00004624

000024320

Mar. - 1988 EAC-420110-163

Rocky Flats Plant

Monthly Environmental Monitoring Report

Environmental Management
G. H. Setlock, Manager
N. M. Daugherty, Program Administrator
D. L. Barr, Report Coordinator

Contributors
M. R. Boss
M. L. Paricio
C. L. Sundblad
H/E Analytical Labs

Rockwell International
Rocky Flats Plant
Aerospace Operations
P.O. Box 464
Golden, Colorado 80402-0464

A Prime Contractor to
The United States Department of Energy

Reviewed for Classification/UCNI/OUO
By: Janet Nesheim, Derivative Classifier
DOE, EMCBC
Date: 11/17/08 KG
Confirmed Unclassified, Not UCNI/Not OUO

RR-RP-00244

ADMIN RECORD

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1/30

D I S T R I B U T I O N

USDOE
Albuquerque Operations Office
Health Protection Branch
P. O. Box 5400
Albuquerque, NM 87115
C. L. Soden

USDOE
Rocky Flats Plant
A. E. Whiteman

USEPA
One Denver Place - Suite 1300
999 - 18th Street
Denver, CO 80202-2413
Dr. M. Lammering

Colorado Department of Health
4210 E. Eleventh Avenue
Denver, CO 80220
P. Ferraro R. Gamewell
A. Stewart A.J. Hazle

Division of Environmental Health
Boulder City/County Health Dept.
3450 Broadway
Boulder, CO 80302
T. Douville

City of Arvada
Utilities Division
8101 Ralston Road
Arvada, CO 80002
S. Daniels

Colorado Water Conservation Board
823 State Centennial Building
1313 Sherman Street
Denver, CO 80203
N. C. Ioannides

Jefferson County Health Department
260 South Kipling
Lakewood, CO 80226
Dr. C. Miller

City of Broomfield
No. 8 Garden Office Center
Broomfield, CO 80020
K. Kochevar

Office of City Manager
City of Boulder
P. O. Box 791
Boulder, CO 80302
J. Piper A. Struthers

City of Northglenn
10701 Melody Drive - Suite 313
Northglenn, CO 80234
T. Ambalam

City of Westminster
3031 W. 76th Avenue
Westminster, CO 80030
W. Christopher

City of Fort Collins
Office of the City Manager
300 La Porte
Ft. Collins, CO 80525
S. Burkett

Denver Water Dept.
Quality Control
1600 W. 12th Avenue
Denver, CO 80254
J. Dice

Air Pollution Control Spec.
c/o Colorado Dept. of Health
4210 E. Eleventh Avenue
Denver, CO 80220
H. Collier

Peak Rock Spring Water
3045 - 10th Street
Boulder, CO 80302
S. Dolson

2/30

D I S T R I B U T I O N (cont.)

Solar Energy Research Institute
1617 Cole Boulevard
Golden, CO 80401
B. Noun

Internal Distribution
Rocky Flats Plant
F. J. Blaha
M. R. Boss
G. W. Campbell
L. E. Coldren
G. C. DeLullo
R. J. Erfurdt
P. J. Etchart
K. J. Freiberg
T. C. Greengard
R. L. Henry
F. D. Hobbs
C. R. Hodgin
D. S. Hurtt
D. N. Ikle
C. R. Lagerquist
G. Langer
R. A. Link
C. M. Marsh
K. B. McKinley
E. R. Naimon
M. L. Paricio
G. L. Potter
C. R. Rose
D. J. Sanchini
G. H. Setlock
C. L. Sundblad
C. Trice
J. M. West
W. F. Weston
EMF
IRF-Library

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MARCH 1988 ENVIRONMENTAL MONITORING REPORT
ROCKY FLATS PLANT

This report summarizes the effluent and environmental monitoring programs at the Rocky Flats Plant for the month of March 1988.

Included in the report are monitoring results for radioactive and nonradioactive airborne effluents continuously sampled from Plant buildings, Tables I and II. Tables III through VI summarize environmental monitoring data from the Rocky Flats Plant ambient air sampling network. This network is comprised of continuously operating air samplers located on plantsite, around the Plant boundary, and in neighboring communities.

Water sampling results for radioactive constituents are given in Tables VII through IX. Results are summarized for Plant surface water control ponds, for nearby drinking water reservoirs, and for tap water for neighboring communities. Nitrate monitoring for Great Western Reservoir and Standley Lake, the two drinking water reservoirs which can receive surface water discharges from the Plant, are summarized in Table X.

The Environmental Protection Agency (EPA) has issued to the Plant a National Pollutant Discharge Elimination System (NPDES) permit for control of surface water discharges. Water sampling results associated with the NPDES permit, as well as applicable discharge limitations imposed by that permit, are reported in Table XI. Daily flow data for surface water from the two Plant drainage systems are given in Tables XII and XIII.

The Rocky Flats Plant Environmental Monitoring Program includes evaluating plant compliance with all relevant guides, limits, and standards. 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.

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Name/Org: Shayne Naugle / PRC Date 11/17/08
Directed by: J.A. Nesheim DOE M471-3-1

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Table I. 1988 Plutonium and Uranium Airborne Effluent Data

Month	Plutonium Release (uCi)	Plutonium CMax (pCi/m3)	Uranium Release (uCi)	Uranium CMax (pCi/m3)
CY 1987	15.36	0.229 ± 0.0278	16.77	0.095 ± 0.0091
January	1.10	0.004 ± 0.0005	2.23	0.005 ± 0.0005
February	2.32	0.013 ± 0.0014	2.00	0.009 ± 0.0009
March	2.73*	0.010 ± 0.0024*	1.13**	0.003 ± 0.0003
April				
May				
June				
July				
August				
September				
October				
November				
December				
Year to Date	6.15*	0.013 ± 0.0014*	5.36**	0.010 ± 0.0009

* 1 Incomplete Analyses.
** 2 Incomplete Analyses.

NOTE: The plutonium, uranium, americium, and beryllium measured concentrations in this report include values that are less than the corresponding calculated MDC's. In some cases, the values are less than zero. This method of reporting began in January 1981. 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. This may happen when measuring concentrations which are very close to zero.

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Table II. 1988 Tritium and Beryllium Airborne Effluent Data

Month	Tritium Release (Ci)	Tritium CMax (pCi/m3)	Beryllium Release (gms)	Beryllium CMax (ug/m3)
CY 1987	0.170	8748 ± 850	0.1648	0.00042
January	-0.001	188 ± 100	0.0395	0.00031
February	0.006	417 ± 250	0.0018	0.00003
March	-0.003	135 ± 100	0.0129	0.00041
April				
May				
June				
July				
August				
September				
October				
November				
December				
Year to Date	0.002	417 ± 250	0.0542	0.00041

NOTE: Beryllium measured at 36 other screening locations was below the screening level of 0.1 gram per month.

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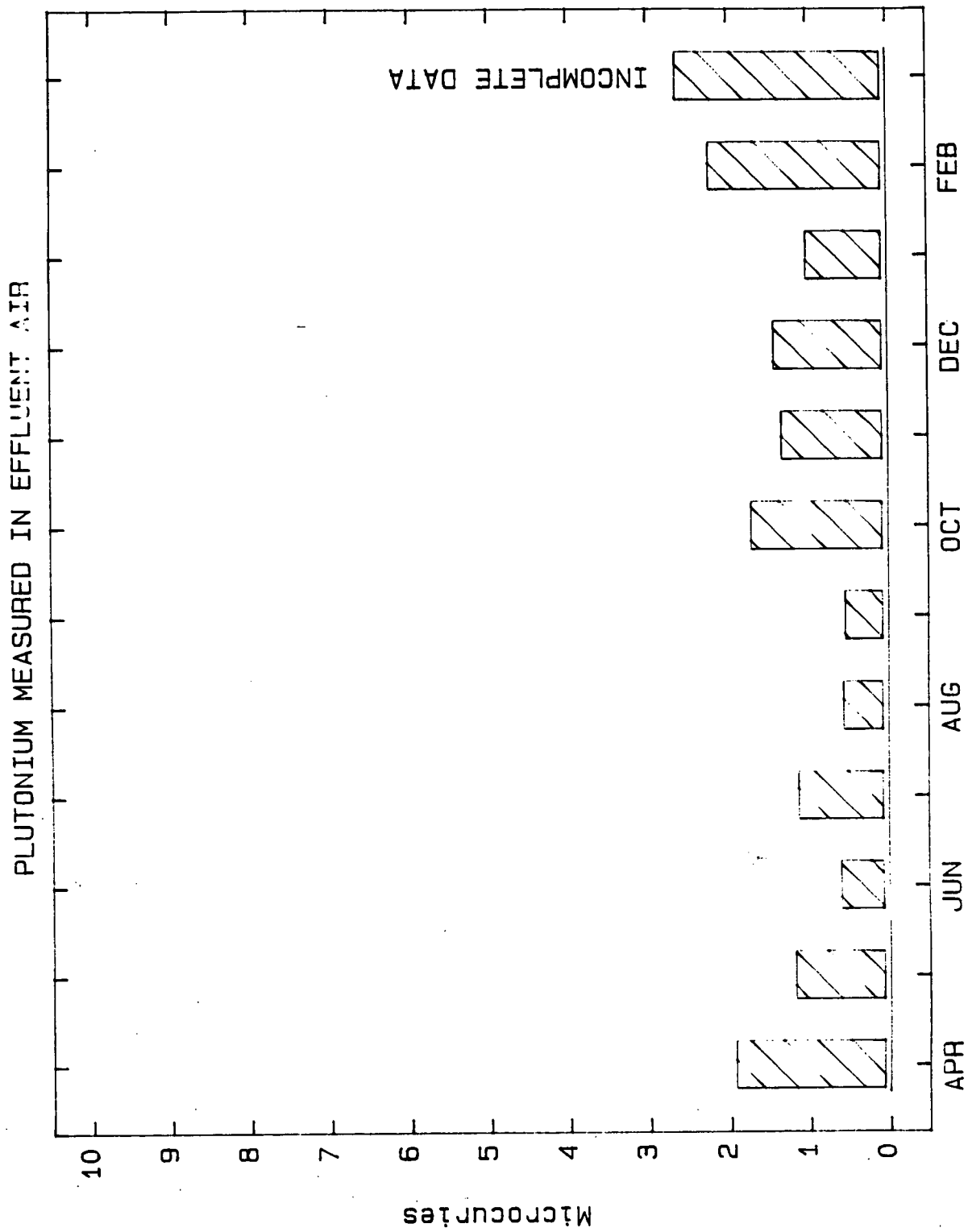
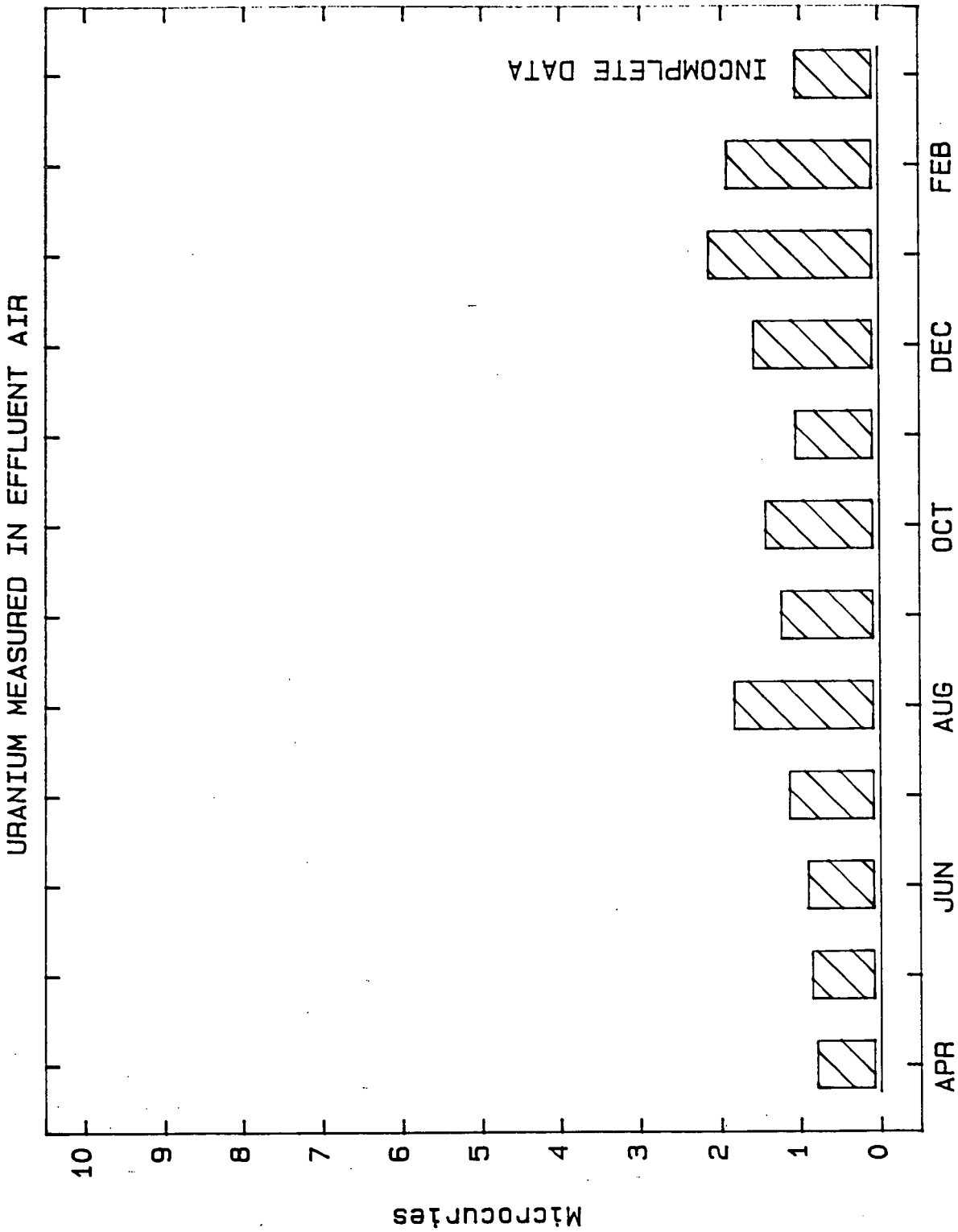

PLUTONIUM MEASURED IN EFFLUENT AIR
INCOMPLETE DATA
Microcuries
0
1
2
3
4
5
6
7
8
9
10
APR
JUN
AUG
OCT
DEC
FEB

7/30


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

8/30

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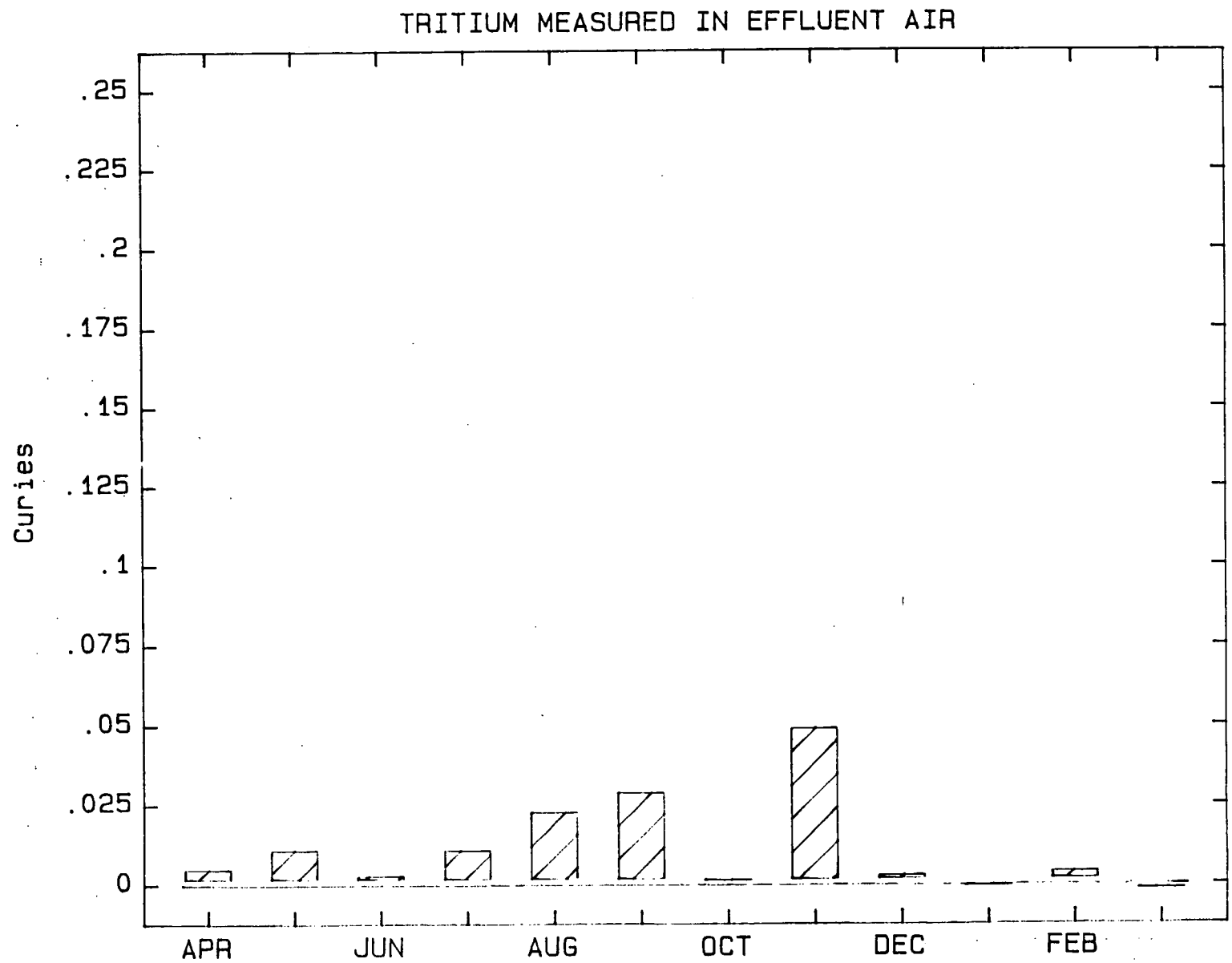
TRITIUM MEASURED IN EFFLUENT AIR



10/30

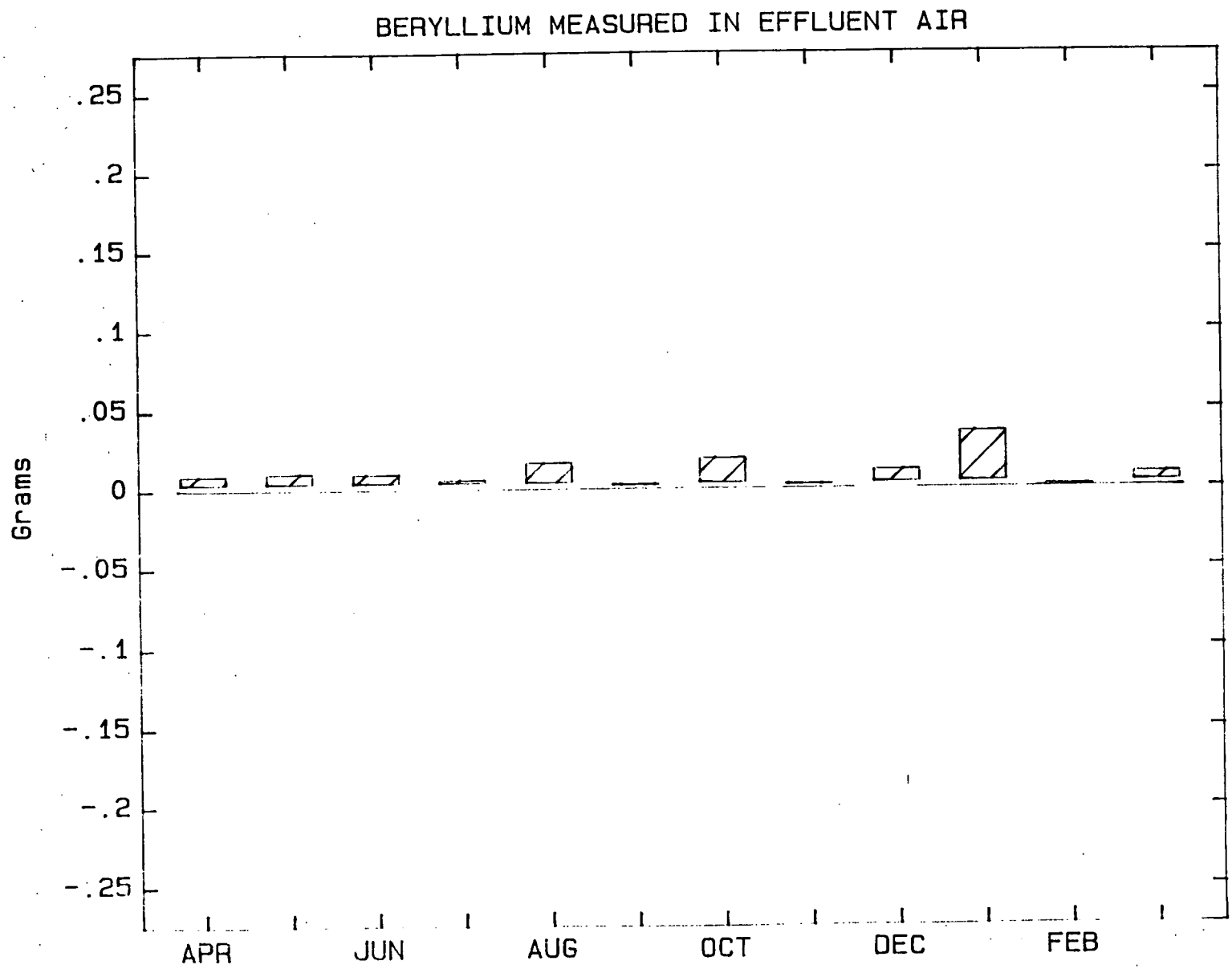

BERYLLIUM MEASURED IN EFFLUENT AIR
Grams
.25
.2
.15
.1
.05
0
-.05
-.1
-.15
-.2
-.25
APR
JUN
AUG
OCT
DEC
FEB

Table III. Plutonium at Selected Onsite Ambient Air Locations
(02/23/88-03/22/88)

Location	n	Volume(m^3)	Concentration (pCi/m^3) Lower Confidence Limit	Point Estimate	Upper Confidence Limit
S-05	2	23,000	0.000207	0.000236	0.000265
S-06	2	26,000	0.000101	0.000117	0.000133
S-07	2	26,000	0.000233	0.000265	0.000297
S-08	2	33,000	0.000221	0.000255	0.000289
S-09	2	31,000	0.000395	0.000443	0.000491

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
(03/01/88 to 03/29/88)

Location	n	Air Volume(m^3)	Point Estimate (pCi/m^3)	+/- Error (pCi/m^3)	Condensed Water Vapor (mls)
S-4	4	49	0.11	0.60	97
S-5	4	37	0.13	0.28	34
S-16	4	57	-0.01	0.53	102

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Table V. Plutonium in Perimeter Ambient Air
(03/01/88-03/29/88)

Location	n	Volume(m^3)	Concentration(pCi/m^3) Lower Confidence Limit	Point Estimate	Upper Confidence Limit
S-31	1	27,000	-0.000001	0.000002	0.000005
S-32	1	26,000	-0.000001	0.000002	0.000005
S-33	1	29,000	-0.000002	0.000001	0.000004
S-34	1	29,000	-0.000004	-0.000001	0.000002
S-35	1	25,000	-0.000004	-0.000001	0.000002
S-36	1	30,000	0.000001	0.000004	0.000007
S-37	1	30,000	0.000000	0.000003	0.000006
S-38	1	30,000	-0.000003	0.000000	0.000003
S-39	1	30,000	-0.000001	0.000002	0.000005
S-40	1	30,000	-0.000002	0.000001	0.000004
S-41	1	29,000	-0.000002	0.000001	0.000004
S-42	1	26,000	-0.000002	0.000001	0.000004
S-43	1	31,000	-0.000003	0.000000	0.000003
S-44	1	32,000	-0.000002	0.000000	0.000002

Mean Point Estimate = 0.000001

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Location of Onsite and Plant Perimeter Ambient Air Samplers
(Portions of figure are not to scale.)

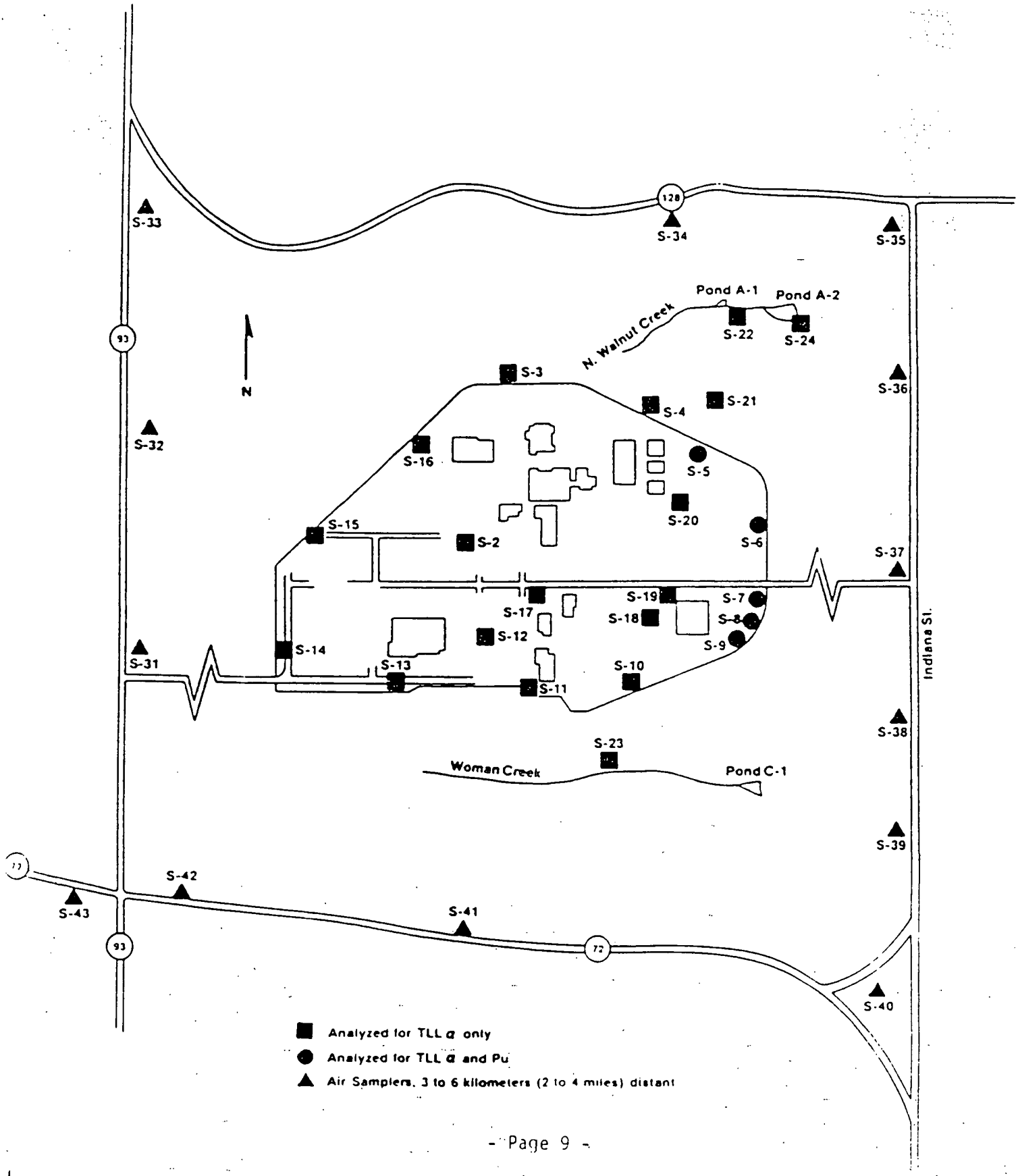

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Table VI. Plutonium in Community Ambient Air
(03/02/88-03/30/88)

Location	n	Volume(m^3)	Concentration(pCi/m^3) Lower Confidence Limit	Point Estimate	Upper Confidence Limit
Marshall	1	14,000	-0.000009	-0.000003	0.000003
Jeffco Airport	1	32,000	-0.000002	0.000000	0.000002
Superior	1	25,000	-0.000003	0.000000	0.000003
Boulder	1	31,000	-0.000004	-0.000001	0.000002
Lafayette	1	31,000	-0.000001	0.000002	0.000005
Broomfield	1	28,000	-0.000002	0.000001	0.000004
Walnut Creek	1	32,000	-0.000003	0.000000	0.000003
Wagner	1	28,000	0.000003	0.000006	0.000009
Leyden	1	27,000	-0.000001	0.000002	0.000005
Westminster	1	29,000	0.000000	0.000003	0.000006
Denver	0*				
Golden	1	22,000	0.000004	0.000008	0.000012
Lakeview Pointe	1	38,000	0.000000	0.000002	0.000004
Cotton Creek	1	31,000	0.000002	0.000005	0.000008
Mean Point Estimate		=		0.000002	

* Denver sampler down due to construction at sampler location.

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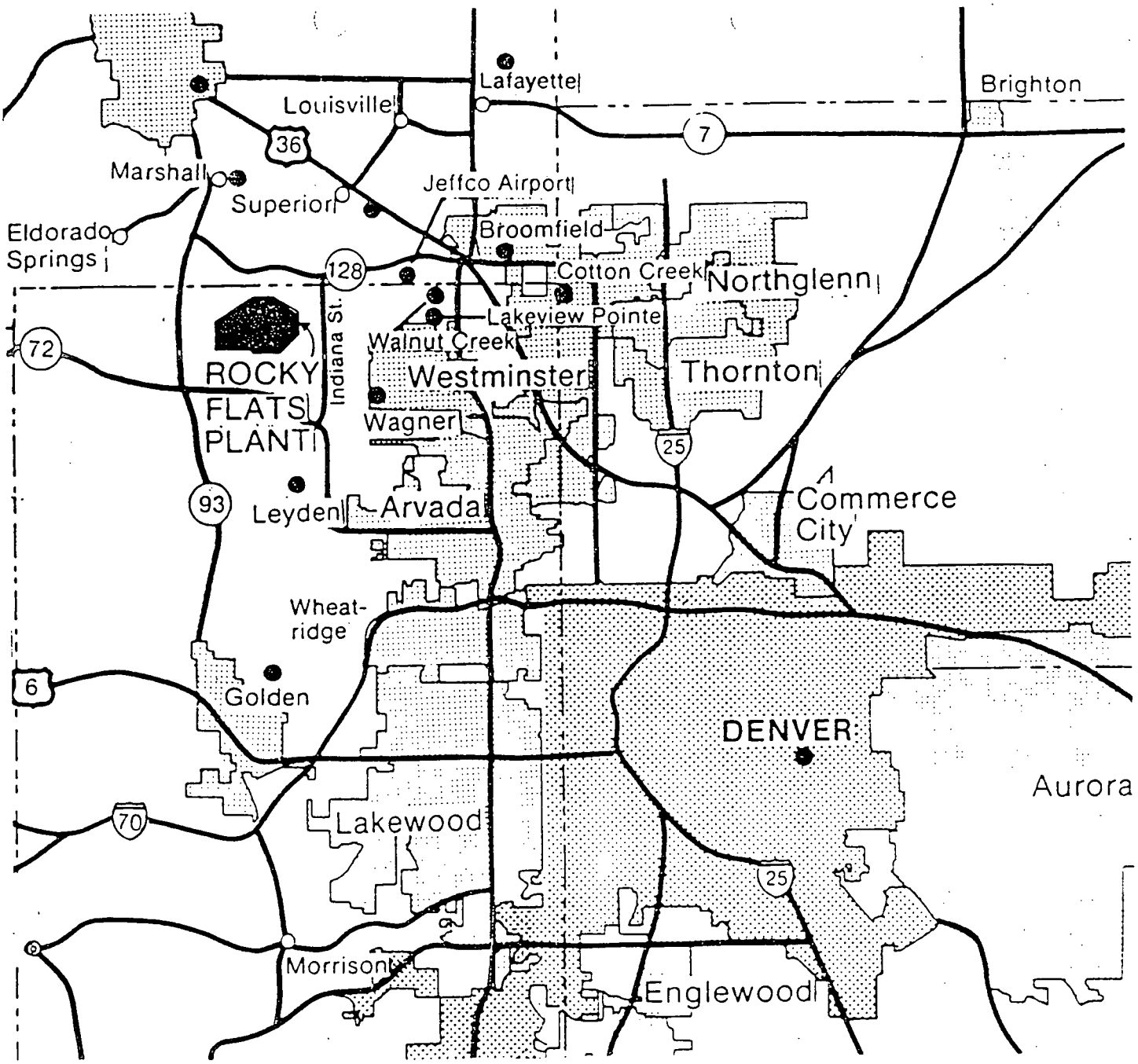

Location of Community Ambient Air Samplers

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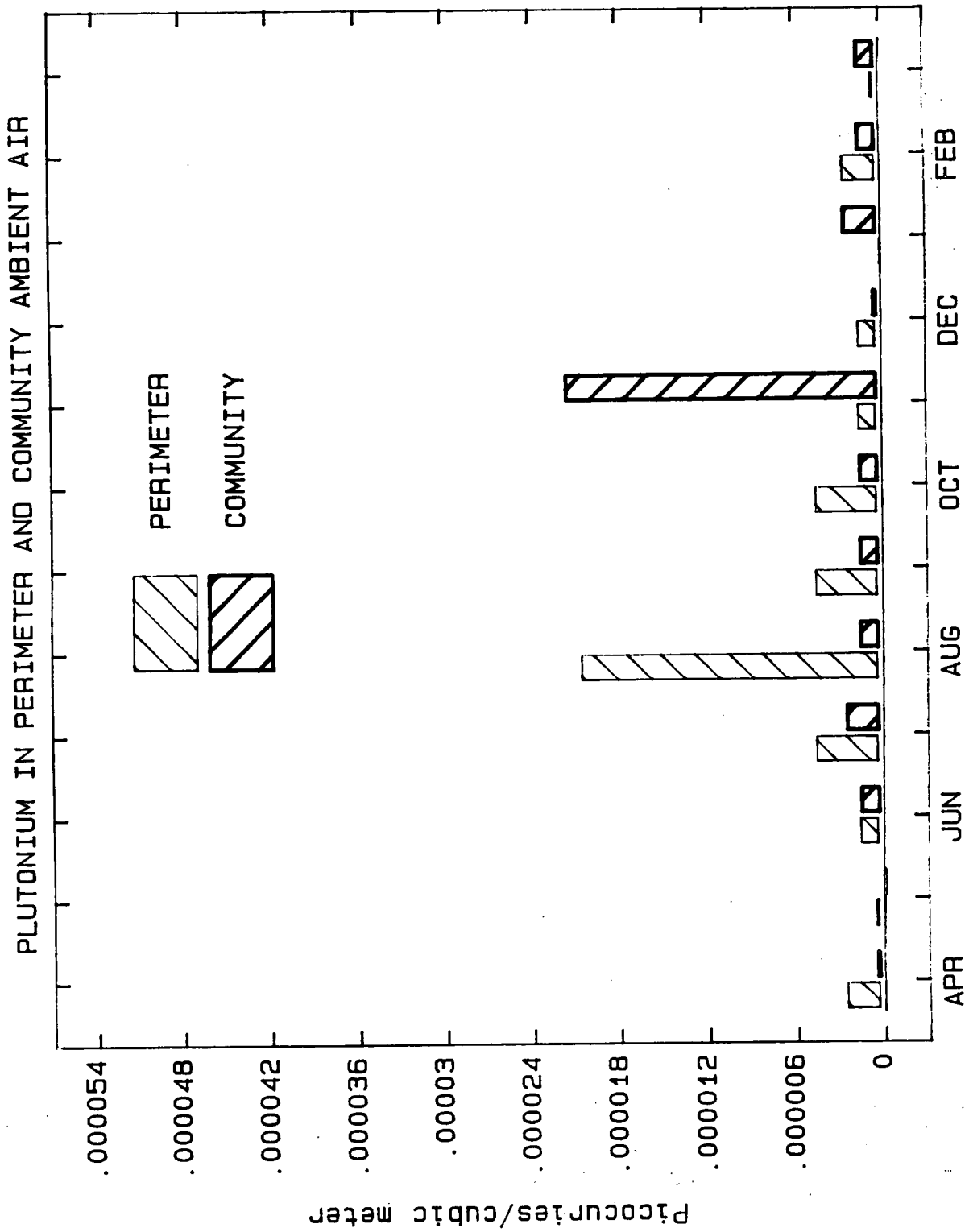
PLUTONIUM IN PERIMETER AND COMMUNITY AMBIENT AIR
PERIMETER
COMMUNITY
.000054
.000048
.000042
.000036
.00003
.000024
.000018
.000012
.000006
0
Picocuries/cubic meter
APR
JUN
AUG
OCT
DEC
FEB

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Table VII. Water Sample Results, Radioactive Parameters

Holding Pond Outfall (pCi/l)

Location	Plutonium	Uranium	Americium
Pond A-4			
03/23/88-03/25/88	-0.003 ± 0.03	11.2 ± 1.2	0.03 ± 0.02
Average Concentration	-0.003 ± 0.03	11.2 ± 1.2	0.03 ± 0.02
Pond B-5			
03/01/88 - 03/03/88	0.08 ± 0.04	2.5 ± 0.3	-0.004 ± 0.02
03/08/88 - 03/09/88	0.03 ± 0.03	2.9 ± 0.3	0.004 ± 0.03
03/15/88 - 03/16/88	0.03 ± 0.03	3.1 ± 0.3	0.02 ± 0.03
03/22/88 - 03/23/88	0.04 ± 0.03	3.4 ± 0.3	0.04 ± 0.03
03/30/88 - 03/31/88	0.04 ± 0.03	3.9 ± 0.3	0.04 ± 0.03
Average Concentration	0.04 ± 0.03	3.2 ± 0.3	0.02 ± 0.03
Pond C-1			
02/29/88 - 03/04/88	0.02 ± 0.007	-0.008 ± 0.2	0.004 ± 0.005
03/07/88 - 03/11/88	0.04 ± 0.03	0.7 ± 0.2	-0.002 ± 0.004
03/14/88 - 03/18/88	0.02 ± 0.01	0.5 ± 0.2	0.009 ± 0.007
03/21/88 - 03/25/88	0.007 ± 0.006	0.7 ± 0.2	0.001 ± 0.005
03/28/88 - 03/31/88	-0.001 ± 0.009	0.5 ± 0.2	0.002 ± 0.008
Average Concentration	0.02 ± 0.02	0.5 ± 0.2	0.002 ± 0.006
Pond C-2			
03/30/88 - 03/31/88	0.09 ± 0.03	4.5 ± 0.3	0.02 ± 0.02
Average Concentration	0.09 ± 0.03	4.5 ± 0.3	0.02 ± 0.02
Walnut Creek at Indiana			
02/29/88 - 03/04/88	0.02 ± 0.007	4.3 ± 0.4	0.001 ± 0.005
03/07/88 - 03/11/88	0.007 ± 0.006	5.7 ± 0.5	0.02 ± 0.007
03/14/88 - 03/18/88	0.03 ± 0.03	4.4 ± 0.4	0.01 ± 0.007
03/21/88 - 03/25/88	0.004 ± 0.005	6.4 ± 0.6	0.01 ± 0.006
03/28/88 - 03/31/88	-0.003 ± 0.01	10.9 ± 0.8	-0.004 ± 0.01
Average Concentration	0.01 ± 0.01	6.3 ± 0.6	0.007 ± 0.007

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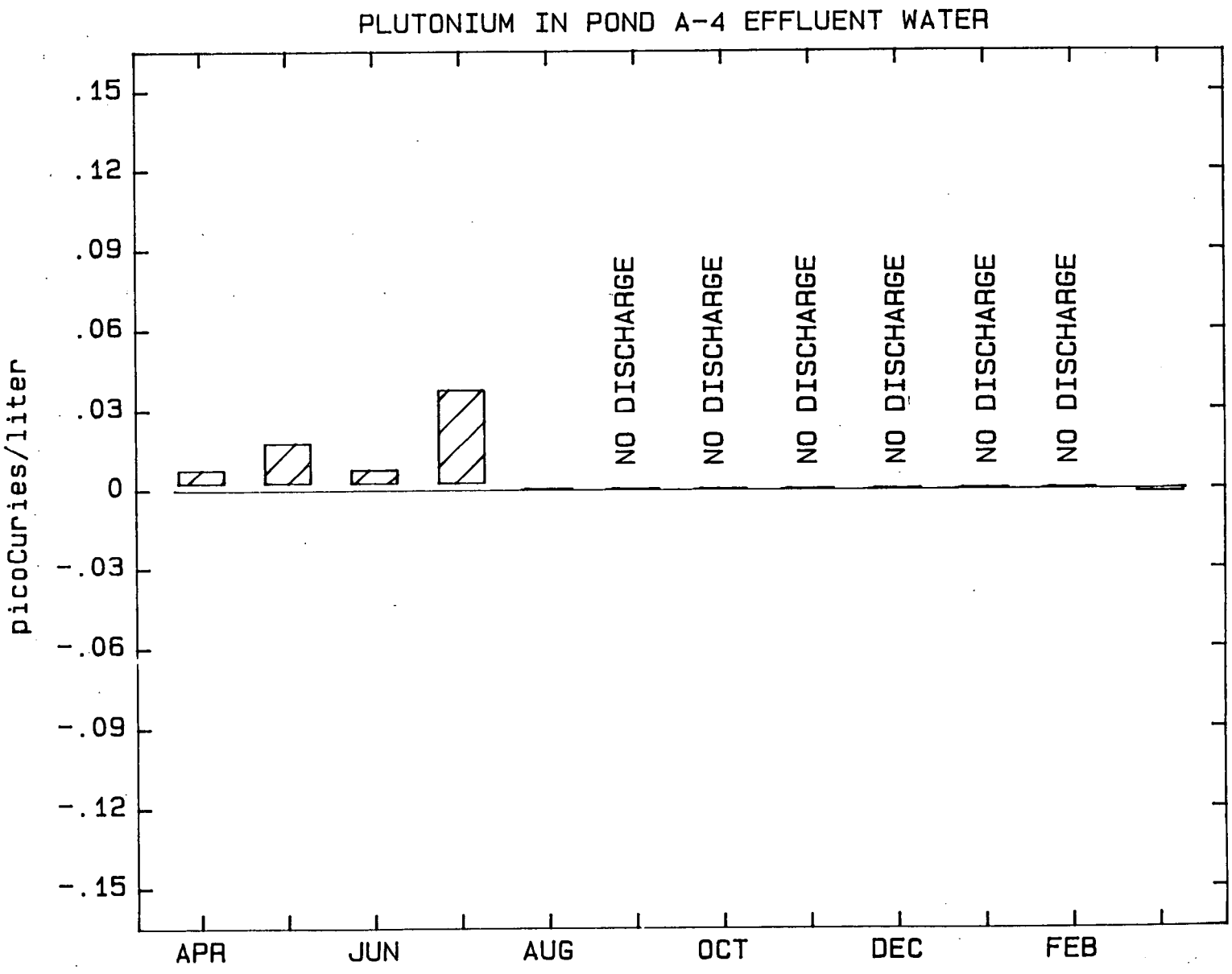
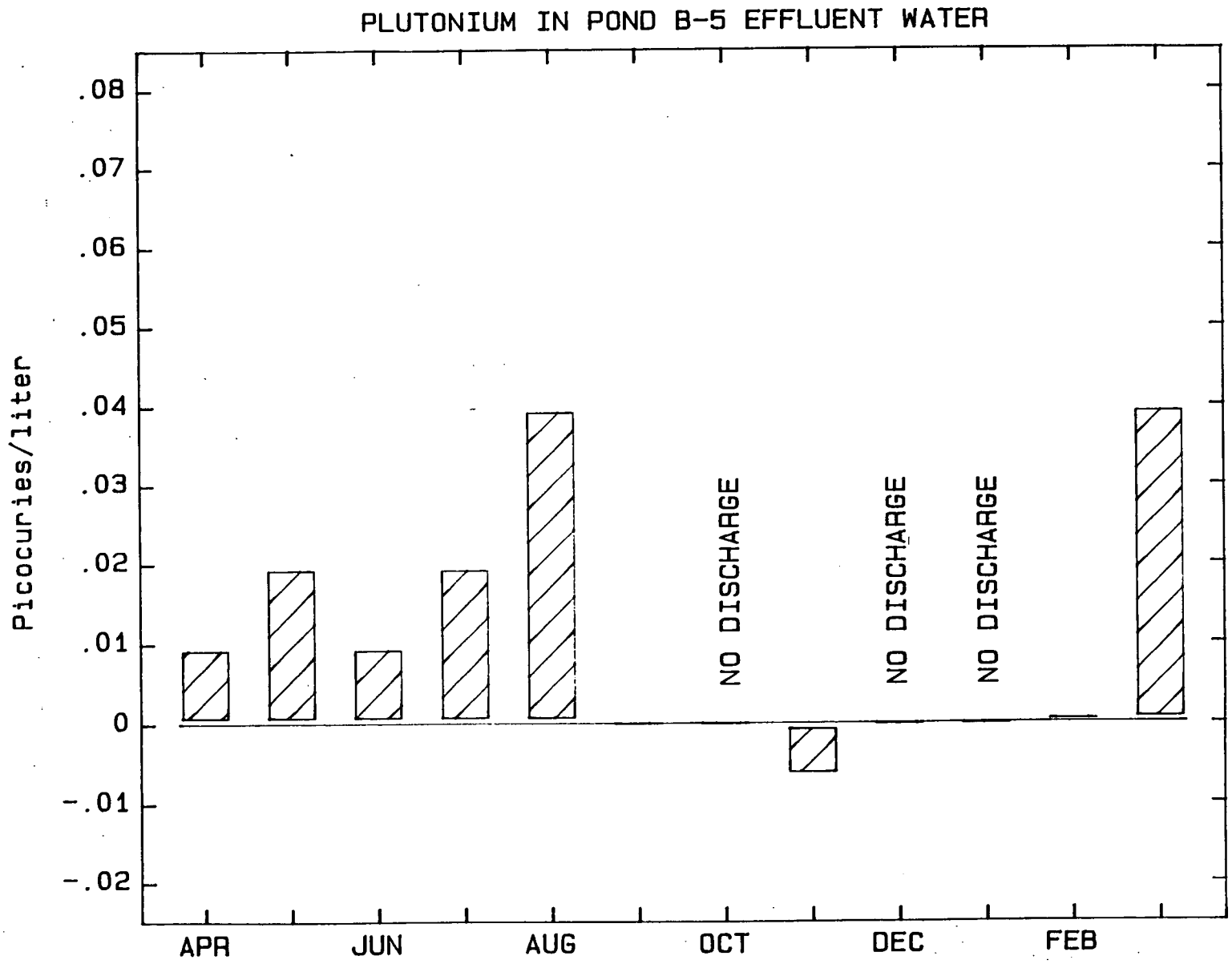
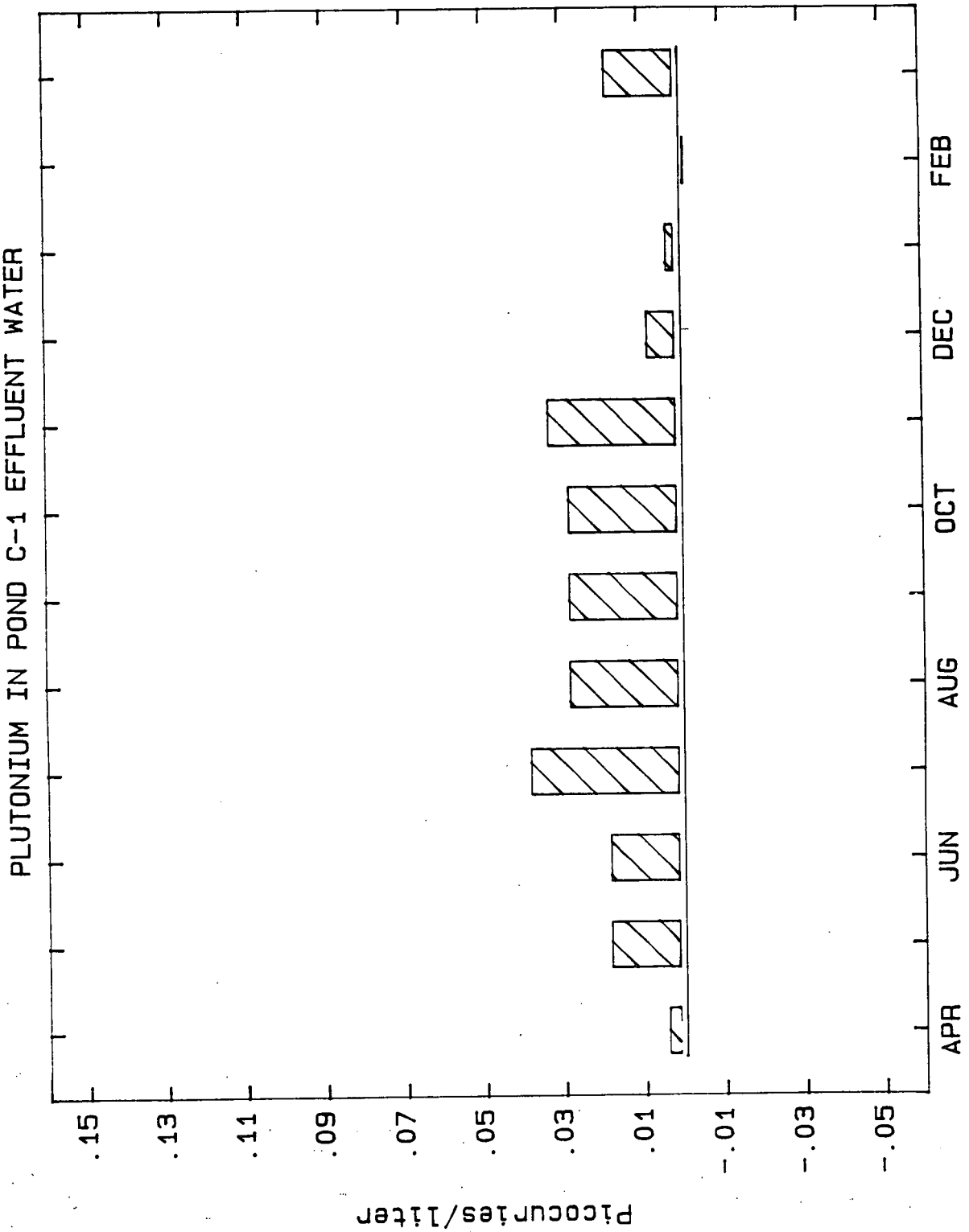
18/30


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
APR
JUN
AUG
OCT
DEC
FEB

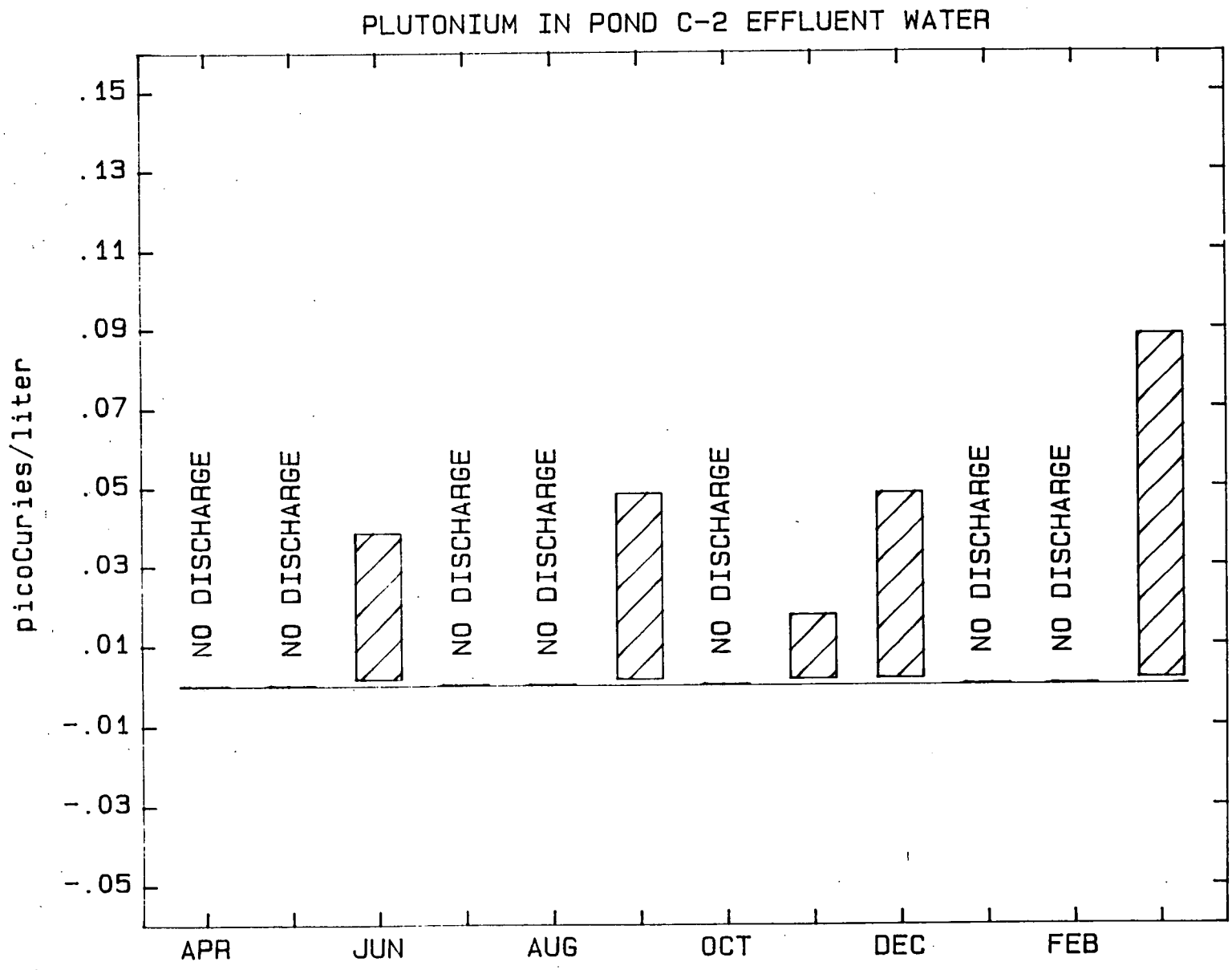
19/30

PLUTONIUM IN POND B-5 EFFLUENT WATER




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

20/30


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
APR
JUN
AUG
OCT
DEC
FEB

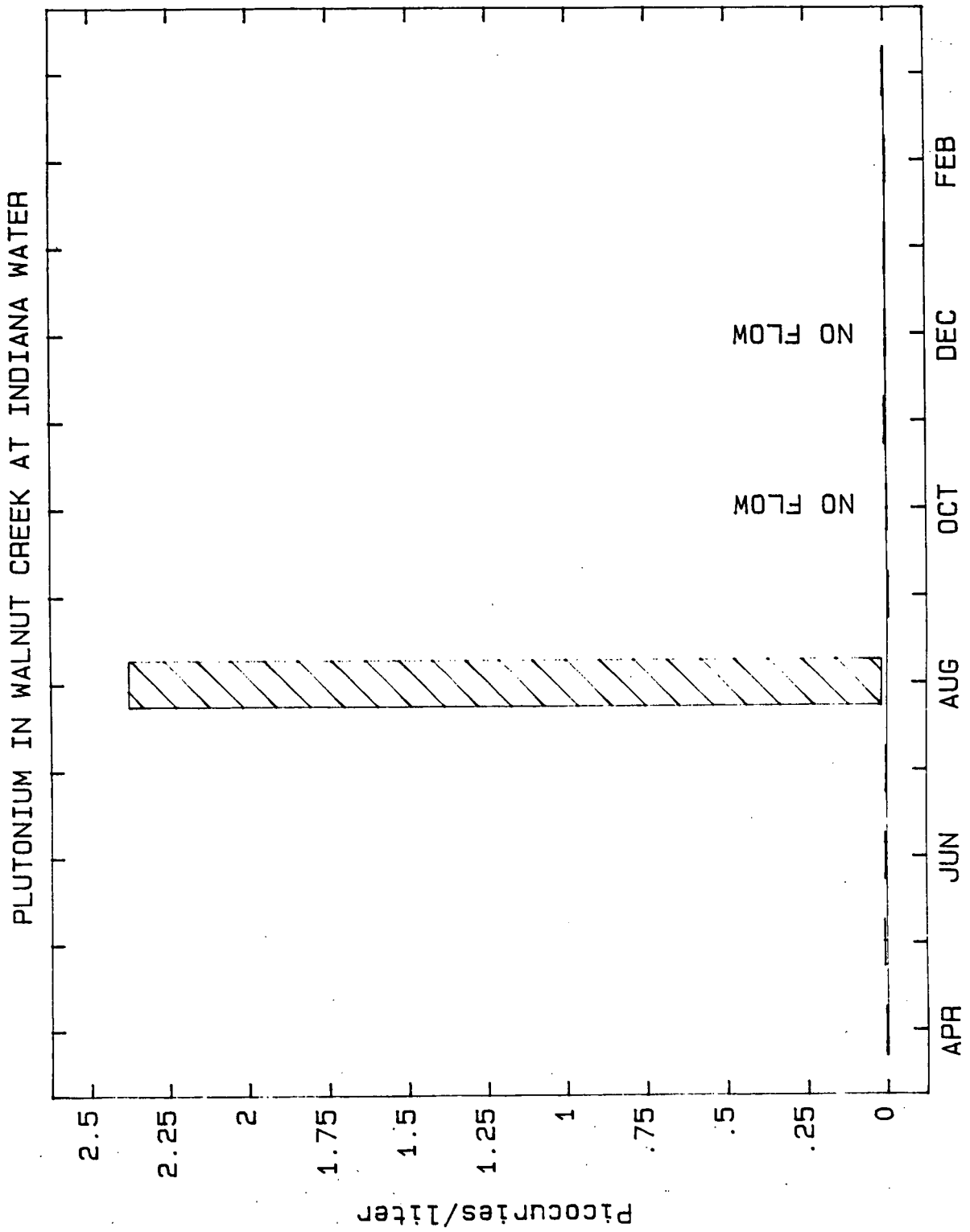

PLUTONIUM IN WALNUT CREEK AT INDIANA WATER
Picocuries/liter
2.5
2.25
2
1.75
1.5
1.25
1
.75
.5
.25
0
APR
JUN
AUG
OCT
DEC
FEB
NO FLOW
NO FLOW

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Table VIII. Water Sample Results, Radioactive Parameters

Reservoirs (pCi/l)

Location	n	Plutonium	Uranium	Americium
Great Western	1*	0.002 ± 0.007	3.3 ± 0.3	0.003 ± 0.006
Standley	1*	0.005 ± 0.008	1.91 ± 0.2	0.02 ± 0.008

Community Tap Water (pCi/l)

Location	n	Plutonium	Uranium	Americium
Arvada	1	0.002 ± 0.03	0.5 ± 0.2	-0.008 ± 0.02
Boulder	1*	-0.001 ± 0.006	0.5 ± 0.2	0.005 ± 0.006
Broomfield	1*	-0.004 ± 0.006	1.7 ± 0.2	0.03 ± 0.03
Denver	1	0.06 ± 0.04	1.9 ± 0.2	-0.005 ± 0.02
Golden	1	-0.002 ± 0.03	2.1 ± 0.2	-0.009 ± 0.02
Lafayette	1	-0.006 ± 0.03	0.2 ± 0.1	-0.01 ± 0.02
Louisville	1	0.003 ± 0.03	0.2 ± 0.2	-0.01 ± 0.02
Thornton	1	0.05 ± 0.04	1.7 ± 0.2	0.02 ± 0.02
Westminster	1*	-0.001 ± 0.007	0.5 ± 0.2	-0.004 ± 0.005

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

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Table IX. Water Sample Results, Radioactive Parameters

Tritium (pCi/l)

Location	n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
Pond A-4	3	-270 ± 290	-160 ± 290	-220 ± 290
Pond B-5	9	-580 ± 640	240 ± 330	-110 ± 400
Pond C-1	3	-150 ± 320	340 ± 290	20 ± 300
Pond C-2	2	-100 ± 300	20 ± 290	-40 ± 300
Walnut Creek at Indiana	19	-360 ± 580	-240 ± 300	-20 ± 370
Arvada	1	100 ± 300	100 ± 300	100 ± 300
Boulder	4	-300 ± 280	220 ± 580	-70 ± 390
Broomfield	4	-60 ± 310	640 ± 610	220 ± 400
Denver	1	-120 ± 300	-120 ± 300	-120 ± 300
Golden	1	-210 ± 290	-210 ± 290	-210 ± 290
Great Western	4	-330 ± 280	640 ± 620	70 ± 400
Lafayette	1	30 ± 300	30 ± 300	30 ± 300
Louisville	1	-210 ± 290	-210 ± 290	-210 ± 290
Standley	4	-250 ± 400	-150 ± 290	-250 ± 400
Thornton	1	100 ± 300	100 ± 300	100 ± 300
Westminster	4	-200 ± 270	740 ± 600	140 ± 390

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Table X. Water Sample Results, Nonradioactive Parameters

Nitrate (as N) at Great Western Reservoir

Sample Date	Nitrate (as N) (mg/l)
03/03/88	0.07
03/10/88	0.11
03/17/88	0.04
03/24/88	0.2

Nitrate (as N) at Standley Lake

03/03/88	0.13
03/10/88	0.11
03/17/88	0.08
03/24/88	0.06

NOTE: For some nonradioactive 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.

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Table XI. NPDES Permit Water Sample Results

Discharge 001 (Pond B-3)
Discharged 11 times

Parameter		Measured 30-Day Average	Limits 30-Day* Average	Measured Daily Maximum	Limits Daily Maximum
Biochem. Oxygen Demand,5 Day	mg/l	21.3	10	28.5	25
Total Suspended Solids	mg/l	6	30	16.0	NA
Nitrates as N	mg/l	2.45	10	3.37	NA
Total Chromium	mg/l	<0.05	0.05	<0.05	0.1
Total Phosphorus	mg/l	0.54	8	1.18	NA
Oil and Grease, Visual	No Visible Sheen		NA		NA
Total Residual Chlorine	mg/l	0.10	NA	0.15	0.5
Fecal Coliforms	#/100 ml	53	200	152	NA

		Measured Daily Minimum	Limits Daily Minimum	Measured Daily Maximum	Limits Daily Maximum
pH	S.U.	7.0	6.0	7.4	9.0

Discharge 002 (Pond A-3)
No Discharge

Parameters		Measured 30-Day Average	Limits 30-Day* Average	Measured Daily Maximum	Limits Daily Maximum
Nitrates as N	mg/l		10		20

		Measured Daily Minimum	Limits Daily Minimum	Measured Daily Maximum	Limits Daily Maximum
pH	S.U.		6.0		9.0

Discharge 003 (RO Pilot Plant)
No Discharge

		Measured Daily Minimum	Limits Daily Minimum	Measured Daily Maximum	Limits Daily 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 004 (RO Plant)
No Discharge

		Measured 30-Day Average	Limits 30-Day* Average	Measured Daily Maximum	Limits Daily Maximum
Total Suspended Solids	mg/l		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	7-Day Average	30-Day Average	30-Day Average
Fecal Coliform	#/100 ml		400		200
		Daily Minimum	Daily Minimum	Daily Maximum	Daily Maximum
pH	S.U.		6.0		9.0

Discharge 005 (Pond A-4)
Discharged 3 days

Parameter		n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
pH	S.U.	3	5.2	7.6	-
Nitrates as N	mg/l	3	2.3	2.9	2.6
Nonvolatile Suspended Solids	mg/l	3	0	1	0.3

Discharge 006 (Pond B-5)
Discharged 13 days

Parameter		n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
pH	S.U.	13	7.2	8.2	-
Nitrates as N	mg/l	13	1.1	1.8	1.5
Nonvolatile Suspended Solids	mg/l	13	0	7	2

Discharge 007 (Pond C-2)
Discharged 2 days

Parameter		n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
pH	S.U.	2	7.2	7.2	-
Nitrates as N	mg/l	2	0.13	0.04	0.09
Nonvolatile Suspended solids	mg/l	2	0	2	1

Table XII. Water Sample Results, Nonradioactive Parameters

Walnut Creek at Indiana Street

Parameter		n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
pH	S.U.	19	6.8	8.0	-
Nitrates as N	mg/l	19	1.8	4.7	2.6

Total Volume (gallons) = 30,019,000

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Table XII.
Daily Flow Data Recorded at the
Walnut Creek at Indiana Gauging Station
Ponds A-4 and B-5,
March 1988

Date	Walnut Creek at Indiana (gallons)	Pond A-4 (gallons)	Pond B-5 (gallons)
03/01/88	608,000	-	1,204,000
03/02/88	1,104,000	-	1,755,000
03/03/88	1,047,000	-	1,782,000
03/04/88	455,000	-	-
03/07/88	311,000	-	-
03/08/88	16,000	-	-
03/09/88	820,000	-	1,765,000
03/10/88	1,225,000	-	2,732,000
03/11/88	1,064,000	-	-
03/14/88	46,000	-	-
03/15/88	-	-	-
03/16/88	2,540,000	-	2,338,000
03/17/88	947,000	-	-
03/18/88	-	-	-
03/21/88	47,000	-	-
03/22/88	1,701,000	2,026,000	1,448,000
03/23/88	5,403,000	2,141,000	2,024,000
03/24/88	4,382,000	5,598,000	-
03/25/88	5,837,000	-	-
03/28/88	2,465,000	-	-
03/29/88	-	-	-
03/30/88	1,000	-	-
03/31/88	-		2,264,000
TOTAL VOLUME	30,019,000	9,765,000	17,312,000

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Table XIII.
Daily Flow Data Recorded at
Ponds C-1 and C-2 during
March 1988
(Woman Creek)

Date	Pond C-1 (gallons)	Pond C-2 (gallons)
03/01/88	560,000	
03/02/88	686,000	
03/03/88	694,000	
03/04/88	686,000	
03/07/88	2,220,000	
03/08/88	548,000	
03/09/88	692,000	
03/10/88	688,000	
03/11/88	690,000	
03/14/88	2,144,000	
03/15/88	632,000	
03/16/88	702,000	
03/17/88	689,000	
03/21/88	2,829,000	
03/22/88	620,000	
03/23/88	820,000	
03/24/88	576,000	
03/25/88	686,000	
03/28/88	2,138,000	
03/29/88	690,000	1,776,000
03/30/88	714,000	1,776,000
03/31/88		1,887,000
TOTAL VOLUME	20,704,000	5,439,000

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