

ROCKY MOUNTAIN ENERGY COMPANY

PDR

40-8380

June 12, 1980

Mr. Tom Mueller
Department of Environmental Quality
District IV, Water Quality Division
30 East Grinnell Street
Sheridan, WY 82801



Dear Mr. Mueller:

Re: Nine Mile Lake, Treated Water Reservoir
(Reservoir "B")

Enclosed are results of sample analyses for the lime overflow circuit, reservoir "B" grab samples and reservoir "A" grab samples. The reservoir "A" analyses (Table 3) are provided for comparison purposes.

As I mentioned in my letter of June 3, 1980 to Dennis, we have finally received radiochem analysis for the April sampling of reservoir "B" water and the lime overflow circuit which confirm that the lime treatment--barium chloride circuit is operating very effectively. As you can see on the CDM Analysis Report sheet (enclosed), Ra-226 levels were 7.0 pCi/l for the April lime overflow composite and 16 pCi/l for the "Pond B" (treated water reservoir) grab sample. Also enclosed are graphs showing pH, uranium and vanadium levels in the lime overflow discharge for the period April 28 through June 9, 1980. Uranium levels have been consistently below 3 mg/l during this period while vanadium content has leveled off at less than 12 mg/l. These data demonstrate that the present water treatment circuit is working quite well.

Also enclosed are Tables 1 and 2 which present assay results for monthly composites of the lime overflow discharge and reservoir "B" grab samples. These tables were used to develop the self-imposed discharge criteria presented in Revised Table II-1. Table II-1 was originally developed from bench test data as part of the treated water reservoir application which was submitted to the DEQ on December 3, 1979. The table has been revised to realistically describe discharge limits for key parameters, based upon operational experience.

We would also request that the sampling procedures described in the original application be modified to eliminate meaningless samples. Specifically, we propose that daily analysis of the shift samples for TDS be eliminated, as it requires a time-consuming analysis which contributes little to interpretation of discharge water quality. Also, we request that samples of reservoir "B" water be collected and analyzed on a monthly basis rather than a weekly basis. The lime overflow samples are analyzed on a

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daily basis which provides a good indication of the characteristics of the water being discharged. Weekly samples are relatively meaningless as water quality in the pond does not vary significantly from week to week. A monthly sample will provide a better indication of long term changes in water quality in the reservoir. The remainder of the sampling program will be maintained as described in the application.

To date, only one sample has been collected from the pond monitor wells as all previous attempts found the wells to be dry. A sample was collected this month from well PM-3 which is located to the southeast and down-dip from the pond. Initial analysis shows pH, conductivity, TDS, sulfate, and vanadium levels typical of the shallow perched water table. It is very likely that the water in the well was due to groundwater movement and not reservoir seepage.

By means of this letter, Rocky Mountain Energy Company (RMEC) requests DEQ approval of the proposed modifications to the monitoring program as described herein as well as concurrence as to the suitability of the revised discharge standards.

If you have any questions, please give me a call.

Sincerely,

Michael R. Neumann

Michael R. Neumann
Field Environmental Coordinator

cc: Tony Mancini (DEQ)
Margery Hulburt (DEQ)
Dennis Morrow (DEQ)
Kent Loest
Pat Spieles
Rick Iwanicki
Jack Rothfleisch (NRC)

TABLE I
LIME OVERFLOW WATER QUALITY
MONTHLY AVERAGES

<u>Constituent</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>
pH	7.95	7.27	7.72	7.76
Sulfate	3605	2724	3550	3431
Calcium	765	768	1097	944
Magnesium	58	108	87.3	76
Sodium	434	507	449	437
Iron	0.2	3.3	1.0	1.3
Silicon (SiO ₂)	38	32.0	15.0	40.4
Zinc	1.2	3.1	0.5	0.3
Aluminum	0.3	0.2	0.3	0.2
Uranium (U ₃ O ₈)	3.2	0.9	1.8	1.5
Vanadium	25.0	39.3	12.8	8.3
Radium - 226 ¹	23.5	18.2	7.0	*
TDS	4870	4320	5440	5060
Arsenic	-	0.01	0.021	*
Selenium	-	0.09	0.36	*
Thorium - 230 ¹	-	1.2	8.2	*

* Analysis Pending

¹ Units given in pCi/l; all others are in mg/l

TABLE 2
RESERVOIR "B" WATER QUALITY
MONTHLY COMPOSITE AVERAGES

<u>Parameter</u>	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>
pH	7.51	7.68	7.42	7.55	7.88
Sulfate	4165	3402	2818	4026	3437
Calcium	946	1029	703	940	864
Magnesium	636	64.7	61	81	66.4
Sodium	476	492	442	447	449
Iron	0.6	2.1	0.2	0.4	3.3
Silicon	33.8	35.4	35.2	33.6	33.2
Zinc	-	1.7	1.9	0.14	0.2
Aluminum	0.27	0.23	0.7	0.1	0.5
Uranium	0.45	3.6	1.6	2.6	1.2
Vanadium	14.1	18.2	33	9.8	8.5
Radium-226 ¹	-	-	11.0	16	*
Thorium-230 ¹	-	-	-	5.4	*
Arsenic	-	-	0.009	0.018	*
Selenium	-	-	N.D.	0.36	*

* Analysis is pending

¹ Units reported as pCi/l; all other values are mg/l

TABLE 3
 RESERVOIR "A" WATER QUALITY
 MONTHLY GRAB SAMPLE - MAY 1980

<u>Constituent</u>		
pH	mg/l	4.60
Sulfate	mg/l	19250
Calcium	mg/l	466
Magnesium	mg/l	411
Sodium	mg/l	5595
Iron	mg/l	6.6
Silicon (SiO ₂)	mg/l	48.6
Zinc	mg/l	15.0
Aluminum	mg/l	37.5
Uranium (U ₃ O ₈)	mg/l	2.80
Vanadium	mg/l	93.6
TDS	mg/l	28,220
Arsenic	mg/l	0.066
Selenium	mg/l	0.15
Ra-226	pCi/l	155 (±70) ¹

¹ Results of April sampling

CDMenvironmental engineers, scientists,
planners, & management consultants

May 27, 1980

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CAMP DRESSER & MCKEE INC.

11455 West 48th Avenue
Wheat Ridge, Colorado 80033
303 422-0469REPORT OF ANALYSIS

Lab Designation	Sponsor Designation	Radium-226 ± Counting Error* (pCi/l)	Thorium-230 ± Counting Error* (pCi/l)
<u>Determination</u>			
700-9986-7-1	Lime O/F Comp. April 1980	7.0 ± 4.8	8.2 ± 1.6
-2	Lime U/F Comp. April 1980	9.0 ± 7.8	3.4 ± 1.5
-3	Feed Comp. April 1980	490 ± 150	8,900 ± 100
-4	Pond A 4-28-80	155 ± 70	360 ± 10
-5	Pond B 4-28-80	16 ± 7	5.4 ± 1.4
-6	RC Pond April 1980	1,100 ± 100	640 ± 10
-7	RC Barren Blend	15,400 ± 1,000	690 ± 10

*Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 1.96σ.

BY Nancy M. EbbesenNancy M. Ebbesen
Radiochemistry
Assistant Supervisor



environmental engineers, scientists,
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May 23, 1980

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CAMP DRESSER & MCKEE INC.

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REPORT OF ANALYSIS

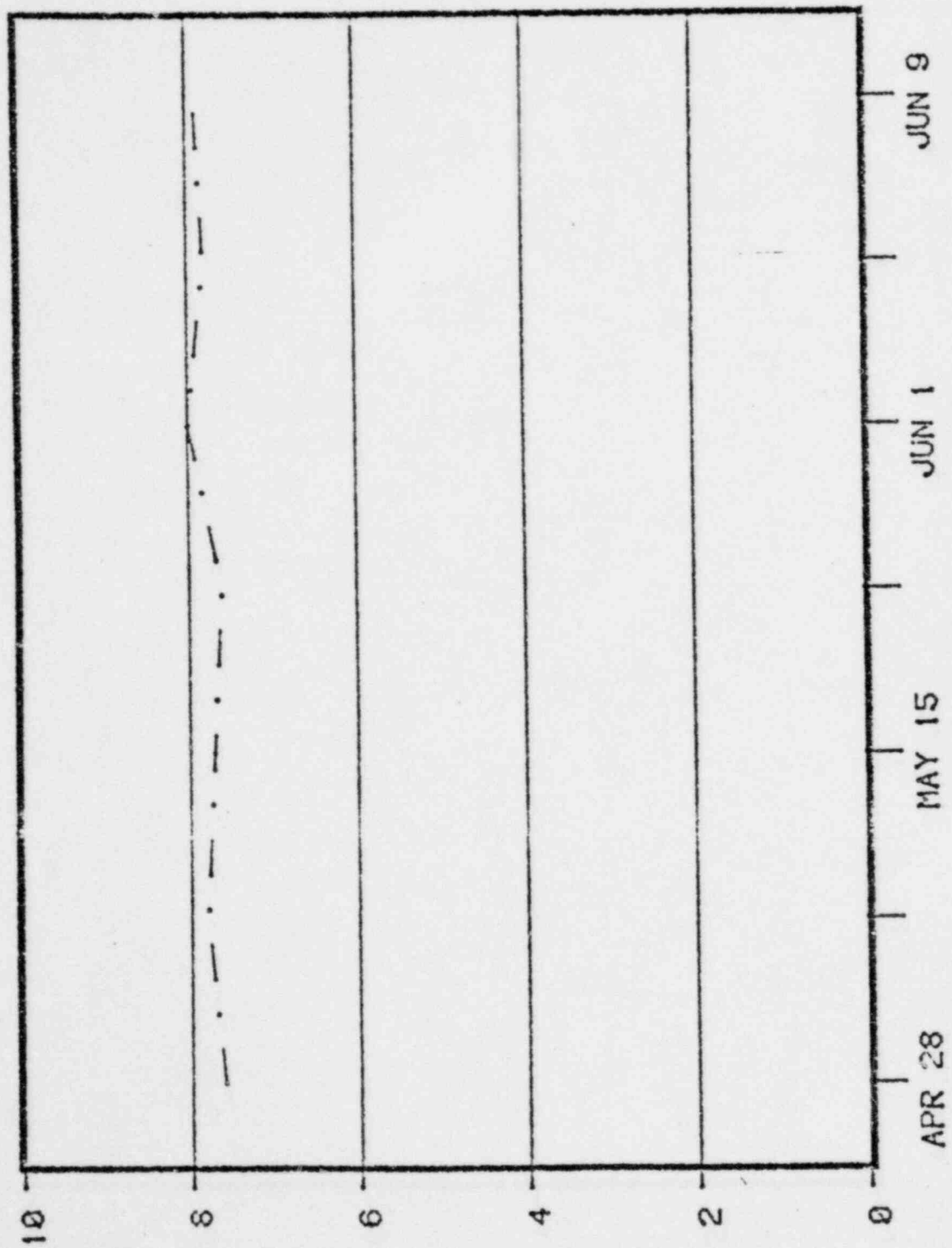
Lab Designation	Sponsor Designation	Arsenic	Selenium
<u>Determination (mg/l)</u>			
700-9986-7-1	Line O/F Comp. April 1980	0.021	0.36
-2	Line U/F Comp. April 1980	0.90	1.9
-3	Feed Comp. April 1980	0.18	0.73
-4	Pond A 4-28-80	0.066	0.15
-5	Pond B 4-28-80	0.018	0.36
-6	RC Pond April 1980	0.053	0.018
-7	RC Barren Blend	0.07	<0.005

BY David A. LeMaster

David A. LeMaster
Water Laboratory Supervi:

DAL/rjf

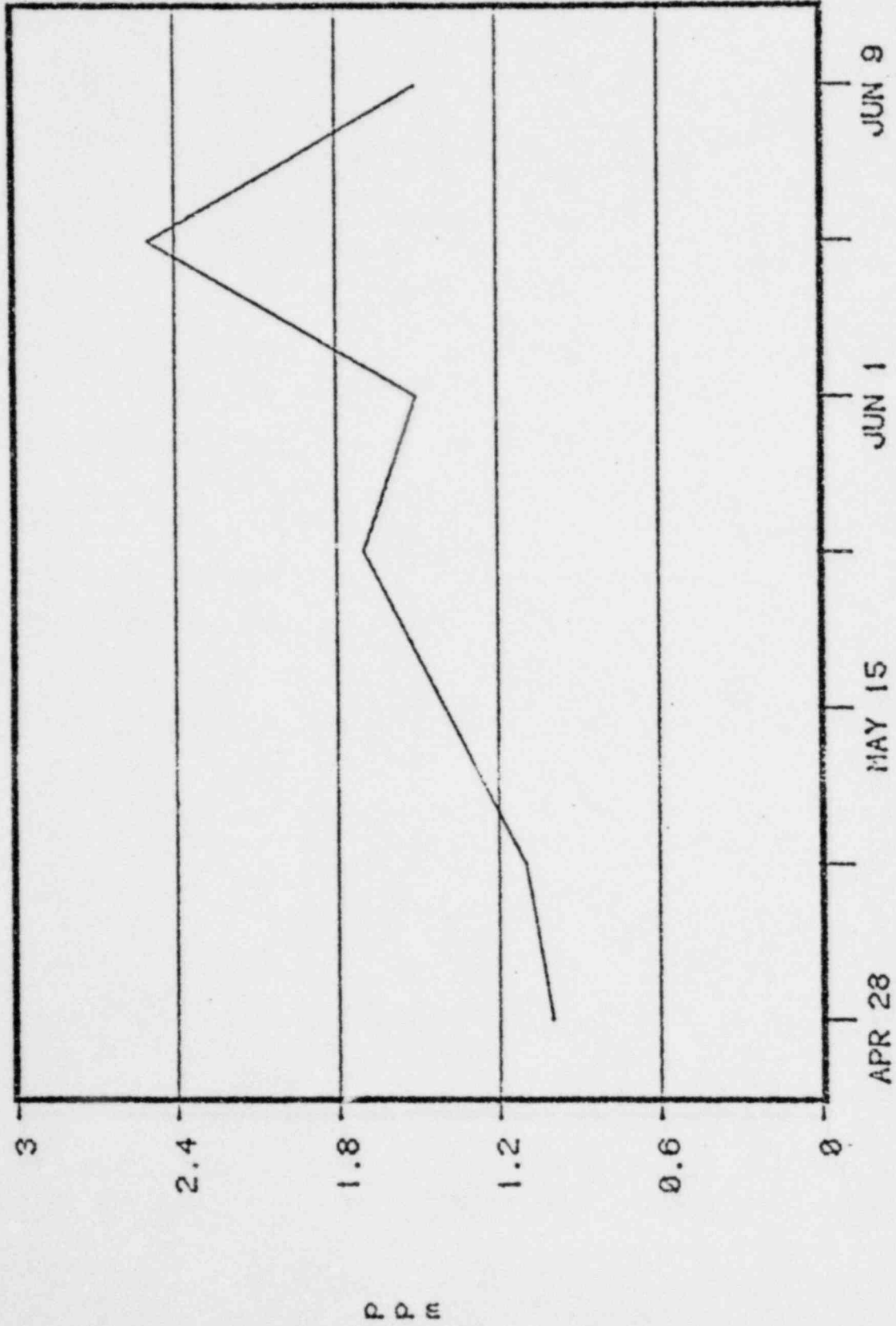
NML -- DISCHARGE WATER TO RESERVOIR B



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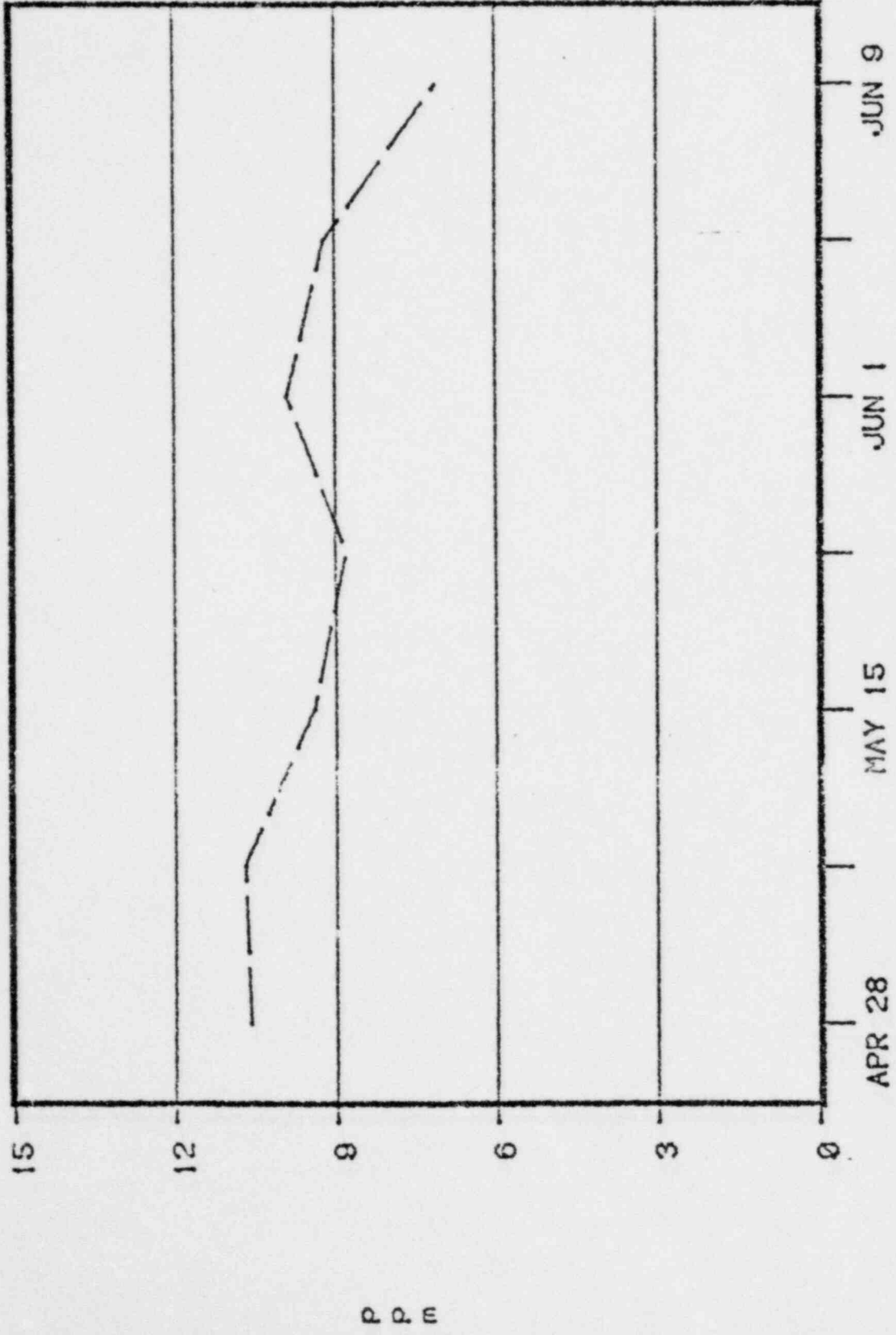
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NML -- DISCHARGE WATER TO RESERVOIR B



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REVISED TABLE 11-1

<u>Constituent</u>	<u>A</u> <u>(PPM)</u>	<u>B</u> <u>(PPM)</u>
TDS	7,000 - 8,000	4,200 - 5,600
pH	1.5 - 1.9	7.0 - 8.0
SO ₄	6,000 - 6,400	2,500 - 4,000
V ⁺	400 - 450	< 15
Ca ⁺⁺	350 - 400	750 - 1,100
Mg ⁺⁺	150 - 175	50 - 110
Na ⁺	450 - 525	400 - 525
Fe ⁺⁺	40 - 90	10
SiO ₂ ⁼	100 - 150	50
Zn ⁺⁺	20 - 30	5.0
Al ⁺⁺⁺	40 - 80	0.3
U ₃ O ₈	< 1	< 5.0
As	0.2	.02
Se	0.8	0.36
Ra ²²⁶	≈ 50 - 500 pci/l	15 pci/l
Th ²³⁰	≈ 9000	10 pci/l