Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

February 10, 2017

Smita Sumbaly
Weston Solutions, Inc
1090 King Georges Post Road
Edison, NJ 08837

RE: Project: Case#: 416
Pace Project No.: 30204854

Dear Smita Sumbaly:
Enclosed are the analytical results for sample(s) received by the laboratory on December 08, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carin Ferris
carin.ferris@pacelabs.com
Project Manager

Enclosures

PRELIMINARY

Pace Analytical Services, LLC
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CERTIFICATIONS

Project: Case#: 416
Pace Project No.: 30204854

Pennsylvania Certification IDs
1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
L-A-B DOD-ELAP Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH-0694
Delaware Certification
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: 90133
Louisiana DHH/TNI Certification #: LA140008
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: PA00091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nebraska Certification #: NE-05-29-14
Nevada Certification #: PA014572015-1
New Hampshire/TNI Certification #: 2976
New Jersey/TNI Certification #: PA 051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Oregon/TNI Certification #: PA200002
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: TN2867
Texas/TNI Certification #: T104704188-14-8
Utah/TNI Certification #: PA014572015-5
USDA Soil Permit #: P330-14-00213
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Certification
Wyoming Certification #: 8TMS-L

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SAMPLE SUMMARY

Project: Case#: 416
Pace Project No.: 30204854

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30204854001	UMR001-S001-0006-01	Solid	11/18/16 09:58	12/08/16 10:20
30204854002	UMR001-S001-0612-01	Solid	11/18/16 09:55	12/08/16 10:20
30204854003	UMR001-S001-0612-01	Solid	11/18/16 09:55	12/08/16 10:20
30204854004	UMR001-S001-0612-02	Solid	11/18/16 09:55	12/08/16 10:20
30204854005	UMR001-S001-1218-01	Solid	11/18/16 09:50	12/08/16 10:20
30204854006	UMR001-S001-1824-01	Solid	11/18/16 09:45	12/08/16 10:20
30204854007	UMR001-S002-0006-01	Solid	11/18/16 10:40	12/08/16 10:20
30204854008	UMR001-S002-0612-01	Solid	11/18/16 10:38	12/08/16 10:20
30204854009	UMR001-S002-1218-01	Solid	11/18/16 10:35	12/08/16 10:20
30204854010	UMR001-S002-1824-01	Solid	11/18/16 10:30	12/08/16 10:20
30204854011	UMR001-S003-0006-01	Solid	11/18/16 11:25	12/08/16 10:20
30204854012	UMR001-S003-0612-01	Solid	11/18/16 11:22	12/08/16 10:20
30204854013	UMR001-S003-1218-01	Solid	11/18/16 11:18	12/08/16 10:20
30204854014	UMR001-S003-1824-01	Solid	11/18/16 11:15	12/08/16 10:20
30204854015	UMR001-S004-0006-01	Solid	11/18/16 12:30	12/08/16 10:20
30204854016	UMR001-S004-0612-01	Solid	11/18/16 12:25	12/08/16 10:20
30204854017	UMR001-S004-1218-01	Solid	11/18/16 12:22	12/08/16 10:20
30204854018	UMR001-S004-1824-01	Solid	11/18/16 12:20	12/08/16 10:20

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SAMPLE ANALYTE COUNT

Project: Case#: 416
Pace Project No.: 30204854

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30204854001	UMR001-S001-0006-01	HSL-300	LAL	6
30204854002	UMR001-S001-0612-01	HSL-300	LAL	6
30204854003	UMR001-S001-0612-01	HSL-300	LAL	3
30204854004	UMR001-S001-0612-02	HSL-300	LAL	3
30204854005	UMR001-S001-1218-01	HSL-300	LAL	6
30204854006	UMR001-S001-1824-01	HSL-300	LAL	6
30204854007	UMR001-S002-0006-01	HSL-300	LAL	6
30204854008	UMR001-S002-0612-01	HSL-300	LAL	6
30204854009	UMR001-S002-1218-01	HSL-300	LAL	6
30204854010	UMR001-S002-1824-01	HSL-300	LAL	6
30204854011	UMR001-S003-0006-01	HSL-300	LAL	6
30204854012	UMR001-S003-0612-01	HSL-300	LAL	6
30204854013	UMR001-S003-1218-01	HSL-300	LAL	6
30204854014	UMR001-S003-1824-01	HSL-300	LAL	6
30204854015	UMR001-S004-0006-01	HSL-300	LAL	6
30204854016	UMR001-S004-0612-01	HSL-300	LAL	6
30204854017	UMR001-S004-1218-01	HSL-300	LAL	6
30204854018	UMR001-S004-1824-01	HSL-300	LAL	6

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PROJECT NARRATIVE

Project: Case#: 416
Pace Project No.: 30204854

Method: **HSL-300**
Description: HSL300(AS) Actinides
Client: Weston Solutions, Inc. (NJ)
Date: February 10, 2017

General Information:
18 samples were analyzed for HSL-300. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 248114

1c: The alpha spectroscopy spectrum for this analyte extended outside of the established region of interest for analysis. Results may be considered biased low. The high activity of the sample contributed to the spectral resolution issue. The spectrum did not overlap with any other identified regions.

- UMR001-S004-0006-01 (Lab ID: 30204854015)
  - Thorium-228
  - Thorium-230
  - Thorium-232
- UMR001-S004-0612-01 (Lab ID: 30204854016)
  - Thorium-228
  - Thorium-230
  - Thorium-232
- UMR001-S004-1218-01 (Lab ID: 30204854017)
  - Thorium-228
  - Thorium-230
  - Thorium-232
- UMR001-S004-1824-01 (Lab ID: 30204854018)
  - Thorium-228
  - Thorium-230
  - Thorium-232

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- BLANK (Lab ID: 1220308)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234

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PROJECT NARRATIVE

Project: Case#: 416
Pace Project No.: 30204854

Method: **HSL-300**
Description: HSL300(AS) Actinides
Client: Weston Solutions, Inc. (NJ)
Date: February 10, 2017

Analyte Comments:

QC Batch: 248114

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- BLANK (Lab ID: 1220308)
  - Uranium-238
  - U-235/236
- UMR001-S001-0006-01 (Lab ID: 30204854001)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- UMR001-S001-0612-01 (Lab ID: 30204854002)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- UMR001-S001-0612-01 (Lab ID: 30204854003)
  - Thorium-230
  - U-233/234
  - Uranium-238
- UMR001-S001-0612-02 (Lab ID: 30204854004)
  - Thorium-230
  - U-233/234
  - Uranium-238
- UMR001-S001-1218-01 (Lab ID: 30204854005)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- UMR001-S001-1824-01 (Lab ID: 30204854006)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- UMR001-S002-0006-01 (Lab ID: 30204854007)
  - Thorium-228
  - Thorium-230
  - Thorium-232

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PROJECT NARRATIVE

Project: Case#: 416
Pace Project No.: 30204854

Method: **HSL-300**
Description: HSL300(AS) Actinides
Client: Weston Solutions, Inc. (NJ)
Date: February 10, 2017

Analyte Comments:

QC Batch: 248114

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- UMR001-S002-0006-01 (Lab ID: 30204854007)
  - U-233/234
  - Uranium-238
  - U-235/236
- UMR001-S002-0612-01 (Lab ID: 30204854008)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- UMR001-S002-1218-01 (Lab ID: 30204854009)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- UMR001-S002-1824-01 (Lab ID: 30204854010)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- UMR001-S003-0006-01 (Lab ID: 30204854011)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- UMR001-S003-0612-01 (Lab ID: 30204854012)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- UMR001-S003-1218-01 (Lab ID: 30204854013)
  - Thorium-228
  - Thorium-230
  - Thorium-232

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PROJECT NARRATIVE

Project: Case#: 416
Pace Project No.: 30204854

Method: **HSL-300**
Description: HSL300(AS) Actinides
Client: Weston Solutions, Inc. (NJ)
Date: February 10, 2017

Analyte Comments:

QC Batch: 248114

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- UMR001-S003-1218-01 (Lab ID: 30204854013)
  - U-233/234
  - Uranium-238
  - U-235/236
- UMR001-S003-1824-01 (Lab ID: 30204854014)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- UMR001-S004-0006-01 (Lab ID: 30204854015)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- UMR001-S004-0612-01 (Lab ID: 30204854016)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- UMR001-S004-1218-01 (Lab ID: 30204854017)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- UMR001-S004-1824-01 (Lab ID: 30204854018)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Case#: 416
Pace Project No.: 30204854

Sample: UMR001-S002-0006-01 **Lab ID: 30204854007** Collected: 11/18/16 10:40 Received: 12/08/16 10:20 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Thorium-228	HSL-300	**2.45 ± 0.586 (0.203) C:NA T:77%**	pCi/g	02/08/17 11:14	14274-82-9	N2
Thorium-230	HSL-300	**0.910 ± 0.303 (0.227) C:NA T:77%**	pCi/g	02/08/17 11:14	14269-63-7	N2
Thorium-232	HSL-300	**2.33 ± 0.549 (0.109) C:NA T:77%**	pCi/g	02/08/17 11:14	7440-29-1	N2
U-233/234	HSL-300	**0.917 ± 0.275 (0.202) C:NA T:100%**	pCi/g	02/07/17 15:12		N2
U-235/236	HSL-300	**0.061 ± 0.075 (0.123) C:NA T:100%**	pCi/g	02/07/17 15:12		N2
Uranium-238	HSL-300	**0.943 ± 0.271 (0.117) C:NA T:100%**	pCi/g	02/07/17 15:12		N2

Sample: UMR001-S002-0612-01 **Lab ID: 30204854008** Collected: 11/18/16 10:38 Received: 12/08/16 10:20 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Thorium-228	HSL-300	**1.22 ± 0.396 (0.324) C:NA T:76%**	pCi/g	02/08/17 11:14	14274-82-9	N2
Thorium-230	HSL-300	**1.84 ± 0.484 (0.170) C:NA T:76%**	pCi/g	02/08/17 11:14	14269-63-7	N2
Thorium-232	HSL-300	**0.818 ± 0.287 (0.122) C:NA T:76%**	pCi/g	02/08/17 11:14	7440-29-1	N2
U-233/234	HSL-300	**1.77 ± 0.437 (0.152) C:NA T:93%**	pCi/g	02/07/17 15:12		N2
U-235/236	HSL-300	**0.153 ± 0.125 (0.158) C:NA T:93%**	pCi/g	02/07/17 15:12		N2
Uranium-238	HSL-300	**1.72 ± 0.429 (0.152) C:NA T:93%**	pCi/g	02/07/17 15:12		N2

Sample: UMR001-S002-1218-01 **Lab ID: 30204854009** Collected: 11/18/16 10:35 Received: 12/08/16 10:20 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Thorium-228	HSL-300	**1.82 ± 0.481 (0.276) C:NA T:87%**	pCi/g	02/08/17 11:14	14274-82-9	N2
Thorium-230	HSL-300	**1.46 ± 0.398 (0.179) C:NA T:87%**	pCi/g	02/08/17 11:14	14269-63-7	N2
Thorium-232	HSL-300	**2.17 ± 0.520 (0.107) C:NA T:87%**	pCi/g	02/08/17 11:14	7440-29-1	N2
U-233/234	HSL-300	**1.50 ± 0.380 (0.157) C:NA T:103%**	pCi/g	02/07/17 15:12		N2
U-235/236	HSL-300	**0.142 ± 0.107 (0.054) C:NA T:103%**	pCi/g	02/07/17 15:12		N2
Uranium-238	HSL-300	**1.33 ± 0.348 (0.102) C:NA T:103%**	pCi/g	02/07/17 15:12		N2

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Case#: 416
Pace Project No.: 30204854

Sample: UMR001-S002-1824-01 **Lab ID: 30204854010** Collected: 11/18/16 10:30 Received: 12/08/16 10:20 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Thorium-228	HSL-300	**1.38 ± 0.405 (0.256) C:NA T:80%**	pCi/g	02/09/17 05:21	14274-82-9	N2
Thorium-230	HSL-300	**1.27 ± 0.366 (0.162) C:NA T:80%**	pCi/g	02/09/17 05:21	14269-63-7	N2
Thorium-232	HSL-300	**1.55 ± 0.413 (0.050) C:NA T:80%**	pCi/g	02/09/17 05:21	7440-29-1	N2
U-233/234	HSL-300	**0.953 ± 0.263 (0.145) C:NA T:104%**	pCi/g	02/07/17 15:12		N2
U-235/236	HSL-300	**0.062 ± 0.065 (0.082) C:NA T:104%**	pCi/g	02/07/17 15:12		N2
Uranium-238	HSL-300	**1.41 ± 0.337 (0.075) C:NA T:104%**	pCi/g	02/07/17 15:12		N2

Sample: UMR001-S003-0006-01 **Lab ID: 30204854011** Collected: 11/18/16 11:25 Received: 12/08/16 10:20 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Thorium-228	HSL-300	**7.56 ± 1.43 (0.269) C:NA T:79%**	pCi/g	02/09/17 05:21	14274-82-9	N2
Thorium-230	HSL-300	**6.87 ± 1.30 (0.144) C:NA T:79%**	pCi/g	02/09/17 05:21	14269-63-7	N2
Thorium-232	HSL-300	**6.89 ± 1.30 (0.092) C:NA T:79%**	pCi/g	02/09/17 05:21	7440-29-1	N2
U-233/234	HSL-300	**6.02 ± 1.24 (0.314) C:NA T:73%**	pCi/g	02/07/17 15:12		N2
U-235/236	HSL-300	**0.437 ± 0.240 (0.085) C:NA T:73%**	pCi/g	02/07/17 15:12		N2
Uranium-238	HSL-300	**5.87 ± 1.21 (0.142) C:NA T:73%**	pCi/g	02/07/17 15:12		N2

Sample: UMR001-S003-0612-01 **Lab ID: 30204854012** Collected: 11/18/16 11:22 Received: 12/08/16 10:20 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Thorium-228	HSL-300	**5.96 ± 1.17 (0.265) C:NA T:77%**	pCi/g	02/09/17 05:21	14274-82-9	N2
Thorium-230	HSL-300	**1.18 ± 0.347 (0.132) C:NA T:77%**	pCi/g	02/09/17 05:21	14269-63-7	N2
Thorium-232	HSL-300	**5.16 ± 1.02 (0.093) C:NA T:77%**	pCi/g	02/09/17 05:21	7440-29-1	N2
U-233/234	HSL-300	**1.16 ± 0.322 (0.159) C:NA T:99%**	pCi/g	02/08/17 07:08		N2
U-235/236	HSL-300	**0.041 ± 0.073 (0.055) C:NA T:99%**	pCi/g	02/08/17 07:08		N2
Uranium-238	HSL-300	**1.35 ± 0.354 (0.103) C:NA T:99%**	pCi/g	02/08/17 07:08		N2

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Case#: 416
Pace Project No.: 30204854

Sample: UMR001-S003-1218-01 **Lab ID: 30204854013** Collected: 11/18/16 11:18 Received: 12/08/16 10:20 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Thorium-228	HSL-300	**1.81 ± 0.472 (0.250) C:NA T:82%**	pCi/g	02/09/17 05:21	14274-82-9	N2
Thorium-230	HSL-300	**0.903 ± 0.289 (0.145) C:NA T:82%**	pCi/g	02/09/17 05:21	14269-63-7	N2
Thorium-232	HSL-300	**1.66 ± 0.426 (0.047) C:NA T:82%**	pCi/g	02/09/17 05:21	7440-29-1	N2
U-233/234	HSL-300	**0.903 ± 0.264 (0.158) C:NA T:93%**	pCi/g	02/08/17 07:08		N2
U-235/236	HSL-300	**0.121 ± 0.095 (0.089) C:NA T:93%**	pCi/g	02/08/17 07:08		N2
Uranium-238	HSL-300	**0.994 ± 0.275 (0.081) C:NA T:93%**	pCi/g	02/08/17 07:08		N2

Sample: UMR001-S003-1824-01 **Lab ID: 30204854014** Collected: 11/18/16 11:15 Received: 12/08/16 10:20 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Thorium-228	HSL-300	**2.20 ± 0.537 (0.242) C:NA T:80%**	pCi/g	02/09/17 05:21	14274-82-9	N2
Thorium-230	HSL-300	**1.01 ± 0.317 (0.239) C:NA T:80%**	pCi/g	02/09/17 05:21	14269-63-7	N2
Thorium-232	HSL-300	**1.66 ± 0.423 (0.086) C:NA T:80%**	pCi/g	02/09/17 05:21	7440-29-1	N2
U-233/234	HSL-300	**0.616 ± 0.233 (0.214) C:NA T:102%**	pCi/g	02/08/17 07:08		N2
U-235/236	HSL-300	**0.042 ± 0.076 (0.057) C:NA T:102%**	pCi/g	02/08/17 07:08		N2
Uranium-238	HSL-300	**0.885 ± 0.274 (0.096) C:NA T:102%**	pCi/g	02/08/17 07:08		N2

Sample: UMR001-S004-0006-01 **Lab ID: 30204854015** Collected: 11/18/16 12:30 Received: 12/08/16 10:20 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Thorium-228	HSL-300	**67.4 ± 11.3 (0.353) C:NA T:107%**	pCi/g	02/09/17 05:21	14274-82-9	1c,N2
Thorium-230	HSL-300	**10.6 ± 2.18 (0.301) C:NA T:107%**	pCi/g	02/09/17 05:21	14269-63-7	1c,N2
Thorium-232	HSL-300	**56.5 ± 9.53 (0.128) C:NA T:107%**	pCi/g	02/09/17 05:21	7440-29-1	1c,N2
U-233/234	HSL-300	**16.0 ± 2.70 (0.171) C:NA T:87%**	pCi/g	02/08/17 15:22		N2
U-235/236	HSL-300	**1.21 ± 0.370 (0.108) C:NA T:87%**	pCi/g	02/08/17 15:22		N2
Uranium-238	HSL-300	**15.6 ± 2.63 (0.111) C:NA T:87%**	pCi/g	02/08/17 15:22		N2

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Case#: 416
Pace Project No.: 30204854

Sample: UMR001-S004-0612-01 **Lab ID: 30204854016** Collected: 11/18/16 12:25 Received: 12/08/16 10:20 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Thorium-228	HSL-300	**54.5 ± 9.26 (0.491) C:NA T:105%**	pCi/g	02/09/17 05:21	14274-82-9	1c,N2
Thorium-230	HSL-300	**7.19 ± 1.63 (0.260) C:NA T:105%**	pCi/g	02/09/17 05:21	14269-63-7	1c,N2
Thorium-232	HSL-300	**45.9 ± 7.85 (0.189) C:NA T:105%**	pCi/g	02/09/17 05:21	7440-29-1	1c,N2
U-233/234	HSL-300	**12.6 ± 2.65 (0.347) C:NA T:38%**	pCi/g	02/08/17 15:22		N2
U-235/236	HSL-300	**0.878 ± 0.441 (0.247) C:NA T:38%**	pCi/g	02/08/17 15:22		N2
Uranium-238	HSL-300	**10.5 ± 2.27 (0.275) C:NA T:38%**	pCi/g	02/08/17 15:22		N2

Sample: UMR001-S004-1218-01 **Lab ID: 30204854017** Collected: 11/18/16 12:22 Received: 12/08/16 10:20 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Thorium-228	HSL-300	**26.5 ± 5.01 (0.473) C:NA T:79%**	pCi/g	02/09/17 05:21	14274-82-9	1c,N2
Thorium-230	HSL-300	**4.68 ± 1.33 (0.511) C:NA T:79%**	pCi/g	02/09/17 05:21	14269-63-7	1c,N2
Thorium-232	HSL-300	**23.8 ± 4.51 (0.290) C:NA T:79%**	pCi/g	02/09/17 05:21	7440-29-1	1c,N2
U-233/234	HSL-300	**4.50 ± 0.846 (0.132) C:NA T:99%**	pCi/g	02/08/17 15:22		N2
U-235/236	HSL-300	**0.197 ± 0.127 (0.136) C:NA T:99%**	pCi/g	02/08/17 15:22		N2
Uranium-238	HSL-300	**4.17 ± 0.794 (0.140) C:NA T:99%**	pCi/g	02/08/17 15:22		N2

Sample: UMR001-S004-1824-01 **Lab ID: 30204854018** Collected: 11/18/16 12:20 Received: 12/08/16 10:20 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Thorium-228	HSL-300	**74.7 ± 12.5 (0.479) C:NA T:113%**	pCi/g	02/09/17 05:21	14274-82-9	1c,N2
Thorium-230	HSL-300	**12.2 ± 2.46 (0.280) C:NA T:113%**	pCi/g	02/09/17 05:21	14269-63-7	1c,N2
Thorium-232	HSL-300	**59.1 ± 9.97 (0.219) C:NA T:113%**	pCi/g	02/09/17 05:21	7440-29-1	1c,N2
U-233/234	HSL-300	**23.5 ± 3.88 (0.155) C:NA T:85%**	pCi/g	02/08/17 15:22		N2
U-235/236	HSL-300	**1.68 ± 0.459 (0.060) C:NA T:85%**	pCi/g	02/08/17 15:22		N2
Uranium-238	HSL-300	**24.2 ± 3.98 (0.084) C:NA T:85%**	pCi/g	02/08/17 15:22		N2

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QUALITY CONTROL - RADIOCHEMISTRY

Project: Case#: 416
Pace Project No.: 30204854

QC Batch: 248114 Analysis Method: HSL-300
QC Batch Method: HSL-300 Analysis Description: HSL300(AS) Actinides
Associated Lab Samples: 30204854001, 30204854002, 30204854003, 30204854004, 30204854005, 30204854006, 30204854007, 30204854008, 30204854009, 30204854010, 30204854011, 30204854012, 30204854013

METHOD BLANK: 1220308 Matrix: Solid
Associated Lab Samples: 30204854001, 30204854002, 30204854003, 30204854004, 30204854005, 30204854006, 30204854007, 30204854008, 30204854009, 30204854010, 30204854011, 30204854012, 30204854013, 30204854014, 30204854015, 30204854016, 30204854017, 30204854018

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Thorium-228	0.078 ± 0.100 (0.196) C:NA T:87%	pCi/g	02/08/17 11:14	N2
Thorium-230	-0.010 ± 0.055 (0.135) C:NA T:87%	pCi/g	02/08/17 11:14	N2
Thorium-232	0.000 ± 0.055 (0.042) C:NA T:87%	pCi/g	02/08/17 11:14	N2
U-233/234	0.070 ± 0.076 (0.135) C:NA T:103%	pCi/g	02/07/17 15:12	N2
U-235/236	-0.004 ± 0.061 (0.085) C:NA T:103%	pCi/g	02/07/17 15:12	N2
Uranium-238	0.043 ± 0.053 (0.087) C:NA T:103%	pCi/g	02/07/17 15:12	N2

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Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALIFIERS

Project: Case#: 416
Pace Project No.: 30204854

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

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ANALYTE QUALIFIERS

1c	The alpha spectroscopy spectrum for this analyte extended outside of the established region of interest for analysis. Results may be considered biased low. The high activity of the sample contributed to the spectral resolution issue. The spectrum did not overlap with any other identified regions.
N2	The lab does not hold NELAC/TNI accreditation for this parameter.

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