

# U. S. ENERGY / CRESTED CORP.

877 North 8th West

(307) 856-9271

Riverton, Wyoming 82501

October 22, 1996

Joseph J. Holonich, Chief  
High Level Waste and Uranium Recovery Projects Branch  
Division of Waste Management, NMSS (T-7-J9)  
Nuclear Regulatory Commission  
11545 Rockville Pike  
Rockville, MD 20850

Re: SUA-1524, Docket No. 40-8971.

Dear Mr. Holonich:

Enclosed are five (5) copies of supplemental information that was due with the 1995-96 Annual Update for the Green Mountain Ion Exchange Facility near Jeffrey City, Wyoming.

The information is being submitted late as a result of re-sampling the soil monitoring locations as per discussions with James Parks. Both the July and the resampling of September 1996 values are plotted on the graphs. As noted on the 50 yds down drainage graph, all values are elevated except for Radium. On the 150 yds down drainage graph, all values after resampling appear in line except for thorium which is elevated. I took additional samples labeled Baseline #1, 2 and 3 which are out of the drainage area for comparison and plotted the highest values as baseline (see attached Location Map). The baseline values are shown on the graphs as an asterisk. It is expected that various surface areas may have higher rad values as the discharge location is in a know mineralized area.

During 1995 and 1996 I personally did the field sampling. Prior to 1995 the sampling was completed by a consulting lab which was a continuation of the sampling procedures established by previous owners. I am at a loss as to why the results are different the past few years especially since there has been no discharge from the facility since February 11, 1989. The Company will continue to monitor the locations in an effort to evaluate the cause which then can be included in the future reclamation of the facility.

9610300140 961022  
PDR ADOCK 04008971  
C PDR

300006

FAX (307) 857-3050

GMMV\Corresp\1996\JH10-16-96

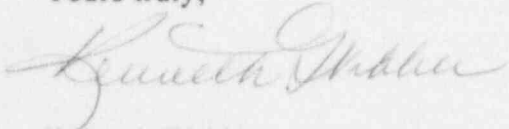
Mr. Joseph J. Holonich, Chief

October 16, 1996

Page 2

If you need any additional information, please contact me.

Yours truly,



Kenneth Webber  
Environmental Coordinator

KW/ms

cc: Mark Moxley  
Wyoming DEQ  
250 Lincoln St.  
Lander, WY 82520

Enclosures:

C-2 Crooks Creek Below Discharge, Analysis And Graph  
C-1 Crooks Creek Above Discharge, Analysis And Graph  
CC-7 Above Discharge On Crooks Creek, Analysis And Graph

Analysis Of Sediment 50 Yds And 150 Yds Down Drainage  
Sediment 50 Yds Down Drainage Graph  
Sediment 150 Yds Down Drainage Graph  
Kirk's Ranch Analysis  
Map Of Soil Sample Locations

TO  
CROOKS  
CREEK

North

FINAL  
RES.

NPDES  
DISCHARGE  
POINT.

150 Yds  
Down.

50 Yds  
Down.

A 2

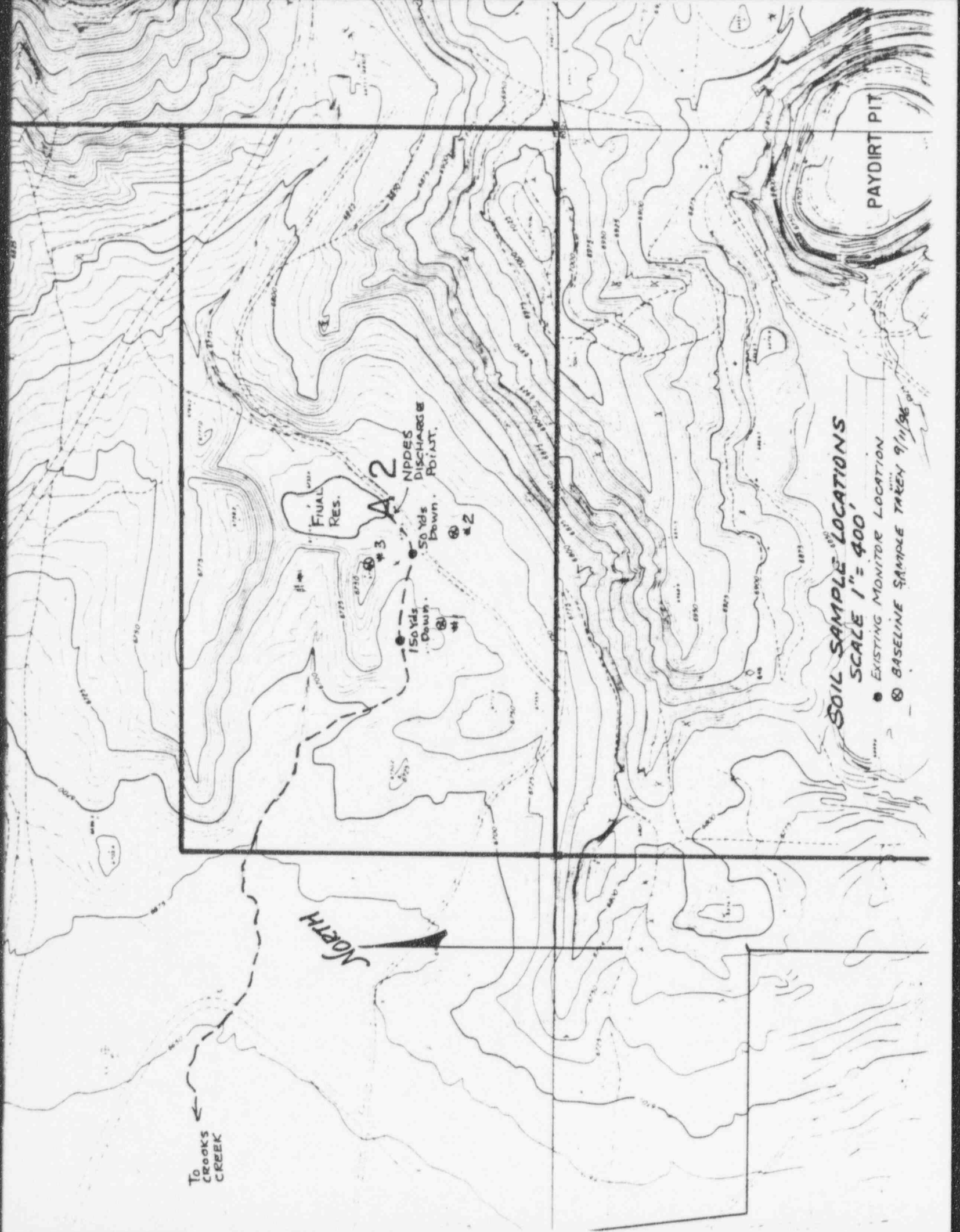
#3

#2

SOIL SAMPLE LOCATIONS  
SCALE 1" = 400'

- EXISTING MONITOR LOCATION
- ⊙ BASELINE SAMPLE TAKEN 9/11/96

PAYDIRT PIT

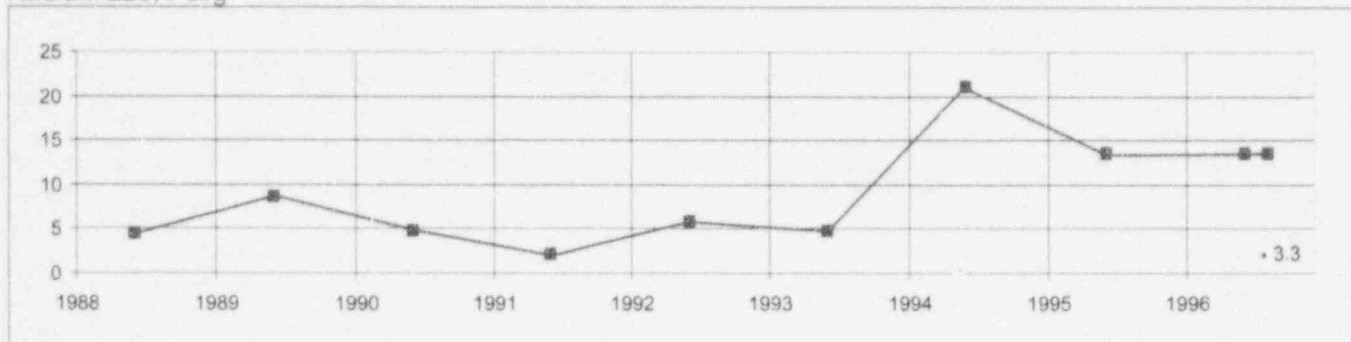


# Sediment 50 yards down drainage

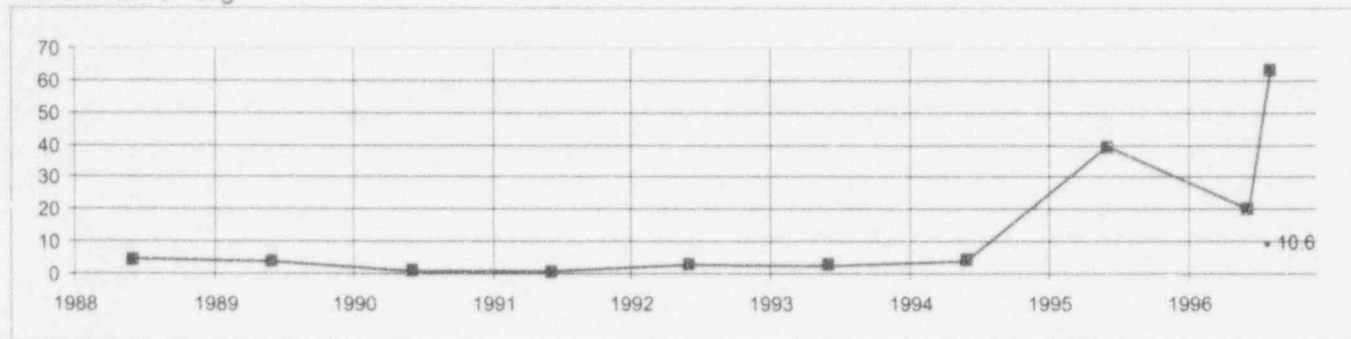
Uranium, Natural Pci/g



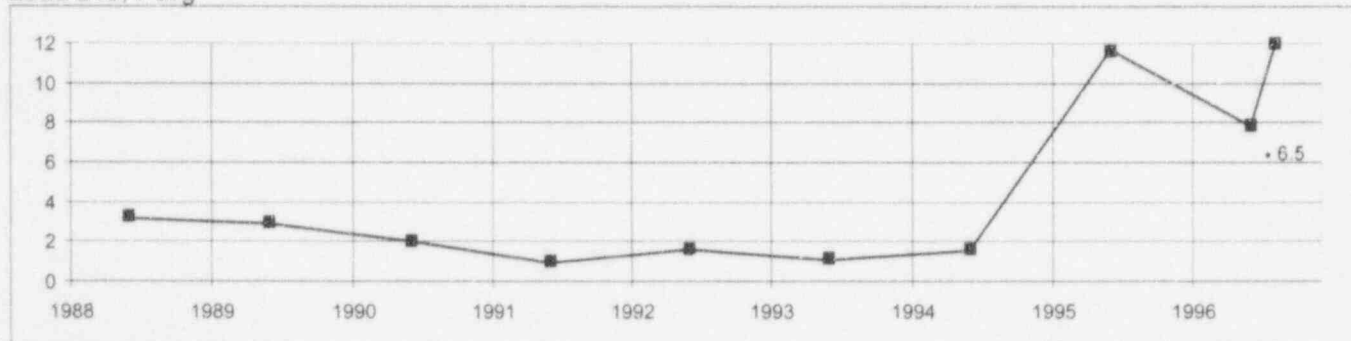
Radium 226, Pci/g



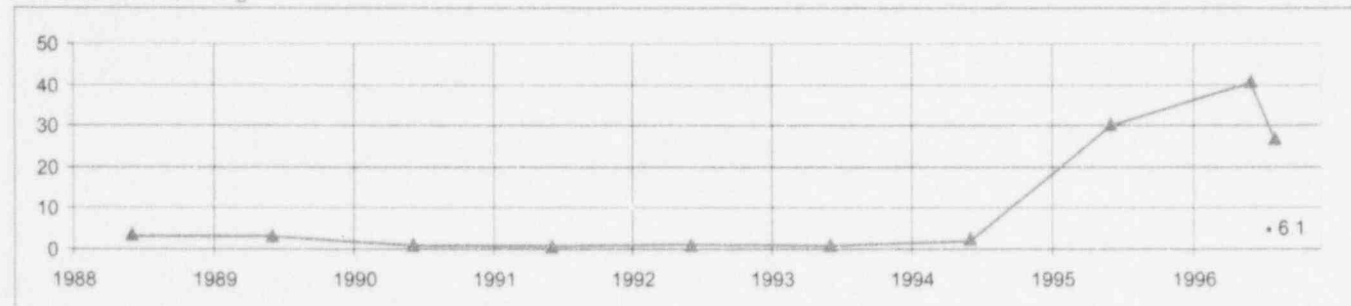
Thorium 230, Pci/g



Lead 210, Pci/g



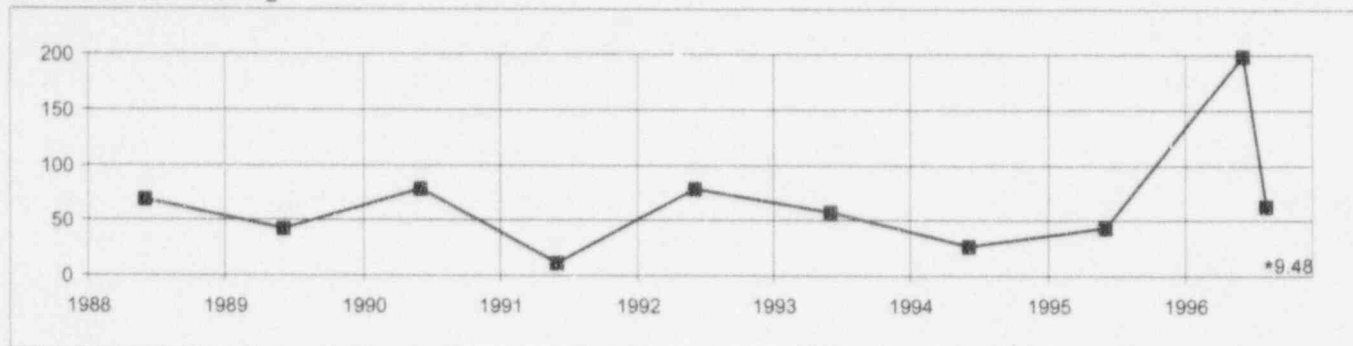
Polonium 210, Pci/g



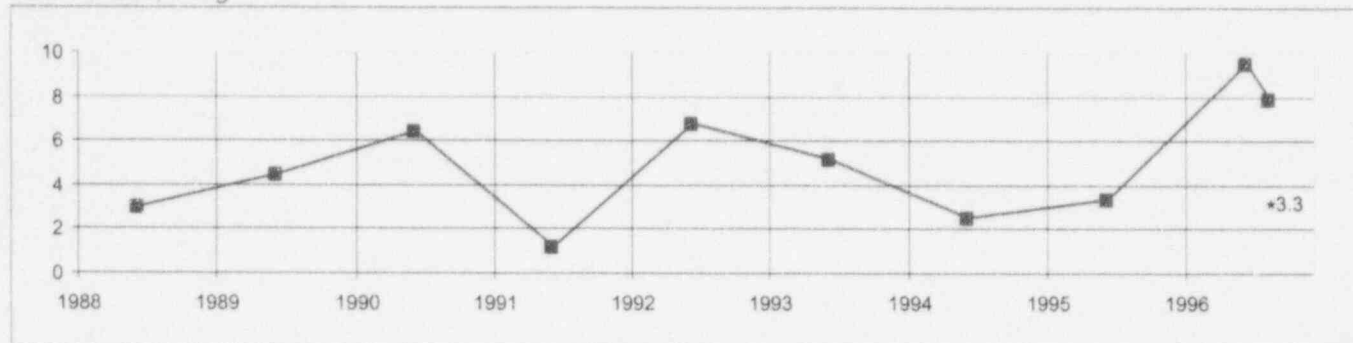
\* denotes the highest result from three baseline samples.

# Sediment 150 yards down drainage

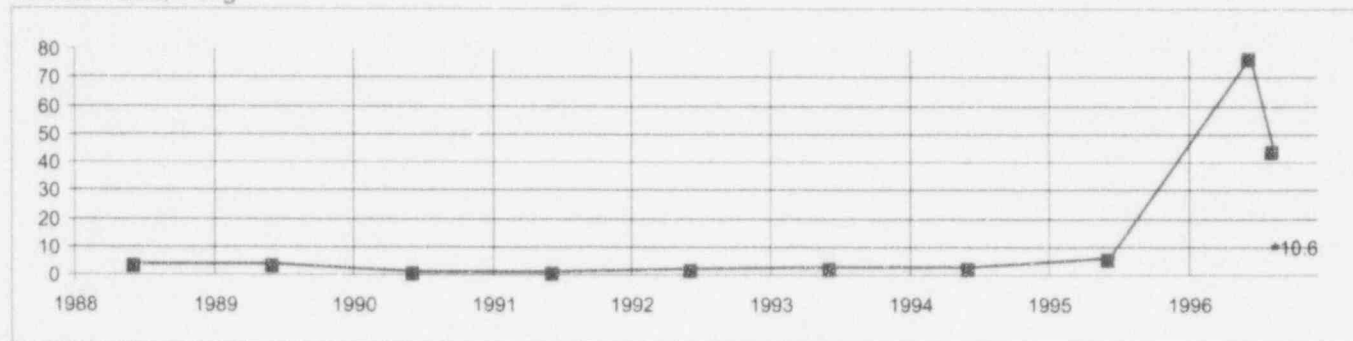
Uranium, Natural Pci/g



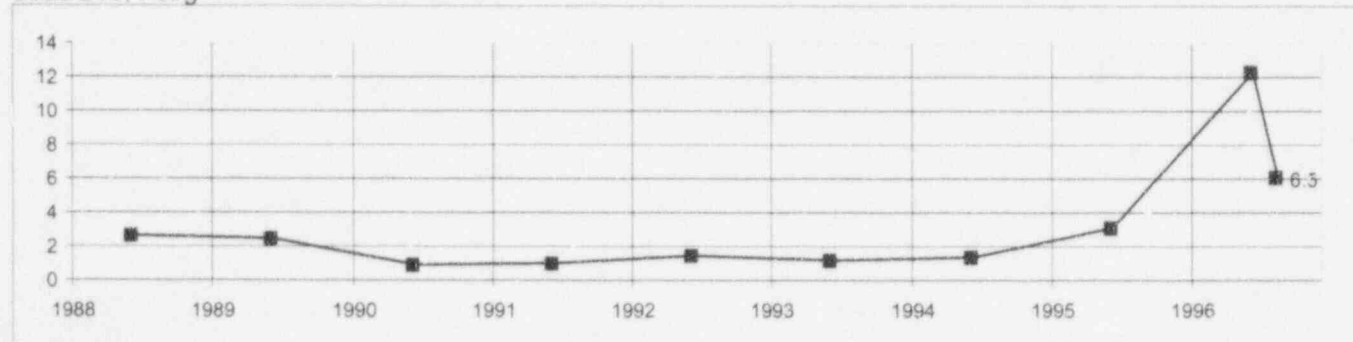
Radium 226, Pci/g



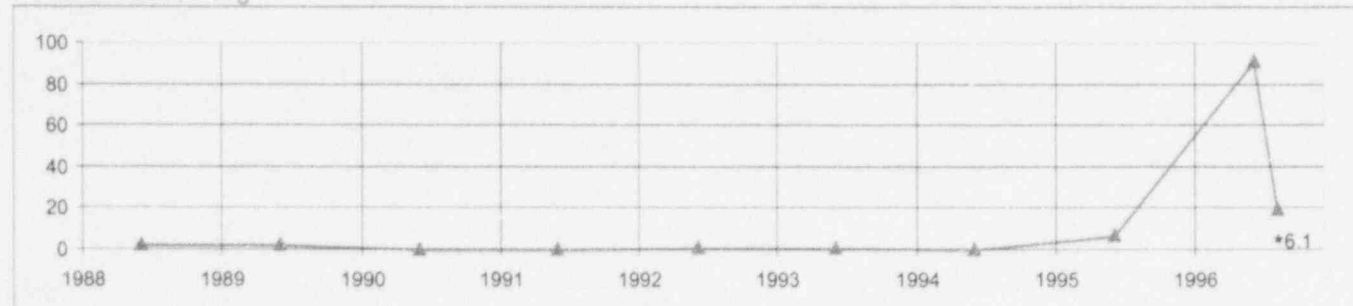
Thorium 230, Pci/g



Lead 210, Pci/g



Polonium 210, Pci/g



\* denotes the highest result from three baseline samples.


**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 - U.S. Energy**
**Page 1 of 2**
**Sample I.D.:**
**Laboratory I.D. #:**
**Sample Matrix:**
**Sample Date:**
**Report Date:**

Baseline #1	Baseline #2	Baseline #3	150 Yards Down	50 Yards Down
96-53519	96-53520	96-53521	96-53522	96-53523
Soil				
09-11-96				
10-10-96				

Radiometric	Units	Results				
Uranium ( $U_{Nat}$ )	pCi/g	2.53	5.86	9.48	63.0	225
Radium 226 ( $Ra_{226}$ )	pCi/g	2.2	3.3	0.6	7.9	13.5
Radium Precision $\pm$		0.2	0.3	0.1	0.4	0.5
Thorium 230 ( $Th_{230}$ )	pCi/g	1.6	10.6	0.4	43.8	63.1
Thorium Precision $\pm$		0.2	1.0	0.1	2.5	4.1
Lead 210 ( $Pb_{210}$ )	pCi/g	1.0	1.4	6.5	6.1	12.0
Lead Precision $\pm$		0.4	0.4	0.5	0.5	1.2
Polonium 210 ( $Po_{210}$ )	pCi/g	0.8	0.5	6.1	20.2	27.1
Polonium Precision $\pm$		0.3	0.2	0.8	1.4	1.7



# Migration Assessment for WDEQ Series Parameters

Sampler Number

Page 1

Well of Surface Location : Crooks Creek (SMP C-1)

Water Type: Surface

Above Discharge

1. Ken Webber
2. WAMCO LAB
3. U.S. Energy
- 4.
- 5.
- 6.

Elev:

Dissolved  
and Total

## Date and Sampler Number

### Parameters

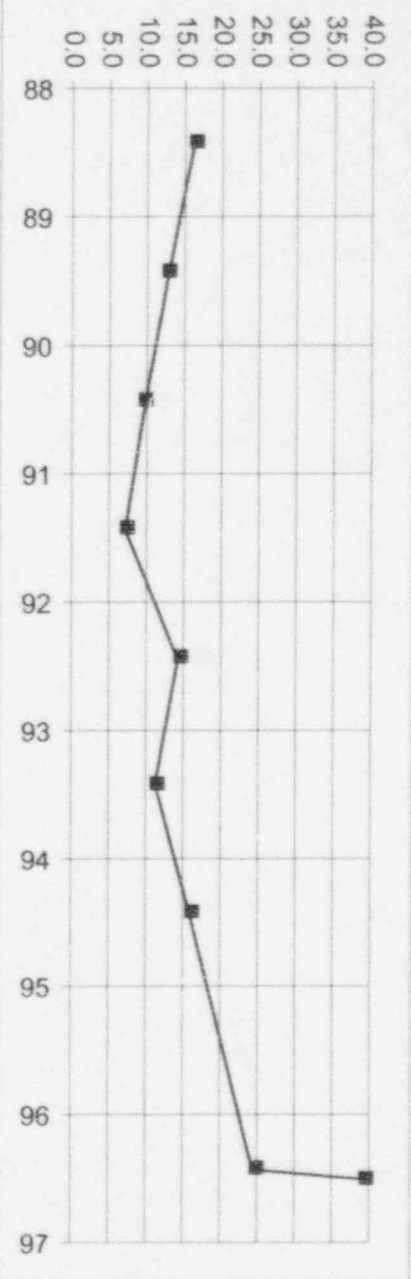
### Units

			8/19/92	7/13/93	6/27/94	6/4/96	6/26/96	
			2	2	2	3	3	
TEMPERATURE (FIELD)		C			16.8			
TOTAL DISSOLVED SOLIDS		Mg/L	207	220	234			
TOTAL SUSPENDED SOLIDS		Mg/L	5.1	3.6	19.8			
SODIUM		Mg/L						
POTASSIUM		Mg/L						
CALCIUM		Mg/L						
MAGNESIUM		Mg/L						
SULFATE		Mg/L						
CHLORIDE		Mg/L						
CARBONATE		Mg/L CO3						
BICARBONATE		Mg/L HCO3						
HYDROXIDE (OH)		Mg/L						
pH (LAB)		S.U.	7.68	8.14	7.72	8.4	8.12	
pH (FIELD)		S.U.			7.5			
CONDUCTIVITY (LAB)		UMHOS/COM @ 25 C			420			
CONDUCTIVITY (FIELD)		UMHOS/COM @ 25 C			410			
TOTAL MILLIEQUIV. MAJOR CATIONS		C						
TOTAL MILLIEQUIV. MAJOR ANIONS		C						
ABSOLUTE VALUE, CHARGED BAL								
AMMONIA AS N		Mg/L						
NITRATE AS N		Mg/L						
NITRITE AS N		Mg/L						
FLORIDE		Mg/L						
TOTAL ALKALINITY AS CAC03		Mg/L						
TOTAL HARDNESS AS CAC03		Mg/L						
BORON	D	Mg/L						
	T	Mg/L						
ALUMINUM	D	Mg/L						
	T	Mg/L						
ARSENIC	D	Mg/L						
	T	Mg/L						
BARIUM	D	Mg/L						
	T	Mg/L						
CADMIUM	D	Mg/L						
	T	Mg/L						
CHROMIUM	D	Mg/L						
	T	Mg/L						
COPPER	D	Mg/L						
	T	Mg/L						
IRON	D	Mg/L						
	T	Mg/L						
LEAD	D	Mg/L						
	T	Mg/L						
MANGANESE	D	Mg/L						
	T	Mg/L						
MERCURY	D	Mg/L						
	T	Mg/L						
NICKEL	D	Mg/L						
	T	Mg/L						
SELENIUM	D	Mg/L						
	T	Mg/L						
ZINC	D	Mg/L						
	T	Mg/L						
MOLYBDENUM	D	Mg/L						
	T	Mg/L						
URANIUM	D	Mg/L	0.0147	0.0116	0.0068	0.025	0.0397	
	T	Mg/L			0.0163	0.026	0.402	
VANADIUM	D	Mg/L						
	T	Mg/L						
RADIUM-226	D	Pci/L	1.1 ± 0.3	0.9 ± 0.3	1.6 ± 0.5	0.2	0.5 ± 0.2	
	T	Pci/L			1.7 ± 0.5	1.1	0.7 ± 0.3	
POLONIUM-210	D	1x10-9uCi/ML	0.9 ± 1.0	0.9 ± 1.0	0.9 ± 1.1	0.2	<1.0	
	T	1x10-9uCi/ML			1.0 ± 1.1	0.2	<1.0	
THORIUM-230	D	1x10-9uCi/ML	0.6 ± 0.5	0.7 ± 0.6	0.2 ± 0.6	1	<0.2	
	T	1x10-9uCi/ML			0.2 ± 0.6	1	<0.2	
LEAD-210	D	1x10-9uCi/ML	1.2 ± 1.1	0.9 ± 1.0	1.1 ± 1.3	1	<1.0	
	T	1x10-9uCi/ML			1.1 ± 1.3	1	<1.0	
TOC		Mg/L						
STATIC WATER LEVEL (FIELD)		(ELEV. FT.)						
DATE								

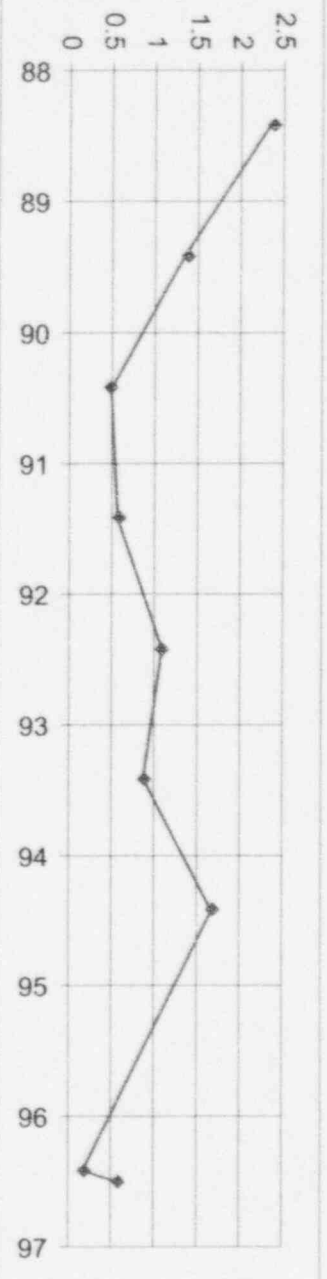
Notes:

# C-1, Crooks Creek above discharge

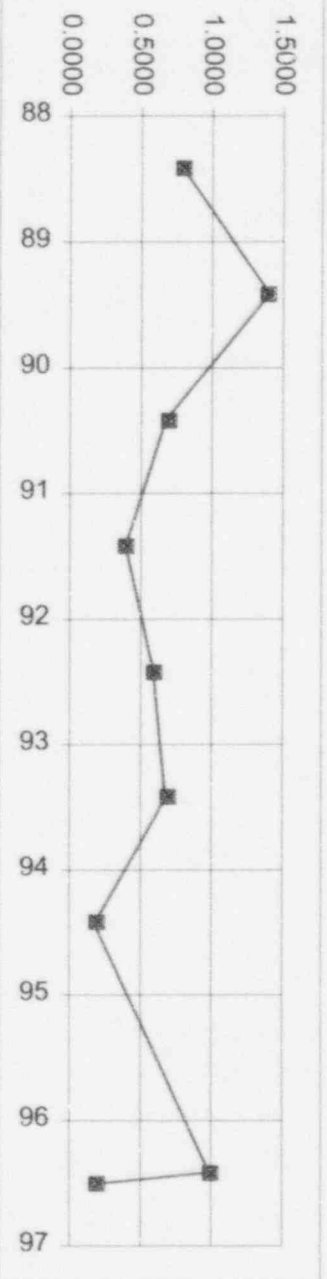
Uranium, Natural PPB



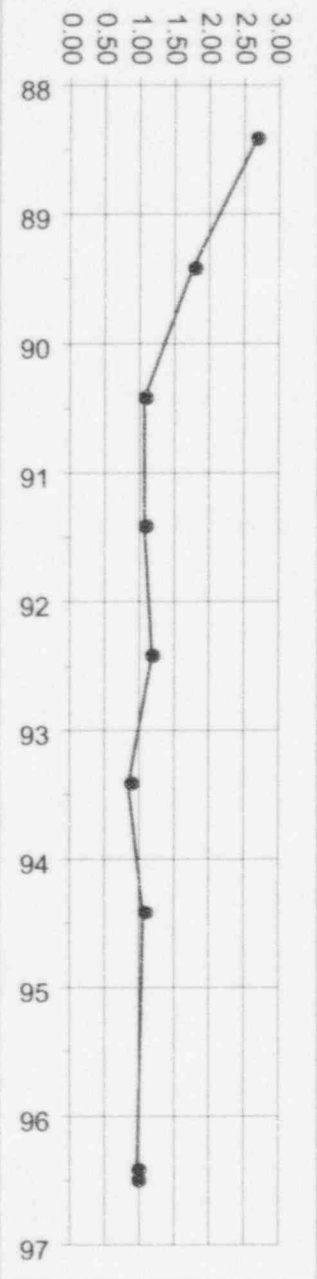
Radium 226, Pci/L



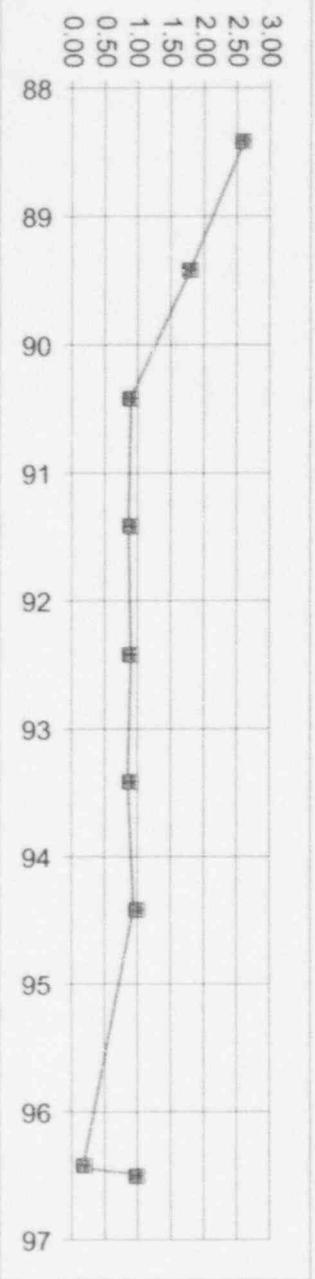
Thorium 230, Pci/L



Lead 210, Pci/L



Polonium 210, Pci/L





# Migration Assessment for WDEQ Series Parameters

Sampler Number

Page 1

Well of Surface Location : Crooks Creek (SMP C-2)

1. Ken Webber
2. WAMCO LAB
3. U.S. Energy

- 4.
- 5.
- 6.

Water Type: Ground Below Discharge

Elev:

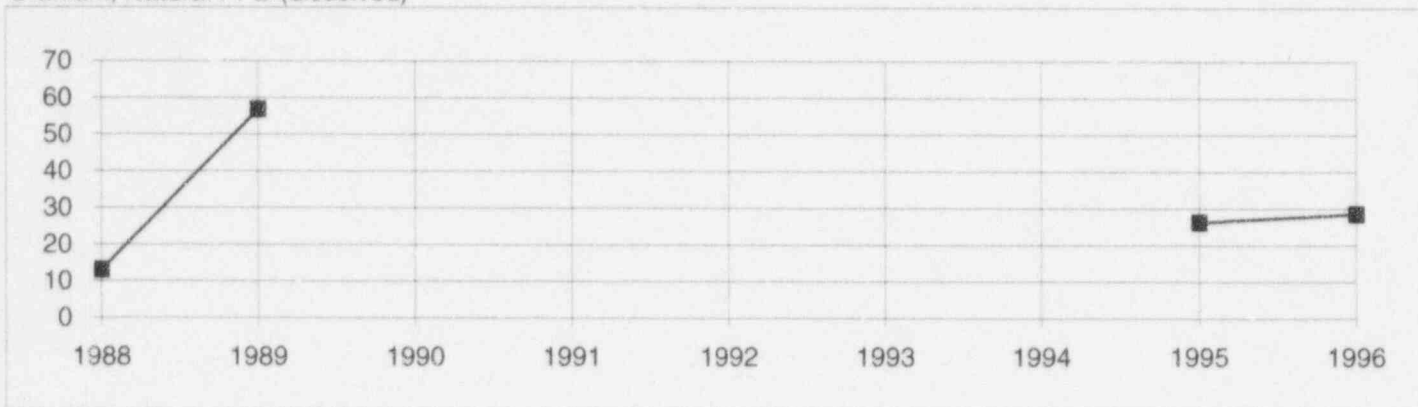
Parameters	Dissolved and Total	Units	Date and Sampler Number					
			8/18/88	11/6/89	7/5/95	6/26/96		
			2	2	3			
TEMPERATURE (FIELD)		C						
TOTAL DISSOLVED SOLIDS		Mg/L	220	282	262			
TOTAL SUSPENDED SOLIDS		Mg/L		28.8				
SODIUM		Mg/L						
POTASSIUM		Mg/L						
CALCIUM		Mg/L						
MAGNESIUM		Mg/L						
SULFATE		Mg/L						
CHLORIDE		Mg/L						
CARBONATE		Mg/L CO <sub>3</sub>						
BICARBONATE		Mg/L HCO <sub>3</sub>						
HYDROXIDE (OH)		Mg/L						
pH (LAB)		S.U.	7.31	8.22	8.2	8.12		
pH (FIELD)		S.U.						
CONDUCTIVITY (LAB)		UMHOS/COM @ 25 C			409			
CONDUCTIVITY (FIELD)		UMHOS/COM @ 25 C						
TOTAL MILLIEQUIV. MAJOR CATIONS		C						
TOTAL MILLIEQUIV. MAJOR ANIONS		C						
ABSOLUTE VALUE, CHARGED BAL.								
AMMONIA AS N		Mg/L						
NITRATE AS N		Mg/L						
NITRITE AS N		Mg/L						
FLORIDE		Mg/L						
TOTAL ALKALINITY AS CAC03		Mg/L						
TOTAL HARDNESS AS CAC03		Mg/L						
BORON	D	Mg/L						
	T	Mg/L						
ALUMINUM	D	Mg/L						
	T	Mg/L						
ARSENIC	D	Mg/L						
	T	Mg/L						
BARIUM	D	Mg/L						
	T	Mg/L						
CADMIUM	D	Mg/L						
	T	Mg/L						
CHROMIUM	D	Mg/L						
	T	Mg/L						
COPPER	D	Mg/L						
	T	Mg/L						
IRON	D	Mg/L						
	T	Mg/L						
LEAD	D	Mg/L						
	T	Mg/L						
MANGANESE	D	Mg/L						
	T	Mg/L						
MERCURY	D	Mg/L						
	T	Mg/L						
NICKEL	D	Mg/L						
	T	Mg/L						
SELENIUM	D	Mg/L						
	T	Mg/L						
ZINC	D	Mg/L						
	T	Mg/L						
MOLYBDENUM	D	Mg/L						
	T	Mg/L						
URANIUM	D	Mg/L	0.0569	0.03	0.0263	0.0286		
	T	Mg/L	0.0615		0.0273	0.0273		
VANADIUM	D	Mg/L						
	T	Mg/L						
RADIUM-226	D	Pci/L	1.4 ± 0.3	0.8 ± 0.3	0.9 ± 0.3	0.6 ± 0.2		
	T	Pci/L	1.8 ± 0.4		5.5 ± 0.9	0.6 ± 0.4		
POLONIUM-210	D	Pci/L	1.1 ± 0.8	1.8 ± 0.9	<1.0	<1.0		
	T	Pci/L	2.1 ± 1.1		<1.0	<1.0		
THORIUM-230	D	Pci/L	1.2 ± 0.5	1.5 ± 0.5	<0.2	<0.2		
	T	Pci/L	1.7 ± 0.6		<0.2	<0.2		
LEAD-210	D	Pci/L	1.6 ± 1.4	1.6 ± 0.4	1.3 ± 1.1	<1.0		
	T	Pci/L	2.2 ± 1.4		<1.0	<1.0		
TOC		Mg/L						
STATIC WATER LEVEL (FIELD)		(ELEV. FT.)						
DATE								

Notes:

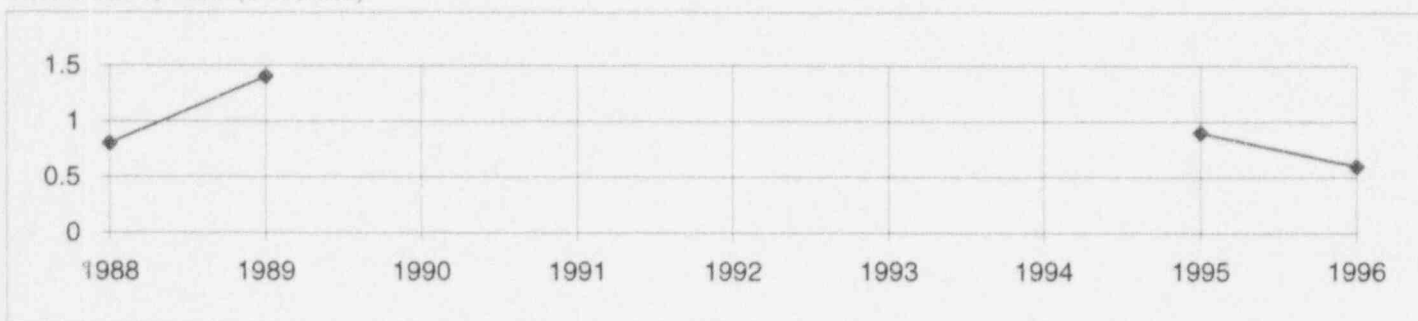
Crooks Creek (SMP C-2).xls

## C-2, Crooks Creek below discharge

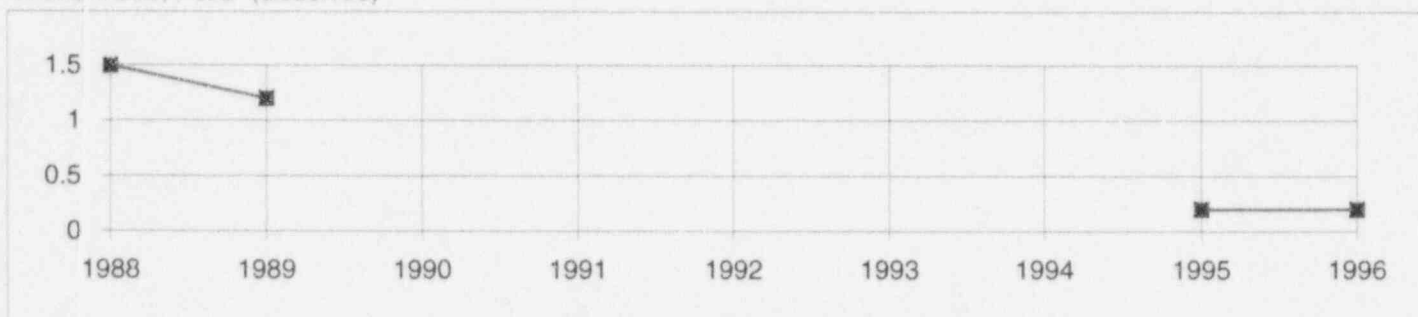
Uranium, Natural PPB (dissolved)



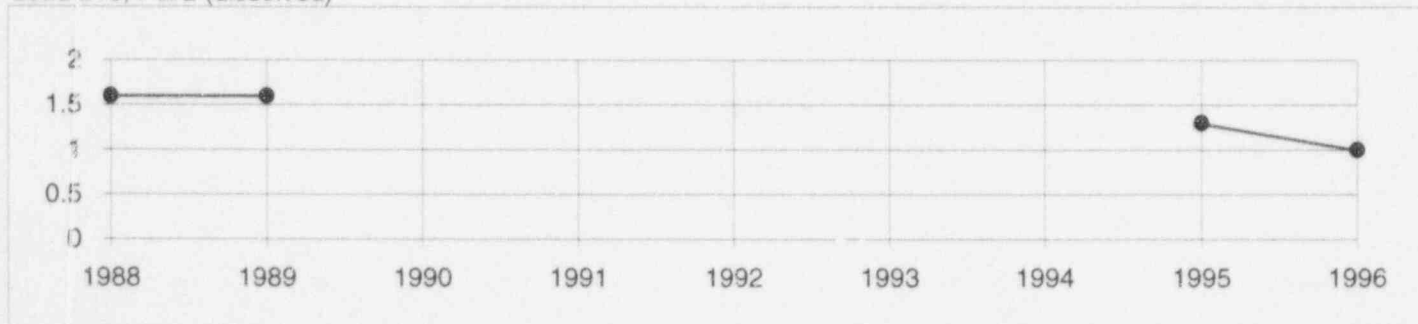
Radium 226, Pci/L (dissolved)



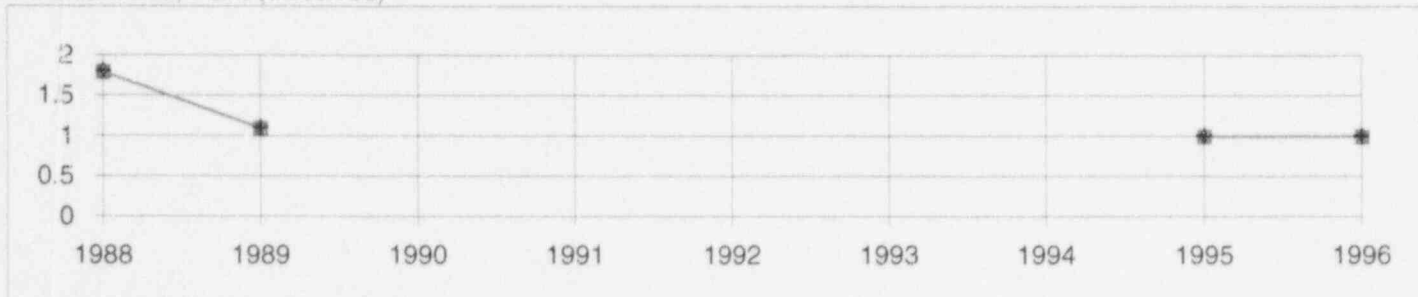
Thorium 230, Pci/L (dissolved)



Lead 210, Pci/L (dissolved)



Polonium 210, Pci/L (dissolved)



# Summary of Well & Surface Water Analysis

Montior Point CC-7

Location: Above the discharge on Crooks Creek

Well, Elev. \_\_\_\_\_  
 Surface, Elev. 6620  
 Impoundment \_\_\_\_\_

Surace, Elev. 6620			Year	1995	1995	1995	1996	1996
Impoundment			Quarter	2	3	4	2	2
Sample Data			6/21/95	9/6/95	11/8/95	6/4/96	6/26/96	
Parameters	Units	Code	G-2-C	G-2-C	G-2-C	G-1-C	G-1-C	
NON METAL								
TOTAL DISSOLVED SOLIDS	MG/L			224	227			
TOTAL SUSPENDED SOLIDS	MG/L			<1.0	7.5			
PH	S.U			8.46	8.17	8.23	7.82	
CONDUCTIVITY	UMHOS/COM @ 25 C				332	368		
TOTAL ALKALINITY AS CaCO3	MG/L			154	136			
TOTAL HARDNESS AS CaCO3	MG/L							
MAJOR IONS								
SODIUM	MG/L			21.8	19.4			
POTASSIUM	MG/L			1.8	1.5			
CALCIUM	MG/L			54.1	52			
MAGNESIUM	MG/L			6	5.6			
SULFATE	MG/L			37.9	37.3			
CHLORIDE	MG/L			2.7	5			
CARBONATE	MG/L CO3			3	0			
BICARBONATE	MG/L HCO3			183	166			
HYDROXIDE (OH)	MG/L							
AMMONIA AS N	MG/L			<0.05	<0.05			
NITRATE AS N	MG/L			<0.10	<0.10			
NITRITE AS N	MG/L			<0.10	<0.10			
FLORIDE	MG/L			0.21	0.19			
TRACE METALS								
BORON	D	MG/L		<0.10	<0.10			
ALUMINUM	D	MG/L		<0.10	<0.10			
ARSENIC	D	MG/L		0.001	0.001			
BARIUM	D	MG/L		<0.10	<0.10			
CADMIUM	D	MG/L		<0.01	<0.001			
CHROMIUM	D	MG/L		<0.05	<0.05			
COPPER	D	MG/L		<0.01	<0.10			
IRON	D	MG/L		<0.05	0.06			
LEAD	D	MG/L		<0.05	0.017			
MANGANESE	D	MG/L		0.04	0.04			
MERCURY	D	MG/L		<0.001	<0.0002			
NICKEL	D	MG/L		<0.05	<0.05			
SELENIUM	D	MG/L		<0.001	0.001			
SILVER	D	MG/L		<0.05	<0.005			
ZINC	D	MG/L		0.02	0.03			
MOLYBDENUM	D	MG/L		<0.1	<0.1			
RADIO-METRICS								
URANIUM	D	Mg/L	0.0167	0.017	0.02	0.02	0.0187	
	T	Mg/L			0.02		0.0191	
VANADIUM	D	MG/L		<0.10	<0.1			
	T	MG/L						
RADIUM-226	D	Pci/L	1.9±0.6	0.9±0.4	1.1±0.4	8.1±0.7	0.7±0.4	
	T	Pci/L			1.5±0.4		1.3±0.6	
POLONIUM-210	D	1X10-9UCI/ML			<1.0		<1.0	
	T	1X10-9UCI/ML			<1.0		<1.0	
THORIUM-230	D	1X10-9UCI/ML			<0.2		<0.2	
	T	1X10-9UCI/ML			<0.2		<0.2	
LEAD-210	D	1X10-9UCI/ML			1.4±1.1		<1.0	
	T	1X10-9UCI/ML			4.8±4.3		<1.0	
QUALITY ASSURANCE								
ANION		MEQ		3.97	3.66			
CATION		MEQ		4.22	3.97			
WYDEQ A/C BALANCE		%		3.03	4.03			
CALC TDS		MG/L		244	228			
TDS A/C BALANCE		DEC. %		0.92	1			
FIELD DATA								
TEMPERATURE		C	15		3.5			
CONDUCTIVITY		UMHOS/COM @ 25 C	393		309			
PH		S.U.	8.14		8.22			
D.O.			7.5		8.6			
STATIC WATER LEVEL		(ELEV. FT.)						
FLOW		CFS	7.02		2.11			
DATE								

## Codes:

### Company Data

- A. Anaconda
- B. Pathfinder
- C. U.S. Energy
- D. Western Nuclear
- E. GMMV - USE
- G. SMP - USE

### Sampler

- 1. U.S. Energy Corp.
- 2. Water, Waste & Land
- 3.
- 4.
- 5.
- 6.

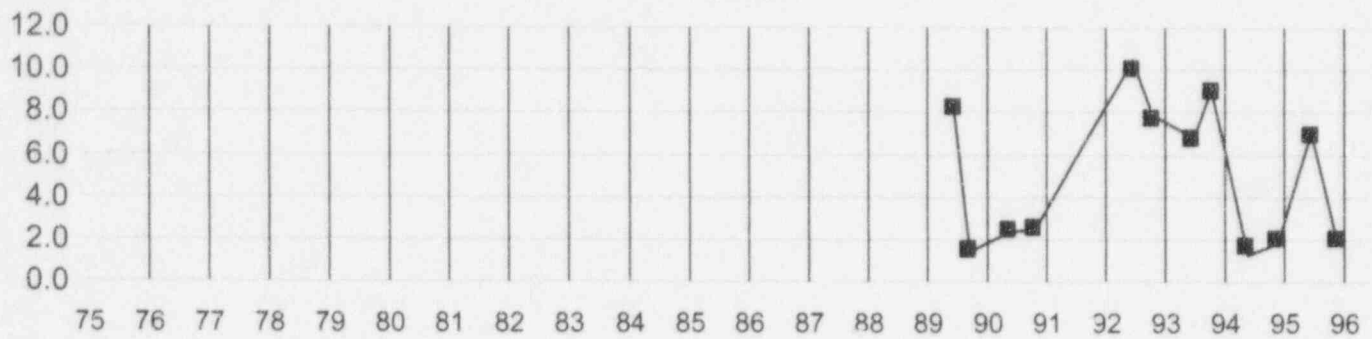
### Lab

- a. WAMCO Labs, Casper, WY
- b. Western Environmental Services & Testing, Capen, WY
- c. Energy Labs, Casper, WY
- d.
- e.
- f.

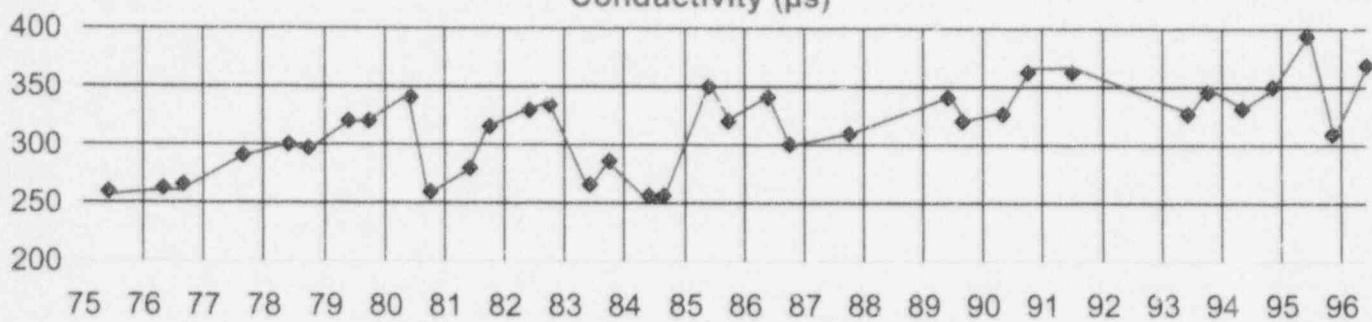
# Surface Water Quality

CC-7 Location (Pathfinder CC-4) : Crooks Creek

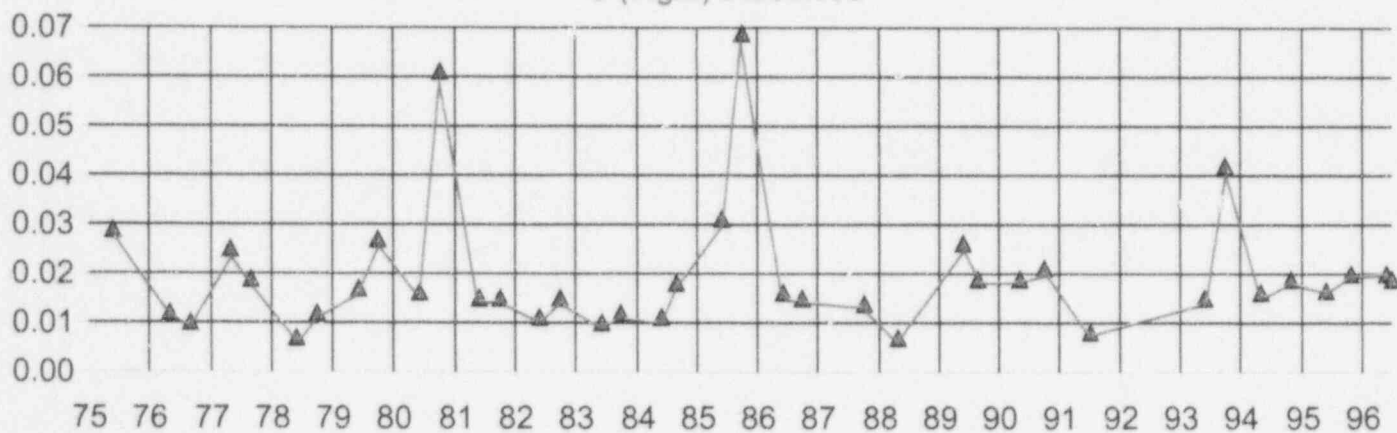
Flow (cfs)



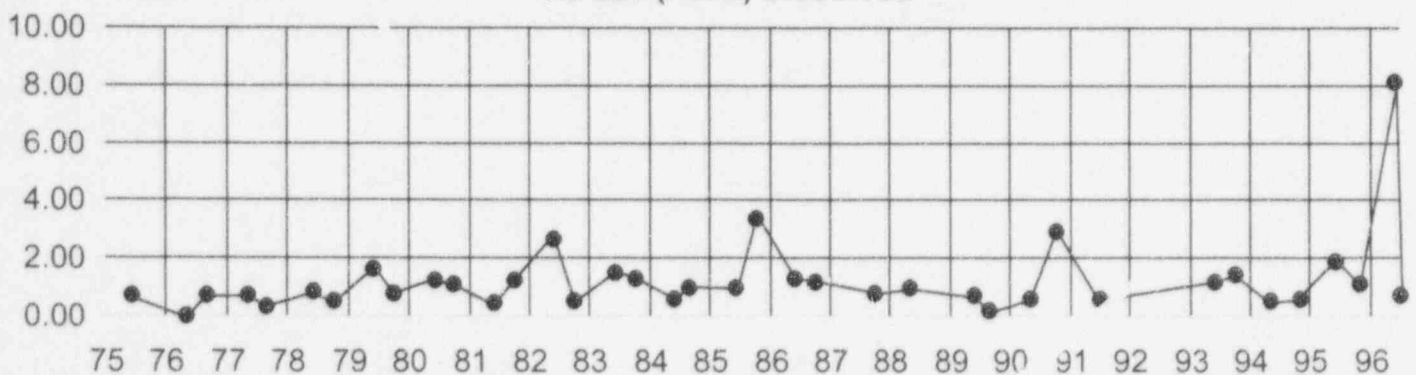
Conductivity ( $\mu$ s)



U (mg/L) Dissolved



Ra 226 (Pci/L) Dissolved



# Migration Assessment for WDEQ Series Parameters

Sampler Number

Well of Surface Location : Kirk's Ranch

Water Type: Ground

Elev:

1. Dodd/Wickstrom WNI

4.U.S. Energy

2. Wickstrom WNI

5.

3. Wamco Labs

6.

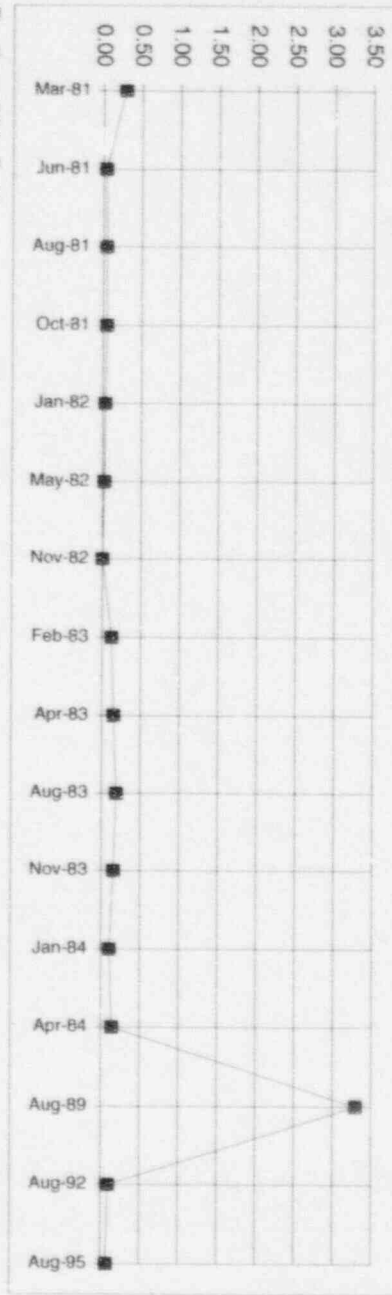
Parameters		Units	Date and Sampler Number					
			8/16/89	8/18/92	7/5-14/95			
			3	3	4			
TEMPERATURE (FIELD)		C						
TOTAL DISSOLVED SOLIDS		MG/L	1252	1343	964			
SODIUM		MG/L						
POTASSIUM		MG/L						
CALCIUM		MG/L						
MAGNESIUM		MG/L						
SULFATE		MG/L						
CHLORIDE		MG/L						
CARBONATE		MG/L CO3						
BICARBONATE		MG/L HCO3						
HYDROXIDE (OH)		MG/L						
PH (LAB)		S.U.	7.99	7.34	7.41			
PH (FIELD)		S.U.						
CONDUCTIVITY (LAB)		UMHOS/COM @ 25 C			1477			
CONDUCTIVITY (FIELD)		UMHOS/COM @ 25 C						
TOTAL MILLIEQUIV. MAJOR CATIONS		C						
TOTAL MILLIEQUIV. MAJOR ANIONS		C						
ABSOLUTE VALUE, CHARGED BAL.								
AMMONIA AS N		MG/L						
NITRATE AS N		MG/L						
NITRITE AS N		MG/L						
FLORIDE		MG/L						
TOTAL ALKALINITY AS CAC03		MG/L						
TOTAL HARDNESS AS CAC03		MG/L						
BORON	D	MG/L						
	T	MG/L						
ALUMINUM	D	MG/L						
	T	MG/L						
ARGENIC	D	MG/L						
	T	MG/L						
BARIUM	D	MG/L						
	T	MG/L						
CADMIUM	D	MG/L						
	T	MG/L						
CHROMIUM	D	MG/L						
	T	MG/L						
COPPER	D	MG/L						
	T	MG/L						
IRON	D	MG/L						
	T	MG/L						
LEAD	D	MG/L						
	T	MG/L						
MANGANESE	D	MG/L						
	T	MG/L						
MERCURY	D	MG/L						
	T	MG/L						
NICKEL	D	MG/L						
	T	MG/L						
SELENIUM	D	MG/L						
	T	MG/L						
ZINC	D	MG/L						
	T	MG/L						
MOLYBDENUM	D	MG/L						
	T	MG/L						
URANIUM	D	1x10 <sup>-6</sup> uci/ml	3.3±0.5	0.093	0.103			
	T				0.104			
VANADIUM	D	MG/L						
	T	MG/L						
RADIUM-226	D	Pci/L	0.9±0.4	1.1±0.3	1.0±0.4			
	T	Pci/L			1.0±0.4			
POLONIUM-210	D	1X10-9UCI/ML	1.9±0.9	1.0±1.0	<1.0			
	T	1X10-9UCI/ML			<1.0			
THORIUM-230	D	1X10-9UCI/ML	1.6±0.5	0.6±0.5	<0.2			
	T	1X10-9UCI/ML			<0.2			
LEAD-210	D	1X10-9UCI/ML	1.7±1.4	1.0±1.1	3.0±2.2			
	T	1X10-9UCI/ML			1.9±1.1			
TOC		MG/L						
STATIC WATER LEVEL (FIELD)		(ELEV. FT.)						
FLOW		CFS						

Next sample due 1998

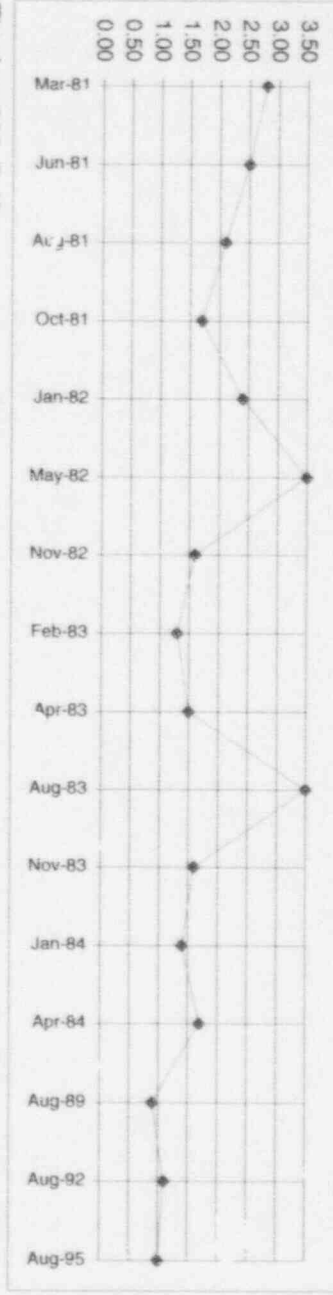
Notes: 1x10<sup>-9</sup> uci/ml = pci/l

Kirk's Ranch

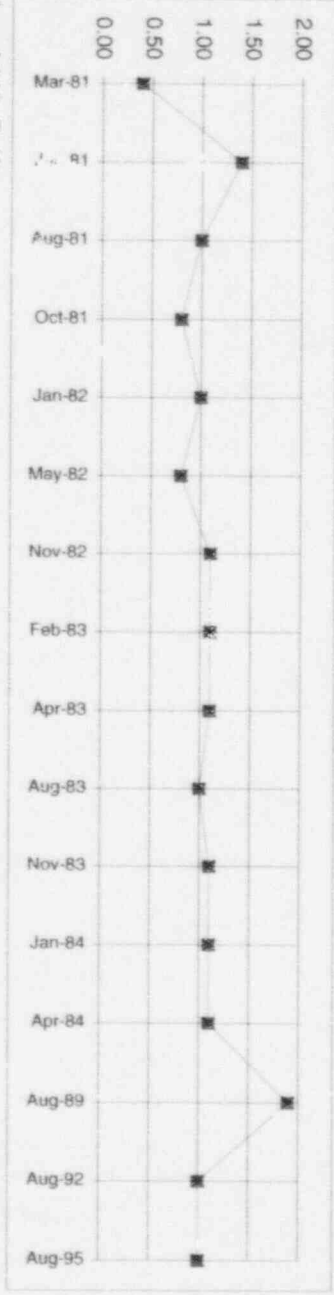
Uranium, Natural 1x10-6 uci/ml



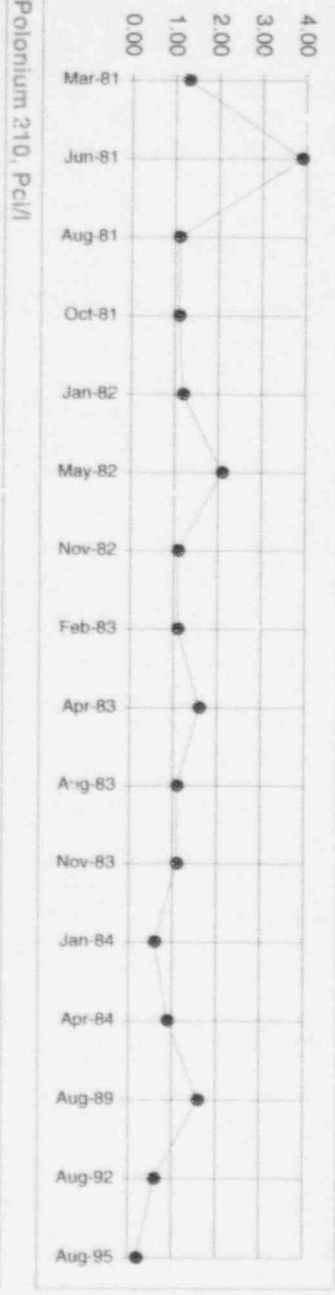
Radium 226, Pci/l



Thorium 230, Pci/l



Lead 210, Pci/l



Polonium 210, Pci/l

