United States
Environmental Protection
Agency

Office of
Radiation Programs
Washington DC 20460

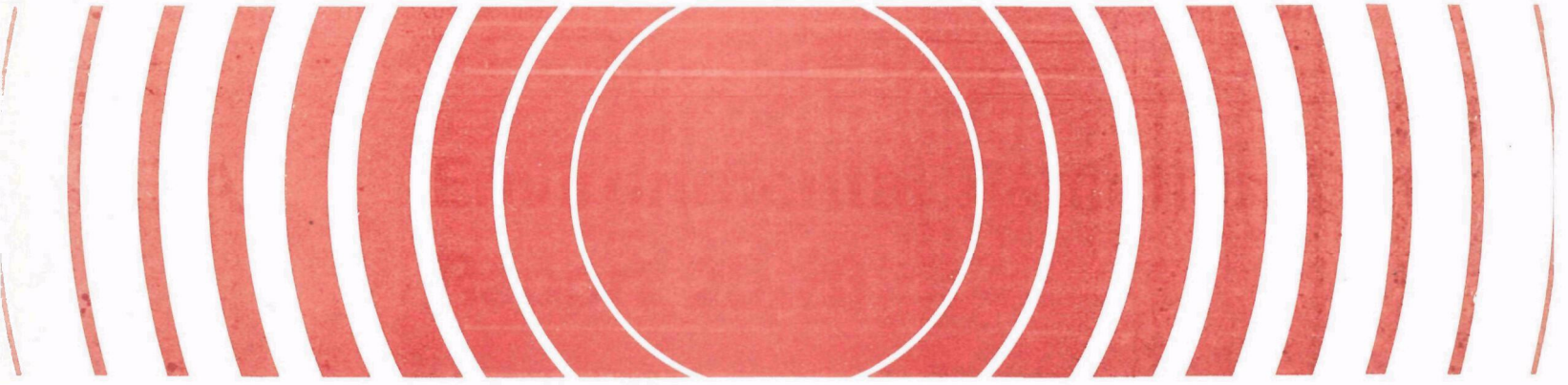
EPA 520/5-82-015
October 1981

Radiation

EPA

Environmental Radiation Data Report 25-26

(January - June 1981)



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 25 - 26

October 1981

Office of Radiation Program

U.S. ENVIRONMENTAL PROTECTION AGENCY

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).

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 the best possible combination of radiation source monitoring (such as surface water downstream from a nuclear power reactor) and wide population coverage.

The radiation analyses performed on these samples include gross alpha and gross beta levels, as well as specific analyses for uranium fuel cycle related radionuclides. The latter category includes but is not limited to uranium, plutonium, iodine, and krypton, which are released into the environment from stationary sources such as nuclear power reactors, fuel fabrication and reprocessing plants.

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

CONTENTS

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 67 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 charcoal impregnated cellulose) 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 22 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.

Beginning with this report the results for the analyses of the airborne particulate and precipitation samples will be found in separate tables.

Tables 8 - 13 present the monthly gross beta concentration and any specific gamma concentrations for precipitation samples from January - June 1981. A compilation of individual measurements is available from the EPA, EERF, Montgomery, AL 36193.

The January - June 1981 for tritium in precipitation samples at the selected stations are shown in Tables 14 - 15.

TABLE 2

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
JANUARY 1981

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	9	1.7	0.3	0.9	0.16	0.05	0.09
CA:BERKELEY	9	0.6	0.1	0.3	0.22	0.05	0.14
CA:LOS ANGELES	12	4.2	0.6	2.0	0.26	0.06	0.16
CT:HARTFORD	9	0.3	0.1	0.1	0.07	0.03	0.05
FL:JACKSONVILLE	8	0.7	<0.1	0.4	0.19	0.05	0.11
FL:MIAMI	9	0.4	0.2	0.2	0.26	0.05	0.12
ID:BOISE	8	1.0	<0.1	0.4	0.18	0.09	0.13
ID:IDAHO FALLS	9	NM	NM	NM	0.24	0.12	0.16
IL:CHICAGO	9	1.1	0.1	0.5	0.11	0.04	0.07
IN:INDIANAPOLIS	8	0.4	0.2	0.3	0.11	0.04	0.07
MI:LANSING	8	0.2	<0.1	0.1	0.11	0.04	0.07
ND:BISMARCK	7	2.2	0.1	0.6	0.15	0.06	0.09
NJ:TRENTON	9	0.5	<0.1	0.2	0.15	0.04	0.09
NY:NEW YORK CITY	5	0.2	0.1	0.1	0.08	0.04	0.06
NY:NIAGARA FALLS	9	0.2	<0.1	0.1	0.10	0.04	0.07
OH:COLUMBUS	8	0.2	<0.1	0.1	0.16	0.05	0.10
OH:PAINESVILLE	9	0.5	0.1	0.2	0.11	0.04	0.07
OR:PORTLAND	7	0.1	<0.1	0.1	0.13	0.03	0.09
PA:HARRISBURG	13	0.6	0.1	0.3	0.14	0.03	0.07
SC:COLUMBIA	9	1.5	0.4	0.7	0.21	0.04	0.12
VA:VIRGINIA BEACH	4	0.3	0.1	0.2	0.09	0.05	0.07
WV:CHARLESTON	8	1.7	0.2	0.6	0.15	0.05	0.09

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

NM NO MEASUREMENT

TABLE 3

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
FEBRUARY 1981

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	8	1.9	0.2	0.5	0.16	0.09	0.12
CA:BERKELEY	8	0.2	0.1	0.1	0.18	0.06	0.11
CA:LOS ANGELES	8	1.5	0.5	0.9	0.27	0.10	0.19
CT:HARTFORD	8	0.3	0.1	0.2	0.12	0.05	0.07
DE:WILMINGTON	8	0.1	0.1	0.1	0.12	0.04	0.08
FL:JACKSONVILLE	7	0.4	0.2	0.3	0.21	0.12	0.15
FL:MIAMI	7	0.3	<0.1	0.2	0.19	0.05	0.13
ID:BOISE	8	1.1	0.2	0.4	0.28	0.07	0.15
ID:IDAHO FALLS	8	NM	NM	NM	0.22	0.07	0.16
IL:CHICAGO	8	0.8	0.2	0.4	0.11	0.03	0.07
IN:INDIANAPOLIS	1	0.3	0.2	0.2	0.05	0.03	0.05
KS:TOPEKA	9	2.6	0.3	1.4	0.23	0.02	0.08
KY:FRANKFORT	2	0.2	0.2	0.2	0.09	0.08	0.09
ME:AUGUSTA	8	0.5	0.1	0.2	0.12	0.04	0.08
MI:LANSING	8	0.2	0.1	0.1	0.10	0.04	0.07
MN:MINNEAPOLIS	8	1.1	0.1	0.5	0.12	0.04	0.07
MO:JEFFERSON CITY	8	0.6	0.2	0.4	0.14	0.02	0.09
MS:JACKSON	8	0.9	0.1	0.4	0.14	0.09	0.11
MT:HELENA	5	0.6	0.1	0.3	0.15	0.10	0.12
NC:CHARLOTTE	4	0.1	0.1	0.1	0.16	0.10	0.12
ND:BISMARCK	8	0.9	0.1	0.4	0.09	0.05	0.07
NH:CONCORD	7	6.3	0.5	1.5	0.13	0.03	0.07
NH:MANCHESTER	1	1.3	0.3	1.3	0.19	0.05	0.05
NJ:TRENTON	8	0.3	0.1	0.2	0.19	0.05	0.11
NM:SANTA FE	8	1.8	0.6	0.9	0.30	0.12	0.20
NV:LAS VEGAS	8	2.3	0.1	1.1	1.10	0.04	0.30
NY:ALBANY	2	0.1	<0.1	0.1	0.08	0.05	0.06
NY:NIAGARA FALLS	6	0.1	0.1	0.1	0.08	0.04	0.06
NY:YAPHANK	8	0.2	0.1	0.1	0.13	0.06	0.09
OH:COLUMBUS	8	0.2	<0.1	0.1	0.10	0.05	0.08
OH:PAINESVILLE	7	0.2	0.1	0.2	0.14	0.04	0.07
OH:TOLEDO	7	0.7	0.2	0.3	0.11	0.04	0.07
OK:OKLAHOMA CITY	12	3.9	0.4	1.8	0.44	0.09	0.20
OR:PORTLAND	8	0.1	<0.1	0.1	0.10	0.03	0.06
PA:HARRISBURG	11	0.3	0.1	0.2	0.13	0.04	0.08
PA:PITTSBURGH	8	0.2	0.1	0.2	0.10	0.03	0.06
RI:PROVIDENCE	8	0.2	<0.1	0.1	0.15	0.05	0.08
SC:BARNWELL	2	0.7	<0.1	0.3	0.11	0.03	0.07
SC:COLUMBIA	8	0.9	0.2	0.4	0.21	0.11	0.16
TN:KNOXVILLE	6	0.7	0.2	0.4	0.16	0.09	0.12
VA:LYNCHBURG	8	1.2	0.2	0.4	0.18	0.06	0.10
WA:SEATTLE	7	0.1	0.1	0.1	0.15	0.05	0.10
WA:SPOKANE	8	0.4	0.1	0.3	0.19	0.05	0.10
WI:MADISON	8	0.4	0.1	0.2	0.12	0.03	0.07
WV:CHARLESTON	9	0.7	0.1	0.4	0.13	0.06	0.09

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

NM NO MEASUREMENT

TABLE 4

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
MARCH 1981

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	9	1.6	0.2	0.8	0.25	0.11	0.20
CA:BERKELEY	9	0.1	0.0	0.1	0.23	0.07	0.12
CA:LOS ANGELES	9	1.0	0.4	0.7	0.23	0.12	0.15
CT:HARTFORD	9	0.4	0.2	0.2	0.18	0.06	0.10
DE:WILMINGTON	9	0.2	0.1	0.1	0.23	0.03	0.10
FL:JACKSONVILLE	7	0.6	0.3	0.4	0.29	0.17	0.24
FL:MIAMI	9	0.4	0.2	0.3	0.28	0.16	0.24
ID:BOISE	9	1.0	0.2	0.6	0.33	0.10	0.19
ID:IDAHO FALLS	9	0.0	0.0	0.0	0.32	0.13	0.23
IL:CHICAGO	9	0.8	0.1	0.5	0.22	0.06	0.11
KS:TOPEKA	9	3.8	0.4	1.7	0.14	0.04	0.10
ME:AUGUSTA	9	0.6	0.1	0.3	0.19	0.05	0.10
MI:LANSING	9	0.5	0.1	0.2	0.20	0.06	0.10
MN:MINNEAPOLIS	8	0.3	0.1	0.2	0.17	0.06	0.12
MO:JEFFERSON CITY	9	1.5	0.5	0.9	0.29	0.09	0.16
MS:JACKSON	7	1.2	0.2	0.7	0.35	0.12	0.22
MT:HELENA	8	1.0	0.1	0.5	0.25	0.05	0.18
NC:CHARLOTTE	4	0.1	0.1	0.1	0.23	0.16	0.19
ND:BISMARCK	9	1.0	0.2	0.6	0.17	0.08	0.12
NH:CONCORD	9	4.1	0.7	1.5	0.22	0.06	0.10
NJ:TRENTON	9	1.6	0.2	0.8	0.30	0.09	0.19
NM:SANTA FE	7	1.0	0.2	0.6	0.38	0.17	0.25
NV:LAS VEGAS	9	0.7	0.7	0.7	0.49	0.06	0.22
NY:ALBANY	9	3.1	0.1	0.5	0.23	0.05	0.11
NY:NEW YORK CITY	2	0.3	0.2	0.2	0.15	0.10	0.12
NY:NIAGARA FALLS	9	0.4	0.1	0.2	0.23	0.08	0.12
NY:YAPHANK	9	0.2	0.1	0.1	0.18	0.06	0.11
OH:COLUMBUS	9	0.2	0.1	0.2	0.18	0.08	0.13
OH:PAINESVILLE	8	0.8	0.2	0.4	0.24	0.07	0.12
OH:TOLEDO	9	1.2	0.3	0.6	0.21	0.06	0.11
OK:OKLAHOMA CITY	15	2.5	0.5	1.5	0.35	0.01	0.21
OR:PORTLAND	9	0.2	0.1	0.1	0.17	0.05	0.10
PA:HARRISBURG	13	1.0	0.2	0.5	0.23	0.06	0.12
PA:PITTSBURGH	9	0.3	0.2	0.2	0.18	0.05	0.09
RI:PROVIDENCE	9	0.5	0.1	0.3	0.21	0.06	0.11
SC:BARNWELL	2	0.4	0.3	0.4	0.10	0.06	0.08
SC:COLUMBIA	9	1.0	0.4	0.7	0.29	0.13	0.24
TN:KNOXVILLE	5	0.4	0.2	0.3	0.16	0.12	0.14
VA:LYNCHBURG	9	1.4	0.3	0.6	0.24	0.09	0.16
WA:SEATTLE	9	0.2	0.0	0.1	0.15	0.05	0.10
WA:SPOKANE	9	1.0	0.2	0.5	0.28	0.08	0.16
WI:MADISON	9	0.6	0.1	0.3	0.18	0.03	0.09
WV:CHARLESTON	9	1.0	0.2	0.4	0.20	0.08	0.13

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

NM NO MEASUREMENT

TABLE 5

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
APRIL 1981

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	9	1.6	0.4	0.9	0.37	0.15	0.22
CA:BERKELEY	8	0.1	0.1	0.1	0.22	0.06	0.13
CA:LOS ANGELES	8	1.2	0.3	0.7	0.44	0.11	0.22
CT:HARTFORD	9	0.4	0.2	0.3	0.23	0.08	0.17
DE:WILMINGTON	6	0.2	0.1	0.2	0.19	0.04	0.12
FL:JACKSONVILLE	6	0.8	0.2	0.4	0.41	0.12	0.26
FL:MIAMI	8	0.3	0.2	0.3	0.25	0.09	0.18
ID:BOISE	9	1.1	0.2	0.5	0.30	0.07	0.19
ID:IDAHO FALLS	9	NM	NM	NM	0.40	0.11	0.22
IL:CHICAGO	8	1.4	0.3	0.8	0.23	0.10	0.17
IN:INDIANAPOLIS	2	0.3	0.3	0.3	0.16	0.14	0.15
KS:TOPEKA	9	5.4	0.3	1.8	0.25	0.02	0.12
ME:AUGUSTA	9	0.4	0.2	0.3	0.24	0.09	0.17
MI:LANSING	9	0.4	0.2	0.3	0.24	0.12	0.18
MN:MINNEAPOLIS	9	1.4	0.2	0.6	0.24	0.03	0.17
MO:JEFFERSON CITY	8	0.7	0.4	0.5	0.29	0.16	0.21
MS:JACKSON	8	0.6	0.4	0.5	0.31	0.15	0.22
MT:HELENA	7	0.6	0.3	0.4	0.24	0.06	0.18
NC:CHARLOTTE	8	0.1	0.1	0.1	0.30	0.16	0.21
ND:BISMARCK	7	1.4	0.3	0.8	0.24	0.11	0.15
NH:CONCORD	9	3.6	1.0	1.7	0.23	0.07	0.16
NJ:TRENTON	7	0.8	0.5	0.6	0.40	0.10	0.18
NM:SANTA FE	8	0.9	0.2	0.6	0.31	0.17	0.22
NV:LAS VEGAS	9	NM	NM	NM	0.41	0.19	0.28
NY:ALBANY	9	0.3	0.2	0.2	0.28	0.07	0.18
NY:NEW YORK CITY	8	0.4	0.2	0.3	0.26	0.05	0.18
NY:NIAGARA FALLS	8	0.5	0.2	0.3	0.31	0.14	0.21
NY:YAPHANK	8	0.2	0.1	0.2	0.24	0.11	0.19
OH:COLUMBUS	8	0.5	0.1	0.2	0.40	0.13	0.25
OH:PAINESVILLE	8	0.6	0.3	0.4	0.32	0.13	0.21
OH:TOLEDO	9	1.0	<0.1	0.6	0.26	0.14	0.19
OK:OKLAHOMA CITY	16	3.7	0.6	2.0	0.55	0.04	0.27
OR:PORTLAND	8	0.2	0.1	0.1	0.16	0.06	0.10
PA:HARRISBURG	13	1.6	0.3	0.8	0.34	0.13	0.22
PA:PITTSBURGH	9	0.4	0.3	0.4	0.23	0.10	0.17
RI:PROVIDENCE	8	0.6	0.2	0.3	0.27	0.08	0.17
SC:BARNWELL	2	0.3	0.2	0.2	0.12	0.11	0.12
SC:COLUMBIA	8	1.9	0.4	0.8	0.48	0.21	0.30
TN:KNOXVILLE	4	0.6	0.3	0.5	0.24	0.16	0.20
VA:LYNCHBURG	9	0.9	0.3	0.5	0.34	0.19	0.24
WA:SEATTLE	7	0.4	0.1	0.1	0.18	0.04	0.09
WA:SPOKANE	9	0.6	0.2	0.3	0.25	0.05	0.13
WI:MADISON	9	0.8	0.3	0.4	0.24	0.11	0.17
WV:CHARLESTON	9	0.9	0.3	0.5	0.36	0.17	0.23

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

NM NO MEASUREMENT

TABLE 6

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
MAY 1981

	AIRBORNE PARTICULATES						
		5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
LOCATION	# SAM	MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	8	1.0	0.4	0.7	0.23	0.10	0.16
CA:BERKELEY	9	0.1	<0.1	0.1	0.13	0.04	0.09
CA:LOS ANGELES	9	0.8	0.3	0.5	0.22	0.07	0.16
CT:HARTFORD	8	0.5	0.2	0.4	0.24	0.12	0.19
FL:JACKSONVILLE	7	0.6	0.2	0.4	0.33	0.11	0.20
FL:MIAMI	9	0.4	0.1	0.3	0.33	0.13	0.22
ID:BOISE	8	0.9	0.3	0.5	0.26	0.08	0.17
ID:IDAHO FALLS	8	NM	NM	NM	0.27	0.07	0.16
IL:CHICAGO	9	1.1	0.2	0.6	0.23	0.08	0.17
IN:INDIANAPOLIS	3	0.5	0.3	0.4	0.27	0.10	0.18
KS:TOPEKA	7	2.7	0.2	1.3	0.15	0.04	0.10
ME:AUGUSTA	8	0.7	0.2	0.4	0.24	0.09	0.16
MI:LANSING	8	0.6	0.2	0.4	0.23	0.05	0.16
MN:MINNEAPOLIS	9	1.3	0.2	0.6	0.28	0.07	0.19
MO:JEFFERSON CITY	9	1.0	0.3	0.6	0.23	0.13	0.19
MS:JACKSON	7	0.9	0.3	0.6	0.22	0.12	0.17
MT:HELENA	9	0.8	0.2	0.4	0.30	0.05	0.14
NC:CHARLOTTE	4	0.1	0.1	0.1	0.26	0.15	0.20
ND:BISMARCK	9	1.4	0.3	0.9	0.27	0.06	0.16
NH:CONCORD	8	5.1	0.7	1.8	0.21	0.12	0.18
NJ:TRENTON	8	1.2	0.3	0.6	0.20	0.09	0.14
NM:SANTA FE	8	1.5	0.6	0.8	0.28	0.14	0.20
NV:LAS VEGAS	8	0.5	0.5	0.5	0.39	0.06	0.26
NY:ALBANY	8	0.7	<0.1	0.4	0.27	0.13	0.21
NY:NEW YORK CITY	9	0.4	0.2	0.3	0.28	0.16	0.21
NY:NIAGARA FALLS	9	0.5	0.2	0.3	0.27	0.14	0.21
NY:YAPHANK	9	0.3	0.1	0.2	0.25	0.13	0.20
OH:COLUMBUS	7	0.2	0.1	0.2	0.43	0.12	0.27
OH:PAINESVILLE	8	0.6	0.2	0.4	0.26	0.15	0.20
OH:TOLEDO	8	1.2	<0.1	0.7	0.23	0.14	0.19
OK:OKLAHOMA CITY	14	3.7	0.3	1.4	0.33	0.07	0.18
OR:PORTLAND	9	0.8	0.1	0.2	0.39	0.07	0.13
PA:HARRISBURG	12	1.2	0.3	0.7	0.27	0.14	0.20
PA:PITTSBURGH	8	0.7	0.2	0.4	0.22	0.14	0.18
RI:PROVIDENCE	9	0.8	0.2	0.4	0.27	0.11	0.19
SC:BARNWELL	2	0.3	0.2	0.2	0.05	0.04	0.05
SC:COLUMBIA	9	1.3	0.1	0.6	0.29	0.10	0.19
TN:KNOXVILLE	7	1.0	0.2	0.6	0.40	0.05	0.19
VA:LYNCHBURG	8	0.8	0.3	0.6	0.27	0.14	0.19
WA:SEATTLE	8	0.1	0.1	0.1	0.12	0.04	0.08
WA:SPOKANE	8	0.7	0.2	0.4	0.27	0.08	0.16
WI:MADISON	8	1.0	0.3	0.6	0.22	0.11	0.17
WV:CHARLESTON	8	1.7	0.2	0.6	0.25	0.13	0.19

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

NM NO MEASUREMENT

TABLE 7

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
JUNE 1981

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	9	1.6	0.2	0.8	0.15	0.03	0.07
CA:BERKELEY	9	0.1	<0.1	0.1	0.11	0.03	0.07
CA:LOS ANGELES	9	0.7	0.2	0.5	0.19	0.05	0.10
CT:HARTFORD	9	0.4	0.2	0.3	0.15	0.06	0.10
FL:JACKSONVILLE	9	0.3	0.1	0.1	0.13	0.04	0.07
FL:MIAMI	8	0.2	0.1	0.1	0.08	0.03	0.05
ID:BOISE	9	0.7	0.3	0.5	0.22	0.08	0.13
ID:IDAHO FALLS	9	NM	NM	NM	0.24	0.11	0.16
IL:CHICAGO	8	0.9	0.2	0.5	0.15	0.07	0.10
IN:INDIANAPOLIS	7	0.6	0.2	0.4	0.18	0.08	0.11
KS:TOPEKA	8	1.2	0.3	0.7	0.11	0.01	0.05
ME:AUGUSTA	9	0.4	0.2	0.3	0.17	0.07	0.11
MI:LANSING	9	0.6	0.1	0.3	0.16	0.06	0.11
MN:MINNEAPOLIS	9	1.0	0.2	0.5	0.20	0.07	0.13
MO:JEFFERSON CITY	9	0.4	0.1	0.3	0.20	0.06	0.11
MS:JACKSON	9	0.6	0.1	0.3	0.14	0.04	0.08
MT:HELENA	9	0.5	0.2	0.4	0.19	0.07	0.12
ND:BISMARCK	9	1.4	0.2	0.6	0.21	0.08	0.12
NH:CONCORD	3	2.1	1.1	1.7	0.15	0.11	0.13
NJ:TRENTON	9	0.8	0.3	0.5	0.15	0.07	0.10
NM:SANTA FE	6	0.8	0.4	0.6	0.21	0.09	0.15
NV:LAS VEGAS	9	0.9	0.5	0.7	0.21	0.05	0.12
NY:ALBANY	9	4.5	0.1	0.7	0.16	0.05	0.11
NY:NEW YORK CITY	9	0.3	0.2	0.2	0.16	0.08	0.12
NY:NIAGARA FALLS	9	0.4	0.1	0.2	0.15	0.07	0.11
NY:YAPHANK	9	0.3	<0.1	0.1	0.15	0.07	0.10
OH:COLUMBUS	9	1.0	<0.1	0.4	0.18	0.09	0.13
OH:PAINESVILLE	9	0.5	0.2	0.3	0.14	0.06	0.10
OH:TOLEDO	9	0.9	0.2	0.5	0.16	0.06	0.11
OK:OKLAHOMA CITY	13	2.6	0.2	1.0	0.35	0.02	0.10
OR:PORTLAND	9	0.1	<0.1	0.1	0.11	0.03	0.06
PA:HARRISBURG	12	0.9	0.2	0.5	0.17	0.07	0.10
PA:PITTSBURGH	9	0.4	0.2	0.3	0.12	0.07	0.10
RI:PROVIDENCE	9	0.6	0.1	0.3	0.23	0.07	0.13
SC:BARNWELL	2	0.2	<0.1	0.1	0.03	0.01	0.02
SC:COLUMBIA	9	0.9	0.2	0.5	0.14	0.05	0.09
TN:KNOXVILLE	8	1.1	0.1	0.4	0.14	0.04	0.08
VA:LYNCHBURG	9	1.0	0.1	0.4	0.15	0.06	0.09
WA:SEATTLE	8	0.1	0.1	0.1	0.10	0.01	0.06
WA:SPOKANE	9	0.5	0.2	0.3	0.24	0.05	0.10
WI:MADISON	5	0.5	0.1	0.3	0.15	0.09	0.11
WV:CHARLESTON	9	0.7	0.2	0.4	0.12	0.05	0.08

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

NM NO MEASUREMENT

TABLE 8

GROSS BETA CONCENTRATION IN PRECIPITATION

JANUARY 1981

LOCATION	DEPTH (mm)	ACT. (nCi/m^2)	± e	SPECIFIC GAMMA ACT. (pCi/l)
CA:BERKELEY	25.4	0.21	0.02	ND
CT:HARTFORD	3.5	0.03	0.00	ND
FL:JACKSONVILLE	13.3	0.16	0.01	ND
FL:MIAMI	18.7	0.14	0.02	ND
ID:BOISE	21.5	0.58	0.03	ZR-NB 16 ± 90 %
ID:IDAHO FALLS	10.8	0.11	0.01	ND
MI:LANSING	7.5	0.08	0.01	ND
ND:BISMARCK	2.6	0.04	0.00	ND
NJ:TRENTON	9.5	0.28	0.01	ZR-NB 16 ± 84%
NY:NEW YORK CITY	2.4	0.06	0.00	ND
OH:PAINESVILLE	22.1	0.52	0.03	ND
OR:PORTLAND	15.0	0.37	0.02	ND
PA:HARRISBURG	21.9	0.48	0.03	ZR-NB 28 ± 39% ^{106}RU 72 ± 60%
SC:COLUMBIA	15.0	0.57	0.03	ZR-NB 55 ± 21%
VA:VIRGINIA BEACH	6.2	0.28	0.01	ZR-NB 49 ± 46%

ND NO GAMMA ACTIVITY DETECTABLE

TABLE 9

GROSS BETA CONCENTRATION IN PRECIPITATION

FEBRUARY 1981

LOCATION	DEPTH (mm)	ACT. (nCi/m^2)	± e	SPECIFIC GAMMA ACT. (pCi/l)
CA:BERKELEY	1.5	0.01	0.00	ND
CT:HARTFORD	54.5	1.36	0.08	ZR-NB 36 ± 30% ^{106}RU 43 ± 91%
FL:JACKSONVILLE	52.8	0.58	0.05	ND
FL:MIAMI	79.0	1.42	0.10	ND
ID:BOISE	42.9	0.73	0.05	ND
ID:IDAHO FALLS	22.5	0.41	0.03	ND
IL:CHICAGO	19.8	0.24	0.02	ND
MI:LANSING	31.3	0.50	0.04	ND
MS:JACKSON	5.0	0.20	0.01	ZR-NB 18 ± 79%
MT:HELENA	7.2	0.26	0.01	ZR-NB 32 ± 35% ^{106}RU 59 ± 67%
ND:BISMARCK	13.9	0.75	0.04	ZR-NB 49 ± 23% ^{106}RU 48 ± 82%
NJ:TRENTON	53.0	1.01	0.07	ZR-NB 30 ± 51%
NV:LAS VEGAS	10.0	0.20	0.02	ND
NY:NIAGARA FALLS	56.7	0.45	0.05	ND
OH:COLUMBUS	36.3	0.54	0.04	ND
OH:PAINESVILLE	89.7	2.60	0.16	ZR-NB 25 ± 43% ^{106}RU 44 ± 89%
OR:PORTLAND	155.8	2.65	0.19	^{106}RU 58 ± 68%
PA:HARRISBURG	63.4	0.63	0.06	ND
SC:COLUMBIA	68.7	0.76	0.07	ND

ND NO GAMMA ACTIVITY DETECTABLE

TABLE 10

GROSS BETA CONCENTRATION IN PRECIPITATION

MARCH 1981

LOCATION	DEPTH (mm)	ACT. ± e (nCi/m^2)		SPECIFIC GAMMA ACT. (pCi/l)
AL:MONTGOMERY	41.3	0.25	0.03	ND
CA:BERKELEY	21.3	0.11	0.02	ND
CA:LOS ANGELES	10.0	0.06	0.01	ND
CO:DENVER	14.0	0.38	0.02	ND
CT:HARTFORD	1.8	0.06	0.00	ZR-NB 23 ± 54% ^{7}BE 67 ± 86%
FL:JACKSONVILLE	85.8	1.03	0.08	ND
FL:MIAMI	43.3	0.69	0.06	ND
ID:BOISE	70.0	1.05	0.08	ND
ID:IDAHO FALLS	32.8	0.56	0.04	ND
MI:LANSING	24.6	0.25	0.03	ND
MT:HELENA	35.7	0.46	0.04	ND
NJ:TRENTON	30.5	0.24	0.03	ND
NY:NEW YORK CITY	6.8	0.11	0.01	ND
NY:NIAGARA FALLS	17.8	0.43	0.03	ND
OH:PAINESVILLE	40.6	1.10	0.07	ND
OR:PORTLAND	76.1	0.76	0.08	ND
PA:HARRISBURG	20.6	0.29	0.02	ND
SC:BARNWELL	65.0	1.24	0.09	ND
SC:COLUMBIA	53.8	1.08	0.06	ND
WV:CHARLESTON	11.4	0.30	0.02	ND

ND NO GAMMA ACTIVITY DETECTABLE

TABLE 11

GROSS BETA CONCENTRATION IN PRECIPITATION

APRIL 1981

LOCATION	DEPTH (mm)	ACT. (nCi/m^2)	± e	SPECIFIC GAMMA ACT. (pCi/l)
AL:MONTGOMERY	43.0	0.43	0.04	ND
CA:LOS ANGELES	7.5	0.20	0.01	ND
CO:DENVER	21.0	0.39	0.03	ND
CT:HARTFORD	34.8	0.72	0.05	ZR-NB 17 ± 60%
ID:BOISE	45.3	0.53	0.05	ND
ID:IDAHO FALLS	18.7	0.25	0.02	ND
IL:CHICAGO	56.0	0.68	0.06	ND
MI:LANSING	72.1	0.59	0.07	ND
MT:HELENA	21.1	0.65	0.04	ND
ND:BISMARCK	15.7	1.34	0.05	ZR-NB 52 ± 29%
NJ:TRENTON	55.3	0.44	0.05	ND
NY:NEW YORK CITY	51.1	0.54	0.05	ND
NY:NIAGARA FALLS	76.3	0.59	0.07	ND
OH:COLUMBUS	62.5	0.51	0.06	ND
OH:PAINESVILLE	85.7	2.04	0.12	ND
OR:PORTLAND	86.0	0.77	0.08	ND
PA:HARRISBURG	43.9	0.45	0.04	ND
SC:BARNWELL	17.5	0.14	0.02	ND
VA:LYNCHBURG	50.0	1.41	0.08	ZR-NB 20 ± 65%
WV:CHARLESTON	37.0	0.48	0.04	ND

ND NO GAMMA ACTIVITY DETECTABLE

TABLE 12

GROSS BETA CONCENTRATION IN PRECIPITATION

MAY 1981

LOCATION	DEPTH (mm)	ACT. ± e (nCi/m^2)		SPECIFIC GAMMA ACT. (pCi/l)
CO:DENVER	21.5	0.29	0.02	ND
CT:HARTFORD	21.0	0.61	0.03	ZR-NB 19 ± 60%
FL:JACKSONVILLE	12.6	0.13	0.01	ND
FL:MIAMI	129.9	0.68	0.10	ND
ID:BOISE	16.5	0.15	0.02	ND
ID:IDAHO FALLS	85.5	0.82	0.08	ND
IL:CHICAGO	89.9	0.52	0.07	ND
MI:LANSING	81.4	0.43	0.06	ND
MT:HELENA	80.7	0.96	0.09	ND
ND:BISMARCK	22.3	0.21	0.02	ND
NJ:TRENTON	59.3	1.39	0.09	ZR-NB 23 ± 51%
NY:NEW YORK CITY	45.8	0.68	0.05	ND
NY:NIAGARA FALLS	73.0	0.35	0.05	ND
OH:COLUMBUS	127.0	0.63	0.09	ND
OH:PAINESVILLE	84.3	2.77	0.14	ND
OR:PORTLAND	59.7	0.60	0.06	ND
PA:HARRISBURG	37.0	0.43	0.04	ND
SC:COLUMBIA	36.3	0.42	0.04	ND
VA:LYNCHBURG	75.0	4.90	0.19	ZR-ND 49 ± 31%
WV:CHARLESTON	55.0	0.78	0.06	ND

ND NO GAMMA ACTIVITY DETECTABLE

TABLE 13

GROSS BETA CONCENTRATION IN PRECIPITATION

JUNE 1981

LOCATION	DEPTH (mm)	ACT. ± e (nCi/m^2)		SPECIFIC GAMMA ACT. (pCi/l)
AL:MONTGOMERY	11.4	0.07	0.01	ND
CO:DENVER	24.0	0.39	0.03	ND
CT:HARTFORD	29.2	0.75	0.04	ND
FL:JACKSONVILLE	100.9	0.43	0.07	ND
FL:MIAMI	160.0	0.36	0.09	ND
ID:BOISE	28.4	0.49	0.03	ND
IL:CHICAGO	84.9	0.46	0.07	ND
MI:LANSING	70.3	0.33	0.05	ND
MT:HELENA	23.9	0.56	0.03	ND
ND:BISMARCK	74.5	0.66	0.07	ND
NJ:TRENTON	64.8	0.77	0.07	ND
NY:NEW YORK CITY	39.0	0.12	0.03	ND
NY:NIAGARA FALLS	93.4	0.49	0.07	ND
OH:COLUMBUS	105.8	0.32	0.07	ND
OH:PAINESVILLE	110.3	0.97	0.10	ND
OR:PORTLAND	92.8	1.03	0.09	ND
PA:HARRISBURG	83.1	0.38	0.06	ND
PA:PITTSBURGH	79.3	0.41	0.06	ND
SC:BARNWELL	125.0	1.50	0.14	ND
SC:COLUMBIA	66.3	0.18	0.04	ND
VA:LYNCHBURG	50.0	1.28	0.08	ND
WV:CHARLESTON	86.5	0.32	0.06	ND

ND NO GAMMA ACTIVITY DETECTABLE

TABLE 14

PRECIPITATION
TRITIUM CONCENTRATION

JANUARY - MARCH 1981

LOCATION	JANUARY nCi/l ± e	FEBRUARY nCi/l ± e	MARCH nCi/l ± e
AL:MONTGOMERY	NS	NS	0.1 0.2
CA:BERKELEY	0.3 0.2	0.2 0.2	0.3 0.2
CA:LOS ANGELES	NS	NS	0.2 0.2
CO:DENVER	NS	NS	0.4 0.2
CT:HARTFORD	0.4 0.2	0.2 0.2	0.4 0.2
FL:JACKSONVILLE	0.1 0.2	0.1 0.2	0.3 0.2
FL:MIAMI	0.4 0.2	0.1 0.2	0.1 0.2
ID:BOISE	0.4 0.2	0.2 0.2	0.3 0.2
ID:IDAHO FALLS	0.2 0.2	0.3 0.2	0.4 0.2
IL:CHICAGO	NS	0.3 0.2	NS
MI:LANSING	0.3 0.2	0.4 0.2	0.5 0.2
MS:JACKSON	NS	0.2 0.2	NS
MT:HELENA	NS	0.3 0.2	0.3 0.2
ND:BISMARCK	0.3 0.2	0.3 0.2	NS
NJ:TRENTON	0.4 0.2	0.1 0.2	0.3 0.2
NV:LAS VEGAS	NS	0.2 0.2	NS
NY:NEW YORK CITY	0.3 0.2	NS	0.5 0.2
NY:NIAGARA FALLS	NS	0.5 0.2	0.5 0.2
OH:COLUMBUS	NS	0.2 0.2	NS
OH:PAINESVILLE	0.3 0.2	0.3 0.2	0.3 0.2
OR:PORTLAND	0.3 0.2	0.2 0.2	0.2 0.2
PA:HARRISBURG	0.2 0.2	0.2 0.2	0.4 0.2
SC:BARNWELL	NS	NS	1.2 0.2
SC:COLUMBIA	1.9 0.2	0.3 0.2	0.7 0.3
VA:VIRGINIA BEACH	0.1 0.2	NS	NS
WV:CHARLESTON	NS	NS	0.3 0.2

NS NO SAMPLE
e 2 SIGMA COUNTING ERROR

TABLE 15

PRECIPITATION
TRITIUM CONCENTRATION

APRIL - JUNE 1981

LOCATION	APRIL nCi/l ± e	MAY nCi/l ± e	JUNE nCi/l ± e
AL:MONTGOMERY	0.3 0.2	NS	0.2 0.2
CA:LOS ANGELES	0.1 0.2	NS	NS
CO:DENVER	0.4 0.2	0.5 0.2	0.5 0.2
CT:HARTFORD	0.3 0.2	0.2 0.2	0.4 0.2
FL:JACKSONVILLE	0.0 0.0	0.1 0.2	0.2 0.2
FL:MIAMI	NS	0.1 0.2	0.2 0.2
ID:BOISE	0.3 0.2	0.4 0.2	0.4 0.2
ID:IDAHO FALLS	0.3 0.2	0.4 0.2	NS
IL:CHICAGO	0.2 0.2	0.4 0.2	0.2 0.2
MI:LANSING	0.2 0.2	0.4 0.2	0.3 0.2
MT:HELENA	0.3 0.2	0.5 0.2	0.5 0.2
ND:BISMARCK	0.3 0.2	0.4 0.2	0.5 0.2
NJ:TRENTON	0.3 0.2	0.3 0.2	0.3 0.2
NY:NEW YORK CITY	0.3 0.2	0.3 0.2	0.4 0.2
NY:NIAGARA FALLS	0.4 0.2	0.3 0.2	0.2 0.2
OH:COLUMBUS	0.2 0.2	0.5 0.2	0.2 0.2
OH:PAINESVILLE	0.3 0.2	0.5 0.2	0.3 0.2
OR:PORTLAND	0.2 0.2	0.2 0.2	0.2 0.2
PA:HARRISBURG	0.2 0.2	0.4 0.2	0.3 0.2
PA:PITTSBURGH	NS	NS	0.3 0.2
SC:BARNWELL	0.6 0.2	NS	1.0 0.2
SC:COLUMBIA	0.2 0.2	0.4 0.2	0.8 0.2
VA:LYNCHBURG	0.2 0.2	0.3 0.2	0.2 0.2
WV:CHARLESTON	0.4 0.2	0.3 0.2	0.4 0.2

NS NO SAMPLE
e 2 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 October 1980 - March 1981 are shown for the 44 stations operating during this period in Tables 16 - 17. The Pu/U ratio will no longer be reported.

TABLE 16

PLUTONIUM AND URANIUM IN AIRBORNE PARTICULATES
OCTOBER - DECEMBER 1980 COMPOSITES

LOCATION	^{238}Pu aCi/m^3 ± e	^{239}Pu aCi/m^3 ± e	^{234}U aCi/m^3 ± e	^{235}U aCi/m^3 ± e	^{238}U aCi/m^3 ± e
AL:MONTGOMERY	1.3 0.6	3.5 1.0	17.4 2.6	4.3 1.1	15.8 2.5
AZ:PHOENIX	15.0 5.8	6.8 3.5	173.4 23.6	6.2 3.4	129.4 18.9
CA:BERKELEY	1.7 1.0	3.3 1.4	16.4 2.7	2.9 1.0	14.3 2.5
CA:LOS ANGELES	6.8 3.7	7.3 3.9	47.2 6.8	6.6 2.1	44.2 6.5
CO:DENVER	9.4 3.5	4.6 2.3	48.5 6.9	3.5 1.4	49.1 7.0
CT:HARTFORD	1.1 0.6	2.1 0.8	22.7 3.4	3.4 1.1	23.6 3.5
DE:DOVER	0.7 0.5	2.6 1.0	22.3 4.4	2.1 1.1	18.5 3.9
FL:JACKSONVILLE	0.7 1.0	3.2 1.2	37.0 4.7	2.6 0.9	30.7 4.1
FL:MIAMI	0.7 0.5	3.5 1.1	22.4 3.0	2.3 0.8	17.7 2.6
ID:BOISE	5.4 2.5	2.5 1.8	36.3 4.5	3.8 1.1	21.9 3.1
ID:IDAHO FALLS	3.0 1.3	3.7 1.4	42.2 5.0	3.8 1.1	42.0 4.9
IL:CHICAGO	1.3 0.8	2.7 1.2	44.8 6.4	8.7 2.2	30.9 5.0
IN:INDIANAPOLIS	2.0 1.0	1.6 0.9	43.0 5.6	5.9 1.6	42.1 5.6
KS:TOPEKA	1.0 1.0	1.2 0.7	21.6 3.3	3.7 1.2	19.6 3.1
KY:FRANKFORT	0.6 0.8	2.9 1.0	29.2 4.0	1.7 0.8	22.0 3.3
MA:LAWRENCE	1.5 1.0	1.8 1.0	39.0 8.2	1.1 1.1	29.1 6.8
ME:AUGUSTA	0.4 0.3	2.2 0.8	26.7 5.4	1.3 1.0	20.4 4.5
MI:LANSING	0.8 0.5	2.9 0.9	26.1 3.3	1.7 0.7	21.4 2.8
MN:MINNEAPOLIS	1.8 1.1	3.9 1.2	33.5 4.1	9.6 1.8	25.9 3.4
MO:JEFFERSON CITY	1.8 0.8	2.9 1.0	30.7 3.7	3.8 1.0	29.7 3.6
MS:JACKSON	6.8 1.8	7.8 2.0	45.0 5.6	6.7 1.7	37.9 5.0
MT:HELENA	5.7 4.2	3.8 3.1	20.2 5.4	1.7 1.6	19.7 5.4
NC:CHARLOTTE	0.7 1.1	2.9 1.3	23.2 3.5	2.1 0.9	21.0 3.3
ND:BISMARCK	2.5 1.5	2.6 1.3	36.3 5.9	5.0 2.0	38.7 6.2
NH:CONCORD	0.6 0.4	1.7 0.7	29.5 5.3	2.0 1.1	22.6 4.4
NJ:TRENTON	2.0 1.1	4.8 1.8	66.0 11.9	3.7 2.2	41.7 8.7
NM:SANTA FE	4.6 1.9	6.0 2.0	25.9 3.8	1.9 0.8	25.9 3.8
NV:LAS VEGAS	1.6 2.2	6.0 2.3	173.4 20.7	8.7 3.0	101.2 13.6
NY:NEW YORK CITY	1.5 0.8	2.4 1.1	29.2 5.4	3.1 1.4	26.7 5.1
NY:NIAGARA FALLS	0.2 0.3	2.1 1.0	72.1 12.2	3.2 2.0	68.6 11.7
NY:YAPHANK	0.6 0.4	2.4 0.9	15.1 2.7	0.7 0.5	13.5 2.5
OH:COLUMBUS	1.5 0.7	3.4 1.1	69.3 8.6	9.6 2.3	46.9 6.4
OH:PAINESVILLE	2.3 1.1	2.8 1.2	41.5 4.8	5.4 1.2	28.3 3.6
OH:TOLEDO	1.9 0.9	6.1 1.5	35.2 4.3	5.5 1.3	31.7 3.9
OK:OKLAHOMA CITY	8.7 5.1	7.9 4.1	40.1 6.4	5.1 2.1	39.4 6.4
OR:PORTLAND	4.5 2.3	11.0 3.9	26.4 3.6	1.8 0.7	24.4 3.4
PA:HARRISBURG	1.1 0.6	2.7 0.9	31.8 7.1	2.5 1.5	22.4 5.7
PA:PITTSBURGH	0.9 1.9	1.3 1.2	87.8 12.8	6.8 2.7	44.2 8.1
RI:PROVIDENCE	1.4 0.7	1.8 0.9	15.3 4.1	0.2 0.5	15.5 4.2
SC:BARNWELL	3.2 1.4	3.6 1.5	18.9 3.5	2.1 1.2	16.7 3.2
SC:COLUMBIA	0.3 1.0	2.0 1.1	49.5 5.9	2.9 0.9	44.1 5.4
TN:KNOXVILLE	0.9 0.6	6.4 1.7	37.6 4.6	7.3 1.6	22.6 3.2
VA:LYNCHBURG	0.2 0.7	4.7 1.6	85.3 11.4	4.0 1.6	16.5 3.5
VA:VIRGINIA BEACH	2.6 1.1	3.2 1.3	34.5 7.2	3.0 2.0	36.4 7.5
WA:SEATTLE	0.4 0.2	0.2 0.1	15.8 2.6	1.8 0.8	11.4 2.1
WA:SPOKANE	6.8 2.8	2.4 1.5	28.6 3.9	2.0 0.8	27.0 3.8
WI:MADISON	0.8 0.5	3.0 1.0	21.7 3.1	6.0 1.4	16.1 2.5
WV:CHARLESTON	1.2 0.6	2.6 1.0	53.5 6.0	2.8 1.0	46.2 5.3

THE ^{238}Pu AND ^{239}Pu CONCENTRATIONS REPORTED IN THIS TABLE HAVE BEEN ROUNDED.

e 2 SIGMA COUNTING ERROR

TABLE 17

PLUTONIUM AND URANIUM IN AIRBORNE PARTICULATES
JANUARY - MARCH 1981 COMPOSITES

LOCATION	^{238}Pu aCi/m^3 ± e	^{239}Pu aCi/m^3 ± e	^{234}U aCi/m^3 ± e	^{235}U aCi/m^3 ± e	^{238}U aCi/m^3 ± e
AL:MONTGOMERY	1.8 1.1	17.4 3.1	25.4 3.7	1.4 0.8	20.7 3.2
CA:BERKELEY	0.8 0.6	13.0 2.1	25.1 5.3	1.4 1.0	16.8 4.0
CA:LOS ANGELES	2.3 1.3	17.1 3.3	33.1 5.8	4.0 1.8	24.0 4.7
CT:HARTFORD	1.2 0.8	8.1 1.9	48.8 5.9	3.5 1.1	38.8 4.9
DE:DOVER	1.5 0.9	8.1 2.0	31.0 4.1	1.5 0.7	22.1 3.2
FL:JACKSONVILLE	0.7 1.3	20.1 3.9	38.7 FS6	1.8 0.8	35.4 4.6
FL:MIAMI	0.9 0.7	23.5 3.2	42.4 5.3	1.5 0.7	33.5 4.5
ID:BOISE	1.9 0.9	16.1 2.6	40.7 6.5	2.4 1.2	17.9 3.7
ID:IDAHO FALLS	2.7 1.3	19.8 3.5	81.3 11.6	2.1 1.3	56.7 8.9
IL:CHICAGO	2.7 2.1	9.3 2.7	33.3 6.0	1.3 1.1	32.2 5.8
IN:INDIANAPOLIS	-0.1 0.8	2.8 1.1	56.2 6.7	3.0 1.1	40.0 5.2
KS:TOPEKA	1.8 1.1	11.5 2.3	30.0 5.0	1.7 1.1	27.9 4.8
KY:FRANKFORT	1.6 1.0	5.4 1.8	68.6 7.8	2.9 1.1	43.8 5.6
ME:AUGUSTA	2.7 1.7	9.9 2.9	48.0 7.9	2.2 1.4	46.6 7.7
MI:LANSING	1.8 1.4	10.3 2.4	33.8 4.6	0.6 0.5	16.9 2.8
MN:MINNEAPOLIS	1.9 1.2	6.8 1.8	54.3 6.9	5.2 1.5	40.4 5.5
MO:JEFFERSON CITY	1.8 0.8	14.7 2.2	46.7 6.7	2.4 1.1	32.5 5.2
MS:JACKSON	1.8 1.4	21.1 3.8	46.5 5.8	2.7 0.9	39.5 5.1
MT:HELENA	1.4 1.3	16.2 3.3	59.3 9.4	2.2 1.5	46.3 7.9
NC:CHARLOTTE	0.3 1.1	11.4 2.4	33.8 5.1	4.1 1.5	27.8 4.4
ND:BISMARCK	4.0 1.9	15.9 3.4	81.8 12.9	4.2 2.2	61.8 10.5
NH:CONCORD	0.6 0.6	7.8 1.8	34.4 4.1	2.2 0.7	18.7 2.6
NJ:TRENTON	0.7 1.5	15.6 3.7	69.7 14.0	3.9 3.0	51.4 11.3
NM:SANTA FE	0.7 0.7	27.0 3.5	48.2 6.5	3.7 1.3	41.1 5.7
NV:LAS VEGAS	1.2 2.5	22.9 5.2	112.0 16.6	7.1 3.2	74.6 12.5
NY:ALBANY	0.8 0.6	13.5 2.2	60.3 6.6	3.6 1.0	62.6 6.8
NY:NEW YORK CITY	1.7 2.8	7.2 3.1	49.5 7.5	2.7 1.4	33.9 5.8
NY:NIAGARA FALLS	2.9 1.7	9.6 2.6	97.1 10.7	6.5 1.8	100.1 10.9
NY:YAPHANK	0.5 0.8	8.3 1.6	3.1 0.4	0.2 0.1	2.9 0.4
OH:COLUMBUS	6.3 1.8	13.5 2.6	72.3 8.7	4.4 1.4	56.5 7.2
OH:PAINESVILLE	1.8 1.1	10.6 2.4	44.0 6.5	2.8 1.2	38.2 5.9
OH:TOLEDO	0.6 0.7	7.8 1.7	51.8 6.8	2.9 1.1	28.0 4.2
OK:OKLAHOMA CITY	1.8 1.4	18.3 3.6	61.2 10.8	3.9 2.8	59.4 10.6
OR:PORTLAND	2.3 1.5	9.3 2.5	30.4 5.7	2.9 1.6	21.3 4.5
PA:HARRISBURG	0.4 0.6	11.2 1.8	30.8 5.4	2.5 1.4	25.4 4.8
PA:PITTSBURGH	1.9 2.2	8.4 3.1	118.7 20.8	3.8 3.6	95.9 17.9
RI:PROVIDENCE	1.3 0.6	10.4 1.9	39.7 4.8	2.4 0.8	39.1 4.7
SC:BARNWELL	2.4 1.9	16.2 3.6	37.7 6.0	4.2 1.7	19.2 3.9
SC:COLUMBIA	0.6 0.9	16.8 3.2	36.3 0.4	3.3 0.8	36.4 4.1
TN:KNOXVILLE	1.6 1.8	13.9 3.7	83.1 10.2	4.0 1.5	50.9 7.0
VA:LYNCHBURG	0.5 0.6	10.3 1.9	75.0 9.2	4.1 1.4	22.8 3.7
VA:VIRGINIA BEACH	0.6 1.0	6.8 2.3	43.7 6.0	1.1 0.8	29.5 4.6
WA:SEATTLE	1.2 0.7	10.1 1.9	17.5 3.1	0.7 0.5	10.1 2.2
WA:SPOKANE	2.3 1.2	11.7 2.8	47.9 8.0	1.2 1.0	32.4 6.1
WI:MADISON	0.9 0.6	9.5 1.9	19.3 3.1	1.0 0.6	21.1 3.3
WV:CHARLESTON	0.9 0.9	11.1 2.0	56.4 6.7	3.0 1.1	46.7 5.8

THE ^{238}Pu AND ^{239}Pu CONCENTRATIONS REPORTED IN THIS TABLE HAVE BEEN ROUNDED.

e 2 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 semiannually and shipped to the EERF where the krypton-85 is cryogenically separated and counted in a liquid scintillation system.

Data for January - June 1976 were reported in ERD 8.

Note. — The recovery tracer required for the analysis of these samples is currently unavailable. When the tracer is available or new methodology developed, the samples received after June 1976 will be analyzed and reported in this report series.

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, therefore, all nuclear power plants that are operating or scheduled for operation through 1980 are being monitored.

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 January - June 1981 are given in Tables 18 - 19.

Results from the 1981 annual gamma analyses of surface water are shown in Table 20.

TABLE 18

SURFACE WATER
TRITIUM CONCENTRATION

JANUARY - MARCH 1981

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± e
AL:DECATUR	TENNESSEE RIVER	1/28/81	0.3	0.2
AL:GORDON	CHATTAHOOCHEE RIVER	1/16/81	0.3	0.2
AL:SCOTTSBORO	TENNESSEE RIVER	1/27/81	0.4	0.2
CA:CLAY STATION	FOLSOM S. CANAL	1/26/81	0.3	0.2
CA:DIABLO CANYON	PACIFIC OCEAN	1/21/81	0.2	0.2
CA:EUREKA	HUMBOLDT BAY	1/ 1/81	0.1	0.2
CA:SAN ONOFRE	PACIFIC OCEAN	1/23/81	0.2	0.2
CO:GREELEY	SOUTH PLATTE RIVER	1/22/81	0.6	0.2
CT:EAST HADDAM	CONNECTICUT RIVER	1/28/81	0.2	0.2
CT:WATERFORD	LONG ISLAND SOUND	1/27/81	0.3	0.2
FL:CRYSTAL RIVER	GULF OF MEXICO	1/ 5/81	0.3	0.2
FL:FT. PIERCE	ATLANTIC OCEAN	1/ 8/81	0.1	0.2
FL:HOMESTEAD	BISCAYNE BAY	2/11/81	0.2	0.2
IA:CEDAR RAPIDS	CEDAR RIVER	1/ 1/81	0.4	0.2
ID:BUHL	SNAKE RIVER	1/20/81	0.2	0.2
IL:BYRON	ROCK RIVER	3/31/81	0.3	0.2
IL:EAST MOLINE	MISSISSIPPI RIVER	2/15/81	0.3	0.2
IL:MARSEILLES	ILLINOIS RIVER	1/ 1/81	0.5	0.2
IL:MORRIS	ILLINOIS RIVER	1/ 1/81	0.4	0.2
IL:OREGON	ROCK RIVER	1/ 2/81	0.3	0.2
LA:NEW ORLEANS	MISSISSIPPI RIVER	1/ 8/81	0.4	0.2
MA:PLYMOUTH	CAPE CODE BAY	1/ 6/81	0.2	0.2
MA:ROWE	DEERFIELD RIVER	1/12/81	0.3	0.2
MD:CONOWINGO	SUSQUEHANNA RIVER	1/13/81	0.3	0.2
MD:LUSBY	CHESAPEAKE BAY	1/ 6/81	0.5	0.2
ME:WISCASSET	MONTSEWAY BAY	1/ 7/81	0.3	0.2
MI:BRIDGMAN	LAKE MICHIGAN	1/ 1/81	0.4	0.2
MI:CHARLEVOIX	LAKE MICHIGAN	1/ 3/81	0.2	0.2
MI:MONROE	LAKE ERIE	1/ 5/81	0.2	0.2
MI:SOUTH HAVEN	LAKE MICHIGAN	1/ 1/81	0.6	0.2
MN:MONTICELLO	MISSISSIPPI RIVER	1/14/81	0.4	0.2
MN:RED WING	MISSISSIPPI RIVER	1/20/81	0.2	0.2
MS:PORT GIBSON	MISSISSIPPI RIVER	1/28/81	0.3	0.2
NC:CHARLOTTE	CATAWBA RIVER	1/ 8/81	0.6	0.2
NC:SOUTHPORT	ATLANTIC OCEAN	1/ 7/81	0.3	0.2
NE:RULO	MISSOURI RIVER	1/12/81	0.4	0.2
NJ:BAYSIDE	DELAWARE RIVER	1/ 9/81	0.3	0.2
NJ:OYSTER CREEK	OYSTER CREEK	1/ 8/81	0.3	0.2
NV:BOULDER CITY	COLORADO RIVER	1/ 1/81	0.4	0.2
NY:OSSINING	HUDSON RIVER	2/25/81	0.3	0.2
NY:OSWEGO	LAKE ONTARIO	1/ 2/81	0.4	0.2
NY:POUGHKEEPSIE	HUDSON RIVER	1/ 7/81	0.5	0.2

TABLE 18 (CONTINUED)

SURFACE WATER
TRITIUM CONCENTRATION

JANUARY - MARCH 1981

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± e
OH:TOLEDO	LAKE ERIE	1/ 2/81	0.2	0.2
OR:BRADWOOD	COLUMBIA RIVER	1/17/81	0.4	0.2
PA:DANVILLE	SUSQUEHANNA RIVER	1/26/81	0.2	0.2
SC:ALLENDALE	SAVANNAH RIVER	1/29/81	5.0	0.3
SC:COLUMBIA	BROAD RIVER	1/28/81	0.3	0.2
SC:HARTSVILLE	LAKE ROBINSON	1/ 5/81	1.2	0.2
TN:DAISY	TENNESSEE RIVER	2/ 9/81	0.4	0.2
TN:KINGSTON	CLINCH RIVER	1/ 6/81	0.5	0.2
TX:EL PASO	RIO GRANDE	1/14/81	0.2	0.2
VA:DOSWELL	NORTH ANNA RIVER	1/ 8/81	1.7	0.2
VT:VERNON	CONNECTICUT RIVER	3/23/81	0.3	0.2
WA:NORTHPORT	COLUMBIA RIVER	2/ 5/81	0.3	0.2
WA:RICHLAND	COLUMBIA RIVER	1/ 8/81	0.4	0.2
WI:TWO CREEKS	LAKE MICHIGAN	2/ 9/81	0.2	0.2
WI:VICTORY	MISSISSIPPI RIVER	1/29/81	0.3	0.2
WV:WHEELING	OHIO RIVER	1/ 6/81	0.2	0.2

NS NO SAMPLE
e 2 SIGMA COUNTING ERROR

TABLE 19

SURFACE WATER
TRITIUM CONCENTRATION

APRIL - JUNE 1981

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± e
AL:DECATUR	TENNESSEE RIVER	4/10/81	0.3	0.2
AL:DOTHAN	CHATTAHOOCHIE RIVER	4/ 1/81	0.2	0.2
AL:SCOTTSBORO	TENNESSEE RIVER	4/ 7/81	0.4	0.2
CA:CLAY STATION	FOLSOM S. CANAL	4/ 6/81	0.3	0.2
CA:DIABLO CANYON	PACIFIC OCEAN	4/16/81	0.1	0.2
CA:EUREKA	HUMBOLDT BAY	4/ 2/81	0.2	0.2
CA:SAN ONOFRE	PACIFIC OCEAN	4/16/81	0.2	0.2
CO:GREELEY	SOUTH PLATTE RIVER	4/24/81	1.5	0.2
CT:EAST HADDAM	CONNECTICUT RIVER	4/29/81	0.2	0.2
CT:WATERFORD	LONG ISLAND SOUND	4/23/81	0.1	0.2
FL:CRYSTAL RIVER	GULF OF MEXICO	4/13/81	0.2	0.2
FL:FT. PIERCE	ATLANTIC OCEAN	4/29/81	0.2	0.2
FL:HOMESTEAD	BISCAYNE BAY	4/30/81	0.3	0.2
GA:BAXLEY	ALTAMAHA RIVER	5/11/81	0.2	0.2
IA:CEDAR RAPIDS	CEDAR RIVER	4/14/81	0.3	0.2
ID:BUHL	SNAKE RIVER	4/ 1/81	0.3	0.2
IL:BYRON	ROCK RIVER	5/15/81	0.3	0.2
IL:E. MOLINE	MISSISSIPPI RIVER	5/15/81	0.2	0.2
IL:MARSEILLES	ILLINOIS RIVER	4/ 1/81	0.5	0.2
IL:MORRIS	ILLINOIS RIVER	4/ 1/81	0.4	0.2
IL:OREGON	ROCK RIVER	6/22/81	0.2	0.2
IL:ZION	LAKE MICHIGAN	4/ 1/81	0.4	0.2
LA:NEW ORLEANS	MISSISSIPPI RIVER	4/ 2/81	0.3	0.2
MA:PLYMOUTH	CAPE CODE BAY	4/ 3/81	0.2	0.2
MA:ROWE	DEERFIELD RIVER	4/30/81	0.2	0.2
MD:CONOWINGO	SUSQUEHANNA RIVER	4/ 7/81	0.2	0.2
MD:LUSBY	CHESAPEAKE BAY	3/31/81	0.2	0.2
ME:WISCASSET	MONTSEWAY BAY	4/ 1/81	0.3	0.2
MI:BRIDGMAN	LAKE MICHIGAN	4/ 7/81	0.6	0.2
MI:CHARLEVOIX	LAKE MICHIGAN	4/ 4/81	0.4	0.2
MI:MONROE	LAKE ERIE	4/ 6/81	0.3	0.2
MI:SOUTH HAVEN	LAKE MICHIGAN	4/ 9/81	0.2	0.2
MN:MONTICELLO	MISSISSIPPI RIVER	4/ 8/81	0.2	0.2
MN:RED WING	MISSISSIPPI RIVER	4/17/81	0.4	0.2
MS:PORT GIBSON	MISSISSIPPI RIVER	5/21/81	0.3	0.2
NC:CHARLOTTE	CATAWBA RIVER	4/ 1/81	0.2	0.2
NC:SOUTHPORT	ATLANTIC OCEAN	4/ 2/81	0.3	0.2
NE:RULO	MISSOURI RIVER	5/12/81	0.4	0.2
NJ:BAYSIDE	DELAWARE RIVER	4/16/81	0.1	0.2
NJ:OYSTER CREEK	OYSTER CREEK	4/14/81	0.3	0.2
NV:BOULDER CITY	COLORADO RIVER	4/10/81	0.3	0.2
NY:OSSINING	HUDSON RIVER	6/ 3/81	0.1	0.2

TABLE 19 (CONTINUED)

SURFACE WATER
TRITIUM CONCENTRATION

APRIL - JUNE 1981

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± e
NY:OSWEGO	LAKE ONTARIO	5/ 4/81	0.3	0.2
NY:POUGHKEEPSIE	HUDSON RIVER	4/ 1/81	0.2	0.2
OH:TOLEDO	LAKE ERIE	3/30/81	0.2	0.2
OR:BRADWOOD	COLUMBIA RIVER	4/26/81	0.3	0.2
PA:DANVILLE	SUSQUEHANNA RIVER	4/ 1/81	0.4	0.2
SC:ALLENDALE	SAVANNAH RIVER	4/ 9/81	3.3	0.3
SC:BROAD RIVER	BROAD RIVER	4/29/81	0.1	0.2
SC:HARTSVILLE	LAKE ROBINSON	4/ 6/81	1.5	0.2
TN:DAISY	TENNESSEE RIVER	5/ 4/81	0.4	0.2
TN:KINGSTON	CLINCH RIVER	5/12/81	1.2	0.2
TX:EL PASO	RIO GRANDE	4/13/81	0.3	0.2
TX:MATAGORDA	COLORADO RIVER	4/28/81	0.1	0.2
VA:DOSWELL	NORTH ANNA RIVER	4/10/81	2.6	0.2
VT:VERNON	CONNECTICUT RIVER	6/10/81	0.2	0.2
WA:NORTHPORT	COLUMBIA RIVER	4/14/81	0.2	0.2
WA:RICHLAND	COLUMBIA RIVER	4/ 1/81	0.4	0.2
WI:TWO CREEKS	LAKE MICHIGAN	5/ 4/81	0.3	0.2
WI:VICTORY	MISSISSIPPI RIVER	4/ 9/81	0.1	0.2
WV:WHEELING	OHIO RIVER	4/ 2/81	0.2	0.2

e 2 SIGMA COUNTING ERROR

TABLE 20

SURFACE WATER
ANNUAL GAMMA ANALYSIS

1981

LOCATION	SOURCE	DATE COLLECTED	GAMMA pCi/l ± e
AL:DECATUR	TENNESSEE RIVER	4/10/81	ND
AL:DOTHAN	CHATTAHOOCHIE RIVER	4/ 1/81	ND
AL:SCOTTSBORO	TENNESSEE RIVER	4/ 7/81	ND
CA:CLAY STATION	FOLSOM S. CANAL	4/ 6/81	ND
CA:DIABLO CANYON	PACIFIC OCEAN	4/16/81	ND
CA:EUREKA	HUMBOLDT BAY	4/ 2/81	^{40}K 212 ± 37%
CA:SAN ONOFRE	PACIFIC OCEAN	4/16/81	^{40}K 223 ± 75%
CO:GREELEY	SOUTH PLATTE RIVER	4/24/81	ND
CT:EAST HADDAM	CONNECTICUT RIVER	4/29/81	ND
CT:WATERFORD	LONG ISLAND SOUND	4/23/81	^{40}K 197 ± 40%
FL:CRYSTAL RIVER	GULF OF MEXICO	4/13/81	ND
FL:FT. PIERCE	ATLANTIC OCEAN	4/29/81	^{40}K 119 ± 65%
FL:HOMESTEAD	BISCAYNE BAY	4/30/81	ND
GA:BAXLEY	ALTAMAHA RIVER	5/11/81	ND
IA:CEDAR RAPIDS	CEDAR RIVER	4/14/81	ND
ID:BUHL	SNAKE RIVER	4/ 1/81	ND
IL:BYRON	ROCK RIVER	5/15/81	ND
IL:E. MOLINE	MISSISSIPPI RIVER	2/15/81	ND
IL:MARSEILLES	ILLINOIS RIVER	4/ 1/81	ND
IL:MORRIS	ILLINOIS RIVER	4/ 1/81	ND
IL:OREGON	ROCK RIVER	6/22/81	ND
IL:ZION	LAKE MICHIGAN	4/ 1/81	ND
LA:NEW ORLEANS	MISSISSIPPI RIVER	4/ 2/81	ND
MA:PLYMOUTH	CAPE CODE BAY	4/ 3/81	ND
MA:ROWE	DEERFIELD RIVER	4/30/81	ND
MD:CONOWINGO	SUSQUEHANNA RIVER	4/ 7/81	ND
MD:LUSBY	CHESAPEAKE BAY	3/31/81	^{40}K 98 ± 78%
ME:WISCASSET	MONTSEWAY BAY	4/ 1/81	^{40}K 183 ± 43%
MI:BRIDGMAN	LAKE MICHIGAN	4/ 7/81	ND
MI:CHARLEVOIX	LAKE MICHIGAN	4/ 4/81	ND
MI:MONROE	LAKE ERIE	4/ 6/81	ND
MI:SOUTH HAVEN	LAKE MICHIGAN	4/ 9/81	ND
MN:MONTICELLO	MISSISSIPPI RIVER	4/ 8/81	ND
MN:RED WING	MISSISSIPPI RIVER	4/17/81	ND
MS:PORT GIBSON	MISSISSIPPI RIVER	5/21/81	ND
NC:CHARLOTTE	CATAWBA RIVER	4/ 1/81	ND
NC:SOUTHPORT	ATLANTIC OCEAN	4/ 2/81	^{40}K 206 ± 39%
NE:RULO	MISSOURI RIVER	5/12/81	ND
NJ:BAYSIDE	DELAWARE RIVER	4/16/81	ND
NJ:OYSTER CREEK	OYSTER CREEK	4/14/81	^{40}K 168 ± 47%
NV:BOULDER CITY	COLORADO RIVER	4/10/81	ND
NY:OSSINING	HUDSON RIVER	6/ 3/81	ND
NY:OSWEGO	LAKE ONTARIO	5/ 4/81	ND

TABLE 20 (CONTINUED)

SURFACE WATER
ANNUAL GAMMA ANALYSIS

1981

LOCATION	SOURCE	DATE COLLECTED	GAMMA pCi/l ± e
NY:POUGHKEEPSIE	HUDSON RIVER	4/ 1/81	ND
OH:TOLEDO	LAKE ERIE	3/30/81	ND
OR:BRADWOOD	COLUMBIA RIVER	4/26/81	ND
PA:DANVILLE	SUSQUEHANNA RIVER	4/ 1/81	ND
SC:ALLENDALE	SAVANNAH RIVER	4/ 9/81	ND
SC:BROAD RIVER	BROAD RIVER	4/29/81	ND
SC:HARTSVILLE	LAKE ROBINSON	4/ 6/81	ND
TN:DAISY	TENNESSEE RIVER	5/ 4/81	ND
TN:KINGSTON	CLINCH RIVER	5/12/81	ND
TX:EL PASO	RIO GRANDE	4/13/81	ND
TX:MATAGORDA	COLORADO RIVER	4/28/81	ND
VA:DOSWELL	NORTH ANNA RIVER	4/10/81	ND
VT:VERNON	CONNECTICUT RIVER	6/10/81	ND
WA:NORTHPORT	COLUMBIA RIVER	4/14/81	ND
WA:RICHLAND	COLUMBIA RIVER	4/ 1/81	ND
WI:TWO CREEKS	LAKE MICHIGAN	5/ 4/81	ND
WI:VICTORY	MISSISSIPPI RIVER	4/ 9/81	ND
WV:WHEELING	OHIO RIVER	4/ 2/81	ND

ND NO GAMMA ACTIVITY DETECTABLE
e 2 SIGMA COUNTING ERROR

Drinking Water

The drinking water program provides ambient radiation monitoring relevant to the effects of the nuclear power industry, natural environmental insult, 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, and strontium-90 on annual composites (gamma analyses are performed if the gross beta activity is greater than 10 pCi/l; 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, on 22 selected sampling locations corresponding to continuously operating air particulate stations.

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 January - June 1981 are shown in Tables 21 - 22.

The annual alpha, beta, gamma, radium, and strontium analyses for the January - December 1980 annual drinking water samples are shown in Table 23.

Plutonium and uranium analyses are similar to procedures given for air particulate samples. Analyses were altered to coincide with revised EPA standards. The results for 1980 composite samples are shown in Table 24.

Iodine-131 concentration in drinking water for January - June 1981 is shown in Table 25.

TABLE 21

DRINKING WATER
TRITIUM CONCENTRATION

JANUARY - MARCH 1981

LOCATION	DATE COLLECTED	nCi/l	± e
AK:FAIRBANKS	1/12/81	0.2	0.2
AL:DOTHAN	1/16/81	0.3	0.2
AL:MONTGOMERY	1/ 2/81	0.4	0.2
AL:MUSCLE SHOALS	1/29/81	0.3	0.2
AL:SCOTTSBORO	1/27/81	0.5	0.2
CA:BERKELEY	1/ 8/81	0.1	0.2
CA:LOS ANGELES	1/ 5/81	0.2	0.2
CO:DENVER	1/23/81	0.4	0.2
CO:PLATTEVILLE	1/22/81	0.4	0.2
CT:HARTFORD	1/ 2/81	0.2	0.2
DE:WILMINGTON	2/ 3/81	0.3	0.2
FL:MIAMI	1/ 5/81	0.2	0.2
FL:TAMPA	1/ 6/81	0.2	0.2
GA:SAVANNAH	1/12/81	3.8	0.3
HI:HONOLULU	1/15/81	0.3	0.2
IA:CEDAR RAPIDS	1/ 1/81	0.5	0.2
ID:BOISE	1/ 2/81	0.3	0.2
ID:IDAHO FALLS	1/ 5/81	0.3	0.2
IL:MORRIS	1/ 5/81	0.6	0.2
KS:TOPEKA	1/ 1/81	0.3	0.2
LA:NEW ORLEANS	1/15/81	0.3	0.2
MA:LAWRENCE	1/ 5/81	0.3	0.2
MA:ROWE	1/12/81	0.3	0.2
MD:BALTIMORE	1/ 6/81	0.3	0.2
MD:CONOWINGO	1/13/81	0.2	0.2
ME:AUGUSTA	1/ 5/81	0.2	0.2
MI:DETROIT	1/ 5/81	0.2	0.2
MI:GRAND RAPIDS	1/13/81	0.2	0.2
MN:MINN/ST. PAUL	1/ 2/81	0.2	0.2
MN:RED WING	1/20/81	0.1	0.2
MO:JEFFERSON CITY	2/24/81	0.2	0.2
MS:JACKSON	1/ 5/81	0.3	0.2
MS:PORT GIBSON	1/28/81	0.3	0.2
MT:HELENA	1/ 8/81	0.3	0.2
NC:CHARLOTTE	1/ 8/81	0.3	0.2
NC:WILMINGTON	1/ 8/81	0.2	0.2
ND:BISMARCK	1/ 2/81	0.4	0.2
NE:LINCOLN	1/ 1/81	0.5	0.2
NH:CONCORD	1/ 2/81	0.3	0.2
NJ:TRENTON	1/19/81	0.2	0.2
NJ:WARETOWN	1/13/81	0.1	0.2
NM:SANTA FE	1/ 2/81	0.4	0.2
NV:LAS VEGAS	1/12/81	0.4	0.2
NY:ALBANY	1/ 6/81	0.4	0.2

TABLE 21 (CONTINUED)

DRINKING WATER
TRITIUM CONCENTRATION

JANUARY - MARCH 1981

LOCATION	DATE COLLECTED	nCi/l	± e
NY:NEW YORK CITY	1/ 2/81	0.2	0.2
NY:NIAGARA FALLS	1/ 2/81	0.4	0.2
NY:SYRACUSE	2/ 1/81	0.4	0.2
OH:CINCINNATI	3/25/81	0.4	0.2
OH:COLUMBUS	1/ 7/81	0.3	0.2
OH:EAST LIVERPOOL	1/28/81	0.9	0.2
OH:PAINESVILLE	1/ 6/81	0.3	0.2
OH:TOLEDO	1/13/81	0.3	0.2
OK:OKLAHOMA CITY	1/ 5/81	0.1	0.2
OR:PORTLAND	1/ 6/81	0.2	0.2
PA:COLUMBIA	1/ 7/81	0.2	0.2
PA:HARRISBURG	1/14/81	0.1	0.2
PA:PITTSBURGH	1/28/81	0.3	0.2
PC:ANCON	2/ 2/81	0.3	0.2
RI:PROVIDENCE	1/ 2/81	0.2	0.2
SC:BARNWELL	1/15/81	0.2	0.2
SC:COLUMBIA	1/ 2/81	0.4	0.2
SC:HARTSVILLE	1/ 5/81	0.2	0.2
SC:JENKINSVILLE	1/30/81	0.3	0.2
SC:SENECA	1/ 7/81	0.4	0.2
TN:CHATTANOOGA	3/18/81	0.3	0.2
TX:AUSTIN	1/ 1/81	0.2	0.2
VA:DOSWELL	1/ 1/81	0.2	0.2
VA:LYNCHBURG	1/ 5/81	0.3	0.2
VA:VIRGINIA BEACH	1/ 1/81	0.3	0.2
VI:ST. THOMAS	2/20/81	0.3	0.2
WA:RICHLAND	1/ 8/81	0.2	0.2
WA:SEATTLE	1/ 6/81	0.1	0.2
WI:GENOA CITY	1/29/81	0.3	0.2
WI:MADISON	1/ 9/81	0.1	0.2

NS NO SAMPLE
e 2 SIGMA COUNTING ERROR

TABLE 22

DRINKING WATER
TRITIUM CONCENTRATION

APRIL - JUNE 1981

LOCATION	DATE COLLECTED	nCi/l	± e
AK:FAIRBANKS	4/ 3/81	0.2	0.2
AL:DOTHAN	4/ 2/81	0.1	0.2
AL:MONTGOMERY	4/30/81	0.3	0.2
AL:MUSCLE SHOALS	4/ 9/81	0.5	0.2
AL:SCOTTSBORO	4/ 7/81	0.5	0.2
CA:BERKELEY	4/ 3/81	0.2	0.2
CA:LOS ANGELES	4/ 1/81	0.1	0.2
CO:DENVER	4/28/81	0.3	0.2
CO:PLATTEVILLE	4/24/81	0.5	0.2
CT:HARTFORD	4/ 1/81	0.3	0.2
DE:WILMINGTON	4/ 1/81	0.2	0.2
FL:MIAMI	4/ 1/81	0.2	0.2
FL:TAMPA	4/ 6/81	0.2	0.2
GA:BAXLEY	5/11/81	0.1	0.2
GA:SAVANNAH	4/20/81	2.7	0.2
HI:HONOLULU	4/ 1/81	0.1	0.2
IA:CEDAR RAPIDS	4/ 1/81	0.9	0.2
ID:BOISE	4/ 7/81	0.3	0.2
ID:IDAHO FALLS	4/ 2/81	0.3	0.2
IL:MORRIS	4/ 1/81	0.1	0.2
IL:W. CHICAGO	6/12/81	0.3	0.2
LA:NEW ORLEANS	4/20/81	0.3	0.2
MA:LAWRENCE	4/13/81	0.1	0.2
MA:ROWE	4/30/81	0.4	0.2
MD:BALTIMORE	4/ 1/81	0.1	0.2
MD:CONOWINGO	4/ 7/81	0.2	0.2
ME:AUGUSTA	4/ 2/81	0.1	0.2
MI:DETROIT	4/ 2/81	0.3	0.2
MI:GRAND RAPIDS	4/ 3/81	0.3	0.2
MN:RED WING	4/16/81	0.6	0.2
MO:JEFFERSON CITY	4/24/81	0.7	0.2
MS:JACKSON	5/14/81	0.2	0.2
MS:PORT GIBSON	5/21/81	0.3	0.2
MT:HELENA	4/ 3/81	0.3	0.2
NC:CHARLOTTE	4/ 1/81	0.2	0.2
NC:WILMINGTON	4/ 2/81	0.2	0.2
ND:BISMARCK	4/ 1/81	0.3	0.2
NE:LINCOLN	4/ 1/81	0.2	0.2
NH:CONCORD	4/ 1/81	0.2	0.2
NJ:TRENTON	4/13/81	0.3	0.2
NJ:WARETOWN	4/14/81	0.1	0.2
NM:SANTA FE	4/ 1/81	0.1	0.2
NV:LAS VEGAS	4/ 1/81	0.3	0.2
NY:ALBANY	4/ 1/81	0.2	0.2

TABLE 22 (CONTINUED)

DRINKING WATER
TRITIUM CONCENTRATION

APRIL - JUNE 1981

LOCATION	DATE COLLECTED	nCi/l	± e
NY:NEW YORK CITY	4/ 1/81	0.3	0.2
NY:NIAGARA FALLS	4/ 1/81	0.4	0.2
NY:SYRACUSE	5/ 7/81	0.2	0.2
OH:CINCINNATI	5/15/81	0.2	0.2
OH:COLUMBUS	4/ 3/81	0.2	0.2
OH:EAST LIVERPOOL	4/27/81	0.2	0.2
OH:PAINESVILLE	4/ 1/81	0.3	0.2
OH:TOLEDO	4/ 1/81	0.3	0.2
OK:OKLAHOMA CITY	4/17/81	0.2	0.2
OR:PORTLAND	4/ 3/81	0.1	0.2
PA:COLUMBIA	4/ 2/81	0.2	0.2
PA:HARRISBURG	4/ 7/81	0.3	0.2
PA:PITTSBURGH	4/27/81	0.3	0.2
PC:ANCON	4/ 1/81	0.2	0.2
RI:PROVIDENCE	4/ 1/81	0.1	0.2
SC:BARNWELL	4/ 9/81	0.2	0.2
SC:COLUMBIA	4/ 6/81	0.3	0.2
SC:HARTSVILLE	4/ 6/81	0.1	0.2
SC:JENKINSVILLE	4/24/81	0.3	0.2
SC:SENECA	4/28/81	0.2	0.2
TN:CHATTANOOGA	5/26/81	0.4	0.2
TN:KNOXVILLE	6/10/81	0.1	0.2
TX:AUSTIN	4/ 1/81	0.6	0.2
VA:DOSWELL	4/27/81	0.1	0.2
VA:LYNCHBURG	4/ 2/81	0.2	0.2
VA:VIRGINIA BEACH	4/21/81	0.2	0.2
VI:ST. THOMAS	4/20/81	0.1	0.2
WA:RICHLAND	4/ 1/81	0.1	0.2
WA:SEATTLE	4/ 1/81	0.2	0.2
WI:GENOA CITY	4/ 9/81	0.2	0.2
WI:MADISON	4/10/81	0.3	0.2

NS NO SAMPLE
e 2 SIGMA COUNTING ERROR

TABLE 23

DRINKING WATER
ALPHA, BETA AND GAMMA CONCENTRATION

JANUARY - DECEMBER 1980

ANNUAL ANALYSES

LOCATION	TOTAL SOLIDS mg/l	GROSS BETA DATE CTD. pCi/l ± e	GROSS ALPHA DATE CTD. pCi/l ± e	^{90}Sr pCi/l ± e	^{226}Ra pCi/l ± e	SPECIFIC GAMMA ACTIVITY
AK:ANCHORAGE	79.2	2.0 0.7 2/ 2/81	0.1 0.3 2/ 2/81	-0.1 0.1	NA	ND
AK:FAIRBANKS	128.8	2.0 0.6 2/ 2/81	0.0 2/ 2/81	0.1 0.4	NA	ND
AL:DOTHAN	149.0	2.0 0.8 2/ 2/81	0.0 2/ 2/81	0.2 0.5	NA	ND
AL:MONTGOMERY	64.4	0.6 0.6 2/ 2/81	0.0 2/ 2/81	0.3 0.8	NA	ND
AL:MUSCLE SHOALS	94.6	2.0 0.7 2/ 2/81	0.0 2/ 2/81	0.2 0.3	NA	ND
AL:SCOTTSBORO	97.8	1.0 0.5 2/ 6/81	0.0 2/ 6/81	0.3 0.3	NA	ND
AR:LITTLE ROCK	41.6	1.0 0.4 2/ 6/81	0.0 2/ 6/81	0.2 0.1	NA	ND
CA:BERKELEY	41.4	0.7 0.6 2/ 6/81	0.0 2/ 6/81	0.0 0.1	NA	ND
CA:LOS ANGELES	258.8	4.0 0.8 2/10/81	4.0 1.1 2/10/81	0.0 0.2	0.1 0.02	ND
CO:DENVER	108.2	3.0 0.6 2/10/81	4.0 1.0 2/10/81	0.0 0.1	0.2 0.02	ND
CO:PLATTEVILLE	703.0	9.0 1.1 2/10/81	4.0 1.4 2/10/81	0.4 0.5	0.3 0.02	ND
CT:HARTFORD	41.0	0.7 0.6 2/10/81	0.0 2/10/81	0.1 0.1	NA	ND
DC:WASHINGTON	106.2	2.0 0.7 2/10/81	0.1 0.3 2/10/81	0.1 0.1	NA	ND
DE:WILMINGTON	127.8	2.0 0.7 2/10/81	0.0 2/10/81	0.2 0.4	NA	ND

TABLE 23 (CONTINUED)

DRINKING WATER
ALPHA, BETA AND GAMMA CONCENTRATION

JANUARY - DECEMBER 1980

ANNUAL ANALYSES

LOCATION	TOTAL SOLIDS mg/l	GROSS BETA DATE CTD. pCi/l ± e	GROSS ALPHA DATE CTD. pCi/l ± e	^{90}Sr pCi/l ± e	^{226}Ra pCi/l ± e	SPECIFIC GAMMA ACTIVITY
FL:MIAMI	179.4	2.0 0.6 2/10/81	0.3 0.6 2/10/81	-0.4 0.6	NA	ND
FL:TAMPA	194.4	3.0 0.7 2/10/81	0.1 0.5 2/10/81	0.3 0.5	NA	ND
GA:BAXLEY	139.0	2.0 0.7 2/17/81	0.8 0.6 2/17/81	0.0 0.2	NA	ND
GA:SAVANNAH	73.6	2.0 0.6 2/17/81	0.1 0.3 2/17/81	0.2 0.2	NA	ND
HI:HONOLULU	180.6	2.0 0.7 2/17/81	0.1 0.5 2/17/81	-0.1 0.0	NA	ND
IA:CEDAR RAPIDS	144.6	2.0 0.6 4/ 3/81	0.1 0.4 4/ 3/81	0.2 0.8	NA	ND
ID:BOISE	76.6	0.6 0.5 2/17/81	0.4 0.3 2/17/81	0.2 0.4	NA	ND
ID:IDAHO FALLS	199.2	2.7 0.8 3/ 4/81	1.8 0.8 3/ 4/81	-0.1 0.5	NA	ND
IL:CHICAGO	205.8	14.0 1.1 3/ 4/81	11.0 1.8 3/ 4/81	-0.2 0.7	7.7 0.07	ND
IL:MORRIS	269.0	13.0 1.2 3/20/81	5.0 1.2 3/20/81	0.0 0.1	6.1 0.06	ND
KS:TOPEKA	404.0	7.0 1.0 3/20/81	0.0 3/20/81	0.2 0.3	NA	ND
LA:NEW ORLEANS	159.0	2.0 0.5 3/20/81	0.4 0.6 3/20/81	0.3 0.7	NA	ND
MA:LAWRENCE	75.4	1.0 0.5 3/20/81	0.0 3/20/81	0.4 0.5	NA	ND
MA:ROWE	39.6	0.1 0.6 3/20/81	0.0 3/20/81	-0.1 0.2	NA	ND

TABLE 23 (CONTINUED)

DRINKING WATER
ALPHA, BETA AND GAMMA CONCENTRATION

JANUARY - DECEMBER 1980

ANNUAL ANALYSES

LOCATION	TOTAL SOLIDS mg/l	GROSS BETA DATE CTD. pCi/l ± e	GROSS ALPHA DATE CTD. pCi/l ± e	^{90}Sr pCi/l ± e	^{226}Ra pCi/l ± e	SPECIFIC GAMMA ACTIVITY
MD:BALTIMORE	62.8	2.0 0.7 3/20/81	0.0 3/20/81	0.1 0.2	NA	ND
MD:CONOWINGO	170.0	3.0 0.9 3/20/81	0.0 3/20/81	0.3 0.3	NA	ND
ME:AUGUSTA	69.6	2.0 0.5 3/20/81	0.7 0.4 3/20/81	0.5 1.0	NA	ND
MI:DETROIT	87.4	2.0 0.7 3/20/81	0.2 0.3 3/20/81	0.5 0.3	NA	ND
MI:GRAND RAPIDS	115.4	2.0 0.6 3/20/81	0.0 3/20/81	0.7 0.4	NA	ND
MN:MINNEAPOLIS	115.2	2.0 0.5 3/20/81	0.9 0.5 3/20/81	0.4 0.4	NA	ND
MN:RED WING	197.6	6.0 0.8 3/24/81	5.0 1.3 3/24/81	0.1 0.4	3.0 0.09	ND
MO:JEFFERSON CITY	240.0	2.0 0.5 3/24/81	2.0 1.1 3/24/81	0.0 0.2	1.0 0.03	ND
MS:JACKSON	195.6	2.0 0.5 3/24/81	0.9 0.7 3/24/81	0.4 0.4	NA	ND
MS:PORT GIBSON	275.0	2.0 0.6 3/24/81	1.0 0.6 3/24/81	0.1 0.2	NA	ND
MT:HELENA	117.8	4.0 0.8 3/24/81	1.0 0.6 3/24/81	0.2 0.7	NA	ND
NC:CHARLOTTE	46.6	1.0 0.4 3/24/81	0.0 3/24/81	0.3 0.4	NA	ND
NC:WILMINGTON	84.4	2.0 0.9 3/24/81	0.0 3/24/81	0.5 0.4	NA	ND
ND:BISMARCK	403.2	5.0 1.0 4/ 3/81	0.3 0.6 4/ 3/81	0.3 0.3	NA	ND

TABLE 23 (CONTINUED)

DRINKING WATER
ALPHA, BETA AND GAMMA CONCENTRATION

JANUARY - DECEMBER 1980

ANNUAL ANALYSES

LOCATION	TOTAL SOLIDS mg/l	GROSS BETA DATE CTD. pCi/l ± e	GROSS ALPHA DATE CTD. pCi/l ± e	^{90}Sr pCi/l ± e	^{226}Ra pCi/l ± e	SPECIFIC GAMMA ACTIVITY
NE:LINCOLN	314.0	9.0 1.0 4/ 3/81	4.0 1.3 4/ 3/81	0.4 0.5	0.3 0.02	ND
NH:CONCORD	60.4	0.2 0.3 3/24/81	0.4 0.3 3/24/81	0.2 0.4	NA	ND
NJ:TRENTON	103.2	1.0 0.5 4/ 3/81	0.1 0.3 4/ 3/81	0.3 0.3	NA	ND
NJ:WARETOWN	*					
NM:SANTA FE	110.8	6.0 0.8 4/ 3/81	5.0 1.0 4/ 3/81	0.0 0.1	0.1 0.02	ND
NV:LAS VEGAS	604.8	8.0 1.2 4/ 3/81	2.0 1.4 4/ 3/81	0.7 0.5	0.2 0.02	ND
NY:ALBANY	59.2	1.0 0.5 4/ 3/81	0.1 0.2 4/ 3/81	0.3 0.6	NA	ND
NY:NEW YORK CITY	46.0	1.0 0.6 4/ 3/81	0.1 0.2 4/ 3/81	0.2 0.3	NA	ND
NY:NIAGARA FALLS	142.2	2.0 0.6 4/ 3/81	0.3 0.5 4/ 3/81	0.8 0.4	NA	ND
NY:SYRACUSE	113.6	2.0 0.7 4/ 6/81	1.0 0.6 4/ 3/81	0.9 0.6	NA	ND
OH:CINCINNATI	176.8	2.0 0.7 4/ 6/81	0.6 0.6 4/ 6/81	0.4 0.4	NA	ND
OH:COLUMBUS	206.2	5.0 1.0 4/ 6/81	0.5 0.6 4/ 6/81	0.4 0.4	NA	ND
OH:EAST LIVERPOOL	220.6	3.0 0.8 4/ 6/81	0.0 4/ 6/81	0.4 0.3	NA	ND
OH:PAINESVILLE	147.0	2.0 0.6 4/ 6/81	0.0 4/ 6/81	0.6 0.3	NA	NA

TABLE 23 (CONTINUED)

DRINKING WATER
ALPHA, BETA AND GAMMA CONCENTRATION

JANUARY - DECEMBER 1980

ANNUAL ANALYSES

LOCATION	TOTAL SOLIDS mg/l	GROSS BETA DATE CTD. pCi/l ± e	GROSS ALPHA DATE CTD. pCi/l ± e	^{90}Sr pCi/l ± e	^{226}Ra pCi/l ± e	SPECIFIC GAMMA ACTIVITY
OH:TOLEDO	111.4	2.0 0.7 4/ 7/81	0.1 0.4 4/ 7/81	0.3 0.5	NA	ND
OK:OKLAHOMA CITY	186.0	4.0 0.8 4/ 7/81	0.0 4/ 7/81	0.2 0.1	NA	ND
OR:PORTLAND	20.0	2.0 0.7 4/ 7/81	0.0 4/ 7/81	0.3 0.3	NA	ND
PA:COLUMBIA	173.2	2.0 0.7 4/ 7/81	0.0 4/ 7/81	0.3 0.3	NA	ND
PA:HARRISBURG	28.6	0.5 0.5 4/ 7/81	0.0 4/ 7/81	0.2 0.3	NA	ND
PA:PITTSBURGH	160.8	2.0 0.7 4/ 7/81	0.1 0.5 4/ 7/81	0.3 0.3	NA	ND
PC:ANCON	64.6	0.5 0.6 4/ 7/81	0.1 0.2 4/ 7/81	0.0 0.1	NA	ND
RI:PROVIDENCE	59.0	2.0 0.7 4/ 7/81	0.3 0.3 4/ 7/81	0.4 0.4	NA	ND
SC:BARNWELL	33.8	0.4 0.5 4/ 8/81	0.1 0.2 4/ 8/81	0.3 0.4	NA	ND
SC:COLUMBIA	59.6	2.0 0.7 4/ 9/81	0.2 0.3 4/ 9/81	0.1 0.2	NA	ND
SC:HARTSVILLE	19.8	2.0 0.6 4/ 8/81	0.2 0.2 4/ 8/81	0.0 0.1	NA	ND
SC:JENKINSVILLE	122.2	4.0 0.8 4/ 8/81	2.0 0.8 4/ 8/81	0.0 0.1	NA	ND
SC:SENECA	25.6	0.7 0.6 4/ 8/81	0.0 4/ 8/81	0.1 0.1	NA	ND
TN:CHATTANOOGA	92.2	1.0 0.4 4/ 8/81	0.2 0.3 4/ 8/81	0.2 0.3	NA	ND

TABLE 23 (CONTINUED)

DRINKING WATER
ALPHA, BETA AND GAMMA CONCENTRATION

JANUARY - DECEMBER 1980

ANNUAL ANALYSES

LOCATION	TOTAL SOLIDS mg/l	GROSS BETA DATE CTD. pCi/l ± e	GROSS ALPHA DATE CTD. pCi/l ± e	^{90}Sr pCi/l ± e	^{226}Ra pCi/l ± e	SPECIFIC GAMMA ACTIVITY
TX:AUSTIN	151.6	2.0 0.6 4/ 8/81	0.0 4/ 8/81	0.2 0.4	NA	ND
VA:DOSWELL	125.4	4.0 0.8 4/ 8/81	0.1 0.3 4/ 8/81	-0.2 0.4	NA	ND
VA:LYNCHBURG	64.2	1.0 0.5 4/ 8/81	0.1 0.2 4/ 8/81	-0.2 0.3	NA	ND
VA:VIRGINIA BEACH	124.8	3.0 0.7 4/ 8/81	0.1 0.3 4/ 8/81	0.4 0.3	NA	ND
WA:RICHLAND	79.6	2.0 0.8 4/ 8/81	0.0 4/ 8/81	0.1 0.4	NA	ND
WA:SEATTLE	25.8	0.1 0.4 4/ 8/81	0.1 0.2 4/ 8/81	0.0 0.1	NA	ND
WI:GENOA CITY	159.8	2.0 0.8 4/ 9/81	0.7 0.6 4/ 9/81	0.2 0.4	NA	ND
WI:MADISON	210.8	2.0 0.7 4/ 9/81	2.0 1.0 4/ 9/81	0.2 0.3	NA	ND

ND NO ACTIVITY DETECTABLE
NA NO ANALYSIS
e 2 SIGMA COUNTING ERROR
* SAMPLE WAS FOUND TO BE CONTAMINTATED WITH BRACKISH SURFACE WATER. SAMPLE DATA ON FILE AT EPA-EERF.

TABLE 24

PLUTONIUM AND URANIUM ANALYSES
OF
SELECTED DRINKING WATER COMPOSITE SAMPLES

1980 COMPOSITE

LOCATION	^{238}Pu pCi/l ± e		^{239}Pu pCi/l ± e		^{234}U pCi/l ± e		^{235}U pCi/l ± e		^{238}U pCi/l ± e	
AL:MONTGOMERY	0.008	0.006	0.009	0.006	0.068	0.015	0.012	0.006	0.015	0.007
CA:BERKELEY	0.007	0.004	0.002	0.002	0.035	0.010	0.001	0.001	0.017	0.007
CA:LOS ANGELES	0.006	0.003	0.001	0.001	2.174	0.211	0.114	0.020	1.785	0.176
CO:DENVER	0.008	0.007	0.000	0.000	1.616	0.166	0.111	0.025	1.316	0.139
FL:MIAMI	0.000	0.000	0.000	0.000	0.158	0.040	0.012	0.011	0.089	0.027
ID:IDAHO FALLS	0.011	0.007	0.003	0.004	1.054	0.111	0.063	0.016	0.513	0.063
IL:CHICAGO	0.003	0.003	0.001	0.001	1.760	0.176	0.211	0.030	0.073	0.015
ND:BISMARCK	0.015	0.010	0.002	0.003	0.118	0.025	0.009	0.007	0.082	0.021
NJ:TRENTON	0.000	0.013	-0.002	0.005	0.063	0.017	0.007	0.005	0.025	0.010
NM:SANTA FE	0.016	0.010	0.003	0.004	4.095	0.377	0.230	0.039	3.572	0.332
NV:LAS VEGAS	0.009	0.007	0.000	0.000	2.703	0.256	0.263	0.040	1.747	0.173
NY:NEW YORK CITY	0.013	0.009	0.012	0.008	0.054	0.020	0.003	0.005	0.008	0.008
NY:NIAGARA FALLS	0.011	0.008	0.000	0.000	0.138	0.029	0.018	0.010	0.082	0.022
OH:CINCINNATI	0.012	0.007	0.004	0.004	0.160	0.031	0.011	0.007	0.098	0.023
OH:COLUMBUS	0.005	0.005	0.004	0.005	0.096	0.025	0.017	0.010	0.052	0.018
OK:OKLAHOMA CITY	0.023	0.011	0.000	0.000	0.113	0.028	0.009	0.008	0.076	0.023
OR:PORTLAND	0.015	0.010	0.007	0.007	0.042	0.016	0.005	0.005	0.035	0.014
PA:HARRISBURG	0.010	0.009	0.003	0.005	0.037	0.013	0.001	0.002	0.015	0.008
PA:PITTSBURGH	0.011	0.007	0.002	0.003	0.063	0.018	0.007	0.006	0.040	0.014
SC:BARNWELL	0.011	0.016	0.001	0.005	0.073	0.022	0.014	0.010	0.026	0.013
SC:COLUMBIA	0.013	0.016	0.004	0.005	0.032	0.015	0.001	0.003	0.022	0.012
VA:LYNCHBURG	0.006	0.010	0.003	0.004	0.041	0.016	0.005	0.005	0.020	0.011

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

e 2 SIGMA COUNTING ERROR

TABLE 25

IODINE-131 IN DRINKING WATER
JANUARY - JUNE 1981

LOCATION	DATE COLLECTED	pCi/l ±	e
AL:MUSCLE SHOALS	1/29/81	0.0	0.0
CA:LOS ANGELES	4/ 1/81	-0.4	0.1
CT:HARTFORD	1/ 2/81	0.1	0.1
DE:WILMINGTON	4/ 1/81	-0.2	0.1
FL:MIAMI	6/30/81	-0.1	0.1
FL:TAMPA	1/ 6/81	0.1	0.1
GA:SAVANNAH	4/20/81	0.0	0.1
IA:CEDAR RAPIDS	1/ 2/81	0.1	0.1
ID:BOISE	4/ 7/81	0.0	0.1
ID:IDAHO FALLS	1/ 5/81	-0.1	0.1
IL:W. CHICAGO	6/29/81	0.0	0.1
KS:TOPEKA	3/30/81	-0.1	0.1
MA:LAWRENCE	4/13/81	0.0	0.2
MD:BALTIMORE	1/ 6/81	0.0	0.1
MD:CONOWINGO	1/13/81	0.1	0.1
ME:AUGUSTA	4/ 2/81	-0.1	0.1
MI:GRAND RAPIDS	1/13/81	-0.3	0.1
MN:MINNEAPOLIS	3/30/81	0.0	0.1
MN:RED WING	4/16/81	0.1	0.1
MO:JEFFERSON CITY	4/24/81	0.0	0.1
MS:JACKSON	1/ 5/81	0.1	0.1
MT:HELENA	1/ 8/81	-0.2	0.1
NC:CHARLOTTE	4/ 1/81	-0.1	0.1
NC:WILMINGTON	1/ 8/81	0.1	0.1
ND:BISMARCK	1/ 2/81	0.2	0.1
NH:CONCORD	1/ 2/81	0.1	0.1
NJ:TRENTON	4/13/81	0.1	0.1
NJ:WARETOWN	1/13/81	-0.2	0.1
NM:SANTA FE	1/ 2/81	-0.2	0.1
NV:LAS VEGAS	1/12/81	0.2	0.1
NY:ALBANY	3/30/81	0.0	0.1
NY:NIAGARA FALLS	1/ 2/81	0.2	0.1
OH:EAST LIVERPOOL	4/27/81	0.1	0.1
OH:PAINESVILLE	1/ 6/81	0.0	0.0
OH:TOLEDO	3/30/81	0.1	0.1
OK:OKLAHOMA CITY	1/ 5/81	0.2	0.1
OR:PORTLAND	4/ 3/81	-0.1	0.1
PA:COLUMBIA	4/ 2/81	0.1	0.1
PA:PITTSBURGH	4/27/81	0.0	0.1
PC:ANCON	2/ 2/81	0.1	0.1
RI:PROVIDENCE	1/ 2/81	-0.2	0.1
SC:BARNWELL	4/ 9/81	0.0	0.1
SC:COLUMBIA	4/ 6/81	0.0	0.2
SC:HARTSVILLE	1/ 5/81	0.0	0.1
SC:JENKINSVILLE	4/24/81	-0.1	0.1
SC:SENECA	1/ 7/81	-0.2	0.1

TABLE 25 (CONTINUED)

IODINE-131 IN DRINKING WATER
JANUARY - JUNE 1981

LOCATION	DATE COLLECTED	pCi/l	±	e
TX:AUSTIN	3/30/81	0.1		0.1
VA:DOSWELL	4/27/81	-0.3		0.1
VA:VIRGINIA BEACH	4/21/81	-0.2		0.1
WA:RICHLAND	4/ 1/81	-0.1		0.1
WA:SEATTLE	4/ 1/81	0.0		0.0
WI:GENOA CITY	4/ 9/81	0.0		0.1
WI:MADISON	4/10/81	-0.1		0.1

e 2 SIGMA COUNTING ERROR

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

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/l.

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. As data from each state are compiled they will be published in ERD.

Summaries of the data from Delaware, Florida, Nevada, North Dakota, Oklahoma and South Dakota are shown in Tables 26 - 31.

TABLE 26

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION ± 2 SIGMA ERROR (pCi/l)	
DE:BETHANY BEACH	6/12/81	3500	8.5	100.9
DE:BETHANY BEACH	6/ 1/81	1500	80.7	76.7
DE:BETHANY BEACH	6/12/81	6000	5.0	102.1
DE:BRIDGEVILLE	6/10/81	1400	54.6	102.3
DE:CAMDEN WYOMING	5/19/81	2500	318.9	63.8
DE:CLAYTON	5/19/81	1200	344.7	65.5
DE:DAGSBORO	5/28/81	1600	74.4	91.7
DE:DELAWARE CITY	5/20/81	2300	55.0	62.2
DE:DELMAR	6/10/81	2300	52.5	103.2
DE:DOVER	5/19/81	25000	224.8	62.9
DE:DOVER AFB	5/19/81	8000	125.9	61.0
DE:FREDERICA	6/15/81	1000	100.5	63.1
DE:GEORGETOWN	5/22/81	3255	159.9	92.3
DE:GEORGETOWN	6/11/81	1900	-112.2	85.4
DE:GEORGETOWN	6/11/81	1000	104.3	89.3
DE:HARRINGTON	5/19/81	2500	144.2	61.3
DE:LAUREL	5/22/81	3210	60.4	90.1
DE:LEWES	5/22/81	5000	-36.4	88.9
DE:LEWES	6/12/81	1500	156.2	105.3
DE:LEWES	5/22/81	1500	-18.1	62.6
DE:MIDDLETOWN	6/15/81	2750	32.9	60.3
DE:MILFORD	5/19/81	5300	20.0	58.4
DE:MILLSBORO	5/22/81	1200	150.4	92.5
DE:MILLSBORO	5/22/81	1313	100.0	90.6
DE:MILLSBORO	5/22/81	2500	90.4	91.1
DE:MILTON	5/22/81	1490	14.0	90.4
DE:NEW CASTLE	5/20/81	5500	114.8	63.6
DE:NEWARK	5/20/81	130000	156.4	64.6
DE:NEWARK	6/18/81	30000	-13.6	95.1
DE:OCEANVIEW	6/12/81	1950	25.4	104.6
DE:REHOBOTH	5/22/81	12000	262.5	95.2
DE:REHOBOTH	5/28/81	250	172.4	93.2
DE:SEAFORD	6/10/81	6000	102.4	103.8
DE:SELBYVILLE	6/11/81	1424	96.3	89.2
DE:SMYRNA	5/19/81	5000	13.5	58.2
DE:WILMINGTON	6/15/81	1240	120.7	62.1

TABLE 27

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION ± 2 SIGMA ERROR (pCi/l)	
FL:ALTAMONTE SPRIN	2/ 3/81	13556	53.2	47.1
FL:APOPKA	1/22/81	13000	86.5	56.1
FL:ARCADIA	5/19/81	10013	893.0	196.0
FL:ATLANTIC BEACH	2/25/81	8900	221.8	106.5
FL:AVON PARK	5/21/81	8500	482.4	138.4
FL:AZELEA PARK	1/20/81	10000	35.9	46.3
FL:BARTOW	3/25/81	16100	46.0	72.5
FL:BOCA RATON	4/29/81	49500	-30.2	118.6
FL:BOYNTON BEACH	4/29/81	45000	15.7	118.9
FL:CAPE CORAL	5/20/81	39000	-15.7	130.8
FL:CASSELBERRY	2/ 3/81	13556	28.2	46.4
FL:CLAIR MEL CITY	5/18/81	8569	-15.8	157.3
FL:CLEARWATER	3/24/81	350000	131.2	82.0
FL:COCOA	5/11/81	100000	-46.8	72.7
FL:CONWAY MANOR	1/20/81	20000	66.0	46.6
FL:COOPER CITY	4/14/81	7600	-22.4	132.3
FL:CORAL SPRINGS	4/ 7/81	27000	143.8	51.7
FL:CORAL SPRINGS	4/ 7/81	8200	25.5	42.4
FL:CRESTVIEW	12/11/80	8900	121.6	77.9
FL:DADE CITY	3/31/81	9500	394.5	82.9
FL:DANIA	4/ 8/81	12500	9.7	110.8
FL:DAVIE	4/14/81	12500	-34.5	130.5
FL:DAYTONA BEACH	3/19/81	69000	35.6	58.4
FL:DE FUNIAK SPRIN	12/15/80	6000	322.1	80.0
FL:DEERFIELD BEACH	4/ 9/81	40000	150.4	100.3
FL:DELAND	3/18/81	25200	228.0	67.1
FL:DELRAY BEACH	4/29/81	36000	81.0	120.8
FL:DUNEDIN	3/24/81	35000	32.8	80.8
FL:EASTPOINT	12/15/80	7000	43.7	38.2
FL:ENGLEWOOD	5/20/81	20000	149.2	164.6
FL:EUSTIS	3/23/81	10000	21.8	113.3
FL:FERNANDINA BEAC	2/27/81	10000	146.6	84.6
FL:FLORIDA CITY	4/16/81	6700	122.7	113.4
FL:FLORIDA CITY	5/21/81	60000	188.9	135.9
FL:FORT PIERCE	5/13/81	38000	269.1	114.9
FL:FT. LAUDERDALE	4/ 9/81	250000	247.4	102.6
FL:FT. LAUDERDALE	4/13/81	43000	274.9	94.6
FL:FT. LAUDERDALE	4/14/81	13700	36.0	75.6
FL:FT. LAUDERDALE	4/ 7/81	6200	30.3	59.1
FL:FT. LAUDERDALE	4/ 9/81	11100	168.6	100.3
FL:FT. LAUDERDALE	4/16/81	6000	76.5	99.8
FL:FT. MYERS	5/20/81	17780	-20.5	131.2
FL:FT. WALTON	12/10/80	20000	93.8	40.5
FL:FT. WALTON	12/10/80	27804	51.9	41.0
FL:GAINESVILLE	1/14/81	100000	290.5	99.1
FL:HALLENDALE	4/ 8/81	37400	37.2	111.7
FL:HOLLY HILL	3/19/81	10000	-30.6	57.1
FL:HOLLYWOOD	4/ 7/81	120000	-54.6	259.6
FL:HOLLYWOOD	4/ 8/81	17000	31.2	161.3

TABLE 27 (CONTINUED)

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION ± 2 SIGMA ERROR (pCi/l)	
FL:HOMESTEAD	4/16/81	13700	129.6	98.4
FL:HOMESTEAD	4/16/81	18000	34.0	95.6
FL:INDIAN HILLS	2/ 3/81	6622	43.6	47.1
FL:JACKSONVILLE	3/17/81	2000	39.7	46.6
FL:JACKSONVILLE	2/24/81	32220	40.2	49.8
FL:JACKSONVILLE	2/24/81	37640	29.6	48.9
FL:JACKSONVILLE	2/25/81	1000	227.2	111.9
FL:JACKSONVILLE	2/24/81	90950	43.4	48.1
FL:JACKSONVILLE	2/24/81	8840	161.3	119.1
FL:JACKSONVILLE	2/24/81	3540	18.2	84.2
FL:JACKSONVILLE	2/24/81	63910	37.4	49.7
FL:JACKSONVILLE	2/24/81	10640	45.2	83.2
FL:JACKSONVILLE	2/25/81	67980	244.2	110.3
FL:JACKSONVILLE	2/25/81	50650	214.9	111.0
FL:JACKSONVILLE	2/24/81	20560	30.0	83.0
FL:JACKSONVILLE	2/25/81	16100	282.1	111.0
FL:JACKSONVILLE	2/24/81	6620	13.6	34.5
FL:JACKSONVILLE	2/24/81	23660	2.9	81.5
FL:JACKSONVILLE	2/ 2/81	26000	91.5	60.7
FL:JACKSONVILLE	2/25/81	26290	205.1	108.5
FL:JACKSONVILLE	2/25/81	9940	249.8	109.9
FL:JACKSONVILLE	2/25/81	21840	-38.9	70.5
FL:JACKSONVILLE	2/25/81	51400	219.8	113.1
FL:JACKSONVILLE	2/25/81	23170	151.7	106.3
FL:KISSIMMEE	5/11/81	10000	-30.7	75.0
FL:KISSIMMEE	5/11/81	5000	-38.8	74.3
FL:LAKE CITY	1/14/81	15000	97.4	99.7
FL:LAKELAND	3/25/81	91000	207.4	72.4
FL:LAUDERHILL	4/13/81	39000	-7.6	88.5
FL:LECANTO	3/23/81	7000	47.3	94.1
FL:LEESBURG	3/23/81	16000	381.9	99.1
FL:LEHIGH ACRES	5/20/81	14545	-9.5	153.5
FL:LIVE OAK	1/13/81	8000	224.0	114.2
FL:MAITLAND	1/20/81	8700	246.5	48.8
FL:MARGATE	4/ 9/81	57000	15.6	96.7
FL:MARIANNA	12/15/80	8000	61.0	65.3
FL:MIAMI	5/21/81	45000	180.8	135.5
FL:MIAMI	5/21/81	800000	235.2	136.3
FL:MIAMI	3/19/81	20000	164.9	60.5
FL:MIAMI	4/15/81	7200	240.9	116.7
FL:MIAMI	4/30/81	6000	230.1	129.0
FL:MIAMI	4/16/81	40000	131.2	98.5
FL:MIAMI	4/15/81	1500000	199.8	115.9
FL:MILTON	12/11/80	12785	117.6	77.0
FL:MIRAMAR	4/ 8/81	12000	70.6	110.9
FL:MIRAMAR	4/ 8/81	29900	82.2	112.0
FL:NAPLES	5/21/81	51621	535.0	144.5
FL:NEW PORT RICHEY	3/26/81	11816	1839.0	73.6
FL:NEW PORT RICHEY	3/26/81	18000	-2.6	62.2

TABLE 27 (CONTINUED)

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATIC	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION ± 2 SIGMA	ERROR (pCi/l)
FL:NEW SMYRNA BEAC	3/19/81	20000	-22.6	57.7
FL:NICEVILLE	12/10/80	8754	159.5	41.5
FL:NO. LAUDERDALE	4/ 9/81	14200	9.6	96.1
FL:NORTH MIAMI	4/30/81	130000	39.3	125.0
FL:NORTH MIAMI	4/30/81	6400	54.8	125.7
FL:NORTH MIAMI	4/30/81	18000	241.5	131.6
FL:OCALA	1/16/81	35000	132.4	71.8
FL:OCOEE	1/22/81	8000	152.9	56.4
FL:ORANGE PARK	3/17/81	5000	34.1	46.7
FL:ORANGE PARK	3/17/81	8000	24.0	45.5
FL:ORANGE PARK	3/17/81	5000	51.4	46.1
FL:ORLANDO	1/22/81	8000	106.8	55.5
FL:ORLANDO	1/22/81	256490	44.1	56.7
FL:ORLANDO	1/22/81	4000	123.4	56.8
FL:ORMOND BEACH	3/19/81	45400	3.6	56.9
FL:PACE	12/ 9/80	9951	70.8	46.0
FL:PALM BEACH GARD	4/28/81	10000	-123.5	132.3
FL:PALM BEACH GARD	4/28/81	55000	-110.8	132.9
FL:PALM BEACH GARD	4/28/81	14000	-84.0	132.7
FL:PALM SPRINGS	4/29/81	17100	302.7	154.6
FL:PANACEA	12/17/80	2000	1307.5	110.8
FL:PEMBROKE PINES	4/14/81	46000	51.2	76.4
FL:PENSACOLA	12/ 7/80	4988	90.4	66.1
FL:PENSACOLA	12/ 9/80	22639	104.9	46.0
FL:PENSACOLA	12/ 9/80	170000	53.7	45.6
FL:PERRINE	4/16/81	8610	206.4	100.2
FL:PERRY	1/12/81	7500	134.2	132.9
FL:PLANT CITY	3/27/81	23177	354.9	63.9
FL:PLANTATION	4/13/81	12000	41.5	89.6
FL:PLANTATION	4/13/81	37000	147.8	91.1
FL:POMPANO BEACH	4/ 9/81	67000	225.0	100.0
FL:POMPANO BEACH	4/ 9/81	48000	110.7	99.3
FL:PORT MALIBAR	5/11/81	16000	118.8	76.6
FL:PORT ORANGE	3/19/81	35000	-9.5	40.8
FL:PORT RICHEY	3/26/81	12000	816.9	69.5
FL:RIVIERA BEACH	4/28/81	30000	81.4	137.8
FL:SANFORD	2/ 3/81	24500	54.9	47.2
FL:SANIBEL ISLAND	5/20/81	7000	124.1	158.9
FL:SARASOTA	5/19/81	60000	-178.9	173.4
FL:SEBRING	5/21/81	16000	124.2	131.6
FL:SPRING CREEK	12/17/80	7000	319.6	100.1
FL:SPRING HILL	3/31/81	17215	51.8	81.0
FL:ST. AUGUSTINE	2/26/81	25000	322.9	99.7
FL:ST. CLOUD	5/11/81	9000	2.7	75.5
FL:ST. PETERSBURG	3/24/81	350000	9.5	81.1
FL:STUART	5/13/81	11000	152.9	93.6
FL:SUNRISE	4/14/81	6000	46.9	136.2
FL:SUNRISE	4/ 9/81	37000	121.8	98.6
FL:SUNRISE	4/14/81	11000	-77.6	133.2

TABLE 27 (CONTINUED)

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION ± 2 SIGMA	ERROR (pCi/l)
FL:TALLAHASSEE	1/13/81	91262	466.8	119.0
FL:TAMARAC	4/ 7/81	27800	242.7	51.6
FL:TAMPA	3/25/81	41000	290.1	80.3
FL:TAMPA	5/18/81	19029	-23.8	223.4
FL:TAMPA	3/27/81	6000	1138.5	68.3
FL:TEMPLE TERRACE	3/27/81	15000	266.7	57.3
FL:TEQUESTA	4/28/81	22000	-47.6	136.1
FL:TITUSVILLE	5/12/81	33000	160.4	133.7
FL:UNIVERSITY SHOR	2/ 3/81	1750	66.4	46.3
FL:VENICE	5/20/81	10800	34.6	163.3
FL:VERO BEACH	5/12/81	19773	169.1	131.9
FL:WARRINGTON	12/ 9/80	28850	104.8	46.1
FL:WEST PALM BEACH	4/29/81	14000	148.4	119.8
FL:WEST PALM BEACH	4/29/81	25000	-22.7	118.6
FL:WINTER GARDEN	1/22/81	11000	77.9	56.9
FL:WINTER HAVEN	3/25/81	45000	-40.4	71.0
FL:WINTER PARK	1/20/81	62000	73.9	47.0
FL:ZEPHYRHILLS	3/31/81	10000	513.3	84.6

TABLE 28

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION ± 2 SIGMA	ERROR (pCi/l)
NV:BATTLE MOUNTAIN	12/11/80	4000	933.2	69.7
NV:CALIENTE	2/12/81	1500	502.5	116.6
NV:CARLIN	12/11/80	2100	163.1	66.8
NV:ELKO	12/10/80	10000	533.1	77.2
NV:ELY	2/13/81	7500	1310.5	65.5
NV:FALLON	1/21/81	5000	-84.9	79.2
NV:FALLON	2/ 3/81	1600	32.8	38.1
NV:FERNLEY	2/ 3/81	1200	-9.9	37.2
NV:GARDNERVILLE	1/21/81	5000	716.4	85.6
NV:GARDNERVILLE	1/21/81	5000	724.4	86.9
NV:GERLACH	1/ 7/81	550	227.1	67.0
NV:JEAN	2/10/81	1500	118.4	39.0
NV:LAS VEGAS	2/10/81	1500	222.8	47.9
NV:LOVELOCK	12/ 8/80	2100	714.8	53.4
NV:MERCURY	2/11/81	1500	135.6	78.3
NV:MESQUITE	2/11/81	1100	237.8	81.6
NV:MOAPA	2/11/81	2600	104.5	80.2
NV:RENO	12/18/80	2100	452.5	67.9
NV:RENO	1/26/81	3500	563.5	42.1
NV:RENO	12/18/80	2100	413.5	71.8
NV:RENO	12/18/80	1500	1104.0	77.3
NV:SPRING CREEK	12/10/80	1200	204.2	79.2
NV:TONOPAH	2/ 9/81	1800	360.4	41.3
NV:WELLS	12/10/80	1250	221.1	75.2
NV:WINNEMUCCA	12/ 8/80	5000	91.3	45.9
NV:YERINGTON	2/ 3/81	3000	1348.5	47.5

TABLE 29

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION ± 2 SIGMA	ERROR (pCi/l)
ND:ASHLEY	2/24/81	1180	74.8	50.1
ND:BEACH	1/13/81	1392	330.5	80.9
ND:BELFIELD	1/ 6/81	1268	504.0	83.0
ND:BEULAH	5/18/81	3000	88.9	89.8
ND:BOTTINEAU	4/21/81	2845	89.9	128.6
ND:BOTTINEAU	4/22/81	1200	287.4	117.8
ND:BOWMAN	2/ 6/81	2070	246.9	69.3
ND:CANDO	4/22/81	1500	203.6	110.7
ND:CARRINGTON	3/18/81	2600	11.4	28.3
ND:CAVALIER	5/ 6/81	4700	301.8	81.5
ND:COOPERSTOWN	3/18/81	1500	152.3	72.4
ND:CROSBY	4/ 8/81	1500	25.7	123.8
ND:DEVIL'S LAKE	4/23/81	1650	184.6	99.5
ND:ELLENDALE	12/10/80	2007	68.9	81.3
ND:ENDERLIN	5/26/81	1200	22.4	60.1
ND:FINLEY	3/19/81	1100	-22.1	66.9
ND:FINLEY	5/ 8/81	1000	176.6	78.6
ND:FORT TOTTON	4/23/81	1151	346.3	100.0
ND:GARRISON	1/22/81	1700	-12.8	71.3
ND:GILBY	5/ 8/81	1500	125.7	80.1
ND:GILBY	5/ 8/81	2000	42.5	79.1
ND:GLEN ULLIN	1/ 7/81	1070	284.0	70.8
ND:GRAFTON	5/ 8/81	4500	240.4	81.9
ND:HANKINSON	12/10/80	1159	56.5	57.5
ND:HARVEY	4/21/81	2500	-21.0	83.1
ND:HAZEN	5/18/81	2390	20.1	88.7
ND:HEBRON	1/ 7/81	1030	140.7	67.5
ND:HETTINGER CITY	2/ 6/81	1738	286.1	68.2
ND:HILLSBORO	3/19/81	1600	58.5	67.4
ND:JAMESTOWN	3/20/81	1500	61.9	51.9
ND:JAMESTOWN	3/20/81	16500	67.8	50.7
ND:KENMARE	4/ 9/81	1000	114.5	104.4
ND:KENMARE	4/ 9/81	300	-54.8	100.0
ND:KENMARE	4/ 9/81	1496	25.4	104.1
ND:KILLDEER	6/29/81	1209	335.8	151.8
ND:KINDRED	6/ 5/81	3600	88.6	93.1
ND:KINDRED	6/ 5/81	2500	92.7	93.1
ND:KINDRED	6/ 5/81	2400	305.8	97.9
ND:LA MOURE	2/25/81	1100	368.2	84.7
ND:LAKOTA	3/18/81	1000	-19.1	77.8
ND:LARIMORE	3/19/81	1523	121.4	71.5
ND:LIDGERWOOD	12/10/80	978	194.8	78.1
ND:LINTON	2/24/81	1695	246.7	53.9
ND:LISBON	12/11/80	2286	219.2	70.1
ND:MOHALL	1/21/81	1100	-174.5	78.4
ND:MOTT	1/14/81	1400	221.3	68.6
ND:NAPOLEON	2/25/81	1088	437.0	98.2

TABLE 29 (CONTINUED)

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION ± 2 SIGMA ERROR (pCi/l)	
ND:NEW ROCKFORD	3/18/81	1800	55.1	75.5
ND:NEW SALEM	1/ 7/81	1082	109.0	68.2
ND:NEW TOWN	4/ 7/81	1400	-8.8	142.9
ND:OAKES	12/10/80	2200	162.5	84.5
ND:PARSHALL	4/ 7/81	1246	-17.4	141.9
ND:PETERSBURG	3/18/81	3500	-53.7	76.3
ND:PORTLAND	3/19/81	5000	62.3	68.5
ND:ROLLA	4/22/81	1400	449.6	118.8
ND:RUGBY	4/21/81	3250	-17.1	83.0
ND:STANLEY	4/ 8/81	1631	300.7	129.4
ND:THOMPSON	4/22/81	9500	325.9	150.6
ND:TIOGA	4/ 8/81	1558	235.6	128.3
ND:UNDERWOOD	1/22/81	1343	168.8	72.6
ND:VALLEY CITY	3/20/81	2000	139.1	52.0
ND:VELVA	4/ 9/81	1146	104.7	102.6
ND:WAHPETON	12/11/80	9065	22.7	67.8
ND:WAHPETON	5/27/81	1800	176.3	59.9
ND:WALHALLA	5/ 7/81	1400	1283.5	115.7
ND:WATFORD CITY	6/29/81	2200	30.6	148.3
ND:WEST FARGO	5/28/81	10080	152.3	88.1

TABLE 30

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION ± 2 SIGMA ERROR (pCi/l)	
OK:ADA	6/19/81	18000	170.3	79.7
OK:ALVA	6/24/81	7900	181.6	64.5
OK:BETHANY	6/ 9/81	21100	22.9	57.4
OK:BRISTOW	6/ 4/81	4860	321.7	119.7
OK:BURNS FLAT	6/10/81	3000	86.6	60.4
OK:CARTER	6/10/81	4250	118.7	61.4
OK:DRUMWRIGHT	6/ 4/81	3675	44.3	114.4
OK:EDMOND	6/ 9/81	16633	126.8	59.3
OK:EL RENO	6/ 9/81	14510	47.0	67.9
OK:ELK CITY	6/10/81	8500	65.6	60.2
OK:ENID	6/12/81	44986	230.7	76.7
OK:FAIRVIEW	6/24/81	3100	132.6	64.0
OK:GUYMON	6/23/81	9500	247.9	63.2
OK:HEALDTON	6/19/81	3407	48.4	84.1
OK:HOLLIS	6/10/81	3175	28.6	59.6
OK:KINGFISHER	6/12/81	5001	76.6	73.7
OK:LINDSAY	6/18/81	4500	173.6	92.1
OK:MANGUM	6/10/81	4500	103.4	61.7
OK:MARLOW	6/18/81	4020	124.4	91.4
OK:MIAMI	6/ 4/81	15000	164.4	115.3
OK:MOORE	6/11/81	25000	53.8	88.9
OK:NICHOLS	6/ 9/81	5000	121.4	59.3
OK:NORMAN	6/11/81	22000	97.7	89.3
OK:PURCELL	6/18/81	4076	81.5	90.7
OK:SAYRE	6/10/81	3000	110.0	60.7
OK:SEMINOLE	6/19/81	8000	189.1	80.3
OK:SULPHUR	6/19/81	5500	901.2	99.2
OK:TONKAWA	6/12/81	3337	118.4	76.3
OK:WATONGA	6/23/81	3680	284.5	66.5
OK:WEATHERFORD	6/10/81	8900	419.7	66.9
OK:WOODWARD	6/23/81	10500	262.8	64.0
OK:YUKON	6/ 9/81	9166	138.4	70.3

TABLE 31

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION ± 2 SIGMA	ERROR (pCi/l)
SD:AVON	3/ 2/81	578	265.6	59.7
SD:BALTIC	2/17/81	85	1020.8	51.1
SD:BANCROFT	12/15/80	40	60.6	41.3
SD:BELLE FOURCHE	12/10/80	4500	1633.0	81.7
SD:BELLE FOURCHE	12/10/80	50	274.6	68.8
SD:BELLE FOURCHE	12/10/80	45	861.4	68.9
SD:BERESFORD	2/18/81	1655	65.2	72.3
SD:BOX ELDER	12/11/80	3175	365.6	62.0
SD:BRANDON	2/17/81	1431	484.3	54.6
SD:BROOKINGS	12/15/80	13717	78.8	44.3
SD:BRYANT	12/15/80	2091	64.8	45.6
SD:BUFFALO GAP	12/ 9/80	188	586.7	55.6
SD:CANISTOTA	3/ 3/81	624	99.4	87.0
SD:CANOVA	12/17/80	204	1058.0	84.6
SD:CANTON	2/18/81	2665	267.9	75.0
SD:CHANCELLOR	2/18/81	260	1412.0	84.8
SD:CLARK	11/20/80	1356	56.7	57.1
SD:CLEAR LAKE	12/16/80	1157	496.9	42.2
SD:CONDE	11/19/80	259	114.2	68.5
SD:CROOKS	2/17/81	600	227.8	47.8
SD:CUSTER	12/ 9/80	1907	2653.0	79.7
SD:DALLAS	3/ 2/81	199	161.1	49.9
SD:DE SMET	12/15/80	1336	240.9	46.7
SD:DELL RAPIDS	2/17/81	1991	1565.5	62.6
SD:EDGEMONT	12/ 9/80	1471	408.6	60.1
SD:ELK POINT	2/18/81	1372	211.3	74.0
SD:ERWIN	12/15/80	1000	67.9	42.1
SD:EUREKA	11/17/80	1359	357.3	57.2
SD:FLANDREAU	12/16/80	2027	556.1	47.1
SD:FREEMAN	3/ 3/81	1461	261.6	51.0
SD:FT. PIERRE	1/15/81	1788	1113.5	66.8
SD:GREGORY	3/ 2/81	1510	119.6	49.0
SD:GROTON	11/19/80	1181	-105.8	70.9
SD:HARTFORD	2/19/81	1206	276.3	58.6
SD:HERMOSA	12/ 9/80	248	579.8	55.0
SD:HIGHMORE	12/14/80	1173	223.7	51.4
SD:HOT SPRINGS	12/ 9/80	4731	-9.0	53.1
SD:HOWARD	12/17/80	1175	493.2	69.1
SD:IGLOO	12/ 9/80	188	80.9	52.2
SD:IPSWICH	11/17/80	1152	180.4	54.1
SD:LEMMON	3/24/81	1867	459.7	46.0
SD:LENNOX	2/18/81	1487	90.7	68.4
SD:MADISON	12/17/80	6315	144.3	73.7
SD:MARTIN	12/ 8/80	1248	217.8	47.5
SD:MIDLAND	12/11/80	276	347.8	63.9
SD:MILLER	12/15/80	2148	-0.8	42.1
SD:MINNEHAHA	2/19/81	4000	53.9	65.0
SD:MITCHELL	3/ 4/81	45	183.0	77.8

TABLE 31 (CONTINUED)

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION ± 2 SIGMA	ERROR (pCi/l)
SD:NORTH SIOUX	2/18/81	860	678.8	77.9
SD:ORIENT	11/20/80	89	318.2	58.8
SD:PARKER	2/18/81	1005	382.1	76.3
SD:PARKSTON	3/ 3/81	1611	648.2	90.3
SD:PHILLIP	12/11/80	1088	556.8	58.4
SD:PIERRE	11/25/80	11966	751.0	80.6
SD:PIERRE	1/15/81	50	422.8	57.0
SD:PINE RIDGE	12/ 8/80	4000	296.9	47.3
SD:PLANKINTON	3/ 4/81	644	268.6	73.7
SD:RAPID CITY	12/10/80	350	268.0	73.0
SD:RAPID CITY	12/11/80	6000	672.0	67.2
SD:REDFIELD	11/20/80	1100	27.8	55.7
SD:REDFIELD	11/20/80	3006	179.8	59.5
SD:ROSEBUD	12/ 8/80	1500	59.6	46.3
SD:SALEM	3/ 3/81	1486	610.5	88.4
SD:SCOTLAND	3/ 3/81	1022	157.4	52.1
SD:SIOUX FALLS	2/19/81	72488	101.9	62.2
SD:SIOUX FALLS	2/19/81	120	3649.5	798.8
SD:SISSETON	11/18/80	2779	387.1	48.3
SD:SPEARFISH	12/10/80	70	84.2	69.3
SD:TYNDALL	3/ 2/81	1249	263.6	61.6
SD:VERMILLION	2/18/81	9128	42.0	68.6
SD:VIRGIL	12/17/80	43	191.1	64.5
SD:VOLGA	12/15/80	982	400.9	46.0
SD:WEBSTER	11/18/80	2414	81.8	82.1
SD:WENTWORTH	12/16/80	1000	226.8	75.8
SD:WESSINGTON SPRI	12/17/80	1300	668.3	83.4
SD:WHITE	12/16/80	4500	149.7	45.6
SD:WHITE LAKE	3/ 4/81	414	911.2	82.0
SD:WINNER	3/ 2/81	3466	115.5	51.0
SD:WITTEN	3/ 2/81	1500	142.4	49.7

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 monitoring 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 January 1981 through June 1981 are shown in Tables 32.

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE		EXPOSURE RATE	
		MR	+/- 2S	MICRO R/HR	+/- 2S
AL:MONTGOMERY	10581- 20281	5.23	11.9	7.78	11.9
AL:MONTGOMERY	20281- 30281	5.75	4.6	8.55	4.6
AL:MONTGOMERY	30381- 40281	6.22	4.6	8.65	4.6
AL:MONTGOMERY	40381- 50181	5.58	3.4	8.31	3.4
AL:MONTGOMERY	50181- 60381	7.13	5.3	9.00	5.3
CA:BERKELEY	122980- 13081	4.38	15.9	5.71	15.9
CA:BERKELEY	13081- 30381	4.56	6.7	5.94	6.7
CA:BERKELEY	30381- 40181	3.96	20.4	5.69	20.4
CA:BERKELEY	40181- 50181	4.45	9.0	6.18	9.0
CA:BERKELEY	50181- 60981	5.64	5.4	6.02	5.4
CA:BERKELEY	60981- 70281	3.51	8.7	6.36	8.7
CO:DENVER	123180- 12981	9.44	8.2	13.57	8.2
CO:DENVER	12981- 30681	13.03	6.7	15.08	6.7
CO:DENVER	30681- 40281	9.25	8.3	14.27	8.3
CO:DENVER	40281- 50581	12.08	3.4	15.25	3.4
CO:DENVER	50581- 62481	16.74	4.3	13.95	4.3
CO:DENVER	62481- 70781	5.00	3.5	16.02	3.5
FL:ORLANDO	10581- 20481	3.77	29.0	5.23	29.0
FL:ORLANDO	20481- 30281	3.47	5.8	5.57	5.8
FL:ORLANDO	30281- 33181	3.75	18.0	5.39	18.0
FL:ORLANDO	33181- 50181	4.15	6.3	5.57	6.3
FL:ORLANDO	50181- 60181	4.47	18.0	6.01	18.0
FL:ORLANDO	60181- 70181	4.38	10.1	6.08	10.1
ID:BOISE	10781- 20281	8.60	7.2	13.78	7.2
ID:BOISE	20281- 30281	8.73	4.0	12.99	4.0
ID:BOISE	30281- 40181	9.76	8.2	13.56	8.2
ID:BOISE	40181- 50181	9.26	7.3	12.86	7.3
ID:BOISE	50181- 60981	12.99	10.0	13.87	10.0
IL:CHICAGO	10681- 20381	4.99	5.5	7.43	5.5
IL:CHICAGO	20381- 30681	5.35	4.7	7.18	4.7
IL:CHICAGO	30681- 40381	4.84	6.8	7.20	6.8
IL:CHICAGO	40381- 50781	5.88	5.6	7.20	5.6
IL:CHICAGO	50781- 60581	5.18	15.6	7.44	15.6
IL:CHICAGO	60581- 70781	5.76	7.8	7.50	7.8
ND:BISMARCK	123180- 20381	11.61	4.4	14.22	4.4
ND:BISMARCK	20381- 30281	5.47	4.0	8.44	4.0
ND:BISMARCK	30281- 40181	6.38	4.5	8.86	4.5
ND:BISMARCK	42881- 60981	4.70	11.1	4.66	11.1
NJ:TRENTON	123180- 20281	7.59	4.8	9.59	4.8
NJ:TRENTON	20281- 30381	6.81	4.2	9.79	4.2
NJ:TRENTON	30381- 40181	8.01	8.8	11.51	8.8
NJ:TRENTON	40181- 50181	8.01	4.9	11.12	4.9
NJ:TRENTON	50181- 61081	9.39	11.0	9.78	11.0
NJ:TRENTON	61081- 70681	6.39	4.3	10.24	4.3
NM:SANTA FE	11481- 20581	7.52	3.5	14.25	3.5
NM:SANTA FE	20581- 31081	10.99	3.4	13.88	3.4
NM:SANTA FE	31081- 40781	9.63	6.0	14.33	6.0
NM:SANTA FE	40781- 50581	8.71	9.8	12.96	9.8
NM:SANTA FE	50581- 61781	13.56	3.3	13.14	3.3
NM:SANTA FE	61781- 70281	4.78	8.6	13.29	8.6

TABLE 32 (CONTINUED)

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE		EXPOSURE RATE	
		MR	+/- 2S	MICRO R/HR	+/- 2S
NV:LAS VEGAS	123180- 13081	5.17	5.6	7.19	5.6
NV:LAS VEGAS	13081- 30281	4.82	4.1	6.48	4.1
NV:LAS VEGAS	30281- 40181	4.77	8.5	6.62	8.5
NV:LAS VEGAS	40181- 50181	4.89	13.3	6.79	13.3
NV:LAS VEGAS	50181- 60881	6.36	4.6	6.98	4.6
NV:LAS VEGAS	60881- 71481	6.12	3.9	7.08	3.9
NY:NEW YORK	10881- 20981	6.39	9.1	8.32	9.1
NY:NEW YORK	20981- 30481	4.27	6.3	7.74	6.3
NY:NEW YORK	30481- 40381	5.63	6.0	7.81	6.0
NY:NEW YORK	40381- 50681	6.36	7.1	8.03	7.1
NY:NEW YORK	50681- 61181	6.55	14.3	7.58	14.3
NY:NEW YORK	61181- 70881	4.96	4.4	7.65	4.4
OH:COLUMBUS	10281- 12881	4.37	8.6	7.00	8.6
OH:COLUMBUS	12881- 30481	6.12	5.2	7.29	5.2
OH:COLUMBUS	30481- 40281	4.91	6.2	7.05	6.2
OH:COLUMBUS	40281- 42981	4.74	6.5	7.31	6.5
OH:COLUMBUS	42981- 61181	7.44	5.2	7.21	5.2
OH:COLUMBUS	61181- 70681	4.35	15.8	7.24	15.8
OK:OKLAHOMA CITY	10781- 20481	5.47	3.9	8.14	3.9
OK:OKLAHOMA CITY	20481- 30981	6.43	6.7	8.12	6.7
OK:OKLAHOMA CITY	30981- 40781	5.61	5.1	8.06	5.1
OK:OKLAHOMA CITY	40781- 50781	5.69	6.6	7.91	6.6
OK:OKLAHOMA CITY	50781- 61081	6.63	4.4	8.13	4.4
OK:OKLAHOMA CITY	61081- 70981	5.51	7.7	7.91	7.7
OR:PORTLAND	10781- 20981	6.16	14.3	7.78	14.3
OR:PORTLAND	20981- 30581	4.33	4.9	7.51	4.9
OR:PORTLAND	30581- 40181	5.20	4.7	8.02	4.7
OR:PORTLAND	40181- 50481	6.08	4.1	7.68	4.1
OR:PORTLAND	50481- 61181	6.84	13.9	7.50	13.9
OR:PORTLAND	61181- 70281	3.82	5.1	7.57	5.1
PA:HARRISBURG	20581- 30281	4.29	5.0	7.15	5.0
PA:HARRISBURG	30281- 40281	4.58	11.7	6.15	11.7
PA:HARRISBURG	40281- 50481	4.91	14.5	6.39	14.5
PA:HARRISBURG	50481- 60581	5.39	6.6	7.02	6.6
PA:HARRISBURG	60581- 70681	4.91	4.3	6.60	4.3
PA:PITTSBURGH	30581- 50481	18.81	4.1	13.06	4.1
PA:PITTSBURGH	50481- 60481	9.31	3.9	12.51	3.9
PA:PITTSBURGH	60481- 70181	8.58	4.2	13.24	4.2
RI:PROVIDENCE	11281- 21081	7.04	12.1	10.12	12.1
RI:PROVIDENCE	21081- 31381	7.37	4.1	9.90	4.1
RI:PROVIDENCE	31381- 41581	8.38	4.2	10.58	4.2
RI:PROVIDENCE	41581- 50481	4.37	13.2	9.58	13.2
RI:PROVIDENCE	50481- 60981	8.77	6.9	10.14	6.9
RI:PROVIDENCE	60981- 70781	7.26	5.4	10.80	5.4
SC:BARNWELL	11581- 12981	2.59	5.2	7.72	5.2
SC:BARNWELL	12981- 30381	6.35	6.8	8.02	6.8
SC:BARNWELL	30381- 40381	5.58	18.8	7.50	18.8
SC:BARNWELL	40281- 50781	6.81	4.5	8.11	4.5
SC:BARNWELL	50781- 60481	5.22	6.6	7.77	6.6
SC:BARNWELL	60481- 70181	5.49	13.5	8.47	13.5

TABLE 32 (CONTINUED)

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE		EXPOSURE RATE	
		MR	+/- 2S	MICRO R/HR	+/- 2S
SC:COLUMBIA	123080- 13081	6.39	6.3	8.59	6.3
SC:COLUMBIA	13081- 30381	6.86	3.8	8.94	3.8
SC:COLUMBIA	30381- 40381	6.52	11.8	8.76	11.8
SC:COLUMBIA	40381- 42881	5.42	3.8	9.03	3.8
SC:COLUMBIA	42881- 60281	7.65	3.9	9.11	3.9
SC:COLUMBIA	60281- 63081	6.01	3.9	8.94	3.9
TN:KNOXVILLE	122380- 13081	8.54	6.1	9.37	6.1
TN:KNOXVILLE	13081- 30381	6.86	4.6	8.94	4.6
TN:KNOXVILLE	30381- 33081	6.14	5.6	9.47	5.6
TN:KNOXVILLE	33081- 42781	6.19	13.0	9.21	13.0
TN:KNOXVILLE	42781- 60181	8.12	3.3	9.96	3.3
TN:KNOXVILLE	60181- 62981	6.61	5.4	9.84	5.4
VA:RICHMOND	123180- 20381	6.03	12.5	7.39	12.5
VA:RICHMOND	20381- 30381	4.81	4.9	7.16	4.9
VA:RICHMOND	30381- 40181	5.47	5.2	7.86	5.2
VA:RICHMOND	40181- 50181	6.02	4.5	8.36	4.5
VA:RICHMOND	50181- 60881	7.02	12.4	7.70	12.4
VA:RICHMOND	60881- 70181	5.09	6.7	9.23	6.7
VT:MONTPELIER	120480- 12081	9.10	6.7	8.07	6.7
VT:MONTPELIER	12081- 21081	3.51	8.1	6.97	8.1
VT:MONTPELIER	21081- 30581	4.22	15.0	7.65	15.0
VT:MONTPELIER	30581- 41081	7.04	4.2	8.15	4.2
VT:MONTPELIER	41081- 51181	6.29	4.0	8.46	4.0
VT:MONTPELIER	51181- 61781	7.85	4.7	54.55	4.7
VT:MONTPELIER	61781- 71081	4.49	14.6	8.14	14.6

E 2 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 major population centers.

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 January - June 1981 are shown in Tables 33 - 38. Strontium values from regional composite samples collected January 1981 and April 1981 are shown in Table 39 - 40.

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 33

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JANUARY 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
AK:PALMER	1/10/81	1.35 0.22	1. 15.	-7. 19.	5. 13.
AL:MONTGOMERY	1/ 8/81	1.39 0.12	4. 7.	-4. 8.	2. 7.
AR:LITTLE ROCK	1/ 5/81	1.33 0.08	5. 5.	-4. 6.	2. 5.
AZ:PHOENIX	1/ 8/81	1.40 0.12	-3. 7.	2. 8.	-3. 7.
CA:LOS ANGELES	1/ 8/81	1.60 0.12	4. 7.	0. 8.	3. 7.
CA:SACRAMENTO	1/ 8/81	1.38 0.12	1. 7.	-5. 8.	-3. 7.
CA:SAN FRANCISCO	1/ 7/81	1.40 0.12	2. 7.	-4. 8.	-5. 7.
CT:HARTFORD	1/ 5/81	1.49 0.12	3. 7.	1. 8.	-3. 7.
DC:WASHINGTON	1/ 1/81	1.72 0.13	8. 7.	-3. 8.	-1. 7.
DE:WILMINGTON	1/12/81	1.37 0.12	-3. 7.	-2. 8.	0. 7.
FL:TAMPA	1/ 7/81	1.43 0.22	18. 15.	-5. 20.	-1. 13.
GA:ATLANTA	1/ 8/81	1.45 0.12	0. 7.	1. 8.	1. 7.
HI:HONOLULU	1/20/81	1.50 0.12	6. 7.	1. 8.	5. 7.
IA:DES MOINES	1/ 5/81	1.39 0.08	4. 5.	0. 6.	1. 5.
ID:IDAHO FALLS	1/ 7/81	1.60 0.22	19. 15.	-22. 19.	-8. 13.
IL:CHICAGO	1/ 6/81	1.49 0.12	3. 7.	-2. 8.	7. 7.
IN:INDIANAPOLIS	1/ 5/81	1.34 0.08	3. 5.	2. 6.	0. 5.
KS:WICHITA	1/ 7/81	1.48 0.12	-6. 7.	0. 8.	2. 7.
KY:LOUISVILLE	1/ 6/81	1.40 0.12	2. 7.	0. 8.	3. 7.
LA:NEW ORLEANS	1/14/81	1.32 0.12	4. 7.	-4. 8.	4. 7.
MA:BOSTON	1/ 6/81	1.42 0.08	2. 5.	-7. 6.	0. 5.
MD:BALTIMORE	1/ 2/81	1.50 0.08	4. 5.	-6. 6.	1. 5.
ME:PORTLAND	1/ 6/81	1.30 0.12	5. 7.	-4. 8.	3. 7.
MI:DETROIT	1/ 8/81	1.43 0.12	0. 7.	-4. 8.	3. 7.
MI:GRAND RAPIDS	1/ 5/81	1.49 0.12	0. 7.	-4. 8.	2. 7.
MN:MINN/ST. PAUL	1/ 8/81	1.48 0.12	3. 7.	0. 8.	-6. 7.
MO:KANSAS CITY	1/ 9/81	1.38 0.12	5. 7.	5. 8.	-1. 7.
MO:ST. LOUIS	1/ 7/81	1.40 0.12	3. 7.	-1. 8.	3. 7.
MS:JACKSON	1/ 5/81	1.39 0.08	0. 5.	-2. 6.	5. 5.
MT:HELENA	1/ 5/81	1.44 0.08	0. 5.	-3. 6.	2. 5.
NC:CHARLOTTE	1/ 5/81	1.24 0.22	10. 15.	11. 20.	4. 13.
ND:MINOT	1/26/81	1.56 0.12	0. 7.	-11. 8.	3. 7.
NE:OMAHA	1/ 9/81	1.36 0.12	3. 7.	1. 8.	-3. 7.
NH:MANCHESTER	1/ 5/81	1.47 0.12	4. 7.	-3. 8.	9. 7.
NJ:TRENTON	1/ 8/81	1.39 0.12	4. 7.	0. 8.	2. 7.

TABLE 33 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JANUARY 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
NM:ALBUQUERQUE	1/ 5/81	1.38 0.12	3. 7.	2. 8.	6. 7.
NV:LAS VEGAS	1/ 6/81	1.38 0.08	3. 5.	-5. 6.	6. 5.
NY:BUFFALO	1/ 6/81	1.43 0.12	0. 7.	-2. 8.	5. 7.
NY:NEW YORK CITY	1/ 5/81	1.38 0.08	7. 5.	-5. 6.	4. 5.
OH:CINCINNATI	1/ 6/81	1.35 0.12	9. 7.	-3. 8.	-1. 7.
OH:CLEVELAND	1/ 7/81	1.51 0.12	4. 7.	3. 8.	0. 7.
OK:OKLAHOMA CITY	1/ 5/81	1.47 0.22	7. 15.	-14. 19.	-11. 13.
OR:PORTLAND	1/ 6/81	1.40 0.12	-5. 7.	-2. 8.	1. 7.
PA:PHILADELPHIA	1/ 5/81	1.44 0.12	-1. 7.	-1. 8.	2. 7.
PA:PITTSBURGH	1/ 7/81	1.37 0.12	3. 7.	-6. 8.	2. 7.
PC:CRISTOBAL	1/15/81	1.50 0.12	6. 7.	-4. 8.	2. 7.
PR:SAN JUAN	1/16/81	1.33 0.12	0. 7.	-1. 8.	1. 7.
SC:CHARLESTON	1/14/81	1.34 0.22	14. 15.	1. 20.	9. 13.
SD:RAPID CITY	1/ 8/81	1.39 0.12	-1. 7.	4. 8.	-1. 7.
TN:CHATTANOOGA	1/ 5/81	1.48 0.12	6. 7.	-2. 8.	6. 7.
TN:KNOXVILLE	1/13/81	1.50 0.12	8. 7.	-3. 8.	1. 7.
TN:MEMPHIS	1/ 8/81	1.39 0.12	5. 7.	0. 8.	0. 7.
TX:AUSTIN	1/ 8/81	1.49 0.12	2. 7.	-2. 8.	-1. 7.
UT:SALT LAKE CITY	1/ 5/81	1.35 0.12	5. 7.	4. 8.	3. 7.
VA:NORFOLK	1/ 2/81	1.43 0.12	1. 7.	-7. 8.	0. 7.
VT:BURLINGTON	1/ 5/81	1.44 0.22	14. 15.	-1. 20.	-2. 13.
WA:SEATTLE	1/ 5/81	1.40 0.08	4. 5.	-2. 6.	-1. 5.
WA:SPOKANE	1/12/81	1.38 0.12	0. 7.	4. 8.	0. 7.
WI:MILWAUKEE	1/ 6/81	1.49 0.12	-1. 7.	-7. 8.	4. 7.
WV:CHARLESTON	1/ 5/81	1.31 0.12	9. 7.	6. 8.	-4. 7.
WY:LARAMIE	1/15/81	1.41 0.12	0. 7.	1. 8.	3. 7.

NS NO SAMPLE
e 2 SIGMA COUNTING ERROR

TABLE 34

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

FEBRUARY 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
AL:MONTGOMERY	2/ 5/81	1.43 0.12	0. 7.	1. 8.	-4. 7.
AR:LITTLE ROCK	2/ 2/81	1.31 0.12	4. 7.	3. 8.	3. 7.
AZ:PHOENIX	2/ 5/81	1.31 0.12	3. 7.	-7. 8.	-1. 7.
CA:LOS ANGELES	2/ 5/81	1.51 0.12	0. 7.	-5. 8.	4. 7.
CA:SACRAMENTO	2/ 2/81	1.33 0.08	2. 5.	-5. 6.	-2. 5.
CA:SAN FRANCISCO	2/ 4/81	1.44 0.12	-1. 7.	-2. 8.	-1. 7.
CO:DENVER	2/ 1/81	1.28 0.12	2. 7.	-3. 8.	2. 7.
CO:DENVER	2/24/81	1.39 0.12	3. 7.	-9. 8.	3. 7.
CT:HARTFORD	2/ 2/81	1.36 0.08	1. 5.	-4. 6.	-2. 5.
DE:WILMINGTON	2/ 3/81	1.31 0.12	-1. 7.	-2. 8.	-2. 7.
FL:TAMPA	2/ 5/81	1.47 0.22	3. 15.	-1. 20.	5. 13.
GA:ATLANTA	2/10/81	1.36 0.12	0. 7.	5. 8.	2. 7.
HI:HONOLULU	2/ 3/81	1.40 0.12	4. 7.	0. 8.	-3. 7.
IA:DES MOINES	2/ 2/81	1.37 0.12	0. 7.	-3. 8.	0. 7.
ID:IDAHO FALLS	2/25/81	1.46 0.22	-2. 15.	-2. 20.	-11. 13.
IL:CHICAGO	2/ 2/81	1.38 0.12	2. 7.	-8. 8.	-1. 7.
IN:INDIANAPOLIS	2/ 2/81	1.41 0.12	0. 7.	-5. 8.	-5. 7.
KS:WICHITA	2/ 6/81	1.44 0.12	1. 7.	-12. 8.	2. 7.
KY:LOUISVILLE	2/ 3/81	1.44 0.12	5. 7.	-2. 8.	-3. 7.
LA:NEW ORLEANS	2/ 9/81	1.38 0.12	4. 7.	-9. 8.	-2. 7.
MA:BOSTON	2/ 3/81	1.39 0.12	1. 7.	-8. 8.	1. 7.
MD:BALTIMORE	2/ 6/81	1.45 0.12	-4. 7.	2. 8.	-3. 7.
ME:PORTLAND	2/ 3/81	1.41 0.12	3. 7.	-1. 8.	-4. 7.
MI:DETROIT	2/ 5/81	1.43 0.12	0. 7.	-7. 8.	2. 7.
MI:GRAND RAPIDS	2/ 2/81	1.38 0.08	2. 5.	-5. 6.	-1. 5.
MN:MINN/ST. PAUL	2/ 4/81	1.38 0.12	3. 7.	-8. 8.	1. 7.
MO:KANSAS CITY	2/ 6/81	1.44 0.12	1. 7.	-2. 8.	2. 7.
MO:ST. LOUIS	2/ 4/81	1.41 0.08	2. 5.	0. 6.	-2. 5.
MS:JACKSON	2/ 5/81	1.34 0.12	3. 7.	-9. 8.	1. 7.
MT:HELENA	2/ 2/81	1.48 0.12	1. 7.	-6. 8.	-9. 7.
NC:CHARLOTTE	2/ 2/81	1.25 0.21	-6. 14.	-20. 19.	-12. 13.
ND:MINOT	2/24/81	1.37 0.12	2. 7.	0. 8.	-2. 7.
NE:OMAHA	2/ 6/81	1.32 0.12	-3. 7.	-3. 8.	6. 7.
NH:MANCHESTER	2/ 2/81	1.43 0.12	4. 7.	-7. 8.	-2. 7.
NJ:TRENTON	2/ 5/81	1.42 0.12	-3. 7.	-5. 8.	-3. 7.

TABLE 34 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

FEBRUARY 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
NV:LAS VEGAS	2/24/81	1.34 0.12	-2. 7.	-3. 8.	3. 7.
NY:BUFFALO	2/23/81	1.44 0.12	0. 7.	3. 8.	-2. 7.
NY:NEW YORK CITY	2/ 2/81	1.31 0.12	1. 7.	-7. 8.	1. 7.
NY:SYRACUSE	2/ 2/81	1.46 0.08	0. 5.	-2. 6.	-1. 5.
OH:CINCINNATI	2/ 3/81	1.35 0.12	3. 7.	-5. 8.	-3. 7.
OH:CLEVELAND	2/ 9/81	1.41 0.12	-1. 7.	-6. 8.	-2. 7.
OR:PORTLAND	2/ 2/81	1.33 0.12	2. 7.	-7. 8.	-3. 7.
PA:PHILADELPHIA	2/ 2/81	1.45 0.12	1. 7.	-3. 8.	1. 7.
PA:PITTSBURGH	2/ 4/81	1.42 0.12	0. 7.	-4. 8.	-2. 7.
PC:CRISTOBAL	2/11/81	1.55 0.12	12. 7.	-3. 8.	-2. 7.
PR:SAN JUAN	2/13/81	1.51 0.12	-1. 7.	-3. 8.	-1. 7.
SC:CHARLESTON	2/10/81	1.39 0.12	7. 7.	-2. 8.	0. 7.
SD:RAPID CITY	2/ 5/81	1.33 0.12	-2. 7.	-3. 8.	-2. 7.
TN:CHATTANOOGA	2/ 2/81	1.40 0.08	2. 5.	-4. 6.	-5. 5.
TN:KNOXVILLE	2/ 3/81	1.37 0.12	-1. 7.	-7. 8.	1. 7.
TN:MEMPHIS	2/ 5/81	1.40 0.12	1. 7.	-4. 8.	-3. 7.
TX:AUSTIN	2/ 2/81	1.41 0.08	2. 5.	-11. 6.	1. 5.
UT:SALT LAKE CITY	2/ 2/81	1.36 0.08	-2. 5.	-7. 6.	0. 5.
VA:NORFOLK	2/ 6/81	1.54 0.12	2. 7.	3. 8.	-5. 7.
VT:BURLINGTON	2/ 3/81	1.31 0.22	0. 15.	-9. 19.	-13. 13.
WA:SEATTLE	2/ 2/81	1.31 0.12	-2. 7.	-3. 8.	0. 7.
WA:SPOKANE	2/ 2/81	1.38 0.08	0. 5.	-5. 6.	-1. 5.
WI:MILWAUKEE	2/ 3/81	1.45 0.12	2. 7.	-4. 8.	-3. 7.
WV:CHARLESTON	2/ 3/81	1.34 0.08	0. 5.	-4. 6.	-6. 5.
WY:LARAMIE	2/17/81	1.48 0.12	2. 7.	-2. 8.	0. 7.

NS NO SAMPLE
e 2 SIGMA COUNTING ERROR

TABLE 35

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

MARCH 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
AK:PALMER	3/ 4/81	1.49 0.22	2. 15.	-6. 19.	0. 13.
AL:MONTGOMERY	3/ 5/81	1.37 0.12	3. 7.	-4. 8.	-2. 7.
AR:LITTLE ROCK	3/ 2/81	1.39 0.12	6. 7.	-2. 8.	-2. 7.
AZ:PHOENIX	3/ 5/81	1.41 0.12	-2. 7.	-5. 8.	1. 7.
CA:LOS ANGELES	3/ 9/81	1.42 0.12	1. 7.	-5. 8.	2. 7.
CA:SACRAMENTO	3/ 3/81	1.40 0.12	1. 7.	0. 8.	-3. 7.
CA:SAN FRANCISCO	3/ 4/81	1.33 0.08	3. 5.	-2. 6.	-2. 5.
CT:HARTFORD	3/ 3/81	1.47 0.12	5. 7.	-1. 8.	0. 7.
DC:WASHINGTON	3/ 6/81	1.43 0.12	-1. 7.	-6. 8.	4. 7.
DE:WILMINGTON	3/16/81	1.29 0.12	7. 7.	0. 8.	1. 7.
FL:TAMPA	3/ 2/81	1.33 0.22	19. 15.	-5. 19.	-9. 13.
GA:ATLANTA	3/23/81	1.31 0.12	5. 7.	-4. 8.	0. 7.
GA:ATLANTA	3/ 3/81	1.33 0.08	2. 5.	-9. 6.	1. 5.
HI:HONOLULU	3/ 5/81	1.45 0.12	7. 7.	0. 8.	1. 7.
IA:DES MOINES	3/ 3/81	1.49 0.12	-1. 7.	-1. 8.	2. 7.
ID:IDAHO FALLS	3/11/81	1.44 0.22	-2. 15.	-1. 20.	0. 13.
IL:CHICAGO	3/ 2/81	1.45 0.08	2. 5.	-2. 6.	0. 5.
IN:INDIANAPOLIS	3/ 2/81	1.37 0.12	3. 7.	-5. 8.	0. 7.
KS:WICHITA	3/ 4/81	1.28 0.12	5. 7.	4. 8.	5. 7.
KY:LOUISVILLE	3/ 3/81	1.36 0.12	1. 7.	-2. 8.	-1. 7.
LA:NEW ORLEANS	3/ 4/81	1.34 0.12	7. 7.	-5. 8.	0. 7.
MA:BOSTON	3/ 2/81	1.35 0.12	3. 7.	4. 8.	-3. 7.
MD:BALTIMORE	3/ 6/81	1.46 0.12	6. 7.	-3. 8.	-5. 7.
ME:PORTLAND	3/ 2/81	1.46 0.12	3. 7.	-1. 8.	1. 7.
MI:DETROIT	3/ 5/81	1.44 0.12	3. 7.	-8. 8.	0. 7.
MI:GRAND RAPIDS	3/ 3/81	1.43 0.12	6. 7.	-11. 8.	-1. 7.
MN:MINN/ST. PAUL	3/ 5/81	1.45 0.12	0. 7.	-1. 8.	2. 7.
MO:KANSAS CITY	3/ 6/81	1.47 0.12	-1. 7.	-1. 8.	-5. 7.
MO:ST. LOUIS	3/ 4/81	1.36 0.12	-3. 7.	1. 8.	-2. 7.
MS:JACKSON	3/ 2/81	1.41 0.12	5. 7.	2. 8.	0. 7.
MT:HELENA	3/ 2/81	1.47 0.12	1. 7.	-2. 8.	5. 7.
NC:CHARLOTTE	3/ 2/81	1.39 0.22	13. 15.	-3. 20.	-12. 13.
ND:MINOT	3/17/81	1.40 0.08	2. 5.	0. 6.	0. 5.
NE:OMAHA	3/ 6/81	1.22 0.08	2. 5.	-4. 6.	-2. 5.
NH:MANCHESTER	3/ 2/81	1.42 0.08	4. 5.	-1. 6.	-4. 5.

TABLE 35 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

MARCH 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
NJ:TRENTON	3/ 5/81	1.44 0.12	3. 7.	1. 8.	-1. 7.
NY:BUFFALO	3/ 2/81	1.39 0.08	4. 5.	0. 6.	-2. 5.
NY:NEW YORK CITY	3/ 2/81	1.41 0.12	2. 7.	0. 8.	-3. 7.
NY:SYRACUSE	3/ 2/81	1.49 0.12	9. 7.	0. 8.	1. 7.
OH:CINCINNATI	3/ 4/81	1.39 0.12	1. 7.	-8. 8.	-1. 7.
OH:CLEVELAND	3/ 9/81	1.40 0.12	3. 7.	-8. 8.	-1. 7.
OK:OKLAHOMA CITY	3/ 2/81	1.40 0.08	2. 5.	-4. 6.	-3. 5.
OR:PORTLAND	3/ 2/81	1.41 0.08	-2. 5.	0. 6.	-2. 5.
PA:PHILADELPHIA	3/ 2/81	1.40 0.08	0. 5.	-2. 6.	-4. 5.
PC:CRISTOBAL	3/ 9/81	1.35 0.12	17. 7.	1. 8.	2. 7.
PR:SAN JUAN	3/13/81	1.39 0.12	3. 7.	-3. 8.	4. 7.
SC:CHARLESTON	3/12/81	1.42 0.22	5. 15.	-7. 19.	4. 13.
SD:RAPID CITY	3/ 5/81	1.32 0.08	0. 5.	-4. 6.	0. 5.
TN:CHATTANOOGA	3/ 2/81	1.41 0.12	2. 7.	-4. 8.	3. 7.
TN:KNOXVILLE	3/ 9/81	1.26 0.12	3. 7.	-2. 8.	-2. 7.
TN:MEMPHIS	3/ 5/81	1.39 0.12	7. 7.	-1. 8.	-4. 7.
TX:AUSTIN	3/ 3/81	1.38 0.12	1. 7.	-4. 8.	-4. 7.
UT:SALT LAKE CITY	3/ 2/81	1.38 0.12	2. 7.	-3. 8.	-2. 7.
VA:NORFOLK	3/ 6/81	1.55 0.12	-2. 7.	-5. 8.	1. 7.
VT:BURLINGTON	3/ 5/81	1.44 0.12	3. 7.	-7. 8.	-1. 7.
WA:SEATTLE	3/ 6/81	1.40 0.08	3. 5.	-5. 6.	-4. 5.
WA:SEATTLE	3/ 2/81	1.44 0.12	7. 7.	-1. 8.	0. 7.
WA:SPOKANE	3/ 5/81	1.33 0.12	1. 7.	3. 8.	3. 7.
WI:MILWAUKEE	3/ 5/81	1.37 0.12	-1. 7.	4. 8.	-2. 7.
WV:CHARLESTON	3/ 2/81	1.41 0.12	0. 7.	-2. 8.	2. 7.
WY:LARAMIE	3/16/81	1.41 0.12	5. 7.	-3. 8.	3. 7.

NS NO SAMPLE
e 2 SIGMA COUNTING ERROR

TABLE 36

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

APRIL 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
AK:ANCHORAGE	4/28/81	1.47 0.12	9. 7.	-3. 8.	0. 7.
AL:MONTGOMERY	4/ 9/81	1.32 0.12	5. 7.	-9. 8.	-2. 7.
AZ:PHOENIX	4/ 7/81	1.36 0.12	-5. 6.	-7. 8.	0. 7.
CA:LOS ANGELES	4/ 9/81	1.40 0.12	-3. 7.	-3. 8.	0. 7.
CA:SACRAMENTO	4/ 2/81	1.40 0.12	-2. 7.	-4. 8.	1. 7.
CA:SAN FRANCISCO	4/ 1/81	1.27 0.12	2. 7.	-1. 8.	-2. 7.
CO:DENVER	4/ 1/81	1.30 0.08	0. 5.	-4. 6.	-2. 5.
CO:DENVER	4/30/81	1.36 0.12	2. 7.	2. 8.	0. 7.
CT:HARTFORD	4/ 6/81	1.40 0.12	1. 7.	-16. 10.	-3. 7.
DC:WASHINGTON	4/ 3/81	1.41 0.08	2. 5.	-7. 6.	-2. 5.
DE:WILMINGTON	4/15/81	1.34 0.12	-1. 7.	-1. 8.	-2. 7.
FL:TAMPA	4/ 6/81	1.38 0.12	13. 7.	-9. 8.	1. 7.
GA:ATLANTA	4/ 7/81	1.39 0.12	-1. 7.	-2. 8.	-4. 7.
HI:HONOLULU	4/ 7/81	1.50 0.12	12. 7.	-7. 8.	-6. 7.
IA:DES MOINES	4/ 6/81	1.38 0.12	-3. 7.	-7. 8.	3. 7.
ID:IDAHO FALLS	4/ 8/81	1.40 0.22	-6. 14.	-20. 19.	-4. 13.
IL:CHICAGO	4/ 6/81	1.38 0.12	-2. 7.	-6. 8.	-4. 7.
IN:INDIANAPOLIS	4/ 6/81	1.40 0.12	0. 7.	-4. 8.	2. 7.
KS:WICHITA	4/ 8/81	1.35 0.12	0. 7.	-5. 8.	-2. 7.
KY:LOUISVILLE	4/ 7/81	1.32 0.12	3. 7.	-5. 8.	-1. 7.
LA:NEW ORLEANS	4/ 2/81	1.36 0.08	7. 5.	-5. 6.	0. 5.
MA:BOSTON	4/ 7/81	1.38 0.12	3. 7.	-6. 8.	-1. 7.
MD:BALTIMORE	4/ 3/81	1.46 0.12	0. 7.	-2. 8.	-3. 7.
ME:PORTLAND	4/ 7/81	1.39 0.12	6. 7.	-4. 8.	2. 7.
MI:DETROIT	4/ 9/81	1.30 0.12	1. 7.	-3. 8.	-3. 7.
MI:GRAND RAPIDS	4/ 6/81	1.34 0.12	-3. 7.	4. 8.	-4. 7.
MN:MINN/ST. PAUL	4/ 1/81	1.38 0.12	1. 7.	-6. 8.	-3. 7.
MO:KANSAS CITY	4/10/81	1.38 0.08	0. 5.	-5. 6.	-2. 5.
MO:ST. LOUIS	4/ 8/81	1.30 0.12	-1. 7.	-3. 8.	1. 7.
MS:JACKSON	4/ 6/81	1.37 0.12	-1. 7.	-6. 8.	2. 7.
MT:HELENA	4/ 6/81	1.39 0.22	-3. 15.	-12. 19.	-6. 13.
NC:CHARLOTTE	4/ 6/81	1.21 0.21	-1. 15.	-17. 19.	-4. 13.
ND:MINOT	4/ 7/81	1.35 0.12	2. 7.	-10. 8.	2. 7.
NE:OMAHA	4/10/81	1.42 0.12	1. 7.	-8. 8.	-1. 7.
NH:MANCHESTER	4/ 6/81	1.41 0.12	-1. 7.	-5. 8.	1. 7.
NJ:TRENTON	4/ 2/81	1.40 0.08	0. 5.	-7. 6.	0. 5.
NM:ALBUQUERQUE	4/ 6/81	1.34 0.12	1. 7.	-8. 8.	-4. 7.
NV:LAS VEGAS	4/ 1/81	1.33 0.08	-3. 5.	-7. 6.	-1. 5.
NY:BUFFALO	4/21/81	1.39 0.12	-1. 7.	-7. 8.	-8. 7.
NY:NEW YORK CITY	4/ 6/81	1.39 0.12	2. 7.	-3. 8.	-3. 7.
NY:SYRACUSE	4/ 6/81	1.36 0.12	-5. 7.	2. 8.	-5. 7.
OH:CINCINNATI	4/ 6/81	1.31 0.12	-3. 7.	-3. 8.	0. 7.
OH:CLEVELAND	4/ 7/81	1.33 0.12	2. 7.	-4. 8.	1. 7.
OK:OKLAHOMA CITY	4/ 6/81	1.36 0.12	0. 7.	-4. 8.	-1. 7.

TABLE 36 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

APRIL 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
OR:PORTLAND	4/ 6/81	1.34 0.12	-3. 7.	-8. 8.	1. 7.
PA:PHILADELPHIA	4/ 6/81	1.39 0.12	3. 7.	-4. 8.	-2. 7.
PA:PITTSBURGH	4/ 7/81	1.42 0.12	3. 7.	-3. 8.	-1. 7.
PC:CRISTOBAL	4/ 8/81	1.44 0.12	6. 7.	-1. 8.	-8. 7.
PR:SAN JUAN	4/10/81	1.37 0.12	1. 7.	-5. 8.	-5. 7.
SC:CHARLESTON	4/22/81	1.33 0.12	10. 7.	-2. 8.	8. 7.
SD:RAPID CITY	4/ 9/81	1.39 0.12	3. 7.	-10. 8.	-5. 7.
TN:CHATTANOOGA	4/ 6/81	1.34 0.12	0. 7.	-6. 8.	-2. 7.
TN:KNOXVILLE	4/ 6/81	1.42 0.08	4. 5.	-7. 6.	1. 5.
TN:MEMPHIS	4/ 9/81	1.33 0.12	3. 7.	-16. 10.	1. 7.
UT:SALT LAKE CITY	4/ 6/81	1.41 0.12	2. 7.	-6. 8.	-1. 7.
VA:NORFOLK	4/ 3/81	1.48 0.12	7. 7.	-4. 8.	-2. 7.
VT:BURLINGTON	4/ 6/81	1.36 0.08	0. 5.	-3. 6.	-2. 5.
WA:SPOKANE	4/ 6/81	1.48 0.12	4. 7.	-4. 8.	-4. 7.
WI:MILWAUKEE	4/ 2/81	1.48 0.08	-1. 5.	-6. 6.	-6. 5.
WV:CHARLESTON	4/ 6/81	1.24 0.12	-2. 7.	-3. 8.	0. 7.
WY:LARAMIE	4/15/81	1.34 0.12	1. 7.	-11. 8.	5. 7.

NS NO SAMPLE
e 2 SIGMA COUNTING ERROR

TABLE 37

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

MAY 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
AL:MONTGOMERY	5/ 7/81	1.42 0.12	6. 7.	-6. 8.	-1. 7.
AR:LITTLE ROCK	5/ 4/81	1.33 0.08	5. 5.	0. 6.	0. 5.
AZ:PHOENIX	5/ 6/81	1.47 0.12	1. 7.	-7. 8.	-1. 7.
CA:LOS ANGELES	5/12/81	1.44 0.12	-1. 7.	-9. 8.	2. 7.
CA:SACRAMENTO	5/ 4/81	1.42 0.12	-6. 7.	-2. 8.	1. 7.
CA:SAN FRANCISCO	5/ 5/81	1.40 0.12	0. 7.	-4. 8.	4. 7.
CO:DENVER	5/27/81	1.33 0.12	0. 7.	-1. 8.	-1. 7.
CT:HARTFORD	5/ 4/81	1.36 0.12	4. 7.	0. 8.	-1. 7.
DC:WASHINGTON	5/ 1/81	1.31 0.12	4. 7.	-4. 8.	-2. 7.
DE:WILMINGTON	5/ 4/81	1.37 0.12	0. 7.	-5. 8.	1. 7.
FL:TAMPA	5/ 4/81	1.35 0.12	12. 7.	-5. 8.	-1. 7.
HI:HONOLULU	5/ 5/81	1.43 0.08	5. 5.	-4. 6.	2. 5.
IA:DES MOINES	5/ 4/81	1.36 0.12	6. 7.	-6. 8.	-1. 7.
ID:IDAHO FALLS	5/ 6/81	1.72 0.23	6. 15.	-20. 19.	0. 13.
IL:CHICAGO	5/ 4/81	1.42 0.12	1. 7.	-6. 8.	2. 7.
IN:INDIANAPOLIS	5/ 4/81	1.34 0.12	4. 7.	2. 8.	1. 7.
KS:WICHITA	5/ 6/81	1.28 0.12	7. 7.	-5. 8.	3. 7.
KY:LOUISVILLE	5/ 5/81	1.41 0.08	0. 5.	-2. 6.	0. 5.
LA:NEW ORLEANS	5/ 1/81	1.35 0.12	4. 7.	-4. 8.	-5. 7.
MA:BOSTON	5/ 5/81	1.38 0.08	4. 5.	-4. 6.	-2. 5.
MD:BALTIMORE	5/ 1/81	1.44 0.08	1. 5.	-3. 6.	0. 5.
ME:PORTLAND	5/ 6/81	1.65 0.22	8. 15.	-15. 19.	3. 13.
MI:DETROIT	5/ 7/81	1.32 0.12	-1. 7.	-6. 8.	1. 7.
MI:GRAND RAPIDS	5/ 4/81	1.35 0.12	6. 7.	2. 8.	1. 7.
MN:MINN/ST. PAUL	5/ 5/81	1.39 0.12	2. 7.	2. 8.	1. 7.
MO:KANSAS CITY	5/ 8/81	1.45 0.12	-1. 7.	-6. 8.	-1. 7.
MO:ST. LOUIS	5/ 6/81	1.39 0.08	0. 5.	-2. 6.	-2. 5.
MS:JACKSON	5/ 4/81	1.38 0.12	4. 7.	-3. 8.	4. 7.
MT:HELENA	5/ 4/81	1.47 0.12	1. 7.	-1. 8.	2. 7.
NC:CHARLOTTE	5/ 4/81	1.39 0.22	20. 15.	-16. 19.	-3. 13.
ND:MINOT	5/26/81	1.40 0.12	-1. 7.	-3. 8.	2. 7.
NE:OMAHA	5/ 8/81	1.24 0.12	5. 7.	-1. 8.	-6. 7.
NH:MANCHESTER	5/ 4/81	1.39 0.12	7. 7.	3. 8.	-2. 7.
NJ:TRENTON	5/ 7/81	1.43 0.12	-2. 7.	-3. 8.	1. 7.
NV:LAS VEGAS	5/11/81	1.49 0.12	0. 7.	0. 8.	-1. 7.
NY:BUFFALO	5/ 4/81	1.44 0.12	3. 7.	-5. 8.	1. 7.
NY:NEW YORK CITY	5/ 4/81	1.40 0.08	2. 5.	-2. 6.	-1. 5.
NY:SYRACUSE	5/ 4/81	1.46 0.12	3. 7.	-8. 8.	2. 7.
OH:CINCINNATI	5/ 5/81	1.47 0.08	5. 5.	-4. 6.	-2. 5.
OH:CLEVELAND	5/ 6/81	1.41 0.12	-1. 7.	-5. 8.	1. 7.
OK:OKLAHOMA CITY	5/ 4/81	1.38 0.12	6. 7.	-1. 8.	0. 7.
OR:PORTLAND	5/ 4/81	1.37 0.08	2. 5.	-6. 6.	0. 5.
PA:PHILADELPHIA	5/ 4/81	1.32 0.12	3. 7.	-4. 8.	-3. 7.
PA:PITTSBURGH	5/ 6/81	1.33 0.12	1. 7.	-4. 8.	5. 7.

TABLE 37 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

MAY 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
PC:CRISTOBAL	5/ 7/81	1.42 0.12	12. 7.	-8. 8.	-2. 7.
PR:SAN JUAN	5/15/81	1.41 0.12	1. 7.	-9. 8.	-2. 7.
SC:CHARLESTON	5/11/81	1.38 0.12	8. 7.	-7. 8.	3. 7.
SD:RAPID CITY	5/ 7/81	1.40 0.08	-1. 5.	-4. 6.	0. 5.
TN:CHATTANOOGA	5/ 4/81	1.39 0.12	5. 7.	5. 8.	0. 7.
TN:KNOXVILLE	5/11/81	1.42 0.12	5. 7.	-6. 8.	-1. 7.
TN:MEMPHIS	5/ 7/81	1.35 0.12	9. 7.	-4. 8.	1. 7.
TX:AUSTIN	5/ 4/81	1.44 0.12	1. 7.	-3. 8.	-2. 7.
UT:SALT LAKE CITY	5/ 4/81	1.45 0.12	-2. 7.	-4. 8.	0. 7.
VA:NORFOLK	5/ 4/81	1.40 0.12	2. 7.	-1. 8.	-3. 7.
VT:BURLINGTON	5/ 4/81	1.43 0.12	5. 7.	-5. 8.	0. 7.
WA:SEATTLE	5/ 4/81	1.38 0.12	3. 7.	-2. 8.	1. 7.
WA:SPOKANE	5/ 5/81	1.46 0.12	3. 7.	-7. 8.	2. 7.
WI:MILWAUKEE	5/ 1/81	1.38 0.12	-2. 7.	-1. 8.	0. 7.
WV:CHARLESTON	5/ 4/81	1.37 0.12	6. 7.	0. 8.	2. 7.
WY:LARAMIE	5/14/81	1.40 0.12	2. 7.	-9. 8.	-1. 7.

NS NO SAMPLE
e 2 SIGMA COUNTING ERROR

TABLE 38

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JUNE 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
AL:MONTGOMERY	6/ 7/81	1.35 0.12	5. 7.	-3. 8.	-3. 7.
AR:LITTLE ROCK	6/ 1/81	1.39 0.12	10. 7.	-4. 8.	1. 7.
AZ:PHOENIX	6/11/81	1.38 0.12	-3. 7.	-2. 8.	-4. 7.
CA:LOS ANGELES	6/ 9/81	1.43 0.12	4. 7.	-1. 8.	-3. 7.
CA:SACRAMENTO	6/ 2/81	1.38 0.08	2. 5.	-2. 6.	0. 5.
CA:SAN FRANCISCO	6/ 5/81	1.40 0.12	1. 7.	0. 8.	2. 7.
CO:DENVER	6/30/81	1.37 0.12	4. 7.	5. 8.	-7. 7.
CT:HARTFORD	6/ 8/81	1.41 0.12	4. 7.	-3. 8.	0. 7.
DC:WASHINGTON	6/ 5/81	1.42 0.12	3. 7.	3. 8.	0. 7.
DE:WILMINGTON	6/ 1/81	1.36 0.08	1. 5.	-2. 6.	2. 5.
FL:TAMPA	6/ 3/81	1.37 0.08	11. 5.	-6. 6.	2. 5.
HI:HONOLULU	6/ 2/81	1.39 0.12	16. 7.	-5. 8.	-1. 7.
IA:DES MOINES	6/ 1/81	1.36 0.12	0. 7.	-2. 8.	0. 7.
ID:IDAHO FALLS	6/10/81	1.38 0.22	-1. 15.	-3. 19.	-4. 13.
IL:CHICAGO	6/ 1/81	1.41 0.12	0. 7.	-4. 8.	1. 7.
IN:INDIANAPOLIS	6/ 8/81	1.31 0.12	9. 7.	-3. 8.	2. 7.
KS:WICHITA	6/ 8/81	1.43 0.08	5. 5.	-2. 6.	0. 5.
KY:LOUISVILLE	6/ 2/81	1.33 0.12	6. 7.	-7. 8.	-3. 7.
MA:BOSTON	6/ 9/81	1.40 0.12	7. 7.	-7. 8.	3. 7.
MD:BALTIMORE	6/ 5/81	1.42 0.12	2. 7.	3. 8.	-1. 7.
ME:PORTLAND	6/ 2/81	1.38 0.08	6. 5.	0. 6.	0. 5.
MI:DETROIT	6/11/81	1.41 0.12	-4. 7.	-3. 8.	-2. 7.
MI:GRAND RAPIDS	6/ 1/81	1.47 0.08	1. 5.	-5. 6.	2. 5.
MN:MINN/ST. PAUL	6/ 3/81	1.42 0.12	4. 7.	-2. 8.	0. 7.
MO:KANSAS CITY	6/12/81	1.44 0.12	6. 7.	-3. 8.	-4. 7.
MO:ST. LOUIS	6/ 3/81	1.29 0.12	5. 7.	-5. 8.	3. 7.
MS:JACKSON	6/ 8/81	1.37 0.12	3. 7.	-1. 8.	2. 7.
MT:HELENA	6/ 1/81	1.47 0.12	2. 7.	-5. 8.	0. 7.
NC:CHARLOTTE	6/ 1/81	1.34 0.22	2. 15.	-5. 19.	-3. 13.
ND:MINOT	6/29/81	1.41 0.12	3. 7.	-5. 8.	-1. 7.
NE:OMAHA	6/12/81	1.23 0.12	2. 7.	-6. 8.	0. 7.
NH:MANCHESTER	6/ 1/81	1.40 0.12	3. 7.	-1. 8.	1. 7.
NJ:TRENTON	6/ 4/81	1.37 0.12	11. 7.	-1. 8.	-1. 7.
NV:LAS VEGAS	6/30/81	1.31 0.12	0. 7.	2. 8.	2. 7.
NY:BUFFALO	6/16/81	1.39 0.12	6. 7.	-7. 8.	4. 7.
NY:NEW YORK CITY	6/ 1/81	1.36 0.12	5. 7.	-6. 8.	0. 7.
NY:SYRACUSE	6/ 1/81	1.39 0.08	2. 5.	-2. 6.	0. 5.
OH:CINCINNATI	6/10/81	1.40 0.12	-4. 7.	-8. 8.	-3. 7.
OH:CLEVELAND	6/ 8/81	1.38 0.12	6. 7.	-1. 8.	0. 7.
OK:OKLAHOMA CITY	6/ 1/81	1.31 0.12	5. 7.	0. 8.	1. 7.
OR:PORTLAND	6/ 8/81	1.34 0.12	3. 7.	-8. 8.	-1. 7.
PA:PHILADELPHIA	6/ 8/81	1.38 0.12	3. 7.	-6. 8.	-2. 7.
PA:PITTSBURGH	6/10/81	1.50 0.12	7. 7.	-6. 8.	-1. 7.
PC:CRISTOBAL	6/ 9/81	1.33 0.12	7. 7.	-3. 8.	-7. 7.

TABLE 38 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JUNE 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
PR:SAN JUAN	6/15/81	1.40 0.12	-2. 7.	-7. 8.	-2. 7.
SC:CHARLESTON	6/24/81	1.51 0.22	-1. 15.	-6. 19.	6. 13.
SD:RAPID CITY	6/ 5/81	1.40 0.12	3. 7.	-4. 8.	3. 7.
TN:CHATTANOOGA	6/ 8/81	1.29 0.12	1. 7.	4. 8.	-1. 7.
TN:KNOXVILLE	6/ 8/81	1.41 0.12	4. 7.	-3. 8.	1. 7.
UT:SALT LAKE CITY	6/ 4/81	1.36 0.08	4. 5.	-2. 6.	0. 5.
VA:NORFOLK	6/ 5/81	1.31 0.12	-2. 7.	-4. 8.	0. 7.
VT:BURLINGTON	6/ 8/81	1.41 0.12	4. 7.	-4. 8.	0. 7.
WA:SEATTLE	6/ 1/81	1.43 0.12	10. 7.	-9. 8.	-4. 7.
WA:SPOKANE	6/ 1/81	1.45 0.08	5. 5.	-3. 6.	-1. 5.
WI:MILWAUKEE	6/ 6/81	1.34 0.12	-6. 7.	2. 8.	1. 7.
WV:CHARLESTON	6/ 2/81	1.38 0.12	6. 7.	-4. 8.	-1. 7.
WY:LARAMIE	6/16/81	1.31 0.12	1. 7.	-5. 8.	-2. 7.

NS NO SAMPLE
e 2 SIGMA COUNTING ERROR

TABLE 39

STRONTIUM-90 AND STRONTIUM-89 IN PASTEURIZED MILK

EPA REGIONAL COMPOSITES

JANUARY 1981

EPA REGION		^{90}Sr pCi/l ± e		^{89}Sr pCi/l ± e*	
I	1/15/81	2.6	1.0	0.	5.
II	1/15/81	2.9	1.0	0.	5.
III	1/15/31	3.8	1.3	0.	5.
IV	1/15/81	2.4	0.9	1.	5.
V	1/15/81	2.5	0.8	1.	5.
VI	1/15/81	2.8	1.0	1.	5.
VII	1/15/81	2.3	0.9	1.	5.
VIII	1/15/81	1.8	0.7	1.	5.
IX	1/15/81	0.7	0.6	1.	5.
X	1/17/91	1.7	0.9	1.	5.

e 2 SIGMA COUNTING ERROR
e* ANALYTICAL ERROR TERM WHICH CLOSELY APPROXIMATES THE COUNTING ERROR

TABLE 40

STRONTIUM-90 AND STRONTIUM-89 IN PASTEURIZED MILK

EPA REGIONAL COMPOSITES

APRIL 1981

EPA REGION		^{90}Sr pCi/l ± e		^{89}Sr pCi/l ± e*	
I	4/15/81	4.5	1.0	-1.	5.
II	4/15/81	2.9	0.9	2.	5.
III	4/15/81	2.5	0.8	2.	5.
IV	4/15/81	2.7	0.8	2.	5.
V	4/15/81	3.7	1.2	1.	5.
VI	4/15/81	3.0	0.8	3.	5.
VII	4/15/81	3.4	1.1	0.	5.
VIII	4/15/81	2.5	1.1	0.	5.
IX	4/15/81	1.1	0.8	0.	5.
X	4/15/81	1.8	0.8	1.	5.

e 2 SIGMA COUNTING ERROR
e* ANALYTICAL ERROR TERM WHICH CLOSELY APPROXIMATES THE COUNTING ERROR

Plutonium and Uranium in Milk

Ten milk sampling sites near plutonium handling facilities, plus 2 sites chosen for background information, are analyzed annually for plutonium and uranium. Analytical techniques approximate those used for air filters.

Only plutonium analyses were performed on the 1974 samples, but due to increased emphasis on levels of natural radioactivity, uranium analyses were included for 1975 - 1976 samples. Data for samples collected April 1978 were reported in ERD 14.

Iodine-129 in Milk

These analyses were designed to assess environmental levels of iodine-129 around nuclear fuel reprocessing facilities. Annual samples collected from Montgomery, Alabama (background); Idaho Falls, Idaho; Chicago, Illinois; Buffalo, New York; and Charleston, South Carolina; are analyzed for iodine-129 and stable iodine-127. Results for 1978 were reported in ERD 17.

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 results of carbon-14 analysis on samples collected during May 1974 were reported in ERD Report 2, September 1975.

SECTION V. Human Bone Program

The Human Bone Program (formerly Human Bone Network) began operation in 1961 to obtain data on the concentration of strontium-90 in man by age and geographical region. The target population for this network is comprised of children and young adults up to 25 years of age. The bone specimens were limited to accident victims or persons who had died of an acute disease process that was not likely to impair bone metabolism.

The following are operational characteristics of this program:

All samples are composited according to age and geographical locations.

Strontium-90, plutonium-238 and -239, and calcium analyses are performed annually on the composite samples.

No additional bone samples were procured past FY-75. Analysis of samples on hand will be completed and results evaluated.

SECTION VI. Pan American Health Organization (PAHO) Air and Milk Program

An agreement was made in 1962 with the Pan American Health Organization (PAHO) to develop a collaborative program for furnishing assistance to health authorities in the Americas for developing programs of radiological health. The agreement provided limited quantities of essential equipment on a loan basis to PAHO which were needed to establish surveillance programs, and also provided the requisite laboratory services for analysis of air particulates, milk, water, and other samples. Technical advice was given on research designs for radiological health programs.

Analyses prior to January 1977 included the following:

Milk - 4 monthly samples analyzed for gamma-emitting radionuclides, strontium-89, -90.

Air particulates - 12 stations with daily samples analyzed for gross beta.

Beginning January 1, 1977, the PAHO Air Program was discontinued and milk sampling was reduced to quarterly collection.

The PAHO programs are included organizationally as an ancillary function of the ERAMS.

Results of the Pan American surface air particulate analyses for October - December 1976 were reported in ERD 8.

Results of the Pan American milk quarterly analyses for October - December 1978 were reported in ERD 16.

Radiologic Health Section
California Department of Health

California Air Sampling Program

The Radiologic Health Section of the California Department of Health with the assistance of several cooperating agencies maintains a statewide air sampling network. One of the objectives of this program is to measure and evaluate the contribution of fixed effluent sources to particulate activity in the air. Data from air samplers placed in proximity to nuclear facilities are compared with information obtained from similar equipment in communities close to the facilities and at several "background" or control stations.

Airborne particles are collected by a continuous sampling of air filtered through a 47 millimeter membrane filter, 0.8 micrometer pore size, using a Gast air pump that provides an average sampling rate of 40 liters per minute. Air volumes are measured with a direct reading gas meter. Filters are replaced when approximately 300 cubic meters of air are collected, i.e., on a weekly or semi-weekly schedule. Charcoal cartridges mounted behind the filters at 10 of the 18 stations are replaced weekly.

All air samples are sent to the Department's Sanitation and Radiation Laboratory, where the filters are analyzed for gross beta radioactivity 72 hours after collection. Alpha activity is determined weekly on ashed filters. Gamma spectroscopy and an analysis for strontium-89 and strontium-90 are normally performed on quarterly composites from each location. Immediate gamma scans are run on any samples for which abnormal gross activity values are observed. Charcoal cartridges are analyzed for radioiodines by gamma spectroscopy as soon as received.

A monthly summary of gross alpha and beta radioactivity in California air for January - March 1981 are shown in Tables 41 - 43.

Radionuclides in composites of California air for the fourth quarter of 1980 are reported in Table 44.

TABLE 41

MONTHLY SUMMARY

OF GROSS ALPHA AND BETA RADIOACTIVITY IN CALIFORNIA AIR

(Alpha, fCi/m^3; Beta, fCi/m^3)

January 1981
Month Year

Station	ALPHA					BETA				
	No. of Samples	Max.	Min.	Averages Mean	±	No. of Samples	Max.	Min.	Averages Mean	±
Eureka	4	1.3	.1	.8	.6	8	390	50	230	10
Humboldt Hill	4	2.1	.1	.8	.5	8	380	50	210	10
Redding	4	6.3	.5	2.6	1.6	8	890	100	460	30
Sacramento	4	3.6	.7	1.6	.5	8	200	20	110	10
Rancho Seco	4	2.8	.1	1.5	.6	8	380	80	230	10
Vallejo	4	6.4	1.2	2.5	1.1	7	370	80	210	10
Berkeley	4	2.4	.5	1.4	.7	8	1220	220	500	20
Livermore	4	9.3	.6	3.5	1.0	8	400	100	280	10
Salinas	4	14.4	.5	5.3	1.1	8	460	80	270	10
San Luis Obispo	4	2.9	.1	1.4	.6	8	840	60	340	10
Diablo Canyon	4	4.9	2.0	3.6	1.6	4	700	250	500	20
Bakersfield	-	-	-	-	-	-	-	-	-	-
Los Angeles	4	7.7	2.1	4.4	1.3	8	540	140	280	10
San Onofre	4	4.1	1.9	2.6	1.2	4	310	170	230	10
San Diego	4	4.3	.9	2.3	1.3	7	670	300	450	20
Barstow	4	3.4	.5	2.1	.8	9	590	70	350	20
El Centro	4	25.7	3.3	9.8	2.0	8	630	240	410	20
Summary	64	25.7	.1	2.9	1.0	119	1220	20	320	10

Source: California State Department of Health Services

TABLE 42

MONTHLY SUMMARY

OF GROSS ALPHA AND BETA RADIOACTIVITY IN CALIFORNIA AIR

(Alpha, fCi/m^3; Beta, fCi/m^3)

February 1981
Month Year

Station	ALPHA					BETA				
	No. of Samples	Max.	Min.	Averages Mean	±	No. of Samples	Max.	Min.	Averages Mean	±
Eureka	4	.8	.2	.4	.4	8	230	50	150	10
Humboldt Hill	4	1.2	.5	.8	.4	8	300	50	170	10
Redding	4	1.1	.4	.8	.7	8	680	190	440	20
Sacramento	4	2.1	.2	.8	.5	8	240	50	140	10
Rancho Seco	4	5.3	.6	2.9	.8	8	410	90	260	10
Vallejo	4	1.4	.2	.7	.6	7	390	110	230	10
Berkeley	4	3.1	1.0	1.6	.8	8	490	160	300	30
Livermore	4	5.4	.1	1.9	.8	8	350	170	270	10
Salinas	4	9.7	.3	3.8	1.0	7	580	90	300	10
San Luis Obispo	4	2.6	.5	1.4	.9	7	390	180	290	10
Diablo Canyon	4	11.0	.7	5.0	1.9	4	720	380	590	20
Bakersfield	-	-	-	-	-	-	-	-	-	-
Los Angeles	4	3.9	.9	2.5	.9	8	710	220	420	20
San Onofre	4	3.8	.3	2.2	1.4	4	430	250	330	10
San Diego	4	4.0	.5	1.7	1.0	8	1160	260	860	30
Barstow	4	3.5	1.0	2.3	.8	8	590	240	440	20
El Centro	4	12.7	2.1	5.8	1.6	7	580	230	390	10
Summary	64	12.7	.1	2.2	.9	116	1160	50	350	10

Source: California State Department of Health Services

TABLE 43

MONTHLY SUMMARY

OF GROSS ALPHA AND BETA RADIOACTIVITY IN CALIFORNIA AIR

(Alpha, fCi/m^3; Beta, fCi/m^3)

March 1981
Month Year

Station	ALPHA					BETA				
	No. of Samples	Max.	Min.	Averages Mean	±	No. of Samples	Max.	Min.	Averages Mean	±
Eureka	4	2.1	.4	1.0	.6	9	360	130	240	10
Humboldt Hill	4	.5	.1	.3	.3	8	310	120	230	10
Redding	4	2.6	.5	1.6	1.0	9	870	250	510	20
Sacramento	4	1.1	.2	.6	.3	9	330	90	160	10
Rancho Seco	4	2.5	.1	1.3	.6	8	390	160	270	10
Vallejo	4	1.4	.4	.9	.6	9	350	140	190	10
Berkeley	4	1.2	.3	.6	.5	9	560	150	320	10
Livermore	4	4.3	.2	2.3	.8	10	510	170	280	10
Salinas	4	3.4	.4	1.8	.6	9	420	150	250	10
San Luis Obispo	4	1.0	.6	.9	.5	9	390	210	280	10
Diablo Canyon	4	4.0	.8	2.4	1.4	4	610	470	540	20
Bakersfield	4	1.3	.2	.8	.4	9	290	140	230	10
Los Angeles	4	2.0	.4	1.0	.8	9	460	250	330	10
San Onofre	4	2.9	.6	2.1	1.0	4	380	220	290	10
San Diego	4	1.4	1.0	1.1	.8	9	820	370	580	20
Barstow	4	2.1	.3	1.2	.6	8	690	270	480	20
El Centro	4	3.8	.8	2.3	.8	9	500	210	330	10
Summary	64	4.3	.1	1.3	.7	141	870	90	320	10

Source: California State Department of Health Services

TABLE 44

* Minimum Detection Limit
* * Weekly Analysis of Charcoal Cartridge
NS= No Sample

RADIOACTIVITY IN AIR COMPOSITES
pCi/1000m^3

Fourth Quarter 1980 Year

Source: CA Department of Health Servi

LOCATION	Be-7	Zr-95	Nb-95	Ru-103	Ru-106	Cs-137	Ce-141	Ce-144	K-40	Sr-89	Sr-90	I-131**
Eureka	26	3.2	4.5	2.0	0.6*	0.1*	5.0	3.0	1.0*	2.3	0.0	0
±	3	0.6	0.6	0.5			0.6	1.0		0.3	0.1	2
Humboldt Bay P.P.	42	6.5	12.3	5.4	0.5*	0.1*	9.4	4.9	0.7*	4.1	0.1	0
±	5	0.9	1.1	0.7			0.9	1.4		0.4	0.1	2
Redding	164	14.9	46.1	23.3	0.6*	0.1*	38.2	8.4	0.8*	11.3	0.3	NS
±	12	1.9	2.8	2.1			2.5	1.6		1.0	0.1	
Sacramento	53	4.7	14.3	5.6	0.4*	0.1*	9.3	2.0	0.5*	3.3	0.1	0
±	6	0.8	1.4	0.7			1.2	0.7		0.3	0.1	2
Rancho Seco N.G.S.	75	7.4	22.3	9.7	0.3*	0.2	20.0	4.2	0.4*	5.2	0.1	0
±	5	0.9	1.4	0.8		0.1	1.2	0.8		0.5	0.1	2
Vallejo	65	5.9	12.6	8.1	0.3*	0.1*	15.0	4.6	0.4*	8.5	0.2	0
±	4	0.7	0.8	0.6			0.9	1.3		0.6	0.1	2
Berkeley	69	6.5	11.7	8.9	0.5*	0.1*	13.1	5.6	0.7*	5.0	0.2	NS
±	6	1.0	1.0	0.9			1.0	1.5		0.4	0.1	
Livermore	107	11.2	19.8	12.3	0.8*	0.6	26.2	6.4	1.2*	9.0	0.2	0
±	10	1.7	1.8	1.1		0.2	2.1	1.6		0.8	0.1	2
Salinas	90	11.3	30.4	13.0	0.5*	0.2	23.7	8.6	2.8	8.6	0.2	NS
±	9	1.3	2.1	1.2		0.2	1.8	1.5	1.2	0.5	0.1	

TABLE 44 (Continued)

RADIOACTIVITY IN AIR COMPOSITES
pCi/1000m^3

* Minimum Detection Limit
* * Weekly Analysis of Charcoal Cartridge
NS= No Sample

Fourth Quarter 1980 Year

Source: CA Department of Health Servi

LOCATION		Be-7	Zr-95	Nb-95	Ru-103	Ru-106	Cs-137	Ce-141	Ce-144	K-40	Sr-89	Sr-90	I-131 **
San Luis Obispo		122	18.6	37.1	14.0	0.5*	0.1*	33.5	7.0	0.8*	10.5	0.3	0
	±	8	1.6	1.9	1.1			1.7	1.8		0.6	0.1	2
Diablo Canyon N.P.P.		250	38.8	95.5	36.1	1.7*	0.6	69.7	14.5	7.5	15.7	0.3	0
	±	25	4.5	7.1	3.9		0.1	7.8	7.5	3.8	1.4	0.2	2
Bakersfield		No Sample											
	±												
San Bernardino		No Sample											
	±												
Barstow		138	14.1	30.5	18.1	0.6*	0.1*	33.4	9.1	0.8*	12.1	0.2	NS
	±	9	1.4	1.8	1.2			2.0	1.9		0.7	0.1	
El Centro		146	18.4	48.8	23.8	0.6*	0.3	38.4	8.0	0.9*	12.8	0.2	NS
	±	11	3.5	3.0	1.7			2.8	2.4		0.8	0.1	
Los Angeles		145	22.1	63.5	18.2	0.8*	0.1*	42.8	12.8	1.2*	13.0	0.3	0
	±	13	2.5	4.0	2.1			3.2	2.5		0.9	0.1	2
San Onofre N.G.S.		134	20.0	63.5	17.0	0.5*	0.3	28.6	6.6	0.9*	10.9	0.5	0
	±	10	1.8	3.2	1.6		0.1	2.0	1.4		1.0	0.2	2
San Diego		130	16.3	28.9	19.4	0.6*	0.5	30.5	7.1	0.9*	11.1	0.3	NS
	±	9	1.6	1.8	1.3		0.2	1.7	2.0		0.7	0.1	

Radionuclides in California Milk

Although milk is only one of the sources of dietary intake of environmental radioactivity, it is the food item that is most useful as an indicator of the general population's intake of radionuclide contaminants resulting from environmental releases. The objective of this milk sampling network is to obtain information on current radionuclide concentrations and long-term trends. From this information the need for further investigation or corrective public health action can be determined.

The California network consists of 10 stations, six of which are from dairies close to major nuclear facilities, and the other four represent controls, composited from local milksheds in similar geographic locations from the plants. Samples are obtained quarterly and analyzed immediately upon receipt.* Results are reported as pCi/l with an error of two standard deviations. Data for the fourth quarter of 1980 are shown in Table 45.

*Radionuclides are determined by gamma spectroscopy, with the exception of iodine-131, which is analyzed in accordance with procedures specified in USNRC Regulatory Guide 4.3, and strontium-89 and strontium-90, which are determined by radiochemical technique.

RADIONUCLIDES IN CALIFORNIA MILK
TABLE 45
pCi/l

Sampling Date	Sampling Location	Radionuclide					
		K-40	Ba-La-140	Cs-137	I-131*	Sr-89	Sr-90
1980							
10-9	Del Norte County	1318 ± 90	1**	1**	0.1 ± 0.1	0 ± 2	5.2 ± 0.6
10-21	Humboldt Bay North	1183 ± 87	1**	1**	0.1 ± 0.1	-1 ± 1	1.6 ± 0.5
10-21	Humboldt Bay South	1325 ± 95	1**	1**	0.2 ± 0.1	0 ± 1	2.2 ± 0.5
10-8	Humboldt County	1383 ± 96	1**	1**	0.1 ± 0.1	-1 ± 1	2.1 ± 0.4
11-25	Rancho Seco North	1280 ± 126	1**	1**	0.0 ± 0.1	-1 ± 1	1.5 ± 0.5
	Rancho Seco South	No Sample					
10-14	Sacramento County	1290 ± 96	1**	1**	0.0 ± 0.1	0 ± 1	0.8 ± 0.4
10-19	Diablo Canyon North	1268 ± 93	1**	1**	0.0 ± 0.1	0 ± 1	0.8 ± 0.4
10-19	Diablo Canyon South	1306 ± 105	1**	1**	0.0 ± 0.1	0 ± 1	1.3 ± 0.4
10-28	San Luis Obispo County	1347 ± 110	1**	1**	0.1 ± 0.1	0 ± 1	0.9 ± 0.4

* I-131 analysis by ion exchange and precipitation method.

Source: California Dept. Health Services

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 for the second quarter of 1981 are shown in Tables 46 - 47.

TABLE 46

INDIANA MILK ANALYSIS PROGRAM

(Second Quarter of 1981)

Concentrations of Selected Gamma Radionuclides in Pasteurized Milk

(pCi/l ± 2 Sigma Counting Error)

Location	Date	I-131	Ba-140	Cs-137	K-40
Evansville	4/81	1 ± 5	0 ± 5	5 ± 5	910 ± 72
Fort Wayne	4/81	0 ± 5	6 ± 5	14 ± 5	880 ± 71
Indianapolis	4/81	4 ± 5	10 ± 5	24 ± 6	859 ± 71
Rochester	4/81	0 ± 5	9 ± 5	11 ± 5	831 ± 71
Seymour	4/81	0 ± 5	9 ± 5	9 ± 5	776 ± 69
Evansville	5/81	0 ± 6	9 ± 6	11 ± 7	781 ± 79
Fort Wayne	5/81	6 ± 6	6 ± 6	21 ± 7	825 ± 80
Indianapolis	5/81	0 ± 6	10 ± 6	10 ± 7	861 ± 81
Rochester	5/81	0 ± 6	6 ± 6	11 ± 7	832 ± 80
Seymour	5/81	2 ± 6	4 ± 6	13 ± 7	783 ± 79
Evansville	6/81	2 ± 6	7 ± 6	13 ± 7	989 ± 86
Fort Wayne	6/81	0 ± 6	0 ± 6	16 ± 7	1037 ± 86
Indianapolis	6/81	3 ± 6	0 ± 6	13 ± 7	1005 ± 86
Rochester	6/81	0 ± 6	4 ± 6	10 ± 7	951 ± 85
Seymour	6/81	0 ± 6	4 ± 6	8 ± 7	1038 ± 87

TABLE 47

Concentrations of ^{90}Sr and ^{89}Sr in Pasteurized Milk

(pCi/l ± 2 Sigma Counting Error)

	Location	Date	^{90}Sr	^{89}Sr
IN:	Evansville	4/81	1 ± 0.5	0 ± 0.3
	Fort Wayne	4/81	1 ± 0.5	0 ± 0.3
	Indianapolis	4/81	1 ± 0.5	0 ± 0.3
	Rochester	4/81	1 ± 0.5	0 ± 0.3
	Seymour	4/81	1 ± 0.5	0 ± 0.3
IN:	Evansville	5/81	2 ± 0.5	0 ± 0.3
	Fort Wayne	5/81	2 ± 0.5	0 ± 0.3
	Indianapolis	5/81	2 ± 0.5	0 ± 0.3
	Rochester	5/81	2 ± 0.5	0 ± 0.3
	Seymour	5/81	2 ± 0.5	0 ± 0.3
IN:	Evansville	6/81	4 ± 0.7	0.5 ± 0.3
	Fort Wayne	6/81	5 ± 0.8	0.7 ± 0.3
	Indianapolis	6/81	5 ± 0.8	0.6 ± 0.3
	Rochester	6/81	4 ± 0.7	0.4 ± 0.3
	Seymour	6/81	5 ± 0.9	0.6 ± 0.3

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.

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

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