		1000	1000	Unfiltered	01		
12	1	0606027-15	SMP		1000	1000	Unfiltered	01		
13	1	GS060606-3	MB		1000	1000	Unfiltered	01		<i>JDD 6/6/06</i>
14	1	GS060606-3	LCS		1000	1000	Unfiltered	01	S1	

Spiked By: N/A Date: N/A

Witnessed By: N/A Date: N/A

Spike Solution Information						
Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Pipet ID
S1	AM-241	718	216.914	DPM/ml	06/06/06	1000 ml
S1	CO-60	718	98.504	DPM/ml	06/06/06	1000 ml
S1	CS-137	718	83.020	DPM/ml	06/06/06	1000 ml

000078

Comments

SAMPLE CONDITION FORM (LIQUID)

ANALYST: JDD

ANALYSIS DATE: 6/6/06

METHOD: Prep

WORK ORDER	SAMPLE ID	SAMPLE CONDITION		
		pH	Color	Remarks
0605177	2	4.2	clear	Slight Sediment, Decanted liquid
0605248	6		clear	None
0605251	5		clear	
0606025	2			
↓	16			
0606026	14			
0606027	2			
↓	12			
↓	15			

000079