

# UNITED NUCLEAR CORPORATION

P.O. Box 3077  
Gallup, New Mexico 87305-3077

Telephone: (505) 722-6651  
Fax: (505) 722-6654

CERTIFIED - RETURN RECEIPT REQUESTED

February 21, 1997

U.S. Nuclear Regulatory Commission  
Division of Waste Management, MST-7J9  
Attn: Joseph J. Holonich, Chief  
High Level Waste and Uranium  
Recovery Projects Branch  
11555 Rockville Pike  
Rockville, MD 20850

Dear Sir:

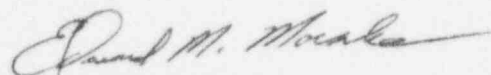
Re: Semi-Annual Effluent and Environmental Monitoring  
Reports for July through December, 1996

In compliance with our Nuclear Regulatory Commission Radioactive Materials License No. SUA-1475, Conditions Nos. 12 and 30, the attached Effluent and Environmental Monitoring Reports are being presented. This data specifies the concentration of each principal radionuclide released to unrestricted areas in an air particulate and water effluent during the period of July 1, 1996, through December 31, 1996. This data is reported on the format required in Regulatory Guide 4.14.

Data included in this report are in the order listed below:

- ° Environmental Inspection Reports
- ° Air Particulate Results
- ° Gamma (TLD Results)
- ° Groundwater Results
- ° Sampling Location Maps

Sincerely,



Edward M. Morales  
General Manager and  
Radiation Safety Officer

EMM:m

Attachments

cc: NRC, Region IV, Arlington, TX  
J. Velasquez, UNC

9703030007 961230  
PDR ADDOCK 04008907  
C PDR

280039



40-8907

IF 17/1

SEMI-ANNUAL  
EFFLUENT AND ENVIRONMENTAL/PERSONNEL  
MONITORING REPORTS  
JULY - DECEMBER 1996

ENVIRONMENTAL INSPECTION REPORTS

ENVIRONMENTAL INSPECTION

Date: 7-29-96

Time Start: 0950

Inspector: M. Chisikley

Time End: 1100

TAILINGS AREA:

	<u>Okay</u>	<u>Problem</u>	<u>Comments</u>
1. Fences	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>NA - NOT APPLICABLE</u>
2. Blown Sands	<input type="checkbox"/>	<input type="checkbox"/>	<u>TAILING - COVERED</u>
3. Air Monitors	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>NA - NOT APPLICABLE</u>
4. Dam Seepage	<input type="checkbox"/>	<input type="checkbox"/>	<u>REMEDIED</u>
5. Radiation Warning Signs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>Noticed 3 weather worn signs</u> <u>@ SE end of tailings perimeter</u> <u>perimeter nearly SITE E.</u>
6. Locked Gates	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Action Taken: replaced signs for item #5

MILL AREA:

Time Start: 0928

Time End: 0947

	<u>Okay</u>	<u>Problem</u>	<u>Comments</u>
1. Fences and Gates	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2. Fire House Equipment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3. Employee Regulation Notices	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Action Taken: \_\_\_\_\_

# ENVIRONMENTAL INSPECTION

Date: B-12-96

Time Start: 1321

Inspector: M. Chiselly

Time End: 1410

## TAILINGS AREA:

	Okay	Problem	Comments
1. Fences	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2. Blown Sands	<input type="checkbox"/>	<input type="checkbox"/>	NA - NOT APPLICABLE TAILINGS COVERED
3. Air Monitors	<input type="checkbox"/>	<input type="checkbox"/>	
4. Dam Seepage	<input type="checkbox"/>	<input type="checkbox"/>	NA - NOT APPLICABLE NOT EXISTENT, REMEDIATED
5. Radiation Warning Signs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6. Locked Gates	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Action Taken: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## MILL AREA:

Time Start: 1304

Time End: 1320

	Okay	Problem	Comments
1. Fences and Gates	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2. Fire House Equipment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3. Employee Regulation Notices	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Action Taken: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

ENVIRONMENTAL INSPECTION

Date: 9-30-96

Time Start: 0935

Inspector: Max Chichilly

Time End: 1002

TAILINGS AREA:

	<u>Okay</u>	<u>Problem</u>	<u>Comments</u>
1. Fences	<u>✓</u>	<u>N</u>	<u>NA - NOT APPLICABLE</u>
2. Blown Sands	<u>✓</u>	<u>A</u>	<u>TAILINGS COVERED</u>
3. Air Monitors	<u>✓</u>	<u>N</u>	<u>NA - NOT APPLICABLE</u>
4. Dam Seepage	<u>✓</u>	<u>A</u>	<u>NOT EXISTENT, REMEDIATED</u>
5. Radiation Warning Signs	<u>✓</u>		
6. Locked Gates	<u>✓</u>		

Action Taken: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

MILL AREA:

Time Start: 0910

Time End: 0930

	<u>Okay</u>	<u>Problem</u>	<u>Comments</u>
1. Fences and Gates	<u>✓</u>		
2. Fire House Equipment	<u>✓</u>		
3. Employee Regulation Notices	<u>✓</u>		

Action Taken: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# ENVIRONMENTAL INSPECTION

Date: 10-28-96

Time Start: 1015

Inspector: M. Churchill

Time End: 1120

## TAILINGS AREA:

	Okay	Problem	Comments
1. Fences	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>NA - NOT APPLICABLE</u>
2. Blown Sands	<input type="checkbox"/>	<input type="checkbox"/>	<u>TAILINGS COVERED</u>
3. Air Monitors	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>NA - NOT APPLICABLE</u>
4. Dam Seepage	<input type="checkbox"/>	<input type="checkbox"/>	<u>NOT EXISTENT, REMEDIATED</u>
5. Radiation Warning Signs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6. Locked Gates	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Action Taken: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## MILL AREA:

Time Start: \_\_\_\_\_

Time End: \_\_\_\_\_

	Okay	Problem	Comments
1. Fences and Gates	<input type="checkbox"/>	<input type="checkbox"/>	
2. Fire House Equipment	<input type="checkbox"/>	<input type="checkbox"/>	
3. Employee Regulation Notices	<input type="checkbox"/>	<input type="checkbox"/>	

Action Taken: N A NA - NOT APPLICABLE, RELEASED FOR UNRESTRICTED  
USE.

# ENVIRONMENTAL INSPECTION

Date: 11-25-96

Time Start: 1507

Inspector: M. Chockley Jr.

Time End: 1600

## TAILINGS AREA:

	Okay	Problem	Comments
1. Fences	<input checked="" type="checkbox"/>		
2. Blown Sands	<input checked="" type="checkbox"/>		NA - NOT APPLICABLE TAILINGS COVERED
3. Air Monitors	<input checked="" type="checkbox"/>		
4. Dam Seepage	<input checked="" type="checkbox"/>		NA - NOT APPLICABLE NOT EXISTENT, REMEDIATED
5. Radiation Warning Signs	<input checked="" type="checkbox"/>		
6. Locked Gates	<input checked="" type="checkbox"/>		

Action Taken: \_\_\_\_\_

## MILL AREA:

Time Start: \_\_\_\_\_

Time End: \_\_\_\_\_

	Okay	Problem	Comments
1. Fences and Gates	<input checked="" type="checkbox"/>		
2. Fire House Equipment	<input checked="" type="checkbox"/>		
3. Employee Regulation Notices	<input checked="" type="checkbox"/>		

Action Taken: NA - NOT APPLICABLE, RELEASED FOR UNRESTRICTED USE.



# ENVIRONMENTAL INSPECTION

Date: 12-31-96

Time Start: 1045

Inspector: M. Chahally

Time End: 1200

## TAILINGS AREA:

	Okay	Problem	Comments
1. Fences	<input checked="" type="checkbox"/>		
2. Blown Sands	<input checked="" type="checkbox"/>		NA - NOT APPLICABLE TAILINGS COVERED
3. Air Monitors	<input checked="" type="checkbox"/>		
4. Dam Seepage	<input checked="" type="checkbox"/>		NA - NOT APPLICABLE NOT EXISTENT, REMEDIATED
5. Radiation Warning Signs	<input checked="" type="checkbox"/>		
6. Locked Gates	<input checked="" type="checkbox"/>		

Action Taken: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## MILL AREA:

Time Start: \_\_\_\_\_

Time End: \_\_\_\_\_

	Okay	Problem	Comments
1. Fences and Gates	<input checked="" type="checkbox"/>		
2. Fire House Equipment	<input checked="" type="checkbox"/>		
3. Employee Regulation Notices	<input checked="" type="checkbox"/>		

Action Taken: NA - NOT APPLICABLE, RELEASED FOR UNRESTRICTED USE.

\_\_\_\_\_

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AIR PARTICULATE RESULTS



# ENERGY LABORATORIES, INC.

P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515  
2393 SALT CREEK HIGHWAY • CASPER, WY 82601 • FAX (307) 234-1639

## HIGH VOLUME AIR SAMPLING REPORT

CLIENT: UNITED NUCLEAR CORPORATION  
P.O. #: EW - 1 - I - 97  
REPORT DATE: February 6, 1997  
SAMPLE ID: D (Background Site)

Quarter/Date Sampled	Radionuclide	Conc.	Error Est.	L.L.D.	* Eff. Conc.	g.	Eff. Conc.
Air Volume		uCi/ml	uCi/ml	uCi/ml	uCi/ml		%
96-24982	U-Nat	1.68E-16	N/A	1.00E-16	9.00E-14		1.86E-01
01/02/96 - 04/09/96	Th-230	< 1.00E-16	N/A	1.00E-16	3.00E-14	<	3.33E-01
Air Volume in mls	Ra-226	2.42E-16	5.59E-17	1.00E-16	9.00E-13		2.69E-02
5.10E+09	Pb-210	3.20E-15	5.03E-16	2.00E-15	9.00E-13		3.56E-01
96-41133	U-Nat	< 1.00E-16	N/A	1.00E-16	9.00E-14	<	1.11E-01
04/09/96 - 07/01/96	Th-230	1.32E-16	4.40E-17	1.00E-16	3.00E-14		4.40E-01
Air Volume in mls	Ra-226	3.30E-16	6.61E-17	1.00E-16	9.00E-13		3.67E-02
4.31E+09	Pb-210	8.06E-15	1.01E-15	2.00E-15	9.00E-13		8.95E-01
96-58427	U-Nat	2.29E-16	N/A	1.00E-16	9.00E-14		2.55E-01
07/01/96 - 09/30/96	Th-230	< 1.00E-16	N/A	1.00E-16	3.00E-14	<	3.33E-01
Air Volume in mls	Ra-226	< 1.00E-16	N/A	1.00E-16	9.00E-13	<	1.11E-02
4.56E+09	Pb-210	1.54E-14	1.33E-15	2.00E-15	9.00E-13		1.71E+00
97-10514	U-Nat	4.26E-16	N/A	1.00E-16	9.00E-14		4.73E-01
09/30/96 - 12/30/96	Th-230	< 1.00E-16	N/A	1.00E-16	3.00E-14	<	3.33E-01
Air Volume in mls	Ra-226	4.26E-16	1.28E-16	1.00E-16	9.00E-13		4.73E-02
4.46E+09	Pb-210	1.14E-14	1.15E-15	2.00E-15	9.00E-13		1.27E+00

LLD's are listed as published in Reg. Guide 4.14

\*Effluent Concentration from the NEW CFR10 Part 20 - Appendix B - Table 2

Year for Natural Uranium

Year for Thorium 230

Week for Radium 226

Day for Lead 210

With daughters removed for Radon 222

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Also Note: 1996 Rn-222 yearly average =  $8.00 \text{ E}^{-10}$  uCi/ml. And all Rn-222 analysis results as listed below are done by track-etch monitors of Landauer, Inc.

Date Sampled	Radionuclide	Conc. uCi/ml	*Eff. Conc. uCi/ml	Eff. Conc%
1/2/96 - 4/9/96	Rn-222	$4.0 \text{ E}^{-10}$	$1.00 \text{ E}^{-8}$	$4.00 \text{ E}^{+00}$
4/9/96 - 7/1/96	Rn-222	$7.0 \text{ E}^{-10}$	$1.00 \text{ E}^{-8}$	$7.00 \text{ E}^{+00}$
7/1/96 - 9/30/96	Rn-222	$1.1 \text{ E}^{-9}$	$1.00 \text{ E}^{-8}$	$11.00 \text{ E}^{+00}$
9/30/96 - 12/31/96	Rn-222	$1.0 \text{ E}^{-9}$	$1.00 \text{ E}^{-8}$	$10.00 \text{ E}^{+00}$



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## HIGH VOLUME AIR SAMPLING REPORT

CLIENT: UNITED NUCLEAR CORPORATION  
P.O. #: EW - 1 - 1 - 97  
REPORT DATE: February 6, 1997  
SAMPLE ID: E

Quarter/Date Sampled	Radionuclide	Conc.	Error Est.	L.L.D.	* Eff. Conc.	g.	Eff. Conc.
Air Volume		uCi/ml	uCi/ml	uCi/ml	uCi/ml		%
96-24980	U-Nat	1.81E-16	N/A	1.00E-16	9.00E-14		2.02E-01
01/02/96 - 04/09/96	Th-230	< 1.00E-16	N/A	1.00E-16	3.00E-14	<	3.33E-01
Air Volume in mls	Ra-226	< 1.00E-16	N/A	1.00E-16	9.00E-13	<	1.11E-02
5.24E+09	Pb-210	2.79E-15	4.90E-16	2.00E-15	9.00E-13		3.11E-01
96-41131	U-Nat	< 1.00E-16	N/A	1.00E-16	9.00E-14	<	1.11E-01
04/09/96 - 07/01/96	Th-230	1.14E-16	4.56E-17	1.00E-16	3.00E-14		3.80E-01
Air Volume in mls	Ra-226	< 1.00E-16	N/A	1.00E-16	9.00E-13	<	1.11E-02
4.16E+09	Pb-210	9.93E-15	1.10E-15	2.00E-15	9.00E-13		1.10E+00
96-58425	U-Nat	3.01E-16	N/A	1.00E-16	9.00E-14		3.34E-01
07/01/96 - 09/30/96	Th-230	< 1.00E-16	N/A	1.00E-16	3.00E-14	<	3.33E-01
Air Volume in mls	Ra-226	< 1.00E-16	N/A	1.00E-16	9.00E-13	<	1.11E-02
4.73E+09	Pb-210	1.28E-14	6.82E-16	2.00E-15	9.00E-13		1.42E+00
97-10512	U-Nat	< 1.00E-16	N/A	1.00E-16	9.00E-14	<	1.11E-01
09/30/96 - 12/30/96	Th-230	< 1.00E-16	N/A	1.00E-16	3.00E-14	<	3.33E-01
Air Volume in mls	Ra-226	1.22E-16	1.01E-16	1.00E-16	9.00E-13		1.35E-02
4.69E+09	Pb-210	1.18E-14	1.11E-15	2.00E-15	9.00E-13		1.31E+00

LLD's are listed as published in Reg. Guide 4.14

\*Effluent Concentration from the NEW CFR10 Part 20 - Appendix B - Table 2

Year for Natural Uranium

Year for Thorium 230

Week for Radium 226

Day for Lead 210

With daughters removed for Radon 222

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Also Note: 1996 Rn-222 yearly average =  $1.23 \text{ E}^{-9}$  uci/ml. And all Rn-222 analysis results as listed below are done by track-etch monitors of Landauer, Inc.

Date Sampled	Radionuclide	Conc. uci/ml	*Eff Conc. uci/ml	Eff. Conc. %
1/2/96 - 4/9/96	Rn-222	$9.0 \text{ E}^{-10}$	$1.00 \text{ E}^{-8}$	$9.00 \text{ E}^{+00}$
4/9/96 - 7/1/96	Rn-222	$1.2 \text{ E}^{-9}$	$1.00 \text{ E}^{-8}$	$12.00 \text{ E}^{+00}$
7/1/96 - 9/30/96	Rn-222	$1.7 \text{ E}^{-9}$	$1.00 \text{ E}^{-8}$	$17.00 \text{ E}^{+00}$
9/30/96 - 12/31/96	Rn-222	$1.1 \text{ E}^{-9}$	$1.00 \text{ E}^{-8}$	$11.00 \text{ E}^{+00}$

**ENERGY LABORATORIES, INC.**P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515  
2393 SALT CREEK HIGHWAY • CASPER, WY 82601 • FAX (307) 234-1639**HIGH VOLUME AIR SAMPLING REPORT**

CLIENT: UNITED NUCLEAR CORPORATION

P.O. #: EW - 1 - 1 - 97

REPORT DATE: February 6, 1997

SAMPLE ID: C

Quarter/Date Sampled	Radionuclide	Conc.	Error Est.	L.L.D.	* Eff. Conc.	Eff. Conc.
Air Volume		uCi/ml	uCi/ml	uCi/ml	uCi/ml	%
96-24979	U-Nat	2.45E-16	N/A	1.00E-16	9.00E-14	2.72E-01
01/02/96 - 04/09/96	Th-230	< 1.00E-16	N/A	1.00E-16	3.00E-14	< 3.33E-01
Air Volume in mls	Ra-226	1.88E-16	5.64E-17	1.00E-16	9.00E-13	2.09E-02
5.05E+09	Pb-210	2.95E-15	5.08E-16	2.00E-15	9.00E-13	3.28E-01
96-41130	U-Nat	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
04/09/96 - 07/01/96	Th-230	1.25E-16	5.01E-17	1.00E-16	3.00E-14	4.17E-01
Air Volume in mls	Ra-226	1.50E-16	7.51E-17	1.00E-16	9.00E-13	1.67E-02
3.80E+09	Pb-210	7.71E-15	1.20E-15	2.00E-15	9.00E-13	8.56E-01
96-58424	U-Nat	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
07/01/96 - 09/30/96	Th-230	< 1.00E-16	N/A	1.00E-16	3.00E-14	< 3.33E-01
Air Volume in mls	Ra-226	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
4.10E+09	Pb-210	1.26E-14	7.65E-16	2.00E-15	9.00E-13	1.40E+00
97-10511	U-Nat	< 1.00E-16	N/A	1.00E-16	9.00E-14	1.11E-01
09/30/96 - 12/30/96	Th-230	< 1.00E-16	N/A	1.00E-16	3.00E-14	3.33E-01
Air Volume in mls	Ra-226	< 1.00E-16	N/A	1.00E-16	9.00E-13	1.11E-02
3.83E+09	Pb-210	1.39E-14	1.36E-15	2.00E-15	9.00E-13	1.55E+00

LLD's are listed as published in Reg. Guide 4.14

\*Effluent Concentration from the NEW CFR10 Part 20 - Appendix B - Table 2

Year for Natural Uranium

Year for Thorium 230

Week for Radium 226

Day for Lead 210

With Daughters removed for Radon 222

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Also Note: 1996 Rn-222 yearly average =  $1.38 \times 10^{-9}$  uCi/ml. And all Rn-222 analysis results as listed below are done by track-etch monitors of Landauer, Inc.

Date Sampled	Radionuclide	Conc. uCi/ml	*Eff. Conc. uCi/ml	Eff. Conc. %
1/2/96 - 4/9/96	Rn-222	$9.0 \times 10^{-10}$	$1.00 \times 10^{-8}$	$9.00 \times 10^0$
4/9/96 - 7/1/96	Rn-222	$1.2 \times 10^{-9}$	$1.00 \times 10^{-8}$	$12.00 \times 10^0$
7/1/96 - 9/30/96	Rn-222	$1.7 \times 10^{-9}$	$1.00 \times 10^{-8}$	$17.00 \times 10^0$
9/30/96 - 12/31/96	Rn-222	$1.7 \times 10^{-9}$	$1.00 \times 10^{-8}$	$17.00 \times 10^0$





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## HIGH VOLUME AIR SAMPLING REPORT

CLIENT: UNITED NUCLEAR CORPORATION  
P.O. #: EW - 1 - 1 - 97  
REPORT DATE: February 6, 1997  
SAMPLE ID: F

Quarter/Date Sampled	Radionuclide	Conc.	Error Est.	L.L.D.	* Eff. Conc.	g.	Eff. Conc.
Air Volume		uCi/ml	uCi/ml	uCi/ml	uCi/ml		%
96-24981	U-Nat	1.01E-16	N/A	1.00E-16	9.00E-14		1.12E-01
01/02/96 - 04/09/96	Th-230	1.34E-16	8.38E-17	1.00E-16	3.00E-14		4.47E-01
Air Volume in mls	Ra-226	2.01E-16	5.03E-17	1.00E-16	9.00E-13		2.23E-02
5.67E+09	Pb-210	3.54E-15	4.69E-16	2.00E-15	9.00E-13		3.93E-01
96-41132	U-Nat	1.11E-16	N/A	1.00E-16	9.00E-14		1.23E-01
04/09/96 - 07/01/96	Th-230	1.11E-16	4.42E-17	1.00E-16	3.00E-14		3.69E-01
Air Volume in mls	Ra-226	< 1.00E-16	N/A	1.00E-16	9.00E-13	<	1.11E-02
4.30E+09	Pb-210	9.27E-15	1.04E-15	2.00E-15	9.00E-13		1.03E+00
96-58426	U-Nat	< 1.00E-16	N/A	1.00E-16	9.00E-14	<	1.11E-01
07/01/96 - 09/30/96	Th-230	< 1.00E-16	N/A	1.00E-16	3.00E-14	<	3.33E-01
Air Volume in mls	Ra-226	< 1.00E-16	N/A	1.00E-16	9.00E-13	<	1.11E-02
4.63E+09	Pb-210	1.19E-14	6.97E-16	2.00E-15	9.00E-13		1.32E+00
97-10513	U-Nat	< 1.00E-16	N/A	1.00E-16	9.00E-14	<	1.11E-01
09/30/96 - 12/30/96	Th-230	1.48E-16	7.41E-17	1.00E-16	3.00E-14		4.94E-01
Air Volume in mls	Ra-226	1.11E-16	9.26E-17	1.00E-16	9.00E-13		1.23E-02
5.13E+09	Pb-210	1.25E-14	1.07E-15	2.00E-15	9.00E-13		1.39E+00

LLD's are listed as published in Reg. Guide 4.14

\*Effluent Concentration from the NEW CFR10 Part 20 - Appendix B - Table 2

Year for Natural Uranium

Year for Thorium 230

Week for Radium 226

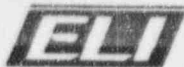
Day for Lead 210

With daughters removed for Radon 222

Imh f:\Reports\Clients 97\Unc nm\Air\4q96.xls

Also Note: 1996 Rn-222 yearly average =  $1.10 \times 10^{-9}$  uCi/ml. And all Rn-222 analysis results as listed below are done by track-etch monitors of Landauer, Inc.

Date Sampled	Radionuclide	Conc. uCi/ml	*Eff. Conc. uCi/ml	Eff. Conc. %
1/2/96 - 4/9/96	Rn-222	$7.0 \times 10^{-10}$	$1.00 \times 10^{-8}$	$7.00 \times 10^{+00}$
4/9/96 - 7/1/96	Rn-222	$1.2 \times 10^{-9}$	$1.00 \times 10^{-8}$	$12.00 \times 10^{+00}$
7/1/96 - 9/30/96	Rn-222	$1.1 \times 10^{-9}$	$1.00 \times 10^{-8}$	$11.00 \times 10^{+00}$
9/30/96 - 12/31/96	Rn-222	$1.4 \times 10^{-9}$	$1.00 \times 10^{-8}$	$14.00 \times 10^{+00}$



## RADIOCHEMICAL QUALITY ASSURANCE REPORT - UNITED NUCLEAR CORPORATION

Laboratory I.D.:  
Sample Matrix:  
Sample Date / Time:  
Date Received:  
Report Date:

97-10511-14
Air Filter
4th Quarter 1996
01-09-97
February 6, 1997

	<u>Method</u>	<u>Duplicate Precision (Percent)</u>	<u>Spike Recovery (Percent)</u>	<u>LCS Recovery (Percent)</u>	<u>Method Blank uCi/ml</u>	<u>Date Analyzed</u>	<u>Analyst</u>
Laboratory #:		97-10390	97-10473	U-15	U-15		
Uranium:	908.1	88	93	93	<1.00E-16	01-16-97	DW
Laboratory #:		96-70730	96-70731	RA-20	RA-20		
Radium 226:	903.0	81	87	92	<1.00E-16	01-29-97	RS
Laboratory #:		97-10478	97-10619	AS-13	AS-13		
Thorium 230:	907.0	100	90	95	<1.00E-16	01-29-97	PH
Laboratory #:		97-10481	97-10482	PB-8	PB-8		
Lead 210:	NERHL-65-4	108	82	105	<2.00E-15	02-05-97	RS

Report Approved By:

Reviewed By:

\\nh.f\Reports\Clients\97\Unc.nm\Air\qc4q96.xls

GAMMA (TLD RESULTS)



Thermo NUtech

# TLD ENVIRONMENTAL MONITOR REPORT

5635 Jefferson Street NE  
Albuquerque, NM 87109  
(505) 345-9931

DATE ISSUED 07/01/96  
DATE RETURNED 01/07/97

DATE ANNEALED 06/15/96  
DATE READ 01/11/97

CUSTOMER NO. 03812  
PAGE 1 OF 1

ROSE MARIE TAUCHE  
DOSIMETRY SERVICES  
DATE 01/15/97

BADGE NUMBER	IDENTIFICATION	DOSIMETER READINGS (mrem)					AVERAGE	+ - 2σ	MREM WEEK	FREQ.
		FIRST	SECOND	THIRD	FOURTH	FIFTH				
01000	CONTROL	46	46	46	40	47	45.0	5.7	1.49	S
01013	SITE C	60	67	71	59	69	65.2	10.8	2.16	S
01014	SITE D (Background)	61	53	66	55	41	55.2	18.9	1.83	S
01015	SITE E	26	36	24	20	17	24.6	14.5	0.82	S
01016	SITE F	69	43	52	57	60	56.2	19.3	1.86	S

\* - DOSIMETER DAMAGED

FREQUENCY CODES

\*\* - BASED ON ELAPSED TIME  
FROM DATE ANNEALED TO  
DATE READ

M - MONTHLY  
Q - QUARTERLY  
S - SEMI-ANNUAL  
A - ANNUAL  
I - IRREGULAR

CUSTOMER  
ATTENTION  
ADDRESS  
CITY

UNC MINING & MILLING CO  
ED MORALES  
P O BOX 3077  
GALLUP

NM 87305-3077

GROUND WATER RESULTS

**ENERGY LABORATORIES, INC.**

P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515  
2393 SALT CREEK HIGHWAY • CASPER, WY 82601 • FAX (307) 234-1639

**LABORATORY ANALYSIS REPORT -****UNC****Page 1 of 3**

Sample I.D.:  
Laboratory I.D. #:  
Sample Matrix:  
Sample Date / Time:  
Date Received:  
Report Date:

Domestic Water Well 1345
96-45847
Water
08-13-96
08-16-96
October 11, 1996

Radiometric	Method	Detection Limit	Units	Results	Date Analyzed
Uranium (UNat)	908.1	0.0003	mg/L	0.0005	09-09-96
Radium 226 (Ra226)	903.0	0.2	pCi/L	<0.2	09-24-96
Radium Precision ±				-	
Thorium 230 (Th230)	907.0	0.2	pCi/L	<0.2	09-24-96
Thorium Precision ±				-	
Lead 210 (Pb210)	NERHL-65-4	1.0	pCi/L	<1.0	10-02-96
Lead Precision ±				-	
Polonium 210 (Po210)	Precipitation	1.0	pCi/L	<1.0	08-29-96
Polonium Precision ±				-	

**NOTE: ADDITIONAL FIELD DATA**

PH (UNITS) = 8.61

COND.(µMHOS) = 2,810

TEMP. (°C) = 18.9

✓

*Reviewed  
OK  
S. H. H. H.*

lmh 96-45847

*OK*

**ENERGY LABORATORIES, INC.**P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515  
2393 SALT CREEK HIGHWAY • CASPER, WY 82601 • FAX (307) 234-1639**LABORATORY ANALYSIS REPORT -****UNC****Page 2 of 3**

Sample I.D.:

Laboratory I.D. #:

Sample Matrix:

Sample Date / Time:

Date Received:

Report Date:

Domestic Water Well 1345

96-45848

Filter

08-13-96

08-16-96

October 11, 1996

Radiometric	Method	Detection Limit	Units	Results	Date Analyzed
Uranium (U <sub>nat</sub> )	908.1	0.0003	pCi/L	0.9	09-09-96
Radium 226 (Ra <sub>226</sub> )	903.0	0.2	pCi/L	<0.2	09-24-96
Radium Precision ±				-	
Thorium 230 (Th <sub>230</sub> )	907.0	0.2	pCi/L	<0.2	09-24-96
Thorium Precision ±				-	
Lead 210 (Pb <sub>210</sub> )	NERHL-65-4	1.0	pCi/L	<1.0	10-02-96
Lead Precision ±				-	
Polonium 210 (Po <sub>210</sub> )	Precipitation	1.0	pCi/L	3.1	08-29-96
Polonium Precision ±				0.6	

lmh 96-45848

## RADIOCHEMICAL QUALITY ASSURANCE REPORT - UNC

Page 3 of 3

Laboratory I.D.:

96-45847-48

**Sample Matrix:**

## Water & Filter

**Sample Date / Time:**

08-13-96

Date Received:

09-16-96

Report Date:

October 11, 1996

	<u>Method</u>	<u>Duplicate Precision (Percent)</u>	<u>Spike Recovery (Percent)</u>	<u>LCS Recovery (Percent)</u>	<u>Method Blank (pCi/L)*</u>	<u>Date Analyzed</u>	<u>Analyst</u>
Laboratory #:		96-45514	96-45484	U-77	U-77		
Uranium:	908.1	101	101	-	<0.0003	09-09-96	RS
Laboratory #:		96-45378	96-46454	RA-234	RA-234		
Radium 226:	903.0	102	80	83	0.5	09-24-96	RS
Laboratory #:		96-45514	96-46159	AS-78	AS-78		
Thorium 230:	907.0	110	86	80	<0.2	09-24-96	PH
Laboratory #:		96-46398	96-46899	PB-47	PB-47		
Lead 210:	NERHL-65-4	100	95	92	<1.0	10-02-96	LH
Laboratory #:		96-45847	96-45848	PO-12	PO-12		
Polonium 210:	Precipitation	100	81	81	<1.0	08-29-96	LH

\*Uranium is reported in mg/L.

Report Approved By:

nh qc45847

**ENERGY LABORATORIES, INC.**

P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515  
2393 SALT CREEK HIGHWAY • CASPER, WY 82601 • FAX (307) 234-1639

**LABORATORY ANALYSIS REPORT - UNITED NUCLEAR CORPORATION**

Sample I.D.:  
Laboratory I.D. #:  
Sample Matrix:  
Sample Date / Time:  
Date Received:  
Report Date:

**Domestic Water Well**

96-59618

Water

10-21-96

10-25-96

November 27, 1996

Radiometric	Method	Detection Limit	Units	Results	Date Analyzed
Uranium (U <sub>nat</sub> )	908.1	0.0003	mg/L	0.0017	11-01-96
Radium 226 (Ra <sub>226</sub> )	903.0	0.2	pCi/L	0.5	11-18-96
Radium Precision ±				0.2	
Thorium 230 (Th <sub>230</sub> )	907.0	0.2	pCi/L	0.6	11-25-96
Thorium Precision ±				0.4	
Lead 210 (Pb <sub>210</sub> )	NERFIL-65-4	1.0	pCi/L	5.0	11-22-96
Lead Precision ±				0.8	
Polonium 210 (Po <sub>210</sub> )	Precipitation	1.0	pCi/L	<1.0	11-12-96
Polonium Precision ±				-	

**NOTE: ADDITIONAL FIELD DATA**

PH (UNITS) = 8.25

COND. (µMHOS) = 2,750

TEMP. (°C) = 16.6

✓

lmh f:\Reports\Clients.96\Unc.nm\Water\rc59618.wk3



**ENERGY LABORATORIES, INC.**P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515  
2393 SALT CREEK HIGHWAY • CASPER, WY 82601 • FAX (307) 234-1639**LABORATORY ANALYSIS REPORT - UNITED NUCLEAR CORPORATION**

Sample I.D.:

Laboratory I.D. #:

Sample Matrix:

Sample Date / Time:

Date Received:

Report Date:

Domestic Water Well

96-59619

Filter

10-21-96

10-25-96

November 27, 1996

Radiometric	Method	Detection Limit	Units	Results	Date Analyzed
Uranium (U <sub>Nat</sub> )	908.1	0.0003	mg/L	0.0024	11-01-96
Radium 226 (Ra <sub>226</sub> )	903.0	0.2	pCi/L	<0.2	11-18-96
Radium Precision ±				-	
Thorium 230 (Th <sub>230</sub> )	907.0	0.2	pCi/L	<0.2	11-25-96
Thorium Precision ±				-	
Lead 210 (Pb <sub>210</sub> )	NERHL-65-4	1.0	pCi/L	<1.0	11-22-96
Lead Precision ±				-	
Polonium 210 (Po <sub>210</sub> )	Precipitation	1.0	pCi/L	<1.0	11-12-96
Polonium Precision ±				-	

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**RADIOCHEMICAL QUALITY ASSURANCE REPORT - UNITED NUCLEAR CORPORATION**

Laboratory I.D.:  
Sample Matrix:  
Sample Date / Time:  
Date Received:  
Report Date:

96-59618-19
Water & Filter
10-21-96
10-25-96
November 27, 1996

	Method	Duplicate Precision (Percent)	Spike Recovery (Percent)	LCS Recovery (Percent)	Method Blank (pCi/L)*	Date Analyzed	Analyst
Laboratory #:		96-59661	96-59204	U-108	U-108		
Uranium:	908.1	100	96	94	<0.0003	11-01-96	TL
Laboratory #:		96-59189	96-59958	RA-293	RA-293		
Radium 226:	903.0	100	96	99	<0.2	11-18-96	RS
Laboratory #:		96-59661	96-59807	AS-106	AS-106		
Thorium 230:	907.0	115	91	104	<0.2	11-25-96	PH
Laboratory #:		96-59660	96-59663	PB-59	PB-59		
Lead 210:	NERHL-65-4	100	89	112	<1.0	11-22-96	LH
Laboratory #:		96-59619	96-59656	PO-17	PO-17		
Polonium 210:	Precipitation	100	95	114	<1.0	11-12-96	LH

\*Uranium is reported in mg/L.

Report Approved By: *[Signature]*  
lmh f:\Reports\Clients.96\Unc.nm\Water\rc59618.wk3

Reviewed By: *[Signature]*





# ENERGY LABORATORIES, INC.

P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515  
2303 SALT CREEK HIGHWAY • CASPER, WY 82601 • FAX (307) 234-1639

## UNC MINING AND MILLING: CHURCHROCK OPERATIONS GROUNDWATER MONITORING PROGRAM: SOUTHWEST ALLUVIUM MONITOR WELLS

Page 3 of 8

WELL NUMBER:

LAB I.D.:

SAMPLE DATE:

REPORT DATE:

QUARTER REPRESENTED:

UNC SUBMITTAL #:

GW-3	GW-3	GW-3	GW-3
96-12194	96-19700	96-41339	96-64899
01-03-96	04-02-96	07-07-96	10-01-96
02-13-96	05-11-96	08-27-96	Dec. 11, 1996
First '96	Second '96	Third '96	Fourth '96
TE-1-1-96	TE-6-4-96	TE-7-7-96	TE-9-10-96

Major Ions	Units	Results	Results	Results	Results	Detection Limit
Calcium (Ca)	mg/L	805	875	865	909	0.05
Magnesium (Mg)	mg/L	240	275	260	277	0.01
Sodium (Na)	mg/L	235	260	245	239	0.05
Potassium (K)	mg/L	6.1	7.0	7.4	6.7	0.10
Bicarbonate (HCO <sub>3</sub> )	mg/L	1521	1510	1434	1480	0.10
Sulfate (SO <sub>4</sub> )	mg/L	1650	1915	1860	1884	1.0
Chloride (Cl)	mg/L	138	155	150	141	1.0
Ammonium (NH <sub>4</sub> ) as N	mg/L	< 0.05	< 0.05	0.14	0.05	0.05
Nitrite + Nitrate (NO <sub>2</sub> + NO <sub>3</sub> ) as N	mg/L	106	111	102	115	0.10

Non-Metals						
Total Dissolved Solids (TDS) @ 180°C	mg/L	4495	5010	4844	4970	1.0
pH	std. units	6.96	7.64	7.13	6.99	0.10

Trace Metals						
Aluminum (Al)	mg/L	< 0.10	< 0.10	< 0.10	< 0.10	0.10
Arsenic (As) III	mg/L	0.002	< 0.001	0.110	< 0.001	0.001
Beryllium (Be)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Cadmium (Cd)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Cobalt (Co)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Lead (Pb)	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Manganese (Mn)	mg/L	1.74	1.82	1.99	1.92	0.01
Molybdenum (Mo)	mg/L	< 0.10	< 0.10	< 0.10	< 0.10	0.10
Nickel (Ni)	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Selenium (Se) IV	mg/L	0.014	< 0.001	< 0.001	0.001	0.001
Vanadium (V)	mg/L	< 0.10	< 0.10	< 0.10	< 0.10	0.10

Radiometric						
Uranium (U <sup>238</sup> )	mg/L	0.081	0.087	0.100	0.072	0.0003
Radium 226 (Ra <sup>226</sup> )	pCi/L	0.4	< 0.2	0.3	< 0.2	0.2
Radium Precision ±		0.3		0.2		
Radium 228 (Ra <sup>228</sup> )	pCi/L	< 1.0	< 1.0	< 1.0	< 1.0	1.0
Radium Precision ±						
Thorium 230 (Th <sup>230</sup> )	pCi/L	0.4	< 0.2	1.2	0.4	0.2
Thorium Precision ±		0.3		0.6	0.2	
Lead 210 (Pb <sup>210</sup> )	pCi/L	< 1.0	< 1.0	< 1.0	< 1.0	1.0
Lead Precision ±						
Polonium 210 (Po <sup>210</sup> )	pCi/L	< 1.0	< 1.0	< 1.0	< 1.0	1.0
Polonium Precision ±						
Gross Alpha	pCi/L	< 1.0	< 1.0	< 1.0	< 1.0	1.0
G. Alpha Precision ±						

Trace Organics						
Chloroform	µg/L	< 1.00	< 1.00	< 1.00	< 1.00	1.00

Quality Assurance Data						Target Range
Anion	meq	70.77	76.94	73.77	75.70	
Cation	meq	70.73	78.26	75.89	79.22	
WYDEQ A/C Balance	%	-0.02	0.85	1.42	2.27	-5 - +5
Calc TDS	mg/L	4306	4736	4558	4708	
TDS A/C Balance	dec. %	1.04	1.06	1.06	1.06	0.80 - 1.20

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UNC FIELD DATA: PH (STD. UNITS)  
COND. (µMHOS)  
WATER DEPTH (FT.)  
TEMP. (°C)

1ST-Q'96	2ND-Q'96	3RD-Q'96	4TH-Q'96
6.5	6.4	6.3	6.4
4,800	4,000	2,600	4,900
50.2	50.2	50.3	50.3
11.7	12.5	14.3	12.9

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICES

**ENERGY LABORATORIES, INC.**P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515  
2393 SALT CREEK HIGHWAY • CASPER, WY 82601 • FAX (307) 234-1639**UNC MINING AND MILLING: CHURCHROCK OPERATIONS  
GROUNDWATER MONITORING PROGRAM: SOUTHWEST ALLUVIUM MONITOR WELLS**

Page 4 of 8

WELL NUMBER:  
LAB I.D.:  
SAMPLE DATE:  
REPORT DATE:  
QUARTER REPRESENTED:  
UNC SUBMITTAL #:

GW-4	GW-4
96-19701	96-55000
04-02-96	10-01-96
05-11-96	Dec. 11, 1996
Second '96	Fourth '96
TE-6-4-96	TE-9-10-96

Major Ions	Units	Results	Results	Detection Limit
Calcium (Ca)	mg/L	718	743	0.05
Magnesium (Mg)	mg/L	193	194	0.01
Sodium (Na)	mg/L	166	165	0.05
Potassium (K)	mg/L	12.4	12.1	0.10
Bicarbonate (HCO <sub>3</sub> )	mg/L	706	808	0.10
Sulfate (SO <sub>4</sub> )	mg/L	1688	1671	1.0
Chloride (Cl)	mg/L	46.6	44.0	1.0
Ammonium (NH <sub>4</sub> ) as N	mg/L	0.37	0.28	0.05
Nitrite + Nitrate (NO <sub>2</sub> + NO <sub>3</sub> ) as N	mg/L	146	126	0.10

Non-Metals				
Total Dissolved Solids (TDS) @ 180°C	mg/L	4092	3900	1.0
pH	std. units	7.83	7.66	0.10

Trace Metals				
Aluminum (Al)	mg/L	< 0.10	0.19	0.10
Arsenic (As) III	mg/L	< 0.001	0.001	0.001
Beryllium (Be)	mg/L	< 0.01	< 0.01	0.01
Cadmium (Cd)	mg/L	< 0.01	< 0.01	0.01
Cobalt (Co)	mg/L	< 0.01	< 0.01	0.01
Lead (Pb)	mg/L	< 0.05	< 0.05	0.05
Manganese (Mn)	mg/L	0.02	0.08	0.01
Molybdenum (Mo)	mg/L	< 0.10	< 0.10	0.10
Nickel (Ni)	mg/L	< 0.05	< 0.05	0.05
Selenium (Se) IV	mg/L	< 0.001	0.007	0.001
Vanadium (V)	mg/L	< 0.10	< 0.10	0.10

Radiometric				
Uranium (U <sup>238</sup> )	mg/L	0.065	0.063	0.0003
Radium 226 (Ra <sup>226</sup> )	pCi/L	0.3	0.8	0.2
Radium Precision ±		0.2	0.3	
Radium 228 (Ra <sup>228</sup> )	pCi/L	< 1.0	< 1.0	1.0
Radium Precision ±				
Thorium 230 (Th <sup>230</sup> )	pCi/L	< 0.2	0.8	0.2
Thorium Precision ±			0.5	
Lead 210 (Pb <sup>210</sup> )	pCi/L	< 1.0	< 1.0	1.0
Lead Precision ±				
Polonium 210 (Po <sup>210</sup> )	pCi/L	< 1.0	< 1.0	1.0
Polonium Precision ±				
Gross Alpha	pCi/L	< 1.0	< 1.0	1.0
G. Alpha Precision ±				

Trace Organics				
Chloroform	µg/L	< 1.00	< 1.00	1.00

Quality Assurance Data				Target Range
Anion	meq	58.48	58.27	
Cation	meq	59.56	60.85	
WYDEQ A/C Balance	%	0.91	2.17	-5 - +5
Calc TDS	mg/L	3824	3791	
TDS A/C Balance	dec. %	1.07	1.03	0.80 - 1.20

4TH-Q '96

6.9  
4,000  
50.7  
13.6

3RD-Q '96

NO  
RECHARGE

2ND-Q '96

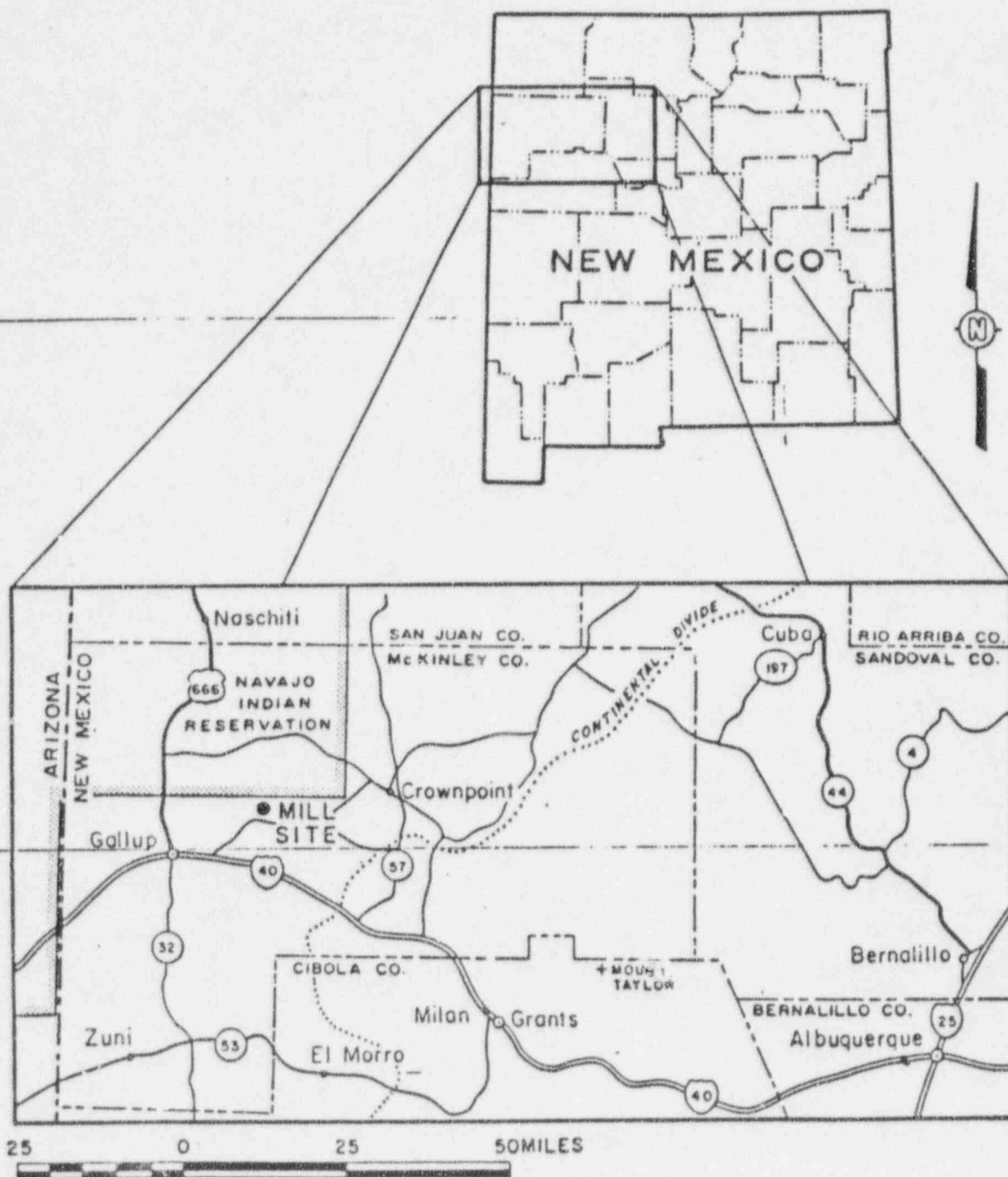
7.1  
3,900  
50.0  
12.0

1ST-Q '96

NO  
RECHARGEUNC FIELD DATA: PH (STD. UNITS)  
COND. (µMHOS)  
WATER DEPTH (FT.)  
TEMP. (°C)

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COMPLETE ENVIRONMENTAL ANALYTICAL SERVICES



**SOURCE:**

URANIUM MILL LICENSE  
RENEWAL APPLICATION-  
ENVIRONMENTAL REPORT.  
LICENSE NO. NM-UNC-ML.  
JNC 1981

SKETCH I-1  
CHURCH ROCK PROJECT  
SITE LOCATION PLAN  
16674-000

SAMPLING LOCATION MAPS



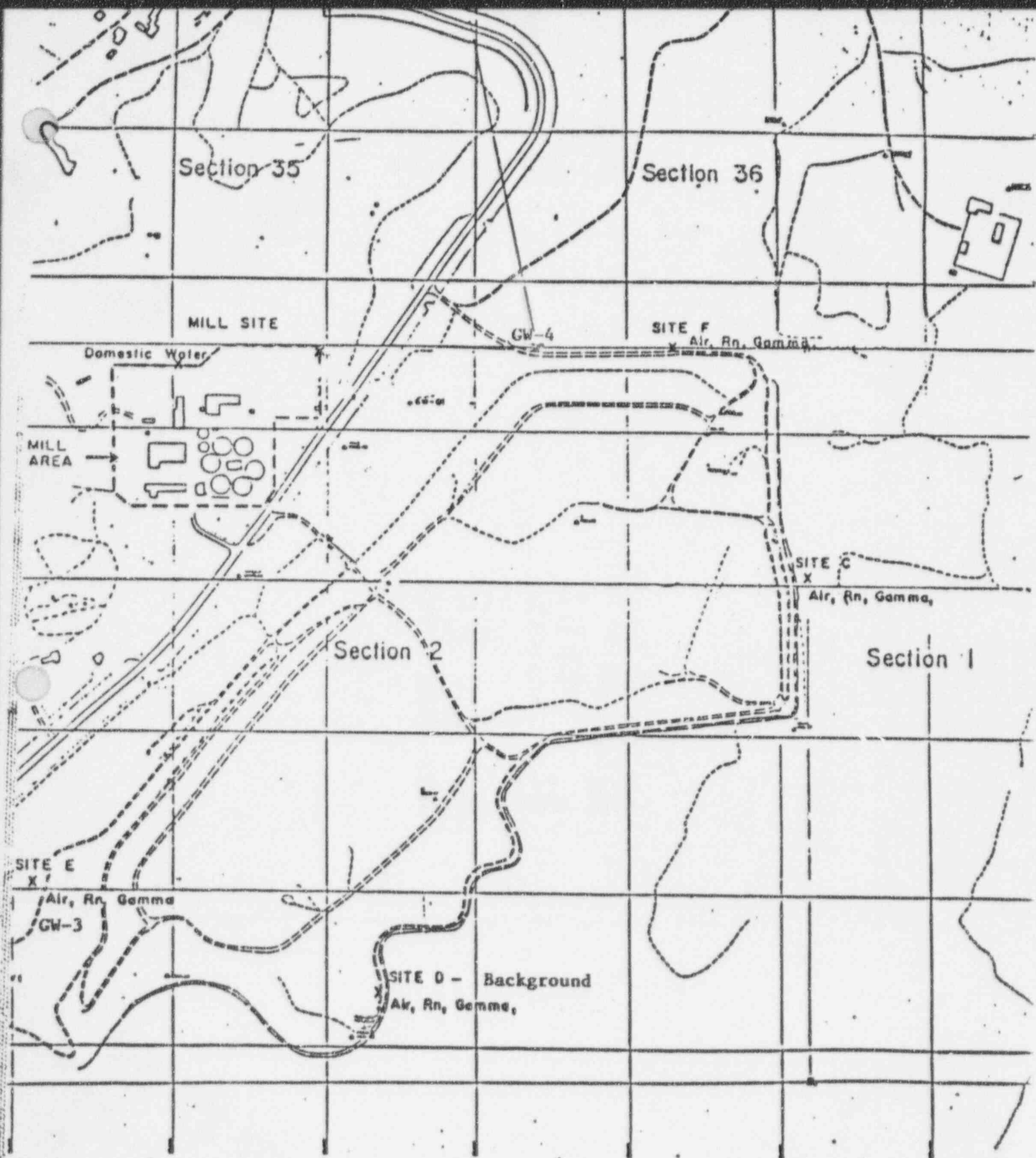
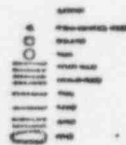


FIGURE 2



END OF PLANNING MAP  
AND MAP DOCUMENTS

UNITED PACIFIC CORPORATION	
PLANNING MAP	
SHEET NO. 1 OF 1	
DATE: 1970	