United States
Environmental Protection
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Eastern Environmental
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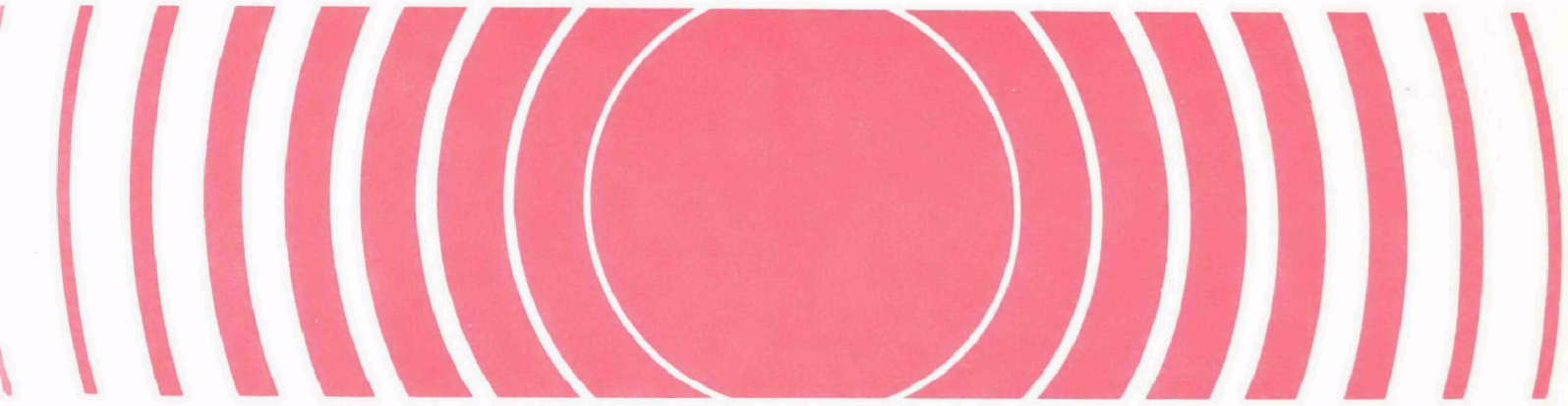
(April - June 1983)



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 34

April - June 1983

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. Data from the Environmental Radiation Ambient Monitoring System (ERAMS), and similar networks operated by contributing States, Canada, Mexico, and the Pan American Health Organization are reported in (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.

1. 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 enviromment.

2. 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 serves to provide ancillary information on releases into the environment from stationary sources such as nuclear power reactors, fuel fabrication and reprocessing plants and natural background levels.

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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DATA - Reporting Rationale and Procedures

The intent of EPA's Office of Radiation Programs in establishing the Environmental Radiation Ambient Monitoring System was to provide continuous, accurate and usable environmental radiation data for the public. Therefore, new data reporting procedures were developed to allow better interpretation of the data. The most significant change in this reporting procedure is that all specific radionuclide analyses will be reported as the counting results indicate, whether the number is negative, zero, or positive.

Reporting Rationale

Frequently, concentrations of a radionuclide 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 does not have 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 several 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. Numerical values given are as of sample collection date.

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 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. Potassium concentrations are determined by specific activity analyses. 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

All reported values will be rounded to no more than three significant figures. The last significant figure will be increased by one if the figure following is five or greater, otherwise it is left unchanged.

(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

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
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
Strontium-90	Milk	pCi/l	.1 pCi/l	1 pCi/l
	Water	pCi/l	.1 pCi/l	1 pCi/l

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
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
Iodine-127	Milk	g/l	10 g/l	10 g/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/m^2 would be dependent on precipitation (mm).
(b) This value in terms of pCi/m^3 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, Virgin Islands, and the Panama Canal.

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 laboratory gross beta counts greater than 1 pCi/m^3. The lower gross beta values reported for laboratory measurements are largely due to the decay of radionuclides which occurred between the times of the field estimates and laboratory measurements.

Precipitation samples are collected at the field stations where air filters are collected. These samples are also sent to EERF where they are composited monthly for tritium, gross beta activity measurements and gamma scans.

These locations also correspond to airborne particulate and drinking water sampling locations selected for plutonium analyses. Plutonium-238, -239, and uranium-234, -235, and -238 analyses are performed annually on precipitation samples collected during March - May.

Tables 2 - 4 present the monthly average gross beta concentrations in airborne particulates for April - June 1983.

Tables 5 - 7 present the monthly average gross beta concentration in precipitation April - June 1983.

The tritium in precipitation samples for April - June 1983 at the selected stations are shown in Table 8.

The specific gamma results will be published when they are available.

A compilation of individual measurements is available from the EPA, EERF, Montgomery, AL 36193.

TABLE 2

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
APRIL 1983

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	11	0.6	0.1	0.3	0.01	0.00	0.01
CA:BERKELEY	9	0.1	0.0	0.1	0.02	0.01	0.01
CA:LOS ANGELES	9	0.8	0.0	0.3	0.01	0.00	0.01
CO:DENVER	8	0.0	0.0	0.0	0.05	0.01	0.02
CT:HARTFORD	8	0.2	0.0	0.1	0.01	0.00	0.00
DE:WILMINGTON	8	0.3	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
HI:HONOLULU	8	0.5	0.0	0.2	0.01	0.00	0.01
IA:IOWA CITY	7	0.5	0.1	0.2	0.02	0.00	0.01
ID:BOISE	8	0.3	0.1	0.2	0.02	0.00	0.01
ID:IDAHO FALLS	8	0.0	0.0	0.0	0.01	0.01	0.01
IL:CHICAGO	8	0.3	0.0	0.1	0.04	0.00	0.01
IN:INDIANAPOLIS	8	1.0	0.1	0.3	0.01	0.00	0.00
ME:AUGUSTA	8	0.2	0.0	0.1	0.01	0.00	0.01
MI:LANSING	8	0.2	0.0	0.1	0.01	0.00	0.01
MN:MINNEAPOLIS	9	0.5	0.1	0.2	0.04	0.01	0.01
MO:JEFFERSON CITY	9	0.3	0.1	0.1	0.02	0.00	0.01
MS:JACKSON	1	0.2	0.2	0.2	0.01	0.01	0.01
ND:BISMARCK	9	0.6	0.0	0.3	0.02	0.00	0.01
NH:CONCORD	9	4.2	0.6	1.3	0.01	0.00	0.00
NJ:TRENTON	3	0.0	0.0	0.0	0.01	0.00	0.00
NM:SANTA FE	1	0.2	0.2	0.2	0.01	0.01	0.01
NV:LAS VEGAS	8	0.5	0.1	0.3	0.02	0.00	0.01
NY:ALBANY	9	0.1	0.0	0.1	0.02	0.00	0.01
NY:NIAGARA FALLS	8	0.2	0.1	0.1	0.01	0.00	0.01
NY:SYRACUSE	7	0.1	0.0	0.0	0.01	0.00	0.01
NY:YAPHANK	7	0.0	0.0	0.0	0.01	0.00	0.01
OH:COLUMBUS	8	0.7	0.1	0.2	0.02	0.00	0.01
OH:PAINESVILLE	9	0.3	0.0	0.2	0.02	0.00	0.01
OR:PORTLAND	9	0.0	0.0	0.0	0.01	0.00	0.00
PA:HARRISBURG	8	0.7	0.1	0.2	0.02	0.00	0.01
PA:PITTSBURGH	8	0.1	0.0	0.1	0.01	0.00	0.01
RI:PROVIDENCE	5	0.1	0.1	0.1	0.01	0.00	0.01
SC:BARNWELL	2	0.0	0.0	0.0	0.01	0.00	0.00
SC:COLUMBIA	9	0.9	0.1	0.3	0.02	0.01	0.02
SD:PIERRE	8	0.2	0.0	0.1	0.02	0.01	0.02
TN:KNOXVILLE	8	0.8	0.1	0.3	0.03	0.01	0.02
TN:NASHVILLE	15	0.0	0.0	0.0	0.03	0.01	0.02
TX:AUSTIN	8	1.5	0.5	0.9	0.02	0.01	0.02
UT:SALT LAKE CITY	5	0.2	0.1	0.1	0.01	0.00	0.01
VA:LYNCHBURG	7	0.4	0.1	0.2	0.01	0.00	0.01
WA:SEATTLE	9	0.0	0.0	0.0	0.01	0.00	0.00
WA:SPOKANE	8	0.6	0.1	0.3	0.01	0.00	0.01
WI:MADISON	8	0.6	0.0	0.2	0.02	0.00	0.01
WV:CHARLESTON	7	0.2	0.0	0.1	0.02	0.01	0.01

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

TABLE 3

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
MAY 1983

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	9	1.0	0.1	0.5	0.01	0.00	0.01
CA:BERKELEY	9	0.1	0.0	0.1	0.01	0.00	0.01
CA:LOS ANGELES	9	0.5	0.2	0.3	0.01	0.00	0.01
CO:DENVER	8	0.0	0.0	0.0	0.02	0.01	0.01
CT:HARTFORD	9	0.1	0.0	0.1	0.01	0.00	0.00
DE:WILMINGTON	8	0.2	0.0	0.1	0.01	0.00	0.01
FL:JACKSONVILLE	1	0.1	0.1	0.1	0.01	0.01	0.01
FL:MIAMI	9	0.0	0.0	0.0	0.01	0.00	0.01
HI:HONOLULU	9	0.1	0.0	0.0	0.01	0.00	0.01
IA:IOWA CITY	9	0.9	0.1	0.4	0.03	0.01	0.01
ID:BOISE	9	0.2	0.1	0.1	0.01	0.00	0.01
ID:IDAHO FALLS	9	0.0	0.0	0.0	0.01	0.01	0.01
IL:CHICAGO	8	1.4	0.0	0.3	0.01	0.00	0.01
IN:INDIANAPOLIS	9	0.3	0.2	0.2	0.01	0.00	0.01
ME:AUGUSTA	9	0.2	0.0	0.1	0.01	0.00	0.01
MI:LANSING	9	0.2	0.0	0.1	0.01	0.00	0.01
MN:MINNEAPOLIS	9	0.3	0.0	0.2	0.03	0.01	0.01
MO:JEFFERSON CITY	9	0.3	0.1	0.2	0.02	0.00	0.01
ND:BISMARCK	10	1.1	0.0	0.6	0.03	0.00	0.02
NH:CONCORD	9	2.9	0.3	0.9	0.01	0.00	0.00
NJ:TRENTON	4	0.3	0.0	0.1	0.01	0.00	0.01
NV:LAS VEGAS	9	0.4	0.1	0.2	0.01	0.01	0.01
NY:ALBANY	9	0.1	0.1	0.1	0.01	0.00	0.01
NY:NIAGARA FALLS	9	0.2	0.1	0.1	0.01	0.00	0.01
NY:SYRACUSE	5	0.0	0.0	0.0	0.01	0.01	0.01
NY:YAPHANK	5	0.0	0.0	0.0	0.01	0.00	0.01
OH:COLUMBUS	9	0.3	0.1	0.2	0.01	0.01	0.01
OH:PAINESVILLE	9	0.3	0.1	0.1	0.01	0.01	0.01
OR:PORTLAND	9	0.1	0.0	0.0	0.01	0.00	0.00
PA:HARRISBURG	9	0.3	0.1	0.2	0.02	0.01	0.01
PA:PITTSBURGH	9	0.0	0.0	0.0	0.01	0.01	0.01
RI:PROVIDENCE	5	0.1	0.0	0.0	0.01	0.00	0.01
SC:BARNWELL	2	0.0	0.0	0.0	0.01	0.00	0.00
SC:COLUMBIA	9	0.4	0.1	0.2	0.02	0.00	0.01
SD:PIERRE	9	0.2	0.0	0.1	0.03	0.01	0.01
TN:KNOXVILLE	9	0.7	0.1	0.4	0.02	0.01	0.01
TN:NASHVILLE	7	0.0	0.0	0.0	0.05	0.00	0.02
TX:AUSTIN	9	1.4	0.2	0.8	0.02	0.01	0.01
UT:SALT LAKE CITY	9	0.2	0.0	0.1	0.09	0.01	0.02
VA:LYNCHBURG	9	0.3	0.1	0.2	0.01	0.01	0.01
WA:SEATTLE	8	0.0	0.0	0.0	0.01	0.00	0.00
WA:SPOKANE	9	0.5	0.2	0.3	0.03	0.00	0.01
WI:MADISON	2	0.4	0.2	0.3	0.01	0.01	0.01
WV:CHARLESTON	9	0.2	0.0	0.1	0.03	0.01	0.01
WY:CHEYENNE	1	1.6	1.6	1.6	0.03	0.02	0.02

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

TABLE 4

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
JUNE 1983

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	14	1.3	0.1	0.4	0.01	0.00	0.01
CA:BERKELEY	8	0.1	0.0	0.0	0.01	0.00	0.00
CA:LOS ANGELES	8	0.6	0.2	0.3	0.01	0.01	0.01
CO:DENVER	7	0.0	0.0	0.0	0.03	0.01	0.02
CT:HARTFORD	8	0.3	0.1	0.2	0.02	0.00	0.01
DE:WILMINGTON	8	0.6	0.1	0.3	0.02	0.00	0.01
FL:JACKSONVILLE	8	0.3	0.0	0.1	0.01	0.00	0.01
FL:MIAMI	8	0.0	0.0	0.0	0.01	0.00	0.00
HI:HONOLULU	9	0.2	0.0	0.1	0.03	0.00	0.01
IA:IOWA CITY	8	1.4	0.4	0.8	0.03	0.01	0.02
ID:BOISE	6	0.3	0.1	0.2	0.01	0.00	0.01
ID:IDAHO FALLS	7	0.0	0.0	0.0	0.02	0.00	0.01
IL:CHICAGO	8	0.9	0.2	0.5	0.02	0.01	0.01
IN:INDIANAPOLIS	8	0.9	0.3	0.6	0.03	0.00	0.01
KS:TOPEKA	2	0.9	0.2	0.6	0.01	0.00	0.00
ME:AUGUSTA	9	0.4	0.1	0.2	0.01	0.01	0.01
MI:LANSING	9	0.3	0.1	0.2	0.02	0.00	0.01
MN:MINNEAPOLIS	8	0.3	0.0	0.2	0.04	0.00	0.01
MO:JEFFERSON CITY	8	1.7	0.2	0.5	0.03	0.01	0.02
MS:JACKSON	3	0.2	0.1	0.2	0.01	0.00	0.01
ND:BISMARCK	8	0.4	0.1	0.3	0.02	0.01	0.01
NH:CONCORD	8	4.1	1.2	2.5	0.01	0.01	0.01
NJ:TRENTON	5	0.3	0.0	0.1	0.01	0.00	0.01
NV:LAS VEGAS	9	0.5	0.1	0.3	0.03	0.01	0.01
NY:ALBANY	8	0.3	0.0	0.2	0.02	0.01	0.01
NY:NIAGARA FALLS	8	0.5	0.1	0.2	0.02	0.01	0.01
NY:SYRACUSE	5	0.1	0.0	0.0	0.02	0.01	0.01
NY:YAPHANK	8	0.0	0.0	0.0	0.01	0.00	0.01
OH:COLUMBUS	8	0.9	0.2	0.4	0.03	0.01	0.02
OH:PAINESVILLE	8	0.5	0.2	0.3	0.02	0.01	0.01
OH:TOLEDO	3	0.4	0.2	0.3	0.01	0.01	0.01
OK:OKLAHOMA CITY	5	0.7	0.3	0.5	0.03	0.01	0.02
OR:PORTLAND	3	0.0	0.0	0.0	0.01	0.00	0.01
PA:HARRISBURG	8	1.5	0.2	0.6	0.03	0.01	0.01
PA:PITTSBURGH	7	0.3	0.1	0.2	0.02	0.01	0.01
RI:PROVIDENCE	8	0.2	0.1	0.2	0.02	0.01	0.01
SC:BARNWELL	3	0.1	0.0	0.1	0.01	0.01	0.01
SC:COLUMBIA	8	1.5	0.1	0.6	0.02	0.01	0.02
SD:PIERRE	8	0.2	0.0	0.1	0.02	0.00	0.01
TN:KNOXVILLE	8	1.1	0.2	0.7	0.03	0.02	0.02
TX:AUSTIN	5	1.2	0.2	0.8	0.03	0.01	0.02
UT:SALT LAKE CITY	7	0.3	0.1	0.2	0.01	0.00	0.01
VA:LYNCHBURG	8	1.0	0.1	0.6	0.01	0.00	0.01
WA:SEATTLE	8	0.0	0.0	0.0	0.01	0.00	0.00
WA:SPOKANE	8	0.4	0.1	0.2	0.01	0.00	0.01
WV:CHARLESTON	7	0.2	0.0	0.1	0.02	0.01	0.01

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

TABLE 5

GROSS BETA CONCENTRATION IN PRECIPITATION

APRIL 1983

LOCATION	DEPTH	ACT. ± 2s		SPECIFIC GAMMA ACT.
	(mm)	(nCi/m^2)		(pCi/l)
AL:MONTGOMERY	270.0	0.15	0.12	ND
CA:BERKELEY	88.1	0.09	0.04	ND
CO:DENVER	37.8	0.05	0.02	ND
CT:HARTFORD	246.3	0.37	0.14	ND
ID:BOISE	24.8	0.10	0.02	ND
ID:IDAHO FALLS	21.8	0.03	0.01	ND
IL:CHICAGO	67.9	0.06	0.03	ND
IN:INDIANAPOLIS	25.0	0.02	0.01	ND
MI:LANSING	111.8	0.12	0.05	ND
MS:JACKSON	311.8	0.11	0.12	ND
NJ:TRENTON	60.0	0.10	0.03	ND
NV:LAS VEGAS	3.7	0.01	0.00	ND
NY:NEW YORK CITY	60.0	0.12	0.04	ND
NY:NIAGARA FALLS	136.0	0.13	0.06	ND
OH:COLUMBUS	116.3	0.06	0.05	ND
OH:PAINESVILLE	83.8	0.13	0.05	ND
OR:PORTLAND	108.3	0.17	0.06	ND
PA:HARRISBURG	108.0	0.04	0.04	ND
SC:BARNWELL	82.5	0.21	0.05	ND
SC:COLUMBIA	162.5	0.27	0.08	ND
VA:LYNCHBURG	177.2	0.11	0.08	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 6

GROSS BETA CONCENTRATION IN PRECIPITATION

MAY 1983

LOCATION	DEPTH	ACT. ± 2s		SPECIFIC GAMMA ACT.
	(mm)	(nCi/m^2)		(pCi/l)
AL:MONTGOMERY	123.8	0.44	0.08	ND
CA:BERKELEY	26.5	0.01	0.01	ND
CO:DENVER	59.8	0.09	0.03	ND
CT:HARTFORD	151.3	0.35	0.09	ND
FL:JACKSONVILLE	81.2	0.14	0.04	ND
ID:BOISE	63.4	0.06	0.03	ND
IL:CHICAGO	130.2	0.18	0.07	ND
IN:INDIANAPOLIS	72.5	0.06	0.03	ND
MI:LANSING	176.8	0.15	0.08	ND
MN:MINNEAPOLIS	53.8	0.13	0.03	ND
MS:JACKSON	249.6	0.29	0.12	ND
ND:BISMARCK	33.4	0.04	0.02	ND
NJ:TRENTON	41.3	0.08	0.02	ND
NY:NEW YORK CITY	58.6	0.15	0.04	ND
NY:NIAGARA FALLS	79.2	0.05	0.03	ND
OH:COLUMBUS	225.6	0.08	0.09	ND
OH:PAINESVILLE	150.6	0.09	0.06	ND
OH:TOLEDO	40.0	0.04	0.02	ND
OR:PORTLAND	32.3	0.04	0.02	ND
PA:HARRISBURG	98.3	0.13	0.05	ND
PA:PITTSBURGH	89.5	0.12	0.04	ND
SC:BARNWELL	40.0	0.04	0.02	ND
SC:COLUMBIA	31.2	0.06	0.02	ND
TX:AUSTIN	40.0	0.02	0.02	ND
WV:CHARLESTON	71.7	0.09	0.03	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 7

GROSS BETA CONCENTRATION IN PRECIPITATION

JUNE 1983

LOCATION	DEPTH (mm)	ACT. (nCi/m^2)	± 2s	SPECIFIC GAMMA ACT. (pCi/l)
AL:MONTGOMERY	115.0	0.17	0.06	ND
CO:DENVER	23.5	0.03	0.01	ND
CT:HARTFORD	75.0	0.36	0.05	ND
FL:JACKSONVILLE	130.6	0.08	0.06	ND
ID:IDAHO FALLS	24.0	0.03	0.01	ND
IL:CHICAGO	29.6	0.03	0.01	ND
IN:INDIANAPOLIS	22.5	0.05	0.01	ND
MI:LANSING	107.5	0.09	0.05	ND
MN:MINNEAPOLIS	417.5	0.56	0.23	ND
MS:JACKSON	86.8	0.07	0.04	ND
ND:BISMARCK	40.8	0.02	0.02	ND
NJ:TRENTON	25.3	0.05	0.01	ND
NY:NEW YORK CITY	20.0	0.02	0.01	ND
NY:NIAGARA FALLS	346.2	0.44	0.17	ND
OH:COLUMBUS	99.0	0.11	0.05	ND
OH:PAINESVILLE	66.3	0.06	0.03	ND
OH:TOLEDO	35.0	0.03	0.02	ND
OK:OKLAHOMA CITY	36.5	0.05	0.02	ND
OR:PORTLAND	103.7	0.17	0.06	ND
PA:HARRISBURG	37.3	0.02	0.02	ND
PA:PITTSBURGH	75.3	0.17	0.05	ND
SC:BARNWELL	130.0	0.12	0.07	ND
SC:COLUMBIA	20.0	0.02	0.01	ND
TX:AUSTIN	42.5	0.03	0.02	ND
WV:CHARLESTON	35.1	0.04	0.02	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 8

PRECIPITATION
TRITIUM CONCENTRATION

APRIL - JUNE 1983

LOCATION	APRIL nCi/l ± 2s	MAY nCi/l ± 2s	JUNE nCi/l ± 2s
AL:MONTGOMERY	0.2 0.2	0.2 0.2	0.1 0.2
CA:BERKELEY	0.1 0.2	0.2 0.2	NS
CO:DENVER	0.3 0.2	0.2 0.2	0.2 0.2
CT:HARTFORD	0.1 0.2	0.3 0.2	0.2 0.2
FL:JACKSONVILLE	NS	0.3 0.2	0.3 0.2
ID:BOISE	0.2 0.2	0.2 0.2	NS
ID:IDAHO FALLS	0.3 0.2	NS	0.3 0.2
IL:CHICAGO	0.2 0.2	0.2 0.2	0.2 0.2
IN:INDIANAPOLIS	0.1 0.2	0.2 0.2	0.2 0.2
MI:LANSING	0.3 0.2	0.2 0.2	0.3 0.2
MN:MINNEAPOLIS	NS	0.3 0.2	0.2 0.2
MS:JACKSON	0.2 0.2	0.1 0.2	0.1 0.2
ND:BISMARCK	NS	0.3 0.2	0.1 0.2
NJ:TRENTON	0.2 0.2	0.3 0.2	0.2 0.2
NV:LAS VEGAS	0.1 0.2	NS	NS
NY:NEW YORK CITY	0.1 0.2	0.3 0.2	0.3 0.2
NY:NIAGARA FALLS	0.2 0.2	0.3 0.2	0.4 0.2
OH:COLUMBUS	0.1 0.2	0.1 0.2	0.2 0.2
OH:PAINESVILLE	0.3 0.2	0.2 0.2	0.3 0.2
OH:TOLEDO	NS	0.2 0.2	0.2 0.2
OK:OKLAHOMA CITY	NS	NS	0.2 0.2
OR:PORTLAND	0.2 0.2	0.2 0.2	0.1 0.2
PA:HARRISBURG	0.2 0.2	0.4 0.2	0.2 0.2
PA:PITTSBURGH	NS	0.3 0.2	0.2 0.2
SC:BARNWELL	3.1 0.2	0.9 0.2	0.4 0.2
SC:COLUMBIA	0.4 0.2	0.2 0.2	0.4 0.2
TX:AUSTIN	NS	0.2 0.2	0.2 0.2
VA:LYNCHBURG	0.3 0.2	NS	NS
WV:CHARLESTON	NS	0.3 0.2	0.2 0.2

NS NO SAMPLE
s SIGMA COUNTING ERROR

Plutonium and Uranium in Airborne Particulates

Environmental radiation levels of plutonium and uranium are determined by the analyses of quarterly composite samples (air filters) collected from the continuously operating airborne particulate samplers. The number of continuously operating stations is being increased from the original 22 will eventually number 67 when all equipment is operational.

Analyses of the composited filters consist of ashing, separating by liquid ion exchange, and coprecipitation of the plutonium or uranium.

Concentration of the specific isotopes of plutonium-238, -239, and uranium-234, -235, and -238 are determined by alpha spectroscopy. The volume of air analyzed normally ranges from 25,000 to 40,000 m^3 for each quarterly composite.

Plutonium and uranium in airborne particulates data for January - March 1983 are shown for the 42 stations operating during this period in Table 9.

TABLE 9

PLUTONIUM AND URANIUM IN AIRBORNE PARTICULATES
JANUARY - MARCH 1983 COMPOSITES

LOCATION	^{238}Pu aCi/m^3 ± 2s		^{239}Pu aCi/m^3 ± 2s		^{234}U aCi/m^3 ± 2s		^{235}U aCi/m^3 ± 2s		^{238}U aCi/m^3 ± 2s	
AL:MONTGOMERY	0.2	0.6	0.9	0.6	5.9	1.6	0.5	0.4	4.8	1.4
CA:BERKELEY	0.1	0.6	1.6	0.8	4.9	1.8	0.1	0.5	4.9	1.8
CA:LOS ANGELES	-0.4	1.0	1.3	0.9	15.6	2.5	1.3	0.6	14.4	2.4
CO:DENVER	0.1	0.5	1.1	0.6	42.0	5.4	1.5	0.7	45.7	5.7
CT:HARTFORD	0.8	0.5	2.2	0.8	16.2	2.8	0.5	0.4	15.8	2.7
DE:WILMINGTON	0.1	0.2	1.0	0.4	10.9	1.9	0.8	0.4	10.3	1.8
FL:MIAMI	0.7	0.6	1.7	0.7	13.9	2.7	0.5	0.5	8.9	2.0
HI:HONOLULU	0.1	0.2	1.1	0.7	6.3	1.8	0.8	0.6	7.0	1.8
IA:IOWA CITY	0.7	0.6	1.2	0.6	8.5	1.8	0.8	0.5	13.7	2.5
ID:BOISE	0.1	0.5	1.5	0.6	14.2	2.5	0.7	0.5	11.3	2.2
ID:IDAHO FALLS	2.5	1.3	2.2	1.1	41.7	7.4	1.3	1.2	42.6	7.4
IL:CHICAGO	0.6	0.5	0.9	0.5	17.3	3.4	1.0	0.6	12.6	2.7
ME:AUGUSTA	0.9	1.1	1.0	0.8	35.7	5.8	1.7	1.0	30.6	5.2
MI:LANSING	0.3	0.4	4.5	1.2	8.2	1.8	0.4	0.3	9.5	2.0
MN:MINNEAPOLIS	0.0	0.5	1.0	0.6	18.5	3.1	1.0	0.6	18.5	3.1
MO:JEFFERSON CITY	0.3	0.3	0.9	0.4	15.3	2.6	0.5	0.4	13.0	2.3
MS:JACKSON	-0.1	1.8	1.7	1.4	19.8	5.0	1.2	1.1	9.7	3.3
ND:BISMARCK	1.2	0.6	0.6	0.5	60.3	8.9	1.6	0.9	57.3	7.0
NH:CONCORD	0.1	0.3	0.6	0.3	11.1	1.9	1.2	0.5	9.8	1.8
NJ:TRENTON	0.5	0.4	2.6	1.0	13.3	2.9	0.5	0.4	12.1	2.7
NM:SANTA FE	0.2	0.6	2.1	0.9	13.6	3.2	3.1	1.4	13.3	3.1
NV:LAS VEGAS	3.2	1.8	5.3	2.0	94.8	13.0	5.9	2.2	47.4	7.8
NY:ALBANY	0.7	1.2	1.2	0.9	44.0	6.5	2.8	1.3	33.9	5.4
NY:NEW YORK CITY	0.9	0.8	0.6	0.8	29.8	5.6	1.4	1.0	22.0	4.6
NY:NIAGARA FALLS	0.4	0.5	0.4	0.4	51.3	8.1	2.9	1.3	45.8	7.5
NY:SYRACUSE	0.8	0.8	1.8	0.8	30.0	5.2	1.8	1.0	24.0	4.5
NY:YAPHANK	0.1	0.6	0.7	0.5	6.5	1.7	0.6	0.5	7.4	1.9
OH:COLUMBUS	0.3	0.4	0.5	0.3	27.3	6.6	1.0	0.9	28.3	6.7
OH:PAINESVILLE	0.6	0.5	1.0	0.5	27.8	4.9	0.5	0.5	28.3	5.0
OR:PORTLAND	1.8	0.5	3.3	1.4	17.6	3.6	0.9	0.7	15.8	3.4
PA:HARRISBURG	0.0	0.8	0.9	0.6	27.0	4.2	0.9	0.6	27.8	4.3
PA:PITTSBURGH	2.1	1.6	0.7	0.7	57.2	8.9	4.0	1.7	53.2	8.5
RI:PROVIDENCE	0.3	0.5	0.9	0.7	13.3	1.8	0.5	0.4	14.9	2.5
SC:BARNWELL	1.0	2.7	0.7	1.4	8.7	3.7	0.0	0.0	7.2	3.3
SC:COLUMBIA	0.3	0.5	0.9	0.5	22.1	3.0	1.6	0.6	19.0	2.7
SD:PIERRE	0.9	0.7	1.5	0.8	16.4	3.5	0.3	0.4	14.8	3.2
TN:KNOXVILLE	0.3	0.6	3.1	1.0	61.6	8.3	10.1	2.3	45.9	6.6
TN:NASHVILLE	-0.1	0.5	1.1	0.6	24.0	4.1	0.9	0.6	20.1	3.6
TX:AUSTIN	0.2	0.4	0.9	0.5	11.7	2.2	0.5	0.4	9.2	1.9
VA:LYNCHBURG	0.3	0.5	1.2	0.6	234.7	23.9	7.2	1.4	10.8	1.8
WA:SEATTLE	0.4	0.7	0.4	0.3	5.7	1.5	0.7	0.5	6.9	1.6
WA:SPOKANE	1.6	1.5	0.8	0.7	25.7	5.4	0.4	0.8	28.0	5.6
WI:MADISON	0.4	0.3	1.1	0.5	12.1	2.3	0.3	0.4	11.5	2.2
WV:CHARLESTON	1.0	1.2	1.6	0.9	49.3	8.2	0.4	0.5	32.8	6.2

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 fabrication, fuel reprocessing, and nuclear detonations. 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 Kr-85 results will be published when they are available.

ERAMS

SECTION II. Water Program

The ERAMS water program provides ambient radiation data to assess the effects of the nuclear power industry, the natural radiation environment, and other nuclear sources on the nation's rivers, streams and drinking water supplies.

Surface Water

Grab samples are taken quarterly at 58 stations located downstream from operating or future nuclear facilities.

Surface water monitoring consists of tritium analyses quarterly and gamma scans annually. Tritium is the primary radioactive pollutant from nuclear power plants.

Tritium concentrations are determined by liquid scintillation counting of distilled samples. Gamma scans are performed annually to determine if there is a buildup of other contaminants.

Tritium concentrations for surface water samples for April - June 1983 are given in Table 10.

TABLE 10

SURFACE WATER
TRITIUM CONCENTRATION

APRIL - JUNE 1983

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± 2s
AL:DECATUR	TENNESSEE RIVER	4/ 4/83	0.2	0.2
AL:DOTHAN	CHATTAHOOCHIE RIVER	4/ 7/83	0.1	0.2
AL:SCOTTSBORO	TENNESSEE RIVER	5/27/83	0.3	0.2
CA:CLAY STATION	FOLSOM S. CANAL	4/ 8/83	0.1	0.2
CA:DIABLO CANYON	PACIFIC OCEAN	4/14/83	0.2	0.2
CA:EUREKA	HUMBOLDT BAY	4/ 7/83	0.1	0.2
CA:SAN ONOFRE	PACIFIC OCEAN	6/ 4/83	0.2	0.2
CO:GREELEY	SOUTH PLATTE RIVER	4/22/83	0.2	0.2
CT:EAST HADDAM	CONNECTICUT RIVER	5/11/83	0.1	0.2
CT:WATERFORD	LONG ISLAND SOUND	5/10/83	0.1	0.2
FL:CRYSTAL RIVER	GULF OF MEXICO	4/ 4/83	0.2	0.2
FL:FT. PIERCE	ATLANTIC OCEAN	4/ 5/83	0.2	0.2
FL:HOMESTEAD	BISCAYNE BAY	4/13/83	0.1	0.2
IA:CEDAR RAPIDS	CEDAR RIVER	4/ 5/83	0.1	0.2
ID:BUHL	SNAKE RIVER	4/19/83	0.1	0.2
IL:E. MOLINE	MISSISSIPPI RIVER	5/ 5/83	0.2	0.2
IL:MORRIS	ILLINOIS RIVER	5/13/83	0.1	0.2
IL:OREGON	ROCK RIVER	4/15/83	0.3	0.2
IL:ZION	LAKE MICHIGAN	4/12/83	0.3	0.2
LA:NEW ORLEANS	MISSISSIPPI RIVER	4/ 8/83	0.1	0.2
MA:PLYMOUTH	CAPE CODE BAY	4/ 6/83	0.2	0.2
MA:ROWE	DEERFIELD RIVER	6/ 1/83	0.2	0.2
MD:CONOWINGO	SUSQUEHANNA RIVER	4/19/83	0.2	0.2
MD:LUSBY	CHESAPEAKE BAY	4/ 5/83	0.2	0.2
ME:WISCASSET	MONTSEWAY BAY	4/ 4/83	0.3	0.2
MI:BRIDGMAN	LAKE MICHIGAN	4/ 5/83	0.2	0.2
MI:CHARLEVOIX	LAKE MICHIGAN	4/10/83	0.1	0.2
MI:MONROE	LAKE ERIE	4/11/83	0.2	0.2
MI:SOUTH HAVEN	LAKE MICHIGAN	4/ 4/83	0.4	0.2
MN:MONTICELLO	MISSISSIPPI RIVER	4/ 7/83	0.1	0.2
MN:RED WING	MISSISSIPPI RIVER	4/20/83	0.2	0.2
MS:PORT GIBSON	MISSISSIPPI RIVER	4/21/83	0.2	0.2
NC:CHARLOTTE	CATAWBA RIVER	4/ 5/83	0.4	0.2
NC:SOUTHPORT	ATLANTIC OCEAN	4/ 6/83	0.2	0.2
NE:RULO	MISSOURI RIVER	4/12/83	0.2	0.2
NJ:BAYSIDE	DELAWARE RIVER	4/ 6/83	0.2	0.2
NJ:OYSTER CREEK	OYSTER CREEK	4/ 7/83	0.1	0.2
NV:BOULDER CITY	COLORADO RIVER	4/ 1/83	0.4	0.2
NY:OSSINING	HUDSON RIVER	4/20/83	0.2	0.2
NY:OSWEGO	LAKE ONTARIO	5/15/83	0.4	0.2
NY:POUGHKEEPSIE	HUDSON RIVER	4/ 6/83	0.3	0.2
OH:TOLEDO	LAKE ERIE	4/ 1/83	0.3	0.2
OR:BRADWOOD	COLUMBIA RIVER	5/29/83	0.2	0.2
PA:DANVILLE	SUSQUEHANNA RIVER	4/20/83	0.3	0.2

TABLE 10 (CONTINUED)

SURFACE WATER
TRITIUM CONCENTRATION

APRIL - JUNE 1983

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± 2s
SC:ALLENDALE	SAVANNAH RIVER	4/21/83	1.0	0.2
SC:BROAD RIVER	BROAD RIVER	4/27/83	0.2	0.2
SC:HARTSVILLE	LAKE ROBINSON	4/11/83	0.4	0.2
TN:DAISY	TENNESSEE RIVER	5/17/83	0.1	0.2
TN:KINGSTON	CLINCH RIVER	4/26/83	1.2	0.2
TX:EL PASO	RIO GRANDE	4/20/83	0.1	0.2
TX:MATAGORDA	COLORADO RIVER	4/ 5/83	0.1	0.2
VT:VERNON	CONNECTICUT RIVER	4/ 5/83	0.3	0.2
WA:NORTHPORT	COLUMBIA RIVER	5/27/83	0.3	0.2
WA:RICHLAND	COLUMBIA RIVER	4/19/83	0.2	0.2
WI:VICTORY	MISSISSIPPI RIVER	4/ 4/83	0.2	0.2
WV:WHEELING	OHIO RIVER	4/14/83	0.1	0.2

s SIGMA COUNTING ERROR

Drinking Water

The drinking water program provides ambient radiation monitoring relevant to the effects of the nuclear power industry, natural environmental levels, and other pertinent sources. 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 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. Radium-226 analyses are performed if the gross alpha exceeds 2 pCi/l; and radium-228 analyses are performed if the radium-226 activity falls between 3 and 5 pCi/l) (c) specific iodine-131 is performed on one quarterly sample per year for each station (d) an annual composite for plutonium-238, -239, uranium-234, -235, -238, for stations which demonstrate gross alpha levels greater than 2 pCi/l.

Tritium analyses are performed by scintillation counting of the distilled samples, gross beta, and gross alpha by evaporating an aliquot on stainless steel planchets for counting, and radium-226 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 1983 are shown in Table 11.

All samples were taken as either a single grab sample or composite samples taken over 12 to 14 days.

TABLE 11

DRINKING WATER
TRITIUM CONCENTRATION

APRIL - JUNE 1983

LOCATION	DATE COLLECTED	nCi/l	± 2s
AK:FAIRBANKS	4/ 1/83	0.3	0.2
AL:DOTHAN	4/ 7/83	0.2	0.2
AL:MONTGOMERY	4/ 5/83	0.3	0.2
AL:MUSCLE SHOALS	4/ 4/83	0.3	0.2
AL:SCOTTSBORO	5/27/83	0.2	0.2
CA:BERKELEY	4/ 1/83	0.1	0.2
CA:LOS ANGELES	4/ 1/83	0.2	0.2
CO:DENVER	4/22/83	0.3	0.2
CO:PLATTEVILLE	4/22/83	0.4	0.2
CT:HARTFORD	4/ 4/83	0.2	0.2
FL:MIAMI	4/ 1/83	0.2	0.2
FL:TAMPA	4/11/83	0.0	0.2
GA:SAVANNAH	4/20/83	1.6	0.2
HI:HONOLULU	4/ 1/83	0.2	0.2
IA:CEDAR RAPIDS	4/ 3/83	0.2	0.2
ID:IDAHO FALLS	5/ 2/83	0.2	0.2
IL:MORRIS	4/ 4/83	0.1	0.2
IL:W. CHICAGO	4/ 1/83	0.2	0.2
KS:TOPEKA	4/ 1/83	0.2	0.2
LA:NEW ORLEANS	4/ 4/83	0.4	0.2
MA:LAWRENCE	4/ 5/83	0.2	0.2
MD:BALTIMORE	4/ 5/83	0.1	0.2
MD:CONOWINGO	4/19/83	0.4	0.2
ME:AUGUSTA	4/ 7/83	0.2	0.2
MI:DETROIT	4/ 5/83	0.4	0.2
MI:GRAND RAPIDS	4/ 7/83	0.3	0.2
MN:MINNEAPOLIS	4/ 4/83	0.2	0.2
MN:RED WING	4/20/83	0.1	0.2
MS:JACKSON	4/ 1/83	0.2	0.2
MS:PORT GIBSON	4/ 7/83	0.2	0.2
MT:HELENA	4/ 8/83	0.3	0.2
NC:CHARLOTTE	4/ 5/83	0.3	0.2
NC:WILMINGTON	4/ 7/83	0.2	0.2
ND:BISMARCK	4/ 1/83	0.3	0.2
NE:LINCOLN	5/23/83	0.2	0.2
NH:CONCORD	4/ 1/83	0.2	0.2
NJ:WARETOWN	4/ 7/83	0.1	0.2
NM:SANTA FE	4/ 4/83	0.1	0.2
NV:LAS VEGAS	4/ 1/83	0.3	0.2
NY:ALBANY	4/ 1/83	0.3	0.2
NY:NEW YORK CITY	4/11/83	0.2	0.2
NY:NIAGARA FALLS	4/ 6/83	0.1	0.2
OH:CINCINNATI	5/16/83	0.1	0.2
OH:COLUMBUS	4/ 1/83	0.1	0.2

TABLE 11 (CONTINUED)

DRINKING WATER
TRITIUM CONCENTRATION

APRIL - JUNE 1983

LOCATION	DATE COLLECTED	nCi/l	± 2s
OH:EAST LIVERPOOL	4/13/83	0.1	0.2
OH:PAINESVILLE	4/ 1/83	0.3	0.2
OH:TOLEDO	4/ 1/83	0.4	0.2
OK:OKLAHOMA CITY	4/ 1/83	0.2	0.2
OR:PORTLAND	4/ 4/83	0.1	0.2
PA:COLUMBIA	4/21/83	0.2	0.2
PA:HARRISBURG	4/15/83	0.2	0.2
PA:PITTSBURGH	4/13/83	0.1	0.2
PC:ANCON	4/ 6/83	0.1	0.2
RI:PROVIDENCE	4/ 4/83	0.2	0.2
SC:BARNWELL	4/21/83	0.1	0.2
SC:COLUMBIA	4/ 1/83	0.4	0.2
SC:HARTSVILLE	4/11/83	0.1	0.2
SC:JENKINSVILLE	4/ 8/83	0.2	0.2
SC:SENECA	4/19/83	0.2	0.2
TN:CHATTANOOGA	4/29/83	0.4	0.2
TN:KNOXVILLE	4/ 1/83	0.2	0.2
TX:AUSTIN	4/ 1/83	0.3	0.2
VA:DOSWELL	4/22/83	0.2	0.2
VA:LYNCHBURG	4/ 1/83	0.3	0.2
VA:VIRGINIA BEACH	4/ 6/83	0.1	0.2
WA:RICHLAND	4/19/83	0.4	0.2
WA:SEATTLE	4/ 1/83	0.2	0.2
WI:GENOA CITY	4/ 5/83	0.1	0.2
WI:MADISON	4/ 5/83	0.1	0.2

s SIGMA COUNTING ERROR

Radon-222 in Drinking Water

Radon-222 in drinking water has previously been considered a source of radiation exposure primarily from an ingestion standpoint. The Office of Radiation Programs (ORP) of the U.S. Environmental Protection Agency (EPA) is investigating radon in water supplies to evaluate the possibility that a major pathway from inhalation exposure may exist in addition to the ingestion pathway. As an inert gas, radon is not chemically bound to the water and consequently can be released during any operation that aerates or agitates water. Depending upon the initial concentration of radon in water, significant quantities of radon could be released in a home or to the general environment.

To determine the scope of this potential problem, a national ground water sampling program has been initiated by the Eastern Environmental Radiation Facility (EERF) to obtain data on radon concentrations in water supplies throughout the country. Sampling kits have been assembled by EERF and distributed to various state health departments. The kit is designed so that state personnel can collect samples from potable water supplies and ship them, without loss of radon other than radioactive decay, to EERF for analysis.

The selection of water supplies to be sampled is handled by two separate methods. Method 1 in which each state collects samples from all groundwater supplies serving at least 1000 people and Method 2 in which the choice of sampling locations and the number of supplies to be sampled is left to the discretion of the state programs. Each state is asked to obtain a representative sampling of ground water supplies within its boundaries. The extent of the sampling efforts and how representative the data are for a given state is determined primarily by the amount of time each state devotes to the program.

The concentrations of radon in water are determined at the EERF by liquid scintillation counting. The limit of detection for this technique using a 50-minute count and a 10-ml sample is 0.16 pCi or 16 pci/1.

The sampling kits are being provided to the various states on a rotating schedule. This schedule is designed to cover the U.S. within approximately two years.

Summaries of the data for Arizona, Illinois, Rhode Island, South Carolina, Tennessee, Virginia, Vermont and Wyoming are shown in Tables 12 - 19.

All radon concentration and counting error results are computer generated resulting in numbers that are less accurate than what is presented (i. e., up to five significant figures are implied). All results should be rounded off to no more than three significant figures when using these results.

TABLE 12

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
AZ:APACHE JUNCTION	4/15/81	10000	135.8	107.9
AZ:ARIZONA CITY	5/29/81	1200	308.6	77.8
AZ:AVONDALE	6/ 4/81	6550	251.3	110.1
AZ:BISBEE	4/28/81	12000	487.4	78.4
AZ:BUCKEYE	4/30/81	1800	1005.5	140.8
AZ:BUCKEYE	4/30/81	3300	372.9	130.3
AZ:CAREFREE	3/18/81	1200	2228.5	111.4
AZ:CASA GRANDE	3/10/81	14900	544.2	54.4
AZ:CAVE CREEK	3/18/81	1450	1356.5	95.0
AZ:COOLIDGE	3/10/81	6711	249.1	48.6
AZ:COOLIDGE	3/10/81	1000	241.9	49.6
AZ:DOUGLAS	4/ 7/81	17300	369.1	51.5
AZ:EL MIRAGE	3/17/81	7200	128.1	110.4
AZ:ELOY	3/19/81	7000	195.2	61.7
AZ:FLORENCE	3/18/81	3200	197.8	42.3
AZ:FLORENCE	3/18/81	1300	236.0	42.3
AZ:FLORENCE	3/18/81	2500	251.1	43.0
AZ:FOUNTAIN HILLS	3/18/81	3500	728.1	97.3
AZ:GILA BEND	5/22/81	1800	279.6	133.3
AZ:GLENDALE	3/17/81	80500	386.8	107.7
AZ:GLOBE	3/13/81	8500	310.5	92.7
AZ:GOODYEAR	4/30/81	2000	203.6	123.7
AZ:HAYDEN	4/ 9/81	1400	113.7	90.2
AZ:HUACHUCA	4/ 2/81	2380	0.0	650.2
AZ:KEARNEY	4/ 9/81	3000	310.9	92.8
AZ:LITCHFIELD PARK	3/18/81	3500	64.2	91.6
AZ:LITCHFIELD PARK	4/30/81	1200	194.0	156.9
AZ:MAMMOTH	4/ 9/81	1300	580.9	95.8
AZ:MIAMI	3/13/81	11456	259.5	90.8
AZ:NOGALES	4/21/81	13500	396.4	72.8
AZ:NOGALES	4/21/81	1363	253.2	67.5
AZ:ORACLE	4/ 9/81	3000	210.8	90.7
AZ:PARADISE VALLEY	3/18/81	11000	242.5	114.4
AZ:PARKER	6/ 2/81	6000	463.4	155.2
AZ:PAYSON	4/28/81	7000	6118.5	123.0
AZ:PHOENIX	3/17/81	880000	311.9	143.3
AZ:PHOENIX	3/17/81	1200	233.9	104.8
AZ:PHOENIX	3/17/81	20100	335.3	105.0
AZ:PICACHO	5/ 7/81	2500	137.5	93.0
AZ:PINE	4/27/81	1600	-51.6	83.6
AZ:PINE	4/27/81	4169	226.3	88.2
AZ:PRESCOTT	4/27/81	3256	859.9	98.7
AZ:SCOTTSDALE	3/18/81	53000	433.3	121.1
AZ:SIERRA VISTA	3/17/81	6130	608.2	48.7
AZ:SIERRA VISTA	4/14/81	1295	313.3	81.4
AZ:SIERRA VISTA	4/14/81	1505	1153.0	92.2
AZ:SIERRA VISTA	7/15/81	4543	535.9	80.4

TABLE 12 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
AZ:SIERRA VISTA	7/15/81	5425	743.8	81.9
AZ:SOMERTON	5/22/81	3500	265.1	126.4
AZ:SUN CITY	3/10/81	1200	561.1	56.1
AZ:SUN CITY	3/17/81	2400	708.5	113.1
AZ:SUN CITY	3/17/81	48000	310.1	142.5
AZ:SUPERIOR	3/13/81	5000	30.9	89.3
AZ:TOLLESON	4/30/81	4000	57.2	153.2
AZ:TUCSON	4/ 9/81	443680	201.8	88.8
AZ:TUCSON	5/ 7/81	121140	434.3	101.0
AZ:TUCSON	9/28/81	22750	460.7	78.3
AZ:TUCSON	9/28/81	15000	416.2	78.9
AZ:TUSCON	3/ 2/82	1700	19.7	60.3
AZ:TUSCON	3/ 2/82	3200	326.4	63.6
AZ:TUSCON	3/ 2/82	3245	246.9	62.7
AZ:TUSCON	3/ 2/82	3200	262.1	72.5
AZ:TUSCON	3/ 2/82	3100	53.1	60.5
AZ:YUMA	5/22/81	3500	68.7	124.9

s = SIGMA COUNTING ERROR (pCi/l)

TABLE 13

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
IL:ADDISON	9/17/82	29759	150.4	96.0
IL:ARLINGTON HEIGH	8/25/82	65000	438.1	112.2
IL:AURORA	1/22/81	75000	123.9	75.6
IL:AURORA	7/20/82	82000	265.1	76.8
IL:BARRINGTON	8/ 6/82	9029	-2.0	80.5
IL:BARTLETT	8/26/82	13254	167.1	93.8
IL:BATAVIA	1/21/81	10000	47.0	88.4
IL:BATAVIA	7/26/82	12800	209.6	74.3
IL:BEARDSTOWN	7/14/82	6500	138.8	56.9
IL:BELLWOOD	8/24/82	23000	112.6	56.5
IL:BELVIDERE	8/ 5/82	15000	160.8	101.8
IL:BENSENVILLE	9/17/82	16124	92.9	96.3
IL:BETHALTO	7/20/82	16103	47.2	59.8
IL:BLOOMINGDALE	9/17/82	13000	210.3	96.5
IL:BOLINGBROOK	7/27/82	15000	486.1	147.3
IL:BOLINGBROOK	7/27/82	28000	373.7	67.1
IL:BUFFALO GROVE	8/27/82	22684	45.9	68.3
IL:BUSHNELL	1/19/81	3500	180.0	57.6
IL:CAROL STREAM	1/22/81	> 10000	-47.5	73.1
IL:CAROL STREAM	9/ 7/82	15500	241.7	72.4
IL:CARPENTERSVILLE	8/ 2/82	23000	7.9	40.3
IL:CHICAGO HEIGHTS	9/ 1/82	37026	338.6	62.2
IL:CHILLICOTHE	6/17/82	6500	315.3	86.0
IL:CLARENDON HILLS	8/ 4/82	6857	148.7	124.9
IL:CLINTON	8/10/82	7400	45.9	58.0
IL:COAL VALLEY	1/20/81	3500	130.5	47.0
IL:COLLINSVILLE	7/20/82	19567	55.8	115.1
IL:COUNTRY CLUB HI	8/18/82	14676	296.0	104.5
IL:CREST HILL	7/ 2/82	8000	268.6	94.9
IL:CREVE-COURE	8/18/82	6851	550.8	104.7
IL:CRYSTAL LAKE	7/29/82	18590	97.4	101.6
IL:CUBA	1/19/81	3500	302.8	57.5
IL:DARIEN	7/27/82	12000	324.9	142.3
IL:DEKALB	8/ 5/82	35500	127.4	98.8
IL:DES PLAINES	8/26/82	6237	91.1	85.6
IL:DES PLAINES	8/26/82	54000	81.1	85.9
IL:DIXON	8/ 3/82	15650	144.8	73.1
IL:DOWNERS GROVE	7/27/82	42500	647.2	145.0
IL:E. CHICAGO HEIG	9/ 1/82	5347	256.6	61.5
IL:EAST ALTON	7/20/82	8750	30.9	61.0
IL:EAST PEORIA	8/18/82	23500	439.9	101.0
IL:EDWARDSVILLE	7/20/82	15400	2.9	58.3
IL:ELGIN	8/ 2/82	67000	76.1	56.8
IL:ELK GROVE	8/27/82	28907	72.3	69.5
IL:ELMHURST	9/ 3/82	44251	189.4	95.2
IL:FLOSSMOOR	8/27/82	8300	218.3	78.6
IL:FOX LAKE	8/20/82	6300	18.1	64.4

TABLE 13 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
IL:FREEPORT	8/ 4/82	30000	59.2	58.2
IL:GALESBURG	8/25/82	35300	183.8	63.1
IL:GENESEO	8/23/82	6450	237.7	59.4
IL:GENEVA	7/26/82	9880	68.7	69.7
IL:GLEN ELLYN	7/30/82	8650	261.9	86.1
IL:GLEN ELLYN	9/20/82	23649	111.8	55.9
IL:GLENDALE HEIGHT	9/ 7/82	24000	83.0	69.1
IL:GLENVIEW	8/25/82	32000	58.6	111.0
IL:GLENWOOD	8/31/82	10437	352.2	73.9
IL:GRAYSLAKE	8/ 7/82	5260	95.8	70.6
IL:GURNEE	8/ 9/82	6300	98.0	59.3
IL:HANOVER PARK	8/26/82	28719	196.8	92.1
IL:HARVARD	7/26/82	5126	21.9	62.7
IL:HINSDALE	8/16/82	18000	34.1	56.0
IL:HOFFMAN ESTATES	8/27/82	37000	278.6	75.1
IL:HOMEWOOD	9/ 1/82	19724	86.7	57.6
IL:HOOPESTON	7/27/82	6500	57.6	57.1
IL:ITASCA	9/ 7/82	7129	92.7	68.6
IL:JERSEYVILLE	7/14/82	8627	70.1	55.7
IL:JOLIET	6/30/82	78000	129.8	57.1
IL:JONESBORO	8/ 5/82	10000	66.2	97.5
IL:KEWANEE	8/23/82	14500	340.2	74.1
IL:LA GRANGE	8/12/82	17100	54.5	78.5
IL:LA GRANGE HIGHL	8/12/82	4700	55.8	77.7
IL:LA SALLE	8/26/82	10800	599.0	98.8
IL:LAKE COUNTRY	8/ 7/82	2027	995.0	84.4
IL:LAKE IN THE HIL	7/29/82	5651	185.0	101.5
IL:LAKE ZURICH	8/ 9/82	8225	66.8	56.6
IL:LAWRENCEVILLE	8/10/82	9200	7.4	58.9
IL:LEMONT	1/22/81	5500	88.3	74.2
IL:LEMONT	7/ 2/82	5600	230.8	92.1
IL:LIBERTYVILLE	8/ 9/82	16520	62.8	69.9
IL:LINCOLN	7/14/82	19000	118.0	54.9
IL:LISLE	8/ 4/82	9000	543.5	130.2
IL:LISLE	8/ 5/82	9500	160.6	121.9
IL:LOCKPORT	7/ 2/82	10000	219.3	93.5
IL:LOMBARD	9/20/82	37295	90.8	56.8
IL:LOVES PARK	8/ 9/82	13000	96.4	134.5
IL:MATTESON	8/18/82	10282	360.1	104.5
IL:MCHENRY	7/29/82	10908	156.4	100.2
IL:MENDOTA	8/26/82	7100	55.0	80.2
IL:METROPOLIS	8/ 5/82	7000	549.7	109.5
IL:MILAN	8/25/82	6300	101.0	62.5
IL:MINONK	1/21/81	2500	71.0	87.4
IL:MOMENCE	8/ 9/82	3300	598.1	68.7
IL:MONMOTH	8/25/82	12100	85.8	62.2
IL:MONTGOMERY	7/20/82	13800	98.7	120.5

TABLE 13 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
IL:MORRIS	6/30/82	8835	22.9	56.6
IL:MORTON	6/21/82	14000	73.9	57.3
IL:MOUNT PROSPECT	8/25/82	20000	107.8	104.7
IL:MT. PROSPECT	8/26/82	39100	149.4	88.4
IL:MUNDELEIN	8/ 9/82	17573	188.7	73.0
IL:N. AURORA	7/26/82	5300	69.2	71.9
IL:NAPERVILLE	7/30/82	47600	337.5	87.7
IL:NEW LENOX	7/ 2/82	6265	225.0	105.8
IL:NORMAL	8/10/82	34800	25.4	56.5
IL:NORTH PARK	8/10/82	18500	171.6	60.1
IL:NORTH TAZWELL	8/30/82	10000	10.2	54.2
IL:OAK BROOK	9/ 3/82	14300	138.8	100.4
IL:ORLAND PARK	8/16/82	23045	207.4	57.4
IL:OTTOWA	8/27/82	19500	108.0	69.8
IL:PALATINE	8/25/82	32166	366.3	111.7
IL:PALATINE	8/25/82	7600	105.6	106.9
IL:PARK FOREST	8/18/82	26222	97.3	97.6
IL:PARK FOREST SO.	8/ 9/82	6300	226.1	84.1
IL:PAXTON	7/27/82	4500	137.2	59.2
IL:PEKIN	7/ 1/82	34000	348.0	115.2
IL:PEORIA HEIGHTS	6/18/82	8500	302.7	70.8
IL:PERU	8/26/82	13000	111.1	82.8
IL:PLANO	7/20/82	5000	381.9	129.8
IL:PRINCETON	8/26/82	7300	16.3	81.1
IL:RANTOUL	7/27/82	13500	40.4	57.8
IL:RICHTON PARK	8/18/82	9403	273.4	101.1
IL:RIVERSIDE	8/12/82	9236	226.0	84.0
IL:ROCHELLE	8/ 5/82	9100	29.4	94.4
IL:ROCK FALLS	8/ 3/82	60640	63.5	69.1
IL:ROCKFORD	8/ 9/82	150000	81.2	69.1
IL:ROLLING MEADOWS	8/25/82	20167	152.1	111.8
IL:ROMEOVILLE	7/ 2/82	15500	60.5	89.9
IL:ROSELLE	9/ 7/82	16948	64.5	68.0
IL:ROUND LAKE BEAC	8/20/82	13600	235.2	69.2
IL:S. ELGIN	8/ 2/82	6218	178.4	57.6
IL:SANDWICH	8/ 5/82	5600	95.2	96.9
IL:SAUK VILLAGE	8/31/82	10906	334.3	74.5
IL:SCHAUMBURG	8/27/82	52000	261.0	338.6
IL:SILVIS	8/23/82	8300	99.3	56.5
IL:SO. CHICAGO HEI	8/27/82	3775	15.5	73.4
IL:SPRING VALLEY	6/22/82	5800	181.8	59.1
IL:ST. CHARLES	8/ 6/82	17500	288.4	125.2
IL:STEGER	8/27/82	10000	188.9	75.9
IL:STERLING	8/ 3/82	19500	150.6	70.5
IL:STREAMWOOD	8/27/82	23400	155.1	82.1
IL:SYCAMORE	8/ 5/82	9000	-14.4	95.6
IL:THORNTON	1/22/81	3700	176.6	74.2

TABLE 13 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
IL:TROY	7/21/82	6650	25.1	62.7
IL:URBANA	7/27/82	135000	39.1	57.9
IL:VILLA PARK	9/20/82	23185	174.2	59.1
IL:W. CHICAGO	9/21/82	12550	183.2	58.8
IL:WASHINGTON	6/17/82	9500	105.4	80.6
IL:WATSEKA	8/25/82	5543	243.9	63.4
IL:WAUCONDA	8/ 6/82	5688	220.4	85.9
IL:WESTERN SPRINGS	8/12/82	12876	119.2	81.5
IL:WESTMONT	8/ 4/82	16700	-88.7	121.8
IL:WHEATON	9/20/82	44075	170.1	56.1
IL:WHEELING	8/25/82	23266	174.0	107.2
IL:WINFIELD	9/21/82	4600	40.5	55.9
IL:WINTHROP HARBOR	8/ 9/82	5428	118.7	59.9
IL:WOOD DALE	9/17/82	11251	142.4	97.0
IL:WOOD RIVER	7/20/82	16275	138.1	62.6
IL:WOODRIDGE	7/27/82	2300	491.4	148.0
IL:WOODSTOCK	7/26/82	11725	21.8	62.2

s = SIGMA COUNTING ERROR (pCi/l)

TABLE 14

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE		POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s	
RI:BRIARCLIFFE	5/14/82		550*	206200.0	0.0	**
RI:BRIARCLIFFE	5/14/82		550	248850.0	0.0	**
RI:BRIARCLIFFE	5/14/82		550	185550.0	0.0	**
RI:BRIARCLIFFE	5/14/82		550	233200.0	0.0	**
RI:BRIARCLIFFE	5/14/82		550	265600.0	0.0	**
RI:BURRILLVILLE	4/21/81	<	100	809.5	97.1	
RI:BURRILLVILLE	4/21/81		550	418.2	93.5	
RI:BURRILLVILLE	7/15/81		550	1267.0	139.4	
RI:BURRILLVILLE	4/21/81		550	2430.0	121.5	
RI:BURRILLVILLE	4/21/81		550	4351.0	130.5	
RI:BURRILLVILLE	4/21/81		550	5186.0	155.6	
RI:BURRILLVILLE	4/21/81	<	100	2050.0	111.6	
RI:BURRILLVILLE	4/21/81		550	6151.5	123.0	
RI:BURRILLVILLE	4/21/81		550	3076.5	123.1	
RI:CHARLESTOWN	8/14/81		550	2040.5	102.1	
RI:CHARLESTOWN	8/14/81		550	3536.0	106.1	
RI:CHARLESTOWN	8/14/81		550	2098.0	104.9	
RI:CHARLESTOWN	8/14/81		550	2129.0	106.5	
RI:CHARLESTOWN	8/20/81		550	15510.0	155.1	
RI:CHARLESTOWN	8/20/81		550	8019.0	160.4	
RI:CHARLESTOWN	8/20/81		550	3742.0	149.7	
RI:CHEPACHET	5/ 1/81		550	1180.5	130.0	
RI:CHEPACHET	5/ 1/81		550	690.2	123.9	
RI:CHEPACHET	4/16/81		550	2765.5	138.4	
RI:CHEPACHET	5/ 1/81		550	1184.0	135.9	
RI:COVENTRY	12/17/80		70000	1719.0	103.4	
RI:COVENTRY	8/26/81	<	100	1826.5	127.9	
RI:CUMBERLAND	9/ 1/81		550	1496.5	92.6	
RI:CUMBERLAND	9/ 1/81		550	1514.5	90.9	
RI:GLENDALE	4/16/81		550	13400.0	134.0	
RI:GLENDALE	4/16/81	<	100	1120.5	106.4	
RI:GLENDALE	7/15/81		550	5108.0	204.3	
RI:GLOUCESTER	4/16/81		550	692.7	103.9	
RI:GLOUCESTER	5/ 1/81		550	1020.0	142.8	
RI:GLOUCESTER	5/ 1/81		550	873.8	125.6	
RI:GLOUCESTER, WES	5/ 1/81		550	377.4	118.6	
RI:GLOUCESTER, WES	5/ 1/81		550	1602.0	135.8	
RI:GLOUCESTER	8/26/81		550	2074.0	134.1	
RI:GLOUCESTER	8/26/81		550	420.9	106.4	
RI:GLOUCESTER	8/26/81		550	1658.0	124.1	
RI:GLOUCESTER	8/26/81		550	898.9	116.1	
RI:HARRISVILLE	1/14/81		3000	747.3	74.8	
RI:HARRISVILLE	1/14/81		3000	809.3	76.7	
RI:KINGSTON, SOUTH	11/25/80		3200	2255.0	90.2	
RI:KINGSTON, SOUTH	11/25/80		3200	3038.5	91.2	
RI:KINGSTON, SOUTH	4/30/81		550	587.0	117.2	
RI:KINGSTON, SOUTH	8/20/81		550	2516.0	125.8	

TABLE 14 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE		POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
RI:KINGSTON, SOUTH	8/20/81		550	7788.0	155.8
RI:KINGSTON, SOUTH	1/15/81		2100	1113.5	72.0
RI:KINGSTON, SOUTH	3/17/81		500	2757.0	55.2
RI:KINGSTON, SOUTH	8/20/81		550	32590.0	325.9
RI:KINGSTON, SOUTH	4/30/81		550	16745.0	167.5
RI:KINGSTON, SOUTH	8/20/81		550	2524.5	126.4
RI:LINCOLN	2/25/81		13500	312.8	89.1
RI:LINCOLN	2/25/81		13500	845.4	97.0
RI:LINCOLN	2/25/81		13500	924.6	96.8
RI:LINCOLN	2/25/81		13500	415.4	89.3
RI:LINCOLN	2/25/81		13500	830.9	95.4
RI:NO. SMITHFIELD	9/ 4/81		550	360.6	77.2
RI:NO. SMITHFIELD	9/ 4/81		550	3533.5	176.7
RI:NO. SMITHFIELD	9/ 4/81		550	23145.0	231.7
RI:NORTH KINGSTOWN	1/15/81		1500	118.9	62.0
RI:NORTH KINGSTOWN	1/27/81		22000	1294.5	64.7
RI:NORTH KINGSTOWN	1/27/81		22000	1656.0	66.2
RI:NORTH KINGSTOWN	1/27/81		22000	1455.0	58.2
RI:NORTH KINGSTOWN	1/27/81		22000	1656.0	66.2
RI:NORTH KINGSTOWN	1/27/81		22000	1455.0	58.2
RI:NORTH KINGSTOWN	1/27/81		22000	1656.0	66.2
RI:NORTH KINGSTOWN	1/27/81		22000	1455.0	58.2
RI:NORTH KINGSTOWN	1/27/81		22000	1905.5	57.2
RI:NORTH KINGSTOWN	1/27/81		22000	2394.5	71.9
RI:NORTH KINGSTOWN	5/20/81		550	10315.0	206.3
RI:NORTH KINGSTOWN	5/20/81		550	2585.0	181.1
RI:PASCOAG	1/14/81		5200	1175.0	82.4
RI:PASCOAG	1/14/81		5200	565.7	79.2
RI:SMITHFIELD	7/15/81		550	119.5	118.9
RI:TIVERTON	5/19/81	<	100	3098.0	217.5
RI:TIVERTON	5/19/81		550	22045.0	440.9
RI:TIVERTON	5/19/81		550	17985.0	359.7
RI:W. KINGSTON	4/30/81		550	2101.0	147.1
RI:WAKEFIELD	11/25/80		28000	1948.5	97.5
RI:WARWICK	1/12/81		6000	2605.0	117.2
RI:WARWICK	1/12/81		6000	3132.0	125.8
RI:WARWICK	1/27/81		70000	2205.5	66.2
RI:WARWICK	1/27/81		70000	2034.0	70.6
RI:WEST GREENWICH	12/17/80		70000	930.4	97.7
RI:WEST GREENWICH	12/17/80		70000	1093.0	98.4
RI:WEST GREENWICH	12/17/80		70000	955.8	94.6
RI:WESTERLY	12/18/80		20000	958.5	85.6
RI:WESTERLY	12/18/80		20000	843.9	83.6
RI:WESTERLY	12/18/80		20000	1195.0	83.7
RI:WESTERLY	12/18/80		20000	1161.5	87.0

* 550 REPRESENTS 100-1000 PEOPLE SERVED

** 0.0 REPRESENTS LESS THAN ± 0.005% COUNTING ERROR

s = SIGMA COUNTING ERROR (pCi/l)

TABLE 15

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
SC:AIKEN	7/27/81	2000	216.3	82.1
SC:AIKEN	7/27/81	1250	454.0	86.3
SC:ALLENDALE	7/28/81	5134	227.3	74.6
SC:ANDREWS	8/ 3/81	3800	98.2	77.3
SC:BAMBERG	7/14/81	4900	-15.5	81.9
SC:BARNWELL	7/19/82	6500	339.0	81.4
SC:BATH	7/27/81	1560	131.0	81.2
SC:BATH	7/27/81	1239	150.3	81.6
SC:BEACH ISLAND	7/27/81	4500	196.3	82.8
SC:BELVEDERE	7/27/81	6800	58.6	79.6
SC:BENNETTSVILLE	5/24/82	11900	298.1	60.9
SC:BISHOPVILLE	4/27/82	4000	381.8	63.0
SC:BLACKVILLE	7/19/82	2975	341.1	80.1
SC:BLENHEIM	5/24/82	1383	455.5	63.8
SC:BOWMAN	7/14/81	2056	32.8	82.5
SC:BRANCHVILLE	7/14/81	1330	34.8	83.0
SC:BREEZY HILL	7/27/81	7000	191.4	114.0
SC:BUFFALO	7/20/82	1260	5653.0	113.2
SC:BULLS BAY	7/29/81	3150	51.0	110.4
SC:BURNETTOWN	7/27/81	1200	79.5	80.1
SC:CASSATT	8/10/81	1558	203.9	78.2
SC:CHERAW	5/24/82	4725	52.2	56.4
SC:CLIFTON	7/20/82	1365	75.5	64.5
SC:CLOVER	4/20/82	5075	4092.0	81.8
SC:CLOVER	4/20/82	2030	45.8	57.4
SC:COLUMBIA	7/ 8/81	1228	722.9	68.5
SC:COLUMBIA	7/ 8/81	1412	943.8	75.5
SC:COLUMBIA	7/ 8/81	1435	-126.5	56.7
SC:CONWAY	8/ 4/81	11000	118.1	71.2
SC:DARLINGTON	8/10/81	10150	126.6	76.7
SC:DENMARK	7/14/81	4550	210.7	86.3
SC:DILLON	5/31/82	3500	152.2	58.1
SC:ELLOREE	7/14/81	2000	105.1	83.5
SC:ESTILL	7/28/81	3010	37.2	84.8
SC:FAIRFAX	7/28/81	1973	73.9	86.2
SC:FLORENCE	4/27/82	44000	-21.3	54.7
SC:FORT MILL	4/20/82	2600	3618.0	108.5
SC:GARDEN CITY	8/ 3/81	2650	85.6	76.3
SC:GASTON	7/13/81	2000	262.8	61.7
SC:GEORGETOWN	8/ 3/81	5500	155.7	77.7
SC:GILBERT	7/ 8/81	1850	989.8	73.9
SC:GLOVERVILLE	7/27/81	1440	18.6	56.1
SC:GOOSE CREEK	7/29/81	4648	-5.2	76.4
SC:GRAY COURT	7/20/82	1250	16135.0	161.4
SC:HAMPTON	7/28/81	4300	154.7	86.8
SC:HARDEEVILLE	7/25/81	2222	-24.2	143.8
SC:HARTSVILLE	8/10/81	11000	252.1	78.2

TABLE 15 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
SC:HEMINGWAY	8/ 4/81	1400	30.8	69.7
SC:HILTON HEAD	7/28/81	2922	-17.0	83.3
SC:HOLLY HILL	7/14/81	1600	131.5	85.2
SC:HOWLANDVILLE	7/27/81	1232	73.6	79.9
SC:INMAN	7/20/82	1068	45.2	63.6
SC:ISLE OF PALMS	7/29/81	5250	88.9	111.2
SC:JACKSON	7/27/81	3152	394.5	85.3
SC:JOHNSONVILLE	8/ 4/81	3500	42.2	69.5
SC:KINGSTREE	8/ 3/81	6300	190.8	78.6
SC:LAKE CITY	8/ 4/81	8750	138.2	76.5
SC:LAKE VIEW	8/ 4/81	1230	82.5	70.0
SC:LAMAR	8/10/81	1575	536.9	83.1
SC:LANGLEY	7/27/81	1330	73.2	80.8
SC:LATTA	5/31/82	2450	274.7	60.3
SC:LAURENS	7/20/82	2636	39.4	63.2
SC:LEESVILLE	7/ 8/81	3400	236.4	64.3
SC:LITTLE MOUNTAIN	7/13/81	1420	303.8	62.4
SC:LORIS	8/ 4/81	2540	74.6	70.1
SC:MANNING	7/20/81	5282	150.4	62.4
SC:MARION	8/ 4/81	2625	1244.0	87.1
SC:MARION	8/ 4/81	10000	221.2	73.0
SC:MCBEE	8/10/81	1190	240.3	78.2
SC:MCCALL	5/24/82	3115	387.5	62.0
SC:MONCKS CORNER	7/29/81	3500	132.1	111.6
SC:MT. PLEASANT	7/29/81	11900	32.5	109.1
SC:MULLINS	8/ 4/81	9450	67.4	70.4
SC:MURRELL'S INLET	8/ 3/81	1200	133.6	77.9
SC:MYRTLE BEACH	8/ 3/81	20000	102.9	76.7
SC:MYRTLE BEACH	8/ 4/81	6000	72.1	75.1
SC:NEW ELLENTON	7/27/81	4000	154.6	82.5
SC:NORTH	7/14/81	1918	331.8	87.6
SC:OUTLAND	8/ 3/81	1050	117.0	77.4
SC:PACOLET MILLS	7/20/82	2268	45.3	63.6
SC:PAMLICO	8/ 4/81	1680	89.9	101.1
SC:PAWLEY'S ISLAND	8/ 3/81	3800	152.9	77.5
SC:PINOPOLIS	7/29/81	1200	83.7	110.9
SC:PROSPERITY	7/13/81	1035	3882.5	116.5
SC:RIDGELAND	7/28/81	2013	-35.6	81.7
SC:SANGAREE	7/29/81	3381	17.0	109.6
SC:SEABROOK	7/28/81	8724	137.1	91.8
SC:SHAW AFB	7/20/81	6975	95.1	61.3
SC:SPARTANBURG	7/20/82	3000	96.2	64.0
SC:SPRINGFIELD	7/19/82	1120	314.8	79.4
SC:ST. GEORGE	7/14/81	2835	258.2	86.5
SC:ST. MATTHEWS	7/14/81	4200	500.0	89.7
SC:ST. STEPHEN	8/ 3/81	1900	54.3	77.0
SC:SULLIVAN'S ISLA	7/29/81	2660	-13.0	108.5

TABLE 15 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
SC:SUMMERTON	7/20/81	2100	194.5	62.8
SC:SUMTER	7/20/81	2325	65.9	60.2
SC:SUMTER	7/20/81	40859	85.1	61.0
SC:SURFSIDE BEACH	8/ 3/81	5500	33.8	75.9
SC:SWANSEA	7/13/81	1364	303.9	62.3
SC:TALATHA	7/27/81	1300	373.4	85.1
SC:TIMMONSVILLE	4/27/82	2615	122.5	57.6
SC:VARNVILLE	7/28/81	1760	222.7	89.0
SC:WAGENER	7/27/81	1400	225.7	80.9
SC:WATERBORO	7/28/81	12000	298.8	88.0
SC:WILLISTON	7/27/81	3800	345.1	86.1
SC:WINDJAMMER MHP	8/ 3/81	1386	239.4	80.2

s = SIGMA COUNTING ERROR (pCi/l)

TABLE 16

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
TN:ALAMO	7/28/82	3000	83.3	112.2
TN:BARTLETT	7/27/82	2800	-4.5	39.4
TN:BARTLETT	7/27/82	3300	-58.3	65.9
TN:BOLIVAR	7/26/82	8000	40.9	69.9
TN:BROWNSVILLE	7/27/82	10000	-5.1	67.2
TN:CHATTANOOGA	8/ 5/82	7643	211.0	104.2
TN:COVINGTON	7/27/82	4631	9.4	67.6
TN:COVINGTON	7/27/82	8000	-10.2	47.2
TN:DECHERD	8/ 5/82	1045	587.8	116.8
TN:DRESDEN	7/28/82	3000	27.3	102.1
TN:DYERSBURG	7/28/82	1430	-33.7	59.7
TN:DYERSBURG	7/28/82	15143	3.1	60.9
TN:EAGLEVILLE	9/14/82	500	165.3	142.9
TN:ELIZABETH	8/24/82	8800	210.6	71.1
TN:ELIZABETHTON	8/24/82	3835	980.8	83.3
TN:ERWIN	8/24/82	3500	208.1	70.7
TN:HALLS	7/27/82	3900	-4.2	66.6
TN:HENDERSON	7/26/82	5000	-1.7	65.6
TN:HIXSON	8/ 6/82	14000	23.8	89.4
TN:HOENWALD	9/16/82	4000	694.1	111.1
TN:HUMBOLDT	7/28/82	10000	85.0	102.5
TN:HUNTINGDON	7/28/82	4000	32.5	102.3
TN:JACKSON	7/26/82	50000	11.0	65.8
TN:JACKSON	7/27/82	50000	24.8	55.5
TN:JEFFERSON CITY	8/25/82	10000	33.3	108.4
TN:LAFAYETTE	9/15/82	2500	164.1	117.7
TN:MARTIN	7/28/82	9585	62.5	103.2
TN:MCKINZIE	7/28/82	2000	62.1	102.4
TN:MEMPHIS	7/27/82	655320	-37.0	67.0
TN:MILAN	7/28/82	10270	46.4	101.9
TN:MILLINGTON	7/27/82	9500	3.4	67.9
TN:MILLINGTON	7/27/82	15000	-33.4	66.9
TN:MOUNTAIN CITY	8/24/82	5492	276.3	68.1
TN:NEW TAZWELL	8/25/82	7500	-5.6	108.0
TN:NEWBURN	7/28/82	6183	65.2	103.2
TN:OLIVER SPRINGS	8/25/82	5295	277.4	111.3
TN:PARIS	7/28/82	4200	9.1	101.8
TN:PIKEVILLE	9/15/82	800	166.8	120.1
TN:RIPLEY	7/27/82	2500	3.4	66.9
TN:RIPLEY	7/27/82	7500	-17.8	66.6
TN:SAVANNAH	7/26/82	4000	185.4	68.5
TN:SEMLER	7/26/82	8503	119.8	67.7
TN:SIGNAL MTN.	8/ 5/82	1510	241.2	108.0
TN:SO. FULTON	7/28/82	2500	28.6	102.2
TN:SOMERVILLE	7/26/82	4070	46.3	66.4
TN:TAFT	9/14/82	2400	148.6	140.4
TN:TRACY CITY	10/12/82	3538	-56.4	166.8
TN:TRENTON	7/28/82	5000	33.7	101.9
TN:UNION CITY	7/28/82	6000	-10.4	101.3
TN:WOODBURY	9/15/82	1500	297.5	122.0

s = SIGMA COUNTING ERROR (pCi/l)

TABLE 17

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
VA:ALEXANDRIA	6/23/81	1200	303.3	64.8
VA:ALTAVISTA	4/27/81	1000	2475.5	99.0
VA:ALTAVISTA	3/31/81	1200	2012.5	100.7
VA:APPOMATTOX	3/31/81	2500	1956.5	97.8
VA:AVONDALE	5/13/82	1300	306.8	89.0
VA:BOWLING GREEN	7/15/81	1000	216.9	77.0
VA:BOYKINS	5/20/82	800	113.7	85.9
VA:BOYKINS	6/30/82	1000	154.4	60.2
VA:BOYKINS	6/30/82	790	226.6	61.8
VA:BRACEY	4/ 8/81	300	1255.0	181.8
VA:BRANCHVILLE	5/20/82	1000	187.8	83.1
VA:BUCHANAN	6/24/82	1700	148.3	86.4
VA:BUENA VISTA	5/ 7/81	7000	474.0	101.8
VA:BURKEVILLE	4/14/81	800	7890.5	236.7
VA:CAPE CHARLES	8/12/82	1550	248.8	88.5
VA:CHASE CITY	4/14/81	3400	680.6	135.8
VA:CHESAPEAKE	6/15/82	2000	279.6	61.4
VA:CHESAPEAKE	8/11/82	2240	214.9	59.0
VA:CHILHOWIE	6/17/81	3600	331.0	66.2
VA:CHINCOTEAGUE	8/12/82	4000	239.8	86.2
VA:COLLINSVILLE	4/17/81	7008	655.5	144.2
VA:COLONIAL BEACH	7/28/82	2500	226.1	64.1
VA:COURTLAND	4/14/82	1500	111.9	97.0
VA:DAHLGREN	5/14/81	1000	424.6	101.7
VA:DAHLGREN	5/14/81	3394	207.4	97.3
VA:DANTE	6/12/81	3600	152.3	78.5
VA:ELKTON	5/ 4/81	1600	188.4	170.9
VA:FAIRLAWN	8/ 3/82	1600	21.4	67.1
VA:FERRUM	4/21/81	1700	293.6	88.1
VA:FORK UNION	4/ 9/81	1000	4743.5	142.3
VA:FRANKLIN	11/23/81	9600	184.9	64.2
VA:GLASGOW	5/ 7/81	1350	109.9	97.2
VA:GLOUCESTER	7/22/82	1500	255.8	90.2
VA:GLOUCESTER	7/22/82	800	207.0	89.5
VA:GROTTOES	5/ 4/81	1400	120.7	165.4
VA:GRUNDY	6/12/81	1800	-13.8	75.1
VA:HONAKER	6/12/81	2500	480.5	86.5
VA:HOT SPRINGS	5/ 6/81	2200	10.9	114.7
VA:INDEPENDENCE	6/23/81	1000	342.8	65.1
VA:IRVINGTON	5/18/82	1110	152.3	71.5
VA:JONESVILLE	6/29/81	1190	114.8	72.5
VA:KILMARNOCK	7/22/82	1100	236.4	90.3
VA:LA CROSSE	4/ 8/81	900	650.2	165.7
VA:LANEXA	6/15/81	1194	276.2	66.2
VA:LAUREL PARK	4/17/81	1270	2098.5	168.0
VA:LEBANON	6/12/81	4000	537.7	86.0
VA:LEESBURG	5/15/81	11000	247.7	81.0
VA:LOUISA	6/ 5/81	932	9195.0	183.9
VA:LOUISA	5/22/81	1100	4543.0	136.7

TABLE 17 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
VA:LURAY	3/25/81	4000	14.0	51.9
VA:MARION	6/17/81	2500	222.9	63.5
VA:MARTINSVILLE	4/17/81	1450	705.1	150.9
VA:MAYFIELD FARMS	5/13/82	1550	184.9	85.5
VA:MCCLURE	6/12/81	1800	-4.6	74.5
VA:MCCLURE	6/12/81	1500	6.3	74.3
VA:MCKENNEY	6/30/82	1312	4712.5	188.8
VA:MECHANICSVILLE	6/22/82	3200	238.3	76.2
VA:MINERAL	6/ 5/81	2800	928.5	102.1
VA:NEW CASTLE	4/22/81	1100	87.2	69.8
VA:ONANCOCK	8/12/82	1700	341.0	88.8
VA:PARKSLEY	8/12/82	1000	206.5	87.7
VA:PEARISBURG	5/20/81	3500	31.7	60.2
VA:PEMBROKE	5/20/81	500	269.6	64.6
VA:PETERSBURG	6/30/82	1022	313.4	63.9
VA:POTOMAC SHORES	7/28/82	1364	145.8	58.1
VA:PURCELLVILLE	5/27/82	1600	43.7	177.0
VA:RAINBOW FOREST	4/22/81	1450	234.4	70.0
VA:RICH CREEK	5/20/81	1500	130.7	62.0
VA:RICHMOND	12/ 3/81	2300	182.8	94.5
VA:RICHMOND	5/13/82	1150	777.6	93.3
VA:RICHMOND	6/22/82	6000	523.8	67.5
VA:RIDGEWAY	4/17/81	227	4975.0	199.0
VA:ROUND HILL	6/ 9/82	1100	9.2	60.5
VA:RURAL RETREAT	6/23/81	1500	213.8	63.1
VA:SALEM	7/ 8/82	2280	-1.0	81.8
VA:SALEM	7/ 1/82	4200	964.0	120.4
VA:SALEM	7/ 1/82	6000	650.2	116.6
VA:SALEM	7/ 1/82	1452	547.9	115.1
VA:SALEM	7/ 1/82	5850	75.4	105.5
VA:SALEM	7/ 1/82	2476	-52.5	102.0
VA:SALEM	7/ 1/82	2480	67.5	104.6
VA:SALEM	7/ 1/82	2224	316.2	111.3
VA:SALTVILLE	6/17/81	3350	316.1	66.4
VA:SMITHFIELD	11/23/81	3600	168.8	66.4
VA:SPRING MEADOWS	5/13/82	2450	190.9	85.7
VA:STANLEY	3/25/81	1208	138.0	38.6
VA:STANLEYTOWN	4/17/81	1850	732.2	150.2
VA:SUFFOLK	11/23/81	1100	193.2	64.1
VA:SUGAR GROVE	6/23/81	1000	52.6	59.7
VA:SURRY	6/15/81	525	-1.7	71.7
VA:TAPPAHANNOCK	7/28/82	1800	145.3	63.9
VA:VERONA	5/ 4/81	3500	-57.7	157.2
VA:VIRGINIA BEACH	8/11/82	1860	379.7	62.6
VA:VIRGINIA BEACH	6/15/82	2000	368.1	76.4
VA:WAKEFIELD	6/30/82	1100	214.6	62.3
VA:WARSAW	7/28/82	1500	235.5	65.1

TABLE 17 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
VA:WAVERLY	6/30/82	2500	172.5	62.7
VA:WAYNESBORO	5/ 6/81	19000	92.4	113.9
VA:WEST POINT	7/22/82	2726	230.7	90.7
VA:WINDSOR	11/23/81	1600	203.4	65.0
VA:WINTERGREEN	4/ 9/81	1000	146.6	94.0

s = SIGMA COUNTING ERROR (pCi/l)

TABLE 18

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
VT:ARLINGTON	6/11/82	1200	396.0	75.2
VT:BETHEL	4/ 6/82	1030	841.3	84.1
VT:CASTLETON	10/19/82	1900	650.0	68.1
VT:HARDWICK	9/ 1/81	1500	388.6	79.6
VT:LUDLOW	6/22/82	1250	773.6	69.6
VT:LYNDONVILLE	3/15/82	3200	1317.0	79.0
VT:MORRISVILLE	9/ 1/81	4100	628.0	81.7
VT:PITTSFORD	6/25/82	1380	227.1	76.1
VT:QUECHEE	4/19/82	2000	621.5	86.5
VT:RANDOLPH	3/31/82	2500	329.6	98.9
VT:WINDSOR	4/ 8/82	3700	624.0	93.6

s = SIGMA COUNTING ERROR (pCi/l)

TABLE 19

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
WY:CASPER	7/30/82	3000	131.6	78.9
WY:DUBOIS	8/24/82	850	306.0	74.6
WY:GILLETTE	7/13/82	16603	54.1	55.7
WY:GLENROCK	8/ 5/82	2700	307.9	107.3
WY:JACKSON	8/ 8/82	5000	556.4	89.0
WY:JEFFREY CITY	9/15/82	500	93.8	56.3
WY:LUSK	7/ 8/82	1600	379.5	90.5
WY:LYMAN	6/18/82	2284	1428.0	85.7
WY:MILLS	7/30/82	3000	612.6	85.4
WY:MILLS	7/30/82	2500	600.5	83.6
WY:MOORCROFT	7/14/82	1500	592.0	65.1
WY:NEWCASTLE	7/ 7/82	4500	114.2	98.2
WY:POWELL	9/ 2/82	5300	278.9	114.1
WY:RIVERTON	8/25/82	9288	938.9	70.3
WY:S. SUPERIOR	9/25/81	700	1729.5	146.5
WY:SHOSHONI	8/24/82	879	1294.0	70.9
WY:SUNDANCE	7/14/82	1250	288.0	61.1
WY:UPTON	7/ 7/82	1100	155.6	59.1

s = SIGMA COUNTING ERROR (pCi/l)

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 will be 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 due to weapons fallout, reactor operations, etc. Initially, the program will consist of approximately 22 sites representing a wide geographic coverage throughout the country. Hopefully, at some later date additional sites will be added to the program. Although exposure measurements at these few sites are not totally representative of nationwide exposures, they will be indicative of national trends.

The jj program utilizes CaF_2:Mn thermoluminescent dosimeters (TLD's). These dosimeters are commercially available glass-bulb type dosimeters with energy compensating shields. A group of four 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 on an approximate one-month cycle. 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 1983 are shown in Table 20.

TABLE 20

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE	EXPOSURE RATE	
		MR	MICRO R/HR ± 2 s *	
AL:MONTGOMERY	40183- 50283	5.2	7.0	15.3
AL:MONTGOMERY	50283- 60283	5.3	7.1	15.4
AL:MONTGOMERY	60283- 70583	4.8	6.0	9.0
CA:BERKELEY	40183- 50483	6.0	7.5	14.0
CA:BERKELEY	50483- 60283	3.8	5.5	10.8
CA:BERKELEY	60283- 70583	4.1	5.1	11.7
CO:DENVER	33183- 51683	15.3	13.9	8.6
CO:DENVER	51683- 60283	6.4	15.6	5.3
CO:DENVER	60283- 70583	10.0	12.6	8.1
FL:ORLANDO	40183- 50283	4.2	5.6	16.1
FL:ORLANDO	50283- 53183	3.8	5.5	8.2
FL:ORLANDO	53183- 70683	4.2	4.9	13.8
ID:BOISE	50983- 71283	17.2	11.2	10.0
IL:CHICAGO	40583- 51083	6.3	7.6	28.0
IL:CHICAGO	51083- 60883	4.6	6.7	18.8
IL:CHICAGO	60883- 70883	4.2	5.8	9.7
ND:BISMARCK	40483- 50483	6.4	9.0	5.9
ND:BISMARCK	50483- 60183	5.9	8.8	5.1
ND:BISMARCK	60183- 70883	7.0	7.8	11.5
NJ:TRENTON	40483- 50283	7.2	10.8	4.2
NJ:TRENTON	50283- 60383	7.8	10.1	21.0
NJ:TRENTON	60383- 71283	8.0	8.6	6.2
NM:SANTA FE	40483- 51783	15.0	14.5	20.3
NM:SANTA FE	51783- 61683	10.1	14.1	10.1
NM:SANTA FE	61683- 71983	9.8	12.4	11.3
NV:LAS VEGAS	33183- 50283	5.2	6.8	12.9
NV:LAS VEGAS	50283- 60283	5.0	6.7	14.2
NV:LAS VEGAS	60283- 63083	4.0	5.9	9.9
NY:NEW YORK	41383- 50583	4.3	8.1	7.1
NY:NEW YORK	50583- 61583	7.4	7.5	7.8
NY:NEW YORK	61583- 71183	3.6	5.8	7.2
OH:COLUMBUS	40183- 50483	5.4	6.8	4.6
OH:COLUMBUS	50483- 60183	4.6	6.9	7.3
OH:COLUMBUS	60183- 70183	4.0	5.6	6.6
OK:OKLAHOMA CITY	41183- 50683	4.5	7.5	8.1
OK:OKLAHOMA CITY	50683- 60683	5.6	7.6	10.8
OK:OKLAHOMA CITY	60683- 70883	5.3	6.9	31.5
OR:PORTLAND	40883- 50383	4.7	7.9	9.9
OR:PORTLAND	50383- 60283	5.6	7.7	13.0
OR:PORTLAND	60283- 71183	5.6	5.9	7.2
PA:HARRISBURG	33083- 50283	6.0	7.1	17.6
PA:HARRISBURG	50283- 53183	4.5	6.5	10.2
PA:HARRISBURG	53183- 70183	3.7	5.0	14.6
PA:PITTSBURGH	40483- 50383	8.1	11.7	7.6
PA:PITTSBURGH	50383- 60383	8.9	12.0	7.0
PA:PITTSBURGH	60383- 70583	7.8	10.2	13.1

TABLE 20 (CONTINUED)

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE	EXPOSURE RATE	
		MR	MICRO R/HR	± 2 s *
RI:PROVIDENCE	41283- 51683	8.2	10.1	8.1
RI:PROVIDENCE	51683- 60883	5.5	10.0	4.7
RI:PROVIDENCE	60883- 70783	6.4	9.1	25.1
SC:BARNWELL	33183- 50583	7.0	8.3	20.9
SC:BARNWELL	50583- 60283	4.2	6.2	14.0
SC:BARNWELL	60283- 80583	9.9	6.5	8.2
SC:COLUMBIA	40183- 50383	6.6	8.6	4.6
SC:COLUMBIA	50383- 53183	5.7	8.5	22.3
SC:COLUMBIA	53183- 70183	6.3	8.4	4.6
TN:KNOXVILLE	33083- 50283	7.3	9.3	7.1
TN:KNOXVILLE	50283- 53183	6.8	9.7	11.5
TN:KNOXVILLE	53183- 63083	5.7	7.9	20.0
VA:RICHMOND	33183- 60183	10.5	7.0	6.5
VA:RICHMOND	60183- 70783	5.2	6.0	5.4
VT:MONTPELIER	40183- 50683	6.3	7.5	12.2
VT:MONTPELIER	50683- 60283	4.7	7.3	7.5
VT:MONTPELIER	60283- 70283	5.0	7.0	4.9

* s = SIGMA ERROR (IN PERCENT)

SECTION IV. Milk Program

Pasteurized Milk

This is a cooperative program of the EPA, ORP and the Dairy and Lipid Products Branch, Milk Sanitation Section, Food and Drug Administration. Milk is a reliable indicator of the general populations intake of radionuclides since it is consumed by a large segment of the population and contains several of the biologically important contaminants resulting 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. These are composite samples representing more than 80 percent of the milk consumed in a given population center.

These 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 from the pasteurized milk samples for April - June 1983 are shown in Tables 21 - 23.

Strontium values from regional composite samples collected April - June 1983 are shown in Table 24.

Tritium in Milk

It was previously proposed to analyze all 65 milk samples for tritium in the aqueous and organic phases, on an annual basis (on the April sample). The EERF is currently evaluating alternative analytical techniques anticipating that these analyses will begin during the coming year.

TABLE 21

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

APRIL 1983

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s		^{140}Ba pCi/l±2s		^{131}I pCi/l±2s	
AL:MONTGOMERY	4/ 7/83	1.61 0.13	1	7	0	9	2	7
AR:LITTLE ROCK	4/ 4/83	1.60 0.13	4	7	-3	9	-2	7
AZ:PHOENIX	4/ 8/83	1.57 0.13	-4	7	1	9	5	7
CA:LOS ANGELES	4/11/83	1.74 0.18	-11	11	11	15	-3	10
CA:SACRAMENTO	4/ 4/83	1.62 0.13	5	7	-1	9	1	7
CA:SAN FRANCISCO	4/ 6/83	1.77 0.25	-4	16	3	20	-8	14
CT:HARTFORD	4/ 3/83	1.47 0.12	-4	7	-2	9	1	7
DC:WASHINGTON	4/ 1/83	1.57 0.12	-1	7	-2	9	0	7
FL:TAMPA	4/11/83	1.47 0.12	5	7	7	9	-1	7
GA:ATLANTA	4/18/83	1.55 0.12	5	7	0	9	2	7
HI:HONOLULU	4/ 5/83	1.66 0.13	1	7	5	9	-6	7
IA:DES MOINES	4/11/83	1.60 0.13	3	7	-3	9	4	7
ID:IDAHO FALLS	4/18/83	1.84 0.25	6	16	1	20	-3	14
IL:CHICAGO	4/ 4/83	0.76 0.11	0	7	0	9	-2	7
IN:INDIANAPOLIS	4/ 4/83	1.60 0.13	3	7	2	9	-4	7
KS:WICHITA	4/13/83	1.54 0.12	7	7	4	9	-2	7
KY:LOUISVILLE	4/ 4/83	1.53 0.12	3	7	1	9	-3	7
LA:NEW ORLEANS	4/26/83	1.59 0.13	2	7	5	9	-2	7
MA:BOSTON	4/ 5/83	1.52 0.12	6	7	4	9	-2	7
MD:BALTIMORE	4/ 8/83	1.67 0.13	0	7	2	9	2	7
ME:PORTLAND	4/ 5/83	1.64 0.09	7	5	0	6	2	5
MI:DETROIT	4/ 7/83	1.53 0.12	1	7	3	9	-1	7
MI:GRAND RAPIDS	4/ 7/83	1.64 0.13	3	7	-3	9	1	7
MN:ST PAUL	4/ 6/83	1.59 0.13	-2	7	3	9	-1	7
MO:KANSAS CITY	4/ 8/83	1.50 0.12	-1	7	-1	9	-2	7
MO:ST LOUIS	4/ 6/83	1.56 0.12	0	7	-5	9	-1	7
MS:JACKSON	4/ 4/83	1.58 0.09	3	5	-3	6	4	5
NC:CHARLOTTE	4/11/83	1.98 0.25	1	16	-6	20	-1	14
ND:MINOT	4/18/83	1.66 0.13	3	7	-4	9	3	7
NE:OMAHA	4/ 8/83	1.53 0.08	0	5	0	6	-2	5
NH:MANCHESTER	4/ 6/83	1.56 0.12	2	7	-3	9	2	7
NJ:TRENTON	4/ 7/83	1.51 0.08	2	5	-1	6	0	5
NV:LAS VEGAS	4/19/83	1.60 0.13	4	7	0	9	-2	7
NY:BUFFALO	4/12/83	1.59 0.13	-1	7	4	9	0	7
NY:NEW YORK CITY	4/ 4/83	1.61 0.13	6	7	-2	9	4	7
NY:SYRACUSE	4/ 4/83	1.57 0.12	-1	7	-8	9	3	7
OH:CINCINNATI	4/ 4/83	1.60 0.09	0	5	0	6	3	5
OH:CLEVELAND	4/11/83	1.63 0.13	0	7	8	9	-5	7
OK:OKLAHOMA CITY	4/ 4/83	1.52 0.12	0	7	-1	9	1	7
PA:PHILADELPHIA	4/ 4/83	1.56 0.09	5	5	0	6	1	5
PA:PITTSBURGH	4/ 5/83	1.57 0.12	3	7	-4	9	1	7
PC:ANCON	4/19/83	1.60 0.13	19	7	5	9	1	7
PR:SAN JUAN	4/29/83	1.56 0.12	0	7	0	9	-4	7
SC:CHARLESTON	4/25/83	1.68 0.24	-3	16	9	21	-8	14

TABLE 21 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

APRIL 1983

LOCATION	DATE COLLECTED	K g/1±2s	^{137}Cs pCi/1±2s	^{140}Ba pCi/1±2s	^{131}I pCi/1±2s
SD:RAPID CITY	4/ 5/83	1.49 0.12	-2 7	-1 9	1 7
TN:CHATTANOOGA	4/ 4/83	1.50 0.12	1 7	2 9	-1 7
TN:KNOXVILLE	4/11/83	1.46 0.12	6 7	-2 9	0 7
TX:AUSTIN	4/ 6/83	1.60 0.09	0 5	-5 6	2 5
UT:SALT LAKE CITY	4/ 4/83	1.67 0.09	5 5	5 6	1 5
VA:NORFOLK	4/20/83	1.59 0.13	-3 7	-1 9	-1 7
VT:BURLINGTON	4/11/83	1.59 0.24	7 16	8 20	-4 14
WA:SEATTLE	4/ 4/83	1.51 0.12	3 7	-1 9	-1 7
WA:SPOKANE	4/ 3/83	1.73 0.17	3 11	7 15	4 10
WV:CHARLESTON	4/11/83	1.62 0.13	0 7	3 9	-3 7
WY:LARAMIE	4/ 4/83	1.58 0.13	2 7	-2 9	-2 7

s SIGMA COUNTING ERROR

TABLE 22

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

MAY 1983

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s		^{140}Ba pCi/l±2s		^{131}I pCi/l±2s	
AL:MONTGOMERY	5/ 5/83	1.56 0.09	4	5	-2	6	-2	5
AR:LITTLE ROCK	5/ 2/83	1.57 0.12	2	7	-4	9	1	7
AZ:PHOENIX	5/ 5/83	1.50 0.08	0	5	-2	6	0	5
CA:LOS ANGELES	5/12/83	1.53 0.12	0	7	-2	9	-3	7
CA:SACRAMENTO	5/ 4/83	1.53 0.12	-3	7	2	9	-2	7
CO:DENVER	5/31/83	1.50 0.12	5	7	2	9	-1	7
CO:DENVER	5/ 1/83	1.59 0.13	1	7	-1	9	2	7
CT:HARTFORD	5/ 2/83	1.54 0.09	3	5	1	6	-1	5
DC:WASHINGTON	5/ 6/83	1.57 0.09	0	5	0	6	-1	5
GA:ATLANTA	5/ 4/83	1.49 0.12	3	7	-6	9	5	7
HI:HONOLULU	5/ 3/83	1.65 0.13	5	7	-1	9	1	7
IA:DES MOINES	5/ 9/83	1.62 0.13	3	7	-1	9	0	7
ID:IDAHO FALLS	5/ 4/83	1.80 0.25	-6	16	3	20	-11	14
IL:CHICAGO	5/ 2/83	1.51 0.12	7	7	0	9	1	7
IN:INDIANAPOLIS	5/ 9/83	1.55 0.12	5	7	1	9	0	7
KS:WICHITA	5/ 5/83	1.55 0.08	4	5	-2	6	0	5
KY:LOUISVILLE	5/ 3/83	1.55 0.12	1	7	-3	9	3	7
LA:NEW ORLEANS	5/12/83	1.57 0.09	0	5	2	6	2	5
MA:BOSTON	5/ 2/83	1.46 0.12	0	7	-2	9	1	7
MD:BALTIMORE	5/ 6/83	1.65 0.13	2	7	-6	9	-3	7
ME:PORTLAND	5/ 3/83	1.59 0.13	5	7	-1	9	1	7
MI:DETROIT	5/ 5/83	1.48 0.12	-2	7	0	9	1	7
MI:GRAND RAPIDS	5/ 3/83	1.58 0.13	3	7	7	9	-1	7
MN:MINNEAPOLIS	5/ 2/83	1.59 0.09	2	5	2	6	-2	5
MN:ST PAUL	5/ 3/83	1.57 0.13	-3	7	4	9	-3	7
MO:KANSAS CITY	5/ 6/83	1.63 0.13	-4	7	1	9	-3	7
MO:ST LOUIS	5/ 4/83	1.47 0.12	1	7	0	9	-1	7
MS:JACKSON	5/17/83	1.55 0.12	4	7	2	9	-2	7
NC:CHARLOTTE	5/ 2/83	1.73 0.25	9	16	-2	20	-3	14
ND:MINOT	5/ 2/83	1.64 0.13	0	7	-1	9	-2	7
NE:OMAHA	5/ 6/83	1.50 0.12	-4	7	5	9	-7	7
NH:CONCORD	5/ 2/83	1.71 0.13	-4	7	0	9	-1	7
NJ:TRENTON	5/ 5/83	1.52 0.12	5	7	-2	9	2	7
NM:ALBUQUERQUE	5/ 2/83	1.60 0.13	-1	7	-1	9	3	7
NY:BUFFALO	5/ 9/83	1.65 0.13	-3	7	-2	9	3	7
NY:NEW YORK CITY	5/ 1/83	1.50 0.12	5	7	4	9	-6	7
NY:SYRACUSE	5/ 4/83	1.59 0.13	3	7	-2	9	3	7
OH:CINCINNATI	5/ 2/83	1.48 0.12	0	7	-3	9	3	7
OH:CLEVELAND	5/ 9/83	1.46 0.12	5	7	1	9	0	7
OR:PORTLAND	5/ 2/83	1.65 0.13	0	7	1	9	-1	7
PA:PHILADELPHIA	5/ 2/83	1.53 0.12	1	7	-2	9	-2	7
PA:PITTSBURGH	5/ 4/83	1.56 0.12	0	7	-5	9	2	7
PC:CRISTOBAL	5/23/83	1.46 0.12	14	7	1	9	-5	7
PR:SAN JUAN	5/19/83	1.54 0.08	0	5	-1	6	-3	5

TABLE 22 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

MAY 1983

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s		^{140}Ba pCi/l±2s		^{131}I pCi/l±2s	
SC:CHARLESTON	5/18/83	1.60 0.13	7	7	2	9	-5	7
SD:RAPID CITY	5/ 5/83	1.60 0.13	2	7	-5	9	-2	7
TN:CHATTANOOGA	5/ 2/83	1.51 0.12	1	7	-2	9	2	7
TN:KNOXVILLE	5/ 9/83	1.58 0.13	1	7	0	9	-3	7
TN:MEMPHIS	5/ 1/83	1.46 0.12	5	7	0	9	-3	7
TN:MEMPHIS	5/26/83	1.57 0.12	5	7	-7	9	3	7
TX:AUSTIN	5/ 5/83	1.79 0.25	10	16	3	20	-10	14
UT:SALT LAKE CITY	5/ 1/83	1.56 0.12	3	7	-4	9	1	7
VA:NORFOLK	5/20/83	1.59 0.13	0	7	-2	9	-2	7
VT:BURLINGTON	5/ 5/83	1.74 0.13	4	7	-2	9	-3	7
WA:SEATTLE	5/ 2/83	1.72 0.17	-4	11	3	14	-3	10
WA:SPOKANE	5/ 1/83	1.50 0.12	2	7	2	9	2	7
WV:CHARLESTON	5/16/83	1.51 0.12	-3	7	-6	9	0	7
WY:LARAMIE	5/ 2/83	1.50 0.08	2	5	-2	6	1	5

s SIGMA COUNTING ERROR

TABLE 23

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JUNE 1983

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
AL:MONTGOMERY	6/ 9/83	1.46 0.12	1 7	2 9	-3 7
AR:LITTLE ROCK	6/ 6/83	1.55 0.08	3 5	-2 6	-2 5
AZ:PHOENIX	6/ 8/83	1.61 0.09	0 5	0 6	-2 5
CA:LOS ANGELES	6/ 8/83	1.77 0.25	-5 16	0 20	5 14
CA:SACRAMENTO	6/ 2/83	1.64 0.09	0 5	-2 6	4 5
CA:SAN FRANCISCO	6/ 2/83	1.53 0.12	-1 7	-3 9	-1 7
CO:DENVER	5/31/83	1.50 0.12	5 7	2 9	-1 7
CO:DENVER	6/28/83	1.43 0.12	-2 7	-1 9	-7 7
CT:HARTFORD	6/ 6/83	1.56 0.12	5 7	-3 9	-2 7
DC:WASHINGTON	6/ 3/83	1.56 0.12	9 7	-2 9	1 7
GA:ATLANTA	7/ 1/83	1.66 0.24	-2 16	-9 20	-11 14
GA:ATLANTA	6/ 1/83	1.53 0.08	-1 5	0 6	-4 5
HI:HONOLULU	6/ 9/83	1.57 0.12	9 7	-1 9	-4 7
IA:DES MOINES	6/ 6/83	1.56 0.09	2 5	2 6	-5 5
ID:IDAHO FALLS	6/ 9/83	2.01 0.25	3 16	-7 20	7 14
IL:CHICAGO	6/ 6/83	1.59 0.13	-1 7	-1 9	1 7
IN:INDIANAPOLIS	6/ 6/83	1.52 0.12	-1 7	0 9	1 7
KS:WICHITA	6/ 6/83	1.55 0.12	5 7	0 9	-1 7
KY:LOUISVILLE	6/ 6/83	1.57 0.12	-3 7	0 9	-2 7
LA:NEW ORLEANS	6/ 7/83	1.46 0.12	9 7	-3 9	-1 7
MA:BOSTON	6/ 7/83	1.68 0.13	2 7	0 9	-3 7
MD:BALTIMORE	6/ 3/83	1.58 0.13	-1 7	6 9	-1 7
ME:PORTLAND	6/ 7/83	1.63 0.13	4 7	-5 9	-2 7
MI:DETROIT	6/ 9/83	1.55 0.12	4 7	-3 9	0 7
MI:GRAND RAPIDS	6/ 6/83	1.54 0.12	-2 7	2 9	-2 7
MN:MINNEAPOLIS	6/ 6/83	1.73 0.13	1 7	-3 9	6 7
MN:ST PAUL	6/ 1/83	1.54 0.09	4 5	-4 6	2 5
MO:KANSAS CITY	6/10/83	1.48 0.12	-1 7	-3 9	4 7
MO:ST LOUIS	6/ 8/83	1.50 0.12	0 7	1 9	0 7
MS:JACKSON	6/ 6/83	1.58 0.13	4 7	-2 9	-2 7
MT:HELENA	6/ 6/83	1.58 0.09	0 5	-6 6	2 5
NC:CHARLOTTE	6/ 6/83	1.60 0.24	-3 16	12 21	-11 14
ND:MINOT	6/20/83	1.58 0.12	0 7	-2 9	-2 7
NE:OMAHA	6/10/83	1.31 0.12	1 7	-4 9	-4 7
NH:MANCHESTER	6/ 6/83	1.53 0.12	2 7	-3 9	-2 7
NJ:TRENTON	6/ 6/83	1.58 0.13	1 7	2 9	-1 7
NV:LAS VEGAS	6/ 6/83	1.63 0.13	-1 7	-4 9	0 7
NY:BUFFALO	6/13/83	1.57 0.13	0 7	2 9	-2 7
NY:NEW YORK CITY	6/ 6/83	1.65 0.13	3 7	-6 9	2 7
NY:SYRACUSE	6/ 6/83	1.57 0.08	0 5	-4 6	2 5
OH:CINCINNATI	6/ 6/83	1.65 0.24	5 16	-3 20	-4 14
OH:CLEVELAND	6/ 7/83	1.61 0.13	2 7	-1 9	-8 7
OK:OKLAHOMA CITY	6/ 6/83	1.68 0.13	0 7	-1 9	-2 7
OR:PORTLAND	6/ 6/83	1.53 0.06	1 4	0 5	-3 4

TABLE 23 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JUNE 1983

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s		^{140}Ba pCi/l±2s		^{131}I pCi/l±2s	
PA:PHILADELPHIA	6/ 6/83	1.46 0.12	3	7	3	9	-6	7
PA:PITTSBURGH	6/ 7/83	1.59 0.13	0	7	-4	9	0	7
PC:CRISTOBAL	6/ 6/83	1.59 0.13	20	7	0	9	-1	7
PR:SAN JUAN	6/16/83	1.61 0.13	4	7	-2	9	0	7
SC:CHARLESTON	6/15/83	1.66 0.13	-1	7	-6	9	4	7
SD:RAPID CITY	6/30/83	1.60 0.13	-3	7	3	9	-3	7
TN:CHATTANOOGA	6/ 6/83	1.52 0.12	-1	7	6	9	-5	7
TN:KNOXVILLE	6/20/83	1.72 0.24	1	16	-5	20	-6	14
TN:MEMPHIS	6/29/83	1.43 0.12	-1	7	-4	9	-1	7
TX:AUSTIN	6/ 6/83	1.61 0.13	-2	7	5	9	-8	7
UT:SALT LAKE CITY	6/ 6/83	1.65 0.13	4	7	-8	9	2	7
VA:NORFOLK	6/15/83	1.62 0.13	5	7	-1	9	-2	7
VT:BURLINGTON	6/13/83	1.53 0.08	4	5	-1	6	0	5
WA:SEATTLE	6/ 6/83	1.52 0.12	2	7	-5	9	0	7
WA:SEATTLE	7/ 1/83	1.52 0.12	-2	7	-1	9	-6	7
WA:SPOKANE	6/ 6/83	1.58 0.13	-1	7	0	9	-2	7
WI:MILWAUKEE	6/ 1/83	1.70 0.13	1	7	-8	9	-2	7
WI:MILWAUKEE	7/ 1/83	1.56 0.09	-1	5	0	6	-3	5
WV:CHARLESTON	6/28/83	1.48 0.12	0	7	-8	9	-3	7
WY:LARAMIE	6/ 6/83	1.45 0.12	5	7	-1	9	-3	7

s SIGMA COUNTING ERROR

TABLE 24

STRONTIUM-90 AND STRONTIUM-89 IN PASTEURIZED MILK

EPA REGIONAL COMPOSITES

APRIL - JUNE 1983

EPA REGION	^{90}Sr pCi/l ± 2s		^{89}Sr pCi/l ± 2s*	
I	3.1	0.4	-1	1
II	2.3	0.7	1	2
III	3.3	1.0	-1	3
IV	3.3	1.0	-2	3
V	2.9	1.2	0	4
VI	3.1	0.9	0	3
VII	2.0	0.5	1	1
VIII	2.3	0.5	0	1
IX	0.7	0.3	1	1
X	2.0	0.6	2	2

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.

Data will be published as it becomes available.

Radiological Health Laboratory
Indiana State Board of Health

Indiana Milk Analysis Program

In order to evaluate the fallout on Indiana pasturelands, the State has implemented a program whereby monthly milk samples from five geographical areas are sent to the Radiological Health Laboratory of the State Board of Health. The milk in these samples is bottled on the same date in all five areas to provide uniform time from pasture to the lab.

Once in the laboratory, the milk is first analyzed by gamma spectroscopy for iodine-131, barium-140, cesium-137, and potassium-40. A one gallon sample is analyzed on a 3" x 3" NaI(Tl) scintillation crystal for 4800 seconds. A background sample of 48,000 seconds is also run. The data are analyzed to give pCi/l for each radionuclide.

A quarterly composite sample is saved and run for strontium-89 and -90 by ion exchange method.

Data will be published as it is received.

Radiological Health Division
State Hygienic Laboratory of Iowa

Iowa Water Sampling Program

The radiological Health Division of the State Hygienic Laboratory of Iowa with the assistance of the State Department of Environmental Quality (DEQ) maintains a state-wide water sampling program of community drinking waters, surface waters and precipitation. All analyses with the exception of the sequential Ra-226, -228 analyses are performed according to "Standard Methods for the Examination of Water and Wastewater", 14th edition. The sequential analyses for radiums are performed according to the EPA publication, EPA-600/4-75-008, "Interim Radiochemical Methodology for Drinking Water."

The drinking water samples are collected by DEQ regional personnel and sent to the State Hygienic Laboratory where they are preserved with HCl. These waters are analyzed for gross alpha and gross beta radioactivity as a screening process. Subsequent analyses for Ra-226, Ra-228, Sr-90 are performed if screening levels are exceeded. Radium levels are of primary concern in Iowa drinking waters as those levels are elevated in deep geologic aquifers within the state.

Surface waters are collected at eleven sites throughout the state with site selection being determined by proximity upstream and downstream to nuclear power plants in Iowa or those plants discharging into rivers which are natural borders with adjoining states. Gross alpha, gross beta, and tritium are the routine radionuclide analyses for these samples. Strontium is of interest when gross beta screening levels are exceeded or if nuclear weapons testing necessitates monitoring to determine its impact on the environment.

Data will be published as it is received.

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