Umetco Minerals Corporation

40-8681

WHITE MESA MILL • P.O. BOX 669 • BLANDING, UTAH 84511
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March 21, 1991

Mr. Ramon E. Hall, Director
U. S. Nuclear Regulatory Commission
Region IV
Uranium Recovery Field Office
Box 25325
Denver, CO 80225

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URFO
RECEIVED

Re: Umetco Minerals Corporation
SUA-1358: Docket No. 40-8681
White Mesa Mill, Utah
EPA NESHAPs Monitoring

Dear Mr. Hall:

Attached are three copies of the report on the results of NESHAPs radon monitoring on Cells 2 and 3 at the White Mesa Mill.

If I can answer any questions that you may have, please feel free to contact me.

Sincerely yours,

John S. Hamrick

John S. Hamrick
Site Environmental Coordinator

Inc.

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40-8681 UMETCO MINERALS CORPORATION

NESHAPS RADON FLUX MEASUREMENT PROGRAM

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NESHAPS RADON FLUX MEASUREMENT PROGRAM

White Mesa Mill

December 1990

ARIX

A Professional Corporation

Engineers Architects Planners

760 Horizon Drive
Grand Junction, Colorado 81506-3983

9104100255

91-0351

40-8681

NESHAPS RADON FLUX MEASUREMENT PROGRAM

White Mesa Mill

Prepared for:

Umetco Minerals Corporation
P. O. Box 669
Blanding, Utah 84511

Prepared by:

ARIX, A Division of Versar, Inc
760 Horizon Drive
Grand Junction, Colorado 81506

December 1990

w/ltr 3/21/91
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Table of Contents

NESHAPS RADON FLUX MEASUREMENT PROGRAM

Umetco Minerals Corporation
White Mesa Mill
P. O. Box 669
Blanding, Utah 84511

1.0 INTRODUCTION

During September 1990, ARIX Corporation provided support to Umetco Minerals Corporation (Umetco) regarding their required National Emission Standards for Hazardous Air Pollutants (NESHAPs) Radon Flux Measurement effort on Tailings Cells 2 and 3 at the White Mesa Mill in Blanding, Utah uranium processing facility. These measurements are required of Umetco to show compliance with 40 Code of Federal Regulations, Part 61, Subpart W, National Emission Standards for Radon Emissions from Operating Mill Tailings. At present, there are no Subpart T uranium mill tailings at this site. According to the regulations, the NESHAP for existing mill tailings piles is a flux standard that limits the emission of radon from piles. The standard limits the amount of radon that can be emitted per unit area (m^2) per unit of time (s). This standard is not an average per facility, but is an average per radon source. According to subsection 61.252 Standard, (a) radon-222 emissions to ambient air from an existing uranium mill tailings pile shall not exceed 20 pCi/m^2-s of radon-222. Subsection 61.253 Determining Compliance, states that: "Compliance with the emission standard in this subpart shall be determined annually through the use of Method 115 of Appendix B."

ARIX Corporation (Grand Junction) was contracted to provide radon collectors, field placement/retrieval of said collectors, and lab analysis for calendar year 1990. This report addresses the procedures employed by ARIX to obtain the results presented in Section 6.0 of this report.

2.0 SITE DESCRIPTION

The White Mesa Mill is located south of Blanding, Utah on Highway 191. The mill began operations in 1980 for the purpose of extracting uranium and vanadium from feed stocks. Processing effluents from the operation are deposited in four "lined" cells which vary in depth (reference Figure 6-1). Cells 1-I and 4A are used solely for "liquor" storage, and Cells 2 and 3 are used for sand tailings/liquor deposition.

Cell 2 has a total area of 66.2 acres. This cell was comprised of three source regions that required NESHAPs radon monitoring: approximately 20.9 acres of the cell had a soil cover of varying thickness; exposed dry tailings "beaches" over approximately 18.1 acres; approximately 25.8 acres were considered to be wet tailings "beaches." The remaining 1.4 acres were covered by standing liquid in "low" elevation areas. At the time of the monitoring effort, Cell 2 was not actively receiving tailings deposition.

Cell 3 has a total area of 68.9 acres. This cell was comprised of two source regions that required NESHAPs monitoring: approximately 6.9 acres had exposed dry tailings "beaches" and approximately 24.4 acres were considered to be wet tailings "beaches." The remaining 37.6 acres of the cell had free-standing liquids and required no radon monitoring.

Cell 3 was actively receiving tailings/liquor effluents during the radon measurement period and in some areas was very dynamic. Due to worker health and safety concerns expressed by both Umetco site personnel and ARIX monitoring staff, large areas of the wet beaches of Cell 3 were not investigated due to the extreme instability of the recently placed wet tailings beaches.

3.0 SAMPLER DESCRIPTION

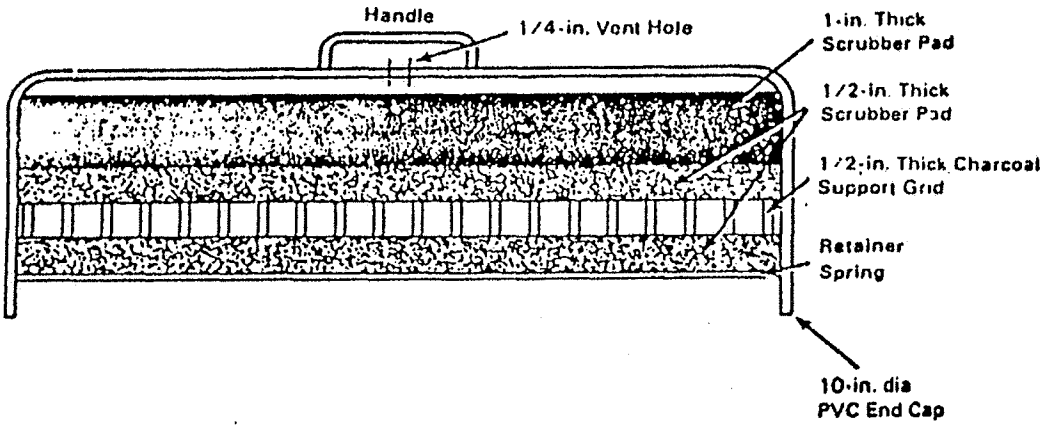
ARIX fabricated Large Area Activated Charcoal Canisters (LAACC) for use by ARIX personnel to perform the required radon measurements. The LAACC were fabricated in conformance with "Radon Flux Measurements on Gardinier and Royster Phosphogypsum Piles near Tampa and Mulberry, Florida" (NTIS Document #PB86-161874) as referenced in 40 CFR, Part 61, Method 115, Appendix B. This method of performing radon flux measurements involves the absorption of radon on activated charcoal in a large-area collector. The charged collector is placed directly on the material surface to be measured and is allowed to collect radon for a given time period (24 hours). The radon collected on the activated charcoal is then measured by means of gamma spectroscopy.

Each LAACC was constructed using a 10-inch diameter PVC end cap, spacer pads, charcoal distribution grid, retainer screens, pads, and a steel retainer ring (see Figure 1).

Prior to deployment, each collector was charged with 180 grams of baked charcoal from sealed individual sample containers (reference Section 5.0 below for laboratory procedures). After the 24 hour measurement period, the exposed charcoal was transferred to the plastic sample containers, sealed air-tight (with tape), labeled as to sample identification along with exposure times/dates, and transferred to the ARIX laboratory (Grand Junction, Colorado) facility for analysis.

Figure 1

Large Area Radon Collector (LAACC)



From Appendix A, page A.1, "Radon Flux Measurements on Gardinier and Royster Phosphogypsum Piles near Tampa and Mulberry, Florida" (NTIS Document #PB86-161874).

4.0 FIELD OPERATIONS

4.1 General Site Specific Information

Prior to commencement of field work operations, the Client provided ARIX with base maps detailing Cells 2 and 3. A grid coordinate location system was developed for each cell to accommodate locating the samplers in the field. East/west and north/south (0 lines) were established for each cell and then a 100-foot traverse grid was developed off of each baseline.

In order to perform the required 500 NESHAPS radon measurements, two field trips were scheduled to obtain the measurements. The first sampling effort (September 5 through September 11) dealt with the three source regions on Cell 2 (wet and dry beaches and the cover area). The second sampling effort (September 24 through September 27) dealt with the two source regions on Cell 3 (wet and dry beaches).

The first sampling effort commenced on September 5, 1990. After site specific health and safety training provided by Umetco Health and Safety personnel, ARIX field technicians laid out the baselines and traverse grid system on Cell 2 utilizing measuring tape, transit and line-of-sight. The grid coordinates were identified both on the field maps and grid lath stakes in the field. Boundary distinctions between the three source regions were established by visual inspection and so noted on the field maps. ARIX personnel also activated a weather station, located along the north edge of Cell 2 (grid coordinates W 2200, 0 S), to provide a continual record of ambient air temperatures to assure compliance with the 35°F measurement criterion. (See Section 4.5 for site atmospheric conditions and Appendix A for complete temperature support data.)

The second sampling effort was originally scheduled to commence on September 17, 1990. After arrival at the site, excessive measurable rainfall (greater than 0.01") required a re-schedule as measurement rainfall sampling criterion was exceeded. This effort was re-scheduled and commenced on September 24,

1990. This effort was concentrated on the two source regions of Cell 3. Prior to placement of samplers on Cell 3, the wet beach region, precipitation was 0.01" within the preceding 24-hour period. Since projected weather conditions called for clearing weather and the sample area was to be wet beaches, it was agreed by the Client Representative and ARIX Field Supervisor to commence sampling efforts.

4.2 Sampler Placement

Radon measurements were made in conformance with methods described in NTIS Document #PB86-161874 for each 100 sample measurement set for each source region. In addition to the 100 samples, each sample set consisted of 5% field blanks. The spacing distribution for each set of 100 measurements was determined by visual means and a "best fit" distribution pattern for each source region. Field personnel safety was paramount in the distribution of samplers over "wet beach" regions due to the loose, unconsolidated condition of the saturated tailings, which are similar in consistency to "quicksand."

Placement of collectors was accomplished from a vehicle where possible and by foot travel where required, due to access. A collector was chosen and the retaining ring, screen and foam pad removed to expose the charcoal support grid. A pre-measured charcoal charge was selected from a batch, opened and distributed evenly across the area of the support grid. The collector was then re-assembled and gently placed face down on the surface to be measured. Care was exercised not to "push" the device into the soil surface. The collector rim was "sealed" to the surface using a berm of local borrow material (either tailings or soil) to reduce dilution due to air or wind currents within the collector.

A sample identification number was then assigned to the collector. Sample numbers utilized an alpha-numeric system composed of the charcoal batch letter (i.e., A, B, C . . .) followed by a sequential number indicating the placement (i.e., 001, 002, . . .). This sample identification number was recorded on an adhesive label and placed on the top of the collector. The grid location,

sample ID, date and time of placement were recorded on a master data sheet for each set of measurements. The charge container was retained for sample retrieval upon completion of the measurement time period (24 hours).

During placement of charcoal flux collectors, five field blanks were collected. The procedure for field blanks was to charge a collector with charcoal, and place it inside an air-tight container. The blank remained in the sealed collector for the 24-hour sample time period. Upon retrieval of the collectors, the field blanks were retrieved and the charcoal charge returned to a container, sealed, and labeled as such, and returned for analysis along with the measurement set.

4.3 Sampler Retrieval

Retrieval of the collectors followed the same pattern as placement. The collectors were disassembled and the charcoal charges remove by pouring from the collector into a large funnel suspended above a sample charge container. The sample ID number was transferred to the charge container which was sealed and placed in a box for transport. The date and time of retrieval were recorded on the same data sheet as the sample placement information.

Sample data sheets accompanied the shipment to the laboratory. ARIX personnel assured timely delivery of the samples to the ARIX Grand Junction laboratory for prompt analysis of the charcoal samples.

Collectors were periodically scanned with a GM-tube for alpha/beta radiation to prevent measurement bias due to equipment contamination. Replacement of contaminated components (e.g., screens, foam spacers) was performed as needed to prevent such bias.

4.4 Site Exit

ARIX field personnel and equipment were alpha scanned for possible contamination resulting from field work activities. All equipment was surveyed and

released for unrestricted use by Umetco Health and Safety personnel. All field personnel surveyed were found to have no detectable radioactive contamination and were released from the site.

4.5 Environmental Conditions during Measurement Periods

Referencing 40 CFR, Part 61, Subpart W, Appendix B, Method 115 - Monitoring for Radon-222 Emissions, Subsection 2.1.4 - Restrictions to Radon Flux Measurements, "the following restrictions are placed on making radon flux measurements:

(a) Measurements shall not be initiated within 24 hours of a rainfall.

(b) If a rainfall occurs during the 24 hours measurement period, the measurement is invalid if the seal around the lip of the collector has washed away or if the collector is surrounded by water.

(c) Measurements shall not be performed if the ambient temperature is below 35°F or if the ground is frozen."

Site Specific Discussion

(a) For this measurement sampling program, rainfall did not affect measurement initiation except on September 17 which required a site rescheduling. Prior to commencement of any sampler placement, rainfall amounts (if any) were confirmed at the Umetco weather station rain gauge.

(b) Rainfall did occur during placement of samplers on September 6, 1990 (dry beach region, Cell 2). Sampler placement was terminated as rainfall increased. Total number of samplers placed was 94 of the 100 measurement sample set. Recovery was 100% of the placed detectors; no wash of seals was noted.

(c) During all 24-hour sample set placements, the minimum ambient air temperature recorded was 51°F. In addition to continuous ambient air temperature monitoring, ARIX field personnel performed high/low soil surface temperature measurements for each 24-hour sampling period at selected sample locations. Of all sample periods the maximum soil temperature observed was 124°F, while the observed minimum was 39°F. (Environmental conditions are presented on Table 1 and complete copies of weather station data are presented in Appendix A - Support Documents.)

Table 1

NESHAPS Radon Monitoring
Environmental Conditions at White Mesa Mill, Utah
September 1990

Date	Sample Subject	Ambient Temperature (°F) minimum/maximum	Soil Temperature (°F) Location		min/max	Comments
9/6 - 9/7	Cell 2 - Dry Tailings	60/83	S0150	W1250	50/115	Precipitation during placement, 94 samplers placed, 100% recovery.
			S0200	W2800	61/ 97	
			S0200	W3200	59/ 95	
			S0400	W0800	46/109	
			S0450	W1850	55/113	
9/8 - 9/9	Cell 2 - Cover	61/94	S0010	W0010	55/124	
			S0300	W0300	57/115	
			S0700	W0700	59/111	
			S0900	W0300	61/117	
9/10 - 9/11	Cell 2 - Wet Tailings	63/91	S0125	W1100	73/ 73	
			S0200	W3250	64/102	
			S0300	W2400	64/100	
			S0830	W1570	63/ 90	
9/24 - 9/25	Cell 3 - Wet Tailings	51/80	S0100	W2250	55/ 93	Precipitation of 0.01" within preceding 24-hour period.
			S0450	W0350	64/ 64	
			S0750	W0075	73/ 73	
9/25 - 9/26	Cell 3 - Dry Tailings	52/81	S0390	W0760	81/ 81	
			S0400	W1150	52/ 95	
			S0830	W0200	39/120	

5.0 LABORATORY OPERATIONS

5.1 Introduction

Activated charcoal gas absorption collectors are passive sampling devices used to determine the flux rate of radon-222 gas from a surface area. The charcoal canister used consists of a 10-inch PVC cap containing a bed of 180 grams of activated, granular charcoal placed in a distribution grid on top of a 1½ inch thick layer of foam and secured under a ½ inch foam layer and a galvanized steel screen by a retaining ring.

Sample collection is initiated by placing 180 grams of unexposed charcoal from a sealed container into the above described canister and, after securing the retaining ring, placing the canister (open face down) onto the surface to be tested. Radon gas is adsorbed on the contained charcoal and subsequent radioactive decay of the entrained radon results in the occurrence of radioactive lead-214 and bismuth-214 in the canister. These radon progeny isotopes emit characteristic gamma photons which can be detected. The original total activity of the adsorbed radon can be calculated from these gamma ray measurements using empirical calibration factors derived from cross-calibration of source standards containing a known total activity of radium-226 in a geometry identical to the samples to be counted.

5.2 Apparatus

- Single- or multi-channel pulse height analysis system, Ludlum Model 2200 with a Teledyne 3" x 3" NaI(Tl) detector.
- Lead shielded counting well approximately 40 cm deep with 5 cm thick lead walls and a 7 cm thick base and 5 cm thick top.
- NBS traceable aqueous solution radium-226 absorbed onto 180 grams of activated charcoal check source and Eberline Model CS-7A cesium-137 check source.
- Ohaus Model C501 balance with 0.1 gram sensitivity.

5.3 Analysis Procedure

Inspection of the Charcoal Container

Charcoal was received at the analytical laboratory in the sealed sample containers. Upon receipt, the integrity of the container was verified by inspection of the plastic container per se, as well as the sealing tape.

Sample Identification Numbers

Each sample container had a unique sample identification number which was determined in the field, and written onto a label attached to the sample container.

Drying and Recycling

All charcoal was dried before use in the field for radon flux measurements. Procedures were the same for newly prepared charcoal and for charcoal recycled after field use. Charcoal was dried at 110°C. Drying procedures were as follows:

- Oven temperature set to 110°C.
- Charcoal placed in the oven in a metal baking tray.
- Dried for 24 hours.
- Immediately after the tray was removed, exactly 180 grams of charcoal were transferred into clean sample containers and sealed with plastic tape.

5.4 Weighing and Background Counting

Proper balance operation was verified daily by checking with a standard weight. The balance readout should agree with the known standard weight to within ± 0.1%. If a discrepant readout was obtained, the balance was re-zeroed, the check weight wiped with a soft, lint-free cloth, and re-weighed. If the discrepancy persisted, the balance would have been removed from service and tagged "Out of Service." (For this project, the scale conformed for each day of use.)

After acceptable balance checkout, each empty container was individually placed on the balance and the tare weight of the container was documented to the nearest 0.1 grams on the label. The scale was re-zeroed with the container on the balance. Charcoal was carefully added to the container until the readout registered exactly 180 grams. The lid was immediately placed on the container and sealed with plastic tape. The tape was stretched slightly while wrapping around the container. The end of the tape was folded to form a tab for easy tape removal. The balance was checked for readout drift between each container weighing step.

Gamma ray counting system checkout was performed as described in Section 5.6. A five-minute background count was acquired for five containers selected at random to represent the "batch." Each sealed container was placed individually in the shielded counting well, with the bottom of the container centered on the detector. Observed container background counts must fall within the range of 190 ± 30 cpm using the existing Ludlum/Teledyne counting system, shielded well, and 4-inch high by 3-inch diameter containers. The background count rate was documented for the five containers on the respective "Radon Flux Field Data Sheet" for that batch. If the background counts were higher than the count range above, the entire batch was labeled non-conforming and recycled through the drying process.

5.5 Receipt and Weighing of Exposed Charcoal

Containers of exposed charcoal were delivered to the laboratory for analysis by common carrier. The laboratory staff was responsible for receipt, log-in, weighing and inspection of the exposed canisters; inspection of the documentation forms; and entry of the required documentation to data base spreadsheets.

When the containers were received, the following items were inspected:

- Container was closed and sealed with tape.
- Container was not damaged.
- Data sheet was complete.
- Discrepancies found during the receipt inspection were documented on the data sheet.

Containers received open or damaged resulting in seal failure were considered void and were not analyzed. (All containers received during this analysis effort were of sound integrity.)

After receipt inspections, sealing tape was removed from conforming containers and were then weighed on a balance to the nearest 0.1 gram and the gross weight was logged on the "Radon Flux Field Data Sheet" under the appropriate column.

5.6 Gamma Ray Counting

Source/Background Checks

The charcoal gamma ray counting system was subjected to performance checks daily when used. These checks included background cesium-137 and radium-226 check source measurements. (Appendix A contains daily counting system performance check records.)

Sample Analysis

- The length of count time was determined by the activity of the sample being analyzed. A minimum of 1000 counts above background had to be accrued for any given sample.
- The sample container was placed in the counting well with the lid side up and the center on the NaI detector and the shielded well door was moved into place.
- One sample count was accrued and the mid-sample count time and date was documented on the field data sheet.
- The sample counts were documented on the field data sheet filed for data reduction.
- The above steps were repeated for each exposed sample collector.
- 10% of the containers counted on a given date were selected for recounting. These containers were recounted no sooner than 1 day and no longer than 10 days following the original count.

5.7 Quality Control Samples

Charcoal flux measurement QC samples included the following intra-laboratory analytical objectives as required in 40 CFR, Part 61, Subpart W, Appendix B, Method 115, 4.0 - Quality Assurance Procedures for Measuring Ra-222 Flux, D.:

- recounts, 10%, and
- equipment blanks, 5%.

In addition to the above described required quality control samples, ARIX performed side-by-side measurements at 10% of the locations measured within each region for comparative analysis. These samples were statistically evaluated for completeness, precision and accuracy. (Note: Reference Appendix B for entire summary analysis of recount, equipment blank, and sice-by-side measurement results.)

5.8 Data Validation - Recounts/Blanks

All sample canister data were subjected to validation protocols. The following presents data validation results by specific source regions by cell:

Cell 2 - Dry Beaches

Twelve recount measurements were performed by conducting replicate analyses of individual field samples. These recount measurements comprised 13% of the field measurements. The precision of the recount measurements ranged from less than 1% to 5% with a mean precision of 2%. This recount precision is well within the expected variability of the analytical method.

Five equipment blanks were analyzed by measuring the radon progeny activity in samples subjected to all aspects of the measurement process, excepting exposure to the source region. These blank sample measurements comprised 5% of the field measurements. The results of the blank sample analyses ranged from less than 0.1 to 0.3 pCi/m^2-s. This mean blank value corresponds to 1% of the regulatory limit of 20 pCi/m^2-s.

Cell 2 - Wet Beaches

Ten recount measurements were performed by conducting replicate analyses of individual field samples. These recount measurements comprised 10% of the field measurements. The precision of the recount measurements ranged from less than 1% to 14% with a mean precision of 4%. This recount precision is well within the expected variability of the analytical method.

Five equipment blanks were analyzed by measuring the radon progeny activity in samples subjected to all aspects of the measurement process, excepting exposure to the source region. These blank sample measurements comprised 5% of the field measurements. The results of the blank sample analyses ranged from less than 0.1 to 0.1 pCi/m^2-s. This mean blank value corresponds to 1% of the regulatory limit of 20 pCi/m^2-s.

Cell 2 - Cover

Ten recount measurements were performed by conducting replicate analyses of individual field samples. These recount measurements comprised 10% of the field measurements. The precision of the recount measurements ranged from less than 1% to 15% with a mean precision of 5%. This recount precision is well within the expected variability of the analytical method.

Five equipment blanks were analyzed by measuring the radon progeny activity in samples subjected to all aspects of the measurement process, excepting exposure to the source region. These blank sample measurements comprised 5% of the field measurements. The results of the blank sample analyses ranged from less than 0.1 to 0.2 pCi/m^2-s. This mean blank value corresponds to 1% of the regulatory limit of 20 pCi/m^2-s.

Cell 3 - Dry Beaches

Fourteen recount measurements were performed by conducting replicate analyses of individual field samples. These recount measurements comprised 14% of the field measurements. The precision of the recount measurements ranged from 1% to 7% with a mean precision of 3%. This recount precision is well within the expected variability of the analytical method.

Seven equipment blanks were analyzed by measuring the radon progeny activity in samples subjected to all aspects of the measurement process, excepting exposure to the source region. These blank sample measurements comprised 7% of the field measurements. The results of the blank sample analyses ranged from less than 0.1 to 0.6 pCi/m^2-s. This mean blank value corresponds to 3% of the regulatory limit of 20 pCi/m^2-s.

Cell 3 - Wet Beaches

Sixteen recount measurements were performed by conducting replicate analyses of individual field samples. These recount measurements comprised 16% of the field measurements. The precision of the recount measurements ranged from less than 1% to 8% with a mean precision of 4%. This recount precision is well within the expected variability of the analytical method.

Five equipment blanks were analyzed by measuring the radon progeny activity in samples subjected to all aspects of the measurement process, excepting exposure to the source region. These blank sample measurements comprised 5% of the field measurements. The results of the blank sample analyses ranged from less than 0.1 to 1.1 pCi/m^2-s. This mean blank value corresponds to 1% of the regulatory limit of 20 pCi/m^2-s.

As presented above, actual QC validation met the objective parameter requirements.

5.9 Data Validation - Side-by-Side Measurements

Side-by-side measurements were performed at 10% of all sample measurement locations. These side-by-side measurements were performed within inches of the respective field sample location. As the below data results indicate, an overall average a precision of 43% was observed. While this overall average precision falls outside of a typically accepted objective of 20%, we feel the data are valid. Validation exercises included confirming daily equipment source checks, equipment calibrations, raw data computer entry, and computer data base formula reviews.

5.10 Calculations

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

In practice, radon flux rates were calculated by a data base computer program. The algorithms utilized by the data base program were as follows:

Equation 5.1:

$$\text{Uncorrected pCi Rn-222/m}^2\text{sec} = \frac{N}{[Ts*A*b*0.5^{(d/91.75)}]}$$

where: N = net sample count rate, cpm under 220-662 keV peak
Ts = sample duration, seconds
b = instrument calibration factor, cpm per pCi; current value: 0.1827
d = decay time, elapsed hours between sample mid-time and count mid-time
A = area of the collector, m^2

Equation 5.2:

$$W_f = (Cg - C_t)*x$$

where: W_f = empirical water vapor adsorption correction factor
Cg = canister gross weight, g
C_t = canister tare weight, g
x = slope, moisture gain versus radon adsorption interference

Equation 5.3:

$$\text{Corrected pCi Rn-222/m}^2\text{sec} = W_f(\text{uncorrected pCi/m}^2\text{s}) + (\text{uncorrected pCi/m}^2\text{s})$$

where: W_f = water vapor adsorption correction factor from Equation 5.2
Uncorrected pCi/l = uncorrected radon-222 concentration from Equation 5.1

Equation 5.4:

$$\frac{\sqrt{\frac{\text{Gross sample, cpm}}{\text{Sample count, t, min}} + \frac{\text{Bkgd, cpm}}{\text{Bkgd count t, min}}}}{\text{Net cpm}} \text{ (sample concentration)}$$

2σ error = 2

Equation 5.5:

$$LLD = \frac{(CF)(S_b)}{[Ts*A*b*0.5^{(d/91.75)}]}$$

where: CF = confidence factor of the background standard deviation
S_b = standard deviation of the background count rate
Ts = sample duration, seconds
b = instrument calibration factor, cpm per pCi; current value: 0.1827
d = decay time, elapsed hours between sample mid-time and count mid-time
A = area of the collector, m^2

6.0 SAMPLE RESULTS/CALCULATIONS

Referencing 40 CFR, Part 61, Subpart W, Appendix B, Method 115 - Monitoring for Radon-222 Emissions, Subsection 2.1.7 - Calculations, "the mean radon flux for each region of the pile and for the total pile shall be calculated and reported as follows:

(a) The individual radon flux calculations shall be made as provided in Appendix A EPA 86(1). The mean radon flux for each region of the pile shall be calculated by summing all individual flux measurements for the region and dividing by the total number of flux measurements for the region.

(b) The mean radon flux for the total uranium mill tailings pile shall be calculated as follows:

$$J_s = \frac{J_1A_1 + \ldots J_2A_2 \; [+] \ldots J_iA_i}{A_t}$$

Where: J_s = Mean flux for the total pile (pCi/m^2-s)
J_i = Mean flux measured in region i (pCi/m^2-s)
A_i = Area of region i (m^2)
A_t = Total area of the pile (m^2)

2.1.8 Reporting. The results of individual flux measurements, the approximate locations on the pile, and the mean radon flux for each region and the mean radon flux for the total stack [pile] shall be included in the emission test report. Any condition or unusual event that occurred during the measurements that could significantly affect the results should be reported."

Site Specific Sample Results (reference Figure 1)

(a) The mean radon flux for each region within each cell is as follows:

Cell 2 - Cover Area = 19.5 pCi/m^2-s (based on 84,602 m^2 area)
- Wet Beach Areas = 27.5 pCi/m^2-s (based on 104,359 m^2 area)
- Dry Beach Areas = 117.6 pCi/m^2-s (based on 73,216 m^2 area)
- Standing Liquid Areas = 0 pCi/m^2-s (based on 5,678 m^2 area)

Cell 3 - Wet Beach Areas = 29.5 pCi/m^2-s (based on 98,805 m^2 area)
- Dry Beach Areas = 48.2 pCi/m^2-s (based on 27,944 m^2 area)
- Standing Liquid Areas = 0 pCi/m^2-s (based on 151,964 m^2 area)

Note: Reference Appendix C for entire summary for individual measurement results and specific sample region maps.

(b) Using the data presented above, we have calculated the total mean radon flux for each pile (cell) as follows:

Cell 2 = 49.0 pCi/m^2-s

$$\frac{(19.5)(84,602) + (27.5)(104,359) + (117.6)(73,216) + (0)(5,678)}{267,854}$$

Cell 3 = 15.3 pCi/m^2-s

$$\frac{(29.5)(98,805) + (48.2)(27,974) + (0)(151,964)}{278,744}$$

A P P E N D I X A

Support Documents

Charcoal Ra-226 Standard

4.90 g. of EPA-EMSL Ra-226 #2557-2 was sorbed onto 180 g. of -8+16 activated charcoal contained in 500 ml poly "cottage cheese" jar, dried at 75°C for 96 hours and sealed.

Standard parameters

ID:	GS-04
Mass:	181 g net
Activity:	(4.9 g)(12.1 nCi/g) = 59.3 nCi = 59,300 pCi Ra-226
Sealed:	June 26, 1990
By:	J. W. Davis

J. W. Davis
July 12, 1990

U.S. Environmental Protection Agency
Environmental Monitoring Systems Laboratory-Las Vegas
Nuclear Radiation Assessment Division

PROVISIONAL
Calibration Certificate

Description

Principal radionuclide: RADIUM-226 Half-life: 1600 years

Nominal activity: 61 nano curies

Nominal volume: 5 ml in ampoule/bottle number: 2557-2

Measurement Activity of principal radionuclide

Activity per gram of this solution

12.1 nano curies of Radium-226

October 1989

Activity of daughter radionuclide

The principal activity was accompanied at the quoted time by

curies Per gram

of the daughter nuclide

Total mass of this solution

APPROX. 5.0 grams

Method of measurement

This standard was prepared by gravimetric dilution of NBS Standard Reference Material 4964-B. The specific activity of the dilution was determined by comparing the activity of the 186 Kev gamma emission to several NBS SRM 4957 sources.

Purity

The manufacturer states that activities other than that of the principal nuclide and of its daughter nuclides, if any, were estimated/known to be:

(1)	less than equal to	%	of the principal activity
(2)	less than equal to	%	of the principal activity
(3)	less than equal to	%	of the principal activity

The activity of impurity (1) is not (2) is not (3) is not included in the quoted figures of the principal activity.

Random Errors

The precision of this standard was such that the certified value of the radioactive concentration of the principal activity had a standard error (sm) not greater than ± 2.8 %
(The 99.7% confidence limits are given by t(sm) where t is obtained from the student t factor for the degree of freedom (n-1)).

The maximum uncertainty due to the assessable systematic errors (dilution, counting, and known uncertainty of the standard) is obtained by the separate arithmetic summation of the positive and negative systematic error (+ δ − δ'). These have been estimated not to exceed

+1.8 % or - 1.8 %

the overall uncertainty (often called accuracy) is an estimate of the possible divergence of the quoted result from the true value. It is a combination of random error [t(sm)] at the 99.7% confidence limits and the worst case estimate of the systematic errors (+ δ , − δ')
The overall uncertainty is therefore calculated on the basis of + [t(sm) + δ], − [t(sm) + δ']
and is + 5.0 %, - 5.0 % of the quoted radioactive concentration.

Decay Schemes

This standardization is based on the following assumptions of the principle nuclide, its daughter nuclides and impurities (no allowance for error in these assumptions or the assumption of quoted half-life have been included in the statement of accuracy above).

Radium-226 is a member of the Uranium-238 decay chain.

Radium-226 decays 100 percent by alpha emission to Radon-222.

Chemical Composition of Solution

Carrier content per gram of solution:	Other components:
0.6 micrograms Ba	0.5M HCl

Preservative:

Remarks

The measured value and the expected value using the gravimetric factors and the NBS calibration of SRM-4964B differed by 1.8 percent. The average of the two values was used for this standard. The value is provisional pending a traceability study with NIST.

Data Certificate Prepared October 24, 1989

Approval Signature Paul B. Wahr

Revised 1/84

Ra-226 / NBS

CHARCOAL CANISTER ANALYSIS SYSTEM

Calibration Check Log

System ID: M02 / D20 Calibration Date: 3-15-90

Scaler S/N: M02 High Voltage: 2.12 Window: 4.42 Threshold: 2.20

Detector S/N: D20 Source ID: G-S-04 Source Activity: 59300 pCi

Empty Shield Bkgd. Range, cpm: 2σ = 167 to 207 3σ = 157 to 217

Net Source Range, cpm: 2σ = 10758 to 11160 3σ = 10695 to 11253

Technician Gary W Davis

Date	By	BKG count (1 min. each) 1	2	3	Avg.	Source count (1 min. each) 1	2	3	Avg. Net	* Y/N
9-10-90	GWD	179	201	190	190	11082	11218	11144	10958	Y
"	GWD	184	190	206	193	11006	11138	11088	10884	Y
9-11-90	GWD	179	189	177	182	11100	11179	11226	10981	Y
9-12-90	DLC	184	170	190	181	10994	10664	10870	10528	N
9-13-90	DG	167	185	183	178	10946	10851	10682	10824	Y
9-14-90	DG	190	208	207	202	11246	11031	11037	10903	Y
9-19-90	DG	160	176	161	166	11273	10965	10991	10910	Y
9-20-90	DG	161	172	161	165	10859	~~10642~~ 10835	10878	10698	Y
9-21-90	DG	153	189	165	169	10966	10930	10993	10794	Y
9-28-90	DG	168	176	185	176	10851	10972	11056	10784	Y

* Y/N: Y = daily average net CPM falls within the calibration range.
N = daily average net CPM does not fall within the calibration range.

The acceptable ranges were determined on the calibration date as shown above and are based on a minimum of 10 counting periods of 10 minutes each.

Cs-137

CHARCOAL CANISTER ANALYSIS SYSTEM

Calibration Check Log

System ID: M02/D20 Calibration Date: 3-15-90

Scaler S/N: M02 High Voltage: 2.12 Window: 4.42 Threshold: 2.20

Detector S/N: D20 Source ID: Cs-7A Source Activity: ~8uCi

Empty Shield Bkgd. Range, cpm: 2σ = 167 to 207 3σ = 157 to 217

Net Source Range, cpm: 2σ = 330969 to 335217 3σ = 329907 to 336279

Technician [illegible]

Date	By	BKG count (1 min. each) 1	2	3	Avg.	Source count (1 min. each) 1	2	3	Avg. Net	* Y/N
9-10-90	[illegible]	179	201	190	190	333768	332119	333992	333103	Y
"	[illegible]	184	190	206	193	331714	333009	332410	332185	Y
9-11-90	[illegible]	179	189	177	182	333665	334157	335001	334087	Y
9-12-90	DLC	184	170	190	181	334302	334808	332413	333687	Y
9-13-90	DG	167	185	153	178	329593	330931	329751	330092	Y
9-14-90	DG	190	208	207	202	329462	328675	328726	328752	N
9-19-90	DG	160	176	161	166	335116	335546	329591	333252	Y
9-20-90	DG	161	172	161	165	338810	330932	331676	330974	Y
9-21-90	DG	153	189	165	169	335431	335695	334142	334920	Y
9-28-90	DG	168	176	185	176	331986	332942	331844	332081	Y

* Y/N: Y = daily average net CPM falls within the calibration range.
N = daily average net CPM does not fall within the calibration range.

The acceptable ranges were determined on the calibration date as shown above and are based on a minimum of 10 counting periods of 10 minutes each.

Ra-226 / NBS

CHARCOAL CANISTER ANALYSIS SYSTEM

Calibration Check Log

System ID: M01 / D21 Calibration Date: 9-10-90

Scaler S/N: M01 High Voltage: 3.33 Window: 4.42 Threshold: 2.20

Detector S/N: D21 Source ID: GS-04 Source Activity: 59,200 dpm

Empty Shield Bkgd. Range, cpm: 2σ = 146 to 206 3σ = 136 to 220

Net Source Range, cpm: 2σ = 10174 to 10630 3σ = 10060 to 10744

Technician gwDavis

Date	By	BKG count (1 min. each) 1	2	3	Avg.	Source count (1 min. each) 1	2	3	Avg. Net	* Y/N
9-10-90	gwD	178	201	171	183	10616	10450	10694	10404	Y
"	gwD	189	171	201	187	10581	10688	10594	10434	Y
9-11-90	gwD	196	199	182	192	10418	10737	10575	10383	Y
9-12-90	DG	183	166	183	177					
9-13-90	DG	202	177	193	191	10399	10641	10227	10422	Y
9-14-90	DG	177	200	204	194	10447	10587	10480	10311	Y
9-17-90	DG	172	202	183	186	10619	10496	10632	10396	Y
9-21-90	DG	212	192	192	197	10554	10357	10647	10322	Y
9-28-90	DG	171	183	185	180	10481	10254	10523	10239	Y

* Y/N: Y = daily average net CPM falls within the calibration range.
N = daily average net CPM does not fall within the calibration range.

The acceptable ranges were determined on the calibration date as shown above and are based on a minimum of 10 counting periods of 10 minutes each.

Cs-137

CHARCOAL CANISTER ANALYSIS SYSTEM

Calibration Check Log

System ID: M01 / D21 Calibration Date: 9-10-90

Scaler S/N: M01 High Voltage: 3.33 Window: 4.42 Threshold: 2.20

Detector S/N: D21 Source ID: CS-7A Source Activity: ~8uCi

Empty Shield Bkgd. Range, cpm: 2σ = 146 to 206 3σ = 136 to 220

Net Source Range, cpm: 2σ = 326629 to 329989 3σ = 325289 to 330829

Technician Gaylen Davis

Date	By	BKG count (1 min. each) 1	2	3	Avg.	Source count (1 min. each) 1	2	3	Avg. Net	* Y/N
9-10-90	GWD	178	201	171	183	327805	329035	328624	328305	Y
"	GWD	189	171	201	187	326917	327643	329011	327670	Y
9-11-90	GWD	196	199	182	192	327747	328858	328698	328242	Y
9-12-90	DLC	183	166	183	177	326890	328412	328279	327683	Y
9-13-90	DG	202	177	193	191	325592	326795	326967	326451	Y
9-14-90	DG	177	200	204	194	328015	328932	328806	328390	Y
9-19-90	DG	172	202	183	186	326499	325815	326642	326133	Y
9-21-90	DG	212	192	192	197	330537	330515	330222	330358	Y
9-28-90	DG	171	183	185	180	328030	327797	327744	327677	Y

* Y/N: Y = daily average net CPM falls within the calibration range.
N = daily average net CPM does not fall within the calibration range.

The acceptable ranges were determined on the calibration date as shown above and are based on a minimum of 10 counting periods of 10 minutes each.

Ra-226 / NBS

CHARCOAL CANISTER ANALYSIS SYSTEM

Calibration Check Log

System ID: M02 / D20 Calibration Date: Oct 1, 1990

Scaler S/N: M02 High Voltage: 1.80 Window: 4.42 Threshold: 2.20

Detector S/N: D20 Source ID: G5-C4 Source Activity: 59300 pCi ~~2.2 kBq~~ DG

Empty Shield Bkgd. Range, cpm: 2σ = 167 to 207 3σ = 157 to 217

Net Source Range, cpm: 2σ = 10487 to 11303 3σ = 10283 to 11507

Technician D. Gaucie

Date	By	BKG count (1 min. each) 1	2	3	Avg.	Source count (1 min. each) 1	2	3	Avg. Net	* Y/N
10/01/90	DG	188	194	186	189	10635	10677	10753	10499	Y
10/02/90	DG	171	184	167	174	10547	10528	10510	10354	Y
10/02/90	WTS	186	188	185	186	10762	10573	10668	10481	Y
10/03/90	WTS	177	168	168	171	10948	10883	10887	10735	Y
10/3/90	WTS	177	168	163	171	10585	10515	10782	10456	Y
~~10/04/90~~	~~DG~~									
10/08/90	DG	166	171	165	167	10778	10650	10877	10601	Y
~~10/09/90~~	~~DG~~	~~192~~	~~164~~	~~169~~ DG						
10/15/90	DG	183	180	174	179	10605	10651	10619	10446	Y
10/15/90	DG	203	181	177	187	10628	10824	10633	10528	Y
10/17/90	DG	173	172	164	170	10751	10994	10771	10669	Y
10/18/90	DG	172	165	179	172	10822	10789	11073	10723	Y
10/18/90	DG	160	189	176	175	10544	10754	10872	10549	Y
10/19/90	DG	181	173	181	178	10771	10770	10696	10568	Y
10/22/90	DMR	190	174	190	185	10908	10975	10953	10760	Y
10/23/90	DG	179	172	160	170	11080	10953	10951	10825	Y
10/25/90	DMR	191	172	172	178	10837	10903	11073	10760	Y
10/29/90	WTS	177	164	181	~~1096~~ 174	10962	11168	10826	10811	Y
10/30/90	WTS	163	175	159	166	10442	10571	10466	10327	Y

* Y/N: Y = daily average net CPM falls within the calibration range.
N = daily average net CPM does not fall within the calibration range.

e acceptable ranges were determined on the calibration date as shown above and are based on a minimum of 10 counting periods of 10 minutes each.

Cs-137

CHARCOAL CANISTER ANALYSIS SYSTEM

Calibration Check Log

System ID: M02/D20 Calibration Date: Oct. 1, 1990

Scaler S/N: M02 High Voltage: 1.80 Window: 4.42 Threshold: 2.20

Detector S/N: D20 Source ID: Cs-7A Source Activity: 8 μCi ~~2.2 kBq~~

Empty Shield Bkgd. Range, cpm: 2σ = 167 to 207 3σ = 157 to 217

Net Source Range, cpm: 2σ = 328585 to 343533 3σ = 324848 to 347270

Technician D. L. Logan

Date	By	BKG count (1 min. each) 1	2	3	Avg.	Source count (1 min. each) 1	2	3	Avg. Net	* Y/N
10/01/90	DG	188	194	186	189	337477	339169	339295	338458	Y
10/02/90	DG	171	184	167	174	335491	335816	335828	335538	Y
10/02/90	WTS	186	188	185	186	337906	339998	338920	338755	Y
10/03/90	WTS	177	168	168	171	337403	339611	339484	338662	Y
10/3/90	WTS	177	168	168	171	338018	338068	337951	337841	Y
10/04/90	DG	161	170	179	170	336977	339289	339269	338342	Y
10/08/90	DG	166	171	165	167	339648	341901	340541	340196	Y
10/09/90	DG	192	164	169	175	338050	338651	339264	338480	Y
10/10/90	DG	167	161	175	168	332436	332961	332600	332498	Y
10/15/90	DG	183	180	174	179	328098	329615	329760	328978	Y
10/15/90	DG	205	181	177	187	326980	328420	329452	328097	Y
10/17/90	DG	173	172	164	170	330375	331749	331772	331145	Y
10/18/90	DG	172	165	179	172	~~335621~~ 335621	337310	337457	336634	Y
10/18/90	DG	160	189	176	175	335071	335763	334816	334375	Y
10/19/90	DG	181	173	181	178	337692	337382	337476	337372	Y
10/22/90	MR	190	174	190	185	334986	334586	333053	334003	Y
10/23/90	DG	179	172	160	170	324553	336496	336260	332366	Y
10/25/90	MR	191	172	172	178	331658	334328	333013	332822	Y
10/29/90	WTS	177	164	181	174	335793	337469	337572	336777	Y
10/30/90	WTS	163	175	159	166	334992	333491	335677	334537	Y

* Y/N: Y = daily average net CPM falls within the calibration range.
N = daily average net CPM does not fall within the calibration range.

* acceptable ranges were determined on the calibration date as shown above and are based on a minimum of 10 counting periods of 10 minutes each.

Ra-226 / NBS

CHARCOAL CANISTER ANALYSIS SYSTEM

Calibration Check Log

System ID: M01 / D21 Calibration Date: Oct. 1, 1990

Scaler S/N: M01 High Voltage: ~~2.47 DG~~ 2.57 DG Window: 4.47 Threshold: 2.20

Detector S/N: D21 Source ID: GS-04 Source Activity: ~~2.2 kBq~~ 59,300 pCi

Empty Shield Bkgd. Range, cpm: 2σ = 146 to 206 3σ = 136 to 220

Net Source Range, cpm: 2σ = 10137 to 10793 3σ = 9973 to 10957

Technician D. Garcia

Date	By	BKG count (1 min. each) 1	2	3	Avg.	Source count (1 min. each) 1	2	3	Avg. Net	* Y/N
10/01/90	DG	188	187	194	190	10149	10142	10274	9998	Y
10/02/90	DG	178	179	199	185	10407	10513	10557	10307	Y
10/02/90	WTS	176	165	164	168	10158	10054	9991	9999.7	N
10/02/90	WTS	176	165	164	168	10415	10803	10613	10442	Y
10/03/90	WTS	179	176	178	178	10438	10375	10361	10213	Y
10/3/90	WTS	179	176	178	178	10136	10231	10154	9995	Y
~~10/04/90~~	~~DG~~									
10/08/90	DG	198	171	210	193	10203	10439	10385	~~10238~~ 10149	Y
10/15/90	DG	177	171	195	181	10203	10401	10425	10162	Y
10/15/90	DG	173	156	183	171	~~10038~~ 10093	10155	10181	9974	Y
10/17/90	DG	198	153	149	167	10293	10199	10156	10049	Y
10/18/90	DG	162	186	180	176	10227	10333	10091	10041	Y
10/18/90	DG	195	191	181	189	10197	10155	10426	10070	Y
10/19/90	DG	201	196	169	187	10133	10292	~~10194~~ 10329	10081	Y
10/22/90	GAR	206	194	176	192	10223	10188	10323	10053	Y
10/23/90	DG	190	191	191	191	10362	10348	10368	10168	Y
10/25/90	GAR	178	164	190	177	10311	10467	10520	10256	Y
10/29/90	WTS	215	184	170	190	10463	10406	10499	10266	Y
10/30/90	WTS	175	153	157	162	10603	10494	10490	10367	Y

* Y/N: Y = daily average net CPM falls within the calibration range.
N = daily average net CPM does not fall within the calibration range.

e acceptable ranges were determined on the calibration date as shown above and are based on a minimum of 10 counting periods of 10 minutes each.

Cs-137

CHARCOAL CANISTER ANALYSIS SYSTEM

Calibration Check Log

System ID: M01 / D21 Calibration Date: Oct. 1, 1990

Scaler S/N: M01 High Voltage: 2.57 Window: 4.42 Threshold: 2.20

Detector S/N: D21 Source ID: Cs-7A Source Activity: ~8.4 Ci ~~2.2 kBq~~

Empty Shield Bkgd. Range, cpm: 2σ = 146 to 206 3σ = 136 to 220

Net Source Range, cpm: 2σ = 324135 to 329691 3σ = 322746 to 331080

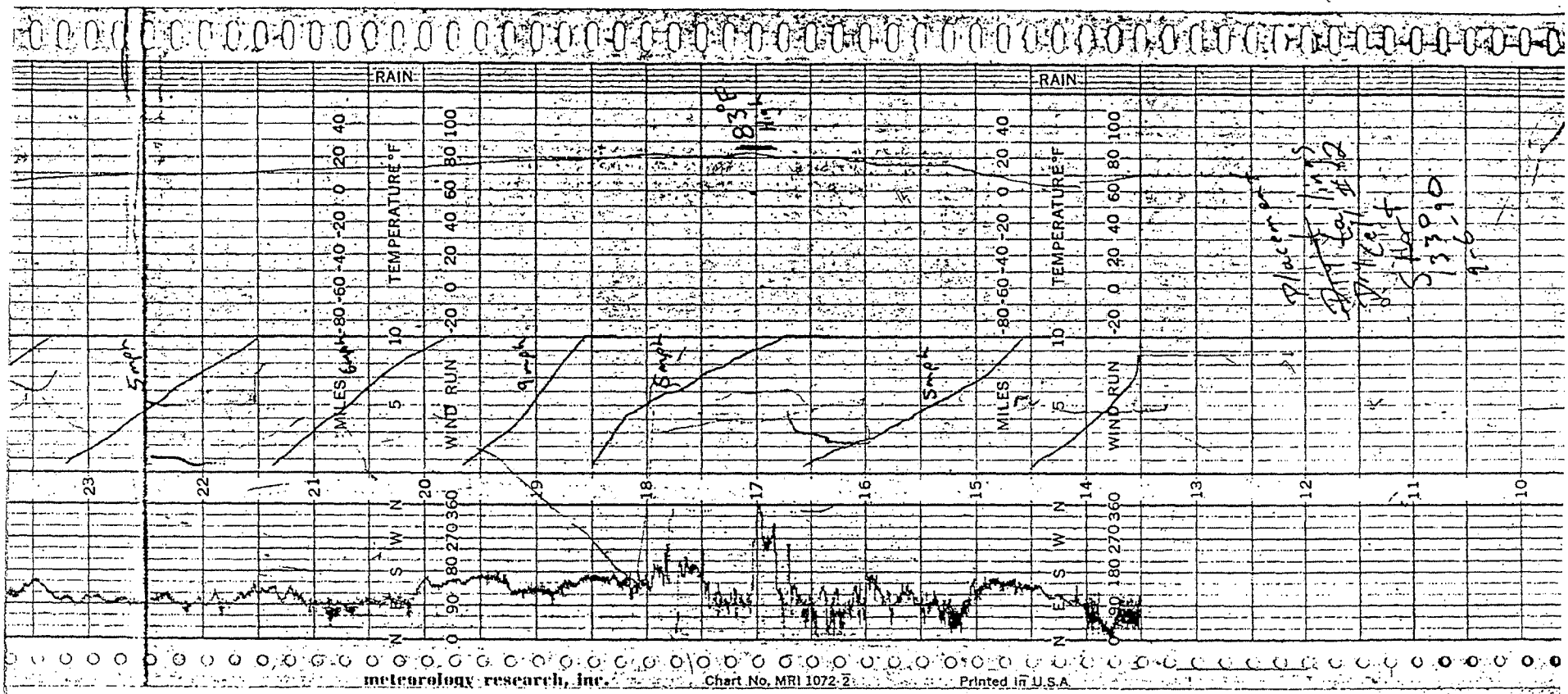
Technician D. L. Cogan

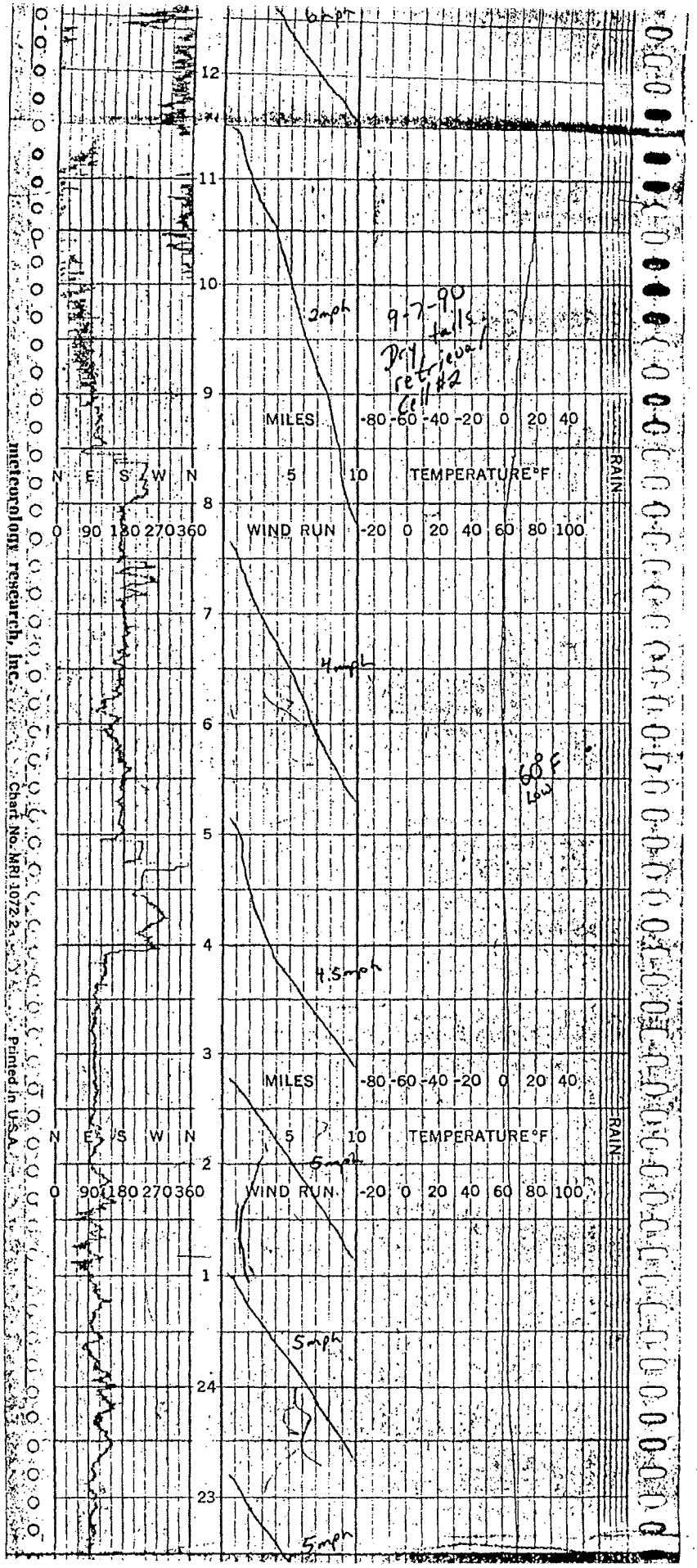
Date	By	BKG count (1 min. each) 1	2	3	Avg.	Source count (1 min. each) 1	2	3	Avg. Net	* Y/N
10/01/90	DG	188	187	194	190	324624	324508	324496	~~324353~~ 324353	Y
10/02/90	DG	178	179	199	~~185~~ 185	325612	327457	327718	326744	Y
10/02/90	WTS	176	165	164	168	324741	326749	326899	325962	Y
10/03/90	WTS	179	176	178	178	318650	319698	320614	319476	N
10/03/90	WTS	179	176	178	178	327118	328101	328130	327605	Y
10/03/90	DG	179	176	178	178	327024	328549	328864	327968	Y
10/04/90	DG	169	185	157	170	327678	329691	327976	328278	Y
10/08/90	DG	198	171	210	193	324526	327409	325927	325761	Y
10/15/90	DG	177	171	195	181	325998	327012	327665	326711	Y
10/15/90	DG	173	156	183	171	324461	325872	325768	325096	Y
10/17/90	DG	198	153	149	167	323421	324882	324819	324207	Y
10/18/90	DG	162	186	180	176	325744	327031	326970	326006	Y
10/18/90	DG	195	191	181	189	325696	327092	326170	326130	Y
10/19/90	DG	201	196	169	187	326547	327973	328676	327545	Y
10/22/90	DAR	206	194	176	192	326425	326599	326684	326379	Y
10/23/90	DG	190	191	191	191	326764	327995	328434	327540	Y
10/25/90	DAR	178	104	190	177	327324	327617	328110	327507	Y
10/29/90	WTS	215	184	170	190	323156	325367	324726	324226	Y
10/30/90	WTS	175	153	157	162	323068	324356	323494	323477	Y

* Y/N: Y = daily average net CPM falls within the calibration range.
N = daily average net CPM does not fall within the calibration range.

e acceptable ranges were determined on the calibration date as shown above and are based on a minimum of 10 counting periods of 10 minutes each.

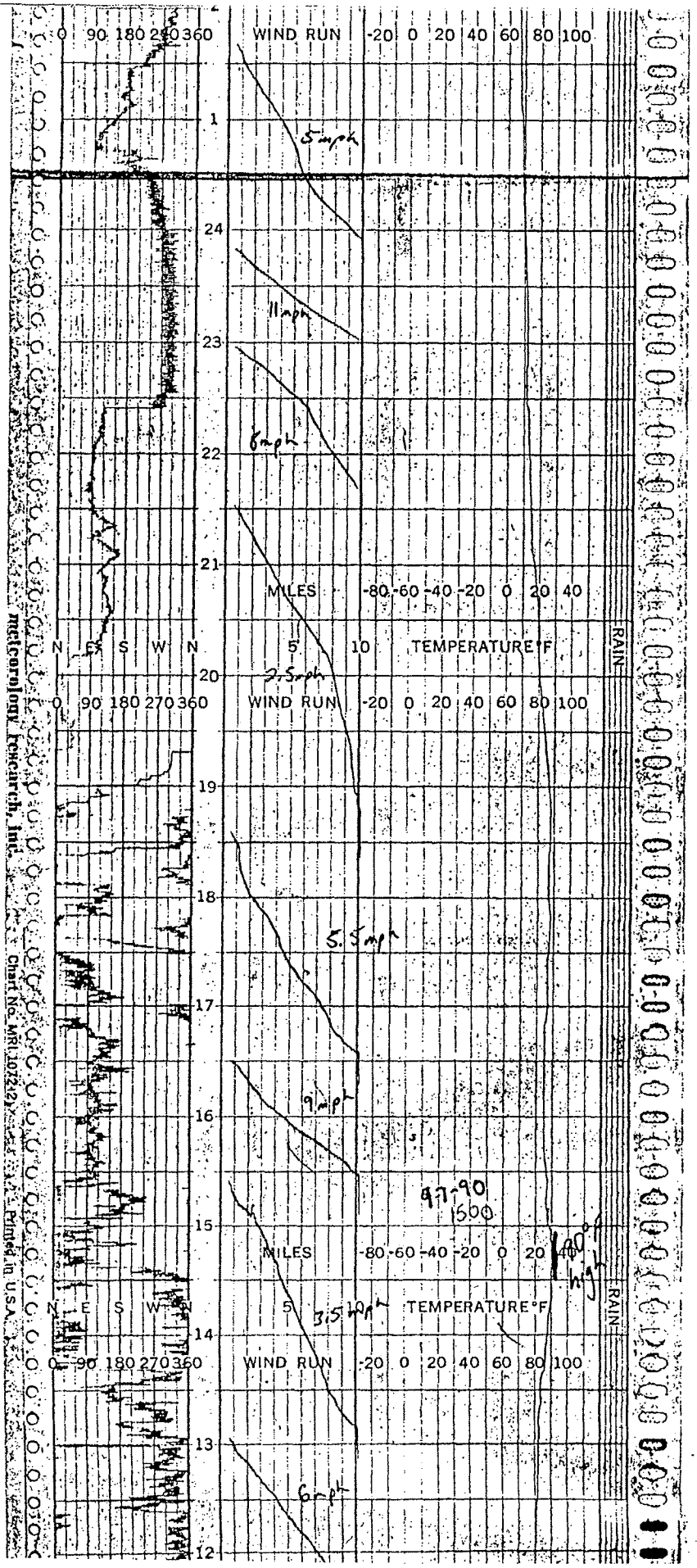
UMETCo
White Mesa
Mill
Blanding, Ut
Cell #2





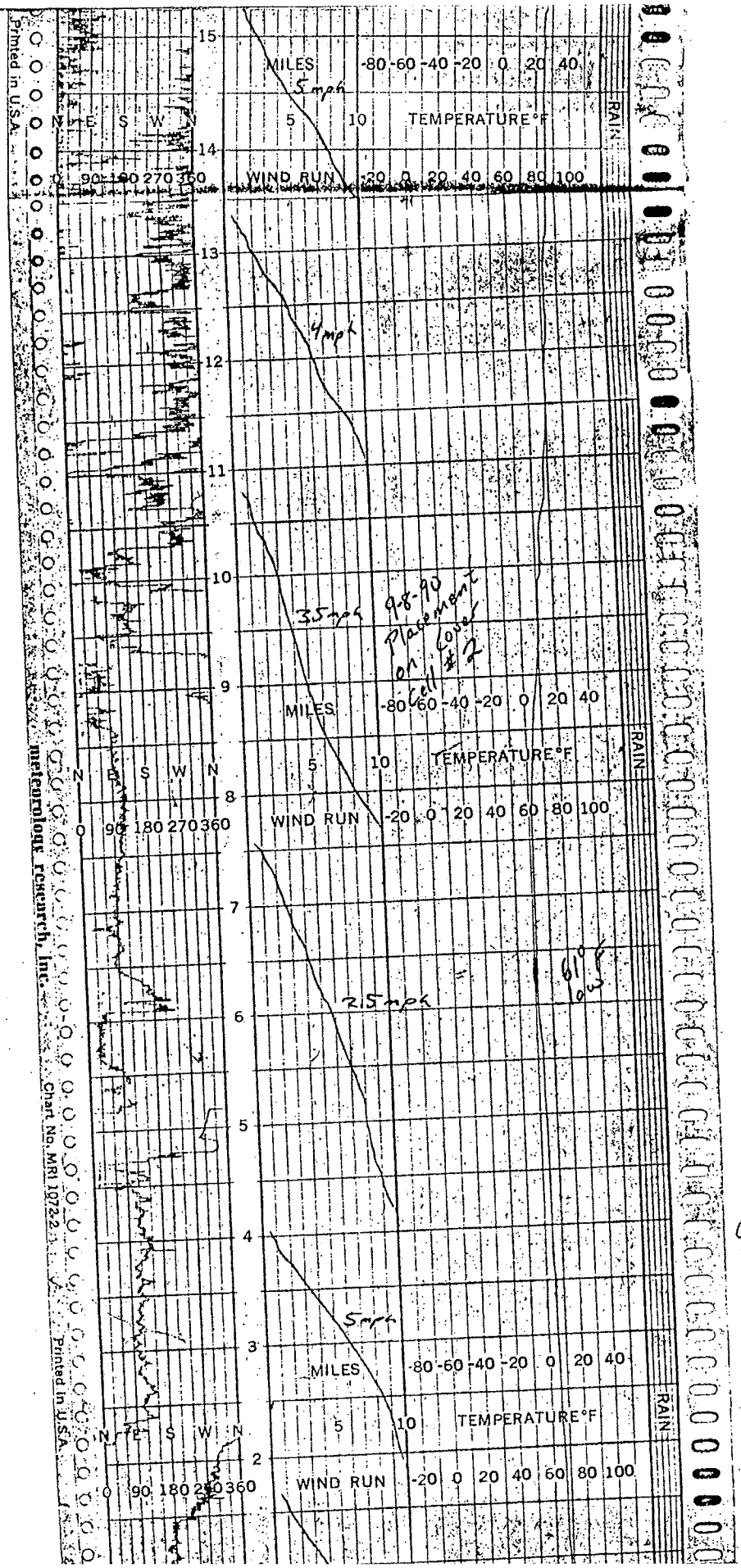
UMETCO
White Mesa
Mill
Blanding Ut
Cell #2

2



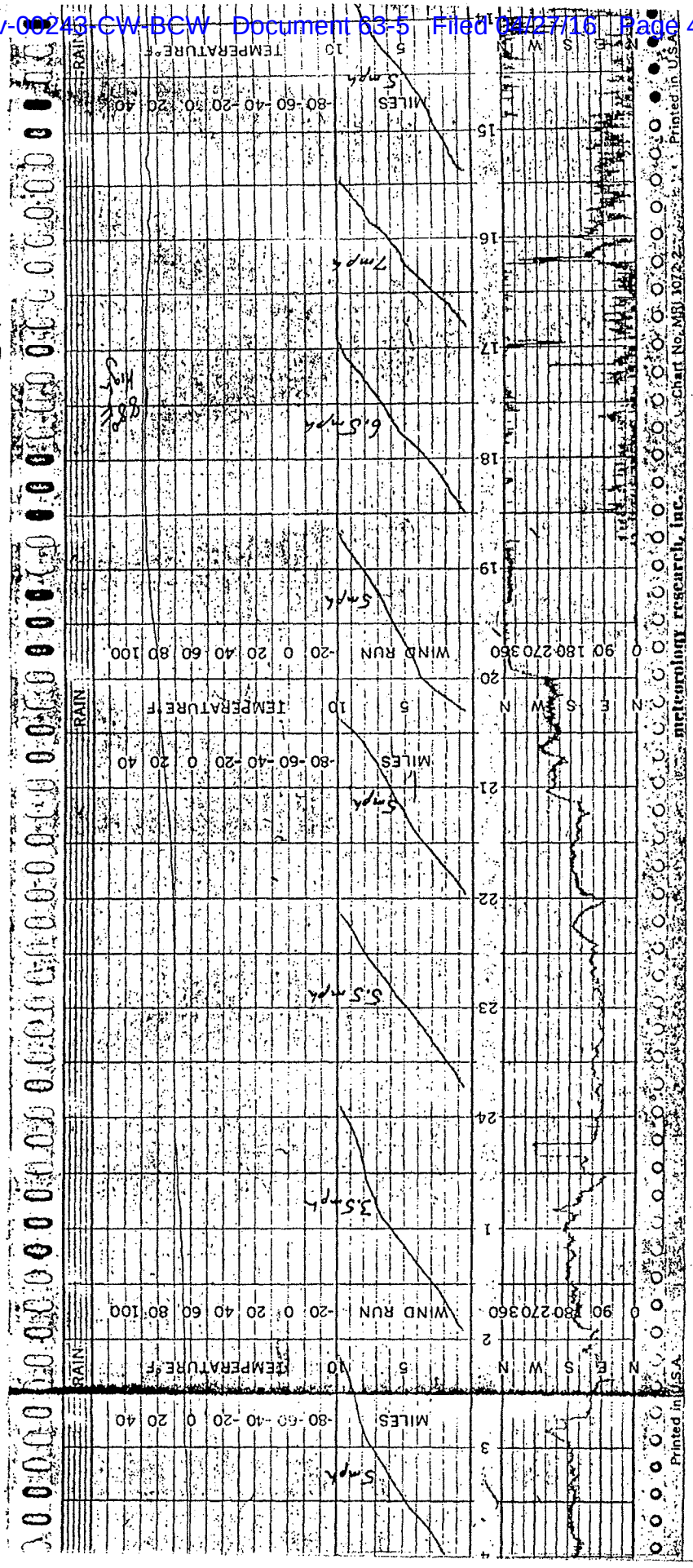
UMETCo
White mesa Mill
Blanding ut
Cell #2

3



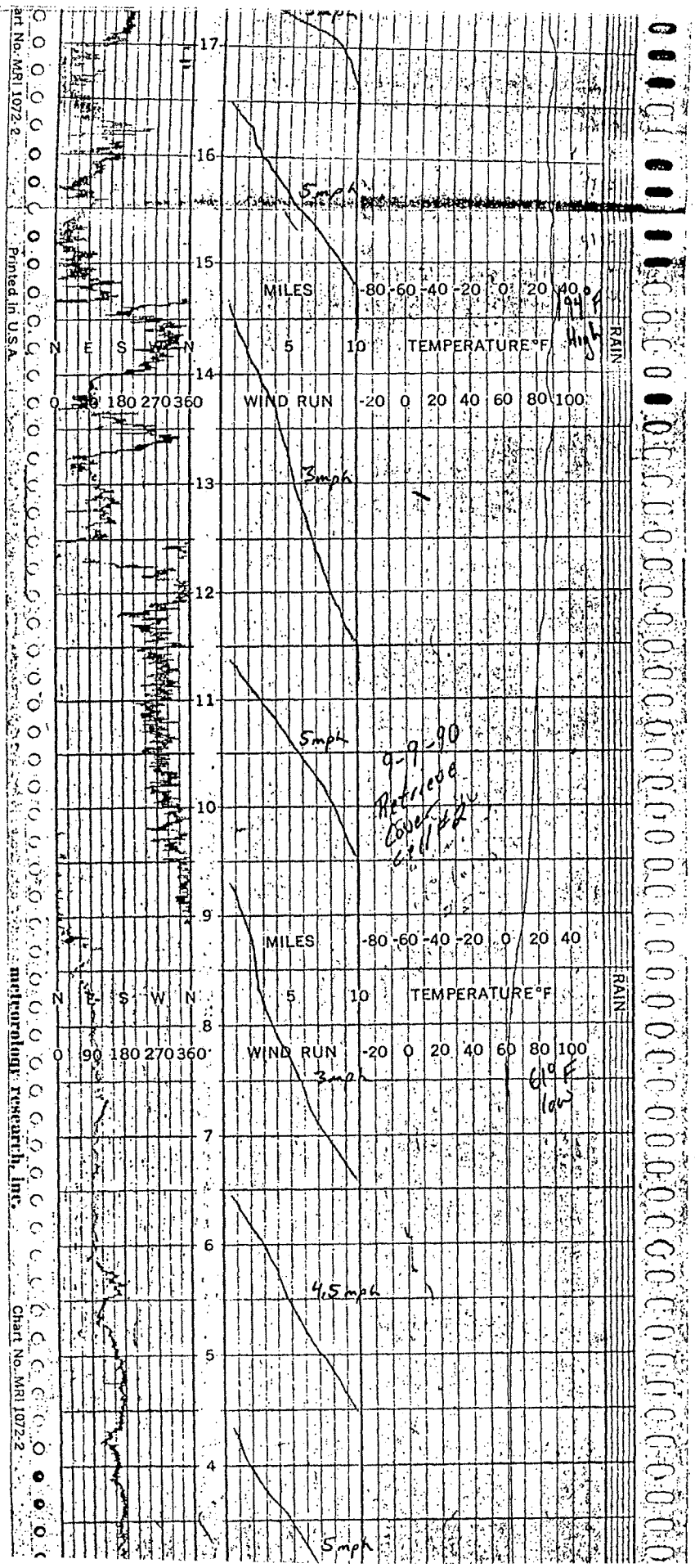
UMETCO
White Mesa Mill
Blanding Ut
Cell #2

(4)



UMETCO
White Mesa Mill
Blanding UT
Coll #2

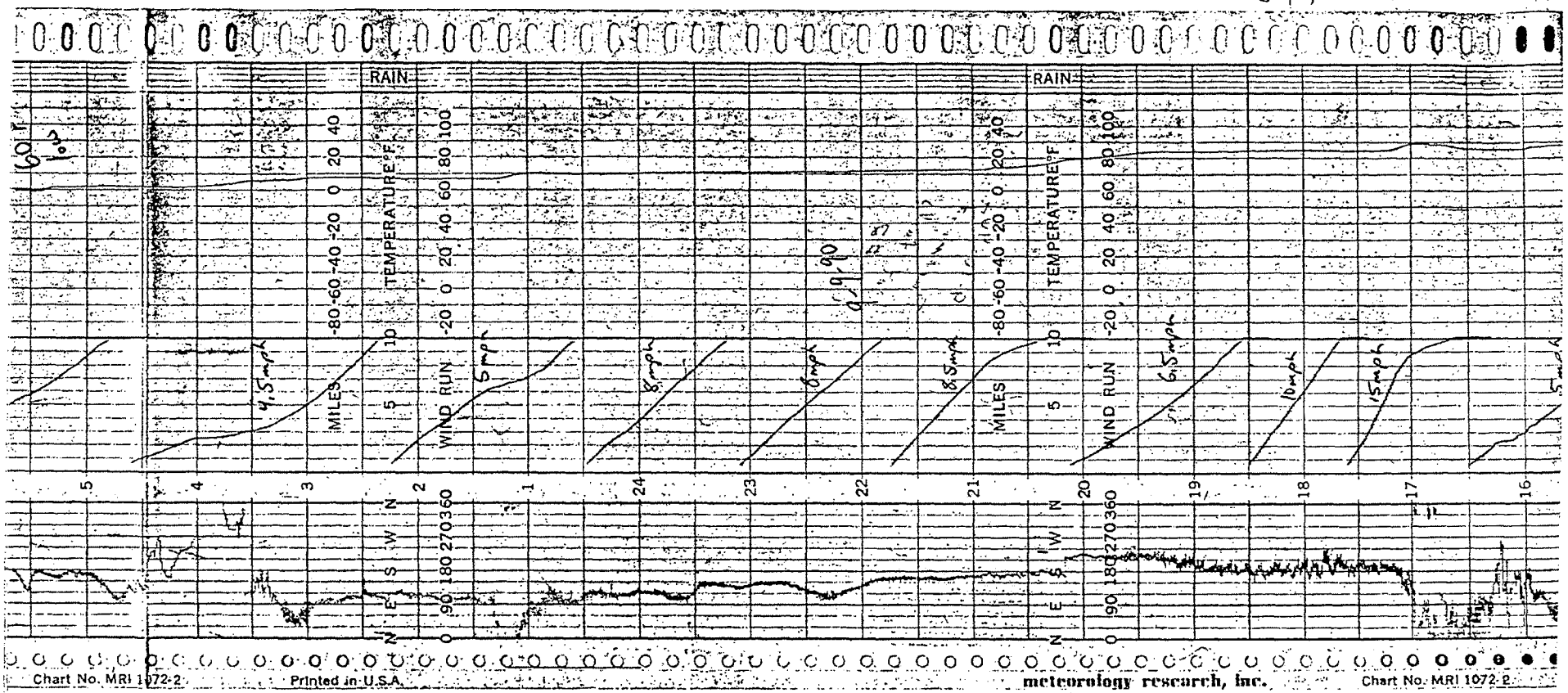
(5)



UMETCo
White Mesa Mill
Blanding Ut
Cell #2

6

UMETCO
White Mesa Mill
Blanding Ut.
Cell #2
7



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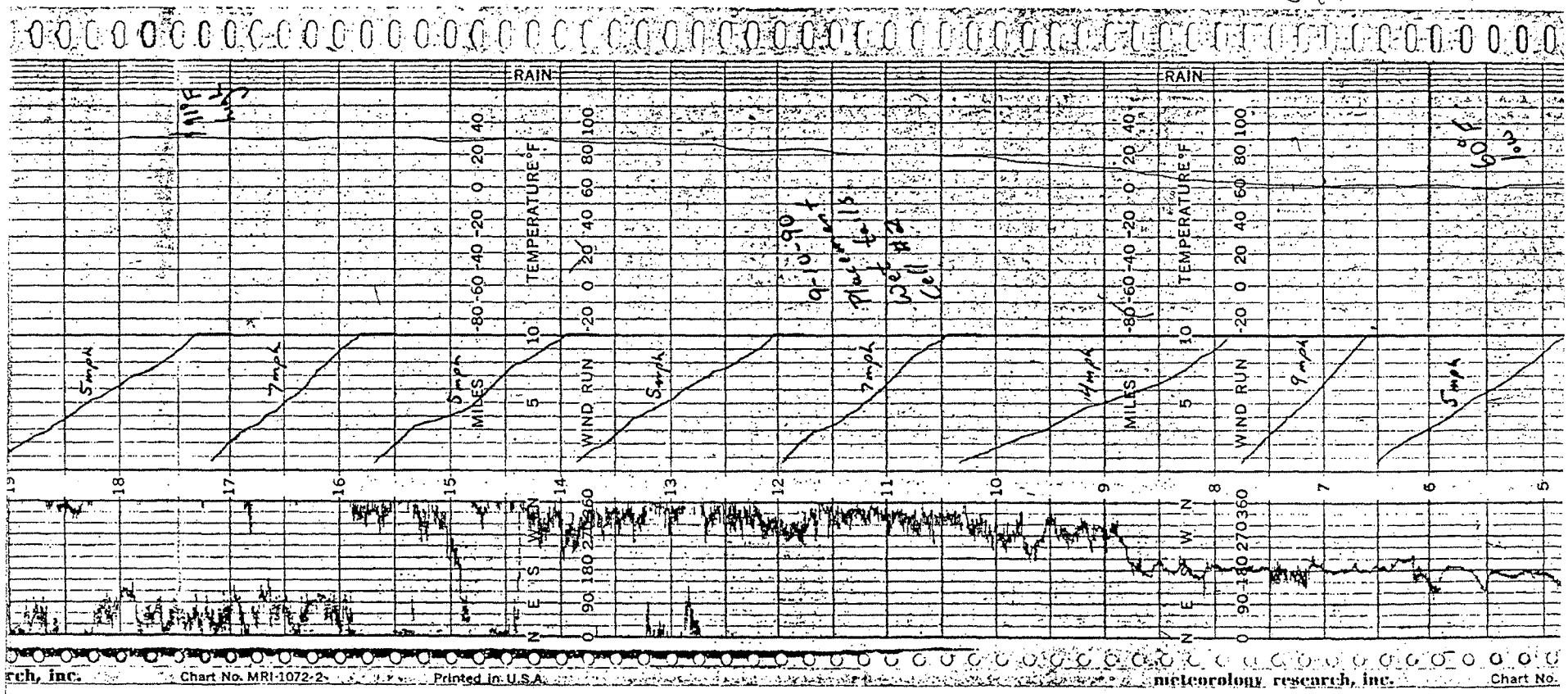
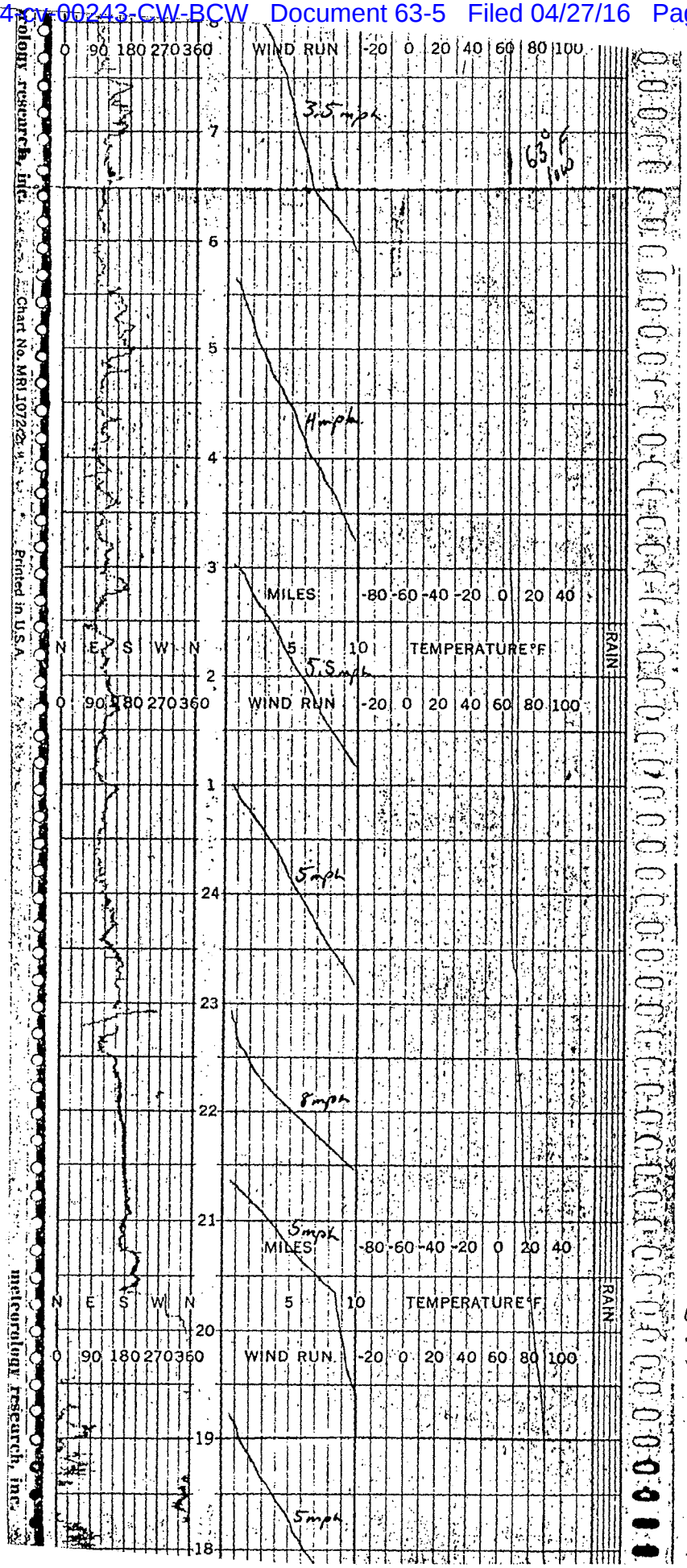
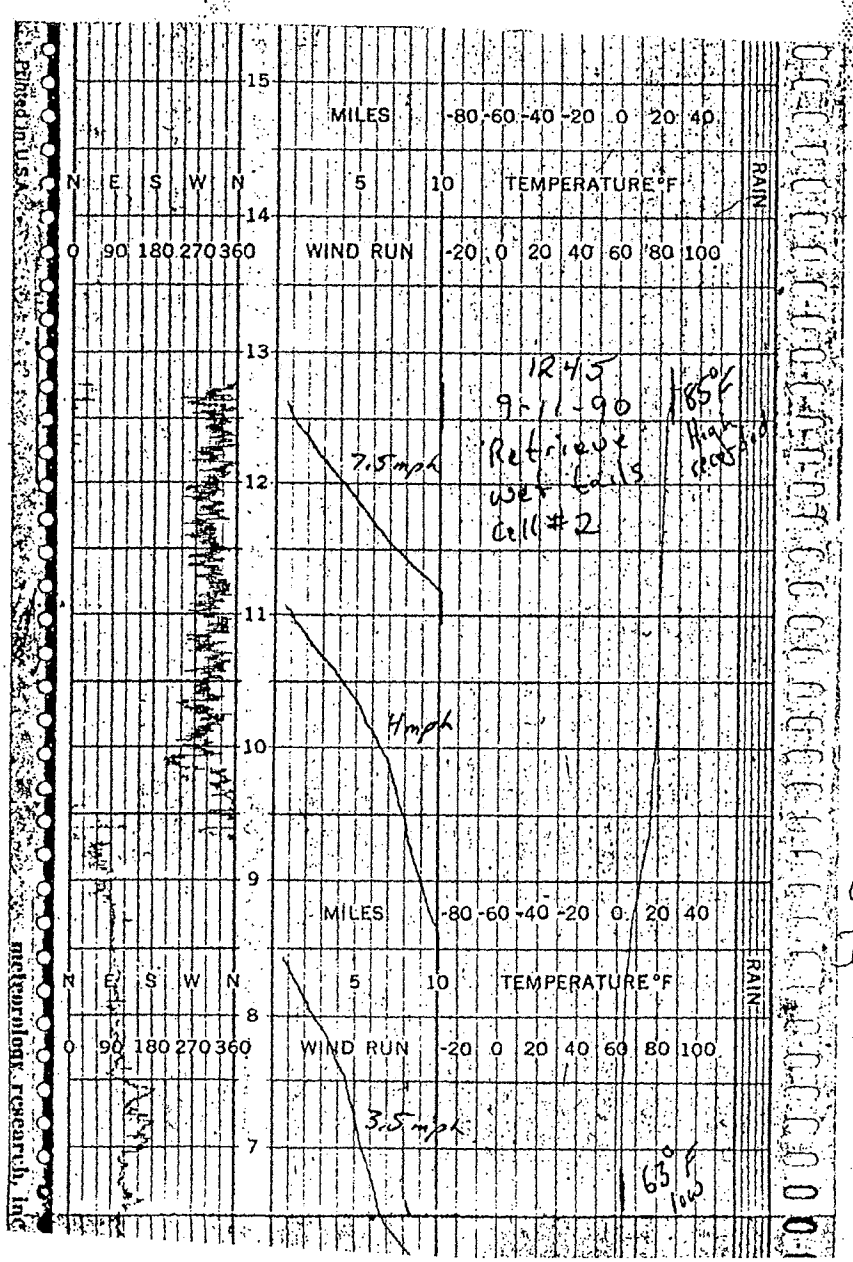
White Mesa Mill
Blanding Ut.
Cell #2
(8)





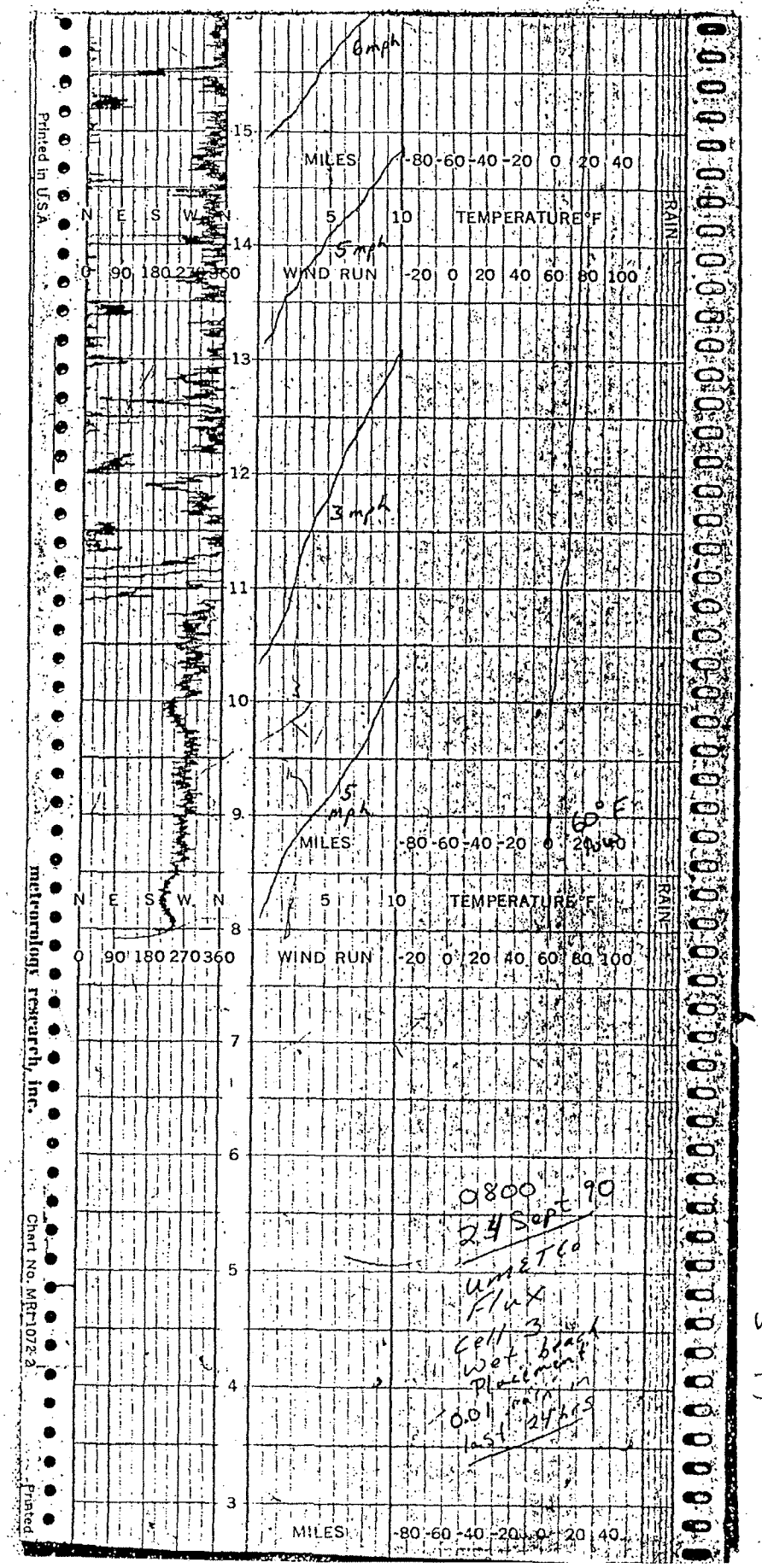
UMETCO
White Mesa Mill
Blanding Ut.
Cell #2

9



UMETCo
White Mesa Mill
Blanding Ut.
Cell #2

(10)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meteorology research, inc.
Chart No. MR-1072-A
Printed
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WIND RUN
MILES
-80 -60 -40 -20 0 20 40
5 10
TEMPERATURE °F
-20 0 20 40 60 80 100
RAIN
15
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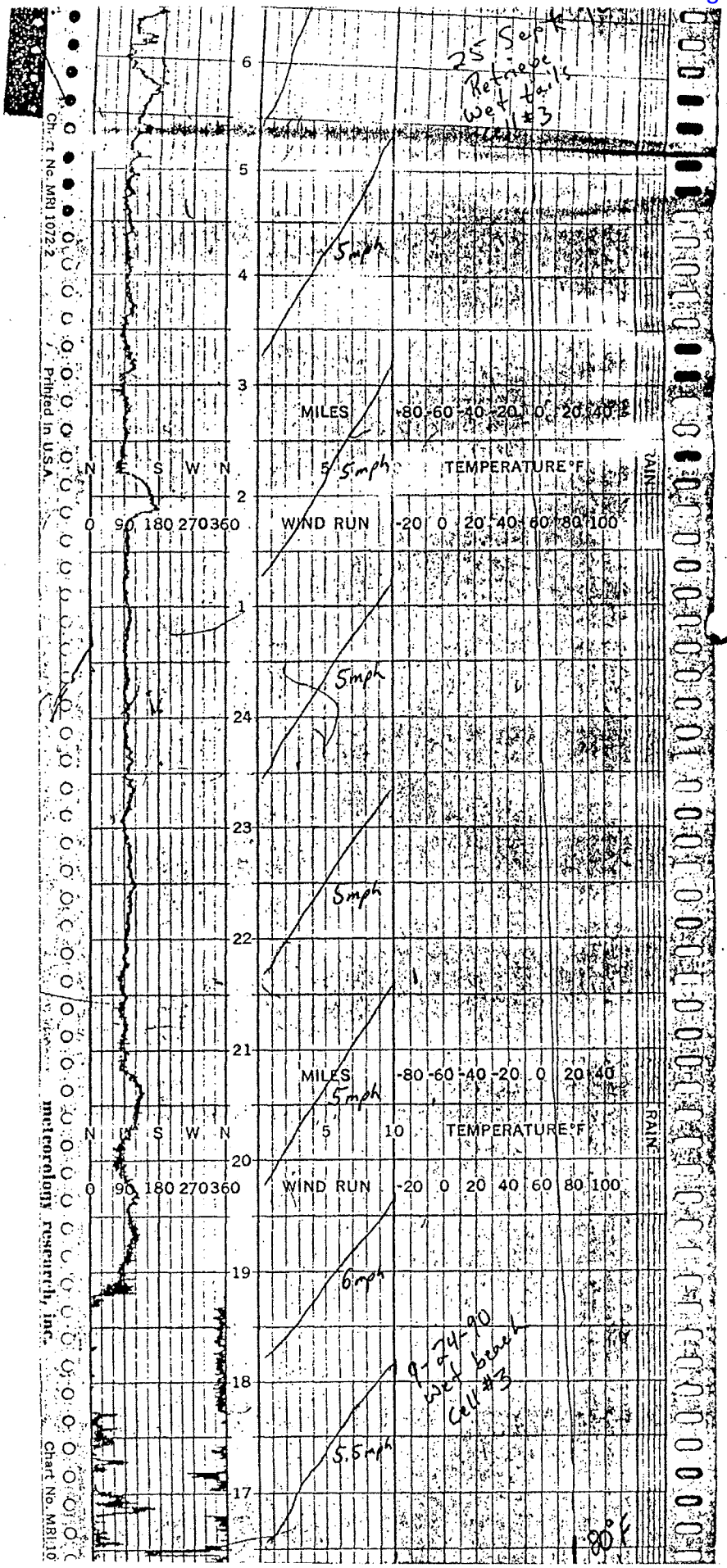
6mph
5mph
3mph
5 mph
60°F
0800 90
24 Sept
UMETCo
UMETCo
Flux
Cell 3
Wet beach
Placement
0.01 rain 24 hrs
last
UMETCo
White Mesa
mill
Blanding Ut
Cell #3
1



UMETCo
White Mesa
mill
Blanding Ut.
Cell #3

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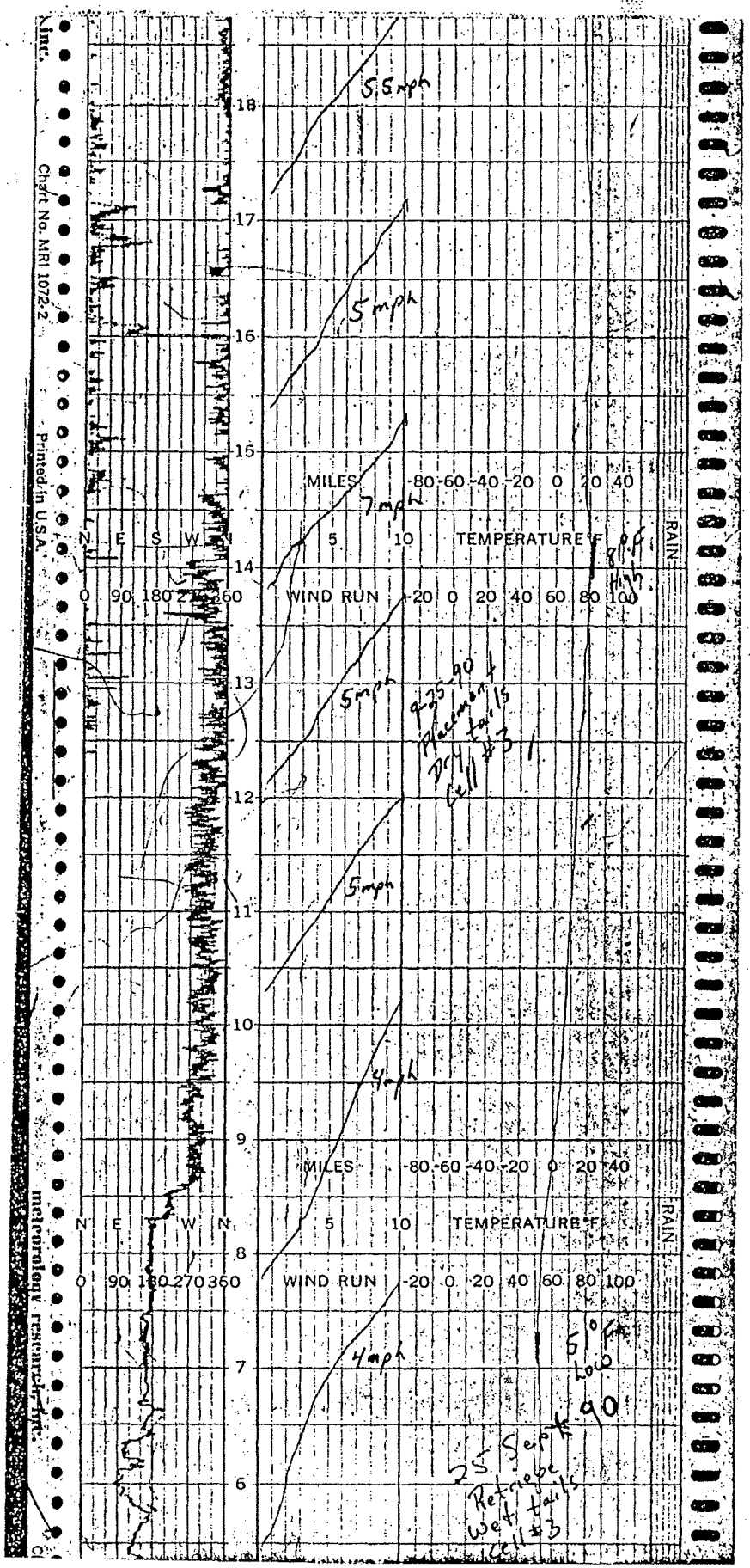
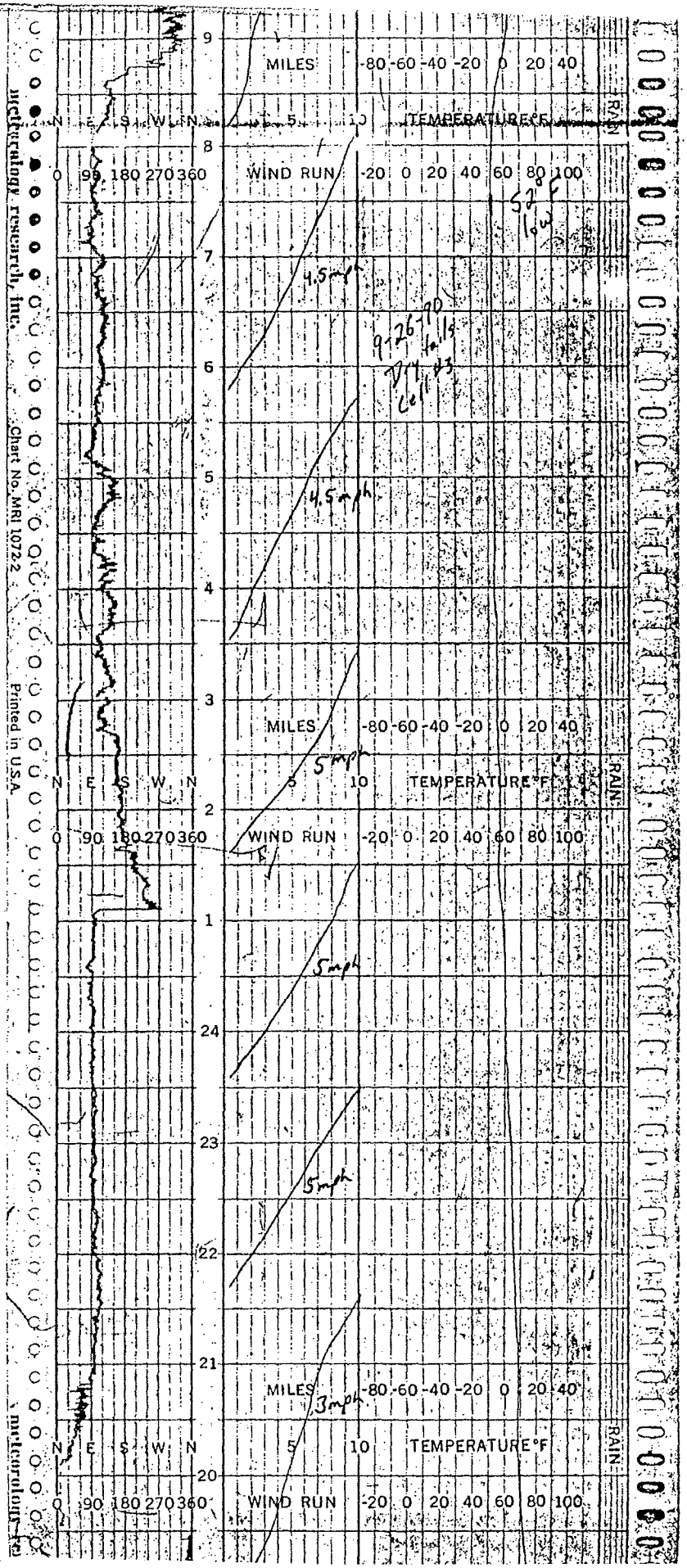


UMETCo
White Mesa Mill
Blanding Ut
Cell #3

3



UMETCo
White Mesa
Mill
Blanding Ut
Cell #3

(4)

UMETCO
Uravan Mesa
Mill
Blending Lab
Coll #3

A P P E N D I X B

Recount, Equipment Blank, and Side-by-Side Quality Assurance Analysis

Cell 2

Recount, Equipment Blank,
Side-by-Side Quality Assurance Data Results

Cover Area

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
LABORATORY ANALYSIS RECOUNT DATA AND BLANKS
PILE: CELL #2 BATCH(S): BCDE SURFACE: DIRT AIR TEMP MIN: 61°F MAX: 93°F NET WT OUT: 180.0 g.
AREA: COVER DEPLOYMENT: 9 8 90 RETRIEVAL: 9 9 90 CHARCOAL BKG CPM: 184 (average)
FIELD TECHNICIANS: STN, DG, DAR COUNTED BY: DLC, DG DATA ENTRY BY: DLC TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	% PRECISION [DIFF]/MEAN	MEAN pCi/m²s
S0200 W0200	B07	8	5	7	51	9	12	90	13	58	1	24169	233.4	57.6	5.3	0.05		
RECOUNT	B07	8	5	7	51	9	20	90	15	14	1	5935	233.4	59.4	5.5	0.19	3 %	58.5
S0200 W0400	B09	8	10	7	52	9	12	90	14	1	1	29103	234.3	69.6	6.6	0.05		
RECOUNT	B09	8	10	7	52	9	20	90	15	56	1	6840	234.3	69.3	6.4	0.20	0 %	69.4
S0700 W0100	C14	9	48	9	46	9	12	90	11	40	1	34787	231.8	79.9	8.0	0.04		
RECOUNT	C14	9	48	9	46	9	20	90	15	11	1	8479	231.8	84.0	8.4	0.20	5 %	81.9
S0040 W0700	C29	10	51	10	50	9	12	90	13	40	1	24913	240.5	57.5	6.0	0.05		
RECOUNT	C29	10	51	10	50	9	20	90	15	9	1	6100	240.5	59.4	6.0	0.05	3 %	58.4
S0300 W0400	D15	8	11	8	13	9	13	90	9	49	1	10039	231.8	27.1	2.6	0.05		
RECOUNT	D15	8	11	8	13	9	20	90	15	2	1	2992	231.8	28.6	2.8	0.20	5 %	27.9
S0300 W0200	D19	8	18	8	18	9	13	90	9	53	1	37522	229.8	102.9	9.9	0.05		
RECOUNT	D19	8	18	8	18	9	20	90	15	16	1	10195	229.8	102.3	9.9	0.20	1 %	102.6
S0400 W0300	D25	8	35	8	33	9	13	90	9	59	1	12754	232.1	34.7	3.3	0.05		
RECOUNT	D25	8	35	8	33	9	20	90	14	59	1	3703	232.1	35.9	3.5	0.20	3 %	35.3
S0600 W0520	D34	9	8	8	49	9	13	90	10	12	1	1220	230.6	2.9	0.3	0.05		
RECOUNT	D34	9	8	8	49	9	20	90	14	57	1	511	230.6	3.4	0.3	0.20	15 %	3.1
S1250 W0020	E20	10	27	10	26	9	12	90	15	15	1	18747	228.5	43.7	4.5	0.05		
RECOUNT	E20	10	27	10	26	9	20	90	16	13	1	4876	228.5	47.1	4.9	0.21	7 %	45.4
S1200 W0100	E21	10	28	10	27	9	12	90	15	17	1	27366	233.8	54.1	6.7	0.05		
RECOUNT	E21	10	28	10	27	9	20	90	15	58	1	7016	233.8	59.0	7.1	0.21	7 %	56.5
													AVERAGE PERCENT PRECISION:				5 %	
EQUIPMENT BLANK	E18	10	20	10	14	9	12	90	15	16	5	1005	211.8	0.0	0.04	0.05		
EQUIPMENT BLANK	E29	11	4	10	55	9	12	90	15	32	6	1019	212.2	-0.1	0.03	0.05		
EQUIPMENT BLANK	C003	8	55	8	55	9	12	90	11	21	4	1002	212.8	0.2	0.05	0.04		
EQUIPMENT BLANK	C017	9	55	9	55	9	12	90	11	45	5	1127	213.0	0.1	0.04	0.04		
EQUIPMENT BLANK	D32	8	50	8	47	9	13	90	10	10	6	1124	213.8	0.0	0.04	0.05		0.1

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
QUALITY CONTROL FIELD SAMPLE DATA
PILE: CELL #2 BATCH(S): ABCDE SURFACE: DIRT AIR TEMP MIN: 61°F MAX: 88°F NET WT OUT: 180.0 g.
AREA: COVER DEPLOYMENT: 9 8 90 RETRIEVAL: 9 9 90 CHARCOAL BKG CPM: 182 (average)
FIELD TECHNICIANS: DG, STN, DAR, DLC COUNTED BY: DLC, DG DATA ENTRY BY: DLC TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	% PRECISION [DIFF]/MEAN	MEAN pCi/m²s
S1000 W800	E12	10	7	10	8	9	12	90	14	56	3	1281	229.6	0.6	0.1	0.05		
SIDE BY SIDE	E13	10	8	10	9	9	12	90	14	56	3	1412	232.3	0.7	0.1	0.05	17 %	0.6
S1200 W200	E22	10	30	10	28	9	12	90	15	20	1	2839	225.4	6.2	0.7	0.05		
SIDE BY SIDE	E23	10	31	10	29	9	12	90	15	20	1	3391	226.7	7.6	0.8	0.05	19 %	6.9
S0500 W0500	C02	8	40	8	40	9	12	90	11	18	3	1400	234.1	0.7	0.1	0.04		
SIDE BY SIDE	C04	8	59	8	40	9	12	90	11	21	4	1579	233.8	0.5	0.1	0.04	27 %	0.6
S0600 W0200	C06	9	9	9	8	9	12	90	11	31	3	1245	240.4	0.6	0.1	0.04		
SIDE BY SIDE	C07	9	9	9	8	9	12	90	11	34	2	1280	241.4	1.1	0.1	0.04	64 %	0.8
S0900 W0300	C24	10	23	10	23	9	12	90	12	2	3	984	234.7	0.4	0.1	0.05		
SIDE BY SIDE	C25	10	23	10	23	9	12	90	12	2	3	938	236.0	0.3	0.1	0.05	10 %	0.3
S0040 W0700	C29	10	51	10	50	9	12	90	13	40	1	24913	240.5	57.5	6.0	0.05		
SIDE BY SIDE	C30	10	51	10	50	9	12	90	13	41	1	30818	237.4	71.2	7.4	0.05	21 %	64.3
S0200 W0500	D09	7	56	7	54	9	13	90	9	43	1	45610	231.0	125.6	11.7	0.05		
SIDE BY SIDE	D10	7	57	7	55	9	13	90	9	43	1	39893	229.9	109.8	10.2	0.05	13 %	117.7
S0350 W0000	D21	8	30	8	29	9	13	90	9	55	1	14024	233.9	38.1	3.7	0.05		
SIDE BY SIDE	D22	8	31	8	30	9	13	90	9	57	1	13453	233.3	36.6	3.5	0.05	4 %	37.3
S0700 W0700	D36	9	11	8	51	9	13	90	10	16	3	1392	233.0	0.8	0.1	0.05		
SIDE BY SIDE	D37	9	12	8	52	9	12	90	16	15	1	1370	232.6	2.9	0.3	0.05	115 %	1.8

AVERAGE PERCENT PRECISION: 32 %

Cell 2

Recount, Equipment Blank,
Side-by-Side Quality Assurance Data Results

Wet Beach Area

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
LABORATORY ANALYSIS RECOUNT DATA
PILE: CELL #2 BATCH: CGHI SURFACE: TAILINGS AIR TEMP MIN: 59°F MAX: 90°F NET WT OUT: 180.0 g.
AREA: WET BEACHES DEPLOYMENT: 9 10 90 RETRIEVAL: 9 11 90 CHARCOAL BKG CPM: 181 (average)
FIELD TECHNICIANS: STN, DG, DAR, DLC COUNTED BY: DLC, DG DATA ENTRY BY: DLC TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	% PRECISION [DIFF]/MEAN	MEAN pCi/m²s
S0100 W3150	C07	9	7	9	6	9	14	90	11	18	1	4862	230.4	10.8	1.1	0.04		
RECOUNT	C07	9	7	9	6	9	20	90	15	4	1	1767	230.4	11.3	1.1	0.14	4 %	11.0
S0300 W1200	G10	8	47	8	51	9	13	90	13	23	1	331414	243.5	647.9	52.4	0.04		
RECOUNT	G10	8	47	8	51	9	20	90	15	42	1	102512	243.5	724.8	59.8	0.14	11 %	686.3
S0875 W1500	H04	11	57	11	57	9	13	90	11	23	1	2322	241.5	4.1	0.4	0.04		
RECOUNT	H04	11	57	11	57	9	20	90	15	19	1	850	241.5	4.7	0.5	0.15	14 %	4.4
S0730 W1675	H09	12	22	12	20	9	13	90	11	28	1	4508	243.1	8.2	0.9	0.04		
RECOUNT	H09	12	22	12	20	9	20	90	15	40	1	1441	243.1	8.8	1.0	0.15	7 %	8.5
S0800 W1700	H10	12	24	12	25	9	13	90	11	30	1	88757	240.2	166.6	13.8	0.04		
RECOUNT	H10	12	24	12	25	9	20	90	15	24	1	24523	240.2	167.8	19.0	0.15	1 %	167.2
S0200 W2920	I07	9	8	9	5	9	14	90	10	7	1	21952	222.9	49.9	5.0	0.05		
RECOUNT	I07	9	8	9	5	9	20	90	15	22	1	7242	222.9	50.0	5.0	0.14	0 %	49.9
S0200 W2720	I12	9	43	9	43	9	14	90	10	17	1	9386	218.6	21.0	4.6	0.04		
RECOUNT	I12	9	43	9	43	9	20	90	15	36	1	3165	218.6	21.0	4.6	0.04	0 %	21.0
S0500 W1800	I21	11	48	11	45	9	14	90	10	33	1	1950	226.3	4.0	0.4	0.05		
RECOUNT	I21	11	48	11	45	9	20	90	15	33	1	751	226.3	3.9	0.4	0.15	2 %	3.9
S0100 W3050	I54	9	24	9	20	9	13	90	14	44	1	5683	228.5	10.9	1.1	0.04		
RECOUNT	I54	9	24	9	20	9	20	90	15	34	1	1731	228.5	10.9	1.1	0.14	0 %	10.9
S0100 W2200	I68	11	21	11	22	9	14	90	10	33	1	21955	231.2	49.1	5.3	0.05		
RECOUNT	I68	11	21	11	22	9	20	90	15	18	1	7576	231.2	51.3	5.6	0.15	4 %	50.2
													AVERAGE PERCENT PRECISION:				4 %	
EQUIPMENT BLANK	I67	11	16	11	2	9	14	90	10	29	6	1317	211.8	0.1	0.05	0.05		
EQUIPMENT BLANK	C08	11	17	12	24	9	14	90	11	23	5	1051	212.9	0.1	0.04	0.05		
EQUIPMENT BLANK	H51	12	29	12	23	9	14	90	10	48	5	1030	212.3	0.1	0.04	0.05		
EQUIPMENT BLANK	H01	11	18	11	35	9	13	90	11	23	5	1000	210.0	0.0	0.03	0.04		
EQUIPMENT BLANK	G24	10	35	10	42	9	13	90	13	41	6	1232	210.3	0.0	0.03	0.04		0.1

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
QUALITY CONTROL FIELD SAMPLES DATA
PILE: CELL #2 BATCH: CGHI SURFACE: TAILINGS AIR TEMP MIN: 59°F MAX: 91°F NET WT OUT: 180.0 g.
AREA: WET BEACHES DEPLOYMENT: 9 10 90 RETRIEVAL: 9 11 90 CHARCOAL BKG CPM: 181 (average)
FIELD TECHNICIANS: DAR, DG, STN, DLC COUNTED BY: DLC, DG DATA ENTRY BY: DLC TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	% PRECISION [DIFF]/MEAN	MEAN pCi/m²s
S0100 W3225	C01	8	37	8	45	9	14	90	11	11	1	76665	241.1	176.1	17.0	0.04		
SIDE BY SIDE	C02	8	38	8	46	9	14	90	11	11	1	19458	242.6	44.4	4.3	0.04	119 %	110.3
S0875 W1650	H05	12	12	12	10	9	13	90	11	25	1	19137	244.0	35.8	4.0	0.04		
SIDE BY SIDE	H06	12	12	12	10	9	13	90	11	27	1	15855	243.6	29.6	3.3	0.04	19 %	32.7
S0750 W1750	H11	12	26	12	25	9	13	90	11	30	1	4705	243.1	8.5	1.0	0.04		
SIDE BY SIDE	H12	12	26	12	26	9	13	90	11	34	1	3847	242.0	6.9	0.8	0.04	21 %	7.7
S1000 W1075	H16	12	47	12	47	9	13	90	11	38	1	21830	241.7	40.7	4.6	0.04		
SIDE BY SIDE	H17	12	47	12	47	9	13	90	11	38	1	30989	238.5	57.9	6.5	0.04	35 %	49.3
S0100 W1000	G03	8	23	8	33	9	13	90	13	17	1	2467	234.2	4.5	0.4	0.04		
SIDE BY SIDE	G04	8	23	8	34	9	13	90	13	17	1	2230	224.6	4.0	0.4	0.04	11 %	4.2
S0800 W1400	G27	11	0	11	0	9	13	90	13	41	1	6206	240.8	11.6	1.3	0.04		
SIDE BY SIDE	G28	11	0	11	0	9	13	90	13	43	1	7128	240.1	13.4	1.5	0.04	14 %	12.5
S0500 W2900	I09	9	21	9	16	9	14	90	10	11	1	3135	246.1	6.8	0.7	0.05		
SIDE BY SIDE	I10	9	21	9	16	9	14	90	10	13	1	2034	236.2	4.2	0.4	0.05	46 %	5.5
S0300 W2800	I16	10	31	10	37	9	14	90	10	24	1	3033	219.4	6.4	0.7	0.05		
SIDE BY SIDE	I17	10	31	10	37	9	14	90	10	26	1	26978	220.1	60.5	6.3	0.05	162 %	33.5
S0300 W2400	I61	10	36	10	34	9	14	90	10	15	1	16665	222.4	37.4	3.9	0.05		
SIDE BY SIDE	I62	10	37	10	35	9	14	90	10	17	1	14016	219.5	31.4	3.3	0.05	17 %	34.4

AVERAGE PERCENT PRECISION: 49 %

Cell 2

Recount, Equipment Blank,
Side-by-Side Quality Assurance Data Results

Dry Beach Area

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
LABORATORY ANALYSIS RECOUNT DATA
PILE: CELL #2 BATCH: ABDF SURFACE: TAILINGS AIR TEMP MIN: 50°F MAX: 81°F NET WT OUT: 180.0 g.
AREA: DRY BEACHES DEPLOYMENT: 9 6 90 RETRIEVAL: 9 7 90 CHARCOAL BKG CPM: 182 (average)
FIELD TECHNICIANS: STN, DG, DAR COUNTED BY: JWD DATA ENTRY BY: DLC TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	% PRECISION [DIFF]/MEAN	MEAN pCi/m²s
S0320 W3000	A08	9	0	9	15	9	10	90	14	21	1	4666	236.4	10.5	1.0	0.05		
RECOUNT	A08	9	0	9	15	9	11	90	9	8	1	4282	236.4	11.0	1.1	0.05	5 %	10.8
S0160 W2590	A13	9	27	9	48	9	10	90	14	33	1	86297	237.1	200.1	20.0	0.05		
RECOUNT	A13	9	27	9	48	9	11	90	9	9	1	75807	237.1	202.3	20.2	0.05	1 %	201.2
S0350 W2100	A25	10	35	11	11	9	10	90	15	0	1	44086	229.1	100.4	10.8	0.05		
RECOUNT	A25	10	35	11	11	9	11	90	9	10	1	40341	229.1	105.3	11.4	0.06	5 %	102.9
S0200 W1900	A33	11	10	11	41	9	10	90	15	15	1	208627	225.8	477.1	51.6	0.05		
RECOUNT	A33	11	10	11	41	9	11	90	9	11	1	184852	225.8	484.1	52.3	0.06	1 %	480.6
S0150 W2850	B01	8	55	8	54	9	10	90	11	20	1	96530	234.0	223.1	21.5	0.05		
RECOUNT	B01	8	55	8	54	9	11	90	9	14	1	82377	234.0	224.5	21.6	0.05	1 %	223.8
S0500 W2250	B10	10	18	10	22	9	10	90	11	48	1	49210	227.6	112.3	11.7	0.05		
RECOUNT	B10	10	18	10	22	9	11	90	9	14	1	42867	227.6	114.9	11.9	0.06	2 %	113.6
S0300 W1900	B20	11	13	11	32	9	10	90	14	21	1	169498	228.4	388.3	42.0	0.05		
RECOUNT	B20	11	13	11	32	9	11	90	9	16	1	147447	228.4	389.6	42.1	0.06	0 %	388.9
S0200 W1400	D002	13	30	13	50	9	10	90	10	51	1	41989	237.7	91.7	10.8	0.05		
RECOUNT	D002	13	30	13	50	9	10	90	10	52	1	41934	237.7	91.6	10.8	0.05	0 %	91.6
S0300 W1600	D006	13	39	13	53	9	10	90	11	5	1	89603	227.6	197.1	23.3	0.05		
RECOUNT	D006	13	39	13	53	9	11	90	9	19	1	76303	227.6	198.5	23.4	0.06	1 %	197.8
S0600 W0800	F006	10	3	10	3	9	10	90	12	51	1	10392	241.6	23.7	2.5	0.05		
RECOUNT	F006	10	3	10	3	9	11	90	9	19	1	8964	241.6	23.8	2.5	0.05	0 %	23.8
S0700 W1200	F031	11	27	11	27	9	10	90	13	20	1	45357	235.5	104.1	11.3	0.05		
RECOUNT	F031	11	27	11	27	9	11	90	9	21	1	39512	235.5	105.4	11.4	0.06	1 %	104.8
S0200 W1150	F038	11	52	11	52	9	10	90	13	33	1	146116	238.1	335.8	36.4	0.05		
RECOUNT	F038	11	52	11	52	9	11	90	9	23	1	127077	238.1	339.2	36.7	0.06	1 %	337.5
													AVERAGE PERCENT PRECISION:				2 %	
EQUIPMENT BLANK	A05	8	40	9	25	9	10	90	14	14	1	201	211.4	0.0	0.82	0.05		
EQUIPMENT BLANK	B19	11	3	11	35	9	10	90	14	19	1	326	211.8	0.3	0.13	0.05		
EQUIPMENT BLANK	D009	13	45	14	25	9	10	90	10	42	1	216	213.0	0.1	0.46	0.05		
EQUIPMENT BLANK	D010	13	45	14	25	9	10	90	11	11	1	245	212.9	0.1	0.26	0.05		0.1

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
QUALITY CONTROL FIELD SAMPLES DATA
PILE: CELL #2 BATCH: A8DF SURFACE: TAILINGS AIR TEMP MIN: 59°F MAX: 82°F NET WT OUT: 180.0 g.
AREA: DRY BEACHES DEPLOYMENT: 9 6 90 RETRIEVAL: 9 7 90 CHARCOAL BKG CPM: 181 (average)
FIELD TECHNICIANS: JWD, DAR, DG, STN COUNTED BY: JWD DATA ENTRY BY: DLC TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	% PRECISION [DIFF]/MEAN	MEAN pCi/m²s
S0200 W3100	A02	8	40	8	44	9	10	90	14	5	1	23185	234.5	54.3	5.2	0.05		
SIDE BY SIDE	A03	8	42	8	44	9	10	90	14	10	1	20191	236.0	47.3	4.6	0.05	14 %	50.8
S0300 W2300	A14	9	40	10	19	9	10	90	14	35	1	14201	242.0	32.1	3.3	0.05		
SIDE BY SIDE	A15	9	42	10	20	9	10	90	14	43	1	22434	244.0	51.0	5.3	0.05	46 %	41.6
S0400 W1950	A31	10	56	11	38	9	10	90	15	11	1	14392	239.9	32.3	3.5	0.05		
SIDE BY SIDE	A32	10	58	11	39	9	10	90	15	13	1	22773	240.2	51.4	5.6	0.05	46 %	41.8
S0450 W2850	B05	9	38	9	35	9	10	90	11	32	1	21708	240.7	49.7	5.0	0.05		
SIDE BY SIDE	B08	9	42	9	37	9	10	90	11	42	1	31575	238.2	72.7	7.3	0.05	38 %	61.2
S0300 W1750	B22	11	15	11	25	9	10	90	14	25	1	33693	238.3	77.4	8.4	0.05		
SIDE BY SIDE	B23	11	16	11	26	9	10	90	14	27	1	21284	241.9	48.7	5.3	0.05	45 %	63.0
S0500 W0900	F012	10	20	10	20	9	10	90	11	23	1	18050	241.4	40.9	4.3	0.05		
SIDE BY SIDE	F013	10	20	10	20	9	10	90	11	27	1	73270	241.1	167.5	17.4	0.05	121 %	104.2
S0200 W1200	F037	11	52	11	52	9	10	90	13	32	1	88748	234.9	203.8	22.1	0.05		
SIDE BY SIDE	F038	11	52	11	52	9	10	90	13	33	1	146116	238.1	335.8	36.4	0.05	49 %	269.8

AVERAGE PERCENT PRECISION: 51 %

Cell 3

Recount, Equipment Blank,
Side-by-Side Quality Assurance Data Results

Wet Beach Area

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
LABORATORY ANALYSIS RECOUNT DATA
PILE: CELL #3 BATCH: HJK SURFACE: TAILINGS AIR TEMP MIN: 50°F MAX: 81°F NET WT OUT: 180.0 g.
AREA: WET BEACHES DEPLOYMENT: 9 24 90 RETRIEVAL: 9 25 90 CHARCOAL BKG CPM: 186 (average)
FIELD TECHNICIANS: STN, DG, DAR COUNTED BY: DG, WTS DATA ENTRY BY: DLC, WTS TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	% PRECISION [DIFF]/MEAN	MEAN pCi/m²s
S0000 W2450	H001	8	35	8	34	10	1	90	14	37	2	1585	227.1	2.5	0.3	0.07		
RECOUNT	H001	8	35	8	34	9	28	90	11	14	1	1315	227.2	2.6	0.3	0.04	4 %	2.6
S0250 W1450	H011	9	14	9	15	9	28	90	11	28	1	1159	243.5	2.3	0.2	0.05		
RECOUNT	H011	9	14	9	15	9	28	90	11	29	1	1205	243.5	2.4	0.2	0.05	5 %	2.3
S0750 W1300	H022	10	41	10	52	9	28	90	11	54	1	31680	235.7	71.6	7.4	0.05		
RECOUNT	H022	10	41	10	52	10	1	90	14	34	1	17763	235.7	70.3	7.0	0.08	2 %	71.0
S0750 W1400	H023	10	43	10	53	9	28	90	11	55	1	2930	229.2	6.3	0.7	0.05		
RECOUNT	H023	10	43	10	53	9	28	90	11	54	1	3087	229.2	6.5	0.7	0.05	6 %	6.4
S0475 W0100	J04	8	55	8	58	9	28	90	14	15	1	15974	238.5	37.3	3.6	0.05		
RECOUNT	J04	8	55	8	58	10	1	90	14	51	1	9729	238.5	39.0	3.6	0.08	5 %	38.1
S0250 W0550	J19	9	16	9	19	9	28	90	14	37	1	1259	237.5	2.5	0.3	0.05		
RECOUNT	J19	9	16	9	16	10	1	90	14	44	2	1609	237.5	2.5	0.3	0.08	0 %	2.5
S0300 W0600	J23	9	27	9	27	9	28	90	14	43	1	42841	238.7	100.8	10.1	0.05		
RECOUNT	J23	9	27	9	27	10	1	90	14	40	1	23743	238.8	95.9	9.2	0.08	5 %	98.4
S0400 W0600	J26	9	44	9	44	9	28	90	14	44	1	409684	236.5	966.1	96.6	0.05		
RECOUNT	J26	9	44	9	44	10	1	90	14	48	1	251185	236.6	1020.7	98.4	0.08	5 %	993.4
S0400 W0820	J35	10	3	10	3	9	28	90	15	0	1	5250	238.3	11.9	1.2	0.05		
RECOUNT	J35	10	3	10	3	10	1	90	14	45	1	3050	238.3	11.6	1.2	0.08	3 %	11.8
S0460 W0850	J42	10	0	10	0	9	28	90	15	8	1	1606	235.6	3.4	0.3	0.05		
RECOUNT	J42	10	0	10	0	10	1	90	14	48	1	1048	235.6	3.5	0.3	0.08	4 %	3.4
S0700 W1400	K001	10	46	10	54	9	28	90	15	43	1	1286	241.8	2.6	0.3	0.05		
RECOUNT	K001	10	46	10	54	10	1	90	14	56	2	1694	241.8	2.6	0.3	0.08	2 %	2.6
S0880 W0850	K011	11	26	11	32	9	28	90	15	52	1	38434	222.4	89.4	9.7	0.05		
RECOUNT	K011	11	26	11	37	10	1	90	14	55	1	20826	222.4	82.2	8.5	0.09	8 %	85.8

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
LABORATORY ANALYSIS RECOUNT DATA
PILE: CELL #3 BATCH: HJK SURFACE: TAILINGS AIR TEMP MIN: 50°F MAX: 81°F NET WT OUT: 180.0 g.
AREA: WET BEACHES DEPLOYMENT: 9 24 90 RETRIEVAL: 9 25 90 CHARCOAL BKG CPM: 186 (average)
FIELD TECHNICIANS: STN, DG, DAR COUNTED BY: DG, WTS DATA ENTRY BY: DLC, WTS TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	% PRECISION [DIFF]/MEAN	MEAN pCi/m²s
S0800 W0400	K025	11	33	11	33	9	28	90	16	12	1	14589	225.5	33.9	3.7	0.05		
RECOUNT	K025	11	33	11	33	10	1	90	15	0	1	8360	225.5	32.8	3.4	0.09	3 %	33.3
S0850 W0600	K028	11	42	11	47	9	28	90	16	14	1	45705	235.2	106.6	11.5	0.05		
RECOUNT	K028	11	42	11	47	10	1	90	15	3	1	26959	235.2	107.0	11.1	0.09	0 %	106.8
S0850 W0550	K029	11	36	11	44	9	28	90	16	16	1	4159	237.7	9.3	1.0	0.05		
RECOUNT	K029	11	36	11	44	10	1	90	15	0	1	2343	237.7	8.6	0.9	0.09	8 %	8.9
S0100 W0700	K034	11	58	11	59	9	28	90	16	20	1	5763	242.3	13.1	1.4	0.05		
RECOUNT	K034	11	58	11	59	10	1	90	15	3	1	3468	242.3	13.1	1.4	0.09	0 %	13.1
												AVERAGE PERCENT PRECISION:					4 %	
EQUIPMENT BLANK	H010	10	8	10	10	9	28	90	11	27	5	1025	210.8	0.1	0.04	0.05		
EQUIPMENT BLANK	J41	10	17	10	22	9	28	90	15	11	6	4036	211.5	1.1	0.16	0.05		
EQUIPMENT BLANK	K015	11	18	11	18	9	28	90	15	59	5	1002	212.5	0.0	0.04	0.05		
EQUIPMENT BLANK	K016	11	14	11	14	9	28	90	15	59	5	1015	211.2	0.0	0.04	0.05		
EQUIPMENT BLANK	K036	12	12	12	12	9	28	90	16	25	5	1005	212.4	0.0	0.04	0.05		0.2

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
QUALITY CONTROL FIELD SAMPLES DATA
PILE: CELL #3 BATCH: KLM SURFACE: TAILINGS AIR TEMP MIN: 50°F MAX: 81°F NET WT OUT: 180.0 g.
AREA: WET BEACHES DEPLOYMENT: 9 24 90 RETRIEVAL: 9 25 90 CHARCOAL BKG CPM: 186 (average)
FIELD TECHNICIANS: DAR, DG, STN COUNTED BY: DG, WTS DATA ENTRY BY: DLC, WTS TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR MIN	RETRIV HR MIN	ANALYSIS MO DA YR	MID-TIME HR MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	% PRECISION [DIFF]/MEAN	MEAN pCi/m²s
S0250 W1450	H011	9 14	9 15	9 28 90	11 28	1	1159	243.5	2.3	0.2	0.05		
SIDE BY SIDE	H012	9 16	9 16	9 28 90	11 33	1	1665	241.8	3.4	0.3	0.05	41 %	2.9
S0200 W0500	J17	9 16	9 15	9 28 90	14 36	1	1275	241.9	2.6	0.3	0.05		
SIDE BY SIDE	J19	9 16	9 19	9 28 90	14 37	1	1259	237.5	2.5	0.3	0.05	2 %	2.6
S0450 W0350	J12	9 14	9 14	9 28 90	14 28	1	15171	240.2	35.4	3.5	0.05		
SIDE BY SIDE	J18	9 14	9 14	9 28 90	14 36	1	9465	237.6	22.0	2.2	0.05	47 %	28.7
S0450 W0780	J36	10 0	10 0	9 28 90	15 0	1	4484	232.7	10.1	1.1	0.05		
SIDE BY SIDE	J42	10 0	10 0	9 28 90	15 8	1	1606	235.6	3.4	0.3	0.05	101 %	6.7
S0880 W1050	K005	11 10	11 25	9 28 90	15 46	1	6437	228.4	14.5	1.6	0.05		
SIDE BY SIDE	K006	11 11	11 26	9 28 90	15 46	1	2935	228.6	6.4	0.7	0.05	78 %	10.4
S0880 W0700	K013	11 31	11 36	9 28 90	15 54	1	9600	223.2	22.0	2.4	0.05		
SIDE BY SIDE	K014	11 33	11 37	9 28 90	15 54	1	6923	222.2	15.7	1.7	0.05	33 %	18.9
S0820 W0100	K017	11 22	11 25	9 28 90	16 3	1	3095	238.5	6.8	0.7	0.05		
SIDE BY SIDE	K019	11 22	11 25	9 28 90	16 5	1	3962	235.9	8.8	1.0	0.05	26 %	7.8
S0800 W0500	K027	11 36	11 44	9 28 90	16 14	1	2342	226.6	5.0	0.5	0.05		
SIDE BY SIDE	K029	11 36	11 44	9 28 90	16 16	1	4159	237.7	9.3	1.0	0.05	60 %	7.1
S0850 W0400	K026	11 37	11 45	9 28 90	16 12	1	31888	238.6	74.1	8.0	0.05		
SIDE BY SIDE	K030	11 37	11 45	9 28 90	16 16	1	10547	239.4	24.2	2.6	0.05	101 %	49.1

AVERAGE PERCENT PRECISION: 54 %

Cell 3

Recount, Equipment Blank,
Side-by-Side Quality Assurance Data Results

Dry Beach Area

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
QUALITY CONTROL FIELD SAMPLES DATA
PILE: CELL #3 BATCH: KLM SURFACE: TAILINGS AIR TEMP MIN: 50°F MAX: 81°F NET WT OUT: 180.0 g.
AREA: DRY BEACHES DEPLOYMENT: 9 25 90 RETRIEVAL: 9 26 90 CHARCOAL BKG CPM: 193 (average)
FIELD TECHNICIANS: DAR, DG, STN COUNTED BY: DG, WTS DATA ENTRY BY: DLC, WTS TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS CPM	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	% PRECISION [DIFF]/MEAN	MEAN pCi/m²s
S0800 W0800	K11	11	54	11	55	10	1	90	16	10	1	13445	225.8	44.6	4.6	0.07		
SIDE BY SIDE	K12	11	55	11	56	10	1	90	16	10	1	9081	227.2	29.9	3.1	0.07	39 %	37.3
S0700 W0900	K15	11	58	11	59	10	1	90	16	15	1	1005	233.1	2.7	0.3	0.07		
SIDE BY SIDE	K16	11	59	12	0	10	1	90	16	15	1	1023	234.7	2.8	0.3	0.08	2 %	2.8
S0350 W0700	L02	11	18	11	18	10	2	90	10	0	1	3324	233.3	12.1	1.3	0.08		
SIDE BY SIDE	L06	11	18	11	18	10	2	90	10	6	1	4311	233.7	16.0	1.7	0.08	27 %	14.1
S0400 W0350	L26	13	44	13	44	10	2	90	10	27	1	17235	228.0	65.1	7.4	0.09		
SIDE BY SIDE	L32	13	44	13	44	10	2	90	10	30	1	15164	224.8	57.2	6.5	0.09	13 %	61.1
S0590 W0540	L51	14	42	14	42	10	2	90	10	37	1	11638	228.9	43.4	5.1	0.09		
SIDE BY SIDE	L53	14	42	14	42	10	2	90	10	42	1	13386	229.6	50.1	5.9	0.09	14 %	46.8
S0250 W0300	L39	13	50	13	50	10	1	90	16	38	1	8406	229.6	27.4	3.1	0.08		
SIDE BY SIDE	L41	13	50	13	50	10	1	90	16	38	1	7999	232.3	26.0	2.9	0.08	5 %	26.7
S0400 W1150	M06	13	7	13	24	10	1	90	15	14	2	1883	219.9	2.5	0.3	0.08		
SIDE BY SIDE	M07	13	8	13	25	10	1	90	15	16	1	1723	220.3	5.0	0.6	0.08	69 %	3.7
S0100 W2100	M21	14	15	14	3	10	1	90	15	36	1	17042	230.1	56.1	6.6	0.08		
SIDE BY SIDE	M22	14	16	14	4	10	1	90	15	38	1	10760	229.4	35.2	4.2	0.08	46 %	45.6
S0830 W0200	M27	14	39	14	40	10	2	90	11	0	1	6933	229.5	25.6	3.0	0.09		
SIDE BY SIDE	M29	14	39	14	40	10	2	90	11	0	1	9515	227.0	35.5	4.2	0.09	32 %	30.6
S0750 W0150	M78	14	45	14	43	10	1	90	15	45	1	12744	225.4	41.3	4.9	0.08		
SIDE BY SIDE	M79	14	46	14	44	10	1	90	15	47	1	13545	227.4	44.0	5.2	0.08	6 %	42.7
S0675 W0350	M84	14	59	14	50	10	1	90	15	51	1	7675	219.9	24.8	2.9	0.08		
SIDE BY SIDE	M85	15	0	14	51	10	1	90	15	53	1	17740	221.8	58.1	6.9	0.08	80 %	41.4

AVERAGE PERCENT PRECISION: 30 %

A P P E N D I X C

Radon Flux Laboratory Data

CLIENT: UMETCO BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
SUMMARY OF FIELD SAMPLES DATA FOR THE COVERED AREA OF CELL #2
PILE: CELL #2 BATCH(S): ABCDE SURFACE: DIRT AIR TEMP MIN: 61°F MAX: 93°F NET WT OUT: 180.0 g.
AREA: COVER DEPLOYMENT: 9 8 90 RETRIEVAL: 9 9 90 CHARCOAL BKG CPM: 184 (average)
FIELD TECHNICIANS: STN, DAR, DG, DLC COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 5/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
S0000 W0150	A03	7	45	7	47	9	12	90	15	59	1	4427	231.5	10.2	1.0	0.05	
S0000 W0350	A04	7	48	7	48	9	12	90	16	0	1	8213	237.3	19.4	1.9	0.05	
S0010 W0010	A02	7	43	7	45	9	12	90	15	57	1	11025	230.4	26.2	2.6	0.05	SOIL TEMP: 55/124 °F
S0020 W0550	A05	7	50	7	50	9	12	90	16	1	1	28945	232.8	69.5	7.0	0.05	
S0040 W0700	C29	10	51	10	50	9	12	90	13	40	1	24913	240.5	57.5	6.0	0.05	
S0100 W0100	B01	7	43	7	40	9	12	90	13	53	1	23037	232.3	54.5	5.5	0.05	
S0100 W0200	B02	7	47	7	41	9	12	90	13	53	1	41260	235.1	98.2	9.8	0.05	
S0100 W0300	B03	7	50	7	42	9	12	90	13	54	1	20871	243.8	49.5	4.9	0.05	
S0100 W0400	B04	7	52	7	43	9	12	90	13	54	1	20001	229.4	47.4	4.7	0.05	
S0100 W0500	B05	7	54	7	45	9	12	90	13	56	1	13334	243.5	31.5	3.1	0.05	
S0100 W0610	D14	8	4	7	59	9	13	90	9	47	1	9527	232.4	25.9	2.6	0.06	
S0100 W0700	D13	8	3	7	58	9	13	90	9	47	1	30769	233.1	84.7	8.5	0.06	
S0150 W0025	A01	7	40	7	44	9	12	90	15	58	2	1606	231.9	1.5	0.1	0.05	
S0200 W0100	B06	8	2	7	50	9	12	90	13	56	1	25156	241.6	59.9	6.0	0.05	
S0200 W0200	B07	8	5	7	51	9	12	90	13	58	1	24169	233.4	57.6	5.8	0.05	
S0200 W0300	B08	8	7	7	52	9	12	90	13	58	1	24303	232.6	57.9	5.8	0.05	
S0200 W0400	B09	8	10	7	52	9	12	90	14	1	1	29103	234.3	69.6	7.0	0.05	
S0200 W0500	D09	7	56	7	54	9	13	90	9	43	1	45610	231.0	125.6	12.6	0.06	
S0200 W0600	D11	7	59	7	56	9	13	90	9	45	1	23745	233.7	65.2	6.5	0.06	
S0200 W0680	D12	8	1	7	57	9	13	90	9	45	1	19089	235.0	52.3	5.2	0.06	
S0300 W0100	D20	8	19	8	19	9	13	90	9	54	2	1181	230.9	1.1	0.1	0.05	
S0300 W0200	D19	8	18	8	18	9	13	90	9	53	1	37522	229.8	102.9	10.3	0.05	
S0300 W0300	D18	8	17	8	17	9	13	90	9	51	1	22138	231.5	60.5	6.1	0.05	SOIL TEMP: 57/115 °F
S0300 W0400	D15	8	11	8	13	9	13	90	9	49	1	10039	231.8	27.1	2.7	0.05	
S0300 W0500	B10	8	17	7	53	9	12	90	14	1	1	29473	235.4	70.8	7.1	0.05	
S0300 W0600	D16	8	13	8	14	9	13	90	9	49	1	6106	232.9	16.3	1.6	0.05	
S0300 W0680	D17	8	14	8	15	9	13	90	9	51	1	18500	235.2	50.5	5.0	0.05	
S0350 W0000	D21	8	30	8	29	9	13	90	9	55	1	14024	233.9	38.1	3.8	0.05	
S0400 W0100	D23	8	32	8	31	9	13	90	9	57	1	2090	234.4	5.3	0.5	0.05	
S0400 W0200	D24	8	33	8	32	9	13	90	9	59	1	5937	232.2	15.9	1.6	0.05	
S0400 W0300	D25	8	35	8	33	9	13	90	9	59	1	12754	232.1	34.7	3.5	0.05	
S0400 W0400	D26	8	36	8	37	9	13	90	10	1	1	1155	232.5	2.7	0.3	0.05	
S0400 W0500	B11	8	30	8	29	9	12	90	14	5	2	1563	234.6	1.4	0.1	0.05	
S0400 W0600	B12	8	32	8	30	9	12	90	14	4	1	2064	240.6	4.5	0.4	0.05	
S0400 W0650	B13	8	35	8	31	9	12	90	14	11	1	2669	240.6	5.9	0.6	0.05	
S0500 W0100	D29	8	45	8	42	9	13	90	10	3	1	18288	233.8	49.9	5.0	0.05	
S0500 W0200	D28	8	44	8	41	9	13	90	10	4	2	1961	235.4	2.2	0.2	0.05	
S0500 W0300	D27	8	42	8	40	9	13	90	10	1	1	2498	231.0	6.4	0.6	0.05	
S0500 W0400	D31	8	50	8	46	9	13	90	10	7	1	1151	241.6	2.7	0.3	0.05	
S0500 W0520	C02	8	40	8	40	9	12	90	11	18	3	1400	234.1	0.7	0.1	0.04	
S0500 W0600	C01	8	38	8	38	9	12	90	11	18	1	1660	232.2	3.4	0.3	0.04	
S0500 W0620	E24	10	57	10	53	9	12	90	15	22	1	4437	237.8	10.0	1.0	0.05	
S0550 W0000	D30	8	47	8	43	9	13	90	10	5	1	4900	229.6	13.0	1.3	0.05	
S0600 W0100	C05	9	6	9	6	9	12	90	11	31	1	1950	234.7	4.1	0.4	0.04	
S0600 W0200	C06	9	9	9	8	9	12	90	11	31	3	1245	240.4	0.6	0.1	0.04	
S0600 W0300	C08	9	12	9	10	9	12	90	11	35	1	1668	232.3	3.5	0.3	0.04	

CLIENT: UMETCO BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
SUMMARY OF FIELD SAMPLES DATA FOR THE COVERED AREA OF CELL #2
PILE: CELL #2 BATCH(S): ABCDE SURFACE: DIRT AIR TEMP MIN: 61°F MAX: 93°F NET WT OUT: 180.0 g.
AREA: COVER DEPLOYMENT: 9 8 90 RETRIEVAL: 9 9 90 CHARCOAL BKG CPM: 184 (average)
FIELD TECHNICIANS: STN, DAR, DG, DLC COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 5/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
S0600 W0400	C09	9	14	9	12	9	12	90	11	37	2	1828	229.9	1.7	0.2	0.04	
S0600 W0500	D33	9	6	8	48	9	13	90	10	9	2	1441	233.8	1.5	0.1	0.06	
S0600 W0620	D34	9	8	8	49	9	13	90	10	12	1	1220	230.6	2.9	0.3	0.06	
S0700 W0100	C14	9	48	9	46	9	12	90	11	40	1	34787	231.8	79.9	8.0	0.04	
S0700 W0200	C13	9	46	9	45	9	12	90	11	40	1	1901	231.8	4.0	0.4	0.04	
S0700 W0300	C12	9	44	9	44	9	12	90	11	39	1	1621	234.2	3.3	0.3	0.04	
S0700 W0400	C10	9	17	9	14	9	12	90	11	37	2	1001	233.7	0.8	0.1	0.04	
S0700 W0500	C11	9	42	9	42	9	12	90	11	39	2	1306	232.7	1.1	0.1	0.04	
S0700 W0600	D35	9	10	8	50	9	13	90	10	14	2	1250	233.7	1.2	0.1	0.06	
S0700 W0700	D36	9	11	8	51	9	13	90	10	16	3	1392	233.0	0.8	0.1	0.06	SOIL TEMP: 59/111 °F
S0700 W0750	E05	9	42	9	39	9	12	90	14	44	1	6376	231.7	14.6	1.5	0.05	
S0750 W0030	C15	9	50	9	47	9	12	90	11	43	1	5069	240.1	11.3	1.1	0.04	
S0800 W0100	C16	9	53	9	52	9	12	90	11	43	1	4574	232.6	10.1	1.0	0.04	
S0800 W0200	C18	10	0	9	58	9	12	90	11	45	1	6929	230.9	15.6	1.6	0.04	
S0800 W0400	C19	10	2	10	2	9	12	90	11	50	4	1152	232.8	0.3	0.0	0.04	
S0800 W0400	C20	10	4	10	4	9	12	90	11	52	3	1148	231.7	0.5	0.0	0.04	
S0800 W0500	C21	10	6	10	5	9	12	90	11	53	3	1151	234.7	0.5	0.0	0.04	
S0800 W0600	E01	9	32	9	35	9	12	90	14	33	2	1182	211.7	0.9	0.1	0.05	
S0800 W0700	E02	9	34	9	36	9	12	90	14	33	2	1153	238.0	0.9	0.1	0.05	
S0800 W0800	E03	9	37	9	37	9	12	90	14	38	3	1004	235.9	0.3	0.0	0.05	
S0800 W0900	E04	9	39	9	38	9	12	90	14	37	2	1408	233.9	1.2	0.1	0.05	EDGE OF COVER
S0900 W0100	C27	10	27	10	26	9	12	90	13	38	1	3435	235.4	7.6	0.8	0.05	
S0900 W0200	C26	10	25	10	25	9	12	90	13	39	3	1126	233.4	0.5	0.0	0.05	
S0900 W0300	C24	10	23	10	23	9	12	90	12	2	3	984	234.7	0.4	0.0	0.04	SOIL TEMP: 61/117 °F
S0900 W0400	C23	10	21	10	21	9	12	90	11	57	3	1005	232.3	0.4	0.0	0.04	
S0900 W0500	C22	10	8	10	6	9	12	90	11	57	3	1108	232.1	0.5	0.0	0.04	
S0900 W0700	E07	9	52	9	52	9	12	90	14	45	2	1495	234.0	1.3	0.1	0.05	
S0900 W0800	E08	9	55	9	53	9	12	90	14	48	3	1094	233.1	0.4	0.0	0.05	
S0900 W0900	E09	9	57	9	54	9	12	90	14	47	2	1801	229.9	1.7	0.2	0.05	
S0950 W0050	C28	10	29	10	28	9	12	90	13	39	1	13862	234.6	31.9	3.2	0.05	
S1000 W0100	E10	9	59	9	55	9	12	90	14	52	3	1178	228.8	0.5	0.0	0.05	
S1000 W0100	E38	11	18	11	7	9	12	90	15	48	1	9332	232.9	21.7	2.2	0.05	
S1000 W0200	E36	11	17	11	6	9	12	90	15	46	2	1544	230.6	1.4	0.1	0.05	
S1000 W0300	E34	11	16	11	5	9	12	90	15	42	4	1161	236.0	0.2	0.0	0.05	
S1000 W0400	E32	11	14	11	4	9	12	90	15	37	2	1100	231.3	0.8	0.1	0.05	
S1000 W0500	E30	11	12	11	3	9	12	90	15	32	3	1309	231.2	0.6	0.1	0.05	
S1000 W0600	E17	10	15	10	13	9	12	90	15	8	3	1209	232.1	0.5	0.1	0.05	
S1000 W0700	E14	10	9	10	10	9	12	90	15	3	4	1123	235.0	0.2	0.0	0.05	
S1000 W0800	E12	10	7	10	8	9	12	90	14	56	3	1281	229.6	0.6	0.1	0.05	
S1000 W1000	E11	10	0	9	56	9	12	90	14	52	3	1281	226.4	0.6	0.1	0.05	
S1050 W0700	E15	10	11	10	11	9	12	90	15	3	4	1085	227.2	0.2	0.0	0.05	
S1050 W0800	E28	11	0	10	54	9	12	90	15	28	4	1072	236.8	0.2	0.0	0.05	
S1100 W0100	E39	11	14	11	2	9	12	90	14	51	2	1197	230.3	1.0	0.1	0.05	
S1100 W0200	E37	11	13	11	1	9	12	90	14	50	4	1129	226.6	0.2	0.0	0.05	
S1100 W0300	E35	11	12	11	0	9	12	90	15	44	4	1026	227.0	0.2	0.0	0.05	
S1100 W0400	E33	11	11	10	59	9	12	90	15	41	3	1408	228.6	0.7	0.1	0.05	

CLIENT: UMETCO BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
SUMMARY OF FIELD SAMPLES DATA FOR THE COVERED AREA OF CELL #2
PILE: CELL #2 BATCH(S): ABCDE SURFACE: DIRT AIR TEMP MIN: 61°F MAX: 93°F NET WT OUT: 130.0 g.
AREA: COVER DEPLOYMENT: 9 8 90 RETRIEVAL: 9 9 90 CHARCOAL BKG CPM: 184 (average)
FIELD TECHNICIANS: STN, DAR, DG, DLC COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 5/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
S1100 W0500	E31	11	9	10	58	9	12	90	15	36	3	1186	229.5	0.5	0.0	0.05	
S1100 W0600	E16	10	12	10	12	9	12	90	15	9	4	1180	227.8	0.2	0.0	0.05	
S1120 W0450	E27	10	56	10	53	9	12	90	15	28	2	1074	234.3	0.8	0.1	0.05	
S1125 W0400	E26	10	54	10	52	9	12	90	15	24	1	1846	230.4	3.9	0.4	0.05	
S1150 W0020	E19	10	25	10	25	9	12	90	15	13	1	12086	231.2	28.0	2.8	0.05	
S1150 W0300	E25	10	52	10	51	9	12	90	15	23	3	1419	226.8	0.7	0.1	0.05	
S1200 W0100	E21	10	28	10	27	9	12	90	15	17	1	27366	233.8	64.1	6.4	0.05	
S1200 W0200	E22	10	30	10	28	9	12	90	15	20	1	2839	225.4	6.2	0.6	0.05	
S1250 W0020	E20	10	27	10	26	9	12	90	15	15	1	18747	228.5	43.7	4.4	0.05	

AVERAGE RADON FLUX FOR CELL #2 COVER: 19.5 pCi/m²s

Cell 2

Measurement Data Results

Wet Beach Area

CLIENT: UMETCO. BLANDING. UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 3109.00
SUMMARY OF FIELD SAMPLES DATA FOR THE WET BEACH AREAS OF CELL #2
PILE: CELL #2 BATCH: CGHI SURFACE: TAILINGS AIR TEMP MIN: 59°F MAX: 90°F NET WT OUT: 180.0 g.
AREA: WET BEACHES DEPLOYMENT: 9 10 90 RETRIEVAL: 9 11 90 CHARCOAL BKG CPM: 181 (average)
FIELD TECHNICIANS: DAR, DLC, DG, STN COUNTED BY: DG, DLC DATA ENTRY BY: DLC TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/0-21, M-02/0-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
S0050 W2550	I55	9	40	9	50	9	13	90	14	46	1	5533	229.4	10.4	1.0	0.04	
S0050 W2850	I22	12	4	12	0	9	14	90	10	35	1	26529	226.9	59.4	5.3	0.05	
S0060 W1000	G06	8	28	8	31	9	13	90	13	18	1	3843	228.6	7.2	0.7	0.04	
S0100 W0850	G01	7	52	8	25	9	13	90	11	58	1	7683	224.2	14.3	1.4	0.04	
S0100 W0900	G02	7	54	8	27	9	13	90	11	58	1	4444	230.2	8.1	0.8	0.04	
S0100 W1000	G03	8	23	8	33	9	13	90	13	17	1	2467	234.2	4.5	0.4	0.04	
S0100 W1300	G18	9	59	9	58	9	13	90	13	33	1	45062	223.4	87.4	8.7	0.04	
S0100 W1375	G19	10	3	10	0	9	13	90	13	33	1	2319	245.3	4.2	0.4	0.04	
S0100 W2200	I68	11	21	11	22	9	14	90	10	33	1	21955	231.2	49.1	4.9	0.05	
S0100 W2300	I57	9	56	9	55	9	14	90	10	7	1	36408	246.2	82.5	8.2	0.05	
S0100 W2400	I56	9	50	9	51	9	14	90	10	5	1	13911	243.6	31.2	3.1	0.05	
S0100 W2750	I11	9	39	9	35	9	14	90	10	15	1	12194	231.2	27.5	2.7	0.05	
S0100 W2900	I06	9	3	9	3	9	14	90	10	5	1	5632	241.0	12.5	1.2	0.05	
S0100 W3050	I54	9	24	9	20	9	13	90	14	44	1	5683	228.5	10.9	1.1	0.04	
S0100 W3150	C07	9	7	9	6	9	14	90	11	18	1	4862	230.4	10.8	1.1	0.04	
S0100 W3225	C01	8	37	8	45	9	14	90	11	11	1	76665	241.1	176.1	17.6	0.04	
S0100 W3320	I01	8	37	8	44	9	13	90	14	37	1	5797	241.7	11.1	1.1	0.04	
S0125 W1100	G07	8	33	8	44	9	13	90	13	21	1	15056	233.8	29.0	2.9	0.04	SOIL TEMP: 73/73 °F
S0150 W1350	G20	10	5	10	4	9	13	90	13	34	1	5318	244.6	10.0	1.0	0.04	
S0150 W1800	I74	12	5	12	0	9	14	90	10	41	1	18320	222.4	40.9	4.1	0.05	
S0170 W1000	G05	8	27	8	37	9	13	90	13	18	1	5151	248.5	9.7	1.0	0.04	
S0200 W1100	G08	8	36	8	47	9	13	90	13	21	1	1219	222.2	2.0	0.2	0.04	
S0200 W2300	I58	9	59	9	56	9	14	90	10	9	1	16945	234.6	38.2	3.8	0.05	
S0200 W2400	I59	10	3	9	57	9	14	90	10	11	1	10076	240.5	22.6	2.3	0.05	
S0200 W2720	I12	9	43	9	43	9	14	90	10	17	1	9386	218.6	46.0	4.6	0.04	
S0200 W2920	I07	9	8	9	5	9	14	90	10	7	1	21952	222.9	49.9	5.0	0.05	
S0200 W3000	C06	8	53	8	54	9	14	90	11	17	2	1151	228.2	0.9	0.1	0.04	
S0200 W3250	C03	8	41	8	47	9	14	90	11	13	1	10378	219.0	23.5	2.4	0.04	SOIL TEMP: 64/102 °F
S0200 W3350	I02	8	39	8	46	9	13	90	14	38	1	6485	241.9	12.4	1.2	0.04	
S0250 W3100	I52	9	18	9	10	9	13	90	14	41	1	7809	221.3	15.1	1.5	0.04	
S0250 W3200	I53	9	21	9	12	9	12	90	14	42	1	3884	228.9	6.1	0.6	0.03	
S0300 W1100	G09	8	42	8	54	9	13	90	13	23	1	1472	231.2	9.6	1.0	0.04	
S0300 W1200	G10	8	47	8	51	9	13	90	13	23	1	331414	243.5	647.9	64.8	0.04	
S0300 W2400	I61	10	36	10	34	9	14	90	10	15	1	16665	222.4	37.4	3.7	0.05	SOIL TEMP: 64/100 °F
S0300 W2500	I60	10	6	10	0	9	14	90	10	13	1	2217	243.9	4.6	0.5	0.05	
S0300 W2700	I13	9	46	9	46	9	14	90	10	19	1	5237	226.1	11.5	1.2	0.05	
S0300 W2800	I16	10	31	10	37	9	14	90	10	24	1	3033	219.4	6.4	0.6	0.05	
S0300 W3050	I51	9	14	9	11	9	13	90	14	39	1	12632	217.5	24.6	2.5	0.04	
S0300 W3320	I03	8	42	8	47	9	13	90	14	40	1	7232	238.6	13.9	1.4	0.04	
S0350 W1440	G13	9	14	9	4	9	13	90	13	26	1	6119	225.4	46.0	4.6	0.04	
S0350 W2950	I50	9	10	9	9	9	13	90	14	38	2	1580	226.7	1.2	0.1	0.04	
S0350 W3200	C04	8	45	8	49	9	14	90	11	14	2	1014	228.1	0.8	0.1	0.04	
S0360 W1390	G12	9	5	9	0	9	13	90	13	26	1	2477	242.3	4.5	0.5	0.04	
S0400 W1200	G34	11	33	11	31	9	13	90	13	49	1	7738	243.0	14.6	1.5	0.04	
S0400 W2500	I63	10	45	10	36	9	14	90	10	19	1	1537	249.2	3.1	0.3	0.05	
S0400 W2600	I15	9	56	9	55	9	14	90	10	22	1	1201	231.3	2.3	0.2	0.05	

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
SUMMARY OF FIELD SAMPLES DATA FOR THE WET BEACH AREAS OF CELL #2
PILE: CELL #2 BATCH: CGHI SURFACE: TAILINGS AIR TEMP MIN: 59°F MAX: 90°F NET WT OUT: 180.0 g.
AREA: WET BEACHES DEPLOYMENT: 9 10 90 RETRIEVAL: 9 11 90 CHARCOAL BKG CPM: 181 (average)
FIELD TECHNICIANS: DAR, DLC, DG, STN COUNTED BY: DG, DLC DATA ENTRY BY: DLC TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
S0400 W2700	I18	11	0	10	57	9	14	90	10	28	1	1313	225.2	2.5	0.3	0.05	
S0400 W2900	I08	9	13	9	10	9	14	90	10	9	1	3239	238.7	9.6	1.0	0.04	
S0400 W3300	I04	8	45	8	49	9	13	90	14	41	1	9908	226.8	19.2	1.9	0.04	
S0425 W1500	G14	9	18	9	5	9	13	90	13	28	1	11297	230.9	21.9	2.2	0.04	
S0440 W3300	I05	8	47	8	50	9	13	90	14	45	3	1035	222.3	0.3	0.0	0.04	
S0450 W3100	C05	8	50	8	51	9	14	90	11	15	2	1125	241.8	0.9	0.1	0.04	
S0500 W1350	G33	11	30	11	28	9	13	90	13	48	1	1652	250.4	2.8	0.3	0.04	
S0500 W1650	G15	9	25	9	12	9	13	90	13	28	1	4087	230.6	7.7	0.8	0.04	
S0500 W1800	I21	11	48	11	45	9	14	90	10	33	1	1950	226.3	4.0	0.4	0.05	
S0500 W2000	I19	11	38	11	36	9	14	90	10	30	1	2385	234.7	5.0	0.5	0.05	
S0500 W2100	I72	11	41	11	31	9	14	90	10	39	1	3144	214.1	6.7	0.7	0.05	
S0500 W2400	I64	10	50	10	37	9	14	90	10	20	1	13951	219.1	31.5	3.1	0.05	
S0500 W2500	I65	10	54	10	39	9	14	90	10	22	1	2837	241.1	6.1	0.6	0.05	
S0500 W2740	I14	9	51	9	51	9	14	90	10	20	1	1032	248.7	1.9	0.2	0.05	
S0500 W2900	I09	9	21	9	16	9	14	90	10	11	1	3135	246.1	6.8	0.7	0.05	
S0550 W1700	G17	9	34	9	20	9	13	90	13	30	1	2414	217.6	3.8	0.4	0.04	
S0550 W1900	I20	11	43	11	39	9	14	90	10	32	1	1909	253.4	4.6	0.4	0.05	
S0550 W2200	I71	11	38	11	29	9	14	90	10	37	1	16511	225.4	37.0	3.7	0.05	
S0590 W2800	H50	12	15	12	15	9	14	90	10	44	1	7467	220.8	16.4	1.6	0.04	
S0600 W1450	G32	11	27	11	25	9	13	90	13	47	1	11889	244.7	22.6	2.3	0.04	
S0600 W1650	G16	9	31	9	15	9	13	90	13	31	2	1898	228.2	1.5	0.2	0.04	
S0600 W2100	I73	11	45	11	32	9	14	90	10	39	1	1470	250.3	3.1	0.3	0.05	
S0600 W2300	I69	11	28	11	26	9	14	90	10	35	1	10809	222.9	24.0	2.4	0.05	
S0600 W2400	I66	10	58	10	40	9	14	90	10	24	1	1961	246.3	4.1	0.4	0.05	
S0700 W1425	G31	11	23	11	25	9	13	90	13	46	1	22676	245.5	43.3	4.3	0.04	
S0700 W2200	I70	11	32	11	28	9	14	90	10	37	1	2344	231.0	4.9	0.5	0.05	
S0700 W2400	G50	12	18	12	15	9	14	90	10	44	1	1725	247.9	3.5	0.3	0.05	
S0730 W1675	H09	12	22	12	20	9	13	90	11	28	1	4508	243.1	8.2	0.8	0.04	
S0730 W2100	H15	12	38	12	36	9	13	90	11	36	1	2506	240.4	4.4	0.4	0.04	
S0750 W1650	H08	12	17	12	15	9	13	90	11	28	1	27271	240.2	51.1	5.1	0.04	
S0750 W1750	H11	12	26	12	25	9	13	90	11	30	1	4705	243.1	8.5	0.9	0.04	
S0780 W2000	H14	12	35	12	33	9	13	90	11	36	1	7636	243.1	14.1	1.4	0.04	
S0800 W1400	G27	11	0	11	0	9	13	90	13	41	1	6206	240.8	11.6	1.2	0.04	
S0800 W1500	G30	11	18	11	18	9	13	90	13	45	2	1286	250.0	0.9	0.1	0.04	
S0800 W1600	H07	12	15	12	14	9	13	90	11	27	1	52752	244.0	99.1	9.9	0.04	
S0800 W1700	H10	12	24	12	25	9	13	90	11	30	1	88757	240.2	166.6	16.7	0.04	
S0825 W1050	G23	10	44	10	44	9	13	90	13	36	1	1799	249.4	3.1	0.3	0.04	
S0830 W1570	H05	12	12	12	10	9	13	90	11	25	1	19137	244.0	35.8	3.6	0.04	SOIL TEMP: 63/90 °F
S0830 W1800	H13	12	29	12	29	9	13	90	11	34	1	17770	239.6	33.1	3.3	0.04	
S0850 W1125	G22	10	40	10	39	9	13	90	13	36	1	1757	247.8	3.0	0.3	0.04	
S0850 W1300	G26	10	56	10	54	9	13	90	13	40	1	1775	244.9	3.1	0.3	0.04	
S0850 W1350	G29	11	4	11	4	9	13	90	13	45	1	1321	246.1	2.2	0.2	0.04	
S0875 W1500	H04	11	57	11	57	9	13	90	11	23	1	2322	241.5	4.1	0.4	0.04	
S0900 W1075	H18	12	52	12	49	9	13	90	11	39	1	1387	246.5	2.3	0.2	0.04	
S0900 W1200	G25	10	53	10	50	9	13	90	13	38	1	6883	242.9	13.0	1.3	0.04	
S0900 W1300	H02	11	41	11	40	9	13	90	11	19	1	4023	242.1	7.3	0.7	0.04	

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
SUMMARY OF FIELD SAMPLES DATA FOR THE WET BEACH AREAS OF CELL #2
PILE: CELL #2 BATCH: CGHI SURFACE: TAILINGS AIR TEMP MIN: 59°F MAX: 90°F NET WT OUT: 180.0 g.
AREA: WET BEACHES DEPLOYMENT: 9 10 90 RETRIEVAL: 9 11 90 CHARCOAL BKG CPM: 181 (average)
FIELD TECHNICIANS: DAR, DLC, DG, STN COUNTED BY: DG, DLC DATA ENTRY BY: DLC TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
S0900 W1400	H03	11	47	11	45	9	13	90	11	21	1	19895	243.7	37.3	3.7	0.04	
S0930 W1300	G37	11	56	11	51	9	13	90	13	52	1	7104	244.1	13.4	1.3	0.04	
S0950 W1100	G21	10	35	10	38	9	13	90	13	34	1	1159	249.4	1.9	0.2	0.04	
S0950 W1200	H19	12	54	12	51	9	13	90	11	39	1	5660	241.5	10.3	1.0	0.04	
S0950 W1250	G36	11	51	11	50	9	13	90	13	51	1	1316	248.4	2.2	0.2	0.04	
S0950 W1400	G38	11	58	11	55	9	13	90	13	52	1	5098	242.3	9.5	0.9	0.04	
S0980 W1125	G35	11	49	11	46	9	13	90	13	49	1	64117	245.8	123.3	12.3	0.04	
S1000 W1075	H16	12	47	12	47	9	13	90	11	38	1	21830	241.7	40.7	4.1	0.04	

AVERAGE RADON FLUX FOR CELL #2 WET BEACHES: 27.5 pCi/m²s

Cell 2

Measurement Data Results

Dry Beach Area

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
SUMMARY OF FIELD SAMPLES DATA FOR THE DRY BEACH AREAS OF CELL #2
PILE: CELL #2 BATCH: ABDF SURFACE: TAILINGS AIR TEMP MIN: 59°F MAX: 82°F NET WT OUT: 180.0 g.
AREA: DRY BEACHES DEPLOYMENT: 9 6 90 RETRIEVAL: 9 7 90 CHARCOA BKG CPM: 182 (average)
FIELD TECHNICIANS: JWD, STN, DAR, DG COUNTED BY: JWD DATA ENTRY BY: DLC TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT (MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
S0050 W1000	F16	10	33	10	33	9	10	90	11	34	1	2612	243.9	5.6	0.6	0.04	
S0075 W1400	D01	13	27	13	46	9	10	90	11	0	1	4394	244.5	9.3	0.9	0.04	
S0100 W0800	F01	9	55	9	55	9	10	90	11	1	1	6522	243.6	14.5	1.5	0.04	
S0100 W0900	F08	10	13	10	13	9	10	90	10	58	1	6378	245.7	14.2	1.4	0.04	WET
S0100 W1100	F26	11	15	11	15	9	10	90	13	10	1	20024	242.4	45.8	4.6	0.04	
S0100 W1200	F36	11	50	11	50	9	10	90	13	30	1	44277	237.7	101.5	10.1	0.04	
S0150 W1250	F39	11	55	11	55	9	10	90	14	1	1	89186	221.8	205.5	20.5	0.04	SOIL TEMP: 50/115 °F
S0150 W1550	D04	13	35	13	55	9	10	90	11	8	1	22002	242.8	47.9	4.8	0.04	
S0150 W2700	A10	9	14	9	43	9	10	90	14	26	1	11833	236.6	26.9	2.7	0.05	
S0150 W2850	B01	8	55	8	54	9	10	90	11	20	1	96530	234.0	223.1	22.3	0.05	
S0150 W3100	A07	8	57	9	13	9	10	90	14	19	1	117103	243.5	273.3	27.3	0.05	
S0150 W3150	A09	9	3	9	12	9	10	90	14	24	1	128158	240.8	300.7	30.1	0.05	
S0160 W2590	A13	9	27	9	48	9	10	90	14	33	1	86297	237.1	200.1	20.0	0.05	
S0200 W0800	F02	9	57	9	57	9	10	90	10	55	1	116970	233.8	267.3	26.7	0.04	
S0200 W0900	F09	10	15	10	15	9	10	90	11	5	1	9342	244.3	21.0	2.1	0.04	WET
S0200 W1150	F38	11	52	11	52	9	10	90	13	33	1	146116	238.1	335.8	33.6	0.04	
S0200 W1400	D02	13	30	13	50	9	10	90	10	51	1	41989	237.7	91.7	9.2	0.04	
S0200 W1900	A33	11	10	11	41	9	10	90	15	15	1	208627	225.8	477.1	47.7	0.05	
S0200 W2100	A23	10	25	11	9	9	10	90	14	57	1	37760	238.4	85.5	8.5	0.05	
S0200 W2630	A12	9	24	9	47	9	10	90	14	30	1	35699	234.8	82.4	8.2	0.05	
S0200 W2700	A11	9	18	9	45	9	10	90	14	28	1	104423	240.7	241.3	24.1	0.05	
S0200 W2800	B02	9	2	9	3	9	10	90	11	23	1	37699	242.4	86.7	8.7	0.05	SOIL TEMP: 61/97 °F
S0200 W3100	A02	8	40	8	44	9	10	90	14	5	1	23185	234.5	54.3	5.4	0.05	
S0200 W3150	A06	8	55	9	10	9	10	90	14	16	1	241301	232.5	563.9	56.4	0.05	
S0200 W3200	A01	8	35	8	40	9	10	90	14	5	1	2726	245.4	6.0	0.6	0.05	SOIL TEMP: 59/95 °F
S0250 W1550	D05	13	37	13	54	9	10	90	10	57	1	51759	233.9	113.4	11.3	0.04	
S0250 W2200	A18	10	10	10	39	9	10	90	14	48	1	57125	239.6	131.1	13.1	0.05	
S0250 W2250	A19	10	12	10	40	9	10	90	14	50	1	29782	236.7	68.2	6.8	0.05	
S0300 W0800	F03	9	59	9	59	9	10	90	11	11	1	116946	239.3	267.7	26.8	0.04	
S0300 W0900	F10	10	17	10	17	9	10	90	11	20	1	169098	239.3	386.8	38.7	0.04	
S0300 W0975	F17	10	42	10	42	9	10	90	11	37	1	6212	244.8	13.8	1.4	0.04	
S0300 W1500	D03	13	22	13	48	9	10	90	11	2	1	1829	242.0	3.6	0.4	0.04	
S0300 W1600	D06	13	39	13	53	9	10	90	11	5	1	89603	227.6	197.1	19.7	0.04	
S0300 W1700	B24	11	20	11	27	9	10	90	14	30	1	40456	239.7	93.2	9.3	0.05	
S0300 W1750	B22	11	15	11	25	9	10	90	14	25	1	33693	238.3	77.4	7.7	0.05	
S0300 W1850	B21	11	15	11	31	9	10	90	14	23	1	32807	240.0	75.0	7.5	0.05	
S0300 W1900	B20	11	13	11	32	9	10	90	14	21	1	169498	228.4	388.3	38.8	0.05	
S0300 W2000	A29	10	52	11	36	9	10	90	15	7	1	2094	234.2	4.3	0.4	0.05	
S0300 W2100	A24	10	32	11	10	9	10	90	14	59	1	71562	234.9	163.0	16.3	0.05	
S0300 W2200	A20	10	15	10	41	9	10	90	14	52	1	70267	239.5	161.7	16.2	0.05	
S0300 W2250	A21	10	17	10	42	9	10	90	14	53	1	83649	236.9	192.7	19.3	0.05	
S0300 W2300	A14	9	40	10	19	9	10	90	14	35	1	14201	242.0	32.1	3.2	0.05	

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AREA: DRY BEACHES DEPLOYMENT: 9 6 90 RETRIEVAL: 9 7 90 CHARCOA BKG CPM: 182 (average)
FIELD TECHNICIANS: JWD, STN, DAR, DG COUNTED BY: JWD DATA ENTRY BY: DLC TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT (MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
S0320 W3000	A08	9	0	9	15	9	10	90	14	21	1	4666	236.4	10.5	1.0	0.05	
S0350 W2000	A30	10	54	11	37	9	10	90	15	9	1	20770	230.3	46.8	4.7	0.05	
S0350 W2050	A28	10	50	11	13	9	10	90	15	5	1	7701	233.2	17.3	1.7	0.05	
S0350 W2100	A25	10	35	11	11	9	10	90	15	0	1	44086	229.1	100.4	10.0	0.05	
S0350 W2150	A26	10	36	11	12	9	10	90	15	2	1	30990	242.0	70.4	7.0	0.05	
S0350 W2250	A22	10	20	10	43	9	10	90	14	55	1	75114	241.2	173.2	17.3	0.05	
S0350 W2300	A16	9	44	10	21	9	10	90	14	44	1	97435	239.5	223.2	22.3	0.05	
S0380 W3000	A04	8	43	8	47	9	10	90	14	11	1	23836	239.2	55.8	5.6	0.05	
S0400 W0800	F04	10	1	10	1	9	10	90	10	41	1	77707	235.8	177.0	17.7	0.04	SOIL TEMP: 46/109 °F
S0400 W0900	F11	10	18	10	18	9	10	90	11	8	1	114285	237.2	260.9	26.1	0.04	
S0400 W1000	F18	10	44	10	44	9	10	90	11	42	1	11211	245.4	25.3	2.5	0.04	
S0400 W1600	D07	13	41	13	52	9	10	90	10	54	1	28967	239.4	63.5	6.4	0.04	
S0400 W1850	B18	10	50	11	3	9	10	90	14	16	1	25656	242.2	58.8	5.9	0.05	
S0400 W1900	B14	10	38	10	59	9	10	90	14	7	1	174466	238.4	400.1	40.0	0.05	
S0400 W1950	A31	10	56	11	38	9	10	90	15	11	1	14392	239.9	32.3	3.2	0.05	
S0400 W2000	B12	10	23	10	25	9	10	90	14	1	1	10468	237.4	24.0	2.4	0.05	
S0400 W2150	B11	10	21	10	24	9	10	90	11	50	1	42283	241.8	96.5	9.6	0.05	
S0400 W2250	A27	10	38	10	44	9	10	90	15	4	1	76584	235.0	178.7	17.9	0.05	
S0400 W2300	A17	9	46	10	22	9	10	90	14	46	1	130868	228.6	300.1	30.0	0.05	
S0400 W2800	B03	9	6	9	5	9	10	90	11	27	1	14738	240.0	33.7	3.4	0.05	
S0400 W2850	B04	9	8	9	8	9	10	90	11	30	1	115688	238.6	267.1	26.7	0.05	
S0450 W1050	F27	11	22	11	22	9	10	90	13	13	1	14902	237.6	33.9	3.4	0.04	
S0450 W1850	B17	10	48	11	2	9	10	90	14	14	1	37509	241.6	86.1	8.6	0.05	SOIL TEMP: 55/113 °F
S0450 W1900	B16	10	45	11	1	9	10	90	14	11	1	86500	241.5	198.8	19.9	0.05	
S0450 W2750	B06	9	43	9	40	9	10	90	11	35	1	39892	240.5	91.7	9.2	0.05	
S0450 W2850	B05	9	38	9	35	9	10	90	11	32	1	21708	240.7	49.7	5.0	0.05	
S0475 W1950	B13	10	25	10	26	9	10	90	14	4	1	65662	241.2	152.8	15.3	0.05	
S0475 W2775	B07	9	46	9	43	9	10	90	11	37	1	15296	240.5	34.9	3.5	0.05	
S0500 W0700	F07	10	4	10	4	9	10	90	10	51	1	51683	233.9	117.7	11.8	0.04	
S0500 W0800	F05	10	2	10	2	9	10	90	11	2	1	35437	233.8	80.7	8.1	0.04	
S0500 W0900	F12	10	20	10	20	9	10	90	11	23	1	18050	241.4	40.9	4.1	0.04	
S0500 W1000	F19	10	45	10	45	9	10	90	11	45	1	61901	240.2	141.3	14.1	0.04	
S0500 W1100	F28	11	24	11	24	9	10	90	18	14	1	7852	240.9	18.4	1.8	0.05	
S0500 W1200	F34	11	45	11	45	9	10	90	13	26	1	10936	238.5	24.8	2.5	0.04	
S0500 W1900	B15	10	43	11	0	9	10	90	14	9	1	36089	241.9	82.6	8.3	0.05	
S0500 W2250	B10	10	18	10	22	9	10	90	11	48	1	49210	227.6	112.3	11.2	0.05	
S0500 W2300	B09	10	16	10	20	9	10	90	11	45	1	155256	228.4	355.2	35.5	0.05	
S0600 W0800	F06	10	3	10	3	9	10	90	12	51	1	10392	241.6	23.7	2.4	0.04	
S0600 W0900	F14	10	22	10	22	9	10	90	11	30	1	6150	244.8	13.7	1.4	0.04	
S0600 W1000	F20	10	47	10	47	9	10	90	11	48	1	57326	233.0	130.8	13.1	0.04	
S0600 W1100	F29	11	25	11	25	9	10	90	13	16	1	38671	235.1	88.7	8.9	0.04	
S0600 W1200	F35	11	47	11	47	9	10	90	13	28	1	36260	234.6	83.0	8.3	0.04	

CLIENT: UNETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
SUMMARY OF FIELD SAMPLES DATA FOR THE DRY BEACH AREAS OF CELL #2
PILE: CELL #2 BATCH: ABDF SURFACE: TAILINGS AIR TEMP MIN: 59°F MAX: 82°F NET WT OUT: 180.0 g.
AREA: DRY BEACHES DEPLOYMENT: 9 6 90 RETRIEVAL: 9 7 90 CHARCOA BKG CPM: 182 (average)
FIELD TECHNICIANS: JWD, STN, DAR, DG COUNTED BY: JWD DATA ENTRY BY: DLC TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT (MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
S0700 W0900	F15	10	23	10	23	9	10	90	11	33	1	2747	242.8	5.9	0.6	0.04	
S0700 W1000	F21	10	48	10	48	9	10	90	11	51	1	28298	231.6	64.4	6.4	0.04	
S0700 W1100	F30	11	26	11	26	9	10	90	13	18	1	7251	242.3	16.3	1.6	0.04	
S0700 W1200	F31	11	27	11	27	9	10	90	13	20	1	45357	235.5	104.1	10.4	0.04	
S0700 W1300	F32	11	32	11	32	9	10	90	13	22	1	17578	243.2	40.1	4.0	0.04	
S0800 W1000	F22	10	50	10	50	9	10	90	12	46	1	1487	242.4	3.0	0.3	0.04	
S0800 W1100	F24	10	57	10	57	9	10	90	12	53	1	18045	229.6	41.2	4.1	0.04	
S0800 W1200	F33	11	32	11	32	9	10	90	13	24	1	13993	242.8	31.8	3.2	0.04	
S0850 W1100	F25	11	3	11	3	9	10	90	12	55	1	4157	242.8	9.2	0.9	0.04	
S0900 W1000	F23	10	52	10	52	9	10	90	12	48	1	3440	246.2	7.5	0.8	0.04	

AVERAGE RADON FLUX FOR CELL #2 DRY BEACHES: 117.6 pCi/m²s

Cell 3

Measurement Data Results

Wet Beach Area

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
SUMMARY OF FIELD SAMPLES DATA FOR THE WET BEACH AREAS OF CELL #3
PILE: CELL #3 BATCH: HJK SURFACE: TAILINGS AIR TEMP MIN: 50°F MAX: 81°F NET WT OUT: 180.0 g.
AREA: WET BEACHES DEPLOYMENT: 9 24 90 RETRIEVAL: 9 25 90 CHARCOAL BKG CPM: 186 (average)
FIELD TECHNICIANS: STN, OAR, DG COUNTED BY: DG DATA ENTRY BY: DLC, WTS TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
S0020 W2400	H002	8	38	8	35	9	28	90	11	14	1	17058	230.0	39.2	3.9	0.05	
S0020 W2450	H001	8	35	8	34	9	28	90	11	14	1	1315	227.2	2.6	0.3	0.05	
S0050 W0200	K040	12	32	12	36	9	28	90	16	30	2	1060	231.1	0.8	0.1	0.05	
S0050 W0450	K039	12	30	12	33	9	28	90	16	27	2	1202	238.0	0.9	0.1	0.05	
S0050 W0520	K032	11	55	11	57	9	28	90	16	18	1	1741	234.0	3.6	0.4	0.05	
S0050 W1000	K038	12	25	12	25	9	28	90	16	24	1	5546	228.3	12.5	1.3	0.05	
S0050 W1100	H014	9	27	9	36	9	28	90	11	36	2	1467	238.0	1.3	0.1	0.04	
S0050 W2200	H003	8	44	8	36	9	28	90	11	18	1	15263	246.1	35.2	3.5	0.05	
S0100 W0250	J05	8	51	8	52	9	28	90	14	16	3	1282	234.1	0.6	0.1	0.05	
S0100 W0400	J09	8	55	8	52	9	28	90	14	26	2	1420	241.9	1.2	0.1	0.05	
S0100 W0700	K034	11	58	11	59	9	28	90	16	20	1	5763	242.3	13.1	1.3	0.05	
S0100 W1600	H009	9	11	9	12	9	28	90	11	26	1	5049	234.2	11.3	1.1	0.05	
S0100 W1950	H008	9	2	8	54	9	28	90	11	23	1	1821	239.1	3.8	0.4	0.05	
S0100 W2250	H004	8	49	8	37	9	28	90	11	18	1	1749	238.9	3.7	0.4	0.05	SOIL TEMP: 55/93 °F
S0150 W0100	J01	8	45	8	46	9	28	90	14	14	1	41789	239.8	98.4	9.8	0.05	
S0150 W1400	H013	9	19	9	17	9	28	90	11	33	1	1362	241.8	2.7	0.3	0.05	
S0150 W2050	H007	8	59	8	53	9	28	90	11	23	1	3647	236.5	8.1	0.8	0.05	
S0200 W0350	J11	9	7	9	8	9	28	90	14	28	1	1819	238.4	3.9	0.4	0.05	
S0200 W0400	J13	9	9	9	9	9	28	90	14	30	1	5982	234.1	13.7	1.4	0.05	
S0200 W0500	J17	9	16	9	15	9	28	90	14	36	1	1275	241.9	2.6	0.3	0.05	
S0200 W2100	H006	8	55	8	52	9	28	90	11	20	1	11538	241.8	26.3	2.6	0.05	
S0200 W2200	H005	8	52	8	51	9	28	90	11	20	1	1721	237.8	3.6	0.4	0.05	
S0250 W0600	J21	9	24	9	25	9	28	90	14	39	1	4086	239.0	9.2	0.9	0.05	
S0250 W0550	J25	9	30	9	29	9	28	90	14	44	1	5475	240.8	12.5	1.3	0.05	
S0250 W1450	H011	9	14	9	15	9	28	90	11	28	1	1159	243.5	2.3	0.2	0.05	
S0280 W0750	J29	9	52	9	55	9	28	90	14	52	1	1910	238.3	4.1	0.4	0.05	
S0300 W0400	J15	9	12	9	12	9	28	90	14	33	1	9261	233.2	21.5	2.1	0.05	
S0300 W0600	J23	9	27	9	27	9	28	90	14	43	1	42841	238.7	100.8	10.1	0.05	
S0300 W0700	J27	9	33	9	33	9	28	90	14	48	1	3373	236.5	7.5	0.8	0.05	
S0300 W0800	J31	9	56	9	56	9	28	90	14	55	1	2380	241.5	5.2	0.5	0.05	
S0300 W1100	H015	9	32	9	37	9	28	90	11	35	1	2101	244.6	4.4	0.4	0.04	LOST=<0.5g.CHARCOAL
S0350 W0820	J33	9	59	9	59	9	28	90	14	58	1	2339	243.9	5.1	0.5	0.05	
S0350 W1250	H016	9	36	9	38	9	28	90	11	42	1	1298	239.4	2.6	0.3	0.04	
S0400 W0600	J26	9	44	9	44	9	28	90	14	44	1	409684	236.5	966.1	96.6	0.05	
S0400 W0650	J30	9	52	9	52	9	28	90	14	52	1	20760	238.8	48.5	4.9	0.05	
S0400 W0820	J35	10	3	10	3	9	28	90	15	0	1	5250	238.3	11.9	1.2	0.05	
S0450 W0050	J02	8	53	8	56	9	28	90	14	14	1	29266	236.7	68.6	6.9	0.05	
S0450 W0350	J12	9	14	9	14	9	28	90	14	28	1	15171	240.2	35.4	3.5	0.05	SOIL TEMP: 64/64 °F
S0450 W0500	J24	9	41	9	41	9	28	90	14	43	1	31569	241.4	74.1	7.4	0.05	
S0450 W0600	J28	9	46	9	46	9	28	90	14	48	1	6966	237.8	16.0	1.6	0.05	
S0450 W0700	J32	9	54	9	54	9	28	90	14	55	1	7569	241.6	17.4	1.7	0.05	
S0450 W0750	J34	9	56	9	56	9	28	90	14	58	1	5633	225.0	12.9	1.3	0.05	
S0450 W0780	J36	10	0	10	0	9	28	90	15	0	1	4484	232.7	10.1	1.0	0.05	
S0450 W0920	J37	10	8	10	7	9	28	90	14	52	1	14965	238.7	34.8	3.5	0.05	
S0450 W1100	H018	9	45	9	40	9	28	90	11	49	1	3088	227.6	6.7	0.7	0.05	
S0450 W1150	H017	9	40	9	39	9	28	90	11	42	1	1513	247.1	3.1	0.3	0.05	

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
SUMMARY OF FIELD SAMPLES DATA FOR THE WET BEACH AREAS OF CELL #3
PILE: CELL #3 BATCH: HJK SURFACE: TAILINGS AIR TEMP MIN: 50°F MAX: 81°F NET WT OUT: 180.0 g.
AREA: WET BEACHES DEPLOYMENT: 9 24 90 RETRIEVAL: 9 25 90 CHARCOAL BKG CPM: 186 (average)
FIELD TECHNICIANS: STN. DAR. DG COUNTED BY: DG DATA ENTRY BY: DLC, WTS TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/0-21, M-02/0-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
S0475 W0100	J04	8	55	8	58	9	28	90	14	15	1	15974	238.5	37.3	3.7	0.05	
S0475 W0200	J06	8	57	9	0	9	28	90	14	17	1	12607	238.6	29.3	2.9	0.05	
S0475 W0300	J10	9	4	9	4	9	28	90	14	25	1	22687	238.8	53.2	5.3	0.05	
S0475 W0250	J08	9	1	9	2	9	28	90	14	22	1	7712	238.5	17.8	1.8	0.05	
S0500 W0400	J14	9	21	9	20	9	28	90	14	30	1	8322	238.0	19.2	1.9	0.05	
S0500 W0460	J16	9	24	9	24	9	28	90	14	33	1	11095	241.0	25.8	2.6	0.05	RAF, LINE
S0500 W0500	J22	9	38	9	39	9	28	90	14	39	1	11568	236.9	26.8	2.7	0.05	
S0500 W0900	J39	10	10	10	9	9	28	90	15	5	1	6891	241.5	15.8	1.6	0.05	
S0550 W0450	J20	9	27	9	27	9	28	90	14	37	1	9566	238.4	22.2	2.2	0.05	RAF
S0550 W0500	J40	10	12	10	14	9	28	90	15	5	1	21254	237.1	49.6	5.0	0.05	
S0550 W0600	J44	10	16	10	16	9	28	90	15	10	1	2276	241.5	4.9	0.5	0.05	
S0575 W0620	J46	10	20	10	20	9	28	90	15	12	1	7692	231.3	17.7	1.8	0.05	
S0580 W0580	J48	10	16	10	16	9	28	90	15	15	1	10939	237.1	25.4	2.5	0.05	
S0600 W0300	J45	10	44	10	46	9	28	90	15	18	2	1646	242.3	1.5	0.1	0.05	
S0600 W0400	J43	10	42	10	44	9	28	90	15	15	1	4719	239.0	10.6	1.1	0.05	
S0600 W0450	J38	10	8	10	12	9	28	90	15	3	1	14980	236.1	34.8	3.5	0.05	RAF
S0650 W0200	J49	10	48	10	48	9	28	90	15	22	2	1288	240.9	1.1	0.1	0.05	
S0650 W0700	K035	11	46	11	51	9	28	90	16	22	1	1204	238.8	2.4	0.2	0.05	
S0650 W1100	H019	10	28	10	49	9	28	90	11	49	1	6161	238.2	13.5	1.4	0.04	
S0670 W0300	J47	10	46	10	47	9	28	90	15	30	2	1736	242.2	1.6	0.2	0.05	
S0700 W0100	J52	10	46	10	48	9	28	90	15	25	1	1353	246.2	2.7	0.3	0.05	
S0700 W0700	K033	11	42	11	49	9	28	90	16	20	1	1210	239.1	2.4	0.2	0.05	
S0700 W1300	K002	10	49	11	15	9	28	90	15	43	1	3034	241.1	6.6	0.7	0.05	
S0700 W1400	K001	10	46	10	54	9	28	90	15	43	1	1286	241.8	2.6	0.3	0.05	
S0750 W0075	J50	10	44	10	46	9	28	90	15	17	1	13017	229.0	30.1	3.0	0.05	SOIL TEMP: 73/73 °F
S0750 W1200	K003	10	53	11	17	9	28	90	15	44	1	4477	233.8	9.9	1.0	0.05	
S0750 W1300	H022	10	41	10	52	9	28	90	11	54	1	31680	235.7	71.6	7.2	0.04	
S0750 W1400	H023	10	43	10	53	9	28	90	11	54	1	3087	229.2	6.6	0.7	0.04	
S0790 W0300	K023	11	30	11	29	9	28	90	16	10	1	4707	241.6	10.6	1.1	0.05	
S0800 W0050	J51	10	50	10	50	9	28	90	15	26	2	1525	247.4	1.4	0.1	0.05	
S0800 W0400	K025	11	33	11	33	9	28	90	16	12	1	14589	225.5	33.9	3.4	0.05	
S0800 W0500	K027	11	36	11	44	9	28	90	16	14	1	2342	226.6	5.0	0.5	0.05	
S0800 W0600	K031	11	40	11	47	9	28	90	16	18	1	7131	229.5	16.2	1.6	0.05	
S0800 W0700	K012	11	29	11	35	9	28	90	15	52	1	18745	224.1	43.4	4.3	0.05	
S0800 W0770	K010	11	24	11	33	9	28	90	15	50	1	5831	225.2	13.1	1.3	0.05	
S0800 W0900	K009	11	21	11	31	9	28	90	15	50	1	9202	242.8	21.0	2.1	0.05	
S0800 W1000	K008	11	18	11	30	9	28	90	15	48	1	2898	241.2	6.3	0.6	0.05	
S0810 W0150	K021	11	27	11	27	9	28	90	16	8	1	8483	239.5	19.5	2.0	0.05	
S0820 W0100	K017	11	22	11	25	9	28	90	16	3	1	3095	238.5	6.8	0.7	0.05	
S0840 W0290	K020	11	28	11	41	9	28	90	16	5	1	2298	236.6	4.9	0.5	0.05	
S0850 W0050	J53	10	52	10	51	9	28	90	15	33	4	1288	239.9	0.3	0.0	0.05	
S0850 W0160	K022	11	31	11	40	9	28	90	16	8	1	2224	239.2	4.7	0.5	0.05	
S0850 W0400	K026	11	37	11	45	9	28	90	16	12	1	31888	238.6	74.1	7.4	0.05	
S0850 W0600	K028	11	42	11	47	9	28	90	16	14	1	45705	235.2	106.6	10.7	0.05	
S0850 W1000	K007	11	16	11	28	9	28	90	15	48	1	4610	227.0	10.3	1.0	0.05	
S0850 W1175	K004	11	6	11	18	9	28	90	15	44	1	32881	235.1	76.2	7.6	0.05	

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
SUMMARY OF FIELD SAMPLES DATA FOR THE WET BEACH AREAS OF CELL #3
PILE: CELL #3 BATCH: HJK SURFACE: TAILINGS AIR TEMP MIN: 50°F MAX: 81°F NET WT OUT: 180.0 g.
AREA: WET BEACHES DEPLOYMENT: 9 24 90 RETRIEVAL: 9 25 90 CHARCOAL BKG CPM: 186 (average)
FIELD TECHNICIANS: STN, DAR, DG COUNTED BY: DG DATA ENTRY BY: DLC, WTS TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
S0850 W1300	H020	10	33	10	50	9	28	90	11	51	1	18542	235.5	41.6	4.2	0.04	
S0850 W1400	H021	10	35	10	51	9	28	90	11	52	2	1804	241.9	1.6	0.2	0.04	
S0880 W0200	K018	11	25	11	41	9	28	90	16	3	1	10241	236.2	23.3	2.3	0.05	
S0880 W0300	K024	11	34	11	43	9	28	90	16	10	1	2645	241.9	5.7	0.6	0.05	
S0880 W0700	K013	11	31	11	36	9	28	90	15	54	1	9600	223.2	22.0	2.2	0.05	
S0880 W0850	K011	11	26	11	32	9	28	90	15	52	1	38434	222.4	89.4	8.9	0.05	
S0880 W1050	K005	11	10	11	25	9	28	90	15	46	1	6437	228.4	14.5	1.5	0.05	
S0100 W0300	J07	8	53	8	55	9	28	90	14	17	2	1455	238.4	1.3	0.1	0.05	
S0150 W0200	J03	8	48	8	49	9	28	90	14	15	1	6450	237.7	14.8	1.5	0.05	

AVERAGE RADON FLUX FOR CELL #3 WET BEACHES: 29.5 pCi/m²s

Cell 3

Measurement Data Results

Dry Beach Area

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
SUMMARY OF FIELD SAMPLES FOR THE DRY BEACH AREAS OF CELL #3
PILE: CELL #3 BATCH: KLM SURFACE: TAILINGS AIR TEMP MIN: 50°F MAX: 81°F NET WT OUT: 180.0 g.
AREA: DRY BEACHES DEPLOYMENT: 9 25 90 RETRIEVAL: 9 26 90 CHARCOAL BKG CPM: 193 (average)
FIELD TECHNICIANS: STN, DAR, DG COUNTED BY: DG, WTS DATA ENTRY BY: DLC, WTS TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
S0050 W1500	M16	13	42	13	46	10	1	90	15	29	1	43102	227.3	141.6	14.2	0.07	
S0050 W1600	M17	13	44	13	47	10	1	90	15	29	1	15953	224.4	52.0	5.2	0.07	
S0050 W1975	M20	14	12	14	1	10	1	90	15	34	1	18722	219.0	61.6	6.2	0.07	
S0050 W2125	M23	14	17	14	5	10	1	90	15	38	1	23895	221.4	78.9	7.9	0.07	
S0075 W1850	M19	14	10	14	0	10	1	90	15	32	1	3442	219.9	10.8	1.1	0.07	
S0075 W2325	M24	14	19	14	6	10	1	90	15	40	1	37930	232.1	125.7	12.6	0.07	
S0100 W1175	M10	13	19	13	28	10	1	90	15	22	1	7682	233.6	24.7	2.5	0.07	
S0100 W1225	M11	13	21	13	29	10	1	90	15	22	1	13802	226.9	44.8	4.5	0.07	
S0100 W1450	M12	13	30	13	42	10	1	90	15	25	1	18545	223.6	60.2	6.0	0.07	
S0100 W2100	M21	14	15	14	3	10	1	90	15	36	1	17042	230.1	56.1	5.6	0.07	
S0125 W1500	M14	13	33	13	44	10	1	90	15	27	1	30503	224.6	99.6	10.0	0.07	
S0125 W1550	M15	13	37	13	45	10	1	90	15	27	1	13146	220.0	42.6	4.3	0.07	
S0150 W1450	M13	13	31	13	43	10	1	90	15	25	1	26622	224.0	86.7	8.7	0.07	
S0200 W0200	L23	13	18	13	18	10	1	90	16	29	1	23904	231.3	79.3	7.9	0.07	
S0200 W0250	L25	13	19	13	19	10	1	90	16	29	1	8421	230.7	27.5	2.8	0.07	
S0200 W0300	L37	13	47	13	46	10	1	90	16	36	1	15651	226.8	51.6	5.2	0.07	
S0230 W0100	L21	13	16	13	17	10	1	90	16	27	1	7675	230.4	25.0	2.5	0.07	
S0250 W0300	L39	13	50	13	50	10	1	90	16	38	1	8406	229.6	27.4	2.7	0.07	
S0250 W1150	M09	13	12	13	27	10	1	90	15	18	1	6461	226.1	20.6	2.1	0.07	
S0300 W0050	L19	13	14	13	16	10	1	90	16	25	1	8155	237.0	26.6	2.7	0.07	
S0300 W0100	L29	13	26	13	26	10	1	90	16	31	1	18149	228.4	60.0	6.0	0.07	
S0300 W0150	L31	13	28	13	27	10	1	90	16	34	1	13385	230.1	44.1	4.4	0.07	
S0300 W0200	L33	13	30	13	28	10	1	90	16	34	1	17371	227.0	57.5	5.7	0.07	
S0330 W0450	L47	14	7	14	7	10	1	90	16	42	1	7760	230.5	25.2	2.5	0.07	
S0330 W0510	L48	14	9	14	9	10	1	90	16	42	1	8446	224.8	27.5	2.7	0.07	
S0350 W0100	L27	13	24	13	25	10	1	90	16	31	1	9017	227.9	29.5	2.9	0.07	
S0350 W0200	L35	13	45	13	45	10	1	90	16	36	1	38489	227.2	127.8	12.8	0.07	
S0350 W0300	L43	13	52	13	52	10	1	90	16	40	1	22594	225.9	74.7	7.5	0.07	
S0350 W0400	L45	14	5	14	4	10	1	90	16	40	1	4688	221.7	15.0	1.5	0.07	
S0350 W0525	L49	14	11	14	10	10	1	90	16	44	1	24718	227.1	81.7	8.2	0.07	
S0350 W0700	L02	11	18	11	18	10	2	90	10	0	1	3324	233.3	12.1	1.2	0.08	
S0350 W0750	L04	11	24	11	24	10	2	90	10	3	1	9186	227.3	34.9	3.5	0.08	
S0350 W0790	L08	11	30	11	30	10	2	90	10	12	1	5108	230.9	19.1	1.9	0.08	
S0350 W1150	M08	13	10	13	26	10	1	90	15	20	2	1303	229.8	1.5	0.2	0.07	
S0375 W0740	L03	11	22	11	22	10	2	90	10	3	1	10394	226.8	39.5	4.0	0.08	
S0380 W0050	L17	13	11	13	15	10	1	90	16	20	1	11959	226.9	39.2	3.9	0.07	
S0390 W0150	L18	13	26	13	27	10	2	90	10	22	1	31557	223.1	119.9	12.0	0.08	
S0390 W0390	L30	13	49	13	49	10	2	90	10	30	1	37099	227.3	140.9	14.1	0.08	
S0390 W0760	L07	11	27	11	27	10	2	90	10	9	1	17615	230.3	67.5	6.8	0.08	SOIL TEMP: 81/81 °F
S0400 W0100	L16	13	25	13	26	10	2	90	10	18	1	8461	230.6	31.6	3.2	0.08	
S0400 W0200	L22	13	30	13	30	10	2	90	10	25	1	30815	231.5	117.1	11.7	0.08	
S0400 W0275	L24	13	33	13	33	10	2	90	10	25	1	8569	230.4	32.0	3.2	0.08	
S0400 W0350	L26	13	44	13	44	10	2	90	10	27	1	17235	228.0	65.1	6.5	0.08	
S0400 W0475	L34	13	53	13	53	10	2	90	10	32	1	29751	224.5	112.8	11.3	0.08	
S0400 W0500	L50	14	13	14	12	10	1	90	16	44	1	26052	224.1	86.1	8.6	0.07	
S0400 W0700	L01	11	15	11	23	10	2	90	10	0	1	4065	233.0	14.9	1.5	0.08	

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
SUMMARY OF FIELD SAMPLES FOR THE DRY BEACH AREAS OF CELL #3
PILE: CELL #3 BATCH: KLM SURFACE: TAILINGS AIR TEMP MIN: 50°F MAX: 81°F NET WT OUT: 180.0 g.
AREA: DRY BEACHES DEPLOYMENT: 9 25 90 RETRIEVAL: 9 26 90 CHARCOAL BKG CPM: 193 (average)
FIELD TECHNICIANS: STN, DAR, DG COUNTED BY: DG, WTS DATA ENTRY BY: DLC, WTS TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
S0400 W0800	L09	11	32	11	32	10	2	90	10	14	1	7670	233.2	29.0	2.9	0.08	
S0400 W1100	M05	13	5	13	23	10	1	90	15	11	1	3445	221.2	10.6	1.1	0.07	
S0400 W1150	M06	13	7	13	24	10	1	90	15	14	2	1883	219.9	2.5	0.2	0.07	SOIL TEMP: 52/95 °F
S0425 W0150	L20	13	28	13	28	10	2	90	10	22	1	23338	230.3	88.5	3.8	0.08	
S0425 W0350	L28	13	46	13	46	10	2	90	10	27	1	8517	226.4	31.8	3.2	0.08	
S0425 W0735	L11	11	39	11	39	10	2	90	10	18	1	9099	229.9	34.5	3.5	0.08	
S0425 W0775	L10	11	34	11	34	10	2	90	10	14	1	8396	232.4	31.8	3.2	0.08	
S0450 W0075	M25	14	30	14	31	10	1	90	15	40	1	16631	229.4	54.1	5.4	0.07	
S0450 W0475	L36	13	55	13	55	10	2	90	10	32	1	10497	231.4	39.3	3.9	0.08	
S0590 W0540	L51	14	42	14	42	10	2	90	10	37	1	11638	228.9	43.4	4.3	0.08	
S0600 W0580	L46	14	17	14	17	10	2	90	10	39	1	27244	229.3	103.0	10.3	0.08	
S0625 W0450	M30	14	51	14	51	10	2	90	11	13	1	4227	231.6	15.4	1.5	0.08	
S0625 W0480	L38	14	8	14	10	10	2	90	10	35	1	18279	227.5	68.8	6.9	0.08	
S0650 W0525	L40	14	10	14	12	10	2	90	10	35	1	14391	226.9	54.0	5.4	0.08	
S0650 W0580	L44	14	15	14	15	10	2	90	10	37	1	26511	230.9	100.2	10.0	0.08	
S0650 W0900	K14	11	57	11	58	10	1	90	16	12	1	4490	232.2	14.5	1.4	0.07	
S0675 W0350	M84	14	59	14	50	10	1	90	15	51	1	7675	219.9	24.8	2.5	0.07	
S0675 W0425	M26	14	48	14	48	10	2	90	11	10	1	47462	228.9	180.0	18.0	0.08	
S0700 W0250	M81	14	54	14	47	10	1	90	15	49	1	5222	231.1	16.6	1.7	0.07	
S0700 W0300	M82	14	55	14	48	10	1	90	15	49	1	5660	229.5	18.1	1.8	0.07	
S0700 W0450	L52	14	46	14	46	10	2	90	10	42	1	18924	221.9	71.1	7.1	0.08	
S0700 W0550	L42	14	12	14	14	10	2	90	10	37	1	15631	232.0	58.7	5.9	0.08	
S0700 W0850	K13	11	56	11	57	10	1	90	16	12	1	7509	228.2	24.6	2.5	0.07	
S0700 W0900	K15	11	58	11	59	10	1	90	16	15	1	1005	233.1	2.7	0.3	0.07	
S0720 W0300	M32	15	0	14	56	10	2	90	11	15	1	3295	227.2	11.8	1.2	0.08	
S0725 W0100	M76	14	42	14	41	10	1	90	15	43	1	7939	221.5	25.5	2.6	0.07	
S0725 W0275	M83	14	57	14	49	10	1	90	15	51	1	4436	220.9	14.0	1.4	0.07	
S0750 W0140	M39	14	56	14	54	10	2	90	11	7	1	3611	227.7	13.0	1.3	0.08	
S0750 W0150	M78	14	45	14	43	10	1	90	15	45	1	12744	225.4	41.3	4.1	0.07	
S0750 W0200	M80	14	47	14	45	10	1	90	15	47	1	6040	229.0	19.3	1.9	0.07	
S0750 W0250	M43	15	2	14	56	10	2	90	11	10	1	4380	227.9	16.0	1.6	0.08	
S0750 W0275	M34	15	2	14	57	10	2	90	11	17	1	9972	218.9	37.3	3.7	0.08	
S0750 W1250	K08	11	12	11	2	10	1	90	16	5	1	5811	229.2	19.2	1.9	0.07	
S0770 W0200	M41	15	0	14	55	10	2	90	11	7	1	5227	233.2	19.2	1.9	0.08	
S0775 W0100	M75	14	41	14	40	10	1	90	15	43	1	3013	231.4	9.3	0.9	0.07	
S0775 W0150	M77	14	44	14	42	10	1	90	15	45	1	7892	221.7	25.4	2.5	0.07	
S0775 W0250	M86	15	4	14	52	10	1	90	15	53	1	4485	230.6	14.2	1.4	0.07	
S0800 W0800	K11	11	54	11	55	10	1	90	16	10	1	13445	225.8	44.6	4.5	0.07	
S0800 W1200	K07	11	11	11	1	10	1	90	16	5	1	4827	227.2	15.8	1.5	0.07	
S0800 W1250	K05	10	49	10	59	10	1	90	16	3	1	12735	230.3	42.3	4.2	0.07	
S0800 W1300	K09	11	13	11	3	10	1	90	16	7	1	16803	230.5	56.7	5.7	0.07	
S0820 W0250	M35	14	45	14	44	10	2	90	11	5	1	6425	223.5	23.7	2.4	0.08	
S0830 W0200	M27	14	39	14	40	10	2	90	11	0	1	6933	229.5	25.6	2.6	0.08	SOIL TEMP: 39/120 °F
S0840 W0225	M37	14	47	14	46	10	2	90	11	5	1	13275	232.0	49.8	5.0	0.08	
S0840 W0250	M31	14	41	14	41	10	2	90	11	3	1	7997	230.8	29.7	3.0	0.08	
S0840 W0270	M33	14	43	14	43	10	2	90	11	3	1	6643	230.2	24.6	2.5	0.08	

CLIENT: UMETCO, BLANDING, UT PROJECT: RADON FLUX MEASUREMENTS PROJECT NO.: 9109.00
SUMMARY OF FIELD SAMPLES FOR THE DRY BEACH AREAS OF CELL #3
PILE: CELL #3 BATCH: KLM SURFACE: TAILINGS AIR TEMP MIN: 50°F MAX: 81°F NET WT OUT: 180.0 g.
AREA: DRY BEACHES DEPLOYMENT: 9 25 90 RETRIEVAL: 9 26 90 CHARCOAL BKG CPM: 193 (average)
FIELD TECHNICIANS: STN, DAR, DG COUNTED BY: DG, WTS DATA ENTRY BY: DLC, WTS TARE WEIGHT: 30 g. (approximately)
COUNTING SYSTEM I. D.: M-01/D-21, M-02/D-20 CALIBRATION DUE: 9/10/91, 3/15/91

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	COUNT TIME(MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
S0850 W1200	K02	10	44	10	56	10	1	90	15	57	1	21816	222.9	72.8	7.3	0.07	
S0850 W1250	K03	10	46	10	57	10	1	90	16	0	1	26624	226.8	89.0	8.9	0.07	
S0880 W0875	K17	12	0	12	1	10	1	90	16	17	1	13605	224.4	45.2	4.5	0.07	
S0880 W1100	K06	11	10	11	0	10	1	90	16	3	1	9127	228.5	30.5	3.0	0.07	
S0880 W1150	K01	10	42	10	55	10	1	90	15	57	1	17881	225.3	59.5	5.9	0.07	
S0880 W1200	K10	11	14	11	4	10	1	90	16	7	1	16740	221.7	56.5	5.6	0.07	
S0880 W1250	K04	10	48	10	58	10	1	90	16	0	1	29652	225.6	99.3	9.9	0.07	

AVERAGE RADON FLUX FOR CELL #3 DRY BEACHES: 48.2 pCi/m²s

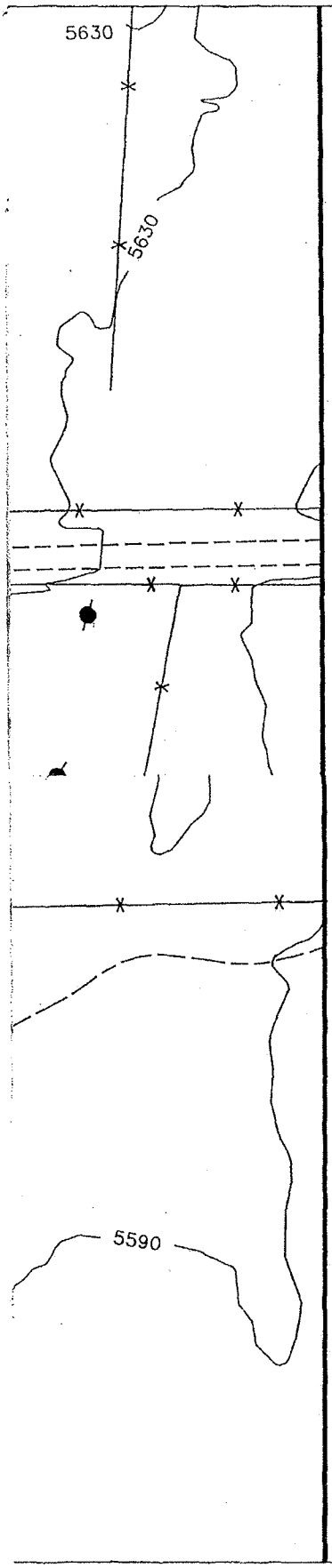


FIGURE 1
RADON FLUX MEASUREMENTS

UMETCO BLANDING, UT.

SEPTEMBER 1990

SCALE IN FEET

200 100 0 200 400

ARIX

A Division of Versar INC.


FIGURE 1
RADON FLUX MEASUREMENTS
UMETCO BLANDING, UT.
SEPTEMBER 1990
LEGEND
SCALE IN FEET
400
200
100
0
200
400
ARIX
A Division of
CELL 1
CELL 2
CELL 3
CELL 4

File [redacted]

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2405

RECEIVED
APR 11 1991
AIR QUALITY

APR - 8 1991

Ref: 8AT-AP

P.K. Willmott
President
Umetco Minerals Corporation
P.O. Box 1029
Grand Junction, Colorado 81502

Dear Mr. Willmott:

This correspondence is to acknowledge the receipt of Umetco's annual, 1990 compliance report, dated March 18, 1991, for the White Mesa Mill. This report satisifies the reporting requirements under 40 CFR Part 61, Subpart W, the National Emission Standards for Radon Emissions From Operating Mill Tailings.

The U.S. Environmental Protection Agency (EPA), Region VIII is in the process of reviewing your 1990 compliance report and will notify Umetco of our findings upon completing our review.

Sincerely,

Milton W. Lammering, Chief
Radiation Programs Branch

cc: Burnell Cordner ([redacted]AQ)

Document Date 4/8/1991
DAQ-1991-001261

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2405

APR - 8 1991

Ref: 8AT-AP

Roger K. Jones
Manager of Environmental Affairs
Umetco Minerals Corporation
P.O. Box 1029
Grand Junction, Colorado 81502

Dear Mr. Jones:

This correspondence is to acknowledge the receipt of Umetco's annual, 1990 compliance reports, dated March 15, 1991, for the uranium mine facilities in Colorado and Utah. These reports satisfy the reporting requirements under 40 CFR Part 61, Subpart B, the National Emission Standards for Radon Emissions From Underground Uranium Mines.

The U.S. Environmental Protection Agency (EPA), Region VIII is in the process of reviewing your 1990 compliance reports and will notify Umetco of our findings upon completing our review.

Sincerely,

Milton W. Lammering, Chief
Radiation Programs Branch

cc: Brad Beckham (CDH)
Burnell Cordner (UBAQ)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2405

APR - 8 1991

Ref: 8AT-AP

Roger T. Berg
Plateau Resources Limited
Shootaring Operations
P.O. Box 2111 - Ticaboo
Lake Powell, Utah 84533

Dear Mr. Berg:

This correspondence is to acknowledge the receipt of Plateau Resources' annual, 1990 compliance report, dated March 5, 1991, for the Shootaring Operations facility. This report satisfies the reporting requirements under 40 CFR Part 61, Subpart W, the National Emission Standards for Radon Emissions From Operating Mill Tailings.

The U.S. Environmental Protection Agency (EPA), Region VIII is in the process of reviewing your 1990 compliance report and will notify Plateau Resources of our findings upon completing our review.

Sincerely,

Milton W. Lammering, Chief
Radiation Programs Branch

cc: Burnell Cordner (UBAQ)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2405

MAY 23 1991

Ref: 8AT-AP

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. P.K. Willmott
President
Umetco Minerals Corporation
P.O. Box 1029
Grand Junction, Colorado 81502

Dear Mr. Willmott:

This is to inform you of the completion of the U.S. Environmental Protection Agency's (EPA) review of [redacted] Corporation's 1990 radon-222 flux measurements report for the White Mesa Mill. The submission of this compliance report is an annual requirement for operating uranium mills under 40 CFR Part 61, Subpart W, National Emission Standards for Radon Emissions From Operating Mill Tailings.

As documented in the compliance report, the operation of the uranium mill tailings impoundments is not in compliance with the radon emissions standard of Section 61.252(a); that is an average radon flux not greater than 20 pCi/m^2-s. Cell 3 is shown to be in compliance with a mean radon flux of 15.3 pCi/m^2-s. However, Cell 2 is not in compliance with a mean radon flux of 49.0 pCi/m^2-s.

In addition to compliance with the radon emission standard, Section 61.252(c) requires compliance with the groundwater quality protection provisions of 40 CFR 192.32(a). EPA Region VIII is requiring Umetco Minerals Corporation to submit groundwater quality monitoring data demonstrating compliance or certification from the U.S. Nuclear Regulatory Commission (NRC) that compliance with such standard is being achieved under the provisions of the NRC license for the White Mesa Mill.

The charcoal canister analysis performance of your contractor, ARIX Corporation of Grand Junction, met the calibration and quality assurance requirements of Method 115 of Appendix B with one exception. Section 4.0 C. of Method 115 requires the preparation of two radium-226 spiked charcoal standards to determine the gamma counting system efficiency. Instead of the required two standards, ARIX used only one such standard. Although this deviation is not considered to be of the

severity to reject the radon data, EPA is requiring adherence to the use of two radium-spiked charcoal standards for all future measurements.

Based on the determination of non-compliance, EPA is requiring Umetco to continue monthly reporting, which includes documentation of the remedial action plan for achieving Cell 2 compliance with the radon-222 emissions standard.

Please submit the requested information within fifteen (15) working days of receipt of this letter. If there are any questions concerning this matter, please contact Monica Morales at (303) 294-7613 or Dr. Milton Lammering at (303) 293-1713.

Sincerely,

Irwin L. Dickstein, Director
Air and Toxics Division

cc: Burnell Cordner (UBAQ)

Umetco Minerals Corporation

40-8681

WHITE MESA MILL • P.O. BOX 669 • BLANDING, UTAH 84511
☎ (801) 678-2221

May 30, 1991

Mr. William K. Reilly, Administrator
U. S. Environmental Protection Agency
401 M South West
Washington, D. C. 20460

NESHAPs Subpart W Compliance Report

Dear Mr. Reilly:

This report is in accordance with 40 CFR 61 Subpart W, and is for the White Mesa Mill, located five miles south of Blanding, Utah, on Highway 191. The White Mesa Mill is owned by a partnership of Umetco Minerals Corporation (70%) and Energy Fuels, Limited (30%). Mr. Richard A. Van Horn of Umetco is the person responsible for the operation of the mill. Mr. Van Horn and Mr. John S. Hamrick of Umetco have prepared this report. Figure 1 shows the mill and tailings area.

As related in previous reports, Cell 3 is in compliance with the NESHAPs standard, while Cell 2 is not. No further NESHAPs testing has been carried out for compliance purposes. 1991 compliance testing will be carried out this year, as per the regulations, and will be done post-construction. The testing will be conducted in the period of August/September/October.

U.S. Nuclear Regulatory Commission mandated dust minimization activities at the mill include spraying large quantities of solutions interior to Cell 3 and Cell 2 from April through September. The solutions are basically sprayed 24 hours per day, except during windy conditions. The intention of the spraying is to wet the areas which may be subject to sand movement (which happen to be the dry, sandy beaches). The impact of the spraying on radon emissions has not been measured. Reductions in emission rates are expected and may be substantial. Approximately 35% of the driest sand surfaces in Cell 2 are now wetted.

The results of measurements by ARIX contained in the January 24, 1991 report have been used to determine the following proposed method to bring Cell 2 at the White Mesa Mill into compliance with the NESHAPs standard of 20 $pCi/m^2/sec$.

As shown by the ARIX report, areas of Cell 2 that have the first layer of final cover (four feet thick) are below the standard except for the northeast corner of the cell, which has probably been contaminated by windblown material. This east end of Cell 2 is shown in Figure 2. Umetco will remove a six inch layer from this corner of

the cell (as shown by the shaded area), and will place one foot of random fill material in this area. Umetco will also place more final cover (random fill four feet thick) on the dry beaches in Cell 2, completely covering the dry beaches and bringing down the overall emission rate below the standard. The basis for this action is as follows.

The following statistics from Cell 2 will be used to calculate the compliance emission rate:

Location	Area, m^2	Rate, $pCi/m^2/sec$
Wet Beaches	104,359	27.5
Dry Beaches	73,216	117.6
Standing Liquids	5,678	0.0
Reclamation Cover	84,602	19.5 (6.9 less the NE corner)

(See Table 1 for the data used to calculate rates for Cell 2 cover.)

Using the grid supplied by ARIX in their report, the area contained in the coordinates 0 south to 300 south by 0 west to 700 west, and in the area 300 south to 400 south by 0 west to 300 west will be removed to a depth of six inches (shown by the shaded area in Figure 2). One foot of random fill material will be replaced in this area. This will bring the average emission rate of the cover area to 6.9 $pCi/m^2/sec$.

Umetco will place a four foot lift of random fill over the dry beaches. The calculated emission rate is then:

$$\text{Cell 2} = 14.8\ pCi/m^2/sec$$

$$\frac{(27.5)(104,359) + (6.9)(84,602 + 73,216) + (0)(5,678)}{267,854}$$

Umetco has prepared Specifications for the Project and has held a pre-bid meeting on May 23, 1991 at the White Mesa mill with interested contractors. Bids will be received until June 5, 1991, with the final contract awarded on June 18, 1991.

Umetco, in accordance with the regulations, will continue to report monthly the progress made in achieving this plan.

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant

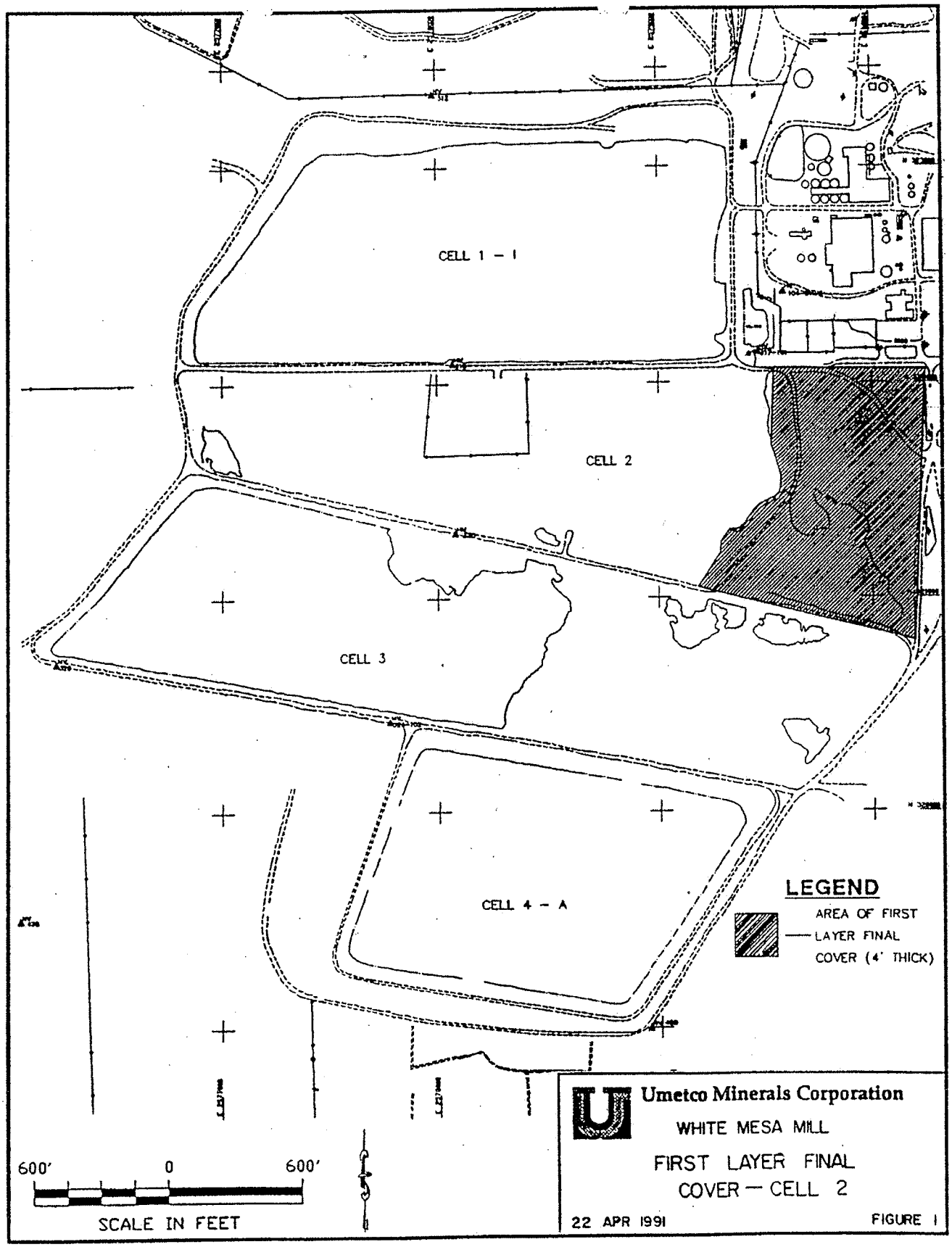
penalties for submitting false information including the possibility of fine and imprisonment. See 18 U.S.C. 1001.

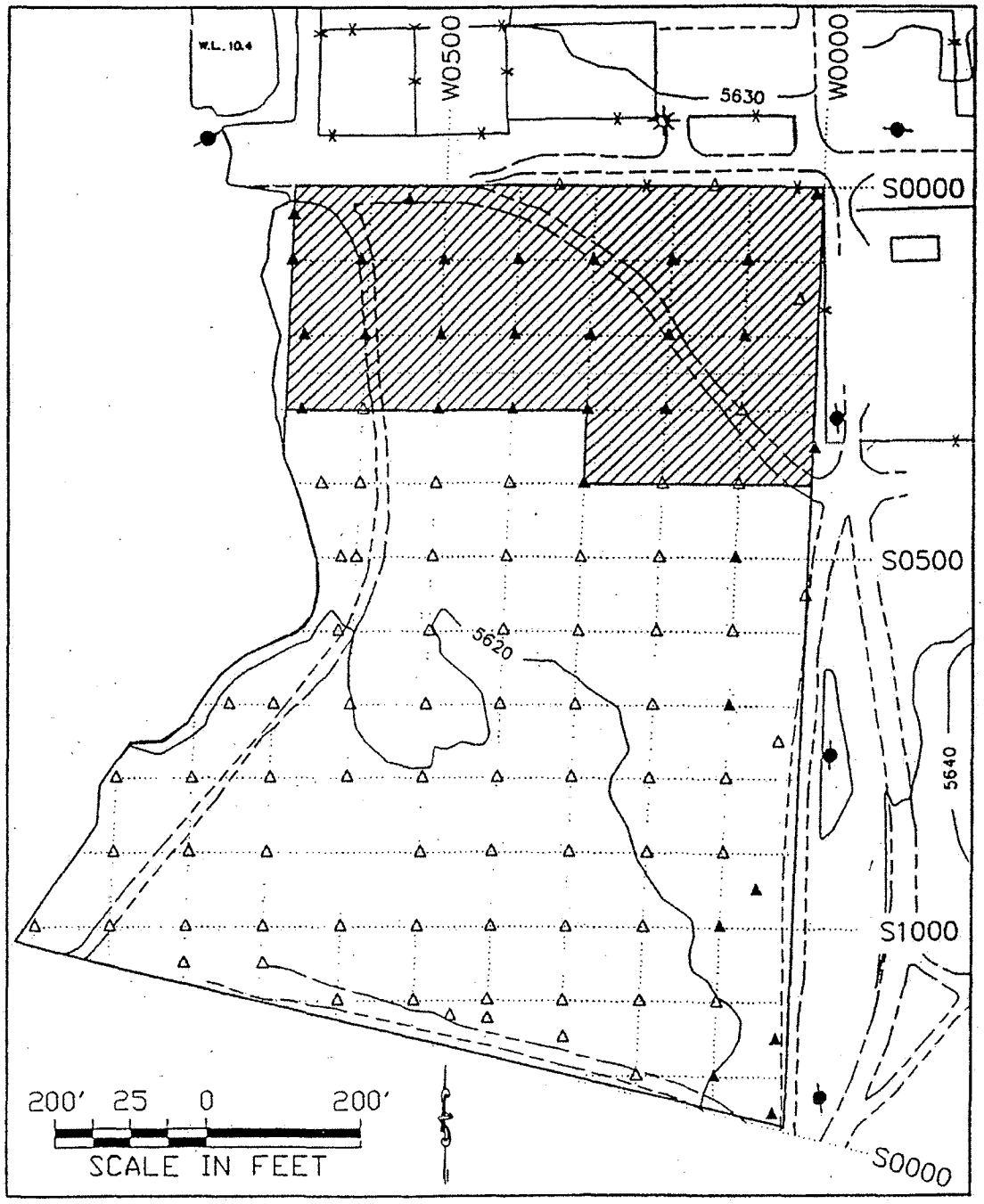
If I can be of assistance in any way please contact me or John Hamrick of my staff.

Very truly yours,

R. A. Van Horn, Director of Operations
Umetco Minerals Corporation

xc Mr. Erwin L. Dickstein, EPA Regional Administrator


CELL 1 – 1
CELL 2
CELL 3
CELL 4 – A
LEGEND
AREA OF FIRST LAYER FINAL COVER (4' THICK)
600'
0
600'
SCALE IN FEET
Umetco Minerals Corporation
WHITE MESA MILL
FIRST LAYER FINAL COVER – CELL 2
22 APR 1991
FIGURE 1



LEGEND

AREA TO HAVE A 6" LAYER REMOVED AND REPLACED WITH 1' OF RANDOM FILL.

Umetco Minerals Corporation

WHITE MESA MILL

NE CORNER — CELL 2

22 APR 1991

FIGURE 2

TABLE 1

CELL2–RN

indicates a measurement within the area
0 south to 300 south by 0 west to 700 west and
300 south to 400 south by 0 west to 300 west

GRID LOCATION

South	West	Rate pCi/m/m/sec	
0	150	10.2	*
0	350	19.4	*
10	10	26.2	*
20	550	69.5	*
40	700	57.5	*
100	100	54.5	*
100	200	98.2	*
100	300	49.5	*
100	400	47.4	*
100	500	31.5	*
100	610	25.9	*
100	700	84.7	*
150	25	1.5	*
200	100	59.9	*
200	200	57.6	*
200	300	57.9	*
200	400	69.6	*
200	500	125.6	*
200	600	65.2	*
200	680	52.3	*
300	100	1.1	*
300	200	102.9	*
300	300	60.5	*
300	400	27.1	*
300	500	70.8	*
300	600	16.3	*
300	680	50.5	*
350	0	38.1	*
400	100	5.3	*
400	200	15.9	*
400	300	34.7	*
400	400	2.7	
400	500	1.4	
400	600	4.5	
400	650	5.9	
500	100	49.9	
500	200	2.2	
500	300	6.4	
500	400	2.7	
500	520	0.7	
500	600	3.4	

CELL2–RN

indicates a measurement within the area
0 south to 300 south by 0 west to 700 west and
300 south to 400 south by 0 west to 300 west

GRID LOCATION

South	West	Rate pCi/m/m/sec
500	620	10.0
550	0	13.0
600	100	4.1
600	200	0.6
600	300	3.5
600	400	1.7
600	500	1.5
600	620	2.9
700	100	79.9
700	200	4.0
700	300	3.3
700	400	0.8
700	500	1.1
700	600	1.2
700	700	0.8
700	750	14.6
750	30	11.3
800	100	10.1
800	200	15.6
800	400	0.3
800	400	0.5
800	500	0.5
800	600	0.9
800	700	0.9
800	800	0.3
800	900	1.2
900	100	7.6
900	200	0.5
900	300	0.4
900	400	0.4
900	500	0.5
900	700	1.3
900	800	0.4
900	900	1.7
950	50	31.9
1000	100	0.5
1000	100	21.7
1000	200	1.4
1000	300	0.2
1000	400	0.8
1000	500	0.6

CELL2–RN

indicates a measurement within the area
0 south to 300 south by 0 west to 700 west and
300 south to 400 south by 0 west to 300 west

GRID LOCATION

South	West	Rate pCi/m/m/sec
1000	600	0.5
1000	700	0.2
1000	800	0.6
1000	1000	0.6
1050	700	0.2
1050	800	0.2
1100	100	0.1
1100	200	0.2
1100	300	0.2
1100	400	0.7
1100	500	0.5
1100	600	0.2
1120	450	0.8
1125	400	3.9
1150	20	28.0
1150	300	0.7
1200	100	64.1
1200	200	6.2
1250	20	43.7
Average of nonshaded area:		6.94
Average of all areas:		19.5

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2405

RECEIVED JUN 12 1991 AIR QUALITY

JUN 07 1991

Ref: 8AT-AP

Document Date 6/7/1991
DAQ-1991-001258

F. Burnell Cordner, Director
Bureau of Air Quality
Department of Health
1950 West North Temple
P. O. Box 16690
Salt Lake City, UT 84116-0690

Re: Notification of Pending EPA Enforcement Action Against Umetco Minerals Corporation

Dear Burnell:

Pursuant to the provisions of the Utah/EPA Enforcement Protocol, I am notifying you of pending EPA enforcement action against a Utah source, Umetco Minerals Corporation. Umetco has been found in violation of National Emission Standards for Hazardous Air Pollutants (NESHAP), at 40 CFR Part 61, Subpart W. The nature of the violation is exceedance of the NESHAP emission limit for Radon-222, which is 20 picoCuries per square meter per second (pCi/m^2-sec). The mean measured value at Umetco's White Mesa Mill, in Blanding, Utah, during 1990, was 49 pCi/m^2-sec.

This is not an overfile action and is not intended to reflect upon the adequacy of the State's enforcement program. The action must be taken by our office, rather than the State, because NESHAP Subpart W has not yet been delegated to the State. We have been advised by Headquarters that the radionuclides NESHAPs cannot be delegated to States via the incorporation-by-reference mechanism, which Utah employs. If any State wishes to assume delegation of these particular NESHAPs, a special written request must be submitted to EPA.

If you have any questions, please contact the assigned EPA attorney, Terry Lukas, at (303) 294-7195, or our technical staff expert on the radionuclides NESHAPs, Monica Morales, at (303) 294-7613. In accordance with the Enforcement Protocol, a copy of the EPA enforcement action will be sent to you upon issuance.

Sincerely,

Douglas M. Skie, Chief
Air Programs Branch

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2405

JUN 07 1991

Ref: 8AT-AP

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. P.K. Willmot, President
Umetco Minerals Corporation
P.O. Box 1029
2754 Compass Drive, Suite 280
Grand Junction, CO 81506

Re: Clean Air Act Section 113
Order for Compliance
Docket No. CAA-113-91-05

Dear Mr. Willmot:

You are hereby served with a Compliance Order, pursuant to Section 113(a)(3) of the Clean Air Act, as Amended November 15, 1990 ("the "Act), 42 U.S.C. 7413(a)(3).

This Order requires Umetco Minerals Corporation to submit a schedule and monthly progress reports to the U.S. Environmental Protection Agency (EPA), for coming into compliance with the federal emission limit for radon-222, specified in 40 CFR Part 61, Subpart W. The facility in violation of the limit is the White Mesa Mill, Cell 2. Test results documenting compliance must be submitted to EPA by October 31, 1991.

Violation of this Order may lead to the commencement of a civil action for permanent or temporary injunction, or to assess and recover a civil penalty of not more than $25,000 per day for each violation, or both, pursuant to Section 113(b) of the Act, 42 U.S.C. Section 7413(b), or criminal sanctions pursuant to Section 113(c) of the Act, 42 U.S.C. Section 7413(c). In issuing this Order, EPA does not waive its right to seek injunctive relief or civil penalties of up to $25,000 for each day of violation under Section 113(b) of the Act for any and all violations, or both injunctive relief and civil penalties.

The Act requires that alleged violators be given an opportunity to confer with EPA. Accordingly, you are allowed ten (10) calendar days from the date of your receipt of this Order to request a conference with EPA. Request must be made in writing. Arrangements for a conference may be made by contacting Teresa Lukas, Assistant Regional Counsel, at (303) 294-7195.

If you have any questions regarding this matter, please contact Ms. Lukas.

Sincerely,

Irwin L. Dickstein, Director
Air and Toxics Division

Enclosure

cc: Burnell Cordner, Director
Utah Bureau of Air Quality

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION VIII

Docket No. CAA-113-91-05

In the Matter of:	)	
	)	
UMETCO MINERALS CORPORATION	)	
P.O. Box 1029	)	
2754 Compass Drive, Suite 280	)	
Grand Junction, CO 81506	)	COMPLIANCE ORDER
	)	
Respondents.	)	
	)	
Clean Air Act Proceeding	)	
Under Section 113(a)(3)	)	
[42 U.S.C. Section	)	
7413(a)(3)]	)	

STATUTORY AUTHORITY

Pursuant to Section 113(a)(3) of the Clean Air Act, as Amended November 15, 1990 ("the Act"), 42 U.S.C. Section 7413(a)(3), the United States Environmental Protection Agency, Region VIII (EPA), by authority duly delegated to the Director of the Air and Toxics Division, and upon the basis of available information, hereby states the following Findings of Fact, Conclusions of Law, and Order.

FINDINGS OF FACT

1. Umetco Minerals Corporation ("the Company") owns and operates a uranium processing facility, the White Mesa Mill, near Blanding, Utah. The facility has two operating mill tailings piles, designated Cell 2 and Cell 3.

2. As operating mill tailings piles, Cells 2 and 3 are subject to Title 40 of the Code of Federal Regulations ("CFR"), at 40 CFR Part 61, Subpart W, National Emission Standards for Radon Emissions From Operating Mill Tailings (40 CFR 61.250 through 61.256), promulgated December 15, 1989, under the Clean Air Act. The emission limit under 40 CFR 61.252(a) for radon-222 is 20 picoCuries per square meter per second (pCi/m^2-sec).

3. 40 CFR 61.253 requires that compliance with the emission limit be determined annually through the use of 40 CFR Part 61, Appendix B, Method 115.

4. Method 115 specifies that certain categories of land areas ("regions") of the tailings pile be monitored with large-area activated charcoal collectors. Measurements shall not be made within 24 hours of rainfall or when the temperature is below 35 degrees Fahrenheit.

5. To comply with 40 CFR 61.253, the Company submitted a "NESHAP Radon Flux Measurement Program" report to the EPA on March 18, 1991. The report contains calendar year 1990 radon-222 monitoring data. The Company selected a monitoring period covering September 5, 1990 through September 11, 1990, to constitute the annual compliance testing for 1990. EPA has reviewed the report and has determined that the monitoring was in accordance with Method 115. Results are shown below.

UMETCO WHITE MESA MILL
ANNUAL COMPLIANCE TESTING FOR 1990
FOR RADON-222
MONITORING PERIOD: 9/5/90 THROUGH 9/11/90

Region Designation (NESHAP)	Corresponding Cell 2 Region Designation (Company)	Area(m^2)	Number of Measurements	Radon Flux (pCi/m^2-s)	Area Times Flux (pCi/sec)
Water Covered Areas	Standing Liquid Area	5,678	-0-	-0-	-0-
Dry Top Surface Areas	Cover Area	84,602	100	19.5	1,649,739
Dry Top Surface Areas	Dry Beach Areas	73,216	100	117.6	8,610,202
Water Saturated Areas	Wet Beach Areas	104,359	100	27.5	2,869,873
TOTALS		267,855			13,129,814

6. Following the calculation method in Section 2.1.7 of Method 115, the result is 13,129,814 divided by 267,855, or 49.0 pCi/m^2-sec, which has been reported by the Company as the mean radon flux for Cell 2 during the reported period. This exceeds the radon-222 emissions standard of 20 pCi/m^2-sec.

7. Under 40 CFR 61.254(b), if the radon-222 emission limit is exceeded, the Company must begin submitting monthly corrective action progress reports ("Compliance Reports") to the EPA. The first such Compliance Report submitted to EPA was dated April 24, 1991, and addressed Cell 2. EPA has reviewed this report and has found that it lacks deadlines for corrective action and retesting at Cell 2.

CONCLUSIONS OF LAW

The Company is violating the radon-222 emissions standard of 40 CFR 61.252(a) at Cell 2.

ORDER

1. Within fifteen (15) calendar days after the effective date of this Order, the Company shall submit to EPA a schedule for implementing the Cell 2 corrective action plan contained in the Company's April 24, 1991 Compliance Report. This schedule shall be subject to EPA approval and shall include: (a) time-lines for specific actions in the corrective action plan, (b) a deadline of no later than September 30, 1991, by which time the radon flux measurements shall be completed for Cell 2, (c) provisions for testing earlier than September of 1991, where necessary to comply with the Method 115 testing restrictions relating to rainfall and ambient temperature, and (d) a deadline of no later than October 31, 1991, by which time the test results shall be submitted to the EPA. Results shall be addressed to:

Mr. Irwin L. Dickstein, Director
Air & Toxics Division
Attention: Ms. Monica Morales (8AT-AP)
U.S. Environmental Protection Agency
999 18th Street, Suite 500
Denver, CO 80202-2405

2. The Company shall submit monthly reports to the EPA which outline the progress toward completion of corrective action and compliance testing. The reports must be signed and dated by a corporate officer and contain the declaration specified in 40 CFR 61.254(a)(4). These reports shall be due within fifteen (15) calendar days following the end of each month. The first such report shall be for the month of June of 1991, with a due date of

July 15, 1991. The monthly reports shall continue to be submitted to the EPA until 1991 test results for Cell 2 are submitted to the EPA and compliance with the radon-222 emission standard is demonstrated. The monthly reports shall be sent to Mr. Dickstein at the address shown in item 1 above.

3. The EPA shall be notified, in writing, of the anticipated date(s) of the calendar year 1991 radon flux tests for Cell 2, no later than fifteen (15) calendar days prior to the test. Notification shall be sent to Mr. Dickstein at the address shown in item 1 above.

4. The Company shall in the future comply with all applicable provisions of 40 CFR Part 61, Subpart W.

PENALTY PROVISIONS

Violation of this Order may lead to injunctive relief, civil penalties of up to $25,000 for each day of violation under Section 113(b) of the Act, 42 U.S.C. Section 7413(b), or criminal sanctions under Section 113(c) of the Act, 42 U.S.C. Section 7413(c). In issuing this Order, the EPA does not waive its right to seek injunctive relief or civil penalties of up to $25,000 for each day of violation under Section 113(b) of the Act for any and all violations, or both injunctive relief and civil penalties.

OPPORTUNITY FOR CONFERENCE

In accordance with Section 113(a)(4) of the Act, 42 U.S.C. Section 7413(a)(4), the EPA hereby offers the Company an opportunity for a conference to discuss this Order. The request for such a conference must be made no later than ten (10) calendar days from the date of receipt of the Order. The request must be made in writing to:

Ms. Teresa Lukas
Assistant Regional Counsel
U.S. Environmental Protection Agency
999 18th Street, Suite 500
Denver, CO 80202-2405

Arrangements for a conference may be made by contacting Ms. Lukas at (303) 294-7195.

EFFECTIVE DATE

This Order shall become effective ten (10) calendar days after receipt by the Company of this Order.

6-7-91
Date

Irwin L. Dickstein, Director
Air and Toxics Division

Umetco Minerals Corporation

40-8681

WHITE MESA MILL • P.O. BOX 669 • BLANDING, UTAH 84511
☎ (801) 678-2221

August 15, 1991

DOCKETED
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USNRC
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Mr. Irwin L. Dickstein, Director
Air and Toxics Division
U. S. Environmental Protection Agency
Region VIII
999 18th Street - Suite 500
Denver, Colorado 80202-2405

Attention Mr. Michael Owens

Re: Compliance Order
Docket No. CAA-113-91-05

Dear Mr. Dickstein:

The following is the Compliance Report for the month of July, 1991 pursuant to the above referenced order. The following table shows compliance steps with completion dates, to bring Cell 2 at the White Mesa Mill to below 20 $pCi/m^2/sec$.

Activity	Completion Date
1. Contractor Mobilization	July 6, 1991
2. Construction	August 16, 1991
3. Measure Radon	August 30, 1991
4. Prepare/Review Report	September 30, 1991

The contractor began construction Monday July 15. The contractor's schedule submitted to Umetco shows completion on August 16 (six total weeks including mobilization) for the placement of 120,000 cubic yards of random fill over 18.1 surface acres. As you know, safety is of prime concern on this job as we are working on unconsolidated tailings and slimes. Due to the soft nature of the tailings sands, one of the contractor's trucks broke through the cover during the first week of construction. To ensure that this would not happen again the thickness of the cover was increased to support the construction equipment. Repeated attempts to reduce the thickness back down to design have not been successful. As of Monday, August 12, SEM Construction had placed 90 M cubic yards but had only covered 43 M square yards of area. This equates to an average thickness in place of 6.25 feet versus a design of 4.0 feet.

OFFICIAL DOCKET COPY

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Since the start of construction on July 15th, we have lost two work days due to rain-induced wet conditions on the cover. Nevertheless, SEM is meeting their schedule for fill placement rates. In order to make up for the unexpected additional volume of cover, Umetco has mobilized its own fleet of 35 ton rock trucks which will work in areas of the tailing where their weight can be supported. Current estimates are that these units will place an additional 30 M cubic yards over what the contractor can place before the end of the construction phase.

As shown on the attached Gantt chart, fill placement is scheduled to continue through the end of August and will terminate on September 7. At completion of the construction phase, approximately 200 M cubic yards of fill will have been placed over an area of approximately 24 acres. The main reason for the increase in cover area is the addition of the NRC permitted dump along the north dike. This area had numerous radon "spikes" within its perimeter and we have since determined that any attempt to control radon would have to include this area. Umetco is in the process of permitting a new dump area with the USNRC.

The radon measurement contract has been awarded to Scientific Analysis. They are currently scheduled to begin on September 4, 1991 with completion of Cell 2 and Cell 3 radon measurements by September 9, 1991.

It therefore appears that Umetco will still be able to meet the deadline of October 31, 1991 as required by the Compliance order. We will continue to keep your staff appraised of significant changes in our schedule as they become known to us. Should you have any questions concerning the content of this report, please contact either me or John Hamrick of my staff.

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment. See 18 U.S.C. 1001.

Very truly yours,

R. A. Van Horn
Director of Operations

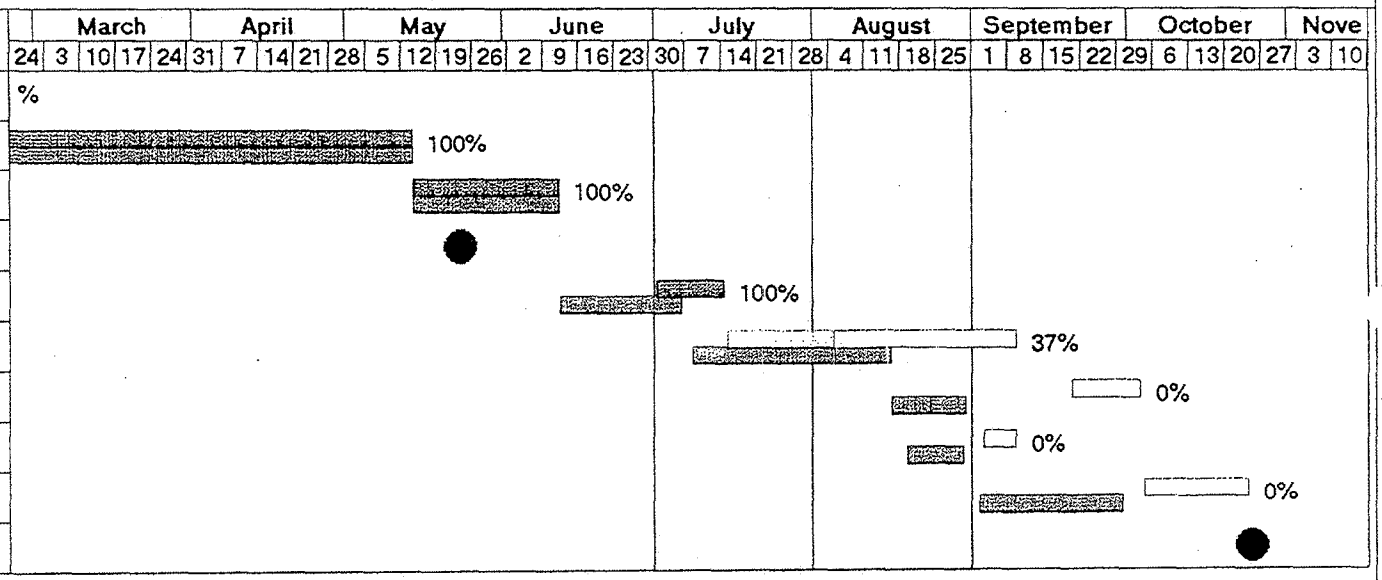
Certified-Return Receipt Requested #P333039310

xc Mr. Ramon E. Hall, U.S. N.R.C.

WHITE MESA Cell 2 NESHAPs COMPLIANCE SCHEDULE

Tasks necessary to meet USEPA mandated date of 10/31/91

ID	Name	
9	Design Engineering	%
10	Prepare Specifications	100%
11	Issue Requests For Bid	100%
12	Contractor Site Meeting	
14	Mobilization	100%
15	Construction	37%
16	Aerial Mapping	0%
17	Measure Radon	0%
18	Prepare/Review Report	0%
19	Submit Report to USEPA	



Planned
Critical
Critical Progress
Noncritical
Noncritical Progress
Planned Milestone
Milestone
Planned Summary
Summary

8/15/91

Umetco Minerals Corporation

40-8681

WHITE MESA MILL • P.O. BOX 669 • BLANDING, UTAH 84511
☎ (801) 678-2221

September 10, 1991

Mr. Irwin L. Dickstein, Director
Air and Toxics Division
U. S. Environmental Protection Agency
Region VIII
999 18th Street - Suite 500
Denver, Colorado 80202-2405

Attention Mr. Michael Owens

Dear Mr. Dickstein:

Re: Compliance Order
Docket No. CAA-113-91-05

The following is the Compliance Report for the month of August, 1991 pursuant to the above referenced order. The following table shows the compliance activities to date.

Activity	Completion Date
1. Contractor Mobilization	COMPLETED
2. Construction	COMPLETED
3. Measure Radon	COMPLETED
4. Prepare/Review Report	September 30, 1991

As stated in the previous monthly reports, the contractor was unable to maintain the four-foot lift of random fill due to the soft nature of the tailings. The thickness of the lift necessary to support the placement equipment was above six feet. This resulted in many more cubic yards being placed to cover a given surface area. Since surface area acres covered is the primary radon reduction method for this project, Umetco dedicated more resources to the project, both men and equipment. Two Cat 769 trucks, two bottom-dump tractor-trailer trucks, a Cat D-7 crawler, a Cat D-6 crawler, and two Cat 980 loaders worked on cover placement. The original project scope called for the placement of 120,000 cubic yards. By the end of construction, the contractor had moved approximately 175,000 cubic yards with Umetco moving an additional 50,000 cubic yards.

As witnessed by Dr. Milton Lammering and Mr. Robert Tauer, radon measurements commenced September 5, 1991. Due to rainfall, measurements were delayed and not completed until September 9, 1991. Preliminary results are expected by September 20, 1991, and will be communicated to Dr. Lammering and Mr. Michael Owens of your staff. Umetco expects that the actions taken to date will result in compliance with the 20 $pCi/m^2/sec$ in both Cells 2 and 3.

The measurement report from Scientific Analysis, Incorporated, will be included with the September monthly report, and should be the final report required by the Compliance Order.

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment. See 18 U.S.C. 1001.

If I can be of assistance in any way, please contact me or John Hamrick of my staff.

Very truly yours,

R. A. Van Horn
Director of Operations

RAV/jsh

Certified - Return Receipt Requested
Number P 333 039 315

cc: Mr. Ramon E. Hall, U.S. N.R.C.

40-8681

Umetco Minerals Corporation

P.O. BOX 1029
GRAND JUNCTION, COLORADO 81502
☎ (303) 245-3700

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October 15, 1991

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USNRC
MAIL SECTION
DOCKET CLERK

Mr. Irwin L. Dickstein, Director
Air and Toxics Division
U.S. Environmental Protection Agency
Region VIII
999 18th Street, Suite 500
Denver, Colorado 80202-2405

Attention Mr. Michael Owens

Dear Mr. Dickstein:

Re: Compliance Order
Docket No. CAA-113-91-05

The following is the Compliance Report for the month of September, 1991, pursuant to the above-referenced order. All compliance steps have been completed with the exception of the submittal of the final monitoring report, which will be submitted prior to October 31, 1991. Preliminary results from Umetco's monitoring vendor, Scientific Analysis, Incorporated, show the average emission rate of Cell 2 (subject to the above Compliance Order) to be 14.4 $pCi/M^2/sec$ with Cell 3's reported average as 11.4 (Cell 3 is subject only to annual reporting requirements).

Umetco therefore requests that the EPA determine that monthly compliance reports are no longer necessary.

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. See 18 U.S.C. 1001.

If I can be of assistance in any way, please contact me or John Hamrick of my staff.

Very truly yours,

R. A. Van Horn
Director of Operations

RAV/sw

Certified - Return Receipt Requested

OFFICIAL DOCKET COPY

cc: Mr. Ramon E. Hall, U.S.N.R.C.

Inc.

92-0031

~~9112020338~~ lp

Umetco Minerals Corporation

40-8681

P.O. BOX 1029
GRAND JUNCTION, COLORADO 81502
☎ (303) 245-3700

October 29, 1991

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OCT 30 1991
USNRC
MAIL SECTION
DOCKET CLERK

Mr. Irwin L. Dickstein, Director
Air and Toxics Division
U.S. Environmental Protection Agency
Region VIII
999 18th Street - Suite 500
Denver, Colorado 80202-2405

Attention Mr. Michael Owens

Dear Mr. Dickstein:

Re: Compliance Order - Docket No. CAA-113-91-05

The following is the Compliance Report for the month of October, 1991, including the required radon monitoring test results pursuant to the above-referenced order. Radon measurements have been completed on Cell 2, with the average emission rate of 15.5 $pCi/m^2/sec$. Enclosed are copies of the report provided by Umetco's contractor, Scientific Analysis, Incorporated. Portions of the testing were witnessed by Dr. Milt Lammering and Mr. Robert Tauer of the EPA.

The attached report shows compliance with the 40 CFR 61.252 limit of 20 $pCi/m^2/sec$ with an ample margin of safety, satisfying the requirements of the above-referenced order. Umetco plans no further actions this year on Cell 2. Accordingly, Umetco will discontinue monthly reports required by the compliance order. If you or your staff require further information about the radon measurements, corrective actions, or any other matter, Umetco will provide the information when requested.

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of tine and imprisonment. See 18 U.S.C. 1001.

If I can be of assistance in any way, please contact me or John Hamrick of my staff.

Very truly yours,

R. A. Van Horn
Director of Operations

RAV/sw

Enclosures

cc: Mr. Ramon E. Hall, U.S.N.R.C. w/o encl.

Inc.

7112040179 lp

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92-0055

Umetco Minerals Corporation

40-8681

WHITE MESA MILL • P.O. BOX 669 • BLANDING, UTAH 84511
☎ (801) 678-2221

See Drugs

October 29, 1991

'91 OCT 31 P3:25
URFO
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Mr. Ramon E. Hall, Director
U. S. Nuclear Regulatory Commission
Region IV
Uranium Recovery Field Office
Box 25325
Denver, CO 80225

DOCKETED
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USNRC
MAIL SECTION
DOCKET CLERK

Re: Umetco Minerals Corporation
SUA-1358: Docket No. 40-8681
White Mesa Mill, Utah
NESHAPs Measurements

Dear Mr. Hall:

Enclosed are four copies (each) of the report from Scientific Analysis, Incorporated made on Cell 2 and Cell 3 at the White Mesa Mill for 1991. As can be seen, both cells are now below the NESHAPs limit for radon 222 emission.

If I can answer any questions that you may have, please feel free to contact me.

Sincerely yours,

J. S. Hamrick

J. S. Hamrick
Site Environmental Coordinator

OFFICIAL DOCKET COPY

Inc.

~~9111180338~~ 38pp.

92-0058

SCIENTIFIC ANALYSIS, INC.

October 9, 1991

Mr. John Hamrick
Umetco Minerals Corporation
P.O. Box 1029
Grand Junction, CO 81502

Subject: Results of Radon Flux Testing
Uranium Mill Tailings Pond - Cell 2
Blanding, UT

Dear Mr. Hamrick:

Scientific Analysis, Inc. is pleased to provide you with the results of 200 radon flux measurements performed on September 5-6 and 8-9, 1991 on the White Mesa tailings pond (Cell 2) in accordance with the requirements of 40 CFR Part 61, Appendix B, Method 115 (Federal Register Notice - December 15, 1989) and Radon Flux Measurements on Gardinier and Royster Phosphogypsum Piles near Tampa and Mulberry, FL, EPA 520/5-85-029, January 1986, Appendix A. See enclosed SAI Standard Operating Procedures for radon flux measurements. These tests can be used to show compliance with the 40 CFR Part 61 standard for operating uranium mill tailings piles, which limits radon emissions to 20 pCi/m^2-s.

The arithmetic mean radon flux levels were 33.3 and 6.0 pCi/m^2-s, respectively, for the beaches (uncovered) and covered areas. Using a beach area of 90,300m^2, a covered area of 166,000m^2, and a water covered area of 2,990m^2, a mean radon flux for the total pond was calculated to be 15.5 pCi/m^2-s.

Individual flux results are presented in the attached Tables Tx and Cx where the prefix UBT refers to Umetco Blanding beaches and UBC refers to Umetco Blanding covered areas. Each table is divided into subparts (v) valid test results for compliance (see Method 115, section 2.1.4 of 40 CFR Part 61), (d) duplicate test results to demonstrate counting precision, (b) "blank" results to check internal quality control, and (i) invalid test results.

A location map (Figure 1) is also attached showing the approximate locations of individual flux measurements. Measurements made at locations identified with an "A" suffix were performed on September 8-9, 1991. All other measurements were made during the September 5-6, 1991 time period. In addition, copies of the sample chain of custody forms are included for your files.

Table QA outlines the quality assurance results. All tests were conducted at ambient temperatures above 35°F. No rainfall occurred within 21 hours prior to testing. The sample collected

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at location UBC-88 was considered invalid since there was no charcoal in the radon collector during the measurement period.

According to 40 CFR Part 61, subpart 61.254 (Annual Reporting Requirements), Umetco has until March 31, 1992 to provide EPA with a report detailing the results of radon flux testing. SAI has provided Umetco with item (3), subpart 61.25A, the results of radon flux testing. All other items identified in subpart 61.254 are the responsibility of Umetco to provide to EPA. If we can be of any help in providing information on the above additional items, please feel free to contact me.

If you have any questions regarding these results and this letter report, please do not hesitate to call me. All data and reports will be treated as confidential and will not be released without your written approval.

Sincerely,

SCIENTIFIC ANALYSIS, INC.

Tom Horton gas

Thomas R. Horton
Radiation Consultant

TH/rlr

attach: Tables (3)

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Table QA

Quality Assurance Results

Pond Regions	% Completeness	Counting % Precision	Blank (Blind) Identification
Beaches	100	1.2	*
Covered	99	1.5	*
Overall	99	1.4	*

*All blanks (blinds) were found and calculated to have an equivalent flux of zero.

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RADON LABORATORY

SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Tv. VALID TEST RESULTS FOR TOP OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBT- 1	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	07:50 am	5 min	0.0951	23341	329	9.6
UBT- 2	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	07:57 am	5 min	0.0951	74049	329	30.7
UBT- 3	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	08:03 am	5 min	0.0951	188710	329	78.4
UBT- 4	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	08:17 am	5 min	0.0951	226072	329	94.1
UBT- 5	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	08:29 am	5 min	0.0951	90575	329	37.7
UBT- 6	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	08:35 am	5 min	0.0951	178357	329	74.4
UBT- 7	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	08:41 am	5 min	0.0951	229275	329	95.7
UBT- 8	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	08:47 am	5 min	0.0951	433942	329	182
UBT- 9	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	08:59 am	5 min	0.0951	109073	329	45.6
UBT- 10	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	09:05 am	5 min	0.0951	479655	329	201
UBT- 11	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	09:16 am	5 min	0.0951	5999	329	2.4
UBT- 12	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	09:22 am	5 min	0.0951	13813	329	5.7
UBT- 13	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	09:28 am	5 min	0.0951	16045	329	6.6
UBT- 15	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	09:38 am	5 min	0.0951	23971	329	10.0
16	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	09:45 am	5 min	0.0951	6475	329	2.6
UBT- 17	09/08/91	09:20 am	09/09/91	07:42 am	09/12/91	09:51 am	5 min	0.0951	1495	329	0.5
UBT- 18	09/08/91	09:20 am	09/09/91	07:42 am	09/12/91	09:56 am	5 min	0.0951	8187	329	3.4
UBT- 19	09/08/91	09:20 am	09/09/91	07:42 am	09/12/91	10:03 am	5 min	0.0951	13117	329	5.5
UBT- 20	09/08/91	09:20 am	09/09/91	07:42 am	09/12/91	10:08 am	5 min	0.0951	37180	329	15.8
UBT- 21	09/08/91	09:20 am	09/09/91	07:42 am	09/12/91	10:15 am	5 min	0.0951	1903	329	0.7
UBT- 22	09/08/91	09:20 am	09/09/91	07:42 am	09/12/91	10:20 am	5 min	0.0951	2084	329	0.8
UBT- 23	09/08/91	09:20 am	09/09/91	07:42 am	09/12/91	10:27 am	5 min	0.0951	4626	329	1.8
UBT- 24	09/08/91	09:20 am	09/09/91	07:42 am	09/12/91	10:33 am	5 min	0.0951	8238	329	3.4

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Tv. VALID TEST RESULTS FOR TOP OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBT- 25	09/08/91	09:20 am	09/09/91	07:42 am	09/12/91	10:41 am	5 min	0.0951	100466	329	43.0
UBT- 26	09/08/91	09:20 am	09/09/91	07:42 am	09/12/91	10:56 am	5 min	0.0951	85358	329	36.6
UBT- 28	09/08/91	09:20 am	09/09/91	07:42 am	09/12/91	11:07 am	5 min	0.0951	9871	329	4.1
UBT- 29	09/08/91	09:20 am	09/09/91	07:42 am	09/12/91	11:15 am	5 min	0.0951	12582	329	5.3
UBT- 30	09/08/91	09:20 am	09/09/91	07:42 am	09/12/91	11:20 am	5 min	0.0951	215733	329	93.0
UBT- 31	09/08/91	09:20 am	09/09/91	07:42 am	09/12/91	11:26 am	5 min	0.0951	77797	329	33.5
UBT- 32	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	11:34 am	5 min	0.0951	3946	329	1.6
UBT- 33	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	11:41 am	5 min	0.0951	2581	329	1.0
UBT- 34	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	11:47 am	5 min	0.0951	3135	329	1.2
UBT- 35	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	11:54 am	5 min	0.0951	199081	329	87.2
UBT- 36	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	11:59 am	5 min	0.0951	1480	329	0.5
UBT- 37	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	12:05 pm	5 min	0.0951	7475	329	3.1
UBT- 39	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	12:16 pm	5 min	0.0951	5377	329	2.2
UBT- 40	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	12:23 pm	5 min	0.0951	3907	329	1.6
UBT- 41	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	12:29 pm	5 min	0.0951	23337	329	10.1
UBT- 42	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	12:35 pm	5 min	0.0951	80491	329	35.3
UBT- 43	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	12:41 pm	5 min	0.0951	164704	329	72.5
UBT- 44	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	12:47 pm	5 min	0.0951	34721	329	15.2
UBT- 45	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	12:53 pm	5 min	0.0951	32702	329	14.3
UBT- 46	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	12:59 pm	5 min	0.0951	56614	329	24.9
UBT- 47	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	01:06 pm	5 min	0.0951	926526	329	410
UBT- 48	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	01:17 pm	5 min	0.0951	155106	329	68.6
UBT- 50	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	01:29 pm	5 min	0.0951	763222	329	339

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Tv. VALID TEST RESULTS FOR TOP OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBT- 51	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	01:39 pm	5 min	0.0951	235384	329	105
UBT- 52	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	01:46 pm	5 min	0.0951	120456	329	53.4
UBT- 54	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	02:21 pm	5 min	0.0951	67765	329	30.1
UBT- 55	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	02:33 pm	5 min	0.0951	34924	329	15.5
UBT- 121	09/05/91	02:40 pm	09/06/91	10:33 am	09/11/91	07:26 am	5 min	0.0947	9579	341	6.1
UBT- 122	09/05/91	02:40 pm	09/06/91	10:33 am	09/11/91	07:36 am	5 min	0.0947	2449	341	1.4
UBT- 123	09/05/91	02:40 pm	09/06/91	10:33 am	09/11/91	07:43 am	5 min	0.0947	7407	341	4.7
UBT- 124	09/05/91	02:40 pm	09/06/91	10:33 am	09/11/91	07:50 am	5 min	0.0947	2283	341	1.3
UBT- 125	09/05/91	02:40 pm	09/06/91	10:33 am	09/11/91	07:56 am	5 min	0.0947	20548	341	13.4
UBT- 126	09/05/91	02:40 pm	09/06/91	10:33 am	09/11/91	08:01 am	5 min	0.0947	2956	341	1.7
UBT- 127	09/05/91	02:40 pm	09/06/91	10:40 am	09/11/91	08:06 am	5 min	0.0947	2368	341	1.3
UBT- 128	09/05/91	02:40 pm	09/06/91	10:40 am	09/11/91	08:12 am	5 min	0.0947	2098	341	1.2
UBT- 129	09/05/91	02:40 pm	09/06/91	10:40 am	09/11/91	08:17 am	5 min	0.0947	10149	341	6.5
UBT- 130	09/05/91	02:40 pm	09/06/91	10:40 am	09/11/91	08:26 am	5 min	0.0947	2771	341	1.6
UBT- 131	09/05/91	02:40 pm	09/06/91	10:40 am	09/11/91	08:37 am	5 min	0.0947	21168	341	13.8
UBT- 132	09/05/91	02:40 pm	09/06/91	10:40 am	09/11/91	08:43 am	5 min	0.0947	2189	341	1.2
UBT- 133	09/05/91	02:40 pm	09/06/91	10:40 am	09/11/91	08:48 am	5 min	0.0947	42103	341	27.7
UBT- 134	09/05/91	02:55 pm	09/06/91	10:40 am	09/11/91	08:55 am	5 min	0.0947	3927	341	2.4
UBT- 135	09/05/91	02:55 pm	09/06/91	10:40 am	09/11/91	09:00 am	5 min	0.0947	109696	341	73.4
UBT- 136	09/05/91	02:55 pm	09/06/91	10:40 am	09/11/91	09:08 am	5 min	0.0947	59118	341	39.5
UBT- 137	09/05/91	02:55 pm	09/06/91	10:40 am	09/11/91	09:14 am	5 min	0.0947	26211	341	17.4
UBT- 138	09/05/91	02:55 pm	09/06/91	10:40 am	09/11/91	09:19 am	5 min	0.0947	3879	341	2.4
UBT- 139	09/05/91	03:10 pm	09/06/91	10:55 am	09/11/91	09:26 am	5 min	0.0947	8571	341	5.5

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

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RADON LABORATORY

SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Tv. VALID TEST RESULTS FOR TOP OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	----- On Stack -----	--- Off Stack ----	-- Count Begun ---	Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBT- 140	09/05/91 03:10 pm	09/06/91 10:55 am	09/11/91 09:32 am	5 min	0.0947	15425	341	10.1
UBT- 141	09/05/91 03:10 pm	09/06/91 10:55 am	09/11/91 09:43 am	5 min	0.0947	12327	341	8.1
UBT- 142	09/05/91 03:10 pm	09/06/91 10:55 am	09/11/91 09:47 am	5 min	0.0947	3907	341	2.4
UBT- 143	09/05/91 03:10 pm	09/06/91 10:55 am	09/11/91 09:56 am	5 min	0.0947	1285	341	0.6
UBT- 144	09/05/91 03:10 pm	09/06/91 10:55 am	09/11/91 10:02 am	5 min	0.0947	42167	341	28.3
UBT- 145	09/05/91 03:10 pm	09/06/91 10:55 am	09/11/91 10:08 am	5 min	0.0947	8444	341	5.5
UBT- 146	09/05/91 03:10 pm	09/06/91 10:55 am	09/11/91 10:17 am	5 min	0.0947	1837	341	1.0
UBT- 147	09/05/91 03:10 pm	09/06/91 10:55 am	09/11/91 10:21 am	5 min	0.0947	1564	341	0.8
UBT- 148	09/05/91 03:35 pm	09/06/91 11:10 am	09/11/91 10:28 am	5 min	0.0947	4233	341	2.7
UBT- 149	09/05/91 03:35 pm	09/06/91 11:10 am	09/11/91 10:34 am	5 min	0.0947	10603	341	7.0
UBT- 150	09/05/91 03:35 pm	09/06/91 11:10 am	09/11/91 10:39 am	5 min	0.0947	4783	341	3.0
UBT- 151	09/05/91 03:35 pm	09/06/91 11:10 am	09/11/91 10:50 am	5 min	0.0947	6387	341	4.1
UBT- 152	09/05/91 03:35 pm	09/06/91 11:10 am	09/11/91 11:00 am	5 min	0.0947	6251	341	4.0
UBT- 153	09/05/91 03:35 pm	09/06/91 11:10 am	09/11/91 11:05 am	5 min	0.0947	5408	341	3.5
UBT- 154	09/05/91 03:35 pm	09/06/91 11:10 am	09/11/91 11:14 am	5 min	0.0947	268224	341	184
UBT- 155	09/05/91 03:35 pm	09/06/91 11:10 am	09/11/91 11:27 am	5 min	0.0947	72477	341	49.5
UBT- 156	09/05/91 03:35 pm	09/06/91 11:10 am	09/11/91 11:33 am	5 min	0.0947	123644	341	84.7
UBT- 157	09/05/91 03:35 pm	09/06/91 11:10 am	09/11/91 11:38 am	5 min	0.0947	61803	341	42.3
UBT- 158	09/05/91 03:35 pm	09/06/91 11:10 am	09/11/91 11:46 am	5 min	0.0947	12685	341	8.5
UBT- 159	09/05/91 03:35 pm	09/06/91 11:10 am	09/11/91 11:52 am	5 min	0.0947	76505	341	52.5
UBT- 160	09/05/91 03:35 pm	09/06/91 11:10 am	09/11/91 11:57 am	5 min	0.0947	8555	341	5.7
UBT- 161	09/05/91 03:35 pm	09/06/91 11:10 am	09/11/91 12:03 pm	5 min	0.0947	8550	341	5.7
UBT- 162	09/05/91 03:35 pm	09/06/91 11:10 am	09/11/91 12:09 pm	5 min	0.0947	148021	341	102

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Tv. VALID TEST RESULTS FOR TOP OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	----- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBT- 163	09/05/91	03:35 pm	09/06/91	11:10 am	09/11/91	12:14 pm	5 min	0.0947	33901	341	23.2
UBT- 164	09/05/91	03:35 pm	09/06/91	11:10 am	09/11/91	12:20 pm	5 min	0.0947	10215	341	6.8
UBT- 165	09/05/91	03:35 pm	09/06/91	11:10 am	09/11/91	12:26 pm	5 min	0.0947	18472	341	12.5
UBT- 166	09/05/91	03:35 pm	09/06/91	11:10 am	09/11/91	12:31 pm	5 min	0.0947	6229	341	4.1
UBT- 167	09/05/91	03:35 pm	09/06/91	11:10 am	09/11/91	12:54 pm	5 min	0.0947	5875	341	3.8
UBT- 168	09/05/91	03:35 pm	09/06/91	11:10 am	09/11/91	12:59 pm	5 min	0.0947	14662	341	9.9
UBT- 169	09/05/91	03:35 pm	09/06/91	11:10 am	09/11/91	01:05 pm	5 min	0.0947	11162	341	7.5
UBT- 170	09/05/91	03:35 pm	09/06/91	11:10 am	09/11/91	01:14 pm	5 min	0.0947	9638	341	6.5

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

NOTE: Number of Flux Measurements = 100; Average flux = 33.3

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Td. DUPLICATE TEST RESULTS FOR TOP OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBT- 3	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	08:11 am	5 min	0.0951	187745	329	78.1
UBT- 4	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	08:23 am	5 min	0.0951	226360	329	94.3
UBT- 8	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	08:52 am	5 min	0.0951	434701	329	182
UBT- 10	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	09:11 am	5 min	0.0951	479087	329	201
UBT- 25	09/08/91	09:20 am	09/09/91	07:42 am	09/12/91	10:49 am	5 min	0.0951	100638	329	43.1
UBT- 47	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	01:12 pm	5 min	0.0951	924602	329	409
UBT- 130	09/05/91	02:40 pm	09/06/91	10:40 am	09/11/91	08:31 am	5 min	0.0947	2874	341	1.7
UBT- 140	09/05/91	03:10 pm	09/06/91	10:55 am	09/11/91	09:38 am	5 min	0.0947	15420	341	10.2
UBT- 150	09/05/91	03:35 pm	09/06/91	11:10 am	09/11/91	10:45 am	5 min	0.0947	4820	341	3.1
UBT- 154	09/05/91	03:35 pm	09/06/91	11:10 am	09/11/91	11:21 am	5 min	0.0947	269407	341	185
UBT- 170	09/05/91	03:35 pm	09/06/91	11:10 am	09/11/91	01:19 pm	5 min	0.0947	9570	341	6.4

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

NOTE: Number of Flux Measurements = 11; Average flux = 110

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Tb. BLANK TEST RESULTS FOR TOP OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBT- 14	09/08/91	08:43 am	09/09/91	07:26 am	09/12/91	09:33 am	5 min	0.0951	352	329	0.0
UBT- 27	09/08/91	09:20 am	09/09/91	07:42 am	09/12/91	11:02 am	5 min	0.0951	344	329	0.0
UBT- 38	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	12:10 pm	5 min	0.0951	370	329	0.0
UBT- 49	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	01:23 pm	5 min	0.0951	363	329	0.0
UBT- 53	09/08/91	09:47 am	09/09/91	07:51 am	09/12/91	02:01 pm	5 min	0.0951	368	329	0.0

*: All times are local stack times; Flux is given in pCi/Sec-Sq M

NOTE: Number of Flux Measurements = 5; Average flux = 0.0

6012 E SHIRLEY LANE □ MONTGOMERY, ALABAMA 36117 □ (205) 271-0643

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Cv. VALID TEST RESULTS FOR COVER OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBC- 56	09/08/91	10:45 am	09/09/91	08:38 am	09/12/91	07:55 am	5 min	0.1049	29963	283	11.5
UBC- 57	09/08/91	10:45 am	09/09/91	08:38 am	09/12/91	08:00 am	5 min	0.1049	10006	283	3.8
UBC- 58	09/08/91	10:45 am	09/09/91	08:38 am	09/12/91	08:05 am	5 min	0.1049	3001	283	1.1
UBC- 59	09/08/91	10:45 am	09/09/91	08:38 am	09/12/91	08:13 am	5 min	0.1049	2381	283	0.8
UBC- 61	09/08/91	10:45 am	09/09/91	08:38 am	09/12/91	08:25 am	5 min	0.1049	2464	283	0.8
UBC- 62	09/08/91	10:45 am	09/09/91	08:38 am	09/12/91	08:36 am	5 min	0.1049	16690	283	6.4
UBC- 63	09/08/91	10:45 am	09/09/91	08:38 am	09/12/91	08:41 am	5 min	0.1049	2569	283	0.9
UBC- 64	09/08/91	10:45 am	09/09/91	08:38 am	09/12/91	08:46 am	5 min	0.1049	14215	283	5.4
UBC- 65	09/08/91	10:45 am	09/09/91	08:38 am	09/12/91	08:52 am	5 min	0.1049	20455	283	7.9
UBC- 66	09/08/91	10:45 am	09/09/91	08:38 am	09/12/91	08:59 am	5 min	0.1049	5110	283	1.9
UBC- 67	09/08/91	10:45 am	09/09/91	08:38 am	09/12/91	09:06 am	5 min	0.1049	2872	283	1.0
UBC- 68	09/08/91	10:45 am	09/09/91	08:38 am	09/12/91	09:11 am	5 min	0.1049	10630	283	4.0
UBC- 69	09/08/91	10:45 am	09/09/91	08:38 am	09/12/91	09:21 am	5 min	0.1049	3758	283	1.4
UBC- 70	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	09:26 am	5 min	0.1049	14809	283	5.7
- 72	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	09:47 am	5 min	0.1049	34857	283	13.6
UBC- 73	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	09:52 am	5 min	0.1049	8521	283	3.2
UBC- 74	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	09:57 am	5 min	0.1049	3154	283	1.1
UBC- 75	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	10:03 am	5 min	0.1049	46380	283	18.2
UBC- 76	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	10:09 am	5 min	0.1049	1639	283	0.5
UBC- 77	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	10:16 am	5 min	0.1049	35366	283	13.8
UBC- 78	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	10:21 am	5 min	0.1049	11127	283	4.3
UBC- 79	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	10:28 am	5 min	0.1049	8436	283	3.2
UBC- 80	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	10:34 am	5 min	0.1049	14266	283	5.5

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

6012 E SHIRLEY LANE □ MONTGOMERY, ALABAMA 36117 □ (205) 271-0643

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Cv. VALID TEST RESULTS FOR COVER OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	----- On Stack -----		--- Off Stack -----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBC- 81	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	12:25 pm	5 min	0.1049	3435	283	1.3
UBC- 82	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	12:38 pm	5 min	0.1049	3558	283	1.3
UBC- 84	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	12:50 pm	5 min	0.1049	2576	283	0.9
UBC- 85	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	12:57 pm	5 min	0.1049	1491	283	0.5
UBC- 86	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	01:03 pm	5 min	0.1049	2584	283	0.9
UBC- 87	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	01:10 pm	5 min	0.1049	1793	283	0.6
UBC- 89	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	01:15 pm	5 min	0.1049	1697	283	0.6
UBC- 90	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	01:20 pm	5 min	0.1049	1788	283	0.6
UBC- 91	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	01:28 pm	5 min	0.1049	1632	283	0.5
UBC- 92	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	01:39 pm	5 min	0.1049	2612	283	0.9
UBC- 93	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	01:46 pm	5 min	0.1049	9131	283	3.6
UBC- 94	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	02:01 pm	5 min	0.1049	8127	283	3.2
UBC- 95	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	02:21 pm	5 min	0.1049	5558	283	2.1
UBC- 96	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	02:33 pm	5 min	0.1049	4653	283	1.8
UBC- 97	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	02:43 pm	5 min	0.1049	9188	283	3.6
UBC- 98	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	02:49 pm	5 min	0.1049	17814	283	7.1
UBC- 99	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	02:56 pm	5 min	0.1049	25370	283	10.2
UBC- 100	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	03:17 pm	5 min	0.1049	2586	283	0.9
UBC- 111	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	03:25 pm	5 min	0.1049	2000	283	0.7
UBC- 112	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	03:30 pm	5 min	0.1049	9760	283	3.9
UBC- 113	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	03:35 pm	5 min	0.1049	2513	283	0.9
UBC- 114	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	03:42 pm	5 min	0.1049	1598	283	0.5
UBC- 115	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	03:48 pm	5 min	0.1049	1682	283	0.6

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

6012 E SHIRLEY LANE □ MONTGOMERY, ALABAMA 36117 □ (205) 271-0643

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RADON LABORATORY

SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Cv. VALID TEST RESULTS FOR COVER OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBC- 116	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	07:39 am	5 min	0.1040	1256	307	0.4
UBC- 117	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	07:50 am	5 min	0.1040	6154	307	2.7
UBC- 118	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	08:00 am	5 min	0.1040	1601	307	0.6
UBC- 119	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	08:06 am	5 min	0.1040	2389	307	1.0
UBC- 120	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	08:13 am	5 min	0.1040	9413	307	4.3
UBC- 121	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	08:18 am	5 min	0.1040	2344	307	1.0
UBC- 123	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	08:28 am	5 min	0.1040	3027	307	1.3
UBC- 124	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	08:39 am	5 min	0.1040	1637	307	0.6
UBC- 125	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	08:46 am	5 min	0.1040	1703	307	0.7
UBC- 126	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	08:51 am	5 min	0.1040	1587	307	0.6
UBC- 127	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	08:56 am	5 min	0.1040	3684	307	1.6
UBC- 128	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	09:03 am	5 min	0.1040	10787	307	4.9
UBC- 129	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	09:08 am	5 min	0.1040	26800	307	12.5
UBC- 130	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	09:19 am	5 min	0.1040	134869	307	63.4
UBC- 132	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	09:40 am	5 min	0.1040	83090	307	39.1
UBC- 133	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	09:45 am	5 min	0.1040	3947	307	1.7
UBC- 134	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	09:54 am	5 min	0.1040	1821	307	0.7
UBC- 135	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	09:59 am	5 min	0.1040	1719	307	0.7
UBC- 136	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	10:05 am	5 min	0.1040	1280	307	0.5
UBC- 137	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	10:16 am	5 min	0.1040	885	307	0.3
UBC- 138	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	10:21 am	5 min	0.1040	21291	307	10.0
UBC- 139	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	10:26 am	5 min	0.1040	56955	307	26.9
UBC- 140	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	07:32 am	5 min	0.0956	3304	355	1.5

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Cv. VALID TEST RESULTS FOR COVER OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBC- 141	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	07:49 am	5 min	0.0956	32473	355	16.3
UBC- 142	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	08:00 am	5 min	0.0956	1712	355	0.7
UBC- 143	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	08:06 am	5 min	0.0956	1548	355	0.6
UBC- 144	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	08:13 am	5 min	0.0956	1899	355	0.8
UBC- 145	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	08:18 am	5 min	0.0956	1325	355	0.5
UBC- 146	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	08:23 am	5 min	0.0956	1268	355	0.5
UBC- 147	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	08:28 am	5 min	0.0956	1274	355	0.5
UBC- 148	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	08:39 am	5 min	0.0956	1667	355	0.7
UBC- 149	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	08:44 am	5 min	0.0956	2542	355	1.1
UBC- 150	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	08:50 am	5 min	0.0956	3056	355	1.4
UBC- 151	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	09:02 am	5 min	0.0956	2173	355	0.9
UBC- 152	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	09:09 am	5 min	0.0956	60633	355	30.9
UBC- 153	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	09:19 am	5 min	0.0956	31778	355	16.1
UBC- 154	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	09:26 am	5 min	0.0956	34534	355	17.5
[illegible]- 155	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	09:32 am	5 min	0.0956	18662	355	9.4
UBC- 156	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	09:40 am	5 min	0.0956	51697	355	26.4
UBC- 157	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	09:45 am	5 min	0.0956	12802	355	6.4
UBC- 158	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	09:54 am	5 min	0.0956	1497	355	0.6
UBC- 159	09/08/91	12:48 pm	09/09/91	10:16 am	09/13/91	10:00 am	5 min	0.0956	1054	355	0.4
UBC- 160	09/08/91	12:48 pm	09/09/91	10:16 am	09/13/91	10:05 am	5 min	0.0956	900	355	0.3
UBC- 161	09/08/91	12:48 pm	09/09/91	10:16 am	09/13/91	10:22 am	5 min	0.0956	994	355	0.3
UBC- 162	09/08/91	12:48 pm	09/09/91	10:16 am	09/13/91	10:27 am	5 min	0.0956	5331	355	2.6
UBC- 163	09/08/91	12:48 pm	09/09/91	10:16 am	09/13/91	10:33 am	5 min	0.0956	5916	355	2.9

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

6012 E SHIRLEY LANE □ MONTGOMERY, ALABAMA 36117 □ (205) 271-0643

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Cv. VALID TEST RESULTS FOR COVER OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBC- 164	09/08/91	12:48 pm	09/09/91	10:16 am	09/13/91	10:38 am	5 min	0.0956	26617	355	13.7
UBC- 165	09/08/91	12:48 pm	09/09/91	10:16 am	09/13/91	10:47 am	5 min	0.0956	15390	355	7.9
UBC- 166	09/08/91	12:48 pm	09/09/91	10:16 am	09/13/91	10:55 am	5 min	0.0956	40126	355	20.8
UBC- 167	09/08/91	12:48 pm	09/09/91	10:16 am	09/13/91	11:00 am	5 min	0.0956	10789	355	5.5
UBC- 168	09/08/91	12:48 pm	09/09/91	10:16 am	09/13/91	11:10 am	5 min	0.0956	85304	355	44.5
UBC- 169	09/08/91	12:48 pm	09/09/91	10:16 am	09/13/91	11:18 am	5 min	0.0956	3357	355	1.6
UBC- 170	09/08/91	12:48 pm	09/09/91	10:16 am	09/13/91	12:36 pm	5 min	0.0956	48084	355	25.3

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

NOTE: Number of Flux Measurements = 99; Average flux = 6.0

6012 E SHIRLEY LANE □ MONTGOMERY, ALABAMA 36117 □ (205) 271-0643

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Cd. DUPLICATE TEST RESULTS FOR COVER OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBC- 61	09/08/91	10:45 am	09/09/91	08:38 am	09/12/91	08:30 am	5 min	0.1049	2483	283	0.9
UBC- 70	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	09:31 am	5 min	0.1049	14445	283	5.6
UBC- 81	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	12:33 pm	5 min	0.1049	3404	283	1.3
UBC- 91	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	03:04 pm	5 min	0.1049	1617	283	0.5
UBC- 115	09/08/91	11:21 am	09/09/91	09:16 am	09/12/91	03:53 pm	5 min	0.1049	1786	283	0.6
UBC- 130	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	09:25 am	5 min	0.1040	134589	307	63.3
UBC- 139	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	10:31 am	5 min	0.1040	56862	307	26.9
UBC- 150	09/08/91	12:17 pm	09/09/91	09:58 am	09/13/91	08:56 am	5 min	0.0956	3091	355	1.4
UBC- 160	09/08/91	12:48 pm	09/09/91	10:16 am	09/13/91	10:16 am	5 min	0.0956	830	355	0.2
UBC- 170	09/08/91	12:48 pm	09/09/91	10:16 am	09/13/91	12:41 pm	5 min	0.0956	48523	355	25.5

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

NOTE: Number of Flux Measurements = 10; Average flux = 12.6

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Cb. BLANK TEST RESULTS FOR COVER OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBC- 60	09/08/91	10:45 am	09/09/91	08:38 am	09/12/91	08:20 am	5 min	0.1049	279	283	0.0
UBC- 71	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	09:38 am	5 min	0.1049	292	283	0.0
UBC- 83	09/08/91	11:00 am	09/09/91	08:47 am	09/12/91	12:44 pm	5 min	0.1049	299	283	0.0
UBC- 122	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	08:23 am	5 min	0.1040	290	307	0.0
UBC- 131	09/08/91	11:50 am	09/09/91	09:36 am	09/13/91	09:31 am	5 min	0.1040	295	307	0.0

. .E: All times are local stack times; Flux is given in pCi/Sec-Sq M

NOTE: Number of Flux Measurements = 5; Average flux = 0.0

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Ci. INVALID TEST RESULTS FOR COVER OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----	--- Off Stack ----	-- Count Begun ---	Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBC- 88	09/08/91 11:21 pm	09/09/91 09:16 am	/ / pm	5 min	0.1049	0	283	0.0

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

NOTE: Number of Flux Measurements = 1; Average flux = 0.0

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SCIENTIFIC ANALYSIS, INC.

CHAIN OF CUSTODY RECORD

Radon Flux Testing

Job Name: Umetco Cell #2 and Cell #3, Blanding, UT

Samplers (Name and Signature): J. Gunn, L. Davis, T. HORTON
G. HORTON Thomas R. Horton

Sample Locations/Sample ID Numbers (Collector Numbers): 4 Backgrounds
UBB-ϕϕ1-1ϕϕ, 111, 112, 114; UBT121-161; UBB113, 12ϕ

Sample Type: Exposed Charcoal in Plastic Container

Total Number of Samples: 150

Collection Date: 9/6/91

Relinquished By (Name and Signature): T. HORTON
Thomas R. Horton

Date/Time: 9/6/91 12:00PM to UPS 2nd day Air

Received By (Name and Signature): Faith ann McWhorter
Faith ann McWhorter

Date/Time: 9/10/91 12:00 pm

Relinquished By (Name and Signature):

Date/Time:

Received By (Name and Signature):

Date/Time:

SCIENTIFIC ANALYSIS, INC.

CHAIN OF CUSTODY RECORD

Radon Flux Testing

Job Name: Umetco Cell #2 and Cell #3, Blanding, UT

Samplers (Name and Signature): T. HORTON, J. Gunn, L. Davis, G. HORTON Thomas R. Horton

Sample Locations/Sample ID Numbers (Collector Numbers):

BKG 46, 61, 86, 113, 115-120; UBT 162-170.

Sample Type: Exposed Charcoal in Plastic Container

Total Number of Samples: 19

Collection Date: 9/6/91

Relinquished By (Name and Signature): T. HORTON Thomas R Horton

Date/Time: 9/8/91 2:00 Pm to SAI lab.

Received By (Name and Signature): Faith ann McWhorter Faith ann McWhorter

Date/Time: 9/9/91 8:00 am

Relinquished By (Name and Signature):

Date/Time:

Received By (Name and Signature):

Date/Time:

SCIENTIFIC ANALYSIS, INC.

CHAIN OF CUSTODY RECORD

Radon Flux Testing

Job Name: United Minerals Cell #2

Samplers (Name and Signature): Allen Gunn, Allen Gunn

Sample Locations/Sample ID Numbers (Collector Numbers):

UBT1-55, BKG1-4 BKG 14, 27, 38, 49, 53, 60, 71, 83, 122, 131

UBC56-170, BKG1-4

Sample Type: Exposed Charcoal in Plastic Container

Total Number of Samples: 188

Collection Date: 9/9/91

Relinquished By (Name and Signature): Allen Gunn
Allen Gunn

Date/Time: 9/9/91 11:45 am

Received By (Name and Signature): Faith ann McWhorter
Faith ann McWhorter

Date/Time: 9/11/91 11:30 am

Relinquished By (Name and Signature):

Date/Time:

Received By (Name and Signature):

Date/Time:

SCIENTIFIC ANALYSIS, INC.

October 9, 1991

Mr. John Hamrick
Umetco Minerals Corporation
P.O. Box 1029
Grand Junction, CO 81502

Subject: Results of Radon Flux Testing
Uranium Mill Tailings Pond - Cell 3
Blanding, UT

Dear Mr. Hamrick:

Scientific Analysis, Inc. is pleased to provide you with the results of 100 radon flux measurements performed on September 5-6, 1991 on the White Mesa tailings pond (Cell 3) in accordance with the requirements of 40 CFR Part 61, Appendix B, Method 115 (Federal Register Notice - December 15, 1989) and Radon Flux Measurements on Gardinier and Royster Phosphogypsum Piles near Tampa and Mulberry, FL, EPA 520/5-85-029, January 1986, Appendix A. See enclosed SAI Standard Operating Procedures for radon flux measurements. These tests can be used to show compliance with the 40 CFR Part 61 standard for operating uranium mill tailings piles, which limits radon emissions to 20 pCi/m^2-s.

The arithmetic mean radon flux level was 25.2 pCi/m^2-s for the beaches (uncovered). Using a beach area of 132,000m^2 and a water covered area of 134,000m^2, a mean radon flux for the total pond was calculated to be 12.5 pCi/m^2-s.

Individual flux results are presented in the attached Tables Bx where the prefix UBB refers to Umetco Blanding beaches. Each table is divided into subparts (v) valid test results for compliance (see Method 115, section 2.1.4 of 40 CFR Part 61), (d) duplicate test results to demonstrate counting precision, (b) "blank" results to check internal quality control, and (i) invalid test results. Radon flux results for background soil are shown in Table Tx where the prefix BKG refers to background soil.

A location map (Figure 1) is also attached showing the approximate locations of individual flux measurements. In addition, a copy of the sample chain of custody form is included for your files.

Table QA outlines the quality assurance results. All tests were conducted at ambient temperatures above 35°F. No rainfall occurred within 24 hours prior to testing. The samples collected at locations UBB-11, UBB-27, and UBB-80 were considered invalid due to a charcoal spill in transit, a cracked radon collector,

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and no charcoal in the radon collector during the measurement period, respectively.

According to 40 CFR Part 61, subpart 61.254 (Annual Reporting Requirements), Umetco has until March 31, 1992 to provide EPA with a report detailing the results of radon flux testing. SAI has provided Umetco with item (3), subpart 61.254, the results of radon flux testing. All other items identified in subpart 61.254 are the responsibility of Umetco to provide to EPA. If we can be of any help in providing information on the above additional items, please feel free to contact me.

If you have any questions regarding these results and this letter report, please do not hesitate to call me. All data and reports will be treated as confidential and will not be released without your written approval.

Sincerely,

SCIENTIFIC ANALYSIS, INC.

Tom Horton

Thomas R. Horton
Radiation Consultant

TH/rlr

attach: Tables (3)

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Table QA

Quality Assurance Results

Pond Regions	% Completeness	Counting % Precision	Blank (Blind) Identification
Beaches	97	0.8	*
Overall	97	0.8	*

*All blanks (blinds) were found and calculated to have an equivalent flux of zero.

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SUMMARY OF RADON FLUX COMPUTATIONS
TABLE Bv. VALID TEST RESULTS FOR BEACHES OF STACK
Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	----- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBB- 1	09/05/91	10:10 am	09/06/91	08:30 am	09/10/91	11:39 am	5 min	0.1043	3392	286	1.5
UBB- 2	09/05/91	10:10 am	09/06/91	08:30 am	09/10/91	11:45 am	5 min	0.1043	12742	286	5.9
UBB- 3	09/05/91	10:10 am	09/06/91	08:30 am	09/10/91	11:50 am	5 min	0.1043	62776	286	29.5
UBB- 4	09/05/91	10:10 am	09/06/91	08:30 am	09/10/91	11:55 am	5 min	0.1043	3343	286	1.4
UBB- 5	09/05/91	10:10 am	09/06/91	08:30 am	09/10/91	12:00 pm	5 min	0.1043	1843	286	0.7
UBB- 6	09/05/91	10:10 am	09/06/91	08:30 am	09/10/91	12:05 pm	5 min	0.1043	2066	286	0.8
UBB- 7	09/05/91	10:10 am	09/06/91	08:30 am	09/10/91	12:12 pm	5 min	0.1043	6835	286	3.1
UBB- 8	09/05/91	10:10 am	09/06/91	08:30 am	09/10/91	12:19 pm	5 min	0.1043	15727	286	7.3
UBB- 9	09/05/91	10:10 am	09/06/91	08:30 am	09/10/91	12:32 pm	5 min	0.1043	16535	286	7.7
UBB- 10	09/05/91	10:10 am	09/06/91	08:30 am	09/10/91	12:41 pm	5 min	0.1043	8920	286	4.1
UBB- 12	09/05/91	10:25 am	09/06/91	08:30 am	09/10/91	12:57 pm	5 min	0.1043	4574	286	2.1
UBB- 13	09/05/91	10:25 am	09/06/91	08:30 am	09/10/91	01:08 pm	5 min	0.1043	1893	286	0.8
UBB- 14	09/05/91	10:25 am	09/06/91	08:30 am	09/10/91	01:20 pm	5 min	0.1043	44573	286	21.3
UBB- 15	09/05/91	10:25 am	09/06/91	08:30 am	09/10/91	01:25 pm	5 min	0.1043	23044	286	11.0
UBB- 16	09/05/91	10:25 am	09/06/91	08:30 am	09/10/91	01:32 pm	5 min	0.1043	11625	286	5.5
UBB- 17	09/05/91	10:25 am	09/06/91	08:30 am	09/10/91	01:40 pm	5 min	0.1043	5459	286	2.5
UBB- 18	09/05/91	10:25 am	09/06/91	08:30 am	09/10/91	01:46 pm	5 min	0.1043	45729	286	22.0
UBB- 19	09/05/91	10:25 am	09/06/91	08:30 am	09/10/91	01:52 pm	5 min	0.1043	7723	286	3.6
UBB- 20	09/05/91	10:25 am	09/06/91	08:30 am	09/10/91	01:59 pm	5 min	0.1043	4681	286	2.1
UBB- 21	09/05/91	10:50 am	09/06/91	08:30 am	09/10/91	02:11 pm	5 min	0.1043	11526	286	5.5
UBB- 22	09/05/91	10:50 am	09/06/91	08:30 am	09/10/91	02:16 pm	5 min	0.1043	88963	286	43.8
UBB- 23	09/05/91	10:50 am	09/06/91	08:30 am	09/10/91	02:22 pm	5 min	0.1043	61045	286	30.0
UBB- 24	09/05/91	10:50 am	09/06/91	08:30 am	09/10/91	02:28 pm	5 min	0.1043	41961	286	20.6

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

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SCIENTIFIC ANALYSIS, INC.

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Bv. VALID TEST RESULTS FOR BEACHES OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBB- 25	09/05/91	10:50 am	09/06/91	08:30 am	09/10/91	11:31 am	5 min	0.0949	46688	322	24.6
UBB- 26	09/05/91	10:50 am	09/06/91	08:30 am	09/10/91	11:39 am	5 min	0.0949	55384	322	29.3
UBB- 28	09/05/91	10:50 am	09/06/91	08:30 am	09/10/91	11:49 am	5 min	0.0949	4517	322	2.2
UBB- 29	09/05/91	10:50 am	09/06/91	08:30 am	09/10/91	11:54 am	5 min	0.0949	8182	322	4.2
UBB- 30	09/05/91	10:50 am	09/06/91	08:30 am	09/10/91	12:00 pm	5 min	0.0949	33421	322	17.7
UBB- 31	09/05/91	11:10 am	09/06/91	08:30 am	09/10/91	12:12 pm	5 min	0.0949	20072	322	10.7
UBB- 32	09/05/91	11:10 am	09/06/91	08:30 am	09/10/91	12:19 pm	5 min	0.0949	3259	322	1.6
UBB- 33	09/05/91	11:10 am	09/06/91	08:30 am	09/10/91	12:32 pm	5 min	0.0949	8648	322	4.5
UBB- 34	09/05/91	11:10 am	09/06/91	08:30 am	09/10/91	12:41 pm	5 min	0.0949	4953	322	2.5
UBB- 35	09/05/91	11:10 am	09/06/91	08:30 am	09/10/91	12:48 pm	5 min	0.0949	3811	322	1.9
UBB- 36	09/05/91	11:10 am	09/06/91	08:30 am	09/10/91	12:57 pm	5 min	0.0949	2776	322	1.3
UBB- 37	09/05/91	11:10 am	09/06/91	08:30 am	09/10/91	01:08 pm	5 min	0.0949	7093	322	3.7
UBB- 38	09/05/91	12:35 pm	09/06/91	09:10 am	09/10/91	01:21 pm	5 min	0.0949	3373	322	1.7
UBB- 39	09/05/91	11:10 am	09/06/91	08:30 am	09/10/91	01:26 pm	5 min	0.0949	2433	322	1.2
UBB- 40	09/05/91	12:35 pm	09/06/91	09:10 am	09/10/91	01:33 pm	5 min	0.0949	4712	322	2.5
UBB- 41	09/05/91	12:35 pm	09/06/91	09:10 am	09/10/91	01:46 pm	5 min	0.0949	1237	322	0.5
UBB- 42	09/05/91	12:35 pm	09/06/91	09:10 am	09/10/91	01:52 pm	5 min	0.0949	3426	322	1.8
UBB- 43	09/05/91	12:35 pm	09/06/91	09:10 am	09/10/91	01:58 pm	5 min	0.0949	3002	322	1.5
UBB- 44	09/05/91	12:35 pm	09/06/91	09:10 am	09/10/91	02:03 pm	5 min	0.0949	14311	322	7.9
UBB- 45	09/05/91	12:35 pm	09/06/91	09:10 am	09/10/91	02:12 pm	5 min	0.0949	3524	322	1.8
UBB- 47	09/05/91	12:35 pm	09/06/91	09:10 am	09/10/91	02:22 pm	5 min	0.0949	2290	322	1.1
UBB- 48	09/05/91	12:35 pm	09/06/91	09:10 am	09/10/91	02:30 pm	5 min	0.0949	1214	322	0.5
UBB- 49	09/05/91	12:35 pm	09/06/91	09:10 am	09/10/91	02:43 pm	5 min	0.0949	3554	322	1.8

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

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SCIENTIFIC ANALYSIS, INC.

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RADON LABORATORY

SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Bv. VALID TEST RESULTS FOR BEACHES OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBB- 50	09/05/91	12:35 pm	09/06/91	09:10 am	09/10/91	02:54 pm	5 min	0.0949	5153	322	2.7
UBB- 51	09/05/91	12:35 pm	09/06/91	09:10 am	09/11/91	07:24 am	5 min	0.1035	1538	296	0.7
UBB- 52	09/05/91	12:35 pm	09/06/91	09:10 am	09/11/91	07:30 am	5 min	0.1035	91008	296	53.6
UBB- 53	09/05/91	12:35 pm	09/06/91	09:10 am	09/11/91	07:36 am	5 min	0.1035	36062	296	21.2
UBB- 54	09/05/91	12:35 pm	09/06/91	09:10 am	09/11/91	07:43 am	5 min	0.1035	4513	296	2.5
UBB- 55	09/05/91	12:35 pm	09/06/91	09:10 am	09/11/91	07:49 am	5 min	0.1035	2366	296	1.2
UBB- 56	09/05/91	12:35 pm	09/06/91	09:10 am	09/11/91	07:55 am	5 min	0.1035	22871	296	13.4
UBB- 57	09/05/91	12:55 pm	09/06/91	09:30 am	09/11/91	08:00 am	5 min	0.1035	85395	296	50.4
UBB- 58	09/05/91	12:55 pm	09/06/91	09:30 am	09/11/91	08:05 am	5 min	0.1035	19508	296	11.4
UBB- 59	09/05/91	12:55 pm	09/06/91	09:30 am	09/11/91	08:11 am	5 min	0.1035	16849	296	9.8
UBB- 60	09/05/91	12:55 pm	09/06/91	09:30 am	09/11/91	08:17 am	5 min	0.1035	494937	296	294
UBB- 62	09/05/91	12:55 pm	09/06/91	09:30 am	09/11/91	08:34 am	5 min	0.1035	6013	296	3.4
UBB- 63	09/05/91	12:55 pm	09/06/91	09:30 am	09/11/91	08:42 am	5 min	0.1035	208630	296	124
UBB- 64	09/05/91	12:55 pm	09/06/91	09:30 am	09/11/91	08:47 am	5 min	0.1035	45347	296	26.8
UBB- 65	09/05/91	12:55 pm	09/06/91	09:30 am	09/11/91	08:54 am	5 min	0.1035	28208	296	16.6
UBB- 66	09/05/91	12:55 pm	09/06/91	09:45 am	09/11/91	09:00 am	5 min	0.1035	45750	296	26.8
UBB- 67	09/05/91	12:55 pm	09/06/91	09:45 am	09/11/91	09:05 am	5 min	0.1035	85210	296	50.0
UBB- 68	09/05/91	12:55 pm	09/06/91	09:45 am	09/11/91	09:13 am	5 min	0.1035	73346	296	43.1
UBB- 69	09/05/91	12:55 pm	09/06/91	09:45 am	09/11/91	09:18 am	5 min	0.1035	91191	296	53.6
UBB- 70	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	09:23 am	5 min	0.1035	66496	296	39.8
UBB- 71	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	09:36 am	5 min	0.1035	60923	296	36.5
UBB- 72	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	09:42 am	5 min	0.1035	17671	296	10.5
UBB- 73	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	09:48 am	5 min	0.1035	45642	296	27.4

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Bv. VALID TEST RESULTS FOR BEACHES OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBB- 74	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	09:53 am	5 min	0.1035	154014	296	92.8
UBB- 75	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	10:06 am	5 min	0.1035	55372	296	33.3
UBB- 76	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	11:10 am	5 min	0.1035	414839	296	253
UBB- 77	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	11:21 am	5 min	0.1035	232754	296	142
UBB- 78	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	11:26 am	5 min	0.1035	84130	296	51.2
UBB- 79	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	11:32 am	5 min	0.1035	344269	296	210
UBB- 81	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	11:37 am	5 min	0.1035	142087	296	86.8
UBB- 82	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	11:46 am	5 min	0.1035	82130	296	50.1
UBB- 83	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	11:51 am	5 min	0.1035	61555	296	37.5
UBB- 84	09/05/91	01:50 pm	09/06/91	10:20 am	09/11/91	11:57 am	5 min	0.1035	1790	296	0.9
UBB- 85	09/05/91	01:50 pm	09/06/91	10:20 am	09/11/91	12:03 pm	5 min	0.1035	12717	296	7.6
UBB- 87	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	12:14 pm	5 min	0.1035	19341	296	11.7
UBB- 88	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	12:20 pm	5 min	0.1035	6864	296	4.0
UBB- 89	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	12:26 pm	5 min	0.1035	1834	296	0.9
UBB- 90	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	12:32 pm	5 min	0.1035	5902	296	3.5
UBB- 91	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	12:59 pm	5 min	0.1035	28663	296	17.5
UBB- 92	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	01:04 pm	5 min	0.1035	43237	296	26.6
UBB- 93	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	01:13 pm	5 min	0.1035	79759	296	49.2
UBB- 94	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	01:19 pm	5 min	0.1035	2098	296	1.1
UBB- 95	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	01:24 pm	5 min	0.1035	4430	296	2.6
UBB- 96	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	01:30 pm	5 min	0.1035	842	296	0.3
UBB- 97	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	01:35 pm	5 min	0.1035	2777	296	1.5
UBB- 98	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	01:40 pm	5 min	0.1035	3776	296	2.2

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

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SCIENTIFIC ANALYSIS, INC.

U.S. EPA LISTED
RADON LABORATORY

SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Bv. VALID TEST RESULTS FOR BEACHES OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBB- 99	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	01:46 pm	5 min	0.1035	6885	296	4.1
UBB- 100	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	01:56 pm	5 min	0.1035	21990	296	13.5
UBB- 111	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	02:05 pm	5 min	0.1035	65003	296	40.4
UBB- 112	09/05/91	01:50 pm	09/06/91	10:05 am	09/11/91	02:10 pm	5 min	0.1035	23959	296	14.8
UBB- 114	09/05/91	01:50 pm	09/06/91	10:05 am	09/11/91	02:22 pm	5 min	0.1035	13649	296	8.4

: All times are local stack times; Flux is given in pCi/Sec-Sq M

NOTE: Number of Flux Measurements = 97; Average flux = 25.2

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Bd. DUPLICATE TEST RESULTS FOR BEACHES OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBB- 10	09/05/91	10:10 am	09/06/91	08:30 am	09/10/91	12:47 pm	5 min	0.1043	8889	286	4.1
UBB- 20	09/05/91	10:25 am	09/06/91	08:30 am	09/10/91	02:04 pm	5 min	0.1043	4722	286	2.1
UBB- 30	09/05/91	10:50 am	09/06/91	08:30 am	09/10/91	12:05 pm	5 min	0.0949	33385	322	17.7
UBB- 40	09/05/91	12:35 pm	09/06/91	09:10 am	09/10/91	01:40 pm	5 min	0.0949	4789	322	2.5
UBB- 50	09/05/91	12:35 pm	09/06/91	09:10 am	09/10/91	02:48 pm	5 min	0.0949	5164	322	2.8
UBB- 60	09/05/91	12:55 pm	09/06/91	09:30 am	09/11/91	08:22 am	5 min	0.1035	495639	296	294
UBB- 70	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	09:30 am	5 min	0.1035	67632	296	40.5
UBB- 74	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	09:59 am	5 min	0.1035	153679	296	92.7
UBB- 76	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	11:15 am	5 min	0.1035	414362	296	253
UBB- 90	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	12:54 pm	5 min	0.1035	5860	296	3.4

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

NOTE: Number of Flux Measurements = 10; Average flux = 71.3

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Bb. BLANK TEST RESULTS FOR BEACHES OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBB- 46	09/05/91	12:35 pm	09/06/91	09:10 am	09/10/91	02:17 pm	5 min	0.0949	369	322	0.0
UBB- 61	09/05/91	12:55 pm	09/06/91	09:30 am	09/11/91	08:28 am	5 min	0.1035	294	296	0.0
UBB- 86	09/05/91	01:50 pm	09/06/91	10:10 am	09/11/91	12:08 pm	5 min	0.1035	308	296	0.0
UBB- 113	09/05/91	01:50 pm	09/06/91	10:05 am	09/11/91	02:16 pm	5 min	0.1035	286	296	0.0
UBB- 120	09/05/91	01:50 pm	09/06/91	10:05 am	09/11/91	02:29 pm	5 min	0.1035	300	296	0.0

: All times are local stack times; Flux is given in pCi/Sec-Sq M

NOTE: Number of Flux Measurements = 5; Average flux = 0.0

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RADON LABORATORY

SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Bi. INVALID TEST RESULTS FOR BEACHES OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	----- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
UBB- 11	09/05/91	10:25 am	09/06/91	08:30 am	09/10/91	pm	5 min	0.1043	0	286	0.0
UBB- 27	09/05/91	10:50 am	09/06/91	08:30 am	09/10/91	11:43 am	5 min	0.0949	15277	322	8.0
UBB- 80	09/05/91	01:20 pm	09/06/91	09:45 am	09/11/91	pm	5 min	0.1035	0	296	0.0

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

NOTE: Number of Flux Measurements = 3; Average flux = 2.7

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Tv. VALID TEST RESULTS FOR TOP OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
BKG- 14	09/08/91	08:10 am	09/09/91	07:10 am	09/12/91	02:53 pm	5 min	0.0951	2597	329	1.0
BKG- 27	09/08/91	08:10 am	09/09/91	07:10 am	09/12/91	02:59 pm	5 min	0.0951	2929	329	1.1
BKG- 38	09/08/91	08:10 am	09/09/91	07:10 am	09/12/91	03:05 pm	5 min	0.0951	2650	329	1.0
BKG- 46	09/05/91	04:00 pm	09/06/91	11:30 am	09/09/91	10:12 am	5 min	0.1042	3086	259	1.2
BKG- 49	09/08/91	08:10 am	09/09/91	07:10 am	09/12/91	03:17 pm	5 min	0.0951	2757	329	1.1
BKG- 53	09/08/91	08:10 am	09/09/91	07:10 am	09/12/91	03:23 pm	5 min	0.0951	2740	329	1.1
BKG- 60	09/08/91	08:10 am	09/09/91	07:10 am	09/12/91	03:29 pm	5 min	0.0951	3084	329	1.2
BKG- 61	09/05/91	04:00 pm	09/06/91	11:30 am	09/09/91	10:19 am	5 min	0.1042	3625	259	1.5
BKG- 71	09/08/91	08:10 am	09/09/91	07:10 am	09/12/91	03:34 pm	5 min	0.0951	2855	329	1.1
BKG- 83	09/08/91	08:10 am	09/09/91	07:10 am	09/12/91	03:41 pm	5 min	0.0951	2287	329	0.9
BKG- 86	09/05/91	04:00 pm	09/06/91	11:30 am	09/09/91	10:25 am	5 min	0.1042	2422	259	0.9
BKG- 113	09/05/91	04:00 pm	09/06/91	11:30 am	09/09/91	10:31 am	5 min	0.1042	2984	259	1.2
BKG- 115	09/05/91	04:00 pm	09/06/91	11:30 am	09/09/91	10:12 am	5 min	0.0950	2514	295	1.0
BKG- 116	09/05/91	04:00 pm	09/06/91	11:30 am	09/09/91	10:19 am	5 min	0.0950	2196	295	0.9
BKG- 117	09/05/91	04:00 pm	09/06/91	11:30 am	09/09/91	10:25 am	5 min	0.0950	2720	295	1.1
BKG- 118	09/05/91	04:00 pm	09/06/91	11:30 am	09/09/91	10:31 am	5 min	0.0950	2669	295	1.1
BKG- 119	09/05/91	04:00 pm	09/06/91	11:30 am	09/09/91	10:38 am	5 min	0.0950	2574	295	1.1
BKG- 120	09/05/91	04:00 pm	09/06/91	11:30 am	09/09/91	10:38 am	5 min	0.1042	2640	259	1.0
BKG- 122	09/08/91	08:10 am	09/09/91	07:10 am	09/12/91	03:47 pm	5 min	0.0951	2905	329	1.1
BKG- 131	09/08/91	08:10 am	09/09/91	07:10 am	09/12/91	03:52 pm	5 min	0.0951	2972	329	1.2

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

NOTE: Number of Flux Measurements = 20; Average flux = 1.1

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SUMMARY OF RADON FLUX COMPUTATIONS

TABLE Td. DUPLICATE TEST RESULTS FOR TOP OF STACK

Scientific Analysis, Inc.; Montgomery, Alabama 36117 09/19/91

Detector	---- On Stack -----		--- Off Stack ----		-- Count Begun ---		Count Len	Counter Eff.	Gross Cnts	Background	Flux
BKG- 120	09/05/91	04:00 pm	09/06/91	11:30 am	09/09/91	10:43 am	5 min	0.1042	2840	259	1.1
BKG- 131	09/08/91	08:10 am	09/09/91	07:10 am	09/12/91	03:58 pm	5 min	0.0951	3014	329	1.2

NOTE: All times are local stack times; Flux is given in pCi/Sec-Sq M

NOTE: Number of Flux Measurements = 2; Average flux = 1.1

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SCIENTIFIC ANALYSIS, INC.

CHAIN OF CUSTODY RECORD

Radon Flux Testing

Job Name: Umetco Cell #2 and Cell #3, Blanding, UT

Samplers (Name and Signature): J. Gunn, L. Davis, T. HORTON
G. HORTON Thomas R. Horton

Sample Locations/Sample ID Numbers (Collector Numbers): 4 Backgrounds
UBB-ØØ1-1ØØ, 111, 112, 114; UBT121-161; UBB113, 12Ø

Sample Type: Exposed Charcoal in Plastic Container

Total Number of Samples: 150

Collection Date: 9/6/91

Relinquished By (Name and Signature): T. HORTON
Thomas R. Horton

Date/Time: 9/6/91 12:00PM to UPS 2nd day Air

Received By (Name and Signature): Faith ann McWhorter
Faith ann McWhorter

Date/Time: 9/10/91 12:00 pm

Relinquished By (Name and Signature):

Date/Time:

Received By (Name and Signature):

Date/Time:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2405

DEC 3 1991

RECEIVED DEC 3 1991 AIR QUALITY

Ref: 8ART-AP

Document Date 12/3/1991
DAQ-1991-001256

Mr. P.K. Willmot, President
Umetco Minerals Corporation
P.O. Box 1029
2754 Compass Drive, Suite 280
Grand Junction, CO 81506

Re: Clean Air Act Section 113
Order for Compliance,
Docket No. CAA-113-91-05

Dear Mr. Willmot:

This is to inform you that our office has found that Umetco Minerals Corporation has complied with the monthly reporting, corrective action and calendar year 1991 radon compliance demonstration requirements of the EPA Compliance Order issued on June 7, 1991.

On September 5-6 and 8-9, 1991, radon flux measurements were performed by Scientific Analysis Inc., on Umetco's White Mesa mill tailings pond (Cell 2) in Utah. Results were calculated by Scientific Analysis Inc. at 15.5 picoCuries per square meter per second (pCi/m^2-sec). A copy of the test report was forwarded to EPA on October 29, 1991, within the October 31 deadline of the Order. Our office has reviewed the report and concludes that compliance with the 40 CFR 61.252 limit of 20 pCi/m^2-sec has been demonstrated.

Umetco is hereby relieved of the corrective action and monthly reporting requirements of the Order. Umetco will be expected to continue to comply with all applicable provisions of 40 CFR Part 61, Subpart W, referenced in the Order, including the ongoing requirements for annual radon testing and reporting.

If you have any followup questions regarding this matter, please contact Mr. Michael Owens of my staff at (303) 293-1756.

Sincerely,

Marshall L. Payne
for Irwin L. Dickstein, Director
Air and Toxics Division

cc: Burnell Cordner, Director
Utah Division of Air Quality