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May - 1985 EAC-417110-129

Rocky Flats Plant

Monthly Environmental Monitoring Report

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MAY 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 May 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.

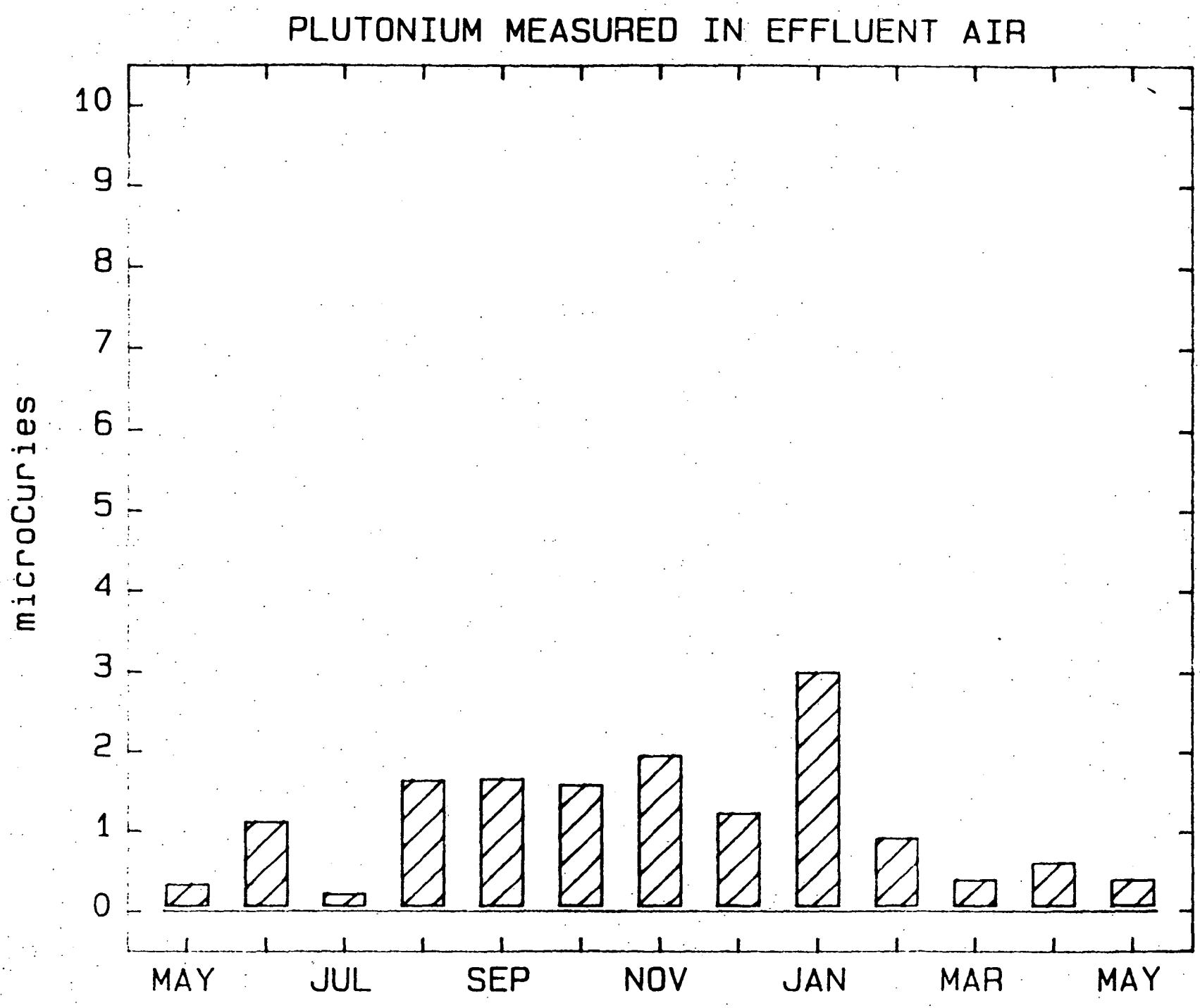
Error terms in the form of a $\pm$ b are included with some of the data. For a single sample, "a" is the reagent-blank corrected value; and term "b" accounts for the statistical counting uncertainty for the associated reagent blanks. These error terms represent a minimum estimate of error for the data. Other analytical and sampling errors are being investigated. These terms will be included as they are determined.

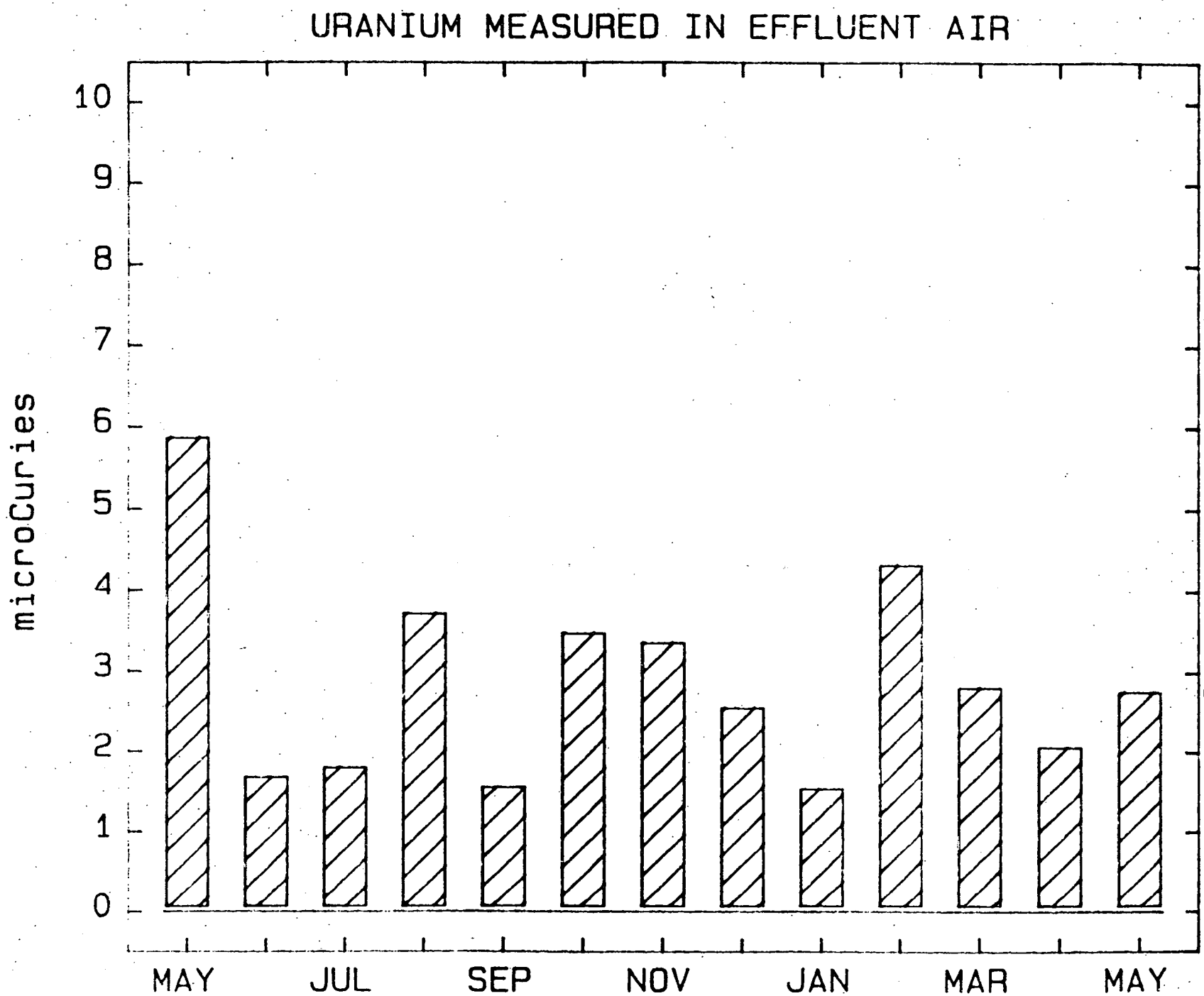
Table I. 1985 Plutonium and Uranium Airborne Effluent Data

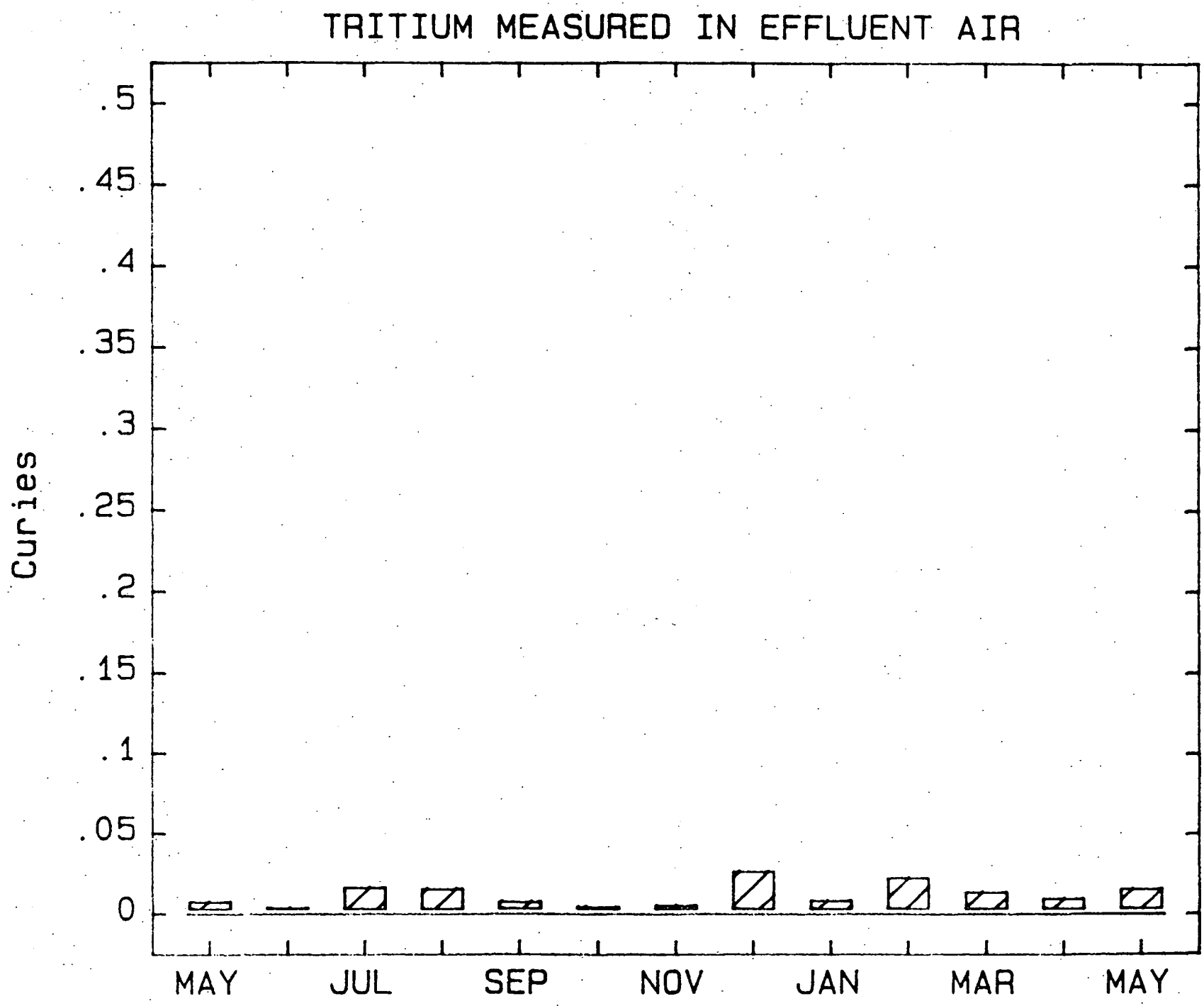
Month	Plutonium Release (uCi)	Plutonium CMax (pCi/m3)	Uranium Release (uCi)	Uranium CMax (pCi/m3)
CY 1984	12.65	0.243 ± 0.023	34.67	0.336 ± 0.0357
January	3.07	0.030 ± 0.006	1.61	0.051 ± 0.018
February	0.99	0.156 ± 0.030	4.39	0.924 ± 0.120
March	0.46	0.002 ± 0.0005	2.87	0.064 ± 0.013
April	0.68	0.002 ± 0.0004	2.12	0.004 ± 0.001
May	0.46	0.002 ± 0.0004	2.82	0.010 ± 0.003
Year to Date	5.66	0.156 ± 0.030	13.81	0.924 ± 0.120

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	0.001
May	0.019	290 ± 70	0.115	0.002
Year to Date	0.087	450 ± 200	0.291	0.0169


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


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


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

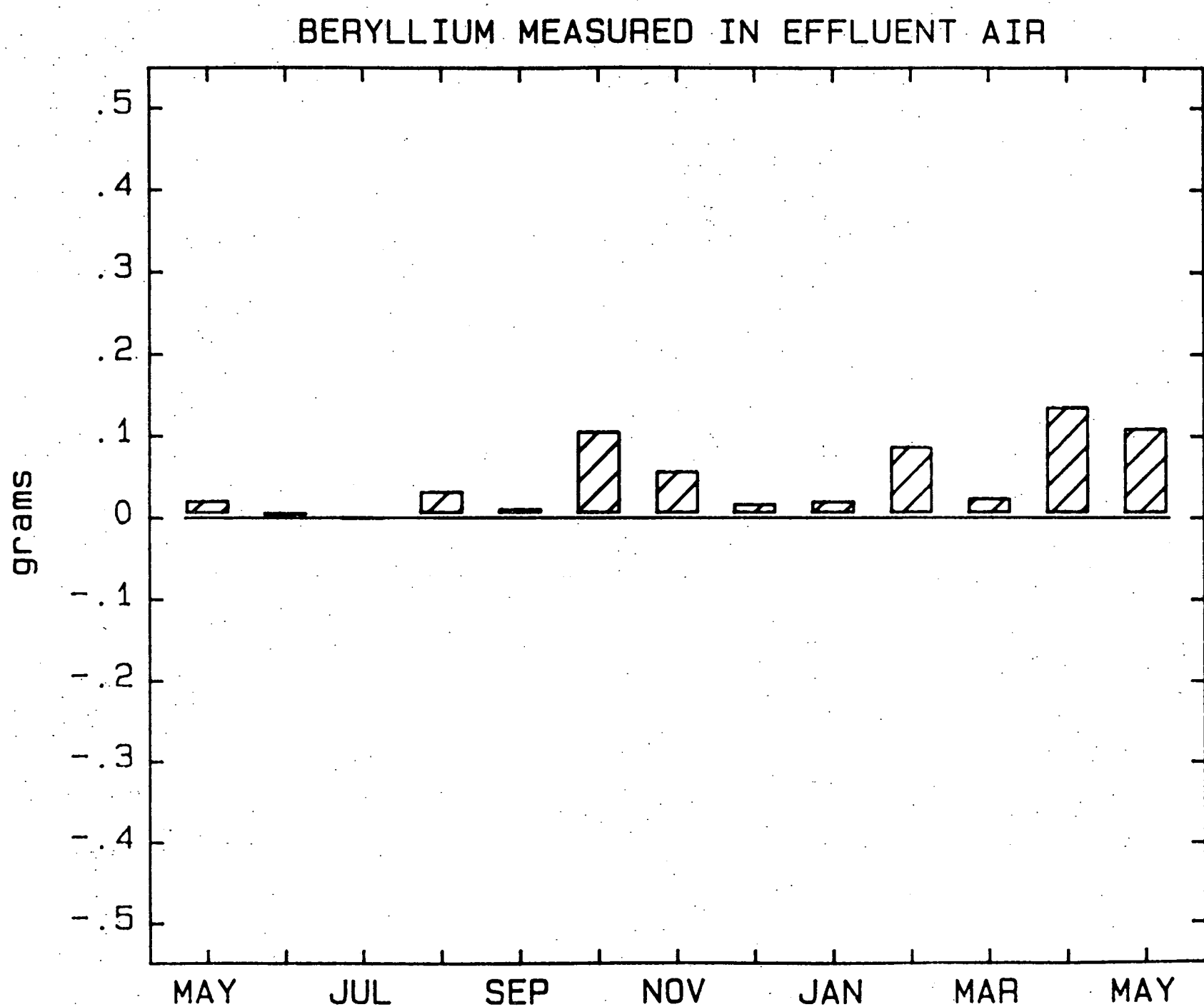

BERYLLIUM MEASURED IN EFFLUENT AIR
grams
.5
.4
.3
.2
.1
0
-.1
-.2
-.3
-.4
-.5
MAY
JUL
SEP
NOV
JAN
MAR
MAY

Table III. Plutonium at Selected Onsite Ambient Air Locations
(04/23/85-05/21/85)

Location	n	Volume(m^3)	Concentration (pCi/m^3) Lower Confidence Limit	Point Estimate	Upper Confidence Limit
S-5	2	34,000	0.000014	0.000023	0.000033
S-6	2	28,000	0.000115	0.000144	0.000174
S-7	2	29,000	0.000245	0.000307	0.000370
S-8	2	31,000	0.000258	0.000322	0.000386
S-9	2	26,000	0.000272	0.000338	0.000404

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	5	230 ± 620
S-5	5	240 ± 670
S-16	5	290 ± 680

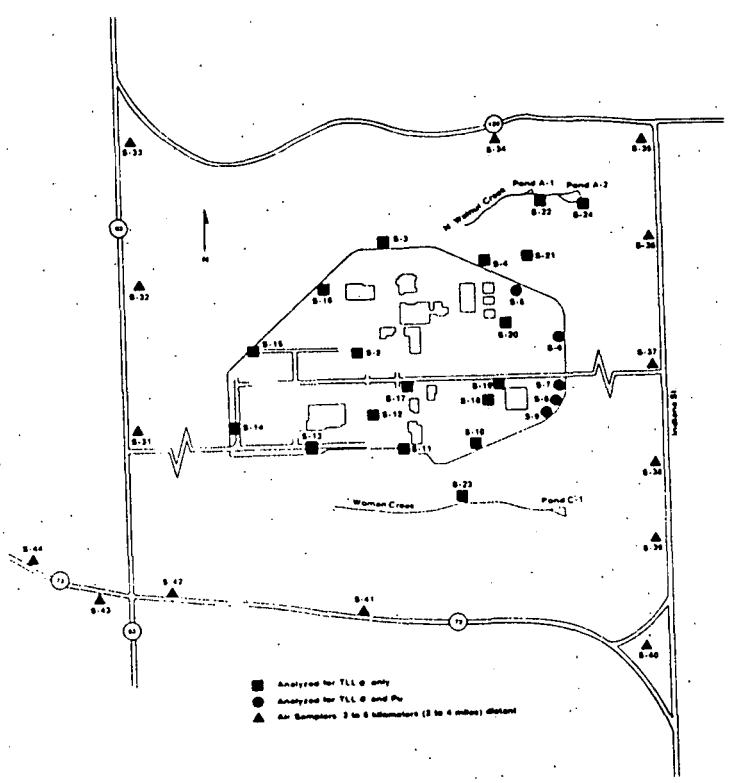


Table V. Plutonium in Perimeter Ambient Air
(04/23/85-05/21/85)

Location	n	Volume(m^3)	Concentration(pCi/m^3) Lower Confidence Limit	Point Estimate	Upper Confidence Limit
S-31	1	27,000	0.000002	0.000004	0.000006
S-32	1	30,000	0.000003	0.000005	0.000007
S-33	1	31,000	0.000002	0.000003	0.000005
S-34	1	27,000	0.000004	0.000006	0.000008
S-35	1	29,000	0.000002	0.000004	0.000005
S-36	1	30,000	0.000004	0.000005	0.000007
S-37	1	32,000	0.000012	0.000015	0.000019
S-38	1	30,000	0.000003	0.000005	0.000007
S-39	1	28,000	0.000002	0.000004	0.000005
S-40	1	30,000	0.000006	0.000009	0.000011
S-41	1	29,000	0.000002	0.000004	0.000005
S-42	1	28,000	0.000006	0.000009	0.000012
S-43	1	31,000	0.000010	0.000013	0.000017
S-44	1	29,000	0.000002	0.000003	0.000004

Average Concentration for Point Estimate 0.000006

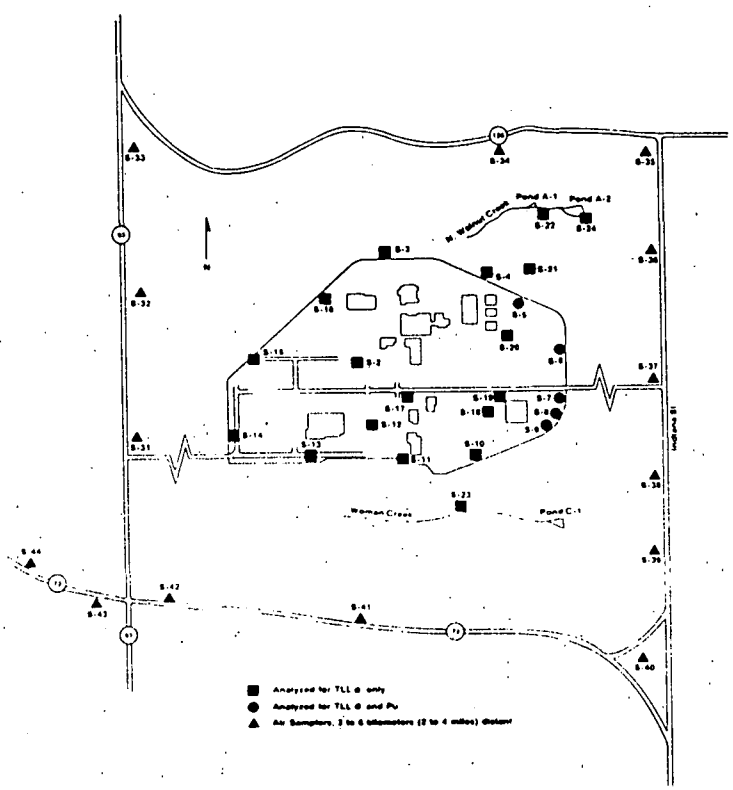
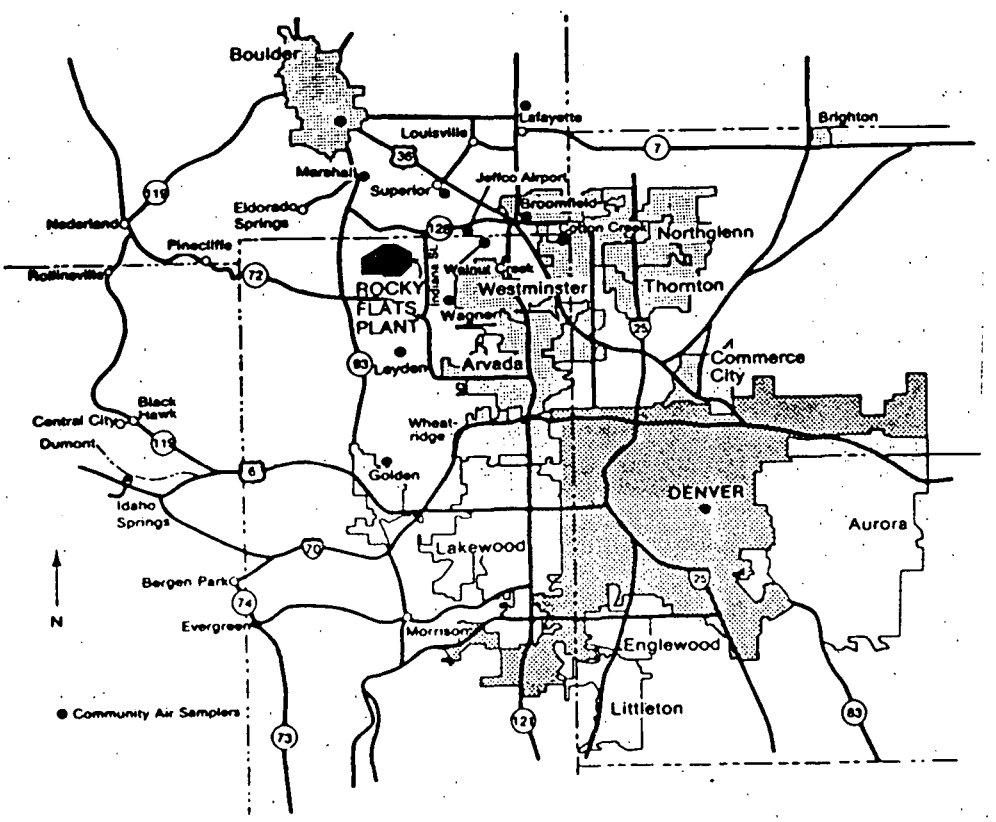


Table VI. Plutonium in Community Ambient Air
(04/24/85-05/22/85)

Location	n	Volume(m^3)	Concentration(pCi/m^3) Lower Confidence Limit	Point Estimate	Upper Confidence Limit
Marshall	1	28,000	0.000004	0.000006	0.000008
Jeffco Airport	1	30,000	0.000003	0.000005	0.000007
Superior	1	30,000	0.000001	0.000002	0.000003
Boulder	1	32,000	0.000010	0.000011	0.000014
Lafayette	1	32,000	0.000002	0.000003	0.000005
Broomfield	1	27,000	0.000004	0.000006	0.000007
Walnut Creek	1	29,000	0.000003	0.000005	0.000007
Wagner	1	30,000	0.000004	0.000006	0.000008
Leyden	1	30,000	0.000009	0.000013	0.000017
Westminster	1	27,000	0.000004	0.000006	0.000008
Denver	1	25,000	0.000006	0.000008	0.000011
Golden	1	31,000	0.000003	0.000004	0.000006
Lake Pointe	1	33,000	0.000002	0.000004	0.000005
Cotton Creek	1	28,000	0.000003	0.000005	0.000007
Average Concentration for Point Estimate				0.000006	



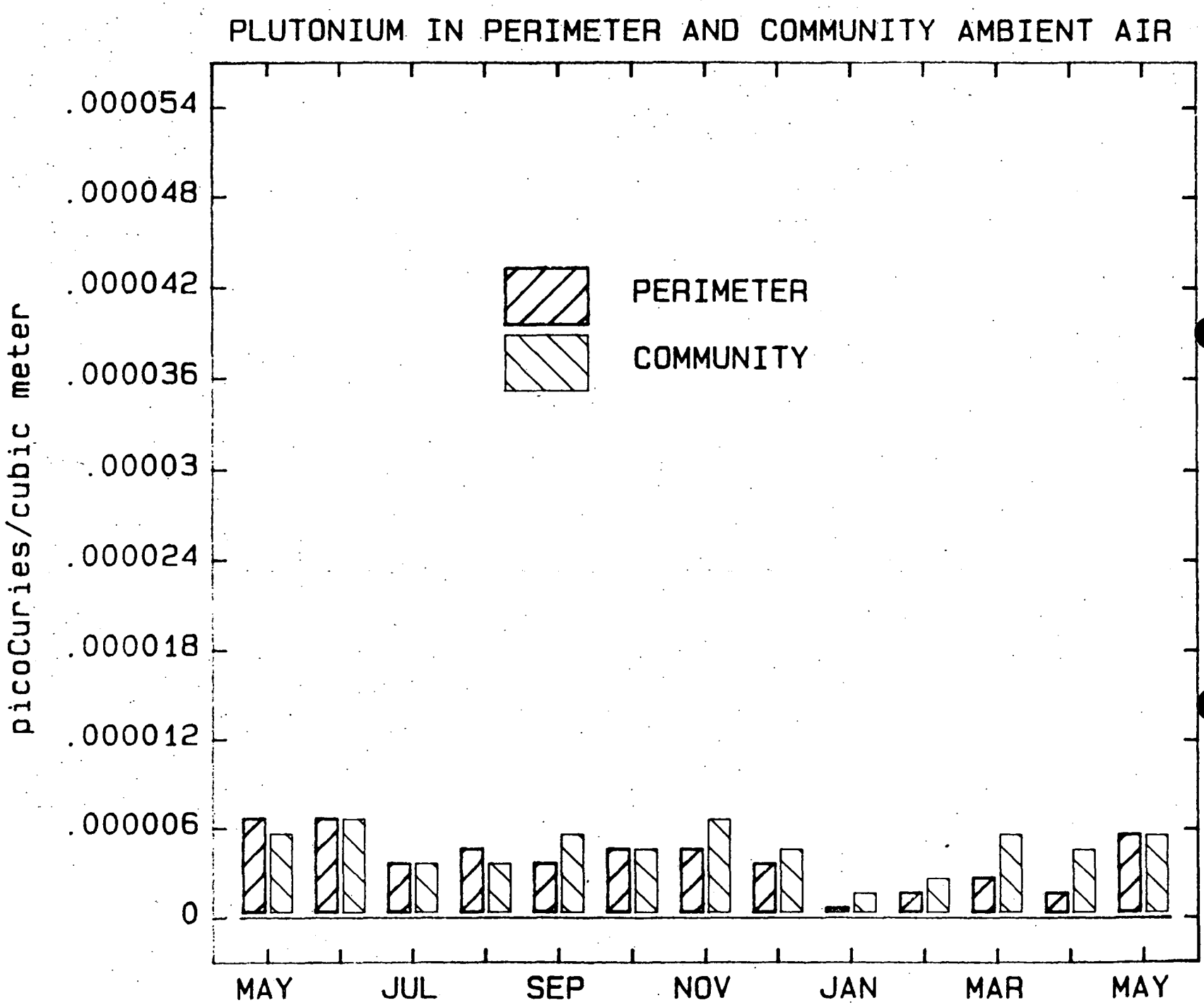
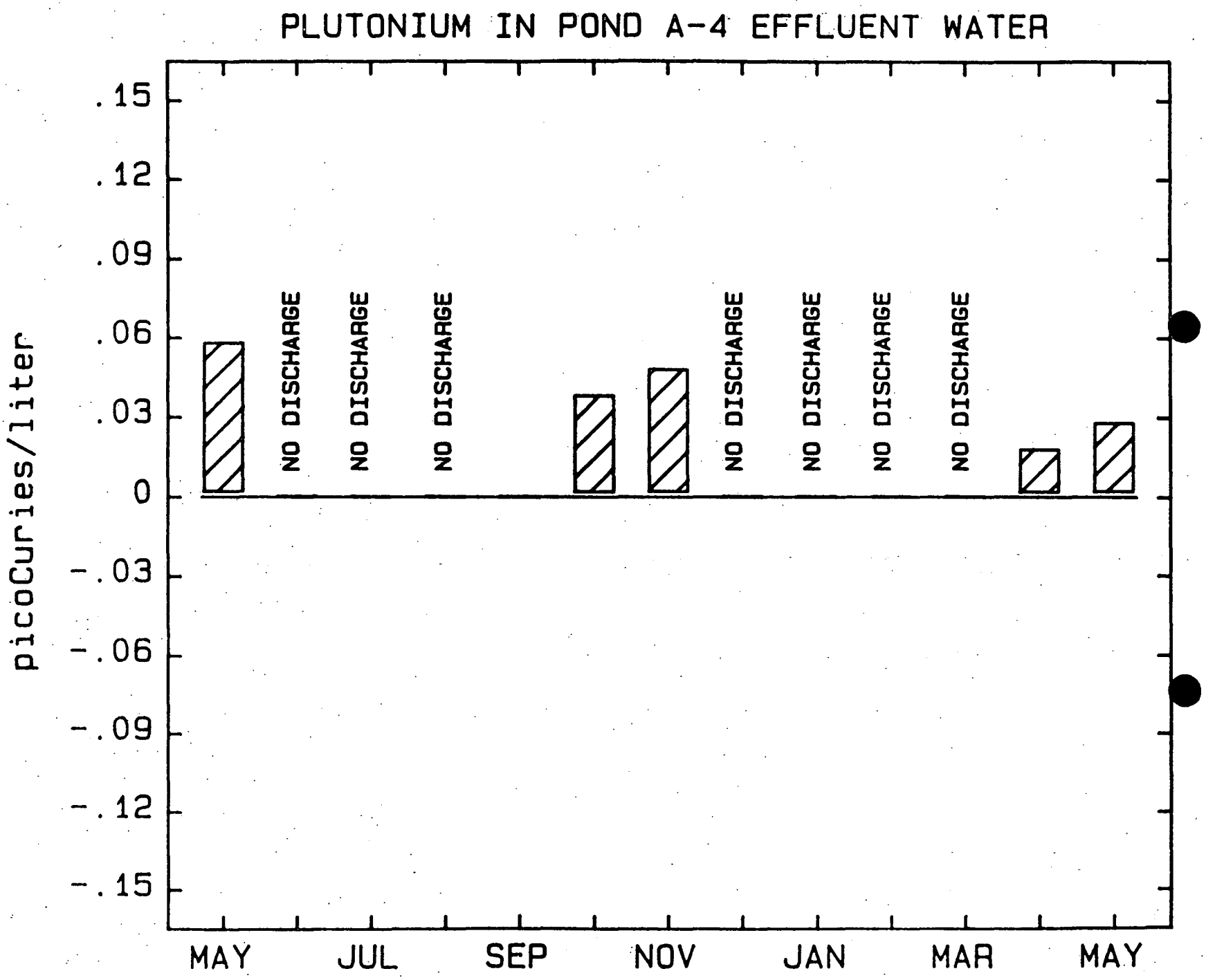

PLUTONIUM IN PERIMETER AND COMMUNITY AMBIENT AIR
picoCuries/cubic meter
.000054
.000048
.000042
.000036
.00003
.000024
.000018
.000012
.000006
0
PERIMETER
COMMUNITY
MAY
JUL
SEP
NOV
JAN
MAR
MAY

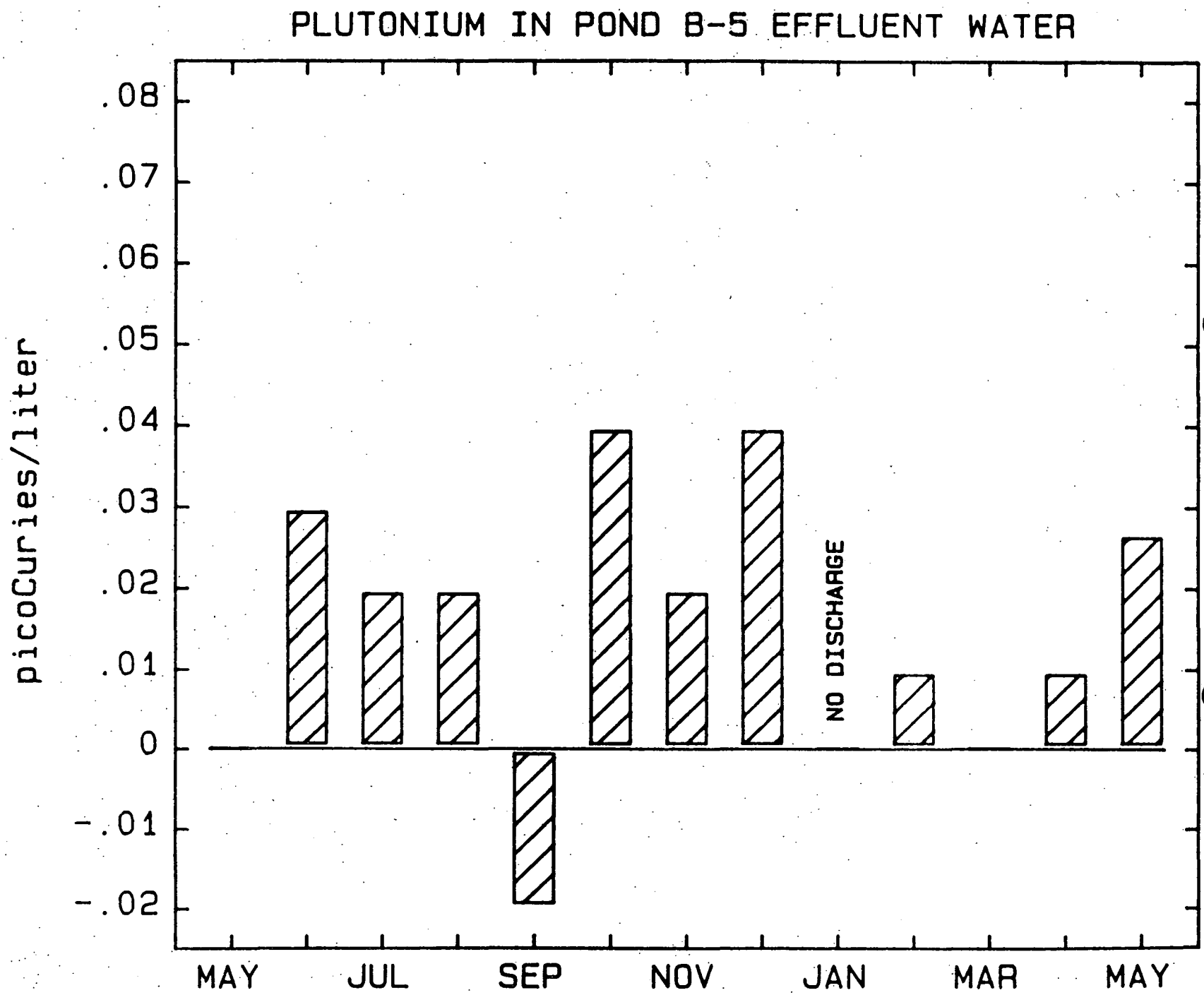
Table VII. Radioactive Water Sample Results

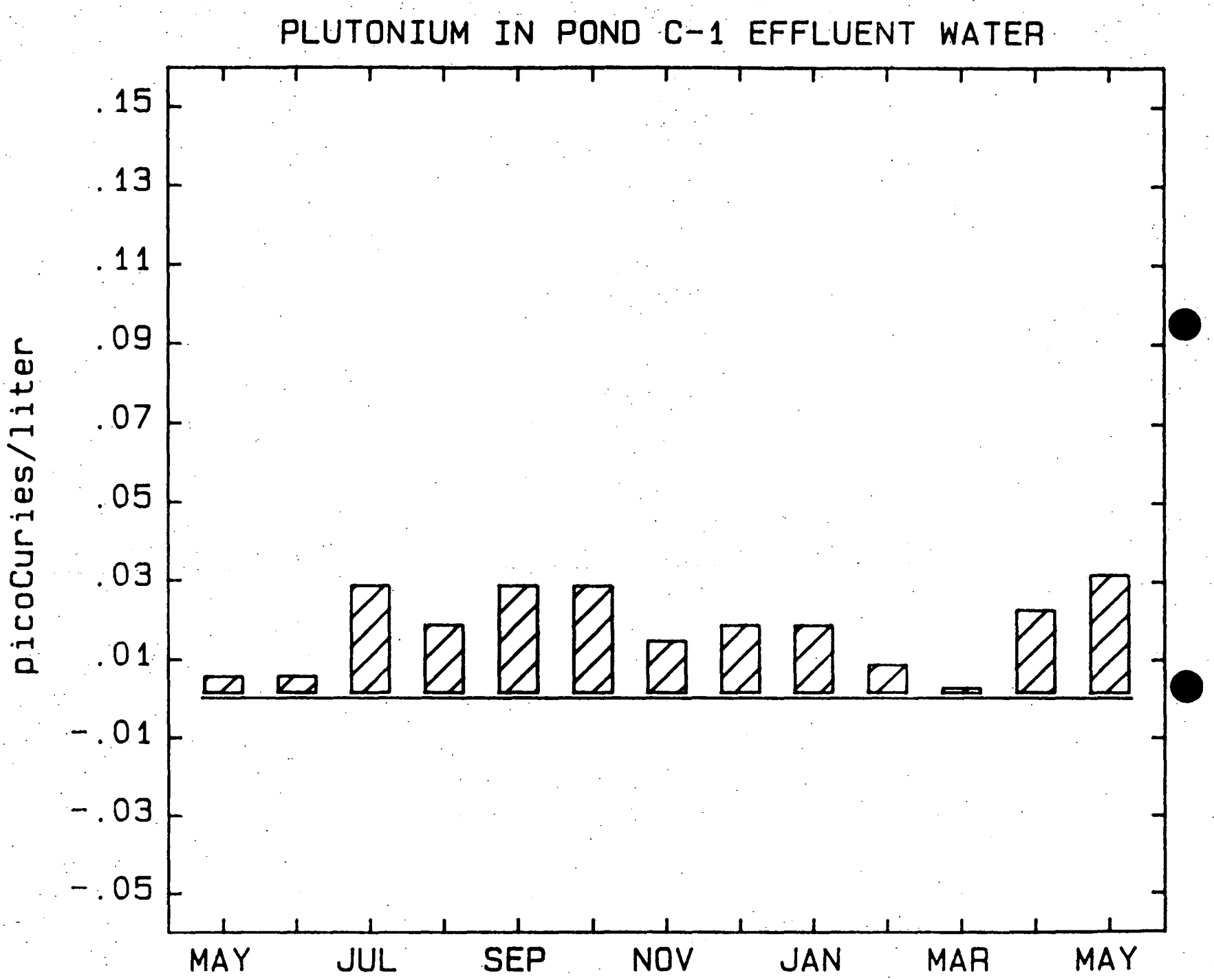
Holding Pond Outfall (pCi/l)

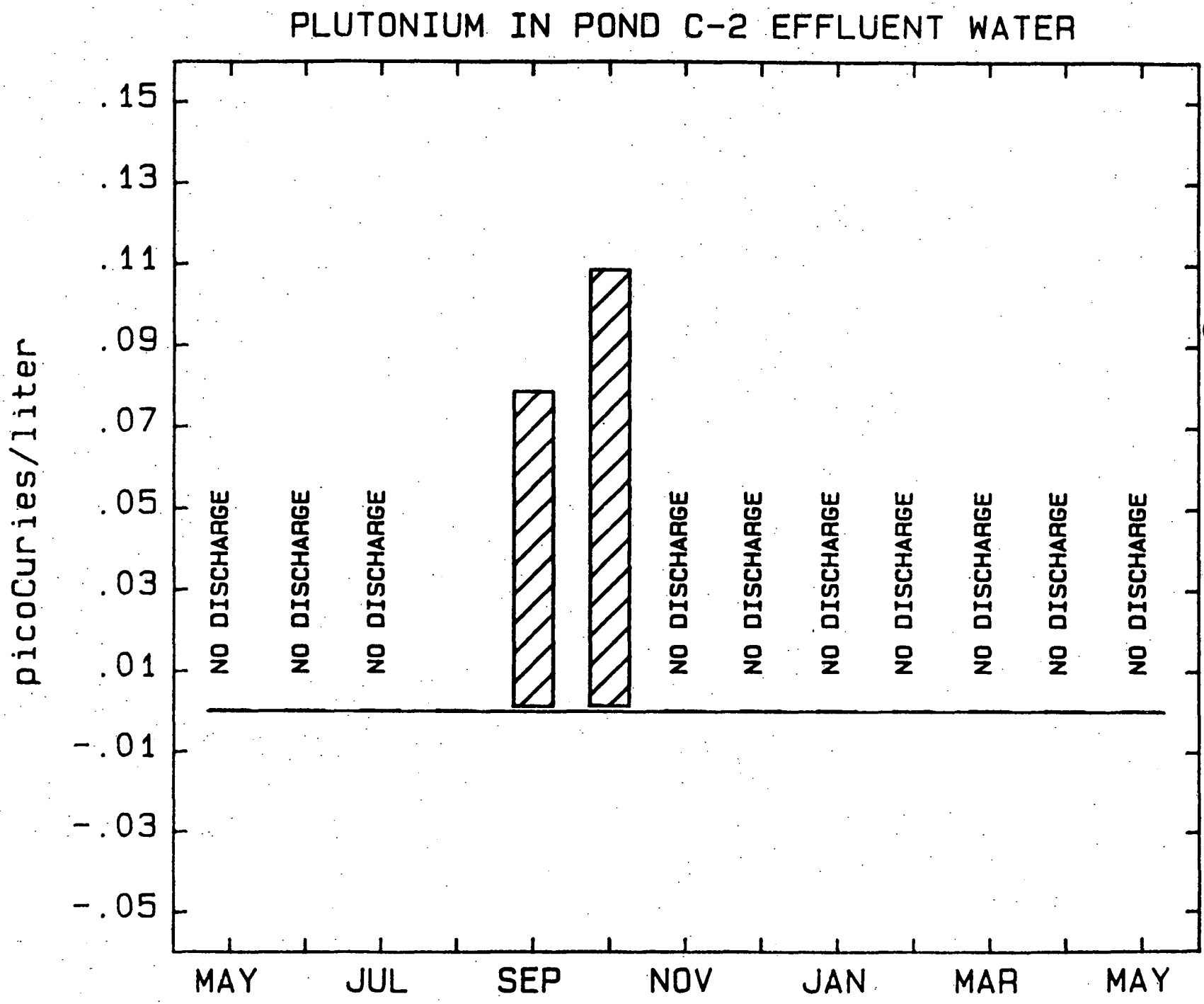
Location	Plutonium	Uranium	Americium
Pond A-4			
05/07/85 - 05/10/85	0.02 ± 0.01	4.3 ± 0.3	-0.01 ± 0.01
05/20/85 - 05/24/85	0.04 ± 0.02	3.0 ± 0.2	0.07 ± 0.02
Average Concentration	0.03 ± 0.01	3.6 ± 0.2	0.03 ± 0.01
Pond B-5			
05/01/85 - 05/03/85	0.01 ± 0.01	4.1 ± 0.3	0.04 ± 0.02
05/06/85 - 05/08/85	0.02 ± 0.01	7.5 ± 0.6	0.03 ± 0.02
05/20/85 - 05/24/85	0.05 ± 0.02	7.0 ± 0.9	0.05 ± 0.02
Average Concentrations	0.027 ± 0.008	6.2 ± 0.4	0.04 ± 0.01
Pond C-1			
05/03/85 - 05/10/85	0.027 ± 0.004	2.1 ± 0.2	0.012 ± 0.007
05/10/85 - 05/17/85	0.04 ± 0.01	2.6 ± 0.3	0.04 ± 0.01
05/17/85 - 05/24/85	0.04 ± 0.01	2.0 ± 0.2	0.023 ± 0.005
05/24/85 - 05/31/85	0.024 ± 0.006	3.2 ± 0.3	0.023 ± 0.006
Average Concentration	0.033 ± 0.004	2.5 ± 0.1	0.024 ± 0.004
Pond C-2			
	No Discharge		
Walnut Creek at Indiana			
05/03/85 - 05/10/85	0.004 ± 0.002	2.4 ± 0.2	0.007 ± 0.005
05/10/85 - 05/17/85	*	4.6 ± 0.4	0.027 ± 0.006
05/17/85 - 05/24/85	0.038 ± 0.007	3.2 ± 0.3	0.031 ± 0.007
05/24/85 - 05/31/85	*	3.4 ± 0.3	0.036 ± 0.008
Average Concentration		3.4 ± 0.2	0.025 ± 0.003

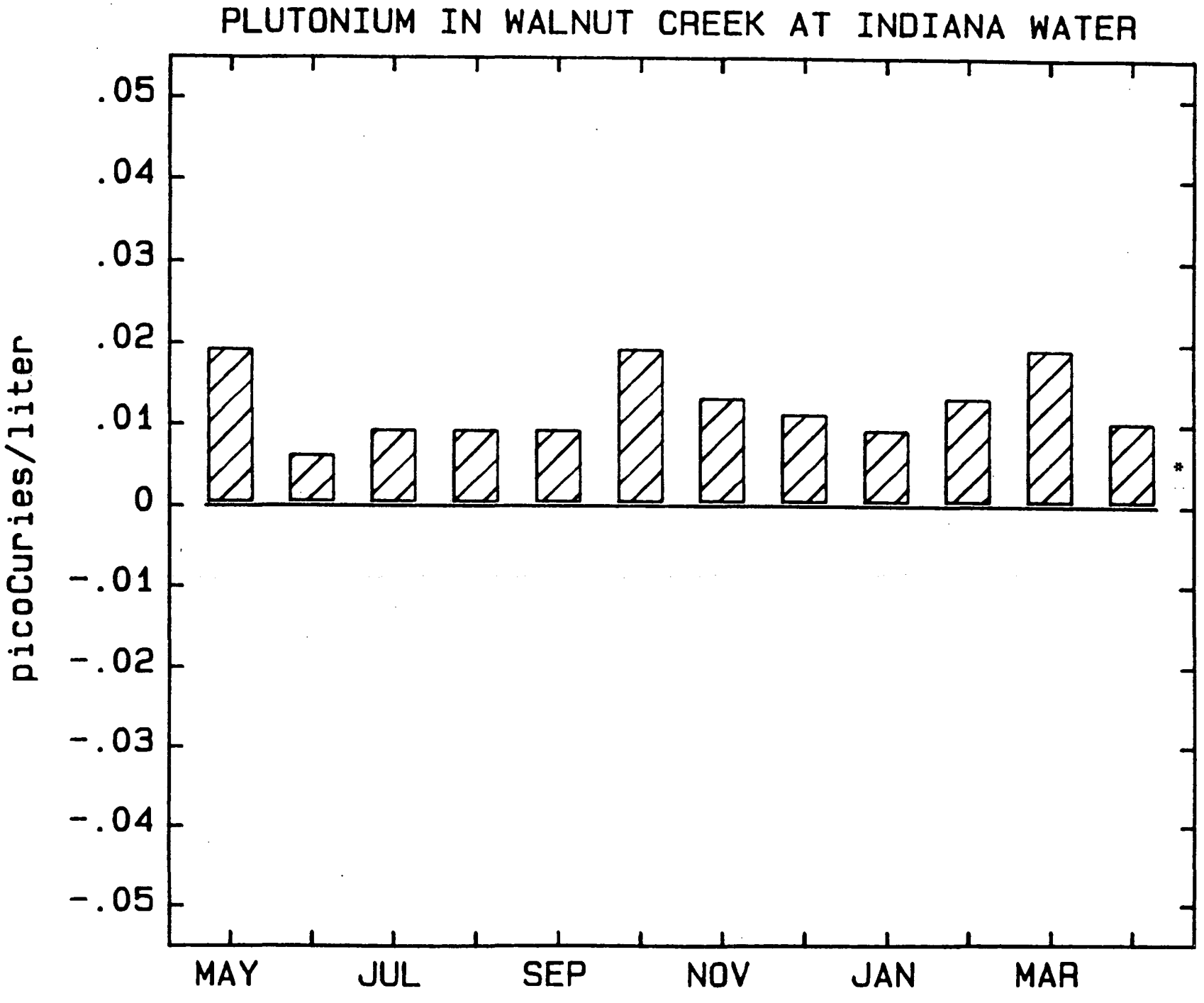
* Analysis Incomplete.


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


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


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


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



* ANALYSIS INCOMPLETE FOR MAY, 1985.

Table VIII. Radioactive Water Sample Results

Reservoirs (pCi/l)

Location	n	Plutonium	Uranium	Americium
Great Western	1*	0.009 ± 0.004	2.6 ± 0.2	0.010 ± 0.004
Standley	1*	0.011 ± 0.004	1.9 ± 0.2	0.018 ± 0.006

Community Tap Water (pCi/l)

Location	n	Plutonium	Uranium	Americium
Boulder	1*	0.004 ± 0.003	0.41 ± 0.05	0.005 ± 0.003
Broomfield	1*	0.008 ± 0.004	1.0 ± 0.1	0.017 ± 0.004
Westminster	1*	0.010 ± 0.004	0.50 ± 0.06	0.024 ± 0.006

* Plutonium, uranium and americium analyses were performed on one sample composited from five weekly grab samples.

Table IX. Radioactive Water Sample Results

Tritium (pCi/l)

Location	n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
Pond A-4	6	100 ± 700	400 ± 700	200 ± 300
Pond B-5	9	-100 ± 400	600 ± 700	200 ± 200
Pond C-1	3	0 ± 600	500 ± 700	300 ± 400
Pond C-2	0	No Discharge		
Walnut Creek at Indiana	3	-200 ± 700	500 ± 700	200 ± 400
Boulder	5	-200 ± 400	500 ± 700	200 ± 300
Broomfield	5	-100 ± 600	600 ± 700	200 ± 300
Great Western	5	-300 ± 400	100 ± 600	0 ± 300
Standley	5	0 ± 600	500 ± 700	200 ± 300
Westminster	5	100 ± 400	200 ± 600	200 ± 300

Table X. Nonradioactive Water Sample Results

Nitrate (as N) at Great Western Reservoir

Sample Date	Nitrate (as N) (mg/l)
05/02/85	<0.2
05/09/85	<0.2
05/16/85	<0.2
05/23/85	<0.2
05/30/85	<0.2

Nitrate (as N) at Standley Lake

Sample Date	Nitrate (as N) (mg/l)
05/02/85	<0.2
05/09/85	<0.2
05/16/85	<0.2
05/23/85	<0.2
05/30/85	<0.2

Table XI. NPDES Permit Water Sample Results

Discharge 001 (Pond B-3)
Discharged one time

Parameter		30-Day Average	Daily Maximum	Discharge Limitations 30-Day* Average	Daily Maximum
Biochem. Oxygen Demand,5 Day	mg/l	5.9	5.9	10	25
Total Suspended Soilds	mg/l	2.0	2.0	30	NA
Nitrates as N	mg/l	3.8	3.8	10	NA
Total Chromium	mg/l	<0.05	<0.05	0.05	0.1
Total Phosphorus	mg/l	3.1	3.1	8	NA
Oil and Grease, Visual		No visible sheen		NA	NA
Total Residual Chlorine	mg/l	0.3	0.3	NA	0.5
Fecal Coliforms	#/100 ml	<1	<1	200	NA
		Minimum	Maximum	Minimum	Maximum
pH	S.U.	7.7	7.7	6.0	9.0

Discharge 002 (Pond A-3)
Discharged two times

Parameters		30-Day Average	Daily Maximum	Discharge Limitations 30-Day* Average	Daily Maximum
Nitrates as N	mg/l	5.4	8.2	10	20
		Minimum	Maximum	Minimum	Maximum
pH	S.U.	7.8	8.0	6.0	9.0

Discharge 003 (RO Pilot Plant)
No Discharge

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

Discharge 004 (RO Plant)
No Discharge

		30-Day Average	Daily Maximum	Discharge Limitations 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)

Parameter		n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
pH	S.U.	7	7.7	8.6	-
Nitrates as N	mg/l	7	1.4	3.2	2.3
Nonvolatile Suspended Solids	mg/l	7	1.0	18.	6.9

Discharge 006 (Pond B-5)

Parameter		n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
pH	S.U.	10	7.6	8.2	-
Nitrates as n	mg/l	10	0.7	4.6	1.9
Nonvolatile Suspended Solids	mg/l	10	1.0	33.	6.0

Discharge 007 (Pond C-2)

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	21	7.5	8.4	-
Nitrates as N	21	<0.2	1.7	<0.8

Total Volume (gallons) = 60,142,000