402-R-03-007

ENVIRONMENTAL RADIATION DATA

REPORT 114

April - June 2003

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 12

2. Drinking Water Program 13

3. Milk Program 17
    Pasteurized Milk 17

(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 2003	2
3	Gross Beta in Airborne Particulates: May 2003	4
4	Gross Beta in Airborne Particulates: June 2003	6
5	Gross Beta and Specific Gamma in Precipitation: April 2003	8
6	Gross Beta and Specific Gamma in Precipitation: May 2003	9
7	Gross Beta and Specific Gamma in Precipitation: June 2003	10
8	Tritium in Precipitation: April - June 2003	11
9	Tritium in Drinking Water: April - June 2003	14
10	Radionuclides in Pasteurized Milk: April - June 2003	18

(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). 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 particulate, precipitation, drinking water, and milk samples.

Sampling locations are selected to provide population and geographic coverage for the United States. The radiation analyses performed on these samples include gross alpha and gross beta analysis, 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 *NAREL Radiochemistry Procedures Manual*. 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 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 the time and effort of 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/m³	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/m³	0.75
	Water	pCi/L	0.1
† Uranium-234,235,238	Air	aCi/m³	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 ^{239}Pu and ^{240}Pu, 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 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 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 analysis in a low background beta counter. Gamma scans are performed on all filters showing gross beta activity greater than 1 pCi/m^3. The laboratory obtained values are usually lower than the field estimates because of the decay of naturally occurring radionuclides during the time between the two measurements.

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

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 2003

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min	Avg	Max	Min	Avg
		(pCi/m³)			(pCi/m³)		
AK: Fairbanks	1	0.0	0.0	0.0	0.027	0.027	0.027
AL: Montgomery/408	9	0.3	0.0	0.1	0.013	0.006	0.008
AL: Montgomery/411	9	0.4	0.0	0.1	0.014	0.007	0.010
AR: Little Rock	8	0.2	0.0	0.1	0.018	0.009	0.012
AZ: Phoenix	5	1.0	0.1	0.4	0.018	0.009	0.013
CA: Berkeley	9	0.1	0.0	0.0	0.008	0.002	0.005
CA: Los Angeles	9	0.2	0.1	0.1	0.011	0.004	0.007
CO: Denver	8	0.7	0.3	0.5	0.013	0.007	0.010
CT: Hartford	8	0.1	0.0	0.0	0.012	0.003	0.008
DE: Wilmington	9	0.2	0.0	0.1	0.016	0.005	0.009
FL: Jacksonville	8	0.1	0.0	0.1	0.011	0.004	0.008
FL: Miami	4	0.0	0.0	0.0	0.008	0.005	0.007
HI: Honolulu	5	0.0	0.0	0.0	0.009	0.004	0.006
IA: Iowa City	8	0.9	0.1	0.4	0.017	0.009	0.014
ID: Idaho Falls	8				0.012	0.004	0.008
IL: Chicago	6	0.7	0.0	0.2	0.018	0.012	0.015
IN: Indianapolis	9	1.0	0.1	0.3	0.016	0.007	0.010
ME: Augusta	7	0.1	0.0	0.0	0.017	0.006	0.011
MI: Lansing	8	0.5	0.0	0.2	0.017	0.009	0.013
MN: Minneapolis	4	0.3	0.1	0.1	0.018	0.010	0.014
MN: Welch/510	2	1.7	1.3	1.5	0.012	0.009	0.011
MS: Jackson	9	0.5	0.1	0.2	0.015	0.008	0.012
NC: Charlotte	9	0.1	0.0	0.0	0.014	0.001	0.008
NC: Wilmington	4				0.012	0.005	0.008
ND: Bismarck	9	2.3	0.5	1.0	0.021	0.007	0.013
NH: Concord	8	0.2	0.1	0.1	0.015	0.002	0.010
NJ: Trenton	4	0.2	0.1	0.1	0.011	0.006	0.008
NV: Las Vegas/906	9	0.2	0.0	0.1	0.012	0.004	0.009
NV: Las Vegas/913	7				0.010	0.004	0.007
NY: Albany	4	0.0	0.0	0.0	0.021	0.011	0.016
NY: New York City	8	0.1	0.0	0.0	0.015	0.006	0.010
NY: Yaphank	7	0.0	0.0	0.0	0.002	0.001	0.001
OH: Painesville	6	0.2	0.1	0.1	0.013	0.006	0.009
OH: Ross	9				0.019	0.007	0.012
OR: Portland	9	0.1	0.0	0.0	0.007	0.002	0.003
PA: Harrisburg	8	0.2	0.1	0.1	0.016	0.004	0.010
PA: Pittsburgh	8				0.017	0.003	0.011
SC: Columbia	4	0.1	0.0	0.1	0.012	0.006	0.009

Table 2 (continued)

Gross Beta in Airborne Particulates
April 2003

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min	Avg	Max	Min	Avg
		(pCi/m³)			(pCi/m³)		
SD: Pierre	7	0.9	0.2	0.4	0.018	0.008	0.011
TN: Knoxville	4	0.6	0.1	0.3	0.022	0.004	0.012
TN: Nashville	7	0.2	0.0	0.1	0.020	0.007	0.011
TN: Oak Ridge/Bethel	7	0.5	0.1	0.2	0.015	0.003	0.009
TN: Oak Ridge/K25	7	0.5	0.1	0.3	0.012	0.003	0.008
TN: Oak Ridge/Melton	7	0.4	0.1	0.2	0.012	0.003	0.008
TN: Oak Ridge/Y12 E	7	0.4	0.1	0.2	0.012	0.003	0.009
TN: Oak Ridge/Y12 W	7	0.3	0.1	0.1	0.012	0.003	0.009
TX: Austin	8	0.2	0.1	0.2	0.013	0.009	0.010
TX: El Paso	9	6.6	0.4	1.5	0.019	0.009	0.014
UT: Salt Lake City	7	0.4	0.0	0.2	0.014	0.007	0.009
VA: Lynchburg	8	0.9	0.1	0.3	0.015	0.001	0.008
WA: Olympia	9	0.1	0.0	0.1	0.007	0.002	0.004
WA: Spokane	8	0.3	0.0	0.2	0.009	0.003	0.005

Table 3

Gross Beta in Airborne Particulates
May 2003

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m³)	Avg	Max	Min (pCi/m³)	Avg
AK: Fairbanks	2	0.0	0.0	0.0	0.008	0.005	0.007
AL: Montgomery/408	9	0.1	0.0	0.0	0.015	0.005	0.009
AL: Montgomery/411	9	0.1	0.0	0.0	0.017	0.005	0.011
AR: Little Rock	7	0.2	0.0	0.1	0.021	0.007	0.012
AZ: Phoenix	4	0.6	0.3	0.4	0.023	0.011	0.017
CA: Berkeley	9	0.1	0.0	0.1	0.008	0.004	0.006
CA: Los Angeles	9	0.3	0.0	0.2	0.013	0.004	0.009
CO: Denver	9	1.2	0.3	0.7	0.022	0.005	0.012
CT: Hartford	9	0.1	0.0	0.1	0.009	0.001	0.005
DE: Wilmington	9	0.3	0.1	0.1	0.012	0.003	0.007
FL: Jacksonville	9	0.1	0.0	0.1	0.014	0.005	0.009
FL: Miami	4	0.1	0.0	0.0	0.009	0.005	0.007
HI: Honolulu	7	0.1	0.0	0.1	0.013	0.003	0.007
IA: Iowa City	9	0.9	0.1	0.3	0.017	0.005	0.009
ID: Idaho Falls	8				0.013	0.003	0.008
IL: Chicago	1	0.1	0.1	0.1	0.009	0.009	0.009
IN: Indianapolis	7	0.4	0.1	0.2	0.016	0.005	0.009
ME: Augusta	6	0.1	0.0	0.0	0.008	0.003	0.006
MI: Lansing	9	0.5	0.0	0.2	0.011	0.005	0.008
MN: Minneapolis	4	0.3	0.1	0.2	0.013	0.008	0.011
MS: Jackson	9	0.4	0.1	0.2	0.019	0.007	0.014
NC: Charlotte	8	0.0	0.0	0.0	0.014	0.007	0.010
NC: Wilmington	4				0.012	0.007	0.009
ND: Bismarck	7	2.1	0.3	0.8	0.015	0.010	0.013
NH: Concord	9	0.4	0.1	0.2	0.009	0.001	0.005
NJ: Trenton	8	0.3	0.1	0.2	0.010	0.003	0.006
NV: Las Vegas/906	8	1.6	0.0	0.3	0.018	0.005	0.012
NV: Las Vegas/913	8				0.015	0.003	0.011
NY: Albany	4	0.0	0.0	0.0	0.010	0.004	0.007
NY: New York City	6	0.0	0.0	0.0	0.012	0.002	0.008
NY: Yaphank	1	0.0	0.0	0.0	0.002	0.002	0.002
OH: Painesville	7	0.2	0.1	0.1	0.011	0.004	0.007
OH: Ross	9				0.016	0.005	0.010
OR: Portland	8	0.1	0.0	0.1	0.008	0.003	0.005
PA: Harrisburg	9	0.3	0.1	0.2	0.013	0.003	0.008
PA: Pittsburgh	9				0.012	0.005	0.008
SC: Columbia	5	0.1	0.0	0.0	0.011	0.006	0.009
SD: Pierre	6	0.4	0.1	0.2	0.013	0.005	0.009

Table 3 (continued)

Gross Beta in Airborne Particulates
May 2003

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min	Avg	Max	Min	Avg
		(pCi/m³)			(pCi/m³)		
TN: Knoxville	2	0.1	0.0	0.0	0.010	0.006	0.008
TN: Nashville	9	0.2	0.0	0.1	0.013	0.005	0.009
TN: Oak Ridge/Bethel	8	0.4	0.1	0.2	0.012	0.005	0.009
TN: Oak Ridge/K25	8	0.6	0.1	0.2	0.013	0.006	0.009
TN: Oak Ridge/Melton	8	0.4	0.1	0.2	0.013	0.006	0.009
TN: Oak Ridge/Y12 E	8	0.4	0.1	0.2	0.013	0.005	0.009
TN: Oak Ridge/Y12 W	8	0.4	0.1	0.2	0.014	0.006	0.010
TX: Austin	9	0.4	0.1	0.2	0.019	0.010	0.014
TX: El Paso	9	1.1	0.5	0.8	0.018	0.012	0.016
UT: Salt Lake City	9	0.4	0.0	0.2	0.017	0.005	0.011
VA: Lynchburg	8	0.5	0.0	0.2	0.010	0.001	0.007
WA: Olympia	8	0.1	0.0	0.1	0.009	0.003	0.005
WA: Spokane	8	0.4	0.0	0.2	0.010	0.005	0.007

Table 4

Gross Beta in Airborne Particulates
June 2003

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m³)	Avg	Max	Min (pCi/m³)	Avg
AK: Fairbanks	4	0.0	0.0	0.0	0.007	0.004	0.005
AL: Montgomery/408	9	0.4	0.0	0.1	0.011	0.003	0.008
AL: Montgomery/411	9	0.5	0.0	0.1	0.013	0.004	0.009
AR: Little Rock	4	0.1	0.0	0.0	0.014	0.006	0.011
AZ: Phoenix	4	0.4	0.2	0.3	0.023	0.015	0.020
CA: Berkeley	7	0.1	0.0	0.0	0.008	0.003	0.005
CA: Los Angeles	8	0.3	0.0	0.2	0.010	0.005	0.008
CO: Denver	9	0.8	0.3	0.5	0.014	0.007	0.011
CT: Hartford	9	0.2	0.0	0.1	0.014	0.002	0.007
DC: Washington	7	0.1	0.0	0.0	0.014	0.003	0.008
DE: Wilmington	9	0.4	0.0	0.1	0.017	0.003	0.008
FL: Jacksonville	8	0.1	0.0	0.1	0.012	0.002	0.007
FL: Miami	5	0.1	0.0	0.0	0.014	0.004	0.008
GA: Atlanta	1	0.2	0.2	0.2	0.018	0.018	0.018
HI: Honolulu	9	0.2	0.0	0.1	0.009	0.003	0.005
IA: Iowa City	9	0.8	0.0	0.3	0.018	0.007	0.011
ID: Idaho Falls	9				0.017	0.005	0.011
IN: Indianapolis	8	0.6	0.1	0.3	0.013	0.007	0.009
ME: Augusta	5	0.1	0.0	0.1	0.008	0.003	0.005
MI: Lansing	9	0.4	0.1	0.2	0.014	0.007	0.010
MN: Minneapolis	5	0.3	0.1	0.1	0.014	0.006	0.010
MS: Jackson	7	0.9	0.1	0.2	0.020	0.008	0.015
NC: Charlotte	8	0.1	0.0	0.1	0.016	0.005	0.009
NC: Wilmington	4				0.008	0.004	0.007
ND: Bismarck	7	1.9	0.3	0.8	0.015	0.008	0.011
NH: Concord	9	0.8	0.1	0.3	0.016	0.004	0.008
NJ: Trenton	8	0.2	0.1	0.1	0.014	0.002	0.007
NM: Santa Fe	1	0.1	0.1	0.1	0.010	0.010	0.010
NV: Las Vegas/906	9	0.2	0.0	0.1	0.025	0.006	0.014
NV: Las Vegas/913	8				0.016	0.006	0.010
NY: Albany	4	0.1	0.0	0.0	0.009	0.005	0.008
NY: New York City	7	0.5	0.0	0.1	0.016	0.002	0.009
NY: Yaphank	9	0.0	0.0	0.0	0.014	0.001	0.006
OH: Painesville	8	0.3	0.1	0.2	0.013	0.004	0.008
OH: Ross	8				0.018	0.007	0.011
OR: Portland	7	0.1	0.0	0.1	0.009	0.002	0.004
PA: Harrisburg	9	0.8	0.1	0.2	0.019	0.005	0.010
PA: Pittsburgh	8				0.019	0.004	0.010

Table 4 (continued)

Gross Beta in Airborne Particulates
June 2003

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min	Avg	Max	Min	Avg
		(pCi/m³)			(pCi/m³)		
SC: Columbia	3	0.1	0.0	0.1	0.013	0.008	0.010
SD: Pierre	7	0.3	0.1	0.2	0.016	0.006	0.010
TN: Knoxville	3	0.3	0.1	0.2	0.012	0.007	0.010
TN: Nashville	8	0.2	0.0	0.1	0.016	0.007	0.011
TN: Oak Ridge/Bethel	9	1.3	0.2	0.4	0.017	0.005	0.012
TN: Oak Ridge/K25	9	1.7	0.2	0.5	0.015	0.006	0.009
TN: Oak Ridge/Melton	9	1.7	0.2	0.5	0.017	0.005	0.010
TN: Oak Ridge/Y12 E	9	1.4	0.1	0.4	0.016	0.005	0.010
TN: Oak Ridge/Y12 W	9	0.7	0.1	0.3	0.019	0.007	0.011
TX: Austin	6	0.2	0.1	0.2	0.017	0.006	0.010
TX: El Paso	8	0.8	0.2	0.5	0.017	0.007	0.013
UT: Salt Lake City	8	0.4	0.1	0.2	0.025	0.009	0.016
VA: Lynchburg	8	1.3	0.1	0.3	0.013	0.005	0.008
WA: Olympia	9	0.1	0.0	0.1	0.008	0.002	0.005
WA: Spokane	9	0.6	0.1	0.3	0.013	0.003	0.009

Table 5

Gross Beta and Specific Gamma in Precipitation
April 2003

Location	Gross Beta Activity		Gamma-Emitting Radionuclides		
	pCi/L	± 2*u*	Nuclide	pCi/L	± 2*u*
AL: Montgomery	0.70	0.28	Be7	21	16
AR: Little Rock	1.60	0.35	Be7	23.8	8.4
AZ: Phoenix	2.43	0.42	Be7	77	34
CA: Berkeley	0.49	0.28		ND	
CO: Denver	1.96	0.37		ND	
CT: Hartford	4.77	0.50	Be7	70	17
			Tl208	1.5	1.5
DE: Wilmington	0.84	0.30	Be7	23	15
FL: Jacksonville	0.57	0.28	Be7	15	14
			Pb212	1.9	2.2
			Tl208	1.4	1.4
FL: Miami	0.56	0.30	Pb212	6.3	5.8
			Tl208	2.0	3.3
HI: Honolulu	1.02	0.33		ND	
IA: Iowa City	0.90	0.32	Be7	14	11
ID: Idaho Falls	2.59	0.47	Be7	134	25
			Pb212	2.5	4.5
MI: Lansing	0.87	0.30	Be7	40	17
MN: Minneapolis	0.84	0.30		ND	
NC: Charlotte	1.55	0.35	Be7	54	18
NC: Wilmington	1.08	0.31	Pb212	2.3	2.7
ND: Bismarck	1.42	0.41		ND	
NY: Albany	2.53	0.41	Be7	41	14
NY: Yaphank	0.55	0.28		ND	
OH: Painesville	2.85	0.42	Be7	37	17
OR: Portland	1.03	0.31		ND	
PA: Harrisburg	1.18	0.33	Be7	64	34
SC: Columbia	1.01	0.31		ND	
TN: Knoxville	8.07	0.65	Be7	19	17
			K40	12	14
TN: Nashville	1.11	0.31	Be7	22	15
UT: Salt Lake City	2.04	0.40	K40	27	36
VA: Lynchburg	0.78	0.30		ND	
WA: Olympia	0.58	0.28	Pb212	3.1	3.9

Note: ND = Not Detected

Table 6

Gross Beta and Specific Gamma in Precipitation
May 2003

Location	Gross Beta Activity		Gamma-Emitting Radionuclides		
	pCi/L	± 2*u*	Nuclide	pCi/L	± 2*u*
AL: Montgomery	0.84	0.28	Be7	37	36
AR: Little Rock	0.82	0.29	K40	40	26
CA: Berkeley	0.69	0.29	Bi212	34	45
CO: Denver	0.67	0.29	K40	24	40
CT: Hartford	1.36	0.33	Be7	51	16
DE: Wilmington	0.77	0.30	Be7	25	14
FL: Jacksonville	0.75	0.28		ND	
FL: Miami	0.73	0.29		ND	
IA: Iowa City	1.99	0.38	Pb212	3.4	4.2
ID: Idaho Falls	1.53	0.35		ND	
ME: Augusta	0.93	0.29		ND	
MI: Lansing	1.25	0.32	Be7	42	27
MN: Minneapolis	1.05	0.33	Tl208	2.5	3.8
MN: Welch	0.78	0.30		ND	
NC: Charlotte	1.60	0.34	Be7	34	15
NC: Wilmington	0.21	0.26		ND	
ND: Bismarck	0.83	0.30		ND	
NH: Concord	1.00	0.31	Be7	40	15
NY: Albany	1.17	0.33	Be7	55	23
NY: Yaphank	1.32	0.32	Be7	11.4	8.0
OH: Painesville	1.76	0.36	Be7	58	29
OR: Portland	2.28	0.39	Be7	45	30
			K40	25	45
PA: Harrisburg	1.31	0.32		ND	
SC: Columbia	0.75	0.29		ND	
TN: Knoxville	2.16	0.38		ND	
TN: Nashville	0.79	0.28	Be7	41	16
TX: Austin	0.74	0.30		ND	
UT: Salt Lake City	0.81	0.31		ND	
VA: Lynchburg	1.92	0.37		ND	
WA: Olympia	1.03	0.32		ND	

Note: ND = Not Detected

Table 7

Gross Beta and Specific Gamma in Precipitation
June 2003

Location	Gross Beta Activity		Gamma-Emitting Radionuclides	
	pCi/L	± 2*u*	Nuclide	pCi/L ± 2*u*
AK: Fairbanks	0.02	0.30	K40	34 42
AL: Montgomery	0.64	0.28	Be7	41 15
			K40	12 13
AR: Little Rock	1.33	0.40	Be7	51 17
CO: Denver	1.12	0.37	Be7	38 16
CT: Hartford	1.50	0.34	Be7	63 15
DE: Wilmington	1.35	0.32	Be7	47 15
FL: Jacksonville	1.02	0.31	Be7	25 14
FL: Miami	0.22	0.25		ND
IA: Iowa City	1.14	0.40		ND
MI: Lansing	1.47	0.34	Be7	18 14
MN: Minneapolis	0.96	0.36	Be7	33 15
NC: Charlotte	1.19	0.31	Be7	47 15
			K40	10 13
NC: Wilmington	0.31	0.26		ND
ND: Bismarck	0.64	0.34		ND
NH: Concord	1.94	0.36	Be7	37 15
			K40	9 13
NY: Albany	1.11	0.32	Be7	21 13
NY: Yaphank	2.06	0.37		ND
OH: Painesville	0.77	0.36	Be7	21 13
OR: Portland	1.10	0.37		ND
SC: Columbia	1.16	0.32		ND
TN: Knoxville	3.47	0.46		ND
TN: Nashville	0.90	0.29	Be7	51 14
			K40	16 13
TX: Austin	0.54	0.34	K40	13 13
UT: Salt Lake City	2.60	0.47	Be7	31.3 9.4
VA: Lynchburg	3.05	0.43		ND
WA: Olympia	2.95	0.48	Be7	107 27
			Pb212	3.2 4.8
			Ra224	54 55

Note: ND = Not Detected

Table 8

Tritium in Precipitation
April - June 2003

Location	April 2003 pCi/L ± 2*u*		May 2003 pCi/L ± 2*u*		June 2003 pCi/L ± 2*u*	
AK: Fairbanks	NS		NS		64	81
AL: Montgomery	49	74	-62	75	-20	77
AR: Little Rock	72	74	-2	79	23	78
AZ: Phoenix	-6	71	NS		NS	
CA: Berkeley	11	73	21	80	NS	
CO: Denver	-23	76	30	81	-10	77
CT: Hartford	17	72	106	82	42	73
DE: Wilmington	82	76	-5	78	13	71
FL: Jacksonville	41	77	-15	77	-24	70
FL: Miami	41	73	-85	75	-20	77
HI: Honolulu	-41	69	NS		NS	
IA: Iowa City	21	73	-18	77	13	78
ID: Idaho Falls	57	75	23	80	NS	
ME: Augusta	NS		49	80	NS	
MI: Lansing	62	75	-50	75	78	81
MN: Minneapolis	85	76	55	81	42	79
MN: Welch	NS		-15	78	NS	
NC: Charlotte	-8	72	21	79	37	72
NC: Wilmington	4	76	-8	78	60	74
ND: Bismarck	116	77	26	80	8	78
NH: Concord	NS		73	81	81	75
NY: Albany	51	70	44	80	63	74
NY: Yaphank	31	75	-5	77	29	72
OH: Painesville	-4	71	-70	75	13	78
OR: Portland	-2	71	-13	79	26	78
PA: Harrisburg	86	76	10	79	NS	
SC: Columbia	43	74	-24	77	71	74
TN: Knoxville	2	72	10	79	-16	76
TN: Nashville	-6	71	-2	78	9	71
TX: Austin	NS		-21	79	-2	77
UT: Salt Lake City	-7	78	0	79	74	81
VA: Lynchburg	58	75	-26	77	-4	71
WA: Olympia	6	74	34	81	20	79

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 typically ranges from 120,000 to 500,000 cubic meters.

Plutonium and uranium results are published when they become available.

2. Drinking Water Program

The ERAMS drinking water program provides data on radionuclide concentrations in the nation's drinking water supplies. Samples are taken at 78 sites which are either major population centers or selected nuclear facility environs.

Drinking water data are used 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.

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) 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 9

Tritium in Drinking Water
April - June 2003

Location	Date Collected	^{3}H pCi/L ± 2*u*	
AK: Fairbanks	04/08/03	-37	70
AL: Dothan	04/03/03	-50	77
AL: Montgomery	04/07/03	-81	76
AL: Muscle Shoals	04/01/03	-43	78
AL: Scottsboro	04/02/03	-9	79
AR: Little Rock	04/11/03	-28	71
CA: Berkeley	04/30/03	40	79
CA: Los Angeles	04/07/03	-22	71
CO: Denver	06/16/03	-20	79
CT: Hartford	04/04/03	-7	80
DE: Dover	04/14/03	-30	76
FL: Miami	04/04/03	-84	76
FL: Tampa	06/09/03	-24	77
GA: Baxley	05/16/03	20	73
GA: Savannah	05/22/03	-3	75
HI: Honolulu	04/09/03	-22	71
IA: Cedar Rapids	04/15/03	-18	77
ID: Boise	04/28/03	-41	76
ID: Idaho Falls	04/11/03	-15	77
IL: W. Chicago	06/03/03	-39	78
KS: Topeka	04/03/03	-17	79
LA: New Orleans	05/20/03	50	77
MD: Baltimore	04/07/03	4	73
MD: Conowingo	05/13/03	37	74
ME: Augusta	04/04/03	-65	77
MI: Detroit	04/09/03	59	75
MI: Grand Rapids	04/11/03	65	76
MN: Minneapolis	04/21/03	16	78
MN: Red Wing	04/30/03	-44	69
MO: Jefferson City	04/04/03	-29	78
MS: Jackson	04/08/03	-6	72
MS: Port Gibson	04/08/03	-13	72
MT: Helena	04/04/03	9	73
NC: Charlotte	06/17/03	104	83
NC: Raleigh	04/23/03	7	78
ND: Bismarck	04/03/03	-31	78
NE: Lincoln	04/08/03	-2	72
NH: Concord	04/03/03	-27	70
NJ: Trenton	04/14/03	-2	78
NJ: Waretown	04/15/03	-8	77

Table 9 (continued)

Tritium in Drinking Water
April - June 2003

Location	Date Collected	^{3}H pCi/L ± 2*u*	
NM: Santa Fe	04/18/03	13	78
NV: Las Vegas	05/12/03	0	71
NY: Albany	04/03/03	65	75
NY: New York City	06/12/03	26	80
NY: Syracuse	05/20/03	74	75
OH: Cincinnati	06/13/03	60	81
OH: Columbus	04/03/03	-67	77
OH: E. Liverpool	06/18/03	11	79
OH: Painesville	04/03/03	9	80
OH: Toledo	04/04/03	28	81
OK: Oklahoma City	04/03/03	-2	80
OR: Portland	04/04/03	-53	75
PA: Columbia	05/14/03	880	110
PA: Harrisburg	05/15/03	63	75
PA: Philadelphia/Baxter	05/12/03	-4	71
PA: Philadelphia/Belmont	05/12/03	0	71
PA: Philadelphia/Queen	05/12/03	63	75
PA: Pittsburgh	06/18/03	34	81
RI: Providence	05/07/03	-26	70
SC: Barnwell	04/08/03	-54	69
SC: Columbia	04/10/03	0	72
SC: Jenkinsville	04/10/03	6	73
SC: Seneca	04/15/03	-35	76
TN: Chattanooga	04/07/03	464	93
TN: Knoxville	04/03/03	-35	78
TN: Oak Ridge - Knox Co. #371	05/20/03	16	72
TN: Oak Ridge - Anderson Co. #768	05/20/03	55	74
TN: Oak Ridge - Roane Co. #360	05/29/03	8	75
VA: Ashland	04/07/03	2200	140
VA: Lynchburg	04/08/03	7	73
WA: Richland	04/21/03	26	78
WA: Seattle	04/28/03	-20	76

(This page intentionally left blank)

3. Milk Program

Pasteurized Milk

Milk is a reliable indicator of the general population's intake of certain 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.

Quarterly samples are collected at approximately 55 sampling sites. 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. During the third quarter collection, one-fourth of the samples are also analyzed for strontium-90 on a four year rotating schedule.

Table 10

Radionuclides in Pasteurized Milk
April - June 2003

Location	Date Collected	K g/L ± 2*u*		^{137}Cs pCi/L ± 2*u*	^{140}Ba pCi/L ± 2*u*	^{131}I pCi/L ± 2*u*
AL: Montgomery	04/08/03	1.63	0.12	ND	ND	ND
AR: Little Rock	06/23/03	1.36	0.15	ND	ND	ND
AZ: Phoenix	06/30/03	1.55	0.12	ND	ND	ND
CA: Sacramento	05/27/03	1.55	0.12	ND	ND	ND
FL: Tampa	04/08/03	1.63	0.12	ND	ND	ND
IA: Des Moines	04/07/03	1.56	0.12	ND	ND	ND
KY: Louisville	04/07/03	1.75	0.12	ND	ND	ND
MA: Boston	05/14/03	1.51	0.16	ND	ND	ND
MD: Baltimore	04/11/03	1.61	0.16	ND	ND	ND
ME: Portland	06/12/03	1.61	0.12	ND	ND	ND
MI: Grand Rapids	04/10/03	1.53	0.11	ND	ND	ND
NJ: Trenton	06/09/03	1.62	0.11	ND	ND	ND
OH: Cincinnati	04/07/03	1.60	0.13	ND	ND	ND
PA: Pittsburgh	04/08/03	1.66	0.13	ND	ND	ND
TN: Chattanooga	04/07/03	1.63	0.12	ND	ND	ND
TX: San Antonio	04/08/03	1.44	0.11	ND	ND	ND
VA: Norfolk	05/27/03	1.55	0.12	ND	ND	ND
VT: Montpelier	06/27/03	1.50	0.12	ND	ND	ND
WA: Tacoma	06/17/03	1.73	0.12	ND	ND	ND
WV: Charleston	04/04/03	1.58	0.12	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:

Frank Marcinowski
USEPA - ORIA
Center for Emergency Preparedness and Clean Materials
Radiation Protection Division (MC66085)
501 Third Street, N.W.
Washington, DC 20001
e-mail: marcinowski.frank@epa.gov

***

(This page intentionally left blank)