

United States
Environmental Protection
Agency
Office of Radiation Programs

Eastern Environmental
Radiation Facility
1890 Federal Drive
Montgomery, AL 36109

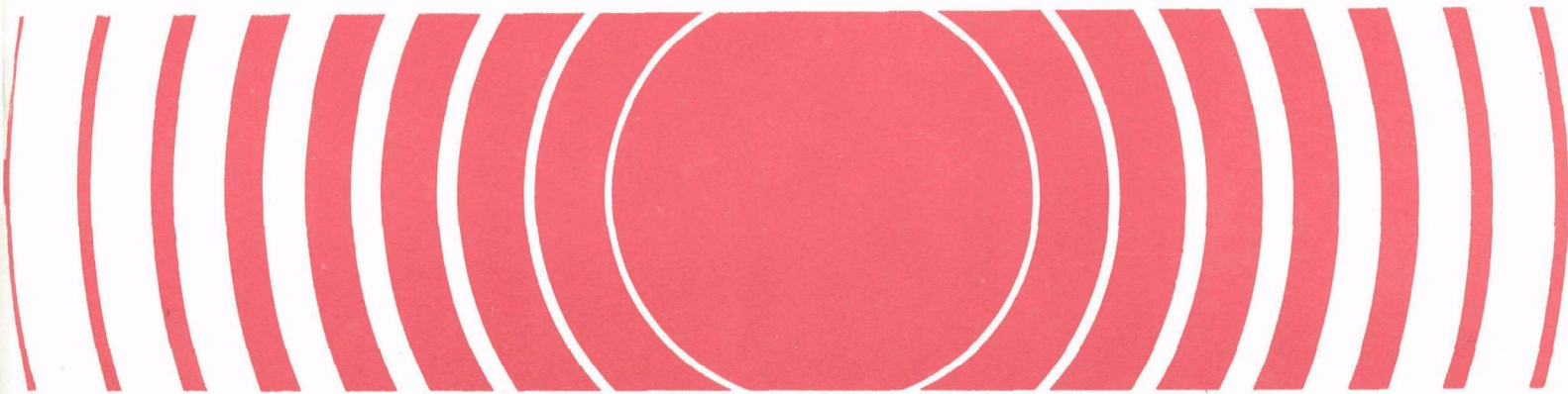
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Report 47



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

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July - September 1986

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).

ENVIRONMENTAL RADIATION

DATA

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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.

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 ³	.01 pCi/m ³	.01 pCi/m ³
	Water	pCi/l	1 pCi/l	1 pCi/l
	Precipitation	nCi/m ²	.01 nCi/m ²	.01 nCi/m ^{2(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 ³	.1 pCi/m ³	2 pCi/m ³
Plutonium-238, 239	Air	aCi/m ³	.1 aCi/m ³	.015 pCi ^(b) per sample
	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 ³	.1 aCi/m ³	.015 pCi ^(b) 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 ^(c)
Iodine-131	Milk	pCi/l	1 pCi/l	10 pCi/l ^(c)
	Water	pCi/l	1 pCi/l	10 pCi/l ^(c)
	Water (specific radiochemical analysis)	pCi/l	.1 pCi/l	.4 pCi/l
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 ^(c)
	Water	pCi/l	1 pCi/l	10 pCi/l ^(c)
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/m²₃ would be dependent on precipitation (mm).
(b) This value in terms of pCi/m³ would be dependent on the air volume.
(c) 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/m³. 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, and uranium-234, -235, and -238 analyses are performed on samples which exceed 2 pCi/liter gross alpha.

* 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 July - September 1986.

Tables 5 - 7 contain the data in precipitation samples for July - September 1986.

Data for the tritium in precipitation samples for July - September 1986 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
 JULY 1986

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m ³)			(pCi/m ³)		
AL:ASHFORD	3	0.0	0.0	0.0	0.01	0.01	0.01
AL:MONTGOMERY	8	0.9	0.1	0.5	0.02	0.01	0.01
AR:LITTLE ROCK	9	1.0	0.1	0.4	0.03	0.01	0.02
AZ:PHOENIX	9	1.9	0.1	0.8	0.03	0.01	0.01
CA:BERKELEY	8	0.0	0.0	0.0	0.01	0.00	0.00
CA:LOS ANGELES	9	0.3	0.0	0.1	0.02	0.01	0.01
CO:DENVER	9	0.9	0.3	0.6	0.01	0.01	0.01
CT:HARTFORD	10	0.2	0.1	0.1	0.02	0.00	0.01
DE:WILMINGTON	9	0.4	0.1	0.2	0.02	0.01	0.01
FL:JACKSONVILLE	10	0.1	0.0	0.1	0.01	0.01	0.01
FL:MIAMI	8	0.0	0.0	0.0	0.01	0.01	0.01
GA:ATLANTA	4	0.1	0.1	0.1	0.02	0.01	0.02
HI:HONOLULU	8	0.2	0.1	0.1	0.01	0.00	0.00
IA:IOWA CITY	9	0.9	0.1	0.4	0.05	0.01	0.02
ID:BOISE	8	0.1	0.0	0.1	0.02	0.00	0.01
ID:IDAHO FALLS	8	0.0	0.0	0.0	0.01	0.01	0.01
IL:CHICAGO	9	0.7	0.0	0.2	0.02	0.01	0.01
IN:INDIANAPOLIS	6	0.8	0.2	0.4	0.02	0.01	0.02
KS:TOPEKA	9	2.1	0.4	1.1	0.02	0.01	0.01
KY:FRANKFORT	9	2.8	0.3	1.2	0.05	0.01	0.02
LA:NEW ORLEANS	7	0.1	0.0	0.1	0.01	0.01	0.01
MA:LAWRENCE	9	0.3	0.0	0.1	0.01	0.00	0.01
ME:AUGUSTA	8	0.2	0.1	0.2	0.01	0.00	0.01
MI:LANSING	9	0.4	0.1	0.2	0.03	0.01	0.01
MN:MINNEAPOLIS	9	0.4	0.0	0.1	0.02	0.01	0.01
MS:JACKSON	9	0.8	0.1	0.4	0.04	0.01	0.02
NC:CHARLOTTE	9	0.4	0.2	0.3	0.03	0.01	0.02
NC:WILMINGTON	9	0.1	0.0	0.1	0.02	0.00	0.01
ND:BISMARCK	8	1.0	0.2	0.5	0.01	0.01	0.01
NE:LINCOLN	2	1.3	0.2	0.8	0.01	0.01	0.01
NH:CONCORD	9	0.3	0.0	0.1	0.01	0.00	0.01
NJ:TRENTON	9	1.5	0.2	0.7	0.02	0.01	0.01
NM:SANTA FE	6	0.3	0.1	0.2	0.01	0.00	0.01
NV:LAS VEGAS	9	0.2	0.1	0.1	0.03	0.01	0.02
NY:ALBANY	5	0.1	0.0	0.1	0.01	0.01	0.01
NY:NEW YORK CITY	8	0.4	0.0	0.2	0.02	0.01	0.01
NY:NIAGARA FALLS	9	0.4	0.1	0.3	0.02	0.01	0.01
NY:SYRACUSE	4	0.2	0.1	0.2	0.01	0.01	0.01

TABLE 2 (CONTINUED)

 AIRBORNE PARTICULATES
 GROSS BETA CONCENTRATION
 JULY 1986

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m ³)			(pCi/m ³)		
NY:YAPHANK	9	0.1	0.0	0.0	0.02	0.00	0.01
OH:COLUMBUS	9	0.5	0.0	0.2	0.02	0.01	0.01
OH:PAINESVILLE	9	0.8	0.1	0.3	0.02	0.01	0.01
OH:TOLEDO	9	0.9	0.1	0.4	0.02	0.01	0.01
OK:OKLAHOMA CITY	7	0.9	0.3	0.6	0.02	0.01	0.01
OR:PORTLAND	9	0.0	0.0	0.0	0.01	0.00	0.00
PA:GOLDSBORO	9	0.9	0.1	0.5	0.10	0.00	0.02
PA:HARRISBURG	9	0.5	0.1	0.2	0.01	0.01	0.01
PA:PITTSBURGH	7	0.0	0.0	0.0	0.03	0.01	0.01
PA:THREE MILE ISL	9	0.9	0.1	0.4	0.02	0.01	0.01
RI:PROVIDENCE	8	0.3	0.1	0.1	0.01	0.01	0.01
SC:BARNWELL	2	0.0	0.0	0.0	0.01	0.00	0.00
SC:COLUMBIA	8	0.4	0.1	0.3	0.03	0.01	0.02
SD:PIERRE	9	0.6	0.1	0.4	0.01	0.01	0.01
TN:KNOXVILLE	7	0.8	0.1	0.3	0.02	0.01	0.02
TN:NASHVILLE	9	1.3	0.0	0.6	0.05	0.01	0.02
TX:AUSTIN	8	0.3	0.1	0.2	0.02	0.01	0.01
TX:EL PASO	9	0.9	0.1	0.5	0.03	0.01	0.01
VA:LYNCHBURG	6	2.7	0.3	0.9	0.02	0.01	0.02
VA:VIRGINIA BEACH	3	0.1	0.0	0.0	0.02	0.01	0.01
WA:OLYMPIA	8	0.1	0.0	0.0	0.01	0.00	0.00
WA:SPOKANE	9	0.4	0.2	0.3	0.01	0.00	0.01
WI:MADISON	9	1.1	0.2	0.5	0.01	0.01	0.01
WV:CHARLESTON	9	0.6	0.1	0.3	0.02	0.01	0.01
WY:CHEYENNE	5	0.7	0.2	0.4	0.02	0.01	0.01

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m³
 MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m³

TABLE 3
 AIRBORNE PARTICULATES
 GROSS BETA CONCENTRATION
 AUGUST 1986

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m ³)			(pCi/m ³)		
AL:ASHFORD	3	0.0	0.0	0.0	0.01	0.00	0.01
AL:MONTGOMERY	9	1.8	0.3	0.8	0.02	0.00	0.01
AR:LITTLE ROCK	8	1.0	0.2	0.5	0.04	0.01	0.02
AZ:PHOENIX	7	0.6	0.0	0.3	0.02	0.01	0.01
CA:BERKELEY	9	0.0	0.0	0.0	0.01	0.00	0.00
CA:LOS ANGELES	9	0.3	0.1	0.2	0.02	0.01	0.01
CO:DENVER	8	1.0	0.5	0.8	0.02	0.01	0.01
CT:HARTFORD	8	0.2	0.0	0.1	0.01	0.01	0.01
DE:WILMINGTON	9	0.4	0.1	0.2	0.02	0.01	0.01
FL:JACKSONVILLE	8	0.1	0.0	0.1	0.01	0.00	0.01
FL:MIAMI	9	0.0	0.0	0.0	0.01	0.00	0.01
GA:ATLANTA	4	0.0	0.0	0.0	0.02	0.01	0.01
HI:HONOLULU	9	0.1	0.1	0.1	0.01	0.00	0.01
IA:IOWA CITY	8	0.6	0.1	0.3	0.02	0.00	0.01
ID:BOISE	9	0.4	0.1	0.2	0.03	0.01	0.01
ID:IDAHO FALLS	9	0.0	0.0	0.0	0.01	0.01	0.01
IL:CHICAGO	8	0.6	0.1	0.2	0.02	0.01	0.01
IN:INDIANAPOLIS	9	0.8	0.3	0.6	0.02	0.01	0.02
KS:TOPEKA	8	2.0	0.4	1.1	0.03	0.01	0.01
KY:FRANKFORT	8	2.3	0.5	1.1	0.02	0.01	0.02
LA:NEW ORLEANS	7	0.2	0.0	0.1	0.02	0.01	0.01
MA:LAWRENCE	8	0.3	0.1	0.2	0.01	0.01	0.01
ME:AUGUSTA	8	0.3	0.1	0.2	0.01	0.00	0.01
MI:LANSING	8	0.8	0.1	0.3	0.02	0.01	0.01
MN:MINNEAPOLIS	8	0.4	0.1	0.2	0.01	0.01	0.01
MO:JEFFERSON CITY	6	2.0	0.8	1.3	0.06	0.01	0.04
MS:JACKSON	9	0.9	0.3	0.6	0.04	0.01	0.02
NC:CHARLOTTE	9	0.6	0.1	0.2	0.02	0.01	0.01
NC:WILMINGTON	7	0.3	0.0	0.1	0.01	0.00	0.01
ND:BISMARCK	9	1.2	0.4	0.8	0.03	0.01	0.01
NE:LINCOLN	1	1.0	1.0	1.0	0.01	0.01	0.01
NH:CONCORD	9	0.2	0.1	0.1	0.01	0.00	0.01
NJ:TRENTON	8	1.0	0.1	0.4	0.01	0.01	0.01
NJ:WILMINGTON	1	0.0	0.0	0.0	0.01	0.01	0.01
NM:SANTA FE	8	0.6	0.2	0.4	0.02	0.01	0.01
NV:LAS VEGAS	8	0.3	0.1	0.2	0.02	0.01	0.02
NY:ALBANY	3	0.1	0.0	0.0	0.01	0.01	0.01
NY:NEW YORK CITY	9	0.2	0.1	0.1	0.01	0.01	0.01

TABLE 3 (CONTINUED)

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
AUGUST 1986

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m ³)			(pCi/m ³)		
NY:SYRACUSE	2	0.1	0.1	0.1	0.01	0.01	0.01
NY:YAPHANK	8	0.2	0.0	0.1	0.01	0.00	0.01
OH:COLUMBUS	8	0.5	0.1	0.3	0.02	0.01	0.02
OH:PAINESVILLE	9	0.3	0.0	0.2	0.03	0.01	0.01
OH:TOLEDO	7	0.6	0.1	0.4	0.03	0.01	0.02
OK:OKLAHOMA CITY	7	1.1	0.3	0.6	0.02	0.01	0.01
OR:PORTLAND	9	0.0	0.0	0.0	0.01	0.00	0.01
PA:GOLDSBORO	8	0.6	0.0	0.3	0.02	0.01	0.01
PA:HARRISBURG	8	0.3	0.0	0.2	0.01	0.01	0.01
PA:PITTSBURGH	9	0.0	0.0	0.0	0.02	0.01	0.01
PA:THREE MILE ISL	8	0.5	0.1	0.2	0.01	0.01	0.01
RI:PROVIDENCE	9	0.2	0.1	0.1	0.01	0.00	0.01
SC:BARNWELL	2	0.2	0.0	0.1	0.01	0.00	0.00
SC:COLUMBIA	9	0.5	0.1	0.2	0.02	0.01	0.01
SD:PIERRE	9	0.6	0.2	0.4	0.09	0.01	0.02
TN:KNOXVILLE	7	0.4	0.2	0.3	0.02	0.01	0.01
TN:NASHVILLE	8	1.1	0.2	0.6	0.05	0.01	0.02
TX:AUSTIN	9	1.2	0.1	0.3	0.03	0.01	0.01
TX:EL PASO	5	0.4	0.1	0.3	0.02	0.01	0.01
VA:LYNCHBURG	7	1.2	0.2	0.6	0.04	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	0.05	0.01	0.02
WI:MADISON	8	0.8	0.1	0.4	0.01	0.01	0.01
WV:CHARLESTON	8	0.5	0.1	0.3	0.01	0.01	0.01
WY:CHEYENNE	3	0.7	0.1	0.4	0.02	0.01	0.01

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m³
 MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m³

TABLE 4
 AIRBORNE PARTICULATES
 GROSS BETA CONCENTRATION
 SEPTEMBER 1986

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m ³)			(pCi/m ³)		
AL:ASHFORD	1	0.0	0.0	0.0	0.01	0.01	0.01
AL:MONTGOMERY	11	1.9	0.2	0.7	0.01	0.00	0.01
AR:LITTLE ROCK	12	1.0	0.3	0.5	0.06	0.01	0.03
AZ:PHOENIX	6	1.2	0.2	0.9	0.02	0.01	0.01
CA:BERKELEY	11	0.2	0.0	0.0	0.01	0.00	0.01
CA:LOS ANGELES	11	0.3	0.1	0.1	0.02	0.01	0.01
CO:DENVER	9	1.3	0.3	0.8	0.03	0.01	0.02
CT:HARTFORD	9	0.2	0.1	0.2	0.01	0.00	0.01
DE:WILMINGTON	10	0.4	0.1	0.2	0.01	0.01	0.01
FL:JACKSONVILLE	7	0.1	0.0	0.1	0.01	0.01	0.01
FL:MIAMI	10	0.0	0.0	0.0	0.01	0.00	0.01
GA:ATLANTA	4	0.0	0.0	0.0	0.02	0.01	0.01
HI:HONOLULU	7	0.3	0.1	0.2	0.02	0.00	0.01
IA:IOWA CITY	9	1.1	0.1	0.4	0.03	0.01	0.02
ID:BOISE	8	0.8	0.1	0.2	0.01	0.01	0.01
ID:IDAHO FALLS	10	0.0	0.0	0.0	0.01	0.00	0.01
IL:CHICAGO	11	0.7	0.2	0.4	0.02	0.01	0.02
IN:INDIANAPOLIS	7	0.7	0.3	0.4	0.02	0.01	0.01
KS:TOPEKA	11	3.0	0.4	1.1	0.05	0.01	0.02
KY:FRANKFORT	11	1.5	0.4	0.8	0.02	0.01	0.01
LA:NEW ORLEANS	6	0.1	0.0	0.1	0.01	0.01	0.01
MA:LAWRENCE	9	0.3	0.1	0.2	0.02	0.00	0.01
ME:AUGUSTA	8	0.5	0.1	0.2	0.01	0.00	0.00
MI:LANSING	9	0.8	0.1	0.3	0.02	0.00	0.01
MN:MINNEAPOLIS	12	0.5	0.0	0.2	0.02	0.01	0.01
MO:JEFFERSON CITY	10	1.4	0.1	0.6	0.05	0.01	0.02
MS:JACKSON	10	0.9	0.2	0.5	0.07	0.01	0.02
NC:CHARLOTTE	10	0.5	0.1	0.3	0.04	0.01	0.02
NC:WILMINGTON	10	0.1	0.0	0.1	0.01	0.01	0.01
ND:BISMARCK	10	0.7	0.2	0.4	0.01	0.00	0.01
NE:LINCOLN	6	1.0	0.3	0.6	0.02	0.01	0.02
NH:CONCORD	10	0.3	0.1	0.2	0.02	0.00	0.01
NJ:TRENTON	9	0.8	0.0	0.3	0.01	0.01	0.01
NM:SANTA FE	9	0.5	0.2	0.3	0.01	0.00	0.01
NV:LAS VEGAS	9	0.3	0.1	0.2	0.04	0.01	0.02
NY:ALBANY	5	0.1	0.0	0.1	0.01	0.01	0.01
NY:NEW YORK CITY	11	0.4	0.1	0.2	0.02	0.00	0.01
NY:NIAGARA FALLS	12	0.5	0.0	0.2	0.02	0.01	0.01

TABLE 4 (CONTINUED)

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
SEPTEMBER 1986

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m ³)			(pCi/m ³)		
NY:SYRACUSE	5	0.2	0.0	0.1	0.01	0.00	0.01
NY:YAPHANK	8	0.1	0.0	0.0	0.01	0.01	0.01
OH:COLUMBUS	9	0.4	0.1	0.2	0.02	0.01	0.01
OH:PAINESVILLE	9	0.4	0.1	0.2	0.01	0.01	0.01
OH:TOLEDO	8	0.6	0.2	0.4	0.03	0.01	0.02
OK:OKLAHOMA CITY	6	0.8	0.3	0.5	0.01	0.01	0.01
OR:PORTLAND	9	0.0	0.0	0.0	0.01	0.00	0.00
PA:GOLDSBORO	11	0.7	0.2	0.5	0.02	0.01	0.01
PA:HARRISBURG	9	0.4	0.1	0.2	0.01	0.01	0.01
PA:PITTSBURGH	10	0.2	0.2	0.2	0.02	0.01	0.01
PA:THREE MILE ISL	9	0.8	0.3	0.5	0.01	0.01	0.01
RI:PROVIDENCE	10	0.6	0.1	0.3	0.01	0.00	0.01
SC:COLUMBIA	10	0.7	0.1	0.3	0.04	0.01	0.02
SD:PIERRE	9	0.4	0.2	0.3	0.03	0.01	0.01
TN:KNOXVILLE	7	0.6	0.1	0.3	0.02	0.01	0.02
TN:NASHVILLE	10	0.3	0.1	0.2	0.05	0.01	0.02
TX:AUSTIN	9	0.3	0.1	0.2	0.02	0.00	0.01
TX:EL PASO	9	0.7	0.0	0.4	0.03	0.01	0.01
VA:LYNCHBURG	7	1.4	0.2	0.6	0.02	0.01	0.01
WA:OLYMPIA	10	0.2	0.0	0.1	0.02	0.00	0.01
WA:SPOKANE	10	0.4	0.2	0.3	0.01	0.01	0.01
WI:MADISON	10	1.0	0.1	0.4	0.02	0.01	0.01
WV:CHARLESTON	9	0.4	0.1	0.3	0.02	0.01	0.01
WY:CHEYENNE	6	0.8	0.4	0.6	0.01	0.01	0.01

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m³
 MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m³

TABLE 5
GROSS BETA CONCENTRATION IN PRECIPITATION
JULY 1986

LOCATION	DEPTH (mm)	ACT.	+ 2s (nCi/m ²)
AL: MONTGOMERY	72.4	0.28	0.05
AZ: PHOENIX	25.6	0.09	0.02
CA: BERKELEY	1.2	0.01	0.01
CT: HARTFORD	120.0	0.30	0.07
DE: WILMINGTON	73.0	0.43	0.06
FL: JACKSONVILLE	118.5	0.40	0.07
FL: MIAMI	113.0	0.06	0.05
GA: ATLANTA	30.0	0.14	0.02
ID: IDAHO FALLS	10.2	0.17	0.02
IL: CHICAGO	87.1	0.07	0.04
IN: INDIANAPOLIS	58.0	0.06	0.03
LA: NEW ORLEANS	112.0	0.08	0.05
ME: AUGUSTA	42.0	0.26	0.03
MI: LANSING	52.0	0.07	0.02
MN: MINNEAPOLIS	99.6	0.06	0.04
MS: JACKSON	95.8	0.08	0.04
NC: CHARLOTTE	56.0	0.20	0.04
NC: WILMINGTON	48.0	0.07	0.03
ND: BISMARCK	146.7	0.08	0.06
NH: CONCORD	112.0	0.45	0.08
NJ: TRENTON	100.2	0.23	0.06
NM: SANTA FE	18.0	0.01	0.01
NV: LAS VEGAS	1.8	0.01	0.01
NY: ALBANY	77.2	0.14	0.04
NY: NEW YORK CITY	53.0	0.11	0.03
NY: NIAGARA FALLS	100.2	0.16	0.05
NY: SYRACUSE	34.8	0.04	0.02
NY: YAPHANK	99.0	0.25	0.06
OH: PAINESVILLE	47.5	0.18	0.03
OH: TOLEDO	104.0	0.10	0.05
OR: PORTLAND	31.0	0.04	0.02
PA: HARRISBURG	121.8	0.44	0.08
PA: MIDDLETOWN	152.0	0.47	0.09
PA: PITTSBURGH	138.0	0.27	0.07
RI: PROVIDENCE	131.0	0.35	0.08
SC: BARNWELL	35.0	0.08	0.02

TABLE 5 (CONTINUED)

GROSS BETA CONCENTRATION IN PRECIPITATION

JULY 1986

LOCATION	DEPTH (mm)	ACT. (nCi/m ²)	+ 2s
SC:COLUMBIA	80.0	0.26	0.05
TN:KNOXVILLE	41.0	0.06	0.02
TN:NASHVILLE	19.4	0.04	0.01
TX:EL PASO	80.0	0.05	0.04
VA:LYNCHBURG	36.0	0.41	0.04
VA:VIRGINIA BEACH	55.0	0.31	0.04
WA:OLYMPIA	12.8	0.01	0.01
WI:MADISON	105.0	0.08	0.05
WV:CHARLESTON	68.6	0.11	0.04
WY:CHEYENNE	14.3	0.05	0.01

s = SIGMA COUNTING ERROR

TABLE 6

GROSS BETA CONCENTRATION IN PRECIPITATION

AUGUST 1986

LOCATION	DEPTH (mm)	ACT. (nCi/m ²)	+ 2s
AL:MONTGOMERY	60.0	0.06	0.03
AR:LITTLE	85.0	0.14	0.04
CO:DENVER	0.8	0.02	0.01
CT:HARTFORD	71.0	0.29	0.05
DE:WILMINGTON	113.0	0.24	0.06
FL:JACKSONVILLE	187.2	0.25	0.09
FL:MIAMI	69.0	0.06	0.03
GA:ATLANTA	48.0	0.14	0.03
ID:IDAHO	36.6	0.25	0.03
IL:CHICAGO	86.8	0.09	0.04
IN:INDIANAPOLIS	35.0	0.04	0.02
LA:NEW ORLEANS	123.0	0.21	0.06
ME:AUGUSTA	148.4	0.56	0.10
MI:LANSING	80.8	0.09	0.04
MN:MINNEAPOLIS	74.6	0.05	0.03
MO:JEFFERSON	16.0	0.01	0.01
MS:JACKSON	38.0	0.04	0.02
NC:CHARLOTTE	159.0	0.19	0.07
NC:WILMINGTON	180.0	0.13	0.08
ND:BISMARCK	46.2	0.08	0.02
NH:CONCORD	115.4	0.33	0.08
NJ:TRENTON	78.2	0.08	0.04
NM:SANTA	11.0	0.06	0.01
NY:ALBANY	28.2	0.08	0.02
NY:NEW YORK CITY	60.5	0.04	0.03
NY:NIAGARA	71.0	0.05	0.03
NY:SYRACUSE	19.0	0.03	0.01
NY:YAPHANK	140.0	0.41	0.09
OH:COLUMBUS	42.0	0.07	0.02
OH:PAINESVILLE	60.0	0.09	0.03
OH:TOLEDO	56.0	0.04	0.03
OK:OKLAHOMA	39.6	0.06	0.02
PA:HARRISBURG	119.6	0.43	0.08
PA:MIDDLETOWN	110.0	0.24	0.06
PA:PITTSBURGH	58.0	0.18	0.04
RI:PROVIDENCE	103.0	0.30	0.07

TABLE 6 (CONTINUED)

GROSS BETA CONCENTRATION IN PRECIPITATION
AUGUST 1986

LOCATION	DEPTH (mm)	ACT.	$\pm 2s$ (nCi/m ²)
SC:BARNWELL	61.6	0.04	0.03
SC:COLUMBIA	261.2	0.70	0.16
SD:PIERRE	72.6	0.09	0.03
TN:KNOXVILLE	50.0	0.07	0.03
TN:NASHVILLE	102.4	0.07	0.04
TX:AUSTIN	20.0	0.03	0.01
TX:EL	40.0	0.02	0.02
VA:LYNCHBURG	38.6	0.33	0.04
WI:MADISON	95.0	0.05	0.04
WV:CHARLESTON	35.2	0.03	0.02
WY:CHEYENNE	21.4	0.08	0.01

s = SIGMA COUNTING ERROR

TABLE 7

GROSS BETA CONCENTRATION IN PRECIPITATION

SEPTEMBER 1986

LOCATION	DEPTH (mm)	ACT. (nCi/m ²)	+ 2s
AL:MONTGOMERY	48.0	0.11	0.03
AR:LITTLE ROCK	23.6	0.02	0.01
AZ:PHOENIX	8.0	0.00	0.01
CA:BERKELEY	39.0	0.03	0.02
CT:HARTFORD	17.0	0.10	0.01
DE:WILMINGTON	51.0	0.12	0.03
FL:JACKSONVILLE	84.0	0.09	0.05
FL:MIAMI	79.0	0.08	0.04
GA:ATLANTA	24.0	0.03	0.01
ID:BOISE	55.8	0.14	0.03
IL:CHICAGO	21.4	0.12	0.06
IN:INDIANAPOLIS	55.0	0.10	0.03
LA:NEW ORLEANS	40.0	0.03	0.02
ME:AUGUSTA	62.0	0.20	0.04
MI:LANSING	85.4	0.22	0.09
MN:MINNEAPOLIS	50.2	0.15	0.08
MO:JEFFERSON CITY	40.0	0.01	0.02
MS:JACKSON	48.0	0.04	0.02
NC:CHARLOTTE	29.0	0.08	0.02
NC:WILMINGTON	52.0	0.09	0.03
ND:BISMARCK	8.8	0.11	0.05
NH:CONCORD	58.0	0.21	0.04
NJ:TRENTON	28.2	0.08	0.02
NM:SANTA FE	12.0	0.01	0.01
NY:ALBANY	22.0	0.10	0.02
NY:NEW YORK CITY	29.2	0.05	0.02
NY:NIAGARA FALLS	63.0	0.36	0.09
NY:SYRACUSE	34.0	1.70	0.15
NY:YAPHANK	33.0	0.08	0.02
OH:COLUMBUS	98.0	0.07	0.04
OH:PAINESVILLE	19.2	0.20	0.06
OH:TOLEDO	30.0	0.10	0.06
OK:OKLAHOMA CITY	43.4	0.03	0.02
OR:PORTLAND	58.2	0.05	0.03
PA:HARRISBURG	57.6	0.11	0.03
PA:PITTSBURGH	62.4	0.12	0.03

TABLE 7 (CONTINUED)
 GROSS BETA CONCENTRATION IN PRECIPITATION
 SEPTEMBER 1986

LOCATION	DEPTH (mm)	ACT.	$\pm 2s$ (nCi/m ²)
SC:COLUMBIA	16.0	0.02	0.01
SD:PIERRE	7.9	0.02	0.01
TN:KNOXVILLE	69.6	0.07	0.03
TN:NASHVILLE	69.6	0.04	0.03
TX:AUSTIN	24.0	0.00	0.01
TX:EL PASO	7.4	0.00	0.01
VA:LYNCHBURG	92.8	0.38	0.06
WA:OLYMPIA	1.4	0.13	0.05
WI:MADISON	6.0	0.13	0.09
WV:CHARLESTON	39.0	0.04	0.02
WY:CHEYENNE	10.8	0.01	0.01

s = SIGMA COUNTING ERROR

TABLE 8

PRECIPITATION
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1986

LOCATION	JULY		AUGUST		SEPTEMBER	
	nCi/l	+ 2s	nCi/l	+ 2s	nCi/l	+ 2s
AL:MONTGOMERY	0.2	0.2	0.2	0.2	0.4	0.2
AR:LITTLE ROCK	NS		0.3	0.2	0.1	0.2
AZ:PHOENIX	0.2	0.2	NS		0.1	0.2
CA:BERKELEY	0.2	0.2	NS		0.1	0.2
CO:DENVER	NS		0.3	0.2	NS	
CT:HARTFORD	0.1	0.2	0.2	0.2	0.2	0.2
DE:WILMINGTON	0.2	0.2	0.1	0.2	0.2	0.2
FL:JACKSONVILLE	0.2	0.2	0.2	0.2	0.2	0.2
FL:MIAMI	0.2	0.2	0.2	0.2	0.1	0.2
GA:ATLANTA	0.4	0.2	0.3	0.2	0.2	0.2
ID:BOISE	NS		NS		0.1	0.2
ID:IDAHO FALLS	0.3	0.2	0.2	0.2	NS	
IL:CHICAGO	0.2	0.2	0.1	0.2	0.3	0.2
IN:INDIANAPOLIS	0.2	0.2	0.3	0.2	0.3	0.2
LA:NEW ORLEANS	0.2	0.2	0.2	0.2	0.1	0.2
ME:AUGUSTA	0.2	0.2	0.3	0.2	0.3	0.2
MI:LANSING	0.2	0.2	0.3	0.2	0.3	0.2
MN:MINNEAPOLIS	0.2	0.2	0.2	0.2	0.1	0.2
MO:JEFFERSON CITY	NS		0.2	0.2	0.1	0.2
MS:JACKSON	0.1	0.2	0.4	0.2	0.3	0.2
NC:CHARLOTTE	0.2	0.2	0.1	0.2	0.3	0.2
NC:WILMINGTON	0.2	0.2	0.1	0.2	0.2	0.2
ND:BISMARCK	0.2	0.2	0.1	0.2	0.1	0.2
NH:CONCORD	0.2	0.2	0.2	0.2	0.3	0.2
NJ:TRENTON	0.2	0.2	0.3	0.2	0.2	0.2
NM:SANTA FE	0.2	0.2	0.1	0.2	0.2	0.2
NV:LAS VEGAS	0.1	0.2	NS		NS	
NY:ALBANY	0.1	0.2	0.2	0.2	0.3	0.2
NY:NEW YORK CITY	0.3	0.2	0.2	0.2	0.2	0.2
NY:NIAGARA FALLS	0.3	0.2	0.2	0.2	0.2	0.2
NY:SYRACUSE	0.2	0.2	0.2	0.2	0.4	0.2
NY:YAPHANK	0.1	0.2	0.1	0.2	0.2	0.2
OH:COLUMBUS	NS		0.2	0.2	0.2	0.2
OH:PAINESVILLE	0.1	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	NS		0.2	0.2	0.2	0.2
OR:PORTLAND	0.2	0.2	NS		0.1	0.2

TABLE 8 (CONTINUED)

PRECIPITATION
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1986

LOCATION	JULY		AUGUST		SEPTEMBER	
	nCi/l	+ 2s	nCi/l	+ 2s	nCi/l	+ 2s
PA:HARRISBURG	0.2	0.2	0.2	0.2	0.2	0.2
PA:MIDDLETOWN	0.2	0.2	0.2	0.2	NS	
PA:PITTSBURGH	0.1	0.2	0.2	0.2	0.1	0.2
RI:PROVIDENCE	0.3	0.2	0.2	0.2	NS	
SC:BARNWELL	1.6	0.2	0.3	0.2	NS	
SC:COLUMBIA	0.5	0.2	0.3	0.2	0.1	0.2
SD:PIERRE	NS		0.1	0.2	0.1	0.2
TN:KNOXVILLE	0.2	0.2	0.2	0.2	0.4	0.2
TN:NASHVILLE	0.4	0.2	0.5	0.2	0.1	0.2
TX:AUSTIN	NS		0.1	0.2	0.1	0.2
TX:EL PASO	0.2	0.2	0.2	0.2	0.1	0.2
VA:LYNCHBURG	0.2	0.2	0.2	0.2	0.2	0.2
VA:VIRGINIA BEACH	0.2	0.2	NS		NS	
WA:OLYMPIA	0.2	0.2	NS		0.1	0.2
WI:MADISON	0.2	0.2	0.3	0.2	0.3	0.2
WV:CHARLESTON	0.1	0.2	0.2	0.2	0.2	0.2
WY:CHEYENNE	0.1	0.2	0.2	0.2	0.2	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 analyses of semi-annual 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 plutonium and uranium results for the period January - June 1986 are shown in Table 9.

Table 9.1 contains the results of plutonium and uranium analyses on selected precipitation composite samples for 1986. Those ERAMS stations that have the longest history of continuous collection were selected for these analyses.

TABLE 9

 PLUTONIUM AND URANIUM IN AIRBORNE PARTICULATES
 JANUARY - JUNE 1986 COMPOSITES

LOCATION	^{238}Pu		^{239}Pu		^{234}U		^{235}U		^{238}U	
	aCi/m ³ _{+ 2s}	aCi/m ³ _{+ 2s}	aCi/m ³ _{+ 2s}	aCi/m ³ _{+ 2s}	aCi/m ³ _{+ 2s}	aCi/m ³ _{+ 2s}	aCi/m ³ _{+ 2s}	aCi/m ³ _{+ 2s}	aCi/m ³ _{+ 2s}	aCi/m ³ _{+ 2s}
AL:ASHFORD	0.5	0.7	0.5	0.4	22.9	3.4	0.7	0.4	20.6	3.1
AL:MONTGOMERY	0.4	0.4	0.2	0.3	15.2	2.3	0.2	0.2	12.9	2.1
AR:LITTLE ROCK	1.6	1.1	-0.2	0.8	21.3	3.4	0.4	0.5	24.4	3.7
CA:BERKELEY	1.9	0.9	0.4	0.4	7.5	2.0	0.1	0.2	7.2	1.9
CA:LOS ANGELES	1.4	0.7	0.5	0.4	19.4	3.4	0.9	0.6	23.7	3.8
CO:DENVER	0.9	1.5	4.2	1.6	39.1	5.2	1.5	0.9	39.9	5.3
CT:HARTFORD	0.7	0.5	0.2	0.3	23.0	4.4	1.6	0.9	18.0	3.5
DE:WILMINGTON	0.8	0.4	-0.1	0.4	13.8	2.2	0.8	0.4	13.0	2.1
FL:JACKSONVILLE	0.7	1.0	0.3	0.6	19.8	4.3	1.3	0.9	19.0	4.2
FL:MIAMI	0.2	0.2	0.8	0.5	19.2	3.4	0.6	0.6	17.1	3.1
HI:HONOLULU	0.2	0.4	0.3	0.3	6.8	1.5	0.1	0.2	6.9	1.5
IA:IOWA CITY	-0.2	0.6	0.2	0.4	15.8	2.7	1.2	0.7	11.5	2.2
ID:BOISE	2.6	1.2	0.7	0.8	34.7	5.0	1.4	0.9	24.5	4.0
ID:IDAHO FALLS	4.5	2.3	0.6	1.0	62.0	9.0	1.8	1.3	60.1	8.7
IL:CHICAGO	0.4	0.5	0.1	0.2	18.7	3.4	1.0	0.7	19.2	3.4
IN:INDIANAPOLIS	0.4	0.5	0.4	0.4	38.0	5.6	2.0	1.0	33.9	5.2
KS:TOPEKA	0.4	1.0	-0.9	1.1	20.2	3.5	1.2	0.7	21.0	3.5
ME:AUGUSTA	0.5	0.7	0.5	0.6	32.8	5.8	0.9	0.9	32.1	5.5
MI:LANSING	0.3	0.4	0.1	0.2	14.6	2.7	-0.1	0.2	12.0	2.3
MN:MINNEAPOLIS	-0.1	0.8	0.4	0.4	18.1	3.2	1.2	0.7	17.2	3.1
MO:JEFFERSON CITY	0.1	0.7	0.2	0.4	16.2	3.2	1.2	0.8	18.0	3.4
MS:JACKSON	0.7	1.5	0.2	1.0	48.5	8.3	2.3	1.4	41.2	7.4
NC:CHARLOTTE	0.2	0.3	0.2	0.2	19.6	3.1	0.8	0.5	16.1	2.6
NC:WILMINGTON	0.4	0.2	0.3	0.2	15.5	2.6	0.9	0.5	11.7	2.1
ND:BISMARCK	0.6	1.3	0.9	0.7	30.2	4.7	1.7	0.9	28.8	4.5
NH:CONCORD	0.2	0.4	0.5	0.4	25.4	4.4	0.7	0.6	27.9	4.5
NJ:TRENTON	0.4	0.5	0.1	0.3	16.1	2.7	0.1	0.3	15.9	2.7
NM:SANTA FE	0.2	1.5	0.7	0.7	14.9	3.7	0.8	1.1	17.5	4.1
NV:LAS VEGAS	1.9	0.9	0.9	0.7	104.5	11.9	1.6	1.1	69.5	8.8
NY:ALBANY	0.1	1.1	0.5	0.8	37.1	6.3	0.5	0.7	27.5	5.1
NY:NEW YORK CITY	0.1	1.2	0.2	0.5	21.4	4.9	2.5	1.4	21.9	4.9
NY:NIAGARA FALLS	0.9	0.9	2.1	1.1	41.5	6.4	0.7	0.6	43.5	6.7
NY:SYRACUSE	0.7	0.6	0.1	0.6	22.3	4.2	1.2	0.9	22.1	4.2
NY:YAPHANK	1.1	0.5	0.6	0.3	10.2	1.9	0.8	0.5	10.3	1.9
OH:COLUMBUS	1.1	1.4	0.1	0.4	27.5	4.7	2.3	1.2	27.6	4.7
OH:PAINESVILLE	1.2	0.9	0.0	0.0	23.8	3.8	0.5	0.7	26.2	4.0
OH:TOLEDO	1.0	0.9	0.5	0.4	26.2	4.2	1.0	0.8	26.2	4.2
OK:OKLAHOMA CITY	1.6	2.8	1.1	1.0	29.3	7.6	0.0	1.0	27.1	6.9
OR:PORTLAND	3.0	2.3	0.0	1.4	30.5	7.0	3.3	2.1	32.2	7.2
PA:GOLDSBORO	1.1	0.9	0.7	0.6	20.5	4.4	0.5	0.6	19.5	4.1

TABLE 9 (CONTINUED)

 PLUTONIUM AND URANIUM IN AIRBORNE PARTICULATES
 JANUARY - JUNE 1986 COMPOSITES

LOCATION	^{238}Pu		^{239}Pu		^{234}U		^{235}U		^{238}U	
	$\text{aCi/m}^3 \pm 2s$	$\text{aCi/m}^3 \pm 2s$	$\text{aCi/m}^3 \pm 2s$	$\text{aCi/m}^3 \pm 2s$	$\text{aCi/m}^3 \pm 2s$	$\text{aCi/m}^3 \pm 2s$	$\text{aCi/m}^3 \pm 2s$	$\text{aCi/m}^3 \pm 2s$	$\text{aCi/m}^3 \pm 2s$	$\text{aCi/m}^3 \pm 2s$
PA:HARRISBURG	0.2	0.6	0.4	0.5	17.7	3.4	0.4	0.5	15.6	2.6
PA:PITTSBURGH	1.1	0.8	0.3	0.9	32.8	5.6	1.4	1.0	30.3	5.3
PA:THREE MILE ISL	1.0	0.9	0.7	0.5	19.6	3.5	0.6	0.5	18.8	3.4
RI:PROVIDENCE	0.7	0.8	0.2	0.3	37.6	7.0	1.4	1.1	20.1	4.3
SC:BARNWELL	0.4	0.7	0.8	0.7	20.4	3.8	0.9	0.7	22.9	4.1
SC:COLUMBIA	0.3	0.4	0.6	0.5	45.3	6.6	1.4	0.8	41.9	6.2
SD:PIERRE	0.2	0.7	1.2	0.7	17.1	3.4	1.0	0.8	19.1	3.6
TN:KNOXVILLE	0.7	0.9	0.4	0.5	51.0	8.4	1.4	1.0	25.9	5.2
TN:NASHVILLE	0.2	0.6	0.1	0.2	24.3	4.6	0.3	0.9	24.6	4.6
TX:AUSTIN	0.3	0.4	0.1	0.2	8.5	1.3	0.4	0.3	9.2	1.4
TX:EL PASO	6.7	3.7	2.2	1.9	79.1	13.4	3.1	2.6	70.8	12.4
VA:LYNCHBURG	0.3	0.3	0.3	0.3	109.8	12.6	1.1	0.5	16.6	2.5
WA:OLYMPIA	0.7	0.4	0.0	0.2	3.9	1.0	0.2	0.2	3.1	0.8
WA:SPOKANE	4.5	3.4	0.8	1.0	32.1	7.4	2.1	1.7	26.6	6.8
WI:MADISON	0.3	0.8	0.1	0.4	14.4	2.7	1.5	0.8	14.1	2.6

s = SIGMA COUNTING ERROR

TABLE 9.1

PLUTONIUM AND URANIUM ANALYSES
OF
SELECTED PRECIPITATION COMPOSITE SAMPLES

1986

LOCATION	^{238}Pu		^{239}Pu		^{234}U		^{235}U		^{238}U	
	pCi/l	$\pm 2s$	pCi/l	$\pm 2s$	pCi/l	$\pm 2s$	pCi/l	$\pm 2s$	pCi/l	$\pm 2s$
AL:MONTGOMERY	0.007	0.022	0.026	0.022	0.031	0.018	0.001	0.007	0.019	0.014
CA:BERKELEY	0.024	0.030	0.007	0.012	0.133	0.053	0.000	0.001	0.078	0.036
CO:DENVER	0.024	0.017	0.015	0.014	0.088	0.084	0.016	0.023	0.104	0.063
FL:MIAMI	0.011	0.013	0.002	0.005	0.062	0.026	0.016	0.013	0.034	0.021
ID:IDAHO FALLS	0.016	0.013	0.003	0.005	0.064	0.045	-0.001	0.010	0.046	0.026
IL:CHICAGO	0.002	0.016	0.005	0.013	0.018	0.024	0.004	0.007	0.007	0.010
MN:MINNEAPOLIS	0.015	0.018	-0.002	0.005	0.052	0.025	0.009	0.010	0.036	0.019
ND:BISMARCK	-0.006	0.045	-0.049	0.038	0.074	0.038	0.014	0.022	0.020	0.024
NJ:TRENTON	0.018	0.020	-0.003	0.006	0.038	0.027	0.003	0.010	0.035	0.020
NY:NEW YORK CITY	0.021	0.019	0.009	0.010	0.047	0.028	0.013	0.014	0.032	0.021
NY:NIAGARA FALLS	0.021	0.019	0.003	0.006	0.064	0.027	0.005	0.008	0.079	0.026
OR:PORTLAND	0.067	0.044	-0.009	0.026	0.024	0.022	0.008	0.019	0.058	0.031
PA:HARRISBURG	-0.008	0.024	0.002	0.025	0.047	0.028	0.009	0.011	0.053	0.026
SC:BARNWELL	0.018	0.027	0.007	0.009	0.052	0.028	0.007	0.010	0.032	0.022
SC:COLUMBIA	0.050	0.031	0.007	0.009	0.069	0.036	-0.004	0.009	0.058	0.033
TN:KNOXVILLE	0.032	0.032	-0.004	0.008	0.038	0.022	0.031	0.020	0.032	0.023
VA:LYNCHBURG	0.000	0.023	0.023	0.017	0.097	0.032	0.013	0.012	0.030	0.018

s = SIGMA COUNTING ERROR

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 July - September 1986 are shown in Table 10.

TABLE 10

SURFACE WATER
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1986

LOCATION	SOURCE	DATE COLLECTED	nCi/l	+ 2s
AL:DECATUR	TENNESSEE RIVER	7/ 8/86	0.3	0.2
AL:GORDAN	CHATTAHOOCHEE R.	7/ 1/86	0.3	0.2
AL:SCOTTSBORO	TENNESSEE RIVER	7/10/86	0.3	0.2
AR:LITTLE ROCK	ARKANSAS RIVER	7/ 3/86	0.2	0.2
CA:DIABLO CANYON	PACIFIC OCEAN	7/30/86	0.1	0.2
CA:EUREKA	HUMBOLDT BAY	7/ 3/86	0.2	0.2
CA:SAN ONOFRE	PACIFIC OCEAN	9/29/86	0.2	0.2
CO:GREELEY	SOUTH PLATTE RIVER	9/ 3/86	0.2	0.2
CT:EAST HADDAM	CONNECTICUT RIVER	8/22/86	0.8	0.2
CT:WATERFORD	LONG ISLAND SOUND	8/22/86	0.2	0.2
FL:CRYSTAL RIVER	GULF OF MEXICO	7/ 1/86	0.1	0.2
FL:FT. PIERCE	ATLANTIC OCEAN	7/ 1/86	0.1	0.2
FL:HOMESTEAD	BISCAYNE BAY	8/27/86	0.1	0.2
IA:CEDAR RAPIDS	CEDAR RIVER	7/ 2/86	0.2	0.2
ID:BUHL	SNAKE RIVER	7/21/86	0.2	0.2
IL:MORRIS	ILLINOIS RIVER	7/23/86	0.2	0.2
IL:ZION	LAKE MICHIGAN	9/30/86	0.2	0.2
KS:LEROY	NEOSHO RIVER	8/15/86	0.2	0.2
LA:NEW ORLEANS	MISSISSIPPI RIVER	7/11/86	0.2	0.2
MA:PLYMOUTH	CAPE COD BAY	7/ 3/86	0.2	0.2
MA:ROWE	DEERFIELD RIVER	7/ 7/86	9.4 *	0.3
MD:CONOWINGO	SUSQUEHANNA RIVER	7/ 8/86	0.2	0.2
MD:LUSBY	CHESAPEAKE BAY	7/ 8/86	0.3	0.2
ME:WISCASSET	MONTSEWAY BAY	7/ 8/86	0.1	0.2
MI:BRIDGMAN	LAKE MICHIGAN	7/13/86	0.3	0.2
MI:CHARLEVOIX	LAKE MICHIGAN	7/ 5/86	0.3	0.2
MI:MONROE	LAKE ERIE	7/14/86	0.6	0.2
MI:SO. HAVEN	LAKE MICHIGAN	7/13/86	0.3	0.2
MN:RED WING	MISSISSIPPI RIVER	7/ 1/86	0.2	0.2
MS:PORT GIBSON	MISSISSIPPI RIVER	7/22/86	0.3	0.2
NC:CHARLOTTE	CATAWBA RIVER	7/ 7/86	0.9	0.2
NC:SOUTHPORT	ATLANTIC OCEAN	7/16/86	0.1	0.2
NE:RULO	MISSOURI RIVER	7/16/86	0.2	0.2
NJ:BAYSIDE	DELAWARE RIVER	7/22/86	0.2	0.2
NJ:OYSTER CREEK	OYSTER CREEK	8/ 7/86	0.2	0.2
NV:BOULDER CITY	COLORADO RIVER	9/ 3/86	0.2	0.2
NY:CHELSEA	HUDSON RIVER	7/30/86	0.1	0.2
NY:OSSINING	HUDSON RIVER	7/ 8/86	0.2	0.2
NY:OSWEGO	LAKE ONTARIO	7/30/86	0.2	0.2

TABLE 10 (CONTINUED)

SURFACE WATER
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1986

LOCATION	SOURCE	DATE COLLECTED	nCi/l	+ - 2s
OH:TOLEDO	LAKE ERIE	7/ 2/86	0.2	0.2
PA:DANVILLE	SUSQUEHANNA RIVER	7/16/86	0.3	0.2
SC:ALLENDALE	SAVANNAH RIVER	7/31/86	2.6	0.2
SC:BROAD RIVER	BROAD RIVER	7/31/86	0.3	0.2
SC:HARTSVILLE	LAKE ROBINSON	7/14/86	2.3	0.2
TN:DAISY	TENNESSEE RIVER	8/27/86	0.4	0.2
TN:KINGSTON	CLINCH RIVER	7/21/86	0.4	0.2
TX:EL PASO	RIO GRANDE	9/25/86	0.1	0.2
TX:MATAGORDA	COLORADO RIVER	7/25/86	0.1	0.2
VA:DOSWELL	NORTH ANNA RIVER	7/ 2/86	3.7	0.2
VA:NEWPORT NEWS	JAMES RIVER	7/22/86	0.2	0.2
WA:NORTHPORT	COLUMBIA RIVER	7/15/86	0.3	0.2
WA:RICHLAND	COLUMBIA RIVER	7/11/86	0.5	0.2
WI:TWO CREEKS	LAKE MICHIGAN	7/ 9/86	0.2	0.2
WI:VICTORY	MISSISSIPPI RIVER	7/ 7/86	0.2	0.2
WV:WHEELING	OHIO RIVER	9/ 4/86	0.3	0.2

* According to comments from Rowe, MA., the elevated level is attributable to a discharge from a test tank at the time of sampling.

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 and -239 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 July - September 1986 are shown in Table 11.

The annual alpha, beta, gamma, radium, and strontium analyses for 1985 annual drinking water samples are shown in Table 12.

Plutonium and uranium analyses are similar to procedures given for air particulate samples. Analyses were altered to coincide with revised EPA standards. The results of 1985 composites are shown in Table 13.

TABLE 11
 DRINKING WATER
 TRITIUM CONCENTRATION
 JULY - SEPTEMBER 1986

LOCATION	DATE COLLECTED	nCi/l	+	2s
AK:FAIRBANKS	7/15/86	0.2		0.2
AL:DOTHAN	7/ 1/86	0.1		0.2
AL:MONTGOMERY	7/11/86	0.2		0.2
AL:MUSCLE SHOALS	7/ 8/86	0.4		0.2
AL:SCOTTSBORO	7/10/86	0.4		0.2
AR:LITTLE ROCK	7/ 1/86	0.2		0.2
CA:BERKELEY	7/ 7/86	0.2		0.2
CA:LOS ANGELES	7/ 7/86	0.1		0.2
CO:DENVER	7/ 3/86	0.2		0.2
CO:PLATTEVILLE	7/ 3/86	0.4		0.2
CT:HARTFORD	7/ 3/86	0.1		0.2
DE:DOVER	7/ 3/86	0.2		0.2
FL:MIAMI	7/ 7/86	0.2		0.2
FL:TAMPA	7/ 1/86	0.2		0.2
GA:SAVANNAH	7/ 3/86	2.3		0.2
IA:CEDAR RAPIDS	7/ 2/86	0.2		0.2
ID:BOISE	9/16/86	0.3		0.2
ID:IDAHO FALLS	8/18/86	0.3		0.2
IL:MORRIS	7/ 2/86	0.2		0.2
IL:W. CHICAGO	7/ 1/86	0.1		0.2
KS:TOPEKA	7/ 1/86	0.2		0.2
LA:NEW ORLEANS	7/ 7/86	0.2		0.2
MA:LAWRENCE	7/10/86	0.2		0.2
MA:ROWE	7/ 7/86	0.2		0.2
MD:BALTIMORE	7/ 2/86	0.2		0.2
MD:CONOWINGO	7/ 8/86	0.1		0.2
ME:AUGUSTA	7/ 8/86	0.2		0.2
MI:DETROIT	7/ 8/86	0.3		0.2
MI:GRAND RAPIDS	7/15/86	0.5		0.2
MN:MINNEAPOLIS	7/ 3/86	0.2		0.2
MN:RED WING	7/ 1/86	0.1		0.2
MS:JACKSON	7/22/86	0.2		0.2
MS:PORT GIBSON	7/22/86	0.2		0.2
MT:HELENA	7/ 1/86	0.2		0.2
NC:CHARLOTTE	7/ 7/86	0.9		0.2
NC:WILMINGTON	7/16/86	0.3		0.2
ND:BISMARCK	7/ 3/86	0.2		0.2

TABLE 11 (CONTINUED)

DRINKING WATER
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1986

LOCATION	DATE COLLECTED	nCi/l	+	2s
NE:LINCOLN	7/18/86	0.2		0.2
NJ:TRENTON	9/ 8/86	0.2		0.2
NJ:WARETOWN	8/ 7/86	0.2		0.2
NM:SANTA FE	7/13/86	0.1		0.2
NV:LAS VEGAS	7/ 3/86	0.2		0.2
NY:ALBANY	7/ 2/86	0.2		0.2
NY:NEW YORK CITY	8/20/86	0.2		0.2
NY:NIAGARA FALLS	7/ 3/86	0.2		0.2
NY:SYRACUSE	9/11/86	0.4		0.2
OH:CINCINNATI	7/ 1/86	0.3		0.2
OH:COLUMBUS	7/14/86	0.3		0.2
OH:EAST LIVERPOOL	7/11/86	0.2		0.2
OH:PAINESVILLE	7/ 1/86	0.2		0.2
OH:TOLEDO	7/ 2/86	0.2		0.2
OK:OKLAHOMA CITY	7/ 1/86	0.1		0.2
OR:PORTLAND	7/ 7/86	0.1		0.2
PA:COLUMBIA	8/ 7/86	0.2		0.2
PA:HARRISBURG	7/ 3/86	0.2		0.2
PA:PITTSBURGH	7/11/86	0.1		0.2
PC:COROZAL	7/24/86	0.4		0.2
RI:PROVIDENCE	7/ 1/86	0.1		0.2
SC:BARNWELL	8/ 4/86	0.2		0.2
SC:COLUMBIA	7/ 7/86	0.3		0.2
SC:HARTSVILLE	7/16/86	0.2		0.2
SC:JENKINSVILLE	8/ 1/86	0.1		0.2
SC:SENECA	7/28/86	0.2		0.2
TN:CHATTANOOGA	7/ 3/86	0.4		0.2
TN:KNOXVILLE	7/ 1/86	0.2		0.2
TX:AUSTIN	7/28/86	0.4		0.2
VA:DOSWELL	7/24/86	0.3		0.2
VA:LYNCHBURG	7/ 1/86	0.2		0.2
VA:VIRGINIA BEACH	7/ 1/86	0.1		0.2
VI:ST. THOMAS	7/25/86	0.3		0.2
WA:RICHLAND	7/11/86	0.6		0.2
WA:SEATTLE	7/ 3/86	0.1		0.2
WI:GENOA CITY	7/ 7/86	0.2		0.2
WI:MADISON	7/ 2/86	0.1		0.2

s = SIGMA COUNTING ERROR

TABLE 12
 DRINKING WATER
 ALPHA, BETA AND GAMMA CONCENTRATION
 1985

LOCATION	TOTAL SOLIDS mg/l	GROSS BETA		GROSS ALPHA		⁹⁰ Sr		²²⁶ Ra		SPECIFIC GAMMA ACTIVITY
		pCi/l	+ 2s	pCi/l	+ 2s	pCi/l	+ 2s	pCi/l	+ 2s	
AK: FAIRBANKS	168.7	2.9	1.4	1.4	1.0	0.2	1.0	NA		ND
AL: DOTHAN	173.3	3.0	1.4	0.7	0.8	0.1	1.0	NA		ND
AL: MONTGOMERY	66.6	1.6	0.8	0.4	0.4	0.1	1.0	NA		ND
AL: MUSCLE SHOALS	110.0	0.7	0.4	3.0	0.9	0.2	1.0	0.1	0.1	ND
AL: SCOTTSBORO	135.6	2.8	1.0	0.6	0.6	0.2	1.0	NA		ND
AR: LITTLE ROCK	39.0	1.9	0.6	0.1	0.2	0.2	1.0	NA		ND
CA: BERKELEY	43.8	0.7	0.4	1.9	0.6	0.1	1.0	NA		ND
CA: LOS ANGELES	346.0	6.4	2.6	4.6	2.2	0.2	1.0	0.1	0.1	ND
CO: DENVER	108.8	1.8	0.8	1.1	0.6	0.2	1.0	NA		ND
CO: PLATTEVILLE	880.0	6.7	3.8	21.4	7.1	0.3	1.0	0.4	0.1	ND
CT: HARTFORD	30.8	0.5	0.4	0.0	0.0	0.1	1.0	NA		ND
DC: WASHINGTON	143.2	2.8	1.5	0.8	0.7	NA		NA		ND
DE: DOVER	288.0	4.1	2.1	1.4	1.4	0.1	1.0	NA		ND
FL: MIAMI	196.7	1.5	1.1	1.4	1.1	0.0	1.0	NA		ND
FL: TAMPA	336.7	4.8	3.2	0.9	1.7	0.0	1.0	NA		ND
GA: SAVANNAH	75.0	2.7	0.9	0.6	0.5	0.0	1.0	NA		ND
HI: HONOLULU	194.3	1.2	1.0	1.3	0.9	0.0	1.0	NA		ND
IA: CEDAR RAPIDS	175.3	3.3	1.5	0.6	0.9	-0.2	1.0	NA		ND
ID: BOISE	97.4	0.8	0.7	0.6	0.4	0.0	1.0	NA		ND
ID: IDAHO FALLS	290.5	4.4	1.9	3.7	1.7	0.0	1.0	0.0	0.1	ND
IL: MORRIS	328.7	17.2	3.4	11.3	3.0	0.3	1.0	6.0	0.1	ND
IL: W. CHICAGO	339.3	14.9	3.2	10.9	2.8	0.1	1.0	4.1	0.1	ND
KS: TOPEKA	298.5	7.5	2.5	0.9	1.5	-0.2	1.0	NA		ND
LA: NEW ORLEANS	178.0	3.7	1.6	0.9	0.8	0.1	1.0	NA		ND
MA: LAWRENCE	98.0	2.1	0.9	0.4	0.5	-0.2	1.0	NA		ND
MA: ROWE	45.0	0.7	0.6	0.6	0.4	-0.5	1.0	NA		ND
MD: BALTIMORE	103.4	2.0	1.0	0.2	0.4	0.2	1.0	NA		ND
MD: CONOWINGO	192.7	1.9	1.1	1.6	1.0	-0.1	1.0	NA		ND
MI: DETROIT	104.6	1.9	0.6	3.4	0.9	0.7	1.0	0.1	0.1	ND
MI: GRAND RAPIDS	177.3	2.5	1.4	0.2	0.9	0.6	1.0	NA		ND
MN: MINNEAPOLIS	114.2	2.8	1.0	0.9	0.6	-0.1	1.0	NA		ND
MN: RED WING	297.3	6.0	2.3	5.7	2.0	-0.2	1.0	2.3	0.1	ND
MS: JACKSON	85.4	3.0	1.0	0.2	0.4	0.5	1.0	NA		ND

TABLE 12 (CONTINUED)

 DRINKING WATER
 ALPHA, BETA AND GAMMA CONCENTRATION

1985

ANNUAL ANALYSES

LOCATION	TOTAL SOLIDS mg/l	GROSS BETA		GROSS ALPHA		^{90}Sr		^{226}Ra		SPECIFIC GAMMA ACTIVITY
		pCi/l	+ 2s	pCi/l	+ 2s	pCi/l	+ 2s	pCi/l	+ 2s	
MS:PORT GIBSON	303.2	7.0	2.1	1.5	1.4	-0.2	1.0	NA		ND
MT:HELENA	185.2	3.0	1.8	0.1	0.7	-0.2	1.0	NA		ND
NC:CHARLOTTE	48.6	1.9	0.9	-0.1	0.3	-0.5	1.0	NA		ND
NC:WILMINGTON	100.8	2.2	0.9	0.4	0.5	0.0	1.0	NA		ND
ND:BISMARCK	319.5	2.7	2.2	0.1	2.1	-0.1	1.0	NA		ND
NE:LINCOLN	406.7	11.7	3.7	0.7	1.6	0.3	1.0	NA		ND
NH:CONCORD	63.0	0.2	0.3	1.4	0.5	-0.3	1.0	NA		ND
NJ:TRENTON	107.6	1.3	0.8	0.0	0.4	0.1	1.0	NA		ND
NJ:WARETOWN	60.4	1.5	0.8	0.8	0.5	-0.2	1.0	NA		ND
NM:SANTA FE	155.8	1.9	0.8	4.2	1.2	-0.2	1.0	0.5	0.1	ND
NV:LAS VEGAS	575.0	6.6	3.9	3.8	4.5	0.6	1.0	0.2	0.1	ND
NY:ALBANY	99.8	1.3	0.8	0.1	0.5	0.0	1.0	NA		ND
NY:NEW YORK CITY	57.8	1.0	0.7	0.3	0.4	0.2	1.0	NA		ND
NY:NIAGARA FALLS	140.8	2.5	1.1	0.3	0.7	0.1	1.0	NA		ND
NY:SYRACUSE	132.0	1.9	1.1	0.8	0.6	0.4	1.0	NA		ND
OH:CINCINNATI	250.0	3.1	1.8	0.6	1.0	0.1	1.0	NA		ND
OH:COLUMBUS	252.7	18.2	10.6	-0.9	2.2	NA		NA		ND
OH:EAST LIVERPOOL	216.3	3.1	1.4	1.3	1.1	0.4	1.0	NA		ND
OH:PAINESVILLE	203.3	4.1	1.6	0.6	1.0	0.9	1.0	NA		ND
OH:TOLEDO	109.0	2.1	0.9	1.4	0.7	0.6	1.0	NA		ND
OK:OKLAHOMA CITY	77.2	2.7	0.9	0.4	0.4	0.2	1.0	NA		ND
OR:PORTLAND	23.4	0.9	0.7	0.2	0.3	0.2	1.0	NA		ND
PA:COLUMBIA	184.0	2.9	1.7	0.3	0.6	0.1	1.0	NA		ND
PA:HARRISBURG	33.0	1.2	0.4	0.1	0.1	0.2	1.0	NA		ND
PA:PITTSBURGH	183.8	3.4	1.2	1.4	18.0	0.5	1.0	NA		ND
PC:ANCON	71.2	0.1	0.6	0.2	6.3	0.0	1.0	NA		ND
RI:PROVIDENCE	59.6	1.5	0.8	0.3	0.3	0.3	1.0	NA		ND
SC:BARNWELL	25.8	1.5	0.8	0.3	0.3	0.0	1.0	NA		ND
SC:COLUMBIA	77.0	2.0	0.6	0.5	0.3	0.3	1.0	NA		ND
SC:HARTSVILLE	52.0	1.2	0.9	1.6	0.7	0.1	1.0	NA		ND
SC:JENKINSVILLE	170.0	5.6	0.9	18.6	2.3	-0.1	1.0	2.2	0.1	ND
SC:SENECA	30.2	-1.2	1.0	4.2	0.7	0.5	1.0	0.0	0.1	ND
TN:CHATTANOOGA	107.6	2.5	0.8	2.6	0.8	0.1	1.0	0.1	0.1	ND

TABLE 12 (CONTINUED)

DRINKING WATER
ALPHA, BETA AND GAMMA CONCENTRATION

1985

ANNUAL ANALYSES

LOCATION	TOTAL SOLIDS mg/l	GROSS BETA		GROSS ALPHA		⁹⁰ Sr		²²⁶ Ra		SPECIFIC GAMMA ACTIVITY
		pCi/l	± 2s	pCi/l	± 2s	pCi/l	± 2s	pCi/l	± 2s	
TN:KNOXVILLE	155.0	2.7	1.2	1.2	0.7	0.2	1.0	NA		ND
TX:AUSTIN	257.6	3.2	1.6	0.9	1.0	0.2	1.0	NA		ND
VA:DOSWELL	159.0	6.1	1.3	0.1	0.6	0.0	1.0	NA		ND
VA:LYNCHBURG	58.0	0.6	0.7	0.4	0.4	0.2	1.0	NA		ND
VA:VIRGINIA BEACH	138.0	3.2	1.0	0.5	0.6	0.6	1.0	NA		ND
VI:ST. THOMAS	19.2	0.7	0.8	0.1	0.2	0.1	1.0	NA		ND
WA:RICHLAND	84.0	1.3	0.9	0.7	0.4	0.2	1.0	NA		ND
WA:SEATTLE	33.8	0.8	0.3	2.9	0.6	0.4	1.0	0.0	0.1	ND
WI:GENOA CITY	198.3	1.7	1.6	1.0	1.0	-0.1	1.0	NA		ND
WI:MADISON	212.4	1.2	1.5	1.8	1.2	0.4	1.0	NA		ND

ND = NO ACTIVITY DETECTABLE

NA = NO ANALYSIS

s = SIGMA COUNTING ERROR

TABLE 13

PLUTONIUM AND URANIUM ANALYSES
OF
SELECTED DRINKING WATER COMPOSITE SAMPLES

LOCATION	1985									
	^{238}Pu		^{239}Pu		^{234}U		^{235}U		^{238}U	
	pCi/l	$\pm 2s$	pCi/l	$\pm 2s$	pCi/l	$\pm 2s$	pCi/l	$\pm 2s$	pCi/l	$\pm 2s$
AL:MUSCLE SHOALS	0.042	0.024	0.004	0.010	0.138	0.039	0.005	0.011	0.049	0.022
AR:LITTLE ROCK	0.100	0.087	-0.008	0.034	0.444	0.113	0.026	0.026	0.206	0.077
CA:LOS ANGELES	0.013	0.026	0.005	0.008	1.858	0.219	0.036	0.021	1.605	0.196
CO:PLATTEVILLE	0.738	0.169	0.081	0.052	6.401	0.622	0.119	0.042	4.881	0.491
CT:HARTFORD	0.840	0.216	0.073	0.060	0.446	0.197	0.047	0.061	0.169	0.139
FL:TAMPA	0.415	0.093	0.026	0.022	0.214	0.087	0.018	0.023	0.333	0.104
ID:IDAHO FALLS	0.016	0.013	0.005	0.007	0.857	0.109	0.025	0.016	0.475	0.074
IL:MORRIS	0.003	0.016	0.000	0.011	0.459	0.083	0.010	0.018	0.037	0.021
IL:W. CHICAGO	0.078	0.040	0.042	0.029	1.292	0.184	0.031	0.023	0.186	0.059
MI:DETROIT	0.006	0.013	-0.006	0.013	0.054	0.020	0.000	0.000	0.057	0.022
MN:RED WING	0.008	0.017	0.002	0.004	0.296	0.043	0.000	0.001	0.040	0.013
MS:PORT GIBSON	0.036	0.019	0.006	0.007	0.310	0.059	0.009	0.011	0.158	0.040
NM:SANTA FE	0.007	0.008	-0.001	0.003	2.378	0.209	0.032	0.014	1.623	0.151
NV:LAS VEGAS	0.005	0.013	0.002	0.003	2.225	0.210	0.058	0.019	1.391	0.142
PA:HARRISBURG	0.019	0.026	0.003	0.006	0.018	0.017	0.004	0.008	0.029	0.016
SC:COLUMBIA	-0.001	0.030	-0.003	0.031	0.024	0.026	-0.002	0.009	0.034	0.022
SC:JENKINSVILLE	0.017	0.030	0.004	0.007	15.540	1.294	0.096	0.035	3.563	0.348
SC:SENECA	0.002	0.015	0.000	0.006	0.039	0.016	-0.002	0.003	0.027	0.013
TN:CHATTANOOGA	0.015	0.011	0.002	0.003	0.033	0.014	0.012	0.008	0.031	0.013
WA:SEATTLE	0.014	0.012	0.002	0.005	0.019	0.012	0.001	0.002	0.016	0.009

THE MINIMUM DETECTABLE LEVEL IS .015 pCi/SAMPLE, FOR EACH INDIVIDUAL ISOTOPE.

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 a wide geographic coverage throughout the country.* Although exposure measurements at these few sites are not totally representative of nationwide exposures, they will be indicative of 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 July - September 1986 are shown in Table 14.

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

TABLE 14

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED	EXPOSURE	
		EXPOSURE	MR	MICRO R/HR \pm 2 s
AL:MONTGOMERY	7/03/86-10/03/86	21.7	9.8	6.2
CA:BERKELEY	7/03/86-10/01/86	14.8	6.8	10.5
CO:DENVER	7/02/86-10/01/86	34.3	15.7	4.9
FL:ORLANDO	6/30/86-10/01/86	15.5	7.0	5.2
ID:BOISE	7/07/86-10/21/86	34.1	13.4	3.9
IL:CHICAGO	7/09/86-10/07/86	21.0	9.7	2.9
ND:BISMARCK	7/16/86- 9/30/86	20.3	11.1	11.8
NJ:TRENTON	7/03/86-10/03/86	30.4	13.8	4.2
NM:SANTA FE	7/14/86-10/06/86	31.1	15.4	5.5
NV:LAS VEGAS	7/01/86-10/02/86	16.9	7.6	7.4
NY:NEW YORK	8/01/86-10/17/86	18.2	9.9	7.5
OH:COLUMBUS	7/09/86-10/02/86	9.4	4.6	8.8
OK:OKLAHOMA CITY	7/08/86-10/07/86	19.1	8.8	3.1
OR:PORTLAND	7/02/86-10/02/86	18.7	8.5	6.2
PA:HARRISBURG	7/07/86-10/01/86	15.9	7.7	4.0
PA:PITTSBURGH	7/03/86-10/02/86	26.4	12.1	7.4
RI:PROVIDENCE	7/01/86-10/01/86	29.8	13.5	3.0
SC:BARNWELL	7/10/86-10/30/86	25.1	9.3	5.0
SC:COLUMBIA	7/07/86-10/03/86	24.6	11.6	6.1
TN:KNOXVILLE	7/08/86-10/07/86	24.9	11.4	3.1
VA:RICHMOND	6/30/86-10/03/86	20.1	8.8	2.9
VT:MONTPELIER	7/10/86-10/17/86	43.3	18.2	5.4

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 would 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 65 samples are analyzed annually in July 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 July - September 1986 are shown in Tables 15 - 17.

Strontium values for these locations are shown in Table 18.

TABLE 15

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JULY 1986

LOCATION	DATE COLLECTED	K		^{137}Cs		^{140}Ba		^{131}I	
		g/l	+2s	pCi/l	+2s	pCi/l	+2s	pCi/l	+2s
AK:ANCHORAGE	7/ 2/86	1.50	0.13	7	7	3	9	11	7
AL:MONTGOMERY	7/10/86	1.41	0.12	4	9	7	9	-2	7
AR:LITTLE ROCK	7/14/86	1.56	0.13	10	7	7	9	5	7
AZ:PHOENIX	7/10/86	1.40	0.12	0	7	-2	9	-2	7
CA:LOS ANGELES	7/15/86	1.80	0.09	6	6	5	6	15	10
CA:SACRAMENTO	7/ 1/86	1.63	0.12	3	7	-1	8	3	7
CA:SACRAMENTO	7/29/86	1.61	0.12	-1	7	4	8	3	7
CA:SAN FRANCISCO	7/ 3/86	1.47	0.13	12	9	1	9	-3	7
CO:DENVER	7/ 2/86	1.49	0.13	18	9	11	10	-4	7
CO:DENVER	7/ 8/86	1.58	0.13	13	9	16	10	-2	7
CT:HARTFORD	7/ 1/86	1.46	0.09	11	6	2	6	0	5
DC:WASHINGTON	7/ 7/86	1.59	0.12	8	7	2	8	1	7
DC:WASHINGTON	7/11/86	1.49	0.12	2	7	6	9	1	7
DE:WILMINGTON	7/ 3/86	1.52	0.12	6	7	4	8	1	7
FL:TAMPA	7/ 1/86	1.54	0.08	11	5	5	6	-1	5
GA:ATLANTA	7/ 1/86	1.44	0.12	6	9	4	9	0	7
GA:ATLANTA	7/ 8/86	1.56	0.12	4	7	1	8	-3	7
HI:HONOLULU	7/ 1/86	1.57	0.08	2	5	0	6	3	5
IA:DES MOINES	7/ 7/86	1.53	0.13	22	10	6	10	2	7
IL:CHICAGO	7/ 7/86	1.76	0.25	4	18	5	19	1	14
IN:INDIANAPOLIS	7/ 7/86	1.67	0.13	11	9	5	9	3	7
KS:WICHITA	7/ 1/86	1.58	0.12	4	7	0	8	2	7
KS:WICHITA	7/ 7/86	1.59	0.08	2	5	2	6	4	5
KY:LOUISVILLE	7/ 1/86	1.55	0.13	7	7	-1	9	4	7
MA:BOSTON	7/ 8/86	1.52	0.13	11	9	-1	9	1	7
MA:BOSTON	7/29/86	1.60	0.12	9	7	1	8	-2	7
MD:BALTIMORE	7/ 3/86	1.59	0.13	4	7	3	9	5	7
MI:DETROIT	7/10/86	1.57	0.13	7	7	-1	9	4	7
MI:GRAND RAPIDS	7/ 7/86	1.44	0.12	11	7	2	9	7	7
MN:MINNEAPOLIS	7/ 7/86	1.63	0.13	6	7	-2	9	2	7
MN:ST. PAUL	7/ 1/86	1.79	0.18	22	13	13	13	10	10
MO:KANSAS CITY	7/ 9/86	1.57	0.12	5	7	5	8	5	7
MO:ST. LOUIS	7/ 1/86	1.59	0.13	14	9	4	9	7	8
MS:JACKSON	7/ 1/86	1.41	0.12	7	9	0	9	1	7
MS:JACKSON	7/ 7/86	1.53	0.13	8	9	5	9	0	7
MT:HELENA	7/ 3/86	1.51	0.13	13	9	5	9	0	7
NC:CHARLOTTE	7/15/86	1.85	0.25	13	18	-1	19	11	14
ND:MINOT	7/25/86	1.55	0.12	1	7	2	8	-6	7
NE:OMAHA	7/11/86	1.48	0.12	8	7	2	9	2	7
NE:OMAHA	7/31/86	1.60	0.13	9	7	1	9	3	7
NH:MANCHESTER	7/ 1/86	1.53	0.13	14	7	-2	9	7	7
NH:MANCHESTER	7/ 7/86	1.59	0.13	13	7	0	9	4	7

TABLE 15 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JULY 1986

LOCATION	DATE COLLECTED	K		^{137}Cs		^{140}Ba		^{131}I	
		g/l	+2s	pCi/l	+2s	pCi/l	+2s	pCi/l	+2s
NJ:TRENTON	7/ 1/86	1.65	0.13	6	7	3	9	5	7
NM:ALBUQUERQUE	7/ 8/86	1.51	0.13	9	7	0	9	5	7
NV:LAS VEGAS	7/15/86	1.67	0.13	4	7	1	9	6	7
NY:BUFFALO	7/ 7/86	1.61	0.08	6	5	3	6	-2	5
NY:NEW YORK CITY	7/ 7/86	1.45	0.13	8	9	18	11	-3	7
NY:SYRACUSE	7/ 9/86	1.49	0.13	13	9	3	9	-2	7
NY:SYRACUSE	7/14/86	1.63	0.16	4	9	2	11	2	9
OH:CLEVELAND	7/20/86	1.54	0.12	2	7	2	8	2	7
OK:OKLAHOMA CITY	7/14/86	1.51	0.13	-1	7	1	9	7	7
OR:PORTLAND	7/ 7/86	1.68	0.14	18	10	7	10	5	8
PA:PITTSBURGH	7/11/86	1.61	0.12	6	7	1	8	0	7
PC:CRISTOBAL	7/ 1/86	1.54	0.13	9	7	6	9	5	7
PR:SAN JUAN	7/ 1/86	1.55	0.13	16	9	3	9	-1	7
PR:SAN JUAN	7/10/86	1.66	0.12	7	7	-2	8	-4	7
PR:SAN JUAN	7/16/86	1.59	0.13	6	7	3	9	8	7
SC:CHARLESTON	7/ 9/86	1.50	0.13	6	9	4	9	0	7
SC:CHARLESTON	7/16/86	1.53	0.12	5	7	2	8	0	7
SD:RAPID CITY	7/ 7/86	1.54	0.09	6	5	-4	6	5	5
TN:CHATTANOOGA	7/ 7/86	1.62	0.12	4	7	-2	8	0	7
TN:KNOXVILLE	7/ 7/86	1.89	0.25	39	19	11	19	18	15
TN:MEMPHIS	7/29/86	1.56	0.13	-1	7	3	9	6	7
TX:AUSTIN	7/ 1/86	1.62	0.12	11	7	-1	8	7	7
TX:FT. WORTH	7/ 2/86	1.59	0.08	5	5	-2	6	5	5
UT:SALT LAKE CITY	7/ 2/86	1.50	0.13	22	10	4	9	0	7
UT:SALT LAKE CITY	7/10/86	1.66	0.12	19	7	-4	8	-2	7
UT:SALT LAKE CITY	7/30/86	1.69	0.12	16	7	7	8	-1	7
VA:NORFOLK	7/ 3/86	1.43	0.12	7	9	8	9	6	7
VT:BURLINGTON	7/ 7/86	1.45	0.12	14	7	1	9	5	7
VT:BURLINGTON	7/28/86	1.61	0.12	7	7	-6	8	4	7
WV:CHARLESTON	7/ 1/86	1.69	0.17	12	13	3	13	4	10
WV:CHARLESTON	7/ 8/86	1.75	0.24	3	18	4	19	8	14
WY:LARAMIE	7/ 1/86	1.74	0.24	12	18	10	19	1	14

s = SIGMA COUNTING ERROR

TABLE 16

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

AUGUST 1986

LOCATION	DATE COLLECTED	K		^{137}Cs		^{140}Ba		^{131}I	
		g/l	+2s	pCi/l	+2s	pCi/l	+2s	pCi/l	+2s
AK: ANCHORAGE	8/15/86	1.67	0.12	9	7	4	8	1	7
AL: MONTGOMERY	8/ 8/86	1.44	0.12	4	7	4	9	5	7
AR: LITTLE ROCK	8/ 5/86	1.57	0.13	7	7	2	9	5	7
AZ: PHOENIX	8/ 7/86	1.61	0.13	4	7	12	9	8	7
CA: LOS ANGELES	8/11/86	1.51	0.13	1	7	-4	9	2	7
CA: LOS ANGELES	8/21/86	1.52	0.13	0	7	-5	9	6	7
CA: SAN FRANCISCO	8/ 8/86	1.63	0.12	8	7	9	8	9	7
CO: DENVER	8/29/86	1.47	0.12	9	7	-1	9	5	7
CT: HARTFORD	8/ 5/86	1.51	0.12	3	7	-3	8	-3	7
DC: WASHINGTON	8/ 8/86	1.64	0.12	11	7	1	8	6	7
DC: WASHINGTON	8/15/86	1.58	0.12	11	7	-2	8	9	7
DC: WASHINGTON	8/22/86	1.62	0.12	12	7	4	8	8	7
DE: WILMINGTON	8/ 4/86	1.69	0.12	2	7	2	8	1	7
FL: TAMPA	8/ 5/86	1.43	0.12	5	7	4	8	-4	7
GA: ATLANTA	8/ 4/86	1.52	0.13	7	7	1	9	4	7
HI: HONOLULU	8/ 4/86	1.70	0.13	0	7	-7	9	7	7
IA: DES MOINES	8/ 4/86	1.66	0.12	10	7	9	8	6	7
ID: IDAHO FALLS	8/12/86	1.47	0.12	7	7	2	9	2	7
IL: CHICAGO	8/ 4/86	1.60	0.12	1	7	-1	8	-3	7
IN: INDIANAPOLIS	8/ 4/86	1.58	0.13	9	7	-5	9	4	7
KS: WICHITA	8/ 6/86	1.57	0.12	5	7	0	8	-1	7
KY: LOUISVILLE	8/ 5/86	1.53	0.13	8	7	9	9	4	7
LA: NEW ORLEANS	8/14/86	1.50	0.13	3	7	6	9	6	7
MD: BALTIMORE	8/ 8/86	1.62	0.13	6	7	-2	9	2	7
ME: PORTLAND	8/ 4/86	1.92	0.18	20	13	6	13	15	10
MI: DETROIT	8/11/86	1.49	0.12	6	7	3	9	0	7
MI: GRAND RAPIDS	8/ 4/86	1.62	0.12	11	7	-2	8	-3	7
MN: MINNEAPOLIS	8/ 4/86	1.52	0.12	7	7	-3	8	5	7
MN: ST. PAUL	8/ 8/86	1.51	0.12	7	7	1	8	0	7
MO: KANSAS CITY	8/ 6/86	1.61	0.09	8	5	-2	6	3	5
MO: ST. LOUIS	8/ 6/86	1.62	0.12	8	7	-2	8	-3	7
MS: JACKSON	8/12/86	1.52	0.13	12	7	2	9	8	7
MT: HELENA	8/ 6/86	1.66	0.12	4	7	2	8	-3	7
NC: CHARLOTTE	8/ 4/86	1.50	0.12	4	7	8	8	-3	7
ND: MINOT	8/22/86	1.59	0.12	8	7	3	8	3	7
NH: MANCHESTER	8/ 4/86	1.60	0.12	7	7	3	8	3	7
NJ: TRENTON	8/ 6/86	1.58	0.12	7	7	6	8	0	7
NM: ALBUQUERQUE	8/ 4/86	1.49	0.12	5	7	4	9	10	7
NV: LAS VEGAS	8/11/86	1.60	0.09	-2	5	-1	6	2	5
NY: BUFFALO	8/ 5/86	1.47	0.12	11	7	-3	9	6	7
NY: NEW YORK CITY	8/ 4/86	1.60	0.12	5	7	3	8	-3	7
NY: SYRACUSE	8/ 4/86	1.65	0.08	3	5	1	6	-3	5

TABLE 16 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

AUGUST 1986

LOCATION	DATE COLLECTED	K		^{137}Cs		^{140}Ba		^{131}I	
		g/l	+2s	pCi/l	+2s	pCi/l	+2s	pCi/l	+2s
OH:CINCINNATI	8/22/86	1.56	0.12	6	7	1	8	1	7
OH:CLEVELAND	8/12/86	1.60	0.08	5	5	-2	6	-1	5
OK:OKLAHOMA CITY	8/ 4/86	1.52	0.13	-2	7	-6	9	3	7
OR:PORTLAND	8/ 6/86	1.68	0.08	14	5	4	6	-1	5
OR:PORTLAND	8/25/86	1.43	0.12	23	7	4	8	0	7
PA:PHILADELPHIA	8/ 4/86	1.62	0.08	3	5	4	6	-2	5
PA:PITTSBURGH	8/ 4/86	1.56	0.13	3	7	-6	9	4	7
PC:CRISTOBAL	8/28/86	1.49	0.12	13	7	-1	9	9	7
PR:SAN JUAN	8/14/86	1.59	0.12	7	7	0	8	-2	7
SD:RAPID CITY	8/ 4/86	1.62	0.12	8	7	2	8	5	7
TN:CHATTANOOGA	8/ 1/86	1.72	0.13	7	7	8	8	0	7
TN:KNOXVILLE	8/ 4/86	1.62	0.24	21	18	3	19	5	14
TX:AUSTIN	8/ 4/86	1.61	0.09	7	5	-4	6	3	5
UT:SALT LAKE CITY	8/ 2/86	1.49	0.13	32	7	6	9	6	7
VA:NORFOLK	8/ 1/86	1.56	0.12	0	7	9	8	-3	7
VT:BURLINGTON	8/22/86	1.72	0.25	34	19	10	19	12	14
WA:SEATTLE	8/ 7/86	1.64	0.13	10	7	4	9	-2	7
WA:SPOKANE	8/22/86	1.56	0.13	8	7	-2	9	1	7
WI:MILWAUKEE	8/29/86	1.64	0.13	5	7	-6	9	0	7
WV:CHARLESTON	8/ 4/86	1.89	0.25	-6	18	-4	19	5	14
WY:LARAMIE	8/ 6/86	1.52	0.09	3	5	-1	6	4	5

s = SIGMA COUNTING ERROR

TABLE 17

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

SEPTEMBER 1986

LOCATION	DATE COLLECTED	K		^{137}Cs		^{140}Ba		^{131}I	
		g/l	2s	pCi/l	2s	pCi/l	2s	pCi/l	2s
AK:ANCHORAGE	9/12/86	1.69	0.09	4	5	-1	6	4	7
AL:MONTGOMERY	9/ 5/86	1.58	0.13	2	7	8	9	8	7
AR:LITTLE ROCK	9/ 9/86	1.68	0.12	4	7	0	8	0	7
AZ:PHOENIX	9/11/86	1.53	0.12	-2	7	-4	8	-1	7
CA:LOS ANGELES	9/12/86	1.69	0.13	2	7	1	9	9	7
CA:SACRAMENTO	9/ 2/86	1.58	0.12	2	7	3	8	1	7
CA:SAN FRANCISCO	9/ 5/86	1.62	0.08	5	5	4	6	-2	7
CT:HARTFORD	9/ 8/86	1.60	0.13	7	7	-5	9	1	7
DC:WASHINGTON	9/ 5/86	1.52	0.13	7	7	-3	9	5	7
DC:WASHINGTON	9/19/86	1.53	0.13	7	7	7	9	4	7
DE:WILMINGTON	9/ 2/86	1.52	0.12	4	7	0	8	4	7
FL:TAMPA	9/ 2/86	1.47	0.12	4	7	-2	8	0	7
GA:ATLANTA	9/ 5/86	1.53	0.13	3	7	4	9	1	7
HI:HONOLULU	9/ 2/86	1.61	0.13	3	7	-1	9	0	7
IA:DES MOINES	9/ 8/86	1.55	0.12	4	7	-4	8	-2	7
IL:CHICAGO	9/ 2/86	1.54	0.13	9	7	-2	9	6	7
IN:INDIANAPOLIS	9/ 8/86	1.49	0.12	11	7	-2	8	-3	7
KS:WICHITA	9/ 8/86	1.66	0.12	7	7	-4	8	2	7
KY:LOUISVILLE	9/ 2/86	1.58	0.12	1	7	3	8	2	7
LA:NEW ORLEANS	9/ 3/86	1.63	0.08	7	5	4	6	-6	7
LA:NEW ORLEANS	9/16/86	1.56	0.12	7	7	3	8	0	7
MA:BOSTON	9/ 8/86	1.50	0.13	11	7	-1	9	10	7
MD:BALTIMORE	9/ 4/86	1.69	0.12	3	7	0	8	-1	7
ME:PORTLAND	9/ 2/86	1.60	0.12	16	7	-1	8	9	7
MI:DETROIT	9/11/86	1.53	0.09	10	5	-2	6	-1	7
MI:GRAND RAPIDS	9/ 8/86	1.75	0.25	13	18	11	9	10	1 7
MN:MINNEAPOLIS	9/ 8/86	1.60	0.13	6	7	3	9	9	7
MN:ST. PAUL	9/ 2/86	1.51	0.12	10	7	2	8	-4	7
MO:KANSAS CITY	9/12/86	1.57	0.13	8	7	-4	9	1	7
MO:ST. LOUIS	9/ 3/86	1.55	0.12	4	7	2	8	3	7
MS:JACKSON	9/ 8/86	1.49	0.12	4	7	3	8	3	7
MT:HELENA	9/12/86	1.65	0.12	5	7	-2	8	1	7
NC:CHARLOTTE	9/ 5/86	1.55	0.13	6	7	1	9	8	7
NE:OMAHA	9/ 5/86	1.47	0.09	9	5	-3	6	-1	7
NH:MANCHESTER	9/ 8/86	1.64	0.09	7	5	2	6	1	7
NJ:TRENTON	9/ 3/86	1.57	0.13	3	7	4	9	1	7
NM:ALBUQUERQUE	9/ 2/86	1.49	0.12	5	7	0	9	3	7
NV:LAS VEGAS	9/ 9/86	1.67	0.12	12	7	0	8	7	7
NY:BUFFALO	9/ 8/86	1.60	0.13	2	7	2	9	2	7
NY:NEW YORK CITY	9/ 8/86	1.63	0.08	4	5	2	6	2	7
NY:SYRACUSE	9/ 2/86	1.57	0.12	1	7	-2	8	2	7
OH:CINCINNATI	9/ 5/86	1.57	0.12	7	7	0	8	1	7

TABLE 17 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

SEPTEMBER 1986

LOCATION	DATE COLLECTED	K		^{137}Cs		^{140}Ba		^{131}I	
		g/l	+2s	pCi/l	+2s	pCi/l	+2s	pCi/l	+2s
OH:CLEVELAND	9/22/86	1.64	0.12	6	7	-2	8	8	7
OK:OKLAHOMA CITY	9/ 3/86	1.65	0.13	2	7	-7	9	7	7
OR:PORTLAND	9/ 5/86	1.61	0.12	15	7	0	8	4	7
PA:PHILADELPHIA	9/ 8/86	1.51	0.13	7	7	7	9	5	7
PA:PITTSBURGH	9/ 8/86	1.54	0.13	10	7	6	9	10	7
PR:SAN JUAN	9/10/86	1.64	0.12	-1	7	6	8	-3	7
SD:RAPID CITY	9/ 1/86	1.52	0.13	0	7	6	9	2	7
TN:CHATTANOOGA	9/ 8/86	1.50	0.12	3	7	-3	8	-1	7
TN:KNOXVILLE	9/ 8/86	1.71	0.24	16	18	7	9	4	1 7
TN:MEMPHIS	9/ 2/86	1.64	0.09	5	5	5	6	4	7
TX:AUSTIN	9/ 2/86	1.57	0.13	4	7	0	9	2	7
TX:FT. WORTH	9/ 8/86	1.55	0.13	10	7	-1	9	5	7
UT:SALT LAKE CITY	9/ 8/86	1.60	0.12	10	7	4	8	2	7
VA:NORFOLK	9/ 4/86	1.65	0.13	6	7	7	9	8	7
VT:BURLINGTON	9/ 2/86	1.50	0.13	6	7	2	9	-1	7
WA:SEATTLE	9/ 2/86	1.47	0.12	19	7	5	9	8	7
WV:CHARLESTON	9/ 8/86	1.65	0.24	5	18	12	9	2	1 7
WY:LARAMIE	9/ 3/86	1.63	0.13	5	7	3	9	7	7

s = SIGMA COUNTING ERROR

TABLE 18

STRONTIUM-90 AND STRONTIUM-89 IN PASTEURIZED MILK

ANNUAL REPORT

JULY - SEPTEMBER 1986

EPA LOCATION		^{90}Sr		^{89}Sr	
		pCi/l	$\pm 2s$	pCi/l	$\pm 2s^*$
AK:ANCHORAGE	7/ 2/86	1.3	0.7	1	1
AL:MONTGOMERY	7/10/86	2.7	1.0	0	1
AZ:PHOENIX	7/10/86	-0.1	0.6	1	1
CA:LOS ANGELES	7/15/86	0.5	0.4	0	1
CA:SACRAMENTO	7/ 1/86	0.7	0.5	0	1
CA:SAN FRANCISCO	7/ 3/86	0.5	0.2	0	1
CO:DENVER	7/ 2/86	1.7	0.3	0	1
CT:HARTFORD	7/ 1/86	1.9	0.5	0	1
DC:WASHINGTON	7/ 7/86	2.2	0.8	-1	1
DE:WILMINGTON	7/ 3/86	2.0	1.1	0	1
FL:TAMPA	7/ 1/86	1.2	0.5	0	1
GA:ATLANTA	7/ 8/86	1.0	0.4	0	1
HI:HONOLULU	7/ 1/86	0.9	0.1	0	1
IA:DES MOINES	7/ 7/86	2.0	0.2	0	1
IL:CHICAGO	7/ 7/86	1.5	0.4	0	1
IN:INDIANAPOLIS	7/ 7/86	2.2	0.9	0	1
KS:WICHITA	7/ 1/86	2.9	0.2	0	1
KY:LOUISVILLE	7/ 1/86	2.9	0.8	-1	1
MA:BOSTON	7/ 8/86	3.0	0.6	0	1
MD:BALTIMORE	7/ 3/86	2.3	0.4	0	1
MI:DETROIT	7/10/86	2.8	0.7	0	1
MI:GRAND RAPIDS	7/ 7/86	3.1	0.4	0	1
MN:MINNEAPOLIS	7/ 7/86	5.1	0.8	-2	1
MN:ST. PAUL	7/ 1/86	3.3	0.3	0	1
MO:KANSAS CITY	7/ 9/86	2.5	0.8	0	1
MO:ST. LOUIS	7/ 1/86	2.6	0.2	-1	1
MS:JACKSON	7/ 1/86	3.2	0.3	-1	1
MT:HELENA	7/ 3/86	1.6	0.5	0	1
NC:CHARLOTTE	7/15/86	2.0	0.5	0	1
ND:MINOT	7/25/86	0.4	1.6	4	2
NE:OMAHA	7/11/86	2.2	0.7	0	1
NH:MANCHESTER	7/ 1/86	2.9	0.5	0	1
NJ:TRENTON	7/ 1/86	-0.2	0.5	2	1
NM:ALBUQUERQUE	7/ 8/86	1.2	0.8	0	1
NV:LAS VEGAS	7/15/86	-0.1	0.4	1	1
NY:BUFFALO	7/ 7/86	3.1	0.4	-1	1
NY:NEW YORK CITY	7/ 7/86	4.3	0.9	-1	1

TABLE 18 (CONTINUED)

STRONTIUM-90 AND STRONTIUM-89 IN PASTEURIZED MILK

ANNUAL REPORT

JULY - SEPTEMBER 1986

EPA LOCATION		^{90}Sr pCi/l \pm 2s		^{89}Sr pCi/l \pm 2s*	
NY:SYRACUSE	7/ 9/86	2.1	0.5	1	1
OH:CLEVELAND	7/20/86	0.3	0.5	2	1
OK:OKLAHOMA CITY	7/14/86	1.7	1.2	1	1
OR:PORTLAND	7/ 7/86	1.5	0.3	0	1
PA:PITTSBURGH	7/11/86	3.8	0.8	0	1
PC:CRISTOBAL	7/ 1/86	0.2	0.3	1	1
PR:SAN JUAN	7/ 1/86	1.0	0.3	0	1
SC:CHARLESTON	7/ 9/86	2.0	1.0	0	1
SD:RAPID CITY	7/ 7/86	2.0	1.1	0	1
TN:CHATTANOOGA	7/ 7/86	2.6	0.4	0	1
TN:KNOXVILLE	7/ 7/86	2.8	1.0	-1	1
TN:MEMPHIS	7/29/86	1.1	1.8	3	2
TX:AUSTIN	7/ 1/86	0.6	0.2	1	1
TX:FT. WORTH	7/ 2/86	1.8	0.3	0	1
UT:SALT LAKE CITY	7/ 2/86	2.0	0.2	0	1
VA:NORFOLK	7/ 3/86	1.2	0.7	1	1
VT:BURLINGTON	7/ 7/86	2.2	0.7	0	1
WV:CHARLESTON	7/ 1/86	2.8	0.6	0	1
WY:LARAMIE	7/ 1/86	1.1	0.5	0	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 for carbon-14. These samples have monitored the 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.

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Technical Support Branch
Eastern Environmental Radiation Facility
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Montgomery, Alabama 36109

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Monitoring and Analytical Services Branch
Eastern Environmental Radiation Facility
1890 Federal Drive
Montgomery, Alabama 36109

or to:

James W. Gunter, Chief
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
