

6425 S. Hwy. 191 • P.O. Box 809 • Blanding, UT 84511 • 801 678 2221 (phone) • 801 678 2224 (fax)

December 3, 1997

Mr. Joseph Holonich, Branch Chief
High Level Waste and Uranium Recovery Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
2 White Flint North, Mail Stop T-7J9
11545 Rockville Pike
Rockville, MD 20852

Re:

Amendment Request to revise License Condition 11.4 Source Material License SUA-1358 Docket No. 40-8681.

Dear Mr. Holonich:

International Uranium (USA) Corporation ("IUSA") hereby submits a license amendment request which will eliminate reference to the provisions and requirements of air sampling monitoring as delineated in Section 2 of the license's Radiation Protection Procedures Manual, and replace them with a more effective alternative. This manual is contained in the White Mesa Mill's License Application, Appendix D, dated August 23, 1991.

Specifically, Section 2.1.2 of the Licensee's Radiation Protection Procedures Manual requires, in part, "Annually a set of samples, covering eight hours of sampling, each at 40 slpm, to be taken at all sites on Table "Airborne Radiation Sampling Locations", and analyzed for: U-nat, Th-230, Ra-226, Pb-210, and Po-210." License Condition 11.4 of the Mill's operating license indicates a relaxation of the annual eight hour air sampling requirement during extended pe. Lods of mill standby, if routine airborne sampling show levels below 10% of 10CFR Part 20 limits.

Contrary to the above, the licensee did not take the set of air samples specified in the application for radioisotopic analysis during 1996. This deficiency was identified during the NRC inspection on July 15-17, 1997, and resulted in a Severity Level IV Violation 40-8681-9701-01. This violation was stated as follows: "Failure to take the annual set of e'm samples for radioisotopic analyses during 1996".

As stated in our letter of November 3, 1997 and as discussed with NRC enforcement inspectors on October 1, 1997, the corrective action to this violation is the submittal of this License Amendment Request.

Mr. Joseph J. Holonich December 3, 1997 Page 2 of 5

In the October 1, 1997, discussion with the NRC, IUSA expressed their belief that the data collected under the requirements for the annual eight hour sampling at each location specified in the table (twenty eight locations) and the radioisot pic analyses of each sample for U-nat, Th-230, Ra-226, Pb-210, and Po-210 are of no value with regard to radiation protection procedures and employee radiation exposure assessment.

Therfore, IUSA reseptfully requests that License Condition 11.4 of Source Material License SUA-1358, be revised, in part, as follows:

Annually, during mill operational periods a set of air samples covering eight hours of sampling, at a high collection flow rate, (≥ 40 lpm) at routinely occupied or frequented areas will be taken and analyzed for gross alpha. An isotopic analysis of operational mill feed or production product will be analyzed for isotopes U-nat, Th-230, Ra-226, and Pb-210 and will be used to assess fundamental constituent composition of air sample particulates.

The rationale for IUSA's request is provided in the following discussion. Please review the information provided herein and attempt to respond to this amendment request by December 20, 1997. We request this prompt response because beyond that date additional sampling of mill areas may be necessary according to the existing license condition.

Discussion:

In the White Mesa Mill's License Application License No. SUA-1358, Docket No. 40-8681, Appendix D, the White Mesa Mill Radiation Protection Procedures Manual lists procedures to support the Mill's Radiation Protection Program. Specifically, Section 2.1.2 of the manual indicates that "Annually a set of eight samples, covering eight hours of sampling each at 40 std. liter per minute will be taken at all sites on Table-Airborne Radiation Sampling Locations and analyzed for U-nat, Th-230, Ra-226, Pb-210 and Po-210."

Attached are results of three years (1987, 1990, 1991) of sampling as prescribed. Samples were collected at each location on the above-cited Table for the prescribed time and flow rate; however samples were collected during differing conditions of Mill operational status. Samples for the years 1987 and 1990 were collected at a time when the mill was processing ore through all phases of recovery operations. Both uranium and vanadium were being produced during those time periods. The ore feed rate averaged approximately seventy tons per hour and drying operations were at full capacity. In 1991, when the sampling was performed, the mill was inoperative and no drying activities were being performed. This would indicate that there should be some relevant and remarkable differences in data results for the fully operational years versus suspended periods of operation.

Mr. Joseph J. Holonich December 3, 1997 Page 3 of 5

It is also reasonable to expect the data would provide some relative constancy in isotopic ratios of individual decay product isotopes to uranium, regardless of production activities.

Numerous questions can be proposed regarding the purpose of the eight hour sampling for each isotope in every loca ion: however, a statistical analysis was performed on the data to answer the following questions:

- 1. Is there any significant difference in uranium concentrations in sampling locations during full capacity production periods versus non-production periods?
- 2. Is there any significant difference in any daughter isotope in sampling locations during full capacity production periods?
- 3. Is there any significant difference in uranium concentrations in sampling locations in any given year?
- 4. Is there any significant difference in any daughter isotope in sampling locations during any given year?
- 5. Is there constancy of significance in uranium concentration to any daughter isotope ratio in any sampling locations at any time?
- 6. Does analyzing for any daughter isotope other than uranium have any significance in either any location or in any year?

The following statistical analysis was applied to each of the above suppositions as applicable: unpaired t test, paired t test, One-way analysis of variance, Bartlett's test for homogeneity of variance, Tukey-Kramer multiple comparisons test.

Statistical analysis was done in a manner to reduce the standard deviations as much as possible, and every effort was made to discover any significant differences in data. Statistical analysis of the data is retained on file at the mill and is not provided herein because of the copious volume.

The only conclusion that may be indicated by applied statistical analysis of this data is:

 There is no significant difference in any suppositional premise proposed above except uranium airborne concentrations are different in the dryer and packaging area during production periods.

This is not a remarkable conclusion. This is a fundamental aspect for radiation protection monitoring and subsequent employee exposure assessment. One identifies the absence or presence of elevated airborne particulate concentrations in all areas of the mill each month by gross alpha counting.

It is IUSA's contention that annual isotopic analysis of U₃O₈ product and /or mill ore feed provides at least as meaningful scientific information regarding fundamental isotopic

Mr. Joseph J. Holonich December 3, 1997 Page 4 of 5

composition of airborne particulate sampling as the annual eight hour sampling. The justification for this license amendment request is based not only on the above discussion but also on the excessive financial burden of this sampling requirement. The annual cost for individual isotopic analysis of each area sample location; many of which are within a fifty-foot proximity, amounts to approximately \$20,000. If the information provided by the current annual eight-hour sampling requirement was beneficial in any regard or significantly meaningful, IUSA would not object to performing this sampling.

IUSA requests that License Condition 11.4 in part, of the White Mesa Mill's Source Material License No. SUA-1358, be amended to reflect annual use of isotopic composition of U₃O₈ product material to airborne sampling requirements in each provision, instead of individual isotopic analysis of each sample. It is suggested that License Condition 11.4 be revised as follows:

Annually, during mill operational periods a set of air samples covering eight hours of sampling, at a high collection flow rate, (≥ 40 lpm) at routizely occupied or frequented areas will be taken and analyzed for gross alpha. An isotopic analysis of operational mill feed or production product will be analyzed for isotopes U-nat, Th-230, Ra-226, and Ph-210 and will be used to assess fundamental constituent composition of air sample particulates.

Upon approval of this license amendment request, the appropriate sections of all related documents cited herein will be revised to meet the amended License Condition.

Please review this request and respond by December 20, 1997, and should you require any additional information, please do no hesitate to contact Mr. Ron E. Berg or myself at the Mill.

Sincerely,

William N. Deal

10,00: Mag

Mill Manager

WND/sp

Attachments

Mr. Joseph J. Holonich December 3, 1997 Page 5 of 5

cc: Jim Park U.S. NR S M. Linda McLean U.S. NRC Harold R. Roberts IUSA Ron E. Berg IUSA David Frydenlund IUSA Michelle R. Rehmann IUSA Central File

CERTIFIED U.S. MAIL NO. P 077 021 201

BARRINGER LABOR Umetco Minerals

15000 W. 6TH AVE., SUITE 300 GOLDEN, COLORADO 80401 PHONE: (303) 277-1687

1455 DEMING WAY, SUITE 15 SPARKS NEVADA 89421 PHONE: (702) 358-1158

White Mesa Mill-P. O. Box 669 Blanding, UT 84511

ATTN: S.L. Schierman

Client No. slending

Sample Type: filters

Date Collected: 1/26/87

Date Received: 1/29/87

Date Reported: 3/24/87

Client PC No.

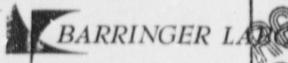
AMENDED REPORT

Sample Identification	Pb 210 10 ⁻⁶ µCi/filter Composite ±Precision*	Ra 226 10 ⁻⁶ µCi/filter Composite ±Precision*	Th 230 10 ⁻⁶ µCi/filter Composite ±Precision*	U 10 ⁻⁶ µCi/filt2 Composite
3744 Salehan	14 ± 3	1.1 ± 1.2	1.4 ± 1.4	5.9
3745	7.7 ± 3.5	13 ± 3	5.4 ± 2.3	17.8
3746	4.4 ± 3.9	4.6 ± 1.9	5.6 ± 2.3	5.5
3747	1.5 ± 3.3	3.3 ± 1.7	0.6 ± 1.2	2.3
3748	7.2 ± 3.0	1.2 ± 1.3	0.2 ± 1.0	1.5
3749	3.4 ± 3.0	0.6 ± 1.2	3.2 ± 1.8	1.5
3750 500	20 ± 3	13 ± 3	19 ± 4	103
3751 1 rue la	15 ± 3	13 ± 4	16 ± 4	87.1
3752 . (1)	2.2 ± 2.7	2.2 ± 1.7	2.8 ± 1.8	4.8
3753 %	0.5 ± 2.7	0.1 ± 1.0	0.4 ± 1.1	40.1
3754	1.8 ± 2.9	0.5 ± 1.1	0.8 ± 1.3	9.5
3755 NC.	5.4 ± 4.4	3.9 ± 1.9	20 + 22	501
3756 YC D.	83 ± 5	1.5 ± 1.4	51 ± 6 2 7110-12	31700
3757 16 116 15	3.5 ± 2.9	1.8 ± 1.5	1.2 ± 1.5	358
3758 48 64 6	11 ± 3	2.8 ± 1.6	7.8 ± 3.0	4220
3759 NO 5401	2.8 ± 3.0	2.2 ± 1.6	2.5 ± 2.0	1650
3760 / **	20 ± 40	11 ± 3	10 ± 3	69.0
3761 24 44 44	6.2 ± 2.4	3.4 ± 1.8	4.8 ± 2.2	26.1
3762	13 ± 3	5.1 ± 2.0	3.6 ± 1.9	69.0
3753	0.0 ± 2.3	3.1 ± 1.7	0.0 ± 0.9	2.0
3764	9.7 ± 4.2	7.5 ± 2.5	7.2 ± 2.5	29.3
3765	3.5 ± 2.8	4.5 ± 2.0	3.6 ± 1.9	13.4
3766	1.6 ± 2.6	1.5 ± 1.4	0.6 ± 1.2	1.6
3767	2.6 ± 1.9	3.3 ± 1.8	2.8 ± 1.8	30.4
3768 V Desait	1.5 ± 2.5	1.1 ± 1.5	0.0 ± 0.9	62.3
3769 V 14	1.8 ± 2.0	2.6 ± 2.0	3.0 ± 1.8	319
3770	0.0 ± 2.4	1.7 ± 1.7	0.0 ± 0.9	1.1
3771		2.6 ± 2.0	1.0 ± 1.3	174
3114	0.7 ± 1.6	2.0 2 6.0	1.0 2 1.3	***

^{*} Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 20

Approved by

ECHNIQUES AND INSTRUMENTATION OR THE EARTH SCIENCES



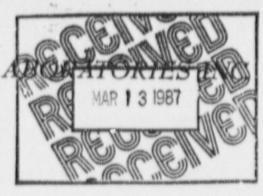
Umetco Minerals White Mesa Mill-P. O. Box 669 Blanding, UT 84511

ATTN: S.L. Schierman

Client No. Blanding

Sample Type: filters

Date Collected: 1/26/87



15000 W 6TH AVE., SUITE 300 GOLDEN, COLORADO 80401 PHONE: (303) 277-1687

1455 DEMINS WAY, SUITE 15 1855 DEMIN. SPANKS NEVADA (702) 358 1158

Log No. 6491

Client PO No.

Date Received: 1/29/87

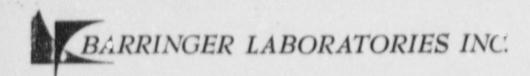
Date Reported: 3/5/87

Sample Identification	Pb 210 10 ⁻⁶ µCi/filter Composite ±Precision*	Ra 226 10 ⁻⁶ µCi/filter Composite ±Precision*	Th 230 10 ⁻⁶ µCi/filter Composite ±Precision*	U 10 ⁻⁶ LCi/filter Composite
3744	14 ± 3	1.1 ± 1.2	1.4 ± 1.4	5.9
3745	7.7 ± 3.5	13 ± 3	5.4 ± 2.3	17.8
3746	4.4 ± 3.9	4.6 ± 1.9	5.6 ± 2.3	5.5
3747	1.5 ± 3.3	3.3 ± 1.7	0.6 ± 1.2	2.3
3748	7.5 ± 3.0	1.2 ± 1.3	0.2 ± 1.0	1.5
3749	3.4 ± 3.0	0.6 ± 1.2	3.2 ± 1.8	2.1
3750	20 ± 3	13 ± 3	23 ± 4	103
3751	15 ± 3	13 ± 4	16 ± 4	87.1
3752	2.2 ± 2.7	2.2 ± 1.7	2.8 ± 1.8	4.8
3753	0.5 ± 2.7	0.1 ± 1.0	5.8 ± 2.3	40.1
3754	1.8 ± 2.9	0.5 ± 1.1	12 ± 3	9.5
3755	5.4 ± 4.4	3.9 ± 1.9	210 ± 10	591
3756	83 ± 5	1.5 ± 1.4	51 ± 6	31700
3757	3.5 ± 2.9	1.8 ± 1.5	43 ± 6	358
3758	11 ± 3	2.8 ± 1.6	23 ± 4	4220
3759	2.8 ± 3.0	2.2 ± 1.6	29 ± 5	1650
3760	20 ± 40	11 ± 3	28 ± 5	
3761	6.2 ± 2.4	3.4 ± 1.8	9.6 ± 2.9	69.0
3762	13 ± 3	5.1 ± 2.0	13 ± 3	26.1
3763	0.0 ± 2.3	3.1 ± 1.7	25 ± 4	69.0
3764	9.7 ± 4.2	7.5 ± 2.5	14 ± 3	2.0
3765	3.5 ± 2.8	4.5 ± 2.0	8.4 ± 2.7	29.3
3766	1.6 ± 2.6	1.5 ± 1.4	0.6 ± 1.2	13.4
3767	2.6 ± 1.9	3.3 ± 1.8	2.8 ± 1.8	1.6
3768	1.5 ± 2.5	1.1 ± 1.5	0.0 ± 0.9	30.4
3769	1.8 ± 2.0	2.6 ± 2.0		62.3
3770	0.0 ± 2.4	1.7 ± 1.7		319
3771	0.7 ± 1.6	2.6 ± 2.0	0.0 ± 0.9 1.0 ± 1.3	1.1

^{*} Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 20

Approved by

ON 3/18/87 EDA called have some Problems with &A on Th-230 will reven and submitt new Report TECHNIQUES AND INSTRUMENTATION FOR THE EARTH SCIENCES SES 34-107



15000 W 6TH AVE. SUITE 300 GOLDEN, COLORADO 80401 FHONE (303) 277-1687

1455 DEMING WAY, SUITE 15 SPARKS, NEVADA 89431 PHONE: (702) 358-1158 PHONE

Umerco Minerals P. O. Box 669 White Mesa Mill Blanding, UT 84511

ATTN: S.L. Schierman

LGN: 6491

QUALITY CONTROL DATA SHEET

Time Received:

Date: 1/29/87 By: Gina Reichert Via: UPS

Sample Cont her Type: petri

Sample Type: filters

Preservative When Asceived: None

Additional Lab Preparation: Mixed Acid Digestion

Parameter	Reference	LLD	Preservative	Analyst	Date(s) of Analysis
Lead 210 Radium 226 Thorium 239	5 4,7 3	*** ***	none none none	J. Garcia M. Howard D. McGuire	2/13-3/6/87 2/24-3/2/87 2/18/87
Uranium	9,10	***	none	B. Tonning	2/19-3/3/87

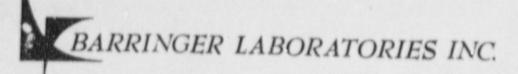
DUPLICATES

Sample Identification	Parameter	Result	Result	Relative Deviation From Mean
3758	Uranium	4190	4250	0.7%

QUALITY CONTROL STANDARDS

Parameter	Result	Certified Result	Acceptable Target Range	Relative Deviation From Known
Lead 210 Radium 226	96	102 101	97-107 96-106	5.0%
Thorium 230 Uranium	35	99 34	94-104 32-36	2.9%

Approved by Dans Park



J. Hamrick/S.L. Schierman UMETCO MINERALS (Blanding) P.O. Box 669 Blanding, UT 34511 15000 W ETH AVE SUITE 300 GOLDEN COLORADO 80401 PHONE (303) 277 1687

1455 DEMING WAY. SUITE 15 SPARKS NEVADA 89431 PHONE 17021 358 1158 19-OCT-90

Page: 1 Copy: 1 of 2 Set: 1

Attn: Scott Schierman Project: Blanding

Received: 20-Sep-90 10:43

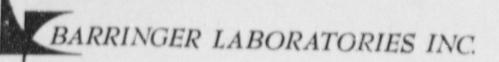
PO #: 253-10000 (20257)

Job: 903209E

Status: Final

Sample Type: Filter

					Th-230 Total	
Sample	10(-6) #Ci/pad	20*	10(-6) µCi/pad	20*	10(-6) uCi/pad	20*
9001	7.3	±2.8	2.8	±1.4	1.4	+2.0
9002	9.3	±2.5		±2.0		±2.0
9003		±2.5		±0.4		±2.4
9004		±2.7		±1.2		±1.4
9005	4.7	±2.5		±1.0		±1.7
9006	6.0	±2.5		±1.3		±1.2
9007		±2.8	6.3	±2.1		±2.0
9008	14	±3		±1.9		±3.4
9009		±3.4	1.3	±1.1		±2.9
9010	4.8	±2.5		±0.9		±4
			0.5	10.9	6.0	±2.5
9011	4.2	±2.3	1.2	+1 0		
9012	6.0		0.4			±2.2
9013	6.2			±1.3		±2.7
9014	5.1			±1.4		±2.9
9015	2.6		2.2			±2.5
9016	4.1	±2.5	1.0		2.9	±1.9
9017	6.8	12.6	2.6		3.2	±2.0
9018	5.3	12.5	2.5			±1.8
9019	9.0	13.9				±2.0
9020	4.9	2.3			2.2	
			0.3	10.7	1.6	±1.6
9021	6.2 5	2.3	5.1	41 0		
9022	11 5				5.4	
9023	3.8 ±	2.2	5.7	11.9	6.1	
9024	4.8 +	2.2	0.9:		1.1	
025	3.6 ±	2.2		1.1		±2.4
026	10 ±	3	1.4 5	1.4		±1.9
027	2.8 ±		2.6 3	1.4	5.6 :	12.4
028	5.0 ±		0.0 ±		0.0 :	11.1
			0.0 ±	0.1	0.2 :	11.5



J. Hamrick/S.L. Schierman UMETCO MINERALS (Blanding) P.O. Box 669 Blanding, UT 84511 15000 W 6TH AVE. SUITE 300 GOLDEN COLOR: DO 80401 PHONE (303) 277 1687

1455 DEMING WAY. SUITE 15 SPARKS. NEVADA 89431 PHONE 1702/358-1158 19-OCT-90

Page: 2 Copy: 1 of 2 Set: 1

Attn: Scott Schierman

Project: Blanding

Received: 20-Sep-90 10:43

PO #: 253-10000 (20257)

Job: 903209E

Status: Final

Sample Type: Filter

Sample	U Total ug/pad	
9001 9002 9003 9004 9005 9006 9007 9008 9009 9010	7.1 23.1 2.5 3.8 2.9 4.4 25.4 35.3 12.0 15.6	4.75 × 10 400 . 10 20 = 4.75 /00 15.5 and 10.75 /00 2.5 1.9 2.9 17.0 18.0 10.5
9011 9012 9013 9014 9015 9016 9017 9018 9019	7.1 189 2860 109 113 142 6.7 23.9 34.2 3.2	4.4 1,914.2 73.0 75.7 95.1 4.5 14.0 22.9
9021 9022 9023 9024 9025 9026 9027 9028	18.3 445 3.7 79.5 44.5 39.0 1.6 146 *	12.3 244.2 2.5 53.3 24.1 1.1 47.8

^{*} Verified by reanalysis

15000 W 6TH AVE SUITE 300 GOLDEN COLDRADO 80401 PHONE (303) 277 1667

1455 DEMING WAY. SUITE 15 SPARKS NEVADA 89431 PHONE 17021 358 1158 19-CCT-90

Page: 3 Copy: 1 of 2 Set: 1

T. Har Ck/S.L. Schierman NERALS (Blanding) 5.6. 60x 669 Landing, UT 84511

Attn: Scott Schierman

Project: Blanding

Received: 20-Sep-90 10:43

PO #: 257-10000 (20257)

Job: 903209E

Status: Final

Abbreviations:

Parameters:

Pb-210

: Lead-210

Ra-226

: Radium-226 : Thorium-230

Th-230

: Uranium

Units:

10(-6) µCi/pad : 10(-6) microCuries per pad

20*

: * Counting error at the 95% confidence level, 20

µg/pad

: micrograms per pad

Signed:

Ellen La Riviere

Radiochemistry Laboratory Manager

J. Hamrick/S.L. Schierman UMETCO MINERALS (Blanding) P.O. Box 669 Blanding, UT 84511 15000 W 6TH AVE, SUITE 300 GOLDEN COLORADO 80401 PHONE (303) 277 1687

1455 DEMING WAY. SUITE 15 SPARKS NEVADA 89431 PHONE 17021 358 1158 19-OCT-90

Page: 4 opy: 1 of 2

Attn: Scott Schierman Project: Blanding Received: 20-Scp-90 10:43

PO #: 253-10000 (20257)

Job: 903209E

Status: Final

QUALITY CONTROL DATA SHEET

Time Received: 10:43 Date: 9/20/90 By: Receiving Via: UPS

Sample Container Type: small plastic rd petri dish

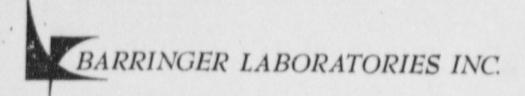
Sample Type: filter

Preservative When Received: none

Additional Lab Preparation: mixed acid digestion

Parameter Ref	Method	LLD	Preservative	Analyst	Analysis
Pb-210 5		2×10-6	pCi/1 none	Kidwell	10/1-10/15
Ra-226 4,7,14	SM-705	1x10-7	pCi/1 none	Howard	9/27-10/1
Th-230 11		1×10-7	pCi/l none	Ortiz	9/27-10/2
U 4,9,10,14	ASTMD2907	1×10-7	pCi/1 none	Meyer	9/28-10/1

DUPLICATES Sample Relative Deviation Identification Parameter Result & From Mean Result 9009 Pb-210 7.0 ± 3.4 3.2 ± 3.3 37 Pb-210 9019 7.0 ± 3.7 11 ± 4 22 9028 Pb-210 6.5 ± 2.9 3.4 ± 2.9 31 9015 Ra-226 1.8 ± 1.4 2.6 ± 1.6 18 9025 Ra-226 1.3 ± 1.4 1.5 ± 1.3 7.1 9007 Th-230 9.4 ± 3.6 7.0 ± 3.2 15 9014 Th-230 2.4 ± 2.2 5.1 ± 2.8 36 9021 5.6 ± 2.9 Th-230 5.1 ± 2.8 4.7 9028 0.3 ± 1.5 Th-230 0.0 ± 1.4 100 9010 U 15.7 15.5 0.6 9020 U 3.3 3.0 4.8



J. Hamrick/S.L. Schierman UMETCO MINERALS (Blanding) P.O. Box 669 Blanding, UT 84511 15000 W 6TH AVE. SUITE 300 GOLDEN COLORADO 80401 PHONE: (303: 277 1687

1455 DEMING WAY. SUITE 15 SPARKS. NEVADA 89431 PHONE 17021358-1158

Page: 5 Copy: 1 of 2

Attn: Scott Schierman Project: Blanding

Received: 20-Sep-90 10:43

PO #: 253-10000 (20257)

Job: 903209E

Status: Final

QUALITY CONTROL STANDARDS

Parameter	Result	Cert. Result	Target	Range	Relative Deviation % From Known
Pb-210	114 ± 2	103	93 -	113	11
Ra-226	106 ± 3	101	91 -	111	5.0
Th-230	104 ± 3	98	88 -	108	6.1
U	33	34	31 -	37	2.9

RADIOCHEMISTRY SPIKES

Sample Identification .

Parameter

Spike Recovery &

9019

*1

100

Approved by:

September 17, 1990

Barringer Laboratories, Inc. 15000 West 6th Ave. Suite 300 Golden, Colorado 80401

Gentlemen:

Enclosed are twenty-eight airborne particulate samples. These are yearly eight-hour samples and must be analyzed for U-Nat, Pb-210, Ra-226 and Th-230. Please report results with matching sample numbers in μg (micrograms)/pad for each parameter.

If you have any questions, please contact me at (801) 678-2221.

Sincerely,

G. A. Jones

Radiation Technician

GAJ/gp

For Lab I Cect. No.	Cect. No.				BORATO 669 84511	RY		1
REPORT TO:	5c 64 Bo BL	OTT SCHIERMA 25 South High 2 669 ANDING, UTAH	FOR GR	AB/RUSH	Plant/E	Date: Project: Charge to:	S. O. Go 9/14/8	1 1 2
Analytical Code No.	T	Sample Description	13/PAD	Mg/Pad	18/Pas	148/Pad 18-210		% or pp
	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	9001 9002 9003 9004 9005 9006 9007 9008 9009 9010 9011 9012 9013 9014 9015 9016 9017 9018 9019						
		Assay Total Analyst						

Special Instructions:

REJECT SAMPLE RETENTION

☐ Discard
☐ 3 months
☐ 12 Months
☐ Other (Specify)

Reported by: ______ Date: _____

For Lab Une Only Cert. No. Date Rec'd		UMETCO MINERALS CORP. ANALYTICAL LABORATORY P.O. Box 669 Blanding, Utah 84511			•			
REPORT TO:	5007	T SCHIERMA	FORGRA	RT OF AN	ALYSIS I SAMPL	ES	SN.	tones
KUOKI IU.					Plant/E	Date: Xp. Office: Project: : Charge to:		
Analytical Code No.	5	ample Description	18/PAD U-NAT	M8/Ad RA 226	Mg/Pax TH-230	18/Pao P8-210		% o
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		Analyst						
RE-CT SAM Discard 3 month 12 Mon	hs ths	N Special Insti	uctions:					
		Reported by						nate:

BARRINGER LABORATORIES INC.

15000 W. 6TH AVE., SUITE 300 GOLDEN, CO 80401 (303) 277-1687 FAX (303) 277-1689

26-Dec-91

J. Hamrick/S.L. Schierman UMETCO MINERALS (Blanding) P.O. Box 669 Blanding, UT 84511

Page: Copy: 1 of 2 Set :

Attn: S.L. Schierman Project: Yearly eight-hour PO #: 253-10000

Received: 26-Nov-91 15:35

Job: 912309E

Status: Final

Sample Type: Filter

Sample	Total		Ra-226 Total pCi/f.comp.		Th-230 Total pCi/f.comp.	Error 2σ
199101 199102 199103 199104 199105 199106 199107 199108 199109	0.5 1.1 0.6 0.3 0.0 0.0 0.4 1.3	±3.7 ±3.4 ±3.8 ±4.3 ±4.2 ±4.0 ±3.8 ±5.3 ±3.6	1.0 2.8 1.7 1.9 0.8 0.7 0.0	±1.0 ±1.1 ±1.5 ±1.3 ±1.3 ±1.0 ±0.5 ±0.5	0.0 0.1 0.0 0.0 0.0 0.5	±1.3 ±1.0 ±1.2 ±1.3 ±1.2 ±1.2 ±1.1 ±1.7
199111 199112 199112A 199113 199113A 199114 199115 199116 199117 199118	3.0 1.3 0.3 0.3 2.2 85 0.3 0.9 2.9	±3.7 ±3.9 ±4.1 ±4.0 ±3.7 ±7 ±3.5 ±4.9 ±3.8 ±4.5	1.6 0.2 1.0 0.1 1.1 1.2 0.0	±1.1 ±1.2 ±0.7 ±1.0 ±0.8 ±1.2 ±1.1 ±0.6 ±0.7	0.5 1.3 0.0 0.0 0.7 0.9 0.0	±0.2 ±1.4 ±1.6 ±1.1 ±1.3 ±1.5 ±2.1 ±1.0 ±1.2 ±1.6
199119 199120 199121 199122 199122A 199123 199124 B 199125 S	1.6 0.0 6.7 6.7 8.2 4.3	±4 ±3.9 ±3.9 ±4.5 ±4.2 ±3.6 ±5.3 ±3.7	1.7 0.3 0.0 0.4 0.8 0.0	±3 ±1.3 ±0.8 ±0.6 ±1.0 ±0.9 ±0.8 ±0.6	0.0 0.0 0.5 0.2 0.1	±4 ±1.0 ±1.3 ±1.4 ±1.7 ±1.3 ±1.0

BARRINGER LABORATORIES INC.

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26-Dec-91

J. Hamrick/3.L. Schierman UMETCO MINERALS (Blanding) P.O. Box 669 Blanding, UT 84511

Page: 1 of Copy: Set :

Attn: S.L. Schierman Project: Yearly eight-hour Received: 26-Nov-91 15:35

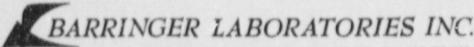
PO #: 253-10000

Job: 912309E

Status: Final

Sample Type: Fi	liter
-----------------	-------

		Sample Ty	ype: Filter	Vol: 1.92X	10 cc
	U Total /f.comp. p	U Total pCi/f.comp.(1)		1.9×10 mi	
199101 199102 199103 199104 199105 199106 199107 199108 199109 199110 199111 199112 199112 199113 199113 199114 199115 199116 199117 199118	0.0028 0.0013 0.0026 0.0016 0.0014 0.0015 0.0014 0.0008 0.0010 0.0023 0.0008 0.0015 0.118 0.0032 0.0158 0.0032 0.0158 0.0030 0.0013 0.0011 0.0013 0.0008	1.9 0.9 1.8 1.1 0.9 1.0 0.9 0.5 0.7 1.6 0.5 1.0 79.7 2.2 10.7 2.0 0.9 0.7	4.15 410-12 LICI/CC 1.15 410-13 1.0 4 4.7 × 10-14 4 3.7 * 4 4.7 × 10-14 4 3.7 * 4	7.9e X 10 3e	9.7 E-14 9.7 E-14 9.1 E-14 9.1 E-14 9.7 "
199119 199120 199121 199122 199122A 199123 199124 199125	0.0254 0.0006 <0.0003 0.0015 0.0006 0.0012 0.0004 0.0792	17.2 0.4 0.2 1.0 0.4 0.8 0.3 53.5	\$ 90 × 10-13 Maifee 8.1 × 10-14 1.0 " " 5.2 " " 2.1 " " 4.2 " " 1.4 " " 2.4 × 10-12 Maifee		



15000 W. 6TH AVE., SUITE 300 GOLDEN, CO 80401 (303) 277-1687 FAX (303) 277-1689

26-Dec-91

J. Hamrick/S.L. Schierman UMETCO MINERALS (Blanding) P.O. Box 669 Blanding, UT 84511

Page: Copy: 1 of 2 Set :

Attn: S.L. Schierman Project: Yearly eight-hour Received: 26-Nov-91 15:35

PO #: 253-10000

Job: 912309E

Final Status:

Abbreviations:

Parameters:

Pb-210 Ra-226

Th-230

: Lead-210 : Radium-226 : Thorium-230

U

: Uranium

Units:

pci/f.comp.

: picoCuries per "liter composite : Counting error at the 95% confidence level, 20

mg/f.comp.

: milligrams per filter composite

pCi/f.comp.(1) : picoCuries per filter composite based on equilibrium

Job approved by:

Signed:

Ellen La Riviere

Radiochemistry Laboratory Manager

15000 W. 6TH AVE., SLITE 300 GOLDEN, CO 80401 (303) 277-1687 FAX (503) 277-1689

26-Dec-91

J. Hamrick/S.L. Schierman UMETCO MINERALS (Blanding) P.O. Box 669 Blanding, UT 84511

Page: Copy: 1 of Set :

Attn: S.L. Schierman Project: Yearly eight-hour PO #: 253-10000

Received: 26-Nov-91 15:35

Job: 912309E

QUALITY CONTROL REPORT

Status:

Final

Sample Type: Filter

	Pb-210 Total	Error	Ra-226 Total	Error	
Sample Id		20	pci/f.comp.	20	
Duplicate		±5.5		±2	
Duplicate	1.4	±5.1	17	±2	
Dunlicate & diff.	7.7		6.0		
s (found value)	102	±2	100	±4	
Std (true value)	97		101		
Std & diff.	5.2		1		
Std % rec.			99		
Blank	0.2	±0.5	0.0	±0.1	
Spike % rec.			101		
	Th-230 Total	Error	U Total	U Total	
Sample Id	Total		Total	U Total pCi/f.comp.(1)	
	Total pci/f.comp.		Total	Total	
Duplicate	Total pCi/f.comp.	20	Total mg/f.comp.	Total pCi/f.comp.(1)	
Duplicate Duplicate	Total pCi/f.comp. 0.0 0.0	2σ ±1.6 ±1.4	Total mg/f.comp. 1	Total pCi/f.comp.(1)	
Duplicate Duplicate Duplicate % diff.	Total pCi/f.comp.	2σ ±1.6 ±1.4	Total mg/f.comp. 1 0.0006 0.0006	Total pci/f.comp.(1)	
Duplicate Duplicate Duplicate % diff. Std (found value)	Total pCi/f.comp. 0.0 0.0 0.0	2σ ±1.6 ±1.4 ±3	Total mg/f.comp. 1 0.0006 0.0006 0.0	Total pci/f.comp.(1)	
Duplicate Duplicate Duplicate % diff. Std (found value) Std (true value)	Total pCi/f.comp. 0.0 0.0 0.0 101	2σ ±1.6 ±1.4 ±3	Total mg/f.comp. 1 0.0006 0.0006 0.0	Total pci/f.comp.(1)	
Duplicate Duplicate Duplicate % diff. Std (found value) Std (true value) Std % diff.	Total pCi/f.comp. 0.0 0.0 0.0 101 98	±1.6 ±1.4 ±3	Total mg/f.comp. 1 0.0006 0.0006 0.0 503 500	Total pci/f.comp.(1)	
Duplicate Duplicate Duplicate % diff. Std (found value) Std (true value)	Total pCi/f.comp. 0.0 0.0 0.0 101 98 3.1	±1.6 ±1.4 ±3	Total mg/f.comp. 1 0.0006 0.0006 0.0 503 500 0.3	Total pci/f.comp.(1)	

26-Dec-91

J. Hamrick/S.L. Schierman UMETCO MINERALS (Blanding) P.O. Box 669 Blanding, UT 84511

Page: 1 of Copy: Set :

Attn: S.L. Schierman Project: Yearly eight-hour Received: 26-Nov-91 15:35

PO #: 253-10000

Job: 912309E

Status: Final

QUALITY CONTROL REPORT

Abbreviations:

Parameters:

Pb-210 Ra-226

Th-230

: Lead-210 : Radium-226 : Thorium-230

U

: Uranium

Units:

pci/f.comp.

: picoCuries per filter composite

20

: Counting error at the 95% confidence level, 20

mg/f.comp.

: milligrams per filter composite

pCi/f.comp.(1) : picoCuries per filter composite based on equilibrium

Job approved by:

Signed:

Approved

Quality Assurance Department

26-Dec-91

J. Hamrick/S.L. Schierman UMETCO MINERALS (Blanding) P.O. Box 669 Blanding, UT 84511

Page: Copy: 1 of 2

Attn: S.L. Schierman Project: Yearly eight-hour PO #: 253-10000

Received: 26-Nov-91 15:35

Job: 912309E

Final. Status:

QUALITY CONTROL REPORT

QUALITY CONTROL DATA SHEET

Received by: sc

Via: UPS

Sample Container Type: Pl Petri dish

Sample Type: Filter

Preservative When Received: None

Additional Lab Preparation: Mixed Acid Digestion

Parameter	Method	LLD	Preser- vative	Analyst	Date(s) of Analysis
Pb-210 Ra-226 Th-230 U	USGS SM-705 USAEC ASTMD2907	1 pci/f.comp. 0.2 pci/f.comp. 0.2 pci/f.comp. 0.0003 mg/f.com	none none none	Kidwell Seidel Ortiz Meyer	12/14-12/26 12/18-12/23 12/ 6-12/16 12/16

Signed:

Mark Burkhardt, Ph.D. Laboratory Director

RADIATION MONITORING - AREAS

AIRBORNE RADIATION SAMPLE LOCATIONS

Location/Description					
Ore Seelebouse					
Ore Scalehouse					
Ore Storage					
Sample Plant					
Sag Mill Area					
Sag Mill Control Room					
Leach Tank Area					
CCD Circuit Thickners					
SX Building North Area					
SX Building South Area					
YC Precipitation & Wet Storage Area					
North YC Dryer Enclosure					
South YC Dryer Enclosure					
YC Drying & Packaging Area					
YC Packaging Enclosure					
Packaged YC Storage Room					
Metallurgical Lab Sample Prep Room					
Lunch Room Area (New Training Room)					
Change Room					
Administration Building					
Warehouse					
Maintenance Shop					
Boiler					
Vanadium Panel					
Tails					
Control Room					
Shifters Office					
Operators Lunch Room					