

January 4, 2018

Ms. Linda Gersey
U.S. Nuclear Regulatory Commission
Region IV
1600 Lamar Boulevard
Arlington, TX 76011-4511

**SUBJECT: ORISE CONTRACT NO. DE-SC0014664
LETTER REPORT FOR ANALYTICAL RESULTS FOR 31 SOIL SAMPLES
ASSOCIATED WITH THE URANIUM ONE – IRIGARAY MINE UNITS 1-9 IN
JOHNSON COUNTY, WYOMING
DOCKET NO. 04008502; DCN: 5317-LR-02-0; SDG: 13965-2**

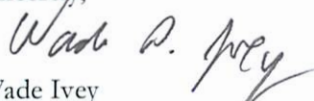
Dear Ms. Gersey:

The Oak Ridge Institute for Science and Education (ORISE) is pleased to provide the enclosed data package for 31 soil samples received on November 20, 2017 associated with the Uranium One – Irigaray Mine Units 1-9 in Johnson County, Wyoming. All samples were analyzed for Ra-226, U-235, and U-238 by gamma spectrometry. The samples were sealed for approximately 30 days to allow the ingrowth of the progeny of Ra-226. The gamma ray of Pb-214 was used to quantify the Ra-226, and the gamma ray of Th-234 was used to quantify the U-238. The analytical data, along with the procedure references, are presented in the attached reports.

Quality Control (QC) requirements were met for this analysis and are available for your review upon request.

Please feel free to contact me at 865.576.9184 or Forrest Smith at 865.574.9802 with any questions or comments.

Sincerely,


Wade Ivey
Laboratory Team Lead
ORAU

WPI:lw

Enclosures

| | | |
|--------------------------|-----------------|--------------------|
| Electronic distribution: | T. Carter, NRC | S. Roberts, ORAU |
| | E. Bailey, ORAU | D. Hagemeyer, ORAU |
| | File code: 5317 | Lab code: 13965 |

| Distribution approval and concurrence: | Initials |
|--|----------|
| Technical Review | ENB |
| Quality Review | JB |

Gamma Spectrometry Summary Results By Analyte



Report Date: December 27, 2017

| | | | |
|-----------------|------------------|-------------------|--------------|
| Analyte: | Ra-226 by Pb-214 | SOP (Rev. #) | CP1 (21) |
| Project Name: | Uranium One | Energy Signature: | 351.93 (KeV) |
| Project # : | 201213965 | SDG # : | 201213965-2 |

| Client Sample ID: | Lab Sample ID: | Result | TPU (2s) | MDC | Units | Qualifier Flag | Batch # |
|-------------------|----------------|--------|----------|-------|-------|----------------|---------|
| DN73 | 13965S0033 | 3.52 | 0.22 | 0.13 | pCi/g | | GS0631 |
| DO74 | 13965S0034 | 4.18 | 0.30 | 0.25 | pCi/g | | GS0631 |
| BS93 | 13965S0035 | 2.62 | 0.18 | 0.13 | pCi/g | | GS0631 |
| | 13965S0035Dup | 2.55 | 0.15 | 0.08 | pCi/g | | GS0631 |
| DQ76 | 13965S0036 | 8.71 | 0.24 | 0.16 | pCi/g | | GS0631 |
| DJ66 | 13965S0037 | 2.21 | 0.14 | 0.10 | pCi/g | | GS0631 |
| AS112 | 13965S0038 | 1.348 | 0.063 | 0.069 | pCi/g | | GS0631 |
| CB95 | 13965S0039 | 2.49 | 0.16 | 0.11 | pCi/g | | GS0631 |
| CH92 | 13965S0040 | 3.87 | 0.23 | 0.12 | pCi/g | | GS0631 |
| BF106 | 13965S0041 | 3.20 | 0.12 | 0.13 | pCi/g | | GS0631 |
| X103 | 13965S0042 | 2.25 | 0.15 | 0.12 | pCi/g | | GS0631 |
| AW99 | 13965S0043 | 1.72 | 0.12 | 0.10 | pCi/g | | GS0631 |
| CK82 | 13965S0044 | 2.35 | 0.14 | 0.08 | pCi/g | | GS0631 |
| P110 | 13965S0045 | 3.71 | 0.12 | 0.11 | pCi/g | | GS0631 |
| DF66 | 13965S0046 | 4.13 | 0.24 | 0.13 | pCi/g | | GS0631 |
| CF82 | 13965S0047 | 1.59 | 0.11 | 0.10 | pCi/g | | GS0631 |
| AU109 | 13965S0048 | 1.42 | 0.10 | 0.10 | pCi/g | | GS0631 |
| BM99 | 13965S0049 | 2.477 | 0.089 | 0.073 | pCi/g | | GS0631 |
| CE84 | 13965S0050 | 1.81 | 0.12 | 0.10 | pCi/g | | GS0631 |
| K99 | 13965S0051 | 2.31 | 0.15 | 0.10 | pCi/g | | GS0632 |
| | 13965S0051Dup | 2.270 | 0.085 | 0.072 | pCi/g | | GS0632 |
| CM81 | 13965S0052 | 3.17 | 0.21 | 0.13 | pCi/g | | GS0632 |
| BW88 | 13965S0053 | 2.41 | 0.15 | 0.10 | pCi/g | | GS0632 |
| DG67 | 13965S0054 | 2.96 | 0.19 | 0.12 | pCi/g | | GS0632 |
| AU101 | 13965S0055 | 2.351 | 0.085 | 0.077 | pCi/g | | GS0632 |
| AF103 | 13965S0056 | 1.77 | 0.13 | 0.12 | pCi/g | | GS0632 |
| BA107 | 13965S0057 | 2.88 | 0.18 | 0.12 | pCi/g | | GS0632 |
| DD69 | 13965S0058 | 2.26 | 0.15 | 0.10 | pCi/g | | GS0632 |
| AZ105 | 13965S0059 | 2.28 | 0.15 | 0.13 | pCi/g | | GS0632 |
| CY67 | 13965S0060 | 1.683 | 0.071 | 0.079 | pCi/g | | GS0632 |
| BD104 | 13965S0061 | 2.94 | 0.19 | 0.14 | pCi/g | | GS0632 |

Qualifier Flags:

U = Analyte not detected (< MDC)

TPU = Total Propagated Uncertainty
MDC = Minimum Detectable Concentration

Gamma Spectrometry Summary Results By Analyte



Report Date: December 27, 2017

| | | | |
|-----------------|------------------|-------------------|--------------|
| Analyte: | Ra-226 by Pb-214 | SOP (Rev. #) | CP1 (21) |
| Project Name: | Uranium One | Energy Signature: | 351.93 (KeV) |
| Project # : | 201213965 | SDG # : | 201213965-2 |

| Client Sample ID: | Lab Sample ID: | Result | TPU (2s) | MDC | Units | Qualifier Flag | Batch # |
|-------------------|----------------|--------|----------|------|-------|----------------|---------|
| AI105 | 13965S0062 | 1.96 | 0.13 | 0.10 | pCi/g | | GS0632 |
| CO79 | 13965S0063 | 2.61 | 0.15 | 0.07 | pCi/g | | GS0632 |

Electronically Validated By:

John Cox- 12/27/2017 07:35, William Smith - 12/27/2017 07:53

Electronically Approved By:

Wade Ivey 12/27/2017 08:06

Qualifier Flags:

U = Analyte not detected (< MDC)

TPU = Total Propagated Uncertainty

MDC = Minimum Detectable Concentration

Gamma Spectrometry Summary Results By Analyte



Report Date: December 27, 2017

| | | | |
|-----------------|-------------|-------------------|--------------|
| Analyte: | U-235 | SOP (Rev. #) | CP1 (21) |
| Project Name: | Uranium One | Energy Signature: | 143.76 (KeV) |
| Project # : | 201213965 | SDG # : | 201213965-2 |

| Client Sample ID: | Lab Sample ID: | Result | TPU (2s) | MDC | Units | Qualifier Flag | Batch # |
|-------------------|----------------|--------|----------|-------|-------|----------------|---------|
| DN73 | 13965S0033 | 0.28 | 0.15 | 0.35 | pCi/g | U | GS0631 |
| DO74 | 13965S0034 | 0.29 | 0.21 | 0.48 | pCi/g | U | GS0631 |
| BS93 | 13965S0035 | 0.21 | 0.14 | 0.32 | pCi/g | U | GS0631 |
| | 13965S0035Dup | 0.17 | 0.10 | 0.23 | pCi/g | U | GS0631 |
| DQ76 | 13965S0036 | 0.27 | 0.15 | 0.36 | pCi/g | U | GS0631 |
| DJ66 | 13965S0037 | 0.18 | 0.14 | 0.32 | pCi/g | U | GS0631 |
| AS112 | 13965S0038 | 0.008 | 0.083 | 0.199 | pCi/g | U | GS0631 |
| CB95 | 13965S0039 | 0.12 | 0.15 | 0.36 | pCi/g | U | GS0631 |
| CH92 | 13965S0040 | 0.25 | 0.14 | 0.32 | pCi/g | U | GS0631 |
| BF106 | 13965S0041 | 0.21 | 0.11 | 0.24 | pCi/g | U | GS0631 |
| X103 | 13965S0042 | 0.10 | 0.14 | 0.34 | pCi/g | U | GS0631 |
| AW99 | 13965S0043 | 0.11 | 0.11 | 0.26 | pCi/g | U | GS0631 |
| CK82 | 13965S0044 | 0.07 | 0.10 | 0.24 | pCi/g | U | GS0631 |
| P110 | 13965S0045 | 0.05 | 0.10 | 0.25 | pCi/g | U | GS0631 |
| DF66 | 13965S0046 | 0.02 | 0.18 | 0.44 | pCi/g | U | GS0631 |
| CF82 | 13965S0047 | 0.13 | 0.10 | 0.24 | pCi/g | U | GS0631 |
| AU109 | 13965S0048 | 0.10 | 0.12 | 0.29 | pCi/g | U | GS0631 |
| BM99 | 13965S0049 | 0.149 | 0.091 | 0.210 | pCi/g | U | GS0631 |
| CE84 | 13965S0050 | 0.16 | 0.14 | 0.34 | pCi/g | U | GS0631 |
| K99 | 13965S0051 | 0.15 | 0.12 | 0.27 | pCi/g | U | GS0632 |
| | 13965S0051Dup | 0.146 | 0.094 | 0.217 | pCi/g | U | GS0632 |
| CM81 | 13965S0052 | 0.27 | 0.14 | 0.33 | pCi/g | U | GS0632 |
| BW88 | 13965S0053 | 0.03 | 0.10 | 0.25 | pCi/g | U | GS0632 |
| DG67 | 13965S0054 | 0.15 | 0.13 | 0.29 | pCi/g | U | GS0632 |
| AU101 | 13965S0055 | 0.11 | 0.10 | 0.24 | pCi/g | U | GS0632 |
| AF103 | 13965S0056 | 0.12 | 0.13 | 0.31 | pCi/g | U | GS0632 |
| BA107 | 13965S0057 | 0.13 | 0.12 | 0.29 | pCi/g | U | GS0632 |
| DD69 | 13965S0058 | 0.13 | 0.15 | 0.36 | pCi/g | U | GS0632 |
| AZ105 | 13965S0059 | 0.18 | 0.12 | 0.28 | pCi/g | U | GS0632 |
| CY67 | 13965S0060 | 0.127 | 0.087 | 0.203 | pCi/g | U | GS0632 |
| BD104 | 13965S0061 | 0.21 | 0.16 | 0.38 | pCi/g | U | GS0632 |

Qualifier Flags:

U = Analyte not detected (< MDC)

TPU = Total Propagated Uncertainty
MDC = Minimum Detectable Concentration

Gamma Spectrometry Summary Results By Analyte



Report Date: December 27, 2017

| | | | |
|-----------------|-------------|-------------------|--------------|
| Analyte: | U-235 | SOP (Rev. #) | CP1 (21) |
| Project Name: | Uranium One | Energy Signature: | 143.76 (KeV) |
| Project # : | 201213965 | SDG # : | 201213965-2 |

| Client Sample ID: | Lab Sample ID: | Result | TPU (2s) | MDC | Units | Qualifier Flag | Batch # |
|-------------------|----------------|--------|----------|-------|-------|----------------|---------|
| AI105 | 13965S0062 | 0.10 | 0.11 | 0.26 | pCi/g | U | GS0632 |
| CO79 | 13965S0063 | 0.035 | 0.093 | 0.222 | pCi/g | U | GS0632 |

Electronically Validated By:

John Cox- 12/27/2017 07:35, William Smith - 12/27/2017 07:53

Electronically Approved By:

Wade Ivey 12/27/2017 08:06

Qualifier Flags:

U = Analyte not detected (< MDC)

TPU = Total Propagated Uncertainty

MDC = Minimum Detectable Concentration

Gamma Spectrometry Summary Results By Analyte



Report Date: December 27, 2017

| | | | |
|-----------------|-----------------|-------------------|-------------|
| Analyte: | U-238 by Th-234 | SOP (Rev. #) | CP1 (21) |
| Project Name: | Uranium One | Energy Signature: | 63.29 (KeV) |
| Project # : | 201213965 | SDG # : | 201213965-2 |

| Client Sample ID: | Lab Sample ID: | Result | TPU (2s) | MDC | Units | Qualifier Flag | Batch # |
|-------------------|----------------|--------|----------|------|-------|----------------|---------|
| DN73 | 13965S0033 | 2.93 | 0.88 | 1.35 | pCi/g | | GS0631 |
| DO74 | 13965S0034 | 3.5 | 1.1 | 1.7 | pCi/g | | GS0631 |
| BS93 | 13965S0035 | 3.13 | 0.91 | 1.34 | pCi/g | | GS0631 |
| | 13965S0035Dup | 2.96 | 0.79 | 1.00 | pCi/g | | GS0631 |
| DQ76 | 13965S0036 | 3.9 | 1.0 | 1.3 | pCi/g | | GS0631 |
| DJ66 | 13965S0037 | 2.04 | 0.96 | 1.95 | pCi/g | | GS0631 |
| AS112 | 13965S0038 | 1.60 | 0.48 | 0.75 | pCi/g | | GS0631 |
| CB95 | 13965S0039 | 2.52 | 0.98 | 1.85 | pCi/g | | GS0631 |
| CH92 | 13965S0040 | 3.63 | 0.97 | 1.23 | pCi/g | | GS0631 |
| BF106 | 13965S0041 | 4.3 | 1.0 | 0.8 | pCi/g | | GS0631 |
| X103 | 13965S0042 | 2.4 | 1.0 | 2.0 | pCi/g | | GS0631 |
| AW99 | 13965S0043 | 2.17 | 0.68 | 1.08 | pCi/g | | GS0631 |
| CK82 | 13965S0044 | 3.11 | 0.79 | 0.87 | pCi/g | | GS0631 |
| P110 | 13965S0045 | 2.13 | 0.61 | 0.91 | pCi/g | | GS0631 |
| DF66 | 13965S0046 | 3.0 | 1.2 | 2.4 | pCi/g | | GS0631 |
| CF82 | 13965S0047 | 1.83 | 0.60 | 1.00 | pCi/g | | GS0631 |
| AU109 | 13965S0048 | 1.5 | 1.1 | 2.4 | pCi/g | U | GS0631 |
| BM99 | 13965S0049 | 2.45 | 0.65 | 0.83 | pCi/g | | GS0631 |
| CE84 | 13965S0050 | 1.34 | 0.92 | 2.04 | pCi/g | U | GS0631 |
| K99 | 13965S0051 | 3.1 | 1.1 | 2.0 | pCi/g | | GS0632 |
| | 13965S0051Dup | 2.32 | 0.63 | 0.83 | pCi/g | | GS0632 |
| CM81 | 13965S0052 | 3.02 | 0.88 | 1.30 | pCi/g | | GS0632 |
| BW88 | 13965S0053 | 2.39 | 0.66 | 0.89 | pCi/g | | GS0632 |
| DG67 | 13965S0054 | 2.26 | 0.73 | 1.23 | pCi/g | | GS0632 |
| AU101 | 13965S0055 | 2.26 | 0.61 | 0.81 | pCi/g | | GS0632 |
| AF103 | 13965S0056 | 1.41 | 0.94 | 2.08 | pCi/g | U | GS0632 |
| BA107 | 13965S0057 | 3.67 | 0.97 | 1.22 | pCi/g | | GS0632 |
| DD69 | 13965S0058 | 1.69 | 0.97 | 2.09 | pCi/g | U | GS0632 |
| AZ105 | 13965S0059 | 3.39 | 0.90 | 1.14 | pCi/g | | GS0632 |
| CY67 | 13965S0060 | 1.71 | 0.48 | 0.68 | pCi/g | | GS0632 |
| BD104 | 13965S0061 | 3.6 | 1.3 | 2.3 | pCi/g | | GS0632 |

Qualifier Flags:

U = Analyte not detected (< MDC)

TPU = Total Propagated Uncertainty
MDC = Minimum Detectable Concentration

Gamma Spectrometry Summary Results By Analyte



Report Date: December 27, 2017

| | | | |
|-----------------|-----------------|-------------------|-------------|
| Analyte: | U-238 by Th-234 | SOP (Rev. #) | CP1 (21) |
| Project Name: | Uranium One | Energy Signature: | 63.29 (KeV) |
| Project # : | 201213965 | SDG # : | 201213965-2 |

| Client Sample ID: | Lab Sample ID: | Result | TPU (2s) | MDC | Units | Qualifier Flag | Batch # |
|-------------------|----------------|--------|----------|------|-------|----------------|---------|
| AI105 | 13965S0062 | 2.51 | 0.74 | 1.10 | pCi/g | | GS0632 |
| CO79 | 13965S0063 | 2.43 | 0.64 | 0.79 | pCi/g | | GS0632 |

Electronically Validated By:

John Cox- 12/27/2017 07:35, William Smith - 12/27/2017 07:53

Electronically Approved By:

Wade Ivey 12/27/2017 08:06

Qualifier Flags:

U = Analyte not detected (< MDC)

TPU = Total Propagated Uncertainty

MDC = Minimum Detectable Concentration