Dec - 1985 EAC-417110-136

Rocky Flats Plant

Monthly Environmental Monitoring Report

Environmental Analysis and Control
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ADMIN RECORD

SW-A-004726

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DECEMBER 1985 ENVIRONMENTAL MONITORING REPORT
ROCKY FLATS PLANT

This is a summary of the effluent and environmental monitoring programs at Rocky Flats Plant for the month of December, 1985.

All average results of monitoring effluent and ambient samples complied with the applicable standards as specified in Executive Order 12088 (rules, regulations and requirements of the Department of Energy).

The data provided in this report are provided as a matter of comity, and should not be construed as an application for a permit or license, or in support of such an application. Approval of the Department of Energy should be obtained prior to publication of any data contained within this report.

For some of the parameters, the concentrations that are measured at or below the minimum detectable concentration (MDC) are assigned to MDC. The less than symbol (<) indicates MDC values and calculated values that include one or more MDC's.

Beginning in January 1981, the plutonium, uranium, americium, and beryllium measured concentrations are reported. These reported concentrations include values that are less than the corresponding calculated MDC's and in some cases, values less than zero. These negative values result when the measured value for the laboratory reagent blank is subtracted from an analytical result which was measured as a smaller value than the reagent blank.

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Table I. 1985 Plutonium and Uranium Airborne Effluent Data CY85

Month	Plutonium Release (uCi)	Plutonium CMax (pCi/m3)	Uranium Release (uCi)	Uranium CMax (pCi/m3)
CY 1984	12.65	0.243 ± 0.023	34.67	0.336 ± 0.0357
January 1985	2.43	0.030 ± 0.0063	1.92	0.057 ± 0.0145
February	1.03	0.157 ± 0.0303	4.43	0.924 ± 0.0206
March	0.39	0.002 ± 0.0005	2.95	0.075 ± 0.0140
April	0.74	0.002 ± 0.0004	2.51	0.004 ± 0.0009
May	0.42	0.002 ± 0.0004	2.39	0.010 ± 0.0026
June	0.39	0.003 ± 0.0008	5.14	0.287 ± 0.0235
July	0.58	0.003 ± 0.0006	4.30	0.054 ± 0.0054
August	0.54	0.008 ± 0.0009	6.57	0.023 ± 0.0029
September	0.42	0.002 ± 0.0001	2.28	0.005 ± 0.0006
October	0.69	0.005 ± 0.0009	1.77	0.005 ± 0.0006
November	0.58	0.007 ± 0.0001	1.81*	0.076 ± 0.0095
December	0.90	0.029 ± 0.0040	2.17	0.005 ± 0.0006
Year to Date	9.11	0.157 ± 0.0303	38.24	0.924 ± 0.0206

FY85

FY86

* Includes partial data not reported in November.

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Table II. 1985 Tritium and Beryllium Airborne Effluent Data

Month	Tritium Release (Ci)	Tritium CMax (pCi/m3)	Beryllium Release (gms)	Beryllium CMax (ug/m3)
CY 1984	0.148	570 ± 140	0.327	0.0161
January	0.012	300 ± 80	0.026	0.0016
February	0.026	300 ± 100	0.093	0.0169
March	0.017	450 ± 200	0.030	0.0007
April	0.013	290 ± 60	0.142	0.0010
May	0.019	290 ± 70	0.115	0.0021
June	0.008	240 ± 80	-0.018	0.0023
July	0.003	270 ± 50	0.022	0.0002
August	0.013	270 ± 50	0.004	0.0001
September	0.017	1360 ± 280	0.031	0.0003
October	0.015	590 ± 160	-0.005	0.0001
November	0.008	580 ± 140	0.038	0.0004
December	0.004	290 ± 65	0.018	0.0001
Year to Date	0.155	1360 ± 280	0.496	0.0169

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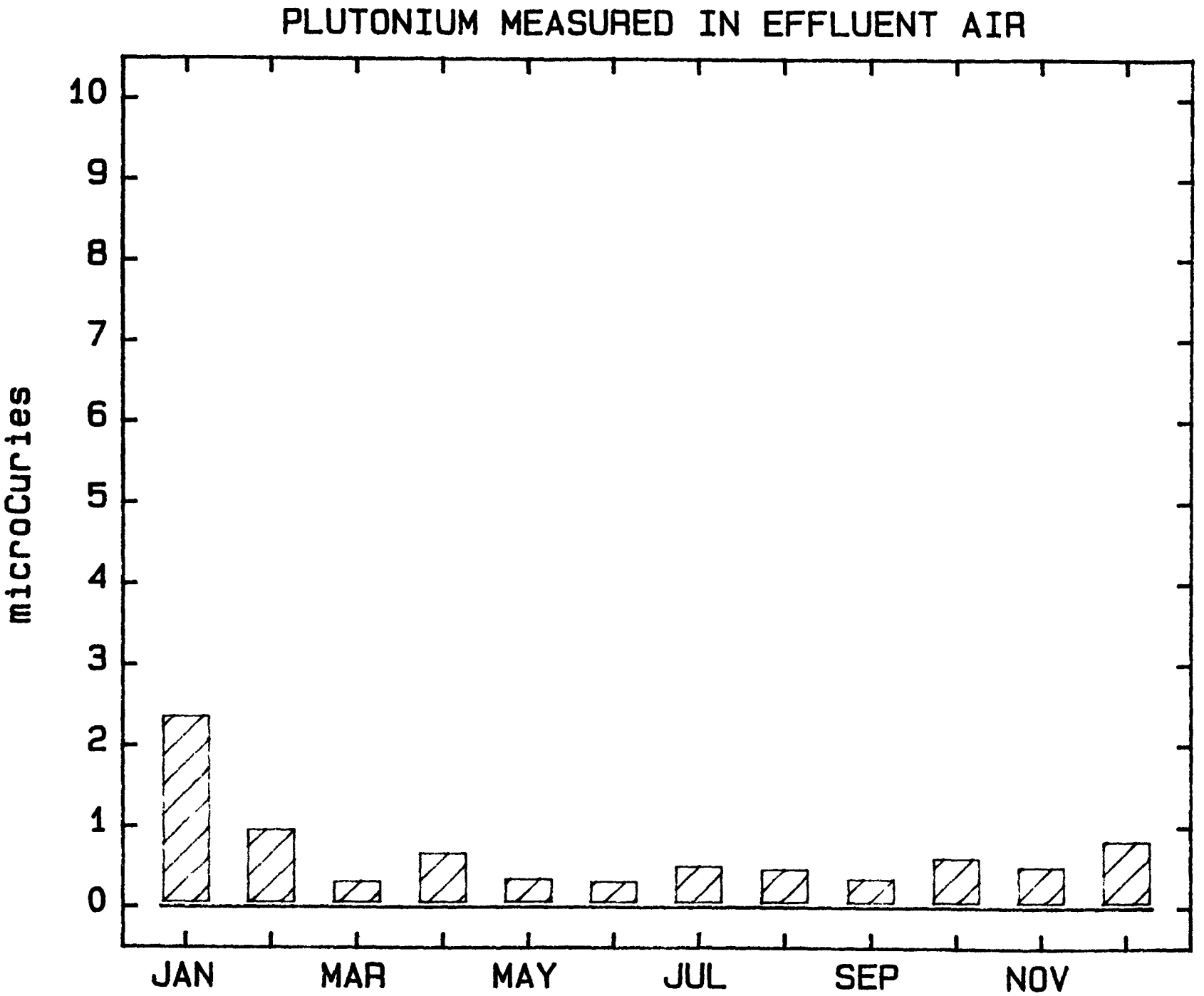
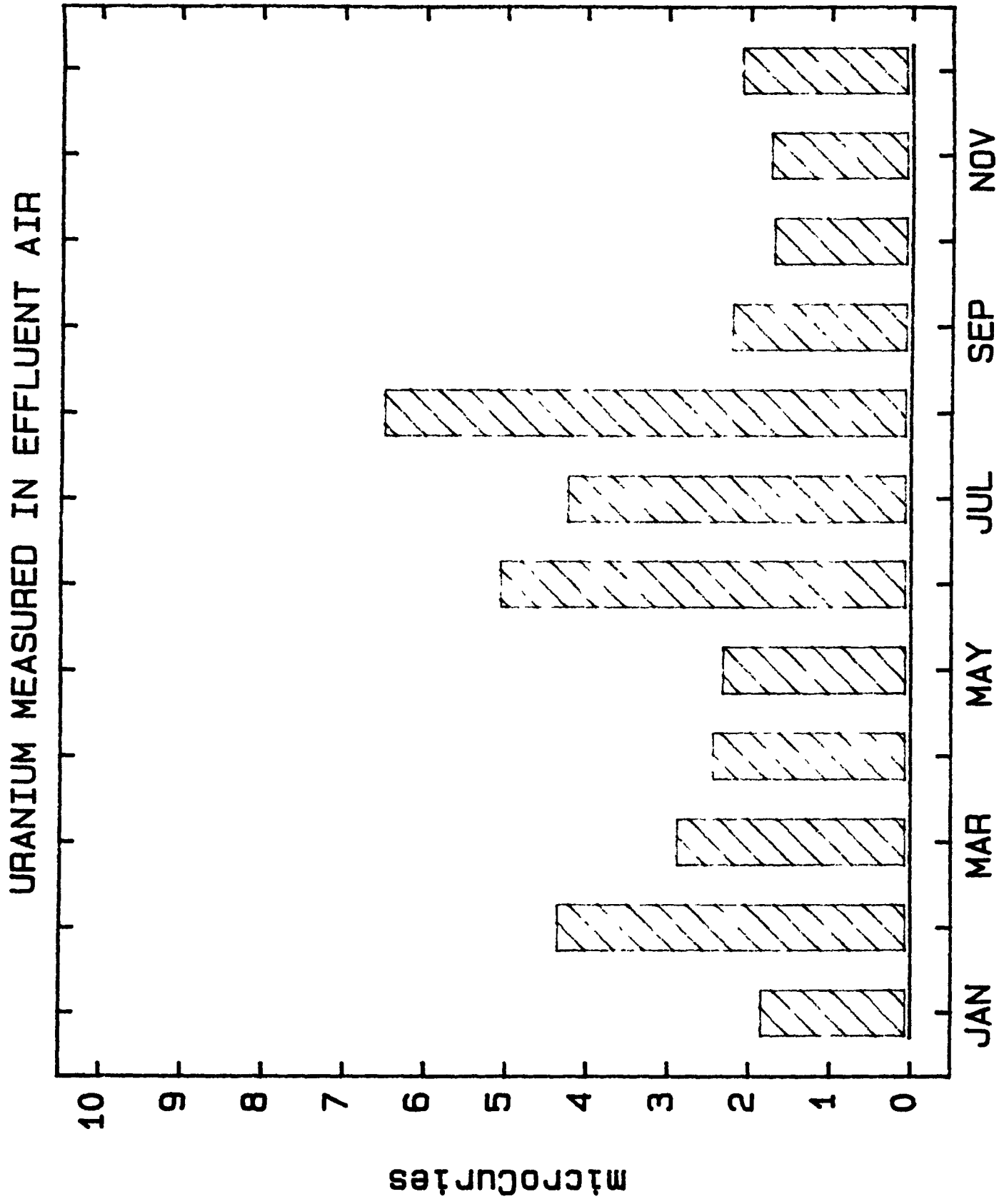
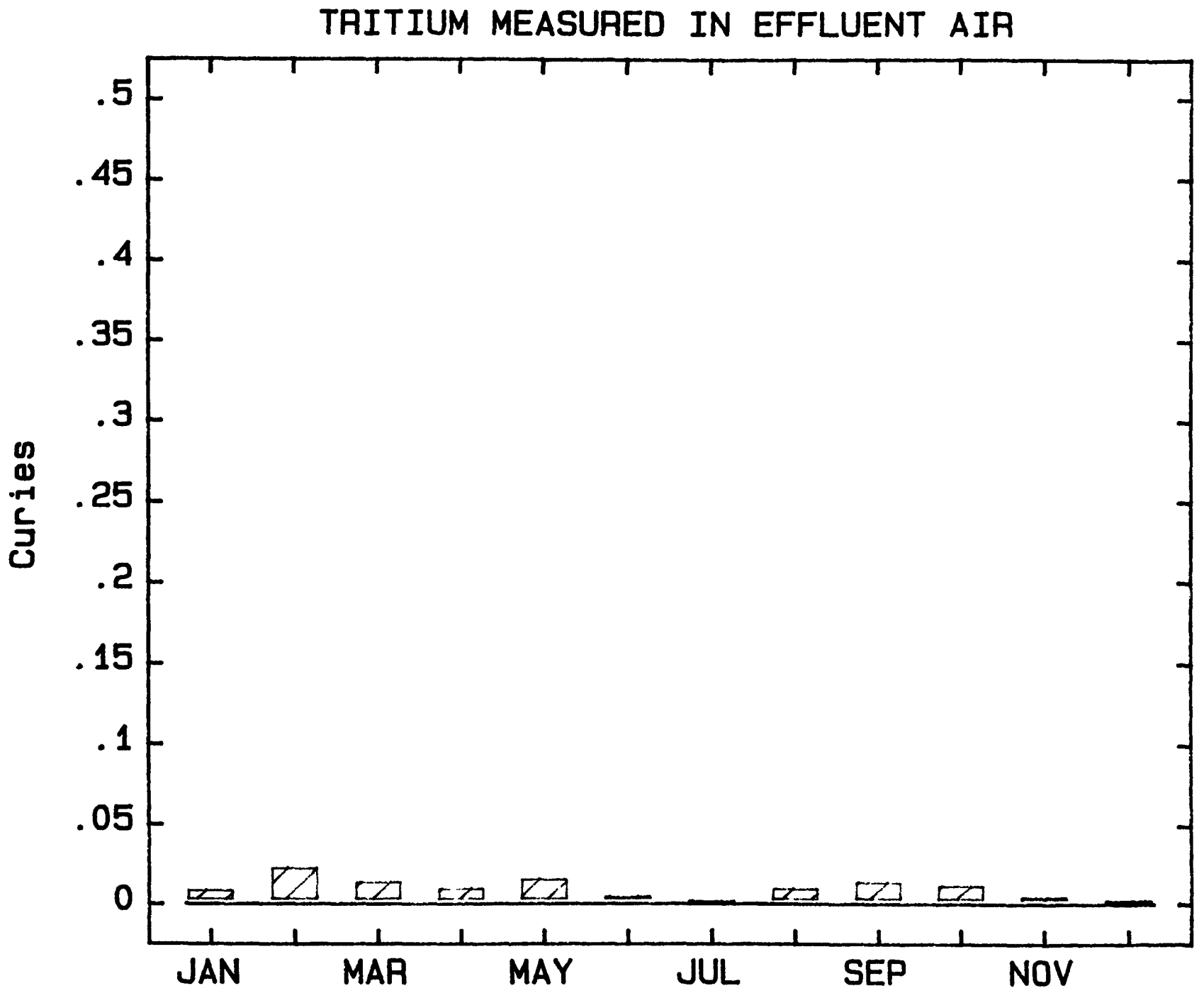

PLUTONIUM MEASURED IN EFFLUENT AIR
microCuries
10
9
8
7
6
5
4
3
2
1
0
JAN
MAR
MAY
JUL
SEP
NOV


URANIUM MEASURED IN EFFLUENT AIR
microcuries
10
9
8
7
6
5
4
3
2
1
0
JAN
MAR
MAY
JUL
SEP
NOV

8


TRITIUM MEASURED IN EFFLUENT AIR
Curies
.5
.45
.4
.35
.3
.25
.2
.15
.1
.05
0
JAN
MAR
MAY
JUL
SEP
NOV

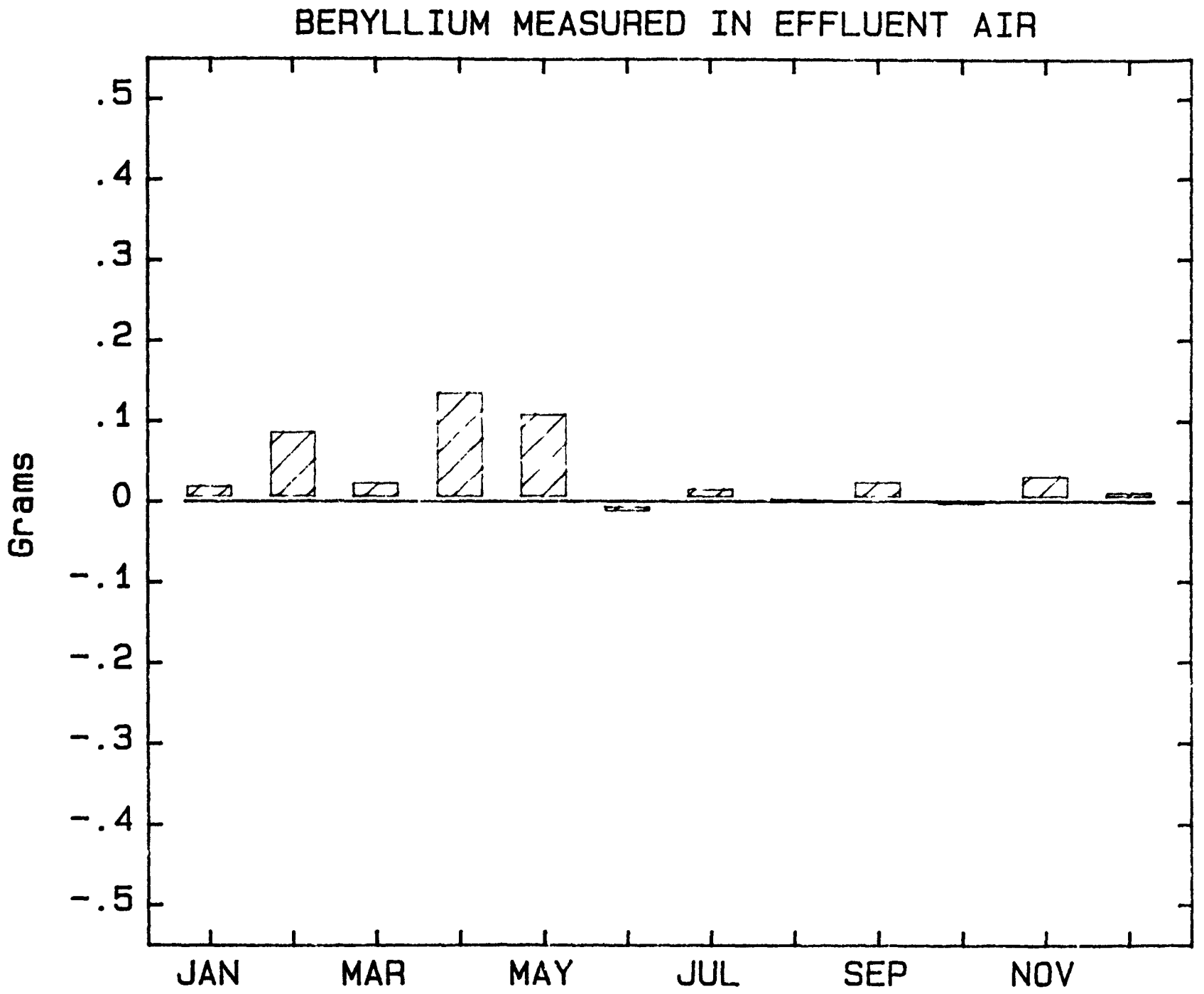

BERYLLIUM MEASURED IN EFFLUENT AIR
Grams
.5
.4
.3
.2
.1
0
-.1
-.2
-.3
-.4
-.5
JAN
MAR
MAY
JUL
SEP
NOV

Table III. Plutonium at Selected Onsite Ambient Air Locations
(12/03/85-01/02/86)

Location	n	Volume(m^3)	Concentration (pCi/m^3) Lower Confidence Limit	Point Estimate	Upper Confidence Limit
S-5	2	30,000	0.000064	0.000072	0.000080
S-6	2	29,000	0.000113	0.000127	0.000141
S-7	2	27,000	0.000115	0.000130	0.000145
S-8	2	27,000	0.000091	0.000104	0.000117
S-9	2	30,000	0.000094	0.000106	0.000118

NOTE: Total long-lived alpha at the remaining 18 onsite ambient air samplers was below the screening level of 0.01 pCi/m3.

Table IV. Tritium in Ambient Air Water Vapor at Selected Onsite Locations

Location	n	Average Concentration (pCi/l)
S-4	3	630 ± 1150
S-5	2	470 ± 1090
S-16	2	230 ± 1030

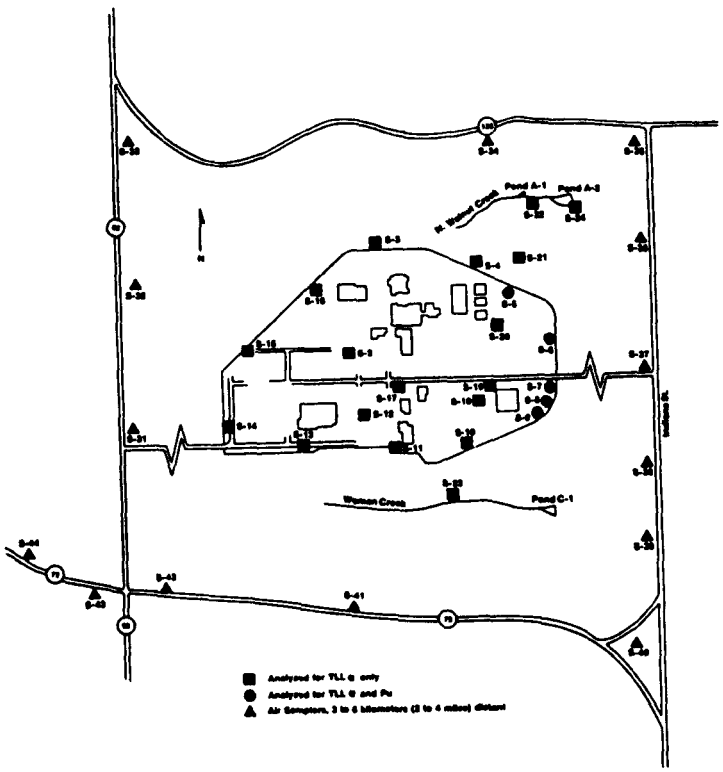


Table V. Plutonium in Perimeter Ambient Air
(11/19/85-01/02/86)

Location	n	Volume(m^3)	Concentration(pCi/m^3) Lower Confidence Limit	Point Estimate	Upper Confidence Limit
S-31	1	47,000	0.000000	0.000001	0.000002
S-32	1	43,000	-0.000001	0.000001	0.000003
S-33	1	48,000	-0.000002	0.000000	0.000002
S-34	1	41,000	-0.000001	0.000001	0.000003
S-35	1	40,000	-0.000003	0.000000	0.000003
S-36	1	52,000	0.000000	0.000002	0.000004
S-37	1	48,000	0.000001	0.000003	0.000005
S-38	1	46,000	0.000002	0.000004	0.000006
S-39	1	46,000	0.000006	0.000009	0.000012
S-40	1	46,000	-0.000002	0.000000	0.000002
S-41	1	44,000	-0.000002	0.000000	0.000002
S-42	1	39,000	-0.000003	0.000000	0.000003
S-43	1	45,000	-0.000001	0.000001	0.000003
S-44	1	48,000	-0.000003	-0.000001	0.000001
Mean Point Estimate				0.000002	

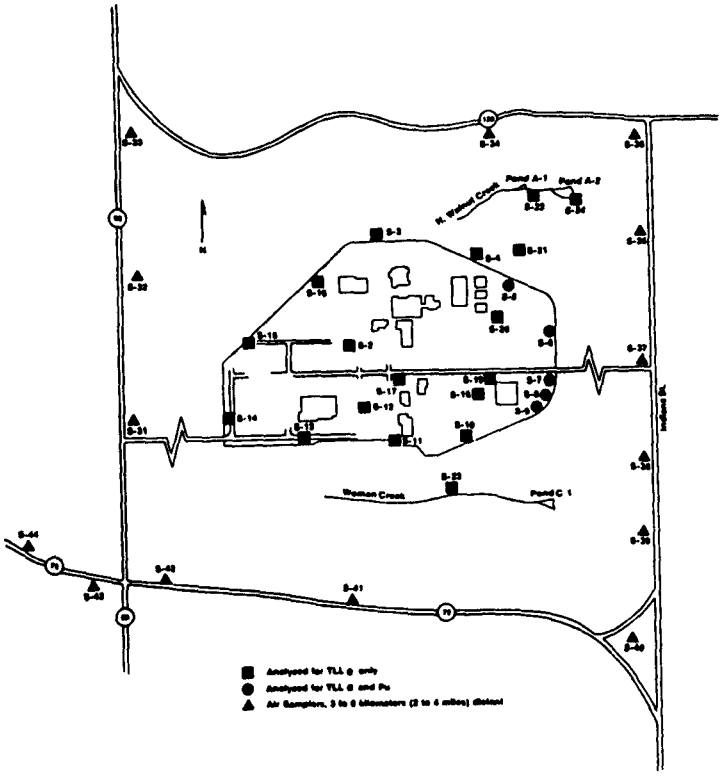


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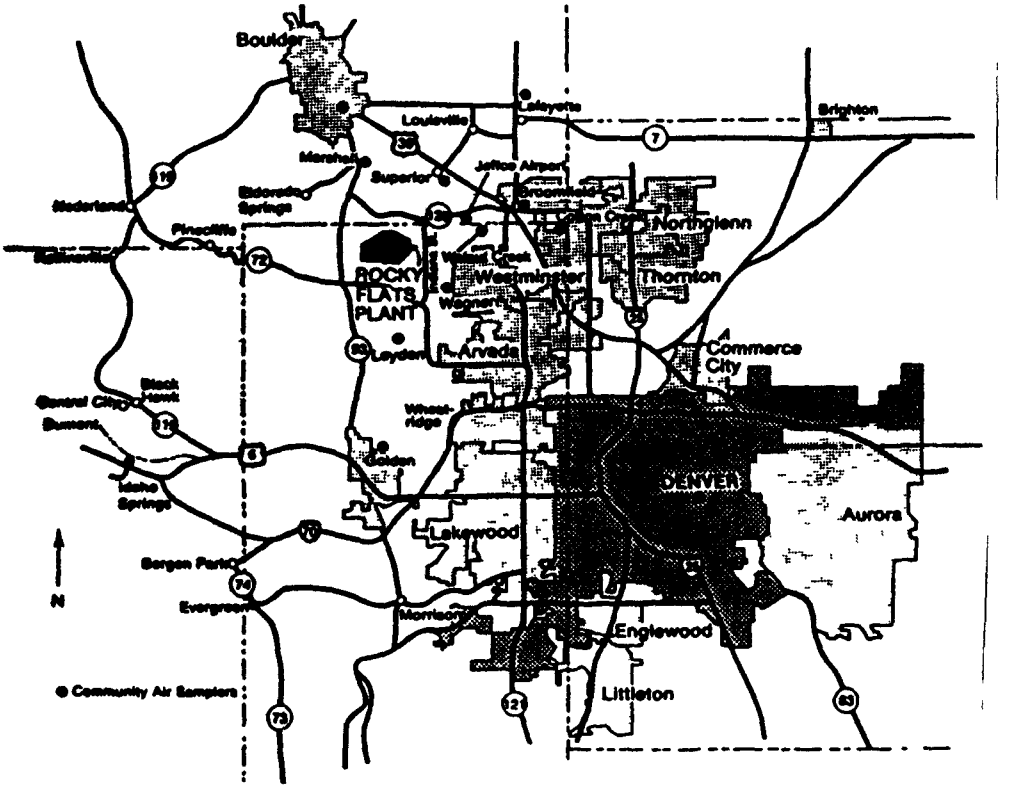
Table VI. Plutonium in Community Ambient Air
(11/20/85-01/03/86)

Location	n	Volume(m^3)	Concentration(pCi/m^3) Lower Confidence Limit	Point Estimate	Upper Confidence Limit
Marshall	1	46,000	-0.000001	0.000001	0.000003
Jeffco Airport	1	47,000	-0.000002	0.000000	0.000002
Superior	1	42,000	-0.000002	0.000000	0.000002
Boulder	1	51,000	-0.000001	0.000001	0.000003
Lafayette	1	26,000	-0.000005	-0.000001	0.000003
Broomfield	1	44,000	-0.000003	-0.000001	0.000001
Walnut Creek	1	49,000	-0.000003	-0.000001	0.000001
Wagner	1	48,000	-0.000003	-0.000001	0.000001
Leyden	1	41,000	-0.000001	0.000001	0.000003
Westminster	1	36,000	-0.000003	0.000000	0.000003
Denver	1	24,000	0.000003	0.000007	0.000011
Golden	1	23,000	-0.000005	-0.000001	0.000003
Lake Pointe	1	25,000	0.000000	0.000004	0.000008
Cotton Creek	1	48,000	-0.000003	-0.000001	0.000001
Mean Point Estimate				0.000001	



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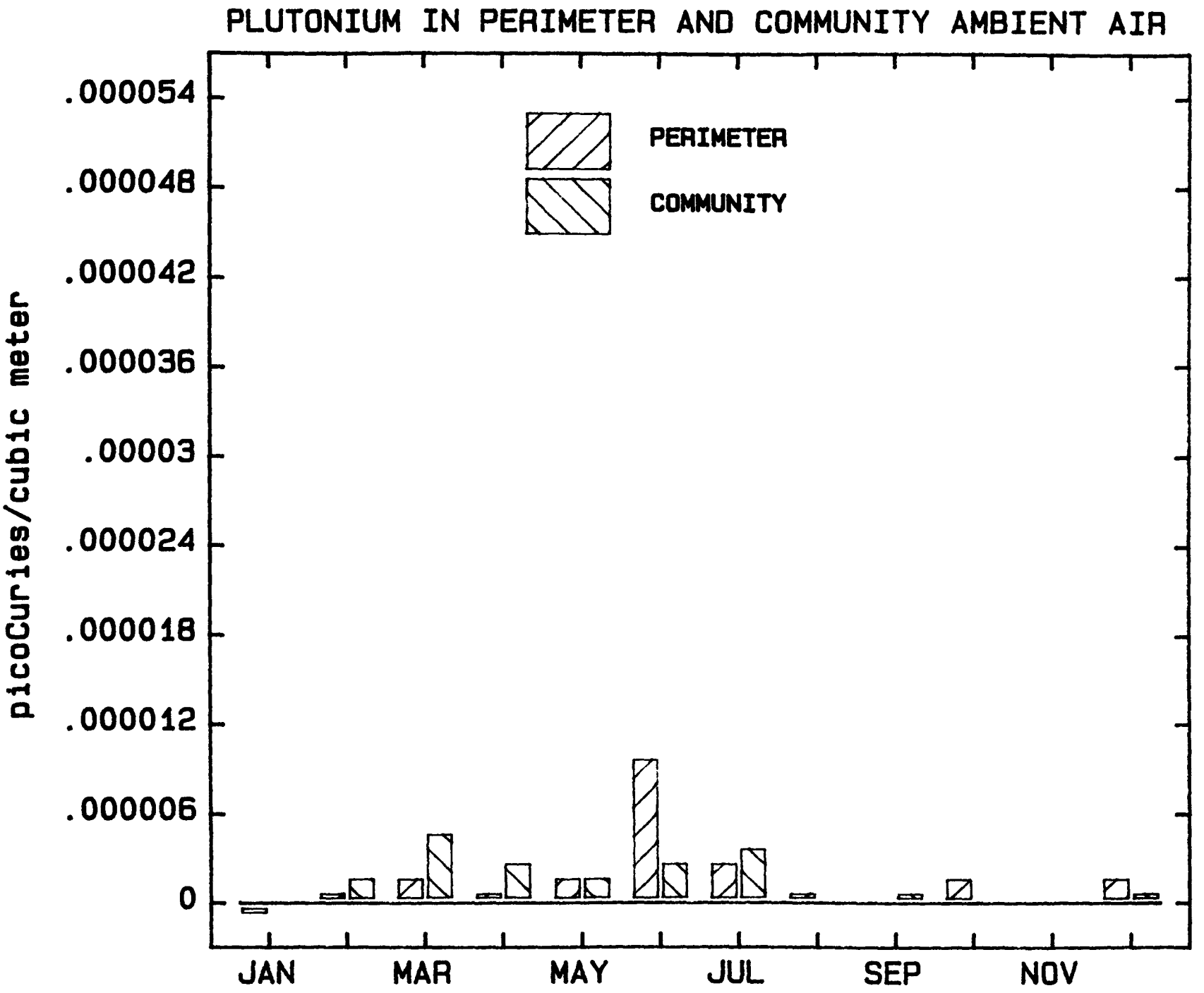
PLUTONIUM IN PERIMETER AND COMMUNITY AMBIENT AIR
PERIMETER
COMMUNITY
picoCuries/cubic meter
.000054
.000048
.000042
.000036
.00003
.000024
.000018
.000012
.000006
0
JAN
MAR
MAY
JUL
SEP
NOV

Table VII. Radioactive Water Sample Results

Holding Pond Outfall (pCi/l)

Location	Plutonium	Uranium	Americium
Pond A-4			
		No Discharge	
Pond B-5			
12/19/85 - 12/20/85	0.00 ± 0.05	10 ± 1	0.01 ± 0.06
12/23/85	-0.02 ± 0.05	8.2 ± 0.8	0.02 ± 0.06
Average Concentration	-0.01 ± 0.04	9.1 ± 0.6	0.02 ± 0.04
Pond C-1			
11/29/85 - 12/06/85	0.012 ± 0.007	1.3 ± 0.2	0.01 ± 0.01
12/06/85 - 12/13/85	0.02 ± 0.01	1.0 ± 0.2	0.01 ± 0.01
12/13/85 - 12/20/85	0.10 ± 0.02	1.9 ± 0.2	0.08 ± 0.02
12/20/85 - 12/24/85	0.01 ± 0.02	1.1 ± 0.1	-0.02 ± 0.03
Average Concentration	0.035 ± 0.008	1.3 ± 0.1	0.02 ± 0.01
Pond C-2			
		No Discharge	
Walnut Creek at Indiana			
11/29/85 - 12/06/85	0.012 ± 0.007	7.6 ± 0.6	0.01 ± 0.01
12/06/85 - 12/13/85	0.043 ± 0.008	8 ± 1	0.04 ± 0.02
12/13/85 - 12/20/85	0.00 ± 0.01	7.3 ± 0.9	0.02 ± 0.01
12/20/85 - 12/24/85	0.00 ± 0.02	*	0.03 ± 0.03
Average Concentration	0.014 ± 0.006	*	0.02 ± 0.01

* Analysis incomplete.

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Table VII. Radioactive Water Sample Results

Holding Pond Outfall (pCi/l)

Location	Plutonium	Uranium	Americium
Pond A-4			
		No Discharge	
Pond B-5			
11/04/85 - 11/06/85	0.00 ± 0.03	6.2 ± 0.6	0.01 ± 0.06
11/20/85 - 11/22/85	0.05 ± 0.03	9 ± 1	0.13 ± 0.06
Average Concentration	0.02 ± 0.02	7.6 ± 0.6	0.07 ± 0.04
Pond C-1			
10/25/85 - 11/01/85	0.03 ± 0.01	1.6 ± 0.2	0.01 ± 0.01
11/01/84 - 11/08/85	0.04 ± 0.05*	1.8 ± 0.2	0.01 ± 0.01
11/08/85 - 11/15/85	0.025 ± 0.009	6.4 ± 0.8	0.02 ± 0.01
11/15/85 - 11/22/85	0.023 ± 0.008	0.9 ± 0.1	0.02 ± 0.01
11/22/85 - 11/29/85	0.02 ± 0.01	1.1 ± 0.2	0.03 ± 0.02
Average Concentration	0.03 ± 0.01*	2.4 ± 0.2	0.018 ± 0.006
Pond C-2			
		No Discharge	
Walnut Creek at Indiana			
10/25/85 - 11/01/85	0.018 ± 0.009	5.6 ± 0.6	0.01 ± 0.01
11/01/85 - 11/08/85	-0.01 ± 0.05	7.3 ± 0.8	0.02 ± 0.01
11/08/85 - 11/15/85	0.04 ± 0.03	1.5 ± 0.2	0.05 ± 0.06
11/15/85 - 11/22/85	0.007 ± 0.007	7.2 ± 0.6	0.03 ± 0.01
11/22/85 - 11/29/85	-0.003 ± 0.009	8.3 ± 0.8	0.01 ± 0.02
Average Concentration	0.01 ± 0.01	6.0 ± 0.3	0.02 ± 0.01

* Analytic results were not reported last month.

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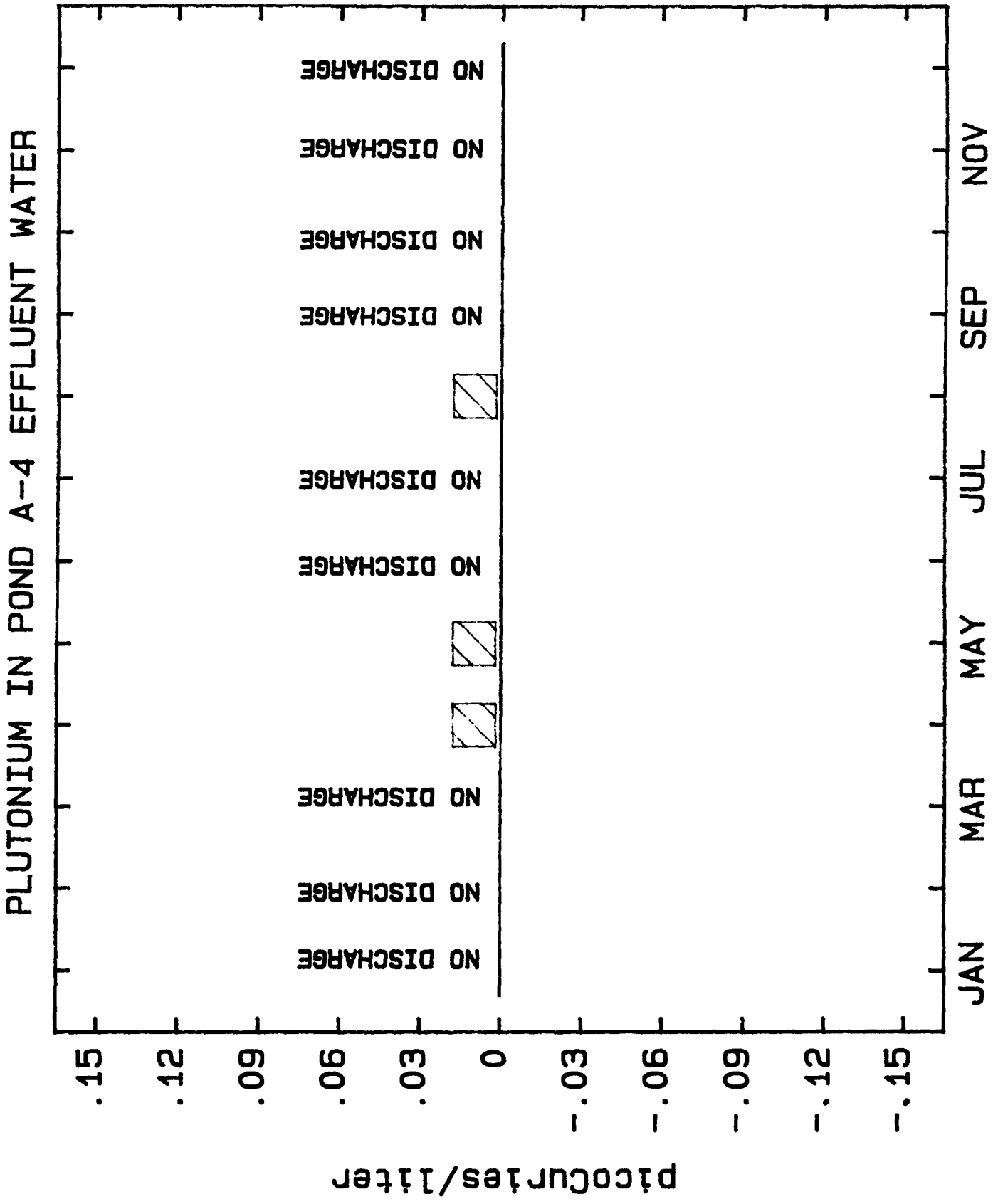
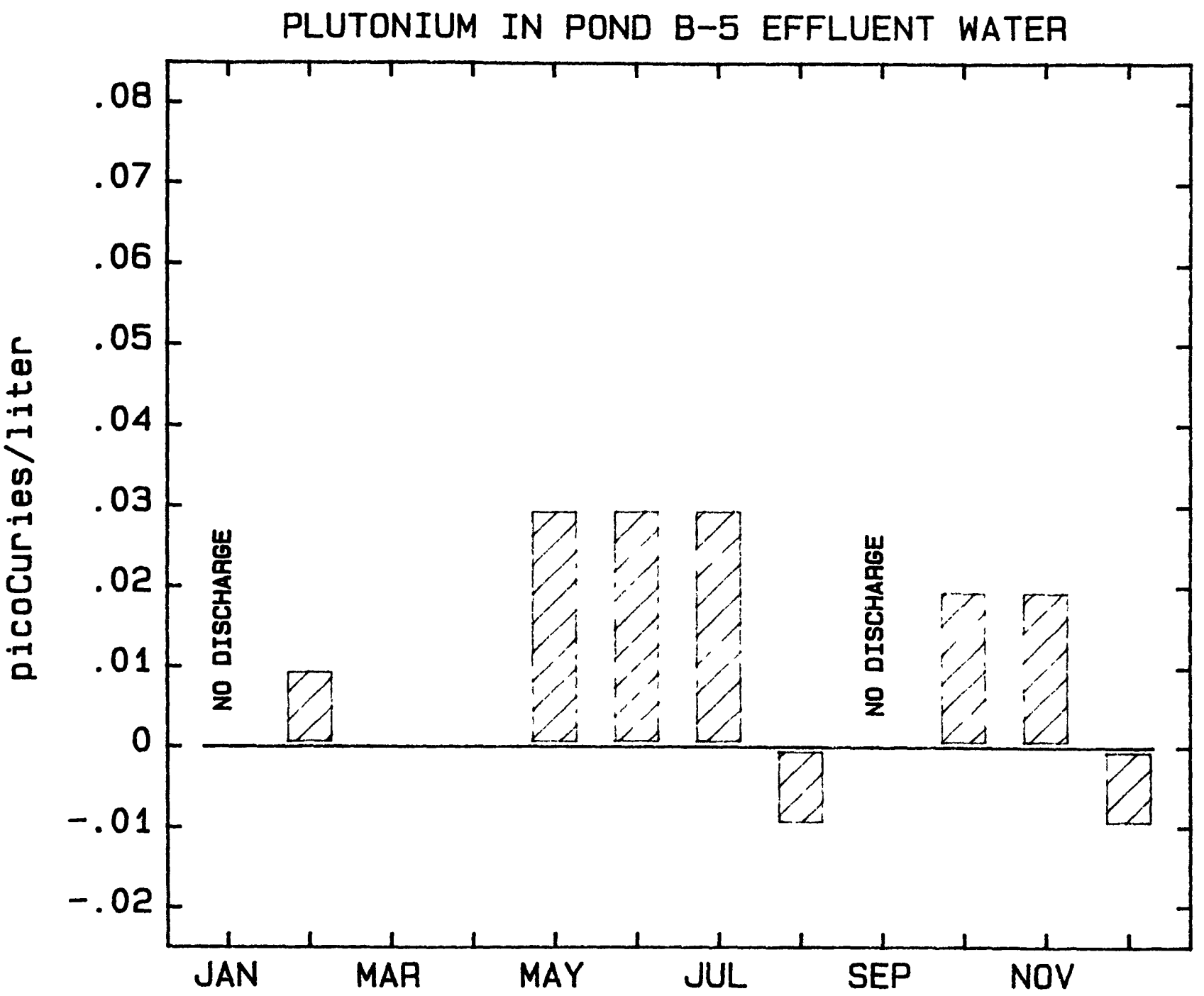
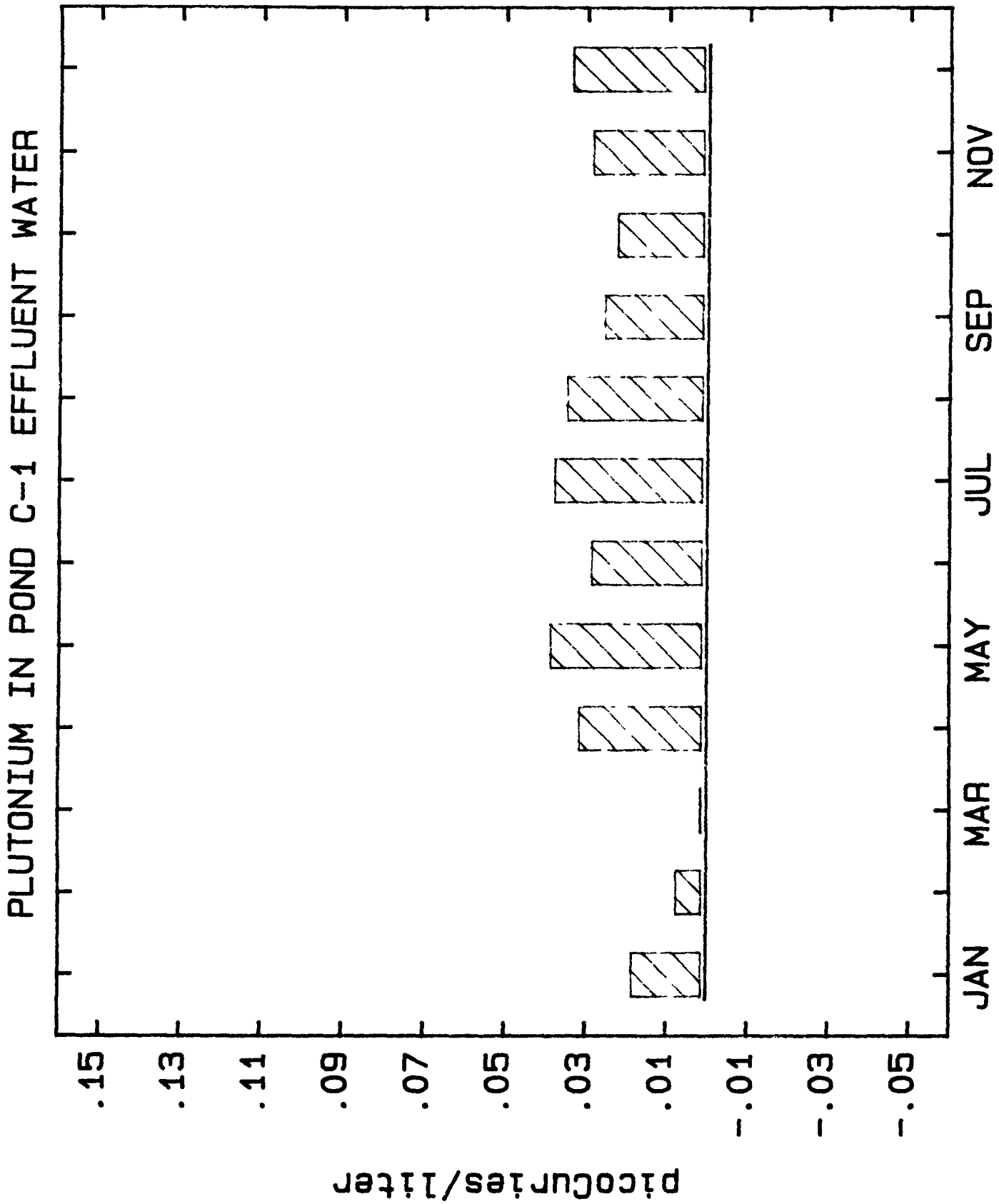
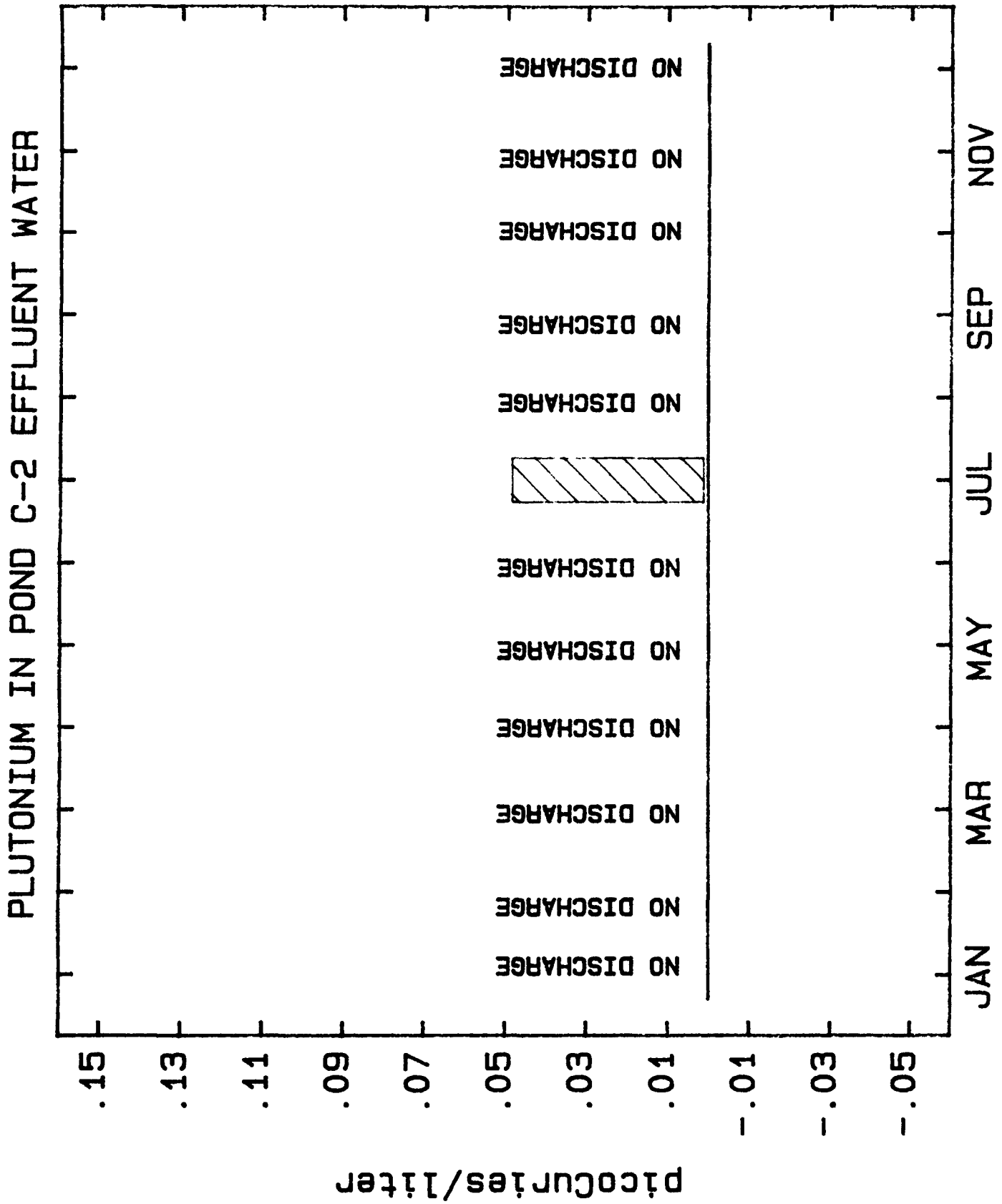

PLUTONIUM IN POND A-4 EFFLUENT WATER
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
.15
.12
.09
.06
.03
0
-.03
-.06
-.09
-.12
-.15
picocuries/liter
JAN
MAR
MAY
JUL
SEP
NOV

17


PLUTONIUM IN POND B-5 EFFLUENT WATER
picoCuries/liter
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
NO DISCHARGE
NO DISCHARGE
JAN
MAR
MAY
JUL
SEP
NOV


PLUTONIUM IN POND C-1 EFFLUENT WATER
picoCuries/liter
.15
.13
.11
.09
.07
.05
.03
.01
-.01
-.03
-.05
JAN
MAR
MAY
JUL
SEP
NOV

19


PLUTONIUM IN POND C-2 EFFLUENT WATER
picocuries/liter
.15
.13
.11
.09
.07
.05
.03
.01
-.01
-.03
-.05
JAN
MAR
MAY
JUL
SEP
NOV
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE

20

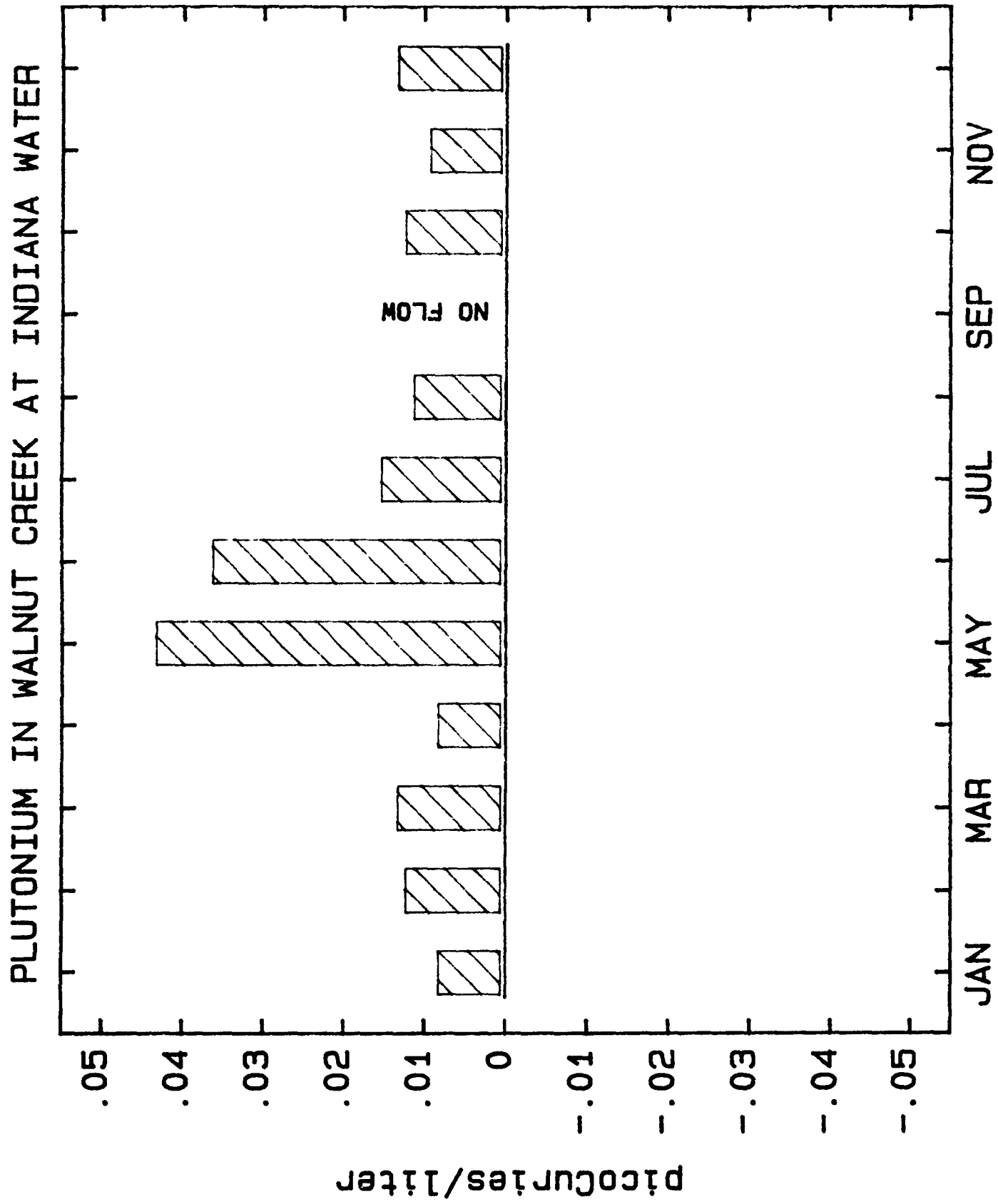

PLUTONIUM IN WALNUT CREEK AT INDIANA WATER
picoCuries/liter
.05
.04
.03
.02
.01
0
-.01
-.02
-.03
-.04
-.05
NO FLOW
JAN
MAR
MAY
JUL
SEP
NOV

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Table VIII. Radioactive Water Sample Results

Reservoirs (pCi/l)

Location	n	Plutonium	Uranium	Americium
Great Western	1*	0.06 ± 0.02	2.6 ± 0.3	0.00 ± 0.02
Standley	1*	0.01 ± 0.02	1.7 ± 0.2	0.01 ± 0.02

Community Tap Water (pCi/l)

Location	n	Plutonium	Uranium	Americium
Arvada	1	-0.02 ± 0.05	0.23 ± 0.08	0.04 ± 0.06
Boulder	1*	0.01 ± 0.02	-0.02 ± 0.07	0.03 ± 0.02
Broomfield	1*	0.05 ± 0.02	1.4 ± 0.2	0.01 ± 0.02
Denver	1	0.01 ± 0.05	2.1 ± 0.2	-0.04 ± 0.06
Golden	1	-0.02 ± 0.05	2.0 ± 0.2	-0.02 ± 0.06
Lafayette	1	-0.01 ± 0.05	0.0 ± 0.1	0.03 ± 0.06
Louisville	1	-0.02 ± 0.05	0.07 ± 0.08	0.06 ± 0.07
Thornton	1	0.00 ± 0.05	1.7 ± 0.2	0.00 ± 0.06
Westminster	1*	0.00 ± 0.02	1.3 ± 0.2	0.00 ± 0.02

* Plutonium, uranium and americium analyses were performed on one sample composited from three weekly grab samples. All other analyses were performed on quarterly grab samples.

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Table IX. Radioactive Water Sample Results

Tritium (pCi/l)

Location	n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
Pond A-4	0	No Discharge		
Pond B-5	2	-500 ± 1400	800 ± 900	200 ± 900
Pond C-1	4	200 ± 800	1300 ± 900	700 ± 500
Pond C-2	0	No Discharge		
Walnut Creek at Indiana	4	100 ± 900	900 ± 1400	400 ± 500
Arvada	1	-600 ± 1300	-600 ± 1300	-600 ± 1300
Boulder	3	-1000 ± 1300	700 ± 700	100 ± 500
Broomfield	3	100 ± 500	600 ± 1400	400 ± 700
Denver	1	100 ± 1400	100 ± 1400	100 ± 1400
Golden	1	0 ± 1400	0 ± 1400	0 ± 1400
Great Western	3	300 ± 700	600 ± 1400	500 ± 600
Lafayette	1	500 ± 1400	500 ± 1400	500 ± 1400
Louisville	1	900 ± 1400	900 ± 1400	900 ± 1400
Standley	3	-300 ± 1300	300 ± 600	0 ± 500
Thornton	1	-300 ± 100	-300 ± 100	-300 ± 100
Westminster	3	0 ± 600	500 ± 1400	300 ± 600

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Table X. Nonradioactive Water Sample Results

Nitrate (as N) at Great Western Reservoir

Sample Date	Nitrate (as N) (mg/l)
12/05/85	<0.2
12/12/85	<0.2
12/19/85	<0.2

Nitrate (as N) at Standley Lake

Sample Date	Nitrate (as N) (mg/l)
12/05/85	<0.2
12/12/85	<0.2
12/19/85	<0.2

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Table XI. NPDES Permit Water Sample Results

Discharge 001 (Pond B-3)
No Discharge

Parameter		Discharge Limitations 30-Day Average	Daily Maximum	30-Day* Average	Daily Maximum
Biochem. Oxygen Demand,5 Day	mg/l	No Discharge		10	25
Total Suspended Soilds	mg/l			30	NA
Nitrates as N	mg/l			10	NA
Total Chromium	mg/l			0.05	0.1
Total Phosphorus	mg/l			8	NA
Oil and Grease, Visual				NA	NA
Total Residual Chlorine	mg/l			NA	0.5
Fecal Coliforms	#/100 ml			200	NA
		Minimum	Maximum	Minimum	Maximum
pH	S.U.			6.0	9.0

Discharge 002 (Pond A-3)
No Discharge

Parameters		Discharge Limitations 30-Day Average	Daily Maximum	30-Day* Average	Daily Maximum
Nitrates as N	mg/l	No Discharge		10	20
		Minimum	Maximum	Minimum	Maximum
pH	S.U.			6.0	9.0

Discharge 003 (RO Pilot Plant)
No Discharge

		Discharge Limitations Minimum	Maximum	Minimum	Maximum
pH	S.U.	No Discharge		6.0	9.0

Discharge 004 (RO Plant)
No Discharge

		Discharge Limitations 30-Day Average	Daily Maximum	30-Day* Average	Daily Maximum
Total Suspended Solids	mg/l	No Discharge		15	25
Total Organic Compounds	mg/l			22	30
Total Phosphorus	mg/l			8	12
Nitrates as N	mg/l			10	20
Total Chromium	mg/l			0.05	0.1
Total Residual Chlorine	mg/l			NA	0.5
		7-Day Average	30-Day Average	7-Day Average	30-Day Average
Fecal Coliform	#/100 ml			400	200
		Minimum	Maximum	Minimum	Maximum
pH	S.U.			6.0	9.0

* This limitation applies when a minimum of 3 consecutive samples are taken during separate weeks.

Tables XI. NPDES Permit Water Sample Results (Continued)

Discharge 005 (Pond A-4)
No Discharge

Parameter		n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
pH	S.U.		No Discharge		
Nitrates as N	mg/l				
Nonvolatile Suspended Solids	mg/l				

Discharge 006 (Pond B-5)

Parameter		n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
pH	S.U.	2	7.6	8.1	-
Nitrates as n	mg/l	2	2.2	2.3	2.2
Nonvolatile Suspended Solids	mg/l	2	3.0	4.0	3.5

Discharge 007 (Pond C-2)
No Discharge

Parameter		n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
pH	S.U.		No Discharge		
Nitrates as N	mg/l				
Nonvolatile Suspended solids	mg/l				

Table XII. Nonradioactive Water Sample Results

Walnut Creek at Indiana Street

Parameter		n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
pH	S.U.	9	7.2	8.3	-
Nitrates as N	mg/l	9	<0.2	0.8	<0.3

Total Volume (gallons) = 4,749,000

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