YANKEE ATOMIC ELECTRIC COMPANY

ANNUAL RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT

January 1, 1981 - December 31, 1981

March 1981

Yankee Atomic Electric Company
Engineering Office
Environmental Engineering Department
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I. INTRODUCTION

This report contains a summary and analysis of the radiological environmental data collected during 1981 by the Environmental Studies Laboratory of the Yankee Atomic Electric Company, Rowe, Massachusetts.

Direct gamma radiation around the plant environs is measured with $CaSO_4$:Dy TLD badges. Yankee personnel prepare, distribute, measure and calibrate these dosimeters. All the environmental samples were processed by the Yankee Environmental Laboratory, located in Westborough, Massachusetts.

Section II of this report contains a list of all sampling stations used in 1981 as well as a tabulation of the media sampled at each station. Figures 1 through 7 indicate the location of the plant site, its topography and the locations of the sampling stations.

Section III summarizes the environmental data. A computer program, ERMAP, produces a digest of the 1981 measurements. Each environmental media appears according to the alphabetical order of its media code. At the top of each page, ERMAP lists the units of measurement for each medium. The left hand column contains the radionuclide which is being reported, total number of analysis of that radionuclide, and the number of measurements which exceeds ten times the yearly average background value. The latter are classified as "non-routine" measurements. The next column lists the nominal minimum detectable concentration (MDC) for each radionuclide.

Those sampling stations which are adjacent to the plant and which could conceivably be affected by the operation of Yankee are called "Indicator" or "Zone I" stations. Distant stations, which are beyond plant influence are called "Control" or "Zone II" stations.

ERMAP calculates a set of statistical parameters for each radionuclide. This set of statistical parameters includes separate analyses for (1) the indicator stations, (2) the control stations, and (3) the station

having the highest annual mean concentration. For each of these three groups of data, ERMAP calculates:

1) The mean value of all concentrations including negative values and values below MDC.

2) The square root of the mean square deviation. This is an estimate of the sample variance.

3) The lowest and highest calculated concentration.

4) The number of positive measurements (activity which is three times greater than the standard deviation) divided by the total number of measurements.

Section IV of this report discusses the Quality Assurance program, which includes EPA results, and Section V discusses fallout from weapons testing.

In the final sections, we analyze the results of our efforts in 1981, calculate environmental radiation doses, and present our conclusions.

II. LOCATIONS OF SAMPLING STATIONS

The following three pages list our sampling locations. Distances are measured from the center of the containment building; directions are relative to true north. The media codes are:

AP	Air particulate
C	Charcoal air filters
FD	Farm crops
FI	Finfish
M	Milk
MS	Maple syrup
S	Soil
SS	Sediment
VA	Aquatic vegetation
VT	Terrestrial vegetation
WD	Storm drain water
WG	Fresh water
WR	River water
TG	Mixed grasses

Direct Radiation - TLD Dosimeter Sites

Sampling and Analysis Frequency - Monthly

Zone I

	Sample Station Locations	Distance (Km) From Plant	Azimuth
GM 1	Furlon House	0.8	232°
GM 2	Observation Stand	0.5	313°
GM 3	Ford Hill Road	2.7	152°
GM 4	Harriman Station	3.2	359°
GM 5	Monroe Bridge	1.1	236°
GM 6	Readsboro Road Barrier	1.3	355°
GM 7	Whitingham Line	3.5	32°
GM 8	Monroe Hill Barrier	1.8	182°
GM 9	Dunbar Brook	3.2	216°
GM 10	Cross Road	3.5	83°
GM 11	Adams High Line	2.1	289°
GM 12	Readsboro, Vermont	5.5	344°
GM 13	Restricted Area Fence	0.08	255°
GM 14	Restricted Area Fence	0.11	300°
GM 15	Restricted Area Fence	0.08	345°
GM 16	Restricted Area Fence	0.13	30°
GM 17	Restricted Area Fence	0.14	70°
GM 18	Restricted Area Fence	0.14	115°
GM 19	Restricted Area Fence	0.16	140°
GM 20	Restricted Area Fence	0.16	160°
GM 21	Restricted Area Fence	0.11	205°

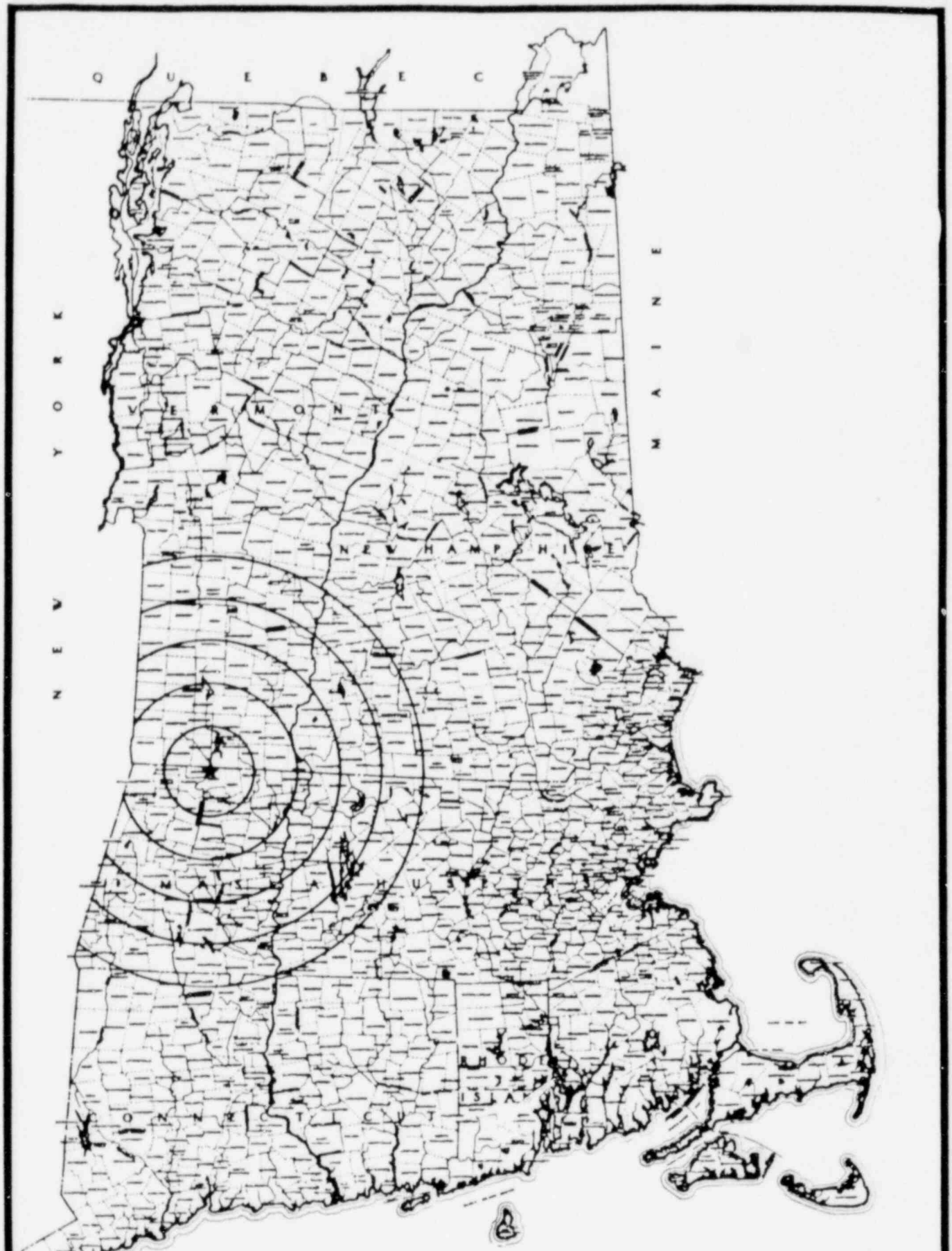
Zone II

GM 22	Heartwellville	12.6	333°
GM 23	Williamstown Substation	22.2	265°

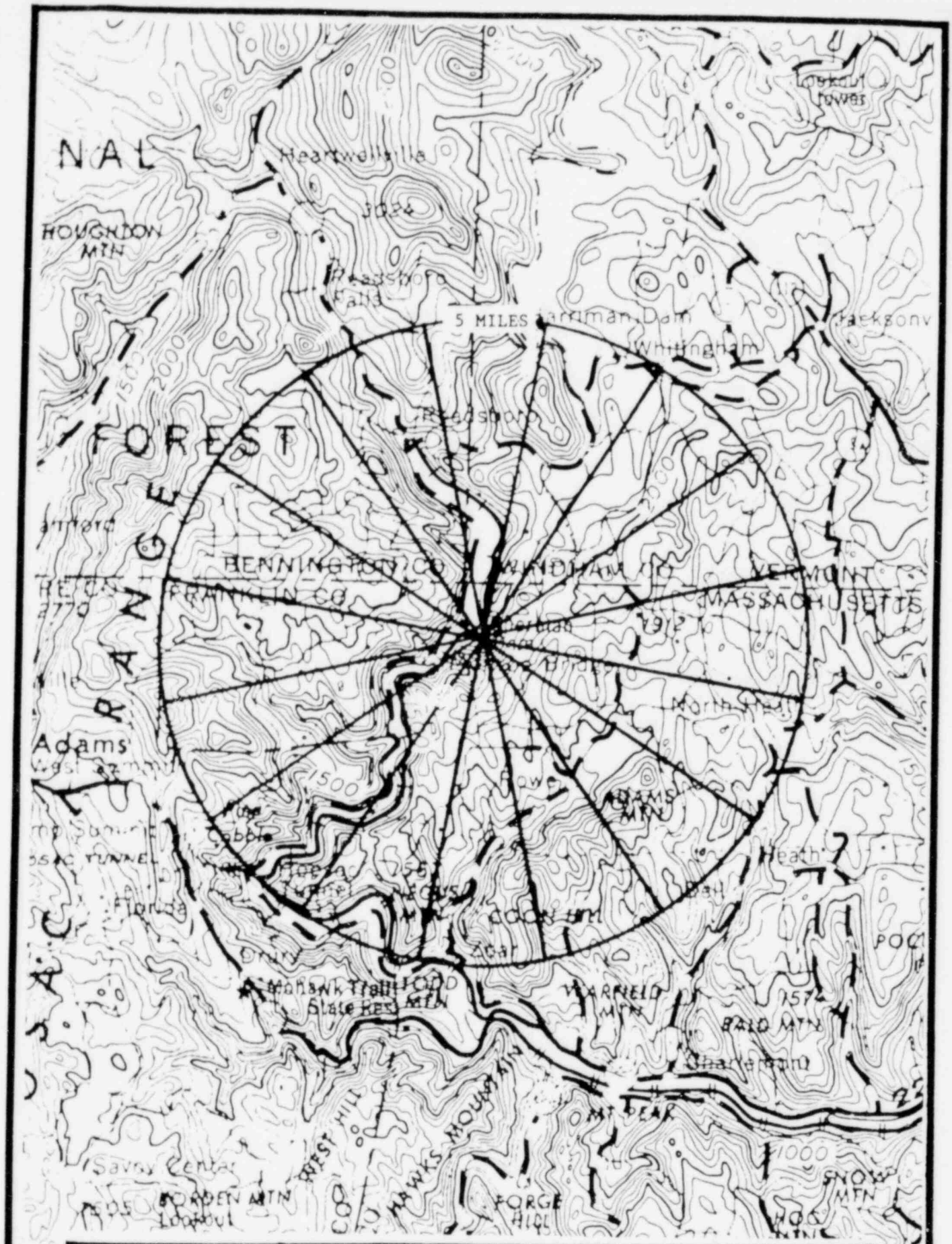
STATION INPUT DATA FOR 39 STATIONS

STATION	ZONE	MEDIA CODES	STATION IDENTIFICATION			
01	1	AP C	FURLON HOUSE	0.8 KM	232 DEGREES	ROWE
02	1	AP C	HARRIMAN STATION	3.2 KM	359 DEGREES	ROWE
03	1	AP C	FORD HILL ROAD	2.7 KM	152 DEGREES	ROWE
04	1	AP C	OBSERVATION STAND	0.5 KM	313 DEGREES	ROWE
05	2	AP C	WILLIAMSTOWN	22.2 KM	265 DEGREES	ROWE
06	2	AP C	HEARTWELLVILLE	12.6 KM	333 DEGREES	ROWE
07	1	AP C	MONROE BRIDGE	1.1 KM	236 DEGREES	ROWE
08	1	AP C	ROWE SCHOOL	4.2 KM	SE	ROWE
02	1	FD	LAFFONA GARDEN,ROWE	2.9 KM	187 DEGREES	ROWE
01	2	FI VA SS	HARRIMAN RESERVOIR	10.0 KM	UPRIVER	ROWE
02	1	FI VA SS	SHERMAN PD DIT.	0.2 KM	N	ROWE
03	1	FI VA	DEERFIELD R.NO. 4	36.1 KM	DOWNRIVER	ROWE
02	1	WR	SHERMAN PD. DIS.	0.1 KM	349 DEGREES	ROWE
03	1	WR	BEAR SWAMP NO.5	6.3 KM	DOWNRIVER	ROWE
21	1	WR	BEAR SWAMP NO.5	6.3 KM	DOWNRIVER	ROWE
11	2	WR	HARRIMAN RES.	10.1 KM	UPSTREAM	ROWE
01	2	WR	HARRIMAN RES.	10.1 KM	UPRIVER	ROWE
01	1	WG	PLANT POTABLE	0.0 KM	ONSITE	ROWE
02	1	WG	SHERMAN SPRING	0.2 KM	304 DEGREES	ROWE
03	1	SS	NO.5 STATION POND	1.12 KM	DOWN RIVER	ROWE
04	1	SS	NO.4 STA. POND	36.2 KM	DOWN RIVER	ROWE
05	2	SS	GRISWOLDVILLE POND	5.0 KM	UP NORTH RIVER	ROWE
01	1	M VT	LIVELY FARM VT	5.8 KM VT	100 DEGREES	ROWE
02	1	M VT	KING FARM VT	6.1 KM VT	354 DEGREES	ROWE
03	2	M VT	MT. WILLIAMS FARM VT	20.9 KM VT	258 DEGREES	ROWE
01	1	TG	MONROE BRIDGE	1.1 KM	236 DEGREES	ROWE
03	1	TG	FORD HILL ROAD	2.7 KM	152 DEGREES	ROWE
04	1	TG	OBSERVATION STAND	0.5 KM	313 DEGREES	ROWE
06	2	TG	HEARTWELLVILLE	12.6 KM	333 DEGREES	ROWE
02	1	TG	HARRIMAN STATION	3.2 KM	359 DEGREES	ROWE
05	1	TG	WILLIAMSTOWN	22.2 KM	265 DEGREES	ROWE
01	1	TG	LIVELY FARM	5.8 KM	100 DEGREES	ROWE
02	1	TG	KING FARM	6.1 KM	354 DEGREES	ROWE
03	2	TG	MT. WILLIAMS FARM	20.9KM	258 DEGREES	ROWE
03	2	FD	WILLIAMSTOWN,MASS.	22.2 KM	265 DEGREES	ROWE
01	1	MS	R.A.TOWER	0.6 KM	SSE	ROWE

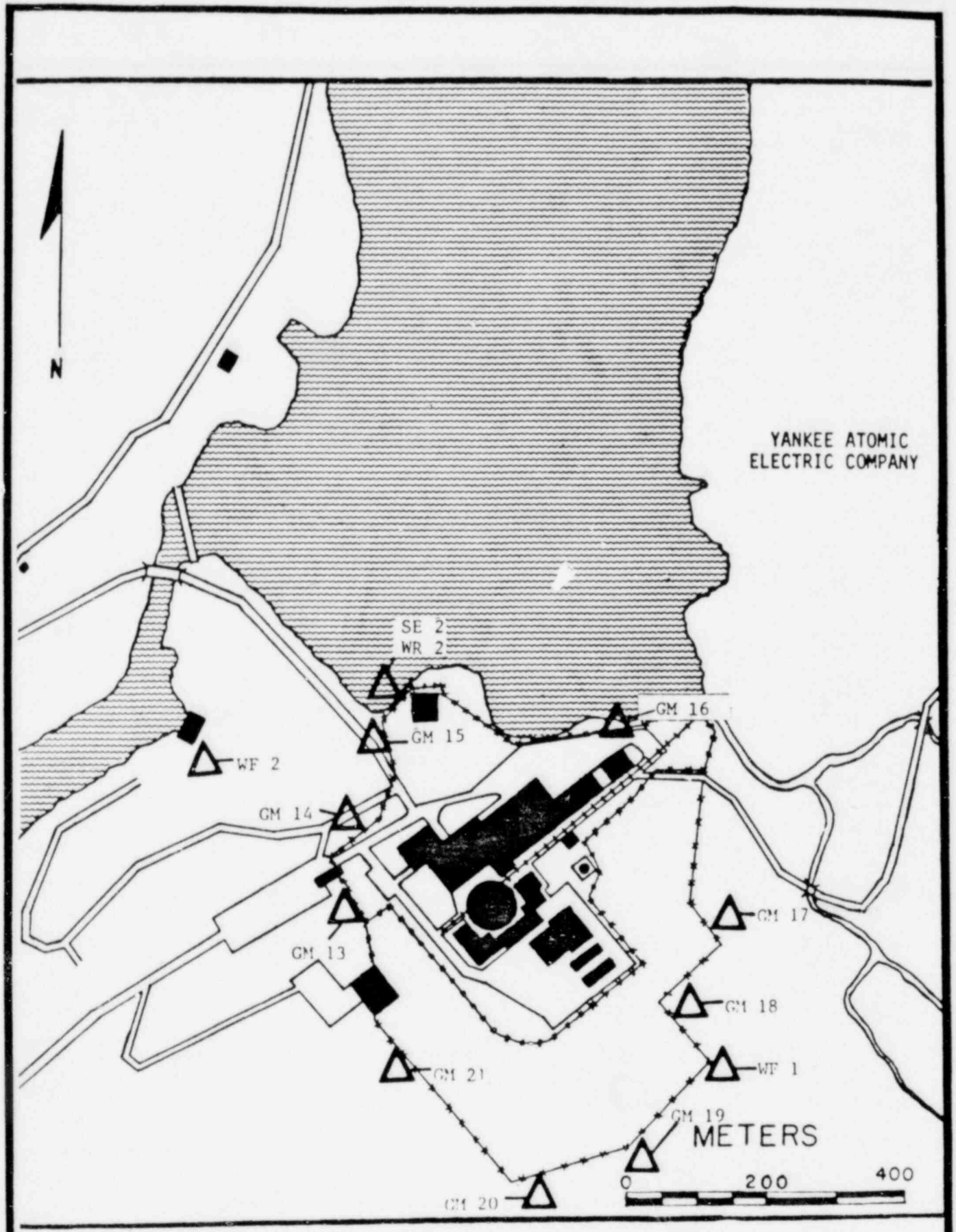
STATION	ZONE	MEDIA CODES	STATION IDENTIFICATION			
02	2	MS	TOWNSEND, COLBAIN	16.9 KM	E	RIVE
03	2	MS	WILLIAMSTOWN, MASS.	21.0 KM	WSW	RIVE
01	1	FD	MONROE BRIDGE	5.8 KM	E	RIVE



YANKEE ATOMIC ELECTRIC COMPANY	LOCATION OF PLANT AND SURROUNDING AREA WITHIN 50 MILE RADIUS	FIG. 1



YANKEE ATOMIC ELECTRIC COMPANY	5 MILE RADIUS	FIG. 2

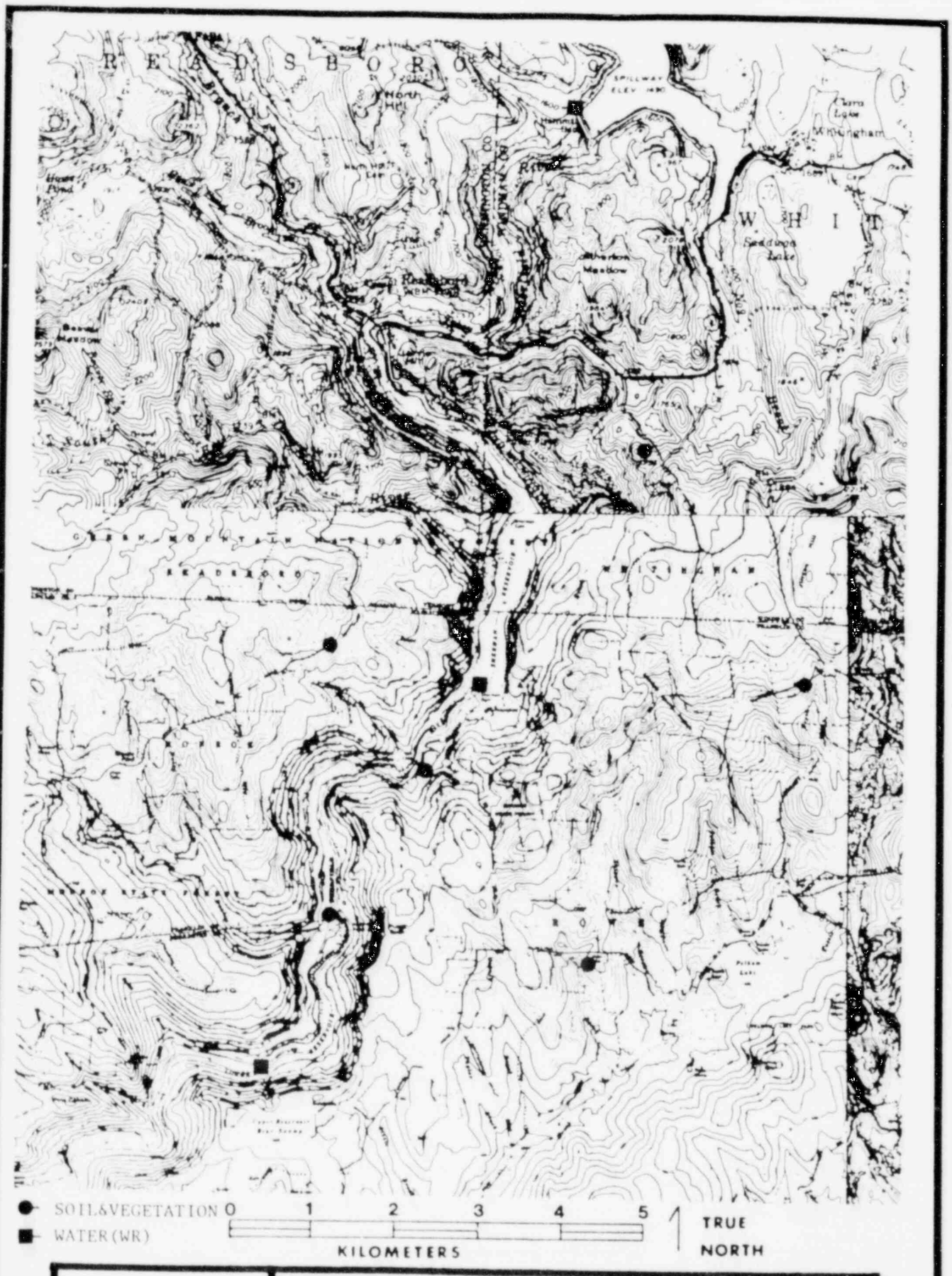


YANKEE ATOMIC ELECTRIC COMPANY	RADIOLOGICAL SAMPLING SITES WITHIN CLOSE PROXIMITY TO PLANT	FIG. 3

YANKEE ATOMIC ELECTRIC COMPANY	GAMMA MONITORING & AIR PARTICULATE SAMPLING SITES	FIG. 4

YANKEE ATOMIC ELECTRIC COMPANY	MILK & MAPLE SYRUP SAMPLING SITES	FIG. 5

YANKEE ATOMIC ELECTRIC COMPANY	AQUATIC & GARDEN VEGETABLE SAMPLING SITES	FIG. 6



YANKEE ATOMIC ELECTRIC COMPANY	WATER, SOIL & VEGETATION SAMPLING SITES	FIG. 7

III. SUMMARY OF 1981 ENVIRONMENTAL DATA

The following tables summarize the analytical results of all environmental samples collected during 1981. These tables were generated by the computer code: ERMAP.

MEDIUM: AIR PARTICULATE FILTERS UNITS: PCI/CU. M

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA.	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
GR-B (370)	4.0E-03	(1.3 ± .1)E -1	03	(1.5 ± .2)E -1	(1.3 ± .1)E -1
(0)		(8.7 - 481.0)E -3		(2.0 - 47.4)E -2	(9.8 - 452.0)E -3
		(268/268)		*(47/ 47)*	*(106/106)*
BE-7 (29)	2.0E-02	(4.3 ± .2)E -2	04	(4.9 ± .5)E -2	(4.7 ± .5)E -2
(0)		(2.2 - 6.3)E -2		(3.7 - 5.9)E -2	(2.7 - 6.0)E -2
		(21/ 21)		*(4/ 4)*	*(8/ 8)*
K-40 (29)	4.0E-02	(3.3 ± .5)E -3	04	(4.7 ± 1.2)E -3	(6.2 ± 13.2)E -4
(0)		(2.0 - 75.5)E -4		(2.3 - 7.6)E -3	(-6.8 - 3.8)E -3
		(4/ 21)		*(1/ 4)*	*(0/ 8)*
CR-51 (29)	2.0E-02	(8.8 ± 8.8)E -4	08	(4.3 ± 2.8)E -3	(-1.7 ± 1.0)E -3
(0)		(-2.4 - 5.3)E -3			(-5.5 - 3.1)E -3
		(0/ 21)		*(0/ 1)*	*(0/ 8)*
MN-54 (29)	2.0E-03	(4.2 ± 1.1)E -4	01	(6.1 ± 3.3)E -4	(4.6 ± 1.5)E -4
(0)		(-2.3 - 18.2)E -4		(-1.5 - 14.2)E -4	(-7.8 - 1250.0)E -6
		(11/ 21)		*(3/ 4)*	*(3/ 8)*
CO-58 (29)	2.0E-03	(-6.0 ± 3.3)E -5	05	(5.8 ± 9.6)E -5	(2.7 ± 95.0)E -6
(0)		(-5.3 - 1.8)E -4			(-3.8 - 4.1)E -4
		(0/ 21)		*(0/ 4)*	*(0/ 8)*
FE-59 (29)	3.0E-03	(-1.5 ± 6.2)E -5	05	(4.8 ± 4.1)E -4	(3.8 ± 2.2)E -4
(0)		(-5.8 - 7.4)E -4			(-3.1 - 16.8)E -4
		(0/ 21)		*(0/ 4)*	*(0/ 8)*
CO-60 (29)	2.0E-03	(2.8 ± 8.0)E -5	02	(1.0 ± 1.2)E -4	(3.2 ± 61.1)E -6
(0)		(-3.4 - 4.7)E -4			(-2.0 - 2.8)E -4
		(0/ 21)		*(0/ 4)*	*(0/ 8)*
ZN-65 (29)	4.0E-03	(6.2 ± 5.6)E -5	02	(3.1 ± 1.5)E -4	(-4.5 ± 88.6)E -6
(0)		(-2.9 - 6.6)E -4			(-3.2 - 3.0)E -4
		(0/ 21)		*(0/ 4)*	*(0/ 8)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: AIR PARTICULATE FILTERS UNITS: PCI/CU. M

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA.*	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
ZR-95 (29)	3.0E-03	(9.8 ± 2.0)E -3	03	(1.1 ± .6)E -2	(9.6 ± 3.2)E -3
(0)		(-1.2 - 2870.0)E -5		(8.2 - 247.0)E -4	(2.0 - 230.0)E -4
		(16/ 21)		*(4/ 4)*	*(6/ 8)*
NB-95 (29)	1.0E-02	(1.8 ± .8)E -2	03	(2.1 ± 1.2)E -2	(1.9 ± .7)E -2
(0)		(-5.1 - 521.0)E -4		(-5.1 - 521.0)E -4	(6.7 - 490.0)E -4
		(15/ 21)		*(3/ 4)*	*(6/ 8)*
AG-110M(29)	2.0E-03	(3.7 ± 2.5)E -4	05	(1.8 ± .7)E -3	(4.2 ± 7.2)E -4
(0)		(-1.5 - 8.4)E -3			(-3.2 - 3.7)E -3
		(0/ 21)		*(0/ 4)*	*(0/ 8)*
RU-103 (29)	2.0E-03	(3.4 ± .7)E -3	04	(4.0 ± 1.9)E -3	(3.8 ± 1.3)E -3
(0)		(-2.6 - 88.0)E -4		(3.5 - 83.5)E -4	(7.9 - 835.0)E -5
		(14/ 21)		*(3/ 4)*	*(5/ 8)*
RU-106 (29)	2.0E-02	(5.6 ± 1.3)E -3	03	(7.1 ± 3.9)E -3	(5.7 ± 2.3)E -3
(0)		(-1.2 - 17.8)E -3		(-4.6 - 178.0)E -4	(-3.2 - 157.0)E -4
		(12/ 21)		*(3/ 4)*	*(4/ 8)*
I-131 (29)	3.0E-03	(-1.9 ± 1.0)E -3	04	(2.4 ± 3.8)E -3	(-3.1 ± 10.8)E -4
(0)		(-3.8 - .7)E -2			(-5.4 - 5.1)E -3
		(0/ 21)		*(0/ 1)*	*(0/ 8)*
CS-134 (29)	2.0E-03	(-1.5 ± .3)E -4	02	(-5.2 ± 4.6)E -5	(-2.5 ± .5)E -4
(0)		(-3.4 - .4)E -4			(-4.4 - 0.0)E -4
		(0/ 21)		*(0/ 4)*	*(0/ 8)*
CS-137 (29)	2.0E-03	(1.1 ± .2)E -3	04	(1.4 ± .6)E -3	(1.1 ± .4)E -3
(0)		(6.8 - 317.0)E -5		(4.6 - 31.7)E -4	(7.1 - 285.0)E -5
		(15/ 21)		*(3/ 4)*	*(4/ 8)*
BA-140 (29)	5.0E-03	(-5.3 ± 14.5)E -5	08	(5.7 ± 16.4)E -4	(-4.1 ± 3.7)E -4
(0)		(-1.4 - 1.0)E -3			(-2.5 - .5)E -3
		(0/ 21)		*(0/ 1)*	*(0/ 8)*
CE-141 (29)	3.0E-03	(1.9 ± .8)E -3	04	(2.4 ± .9)E -3	(1.5 ± .6)E -3
(0)		(-3.3 - 85.3)E -4		(2.9 - 41.5)E -4	(-3.9 - 39.8)E -4
		(10/ 21)		*(2/ 4)*	*(4/ 8)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: AIR PARTICULATE FILTERS UNITS: PCI/CU. M

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN, RANGE, AND NO. DETECTED**	STA.	HIGHEST STATION MEAN, RANGE, AND NO. DETECTED**	CONTROL LOCATIONS MEAN, RANGE, AND NO. DETECTED**
CE-144 (29) (0)	2.0E-02	(1.4 ± .3)E -2 (-8.9 - 388.0)E -4 *(16/ 21)*	09	(1.6 ± .8)E -2 (3.7 - 38.3)E -3 *(3/ 4)*	(1.2 ± .4)E -2 (1.1 - 35.6)E -3 *(6/ 8)*
TH-228 (29) (0)	9.0E-03	(-7.5 ± 8.5)E -5 (-7.5 - 8.8)E -4 *(0/ 21)*	09	(5.4 ± 28.5)E -5 *(0/ 4)*	(1.0 ± 11.9)E -5 (-4.5 - 5.0)E -4 *(0/ 8)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: CHARCOAL FILTERS UNITS: PCI/CU. M

RADIONUCLIDES (NO. ANALYSES) (NO. ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
I-131 (363) (0)	3.0E-03	(2.9 ± 3.8)E -2 (-1.7 - 2.8)E -2 *(1/259)*	02	(1.5 ± .8)E -3 *(0/ 52)*	(2.5 ± 5.7)E -2 (-1.7 - 2.8)E -2 *(0/104)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

[redacted] SUMMARY FOR THE PERIOD 12/30/80 - 12/31/81

MEDIUM: FOOD/GARDEN CROPS

UNITS: PCI/KG WET

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*		NOMINAL LLD	INDICATOR STATIONS MEAN, RANGE, AND NO. DETECTED**	STA	HIGHEST STATION MEAN, RANGE, AND NO. DETECTED**	CONTROL LOCATIONS MEAN, RANGE, AND NO. DETECTED**
BE-7	(3)	.2	(10.0 ± 3.0)E 1	02	(1.4 ± .7)E 2	(-3.2 ± 6.0)E 1
	(0)		(6.0 - 13.0)E 1			(-3.2 - 0.0)E 1
			(0/ 2)		*(0/ 1)*	*(0/ 1)*
K-40	(3)	.5	(3.4 ± .5)E 3	02	(3.9 ± .3)E 3	(3.1 ± .2)E 3
	(0)		(2.8 - 3.9)E 3			
			(2/ 2)		*(1/ 1)*	*(1/ 1)*
CR-51	(3)	3.2E+02	(-4.1 ± 8.7)E 1	02	(4.5 ± 6.9)E 1	(-2.1 ± 5.7)E 1
	(0)		(-1.3 - .5)E 2			(-2.1 - 0.0)E 1
			(0/ 2)		*(0/ 1)*	*(0/ 1)*
MN-54	(3)	2.0E+02	(2.4 ± 1.3)E 1	01	(3.7 ± 1.5)E 1	(3.0 ± 6.7)E 0
	(0)		(1.0 - 3.7)E 1			
			(0/ 2)		*(0/ 1)*	*(0/ 1)*
CO-58	(3)	2.0E+02	(-1.5 ± 110.5)E -1	02	(1.2 ± .8)E 1	(5.5 ± 7.7)E 0
	(0)		(-1.2 - 1.2)E 1			
			(0/ 2)		*(0/ 1)*	*(0/ 1)*
FE-59	(3)	3.0E+01	(5.0 ± 2.7)E 0	03	(3.1 ± 1.7)E 1	(3.1 ± 1.7)E 1
	(0)		(2.3 - 7.6)E 0			
			(0/ 2)		*(0/ 1)*	*(0/ 1)*
CO-60	(3)	2.0E+02	(-1.8 ± 1.0)E 1	03	(6.2 ± 10.1)E 0	(6.2 ± 10.1)E 0
	(0)		(-2.8 - 0.0)E 1			
			(0/ 2)		*(0/ 1)*	*(0/ 1)*
ZN-65	(3)	6.7E+01	(8.7 ± 8.6)E 0	02	(1.3 ± 2.3)E 1	(-1.0 ± 1.8)E 1
	(0)		(4.2 - 13.3)E 0			(-1.0 - 0.0)E 1
			(0/ 2)		*(0/ 1)*	*(0/ 1)*
ZR-95	(3)	4.0E+02	(3.7 ± 10.8)E 0	02	(1.8 ± 1.6)E 1	(1.4 ± 1.3)E 1
	(0)		(-6.7 - 14.1)E 0			
			(0/ 2)		*(0/ 1)*	*(0/ 1)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: FOOD/GARDEN CROPS — UNITS: PCI/KG WET

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA.	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
NB-95 (3)	3.0E+01	(1.3 ± 1.1)E 1	01	(2.4 ± 1.0)E 1	(1.1 ± .8)E 1
(0)		(1.8 - 20.0)E 0			
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
AG-110M(3)	2.5E+02	(6.6 ± 8.0)E 1	01	(1.1 ± 1.0)E 2	(-7.3 ± 59.6)E 0
(0)		(2.7 - 10.6)E 1			(-7.3 - 0.0)E 0
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
RU-103 (3)	2.0E+02	(4.3 ± .8)E 0	03	(1.1 ± .8)E 1	(1.1 ± .8)E 1
(0)		(3.9 - 4.6)E 0			
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
RU-106 (3)	.2	(5.8 ± .8)E 1	03	(9.2 ± 6.7)E 1	(9.2 ± 6.7)E 1
(0)		(4.6 - 6.2)E 1			
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
I-131 (3)	0.	(1.3 ± 1.0)E 1	01	(2.6 ± 2.7)E 1	(-6.5 ± 4.1)E 0
(0)		(-8.2 - 263.0)E -1			(-6.5 - 0.0)E 0
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
CS-134 (3)	2.0E+02	(2.3 ± 1.7)E 0	02	(4.0 ± 8.6)E 0	(-1.8 ± .8)E 1
(0)		(5.4 - 30.0)E -1			(-1.8 - 0.0)E 1
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
CS-137 (3)	2.0E+02	(9.2 ± 8.9)E 0	02	(1.4 ± .9)E 1	(-8.7 ± 6.8)E 0
(0)		(4.4 - 18.1)E 0			(-8.7 - 0.0)E 0
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
BA-140 (3)	8.0E+02	(1.4 ± 1.6)E 1	01	(3.0 ± 1.9)E 1	(-3.0 ± 1.5)E 1
(0)		(-2.4 - 29.7)E 0			(-3.0 - 0.0)E 1
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
CE-141 (3)	4.0E+02	(2.0 ± .2)E 1	02	(2.2 ± 1.3)E 1	(1.2 ± 1.1)E 1
(0)		(1.8 - 2.2)E 1			
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
CE-144 (3)	.2	(7.2 ± 1.0)E 1	02	(9.1 ± 8.6)E 1	(1.5 ± 3.9)E 1
(0)		(5.3 - 9.1)E 1			
		(0/ 2)		*(0/ 1)*	*(0/ 1)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: FOOD/GARDEN CROPS UNITS: PCI/KG WET

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA.	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
TH-228 (3)	2.0E-02	(4.5 ± 5.0)E 1	01	(9.5 ± 7.4)E 1	(3.2 ± 3.3)E 1
(0)		(-4.3 - 99.9)E 0			
		(0/ 2)		*(0/ 1)*	*(0/ 1)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: FISH

UNITS: PCI/KG WET

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*		NOMINAL LLD	INDICATOR STATIONS MEAN, RANGE, AND NO. DETECTED**	STA*	HIGHEST STATION MEAN, RANGE, AND NO. DETECTED**	CONTROL LOCATIONS MEAN, RANGE, AND NO. DETECTED**
BE-7	(6)	.2	(6.1 ± 3.3)E 1	03	(8.6 ± 6.9)E 1	(-1.9 ± .5)E 2
	(0)		(1.4 - 15.5)E 1			(-2.4 - 0.0)E 2
			(0/ 4)		*(0/ 2)*	*(0/ 2)*
K-40	(6)	.5	(2.5 ± .1)E 3	01	(2.7 ± .2)E 3	(2.7 ± .2)E 3
	(0)		(2.5 - 2.7)E 3		(2.4 - 2.9)E 3	(2.4 - 2.9)E 3
			(4/ 4)		*(2/ 2)*	*(2/ 2)*
CR-51	(6)	3.2E+02	(-1.5 ± .6)E 2	01	(-4.7 ± 13.9)E 1	(-4.7 ± 13.9)E 1
	(0)		(-3.1 - 0.0)E 2			(-1.9 - .9)E 2
			(0/ 4)		*(0/ 2)*	*(0/ 2)*
MN-54	(6)	2.0E+02	(-1.4 ± 4.3)E 0	02	(4.0 ± 1.9)E 0	(4.1 ± 90.4)E -1
	(0)		(-1.4 - .6)E 1			(-8.6 - 9.5)E 0
			(0/ 4)		*(0/ 2)*	*(0/ 2)*
CO-58	(6)	2.0E+02	(7.8 ± 6.2)E 0	03	(1.5 ± .0)E 1	(4.3 ± 11.6)E 0
	(0)		(-1.1 - 1.6)E 1			(-7.3 - 15.9)E 0
			(0/ 4)		*(0/ 2)*	*(0/ 2)*
FE-59	(6)	3.0E+01	(2.2 ± 2.9)E 1	03	(7.1 ± .7)E 1	(1.9 ± 3.7)E 1
	(0)		(-3.6 - 7.8)E 1			(-1.8 - 5.7)E 1
			(0/ 4)		*(0/ 2)*	*(0/ 2)*
CO-60	(6)	2.0E+02	(7.7 ± 7.4)E 0	02	(1.7 ± 1.3)E 1	(-1.1 ± .7)E 1
	(0)		(-3.4 - 20.5)E 0			(-1.8 - 0.0)E 1
			(0/ 4)		*(0/ 2)*	*(0/ 2)*
ZN-65	(6)	4.7E+01	(5.8 ± 6.6)E 0	03	(1.1 ± 1.4)E 1	(-3.7 ± 4.8)E 0
	(0)		(-2.7 - 25.4)E 0			(-8.5 - 1.2)E 0
			(0/ 4)		*(0/ 2)*	*(0/ 2)*
ZR-95	(6)	4.0E+02	(-9.5 ± 19.7)E 0	02	(1.6 ± 1.0)E 1	(2.2 ± 2.8)E 0
	(0)		(-6.5 - 2.6)E 1			(-5.4 - 49.7)E -1
			(0/ 4)		*(0/ 2)*	*(0/ 2)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: FISH

UNITS: PCI/KG WET

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*		NOMINAL LLD	INDICATOR STATIONS MEAN, RANGE, AND NO. DETECTED**	STA.	HIGHEST STATION MEAN, RANGE, AND NO. DETECTED**	CONTROL LOCATIONS MEAN, RANGE, AND NO. DETECTED**
NB-95	(4)	3.0E+01	(3.0 ± 5.0)E 0	01	(1.3 ± 1.1)E 1	(1.3 ± 1.1)E 1
	(0)		(-8.5 - 10.2)E 0			(1.7 - 23.9)E 0
			(0/ 4)		*(0/ 2)*	*(0/ 2)*
AG-110M	(4)	2.5E+02	(-4.9 ± 11.5)E 1	02	(7.8 ± 6.7)E 1	(-6.1 ± 2.0)E 1
	(0)		(-3.8 - 1.5)E 2			(-8.1 - 0.0)E 1
			(0/ 4)		*(0/ 2)*	*(0/ 2)*
RU-103	(6)	2.0E-02	(3.3 ± 9.1)E 0	03	(1.6 ± .6)E 1	(1.1 ± .9)E 1
	(0)		(-2.1 - 2.2)E 1			(1.2 - 19.9)E 0
			(0/ 4)		*(0/ 2)*	*(0/ 2)*
RU-106	(6)	.2	(3.2 ± 8.8)E 1	03	(1.3 ± 1.6)E 2	(3.7 ± .1)E 1
	(0)		(-1.3 - 2.8)E 2			(3.6 - 3.8)E 1
			(0/ 4)		*(0/ 2)*	*(0/ 2)*
I-131	(6)	0.	(6.0 ± 8.4)E 2	03	(1.0 ± .8)E 3	(-3.2 ± 3.8)E 2
	(0)		(-3.4 - 188.0)E 1			(-7.0 - .5)E 2
			(0/ 4)		*(0/ 2)*	*(0/ 2)*
CS-134	(4)	2.0E-02	(2.0 ± 7.2)E 0	02	(4.2 ± 2.6)E 0	(-4.9 ± 7.9)E 0
	(0)		(-1.7 - 1.7)E 1			(-1.3 - .3)E 1
			(0/ 4)		*(0/ 2)*	*(0/ 2)*
CS-137	(4)	2.0E-02	(9.2 ± 8.7)E 1	02	(1.6 ± .7)E 2	(1.5 ± .2)E 2
	(0)		(2.4 - 22.8)E 1		(8.2 - 22.8)E 1	(1.3 - 1.7)E 2
			(2/ 4)		*(2/ 2)*	*(2/ 2)*
BA-140	(6)	8.0E-02	(1.9 ± 1.3)E 2	03	(3.6 ± 2.1)E 2	(2.0 ± 63.9)E 0
	(0)		(1.4 - 57.0)E 1			(-6.2 - 6.6)E 1
			(0/ 4)		*(0/ 2)*	*(0/ 2)*
CE-141	(4)	8.0E-02	(-1.0 ± 1.0)E 1	02	(1.7 ± 16.6)E 0	(-4.5 ± 331.5)E -2
	(0)		(-2.3 - 1.8)E 1			(-3.4 - 3.3)E 0
			(0/ 4)		*(0/ 2)*	*(0/ 2)*
CE-144	(6)	.2	(-2.8 ± 1.1)E 1	01	(5.6 ± 1.5)E 1	(5.6 ± 1.5)E 1
	(0)		(-4.9 - .3)E 1			(4.1 - 7.0)E 1
			(0/ 4)		*(0/ 2)*	*(0/ 2)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >2SIGMA) IS INDICATED WITHIN *( )*.

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MEDIUM: FISH

UNITS: PCI/KG WET

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA.*	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
TH-228 (4)	2.0E-02	(1.6 ± 1.0)E 1	02	(3.1 ± 2.2)E 1	(-1.3 ± 18.4)E 0
(0)		(-3.5 - 5.3)E 1			(-2.0 - 1.7)E 1
		(0/ 4)		*(0/ 2)*	*(0/ 2)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

SUMMARY FOR THE PERIOD 12/20/80 - 12/31/81

MEDIUM: MAPLE SYRUP UNITS: PCI/LITER

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*		NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA.	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
BE-7	(3)	8.0E+01	(6.8 ± 64.4)E -1	01	(6.8 ± 64.4)E -1	(-3.4 ± 2.6)E 0
	(0)					(-6.0 - 0.0)E 0
			(0/ 1)		*(0/ 1)*	*(0/ 2)*
K-40	(3)	2.0E+02	(1.9 ± .0)E 3	02	(2.0 ± .0)E 3	(1.9 ± .1)E 3
	(0)					(1.9 - 2.0)E 3
			(1/ 1)		*(1/ 1)*	*(2/ 2)*
CR-51	(3)	-1.0-100	(-8.7 ± 7.2)E 0	03	(1.6 ± .7)E 1	(7.7 ± 8.7)E 0
	(0)		(-8.7 - 0.0)E 0			(-1.0 - 16.4)E 0
			(0/ 1)		*(0/ 1)*	*(0/ 2)*
MN-54	(3)	8.	(-1.1 ± .7)E 0	03	(-1.2 ± 63.1)E -2	(-4.6 ± 4.4)E -1
	(0)		(-1.1 - 0.0)E 0			(-9.0 - 0.0)E -1
			(0/ 1)		*(0/ 1)*	*(0/ 2)*
CO-58	(3)	8.	(3.6 ± 7.4)E -1	01	(3.6 ± 7.4)E -1	(-5.2 ± 5.4)E -1
	(0)					(-1.1 - .0)E 0
			(0/ 1)		*(0/ 1)*	*(0/ 2)*
FE-59	(3)	1.0E+01	(2.2 ± 2.2)E 0	03	(4.9 ± 1.9)E 0	(2.1 ± 2.8)E 0
	(0)					(-6.6 - 49.0)E -1
			(0/ 1)		*(0/ 1)*	*(0/ 2)*
CO-60	(3)	8.	(2.7 ± 8.7)E -1	03	(1.6 ± .9)E 0	(1.1 ± .5)E 0
	(0)					(5.5 - 16.4)E -1
			(0/ 1)		*(0/ 1)*	*(0/ 2)*
ZN-65	(3)	-1.0-100	(-1.4 ± 2.2)E 0	03	(1.0 ± 1.9)E 0	(2.6 ± 7.9)E -1
	(0)		(-1.4 - 0.0)E 0			(-5.4 - 10.5)E -1
			(0/ 1)		*(0/ 1)*	*(0/ 2)*
ZR-95	(3)	1.0E+01	(-6.7 ± 13.7)E -1	03	(8.1 ± 12.7)E -1	(-9.3 ± 90.5)E -2
	(0)		(-6.7 - 0.0)E -1			(**** - 8.1)E -1
			(0/ 1)		*(0/ 1)*	*(0/ 2)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

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SUMMARY FOR THE PERIOD 12/20/80 - 12/31/81

MEDIUM: MAPLE SYRUP UNITS: PCI/LITER

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA.	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
NB-95 (3)	-1.0-100	(4.4 ± 9.0)E -1	01	(4.4 ± 9.0)E -1	(2.8 ± .1)E -1
(0)					(2.7 - 3.0)E -1
		(0/ 1)		*(0/ 1)*	*(0/ 2)*
AG-110M(3)	-1.0-100	(9.5 ± 5.0)E 0	02	(1.1 ± .6)E 1	(4.1 ± 7.3)E 0
(0)					(-3.1 - 11.4)E 0
		(0/ 1)		*(0/ 1)*	*(0/ 2)*
RU-103 (3)	8.	(1.0 ± .9)E 0	01	(1.0 ± .9)E 0	(-6.7 ± 10.5)E -1
(0)					(-1.7 - .4)E 0
		(0/ 1)		*(0/ 1)*	*(0/ 2)*
RU-106 (3)	8.0E+01	(-6.6 ± 5.5)E 0	03	(-5.8 ± 5.5)E 0	(-7.8 ± 2.0)E 0
(0)		(-6.6 - 0.0)E 0			(-9.9 - 0.0)E 0
		(0/ 1)		*(0/ 1)*	*(0/ 2)*
I-131 (3)	.5	(3.3 ± 3.8)E 0	01	(3.3 ± 3.8)E 0	(-1.3 ± 3.8)E 0
(0)					(-5.1 - 2.5)E 0
		(0/ 1)		*(0/ 1)*	*(0/ 2)*
CS-134 (3)	9.	(-9.9 ± 62.5)E -2	02	(2.3 ± 6.6)E -1	(1.2 ± 1.1)E -1
(0)		(-9.9 - 0.0)E -2			(6.9 - 234.0)E -3
		(0/ 1)		*(0/ 1)*	*(0/ 2)*
CS-137 (3)	9.	(3.3 ± .6)E 0	02	(4.0 ± .1)E 1	(3.1 ± .8)E 1
(0)					(2.3 - 4.0)E 1
		(1/ 1)		*(1/ 1)*	*(2/ 2)*
BA-140 (3)	1.5E+01	(-1.7 ± 1.7)E 0	02	(-4.9 ± 17.5)E -1	(-1.2 ± .7)E 0
(0)		(-1.7 - 0.0)E 0			(-2.0 - 0.0)E 0
		(0/ 1)		*(0/ 1)*	*(0/ 2)*
CE-141 (3)	2.0E+01	(-4.1 ± 14.3)E -1	03	(2.1 ± 1.3)E 0	(-5.0 ± 2065.0)E -3
(0)		(-4.1 - 0.0)E -1			(-2.1 - 2.1)E 0
		(0/ 1)		*(0/ 1)*	*(0/ 2)*
CE-144 (3)	8.0E+01	(-5.3 ± 4.0)E 0	02	(1.3 ± 4.6)E 0	(-1.0 ± 2.3)E 0
(0)		(-5.3 - 0.0)E 0			(-3.3 - 1.3)E 0
		(0/ 1)		*(0/ 1)*	*(0/ 2)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

SUMMARY FOR THE PERIOD 12/20/80 - 12/31/81

MEDIUM: MAPLE SYRUP

UNITS: PCI/LITER

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA.	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
TH-228 (3)	1.0E+01	(4.9 & 2.4)E 0	03	(9.5 & 2.3)E 0	(8.7 & .8)E 0
(0)					(8.0 - 9.5)E 0
		(0/ 1)		*(1/ 1)*	*(1/ 2)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

SUMMARY FOR THE PERIOD 12/20/80 - 12/31/81

MEDIUM: MILK UNITS: PCI/LITER

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA.	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
SR-89 (36) (0)	8.	(1.3 ± .8)E 0 (-1.0 - 5.0)E 0 *(7/ 24)*	01	(1.6 ± .6)E 0 (-1.0 - 5.0)E 0 *(4/ 12)*	(8.1 ± 2.7)E -1 (-1.7 - 24.3)E -1 *(3/ 12)*
SR-90 (36) (0)	.8	(7.0 ± .8)E 0 (1.8 - 15.2)E 0 *(24/ 24)*	01	(1.0 ± .1)E 1 (5.8 - 15.2)E 0 *(12/ 12)*	(2.0 ± .2)E 0 (1.2 - 3.3)E 0 *(12/ 12)*
BE-7 (37) (0)	8.0E+01	(8.8 ± 11.8)E -1 (-1.2 - 1.8)E 1 *(0/ 25)*	02	(1.8 ± 1.5)E 0 *(0/ 13)*	(-7.7 ± 192.7)E -2 (-1.2 - .8)E 1 *(0/ 12)*
K-40 (37) (0)	2.0E+02	(1.3 ± .0)E 3 (1.2 - 1.5)E 3 *(25/ 25)*	02	(1.8 ± .0)E 3 (1.2 - 1.5)E 3 *(13/ 13)*	(1.4 ± .0)E 3 (1.3 - 1.4)E 3 *(12/ 12)*
CR-51 (37) (0)	-1.0-100	(3.8 ± 18.2)E -1 (-1.7 - 1.5)E 1 *(0/ 25)*	01	(3.5 ± 21.9)E -1 *(0/ 12)*	(-9.4 ± 158.6)E -2 (-9.2 - 7.9)E 0 *(0/ 12)*
MN-54 (37) (0)	8.	(3.8 ± 1.0)E -1 (-1.9 - 2.2)E 0 *(0/ 25)*	01	(7.5 ± 2.2)E -1 *(0/ 12)*	(1.7 ± 1.5)E -1 (-5.8 - 9.8)E -1 *(0/ 12)*
CO-58 (37) (0)	8.	(1.9 ± 15.0)E -2 (-1.3 - 1.7)E 0 *(0/ 25)*	02	(9.9 ± 21.3)E -2 *(0/ 13)*	(-2.7 ± 2.1)E -1 (-1.5 - .9)E 0 *(0/ 12)*
FE-59 (37) (0)	1.0E+01	(-3.8 ± 2.7)E -1 (-3.3 - 2.0)E 0 *(0/ 25)*	03	(1.1 ± 8.5)E -1 *(0/ 12)*	(1.1 ± 8.5)E -1 (-5.2 - 5.8)E 0 *(0/ 12)*
CO-60 (37) (0)	8.	(-8.3 ± 1.8)E -1 (-1.8 - 2.0)E 0 *(0/ 25)*	02	(-3.0 ± 2.8)E -1 *(0/ 13)*	(-4.0 ± 1.9)E -1 (-2.0 - .8)E 0 *(0/ 12)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

[redacted]

MEDIUM: MILK

UNITS: PCI/LITER

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN, RANGE, AND NO. DETECTED**	STA.	HIGHEST STATION MEAN, RANGE, AND NO. DETECTED**	CONTROL LOCATIONS MEAN, RANGE, AND NO. DETECTED**
ZN-65 (37)	-1.0-100	(6.2 ± 2.6)E -1	02	(9.2 ± 3.9)E -1	(-1.2 ± 4.0)E -1
(0)		(-1.5 - 3.5)E 0			(-2.2 - 1.9)E 0
		(0/ 25)		*(0/ 13)*	*(0/ 12)*
ZR-95 (37)	1.0E+01	(4.5 ± 1.9)E -1	01	(4.9 ± 3.2)E -1	(-3.0 ± 4.1)E -1
(0)		(-1.9 - 2.3)E 0			(-1.7 - 3.0)E 0
		(0/ 25)		-(0/ 12)*	*(0/ 12)*
NB-95 (37)	-1.0-100	(9.8 ± 15.0)E -2	02	(2.6 ± 2.5)E -1	(8.4 ± 15.4)E -2
(0)		(-1.3 - 2.4)E 0			(-8.1 - 9.1)E -1
		(0/ 25)		*(0/ 13)*	*(0/ 12)*
AG-110M(37)	-1.0-100	(-4.0 ± 12.2)E -1	03	(2.6 ± 1.1)E 0	(2.6 ± 1.1)E 0
(0)		(-1.2 - 1.2)E 1			(-4.3 - 7.1)E 0
		(0/ 25)		*(0/ 12)*	*(0/ 12)*
RU-103 (37)	8.	(-9.2 ± 2.0)E -1	02	(-7.4 ± 2.3)E -1	(-8.9 ± 1.8)E -1
(0)		(-2.9 - 1.1)E 0			(-2.2 - 0.0)E 0
		(0/ 25)		*(0/ 13)*	*(0/ 12)*
RU-106 (37)	8.0E+01	(-2.2 ± 1.4)E 0	03	(-2.1 ± 1.5)E 0	(-2.1 ± 1.5)E 0
(0)		(-1.7 - 1.0)E 1			(-1.2 - .8)E 1
		(0/ 25)		*(0/ 12)*	*(0/ 12)*
I-131 (37)	.5	(2.2 ± .7)E -2	03	(3.5 ± 2.1)E -2	(3.5 ± 2.1)E -2
(0)		(-3.1 - 11.4)E -2			(-8.6 - 22.8)E -2
		(0/ 25)		*(0/ 12)*	*(0/ 12)*
CS-134 (37)	9.	(-6.5 ± 1.4)E -1	03	(-4.5 ± 1.3)E -1	(-4.5 ± 1.3)E -1
(0)		(-2.4 - .5)E 0			(-1.1 - .5)E 0
		(0/ 25)		*(0/ .2)*	*(0/ 12)*
CS-137 (37)	9.	(1.3 ± .2)E 1	01	(2.1 ± .3)E 1	(2.7 ± .4)E 0
(3)		(3.4 - 39.6)E 0		(8.8 - 39.6)E 0	(6.5 - 56.4)E -1
		(25/ 25)		*(12/ 12)*	*(10/ 12)*
BA-140 (37)	1.5E+01	(5.6 ± 3.1)E -1	01	(6.2 ± 5.1)E -1	(2.5 ± 4.1)E -1
(0)		(-3.0 - 5.5)E 0			(-1.7 - 3.3)E 0
		(0/ 25)		*(0/ 12)*	*(0/ 12)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

SUMMARY FOR THE PERIOD 12/29/80 - 12/31/81

MEDIUM: MILK

UNITS: PCI/LITER

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN, RANGE, AND NO. DETECTED**	STA.	HIGHEST STATION MEAN, RANGE, AND NO. DETECTED**	CONTROL LOCATIONS MEAN, RANGE, AND NO. DETECTED**
CE-141 (37) (0)	2.0E+01	(-1.2 ± 2.3)E -1 (-2.2 - 2.6)E 0 *(0/ 25)*	01	(4.3 ± 3.2)E -1 *(0/ 12)*	(2.3 ± 5.6)E -1 (-2.4 - 3.1)E 0 *(0/ 12)*
CE-144 (37) (0)	8.0E+01	(8.3 ± 6.9)E -1 (-8.5 - 6.2)E 0 *(0/ 25)*	03	(1.8 ± 1.5)E 0 *(0/ 12)*	(1.8 ± 1.5)E 0 (-6.5 - 10.6)E 0 *(0/ 12)*
TH-228 (37) (0)	1.0E+01	(-8.0 ± 5.4)E -1 (-5.9 - 6.4)E 0 *(0/ 25)*	03	(4.9 ± 7.2)E -1 *(0/ 12)*	(4.9 ± 7.2)E -1 (-2.5 - 4.9)E 0 *(0/ 12)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: SEDIMENT/SILT

UNITS: PCI/KG DRY

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*		NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**		STA	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**		CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**	
BE-7	(53)	.2	(1.4 ± 2.0)E 1		01	(7.7 ± 6.9)E 1		(-2.7 ± 5.2)E 1	
	(0)		(-4.1 - 4.4)E 2					(-4.1 - 4.1)E 2	
			(0/ 33)			*(0/ 11)*		*(0/ 20)*	
K-40	(53)	.5	(1.4 ± .1)E 4		02	(1.6 ± .1)E 4		(1.2 ± .1)E 4	
	(0)		(9.0 - 21.0)E 3			(1.0 - 2.1)E 4		(7.8 - 16.6)E 3	
			(33/ 33)			*(13/ 13)*		*(20/ 20)*	
CR-51	(53)	3.7E+02	(1.5 ± 6.7)E 1		01	(5.8 ± 15.5)E 1		(-2.2 ± 11.8)E 1	
	(0)		(-9.8 - 9.0)E 2					(-9.6 - 12.9)E 2	
			(0/ 33)			*(0/ 11)*		*(0/ 20)*	
MN-54	(53)	2.0E+02	(5.5 ± 3.3)E 0		04	(7.4 ± 4.4)E 0		(1.7 ± 3.6)E 0	
	(0)		(-3.1 - 5.0)E 1					(-2.3 - 2.7)E 1	
			(0/ 33)			*(0/ 11)*		*(0/ 20)*	
CO-58	(53)	2.0E+02	(-7.5 ± 4.9)E 0		01	(7.7 ± 5.1)E 0		(5.1 ± 5.0)E 0	
	(0)		(-8.9 - 5.7)E 1					(-3.5 - 6.6)E 1	
			(0/ 33)			*(0/ 11)*		*(0/ 20)*	
FE-59	(53)	5.0E+01	(-1.9 ± 1.2)E 1		02	(-1.7 ± 1.5)E 1		(-3.0 ± 1.8)E 1	
	(0)		(-1.3 - 1.5)E 2					(-2.0 - 1.2)E 2	
			(0/ 33)			*(0/ 13)*		*(0/ 20)*	
CO-60	(53)	2.0E+02	(4.8 ± 2.4)E 1		02	(1.3 ± .5)E 2		(-1.5 ± 3.8)E 0	
	(5)		(-3.9 - 49.5)E 1			(-1.3 - 49.5)E 1		(-4.8 - 2.2)E 1	
			(5/ 33)			*(5/ 13)*		*(0/ 20)*	
ZN-65	(53)	6.8E+01	(-1.1 ± .9)E 1		01	(3.3 ± 12.5)E 0		(-2.5 ± 7.6)E 0	
	(0)		(-1.4 - .8)E 2					(-6.4 - 6.7)E 1	
			(0/ 33)			*(0/ 11)*		*(0/ 20)*	
ZR-95	(52)	4.0E+02	(2.6 ± .7)E 1		01	(4.3 ± 1.4)E 1		(3.3 ± .9)E 1	
	(0)		(-8.2 - 9.8)E 1					(-6.2 - 10.2)E 1	
			(0/ 33)			*(0/ 10)*		*(0/ 19)*	

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: SEDIMENT/SILT UNITS: PCI/KG DRY

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA.	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
NB-95 (51)	3.1E+01	(2.6 ± .6)E 1	02	(3.8 ± 1.1)E 1	(2.3 ± .8)E 1
(0)		(-5.9 - 12.6)E 1		(-1.4 - 12.6)E 1	(-3.3 - 10.6)E 1
		(2/ 33)		*(1/ 13)*	*(2/ 18)*
AG-110M (53)	1.9E+02	(4.1 ± 2.8)E 1	02	(7.0 ± 5.9)E 1	(8.9 ± 22.8)E 0
(0)		(-2.6 - 3.3)E 2			(-1.7 - 3.4)E 2
		(0/ 33)		*(0/ 13)*	*(0/ 20)*
RU-103 (53)	2.0E-02	(7.1 ± 6.4)E 0	04	(1.8 ± 1.0)E 1	(-1.0 ± 1.0)E 1
(0)		(-9.2 - 8.4)E 1		(-9.1 - 6.5)E 1	
		(0/ 33)		*(0/ 11)*	*(0/ 20)*
RU-106 (53)	.2	(-7.8 ± 1.9)E 1	05	(5.8 ± 4.0)E 1	(2.2 ± 278.0)E -1
(0)		(-2.7 - 1.3)E 2			(-1.9 - 2.2)E 2
		(0/ 33)		*(0/ 9)*	*(0/ 20)*
I-131 (51)	0.	(5.6 ± 10.2)E 2	07	(2.3 ± 3.5)E 3	(-1.6 ± 1.0)E 3
(0)		(-2.1 - 1.5)E 4			(-1.2 - .5)E 4
		(0/ 33)		*(0/ 9)*	*(0/ 18)*
CS-134 (53)	2.0E-02	(-4.5 ± 2.3)E 0	02	(-2.9 ± 4.7)E 0	(-5.2 ± 3.1)E 0
(0)		(-2.6 - 2.4)E 1			(-3.7 - 2.4)E 1
		(0/ 33)		*(0/ 13)*	*(0/ 20)*
CS-137 (53)	2.0E-02	(6.0 ± 2.2)E 2	02	(1.4 ± .5)E 3	(2.9 ± .9)E 2
(3)		(-2.8 - 870.0)E 1		(-4.5 - 4700.0)E 0	(1.4 - 181.0)E 1
		(22/ 33)		*(10/ 13)*	*(17/ 20)*
BA-140 (53)	4.0E-02	(-3.5 ± 1.2)E 2	03	(-2.0 ± 2.0)E 2	(-4.1 ± 1.3)E 2
(0)		(-1.7 - 1.1)E 3			(-1.5 - .5)E 3
		(0/ 33)		*(0/ 9)*	*(0/ 20)*
CE-141 (53)	4.0E-02	(4.2 ± 1.0)E 1	04	(4.7 ± 2.0)E 1	(3.5 ± 1.5)E 1
(0)		(-6.7 - 16.0)E 1			(-1.3 - 1.8)E 2
		(0/ 33)		*(0/ 11)*	*(0/ 20)*
CE-144 (53)	.2	(-3.9 ± 1.7)E 1	02	(4.1 ± 35.4)E 0	(-3.1 ± 1.7)E 1
(0)		(-2.4 - 2.0)E 2			(-1.5 - 1.1)E 2
		(0/ 33)		*(0/ 13)*	*(0/ 20)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT
** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. 3SIGMA) IS INDICATED WITHIN *( )*.

SUMMARY FOR THE PERIOD 12/20/80 - 12/31/81

MEDIUM: SEDIMENT/SILT

UNITS: PCI/KG DRY

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN, RANGE, AND NO. DETECTED**	STA.	HIGHEST STATION MEAN, RANGE, AND NO. DETECTED**	CONTROL LOCATIONS MEAN, RANGE, AND NO. DETECTED**
TH-228 (53)	2.0E-02	(7.8 ± .7)E 2	02	(1.0 ± .2)E 3	(5.1 ± .3)E 2
(0)		(3.6 - 20.3)E 2		(3.7 - 20.3)E 2	(2.5 - 8.5)E 2
		(33/ 33)		*(13/ 13)*	*(20/ 20)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: MIXED GRASES

UNITS: PCI/KG WET

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*		NOMINAL LLD	INDICATOR STATIONS MEAN, RANGE, AND NO. DETECTED**	STA.*	HIGHEST STATION MEAN, RANGE, AND NO. DETECTED**	CONTROL LOCATIONS MEAN, RANGE, AND NO. DETECTED**
BE-7	(1A)	.2	(2.3 ± .6)E 1	06	(4.1 ± 2.1)E 1	(4.1 ± 2.1)E 1
	(0)		(8.7 - 418.0)E 1		(1.1 - 8.1)E 1	(1.1 - 8.1)E 1
			(10/ 15)		*(3/ 3)*	*(3/ 3)*
K-40	(1A)	.9	(5.0 ± .3)E 1	02	(5.7 ± 1.0)E 1	(4.4 ± 1.4)E 1
	(0)		(3.3 - 7.1)E 1		(3.8 - 7.1)E 1	(2.9 - 7.2)E 1
			(15/ 15)		*(3/ 3)*	*(3/ 3)*
CR-51	(1A)	3.2E+02	(4.2 ± 6.0)E 1	03	(2.0 ± 2.3)E 2	(3.6 ± 21.2)E 1
	(0)		(-2.2 - 6.1)E 2			(-3.2 - 4.1)E 2
			(0/ 15)		*(0/ 3)*	*(0/ 3)*
MN-54	(1A)	2.0E+02	(1.2 ± .4)E 1	06	(2.6 ± 1.5)E 1	(2.6 ± 1.5)E 1
	(0)		(-6.7 - 40.6)E 0		(5.7 - 56.3)E 0	(5.7 - 56.3)E 0
			(0/ 15)		*(1/ 3)*	*(1/ 3)*
CO-58	(1A)	2.0E+02	(-8.5 ± 3.2)E 0	05	(2.7 ± 2.2)E 0	(-4.6 ± 4.5)E 0
	(0)		(-3.6 - .4)E 1			(-1.3 - .1)E 1
			(0/ 15)		*(0/ 3)*	*(0/ 3)*
FE-59	(1A)	3.0E+01	(2.7 ± .9)E 1	02	(5.6 ± 2.8)E 1	(1.3 ± 2.1)E 1
	(0)		(-1.7 - 9.8)E 1			(-2.8 - 4.2)E 1
			(0/ 15)		*(0/ 3)*	*(0/ 3)*
CO-60	(1A)	2.0E+02	(-2.7 ± 3.5)E 0	03	(3.9 ± 13.6)E 0	(-2.8 ± 1.5)E 1
	(0)		(-2.3 - 2.2)E 1			(-5.8 - 0.0)E 1
			(0/ 15)		*(0/ 3)*	*(0/ 3)*
ZN-65	(1A)	6.7E+01	(-1.1 ± .5)E 1	06	(3.2 ± 2.5)E 1	(3.2 ± 2.5)E 1
	(0)		(-4.4 - 2.1)E 1			(-4.3 - 79.7)E 0
			(0/ 15)		*(0/ 3)*	*(0/ 3)*
ZR-95	(1A)	4.0E+02	(9.8 ± 1.7)E 1	06	(1.7 ± .3)E 2	(1.7 ± .3)E 2
	(0)		(9.7 - 223.0)E 0		(1.2 - 2.3)E 2	(1.2 - 2.3)E 2
			(7/ 15)		*(3/ 3)*	*(3/ 3)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: MIXED GRASES UNITS: PCI/KG WET

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA*	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
NB-95 (15)	3.9E+01	(1.9 ± .2)E 2	06	(3.3 ± .4)E 2	(3.3 ± .4)E 2
(0)		(2.5 - 33.0)E 1		(2.8 - 4.2)E 2	(2.8 - 4.2)E 2
		(14/ 15)		*(3/ 3)*	*(3/ 3)*
AG-110M(15)	2.5E+02	(1.5 ± 3.5)E 1	05	(8.3 ± 12.1)E 1	(-9.2 ± 4.4)E 1
(0)		(-1.8 - 2.9)E 2			(-1.4 - 0.0)E 2
		(0/ 15)		*(0/ 3)*	*(0/ 3)*
RU-103 (15)	2.0E+02	(2.2 ± 1.1)E 1	02	(6.4 ± 2.6)E 1	(1.6 ± 1.5)E 1
(2)		(-4.0 - 11.2)E 1		(2.1 - 11.2)E 1	(-7.8 - 43.4)E 0
		(2/ 15)		*(1/ 3)*	*(0/ 3)*
RU-106 (15)	.2	(5.8 ± 3.9)E 1	06	(2.7 ± 1.4)E 2	(2.7 ± 1.4)E 2
(0)		(-1.3 - 3.9)E 2		(1.4 - 5.5)E 2	(1.4 - 5.5)E 2
		(0/ 15)		*(1/ 3)*	*(1/ 3)*
I-131 (15)	0.	(-9.5 ± 6.1)E 2	06	(1.0 ± 1.3)E 3	(1.0 ± 1.3)E 3
(0)		(-8.2 - .9)E 3			(-4.9 - 35.1)E 2
		(0/ 15)		*(0/ 3)*	*(0/ 3)*
CS-134 (15)	2.0E+02	(-6.6 ± 4.4)E 0	04	(1.2 ± .3)E 1	(-2.5 ± .8)E 1
(0)		(-4.8 - 1.7)E 1			(-4.0 - 0.0)E 1
		(0/ 15)		*(0/ 3)*	*(0/ 3)*
CS-137 (15)	2.0E+02	(2.5 ± .5)E 1	06	(9.6 ± 2.7)E 1	(9.6 ± 2.7)E 1
(0)		(1.0 - 65.6)E 0		(5.2 - 14.5)E 1	(5.2 - 14.5)E 1
		(5/ 15)		*(3/ 3)*	*(3/ 3)*
BA-140 (15)	8.0E+02	(-6.8 ± 6.2)E 1	02	(3.0 ± 17.1)E 1	(-3.0 ± 1.8)E 2
(0)		(-6.5 - 3.5)E 2			(-6.1 - .0)E 2
		(0/ 15)		*(0/ 3)*	*(0/ 3)*
CE-141 (15)	4.0E+02	(3.7 ± 1.0)E 1	02	(6.7 ± 3.3)E 1	(5.8 ± 1.1)E 1
(1)		(-3.0 - 13.0)E 1		(2.0 - 13.0)E 1	(3.7 - 7.1)E 1
		(1/ 15)		*(1/ 3)*	*(0/ 3)*
CE-144 (15)	.2	(3.4 ± .5)E 2	06	(5.6 ± 1.4)E 2	(5.6 ± 1.4)E 2
(0)		(7.7 - 78.6)E 1		(4.0 - 8.5)E 2	(4.0 - 8.5)E 2
		(12/ 15)		*(3/ 3)*	*(3/ 3)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: MIXED GRASES UNITS: PCI/KG WET

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
TH-228 (18)	2.0E-02	(7.3 ± 2.1)E 1	01	(9.3 ± 6.1)E 1	(5.8 ± 1.7)E 1
(3)		(-1.6 - 23.5)E 1		(2.3 - 20A.0)E 0	(2.6 - A.5)E 1
		(3/ 15)		*(1/ 3)*	*(0/ 3)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: VEGETATION - AQUATIC

UNITS: PCI/KG WET

RADIONUCLIDER (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN, RANGE, AND NO. DETECTED**	STA.	HIGHEST STATION MEAN, RANGE, AND NO. DETECTED**	CONTROL LOCATIONS MEAN, RANGE, AND NO. DETECTED**
BE-7 (6)	.2	(3.0 ± 1.5)E 3	01	(8.9 ± 8.8)E 3	(4.9 ± 8.8)E 3
(0)		(3.1 - 59.9)E 2		(5.4 - 975.0)E 1	(5.4 - 975.0)E 1
		(3/ 6)		*(1/ 2)*	*(1/ 2)*
K-40 (6)	.5	(3.2 ± .8)E 3	01	(3.8 ± .6)E 3	(3.8 ± .6)E 3
(0)		(1.9 - 3.7)E 3		(3.2 - 4.3)E 3	(3.2 - 4.3)E 3
		(6/ 6)		*(2/ 2)*	*(2/ 2)*
CR-51 (6)	-1.0-100	(-3.1 ± 1.7)E 2	03	(-1.9 ± 2.2)E 2	(-2.8 ± 1.8)E 2
(0)		(-7.5 - .3)E 2			(-4.2 - 0.0)E 2
		(0/ 6)		*(0/ 2)*	*(0/ 2)*
MN-54 (6)	2.0E-02	(1.2 ± 1.0)E 1	01	(2.1 ± 1.6)E 1	(2.1 ± 1.6)E 1
(1)		(**** - 50.1)E 0			(5.7 - 37.3)E 0
		(1/ 6)		*(0/ 2)*	*(0/ 2)*
CO-58 (6)	2.0E-02	(1.7 ± 5.8)E 0	01	(3.7 ± 2.0)E 1	(3.7 ± 2.0)E 1
(0)		(-8.7 - 18.2)E 0			(1.3 - 6.1)E 1
		(0/ 6)		*(0/ 2)*	*(0/ 2)*
FE-59 (6)	3.0E+01	(-1.9 ± 2.5)E 1	01	(1.2 ± 3.0)E 1	(1.2 ± 3.0)E 1
(0)		(-5.9 - 5.0)E 1			(-1.9 - 4.2)E 1
		(0/ 6)		*(0/ 2)*	*(0/ 2)*
CO-60 (6)	2.0E-02	(-7.5 ± 561.8)E -2	02	(2.0 ± 17.0)E -1	(-1.2 ± .6)E 1
(0)		(-1.4 - 1.3)E 1			(-1.8 - 0.0)E 1
		(0/ 6)		*(0/ 2)*	*(0/ 2)*
ZN-65 (6)	-1.0-100	(-8.5 ± 29.1)E 0	03	(3.5 ± 2.3)E 1	(-2.7 ± .8)E 1
(0)		(-8.1 - 5.0)E 1			(-3.5 - 0.0)E 1
		(0/ 6)		*(0/ 2)*	*(0/ 2)*
ZR-95 (6)	4.0E-02	(9.4 ± 2.1)E 1	01	(1.7 ± .5)E 2	(1.7 ± .5)E 2
(0)		(3.5 - 13.7)E 1		(1.2 - 2.3)E 2	(1.2 - 2.3)E 2
		(3/ 6)		*(1/ 2)*	*(1/ 2)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: VEGETATION - AQUATIC UNITS: PCI/KG WET

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA.*	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
NB-95 (6)	-1.0-100	(2.2 ± .8)E 2	01	(3.5 ± 1.4)E 2	(3.5 ± 1.4)E 2
(0)		(1.3 - 3.0)E 2		(2.1 - 4.9)E 2	(2.1 - 4.9)E 2
		(0/ 4)		*(2/ 2)*	*(2/ 2)*
AG-110M(6)	-1.0-100	(3.4 ± 6.8)E 1	02	(5.1 ± 10.3)E 1	(-1.3 ± 1.2)E 2
(0)		(-9.3 - 15.8)E 1			(-2.5 - 0.0)E 2
		(0/ 4)		*(0/ 2)*	*(0/ 2)*
RU-103 (6)	2.0E-02	(2.0 ± 2.1)E 1	03	(2.0 ± .3)E 1	(1.2 ± 2.9)E 1
(1)		(-3.2 - 7.1)E 1			(-1.7 - 4.2)E 1
		(1/ 4)		*(0/ 2)*	*(0/ 2)*
RU-106 (6)	.2	(4.9 ± 6.3)E 1	01	(2.1 ± 1.2)E 2	(2.1 ± 1.2)E 2
(0)		(-1.1 - 2.0)E 2			(8.5 - 32.9)E 1
		(0/ 4)		*(0/ 2)*	*(0/ 2)*
I-131 (6)	0.	(-5.1 ± 32.6)E 1	03	(1.3 ± 2.9)E 2	(-9.0 ± 1.4)E 2
(0)		(-9.3 - 4.7)E 2			(-1.0 - 0.0)E 3
		(0/ 4)		*(0/ 2)*	*(0/ 2)*
CS-134 (6)	2.0E-02	(-1.1 ± .8)E 1	02	(-1.1 ± .8)E 1	(-1.6 ± 1.0)E 1
(0)		(-1.9 - 0.6)E 1			(-2.6 - 0.0)E 1
		(0/ 4)		*(0/ 2)*	*(0/ 2)*
CS-137 (6)	2.0E-02	(6.1 ± 2.1)E 1	01	(2.1 ± .8)E 2	(2.1 ± .8)E 2
(0)		(1.5 - 11.6)E 1		(1.3 - 2.9)E 2	(1.3 - 2.9)E 2
		(3/ 4)		*(2/ 2)*	*(2/ 2)*
BA-140 (6)	8.0E-02	(-2.1 ± 1.9)E 2	03	(-6.7 ± 3.5)E 1	(-1.3 ± 1.2)E 2
(0)		(-7.6 - .7)E 2			(-2.5 - 0.0)E 2
		(0/ 4)		*(0/ 2)*	*(0/ 2)*
CE-141 (6)	4.0E-02	(6.7 ± 2.6)E 1	02	(9.1 ± 2.1)E 1	(3.1 ± 1.8)E 1
(1)		(-6.8 - 112.0)E 0			(1.2 - 4.9)E 1
		(1/ 4)		*(0/ 2)*	*(0/ 2)*
CE-144 (6)	.2	(2.7 ± .6)E 2	01	(6.8 ± 3.6)E 2	(6.8 ± 3.6)E 2
(0)		(1.9 - 4.0)E 2		(3.2 - 10.4)E 2	(3.2 - 10.4)E 2
		(3/ 4)		*(2/ 2)*	*(2/ 2)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >2SIGMA) IS INDICATED WITHIN *( )*.

SUMMARY FOR THE PERIOD 12/29/80 - 12/31/81

MEDIUM: VEGETATION - AQUATIC

UNITS: PCI/KG WET

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA.	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
TH-228 (6)	2.0E-02	(1.5 ± .8)E 2	03	(1.9 ± 1.7)E 2	(1.1 ± 1.6)E 2
(0)		(1.7 - 36.3)E 1		(1.7 - 36.3)E 1	(-5.0 - 27.5)E 1
		(2/ 8)		*(1/ 2)*	*(1/ 2)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

SUMMARY FOR THE PERIOD 12/20/80 - 12/31/81

MEDIUM: VEGETATION - TERRESTIAL

UNITS: PCI/KG WET

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN, RANGE, AND NO. DETECTED**	STA	HIGHEST STATION MEAN, RANGE, AND NO. DETECTED**	CONTROL LOCATIONS MEAN, RANGE, AND NO. DETECTED**
SR-89 (3)	3.0E-02	(3.1 ± 2.6)E 1	01	(5.7 ± 1.3)E 1	(4.8 ± .5)E 1
(0)		(5.0 - 56.9)E 0			
		(1/ 2)		*(1/ 1)*	*(1/ 1)*
SR-90 (3)	5.0E-03	(6.8 ± .2)E 1	01	(7.0 ± .6)E 1	(4.1 ± .3)E 1
(0)		(6.6 - 7.1)E 1			
		(2/ 2)		*(1/ 1)*	*(1/ 1)*
BE-7 (3)	.2	(7.2 ± 3.5)E 2	03	(1.5 ± .1)E 3	(1.5 ± .1)E 3
(0)		(3.7 - 10.7)E 2			
		(2/ 2)		*(1/ 1)*	*(1/ 1)*
K-40 (3)	.5	(5.8 ± .7)E 3	01	(6.4 ± .1)E 3	(4.8 ± .1)E 3
(0)		(5.1 - 6.4)E 3			
		(2/ 2)		*(1/ 1)*	*(1/ 1)*
CR-51 (3)	-1.0-100	(3.6 ± 5.7)E 1	03	(1.2 ± .9)E 2	(1.2 ± .9)E 2
(0)		(-2.2 - 9.3)E 1			
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
MN-54 (3)	2.0E-02	(3.0 ± 8.4)E 0	03	(1.5 ± .4)E 1	(1.5 ± .4)E 1
(0)		(-5.4 - 11.4)E 0			
		(1/ 2)		*(1/ 1)*	*(1/ 1)*
CO-58 (3)	2.0E-02	(-6.1 ± 4.1)E 0	01	(-1.9 ± 3.5)E 0	(-6.1 ± 5.7)E 0
(0)		(-1.0 - 0.0)E 1			(-6.1 - 0.0)E 0
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
FE-59 (3)	3.0E+01	(1.2 ± .6)E 1	02	(1.8 ± 1.2)E 1	(6.3 ± 169.0)E -1
(0)		(6.7 - 18.3)E 0			
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
CO-60 (3)	2.0E-02	(-4.0 ± 3.8)E 0	01	(-2.6 ± 31.6)E -1	(-3.3 ± 6.5)E 0
(0)		(-7.8 - 0.0)E 0			(-3.3 - 0.0)E 0
		(0/ 2)		*(0/ 1)*	*(0/ 1)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: VEGETATION - TERRESTIAL UNITS: PCI/KG -ET

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
ZN-65 (3)	-1.0-100	(-3.1 ± 7.9)E 0	02	(9.8 ± 13.4)E 0	(-1.6 ± 1.2)E 1
(0)		(-1.1 - .5)E 1			(-1.6 - 0.0)E 1
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
ZR-95 (3)	8.0E-03	(5.4 ± 8.1)E 1	01	(9.5 ± .8)E 1	(7.1 ± 1.2)E 1
(0)		(1.3 - 9.5)E 1			
		(1/ 2)		*(1/ 1)*	*(1/ 1)*
NB-95 (3)	-1.0-100	(8.6 ± 9.1)E 1	01	(1.8 ± .2)E 2	(1.7 ± .2)E 2
(0)		(-5.1 - 177.0)E 0			
		(1/ 2)		*(1/ 1)*	*(1/ 1)*
AG-110M(3)	-1.0-100	(-1.1 ± 8.8)E 1	01	(3.6 ± 2.0)E 1	(-8.7 ± 36.1)E 0
(0)		(-5.9 - 3.4)E 1			(-8.7 - 0.0)E 0
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
RU-103 (3)	2.0E-02	(2.2 ± 3.9)E 0	03	(1.6 ± .8)E 1	(1.6 ± .8)E 1
(0)		(-1.7 - 6.0)E 0			
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
RU-106 (3)	.2	(3.0 ± 8.1)E 1	01	(7.1 ± 1.4)E 1	(3.7 ± 8.0)E 1
( )		(-1.1 - 7.1)E 1			
		(1/ 2)		*(1/ 1)*	*(0/ 1)*
I-131 (3)	0.	(8.3 ± 5.0)E 1	01	(9.3 ± 31.3)E 1	(-8.1 ± 28.2)E 1
(0)		(-7.5 - 92.7)E 0			(-8.1 - 0.0)E 1
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
CS-134 (3)	2.0E-02	(-2.2 ± .9)E 0	01	(-1.3 ± 1.8)E 0	(-8.3 ± 8.0)E 0
(0)		(-3.1 - 0.0)E 0			(-8.3 - 0.0)E 0
		(0/ 2)		*(0/ 1)*	*(0/ 1)*
CS-137 (3)	2.0E-02	(2.6 ± 2.3)E 1	01	(8.9 ± .2)E 1	(1.3 ± .3)E 1
(0)		(2.6 - 48.7)E 0			
		(1/ 2)		*(1/ 1)*	*(1/ 1)*
BA-140 (3)	8.0E-02	(-8.6 ± 5.9)E 1	03	(9.1 ± 5.8)E 1	(9.1 ± 5.8)E 1
(0)		(-1.0 - .1)E 2			
		(0/ 2)		*(0/ 1)*	*(0/ 1)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: VEGETATION - TERRESTIAL UNITS: PCI/KG WET

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
CE-141 (3)	4.0E-02	(1.2 ± 1.5)E 1	03	(4.4 ± 1.2)E 1	(4.4 ± 1.2)E 1
(0)		(-3.6 - 26.7)E 0			
		(1/ 2)		*(1/ 1)*	*(1/ 1)*
CE-144 (3)	.2	(1.4 ± 1.3)E 2	01	(2.6 ± .1)E 2	(2.4 ± .2)E 2
(0)		(9.1 - 263.0)E 0			
		(1/ 2)		*(1/ 1)*	*(1/ 1)*
TH-228 (3)	2.0E-02	(3.4 ± 5.7)E 1	01	(9.1 ± .9)E 1	(2.7 ± 1.7)E 1
(1)		(-2.4 - 9.1)E 1			
		(1/ 2)		*(1/ 1)*	*(0/ 1)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: WATER - GROUND UNITS: PCI/LITER

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN, RANGE, AND NO. DETECTED**	STA.	HIGHEST STATION MEAN, RANGE, AND NO. DETECTED**	CONTROL LOCATIONS MEAN, RANGE, AND NO. DETECTED**
GR-A (24)	.9	(4.4 ± .2)E 0	01	(4.8 ± .4)E 0	NO DATA
(0)		(2.8 - 8.4)E 0		(3.2 - 8.4)E 0	
		(24/ 24)		*(12/ 12)*	
BE-7 (24)	8.0E+01	(-2.0 ± 2.3)E 0	02	(2.8 ± 1.7)E 0	NO DATA
(0)		(-3.9 - 1.4)E 1			
		(0/ 24)		*(0/ 12)*	
K-40 (24)	2.0E+02	(-1.8 ± 2.9)E 0	02	(-1.7 ± 4.1)E 0	NO DATA
(0)		(-3.0 - 1.9)E 1			
		(0/ 24)		*(0/ 12)*	
CR-51 (24)	1.7E+01	(-2.1 ± 1.9)E 0	01	(3.8 ± 30.6)E -1	NO DATA
(0)		(-2.3 - 1.1)E 1			
		(0/ 24)		*(0/ 12)*	
MN-54 (24)	8.	(-3.9 ± 2.0)E -1	02	(3.4 ± 21.0)E -2	NO DATA
(0)		(-2.9 - 1.3)E 0			
		(0/ 24)		*(0/ 12)*	
CO-58 (24)	8.	(-1.1 ± .5)E 0	02	(-8.8 ± 1.6)E -1	NO DATA
(0)		(-1.3 - .1)E 1			
		(0/ 24)		*(0/ 12)*	
FE-59 (24)	1.0E+01	(2.9 ± 3.8)E -1	02	(6.1 ± 4.0)E -1	NO DATA
(0)		(-2.8 - 8.1)E 0			
		(0/ 24)		*(0/ 12)*	
CO-60 (24)	8.	(-5.2 ± 1.8)E -1	02	(-2.8 ± 2.3)E -1	NO DATA
(0)		(-2.3 - 1.0)E 0			
		(0/ 24)		*(0/ 12)*	
ZN-65 (24)	8.	(-1.0 ± 3.6)E -1	01	(8.0 ± 59.2)E -2	NO DATA
(0)		(-3.5 - 3.9)E 0			
		(0/ 24)		*(0/ 12)*	

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS

MEDIUM: WATER - GROUND UNITS: PCI/LITER

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN, RANGE, AND NO. DETECTED**	STA.	HIGHEST STATION MEAN, RANGE, AND NO. DETECTED**	CONTROL LOCATIONS MEAN, RANGE, AND NO. DETECTED**
ZR-95 (24) (0)	1.0E+01	(-3.7 ± 3.0)E -1 (-3.4 - 1.9)E 0 *(0/ 24)*	01	(-3.2 ± 4.0)E -1 *(0/ 12)*	NO DATA
NB-95 (24) (0)	2.	(1.7 ± 1.9)E -1 (-1.2 - 2.4)E 0 *(0/ 24)*	01	(3.9 ± 3.1)E -1 *(0/ 12)*	NO DATA
AG-110M(24) (0)	1.0E+01	(1.2 ± 1.4)E 0 (-1.4 - 1.2)E 1 *(0/ 24)*	01	(2.7 ± 1.8)E 0 *(0/ 12)*	NO DATA
RU-103 (24) (0)	8.	(-7.7 ± 2.1)E -1 (-2.9 - 1.2)E 0 *(0/ 24)*	02	(-7.6 ± 2.8)E -1 *(0/ 12)*	NO DATA
RU-106 (24) (0)	8.0E+01	(-1.8 ± 142.9)E -2 (-1.2 - 1.8)E 1 *(0/ 24)*	01	(9.5 ± 24.1)E -1 *(0/ 12)*	NO DATA
I-131 (24) (0)	6.	(-9.7 ± 6.5)E -1 (-8.3 - 3.4)E 0 *(0/ 24)*	02	(-3.7 ± 10.4)E -1 *(0/ 12)*	NO DATA
CS-134 (24) (0)	9.	(-1.9 ± 1.3)E -1 (-1.2 - 1.6)E 0 *(0/ 24)*	02	(-1.7 ± 1.5)E -1 *(0/ 12)*	NO DATA
CS-137 (24) (0)	9.	(-2.5 ± 3.4)E -1 (-6.5 - 8.1)E 0 *(1/ 24)*	02	(-1.0 ± 1.5)E -1 *(0/ 12)*	NO DATA
BA-140 (24) (0)	1.5E+01	(-2.8 ± 6.2)E -1 (-7.9 - 5.5)E 0 *(0/ 24)*	02	(1.2 ± 6.6)E -1 *(0/ 12)*	NO DATA
CE-141 (24) (0)	2.0E+01	(5.1 ± 3.9)E -1 (-4.1 - 3.7)E 0 *(0/ 24)*	01	(1.1 ± .5)E 0 *(0/ 12)*	NO DATA

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

SUMMARY FOR THE PERIOD 12/20/80 - 12/31/81

MEDIUM: WATER - GROUND

UNITS: PCI/LITER

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN, RANGE, AND NO. DETECTED**	STA.	HIGHEST STATION MEAN, RANGE, AND NO. DETECTED**	CONTROL LOCATIONS MEAN, RANGE, AND NO. DETECTED**
CE-144 (24)	8.0E+01	(1.5 ± .9)E 0	01	(2.8 ± 1.4)E 0	NO DATA
(0)		(-4.7 - 13.4)E 0			
		(0/ 24)		*(0/ 12)*	
TH-228 (24)	1.0E+01	(-1.0 ± .6)E 0	01	(-3.8 ± 11.6)E -1	NO DATA
(0)		(-4.7 - 10.1)E 0			
		(0/ 24)		*(0/ 12)*	
H-3 (17)	9.0E+01	(2.8 ± .5)E 3	02	(3.9 ± .2)E 3	NO DATA
(12)		(-2.4 - 56.4)E 2		(2.4 - 5.6)E 3	
		(12/ 17)		*(12/ 12)*	

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: WATER - RIVER UNITS: PCI/LITER

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*		NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA.*	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
GR-B	(59)	.9	(3.1 ± .1)E 0	11	(3.3 ± .2)E 0	(3.1 ± .2)E 0
	(0)		(1.8 - 4.7)E 0		(1.8 - 4.1)E 0	(1.1 - 4.8)E 0
			(36/ 36)		*(10/ 11)*	*(22/ 23)*
BE-7	(59)	8.0E+01	(-1.2 ± 1.3)E 0	11	(2.1 ± 2.0)E 0	(9.4 ± 14.7)E -1
	(0)		(-2.6 - 1.6)E 1			(-1.4 - 1.2)E 1
			(0/ 36)		*(0/ 11)*	*(0/ 23)*
K-40	(59)	2.0E+02	(5.4 ± 2.5)E 0	21	(9.3 ± 2.0)E 0	(-4.8 ± 2.3)E 0
	(0)		(-2.1 - 4.2)E 1			(-2.8 - 1.1)E 1
			(0/ 36)		*(0/ 12)*	*(0/ 23)*
CR-51	(59)	1.7E+01	(5.0 ± 16.8)E -1	02	(3.8 ± 3.8)E 0	(-8.1 ± 16.2)E -1
	(0)		(-1.9 - 3.7)E 1			(-1.4 - 1.6)E 1
			(0/ 36)		*(0/ 12)*	*(0/ 23)*
MN-54	(59)	8.	(1.4 ± 1.2)E -1	02	(3.7 ± 2.8)E -1	(4.0 ± 17.2)E -2
	(0)		(-1.2 - 2.3)E 0			(-1.6 - 1.9)E 0
			(0/ 36)		*(0/ 12)*	*(0/ 23)*
CO-58	(59)	8.	(-8.4 ± 14.1)E -2	03	(3.8 ± 2.1)E -1	(1.5 ± 1.5)E -1
	(0)		(-2.1 - 1.4)E 0			(-1.4 - 1.4)E 0
			(0/ 36)		*(0/ 12)*	*(0/ 23)*
FE-59	(59)	1.0E+01	(1.1 ± .8)E 0	21	(1.8 ± .8)E 0	(-1.8 ± 5.7)E -1
	(0)		(-5.9 - 5.4)E 0		(-8.8 - 42.4)E -1	(-8.4 - 4.0)E 0
			(1/ 36)		*(1/ 12)*	*(0/ 23)*
CO-60	(59)	8.	(-6.1 ± 1.8)E -1	01	(-2.0 ± 3.9)E -1	(-4.8 ± 2.4)E -1
	(0)		(-2.8 - 1.8)E 0			(-2.7 - 2.8)E 0
			(0/ 36)		*(0/ 12)*	*(0/ 23)*
ZN-65	(59)	4.	(9.6 ± 40.5)E -2	01	(1.3 ± .6)E 0	(9.3 ± 4.1)E -1
	(0)		(-7.6 - 4.7)E 0			(-3.1 - 4.7)E 0
			(0/ 36)		*(0/ 12)*	*(0/ 23)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: WATER - RIVER UNITS: PCI/LITER

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN, RANGE, AND NO. DETECTED**	STA.*	HIGHEST STATION MEAN, RANGE, AND NO. DETECTED**	CONTROL LOCATIONS MEAN, RANGE, AND NO. DETECTED**
ZR-95 (59)	1.0E+01	(1.4 ± 3.1)E -1	03	(2.7 ± 3.8)E -1	(1.7 ± 28.5)E -2
(0)		(-6.8 - 8.8)E 0			(-2.5 - 3.1)E 0
		(0/ 36)		*(0/ 12)*	*(0/ 23)*
NB-95 (59)	2.	(1.1 ± 1.8)E -1	01	(5.6 ± 2.1)E -1	(2.7 ± 1.4)E -1
(0)		(-4.8 - 1.7)E 0			(-1.1 - 1.5)E 0
		(0/ 36)		*(0/ 12)*	*(0/ 23)*
AG-110M(59)	1.0E+01	(-1.7 ± 11.8)E -1	01	(1.3 ± 1.5)E 0	(-5.2 ± 18.9)E -1
(0)		(-2.0 - 1.8)E 1			(-2.4 - 1.3)E 1
		(0/ 36)		*(0/ 12)*	*(0/ 23)*
RU-103 (59)	8.	(-9.6 ± 1.8)E -1	02	(-8.2 ± 2.0)E -1	(-1.1 ± .2)E 0
(0)		(-3.0 - 1.7)E 0			(-3.5 - 1.4)E 0
		(0/ 36)		*(0/ 12)*	*(0/ 23)*
RU-106 (59)	8.0E+01	(-1.8 ± 15.1)E -1	21	(2.0 ± 1.9)E 0	(-1.3 ± 1.1)E 0
(0)		(-3.2 - 1.9)E 1			(-1.6 - .7)E 1
		(0/ 36)		*(0/ 12)*	*(0/ 23)*
I-131 (59)	0.	(-3.2 ± 71.6)E -2	11	(5.6 ± 19.7)E -1	(-1.2 ± 1.2)E 0
(0)		(-1.2 - 1.2)E 1			(-1.4 - 1.6)E 1
		(0/ 36)		*(0/ 11)*	*(0/ 23)*
CS-134 (59)	9.	(-4.9 ± 1.3)E -1	01	(-2.1 ± 2.4)E -1	(-4.2 ± 1.9)E -1
(0)		(-2.6 - .6)E 0			(-2.8 - 1.0)E 0
		(0/ 36)		*(0/ 12)*	*(0/ 23)*
CS-137 (59)	9.	(1.6 ± 1.5)E -1	03	(2.6 ± 1.7)E -1	(-3.1 ± 1.9)E -1
(0)		(-2.3 - 2.0)E 0			(-3.0 - 1.2)E 0
		(0/ 36)		*(0/ 12)*	*(0/ 23)*
BA-140 (59)	1.5E+01	(6.2 ± 42.0)E -2	02	(3.7 ± 8.6)E -1	(-8.8 ± 7.3)E -1
(0)		(-5.2 - 5.1)E 0			(-1.1 - .7)E 1
		(0/ 36)		*(0/ 12)*	*(0/ 23)*
CE-141 (59)	2.0E+01	(3.3 ± 30.7)E -2	02	(7.9 ± 5.5)E -1	(1.0 ± 3.0)E -1
(0)		(-3.1 - 8.0)E 0			(-4.3 - 2.5)E 0
		(0/ 36)		*(0/ 12)*	*(0/ 23)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAT TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >2SIGMA) IS INDICATED WITHIN *( )*.

MEDIUM: WATER - RIVER UNITS: PCI/LITER

RADIONUCLIDES (NO. ANALYSES) (NON-ROUTINE)*	NOMINAL LLD	INDICATOR STATIONS MEAN,RANGE,AND NO. DETECTED**	STA.	HIGHEST STATION MEAN,RANGE,AND NO. DETECTED**	CONTROL LOCATIONS MEAN,RANGE,AND NO. DETECTED**
CE-144 (50)	9.0E+01	(3.4 ± 8.3)E -1	03	(1.3 ± 1.1)E 0	(2.4 ± 9.1)E -1
(0)		(-1.2 - 1.0)E 1			(-8.9 - 9.8)E 0
		(0/ 34)		*(0/ 12)*	*(0/ 23)*
TH-228 (50)	1.0E+01	(-2.3 ± 8.0)E -1	03	(1.7 ± 1.1)E 0	(7.7 ± 56.2)E -2
(0)		(-1.8 - 1.0)E 1			(-5.5 - 8.1)E 0
		(0/ 34)		*(0/ 12)*	*(0/ 23)*
H-3 (16)	9.0E+01	(2.5 ± 8.1)E 2	21	(3.5 ± 1.9)E 2	(4.1 ± 8.9)E 1
(0)		(-3.1 - 53.5)E 1		(1.6 - 5.4)E 2	(-2.0 - 1.0)E 2
		(0/ 10)		*(1/ 2)*	*(0/ 6)*

* NON-ROUTINE REFERS TO THE NUMBER OF SEPARATE MEASUREMENTS WHICH WERE GREATER THAN TEN (10) TIMES THE AVERAGE BACKGROUND FOR THE PERIOD OF THE REPORT

** THE FRACTION OF SAMPLE ANALYSES YIELDING DETECTABLE MEASUREMENTS (I.E. >3SIGMA) IS INDICATED WITHIN *( )*.

IV. QUALITY ASSURANCE PROGRAM

Three separate Quality Assurance programs were performed during 1981 to demonstrate the validity of laboratory analyses by the Yankee Environmental Laboratory (YEL).

YEL participates in the EPA interlaboratory comparison (cross-check) program for those species and matrices routinely analyzed by the laboratory. This provides an independent check of accuracy and precision of the laboratory analysis. When the results of the cross-check analysis fall outside of the control limit, an investigation is made to determine the cause of the problem and corrective measures are taken.

YEL maintains an intralaboratory quality control program to assure the validity and reliability of the data. This program includes quality control of laboratory equipment, use of reference standards for calibration, determination of counting efficiencies and analysis of blank and spiked samples. The records of the quality control program are reviewed by the responsible cognizant engineer, and corrective measures are taken whenever applicable.

Samples are prepared from split or homogenous media and sent to the laboratory for analysis. The results from this blind duplicate program are used to check for precision in laboratory analyses.

EPA, Intralaboratory and Interlaboratory

The Quality Assurance program implemented at the analytical laboratory indicated good precision and accuracy in reported values. Table 1 shows the results of accuracy and precision for laboratory analyses in 1981 for EPA samples, intralaboratory analyses and interlaboratory cross-check analyses. For accuracy, 37.1 and 61.7 percent of the results were within 5 and 10 percent of the known values, respectively, with 93.7 percent of all results falling within the laboratory criteria of 15 percent. For precision, 70.6 and 88.4 percent of the results were within 5 and 10 percent of the mean, respectively, with 99.8 percent of all results meeting the laboratory criteria of 15 percent.

TABLE 1

EPA, Intralaboratory and Interlaboratory Results

	Accuracy			Precision			
Total Number of Samples	0 to 5%	0 to 10%	0 to 15%*	Total Number of Samples	0 to 5%	0 to 10%	0 to 15%*
472	175 (37.1%)	291 (61.7%)	443 (93.9%)	405	286 (70.6%)	358 (88.4%)	404 (99.8%)

*This category also contains those samples having a verified zero concentration which were analyzed and found not to contain the isotope of interest.

Blind Duplicate-Replicate Program

A total of 76 paired samples were submitted for analysis during 1981. The data base used for the duplicate-replicate analysis consisted of pair measurements of 26 gamma emitting nuclides, tritium, Strontium-89, Strontium-90, low level I-131, gross beta and Radium-226. A dual level criteria for agreement was established if the paired measurements fall within $\pm$ 15 percent of their average value, then agreement between the measurements has been met. If the value falls outside of the $\pm$ 15 percent, then a two sigma range (95 percent confidence level) for duplicates and a three sigma range 99 percent confidence level) for replicates is established for each of the analyses. If the ranges overlap, agreement is obtained. Two thousand three hundred and twenty-six paired duplicate and replicate measurements were analyzed for 1981. A total of 98.8 percent of all measurements fell within the established criteria discussed above. Of the 1.2 percent of the measurements which fell outside of the criteria, most of these were made up of fallout and plant-related radionuclides contained in sediment samples. Table 2 shows the results of some radionuclides measured in sediment samples during 1981. This table indicates that only man-made radionuclides fell outside of the criteria, and that the naturally occurring radionuclides K-40 and Th-228, which are normally evenly distributed in sediment, agree well. Since K-40 and Th-228 show good agreement in sediment samples and other media and Co-60, Cs-134 and Cs-137 show good agreement in other media, the poor agreement in sediment can be attributed to non-uniform distribution of man-made radionuclides in these samples, rather than poor precision in laboratory analysis.

TABLE 2

Agreement of Radionuclides in Sediment Samples

Lab Sample Numbers

Nuclides	G27850 G27867	G27851 G27868	G27852 G27869	G27853 G27870	G23430 G23914	G23916 G23931	G23915 G13932	G23917 G23933	G23784 G23804
Ce-141	2σ	6.5%	2σ	2σ	12%	2σ	2σ	2σ	2σ
Ce-144	2σ	20	2σ	2σ	12%	2σ	2σ	10%	2σ
Cs-137	*	14%	*	*	*	*	11%	2%	2%
Cs-134	*	1.6%	2σ	*	2σ	*	30	8%	2σ
Co-60	3σ	10%	6.2%	*	10%	*	4%	10%	15%
Th-228	3σ	5.2%	2σ	6.8%	9%	2%	4%	7%	8%
K-40	2.9%	1.5%	1.6%	1.9%	3%	1%	1%	1%	3%

*Values outside 3 sigma level.

V. ATMOSPHERIC FALLOUT DURING 1981

On October 17, 1980, the People's Republic of China detonated a nuclear device in the atmosphere at the Lop Nor test site in northwest China. The explosion was estimated by the Department of Energy to be in the 200 kilotons to one megaton yield range. The clouds of radioactive debris began drifting over the western part of the United States on October 19, 1980.

During the beginning of November, 1980, increased airborne beta activity was detected at both indicator and control locations (Figure 8). The airborne beta activity continued to increase into 1981, and a gamma analysis of fourth quarter composite filters showed detectable concentrations of fission products which are associated with the October Chinese test (Figures 9 to 12). As expected, a significant increase in airborne gross beta activity was detected on air particulate filter samples submitted from all sampling locations during the first three quarters of 1981. The highest airborne gross beta activity occurred during the spring and summer months when the intermixing of the stratosphere and troposhere causes additional radioactive debris from weapon testing to be introduced into the troposhere (Figure 13). For the first three quarters of 1981, gamma analysis performed quarterly on weekly composite air particulate filter samples showed detectable concentrations of fallout fission products related to the Chinese weapons test (Figures 14 to 20).

In addition to our required Technical Specification air sampling locations, an additional control air sampler was set up at our Environmental Laboratory in Westborough, Massachusetts. Air particulate samples analyzed from this location showed similar levels of fission products as the filter samples submitted from the environs of the Yankee plant (Figures 21 to 27).

Fallout was also detected in other environmental media during 1981. Aquatic and terrestrial vegetation samples collected from indicator and control locations showed fission products related to fallout from the Chinese weapons test.

Figure 8

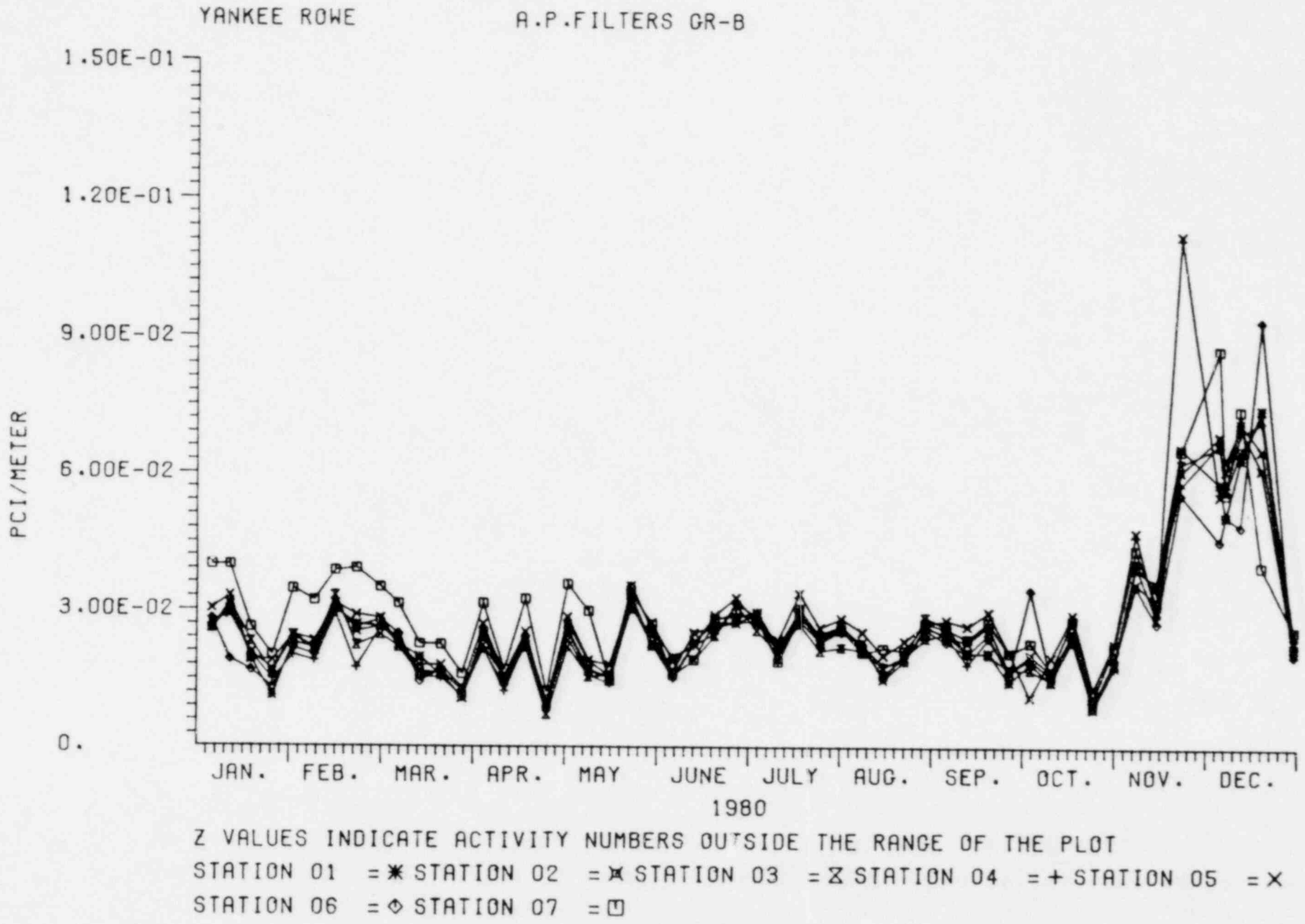

YANKEE ROWE
A.P.FILTERS GR-B
1.50E-01
1.20E-01
9.00E-02
6.00E-02
3.00E-02
0.
PCI/METER
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEP.
OCT.
NOV.
DEC.
1980
Z VALUES INDICATE ACTIVITY NUMBERS OUTSIDE THE RANGE OF THE PLOT
STATION 01 = STATION 02 = STATION 03 = STATION 04 = + STATION 05 = X
STATION 06 = STATION 07 =

Figure 9

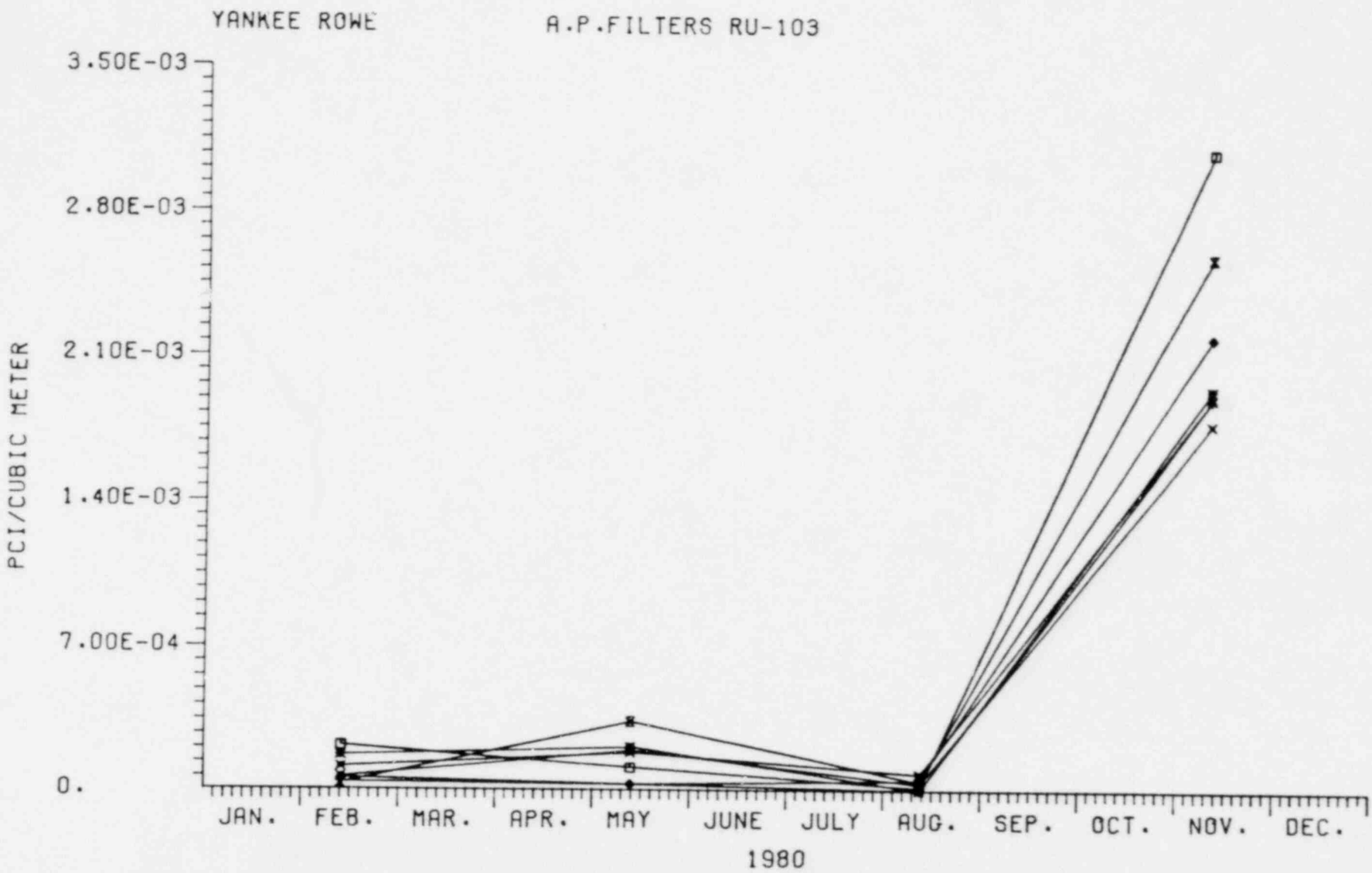

YANKEE ROWE
A.P.FILTERS RU-103
3.50E-03
2.80E-03
2.10E-03
1.40E-03
7.00E-04
0.
PCI/CUBIC METER
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEP.
OCT.
NOV.
DEC.
1980
Z VALUES INDICATE ACTIVITY NUMBERS OUTSIDE THE RANGE OF THE PLOT
STATION 01 = STATION 02 = STATION 03 = STATION 04 = + STATION 05 = X
STATION 06 = STATION 07 =

Figure 10

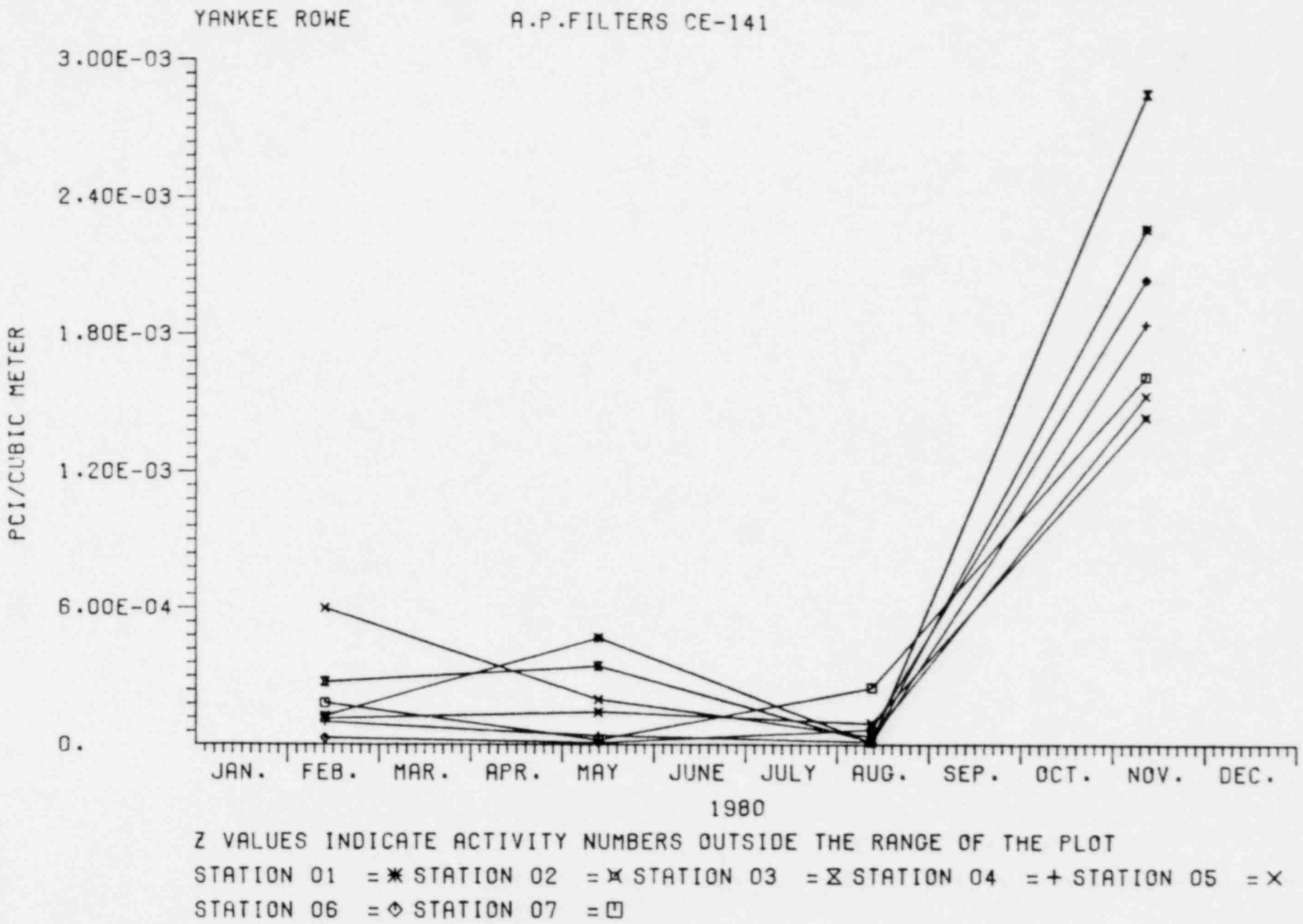

YANKEE ROWE
A.P.FILTERS CE-141
3.00E-03
2.40E-03
1.80E-03
1.20E-03
6.00E-04
0.
PCI/CUBIC METER
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEP.
OCT.
NOV.
DEC.
1980
Z VALUES INDICATE ACTIVITY NUMBERS OUTSIDE THE RANGE OF THE PLOT
STATION 01 = STATION 02 = STATION 03 = STATION 04 = + STATION 05 = ×
STATION 06 = STATION 07 =

Figure 11

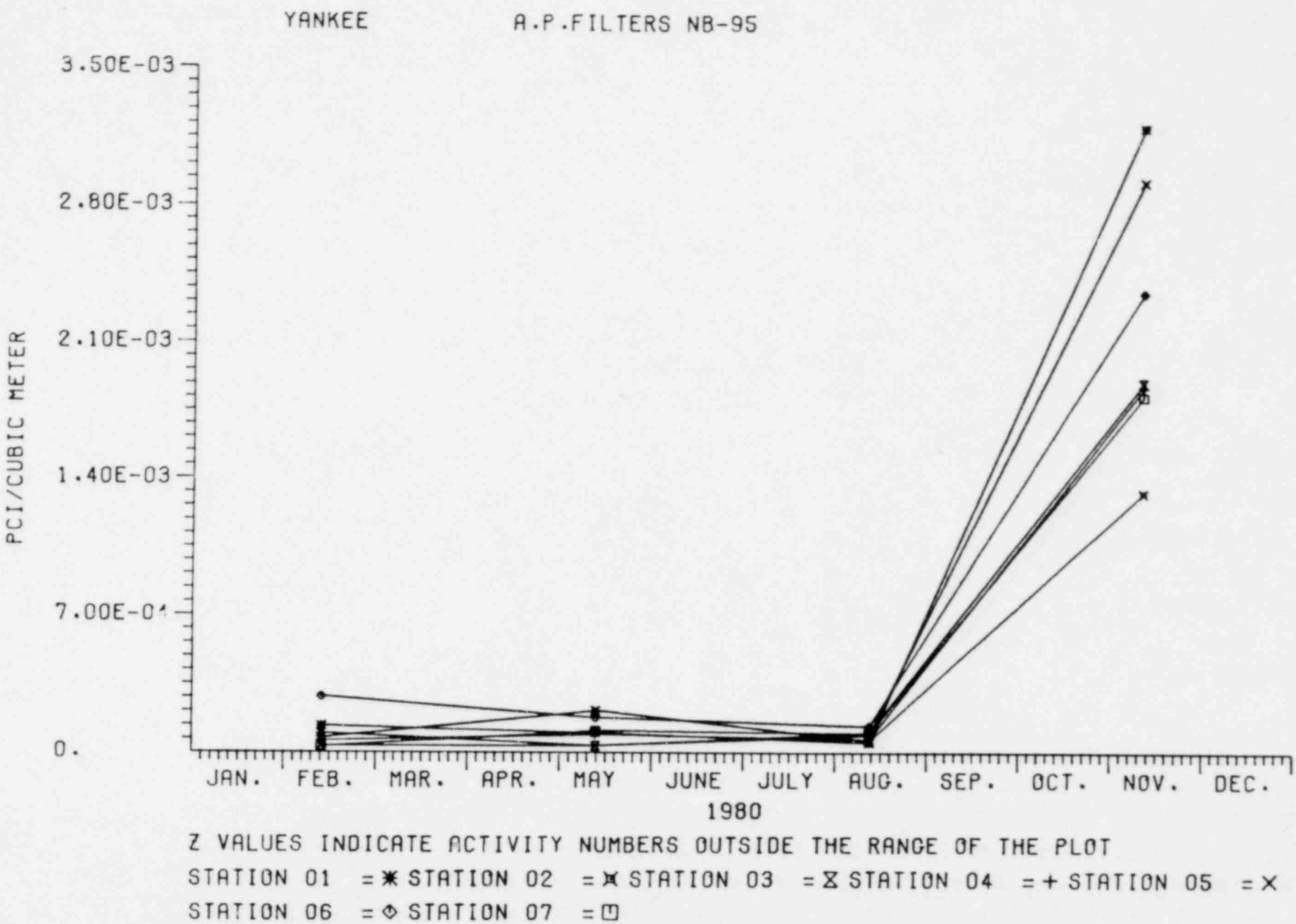

YANKEE
A.P.FILTERS NB-95
3.50E-03
2.80E-03
2.10E-03
1.40E-03
7.00E-04
0.
PCI/CUBIC METER
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEP.
OCT.
NOV.
DEC.
1980
Z VALUES INDICATE ACTIVITY NUMBERS OUTSIDE THE RANGE OF THE PLOT
STATION 01 = ✱ STATION 02 = ⧓ STATION 03 = ⧖ STATION 04 = + STATION 05 = ×
STATION 06 = ◇ STATION 07 = ⊡

Figure 12

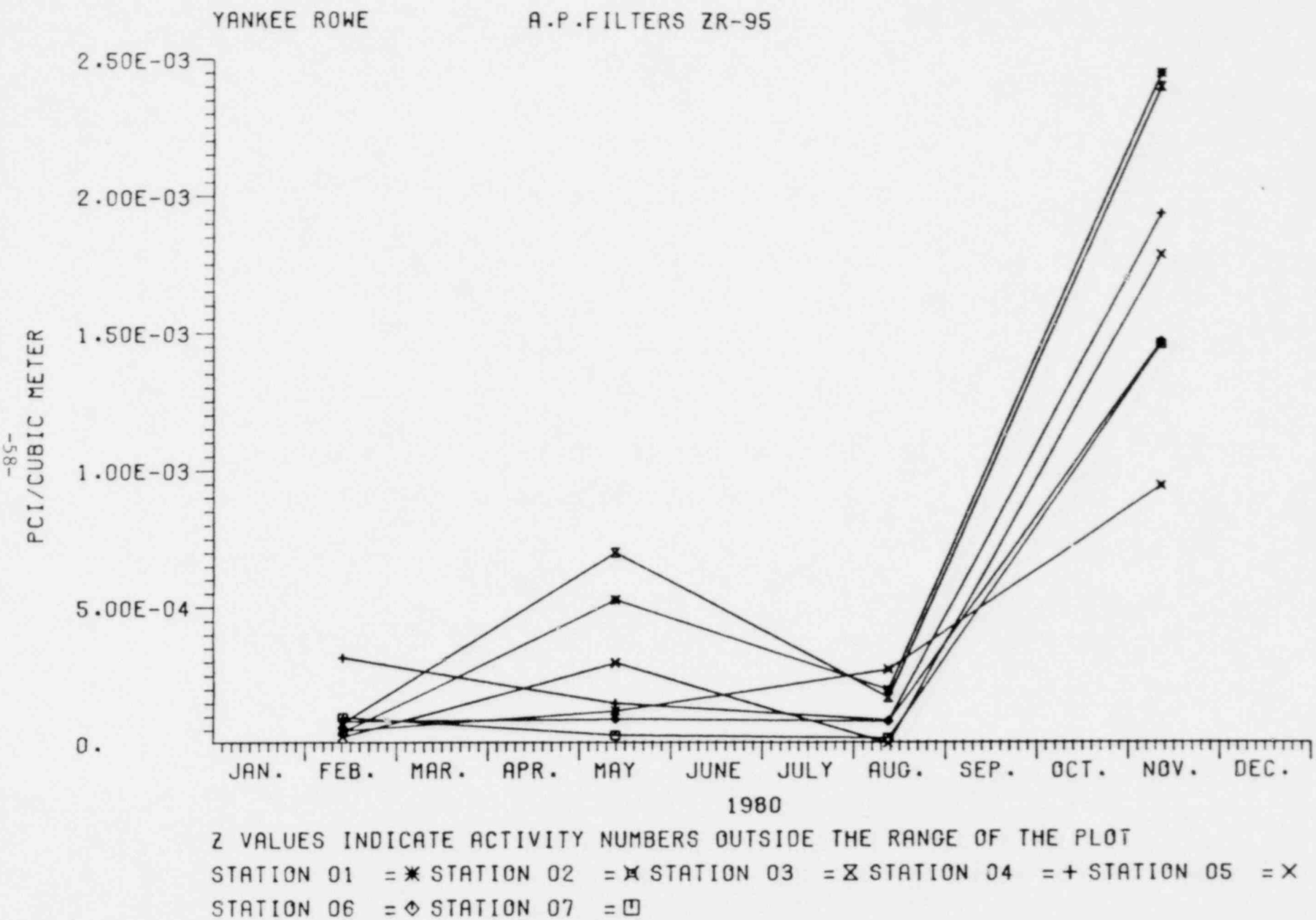

YANKEE ROWE
A.P.FILTERS ZR-95
2.50E-03
2.00E-03
1.50E-03
1.00E-03
5.00E-04
0.
PCI/CUBIC METER
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEP.
OCT.
NOV.
DEC.
1980
Z VALUES INDICATE ACTIVITY NUMBERS OUTSIDE THE RANGE OF THE PLOT
STATION 01 = STATION 02 = STATION 03 = STATION 04 = + STATION 05 = X
STATION 06 = STATION 07 =

Figure 13

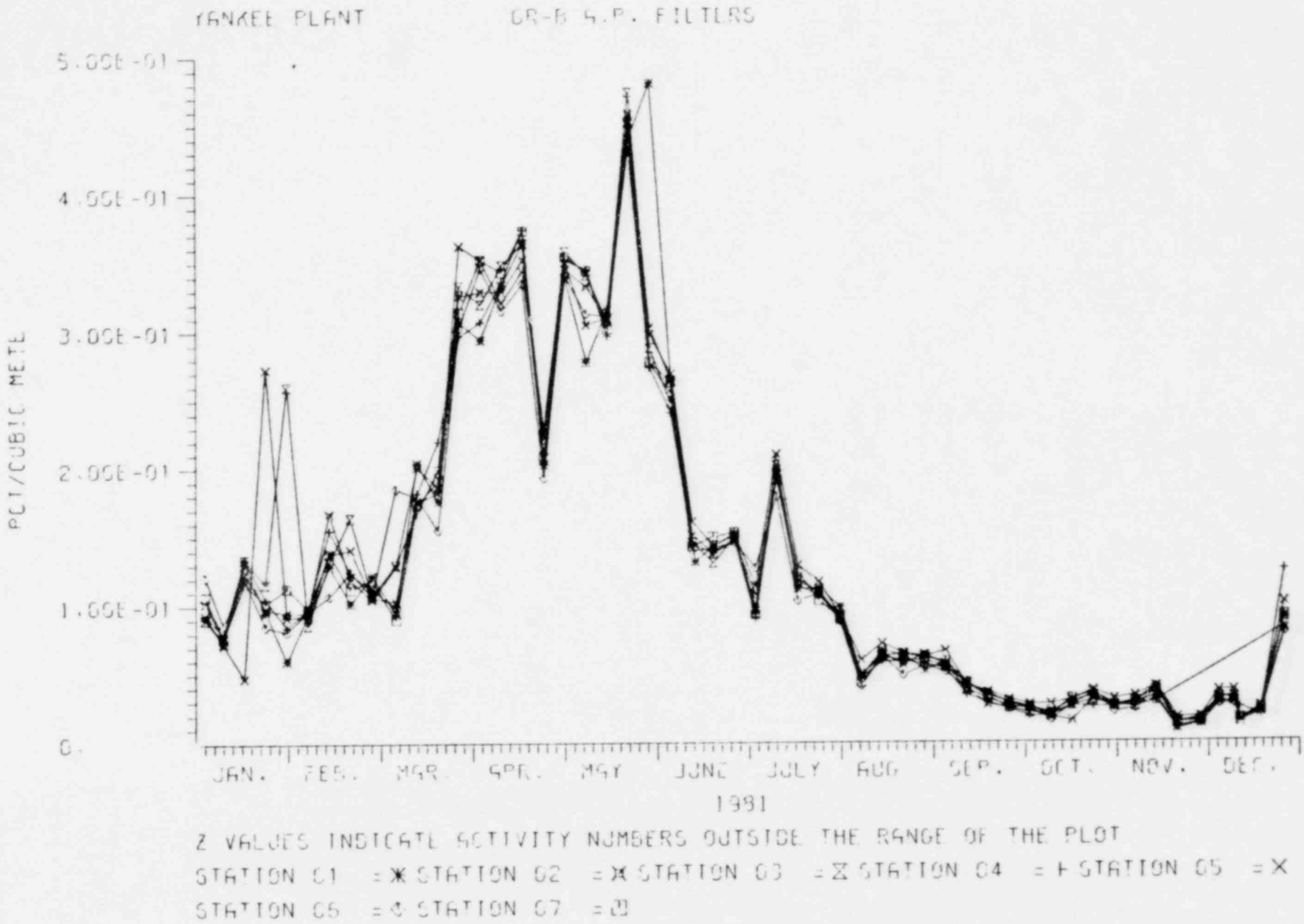

YANKEE PLANT
GR-B S.P. FILTERS
5.00E-01
4.00E-01
3.00E-01
2.00E-01
1.00E-01
0.
PCI/CUBIC METE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG SEP. OCT. NOV. DEC.
1981
Z VALUES INDICATE ACTIVITY NUMBERS OUTSIDE THE RANGE OF THE PLOT
STATION 01 = STATION 02 = STATION 03 = STATION 04 = STATION 05 = X
STATION 06 = STATION 07 =

Figure 14

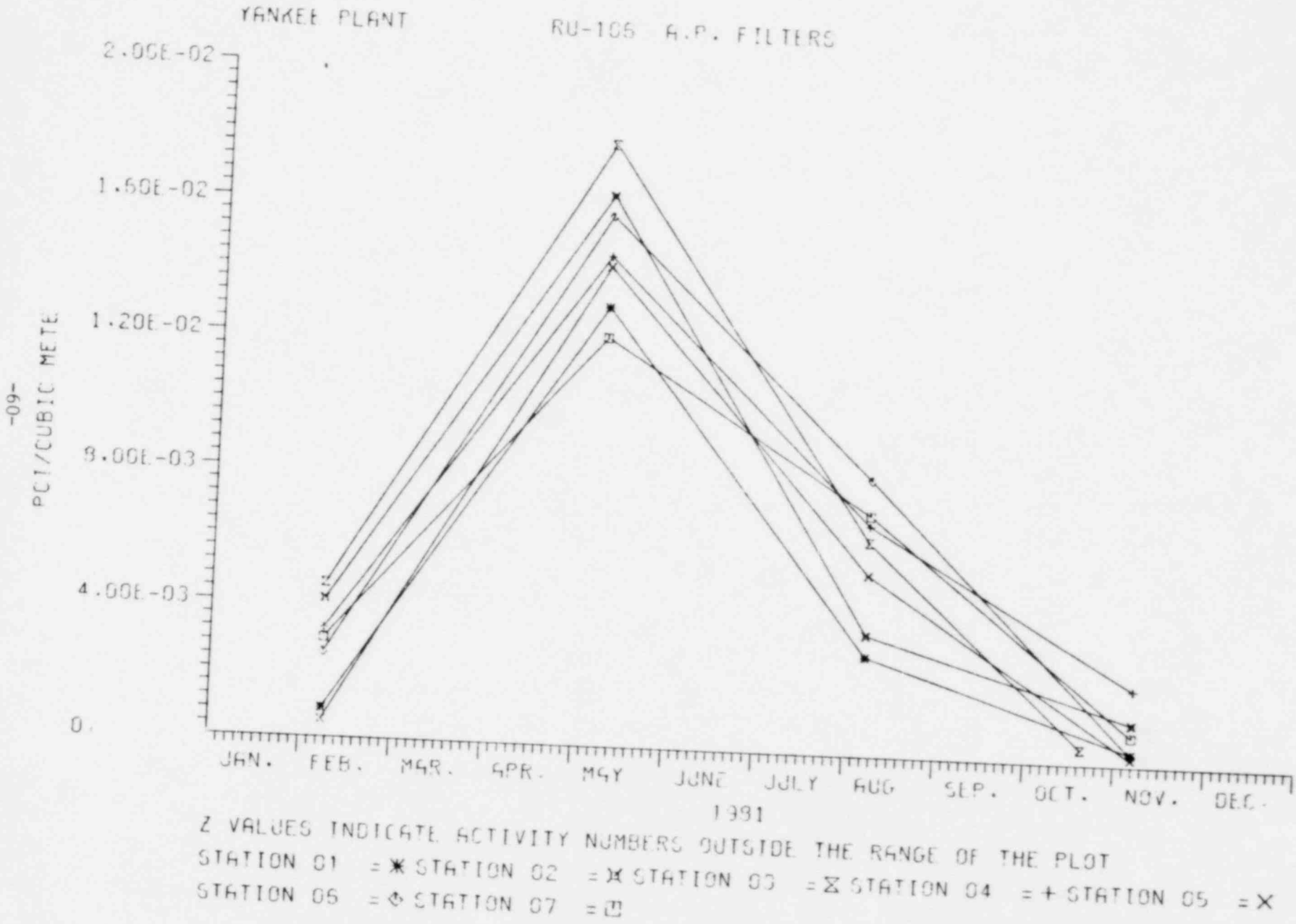

YANKEE PLANT
RU-105 A.P. FILTERS
2.00E-02
1.60E-02
1.20E-02
8.00E-03
4.00E-03
0.
PCI/CUBIC METE
-09-
JAN. FEB. MAR. APR. MAY JUNE JULY AUG SEP. OCT. NOV. DEC.
1981
Z VALUES INDICATE ACTIVITY NUMBERS OUTSIDE THE RANGE OF THE PLOT
STATION 01 = STATION 02 = STATION 03 = STATION 04 = + STATION 05 = X
STATION 06 = STATION 07 =

Figure 15

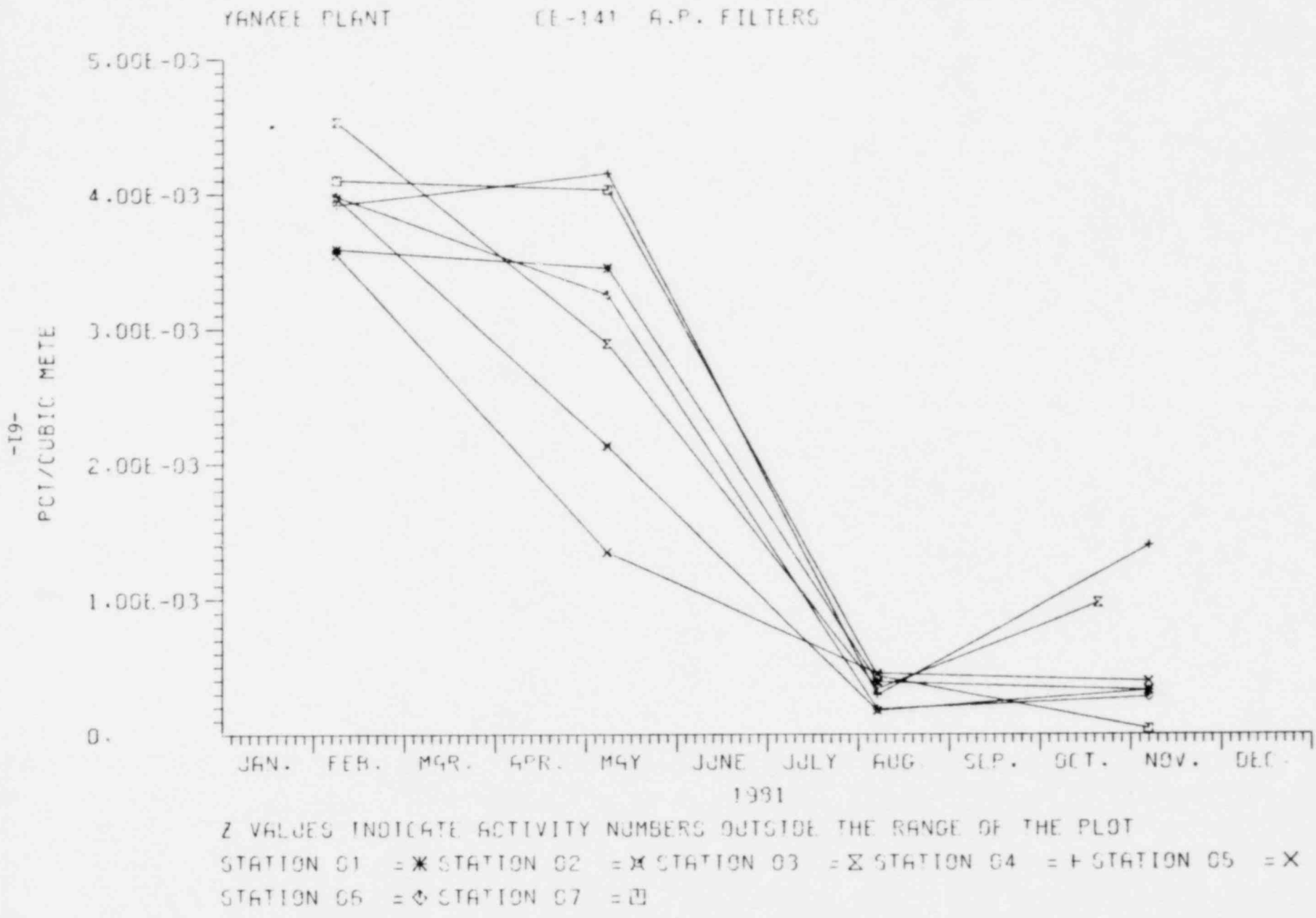

YANKEE PLANT
CE-141 A.P. FILTERS
5.00E-03
4.00E-03
3.00E-03
2.00E-03
1.00E-03
0.
PCI/CUBIC METE
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG
SEP.
OCT.
NOV.
DEC
1991
Z VALUES INDICATE ACTIVITY NUMBERS OUTSIDE THE RANGE OF THE PLOT
STATION 01 = STATION 02 = STATION 03 = STATION 04 = STATION 05 = X
STATION 06 = STATION 07 =

Figure 16

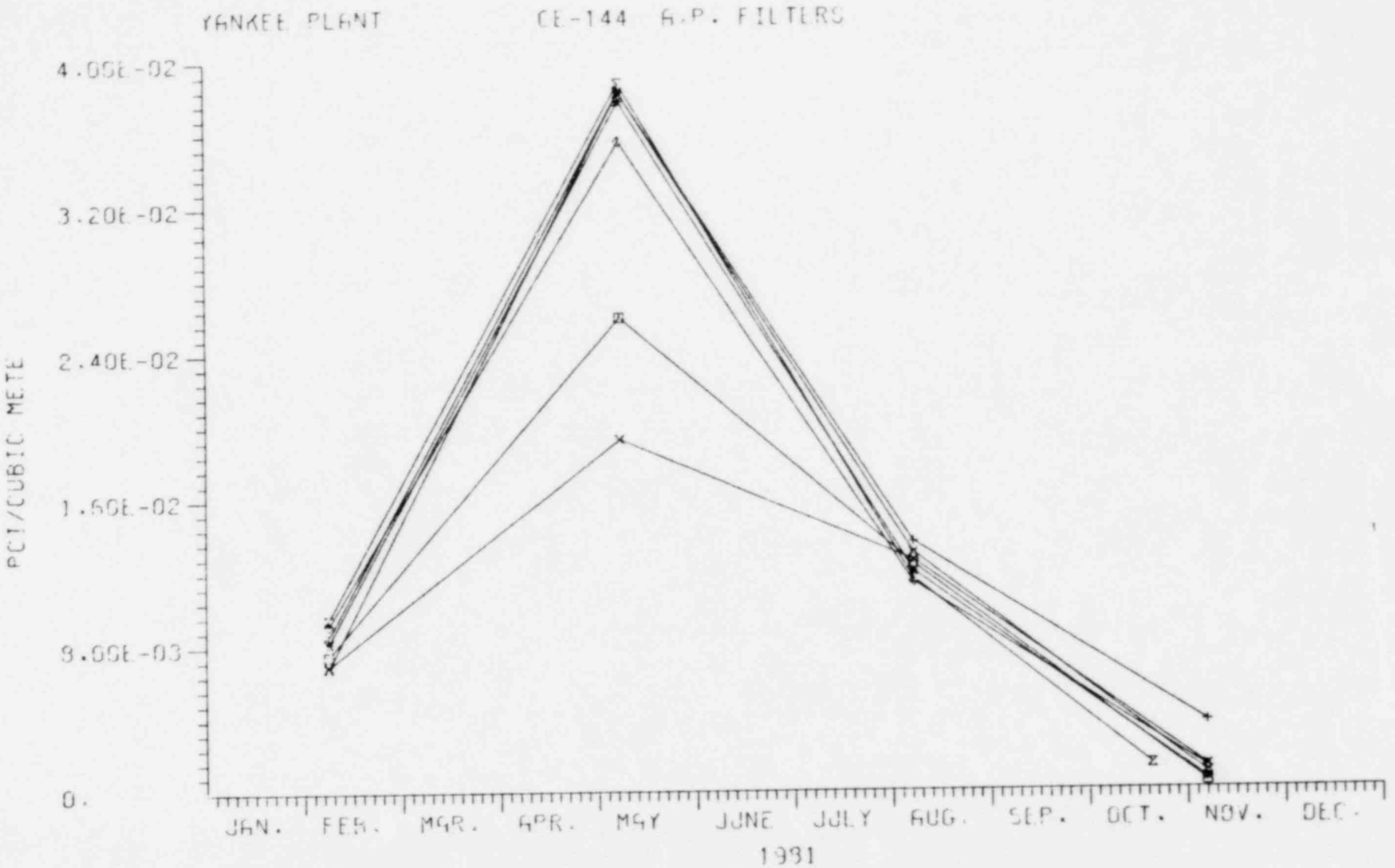

YANKEE PLANT
CE-144 G.P. FILTERS
4.00E-02
3.20E-02
2.40E-02
1.60E-02
8.00E-03
0.
PCI/CUBIC METE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEP. OCT. NOV. DEC.
1981
Z VALUES INDICATE ACTIVITY NUMBERS OUTSIDE THE RANGE OF THE PLOT
STATION 01 = STATION 02 = STATION 03 = STATION 04 = + STATION 05 = X
STATION 06 = STATION 07 =

Figure 17

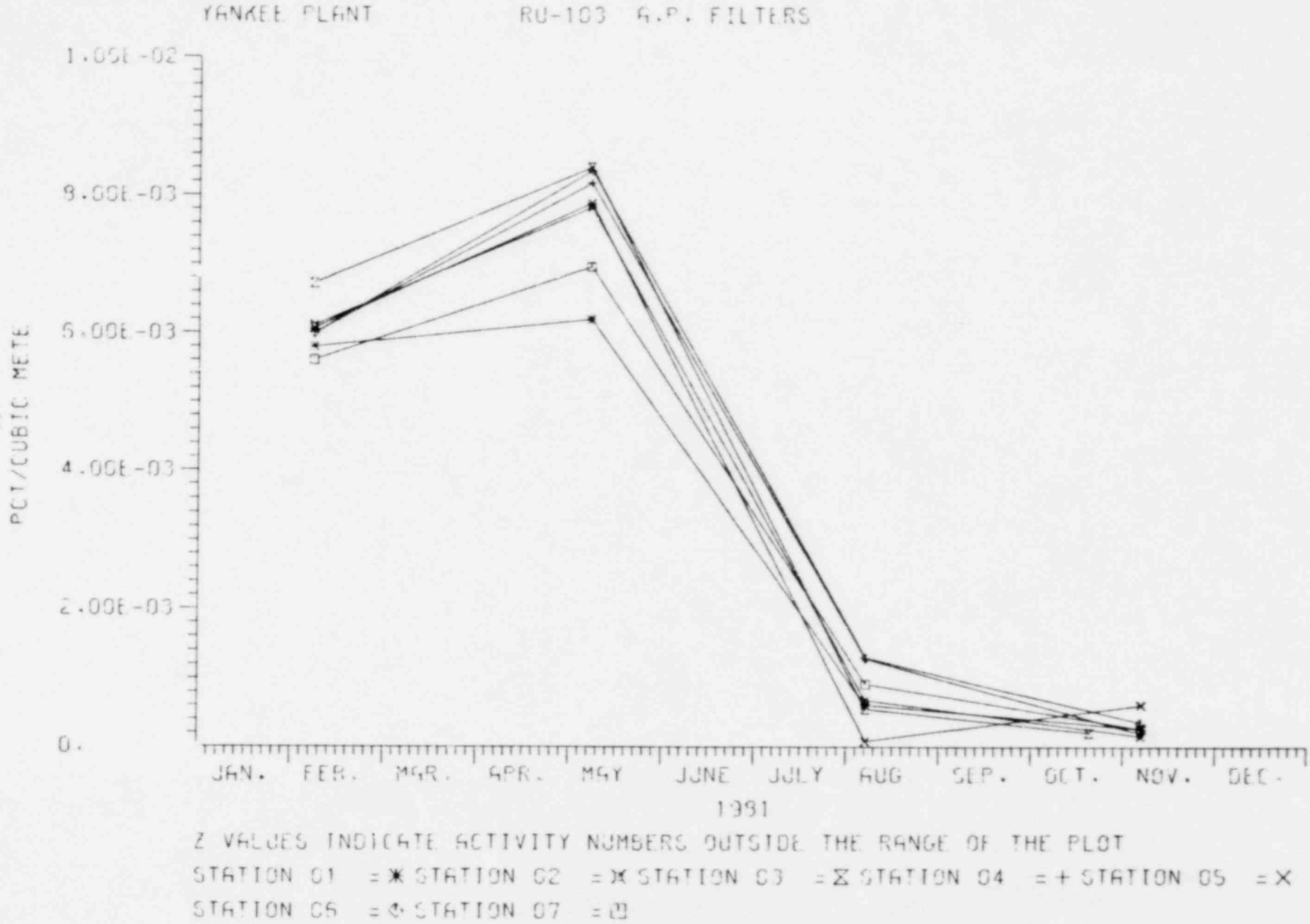

YANKEE PLANT
RU-103 G.P. FILTERS
1.00E-02
8.00E-03
6.00E-03
4.00E-03
2.00E-03
0.
PCI/CUBIC METE
JAN. FEB. MGR. APR. MAY JUNE JULY AUG SEP. OCT. NOV. DEC.
1991
Z VALUES INDICATE ACTIVITY NUMBERS OUTSIDE THE RANGE OF THE PLOT
STATION 01 = STATION 02 = STATION 03 = STATION 04 = + STATION 05 = X
STATION 06 = STATION 07 =

Figure 18

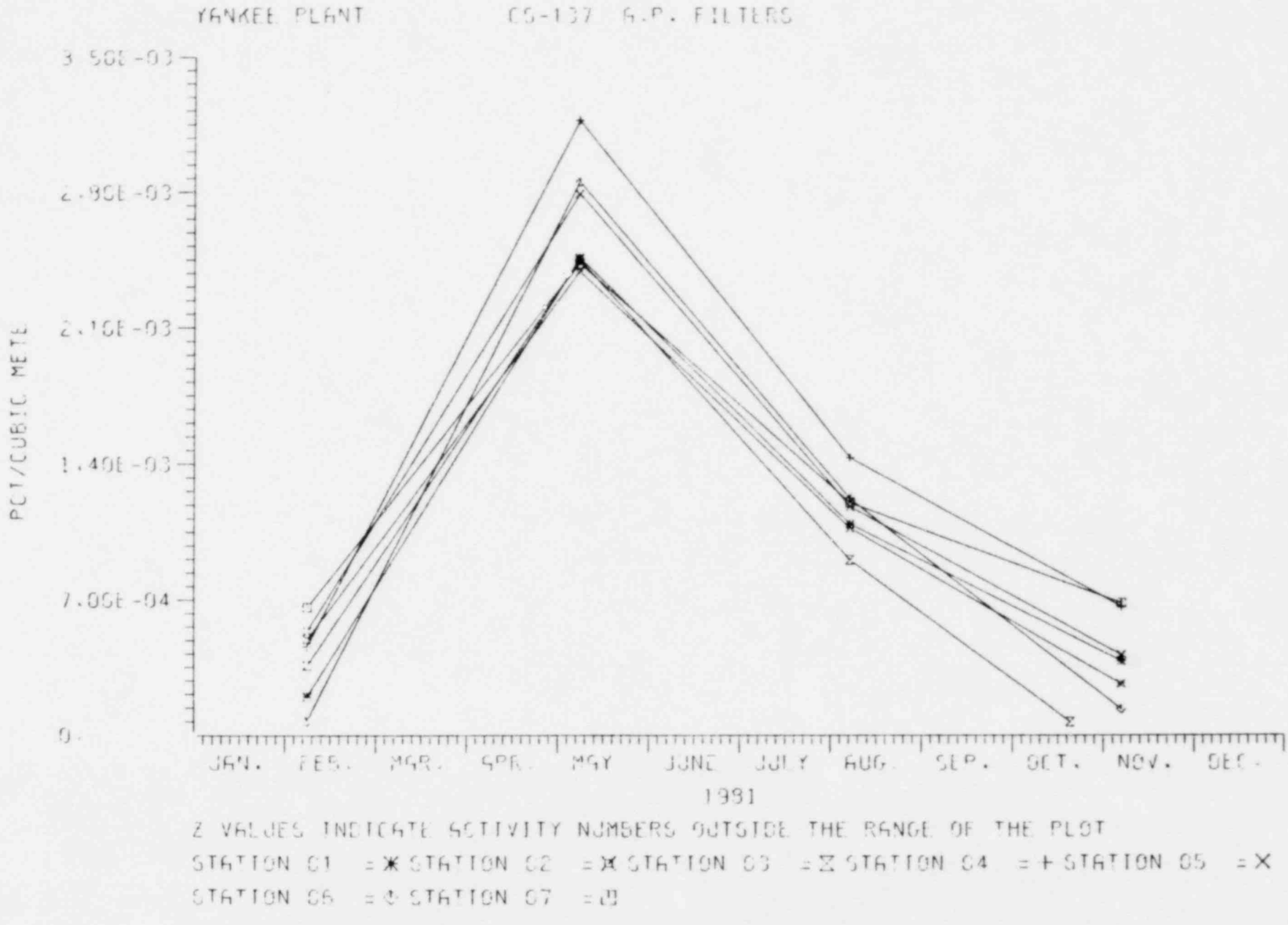

YANKEE PLANT
CS-137 G.P. FILTERS
3.50E-03
2.80E-03
2.10E-03
1.40E-03
7.00E-04
0.
PCI/CUBIC METE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEP. OCT. NOV. DEC.
1981
Z VALUES INDICATE ACTIVITY NUMBERS OUTSIDE THE RANGE OF THE PLOT
STATION 01 = STATION 02 = STATION 03 = STATION 04 = STATION 05 = X
STATION 06 = STATION 07 =

Figure 19

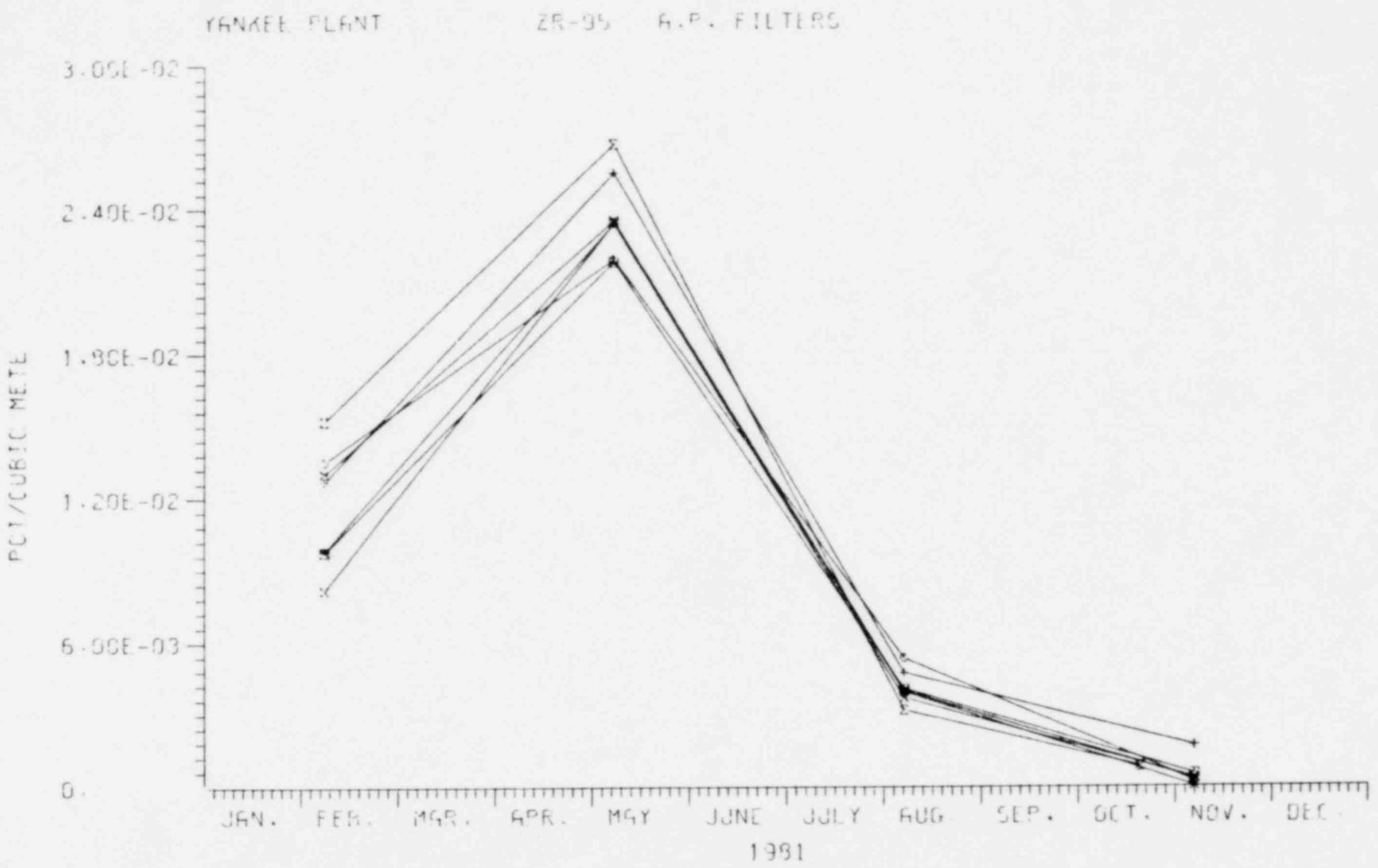

YANKEE PLANT
ZR-95 A.P. FILTERS
3.00E-02
2.40E-02
1.80E-02
1.20E-02
6.00E-03
0.
PCI/CUBIC METE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG SEP. OCT. NOV. DEC
1981
Z VALUES INDICATE ACTIVITY NUMBERS OUTSIDE THE RANGE OF THE PLOT
STATION 01 = STATION 02 = STATION 03 = STATION 04 = + STATION 05 = X
STATION 06 = STATION 07 =

Figure 20

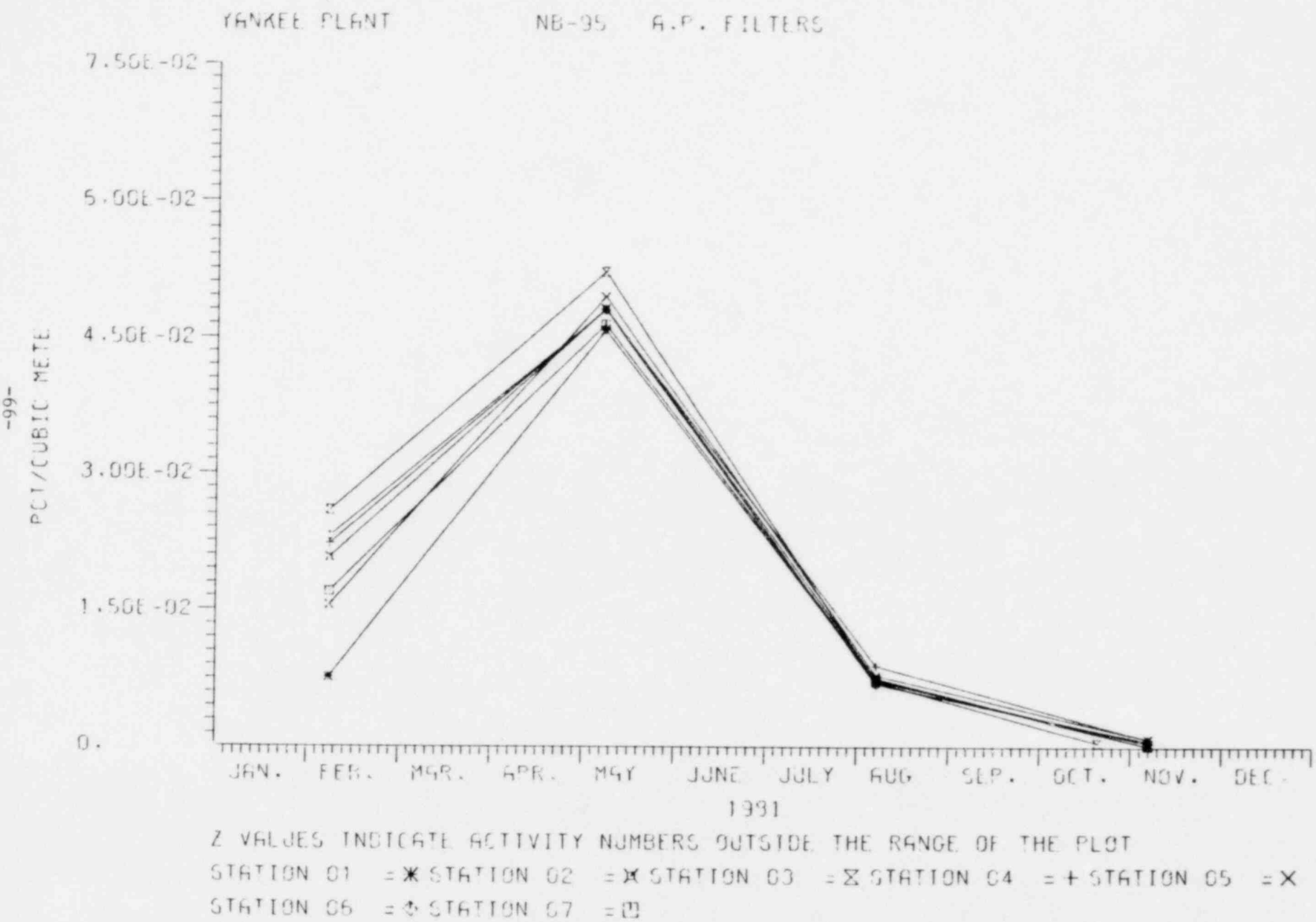

YANKEE PLANT
NB-95 A.P. FILTERS
7.50E-02
5.00E-02
4.50E-02
3.00E-02
1.50E-02
0.
PCI/CUBIC METE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG SEP. OCT. NOV. DEC.
1991
Z VALUES INDICATE ACTIVITY NUMBERS OUTSIDE THE RANGE OF THE PLOT
STATION 01 = STATION 02 = STATION 03 = STATION 04 = + STATION 05 = X
STATION 06 = STATION 07 =

Figure 21

RU-103 IN AP FILTERS SAMPLES FROM WESTBORO
1981 * TIMES E-3

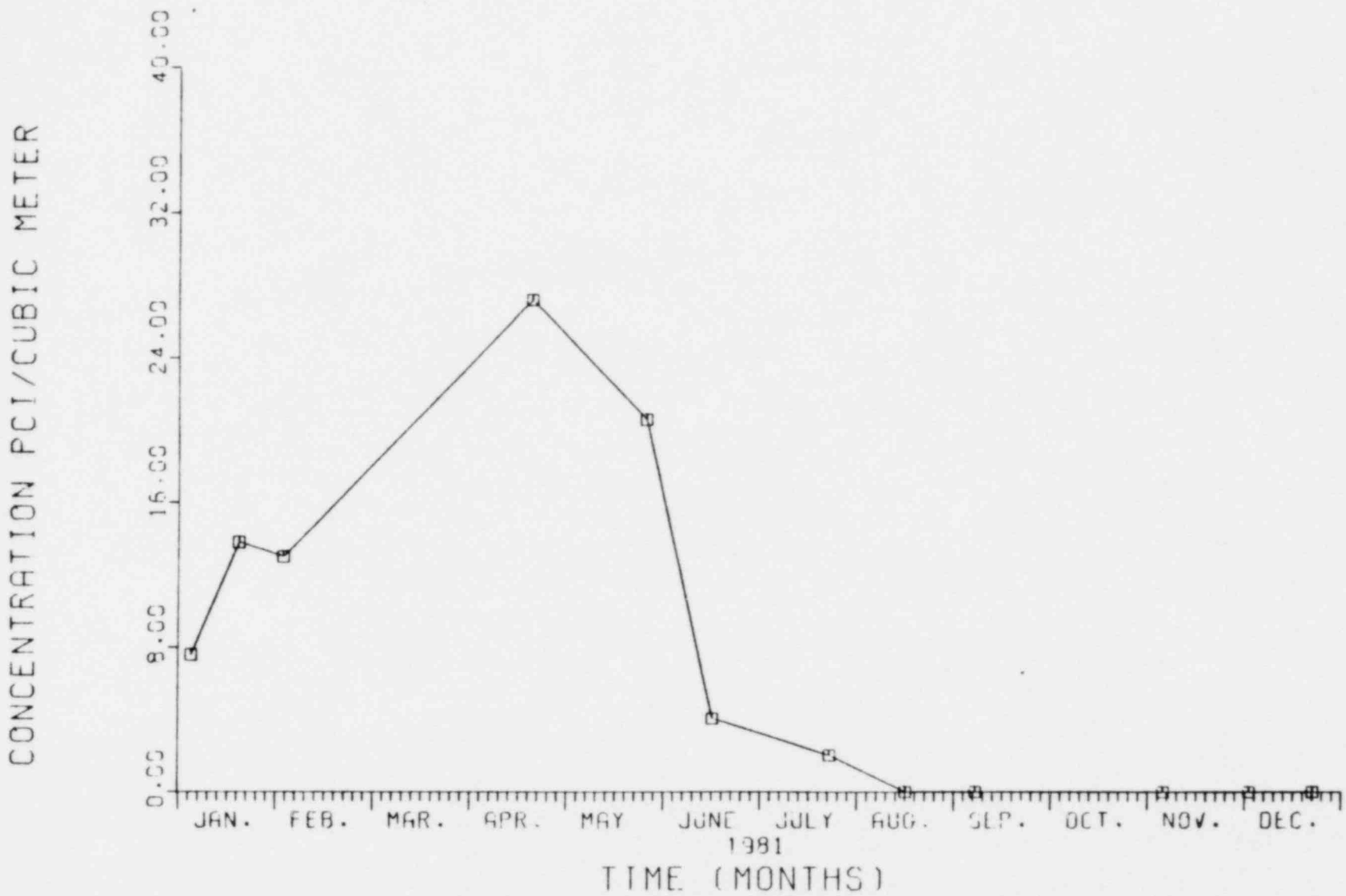


Figure 22

ZR-95 IN AP FILTERS SAMPLES FROM WESTBORO
1981 TIMES E-3

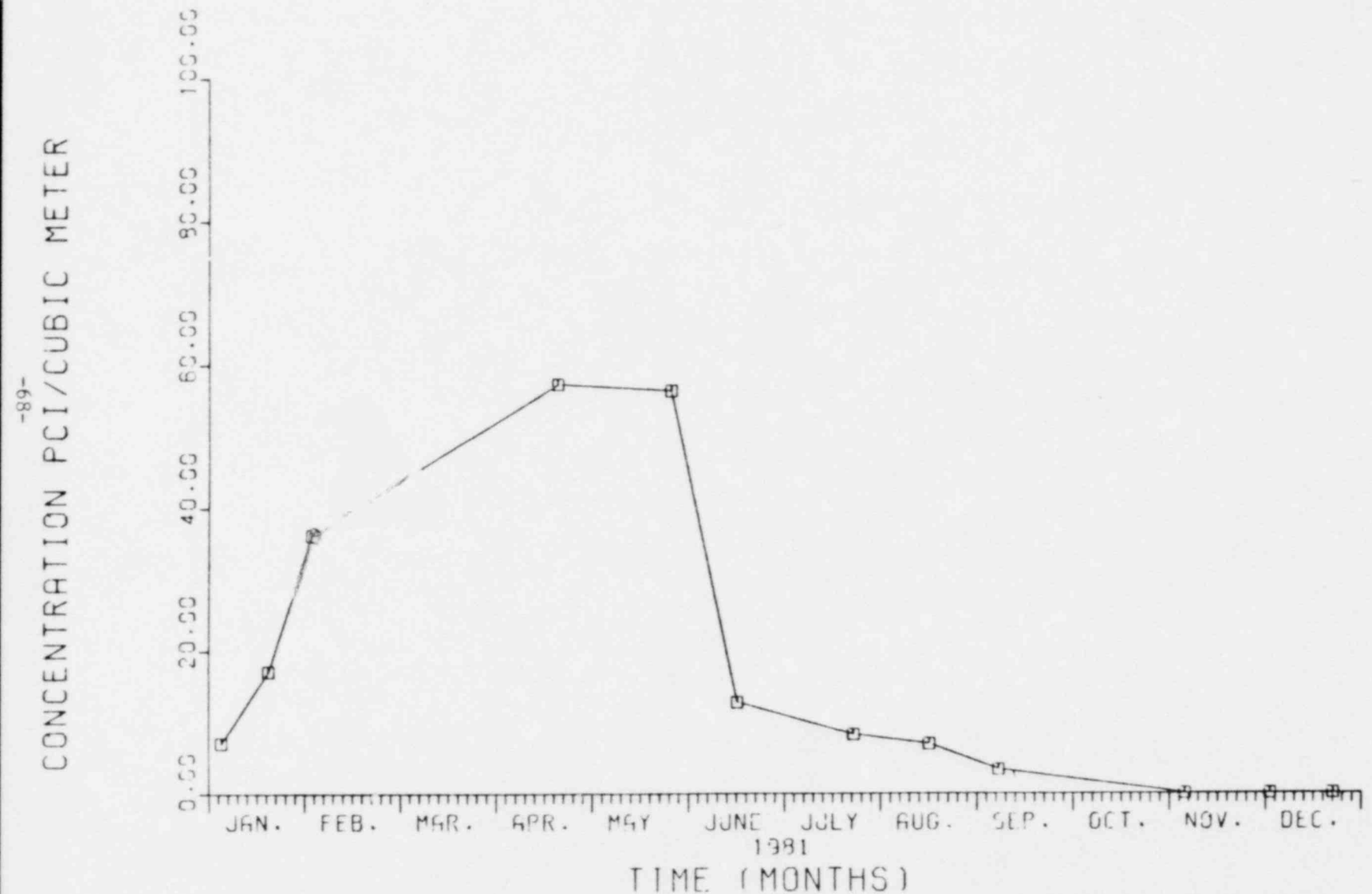


Figure 23

CE-141 IN AP FILTERS SAMPLES FROM WESTBORO
1981 TIMES E-3

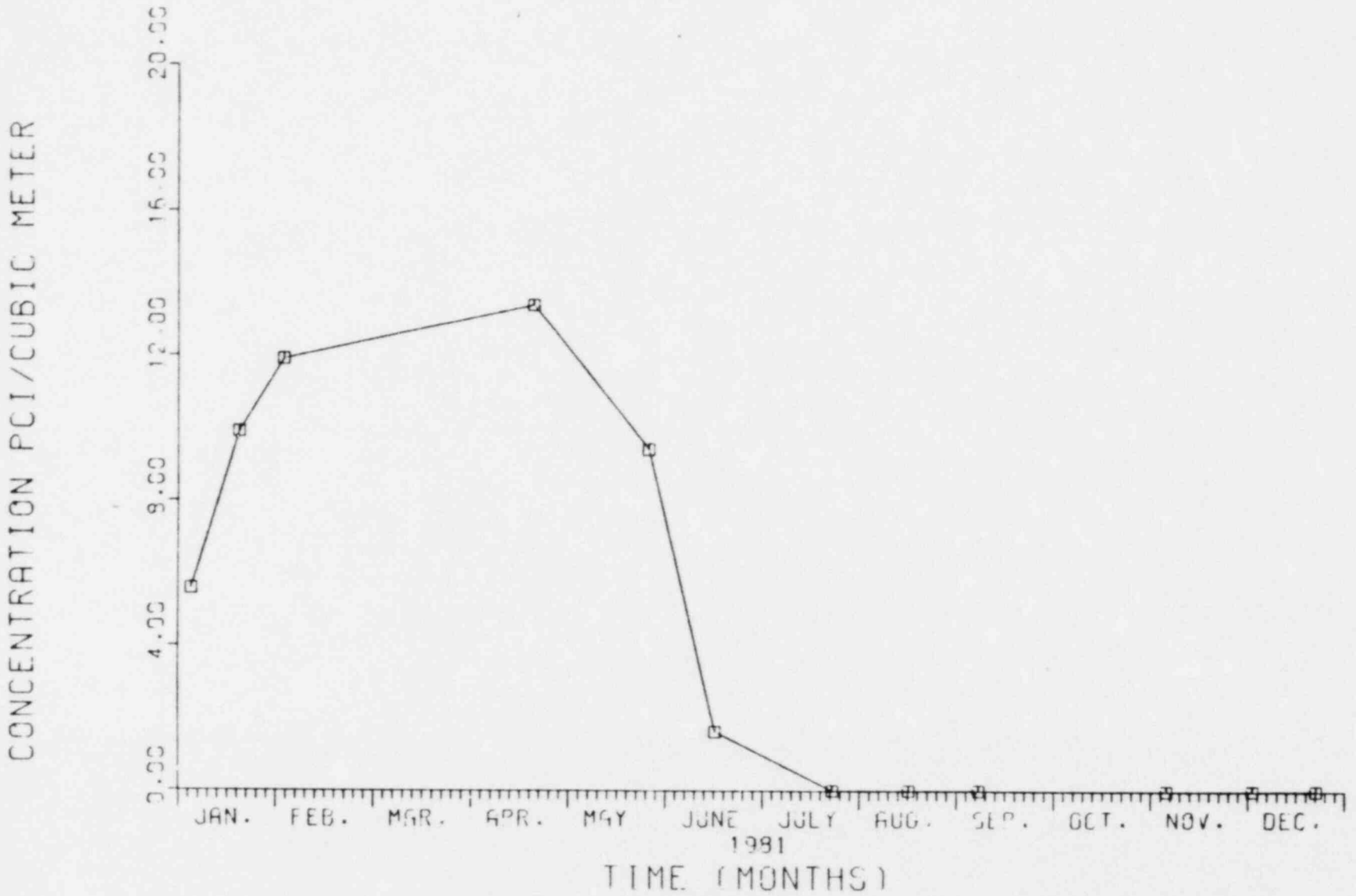


Figure 24

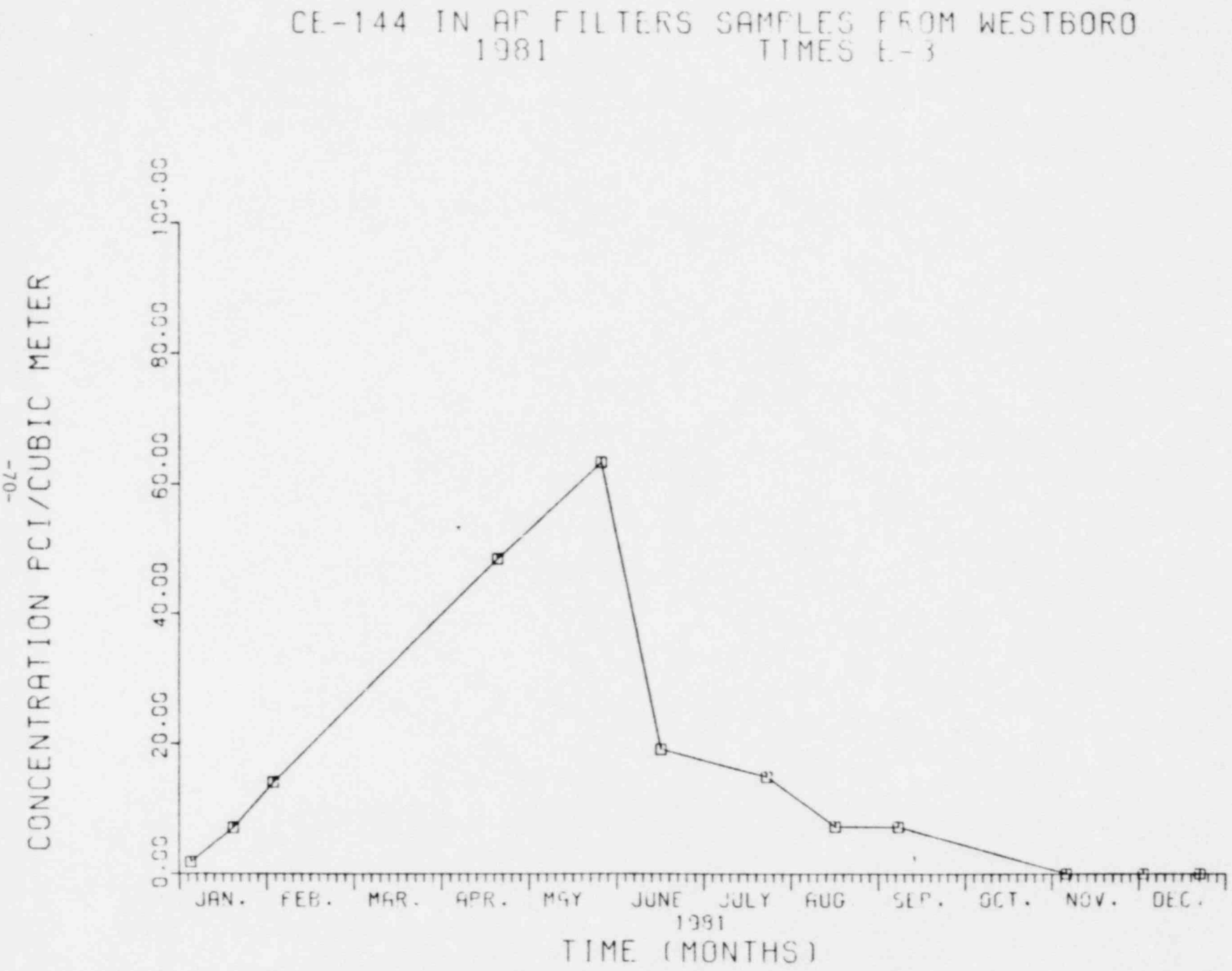

CE-144 IN AP FILTERS SAMPLES FROM WESTBORO
1981 TIMES E-3
CONCENTRATION PCI/CUBIC METER
0.00
20.00
40.00
60.00
80.00
100.00
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG
SEP.
OCT.
NOV.
DEC.
1981
TIME (MONTHS)

Figure 25

RU-106 IN AP FILTERS SAMPLES FROM WESTBORO
1981 TIMES E-3

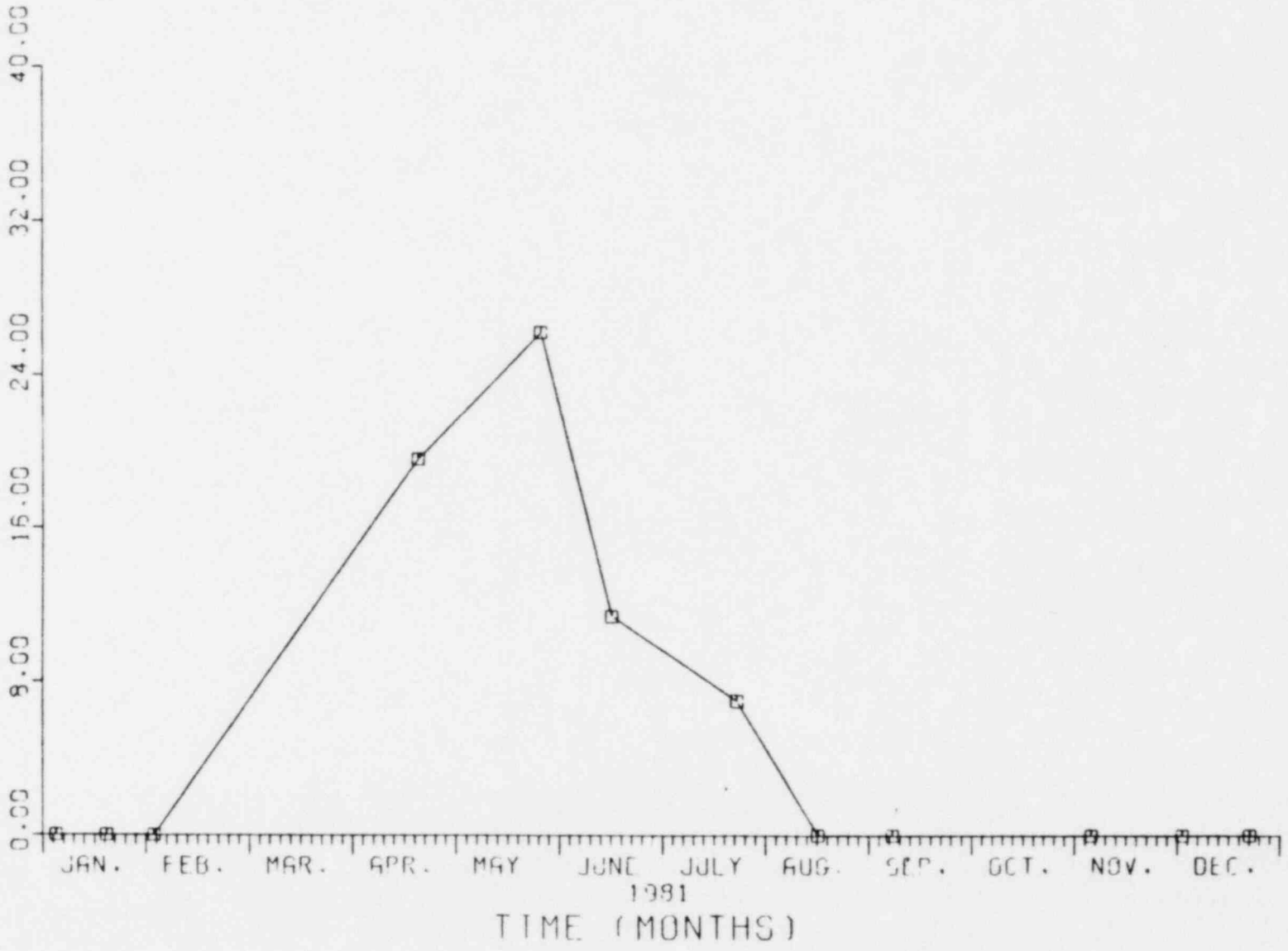


Figure 26

CS-137 IN AP FILTERS SAMPLES FROM WESTBORO
1981 TIMES E-3

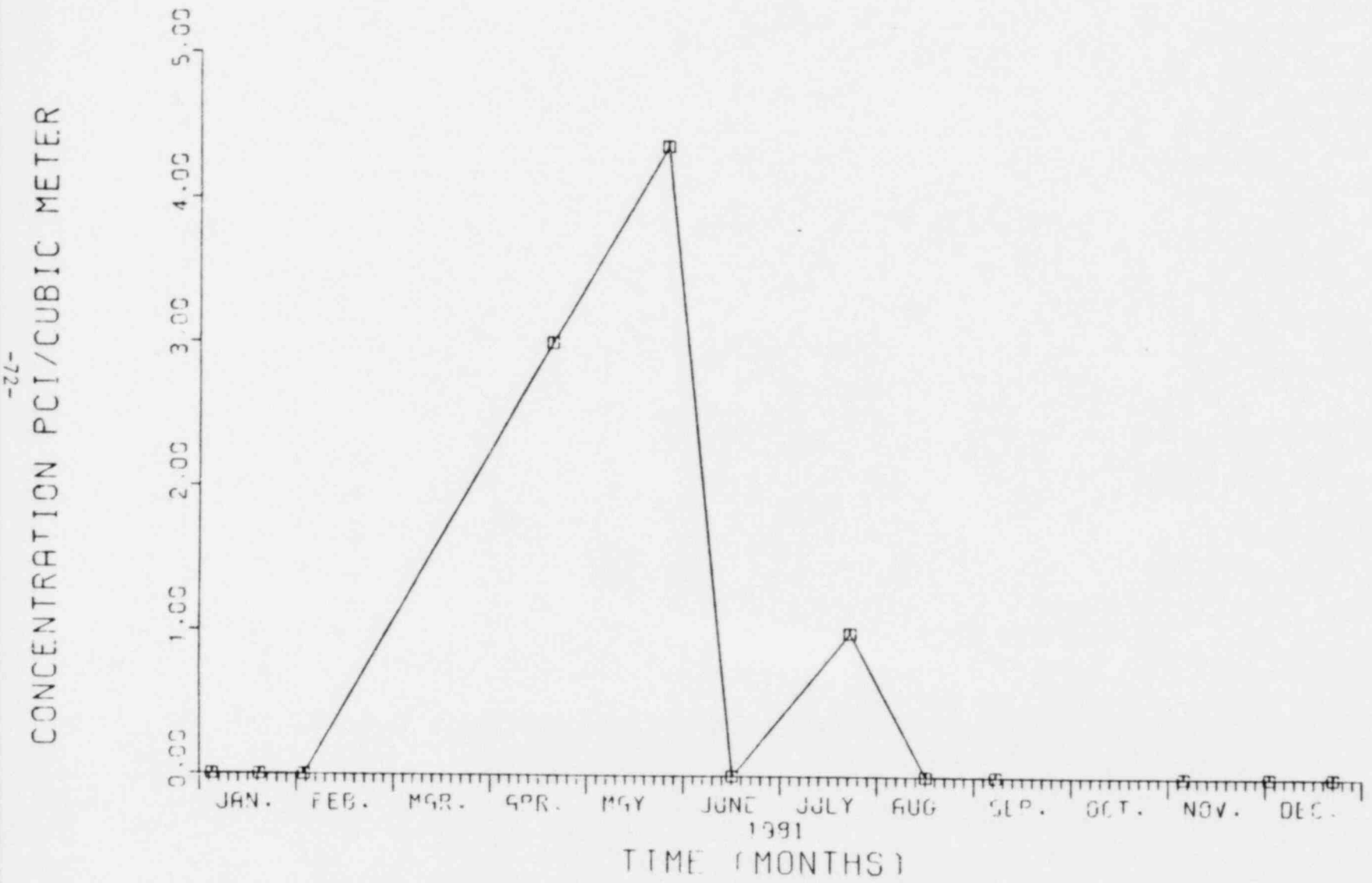
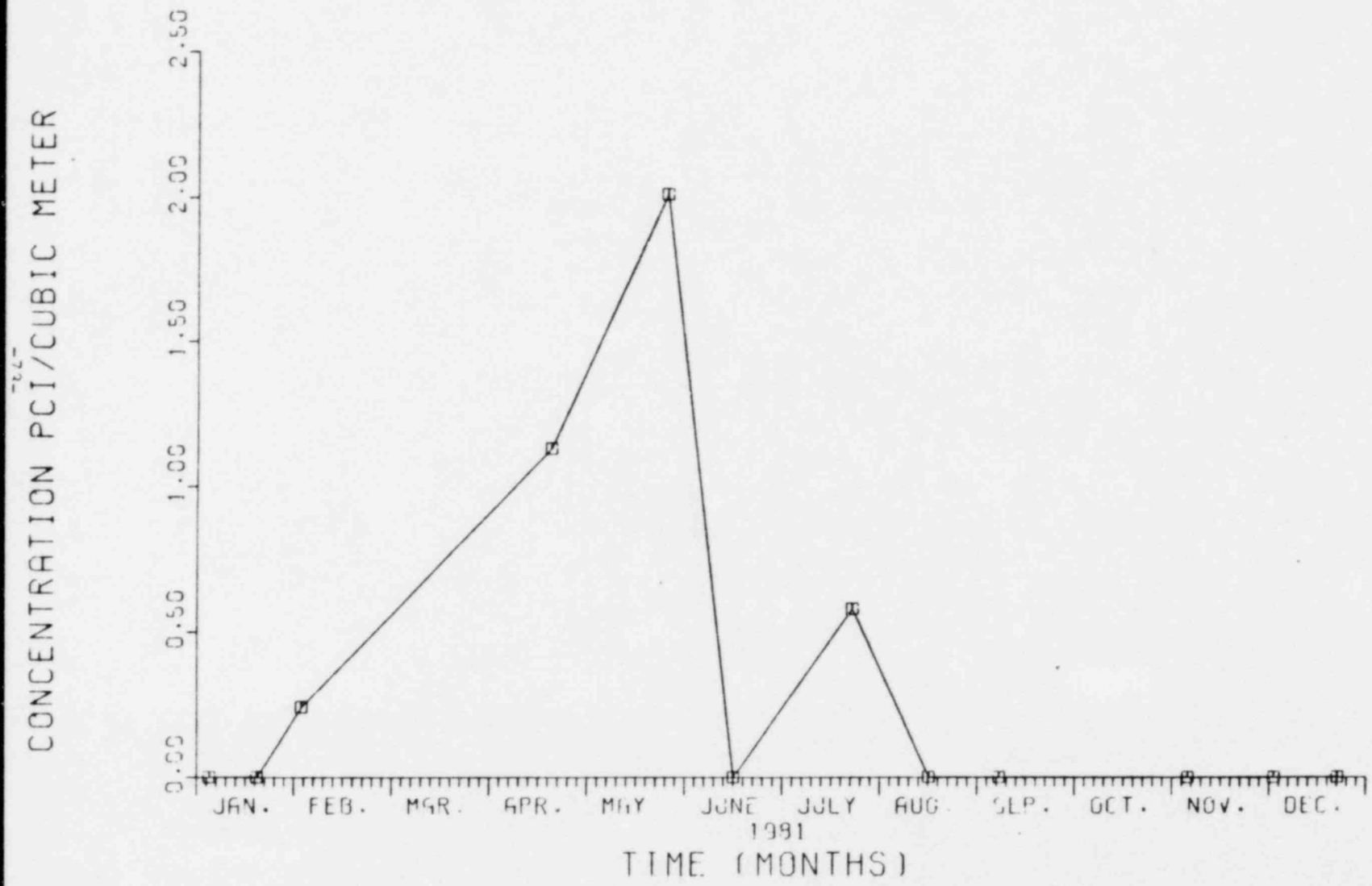


Figure 27

MN-54 IN AP FILTERS SAMPLES FROM WESTBORO
1981 TIMES E-3



VI. ANALYSIS OF ENVIRONMENTAL DATA

The analysis of environmental data may be divided into three sections: airborne radioactivity, waterborne radioactivity, and direct exposure measurements. A discussion of each environmental media within these sections will follow:

1. Airborne

a. Air Particulate

Air monitoring stations are established at a total of seven locations. Five of these locations are indicator while the remaining two are control stations. Airborne particulates are collected by passing air through a fiber filter; these filters are collected weekly and held for at least 24 hours before being analyzed for gross beta activity to allow for the decay of radon and thoron daughter products. Weekly composite air filters from each location are analyzed quarterly for gamma emitting nuclides.

A significant increase in airborne gross beta activity was measured on all weekly air particulate filter samples submitted from indicator and control locations during the first three quarters of 1981 (Figure 13). Gamma analysis performed quarterly on weekly composite filters showed detectable concentrations of fission products in indicator and control station samples. The highest airborne gross beta and fission product activity occurred during the spring and summer months when intermixing of the stratosphere and troposhere takes place causing radioactive debris in the stratosphere from weapons testing to be introduced in the troposhere. An additional control air sampling location was set up at our Environmental Laboratory in Westborough, Massachusetts. Air particulate samples analyzed from this location showed detectable levels of fission products with activity concentrations which were not significantly different from the sampling locations around the Yankee plant.

During 1981 increased airborne gross beta and fission products activity detected in indicator and control air samples was due to fallout from weapons testing (see Section V).

b. Radioiodine

Iodine-131 activity was detected in a charcoal filter sample collected from station 7, an indicator station located 1.1 kilometers southwest of the plant, during the week of February 16, 1981. This activity was related to an I-131 release from the Yankee plant which occurred on February 17, 1981. The concentration of I-131 in the charcoal sample was 1.53 E-2 pCi/cubic meter, and this concentration was used to calculate the radiation dose to the thyroid. Using the methodology in Regulatory Guide 1.109 and conservative assumptions, the thyroid dose to different age groups is shown in Table 3. The radiation doses are small and below the limits of 10CFR Part 20.105 (Permissible Levels of Radiation in Unrestricted Areas). No other I-131 activity was detected in charcoal filter samples during 1981.

c. Milk

Milk samples were collected and analyzed monthly for Sr-89, Sr-90, low level I-131 and gamma emitting radionuclides. During 1981, detectable levels of Sr-89 were measured in milk samples submitted from indicator and control locations during pasture season. This radionuclide was also detected in milk samples from three additional milk locations used in a special study. The Sr-89 activity is related to the Chinese weapons test discussed in Section V.

Detectable concentrations of Cs-137 and Sr-90 were measured in milk samples submitted from indicator and control locations. The mean concentration of Cs-137 and Sr-90 in milk samples from the indicator locations was greater by a factor of 4.8 and 2.3, respectively, than the control location. The higher concentrations in indicator samples has been noted for several years and is not related to Yankee's gaseous release (see Milk section of 1979 Annual Report).

Table 3

Thyroid Doses

Age Group	Thyroid Dose (mrem)
Adult	3.51E-3
Teen	4.31E-3
Child	4.39E-3
Infant	6.67E-3

An in-depth study of Cs-137 and Sr-90 levels in the environment was started in May of 1981 and continued over a four-month period to identify the cause of different levels of Cs-137 and Sr-90 in milk. The study included present milk sampling locations plus four additional farms. In addition to collection and analysis of milk, cattle feed and vegetation samples, in situ soil analyses were carried out at six farms during 1981. The results of the gamma in situ analysis of soil showed that naturally occurring K-40, Th-228 and U-238 plus man-made Cs-137 and Nb-95 were detected at all farm locations. Zr-95 was also detected at three of these locations. Nb-95 and Zr-95 concentrations were not statistically different between indicator and control locations, and these radionuclides were related to the weapons fallout during 1981. Cs-137 was the only radionuclide that could be related to the operation of the plant, but the lack of any other plant-related gamma emitting nuclides and the fact that Cs-137 concentrations at all farm locations were within the expected concentrations in soil due to weapons testing, indicate that the Cs-137 levels in milk were not related to the operation of the Yankee plant.

The special milk study showed that Cs-137 and Sr-90 concentrations in milk and vegetation varied from farm to farm. The cattle feed samples collected from farm locations showed Cs-137 and Sr-90 activity which ranged from 449 pCi/kg to below detectable levels and 547 pCi/kg to 14 pCi/kg, respectively. The primary results from this special study indicate that farming practices (amount of vegetation and type of vegetation that cows are allowed to feed on) were the cause for large variations of Cs-137 and Sr-90 concentrations in milk. This can be further demonstrated by the fact that during 1981, Sr-89 activity due to fallout from weapons testing and which is assumed to be evenly distributed, was measured in indicator station milk samples by a factor of 1.7 higher than control locations.

d. Food and Garden Crops

Samples of food crops were collected at harvest time and analyzed for gamma emitting nuclides plus low level I-131. Potassium 40, a

naturally occurring radionuclide, was the only gamma emitter detected with activity concentrations greater than minimum detectable concentrations.

e. Maple Syrup

Samples of maple syrup were collected in March from one indicator and two control locations. Detectable concentrations of K-40, Th-228, and Cs-137 were measured in these samples. Potassium 40 and Th-228 are both naturally occurring radionuclides. The average concentration of Cs-137 measured in syrup from the control locations was a factor of 10 greater than the concentration detected in the indicator station sample. The Cs-137 activity in maple syrup is the result of fallout from nuclear weapons testing in the atmosphere.

f. Mixed Vegetation

Mixed vegetation samples were collected in May, August and November from six sampling locations. These vegetation samples consisted of mixed grass and were analyzed for gamma emitting nuclides. Detectable concentrations of fission products (Zr-95, Nb-95, Ru-103, Cs-137 and Ce-144) were measured in samples submitted from indicator and control locations. The concentration of these radionuclide in indicator station samples were not statistically different from the concentration measured in control station samples.

Since the above radionuclides were detected in control stations, and the fact that some of these fission products were not detected in Yankee gaseous releases indicate that the activity in mixed vegetation was related to fallout from weapons testing discussed in Section V.

Soil

Soil analysis was performed at eleven soil sampling locations during the month of September. In situ gamma spectrometry was used due to its convenient and efficient method of measuring radioactivity in the

soil. This technique eliminates two problems which are present in normal soil core sampling analysis; (1) the non-representative nature of a single core soil sample from a given location, (2) relatively long counting time due to small volume of soil. The analytical methodology was based on HASL 258 (Reference 1).

In nearly all the analyses performed, over 95 percent of the exposure rate is attributed to naturally occurring K-40, Th-232 and U-238 (Table 4). The other main component of the exposure rate is from Cs-137 with values ranging from 0.1 μR per hour to 0.7 μR per hour (244 pCi/kg to 130 pCi/kg). Small concentrations of Zr-95 and Nb-95 were observed in the analysis and can be attributed to recent fallout discussed in Section V. Cs-137 was present at all locations and Table 5 shows that the mean concentration at indicator stations was higher than the control stations. A student t-test was performed and the results showed that the average Cs-137 values were not statistically different at the 95% confidence level. The variation of Cs-137 concentration at different locations is due to variability in soil (pH conditions causing different scavenging effect), and different deposition of fallout. The lack of detection of plant-related radionuclides (Cs-134, Co-60) indicates that the Cs-137 is from fallout due to weapons testing.

In conclusion, the results in situ gamma ray spectrometry indicate that there is no detectable effect on the soil at offsite stations due to the operation of the Yankee plant.

TABLE 4

Average Soil Exposure Rates
Microrem/Hour

Nuclide	Indicator Locations		Control Locations	
	Mean	Range	Mean	Range
U-238	1.00 ± 0.21	0.78 to 1.39	1.20 ± 0.27	1.01 to 1.40
Th-232	1.83 ± 0.71	0.75 to 2.93	2.69 ± 0.19	2.56 to 2.83
K-40	2.44 ± 0.61	1.82 to 3.48	2.32 ± 0.16	2.20 to 2.43
Cs-137	0.40 ± 0.20	0.19 to 0.72	0.42 ± 0.15	0.24 to 0.31
Nb-95	0.05 ± 0.01	0.04 to 0.07	0.06 ± 0.01	0.05 to 0.07

TABLE 5

Average Soil Concentrations

Nuclide	Indicator Locations		Control Locations	
	Mean	Range	Mean	Range
U-238	(5.50 ± 1.18) E + 2)	(4.28 to 7.61) E + 2	(6.60 ± 0.15) E + 2	(5.54 to 7.66) E + 2
Th-232	(6.49 ± 2.53) E + 2)	(2.66 to 10.39) E + 2	(9.56 ± 0.66) E + 2	(9.09 ± 10.02) E + 2
K-40	(1.36 ± 0.33) E + 4)	(1.02 to 1.94) E + 4	(1.54 ± 0.26) E + 4	(1.36 to 1.73) E + 4
Cs-137	(7.31 ± 3.68) E + 2	(2.64 to 13.07) E + 2	(4.99 ± 1.00) E + 2	(4.28 to 5.70) E + 2
Nb-95	(6.65 ± 0.92) E + 1	(5.61 to 8.77) E + 1	(7.48 ± 1.10) E + 1	(6.70 to 8.25) E + 1

2. Waterborne Pathway

a. River Water

River water was collected and analyzed monthly from gross beta and gamma emitting nuclides. Tritium analyses were performed quarterly on monthly composite samples.

During 1981, the average gross beta activity was similar at indicator and control locations, and there were no detectable concentrations of gamma emitting nuclides in river water samples. Detectable concentrations of H-3 were measured in indicator station samples with an average concentration of 250 pCi per liter which approximates surface water H-3 levels in the United States.

b. Ground Water

Ground water samples were collected from two indicator locations and analyzed for gamma emitting nuclides and tritium activity. Station 01, located on the plant site, showed a detectable level of Cs-137 in the February water sample. Resampling of the water indicated no detectable concentrations of gamma emitting nuclides. Since the February water sample was collected from the secondary chemistry laboratory, there was a strong possibility that the sample was contaminated. Tygon tubing, in which the February water samples were collected through, was analyzed, and the results showed detectable concentrations of I-131 indicating contamination in this lab. For the rest of 1981 all ground water samples were collected from the information center to avoid the possibility of contamination.

Elevated tritium levels were measured in samples submitted from station 02 (Sherman Spring) located 0.2 km west-northwest of the plant. This tritium activity does not correlate with present plant releases and the concentration has been constant over the last few years. A new liner for the spent fuel pool was replaced and the tritium activity at station 02 will be monitored to see if this installation reduces the tritium levels.

c. Aquatic Vegetation

Aquatic vegetation samples were collected in May and November from three sampling locations and analyzed for gamma emitters. Detectable levels of fission products (Zr-95, Nb-95, Ru-103, Cs-137, Ce-141 and Ce-144) were measured in samples from indicator and control locations. The radioactivity in aquatic vegetation was due to fallout measured in air particulate samples during the spring and summer months (see Section V).

d. Fish

Fish samples were collected from three sampling locations and analyzed for gamma emitting nuclides. The only radionuclides with detectable concentrations measured in fish samples were K-40, a naturally occurring radionuclide and Cs-137. The average Cs-137 concentration in the control station sample showed higher levels than the indicator stations, indicating that the Cs-137 activity can be attributed to residual fallout from weapons testing.

e. Sediment

Sediment samples showed detectable levels of K-40, Th-228, Cs-137, Nb-95 and Co-60. K-40 and Th-228 are naturally occurring radionuclides. Cs-137 was measured at station 02, Sherman Pond, at a higher level than the control location. This, plus the presence of detectable levels of Co-60 at this location, indicates that these radionuclides were plant-related. Nb-95 was detected at both indicator and control locations and can be attributed to fallout from weapons testing discussed in Section V.

Using Regulatory Guide 1.109, the radiation dose from shoreline sediment due to plant-related radionuclides was calculated. A total body dose of 0.02 mrem/yr was calculated to the maximum individual (teen) who would spend 67 hours per year in this area. This dose is only a small fraction of the 100 mrem per year received from background. The radiation is small and below the limits of 10 CFR

Part 20.105 (Permissible Levels of Radiation in Unrestricted Areas.)

3. Direct Radiation - TLD's

Table 6 shows the yearly average exposure from direct gamma radiation in microrem per hour from twenty-three TLD stations located on and off the Yankee site. The 1981 data exhibits similar trends as in previous years.

Direct gamma radiation is measured with $CaSO_4$:Dy TLD badges which integrate the gamma radiation exposure over a period of one month. Yankee Atomic personnel prepare, distribute, measure and calibrate these dosimeters. To demonstrate validity in reported measurements, Yankee particicpted in the Environmental Dosimeter intercomparison project, our results were in good agreement for the last intercomparison program.

Table 7 shows that the average exposure at indicator TLD stations located offsite were below the average exposure at control stations indicating that there were no detectable levels of direct gamma radiation due to the operation of the plant.

TABLE 6

1981 Average TLD Exposure

		Microrem per hour
GM 1	Zone I	9.6
GM 2	Zone I	8.7
GM 3	Zone I	8.6
GM 4	Zone I	8.7
GM 5	Zone I	10.8
GM 6	Zone I	8.4
GM 7	Zone I	8.2
GM 8	Zone I	9.3
GM 9	Zone I	8.8
GM 10	Zone I	8.3
GM 11	Zone I	9.2
GM 12	Zone I	9.3
GM 13	Restricted Area	19.7
GM 14	Restricted Area	23.7
GM 15	Restricted Area	21.9
GM 16	Restricted Area	27.3
GM 17	Restricted Area	22.8
GM 18	Restricted Area	32.8
GM 19	Restricted area	30.7
GM 20	Restricted Area	22.1
GM 21	Restricted Area	21.8
GM 22	Zone II	9.0
GM 23	Zone II	9.6

Zone I average (excluding restricted area) = 9.0 microrem per hour

Zone II average = 9.3 microrem per hour

TABLE 7

Offsite Environmental Radiological Monitoring
Summary of Analyses for the Period
December 31, 1980 to December 31, 1981

TLD - Direct Radiation
microrem per hour

Analyses Performed (total number)	Lower Limit of Detection (LLD)	Indicator Stations	Restricted Areas (mean range)	Highest Station (mean range)	Control Station
TLD (276)	0.3 mean ± sigma range	(9.0 ± 1.2) (6.5 to 13.5)	(24.7 ± 11.6) (13.1 to 63.1)	18 (32.8 ± 8.4) (23.1 to 45.6)	(9.3 ± 0.8) (8.1 to 10.9)

VII. ENVIRONMENTAL DOSIMETRY

The mean concentration of radionuclides having activity concentrations greater than the lower limit of detection values in indicator and control station samples of air particulate filters, charcoal filters, drinking water, seafood, milk and food crops were used to calculate total body doses to adults. The average individuals' usage factors were taken from U.S. NRC Regulatory Guide 1.109 (October 1977). These usage factors are:

8000 M^3/year of inhaled air
370 liters/year of drinking water
7.9 Kg/year of seafood
110 liters/year of milk
190 Kg/year of food products

The product of the mean radionuclide concentration and the usage factor yields the yearly radionuclide intake. The dose was calculated by using the dose conversion factors contained in Regulatory Guide 1.109 (Reference 2). Iodine-131 doses to the thyroid were calculated separately from data of the sample media mentioned above. In addition, external whole body doses were measured with TLD's placed in indicator and control stations.

Table 8 summarizes the environmental doses from mean radionuclide concentrations greater than MDC values in indicator and control station samples. The whole body dose from ingestion in indicator locations is almost entirely due to contributions of Sr-90 in milk. As mentioned in the Milk section, this activity is not related to plant releases.

Restricted area TLD values were not used since no individuals reside at the fenceline. Indicator TLD measurements show that nearby residents did not receive any measurable external dose from plant operation. In fact, the control locations TLD's measured a higher yearly external dose.

TABLE 8

Summary of Environmental Radiation Doses
(mrem/yr)

Source	Plant Environs	Background
Inhalation	4.3 E-3	4.3 E-3
Seafood	8.7 E-2	8.4 E-2
Food Crops	***	***
Milk	4.3	1.2
Water	0.2	*
I-131	3.5 E-3**	***
TLD	78.8	81.5
TOTAL	83.4	82.8

* No control station

** Thyroid dose for I-131 activity

*** No concentrations greater than MDL

VIII. CONCLUSION

During 1981, our radiological environmental monitoring program conducted in the offsite environment of the Yankee plant showed that, in general, the major radionuclides measured in environmental media were the naturally occurring radionuclides and fallout fission products from atmospheric weapons testing. There was no significant increase in radioactivity in the environment due to the operation of the Yankee plant.

IX. REFERENCES

1. HASL-258, "In-Situ (Ge(Li)) and Na(TL) Gamma-Ray Spectrometry," September, 1972.

2. U.S. NRC Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Release of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR50, Appendix I", 1977.