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Environmental Protection  
Agency

Eastern Environmental  
Radiation Facility  
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Montgomery, AL 36109

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Radiation

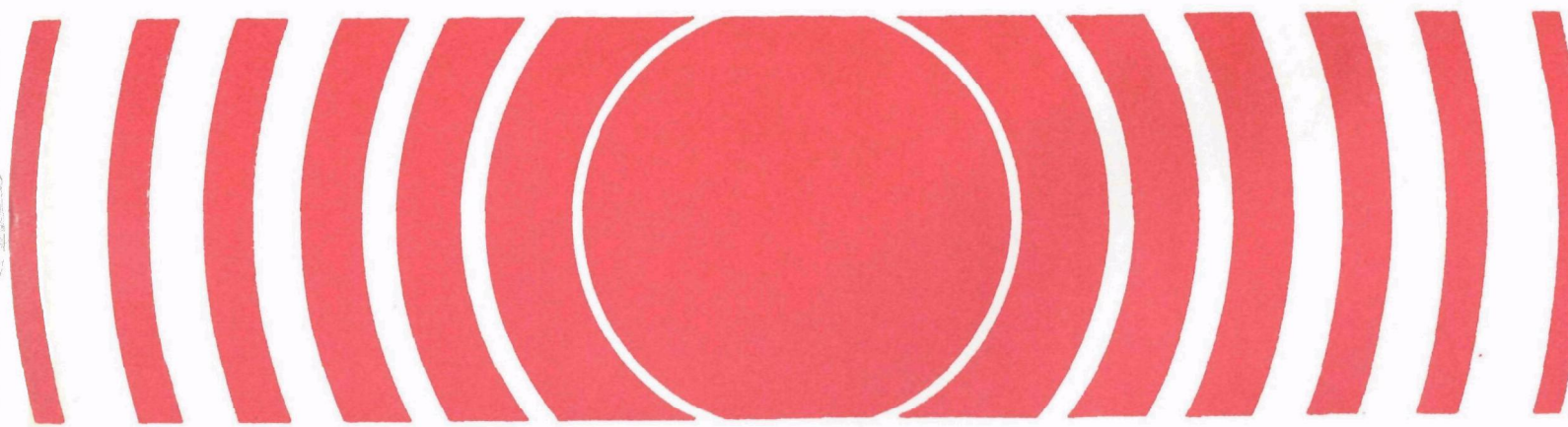
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# Environmental Radiation Data

## Report 50

April 1987 - June 1987



E N V I R O N M E N T A L

R A D I A T I O N

D A T A

REPORT 50

April - June 1987

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Office of Radiation Programs

## Preface

Environmental Radiation Data (ERD) is compiled and distributed quarterly by the Office of Radiation Programs' Eastern Environmental Radiation Facility (EERF), Montgomery, Alabama, and contains data from the Environmental Radiation Ambient Monitoring System (ERAMS). Data from similar networks operated by contributing States, Canada, Mexico, and the Pan American Health Organization are reported in the ERD when available.

ERAMS was established in 1973 by the U. S. Environmental Protection Agency's Office of Radiation Programs (ORP). The ERAMS is comprised of nationwide sampling stations that provide air, surface and drinking water, and milk samples from which environmental radiation levels are derived. The major emphasis for ERAMS is toward identifying trends in the accumulation of long-lived radionuclides in the environment.

Sampling locations are selected to provide optimal population coverage while functioning to monitor fallout from nuclear devices and other forms of radioactive contamination of the environment. The radiation analyses performed on these samples include gross alpha and gross beta levels, gamma analyses for fission products, and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton, and tritium. This monitoring effort also provides ancillary information on natural background levels and on releases into the environment from stationary sources such as nuclear power reactors, fuel fabrication facilities, and reprocessing plants.

The radiochemical procedures used by the EERF in processing the ERAMS samples are contained in Eastern Environmental Radiation Facility Radiochemistry Procedures Manual (EPA 520/5-84-006).

E N V I R O N M E N T A L   R A D I A T I O N  
D A T A

C O N T E N T S

	Page
DATA - Reporting Rationale and Procedures	vii
- Table of Reporting Increments and Minimum Detectable Levels	ix
 DATA - ERAMS	
SECTION I. Air Program	1
1. Airborne Particulates and Precipitation	1
2. Plutonium and Uranium in Airborne Particulates and Precipitation	15
3. Krypton-85	16
SECTION II. Water Program	17
1. Surface Water	17
2. Drinking Water	20
SECTION III. External Gamma Ambient Monitoring Program	23

SECTION IV. Milk Program	25
1. Pasteurized Milk	25
2. Strontium-89 and -90 in Milk	25
3. Carbon-14 in Milk	33

## DATA - Reporting Rationale and Procedures

In 1973, the U.S. Environmental Protection Agency's Office of Radiation Programs, established the Environmental Radiation Ambient Monitoring System (ERAMS) to provide continuous, accurate, and usable environmental radiation data to the public. For completeness, ERAMS data for all specific radionuclide analyses are reported as the calculated results indicate, whether the numbers are negative, zero, or positive.

### Reporting Rationale

Frequently, concentrations of radionuclides in environmental media are close to zero. When the actual concentration of a nuclide is zero, the net counting results should statistically show a distribution of negative and positive numbers about zero. This occurs when the background count is subtracted from a sample which has only background activity. Prior to July 1975, ERAMS data were not reported numerically when the results were less than a specified reporting level or minimum detectable level. The present reporting procedure allows all the data to be reported and evaluated statistically without an arbitrary cutoff of small or negative numbers. This approach will facilitate estimates of bias in the nuclide analyses and will allow better evaluation of distributions and trends in environmental data.

When reviewing the data in this report, caution should be exercised in the interpretation of individual negative values. Obviously, a negative activity value has no physical significance. Such numbers, however, are significant when taken together with other observations which indicate that the true value of a distribution is near zero. When an average of many measurements produces a result less than zero, this indicates a negative bias in the measurement procedure.

#### (1) Reported Values

Specific Analyses - All specific radionuclide analyses will be reported as the counting results indicate, whether the number is negative, zero, or positive. All reported values are corrected for decay to the collection date of the sample.

Potassium concentrations are determined by specific activity analyses.

Gross Analyses - The actual value of gross radioactivity measurements will be reported, unless the value is below the

minimum detectable level (MDL) at the 2 sigma confidence level, then < minimum detectable level will be reported.

MDL is defined as the 3 sigma error of the background. A tabulation of typical MDL's is given in the following table.

#### (2) Reported Error Terms

Each reported value for specific analyses will be accompanied by a counting error term at the 2 sigma (95%) confidence interval. Error terms are therefore reported as counting errors. At the very low levels characteristic of most ERAMS measurements, counting error is the greatest contributor to overall error.

#### (3) Significant Figures

No more than three significant figures will be reported. If a datum contains more than three figures, it will be rounded off to three figures.

#### (4) Reporting Levels

The reporting units, smallest increments for reporting, and minimum detectable levels for each isotope are shown in Table 1. Smallest increments are sometimes considerably smaller than minimum detectable amounts to avoid truncation errors in averaging.

#### (5) Averages

Averages will be calculated along with appropriate error terms in an annual summary and analysis of ERAMS data. In calculating these averages, all values of individual data including negative numbers will be utilized. Averages will not be included in ERD quarterly reports.

TABLE 1

ERAMS Reporting Increments and Minimum Detectable Levels  
for Radionuclide Analyses

<u>Radionuclide</u>	<u>Media</u>	<u>Reporting Units</u>	<u>Reporting Increments</u>	<u>Minimum Detectable Levels</u>
Gross alpha	Water	pCi/l	1 pCi/l	2 pCi/l
Gross beta	Air	pCi/m <sup>3</sup>	.01 pCi/m <sup>3</sup>	.01 pCi/m <sup>3</sup>
	Water	pCi/l	1 pCi/l	1 pCi/l
	Precipitation	nCi/m <sup>2</sup>	.01 nCi/m <sup>2</sup>	.01 nCi/m <sup>2</sup> (a)
Tritium	Water	nCi/l	.1 nCi/l	.2 nCi/l
	Milk	nCi/l	.1 nCi/l	.2 nCi/l
Carbon-14	Milk	pCi/l	1 pCi/l	15 pCi/l
Krypton-85	Ambient Air	pCi/m <sup>3</sup>	.1 pCi/m <sup>3</sup>	2 pCi/m <sup>3</sup>
Plutonium-238, 239, 240	Air	aCi/m <sup>3</sup>	.1 aCi/m <sup>3</sup>	.015 pCi <sup>(b)</sup> per sample (c)
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Uranium-234, 235,238	Air	aCi/m <sup>3</sup>	.1 aCi/m <sup>3</sup>	.015 pCi <sup>(b)</sup> per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Radium-226	Water	pCi/l	.1 pCi/l	.1 pCi/l



<u>Radionuclide</u>	<u>Media</u>	<u>Reporting Units</u>	<u>Reporting Increments</u>	<u>Minimum Detectable Levels</u>
Strontium-90	Milk	pCi/l	.1 pCi/l	1 pCi/l
	Water	pCi/l	.1 pCi/l	1 pCi/l
Strontium-89	Milk	pCi/l	1 pCi/l	5 pCi/l <sup>(d)</sup>
Iodine-131	Milk	pCi/l	1 pCi/l	10 pCi/l <sup>(d)</sup>
	Water	pCi/l	1 pCi/l	10 pCi/l <sup>(d)</sup>
	Water (specific radiochemical analysis)	pCi/l	.1 pCi/l	.4 pCi/l <sup>(d)</sup>
Iodine-129	Milk	fCi/l	.1 fCi/l	.4 fCi/l
Cesium-137	Milk	pCi/l	1 pCi/l	10 pCi/l
	Water	pCi/l	1 pCi/l	10 pCi/l
Barium-140	Milk	pCi/l	1 pCi/l	10 pCi/l <sup>(d)</sup>
	Water	pCi/l	1 pCi/l	10 pCi/l <sup>(d)</sup>
Potassium	Milk	g/l	.1 g/l	.12 g/l
	Water	g/l	.1 g/l	.12 g/l
Potassium-40	Water	pCi/l	1 pCi/l	100 pCi/l

- (a) The value in terms of nCi/m<sup>2</sup><sub>3</sub> would be dependent on precipitation (mm).  
(b) This value in terms of pCi/m<sup>3</sup> would be dependent on the air volume.  
(c) Measurement by alpha spectroscopy which includes contributions of plutonium-239 and plutonium-240.  
(d) Activity as of the day of counting.

ENVIRONMENTAL RADIATION  
AMBIENT MONITORING SYSTEM (ERAMS)

SECTION I. Air Program

Airborne Particulates and Precipitation

Gross beta radioactivity measurements and certain specific analyses are performed on air particulates and precipitation samples as indicator measurements in assessing the general (national) impact of all contributing sources on environmental levels of radiation.

Airborne particulates are collected continuously at field stations representing wide geographic coverage, including present and potential sources of environmental radioactivity. Sampling sites are located throughout the United States.

Filters ( 10-cm diameter synthetic fiber ) from air samplers are changed twice weekly and field measurements are made with a G-M survey meter \* at 5 hours and 29 hours after collection to allow for radon and thoron daughter product decay. Field estimates are reported to appropriate EPA officials by telephone or mail depending on the activity levels found.

The filters are sent to EERF for more sensitive analyses in a low background beta counter. Gamma scans are performed on all filters showing gross beta counts greater than 1 pCi/m<sup>3</sup>. The laboratory obtained values are usually lower than the field estimates due to the decay of naturally occurring radionuclides between the times of the two measurements.

Precipitation samples are collected at these field stations collecting air filters. These samples are also sent to EERF where they are composited monthly for gamma scans, tritium, and gross beta activity measurements. Plutonium-238, -239, -240, and uranium-234, -235, and -238 analyses are performed on the March-April-May composite samples.

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\* The counts at five hours for the Montgomery, Alabama station are performed on a low background beta counter.

Tables 2 - 4 contain the data in airborne particulate samples for April - June 1987.

Tables 5 - 7 contain the data in precipitation samples for April - June 1987.

Data for the tritium in precipitation samples for April - June 1987 at the selected stations are shown in Table 8.

A compilation of individual measurements is available from the EPA, EERF, Montgomery, AL 36109.

TABLE 2  
 AIRBORNE PARTICULATES  
 GROSS BETA CONCENTRATION  
 APRIL 1987

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m <sup>3</sup> )			(pCi/m <sup>3</sup> )		
AL:ASHFORD	5	0.0	0.0	0.0	0.08	0.01	0.02
AL:MONTGOMERY	8	1.0	0.1	0.5	0.01	0.01	0.01
AR:LITTLE ROCK	8	1.1	0.0	0.4	0.02	0.01	0.02
AZ:PHOENIX	9	2.2	0.5	1.2	0.08	0.01	0.02
CA:BERKELEY	8	0.0	0.0	0.0	0.01	0.00	0.01
CA:LOS ANGELES	8	0.4	0.1	0.3	0.02	0.01	0.01
CO:DENVER	9	0.7	0.3	0.5	0.02	0.01	0.01
CT:HARTFORD	9	0.1	0.0	0.1	0.01	0.00	0.01
DE:WILMINGTON	9	0.1	0.0	0.1	0.01	0.00	0.01
FL:JACKSONVILLE	7	0.2	0.0	0.1	0.01	0.01	0.01
FL:MIAMI	8	0.1	0.0	0.0	0.01	0.01	0.01
GA:ATLANTA	4	0.0	0.0	0.0	0.01	0.01	0.01
HI:HONOLULU	8	0.3	0.2	0.2	0.01	0.00	0.00
IA:IOWA CITY	9	0.9	0.4	0.6	0.03	0.00	0.01
ID:BOISE	9	0.3	0.0	0.2	0.02	0.01	0.01
ID:IDAHO FALLS	5	0.0	0.0	0.0	0.02	0.01	0.01
IL:CHICAGO	8	0.7	0.0	0.2	0.02	0.01	0.02
IN:INDIANAPOLIS	4	0.6	0.0	0.2	0.01	0.01	0.01
KS:TOPEKA	9	1.9	0.5	1.1	0.02	0.01	0.01
KY:FRANKFORT	5	0.9	0.1	0.5	0.01	0.01	0.01
LA:NEW ORLEANS	3	0.1	0.0	0.1	0.02	0.01	0.01
MA:LAWRENCE	8	0.2	0.0	0.1	0.01	0.00	0.01
ME:AUGUSTA	7	0.2	0.1	0.1	0.01	0.00	0.01
MI:LANSING	9	0.2	0.0	0.1	0.02	0.01	0.01
MN:MINNEAPOLIS	8	1.1	0.1	0.5	0.03	0.01	0.02
MO:JEFFERSON CITY	8	0.9	0.2	0.6	0.06	0.01	0.02
MS:JACKSON	7	0.3	0.0	0.2	0.03	0.01	0.01
NC:CHARLOTTE	8	0.2	0.1	0.1	0.02	0.00	0.01
NC:WILMINGTON	6	0.4	0.4	0.4	0.01	0.01	0.01
ND:BISMARCK	7	1.0	0.0	0.5	0.04	0.01	0.02
NE:LINCOLN	9	2.7	0.5	1.7	0.08	0.01	0.02
NH:CONCORD	8	0.1	0.0	0.1	0.04	0.00	0.01
NJ:TRENTON	9	0.3	0.0	0.2	0.01	0.00	0.01
NM:SANTA FE	7	0.5	0.2	0.3	0.01	0.00	0.01
NV:LAS VEGAS	9	0.3	0.1	0.2	0.05	0.01	0.02
NY:ALBANY	4	0.0	0.0	0.0	0.01	0.01	0.01
NY:NEW YORK CITY	8	0.2	0.0	0.1	0.01	0.00	0.01
NY:NIAGARA FALLS	8	0.2	0.1	0.2	0.01	0.01	0.01
NY:SYRACUSE	6	0.2	0.1	0.1	0.01	0.00	0.01

TABLE 2 (CONTINUED)

AIRBORNE PARTICULATES  
GROSS BETA CONCENTRATION  
APRIL 1987

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m <sup>3</sup> )			(pCi/m <sup>3</sup> )		
NY:YAPHANK	5	0.1	0.0	0.0	0.01	0.00	0.00
OH:COLUMBUS	7	0.3	0.0	0.1	0.01	0.01	0.01
OH:PAINESVILLE	8	0.3	0.1	0.2	0.01	0.01	0.01
OH:TOLEDO	9	0.3	0.0	0.2	0.03	0.01	0.01
OK:OKLAHOMA CITY	8	0.9	0.3	0.5	0.02	0.01	0.01
OR:PORTLAND	6	0.1	0.0	0.1	0.02	0.00	0.00
PA:GOLDSBORO	9	0.3	0.0	0.2	0.01	0.00	0.01
PA:HARRISBURG	9	0.2	0.1	0.1	0.01	0.00	0.01
PA:PHILADELPHIA	7	0.2	0.0	0.1	0.01	0.00	0.01
PA:PITTSBURGH	8	0.1	0.1	0.1	0.02	0.00	0.01
PA:THREE MILE ISL	9	0.4	0.0	0.2	0.01	0.00	0.01
RI:PROVIDENCE	7	0.1	0.0	0.1	0.01	0.00	0.01
SC:BARNWELL	1	0.0	0.0	0.0	0.01	0.01	0.01
SC:COLUMBIA	8	0.5	0.1	0.2	0.03	0.01	0.02
SD:PIERRE	7	0.7	0.1	0.4	0.03	0.01	0.01
TN:KNOXVILLE	9	0.5	0.1	0.2	0.02	0.01	0.01
TN:NASHVILLE	7	1.0	0.1	0.4	0.03	0.01	0.02
TX:AUSTIN	8	0.3	0.1	0.2	0.01	0.01	0.01
TX:EL PASO	9	1.0	0.2	0.5	0.02	0.01	0.01
VA:LYNCHBURG	9	0.6	0.1	0.3	0.01	0.00	0.01
WA:OLYMPIA	8	0.2	0.0	0.1	0.01	0.00	0.00
WA:SPOKANE	9	0.6	0.2	0.3	0.03	0.00	0.01
WI:MADISON	8	0.6	0.1	0.3	0.01	0.00	0.01
WV:CHARLESTON	8	0.6	0.0	0.2	0.01	0.01	0.01
WY:CHEYENNE	2	0.4	0.1	0.3	0.02	0.01	0.01

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m<sup>3</sup>  
 MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m<sup>3</sup>

TABLE 3

AIRBORNE PARTICULATES  
GROSS BETA CONCENTRATION  
MAY 1987

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m <sup>3</sup> )			(pCi/m <sup>3</sup> )		
AL:ASHFORD	4	0.0	0.0	0.0	0.08	0.01	0.03
AL:MONTGOMERY	13	1.3	0.5	0.8	0.04	0.01	0.02
AR:LITTLE ROCK	8	0.9	0.2	0.5	0.08	0.01	0.02
AZ:PHOENIX	8	1.4	0.2	0.7	0.09	0.01	0.03
CA:BERKELEY	9	0.0	0.0	0.0	0.01	0.00	0.01
CA:LOS ANGELES	9	0.3	0.0	0.1	0.02	0.01	0.01
CO:DENVER	8	0.9	0.2	0.5	0.02	0.00	0.01
CT:HARTFORD	8	0.2	0.0	0.1	0.01	0.00	0.01
DE:WILMINGTON	7	0.2	0.0	0.1	0.01	0.00	0.01
FL:JACKSONVILLE	8	0.1	0.0	0.1	0.02	0.01	0.01
FL:MIAMI	9	0.1	0.0	0.0	0.01	0.01	0.01
GA:ATLANTA	3	0.0	0.0	0.0	0.02	0.01	0.01
HI:HONOLULU	8	0.4	0.1	0.3	0.01	0.00	0.00
IA:IOWA CITY	8	1.1	0.2	0.7	0.02	0.01	0.01
ID:BOISE	7	0.4	0.1	0.2	0.02	0.00	0.01
ID:IDAHO FALLS	9	0.0	0.0	0.0	0.04	0.01	0.02
IL:CHICAGO	7	0.9	0.0	0.4	0.02	0.01	0.01
IN:INDIANAPOLIS	8	0.6	0.1	0.4	0.02	0.01	0.01
KS:TOPEKA	8	2.0	0.5	1.2	0.03	0.01	0.02
KY:FRANKFORT	7	1.4	0.3	1.0	0.03	0.01	0.02
LA:NEW ORLEANS	3	0.1	0.0	0.0	0.02	0.01	0.01
MA:LAWRENCE	9	0.2	0.0	0.1	0.01	0.00	0.01
ME:AUGUSTA	9	0.1	0.0	0.1	0.01	0.00	0.01
MI:LANSING	8	0.4	0.2	0.3	0.03	0.01	0.01
MN:MINNEAPOLIS	9	0.4	0.2	0.3	0.03	0.01	0.01
MO:JEFFERSON CITY	9	1.9	0.2	0.7	0.04	0.01	0.02
MS:JACKSON	8	0.5	0.1	0.2	0.18	0.01	0.03
NC:CHARLOTTE	9	0.3	0.1	0.2	0.02	0.01	0.01
NC:WILMINGTON	6	0.0	0.0	0.0	0.02	0.01	0.01
ND:BISMARCK	9	1.5	0.3	0.8	0.04	0.01	0.02
NE:LINCOLN	7	2.5	0.0	1.5	0.04	0.01	0.02
NH:CONCORD	9	0.1	0.1	0.1	0.01	0.00	0.01
NJ:TRENTON	8	0.6	0.0	0.3	0.01	0.00	0.01
NM:SANTA FE	6	0.5	0.1	0.3	0.01	0.01	0.01
NV:LAS VEGAS	8	0.3	0.1	0.2	0.05	0.01	0.02
NY:ALBANY	4	0.1	0.0	0.1	0.01	0.01	0.01
NY:NEW YORK CITY	9	0.6	0.1	0.2	0.02	0.01	0.01
NY:NIAGARA FALLS	9	0.7	0.1	0.3	0.02	0.00	0.01

TABLE 3 (CONTINUED)

AIRBORNE PARTICULATES  
GROSS BETA CONCENTRATION  
MAY 1987

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m <sup>3</sup> )			(pCi/m <sup>3</sup> )		
NY:SYRACUSE	2	0.1	0.0	0.1	0.01	0.01	0.01
NY:YAPHANK	8	0.3	0.0	0.1	0.01	0.00	0.01
OH:COLUMBUS	9	0.4	0.1	0.2	0.01	0.01	0.01
OH:PAINESVILLE	9	0.3	0.1	0.2	0.02	0.01	0.01
OH:TOLEDO	8	0.9	0.2	0.5	0.02	0.00	0.01
OK:OKLAHOMA CITY	6	0.8	0.2	0.5	0.02	0.01	0.01
OR:PORTLAND	4	0.0	0.0	0.0	0.01	0.00	0.01
PA:GOLDSBORO	7	0.9	0.0	0.5	0.02	0.00	0.01
PA:HARRISBURG	8	0.5	0.1	0.2	0.01	0.01	0.01
PA:MIDDLETOWN	1	0.0	0.0	0.0	0.01	0.01	0.01
PA:PHILADELPHIA	9	0.3	0.0	0.1	0.01	0.01	0.01
PA:PITTSBURGH	9	0.1	0.1	0.1	0.01	0.00	0.01
PA:THREE MILE ISL	8	1.2	0.0	0.4	0.02	0.00	0.01
RI:PROVIDENCE	9	0.2	0.1	0.1	0.01	0.01	0.01
SC:BARNWELL	1	0.0	0.0	0.0	0.01	0.01	0.01
SC:COLUMBIA	9	0.5	0.1	0.3	0.03	0.01	0.02
SD:PIERRE	7	0.6	0.1	0.4	0.02	0.01	0.01
TN:KNOXVILLE	8	0.5	0.1	0.4	0.02	0.01	0.01
TN:NASHVILLE	8	0.7	0.1	0.4	0.03	0.01	0.02
TX:AUSTIN	9	0.5	0.1	0.2	0.01	0.00	0.01
TX:EL PASO	8	1.0	0.3	0.5	0.02	0.01	0.02
VA:LYNCHBURG	8	0.6	0.2	0.4	0.01	0.00	0.01
WA:OLYMPIA	9	0.2	0.0	0.1	0.01	0.00	0.01
WA:SPOKANE	8	0.4	0.2	0.3	0.03	0.01	0.01
WI:MADISON	8	1.1	0.2	0.5	0.02	0.00	0.01
WV:CHARLESTON	8	0.2	0.2	0.2	0.02	0.01	0.01
MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES		-			.1	pCi/m <sup>3</sup>	
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT		-			.01	pCi/m <sup>3</sup>	

TABLE 4  
 AIRBORNE PARTICULATES  
 GROSS BETA CONCENTRATION  
 JUNE 1987

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m <sup>3</sup> )			(pCi/m <sup>3</sup> )		
AL:ASHFORD	4	0.0	0.0	0.0	0.01	0.00	0.00
AL:MONTGOMERY	9	2.6	0.1	1.1	0.02	0.01	0.01
AR:LITTLE ROCK	9	0.8	0.1	0.3	0.06	0.01	0.02
AZ:PHOENIX	7	1.4	0.2	0.8	0.03	0.01	0.02
CA:BERKELEY	9	0.0	0.0	0.0	0.01	0.00	0.00
CA:LOS ANGELES	9	0.1	0.0	0.1	0.01	0.01	0.01
CO:DENVER	9	1.7	0.2	0.6	0.01	0.01	0.01
CT:HARTFORD	9	0.2	0.0	0.1	0.01	0.00	0.01
DE:WILMINGTON	9	0.2	0.0	0.1	0.01	0.01	0.01
FL:JACKSONVILLE	8	0.1	0.0	0.1	0.01	0.00	0.01
FL:MIAMI	9	0.1	0.0	0.0	0.01	0.00	0.01
GA:ATLANTA	3	0.0	0.0	0.0	0.02	0.01	0.01
HI:HONOLULU	8	0.6	0.1	0.3	0.00	0.00	0.00
IA:IOWA CITY	9	1.7	0.0	0.6	0.02	0.01	0.01
ID:BOISE	9	0.4	0.1	0.2	0.02	0.01	0.01
ID:IDAHO FALLS	7	0.0	0.0	0.0	0.03	0.01	0.01
IL:CHICAGO	9	0.6	0.1	0.4	0.05	0.01	0.02
IN:INDIANAPOLIS	5	0.4	0.0	0.3	0.02	0.02	0.02
KS:TOPEKA	9	1.7	0.5	1.3	0.03	0.01	0.02
KY:FRANKFORT	8	1.7	0.4	1.0	0.03	0.01	0.02
LA:NEW ORLEANS	3	0.1	0.0	0.0	0.01	0.01	0.01
MA:LAWRENCE	9	0.2	0.0	0.1	0.01	0.00	0.01
ME:AUGUSTA	9	0.2	0.0	0.1	0.01	0.00	0.01
MI:LANSING	9	0.3	0.1	0.2	0.03	0.01	0.01
MN:MINNEAPOLIS	9	0.5	0.2	0.3	0.03	0.01	0.01
MO:JEFFERSON CITY	8	1.7	0.2	0.8	0.04	0.01	0.02
MS:JACKSON	9	0.5	0.0	0.2	0.04	0.01	0.02
NC:CHARLOTTE	9	0.3	0.2	0.2	0.02	0.00	0.01
NC:WILMINGTON	7	0.0	0.0	0.0	0.01	0.01	0.01
ND:BISMARCK	9	1.6	0.1	0.7	0.02	0.01	0.01
NE:LINCOLN	9	1.6	0.2	1.0	0.02	0.01	0.02
NH:CONCORD	9	0.2	0.0	0.1	0.02	0.00	0.01
NJ:TRENTON	9	0.7	0.3	0.4	0.01	0.01	0.01
NM:SANTA FE	6	0.4	0.2	0.3	0.01	0.01	0.01
NV:LAS VEGAS	9	0.3	0.1	0.2	0.06	0.01	0.02
NY:ALBANY	5	0.1	0.0	0.1	0.01	0.01	0.01
NY:NEW YORK CITY	7	0.4	0.1	0.2	0.01	0.01	0.01
NY:NIAGARA FALLS	9	0.6	0.2	0.3	0.02	0.01	0.01



TABLE 4 (CONTINUED)

AIRBORNE PARTICULATES  
GROSS BETA CONCENTRATION  
JUNE 1987

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m <sup>3</sup> )			(pCi/m <sup>3</sup> )		
NY:SYRACUSE	4	0.1	0.0	0.1	0.01	0.01	0.01
NY:YAPHANK	7	0.2	0.1	0.1	0.01	0.01	0.01
OH:COLUMBUS	9	0.6	0.1	0.2	0.01	0.01	0.01
OH:PAINESVILLE	7	0.3	0.1	0.2	0.02	0.01	0.01
OH:TOLEDO	9	0.3	0.1	0.2	0.02	0.01	0.01
OK:OKLAHOMA CITY	9	0.6	0.1	0.3	0.01	0.01	0.01
OR:PORTLAND	6	0.0	0.0	0.0	0.01	0.00	0.00
PA:GOLDSBORO	9	0.8	0.1	0.5	0.02	0.01	0.01
PA:HARRISBURG	9	0.5	0.1	0.3	0.02	0.01	0.01
PA:PHILADELPHIA	9	0.2	0.1	0.1	0.02	0.01	0.01
PA:PITTSBURGH	5	0.0	0.0	0.0	0.03	0.01	0.02
PA:THREE MILE ISL	8	0.8	0.3	0.6	0.02	0.01	0.01
RI:PROVIDENCE	8	0.2	0.1	0.2	0.03	0.01	0.01
SC:BARNWELL	2	0.0	0.0	0.0	0.01	0.01	0.01
SC:COLUMBIA	8	0.5	0.1	0.2	0.02	0.01	0.01
SD:PIERRE	5	0.5	0.2	0.3	0.01	0.00	0.01
TN:KNOXVILLE	7	0.6	0.1	0.3	0.02	0.01	0.01
TN:NASHVILLE	9	1.0	0.2	0.5	0.02	0.01	0.01
TX:AUSTIN	8	0.2	0.1	0.1	0.01	0.01	0.01
TX:EL PASO	9	0.8	0.1	0.4	0.02	0.01	0.01
VA:LYNCHBURG	9	0.7	0.3	0.5	0.01	0.01	0.01
WA:OLYMPIA	9	0.2	0.0	0.1	0.01	0.00	0.00
WA:SPOKANE	9	0.4	0.1	0.3	0.02	0.00	0.01
WI:MADISON	9	1.1	0.3	0.5	0.02	0.01	0.01
WV:CHARLESTON	9	0.4	0.1	0.2	0.02	0.01	0.01
WY:CHEYENNE	1	0.0	0.0	0.0	0.01	0.01	0.01
MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES		-			.1	pCi/m <sup>3</sup>	
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT		-			.01	pCi/m <sup>3</sup>	

TABLE 5

## GROSS BETA CONCENTRATION IN PRECIPITATION

LOCATION	DEPTH (mm)	APRIL 1987		SPECIFIC GAMMA ACT.
		ACT.	$\pm$ 2s (nCi/m <sup>2</sup> )	
AL:MONTGOMERY	21.0	0.02	0.01	ND
AR:LITTLE ROCK	18.0	0.04	0.01	ND
CT:HARTFORD	119.4	0.12	0.05	ND
DE:WILMINGTON	14.0	0.03	0.01	ND
FL:JACKSONVILLE	26.6	0.03	0.01	ND
FL:MIAMI	32.0	0.02	0.01	ND
IL:CHICAGO	87.3	0.09	0.04	ND
MA:LAWRENCE	119.4	0.21	0.06	ND
MI:LANSING	53.0	0.09	0.03	ND
MO:JEFFERSON CITY	15.6	0.02	0.01	ND
MS:JACKSON	35.0	0.04	0.01	ND
NC:CHARLOTTE	60.0	0.10	0.03	ND
NC:WILMINGTON	77.0	0.06	0.03	ND
ND:BISMARCK	2.2	0.03	0.01	ND
NH:CONCORD	45.0	0.03	0.02	ND
NJ:TRENTON	149.3	0.18	0.07	ND
NV:LAS VEGAS	4.4	0.02	0.01	ND
NY:ALBANY	88.0	0.13	0.04	ND
NY:NEW YORK CITY	44.0	0.02	0.02	ND
NY:NIAGARA FALLS	76.0	0.14	0.04	ND
NY:SYRACUSE	7.0	0.01	0.01	ND
NY:YAPHANK	94.0	0.12	0.05	ND
OH:COLUMBUS	27.0	0.03	0.01	ND
OH:PAINESVILLE	79.0	0.24	0.05	ND
OH:TOLEDO	62.0	0.03	0.03	ND
OK:OKLAHOMA CITY	12.0	0.02	0.01	ND
OR:PORTLAND	65.0	0.13	0.04	ND
PA:HARRISBURG	117.2	0.41	0.08	ND
PA:MIDDLETOWN	85.0	0.10	0.04	ND
PA:PHILADELPHIA	66.0	0.07	0.03	ND
RI:PROVIDENCE	74.0	0.10	0.03	ND
SD:PIERRE	56.8	0.04	0.02	ND
TN:KNOXVILLE	70.0	0.05	0.03	ND
TN:NASHVILLE	40.2	0.07	0.02	ND
VA:LYNCHBURG	33.4	0.06	0.03	ND
WA:OLYMPIA	70.2	0.08	0.03	ND
WI:MADISON	377.0	0.29	0.18	ND

s = SIGMA COUNTING ERROR

TABLE 6

## GROSS BETA CONCENTRATION IN PRECIPITATION

MAY 1987

LOCATION	DEPTH (mm)	ACT. $\pm$ 2s (nCi/m <sup>2</sup> )		SPECIFIC GAMMA ACT.
		ACT.	$\pm$ 2s	
AL:MONTGOMERY	55.0	0.15	0.03	ND
AR:LITTLE ROCK	73.0	0.17	0.04	ND
CA:BERKELEY	6.8	0.01	0.01	ND
CT:HARTFORD	32.0	0.10	0.02	ND
DE:WILMINGTON	59.0	0.28	0.04	ND
FL:JACKSONVILLE	58.6	0.06	0.03	ND
FL:MIAMI	53.0	0.04	0.02	ND
ID:BOISE	9.0	0.02	0.01	ND
ID:IDAHO FALLS	4.2	0.04	0.01	ND
IL:CHICAGO	132.9	0.11	0.06	ND
LA:NEW ORLEANS	83.0	0.12	0.04	ND
MA:LAWRENCE	38.6	0.03	0.02	ND
ME:AUGUSTA	19.0	0.06	0.01	ND
MI:LANSING	31.3	0.05	0.01	ND
MN:MINNEAPOLIS	44.6	0.13	0.03	ND
MO:JEFFERSON CITY	35.0	0.05	0.02	ND
MS:JACKSON	78.2	0.12	0.04	ND
NC:CHARLOTTE	42.0	0.14	0.03	ND
NC:WILMINGTON	27.0	0.06	0.02	ND
ND:BISMARCK	84.6	0.17	0.05	ND
NH:CONCORD	14.0	0.04	0.01	ND
NJ:TRENTON	45.3	0.13	0.03	ND
NM:SANTA FE	7.4	0.01	0.01	ND
NV:LAS VEGAS	7.0	0.01	0.01	ND
NY:ALBANY	31.2	0.10	0.02	ND
NY:NEW YORK CITY	28.2	0.04	0.01	ND
NY:NIAGARA FALLS	31.0	0.03	0.01	ND
NY:SYRACUSE	16.0	0.02	0.01	ND
NY:YAPHANK	64.0	0.25	0.04	ND
OH:COLUMBUS	41.0	0.13	0.03	ND
OH:PAINESVILLE	66.0	0.12	0.04	ND
OH:TOLEDO	32.0	0.02	0.01	ND
OK:OKLAHOMA CITY	40.0	0.00	0.01	ND
OR:PORTLAND	14.6	0.01	0.01	ND
PA:HARRISBURG	63.6	0.14	0.03	ND
PA:MIDDLETOWN	94.0	0.17	0.05	ND
PA:PHILADELPHIA	83.0	0.27	0.05	ND
PA:PITTSBURGH	33.2	0.16	0.02	ND
RI:PROVIDENCE	67.0	0.08	0.03	ND
SC:BARNWELL	5.0	0.01	0.01	ND
SC:COLUMBIA	39.6	0.14	0.02	ND

TABLE 6 (CONTINUED)

## GROSS BETA CONCENTRATION IN PRECIPITATION

LOCATION	MAY 1987			SPECIFIC GAMMA ACT.
	DEPTH	ACT.	$\pm 2s$	
	(mm)	(nCi/m <sup>2</sup> )		
SD:PIERRE	37.4	0.03	0.02	ND
TN:KNOXVILLE	70.0	0.09	0.03	ND
TN:NASHVILLE	12.6	0.02	0.01	ND
TX:AUSTIN	36.0	0.22	0.03	ND
VA:LYNCHBURG	139.0	0.10	0.06	ND
WA:OLYMPIA	41.4	0.04	0.02	ND
WI:MADISON	120.2	0.09	0.05	ND
WV:CHARLESTON	60.0	0.23	0.04	ND

s = SIGMA COUNTING ERROR

TABLE 7

## GROSS BETA CONCENTRATION IN PRECIPITATION

LOCATION	DEPTH (mm)	JUNE 1987		SPECIFIC GAMMA ACT.
		ACT.	$\pm$ 2s (nCi/m <sup>2</sup> )	
AL:MONTGOMERY	107.0	0.04	0.04	ND
AR:LITTLE ROCK	67.0	0.12	0.03	ND
CO:DENVER	43.6	0.17	0.03	ND
CT:HARTFORD	60.0	0.23	0.04	ND
DE:WILMINGTON	86.2	0.21	0.05	ND
FL:JACKSONVILLE	85.0	0.04	0.04	ND
FL:MIAMI	69.0	0.07	0.03	ND
ID:BOISE	7.8	0.02	0.01	ND
ID:IDAHO FALLS	38.2	0.07	0.02	ND
IL:CHICAGO	147.6	0.13	0.07	ND
LA:NEW ORLEANS	43.0	0.04	0.02	ND
MA:LAWRENCE	38.0	0.13	0.02	ND
ME:AUGUSTA	96.0	0.17	0.05	ND
MI:LANSING	63.2	0.13	0.04	ND
MN:MINNEAPOLIS	56.0	0.15	0.03	ND
MO:JEFFERSON CITY	16.0	0.03	0.01	ND
NC:CHARLOTTE	93.0	0.30	0.06	ND
NC:WILMINGTON	75.0	0.24	0.05	ND
ND:BISMARCK	48.4	0.10	0.03	ND
NH:CONCORD	133.4	0.38	0.08	ND
NJ:TRENTON	74.2	0.23	0.04	ND
NV:LAS VEGAS	3.6	0.01	0.01	ND
NY:ALBANY	99.2	0.41	0.07	ND
NY:NEW YORK CITY	33.3	0.06	0.02	ND
NY:NIAGARA FALLS	90.0	0.19	0.05	ND
NY:SYRACUSE	68.0	0.05	0.03	ND
OH:COLUMBUS	86.0	0.16	0.04	ND
OH:PAINESVILLE	117.0	0.34	0.07	ND
OH:TOLEDO	80.0	0.09	0.04	ND
OK:OKLAHOMA CITY	111.0	0.16	0.05	ND
OR:PORTLAND	22.2	0.03	0.01	ND
PA:HARRISBURG	39.4	0.74	0.05	ND
PA:MIDDLETOWN	74.0	0.14	0.04	ND
PA:PHILADELPHIA	96.0	0.11	0.04	ND
PA:PITTSBURGH	95.6	0.38	0.06	ND
RI:PROVIDENCE	26.0	0.15	0.02	ND
SC:BARNWELL	86.4	0.09	0.04	ND
SC:COLUMBIA	182.0	0.53	0.13	ND
TN:KNOXVILLE	96.0	0.17	0.05	ND
TN:NASHVILLE	67.2	0.03	0.03	ND
TX:AUSTIN	40.0	0.05	0.02	ND
TX:EL PASO	74.4	0.05	0.03	ND
VA:LYNCHBURG	51.6	0.56	0.05	ND
WA:OLYMPIA	56.0	0.09	0.03	ND
WI:MADISON	12.0	0.02	0.01	ND
WV:CHARLESTON	51.0	0.12	0.03	ND

s = SIGMA COUNTING ERROR

TABLE 8  
PRECIPITATION  
TRITIUM CONCENTRATION

APRIL - JUNE 1987

LOCATION	APRIL		MAY		JUNE	
	nCi/l	$\pm 2s$	nCi/l	$\pm 2s$	nCi/l	$\pm 2s$
AL:MONTGOMERY	0.2	0.2	0.1	0.2	0.1	0.2
AR:LITTLE ROCK	0.2	0.2	0.2	0.2	0.2	0.2
CA:BERKELEY	NS		0.2	0.2	NS	
CO:DENVER	NS		NS		0.1	0.2
CT:HARTFORD	0.1	0.2	0.1	0.2	0.1	0.2
DE:WILMINGTON	0.1	0.2	0.2	0.2	0.1	0.2
FL:JACKSONVILLE	0.1	0.2	0.2	0.2	0.2	0.2
FL:MIAMI	0.1	0.2	0.1	0.2	0.2	0.2
ID:BOISE	NS		0.3	0.2	0.1	0.2
ID:IDAHO FALLS	NS		0.2	0.2	0.3	0.2
IL:CHICAGO	0.2	0.2	0.2	0.2	0.2	0.2
LA:NEW ORLEANS	NS		0.1	0.2	0.1	0.2
MA:LAWRENCE	0.2	0.2	0.2	0.2	0.1	0.2
ME:AUGUSTA	NS		0.2	0.2	0.2	0.2
MI:LANSING	NS		0.3	0.2	0.1	0.2
MN:MINNEAPOLIS	NS		0.1	0.2	0.2	0.2
MO:JEFFERSON CITY	0.3	0.2	0.1	0.2	0.1	0.2
MS:JACKSON	0.2	0.2	0.1	0.2	NS	
NC:CHARLOTTE	0.2	0.2	0.4	0.2	0.2	0.2
NC:WILMINGTON	0.2	0.2	0.2	0.2	0.1	0.2
ND:BISMARCK	0.2	0.2	0.1	0.2	0.3	0.2
NH:CONCORD	0.2	0.2	0.1	0.2	0.2	0.2
NJ:TRENTON	0.2	0.2	0.2	0.2	0.1	0.2
NM:SANTA FE	NS		0.2	0.2	NS	
NV:LAS VEGAS	0.1	0.2	0.2	0.2	0.2	0.2
NY:ALBANY	0.2	0.2	0.2	0.2	0.2	0.2
NY:NEW YORK CITY	0.2	0.2	0.1	0.2	0.2	0.2
NY:NIAGARA FALLS	0.2	0.2	0.1	0.2	0.1	0.2
NY:SYRACUSE	0.1	0.2	0.2	0.2	0.1	0.2
NY:YAPHANK	0.2	0.2	NS		NS	
OH:COLUMBUS	0.2	0.2	0.1	0.2	0.1	0.2
OH:PAINESVILLE	0.2	0.2	0.2	0.2	0.1	0.2
OH:TOLEDO	0.2	0.2	0.2	0.2	0.1	0.2
OK:OKLAHOMA CITY	0.1	0.2	0.1	0.2	0.1	0.2
OR:PORTLAND	0.1	0.2	0.2	0.2	0.2	0.2
PA:HARRISBURG	0.4	0.2	0.2	0.2	0.2	0.2
PA:MIDDLETOWN	0.1	0.2	0.2	0.2	0.1	0.2
PA:PHILADELPHIA	0.2	0.2	0.2	0.2	0.2	0.2
PA:PITTSBURGH	NS		0.2	0.2	0.3	0.2

TABLE 8 (CONTINUED)  
 PRECIPITATION  
 TRITIUM CONCENTRATION  
 APRIL - JUNE 1987

LOCATION	APRIL		MAY		JUNE	
	nCi/l $\pm$ 2s		nCi/l $\pm$ 2s		nCi/l $\pm$ 2s	
RI:PROVIDENCE	0.1	0.2	0.2	0.2	0.2	0.2
SC:BARNWELL	NS		0.4	0.2	0.4	0.2
SC:COLUMBIA	NS		0.2	0.2	0.8	0.2
SD:PIERRE	0.2	0.2	0.1	0.2	NS	
TN:KNOXVILLE	0.2	0.2	0.2	0.2	0.2	0.2
TN:NASHVILLE	0.1	0.2	0.2	0.2	0.2	0.2
TX:AUSTIN	NS		0.2	0.2	0.1	0.2
TX:EL PASO	NS		NS		0.1	0.2
VA:LYNCHBURG	0.1	0.2	0.3	0.2	0.2	0.2
WA:OLYMPIA	NS		0.2	0.2	0.2	0.2
WI:MADISON	0.1	0.2	0.1	0.2	0.1	0.2
WV:CHARLESTON	0.2	0.2	0.1	0.2	0.1	0.2

NS = NO SAMPLE  
 s = SIGMA COUNTING ERROR

## Plutonium and Uranium in Airborne Particulates and Precipitation

Environmental radiation levels of plutonium and uranium are determined by the analysis of semi-annually composited samples (air filters) collected from the continuously operating airborne particulate samplers.

Concentration of the specific isotopes of plutonium-238, -239, -240, and uranium-234, -235, and -238 are determined by alpha spectroscopy following chemical separation. The volume of air represented by the semi-annual composite ranges from 25,000 to 40,000 cubic meters.

The most recent results for plutonium and uranium (July-December 1986) were published in Environmental Radiation Data: Report 48.



## Krypton-85

Krypton-85 is a long-lived noble gas with a half life of 10.8 years. It is released into the atmosphere by nuclear reactor operations, fuel reprocessing, weapons tests, and research and defense related activities. Krypton-85 also occurs naturally in minor quantities primarily from the neutron capture of stable krypton-84 as well as spontaneous fission and neutron-induced fission of uranium. Monitoring of krypton-85 in the atmosphere has been conducted to identify and establish baseline levels and long-term trends.

Krypton-85 analysis began in January 1973 with sample collections and analyses being performed for 12 sampling locations. These locations were selected to provide atmospheric coverage of the United States with considerations being given to the proximity to fuel reprocessing plants, nuclear reactors, and wide geographic coverage.

Dry compressed air samples, collected at each location, are purchased from commercial air suppliers annually and shipped to the EERF where the krypton-85 is cryogenically separated and counted in a liquid scintillation system.

The last Kr-85 results were for 1976, 1977, and 1979. They were published in Environmental Radiation Data: Report 30.

## ERAMS

## SECTION II. Water Program

The ERAMS water program provides data on ambient radiation levels in the nation's rivers, streams and drinking water supplies.

Surface Water

Quarterly grab samples are taken downstream from operating or future nuclear facilities at 58 stations.

Surface water samples are analyzed for tritium quarterly and specific gamma activity annually. Tritium is a primary radioactive pollutant from nuclear power plants and weapons production activities.

Tritium concentrations are determined by liquid scintillation counting of distilled samples. Gamma scans are performed annually to determine levels of gamma emitting radionuclides.

Tritium concentrations for April - June 1987 are shown in Table 9.

TABLE 9

SURFACE WATER  
TRITIUM CONCENTRATION

APRIL - JUNE 1987

LOCATION	SOURCE	DATE COLLECTED	nCi/l	+ 2s
AL:DECATUR	TENNESSEE RIVER	4/ 1/87	0.2	0.2
AL:DO THAN	CHATTAHOOCHEE RIVER	4/ 9/87	0.2	0.2
AL:SCOTTSBORO	TENNESSEE RIVER	4/ 3/87	0.3	0.2
AR:LITTLE ROCK	ARKANSAS RIVER	4/ 1/87	0.2	0.2
CA:DIABLO CANYON	PACIFIC OCEAN	4/15/87	0.1	0.2
CA:EUREKA	HUMBOLDT BAY	4/ 9/87	0.2	0.2
CA:SAN ONOFRE	PACIFIC OCEAN	6/ 8/87	0.1	0.2
CO:PLATTEVILLE	SOUTH PLATTE RIVER	4/13/87	0.1	0.2
CT:EAST HADDAM	CONNECTICUT RIVER	5/15/87	0.2	0.2
CT:WATERFORD	LONG ISLAND SOUND	5/15/87	0.1	0.2
FL:CRYSTAL RIVER	GULF OF MEXICO	4/ 6/87	0.1	0.2
FL:FT. PIERCE	ATLANTIC OCEAN	4/ 7/87	0.1	0.2
FL:HOMESTEAD	BISCAYNE BAY	4/ 7/87	0.1	0.2
FL:HOMESTEAD	BISCAYNE BAY	5/18/87	0.1	0.2
IA:CEDAR RAPIDS	CEDAR RIVER	5/ 5/87	0.1	0.2
ID:BUHL	SNAKE RIVER	5/ 6/87	0.2	0.2
IL:MORRIS	ILLINOIS RIVER	4/25/87	0.1	0.2
KS:LE ROY	NEOSHO RIVER	6/30/87	0.2	0.2
LA:NEW ORLEANS	MISSISSIPPI RIVER	4/ 8/87	0.1	0.2
MA:PLYMOUTH	CAPE COD BAY	4/ 6/87	0.1	0.2
MD:CONOWINGO	SUSQUEHANNA RIVER	4/14/87	0.2	0.2
MD:LUSBY	CHESAPEAKE BAY	4/15/87	0.3	0.2
ME:WISCASSET	MONTSEWAY BAY	4/ 7/87	0.2	0.2
MI:BRIDGMAN	LAKE MICHIGAN	4/ 7/87	0.2	0.2
MI:CHARLEVOIX	LAKE MICHIGAN	4/ 3/87	0.2	0.2
MI:MONROE	LAKE ERIE	4/ 6/87	0.2	0.2
MI:SOUTH HAVEN	LAKE ERIE	4/ 6/87	0.2	0.2
MN:MONTICELLO	MISSISSIPPI RIVER	4/ 6/87	0.1	0.2
MN:RED WING	MISSISSIPPI RIVER	4/ 7/87	0.1	0.2
MS:PORT GIBSON	MISSISSIPPI RIVER	4/ 9/87	0.2	0.2
NC:CHARLOTTE	CATAWBA RIVER	4/ 1/87	0.3	0.2
NC:SOUTHPORT	ATLANTIC OCEAN	4/ 9/87	0.2	0.2
NJ:BAYSIDE	DELAWARE RIVER	4/13/87	0.1	0.2
NJ:OYSTER CREEK	OYSTER CREEK	4/23/87	0.2	0.2
NV:BOULDER CITY	COLORADO RIVER	4/30/87	0.2	0.2
NY:CHELSEA	HUDSON RIVER	4/ 1/87	0.1	0.2
OH:TOLEDO	LAKE ERIE	4/ 1/87	0.2	0.2
OR:BRADWOOD	COLUMBIA RIVER	4/29/87	0.2	0.2
PA:DANVILLE	SUSQUEHANNA RIVER	4/22/87	0.1	0.2
SC:ALLENDALE	SAVANNAH RIVER	4/30/87	2.1	0.2
SC:BROAD RIVER	BROAD RIVER	4/ 9/87	0.2	0.2

TABLE 9 (CONTINUED)

SURFACE WATER  
TRITIUM CONCENTRATION

APRIL - JUNE 1987

LOCATION	SOURCE	DATE COLLECTED	nCi/l	+ - 2s
SC:HARTSVILLE	LAKE ROBINSON	4/ 6/87	0.6	0.2
TN:DAISY	TENNESSEE RIVER	4/16/87	0.2	0.2
TN:KINGSTON	CLINCH RIVER	4/14/87	5.5	0.3
TN:OAK RIDGE	CLINCH RIVER	5/15/87	2.0	0.2
TX:EL PASO	RIO GRANDE	4/29/87	0.1	0.2
TX:MATAGORDA	COLORADO RIVER	4/22/87	0.2	0.2
VA:DOSWELL	NORTH ANNA RIVER	4/ 9/87	5.0	0.3
VA:NEWPORT NEWS	JAMES RIVER	4/ 9/87	0.2	0.2
WA:NORTHPORT	COLUMBIA RIVER	5/20/87	0.1	0.2
WA:RICHLAND	COLUMBIA RIVER	4/21/87	0.3	0.2
WI:TWO CREEKS	LAKE MICHIGAN	4/27/87	0.2	0.2
WI:VICTORY	MISSISSIPPI RIVER	4/13/87	0.3	0.2
WV:WHEELING	OHIO RIVER	6/ 5/87	0.2	0.2

s = SIGMA COUNTING ERROR

## Drinking Water

This program monitors ambient radiation levels in drinking water at 78 sites. These data serve to assess trends and anomalies in concentrations, and to compare with standards set forth in the EPA "National Interim Primary Drinking Water Regulations." These regulations provide for approval of supplies when the combined radium-226 and radium-228 levels do not exceed 5 pCi/l, when the gross alpha (excluding radon and uranium) levels do not exceed 15 pCi/l, when tritium levels do not exceed 20,000 pCi/l, when the strontium-90 levels do not exceed 8 pCi/l, and when the gross beta levels do not exceed 50 pCi/l.

Grab samples are taken at the 78 sites which are either major population centers or selected nuclear facility environs.

The analyses include (a) tritium on a quarterly basis; (b) gross alpha, gross beta, strontium-90, and gamma on annual composites; (c) radium-226 if the gross alpha exceeds 2 pCi/l and radium-228 if the radium-226 falls between 3 and 5 pCi/l; (d) specific iodine-131 on one quarterly sample per year for each station; and (e) an annual composite for plutonium-238, -239, -240 and uranium-234, -235, and -238 for stations that demonstrate gross alpha levels greater than 2 pCi/l.

Tritium analyses are performed by scintillation counting of the distilled samples. Gross beta and alpha are determined by evaporating an aliquot on a stainless steel planchet for counting. Radium-226 is determined by the standard emanation technique. Strontium-90 is determined by beta counting a strontium carbonate precipitate isolated by ion exchange.

The results of tritium in drinking water analyses for April - June 1987 are shown in Table 10.

TABLE 10  
 DRINKING WATER  
 TRITIUM CONCENTRATION  
 APRIL - JUNE 1987

LOCATION	DATE COLLECTED	nCi/l	<u>±</u>	2s
AK:FAIRBANKS	4/15/87	0.2		0.2
AL:DOTHAN	4/ 8/87	0.1		0.2
AL:MONTGOMERY	6/ 2/87	0.1		0.2
AL:MUSCLE SHOALS	4/ 1/87	0.3		0.2
AL:SCOTTSBORO	4/ 3/87	0.2		0.2
AR:LITTLE ROCK	4/ 1/87	0.2		0.2
CA:BERKELEY	4/13/87	0.2		0.2
CA:LOS ANGELES	4/ 7/87	0.2		0.2
CO:DENVER	4/ 8/87	0.2		0.2
CO:PLATTEVILLE	4/13/87	0.2		0.2
CT:HARTFORD	4/ 1/87	0.1		0.2
DE:DOVER	4/ 1/87	0.1		0.2
FL:MIAMI	4/ 1/87	0.1		0.2
FL:TAMPA	4/ 8/87	0.1		0.2
GA:SAVANNAH	4/14/87	1.1		0.2
HI:HONOLULU	4/23/87	0.1		0.2
IA:CEDAR RAPIDS	5/ 5/87	0.2		0.2
ID:IDAHO FALLS	5/ 6/87	0.2		0.2
IL:MORRIS	4/16/87	0.1		0.2
IL:W. CHICAGO	3/30/87	0.2		0.2
KS:TOPEKA	4/ 1/87	0.1		0.2
LA:NEW ORLEANS	4/ 2/87	0.3		0.2
MA:LAWRENCE	4/ 8/87	0.2		0.2
MD:BALTIMORE	5/15/87	0.2		0.2
MD:CONOWINGO	4/14/87	0.2		0.2
ME:AUGUSTA	4/ 8/87	0.2		0.2
MI:DETROIT	4/ 7/87	0.2		0.2
MI:GRAND RAPIDS	4/ 8/87	0.2		0.2
MN:MINNEAPOLIS	4/ 3/87	0.2		0.2
MN:RED WING	4/ 7/87	0.2		0.2
MS:JACKSON	4/10/87	0.1		0.2
MS:PORT GIBSON	4/ 9/87	0.1		0.2
MT:HELENA	4/ 7/87	0.1		0.2
NC:CHARLOTTE	4/ 1/87	0.3		0.2
NC:WILMINGTON	4/ 9/87	0.2		0.2
ND:BISMARCK	4/ 1/87	0.1		0.2
NE:LINCOLN	4/14/87	0.2		0.2
NH:CONCORD	4/ 1/87	0.1		0.2
NJ:TRENTON	5/28/87	0.1		0.2
NJ:WARETOWN	4/23/87	0.1		0.2
NM:SANTA FE	4/ 6/87	0.1		0.2

TABLE 10 (CONTINUED)

DRINKING WATER  
TRITIUM CONCENTRATION

APRIL - JUNE 1987

LOCATION	DATE COLLECTED	nCi/l	<u>+</u>	2s
NV:LAS VEGAS	4/ 8/87	0.2		0.2
NY:ALBANY	4/ 1/87	0.1		0.2
NY:NEW YORK CITY	4/ 9/87	0.1		0.2
NY:NIAGARA FALLS	4/ 2/87	0.1		0.2
NY:SYRACUSE	3/30/87	0.3		0.2
OH:CINCINNATI	5/ 7/87	0.1		0.2
OH:COLUMBUS	3/31/87	0.3		0.2
OH:EAST LIVERPOOL	6/10/87	0.2		0.2
OH:PAINESVILLE	4/ 3/87	0.2		0.2
OH:TOLEDO	4/ 1/87	0.3		0.2
OK:OKLAHOMA CITY	4/ 3/87	0.2		0.2
OR:PORTLAND	4/ 8/87	0.1		0.2
PA:COLUMBIA	4/ 9/87	0.2		0.2
PA:HARRISBURG	4/ 7/87	0.2		0.2
PA:PITTSBURGH	6/10/87	0.1		0.2
RI:PROVIDENCE	4/ 1/87	0.1		0.2
SC:BARNWELL	4/27/87	0.2		0.2
SC:COLUMBIA	4/ 1/87	0.2		0.2
SC:HARTSVILLE	4/ 6/87	0.1		0.2
SC:JENKINSVILLE	4/24/87	0.1		0.2
SC:SENECA	4/21/87	0.1		0.2
TN:CHATTANOOGA	4/ 2/87	0.5		0.2
TN:KNOXVILLE	3/30/87	0.2		0.2
TX:AUSTIN	5/ 4/87	0.2		0.2
VA:DOSWELL	4/14/87	0.1		0.2
VA:LYNCHBURG	4/ 1/87	0.1		0.2
VA:VIRGINIA BEACH	6/ 2/87	0.1		0.2
VI:ST. THOMAS	5/19/87	0.1		0.2
WA:RICHLAND	4/21/87	0.2		0.2
WA:SEATTLE	4/ 3/87	0.1		0.2
WI:GENOA CITY	4/13/87	0.2		0.2
WI:MADISON	4/ 7/87	0.1		0.2

s = SIGMA COUNTING ERROR

### SECTION III. External Gamma Ambient Monitoring Program

The external gamma monitoring program, which began in October 1978, provides a continuous measurement of ambient gamma exposure rates, including cosmic, at selected sites throughout the continental United States. Data from this program are used to evaluate fluctuations in natural background due to variations in environmental conditions and to provide a means of monitoring any significant increases in ambient gamma levels. The program consists of approximately 22 sites representing wide geographic coverage throughout the country.\* Although exposure measurements at these few sites are not totally representative of nationwide exposures, they do indicate national trends.

The monitoring program utilizes  $\text{CaF}_2:\text{Mn}$  thermoluminescent dosimeters (TLD's). These dosimeters are commercially available glass-bulb type dosimeters with energy compensating shields. A group of three TLD's is located at each station or site. Dosimeters are annealed by the station operator prior to positioning in the field. The dosimeters are returned to EERF for readout approximately every three months. Several dosimeters are annealed by the station operator as controls and returned with the exposed field dosimeters to correct for any exposures accumulated during shipment.

Results from the period April - June 1987 are shown in Table 11.

\* Some of these sites may not return dosimeters each period and consequently the number of sites listed may vary slightly.



TABLE 11

## ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED	EXPOSURE	
		EXPOSURE	MR	MICRO R/HR $\pm$ 2 s
AL:MONTGOMERY	4/02/87- 7/01/87	18.7	8.7	3.9
CA:BERKELEY	3/30/87- 7/01/87	16.4	7.4	5.5
CO:DENVER	4/01/87- 7/08/87	37.2	15.8	6.1
FL:ORLANDO	4/01/87- 7/01/87	18.5	8.5	3.7
ID:BOISE	4/16/87- 7/13/87	27.5	13.0	5.4
IL:CHICAGO	4/02/87- 7/09/87	21.0	8.9	6.5
ND:BISMARCK	4/01/87- 7/07/87	25.2	10.8	4.5
NJ:TRENTON	4/02/87- 7/01/87	34.0	15.7	4.6
NM:SANTA FE	4/03/87- 7/01/87	33.7	15.8	3.8
NV:LAS VEGAS	4/01/87- 6/30/87	16.9	7.8	5.4
NY:NEW YORK	1/07/87- 5/22/87	30.1	9.3	5.5
NY:NEW YORK	5/22/87- 7/14/87	11.9	9.3	2.5
OH:COLUMBUS	4/20/87- 7/01/87	15.1	8.7	6.4
OK:OKLAHOMA CITY	4/03/87- 7/07/87	20.6	9.0	2.5
OR:PORTLAND	4/20/87- 6/30/87	17.0	10.0	11.9
PA:HARRISBURG	4/03/87- 7/02/87	16.9	7.8	4.1
PA:PITTSBURGH	4/03/87- 7/02/87	26.4	12.2	4.8
RI:PROVIDENCE	4/02/87- 7/01/87	26.5	12.3	5.0
SC:BARNWELL	4/27/87- 7/10/87	16.2	9.1	4.0
SC:COLUMBIA	3/31/87- 6/30/87	30.2	13.8	3.9
TN:KNOXVILLE	3/30/87- 7/01/87	39.5	17.7	4.9
VA:RICHMOND	4/08/87- 7/01/87	16.8	8.3	5.7
VT:MONTPELIER	1/21/87- 7/16/87	35.3	8.4	4.6

s = SIGMA ERROR (IN PERCENT)

## SECTION IV. Milk Program

### Pasteurized Milk

This is a cooperative program with the Dairy and Lipid Products Branch, Milk Sanitation Section, Food and Drug Administration. Milk is a reliable indicator of the general population's intake of radionuclides since it is consumed fresh by a large segment of the population and can contain several of the biologically important radionuclides which result from environmental releases from nuclear activities. A primary function of this program is to obtain reliable monitoring data relative to current radionuclide concentrations and determine any long-term trends.

Monthly samples are collected at 65 sampling sites with one or more located in each state, Puerto Rico, and the Panama Canal Zone. The samples are composited, according to production, from the major milk suppliers representing more than 80 percent of the milk consumed in a given population center.

The samples are analyzed for iodine-131, barium-140, cesium-137, and potassium. All samples collected in July are analyzed for strontium-89, and strontium-90. Also, for the first month of the three quarters beginning January, April and October, 10 regional composite samples of milk made up from the states within each of EPA's 10 regions are analyzed for strontium-89 and strontium-90.

Iodine-131, barium-140, cesium-137 and potassium are determined by gamma spectral analysis. Strontium-89 and strontium-90 are determined by beta counting a total strontium precipitate which has been chemically separated by ion-exchange.

The values for the pasteurized milk samples for April - June 1987 are shown in Tables 12 - 14.

Strontium values for these locations shown in Table 15.

TABLE 12

## CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

APRIL 1987

LOCATION	DATE COLLECTED	K		$^{137}\text{Cs}$		$^{140}\text{Ba}$		$^{131}\text{I}$	
		g/l	2s	pCi/l	2s	pCi/l	2s	pCi/l	2s
AL: MONTGOMERY	4/10/87	1.30	0.12	11	9	1	9	-1	7
AR: LITTLE ROCK	4/ 6/87	1.51	0.09	6	5	3	6	-1	5
CA: LOS ANGELES	4/ 2/87	1.56	0.08	5	5	3	6	3	5
CA: SACRAMENTO	4/ 2/87	1.56	0.13	2	7	1	9	0	7
CA: SAN FRANCISCO	4/ 1/87	1.51	0.13	6	7	-1	9	2	7
CT: HARTFORD	4/ 6/87	1.60	0.13	2	7	-1	9	0	7
DE: WILMINGTON	4/ 1/87	1.54	0.13	4	7	-4	9	3	7
FL: TAMPA	4/ 7/87	1.48	0.13	21	9	3	9	3	7
GA: ATLANTA	4/14/87	1.51	0.13	7	9	0	9	3	7
HI: HONOLULU	4/ 6/87	1.46	0.13	13	9	10	10	1	7
IA: DES MOINES	4/ 6/87	1.53	0.13	16	9	4	9	-2	7
ID: IDAHO FALLS	4/13/87	2.00	0.14	24	10	8	10	-3	7
IL: CHICAGO	4/ 6/87	1.59	0.12	6	7	2	8	5	7
IN: INDIANAPOLIS	4/ 6/87	1.58	0.13	6	9	4	9	-3	7
KS: WICHITA	4/ 8/87	1.44	0.13	-1	9	5	9	-4	7
KY: LOUISVILLE	4/ 7/87	1.50	0.13	3	9	2	9	-3	7
LA: NEW ORLEANS	4/15/87	1.67	0.12	6	7	5	8	1	7
MD: BALTIMORE	4/ 3/87	1.42	0.12	4	7	4	9	2	7
ME: PORTLAND	4/ 7/87	1.59	0.13	14	9	0	9	2	7
MI: DETROIT	4/10/87	1.57	0.13	5	9	3	9	4	7
MI: GRAND RAPIDS	4/ 6/87	1.39	0.12	9	7	5	9	1	7
MN: MINNEAPOLIS	4/ 6/87	1.52	0.13	5	7	3	9	-1	7
MN: ST. PAUL	4/ 6/87	1.56	0.13	10	9	2	9	2	7
MO: KANSAS CITY	4/10/87	1.48	0.13	14	9	0	9	1	7
MO: ST. LOUIS	4/ 8/87	1.56	0.09	2	6	7	6	-3	5
MS: JACKSON	4/ 6/87	1.54	0.13	8	9	0	9	-5	7
MT: HELENA	4/10/87	1.43	0.12	1	7	3	9	1	7
NC: CHARLOTTE	4/14/87	1.68	0.25	5	18	2	19	3	14
ND: MINOT	4/24/87	1.53	0.09	7	6	8	7	-2	5
NE: OMAHA	4/10/87	1.41	0.12	3	9	4	9	-2	7
NJ: TRENTON	4/ 9/87	1.50	0.09	6	6	1	6	-1	5
NM: ALBUQUERQUE	4/ 6/87	1.49	0.12	4	7	5	8	5	7
NV: LAS VEGAS	4/27/87	1.40	0.12	7	9	3	9	0	7
NY: BUFFALO	4/ 6/87	1.75	0.13	6	9	5	10	-3	7
NY: NEW YORK CITY	4/ 6/87	1.64	0.12	4	7	-2	8	9	7
NY: SYRACUSE	4/ 6/87	1.54	0.13	7	7	4	9	-2	7
OH: CINCINNATI	4/28/87	1.53	0.08	2	5	0	6	1	5
OH: CLEVELAND	4/13/87	1.46	0.13	5	9	7	9	0	7
OK: OKLAHOMA CITY	4/18/87	1.58	0.24	8	18	-13	18	11	14
OR: PORTLAND	4/ 6/87	1.53	0.13	9	9	5	9	-3	7
PA: PHILADELPHIA	4/ 6/87	1.49	0.13	2	7	2	9	3	7

TABLE 12 (CONTINUED)

## CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

APRIL 1987

LOCATION	DATE COLLECTED	K		$^{137}\text{Cs}$		$^{140}\text{Ba}$		$^{131}\text{I}$	
		g/l	+2s	pCi/l	+2s	pCi/l	+2s	pCi/l	+2s
PA:PITTSBURGH	4/ 6/87	1.47	0.09	4	5	4	6	3	5
PC:CRISTOBAL	4/29/87	1.45	0.13	13	9	3	9	-1	7
PR:SAN JUAN	4/15/87	1.60	0.12	-1	7	0	8	3	7
SD:RAPID CITY	4/ 6/87	1.58	0.13	7	7	4	9	1	7
TN:CHATTANOOGA	4/ 6/87	1.59	0.12	1	7	2	8	8	7
TN:KNOXVILLE	4/ 5/87	1.51	0.13	3	9	5	9	0	7
TN:MEMPHIS	4/28/87	1.60	0.09	4	6	4	6	3	5
UT:SALT LAKE CITY	4/ 6/87	1.65	0.12	5	7	-2	8	4	7
VA:NORFOLK	4/ 1/87	1.62	0.13	2	7	-5	9	4	7
VT:BURLINGTON	4/ 3/87	1.63	0.14	8	10	2	10	0	8
WA:SEATTLE	4/ 6/87	1.53	0.09	14	5	2	6	5	5
WA:SPOKANE	4/14/87	1.39	0.12	6	9	10	10	-6	7
WV:CHARLESTON	4/27/87	1.62	0.24	5	18	-1	19	0	14
WY:LARAMIE	4/ 7/87	1.53	0.13	2	7	2	9	2	7

s = SIGMA COUNTING ERROR

TABLE 13

## CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

MAY 1987

LOCATION	DATE COLLECTED	K		$^{137}\text{Cs}$		$^{140}\text{Ba}$		$^{131}\text{I}$	
		g/l	+2s	pCi/l	+2s	pCi/l	+2s	pCi/l	+2s
AL:MONTGOMERY	5/ 8/87	1.59	0.12	0	7	1	8	2	7
AR:LITTLE ROCK	5/ 4/87	1.52	0.12	1	7	0	8	0	7
AZ:PHOENIX	5/ 6/87	1.53	0.09	6	6	6	7	-1	5
CA:LOS ANGELES	5/ 8/87	1.58	0.13	2	9	0	9	1	7
CA:SACRAMENTO	5/ 6/87	1.52	0.13	3	7	1	9	0	7
CA:SAN FRANCISCO	5/27/87	1.58	0.13	5	9	1	9	3	7
CO:DENVER	5/ 1/87	1.47	0.09	6	5	1	6	4	5
CT:HARTFORD	5/ 4/87	1.58	0.12	4	7	2	8	2	7
DC:WASHINGTON	5/ 1/87	1.60	0.13	1	7	1	9	4	7
DE:WILMINGTON	5/ 4/87	1.53	0.13	3	7	-2	9	7	7
FL:TAMPA	5/ 5/87	1.52	0.13	20	7	-2	9	1	7
GA:ATLANTA	5/11/87	1.44	0.12	5	7	1	8	1	7
HI:HONOLULU	5/ 4/87	1.55	0.13	1	9	5	9	1	7
IA:DES MOINES	5/ 4/87	1.55	0.12	2	7	4	8	2	7
IL:CHICAGO	5/ 4/87	1.47	0.09	2	5	3	6	1	5
IN:INDIANAPOLIS	5/ 4/87	1.46	0.13	12	9	3	9	-1	7
KS:WICHITA	5/ 6/87	1.54	0.13	10	9	5	9	3	7
KY:LOUISVILLE	5/ 5/87	1.55	0.13	5	9	3	9	0	7
LA:NEW ORLEANS	5/ 4/87	1.52	0.13	2	7	0	9	4	7
MD:BALTIMORE	5/ 1/87	1.59	0.09	3	5	-2	6	4	5
ME:PORTLAND	5/ 5/87	1.70	0.12	10	7	6	8	3	7
MI:DETROIT	5/ 7/87	1.56	0.13	10	9	3	9	1	7
MI:GRAND RAPIDS	5/ 4/87	1.59	0.13	9	7	0	9	3	7
MN:MINNEAPOLIS	5/11/87	1.60	0.12	5	7	-1	8	4	7
MN:ST. PAUL	5/ 6/87	1.54	0.13	11	7	0	9	1	7
MO:KANSAS CITY	5/ 7/87	1.50	0.13	11	9	5	9	0	7
MO:ST. LOUIS	5/ 6/87	1.48	0.13	10	9	-12	9	1	7
MS:JACKSON	5/ 5/87	1.58	0.08	1	5	0	6	4	5
MT:HELENA	5/ 8/87	1.53	0.12	1	7	6	8	-2	7
NC:CHARLOTTE	5/11/87	1.44	0.24	14	18	-2	19	1	14
ND:MINOT	5/26/87	1.45	0.13	9	9	0	9	-3	7
NE:OMAHA	5/ 8/87	1.01	0.08	6	5	-4	6	1	5
NH:MANCHESTER	5/ 4/87	1.62	0.08	11	5	5	6	-2	5
NJ:TRENTON	5/ 6/87	1.54	0.13	8	7	-1	9	-2	7
NM:ALBUQUERQUE	5/ 4/87	1.34	0.12	11	9	-3	9	-4	7
NV:LAS VEGAS	5/18/87	1.62	0.13	-2	7	-2	9	-1	7
NY:BUFFALO	5/ 5/87	1.59	0.13	3	7	0	9	3	7
NY:NEW YORK CITY	5/ 4/87	1.40	0.12	6	9	4	9	3	7
NY:SYRACUSE	5/ 4/87	1.64	0.12	3	7	6	8	-1	7
OH:CINCINNATI	5/21/87	1.47	0.13	6	9	1	9	-4	7
OH:CLEVELAND	5/25/87	1.54	0.13	3	7	-4	9	-1	7
OK:OKLAHOMA CITY	5/ 4/87	1.61	0.08	4	5	2	6	0	5

TABLE 13 (CONTINUED)

## CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

LOCATION	DATE COLLECTED	MAY 1987		$^{137}\text{Cs}$		$^{140}\text{Ba}$		$^{131}\text{I}$	
		K g/l+2s		pCi/l+2s		pCi/l+2s		pCi/l+2s	
OR:PORTLAND	5/ 4/87	1.53	0.09	15	6	3	6	3	5
PA:PHILADELPHIA	5/ 4/87	1.47	0.13	9	9	-1	9	3	7
PA:PITTSBURGH	5/ 4/87	1.39	0.12	2	7	1	9	4	7
PC:CRISTOBAL	5/28/87	1.41	0.12	18	9	7	9	-2	7
PR:SAN JUAN	5/12/87	1.58	0.09	6	6	4	6	-6	5
SC:CHARLESTON	5/11/87	1.56	0.13	7	7	-3	9	1	7
SD:RAPID CITY	5/ 4/87	1.53	0.12	6	7	3	8	4	7
TN:CHATTANOOGA	5/ 4/87	1.50	0.13	-5	7	-1	9	4	7
TN:KNOXVILLE	5/ 4/87	1.61	0.12	6	7	-3	8	3	7
TN:MEMPHIS	5/12/87	1.52	0.13	4	7	1	9	3	7
TX:FT. WORTH	5/13/87	1.44	0.13	5	9	0	9	-1	7
UT:SALT LAKE CITY	5/ 4/87	1.59	0.12	14	7	1	8	4	7
VA:NORFOLK	5/ 1/87	1.46	0.12	4	7	-1	9	5	7
VT:BURLINGTON	5/ 4/87	1.44	0.13	12	9	7	9	-2	7
WA:SEATTLE	5/ 1/87	1.56	0.12	1	7	-3	8	6	7
WA:SPOKANE	5/ 8/87	1.60	0.13	13	7	-4	9	1	7
WY:LARAMIE	5/ 5/87	1.53	0.13	9	9	3	9	3	7

s = SIGMA COUNTING ERROR

TABLE 14

## CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JUNE 1987

LOCATION	DATE COLLECTED	K		$^{137}\text{Cs}$		$^{140}\text{Ba}$		$^{131}\text{I}$	
		g/l	+2s	pCi/l	+2s	pCi/l	+2s	pCi/l	+2s
AL:MONTGOMERY	6/ 4/87	1.48	0.13	10	9	1	9	0	7
AR:LITTLE ROCK	6/ 2/87	1.58	0.13	5	9	-1	9	5	7
AZ:PHOENIX	6/11/87	1.50	0.12	-2	7	-2	8	-6	7
CA:LOS ANGELES	6/11/87	1.60	0.13	-1	7	-3	9	3	7
CA:SACRAMENTO	6/ 3/87	1.43	0.13	7	9	8	9	2	7
CA:SAN FRANCISCO	6/24/87	1.61	0.13	2	7	2	9	1	7
CO:DENVER	6/ 1/87	1.50	0.13	15	9	3	9	-2	7
CT:HARTFORD	6/ 1/87	1.54	0.09	5	5	1	6	0	5
DE:WILMINGTON	6/ 2/87	1.59	0.09	18	7	5	7	3	5
FL:TAMPA	6/ 2/87	1.55	0.09	17	5	5	6	0	5
GA:ATLANTA	6/ 8/87	1.51	0.13	-1	8	1	10	2	14
HI:HONOLULU	6/ 1/87	1.57	0.13	6	9	8	10	2	7
IA:DES MOINES	6/ 2/87	1.48	0.13	4	9	9	10	0	7
IL:CHICAGO	6/ 1/87	1.56	0.12	2	7	-1	8	0	7
IN:INDIANAPOLIS	6/ 8/87	1.46	0.12	-2	7	3	9	3	7
KS:WICHITA	6/ 8/87	1.43	0.13	7	9	2	9	0	7
KY:LOUISVILLE	6/ 2/87	1.59	0.13	6	7	6	9	6	7
MD:BALTIMORE	6/ 5/87	1.49	0.13	10	9	5	9	-2	7
ME:PORTLAND	6/ 5/87	1.51	0.13	23	10	3	9	3	7
MI:DETROIT	6/ 3/87	1.61	0.13	12	9	9	10	-1	7
MI:GRAND RAPIDS	6/ 8/87	1.66	0.13	17	9	5	10	2	7
MN:MINNEAPOLIS	6/ 1/87	1.57	0.09	10	6	2	6	-1	5
MN:ST. PAUL	6/ 1/87	1.53	0.13	8	7	-3	9	-2	7
MO:KANSAS CITY	6/19/87	1.45	0.12	1	7	-2	8	-1	7
MO:ST. LOUIS	6/ 3/87	1.59	0.09	12	6	1	6	5	5
MS:JACKSON	6/ 1/87	1.56	0.13	3	7	1	9	-1	7
MT:HELENA	6/ 5/87	1.49	0.13	15	9	5	9	8	8
NC:CHARLOTTE	6/15/87	1.62	0.24	9	18	1	19	-4	14
ND:MINOT	6/26/87	1.35	0.12	3	9	4	9	-1	7
NE:OMAHA	6/ 5/87	1.41	0.12	5	7	-3	9	1	7
NH:MANCHESTER	6/22/87	1.59	0.13	3	7	-2	9	5	7
NJ:TRENTON	6/ 3/87	1.51	0.13	6	9	-2	9	1	7
NM:ALBUQUERQUE	6/ 8/87	1.42	0.09	13	6	4	6	4	5
NV:LAS VEGAS	6/ 8/87	1.54	0.09	3	5	-1	6	2	5
NY:BUFFALO	6/ 8/87	1.56	0.13	4	7	1	9	2	7
NY:NEW YORK CITY	6/ 1/87	1.62	0.12	2	7	-6	8	-3	7
NY:SYRACUSE	6/ 1/87	1.59	0.09	3	6	6	6	0	5
OH:CINCINNATI	6/30/87	1.57	0.13	4	7	2	9	-1	7
OH:CLEVELAND	6/25/87	1.58	0.13	3	7	-4	9	2	7
OR:PORTLAND	6/ 1/87	1.54	0.13	3	7	5	9	2	7
PA:PHILADELPHIA	6/ 8/87	1.44	0.13	17	9	1	9	2	7
PA:PITTSBURGH	6/ 8/87	1.51	0.13	1	9	-5	9	2	7

TABLE 14 (CONTINUED)

## CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JUNE 1987

LOCATION	DATE COLLECTED	K		$^{137}\text{Cs}$		$^{140}\text{Ba}$		$^{131}\text{I}$	
		g/l	+2s	pCi/l	+2s	pCi/l	+2s	pCi/l	+2s
PC:CRISTOBAL	6/25/87	1.74	0.13	26	10	2	10	-4	7
PR:SAN JUAN	6/19/87	1.55	0.13	3	7	1	9	6	7
SD:RAPID CITY	6/ 3/87	1.50	0.13	10	9	6	9	-6	7
TN:CHATTANOOGA	6/ 1/87	1.58	0.13	-1	7	3	9	3	7
TN:MEMPHIS	6/22/87	1.52	0.13	2	9	10	10	-7	7
TX:AUSTIN	6/16/87	1.45	0.13	2	9	-3	9	3	7
UT:SALT LAKE CITY	6/ 1/87	1.59	0.13	6	7	2	9	-3	7
VA:NORFOLK	6/ 2/87	1.43	0.13	13	9	9	10	5	7
VT:BURLINGTON	6/ 4/87	1.54	0.13	9	7	-2	9	9	7
WA:SEATTLE	6/ 5/87	1.46	0.13	0	8	-1	10	2	14
WV:CHARLESTON	6/ 2/87	1.60	0.24	2	18	4	19	15	14
WY:LARAMIE	6/ 9/87	1.53	0.09	9	6	3	6	-3	5

s = SIGMA COUNTING ERROR



TABLE 15  
 STRONTIUM-90 AND STRONTIUM-89 IN PASTEURIZED MILK  
 EPA REGIONAL COMPOSITES

REGION	MAY 1987			
	$^{90}\text{Sr}$		$^{89}\text{Sr}$	
	pCi/l $\pm$ 2s		pCi/l $\pm$ 2s*	
I	2.5	0.1	-1	2
II	1.9	0.3	0	1
III	2.0	0.4	-1	1
IV	2.1	0.4	-1	1
V	2.5	0.5	0	1
VI	2.1	1.0	1	2
VII	1.9	0.3	0	1
VIII	1.9	0.5	0	1
IX	0.6	0.2	1	1
X	1.6	0.5	-1	1

s = SIGMA COUNTING ERROR

s\* = ANALYTICAL ERROR TERM WHICH CLOSELY APPROXIMATES THE  
 COUNTING ERROR

### Carbon-14 in Milk

Nine stations, chosen for wide geographical distribution, contribute milk samples for annual analysis of carbon-14. These samples are monitored for carbon-14 levels in the food chain resulting from nuclear testing.

Analysis consists of combusting the samples and measuring released carbon dioxide through liquid scintillation.

The last carbon-14 results were for samples collected during May 1975 and May 1979. They were published in Environmental Radiation Data: Report 29.

ENVIRONMENTAL RADIATION DATA (ERD) is published quarterly (January, April, July, October) by the U. S. Environmental Protection Agency's Office of Radiation Programs.

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Environmental Studies and Statistics  
Analysis and Support Division (ANR-461)  
U. S. Environmental Protection Agency  
Waterside Mall East  
401 M Street, SW  
Washington, DC 20460

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