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Oct. 1988 EAC-420110-167

Rocky Flats Plant

Monthly Environmental Monitoring Report

000024313

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RR-RP-00251

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

A Prime Contractor to
The United States Department of Energy

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By: Janet Nesheim, Derivative Classifier
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OCTOBER 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 October 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, XIII, and XIV.

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 Nayk/PAC Date 11/17/08
Directed by: J.A. Nesheim ODE M471.3-1

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Table I. 1988 Plutonium and Uranium Airborne Effluent Data

Month	Plutonium (09/16/88 - 10/17/88 - Oct.) Release (uCi)	Plutonium CMax (pCi/m3)	Uranium (09/16/88 - 10/18/88 - Oct.) 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	1.49	0.004 ± 0.0024
April	1.22	0.005 ± 0.0007	1.33	0.006 ± 0.0007
May	1.84	0.015 ± 0.0017	0.82	0.004 ± 0.0004
June	1.01	0.023 ± 0.0052	0.87	0.004 ± 0.0004
July	1.79	0.012 ± 0.0013	0.59	0.004 ± 0.0004
August	1.75	0.010 ± 0.0010	0.72	0.004 ± 0.0004
September	0.40*	0.010 ± 0.0011*	0.26*	0.002 ± 0.0003*
October	0.66	0.007 ± 0.0008	0.58	0.003 ± 0.0004
November				
December				
Year to Date	14.80	0.023 ± 0.0052	10.89	0.009 ± 0.0009

* Previously unreported

NOTE: The plutonium, uranium, americium, and beryllium measured concentrations in this report include values that are less than the corresponding calculated minimum detectable concentrations (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 (09/16/88 - 10/17/88 - Oct.) Release (Ci)	Tritium CMax (pCi/m3)	Beryllium (09/16/88 - 10/18/88 - Oct.) Release (grams)	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	0.006	250 ± 180	0.0131	0.00031
May	-0.002	243 ± 150	0.0200	0.00033
June	0.002	194 ± 120	0.0159	0.00025
July	0.004	100 ± 120	0.0067	0.00016
August	0.001	194 ± 100	0.0101	0.00021
September	0.000	139 ± 120	-0.0038	0.00012
October	0.000	97 ± 155	0.0058	0.00005
November				
December				
Year to Date	0.013	417 ± 250	0.1220	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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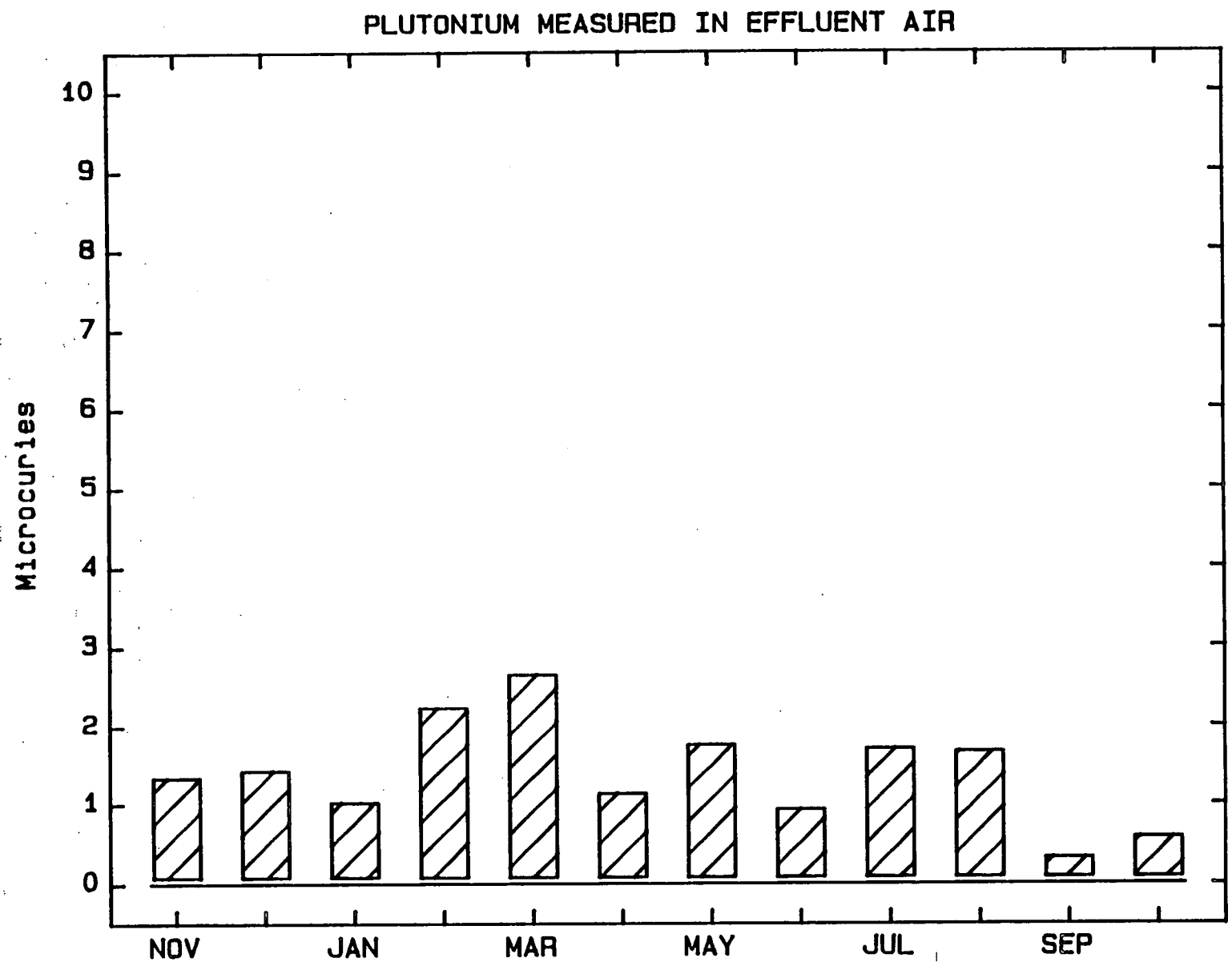
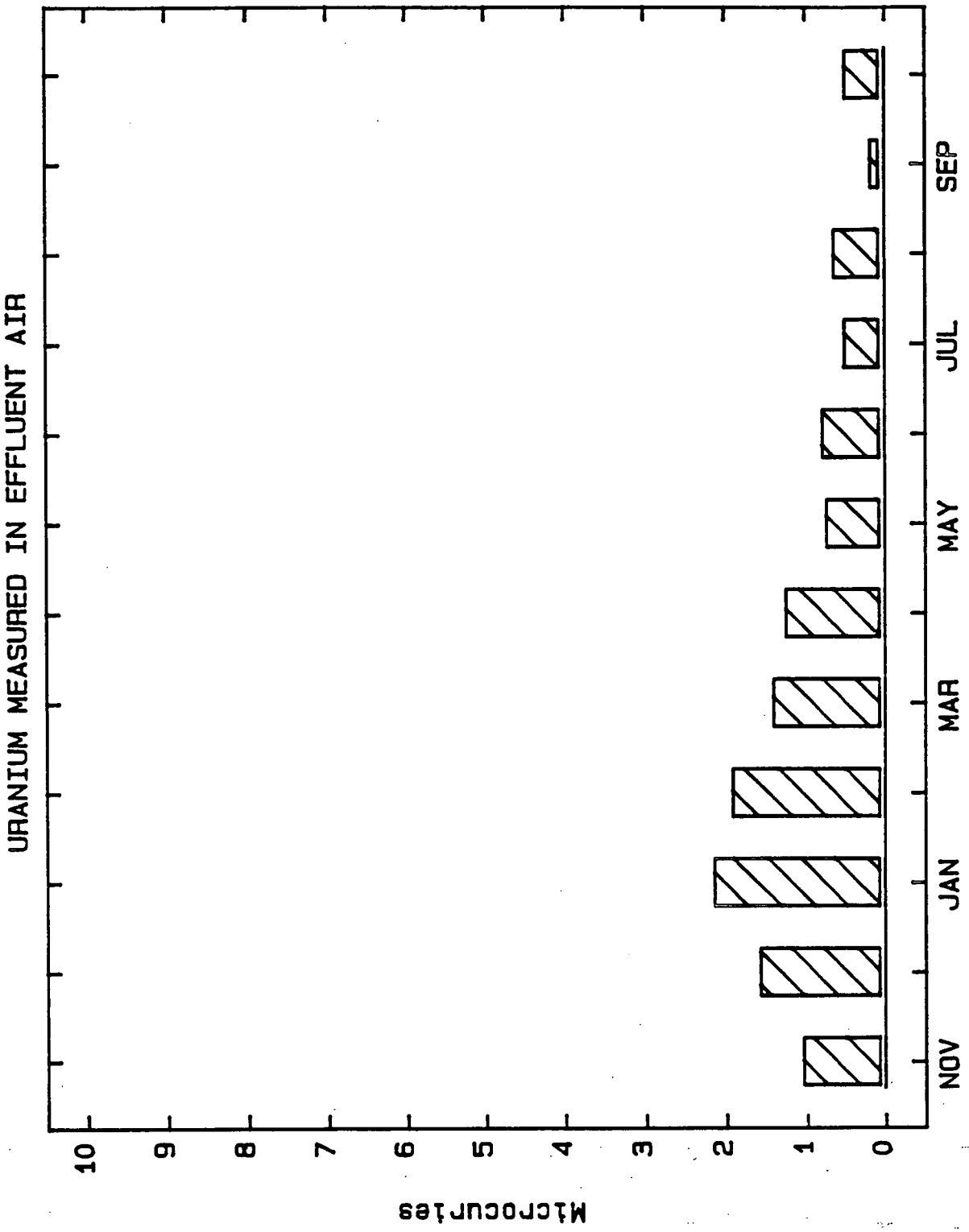
PLUTONIUM MEASURED IN EFFLUENT AIR




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

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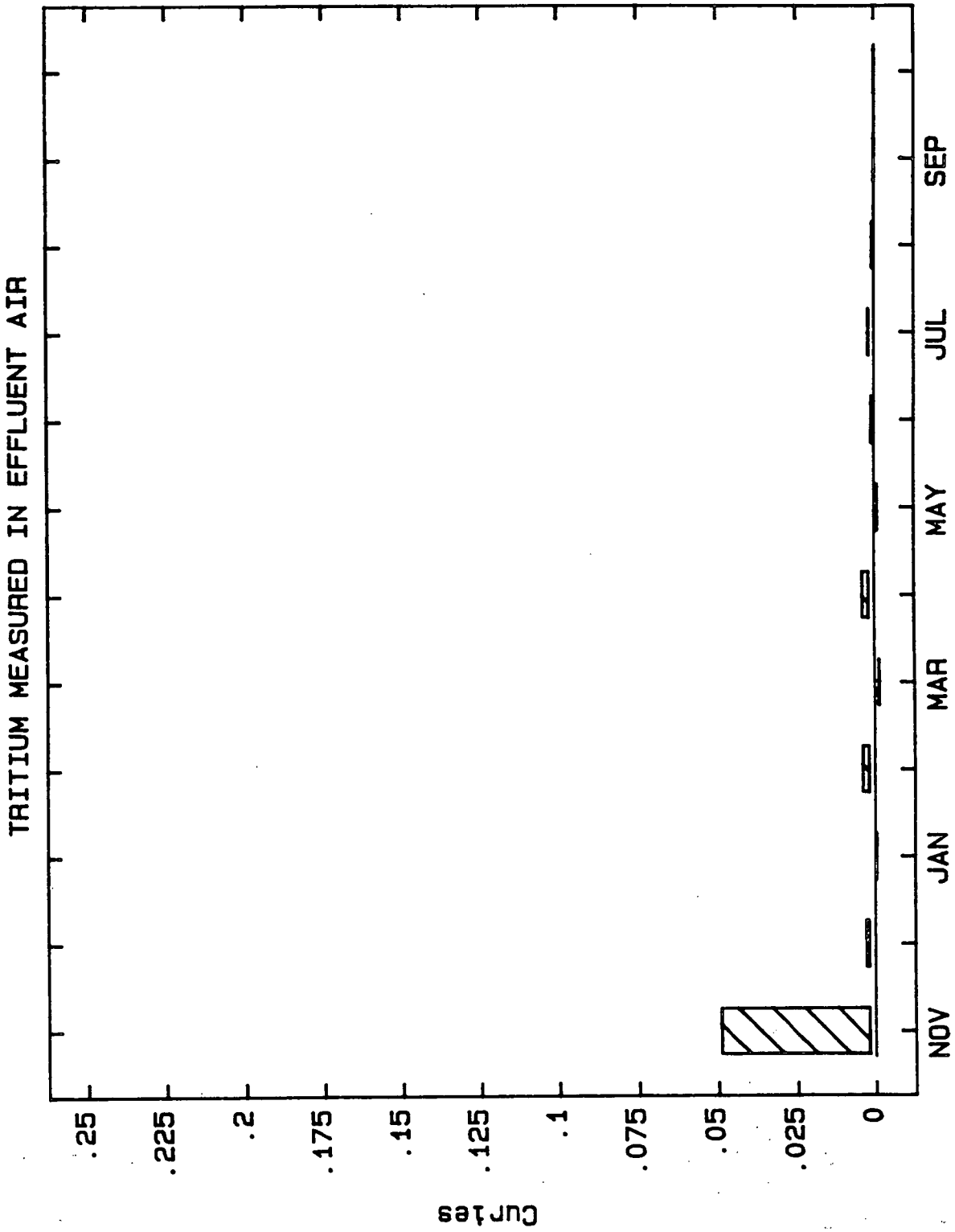
TRITIUM MEASURED IN EFFLUENT AIR
Curies
.25
.225
.2
.175
.15
.125
.1
.075
.05
.025
0
NOV
JAN
MAR
MAY
JUL
SEP

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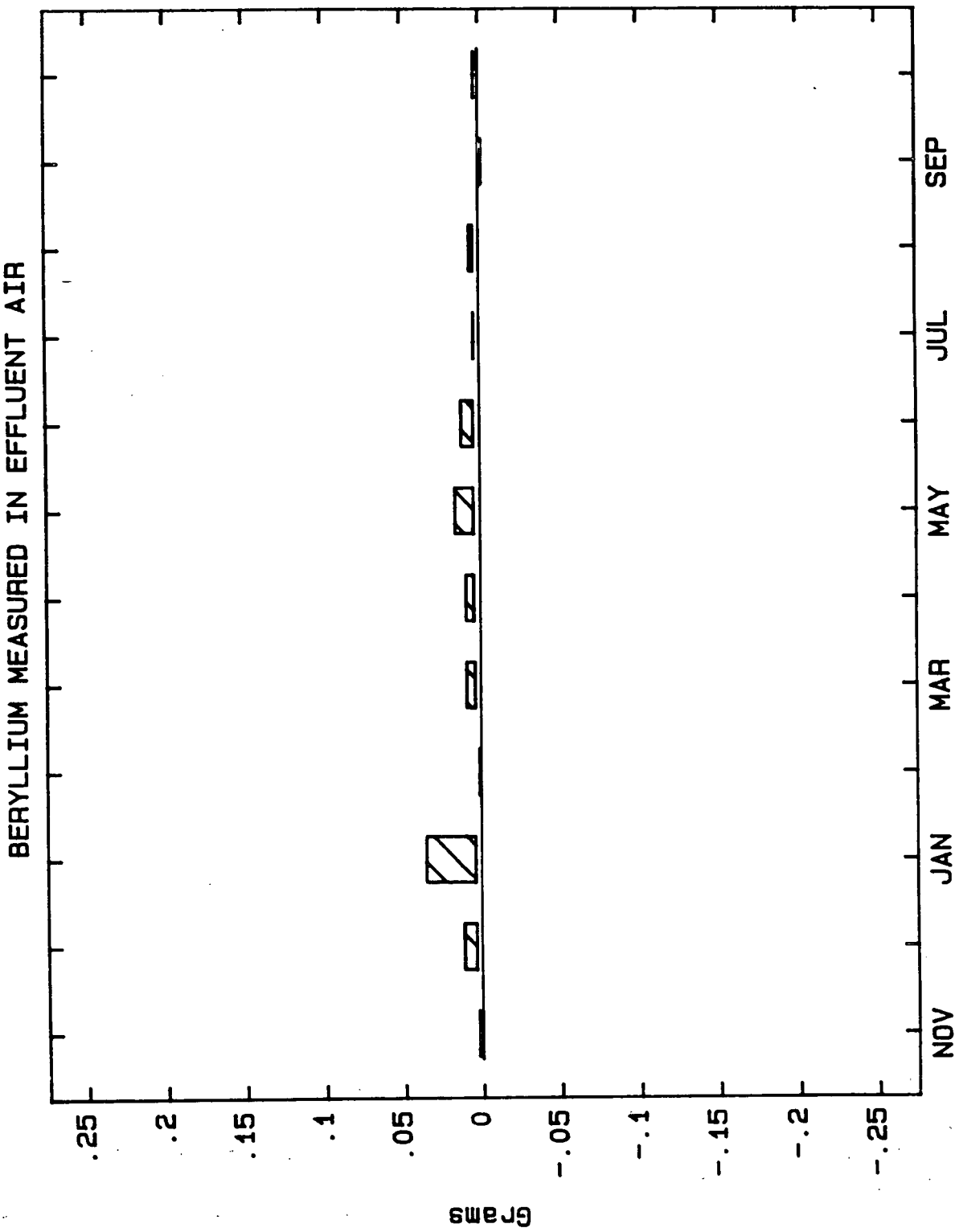
BERYLLIUM MEASURED IN EFFLUENT AIR
.25
.2
.15
.1
.05
0
-.05
-.1
-.15
-.2
-.25
Grams
NOV
JAN
MAR
MAY
JUL
SEP

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Table III. Plutonium at Selected Onsite Ambient Air Locations
(09/20/88 - 10/18/88)

Location	n	Volume (m3)	Concentration (pCi/m3) Point Estimate	± Error
S-05	1*	11,000	0.000706	0.000085
S-06	2	26,000	0.000144	0.000020
S-07	2	23,000	0.000342	0.000039
S-08	2	32,000	0.000715	0.000083
S-09	2	31,000	0.000706	0.000083

NOTE: Total long-lived alpha at the remaining 18 onsite ambient air samplers was below the screening level of 0.01 pCi/m^3.

* Sampling period was 10/04/88 - 10/18/88. Filter for sampling period 9/20/88 - 10/04/88 was damaged during maintenance on the sampler.

SEPTEMBER 1988*

Table III. Plutonium at Selected Onsite Ambient Air Locations
(08/23/88 - 09/20/88)

			Concentration (pCi/m3)	
Location	n	Volume (m3)	Point Estimate	± Error
S-05	2	26,000	0.000344	0.000039
S-06	2	24,000	0.000182	0.000023
S-07	2	21,000	0.000487	0.000056
S-08	2	29,000	0.000844	0.000092
S-09	2	23,000	0.001179	0.000127

NOTE: Total long-lived alpha at the remaining 18 onsite ambient air samplers was below the screening level of 0.01 pCi/m^3.

* Previously unreported data.

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Table III. Plutonium at Selected Onsite Ambient Air Locations
(07/12/88 - 08/23/88)

Location	n	Volume (m3)	Concentration (pCi/m3) Point Estimate	± Error
S-05	3*	39,000	0.000054	0.000010
S-06	3*	39,000	0.000027	0.000008
S-07	3*	41,000	0.000338	0.000040
S-08	3*	44,000	0.000512	0.000059
S-09	3*	35,000	0.000599	0.000068

NOTE: Total long-lived alpha at the remaining 18 onsite ambient air samplers was below the screening level of 0.01 pCi/m^3.

* Previously reported as (2).

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Table IV. Plutonium in Perimeter Ambient Air
(09/27/88 - 10/25/88)

Location	n	Volume (m3)	Concentration (pCi/m3) Point Estimate	± Error
S-31	1	14000	0.000000	0.000006
S-32	1	19000	-0.000002	0.000004
S-33	1	27000	0.000000	0.000003
S-34	1	29000	0.000000	0.000003
S-35	1	25000	0.000002	0.000004
S-36	1	28000	0.000000	0.000003
S-37	1	32000	0.000004	0.000003
S-38	1	27000	0.000006	0.000003
S-39	1	30000	0.000001	0.000003
S-40	1	28000	0.000002	0.000003
S-41	1	25000	0.000001	0.000003
S-42	1	25000	0.000000	0.000003
S-43	1	29000	0.000000	0.000003
S-44	1	28000	-0.000001	0.000003

Mean Point Estimate = 0.000001 pCi/m^3

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SEPTEMBER 1988*

Table IV. Plutonium in Perimeter Ambient Air
(08/30/88 - 09/27/88)

Location	n	Volume (m3)	Concentration (pCi/m3) Point Estimate	± Error
S-31	1	20000	0.000004	0.000004
S-32	1	23000	0.000002	0.000004
S-33	1	29000	0.000001	0.000003
S-34	1	28000	-0.000001	0.000003
S-35	1	24000	0.000000	0.000003
S-36	1	21000	0.000004	0.000004
S-37	1	32000	0.000007	0.000003
S-38	1	21000	0.000002	0.000004
S-39	1	29000	0.000001	0.000003
S-40	1	31000	0.000002	0.000003
S-41	1	27000	0.000003	0.000003
S-42	1	26000	0.000001	0.000003
S-43	1	26000	0.000005	0.000003
S-44	1	27000	0.000001	0.000003

Mean Point Estimate = 0.000002 pCi/m^3

* Previously unreported data.

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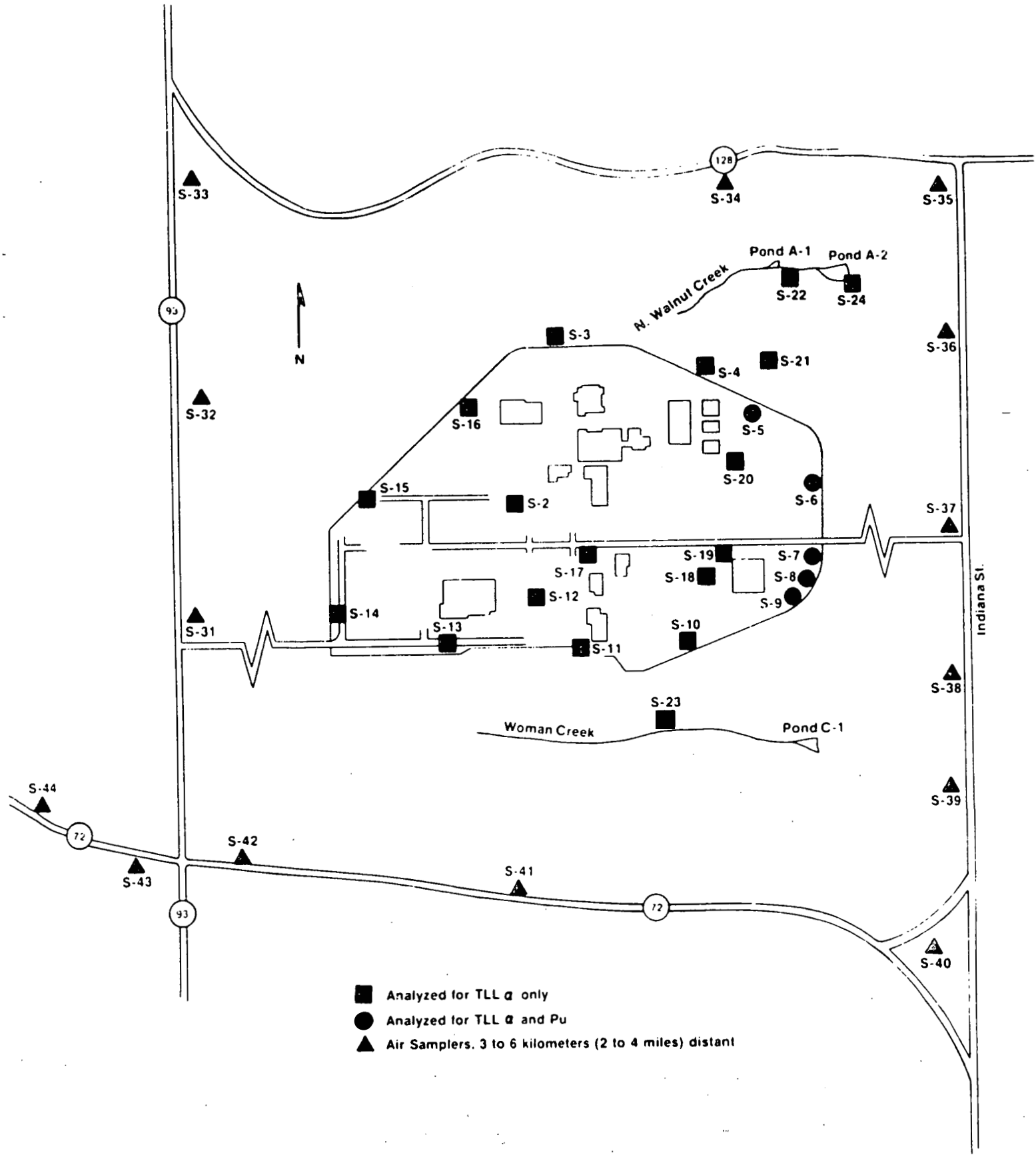

Location of Onsite and Plant Perimeter Ambient Air Samplers
(Portions of figure are not to scale.)

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OCTOBER 1988

Table V. Plutonium in Community Ambient Air
(09/28/88 - 10/26/88)

Location	Community Name	n	Point Volume (m3)	Concentration (pCi/m3) Estimate	± Error
S-51	Marshall	1	24000	0.000002	0.000003
S-52	Jeffco Airport	1	32000	-0.000001	0.000002
S-53	Superior	1	24000	-0.000001	0.000003
S-54	Boulder	1	28000	0.000001	0.000003
S-55	Lafayette	1	27000	0.000000	0.000003
S-56	Broomfield	1	22000	-0.000002	0.000004
S-57	Walnut Creek	1	29000	0.000000	0.000003
S-58	Wagner	1	27000	0.000002	0.000003
S-59	Leyden	1	31000	0.000000	0.000003
S-60	Westminster	1	16000	-0.000002	0.000005
S-61	Denver	1	7000	0.000003	0.000011
S-62	Golden	1	23000	0.000001	0.000004
S-68	Lakeview Pointe	1	31000	0.000001	0.000003
S-73	Cotton Creek	1	24000	0.000001	0.000003

Mean Point Estimate = 0.000000 pCi/m^3

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Table V. Plutonium in Community Ambient Air
(08/31/88 - 09/28/88)

Location	Community Name	n	Concentration (pCi/m3) Point Volume (m3)	Estimate	± Error
S-51	Marshall	1	25000	0.000001	0.000003
S-52	Jeffco Airport	1	28000	0.000005	0.000003
S-53	Superior	1	22000	0.000002	0.000004
S-54	Boulder	1	29000	0.000000	0.000003
S-55	Lafayette	1	28000	0.000002	0.000003
S-56	Broomfield	1	28000	0.000001	0.000003
S-57	Walnut Creek	1	26000	0.000001	0.000003
S-58	Wagner	1	25000	0.000003	0.000003
S-59	Leyden	1	31000	0.000002	0.000003
S-60	Westminster	1	16000	0.000004	0.000005
S-61	Denver	1	28000	0.000002	0.000003
S-62	Golden	1		No Analysis **	
S-68	Lakeview Pointe	1	28000	0.000000	0.000003
S-73	Cotton Creek	1	27000	0.000000	0.000003

Mean Point Estimate = 0.000002 pCi/m^3

* Previously unreported data.

** The sample for S-62 was lost prior to analysis.

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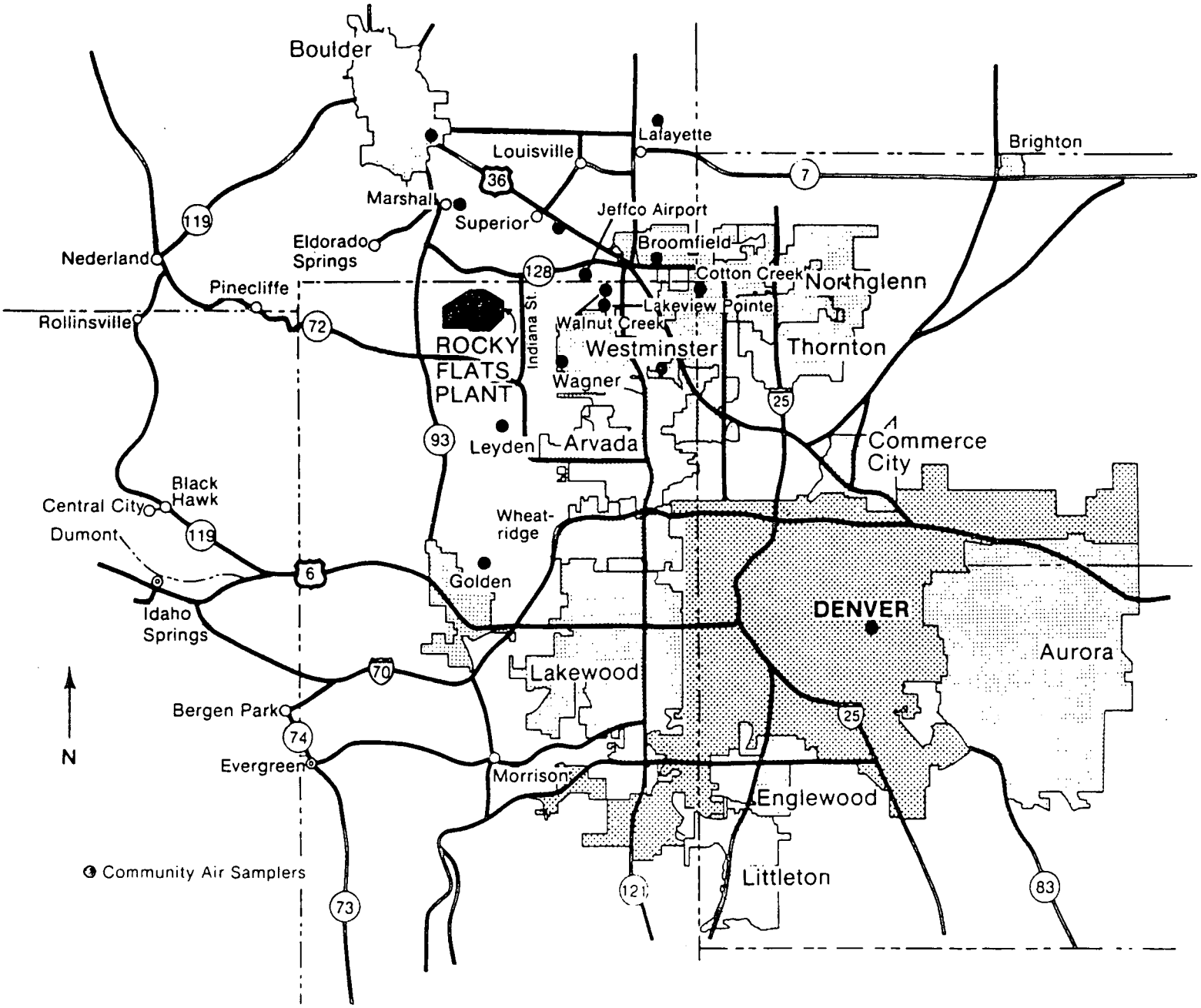
Location of Community Ambient Air Samplers



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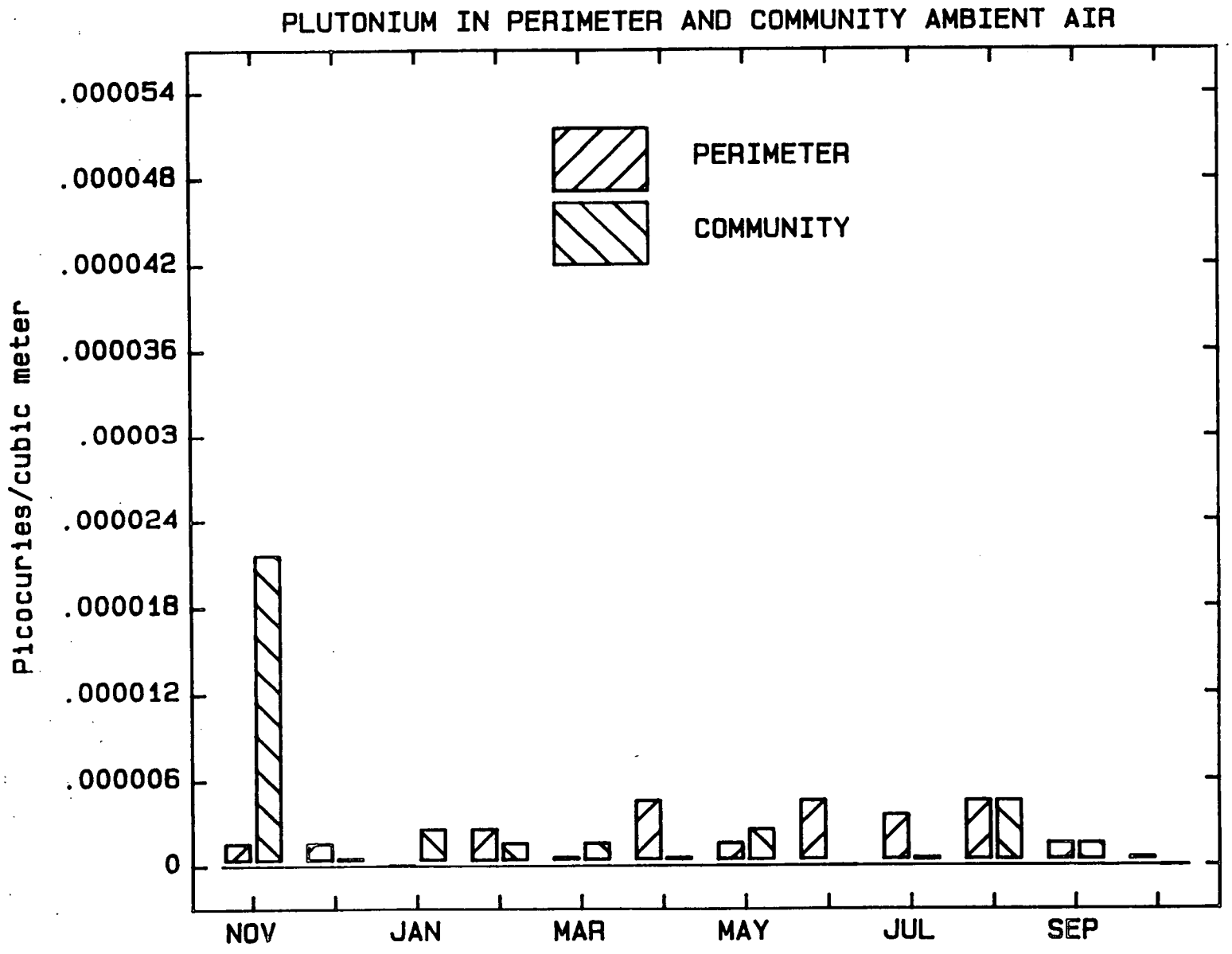
PLUTONIUM IN PERIMETER AND COMMUNITY AMBIENT AIR
PERIMETER
COMMUNITY
Picocuries/cubic meter
.000054
.000048
.000042
.000036
.00003
.000024
.000018
.000012
.000006
0
NOV
JAN
MAR
MAY
JUL
SEP

OCTOBER 1988

Table VI. Water Sample Results, Radioactive Parameters

Holding Pond Outfall (pCi/l)

Location	Plutonium	Uranium	Americium
Pond A-4			
No Discharge			
Average Concentration			
Pond B-5			
No Discharge			
Average Concentration			
Pond C-1			
10/17/88 - 10/21/88	0.014 ± 0.007	3.15 ± 0.31	0.001 ± 0.005
10/24/88 - 10/29/88	0.021 ± 0.008	0.49 ± 0.05	0.007 ± 0.005
Average Concentration	0.018 ± 0.008	1.82 ± 0.22	0.004 ± 0.005
Pond C-2			
No Discharge			
Average Concentration			
Walnut Creek at Indiana			
No Flow			
Average Concentration			

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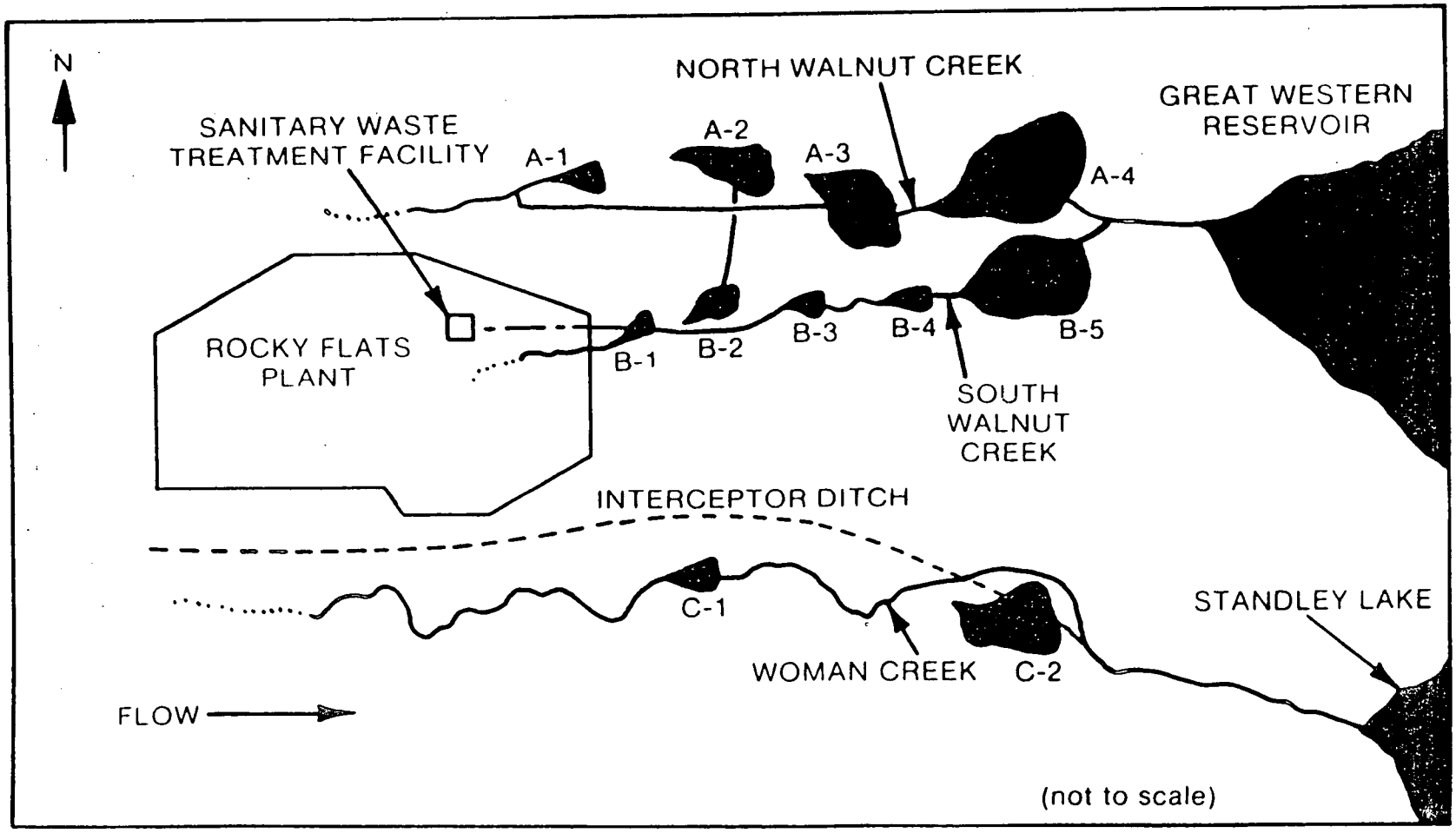
SEPTEMBER 1988

Table VI. Water Sample Results, Radioactive Parameters

Holding Pond Outfall (pCi/l)

Location	Plutonium	Uranium	Americium
Pond A-4			
9/28/88-9/30/88	0.001 ± 0.028	5.46 ± 0.62	0.013 ± 0.027*
Average Concentration	0.001 ± 0.028	5.46 ± 0.62	0.013 ± 0.027*
Pond B-5			
9/13/88 - 9/16/88	-0.017 ± 0.054	2.69 ± 0.25	0.017 ± 0.027
Average Concentration	-0.017 ± 0.054	2.69 ± 0.25	0.017 ± 0.027
Pond C-1			
No Flow			
Average Concentration			
Pond C-2			
No Discharge			
Average Concentration			
Walnut Creek at Indiana			
9/12/88 - 9/16/88	0.013 ± 0.015	2.47 ± 0.21	0.030 ± 0.016
9/28/88 - 9/30/88	-0.008 ± 0.026*	5.16 ± 0.39	0.026 ± 0.028*
Average Concentration	0.003 ± 0.02*	3.82 ± 0.31	0.028 ± 0.023*

* Previously reported as incomplete analysis.



Holding Ponds and Liquid Effluent Watercourses

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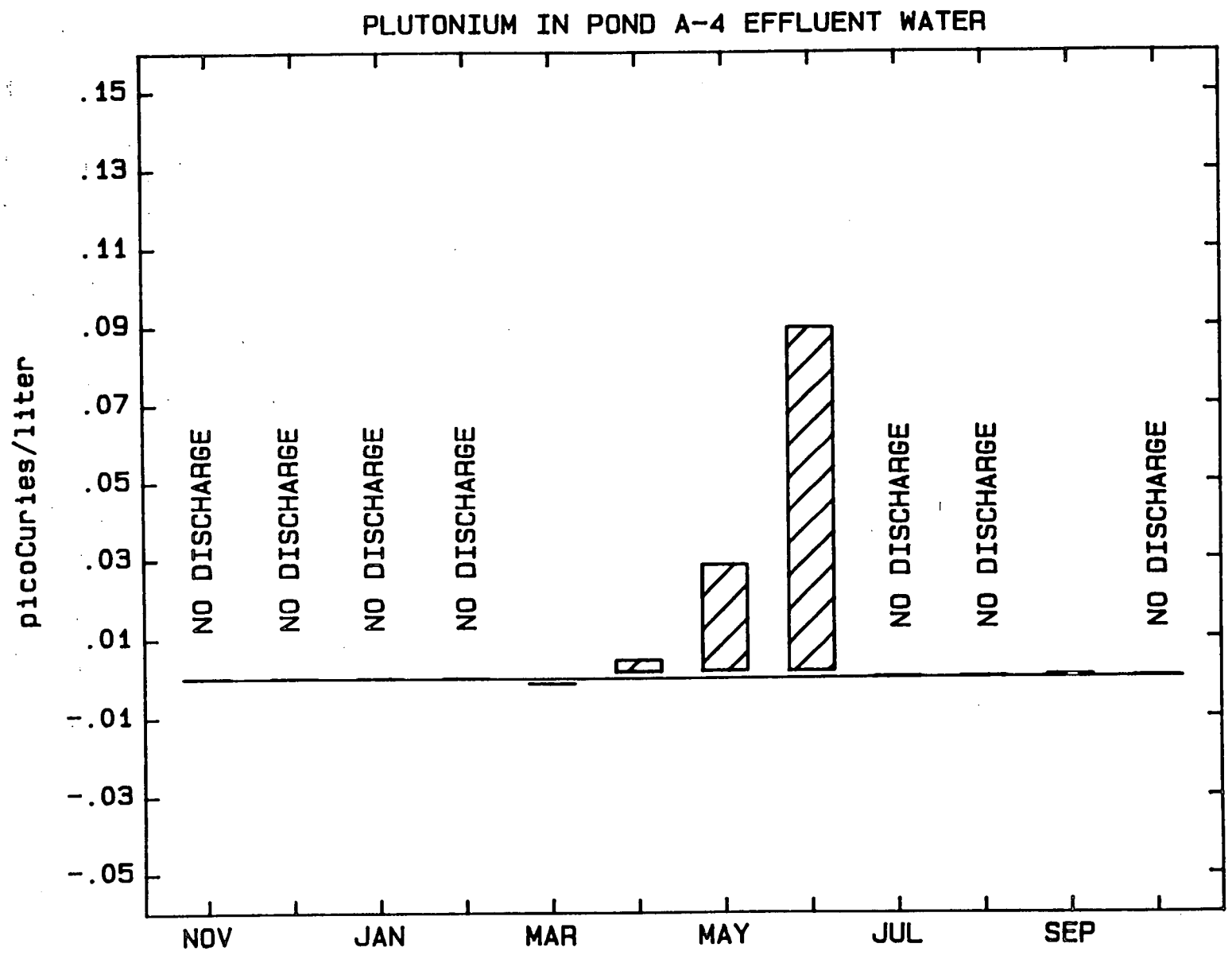
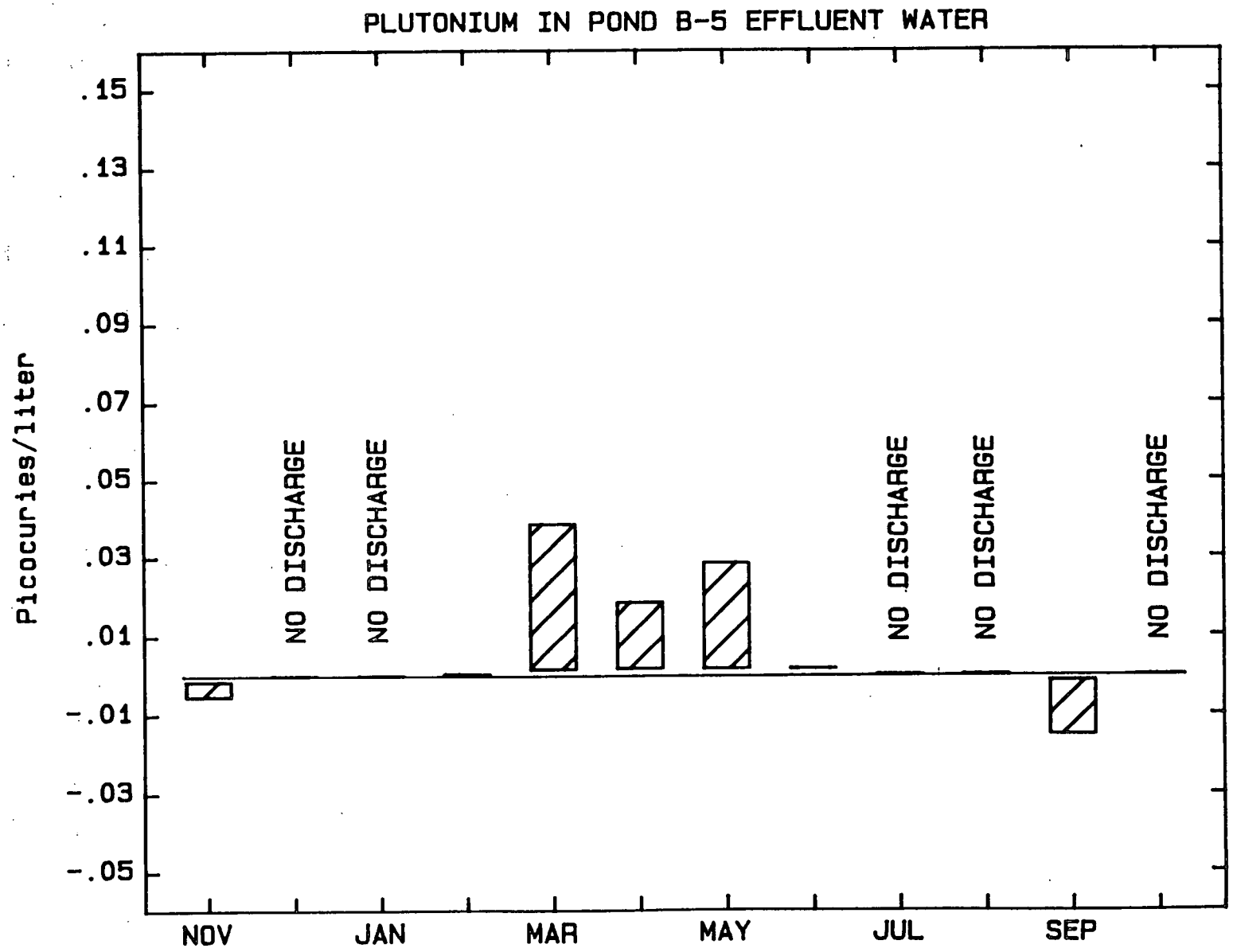
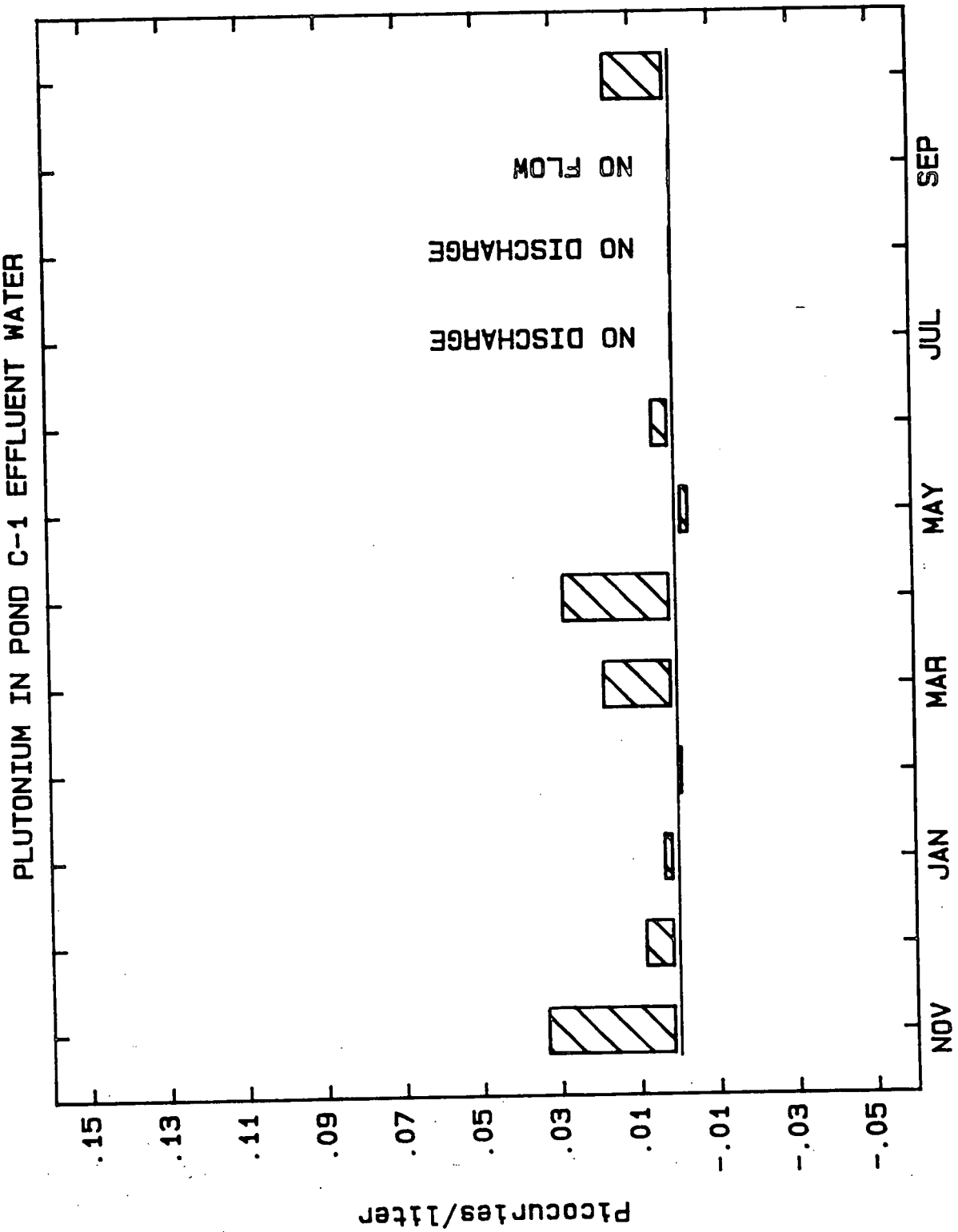

PLUTONIUM IN POND A-4 EFFLUENT WATER
picoCuries/liter
.15
.13
.11
.09
.07
.05
.03
.01
-.01
-.03
-.05
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NOV
JAN
MAR
MAY
JUL
SEP

24/97


PLUTONIUM IN POND B-5 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
NOV
JAN
MAR
MAY
JUL
SEP


PLUTONIUM IN POND C-1 EFFLUENT WATER
NO FLOW
NO DISCHARGE
NO DISCHARGE
.15
.13
.11
.09
.07
.05
.03
.01
-.01
-.03
-.05
picocuries/liter
NOV
JAN
MAR
MAY
JUL
SEP

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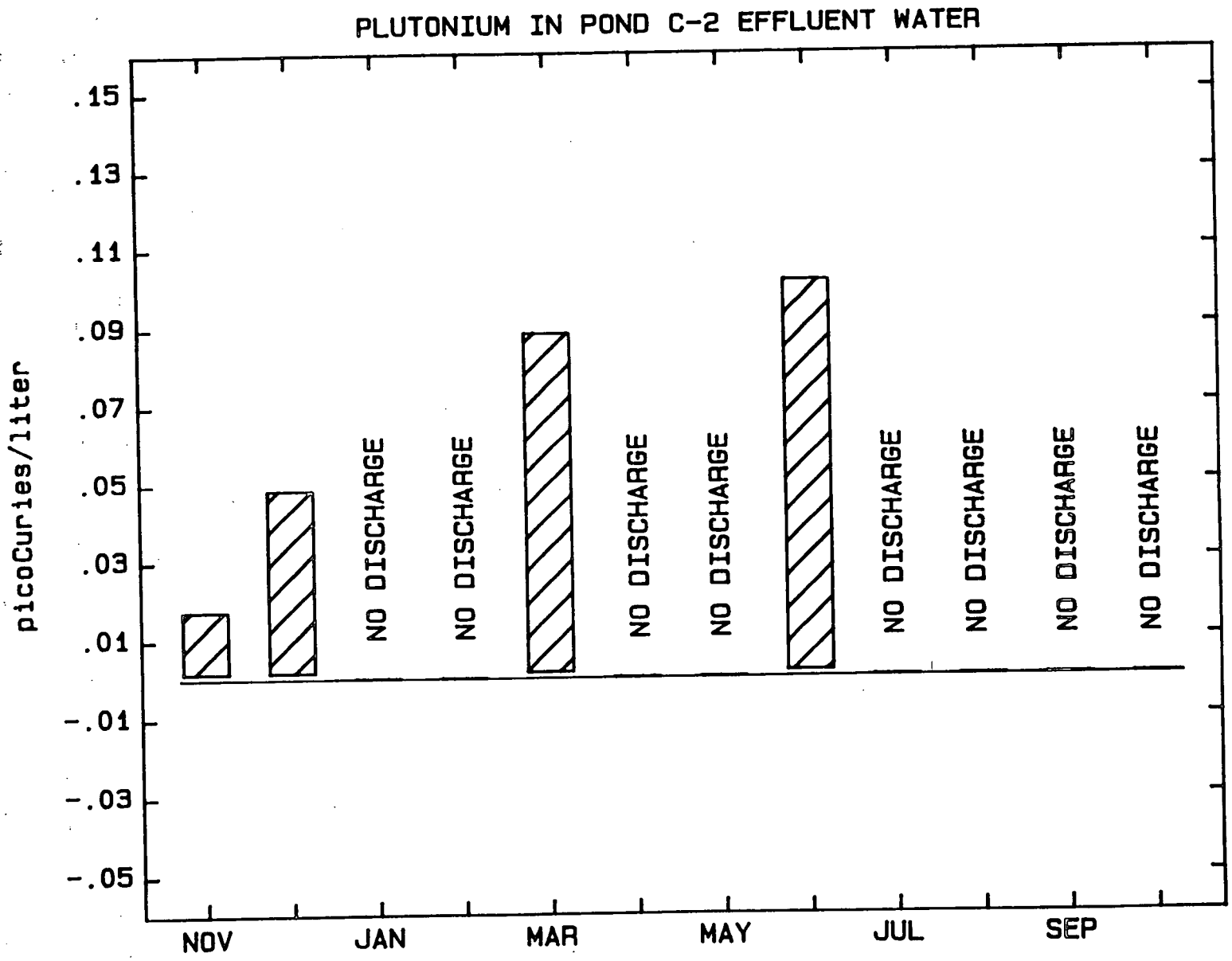
PLUTONIUM IN POND C-2 EFFLUENT WATER
picoCuries/liter
.15
.13
.11
.09
.07
.05
.03
.01
-.01
-.03
-.05
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
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JAN
MAR
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JUL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

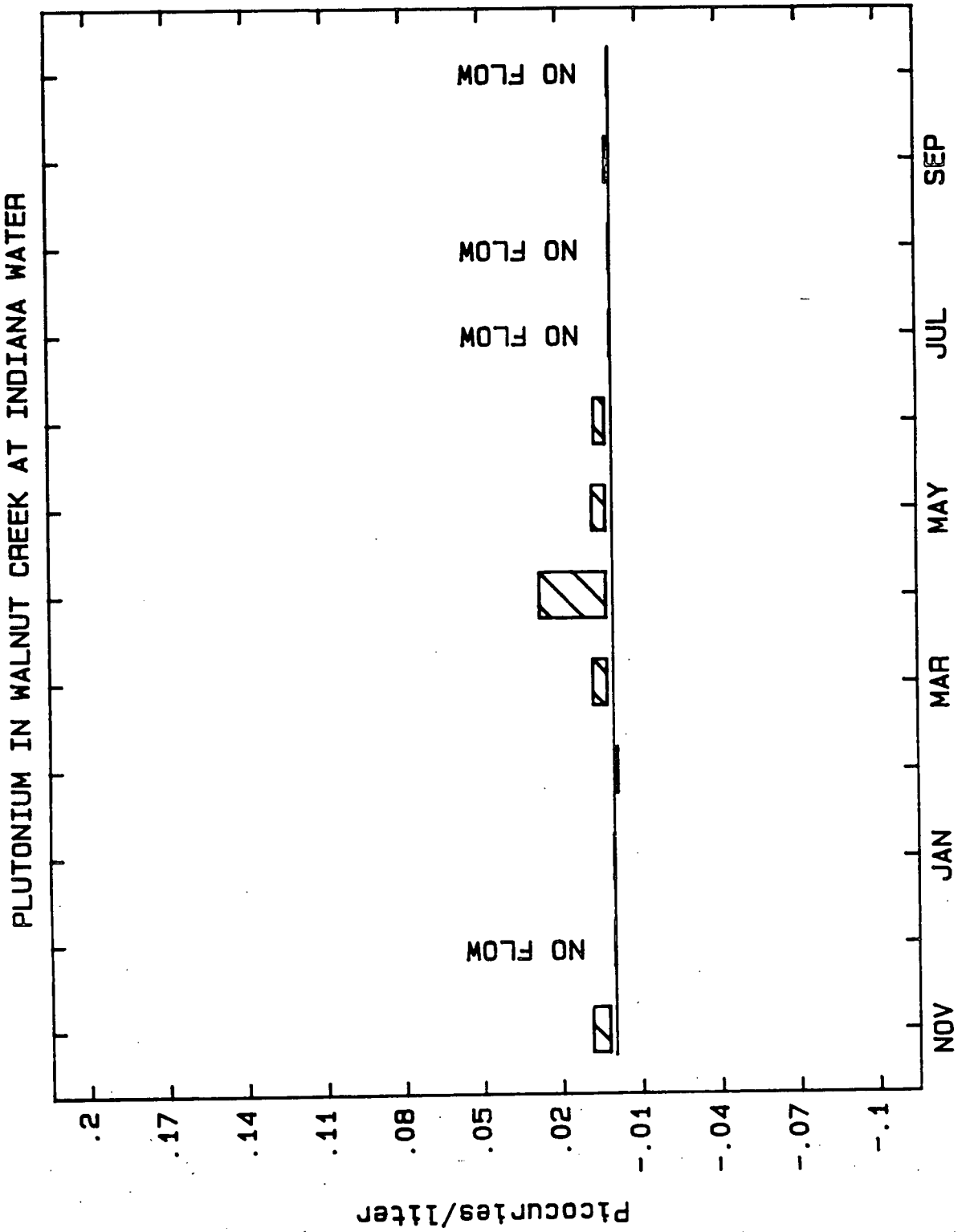
PLUTONIUM IN WALNUT CREEK AT INDIANA WATER
NO FLOW
NO FLOW
NO FLOW
NO FLOW
picocuries/liter
.2
.17
.14
.11
.08
.05
.02
-.01
-.04
-.07
-.1
NOV
JAN
MAR
MAY
JUL
SEP

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Table VII. Water Sample Results, Radioactive Parameters

Reservoirs (pCi/l)

Location	n	Plutonium	Uranium	Americium
Great Western	1*	0.000 ± 0.007	1.57 ± 0.15	0.011 ± 0.007
Standley Lake	1*	-0.004 ± 0.006	1.59 ± 0.18	0.014 ± 0.007

Community Tap Water (pCi/l)

Location	n	Plutonium	Uranium	Americium
Boulder	1*	0.004 ± 0.008	0.48 ± 0.11	0.004 ± 0.007
Broomfield	1*	0.001 ± 0.008	1.19 ± 0.15	0.003 ± 0.007
Westminster	1*	0.001 ± 0.007	0.68 ± 0.11	0.007 ± 0.008

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

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Table VII. Water Sample Results, Radioactive Parameters

Tritium (pCi/l)

Location	n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
Pond A-4		No Discharge		
Pond B-5		No Discharge		
Pond C-1	2	-50 ± 520	-8 ± 500	-30 ± 510
Pond C-2		No Discharge		
Walnut Creek at Indiana		No Flow		
Boulder	4	-350 ± 500	120 ± 510	-160 ± 510
Broomfield	4	-460 ± 500	58 ± 530	- 60 ± 510
Great Western	4	-180 ± 510	230 ± 520	14 ± 510
Standley	4	-440 ± 500	140 ± 520	210 ± 510
Westminster	4	-260 ± 510	570 ± 520	220 ± 510

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Table VII. Water Sample Results, Radioactive Parameters

Tritium (pCi/l)

Location	n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
Pond A-4		No Discharge		
Pond B-5	3*	-580 ± 540	-77 ± 520	-250 ± 530
Pond C-1		No Flow		
Pond C-2		No Discharge		
Walnut Creek at Indiana	6*	-110 ± 530	160 ± 530	- 70 ± 530
Boulder	4	-350 ± 500	120 ± 510	-160 ± 510
Broomfield	4	-460 ± 500	58 ± 530	- 60 ± 510
Great Western	4	-180 ± 510	230 ± 520	14 ± 510
Standley	4	-440 ± 500	140 ± 520	210 ± 510
Westminster	4	-260 ± 510	570 ± 520	220 ± 510

* Previously reported as incomplete analysis.

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Table VIII. Water Sample Results, Nonradioactive Parameters

Nitrate (as N) at Great Western Reservoir

Sample Date	Nitrate (as N) (mg/l)
10/06/88	<0.02
10/13/88	<0.02
10/20/88	<0.02
10/27/88	<0.02

Nitrate (as N) at Standley Lake

Sample Date	Nitrate (as N) (mg/l)
10/06/88	<0.02
10/13/88	<0.02
10/20/88	<0.02
10/27/88	<0.02

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 IX. NPDES Permit Water Sample Results

Discharge 001 (Pond B-3)
No Discharge

Parameters		Measured 30-Day Average	Limits 30-Day* Average	Measured Daily Maximum	Limits Daily Maximum
Biochem. Oxygen Demand, 5 Day	mg/l	No Discharge	10	No Discharge	25
Total Suspended Solids	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

Parameter		Measured Daily Minimum	Limits Daily Minimum	Measured Daily Maximum	Limits Daily Maximum
pH	S.U.	No Discharge	6.0	No Discharge	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	No Discharge	10	No Discharge	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

Parameter		Measured Daily Minimum	Limits Daily Minimum	Measured Daily Maximum	Limits Daily Maximum
pH	S.U	No Discharge	6.0	No Discharge	9.0

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

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Table IX. NPDES Permit Water Sample Results (Continued)

Discharge 004 (RO Plant)
No Discharge

Parameters		Measured 30-Day Average	Limits 30-Day* Average	Measured Daily Maximum	Limits Daily Maximum
Total Suspended Solids	mg/l	No Discharge	15	No Discharge	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	No Discharge	400	No Discharge	200

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

Discharge 005 (Pond A-4)
No Discharge

Parameters		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)
No Discharge

Parameters		n	C Minimum	C Maximum	C Average
pH	S.U.		No Discharge		
Nitrates as N	mg/l				
Nonvolatile Suspended Solids	mg/l				

Discharge 007 (Pond C-2)
No Discharge

Parameters		n	C Minimum	C Maximum	C Average
pH	S.U.		No Discharge		
Nitrates as N	mg/l				
Nonvolatile Suspended Solids	mg/l				

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Table XII. Water Sample Results, Nonradioactive Parameters

Walnut Creek at Indiana Street
No Flow

Parameters		n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
pH	S.U.		No Flow		
Nitrates as N	mg/l				

Total Volume (gallons) =

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Table XIII.
Daily Flow Data Recorded at the
Walnut Creek at Indiana Gaging Station
Ponds A-4 and B-5,
October, 1988

DATE	WALNUT CREEK AT INDIANA (gallons)*	POND A-4 (gallons)	POND B-5 (gallons)
10/03/88	No Flow	No Discharge	No Discharge
10/04/88	" "	" "	" "
10/05/88	" "	" "	" "
10/06/88	" "	" "	" "
10/07/88	" "	" "	" "
10/10/88	" "	" "	" "
10/11/88	" "	" "	" "
10/12/88	" "	" "	" "
10/13/88	" "	" "	" "
10/14/88	" "	" "	" "
10/17/88	" "	" "	" "
10/18/88	" "	" "	" "
10/19/88	" "	" "	" "
10/20/88	" "	" "	" "
10/21/88	" "	" "	" "
10/24/88	" "	" "	" "
10/25/88	" "	" "	" "
10/26/88	" "	" "	" "
10/27/88	" "	" "	" "
10/28/88	" "	" "	" "
10/31/88	" "	" "	" "
TOTAL VOLUME	No Flow	No Discharge	No Discharge

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Table XIV.
Daily Flow Data Recorded at
Ponds C-1 and C-2 During
October, 1988

(Woman Creek)

DATE	POND C-1 (gallons)	POND C-2 (gallons)
10/03/88	No Flow	No Discharge
10/04/88	" "	" "
10/05/88	" "	" "
10/06/88	" "	" "
10/07/88	" "	" "
10/10/88	" "	" "
10/11/88	" "	" "
10/12/88	" "	" "
10/13/88	" "	" "
10/14/88	" "	" "
10/17/88	" "	" "
10/18/88	8,000	" "
10/19/88	24,000	" "
10/20/88	50,000	" "
10/21/88	No Flow	" "
10/24/88	" "	" "
10/25/88	144,000	" "
10/26/88	156,000	" "
10/27/88	160,000	" "
10/28/88	198,000	" "
10/31/88	660,000	" "
TOTAL VOLUME	1,400,000	No Discharge

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