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CY-1981 EFFLUENT MONITORING REPORT

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by

R. J. Honkus

May 1982

**EXON NUCLEAR IDAHO COMPANY, Inc.**

PREPARED FOR THE  
**DEPARTMENT OF ENERGY**  
**IDAHO OPERATIONS OFFICE**  
UNDER CONTRACT DE-AC07-79ID01675

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*Harry E. Williams*  
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Effluent Monitoring Report  
Idaho Chemical Processing Plant (ICPP)  
CY-1981

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General

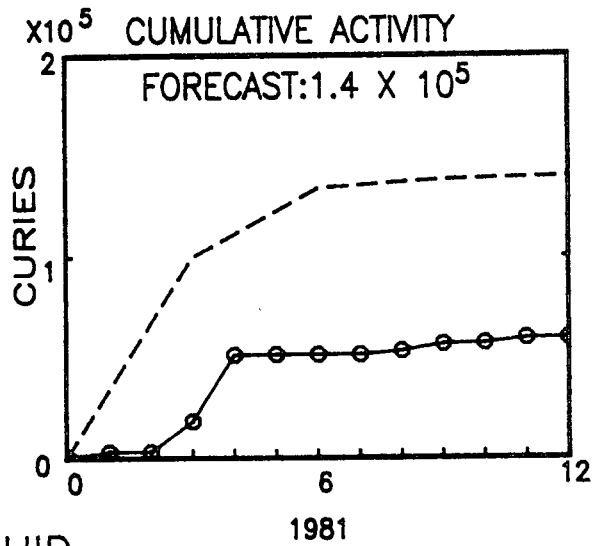
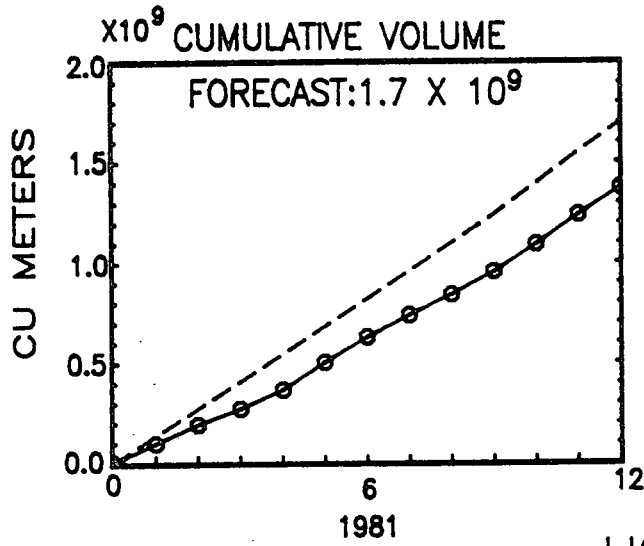
This is a summary of the effluent monitoring programs at ICPP for calendar year 1981. During the year, five significant occurrences or unplanned releases occurred. These are briefly described and presented in Table I. In none of the instances were the applicable Radiation Concentration Guides (RCG's) exceeded.

Figure I presents graphically a summary of the total Airborne, Liquid and Solid releases during CY-1981. Liquid waste activity was higher than anticipated due to various processing factors throughout the year. The Solid waste jumped dramatically in December due to shipment of end-products from the EBR-II fuel which was processed during the Electrolytic campaign.

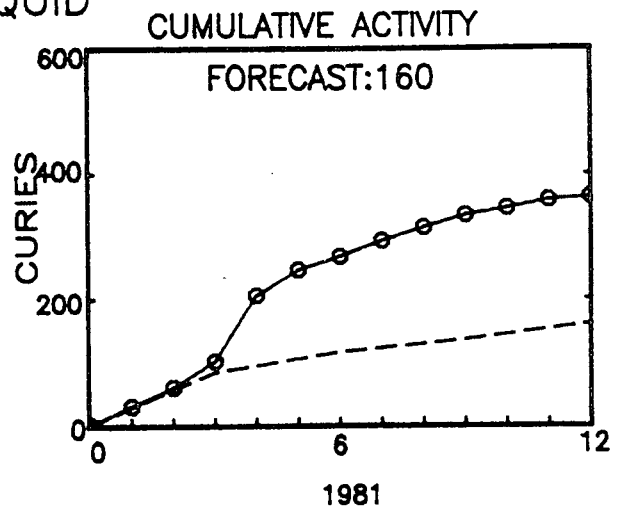
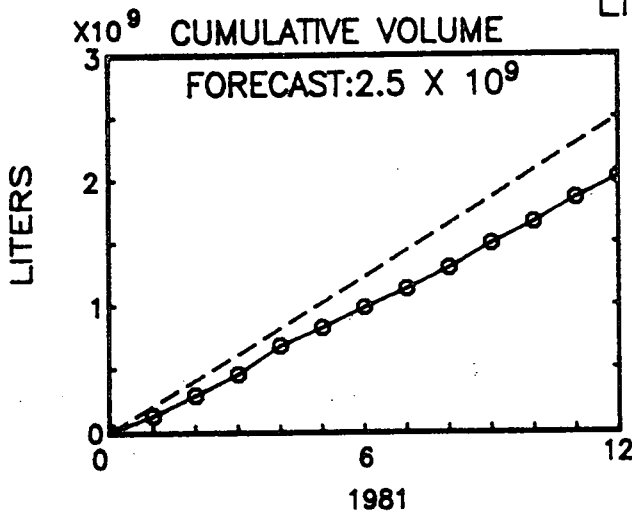
## Significant Occurrences and Unplanned Releases

- I. Date: February 22, 1981  
Time: 1130 hrs  
Type of Release: Airborne  
Major Nuclide(s): Kr-85  
Total Activity: 900 Ci  
Description: Residual Kr-85 in storage tank WM-158A and WM-158B was purged to the stack during testing of the Rare Gas Plant. Release was twenty times that for normal operating conditions resulting in violation of CSOP 1.6.10 (Unusual Occurrence Report (UOR) #81-06).
- II. Date: March 16, 1981  
Time: 0015 hrs  
Type of Release: Airborne  
Major Nuclide(s): Sb-125  
Total Activity: 26 mCi  
Description: Significant increase in the activity collected on the stack filter over a seven hour period. The activity, Sb-125, was the result of the E-cell dissolver operation.
- III. Date: March 18, 1981  
Time: 0800 hrs  
Type of Release: Airborne  
Major Nuclide(s): Ru-106  
Total Activity: 58 mCi  
Description: Significant release of Ru-106 via the stack due to a breached filter at the Waste Calciner Facility.
- IV. Date: March 23, 1981  
Time: 1600 hrs  
Type of Release: Liquid  
Major Nuclide(s): Normal release  
Total Activity: Normal release  
Description: The glass sample flask in monitor RE-YDA-EIB in CPP-709, ESSW, was broken and leaking water shorted out the electronics for both monitors (RE-YDA-EIA & RE-YDA-EIB). Technical Specification 4.2B11 limits outage of these monitors to four hours. When the four hour time limit was reached, neither monitor was back in service so in accordance with T.S. 4.2B11, the plant processes were shut down.
- V. Date: May 27, 1981  
Time: 0045 hrs  
Type of Release: Liquid  
Major Nuclide(s): Cs-137, Ru-106, Sr-90, & Sb-125  
Total Activity: 25 mCi  
Description: Activity was carried into the low level waste tank (WL-103) through a steam jet line. WL-103 pumps automatically to the the injection well through WSSW, CPP-734 (UOR #81-14).

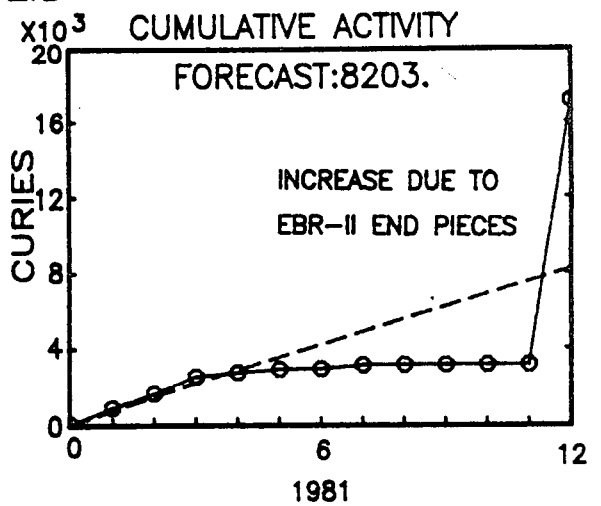
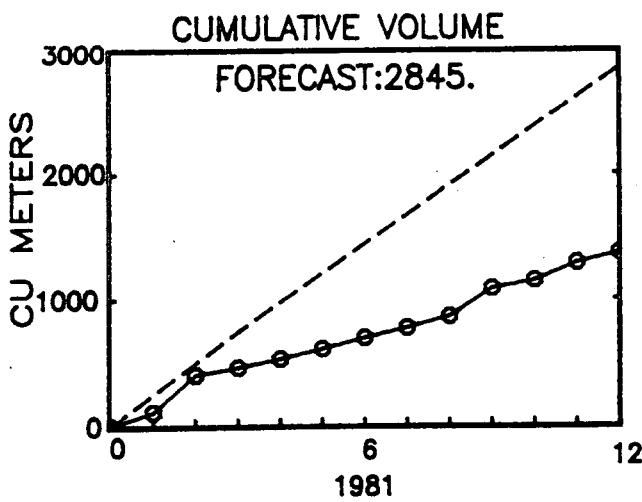
# AIRBORNE



# LIQUID



# SOLID



## SUMMARY OF EFFLUENT RELEASES — CY 1981

Figure 1

## Liquid Releases to the Injection Well, CY-1981

- A) Radioactive Discharges: Table II presents the radioactive releases to the injection well for CY-1981. Figures 2-4 present graphically the release of several nuclides. Several factors have influenced the quantity of various nuclides and the release of several nuclides which are unusual for ICPP.

The total activity exceeded the 1981 forecast value mainly due to a longer coprocessing campaign than anticipated during the second quarter. Increased levels of Cs-137 and Sr-90 were released during April and May due to operation of the WC-114 evaporator. The processing of EBR-II fuel during the electrolytic campaign increased the quantity of Ru-106 released during the fourth quarter. The evaporation of this waste during November and December also resulted in increased Ru-106 and some nuclides unusual for ICPP being released. The fuel was out of the reactor for only 127 days when it was processed therefore some short lived nuclides (I-131, Nb-95, Mn-54, Zr-95, Ru-103) were present in the waste.

Table III presents the concentration of nuclides released for CY-1981 and compares these to the applicable DOE Radiation Concentration Guide (DOE 5480.1, Chapter XI, Attachment IX-1, Table II, Column 2). Figure 5 presents this graphically. It is important to note that during 1981, ICPP made the transition from meeting controlled area RCG's to uncontrolled area RCG's. The aforementioned DOE Chapter requires that the sum of the annual average concentration to "RCG Ratio" of all nuclides not exceed one. In addition, any nuclide which has a concentration of less than one tenth of the RCG for that nuclide can be excluded provided that the sum of all such nuclide's "RCG Ratios" do not exceed .25.

- B) Non-Radioactive Releases: Table IV presents the non-radioactive releases to the injection well during CY-1981. The non-radioactive releases have been broken down into four categories: Inorganic chemicals, Ions, Organics, and Water Quality Parameters. The applicable maximum contaminant level for the inorganics and organic chemicals are those listed in 40 CFR 261, Regulations for Identifying Hazardous Waste (RCRA legislation).

Figures 6-10 present graphically the concentration of inorganics. In March 1981, the level of magnesium was high in the raw water supply which caused interference with various analyses. The service waste sample is a monthly composite so there was no way to verify March's analysis results. However, it leaves a question as to whether the results for March are accurate. The service waste is analyzed annually for organic chemicals, all of which were below the minimum detectable level for CY-1981.

TABLE II. Liquid Releases to the Injection Well CY-1981

	<u>RADIOACTIVE DISCHARGES</u>						<u>CY-1981 Total Activity</u>
	<u>Jan July</u>	<u>Feb Aug</u>	<u>Mar Sept</u>	<u>Apr Oct</u>	<u>May Nov</u>	<u>June Dec</u>	
<u>Total Activity (Ci)</u>	2.90E+01 2.52E+01	3.02E+01 2.16E+01	4.13E+01 1.96E+01	1.05E+02 1.10E+01	4.09E+01 1.29E+01	2.12E+01 4.95E+00	3.63E+02
<u>Total Volume (ml)</u>	1.26E+11 1.49E+11	1.59E+11 1.65E+11	1.68E+11 1.94E+11	2.28E+11 1.67E+11	1.42E+11 1.93E+11	1.62E+11 1.64E+11	2.01E+12
<u>Nuclides (mCi)</u>							
C-14	3.07E-01 1.41E+00	1.59E+00 5.37E+00	1.99E+00 1.47E+00	1.23E+01 2.40E+00	2.23E+00 2.56E+00	1.80E+00 9.56E-01	3.45E+01
Ce-144	- 5.05E+00	2.28E+00 3.27E+00	3.26E+00 3.89E+00	3.48E+00 7.70E+00	9.71E+00 2.19E+01	6.85E+00 1.72E+01	8.46E+01
Co-57	- 2.79E-01	- 4.03E-01	- -	1.74E-01 -	5.11E-01 5.74E-01	- -	1.94E+00
Co-60	- 1.84E-01	- -	- -	- 7.70E-01	- 2.76E-01	- -	1.23E+00
Cs-134	4.60E-01 2.86E+00	1.50E+00 1.78E+00	1.47E+00 1.15E+00	3.65E+00 1.63E+00	5.51E+00 3.23E+00	3.97E+00 1.01E+00	2.82E+01
Cs-137	2.10E+00 2.87E+01	8.56E+00 5.22E+01	1.24E+01 4.19E+01	4.20E+01 4.53E+01	7.51E+01 3.81E+01	5.34E+01 1.86E+01	4.18E+02
H-3	2.90E+04 2.51E+04	3.02E+04 2.15E+04	4.12E+04 1.94E+04	1.05E+05 1.08E+04	4.07E+04 1.25E+04	2.11E+04 2.94E+03	3.58E+05
I-129	6.16E+00 6.28E+00	6.22E+00 7.86E+00	4.11E+00 1.96E+00	1.80E+00 1.53E+00	3.05E+00 2.64E+00	5.17E+00 6.37E-01	4.73E+01
I-131	- -	- -	- -	- -	- 8.97E+01	- 5.60E-01	9.03E+01
Mn-54	- -	- -	- -	- 2.50E-01	- 3.15E-01	- -	5.65E-01
Nb-95	- -	- -	- -	- -	- 3.40E+01	- 6.24E+01	9.64E+01
Pu-238	5.12E-02 3.92E+00	2.84E-01 1.65E-01	2.17E-01 2.31E-01	2.03E-01 1.18E+00	3.61E-01 6.78E-01	9.22E-01 9.20E-02	8.30E+00



TABLE II (Cont)  
Liquid Releases to the Injection Well CY-1981

RADIOACTIVE DISCHARGES

Nuclides (mCi) (contd.)	Jan July	Feb Aug	Mar Sept	Apr Oct	May Nov	June Dec	CY-1981 Total Activity
Pu-239/240	1.36E-02 1.86E-01	2.15E+00 9.84E-03	1.36E-02 4.88E-02	1.85E-02 1.68E-01	1.65E-03 2.61E-01	8.78E-02 3.60E-02	3.01E+00
Ru-103	- -	- -	- -	- -	- -	- 4.32E+01	4.32E+01
Ru-106	- 7.76E+00	- -	4.53E+00 4.40E+01	2.39E+00 3.80E+01	1.37E+01 5.01E+01	9.88E+00 8.82E+02	1.05E+03
Sb-125	4.60E-01 -	- -	1.09E+00 -	- 3.13E+00	- 6.78E+00	- 2.97E+01	4.12E+01
Sr-89	2.72E-01 1.62E+00	1.29E+00 7.16E+00	4.53E-01 3.15E+00	1.23E+00 3.17E+00	1.15E+00 3.13E+00	3.95E+00 2.78E+00	2.94E+01
Sr-90	2.35E+00 2.02E+01	3.28E+00 1.34E+01	7.02E+00 3.04E+01	1.03E+01 2.81E+01	2.57E+01 2.40E+01	1.67E+01 2.50E+01	2.06E+02
U-234	2.11E-01 2.76E-01	3.88E-03 5.19E-01	2.81E-01 4.13E-01	4.62E-01 3.99E-01	3.84E-01 4.54E-01	7.11E+00 3.84E-01	1.09E+01
U-235	4.09E-03 8.99E-03	4.31E-04 1.03E-02	5.44E-03 8.92E-03	1.54E-01 8.61E-03	1.92E-02 7.30E-03	9.44E-01 7.54E-03	1.19E+00
U-238	9.55E-02 1.05E-01	9.91E-01 2.24E-01	1.36E-01 1.68E-01	2.46E-02 1.63E-01	1.04E-01 1.93E-01	1.89E-01 1.56E-01	2.55E+00
Zr-95	- -	- -	- -	- -	- 9.64E+01	- 1.06E+01	1.07E+02

# ICPP LIQUID EFFLUENT TRITIUM

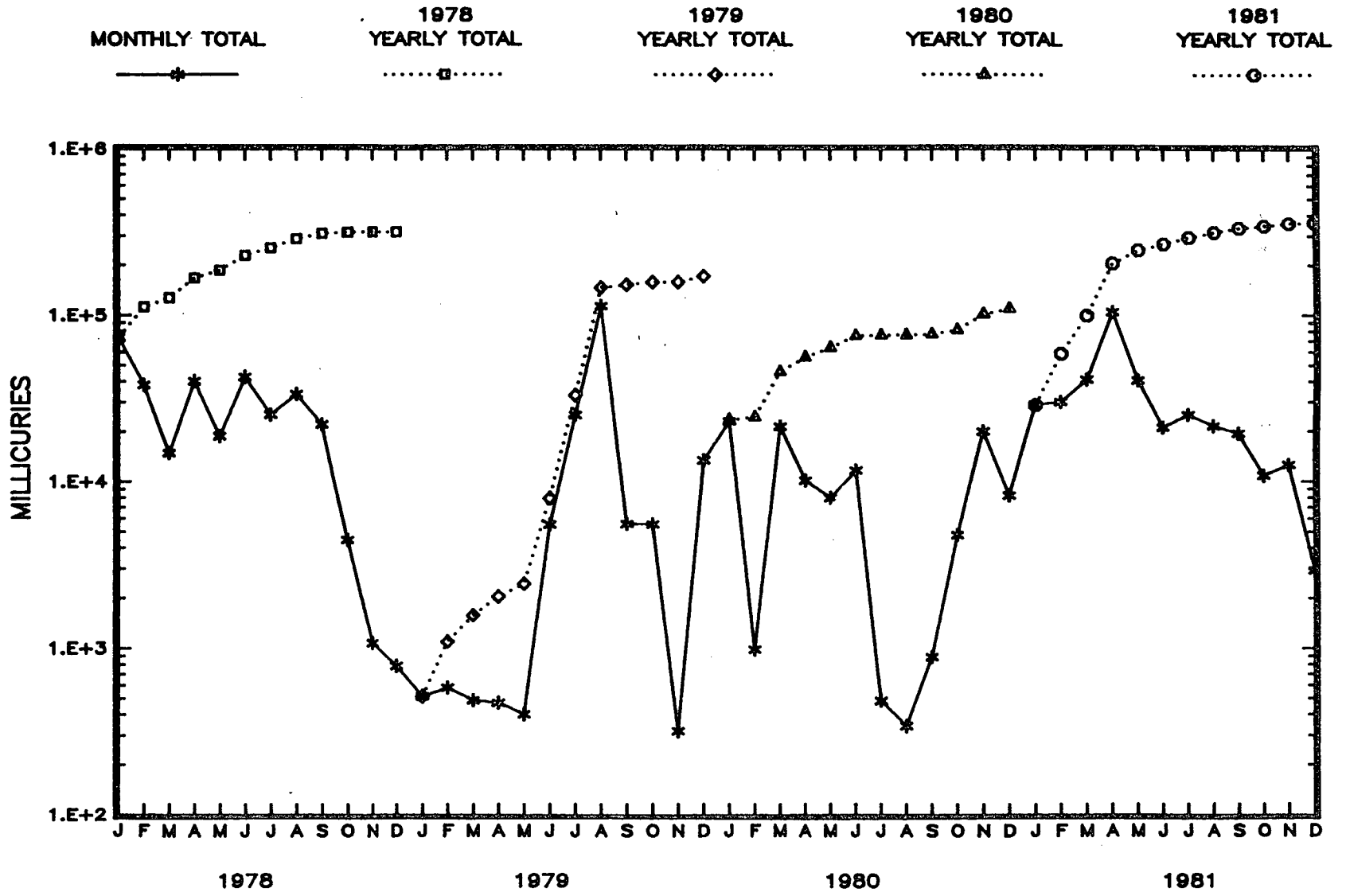


Figure 2

# ICPP LIQUID EFFLUENT Iodine-129

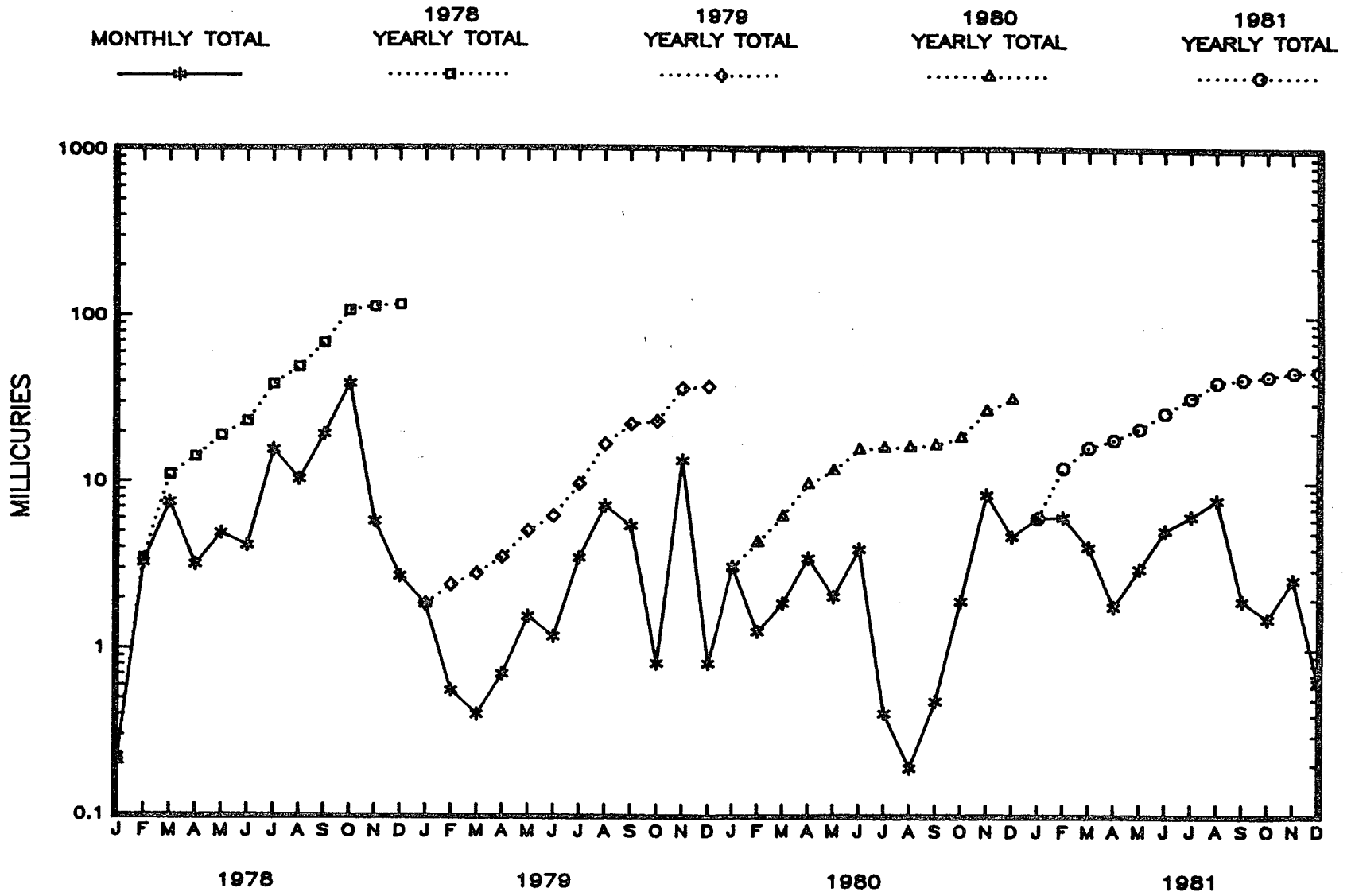


Figure 3

# ICPP LIQUID EFFLUENT PLUTONIUM

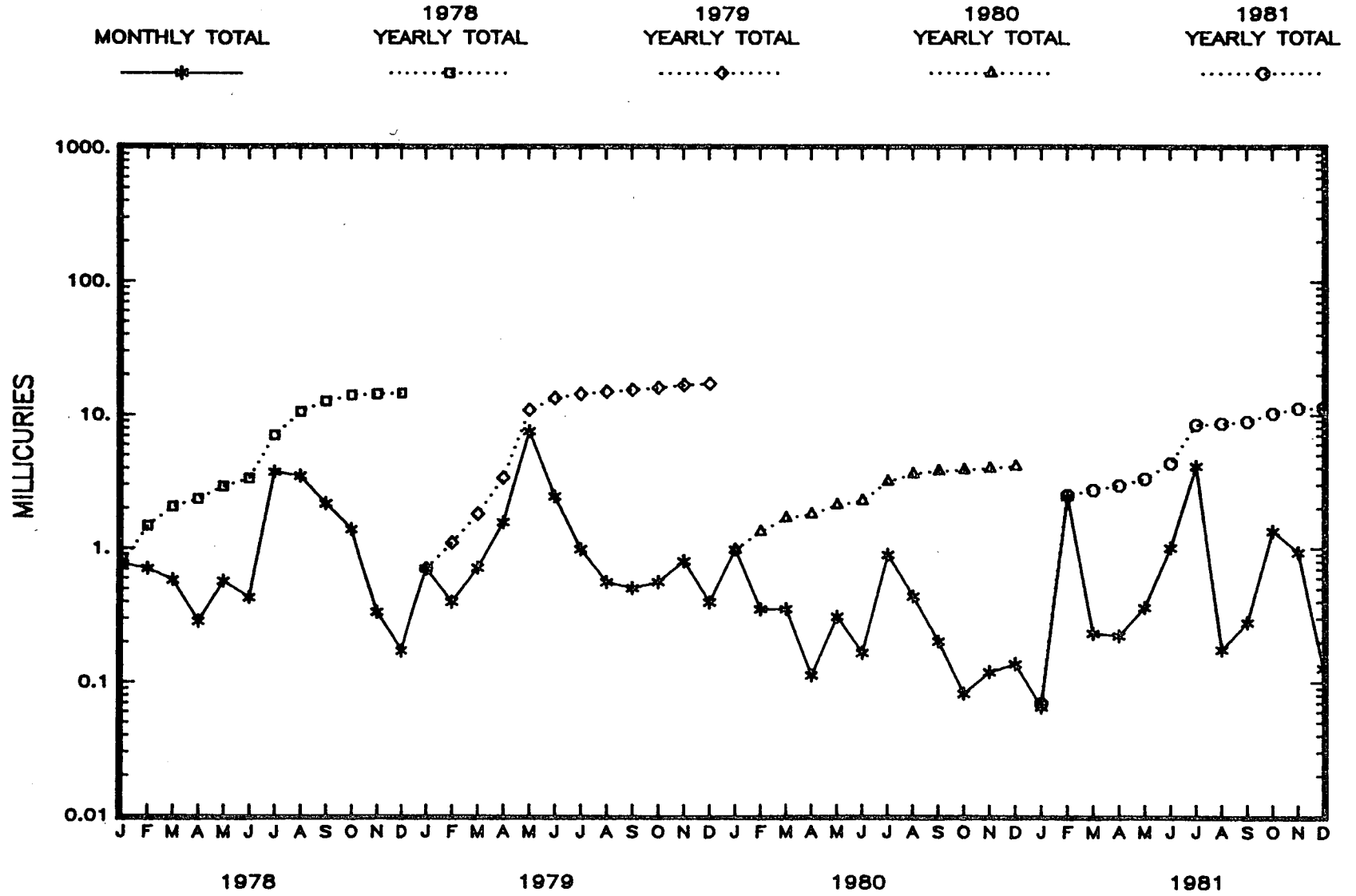


Figure 4

TABLE III

Nuclide	CY-1981 Average Concentration ( $\mu\text{Ci/ml}$ )	Uncontrolled Area Radiation Concentration Guide (RCG) ( $\mu\text{Ci/ml}$ )	Ratio of Concentration to RCG
C-14	1.72E-08	8E-04	2.15E-05
Ce-144	4.21E-08	1E-05	4.21E-03
Co-57	9.65E-10	4E-04	2.41E-06
Co-60	6.12E-10	3E-05	2.04E-05
Cs-134	1.40E-08	9E-06	1.55E-03
Cs-137	2.08E-07	2E-05	1.04E-02
H-3	1.78E-04	3E-03	5.93E-02
I-129	2.35E-08	6E-08	3.92E-01
I-131	4.49E-08	3E-07	1.50E-01
Mn-54	2.81E-10	1E-04	2.81E-06
Nb-95	4.80E-08	1E-04	4.80E-04
Pu-238	4.13E-09	5E-06	8.26E-04
Pu-239/240	1.50E-09	5E-06	3.00E-04
Ru-103	2.15E-08	8E-05	2.69E-04
Ru-106	5.22E-07	1E-05	5.22E-02
Sb-125	2.05E-08	1E-04	2.05E-04
Sr-89	1.46E-08	3E-06	4.87E-03
Sr-90	1.02E-07	3E-07	3.40E-01
U-234	5.43E-09	3E-05	1.81E-04
U-235	5.92E-10	3E-05	1.97E-05
U-238	1.27E-09	4E-05	3.17E-05
Zr-95	5.32E-08	6E-05	8.87E-04
			1.02E+00
		Corrected Ratio	8.82E-01

# HISTORICAL COMPARISON Radioactivity in Injection Well

vs

EPA - UIC guidelines

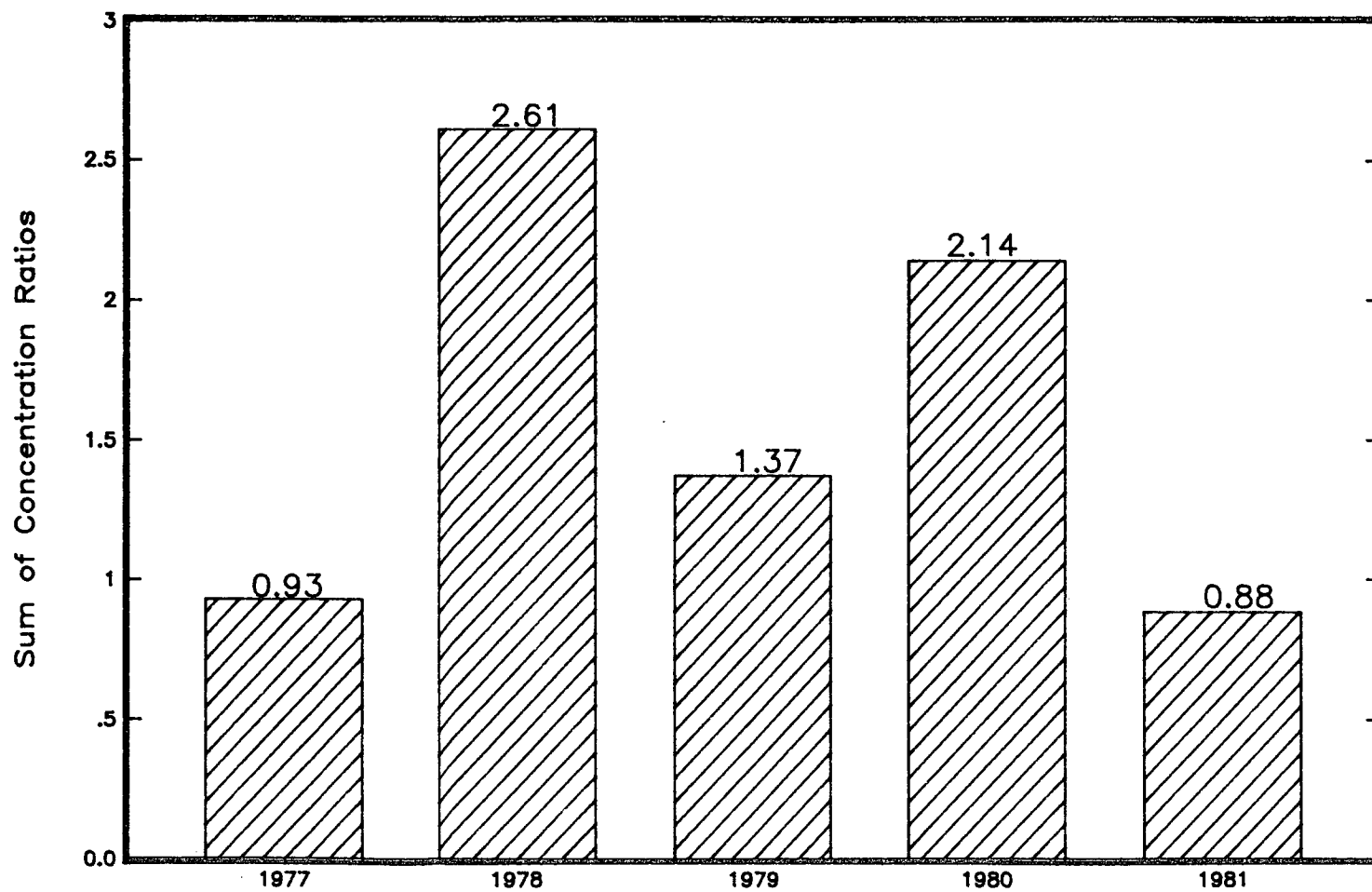


Figure 5

TABLE IV. Liquid Released to the Injection Well, CY-1981

NON-RADIOACTIVE RELEASES

Inorganic Chemicals ( $\mu\text{g/ml}$ )	Jan July	Feb Aug	Mar Sept	Apr Oct	May Nov	June Dec	Maximum Conc.	CY-1981 Average	Max. 1 Contamin. Level
Arsenic (As)	<5.0E-03 <5.0E-03	<5.0E-03 <5.0E-03	<5.0E-03 <5.0E-03	<5.0E-03 <5.0E-03	<5.0E-03 <5.0E-03	<5.0E-03 <5.0E-03	<5.0E-03	<5.0E-03	5.0E+00
Barium (Ba)	1.5E-01 1.0E-01	1.0E-01 1.0E-01	1.2E-01 1.2E-01	1.3E-01 1.1E-01	1.1E-01 1.3E-01	1.2E-01 1.2E-01	1.5E-01	1.2E-01	1.0E+02
Cadmium (Cd)	3.0E-03 <2.0E-03	5.0E-03 4.0E-03	5.0E-03 <2.0E-03	<2.0E-03 <2.0E-03	2.0E-03 <2.0E-03	2.0E-03 <2.0E-03	5.0E-03	2.7E-03	1.0E+00
Chromium (Cr)	1.0E-02 5.0E-03	1.0E-02 1.0E-02	3.0E-02 2.0E-02	9.0E-03 1.6E-02	2.0E-02 1.0E-02	1.9E-02 2.0E-02	3.0E-02	1.4E-02	5.0E+00
Lead (Pb)	4.0E-02 <1.0E-02	4.0E-02 1.0E-02	1.5E-01 <1.0E-02	<1.0E-02 <1.0E-02	3.0E-02 <1.0E-02	<1.0E-02 <1.0E-02	1.5E-01	2.8E-02	5.0E+00
Mercury (Hg)	4.9E-03 5.0E-03	1.6E-02 3.0E-03	2.1E-01 4.4E-03	1.4E-02 2.2E-03	3.6E-02 2.3E-03	7.0E-03 1.3E-03	2.1E-01	2.5E-02	2.0E-01
Selenium (Se)	2.0E-03 <2.0E-03	<2.0E-03 <2.0E-03	<2.0E-03 <2.0E-03	<2.0E-03 <2.0E-03	<2.0E-03 <2.0E-03	<2.0E-03 <2.0E-03	<2.0E-03	<2.0E-03	1.0E+00
Silver (Ag)	<1.0E-02 <1.0E-02	<1.0E-02 <1.0E-02	<1.0E-02 <1.0E-02	<1.0E-02 <1.0E-02	<1.0E-02 <1.0E-02	<1.0E-02 <1.0E-02	<1.0E-02	<1.0E-02	5.0E+00
<u>Ions (<math>\mu\text{g/ml}</math>)</u>									
Chloride Ion	3.3E+02 1.3E+02	1.7E+02 1.4E+02	2.2E+02 2.5E+02	1.3E+03 1.7E+02	1.8E+02 2.1E+02	1.5E+02 1.6E+02	3.3E+02	1.9E+02	
Fluoride Ion	6.4E-01 3.5E-01	4.0E-01 5.0E-01	9.2E-01 4.0E-01	1.1E+01 5.0E-01	5.4E-01 3.4E-01	5.0E-01 1.1E+00	1.1E+01	1.5E+00	
Nitrate Ion	8.6E+01 2.6E+01	9.5E+01 5.7E+01	8.6E+01 5.9E+01	7.7E+01 4.2E+01	1.2E+02 1.2E+02	8.4E+01 1.7E+01	1.2E+02	1.6E+01 (as N)	
Sodium Ion	1.4E+02 9.5E+01	1.0E+02 7.6E+01	1.2E+02 1.0E+02	1.3E+02 1.0E+02	9.2E+01 9.8E+01	1.1E+02 1.0E+02	1.4E+02	1.1E+02	
Sulfate Ion	8.5E+00 1.4E+01	5.2E+01 4.0E+01	5.9E+01 4.0E+01	4.4E+01 4.6E+01	4.8E+01 4.3E+01	5.3E+01 5.0E+01	5.9E+01	4.4E+01	

TABLE IV (Cont)  
Liquid Released to the Injection Well, CY-1981  
NON-RADIOACTIVE RELEASES

<u>Organics</u> <u>(mg/l)</u>	<u>Jan</u> <u>July</u>	<u>Feb</u> <u>Aug</u>	<u>Mar</u> <u>Sept</u>	<u>Apr</u> <u>Oct</u>	<u>May</u> <u>Nov</u>	<u>June</u> <u>Dec</u>	<u>Maximum</u> <u>Conc.</u>	<u>CY-1981</u> <u>Average</u>	<u>Max. 1</u> <u>Contamin</u> <u>Level</u>
Endrin	-	-	-	-	-	-	-	-	2.0E-02
	-	-	-	-	-	<4E-06	-	-	
Lindane	-	-	-	-	-	-	-	-	4.0E-01
	-	-	-	-	-	<3E-06	-	-	
Methoxychlor	-	-	-	-	-	-	-	-	1.0E+01
	-	-	-	-	-	<5E-05	-	-	
Silver	-	-	-	-	-	-	-	-	1.0E+00
	-	-	-	-	-	<2E-03	-	-	
Toxaplene	-	-	-	-	-	-	-	-	5.0E-01
	-	-	-	-	-	<1E-05	-	-	
2,4 - D	-	-	-	-	-	-	-	-	1.0E+01
	-	-	-	-	-	<1E-02	-	-	
<u>Water Quality</u>									
<u>Parameters</u>									
Total Dissolved Solids (TDS) (µg/ml)	7.1E+02 6.0E+02	5.7E+02 5.0E+02	6.5E+02 6.2E+02	3.0E+02 5.7E+02	6.5E+02 7.5E+02	4.8E+02 6.2E+02		5.8E+02	
pH	7.70 7.46	7.42 7.30	7.56 7.83	7.98 7.80	7.29 7.35	7.62 7.34		7.55	
Conductivity (milli-mhos)	1.5E+00 8.3E-01	1.3E+00 8.2E-01	1.5E+00 1.0E+00	4.5E+00 8.7E-01	1.1E+01 9.0E-01	1.1E+00 8.5E-01		2.2E+00	

1) Maximum contaminant level; as required by 40 CFR 261 for inorganics and organics.



ICPP SERVICE WASTE  
BARIUM - MONTHLY AVERAGE CONCENTRATION

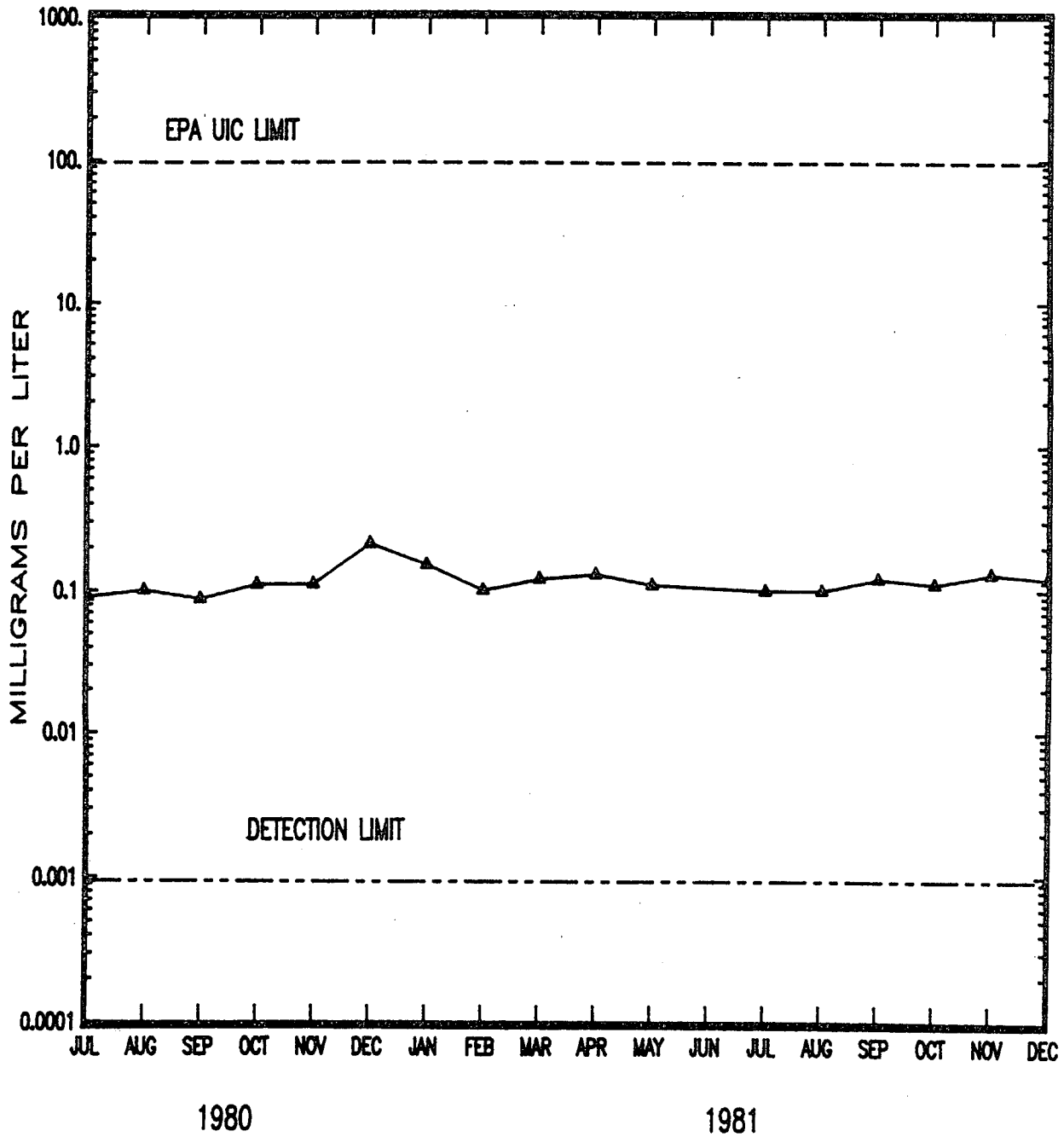


Figure 6

ICPP SERVICE WASTE  
CADMIUM - MONTHLY AVERAGE CONCENTRATION

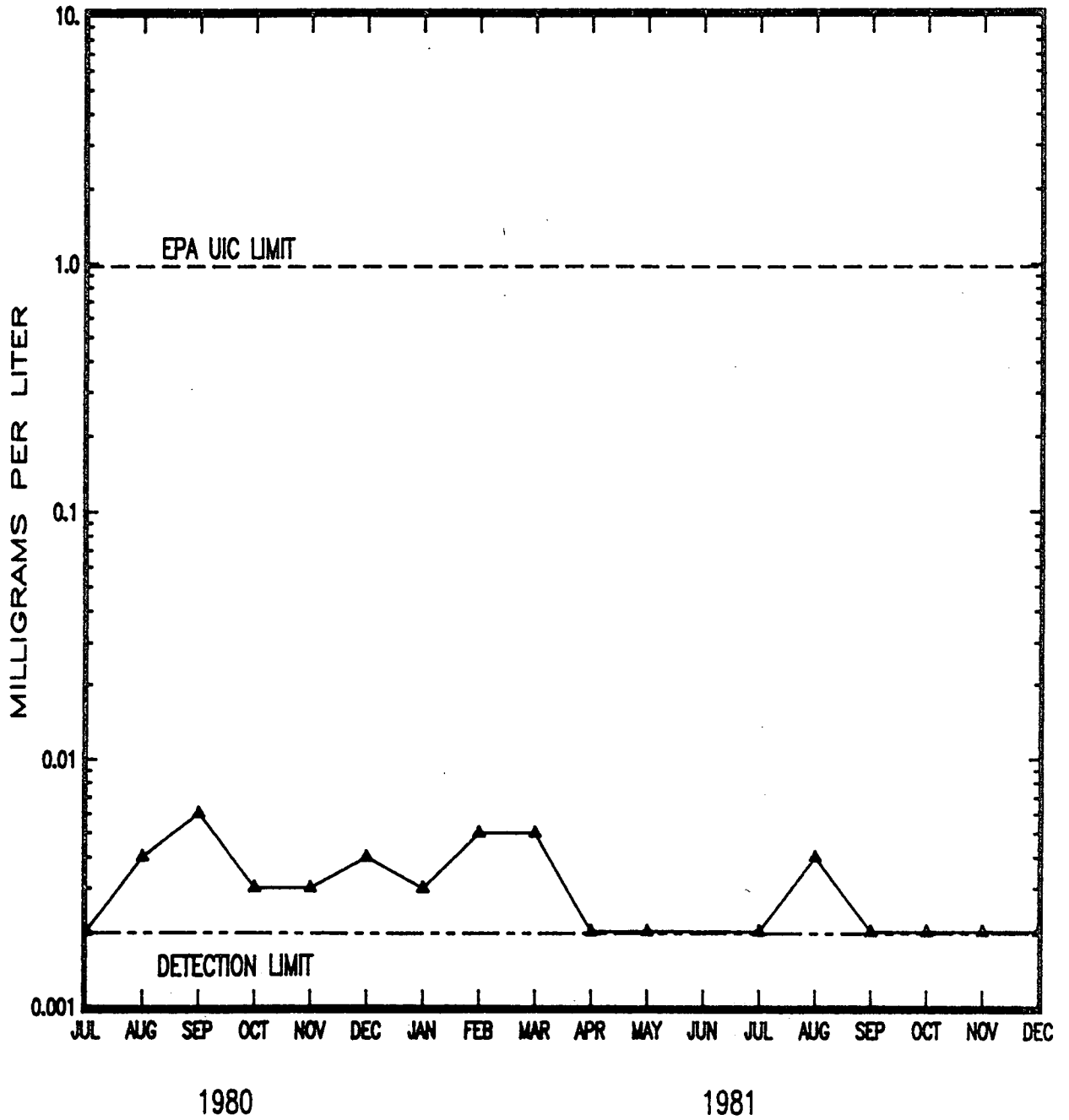


Figure 7

# ICPP SERVICE WASTE CHROMIUM - MONTHLY AVERAGE CONCENTRATION

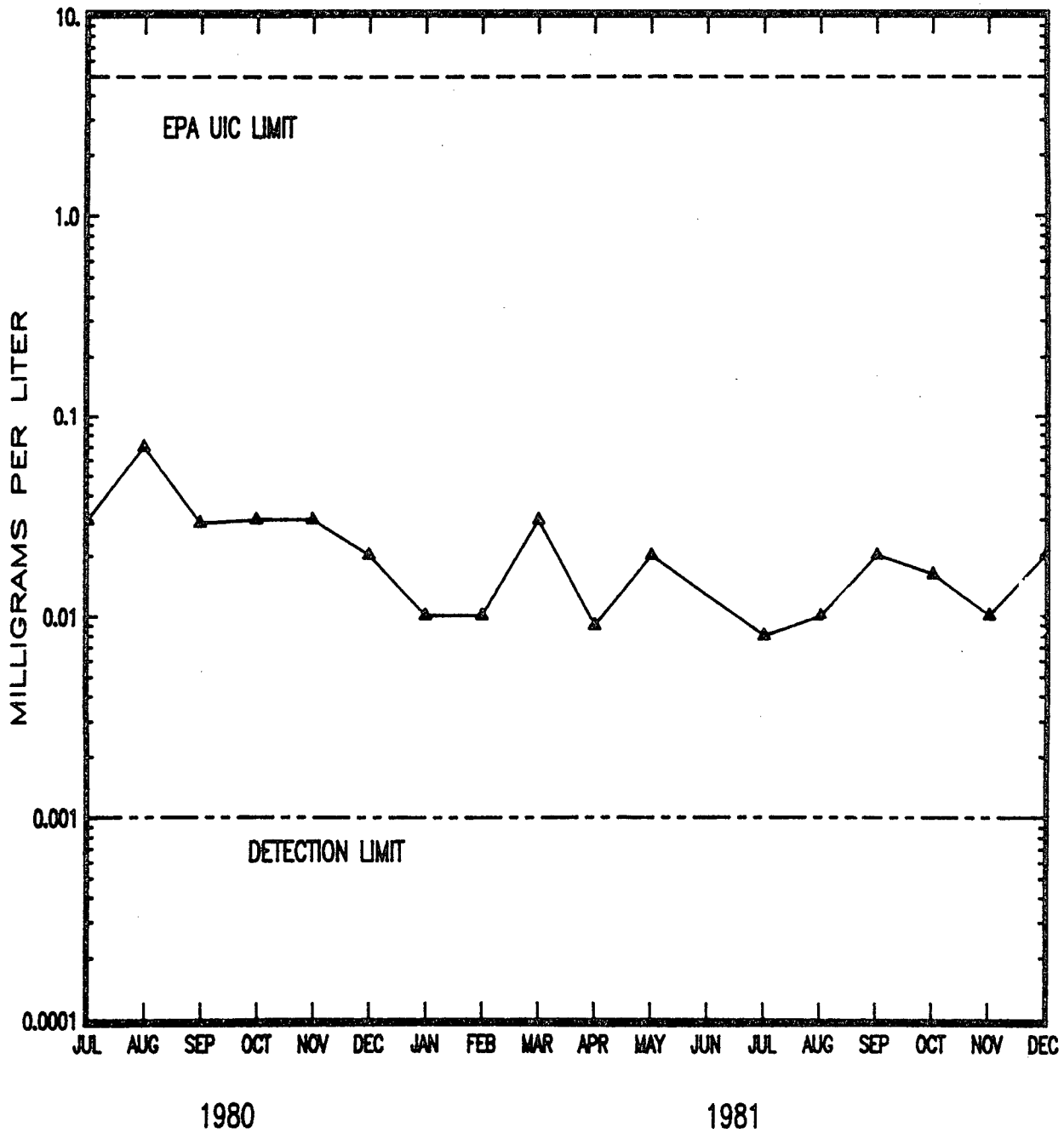


Figure 8

ICPP SERVICE WASTE  
LEAD - MONTHLY AVERAGE CONCENTRATION

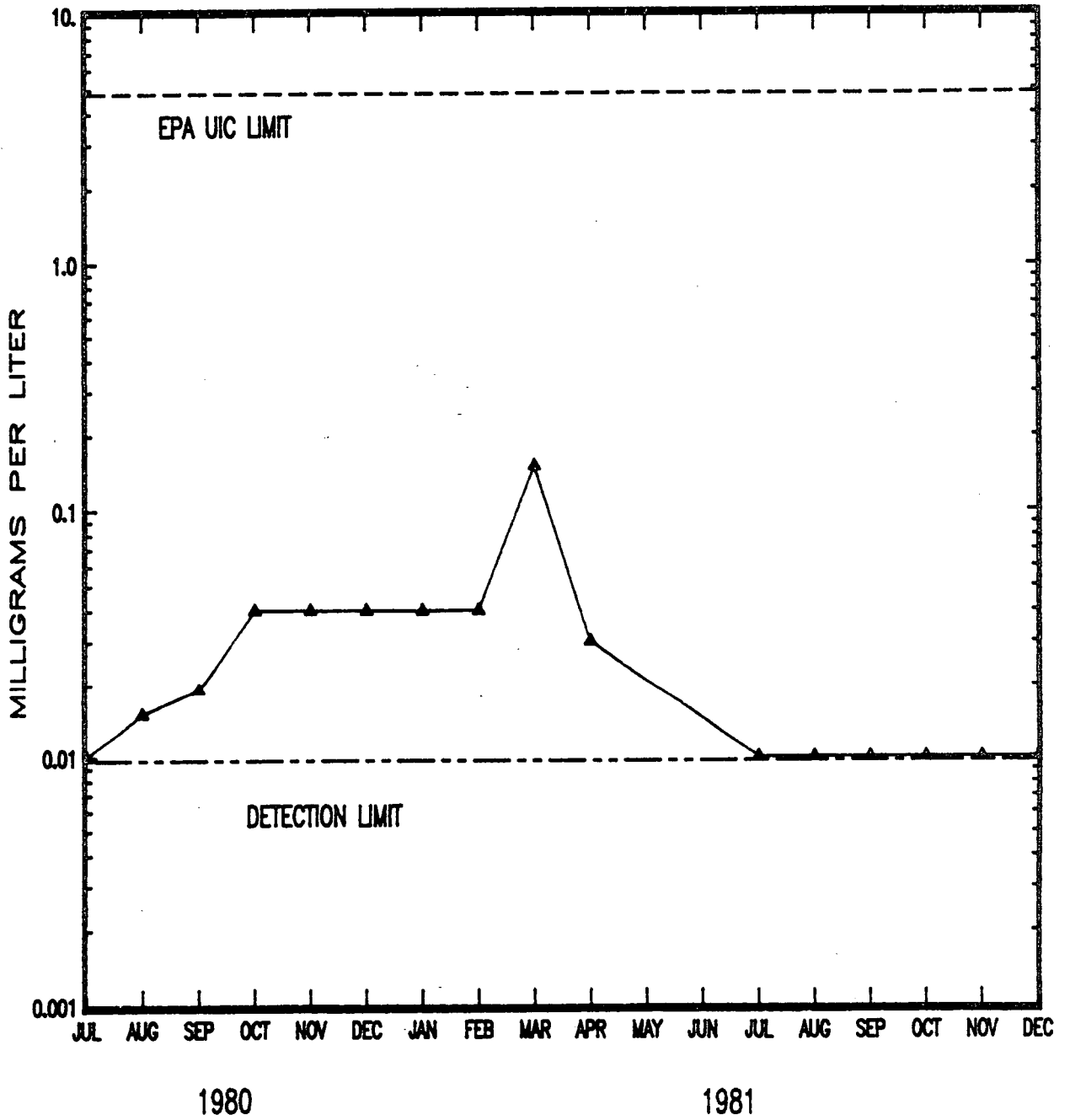


Figure 9

ICPP SERVICE WASTE  
MERCURY - MONTHLY AVERAGE CONCENTRATION

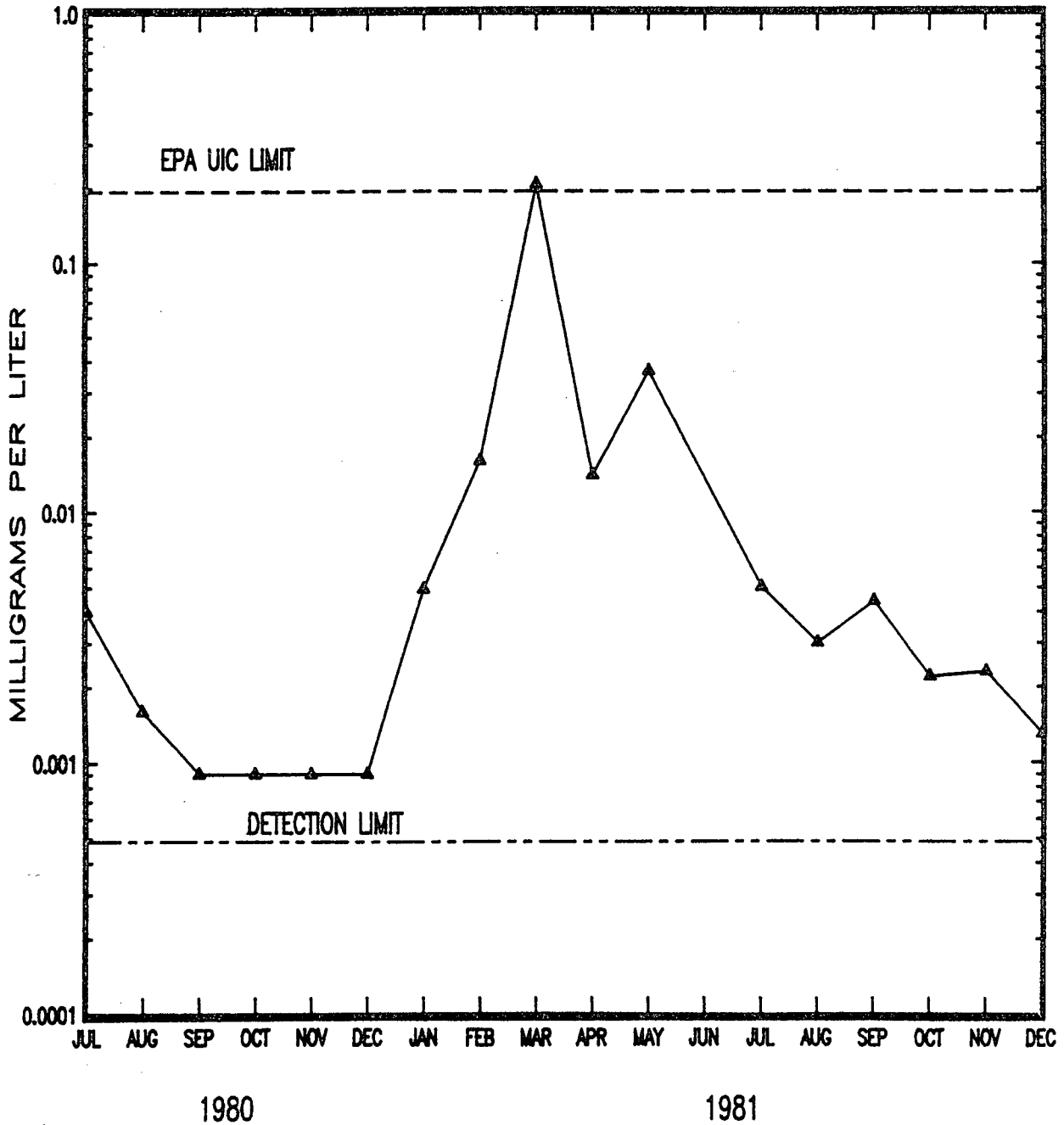


Figure 10

### Airborne Releases CY-1981

Radioactive Releases: Table V presents the radioactive releases for CY-1981. Figures 11-15 present graphically various nuclides released during CY-1981. Airborne releases were lower than forecast due to operation of the Rare Gas Plant to recover Kr-85. An increased quantity of Ru-106 was released during March due to a breached filter at the Waste Calcining Facility. During September and November, I-131 was released due to processing of the EBR-II fuel and waste.

Table VI presents the annual average concentration released at the stack and the calculated concentration at the site boundary. In addition, the site boundary concentration is compared to the uncontrolled area RCG. Releases for CY-1981 were well below the allowable RCG's.

Non-Radioactive Releases: Table VII presents the NO<sub>x</sub> releases for CY-1981. These releases correlate to operation of WCF and testing of the New Waste Calcining Facility.

TABLE V. Airborne Releases CY-1981

RADIOACTIVE RELEASES

	Jan July	Feb Aug	Mar Sept	Apr Oct	May Nov	June Dec	CY-1981 Total
<u>Total Activity (Ci)</u>	2.43E+03 1.80E+00	5.14E+00 1.80E+03	1.53E+04 3.52E+03	3.31E+04 3.56E+02	2.27E+02 2.46E+03	1.04E+00 5.00E+01	5.93E+04
<u>Total Volume (L)</u>	9.77E+10 1.07E+11	9.44E+10 1.01E+11	8.08E+10 1.16E+11	9.42E+10 1.36E+11	1.38E+11 1.47E+11	1.25E+11 1.37E+11	1.38E+12
<u>Nuclides (mCi)</u>							
C-14	3.78E+01 2.28E+01	2.39E+00 2.21E+01	4.40E-01 3.69E+00	1.16E+03 4.22E+01	2.60E+01 2.53E+01	2.88E+01 1.22E+01	1.38E+03
Ce-144	- -	- -	3.27E-01 1.39E-02	2.06E-02 -	- 1.50E-03	4.31E-03 -	3.69E-01
Co-60	- 3.61E-04	- 1.07E-03	- 2.40E-04	4.82E-03 1.70E-04	7.06E-04 2.10E-04	- 1.30E-04	7.74E-03
Cs-134	2.75E-03 6.60E-03	7.31E-04 5.80E-03	5.97E-03 7.18E-03	9.62E-03 2.40E-03	5.89E-03 3.30E-03	6.30E-03 1.63E-03	5.76E-02
Cs-137	5.79E-01 1.15E+00	2.35E-01 8.23E-01	9.55E-01 5.47E-01	6.64E-01 5.12E-01	7.88E-01 5.90E-01	1.13E+00 3.29E-01	8.30E+00
Eu-152	- 5.99E-04	- -	- -	- -	- -	- -	5.99E-04
Eu-154	7.49E-04 9.59E-04	- 1.95E-03	- 3.77E-04	- 5.90E-04	6.30E-04 3.20E-04	8.77E-04 1.20E-03	7.65E-03
Eu-155	- 1.54E-03	- -	- -	- -	- -	- -	1.54E-03
H-3	1.04E+05 1.77E+03	5.13E+03 1.56E+03	3.26E+02 2.88E+03	2.13E+05 1.75E+03	5.34E+04 5.33E+03	1.00E+03 1.89E+02	3.90E+05
I-129	7.49E+00 1.96E+00	4.17E+00 3.66E+00	1.64E+00 3.33E+00	3.56E+00 2.08E+00	1.02E+00 6.52E+00	1.33E+00 3.41E-01	3.69E+01
I-131	- -	- 1.79E-02	- 1.57E-01	- -	3.08E-02 5.40E+01	- 1.98E-01	5.44E+01
Kr-85	2.33E+06 -	- 1.80E+06	1.53E+07 3.52E+06	3.29E+07 3.54E+05	1.74E+05 2.45E+06	- 5.00E+04	5.88E+07

TABLE V (Cont)  
Airborne Releases CY-1981  
RADIOACTIVE RELEASES

Nuclides (mCi) (cont'd)	Jan July	Feb Aug	Mar Sept	Apr Oct	May Nov	June Dec	CY-1981 Total
Mn-54	-	-	-	-	-	-	1.35E-04
	-	-	1.35E-04	-	-	-	1.35E-04
Nb-95	-	-	9.37E-03	1.32E-03	-	-	1.40E-02
	-	-	-	-	9.40E-04	2.75E-03	1.40E-02
Pu-238	1.30E-02	5.85E-03	7.52E-03	1.39E-02	5.37E-03	5.84E-03	7.37E-02
	3.81E-03	3.71E-03	7.90E-03	1.97E-03	2.96E-03	1.77E-03	7.37E-02
Pu-239/240	5.88E-03	5.08E-04	1.12E-03	2.08E-03	4.04E-04	5.07E-04	1.43E-02
	5.20E-04	4.59E-04	5.95E-04	1.49E-04	1.97E-03	1.13E-04	1.43E-02
Ru-106	1.99E+00	1.83E-01	6.57E+01	1.93E+00	1.46E+00	2.30E+00	7.74E+01
	1.11E+00	9.74E-01	1.94E-01	1.67E-01	2.60E-01	1.07E-01	7.74E+01
Sb-125	1.03E+01	4.87E+00	6.95E+01	8.28E+01	5.03E+00	3.30E+00	1.87E+02
	1.61E+00	4.82E+00	1.39E+00	1.57E+00	1.70E+00	4.01E-01	1.87E+02
Sr-90	1.63E-01	6.73E-02	4.23E-01	1.70E-01	2.17E-01	6.11E-01	3.89E+00
	3.58E-01	3.26E-01	1.64E-01	2.13E-01	3.60E-01	8.28E-01	3.89E+00
Zr-95	-	-	6.09E-03	9.95E-04	-	-	7.58E-03
	-	-	-	-	4.30E-04	7.10E-05	7.58E-03



# ICPP STACK EFFLUENT

## TRITIUM

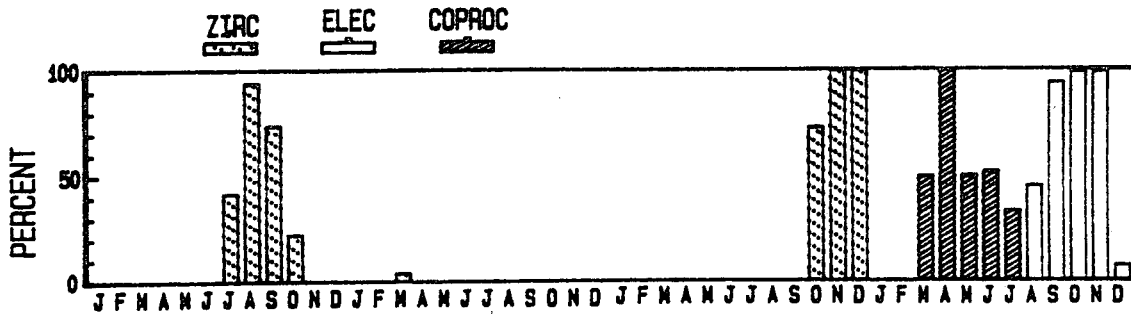
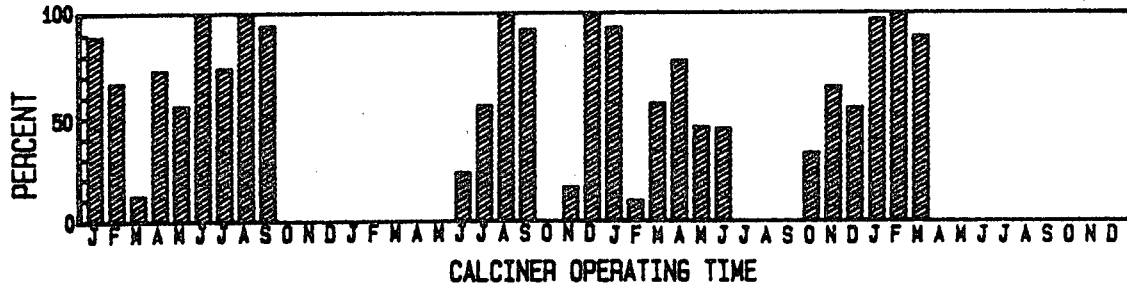
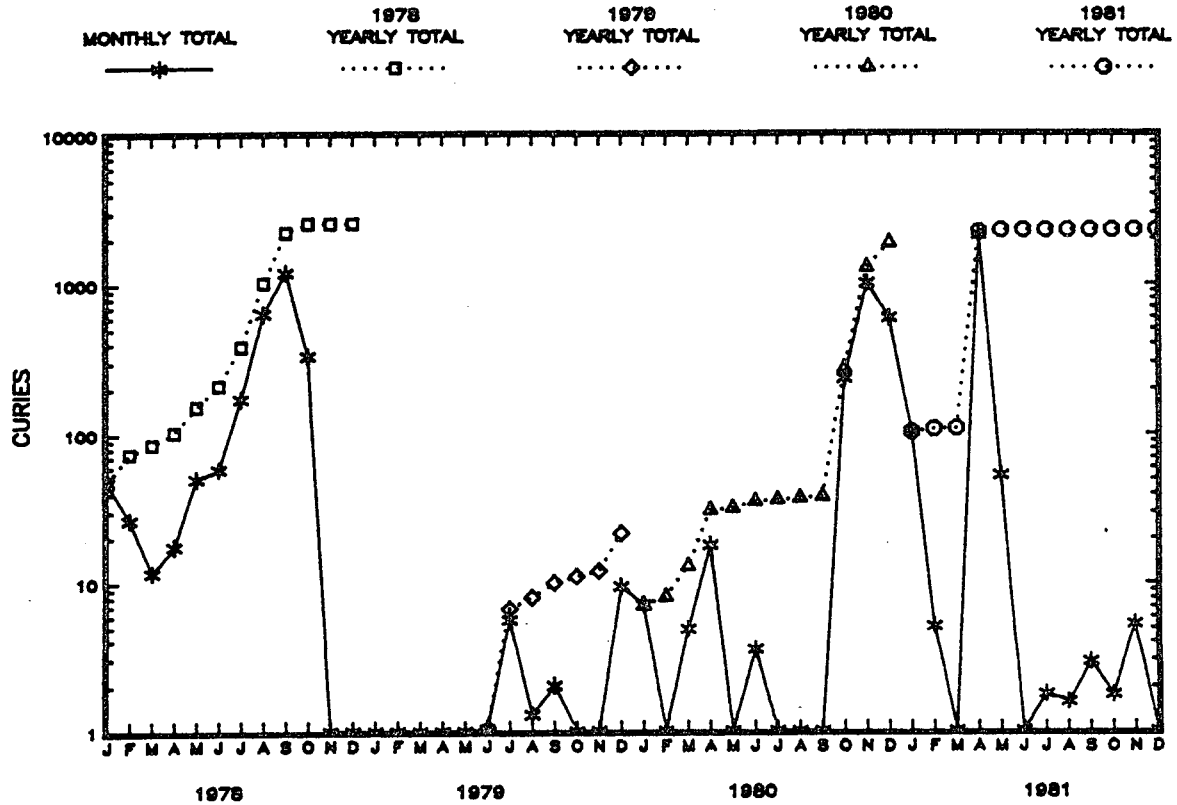


Figure 11

# ICPP STACK EFFLUENT

## Iodine-129

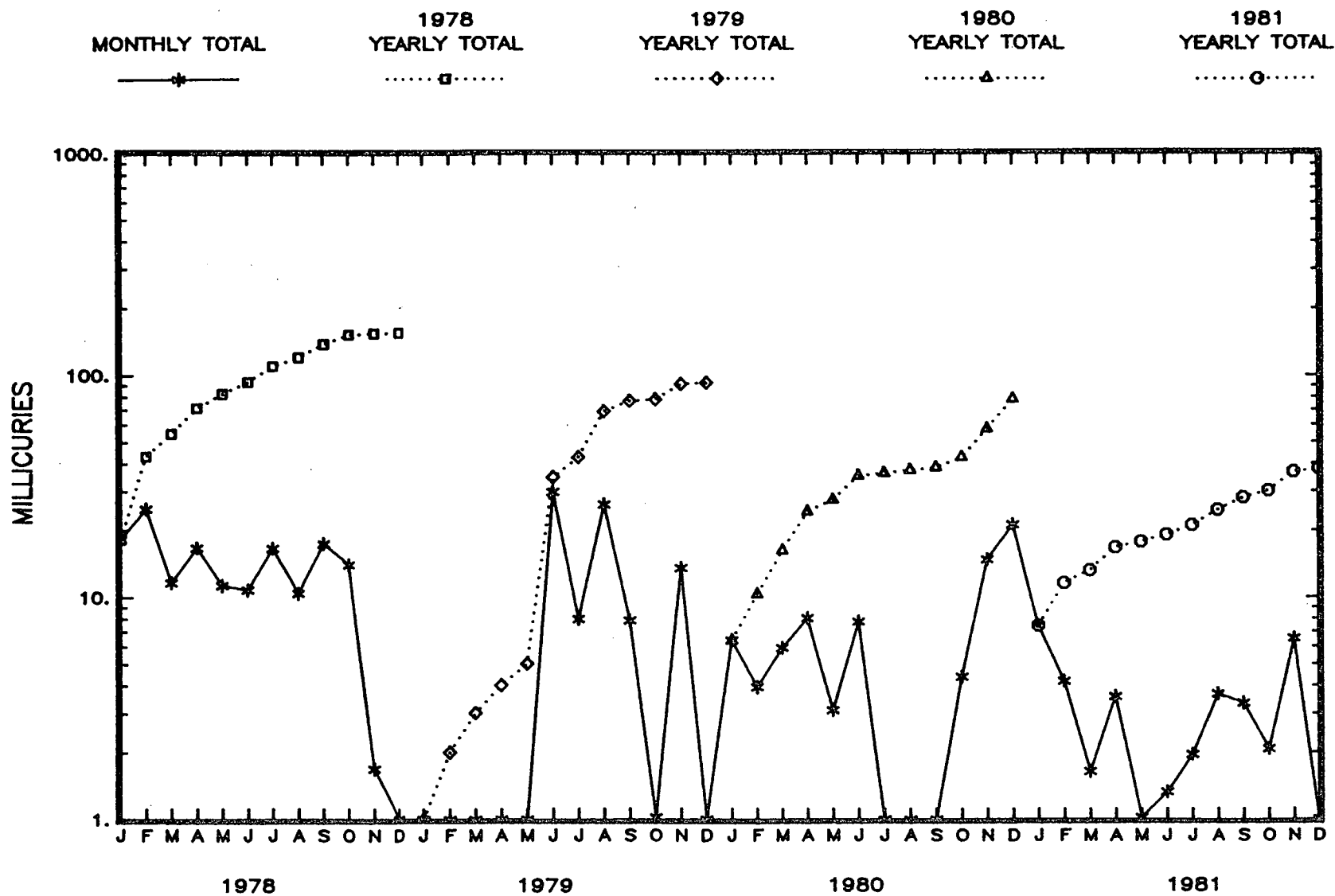


Figure 12

# ICPP STACK EFFLUENT KRYPTON-85

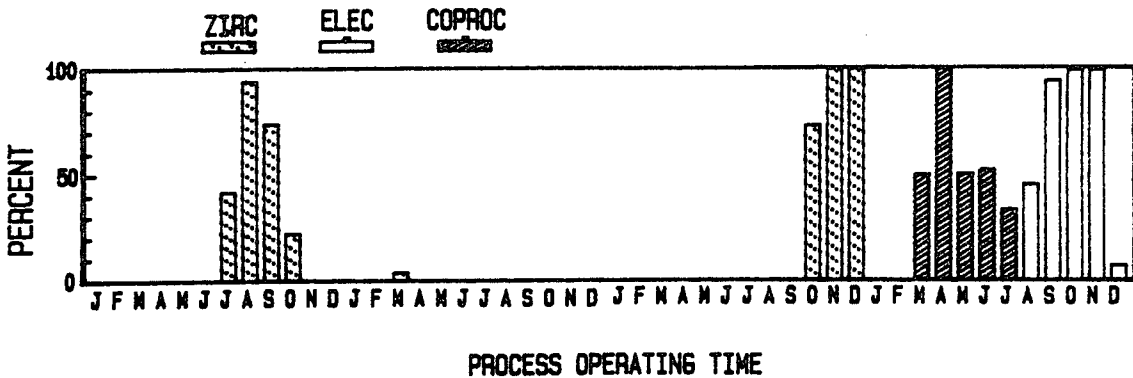
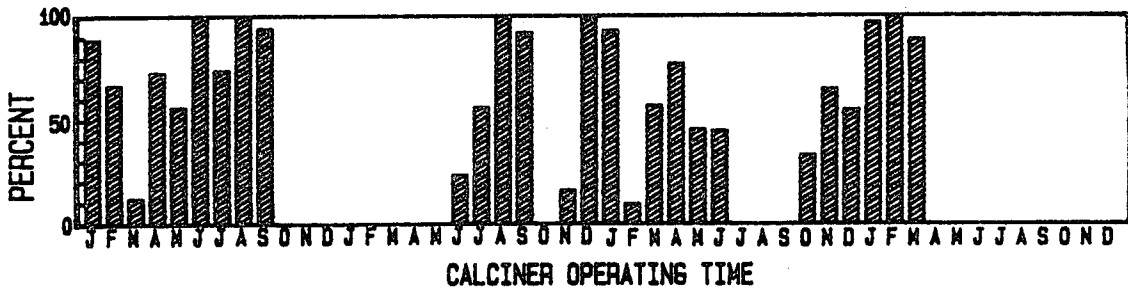
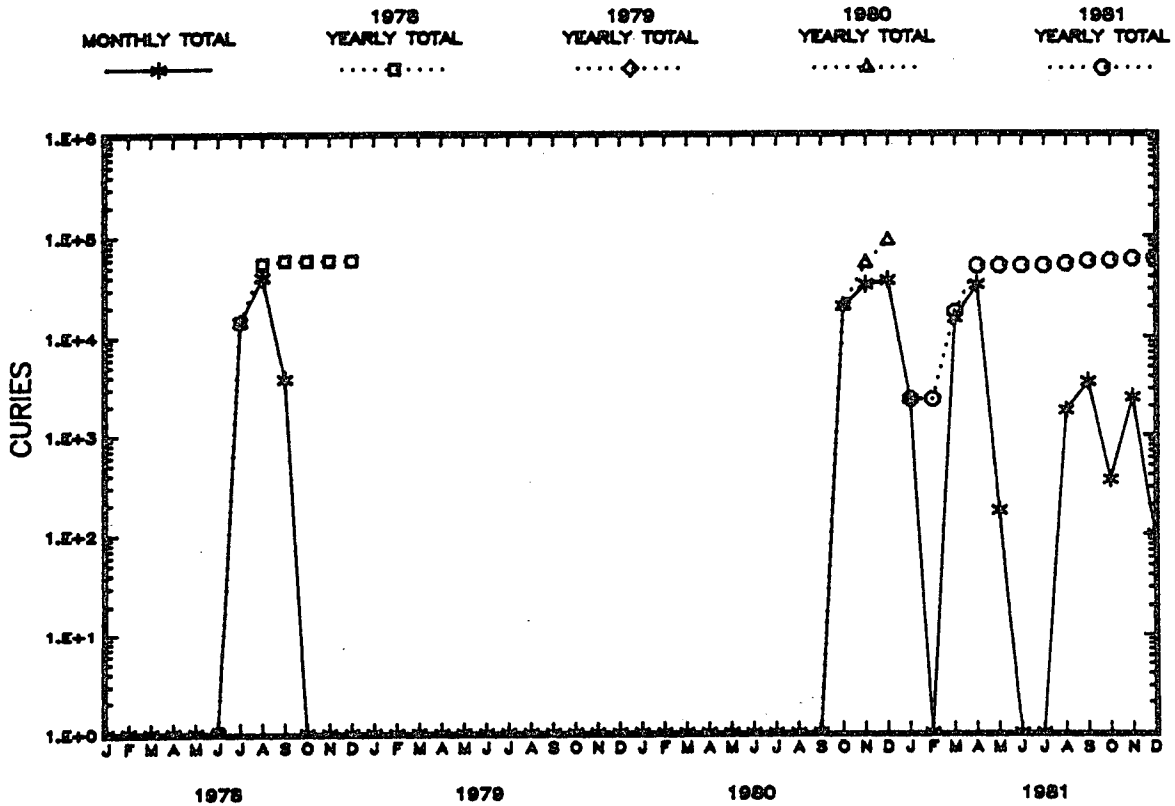


Figure 13

# ICPP STACK EFFLUENT

## Plutonium

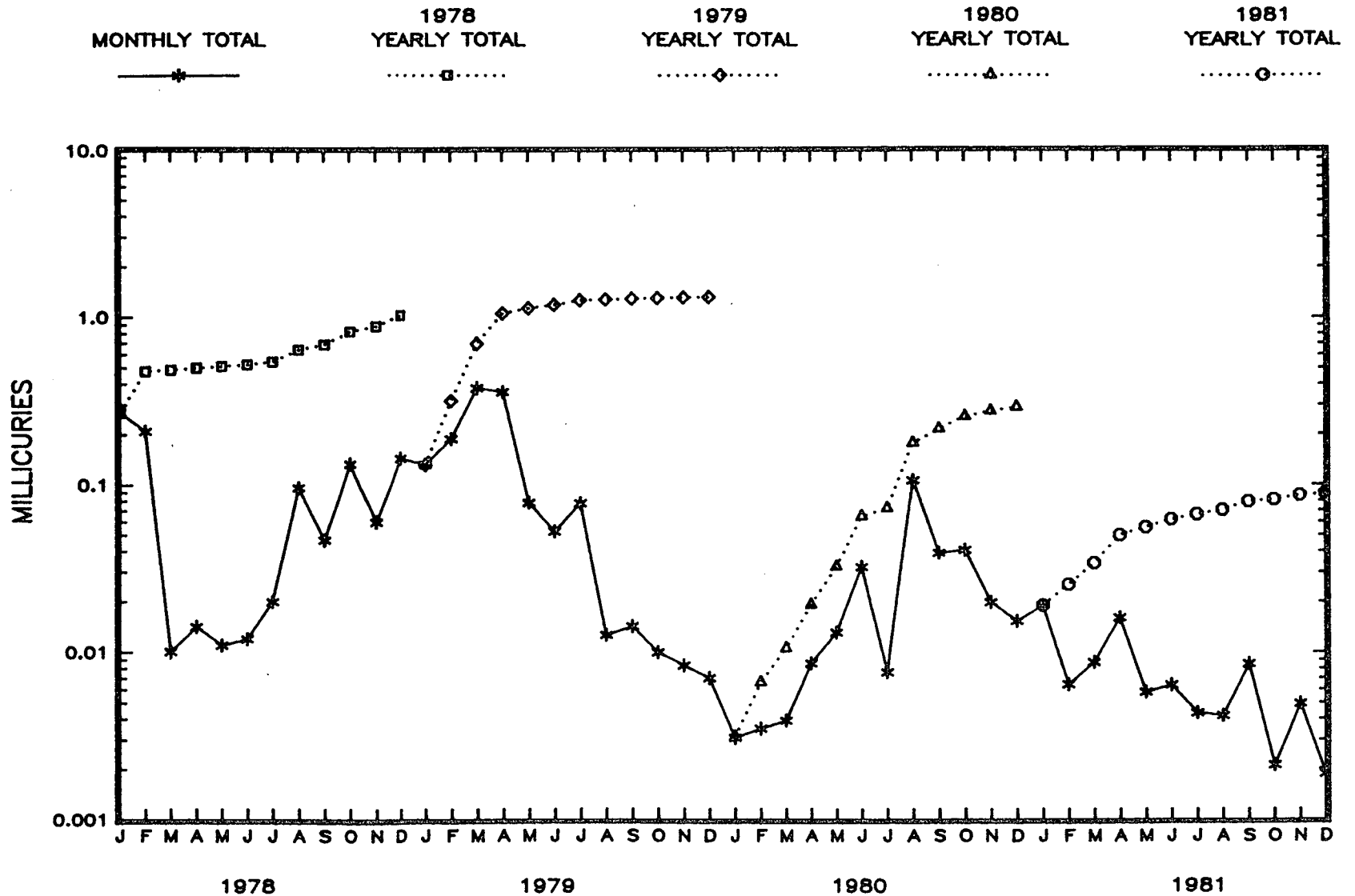
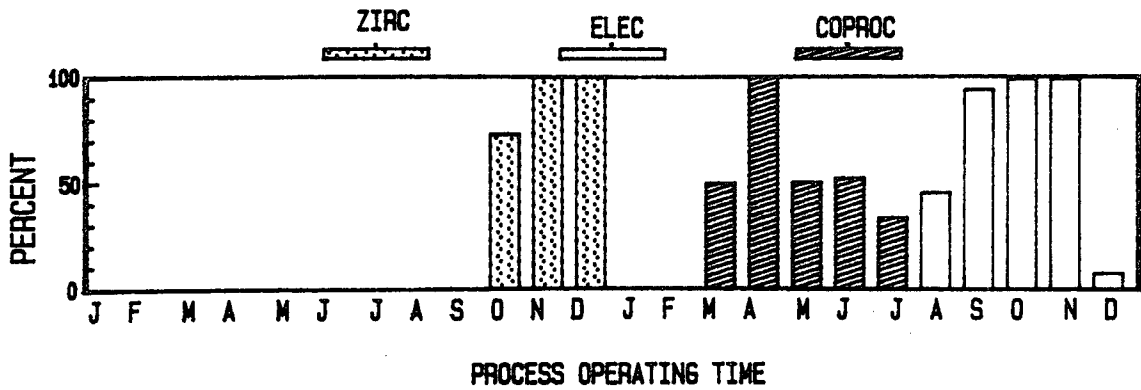
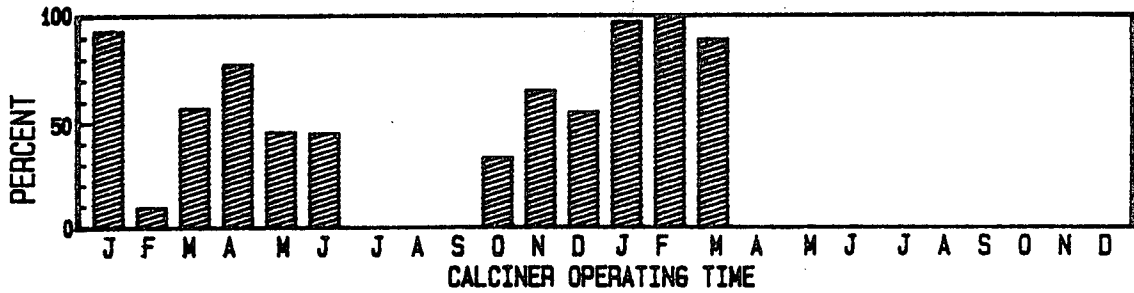
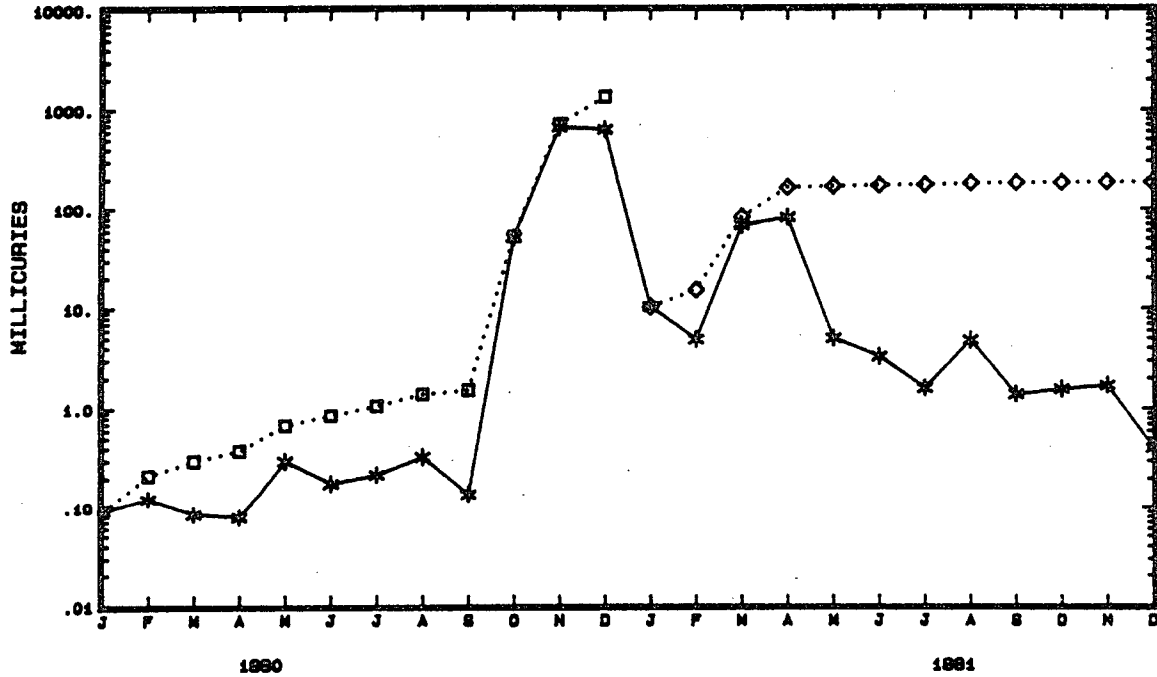


Figure 14

# ICPP STACK EFFLUENT

SB-125

MONTHLY TOTAL      1990 YEARLY TOTAL      1991 YEARLY TOTAL



PROCESS OPERATING TIME

Figure 15

TABLE VI. Airborne Radioactive Releases CY-1981

<u>Nuclide</u>	<u>Average Concentration (<math>\mu\text{Ci/cc}</math>)</u>	<u>INEL Site Boundary Concentration<sup>a</sup> (<math>\mu\text{Ci/cc}</math>)</u>	<u>Uncontrolled Area Radiation Concentration Guide (RCG) (<math>\mu\text{Ci/cc}</math>)</u>	<u>Ratio of Boundary Concentration to RCG</u>
C-14	1.00E-09	2.19E-15	1E-07	2.19E-08
Ce-144	2.67E-13	5.85E-19	2E-10	2.92E-09
Co-60	5.61E-15	1.23E-20	3E-10	3.72E-12
Cs-134	4.17E-14	9.13E-20	4E-10	2.28E-10
Cs-137	6.01E-12	1.31E-17	5E-10	2.63E-08
Eu-152	4.34E-16	9.50E-22	4E-10	2.37E-12
Eu-154	5.54E-15	1.21E-20	1E-10	1.21E-10
Eu-155	1.11E-15	2.44E-21	3E-09	8.14E-13
H-3	2.83E-07	6.18E-13	2E-07	3.09E-06
I-129	2.67E-11	5.85E-17	2E-11	2.93E-06
I-131	3.94E-11	8.63E-17	1E-10	8.63E-07
Kr-85	4.26E-05	9.32E-11	3E-07	3.11E-04
Mn-54	9.78E-17	2.14E-22	1E-09	2.14E-13
Nb-95	1.01E-14	2.22E-20	3E-09	7.40E-12
Pu-238	5.34E-14	1.17E-19	7E-14	1.67E-06
Pu-239/240	1.04E-14	2.27E-20	6E-14	3.78E-07
Ru-106	5.61E-11	1.23E-16	2E-10	6.14E-07
Sb-125	1.35E-10	2.96E-16	9E-10	3.29E-07
Sr-90	2.82E-12	6.17E-18	3E-11	2.05E-07
Zr-95	5.49E-15	1.20E-20	1E-09	1.20E-11

a Concentrations at the INEL boundary were calculated using a mean annual dispersion factor of  $5 \times 10^{-8} \text{ sec/m}^3$

Airborne Releases CY-1981

Non-Radioactive Releases

Nitrate (ppm)	Jan July	Feb Aug	Mar Sept	Apr Oct	May Nov	June Dec
NO <sub>2</sub>	1.3E+02 <1.2E+01	1.2E+02 4.2E+01	1.1E+02 1.2E+02	<1.2E+01 <1.2E+01	<1.2E+01 2.5E+02	<1.2E+01 1.2E+02
NO	7.9E+01 <7.5E+00	7.2E+01 2.5E+01	6.4E+01 6.9E+01	<7.5E+00 <7.5E+00	<7.5E+00 1.5E+02	<7.5E+00 7.5E+01

### Production Wells

Figures 16 and 17 present graphically the concentration of Strontium-90 and Tritium in the Production Wells. Traditionally, Well #616 has had a higher concentration of both Strontium-90 and Tritium. However, the concentration of Tritium in Well #617 is now approaching that of Well #616. Beginning in mid-1980, concentration of these nuclides in both wells has been increasing. Therefore, procedures have been initiated to obtain a new source of potable water.



# ICPP PRODUCTION WELLS TRITIUM

WELL # 616

WELL # 617

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MICROCURIRES PER MILLILITER

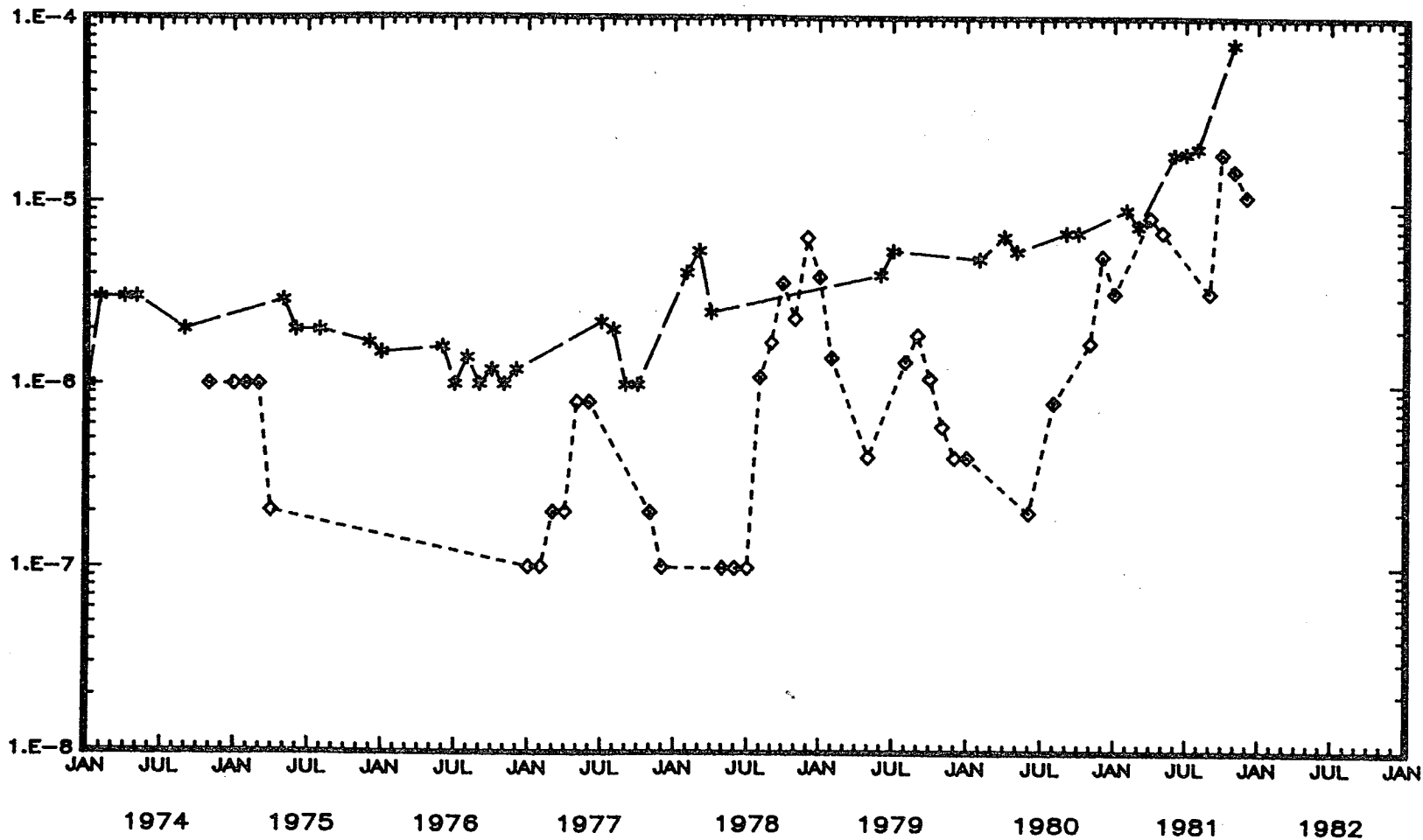


Figure 16

# ICPP PRODUCTION WELLS STRONTIUM 90

WELL # 616

WELL # 617

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MICROCURIES PER MILLILITER

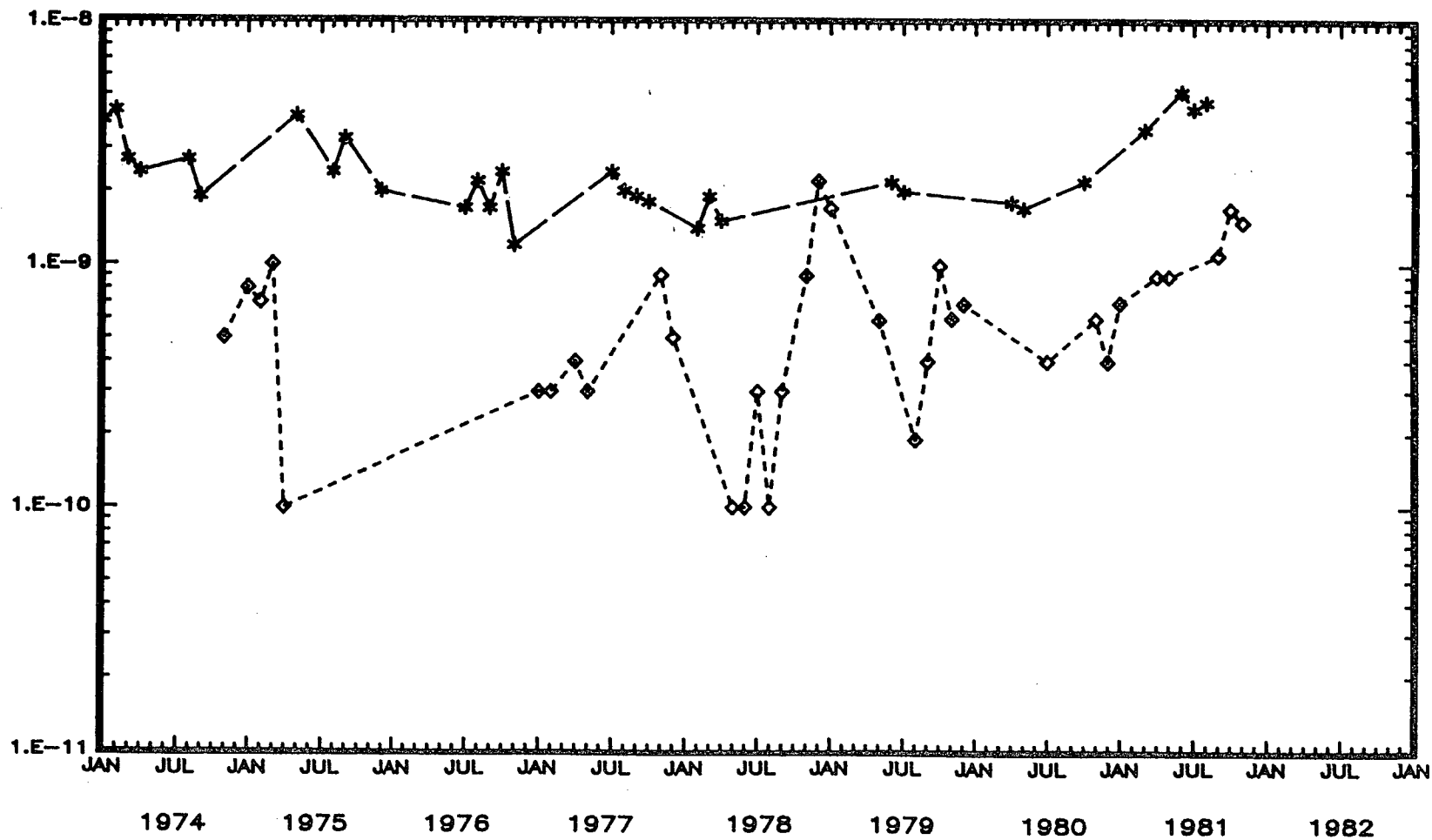


Figure 17