



Paragon Analytics

Radiochemistry Case Narrative

Isotopic Uranium

New Horizons

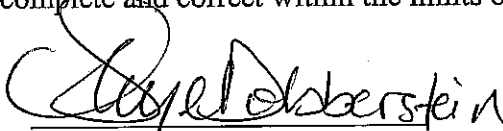
CSMRI / 2135

PA WO 0404284

1. This report consists of the analytical results for three soil samples received by Paragon on 04/28/04.
2. These samples were prepared according to Paragon Analytics procedures PA SOP773R8, PA SOP778R9, and PA SOP721R10.
3. The samples were analyzed for the presence of isotopic uranium according to Paragon Analytics procedure PA SOP714R8. The analyses were completed on 06/02/04.
4. The isotopic analysis results for these samples are reported on a dry weight basis in units of pCi/gram.
5. Samples Area 1 Bottom and H-10-2 (PA ID 0404284-1 and -3) were prepared in batch AS040523-2 at a reduced aliquot of 1.0 grams and further reduced replicate aliquots of 0.5 grams and 0.1 grams respectively, due to elevated activity detected in the prescreen results. Only the replicate samples were counted, and adequate spectral quality was obtained, producing accurate quantification of the results. The results of the replicate samples are submitted in this report. Due to the reduced aliquots used to prepare these samples, the requested MDC of 0.1 pCi/g was not met for the samples or their duplicates. In all cases, the reported activity exceeds the achieved MDC value, and the samples are identified with "M3" flags on the final reports.
6. This analytical method quantifies U-235 alpha activity in a specific region of interest corresponding to emission energies between those of U-234 and U-238. A potential limitation of this method is that measurable amounts of U-234 in the sample may cause a small amount of characteristic activity in the U-235 region of interest due to poorly resolved alpha activity at the boundary between the two regions. To minimize the potential for a high bias in the U-235 analytical results, the U-235 region of interest has been narrowed and limited to a lower energy region. An 85.1% abundance correction has been made to the final U-235 results.

7. 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.
8. U-235 activity is reported in method blank AS040523-1MB above the minimum detectable concentration value. U-234 activity is reported in method blank AS040523-2MB above the MDC. The measured blank activities are below the requested MDC (0.1 pCi/g). Results are acceptable according to PA SOP 715, and are submitted without further qualification.
9. No further anomalous situations were encountered during the preparation or analysis of these samples. All remaining quality control criteria were met.

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



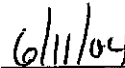
Skye Dobberstein
Radiochemistry Instrumentation



Date



Radiochemistry Final Data Review



Date

Isotopic Uranium By Alpha Spectroscopy

PAI 714 Rev 8

Method Blank Results

Lab Name: Paragon Analytics

Work Order Number: 0404284

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Lab ID: AS040523-1MB

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 9
Date Collected: 23-May-04
Date Prepared: 23-May-04
Date Analyzed: 27-May-04

Prep Batch: AS040523-1
QCBatchID: AS040523-1-1
Run ID: AS040523-1A
Count Time: 300 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: U5231B

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13966-29-5	U-234	0.004 +/- 0.010	0.018	U
15117-96-1	U-235	0.014 +/- 0.014	0.009	B3
7440-61-1	U-238	0.003 +/- 0.010	0.021	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.273	3.49	pCi/g	81.8	30 - 110 %	

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 709)
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: U0404284-1

Isotopic Uranium By Alpha Spectroscopy

PAI 714 Rev 8

Method Blank Results

Lab Name: Paragon Analytics

Work Order Number: 0404284

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Lab ID: AS040523-2MB

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 9
Date Collected: 23-May-04
Date Prepared: 23-May-04
Date Analyzed: 29-May-04

Prep Batch: AS040523-2
QCBatchID: AS040523-2-1
Run ID: AS040523-2A
Count Time: 300 minutes

Final Aliquot: 1.00 g
Result Units: pCi/g
File Name: U5232B

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13966-29-5	U-234	0.062 +/- 0.046	0.059	B3
15117-96-1	U-235	-0.007 +/- 0.027	0.053	U
7440-61-1	U-238	0.016 +/- 0.030	0.062	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	8.540	6.9	pCi/g	80.3	30 - 110 %	

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 709)
- 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: U0404284-1

Isotopic Uranium By Alpha Spectroscopy

PAI 714 Rev 8

Laboratory Control Sample(s)

Lab Name: Paragon Analytics

Work Order Number: 0404284

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Lab ID: AS040523-1LCS

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 9
Date Collected: 23-May-04
Date Prepared: 23-May-04
Date Analyzed: 27-May-04

Prep Batch: AS040523-1
QCBatchID: AS040523-1-1
Run ID: AS040523-1A
Count Time: 300 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: U5231L

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13966-29-5	U-234	4.58 +/- 0.75	0.02	4.34	106	82 - 122	P
7440-61-1	U-238	4.75 +/- 0.78	0.03	4.50	105	82 - 122	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.273	3.17	pCi/g	74.3	30 - 110 %	

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 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)

Data Package ID: U0404284-1

Isotopic Uranium By Alpha Spectroscopy

PAI 714 Rev 8

Laboratory Control Sample(s)

Lab Name: Paragon Analytics

Work Order Number: 0404284

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Lab ID: AS040523-2LCS

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 9
Date Collected: 23-May-04
Date Prepared: 23-May-04
Date Analyzed: 29-May-04

Prep Batch: AS040523-2
QCBatchID: AS040523-2-1
Run ID: AS040523-2A
Count Time: 300 minutes

Final Aliquot: 1.00 g
Result Units: pCi/g
File Name: U5232L

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13966-29-5	U-234	8.5 +/- 1.4	0	8.68	97.9	82 - 122	P
7440-61-1	U-238	8.8 +/- 1.4	0.1	9.01	97.4	82 - 122	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	8.540	6.9	pCi/g	80.9	30 - 110 %	

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 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)

Data Package ID: U0404284-1

Isotopic Uranium By Alpha Spectroscopy

PAI 714 Rev 8

Duplicate Sample Results (DER)

Lab Name: Paragon Analytics

Work Order Number: 0404284

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: Area 1 Bottom Lab ID: 0404284-1DUPrep2	Sample Matrix: SOIL Prep SOP: PAI 778 Rev 9 Date Collected: 27-Apr-04 Date Prepared: 23-May-04 Date Analyzed: 29-May-04	Prep Batch: AS040523-2 QCBatchID: AS040523-2-1 Run ID: AS040523-2A Count Time: 300 minutes Report Basis: Dry Weight	Final Aliquot: 0.582 g Prep Basis: Dry Weight Moisture(%): NA Result Units: pCi/g File Name: UR5232D2
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CASNO	Analyte	Sample Result +/- 2s TPU	Duplicate Result +/- 2s TPU	DER	Control Limit	Lab Qualifiers
13966-29-5	U-234	4.85 +/- 0.90	4.59 +/- 0.85	0.20	2.13	M3
15117-96-1	U-235	0.29 +/- 0.14	0.126 +/- 0.089	0.97	2.13	M3
7440-61-1	U-238	4.49 +/- 0.84	4.40 +/- 0.82	0.08	2.13	

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

Data Package ID: U0404284-1

Isotopic Uranium By Alpha Spectroscopy

PAI 714 Rev 8

Duplicate Sample Results (DER)

Lab Name: Paragon Analytics

Work Order Number: 0404284

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: H-10-2	Sample Matrix: SOIL	Prep Batch: AS040523-2	Final Aliquot: 0.118 g
Lab ID: 0404284-3DUPrep2	Prep SOP: PAI 778 Rev 9	QCBatchID: AS040523-2-1	Prep Basis: Dry Weight
	Date Collected: 26-Apr-04	Run ID: AS040523-2A	Moisture(%): NA
	Date Prepared: 23-May-04	Count Time: 300 minutes	Result Units: pCi/g
	Date Analyzed: 29-May-04	Report Basis: Dry Weight	File Name: U5232D3

CASNO	Analyte	Sample Result +/- 2s TPU	Duplicate Result +/- 2s TPU	DER	Control Limit	Lab Qualifiers
13966-29-5	U-234	36.2 +/- 6.1	33.2 +/- 5.8	0.36	2.13	M3
15117-96-1	U-235	0.98 +/- 0.46	1.33 +/- 0.61	0.45	2.13	M3
7440-61-1	U-238	30.7 +/- 5.3	28.2 +/- 5.0	0.34	2.13	M3

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

Data Package ID: U0404284-1

Isotopic Uranium By Alpha Spectroscopy

PAI 714 Rev 8

Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404284

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: Area I Bottom
Lab ID: 0404284-1REP2

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 9
Date Collected: 27-Apr-04
Date Prepared: 23-May-04
Date Analyzed: 02-Jun-04

Prep Batch: AS040523-2
QCBatchID: AS040523-2-1
Run ID: AS040523-2A
Count Time: 300 minutes
Report Basis: Dry Weight

Final Aliquot: 0.507 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: UR5232R2

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13966-29-5	U-234	4.85 +/- 0.90	0.19	M3
15117-96-1	U-235	0.29 +/- 0.14	0.10	M3
7440-61-1	U-238	4.49 +/- 0.84	0.12	M3

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	16.83	14.2	pCi/g	84.3	30 - 110 %	

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 709)
- BDL - Below Detection Limit

Data Package ID: U0404284-1

Isotopic Uranium By Alpha Spectroscopy

PAI 714 Rev 8

Sample Duplicate Results

Lab Name: Paragon Analytics

Work Order Number: 0404284

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: Area 1 Bottom
Lab ID: 0404284-1DUPrep2

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 9
Date Collected: 27-Apr-04
Date Prepared: 23-May-04
Date Analyzed: 29-May-04

Prep Batch: AS040523-2
QCBatchID: AS040523-2-1
Run ID: AS040523-2A
Count Time: 300 minutes
Report Basis: Dry Weight

Final Aliquot: 0.582 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: UR5232D2

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13966-29-5	U-234	4.59 +/- 0.85	0.15	M3
15117-96-1	U-235	0.126 +/- 0.089	0.100	M3
7440-61-1	U-238	4.40 +/- 0.82	0.10	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	14.68	11.6	pCi/g	78.9	30 - 110 %	

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.
- 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

Abbreviations:

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

Data Package ID: U0404284-1

Isotopic Uranium By Alpha Spectroscopy

PAI 714 Rev 8

Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404284

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: Area K Bottom

Lab ID: 0404284-2

Sample Matrix: SOIL

Prep SOP: PAI 778 Rev 9

Date Collected: 28-Apr-04

Date Prepared: 23-May-04

Date Analyzed: 27-May-04

Prep Batch: AS040523-1

QC Batch ID: AS040523-1-1

Run ID: AS040523-1A

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: U42842

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13966-29-5	U-234	10.2 +/- 1.6	0	
15117-96-1	U-235	0.57 +/- 0.13	0.03	
7440-61-1	U-238	10.6 +/- 1.7	0	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.179	3.24	pCi/g	77.4	30 - 110 %	

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 709)

BDL - Below Detection Limit

Data Package ID: U0404284-1

Isotopic Uranium By Alpha Spectroscopy

PAI 714 Rev 8

Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404284

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: H-10-2
Lab ID: 0404284-3REP2

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 9
Date Collected: 26-Apr-04
Date Prepared: 23-May-04
Date Analyzed: 29-May-04

Prep Batch: AS040523-2
QCBatchID: AS040523-2-1
Run ID: AS040523-2A
Count Time: 300 minutes
Report Basis: Dry Weight

Final Aliquot: 0.154 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: U5232R2

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13966-29-5	U-234	36.2 +/- 6.1	0.3	M3
15117-96-1	U-235	0.98 +/- 0.46	0.25	M3
7440-61-1	U-238	30.7 +/- 5.3	0.1	M3

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	55.31	45.9	pCi/g	83.1	30 - 110 %	

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 709)

BDL - Below Detection Limit

Data Package ID: U0404284-1

Isotopic Uranium By Alpha Spectroscopy

PAI 714 Rev 8

Sample Duplicate Results

Lab Name: Paragon Analytics

Work Order Number: 0404284

Client Name: New Horizons

ClientProject ID: CSMRI 2135

Field ID: H-10-2
Lab ID: 0404284-3DUPrep2

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 9
Date Collected: 26-Apr-04
Date Prepared: 23-May-04
Date Analyzed: 29-May-04

Prep Batch: AS040523-2
QCBatchID: AS040523-2-1
Run ID: AS040523-2A
Count Time: 300 minutes
Report Basis: Dry Weight

Final Aliquot: 0.118 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: U5232D3

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
13966-29-5	U-234	33.2 +/- 5.8	0.4	M3
15117-96-1	U-235	1.33 +/- 0.61	0.17	M3
7440-61-1	U-238	28.2 +/- 5.0	0.3	M3

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	72.44	58.9	pCi/g	81.3	30 - 110 %	

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.
- 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

Abbreviations:

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

Data Package ID: U0404284-1