

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 2007

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
AL: Birmingham	9	0.1	0.0	0.1	0.012	0.003	0.008
AL: Montgomery/408	9	0.1	0.0	0.1	0.010	0.004	0.007
AR: Little Rock	5	0.0	0.0	0.0	0.017	0.008	0.012
AZ: Phoenix	3	0.4	0.1	0.2	0.014	0.007	0.011
AZ: Phoenix/956	9	1.4	0.0	0.6	0.047	0.014	0.020
CA: Anaheim	9	0.0	0.0	0.0	0.018	0.004	0.011
CA: Fresno	9	0.9	0.2	0.5	0.022	0.005	0.010
CA: Los Angeles	9	1.1	0.1	0.4	0.031	0.007	0.014
CA: Richmond	5	0.1	0.0	0.1	0.009	0.003	0.006
CA: Riverside	7	0.0	0.0	0.0	0.011	0.006	0.008
CA: San Bernardino Cty.	9	0.0	0.0	0.0	0.018	0.007	0.012
CA: San Diego	6	0.2	0.0	0.1	0.034	0.006	0.013
CA: San Francisco	5	0.0	0.0	0.0	0.009	0.003	0.005
CA: San Jose	6	0.0	0.0	0.0	0.007	0.004	0.005
CO: Denver	8	0.9	0.1	0.3	0.009	0.002	0.006
CT: Hartford	10	0.1	0.0	0.0	0.010	0.002	0.005
DC: Washington	8	0.1	0.0	0.1	0.010	0.002	0.006
DE: Wilmington	8	0.8	0.1	0.3	0.013	0.006	0.008
FL: Jacksonville	9	0.0	0.0	0.0	0.008	0.002	0.005
FL: Miami	7	0.0	0.0	0.0	0.007	0.002	0.004
FL: Orlando	9	0.1	-0.0	0.1	0.017	0.002	0.007
GA: Atlanta	5	0.0	0.0	0.0	0.009	0.005	0.007
IA: Des Moines	7	0.3	0.0	0.2	0.011	0.004	0.008
IA: Iowa City	9	1.9	0.3	0.8	0.013	0.005	0.010
ID: Idaho Falls	9				0.014	0.003	0.007
IL: Chicago	8	0.2	0.0	0.1	0.033	0.003	0.011
IN: Indianapolis	6	0.6	0.1	0.2	0.010	0.005	0.008
KS: Kansas City	7	0.1	0.1	0.1	0.026	0.003	0.012
KS: Topeka	9	0.5	0.2	0.3	0.011	0.003	0.007
MA: Boston	5	0.1	0.0	0.1	0.007	0.002	0.004
MD: Baltimore	5	0.2	0.0	0.1	0.016	0.007	0.012
MI: Detroit	10	0.2	0.1	0.2	0.020	0.002	0.009
MN: St. Paul	5	0.1	0.0	0.0	0.011	0.004	0.007
MS: Jackson	8	0.3	0.1	0.1	0.020	0.005	0.009
NC: Charlotte	9	0.3	0.0	0.1	0.018	0.004	0.009
NC: Wilmington	5				0.010	0.006	0.007
ND: Bismarck	5	2.8	0.2	1.0	0.021	0.005	0.012
NH: Concord	9	0.2	0.0	0.1	0.016	0.003	0.008

Table 2 (continued)
Gross Beta in Airborne Particulates
October 2007

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
NJ: Edison	7	0.0	0.0	0.0	0.007	0.003	0.005
NJ: Trenton	9	0.5	0.1	0.2	0.013	0.005	0.009
NM: Santa Fe	6	3.0	0.1	1.1	0.019	0.006	0.013
NY: Albany	5	0.1	0.0	0.0	0.011	0.004	0.008
NY: Lockport	9	0.1	0.0	0.0	0.014	0.004	0.008
NY: New York City	7	0.0	0.0	0.0	0.022	0.007	0.013
NY: Yaphank	9	0.1	0.0	0.1	0.007	0.002	0.004
OH: Cincinnati	9	0.2	0.0	0.1	0.011	0.003	0.007
OH: Cleveland	9	0.2	0.0	0.1	0.025	0.006	0.014
OH: Columbus	9	0.0	0.0	0.0	0.019	0.005	0.012
OH: Painesville	7	0.2	0.0	0.1	0.015	0.003	0.009
OH: Ross	9				0.033	0.005	0.015
OK: Oklahoma City	1	0.1	0.1	0.1	0.006	0.006	0.006
OR: Portland	8	0.1	0.0	0.0	0.012	0.004	0.007
PA: Harrisburg	9	0.8	0.1	0.3	0.017	0.006	0.011
PA: Pittsburgh	5	0.3	0.0	0.1	0.013	0.005	0.009
RI: Providence	7	0.2	0.1	0.1	0.013	0.002	0.007
SC: Barnwell	1	0.0	0.0	0.0	0.010	0.010	0.010
SC: Columbia	2	0.1	0.0	0.0	0.012	0.010	0.011
SD: Pierre	4	1.2	0.2	0.6	0.016	0.007	0.010
TN: Knoxville	7	0.7	0.2	0.4	0.023	0.010	0.014
TN: Memphis	4	0.3	0.1	0.2	0.011	0.006	0.007
TN: Oak Ridge/Bethel	9	0.9	0.2	0.6	0.018	0.007	0.011
TN: Oak Ridge/K25	9	1.0	0.4	0.7	0.017	0.007	0.010
TN: Oak Ridge/Melton	9	1.1	0.3	0.7	0.019	0.008	0.013
TN: Oak Ridge/Y12 E	9	0.8	0.2	0.5	0.015	0.007	0.009
TN: Oak Ridge/Y12 W	9	0.7	0.1	0.3	0.016	0.007	0.010
TX: Austin	9	0.2	0.0	0.1	0.015	0.006	0.010
TX: Austin/Concordia	9	0.4	0.1	0.2	0.015	0.004	0.008
TX: Dallas	6	0.2	0.0	0.1	0.008	0.003	0.006
TX: El Paso	9	0.9	0.3	0.7	0.012	0.008	0.010
TX: Ft. Worth	1	0.1	0.1	0.1	0.004	0.004	0.004
TX: Houston	9	2.7	0.0	0.4	0.011	0.004	0.007
UT: Salt Lake City	9	0.6	0.0	0.3	0.024	0.004	0.013
VA: Lynchburg	9	1.9	0.2	0.8	0.022	0.004	0.011
VA: Richmond	9	0.1	0.0	0.0	0.013	0.003	0.006
VA: Virginia Beach	8	0.2	0.0	0.1	0.011	0.004	0.007

Table 2 (continued)
Gross Beta in Airborne Particulates
October 2007

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
WA: Olympia	9	0.1	0.0	0.0	0.007	0.002	0.004
WA: Spokane	8	1.4	0.1	0.4	0.019	0.004	0.009
WI: Milwaukee	7	0.9	0.0	0.2	0.032	0.012	0.021

Table 3
Gross Beta in Airborne Particulates
November 2007

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
AL: Birmingham	8	0.4	0.0	0.1	0.030	0.007	0.014
AL: Montgomery/408	9	0.3	0.1	0.1	0.029	0.009	0.016
AR: Little Rock	5	0.1	0.0	0.0	0.020	0.012	0.016
AZ: Phoenix	3	0.8	0.3	0.4	0.026	0.023	0.024
AZ: Phoenix/956	6	3.6	0.0	1.1	0.035	0.017	0.029
CA: Anaheim	8	0.0	0.0	0.0	0.049	0.015	0.025
CA: Fresno	9	0.9	0.2	0.6	0.067	0.015	0.030
CA: Los Angeles	5	0.9	0.1	0.4	0.055	0.023	0.037
CA: Richmond	4	0.3	0.1	0.1	0.015	0.003	0.012
CA: San Bernardino Cty.	6	0.1	0.0	0.0	0.039	0.019	0.025
CA: San Diego	4	0.1	0.1	0.1	0.026	0.018	0.021
CA: San Francisco	4	0.1	0.0	0.0	0.016	0.003	0.010
CA: San Jose	7	0.1	0.0	0.0	0.036	0.003	0.013
CO: Denver	9	0.8	0.3	0.6	0.014	0.009	0.012
CT: Hartford	7	0.1	0.0	0.0	0.031	0.001	0.009
DC: Washington	9	0.1	0.0	0.1	0.012	0.004	0.006
DE: Wilmington	7	0.6	0.1	0.3	0.011	0.009	0.010
FL: Jacksonville	6	0.0	0.0	0.0	0.012	0.009	0.010
FL: Miami	7	0.1	0.0	0.0	0.013	0.006	0.008
FL: Orlando	9	0.1	0.0	0.0	0.014	0.006	0.010
GA: Atlanta	3	0.1	0.0	0.0	0.013	0.007	0.010
IA: Des Moines	7	0.8	0.4	0.6	0.016	0.007	0.012
IA: Iowa City	8	4.2	0.6	2.4	0.022	0.007	0.013
ID: Idaho Falls	9				0.027	0.006	0.016
IL: Chicago	7	0.3	0.1	0.2	0.016	0.005	0.011
IN: Indianapolis	1	0.3	0.3	0.3	0.007	0.007	0.007
KS: Kansas City	7	0.8	0.0	0.4	0.017	0.006	0.011
KS: Topeka	8	2.1	0.4	1.0	0.018	0.006	0.012
MD: Baltimore	4	0.1	0.0	0.0	0.013	0.011	0.012
MI: Detroit	7	0.2	0.0	0.1	0.016	0.006	0.009
MN: St. Paul	3	0.3	0.0	0.1	0.014	0.006	0.009
MS: Jackson	7	0.9	0.1	0.4	0.022	0.006	0.014
NC: Charlotte	7	0.3	0.0	0.2	0.030	0.009	0.015
NC: Wilmington	4				0.014	0.008	0.011
ND: Bismarck	8	2.0	0.6	1.1	0.014	0.007	0.012
NH: Concord	7	0.1	0.0	0.0	0.014	0.004	0.007
NJ: Edison	5	0.0	0.0	0.0	0.011	0.004	0.007
NJ: Trenton	9	0.4	0.1	0.2	0.022	0.007	0.011

Table 3 (continued)
Gross Beta in Airborne Particulates
November 2007

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
NM: Santa Fe	7	5.2	0.0	1.8	0.026	0.007	0.019
NY: Albany	4	0.0	0.0	0.0	0.010	0.005	0.007
NY: Lockport	9	0.0	0.0	0.0	0.015	0.005	0.009
NY: New York City	6	0.0	0.0	0.0	0.022	0.018	0.021
NY: Yaphank	9	0.1	0.0	0.0	0.009	0.003	0.005
OH: Cincinnati	8	0.1	0.0	0.1	0.012	0.005	0.008
OH: Cleveland	8	0.1	0.0	0.1	0.022	0.007	0.013
OH: Columbus	9	0.0	0.0	0.0	0.030	0.010	0.015
OH: Painesville	7	0.1	0.0	0.1	0.017	0.007	0.012
OH: Ross	9				0.020	0.009	0.015
OK: Oklahoma City	7	0.2	0.0	0.1	0.017	0.005	0.010
OR: Portland	7	0.1	0.0	0.0	0.011	0.003	0.007
PA: Harrisburg	9	0.2	0.0	0.1	0.019	0.009	0.013
PA: Pittsburgh	7	0.1	0.0	0.0	0.015	0.005	0.010
PR: San Juan	5	0.0	0.0	0.0	0.008	-0.001	0.002
RI: Providence	6	3.0	0.0	0.5	0.006	0.004	0.005
SD: Pierre	6	2.9	0.5	1.5	0.022	0.008	0.015
TN: Knoxville	8	0.7	0.2	0.4	0.029	0.015	0.021
TN: Oak Ridge/Bethel	7	0.8	0.1	0.4	0.018	0.011	0.013
TN: Oak Ridge/K25	7	0.9	0.1	0.5	0.016	0.010	0.012
TN: Oak Ridge/Melton	7	1.3	0.1	0.5	0.018	0.012	0.014
TN: Oak Ridge/Y12 E	7	0.8	0.1	0.4	0.016	0.008	0.012
TN: Oak Ridge/Y12 W	7	0.4	0.1	0.2	0.014	0.010	0.012
TX: Austin	7	0.3	0.0	0.1	0.030	0.010	0.017
TX: Austin/Concordia	9	0.5	0.1	0.3	0.024	0.006	0.013
TX: Dallas	6	0.3	0.2	0.2	0.014	0.009	0.012
TX: El Paso	7	1.7	0.7	1.0	0.039	0.013	0.027
TX: Ft. Worth	3	0.6	0.0	0.2	0.008	0.006	0.007
TX: Houston	8	3.1	0.0	0.5	0.021	0.005	0.012
UT: Salt Lake City	7	0.6	0.1	0.4	0.031	0.013	0.020
VA: Lynchburg	7	1.1	0.2	0.5	0.018	0.010	0.013
VA: Richmond	7	0.1	0.0	0.0	0.013	0.004	0.008
VA: Virginia Beach	8	0.1	0.0	0.0	0.016	0.005	0.008
WA: Olympia	8	0.1	0.0	0.0	0.014	0.003	0.006
WA: Spokane	8	0.9	0.1	0.4	0.033	0.010	0.017
WI: Milwaukee	5	0.6	-0.0	0.2	0.035	0.012	0.023

Table 4
Gross Beta in Airborne Particulates
December 2007

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
AL: Birmingham	9	0.2	0.0	0.1	0.028	0.008	0.012
AL: Montgomery/408	8	0.1	0.0	0.1	0.020	0.010	0.014
AR: Little Rock	6	0.1	0.0	0.0	0.030	0.016	0.021
AZ: Phoenix	4	0.6	0.1	0.3	0.022	0.015	0.019
AZ: Phoenix/956	6	0.9	0.2	0.5	0.026	0.008	0.014
CA: Anaheim	7	0.0	0.0	0.0	0.018	0.003	0.010
CA: Fresno	8	0.5	-0.0	0.2	0.044	0.004	0.016
CA: Los Angeles	3	0.2	0.0	0.2	0.006	0.002	0.004
CA: Richmond	4	0.1	0.0	0.1	0.007	0.004	0.005
CA: San Diego	4	0.1	0.0	0.1	0.019	0.006	0.011
CA: San Francisco	4	0.0	0.0	0.0	0.005	0.002	0.004
CA: San Jose	2	0.1	-0.0	0.1	0.004	0.003	0.003
CO: Denver	9	0.9	0.0	0.2	0.016	0.004	0.010
CT: Hartford	2	0.0	0.0	0.0	0.009	0.004	0.006
DC: Washington	9	0.1	0.0	0.1	0.024	0.006	0.011
DE: Wilmington	7	0.3	0.0	0.2	0.014	0.005	0.011
FL: Jacksonville	9	0.1	0.0	0.0	0.021	0.006	0.010
FL: Miami	8	0.1	0.0	0.0	0.016	0.003	0.007
FL: Orlando	8	0.1	0.0	0.0	0.015	0.004	0.008
GA: Atlanta	4	0.0	0.0	0.0	0.012	0.008	0.010
IA: Des Moines	7	0.2	0.0	0.1	0.035	0.015	0.022
IA: Iowa City	8	0.6	0.1	0.3	0.039	0.014	0.023
ID: Idaho Falls	8				0.022	0.006	0.011
IL: Chicago	8	0.2	0.0	0.1	0.026	0.007	0.017
KS: Kansas City	6	0.2	0.0	0.1	0.022	0.013	0.017
KS: Topeka	7	0.7	0.1	0.2	0.032	0.016	0.023
MD: Baltimore	4	0.1	0.0	0.0	0.015	0.011	0.013
MI: Detroit	8	0.1	0.0	0.0	0.084	0.010	0.024
MN: St. Paul	3	0.2	0.0	0.2	0.223	0.010	0.132
MS: Jackson	5	0.2	0.1	0.2	0.016	0.006	0.011
NC: Charlotte	7	0.2	0.1	0.1	0.021	0.005	0.013
NC: Wilmington	3				0.012	0.008	0.010
ND: Bismarck	4	1.2	0.2	0.7	0.024	0.018	0.021
NH: Concord	9	0.0	0.0	0.0	0.016	0.005	0.010
NJ: Edison	6	0.0	0.0	0.0	0.010	0.003	0.007
NJ: Trenton	6	0.1	0.0	0.1	0.016	0.009	0.012
NM: Santa Fe	7	7.0	0.0	1.1	0.022	0.008	0.014
NY: Albany	4	0.0	0.0	0.0	0.011	0.006	0.009

Table 4 (continued)
Gross Beta in Airborne Particulates
December 2007

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
NY: Lockport	9	0.0	0.0	0.0	0.021	0.003	0.011
NY: New York City	6	0.0	0.0	0.0	0.028	0.007	0.020
NY: Yaphank	8	0.1	0.0	0.0	0.015	0.005	0.007
OH: Cincinnati	10	0.1	0.0	0.0	0.019	0.005	0.010
OH: Cleveland	9	0.0	0.0	0.0	0.024	0.008	0.016
OH: Columbus	9	0.0	0.0	0.0	0.018	0.008	0.013
OH: Painesville	7	0.1	0.0	0.0	0.019	0.006	0.014
OH: Ross	9				0.023	0.009	0.016
OK: Oklahoma City	6	0.0	0.0	0.0	0.015	0.009	0.011
OR: Portland	7	0.0	0.0	0.0	0.028	0.002	0.008
PA: Harrisburg	9	0.2	0.0	0.1	0.026	0.007	0.016
PA: Pittsburgh	8	0.1	0.0	0.0	0.015	0.005	0.012
PR: San Juan	2	0.0	0.0	0.0	0.002	0.001	0.001
RI: Providence	5	0.1	0.0	0.0	0.008	0.004	0.006
SC: Columbia	1	0.0	0.0	0.0	0.016	0.016	0.016
SD: Pierre	1	0.7	0.7	0.7	0.017	0.017	0.017
TN: Knoxville	6	0.6	0.2	0.3	0.033	0.011	0.019
TN: Memphis	6	0.1	0.0	0.0	0.011	0.006	0.008
TN: Nashville	5				0.013	0.004	0.009
TN: Oak Ridge/Bethel	7	0.4	0.1	0.2	0.018	0.010	0.013
TN: Oak Ridge/K25	7	0.6	0.1	0.3	0.020	0.009	0.012
TN: Oak Ridge/Melton	7	0.4	0.1	0.2	0.021	0.011	0.013
TN: Oak Ridge/Y12 E	7	0.4	0.1	0.2	0.020	0.009	0.012
TN: Oak Ridge/Y12 W	7	0.3	0.1	0.2	0.019	0.010	0.013
TX: Austin	7	0.2	0.1	0.1	0.017	0.006	0.011
TX: Austin/Concordia	9	0.3	0.1	0.2	0.013	0.006	0.009
TX: Dallas	5	0.4	0.0	0.2	0.017	0.007	0.012
TX: El Paso	8	1.4	0.0	0.8	0.024	0.005	0.015
TX: Ft. Worth	7	0.3	0.0	0.2	0.012	0.006	0.009
TX: Houston	8	0.2	0.0	0.1	0.025	0.005	0.011
UT: Salt Lake City	7	0.1	0.0	0.1	0.025	0.006	0.017
VA: Lynchburg	6	0.9	0.1	0.5	0.019	0.009	0.013
VA: Richmond	8	0.2	0.0	0.0	0.012	0.006	0.008
VA: Virginia Beach	7	0.1	0.0	0.0	0.007	0.001	0.006
WA: Olympia	9	0.1	0.0	0.0	0.010	0.001	0.003
WA: Spokane	9	0.2	0.1	0.2	0.025	0.003	0.010
WI: Milwaukee	4	0.2	-0.1	0.0	0.039	0.017	0.027

Table 5
Gross Beta and Specific Gamma in Precipitation
October 2007

Location	Gross Beta Activity		Gamma-Emitting Radionuclides		
	pCi/L $\pm 2u$		Nuclide	pCi/L $\pm 2u$	
AL: Montgomery/408	0.64	0.33	K40	8	12
AR: Little Rock	0.38	0.31		ND	
CA: Richmond	0.99	0.38	Tl208	1.6	1.4
CO: Denver	2.22	0.48	Be7	12.3	9.7
CT: Hartford	1.25	0.40	Be7	38	19
DE: Wilmington	0.48	0.32	Be7	17	14
			Pb212	1.5	2.5
FL: Jacksonville	0.50	0.32	Be7	27	15
GA: Atlanta	0.39	0.31	Be7	15	14
IA: Iowa City	0.37	0.31		ND	
KS: Kansas City	0.32	0.29	Be7	30	19
MA: Boston	1.79	0.44	Be7	91	21
MI: Lansing	0.66	0.33	K40	27	12
MN: St. Paul	0.67	0.33		ND	
NC: Charlotte	0.59	0.32	Be7	28	29
			Bi212	29	42
NC: Wilmington	0.32	0.30		ND	
ND: Bismarck	1.03	0.37	K40	33	40
			Pb212	5.1	6.8
			Ra224	34	38
NH: Concord	1.30	0.39	Be7	24	17
NM: Santa Fe	0.80	0.34		ND	
NY: Albany	1.01	0.37	Be7	51	20
NY: Yaphank	9.0	1.2	K40	26.7	7.8
OH: Painesville	0.86	0.34	Be7	20	16
OR: Portland	0.02	0.27	Be7	59	36
PA: Harrisburg	0.42	0.32		ND	
TN: Knoxville	0.74	0.34		ND	
TN: Oak Ridge/K25	0.57	0.32	Be7	29	22
TN: Oak Ridge/Melton	0.65	0.34	Be7	25	19
TX: Austin	0.78	0.35		ND	
UT: Salt Lake City	1.34	0.40	K40	13	12
VA: Lynchburg	4.41	0.70		ND	
WA: Olympia	0.18	0.29	Be7	21	18
			K40	9	12

Note: ND = Not Detected

Table 6
Gross Beta and Specific Gamma in Precipitation
November 2007

Location	Gross Beta Activity		Gamma-Emitting Radionuclides		
	pCi/L $\pm 2u$		Nuclide	pCi/L $\pm 2u$	
AL: Montgomery/408	0.64	0.58	Be7	10.7	7.9
AR: Little Rock	0.12	0.54	K40	18	28
			Pb212	3.4	4.3
			Tl208	3.3	3.7
CA: Richmond	0.32	0.56		ND	
CO: Denver	10.2	3.7	Be7	270	44
CT: Hartford	1.77	0.71	Be7	63	17
DE: Wilmington	1.57	0.69	Be7	75	17
GA: Atlanta	1.19	0.65	Be7	23	24
IA: Iowa City	7.8	3.5	Tl208	12	11
ID: Idaho Falls	1.35	0.68	Be7	42	29
			Bi212	42	45
KS: Kansas City	-0.6	2.6		ND	
MA: Boston	1.0	1.4	Be7	74	27
MI: Lansing	1.95	0.74	Be7	52	33
MN: St. Paul	12.0	3.9	Be7	155	96
NC: Charlotte	1.09	0.65	Be7	39	29
			K40	28	47
NC: Wilmington	0.60	0.58		ND	
NH: Concord	1.35	0.65	Be7	78	18
NY: Albany	1.02	0.61	Be7	73	18
NY: Yaphank	5.0	1.0	Be7	12	11
			Bi212	17	16
OH: Painesville	1.74	0.69	Be7	50	15
OR: Portland	1.40	0.68	Be7	49	45
PA: Harrisburg	2.03	0.71	Be7	66	29
			Tl208	2.6	2.6
TN: Knoxville	3.01	0.81	Be7	20	17
			Pb212	3.9	4.3
TN: Oak Ridge/K25	1.07	0.64	Be7	36	15
TN: Oak Ridge/Melton	1.89	0.70	Be7	38	16
TX: Austin	0.27	0.57	K40	21	33
TX: El Paso	1.26	0.65		ND	
UT: Salt Lake City	1.47	0.68		ND	
VA: Lynchburg	2.98	0.80	K40	50	28
WA: Olympia	0.8	1.4	Be7	17	12

Note: ND = Not Detected

Table 7
Gross Beta and Specific Gamma in Precipitation
December 2007

Location	Gross Beta Activity		Gamma-Emitting Radionuclides	
	pCi/L	$\pm 2u$	Nuclide	pCi/L $\pm 2u$
AL: Montgomery/408	0.63	0.58	Be7	37 16
AR: Little Rock	0.44	0.30	Be7	34 15
AZ: Phoenix	1.42	0.41	K40	38 34
CA: Richmond	0.51	0.31		ND
CO: Denver	1.43	0.40	Be7	22 14
CT: Hartford	2.20	0.74	Be7	47 15
DE: Wilmington	2.22	0.74	Be7	67 14
FL: Jacksonville	0.46	0.59	Be7	15.2 8.5
GA: Atlanta	-0.22	0.50	Be7	31 24
			Tl208	1.8 2.2
IA: Iowa City	0.81	0.34	Be7	17 15
ID: Idaho Falls	1.42	0.42		ND
KS: Kansas City	0.30	0.29	K40	23 33
MA: Boston	0.77	0.60	Be7	42 14
			Tl208	1.0 1.4
MN: St. Paul	0.89	0.36	Be7	19.0 8.3
NC: Charlotte	1.7	1.5	Be7	37 27
NC: Wilmington	0.5	1.3	Pb212	3.3 6.5
ND: Bismarck	3.91	0.95	Be7	66 35
			K40	27 35
			Pb212	4.7 6.1
NM: Santa Fe	1.52	0.42		ND
NY: Albany	0.94	0.61	Be7	27 16
NY: Yaphank	3.1	1.6		ND
OH: Painesville	2.07	0.46	Be7	41 14
			Pb212	1.8 2.4
OR: Portland	0.42	0.29	Be7	74 31
PA: Harrisburg	1.10	0.64		ND
TN: Knoxville	0.35	0.57		ND
TN: Nashville	0.61	0.58	Be7	67 19
TN: Oak Ridge/K25	1.34	0.39	Be7	43 16
			K40	10 12
TN: Oak Ridge/Melton	1.15	0.63	Be7	46 17
			K40	9 12
			Pb212	1.9 2.3
TX: Austin	1.97	0.72	K40	25 36
UT: Salt Lake City	0.74	0.34	Bi212	29 37

Note: ND = Not Detected

Table 7 (continued)
Gross Beta and Specific Gamma in Precipitation
December 2007

Location	Gross Beta Activity pCi/L $\pm 2u$		Gamma-Emitting Radionuclides	
			Nuclide	pCi/L $\pm 2u$
VA: Lynchburg	15.0	2.8		ND
WA: Olympia	0.48	0.30	Be7	15 15

Note: ND = Not Detected

Table 8
Tritium in Precipitation
October - December 2007

Location	October 2007 pCi/L $\pm 2u$	November 2007 pCi/L $\pm 2u$	December 2007 pCi/L $\pm 2u$
AL: Montgomery/408	-18 82	0 77	70 77
AR: Little Rock	-29 85	-12 82	79 79
AZ: Phoenix	NS	NS	33 77
CA: Richmond	-36 84	6 82	29 77
CO: Denver	-33 86	54 85	42 77
CT: Hartford	-58 85	73 81	71 78
DE: Wilmington	-57 81	42 79	15 75
FL: Jacksonville	-52 82	NS	31 76
GA: Atlanta	-6 83	23 78	17 75
IA: Iowa City	-81 80	2 77	31 76
ID: Idaho Falls	NS	10 82	69 78
KS: Kansas City	11 87	15 82	13 76
MA: Boston	-16 83	46 79	95 79
MI: Lansing	-75 80	4 77	NS
MN: St. Paul	-12 82	40 79	31 76
NC: Charlotte	-49 81	57 80	35 77
NC: Wilmington	-61 80	21 78	50 77
ND: Bismarck	-42 85	NS	69 78
NH: Concord	-12 83	-2 77	NS
NM: Santa Fe	-70 83	NS	157 83
NY: Albany	24 85	11 77	84 78
NY: Yaphank	-55 81	23 78	82 78
OH: Painesville	8 84	29 79	38 76
OR: Portland	-86 83	48 78	71 79
PA: Harrisburg	-34 82	11 78	69 77
TN: Knoxville	4 84	35 79	44 77
TN: Nashville	NS	NS	82 79
TN: Oak Ridge/K25	-56 81	-17 76	61 77
TN: Oak Ridge/Melton	-21 82	31 79	122 80
TX: Austin	-31 85	-19 76	132 81
TX: El Paso	NS	-10 81	NS
UT: Salt Lake City	-48 85	-17 80	94 80
VA: Lynchburg	-56 81	-4 78	-10 74
WA: Olympia	-64 84	-8 81	76 79

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 2007 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
AL: Birmingham	1.0	3.2	0.0	1.2	44	11	2.3	2.8	29.4	8.6
AL: Montgomery/408	-0.07	0.92	0.40	0.71	13.8	3.9	1.3	1.3	6.8	2.6
AR: Little Rock	-0.9	2.5	0.3	1.6	93	18	7.4	4.5	88	17
AZ: Phoenix	0.9	4.0	-0.7	1.6	64	18	0.7	3.3	42	14
AZ: Phoenix	3.7	5.0	-0.7	1.7	64	18	0.7	3.3	42	14
CA: Los Angeles	3.0	4.1	0.2	1.6	39	13	1.7	3.7	26	11
CA: Richmond	-0.22	0.77	-0.05	0.36	9.6	3.2	1.0	1.2	4.1	2.0
CA: San Diego	-1.0	2.0	-0.1	1.2	21.8	6.3	3.0	2.7	26.1	7.0
CA: San Francisco	0.1	1.4	0.00	0.77	9.6	4.2	1.7	2.1	6.9	3.5
CO: Denver	0.20	0.79	0.20	0.54	18.2	3.9	3.7	1.7	16.4	3.6
CT: Hartford	0.00	0.58	0.28	0.80	15.6	4.4	0.5	1.0	10.7	3.5
DC: Washington	-0.73	0.71	0.08	0.75	13.1	3.8	0.00	0.56	9.9	3.3
DE: Wilmington	0.1	2.2	0.2	1.0	16.9	5.2	1.9	2.0	13.8	4.7
FL: Jacksonville	-0.26	0.88	0.09	0.81	14.5	4.4	0.8	1.4	9.6	3.5
FL: Miami	1.1	1.8	0.2	1.1	21.0	6.1	0.9	1.6	17.4	5.5
FL: Orlando	0.16	0.88	-0.05	0.36	11.8	3.6	2.5	1.8	8.6	3.0
GA: Atlanta	0.9	1.2	0.6	1.0	26.3	6.4	3.1	2.2	18.4	5.2
IA: Des Moines	0.5	1.0	0.27	0.59	16.0	3.2	1.9	1.2	16.0	3.2
IA: Iowa City	0.2	1.0	0.06	0.53	18.6	4.1	2.6	1.5	16.1	3.7
IL: Chicago	-1.1	3.5	1.1	2.3	43	11	7.2	4.6	38	10
IN: Indianapolis	-0.7	1.4	-0.08	0.56	29.5	6.3	2.5	1.9	28.1	6.1
KS: Kansas City	-0.5	1.2	0.22	0.82	26.7	5.9	2.4	1.9	27.4	5.9
KS: Topeka	0.11	0.63	0.11	0.50	20.8	4.4	2.7	1.5	17.0	3.9
MA: Boston	1.0	1.5	0.14	0.64	8.8	2.4	0.37	0.66	5.9	1.9
MD: Baltimore	0.8	1.3	0.15	0.67	14.4	4.1	0.19	0.85	8.9	3.2
MI: Detroit	0.00	0.60	0.04	0.41	16.7	3.8	2.0	1.4	19.7	4.2
MI: Lansing	-0.32	0.59	-0.09	0.32	12.5	2.9	0.92	0.85	11.3	2.7
MN: St. Paul	0.08	0.66	0.40	0.56	12.7	2.7	1.10	0.92	13.2	2.8
MO: St. Louis	0.77	0.91	-0.06	0.37	10.0	2.4	0.75	0.73	11.3	2.6
MS: Jackson	-0.7	1.3	0.52	0.93	14.5	5.1	-0.15	0.98	11.9	4.5
NC: Charlotte	0.6	1.6	-0.23	0.78	20.9	6.2	1.8	2.0	20.5	6.1
NC: Wilmington	-0.1	1.1	0.19	0.54	12.0	3.5	0.00	0.78	13.3	3.7
ND: Bismarck	0.9	1.7	-0.39	0.61	23.3	4.8	2.3	1.9	21.4	4.6
NH: Concord	5.2	2.0	0.84	0.84	10.2	2.9	1.1	1.0	9.2	2.7
NH: Concord	0.1	1.1	0.38	0.67	10.2	2.9	1.1	1.0	9.2	2.7
NJ: Edison	0.24	0.90	0.00	0.39	10.7	3.0	0.53	0.82	9.0	2.7
NJ: Trenton	-0.2	1.3	0.25	0.73	15.5	4.3	1.7	1.5	12.3	3.8
NM: Santa Fe	0.49	0.86	0.09	0.39	19.4	4.0	0.67	0.79	18.7	3.9
NV: Las Vegas/913	-1.3	1.3	-0.3	1.0	55	12	4.4	3.2	36.1	8.9
NY: Albany	2.0	1.9	0.00	0.57	11.3	3.9	1.2	1.5	10.0	3.6

Note: NA = No Analysis

Table 9 (continued)
Plutonium and Uranium in Airborne Particulates
January - December 2007 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
NY: Lockport	-0.65	0.95	0.14	0.65	4.0	1.7	0.69	0.78	5.7	2.0
NY: New York City	1.7	2.5	0.2	1.1	18.5	5.5	1.8	2.0	21.4	6.0
NY: Yaphank	0.83	0.79	0.29	0.51	7.9	2.3	0.16	0.47	3.7	1.5
OH: Cincinnati	-0.24	0.40	0.03	0.28	11.5	2.5	0.54	0.54	9.2	2.2
OH: Cleveland	-0.06	0.88	0.23	0.63	24.0	5.0	0.83	0.94	22.7	4.9
OH: Columbus	0.6	1.0	0.16	0.48	19.7	4.2	1.9	1.3	20.6	4.4
OH: Painesville	-0.21	0.29	0.07	0.32	13.3	2.8	0.37	0.51	11.2	2.5
OH: Ross	-0.3	1.2	-0.14	0.68	17.8	4.3	3.1	1.8	18.1	4.3
OK: Oklahoma City	0.7	1.0	-0.09	0.42	12.6	2.9	0.99	0.81	9.0	2.4
OR: Portland	0.6	1.4	0.15	0.66	9.1	3.8	0.4	1.2	9.2	3.8
PA: Harrisburg	0.28	0.80	0.00	0.58	8.1	2.9	1.7	1.4	10.1	3.2
PA: Pittsburgh	0.1	1.1	-0.15	0.51	18.3	4.8	0.9	1.3	14.1	4.1
PR: San Juan	0.1	1.7	0.00	0.65	6.2	2.8	0.32	0.94	5.6	2.7
RI: Providence	2.9	2.7	0.8	1.3	13.1	3.8	1.2	1.3	10.1	3.3
SC: Barnwell	-0.32	0.58	0.12	0.35	7.7	2.1	0.40	0.55	7.9	2.2
SC: Columbia	-0.42	0.88	0.56	0.86	32.0	7.9	2.7	2.5	26.3	7.0
SD: Pierre	0.7	1.2	0.60	0.81	19.3	4.4	1.2	1.2	18.9	4.4
TN: Knoxville	0.4	1.2	1.7	1.9	26.9	7.6	5.5	3.6	20.1	6.4
TN: Memphis	1.4	1.9	0.9	1.4	20.7	6.6	3.7	3.2	21.3	6.6
TN: Nashville	0.9	1.5	0.7	1.2	12.6	4.5	0.3	1.2	11.7	4.3
TN: Oak Ridge/Bethel	-0.05	0.72	0.16	0.46	12.3	3.3	1.1	1.1	12.4	3.4
TN: Oak Ridge/K25	-0.33	0.61	0.12	0.36	25.5	4.8	3.0	1.5	52.6	8.3
TN: Oak Ridge/Melton	-0.07	0.44	0.00	0.23	9.9	3.2	0.7	1.0	8.3	2.9
TN: Oak Ridge/Y12 E	-1.0	1.4	0.18	0.81	65	12	6.6	3.2	20.1	5.5
TN: Oak Ridge/Y12 W	0.55	0.95	0.12	0.54	13.0	3.6	1.1	1.2	9.1	2.9
TX: Austin	0.08	0.43	0.08	0.34	12.7	2.9	0.15	0.64	8.6	2.3
TX: Austin/Concordia	0.28	0.69	0.09	0.42	12.2	3.0	0.74	0.79	12.3	3.0
TX: Dallas	0.05	0.69	0.10	0.46	13.7	3.0	1.07	0.86	12.7	2.9
TX: El Paso	-0.4	2.2	-0.14	0.92	66	13	4.0	3.1	48	11
TX: Ft. Worth	0.21	0.98	0.10	0.68	12.2	3.0	1.03	0.95	13.3	3.1
TX: Houston	0.0	1.2	-0.42	0.79	22.4	5.2	1.1	1.2	22.6	5.1
UT: Salt Lake City	0.5	1.6	0.3	1.1	33.5	7.6	2.3	2.0	27.2	6.6
VA: Lynchburg	-0.1	1.3	0.00	0.49	47.9	8.1	1.3	1.1	9.8	2.8
VA: Richmond	0.89	0.99	0.00	0.30	15.3	3.8	0.75	0.95	13.6	3.5
VA: Virginia Beach	-0.10	0.95	0.05	0.48	10.9	2.9	0.37	0.78	10.5	2.9
WA: Spokane	-1.2	1.1	0.4	1.3	17.8	6.7	0.4	1.9	18.1	6.7
WI: Milwaukee	-0.25	0.88	0.30	0.54	11.5	3.0	0.48	0.75	11.5	3.0

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 2007

Location	Date Collected	³ H pCi/L ± 2 <i>u</i>
AK: Fairbanks	10/23/07	6 79
AL: Dothan	10/11/07	-32 72
AL: Montgomery/408	10/03/07	48 78
AL: Muscle Shoals	10/04/07	157 84
AL: Scottsboro	10/03/07	203 88
AR: Little Rock	10/03/07	27 77
CA: Los Angeles	10/02/07	43 78
CA: Richmond	10/01/07	-31 74
CO: Denver	10/05/07	-25 68
CT: Hartford	10/02/07	30 77
DE: Dover	10/16/07	12 80
FL: Tampa	10/03/07	25 77
GA: Baxley	11/29/07	-36 84
GA: Savannah	12/11/07	56 89
HI: Honolulu	11/13/07	-84 82
IA: Cedar Rapids	10/02/07	35 81
ID: Boise	12/10/07	-24 85
ID: Idaho Falls	11/08/07	-17 86
IL: W. Chicago	10/29/07	64 78
LA: New Orleans	12/06/07	83 90
MA: Lawrence	11/26/07	-27 85
MD: Baltimore	10/02/07	82 80
MD: Conowingo	11/20/07	37 85
MI: Detroit	10/02/07	57 79
MI: Grand Rapids	10/10/07	6 74
MN: Red Wing	10/10/07	45 81
MN: St. Paul	10/31/07	83 78
MO: Jefferson City	10/16/07	8 79
MS: Jackson	10/01/07	-32 75
MS: Port Gibson	10/01/07	22 77
MT: Helena	10/02/07	93 80
NC: Charlotte	10/05/07	960 110
NC: Raleigh	10/25/07	10 78
ND: Bismarck	10/05/07	45 85
NE: Lincoln	10/03/07	21 77
NH: Concord	10/04/07	2 75
NJ: Trenton	10/03/07	37 78
NJ: Waretown	10/10/07	54 81
NM: Santa Fe	10/31/07	70 78
NY: Albany	10/17/07	27 80

Table 10 (continued)
Tritium in Drinking Water
October - December 2007

Location	Date Collected	³ H pCi/L ± 2 <i>u</i>
NY: New York City	10/22/07	35 80
NY: Niagara Falls	12/27/07	66 85
NY: Syracuse	12/31/07	21 83
OH: Cincinnati	12/31/07	-11 80
OH: E. Liverpool	10/31/07	129 81
OH: Painesville	10/24/07	24 81
OH: Toledo	10/03/07	48 77
OR: Portland	09/28/07	146 82
OR: Portland	12/28/07	13 82
PA: Columbia	11/21/07	-7 86
PA: Harrisburg	11/19/07	-9 86
PA: Philadelphia - Baxter Control Lab.	10/22/07	88 79
PA: Philadelphia - Belmont	10/22/07	109 80
PA: Philadelphia - Queen Lane Lab.	10/22/07	4 79
PA: Pittsburgh	10/31/07	68 77
RI: Providence	10/02/07	-13 75
SC: Barnwell	10/15/07	6 79
SC: Columbia	10/17/07	62 82
SC: Jenkinsville	10/11/07	66 82
SC: Seneca	10/08/07	16 80
TN: Chattanooga	10/02/07	174 84
TN: Knoxville	11/13/07	-31 85
TN: Oak Ridge/#360	10/03/07	19 76
TN: Oak Ridge/#371	10/03/07	83 79
TN: Oak Ridge/#4442	10/04/07	73 78
TN: Oak Ridge/#768	10/03/07	33 76
TN: Oak Ridge/#772	10/03/07	960 110
TN: Oak Ridge/#772	10/03/07	84 80
TX: Austin	10/04/07	81 79
VA: Ashland	10/05/07	47 76
VA: Lynchburg	10/09/07	-4 79
WA: Richland	10/22/07	31 80
WA: Seattle	10/01/07	77 80

Table 12
Iodine-131 in Drinking Water
January - December 2007

Location	Date Collected	¹³¹ I	
		pCi/L	± 2u
AK: Fairbanks	10/23/07	0.04	0.18
AL: Dothan	04/11/07	0.00	0.14
AL: Montgomery	01/05/07	0.06	0.13
AL: Muscle Shoals	01/10/07	0.28	0.33
AL: Scottsboro	07/11/07	-0.05	0.24
AR: Little Rock	01/05/07	0.01	0.14
CA: Los Angeles	10/02/07	-0.10	0.36
CA: Richmond	10/01/07	-0.16	0.39
CO: Denver	01/10/07	-0.06	0.28
CT: Hartford	01/05/07	0.01	0.17
DE: Dover	01/17/07	0.04	0.30
FL: Tampa	04/04/07	0.05	0.17
GA: Baxley	11/29/07	0.18	0.33
GA: Savannah	03/14/07	-0.07	0.18
HI: Honolulu	02/21/07	0.02	0.19
IA: Cedar Rapids	04/04/07	0.09	0.17
ID: Boise	03/08/07	-0.07	0.37
ID: Idaho Falls	01/16/07	-0.02	0.16
IL: Morris	03/09/07	-0.06	0.22
IL: W. Chicago	04/17/07	0.06	0.14
KS: Topeka	01/18/07	-0.04	0.29
MA: Lawrence	11/26/07	-0.06	0.22
MD: Baltimore	04/04/07	0.10	0.15
MD: Conowingo	11/20/07	0.15	0.47
MI: Detroit	01/04/07	-0.01	0.15
MI: Grand Rapids	01/31/07	0.02	0.18
MN: Red Wing	10/10/07	-0.01	0.19
MN: St. Paul	01/31/07	0.12	0.24
MO: Jefferson City	04/02/07	0.17	0.18
NC: Charlotte	02/07/07	0.05	0.16
NC: Raleigh	02/14/07	-0.04	0.18
ND: Bismarck	04/03/07	0.09	0.15
NE: Lincoln	01/08/07	0.03	0.12
NH: Concord	01/05/07	0.02	0.13
NJ: Trenton	04/04/07	-0.07	0.17
NJ: Waretown	01/05/07	0.04	0.15
NM: Santa Fe	01/05/07	0.08	0.16
NV: Las Vegas	04/26/07	0.03	0.15
NY: Albany	07/05/07	0.21	0.35
NY: New York City	10/22/07	-0.12	0.21
NY: Niagara Falls	12/27/07	0.4	1.6

Table 12 (continued)
Iodine-131 in Drinking Water
January - December 2007

Location	Date Collected	¹³¹ I	
		pCi/L	± 2u
NY: Syracuse	12/31/07	-0.4	1.2
OH: Columbus	03/01/07	0.10	0.16
OH: E. Liverpool	04/25/07	0.30	0.21
OH: E. Liverpool	04/25/07	0.35	0.18
OH: Painesville	07/26/07	-0.01	0.15
OH: Toledo	01/04/07	0.09	0.13
PA: Columbia	03/14/07	0.24	0.19
PA: Harrisburg	03/15/07	0.19	0.17
PA: Philadelphia -Baxter Control Lab	10/22/07	0.26	0.34
PA: Philadelphia -Queen Lane Lab	10/22/07	3.20	0.42
PA: Philadelphia -Queen Lane Lab	10/22/07	2.71	0.78
PA: Philadelphia -Queen Lane Lab	10/22/07	3.34	0.38
PA: Philadelphia -Belmont	10/22/07	2.33	0.39
PA: Pittsburgh	04/25/07	0.05	0.18
RI: Providence	04/18/07	0.00	0.14
SC: Barnwell	04/18/07	-0.17	0.17
SC: Columbia	04/20/07	0.25	0.28
SC: Jenkinsville	10/11/07	1.40	0.68
SC: Jenkinsville	10/11/07	0.8	1.7
SC: Jenkinsville	10/11/07	2.50	0.59
SC: Seneca	10/08/07	-0.15	0.65
TN: Chattanooga	04/02/07	0.01	0.17
TN: Knoxville	01/04/07	-0.03	0.15
TN: Oak Ridge/#360	07/10/07	0.00	0.27
TN: Oak Ridge/#371	07/10/07	-0.13	0.24
TN: Oak Ridge/#4442	07/10/07	-0.03	0.28
TN: Oak Ridge/#768	07/10/07	-0.02	0.33
TN: Oak Ridge/#772	07/10/07	-0.17	0.30
TX: Austin	01/25/07	0.07	0.16
VA: Ashland	07/27/07	0.08	0.15
VA: Lynchburg	04/16/07	0.04	0.16
VA: Lynchburg	10/09/07	-0.12	0.21
WA: Richland	03/06/07	0.00	0.18
WA: Richland	04/09/07	-0.10	0.16
WA: Seattle	02/05/07	0.04	0.22

Table 13
Drinking Water
Alpha, Beta, and Sr-90 Concentrations
Composites
January - December 2007

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	49.7	4.5 2.3	-1.0 4.7	
AL: Dothan	58.8	3.7 2.2	2.5 5.5	
AL: Montgomery	56.8	2.08 0.77	0.8 1.6	
AL: Muscle Shoals	63.3	2.24 0.79	0.4 1.7	
AL: Scottsboro	106.4	3.0 1.1	-0.1 3.1	
AR: Little Rock	34.2	1.09 0.64	0.0 1.0	0.15 0.25
CA: Los Angeles	67.4	4.1 2.3	-1.7 5.8	
CA: Richmond	54.9	0.90 0.81	1.3 2.1	
CO: Denver	98.7	2.25 0.96	0.9 2.9	
CT: Hartford	37.9	0.54 0.61	-0.1 1.1	
DE: Dover	97.8	8.7 2.9	0.6 8.0	
FL: Tampa	100.1	2.8 1.8	1.7 5.8	
GA: Baxley	77.4	2.0 1.7	3.0 5.2	
GA: Savannah	78.0	6.1 1.8	-1.1 3.8	
HI: Honolulu	68.7	4.3 2.3	-0.3 5.5	
IA: Cedar Rapids	90.9	3.9 1.6	-0.9 3.9	
ID: Boise	38.9	1.5 1.4	9.0 4.2	
ID: Idaho Falls	57.8	2.2 3.0	0.3 7.5	
IL: Morris	167.8	19.7 3.9	28 14	-0.15 0.23
IL: W. Chicago	41.6	10.5 3.8	1.6 6.3	0.22 0.24
KS: Topeka	88.0	9.1 2.9	0.5 7.2	
LA: New Orleans	99.9	5.5 2.0	1.9 5.8	0.29 0.27
MA: Lawrence	15.5	8.7 3.5	0.4 3.2	
MD: Baltimore	56.6	1.6 1.1	0.2 2.6	
MD: Conowingo	81.6	2.4 1.4	0.6 3.9	
MI: Detroit	119.7	1.59 0.76	-0.2 2.5	0.13 0.26
MI: Grand Rapids	131.0	2.3 1.0	-0.1 3.5	0.30 0.34
MN: Red Wing	183.8	14.6 4.8	4 18	-0.04 0.25
MN: St. Paul	27.5	4.1 3.1	0.7 4.5	0.09 0.30
MO: Jefferson	81.9	8.8 2.3	1.3 5.3	
MS: Jackson	48.3	1.71 0.71	0.3 1.4	
MS: Port Gibson	61.7	5.9 3.4	6.9 9.4	
MT: Helena	52.5	3.1 1.4	0.2 3.0	
NC: Charlotte	48.7	1.96 0.81	5.0 2.3	
NC: Raleigh	87.7	3.63 0.93	0.1 2.0	
ND: Bismarck	59.7	3.4 2.2	1.6 5.5	
NE: Lincoln	84.3	11.1 3.1	8.1 8.4	

Table 13 (continued)
Drinking Water
Alpha, Beta, and Sr-90 Concentrations
Composites
January - December 2007

Location	Total Solids (mg/L)	Gross Beta pCi/L \pm 2u	Gross Alpha pCi/L \pm 2u	⁹⁰ Sr pCi/L \pm 2u
NH: Concord	67.2	1.1 1.0	29.4 7.4	
NJ: Trenton	67.2	1.4 1.1	-0.5 2.8	
NJ: Waretown	55.4	2.54 0.82	0.5 1.6	
NM: Santa Fe	69.9	2.0 1.2	4.7 3.9	-0.08 0.29
NV: Las Vegas	87.0	9.1 3.8	8 11	
NY: Albany	50.1	1.6 1.1	-0.3 2.3	
NY: New York City	42.5	0.48 0.62	0.6 1.4	
NY: Niagara Falls	71.4	1.8 1.3	-0.2 3.4	
NY: Syracuse	74.6	1.7 1.3	-0.1 3.7	
OH: Cincinnati	114.4	1.9 1.2	0.4 4.3	0.25 0.34
OH: Columbus	144.6	5.4 1.2	0.4 2.9	-0.11 0.21
OH: E. Liverpool	116.2	2.8 1.3	1.4 4.5	0.18 0.22
OH: Painesville	91.5	2.1 1.2	-0.4 3.6	0.32 0.23
OH: Toledo	132.5	2.76 0.89	0.1 2.7	0.08 0.21
OR: Portland	27.7	0.10 0.57	0.4 1.0	
PA: Columbia	75.1	2.6 1.4	0.3 3.8	
PA: Harrisburg	61.9	1.9 1.3	-0.5 3.0	
PA: Philadelphia/Baxter PA:	79.6	1.7 1.2	-0.3 3.2	
Philadelphia/Belmont	102.0	3.1 1.8	-1.3 5.6	
PA: Philadelphia/Queen	103.1	4.3 1.9	-0.2 5.8	
PA: Pittsburgh	118.5	3.2 1.3	2.8 4.6	
RI: Providence	66.0	1.17 0.69	-0.1 1.7	
SC: Barnwell	20.8	1.42 0.69	0.28 0.82	
SC: Columbia	61.4	2.22 0.81	1.5 2.2	0.05 0.23
SC: Jenkinsville	56.8	3.94 0.96	3.0 2.2	-0.04 0.21
SC: Seneca	36.1	1.66 0.71	0.1 1.0	0.00 0.21
TN: Chattanooga	113.3	2.21 0.85	2.2 4.1	0.01 0.23
TN: Knoxville	81.8	2.4 1.0	1.4 3.7	-0.01 0.18
TN: Oak Ridge/#360	58.4	2.6 1.4	1.7 3.8	-0.02 0.25
TN: Oak Ridge/#371	92.2	3.1 1.5	-0.3 6.3	0.04 0.22
TN: Oak Ridge/#4442	79.3	2.7 1.5	0.3 4.8	0.21 0.26
TN: Oak Ridge/#768	82.3	3.5 1.5	-0.2 5.5	-0.11 0.22
TN: Oak Ridge/#772	81.6	2.2 1.4	0.4 5.2	0.04 0.21
TX: Austin	111.0	5.0 1.3	0.4 4.6	0.01 0.23
VA: Ashland	78.1	4.13 0.99	1.2 2.7	
VA: Lynchburg	76.7	2.45 0.83	0.1 2.3	
WA: Richland	66.0	1.10 0.86	1.5 2.9	

Table 13 (continued)
Drinking Water
Alpha, Beta, and Sr-90 Concentrations
Composites
January - December 2007

Location	Total Solids (mg/L)	Gross Beta pCi/L $\pm 2u$	Gross Alpha pCi/L $\pm 2u$	⁹⁰ Sr pCi/L $\pm 2u$
WA: Seattle	20.4	0.52 0.61	0.61 0.81	

Table 14
Drinking Water
Radium and Gamma-Emitting Radionuclides
Composites
January - December 2007

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	0.19 0.12	NA		ND
AL: Montgomery	NA	NA		ND
AL: Muscle Shoals	NA	NA		ND
AL: Scottsboro	NA	NA		ND
AR: Little Rock	NA	NA		ND
CA: Los Angeles	NA	NA		ND
CA: Richmond	NA	NA		ND
CO: Denver	NA	NA		ND
CT: Hartford	NA	NA		ND
DE: Dover	NA	NA		ND
FL: Tampa	NA	NA		ND
GA: Baxley	2.16 0.39	NA		ND
GA: Savannah	NA	NA		ND
HI: Honolulu	NA	NA		ND
IA: Cedar Rapids	NA	NA		ND
ID: Boise	0.131 0.096	NA		ND
ID: Idaho Falls	NA	NA		ND
IL: Morris	5.13 0.66	NA		ND
IL: W. Chicago	NA	NA		ND
KS: Topeka	NA	NA	K40	12 13
LA: New Orleans	NA	NA		ND
MA: Lawrence	NA	NA	K40	18 35
MD: Baltimore	NA	NA		ND
MD: Conowingo	NA	NA		ND
MI: Detroit	NA	NA		ND
MI: Grand Rapids	NA	NA		ND
MN: Red Wing	0.40 0.17	NA	K40	11 13
MN: St. Paul	NA	NA		ND
MO: Jefferson City	NA	NA	K40	12 13
MS: Jackson	NA	NA		ND
MS: Port Gibson	0.41 0.16	NA		ND
MT: Helena	NA	NA	K40	9 13
NC: Charlotte	0.013 0.058	NA		ND
NC: Raleigh	NA	NA		ND

Note: ND = Not Detected
NA = No Analysis

Table 14 (continued)
Drinking Water
Radium and Gamma-Emitting Radionuclides
Composites
January - December 2007

Location	²²⁶ Ra		²²⁸ Ra		Gamma-Emitting Radionuclides	
	pCi/L ± 2u		pCi/L ± 2u		Nuclide	pCi/L ± 2u
ND: Bismarck	NA		NA			ND
NE: Lincoln	0.20 0.12		NA			ND
NH: Concord	0.088 0.082		NA			ND
NJ: Trenton	NA		NA		K40	9 13
NJ: Waretown	NA		NA			ND
NM: Santa Fe	0.018 0.065		NA			ND
NV: Las Vegas	0.34 0.16		NA			ND
NY: Albany	NA		NA			ND
NY: New York City	NA		NA			ND
NY: Niagara Falls	NA		NA			ND
NY: Syracuse	NA		NA		Pb212	2.0 2.6
OH: Cincinnati	NA		NA			ND
OH: Columbus	NA		NA			ND
OH: E. Liverpool	NA		NA		K40	9 13
OH: Painesville	NA		NA		K40	9 12
OH: Toledo	NA		NA			ND
OR: Portland	NA		NA			ND
PA: Columbia	NA		NA			ND
PA: Harrisburg	NA		NA			ND
PA: Philadelphia/Baxter	NA		NA		Tl208	1.5 1.6
PA: Philadelphia/Belmont	NA		NA			ND
PA: Philadelphia/Queen	NA		NA			ND
PA: Pittsburgh	0.070 0.067		NA		K40	10 12
RI: Providence	NA		NA			ND
SC: Barnwell	NA		NA			ND
SC: Columbia	NA		NA		Pb212	1.9 2.5
SC: Jenkinsville	0.110 0.086		NA			ND
SC: Seneca	NA		NA			ND
TN: Chattanooga	0.062 0.087		NA			ND
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
TN: Oak Ridge/#768	NA		NA			ND
TN: Oak Ridge/#772	NA		NA			ND

Note: ND = Not Detected
NA = No Analysis

Table 14 (continued)
Drinking Water
Radium and Gamma-Emitting Radionuclides
Composites
January - December 2007

Location	²²⁶ Ra	²²⁸ Ra	Gamma-Emitting Radionuclides	
	pCi/L ± 2 <i>u</i>	pCi/L ± 2 <i>u</i>	Nuclide	pCi/L ± 2 <i>u</i>
TX: Austin	NA	NA	K40	10 12
VA: Ashland	NA	NA		ND
VA: Lynchburg	NA	NA		ND
WA: Richland	NA	NA		ND
WA: Seattle	NA	NA		ND

Note: ND = Not Detected
NA = No Analysis

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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 15
Radionuclides in Pasteurized Milk
October - December 2007

Location	Date Collected	K g/L ± 2u	¹³⁷ Cs pCi/L ± 2u	¹⁴⁰ Ba pCi/L ± 2u	¹³¹ I pCi/L ± 2u
AZ: Phoenix	12/31/07	1.55 0.20	ND	ND	ND
CA: Los Angeles	10/02/07	1.57 0.23	ND	ND	ND
CA: Sacramento	11/01/07	1.69 0.22	ND	ND	ND
CA: San Francisco	10/04/07	1.86 0.24	ND	ND	ND
DE: Wilmington	10/17/07	1.55 0.23	ND	ND	ND
FL: Tampa	10/10/07	1.56 0.23	ND	ND	ND
HI: Honolulu	11/14/07	1.55 0.20	ND	ND	ND
IA: Des Moines	12/03/07	1.56 0.20	ND	ND	ND
KS: Wichita	10/09/07	1.68 0.21	ND	ND	ND
KY: Louisville	10/10/07	1.57 0.20	ND	ND	ND
MA: Boston	12/12/07	1.62 0.20	ND	ND	ND
MD: Baltimore	10/05/07	1.54 0.19	ND	ND	ND
MI: Detroit	12/11/07	1.66 0.21	ND	ND	ND
MO: Jefferson City	12/21/07	1.61 0.20	ND	ND	ND
NJ: Trenton	11/02/07	1.50 0.19	ND	ND	ND
NM: Albuquerque	10/24/07	1.47 0.19	ND	ND	ND
NV: Las Vegas	12/21/07	1.51 0.20	ND	ND	ND
NY: Buffalo	10/10/07	1.57 0.21	ND	ND	ND
NY: Syracuse	10/16/07	1.62 0.20	ND	ND	ND
OH: Cleveland	11/16/07	1.62 0.21	ND	ND	ND
OR: Portland	10/08/07	1.67 0.21	ND	ND	ND
PA: Pittsburgh	10/11/07	1.53 0.19	ND	ND	ND
TN: Chattanooga	12/13/07	1.68 0.21	ND	ND	ND
TN: Knoxville	10/24/07	1.62 0.20	ND	ND	ND
TN: Memphis	11/05/07	1.62 0.23	ND	ND	ND
TX: Austin	10/02/07	1.41 0.18	ND	ND	ND
TX: Ft. Worth	11/12/07	1.55 0.20	ND	ND	ND
VA: Norfolk	10/16/07	1.61 0.20	ND	ND	ND
WA: Spokane	10/08/07	1.45 0.19	ND	ND	ND
WA: Tacoma	12/29/07	1.63 0.21	ND	ND	ND
WV: Charleston	10/04/07	1.67 0.20	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:

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