

ENVIRONMENTAL

RADIATION

DATA

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October - December 2008

United States Environmental Protection Agency

Office of Radiation and Indoor Air

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Contents

	Page
List of Tables	v
Preface.....	vii
Acknowledgments.....	ix
Data Reporting Conventions.....	xi
1. Air Program	1
Airborne Particulates and Precipitation	1
Plutonium and Uranium in Airborne Particulates.....	15
Beta Activity in Precipitation.....	15
2. Water Program.....	17
3. Milk Program	25
Pasteurized Milk	25

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List of Tables

Table		Page
1	Reporting Units and Minimum Detectable Concentrations	xiii
2	Gross Beta in Airborne Particulates: October 2008	2
3	Gross Beta in Airborne Particulates: November 2008	5
4	Gross Beta in Airborne Particulates: December 2008	8
5	Gross Beta and Specific Gamma in Precipitation: October 2008	11
6	Gross Beta and Specific Gamma in Precipitation: November 2008	12
7	Gross Beta and Specific Gamma in Precipitation: December 2008	13
8	Tritium in Precipitation: October - December 2008	14
9	Tritium in Drinking Water: October - December 2008	18
10	Iodine-131 in Drinking Water: January - December 2008	20
11	Alpha, Beta, and Sr-90 Concentrations in Drinking Water: January - December 2008 Composites	22
12	Radium-226, -228 and Gamma-Emitting Radionuclides in Drinking Water: January - December 2008 Composites	22
13	Radionuclides in Pasteurized Milk: October - December 2008	26

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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 2008

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	2	0.8	0.0	0.4	0.029	0.007	0.018
AL: Montgomery/408	9	0.2	0.0	0.1	0.016	0.006	0.011
AR: Little Rock	9	0.2	0.0	0.1	0.014	0.005	0.009
AZ: Phoenix	5	0.7	0.0	0.4	0.019	0.017	0.018
AZ: Phoenix/956	6	1.6	0.0	0.6	0.027	0.014	0.019
CA: Anaheim	9	0.0	0.0	0.0	0.043	0.005	0.017
CA: Fresno	5	0.2	0.1	0.1	0.037	0.006	0.018
CA: Los Angeles	8	0.3	0.0	0.1	0.021	0.005	0.016
CA: Richmond	4	0.1	0.0	0.1	0.016	0.005	0.010
CA: Riverside	9	0.0	0.0	0.0	0.015	0.003	0.010
CA: San Diego	5	0.2	0.0	0.1	0.020	0.007	0.013
CA: San Francisco	5	0.1	0.0	0.0	0.006	0.002	0.004
CA: San Jose	9	0.2	0.0	0.1	0.016	0.003	0.009
CO: Denver	9	0.7	0.1	0.4	0.015	0.005	0.008
DC: Washington	10	0.3	0.0	0.1	0.021	0.001	0.007
DE: Wilmington	8	0.8	0.4	0.6	0.016	0.004	0.009
FL: Jacksonville	9	0.0	0.0	0.0	0.014	0.003	0.008
FL: Orlando	8	0.1	0.0	0.0	0.017	0.006	0.010
FL: Tampa	9	0.0	0.0	0.0	0.013	0.004	0.008
GA: Atlanta	4	0.0	0.0	0.0	0.013	0.007	0.009
GA: Augusta	4	0.4	0.0	0.2	0.024	0.003	0.011
HI: Honolulu	8	0.1	0.0	0.1	0.008	0.001	0.003
IA: Des Moines	8	0.3	0.0	0.1	0.019	0.004	0.009
IA: Iowa City	9	0.9	0.2	0.6	0.015	0.006	0.010
ID: Idaho Falls	3	0.8	0.2	0.4	0.013	0.011	0.012
IL: Chicago	5	0.1	0.0	0.1	0.015	0.008	0.011
IN: Indianapolis	9	0.5	0.0	0.2	0.014	0.005	0.009
KS: Kansas City	6	0.3	0.1	0.1	0.022	0.005	0.011
KS: Topeka	9	0.2	0.0	0.1	0.010	0.004	0.008
KS: Wichita	8	0.9	0.1	0.3	0.015	0.005	0.009
KY: Lexington	8	0.1	0.0	0.0	0.011	0.003	0.008
LA: Baton Rouge	8	0.4	0.1	0.2	0.011	0.006	0.008
MA: Boston	6	0.0	0.0	0.0	0.006	0.002	0.004
MD: Baltimore	4	0.2	0.0	0.1	0.018	0.007	0.012
MI: Detroit	9	0.3	0.1	0.1	0.009	0.004	0.006
MI: Lansing	9	0.1	0.0	0.1	0.009	0.006	0.008
MN: Duluth	2	0.1	0.0	0.1	0.007	0.005	0.006
MN: St. Paul	4	0.1	0.0	0.0	0.009	0.005	0.007

Table 2 (continued)
Gross Beta in Airborne Particulates
October 2008

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
MN: Welch/510	9	0.3	0.0	0.1	0.017	0.007	0.010
MO: Jefferson City	2	0.2	0.1	0.1	0.009	0.006	0.008
MS: Jackson	9	0.1	0.0	0.1	0.020	0.007	0.012
MS: Jackson/Deq	9	0.5	0.1	0.2	0.013	0.005	0.009
NC: Wilmington	4				0.013	0.006	0.009
ND: Bismarck	5	1.6	0.2	0.8	0.017	0.007	0.012
NE: Lincoln	9	0.8	0.1	0.3	0.015	0.004	0.008
NE: Omaha	6	0.6	0.0	0.2	0.011	0.004	0.007
NJ: Edison	6	0.9	-0.0	0.1	0.007	0.002	0.004
NJ: Trenton	8	0.3	0.1	0.2	0.012	0.004	0.008
NM: Santa Fe	2	1.4	1.4	1.4	0.015	0.008	0.012
NV: Las Vegas/913	5				0.013	0.005	0.008
NY: Albany	5	0.1	0.0	0.0	0.010	0.006	0.007
NY: Hauppauge	6	0.1	0.0	0.0	0.008	0.004	0.005
NY: Lockport	9	0.0	-0.0	0.0	0.009	0.003	0.005
NY: Yaphank	8	0.0	0.0	0.0	0.007	0.002	0.004
OH: Cincinnati	7	0.2	0.0	0.1	0.012	0.003	0.007
OH: Cleveland	5	0.2	0.0	0.1	0.016	0.009	0.013
OH: Painesville	7	0.1	0.0	0.1	0.012	0.006	0.008
OK: Oklahoma City	5	0.0	0.0	0.0	0.008	0.003	0.005
OK: Tulsa	7	0.0	0.0	0.0	0.011	0.006	0.008
OR: Corvallis	7	0.5	0.0	0.1	0.008	0.002	0.003
OR: Portland	7	0.1	0.0	0.1	0.026	0.004	0.011
PA: Harrisburg	9	0.5	0.1	0.3	0.016	0.005	0.010
PA: Pittsburgh	8	0.3	0.0	0.1	0.011	0.003	0.007
PR: San Juan	8	-0.0	-0.0	-0.0	0.007	0.001	0.002
RI: Providence	4	0.1	0.0	0.0	0.006	0.001	0.004
SC: Barnwell	1	0.0	0.0	0.0	0.010	0.010	0.010
SC: Columbia	3	0.1	0.0	0.1	0.013	0.010	0.011
SD: Pierre	7	1.8	0.2	0.9	0.017	0.006	0.011
TN: Knoxville	9	0.8	0.0	0.4	0.013	0.004	0.008
TN: Memphis	6	0.1	0.0	0.0	0.014	0.005	0.009
TN: Nashville	7	0.2	0.0	0.0	0.013	0.005	0.009
TN: Oak Ridge/Bethel	9	1.3	0.1	0.5	0.134	0.006	0.026
TN: Oak Ridge/K25	9	1.3	0.1	0.6	0.135	0.006	0.026
TN: Oak Ridge/Melton	9	1.4	0.1	0.6	0.155	0.007	0.030
TN: Oak Ridge/Y12 E	9	1.1	0.1	0.5	0.039	0.007	0.018
TN: Oak Ridge/Y12 W	8	0.4	0.0	0.2	0.056	0.006	0.017

Table 2 (continued)
Gross Beta in Airborne Particulates
October 2008

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
TX: Austin	8	0.6	0.0	0.3	0.017	0.003	0.011
TX: Dallas	7	0.3	0.2	0.2	0.012	0.004	0.007
TX: El Paso	6	0.3	0.0	0.2	0.023	0.008	0.014
TX: Ft. Worth	8	0.3	0.1	0.2	0.011	0.003	0.008
VA: Lynchburg	9	1.1	0.3	0.7	0.015	0.007	0.010
VA: Richmond	9	0.1	0.0	0.0	0.018	0.003	0.009
VA: Virginia Beach	9	0.1	0.0	0.1	0.014	0.004	0.007
WA: Olympia	9	0.2	0.0	0.1	0.010	0.003	0.005
WA: Seattle	9	0.0	-0.0	0.0	0.017	0.004	0.009
WA: Spokane	9	0.8	0.1	0.4	0.029	0.005	0.012
WI: Milwaukee	7	0.1	-0.0	0.0	0.019	0.006	0.014
WV: Charleston	6	0.0	0.0	0.0	0.013	0.006	0.010

Table 3
Gross Beta in Airborne Particulates
November 2008

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
AK: Anchorage	1				0.005	0.005	0.005
AL: Birmingham	8	0.3	0.0	0.1	0.024	0.009	0.015
AL: Montgomery/408	8	0.1	0.0	0.1	0.016	0.008	0.012
AR: Little Rock	7	0.1	0.0	0.1	0.015	0.007	0.011
AZ: Phoenix	4	0.6	0.1	0.4	0.025	0.012	0.019
AZ: Phoenix/956	8	2.0	0.2	0.7	0.031	0.010	0.018
AZ: Tucson	5	1.1	0.9	1.0	0.012	0.005	0.008
CA: Anaheim	7	0.3	0.0	0.1	0.030	0.005	0.015
CA: Fresno	2	0.1	0.0	0.1	0.019	0.009	0.014
CA: Los Angeles	6	0.3	0.0	0.1	0.027	0.006	0.013
CA: Richmond	2	0.2	0.1	0.2	0.013	0.010	0.011
CA: Riverside	7	0.0	0.0	0.0	0.017	0.002	0.008
CA: San Bernardino Cty.	6	0.0	0.0	0.0	0.034	0.002	0.017
CA: San Diego	4	0.1	0.0	0.1	0.023	0.005	0.014
CA: San Francisco	4	0.0	0.0	0.0	0.012	0.002	0.006
CA: San Jose	6	0.1	0.0	0.1	0.018	0.002	0.007
CO: Colorado Springs	3				0.013	0.007	0.010
CO: Denver	6	0.5	0.3	0.4	0.011	0.005	0.007
DC: Washington	3	0.0	0.0	0.0	0.005	0.003	0.004
DE: Wilmington	8	0.5	0.1	0.3	0.010	0.004	0.007
FL: Jacksonville	8	0.1	0.0	0.0	0.007	0.004	0.006
FL: Miami	6	0.0	0.0	0.0	0.009	0.003	0.005
FL: Orlando	6	0.1	0.0	0.0	0.010	0.006	0.007
FL: Tampa	8	0.0	0.0	0.0	0.009	0.003	0.006
GA: Atlanta	4	0.1	0.0	0.0	0.011	0.008	0.009
GA: Augusta	4	0.2	0.1	0.1	0.010	0.006	0.008
HI: Honolulu	8	0.1	-0.0	0.0	0.013	0.001	0.003
IA: Des Moines	7	0.3	0.0	0.2	0.021	0.003	0.009
IA: Iowa City	8	2.3	0.7	1.1	0.024	0.005	0.015
ID: Idaho Falls	8	0.9	0.0	0.3	0.018	0.002	0.008
IL: Chicago	1	0.1	0.1	0.1	0.010	0.010	0.010
IN: Indianapolis	7	0.5	0.0	0.2	0.020	0.004	0.012
KS: Kansas City	7	0.2	0.1	0.1	0.013	0.006	0.009
KS: Topeka	7	0.4	0.1	0.2	0.019	0.005	0.011
KS: Wichita	7	0.4	0.0	0.2	0.023	0.005	0.011
KY: Lexington	7	0.1	-0.0	0.0	0.016	0.007	0.010
LA: Baton Rouge	8	0.4	0.1	0.2	0.011	0.004	0.007
MA: Boston	7	0.0	0.0	0.0	0.005	0.002	0.003

Table 3 (continued)
Gross Beta in Airborne Particulates
November 2008

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
MA: Lawrence	1				0.003	0.003	0.003
MD: Baltimore	4	0.0	0.0	0.0	0.018	0.005	0.010
MI: Detroit	7	0.3	0.0	0.1	0.023	0.004	0.010
MI: Lansing	7	0.2	0.0	0.1	0.020	0.006	0.011
MN: Duluth	8	0.3	0.0	0.1	0.010	0.001	0.006
MN: St. Paul	4	0.3	0.0	0.1	0.012	0.004	0.006
MS: Jackson	6	0.5	0.0	0.3	0.015	0.007	0.013
MS: Jackson/Deq	6	0.2	-0.3	0.1	0.013	0.006	0.009
NC: Wilmington	3				0.009	0.007	0.008
ND: Bismarck	2	1.2	0.0	0.6	0.023	0.012	0.018
NE: Lincoln	8	0.9	0.1	0.3	0.014	0.005	0.008
NE: Omaha	5	0.3	0.0	0.1	0.021	0.005	0.010
NJ: Edison	5	0.0	0.0	0.0	0.007	0.003	0.005
NJ: Trenton	8	0.3	0.1	0.1	0.012	0.004	0.008
NM: Santa Fe	3				0.028	0.014	0.019
NV: Las Vegas/913	5				0.017	0.003	0.009
NY: Albany	4	0.1	0.0	0.0	0.014	0.004	0.008
NY: Hauppauge	7	0.1	0.0	0.0	0.007	0.002	0.005
NY: Lockport	8	0.0	-0.0	0.0	0.023	0.003	0.009
NY: Rochester	5	0.0	0.0	0.0	0.030	0.003	0.009
NY: Yaphank	6	0.0	0.0	0.0	0.006	0.002	0.003
OH: Cincinnati	9	0.4	0.0	0.1	0.019	0.005	0.009
OH: Cleveland	7	0.0	0.0	0.0	0.034	0.006	0.015
OH: Painesville	6	0.2	0.0	0.1	0.025	0.007	0.015
OK: Oklahoma City	7	0.4	0.0	0.1	0.008	0.003	0.006
OK: Tulsa	6	0.0	0.0	0.0	0.014	0.005	0.009
OR: Corvallis	7	0.0	0.0	0.0	0.006	0.001	0.003
OR: Portland	8	0.2	0.0	0.1	0.019	0.003	0.010
PA: Harrisburg	7	0.2	0.0	0.1	0.017	0.006	0.010
PA: Pittsburgh	5	0.6	0.0	0.2	0.020	0.005	0.010
PR: San Juan	8	0.0	-0.0	-0.0	0.022	0.001	0.004
RI: Providence	2	0.0	0.0	0.0	0.005	0.003	0.004
SC: Columbia	3	0.1	0.0	0.1	0.011	0.009	0.010
SD: Pierre	4	1.6	0.3	0.8	0.019	0.008	0.012
TN: Knoxville	6	0.2	0.1	0.1	0.013	0.004	0.007
TN: Memphis	6	0.0	0.0	0.0	0.013	0.003	0.009
TN: Nashville	2	0.0	0.0	0.0	0.014	0.010	0.012
TN: Oak Ridge/Bethel	7	0.6	0.3	0.4	0.024	0.009	0.015

Table 3 (continued)
Gross Beta in Airborne Particulates
November 2008

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
TN: Oak Ridge/K25	7	0.9	0.4	0.5	0.025	0.007	0.015
TN: Oak Ridge/Melton	7	0.7	0.2	0.4	0.024	0.008	0.015
TN: Oak Ridge/Y12 E	7	0.9	0.3	0.5	0.027	0.009	0.016
TN: Oak Ridge/Y12 W	7	0.4	0.2	0.2	0.021	0.008	0.013
TX: Austin	5	0.4	0.2	0.3	0.015	0.007	0.011
TX: Dallas	7	0.4	0.1	0.2	0.009	0.004	0.005
TX: El Paso	7	0.4	0.0	0.2	0.031	0.009	0.018
TX: Ft. Worth	7	0.2	0.1	0.2	0.009	0.004	0.006
TX: Houston	6	0.1	0.0	0.1	0.005	0.002	0.004
VA: Lynchburg	5	0.6	0.2	0.3	0.013	0.006	0.009
VA: Richmond	7	0.1	0.0	0.0	0.011	0.004	0.007
VA: Virginia Beach	7	0.0	0.0	0.0	0.009	0.003	0.006
WA: Olympia	7	0.0	-0.0	0.0	0.007	0.001	0.004
WA: Seattle	7	0.0	0.0	0.0	0.005	0.002	0.003
WA: Spokane	8	0.2	0.0	0.1	0.020	0.002	0.009
WI: Madison	6	0.2	0.0	0.1	0.012	0.005	0.008
WI: Milwaukee	8	0.3	-2.4	-0.2	0.027	-0.035	0.013
WV: Charleston	3	0.0	0.0	0.0	0.012	0.006	0.008

Table 4
Gross Beta in Airborne Particulates
December 2008

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
AK: Anchorage	5				0.089	0.007	0.027
AL: Birmingham	10	0.0	0.0	0.0	0.019	0.006	0.011
AL: Montgomery/408	9	0.0	0.0	0.0	0.019	0.005	0.011
AR: Little Rock	7	0.0	0.0	0.0	0.015	0.007	0.011
AZ: Phoenix	5	0.5	0.1	0.3	0.019	0.007	0.013
AZ: Phoenix/956	7	1.7	0.2	0.8	0.021	0.003	0.012
AZ: Tucson	7	0.9	0.1	0.4	0.007	0.003	0.005
CA: Anaheim	9	0.0	0.0	0.0	0.032	0.003	0.013
CA: Fresno	3	0.2	0.0	0.1	0.008	0.006	0.007
CA: Los Angeles	8	0.2	0.0	0.1	0.026	0.002	0.010
CA: Richmond	5	0.1	0.0	0.1	0.027	0.004	0.012
CA: Riverside	8	0.0	0.0	0.0	0.017	0.002	0.007
CA: Sacramento	3	0.2	0.0	0.1	0.021	0.003	0.010
CA: San Bernardino Cty.	8	0.0	0.0	0.0	0.026	0.002	0.010
CA: San Diego	5	0.1	0.0	0.0	0.013	0.003	0.008
CA: San Francisco	4	0.1	0.1	0.1	0.016	0.002	0.008
CA: San Jose	6	0.2	0.0	0.1	0.025	0.003	0.015
CO: Colorado Springs	7				0.011	0.005	0.008
CO: Denver	8	0.3	0.1	0.2	0.012	0.004	0.007
DC: Washington	8	0.0	0.0	0.0	0.009	0.003	0.006
DE: Dover	2	0.0	0.0	0.0	0.010	0.010	0.010
DE: Wilmington	9	0.2	0.0	0.1	0.015	0.006	0.011
FL: Jacksonville	8	0.0	0.0	0.0	0.007	0.002	0.005
FL: Miami	8	0.0	0.0	0.0	0.009	0.003	0.006
FL: Orlando	8	0.1	0.0	0.0	0.009	0.005	0.007
FL: Tampa	9	0.0	0.0	0.0	0.011	0.003	0.008
GA: Atlanta	2	0.0	0.0	0.0	0.010	0.006	0.008
GA: Augusta	5	0.1	0.0	0.1	0.011	0.006	0.008
HI: Honolulu	8	0.1	0.0	0.0	0.002	0.001	0.001
IA: Des Moines	8	0.2	0.0	0.1	0.017	0.006	0.011
IA: Iowa City	7	1.0	0.2	0.5	0.023	0.011	0.017
ID: Idaho Falls	3	0.4	0.1	0.2	0.015	0.004	0.009
IL: Chicago	5	0.0	0.0	0.0	0.014	0.011	0.012
IN: Indianapolis	7	0.1	0.0	0.1	0.012	0.008	0.011
KS: Kansas City	8	0.5	0.0	0.1	0.039	0.006	0.017
KS: Topeka	7	0.3	0.0	0.2	0.020	0.007	0.013
KS: Wichita	8	0.8	0.0	0.3	0.020	0.006	0.012
KY: Lexington	7	0.0	0.0	0.0	0.011	0.005	0.008

Table 4 (continued)
Gross Beta in Airborne Particulates
December 2008

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
LA: Baton Rouge	7	0.1	0.0	0.1	0.009	0.005	0.007
MA: Boston	4	0.0	0.0	0.0	0.004	0.002	0.003
MD: Baltimore	5	0.0	0.0	0.0	0.018	0.009	0.013
MI: Detroit	8	0.1	0.0	0.0	0.014	0.007	0.010
MI: Lansing	8	0.1	0.0	0.0	0.022	0.009	0.016
MN: Duluth	7	0.1	0.0	0.0	0.020	0.004	0.010
MN: St. Paul	5	0.0	0.0	0.0	0.015	0.007	0.010
MO: Jefferson City	3	0.1	0.0	0.1	0.015	0.008	0.011
MS: Jackson	7	0.1	0.0	0.1	0.015	0.005	0.009
MS: Jackson/Deq	7	0.5	-0.0	0.1	0.013	0.003	0.007
NC: Charlotte	6	0.1	0.0	0.0	0.012	0.006	0.009
NC: Wilmington	5				0.012	0.006	0.009
ND: Bismarck	8	0.1	0.0	0.0	0.018	0.005	0.011
NE: Lincoln	8	0.5	0.0	0.2	0.019	0.005	0.011
NE: Omaha	6	0.4	0.0	0.1	0.016	0.006	0.010
NJ: Edison	5	0.0	-0.0	0.0	0.007	0.003	0.006
NJ: Trenton	9	0.3	0.0	0.1	0.017	0.008	0.010
NM: Santa Fe	7				0.014	0.005	0.009
NV: Las Vegas/913	6	0.0	0.0	0.0	0.015	0.004	0.008
NY: Albany	4	0.0	0.0	0.0	0.012	0.007	0.009
NY: Hauppauge	9	0.0	0.0	0.0	0.013	0.005	0.008
NY: Lockport	9	0.0	-0.0	0.0	0.011	0.004	0.008
NY: Rochester	8	0.0	0.0	0.0	0.014	0.005	0.008
NY: Yaphank	9	0.0	0.0	0.0	0.006	0.001	0.004
OH: Cincinnati	9	0.1	0.0	0.0	0.013	0.006	0.009
OH: Cleveland	8	0.0	0.0	0.0	0.023	0.009	0.014
OH: Painesville	7	0.1	0.0	0.0	0.017	0.009	0.011
OK: Oklahoma City	8	0.0	0.0	0.0	0.015	0.004	0.008
OK: Tulsa	9	0.0	0.0	0.0	0.018	0.005	0.012
OR: Corvallis	8	0.1	0.0	0.0	0.005	0.001	0.003
OR: Portland	7	0.1	0.0	0.1	0.023	0.005	0.012
PA: Harrisburg	9	0.1	0.0	0.1	0.025	0.006	0.014
PA: Pittsburgh	7	0.0	0.0	0.0	0.011	0.004	0.008
PR: San Juan	2	0.0	-0.0	-0.0	0.002	0.002	0.002
RI: Providence	2	0.0	0.0	0.0	0.005	0.005	0.005
SD: Pierre	7	0.2	0.1	0.1	0.022	0.005	0.012
TN: Knoxville	8	0.1	0.0	0.1	0.008	0.002	0.005
TN: Memphis	7	0.0	0.0	0.0	0.013	0.005	0.009

Table 4 (continued)
Gross Beta in Airborne Particulates
December 2008

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m ³)	Avg	Max	Min (pCi/m ³)	Avg
TN: Nashville	2	0.0	0.0	0.0	0.011	0.010	0.010
TN: Oak Ridge/Bethel	8	0.3	0.1	0.1	0.016	0.005	0.011
TN: Oak Ridge/K25	8	0.4	0.1	0.2	0.016	0.004	0.011
TN: Oak Ridge/Melton	8	0.3	0.1	0.1	0.017	0.005	0.012
TN: Oak Ridge/Y12 E	8	0.3	0.1	0.1	0.018	0.006	0.013
TN: Oak Ridge/Y12 W	8	0.2	0.1	0.1	0.014	0.005	0.010
TX: Austin	7	1.0	0.0	0.4	0.023	0.011	0.014
TX: Dallas	7	0.3	0.1	0.2	0.011	0.004	0.007
TX: El Paso	5	0.7	0.2	0.5	0.020	0.010	0.014
TX: Ft. Worth	8	0.4	0.0	0.2	0.013	0.004	0.008
TX: Houston	6	0.1	0.0	0.0	0.005	0.003	0.004
TX: San Antonio	8	0.9	0.1	0.6	0.021	0.006	0.011
UT: Salt Lake City	1	0.2	0.2	0.2	0.003	0.003	0.003
VA: Harrisonburg	8	0.3	0.0	0.1	0.009	0.004	0.006
VA: Lynchburg	7	0.4	0.1	0.2	0.013	0.007	0.011
VA: Richmond	8	0.0	0.0	0.0	0.013	0.004	0.008
VA: Virginia Beach	8	0.0	0.0	0.0	0.009	0.005	0.006
WA: Olympia	8	0.0	0.0	0.0	0.021	0.003	0.006
WA: Seattle	7	0.0	0.0	0.0	0.012	0.002	0.005
WA: Spokane	8	0.1	0.0	0.0	0.021	0.007	0.014
WI: Madison	7	0.1	0.0	0.0	0.022	0.005	0.012
WI: Milwaukee	6	0.0	0.0	0.0	0.027	0.011	0.019
WV: Charleston	5	0.0	0.0	0.0	0.014	0.006	0.010

Table 5
Gross Beta and Specific Gamma in Precipitation
October 2008

Location	Gross Beta Activity		Gamma-Emitting Radionuclides		
	pCi/L $\pm 2u$		Nuclide	pCi/L $\pm 2u$	
AL: Montgomery/408	0.45	0.57		ND	
AR: Little Rock	1.43	0.41	Bi212	34	31
			K40	109	30
			Pb212	8.5	6.3
CA: Richmond	3.9	1.0		ND	
CO: Denver	2.4	1.1		ND	
CT: Hartford	1.35	0.67	Be7	53	23
DE: Wilmington	0.94	0.63	Be7	20	14
FL: Jacksonville	0.90	0.63	Be7	25	24
GA: Atlanta	0.73	0.61		ND	
IA: Iowa City	2.08	0.47		ND	
KS: Kansas City	1.04	0.37	Tl208	1.0	1.1
MA: Boston	0.24	0.55	Be7	41	24
			K40	16	13
MI: Lansing	0.44	0.59		ND	
MN: St. Paul	4.69	0.74		ND	
MN: Welch/510	9.7	1.2	Be7	30	22
			Tl208	1.1	1.1
NC: Wilmington	0.60	0.60		ND	
NM: Santa Fe	1.67	0.68	K40	112	29
NY: Albany	-0.2	1.4	K40	12	13
NY: Yaphank	0.85	0.61		ND	
OH: Painesville	2.95	0.55		ND	
OR: Portland	0.64	0.33	Tl208	3.3	4.0
PA: Harrisburg	0.58	0.60	Be7	73	48
			Pb212	5.9	6.5
TN: Knoxville	0.92	0.63	Tl208	2.2	3.6
TN: Nashville	0.85	0.62	Pb212	8.2	7.1
TN: Oak Ridge/K25	1.07	0.36		ND	
TN: Oak Ridge/Melton	2.22	0.75		ND	
TN: Oak Ridge/Y12 E	0.52	0.33	Pb212	3.7	5.7
TX: Austin	1.03	0.36	K40	81	29
			Pb212	5.9	6.2
			Tl208	7.3	3.3
UT: Salt Lake City	1.69	0.46		ND	
VA: Lynchburg	2.89	0.82	Bi212	29	30
WA: Olympia	0.73	0.34	Be7	42	30

Note: ND = Not Detected

Table 6
Gross Beta and Specific Gamma in Precipitation
November 2008

Location	Gross Beta Activity		Gamma-Emitting Radionuclides	
	pCi/L	$\pm 2u$	Nuclide	pCi/L $\pm 2u$
AL: Montgomery/408	0.38	0.35		ND
AR: Little Rock	1.39	0.40	Be7	36 21
CA: Richmond	0.80	0.34		ND
CT: Hartford	1.52	0.47	Be7	49 21
			K40	11 14
DE: Wilmington	1.29	0.44	Be7	27 19
FL: Jacksonville	6.3	1.2	Be7	48 37
GA: Atlanta	0.78	0.41		ND
IA: Iowa City	1.37	0.42		ND
ID: Idaho Falls	2.63	0.54		ND
KS: Kansas City	1.53	0.42	Be7	33 20
MA: Boston	1.57	0.46	Be7	36 17
MI: Lansing	3.74	0.66	Be7	22 18
			K40	12 13
MN: St. Paul	3.86	0.67		ND
MN: Welch/510	1.35	0.39	K40	17 33
NC: Wilmington	0.43	0.38	Tl208	2.2 3.6
NY: Albany	1.21	0.46	Be7	18 16
NY: Yaphank	1.07	0.42		ND
OR: Portland	0.49	0.31		ND
PA: Harrisburg	1.41	0.46	Be7	76 42
			Pb212	4.0 6.3
TN: Knoxville	0.7	1.4		ND
TN: Nashville	0.65	0.41		ND
TN: Oak Ridge/K25	1.05	0.36	Be7	31 10
TN: Oak Ridge/Melton	1.91	0.50	K40	11 14
TN: Oak Ridge/Y12 E	0.79	0.34	Be7	21 16
TX: Austin	0.93	0.36	Pb212	3.1 4.9
UT: Salt Lake City	1.35	0.41	Bi212	34 46
			Pb212	4.7 7.0
VA: Lynchburg	6.10	0.91	Pb212	3.8 6.3
WA: Olympia	0.24	0.28		ND

Note: ND = Not Detected

Table 7
Gross Beta and Specific Gamma in Precipitation
December 2008

Location	Gross Beta Activity		Gamma-Emitting Radionuclides	
	pCi/L	± 2u	Nuclide	pCi/L ± 2u
AL: Montgomery/408	0.57	0.33		ND
AR: Little Rock	1.15	0.37	Be7	18 17
			K40	11 12
AZ: Phoenix	1.79	0.46		ND
CA: Richmond	0.46	0.31	K40	10 12
CO: Denver	4.22	0.70	Be7	39 38
			Pb212	11.3 6.2
CT: Hartford	2.10	0.48	Be7	37 18
			K40	10 12
DE: Wilmington	2.63	0.53	Be7	54 19
FL: Jacksonville	0.72	0.34	K40	8 11
GA: Atlanta	0.58	0.34		ND
IA: Iowa City	3.35	0.62		ND
ID: Idaho Falls	5.3	1.1		ND
MA: Boston	1.57	0.43	Be7	60 38
			K40	24 35
MI: Lansing	0.86	0.36		ND
MN: St. Paul	4.40	0.72	Be7	25.0 9.4
			Pb212	1.9 1.7
			Tl208	0.94 0.61
NC: Charlotte	0.85	0.36		ND
NC: Wilmington	0.32	0.30	Be7	20 16
NY: Albany	3.10	0.59	Be7	16 18
			K40	27 12
NY: Yaphank	0.49	0.33	Tl208	1.9 1.4
OH: Painesville	2.04	0.46	Be7	36 20
OR: Portland	0.64	0.32		ND
PA: Harrisburg	0.90	0.36		ND
TN: Knoxville	0.65	0.35	Be7	17 16
TN: Nashville	2.13	0.48	Be7	51 19
TN: Oak Ridge/K25	0.95	0.36	Be7	33 18
TN: Oak Ridge/Melton	0.84	0.35	Be7	34 19
TN: Oak Ridge/Y12 E	0.55	0.31	Be7	34 19
UT: Salt Lake City	0.62	0.34		ND
VA: Lynchburg	5.31	0.79		ND
WA: Olympia	0.59	0.32		ND

Note: ND = Not Detected

Table 8
Tritium in Precipitation
October - December 2008

Location	October 2008 pCi/L $\pm 2u$	November 2008 pCi/L $\pm 2u$	December 2008 pCi/L $\pm 2u$
AL: Montgomery/408	26 84	-2 76	54 77
AR: Little Rock	-17 84	23 78	56 77
AZ: Phoenix	NS	NS	67 76
CA: Richmond	-22 84	53 87	90 78
CO: Denver	-15 84	NS	25 75
CT: Hartford	13 85	72 81	90 75
DE: Wilmington	74 88	81 80	73 74
FL: Jacksonville	4 85	33 78	31 76
GA: Atlanta	34 86	31 78	118 80
IA: Iowa City	44 86	-41 75	98 78
ID: Idaho Falls	NS	20 86	43 77
KS: Kansas City	0 85	285 97	NS
MA: Boston	15 84	-6 77	50 74
MI: Lansing	-2 86	79 80	66 77
MN: St. Paul	-6 84	23 78	91 78
MN: Welch/510	4 85	66 80	NS
NC: Charlotte	NS	NS	102 75
NC: Wilmington	-24 83	21 78	72 74
NM: Santa Fe	-19 84	NS	NS
NY: Albany	76 88	-8 76	117 76
NY: Yaphank	43 85	33 79	41 73
OH: Painesville	50 87	NS	50 76
OR: Portland	73 87	35 86	92 78
PA: Harrisburg	51 86	19 77	109 76
TN: Knoxville	-71 85	23 78	15 74
TN: Nashville	41 86	33 78	15 74
TN: Oak Ridge/K25	57 87	112 90	-44 88
TN: Oak Ridge/Melton	66 87	182 85	160 82
TN: Oak Ridge/Y12 E	74 88	98 90	77 78
TX: Austin	-15 84	6 77	NS
UT: Salt Lake City	4 84	48 87	134 80
VA: Lynchburg	54 86	68 80	125 80
WA: Olympia	-26 83	-9 84	10 74

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.

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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 9
Tritium in Drinking Water
October - December 2008

Location	Date Collected	³ H pCi/L ± 2 <i>u</i>
AK: Fairbanks	11/24/08	-9 82
AL: Dothan	10/16/08	4 83
AL: Montgomery	10/09/08	38 78
AL: Muscle Shoals	10/09/08	198 89
AL: Scottsboro	10/08/08	62 84
AR: Little Rock	10/10/08	30 85
CA: Los Angeles	10/06/08	-10 77
CA: Richmond	10/07/08	-26 74
CO: Denver	10/16/08	52 86
CT: Hartford	10/07/08	19 78
DE: Dover	10/06/08	94 85
FL: Miami	10/16/08	-6 76
FL: Tampa	10/20/08	82 87
GA: Baxley	11/17/08	4 84
GA: Savannah	12/22/08	27 85
HI: Honolulu	11/18/08	-63 79
IA: Cedar Rapids	10/09/08	80 85
ID: Boise	12/19/08	-27 82
ID: Idaho Falls	10/21/08	67 86
IL: Morris	12/11/08	-37 83
IL: W. Chicago	11/17/08	17 84
KS: Topeka	10/06/08	42 79
LA: New Orleans	12/29/08	11 85
MD: Baltimore	10/06/08	41 79
MD: Conowingo	10/28/08	63 80
MI: Detroit	10/20/08	118 89
MI: Grand Rapids	10/30/08	43 79
MN: St. Paul	10/07/08	112 86
MN: Welch	10/07/08	48 83
MO: Jefferson City	10/07/08	97 85
MS: Jackson	10/07/08	144 86
MS: Port Gibson	10/07/08	21 78
MT: Helena	10/03/08	146 87
NC: Charlotte	10/09/08	1480 130
ND: Bismarck	10/07/08	139 87
NE: Lincoln	10/08/08	93 85
NJ: Trenton	10/06/08	110 85
NJ: Waretown	10/07/08	40 83
NM: Santa Fe	11/04/08	-23 88
NV: Las Vegas	12/30/08	49 86

Table 9 (continued)
Tritium in Drinking Water
October - December 2008

Location	Date Collected	³ H pCi/L ± 2u
NY: Albany	10/21/08	19 78
NY: New York City	10/14/08	35 78
NY: Niagara Falls	10/23/08	28 78
NY: Syracuse	10/09/08	112 88
OH: Cincinnati	11/24/08	103 87
OH: Columbus	12/19/08	55 73
OH: E. Liverpool	10/27/08	560 96
OH: Painesville	11/06/08	129 94
OH: Toledo	10/06/08	155 88
OR: Portland	12/29/08	9 85
PA: Columbia	10/29/08	46 79
PA: Harrisburg	10/29/08	65 80
PA: Philadelphia/Baxter	10/14/08	81 88
PA: Philadelphia/Belmont	10/14/08	163 91
PA: Philadelphia/Queen	10/14/08	114 89
PA: Pittsburgh	10/21/08	-12 77
RI: Providence	12/02/08	-18 83
SC: Barnwell	10/07/08	13 85
SC: Columbia	10/17/08	130 89
SC: Jenkinsville	10/08/08	52 85
SC: Seneca	10/01/08	21 85
TN: Chattanooga	10/06/08	63 80
TN: Knoxville	12/10/08	4 84
TN: Oak Ridge/#360	10/07/08	-2 80
TN: Oak Ridge/#371	10/07/08	101 85
TN: Oak Ridge/#4442	10/07/08	212 93
TN: Oak Ridge/#768	10/07/08	2 81
TN: Oak Ridge/#772	10/07/08	39 83
TX: Austin	10/10/08	4 84
VA: Ashland	11/24/08	800 110
VA: Lynchburg	10/06/08	-37 76
WA: Richland	10/07/08	120 86
WA: Seattle	10/06/08	56 87

Table 10
Iodine-131 in Drinking Water
January - December 2008

Location	Date Collected	¹³¹ I	
		pCi/L	± 2u
AK: Fairbanks	05/07/08	-0.15	0.33
AL: Dothan	01/23/08	0.00	0.16
AL: Montgomery	04/03/08	-0.30	0.39
AL: Muscle Shoals	07/24/08	0.12	0.29
AL: Scottsboro	07/23/08	-0.22	0.35
AR: Little Rock	10/10/08	0.08	0.25
CA: Los Angeles	10/06/08	-0.13	0.23
CA: Richmond	07/03/08	0.02	0.24
CO: Denver	04/01/08	-0.05	0.16
CT: Hartford	04/04/08	0.03	0.39
DE: Dover	07/07/08	0.03	0.20
FL: Miami	04/07/08	-0.04	0.34
FL: Tampa	04/07/08	0.00	0.24
GA: Baxley	02/18/08	0.00	0.22
GA: Savannah	05/28/08	0.00	0.21
HI: Honolulu	11/18/08	-0.02	0.14
IA: Cedar Rapids	07/07/08	-0.04	0.17
ID: Boise	08/19/08	-0.08	0.20
ID: Idaho Falls	10/21/08	0.13	0.19
IL: Morris	04/03/08	-0.13	0.27
IL: W. Chicago	01/22/08	0.07	0.17
KS: Topeka	04/01/08	-0.04	0.16
LA: New Orleans	06/25/08	0.03	0.20
MD: Baltimore	04/01/08	0.01	0.15
MD: Conowingo	08/12/08	-0.04	0.33
MI: Detroit	01/23/08	-0.06	0.20
MI: Grand Rapids	01/29/08	0.04	0.15
MN: St. Paul	04/23/08	0.15	0.22
MN: Welch - Red Wing Location Ch	04/08/08	0.17	0.32
MO: Jefferson City	07/03/08	-0.16	0.35
MS: Jackson	04/02/08	0.08	0.26
MS: Port Gibson	04/02/08	-0.08	0.30
MT: Helena	04/09/08	0.02	0.31
NC: Charlotte	10/09/08	0.03	0.18
NC: Raleigh	01/30/08	0.01	0.14
ND: Bismarck	04/29/08	-0.02	0.16
NE: Lincoln	04/04/08	0.24	0.36
NJ: Trenton	04/04/08	-0.02	0.34
NJ: Waretown	04/08/08	0.07	0.33
NM: Santa Fe	01/22/08	0.04	0.18
NV: Las Vegas	07/11/08	-0.04	0.18

Table 10 (continued)
Iodine-131 in Drinking Water
January - December 2008

Location	Date Collected	¹³¹ I	
		pCi/L	± 2u
NY: Albany	04/03/08	0.00	0.29
NY: New York City	04/30/08	-0.05	0.31
NY: Niagara Falls	05/14/08	-0.02	0.30
NY: Syracuse	03/05/08	-0.24	0.34
OH: Cincinnati	05/13/08	0.00	0.20
OH: Columbus	05/21/08	0.01	0.21
OH: E. Liverpool	04/23/08	1.22	0.26
OH: E. Liverpool	04/23/08	0.52	0.42
OH: Painesville	02/18/08	-0.07	0.22
OH: Painesville	04/30/08	-0.04	0.30
OH: Painesville	08/11/08	-0.28	0.37
OH: Toledo	04/03/08	-0.27	0.37
OR: Portland	03/27/08	0.04	0.19
PA: Columbia	08/13/08	0.21	0.27
PA: Harrisburg	08/12/08	-0.03	0.29
PA: Philadelphia/Baxter	04/28/08	0.14	0.17
PA: Philadelphia/Belmont	04/28/08	1.50	0.24
PA: Philadelphia/Belmont	04/28/08	1.70	0.40
PA: Philadelphia/Queen	04/28/08	1.47	0.25
PA: Philadelphia/Queen	04/28/08	1.19	0.43
PA: Pittsburgh	08/07/08	0.51	0.20
RI: Providence	04/03/08	0.16	0.27
SC: Barnwell	10/07/08	-0.07	0.38
SC: Columbia	07/31/08	0.07	0.37
SC: Jenkinsville	10/08/08	0.04	0.36
SC: Seneca	10/01/08	0.46	0.65
TN: Chattanooga	04/01/08	0.05	0.16
TN: Knoxville	08/07/08	-0.19	0.49
TN: Oak Ridge/#360	04/01/08	-0.01	0.34
TN: Oak Ridge/#371	04/01/08	-0.11	0.17
TN: Oak Ridge/#4442	04/01/08	0.13	0.20
TN: Oak Ridge/#768	07/08/08	-0.06	0.39
TN: Oak Ridge/#772	04/01/08	0.10	0.32
TX: Austin	04/02/08	-0.11	0.28
VA: Ashland	04/10/08	-0.11	0.26
VA: Lynchburg	04/03/08	0.10	0.28
WA: Richland	04/11/08	-0.17	0.27
WA: Seattle	04/09/08	0.10	0.37

Table 12
Drinking Water
Radium and Gamma-Emitting Radionuclides
Composites
January - December 2008

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	NA	NA		ND
AL: Muscle Shoals	NA	NA	K40	12 13
AL: Scottsboro	NA	NA	Pb212	1.8 2.9
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	K40	11 13
DE: Dover	NA	NA	K40	11 19
FL: Miami	NA	NA		ND
FL: Tampa	NA	NA		ND
GA: Baxley	NA	NA		ND
GA: Savannah	NA	NA	K40	10 14
HI: Honolulu	NA	NA		ND
IA: Cedar Rapids	NA	NA		ND
ID: Boise	NA	NA		ND
ID: Idaho Falls	NA	NA		ND
IL: Morris	NA	NA	K40	8 13
IL: W. Chicago	NA	NA		ND
KS: Topeka	NA	NA	K40	11 13
LA: New Orleans	NA	NA		ND
MD: Baltimore	NA	NA		ND
MD: Conowingo	NA	NA		ND
MI: Detroit	NA	NA		ND
MI: Grand Rapids	NA	NA		ND
MN: S. St. Paul	NA	NA		ND
MN: Welch	NA	NA	K40	22 13
MO: Jefferson City	NA	NA		ND
MS: Jackson	NA	NA		ND
MS: Port Gibson	NA	NA		ND
MT: Helena	NA	NA		ND
NC: Charlotte	NA	NA		ND
NC: Raleigh	NA	NA		ND

Note: ND = Not Detected
NA = No Analysis

Table 12 (continued)
Drinking Water
Radium and Gamma-Emitting Radionuclides
Composites
January - December 2008

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	NA	NA	K40	11 13
			Tl208	1.6 1.6
NH: Concord	NA	NA	K40	10 13
NJ: Trenton	NA	NA	K40	10 13
			Pb212	3.8 3.9
NJ: Waretown	NA	NA		ND
NM: Santa Fe	NA	NA		ND
NV: Las Vegas	NA	NA		ND
NY: Albany	NA	NA	K40	9 13
NY: New York City	NA	NA		ND
NY: Niagara Falls	NA	NA		ND
NY: Syracuse	NA	NA		ND
OH: Cincinnati	NA	NA	K40	11 13
OH: Columbus	NA	NA		ND
OH: E. Liverpool	NA	NA		ND
OH: Painesville	NA	NA	Pb212	2.2 3.1
OH: Toledo	NA	NA		ND
OK: Oklahoma City	NA	NA		ND
OR: Portland	NA	NA	Pb212	1.9 2.4
PA: Columbia	NA	NA	Pb212	0.81 0.89
PA: Harrisburg	NA	NA	K40	23 12
PA: Philadelphia/Baxter	NA	NA		ND
PA: Philadelphia/Belmont	NA	NA	K40	12 14
			Tl208	1.7 1.8
PA: Philadelphia/Queen	NA	NA	K40	9 12
PA: Pittsburgh	NA	NA		ND
RI: Providence	NA	NA		ND
SC: Barnwell	NA	NA		ND
SC: Columbia	NA	NA	K40	13 13
SC: Jenkinsville	NA	NA		ND
SC: Seneca	NA	NA		ND
TN: Chattanooga	NA	NA		ND
TN: Knoxville	NA	NA		ND
TN: Oak Ridge/#360	NA	NA	Pb212	2.1 2.8

Note: ND = Not Detected
NA = No Analysis

Table 12 (continued)
Drinking Water
Radium and Gamma-Emitting Radionuclides
Composites
January - December 2008

Location	²²⁶ Ra	²²⁸ Ra	Gamma-Emitting Radionuclides	
	pCi/L ± 2u	pCi/L ± 2u	Nuclide	pCi/L ± 2u
TN: Oak Ridge/#360	NA	NA	Tl208	1.1 1.9
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
TX: Austin	NA	NA		ND
VA: Ashland	NA	NA		ND
VA: Lynchburg	NA	NA		ND
WA: Richland	NA	NA		ND
WA: Seattle	NA	NA		Pb212
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 13
Radionuclides in Pasteurized Milk
October - December 2008

Location	Date Collected	K g/L ± 2u	¹³⁷ Cs pCi/L ± 2u	¹⁴⁰ Ba pCi/L ± 2u	¹³¹ I pCi/L ± 2u
AR: Little Rock	12/08/08	1.42 0.18	ND	ND	ND
AZ: Phoenix	12/31/08	1.61 0.20	ND	ND	ND
CA: Los Angeles	11/17/08	1.50 0.19	ND	ND	ND
CA: San Francisco	10/08/08	1.51 0.22	ND	ND	ND
CT: Hartford	10/27/08	1.63 0.21	ND	ND	ND
DE: Wilmington	11/21/08	1.64 0.20	ND	ND	ND
FL: Tampa	10/15/08	1.55 0.19	ND	ND	ND
IA: Des Moines	10/28/08	1.56 0.20	ND	ND	ND
KS: Wichita	10/07/08	1.54 0.20	ND	ND	ND
KY: Louisville	10/04/08	1.64 0.20	ND	ND	ND
MA: Boston	12/02/08	1.61 0.21	ND	ND	ND
MD: Baltimore	10/03/08	1.53 0.23	ND	ND	ND
MI: Detroit	12/16/08	1.56 0.20	ND	ND	ND
MO: Jefferson City	10/21/08	1.57 0.20	ND	ND	ND
NJ: Trenton	10/07/08	1.55 0.20	ND	ND	ND
NV: Las Vegas	10/14/08	1.62 0.20	ND	ND	ND
NY: Buffalo	10/06/08	1.63 0.21	ND	ND	ND
NY: Syracuse	10/27/08	1.58 0.20	ND	ND	ND
OH: Cincinnati	12/09/08	1.62 0.20	ND	ND	ND
OR: Portland	12/08/08	1.60 0.20	ND	ND	ND
PA: Pittsburgh	10/28/08	1.54 0.22	ND	ND	ND
TN: Chattanooga	10/06/08	1.51 0.20	ND	ND	ND
TN: Knoxville	12/15/08	1.63 0.23	ND	ND	ND
TN: Memphis	10/06/08	1.50 0.19	ND	ND	ND
TX: Austin	10/06/08	1.53 0.19	ND	ND	ND
TX: Dallas	11/10/08	1.51 0.19	ND	ND	ND
VA: Norfolk	12/01/08	1.55 0.23	ND	ND	ND
VT: Montpelier	12/30/08	1.63 0.20	ND	ND	ND
WA: Spokane	10/07/08	1.54 0.20	ND	ND	ND
WA: Tacoma	12/30/08	1.54 0.20	ND	ND	180 200
WV: Charleston	10/09/08	1.66 0.21	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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