1. This report consists of the analytical results for seven soil samples received by Paragon on 05/19/04.

2. These samples were prepared according to Paragon Analytics procedures PA SOP721R10, PA SOP773R8, and PA SOP777R7.

3. The samples were analyzed for the presence of isotopic thorium according to Paragon Analytics procedure PA SOP714R8. The analyses were completed on 06/21/04.

4. The isotopic analysis results for these samples are reported on a dry weight basis in units of pCi/gram.

5. 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.

6. Sample SDA064 (PA ID 0405169-13) was prepared at a greatly reduced aliquot (0.04-g versus 2.0-g standard aliquot) in a separate batch due to elevated activity detected in the prescreen results. Due to the reduced aliquot, the requested MDC of 0.1 pCi/g was not achieved, however the reported activity in the sample exceeds its achieved MDC values. It is identified with “M3” flags on the final reports.

7. Likewise, the method blank associated with 0405169-13 (AS040610-3MB) was prepared at an analogous reduced aliquot to this sample. It did not meet the requested MDC and was given an extended count of 1000 minutes in order to lower all associated MDC and uncertainty values. Th-228 activity is also reported in this method blank above the MDC value. The measured blank Th-228 activity is not less than one-fifth the Th-228 activity reported in sample 0405169-13. Therefore, the results of this sample are potentially biased high as is indicated by the elevated blank
activity. At the client's request, the results of this sample and its associated quality control samples are submitted in this report without further qualification. Please refer to NCR 5739 included with this data package.

8. A few other samples did not meet the requested MDC of 0.1 pCi/g for Th-228 and/or Th-230. The reported activity in these samples exceeds their achieved MDC values in each case. They are identified with an "M3" flag on the final reports.

9. The magnitude of the negative Th-230 activity for method blank AS040610-4MB is greater than the 2 sigma TPU. The analyst's review of the data does not indicate a problem with the instrument data or the subsequent reporting systems. The data quality is not believed to be affected and the results are submitted without qualification. Under typical conditions, where background level sample data is normally distributed and analyzed by paired observations, this event is likely to occur at least 2.5% of the time.

10. No further anomalous situations were encountered during the preparation or analysis of these samples. All remaining quality control criteria were met.

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

Skye Dobberstein
Radiochemistry Instrumentation

Date

Radiochemistry Final Data Review

Date
CONTROLL\ED
NON-CONFORMANCE REPORT

Initiated by:  
Date: 6-18-04  
Method/Procedure:  
Work Orders Affected: 0405679  
Clients:  

SECTION I  TYPE OF EVENT (circle as appropriate)

1. LCS / Surrogate / IS / Tracer or Chemical Yield Criteria Not Met
2. Calibration Criteria Not Met (ICAL, ICV, CCV)
X 3. Method Requirements Not Met (HTV, MB)
4. Deviation from LQAP / SOP (i.e., PAI criteria not met)
5. Client Criteria Not Met (MDC, DER, )
6. Equipment Failure or Laboratory Incident / Error
7. Other

Actions to Prevent Recurrence (Retrain, etc.):

SECTION II  NOTIFICATION

Client Contacted? (Y/N) Name: Sally Cuffari  Date: 6/18/04  Time: 10:20

SECTION III  CORRECTIVE ACTIONS

1. Submit for Re-Prep. or Clean-up
2. Re-analyze
3. Resubmit Data (hc, edd, narrative)
4. Document in Narrative
5. Other

Approved by: DPM PM

SECTION IV  REQUEST FOR REWORK

Initial Batch ID: Date:
Reworked Batch ID: Date:
Outcome: 6/21/04

Approved by:

SECTION V  DISPOSITION

Use as is  Repair  Reject

SECTION VI  COMMENTS

Narrate and flag data appropriately.

SECTION VII  APPROVAL SIGNATURES

Project Manager (PM):  Date: 6/18/04  (Verification of Disposition)
Department Manager (DPM):  Date: 6/21/04
QA Manager:  Date: 6/21/04

SECTION VIII  DISTRIBUTION

PM  DPM  Lab Director  Rpt. Group
Isotopic Thorium By Alpha Spectroscopy
PAI 714 Rev 8
Method Blank Results

Lab Name: Paragon Analytics
Work Order Number: 0405169
Client Name: New Horizons
ClientProject ID: CSMRI 2135

Lab ID: AS040610-2MB
Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 7
Date Collected: 10-Jun-04
Date Prepared: 10-Jun-04
Date Analyzed: 21-Jun-04
Prep Batch: AS040610-2
QCBatchID: AS040610-2-2
Run ID: AS040610-2a
Count Time: 300 minutes
Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: T6102B

<table>
<thead>
<tr>
<th>CASNO</th>
<th>Target Nuclide</th>
<th>Result +/- 2 s TPU</th>
<th>MDC</th>
<th>Lab Qualifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>14274-82-9</td>
<td>Th-228</td>
<td>0.007 +/- 0.024</td>
<td>0.055</td>
<td>U</td>
</tr>
<tr>
<td>14289-63-7</td>
<td>Th-230</td>
<td>-0.014 +/- 0.031</td>
<td>0.078</td>
<td>U</td>
</tr>
<tr>
<td>7440-29-1</td>
<td>Th-232</td>
<td>0.003 +/- 0.013</td>
<td>0.019</td>
<td>U</td>
</tr>
</tbody>
</table>

Chemical Yield Summary

<table>
<thead>
<tr>
<th>Carrier/Tracer</th>
<th>Amount Added</th>
<th>Result</th>
<th>Units</th>
<th>Yield</th>
<th>Control Limits</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Th-229</td>
<td>2.309</td>
<td>1.69</td>
<td>pCi/g</td>
<td>73.1</td>
<td>30 - 110 %</td>
<td></td>
</tr>
</tbody>
</table>

Comments:

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

Abbreviations:
TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 706)
BDL - Below Detection Limit

M - Requested MDC not met.
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.

Data Package ID: TH0405169-1

Date Printed: Thursday, June 24, 2004
Paragon Analytics
LIMS Version: 5.338A
Isotopic Thorium By Alpha Spectroscopy

PAI 714 Rev 8
Method Blank Results

Lab Name: Paragon Analytics
Work Order Number: 0405169
Client Name: New Horizons
Client/Project ID: CSMRI 2135

Lab ID: AS040510-4MB
Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 7
Date Collected: 10-Jun-04
Date Prepared: 10-Jun-04
Date Analyzed: 17-Jun-04

Prep Batch: AS040510-4
QCBatchID: AS040510-4-1
Run ID: AS040510-4A
Count Time: 1000 minutes
Final Aliquot: 0.0397 g
Result Units: pCi/g
File Name: T6104B

<table>
<thead>
<tr>
<th>CASNO</th>
<th>Target Nuclide</th>
<th>Result +/- 2 s TPU</th>
<th>MDC</th>
<th>Lab Qualifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>14274-82-9</td>
<td>Th-228</td>
<td>1.19 +/- 0.76</td>
<td>1.06</td>
<td>B,M</td>
</tr>
<tr>
<td>14289-83-7</td>
<td>Th-230</td>
<td>-1.22 +/- 0.95</td>
<td>1.83</td>
<td>U,M</td>
</tr>
<tr>
<td>7440-29-1</td>
<td>Th-232</td>
<td>0.44 +/- 0.45</td>
<td>0.70</td>
<td>U,M</td>
</tr>
</tbody>
</table>

Chemical Yield Summary

<table>
<thead>
<tr>
<th>Carrier/Tracer</th>
<th>Amount Added</th>
<th>Result</th>
<th>Units</th>
<th>Yield</th>
<th>Control Limits</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Th-229</td>
<td>116.3</td>
<td>94</td>
<td>pCi/g</td>
<td>81.0</td>
<td>30 - 110 %</td>
<td></td>
</tr>
</tbody>
</table>

Comments:

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

Abbreviations:
TPU - Total Propagated Uncertainty (see PAI SOP 745)
MDC - Minimum Detectable Concentration (see PAI SOP 709)
SDL - Below Detection Limit

Data Package ID: TH0405169-1

Date Printed: Thursday, June 24, 2004

Paragon Analytics
LIMS Version: 5.036A
Isotopic Thorium By Alpha Spectroscopy

PAI 714 Rev 8

Laboratory Control Sample(s)

Lab Name: Paragon Analytics
Work Order Number: 0405169
Client Name: New Horizons
ClientProject ID: CSMRI 2135

<table>
<thead>
<tr>
<th>Lab ID: AS040610-2LCS</th>
<th>Sample Matrix: SOIL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prep SOP: PAI 777 Rev 7</td>
</tr>
<tr>
<td>Date Collected: 10-Jun-04</td>
<td>QC Batch ID: AS040610-2a</td>
</tr>
<tr>
<td>Date Prepared: 10-Jun-04</td>
<td>Run ID: AS040610-2a</td>
</tr>
<tr>
<td>Date Analyzed: 21-Jun-04</td>
<td>Count Time: 300 minutes</td>
</tr>
<tr>
<td>Final Aliquot: 2.00 g</td>
<td>Result Units: pCi/g</td>
</tr>
<tr>
<td></td>
<td>File Name: T6102L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CASNO</th>
<th>Target Nuclide</th>
<th>Results +/- 2s TPU</th>
<th>MDC</th>
<th>Spike Added</th>
<th>% Rec</th>
<th>Control Limits</th>
<th>Lab Qualifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>14260-63-7</td>
<td>Th-230</td>
<td>2.38 +/- 0.43</td>
<td>0.08</td>
<td>2.30</td>
<td>104</td>
<td>85 - 121</td>
<td>P</td>
</tr>
</tbody>
</table>

Chemical Yield Summary

<table>
<thead>
<tr>
<th>Carrier/Tracer</th>
<th>Amount Added</th>
<th>Result</th>
<th>Units</th>
<th>Yield</th>
<th>Control Limits</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Th-229</td>
<td>2.309</td>
<td>1.88</td>
<td>pCi/g</td>
<td>81.6</td>
<td>30 - 110 %</td>
<td></td>
</tr>
</tbody>
</table>

Comments:

Qualifiers/Flags:
U - Result is less than the sample specific MDC.
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 735)

Data Package ID: TH0405169-1

Date Printed: Thursday, June 24, 2004
Isotopic Thorium By Alpha Spectroscopy
PAI 714 Rev 8
Laboratory Control Sample(s)

Lab Name: Paragon Analytics
Work Order Number: 0405169
Client Name: New Horizons
Client Project ID: CSMRI 2135

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 7
Date Collected: 10-Jun-04
Date Prepared: 10-Jun-04
Date Analyzed: 16-Jun-04

Lab ID: AS040610-4LCS
Prep Batch: AS040610-4
QC Batch ID: AS040610-4-1
Run ID: AS040610-4A
File Name: T6104L
Final Aliquot: 0.0397 g
Result Units: pCi/g

<table>
<thead>
<tr>
<th>CASNO</th>
<th>Target Nuclide</th>
<th>Results +/- 2s TPU</th>
<th>MDC</th>
<th>Spike Added</th>
<th>% Rec</th>
<th>Control Limits</th>
<th>Lab Qualifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>14269-83-7</td>
<td>Th-230</td>
<td>126 +/- 23</td>
<td>4</td>
<td>116</td>
<td>109</td>
<td>85 - 121</td>
<td>P,M3</td>
</tr>
</tbody>
</table>

Chemical Yield Summary

<table>
<thead>
<tr>
<th>Carrier/Tracer</th>
<th>Amount Added</th>
<th>Result</th>
<th>Units</th>
<th>Yield</th>
<th>Control Limits</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Th-229</td>
<td>116.5</td>
<td>81</td>
<td>pCi/g</td>
<td>69.5</td>
<td>30 - 110 %</td>
<td></td>
</tr>
</tbody>
</table>

Comments:

Qualifier/Flags:
U - Result is less than the sample specific MDC.
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 - Totals Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: TH0405169-1

Date Printed: Thursday, June 24, 2004
# Isotopic Thorium By Alpha Spectroscopy

**PAI 714 Rev 8**  
**Duplicate Sample Results (DER)**

**Lab Name:** Paragon Analytics  
**Work Order Number:** 0405199  
**Client Name:** New Horizons  
**Client Project ID:** CSMRI 2135

---

**Sample Matrix:** SOIL  
**Prep SOP:** PAI 777 Rev 7  
**Date Collected:** 03-May-04  
**Date Prepared:** 10-Jun-04  
**Date Analyzed:** 21-Jun-04  
**Prep Batch:** AS040610-2  
**Tech Batch ID:** AS040610-2-2  
**Run ID:** AS040610-2a  
**Count Time:** 300 minutes  
**Report Basis:** Dry Weight  
**Final Aliquot:** 2.04 g  
**Prep Basis:** Dry Weight  
**Moisture (%):** NA  
**Result Units:** pCi/g  
**File Name:** T51692D

<table>
<thead>
<tr>
<th>CASNO</th>
<th>Analyte</th>
<th>Sample Result +/- 2s TPU</th>
<th>Duplicate Result +/- 2s TPU</th>
<th>DER</th>
<th>Control Limit</th>
<th>Lab Qualifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>14274-82-0</td>
<td>Th-226</td>
<td>2.39 +/- 0.46</td>
<td>2.51 +/- 0.47</td>
<td>0.18</td>
<td>2.13</td>
<td></td>
</tr>
<tr>
<td>14289-83-7</td>
<td>Th-230</td>
<td>1.23 +/- 0.28</td>
<td>1.18 +/- 0.24</td>
<td>0.17</td>
<td>2.13</td>
<td></td>
</tr>
<tr>
<td>7440-26-1</td>
<td>Th-232</td>
<td>2.11 +/- 0.41</td>
<td>2.23 +/- 0.42</td>
<td>0.21</td>
<td>2.13</td>
<td></td>
</tr>
</tbody>
</table>

---

**Comments:**

- **Duplicate Qualifiers/Flags:**
  - **U** - Result is less than the sample specific MDC.
  - **Y1** - Chemical Yield is in control at 105-110%. 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
  - **L** - Result is less than Requested 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

- **Data Package ID:** TH0405199-1

---

**Abbreviations:**

- **TPU** - Total Propagated Uncertainty (see PAI SOP 743)
- **DER** - Duplicate Error Ratio
- **BOL** - Below Detection Limit
- **NR** - Not Reported

---

**Date Printed:** Thursday, June 24, 2004  
**Paragon Analytics**  
**LIMS Version:** 5.036A  
**Page 1 of 2**
# Isotopic Thorium By Alpha Spectroscopy

**PAI 714 Rev 8**

**Duplicate Sample Results (DER)**

Lab Name: Paragon Analytics  
Work Order Number: 0405169  
Client Name: New Horizons  
Client Project ID: CSMRI 2135

<table>
<thead>
<tr>
<th>Sample Matrix: SCIL Prep SOP: PAI 777 Rev 7 Prep Batch: AS040610-4 Final Aliquot: 0.0406 g</th>
<th>QCBatchID: AS040610-4-1 Prep Basis: Dry Weight</th>
<th>Moisture(%): NA</th>
<th>Result Units: pCi/g</th>
<th>File Name: T516913D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Collected: 13-May-04 Run ID: AS040610-4A Report Basis: Dry Weight</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date Prepared: 10-Jun-04</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date Analyzed: 17-Jun-04</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### CASNO  
<table>
<thead>
<tr>
<th>Analyte</th>
<th>Sample Result +/- 2s TPU</th>
<th>Duplicate Result +/- 2s TPU</th>
<th>DER</th>
<th>Control Limit</th>
<th>Lab Qualifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>14274-82-9</td>
<td>Th-228</td>
<td>3.7 +/- 1.5</td>
<td>3.4 +/- 1.2</td>
<td>0.11</td>
<td>2.13</td>
</tr>
<tr>
<td>14269-03-7</td>
<td>Th-230</td>
<td>145 +/- 23</td>
<td>137 +/- 21</td>
<td>0.29</td>
<td>2.13</td>
</tr>
<tr>
<td>7440-29-1</td>
<td>Th-232</td>
<td>0.99 +/- 0.52</td>
<td>1.20 +/- 0.51</td>
<td>0.28</td>
<td>2.13</td>
</tr>
</tbody>
</table>

### 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 Requested 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

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

### Data Package ID: TH0405169-1

**Date Printed:** Thursday, June 24, 2004  
**Paragon Analytics**  
**LIMS Version:** 6.036A
# Isotopic Thorium by Alpha Spectroscopy

**PAI 714 Rev 8**

**Sample Results**

**Lab Name:** Paragon Analytics  
**Work Order Number:** 0405169  
**Client Name:** New Horizons  
**Client Project ID:** CSMRI 2135

---

| Lab ID: | 0405169-2 | | | QCBatchID: AS040610-2-2 |
| Date Collected: | 03-May-04 | | | Run ID: AS040610-2a |
| Date Prepared: | 10-Jun-04 | | | Count Time: 300 minutes |
| Date Analyzed: | 21-Jun-04 | Report Basis: Dry Weight | | |

**Final Aliquot:** 2.03 g  
**Prep Basis:** Dry Weight  
**Moisture (%):** NA  
**Result Units:** pCi/g  
**File Name:** T51662

---

### CASNO

<table>
<thead>
<tr>
<th>CASNO</th>
<th>Target Nuclide</th>
<th>Result +/- 2 s TPU</th>
<th>MDC</th>
<th>Lab Qualifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>14274-82-9</td>
<td>Th-228</td>
<td>2.39 +/- 0.46</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>14269-63-7</td>
<td>Th-230</td>
<td>1.23 +/- 0.26</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>7440-29-1</td>
<td>Th-232</td>
<td>2.11 +/- 0.41</td>
<td>0.03</td>
<td></td>
</tr>
</tbody>
</table>

---

### Chemical Yield Summary

<table>
<thead>
<tr>
<th>Carrier/Tracer</th>
<th>Amount Added</th>
<th>Result</th>
<th>Units</th>
<th>Yield</th>
<th>Control Limits</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Th-229</td>
<td>2.274</td>
<td>1.23</td>
<td>pCi/g</td>
<td>54.1</td>
<td>30 - 110 %</td>
<td></td>
</tr>
</tbody>
</table>

---

### Comments:

**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.
- **LT:** Result is less than Requested MDC, greater than sample specific MDC.
- **M:** 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 708)
- **BDL:** Below Detection Limit

**Data Package ID:** TH0405169-1

---

**Date Printed:** Thursday, June 24, 2004  
**Paragon Analytics**  
**LIMS Version:** 5.030A  
**Page 1 of 7**
Isotopic Thorium By Alpha Spectroscopy

PAI 714 Rev 8
Sample Duplicate Results

Lab Name: Paragon Analytics
Work Order Number: 0405169
Client Name: New Horizons
Client Project ID: CSMRI 2135

Field ID: IC1008
Lab ID: 0405169-2DUP

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 7
Date Collected: 03-May-04
Date Prepared: 10-Jun-04
Prep Batch: AS040610-2
QC Batch ID: AS040610-2-2
Run ID: AS040610-2a
Count Time: 300 minutes
Report Basis: Dry Weight
Final Aliquot: 2.04 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: T51692D

<table>
<thead>
<tr>
<th>CASNO</th>
<th>Target Nuclide</th>
<th>Result +/- 2 s TPU</th>
<th>MDC</th>
<th>Lab Qualifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>14274-62-9</td>
<td>Th-228</td>
<td>2.51 +/- 0.47</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>14289-63-7</td>
<td>Th-230</td>
<td>1.18 +/- 0.24</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>7440-29-1</td>
<td>Th-232</td>
<td>2.23 +/- 0.42</td>
<td>0.03</td>
<td></td>
</tr>
</tbody>
</table>

Chemical Yield Summary

<table>
<thead>
<tr>
<th>Carrier/Tracer</th>
<th>Amount Added</th>
<th>Result</th>
<th>Units</th>
<th>Yield</th>
<th>Control Limits</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Th-229</td>
<td>2.296</td>
<td>1.39</td>
<td>pCi/g</td>
<td>61.1</td>
<td>30 - 110 %</td>
<td></td>
</tr>
</tbody>
</table>

Comments:

Qualifiers/Flags:
U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%.
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.
MB - The requested MDC was not met, but the reported 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

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

Data Package ID: TH0405169-1

Date Printed: Thursday, June 24, 2004
Paragon Analytics
LIMS Version: 5.036A
Isotopic Thorium By Alpha Spectroscopy

PAI 714 Rev 8
Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0405169
Client Name: New Horizons
ClientProject ID: CSMRI 2135

Field ID: IC1025
Lab ID: 0405169-4

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 7
Date Collected: 04-May-04
Date Prepared: 10-Jun-04
Date Analyzed: 21-Jun-04

Prep Batch: AS040510-2
QCBatchID: AS040510-2-2
Run ID: AS040810-2a
Count Time: 300 minutes
Report Basis: Dry Weight
Final Aliquot: 2.01 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: T61694

<table>
<thead>
<tr>
<th>CASNO</th>
<th>Target Nuclide</th>
<th>Result +/- 2 s TPU</th>
<th>MDC</th>
<th>Lab Qualifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>14274-82-9</td>
<td>Th-228</td>
<td>1.42 +/- 0.29</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>14269-63-7</td>
<td>Th-230</td>
<td>2.76 +/- 0.52</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>7440-28-1</td>
<td>Th-232</td>
<td>1.42 +/- 0.28</td>
<td>0.03</td>
<td></td>
</tr>
</tbody>
</table>

Chemical Yield Summary

<table>
<thead>
<tr>
<th>Carrier/Tracer</th>
<th>Amount Added</th>
<th>Result</th>
<th>Units</th>
<th>Yield</th>
<th>Control Limits</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Th-228</td>
<td>2.301</td>
<td>1.33</td>
<td>pCi/g</td>
<td>58.0</td>
<td>50 - 110 %</td>
<td></td>
</tr>
</tbody>
</table>

Comments:

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.
LT - Result is less than Requested MDC, greater than sample specific MDC.
MB - The requested MDC was not met, but the reported activity is greater than the reported MDC.
M - The requested MDC was not met.

Abbreviations:
TPE - Total Propagated Uncertainty (see PAI SOP 745)
MDC - Minimum Detectable Concentration (see PAI SOP 709)
BDL - Below Detection Limit

Data Package ID: TH0405169-1

Date Printed: Thursday, June 24, 2004
Paragon Analytics
LIMS Version: 5.036A
# Isotopic Thorium By Alpha Spectroscopy

**PAI 714 Rev 8**  
**Sample Results**

**Lab Name:** Paragon Analytics  
**Work Order Number:** 0405169  
**Client Name:** New Horizons  
**Client Project ID:** CSMRI 2135

<table>
<thead>
<tr>
<th>Field ID:</th>
<th>Lab ID:</th>
</tr>
</thead>
<tbody>
<tr>
<td>IC1026</td>
<td>0405169-6</td>
</tr>
</tbody>
</table>

| Sample Matrix: | SOIL |
| Prep SOP: | PAI 777 Rev 7 |
| QC Batch ID: | AS040610-2-2 |
| Run ID: | AS040610-2-2a |
| Date Collected: | 04-May-04 |
| Date Prepared: | 10-Jun-04 |
| Date Analyzed: | 21-Jun-04 |
| Count Time: | 300 minutes |
| Report Basis: | Dry Weight |
| Final Aliquot: | 2.02 g |
| Prep Basis: | Dry Weight |
| Moisture(%): | NA |
| Result Units: | pCi/g |
| File Name: | TS51696 |

<table>
<thead>
<tr>
<th>CASNO</th>
<th>Target Nuclide</th>
<th>Result +/- 2 s TPU</th>
<th>MDC</th>
<th>Lab Qualifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>14274-82-9</td>
<td>Th-228</td>
<td>2.31 +/- 0.45</td>
<td>0.11</td>
<td>M3</td>
</tr>
<tr>
<td>14269-83-7</td>
<td>Th-230</td>
<td>1.79 +/- 0.36</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>7440-29-1</td>
<td>Th-232</td>
<td>2.24 +/- 0.43</td>
<td>0.05</td>
<td></td>
</tr>
</tbody>
</table>

## Chemical Yield Summary

<table>
<thead>
<tr>
<th>Carrier/Tracer</th>
<th>Amount Added</th>
<th>Result</th>
<th>Units</th>
<th>Yield</th>
<th>Control Limits</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Th-229</td>
<td>2.29f</td>
<td>1.21</td>
<td>pCi/g</td>
<td>92.9</td>
<td>30 - 110%</td>
<td></td>
</tr>
</tbody>
</table>

**Comments:**

**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.
- **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.
- **M4:** 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

**Data Package ID:** TH0405169-1

**Date Printed:** Thursday, June 24, 2004  
**Paragon Analytics**  
**LIMS Version:** 5.036A  
**Page 3 of 7**
Isotopic Thorium By Alpha Spectroscopy
PAI 714 Rev 8
Sample Results

Lab Name: Paragon Analytics
Work Order Number: 040516B
Client Name: New Horizons
ClientProject ID: CSMRI 2135

Field ID: H214
Lab ID: 040516B-8
Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 7
Date Collected: 04-May-04
Date Prepared: 10-Jun-04
Date Analyzed: 21-Jun-04
Prep Batch: AS040610-2
QCBatchID: AS040610-2-2
Run ID: AS040610-2a
Count Time: 300 minutes
Report Basis: Dry Weight
Final Aliquot: 2.04 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: T5169B

<table>
<thead>
<tr>
<th>CASNO</th>
<th>Target Nuclide</th>
<th>Result +/- 2 s TPU</th>
<th>MDC</th>
<th>Lab Qualifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>14274-82-9</td>
<td>Th-228</td>
<td>1.41 +/- 0.29</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>14298-63-7</td>
<td>Th-230</td>
<td>27.6 +/- 4.7</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>7440-29-1</td>
<td>Th-232</td>
<td>1.35 +/- 0.27</td>
<td>0.01</td>
<td></td>
</tr>
</tbody>
</table>

Chemical Yield Summary

<table>
<thead>
<tr>
<th>Carrier/Tracer</th>
<th>Amount Added</th>
<th>Result</th>
<th>Units</th>
<th>Yield</th>
<th>Control Limits</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Th-229</td>
<td>2.280</td>
<td>1.36</td>
<td>pCi/g</td>
<td>60.0</td>
<td>30 - 110 %</td>
<td></td>
</tr>
</tbody>
</table>

Comments:
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.
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:
TJP - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 736)
BDL - Below Detection Limit

Data Package ID: TH040516B-1

Date Printed: Thursday, June 24, 2004
Paragon Analytics
LIMS Version: 5.036A
Isotopic Thorium By Alpha Spectroscopy

PAI 714 Rev 8
Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0405169
Client Name: New Horizons
ClientProject ID: CSMRI 2135

Field ID: H236
Lab ID: 0405169-10

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 7
Date Collected: 05-May-04
Data Prepared: 10-Jun-04
Date Analyzed: 21-Jun-04
Prep Batch: AS040610-2
QCBatchID: AS040610-2-2
Run ID: AS040610-2a
Count Time: 300 minutes
Report Basis: Dry Weight
Final Allot: 1.03 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: T516910

<table>
<thead>
<tr>
<th>CASNO</th>
<th>Target Nuclide</th>
<th>Result +/- 2 s TPU</th>
<th>MDC</th>
<th>Lab Qualifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>14274-82-9</td>
<td>Th-228</td>
<td>2.03 +/- 0.43</td>
<td>0.17</td>
<td>M3</td>
</tr>
<tr>
<td>14289-83-7</td>
<td>Th-230</td>
<td>1.46 +/- 0.25</td>
<td>0</td>
<td>M3</td>
</tr>
<tr>
<td>7440-28-1</td>
<td>Th-232</td>
<td>2.03 +/- 0.42</td>
<td>0.08</td>
<td></td>
</tr>
</tbody>
</table>

Chemical Yield Summary

<table>
<thead>
<tr>
<th>Carrier/Tracer</th>
<th>Amount Added</th>
<th>Result</th>
<th>Units</th>
<th>Yield</th>
<th>Control Limits</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Th-229</td>
<td>4.503</td>
<td>2.89</td>
<td>pCi/g</td>
<td>64.2</td>
<td>30 - 110 %</td>
<td></td>
</tr>
</tbody>
</table>

Comments:

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

Data Package ID: TH0405169-1

Date Printed: Thursday, June 24, 2004
Isotopic Thorium By Alpha Spectroscopy

PAI 714 Rev 8
Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0405169
Client Name: New Horizons
ClientProject ID: CSMRI 2135

Field ID: E32
Lab ID: 0405169-12

Sample Matrix: SOIL
 Prep SOP: PAI 777 Rev 7
 Date Collected: 10-May-04
 Date Prepared: 10-Jun-04
 Date Analyzed: 21-Jun-04
 Prep Batch: AS040610-2
 QCBatchID: AS040610-2a
 Run ID: AS040610-2a
 Count Time: 300 minutes
 Report Basis: Dry Weight
 Final Alloqu: 0.505 g
 Prep Basis: Dry Weight
 Moisture(%): NA
 Result Units: pCi/g
 File Name: T516912

<table>
<thead>
<tr>
<th>CASNO</th>
<th>Target Nuclide</th>
<th>Result +/- 2 s TPU</th>
<th>MDC</th>
<th>Lab Qualifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>14274-82-9</td>
<td>Th-228</td>
<td>2.85 +/- 0.60</td>
<td>0.19</td>
<td>M3</td>
</tr>
<tr>
<td>14288-83-7</td>
<td>Th-230</td>
<td>65 +/- 11</td>
<td>0</td>
<td>M3</td>
</tr>
<tr>
<td>7440-29-1</td>
<td>Th-232</td>
<td>2.93 +/- 0.61</td>
<td>0.09</td>
<td></td>
</tr>
</tbody>
</table>

Chemical Yield Summary

<table>
<thead>
<tr>
<th>Carrier/Tracer</th>
<th>Amount Added</th>
<th>Result</th>
<th>Units</th>
<th>Yield</th>
<th>Control Limits</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Th-229</td>
<td>9.136</td>
<td>7.2</td>
<td>pCi/g</td>
<td>79.2</td>
<td>30 - 110 %</td>
<td></td>
</tr>
</tbody>
</table>

Comments:

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.
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 705)
BOL - Below Detection Limit

Data Package ID: TH0405169-1

Date Printed: Thursday, June 24, 2004
Isotopic Thorium By Alpha Spectroscopy

PAI 714 Rev 8
Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0405169
Client Name: New Horizons
Client Project ID: CSMRI 2135

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 7
Prep Batch: AS040610-4
QC Batch ID: AS040610-4-1
Run ID: AS040610-4A
Count Time: 1000 minutes
Report Basis: Dry Weight
Final Aliquot: 0.0406 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: T516913

<table>
<thead>
<tr>
<th>CASNO</th>
<th>Target Nuclide</th>
<th>Result +/- 2 s TPU</th>
<th>MDC</th>
<th>Lab Qualifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>14274-82-9</td>
<td>Th-228</td>
<td>3.7 +/- 1.5</td>
<td>2.0</td>
<td>M3</td>
</tr>
<tr>
<td>14269-63-7</td>
<td>Th-230</td>
<td>146 +/- 23</td>
<td>2</td>
<td>M3</td>
</tr>
<tr>
<td>7440-29-1</td>
<td>Th-232</td>
<td>0.99 +/- 0.52</td>
<td>0.54</td>
<td>M3</td>
</tr>
</tbody>
</table>

Chemical Yield Summary

<table>
<thead>
<tr>
<th>Carrier/Tracer</th>
<th>Amount Added</th>
<th>Result</th>
<th>Units</th>
<th>Yield</th>
<th>Control Limits</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Th-229</td>
<td>113.8</td>
<td>86</td>
<td>pCi/g</td>
<td>75.5</td>
<td>30 - 110 %</td>
<td></td>
</tr>
</tbody>
</table>

Comments:

Qualifier/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.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M6 - 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

Data Package ID: TH0405169-1

Date Printed: Thursday, June 24, 2004
Paragon Analytics
LIMS Version: 5.03SA
# Isotopic Thorium By Alpha Spectroscopy

**PAI 714 Rev 8**

**Sample Duplicate Results**

<table>
<thead>
<tr>
<th>Field ID: SDA064</th>
<th>Lab ID: 0405169-13DUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Matrix: SOIL</td>
<td>Prep SOP: PAI 777 Rev 7</td>
</tr>
<tr>
<td>Date Collected: 13-May-04</td>
<td>Prep Batch: AS040810-4</td>
</tr>
<tr>
<td>Date Prepared: 10-Jun-04</td>
<td>QCBatchID: AS040810-4-1</td>
</tr>
<tr>
<td>Date Analyzed: 17-Jun-04</td>
<td>Run ID: AS040810-4A</td>
</tr>
<tr>
<td>Report Basis: Dry Weight</td>
<td>Count Time: 1000 minutes</td>
</tr>
<tr>
<td>Final Aliquot: 0.0406 g</td>
<td>Result Units: pCi/g</td>
</tr>
<tr>
<td>Prep Basis: Dry Weight</td>
<td>File Name: T516913D</td>
</tr>
</tbody>
</table>

## CASNO and Target Nuclide

<table>
<thead>
<tr>
<th>CASNO</th>
<th>Target Nuclide</th>
<th>Result +/- 2 s TPU</th>
<th>MDC</th>
<th>Lab Qualifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>14274-82-9</td>
<td>Th-228</td>
<td>3.4 +/- 1.2</td>
<td>1.4</td>
<td>M3</td>
</tr>
<tr>
<td>14269-63-7</td>
<td>Th-230</td>
<td>137 +/- 21</td>
<td>2</td>
<td>M3</td>
</tr>
<tr>
<td>7440-29-1</td>
<td>Th-232</td>
<td>1.20 +/- 0.51</td>
<td>0.33</td>
<td>M3</td>
</tr>
</tbody>
</table>

## Chemical Yield Summary

<table>
<thead>
<tr>
<th>Carrier/Tracer</th>
<th>Amount Added</th>
<th>Result</th>
<th>Units</th>
<th>Yield</th>
<th>Control Limits</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Th-229</td>
<td>113.8</td>
<td>90</td>
<td>pCi/g</td>
<td>79.3</td>
<td>30 - 110 %</td>
<td></td>
</tr>
</tbody>
</table>

## Comments:

**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.
- **LT** - Result is less than Requested MDC, greater than sample specific MDC.
- **M** - The requested MDC was not met.
- **MS** - The requested MDC was not met, but the reported 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

**Abbreviations:**
- **TPU** - Total Propagated Uncertainty (see PAI SOP 743)
- **MDC** - Minimum Detectable Concentration (see PAI SOP 709)
- **SDL** - Below Detection Limit

**Data Package ID:** TH0405169-1

---

**Date Printed:** Thursday, June 24, 2004

**Paragon Analytics**

**LIMS Version:** 5.036A