

UNITED NUCLEAR CORPORATION

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Suite 1040

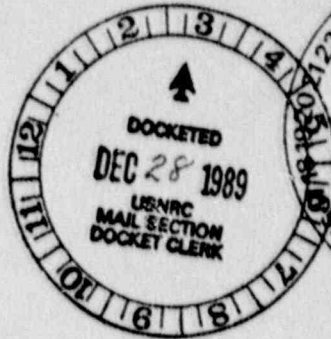
Albuquerque, New Mexico 87110
Telephone 505/883-6901

40-8907

December 21, 1989
UNC-ALO-89-309M

RETURN ORIGINAL TO PDR, HQ.

Mr. Edward Hawkins
US Nuclear Regulatory Commission
Uranium Fuel Recovery Office
Region IV
P.O. Box 25325
Denver, CO 80225



Dear Mr. Hawkins:

Submitted herewith for your consideration are 3 copies of a report titled "Windblown Tailings Cleanup Verification Report". This report is submitted in accordance with License condition No. 33 of License SUA-1475.

In reviewing the report you will note that cleanup of the 5.3 acres identified for cleanup in section 1, TI6N, RI6W is not included. You will recall that section 1 is the area which required Navajo EPA concurrence. Approval from Navajo EPA was received too late in the year to conduct cleanup and has been deferred as explained in our request for license amendment dated October 20, 1989. Recent discussions with Mr. Pete Garcia of your staff indicate the NRC will approve our request for License amendment in the near future.

Sincerely yours,

Juan R. Velasquez
Juan R. Velasquez
President

JRV:lrs

Enclosure

cc: Charles Johnson, w/o enclosure

DESIGNATED ORIGINAL

Certified By Mary C. Ford

DF02
11

90-0184

9002120195 891221
FDR ADOCK 04008907
C PDC

FIGURES 1-3
VERIFICATION REPORT
DECEMBER, 1989

20

pc/gm vs. MR/HR, W/SHIELD

FIGURE 4

(pc/gm)

15

10

5

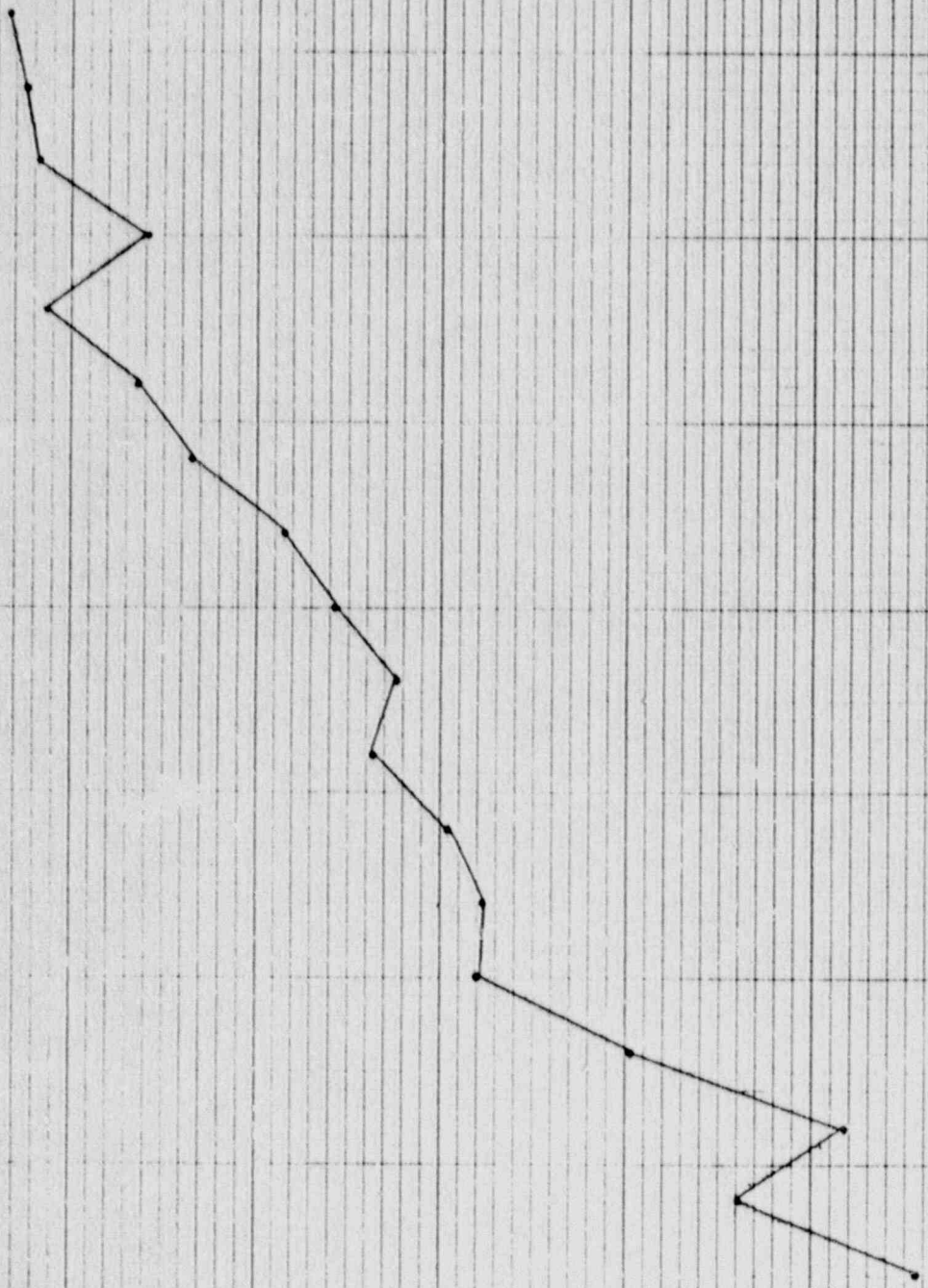
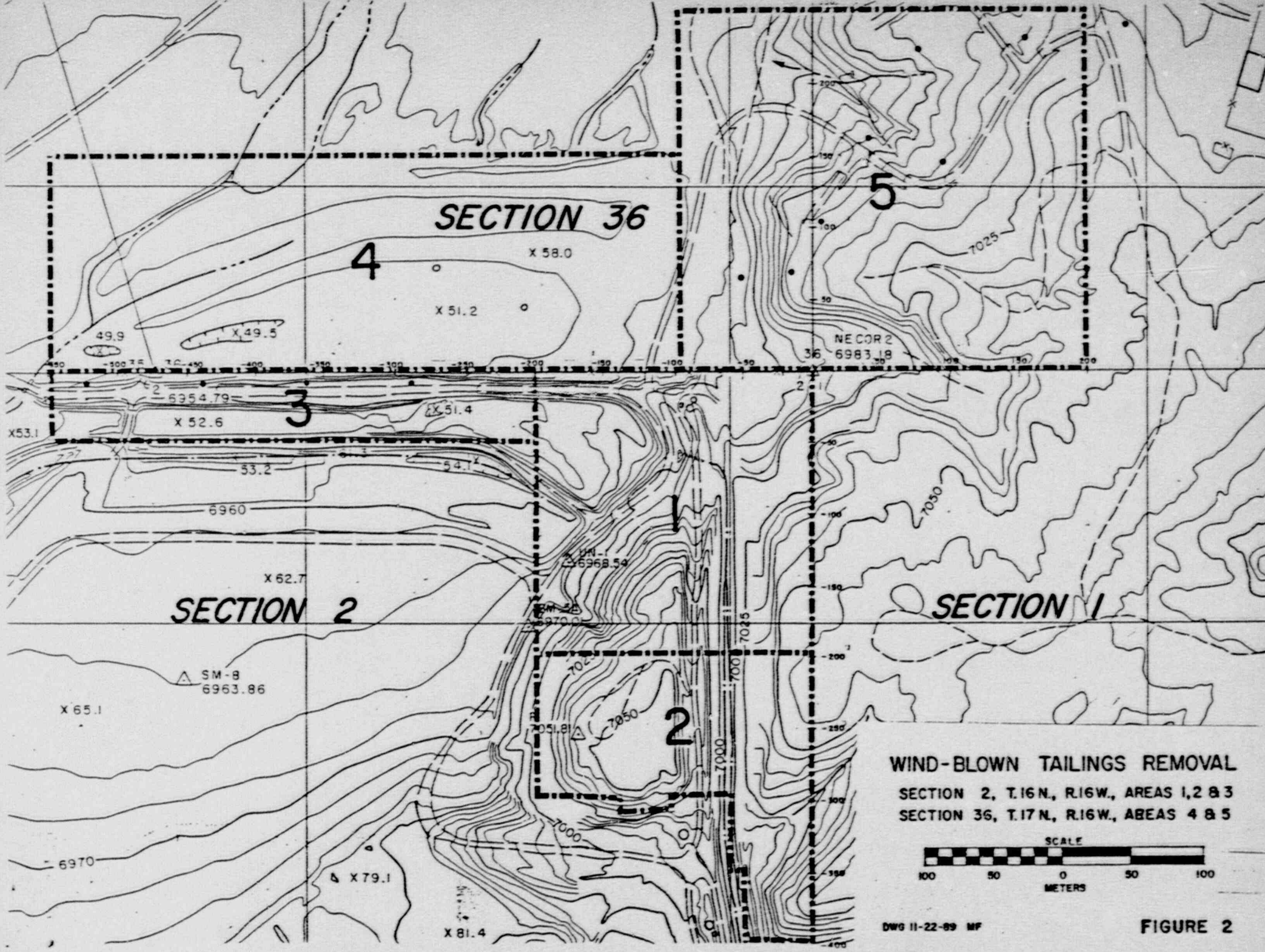


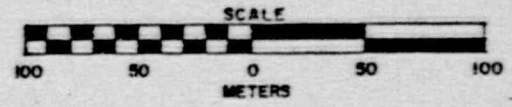
FIGURE 1

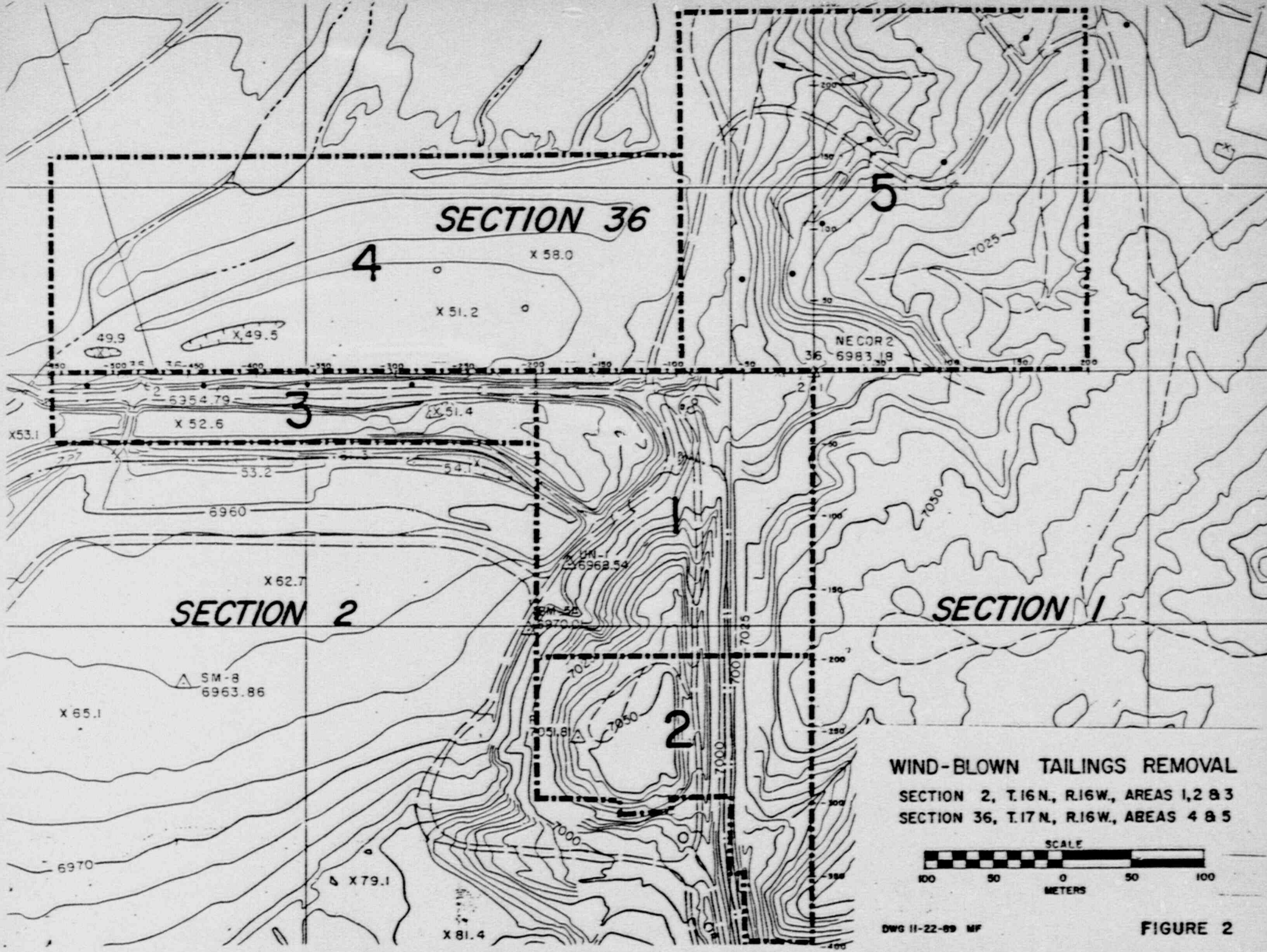


SECTION 36

SECTION 2

WIND-BLOWN TAILINGS REMOVAL
 SECTION 2, T.16N, R.16W., AREAS 1, 2 & 3
 SECTION 36, T.17N, R.16W., AREAS 4 & 5





SECTION 36

SECTION 2

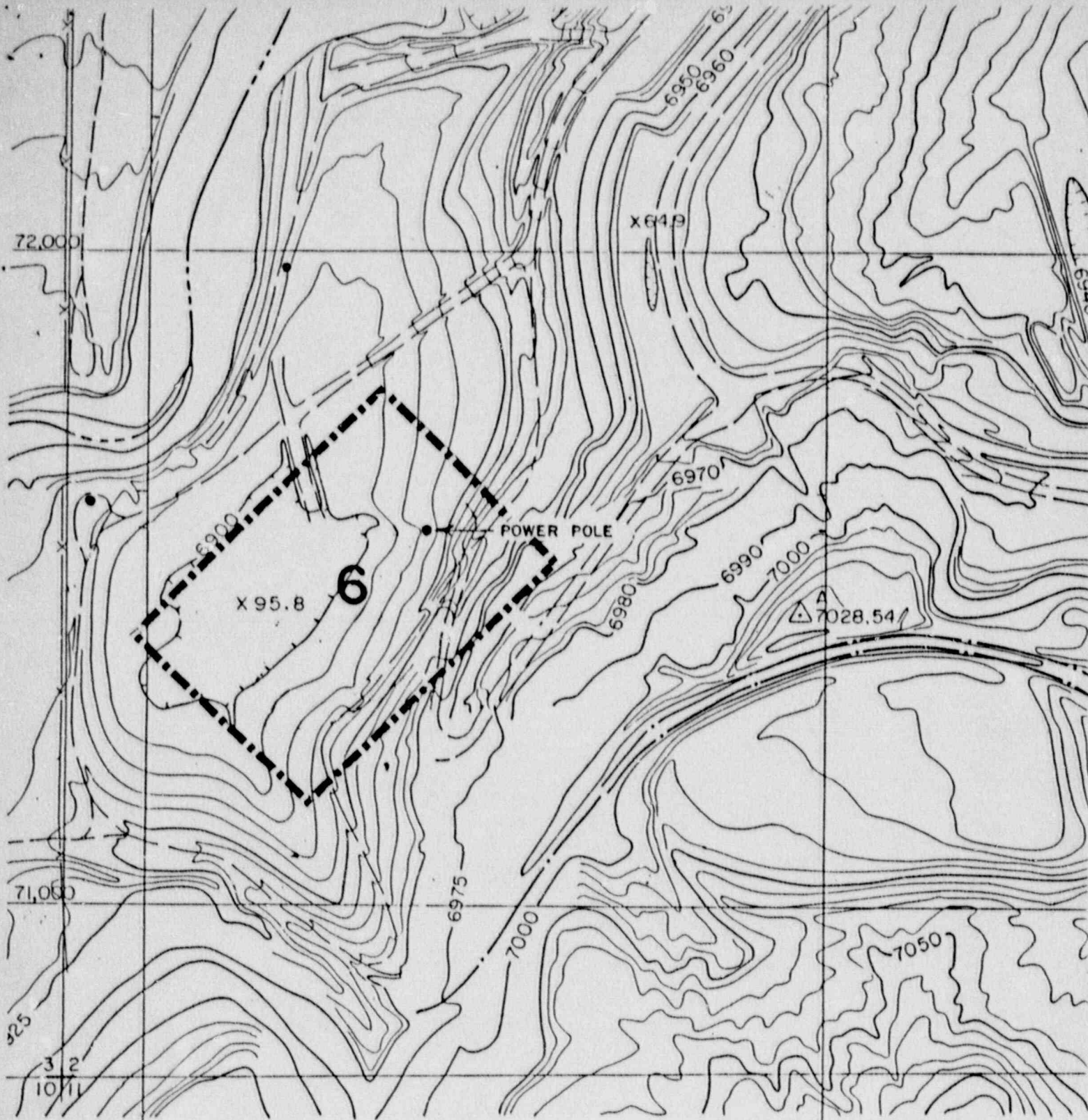
SECTION 1

WIND-BLOWN TAILINGS REMOVAL
SECTION 2, T.16N, R.16W., AREAS 1, 2 & 3
SECTION 36, T.17N, R.16W., AREAS 4 & 5

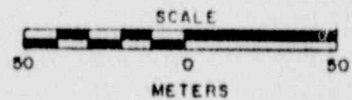
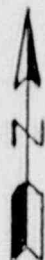


DWG 11-22-89 MF

FIGURE 2



WIND-BLOWN TAILINGS REMOVAL
SECTION 2, T.16N., R.16W. AREA 6



DWG. 12-7-89 M.F.

FIGURE 3

TABLES 1-11
CORRELATION TABLE AND GAMMA READINGS
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DECEMBER, 1989

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TABLE 1

COMPUTATIONS

SUBJECT AVERAGE COORDINATES FOR GRAPH (PCI/gm vs $\mu\text{R}/\text{HR}$ Sheet No. 1 of 1
W/SHIELD) WHICH INCLUDES ALL SOIL SAMPLE ANALYSIS (PCI/gm) Made By MC Date 11-8-89
RESULTS _____ Chkd. By _____ Date _____

$\mu\text{R}/\text{HR}$ W/SHIELD	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	28.0
pci/gm	2.09	2.01	2.20	2.60	1.50	3.40	3.30	3.09	2.10	3.90	6.10	7.07	4.20	8.30	6.60	7.30	13.1	17.6	12.8
	2.18	1.50	1.80	1.50	3.30	2.30	5.08	5.90	6.16	4.60	7.50	5.64	6.40	7.70	13.5	18.6	12.5	10.0	
	1.80	2.40	2.62	2.71	2.58	4.40	3.60	4.90	7.70	3.56	3.80	7.65	5.50	6.60			16.2		
	2.30	2.00	2.56	2.92	1.50	4.82	4.40	4.20	8.10	7.70	9.82	6.38	5.98	13.6			4.30		
	1.30	1.99	2.10	2.04	2.10	2.50	3.00	8.10		6.60	6.29	7.90	8.10	3.80					
	2.30	2.10	1.60	2.66		3.90		6.20		6.60	6.10	7.60	7.60						
	2.30	1.80	1.80	2.46		2.90				6.80		8.00	7.40						
	0.80	2.70	1.51	3.70		3.30				6.20		9.57	11.90						
	0.90	0.90		3.30		3.50				11.50		8.90	12.3						
	1.00			3.72						8.50		7.69	8.60						
				2.80									3.57						
				2.00									15.3						
				8.10															
				7.10															
				3.88															
				4.29															
				4.09															
				3.86															
AVERAGE pci/gm	1.70	1.93	2.02	3.54	2.20	3.45	3.88	5.40	6.62	6.90	6.60	7.64	8.07	8.00	10.05	12.95	11.53	13.80	12.8

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CONTACT
1ST READING - WITH SHIELD
2ND READING - 1 METER
WITHOUT SHIELD

TABLE 2

COMPUTATIONS

SUBJECT REMEDIATION - GAMMA SURVEY IN NE CORNER OF SECTION 2 Sheet No. 1 of 1
WINDBLOWN AREA No. 1. REFER TO MAP OF OUTLINED BOUNDARY AREA Made By ML Date 10-13-89
No. 1 FOR SPECIFIC LOCATION AND COORDINATES. Chkd. By _____ Date _____

SEC. 1

0-0	17/23	14/20	17/30	11/22	17/30	11/23	14/21	13/28	19/28	10/22	14/24	9/19	14/24	12/26	14/26
0-50	14/26	10/22	10/21	12/18	8/20	12/22	11/21	13/22	13/22	7/17	9/20	10/20	14/24	10/20	14/22
0-100	15/24	12/23	13/20	12/22	9/20	10/22	12/22	11/22	10/20	12/22	10/22	11/22	11/22	11/22	8/18
0-150	14/28	11/23	12/21	13/22	8/20	12/22	11/22	10/21	17/26	12/22	10/23	15/25	10/25	12/22	11/22
0-200	16/28	13/24	12/26	10/20	11/22	12/22	12/22	10/20	7/20	13/23	10/22	12/22	12/22	12/22	12/26
0-250	10/29	15/26	14/27	13/23	12/22	11/23	12/27	13/22	10/22	13/22	12/22	12/24	12/22	12/22	12/24
0-300	12/23	10/24	17/21	17/27	15/24	14/26	17/26	15/29	14/34	14/28	13/24	13/23	12/26	12/26	14/30
0-350	13/24	14/26	10/20	12/24	12/26	13/24	12/23	14/28	13/25	13/25	14/26	12/27	14/34	14/28	14/30
0-400	11/22	17/25	10/20	12/20	17/24	11/26	15/26	15/28	13/30	17/34	13/24	14/30	17/32	17/32	14/26
0-450	14/28	12/19	12/23	14/19	9/23	8/24	8/24	14/24	14/28	11/24	14/28	12/28	14/31	13/28	15/32
0-500	13/26	13/20	13/24	17/32	14/26	13/24	15/28	14/24	10/22	12/22	12/24	11/20	10/24	10/22	10/22
0-550	11/22	13/24	14/25	14/22	17/30	13/24	10/22	12/22	12/22	9/24	12/24	11/20	9/19	10/22	10/24
0-600	12/22	9/16	15/32	13/22	17/28	12/26	12/23	17/30	17/30	12/25	12/24	13/24	12/24	10/20	11/24
0-650	12/26	10/22	12/27	13/22	13/30	17/30	17/24	14/22	14/22	12/25	12/24	13/24	12/26	12/22	11/24
0-700	14/17	13/23	17/27	10/21	11/26	11/25	15/26	14/22	10/22	13/24	11/22	10/25	12/27	12/24	12/24
0-750	10/27	10/20	13/24	13/23	11/22	12/24	17/28	14/28	14/28	12/24	10/28	10/25	12/27	14/21	10/22
0-800	14/26	9/16	17/26	17/22	14/21	12/27	8/22	13/22	11/22	12/22	10/28	12/23	14/26	14/26	12/23
0-850	19/30	7/16	14/28	13/24	11/24	14/30	14/24	17/32	12/28	12/30	14/30	13/34	14/30	15/30	15/29
0-900	11/22	9/16	13/26	19/21	11/24	10/20	12/22	14/23	14/23	8/20	12/22	12/23	14/26	14/26	14/29
0-950	10/22	13/26	17/24	14/21	14/21	12/22	12/22	11/22	11/22	12/22	12/22	12/23	14/26	14/26	14/29
0-1000	11/22	13/26	17/24	14/21	14/21	12/22	12/22	11/22	11/22	12/22	12/22	12/23	14/26	14/26	14/29

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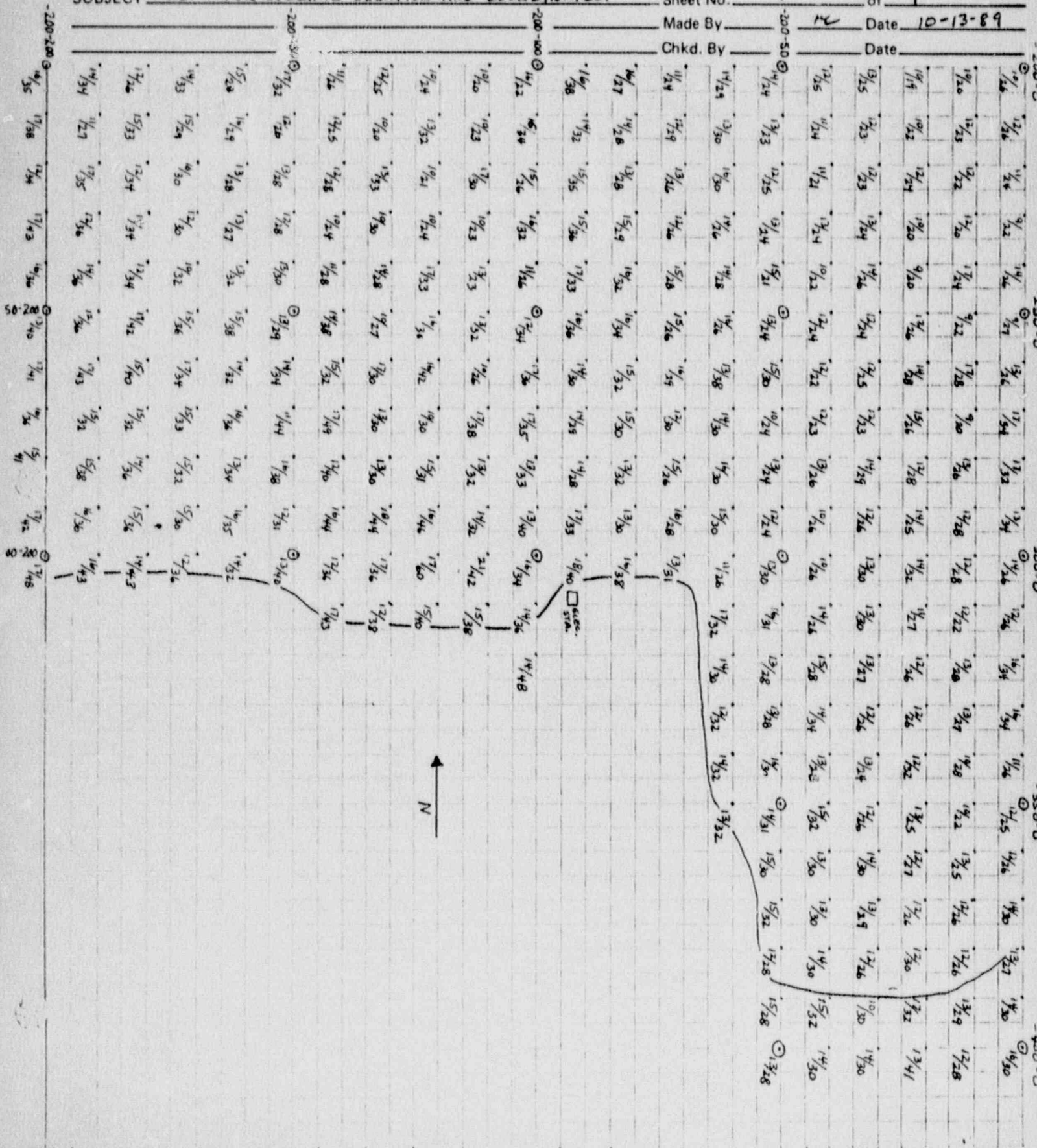
CONTACT
1ST READING - WITH SHIELD
2ND READING - 1 METER
WITHOUT SHIELD

TABLE 3

COMPUTATIONS

REMEDATION - GAMMA SURVEY IN NE CORNER OF SECTION 2
WINDBLOWN AREA NO. 2. REFER TO MAP OF OUTLINED BOUNDARY AREA
SUBJECT NO. 2 FOR SPECIFIC LOCATION AND COORDINATES.

Sheet No. 1 of 1
Made By MC Date 10-13-89
Chkd. By _____ Date _____



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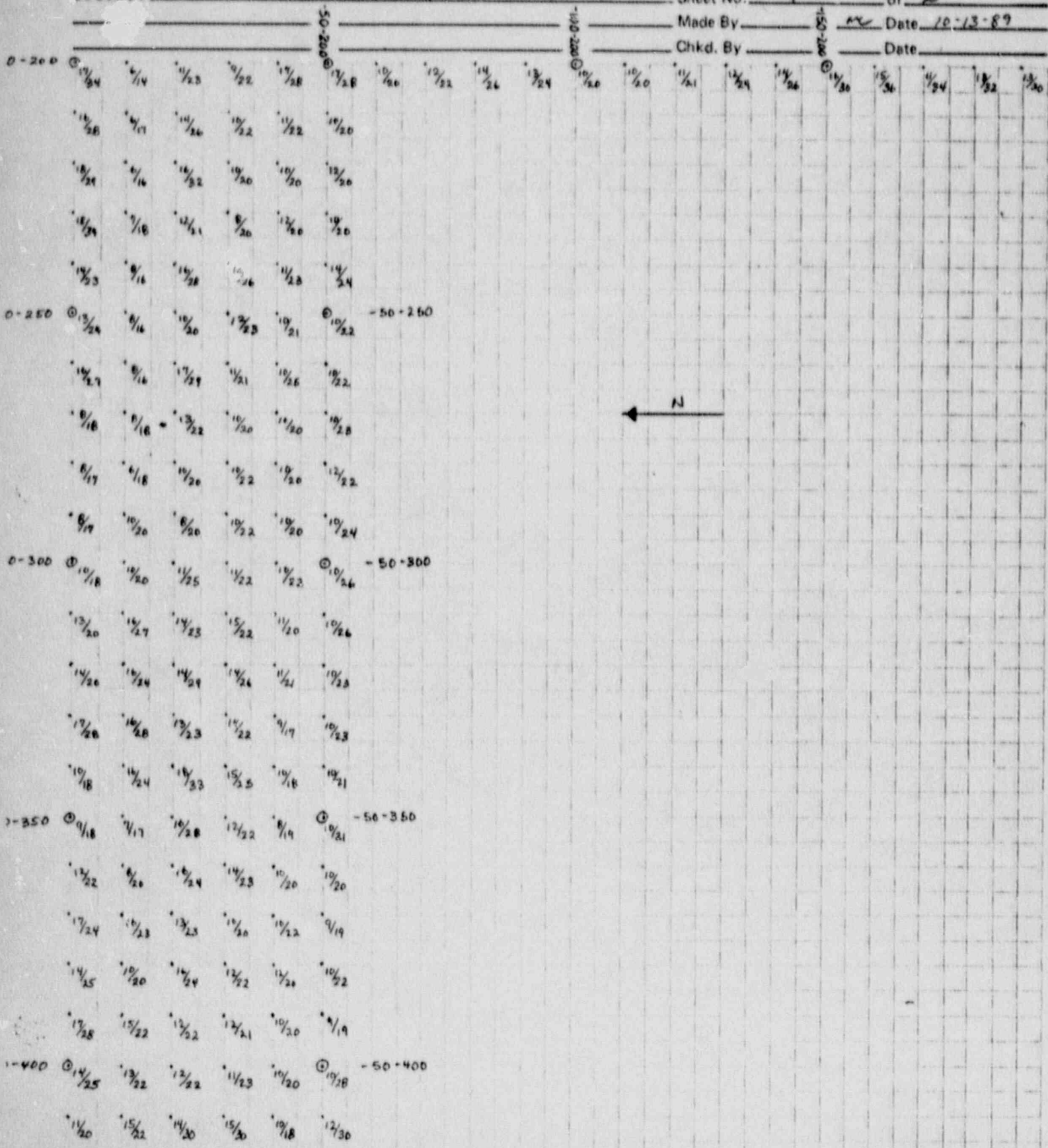
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TABLE 4

CONTACT
1ST READING - WITH SHIELD
2ND READING - 1 METER
COMPUTATIONS WITHOUT SHIELD

REMEDATION - GAMMA SURVEY IN NE CORNER OF SECTION 2
WIND BLOWN AREA NO. 3. REFER TO MAP OF OUTLINED BOUNDARY AREA

SUBJECT NO. 3 FOR SPECIFIC LOCATION AND COORDINATES Sheet No. 1 of 2
Made By MS Date 10-13-89
Chkd. By _____ Date _____



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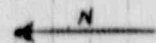


CONTACT
1ST READING - WITH SHIELD
2ND READING - 1 METER
COMPUTATIONS WITHOUT SHIELD

TABLE 5

SUBJECT REMEDIATION - GAMMA SURVEY CONTINUATION IN NE CORNER Sheet No. 2 of 2
OF SECTION 2 WINDBLOWN AREA NO. 3. REFER TO MAP OF OUTLINED Made By MC Date 10-13-89
BOUNDARY AREA NO. 3 FOR SPECIFIC LOCATION AND COORDINATES Chkd. By _____ Date _____

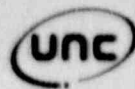
	¹⁵ / ₂₂	¹⁷ / ₂₂	⁹ / ₂₂	¹⁰ / ₂₀	¹¹ / ₂₂	¹² / ₂₇	
	¹⁰ / ₂₀	¹⁴ / ₂₂	⁸ / ₂₄	¹³ / ₂₆	¹⁰ / ₂₃	⁹ / ₂₆	
	¹⁷ / ₂₉	¹⁰ / ₂₂	¹² / ₃₀	¹⁷ / ₃₂	¹⁰ / ₂₃	¹¹ / ₂₇	
0-450	⊙ ¹² / ₂₄	¹⁵ / ₂₄	¹³ / ₂₄	¹³ / ₃₂	¹⁰ / ₂₄	⊙ ⁹ / ₂₅	-50-450
	¹⁴ / ₂₈	¹⁵ / ₂₃	¹² / ₂₂	¹⁹ / ₁₈	¹⁰ / ₂₂	¹² / ₂₄	
sec 26	¹⁴ / ₂₈	¹⁴ / ₂₂	¹¹ / ₂₀	¹² / ₂₄	⁹ / ₂₄	¹⁰ / ₂₄	
sec 25	¹⁴ / ₂₆	¹⁴ / ₂₂	¹² / ₂₂	¹⁰ / ₂₆	¹⁰ / ₂₀	¹⁴ / ₂₅	
	¹⁴ / ₂₈	¹⁴ / ₂₈	¹² / ₂₂	¹⁴ / ₂₃	¹⁷ / ₂₂	¹⁰ / ₂₂	
0-500	⊙ ¹¹ / ₁₈	¹⁵ / ₂₅	¹⁰ / ₂₃	¹³ / ₂₄	¹⁹ / ₃₀	⊙ ⁹ / ₂₆	-50-500
	¹² / ₂₁	¹³ / ₂₂	⁷ / ₁₉	¹⁴ / ₂₄	¹⁰ / ₂₀	¹⁰ / ₂₃	
	¹² / ₂₄	⁷ / ₁₈	¹⁴ / ₂₄	¹¹ / ₂₄	¹¹ / ₂₄	¹⁰ / ₂₂	
	¹³ / ₂₂	⁷ / ₂₀	¹⁴ / ₂₂	¹⁴ / ₂₃	⁹ / ₁₈	¹⁹ / ₂₄	
	¹³ / ₂₃	¹³ / ₂₃	¹² / ₂₁	¹¹ / ₂₄	¹¹ / ₂₄	¹¹ / ₂₄	
0-550	⊙ ¹³ / ₂₂	¹³ / ₂₃	¹⁰ / ₂₄	¹⁴ / ₂₄	¹⁰ / ₂₃	⊙ ⁸ / ₂₂	-50-550



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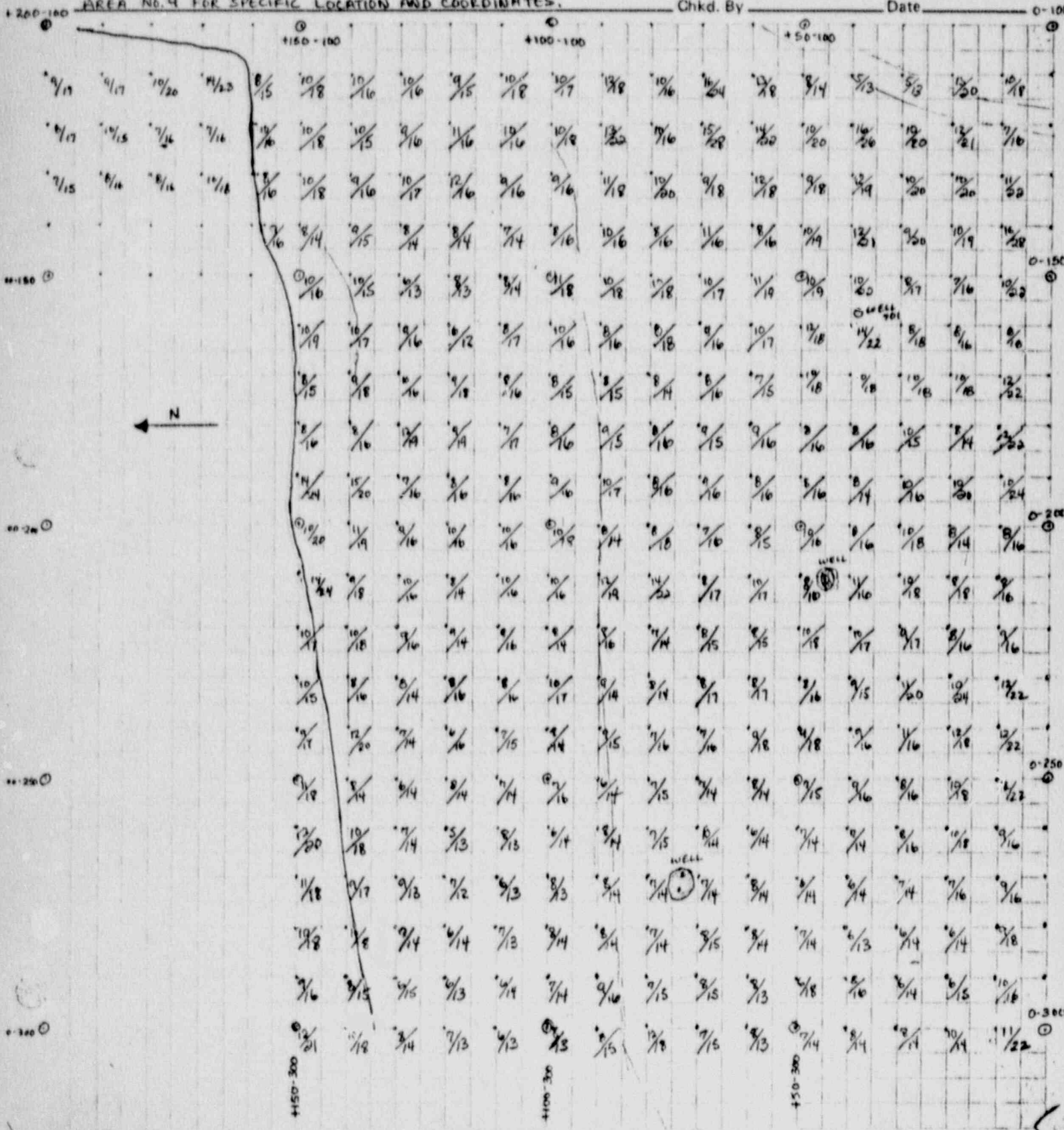
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(505) 265-4421



1ST READING - WITH SHIELD
2ND READING - 1 METER
COMPUTATIONS

TABLE 6

SUBJECT REMEDIATION - GAMMA SURVEY IN SW CORNER OF SECTION 36 Sheet No. 1 of 3
WIND BLOWN AREA NO. 4, REFER TO MAP OF OUTLINED BOUNDARY Made By ML Date 10-13-89
AREA NO. 4 FOR SPECIFIC LOCATION AND COORDINATES. Chkd. By _____ Date _____



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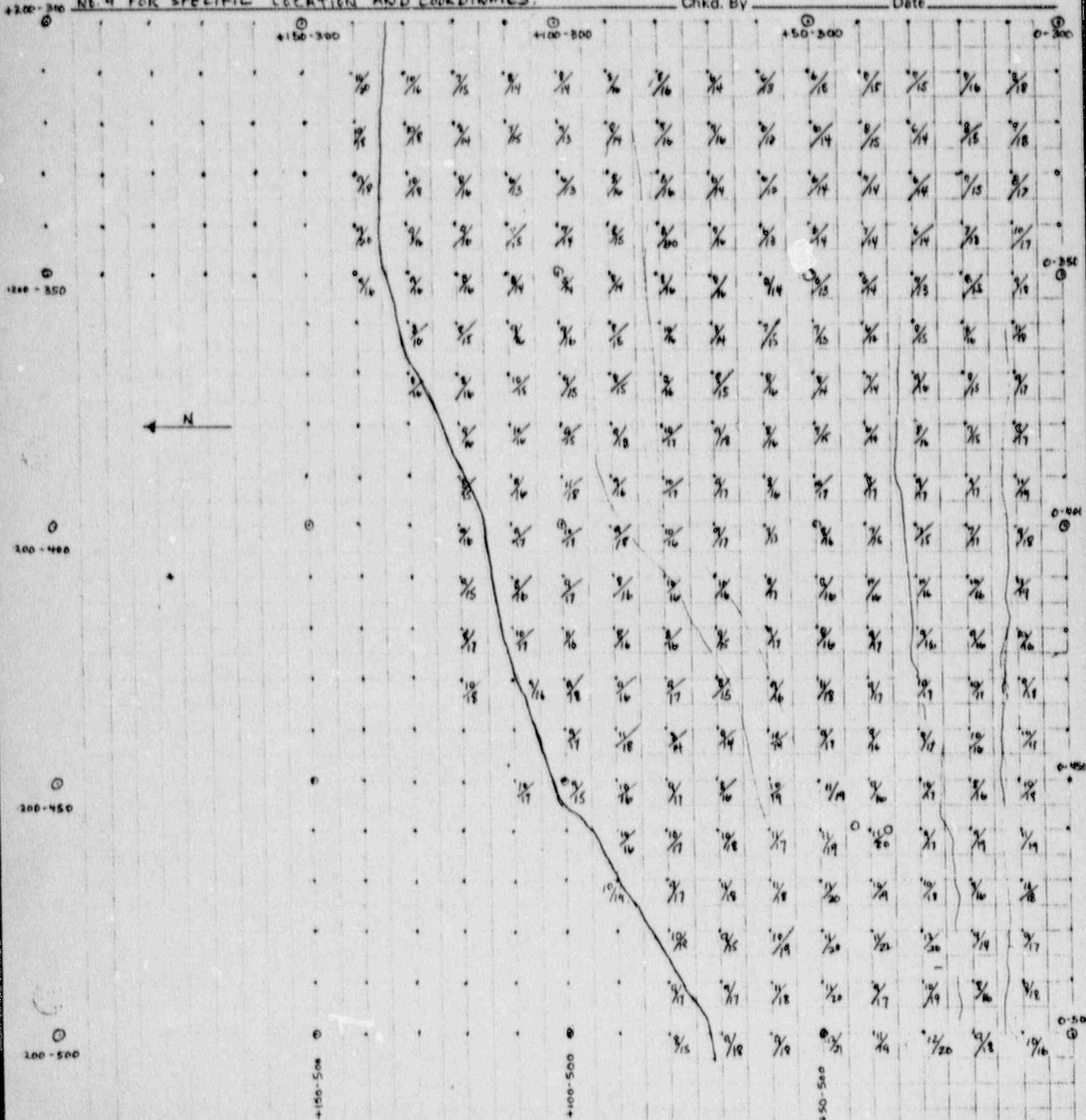
1ST READING - WITH SHIELD
2ND READING - 1 METER
COMPUTATIONS

TABLE 7

SUBJECT REMEDIATION - GAMMA SURVEY IN SW CORNER OF SECTION 36 Sheet No. 2 of 3

WIND BLOWN AREA NO. 4. REFER TO MAP OF OUTLINED BOUNDARY AREA Made By MC Date 10-13-89

NO. 4 FOR SPECIFIC LOCATION AND COORDINATES. Chkd. By _____ Date _____



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1ST READING - WITH SHIELD
2ND READING - 1 METER
COMPUTATIONS

TABLE 8

SUBJECT REMEDIATION - GAMMA SURVEY CONTINUATION IN SW CORNER Sheet No. 3 of 3
OF SECTION 36 WINDBLOWN AREA NO. 4. REFER TO MAP OF OUTLINED Made By MC Date 10-13-89
BOUNDARY AREA NO. 4 FOR SPECIFIC LOCATION AND COORDINATES, Chkd. By _____ Date _____



WINDBLOWN TAILINGS CLEANUP
VERIFICATION REPORT
CHURCHROCK, NM

December, 1989

1.0 Introduction

In accordance with Condition 33 of Material License SUA-1475, United Nuclear Corporation has completed the cleanup of areas contaminated by windblown tailings. This report presents data verifying that the cleanup was conducted in accordance with Criterion 6 of Appendix A to Title 10, Part 40 of the Code of Federal Regulations.

Windblown tailings cleanup is an integral part of the reclamation of the Churchrock tailings facility as presented in the Reclamation Plan of June 1987 and the schedule of activities as presented in Amendment 1 to that plan dated July 1988.

2.0 Areas to be Cleaned

Section 2.0 of the 1987 Reclamation Plan report presents the radiological survey of the Churchrock site and the areas which were affected by windblown tailings. Subsequent work in Sections 1 and 36 have refined this delineation as explained herein.

2.1 Section 1

In accordance with Condition 16 of the license, a radiological survey of the northwest corner of Section 1, T16N, R16W was conducted in 1988. Section 1 is Navajo trust land. The results of this survey were presented to the NRC in a letter dated December 22, 1988. The gamma survey identified that an area of about 15 acres which had been potentially impacted by windblown tailings. Soil analyses however, failed to confirm the gamma readings in the eastern and southeastern portions of the area. UNC decided to perform a detailed and systematic soil sampling and analyses survey in Section 1 to conclusively

delineate areas exceeding Criterion 6 standards. This survey was performed by UNC in 1989 and the results were submitted to the NRC by letter dated May 24, 1989.

An area of approximately five acres in the northwest corner of Section 1 was identified as exceeding the criteria. UNC informed the Navajo Tribe in May regarding Section 1 results and recommended that this area not be cleaned due to the impact such action would have on the vegetation and archaeological sites.

The tribe determined that the cleanup should be performed and notified UNC by letter dated October 20, 1989. The tribe's decision was received after the 1989 interim reclamation work had been completed and the earthwork contractor had demobilized. United Nuclear requested a license amendment on October 26 to extend the completion of the Section 1 cleanup to December 31, 1990. Recent telephone communications with the NRC confirm that the NRC will approve our request. Pending NRC approval, the Section 1 cleanup will be conducted in 1990.

2.2 Delineation of Areas in Sections 2 and 36

The radiological survey contained in the 1987 Reclamation Plan report served as the beginning point for delineation of windblown areas. The detailed soils analyses survey which UNC performed in Section 1 was extended north and west into Section 36 to refine the areas requiring cleanup. A coordinate system was established with the origin or zero-zero point being the northeast corner of Section 2. A grid system was then surveyed at 50 meter intervals in all directions as shown on Figure 2. Grid lines south and west of the origin are labeled as negative distances and grid lines

north and east of the origin are labeled as positive distances. For example, a sample point labeled as 50, -100 would be located 50 meters north and 100 meters west of the northeast corner of Section 2. A composite sample was collected to represent the radium concentration of the soil at the grid point location. The composite was obtained by sampling at the grid point and at the corners of a 10 meter square centered on the 50 meter grid point. These samples were homogenized, oven dried, pulverized, split and sent to the contract laboratory in metal cannisters. Copies of the analytical results are contained in Appendix A. Cleanup targets were then defined based on these results using the exceedence of 6 pCi/g (5+1 background) as the criteria. The determination of a background radium concentration of 1 pCi/g was presented in Section 2.0 of the 1987 Reclamation Plan report.

Some changes were made in the delineated areas relative to those presented in Figure 2 of the 1987 Reclamation Plan as a result of this work. Cleanup was extended further north and east in Section 36 and the small isolated area in the arroyo just northwest of the North Cell was eliminated based on the soil sample results.

3.0 Cleanup Methods

The boundaries of the areas to be cleaned were staked by survey. Trees and large shrubs within these areas were removed using a dozer and transported to the east side of the North Cell where they were burned. Earthmoving equipment was then used to remove at least the upper six inches of soil which was placed into the North Cell as fill during recontouring. In areas of steep topography,

the soil was pushed with a dozer or excavated with a front-end loader into stockpiles which were then trucked to the North Cell. The areas cleaned were then resurveyed. Soil from the few areas which required additional excavation as a result of verification surveys was placed into the southwest corner of Barrow Pit #2. The material placed in Barrow Pit #2 was sprayed with a polymer binder to prevent dispersal by wind. Placement into Barrow Pit #2 was required because the North Cell had been filled to design grade at the time these additional soils were excavated.

4.0 Verification Survey

Verification surveys were conducted after excavation of the soil in the delineated areas. The survey consisted of unshielded, one meter gamma readings, and shielded surface gamma readings. The readings were taken at 10 meter intervals using the surveyed 50 meter grid points as control.

The gamma meter used was a Ludlum Model 19 calibrated by the manufacturer on January 26. The meter was function checked each day prior to use. The shielded surface readings were taken with this meter inside a wooden box lined with lead sheeting. Field checks were made against a Cesium 137 source. Background shielded gamma was determined to be in the range of 8-10 uR/h by taking 14 readings at 50 meter intervals along a north-south line in the southeast quarter of Section 2. This area is identified as Background Area 3 on Figure 2.1 of the Reclamation Plan.

Soil samples were used to develop a correlation of shielded gamma readings to radium concentration in the soil. Soil samples were taken to a depth of 15 cm. The samples were oven dried,

pulverized, blended, split, and sent to the contract laboratory in metal cannisters. Radium analyses were performed by gamma spectroscopy at Radon-222 equilibrium. Checks on the gamma spectroscopy results were performed by the chemical digestion method.

The shielded gamma readings were correlated with soil analyses results as presented in Table 1 and Figure 1. The soil analyses values used to develop the correlation were those determined by gamma spectroscopy at Rn-222 equilibrium (Method 2 on lab reports). The lab reports are attached as Appendix B.

In examining Figure 1 it was recognized that three different relationships existed. At the background level of gamma (8-10 uR/h) there was no correlation. Above background a correlation existed, but the relationship changes above 20 uR/h. The correlation was developed for the range of 11 uR/h to 20 uR/h. In this range the least squares correlation coefficient is +0.70. The relationship is:

$$\text{Ra-226 pCi/g} = 0.58 \text{ uR/h} - 3$$

so that 6 pCi/g Ra-226 in the soil correlates with a shielded gamma reading of 16 uR/h.

It was found that the unshielded one meter gamma readings were not reliable in areas near the tailings due to radioactive shine from this source. In areas away from the tailings, there appeared to be an approximate correlation of 30 uR/h unshielded with 6 pCi/g of Ra-226 in the underlying soil. Unshielded readings were not used for control of additional excavation.

Once the initial soil removal in an area was completed, shielded gamma readings were taken at 10 meter intervals. Additional soil was excavated at grid points where the shielded gamma readings were 18 uR/h or higher. The area was surveyed again and additional soil

was excavated until the average shielded gamma reading at the grid point and its eight adjacent grid points was 16 uR/h or less.

Tables 2 through 11 present the final gamma readings in the areas cleaned. The Tables should be referenced to Figures 2 and 3. The shielded and unshielded gamma readings at each 10 meter grid point are plotted. The 50 meter surveyed points are circled and labeled. The 50 meter grid was not extended south to Area 6. A power pole adjacent to the area cleaned was used as a reference for the shielded gamma readings.

9002126195-01

S1 APERTURE CARD

Also Available On Aperture Card



UNC MINING AND MILLING

CHURCHROCK MINE
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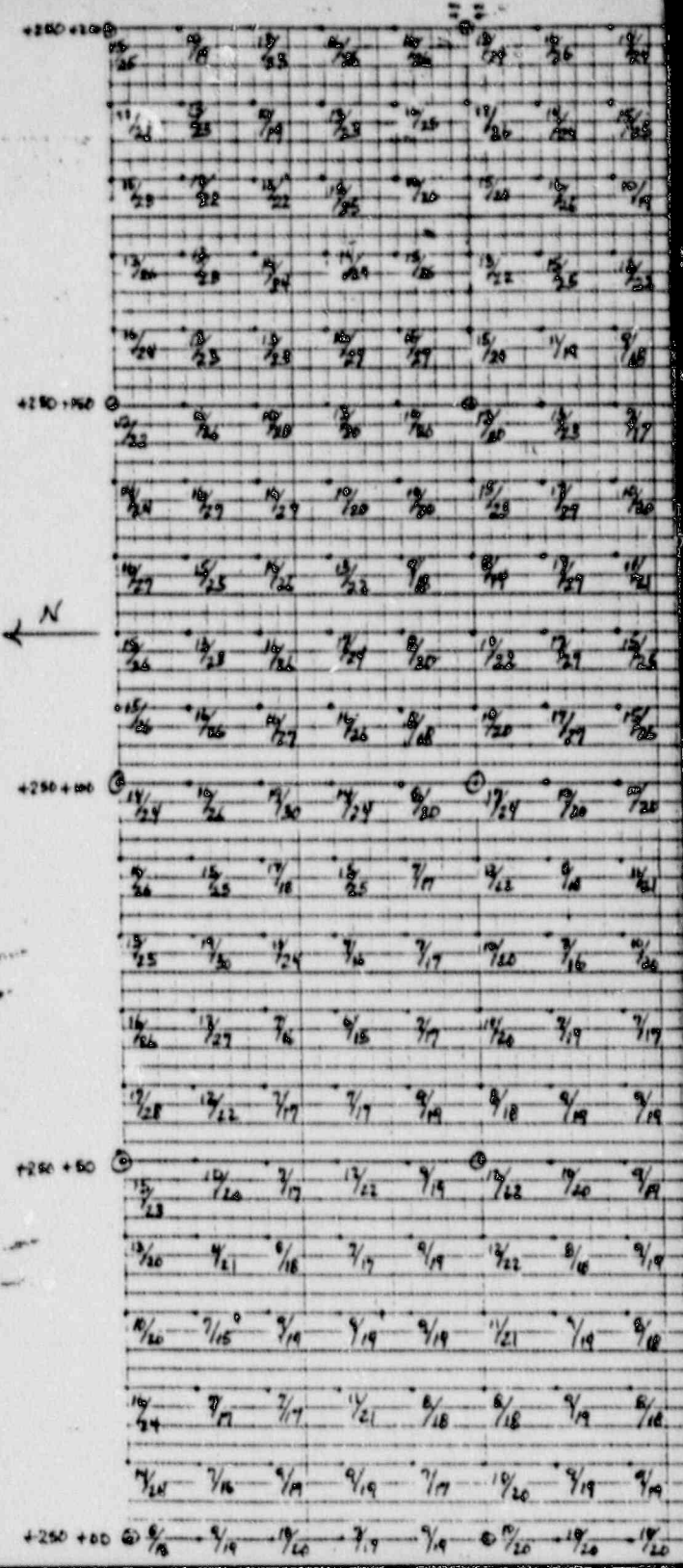
P.O. BOX 3951
ALBUQUERQUE, NEW MEXICO 87190
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1ST READING - CONTACT WITH SHIELD
2ND READING - 1 METER WITHOUT SHIELD

COMPUTATIONS

TABLE 9

SUBJECT REMEDIATION-GAMMA SURVEY IN S.W. CORNER OF SECTION 36, Sheet No. 1 of 2
WIND-BLOWN AREA No. 5, REFER TO MAP OF OUTLINED BOUNDARY Made By [Signature] Date 6-15-89
AREA No. 5 FOR SPECIFIC LOCATION AND COORDINATES Chkd. By [Signature] Date



Handwritten table with 20 rows and 20 columns of numerical entries, likely representing a grid of data points or measurements. The entries are mostly fractions and integers.

1/23	19/29	9/19	10/21	9/19	7/20	9/20	10/20	7/23	11/21	9/18	10/20	10/22	11/21	11/21	10/21	10/20	10/20	10/20	10/20
8/20	13/23	8/15	7/16	6/15	7/19	7/17	7/16	7/23	24/20	11/22	4/18	10/20	11/21	7/20	13/20	13/20	13/20	13/20	13/20
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10/20	7/16	7/17	7/16	7/17	9/18	7/19	7/19	7/22	9/20	9/20	9/20	13/25	7/19	15/25	13/20	14/27	14/22	14/22	14/22
8/20	9/18	9/20	7/17	11/21	7/16	7/19	7/17	7/19	7/16	7/17	9/19	10/20	11/21	7/25	13/24	14/27	14/27	14/27	14/27
9/18	7/16	10/19	10/20	8/18	9/19	7/16	7/18	7/17	9/19	7/17	9/15	13/22	14/24	14/27	10/20	13/22	13/22	13/22	13/22
10/20	15/25	10/20	10/20	9/17	9/18	7/16	10/20	7/17	9/16	8/18	8/16	10/20	10/20	14/24	14/20	14/24	14/24	14/24	14/24
10/24	14/29	10/20	10/20	8/16	8/20	8/20	10/23	7/17	7/16	7/19	7/19	8/18	8/18	9/18	14/28	14/20	14/20	14/20	14/20
11/21	10/20	10/20	10/20	10/20	10/20	10/20	10/20	7/19	7/16	8/16	7/16	8/18	10/20	8/18	9/16	10/20	14/24	14/24	14/24
7/27	13/25	10/20	10/20	10/20	10/20	10/20	10/16	8/18	8/16	7/17	7/19	8/18	7/19	8/18	10/20	14/28	14/28	14/28	14/28
7/19	10/19	24/26	11/21	7/19	13/22	13/22	10/18	7/17	9/19	7/15	9/19	11/21	9/19	7/19	17/25	10/20	14/29	14/29	14/29
10/20	7/19	13/22	14/21	13/23	14/24	8/18	8/18	7/16	7/19	7/16	7/19	13/28	13/25	13/25	14/24	14/22	14/22	14/22	14/22
8/20	13/23	14/21	9/22	7/28	9/19	9/19	9/18	9/19	7/16	8/18	14/21	13/22	13/23	13/28	13/22	14/22	14/22	14/22	14/24
9/19	8/18	13/22	13/25	15/25	13/22	7/17	9/15	7/16	7/15	8/15	7/19	10/20	13/25	14/22	10/20	16/26	15/25	15/25	15/25
9/19	9/19	10/20	14/21	14/21	9/19	8/16	7/17	8/18	7/16	7/17	8/18	10/20	13/22	12/22	14/26	13/22	13/22	13/22	13/22
8/18	8/18	11/16	7/17	10/20	7/16	7/19	9/18	20/25	7/16	7/16	7/17	10/20	14/24	10/20	10/20	14/22	14/24	14/24	14/24
8/20	13/23	14/22	7/19	12/22	9/19	7/17	14/21	7/15	7/15	10/20	7/17	10/20	11/21	13/22	15/25	14/22	14/22	14/22	14/22
11/21	13/23	17/22	10/20	10/20	7/17	7/17	14/21	9/19	10/20	9/19	7/17	14/21	9/19	13/22	14/26	14/22	14/22	14/22	14/24
10/19	13/22	10/20	14/24	7/22	9/18	7/16	14/21	8/18	9/19	8/18	7/17	10/20	14/20	10/20	14/22	14/22	14/21	14/21	14/21
7/22	9/18	7/20	13/29	14/24	8/18	7/16	9/18	7/17	7/17	10/20	7/17	14/22	14/20	14/21	14/23	14/23	14/23	14/23	14/24
10/20	7/19	10/20	14/20	14/24	10/20	7/15	10/20	8/18	7/17	13/22	9/15	13/22	14/20	13/22	12/22	14/22	14/22	14/22	14/22

Vertical text on the right edge of the page, possibly a page number or reference code, including the number '100' at the top and '100' at the bottom.

8/18	9/18	10/20	11/22	12/24	1/26	2/28	3/30	4/1	5/3	6/5	7/7	8/9	9/11	10/13	11/15	12/17	1/19	2/21	3/23
3/20	4/20	5/18	6/19	7/22	8/19	9/23	10/20	11/23	12/25	1/22	2/26	3/23	4/27	5/24	6/28	7/25	8/29	9/26	10/30
10/26	11/26	12/26	1/26	2/26	3/23	4/22	5/22	6/22	7/22	8/22	9/21	10/17	11/24	12/19	1/24	2/19	3/24	4/20	5/20
9/26	8/18	11/27	9/26	8/26	7/17	8/26	9/24	8/25	7/29	8/23	9/23	10/20	11/26	12/26	1/21	2/19	3/22	4/20	5/20
1/22	2/22	3/20	4/20	5/22	6/22	7/28	8/25	9/23	10/22	11/19	12/24	1/21	2/29	3/24	4/23	5/22	6/22	7/26	8/26
12/22	1/19	2/28	3/22	4/22	5/20	6/23	7/26	8/25	9/29	10/28	11/22	12/24	1/26	2/22	3/25	4/29	5/26	6/22	7/22
1/22	2/18	3/20	4/18	5/29	6/22	7/26	8/23	9/24	10/22	11/22	12/20	1/18	2/22	3/25	4/22	5/26	6/26	7/26	8/29
8/18	9/26	12/21	1/26	2/22	3/28	4/24	5/26	6/28	7/24	8/28	9/26	10/17	11/18	12/14	1/18	2/24	3/18	4/24	5/22
9/20	10/24	11/21	12/26	1/26	2/26	3/24	4/24	5/20	6/19	7/29	8/22	9/22	10/18	11/22	12/29	1/28	2/20	3/20	4/29
5/22	6/21	7/20	8/22	9/22	10/25	11/17	12/20	1/29	2/26	3/26	4/26	5/25	6/22	7/25	8/22	9/26	10/20	11/22	12/29

001-0514

001-0411

001-0314

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KODAK SAFETY FILM

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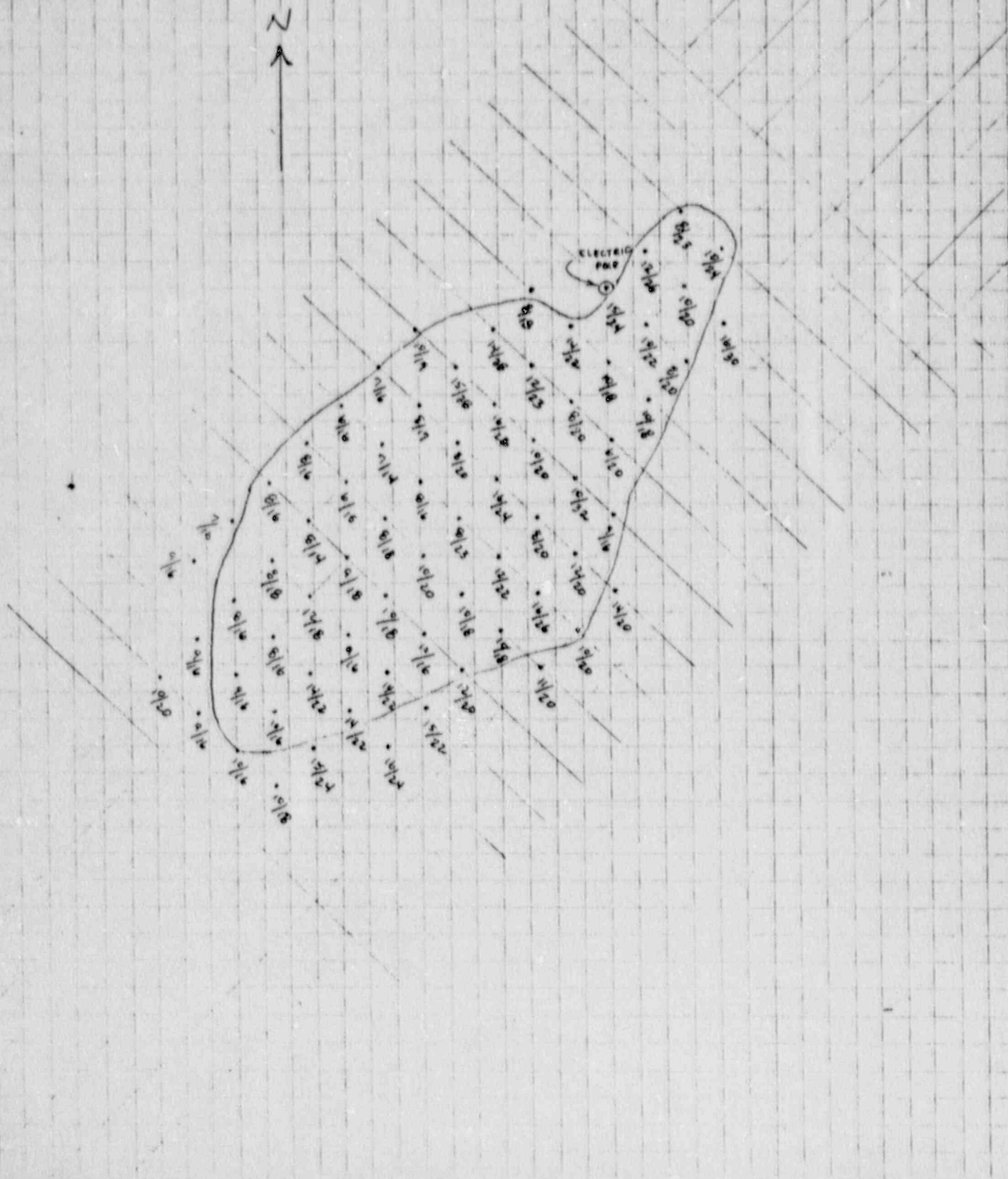
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1ST READING - WITH SHIELD (CONTACT)
2ND READING - 2 METER WITHOUT SHIELD

TABLE 31

COMPUTATIONS

SUBJECT REMEDIATION - GAMMA SURVEY IN S.W. CORNER OF SECTION 2 Sheet No. 1 of 1
NEAR BASE OF DAM AREA NO. 6. REFER TO MAP OF OUTLINED Made By mc Date 7-17-69
BOUNDARY AREA NO. 6 FOR SPECIFIC LOCATION, EACH READING IS 10 Chkd. By _____ Date _____
METERS APART.



APPENDIX A
DELINEATION SAMPLE RESULTS
VERIFICATION REPORT
DECEMBER, 1989

UNC MINING & MILLING - NEW MEXICO OPERATIONS

RADIOCHEMICAL SOIL ANALYSIS
MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Sample I.D.	450-20	4100-20	4150-20	+50+0	+100+0	+150+0	+50+50
Section	36	36	36	36	36	36	36
Sample Date	3-14-89	3-14-89	3-14-89	3-14-89	3-14-89	3-14-89	3-14-89
Sample #	89-2812	89-2813	89-2814	89-2815	89-2816	89-2817	89-2818
Ra-226 *1	6.50	8.09	8.16	9.02	12.25	13.81	12.36
precision +/-	0.65	0.78	0.78	0.85	1.08	1.22	1.09
Ra-226 *2	7.06	6.18	6.67	5.99	8.88	8.79	10.99
precision +/-	0.80	0.73	0.76	0.71	0.92	0.96	1.07
Ra-226 *3	N/A	N/A	4.30	N/A	N/A	7.60	N/A
precision +/-	N/A	N/A	0.20	N/A	N/A	0.20	N/A

Report Date: 04-26-89

Purchase Order #: EW-10-3-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *P.A. Leasing*
Energy Laboratories, Inc.
Casper, Wyoming 82602

UNC MINING & MILLING - NEW MEXICO OPERATIONS

RADIOCHEMICAL SOIL ANALYSIS
MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Sample I.D.	+100+50	+150+50	+50+100	+100+100	+150+100	+50+150	+100+150
Section	36	36	36	36	36	36	36
Sample Date	3-17-89	3-17-89	3-17-89	3-17-89	3-17-89	3-17-89	3-17-89
Sample #	89-2894	89-2895	89-2896	89-2897	89-2898	89-2899	89-2900
Ra-226 *1	9.51	8.80	8.05	12.06	8.53	26.39	12.22
precision +/-	0.91	0.85	0.80	1.11	0.84	1.92	1.14
Ra-226 *2	6.02	6.59	6.63	4.59	4.44	4.22	10.32
precision +/-	0.71	0.76	0.77	0.59	0.57	0.54	1.06
Ra-226 *3	N/A	N/A	N/A	3.20	N/A	3.00	N/A
precision +/-	N/A	N/A	N/A	0.10	N/A	0.10	N/A

Sample I.D.	+150+150	+50+200	+100+200	+150+200
Section	36	36	36	36
Sample Date	3-17-89	3-17-89	3-17-89	3-17-89
Sample #	89-2901	89-2902	89-2903	89-2904
Ra-226 *1	9.72	5.71	6.57	6.16
precision +/-	0.93	0.60	0.67	0.64
Ra-226 *2	7.91	3.72	4.30	3.25
precision +/-	0.87	0.49	0.56	0.45
Ra-226 *3	N/A	4.20	N/A	N/A
precision +/-	N/A	0.10	N/A	N/A

Report Date: 04-26-89

Purchase Order #: EW-11-3-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *A. C. Leasing*
Energy Laboratories, Inc.
Casper, Wyoming 82602

UNC MINING & MILLING - NEW MEXICO OPERATIONS

RADIOCHEMICAL SOIL ANALYSIS
MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Sample I.D.	+150-50	+150-100	+200-50	+200-100	+200+0	+200+50	+200+100
Section	36	36	36	36	36	36	36
Sample Date	04-19-89	04-19-89	04-19-89	04-19-89	04-19-89	04-20-89	04-20-89
Sample #	89-5073	89-5074	89-5075	89-5076	89-5077	89-5078	89-5079
Ra-226 *1	7.67	5.22	10.31	8.69	7.23	7.07	4.77
precision +/-	0.53	0.39	0.65	0.59	0.49	0.49	0.35
Ra-226 *2	6.02	5.03	7.82	7.97	6.10	6.39	5.48
precision +/-	0.42	0.37	0.51	0.53	0.42	0.44	0.39
Ra-226 *3	5.6	N/A	8.7	N/A	N/A	5.3	N/A
precision +/-	0.6	N/A	0.8	N/A	N/A	0.6	N/A

Sample I.D.	+200+150	+200+200	+250-100	+250-50	+250+0	+250+50	+250+100
Section	36	36	36	36	36	36	36
Sample Date	04-20-89	04-20-89	04-21-89	04-21-89	04-21-89	04-21-89	04-21-89
Sample #	89-5080	89-5081	89-5082	89-5083	89-5084	89-5085	89-5086
Ra-226 *1	4.35	4.99	2.65	6.33	6.12	4.45	4.78
precision +/-	0.33	0.36	0.21	0.45	0.44	0.33	0.35
Ra-226 *2	6.15	4.31	2.31	6.16	4.99	4.77	3.98
precision +/-	0.42	0.31	0.19	0.42	0.36	0.34	0.29
Ra-226 *3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
precision +/-	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Sample I.D.	+250+150	+250+200
Section	36	36
Sample Date	04-21-89	04-21-89
Sample #	89-5087	89-5088
Ra-226 *1	6.11	5.00
precision +/-	0.44	0.37
Ra-226 *2	5.12	5.10
precision +/-	0.37	0.36
Ra-226 *3	N/A	N/A
precision +/-	N/A	N/A

Report Date: 05-25-89
Purchase Order #: EW-17-4-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *A. Carling*
Energy Laboratories, Inc.
Casper, Wyoming 82602

UNC MINING & MILLING - NEW MEXICO OPERATIONS

RADIOCHEMICAL SOIL ANALYSIS
MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Sample I.D.	+150-150	+150-200	+200-150	+200-200
Section	36	36	36	36
Sample Date	05-04-89	05-04-89	05-04-89	05-04-89
Sample #	89-5373	89-5374	89-5375	89-5376
Ra-226 *1	5.30	2.10	4.23	2.33
precision +/-	0.35	0.15	0.29	0.17
Ra-226 *2	4.30	2.30	3.90	1.90
precision +/-	0.30	0.20	0.30	0.10
Ra-226 *3	2.30	N/A	N/A	N/A
precision +/-	0.10	N/A	N/A	N/A

Report Date: 05-30-89
Purchase Order #: EW-19-5-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *S.A. Leasing*
Energy Laboratories, Inc.
Casper, Wyoming 82602

UNC MINING & MILLING - NEW MEXICO OPERATIONS

RADIOCHEMICAL SOIL ANALYSIS
MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Sample I.D.	-107-640	-148-677	-184-710	-222-740
Section	2	2	2	2
Sample Date	3-22-89	3-22-89	3-22-89	3-22-89
Sample #	89-2936	89-2937	89-2938	89-2939
Ra-226 *1	4.89	3.41	9.01	8.64
precision +/-	0.52	0.39	0.90	0.87
Ra-226 *2	3.72	2.95	4.52	4.33
precision +/-	0.41	0.32	0.45	0.43
Ra-226 *3	2.10	2.40	3.60	2.90
precision +/-	0.10	0.10	0.10	0.10

Report Date: 04-26-89
Purchase Order #: EW-13-3-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *A. A. ...*
Energy Laboratories, Inc.
Casper, Wyoming 82602

APPENDIX B
CORRELATION SAMPLE RESULTS
VERIFICATION REPORT
DECEMBER, 1989

AREA # 1

UNC MINING & MILLING - NEW MEXICO OPERATIONS

RADIOCHEMICAL SOIL ANALYSIS
MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Section 2

Sample I.D.	-20-30	-40-40	-90-03	-90-10	-140-10	-120-40	-170-20
Location	1A	1A	2A	2A	3A	3A	4A
Sample Date	07-25-89	07-25-89	07-25-89	07-25-89	07-26-89	07-26-89	07-26-89
Sample #	89-11491	89-11492	89-11493	89-11494	89-11495	89-11496	89-11497

Ra-226 *1							
precision +/-							
Ra-226 *2	8.00	2.71	6.29	1.99	2.09	7.07	2.18
precision +/-	0.50	0.20	0.40	0.20	0.20	0.40	0.20
Ra-226 *3			5.80				
precision +/-			0.20				

Sample I.D.	-160-30	-230-0	-240-10	-250-10	-270-10	-330-10	-340-10
Location	4A	5A	5A	1B	1B	2B	2B
Sample Date	07-26-89	07-26-89	07-26-89	07-26-89	07-26-89	07-27-89	07-27-89
Sample #	89-11498	89-11499	89-11500	89-11501	89-11502	89-11503	89-11504

Ra-226 *1							
precision +/-							
Ra-226 *2	6.16	1.51	9.82	2.56	7.69	9.57	3.88
precision +/-	0.40	0.10	0.60	0.20	0.50	0.60	0.30
Ra-226 *3					7.20		
precision +/-					0.20		

Sample I.D.	-350-10	-350-40
Location	3B	3B
Sample Date	07-27-89	07-27-89
Sample #	89-11505	89-11506

Ra-226 *1		
precision +/-		
Ra-226 *2	2.92	5.64
precision +/-	0.20	0.40
Ra-226 *3		
precision +/-		

Report Date: 08-21-89
Purchase Order #: EW-26-8-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *P.A. Leaking*
Energy Laboratories, Inc.
Casper, Wyoming 82602



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UNC MINING & MILLING - NEW MEXICO OPERATIONS

RADIOCHEMICAL SOIL ANALYSIS
MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Section 2

Sample I.D.	-250-140	-290-140	-220-130	-200-120	-50-140	-50-130	-130-140
Location	11B	11B	15A	15A	12A	12A	13A
Sample Date	08-02-89	08-02-89	08-02-89	08-02-89	08-03-89	08-03-89	08-03-89
Sample #	89-11564	89-11565	89-11566	89-11567	89-11568	89-11569	89-11570
Ra-226 *1						<i>Resampled</i>	<i>Resampled</i>
precision +/-						7.65	9.52
Ra-226 *2	3.09	3.56	5.08	2.04	2.66	0.70	0.80
precision +/-	0.30	0.40	0.50	0.20	0.30		
Ra-226 *3							
precision +/-							

Sample I.D.	-140-110	-170-110	-180-130	-230-160	-200-180	-190-150	-150-180
Location	13A	14A	14A	16A	16A	17A	17A
Sample Date	08-03-89	08-03-89	08-03-89	08-04-89	08-04-89	08-04-89	08-04-89
Sample #	89-11571	89-11572	89-11573	89-11574	89-11575	89-11576	89-11577
Ra-226 *1			<i>Resampled</i>				
precision +/-			11.83	6.38	4.82	2.46	3.75
Ra-226 *2	4.29	2.62	0.90	0.60	0.50	0.30	0.40
precision +/-	0.50	0.30		5.30			
Ra-226 *3				0.10			
precision +/-							

Sample I.D.	-270-150	-270-180	-30-140	-20-130
Location	20B	20B	11A	11A
Sample Date	08-04-89	08-04-89	08-04-89	08-04-89
Sample #	89-11578	89-11579	89-11580	89-11581
Ra-226 *1			<i>Resampled</i>	
precision +/-			15.45	4.09
Ra-226 *2	2.58	5.98	1.00	0.40
precision +/-	0.20	0.60		
Ra-226 *3		5.20		
precision +/-		0.10		

Report Date: 08-29-89
Purchase Order #: EW-27-8-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *E.A. Locking*
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RADIOCHEMICAL SOIL ANALYSIS
MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Section 2 & 36

Sample I.D.	-50-130	-130-140	-180-130	-30-150	-30-140	-30-250
Location	12A	13A	14A	20A	11A	30A
Sample Date	10-11-89	10-11-89	10-11-89	10-11-89	10-11-89	10-12-89
Sample #	89-17973	89-17974	89-17975	89-17976	89-17977	89-17978

Ra-226 #1						
precision +/-						
Ra-226 #2	3.9	2.8	2.9	4.9	3.6	3.3
precision +/-	0.3	0.2	0.2	0.3	0.2	0.2
Ra-226 #3						
precision +/-						

Sample I.D.	-20-330	-01-450	-20-350	⁵⁰⁻⁵⁴ +150-200	0-400	-10-510
Location	1H	20H	10H	13H	11H	21H
Sample Date	10-12-89	10-12-89	10-12-89	10-13-89	10-13-89	10-13-89
Sample #	89-17979	89-17980	89-17981	89-17982	89-17983	89-17984

Ra-226 #1						
precision +/-						
Ra-226 #2	4.4	3.5	6.6	2.0	4.2	3.0
precision +/-	0.3	0.2	0.4	0.1	0.3	0.2
Ra-226 #3						
precision +/-						

Report Date: 10-29-89
Purchase Order #: EW-31-10-89

- #1 Analyses performed by quick turnaround gamma spectroscopy
- #2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- #3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *L.A. Leasing*
Energy Laboratories, Inc.
Casper, Wyoming 82602



UNC MINING & MILLING - NEW MEXICO OPERATIONS
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 MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Section 2

Sample I.D.	-30-140	-50-130	-180-130	-130-140	-30-150	-40-190	-40-200
Location	11A	12A	14A	13A	20A	20A	21A
Sample Date	08-04-89	08-04-89	08-04-89	08-04-89	09-06-89	09-06-89	09-06-89
Sample #	89-12086	89-12087	89-12088	89-12089	89-12090	89-12091	89-12092

Ra-226 *1							
precision +/-							
Ra-226 *2	15.3	9.0	11.5	8.6	8.9	3.3	6.1
precision +/-	0.8	0.5	0.6	0.5	0.5	0.2	0.4
Ra-226 *3							
precision +/-							0.1

Sample I.D.	-30-200	-30-270	-30-250	-40-330	-20-330	-20-350	-40-350
Location	21A	30A	30A	1H	1H	10H	10H
Sample Date	09-06-89	09-06-89	09-06-89	09-06-89	09-06-89	09-06-89	09-06-89
Sample #	89-12093	89-12094	89-12095	89-12096	89-12097	89-12098	89-12099

Ra-226 *1							
precision +/-							
Ra-226 *2	1.8	1.1	8.5	2.2	7.5	8.1	2.1
precision +/-	0.1	0.1	0.5	0.2	0.5	0.5	0.2
Ra-226 *3							
precision +/-							

Sample I.D.	-40-400	0-400	-40-480	-01-450	-10-510	-40-530
Location	11H	11H	20H	20H	21H	21H
Sample Date	09-06-89	09-06-89	09-06-89	09-06-89	09-06-89	09-06-89
Sample #	89-12100	89-12101	89-12102	89-12103	89-12104	89-12105

Ra-226 *1						
precision +/-						
Ra-226 *2	3.7	7.9	3.3	7.7	8.1	3.7
precision +/-	0.3	0.5	0.2	0.5	0.5	0.3
Ra-226 *3						
precision +/-						

Report Date: 11-03-89
 Purchase Order #: EW-28-9-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *A. Leasing*
 Energy Laboratories, Inc.
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AREA # 2

UNC MINING & MILLING - NEW MEXICO OPERATIONS
RADIOCHEMICAL SOIL ANALYSIS
MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Section 2

Sample I.D.	-250-140	-290-140	-220-130	-200-120	-50-140	-50-130	-130-140
Location	11B	11B	15A	15A	12A	12A	13A
Sample Date	08-02-89	08-02-89	08-02-89	08-02-89	08-03-89	08-03-89	08-03-89
Sample #	89-11564	89-11565	89-11566	89-11567	89-11568	89-11569	89-11570

Ra-226 *1							
precision +/-							
Ra-226 *2	3.09	3.56	5.08	2.04	2.66	7.65	9.52
precision +/-	0.30	0.40	0.50	0.20	0.30	0.70	0.80
Ra-226 *3							
precision +/-							

Sample I.D.	-140-110	-170-110	-180-130	-230-160	-200-180	-190-150	-150-180
Location	13A	14A	14A	16A	16A	17A	17A
Sample Date	08-03-89	08-03-89	08-03-89	08-04-89	08-04-89	08-04-89	08-04-89
Sample #	89-11571	89-11572	89-11573	89-11574	89-11575	89-11576	89-11577

Ra-226 *1							
precision +/-							
Ra-226 *2	4.29	2.62	11.83	6.38	4.82	2.46	3.75
precision +/-	0.50	0.30	0.90	0.60	0.50	0.30	0.40
Ra-226 *3				5.30			
precision +/-				0.10			

Sample I.D.	-270-150	-270-180	-30-140	-20-130
Location	20B	20B	11A	11A
Sample Date	08-04-89	08-04-89	08-04-89	08-04-89
Sample #	89-11578	89-11579	89-11580	89-11581

Ra-226 *1				
precision +/-				
Ra-226 *2	2.58	5.98	15.45	4.09
precision +/-	0.20	0.60	1.00	0.40
Ra-226 *3		5.20		
precision +/-		0.10		

Report Date: 08-29-89
Purchase Order #: EW-27-8-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *EA. Locking*
Energy Laboratories, Inc.
Casper, Wyoming 82602

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Section 2

Sample I.D.	-20-30	-40-40	-90-03	-90-10	-140-10	-120-40	-170-20
Location	1A	1A	2A	2A	3A	3A	4A
Sample Date	07-25-89	07-25-89	07-25-89	07-25-89	07-26-89	07-26-89	07-26-89
Sample #	89-11491	89-11492	89-11493	89-11494	89-11495	89-11496	89-11497

Ra-226 #1							
precision +/-							
Ra-226 #2	8.00	2.71	6.29	1.99	2.09	7.07	2.18
precision +/-	0.50	0.20	0.40	0.20	0.20	0.40	0.20
Ra-226 #3			5.80				
precision +/-			0.20				

Sample I.D.	-160-30	-230-0	-240-10	-250-10	-270-10	-330-10	-340-10
Location	4A	5A	5A	1B	1B	2B	2B
Sample Date	07-26-89	07-26-89	07-26-89	07-26-89	07-26-89	07-27-89	07-27-89
Sample #	89-11498	89-11499	89-11500	89-11501	89-11502	89-11503	89-11504

Ra-226 #1							
precision +/-							
Ra-226 #2	6.16	1.51	9.82	2.56	7.69	9.57	3.88
precision +/-	0.40	0.10	0.60	0.20	0.50	0.60	0.30
Ra-226 #3					7.20		
precision +/-					0.20		

Sample I.D.	-350-10	-350-40
Location	3B	3B
Sample Date	07-27-89	07-27-89
Sample #	89-11505	89-11506

Ra-226 #1		
precision +/-		
Ra-226 #2	2.92	5.64
precision +/-	0.20	0.40
Ra-226 #3		
precision +/-		

Report Date: 08-21-89
Purchase Order #: EW-26-8-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *S.A. Leaking*
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AREA # 3

UNC MINING & MILLING - NEW MEXICO OPERATIONS

RADIOCHEMICAL SOIL ANALYSIS
MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Section 2

Sample I.D.	-30-140	-50-130	-180-130	-130-140	-30-150	-40-190	-40-200
Location	11A	12A	14A	13A	20A	20A	21A
Sample Date	08-04-89	08-04-89	08-04-89	08-04-89	09-06-89	09-06-89	09-06-89
Sample #	89-12086	89-12087	89-12088	89-12089	89-12090 <i>Resampled</i>	89-12091	89-12092
Ra-226 *1 precision +/-							
Ra-226 *2 precision +/-	15.3	9.0	11.5	8.6	8.9	3.3	6.1
Ra-226 *3 precision +/-	0.8	0.5	0.6	0.5	0.5	0.2	0.4

Sample I.D.	-30-200	-30-270	-30-250	-40-330	-20-330	-20-350	-40-350
Location	21A	30A	30A	1H	1H	10H	10H
Sample Date	09-06-89	09-06-89	09-06-89	09-06-89	09-06-89	09-06-89	09-06-89
Sample #	89-12093	89-12094	89-12095	89-12096	89-12097	89-12098	89-12099
Ra-226 *1 precision +/-			<i>Resampled</i>		<i>Resampled</i>	<i>Resampled</i>	
Ra-226 *2 precision +/-	1.8	1.1	8.5	2.2	7.5	8.1	2.1
Ra-226 *3 precision +/-	0.1	0.1	0.5	0.2	0.5	0.5	0.2

Sample I.D.	-40-400	0-400	-40-480	-01-450	-10-510	-40-530
Location	11H	11H	20H	20H	21H	21H
Sample Date	09-06-89	09-06-89	09-06-89	09-06-89	09-06-89	09-06-89
Sample #	89-12100	89-12101	89-12102	89-12103	89-12104	89-12105
Ra-226 *1 precision +/-		<i>Resampled</i>		<i>Resampled</i>	<i>Resampled</i>	
Ra-226 *2 precision +/-	3.7	7.9	3.3	7.7	8.1	3.7
Ra-226 *3 precision +/-	0.3	0.5	0.2	0.5	0.5	0.3

Report Date: 11-03-89
Purchase Order #: EW-28-9-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Ra-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *A. Harding*
Energy Laboratories, Inc.
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MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Section 2 & 36

Sample I.D.	-50-130	-130-140	-180-130	-30-150	-30-140	-30-250
Location	12A	13A	14A	20A	11A	30A
Sample Date	10-11-89	10-11-89	10-11-89	10-11-89	10-11-89	10-12-89
Sample #	89-17973	89-17974	89-17975	89-17976	89-17977	89-17978

Ra-226 *1 precision +/-						
Ra-226 *2 precision +/-	3.9	2.8	2.9	4.9	3.6	3.3
Ra-226 *3 precision +/-	0.3	0.2	0.2	0.3	0.2	0.2

Sample I.D.	-20-330	-01-450	-20-350	+150-200	0-400	-10-510
Location	1H	20H	10H	13H	11H	21H
Sample Date	10-12-89	10-12-89	11-28-89	10-13-89	10-13-89	10-13-89
Sample #	89-17979	89-17980	89-17981	89-17982	89-17983	89-17984

Ra-226 *1 precision +/-						
Ra-226 *2 precision +/-	4.4	3.5	6.6	2.0	4.2	3.0
Ra-226 *3 precision +/-	0.3	0.2	0.4	0.1	0.3	0.2

Report Date: 10-29-89
Purchase Order #: EW-31-10-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *R.A. Leasing*
Energy Laboratories, Inc.
Casper, Wyoming 82602

AREA #4

UNC MINING & MILLING - NEW MEXICO OPERATIONS
RADIOCHEMICAL SOIL ANALYSIS
MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Section 36

Sample I.D.	+90-100	+100-150	+150-200	+40-160	+10-230	+10-300	+100-300
Location	4H	7H	13H	15H	16H	25H	27H
Sample Date	09-08-89	09-08-89	09-08-89	09-08-89	09-08-89	09-08-89	09-08-89
Sample #	89-12106	89-12107	89-12108	89-12109	89-12110	89-12111	89-12112
Ra-226 #1			<i>Reanalyzed</i>				
precision +/-	5.9	1.5	8.1	6.2	2.5	2.1	0.9
Ra-226 #2			0.5	0.5	0.2	0.2	0.1
precision +/-	0.4	0.1		4.4			
Ra-226 #3				0.1			
precision +/-	4.6						
	0.1						

Sample I.D.	+60-350	+50-450	+20-570	CORRECTION SEC 35 +20-520
Location	4I	15I	16I	
Sample Date	09-08-89	09-08-89	09-08-89	
Sample #	89-12113	89-12114	89-12115	
Ra-226 #1				
precision +/-	1.8	2.7	3.8	
Ra-226 #2				
precision +/-	0.1	0.2	0.3	
Ra-226 #3				
precision +/-				

Report Date: 11-03-89
Purchase Order #: EW-28-9-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *E.A. Kailing*
Energy Laboratories, Inc.
Casper, Wyoming 82602



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UNC MINING & MILLING - NEW MEXICO OPERATIONS

RADIOCHEMICAL SOIL ANALYSIS
MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Section 2 & 36

Sample I.D.	-50-130	-130-140	-180-130	-30-150	-30-140	-30-250
Location	12A	13A	14A	20A	11A	30A
Sample Date	10-11-89	10-11-89	10-11-89	10-11-89	10-11-89	10-12-89
Sample #	89-17973	89-17974	89-17975	89-17976	89-17977	89-17978

Ra-226 *1 precision +/-						
Ra-226 *2	3.9	2.8	2.9	4.9	3.6	3.3
precision +/-	0.3	0.2	0.2	0.3	0.2	0.2
Ra-226 *3						
precision +/-						

Sample I.D.	-20-330	-01-450	-20-350	^{sec. 36} +150-200	0-400	-10-510
Location	1H	20H	10H	13H	11H	21H
Sample Date	10-12-89	10-12-89	11-28-89	10-13-89	10-13-89	10-13-89
Sample #	89-17979	89-17980	89-17981	89-17982	89-17983	89-17984

Ra-226 *1 precision +/-						
Ra-226 *2	4.4	3.5	6.6	2.0	4.2	3.0
precision +/-	0.3	0.2	0.4	0.1	0.3	0.2
Ra-226 *3			3.8			
precision +/-			0.1			

Report Date: 10-29-89
Purchase Order #: EW-31-10-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *R.A. Leach*
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Casper, Wyoming 82602



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AREA #5

UNC MINING & MILLING - NEW MEXICO OPERATIONS

RADIOCHEMICAL SOIL ANALYSIS
MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Section 36

Sample I.D.	+210+190	+250+160	+190+160	+200+190	+150+160	+140+200	+70+180
Location	1	1	2	2	3	3	4
Sample Date	06-20-89	06-20-89	06-20-89	06-20-89	06-20-89	06-20-89	06-20-89
Sample #	89-7933	89-7934	89-7935	89-7936	89-7937	89-7938	89-7939
Ra-226 *1	14.6	6.4	4.4	7.8	3.2	3.2	8.2
precision +/-	1.1	0.7	0.5	0.8	0.4	0.4	0.8
Ra-226 *2	13.5	4.2	3.9	6.4	1.8	2.6	6.6
precision +/-	1.0	0.5	0.4	0.6	0.2	0.3	0.6
Ra-226 *3	N/A	N/A	N/A	6.7	N/A	N/A	7.8
precision +/-	N/A	N/A	N/A	0.3	N/A	N/A	0.2

Sample I.D.	+80+190	+10+190	+20+180	+130+140	+120+140	+180+110	+200+140
Section	4	5	5	8	8	9	9
Sample Date	06-20-89	06-20-89	06-20-89	06-20-89	06-20-89	06-20-89	06-20-89
Sample #	89-7940	89-7941	89-7942	89-7943	89-7944	89-7945	89-7946
Ra-226 *1	21.5	8.7	5.6	1.5	1.9	4.0	10.3
precision +/-	1.4	0.8	0.6	0.2	0.2	0.5	0.9
Ra-226 *2	17.6	7.6	3.8	1.8	1.5	2.1	7.6
precision +/-	1.2	0.7	0.4	0.2	0.2	0.3	0.7
Ra-226 *3	N/A	8.0	N/A	N/A	N/A	N/A	N/A
precision +/-	N/A	0.3	N/A	N/A	N/A	N/A	N/A

Report Date: 08-08-89

Purchase Order #: EW-22-6-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *AA. Kailing*
 Energy Laboratories, Inc.
 Casper, Wyoming 82602

UNC MINING & MILLING - NEW MEXICO OPERATIONS

RADIOCHEMICAL SOIL ANALYSIS
MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Section 36

Sample I.D.	+210+110	+210+150	+230+80	+230+100
Location	10	10	11	11
Sample Date	06-20-89	06-20-89	06-20-89	06-20-89
Sample #	89-7947	89-7948	89-7949	89-7950
Ra-226 *1	8.2	4.9	2.7	6.9
precision +/-	0.8	0.5	0.3	0.7
Ra-226 *2	7.3	4.6	1.5	5.5
precision +/-	0.7	0.5	0.2	0.6
Ra-226 *3	N/A	N/A	N/A	N/A
precision +/-	N/A	N/A	N/A	N/A

Report Date: 07-13-89

Purchase Order #: EW-22-6-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *P.A. Sealing*
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Casper, Wyoming 82602

UNC MINING & MILLING - NEW MEXICO OPERATIONS

RADIOCHEMICAL SOIL ANALYSIS
MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Section 36

Sample I.D.	+140-0	+110-20	+100-20	+70-20	+10-30	+50-20	+20-60
Location	23	23	24	24	25	25	26
Sample Date	06-28-89	06-28-89	06-28-89	06-28-89	06-28-89	06-28-89	06-28-89
Sample #	89-8114	89-8115	89-8116	89-8117	89-8118	89-8119	89-8120
Ra-226 *1	16.1	15.6	8.0	14.5	4.3	10.0	22.9
precision +/-	1.2	1.1	0.8	1.1	0.5	0.9	1.4
Ra-226 *2	13.1	12.3	7.7	12.5	4.4	9.2	18.6
precision +/-	0.7	0.7	0.5	0.7	0.3	0.6	0.9
Ra-226 *3	N/A	N/A	7.7	N/A	4.3	N/A	N/A
precision +/-	N/A	N/A	0.1	N/A	0.1	N/A	N/A

Sample I.D.	+0-50	+140-80	+100-40	+90-100
Location	26	28	27	27
Sample Date	06-28-89	06-28-89	06-28-89	06-28-89
Sample #	89-8121	89-8122	89-8123	89-8124
Ra-226 *1	5.2	20.2	20.1	16.6
precision +/-	0.6	1.4	1.4	1.3
Ra-226 *2	4.3	16.2	17.9	12.8
precision +/-	0.3	0.8	0.9	0.7
Ra-226 *3	5.4	N/A	N/A	N/A
precision +/-	0.3	N/A	N/A	N/A

Report Date: 08-08-89

Purchase Order #: EW-24-6-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

QUALITY ASSURANCE MANAGER: *P.A. Leasing*
Energy Laboratories, Inc.
Casper, Wyoming 82602



UNC MINING & MILLING - NEW MEXICO OPERATIONS
 RADIOCHEMICAL SOIL ANALYSIS
 MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Section 36

Sample I.D.	+40+150	+10+130	+100+110	+80+120	+170+100	Arroyo	+150+100
Location	6	6	7	7	12	12	13
Sample Date	06-21-89	06-21-89	06-21-89	06-21-89	06-21-89	06-21-89	06-21-89
Sample #	89-7980	89-7981	89-7982	89-7983	89-7984	89-7985	89-7986
Ra-226 *1	5.2	8.7	10.2	2.9	2.2	4.6	9.8
precision +/-	0.4	0.6	0.6	0.2	0.2	0.3	0.6
Ra-226 *2	3.8	6.2	8.1	2.0	2.3	3.6	6.6
precision +/-	0.4	0.6	0.7	0.3	0.3	0.4	0.7
Ra-226 *3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
precision +/-	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Sample I.D.	+110+60	+70+100	+60+80	+90+40	+90+50	+120+20	+120+50
Section	13	14	14	17	17	18	18
Sample Date	06-21-89	06-21-89	06-21-89	06-21-89	06-21-89	06-21-89	06-21-89
Sample #	89-7987	89-7988	89-7989	89-7990	89-7991	89-7992	89-7993
Ra-226 *1	2.0	1.7	4.6	4.0	15.1	14.1	2.3
precision +/-	0.2	0.1	0.3	0.3	0.8	0.8	0.2
Ra-226 *2	2.4	1.3	3.4	0.9	13.6	11.9	2.3
precision +/-	0.3	0.2	0.4	0.1	1.0	0.9	0.3
Ra-226 *3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
precision +/-	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Report Date: 07-13-89
 Purchase Order #: EW-23-6-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

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UNC MINING & MILLING - NEW MEXICO OPERATIONS

RADIOCHEMICAL SOIL ANALYSIS
MILL DECOMMISSIONING & DECONTAMINATION PROGRAM

Section. 36

Sample I.D.	+170+20	+180+20	+250+50	+240+30	0+60	+20+90	+50+30
Location	19	19	20	20	15	15	16
Sample Date	06-21-89	06-21-89	06-21-89	06-21-89	06-22-89	06-22-89	06-22-89
Sample #	89-7994	89-7995	89-7996	89-7997	89-7998	89-7999	89-8000
Ra-226 *1	8.2	3.5	7.9	2.9	2.4	12.6	10.9
precision +/-	0.5	0.3	0.5	0.2	0.2	0.7	0.7
Ra-226 *2	7.1	2.0	6.6	2.3	2.3	10.0	7.4
precision +/-	0.7	0.3	0.6	0.3	0.3	0.9	0.7
Ra-226 *3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
precision +/-	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Sample I.D.	+20+50	+240-40	+210-40	+200-40	+160-10	+200-50	+190-80
Section	16	21	21	22	22	29	29
Sample Date	06-22-89	06-22-89	06-22-89	06-22-89	06-22-89	06-22-89	06-22-89
Sample #	89-8001	89-8002	89-8003	89-8004	89-8005	89-8006	89-8007
Ra-226 *1	3.4	2.8	4.3	8.9	1.9	10.3	3.0
precision +/-	0.3	0.2	0.3	0.6	0.2	0.6	0.2
Ra-226 *2	1.5	0.8	3.3	6.8	1.6	8.3	2.1
precision +/-	0.2	0.1	0.4	0.7	0.2	0.8	0.3
Ra-226 *3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
precision +/-	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Report Date: 07-13-89

Purchase Order #: EW-23-6-89

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- *3 Analyses performed by EPA-900.1 following chemical digestion

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Section 36

Sample I.D.	+230-90	+230-50	+150-90
Location	30	30	28
Sample Date	06-22-89	06-22-89	06-22-89
Sample #	89-8008	89-8009	89-8010
Ra-226 *1	5.8	2.0	8.0
precision +/-	0.4	0.2	0.5
Ra-226 *2	6.1	1.0	7.7
precision +/-	0.6	0.1	0.7
Ra-226 *3	N/A	N/A	N/A
precision +/-	N/A	N/A	N/A

Report Date: 07-13-89

Purchase Order #: EW-23-6-89

- *1 Analyses performed by quick turnaround gamma spectroscopy
- *2 Analyses performed by gamma spectroscopy @ Rn-222 equilibrium
- *3 Analyses performed by EPA-900.1 following chemical digestion

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