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ICPP Environmental Monitoring Report CY-1994

Environmental Support

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ACRONYM LIST

BAT	Best Available Technology
BOD	Biological Oxygen Demand
CFSGF	Coal Fired Steam Generating Facility
DCGs	Derived Concentration Guides
DO	Dissolved Oxygen
DOE	Department of Energy
EPA	Environmental Protection Agency
FAST	Fluorinel Dissolution Process & Fuel Storage Facility
ICPP	Idaho Chemical Processing Plant
LITCO	Lockheed Idaho Technologies Company
NO _x	Nitrogen Oxide
NWCF	New Waste Calcining Facility
pH	Potential of Hydrogen
QA	Quality Assurance
QAPJP	Quality Assurance Project Plan
RAL	Remote Analytical Laboratory
STP	Sewage Treatment Plant
SO ₂	Sulfur Dioxide
VOG	Ventilation Off-Gas

ICPP ENVIRONMENTAL MONITORING REPORT 1994

I. INTRODUCTION

Summarized in this report are the data collected through Environmental Monitoring programs conducted at the Idaho Chemical Processing Plant (ICPP) by the Environmental Protection Department. This report is published in response to DOE Order 5400.1.

The ICPP is responsible for complying with all applicable Federal, State, Local and DOE Rules, Regulations and Orders. Radiological effluent and emissions are regulated by the DOE in accordance with the Derived Concentration Guides (DCGs) as presented in DOE Order 5400.5. The State of Idaho regulates nonradiological waste resulting from the ICPP operations including airborne, liquid, and solid waste.

The Environmental Department updated the Quality Assurance (QA) Project Plan for Environmental Monitoring activities during the third quarter of 1992. QA activities have resulted in the ICPP's implementation of the Environmental Protection Agency (EPA) rules and guidelines pertaining to the collection, analyses, and reporting of environmentally related samples. Where no EPA methods for analyses existed for radionuclides, LITCO methods were used.

Table 1-1 summarizes the volumes and activity released from ICPP stacks and liquid release points. Figure 1-1 is a graphic representation of cumulative volume & airborne releases and Figure 1-2 depicts cumulative volume & liquid releases for the year. The graphs allow trends to be made of waste volume and activity released for the year. The Main Stack gaseous monitor was not in operation for 1994. New Waste Calcining Facility (NWCF) was not in operation in 1994. During 1994 the cumulative airborne and liquid release of radionuclides was $8.81\text{E-}03$ curies. Airborne releases to the atmosphere contributed $2.92\text{E-}03$ curies and liquid effluent released to the Percolation Pond contributed $5.89\text{E-}03$ curies. Liquid Effluent Treatment and Disposal (LET&D) began operation on January 1, 1993. PEW condensates which previously were discharged to Service Waste are now treated in the LET&D facility. Table 3-1 and 3-2 provide information on radionuclide activity and concentration of inorganic chemicals present in the service waste. The values are compared to regulatory limits where applicable.

Table 1-1
SUMMARY OF RELEASE DATA FOR 1994

AIRBORNE					LIQUID				
Volume (E+09 m3)			Activity (curies)		Volume (E+09 L)			Activity (curies)	
	<u>Month</u>	<u>YTD</u>	<u>Month</u>	<u>YTD</u>		<u>Month</u>	<u>YTD</u>	<u>Month</u>	<u>YTD</u>
Jan	0.378	0.378	5.44E-05	5.44E-05		0.222	0.222	6.36E-04	6.36E-04
Feb	0.35	0.728	3.65E-05	9.09E-05		0.159	0.381	4.59E-04	1.10E-03
Mar	0.331	1.059	1.63E-04	2.54E-04		0.208	0.589	5.50E-04	1.65E-03
Apr	0.359	1.418	2.15E-04	4.69E-04		0.195	0.784	6.47E-04	2.29E-03
May	0.347	1.765	2.07E-04	6.76E-04		0.201	0.985	5.12E-04	2.80E-03
Jun	0.352	2.117	3.14E-04	9.90E-04		0.173	1.158	4.47E-04	3.25E-03
Jul	0.337	2.454	4.39E-05	1.03E-03		0.145	1.303	4.33E-04	3.68E-03
Aug	0.345	2.799	1.25E-03	2.28E-03		0.15	1.453	3.56E-04	4.04E-03
Sep	0.369	3.168	3.23E-04	2.61E-03		0.157	1.61	7.44E-04	4.78E-03
Oct	0.322	3.49	7.43E-05	2.68E-03		0.145	1.755	3.66E-04	5.15E-03
Nov	0.333	3.823	2.04E-04	2.89E-03		0.158	1.913	3.98E-04	5.55E-03
Dec	0.335	4.158	3.94E-05	2.92E-03		0.156	2.069	3.44E-04	5.89E-03

Figure 1-1
AIRBORNE RELEASES
CY-1994

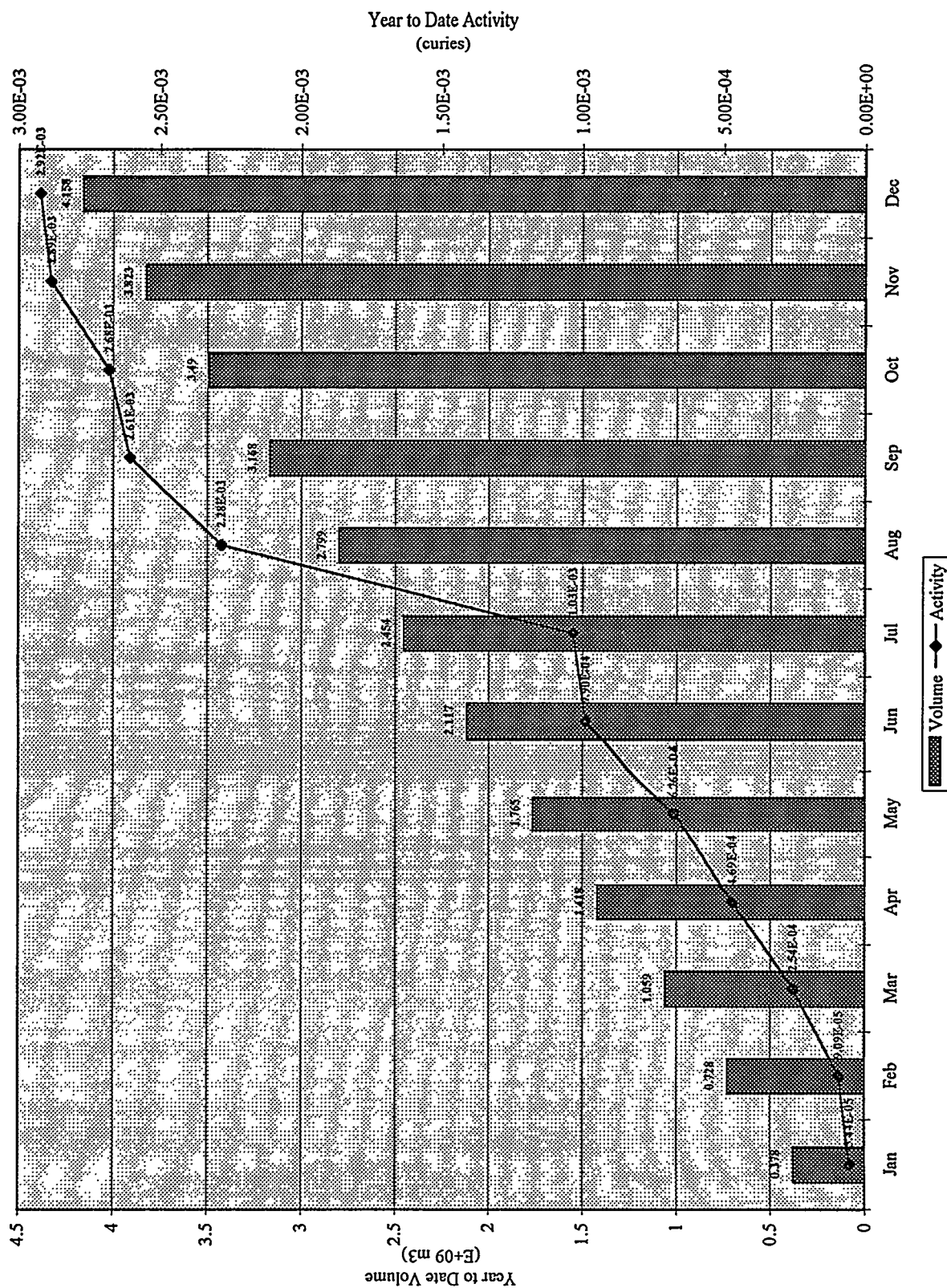
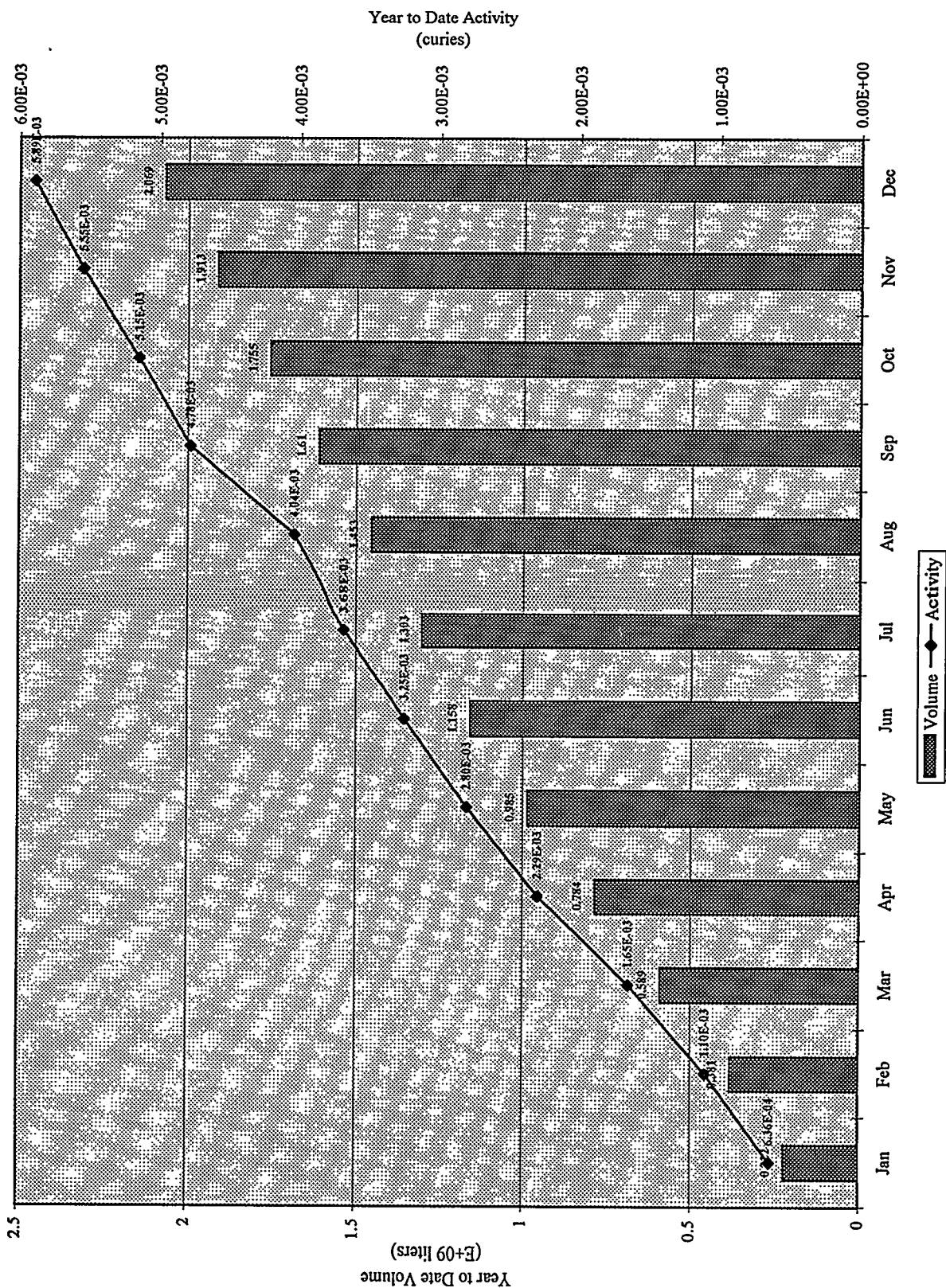


Figure 1-2
LIQUID EFFLUENT RELEASES
CY-1994



II. AIRBORNE MONITORING

1. INTRODUCTION

Airborne radioactive emissions are monitored from the Main Stack (CPP-708), the Fluorine Dissolution Process and Fuel Storage Facility (FAST) Stack (CPP-767), the New Waste Calcining Facility (NWCF) Stack (CPP-659), and the Remote Analytical Laboratory (RAL) Stack (CPP-684). NWCF was not in operation in 1994.

The Main Stack is equipped with radiological particulate and gaseous monitoring systems and the FAST Stack is equipped with a particulate monitoring system. The Main Stack gaseous monitor was not in operation in 1994. The airborne monitoring systems are based upon a proportional isokinetic sample. Particulate filters are collected and analyzed daily on the Main Stack. Nitrogen oxide (NO_x) emissions are the only nonradioactive airborne contaminant that is monitored from the Main Stack.

Particulate filters for the RAL Stack were pulled and analyzed daily through October. Beginning in November 1994, filters are pulled and analyzed monthly. Particulate filters for the FAST Stack were collected and analyzed daily through September. Beginning in October 1994, filters are pulled and analyzed monthly.

The NWCF HVAC stack monitor filters are collected weekly and the Ventilation Off-Gas (VOG) system is continuously monitored for radioactive particulates. The CFSGF is monitored for NO_x , SO_2 , carbon monoxide, and opacity in accordance with the State of Idaho, the EPA and the DOE-ID.

Radioactive releases for each emission point were well below the DOE DCGs for 1994. DCGs at the INEL boundary are reference values for conducting radiological environmental protection programs at operational DOE facilities and sites.

Quality assurance objectives for data measurement and laboratory performance are listed in the Quality Assurance Project Plan (QAPjP-001) for the Analysis of the Environmental Samples by both the LITCO CPP Analytical Labs and Radiation and Environmental Measurement Systems. Final data reduction is performed by the Environmental Support section of the Environmental Protection Department.

2. AIRBORNE RELEASES TO THE ENVIRONMENT

2.1 Main Stack

Airborne radioactive release data from the Main Stack for each month and the year are given in Table 2-1. This information is presented graphically in Figure 2-1. Graphic presentations showing yearly trends for radionuclides most likely to be present (iodine-129, cesium-137, strontium-90, ruthenium-106, plutonium (total), antimony-125, C-14, and H-3), are given in Figures 2-2 through 2-9, respectively. I-129, C-14, and H-3 will have no results reported for 1994 because the gaseous monitor was not in operation. Also NWCF was not in operation during 1994 so no releases for those radionuclides are apparent.

Main Stack (cont'd)

Nitrogen oxide (NO_x) emission from the Main Stack is the only nonradioactive airborne contaminant continuously monitored. NO_x concentration levels, while they do not violate any ambient air quality standard, must not exceed limits imposed by the FPR PSD permit. The limits set for the Main Stack are 388 pounds per hour and 1700 tons per year. Figure 2-10 provides NO_x emissions for the last three years. The total NO_x released in 1994 was 0 tons.

Table 2-1
AIRBORNE RELEASES FROM ICPP MAIN STACK CY-94 (curies)

RADIONUCLIDES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG*	SEP	OCT	NOV	DEC	TOTAL
Co-57					1.50E-08			4.43E-08					5.93E-08
Co-60				3.76E-08				1.53E-07				7.64E-08	2.67E-07
Cs-134	1.66E-07	1.26E-07	7.88E-07	1.43E-06	9.92E-07	2.82E-07	5.56E-08	4.38E-06	1.53E-06	3.78E-07	1.05E-06		1.12E-05
Cs-137	2.56E-05	2.32E-05	9.20E-05	1.47E-04	1.09E-04	4.41E-05	2.46E-05	5.62E-04	2.22E-04	5.38E-05	1.74E-04	1.11E-05	1.49E-03
Eu-152													
Eu-154				8.16E-08	5.13E-08			1.72E-07			1.29E-07		4.34E-07
Pu-Total								2.58E-06				5.68E-07	3.15E-06
Ru-106	1.98E-05	1.18E-05	5.08E-05	6.31E-05	5.39E-05	1.34E-05	9.44E-06	1.47E-04	4.35E-05	5.70E-06	2.33E-05	1.12E-06	4.43E-04
Sb-125	5.18E-07	3.53E-07	2.11E-06	1.82E-06	1.94E-06	6.53E-07	2.36E-07	5.97E-06	6.57E-06	1.22E-06	1.30E-06	1.22E-07	2.28E-05
Sr-90				9.60E-07	2.76E-05	1.11E-04	6.86E-06	1.68E-04	4.78E-05	1.05E-05	1.61E-06	2.62E-05	4.01E-04
TOTAL ACTIVITY	4.61E-05	3.55E-05	1.46E-04	2.14E-04	1.93E-04	1.69E-04	4.12E-05	8.90E-04	3.21E-04	7.16E-05	2.01E-04	3.92E-05	2.37E-03
TOTAL VOLUME (cubic meters)	1.30E+08	1.30E+08	1.20E+08	1.27E+08	1.27E+08	1.24E+08	1.19E+08	1.26E+08	1.27E+08	1.25E+08	1.27E+08	1.17E+08	
CUMULATIVE ACTIVITY	4.61E-05	8.16E-05	2.27E-04	4.42E-04	6.35E-04	8.05E-04	8.46E-04	1.74E-03	2.06E-03	2.13E-03	2.33E-03	2.37E-03	

*DENITRATOR OPERATING

Blanks for Sr-90 and Pu represent below detection and remaining blanks represent not detected in the gamma scan

Figure 2-1
MAIN STACK EFFLUENT
Total Activity (curies)

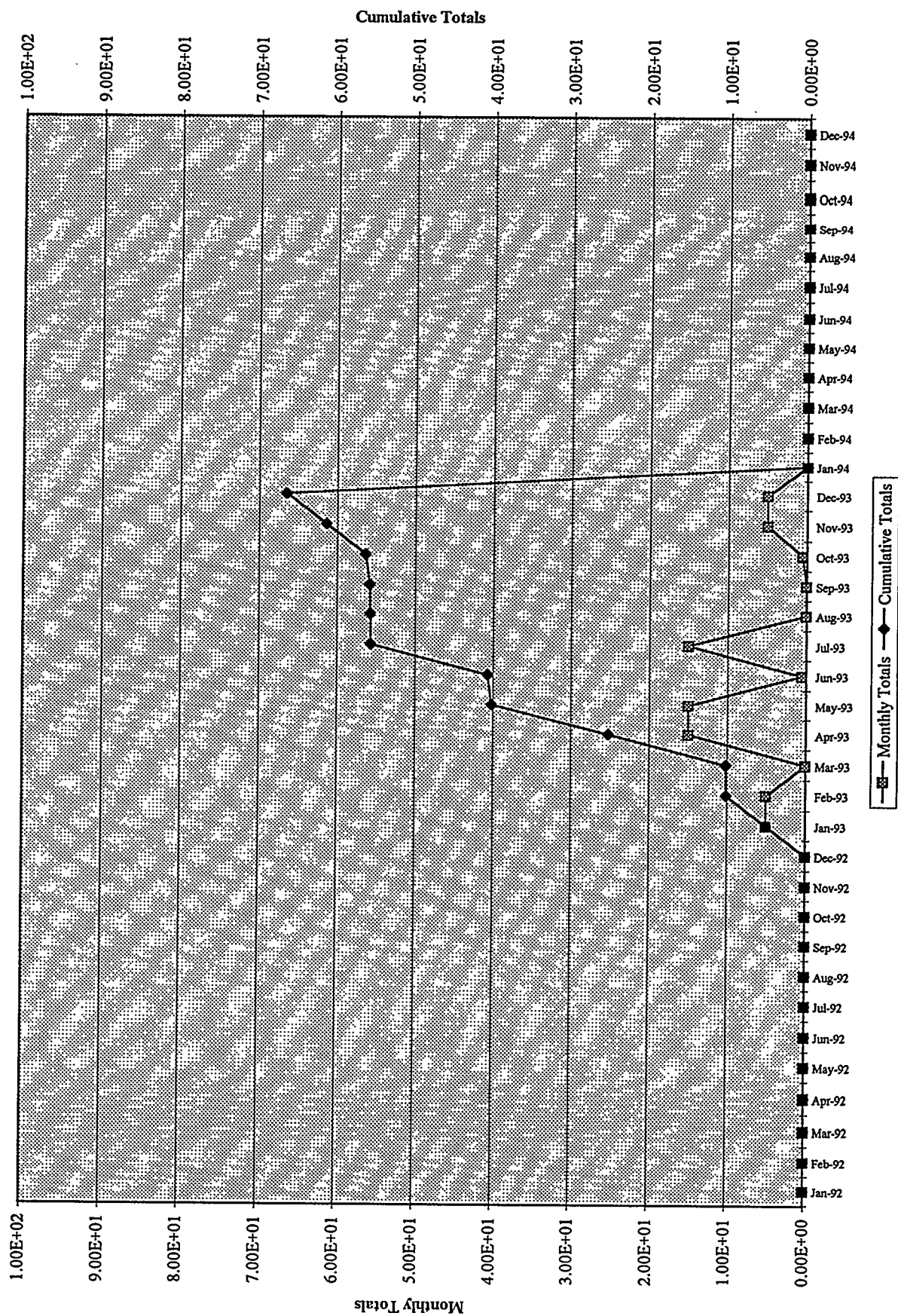


Figure 2-2
MAIN STACK EFFLUENT
I-129 (curies)

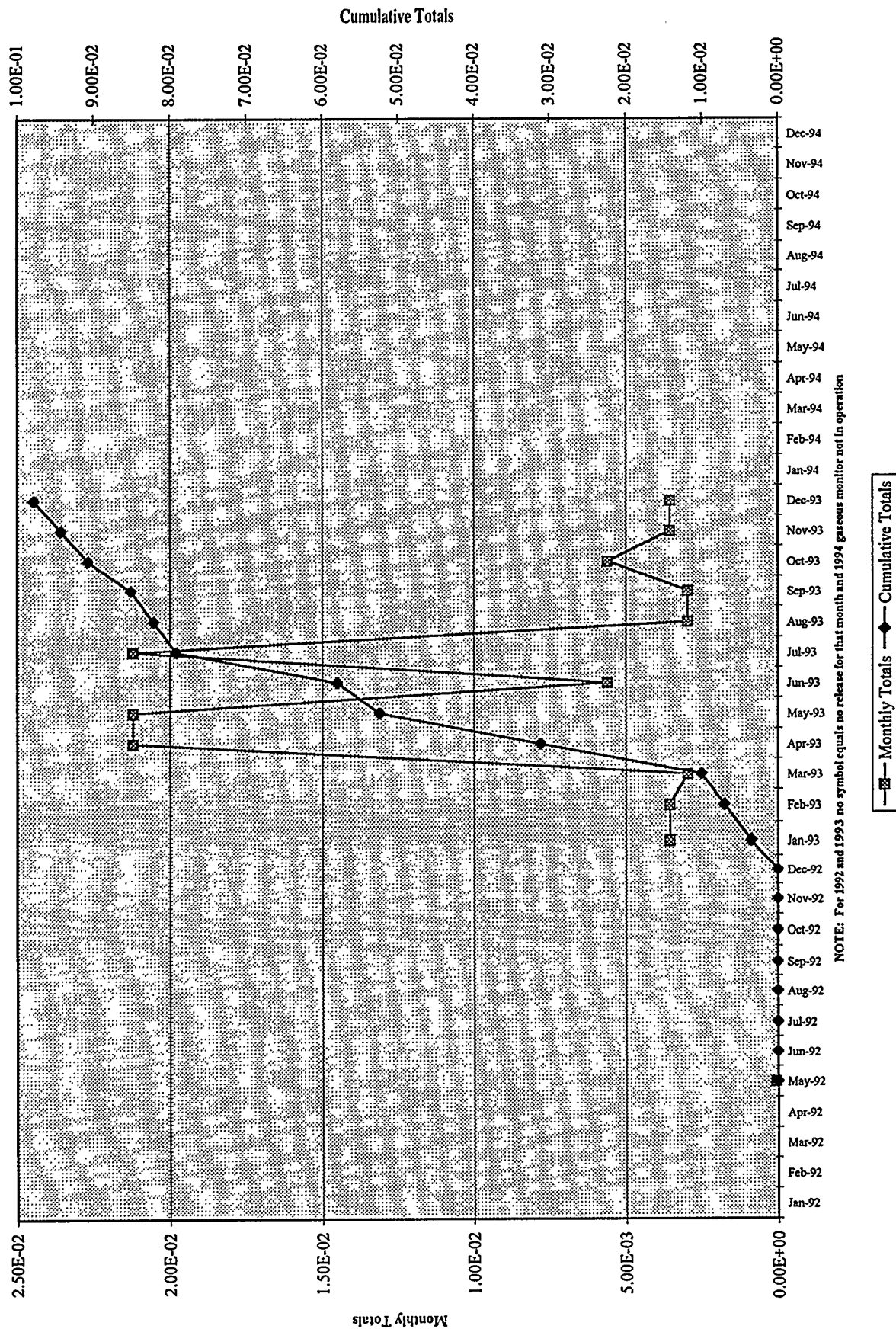


Figure 2-3
MAIN STACK EFFLUENT
Cs-137 (curies)

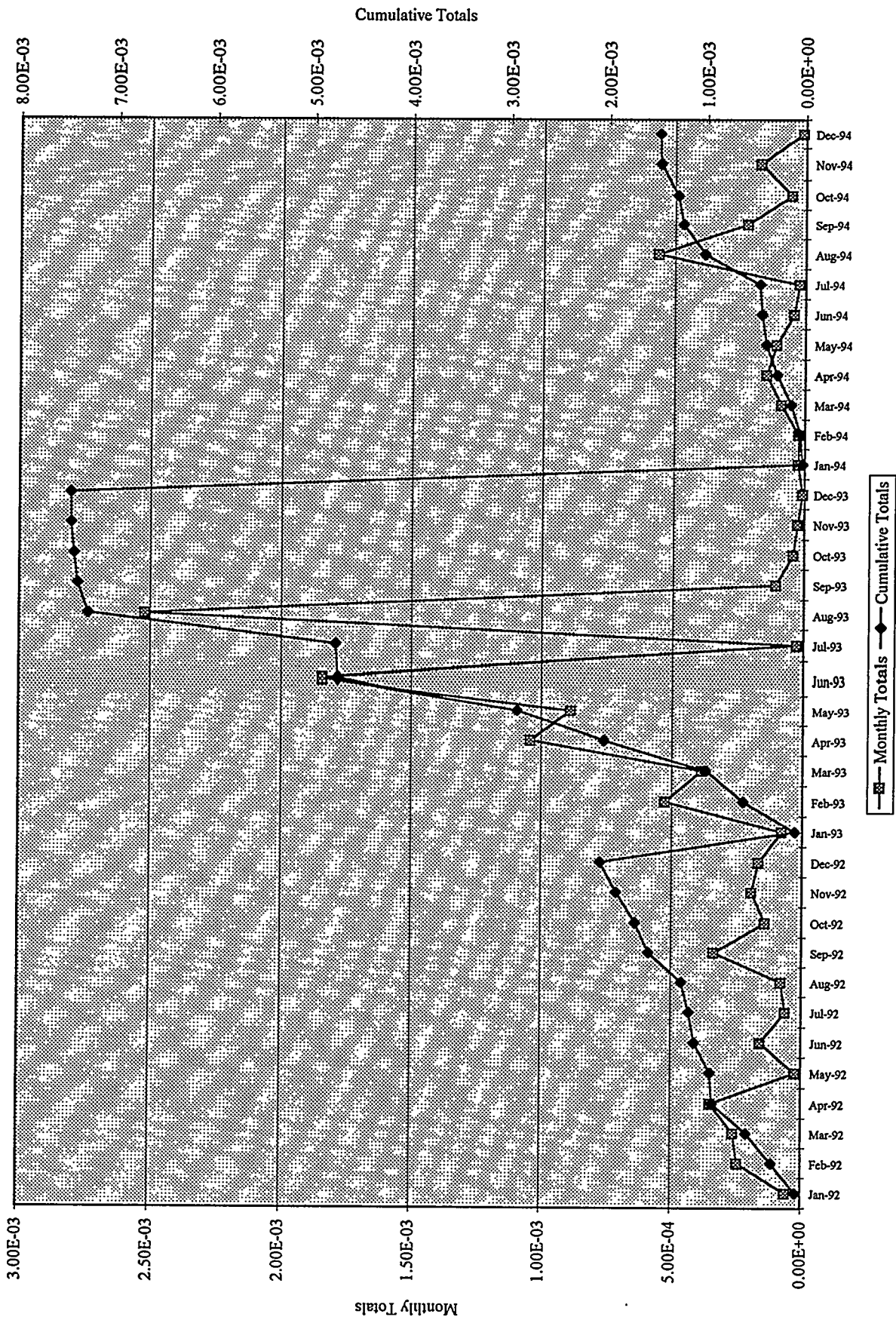


Figure 2-4
MAIN STACK EFFLUENT
Sr-90 (curies)

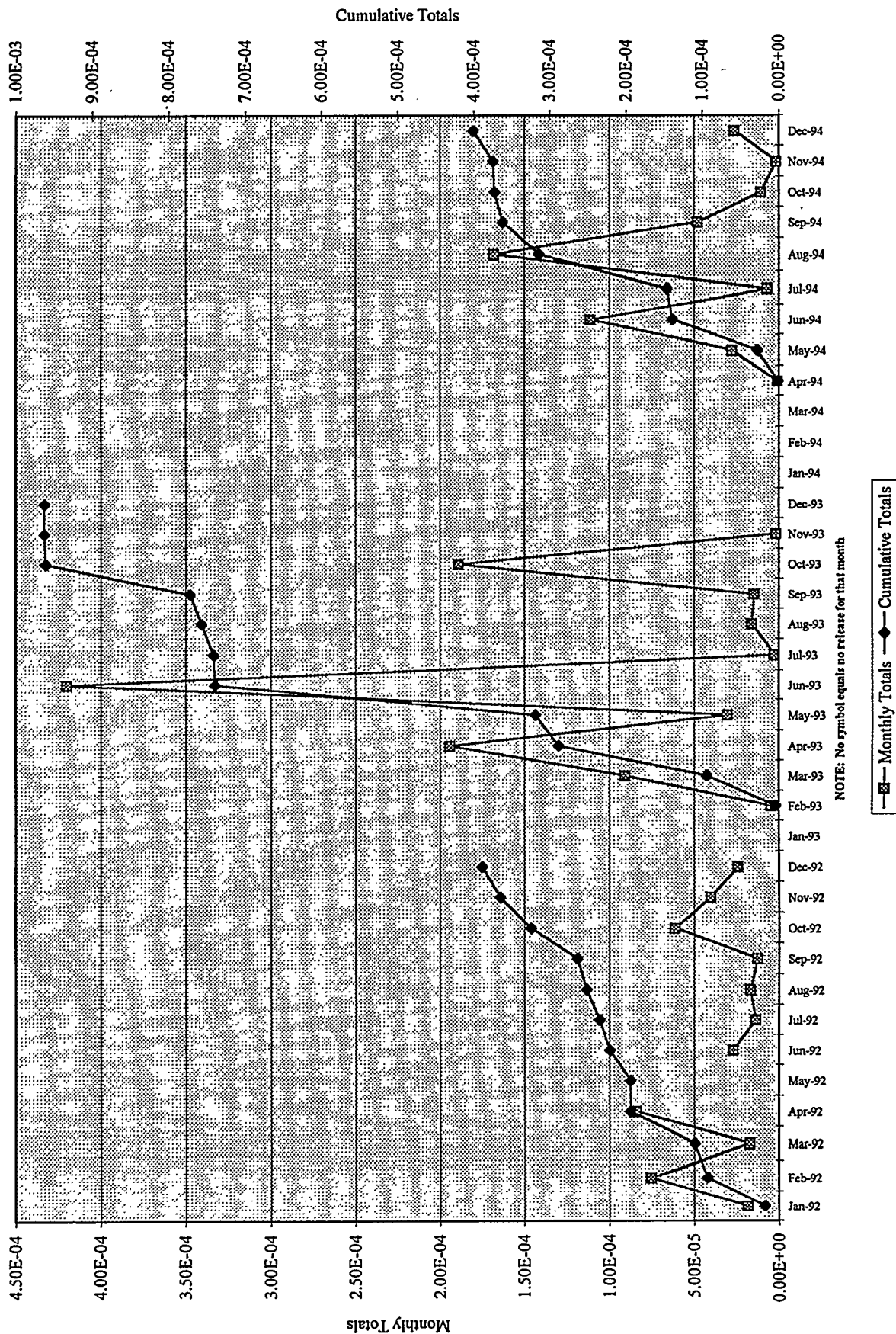


Figure 2-5
MAIN STACK EFFLUENT
Ru-106 (curies)

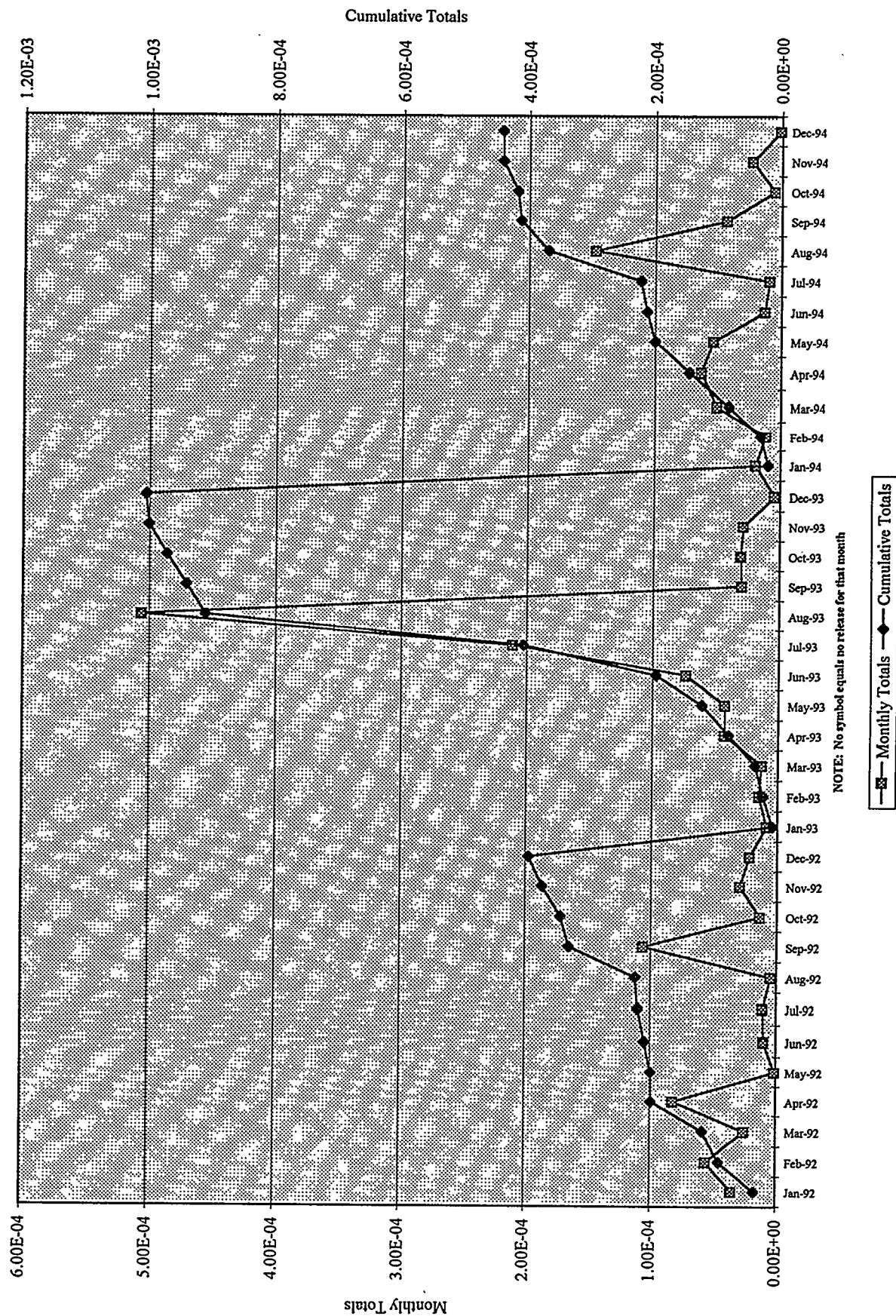


Figure 2-6
MAIN STACK EFFLUENT
Pu-Total (curies)

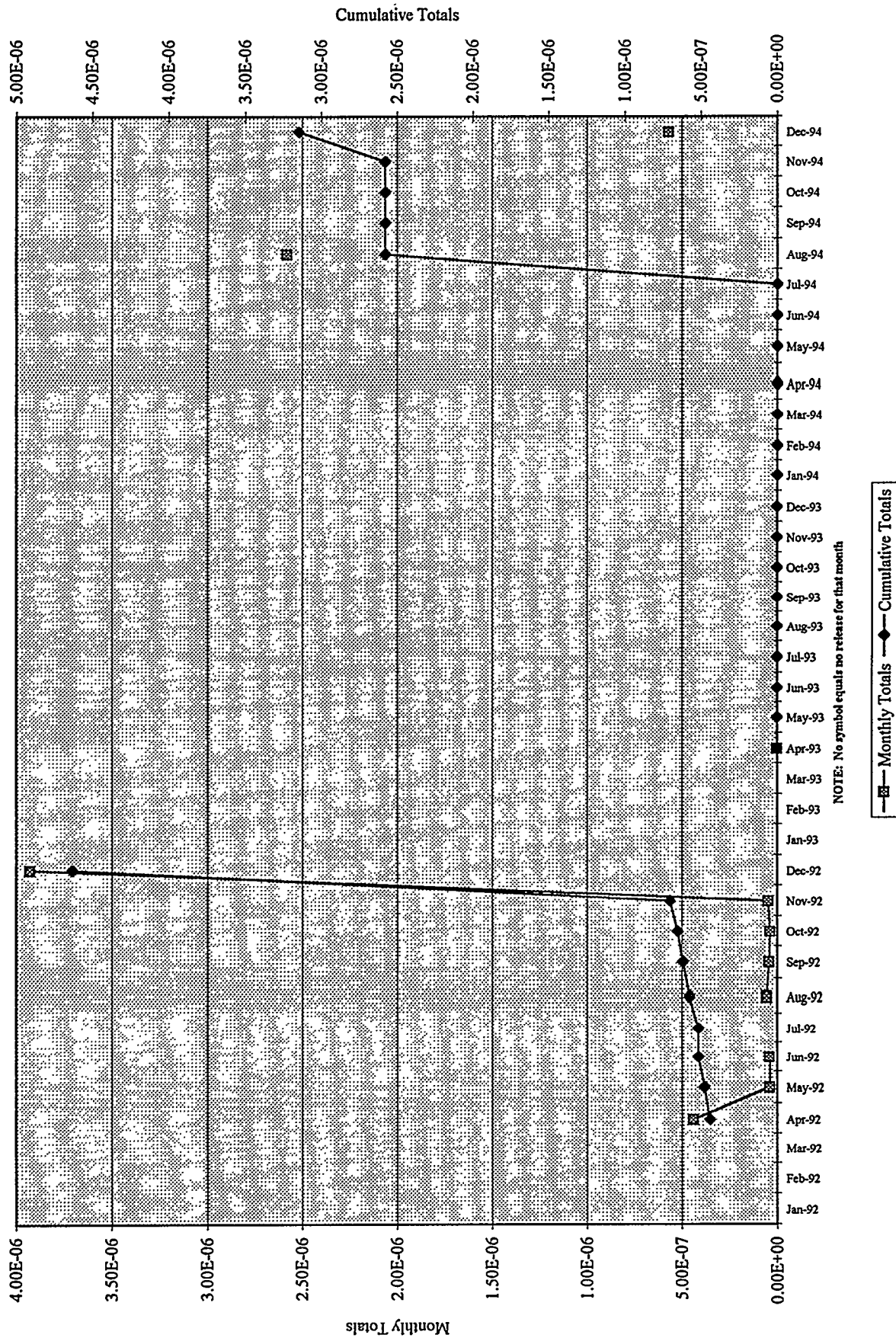
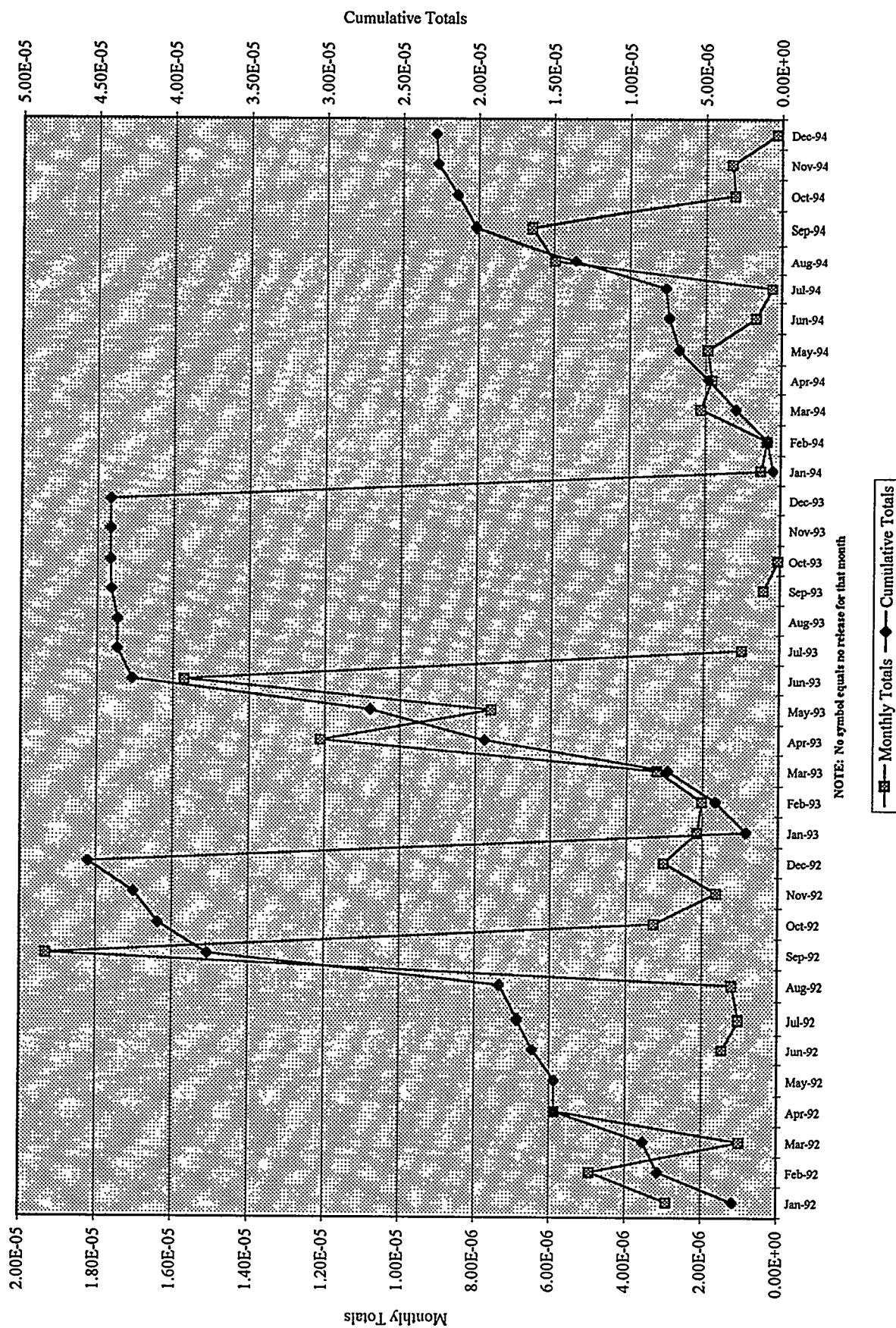


Figure 2-7
MAIN STACK EFFLUENT
Sb-125 (curies)



NOTE: No symbol equals no release for that month

—■— Monthly Totals —◆— Cumulative Totals

Figure 2-8
MAIN STACK EFFLUENT
C-14 (curies)

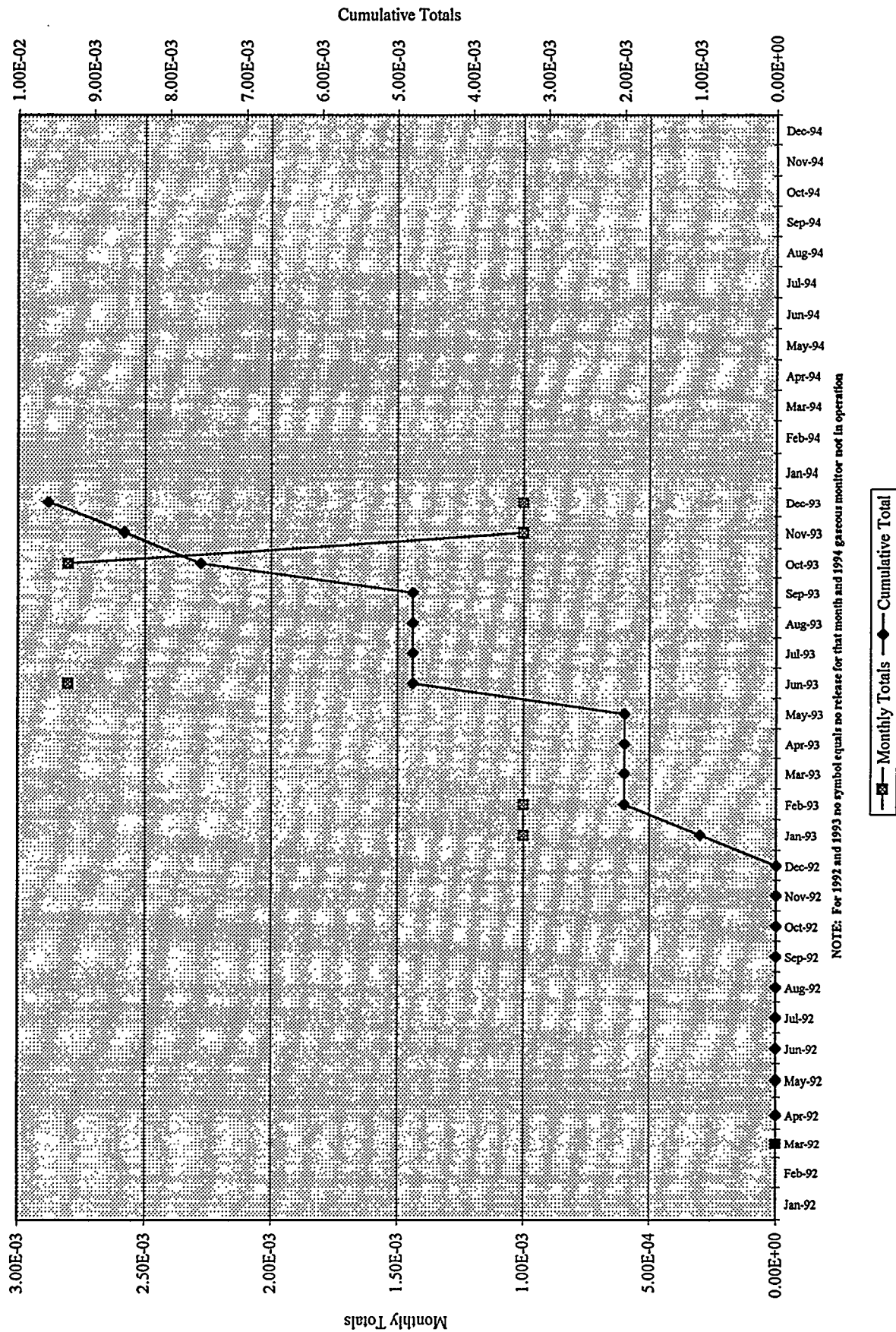


Figure 2-9
MAIN STACK EFFLUENT
H-3 (curies)

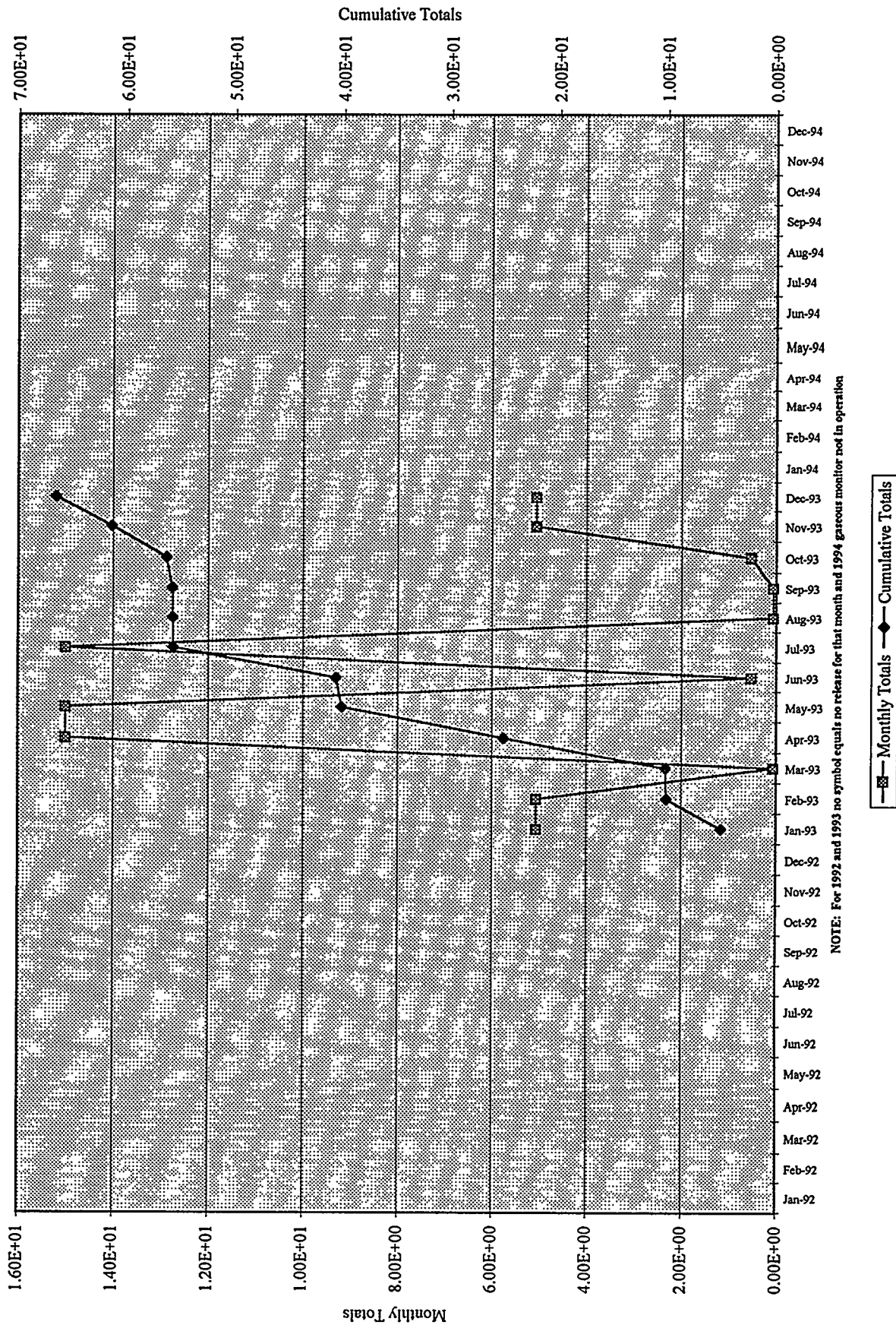
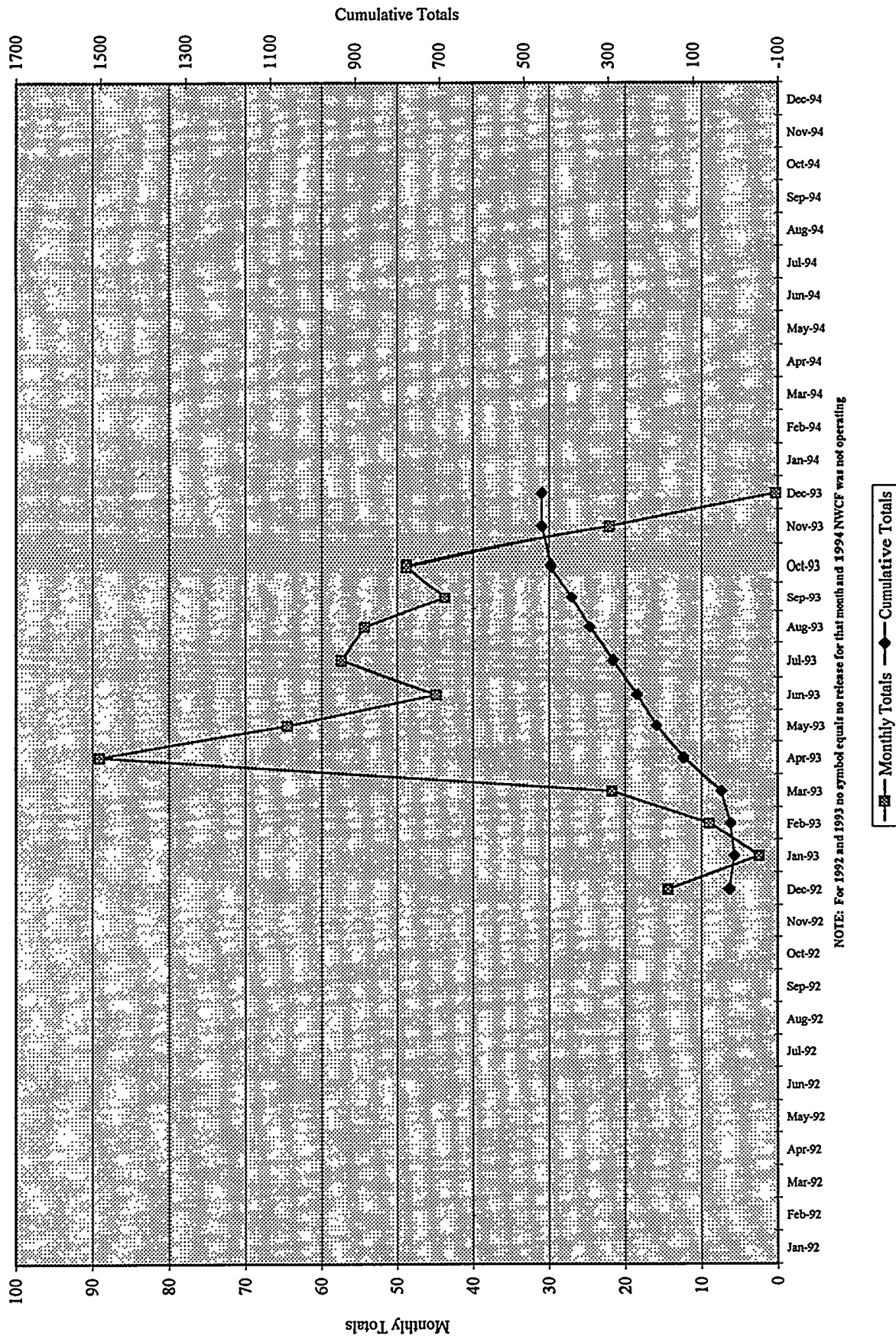


Figure 2-10
NO_x Released from ICPP Main Stack (tons)



2.2 FAST Stack

Table 2-2 lists the total radionuclide releases in curies from the FAST Stack per month by radionuclide and Figure 2-11 depicts the total monthly activity. Graphic presentations for tritium (H-3), plutonium (Total), antimony-125, and cesium 137 showing yearly trends are given in Figures 2-12 through 2-15, respectively.

2.3 NWCF Stack

Table 2-3 presents the radioactive emissions from the NWCF VOG system. The radionuclides reported are those that have been routinely analyzed for in the ventilation stack emissions. Figure 2-16 depicts the total monthly activity.

2.4 RAL Stack

Table 2-4 presents the radioactive emissions from the RAL VOG system. The radionuclides reported are those that have been identified in the ventilation stack emissions. Figure 2-17 depicts the total monthly activity.

2.5 Coal Fired Steam Generating Facility (CFSGF)

The CFSGF stack is monitored continuously for sulfur dioxide (SO_2), nitrogen oxide (NO_x), and opacity. Carbon monoxide (CO) is calculated by using AP-42 emission factors and fuel consumption rates. Emission limits for the stack are set by the Environmental Protection Agency (EPA) and the State of Idaho. Table 2-5 lists the releases per month for the CFSGF. The facility must provide a minimum removal efficiency of 70% for SO_2 calculated as an average over a 30 day period. SO_2 emissions shall not exceed an average of 0.6 pounds per MM/Btu of fuel input averaged over a 24 hour period. NO_x emissions shall not exceed an average of 0.5 pounds per MM/Btu of fuel input averaged over a 24 hour period when the steam load is equal to or greater than 35,000 pounds per hour. NO_x emissions shall not exceed 0.7 pounds per MM/Btu of fuel input averaged over a 24 hour period when the steam load is less than 35,000 pounds per hour. Carbon monoxide shall not exceed 148.5 lbs/hr or 650.4 tons/yr. Opacity limit for the CFSGF is 20%.

Table 2-2
AIRBORNE RELEASES FROM ICPP FAST STACK FY-1994
(curies)

RADIONUCLIDES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Co-60													
Cs-134													
Cs-137	7.52E-07	4.06E-07	2.49E-06	4.74E-07	4.94E-07	1.18E-07	1.76E-07	6.50E-07	8.78E-07				6.44E-06
Eu-152													
Eu-154								4.79E-08					4.79E-08
Mn-54								3.06E-08					3.06E-08
Pu-Total										5.50E-07			5.50E-07
Ru-106	9.35E-07		1.29E-05										1.38E-05
Sb-125	6.13E-06	5.85E-07	1.10E-06	1.23E-07	1.95E-07		3.65E-07	1.05E-07	4.76E-07	2.12E-06		1.53E-07	1.14E-05
Sr-90					1.15E-05	2.98E-05		5.60E-05					9.73E-05
Tl-208	4.85E-08												4.85E-08
TOTAL ACTIVITY	7.87E-06	9.91E-07	1.65E-05	5.97E-07	1.22E-05	2.99E-05	5.41E-07	5.68E-05	1.35E-06	2.67E-06		1.53E-07	1.30E-04
TOTAL VOLUME (cubic meters)	1.05E+08	1.04E+08	9.76E+07	9.99E+07	1.02E+08	1.08E+08	1.00E+08	1.05E+08	1.05E+08	9.76E+07	1.07E+08	1.04E+08	
CUMULATIVE ACTIVITY	7.87E-06	8.86E-06	2.53E-05	2.59E-05	3.81E-05	6.81E-05	6.86E-05	1.25E-04	1.27E-04	1.29E-04	1.29E-04	1.30E-04	

Beginning in October 1994, filters are being pulled on a monthly basis rather than daily.

Blanks for Sr-90 and Pu represent below detection and remaining blanks represent not detected in the gamma scan

Figure 2-11
FAST STACK EFFLUENT
Total Activity (curies)

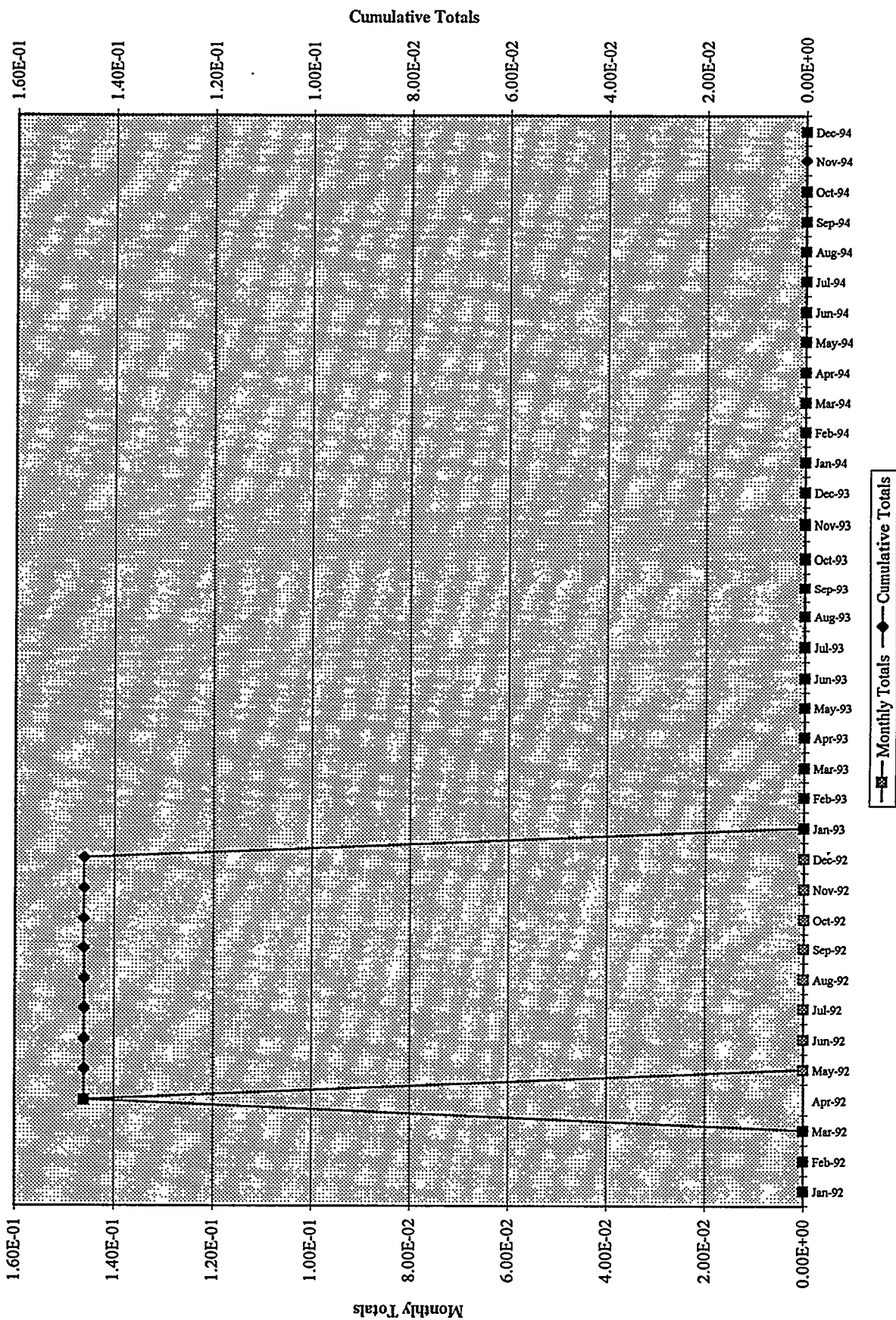


Figure 2-12
FAST STACK EFFLUENT
H-3 (curies)

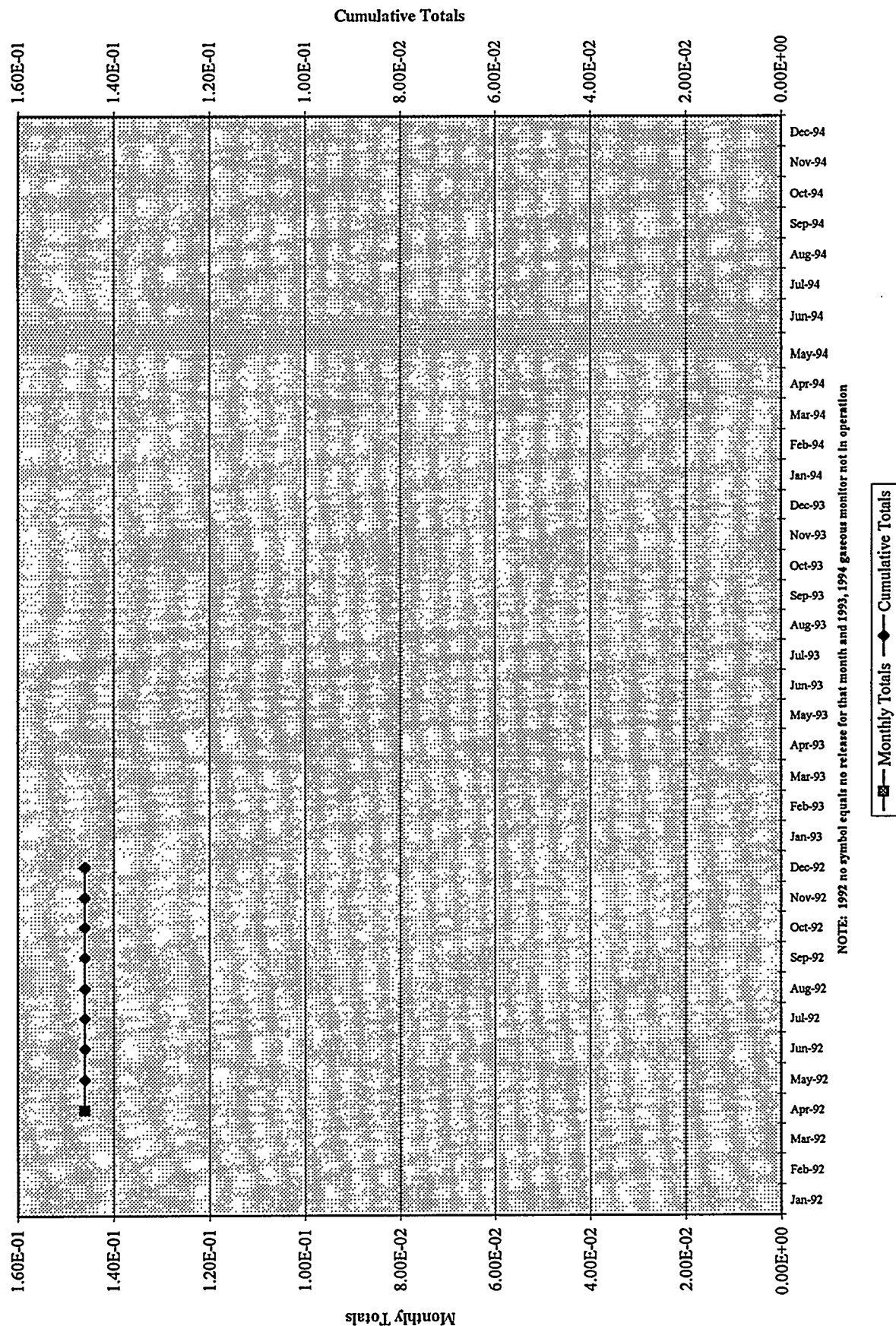


Figure 2-13
FAST STACK EFFLUENT
Pu-Total (curies)

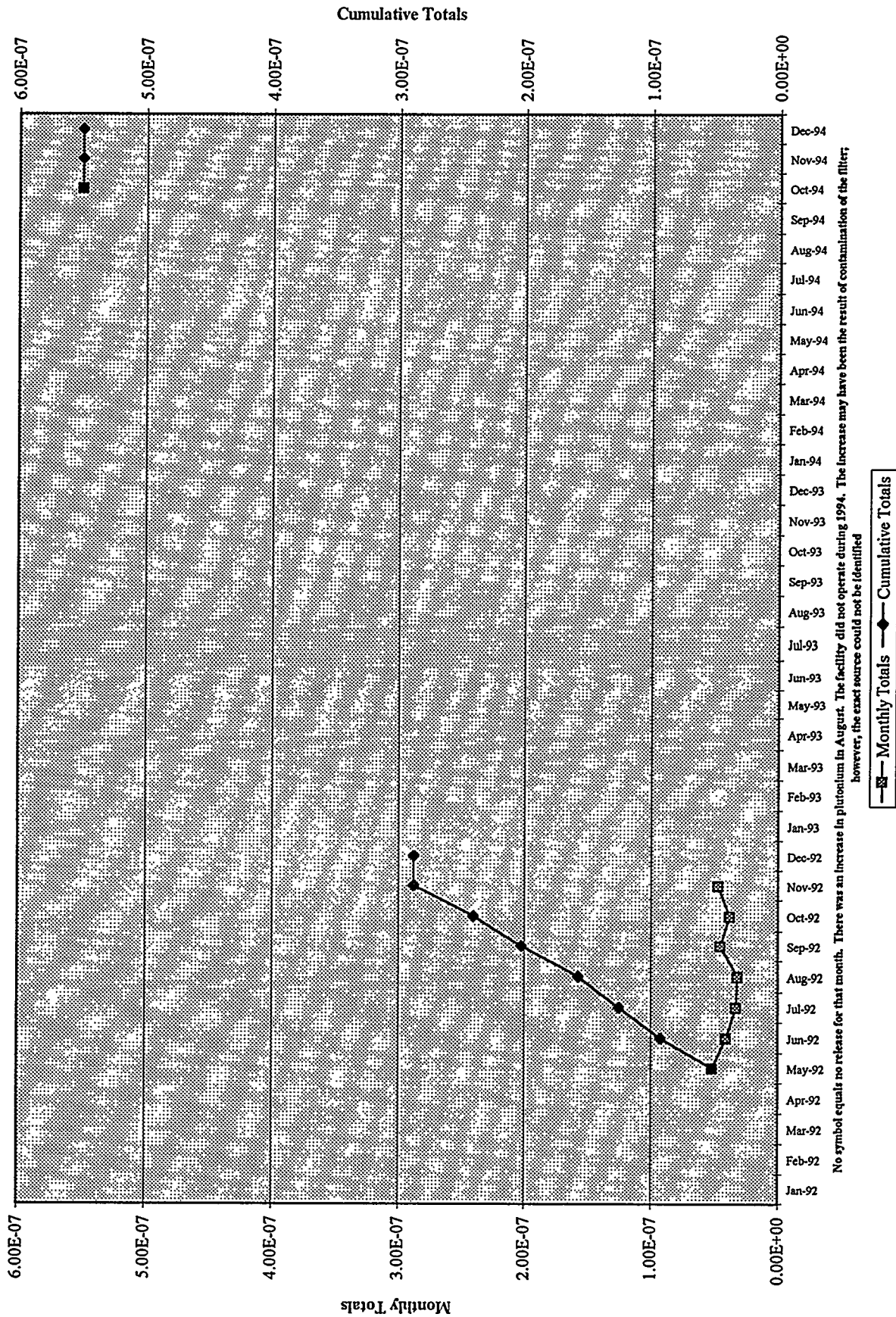


Figure 2-14
FAST STACK EFFLUENT
Sb-125 (curies)

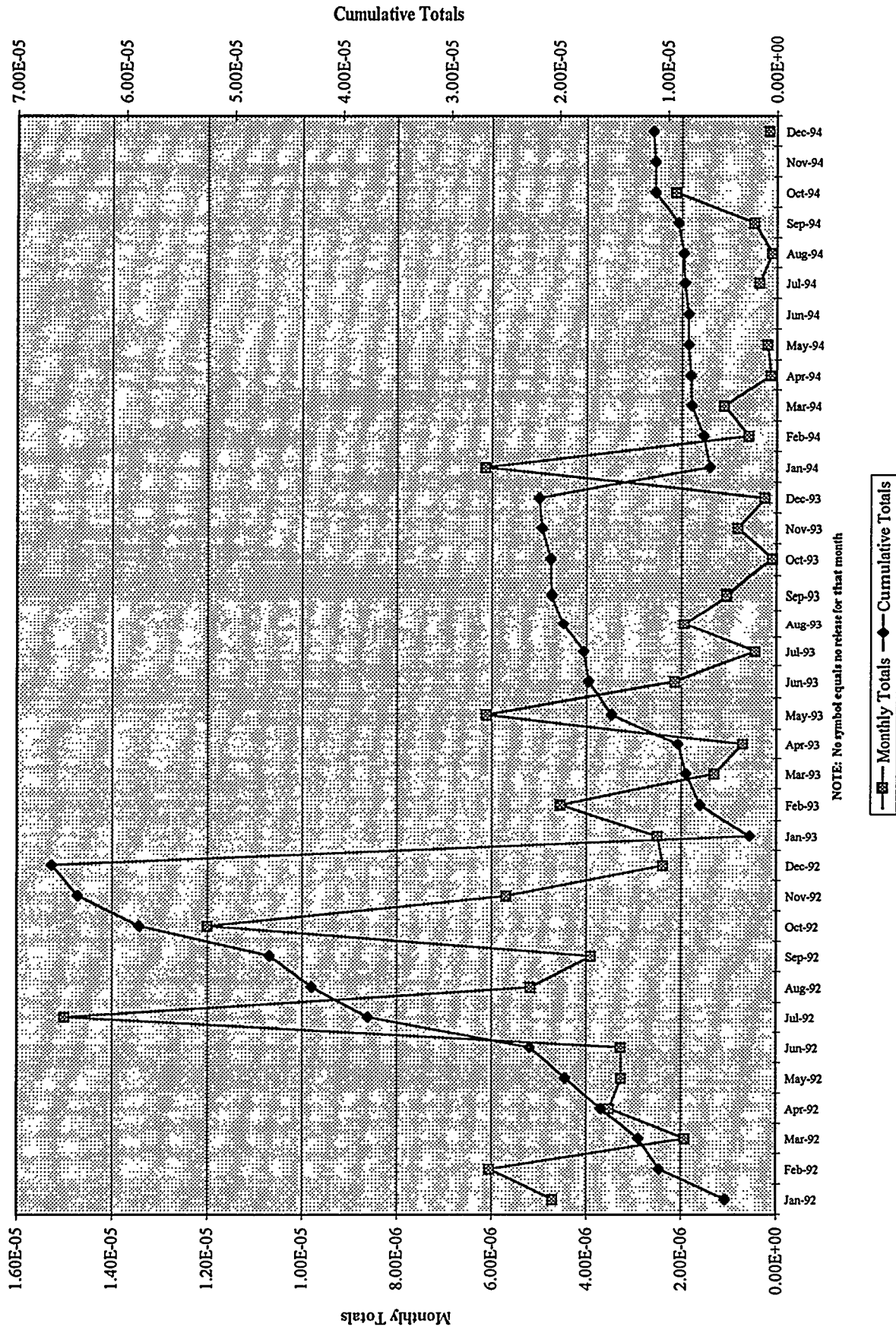


Figure 2-15
FAST STACK EFFLUENT
Cs-137 (curies)

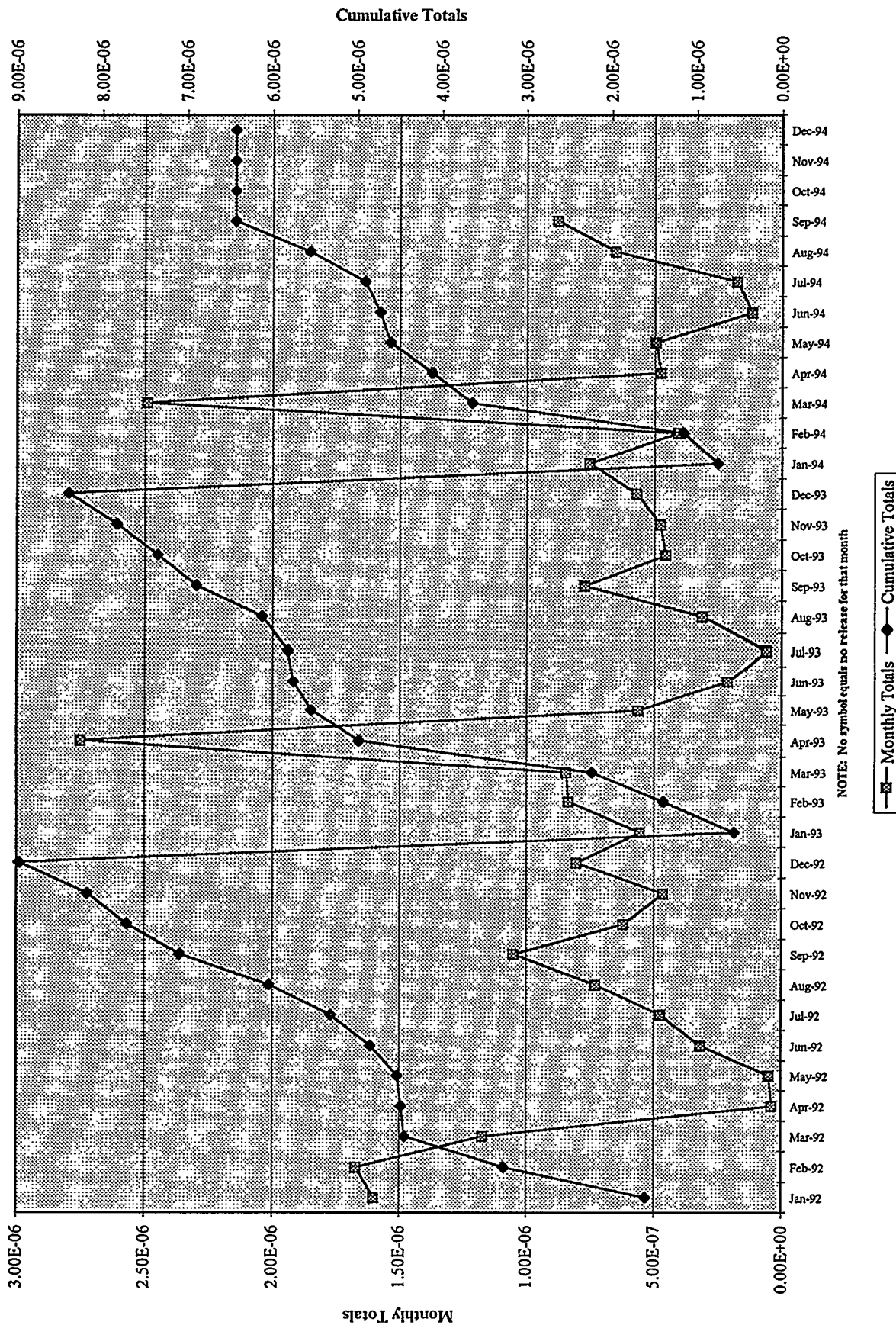


Table 2-3
AIRBORNE RELEASES FROM ICPP NWCF CY-1994
(curies)

RADIONUCLIDES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Cs-137	2.55E-07												2.55E-07
Total-Pu						4.32E-09							4.32E-09
Ru-106													
Sb-125													
Sr-90	1.35E-07	2.34E-08		8.60E-08	5.04E-08	3.59E-07	6.49E-08					2.96E-08	7.48E-07
TOTAL ACTIVITY	3.90E-07	2.34E-08		8.60E-08	5.04E-08	3.63E-07	6.49E-08					2.96E-08	1.01E-06
TOTAL VOLUME (cubic meters)	1.22E+08	9.53E+07	9.48E+07	1.11E+08	9.80E+07	9.87E+07	9.75E+07	9.30E+07	1.16E+08	7.92E+07	7.82E+07	9.39E+07	
CUMULATIVE ACTIVITY	3.90E-07	4.13E-07	4.13E-07	4.99E-07	5.50E-07	9.13E-07	9.78E-07	9.78E-07	9.78E-07	9.78E-07	9.78E-07	1.01E-06	

Blanks represent below detection

Figure 2-16
NWCFF STACK EFFLUENT
Total Activity (curies)

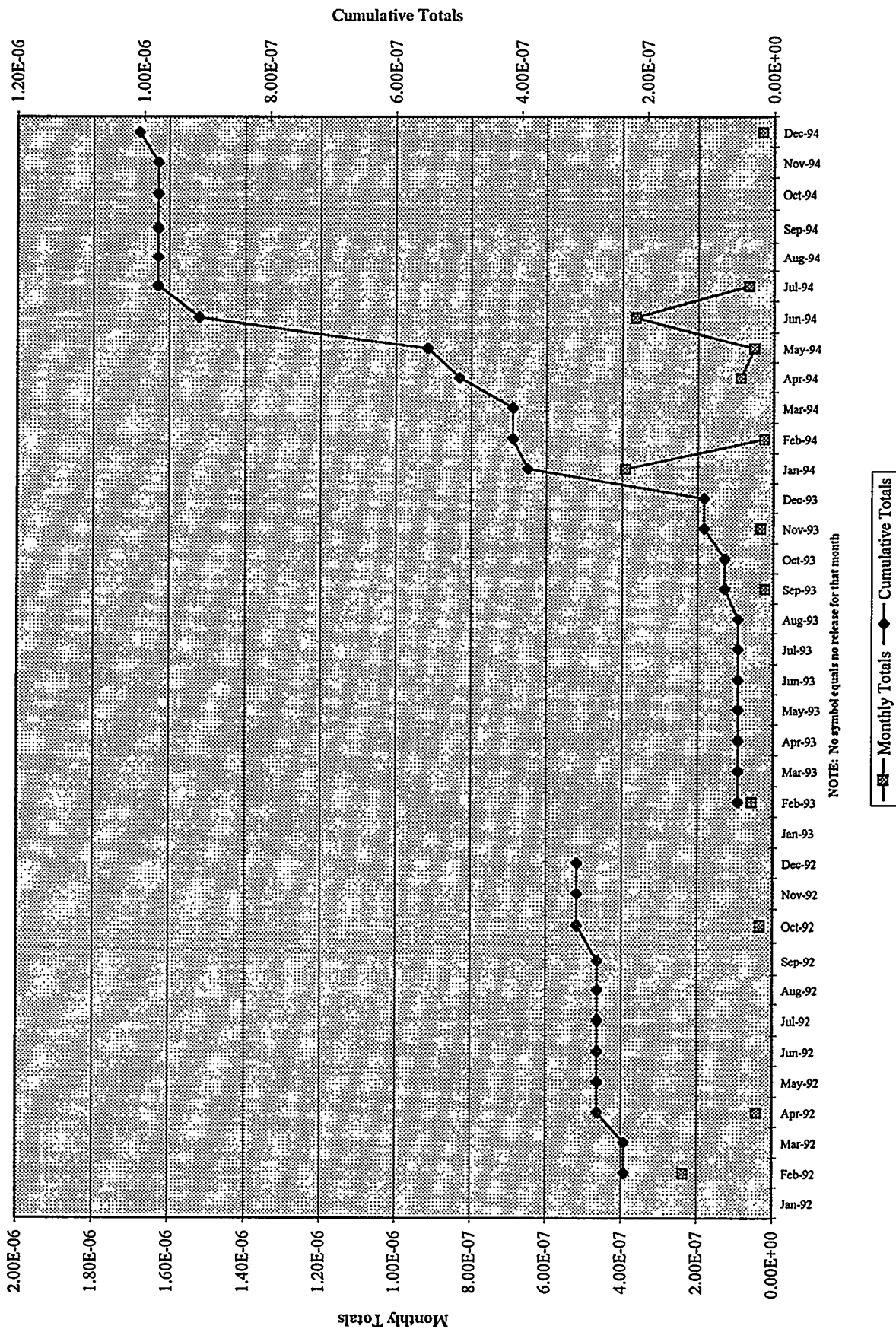


Table 2-4
AIRBORNE RELEASES FROM ICPP RAL STACK CY-1994
(curies)

RADIONUCLIDES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG*	SEP	OCT	NOV	DEC	TOTAL
Co-60								3.09E-07					3.09E-07
Cs-134													
Cs-137				1.28E-07	1.69E-07		2.83E-08	3.16E-07	2.74E-07	8.86E-08			1.00E-06
Total-Pu													
Ru-106													
Sb-125													
Sr-90						1.15E-04	2.03E-06	3.00E-04			2.95E-06		4.20E-04
TOTAL ACTIVITY				1.28E-07	1.69E-07	1.15E-04	2.06E-06	3.00E-04	2.74E-07	8.86E-08	2.95E-06		4.21E-04
TOTAL VOLUME (cubic meters)	2.08E+07	2.08E+07	1.81E+07	2.08E+07	2.02E+07	2.08E+07	2.02E+07	2.08E+07	2.08E+07	2.02E+07	2.08E+07	2.02E+07	
CUMULATIVE ACTIVITY				1.28E-07	2.97E-07	1.15E-04	1.17E-04	4.18E-04	4.18E-04	4.18E-04	4.21E-04	4.21E-04	

*CLEANING HOT CELL (DECON-RAL UPGRADE)

Beginning in November 1994, filters are being pulled monthly rather than daily

Blanks for Sr-90 and Pu represent below detection and remaining blanks represent not detected in the gamma scan

Figure 2-17
RAL STACK EFFLUENT
Total Activity (curies)

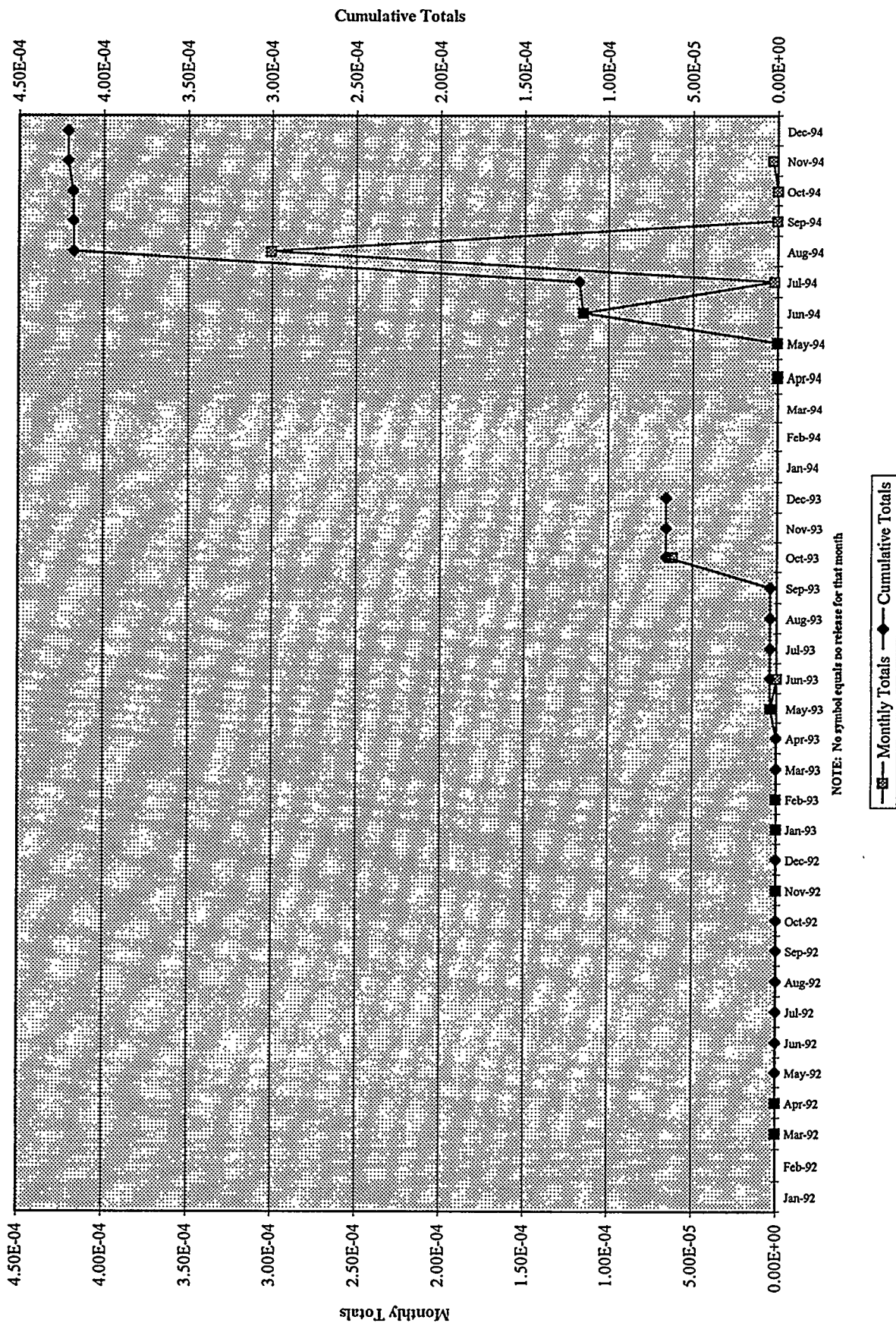


Table 2-5
CY-1994
COAL FIRED STEAM GENERATOR FACILITY

	JAN	FEB	MAR	APR	MAY	JUN*	JUL	AUG	SEP	OCT	NOV	DEC	EMISSION LIMITATIONS
COAL BURNED (TONS)	1260	827				1035	873	1778	602		856	1492	N/A
CUMULATIVE COAL BURNED (TONS)	1260	2087	2087	2087	2087	3122	3995	5773	6375	6375	7231	8723	N/A
MM/Btu/#Burned	0.012798	0.012798				0.012535	0.012535	0.012535	0.012535		0.012535	0.012535	N/A
% Sulfur	0.41	0.41				0.37	0.37	0.37	0.37		0.37	0.37	N/A
#NOx/MM/Btu	0.39	0.39				0.38	0.42	0.43	0.48		0.38	0.4	SEE FOOTNOTE
#SO2/MM/Btu	0.06	0.04				0.02	0.05	0.06	0.07		0.02	0.06	0.6
Permit Steam Flow Range A or B	B	B				B	A	A	A		B	B	SEE FOOTNOTE
% SO2 Removed	91	93				95.8	91	89.6	87.6		96.2	90.4	70% OR GREATER
% Opacity	0	1				2	2	3	2		2	3	
*Carbon Monoxide (CO) lbs/hr						34.8	19.3	21.5	30		30.4	35.55	148.5
Carbon Monoxide (CO) tons						7.15	6.98	16	5.42		7.45	12.3	
Carbon Monoxide (CO) TONS CUMULATIVE						7.15	14.13	30.13	35.55	35.55	43	55.3	650.4

Opacity = <20%

Coal Burned (tons) = N/A

MM/Btu burned = N/A

% Sulfur = N/A

Nitrogen oxide (lbs. NOx/MM/Btu) emissions shall not exceed an average of 0.5 pounds per million Btu (Range B) for steam flow greater or equal to 35000 lbs/hr.

Nitrogen oxide (lbs. NOx/MM/Btu) emissions shall not exceed an average of 0.7 pounds per million Btu (Range A) for steam flow less than 35000 lbs/hr.

Sulfur dioxide (lbs. SO2/MM/Btu) emissions shall not exceed an average of 0.6 pounds per million Btu of fuel input, averaged over a 24 hour period.

%SO2 removal = 70% or greater and shall be calculated as an average over a 30 day period.

Steam flow = N/A (Range B = steam load equal to or greater than 35000 pounds per hour and Range A = steam load less than 35000 pounds per hour)

Carbon monoxide (CO) emissions for the boilers shall not exceed an average of 148.5 lbs/hr averaged over a 30 day period.

*CO started being reported to Environmental Characterization in June, due to permit modification

III. LIQUID MONITORING

1. INTRODUCTION

Liquid monitoring discussed in this report includes: 1) Service Waste System; 2) Percolation Ponds 1 & 2; 3) Sewage Treatment Plant; and 4) Production and Potable Water Wells. Quality Assurance objectives for measurement data and laboratory performance are listed in both the Quality Assurance Project Plan for the Analysis of Environmental Samples by the LITCO Analytical Chemistry Section and the Special Technologies Quality Assurance Project Plans for Work Subject to EPA QAMS-005/80.

2. LIQUID RELEASES TO THE ENVIRONMENT

2.1 Service Waste System

Liquid waste streams are generated from all areas of the ICPP. The waste streams vary in volume. Waste streams are disposed of through the Service Waste System. The Liquid Effluent Treatment and Disposal (LET&D) Facility began operation on January 1, 1993. PEW condensates which previously were discharged to Service Waste are now treated in the LET&D facility.

Isotopic radionuclide and inorganic chemical release data for the Service Waste System for each month and year totals are presented in Table 3-1 and 3-2. Table 3-3 lists the monthly DCG release ratios respectively for individual radionuclides. DCGs are not release limits, but rather are screening values for considering Best Available Technology (BAT) for discharges and dose estimates.

The radionuclides reported are those that have been found in the past. Listed radionuclides that do not have values shown were not observed during the reporting month or were below detection limits. Figure 3-1 depicts the total monthly activity released to the active Percolation Pond at ICPP.

Figure 3-2 depicts total plutonium and figure 3-3 depicts total uranium found in the service waste stream. The quantity of plutonium and uranium released to the Pond remained relatively constant during 1994. Figures 3-4 through 3-7 present trend information for select radionuclides in the Service Waste.

The ratio is calculated by dividing the detected radionuclide concentration by the established limit. Governmental regulations state that a corrected total ratio of 1.0 equals allowable radionuclide concentrations. The ICPP did not approach the total allowable release at any time during 1994. The ICPP did not exceed a ratio of 1.0 during any month in 1994.

Table 3-1
LIQUID RELEASES FROM ICPP SERVICE WASTE CY-1994
(curies)

RADIONUCLIDES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
C-14													
Co-60		3.78E-05	3.89E-05								3.50E-05		1.12E-04
Cs-134													
Cs-137	6.93E-05	4.68E-05	1.57E-05	8.25E-05	6.42E-05	7.66E-05	8.32E-05	1.42E-05					4.53E-04
H-3													
I-129													
Pu-238										5.79E-06	2.73E-06		8.52E-06
Pu-239													
Pu-241													
Ru-106													
Sb-125							4.24E-05						4.24E-05
Sr-90	1.89E-04			1.07E-04					3.81E-04				6.77E-04
*U-234	3.78E-04	2.47E-04	3.33E-04	3.00E-04	2.95E-04	2.42E-04	2.00E-04	2.29E-04	2.44E-04	2.40E-04	2.43E-04	2.23E-04	3.17E-03
U-235		4.63E-06	1.66E-05	7.50E-06	5.52E-06	7.57E-06		4.01E-06	7.62E-06	4.52E-06		7.27E-06	6.52E-05
U-238		1.23E-04	1.46E-04	1.50E-04	1.47E-04	1.21E-04	1.07E-04	1.09E-04	1.11E-04	1.16E-04	1.17E-04	1.14E-04	1.36E-03
TOTAL ACTIVITY	6.36E-04	4.59E-04	5.50E-04	6.47E-04	5.12E-04	4.47E-04	4.33E-04	3.56E-04	7.44E-04	3.66E-04	3.98E-04	3.44E-04	5.89E-03
TOTAL VOLUME (liters)	2.10E+08	1.54E+08	2.08E+08	1.88E+08	1.84E+08	1.51E+08	1.33E+08	1.43E+08	1.52E+08	1.41E+08	1.52E+08	1.48E+08	
CUMULATIVE ACTIVITY	6.36E-04	1.10E-03	1.65E-03	2.29E-03	2.80E-03	3.25E-03	3.68E-03	4.04E-03	4.78E-03	5.15E-03	5.55E-03	5.89E-03	

*NOTE: JANUARY URANIUM IS ACTUALLY U-TOTAL DUE TO CLASSIFICATION.
Blanks for H-3, C-14, Sr-90, I-129, U-234, U-235, U-238, Pu-238, Pu-239 and Pu-241 indicate below detection limit and remaining radionuclides represent not detected in gamma scan

Table 3-2
ICPP SERVICE WASTE CY-1994
(mg/L)

SUBSTANCE	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	IDAHO WATER QUALITY STANDARDS
Arsenic (As)		1.30E-03											5.00E+00
Barium (Ba)	1.02E-01	1.18E-01	7.42E-02	9.42E-02	9.70E-02	1.05E-01	8.83E-02	1.01E-01	9.36E-02	1.05E-01	9.72E-02	1.01E-01	1.00E+02
Cadmium (Cd)	7.30E-03												1.00E+00
Chloride Ion	2.71E+02	2.65E+02	2.73E+02	2.84E+02	2.50E+02	3.21E+02	2.71E+02	2.91E+02	2.91E+02	2.76E+02	2.67E+02	3.45E+02	N/A
Chromium (Cr)					1.60E-02	1.32E-02					1.11E-02		5.00E+00
Fluoride Ion		2.25E-01	2.23E-01	2.23E-01	2.36E-01	2.05E-01	2.17E-01	2.33E-01	2.27E-01	2.11E-01	2.15E-01	2.14E-01	N/A
Iron (Fe)												3.26E-02	N/A
Lead (Pb)												3.47E-02	5.00E+00
Mercury (Hg)													2.00E-01
Nitrate Ion	5.21E+00	4.77E+00	4.85E+00	6.66E+00	1.21E+01	1.76E+01	5.45E+00	5.95E+00	5.15E+00	4.93E+00	5.08E+00	4.98E+00	N/A
Phosphate Ion													N/A
Selenium (Se)													1.00E+00
Silver (Ag)						2.66E-02							5.00E+00
Sodium (Na)	1.90E+02	1.60E+02	1.60E+02	1.80E+02	1.70E+02	1.80E+02	1.60E+02	1.60E+02	1.90E+02	1.50E+02	1.66E+02	1.70E+02	N/A
Sulfate Ion	2.75E+01	2.94E+01	2.86E+01	2.80E+01	2.71E+01	2.86E+01	2.84E+01	2.93E+01	2.90E+01	2.77E+01	2.87E+01	2.75E+01	N/A
Total Dissolved Solids (TDS)	7.30E+02	6.60E+02	6.80E+02	7.30E+02	6.80E+02	7.10E+02	7.00E+02	6.30E+02	6.40E+02	7.10E+02	6.70E+02	7.00E+02	N/A
Conductivity (uMhos)	1,350	1,300	1,200	1,200	1,250	1,400	1,300	1,300	1,300	1,300	1,200	1,300	N/A
pH	8.1	8.4	8.2	8.2	8.1	8.4	8.4	8.2	8.5	8.2	8.4	8.2	BETWEEN 2 & 12.5

Table 3-3
DOE DCG RATIOS CY-1994

RADIONUCLIDES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
C-14												
Co-60		3.60E-05	3.74E-05								4.61E-05	
Cs-134												
Cs-137	1.10E-04	1.01E-04	2.52E-05	1.46E-04	1.16E-04	1.69E-04	2.09E-04	3.31E-05				
H-3												
I-129												
Pu-238										1.03E-03	4.49E-04	
Pu-239												
Pu-241												
Ru-106												
Sb-125							6.38E-06					
Sr-90	9.00E-04			5.69E-04					2.51E-03			
U-234	3.60E-02	3.21E-03	3.20E-03	3.19E-03	3.21E-03	3.21E-03	3.01E-03	3.20E-03	3.21E-03	3.40E-03	3.20E-03	3.01E-03
U-235		5.01E-05	1.33E-04	6.65E-05	5.00E-05	8.36E-05		4.67E-05	8.36E-05	5.34E-05		8.19E-05
U-238		1.33E-03	1.17E-03	1.33E-03	1.33E-03	1.34E-03	1.34E-03	1.27E-03	1.22E-03	1.37E-03	1.28E-03	1.28E-03

Figure 3-1
SERVICE WASTE EFFLUENT
Total Activity (curies)

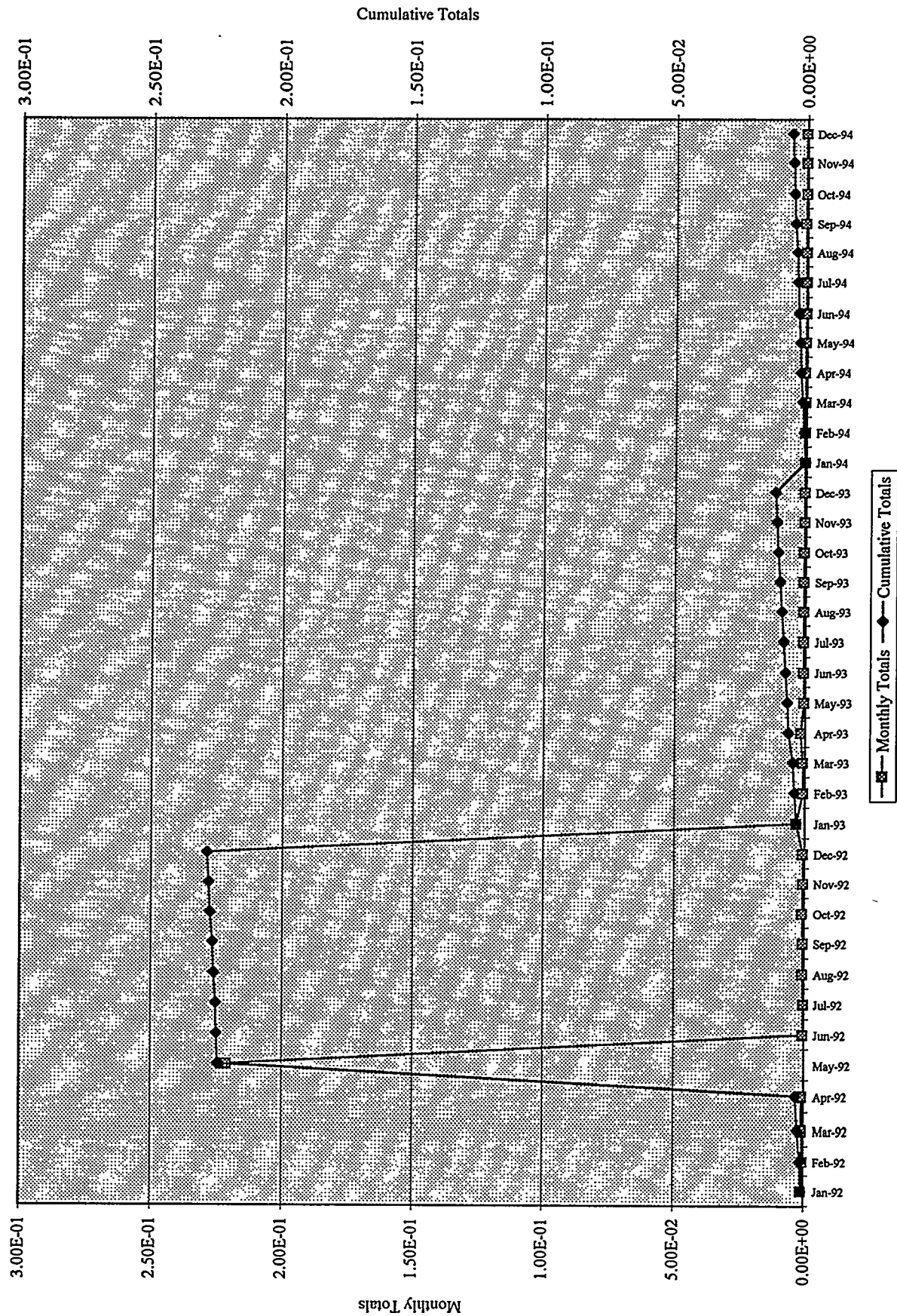


Figure 3-2
SERVICE WASTE EFFLUENT
Total-Pu (curies)

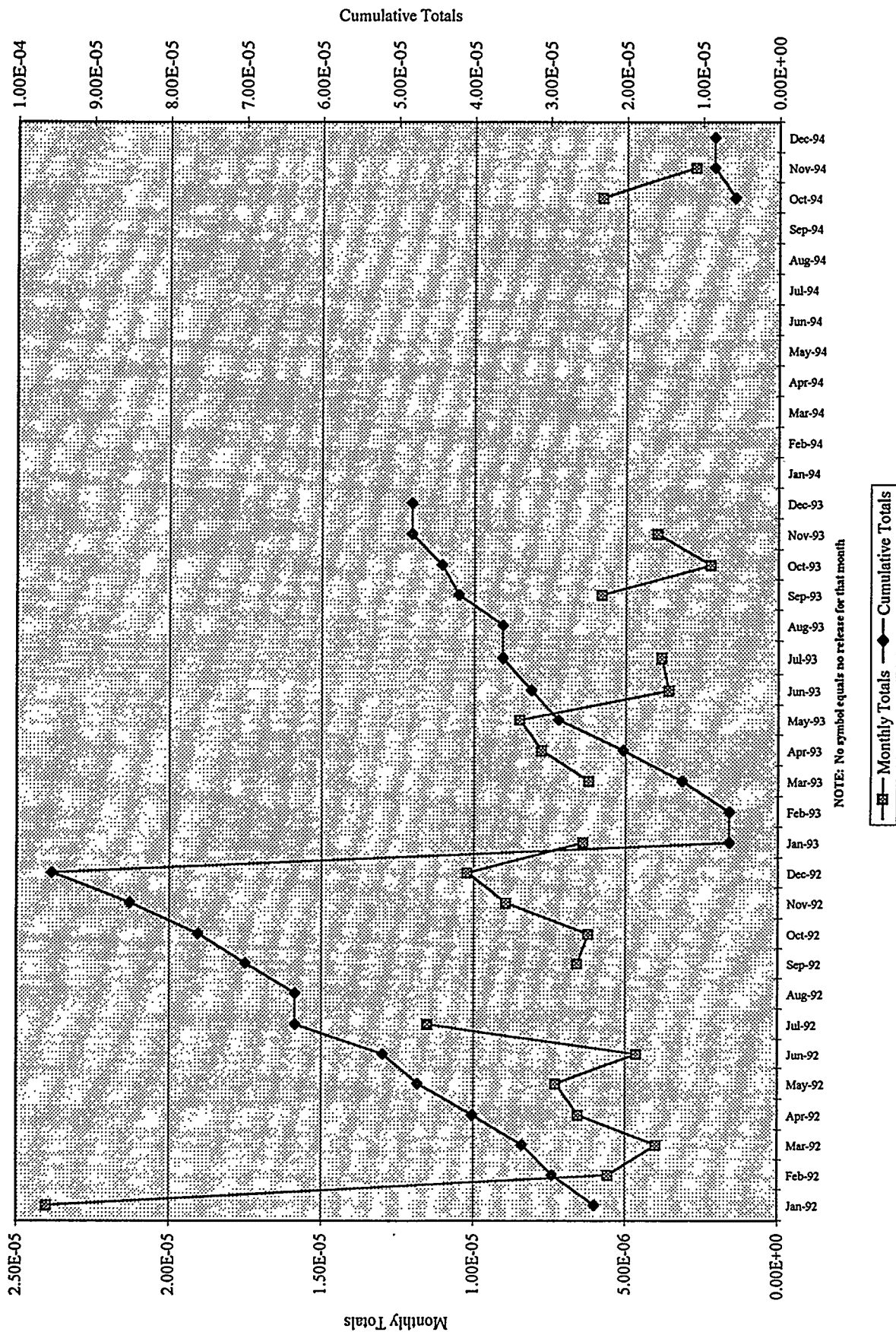


Figure 3-3
SERVICE WASTE EFFLUENT
Total-U (curies)

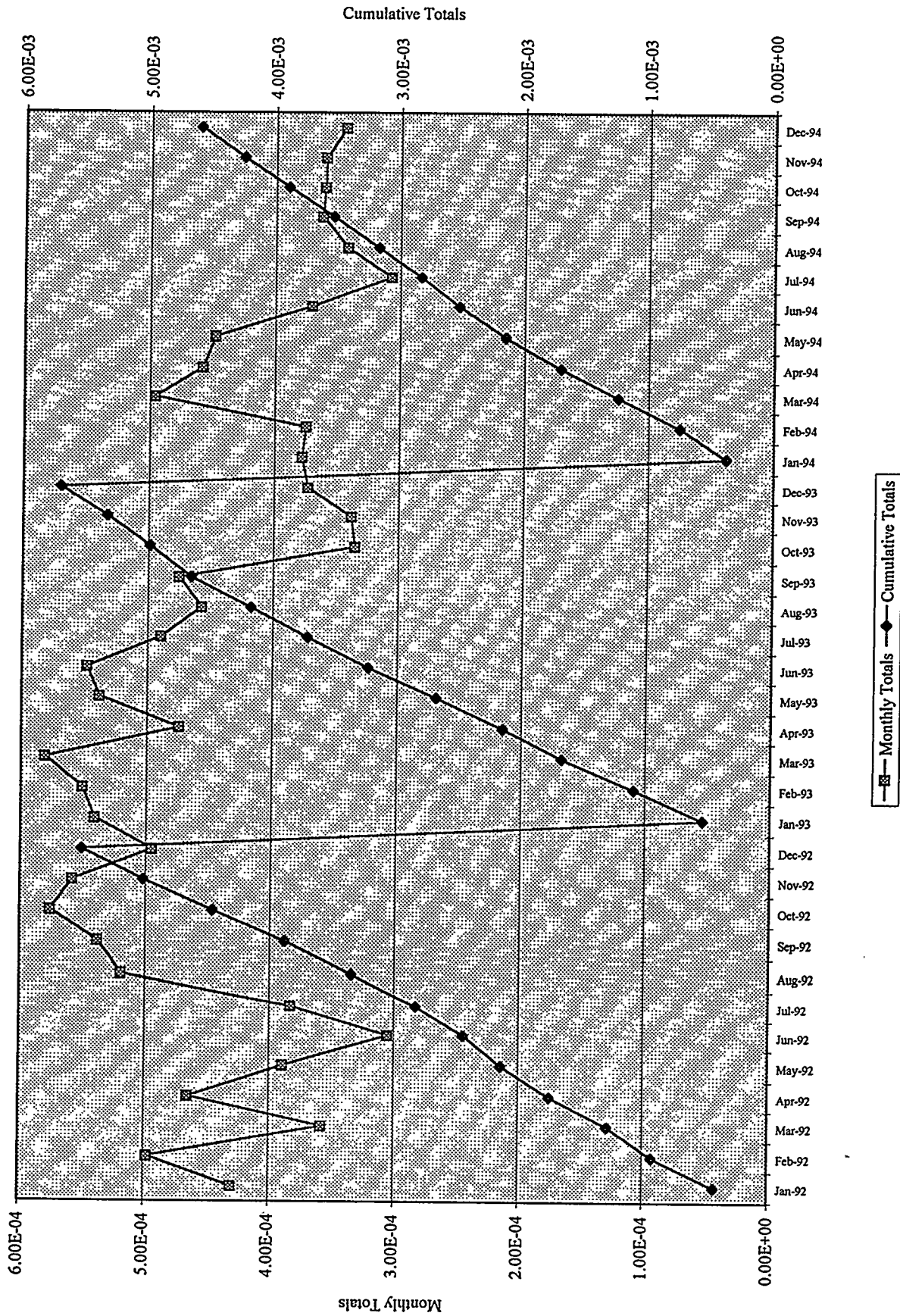


Figure 3-4
SERVICE WASTE EFFLUENT
H-3 (curies)

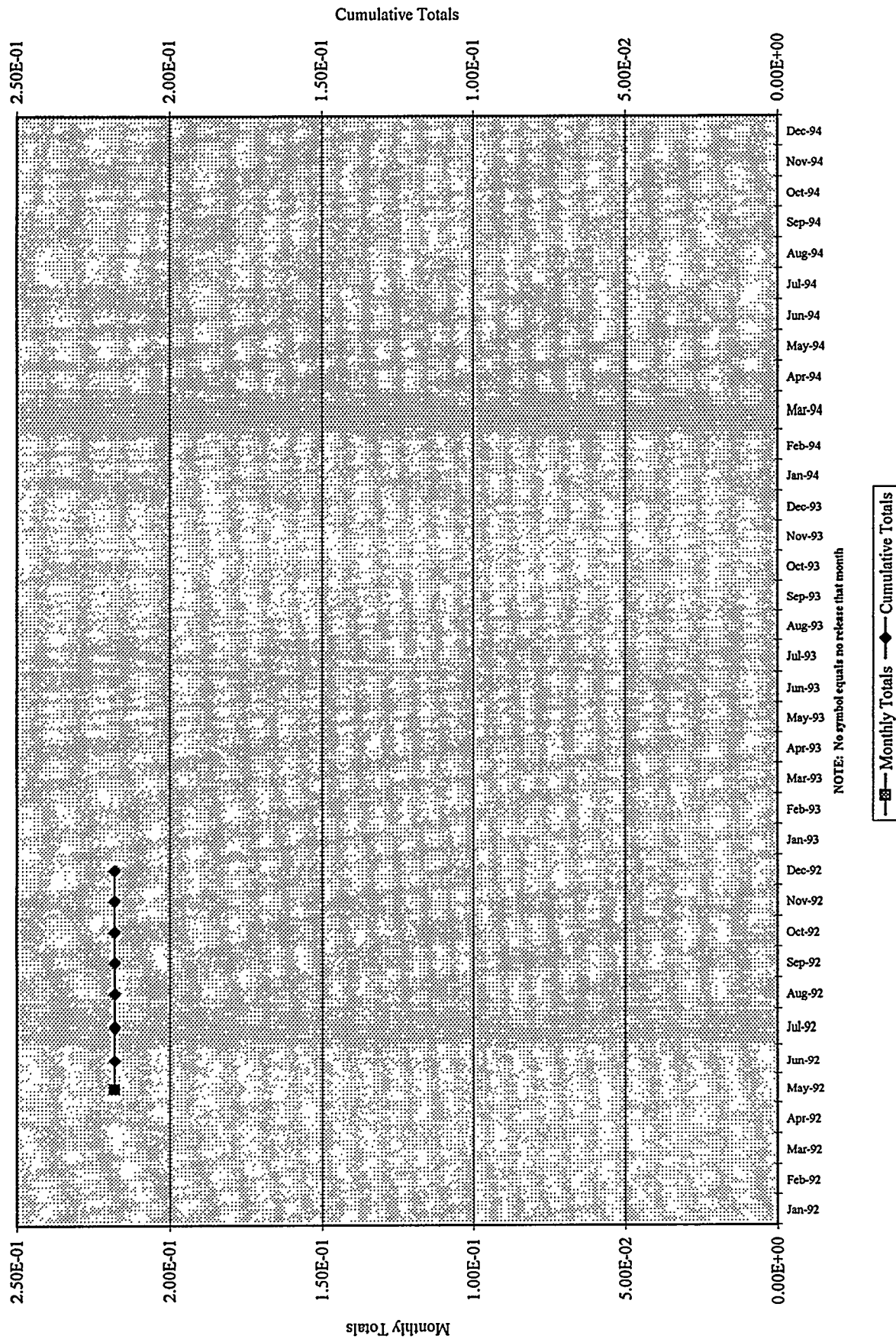


Figure 3-5
SERVICE WASTE EFFLUENT
Ru-106 (curies)

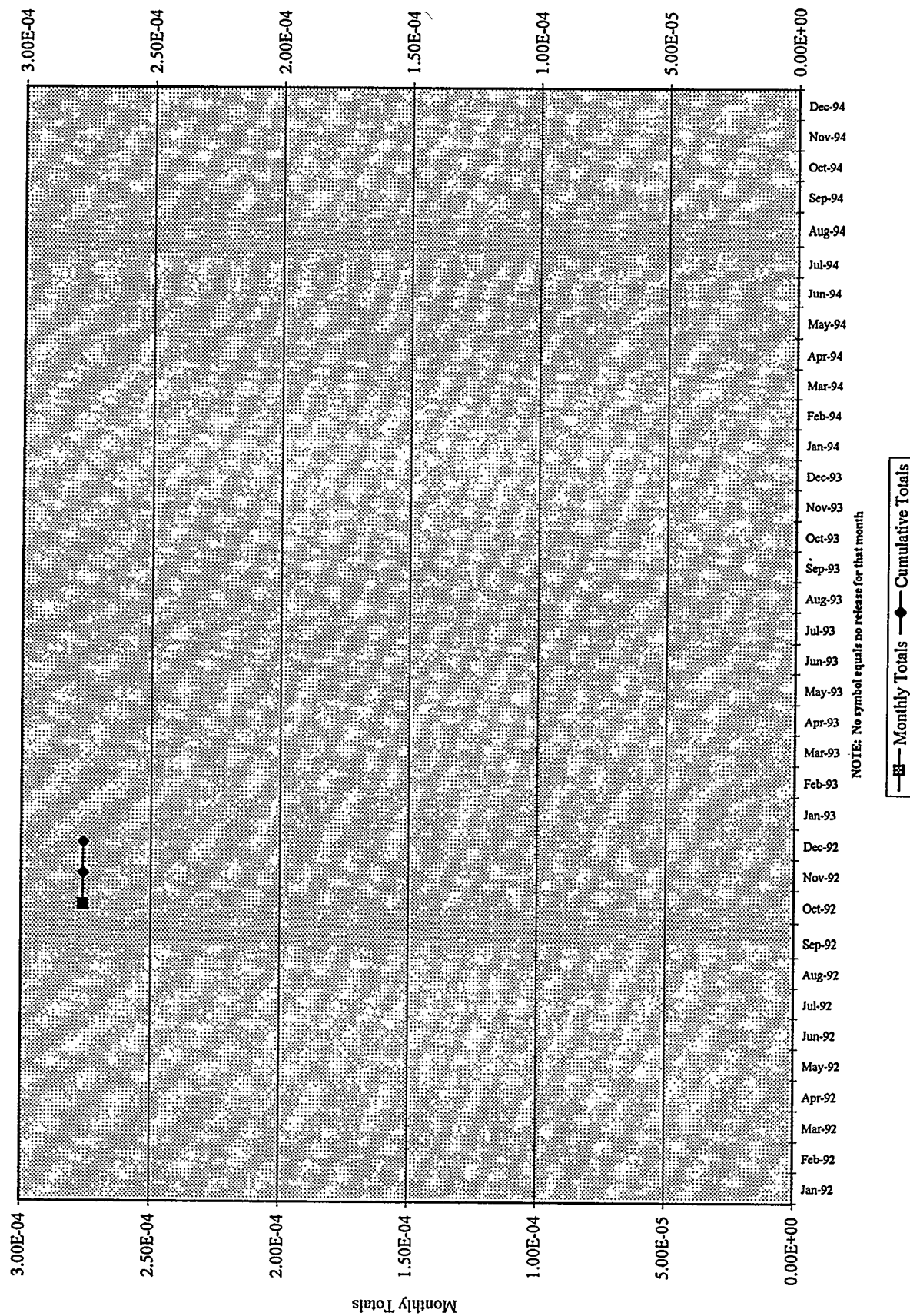


Figure 3-6
SERVICE WASTE EFFLUENT
Sr-90 (curies)

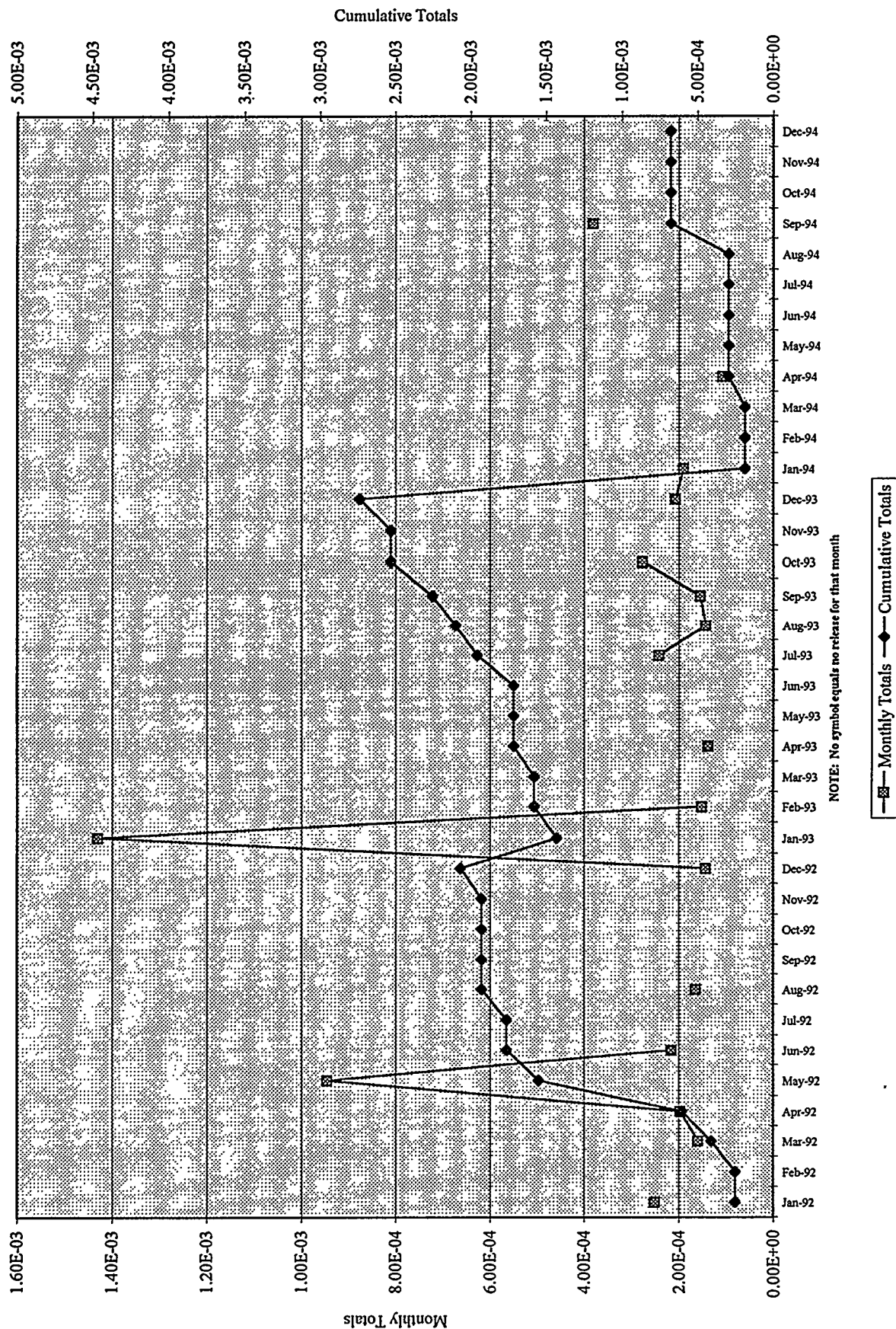
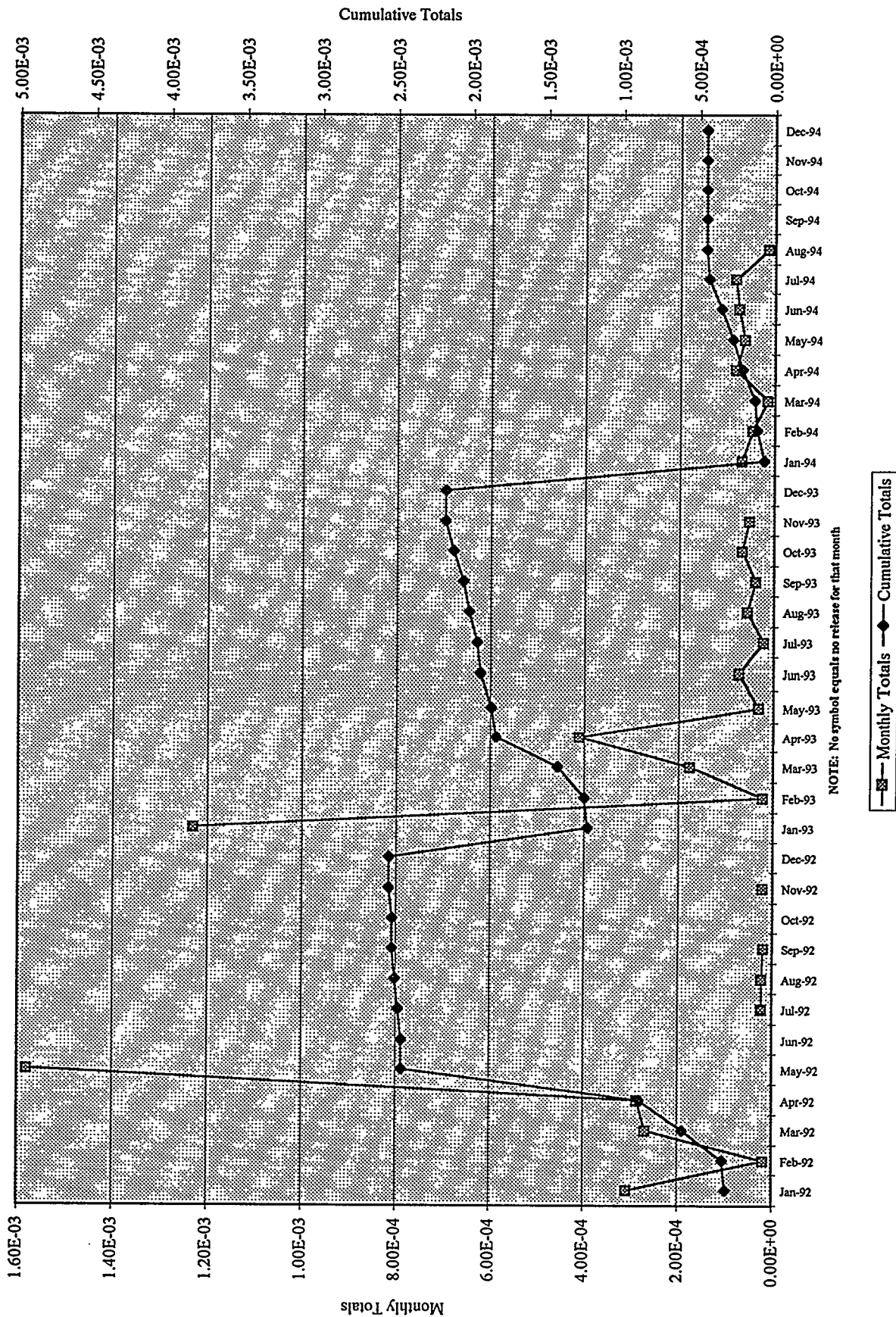


Figure 3-7
SERVICE WASTE EFFLUENT
Cs-137 (curies)



2.2 Production and Potable Water Wells

There are two production wells and one potable water well for influent at the ICPP. The production wells are operated alternately. Grab samples are collected monthly from the operating wells. Radiological analysis of the well water is done by the Accu-Labs Research, Inc.

Nonradiological analyses for arsenic, barium, cadmium, chloride, chromium, lead, mercury, nitrate, selenium, and silver are performed monthly by the Analytical Chemistry group. Periodically, grab samples are analyzed for the following organic contaminants: total organic carbon; Endrin; Lindane; Methoxychlor; Toxaphene; 2-4-D; and 2,4,5-TP Silvex.

Tables 3-4 and 3-5 list the results of the analyses performed on the Production and Potable Water Wells. All results indicate that the ICPP well waters are below all applicable regulatory standards for trace metals and organics. The Environmental Safety & Health department collects monthly samples of the wells to perform analyses for tritium and strontium, and sends the samples off-site to Acculab in Colorado.

2.3 Sewage Treatment Plant

Domestic waste water at the ICPP is pumped to the Waste Water Treatment Facility which is located outside the security fence. LITCO Power Plant Services is responsible for the operation and maintenance of the Waste Water Treatment Facility. LITCO Environmental Protection department takes monthly grab samples for radionuclides. The samples are analyzed for gross alpha, gross beta and gamma. The LITCO Environmental Safety & Health Department monitors the operation and performance of the domestic Waste Water Treatment Plant. Table 3-6 lists the monthly Biological Oxygen Demand (BOD), Dissolved Oxygen (DO) and pH for 1994. Table 3-6 also lists the monthly strontium, quarterly plutonium (total).

Monthly influent (raw) and effluent (final) Biological Oxygen Demand (BOD) concentrations are shown in Figure 3-8. The difference in concentrations between influent BOD and effluent BOD represents the treatment efficiency.

Since the facility has been operational, treatment efficiency has met design criteria (80%) except during algae blooms when excess algae overflows the effluent weir. Dissolved Oxygen (DO) levels in the influent and effluent are also indicators of proper operation. Values for influent and effluent DO are shown in Figure 3-9. Figure 3-10 lists the pH and Figure 3-11 represents STP volume.

2.4 ICPP Injection Well

The ICPP injection well was permanently sealed in November 1989.

Table 3-4
ICPP PRODUCTION WATER WELL CY-1994
(mg/L)

INORGANIC CHEMICALS	JAN	FEB	MAR	APR	MAY	*JUN	JUL	AUG	SEP	OCT	NOV	DEC	MAXIMUM CONTAMINANT LEVEL
Arsenic (As)													5.00E-02
Barium (Ba)	8.69E-02	8.90E-02	8.53E-02	8.17E-02	7.98E-02	7.98E-02	9.02E-02	8.48E-02	8.66E-02	8.68E-02	9.48E-02	9.03E-02	2.00E+00
Cadmium (Cd)				9.00E-04	4.00E-04	8.00E-04							5.00E-03
Chloride Ion	1.84E+01	1.75E+01	1.81E+01	1.76E+01	1.84E+01	2.08E+01	1.71E+01	1.79E+01	1.88E+01	2.02E+01	1.77E+01	1.60E+01	
Chromium (Cr)	5.45E-03	5.40E-03	6.20E-03	5.60E-03	6.20E-03	6.20E-03	6.05E-03	7.20E-03	5.10E-03	5.90E-03	6.00E-03	4.55E-03	1.00E-01
Fluoride Ion	2.16E-01		2.26E-01	2.43E-01	1.96E-01	2.09E-01	2.29E-01	2.09E-01	1.99E-01			2.04E-01	4.00E+00
Lead (Pb)				6.90E-03								5.32E-02	5.00E-02
Mercury (Hg)													2.00E-03
Nitrate Ion	4.68E+00	4.55E+00	4.84E+00	4.64E+00	4.57E+00	4.91E+00	4.55E+00	4.83E+00	4.75E+00	4.73E+00	4.65E+00	4.64E+00	1.00E+01
Phosphate Ion													
Selenium (Se)												2.50E-03	5.00E-02
Silver (Ag)													
Sodium (Na)	8.00E+00	8.30E+00	7.80E+00	7.20E+00	7.20E+00	7.00E+00	7.30E+00	7.80E+00	7.30E+00	7.80E+00	7.50E+00	8.10E+00	
Sulfate Ion	2.34E+01	2.57E+01	2.71E+01	2.68E+01	2.61E+01	2.67E+01	2.49E+01	2.67E+00	2.80E+01	2.76E+01	2.59E+01	2.60E+01	

Blanks represent below detection limit

Information Source: Analytical

*NOTE: Ref: Letter LRS-66-94, dated June 30, 1994. Potable well out of service. Production wells are being used as ICPP's potable water source until construction is complete on new potable well

Table 3-5
ICPP POTABLE WELL CY-1994
(mg/L)

INORGANIC CHEMICALS	JAN	FEB	MAR	APR	MAY	*JUN	JUL	AUG	SEP	OCT	NOV	DEC	MAXIMUM CONTAMINANT LEVEL
Arsenic (As)													5.00E-02
Barium (Ba)	8.52E-02	9.22E-02	8.33E-02	8.15E-02	8.50E-02		8.52E-02	9.15E-02	9.16E-02	8.74E-02	9.42E-02	2.90E-03	2.00E-02
Cadmium (Cd)					3.90E-03								5.00E-03
Chloride Ion	1.71E+01	1.77E+01	1.97E+01	1.74E+01	1.81E+01		2.00E+01	1.73E+01	1.73E+01	1.80E+01	1.88E+01	1.60E+01	
Chromium (Cr)	5.50E-03	5.80E-03	5.60E-03	5.20E-03	5.70E-03		5.75E-03	3.00E-03	3.90E-03	5.40E-03	6.60E-03	6.65E-03	1.00E-01
Fluoride Ion	2.25E-01		2.19E-01	2.32E-01	2.19E-01		2.14E-01	2.11E-01	2.08E-01	2.01E-01		2.10E-01	4.00E+00
Lead (Pb)													5.00E-02
Mercury (Hg)													2.00E-03
Nitrate Ion	4.67E+00	4.66E+00	4.77E+00	4.69E+00	4.53E+00		4.63E+00	4.89E+00	4.50E+00	4.77E+00	4.71E+00	4.73E+00	1.00E+01
Phosphate Ion													
Selenium (Se)	7.10E-03												5.00E-02
Silver (Ag)													
Sodium (Na)	7.70E+00	8.30E+00	8.00E+00	8.30E+00	7.40E+00		7.50E+00	7.30E+00	7.30E+00	7.40E+00	7.50E+00	9.90E+01	
Sulfate Ion	2.51E+01	2.73E+01	2.84E+01	2.59E+01	2.67E+01		2.66E+01	2.47E+01	2.72E+01	2.51E+01	2.55E+01	2.60E+01	

Blanks represent below detection limit

Information Source: Analytical

*NOTE: Ref: Letter LRS-66-94, dated June 30, 1994. Potable well out of service. Production wells are being used as ICPP's potable water source until construction is complete on new potable well

Table 3-6
SEWAGE TREATMENT PLANT ANALYSIS
CY-1994

	JAN	FEB	*MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
RAW BOD	155	108	192	158	100	164	123	103	92	133	90	98
FINAL BOD	15	22	23	33	37	57	47	17	16	22	10	10
EFFICIENCY	90%	80%	88%	79%	63%	65%	62%	83%	83%	83%	89%	90%
RAW DO	1.12	0.93	0.65	0.87	1.05	1.09	0.89	0.83	0.78	1.29	1.66	1.45
FINAL DO	3.8	4.41	7.89	6.85	5.48	6.35	5	3.46	4.91	7.17	9.3	10.29
RAW PH	8.67	8.49	8.16	8.17	7.91	8.2	7.96	8.01	7.84	7.8	8.14	8.02
FINAL PH	8.04	7.79	8.01	7.93	7.97	8.4	8.97	7.65	7.73	7.95	8.38	8.11
TOTAL VOLUME (G)	3.11E+06	1.37E+06		1.91E+06	4.44E+06	5.91E+06	3.15E+06	1.95E+06	1.43E+06	1.02E+06	1.64E+06	1.99E+06
RADIONUCLIDES												
SR-89												
SR-90												
PU-TOTAL (QTR)												

NOTE: BLANKS FOR RADIONUCLIDES REPRESENT BELOW DETECTION LIMITS.
SOME DIFFICULTIES MAKING NEW METERING SYSTEM FUNCTIONAL AT STP. BEGINNING WITH AUGUST, MORE ACCURATE DATA HAS BECOME AVAILABLE
No flow reported for March

Figure 3-8
SEWAGE TREATMENT PLANT
BOD

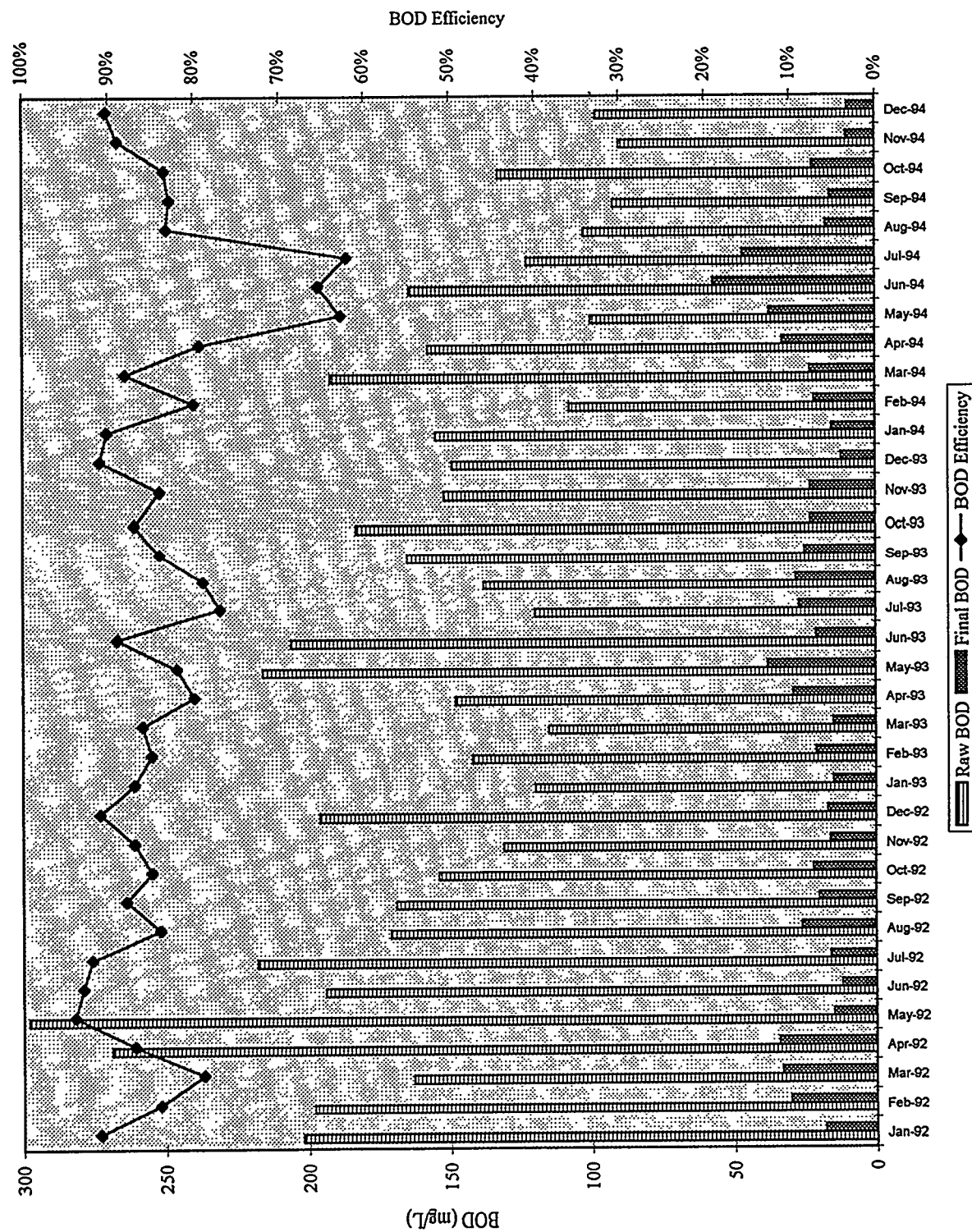


Figure 3-9
SEWAGE TREATMENT PLANT
DO

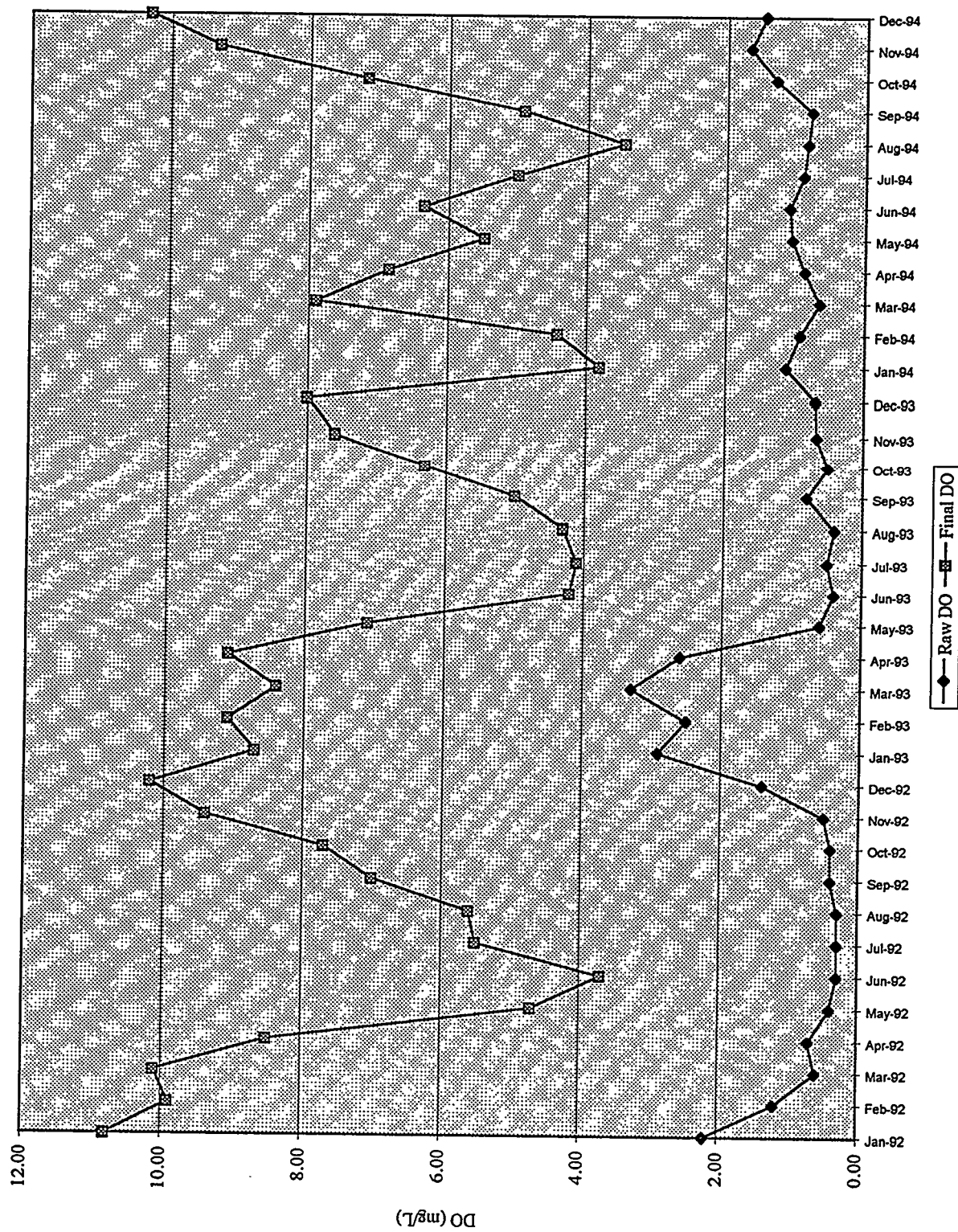


Figure 3-10
SEWAGE TREATMENT PLANT
pH

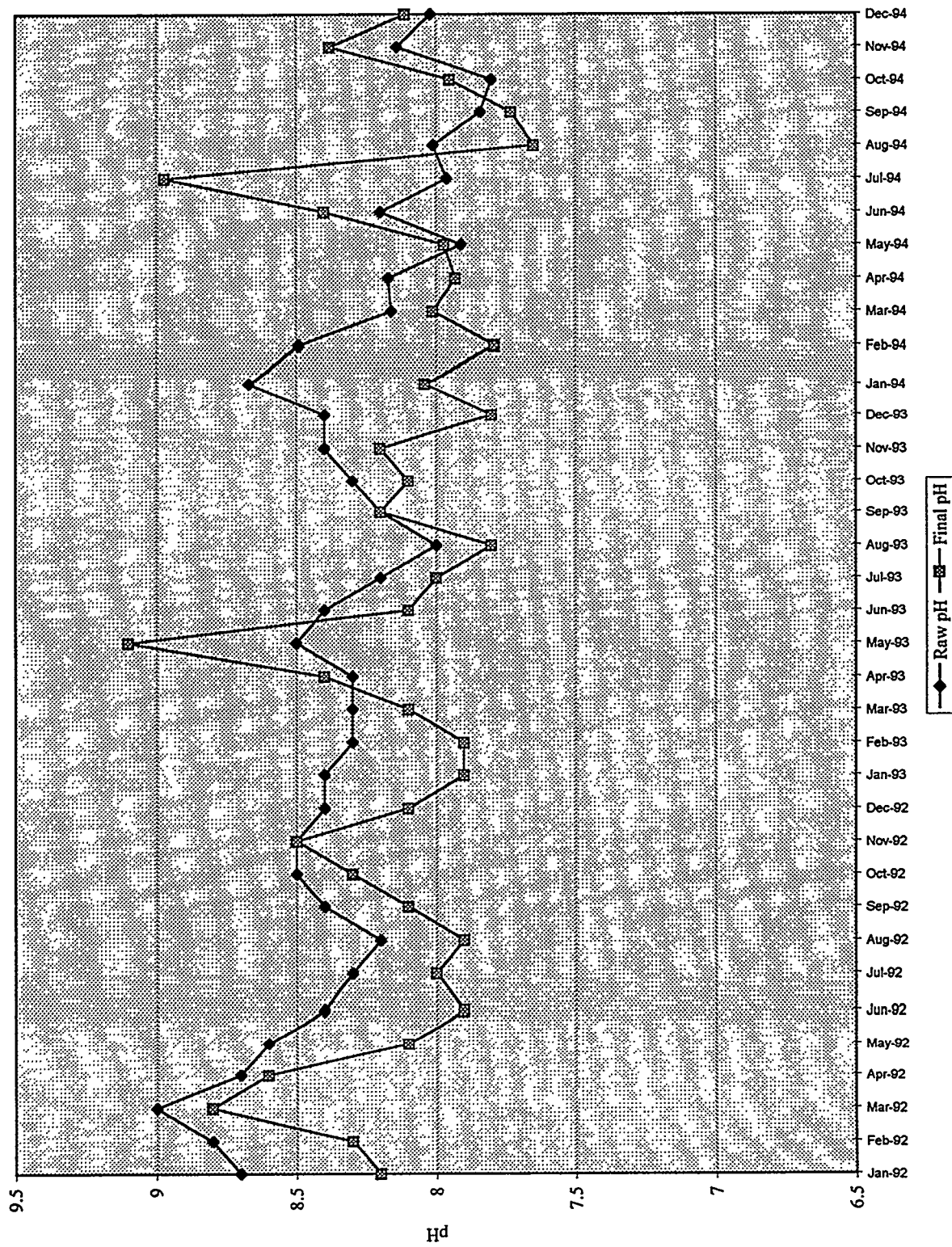


Figure 3-11
SEWAGE TREATMENT PLANT
Volume

