

ENVIRONMENTAL

RADIATION

DATA

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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 RadNet monitoring system (formerly 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 RadNet in 1973 with an emphasis on identifying trends in the accumulation of long-lived radionuclides in the environment. RadNet 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 RadNet 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 RadNet monitoring system (formerly 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 RadNet. 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 sample that is analyte-free.

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

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

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

‡ Activity as of the day of counting.

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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 natural radon isotopes and their progeny to decay. 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/m³. 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 2005

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
AL: Montgomery/408	9				0.016	0.005	0.011
AR: Little Rock	6	0.0	0.0	0.0	0.024	0.006	0.013
AZ: Phoenix	4	0.5	0.1	0.3	0.015	0.011	0.013
CA: Los Angeles	8	1.0	0.2	0.4	0.023	0.013	0.019
CA: Richmond	4	0.1	0.0	0.0	0.007	0.004	0.005
CA: San Francisco	3				0.004	0.003	0.004
CO: Denver	8	1.3	0.1	0.7	0.018	0.006	0.011
CT: Hartford	9	0.1	0.0	0.0	0.009	0.002	0.005
DC: Washington	9	0.1	0.0	0.1	0.011	0.002	0.007
DE: Wilmington	9	0.5	0.1	0.1	0.013	0.002	0.007
FL: Jacksonville	8	0.1	0.1	0.1	0.014	0.002	0.006
GA: Atlanta	5	0.1	0.0	0.0	0.013	0.006	0.010
IA: Iowa City	9	0.9	0.3	0.5	0.013	0.003	0.008
ID: Idaho Falls	9				0.013	0.006	0.009
IL: Chicago	6	0.4	0.0	0.1	0.012	0.003	0.008
IN: Indianapolis	8				0.020	0.004	0.010
KS: Topeka	5	1.1	0.6	0.9	0.019	0.005	0.012
MA: Boston	9	0.5	0.0	0.1	0.014	0.000	0.006
ME: Augusta	4	0.1	0.0	0.1	0.007	0.002	0.004
MI: Detroit	9	1.5	0.4	1.0	0.025	0.002	0.008
MI: Lansing	9	0.4	0.2	0.3	0.025	0.003	0.009
MN: Minneapolis	4	0.2	0.1	0.1	0.012	0.006	0.008
MS: Jackson	8	0.4	0.0	0.1	0.022	0.006	0.014
NC: Charlotte	4	0.1	0.0	0.1	0.012	0.007	0.010
NC: Wilmington	4				0.017	0.003	0.009
ND: Bismarck	5	1.5	0.2	0.9	0.025	0.008	0.015
NH: Concord	8	0.6	0.1	0.2	0.011	0.002	0.005
NJ: Trenton	6	0.4	0.0	0.1	0.007	0.001	0.005
NM: Santa Fe	4	2.5	0.6	1.4	0.008	0.004	0.007
NV: Las Vegas/913	8	0.2	0.0	0.1	0.009	0.004	0.006
NY: Albany	4	0.1	0.0	0.0	0.011	0.004	0.006
NY: New York City	7	0.0	0.0	0.0	0.014	0.003	0.009
NY: Yaphank	9	0.2	0.1	0.1	0.007	0.001	0.004
OH: Painesville	7	0.6	0.1	0.2	0.016	0.003	0.007
OH: Ross	8				0.020	0.004	0.011
ON: Ottawa	4	0.1	0.0	0.0	0.008	0.001	0.004
OR: Portland	8	0.2	0.0	0.1	0.008	0.003	0.005
PA: Harrisburg	9	1.4	0.1	0.3	0.018	0.001	0.008

Table 2 (continued)
Gross Beta in Airborne Particulates
October 2005

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
PA: Philadelphia	2	0.0	0.0	0.0	0.004	0.003	0.004
PA: Pittsburgh	9	0.5	0.1	0.2	0.019	0.003	0.008
SC: Barnwell	1	0.0	0.0	0.0	0.008	0.008	0.008
SC: Columbia	6	0.3	0.0	0.1	0.029	0.004	0.011
SD: Pierre	7	0.9	0.1	0.4	0.027	0.004	0.013
TN: Knoxville	5	1.9	0.0	0.5	0.040	0.007	0.020
TN: Nashville	9	0.6	0.1	0.3	0.021	0.005	0.014
TN: Oak Ridge/Bethel	9	2.0	0.4	1.0	0.022	0.004	0.014
TN: Oak Ridge/K25	9	2.2	0.4	1.3	0.024	0.005	0.014
TN: Oak Ridge/Melton	9	2.3	0.5	1.3	0.027	0.006	0.015
TN: Oak Ridge/Y12 E	9	2.3	0.4	1.0	0.025	0.006	0.015
TN: Oak Ridge/Y12 W	9	0.7	0.3	0.5	0.024	0.005	0.015
TX: Austin	9	0.3	0.0	0.2	0.023	0.007	0.014
TX: Dallas	5	0.4	0.1	0.3	0.018	0.006	0.012
TX: El Paso	8	0.9	0.3	0.6	0.023	0.007	0.013
UT: Salt Lake City	9	0.3	0.0	0.1	0.015	0.006	0.011
VA: Lynchburg	8	1.0	0.1	0.5	0.014	0.004	0.009
WA: Olympia	9	0.1	0.0	0.1	0.005	0.003	0.004
WA: Spokane	8	0.6	0.2	0.3	0.018	0.004	0.009

Table 3
Gross Beta in Airborne Particulates
November 2005

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
AL: Montgomery/408	8	0.1	0.0	0.0	0.013	0.006	0.010
AR: Little Rock	4	0.0	0.0	0.0	0.017	0.011	0.013
AZ: Phoenix	5	0.6	0.3	0.5	0.025	0.013	0.019
CA: Los Angeles	7	0.4	0.2	0.3	0.032	0.013	0.018
CA: Richmond	5	0.5	0.0	0.2	0.019	0.003	0.010
CA: San Francisco	4				0.021	0.003	0.008
CO: Denver	7	2.4	0.3	0.8	0.011	0.005	0.008
CT: Hartford	8	0.1	0.0	0.0	0.015	0.003	0.007
DC: Washington	8	0.1	0.0	0.0	0.015	0.005	0.009
DE: Wilmington	8	0.3	0.0	0.1	0.017	0.007	0.012
FL: Jacksonville	7	0.1	0.1	0.1	0.010	0.004	0.008
GA: Atlanta	4	0.1	0.0	0.0	0.011	0.008	0.010
IA: Iowa City	8	1.0	0.3	0.6	0.019	0.006	0.012
ID: Idaho Falls	8				0.024	0.004	0.010
IL: Chicago	6	0.3	0.1	0.2	0.019	0.008	0.012
IN: Indianapolis	8				0.014	0.007	0.010
KS: Topeka	3	1.3	0.7	1.0	0.023	0.011	0.015
MA: Boston	6	0.2	0.0	0.1	0.018	0.004	0.011
ME: Augusta	4	0.1	0.0	0.1	0.008	0.004	0.007
MI: Detroit	7	1.2	0.2	0.7	0.016	0.003	0.010
MI: Lansing	8				0.017	0.005	0.012
MN: Minneapolis	3	0.2	0.1	0.2	0.017	0.011	0.015
MN: St. Paul	2	0.2	0.1	0.1	0.009	0.007	0.008
MS: Jackson	7	0.1	0.0	0.1	0.015	0.008	0.011
NC: Charlotte	5	0.1	0.0	0.1	0.028	0.008	0.017
NC: Wilmington	5				0.013	0.007	0.010
ND: Bismarck	7	1.2	0.2	0.7	0.034	0.006	0.014
NH: Concord	8	0.3	0.1	0.2	0.011	0.003	0.007
NJ: Trenton	7	0.5	0.1	0.3	0.016	0.008	0.011
NM: Santa Fe	5	2.9	1.4	2.5	0.012	0.007	0.010
NV: Las Vegas/913	5	0.3	0.0	0.1	0.012	0.007	0.009
NY: Albany	5	0.0	0.0	0.0	0.013	0.006	0.010
NY: New York City	8	0.0	0.0	0.0	0.021	0.006	0.015
NY: Yaphank	8	1.0	0.0	0.2	0.012	0.003	0.006
OH: Painesville	8	0.2	0.1	0.1	0.011	0.004	0.008
OH: Ross	9				0.014	0.008	0.011
ON: Ottawa	5	0.0	0.0	0.0	0.007	0.004	0.005
OR: Portland	8	0.1	0.0	0.0	0.009	0.002	0.005

Table 3 (continued)
Gross Beta in Airborne Particulates
November 2005

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
PA: Harrisburg	7	0.5	0.1	0.2	0.018	0.007	0.014
PA: Philadelphia	6	0.0	0.0	0.0	0.012	0.005	0.009
PA: Pittsburgh	8	0.3	0.0	0.1	0.015	0.006	0.012
SC: Barnwell	1	0.0	0.0	0.0	0.015	0.015	0.015
SC: Columbia	4	0.2	0.0	0.1	0.015	0.008	0.010
SD: Pierre	6	0.5	0.2	0.4	0.013	0.005	0.009
TN: Knoxville	6	0.4	0.0	0.1	0.025	0.014	0.019
TN: Nashville	8	0.3	0.1	0.2	0.023	0.010	0.015
TN: Oak Ridge/Bethel	7	1.0	0.3	0.5	0.017	0.011	0.014
TN: Oak Ridge/K25	7	1.6	0.2	0.7	0.018	0.011	0.014
TN: Oak Ridge/Melton	7	1.3	0.3	0.5	0.017	0.009	0.013
TN: Oak Ridge/Y12 E	7	1.3	0.2	0.6	0.019	0.011	0.015
TN: Oak Ridge/Y12 W	7	0.6	0.2	0.3	0.019	0.010	0.016
TX: Austin	7	0.2	0.0	0.1	0.013	0.006	0.009
TX: Dallas	4	0.5	0.1	0.3	0.017	0.009	0.012
TX: El Paso	7	2.2	0.2	1.0	0.026	0.010	0.016
UT: Salt Lake City	8	0.8	0.0	0.2	0.039	0.005	0.015
VA: Lynchburg	5	0.8	0.1	0.4	0.012	0.009	0.010
WA: Olympia	8	0.1	0.0	0.0	0.010	0.002	0.005
WA: Spokane	9	0.3	0.1	0.2	0.038	0.003	0.013

Table 4
Gross Beta in Airborne Particulates
December 2005

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
AL: Montgomery/408	9	0.1	0.0	0.0	0.017	0.008	0.012
AR: Little Rock	5	0.0	0.0	0.0	0.026	0.012	0.019
AZ: Phoenix	4	0.6	0.3	0.4	0.028	0.015	0.020
CA: Los Angeles	7	0.7	0.2	0.5	0.064	0.011	0.033
CA: Richmond	4	0.2	0.0	0.1	0.021	0.002	0.011
CA: San Francisco	4	0.0	0.0	0.0	0.014	0.002	0.008
CO: Denver	7	1.2	0.2	0.5	0.016	0.004	0.010
CT: Hartford	9	0.1	0.0	0.0	0.012	0.004	0.008
DC: Washington	9	0.0	0.0	0.0	0.019	0.008	0.011
DE: Wilmington	7	0.1	0.0	0.1	0.024	0.008	0.014
FL: Jacksonville	9	0.1	0.0	0.1	0.011	0.005	0.007
FL: Miami	7	0.0	0.0	0.0	0.011	0.008	0.009
GA: Atlanta	2	0.0	0.0	0.0	0.016	0.011	0.014
IA: Iowa City	8	0.3	0.0	0.1	0.036	0.008	0.019
ID: Idaho Falls	9				0.036	0.002	0.014
IN: Indianapolis	9				0.027	0.008	0.013
KS: Topeka	1	0.5	0.5	0.5	0.012	0.012	0.012
MA: Boston	9	0.2	0.0	0.1	0.022	0.006	0.014
ME: Augusta	3	0.1	0.1	0.1	0.012	0.008	0.010
MI: Detroit	7	0.7	0.0	0.3	0.025	0.006	0.014
MI: Lansing	9	0.2	0.0	0.1	0.023	0.005	0.015
MN: St. Paul	4	0.1	0.1	0.1	0.021	0.008	0.014
MS: Jackson	7	0.3	0.0	0.1	0.019	0.007	0.013
NC: Charlotte	7	0.0	0.0	0.0	0.021	0.008	0.015
NC: Wilmington	3				0.013	0.011	0.012
ND: Bismarck	5	0.6	0.1	0.3	0.026	0.008	0.015
NH: Concord	9	0.8	0.1	0.2	0.017	0.005	0.010
NJ: Trenton	9	0.2	0.1	0.1	0.022	0.002	0.013
NM: Santa Fe	2	1.5	0.0	0.8	0.009	0.007	0.008
NV: Las Vegas/913	7	0.3	0.1	0.2	0.022	0.003	0.010
NY: Albany	4	0.0	0.0	0.0	0.013	0.007	0.011
NY: New York City	6	0.0	0.0	0.0	0.040	0.012	0.021
NY: Yaphank	9	0.0	0.0	0.0	0.015	0.005	0.008
OH: Painesville	7	0.1	0.0	0.1	0.015	0.005	0.010
OH: Ross	9				0.025	0.008	0.014
ON: Ottawa	6	0.0	0.0	0.0	0.011	0.004	0.007
OR: Portland	8	0.2	0.0	0.1	0.029	0.001	0.010
PA: Harrisburg	9	0.1	0.0	0.1	0.020	0.009	0.014

Table 4 (continued)
Gross Beta in Airborne Particulates
December 2005

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
PA: Philadelphia	2	0.0	0.0	0.0	0.016	0.007	0.012
PA: Pittsburgh	9	0.2	0.0	0.1	0.019	0.008	0.013
SC: Columbia	3	0.0	0.0	0.0	0.009	0.008	0.009
SD: Pierre	7	0.3	0.0	0.2	0.031	0.002	0.014
TN: Knoxville	7	0.1	0.0	0.0	0.028	0.014	0.018
TN: Nashville	8	0.3	0.0	0.1	0.036	0.011	0.019
TN: Oak Ridge/Bethel	8	0.5	0.1	0.3	0.018	0.009	0.013
TN: Oak Ridge/K25	8	0.7	0.1	0.4	0.021	0.010	0.014
TN: Oak Ridge/Melton	8	0.5	0.1	0.3	0.023	0.010	0.015
TN: Oak Ridge/Y12 E	8	0.5	0.1	0.3	0.024	0.011	0.015
TN: Oak Ridge/Y12 W	8	0.3	0.1	0.2	0.029	0.012	0.018
TX: Austin	9	0.2	0.0	0.1	0.026	0.009	0.014
TX: Dallas	6	0.4	0.2	0.3	0.024	0.008	0.015
TX: El Paso	8	1.9	0.5	0.9	0.040	0.007	0.021
UT: Salt Lake City	9	0.2	0.0	0.1	0.028	0.003	0.015
VA: Lynchburg	6	0.2	0.1	0.2	0.015	0.008	0.011
WA: Olympia	8	0.1	0.0	0.0	0.017	0.002	0.007
WA: Spokane	9	0.2	0.1	0.1	0.052	0.003	0.023

Table 5
Gross Beta and Specific Gamma in Precipitation
October 2005

Location	Gross Beta Activity		Gamma-Emitting Radionuclides		
	pCi/L $\pm 2u$		Nuclide	pCi/L $\pm 2u$	
AL: Montgomery/408	0.38	0.28		ND	
CO: Denver	1.13	0.34		ND	
CT: Hartford	0.29	0.27	Be7	23	14
DE: Wilmington	0.25	0.28		ND	
FL: Jacksonville	0.24	0.28		ND	
GA: Atlanta	3.43	0.52		ND	
IA: Iowa City	1.14	0.37		ND	
ID: Idaho Falls	1.91	0.41	Be7	29	23
			Pb212	3.3	4.4
			Ra224	18	22
MA: Boston	0.62	0.31	Be7	49	15
MN: Minneapolis	1.00	0.33	Be7	49	21
NC: Charlotte	0.09	0.25		ND	
ND: Bismarck	1.99	0.42		ND	
NH: Concord	0.23	0.25		ND	
NM: Santa Fe	0.48	0.29		ND	
NY: Albany	1.02	0.32		ND	
NY: Yaphank	3.81	0.49	Pb212	3.6	7.5
OH: Painesville	0.93	0.32		ND	
OR: Portland	0.43	0.29	Be7	35	24
			Bi212	47	29
PA: Harrisburg	0.34	0.27		ND	
TN: Knoxville	6.54	0.65		ND	
TN: Nashville	1.15	0.36		ND	
TN: Oak Ridge/Melton	1.66	0.36		ND	
TX: Austin	0.32	0.29		ND	
TX: El Paso	0.40	0.28		ND	
UT: Salt Lake City	2.41	0.45	K40	17	29
WA: Olympia	0.46	0.29		ND	

Note: ND = Not Detected

Table 6
Gross Beta and Specific Gamma in Precipitation
November 2005

Location	Gross Beta Activity		Gamma-Emitting Radionuclides	
	pCi/L	$\pm 2u$	Nuclide	pCi/L $\pm 2u$
AL: Montgomery/408	0.45	0.28		ND
AR: Little Rock	0.98	0.34	K40	8 12
CA: Richmond	0.47	0.30		ND
CT: Hartford	1.75	0.37	Be7	92 11
DE: Wilmington	0.64	0.32	K40	22 37
FL: Jacksonville	1.10	0.39	Be7	31 28
GA: Atlanta	1.00	0.34		ND
IA: Iowa City	1.15	0.36		ND
ID: Idaho Falls	1.25	0.36		ND
MA: Boston	2.87	0.44	Be7	87 17
MI: Lansing	0.77	0.32		ND
MN: Minneapolis	9.97	0.79	Be7	36 15
			K40	42 10
NC: Charlotte	0.62	0.31	Be7	14 15
NC: Wilmington	0.32	0.28	Be7	34 26
ND: Bismarck	76.2	5.1	Be7	205 39
			K40	26 41
NH: Concord	2.11	0.39	Be7	88 25
NY: Albany	1.20	0.34	Be7	69 15
NY: Yaphank	8.41	0.72	Pb212	3.7 5.0
OH: Painesville	2.25	0.40	Be7	54 15
OR: Portland	0.53	0.28	Be7	37 29
PA: Harrisburg	0.57	0.29	Be7	42 28
TN: Knoxville	37.9	1.5	K40	30 39
TN: Nashville	1.87	0.40		ND
TN: Oak Ridge/Melton	3.34	0.47	Be7	32.3 8.6
TX: Austin	0.57	0.31		ND
TX: Dallas	0.40	0.29	Be7	45 24
UT: Salt Lake City	5.77	0.65	Be7	18 14
			K40	28 12
VA: Lynchburg	3.94	0.49		ND
WA: Olympia	0.16	0.25	Be7	25 17

Note: ND = Not Detected

Table 7
Gross Beta and Specific Gamma in Precipitation
December 2005

Location	Gross Beta Activity		Gamma-Emitting Radionuclides		
	pCi/L $\pm 2u$		Nuclide	pCi/L $\pm 2u$	
AL: Montgomery/408	1.33	0.35	Be7	63	15
AR: Little Rock	0.57	0.30		ND	
CA: Richmond	0.26	0.26	K40	24	40
CT: Hartford	0.52	0.29	Be7	29.6	9.4
DE: Wilmington	1.61	0.38	Be7	68	17
FL: Jacksonville	0.31	0.27		ND	
GA: Atlanta	0.32	0.27	Be7	54	30
IA: Iowa City	2.37	0.44	Be7	31	23
			Tl208	1.6	3.2
ID: Idaho Falls	2.20	0.44	Be7	30	27
			Pb212	3.6	4.3
MA: Boston	0.88	0.31	Be7	65	16
			K40	13	12
MI: Lansing	0.44	0.28		ND	
MN: Minneapolis	6.32	0.67		ND	
MN: St. Paul	1.10	0.36	Pb212	4.2	6.3
NC: Charlotte	0.58	0.29	Be7	45	33
			Pb212	4.3	6.5
NC: Wilmington	0.33	0.28		ND	
ND: Bismarck	34.1	4.0	Be7	87	31
NH: Concord	1.34	0.35	Be7	45	28
NM: Santa Fe	48.9	4.6	Be7	272	37
NY: Albany	1.15	0.35	Be7	45	16
NY: Yaphank	2.26	0.42	Tl208	3.1	3.7
OR: Portland	0.27	0.26		ND	
PA: Harrisburg	0.75	0.31		ND	
TN: Knoxville	16.45	0.97		ND	
TN: Nashville	0.80	0.32	Pb212	4.7	6.0
TN: Oak Ridge/Melton	0.77	0.31		ND	
UT: Salt Lake City	2.61	0.47		ND	
VA: Lynchburg	8.25	0.68	Tl208	2.2	3.6
WA: Olympia	0.63	0.29	Be7	26	26

Note: ND = Not Detected

Table 8
Tritium in Precipitation
October - December 2005

Location	October 2005 pCi/L $\pm 2u$	November 2005 pCi/L $\pm 2u$	December 2005 pCi/L $\pm 2u$
AL: Montgomery/408	-10 80	NS	70 79
AR: Little Rock	NS	52 77	27 77
CA: Richmond	NS	22 75	55 78
CO: Denver	26 81	NS	NS
CT: Hartford	-30 81	-38 81	-14 82
DE: Wilmington	-88 78	-4 82	4 83
FL: Jacksonville	-42 80	-31 81	-37 81
GA: Atlanta	-42 80	-53 79	63 78
IA: Iowa City	59 82	12 82	70 79
ID: Idaho Falls	1720 140	68 78	14 76
MA: Boston	16 83	-5 81	-63 81
MI: Lansing	NS	-18 81	25 76
MN: Minneapolis	-41 78	52 77	41 77
MN: St. Paul	NS	NS	49 78
NC: Charlotte	-43 81	-25 80	-19 82
NC: Wilmington	NS	-41 80	-82 81
ND: Bismarck	-16 79	39 76	48 78
NH: Concord	-44 80	-75 78	-12 82
NM: Santa Fe	356 96	NS	18 77
NY: Albany	-19 81	-44 79	-68 80
NY: Yaphank	-63 79	-46 80	-86 79
OH: Painesville	75 83	-52 79	NS
OR: Portland	-10 79	0 75	24 78
PA: Harrisburg	-35 79	-20 80	-41 81
TN: Knoxville	57 83	-36 81	35 78
TN: Nashville	-18 81	-48 79	55 78
TN: Oak Ridge/Melton	550 100	-2 81	158 83
TX: Austin	47 82	57 76	NS
TX: Dallas	NS	59 77	NS
TX: El Paso	16 80	NS	NS
UT: Salt Lake City	59 83	79 78	-4 76
VA: Lynchburg	NS	-87 78	-14 82
WA: Olympia	16 80	142 81	40 78

Note: NS = No Sample

Plutonium and Uranium in Airborne Particulates

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-particle 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.

Beta Activity in Precipitation

All stations routinely submit precipitation samples as rainfall, snow, or sleet occurs. The precipitation samples are composited at NAREL into single monthly samples for each station. Each month that precipitation occurs, an aliquant of the composited sample is analyzed for gross beta, tritium, and gamma-emitting radionuclides.

Table 9
Plutonium and Uranium in Airborne Particulates
January - December 2005 Composites

Location	²³⁸ Pu		²³⁹⁻²⁴⁰ Pu		²³⁴ U		²³⁵ U		²³⁸ U	
	aCi/m ³	± 2u	aCi/m ³	± 2u	aCi/m ³	± 2u	aCi/m ³	± 2u	aCi/m ³	± 2u
AK: Anchorage	-0.3	3.5	0.5	2.3	8.9	6.1	0.7	3.1	16.9	8.2
AL: Montgomery/408	1.1	2.6	0.19	0.86	10.2	2.9	0.8	1.0	10.5	2.9
AR: Little Rock	4.4	2.6	-0.48	0.75	42.9	8.5	1.8	1.7	40.8	8.2
AZ: Phoenix	-0.2	2.5	0.6	1.9	64	14	4.6	3.9	43	11
CA: Los Angeles	1.9	2.4	0.6	1.2	36.9	8.6	1.3	1.8	24.8	6.8
CA: Richmond	0.8	1.8	0.00	0.71	11.5	3.4	-0.08	0.53	5.7	2.3
CA: San Francisco	0.45	0.79	0.00	0.35	7.0	2.3	0.55	0.75	4.7	1.9
CO: Denver	1.3	1.3	0.25	0.54	26.1	6.7	2.0	2.1	27.4	6.8
CT: Hartford	-0.5	1.8	-0.09	0.60	9.4	3.4	1.5	1.5	11.9	3.8
DC: Washington	0.3	1.8	0.00	0.74	10.6	3.6	-0.10	0.97	12.9	4.0
DE: Wilmington	2.5	4.3	0.5	1.4	22.6	6.9	1.5	2.4	19.3	6.3
FL: Jacksonville	0.2	1.2	-0.08	0.55	10.6	3.8	0.33	0.95	10.5	3.7
FL: Miami	0.4	1.3	0.32	0.82	17.8	4.6	0.8	1.1	15.6	4.2
GA: Atlanta	-0.5	1.4	0.00	0.64	15.5	3.9	0.48	0.87	14.5	3.7
HI: Honolulu	1.5	1.9	0.6	1.1	7.2	2.5	0.58	0.89	5.2	2.1
IA: Iowa City	0.3	1.3	-0.17	0.40	16.0	4.3	0.6	1.1	13.2	3.8
ID: Idaho Falls	0.0	2.3	0.1	1.0	21.0	5.9	1.8	1.9	17.5	5.3
IL: Chicago	0.3	2.4	0.3	1.4	30.8	8.9	1.8	2.4	19.5	6.8
IN: Indianapolis	0.0	3.9	0.7	1.9	28.5	9.5	1.5	2.7	26.6	9.1
KS: Kansas City	0.16	0.76	0.08	0.36	22.0	4.5	2.2	1.4	17.5	3.9
KS: Topeka	0.2	1.4	-0.18	0.59	23.6	6.3	1.7	1.9	26.2	6.7
MA: Boston	0.2	1.5	0.22	0.95	6.3	2.3	0.49	0.87	6.6	2.3
ME: Augusta	0.6	1.8	0.23	0.66	20.8	5.5	0.8	1.3	14.1	4.4
MI: Detroit	0.63	0.98	0.17	0.50	26.4	5.4	2.7	1.6	23.4	5.0
MI: Lansing	0.44	0.68	0.00	0.26	10.8	2.3	1.33	0.79	12.3	2.5
MN: Minneapolis	-0.26	0.39	0.04	0.34	16.1	3.8	2.7	1.5	15.4	3.7
MN: St. Paul	0.02	0.36	-0.03	0.12	2.76	0.80	0.79	0.46	2.85	0.82
MS: Jackson	0.3	1.6	0.21	0.78	9.8	3.0	0.8	1.1	8.1	2.8
NC: Charlotte	1.2	3.3	0.3	1.2	19.8	6.0	1.0	1.8	23.8	6.7
NC: Wilmington	0.22	0.75	-0.03	0.31	10.1	2.3	1.02	0.73	9.7	2.2
ND: Bismarck	0.5	1.3	0.00	0.59	33.3	7.2	1.9	1.7	31.5	7.0
NH: Concord	0.7	1.1	0.00	0.43	10.6	3.1	0.49	0.87	13.0	3.5
NJ: Trenton	0.7	1.9	0.08	0.74	14.7	4.1	0.54	0.96	10.6	3.4
NV: Las Vegas/906	11.0	5.2	-0.26	0.89	40.4	9.1	1.7	2.2	23.9	6.6
NV: Las Vegas/913	-0.7	2.8	0.0	1.3	61	13	2.3	2.8	33.8	9.4
NY: Albany	1.0	1.4	0.18	0.80	15.9	5.1	0.7	1.5	16.4	5.2
NY: New York City	0.0	1.4	0.9	1.1	18.1	5.2	0.4	1.6	11.4	4.1
NY: Yaphank	-0.2	1.1	0.17	0.51	6.5	2.1	0.53	0.74	5.7	1.9

Note: NA = No Analysis

Table 9 (continued)
Plutonium and Uranium in Airborne Particulates
January - December 2005 Composites

Location	²³⁸ Pu		²³⁹⁻²⁴⁰ Pu		²³⁴ U		²³⁵ U		²³⁸ U	
	aCi/m ³	± 2u	aCi/m ³	± 2u	aCi/m ³	± 2u	aCi/m ³	± 2u	aCi/m ³	± 2u
OH: Painesville	0.09	0.69	0.00	0.29	12.1	2.4	2.00	0.89	10.9	2.2
OH: Ross	0.13	0.98	0.07	0.60	22.5	5.5	1.7	1.6	25.1	5.8
OR: Portland	0.2	1.4	0.18	0.82	7.5	2.6	0.45	0.80	5.9	2.3
PA: Harrisburg	0.1	1.1	-0.28	0.68	9.5	3.2	1.5	1.5	10.8	3.4
PA: Philadelphia	1.2	2.7	0.1	1.0	13.5	4.4	0.7	1.4	11.1	3.9
PA: Pittsburgh	1.4	2.2	-0.34	0.64	22.5	5.2	0.6	1.0	15.2	4.1
SC: Barnwell	0.29	0.73	0.29	0.53	7.6	2.0	0.35	0.48	6.1	1.8
SC: Columbia	0.3	1.5	0.00	0.59	21.4	4.9	1.9	1.5	23.9	5.3
SD: Pierre	1.3	1.2	-0.11	0.56	23.7	4.7	1.3	1.3	19.9	4.2
TN: Knoxville	-0.5	2.6	-0.27	0.93	23.1	6.7	3.6	2.7	21.8	6.4
TN: Nashville	1.3	1.7	-0.09	0.58	13.2	4.4	1.9	1.9	16.4	5.0
TN: Oak Ridge/Bethel	0.5	1.3	0.00	0.51	11.2	3.6	0.36	0.98	9.9	3.3
TN: Oak Ridge/K25	0.6	1.1	0.96	0.81	17.7	3.6	0.45	0.63	36.0	6.0
TN: Oak Ridge/Melton	0.28	0.71	4.2	1.8	8.7	2.6	1.2	1.1	6.9	2.2
TN: Oak Ridge/Y12 E	0.0	2.3	0.1	1.0	38.2	9.6	0.9	2.2	24.8	7.4
TN: Oak Ridge/Y12 W	0.9	1.3	-0.1	1.1	75	14	5.1	3.0	19.9	5.8
TX: Austin	-0.37	0.89	-0.09	0.32	12.3	3.0	1.4	1.1	10.9	2.8
TX: Dallas	1.4	1.4	0.00	0.54	16.9	3.8	1.0	1.0	15.9	3.6
TX: El Paso	4.0	3.1	0.1	1.1	71	16	3.7	3.8	46	12
UT: Salt Lake City	-0.4	1.5	-0.12	0.81	30.0	8.0	0.6	1.8	23.1	6.8
VA: Lynchburg	0.4	1.3	0.33	0.70	52.1	8.0	3.0	1.4	10.4	2.6
WA: Olympia	-0.1	2.1	-0.19	0.67	5.3	2.1	0.41	0.86	5.2	2.0
WA: Spokane	-0.6	1.4	-0.28	0.96	22.3	6.7	2.6	2.7	18.2	6.1

Note: NA = No Analysis

2. Drinking Water Program

The RadNet 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 2005

Location	Date Collected	³ H pCi/L ± 2 <i>u</i>	
AK: Fairbanks	10/05/05	102	83
AL: Dothan	10/06/05	-22	75
AL: Montgomery/408	10/11/05	4	76
AL: Muscle Shoals	10/12/05	-7	76
AL: Scottsboro	10/13/05	-31	75
AR: Little Rock	10/07/05	76	80
CA: Los Angeles	10/03/05	-4	79
CA: Richmond	10/07/05	-9	76
CO: Denver	11/02/05	42	83
CT: Hartford	10/21/05	58	81
DE: Dover	10/03/05	16	77
FL: Miami	12/30/05	23	75
FL: Tampa	11/07/05	-11	82
GA: Baxley	10/26/05	-43	80
GA: Savannah	12/14/05	11	74
HI: Honolulu	10/07/05	4	77
IA: Cedar Rapids	10/04/05	37	78
ID: Boise	12/09/05	-12	81
ID: Idaho Falls	10/21/05	-28	77
IL: W. Chicago	10/05/05	86	80
KS: Topeka	10/03/05	60	79
LA: New Orleans	12/09/05	16	75
MD: Baltimore	10/03/05	-33	81
MD: Conowingo	12/13/05	116	79
ME: Augusta	10/03/05	-5	82
MI: Detroit	10/20/05	383	96
MI: Grand Rapids	10/13/05	37	79
MN: Minneapolis	10/25/05	-36	76
MN: Red Wing	10/25/05	5	83
MO: Jefferson City	10/04/05	53	79
MS: Jackson	10/11/05	-60	74
MS: Port Gibson	10/11/05	-34	75
MT: Helena	10/05/05	65	79
NC: Charlotte	10/12/05	1010	110
NC: Raleigh	10/11/05	14	76
ND: Bismarck	10/04/05	133	82
NE: Lincoln	10/14/05	34	81
NH: Concord	10/14/05	14	79
NJ: Trenton	10/03/05	60	79
NJ: Waretown	10/13/05	159	86

Table 10 (continued)
Tritium in Drinking Water
October - December 2005

Location	Date Collected	³ H pCi/L ± 2 <i>u</i>
NM: Santa Fe	10/07/05	0 76
NV: Las Vegas	11/16/05	14 81
NY: Albany	10/04/05	7 77
NY: New York City	11/01/05	-53 79
NY: Syracuse	12/08/05	1550 140
OH: Cincinnati	11/23/05	28 80
OH: E. Liverpool	12/06/05	47 82
OH: Painesville	11/07/05	72 85
OH: Toledo	10/06/05	141 83
OK: Oklahoma City	10/11/05	-17 75
OR: Portland	10/21/05	16 84
PA: Columbia	12/14/05	71 77
PA: Harrisburg	12/14/05	48 76
PA: Philadelphia - Queen Lane Lab.	11/09/05	19 83
PA: Philadelphia – Belmont Lab.	11/09/05	56 84
PA: Philadelphia – Baxter Lab.	11/09/05	5 82
PA: Pittsburgh	12/06/05	60 81
RI: Providence	10/03/05	-30 81
SC: Barnwell	10/07/05	-47 73
SC: Columbia	10/10/05	9 76
SC: Jenkinsville	10/05/05	27 77
SC: Seneca	10/03/05	11 81
TN: Chattanooga	10/03/05	100 81
TN: Knoxville	10/04/05	44 78
TN: Oak Ridge/#768	10/07/05	3 75
TN: Oak Ridge/#772	10/07/05	9 76
TN: Oak Ridge/#371	10/07/05	53 78
TN: Oak Ridge/#360	10/07/05	0 76
TN: Oak Ridge/#4442	10/10/05	130 81
TX: Austin	10/04/05	72 79
VA: Ashland	10/24/05	2900 170
VA: Lynchburg	10/03/05	21 83
WA: Richland	10/06/05	72 80
WA: Seattle	12/12/05	120 78

Table 11
Plutonium and Uranium Analyses
Selected Drinking Water Composite Samples
January - December 2005

Location	²³⁸ Pu pCi/L ± 2u	²³⁹⁻²⁴⁰ Pu pCi/L ± 2u	²³⁴ U pCi/L ± 2u	²³⁵ U pCi/L ± 2u	²³⁸ U pCi/L ± 2u
AL: Montgomery	-0.003 0.027	0.006 0.014	0.042 0.036	0.015 0.024	0.024 0.029
CA: Los Angeles	0.003 0.015	0.0000 0.0082	1.76 0.20	0.068 0.038	1.42 0.18
DE: Dover	-0.003 0.029	0.001 0.013	0.122 0.050	-0.004 0.012	0.015 0.023
GA: Baxley	0.004 0.018	0.004 0.012	0.032 0.026	-0.002 0.010	0.013 0.018
IL: Morris	0.006 0.016	0.011 0.015	0.556 0.099	0.009 0.016	0.031 0.024
IL: W. Chicago	-0.002 0.016	0.035 0.025	0.130 0.045	0.011 0.017	0.014 0.015
LA: New Orleans	-0.010 0.014	-0.0010 0.0063	0.456 0.088	0.007 0.016	0.349 0.076
ME: Augusta	-0.006 0.016	0.000 0.012	1.21 0.16	0.070 0.038	1.04 0.14
MN: Red Wing	-0.002 0.024	0.003 0.010	0.64 0.15	0.019 0.039	0.094 0.057
MS: Port Gibson	0.000 0.028	0.004 0.015	0.057 0.034	0.000 0.011	0.042 0.030
NE: Lincoln	0.001 0.017	0.000 0.011	2.89 0.29	0.111 0.049	2.02 0.23
NV: Las Vegas	-0.005 0.018	-0.0010 0.0069	1.98 0.22	0.049 0.031	1.16 0.15

Note: NA = No Analysis

Table 12
Iodine-131 in Drinking Water
January - December 2005

Location	Date Collected	¹³¹ I	
		pCi/L	± 2u
AK: Fairbanks	01/04/05	0.15	0.24
AL: Dothan	10/06/05	0.32	0.44
AL: Montgomery	01/05/05	0.067	0.095
AL: Muscle Shoals	04/13/05	0.13	0.28
AL: Scottsboro	04/14/05	0.18	0.25
AR: Little Rock	07/06/05	0.00	0.17
AR: Little Rock	10/07/05	0.05	0.14
CA: Los Angeles	10/03/05	0.03	0.38
CA: Richmond	05/03/05	0.10	0.17
CO: Denver	11/02/05	0.19	0.27
CT: Hartford	10/21/05	0.14	0.25
DE: Dover	10/03/05	0.05	0.16
FL: Miami	07/20/05	-0.07	0.15
FL: Tampa	03/31/05	-0.03	0.16
GA: Baxley	04/27/05	0.00	0.14
GA: Savannah	02/17/05	0.00	0.14
HI: Honolulu	01/06/05	0.05	0.14
IA: Cedar Rapids	07/07/05	-0.17	0.16
IA: Cedar Rapids	10/04/05	0.00	0.16
ID: Boise	02/23/05	-0.02	0.25
ID: Idaho Falls	04/08/05	0.04	0.16
IL: Morris	01/13/05	-0.08	0.22
IL: W. Chicago	01/04/05	-0.02	0.14
KS: Topeka	01/03/05	0.11	0.12
LA: New Orleans	03/18/05	0.12	0.24
LA: New Orleans	05/13/05	0.16	0.13
MD: Baltimore	01/04/05	0.21	0.26
MD: Baltimore	04/05/05	0.09	0.14
MD: Conowingo	09/06/05	0.15	0.20
ME: Augusta	04/04/05	0.01	0.12
MI: Detroit	02/10/05	0.14	0.16
MI: Grand Rapids	01/06/05	0.02	0.13
MN: Minneapolis	01/24/05	0.02	0.15
MN: Red Wing	04/25/05	-0.06	0.12
MO: Jefferson City	07/07/05	0.33	0.20
MO: Jefferson City	10/04/05	-0.01	0.21
MS: Jackson	04/05/05	-0.10	0.14
MS: Port Gibson	01/11/05	0.08	0.18
MT: Helena	04/06/05	-0.07	0.11
NC: Charlotte	01/12/05	0.12	0.15
NC: Raleigh	01/25/05	0.04	0.16

Table 12 (continued)
Iodine-131 in Drinking Water
January - December 2005

Location	Date Collected	¹³¹ I	
		pCi/L	± 2u
ND: Bismarck	01/03/05	0.02	0.15
NE: Lincoln	01/07/05	0.05	0.22
NH: Concord	01/04/05	-0.20	0.30
NJ: Trenton	01/03/05	-0.02	0.16
NJ: Waretown	01/05/05	0.01	0.16
NM: Santa Fe	10/07/05	-0.04	0.14
NV: Las Vegas/906	06/16/05	0.01	0.19
NY: Albany	01/04/05	-0.05	0.28
NY: New York City	11/01/05	0.02	0.14
NY: Syracuse	01/28/05	0.01	0.15
OH: Cincinnati	09/09/05	0.05	0.16
OH: E. Liverpool	07/27/05	0.79	0.19
OH: Painesville	01/18/05	-0.05	0.23
OH: Toledo	01/04/05	0.04	0.13
OK: Oklahoma City	04/22/05	0.01	0.16
OR: Portland	07/06/05	0.04	0.15
OR: Portland	10/21/05	0.04	0.29
PA: Columbia	09/07/05	0.33	0.25
PA: Harrisburg	06/02/05	-0.01	0.15
PA: Philadelphia - Baxter Lab.	02/03/05	0.55	0.16
PA: Philadelphia - Queen Lane Lab.	02/03/05	4.42	0.20
PA: Philadelphia - Belmont Lab.	02/03/05	1.52	0.16
PA: Pittsburgh	07/28/05	0.08	0.15
RI: Providence	01/06/05	-0.04	0.26
SC: Barnwell	01/31/05	-0.01	0.15
SC: Columbia	01/06/05	0.08	0.32
SC: Jenkinsville	04/08/05	-0.03	0.15
SC: Seneca	01/05/05	-0.01	0.17
TN: Chattanooga	01/04/05	-0.04	0.14
TN: Knoxville	04/19/05	-0.01	0.21
TN: Oak Ridge/#360	07/08/05	-0.02	0.27
TN: Oak Ridge/#4442	07/08/05	0.08	0.22
TN: Oak Ridge/#371	07/08/05	0.07	0.21
TN: Oak Ridge/#768	07/08/05	-0.13	0.26
TN: Oak Ridge/#772	07/08/05	-0.01	0.22
TX: Austin	01/27/05	0.05	0.13
VA: Ashland	10/24/05	0.14	0.17
VA: Lynchburg	07/27/05	-0.06	0.19
WA: Richland	04/11/05	-0.05	0.15
WA: Seattle	02/09/05	0.02	0.21

Table 13
Drinking Water
Alpha, Beta, and Sr-90 Concentrations
Composites
January - December 2005

Location	Total Solids (mg/L)	Gross Beta pCi/L \pm 2u	Gross Alpha pCi/L \pm 2u	⁹⁰ Sr pCi/L \pm 2u
AK: Fairbanks	148.6	4.9 1.5	0.4 4.8	-0.12 0.31
AL: Dothan	125.1	2.6 1.3	-0.1 4.1	
AL: Montgomery	60.2	1.98 0.74	2.1 2.0	
AL: Muscle Shoals	45.2	0.32 0.79	0.2 1.7	
AL: Scottsboro	105.4	1.34 0.75	-0.1 2.3	
AR: Little Rock	28.2	0.48 0.56	0.1 1.0	
CA: Los Angeles	98.7	5.6 2.0	4.7 6.3	
CA: Richmond	59.4	0.85 0.79	0.5 2.1	
CO: Denver	99.6	2.35 0.80	0.7 2.3	
CT: Hartford	39.8	1.21 0.65	0.1 1.3	0.28 0.31
DE: Dover	97.5	7.8 2.7	3.8 7.8	0.34 0.25
FL: Miami	127.9	1.98 0.82	0.2 2.6	
FL: Tampa	89.3	4.3 1.9	-0.7 5.0	
GA: Baxley	110.0	2.2 1.4	3.6 4.4	
GA: Savannah	97.9	1.9 1.2	-0.1 3.7	
HI: Honolulu	111.2	3.1 1.9	-0.6 5.9	
IA: Cedar Rapids	74.2	3.1 1.4	0.7 3.8	
ID: Boise	94.0	1.09 0.71	0.2 2.2	0.22 0.30
ID: Idaho Falls	125.3	5.9 2.1	0.2 6.5	0.10 0.28
IL: Morris	102.8	12.1 3.0	10.0 9.1	
IL: W. Chicago	37.2	12.5 3.7	6.8 7.2	
KS: Topeka	102.5	6.6 1.7	1.5 4.7	
LA: New Orleans	121.2	5.3 1.5	2.0 4.5	
MA: Lawrence	62.3	1.84 0.72	1.5 1.9	0.3 1.2
MD: Baltimore	136.0	3.81 0.97	1.1 2.9	0.10 0.29
MD: Conowingo	116.1	3.0 1.0	0.3 3.0	0.14 0.26
ME: Augusta	72.8	4.3 1.5	2.7 4.0	0.09 0.30
MI: Detroit	112.5	2.19 0.83	1.1 2.6	
MI: Grand Rapids	125.3	2.7 1.0	0.0 3.2	
MN: Minneapolis	98.6	2.63 0.82	0.5 2.3	
MN: Red Wing	176.2	17.1 3.1	19 11	
MO: Jefferson City	104.7	6.8 1.5	1.5 4.0	
MS: Jackson	78.5	3.38 0.84	0.1 1.9	
MS: Port Gibson	52.2	-1.4 3.1	6.2 8.2	
MT: Helena	119.6	2.75 0.86	0.3 2.5	
NC: Charlotte	43.7	1.65 0.68	0.2 1.4	
NC: Raleigh	70.4	3.52 0.84	-0.1 1.7	

Table 13 (continued)
Drinking Water
Alpha, Beta, and Sr-90 Concentrations
Composites
January - December 2005

Location	Total Solids (mg/L)	Gross Beta pCi/L \pm 2u	Gross Alpha pCi/L \pm 2u	⁹⁰ Sr pCi/L \pm 2u
ND: Bismarck	121.0	5.0 1.5	0.3 4.3	
NE: Lincoln	128.8	13.8 2.3	3.4 5.8	
NH: Concord	65.5	1.32 0.69	0.4 1.8	0.19 0.30
NJ: Trenton	112.1	1.60 0.77	0.6 2.4	-0.09 0.28
NJ: Waretown	63.0	2.60 0.78	0.9 1.8	0.11 0.27
NM: Santa Fe	51.2	2.0 1.1	1.4 2.7	
NV: Las Vegas	99.7	3.0 2.3	2.5 7.6	
NY: Albany	91.4	0.39 0.64	0.4 2.1	0.11 0.28
NY: New York City	43.7	1.05 0.63	0.5 1.4	0.24 0.26
NY: Niagara Falls	149.0	3.19 0.93	-0.5 2.7	
NY: Syracuse	69.1	2.0 1.3	1.2 3.7	0.22 0.27
OH: Cincinnati	105.9	1.8 1.2	1.8 4.1	
OH: E. Liverpool	127.8	3.3 1.1	0.3 3.3	
OH: Painesville	115.2	2.4 1.0	1.0 3.2	
OH: Toledo	95.1	1.72 0.76	0.6 2.2	
OK: Oklahoma City	90.5	4.4 1.1	-0.1 2.5	
OR: Portland	19.6	0.46 0.62	0.25 0.95	0.11 0.30
PA: Columbia	112.3	3.8 1.1	1.5 3.2	0.14 0.30
PA: Harrisburg	91.1	2.03 0.78	0.3 2.1	
PA: Philadelphia/Baxter	80.0	3.1 1.3	0.1 3.2	
PA: Philadelphia/Belmont	126.0	5.2 1.5	-0.4 4.1	
PA: Philadelphia/Queen	141.0	6.2 1.6	0.7 4.6	
PA: Pittsburgh	87.4	2.3 1.2	0.6 3.4	
RI: Providence	71.0	1.69 0.71	0.5 1.8	0.28 0.33
SC: Barnwell	36.5	1.43 0.66	1.2 1.4	
SC: Columbia	55.5	1.90 0.77	0.2 1.5	
SC: Jenkinsville	50.4	1.85 0.71	0.2 1.5	
SC: Seneca	21.9	1.18 0.61	-0.12 0.83	
TN: Chattanooga	76.0	0.99 0.74	0.1 1.8	
TN: Knoxville	93.0	2.40 0.80	0.1 2.1	
TN: Oak Ridge/#360	98.1	1.96 0.78	0.6 2.3	0.07 0.28
TN: Oak Ridge/#371	185.8	1.87 0.92	0.2 3.3	-0.05 0.34
TN: Oak Ridge/#4442	190.4	3.5 1.0	0.8 3.4	0.46 0.30
TN: Oak Ridge/#768	179.3	1.77 0.90	-0.4 3.1	0.12 0.31
TN: Oak Ridge/#772	199.9	2.41 0.96	0.4 3.4	0.46 0.29
TX: Austin	37.1	1.41 0.79	0.3 1.5	
VA: Ashland	53.6	3.77 0.98	1.7 2.2	

Table 13 (continued)
Drinking Water
Alpha, Beta, and Sr-90 Concentrations
Composites
January - December 2005

Location	Total Solids (mg/L)	Gross Beta pCi/L \pm 2u	Gross Alpha pCi/L \pm 2u	⁹⁰ Sr pCi/L \pm 2u
VA: Lynchburg	66.3	1.36 0.69	0.3 1.8	
WA: Richland	75.3	1.14 0.74	1.0 2.2	0.16 0.28
WA: Seattle	0.5	0.28 0.51	0.19 0.43	0.09 0.26

Table 14
Drinking Water
Radium and Gamma-Emitting Radionuclides
Composites
January - December 2005

Location	²²⁶ Ra		²²⁸ Ra		Gamma-Emitting Radionuclides	
	pCi/L ± 2u		pCi/L ± 2u		Nuclide	pCi/L ± 2u
AK: Fairbanks	NA		NA			ND
AL: Dothan	NA		NA			ND
AL: Montgomery	0.102	0.021	NA			ND
AL: Muscle Shoals	NA		NA			ND
AL: Scottsboro	NA		NA		Tl208	1.8 1.9
AR: Little Rock	NA		NA		K40	13 12
CA: Los Angeles	0.125	0.023	NA			ND
CA: Richmond	NA		NA			ND
CO: Denver	NA		NA			ND
CT: Hartford	NA		NA			ND
DE: Dover	NA		NA			ND
FL: Miami	NA		NA			ND
FL: Tampa	NA		NA		Tl208	1.6 1.8
GA: Baxley	1.61	0.20	NA			ND
GA: Savannah	NA		NA		K40	9 13
HI: Honolulu	NA		NA			ND
IA: Cedar Rapids	NA		NA			ND
ID: Boise	NA		NA			ND
ID: Idaho Falls	NA		NA			ND
IL: Morris	0.185	0.031	NA			ND
IL: W. Chicago	1.06	0.13	NA			ND
KS: Topeka	NA		NA			ND
LA: New Orleans	0.102	0.021	NA			ND
MA: Lawrence	NA		NA		Tl208	2.0 3.8
MD: Baltimore	NA		NA			ND
MD: Conowingo	NA		NA			ND
ME: Augusta	0.077	0.018	NA			ND
MI: Detroit	NA		NA		Tl208	2.5 2.0
MI: Grand Rapids	NA		NA			ND
MN: Minneapolis	NA		NA			ND
MN: Red Wing	3.26	0.39	3.92	0.75	Tl208	1.4 1.8
MO: Jefferson City	NA		NA			ND
MS: Jackson	NA		NA		K40	12 12
MS: Port Gibson	0.290	0.045	NA			ND
MT: Helena	NA		NA			ND

Note: ND = Not Detected
NA = No Analysis

Table 14 (continued)
Drinking Water
Radium and Gamma-Emitting Radionuclides
Composites
January - December 2005

Location	²²⁶ Ra	²²⁸ Ra	Gamma-Emitting Radionuclides	
	pCi/L ± 2u	pCi/L ± 2u	Nuclide	pCi/L ± 2u
NC: Charlotte	NA	NA		ND
NC: Raleigh	NA	NA		ND
ND: Bismarck	NA	NA		ND
NE: Lincoln	0.161 0.028	NA		ND
NH: Concord	NA	NA		ND
NJ: Trenton	NA	NA		ND
NJ: Waretown	NA	NA		ND
NM: Santa Fe	NA	NA		ND
NV: Las Vegas	0.222 0.037	NA		ND
NY: Albany	NA	NA		ND
NY: New York City	NA	NA		ND
NY: Niagara Falls	NA	NA	Tl208	3.0 4.9
NY: Syracuse	NA	NA		ND
OH: Cincinnati	NA	NA		ND
OH: E. Liverpool	NA	NA		ND
OH: Painesville	NA	NA		ND
OH: Toledo	NA	NA		ND
OK: Oklahoma City	NA	NA		ND
OR: Portland	NA	NA	K40	14 13
PA: Columbia	NA	NA		ND
PA: Harrisburg	NA	NA		ND
PA: Philadelphia/Baxter	NA	NA		ND
PA: Philadelphia/Belmont	NA	NA		ND
PA: Philadelphia/Queen	NA	NA		ND
PA: Pittsburgh	NA	NA		ND
RI: Providence	NA	NA	K40	11 12
SC: Barnwell	NA	NA		ND
SC: Columbia	NA	NA		ND
SC: Jenkinsville	NA	NA		ND
SC: Seneca	NA	NA		ND
TN: Chattanooga	NA	NA	K40	9 12
TN: Knoxville	NA	NA		ND
TN: Oak Ridge/#360	NA	NA		ND
TN: Oak Ridge/#371	NA	NA		ND
TN: Oak Ridge/#4442	NA	NA		ND

Note: ND = Not Detected
NA = No Analysis

Table 14 (continued)
Drinking Water
Radium and Gamma-Emitting Radionuclides
Composites
January - December 2005

Location	²²⁶ Ra	²²⁸ Ra	Gamma-Emitting Radionuclides	
	pCi/L ± 2u	pCi/L ± 2u	Nuclide	pCi/L ± 2u
TN: Oak Ridge/#768	NA	NA		ND
TN: Oak Ridge/#772	NA	NA		ND
TX: Austin	NA	NA		ND
VA: Ashland	NA	NA		ND
VA: Lynchburg	NA	NA		ND
WA: Richland	NA	NA	Tl208	1.6 1.7
WA: Seattle	NA	NA	K40	9 13

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 2005

Location	Date Collected	K g/L $\pm 2u$	¹³⁷ Cs pCi/L $\pm 2u$	¹⁴⁰ Ba pCi/L $\pm 2u$	¹³¹ I pCi/L $\pm 2u$
AR: Little Rock	10/24/05	1.48 0.13	ND	ND	ND
AZ: Phoenix	12/13/05	1.49 0.11	ND	ND	ND
CA: Los Angeles	11/01/05	1.58 0.11	ND	ND	ND
CA: Sacramento	10/13/05	1.62 0.12	ND	ND	ND
CA: San Francisco	10/04/05	1.51 0.12	ND	ND	ND
DE: Wilmington	10/26/05	1.53 0.12	ND	ND	ND
FL: Tampa	10/12/05	1.68 0.12	ND	ND	ND
HI: Honolulu	11/09/05	1.53 0.12	ND	ND	ND
IA: Des Moines	10/10/05	1.54 0.12	ND	ND	ND
IN: Indianapolis	10/12/05	1.56 0.12	ND	ND	ND
KS: Wichita	10/10/05	1.54 0.12	ND	ND	ND
KY: Louisville	10/11/05	1.66 0.12	ND	ND	ND
MA: Boston	12/12/05	1.56 0.17	ND	ND	ND
MD: Baltimore	10/07/05	1.57 0.13	ND	ND	ND
ME: Portland	10/20/05	1.62 0.12	ND	ND	ND
MI: Detroit	12/05/05	1.66 0.13	ND	ND	ND
MO: Jefferson City	10/07/05	1.64 0.12	ND	ND	ND
NJ: Trenton	10/03/05	1.61 0.13	ND	ND	ND
NV: Las Vegas	10/24/05	1.55 0.12	ND	ND	ND
NY: Buffalo	10/11/05	1.60 0.12	ND	ND	ND
NY: Syracuse	10/19/05	1.64 0.12	ND	ND	ND
OH: Cincinnati	10/17/05	1.62 0.12	ND	ND	ND
OH: Cleveland	11/09/05	1.54 0.12	ND	ND	ND
OR: Portland	12/05/05	1.62 0.12	ND	ND	ND
PA: Philadelphia	10/05/05	1.57 0.13	ND	ND	ND
PA: Pittsburgh	10/04/05	1.56 0.12	ND	ND	ND
TN: Chattanooga	11/14/05	1.57 0.13	ND	ND	ND
TN: Knoxville	10/31/05	1.51 0.12	ND	ND	ND
TN: Memphis	10/10/05	1.54 0.12	ND	ND	ND
TX: Ft. Worth	10/17/05	1.69 0.13	ND	ND	ND
TX: San Antonio	10/18/05	1.36 0.16	ND	ND	ND
VT: Montpelier	12/13/05	1.57 0.12	ND	ND	ND
WA: Spokane	11/01/05	1.60 0.12	ND	ND	ND
WA: Tacoma	12/22/05	1.55 0.12	ND	ND	ND
WV: Charleston	10/06/05	1.66 0.17	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 RadNet 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

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National Air and Radiation Environmental Laboratory
540 South Morris Avenue
Montgomery, Alabama 36115-2601
e-mail: petko.charles@epa.gov

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Jonathan Edwards
USEPA - ORIA
Radiation Protection Division (MC6608J)
1200 Pennsylvania Ave. N.W.
Washington, DC 20460
e-mail: edwards.jonathan@epa.gov

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