National Emission Standards for Hazardous Air Pollutants 2005-2006 Radon Flux Measurement Program **GHP-2** Repository Gas Hills, Wyoming

Prepared for: Umetco Minerals Corporation 2754 Compass Drive, Suite 280 Grand Junction, Colorado 81506

Prepared by:

Tellco Environmental P.O. Box 3987 Grand Junction, Colorado 81502

TABLE OF CONTENTS

	<u>Page</u>
1. INTRODUCTION	
2. SITE HISTORY AND DESCRIPTION	1
3. REGULATORY REQUIREMENTS	1
4. SAMPLING METHODOLOGY	1
5. FIELD OPERATIONS	2
5.1 Equipment Preparation	2
5.2 Sample Locations, Identification, and Placement	2
5.3 Sample Retrieval	3
5.4 Environmental Conditions	
6. SAMPLE ANALYSIS	
6.1 Apparatus	
6.2 Sample Inspection and Documentation	3
6.3 Background and Sample Counting	4
7. QUALITY CONTROL AND DATA VALIDATION	4
7.1 Sensitivity	4
7.2 Precision	
7.3 Accuracy	5
7.4 Completeness	5
8. CALCULATIONS	5
9. RESULTS	6
9.1 Mean Radon Flux	6
9.2 Site Results	
References	7
Figure 4-1	

Appendix A. Charcoal Canister Analyses Support Documents

Appendix B. Recount Data Analyses

Appendix C. Radon Flux Sample Laboratory Data (Including Blanks)

Appendix D. Map, Figure D-1

1. INTRODUCTION

This report presents the final results of the National Emissions Standards for Hazardous Air Pollutants (NESHAPS) measurements for the GHP-2 repository at the Gas Hills site in Natrona County, Wyoming. Umetco Minerals Corporation (Umetco) and Tellco Environmental, L.L.C. (Tellco) measured radon-222 releases at the former uranium processing facility. Sampling was conducted in a "phased placement" program over a two-year period. Final radon flux measurement sampling was performed on top of the final cover material at fifty-eight locations during October 24-25, 2005; and was performed at the remaining forty-two locations during May 22-23, 2006, for a grand total of one hundred final radon flux measurements. The analytical results of these one hundred radon flux measurements were used to calculate the final mean radon flux for the GHP-2 Repository.

2. SITE HISTORY AND DESCRIPTION

The site is approximately 55 miles east of Riverton, Wyoming. Uranium was discovered in the area in 1953 and the mill began operating in 1960. With uranium processing at its peak in 1980, tailings from milling operations were deposited in the GHP-2 Repository. Milling operations shut down in 1984. The mill was decommissioned and dismantled in 1990. The GHP-2 Repository presently consists of approximately 144,602 square meters.

3. **REGULATORY REQUIREMENTS FOR THE GAS HILLS SITE**

Radon emissions from uranium mill tailings are regulated by the Nuclear Regulatory Commission (NRC) under generally applicable standards set by the Environmental Protection Agency (EPA). Applicable regulations are specified in 10 CFR Part 40, Criterion 6 and applicable technical procedures in 40 CFR Part 61, Appendix B. Radon-222 emissions from uranium mill tailings are limited to an average of 20 picoCuries per meter squared per second (pCi/m²-s) for each region. The sampling and analytical method used was in conformance with 40 CFR, Part 61, Appendix B, Method 115. The GHP-2 Repository at Gas Hills is subject to radon-emissions monitoring upon placement of the final cover and prior to placement of erosion protection.

4. SAMPLING METHODOLOGY

Radon emissions were measured using Large Area Activated Charcoal Canisters (canisters) in conformance with 40 CFR, Part 61, Appendix B, Method 115, Restrictions to Radon Flux Measurements, (EPA, 2001). These canisters are passive gas adsorption sampling devices used to determine the flux rate of radon-222 gas from a surface. The canisters were constructed using a 10-inch diameter PVC end cap for containing a bed of 180 grams of activated, granular charcoal. At the designated sample locations the prepared charcoal was placed in the canisters on a support grid on top of a ½ inch thick layer of foam and secured with a retaining ring under 1½ inches of foam (see Figure 4-1).

Each charged canister was placed directly onto the surface (open face down) and exposed to the surface for 24 hours. Radon gas adsorbed onto the charcoal and the subsequent radioactive decay of the entrained radon produced lead-214 and bismuth-214. These radon progeny isotopes emit characteristic gamma photons that can be detected through gamma spectroscopy. The original total activity of the adsorbed

1

radon was calculated from these gamma ray measurements using calibration factors derived from crosscalibration of standard sources.

After 24 hours, the exposed charcoal was transferred to a sealed plastic sample container, and labeled showing exposure times/dates. Samples from the 2005 sampling phase were delivered via common carrier to the Tellco analytical laboratory in Grand Junction, CO, while Tellco personnel maintained custody of the 2006 samples from collection through delivery and analysis at the Tellco laboratory.

5. FIELD OPERATIONS

5.1 Equipment Preparation

All charcoal was dried at 110°C before use in the field. Aliquots of 180 grams of dried charcoal were placed in containers as follows:

- Proper balance operation was verified daily by checking a standard weight. The balance readout agreed with the known standard weight to within ± 0.1 percent. (see Appendix A, "Balance Operation Daily Check" form).
- After acceptable balance check, empty containers were individually placed on the balance and the scale was re-zeroed with the container on the balance. Unexposed and dried charcoal was placed in the container until the readout registered 180 grams. The lid was immediately placed on the container and sealed with plastic tape. The balance was checked for readout drift between readings.
- Sealed containers with unexposed charcoal were placed individually in the shielded counting well, with the bottom of the container centered over the detector and the background count rate was documented. If the background counts were too high to achieve an acceptable lower limit of detection (LLD), the entire charcoal batch was labeled non-conforming and recycled through the heating/drying process.

5.2 Sample Locations, Identification, and Placement

Designated sample point locations were surveyed and marked with pin flags or lath. An on-site weather station monitored minimum/maximum air temperatures and any rainfall occurrences to ensure compliance with the measurement criteria.

A sample identification number (ID) was assigned to every canister, using an alphanumeric system noting the charcoal batch followed by a sequential number indicating the location within the sampling grid (e.g., G05). This ID was recorded on an adhesive label and placed on top of the canister, and the sample ID, date, and time of placement were recorded on field data sheets.

The sampling locations were evenly spaced within the GHP-2 Repository. At each location, a canister was chosen and the retaining ring, screen, and foam pad were removed to expose the charcoal support grid. A pre-measured charcoal charge was selected from a batch, opened and distributed evenly across the support grid. The canister was reassembled and placed face down on the surface. Care was exercised not to push the device into the soil surface and the rim was "sealed" to the surface using local material.

2

Approximately five percent of the total number of canisters used during each sampling phase were also charged with clean charcoal in the same manner as the samples, and were labeled as blanks. These blank canisters remained inside airtight plastic bags during each of the 24-hour testing periods.

5.3 Sample Retrieval

At the end of each of the 24-hour testing periods, all canisters were disassembled and each sample was individually poured through a funnel into a container. Sample labels were transferred to the appropriate containers and the containers were sealed for transport. Retrieval date and time were recorded on the same data sheet used during placement. The blank samples were similarly processed.

5.4 Environmental Conditions

In accordance with 40 CFR, Part 61, Appendix B, Method 115:

- During both 2005 and 2006, no measurements were initiated within 24 hours after rainfall. There was no rainfall during the 2005 sampling, but there was approximately 0.12 inches of precipitation on 5/22/06 after canister placement during the 2006 sampling.
- None of the seals around the rims were broken nor surrounded by water by the 5/22/06 rainfall.
- During both 2005 and 2006, no measurements presented in this report were performed during ambient air temperatures below 35°F nor on frozen ground. The minimum air temperatures recorded at the site during radon flux sampling were 43°F in 2005, and 44°F in 2006.

6. SAMPLE ANALYSIS

6.1 Apparatus

The apparatus used for the analysis is as follows:

- Single- or multi-channel pulse height analysis system, Ludlum Model 2200 with a Teledyne 3" x 3" sodium iodide, thallium-activated (NaI (Tl)) detector.
- Lead shielded counting well approximately 40-centimeters (cm) deep with 5-cm lead walls, a 7-cm base, and 5-cm top.
- National Institute of Standards and Technology traceable calibration standard.

3

• Ohaus Model C501 balance with 0.1-gram sensitivity.

6.2 Sample Inspection and Documentation

The integrity of each sample container was verified in the laboratory by visual inspection.

The following items were verified:

- Container was sealed and undamaged.
- Data sheet was complete.

All of the sample containers from both the 2005 and 2006 sampling phases were found to be sealed when received at the laboratory, documentation was completed, and no discrepancies were noted. After inspection, all containers were weighed and the gross weight (to the nearest 0.1 gram) was recorded.

6.3 **Background and Sample Counting**

The gamma ray counting system was checked daily, including background and calibration source measurements before and after sample counting each day. Three five-minute background counts were conducted for five containers selected at random to represent each "batch". Based on calibration statistics, (using blanks and a known source) background ranges in counts per minute (cpm) were established for the Ludlum/Teledyne counting system with shielded well (see Appendix A, "Charcoal Canister Analysis System" form).

Gamma ray counting of exposed charcoal samples included the following steps:

- The length of count time was selected by the activity of the sample being analyzed. A data quality objective of a minimum of 1,000 counts was selected for any given sample.
- Sample containers were centered on the NaI detector and the shielded well door was closed.
- The sample was counted over a pre-determined period and then the mid-sample count time date and counts were documented on the field data sheet and used in the calculations.
- The above steps were repeated for each sample.
- Approximately 10 percent of the containers counted were selected for recounting. These containers were recounted no sooner than one day, and no longer than three days after the original count for Quality Control (QC) and Data Validation.

7. QUALITY CONTROL AND DATA VALIDATION

Charcoal flux measurement QC samples included the following intra-laboratory analytical frequency objectives:

- Recounts, ten percent, and
- Blanks, five percent

All sample data were subjected to validation protocols that included assessments of sensitivity, precision, accuracy, and completeness. All method-required data quality objectives (EPA, 2001) were attained.

7.1 Sensitivity

A total of five blanks were analyzed by measuring the radon progeny activity in samples subjected to the measurement process, excepting exposure to the GHP-2 Repository. Three of the blanks were analyzed in 2005 representing fifty-eight radon flux samples, and two of the blanks were analyzed in 2006 representing forty-two samples. These blank sample measurements comprised five percent of the final field measurements. The blank sample analyses measured radon flux rates ranging from 0.01 to 0.66 pCi/m²-s, with an average of approximately 0.20 pCi/m²-s.

4

7.2 Precision

Ten recount measurements, distributed throughout the sample sets, were performed by replicating analyses of individual field samples. Six of the recounts were performed in 2005 representing fifty-eight samples, while four of the recounts were performed in 2006 representing the remaining forty-two samples. These recount measurements comprised approximately 10 percent of the total number of samples analyzed. The precision of all recount measurements, expressed as relative percent difference (RPD), ranged from less than 1 percent to 8.0 percent with an overall average precision of approximately 2.4 percent (see Appendix B).

7.3 Accuracy

Accuracy of field measurements was assessed daily by counting two laboratory control samples. Accuracy of these lab control sample measurements, expressed as percent error, ranged from -2.9 percent to 1.6 percent. The arithmetic average error of all lab control sample measurements was -0.7 percent (see Appendix A, "Accuracy Appraisal Table").

7.4 Completeness

Method 115 specifies 100 samples to be collected from each region, with a completeness objective of 85 percent. All of the samples presented from the 2005 sampling phase, as well as the 2006 sampling (a total of 100 final samples) met technical criteria, representing 100% completeness.

8. CALCULATIONS

Radon flux rates were calculated for samples, using calibration factors derived from cross-calibration to two sources with known total activity and identical geometry as the charcoal containers. A yield efficiency factor was used to calculate the total activity of the sample charcoal containers.

A computer spreadsheet program calculated the individual radon flux rates. The algorithms used to reduce sample data collected this year were as follows:

Equation 1

pCi Rn-222/m²sec =
$$\frac{N}{[Ts^*A^*b^*0.5^{(d/91.75)}]}$$

where: N

Τs

b

= sample duration, seconds

= instrument calibration factor, cpm per pCi; values used: 0.1759 for M = 0.1764 for M = 0.2759 for M = 0.2759

= net sample count rate, cpm under 220-662 keV peak

0.1758, for M-01/D-21 and 0.1764, for M-02/D-20

d = decay time, elapsed hours between sample mid-time and count mid-time

91.75 = Rn-222 half life in hours

A = area of the collector, m^2

5

Equation 2

	Gross Sample, cpm	Background Sample, cpm	
Error, $2\sigma = 2 \times$	SampleCount, t, min	Background Count, t, min	- × Sample Concentration
$101,20 - 2^{-1}$		et, cpm	

Equation 3

 $\frac{2.71 + (4.65)(S_b)}{[Ts^*A^*b^*0.5^{(d/91.75)}]}$

where: 2.7	71 =	= constant
4.0	65 =	= confidence interval
Sb	, =	standard deviation of the background count rate
Ts	5 =	= sample duration, seconds
b	=	= instrument calibration factor, cpm per pCi; values used:
		0.1758, for M-01/D-21 and 0.1764, for M-02/D-20
d d	. =	= decay time, elapsed hours between sample mid-time and count mid-time
91		= Rn-222 half life in hours
A	=	= area of the collector, m^2

9. **RESULTS**

9.1 Mean Radon Flux

According to 40 CFR, Part 61, Appendix B, Method 115, Subsection 2.1.7, the mean radon flux for the GHP-2 Repository was calculated by summing all individual final flux measurements and dividing by the total number of measurements for the GHP-2 Repository. The mean radon flux for the GHP-2 Repository was calculated as follows:

$$\overline{\mathbf{x}} = \frac{\Sigma}{n}$$

Where: \overline{x} = mean flux for the GHP-2 Repository (pCi/m²-s) Σ = sum of all individual flux measurements (pCi/m²-s) n = total number of measurements

9.2 Site Results

The mean radon flux rate for the GHP-2 Repository was calculated at 6.8 pCi/m²-s, which is below the NRC and EPA standard of 20 pCi/m²-s. All of the requirements and the conditions specified in 40 CFR, Part 61, Appendix B, Method 115 were fulfilled.

Appendix C is a summary of individual measurement results, including blank canister analysis results. Sample locations are depicted on Figure D-1, which is included in Appendix D.

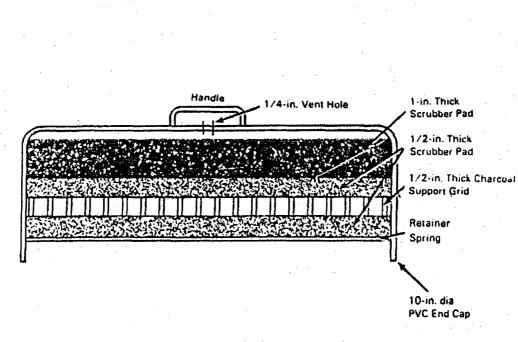


Figure 4-1 Large Area Activated Charcoal Canisters Diagram

FIGURE 1 La

8

Large-Area Radon Collector

Appendix A

Charcoal Canister Analyses Support Documents

ACCURACY APPRAISAL TABLE

UMETCO MINERALS CORPORTION GAS HILLS, WYOMING FINAL NESHAPS RADON FLUX MEASUREMENTS (2005 & 2006) GHP-2 REPOSITORY

SYSTEM	DATE	Bkg Cou	nts (1 min	each)	Source Cou	ints (1 min. e	each)	AVG NET	YIELD	FOUND	SOURCE	KNOWN	% BIAS
. I.D.		#1	#2	#3	#1	#2	#3	cpm	cpm/pCi	pCi	ID	pCi	1
M-01/D-21	10/11/2005	126	155	115	10375	10318	10507	10268	0.1758	58407	GS-04	59300	-1.5%
M-01/D-21	10/11/2005	132	150	142	10523	10519	10558	10392	0.1758	59113	GS-04	59300	-0.3%
M-01/D-21	10/12/2005	160	153	122	10247	10502	10332	10215	0.1758	58108	GS-04	59300	-2.0%
M-01/D-21	10/12/2005	128	117	136	10658	10672	10707	10552	0.1758	60023	GS-04	59300	1.2%
M-01/D-21	10/27/2005	116	129	138	10701	10527	10491	10445	0.1758	59416	GS-04	59300	0.2%
M-01/D-21	10/27/2005	134	130	137	10815	10600	10672	10562	0.1758	60080	GS-04	59300	1.3%
M-01/D-21	10/28/2005	134	121	137	10567	10692	10781	10549	0.1758	60008	GS-04	59300	1.2%
M-01/D-21	10/28/2005	146	137	112	10601	10494	10616	10439	0.1758	59378	GS-04	59300	0.1%
M-01/D-21	10/11/2005	126	155	115	10275	10217	10360	10152	0.1758	57747	GS-05	59300	-2.6%
M-01/D-21	10/11/2005	132	150	142	10312	10326	10446	10220	0.1758	58134	GS-05	59300	-2.0%
M-01/D-21	10/12/2005	160	153	122	10218	10163	10453	10133	0.1758	57639	GS-05	59300	-2.8%
M-01/D-21	10/12/2005	128	117	136	10310	10407	10236	10191	0.1758	57967	GS-05	59300	-2.2%
M-01/D-21	10/27/2005	116	129	138	10291	10541	10614	10354	0.1758	58898	GS-05	59300	-0.7%
M-01/D-21	10/27/2005	134	130	137	10396	10310	.10483	10263	0.1758	58377	GS-05	59300	-1.6%
M-01/D-21	10/28/2005	134	121	137	10458	10647	10343	10352	0.1758	58885	GS-05	59300	-0.7%
M-01/D-21	10/28/2005	146	137	112	10335	10357	10420	10239	0.1758	58242	GS-05	59300	-1.8%
M-02/D-20	10/11/2005	139	146	147	10558	10470	10494	10363	0,1764	58749	GS-05	59300	-0.9%
M-02/D-20	10/11/2005	145	132	134	10297	10327	10302	10172	0.1764	57663	GS-05	59300	-2.8%
M-02/D-20	10/12/2005	120	144	168	10339	10309	10443	10220	0.1764	57935	GS-05	59300	-2.3%
M-02/D-20	10/12/2005	139	158	138	10320	10409	10631	10308	0.1764	58437	GS-05	59300	-1.5%
M-02/D-20	10/27/2005	147	143	132	10377	10445	10457	10286	0.1764	58309	GS-05	59300	-1.7 <u></u> %
M-02/D-20	10/27/2005	145	137	136	10515	10629	10406	10377	0.1764	58828	GS-05	59300	-0.8%
M-02/D-20	10/28/2005	140	132	152	10528	10341	10585	10343	0.1764	58636	GS-05	59300	-1.1%
M-02/D-20	10/28/2005	159	143	133	10411	10297	10523	10265	0.1764	58193	GS-05	59300	-1.9%
M-02/D-20	10/11/2005	139	146	147	10666	10731	10482	10482	0.1764	59424	<u>GS-04</u>	59300	0.2%
M-02/D-20	10/11/2005	145	132	134	10540	10676	10639	10481	0.1764	59418	GS-04	59300	0.2%
M-02/D-20	10/12/2005	120	144	168	10594	10628	10442	10411	0.1764	59017	GS-04	59300	-0.5%

ACCURACY APPRAISAL TABLE

UMETCO MINERALS CORPORTION GAS HILLS, WYOMING FINAL NESHAPS RADON FLUX MEASUREMENTS (2005 & 2006) GHP-2 REPOSITORY

SYSTEM	DATE	Bkg Cou	nts (1 min	each)	Source Cou	ints (1 min. e	each)	AVG NET	YIELD	FOUND	SOURCE	KNOWN	% BIAS
I.D.		#1	#2	#3	#1	#2	#3	cpm	cpm/pCi	pCi	ID	pCi	
M-02/D-20	10/12/2005	139	158	138	10620	10772	10508	10488	0.1764	59458	GS-04	59300	0.3%
M-02/D-20	10/27/2005	147	143	132	10807	10776	10579	10580	0.1764	59977	GS-04	59300	1.1%
M-02/D-20	10/27/2005	145	137	136	10872	10699	10734	10629	0.1764	60255	GS-04	59300	1.6%
M-02/D-20	10/28/2005	140	132	152	10600	10571	10522	10423	0.1764	59087	GS-04	59300	-0.4%
M-02/D-20	10/28/2005	159	143	133	10552	10573	10644	10445	0.1764	59210	GS-04	59300	-0.2%
M-01/D-21	5/24/2006	140	147	112	10675	10579	10567	10474	0.1758	59579	GS-04	59300	0.5%
M-01/D-21	5/24/2006	126	140	142	10595	10648	10586	10474	0.1758	59577	GS-04	59300	0.5%
M-01/D-21	5/25/2006	136	120	138	10446	10412	10718	10394	0.1758	59124	GS-04	59300	-0.3%
M-01/D-21	5/25/2006	143	127	133	10716	10423	10575	10437	0.1758	59369	GS-04	59300	0.1%
M-01/D-21	5/24/2006	140	147	112	10497	10349	10385	10277	0.1758	58460	GS-05	59300	-1.4%
M-01/D-21	5/24/2006	126	140	142	10178	10346	10287	10134	0.1758	57647	GS-05	59300	-2.8%
M-01/D-21	5/25/2006	136	120	138	10298	10304	10173	10127	0.1758	57605	GS-05	59300	-2.9%
M-01/D-21	5/25/2006	143	127	133	10521	10464	10366	10316	0.1758	58680	GS-05	59300	-1.0%
M-02/D-20	5/24/2006	137	131	130	10662	10508	10623	10465	0.1764	59325	GS-04	59300	0.0%
M-02/D-20	5/24/2006	130	164	156	10744	10716	10653	10554	0.1764	59832	GS-04	59300	0.9%
M-02/D-20	5/25/2006	132	148	152	10610	10446	10566	10397	0.1764	58938	GS-04	59300	-0.6%
M-02/D-20	5/25/2006	142	122	138	10741	10581	10645	10522	0.1764	59647	GS-04	59300	0.6%
M-02/D-20	5/24/2006	137	131	130	10660	10483	10435	10393	0.1764	58919	GS-05	59300	-0.6%
M-02/D-20	5/24/2006	130	164	156	10473	10649	10512	10395	0.1764	58927	GS-05	59300	-0.6%
M-02/D-20	5/25/2006	132	148	152	10406	10425	10399	10266	0.1764	58197	GS-05	59300	-1.9%
M-02/D-20	5/25/2006	142	122	138	10671	10486	10742	10499	0.1764	59518	GS-05	59300	0.4%

AVERAGE PERCENT BIAS FOR ALL ANALYTICAL SESSIONS:

Gas Hills GHP-2 Umetco Minerals Corp.

BALANCE OPERATION DAILY CHECK

Balance Model:	Ohaus	port-	0-gram	
Standard Weight	(g): <u>200</u>	.0		

Date	Pre-check (g)	Post-check (g)	O.K. ± 0.1 % ?	By
10/11/05	200,0	200.0	485	Mag
10/12/05	200,0	200.0	Ves	DL Coop
10/27/05	200,0	200.0	Yes	DL Coope DL Coope D/Loop
10/28/05	2000	200.0	yes	Mog
				· · · · · · · · · · · · · · · · · · ·
		· .		
· · ·				
				· .
		_ • • •		

Gas Hills - GHP-2 Umetco Minerals Corp

BALANCE OPERATION DAILY CHECK

Balance Model:	Ohaus	Port-	0-	gram	
	•				

Standard Weight (g): 200.0

Date	Pre-check (g)	Post-check (g)	O.K. ± 0.1 % ?	Ву		
5/24/06	200.0	200.0	yes	Delog		
5/25/06	200,0	200.0	yes	DL Coope		
				U		
· · · · · · · ·						
	· · · · · · · · · · · · · · · · · · ·					
· .						
	· · · ·		· · · · · · · · · · · · · · · · · · ·			
· · · · ·						
	· · · · · · · · · · · · · · · · · · ·					
	· .					
			· · ·			
	· ·			· · · · · · · · · · · · · · · · · · ·		

CHARCOAL CANISTER ANALYSIS SYSTEM

	SITE LOCAT	ΓΙΟN:	Gae	s Hill	S W	y 0	•				
	CLIENT:	Üm	etio	Min	erals	(orf	2.				:
	•	•••			-		<u>h Check Log</u>		•		
	System ID:	M-01	/ D-2	<u>}</u>	C	alibration	Date: 6 (0	01/05	Due Date:	6/01/06	,
•	Scaler S/N: _	5157	12	(M-0)) High	Voltage: _	1050	_ Window:	4.42 Th	nrshld: <u>2.20</u>	
	Detector S/N	641	533	(D-2		e ID/SN:	R9226	GS-04 5	Source Activit	y: 59.3K	<u>pC:</u>
·	Blank Caniste	er Bkgd. I	Range, cp	m: 2 σ = _	101	to	161	3 σ =	93	to 175	
	Gross Source	Range, c	pm:						0067	to 11101	0
				Techn	ician:	*	76 Co	gr-			•
	• • • •				.*			U		•	
	All cour	nts times	are one m	inute.							
	Date	By	¥	round Cou	· · · · ·	í í í			s (1 min. each	·	ok?
pre	TIDALOU		#1	#2	#3	Avg. 133	#1	#2 10579	#3	Average	Y/N ℃
Post	5/24/06			147	112	136	10595	10648	10566		<u> </u>
•.	5 25 06			120	130	131	10446	10412	10718	10525	
pre	5/25/06			127	133	134-	10716	104-23	10575	10571	J.
1000		110.31									
				· ·		<u>.</u>					
				·			•				
							· · · · ·		· · · · · · · · · · · · · · · · · · ·		
• • •			./						· · · · · · · · · · · · · · · · · · ·		
							· · · ·				
										······································	
										· · · · · · · · · · · · · · · · · · ·	
•						•					
				· · ·	~		· · ·			· .	

Y/N: Y = average background and source cpm falls within the control limits.

N = average background and source cpm does not fall within the control limits.

• • .			CH	ARCOAL	CANIST	ER ANALYS	IS SYSTEM	·			
SITE LOCAT	ION:	6	-25	H:115	, W.	10.		· · ·			
CLIENT:	Ú	lme-	40	Mine	rals	Lorp.	· .	· · ·			· * · ·
		· .			Calibration	<u>n Check Log</u>	2 e N	• • •			
System ID:	M-0	I/D	-21	(Calibration	Date: 6/	01/05	_ Due Date	6/0	1/06	
Scaler S/N:				,			1				
Detector S/N:	04	1533	(D-2) Source	ce ID/SN:	Ra 224 /	65-05	Source Act	ivity:	59.3 K	pL:
Blank Canister	r Bkgd.	Range, cp	m: $2\sigma = $	10-	<u>1</u> to	161	3σ=_	93	to	175	
Gross Source	Range, c	pm:	2 σ =	10160	<u> </u>	10917	3 σ = _	9970	to	11106	,
. · ·			Techr	ician:	DL	Cog		·		. *	
4.11			· .				•				
Date	ts times By	are one m	inute. round Cou	inte (1 mir	each)		Source Cou	ints (1 min. e	each)		ok?
Date	Бу		#2	#3	Avg.	#1			<u> </u>	verage	Y/N

	Date	By	Backg	round Cou	nts (1 min	. each)	Source Counts (1 min. each)				
			#1	#2	#3	Avg.	#1	#2	#3	Average	Y/N
pre	5/24/06		14-0	147	112	133	10497	10349	10385	10410	<u> </u>
Post	5/24/06	DLLogs	126	140	142	136	10178	10346	10267	10270	ΎΥ
	5/25/06			120	138	13)	10298	10304	10173	10258	Ý
post	5/25/04	The	143	127	133	134	10521	10464	10366	10450	<u>Ý</u>
											(
											1
		· ·									
							·				
· · · ·	· · · · · · · · · · · · · · · · · · ·										
									•		
											
	· · · ·										······
	<u> </u>									· · · · · · · · · · · · · · · · · · ·	
	· · · ·										· · · · · ·
		·	·]
.]		ll						L			

Y/N: Y = average background and source cpm falls within the control limits.

N = average background and source cpm does not fall within the control limits.

CHARCOAL CANISTER ANALYSIS SYSTEM	• •
SITE LOCATION: Gas Hills, Wyo.	
CLIENT: Umetro Minerals Corp	
Calibration Check Log	
System ID: $M^{-02}/\overline{D}^{-20}$ Calibration Date: $6/0, 105$ Due Date:	6101/06
Scaler S/N: 51563 (M-02) High Voltage: 1000 Window: 4.42	Thrshld:
Detector S/N: 041532 (D-20) Source ID/SN: $Ra^{226}/G5-04$ Source Acti	ivity: <u>59.3k pC</u> ;
Blank Canister Bkgd. Range, cpm: $2\sigma = 117$ to 169 $3\sigma = 104$	toi 8~2
Gross Source Range, cpm: $2\sigma = 10(2)$ to 10933 $3\sigma = 9918$	to 11137
Technician: DL Coop	· · · ·

All counts times are one minute. Date By Background Counts (1 min. each) Source Counts (1 min. each) ok? #2 Y/N #1 #3 #1 #2 #3 Avg. Average LOSOB V Log Pre 5/24/06 137 13 130 10662 133 10623 10598 5/24/06 D/ Corn 130 164 156 150 10744 10716 10653 10704 10446 5/25/06 DLGen 132 148 152 144 10566 10541 10610 Pre 10741 0645 10654 5/25/06 DI.Coy 38 122 38 134 10581 post

Y/N: Y = average background and source cpm falls within the control limits.

N = average background and source cpm does not fall within the control limits.

The acceptable ranges were determined from prior background and source check data.

Post

			CH	ARCOAL	CANISTE	ER ANALYSI	S SYSTEM	· ·	· ·	
SITE LOCA	ΓΙΟN:	G	as H	ills, "	Nyo.					
CLIENT:	U	metu	0 M	inera	15 0	orp.	· · ·			
· · ·				9	Calibration	a Check Log				
System ID: _	M-07	- /D-	-20	C	Calibration	Date: <u>6/0</u>	1/05	Due Date:	6/01/06	
Scaler S/N: _	515	63	(m-c	حر) High	Voltage: _	1000	_ Window:	<u>4.42</u> T	hrshld: <u>2.20</u>	
Detector S/N	: 0419	532	(D-24	o) Sourc	e ID/SN:	29226/G	505	Source Activit	y: 59.3 K	<u>pC;</u>
Blank Caniste	er Bkgd. I	Range, cp	m: $2\sigma =$	117	to	169	3 σ =	104	_to_ <u>i82</u>	
Gross Source	Range, c	pm:							to llzsc	>
		·	Techr	nician:	DL	Cog				
							. ·			÷
All cou	nts times	are one m		<u> </u>						
Date	Ву	Backg	round Cou	ints (1 min	. each)			ts (1 min. each	<u> </u>	ok?
ļ		#1	#2	#3	Avg.	#1	#2	#3	Average	Y/N
	pl logn		131	130		10660		10435	10526	Y
5/24/06	DL Lows	130	164	156	150	10473	10649	10512	10545	′ ∨

•

Pre

Post

pre

5/25/06 DLlog 5/25/06 DLlog

DLLog

	P
•	

Y/N: Y = average background and source cpm falls within the control limits.

N = average background and source cpm does not fall within the control limits.

CHARCOAL CANISTER ANALYSIS SYSTEM
SITE LOCATION: Gas Hills, WY
CLIENT: Umetco Minerals Corp.
Calibration Check Log
System ID: $M - 01 / D - 21$ Calibration Date: $6/01/05$ Due Date: $6/01/06$
Scaler S/N: $51572 (M-01)$ High Voltage: 1050 Window: 4.42 Thrshld: 2.20
Detector S/N: $041533(D-21)$ Source ID/SN: $Ra^{224}/GS-04$ Source Activity: <u>59.3KpL</u> ;
Blank Canister Bkgd. Range, cpm: $2\sigma = 107$ to 161 $3\sigma = 93$ to 175
Gross Source Range, cpm: $2\sigma = 10240$ to 10933 $3\sigma = 10067$ to 11106
Technician: DL Cooper

All counts times are one minute.

	Date	By	Backg	round Cou	nts (1 min	. each)	Source Counts (1 min. each)						
			#1	#2	#3	Avg.	#1	#2	#3	Average	ok? Y/N		
pre	10/11/05	DLlog	-126	155	115	132	10375	10318	10507	10400	Y		
post	10/11/05	Decogn	132	150	142	141	10523	10519	1055B	10533	¥		
pre	10/12/05	Allog	-160	153	122	145	16247	10502	10332	10360	ý		
post	10/12/05	Dllope		117.	136	127	10656	10672	10707	10679	4		
pre	10/27/05		116	129	138	128	10701	10527	10491	10573	Y		
	10/27/05			130	137	134	10815	10600	10672	10696	<u> </u>		
pre	10/28/05	Diagn	134	121	137	131	10567	10692	10781	10680			
904	10/28/05	DHap	-146	137	112	132	10601	10494	10616	10570	Ý.		
								`					
· · · .									· · · · · · · · · · · · · · · · · · ·				
									· · · · · · · · · · · · · · · · · · ·				
										·····			
·							·			·			
											<u>_</u>		
					·								

Y/N: Y = average background and source cpm falls within the control limits.

N = average background and source cpm does not fall within the control limits.

CHARCOAL CANISTER ANALYSIS SYSTEM
SITE LOCATION: GAS Hills, WY
CLIENT: Umetco Minerals Corp
Calibration Check Log
System ID: $M - OI / D - ZI$ Calibration Date: $6/01/05$ Due Date: $6/01/06$
Scaler S/N: 51572 (M-O1) High Voltage: 1050 Window: 4.42 Thrshld: 2.20
Detector S/N: $04^{1}533$ (D-21) Source ID/SN: $Ra^{226}/GS-05$ Source Activity: <u>59.3 KpC</u> ;
Blank Canister Bkgd. Range, cpm: $2\sigma = 107$ to 161 $3\sigma = 03$ to 175
Gross Source Range, cpm: $2\sigma = \frac{10160}{t_0} t_0 \frac{10917}{3\sigma} = \frac{9970}{t_0} t_0 \frac{1106}{t_0}$
Technician: DL Cooper
All counts times are one minute.
Data Dry Deakground Counts (1 min each) Source Counts (1 min each)

•		· · · · · ·						Date By Background Counts (1 min. each) Source Counts (1 min. each) ok													
	Date	By	Backg	round Cou	nts (1 min	. each)		Source Count	<u>/</u>	· ·	ok?										
			#1	#2	#3	Avg.	#1	#2	#3	Average	Y/N										
pre	10/11/05	Dilloon	- 126	155	115	132	10275	10217	10360	10284	Y										
post	19/11/05	Di Cooph	132	150	142	141	10312	10326	10446	10361	́У										
pre	10/12/05	Decor	160	153	122	145	1021B	10163	10453	10278	Ý										
post		OL Coope	128	117	136	127	10310	10407	10236		14										
pre	10/27/05	Obligge	116	129	138	128	10291	10541	10614	10482	¥										
post	10/27/05	Dicogn	134	130	137	134	10396	10310	10483	10396	/ y										
pre	10/28/05	Plicifn	134	121	137	131	10458	10647	10343	10483	Ý										
POST	10/28/05	Diog	146	137	112	132	10335	10357	10420	10371	Y										
•											· · ·										
										· · · · ·											
	-																				
								· · · · · · · · · · · · · · · · · · ·													
										· · · · · · · · · · · · · · · · · · ·											
			1999 - A.																		
	· ·																				
									1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -												
. 1																					
										•											
										· · · ·											
								<u> </u>													

Y/N: Y = average background and source cpm falls within the control limits.

N = average background and source cpm does not fall within the control limits.

CHARCOAL CANISTER ANALYSIS SYSTEM	· ·
SITE LOCATION: Gas Hills, WY	· · · ·
CLIENT: Umétro Mineral's Corp	
Calibration Check Log	
System ID: $M-02/D-20$ Calibration Date: $6/01/05$ Due Date:	6/01/06
Scaler S/N: 51563 (M-02) High Voltage: 1000 Window: 4.42	_
Detector S/N: $041532(D-20)$ Source ID/SN: $Rq^{224}/GS-04$ Source Activ	ity: <u>59.3KpCi</u>
Blank Canister Bkgd. Range, cpm: $2\sigma = 117$ to 169 $3\sigma = 104$	_to_187_
Gross Source Range, cpm: $2\sigma = 10121$ to 10033 $3\sigma = 9918$	_to_11137
Technician: DL Cooper	

	All cou	nts times a	ire one mi	nute.							
	Date	By	Backg	round Cou	nts (1 min	. each)		Source Count	s (1 min. each)	ok?
•			#1	#2	#3	Avg.	#1	#2	#3	Average	Y/N
pre	10/11/05	JLCoon	139	144	147	144	10666	1073)	10482	10626	У
post	10/11/05		145	132	134	137	10540	10676	10639	10618	<u> </u>
pre	10/12/05	DLCogra	120	144	168	144	10594	10628	10442	10555	4
post	10/12/05	Diege	139	158	138	145	10620	10772	10508	10033	Ý
pre		Dlight	147	143	132	141	10807	10776	10579	10721	4
post	10/27/05	Deloger	145	137	136	139	10872	-10699	10734	10768	Y Y
pre	10/28/05	Delaph	140	132	152	141	10600	10571	10522	10564	ý ·
post	10/28/05	ti Con	159	143	133	145	10552	10573	10644_	10590	4
											(.
	· ·							·			
1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1									·		·
			<u> </u>								
							· .				
	·				·						
				•							
				· · ·							
				l ·				<u> </u>			

Y/N: Y = average background and source cpm falls within the control limits.

N = average background and source cpm does not fall within the control limits.

CHARCOAL CANISTER ANALYSIS SYSTEM		•
SITE LOCATION: Gas Hills, WY		
CLIENT: Um etco Minerals Corp.	· · ·	· · ·
Calibration Check Log	•.	· · · ·
System ID: $M - 02 / D - 20$ Calibration Date: $6/01/05$	Due Date:	101/06
Scaler S/N: 51563 (M-02) High Voltage: 1000 Window:	<u>4.42</u> Th	rshld:
Detector S/N: 041532(D-20) Source ID/SN: $R_{q}^{226}/GS-05$ s	ource Activity	59.3KpCi
Blank Canister Bkgd. Range, cpm: $2\sigma = 117$ to 169 $3\sigma =$	104	to_182_
Gross Source Range, cpm: $2\sigma = \frac{10296}{t01059}$ to $\frac{11059}{3\sigma} = 1000$	10105	to 11250
Technician: DL Coope	<u> </u>	
and the second		

All counts times are one minute.

	All counts times are one timine.													
	Date	By	Backg	round Cou	nts (1 min	. each)		Source Count	s (1 min. each)	ok?			
			#1	#2	#3	Avg.	#1	#2	#3	Average	Y/N			
pre	10/11/05	Pllagn	1.39	146	147	144	1055B	10470	10494	10507	$\boldsymbol{\gamma}$			
POST	10/11/05	Klopp	-145	132	134	137	10297	10327	10302	10309	ý			
pre	10/12/05	Piloon	20	144	168	144	10339	10309	10443	10364	Ý			
post	10/12/05	PLCoope	139	158	138	145	10320	10409	10631	10453	Y			
pre	10/27/05	DLCogen	147	143	132	14)	10377	10445	10457	10420	Ý			
0055	10/27/05	dage	145	137	136	139	10515	10629	10406	10517	4			
יזק'	10/28/05	Plian		132	i52_	141	1052B	10341	10585	10485	1			
post-	10/28/05	04 con	159	143	133	145	1041)	10297	10523	10410	Ý			
. 1														
						•								
			· .											
				•										
									L					

Y/N: Y = average background and source cpm falls within the control limits.

N = average background and source cpm does not fall within the control limits.

Appendix **B**

Recount Data Analyses

RALS PROJECT: RADON FLUX MEASUREMENTS, GAS HILLS, WY

PROJECT NOS.: 05003.01; 05003.02

AIR TEMP MIN:43°F WEATHER:RAINED 0.12" AFTER "I" BATCH PLACEMENT PILE:GHP-2 REGION:COVER SURFACE:SOIL "G" BATCH DEPLOYED 10 24 5 RETRIEVED: 10 25 5 CHARCOAL BKG: 147 cpm Wt. Out: 180.0 g. "I" BATCH 5 22 6 DEPLOYED RETRIEVED: 5 23 6 CHARCOAL BKG: 150 cpm Wt. Out: 180.0 α. FIELD TECHNICIANS: AI, SS, KA, CS, DL COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 29.2 g. COUNTING SYSTEM I.D.: M01/D21, M02/D2 CAL. DUE: 6/01/06

RECOUNT CANISTER ANALYSIS:

GRID LOCATION	SAMPLE	DEPL	OY MIN	RET HR	RIV MIN	ANA	الايتر بالجار أيتربوه	1.000 (Maria)	MID-	TIME	Bar Sec. Sol	SS St. Mathematica St.	GROSS	RADON	±	LLD	PRECISION
GHP2-25	G25	HR	52							MIN	(MIN)	COUNTS		pCi/m²s	pCi/m²s	pCi/m²s	% RPD
RECOUNT	G25	10 10	52 52	11 11	13 13	10 10	27 28	5 5	16 9	47 50		10957 9644	225.8 225.8	21.8 21.8	2.18 2.18	0.04	0.0%
	9 49		i qr		19	i (Mi)	i 'Y i	Y	Y			3044	449.0	- 41.0	4.10		
GHP2-40	G40	10	55	11	0	10	27	5	16	57	2	1741	219.5	1.5	0.15	0.04	
RECOUNT	G40	10	55	11	0	10	28	5	9	52	2	1548	219.5	1.5	0.15	0.04	0.0%
GHP2-65	G65	15	24	16	32	10	27	5	17	28	4	1169	222.8	1.9	0 19	0.03	2010/02/02/02/02/02/02/02
RECOUNT	G65	15	24	16	32	10	28	5	9	54		1032	222.8	1.9	0.19	0.03	0.0%
			in Third	in Maria	HATCH		40 7 07044	i i i Ti i i	in Trip	in Midal			*****	***********	T. T		
GHP2-72	G72	15	20	.16	28	10	27	5	17	24	1	8269	221.2	15.4	1.54	0.03	
RECOUNT	G72	15	20	16	28	10	28	5	9	54	1	7609	221.2	16.1	1.61	0.04	4.4%
GHP2-78	G78	10	- 39	11	5	10	27	5	16	- 38	4	5859	222.3	11.5	1 15	0 04	
RECOUNT	G78	10	39	11	5	10	28	5	9	50	ł	5150	222.3	11.5	1.15	0.04	0.0%
	************************	**************		••••••••••••								*****					
GHP2-81	G81	15	15	16	31	10	27	5	17	19	1	4392	222.8	8.0	0.80	0.03	4.00/
RECOUNT	G81	15 ·	15	16	31	10	28	5	9	52	1	3907	222.8	8.1	0.81	0.04	1.2%
GHP2-6	106	10	38	10	38	5	24	6	13	33	1	7559	219.6	12.4	1.24	0.03	
RECOUNT	106	10	38	10	38	5	25	6	11	59	1	6489	219.6	12.6	1.26	0,04	1,6%
		4.0				-	~ 4	••••••	40		•	4007	040.0	4.0	0.40	0.02	
GHP2-7	107	10	55 55	10	55 55	5 5	24 25	6 6	13 11	32 59	2 2	1887 1533	218.9 218.9	1.3 1.2	0.13	0.03 0.04	8.0%
RECOUNT	107	10	55	10	55	Ð.	20	0	· 1 1	09	2	1000	210.9	1.2	0.12	0.04	0.0 %
GHP2-85	185	9	54	9	54	5	24	6	13	10	1	2192	220.8	3.4	0.34	0.03	
RECOUNT	185	9	54	9	54	5	25	6	11	57	1	1785	220.8	3,3	0.33	0.04	3.0%
GUD0 07	707	10	1 1	10	10	e	04		1 2	01	1	2205	222.5	5.3	0.53	0.03	
GHP2-97 RECOUNT	I97 I97	10 10	16 16	10 10	16 16	5 5	24 25	6 6	13 11	21 57	1	3325 2942	222.5	5.6	0.55	0.03	5.5%
		10											RED REG				2.4%
-		n je kolecki si užana fatiki si													*************		

Page 1 of 1

Appendix C

Ť

š

ě

)))

Radon Flux Sample Laboratory Data (including Blanks)

PROJECT: RADON FLUX MEASUREMENTS, GAS HILLS, WY

PROJECT NOS.: 05003.01; 05003.02

AIR TEMP MIN:43°F WEATHER:RAINED 0.12" AFTER "I" BATCH PLACEMENT PILE:GHP-2 REGION:COVER_ SURFACE:SOIL "G" BATCH DEPLOYED 10 24 5 RETRIEVED: 10 25 5 CHARCOAL BKG: 147 cpm Wt. Out: 180.0 g. "I" BATCH DEPLOYED 5 22 6 RETRIEVED: 5 23 6 CHARCOAL BKG: 150 cpm Wt. Out: 180.0 α. FIELD TECHNICIANS: AI, SS, KA, CS, DL COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 29.2 q. COUNTING SYSTEM I.D.: M01/D21, M02/D2 CAL. DUE: 6/01/06

GRID	SAMPLE	DEPL	.OY 🔬	RET	RIV							GROSS	GROSS	RADON	chi t rees	LLD	an han ha she
LOCATION	I. D.	HR	MIN	HR	MIN	MO	DA	YR	HR	MIN	(MIN)	COUNTS	WT IN	pCi/m²s	pCi/m²s	pCi/m²s	COMMENTS:
GHP2-01	101	10	57	10	57	5	24	6	13	33	1	7934	229.6	13.0	1.30	0.03	
GHP2-02	102	10	56	10	56	5	24	6	13	33	1	1023	220.5	1.5	0.15	0.03	
GHP2-03	103	10	36	10	-36	5	24	6	13	33	1	10231	222.0	16.9	1.69	0.03	
GHP2-04	G04	10	27	10	58	10	27	5	16	30	. 1	10093	224.1	20.0	2.00	0.04	
GHP2-05	G05	10	33	10	58	10	27	5	16	49	2	1763	220.4	1.5	0.15	0.04	
GHP2-06	106	10	38	10	38	5	24	6	13	33	1	7559	219.6	12.4	1.24	0.03	
GHP2-07	107	10	55	10	55	5	24	6	13	32	2	1887	218.9	1.3	0.13	0.03	
GHP2-08	108	10	53	10	53	5	24	6	13	31	1	1310	216.6	1.9	0.19	0.03	
GHP2-09	109	10	40	10	40	5	24	6	13	34	1	8259	221/1	13,6	1.36	0.03	
GHP2-10	G10	10	36	10	59	10	27	5	16	51	1	8602	222.9	17.2	1.72	0.04	
GHP2-11	G11	10	- 29	11	9	10	27	5	16	-30	1	21542	222.9	42.7	4.27	0.04	· · · ·
GHP2-12	G12	10	51	11	10	10	27	5	16	47	<u> </u>	1541	224.6	2.8	0.28	0.04	
GHP2-13	113	10	33	10	- 33	5	24	6	13	31	1	2116	224.4	3.3	0.33	0.03	
GHP2-14	114	10	28	10	28	5	24	6	13	28	1	2881	224.2	4.6	0.46	0.03	
GHP2-15	··· I15	10	29	10	29 1	5	24	6	13	29	2	1241	222.2	0.8	0.08		
GHP2-16	. I 16	10	31	10	31	5	24	6	13	31	. 1	1010	220.7	1.4	0.14	0.03	
GHP2-17	G17	10	49	11	10	10	27	5	16	46	1	1597	224.1	2.9	0.29	0.04	
GHP2-18	G18	10	32	11	9	10	27	5	16	32	2	1365	225.4	1.1	0.11	0.04	
GHP2-19	G19	10	39	11	0	10	27	5	-16	51	1	1228	222.6	2.2	0.22	0.04	
GHP2-20	120.	10	42	10	42	5	24	6	13	34	1	8924	215.1	14.7	1.47	0.03	
GHP2-21	121	10	51	10	51	5	24	6	13	39	1	1098	221.4	1.6	0.16	0.03	
GHP2-22	li22	10	44	10	44	5	24	6	13	35	1	9784	216.2	16.1	1.61	0.03	
GHP2-23	G23	10	33	11	8	10	27	5	16	32	1	1952	224.5	3.6	0.36	0.04	
GHP2-24	G24	10 [.]	47	11	11	10	27	5	16	46	1	4811	223.0	9.4	0.94	0.04	
GHP2-25	G25	10	52	11	13	10	27	5	16	47	1	10957	225.8	21.8	2.18	0.04	
GHP2-26	126	10	22	10	22	5	24	6	13	25	2	1142	226.7	0.7	0.07	0.03	
GHP2-27	127	10	24	10	24	5	24	6	13	27	. 1	3349	224.2	5.4	0.54	0.03	

Page 1 of 4

ALS PROJECT: RADON FLUX MEASUREMENTS, GAS HILLS, WY

PROJECT NOS.: 05003.01; 05003.02

PILE:GHP-2 REGION:COVER SURFACE: SOIL AIR TEMP MIN: 43°F WEATHER: RAINED 0.12" AFTER "I" BATCH PLACEMENT "G" BATCH DEPLOYED 10 24 5 RETRIEVED: 10 25 5 CHARCOAL BKG: 147 cpm Wt. Out: 180.0 q. "I" BATCH 5 22 6 RETRIEVED: 5 23 6 DEPLOYED CHARCOAL BKG: 150 cpm Wt. Out: 180.0 q. FIELD TECHNICIANS: AI, SS, KA, CS, DL COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 29.2 q. COUNTING SYSTEM I.D.: M01/D21, M02/D2 CAL. DUE: 6/01/06

GRID	SAMPLE	TRANS I HAVE A	OY_	RET	S. Same	1. 1	18 . Sec. 14.	1	1 7. M. ma	Second of the		GROSS	GROSS	RADON		LLD	the state of the second second
LOCATION	I. D.	HR	MIN	HR	MIN	MO	[*] DA	YR	HR	MIN	(MIN)	COUNTS	WT IN	pCi/m²s	pCi/m²s	pCi/m²s	COMMENTS:
GHP2-28	128	10	26	10	26	5	24	6	13	27	1	1255	228.1	1.9	0.19	0.03	
GHP2-29	G29	15	31	16	34	10	27	5	17	32	1	4139	219,1	7.6	0.76	0.03	
GHP2-30	G30	15	29	16	35	10	27	5	17	32	1	1568	224.1	2.7	0.27	0.03	
GHP2-31	G31	15	28	16	34	10	.27	5	17	29	1	1184	223.0	2.0	0.20	0.03	
GHP2-32	132	10	20	10	20	5	24	6	13	24	1	3101	222.4	5.0	0.50	0.03	
GHP2-33	G33	15	8	16	30	10	27	5	17	10	2	1209	224.0	0.9	0.09	0.03	
GHP2-34	G34	15	6	16	23	10	27	5	17	0	2	1960	223.3	16	0 16	0.03	
GHP2-35	G35	10	46	11	11	10	27	5	16	44	1	8631	226.3	17.1	1.71	0.04	
GHP2-36	G36	10	35	11	8	10	27	5	16	34	1	4489	229.8	8.7	0.87	0.04	
GHP2-37	137	10	45	10	45	5	24	6	13	35	1	2859	215.8	4.5	0.45	0.03	
GHP2-38	t38	10	49	10	49	5	24	6	13	39	1	1980	223.0	3.1	0.31	0.03	
GHP2-39	139	10	47	10	47	5	24	6	13	37	1	1407	221.0	2.1	0.21	0.03	
GHP2-40	G40	10	55	11	0	10	27	5	16	57	2	1741	219.5	1.5	0.15	0.04	
GHP2-41	G41	10	36	11	7	10	27	5	16	35	2	1708	223.4	1.4	0.14	0.04	
GHP2-42	G42	10	55	11	12	10	27	5	16	49	2	1651	218.8	1.4	0.14	0.04	
GHP2-43	G43	15	10	16	24	10	27	5	17	13	2	1548	223.8	1.2	0.12	0.03	
GHP2-44	G44	15	8	16	30	10	27	5	17	10	2	1566	222.1	1.2	0.12	0.03	
GHP2-45	G45	15	26	16	33	10	27	5	17	29	1	3437	224.5	6.3	0.63	0.03	
GHP2-46	G46	15	29	16	35	10	27	5	17	30	1	4707	217.9	8.7	0.87	0.03	
GHP2-47	147	9	36	9	35	5	24	6	13	1	1	2554	225.7	4.1	0.41	0.03	
GHP2-48	148	9	45	9	45	5	24	6	13	6	1	6156	224.1	10.1	1.01	0.03	
GHP2-49	149	9	47	9	47	5	24	6	13	7	1	5553	229.9	9.1	0.91	0.03	
GHP2-50	150	9	42	9	42	5	24	6	13	6	1	5066	223.5	8.3	0.83	0.03	
GHP2-51	G51	15	28	16	35	10	27	5	.17	30	1	2579	220.7	4.6	0.46	0.03	
GHP2-52	G52	15	26	16	33	10	27	5	17	28	1	2157	224.6	3.8	0.38	0.03	
GHP2-53	G53	15	10	16	30	10	27	5	17	13	1	8027	224.6	14.8	1.48	0.03	
GHP2-54	G54	15	12	16	26	10	27	5	17	15	1	6950	224.5	12.9	1.29	0.03	

S PROJECT: RADON FLUX MEASUREMENTS, GAS HILLS, WY

PROJECT NOS.: 05003.01; 05003.02

SURFACE:SOIL AIR TEMP MIN:43°F WEATHER:RAINED 0.12" AFTER "I" BATCH PLACEMENT PILE:GHP-2 REGION:COVER "G" BATCH DEPLOYED 10 24 5 RETRIEVED: 10 25 5 CHARCOAL BKG: 147 cpm Wt. Out: 180.0 g. "I" BATCH 5 22 6 RETRIEVED: 5 23 6 DEPLOYED CHARCOAL BKG: 150 cpm Wt. Out: 180.0 **q** . FIELD TECHNICIANS: AI, SS, KA, CS, DL COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 29.2 q. COUNTING SYSTEM I.D.: M01/D21, M02/D2 CAL. DUE: 6/01/06

GRID	SAMPLE	DEPL	OY	RET	RIV	AN	LYS	IS	MID	TIME	E CNT	GROSS	GROSS	RADON	108 ± 668	LLD	
LOCATION	I. D.	HR	MIN	HR	MIN	MO	DA	YR	HR	MIN	(MIN)	COUNTS	WT IN	pCi/m²s	pCi/m²s	pCi/m²s	COMMENTS:
GHP2-55	G55	15	23	16	39	10	27	5	17	26	2	1607	224.5	1.2	0.12	0.03	
GHP2-56	G56	10	37	11	7	10	27	5	16	.37	1	1973	224.8	3.7	0.37	0.04	
GHP2-57	G57	10	43	11	1	10	27	5	16	53	2	1428	223.9	1.2	0.12	0.04	
GHP2-58	158	10	46	10	46	5	24	6	13	37	1	6602	217.8	10.8	1.08	0.03	
GHP2-59	G59	10	45	11	1	10	27	5	16	52	1	2329	225.1	4.4	0.44	0.04	•
GHP2-60	G60	10	45	11	4.	10	27	5	16	44	2	1654	225.2	1.4	0.14	0.04	
GHP2-61	G61	10	38	11	6	10	27	5	16	37	1	1320	226.4	2.4	0.24	0.04	
GHP2-62	G62	15	22	16	29	10	27	5	17	24	1	2470	223.1	4.4	0.44	0.03	
GHP2-63	G63	15	14	16	26	10	27	5	17	17	1 ·	1328	223.7	2.2	0.22	0.03	· ·
GHP2-64	G64	15	12	16	31	10	27	5	17	15	1	2996	223.6	5.4	0.54	0.03	·
GHP2-65	G65	15	24	16	32	10	27	5	17	28	1	1169	222.8	19	0.19	0.03	
GHP2-66	166	9	40	9	40	5	24	6	13	3	3	1296	228.0	0.5	0.05	0.03	
GHP2-67	167	9 .	49	9	49	5	24	6	13	7	1	9899	217.8	16.4	1.64	0.03	
GHP2-68	168	9	50	9	50	5	24	6	13	9	1	16344	219.4	27.3	2.73	0.03	
GHP2-69	G69	15	23	16	32	10	27	5	17	25	1	3113	222.2	5.6	0.56	0.03	
GHP2-70	G70	15	14	16	31	10	27	5	17	17	2	1714	224.5	1.3	0.13	0.03	
GHP2-71	G71	15	16	16	26	10	27	5	17	19	1	4336	210.0	7.9	0.79	0.03	
GHP2-72	G72	15	20	16	28	10	27	5	_17	24	1	8269	221.2	15.4	1.54	0.03	
GHP2-73	G73	10	39	11	6	10	27	5	16	- 38	1	2278	222.0	4.3	0.43	0.04	
GHP2-74	G74	10	43	11	3	10	27	5	16	42	1	1167	223.4	2.1	0.21	0.04	
GHP2-75	G75	10	47	11	1	10	27	5	16	- 55	1	1996	222.1	3.8	0.38	0.04	•
GHP2-76	G76	10	48	11	2	10	27	5	16	55	1	2100	222.4	4.0	0.40	0.04	
GHP2-77	G77	10	42	11	3	10	27	5	16	42	1	6197	222.7	12.3	1.23	0.04	
GHP2-78	G78	10	39	11	5	10	27	5	16	38	1	5859	222.3	11.5	1.15	0.04	
GHP2-79	G79	15	18	16	28	10	27	5	17	22	1	14630	223.2	27.5	2.75	0.03	
GHP2-80	G80	15	17	16	27	10	27	5	17	20	1	5094	224.2	9.4	0.94	0.03	
GHP2-81	G81	15	15	16	31	10	27	5	17	19	1	4392	222.8	8.0	0.80	0.03	

Page 3 of 4

S PROJECT: RADON FLUX MEASUREMENTS, GAS HILLS, WY

PROJECT NOS.: 05003.01; 05003.02

AIR TEMP MIN:43°F WEATHER:RAINED 0.12" AFTER "I" BATCH PLACEMENT SURFACE:SOIL PILE:GHP-2 REGION:COVER CHARCOAL BKG: 147 cpm "G" BATCH DEPLOYED 10 24 5 RETRIEVED: 10 25 5 Wt. Out: 180.0 g. 5 22 6 5 23 6 CHARCOAL BKG: 150 cpm "I" BATCH DEPLOYED RETRIEVED: Wt. Out: 180.0 q. FIELD TECHNICIANS: AI, SS, KA, CS, DL COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 29.2 g. COUNTING SYSTEM I.D.: M01/D21, M02/D2 CAL. DUE: 6/01/06

GRID	SAMPLE	DEPL	OY	RET	RIV	AN/	ALÝS	IS	MID-	TIME	CNT	GROSS	GROSS	RADON	865 ± 484		AND AND S
LOCATION	l. D.	HR	MIN	HR	MIN	MO	DA	YR	HR	MIN	(MIN)	COUNTS	WT IN	pCi/m²s	pCi/m²s	pCi/m²s	COMMENTS:
GHP2-82	G82	15	31	16	37	10	27	5	17	33	1	7290	229.6	13.6	1.36	0.03	
GHP2-83	183	9	52	9	52	5	24	6	13	9	1	7415	222.3	12.2	1.22	0.03	
GHP2-84	184	9	53	9	53	5	24	6	13	10	1	.9015	219.1	14.9	1.49	0.03	·
GHP2-85	185	9	54	9	54	5	24	6	13	10	1	2192	220.8	3.4	0.34	0.03	
GHP2-86	G86	15	18	16	27	10	27	5	17	20	1	1817	225.7	3.2	0.32	0.03	
GHP2-87	G87	15	20	16	28	10	27	5	17	22	1	2934	209.7	5.3	0.53	0.03	
GHP2-88	G88	10	40	11	5	10	27	5	16	39	1	3157	224.5	6.1	0.61	0.04	
GHP2-89	G89	10	41	11	3	10	27	5	16	40	2	1421	224.3	1.1	0.11	0.04	
GHP2-90	G90	10	50	11	2	10	27	5	16	57	2	1269	224,2	1.0	0.10	0.04	
GHP2-91	191	10	7	10	7	5	24	6	13	18	1	1877	224.7	2.9	0.29	0.03	
GHP2-92	192	10	5	10	5	5	24	6	13	18	1	1133	230.6	1.7	0.17	0.03	414444444444444444444444444444444444444
GHP2-93	193	10	2	10	2	5	24	6	- 13	16	3	2630	227.1	1.2	0.12	0.03	
GHP2-94	194	10	0	10	0	5	24	6	13	16	3	2238	225.3	1.0	0.10	0.03	
GHP2-95	195	9	58	9	58	5	24	6	13	12	.1	6342	225.2	10.4	1.04	0.03	
GHP2-96	196	9	56	9	56	5	24	6	13	12	1	4364	219.5	7.1	0.71	0.03	
GHP2-97	197	10	16	10	16	5	24	6	13		1	3325	222.5	5.3	0.53	0.03	
GHP2-98	198	10	15	10	15	5	- 24	6	13	22	2	1687	223.6	12	0.12	0.03	
GHP2-99	199	10	12	10	12	5	24	6	13	20	1	5289	226.1	8.6	0.86	0.03	,
GHP2-100	· I100	10	10	10	10	5	24	6	13	20	1	2217	216.5	3.5	0.35	0.03	
	AVERAGE	RADON	I FLU	X RA	TE FO	DR T	HE G	HP-2	2 CO'	VER	REGION	•		6.8	pCi/m²s		
											MIN	NIMUM FLU	UX RATE	0.5	pCi/m²s		

MAXIMUM FLUX RATE 42.7 pCi/m²s

PROJECT: RADON FLUX MEASUREMENTS, GAS HILLS, WY

PROJECT NOS.: 05003.01; 05003.02

PILE:GHP-2 REGION:COVER SURFACE: SOIL AIR TEMP MIN:43°F WEATHER:RAINED 0.12" AFTER "I" BATCH PLACEMENT "G" BATCH DEPLOYED CHARCOAL BKG: 147 cpm 10 24 5 RETRIEVED: 10 25 5 Wt. Out: 180.0 g. "I" BATCH DEPLOYED 5 22 6 RETRIEVED: 5 23 6 CHARCOAL BKG: 150 cpm Wt. Out: 180.0 **a** .-FIELD TECHNICIANS: AI, SS, KA, CS, DL COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 29.2 α. COUNTING SYSTEM I.D.: M01/D21, M02/D2 CAL. DUE: 6/01/06

BLANK CANISTER ANALYSIS:

GRID	SAMPLE	EPLC)Y F	ETR	IV AN	IALY:	SIS	M	D-TI	ME 👘	CNT	GROSS	GROSS	RADON	≥ ± \$	્યું <mark>LLD</mark> ્યું	
LOCATION	I. D.	HR	MIN	HR	MIN	MO	DA	YR	HR	MIN	(MIN)	COUNTS	WT IN	pCi/m²s	pCi/m²s	pCi/m²s	COMMENTS:
BLANK	G blank 1	. 4	10	4	39	10	11	5	11	5	10	4219	213.9	0.66	0.07	0.04	CONTROL
BLANK	G blank 2	10	18	17	10	10	27	5	17	4	10	1879	210.4	0.06	0.02	0.03	CONTROL
BLANK	G blank 3.	14	. 30	17	10	10	27	5	17	38	10	2868	197.1	0.25	0.03	0.03	CONTROL
BLANK	l blank 1	9	20	9	28	5	24	6	14	36	10	1560	209.0	0.01	0.02	0.03	CONTROL
BLANK	l blank 2	9	21	9	29	. 5	24	6	14	36	10	1687	211.0	0.03	0.02	0.03	CONTROL
AVERAGE B	LANK CANIS	TER /	ANALY	SIS I	FOR T	HE G	HP-	2 CC	VER	REGI	ON:			0.20	pCi/m²s		

Page 1 of 1

Appendix D

Map, Figure D-1



10-ft Contour Interval

GHP-2 Repository 2005 Canister Location

GHP2 NS-4; NS-5; NS-10 Thru NS-12; NS-17 Thru NS-19; NS-23 Thru NS-25; NS-29 Thru NS-31; NS-33 Thru NS-36; NS-40 Thru NS-46; NS-51 Thru NS-57; NS-59 Thru NS-65; NS-69 Thru NS-82; NS-86 Thru NS-90. Deployed October 24, 2005 Retrieved October 25, 2005

GHP-2 Repository 2006 Canister Location

GHP2 NS-1 Thru NS-3; NS-6 Thru NS-9; NS-13 Thru NS-16; NS-20 Thru NS-22; NS-26 Thru NS-28; NS-32; NS-37 Thru NS-39; NS-47 Thru NS-50; NS-58; NS-66 Thru NS-68; NS-83 Thru NS-85; NS-91 Thru NS-100. Deployed May 22, 2006 Retrieved May 23, 2006

