

ENVIRONMENTAL

RADIATION

DATA

REPORT 86

April - June 1996

United States Environmental Protection Agency

Office of Radiation and Indoor Air

(This page intentionally left blank)

Contents

	Page
List of Tables	v
Preface	vii
Acknowledgments	ix
Data Reporting Conventions	xi
1. Air Program	1
Airborne Particulates and Precipitation	1
Plutonium and Uranium in Airborne Particulates and Precipitation	16
2. Water Program	19
Surface Water	19
Drinking Water	22
3. Milk Program	27
Pasteurized Milk	27

(This page intentionally left blank)

List of Tables

Table	Page
1 Reporting Units and Minimum Detectable Concentrations	xiii
2 Gross Beta in Airborne Particulates: April 1996	2
3 Gross Beta in Airborne Particulates: May 1996	4
4 Gross Beta in Airborne Particulates: June 1996	6
5 Gross Beta and Specific Gamma in Precipitation: April 1996	8
6 Gross Beta and Specific Gamma in Precipitation: May 1996	10
7 Gross Beta and Specific Gamma in Precipitation: June 1996	12
8 Tritium in Precipitation: April - June 1996	14
9 Plutonium and Uranium Analyses of Selected Precipitation Composite Samples: March - May 1996	17
10 Tritium in Surface Water: April - June 1996	20
11 Tritium in Drinking Water: April - June 1996	23
12 Radionuclides in Pasteurized Milk: April 1996	28
13 Radionuclides in Pasteurized Milk: May 1996	30
14 Radionuclides in Pasteurized Milk: June 1996	32

(This page intentionally left blank)

Preface

Environmental Radiation Data (ERD) is compiled and published quarterly by the Office of Radiation and Indoor Air's National Air and Radiation Environmental Laboratory (NAREL) in Montgomery, Alabama, and contains data from the Environmental Radiation Ambient Monitoring System (ERAMS). Data from similar networks operated by contributing States, Canada, Mexico, and the Pan American Health Organization are reported in the ERD when available. ERD is published in both hard-copy and electronic formats. Electronic reports are available online at www.epa.gov/narel.

The United States Environmental Protection Agency established ERAMS in 1973 with an emphasis on identifying trends in the accumulation of long-lived radionuclides in the environment. ERAMS is comprised of a nationwide network of sampling stations that provide air, precipitation, surface water, drinking water, and milk samples.

Sampling locations are selected to provide optimal population coverage while functioning to monitor fallout from nuclear devices and other forms of radioactive contamination of the environment. The radiation analyses performed on these samples include gross alpha and gross beta levels, gamma analyses, and radionuclide-specific analyses for uranium, plutonium, strontium, iodine, radium, and tritium. This monitoring effort also provides ancillary information on natural background levels and on routine and accidental releases into the environment from stationary sources.

The radiochemical procedures used by NAREL to analyze the ERAMS samples are contained in the *Eastern Environmental Radiation Facility Radiochemistry Procedures Manual* (EPA 520/5-84-006). Station operation and sample collection are in accordance with procedures contained in the *ERAMS Manual* (EPA 520/5-84-007, 008, 009).

(This page intentionally left blank)

Acknowledgments

All sampling for the Environmental Radiation Ambient Monitoring System (ERAMS) is performed by volunteer collectors who are frequently members of the health departments or related environmental agencies of their respective states. The National Air and Radiation Environmental Laboratory (NAREL) on behalf of the U.S. Environmental Protection Agency would like to acknowledge its indebtedness to these volunteer collectors who are so essential to the successful operation of ERAMS. The efforts of the sample collectors are especially appreciated during times of emergency operation when sampling frequencies are increased and schedules are sometimes demanding.

(This page intentionally left blank)

Data Reporting Conventions

Every laboratory measurement involves uncertainty. When there is little or no radioactivity in a sample, one consequence of measurement uncertainty is the possibility of obtaining a measured value that is less than zero. Such a negative result occurs when random effects in the measurement process cause the measured value for the sample to be less than that of the blank or background, which is subtracted from it. From April 1991 to December 1995, negative results were reported as “not detected” or “ND,” and gamma analysis results that were less than their estimated measurement uncertainties were also reported as “ND.” In January 1996 both of these practices were discontinued. Although negative activities are physically impossible, the inclusion of negative results in the report allows better statistical analysis of the data.

Results of gamma analyses are still reported as “ND” when gamma-emitting radionuclides are not detected.

Measurement Uncertainty

Each measured value y is reported with an expanded uncertainty $U = k u_c(y)$, which is determined from the combined standard uncertainty $u_c(y)$ and the coverage factor $k = 2$. The interval from $y - U$ to $y + U$ is estimated to have a level of confidence of approximately 95%.

Significant Figures

Expanded uncertainties are reported to two significant figures. Measurement results are rounded to the corresponding number of decimal places.

Detection Capability

The minimum detectable concentrations (MDCs) for each radionuclide are shown in Table 1. The MDC is defined as the minimum concentration that gives a 95% probability of detection when the detection criteria are chosen to give only a 5% probability of false detection in a blank sample.

(This page intentionally left blank)

Table 1**Reporting Units and Minimum Detectable Concentrations
for Radionuclide Analyses**

Radionuclide	Media	Reporting Unit	Minimum Detectable Concentration
Gross Alpha	Water	pCi/L	2
Gross Beta	Air	pCi/m ³	0.0015
	Water	pCi/L	2
	Precipitation	pCi/L	2
Tritium	Water	pCi/L	150
	Milk	pCi/L	150
* Plutonium-238,239/240	Air	aCi/m ³	0.75
	Water	pCi/L	0.1
† Uranium-234,235,238	Air	aCi/m ³	0.75
	Water	pCi/L	0.1
Radium-226	Water	pCi/L	0.02
Strontium-90	Milk	pCi/L	2
	Water	pCi/L	1
‡ Iodine-131	Milk (gamma)	pCi/L	4
	Water (gamma)	pCi/L	4
	Water	pCi/L	0.3
Cesium-137	Milk	pCi/L	5
	Water	pCi/L	5
‡ Barium-140	Milk	pCi/L	15
	Water	pCi/L	15
Potassium	Milk	g/L	0.06
	Water	g/L	0.06
Potassium-40	Water	pCi/L	50

* The MDC for air is based on an assumed total sample volume of 120,000 m³. Measurement by alpha spectrometry includes combined activities of ²³⁹Pu and ²⁴⁰Pu, since the relative contributions of these two isotopes cannot be determined.

† The MDC for air is based on an assumed total sample volume of 120,000 m³.

‡ Activity as of the day of counting.

(This page intentionally left blank)

1. Air Program

Airborne Particulates and Precipitation

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

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

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

The filters are sent to NAREL for more sensitive analyses in a low background beta counter. Gamma scans are performed on all filters showing gross beta counts greater than 1 pCi/m³. The laboratory obtained values are usually lower than the field estimates due to the decay of naturally occurring radionuclides between the times of the two measurements.

Precipitation samples are collected at those field stations collecting air filters. These samples are also sent to NAREL where they are composited monthly for gamma scans, tritium, and gross beta activity measurements. A composite of the March, April, and May precipitation samples is analyzed for plutonium-238, combined plutonium-239 and 240, and uranium-234, 235, and 238.

A compilation of individual measurements is available from the National Air and Radiation Environmental Laboratory, 540 South Morris Avenue, Montgomery, AL 36115-2601.

Table 2
Gross Beta in Airborne Particulates
April 1996

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
AK: Fairbanks	2	0.0	0.0	0.0	0.011	0.008	0.010
AL: Montgomery	9	0.2	0.0	0.0	0.015	0.007	0.010
AR: Little Rock	9	0.4	0.0	0.1	0.018	0.005	0.011
AZ: Phoenix	5	0.9	0.1	0.6	0.018	0.010	0.013
CA: Berkeley	9	0.1	0.0	0.0	0.010	0.003	0.005
CA: Los Angeles	9	0.3	0.0	0.1	0.028	0.006	0.011
CO: Denver	9	0.9	0.1	0.5	0.015	0.006	0.009
CT: Hartford	9	0.1	0.0	0.0	0.011	0.004	0.008
DE: Wilmington	9	0.2	0.0	0.1	0.014	0.007	0.010
FL: Jacksonville	8	0.1	0.0	0.1	0.011	0.006	0.009
FL: Miami	9	0.0	0.0	0.0	0.009	0.004	0.007
HI: Honolulu	9	0.2	0.1	0.1	0.005	0.002	0.004
IA: Iowa City	9	0.9	0.2	0.4	0.016	0.007	0.012
ID: Boise	9	0.4	0.1	0.2	0.008	0.003	0.007
ID: Idaho Falls	9				0.011	0.005	0.007
IN: Indianapolis	9	0.4	0.1	0.2	0.015	0.008	0.011
KS: Topeka	7	1.7	0.3	0.7	0.017	0.008	0.012
ME: Augusta	9	0.1	0.0	0.0	0.012	0.001	0.006
MI: Lansing	9	0.2	0.1	0.1	0.016	0.007	0.010
MN: Minneapolis	5	0.2	0.0	0.1	0.018	0.009	0.013
MN: Welch	3	1.1	0.0	0.4	0.010	0.007	0.008
MS: Jackson	9	0.2	0.0	0.1	0.015	0.008	0.011
NC: Charlotte	3	0.0	0.0	0.0	0.013	0.010	0.011
NC: Wilmington	5				0.013	0.005	0.010
ND: Bismarck	5	0.4	0.0	0.2	0.017	0.007	0.013
NH: Concord	9	0.1	0.0	0.1	0.013	0.003	0.007
NJ: Trenton	8	0.4	0.0	0.2	0.011	0.004	0.008
NM: Santa Fe	3	0.2	0.1	0.1	0.007	0.007	0.007
NV: Las Vegas	9	0.2	0.1	0.1	0.010	0.006	0.009
NY: Albany	4	0.1	0.0	0.0	0.016	0.006	0.011
NY: New York City	5	0.0	0.0	0.0	0.014	0.005	0.009
NY: Yaphank	8	0.1	0.0	0.0	0.014	0.005	0.008
OH: Painesville	8	0.2	0.0	0.1	0.014	0.006	0.010
OH: Ross	9				0.014	0.008	0.011
PA: Harrisburg	9	0.3	0.1	0.2	0.015	0.005	0.011
PA: Pittsburgh	9	0.2	0.1	0.1	0.015	0.009	0.011
SC: Barnwell	2	0.0	0.0	0.0	0.012	0.011	0.012
SC: Columbia	7	0.2	0.0	0.1	0.019	0.007	0.013

Table 2 (continued)
Gross Beta in Airborne Particulates
April 1996

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
SD: Pierre	9	0.3	0.0	0.2	0.018	0.008	0.012
TN: Knoxville	4	0.5	0.1	0.3	0.015	0.008	0.011
TN: Nashville	8	0.4	0.0	0.1	0.016	0.008	0.012
TN: Oak Ridge/Bethel	2	0.1	0.0	0.0	0.009	0.008	0.008
TX: Austin	6	0.2	0.1	0.1	0.012	0.007	0.010
TX: El Paso	9	1.6	0.2	0.6	0.020	0.008	0.013
UT: Salt Lake City	9	0.1	0.0	0.1	0.009	0.004	0.007
VA: Lynchburg	9	0.6	0.2	0.4	0.010	0.004	0.008
VA: Virginia Beach	1	0.0	0.0	0.0	0.012	0.012	0.012
WA: Olympia	8	0.1	0.0	0.0	0.006	0.002	0.003
WA: Spokane	9	0.2	0.1	0.1	0.011	0.003	0.006
WI: Madison	9	0.4	0.1	0.2	0.014	0.008	0.011

Table 3
Gross Beta in Airborne Particulates
May 1996

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
AK: Fairbanks	1	0.0	0.0	0.0	0.009	0.009	0.009
AL: Montgomery	9	0.2	0.0	0.1	0.016	0.007	0.011
AR: Little Rock	9	0.2	0.1	0.1	0.014	0.007	0.010
AZ: Phoenix	4	0.5	0.0	0.3	0.019	0.014	0.017
CA: Berkeley	9	0.1	0.0	0.1	0.008	0.002	0.005
CA: Los Angeles	9	0.3	0.0	0.1	0.015	0.005	0.009
CO: Denver	9	1.1	0.3	0.8	0.014	0.003	0.010
CT: Hartford	9	0.1	0.0	0.1	0.010	0.005	0.007
DE: Wilmington	9	0.1	0.0	0.1	0.013	0.005	0.009
FL: Jacksonville	9	0.1	0.0	0.1	0.010	0.007	0.008
FL: Miami	9	0.1	0.0	0.0	0.011	0.004	0.006
HI: Honolulu	9	0.2	0.1	0.1	0.006	0.003	0.004
IA: Iowa City	9	0.6	0.0	0.3	0.014	0.008	0.010
ID: Boise	8	0.6	0.1	0.2	0.014	0.005	0.009
ID: Idaho Falls	9				0.016	0.004	0.010
IN: Indianapolis	9	0.4	0.1	0.2	0.015	0.008	0.011
KS: Topeka	6	0.6	0.0	0.3	0.012	0.007	0.009
ME: Augusta	9	0.2	0.0	0.1	0.010	0.003	0.006
MI: Lansing	9	0.2	0.1	0.1	0.014	0.007	0.009
MN: Minneapolis	4	0.1	0.1	0.1	0.012	0.009	0.011
MN: Welch	9	0.4	0.0	0.2	0.013	0.005	0.009
MS: Jackson	8	0.3	0.1	0.2	0.021	0.008	0.013
NC: Charlotte	8	0.2	0.0	0.1	0.018	0.010	0.014
NC: Wilmington	4				0.009	0.008	0.009
ND: Bismarck	4	0.6	0.2	0.4	0.011	0.007	0.009
NH: Concord	9	0.1	0.0	0.1	0.010	0.004	0.006
NJ: Trenton	9	0.5	0.1	0.2	0.010	0.004	0.007
NM: Santa Fe	4	0.3	0.1	0.2	0.011	0.008	0.010
NV: Las Vegas	9	0.2	0.1	0.1	0.014	0.009	0.011
NY: Albany	5	0.1	0.0	0.0	0.008	0.006	0.007
NY: Yaphank	7	0.1	0.0	0.1	0.009	0.005	0.007
OH: Painesville	8	0.2	0.1	0.1	0.010	0.005	0.007
OH: Ross	9				0.016	0.008	0.011
PA: Harrisburg	9	0.2	0.0	0.1	0.013	0.004	0.009
PA: Pittsburgh	8	0.1	0.1	0.1	0.015	0.007	0.010
SC: Barnwell	2	0.0	0.0	0.0	0.014	0.010	0.012
SC: Columbia	8	0.3	0.0	0.2	0.033	0.009	0.016
SD: Pierre	1	0.1	0.1	0.1	0.008	0.008	0.008

Table 3 (continued)
Gross Beta in Airborne Particulates
May 1996

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
TN: Knoxville	8	0.3	0.0	0.2	0.027	0.010	0.017
TN: Nashville	8	0.2	0.1	0.1	0.020	0.008	0.012
TN: Oak Ridge/Bethel	9	0.7	0.0	0.2	0.016	0.007	0.010
TX: Austin	9	0.2	0.1	0.2	0.010	0.005	0.008
TX: El Paso	9	0.9	0.0	0.6	0.020	0.011	0.016
UT: Salt Lake City	9	0.4	0.1	0.1	0.016	0.007	0.011
VA: Lynchburg	9	0.8	0.2	0.4	0.012	0.002	0.009
WA: Olympia	8	0.1	0.0	0.0	0.012	0.002	0.005
WA: Spokane	9	0.2	0.1	0.1	0.016	0.004	0.007
WI: Madison	9	0.4	0.1	0.2	0.013	0.007	0.010

Table 4
Gross Beta in Airborne Particulates
June 1996

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
AL: Montgomery	8	0.2	0.0	0.1	0.040	0.008	0.014
AR: Little Rock	8	0.4	0.1	0.2	0.013	0.007	0.011
AZ: Phoenix	4	0.7	0.3	0.5	0.021	0.015	0.019
CA: Berkeley	7	0.1	0.0	0.0	0.004	0.003	0.003
CA: Los Angeles	8	0.1	0.0	0.1	0.013	0.004	0.009
CO: Denver	8	0.8	0.1	0.4	0.014	0.008	0.012
CT: Hartford	8	0.1	0.0	0.1	0.010	0.004	0.006
DE: Wilmington	8	0.3	0.0	0.2	0.027	0.008	0.013
FL: Jacksonville	8	0.1	0.0	0.0	0.009	0.004	0.006
FL: Miami	7	0.0	0.0	0.0	0.006	0.003	0.005
HI: Honolulu	6	0.2	0.1	0.1	0.005	0.001	0.003
IA: Iowa City	8	1.0	0.0	0.4	0.015	0.006	0.009
ID: Boise	8	0.8	0.3	0.4	0.016	0.004	0.011
ID: Idaho Falls	8				0.015	0.006	0.011
IN: Indianapolis	8	0.5	0.1	0.2	0.018	0.008	0.011
KS: Topeka	6	1.7	0.2	0.8	0.015	0.009	0.011
ME: Augusta	7	0.1	0.0	0.1	0.007	0.002	0.006
MI: Lansing	8	0.2	0.1	0.1	0.013	0.004	0.008
MN: Minneapolis	1	0.2	0.2	0.2	0.015	0.015	0.015
MN: Welch	8	0.6	0.0	0.2	0.010	0.004	0.007
MS: Jackson	8	0.8	0.1	0.3	0.016	0.006	0.011
NC: Charlotte	8	0.2	0.0	0.1	0.018	0.009	0.012
NC: Wilmington	4				0.009	0.007	0.007
ND: Bismarck	4	0.7	0.1	0.4	0.009	0.003	0.007
NH: Concord	8	0.2	0.0	0.1	0.009	0.002	0.006
NJ: Trenton	8	1.0	0.1	0.3	0.010	0.005	0.007
NM: Santa Fe	3	0.1	0.0	0.1	0.013	0.008	0.011
NV: Las Vegas	8	0.2	0.1	0.1	0.024	0.009	0.015
NY: Albany	4	0.1	0.0	0.0	0.009	0.005	0.008
NY: New York City	7	0.1	0.0	0.0	0.011	0.002	0.007
NY: Yaphank	8	0.1	0.0	0.0	0.011	0.004	0.006
OH: Painesville	8	0.2	0.1	0.1	0.015	0.006	0.009
OH: Ross	8				0.024	0.008	0.014
PA: Harrisburg	8	0.4	0.2	0.2	0.015	0.007	0.010
PA: Pittsburgh	8	0.1	0.1	0.1	0.017	0.008	0.010
SC: Barnwell	2	0.0	0.0	0.0	0.010	0.007	0.009
SC: Columbia	8	0.4	0.1	0.2	0.024	0.007	0.015
TN: Knoxville	6	0.6	0.0	0.2	0.019	0.011	0.015

Table 4 (continued)
Gross Beta in Airborne Particulates
June 1996

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
TN: Nashville	8	0.3	0.0	0.1	0.021	0.006	0.013
TN: Oak Ridge/Bethel	8	0.7	0.0	0.2	0.015	0.007	0.010
TN: Oak Ridge/Melton	2	0.3	0.2	0.3	0.015	0.009	0.012
TX: Austin	8	0.2	0.1	0.2	0.014	0.004	0.008
TX: El Paso	8	0.7	0.1	0.5	0.025	0.010	0.016
UT: Salt Lake City	8	0.3	0.0	0.1	0.016	0.009	0.012
VA: Lynchburg	8	1.0	0.3	0.6	0.012	0.008	0.010
VA: Virginia Beach	1	0.0	0.0	0.0	0.010	0.010	0.010
WA: Olympia	6	0.1	0.0	0.1	0.006	0.002	0.004
WA: Spokane	8	0.3	0.1	0.2	0.012	0.004	0.008
WI: Madison	8	0.3	0.0	0.2	0.013	0.006	0.008

Table 5
Gross Beta and Specific Gamma in Precipitation
April 1996

Location	Gross Beta Activity		Specific Gamma Activity		
	pCi/L $\pm 2\sigma$		Nuclide	pCi/L $\pm 2\sigma$	
AL: Montgomery	2.36	0.37	Be7	62	35
AR: Little Rock	1.20	0.29	Be7	69	33
			Tl208	2.3	3.4
CA: Berkeley	0.59	0.25		ND	
CO: Denver	9.64	0.71	Be7	47	23
CT: Hartford	2.51	0.38	Be7	72	32
DE: Wilmington	1.09	0.31	Be7	33	24
			Bi214	14.4	5.5
			Pb214	9.2	5.0
FL: Jacksonville	0.95	0.28		ND	
FL: Miami	1.04	0.31	Tl208	1.6	2.7
HI: Honolulu	1.70	0.34	Tl208	2.4	3.2
IA: Iowa City	3.20	0.44	Tl208	2.4	3.2
ID: Idaho Falls	3.43	0.44	Pb212	2.7	4.5
ME: Augusta	0.25	0.23		ND	
MI: Lansing	3.28	0.43	Tl208	2.8	3.3
MN: Minneapolis	1.71	0.34	Tl208	3.0	2.9
MS: Jackson	0.92	0.30		ND	
NC: Charlotte	2.93	0.42	Be7	92	47
			Tl208	3.5	5.0
NC: Wilmington	1.44	0.32	Be7	32	28
ND: Bismarck	11.70	0.79	Be7	112	41
NH: Concord	2.07	0.35	Be7	40	30
NJ: Trenton	1.30	0.31		ND	
NY: Albany	1.60	0.32	Be7	42	30
NY: Yaphank	1.62	0.34	Be7	66	48
OH: Painesville	1.76	0.34	Be7	60	36
			Pb214	6.0	6.3
OR: Portland	0.79	0.28		ND	
PA: Harrisburg	4.51	0.48	Be7	53	35
SC: Barnwell	2.16	0.36	Be7	33	34
SC: Columbia	1.04	0.29	Tl208	2.8	2.2
TN: Knoxville	0.92	0.28		ND	
TN: Nashville	1.17	0.30	Be7	49	45
TX: Austin	0.94	0.28		ND	
TX: El Paso	0.91	0.29		ND	
UT: Salt Lake City	0.80	0.26		ND	

Note: ND = Not detected.

Table 5 (continued)
Gross Beta and Specific Gamma in Precipitation
April 1996

Location	Gross Beta Activity		Specific Gamma Activity		
	pCi/L $\pm 2\sigma$		Nuclide	pCi/L $\pm 2\sigma$	
VA: Lynchburg	1.04	0.28		ND	
WA: Olympia	0.67	0.28	Pb212	3.6	7.2
			Tl208	4.5	2.8
WI: Madison	4.85	0.52	K40	19	36
			Tl208	2.6	3.1

Note: ND = Not detected.

Table 6
Gross Beta and Specific Gamma in Precipitation
May 1996

Location	Gross Beta Activity		Specific Gamma Activity		
	pCi/L $\pm 2\sigma$		Nuclide	pCi/L $\pm 2\sigma$	
AL: Montgomery	1.32	0.31		ND	
AR: Little Rock	1.42	0.32	Bi214	4.7	5.0
			K40	18	27
			Pb212	3.9	4.9
CA: Berkeley	0.32	0.22		ND	
CO: Denver	2.71	0.39	Be7	43	37
CT: Hartford	1.20	0.31	Be7	19	23
			Bi214	5.5	7.2
DE: Wilmington	1.82	0.34	Be7	50	22
FL: Jacksonville	1.16	0.29		ND	
FL: Miami	1.49	0.33		ND	
IA: Iowa City	0.96	0.29		ND	
ID: Boise	1.52	0.31	Tl208	2.3	3.3
ID: Idaho Falls	0.95	0.28	K40	18	27
			Tl208	1.4	2.9
ME: Augusta	0.81	0.27		ND	
MI: Lansing	0.87	0.27		ND	
MN: Minneapolis	0.92	0.27		ND	
MN: Welch	5.64	0.55	Pb212	3.2	4.4
			Ra224	21	23
NC: Charlotte	1.65	0.34	Be7	70	37
NC: Wilmington	0.55	0.24	Be7	40	28
ND: Bismarck	2.10	0.37		ND	
NE: Lincoln	2.54	0.38		ND	
NH: Concord	1.60	0.34	K40	24	33
NJ: Trenton	1.63	0.32		ND	
NV: Las Vegas	22.0	1.2	K40	36	38
			Pb212	8.1	5.4
NY: Albany	1.23	0.30	Be7	36	34
NY: Yaphank	2.03	0.36	Be7	33	28
OH: Painesville	2.53	0.39		ND	
OR: Portland	1.52	0.31		ND	
PA: Harrisburg	5.89	0.53	Be7	68	26
SC: Barnwell	2.06	0.35	Pb212	2.7	4.6
SC: Columbia	1.04	0.28		ND	
TN: Knoxville	1.52	0.31	Be7	53	28
TN: Nashville	1.02	0.29	Be7	60	54

Note: ND = Not detected.

Table 6 (continued)
Gross Beta and Specific Gamma in Precipitation
May 1996

Location	Gross Beta Activity		Specific Gamma Activity		
	pCi/L $\pm 2\sigma$		Nuclide	pCi/L $\pm 2\sigma$	
TX: Austin	1.91	0.37		ND	
UT: Salt Lake City	1.44	0.32	Pb212	2.9	4.5
VA: Lynchburg	8.78	0.64	Tl208	3.9	4.9
WA: Olympia	1.17	0.31	Be7	52	34
WI: Madison	1.07	0.29	Pb212	3.0	4.1
			Ra224	26	26

Note: ND = Not detected.

Table 7
Gross Beta and Specific Gamma in Precipitation
June 1996

Location	Gross Beta Activity		Specific Gamma Activity		
	pCi/L $\pm 2\sigma$		Nuclide	pCi/L $\pm 2\sigma$	
AL: Montgomery	1.20	0.35	Be7	17	19
			Tl208	1.3	2.7
AR: Little Rock	2.68	0.42	Be7	75	30
			Tl208	4.6	3.2
CO: Denver	2.58	0.37		ND	
CT: Hartford	2.42	0.37	Be7	65	26
DE: Wilmington	1.47	0.32	Be7	34	26
FL: Jacksonville	1.65	0.32	Be7	59	30
FL: Miami	0.92	0.37	Be7	17	18
HI: Honolulu	2.29	0.37		ND	
IA: Iowa City	0.58	0.28		ND	
ID: Boise	0.75	0.27		ND	
ME: Augusta	1.70	0.32	Be7	44	28
MI: Lansing	0.78	0.32		ND	
MN: Minneapolis	1.33	0.37		ND	
MN: Welch	0.68	0.32	Be7	39	31
MS: Jackson	0.52	0.31	Pb212	3.1	4.6
NC: Charlotte	3.37	0.41	Be7	83	41
NC: Wilmington	2.03	0.36	Be7	55	21
ND: Bismarck	1.69	0.39	Pb212	2.4	4.3
NE: Lincoln	0.91	0.32		ND	
NH: Concord	3.90	0.44	Be7	74	39
NJ: Trenton	4.16	0.46	Be7	42	23
NY: Albany	5.97	0.52	Be7	115	25
			Pb212	4.1	5.1
NY: Yaphank	1.56	0.33		ND	
OH: Painesville	4.01	0.48	Be7	57	39
OR: Portland	1.55	0.31		ND	
PA: Harrisburg	3.31	0.42	Be7	74	21
SC: Barnwell	1.77	0.36	Be7	33	27
SC: Columbia	2.02	0.40	Be7	61	31
TN: Knoxville	1.61	0.37		ND	
TN: Nashville	1.88	0.34	Be7	79	31
TX: Austin	0.76	0.30	Ra224	27	25
TX: El Paso	1.20	0.34		ND	
UT: Salt Lake City	1.81	0.34	Bi214	7.5	8.9
VA: Lynchburg	7.99	0.61		ND	

Note: ND = Not detected.

Table 7 (continued)
Gross Beta and Specific Gamma in Precipitation
June 1996

Location	Gross Beta Activity		Specific Gamma Activity	
	pCi/L $\pm 2\sigma$		Nuclide	pCi/L $\pm 2\sigma$
WA: Olympia	0.82	0.26		ND
WI: Madison	1.08	0.31		ND

Note: ND = Not detected.

Table 8
Tritium in Precipitation
April - June 1996

Location	April 1996		May 1996		June 1996	
	pCi/L $\pm 2u$		pCi/L $\pm 2u$		pCi/L $\pm 2u$	
AL: Montgomery	65	81	-4	72	34	81
AR: Little Rock	-82	72	18	76	90	130
CA: Berkeley	-58	73	44	76	NS	
CO: Denver	6	75	66	78	40	130
CT: Hartford	96	82	68	80	35	81
DE: Wilmington	52	80	63	80	0	80
FL: Jacksonville	15	79	-23	71	0	80
FL: Miami	10	78	-35	71	0	80
HI: Honolulu	-46	73	NS		-140	120
IA: Iowa City	-3	75	6	73	0	120
ID: Boise	NS		22	75	-80	120
ID: Idaho Falls	-35	73	27	76	NS	
ME: Augusta	53	80	31	79	36	82
MI: Lansing	26	76	-31	72	39	81
MN: Minneapolis	-12	74	-12	72	0	120
MN: Welch	NS		61	75	60	130
MS: Jackson	68	81	NS		42	82
NC: Charlotte	21	79	3	72	40	81
NC: Wilmington	55	80	-6	72	11	81
ND: Bismarck	-75	72	15	73	40	130
NE: Lincoln	NS		3	73	20	120
NH: Concord	89	82	8	78	45	82
NJ: Trenton	31	79	57	80	0	80
NV: Las Vegas	NS		6	75	NS	
NY: Albany	89	82	42	79	0	80
NY: Yaphank	78	81	39	73	42	82
OH: Painesville	55	77	19	73	90	140
OR: Portland	-50	73	54	77	-20	130
PA: Harrisburg	50	80	166	84	13	81
SC: Barnwell	55	77	116	77	209	88
SC: Columbia	50	80	13	73	63	83
TN: Knoxville	-38	74	-9	72	0	80
TN: Nashville	18	79	-27	71	31	81
TX: Austin	-32	74	0	76	20	120
TX: El Paso	-29	74	NS		-60	130
UT: Salt Lake City	-74	72	34	76	40	130
VA: Lynchburg	0	78	9	72	22	81
WA: Olympia	-40	73	70	78	-20	130

Note: NS = No sample.

Table 8 (continued)
Tritium in Precipitation
April - June 1996

Location	April 1996 pCi/L $\pm 2u$	May 1996 pCi/L $\pm 2u$	June 1996 pCi/L $\pm 2u$
WI: Madison	-40 73	-20 72	-40 130

Note: NS = No sample.

Plutonium and Uranium in Airborne Particulates and Precipitation

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

Concentrations of plutonium-238, combined plutonium-239 and 240, and uranium-234, 235, and 238 are determined by alpha spectrometry following chemical separation. The volume of air represented by the annual composite ranges from 120,000 to 500,000 cubic meters.

Plutonium and uranium results are published when they become available.

Table 9
Plutonium and Uranium Analyses
Selected Precipitation Composite Samples
March - May 1996

Location	²³⁸ Pu		²³⁹⁻²⁴⁰ Pu		²³⁴ U		²³⁵ U		²³⁸ U	
	pCi/L ± 2u		pCi/L ± 2u		pCi/L ± 2u		pCi/L ± 2u		pCi/L ± 2u	
AL: Montgomery	0.005	0.011	-0.0009	0.0013	0.0163	0.0080	0.0040	0.0044	0.0036	0.0042
AR: Little Rock	0.0000	0.0097	0.0030	0.0042	0.0096	0.0062	0.0044	0.0044	0.0065	0.0049
CA: Berkeley	0.0021	0.0033	-0.0003	0.0005	0.0153	0.0074	0.0038	0.0042	0.0043	0.0048
CO: Denver	0.0035	0.0049	0.0008	0.0025	0.092	0.019	0.026	0.010	0.044	0.013
CT: Hartford	0.0022	0.0031	0.0	0.0	0.0169	0.0089	0.0012	0.0038	0.0045	0.0053
DE: Wilmington	0.0025	0.0038	-0.0011	0.0012	0.0200	0.0079	0.0025	0.0032	0.0023	0.0027
FL: Jacksonville	0.0045	0.0072	0.0000	0.0024	0.0080	0.0054	0.0067	0.0051	0.0051	0.0043
FL: Miami	0.007	0.012	-0.0005	0.0033	0.022	0.010	0.0027	0.0038	0.0086	0.0064
HI: Honolulu	-0.0004	0.0077	-0.0008	0.0011	0.0156	0.0086	0.0037	0.0051	0.0014	0.0030
ID: Boise	-0.0007	0.0074	-0.0007	0.0010	0.0114	0.0071	0.0100	0.0073	0.0057	0.0050
ID: Idaho Falls	0.0013	0.0097	0.0013	0.0027	0.0311	0.0099	0.0111	0.0066	0.0065	0.0046
ME: Augusta	-0.0042	0.0064	-0.0014	0.0014	0.023	0.011	0.0067	0.0060	0.0086	0.0064
MI: Lansing	-0.0009	0.0010	0.0025	0.0029	0.0138	0.0067	0.0016	0.0028	0.0097	0.0056
MN: Minneapolis	0.011	0.010	0.0011	0.0034	0.0202	0.0092	0.0020	0.0044	0.0132	0.0075
MN: Welch	-0.004	0.014	-0.0014	0.0020	0.047	0.020	0.013	0.012	0.024	0.015
MS: Jackson	0.009	0.011	0.0015	0.0030	0.0145	0.0080	0.0134	0.0084	0.0137	0.0081
NC: Charlotte	0.0026	0.0097	-0.0009	0.0012	0.0101	0.0062	0.0085	0.0060	0.0151	0.0074
NC: Wilmington	0.0023	0.0072	0.0019	0.0033	0.0218	0.0086	0.0047	0.0045	0.0106	0.0061
ND: Bismarck	0.003	0.010	0.0034	0.0053	0.079	0.020	0.019	0.011	0.043	0.014
NE: Lincoln	0.0043	0.0082	-0.0007	0.0009	0.049	0.016	0.0129	0.0087	0.028	0.011
NH: Concord	0.0000	0.0063	0.0	0.0	0.0195	0.0087	0.0113	0.0074	0.0240	0.0098
NJ: Trenton	0.0017	0.0078	0.0003	0.0022	0.0123	0.0069	0.0018	0.0031	0.0044	0.0044
NV: Las Vegas	0.016	0.019	-0.0013	0.0027	0.261	0.066	0.018	0.020	0.101	0.042
NY: Albany	0.0025	0.0075	0.0039	0.0043	0.0229	0.0082	0.0043	0.0039	0.0094	0.0052
NY: Yaphank	0.0020	0.0076	-0.0008	0.0011	0.0141	0.0068	0.0051	0.0048	0.0077	0.0051
OH: Painesville	-0.0049	0.0047	-0.0013	0.0013	0.0077	0.0063	0.0083	0.0071	0.0035	0.0045
OR: Portland	0.0027	0.0098	0.0014	0.0027	0.0300	0.0095	0.0111	0.0064	0.0129	0.0063
PA: Harrisburg	0.0012	0.0080	-0.0004	0.0028	0.038	0.012	0.0103	0.0065	0.0098	0.0060
SC: Barnwell	-0.0017	0.0066	-0.0017	0.0016	0.0153	0.0072	0.0069	0.0052	0.0085	0.0055
SC: Columbia	0.0023	0.0062	-0.0007	0.0025	0.0126	0.0065	0.0070	0.0053	0.0039	0.0038
TN: Knoxville	-0.0008	0.0073	-0.0004	0.0008	0.0111	0.0057	0.0043	0.0038	0.0043	0.0035
TN: Nashville	0.0047	0.0040	0.0	0.0	0.0074	0.0068	0.0014	0.0043	0.0016	0.0044
TX: Austin	0.0019	0.0030	0.0005	0.0015	0.0119	0.0066	0.0017	0.0030	0.0061	0.0054
TX: El Paso	0.0053	0.0098	-0.0009	0.0018	0.043	0.022	0.012	0.014	0.036	0.020
UT: Salt Lake City	-0.0025	0.0072	-0.0004	0.0026	0.0196	0.0078	0.0021	0.0032	0.0102	0.0056
VA: Lynchburg	0.0016	0.0074	0.0026	0.0035	0.050	0.013	0.0083	0.0056	0.0080	0.0052
WA: Olympia	-0.0011	0.0072	-0.0011	0.0013	0.0176	0.0072	0.0051	0.0042	0.0052	0.0041
WI: Madison	0.0028	0.0073	-0.0009	0.0011	0.0209	0.0098	0.0039	0.0045	0.0065	0.0053

Note: NA = No analysis.

2. Water Program

The ERAMS water program provides data on radionuclide concentrations in the nation's rivers, streams, and drinking water supplies.

Surface Water

Quarterly grab samples are taken downstream from operating or future nuclear facilities at 58 stations. Surface water samples are analyzed for tritium quarterly and gamma-emitting radionuclides annually. Tritium is a primary potential radioactive pollutant from nuclear power plants and weapons production activities.

Table 10
Tritium in Surface Water
April - June 1996

Location	Source	Date Collected	³ H pCi/L ± 2u	
AL: Decatur	Tennessee River	04/24/96	93	76
AL: Gordon	Chattahoochee River	04/03/96	-9	72
AL: Scottsboro	Tennessee River	04/23/96	50	74
AR: Little Rock	Arkansas River	04/02/96	17	72
CA: Clay Station	Folsom S. Canal	04/23/96	46	74
CA: Diablo Canyon	Pacific Ocean	04/02/96	-50	69
CA: Eureka	Humboldt Bay	04/11/96	-32	72
CA: San Onofre	Pacific Ocean	06/27/96	36	71
CO: Platteville	South Platte River	04/03/96	4	71
CT: E. Haddam	Connecticut River	05/20/96	15	78
CT: Waterford	Long Island Sound	05/16/96	34	79
FL: Crystal River	Gulf Of Mexico	04/02/96	15	72
FL: Ft. Pierce	Atlantic Ocean	04/09/96	-14	74
FL: Homestead	Biscayne Bay	04/19/96	-3	73
GA: Baxley	Altamaha River	06/25/96	43	76
IA: Cedar Rapids	Cedar River	04/10/96	47	77
ID: Buhl	Snake River	04/09/96	55	80
IL: Moline	Mississippi River	04/03/96	1	71
IL: Morris	Illinois River	04/01/96	203	84
IL: Zion	Lake Michigan	05/15/96	10	74
KS: Le Roy	Neosho River	04/02/96	-10	71
KS: Le Roy	Neosho River	06/25/96	97	78
LA: New Orleans	Mississippi River	04/30/96	19	79
MA: Plymouth	Cape Cod Bay	04/29/96	-9	72
MD: Conowingo	Susquehanna River	04/11/96	24	76
MD: Lusby	Chesapeake Bay	04/08/96	49	80
ME: Wiscasset	Montseway Bay	04/10/96	107	79
MI: Bridgman	Lake Michigan	04/09/96	66	76
MI: Bridgman	Lake Michigan	04/09/96	57	76
MI: Charlevoix	Lake Michigan	04/04/96	38	73
MI: Charlevoix	Lake Michigan	06/11/96	84	73
MI: Monroe	Lake Erie	04/08/96	124	82
MI: S. Haven	Lake Michigan	04/09/96	-19	73
MI: S. Haven	Lake Michigan	04/09/96	26	74
MN: Monticello	Mississippi River	04/15/96	9	74
MN: Red Wing	Mississippi River	04/08/96	60	77
MS: Port Gibson	Mississippi River	04/02/96	-1	70
NC: Charlotte	Catawba River	04/15/96	263	84
NC: Southport	Atlantic Ocean	04/11/96	-38	72
NE: Rulo	Missouri River	04/17/96	40	75

Table 10 (continued)
Tritium in Surface Water
April - June 1996

Location	Source	Date Collected	³ H pCi/L ± 2 <i>u</i>	
NJ: Bayside	Delaware River	04/16/96	-22	73
NJ: Oyster Creek	Oyster Creek	04/18/96	-22	73
NY: Chelsea	Hudson River	04/22/96	13	73
NY: Croton-On-Hudson	Hudson River	04/08/96	-17	74
NY: Oswego	Lake Ontario	06/20/96	119	79
OH: Toledo	Lake Erie	04/16/96	-6	74
OR: Bradwood	Columbia River	05/15/96	-7	74
PA: Danville	Susquehanna River	04/10/96	36	76
PA: Philadelphia	Delaware River - Baxter	04/04/96	-20	70
PA: Philadelphia	Schuylkill River - Belmont	04/04/96	32	72
PA: Philadelphia	Schuylkill River - Queen Lane	04/04/96	39	72
SC: Allendale	Savannah River	04/01/96	518	95
SC: Broad River	Broad River	04/17/96	335	86
SC: Hartsville	Lake Robinson	04/15/96	638	95
TN: Daisy	Tennessee River	04/16/96	82	77
TN: Kingston	Clinch River	04/16/96	1450	120
TN: Oak Ridge	Clinch River	04/25/96	760	100
TX: El Paso	Rio Grande	05/03/96	-16	72
TX: Matagorda	Colorado River	04/11/96	-22	73
VA: Doswell	North Anna River	04/03/96	2690	140
VA: Newport News	James River	04/11/96	65	75
VT: Vernon	Connecticut River	04/03/96	17	71
WA: Northport	Columbia River	04/03/96	-6	69
WA: Richland	Columbia River	04/10/96	18	78
WI: Two Creeks	Lake Michigan	04/09/96	275	88
WI: Victory	Mississippi River	04/02/96	41	73
WV: Wheeling	Ohio River	04/01/96	73	78

Drinking Water

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

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

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

Table 11
Tritium in Drinking Water
April - June 1996

Location	Date Collected	³ H pCi/L ± 2 <i>u</i>	
AK: Fairbanks	04/16/96	6	73
AL: Dothan	04/03/96	-59	70
AL: Muscle Shoals	04/24/96	98	76
AL: Scottsboro	04/23/96	143	77
AR: Little Rock	04/02/96	48	72
CA: Berkeley	04/01/96	1	71
CA: Los Angeles	04/02/96	71	79
CO: Denver	04/03/96	68	78
CO: Platteville	04/03/96	39	71
CT: Hartford	04/01/96	85	79
DC: Washington	04/16/96	47	76
DE: Dover	04/16/96	-78	71
FL: Miami	04/16/96	-62	71
FL: Tampa	04/30/96	9	72
GA: Baxley	06/25/96	0	74
GA: Savannah	06/11/96	16	78
HI: Honolulu	04/01/96	-25	70
IA: Cedar Rapids	04/10/96	96	79
ID: Boise	04/01/96	36	77
ID: Idaho Falls	04/23/96	71	75
IL: W. Chicago	04/29/96	-70	69
KS: Topeka	04/01/96	71	78
LA: New Orleans	04/04/96	58	72
MA: Lawrence	04/02/96	-4	70
MD: Baltimore	04/01/96	4	70
MD: Conowingo	04/11/96	44	77
ME: Augusta	04/03/96	12	71
MI: Detroit	04/04/96	179	77
MI: Grand Rapids	04/18/96	26	75
MN: Minneapolis	04/29/96	36	74
MN: Red Wing	04/22/96	-40	71
MO: Jefferson City	04/02/96	52	72
MS: Jackson	04/02/96	-24	69
MS: Port Gibson	04/02/96	-35	69
MT: Helena	04/30/96	19	73
NC: Charlotte	04/15/96	352	87
NC: Wilmington	04/11/96	96	77
ND: Bismarck	04/01/96	47	77
NE: Lincoln	04/19/96	-33	72
NH: Concord	04/02/96	-3	71

Table 11 (continued)
Tritium in Drinking Water
April - June 1996

Location	Date Collected	³ H pCi/L ± 2 <i>u</i>	
NJ: Trenton	04/15/96	-50	72
NJ: Waretown	04/18/96	-70	71
NM: Santa Fe	06/06/96	97	81
NV: Las Vegas	04/01/96	46	72
NY: Albany	04/02/96	53	78
NY: Niagara Falls	04/08/96	146	83
NY: Syracuse	05/30/96	100	81
OH: Cincinnati	05/29/96	79	80
OH: Columbus	05/02/96	-6	75
OH: E. Liverpool	05/10/96	36	79
OH: E. Liverpool	05/30/96	19	78
OH: Painesville	05/15/96	151	83
OH: Toledo	04/09/96	157	83
OK: Oklahoma City	04/02/96	42	77
OR: Portland	04/04/96	-3	70
PA: Columbia	04/12/96	101	78
PA: Philadelphia - Belmont	04/04/96	59	72
PA: Philadelphia - Baxter	04/04/96	26	71
PA: Philadelphia - Queen Lane	04/04/96	43	72
PA: Pittsburgh	04/12/96	-7	73
PA: Pittsburgh	05/10/96	0	78
PC: Corozal	04/03/96	10	72
RI: Providence	04/01/96	77	79
SC: Barnwell	04/10/96	75	78
SC: Columbia	04/02/96	190	83
SC: Jenkinsville	04/08/96	80	74
SC: Seneca	04/09/96	48	79
TN: Chattanooga	04/03/96	16	74
TN: Knoxville	04/08/96	55	72
TN: Oak Ridge - Anderson Co. #768	06/11/96	77	80
TN: Oak Ridge - Anderson Co. #772	06/11/96	56	79
TN: Oak Ridge - Knox Co. #371	06/14/96	88	80
TN: Oak Ridge - Roane Co. #360	06/14/96	50	79
TN: Oak Ridge - Roane Co. #4442	06/14/96	365	91
TX: Austin	04/24/96	7	72
VA: Doswell	04/02/96	19	71
VA: Doswell	06/27/96	74	77
VA: Lynchburg	04/05/96	32	72
VA: Virginia Beach	05/10/96	7	75
WA: Richland	04/10/96	97	81

Table 11 (continued)
Tritium in Drinking Water
April - June 1996

Location	Date Collected	³ H pCi/L ± 2 <i>u</i>	
WA: Seattle	04/02/96	13	76
WI: Genoa City	04/02/96	4	71
WI: Madison	04/04/96	22	72

3. Milk Program

Pasteurized Milk

Milk is a reliable indicator of the general population's intake of radionuclides since it is consumed fresh by a large segment of the population and can contain several of the biologically significant radionuclides that result from environmental releases from nuclear activities. A primary function of this program is to obtain reliable monitoring data relative to current radionuclide concentrations and determine any long-term trends.

Monthly samples are collected at approximately 55 sampling sites with at least one located in each state, Puerto Rico, and the Panama Canal Zone. The samples are composited, according to production, from the major milk suppliers representing more than 80 percent of the milk consumed in a given population center.

The samples are analyzed for gamma-emitting nuclides, including iodine-131, barium-140, cesium-137, and potassium-40. Total potassium concentrations in g/L are determined from potassium-40 activities assuming natural isotopic abundances. All samples collected in July are analyzed for strontium-90.

Iodine-131, barium-140, cesium-137, and potassium-40 are determined by gamma spectral analysis. Strontium-90 is determined by beta counting a total strontium precipitate that has been chemically separated by ion exchange.

Table 12
Radionuclides in Pasteurized Milk
April 1996

Location	Date Collected	K g/L $\pm 2u$		¹³⁷ Cs pCi/L $\pm 2u$		¹⁴⁰ Ba pCi/L $\pm 2u$	¹³¹ I pCi/L $\pm 2u$
AL: Montgomery	04/05/96	1.597	0.079	ND		ND	ND
AR: Little Rock	04/15/96	1.537	0.078	ND		ND	ND
CA: Los Angeles	04/12/96	1.704	0.091	ND		ND	ND
CA: Sacramento	04/08/96	1.621	0.091	ND		ND	ND
CA: San Francisco	04/04/96	1.668	0.068	ND		ND	ND
CO: Denver	04/02/96	1.644	0.079	ND		ND	ND
DE: Wilmington	04/10/96	1.585	0.080	ND		ND	ND
FL: Tampa	04/03/96	1.668	0.082	2.6	2.1	ND	ND
GA: Atlanta	04/10/96	1.501	0.078	ND		ND	ND
HI: Honolulu	04/23/96	1.728	0.090	ND		ND	ND
IA: Des Moines	04/01/96	1.716	0.092	ND		ND	ND
IN: Indianapolis	04/09/96	1.44	0.14	ND		ND	ND
KS: Wichita	04/23/96	1.66	0.14	ND		ND	ND
KY: Louisville	04/03/96	1.609	0.087	ND		ND	ND
MA: Boston	04/08/96	1.692	0.091	ND		ND	ND
MD: Baltimore	04/04/96	1.680	0.093	ND		ND	ND
ME: Portland	04/04/96	1.740	0.093	ND		ND	ND
MI: Detroit	04/18/96	1.56	0.10	ND		ND	ND
MI: Grand Rapids	04/08/96	1.632	0.067	ND		ND	ND
MN: St. Paul	04/01/96	1.704	0.092	ND		ND	ND
MO: Kansas City	04/23/96	1.609	0.079	ND		ND	ND
MS: Jackson	04/02/96	1.525	0.075	ND		ND	ND
NC: Charlotte	04/09/96	1.597	0.080	ND		ND	ND
ND: Minot	04/01/96	1.489	0.074	ND		ND	ND
NJ: Trenton	04/10/96	1.67	0.12	ND		ND	ND
NM: Albuquerque	04/22/96	1.54	0.14	ND		ND	ND
NV: Las Vegas	04/08/96	1.48	0.14	ND		ND	ND
NY: Buffalo	04/04/96	1.680	0.092	ND		ND	ND
NY: Syracuse	04/09/96	1.692	0.083	ND		ND	ND
OH: Cincinnati	04/30/96	1.561	0.089	ND		ND	ND
OH: Cleveland	04/15/96	1.66	0.12	ND		ND	ND
OR: Portland	04/01/96	1.716	0.093	ND		ND	ND
PA: Philadelphia	04/08/96	1.537	0.087	ND		ND	ND
PA: Pittsburgh	04/08/96	1.597	0.090	ND		ND	ND
PR: San Juan	04/18/96	1.597	0.075	ND		ND	ND
SC: Charleston	04/17/96	1.501	0.089	ND		ND	ND
SD: Rapid City	04/03/96	1.466	0.088	ND		ND	ND
TN: Memphis	04/24/96	1.668	0.068	ND		ND	ND
TX: Ft. Worth	04/30/96	1.656	0.092	ND		ND	ND

Note: ND = Not detected

Table 12 (continued)
Radionuclides in Pasteurized Milk
April 1996

Location	Date Collected	K g/L $\pm 2u$		¹³⁷ Cs pCi/L $\pm 2u$	¹⁴⁰ Ba pCi/L $\pm 2u$	¹³¹ I pCi/L $\pm 2u$
VA: Norfolk	04/30/96	1.561	0.077	ND	ND	ND
VT: Burlington	04/29/96	1.501	0.074	ND	ND	ND
WA: Seattle	04/01/96	1.609	0.090	ND	ND	ND
WA: Spokane	04/09/96	1.609	0.091	ND	ND	ND
WV: Charleston	04/08/96	1.668	0.092	ND	ND	ND

Note: ND = Not detected

Table 13
Radionuclides in Pasteurized Milk
May 1996

Location	Date Collected	K g/L $\pm 2u$		¹³⁷ Cs pCi/L $\pm 2u$		¹⁴⁰ Ba pCi/L $\pm 2u$	¹³¹ I pCi/L $\pm 2u$
AL: Montgomery	05/02/96	1.501	0.090	ND		ND	ND
AR: Little Rock	05/07/96	1.47	0.10	ND		ND	ND
AZ: Phoenix	05/03/96	1.537	0.076	ND		ND	ND
CA: Los Angeles	05/07/96	1.585	0.080	ND		ND	ND
CA: Sacramento	05/30/96	1.50	0.14	ND		ND	ND
CA: San Francisco	05/02/96	1.61	0.10	ND		ND	ND
CO: Denver	05/02/96	1.418	0.072	ND		ND	ND
CT: Hartford	05/07/96	1.56	0.10	ND		ND	ND
DE: Wilmington	05/23/96	1.680	0.080	ND		ND	ND
FL: Tampa	05/06/96	1.692	0.081	ND		ND	ND
GA: Atlanta	05/01/96	1.55	0.10	ND		ND	ND
HI: Honolulu	05/22/96	1.78	0.15	ND		ND	ND
IA: Des Moines	05/13/96	1.621	0.079	ND		ND	ND
IL: Chicago	05/23/96	1.609	0.080	ND		ND	ND
KS: Wichita	05/14/96	1.53	0.10	ND		ND	ND
KY: Louisville	05/16/96	1.644	0.082	ND		ND	ND
MA: Boston	05/06/96	1.609	0.067	ND		ND	ND
MD: Baltimore	05/03/96	1.680	0.082	ND		ND	ND
ME: Portland	05/16/96	1.573	0.077	ND		ND	ND
MI: Detroit	05/16/96	1.561	0.091	ND		ND	ND
MI: Grand Rapids	05/06/96	1.621	0.068	ND		ND	ND
MN: St. Paul	05/06/96	1.585	0.076	ND		ND	ND
MO: Kansas City	05/08/96	1.644	0.091	ND		ND	ND
MS: Jackson	05/06/96	1.609	0.088	ND		ND	ND
NC: Charlotte	05/07/96	1.632	0.091	ND		ND	ND
ND: Minot	05/17/96	1.63	0.14	ND		ND	ND
NJ: Trenton	05/08/96	1.63	0.12	ND		ND	ND
NV: Las Vegas	05/13/96	1.656	0.091	ND		ND	ND
NY: Buffalo	05/08/96	1.656	0.081	ND		ND	ND
NY: Syracuse	05/06/96	1.573	0.076	ND		ND	ND
OH: Cincinnati	05/08/96	1.53	0.11	ND		ND	ND
OH: Cleveland	05/13/96	1.668	0.080	ND		ND	ND
OR: Portland	05/07/96	1.668	0.068	ND		ND	ND
PA: Philadelphia	05/08/96	1.609	0.092	ND		ND	ND
PA: Pittsburgh	05/07/96	1.573	0.066	ND		ND	ND
PC: Cristobal	05/02/96	1.597	0.080	3.4	2.3	ND	ND
PC: Cristobal	05/23/96	1.585	0.091	3.9	2.7	ND	ND
PR: San Juan	05/10/96	1.537	0.089	ND		ND	ND
SC: Charleston	05/16/96	1.537	0.088	ND		ND	ND

Note: ND = Not detected

Table 13 (continued)
Radionuclides in Pasteurized Milk
May 1996

Location	Date Collected	K g/L $\pm 2u$	¹³⁷ Cs pCi/L $\pm 2u$	¹⁴⁰ Ba pCi/L $\pm 2u$	¹³¹ I pCi/L $\pm 2u$
TN: Chattanooga	05/07/96	1.621 0.091	ND	ND	ND
TN: Knoxville	05/06/96	1.60 0.10	ND	ND	ND
TN: Memphis	05/21/96	1.621 0.068	ND	ND	ND
TX: Austin	05/14/96	1.60 0.14	ND	ND	ND
TX: Ft. Worth	05/06/96	1.680 0.081	ND	ND	ND
VT: Burlington	05/24/96	1.621 0.080	ND	ND	ND
WA: Seattle	05/07/96	1.656 0.079	ND	ND	ND
WA: Spokane	05/14/96	1.656 0.093	ND	ND	ND
WV: Charleston	05/06/96	1.57 0.10	ND	ND	ND

Note: ND = Not detected

Table 14
Radionuclides in Pasteurized Milk
June 1996

Location	Date Collected	K g/L $\pm 2u$		¹³⁷ Cs pCi/L $\pm 2u$		¹⁴⁰ Ba pCi/L $\pm 2u$	¹³¹ I pCi/L $\pm 2u$
AL: Montgomery	06/18/96	1.537	0.087	ND		ND	ND
AR: Little Rock	06/05/96	1.585	0.082	ND		ND	ND
AZ: Phoenix	06/26/96	1.656	0.088	ND		ND	ND
CA: Los Angeles	06/06/96	1.668	0.080	ND		ND	ND
CA: Sacramento	06/19/96	1.62	0.14	ND		ND	ND
CA: San Francisco	06/06/96	1.585	0.076	ND		ND	ND
CO: Denver	06/12/96	1.561	0.095	ND		ND	ND
CT: Hartford	06/03/96	1.60	0.11	ND		ND	ND
DE: Wilmington	06/25/96	1.62	0.11	ND		ND	ND
FL: Tampa	06/05/96	1.58	0.11	3.6	3.0	ND	ND
GA: Atlanta	06/18/96	1.585	0.079	ND		ND	ND
HI: Honolulu	06/25/96	1.740	0.068	ND		ND	ND
IA: Des Moines	06/03/96	1.656	0.092	ND		ND	ND
IL: Chicago	06/05/96	1.609	0.082	ND		ND	ND
IN: Indianapolis	06/11/96	1.478	0.076	ND		ND	ND
KS: Wichita	06/12/96	1.597	0.079	ND		ND	ND
KY: Louisville	06/04/96	1.632	0.068	ND		ND	ND
MA: Boston	06/07/96	1.632	0.068	ND		ND	ND
MD: Baltimore	06/07/96	1.573	0.089	ND		ND	ND
ME: Portland	06/04/96	1.692	0.068	ND		ND	ND
MI: Detroit	06/12/96	1.656	0.078	ND		ND	ND
MI: Grand Rapids	06/03/96	1.64	0.11	ND		ND	ND
MN: St. Paul	06/04/96	1.656	0.091	ND		ND	ND
MO: Kansas City	06/03/96	1.632	0.092	ND		ND	ND
MS: Jackson	06/03/96	1.585	0.089	ND		ND	ND
NC: Charlotte	06/04/96	1.609	0.078	ND		ND	ND
NJ: Trenton	06/05/96	1.573	0.079	ND		ND	ND
NY: Buffalo	06/07/96	1.632	0.079	ND		ND	ND
NY: Syracuse	06/03/96	1.537	0.081	ND		ND	ND
OH: Cincinnati	06/12/96	1.58	0.14	ND		ND	ND
OH: Cleveland	06/12/96	1.621	0.091	ND		ND	ND
OR: Portland	06/03/96	1.656	0.079	ND		ND	ND
PA: Philadelphia	06/04/96	1.621	0.092	ND		ND	ND
PA: Pittsburgh	06/03/96	1.609	0.079	ND		ND	ND
PC: Cristobal	06/23/96	1.45	0.10	7.1	3.0	ND	ND
PR: San Juan	06/07/96	1.644	0.068	ND		ND	ND
SC: Charleston	06/04/96	1.58	0.14	ND		ND	ND
SD: Rapid City	06/12/96	1.55	0.12	ND		ND	ND
TN: Chattanooga	06/03/96	1.609	0.080	ND		ND	ND

Note: ND = Not detected

Table 14 (continued)
Radionuclides in Pasteurized Milk
June 1996

Location	Date Collected	K g/L $\pm 2u$	¹³⁷ Cs pCi/L $\pm 2u$	¹⁴⁰ Ba pCi/L $\pm 2u$	¹³¹ I pCi/L $\pm 2u$
TN: Knoxville	06/03/96	1.61 0.12	ND	ND	ND
TN: Memphis	06/12/96	1.585 0.080	ND	ND	ND
TX: Austin	06/11/96	1.525 0.075	ND	ND	ND
TX: Ft. Worth	06/10/96	1.597 0.090	ND	ND	ND
VA: Norfolk	06/06/96	1.609 0.091	ND	ND	ND
VT: Burlington	06/25/96	1.609 0.067	ND	ND	ND
WA: Seattle	06/07/96	1.51 0.10	ND	ND	ND
WA: Spokane	06/03/96	1.478 0.091	ND	ND	ND
WV: Charleston	06/04/96	1.561 0.077	ND	ND	ND

Note: ND = Not detected

For More Information

Environmental Radiation Data (ERD) is published quarterly by the U.S. Environmental Protection Agency's Office of Radiation and Indoor Air.

Requests for information concerning the operation of ERAMS and the data that are generated should be directed as follows:

For System Operations—

Rhonda Sears
National Air and Radiation Environmental
Laboratory
540 South Morris Avenue
Montgomery, Alabama 36115-2601
e-mail: sears.rhonda@epa.gov

For Analytical Information and Data—

John Griggs
National Air and Radiation Environmental
Laboratory
540 South Morris Avenue
Montgomery, Alabama 36115-2601
e-mail: griggs.john@epa.gov

Requests for information concerning publication and distribution of ERD should be directed to:

Charles M. Petko
Office of the Director
National Air and Radiation Environmental Laboratory
540 South Morris Avenue
Montgomery, Alabama 36115-2601
e-mail: petko.charles@epa.gov

Requests for information concerning policies of the Office of Radiation and Indoor Air should be directed to:

William C. Conklin
USEPA - ORIA
Center for Emergency Preparedness and Clean Materials
Radiation Protection Division (MC66085)
501 Third Street, N.W.
Washington, DC 20001
e-mail: conklin.craig@epa.gov

(This page intentionally left blank)