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June - 1985 EAC-417110-130

Rocky Flats Plant

Monthly Environmental Monitoring Report

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JUNE 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 June 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.

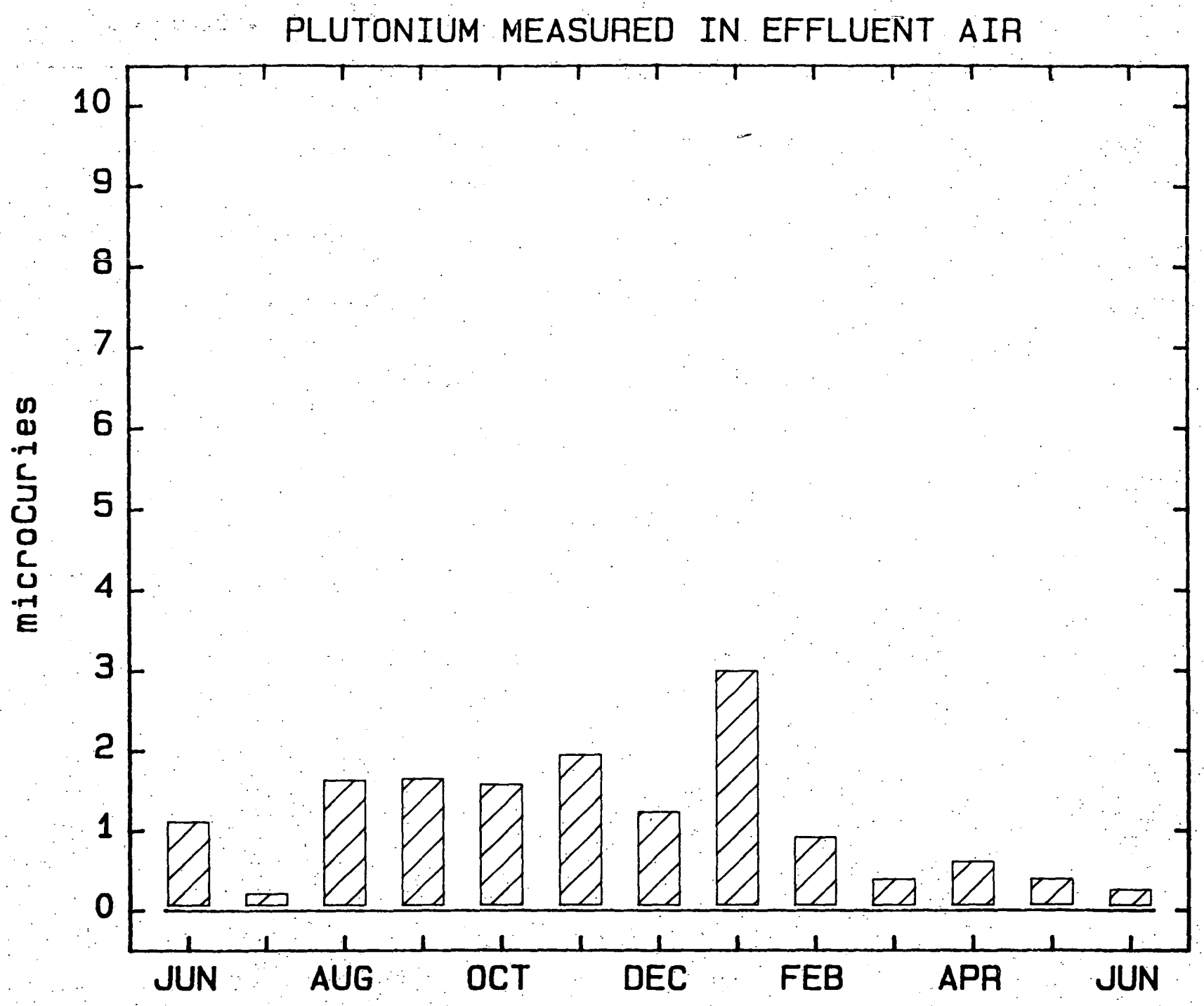
Error terms in the form of a $\pm$ b are included with some of the data. For a single sample, "a" is the reagent-blank corrected value; and term "b" accounts for the statistical counting uncertainty for the associated reagent blanks. These error terms represent a minimum estimate of error for the data.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

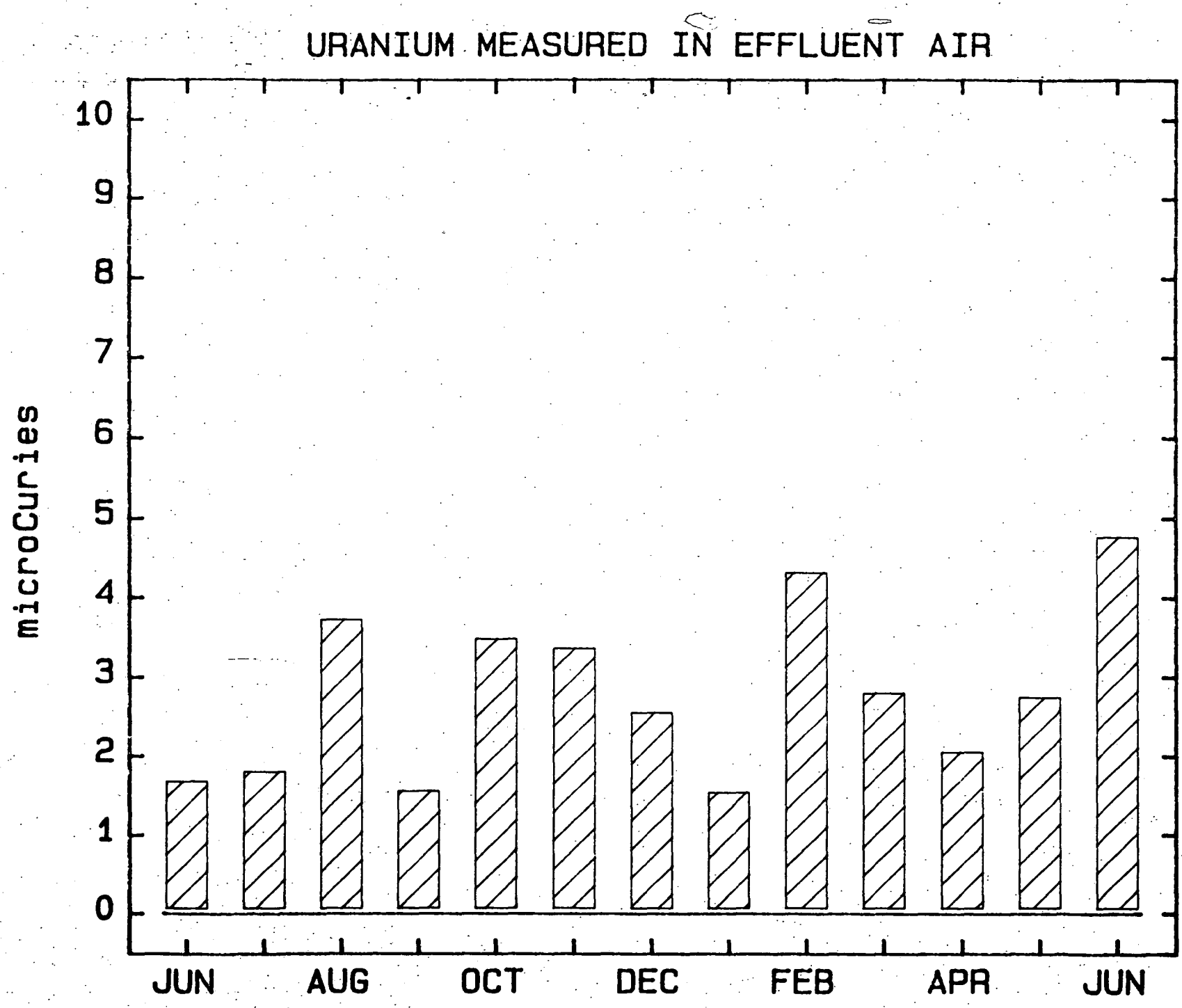
Table I. 1985 Plutonium and Uranium Airborne Effluent Data

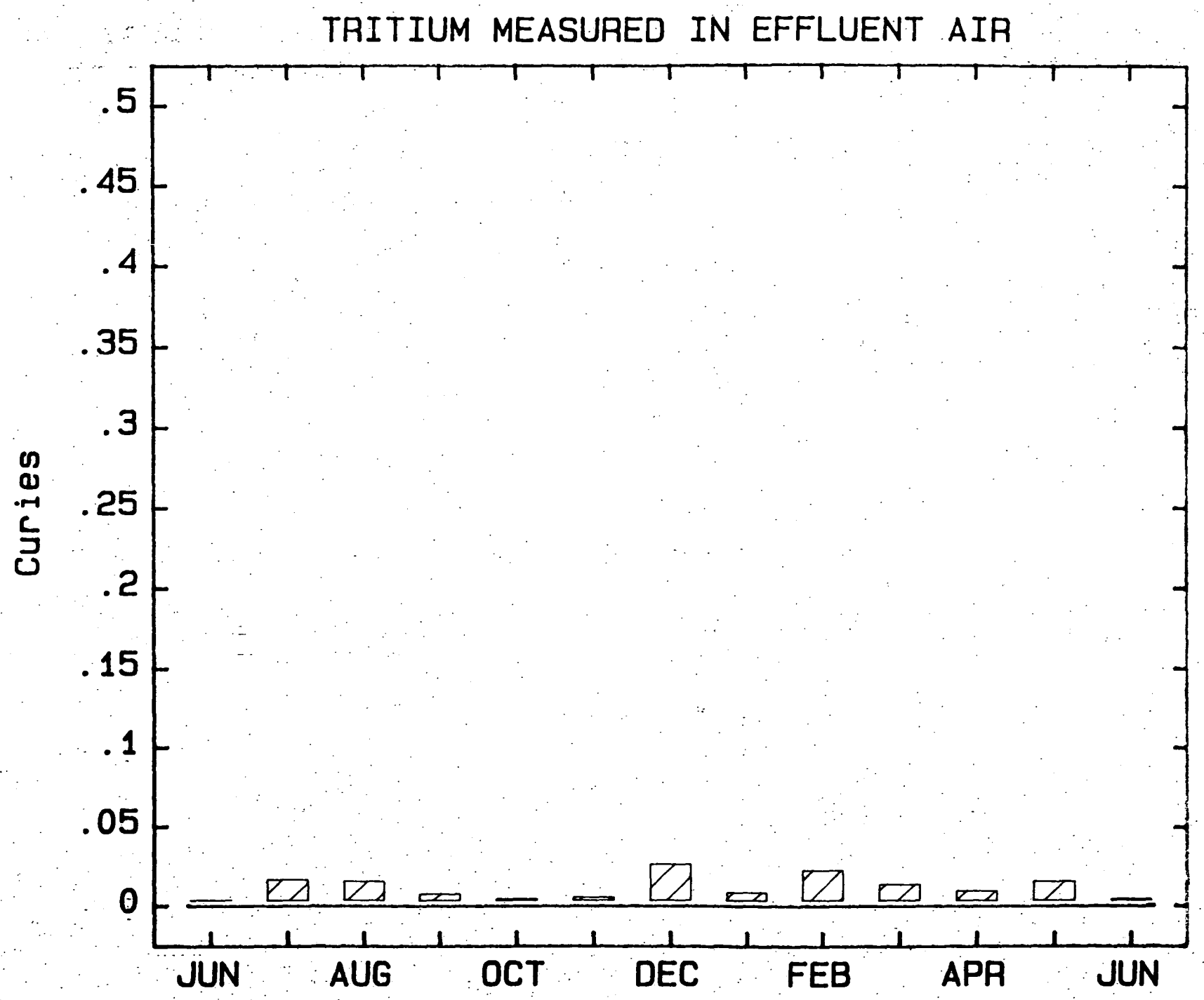
Month	Plutonium Release (uCi)	Plutonium CMax (pCi/m3)	Uranium Release (uCi)	Uranium CMax (pCi/m3)
CY 1984	12.65	0.243 ± 0.023	34.67	0.336 ± 0.0357
January	3.07	0.030 ± 0.006	1.61	0.051 ± 0.018
February	0.99	0.156 ± 0.030	4.39	0.924 ± 0.120
March	0.46	0.002 ± 0.0005	2.87	0.064 ± 0.013
April	0.68	0.002 ± 0.0004	2.12	0.004 ± 0.001
May	0.46	0.002 ± 0.0004	2.82	0.010 ± 0.003
June	0.33	0.003 ± 0.0004	4.84	0.287 ± 0.0235
Year to Date	5.99	0.156 ± 0.030	18.65	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	0.0010
May	0.019	290 ± 70	0.115	0.0021
June	0.008	240 ± 80	-0.018	0.0023
Year to Date	0.095	450 ± 200	0.388	0.0169


PLUTONIUM MEASURED IN EFFLUENT AIR
microCuries
10
9
8
7
6
5
4
3
2
1
0
JUN
AUG
OCT
DEC
FEB
APR
JUN


URANIUM MEASURED IN EFFLUENT AIR
microCuries
0
1
2
3
4
5
6
7
8
9
10
JUN
AUG
OCT
DEC
FEB
APR
JUN


TRITIUM MEASURED IN EFFLUENT AIR
Curies
.5
.45
.4
.35
.3
.25
.2
.15
.1
.05
0
JUN
AUG
OCT
DEC
FEB
APR
JUN

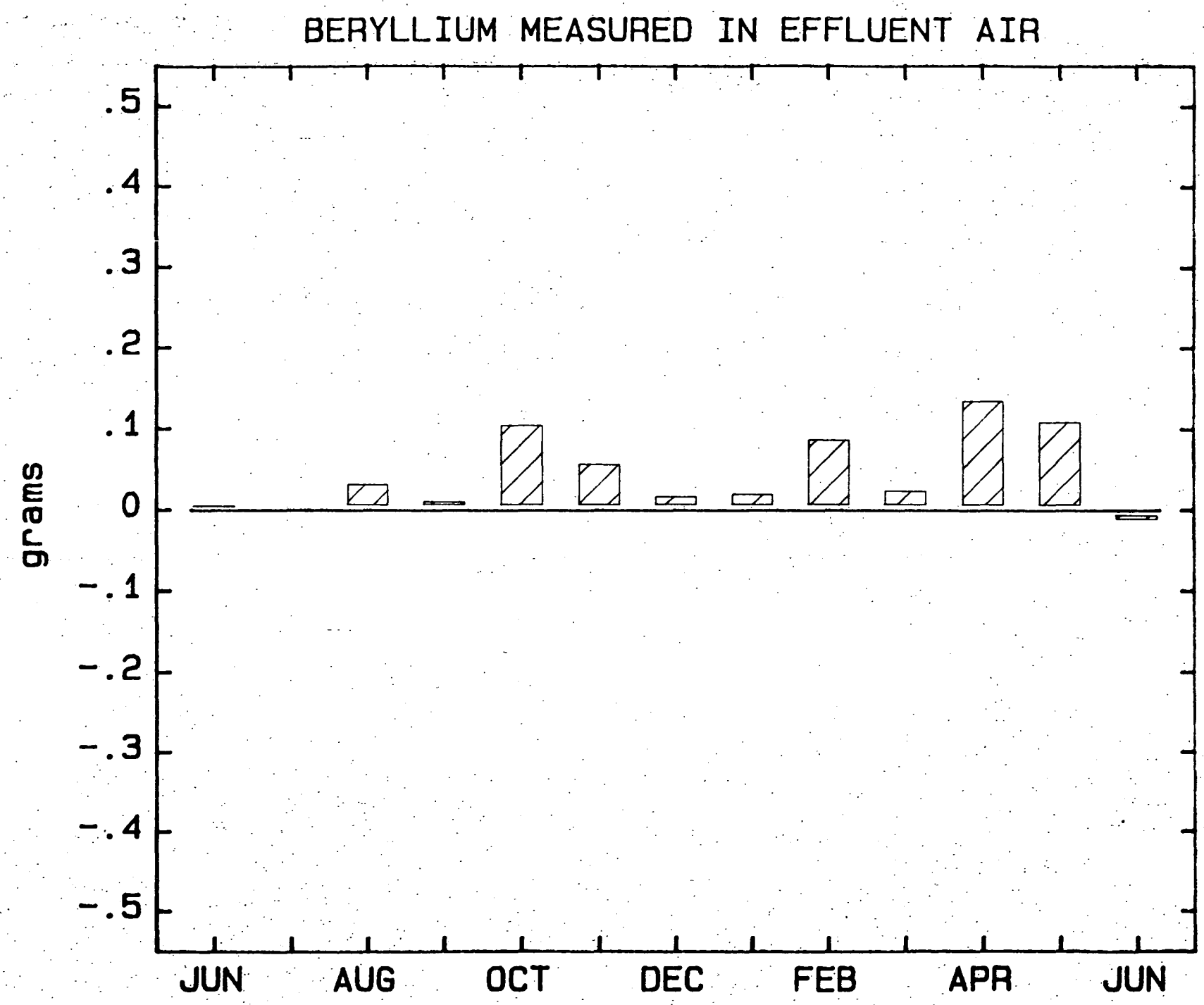

BERYLLIUM MEASURED IN EFFLUENT AIR
grams
.5
.4
.3
.2
.1
0
-.1
-.2
-.3
-.4
-.5
JUN
AUG
OCT
DEC
FEB
APR
JUN

Table III. Plutonium at Selected Onsite Ambient Air Locations
(05/21/85-07/02/85)

Location	n*	Volume(m^3)	Concentration (pCi/m^3) Lower Confidence Limit	Point Estimate	Upper Confidence Limit
S-5	2*	30,000	-0.000049	0.000008	0.000065
S-6	2*	29,000	-0.000018	0.000043	0.000104
S-7	2*	28,000	0.000268	0.000366	0.000465
S-8	2*	30,000	0.000395	0.000542	0.000689
S-9	2*	23,000	0.000614	0.000784	0.000955

*Onsite samples for the two weeks 5/21/85 to 6/4/85 were lost in the laboratory due to a bad reagent.

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	4	280 ± 660
S-5	4	410 ± 660
S-16	4	130 ± 640

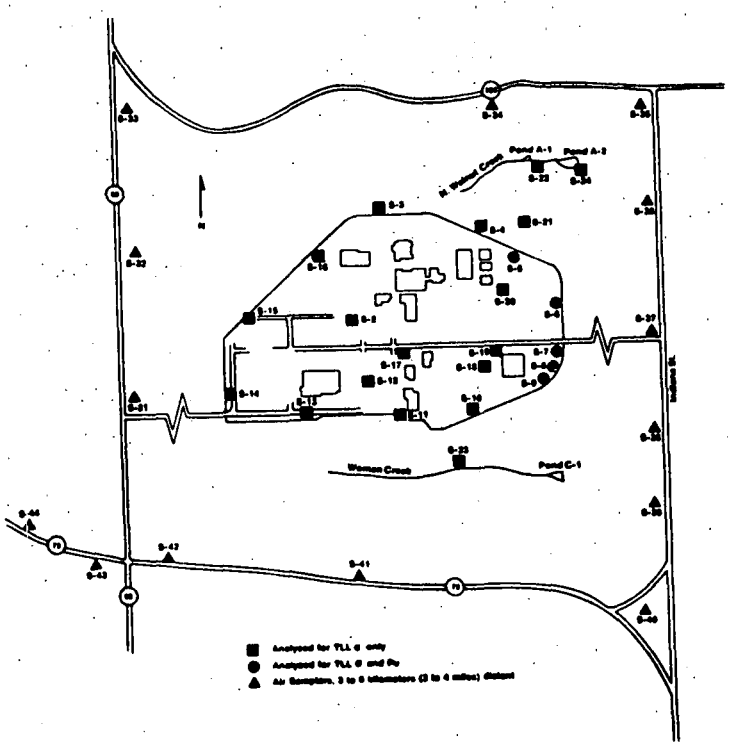


Table V. Plutonium in Perimeter Ambient Air
(05/21/85-06/19/85)

Location	n	Volume(m^3)	Concentration(pCi/m^3) Lower Confidence Limit	Point Estimate	Upper Confidence Limit
S-31	1	27,000	-0.000020	-0.000005	0.000010
S-32	1	30,000	-0.000018	-0.000005	0.000009
S-33	1	31,000	-0.000018	-0.000005	0.000008
S-34	1	28,000	-0.000018	-0.000004	0.000011
S-35	1	28,000	-0.000020	-0.000006	0.000008
S-36	1	30,000	-0.000004	0.000011	0.000025
S-37	1	32,000	0.000006	0.000020	0.000035
S-38	1	30,000	0.000009	0.000025	0.000040
S-39	1	28,000	-0.000012	0.000003	0.000018
S-40	1	29,000	-0.000017	-0.000003	0.000011
S-41	1	29,000	0.000004	0.000020	0.000035
S-42	1	28,000	0.000000	0.000016	0.000031
S-43	1	31,000	-0.000016	-0.000003	0.000011
S-44	1	29,000	-0.000015	-0.000001	0.000013

Average Concentration for Point Estimate 0.000005

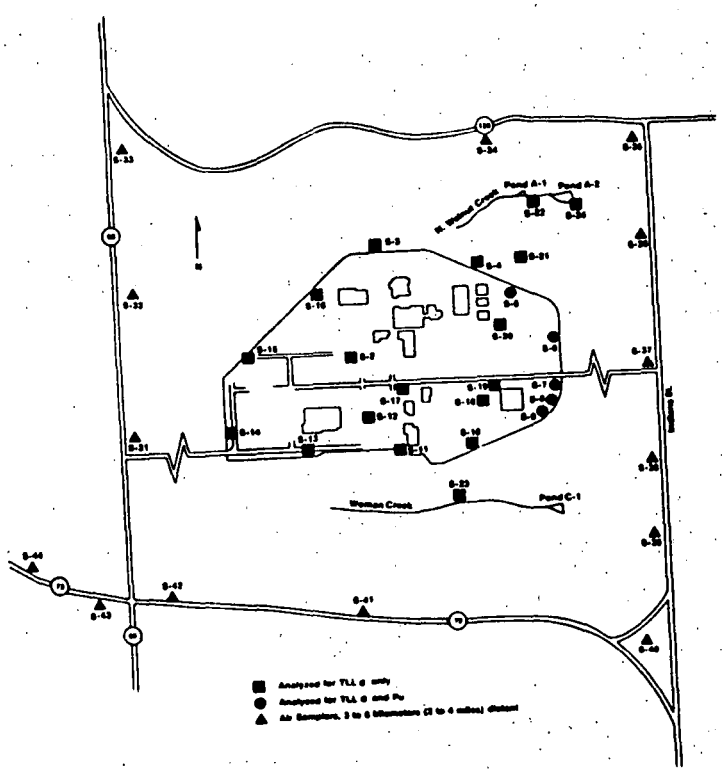
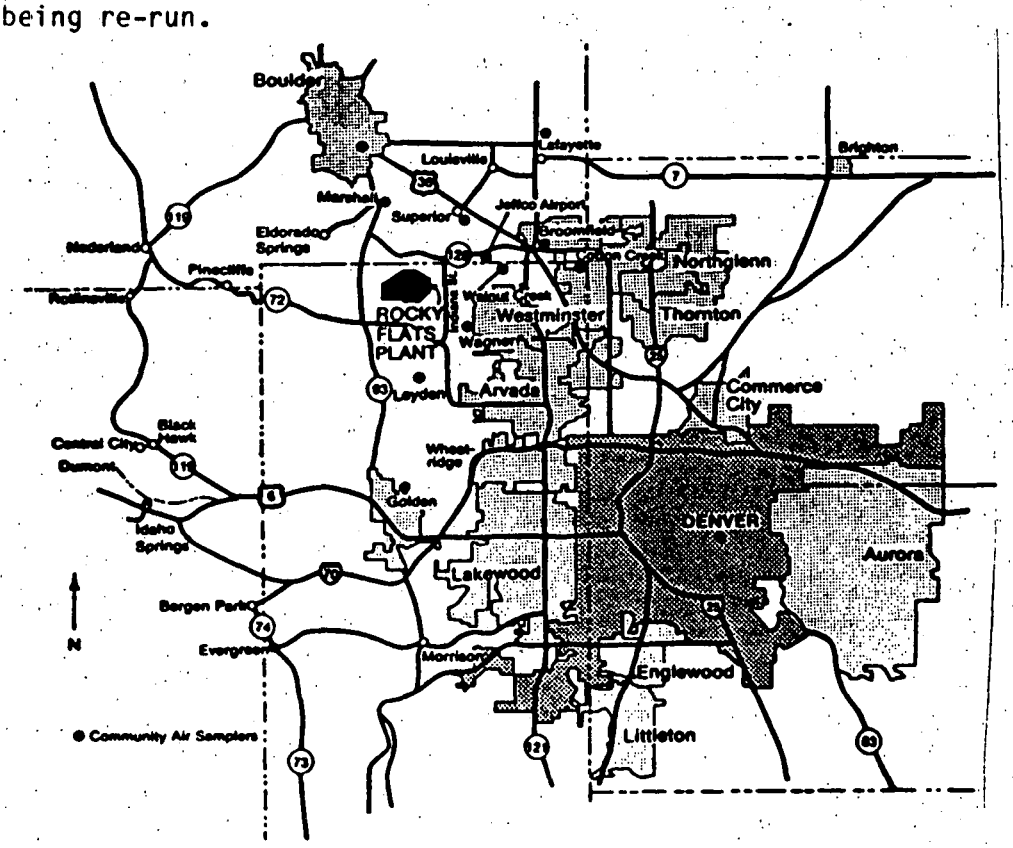


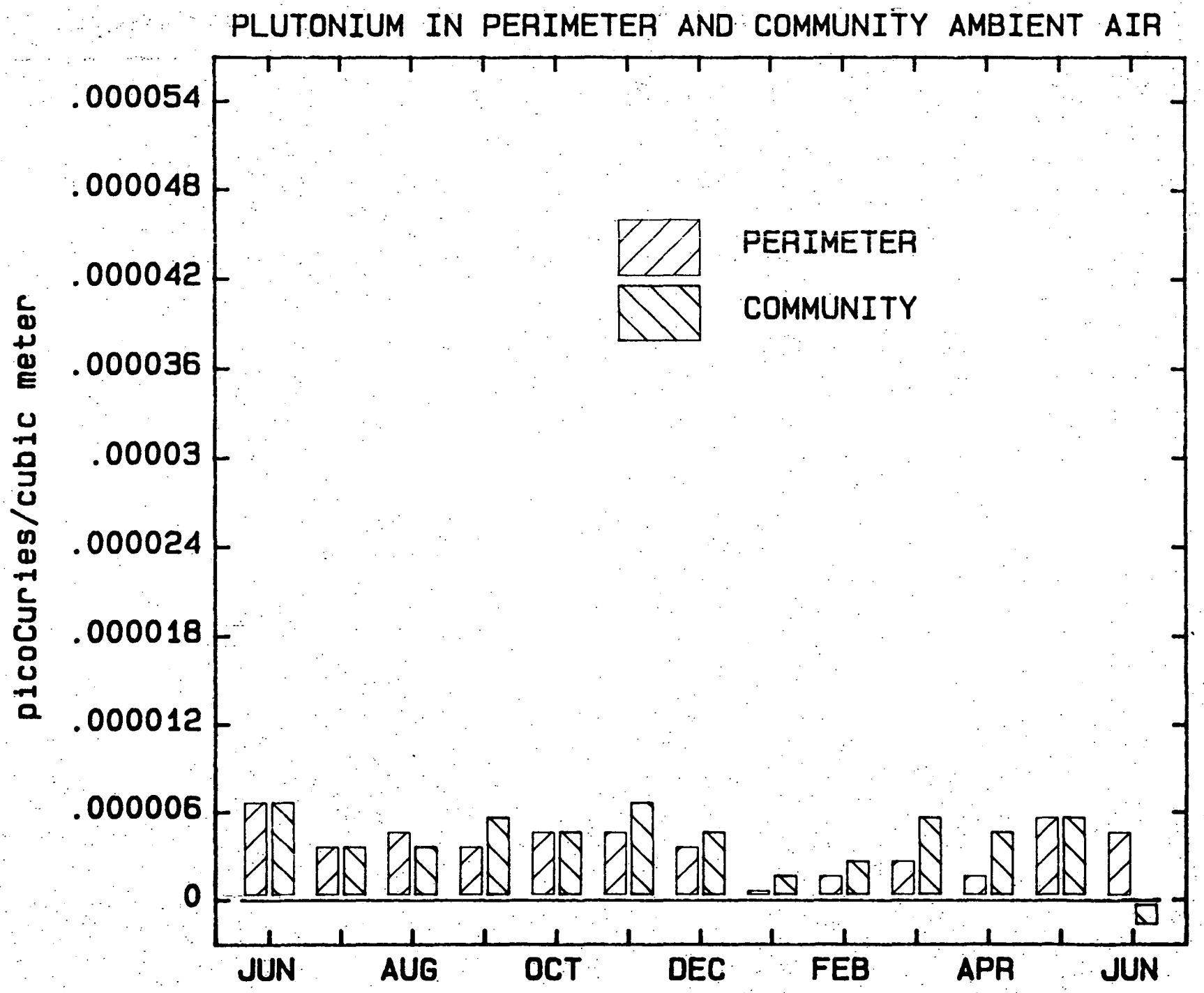
Table VI. Plutonium in Community Ambient Air
(05/22/85-06/19/85)

Location	n	Volume(m^3)	Concentration(pCi/m^3) Lower Confidence Limit	Point Estimate	Upper Confidence Limit
Marshall	1	28,000	-0.000020	-0.000005	0.000009
Jeffco Airport	1	29,000	-0.000007	0.000008	0.000023
Superior	1	29,000	-0.000018	-0.000004	0.000010
Boulder	1	31,000	-0.000019	-0.000006	0.000007
Lafayette	1*				
Broomfield	1	27,000	-0.000022	-0.000007	0.000008
Walnut Creek	1	28,000	-0.000015	-0.000001	0.000014
Wagner	1	30,000	-0.000013	-0.000006	0.000001
Leyden	1	33,000	-0.000031	-0.000006	0.000020
Westminster	1	27,000	-0.000016	-0.000001	0.000014
Denver	1	18,000	-0.000026	-0.000004	0.000019
Golden	1	31,000	-0.000017	-0.000004	0.000009
Lake Pointe	1	32,000	-0.000010	0.000003	0.000016
Cotton Creek	1	24,000	-0.000019	-0.000002	0.000015

Average Concentration for Point Estimate -0.000002

*Sample S-55 being re-run.




PLUTONIUM IN PERIMETER AND COMMUNITY AMBIENT AIR
picoCuries/cubic meter
.000054
.000048
.000042
.000036
.00003
.000024
.000018
.000012
.000006
0
PERIMETER
COMMUNITY
JUN
AUG
OCT
DEC
FEB
APR
JUN

JUNE 1985

Table VII. Radioactive Water Sample Results

Holding Pond Outfall (pCi/l)

Location	Plutonium	Uranium	Americium
Pond A-4			
	No Discharge		
Pond B-5			
06/24/85 - 06/27/85	0.0 ± 0.1	6 ± 1	0.07 ± 0.04
Average Concentration	0.0 ± 0.1	6 ± 1	0.07 ± 0.04
Pond C-1			
05/31/85 - 06/07/85	0.0 ± 0.1	3.0 ± 0.2	0.015 ± 0.005
06/07/85 - 06/14/85	0.0 ± 0.1	4.1 ± 0.3	0.030 ± 0.007
06/14/85 - 06/21/85	0.02 ± 0.02	5.2 ± 0.4	0.00 ± 0.01
06/21/85 - 06/28/85	0.06 ± 0.03	5.9 ± 0.6	0.02 ± 0.01
Average Concentration	0.02 ± 0.04	4.6 ± 0.2	0.016 ± 0.004
Pond C-2			
	No Discharge		
Walnut Creek at Indiana			
05/31/85 - 06/07/85	0.0 ± 0.1	3.3 ± 0.3	0.033 ± 0.007
06/07/85 - 06/14/85	0.0 ± 0.1	3.2 ± 0.3	0.040 ± 0.008
06/14/85 - 06/21/85	0.07 ± 0.03	3.2 ± 0.3	0.05 ± 0.02
06/21/85 - 06/28/85	0.03 ± 0.03	4.1 ± 0.6	0.02 ± 0.01
Average Concentration	0.02 ± 0.04	3.4 ± 0.2	0.036 ± 0.006

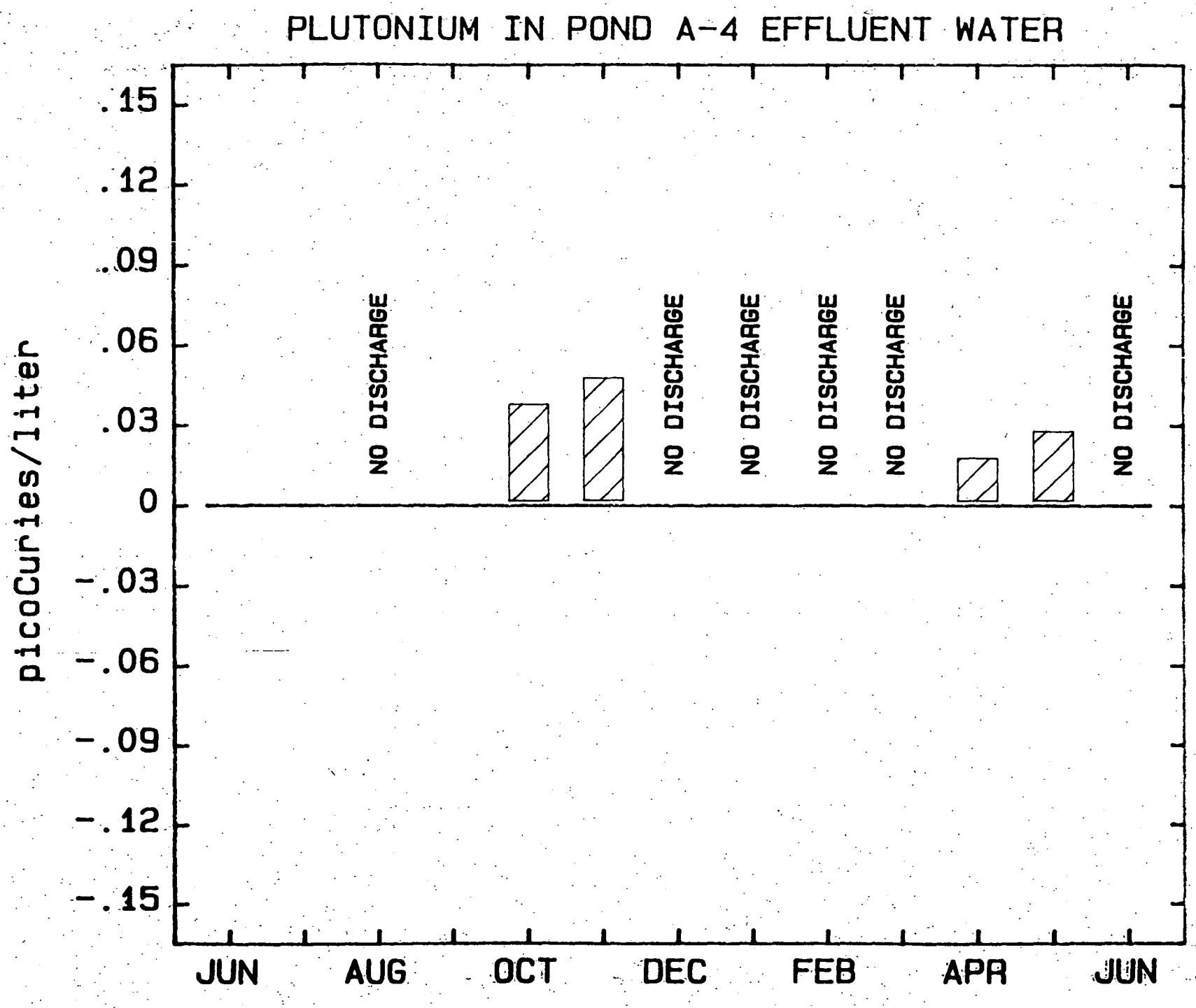
MAY 1985

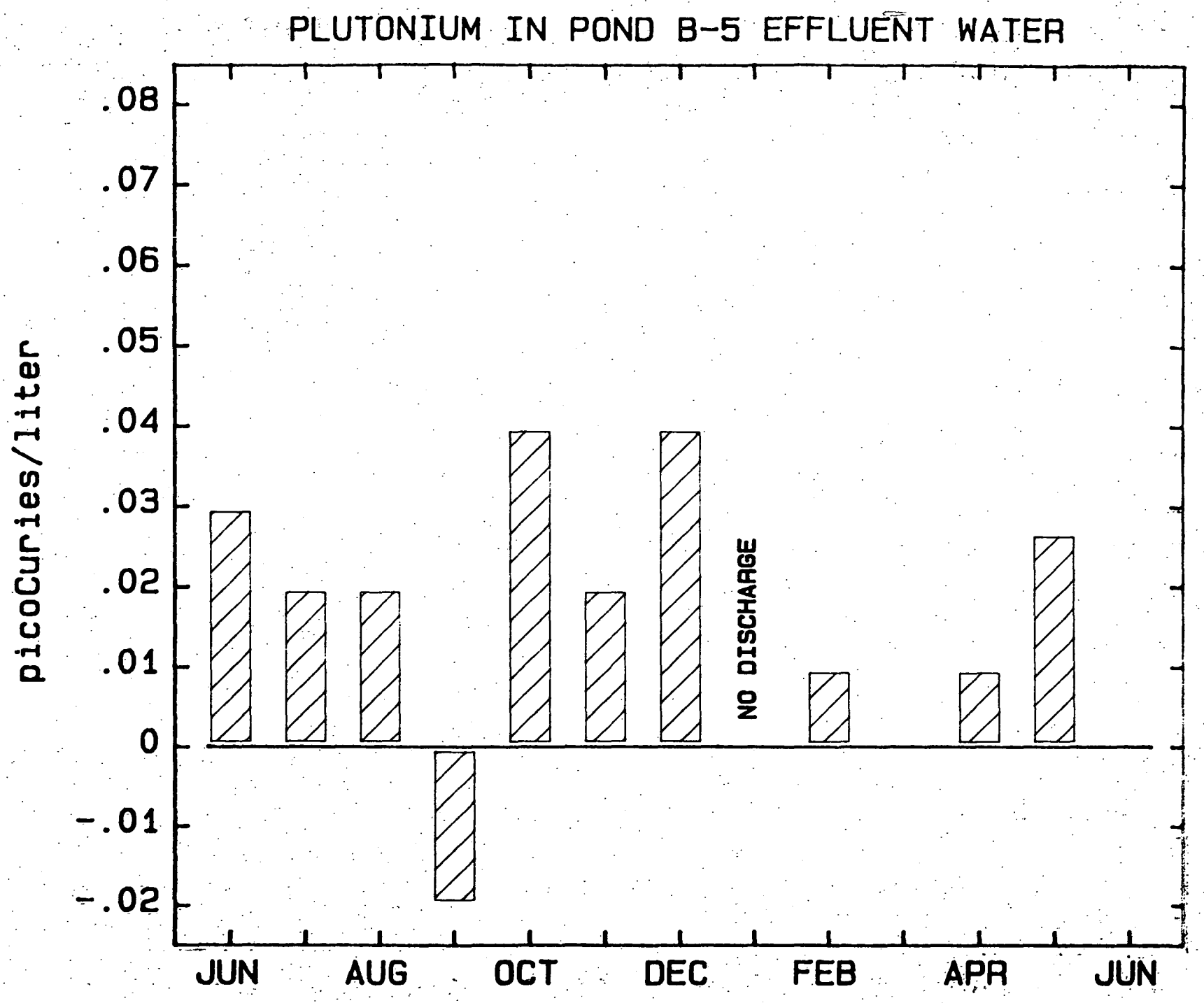
Table VII. Radioactive Water Sample Results

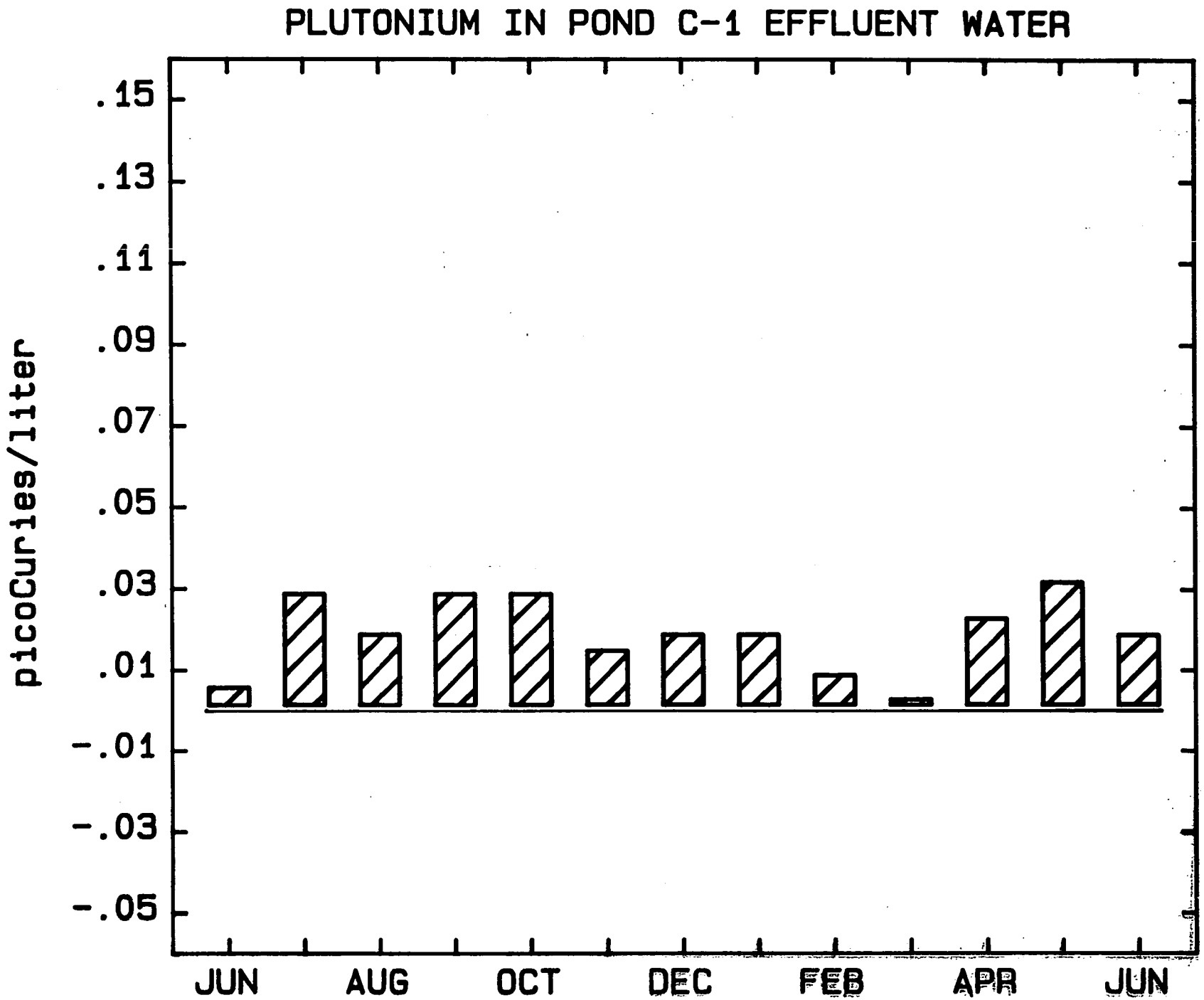
Holding Pond Outfall (pCi/l)

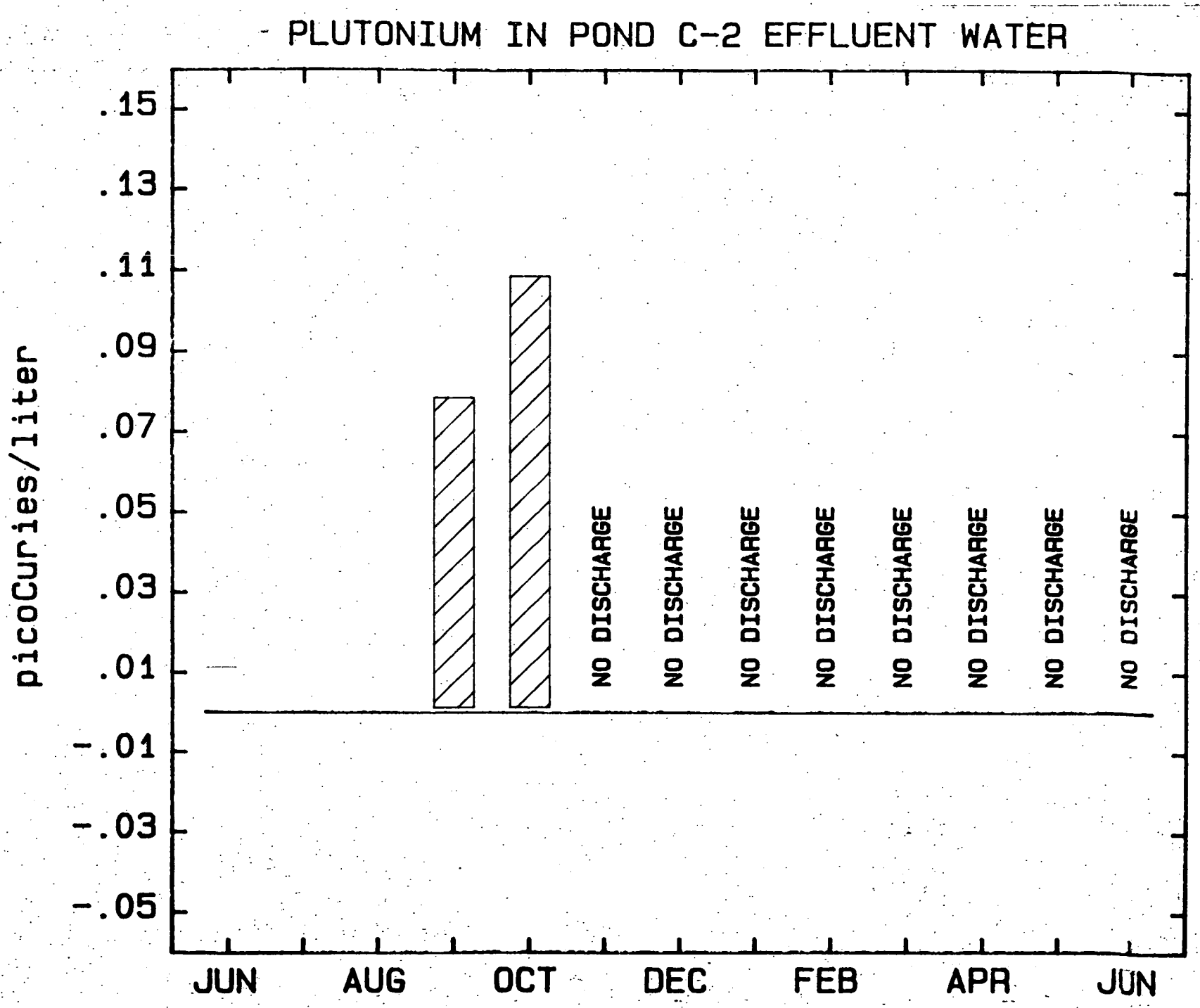
Location	Plutonium	Uranium	Americium
Pond A-4			
05/07/85 - 05/10/85	0.02 ± 0.01	4.3 ± 0.3	-0.01 ± 0.01
05/20/85 - 05/24/85	0.04 ± 0.02	3.0 ± 0.2	0.07 ± 0.02
Average Concentration	0.03 ± 0.01	3.6 ± 0.2	0.03 ± 0.01
Pond B-5			
05/01/85 - 05/03/85	0.01 ± 0.01	4.1 ± 0.3	0.04 ± 0.02
05/06/85 - 05/08/85	0.02 ± 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 Concentration	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	0.07 ± 0.01*	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	0.07 ± 0.01*	3.4 ± 0.3	0.036 ± 0.008
Average Concentration	0.046 ± 0.004*	3.4 ± 0.2	0.025 ± 0.003

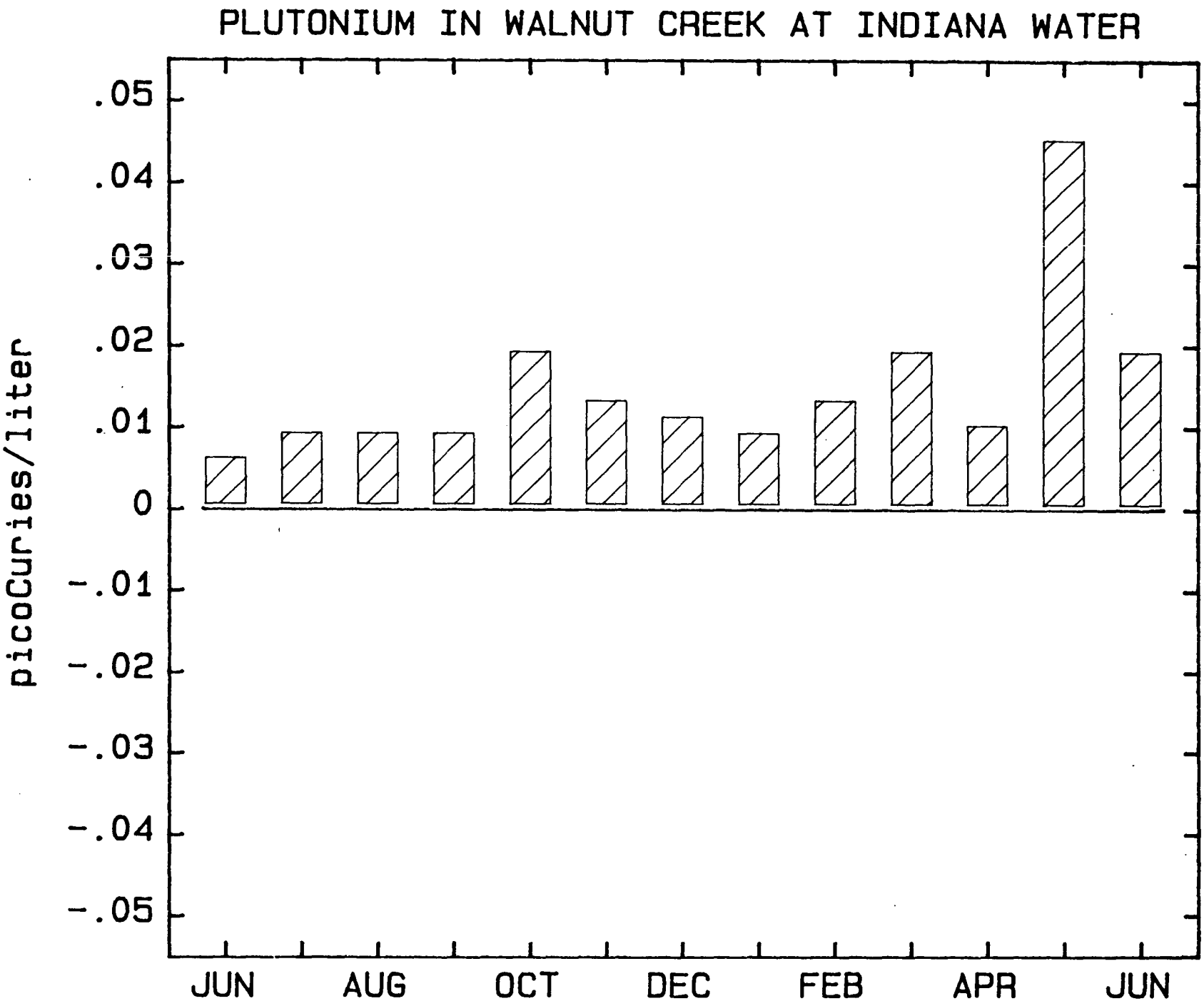
* Data not previously reported.


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
JUN
AUG
OCT
DEC
FEB
APR
JUN


PLUTONIUM IN POND B-5 EFFLUENT WATER
picoCuries/liter
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
NO DISCHARGE
JUN
AUG
OCT
DEC
FEB
APR
JUN


PLUTONIUM IN POND C-1 EFFLUENT WATER
picoCuries/liter
.15
.13
.11
.09
.07
.05
.03
.01
-.01
-.03
-.05
JUN
AUG
OCT
DEC
FEB
APR
JUN


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
JUN
AUG
OCT
DEC
FEB
APR
JUN


PLUTONIUM IN WALNUT CREEK AT INDIANA WATER
picoCuries/liter
.05
.04
.03
.02
.01
0
-.01
-.02
-.03
-.04
-.05
JUN
AUG
OCT
DEC
FEB
APR
JUN

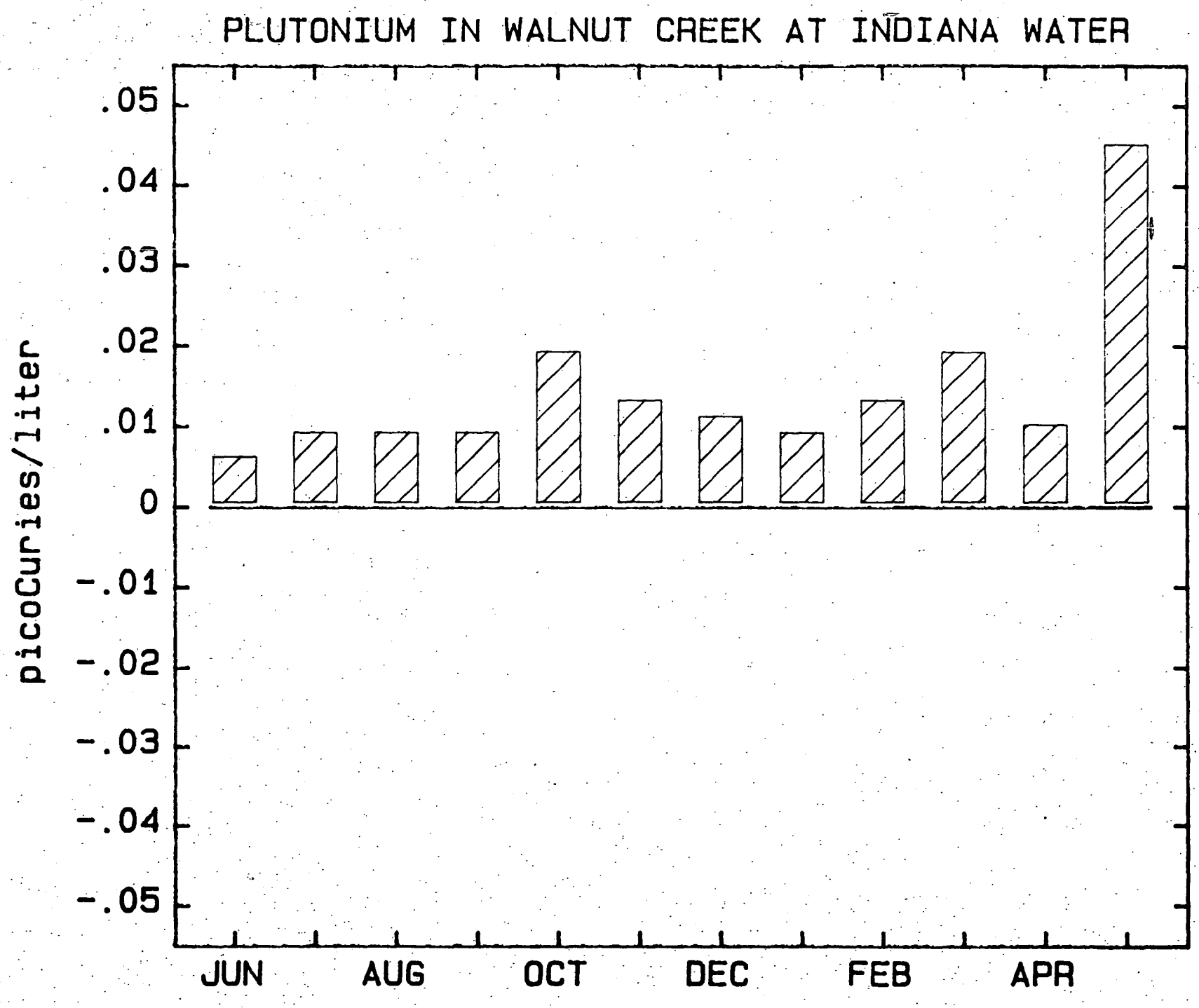

PLUTONIUM IN WALNUT CREEK AT INDIANA WATER
picoCuries/liter
.05
.04
.03
.02
.01
0
-.01
-.02
-.03
-.04
-.05
JUN
AUG
OCT
DEC
FEB
APR

Table VIII. Radioactive Water Sample Results

Reservoirs (pCi/l)

Location	n	Plutonium	Uranium	Americium
Great Western	1*	0.00 ± 0.03	2 ± 1	0.02 ± 0.02
Standley	1*	0.00 ± 0.03	1 ± 1	0.00 ± 0.02

Community Tap Water (pCi/l)

Location	n	Plutonium	Uranium	Americium
Arvada	1	0.0 ± 0.1	0.43 ± 0.06	0.06 ± 0.02
Boulder	1*	0.00 ± 0.03	0 ± 1	0.03 ± 0.02
Broomfield	1*	0.00 ± 0.03	1 ± 1	0.00 ± 0.02
Denver	1	0.0 ± 0.1	0.66 ± 0.08	-0.04 ± 0.06
Golden	1	0.0 ± 0.1	1.0 ± 0.1	0.04 ± 0.01
Lafayette	1	0.0 ± 0.1	0.41 ± 0.06	0.08 ± 0.02
Louisville	1	0.0 ± 0.1	0.16 ± 0.03	-0.04 ± 0.06
Thornton	1	0.0 ± 0.1	2.8 ± 0.3	0.09 ± 0.03
Westminster	1*	0.00 ± 0.03	0 ± 1	0.02 ± 0.02

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

JUNE 1985

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	4	-100 ± 600	100 ± 600	0 ± 300
Pond C-1	4	-400 ± 600	1000 ± 700	100 ± 300
Pond C-2	0		No Discharge	
Walnut Creek at Indiana	4	200 ± 600	400 ± 700	300 ± 300
Arvada	1	200 ± 700	200 ± 700	200 ± 700
Boulder	4	-400 ± 600	100 ± 600	-100 ± 300
Broomfield	4	-100 ± 600	700 ± 700	300 ± 300
Denver	1	-400 ± 600	-400 ± 600	-400 ± 600
Golden	1	100 ± 700	100 ± 700	100 ± 700
Great Western	4	-100 ± 600	500 ± 700	100 ± 300
Lafayette	1	200 ± 700	200 ± 700	200 ± 700
Louisville	1	100 ± 700	100 ± 700	100 ± 700
Standley	4	-300 ± 600	700 ± 700	100 ± 300
Thornton	1	-300 ± 600	-300 ± 600	-300 ± 600
Westminster	4	100 ± 600	300 ± 700	100 ± 300

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Table X. Nonradioactive Water Sample Results

Nitrate (as N) at Great Western Reservoir

Sample Date	Nitrate (as N) (mg/l)
06/06/85	<0.2
06/13/85	<0.2
06/20/85	0.5
06/27/85	<0.2

Nitrate (as N) at Standley Lake

Sample Date	Nitrate (as N) (mg/l)
06/06/85	<0.2
06/13/85	<0.2
06/20/85	<0.2
06/27/85	0.4

Table XI. NPDES Permit Water Sample Results

Discharge 001 (Pond B-3)
No Discharge

Parameter		30-Day Average	Daily Maximum	Discharge Limitations 30-Day* Average	Daily Maximum
Biochem. Oxygen Demand,5 Day	mg/l			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		30-Day Average	Daily Maximum	Discharge Limitations 30-Day* Average	Daily Maximum
Nitrates as N	mg/l			10	20
		Minimum	Maximum	Minimum	Maximum
pH	S.U.			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)
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.	4	7.9	8.3	-
Nitrates as n	mg/l	4	<0.2	1.2	<0.6
Nonvolatile Suspended Solids	mg/l	4	3.0	31.	14.5

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	20	7.5	8.5	-
Nitrates as N	20	<0.2	0.4	<0.2

Total Volume (gallons) = 3,941,000