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ENVIRONMENTAL RADIATION DATA

REPORT 104

October - December 2000

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
October 2000

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min	Avg	Max	Min	Avg
		(pCi/m³)			(pCi/m³)		
AK: Fairbanks	2	0.0	0.0	0.0	0.010	0.004	0.007
AL: Montgomery/408	10	0.3	0.0	0.1	0.062	0.010	0.034
AL: Montgomery/411	9	0.2	0.0	0.1	0.027	0.005	0.015
AR: Little Rock	7	0.5	0.0	0.1	0.034	0.007	0.017
CA: Berkeley	9	0.2	0.0	0.1	0.010	0.004	0.006
CA: Los Angeles	9	0.3	0.1	0.2	0.030	0.005	0.015
CO: Denver	9	1.1	0.4	0.7	0.016	0.006	0.011
CT: Hartford	9	0.2	0.1	0.1	0.014	0.003	0.009
DE: Wilmington	9	0.4	0.1	0.2	0.021	0.008	0.014
FL: Jacksonville	9	0.2	0.0	0.1	0.027	0.003	0.014
FL: Miami	5	0.1	0.0	0.0	0.012	0.003	0.009
HI: Honolulu	8	0.1	0.1	0.1	0.006	0.002	0.003
IA: Iowa City	9	0.5	0.1	0.3	0.027	0.006	0.015
ID: Boise	3	1.0	0.1	0.5	0.014	0.007	0.010
ID: Idaho Falls	9				0.016	0.006	0.010
IL: Chicago	5	0.4	0.1	0.2	0.020	0.015	0.017
IN: Indianapolis	9	0.5	0.1	0.3	0.034	0.005	0.017
KS: Topeka	9	1.1	0.2	0.5	0.025	0.008	0.015
ME: Augusta	9	0.3	0.1	0.2	0.013	0.003	0.008
MI: Lansing	8	0.8	0.0	0.2	0.023	0.006	0.013
MN: Minneapolis	5	0.5	0.1	0.3	0.026	0.010	0.017
MN: Welch/510	2				0.119	0.088	0.104
MS: Jackson	7	0.5	0.1	0.2	0.074	0.006	0.028
NC: Charlotte	6	0.3	0.1	0.1	0.025	0.008	0.019
NC: Wilmington	5				0.023	0.008	0.015
ND: Bismarck	6	1.2	0.2	0.7	0.019	0.008	0.013
NH: Concord	9	0.4	0.1	0.2	0.015	0.003	0.010
NV: Las Vegas	9	0.2	0.1	0.1	0.013	0.005	0.009
NY: Albany	4	0.1	0.0	0.0	0.020	0.007	0.014
NY: New York City	9	0.1	0.0	0.1	0.019	0.008	0.012
NY: Syracuse	3				0.019	0.008	0.013
NY: Yaphank	9	0.8	0.0	0.3	0.020	0.007	0.012
OH: Painesville	7	0.3	0.1	0.2	0.024	0.007	0.015
OH: Ross	9				0.041	0.005	0.021
OR: Portland	9	0.2	0.1	0.1	0.016	0.003	0.007
PA: Harrisburg	8	0.8	0.1	0.3	0.024	0.011	0.017
PA: Pittsburgh	8				0.027	0.008	0.019
SC: Barnwell	3	0.1	0.1	0.1	0.025	0.006	0.014

Table 2 (continued)

Gross Beta in Airborne Particulates
October 2000

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min	Avg	Max	Min	Avg
		(pCi/m³)			(pCi/m³)		
SC: Columbia	9	0.7	0.0	0.4	0.027	0.008	0.018
TN: Knoxville	9	1.9	0.3	1.1	0.106	0.013	0.034
TN: Nashville	9	0.5	0.1	0.3	0.033	0.007	0.019
TN: Oak Ridge/Bethel	9	2.0	0.4	1.0	0.038	0.009	0.022
TN: Oak Ridge/K25	9	1.4	0.4	0.8	0.032	0.010	0.019
TN: Oak Ridge/Melton	9	1.5	0.3	1.0	0.030	0.009	0.019
TN: Oak Ridge/Y12 E	9	2.0	0.4	1.1	0.043	0.010	0.022
TN: Oak Ridge/Y12 W	7	0.9	0.1	0.5	0.038	0.009	0.024
TX: Austin	8	0.2	0.1	0.1	0.016	0.005	0.010
TX: El Paso	9	1.1	0.4	0.7	0.020	0.008	0.013
UT: Salt Lake City	7	0.4	0.0	0.2	0.021	0.005	0.013
VA: Lynchburg	9	1.3	0.1	0.7	0.021	0.007	0.013
WA: Olympia	2	0.1	0.1	0.1	0.006	0.004	0.005
WA: Spokane	9	0.5	0.1	0.3	0.036	0.005	0.014

Table 3

Gross Beta in Airborne Particulates
November 2000

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	0.014	0.014	0.014
AL: Montgomery/408	9	0.2	0.0	0.1	0.071	0.015	0.030
AL: Montgomery/411	9	0.2	0.0	0.0	0.029	0.007	0.014
AR: Little Rock	7	0.1	0.0	0.0	0.030	0.009	0.019
CA: Berkeley	7	0.4	0.0	0.2	0.020	0.003	0.010
CA: Los Angeles	7	0.4	0.2	0.2	0.020	0.008	0.013
CO: Denver	8	0.8	0.1	0.4	0.016	0.008	0.013
CT: Hartford	8	0.2	0.0	0.1	0.009	0.002	0.005
DE: Wilmington	9	0.3	0.1	0.2	0.022	0.004	0.011
FL: Jacksonville	8	1.0	0.1	0.2	0.035	0.011	0.016
FL: Miami	3	0.0	0.0	0.0	0.011	0.007	0.009
HI: Honolulu	7	0.1	0.1	0.1	0.004	0.001	0.002
IA: Iowa City	8	0.4	0.1	0.3	0.028	0.009	0.017
ID: Boise	4	0.3	0.2	0.2	0.059	0.007	0.031
ID: Idaho Falls	9				0.036	0.006	0.017
IL: Chicago	6	0.4	0.1	0.2	0.023	0.011	0.018
IN: Indianapolis	5	0.8	0.1	0.3	0.018	0.010	0.014
KS: Topeka	7	0.5	0.2	0.3	0.021	0.006	0.013
ME: Augusta	6	0.2	0.0	0.1	0.007	0.002	0.005
MI: Lansing	9	0.4	0.1	0.2	0.029	0.005	0.013
MN: Minneapolis	4	0.2	0.1	0.2	0.032	0.009	0.018
MS: Jackson	7	0.2	0.1	0.1	0.035	0.007	0.019
NC: Charlotte	3	0.0	0.0	0.0	0.018	0.011	0.014
NC: Wilmington	3				0.015	0.012	0.014
ND: Bismarck	5	0.3	0.0	0.2	0.021	0.011	0.015
NH: Concord	8	0.1	0.0	0.1	0.010	0.001	0.006
NJ: Trenton	1				0.005	0.005	0.005
NV: Las Vegas	9	0.5	0.1	0.2	0.029	0.004	0.012
NY: Albany	5	0.1	0.0	0.0	0.015	0.005	0.009
NY: New York City	8	0.4	0.0	0.1	0.018	0.002	0.008
NY: Syracuse	3				0.010	0.007	0.008
NY: Yaphank	9	0.3	0.0	0.1	0.014	0.002	0.006
OH: Painesville	8	0.4	0.1	0.2	0.016	0.006	0.011
OH: Ross	7				0.024	0.012	0.017
OR: Portland	6	0.2	0.0	0.1	0.037	0.003	0.018
PA: Harrisburg	9	1.2	0.1	0.3	0.025	0.003	0.013
PA: Pittsburgh	9				0.028	0.007	0.014
SC: Barnwell	1	0.0	0.0	0.0	0.018	0.018	0.018

Table 3 (continued)

Gross Beta in Airborne Particulates
November 2000

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min	Avg	Max	Min	Avg
		(pCi/m³)			(pCi/m³)		
SC: Columbia	5	0.6	0.1	0.2	0.025	0.013	0.018
TN: Knoxville	8	3.4	0.1	0.7	0.035	0.014	0.023
TN: Nashville	7	0.3	0.0	0.2	0.029	0.009	0.018
TN: Oak Ridge/Bethel	9	1.9	0.2	0.5	0.024	0.010	0.016
TN: Oak Ridge/K25	9	0.9	0.2	0.4	0.024	0.008	0.015
TN: Oak Ridge/Melton	9	0.9	0.2	0.4	0.023	0.008	0.015
TN: Oak Ridge/Y12 E	9	2.5	0.2	0.6	0.025	0.009	0.016
TN: Oak Ridge/Y12 W	9	0.7	0.1	0.3	0.028	0.009	0.017
TX: Austin	8	0.1	0.0	0.1	0.017	0.006	0.012
TX: El Paso	7	1.0	0.3	0.7	0.028	0.007	0.015
UT: Salt Lake City	7	0.2	0.0	0.1	0.031	0.006	0.014
VA: Lynchburg	6	1.1	0.1	0.6	0.023	0.009	0.014
WA: Olympia	1	0.2	0.2	0.2	0.027	0.027	0.027
WA: Spokane	8	0.3	0.1	0.2	0.036	0.009	0.021

Table 4

Gross Beta in Airborne Particulates
December 2000

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	0.014	0.014	0.014
AL: Montgomery/408	8	0.0	0.0	0.0	0.040	0.015	0.027
AL: Montgomery/411	8	0.0	0.0	0.0	0.021	0.007	0.012
AR: Little Rock	4	0.1	0.0	0.1	0.026	0.011	0.017
CA: Berkeley	9	0.4	0.0	0.2	0.033	0.004	0.015
CA: Los Angeles	9	0.6	0.1	0.3	0.033	0.006	0.018
CO: Denver	8	0.8	0.1	0.4	0.027	0.005	0.011
CT: Hartford	9	0.1	0.0	0.0	0.013	0.005	0.007
DE: Wilmington	8	0.2	0.0	0.1	0.028	0.006	0.015
FL: Jacksonville	8	0.1	0.0	0.1	0.027	0.009	0.013
FL: Miami	5	0.0	0.0	0.0	0.009	0.003	0.007
HI: Honolulu	7	0.1	0.1	0.1	0.004	0.001	0.003
IA: Iowa City	7	0.3	0.0	0.1	0.023	0.012	0.018
ID: Boise	7	0.4	0.0	0.2	0.032	0.004	0.016
ID: Idaho Falls	7				0.034	0.003	0.017
IL: Chicago	2	0.1	0.1	0.1	0.020	0.013	0.016
IN: Indianapolis	9	0.3	0.0	0.1	0.027	0.008	0.017
KS: Topeka	8	1.1	0.1	0.3	0.027	0.011	0.019
ME: Augusta	9	0.2	0.0	0.1	0.011	0.005	0.008
MI: Lansing	8	0.1	0.0	0.0	0.022	0.007	0.014
MN: Minneapolis	4	0.2	0.1	0.1	0.022	0.013	0.017
MN: Welch/510	3				0.021	0.015	0.019
MS: Jackson	8	0.5	0.1	0.2	0.025	0.011	0.020
NC: Charlotte	4	0.1	0.0	0.1	0.018	0.012	0.015
NC: Wilmington	3				0.017	0.013	0.015
ND: Bismarck	5	0.1	0.0	0.1	0.053	0.013	0.026
NH: Concord	9	0.2	0.0	0.1	0.012	0.004	0.008
NJ: Trenton	3				0.011	0.007	0.009
NV: Las Vegas	8	0.4	0.1	0.3	0.021	0.006	0.014
NY: Albany	4	0.0	0.0	0.0	0.012	0.007	0.010
NY: New York City	6	0.1	0.0	0.0	0.021	0.005	0.011
NY: Yaphank	8	0.9	0.0	0.2	0.021	0.004	0.010
OH: Painesville	7	0.2	0.0	0.1	0.021	0.006	0.012
OH: Ross	8				0.031	0.005	0.017
OR: Portland	9	0.1	0.0	0.1	0.022	0.003	0.009
PA: Harrisburg	8	0.3	0.1	0.1	0.028	0.006	0.014
PA: Pittsburgh	8				0.026	0.009	0.014
SC: Barnwell	1	0.0	0.0	0.0	0.015	0.015	0.015

Table 4 (continued)

Gross Beta in Airborne Particulates
December 2000

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min	Avg	Max	Min	Avg
		(pCi/m³)			(pCi/m³)		
SC: Columbia	5	0.4	0.1	0.2	0.031	0.009	0.019
TN: Knoxville	5	0.3	0.1	0.2	0.028	0.009	0.020
TN: Nashville	3	0.2	0.1	0.1	0.017	0.015	0.016
TN: Oak Ridge/Bethel	7	0.3	0.1	0.2	0.034	0.010	0.019
TN: Oak Ridge/K25	7	0.3	0.1	0.2	0.033	0.012	0.018
TN: Oak Ridge/Melton	7	0.3	0.1	0.2	0.029	0.009	0.017
TN: Oak Ridge/Y12 E	7	0.3	0.1	0.2	0.033	0.011	0.019
TN: Oak Ridge/Y12 W	7	0.2	0.1	0.1	0.043	0.012	0.024
TX: Austin	7	0.2	0.0	0.1	0.025	0.007	0.014
TX: El Paso	6	1.5	0.7	1.1	0.036	0.010	0.020
UT: Salt Lake City	4	0.3	0.0	0.1	0.039	0.011	0.020
VA: Lynchburg	6	0.6	0.1	0.3	0.018	0.008	0.013
WA: Olympia	1	0.1	0.1	0.1	0.007	0.007	0.007
WA: Spokane	6	0.1	0.1	0.1	0.026	0.007	0.016

Table 5

Gross Beta and Specific Gamma in Precipitation
October 2000

Location	Gross Beta Activity		Gamma-Emitting Radionuclides		
	pCi/L	± 2*u*	Nuclide	pCi/L	± 2*u*
AL: Montgomery	0.32	0.29		ND	
AR: Little Rock	1.30	0.42	Be7	59	43
AZ: Phoenix	1.02	0.41		ND	
CA: Berkeley	-0.01	0.37		ND	
CO: Denver	0.52	0.40	Pb212	5.8	6.6
CT: Hartford	7.66	0.67	Be7	163	39
			Pb212	8.7	6.7
DE: Wilmington	1.22	0.36	Pb212	3.5	5.3
FL: Jacksonville	1.11	0.34	Pb212	5.5	7.0
FL: Miami	0.86	0.35		ND	
HI: Honolulu	3.62	0.93		ND	
	2.08	0.50	Pb212	4.9	6.6
			Tl208	2.2	3.8
IA: Iowa City	4.5	2.9		ND	
ID: Boise	0.20	0.40		ND	
ID: Idaho Falls	1.24	0.42		ND	
KS: Topeka	1.16	0.42		ND	
ME: Augusta	4.20	0.51	Be7	67	28
			Pb212	5.6	5.9
MI: Lansing	4.42	0.54	K40	63	34
			Tl208	2.5	4.3
MN: Minneapolis	15.2	3.9		ND	
MN: Welch	4.5	3.1	K40	32	41
			Tl208	2.6	4.4
MS: Jackson	1.29	0.36	Pb212	3.6	5.4
NC: Charlotte	1.27	0.35	Pb212	7.8	7.4
			Tl208	3.1	4.4
NC: Wilmington	0.99	0.35	Be7	52	22
ND: Bismarck	0.47	0.41		ND	
NH: Concord	2.82	0.45	Be7	51	27
			Tl208	3.1	3.2
NM: Santa Fe	1.25	0.43	Be7	37	36
			Pb212	4.8	5.9
NY: Albany	4.21	0.52	Be7	47	21
			Tl208	2.0	2.7
NY: Syracuse	3.57	0.48		ND	
OH: Painesville	1.66	0.38		ND	

Note: ND = Not Detected

Table 5 (continued)

Gross Beta and Specific Gamma in Precipitation
October 2000

Location	Gross Beta Activity		Gamma-Emitting Radionuclides	
	pCi/L	± 2*u*	Nuclide	pCi/L ± 2*u*
OR: Portland	0.09	0.40		ND
PA: Harrisburg	0.27	0.28		ND
SC: Barnwell	1.08	0.33	K40	31 39
TX: Austin	0.45	0.36		ND
TX: El Paso	0.26	0.41	Tl208	3.7 2.9
UT: Salt Lake City	0.91	0.41	Pb212	2.3 3.0
			Tl208	1.4 1.6
VA: Lynchburg	4.99	0.56	Pb212	6.1 5.6
			Ra224	54 45
WA: Olympia	-0.11	0.36	Pb212	4.0 6.1

Note: ND = Not Detected

Table 6

Gross Beta and Specific Gamma in Precipitation
November 2000

Location	Gross Beta Activity		Gamma-Emitting Radionuclides		
	pCi/L	± 2*u*	Nuclide	pCi/L	± 2*u*
AL: Montgomery	0.11	0.38		ND	
AR: Little Rock	0.49	0.37	Pb212	3.2	3.1
			Tl208	1.7	1.7
AZ: Phoenix	0.77	0.39		ND	
CA: Berkeley	0.80	0.37		ND	
CO: Denver	1.15	0.42		ND	
CT: Hartford	0.34	0.40	K40	24	39
DE: Wilmington	0.47	0.40		ND	
FL: Jacksonville	0.75	0.41		ND	
FL: Miami	2.69	0.93		ND	
HI: Honolulu	1.33	0.43		ND	
IA: Iowa City	0.65	0.39		ND	
ID: Boise	1.03	0.40	Pb212	5.8	6.5
ID: Idaho Falls	0.78	0.37	Pb212	4.5	5.9
KS: Topeka	0.46	0.36	K40	28	38
			Pb212	5.0	6.8
ME: Augusta	1.23	0.44		ND	
MI: Lansing	1.93	0.46		ND	
MN: Minneapolis	1.32	0.40		ND	
MN: Welch	0.28	0.40	K40	29	37
MS: Jackson	0.00	0.35		ND	
NC: Charlotte	1.69	0.47		ND	
NC: Wilmington	2.60	0.52		ND	
ND: Bismarck	1.15	0.41		ND	
NH: Concord	1.04	0.41		ND	
NM: Santa Fe	1.17	0.39		ND	
NV: Las Vegas	2.52	0.51	Pb212	5.7	6.7
NY: Albany	0.82	0.41		ND	
NY: Syracuse	0.97	0.41	Pb212	8.0	6.8
NY: Yaphank	0.68	0.40		ND	
OH: Painesville	4.08	0.57	Bi214	12.2	3.0
OR: Portland	1.55	0.44	Pb212	5.1	6.9
PA: Harrisburg	2.99	0.54		ND	
SC: Columbia	1.70	0.47	K40	28	42
TN: Knoxville	3.37	0.55		ND	
TN: Nashville	-0.08	0.36		ND	
TX: Austin	0.63	0.38		ND	

Note: ND = Not Detected

Table 6 (continued)

Gross Beta and Specific Gamma in Precipitation
November 2000

Location	Gross Beta Activity		Gamma-Emitting Radionuclides	
	pCi/L	± 2*u*	Nuclide	pCi/L ± 2*u*
TX: El Paso	0.50	0.37		ND
UT: Salt Lake City	1.32	0.40		ND

Note: ND = Not Detected

Table 7

Gross Beta and Specific Gamma in Precipitation
December 2000

Location	Gross Beta Activity		Gamma-Emitting Radionuclides		
	pCi/L	± 2*u*	Nuclide	pCi/L	± 2*u*
AL: Montgomery	1.60	0.41		ND	
CA: Berkeley	0.39	0.39		ND	
CT: Hartford	1.09	0.41	Be7	57	40
FL: Jacksonville	1.05	0.39		ND	
FL: Miami	1.07	0.44		ND	
	1.53	0.43		ND	
HI: Honolulu	6.39	0.66		ND	
IA: Iowa City	1.14	0.42	K40	23	41
			Pb212	5.5	6.5
ID: Idaho Falls	3.24	0.56		ND	
MN: Minneapolis	1.13	0.46		ND	
NC: Wilmington	0.44	0.37	Bi214	7.5	2.7
NY: Albany	2.11	0.45		ND	
NY: Yaphank	2.41	0.48		ND	
OH: Painesville	6.49	0.65		ND	
OR: Portland	1.42	0.43		ND	
SC: Columbia	2.43	0.48	Pb212	5.8	6.1
TN: Knoxville	7.33	0.69	K40	30	44
TX: Austin	0.80	0.41		ND	
TX: El Paso	0.90	0.38		ND	
UT: Salt Lake City	0.99	0.42		ND	
VA: Lynchburg	11.10	0.83	K40	37	42
WA: Olympia	0.27	0.28		ND	

Note: ND = Not Detected

Table 8

Tritium in Precipitation
October - December 2000

Location	October 2000		November 2000		December 2000	
	pCi/L	± 2*u*	pCi/L	± 2*u*	pCi/L	± 2*u*
AL: Montgomery	-2	73	-41	76	-21	77
AR: Little Rock	12	80	-39	77	NS	
AZ: Phoenix	-52	76	-34	76	NS	
CA: Berkeley	-89	76	-65	75	-35	76
CO: Denver	0	79	-35	75	NS	
CT: Hartford	-17	72	15	78	51	81
DE: Wilmington	-10	72	29	78	NS	
FL: Jacksonville	-10	72	-18	76	-8	77
FL: Miami	19	73	-61	75	-33	77
HI: Honolulu	-56	77	-26	77	-71	74
IA: Iowa City	-43	70	-53	75	-11	78
ID: Boise	-32	78	-47	75	NS	
ID: Idaho Falls	-55	78	-15	77	-18	78
KS: Topeka	-75	77	7	78	NS	
ME: Augusta	17	73	-51	76	NS	
MI: Lansing	47	75	-8	77	NS	
MN: Minneapolis	29	74	-23	77	-68	75
MN: Welch	-66	69	-6	76	NS	
MS: Jackson	10	74	-38	76	NS	
NC: Charlotte	-10	72	-11	76	NS	
NC: Wilmington	5	73	-29	75	-18	77
ND: Bismarck	-59	76	-44	75	NS	
NH: Concord	118	78	54	79	NS	
NM: Santa Fe	-62	78	18	79	NS	
NV: Las Vegas	NS		-23	77	NS	
NY: Albany	-2	72	-5	79	27	79
NY: Syracuse	45	75	33	78	NS	
NY: Yaphank	NS		-18	76	15	79
OH: Painesville	-7	73	7	77	-11	77
OR: Portland	-84	76	2	78	-31	76
PA: Harrisburg	14	73	-24	75	NS	
SC: Barnwell	-36	71	NS		NS	
SC: Columbia	NS		85	81	31	79
TN: Knoxville	NS		-10	77	63	80
TN: Nashville	NS		-25	77	NS	
TX: Austin	-68	77	11	78	21	79
TX: El Paso	-50	78	-34	77	-16	78
UT: Salt Lake City	-20	79	-31	77	-5	78

Note: NS = No Sample

Table 8 (continued)

Tritium in Precipitation
October - December 2000

Location	October 2000 pCi/L ± 2*u*		November 2000 pCi/L ± 2*u*	December 2000 pCi/L ± 2*u*	
VA: Lynchburg	-14	72	NS	14	78
WA: Olympia	-32	78	NS	37	85

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.

Table 9

Plutonium and Uranium in Airborne Particulates
January - December 2000 Composites

Location	^{238}Pu aCi/m³	± 2*u*	$^{239-240}$Pu aCi/m³	± 2*u*	^{234}U aCi/m³	± 2*u*	^{235}U aCi/m³	± 2*u*	^{238}U aCi/m³	± 2*u*
AK: Fairbanks	0.34	0.51	0.05	0.20	9.3	2.0	0.89	0.63	9.2	2.0
AL: Montgomery/408	0.2	1.1	0.11	0.54	15.3	3.2	1.05	0.81	12.5	2.8
AL: Montgomery/411	0.8	1.3	0.00	0.64	11.3	2.6	0.74	0.72	11.5	2.6
AR: Little Rock	1.2	1.7	0.00	0.81	24.6	5.0	1.9	1.4	19.6	4.3
AZ: Phoenix	-0.5	4.7	-0.3	1.8	81	17	9.5	5.8	73	16
CA: Berkeley	-0.38	0.68	-0.12	0.36	8.6	2.3	2.9	1.5	4.5	1.6
CA: Los Angeles	0.8	1.8	-0.20	0.48	28.2	5.4	2.9	1.6	24.0	4.8
CO: Denver	-0.3	1.8	0.43	0.93	28.7	5.7	3.6	2.0	32.2	6.2
CT: Hartford	0.0	1.0	-0.05	0.32	9.5	2.4	0.62	0.68	7.5	2.1
DE: Wilmington	-0.25	0.86	0.00	0.32	14.4	2.8	1.08	0.70	12.4	2.5
FL: Jacksonville	1.0	1.6	0.23	0.68	13.1	2.7	1.57	0.90	14.7	2.9
FL: Miami	0.20	0.75	0.44	0.51	10.1	2.1	0.72	0.55	8.8	1.9
HI: Honolulu	0.0	1.0	0.25	0.44	7.8	1.9	1.15	0.74	5.1	1.5
ID: Boise	0.00	0.89	0.27	0.57	17.7	4.0	6.9	2.6	15.3	3.7
ID: Idaho Falls	0.29	0.97	0.29	0.52	20.5	5.0	2.5	1.8	20.2	4.9
IL: Chicago	0.4	1.8	0.8	1.3	23.5	4.8	2.3	1.5	19.8	4.3
IN: Indianapolis	-0.3	2.1	-0.17	0.58	24.4	5.2	2.1	1.5	23.7	5.1
ME: Augusta	0.2	1.9	0.14	0.64	20.4	4.5	2.0	1.4	19.1	4.3
MI: Lansing	-0.32	0.89	-0.06	0.32	13.8	3.0	1.5	1.0	12.4	2.8
MS: Jackson	0.6	1.4	0.31	0.67	13.5	3.0	0.90	0.81	12.1	2.9
NC: Charlotte	-0.3	2.5	0.9	1.5	24.7	4.8	2.5	1.4	24.1	4.8
NC: Wilmington	-0.4	1.1	0.24	0.62	9.6	1.9	0.78	0.51	8.6	1.8
ND: Bismarck	1.1	1.5	0.51	0.76	23.1	4.6	2.2	1.4	16.4	3.7
NH: Concord	0.24	0.95	0.17	0.44	9.8	2.3	1.24	0.86	9.9	2.3
NJ: Trenton	0.5	1.0	0.10	0.40	10.9	2.4	0.92	0.75	10.6	2.4
NM: Santa Fe	-5	17	7	10	245	52	18	15	226	50
NV: Las Vegas	0.2	2.0	2.9	1.8	75	13	4.8	2.8	49.3	9.5
NY: Albany	-0.3	1.9	0.33	0.70	14.4	3.2	1.6	1.0	15.3	3.3
NY: New York City	0.3	1.2	1.0	1.0	13.4	2.8	1.05	0.78	11.9	2.6
NY: Syracuse	0.20	0.87	0.08	0.37	10.9	2.4	1.18	0.83	13.1	2.7
NY: Yaphank	0.2	1.2	0.11	0.50	7.7	1.7	1.08	0.64	5.3	1.3
OH: Painesville	-0.60	0.65	-0.06	0.20	12.2	2.7	1.44	0.92	12.5	2.7
OH: Ross	0.3	1.0	-0.14	0.47	33.6	6.9	1.4	1.5	37.3	7.4
OR: Portland	0.66	0.66	0.41	0.41	9.8	2.1	1.06	0.70	6.9	1.7
PA: Harrisburg	0.16	0.78	0.16	0.59	8.8	1.9	0.79	0.57	7.1	1.7
PA: Pittsburgh	0.3	1.3	-0.05	0.47	16.2	3.2	2.0	1.1	15.1	3.1
SC: Barnwell	0.49	0.49	0.10	0.32	9.0	1.8	0.33	0.39	7.0	1.5
SC: Columbia	0.3	1.0	0.00	0.61	29.3	5.2	1.4	1.1	23.6	4.4
TN: Knoxville	-0.2	1.6	-0.11	0.39	28.2	6.0	2.1	1.7	21.7	5.0
TN: Knoxville	-0.2	1.6	-0.11	0.39	31.8	6.4	1.3	1.3	24.7	5.4

Note: NA = No Analysis

Table 9 (continued)

Plutonium and Uranium in Airborne Particulates
January - December 2000 Composites

Location	^{238}Pu aCi/m³	± 2*u*	$^{239-240}$Pu aCi/m³	± 2*u*	^{234}U aCi/m³	± 2*u*	^{235}U aCi/m³	± 2*u*	^{238}U aCi/m³	± 2*u*
TN: Nashville	0.6	1.3	0.00	0.55	19.4	3.8	1.5	1.1	15.7	3.3
TN: Oak Ridge/Bethel	0.7	1.2	0.20	0.57	10.1	2.6	0.86	0.84	9.9	2.5
TN: Oak Ridge/K25	0.46	0.74	0.11	0.43	23.7	3.7	2.19	0.87	27.4	4.2
TN: Oak Ridge/Melton	-0.25	0.66	-0.16	0.31	7.4	1.6	0.32	0.37	6.6	1.5
TN: Oak Ridge/Y12 E	1.7	2.2	-0.14	0.67	37.0	6.9	2.3	1.6	16.6	4.0
TN: Oak Ridge/Y12 W	-0.7	1.1	0.17	0.64	70.1	9.6	6.0	1.8	37.4	5.7
TX: Austin	0.7	1.2	0.25	0.54	14.4	3.1	1.5	1.0	10.8	2.6
TX: El Paso	3.8	4.0	-0.2	1.9	61	13	2.3	3.2	45	11
UT: Salt Lake City	-0.2	1.7	0.4	1.2	42.3	7.7	4.0	2.1	31.1	6.2
VA: Lynchburg	0.00	0.52	0.20	0.31	135	17	6.6	1.6	19.1	3.0
WA: Olympia	0.21	0.49	0.00	0.17	6.1	1.3	0.49	0.42	4.1	1.1
WA: Spokane	0.1	1.4	0.43	0.66	20.1	4.2	3.6	1.7	14.4	3.4
WI: Madison	0.44	0.72	0.22	0.47	7.9	2.0	0.88	0.67	9.1	2.1

Note: NA = No Analysis

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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 10

Tritium in Drinking Water
October - December 2000

Location	Date Collected	^{3}H pCi/L ± 2*u*	
AK: Fairbanks	11/24/00	23	79
AL: Dothan	10/17/00	-47	77
AL: Montgomery	10/02/00	-43	73
AL: Muscle Shoals	10/12/00	84	82
AL: Scottsboro	10/13/00	170	85
AR: Little Rock	10/04/00	-72	74
CA: Berkeley	10/15/00	-54	77
CA: Los Angeles	10/11/00	0	78
CO: Denver	10/27/00	-16	79
CO: Platteville	10/26/00	-48	77
CT: Hartford	10/06/00	-20	78
DE: Dover	10/10/00	-67	76
FL: Miami	10/09/00	13	79
FL: Tampa	11/20/00	-34	76
GA: Baxley	10/03/00	-39	75
GA: Savannah	10/24/00	-65	77
HI: Honolulu	10/24/00	-36	77
IA: Cedar Rapids	10/04/00	-55	74
ID: Idaho Falls	10/16/00	-5	78
IL: Morris	11/30/00	-21	76
KS: Topeka	10/02/00	-34	75
LA: New Orleans	10/17/00	16	80
MA: Lawrence	10/03/00	18	77
MD: Baltimore	10/10/00	-26	77
MD: Conowingo	11/09/00	7	80
ME: Augusta	10/04/00	8	78
MI: Detroit	10/20/00	143	86
MI: Grand Rapids	11/03/00	48	82
MN: Minneapolis	11/06/00	15	78
MN: Red Wing	10/16/00	-36	77
MO: Jefferson City	10/05/00	15	77
MS: Jackson	10/10/00	-60	76
MS: Port Gibson	10/10/00	-40	77
NC: Charlotte	10/05/00	720	100
NC: Wilmington	10/09/00	-65	76
ND: Bismarck	10/04/00	25	78
NE: Lincoln	10/06/00	-6	76
NH: Concord	10/04/00	13	77
NJ: Trenton	10/16/00	-18	78
NJ: Waretown	11/15/00	-29	78

Table 10 (continued)

Tritium in Drinking Water
October - December 2000

Location	Date Collected	^{3}H pCi/L ± 2*u*	
NM: Santa Fe	11/17/00	-21	76
NV: Las Vegas	10/13/00	-68	77
NY: Albany	10/05/00	3	77
NY: Niagara Falls	10/16/00	16	80
NY: Syracuse	12/14/00	2	77
OH: Cincinnati	12/04/00	11	76
OH: Columbus	12/18/00	-15	77
OH: E. Liverpool	11/01/00	8	77
OH: Painesville	10/05/00	99	80
OK: Oklahoma City	10/04/00	-74	73
OR: Portland	10/05/00	-10	76
PA: Columbia	10/26/00	-45	77
PA: Harrisburg	11/13/00	2	80
PA: Philadelphia/Baxter	10/24/00	-44	78
PA: Philadelphia/Queen	10/24/00	8	80
PA: Pittsburgh - Dw	11/01/00	20	79
RI: Providence	10/11/00	-5	79
SC: Barnwell	10/04/00	-18	76
SC: Columbia	10/05/00	230	86
SC: Jenkinsville	10/05/00	49	79
SC: Seneca	10/09/00	-16	78
TN: Chattanooga	10/06/00	127	83
TN: Knoxville	11/09/00	-24	76
TX: Austin	10/04/00	24	78
VA: Ashland	10/13/00	-21	79
VA: Lynchburg	10/02/00	-42	74
WA: Richland	10/10/00	-6	78
WA: Seattle	11/07/00	-35	78
WI: Genoa	10/10/00	-33	78

Table 11

Plutonium and Uranium Analyses
Selected Drinking Water Composite Samples
January - December 2000

Location	^{238}Pu pCi/L ± 2*u*		$^{239-240}$Pu pCi/L ± 2*u*		^{234}U pCi/L ± 2*u*		^{235}U pCi/L ± 2*u*		^{238}U pCi/L ± 2*u*	
GA: Baxley	-0.007	0.016	0.0006	0.0043	0.029	0.017	0.0017	0.0099	0.013	0.012
IL: Morris	0.014	0.029	-0.0044	0.0051	0.444	0.089	0.014	0.020	0.037	0.027
IL: W. Chicago	0.002	0.033	0.003	0.014	0.81	0.14	0.009	0.016	0.125	0.050
MN: Red Wing	0.07	0.14	-0.023	0.049	0.38	0.12	0.017	0.037	0.031	0.034
MS: Port Gibson	0.010	0.028	-0.001	0.013	0.040	0.028	-0.002	0.012	0.055	0.033
NE: Lincoln	0.025	0.056	-0.002	0.016	4.73	0.41	0.199	0.065	3.24	0.31
NM: Santa Fe	0.031	0.040	0.013	0.020	9.27	0.72	0.390	0.097	6.56	0.54
NV: Las Vegas	0.014	0.020	-0.0031	0.0034	2.13	0.21	0.076	0.031	1.22	0.14
SC: Jenkinsville	0.009	0.015	0.0013	0.0042	2.28	0.20	0.089	0.030	1.39	0.14

Note: NA = No Analysis

Table 12

Iodine-131 in Drinking Water
January - December 2000

Location	Date Collected	^{131}I pCi/L	± 2*u*
AK: Fairbanks	11/24/00	0.04	0.13
AL: Dothan	04/04/00	-0.03	0.22
AL: Montgomery	01/03/00	0.041	0.076
AL: Muscle Shoals	04/13/00	0.090	0.082
AL: Scottsboro	07/19/00	0.001	0.059
AR: Little Rock	01/06/00	0.030	0.083
CA: Berkeley	07/12/00	-0.013	0.089
CA: Los Angeles	01/06/00	0.05	0.10
CO: Denver	10/27/00	0.09	0.14
CO: Platteville	10/26/00	-0.03	0.15
CT: Hartford	01/06/00	-0.025	0.086
DE: Dover	07/10/00	0.086	0.075
FL: Miami	01/14/00	-0.039	0.088
FL: Miami	04/04/00	0.09	0.22
FL: Tampa	11/20/00	0.15	0.20
GA: Baxley	10/03/00	0.01	0.18
GA: Savannah	02/02/00	-0.05	0.21
HI: Honolulu	10/24/00	-0.21	0.58
IA: Cedar Rapids	04/03/00	0.061	0.072
ID: Idaho Falls	01/24/00	0.018	0.083
IL: Morris	01/18/00	-0.25	0.23
IL: W. Chicago	08/10/00	0.06	0.12
KS: Topeka	01/06/00	0.036	0.089
LA: New Orleans	10/17/00	0.23	0.33
MA: Lawrence	10/03/00	0.11	0.19
MD: Baltimore	01/05/00	-0.039	0.089
MD: Conowingo	11/09/00	0.19	0.45
ME: Augusta	04/19/00	0.010	0.091
MI: Detroit	10/20/00	0.11	0.23
MI: Grand Rapids	01/18/00	0.13	0.20
MN: Minneapolis	01/31/00	0.013	0.072
MN: Red Wing	10/16/00	0.25	0.20
MO: Jefferson City	01/07/00	0.014	0.078
MS: Jackson	04/19/00	0.045	0.090
MS: Port Gibson	10/10/00	-0.01	0.15
NC: Charlotte	10/05/00	0.11	0.15
NC: Wilmington	10/09/00	0.10	0.35
ND: Bismarck	04/04/00	0.24	0.19
NE: Lincoln	04/04/00	-0.03	0.22
NH: Concord	01/06/00	-0.028	0.072
NJ: Trenton	10/16/00	0.17	0.20

Table 12 (continued)

Iodine-131 in Drinking Water
January - December 2000

Location	Date Collected	^{131}I pCi/L	± 2*u*
NJ: Waretown	09/06/00	1.15	0.15
NM: Santa Fe	01/20/00	-0.05	0.18
NV: Las Vegas	04/05/00	0.11	0.19
NY: Albany	01/06/00	-0.079	0.082
NY: Niagara Falls	03/31/00	0.079	0.071
OH: Cincinnati	03/10/00	0.055	0.070
OH: Columbus	12/18/00	0.15	0.83
OH: E. Liverpool	03/01/00	0.163	0.078
OH: E. Liverpool	04/27/00	0.324	0.083
OH: Painesville	01/06/00	0.09	0.23
OH: Toledo	03/30/00	0.113	0.086
OK: Oklahoma City	01/06/00	0.00	0.21
OR: Portland	04/04/00	-0.24	0.25
PA: Columbia	03/02/00	-0.039	0.081
PA: Columbia	04/27/00	0.070	0.075
PA: Harrisburg	03/02/00	-0.008	0.081
PA: Harrisburg	04/28/00	-0.067	0.081
PA: Philadelphia/Baxter	02/02/00	0.03	0.26
PA: Philadelphia/Baxter	04/13/00	0.44	0.20
PA: Philadelphia/Queen	02/02/00	0.19	0.22
PA: Philadelphia/Queen	04/13/00	0.37	0.19
PA: Pittsburgh	03/01/00	0.080	0.087
PA: Pittsburgh	04/27/00	0.004	0.073
RI: Providence	10/11/00	-0.17	0.25
SC: Barnwell	04/13/00	0.025	0.082
SC: Columbia	01/06/00	-0.004	0.081
SC: Jenkinsville	04/14/00	-0.045	0.080
SC: Seneca	01/05/00	-0.01	0.11
TN: Chattanooga	04/07/00	0.05	0.10
TN: Knoxville	01/05/00	0.002	0.088
TN: Oak Ridge - Knox Co. #371	09/25/00	0.09	0.28
TN: Oak Ridge - Anderson Co. #768	09/26/00	0.21	0.24
TN: Oak Ridge - Roane Co. #4442	09/28/00	-0.06	0.15
TX: Austin	01/17/00	-0.042	0.080
VA: Ashland	03/02/00	-0.022	0.091
VA: Ashland	07/24/00	-0.043	0.072
VA: Lynchburg	02/12/00	0.051	0.089
WA: Richland	04/06/00	0.02	0.19
WA: Seattle	11/07/00	-0.03	0.26
WI: Genoa	04/12/00	0.127	0.093

Table 13

Drinking Water
Alpha, Beta, and Sr-90 Concentrations
January - December 2000 Composites

Location	Total Solids (mg/L)	Gross Beta pCi/L ± 2*u*		Gross Alpha pCi/L ± 2*u*		^{90}Sr pCi/L ± 2*u*	
AK: Fairbanks	65.0	3.77	0.93	0.59	0.94		
AL: Dothan	168.6	2.86	0.97	0.4	1.7		
AL: Montgomery	33.6	2.33	0.72	0.20	0.62		
AL: Muscle Shoals	44.0	1.99	0.84	0.09	0.84		
AL: Scottsboro	65.0	2.03	0.70	-0.17	0.75		
AR: Little Rock	17.3	1.20	0.77	-0.19	0.54	0.04	0.29
CA: Berkeley	20.0	0.86	0.72	0.00	0.55		
CA: Los Angeles	35.8	6.8	4.1	1.7	3.3		
CO: Denver	71.4	3.57	0.92	0.62	0.99		
CO: Platteville	6.0	0.3	3.6	0.9	2.5		
CT: Hartford	24.0	1.46	0.67	0.00	0.55		
DC: Washington	41.5	3.3	1.2	0.1	1.1		
DE: Dover	51.1	2.7	1.1	0.2	1.2		
FL: Miami	66.2	3.35	0.93	0.4	1.0		
FL: Tampa	144.9	3.1	1.3	1.5	2.3		
GA: Baxley	87.1	4.55	0.91	2.0	1.3		
GA: Savannah	75.2	2.54	0.74	0.46	0.93		
HI: Honolulu	83.6	2.1	1.0	-0.2	1.2		
IA: Cedar Rapids	66.0	3.01	0.94	0.61	0.93	-0.23	0.27
ID: Idaho Falls	65.3	2.5	1.4	0.6	1.5		
IL: Morris	72.3	10.0	3.0	5.5	3.8	0.0	1.1
IL: W. Chicago	107.0	10.0	2.1	6.5	3.3	0.3	1.2
KS: Topeka	94.0	6.4	1.8	-0.4	2.1	0.00	0.25
LA: New Orleans	90.2	5.1	1.2	0.2	1.3	-0.02	0.28
MA: Lawrence	61.2	2.56	0.76	0.32	0.85		
MD: Baltimore	55.8	2.58	0.77	0.43	0.83		
MD: Conowingo	69.5	2.29	0.89	0.2	1.1		
ME: Augusta	44.3	1.52	0.67	0.29	0.68		
MI: Detroit	43.0	1.98	0.84	0.25	0.77	0.35	0.28
MI: Grand Rapids	61.0	2.48	0.85	0.00	0.82	0.52	0.28
MN: Minneapolis	46.6	2.30	0.89	0.38	0.75	0.09	0.39
MN: Red Wing	78.1	13.7	2.0	19.6	3.6	-0.30	0.33
MO: Jefferson City	95.2	5.9	1.6	-0.3	1.8		
MS: Jackson	57.2	3.57	0.81	0.04	0.75		
MS: Port Gibson	90.0	6.9	1.7	7.4	2.9		
MT: Helena	96.9	5.4	1.0	1.1	1.3		
NC: Charlotte	28.6	2.29	0.72	0.17	0.60		

Table 13 (continued)

Drinking Water
Alpha, Beta, and Sr-90 Concentrations
January - December 2000 Composites

Location	Total Solids (mg/L)	Gross Beta pCi/L ± 2*u*		Gross Alpha pCi/L ± 2*u*		^{90}Sr pCi/L ± 2*u*	
NC: Wilmington	74.9	4.24	0.85	0.54	0.94		
ND: Bismarck	89.8	3.3	1.4	0.2	1.8		
NE: Lincoln	87.0	15.2	2.3	5.8	3.0		
NH: Concord	51.4	1.14	0.63	0.39	0.75		
NJ: Trenton	53.4	2.54	0.74	-0.08	0.68		
NJ: Waretown	37.0	2.46	0.74	0.36	0.68		
NM: Santa Fe	85.1	13.8	2.0	9.8	2.9	0.01	0.49
NV: Las Vegas	75.8	7.4	2.9	2.2	3.7		
NY: Albany	42.8	0.86	0.60	0.23	0.67		
NY: Niagara Falls	53.2	2.68	0.75	0.18	0.72		
NY: Syracuse	49.9	2.39	0.75	0.07	0.72		
OH: Cincinnati	96.2	3.2	1.2	0.4	1.3	0.03	0.31
OH: Columbus	93.7	3.7	1.7	0.0	2.1	-0.18	0.52
OH: E. Liverpool	94.5	3.8	1.2	0.4	1.5	0.39	0.26
OH: Painesville	51.5	2.4	1.0	-0.08	0.92	0.28	0.26
OH: Toledo	59.7	2.48	0.91	0.43	0.86	0.67	0.90
OK: Oklahoma City	48.9	3.03	0.90	0.13	0.80	0.10	0.32
OR: Portland	12.1	0.73	0.71	0.00	0.52		
PA: Columbia	67.1	2.30	0.72	0.00	0.79		
PA: Harrisburg	22.0	0.73	0.75	-0.06	0.66		
PA: Philadelphia/Baxter	36.1	2.0	1.1	0.0	1.0		
PA: Philadelphia/Queen	81.2	4.4	1.3	0.2	1.5		
PA: Pittsburgh	72.3	2.21	0.86	0.0	1.0		
RI: Providence	32.8	1.17	0.66	0.06	0.60		
SC: Barnwell	24.6	1.10	0.62	0.61	0.63		
SC: Columbia	57.2	2.91	0.77	-0.21	0.72		
SC: Jenkinsville	48.5	5.7	1.1	4.4	1.4		
SC: Seneca	19.0	1.46	0.64	-0.02	0.50		
TN: Chattanooga	55.1	2.22	0.73	0.01	0.75	-0.13	0.24
TN: Knoxville	78.0	2.22	0.72	-0.05	0.84		
TN: Oak Ridge - Anderson Co. #768	64.6	1.92	0.83	0.58	0.96	0.08	0.23
TN: Oak Ridge - Anderson Co. #772	60.6	1.41	0.81	0.00	0.88	0.01	0.28
TN: Oak Ridge - Roane Co. #4442	60.1	3.73	0.92	0.07	0.82	0.99	0.38
TN: Oak Ridge - Roane Co. #360	55.8	2.18	0.88	0.14	0.78	0.20	0.28
TN: Oak Ridge - Knox Co. #371	54.0	1.83	0.81	0.07	0.79	-0.13	0.48
TX: Austin	58.2	3.8	1.1	0.00	0.99	-0.07	0.27
VA: Ashland	45.4	2.33	0.84	-0.10	0.79		

Table 13 (continued)

Drinking Water
Alpha, Beta, and Sr-90 Concentrations
January - December 2000 Composites

Location	Total Solids (mg/L)	Gross Beta pCi/L ± 2*u*		Gross Alpha pCi/L ± 2*u*		^{90}Sr pCi/L ± 2*u*	
VA: Lynchburg	30.3	0.71	0.60	0.44	0.65		
WA: Richland	27.3	0.77	0.73	-0.05	0.59		
WA: Seattle	1.2	0.28	0.70	0.13	0.53		
WI: Genoa	75.8	2.14	0.86	1.1	1.1	-0.04	0.27

Table 14

Drinking Water
Radium and Gamma-Emitting Radionuclides
January - December 2000 Composites

Location	^{226}Ra		^{228}Ra		Gamma-Emitting Radionuclides		
	pCi/L	± 2*u*	pCi/L	± 2*u*	Nuclide	pCi/L	± 2*u*
AK: Fairbanks	NA		NA		Tl208	2.9	4.9
AL: Dothan	NA		NA			ND	
AL: Montgomery	NA		NA			ND	
AL: Muscle Shoals	NA		NA			ND	
AL: Scottsboro	NA		NA			ND	
AR: Little Rock	NA		NA		Pb212	4.9	6.4
CA: Berkeley	NA		NA			ND	
CA: Los Angeles	NA		NA		Tl208	3.5	5.9
CO: Denver	NA		NA		Tl208	2.2	4.6
CO: Platteville	NA		NA		Bi214	7.0	7.1
CT: Hartford	NA		NA			ND	
DC: Washington	NA		NA			ND	
DE: Dover	NA		NA		K40	30	39
FL: Miami	NA		NA			ND	
FL: Tampa	NA		NA			ND	
GA: Baxley	1.75	0.20	NA			ND	
GA: Savannah	NA		NA			ND	
HI: Honolulu	NA		NA			ND	
IA: Cedar Rapids	NA		NA			ND	
ID: Idaho Falls	NA		NA			ND	
IL: Morris	1.93	0.22	NA		K40	31	36
IL: W. Chicago	1.20	0.14	NA		Pb212	4.3	6.5
KS: Topeka	NA		NA			ND	
LA: New Orleans	NA		NA			ND	
MA: Lawrence	NA		NA			ND	
MD: Baltimore	NA		NA			ND	
MD: Conowingo	NA		NA			ND	
ME: Augusta	NA		NA		Pb212	4.1	6.4
MI: Detroit	NA		NA		K40	28	47
					Tl208	3.8	7.1
MI: Grand Rapids	NA		NA			ND	
MN: Minneapolis	NA		NA		Pb212	3.4	5.2
MN: Red Wing	3.39	0.36	2.9	1.0	K40	32	37
MO: Jefferson City	NA		NA		K40	39	46
MS: Jackson	NA		NA			ND	
MS: Port Gibson	0.795	0.094	NA		Bi212	31	31

Note: ND = Not Detected
NA = No Analysis

Table 14 (continued)

Drinking Water
Radium and Gamma-Emitting Radionuclides
January - December 2000 Composites

Location	^{226}Ra		^{228}Ra		Gamma-Emitting Radionuclides		
	pCi/L	± 2*u*	pCi/L	± 2*u*	Nuclide	pCi/L	± 2*u*
MT: Helena	NA		NA			ND	
NC: Charlotte	NA		NA			ND	
NC: Wilmington	NA		NA		K40	21	38
ND: Bismarck	NA		NA			ND	
NE: Lincoln	0.164	0.027	NA			ND	
NH: Concord	NA		NA			ND	
NJ: Trenton	NA		NA			ND	
NJ: Waretown	NA		NA		K40	20	37
NM: Santa Fe	0.037	0.013	NA		K40	20	39
NV: Las Vegas	0.152	0.026	NA			ND	
NY: Albany	NA		NA		Pb212	5.7	6.4
NY: Niagara Falls	NA		NA			ND	
NY: Syracuse	NA		NA			ND	
OH: Cincinnati	NA		NA		Pb212	6.2	6.3
OH: Columbus	NA		NA			ND	
OH: E. Liverpool	NA		NA		K40	49	37
OH: Painesville	NA		NA			ND	
OH: Toledo	NA		NA			ND	
OK: Oklahoma City	NA		NA			ND	
OR: Portland	NA		NA			ND	
PA: Columbia	NA		NA			ND	
PA: Harrisburg	NA		NA		Pb212	5.6	7.0
					Ra224	68	63
PA: Philadelphia/Baxter	NA		NA			ND	
PA: Philadelphia/Queen	NA		NA			ND	
PA: Pittsburgh	NA		NA		Pb212	4.4	6.1
RI: Providence	NA		NA		Tl208	4.2	5.1
SC: Barnwell	NA		NA			ND	
SC: Columbia	NA		NA			ND	
SC: Jenkinsville	0.578	0.070	NA		K40	28	49
SC: Seneca	NA		NA			ND	
TN: Chattanooga	NA		NA		Pb212	4.4	6.3
TN: Knoxville	NA		NA			ND	
TN: Oak Ridge - Anderson Co. #768	NA		NA			ND	
TN: Oak Ridge - Anderson Co. #772	NA		NA			ND	
TN: Oak Ridge - Roane Co. #4442	NA		NA		Pb212	3.7	5.8

Note: ND = Not Detected
NA = No Analysis

Table 14 (continued)

Drinking Water
Radium and Gamma-Emitting Radionuclides
January - December 2000 Composites

Location	^{226}Ra	^{228}Ra	Gamma-Emitting Radionuclides	
	pCi/L ± 2*u*	pCi/L ± 2*u*	Nuclide	pCi/L ± 2*u*
TN: Oak Ridge - Roane Co. #360	NA	NA	K40	24 41
TN: Oak Ridge - Knox Co. #371	NA	NA		ND
TX: Austin	NA	NA		ND
VA: Ashland	NA	NA		ND
VA: Lynchburg	NA	NA		ND
WA: Richland	NA	NA	K40	31 37
			Tl208	4.1 5.3
WA: Seattle	NA	NA		ND
WI: Genoa	NA	NA		ND

Note: ND = Not Detected
NA = No Analysis

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 15

Radionuclides in Pasteurized Milk
October - December 2000

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	10/11/00	1.48	0.16	ND		ND	ND
AR: Little Rock	12/11/00	1.55	0.12	ND		ND	ND
AZ: Phoenix	10/31/00	1.53	0.12	ND		ND	ND
CA: Los Angeles	10/10/00	1.60	0.17	ND		ND	ND
CA: Sacramento	11/15/00	1.56	0.13	ND		ND	ND
CA: San Francisco	10/10/00	1.60	0.17	ND		ND	ND
CT: Hartford	11/07/00	1.62	0.13	ND		ND	ND
DE: Wilmington	10/05/00	1.57	0.13	ND		ND	ND
FL: Tampa	10/03/00	1.72	0.11	2.9	1.5	ND	ND
HI: Honolulu	10/13/00	1.55	0.12	ND		ND	ND
IA: Des Moines	10/16/00	1.54	0.12	ND		ND	ND
IL: Chicago	11/29/00	1.56	0.12	ND		ND	ND
IN: Indianapolis	10/10/00	1.57	0.11	ND		ND	ND
KS: Wichita	10/16/00	1.48	0.12	ND		ND	ND
KY: Louisville	10/09/00	1.58	0.12	ND		ND	ND
MA: Boston	10/16/00	1.58	0.12	ND		ND	ND
MD: Baltimore	10/06/00	1.57	0.13	ND		ND	ND
ME: Portland	10/03/00	1.66	0.12	ND		ND	ND
MI: Detroit	10/03/00	1.61	0.16	ND		ND	ND
MI: Grand Rapids	10/03/00	1.55	0.12	ND		ND	ND
MO: Jefferson City	10/27/00	1.54	0.13	ND		ND	ND
MS: Jackson	10/11/00	1.53	0.12	ND		ND	ND
NC: Charlotte	10/19/00	1.54	0.12	ND		ND	ND
NJ: Trenton	12/11/00	1.67	0.13	ND		ND	ND
NV: Las Vegas	10/16/00	1.49	0.12	ND		ND	ND
NY: Buffalo	10/05/00	1.57	0.17	ND		ND	ND
NY: Syracuse	10/10/00	1.45	0.12	ND		ND	ND
OH: Cincinnati	11/14/00	1.54	0.12	ND		ND	ND
OH: Cleveland	11/13/00	1.62	0.12	ND		ND	ND
OR: Portland	10/23/00	1.60	0.13	ND		ND	ND
PA: Philadelphia	10/03/00	1.58	0.11	ND		ND	ND
PA: Pittsburgh	11/07/00	1.51	0.16	ND		ND	ND
TN: Chattanooga	11/07/00	1.57	0.12	ND		ND	ND
TN: Knoxville	10/17/00	1.50	0.12	ND		ND	ND
TN: Memphis	10/16/00	1.48	0.12	ND		ND	ND
TX: Ft. Worth	10/23/00	1.61	0.12	ND		ND	ND
TX: San Antonio	10/04/00	1.51	0.11	ND		ND	ND
VA: Norfolk	10/25/00	1.45	0.12	ND		ND	ND
VT: Montpelier	10/26/00	1.56	0.12	ND		ND	ND

Note: ND = Not Detected

Table 15 (continued)

Radionuclides in Pasteurized Milk
October - December 2000

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*
WA: Spokane	10/11/00	1.50 0.12	ND	ND	ND
WA: Tacoma	11/28/00	1.72 0.12	ND	ND	ND
WV: Charleston	10/03/00	1.53 0.12	ND	ND	ND

Note: ND = Not Detected

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