



# Paragon Analytics

## Radiochemistry Case Narrative

### Gamma Spectroscopy

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#### **New Horizons**

CSMRI / 2135

Paragon Work Order 0404241

1. This report consists of analysis results for six soil samples received by Paragon Analytics on 4/23/04. The analysis results for these samples are reported on an 'as received' basis in units of pCi/gram.
2. These samples were received from the client already packed in jars. Therefore, the average weight of seven empty jars was used for a tare weight in order to determine the final analytical mass. Once the samples final weight was determined, the samples were submitted for counting. Please refer to QASS 205685.
3. The samples were analyzed for the presence of gamma emitting radionuclides according to Paragon Analytics procedure PA SOP713R8. The analyses were completed on 4/30/04. After the initial analysis the samples will be packed in steel cans for Ra-226 analysis, allowing 21 days for ingrowth of the Pb-214 and Bi-214 daughters, and subsequent re-analysis, per client instruction.
4. Sample volumes were insufficient to allow preparation of a duplicate. A duplicate analysis of sample H07S (PA ID 0404241-10) was performed in lieu of a prepared duplicate.
5. Duplicate analysis results above the DER warning limit of 1.42 have been flagged as "W" for Warn. DER values exceeding 2.13 have been flagged "D" denoting 'outside limits, high'. For gamma spectroscopic analysis, SOP 715R13 states that 75% of the nuclides must be within the 2-sigma control limit to meet DER requirements. Elevated DER values may be attributable to sample inhomogeneity.
6. 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 "TP" qualifier.
7. Radium-228 does not emit any gamma photons useful for quantification, and thus the activity calculated for this analyte is quantified from the daughter nuclide, Ac-228. The two nuclides are assumed to be in secular equilibrium, using the half-life of the parent Ra-228 nuclide used in all activity calculations. Results are submitted without further qualification.
8. Due to elevated levels of sample activity, minor lines of high activity nuclides can interfere with quantification of other nuclides. Samples with elevated Ac-228 activity, the daughter of Ra-228, will interfere with the quantification of Mn-54. In cases where these interferences

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are suspected, the affected nuclides have been assigned an "SI" flag denoting spectral interference.

9. In cases where Cd-109 is identified at a level greater than the MDC, an "SI" flag is assigned denoting spectral interference. This interference occurs with the  $K_{\beta}$  x-rays of Pb, which occur at an energy of 87 keV.
10. There are cases where the sample density is less than the associated calibration standard density. Cases that exceed the limit of +/- 15% of the density of the calibration standard are flagged with a 'G', denoting a significant density difference between the sample and calibration standard. Consequently, the results may be biased low for the flagged results in this work order. If requested, Paragon Analytics will perform a transmission spike in order to estimate a magnitude of this bias. The results are reported without further qualification.
11. Normally, samples analyzed for Ra-226, using the activity of the Bi-214 and Pb-214 daughters, are sealed in a steel can and allowed to ingrow for a 21-day period to ensure the capture and full ingrowth of the Rn-222 gas and associated progeny. However, per client request, no ingrowth time has been allowed for these samples nor were they sealed in steel cans. Therefore, the reported Ra-226 activity should be considered an estimated value for these samples, and the affected results are flagged with a "J"-qualifier. A re-preparation and 21-day ingrowth will be allowed, as described in case narrative comment #3, after the initial analyses are completed.
12. Due to elevated activity and subsequent elevated background from the Compton Continuum in these samples, the requested MDC of 0.2 pCi/gram for Ra-228 was not met. As there is significant activity in these samples, results are reported without further qualification.
13. Paragon Analytics follows the convention outlined in ANSI N42.23 for reporting significant digits in the TPU and MDC results. ANSI N42.23 states that the TPU result should be rounded to two significant digits and that the MDC result should be rounded to the same decimal place as the TPU result. In practice, this could result in an MDC result with a reported value of 0 for samples with significant activity, including the batch laboratory control sample.
14. 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.
15. No problems were encountered with either the client samples or the associated quality control samples. All 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

5-10-04  
Date

  
Radiochemistry Final Data Review

5-9-04  
Date

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QUALITY ASSURANCE SUMMARY SHEET

PAI W.O. # / BATCH 0404241  
TEST Gamma SP  
METHOD Prep.  
SOP/REV (PREP) 739-R8  
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.

Six samples were rec'd from the client in Gamma Jars, They were submitted for counting as Geo 13's. An average of 7 empty Gamma Jars was used to have a Tare weight (i.e. 51.1g).

C.O. = 4/27/04

TECHNICIAN/ANALYST Carson R. O'Dell DATE 4/27/04  
RESOURCE MANAGER Chad Wayles DATE 4/27/04

# Gamma Spectroscopy Results

## PAI 713 Rev 8 Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: BB04  
Lab ID: 0404241-1

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 16-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QC Batch ID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Aliquot: 664 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040631D08A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
15262-20-1	Ra-228	8.4 +/- 1.0	0.4	M3,G
14391-76-5	Ag-110m	0.013 +/- 0.057	0.101	U,G
14682-66-7	Al-26	0 +/- 0.056	0.099	U,G
14596-10-2	Am-241	-0.10 +/- 0.14	0.24	U,G
13966-02-4	Be-7	-0.37 +/- 0.58	1.01	U,G
14913-49-6	Bi-212	9.5 +/- 1.6	1.4	G
13982-63-3	Ra-226	8.8 +/- 1.0	0.2	G,J
14109-32-1	Cd-109	17.7 +/- 2.7	2.4	G,SI
13982-30-4	Ce-139	-0.006 +/- 0.063	0.105	U,G
14762-78-8	Ce-144	-0.25 +/- 0.39	0.65	U,G
14093-03-9	Co-56	1.28 +/- 0.31	0.34	G,TI
13981-50-5	Co-57	-0.005 +/- 0.047	0.079	U,G
13981-38-9	Co-58	0.003 +/- 0.061	0.105	U,G
10198-40-0	Co-60	0.001 +/- 0.061	0.106	U,G
14392-02-0	Cr-51	-3.0 +/- 7.1	12.0	U,G

### 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: GSS0404241-1

# Gamma Spectroscopy Results

PAI 713 Rev 8

## Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: BB04  
Lab ID: 0404241-1

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 16-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QC Batch ID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Allquot: 664 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040631D08A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13967-70-9	Cs-134	0.141 +/- 0.051	0.103	G, TI
10045-97-3	Cs-137	-0.031 +/- 0.063	0.110	U, G
14683-23-9	Eu-152	1.50 +/- 0.65	0.86	G, TI
15585-10-1	Eu-154	0.16 +/- 0.32	0.53	U, G
14391-16-3	Eu-155	0.36 +/- 0.23	0.36	U, G
14596-12-4	Fe-59	0.09 +/- 0.13	0.21	U, G
10043-66-0	I-131	0.11 +/- 0.17	0.28	U, G
13966-00-2	K-40	9.2 +/- 1.5	0.9	G
13966-31-9	Mn-54	0.133 +/- 0.050	0.067	G, SI
13966-32-0	Na-22	-0.009 +/- 0.064	0.113	U, G
14681-63-1	Nb-94	0.015 +/- 0.065	0.109	U, G
13967-76-5	Nb-95	-0.07 +/- 0.11	0.19	U, G
15100-28-4	Pa-234m	7.6 +/- 9.4	15.4	U, G
15092-94-1	Pb-212	8.08 +/- 0.97	0.19	G
13967-48-1	Ru-106	-0.07 +/- 0.58	0.99	U, G

### 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.  
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Data Package ID: GSS0404241-1

# Gamma Spectroscopy Results

PAI 713 Rev 8

## Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: BB04  
Lab ID: 0404241-1

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 16-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QCBatchID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Aliquot: 664 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040631D08A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
14683-10-4	Sb-124	0.001 +/- 0.070	0.119	U,G
14234-35-6	Sb-125	0.17 +/- 0.18	0.29	U,G
13967-63-0	Sc-46	-0.064 +/- 0.067	0.120	U,G
15623-47-9	Th-227	0.69 +/- 0.40	0.63	G
15065-10-8	Th-234	5.0 +/- 1.0	1.9	G
14913-50-9	Tl-208	2.63 +/- 0.33	0.11	G
15117-96-1	U-235	-0.08 +/- 0.39	0.65	U,G
13982-39-3	Zn-65	0.33 +/- 0.31	0.50	U,G

### Comments:

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Data Package ID: GSS0404241-1

# Gamma Spectroscopy Results

## PAI 713 Rev 8 Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: BI17  
Lab ID: 0404241-2

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 19-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QCBatchID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Aliquot: 771 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040563D07A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
15262-20-1	Ra-228	0.83 +/- 0.17	0.23	M3,G
14391-76-5	Ag-110m	0.006 +/- 0.026	0.045	U,G
14682-66-7	Al-26	0.003 +/- 0.028	0.054	U,G
14596-10-2	Am-241	0.042 +/- 0.063	0.104	U,G
13966-02-4	Be-7	-0.15 +/- 0.28	0.51	U,G
14913-49-6	Bi-212	1.02 +/- 0.55	0.80	G
13982-63-3	Ra-226	1.75 +/- 0.22	0.11	G,J
14109-32-1	Cd-109	3.45 +/- 0.90	1.19	G,SI
13982-30-4	Ce-139	-0.007 +/- 0.027	0.047	U,G
14762-78-8	Ce-144	-0.06 +/- 0.19	0.32	U,G
14093-03-9	Co-56	0.193 +/- 0.085	0.113	G,TI
13981-50-5	Co-57	-0.013 +/- 0.023	0.040	U,G
13981-38-9	Co-58	0.022 +/- 0.033	0.055	U,G
10198-40-0	Co-60	-0.030 +/- 0.037	0.073	U,G
14392-02-0	Cr-51	1.9 +/- 3.0	5.0	U,G

### Comments:

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Data Package ID: GSS0404241-1

# Gamma Spectroscopy Results

## PAI 713 Rev 8 Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: BI17  
Lab ID: 0404241-2

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 19-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QCBatchID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Aliquot: 771 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040563D07A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13967-70-9	Cs-134	-0.006 +/- 0.030	0.053	U,G
10045-97-3	Cs-137	0.010 +/- 0.036	0.061	U,G
14683-23-9	Eu-152	0.16 +/- 0.17	0.26	U,G
15585-10-1	Eu-154	-0.02 +/- 0.21	0.37	U,G
14391-16-3	Eu-155	0.017 +/- 0.081	0.138	U,G
14596-12-4	Fe-59	-0.006 +/- 0.075	0.137	U,G
10043-66-0	I-131	-0.033 +/- 0.068	0.122	U,G
13966-00-2	K-40	12.5 +/- 1.9	0.7	G
13966-31-9	Mn-54	-0.007 +/- 0.032	0.059	U,G
13966-32-0	Na-22	0 +/- 0.038	0.068	U,G
14681-63-1	Nb-94	-0.001 +/- 0.032	0.057	U,G
13967-76-5	Nb-95	-0.061 +/- 0.056	0.107	U,G
15100-28-4	Pa-234m	0.6 +/- 6.3	11.1	U,G
15092-94-1	Pb-212	0.85 +/- 0.13	0.09	G
13967-48-1	Ru-106	-0.05 +/- 0.28	0.51	U,G

### Comments:

#### Qualifiers/Flags:

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Data Package ID: GSS0404241-1



# Gamma Spectroscopy Results

PAI 713 Rev 8

## Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: BI17  
Lab ID: 0404241-2

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 19-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QCBatchID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Aliquot: 771 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040563D07A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
14683-10-4	Sb-124	-0.010 +/- 0.033	0.059	U,G
14234-35-6	Sb-125	0.084 +/- 0.074	0.126	U,G
13967-63-0	Sc-46	-0.006 +/- 0.034	0.062	U,G
15623-47-9	Th-227	-0.9 +/- 4.6	7.5	U,G
15065-10-8	Th-234	1.16 +/- 0.42	0.71	G
14913-50-9	Tl-208	0.315 +/- 0.064	0.055	G
15117-96-1	U-235	0.05 +/- 0.20	0.33	U,G
13982-39-3	Zn-65	0.03 +/- 0.18	0.31	U,G

### Comments:

#### Qualifiers/Flags:

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Data Package ID: GSS0404241-1

# Gamma Spectroscopy Results

PAI 713 Rev 8

## Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: BI37  
Lab ID: 0404241-4

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 19-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QCBatchID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Aliquot: 706 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040632D08A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
15262-20-1	Ra-228	1.53 +/- 0.25	0.28	M3,G
14391-76-5	Ag-110m	-0.015 +/- 0.035	0.066	U,G
14682-66-7	Al-26	0.037 +/- 0.037	0.057	U,G
14596-10-2	Am-241	0.066 +/- 0.087	0.143	U,G
13966-02-4	Be-7	-0.07 +/- 0.34	0.60	U,G
14913-49-6	Bi-212	1.26 +/- 0.72	1.09	G
13982-63-3	Ra-226	5.91 +/- 0.71	0.13	G,J
14109-32-1	Cd-109	8.0 +/- 1.4	1.5	G,SI
13982-30-4	Ce-139	0.027 +/- 0.040	0.065	U,G
14762-78-8	Ce-144	-0.11 +/- 0.23	0.39	U,G
14093-03-9	Co-56	0.93 +/- 0.23	0.23	G,TI
13981-50-5	Co-57	0.013 +/- 0.030	0.049	U,G
13981-38-9	Co-58	0.011 +/- 0.039	0.067	U,G
10198-40-0	Co-60	-0.026 +/- 0.042	0.079	U,G
14392-02-0	Cr-51	-1.3 +/- 3.9	6.8	U,G

### Comments:

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Data Package ID: GSS0404241-1

# Gamma Spectroscopy Results

## PAI 713 Rev 8 Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: BI37  
Lab ID: 0404241-4

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 19-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QCBatchID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Aliquot: 706 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040632D08A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13967-70-9	Cs-134	0.012 +/- 0.035	0.060	U,G
10045-97-3	Cs-137	0.037 +/- 0.040	0.065	U,G
14683-23-9	Eu-152	0.48 +/- 0.26	0.38	G,TI
15585-10-1	Eu-154	-0.15 +/- 0.23	0.42	U,G
14391-16-3	Eu-155	0.01 +/- 0.11	0.19	U,G
14596-12-4	Fe-59	0.041 +/- 0.091	0.155	U,G
10043-66-0	I-131	0.007 +/- 0.082	0.141	U,G
13966-00-2	K-40	11.1 +/- 1.7	0.8	G
13966-31-9	Mn-54	-0.013 +/- 0.044	0.078	U,G
13966-32-0	Na-22	0.002 +/- 0.049	0.086	U,G
14681-63-1	Nb-94	0.031 +/- 0.043	0.070	U,G
13967-76-5	Nb-95	-0.046 +/- 0.067	0.121	U,G
15100-28-4	Pa-234m	8.4 +/- 7.0	10.9	U,G
15092-94-1	Pb-212	1.29 +/- 0.19	0.12	G
13967-48-1	Ru-106	0.14 +/- 0.36	0.60	U,G

### 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: GSS0404241-1

# Gamma Spectroscopy Results

## PAI 713 Rev 8 Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: BI37  
Lab ID: 0404241-4

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 19-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QCBatchID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Aliquot: 706 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040632D08A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
14683-10-4	Sb-124	0.010 +/- 0.039	0.067	U,G
14234-35-6	Sb-125	0.09 +/- 0.11	0.20	U,G
13967-63-0	Sc-46	-0.047 +/- 0.046	0.086	U,G
15623-47-9	Th-227	0.28 +/- 0.26	0.42	U,G
15065-10-8	Th-234	1.99 +/- 0.51	0.74	G
14913-50-9	Tl-208	0.402 +/- 0.076	0.072	G
15117-96-1	U-235	0.20 +/- 0.28	0.46	U,G
13982-39-3	Zn-65	-0.033 +/- 0.087	0.157	U,G

### 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: GSS0404241-1

# Gamma Spectroscopy Results

PAI 713 Rev 8

## Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: B142  
Lab ID: 0404241-6

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 19-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QC Batch ID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Aliquot: 687 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040565D07A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
15262-20-1	Ra-228	1.17 +/- 0.21	0.23	M3,G
14391-76-5	Ag-110m	0.002 +/- 0.030	0.054	U,G
14682-66-7	Al-26	0.027 +/- 0.028	0.043	U,G
14596-10-2	Am-241	-0.003 +/- 0.062	0.107	U,G
13966-02-4	Be-7	0.27 +/- 0.26	0.42	U,G
14913-49-6	Bi-212	1.13 +/- 0.55	0.74	G
13982-63-3	Ra-226	0.582 +/- 0.094	0.114	G,J
14109-32-1	Cd-109	2.63 +/- 0.74	0.97	G,SI
13982-30-4	Ce-139	-0.009 +/- 0.026	0.046	U,G
14762-78-8	Ce-144	-0.03 +/- 0.18	0.31	U,G
14093-03-9	Co-56	0.059 +/- 0.083	0.136	U,G
13981-50-5	Co-57	-0.015 +/- 0.022	0.038	U,G
13981-38-9	Co-58	-0.017 +/- 0.032	0.061	U,G
10198-40-0	Co-60	0.014 +/- 0.033	0.058	U,G
14392-02-0	Cr-51	-1.1 +/- 3.0	5.3	U,G

### 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: GSS0404241-1

# Gamma Spectroscopy Results

PAI 713 Rev 8

## Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: BI42  
Lab ID: 0404241-6

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 19-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QC Batch ID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Allquot: 687 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040565D07A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13967-70-9	Cs-134	0.023 +/- 0.023	0.051	U,G
10045-97-3	Cs-137	-0.029 +/- 0.037	0.070	U,G
14683-23-9	Eu-152	-0.01 +/- 0.16	0.30	U,G
15585-10-1	Eu-154	0.02 +/- 0.17	0.30	U,G
14391-16-3	Eu-155	0.047 +/- 0.081	0.134	U,G
14596-12-4	Fe-59	0.044 +/- 0.083	0.141	U,G
10043-66-0	I-131	-0.066 +/- 0.075	0.137	U,G
13966-00-2	K-40	13.1 +/- 2.0	0.7	G
13966-31-9	Mn-54	-0.008 +/- 0.029	0.055	U,G
13966-32-0	Na-22	-0.011 +/- 0.037	0.071	U,G
14681-63-1	Nb-94	-0.023 +/- 0.036	0.067	U,G
13967-76-5	Nb-95	-0.032 +/- 0.040	0.075	U,G
15100-28-4	Pa-234m	-1.5 +/- 5.3	10.0	U,G
15092-94-1	Pb-212	1.35 +/- 0.19	0.09	G
13967-48-1	Ru-106	0.10 +/- 0.31	0.54	U,G

### 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: GSS0404241-1

# Gamma Spectroscopy Results

PAI 713 Rev 8

## Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: BI42  
Lab ID: 0404241-6

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 19-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QCBatchID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Allquot: 687 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040565D07A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
14683-10-4	Sb-124	0.002 +/- 0.034	0.060	U,G
14234-35-6	Sb-125	0.064 +/- 0.071	0.127	U,G
13967-63-0	Sc-46	0 +/- 0.035	0.063	U,G
15623-47-9	Th-227	0.2 +/- 4.5	7.3	U,G
15065-10-8	Th-234	1.23 +/- 0.44	0.92	G
14913-50-9	Tl-208	0.422 +/- 0.077	0.060	G
15117-96-1	U-235	0.06 +/- 0.18	0.31	U,G
13982-39-3	Zn-65	-0.02 +/- 0.16	0.27	U,G

### 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: GSS0404241-1

000015

# Gamma Spectroscopy Results

## PAI 713 Rev 8 Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: H07  
Lab ID: 0404241-8

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 22-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QCBatchID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Aliquot: 656 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040564D07A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
15262-20-1	Ra-228	0.64 +/- 0.21	0.44	M3,G
14391-76-5	Ag-110m	0.018 +/- 0.053	0.094	U,G
14682-66-7	Al-26	-0.047 +/- 0.056	0.112	U,G
14596-10-2	Am-241	0.31 +/- 0.16	0.24	G,TI
13966-02-4	Be-7	-0.48 +/- 0.54	0.95	U,G
14913-49-6	Bi-212	0.67 +/- 0.55	0.85	U,G
13982-63-3	Ra-226	13.5 +/- 1.6	0.2	G,J
14109-32-1	Cd-109	12.1 +/- 2.4	2.9	G,SI
13982-30-4	Ce-139	-0.03 +/- 0.12	0.20	U,G
14762-78-8	Ce-144	-0.11 +/- 0.42	0.71	U,G
14093-03-9	Co-56	0.92 +/- 0.34	0.45	G,TI
13981-50-5	Co-57	0.023 +/- 0.052	0.087	U,G
13981-38-9	Co-58	0.011 +/- 0.064	0.110	U,G
10198-40-0	Co-60	0.009 +/- 0.071	0.124	U,G
14392-02-0	Cr-51	-2.7 +/- 6.0	10.2	U,G

### 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 halfives.  
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: GSS0404241-1

000015  
000016



# Gamma Spectroscopy Results

## PAI 713 Rev 8 Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: H07  
Lab ID: 0404241-8

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 22-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QCBatchID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Aliquot: 656 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040564D07A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13967-70-9	Cs-134	0 +/- 0.057	0.098	U,G
10045-97-3	Cs-137	0 +/- 0.10	0.17	U,G
14683-23-9	Eu-152	0.22 +/- 0.72	1.19	U,G
15585-10-1	Eu-154	0.03 +/- 0.48	0.82	U,G
14391-16-3	Eu-155	0.11 +/- 0.19	0.31	U,G
14596-12-4	Fe-59	-0.03 +/- 0.15	0.26	U,G
10043-66-0	I-131	0.05 +/- 0.11	0.19	U,G
13966-00-2	K-40	9.9 +/- 1.7	1.2	G
13966-31-9	Mn-54	-0.041 +/- 0.096	0.169	U,G
13966-32-0	Na-22	0.020 +/- 0.072	0.124	U,G
14681-63-1	Nb-94	0.037 +/- 0.038	0.061	U,G
13967-76-5	Nb-95	-0.26 +/- 0.13	0.24	U,G
15100-28-4	Pa-234m	35 +/- 13	18	G
15092-94-1	Pb-212	0.73 +/- 0.15	0.19	G
13967-48-1	Ru-106	0.28 +/- 0.49	0.85	U,G

### 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: GSS0404241-1

# Gamma Spectroscopy Results

PAI 713 Rev 8

## Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: H07  
Lab ID: 0404241-8

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 22-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QCBatchID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Aliquot: 656 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040564D07A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
14683-10-4	Sb-124	0.010 +/- 0.061	0.104	U,G
14234-35-6	Sb-125	0.14 +/- 0.12	0.20	U,G
13967-63-0	Sc-46	-0.067 +/- 0.068	0.124	U,G
15623-47-9	Th-227	0.71 +/- 0.45	0.71	G
15065-10-8	Th-234	26.9 +/- 3.3	1.7	G
14913-50-9	Tl-208	0.198 +/- 0.066	0.086	G
15117-96-1	U-235	1.47 +/- 0.38	0.64	G
13982-39-3	Zn-65	-0.08 +/- 0.41	0.70	U,G

### 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: GSS0404241-1

# Gamma Spectroscopy Results

## PAI 713 Rev 8 Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: H07S  
Lab ID: 0404241-10

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 22-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QCBatchID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Aliquot: 626 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040633D08A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
15262-20-1	Ra-228	0.65 +/- 0.19	0.35	M3,G
14391-76-5	Ag-110m	0 +/- 0.045	0.081	U,G
14682-66-7	Al-26	-0.028 +/- 0.042	0.084	U,G
14596-10-2	Am-241	0.09 +/- 0.14	0.24	U,G
13966-02-4	Be-7	0.13 +/- 0.45	0.75	U,G
14913-49-6	Bi-212	0.68 +/- 0.71	1.14	U,G
13982-63-3	Ra-226	11.7 +/- 1.4	0.2	G,J
14109-32-1	Cd-109	5.1 +/- 1.5	2.2	G,SI
13982-30-4	Ce-139	-0.051 +/- 0.081	0.136	U,G
14762-78-8	Ce-144	-0.04 +/- 0.32	0.53	U,G
14093-03-9	Co-56	1.58 +/- 0.34	0.33	G,TI
13981-50-5	Co-57	0.039 +/- 0.041	0.067	U,G
13981-38-9	Co-58	0.027 +/- 0.076	0.126	U,G
10198-40-0	Co-60	-0.045 +/- 0.061	0.112	U,G
14392-02-0	Cr-51	-2.1 +/- 5.1	8.8	U,G

### 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: GSS0404241-1

# Gamma Spectroscopy Results

## PAI 713 Rev 8 Sample Results

Lab Name: Paragon Analytics  
Work Order Number: 0404241  
Client Name: New Horizons  
ClientProject ID: CSMRI 2135

Field ID: H07S  
Lab ID: 0404241-10

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 22-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QC Batch ID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Aliquot: 626 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040633D08A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13967-70-9	Cs-134	-0.013 +/- 0.054	0.093	U,G
10045-97-3	Cs-137	0.011 +/- 0.049	0.084	U,G
14683-23-9	Eu-152	1.51 +/- 0.66	0.88	G, TI
15585-10-1	Eu-154	-0.56 +/- 0.51	0.94	U,G
14391-16-3	Eu-155	0.04 +/- 0.16	0.26	U,G
14596-12-4	Fe-59	-0.04 +/- 0.11	0.20	U,G
10043-66-0	I-131	0.045 +/- 0.086	0.142	U,G
13966-00-2	K-40	9.9 +/- 1.6	0.9	G
13966-31-9	Mn-54	-0.084 +/- 0.086	0.155	U,G
13966-32-0	Na-22	-0.011 +/- 0.061	0.108	U,G
14681-63-1	Nb-94	0.071 +/- 0.054	0.085	U,G
13967-76-5	Nb-95	-0.29 +/- 0.10	0.19	U,G
15100-28-4	Pa-234m	50 +/- 13	14	G
15092-94-1	Pb-212	0.75 +/- 0.14	0.16	G
13967-48-1	Ru-106	0.14 +/- 0.45	0.76	U,G

### 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: GSS0404241-1

# Gamma Spectroscopy Results

PAI 713 Rev 8  
Sample Results

Lab Name: Paragon Analytics  
Work Order Number: 0404241  
Client Name: New Horizons  
ClientProject ID: CSMRI 2135

Field ID: H07S  
Lab ID: 0404241-10

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 22-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QCBatchID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 60 minutes  
Report Basis: As Received

Final Aliquot: 626 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040633D08A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
14683-10-4	Sb-124	-0.011 +/- 0.058	0.099	U,G
14234-35-6	Sb-125	0.20 +/- 0.15	0.25	U,G
13967-63-0	Sc-46	-0.021 +/- 0.063	0.110	U,G
15623-47-9	Th-227	0.81 +/- 0.35	0.53	G
15065-10-8	Th-234	29.7 +/- 3.6	1.6	G
14913-50-9	Tl-208	0.220 +/- 0.065	0.083	G
15117-96-1	U-235	1.99 +/- 0.39	0.54	G
13982-39-3	Zn-65	0.04 +/- 0.34	0.56	U,G

## 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: GSS0404241-1

# Gamma Spectroscopy Results

PAI 713 Rev 8

## Sample Duplicate Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: H07S  
Lab ID: 0404241-10DUP

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 22-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QCBatchID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 90 minutes  
Report Basis: As Received

Final Aliquot: 626 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040567D07A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
15262-20-1	Ra-228	0.72 +/- 0.19	0.34	M3,G
14391-76-5	Ag-110m	-0.006 +/- 0.041	0.074	U,G
14682-66-7	Al-26	0.004 +/- 0.039	0.071	U,G
14596-10-2	Am-241	0.35 +/- 0.13	0.19	G,TI
13966-02-4	Be-7	-0.27 +/- 0.61	1.05	U,G
14913-49-6	Bi-212	0.66 +/- 0.59	0.95	U,G
13982-63-3	Ra-226	11.6 +/- 1.4	0.2	G,J
14109-32-1	Cd-109	5.7 +/- 1.4	1.9	G,SI
13982-30-4	Ce-139	-0.082 +/- 0.078	0.130	U,G
14762-78-8	Ce-144	-0.30 +/- 0.32	0.54	U,G
14093-03-9	Co-56	0.66 +/- 0.24	0.33	D,G,TI
13981-50-5	Co-57	0.002 +/- 0.040	0.066	U,G
13981-38-9	Co-58	0.006 +/- 0.047	0.081	U,G

### 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.  
M - The requested MDC was not met.  
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.  
W - DER is greater than Warning Limit of 1.42  
D - DER is greater than Control Limit of 2.13

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: GSS0404241-1

# Gamma Spectroscopy Results

PAI 713 Rev 8

## Sample Duplicate Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: H07S  
Lab ID: 0404241-10DUP

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 22-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QC Batch ID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 90 minutes  
Report Basis: As Received

Final Aliquot: 626 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040567D07A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10198-40-0	Co-60	0.022 +/- 0.054	0.091	U,G
14392-02-0	Cr-51	-4.4 +/- 4.5	7.8	U,G
13967-70-9	Cs-134	0.019 +/- 0.043	0.071	U,G
10045-97-3	Cs-137	0.042 +/- 0.078	0.126	U,G
14683-23-9	Eu-152	0.24 +/- 0.50	0.82	U,W,G
15585-10-1	Eu-154	-0.05 +/- 0.38	0.66	U,G
14391-16-3	Eu-155	0.05 +/- 0.14	0.23	U,G
14596-12-4	Fe-59	-0.02 +/- 0.11	0.19	U,G
10043-66-0	I-131	-0.074 +/- 0.084	0.146	U,G
13966-00-2	K-40	8.8 +/- 1.4	0.9	G
13966-31-9	Mn-54	-0.026 +/- 0.045	0.080	U,G
13966-32-0	Na-22	-0.004 +/- 0.054	0.095	U,G
14681-63-1	Nb-94	0.012 +/- 0.049	0.082	U,G

### 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.

M - The requested MDC was not met.

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

W - DER is greater than Warning Limit of 1.42

D - DER is greater than Control Limit of 2.13

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.

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: GSS0404241-1

# Gamma Spectroscopy Results

PAI 713 Rev 8

## Sample Duplicate Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: H07S  
Lab ID: 0404241-10DUP

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 22-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QC Batch ID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 90 minutes  
Report Basis: As Received

Final Aliquot: 626 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040567D07A

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13967-76-5	Nb-95	-0.20 +/- 0.10	0.18	U,G
15100-28-4	Pa-234m	48 +/- 12	13	G
15092-94-1	Pb-212	0.79 +/- 0.13	0.12	G
13967-48-1	Ru-106	-0.01 +/- 0.40	0.68	U,G
14683-10-4	Sb-124	-0.004 +/- 0.045	0.078	U,G
14234-35-6	Sb-125	0.14 +/- 0.12	0.20	U,G
13967-63-0	Sc-46	-0.042 +/- 0.053	0.094	U,G
15623-47-9	Th-227	0.95 +/- 0.32	0.46	G
15065-10-8	Th-234	30.1 +/- 3.6	1.3	G
14913-50-9	Tl-208	0.206 +/- 0.059	0.077	G
15117-96-1	U-235	1.82 +/- 0.36	0.54	G
13982-39-3	Zn-65	-0.04 +/- 0.31	0.52	U,G

### 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.  
M - The requested MDC was not met.  
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.  
W - DER is greater than Warning Limit of 1.42  
D - DER is greater than Control Limit of 2.13

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.  
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: GSS0404241-1



# Gamma Spectroscopy Results

PAI 713 Rev 8

## Method Blank Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Lab ID: GS040427-2MB

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8

Prep Batch: GS040427-2  
QC Batch ID: GS040427-2-1

Final Aliquot: 500 g  
Result Units: pCi/g

Date Collected: 27-Apr-04

Run ID: GS040427-2A

File Name: 040634D08A

Date Prepared: 27-Apr-04

Count Time: 90 minutes

Date Analyzed: 29-Apr-04

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
15262-20-1	Ra-228	0.033 +/- 0.090	0.156	U
14391-76-5	Ag-110m	0.011 +/- 0.018	0.031	U
14682-66-7	Al-26	0.009 +/- 0.022	0.040	U
14596-10-2	Am-241	0.001 +/- 0.025	0.043	U
13966-02-4	Be-7	-0.01 +/- 0.13	0.24	U
14913-49-6	Bi-212	0.04 +/- 0.23	0.42	U
13982-63-3	Ra-226	0.006 +/- 0.038	0.066	U,J
14109-32-1	Cd-109	0.24 +/- 0.23	0.37	U
13982-30-4	Ce-139	0.002 +/- 0.011	0.019	U
14762-78-8	Ce-144	-0.005 +/- 0.070	0.125	U
14093-03-9	Co-56	-0.016 +/- 0.035	0.069	U
13981-50-5	Co-57	-0.0016 +/- 0.0082	0.0149	U
13981-38-9	Co-58	0.009 +/- 0.019	0.033	U
10198-40-0	Co-60	0.012 +/- 0.023	0.039	U
14392-02-0	Cr-51	-0.5 +/- 1.3	2.3	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: GSS0404241-1

Date Printed: Sunday, May 09, 2004

Paragon Analytics  
LIMS Version: 5.009A

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# Gamma Spectroscopy Results

PAI 713 Rev 8

## Method Blank Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Lab ID: GS040427-2MB

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8

Prep Batch: GS040427-2  
QCBatchID: GS040427-2-1

Final Aliquot: 500 g  
Result Units: pCi/g  
File Name: 040634D08A

Date Collected: 27-Apr-04

Run ID: GS040427-2A

Count Time: 90 minutes

Date Prepared: 27-Apr-04

Date Analyzed: 29-Apr-04

Library: FANP\_NEW-HO

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13967-70-9	Cs-134	0.001 +/- 0.021	0.038	U
10045-97-3	Cs-137	-0.021 +/- 0.019	0.039	U
14683-23-9	Eu-152	-0.02 +/- 0.13	0.24	U
15585-10-1	Eu-154	0.02 +/- 0.10	0.19	U
14391-16-3	Eu-155	0.011 +/- 0.031	0.054	U
14596-12-4	Fe-59	0.021 +/- 0.035	0.059	U
10043-66-0	I-131	0 +/- 0.015	0.027	U
13966-00-2	K-40	-0.12 +/- 0.29	0.55	U
13966-31-9	Mn-54	0.019 +/- 0.021	0.034	U
13966-32-0	Na-22	-0.006 +/- 0.020	0.039	U
14681-63-1	Nb-94	0.008 +/- 0.022	0.038	U
13967-76-5	Nb-95	0.004 +/- 0.021	0.037	U
15100-28-4	Pa-234m	-1.6 +/- 3.2	6.4	U
15092-94-1	Pb-212	0.011 +/- 0.028	0.047	U
13967-48-1	Ru-106	-0.01 +/- 0.19	0.34	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: GSS0404241-1

Date Printed: Sunday, May 09, 2004

Paragon Analytics  
LIMS Version: 5.009A

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# Gamma Spectroscopy Results

PAI 713 Rev 8

## Method Blank Results

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Lab ID: GS040427-2MB

Sample Matrix: SOIL

Prep Batch: GS040427-2

Final Aliquot: 500 g

Prep SOP: PAI 739 Rev 8

QC Batch ID: GS040427-2-1

Result Units: pCi/g

Date Collected: 27-Apr-04

Run ID: GS040427-2A

File Name: 040634D08A

Date Prepared: 27-Apr-04

Count Time: 90 minutes

Library: FANP\_NEW-HO

Date Analyzed: 29-Apr-04

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
14683-10-4	Sb-124	-0.012 +/- 0.021	0.040	U
14234-35-6	Sb-125	-0.011 +/- 0.041	0.077	U
13967-63-0	Sc-46	0.012 +/- 0.020	0.034	U
15623-47-9	Th-227	0.058 +/- 0.086	0.143	U
15065-10-8	Th-234	0.15 +/- 0.23	0.38	U
14913-50-9	Tl-208	0.012 +/- 0.024	0.040	U
15117-96-1	U-235	-0.004 +/- 0.092	0.162	U
13982-39-3	Zn-65	0.014 +/- 0.043	0.076	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: GSS0404241-1

# Gamma Spectroscopy Results

PAI 713 Rev 8

## Laboratory Control Sample(s)

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Lab ID: GS040427-2LCS

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 27-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 30-Apr-04

Prep Batch: GS040427-2  
QC Batch ID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 30 minutes

Final Aliquot: 500 g  
Result Units: pCi/g  
File Name: 040572D07A

Library: ANALYTICAL

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14596-10-2	Am-241	206 +/- 24	1	196	105	85 - 115	P
14109-32-1	Cd-109	551 +/- 65	6	521	106	85 - 115	P
10198-40-0	Co-60	86 +/- 10	0	83.4	103	85 - 115	P
10045-97-3	Cs-137	81.6 +/- 9.6	0.6	78.8	103	85 - 115	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: GSS0404241-1

# Gamma Spectroscopy Results

PAI 713 Rev 8

## Duplicate Sample Results (DER)

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: H07S  
Lab ID: 0404241-10DUP

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 22-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QC Batch ID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 90 minutes  
Report Basis: As Received

Final Aliquot: 626 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040567D07A

Library: FANP\_NEW-HO

CASNO	Analyte	Sample Result +/- 2s TPU	Duplicate Result +/- 2s TPU	DER	Control Limit	Lab Qualifiers
15262-20-1	Ra-228	0.65 +/- 0.19	0.72 +/- 0.19	0.28		M3,G
14391-76-5	Ag-110m	0 +/- 0.045	-0.006 +/- 0.041	0.10	2.13	U,G
14682-66-7	Al-26	-0.028 +/- 0.042	0.004 +/- 0.039	0.55	2.13	U,G
14596-10-2	Am-241	0.09 +/- 0.14	0.35 +/- 0.13	1.35	2.13	G,TI
13966-02-4	Be-7	0.13 +/- 0.45	-0.27 +/- 0.61	0.52	2.13	U,G
14913-49-6	Bi-212	0.68 +/- 0.71	0.66 +/- 0.59	0.02	2.13	U,G
13982-63-3	Ra-226	11.7 +/- 1.4	11.6 +/- 1.4	0.04		G,J
14109-32-1	Cd-109	5.1 +/- 1.5	5.7 +/- 1.4	0.29	2.13	G,SI
13982-30-4	Ce-139	-0.051 +/- 0.081	-0.082 +/- 0.078	0.27	2.13	U,G
14762-78-8	Ce-144	-0.04 +/- 0.32	-0.30 +/- 0.32	0.56	2.13	U,G
14093-03-9	Co-56	1.58 +/- 0.34	0.66 +/- 0.24	2.21	2.13	D,G,TI
13981-50-5	Co-57	0.039 +/- 0.041	0.002 +/- 0.040	0.65	2.13	U,G
13981-38-9	Co-58	0.027 +/- 0.076	0.006 +/- 0.047	0.24	2.13	U,G
10198-40-0	Co-60	-0.045 +/- 0.061	0.022 +/- 0.054	0.82	2.13	U,G
14392-02-0	Cr-51	-2.1 +/- 5.1	-4.4 +/- 4.5	0.34	2.13	U,G
13967-70-9	Cs-134	-0.013 +/- 0.054	0.019 +/- 0.043	0.47	2.13	U,G
10045-97-3	Cs-137	0.011 +/- 0.049	0.042 +/- 0.078	0.34	2.13	U,G

### Comments:

#### Duplicate Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- W - DER is greater than Warning Limit of 1.42
- D - DER is greater than Control Limit of 2.13
- LT - Result is less than Request MDC, greater than sample specific MDC
- M - Requested MDC not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS, Matrix Spike Recovery within control limits.
- N - Matrix Spike Recovery outside control limits

#### Abbreviations:

- TPU - Total Propagated Uncertainty (see PAI SOP 743)
- DER - Duplicate Error Ratio
- BDL - Below Detection Limit
- NR - Not Reported
- 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: GSS0404241-1

# Gamma Spectroscopy Results

PAI 713 Rev 8

## Duplicate Sample Results (DER)

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: H07S  
Lab ID: 0404241-10DUP

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 22-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QC Batch ID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 90 minutes  
Report Basis: As Received

Final Aliquot: 626 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040567D07A

Library: FANP\_NEW-HO

14683-23-9	Eu-152	1.51 +/- 0.66	0.24 +/- 0.50	1.52	2.13	U,W,G
15585-10-1	Eu-154	-0.56 +/- 0.51	-0.05 +/- 0.38	0.79	2.13	U,G
14391-16-3	Eu-155	0.04 +/- 0.16	0.05 +/- 0.14	0.04	2.13	U,G
14596-12-4	Fe-59	-0.04 +/- 0.11	-0.02 +/- 0.11	0.13	2.13	U,G
10043-66-0	I-131	0.045 +/- 0.086	-0.074 +/- 0.084	0.99	2.13	U,G
13966-00-2	K-40	9.9 +/- 1.6	8.8 +/- 1.4	0.53	2.13	G
13966-31-9	Mn-54	-0.084 +/- 0.086	-0.026 +/- 0.045	0.60	2.13	U,G
13966-32-0	Na-22	-0.011 +/- 0.061	-0.004 +/- 0.054	0.08	2.13	U,G
14681-63-1	Nb-94	0.071 +/- 0.054	0.012 +/- 0.049	0.81	2.13	U,G
13967-76-5	Nb-95	-0.29 +/- 0.10	-0.20 +/- 0.10	0.64	2.13	U,G
15100-28-4	Pa-234m	50 +/- 13	48 +/- 12	0.09	2.13	G
15092-94-1	Pb-212	0.75 +/- 0.14	0.79 +/- 0.13	0.24	2.13	G
13967-48-1	Ru-106	0.14 +/- 0.45	-0.01 +/- 0.40	0.26	2.13	U,G
14683-10-4	Sb-124	-0.011 +/- 0.058	-0.004 +/- 0.045	0.09	2.13	U,G
14234-35-6	Sb-125	0.20 +/- 0.15	0.14 +/- 0.12	0.34	2.13	U,G
13967-63-0	Sc-46	-0.021 +/- 0.063	-0.042 +/- 0.053	0.26	2.13	U,G
15623-47-9	Th-227	0.81 +/- 0.35	0.95 +/- 0.32	0.29	2.13	G
15065-10-8	Th-234	29.7 +/- 3.6	30.1 +/- 3.6	0.09	2.13	G
14913-50-9	Tl-208	0.220 +/- 0.065	0.206 +/- 0.059	0.16	2.13	G

### Comments:

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Data Package ID: GSS0404241-1

# Gamma Spectroscopy Results

PAI 713 Rev 8

## Duplicate Sample Results (DER)

Lab Name: Paragon Analytics

Work Order Number: 0404241

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: H07S  
Lab ID: 0404241-10DUP

Sample Matrix: SOIL  
Prep SOP: PAI 739 Rev 8  
Date Collected: 22-Apr-04  
Date Prepared: 27-Apr-04  
Date Analyzed: 29-Apr-04

Prep Batch: GS040427-2  
QCBatchID: GS040427-2-1  
Run ID: GS040427-2A  
Count Time: 90 minutes  
Report Basis: As Received

Final Aliquot: 626 g  
Prep Basis: As Received  
Moisture(%): NA  
Result Units: pCi/g  
File Name: 040567D07A

Library: FANP\_NEW-HO

15117-96-1	U-235	1.99 +/- 0.39	1.82 +/- 0.36	0.33	2.13	G
13982-39-3	Zn-65	0.04 +/- 0.34	-0.04 +/- 0.31	0.17	2.13	U,G

### Comments:

#### Duplicate Qualifiers/Flags:

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