

40-6659

00867

ENVIRONMENTAL SAMPLE DATA

1st Quarter 1985

PETROTOMICS COMPANY  
Shirley Basin, WY

8510180439 850829  
PDR ADDCK 04006659  
C PDR

1. STACK SAMPLES

Date collected: March 14, 1985  
 Location: Yellowcake Dryer Stack  
 Stack flow rate (m<sup>3</sup>/sec): 0.8077

<u>Radionuclide</u>	<u>CONCENTRATION (uCi/ml)</u>	<u>ERROR ESTIMATE (uCi/ml)</u>	<u>RELEASE RATE (Ci/qr)</u>	<u>ERROR ESTIMATE (Ci/qr)</u>	<u>LLD (uCi/ml)</u>	<u>RESTRICTED %MPC</u>
U-nat	3.01 X 10 <sup>-9</sup>	± 0.07 X 10 <sup>-9</sup>	62.4 X 10 <sup>-4</sup>	± 1.45 X 10 <sup>-4</sup>	4 X 10 <sup>-13</sup>	3,010
Th-230	2.45 X 10 <sup>-12</sup>	± 1.05 X 10 <sup>-12</sup>	5.08 X 10 <sup>-6</sup>	± 2.18 X 10 <sup>-6</sup>	7 X 10 <sup>-13</sup>	122.5
Ra-226	4.8 X 10 <sup>-13</sup>	± 3.68 X 10 <sup>-13</sup>	1.00 X 10 <sup>-6</sup>	± 0.76 X 10 <sup>-6</sup>	5 X 10 <sup>-13</sup>	1.6
Pb-210	0.00 X 10 <sup>-12</sup>	± 4.86 X 10 <sup>-12</sup>	0.00 X 10 <sup>-6</sup>	± 10.08 X 10 <sup>-6</sup>	8 X 10 <sup>-12</sup>	0.0
Rn-222	3.7 X 10 <sup>-9</sup>	± 0.6 X 10 <sup>-9</sup>	76.72 X 10 <sup>-4</sup>	± 12.44 X 10 <sup>-4</sup>	2 X 10 <sup>-10</sup>	12.3

Date collected: March 14, 1985  
 Location: Packaging Room Scrubber Stack  
 Stack flow rate (m<sup>3</sup>/sec): 0.2638

RADIONUCLIDE

U-nat	6.88 X 10 <sup>-10</sup>	± 0.05 X 10 <sup>-10</sup>	4.66 X 10 <sup>-4</sup>	± 0.03 X 10 <sup>-4</sup>	4 X 10 <sup>-13</sup>	688
Th-230	6.61 X 10 <sup>-12</sup>	± 1.10 X 10 <sup>-12</sup>	4.48 X 10 <sup>-6</sup>	± 0.74 X 10 <sup>-6</sup>	8 X 10 <sup>-13</sup>	330.5
Ra-226	7.47 X 10 <sup>-13</sup>	± 3.73 X 10 <sup>-13</sup>	0.51 X 10 <sup>-6</sup>	± 0.25 X 10 <sup>-6</sup>	5 X 10 <sup>-13</sup>	2.5
Pb-210	1.22 X 10 <sup>-12</sup>	± 3.80 X 10 <sup>-12</sup>	0.83 X 10 <sup>-6</sup>	± 2.57 X 10 <sup>-6</sup>	6 X 10 <sup>-12</sup>	1.2
Rn-222	0.5 X 10 <sup>-9</sup>	± 0.3 X 10 <sup>-9</sup>	3.39 X 10 <sup>-4</sup>	± 2.03 X 10 <sup>-4</sup>	2 X 10 <sup>-10</sup>	1.7

1. STACK SAMPLES (CONTINUED)

Date collected: March 14, 1985  
 Location: Cooler Exhaust Stack  
 Stack flow rate (m<sup>3</sup>/sec): 0.2684

<u>Radionuclide</u>	<u>CONCENTRATION (uCi/ml)</u>	<u>ERROR ESTIMATE (uCi/ml)</u>	<u>RELEASE RATE (Ci/gr)</u>	<u>ERROR ESTIMATE (Ci/gr)</u>	<u>LLD (uCi/ml)</u>	<u>RESTRICTED ΣMPC</u>
U-nat	$4.11 \times 10^{-11}$	$\pm 0.27 \times 10^{-11}$	$0.28 \times 10^{-4}$	$\pm 0.02 \times 10^{-4}$	$3 \times 10^{-13}$	41.1
Th-230	$6.83 \times 10^{-12}$	$\pm 1.12 \times 10^{-12}$	$4.71 \times 10^{-6}$	$\pm 0.77 \times 10^{-6}$	$8 \times 10^{-13}$	341.5
Ra-226	$3.61 \times 10^{-13}$	$\pm 3.25 \times 10^{-13}$	$2.49 \times 10^{-6}$	$\pm 2.24 \times 10^{-6}$	$5 \times 10^{-13}$	1.2
Pb-210	$1.60 \times 10^{-13}$	$\pm 26.3 \times 10^{-13}$	$0.11 \times 10^{-6}$	$\pm 1.81 \times 10^{-6}$	$4 \times 10^{-12}$	1.6
Rn-222	$5.2 \times 10^{-9}$	$\pm 0.7 \times 10^{-9}$	$35.83 \times 10^{-4}$	$\pm 4.82 \times 10^{-4}$	$2 \times 10^{-10}$	17.3

## 2. AIR SAMPLES

Locations: Site 1 - 7800' WNW of yellowcake dryer stack.  
 Site 2 - 500' S of yellowcake dryer stack.  
 Site 3 - 3200' NE of yellowcake dryer stack.  
 Site 4 - 11800' NNE of yellowcake dryer stack.  
 Site 5 - 3000' ENE of yellowcake dryer stack.  
 Site 6 - 11700' S of yellowcake dryer stack.

DATE COLLECTED:	<u>RADIONUCLIDE</u>	<u>CONCENTRATION</u> (uCi/ml)	<u>ERROR ESTIMATE</u> (uCi/ml)	<u>LLD</u> (uCi/ml)	<u>LMPC</u>
1st Quarter 1985					
LOCATION: SITE 1	U-Nat	$0.71 \times 10^{-15}$		$1 \times 10^{-16}$	0.01
	Th-230	$0.17 \times 10^{-15}$	$\pm 0.07 \times 10^{-15}$	$1 \times 10^{-16}$	0.21
	Ra-226	$0.11 \times 10^{-15}$	$\pm 0.05 \times 10^{-15}$	$1 \times 10^{-16}$	0.004
	Pb-210	$1.50 \times 10^{-14}$	$\pm 0.02 \times 10^{-14}$	$1 \times 10^{-15}$	0.37
	Rn-222	$0.83 \times 10^{-9}$	$\pm 0.09 \times 10^{-9}$	$0.2 \times 10^{-9}$	27.7
DATE COLLECTED:	<u>RADIONUCLIDE</u>				
1st Quarter 1985					
LOCATION: SITE 2	U-Nat	$7.01 \times 10^{-15}$		$1 \times 10^{-16}$	0.14
	Th-230	$2.3 \times 10^{-15}$	$\pm 0.2 \times 10^{-15}$	$1 \times 10^{-16}$	2.9
	Ra-226	$1.1 \times 10^{-15}$	$\pm 0.1 \times 10^{-15}$	$1 \times 10^{-16}$	0.04
	Pb-210	$1.47 \times 10^{-14}$	$\pm 0.03 \times 10^{-14}$	$1 \times 10^{-15}$	0.37
	Rn-222	$1.84 \times 10^{-9}$	$\pm 0.06 \times 10^{-9}$	$0.2 \times 10^{-9}$	61.3

2. AIR SAMPLES (CONTINUED)

DATE COLLECTED: 1st Quarter 1985	<u>RADIONUCLIDE</u>	<u>CONCENTRATION</u> (uCi/ml)	<u>ERROR ESTIMATE</u> (uCi/ml)	<u>LLD</u> (uCi/ml)	<u>%MPC</u>
LOCATION: SITE 3	U-Nat	$1.29 \times 10^{-15}$		$1 \times 10^{-16}$	0.03
	Th-230	$1.6 \times 10^{-15}$	$\pm 0.2 \times 10^{-15}$	$1 \times 10^{-16}$	2.0
	Ra-226	$1.3 \times 10^{-15}$	$\pm 0.1 \times 10^{-15}$	$1 \times 10^{-16}$	0.04
	Pb-210	$1.13 \times 10^{-14}$	$\pm 0.02 \times 10^{-14}$	$1 \times 10^{-15}$	0.28
	Rn-222	$0.61 \times 10^{-9}$	$\pm 0.08 \times 10^{-9}$	$0.2 \times 10^{-9}$	20.3
DATE COLLECTED: 1st Quarter 1985	<u>RADIONUCLIDE</u>				
LOCATION: SITE 4	U-Nat	$0.64 \times 10^{-15}$		$1 \times 10^{-16}$	0.01
	Th-230	$0.30 \times 10^{-15}$	$\pm 0.10 \times 10^{-15}$	$1 \times 10^{-16}$	0.38
	Ra-226	$0.27 \times 10^{-15}$	$\pm 0.08 \times 10^{-15}$	$1 \times 10^{-16}$	0.009
	Pb-210	$1.28 \times 10^{-14}$	$\pm 0.02 \times 10^{-14}$	$1 \times 10^{-15}$	0.32
	Rn-222	$0.54 \times 10^{-9}$	$\pm 0.07 \times 10^{-9}$	$0.2 \times 10^{-9}$	18.0
DATE COLLECTED: 1st Quarter 1985	<u>RADIONUCLIDE</u>				
LOCATION: SITE 5	U-Nat	$3.07 \times 10^{-15}$		$1 \times 10^{-16}$	0.06
	Th-230	$1.6 \times 10^{-15}$	$\pm 0.2 \times 10^{-15}$	$1 \times 10^{-16}$	2.0
	Ra-226	$1.1 \times 10^{-15}$	$\pm 0.1 \times 10^{-15}$	$1 \times 10^{-16}$	0.04
	Pb-210	$1.28 \times 10^{-14}$	$\pm 0.02 \times 10^{-14}$	$1 \times 10^{-15}$	0.32
	Rn-222	$1.24 \times 10^{-9}$	$\pm 0.11 \times 10^{-9}$	$0.2 \times 10^{-9}$	41.3

2. AIR SAMPLES (CONTINUED)

DATE COLLECTED: 1st Quarter 1985	<u>RADIONUCLIDE</u>	<u>CONCENTRATION</u> <u>(uCi/ml)</u>	<u>ERROR ESTIMATE</u> <u>(uCi/ml)</u>	<u>LLD</u> <u>(uCi/ml)</u>	<u>IMPC</u>
LOCATION: SITE 6	U-Nat	$0.42 \times 10^{-15}$		$1 \times 10^{-16}$	0.01
	Th-230	$0.10 \times 10^{-15}$	$\pm 0.06 \times 10^{-15}$	$1 \times 10^{-16}$	0.13
	Ra-226	$0.03 \times 10^{-15}$	$\pm 0.04 \times 10^{-15}$	$1 \times 10^{-16}$	0.001
	Pb-210	$1.11 \times 10^{-14}$	$\pm 0.02 \times 10^{-14}$	$1 \times 10^{-15}$	0.28
	Rn-222	$0.57 \times 10^{-9}$	$\pm 0.08 \times 10^{-9}$	$0.2 \times 10^{-9}$	19.0

### 3. LIQUID SAMPLES

The following water samples were not collected for this quarter for the stated reason.

<u>LOCATION</u>	<u>TYPE OF SAMPLE</u>	<u>REASON</u>
1. SAND DRAW	SURFACE	DRY
2. LITTLE MEDICINE BOW RIVER	SURFACE	FROZEN SOLID
3. LITTLE MEDICINE BOW RIVER (BELOW)	SURFACE	FROZEN SOLID
4. COLLECTION WELL	GROUNDWATER	FROZEN
5. RTH 2	GROUNDWATER	DRY WELL
6. RTH 3	GROUNDWATER	DRY WELL
7. 1-AC	GROUNDWATER	COULD NOT LOCATE DUE TO SNOW DEPTH.

### 3. LIQUID SAMPLES

Date collected: January 15, 1985  
 Location: Mill Feed Pond  
 Type of sample: Surface - Grab

<u>RADIONUCLIDE</u>	<u>CONCENTRATION (uCi/ml)</u>	<u>ERROR ESTIMATE (uCi/ml)</u>	<u>LLD (uCi/ml)</u>
U-nat (Dissolved)	41.6 X 10 <sup>-9</sup>		
U-nat (Suspended)	1.93 X 10 <sup>-9</sup>		
Th-230 (Dissolved)	0.2 X 10 <sup>-9</sup>	± 0.3 X 10 <sup>-9</sup>	0.2 X 10 <sup>-9</sup>
Th-230 (Suspended)	0.7 X 10 <sup>-9</sup>	± 0.2 X 10 <sup>-9</sup>	0.2 X 10 <sup>-9</sup>
Ra-226 (Dissolved)	5.12 X 10 <sup>-9</sup>	± 0.4 X 10 <sup>-9</sup>	0.2 X 10 <sup>-9</sup>
Ra-226 (Suspended)	0.23 X 10 <sup>-9</sup>	± 0.29 X 10 <sup>-9</sup>	0.6 X 10 <sup>-9</sup>
Pb-210 (Dissolved)	6.58 X 10 <sup>-9</sup>	± 2.52 X 10 <sup>-9</sup>	5.6 X 10 <sup>-9</sup>
Pb-210 (Suspended)	4.0 X 10 <sup>-9</sup>	± 3.8 X 10 <sup>-9</sup>	9.0 X 10 <sup>-9</sup>
Po-210 (Dissolved)	0.0 X 10 <sup>-9</sup>	± 0.2 X 10 <sup>-9</sup>	0.3 X 10 <sup>-9</sup>
Po-210 (Suspended)	0.0 X 10 <sup>-9</sup>	± 0.2 X 10 <sup>-9</sup>	0.2 X 10 <sup>-9</sup>



### 3. LIQUID SAMPLES

Date collected: January 22, 1985  
 Location: Little Medicine Bow River  
 Type of sample: Surface - Grab

<u>RADIONUCLIDE</u>	<u>CONCENTRATION (uCi/ml)</u>	<u>ERROR ESTIMATE (uCi/ml)</u>	<u>LLD (uCi/ml)</u>
U-nat (Dissolved)	$7.75 \times 10^{-9}$		
U-nat (Suspended)	$0.0 \times 10^{-9}$		
Th-230 (Dissolved)	$1.3 \times 10^{-9}$	$\pm 0.3 \times 10^{-9}$	$0.2 \times 10^{-9}$
Th-230 (Suspended)	$1.1 \times 10^{-9}$	$\pm 0.2 \times 10^{-9}$	$0.2 \times 10^{-9}$
Ra-226 (Dissolved)	$0.24 \times 10^{-9}$	$\pm 0.13 \times 10^{-9}$	$0.2 \times 10^{-9}$
Ra-226 (Suspended)	$0.45 \times 10^{-9}$	$\pm 0.28 \times 10^{-9}$	$0.5 \times 10^{-9}$
Pb-210 (Dissolved)	$4.25 \times 10^{-9}$	$\pm 2.0 \times 10^{-9}$	$4.6 \times 10^{-9}$
Pb-210 (Suspended)	$3.1 \times 10^{-9}$	$\pm 4.13 \times 10^{-9}$	$9.8 \times 10^{-9}$
Po-210 (Dissolved)	$0.0 \times 10^{-9}$	$\pm 0.2 \times 10^{-9}$	$0.3 \times 10^{-9}$
Po-210 (Suspended)	$0.0 \times 10^{-9}$	$\pm 0.2 \times 10^{-9}$	$0.2 \times 10^{-9}$

### 3. LIQUID SAMPLES

Date collected: January 21, 1985  
 Location: Mine Shop Well  
 Type of sample: Groundwater - Pumped

<u>RADIONUCLIDE</u>	<u>CONCENTRATION (uCi/ml)</u>	<u>ERROR ESTIMATE (uCi/ml)</u>	<u>LLD (uCi/ml)</u>
U-nat (Dissolved)	$5.81 \times 10^{-9}$		
U-nat (Suspended)	$2.90 \times 10^{-9}$		
Th-230 (Dissolved)	$0.7 \times 10^{-9}$	$\pm 0.3 \times 10^{-9}$	$0.2 \times 10^{-9}$
Th-230 (Suspended)	$0.8 \times 10^{-9}$	$\pm 0.2 \times 10^{-9}$	$0.2 \times 10^{-9}$
Ra-226 (Dissolved)	$0.39 \times 10^{-9}$	$\pm 0.12 \times 10^{-9}$	$0.2 \times 10^{-9}$
Ra-226 (Suspended)	$0.26 \times 10^{-9}$	$\pm 0.24 \times 10^{-9}$	$0.5 \times 10^{-9}$
Pb-210 (Dissolved)	$5.9 \times 10^{-9}$	$\pm 2.8 \times 10^{-9}$	$6.2 \times 10^{-9}$
Pb-210 (Suspended)	$7.5 \times 10^{-9}$	$\pm 6.76 \times 10^{-9}$	$16.0 \times 10^{-9}$
Po-210 (Dissolved)	$0.0 \times 10^{-9}$	$\pm 0.2 \times 10^{-9}$	$0.3 \times 10^{-9}$
Po-210 (Suspended)	$0.0 \times 10^{-9}$	$\pm 0.2 \times 10^{-9}$	$0.2 \times 10^{-9}$

# PETROTOMICS ENVIRONMENTAL LABORATORY

## ANALYTICAL REPORT WATER

SAMPLE SITE: Mine Shop well

SAMPLE NO.: 16183

DATE: 1-21-85

	<u>mg/l</u>
Aluminium .....	_____
Ammonia .....	_____
Arsenic .....	<u>nd(0.002)</u>
Barium .....	_____
Bicarbonate .....	_____
Boron .....	_____
Cadmium .....	_____
Calcium .....	_____
Carbon (organic) .....	_____
Carbonate .....	_____
Chloride .....	<u>4.0</u>
Chromium .....	_____
Copper .....	_____
Fluoride .....	_____
Hardness .....	<u>100</u>

	<u>mg/l</u>
Iron .....	_____
Lead .....	<u>nd(0.05)</u>
Magnesium .....	_____
Manganese .....	_____
Mercury .....	_____
Molybdenum .....	_____
Nickel .....	_____
Nitrate .....	<u>0.06</u>
Potassium .....	_____
Selenium .....	_____
Sodium .....	_____
Sulfate .....	<u>324</u>
Total Dissolved Solids .....	<u>549</u>
Total Suspended Solids .....	_____
Zinc .....	_____
pH (units) .....	_____

COMMENTS: \_\_\_\_\_

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NR = Analysis Not Required

I = Not Detected at level given in parenthesis.

Reviewed by: SJP/H

Date: 4-4-85

### 3. LIQUID SAMPLES (CONTINUED)

Date collected: January 15, 1985  
 Location: Well RTH-1  
 Type of sample: Groundwater - Bailed

<u>RADIONUCLIDE</u>	<u>CONCENTRATION</u> (uCi/ml)	<u>ERROR ESTIMATE</u> (uCi/ml)	<u>LLD</u> (uCi/ml)
U-nat	28.1 X 10 <sup>-9</sup>		
Th-230	0.9 X 10 <sup>-9</sup>	± 0.2 X 10 <sup>-9</sup>	0.2 X 10 <sup>-9</sup>
Ra-226	2.34 X 10 <sup>-9</sup>	± 0.29 X 10 <sup>-9</sup>	0.2 X 10 <sup>-9</sup>
Pb-210	2.56 X 10 <sup>-9</sup>	± 1.79 X 10 <sup>-9</sup>	4.0 X 10 <sup>-9</sup>
Po-210	0.0 X 10 <sup>-9</sup>	± 0.2 X 10 <sup>-9</sup>	0.3 X 10 <sup>-9</sup>

Date collected: January 18, 1985  
 Location: Well RTH-4  
 Type of sample: Groundwater - Bailed

<u>RADIONUCLIDE</u>			
U-nat	8.71 X 10 <sup>-9</sup>		
Th-230	0.6 X 10 <sup>-9</sup>	± 0.2 X 10 <sup>-9</sup>	0.2 X 10 <sup>-9</sup>
Ra-226	1.10 X 10 <sup>-9</sup>	± 0.19 X 10 <sup>-9</sup>	0.1 X 10 <sup>-9</sup>
Pb-210	6.9 X 10 <sup>-9</sup>	± 5.1 X 10 <sup>-9</sup>	12.0 X 10 <sup>-9</sup>
Po-210	0.0 X 10 <sup>-9</sup>	± 0.4 X 10 <sup>-9</sup>	0.4 X 10 <sup>-9</sup>

PETROTOMICS ENVIRONMENTAL LABORATORY

ANALYTICAL REPORT  
WATER

SAMPLE SITE: Rth 1

SAMPLE NO.: 116177

DATE: 1-15-85

	<u>mg/l</u>		<u>mg/l</u>
Aluminium .....	_____	Iron .....	_____
Ammonia .....	_____	Lead .....	<u>.08</u>
Arsenic .....	<u>ND(0.002)</u>	Magnesium .....	_____
Barium .....	_____	Manganese .....	_____
Bicarbonate .....	_____	Mercury .....	_____
Boron .....	_____	Molybdenum .....	_____
Cadmium .....	_____	Nickel .....	_____
Calcium .....	_____	Nitrate .....	<u>2098</u>
Carbon (organic) .....	_____	Potassium .....	_____
Carbonate .....	_____	Selenium .....	_____
Chloride .....	<u>512</u>	Sodium .....	_____
Chromium .....	_____	Sulfate .....	<u>1295</u>
Copper .....	_____	Total Dissolved Solids .....	<u>2814</u>
Fluoride .....	_____	Total Suspended Solids .....	_____
Hardness .....	<u>2080</u>	Zinc .....	_____
		pH (units) .....	<u>6.3</u>

COMMENTS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

NR = Analysis Not Required

ND = Not Detected at level given in parenthesis.

Reviewed by: [Signature]

Date: 4-4-85

PETROTOMICS ENVIRONMENTAL LABORATORY

ANALYTICAL REPORT  
WATER

SAMPLE SITE: Rth 4

SAMPLE NO.: 16178

DATE: 1-28-85

	<u>mg/l</u>		<u>mg/l</u>
Aluminium .....	_____	Iron .....	_____
Ammonia .....	_____	Lead .....	<u>ND(0.05)</u>
Arsenic .....	<u>ND(0.002)</u>	Magnesium .....	_____
Barium .....	_____	Manganese .....	_____
Bicarbonate .....	_____	Mercury .....	_____
Boron .....	_____	Molybdenum .....	_____
Cadmium .....	_____	Nickel .....	_____
Calcium .....	_____	Nitrate .....	<u>037</u>
Carbon (organic) .....	_____	Potassium .....	_____
Carbonate .....	_____	Selenium .....	_____
Chloride .....	<u>8.0</u>	Sodium .....	_____
Chromium .....	_____	Sulfate .....	<u>452</u>
Copper .....	_____	Total Dissolved Solids .....	<u>676</u>
Fluoride .....	_____	Total Suspended Solids .....	_____
Hardness .....	<u>460</u>	Zinc .....	_____
		pH (units) .....	_____

COMMENTS: \_\_\_\_\_

NR = Analysis Not Required

ND = Not Detected at level given in parenthesis.

Reviewed by: [Signature]

Date: 4-4-85

### 3. LIQUID SAMPLES (CONTINUED)

Date collected: January 28, 1985  
 Location: Well RTH-5  
 Type of sample: Groundwater - Bailed

<u>RADIONUCLIDE</u>	<u>CONCENTRATION (uCi/ml)</u>	<u>ERROR ESTIMATE (uCi/ml)</u>	<u>LLD (uCi/ml)</u>
U-nat	12.5 X 10 <sup>-9</sup>		
Th-230	0.5 X 10 <sup>-9</sup>	± 0.2 X 10 <sup>-9</sup>	0.2 X 10 <sup>-9</sup>
Ra-226	0.95 X 10 <sup>-9</sup>	± 0.17 X 10 <sup>-9</sup>	0.01 X 10 <sup>-9</sup>
Pb-210	6.5 X 10 <sup>-9</sup>	± 5.9 X 10 <sup>-9</sup>	14.0 X 10 <sup>-9</sup>
Po-210	0.0 X 10 <sup>-9</sup>	± 0.2 X 10 <sup>-9</sup>	0 X 10 <sup>-9</sup>

Date collected: January 21, 1985  
 Location: Townsite  
 Type of sample: Groundwater - Pumped

<u>RADIONUCLIDE</u>			
U-nat	4.8 X 10 <sup>-9</sup>		
Th-230	0.9 X 10 <sup>-9</sup>	± 0.2 X 10 <sup>-9</sup>	0.2 X 10 <sup>-9</sup>
Ra-226	0.26 X 10 <sup>-9</sup>	± 0.1 X 10 <sup>-9</sup>	0.01 X 10 <sup>-9</sup>
Pb-210	9.9 X 10 <sup>-9</sup>	± 4.1 X 10 <sup>-9</sup>	9.2 X 10 <sup>-9</sup>
Po-210	0.0 X 10 <sup>-9</sup>	± 0.2 X 10 <sup>-9</sup>	0.3 X 10 <sup>-9</sup>

# PETROTOMICS ENVIRONMENTAL LABORATORY

## ANALYTICAL REPORT WATER

SAMPLE SITE: Rth 5

SAMPLE NO.: 16179

DATE: 1-28-85

	<u>mg/l</u>		<u>mg/l</u>
Aluminium .....	_____	Iron .....	_____
Ammonia .....	_____	Lead .....	<u>ND(0.05)</u>
Arsenic .....	<u>ND(0.002)</u>	Magnesium .....	_____
Barium .....	_____	Manganese .....	_____
Bicarbonate .....	_____	Mercury .....	_____
Boron .....	_____	Molybdenum .....	_____
Cadmium .....	_____	Nickel .....	_____
Calcium .....	_____	Nitrate .....	<u>1044</u>
Carbon (organic) .....	_____	Potassium .....	_____
Carbonate .....	_____	Selenium .....	_____
Chloride .....	<u>6.0</u>	Sodium .....	_____
Chromium .....	_____	Sulfate .....	<u>567</u>
Copper .....	_____	Total Dissolved Solids .....	<u>919</u>
Fluoride .....	_____	Total Suspended Solids .....	_____
Hardness .....	<u>1000</u>	Zinc .....	_____
		pH (units) .....	_____

COMMENTS: \_\_\_\_\_

\_\_\_\_\_

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NR = Analysis Not Required

ND = Not Detected at level given in parenthesis.

Reviewed by: [Signature]

Date: 4-4-85



# PETROTOMICS ENVIRONMENTAL LABORATORY

## ANALYTICAL REPORT WATER

SAMPLE SITE: Townsite

SAMPLE NO.: 16180

DATE: 7-21-85

	<u>mg/l</u>		<u>mg/l</u>
Aluminium .....	_____	Iron .....	_____
Ammonia .....	_____	Lead .....	<u>ND(0.05)</u>
Arsenic .....	<u>ND(0.05)</u>	Magnesium .....	_____
Barium .....	_____	Manganese .....	_____
Bicarbonate .....	_____	Mercury .....	_____
Boron .....	_____	Molybdenum .....	_____
Cadmium .....	_____	Nickel .....	_____
Calcium .....	_____	Nitrate .....	<u>.023</u>
Carbon (organic) .....	_____	Potassium .....	_____
Carbonate .....	_____	Selenium .....	_____
Chloride .....	<u>10.0</u>	Sodium .....	_____
Chromium .....	_____	Sulfate .....	<u>1850</u>
Copper .....	_____	Total Dissolved Solids .....	<u>362</u>
Fluoride .....	_____	Total Suspended Solids .....	_____
Hardness .....	<u>240</u>	Zinc .....	_____
		pH (units) .....	_____

COMMENTS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

NR = Analysis Not Required

ND = Not Detected at level given in parenthesis.

Reviewed by: [Signature]

Date: 4-4-85

3. LIQUID SAMPLES (CONTINUED)

Date collected: January 22, 1985  
 Location: Well 3-SC  
 Type of sample: Groundwater - Bailed

<u>RADIONUCLIDE</u>	<u>CONCENTRATION</u> <u>(uCi/ml)</u>	<u>ERROR ESTIMATE</u> <u>(uCi/ml)</u>	<u>LLD</u> <u>(uCi/ml)</u>
U-nat	101.6 X 10 <sup>-9</sup>		
Ra-226	4.12 X 10 <sup>-9</sup>	± 0.36 X 10 <sup>-9</sup>	0.1 X 10 <sup>-9</sup>

Date collected: January 22, 1985  
 Location: Well 4-SC  
 Type of sample: Groundwater - Bailed

<u>RADIONUCLIDE</u>			
U-nat	32.9 X 10 <sup>-9</sup>		
Ra-226	11.57 X 10 <sup>-9</sup>	± 0.59 X 10 <sup>-9</sup>	0.1 X 10 <sup>-9</sup>

SEEPAGE  
WATER ANALYSIS RESULTS

LOCATION: 35C

DATE: 1-22-85

COLLECTED BY: mm/jh

TIME: \_\_\_\_\_

SAMPLES #: 16187

ANALYSIS:

U-Nat 1016.522 <sup>-10 uCi/ml</sup> 0 <sup>mg/l</sup>  
Th -230 \_\_\_\_\_ p Ci/l  
Ra -226 4.12 ± .3 <sup>uCi/ml -9</sup> p Ci/l x 10 0.0 LLD  
Pb -210 \_\_\_\_\_ p Ci/l  
Po -210 \_\_\_\_\_ p Ci/l

FIELD MEASUREMENTS:

Alkalinity: \_\_\_\_\_

Chloride: 415 mg/l

Conductivity (micromhos, cm corrected to 25°C): 5440

Discharge Rate: \_\_\_\_\_

Dissolved Oxygen: \_\_\_\_\_

pH (reported to nearest 0.1 pH units): 6.4

Pumping Time (for wells): \_\_\_\_\_

Temperature: 1.8°C

Turbidity: \_\_\_\_\_

Water Level (for wells): \_\_\_\_\_

COMMENTS: Sulfate = 3040 mg/l  
TDS = 5737 mg/l

Reviewed by: mm/jh

Date: 4-4-85

SEEPAGE  
WATER ANALYSIS RESULTS

LOCATION: 45C

DATE: 1-22-85

COLLECTED BY: mm/gk

TIME: \_\_\_\_\_

SAMPLES #: 16188

ANALYSIS:

U-Nat 329.16 x 10<sup>-10</sup>  $\mu$ Ci/ml mg/l

Th -230 \_\_\_\_\_ p Ci/l

Ra -226 11.57  $\pm$  .59  $\mu$ Ci/ml  $\times 10^{-9}$  1.3 x 10<sup>-10</sup> pCi/L LLD

Pb -210 \_\_\_\_\_ p Ci/l

Po -210 \_\_\_\_\_ p Ci/l

FIELD MEASUREMENTS:

Alkalinity: \_\_\_\_\_

Chloride: 860 mg/l

Conductivity (micromhos/cm corrected to 25°C): 5260

Discharge Rate: \_\_\_\_\_

Dissolved Oxygen: \_\_\_\_\_

pH (reported to nearest 0.1 pH units): 5.8

Pumping Time (for wells): \_\_\_\_\_

Temperature: 8.2°C

Turbidity: \_\_\_\_\_

Water Level (for wells): \_\_\_\_\_

COMMENTS: Sulfate = 2680 mg/l

TDS = 5316 mg/l

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Reviewed by: HP/roff

Date: 4-4-85

### 3. LIQUID SAMPLES (CONTINUED)

Date collected: January 24, 1985  
 Location: Well 40-SC  
 Type of sample: Groundwater - Bailed

<u>RADIONUCLIDE</u>	<u>CONCENTRATION</u> <u>(uCi/ml)</u>	<u>ERROR ESTIMATE</u> <u>(uCi/ml)</u>	<u>LLD</u> <u>(uCi/ml)</u>
U-nat	3.87 X 10 <sup>-9</sup>		
Ra-226	0.39 X 10 <sup>-9</sup>	± 0.11 X 10 <sup>-9</sup>	0.1 X 10 <sup>-9</sup>

Date collected: January 24, 1985  
 Location: Well 41-SC  
 Type of sample: Groundwater - Bailed

<u>RADIONUCLIDE</u>	<u>CONCENTRATION</u> <u>(uCi/ml)</u>	<u>ERROR ESTIMATE</u> <u>(uCi/ml)</u>	<u>LLD</u> <u>(uCi/ml)</u>
U-nat	56.1 X 10 <sup>-9</sup>		
Ra-226	0.64 X 10 <sup>-9</sup>	± 0.14 X 10 <sup>-9</sup>	0.1 X 10 <sup>-9</sup>

SEEPAGE  
WATER ANALYSIS RESULTS

LOCATION: 40 SC

DATE: 1/24/85

COLLECTED BY: mm/gk

TIME: \_\_\_\_\_

SAMPLES #: 16185

ANALYSIS:

U-Nat 38.72 x 10<sup>-10</sup> uc/ml mg/l  
Th -230 \_\_\_\_\_ p Ci/l  
Ra -226 .39 ± .11 uc/ml -9 1.16 x 10<sup>-10</sup> pCi/l LD  
Pb -210 \_\_\_\_\_ p Ci/l  
Po -210 \_\_\_\_\_ p Ci/l

FIELD MEASUREMENTS:

Alkalinity: \_\_\_\_\_

Chloride: 72 mg/l

Conductivity (micromhos/cm corrected to 25°C): 1675

Discharge Rate: \_\_\_\_\_

Dissolved Oxygen: \_\_\_\_\_

pH (reported to nearest 0.1 pH units): 6.2

Pumping Time (for wells): \_\_\_\_\_

Temperature: 4.3°C

Turbidity: \_\_\_\_\_

Water level (for wells): 6'

COMMENTS: sulfate = 236 mg/l

TDS = 507 mg/l

Reviewed by: [Signature]

Date: 4-4-85

SEEPAGE  
WATER ANALYSIS RESULTS

LOCATION: 415C

DATE: 1/24/85

COLLECTED BY: mm/jc

TIME: \_\_\_\_\_

SAMPLES #: 16186

ANALYSIS:

U-Nat 561.50 x 10<sup>-10</sup> mCi/ml

Th -230 \_\_\_\_\_ p Ci/l

Ra -226 0.64 ± .14 p Ci/l 9.1 x 10<sup>-11</sup> pCi/l LLD

Pb -210 \_\_\_\_\_ p Ci/l

Po -210 \_\_\_\_\_ p Ci/l

FIELD MEASUREMENTS:

Alkalinity: \_\_\_\_\_

Chloride: 536 mg/l

Conductivity (micromhos/cm corrected to 25°C): 3280

Discharge Rate: \_\_\_\_\_

Dissolved Oxygen: \_\_\_\_\_

pH (reported to nearest 0.1 pH units): 10.0

Pumping Time (for wells): \_\_\_\_\_

Temperature: 5.7°C

Turbidity: \_\_\_\_\_

Water Level (for wells): 12'

COMMENTS: Sulfate = 1540 mg/l

TDS = 3098 mg/l

Reviewed by: HPH

Date: 4-4-85

4. VEGETATION, FOOD, AND FISH SAMPLES

No samples collected this quarter.

5. SOIL AND SEDIMENT SAMPLES

No samples collected this quarter.



# 6. DIRECT RADIATION MEASUREMENTS

<u>LOCATION</u>	<u>EXPOSURE RATE</u> <u>(mr/qr)</u>	<u>ERROR ESTIMATE</u> <u>(mr/qr)</u>
Site 1	53.6	± 8.7
Site 2	83.2	±27.8
Site 3	73.0	±15.5
Site 4	50.4	± 3.0
Site 5	77.2	±16.8
Site 6	51.8	± 6.1

LOCATIONS: Site 1 - 1000' WNW of yellowcake dryer stack.  
 Site 2 - 500' S of yellowcake dryer stack.  
 Site 3 - 3200' NE of yellowcake dryer stack.  
 Site 4 - 11800' NNE of yellowcake dryer stack.  
 Site 5 - 3000' ENE of yellowcake dryer stack.  
 Site 6 - 11700' S of yellowcake dryer stack.