00004615

000024311

Dec - 1988 EAC-420110-172

Rocky Flats Plant

Monthly Environmental Monitoring Report

Environmental Management
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RR-RP-00253

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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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Date: 11/17/08 KG
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DECEMBER 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 December 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 V 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 VI through VIII. 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 IX.

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 X. Analytical results for nonradioactive parameters in water at the Walnut Creek at Indiana Street location are summarized in Table XI Daily flow data for surface water from the two Plant drainage systems are given in Tables XI, 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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Table I 1988 Plutonium and Uranium Airborne Effluent Data

Month	Plutonium (11/17/88 - 12/22/88 - Dec.) Release (uCi)	Plutonium CMax (pCi/m3)	Uranium (11/18/88 - 12/20/88 - Dec) 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	1.18	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	0 25	0 003 ± 0 0003	0 39	0 001 ± 0 0001
December	0.30	0 001 ± 0.0001	0.65	0.001 ± 0.0002
Year to Date	15 33	0 023 ± 0 0052	11 93	0 009 ± 0.0009

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 (11/18/88 - 12/21/88 - Dec) Release (Ci)	Tritium CMax (pCi/m3)	Beryllium (11/18/88 - 12/22/88 - Dec) 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	0 001	83 ± 165	0 0102	0.00010
December	0 001	104 ± 120	0 0061	0 00007
Year to Date	0 015	417 ± 250	0 1383	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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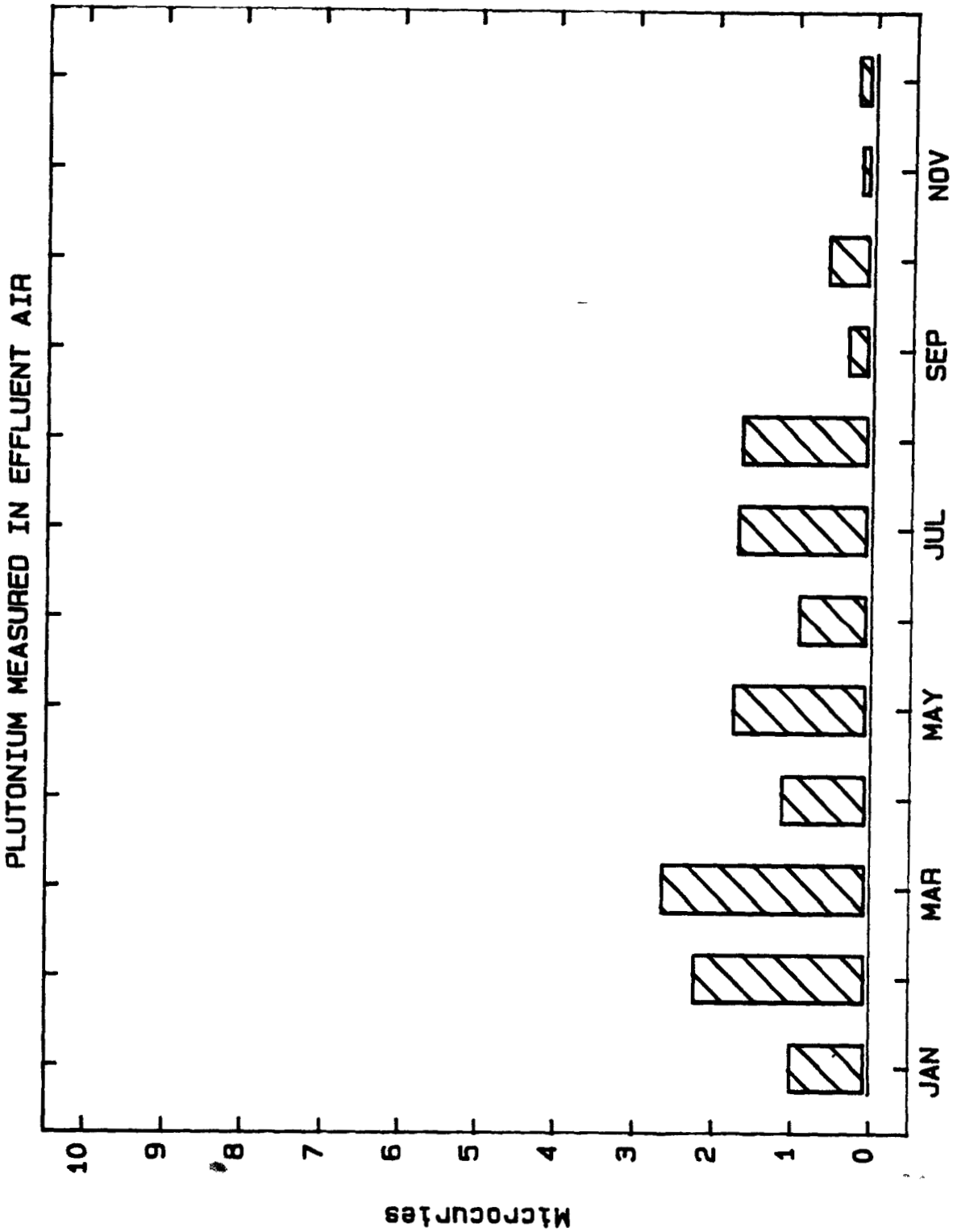
PLUTONIUM MEASURED IN EFFLUENT AIR
Microcuries
0
1
2
3
4
5
6
7
8
9
10
JAN
MAR
MAY
JUL
SEP
NOV

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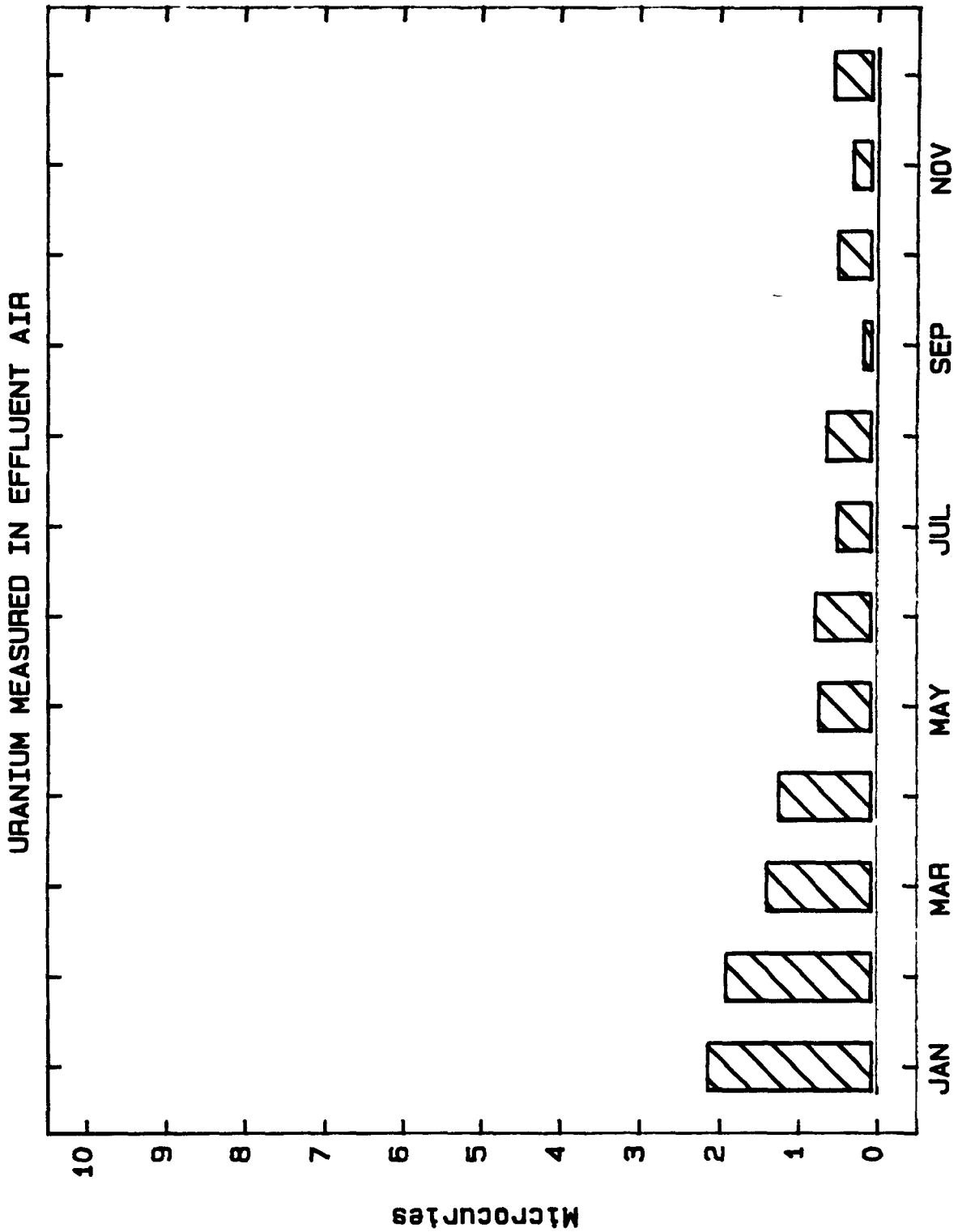
URANIUM MEASURED IN EFFLUENT AIR
Microcuries
10
9
8
7
6
5
4
3
2
1
0
JAN
MAR
MAY
JUL
SEP
NOV

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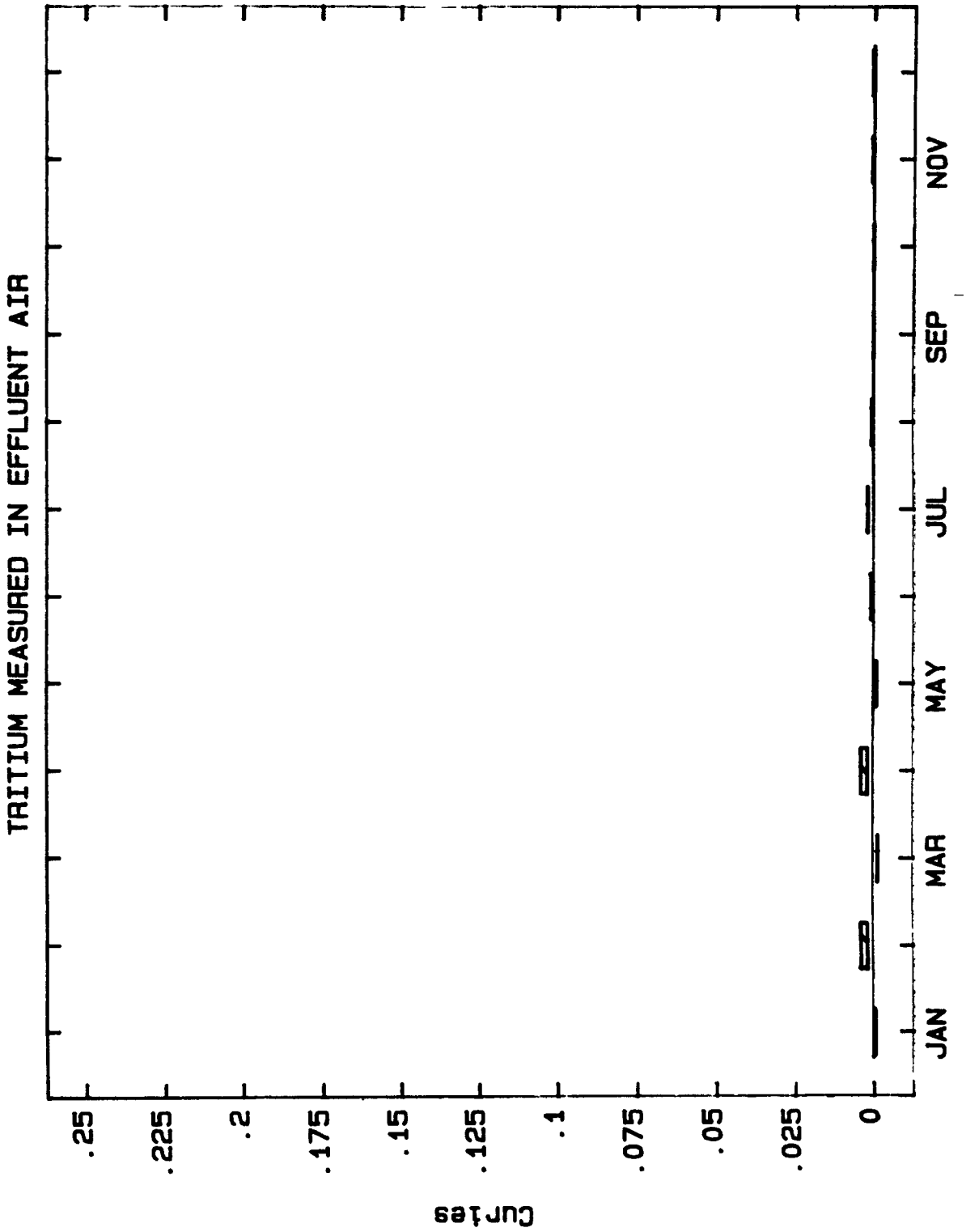
TRITIUM MEASURED IN EFFLUENT AIR
Curies
.25
.225
.2
.175
.15
.125
.1
.075
.05
.025
0
JAN
MAR
MAY
JUL
SEP
NOV

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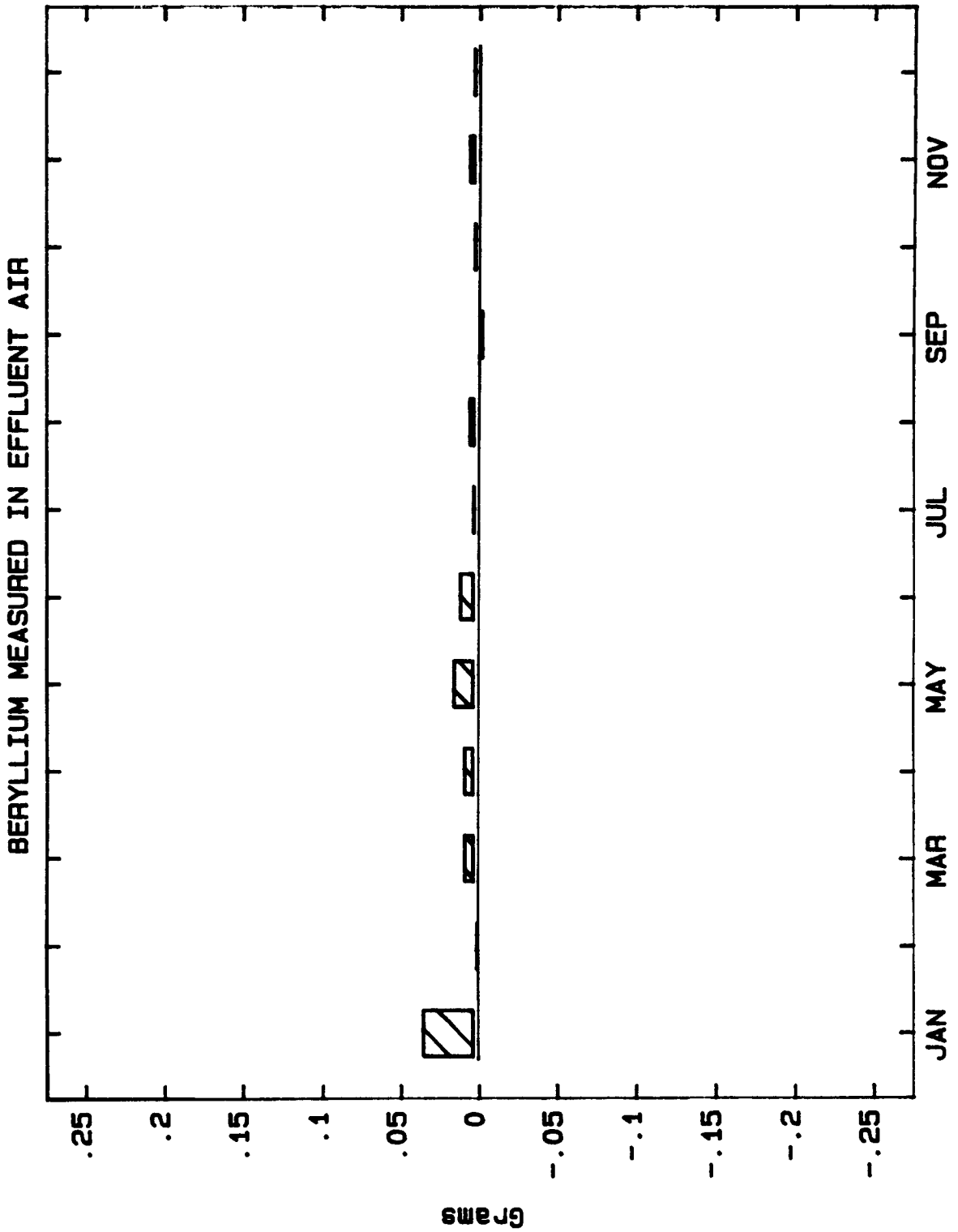
BERYLLIUM MEASURED IN EFFLUENT AIR
Grams
.25
.2
.15
.1
.05
0
-.05
-.1
-.15
-.2
-.25
JAN
MAR
MAY
JUL
SEP
NOV

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Table III. Plutonium at Selected Onsite Ambient Air Locations
(11/29/88 - 12/27/88)

Location	n	Volume (m3)	Concentration (pCi/m3) Point Estimate	± Error
S-05	3	29000	0.000447	0.000046
S-06	3	27000	0.000215	0 000026
S-07	3	24000	0.000240	0 000029
S-08	3	34000	0.001122	0.000184
S-09	3	32000	0.000372	0.000046

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

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Table IV Plutonium in Perimeter Ambient Air
(11/22/88 - 12/20/88)

Location	n	Volume (m3)	Concentration (pCi/m3) Point Estimate	± Error
S-31	1	16000	0.000004	0 000002
S-32	1	17000	0.000001	0.000001
S-33	1	29000	0 000002	0.000001
S-34	1	30000	0 000008	0.000002
S-35	1	30000	0 000001	0.000001
S-36	1	29000	0 000002	0.000001
S-37	1	32000	0 000013	0.000002
S-38	1	28000	0.000003	0.000001
S-39	1	30000	0.000002	0.000001
S-40	1	29000	0 000000	0.000001
S-41	1	24000	0 000001	0.000001
S-42	1	25000	0.000003	0.000001
S-43	1	30000	0 000001	0.000001
S-44	1	29000	0.000000	0.000001

Mean Point Estimate = 0 000003 pCi/m^3

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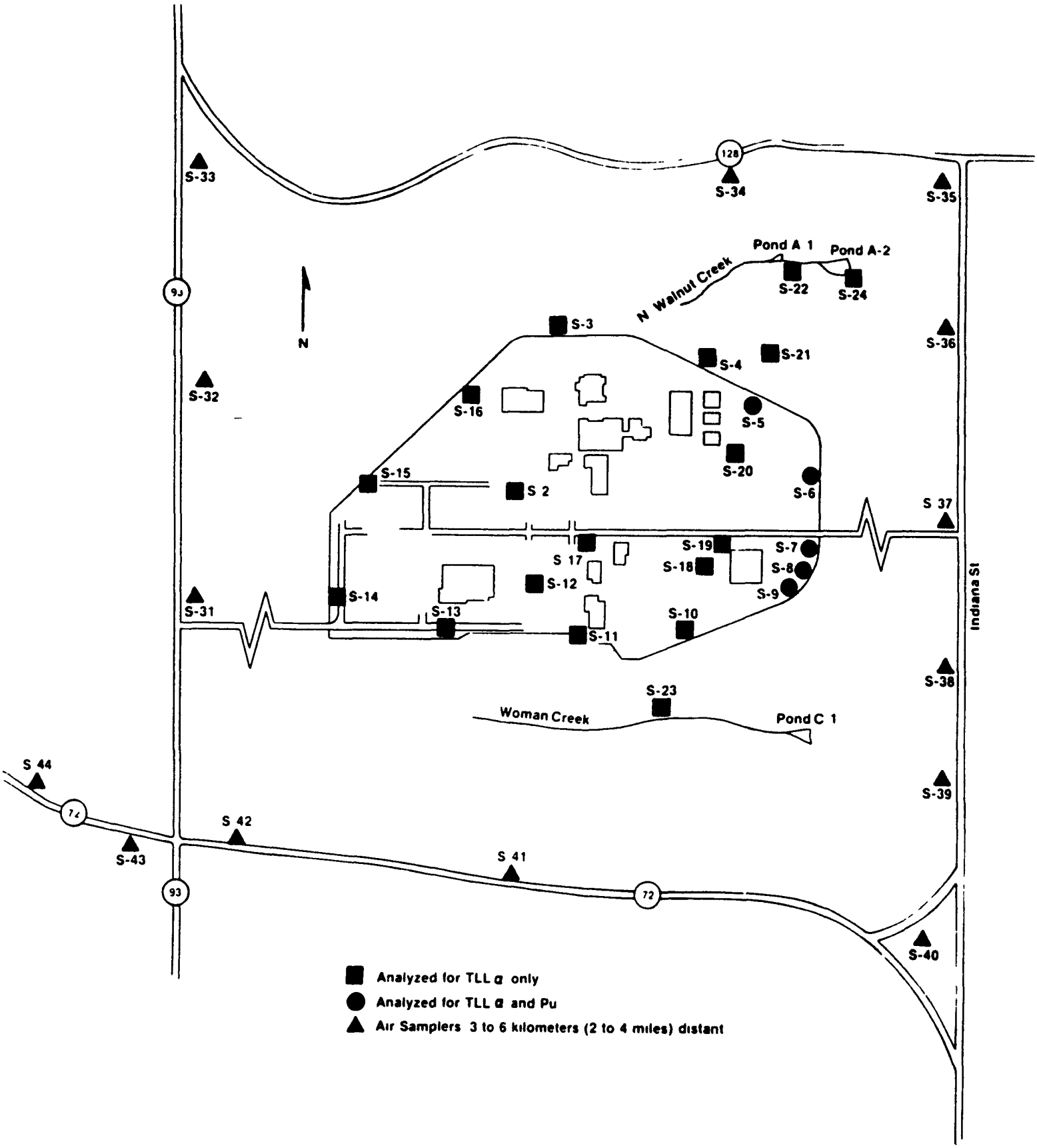

Location of Onsite and Plant Perimeter Ambient Air Samplers
(Portions of figure are not to scale)

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Table V. Plutonium in Community Ambient Air
(11/23/88 - 12/21/88)

			Concentration (pCi/m3)		
Location	Community Name	n	Volume (m3)	Point Estimate	± Error
S-51	Marshall	1	25000	0.000001	0 000001
S-52	Jeffco Airport	1	34000	0.000002	0.000001
S-53	Superior	1	26000	0.000050	0.000006
S-54	Boulder	1	29000	0 000002	0 000001
S-55	Lafayette	1	28000	0.000000	0.000001
S-56	Broomfield	1	25000	0.000001	0.000001
S-57	Walnut Creek	1	31000	0.000000	0.000001
S-58	Wagner	1	29000	0.000004	0 000001
S-59	Leyden	1	32000	0.000005	0.000001
S-60	Westminster	1	19000	0 000002	0.000001
S-61	Denver	1	7000	-0 000001	0.000003
S-62	Golden	1	25000	0.000004	0 000001
S-68	Lakeview Pointe	1	37000	0.000000	0 000001
S-73	Cotton Creek	1	26000	0 000004	0.000001

Mean Point Estimate = 0.000005 pCi/m^3

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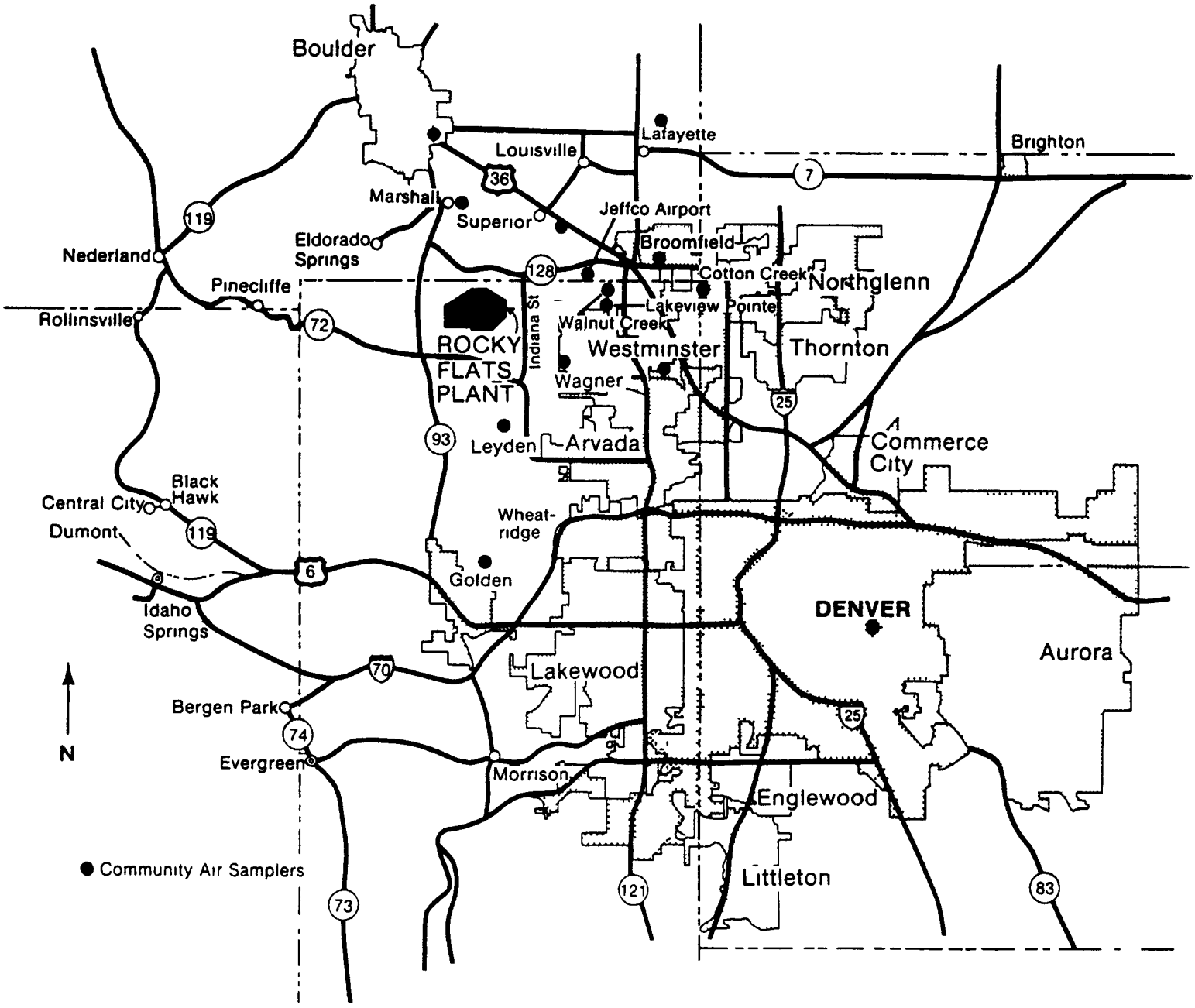
Location of Community Ambient Air Samplers



18
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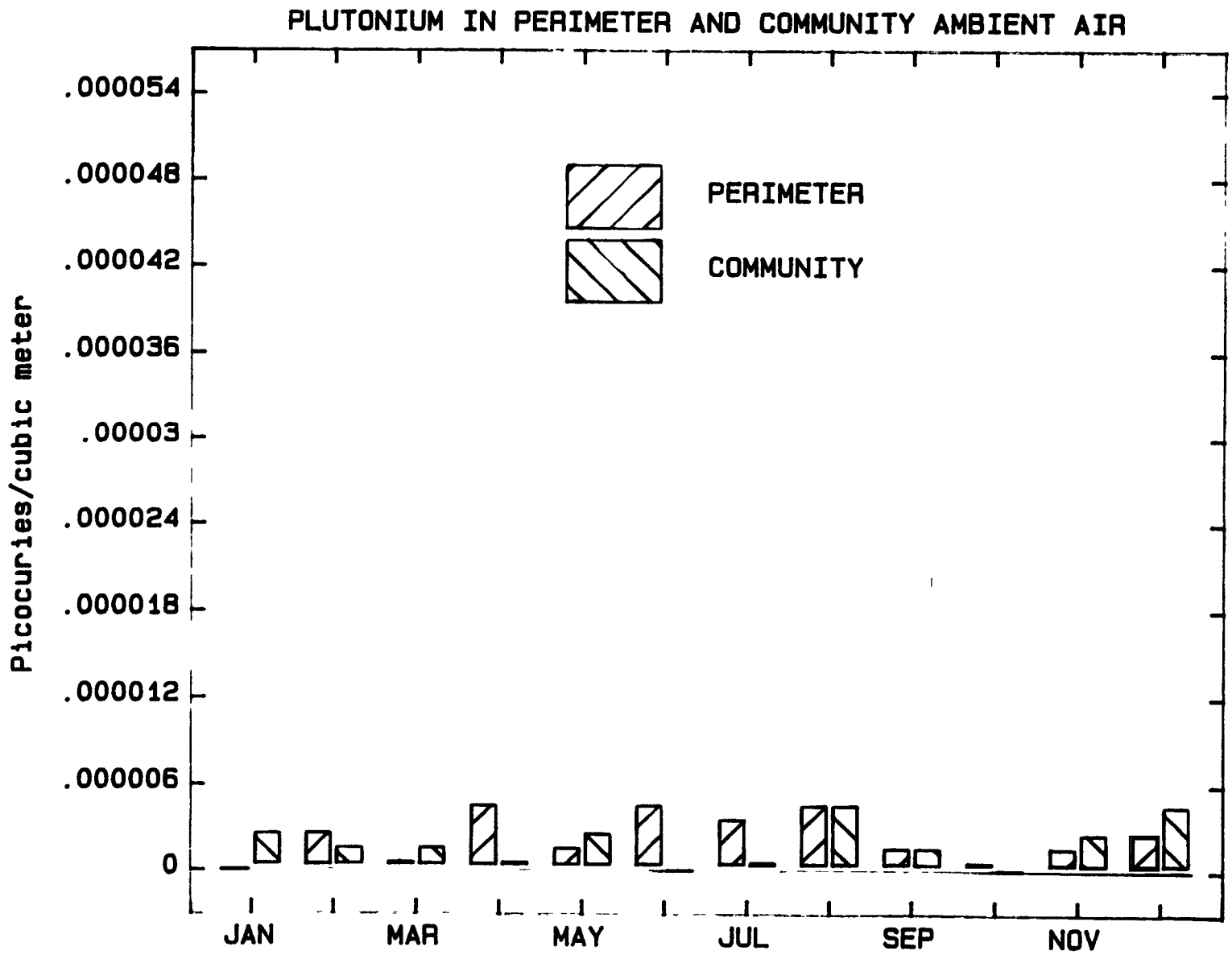
PLUTONIUM IN PERIMETER AND COMMUNITY AMBIENT AIR
Picocuries/cubic meter
.000054
.000048
.000042
.000036
.00003
.000024
.000018
.000012
.000006
0
PERIMETER
COMMUNITY
JAN
MAR
MAY
JUL
SEP
NOV

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Table VI. Onsite Water Sample Results - Plutonium, Uranium, and Americium

Holding Pond Outfall (pCi/l)

Location	Plutonium	Uranium	Americium
Pond A-4			
No Discharge			
Average Concentration			
Pond B-5			
12/20/88 - 12/21/88	0.021 ± 0.031	5.25 ± 0 33	0.015 ± 0 027
Average Concentration	0.021 ± 0.031	5.25 ± 0 33	0.015 ± 0 027
Pond C-1			
11/28/88 - 12/02/88	*	0 64 ± 0 13	0 004 ± 0 005
12/05/88 - 12/09/88	0.003 ± 0.006	1.61 ± 0 31	0 060 ± 0.013
12/12/88 - 12/16/88	-0.012 ± 0 025	1.52 ± 0.24	*
12/19/88 - 12/23/88	0.004 ± 0.007	0 88 ± 0 13	*
Average Concentration	*	1 16 ± 0.22	*
Pond C-2			
No Discharge			
Average Concentration			
Walnut Creek at Indiana			
12/20/88 - 12/23/88	0 004 ± 0 009	5.98 ± 0 34	*
Average Concentration	0 004 ± 0 009	5.98 ± 0.34	*

* Incomplete Analysis

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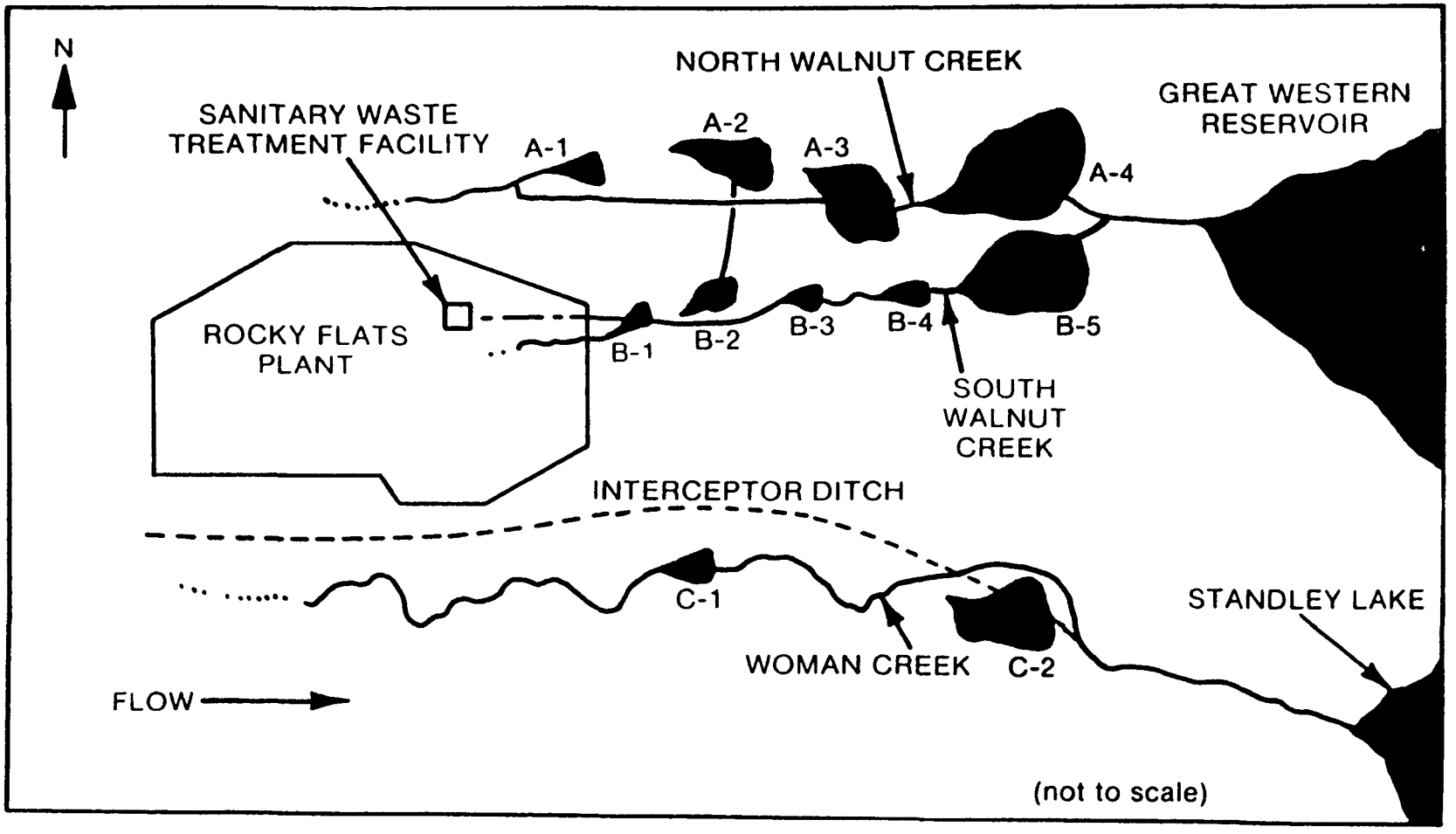
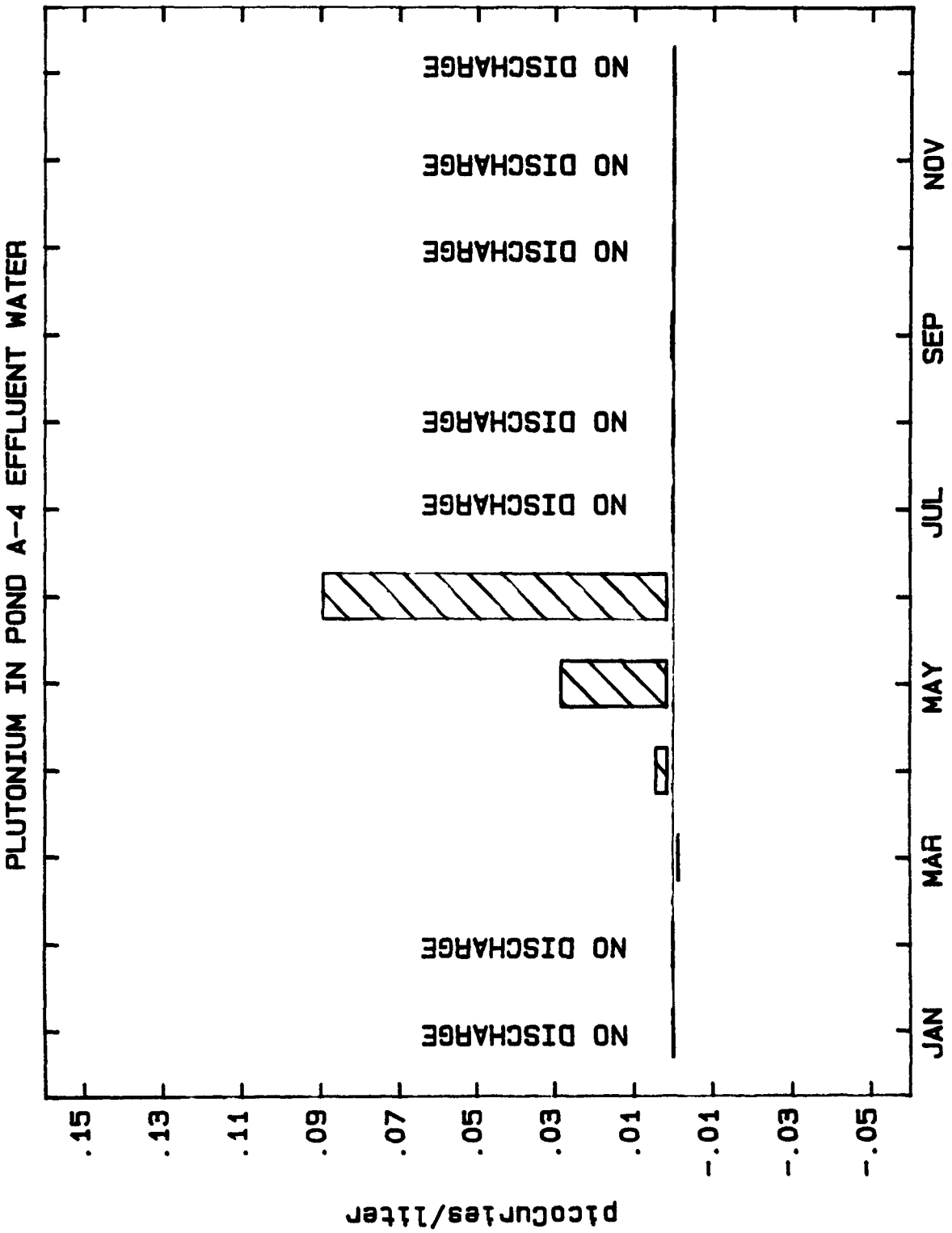


Holding Ponds and Liquid Effluent Watercourses


PLUTONIUM IN POND A-4 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

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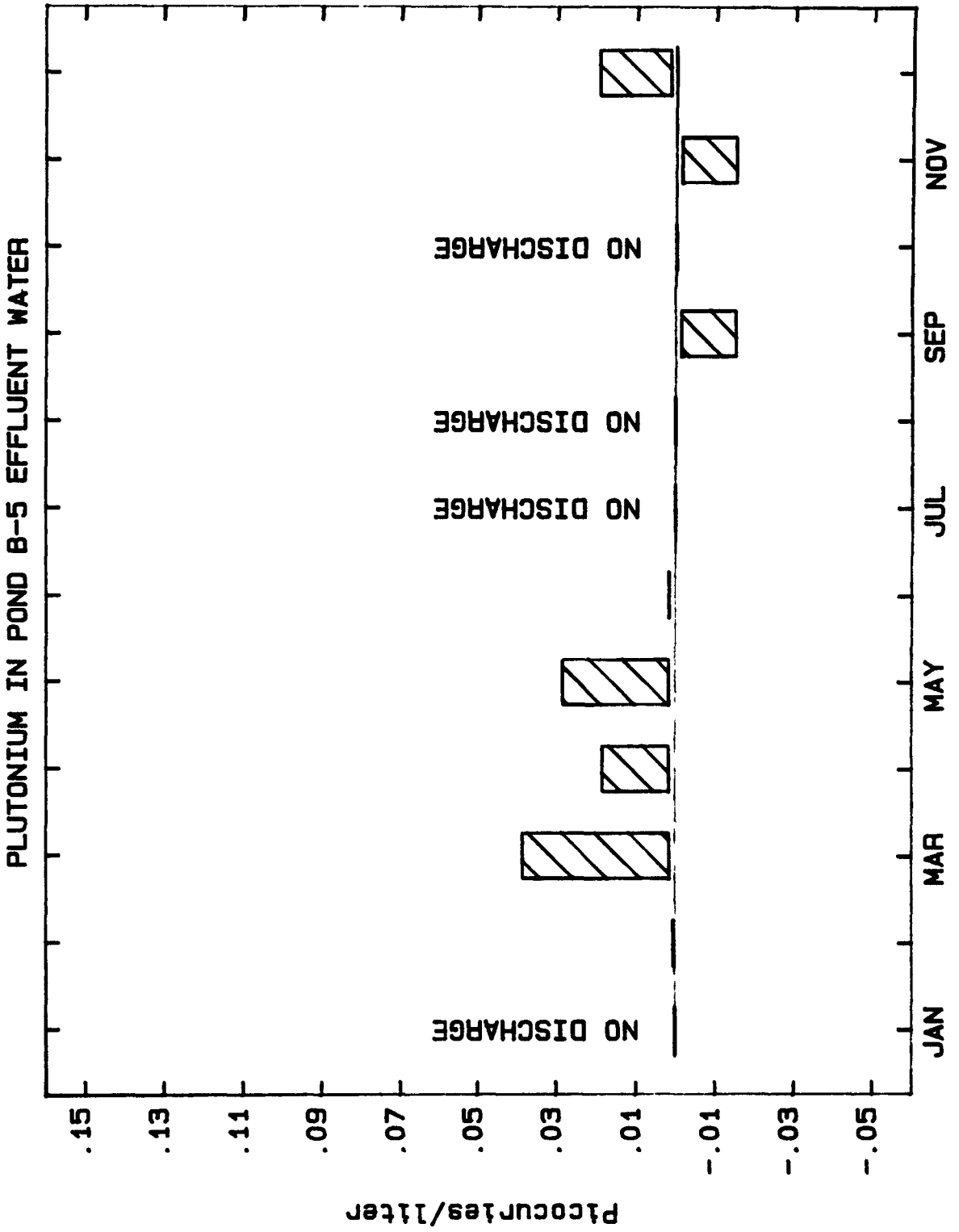
PLUTONIUM IN POND B-5 EFFLUENT WATER
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
JAN
MAR
MAY
JUL
SEP
NOV
.15
.13
.11
.09
.07
.05
.03
.01
-.01
-.03
-.05
picocuries/liter

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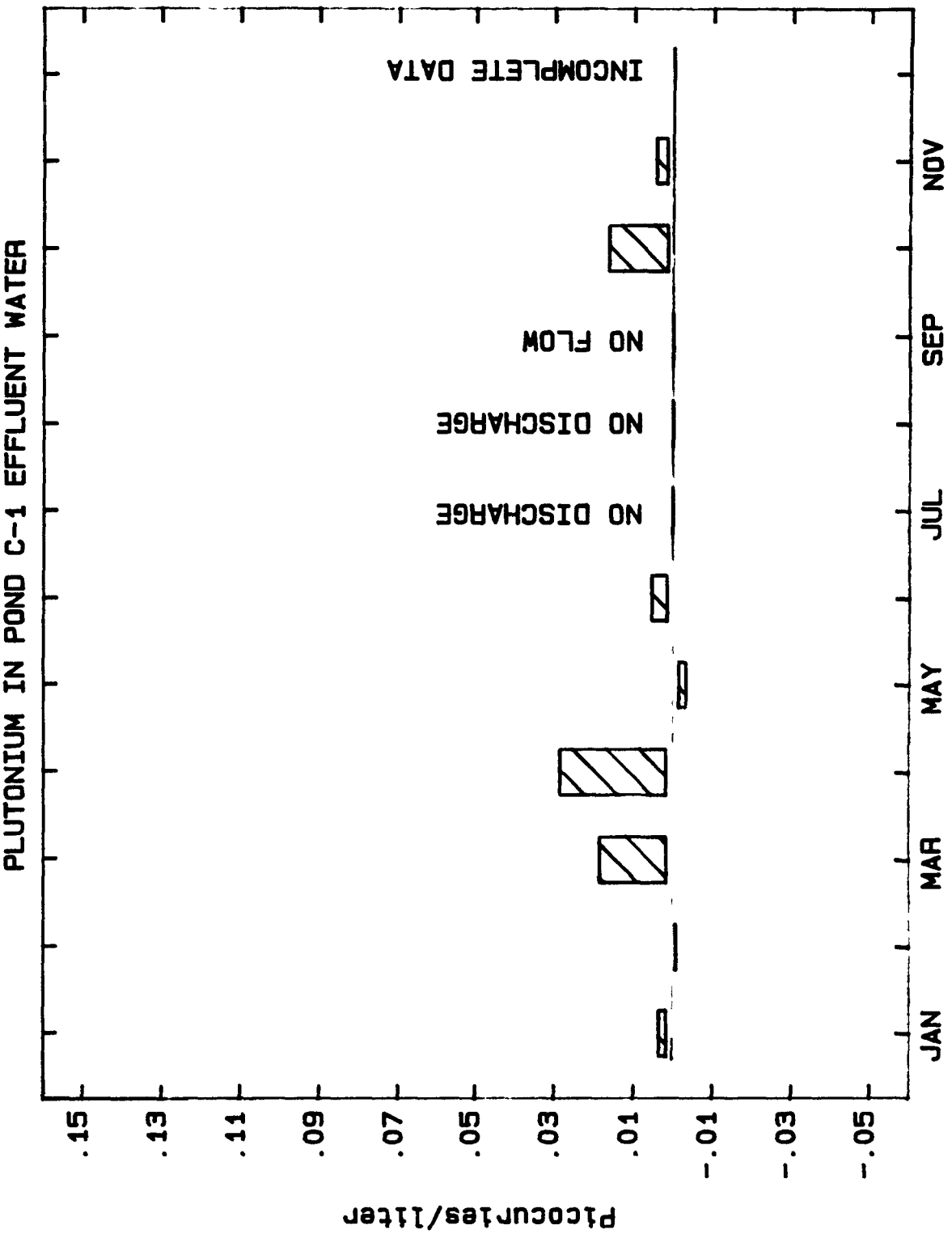
PLUTONIUM IN POND C-1 EFFLUENT WATER
INCOMPLETE DATA
NO FLOW
NO DISCHARGE
NO DISCHARGE
.15
.13
.11
.09
.07
.05
.03
.01
-.01
-.03
-.05
Picocuries/liter
JAN
MAR
MAY
JUL
SEP
NOV

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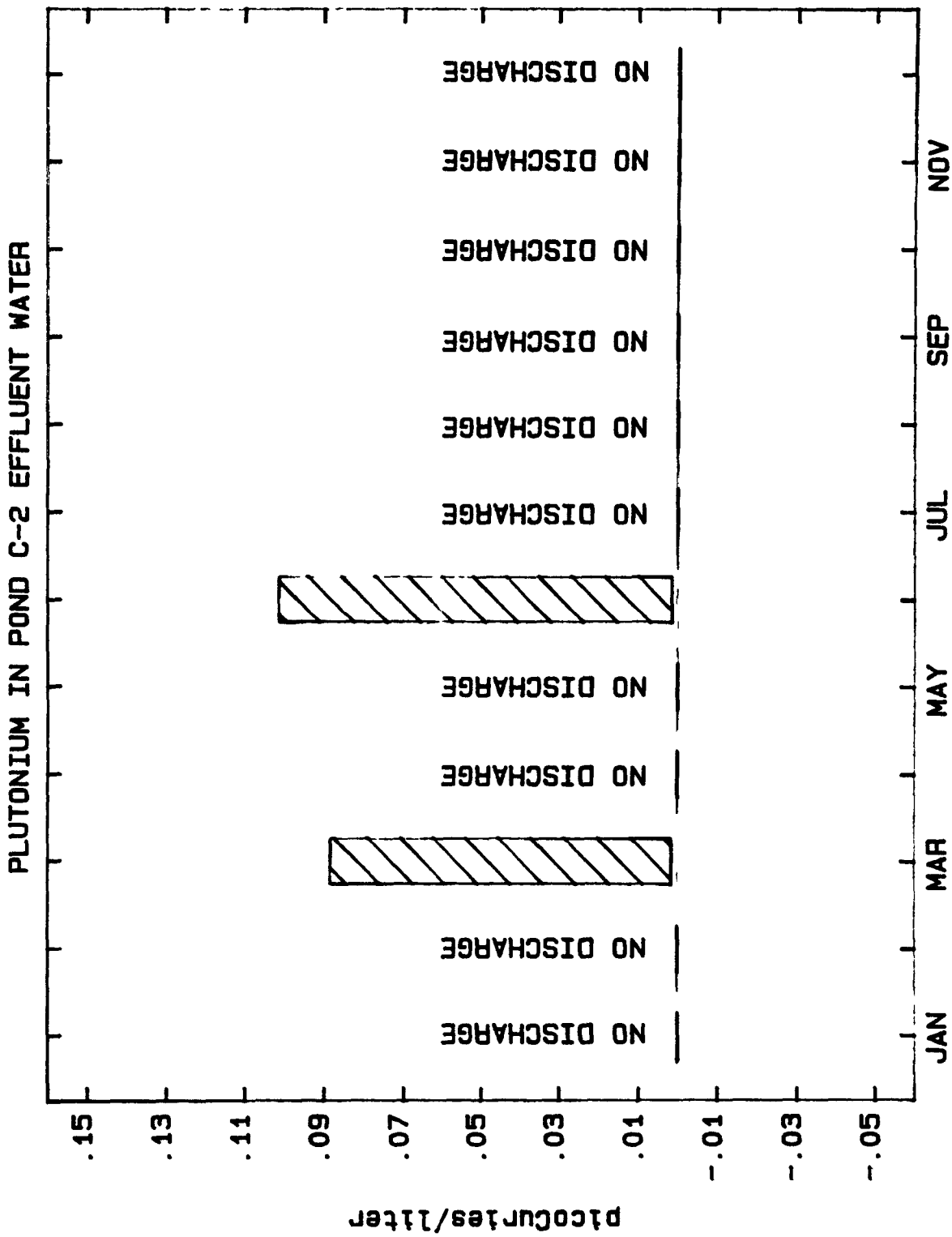
PLUTONIUM IN POND C-2 EFFLUENT WATER
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
NO DISCHARGE
JAN
MAR
MAY
JUL
SEP
NOV
.15
.13
.11
.09
.07
.05
.03
.01
-.01
-.03
-.05
picoCuries/liter

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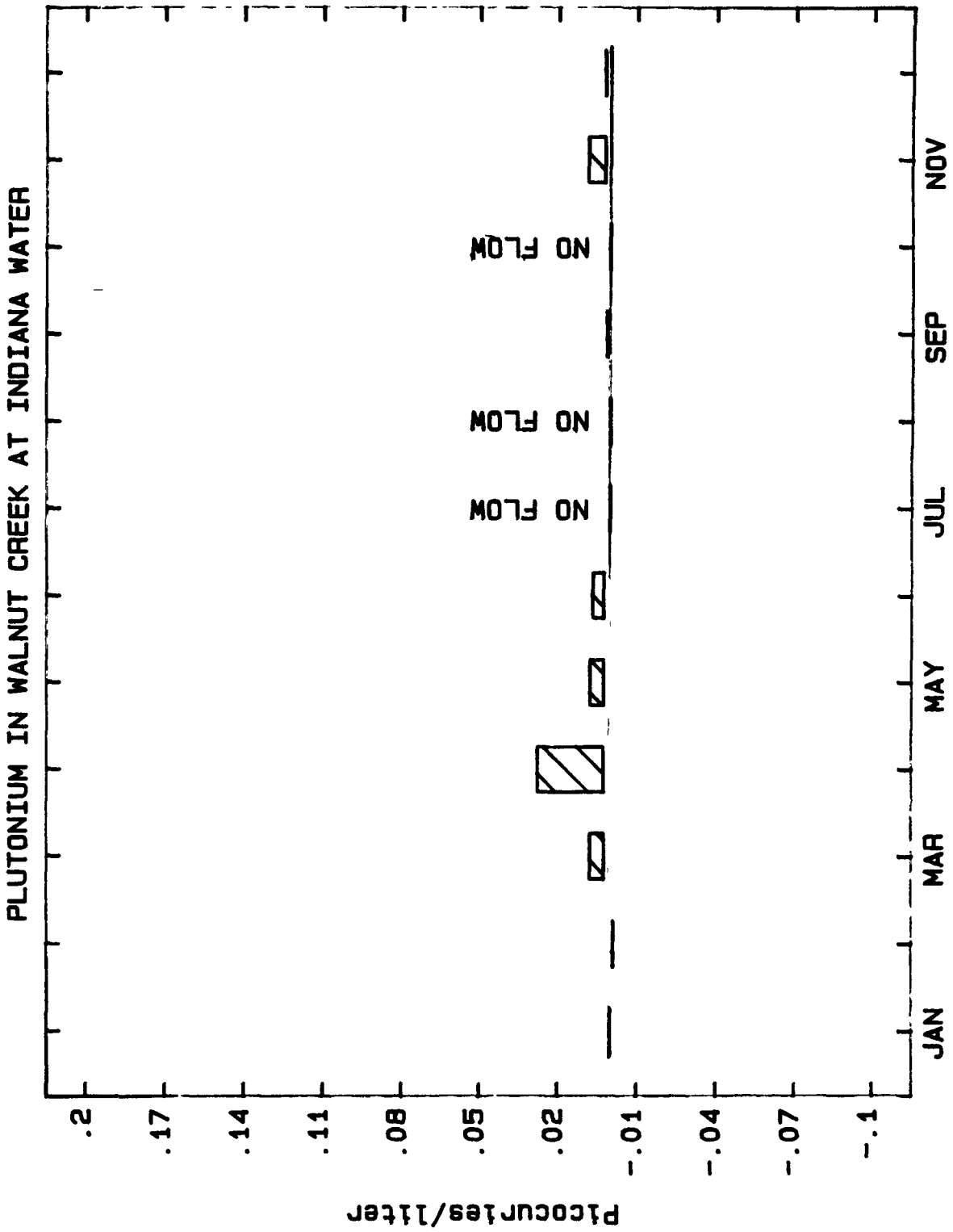
PLUTONIUM IN WALNUT CREEK AT INDIANA WATER
NO FLOW
NO FLOW
NO FLOW
JAN
MAR
MAY
JUL
SEP
NOV
.2
.17
.14
.11
.08
.05
.02
-.01
-.04
-.07
-.1
picocuries/liter

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Table VII. Offsite Water Sample Results - Plutonium, Uranium, and Americium

Reservoirs (pCi/l)

Location	n	Plutonium	Uranium	Americium
Great Western	1*	**	1.79 ± 0.17	0 000 ± 0 001
Standley Lake	1*	0.003 ± 0 007	**	0.000 ± 0 001

Community Tap Water (pCi/l)

Location	n	Plutonium	Uranium	Americium
Arvada	1	0 010 ± 0.029	0.57 ± 0 12	0.018 ± 0.030
Boulder	1*	0.003 ± 0 006	0.24 ± 0.10	0.001 ± 0.001
Broomfield	1*	0 003 ± 0.007	1.49 ± 0.15	0.000 ± 0.001
Denver	1	-0.007 ± 0 026	1 23 ± 0.15	0.001 ± 0.024
Golden	1	-0.005 ± 0.027	1.00 ± 0.13	-0.007 ± 0.024
Lafayette	1	-0.012 ± 0.026	0.24 ± 0.11	0.021 ± 0.025
Louisville	1	0.008 ± 0 029	0.28 ± 0.09	-0.004 ± 0 024
Thornton	1	0 002 ± 0 027	1.42 ± 0 15	0.027 ± 0 028
Westminster	1*	0.007 ± 0 008	0.72 ± 0.12	0.000 ± 0.000

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

** Incomplete Analysis

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Table VIII. Onsite and Offsite Water Sample Results - Tritium

Tritium (pCi/l)

Location	n	[C]Minimum	[C]Maximum	[C]Average
Pond A-4		No Discharge		
Pond B-5	2	-120 ± 520	320 ± 520	100 ± 520
Pond C-1	4	-580 ± 500	150 ± 520	-210 ± 510
Pond C-2		No Discharge		
Walnut Creek at Indiana	2	-180 ± 510	210 ± 520	15 ± 520
Arvada	1	-170 ± 510	-170 ± 510	-170 ± 510
Boulder	4	40 ± 510	150 ± 520	90 ± 520
Broomfield	4	-270 ± 520	150 ± 520	- 70 ± 510
Denver	1	-410 ± 520	-410 ± 520	-410 ± 520
Golden	1	130 ± 520	130 ± 520	130 ± 520
Great Western	4	-400 ± 510	350 ± 530	-100 ± 520
Lafayette	1	- 40 ± 520	- 40 ± 520	- 40 ± 520
Louisville	1	90 ± 520	90 ± 520	90 ± 520
Standley	4	- 30 ± 520	370 ± 520	170 ± 520
Thornton	1	150 ± 530	150 ± 530	150 ± 530
Westminster	4	-140 ± 520	140 ± 520	- 3 ± 520

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Table IX. Offsite Water Sample Results - Nitrate as Nitrogen

Nitrate (as N) at Great Western Reservoir

Sample Date	Nitrate (as N) (mg/l)
12/01/88	0.02
12/08/88	0.02
12/15/88	0.03
12/22/88	<0.02

Nitrate (as N) at Standley Lake

Sample Date	Nitrate (as N) (mg/l)
12/01/88	<0 02
12/08/88	<0 02
12/15/88	0 03
12/22/88	<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 X. 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	No Discharge	6.0	No Discharge	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 X. 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)
Discharged two days

Parameters		n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
pH	S U	2	7.4	7 4	NA
Nitrates as N	mg/l	2	2.46	2.67	2.57
Nonvolatile Suspended Solids	mg/l	2	2	3	2.5

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 XI Water Sample Results, Nonradioactive Parameters

Walnut Creek at Indiana Street

Parameters		n	$C_{Minimum}$	$C_{Maximum}$	$C_{Average}$
pH	S.U.	2	7.6	7.7	NA
Nitrates as N	mg/l	3	1.96	2.75	2.25

Total Volume (gallons) = 3,375,00

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

(Walnut Creek Drainage)

DATE	WALNUT CREEK AT INDIANA (gallons)	POND A-4 (gallons)	POND B-5 (gallons)
12/01/88	No Flow	No Discharge	No Discharge
12/02/88	" "	" "	" "
12/05/88	" "	" "	" "
12/06/88	" "	" "	" "
12/07/88	" "	" "	" "
12/08/88	" "	" "	" "
12/09/88	" "	" "	" "
12/12/88	" "	" "	" "
12/13/88	" "	" "	" "
12/14/88	" "	" "	" "
12/15/88	" "	" "	" "
12/16/88	" "	" "	" "
12/19/88	" "	" "	" "
12/20/88	" "	" "	" "
12/21/88	1,938,000	" "	2,114,000
12/22/88	1,437,000	" "	1,514,000
12/23/88	" "	" "	" "
TOTAL VOLUME	3,375,000	No Discharge	3,628,000

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

(Woman Creek Drainage)

DATE	POND C-1 (gallons)	POND C-2 (gallons)
12/01/88	632,000	No Discharge
12/02/88	754,000	" "
12/05/88	2,164,000	" "
12/06/88	600,000	" "
12/07/88	632,000	" "
12/08/88	562,800	" "
12/09/88	790,000	" "
12/12/88	2,120,000	" "
12/13/88	684,000	" "
12/14/88	686,000	" "
12/15/88	548,000	" "
12/16/88	634,000	" "
12/19/88	1,962,000	" "
12/20/88	722,000	" "
12/21/88	648,000	" "
12/22/88	520,000	" "
12/23/88	600,000	" "
TOTAL VOLUME	13,340,000	No Discharge

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