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ENVIRONMENTAL RADIATION DATA

REPORT 110

April - June 2002

United States Environmental Protection Agency

Office of Radiation and Indoor Air

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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).

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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.

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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.

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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.

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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 2002

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m³)	Avg	Max	Min (pCi/m³)	Avg
AK: Fairbanks	1	0.0	0.0	0.0	0.018	0.018	0.018
AL: Montgomery/408	9	0.2	0.0	0.1	0.019	0.007	0.013
AR: Little Rock	6	0.0	0.0	0.0	0.010	0.005	0.008
AZ: Phoenix	5	0.7	0.1	0.5	0.020	0.013	0.016
CA: Berkeley	9	0.1	0.0	0.0	0.011	0.002	0.006
CA: Los Angeles	9	0.2	0.0	0.1	0.016	0.004	0.009
CO: Denver	9	1.2	0.5	0.7	0.017	0.008	0.012
CT: Hartford	9	0.1	0.0	0.1	0.010	0.005	0.007
DE: Wilmington	9	0.3	0.1	0.1	0.015	0.008	0.011
FL: Jacksonville	9	0.1	0.0	0.1	0.011	0.004	0.008
FL: Miami	4	0.0	0.0	0.0	0.009	0.003	0.006
HI: Honolulu	7	0.1	0.1	0.1	0.005	0.002	0.004
IA: Iowa City	9	0.5	0.0	0.2	0.018	0.010	0.013
ID: Boise	7	0.2	0.0	0.1	0.016	0.004	0.009
ID: Idaho Falls	9				0.011	0.003	0.008
IN: Indianapolis	9	0.2	0.1	0.1	0.011	0.006	0.009
ME: Augusta	9	0.1	0.0	0.1	0.012	0.005	0.008
MI: Lansing	9	0.6	0.1	0.2	0.014	0.009	0.011
MN: Minneapolis	4	0.4	0.1	0.2	0.019	0.010	0.013
MN: Welch/510	6	0.4	0.1	0.2	0.020	0.010	0.013
MS: Jackson	8	0.2	0.0	0.1	0.012	0.008	0.009
NC: Charlotte	9	0.1	0.0	0.1	0.016	0.008	0.011
NC: Wilmington	5				0.012	0.008	0.010
ND: Bismarck	8	1.3	0.2	0.6	0.022	0.006	0.013
NH: Concord	9	0.3	0.1	0.2	0.014	0.008	0.010
NJ: Trenton	2				0.010	0.007	0.009
NV: Las Vegas	9	0.2	0.1	0.1	0.020	0.007	0.013
NY: Albany	4	0.0	0.0	0.0	0.013	0.011	0.012
NY: New York City	9	0.1	0.0	0.0	0.017	0.008	0.010
NY: Yaphank	9	0.1	0.0	0.0	0.011	0.007	0.008
OH: Painesville	6	0.2	0.0	0.1	0.012	0.007	0.009
OH: Ross	8				0.012	0.005	0.009
OR: Portland	8	0.1	0.0	0.1	0.008	0.002	0.005
PA: Harrisburg	9	0.4	0.1	0.2	0.015	0.007	0.010
PA: Pittsburgh	9				0.014	0.007	0.009
SC: Barnwell	1	0.0	0.0	0.0	0.012	0.012	0.012
SC: Columbia	5	0.8	0.0	0.2	0.013	0.007	0.009
SD: Pierre	8	0.6	0.2	0.3	0.021	0.008	0.011

Table 2 (continued)

Gross Beta in Airborne Particulates
April 2002

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min	Avg	Max	Min	Avg
		(pCi/m³)			(pCi/m³)		
TN: Knoxville	8	0.6	0.0	0.2	0.017	0.003	0.011
TN: Nashville	4	0.1	0.0	0.1	0.013	0.006	0.009
TN: Oak Ridge/Bethel	9	0.6	0.1	0.3	0.015	0.007	0.010
TN: Oak Ridge/K25	9	0.7	0.1	0.3	0.013	0.008	0.009
TN: Oak Ridge/Melton	9	0.5	0.1	0.2	0.013	0.006	0.009
TN: Oak Ridge/Y12 E	9	1.0	0.0	0.3	0.014	0.006	0.010
TN: Oak Ridge/Y12 W	9	0.4	0.1	0.2	0.018	0.008	0.011
TX: Austin	8	0.3	0.0	0.2	0.011	0.006	0.009
TX: El Paso	9	1.4	0.5	0.8	0.018	0.011	0.016
UT: Salt Lake City	9	0.4	0.1	0.2	0.012	0.008	0.010
VA: Lynchburg	8	0.5	0.1	0.3	0.013	0.006	0.009
WA: Olympia	9	0.1	0.0	0.1	0.008	0.001	0.004
WA: Spokane	9	0.5	0.2	0.3	0.014	0.003	0.008

Table 3

Gross Beta in Airborne Particulates
May 2002

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	0.007	0.007	0.007
AL: Montgomery/408	9	0.2	0.1	0.1	0.015	0.006	0.011
AR: Little Rock	8	0.0	0.0	0.0	0.012	0.007	0.010
AZ: Phoenix	4	0.5	0.2	0.4	0.017	0.011	0.014
CA: Berkeley	9	0.1	0.0	0.0	0.007	0.002	0.004
CA: Los Angeles	9	2.6	0.0	0.4	0.010	0.004	0.008
CO: Denver	8	1.6	0.6	0.8	0.014	0.009	0.011
CT: Hartford	9	0.1	0.0	0.0	0.011	0.003	0.006
DE: Wilmington	9	0.2	0.1	0.1	0.017	0.005	0.010
FL: Jacksonville	9	0.1	0.0	0.1	0.010	0.005	0.007
FL: Miami	5	0.0	0.0	0.0	0.008	0.005	0.006
HI: Honolulu	6	0.2	0.0	0.1	0.006	0.003	0.004
IA: Iowa City	9	0.8	0.0	0.4	0.012	0.008	0.010
ID: Boise	5	0.5	0.0	0.1	0.009	0.006	0.008
ID: Idaho Falls	9				0.009	0.004	0.007
IN: Indianapolis	9	0.3	0.1	0.2	0.009	0.006	0.008
ME: Augusta	7	0.2	0.0	0.1	0.010	0.005	0.007
MI: Lansing	9	0.2	0.1	0.1	0.013	0.005	0.008
MN: Minneapolis	5	0.2	0.1	0.1	0.011	0.008	0.009
MS: Jackson	9	0.6	0.0	0.2	0.013	0.008	0.010
NC: Charlotte	9	0.1	0.0	0.1	0.017	0.009	0.012
NC: Wilmington	3				0.010	0.008	0.009
ND: Bismarck	6	0.9	0.2	0.7	0.012	0.009	0.010
NH: Concord	9	0.4	0.1	0.2	0.015	0.004	0.008
NJ: Trenton	4				0.007	0.004	0.006
NV: Las Vegas	8	0.2	0.0	0.1	0.010	0.002	0.008
NY: Albany	5	0.1	0.0	0.0	0.011	0.008	0.009
NY: New York City	2	0.1	0.0	0.0	0.009	0.008	0.008
NY: Yaphank	8	0.3	0.0	0.1	0.014	0.003	0.008
OH: Painesville	9	0.2	0.1	0.1	0.012	0.005	0.007
OH: Ross	8				0.013	0.007	0.009
OR: Portland	6	0.1	0.0	0.1	0.009	0.003	0.006
PA: Harrisburg	9	0.5	0.1	0.2	0.016	0.006	0.009
PA: Pittsburgh	9				0.013	0.005	0.009
SC: Barnwell	1	0.0	0.0	0.0	0.011	0.011	0.011
SC: Columbia	3	0.1	0.0	0.0	0.012	0.009	0.011
SD: Pierre	7	0.8	0.1	0.4	0.010	0.006	0.008
TN: Knoxville	8	0.6	0.0	0.3	0.017	0.009	0.013

Table 3 (continued)

Gross Beta in Airborne Particulates
May 2002

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min	Avg	Max	Min	Avg
		(pCi/m³)			(pCi/m³)		
TN: Nashville	8	0.1	0.0	0.1	0.012	0.008	0.009
TN: Oak Ridge/Bethel	8	0.7	0.1	0.3	0.012	0.006	0.009
TN: Oak Ridge/K25	8	0.9	0.2	0.4	0.012	0.008	0.010
TN: Oak Ridge/Melton	8	0.7	0.2	0.3	0.012	0.008	0.010
TN: Oak Ridge/Y12 E	8	0.7	0.2	0.3	0.012	0.008	0.010
TN: Oak Ridge/Y12 W	8	0.4	0.2	0.2	0.014	0.009	0.011
TX: Austin	9	0.3	0.0	0.2	0.012	0.007	0.009
TX: El Paso	9	1.3	0.2	0.7	0.022	0.011	0.015
UT: Salt Lake City	9	0.4	0.2	0.3	0.011	0.005	0.008
VA: Lynchburg	9	0.8	0.1	0.4	0.012	0.007	0.009
WA: Olympia	9	0.1	0.0	0.1	0.008	0.002	0.005
WA: Spokane	9	0.4	0.1	0.2	0.011	0.004	0.007

Table 4

Gross Beta in Airborne Particulates
June 2002

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m³)	Avg	Max	Min (pCi/m³)	Avg
AK: Fairbanks	1	0.0	0.0	0.0	0.006	0.006	0.006
AL: Montgomery/408	8	0.2	0.0	0.1	0.013	0.004	0.009
AR: Little Rock	8	0.1	0.0	0.1	0.018	0.007	0.011
AZ: Phoenix	4	0.5	0.2	0.3	0.021	0.013	0.017
CA: Berkeley	8	0.1	0.0	0.1	0.005	0.001	0.003
CA: Los Angeles	8	0.3	0.0	0.1	0.012	0.005	0.008
CO: Denver	8	0.9	0.4	0.6	0.014	0.006	0.012
CT: Hartford	8	0.1	0.0	0.1	0.011	0.002	0.006
DE: Wilmington	8	0.3	0.0	0.2	0.016	0.004	0.010
FL: Jacksonville	8	0.1	0.0	0.1	0.016	0.003	0.007
FL: Miami	4	0.0	0.0	0.0	0.008	0.004	0.006
HI: Honolulu	6	0.2	0.0	0.1	0.004	0.003	0.003
IA: Iowa City	8	0.7	0.0	0.2	0.022	0.007	0.011
ID: Boise	4	0.3	0.0	0.1	0.009	0.003	0.007
ID: Idaho Falls	8				0.011	0.004	0.007
IN: Indianapolis	8	0.8	0.2	0.3	0.015	0.005	0.009
ME: Augusta	7	0.1	0.0	0.1	0.009	0.003	0.005
MI: Lansing	8	0.5	0.1	0.2	0.019	0.005	0.010
MN: Minneapolis	4	0.2	0.1	0.2	0.013	0.007	0.009
MS: Jackson	8	0.4	0.1	0.2	0.013	0.006	0.011
NC: Charlotte	8	0.1	0.0	0.1	0.013	0.005	0.010
NC: Wilmington	4				0.009	0.005	0.007
ND: Bismarck	6	0.8	0.3	0.6	0.013	0.004	0.008
NH: Concord	8	0.4	0.1	0.2	0.015	0.002	0.006
NJ: Trenton	2				0.007	0.006	0.006
NV: Las Vegas	8	0.1	0.0	0.1	0.011	0.006	0.009
NY: Albany	4	0.1	0.0	0.0	0.021	0.006	0.013
NY: Yaphank	8	0.1	0.0	0.1	0.010	0.003	0.007
OH: Painesville	8	0.4	0.1	0.2	0.021	0.005	0.010
OH: Ross	8				0.016	0.005	0.011
OR: Portland	5	0.0	0.0	0.0	0.006	0.002	0.004
PA: Harrisburg	8	0.7	0.1	0.3	0.020	0.004	0.011
PA: Pittsburgh	8				0.015	0.006	0.010
SC: Barnwell	1	0.0	0.0	0.0	0.008	0.008	0.008
SC: Columbia	5	0.3	0.1	0.2	0.017	0.006	0.010
SD: Pierre	6	0.4	0.2	0.3	0.010	0.004	0.008
TN: Knoxville	6	0.6	0.2	0.4	0.017	0.007	0.011
TN: Nashville	8	0.3	0.0	0.2	0.023	0.005	0.013

Table 4 (continued)

Gross Beta in Airborne Particulates
June 2002

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min	Avg	Max	Min	Avg
		(pCi/m³)			(pCi/m³)		
TN: Oak Ridge/Bethel	8	1.0	0.4	0.7	0.037	0.009	0.015
TN: Oak Ridge/K25	8	1.0	0.4	0.8	0.014	0.005	0.011
TN: Oak Ridge/Melton	8	1.0	0.3	0.6	0.013	0.006	0.011
TN: Oak Ridge/Y12 E	8	1.0	0.3	0.7	0.015	0.006	0.011
TN: Oak Ridge/Y12 W	8	1.0	0.3	0.5	0.017	0.006	0.013
TX: Austin	8	0.3	0.1	0.2	0.013	0.008	0.010
TX: El Paso	8	0.9	0.2	0.6	0.019	0.010	0.015
UT: Salt Lake City	7	0.4	0.0	0.2	0.012	0.005	0.008
VA: Lynchburg	7	0.7	0.3	0.5	0.013	0.004	0.009
WA: Olympia	8	0.1	0.0	0.1	0.006	0.002	0.003
WA: Spokane	8	0.5	0.1	0.2	0.011	0.003	0.007

Table 5

Gross Beta and Specific Gamma in Precipitation
April 2002

Location	Gross Beta Activity		Gamma-Emitting Radionuclides		
	pCi/L	± 2*u*	Nuclide	pCi/L	± 2*u*
AL: Montgomery	0.51	0.27	Pb212	5.4	4.5
AR: Little Rock	1.16	0.38		ND	
CT: Hartford	2.20	0.38	Be7	76	34
DE: Wilmington	1.76	0.35		ND	
FL: Jacksonville	0.41	0.26	Tl208	2.1	3.6
FL: Miami	0.01	0.24		ND	
HI: Honolulu	1.71	0.42		ND	
IA: Iowa City	0.65	0.37		ND	
ID: Idaho Falls	2.34	0.47	Tl208	3.3	2.6
MI: Lansing	1.01	0.32	Tl208	2.1	3.4
MN: Minneapolis	1.22	0.38		ND	
MN: Welch	0.22	0.34		ND	
NC: Charlotte	1.02	0.31		ND	
NC: Wilmington	1.01	0.31		ND	
ND: Bismarck	0.51	0.37		ND	
NY: Albany	1.36	0.34		ND	
NY: Yaphank	1.87	0.37	Pb212	5.4	7.3
OH: Painesville	2.40	0.39	Be7	44	34
OR: Portland	1.18	0.39		ND	
PA: Harrisburg	1.57	0.35	Be7	62	35
			Pb212	4.2	6.7
SC: Barnwell	4.20	0.48		ND	
SC: Columbia	1.63	0.35		ND	
TN: Knoxville	22.1	1.1	K40	22	37
TN: Nashville	1.56	0.34	Be7	51	35
UT: Salt Lake City	1.29	0.46		ND	
VA: Lynchburg	2.14	0.39		ND	
WA: Olympia	0.49	0.36	Pb212	2.9	4.9

Note: ND = Not Detected

Table 6

Gross Beta and Specific Gamma in Precipitation
May 2002

Location	Gross Beta Activity		Gamma-Emitting Radionuclides		
	pCi/L	± 2*u*	Nuclide	pCi/L	± 2*u*
AL: Montgomery	0.86	0.30		ND	
AR: Little Rock	0.85	0.30	Be7	35	22
CA: Berkeley	0.35	0.26		ND	
CO: Denver	1.06	0.31		ND	
CT: Hartford	1.65	0.35	Be7	51	22
DE: Wilmington	2.25	0.37	Be7	45	31
FL: Jacksonville	0.63	0.30		ND	
FL: Miami	0.66	0.29		ND	
HI: Honolulu	1.36	0.34		ND	
IA: Iowa City	0.56	0.27		ND	
ID: Idaho Falls	1.40	0.34	Be7	50	26
MI: Lansing	1.35	0.33		ND	
MN: Minneapolis	1.46	0.34	Tl208	5.2	3.2
NC: Charlotte	1.44	0.34	Be7	34	26
NC: Wilmington	0.69	0.28		ND	
ND: Bismarck	1.11	0.32		ND	
NH: Concord	0.57	0.27		ND	
NY: Albany	0.29	0.25		ND	
NY: Yaphank	2.85	0.42	Be7	35	31
OH: Painesville	2.32	0.38	Be7	70	31
OR: Portland	0.87	0.29	K40	16	27
PA: Harrisburg	2.96	0.42	Be7	108	29
SC: Barnwell	2.19	0.38		ND	
SC: Columbia	0.72	0.28		ND	
TN: Knoxville	2.44	0.39	Pb212	4.9	6.8
TN: Nashville	1.04	0.31	Be7	29	23
TX: Austin	0.97	0.32	Tl208	4.0	2.7
UT: Salt Lake City	4.95	0.58	Be7	82	40
VA: Lynchburg	11.41	0.76	K40	20	27
WA: Olympia	0.78	0.29		ND	

Note: ND = Not Detected

Table 7

Gross Beta and Specific Gamma in Precipitation
June 2002

Location	Gross Beta Activity		Gamma-Emitting Radionuclides	
	pCi/L	± 2*u*	Nuclide	pCi/L ± 2*u*
AL: Montgomery	0.93	0.30	Be7	67 26
			Tl208	1.9 3.4
AR: Little Rock	1.20	0.32	Be7	50 23
			K40	21 35
CO: Denver	0.34	0.27		ND
CT: Hartford	2.10	0.37	Be7	74 31
DE: Wilmington	1.44	0.34	Be7	74 31
			Pb212	5.0 6.3
			Tl208	2.4 3.6
FL: Jacksonville	0.54	0.29		ND
FL: Miami	0.14	0.24		ND
HI: Honolulu	2.01	0.40		ND
IA: Iowa City	1.19	0.33		ND
ME: Augusta	3.08	0.42	Be7	77 31
MI: Lansing	1.87	0.37	Be7	60 32
MN: Minneapolis	0.83	0.30	Be7	39 26
			Pb212	3.2 5.2
			Ra224	29 32
NC: Charlotte	1.47	0.34	Tl208	3.5 3.6
NC: Wilmington	0.24	0.25	Tl208	2.6 3.8
NH: Concord	1.28	0.32	Be7	49 34
NY: Albany	1.09	0.32		ND
NY: Yaphank	3.88	0.47		ND
OH: Painesville	1.84	0.36	Be7	53 23
OR: Portland	0.34	0.26	K40	51 23
PA: Harrisburg	1.91	0.36	Be7	30 32
SC: Barnwell	1.01	0.31		ND
SC: Columbia	1.36	0.33		ND
TN: Knoxville	2.03	0.38	Pb212	4.1 7.1
TN: Nashville	1.62	0.34	Be7	33 25
TX: Austin	0.69	0.29	K40	23 36
VA: Lynchburg	7.52	0.63		ND
WA: Olympia	1.00	0.34	K40	23 40

Note: ND = Not Detected

Table 8

Tritium in Precipitation
April - June 2002

Location	April 2002 pCi/L ± 2*u*		May 2002 pCi/L ± 2*u*		June 2002 pCi/L ± 2*u*	
AL: Montgomery	55	80	22	77	-4	75
AR: Little Rock	46	81	40	79	-73	76
CA: Berkeley	NS		-24	76	NS	
CO: Denver	NS		58	80	-11	79
CT: Hartford	25	78	51	79	6	76
DE: Wilmington	15	78	60	78	0	76
FL: Jacksonville	13	78	-29	75	-7	75
FL: Miami	44	80	-13	76	-8	79
HI: Honolulu	-29	77	-2	78	-49	78
IA: Iowa City	-9	77	18	77	-2	76
ID: Idaho Falls	-35	77	-36	76	NS	
ME: Augusta	NS		NS		87	80
MI: Lansing	52	81	5	76	37	78
MN: Minneapolis	2	77	35	78	-35	74
MN: Welch	-5	77	NS		NS	
NC: Charlotte	-22	76	-40	74	31	77
NC: Wilmington	-2	77	4	77	-16	75
ND: Bismarck	-60	75	70	81	NS	
NH: Concord	NS		-15	75	33	78
NY: Albany	2	78	42	78	22	77
NY: Yaphank	-22	76	-27	75	29	78
OH: Painesville	4	77	-18	75	40	78
OR: Portland	-82	74	28	79	2	80
PA: Harrisburg	-35	76	18	77	6	77
SC: Barnwell	13	78	93	81	75	79
SC: Columbia	18	78	-14	75	15	77
TN: Knoxville	4	78	-13	76	99	80
TN: Nashville	-30	77	-31	75	-9	75
TX: Austin	NS		42	80	10	80
UT: Salt Lake City	31	80	13	79	NS	
VA: Lynchburg	-11	77	35	78	-15	75
WA: Olympia	-26	77	5	78	-21	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 2002

Location	Date Collected	^{3}H pCi/L ± 2*u*	
AK: Fairbanks	04/29/02	-51	73
AL: Dothan	04/04/02	-24	76
AL: Montgomery	04/01/02	-25	75
AL: Muscle Shoals	04/16/02	38	79
AL: Scottsboro	04/16/02	81	82
AR: Little Rock	04/10/02	22	71
CA: Berkeley	05/06/02	13	75
CA: Los Angeles	04/05/02	129	83
CT: Hartford	04/03/02	-26	75
DE: Dover	04/15/02	-9	77
FL: Miami	04/06/02	51	72
FL: Tampa	06/13/02	-5	78
GA: Baxley	04/10/02	-42	75
GA: Savannah	04/17/02	-24	76
HI: Honolulu	04/22/02	-47	75
IA: Cedar Rapids	04/16/02	7	78
ID: Boise	04/08/02	57	73
ID: Idaho Falls	04/08/02	55	73
IL: Morris	06/18/02	-3	78
IL: W. Chicago	06/14/02	28	79
KS: Topeka	04/05/02	24	71
LA: New Orleans	06/27/02	66	79
MA: Lawrence	04/23/02	-4	78
MD: Baltimore	04/09/02	71	74
MD: Conowingo	05/07/02	79	78
ME: Augusta	04/02/02	24	77
MI: Detroit	04/08/02	141	77
MI: Grand Rapids	04/09/02	136	76
MN: Minneapolis	04/22/02	26	79
MN: Red Wing	04/15/02	-82	73
MO: Jefferson City	04/04/02	35	73
MS: Jackson	04/09/02	-14	69
MS: Port Gibson	04/09/02	22	71
MT: Helena	04/12/02	11	78
NC: Charlotte	05/06/02	464	94
NC: Wilmington	04/22/02	44	78
ND: Bismarck	04/03/02	22	78
NE: Lincoln	04/04/02	79	74
NH: Concord	04/03/02	183	79
NJ: Trenton	06/19/02	-8	77

Table 9 (continued)

Tritium in Drinking Water
April - June 2002

Location	Date Collected	^{3}H pCi/L ± 2*u*	
NJ: Waretown	06/25/02	13	77
NM: Santa Fe	06/03/02	-51	75
NV: Las Vegas	06/28/02	-64	73
NY: Albany	04/03/02	147	78
NY: Niagara Falls	04/22/02	73	81
NY: Syracuse	06/18/02	-3	78
OH: Cincinnati	05/01/02	69	78
OH: E. Liverpool	05/24/02	31	76
OH: Painesville	04/11/02	127	76
OH: Toledo	04/10/02	119	83
OK: Oklahoma City	04/04/02	7	70
OR: Portland	04/08/02	36	72
PA: Columbia	05/10/02	11	75
PA: Harrisburg	05/10/02	31	76
PA: Philadelphia/Baxter	05/01/02	4	76
PA: Philadelphia/Queen	05/01/02	-36	74
PA: Pittsburgh	05/24/02	31	76
RI: Providence	04/05/02	176	86
SC: Barnwell	04/17/02	22	79
SC: Columbia	04/03/02	2	76
SC: Jenkinsville	04/18/02	18	78
SC: Seneca	04/15/02	-16	77
TN: Chattanooga	04/04/02	71	73
TN: Knoxville	04/01/02	-5	76
TN: Oak Ridge - Anderson Co. #768	05/24/02	5	78
TN: Oak Ridge - Knox Co. #371	05/24/02	-15	78
TN: Oak Ridge - Anderson Co. #772	05/24/02	11	78
TN: Oak Ridge - Roane Co. #360	05/30/02	79	82
TN: Oak Ridge - Roane Co. #4442	06/04/02	485	98
TX: Austin	04/23/02	-34	75
VA: Ashland	04/10/02	2380	150
VA: Lynchburg	04/02/02	71	80
WA: Richland	04/08/02	60	73

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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 2002

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	04/09/02	1.56	0.12	ND	ND	ND
AR: Little Rock	06/24/02	1.57	0.16	ND	ND	ND
AZ: Phoenix	05/20/02	1.53	0.12	ND	ND	ND
CA: Los Angeles	04/03/02	1.51	0.12	ND	ND	ND
CA: Sacramento	05/06/02	1.58	0.12	ND	ND	ND
CA: San Francisco	04/09/02	1.51	0.12	ND	ND	ND
DE: Wilmington	04/16/02	1.72	0.13	ND	ND	ND
FL: Tampa	04/09/02	1.54	0.12	ND	ND	ND
HI: Honolulu	04/09/02	1.50	0.11	ND	ND	ND
IA: Des Moines	04/08/02	1.54	0.11	ND	ND	ND
IL: Chicago	06/19/02	1.53	0.16	ND	ND	ND
IN: Indianapolis	04/19/02	1.55	0.12	ND	ND	ND
KS: Wichita	04/15/02	1.61	0.13	ND	ND	ND
KY: Louisville	04/08/02	1.48	0.11	ND	ND	ND
MA: Boston	04/12/02	1.64	0.13	ND	ND	ND
MD: Baltimore	04/04/02	1.61	0.11	ND	ND	ND
MI: Detroit	04/09/02	1.54	0.12	ND	ND	ND
MI: Grand Rapids	04/09/02	1.60	0.12	ND	ND	ND
MO: Jefferson City	04/12/02	1.51	0.12	ND	ND	ND
NJ: Trenton	04/16/02	1.50	0.12	ND	ND	ND
NM: Albuquerque	04/11/02	1.48	0.11	ND	ND	ND
NV: Las Vegas	04/09/02	1.57	0.12	ND	ND	ND
NY: Buffalo	04/05/02	1.43	0.11	ND	ND	ND
NY: Syracuse	04/02/02	1.44	0.12	ND	ND	ND
OH: Cincinnati	05/20/02	1.33	0.11	ND	ND	ND
OH: Cleveland	04/15/02	1.49	0.12	ND	ND	ND
OR: Portland	04/02/02	1.56	0.12	ND	ND	ND
PA: Philadelphia	04/04/02	1.60	0.13	ND	ND	ND
PA: Pittsburgh	04/10/02	1.64	0.13	ND	ND	ND
SD: Rapid City	04/16/02	1.47	0.12	ND	ND	ND
TN: Chattanooga	05/06/02	1.56	0.12	ND	ND	ND
TN: Knoxville	04/22/02	1.54	0.12	ND	ND	ND
TN: Memphis	05/20/02	1.45	0.12	ND	ND	ND
TX: Ft. Worth	04/29/02	1.60	0.13	ND	ND	ND
TX: San Antonio	04/16/02	1.45	0.11	ND	ND	ND
VA: Norfolk	06/27/02	1.47	0.11	ND	ND	ND
WA: Spokane	04/10/02	1.64	0.13	ND	ND	ND
WA: Tacoma	06/18/02	1.68	0.17	ND	ND	ND
WV: Charleston	04/03/02	1.51	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:

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

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

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