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ENVIRONMENTAL RADIATION DATA

REPORT 144

October - December 2010

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/m³	0.0015
	Water	pCi/L	2
	Precipitation	pCi/L	2
Tritium	Water	pCi/L	150
	Milk	pCi/L	150
* Plutonium-238,239/240	Air	aCi/m³	0.75
	Water	pCi/L	0.1
† Uranium-234,235,238	Air	aCi/m³	0.75
	Water	pCi/L	0.1
Radium-226	Water	pCi/L	0.02
Strontium-90	Milk	pCi/L	2
	Water	pCi/L	1
‡ Iodine-131	Milk (gamma)	pCi/L	4
	Water (gamma)	pCi/L	4
	Water	pCi/L	0.3
Cesium-137	Milk	pCi/L	5
	Water	pCi/L	5
‡ Barium-140	Milk	pCi/L	15
	Water	pCi/L	15
Potassium	Milk	g/L	0.06
	Water	g/L	0.06
Potassium-40	Water	pCi/L	50

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

† The MDC for air is based on an assumed total sample volume of 120,000 m^3.

‡ 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 dual-phosphor scintillation counter 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 proportional counter. Gamma scans are performed on all filters showing gross beta activity greater than 1 pCi/m^3. The laboratory obtained values are usually lower than the field estimates because of the decay of naturally occurring radionuclides during the time between the two measurements.

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 tritium and gamma-emitting radionuclides. NAREL discontinued gross beta analysis of precipitation beginning in January, 2010.

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 2010

Location	Number of Samples	5-hour Field Estimate Max (pCi/m³)	5-hour Field Estimate Min (pCi/m³)	5-hour Field Estimate Avg (pCi/m³)	NAREL Lab Measurement Max (pCi/m³)	NAREL Lab Measurement Min (pCi/m³)	NAREL Lab Measurement Avg (pCi/m³)
AK: Anchorage	8	0.0	-0.0	0.0	0.004	0.000	0.002
AK: Fairbanks	4	0.1	0.0	0.0	0.005	0.004	0.005
AK: Juneau	6	0.0	0.0	0.0	0.004	0.000	0.002
AL: Birmingham	6	0.3	0.0	0.1	0.032	0.006	0.017
AL: Montgomery/408	8	0.1	-0.0	0.1	0.026	0.003	0.016
AR: Fort Smith	7	0.5	0.0	0.2	0.018	0.006	0.012
AR: Little Rock	5	0.1	0.0	0.1	0.023	0.006	0.016
AZ: Phoenix	9	3.7	0.8	1.8	0.019	0.010	0.015
AZ: Tucson	8	0.0	0.0	0.0	0.017	0.007	0.012
CA: Anaheim	5	0.0	0.0	0.0	0.014	0.004	0.009
CA: Bakersfield	9	2.7	0.1	1.0	0.033	0.004	0.016
CA: Eureka	5	0.0	0.0	0.0	0.008	0.002	0.005
CA: Fresno	4	1.0	0.1	0.4	0.023	0.005	0.015
CA: Los Angeles	8	0.2	0.1	0.1	0.015	0.005	0.011
CA: Richmond	4	0.2	0.1	0.1	0.008	0.004	0.005
CA: Riverside	9	0.0	0.0	0.0	0.015	0.006	0.010
CA: Sacramento	8	1.3	0.2	0.5	0.017	0.004	0.010
CA: San Bernardino Cty.	6	0.0	0.0	0.0	0.020	0.009	0.014
CA: San Francisco	4	0.0	0.0	0.0	0.006	0.003	0.004
CA: San Jose	4	0.1	0.0	0.1	0.013	0.006	0.009
CO: Colorado Springs	5				0.015	0.007	0.011
CO: Denver	8	0.6	0.2	0.3	0.014	0.002	0.009
CO: Grand Junction	7	0.3	0.0	0.1	0.018	0.007	0.012
CT: Hartford	7	0.1	0.0	0.0	0.006	0.001	0.003
DC: Washington	8	0.1	0.0	0.0	0.006	0.001	0.003
DE: Dover	6	0.0	0.0	0.0	0.009	0.002	0.005
FL: Tallahassee	4	0.0	0.0	0.0	0.012	0.007	0.010
GA: Augusta	4	0.4	0.1	0.2	0.021	0.007	0.012
HI: Hilo	8	0.0	0.0	0.0	0.005	0.001	0.003
HI: Honolulu	9	0.1	0.0	0.0	0.004	0.001	0.002
IA: Des Moines	4	0.7	0.2	0.5	0.016	0.007	0.012
IA: Mason City	1	0.3	0.3	0.3	0.010	0.010	0.010
IL: Aurora	9	1.0	0.1	0.6	0.024	0.003	0.014
IL: Chicago	7	0.2	0.0	0.1	0.026	0.005	0.011
IN: Indianapolis	8	0.6	0.1	0.3	0.024	0.005	0.014
KS: Kansas City	6	0.3	0.0	0.2	0.016	0.006	0.010
KS: Topeka	8	0.7	0.2	0.5	0.018	0.005	0.012
KY: Lexington	7	0.0	0.0	0.0	0.019	0.004	0.009

Table 2 (continued)
Gross Beta in Airborne Particulates
October 2010

Location	Number of Samples	5-hour Field Estimate Max (pCi/m³)	5-hour Field Estimate Min (pCi/m³)	5-hour Field Estimate Avg (pCi/m³)	NAREL Lab Measurement Max (pCi/m³)	NAREL Lab Measurement Min (pCi/m³)	NAREL Lab Measurement Avg (pCi/m³)
KY: Louisville	7	1.0	0.1	0.5	0.029	0.006	0.015
LA: Baton Rouge	9	0.4	0.1	0.2	0.013	0.003	0.008
LA: Shreveport	9	0.2	0.0	0.1	0.017	0.005	0.010
MA: Worcester	6	0.1	0.0	0.0	0.009	0.002	0.005
MD: Baltimore	9	0.1	0.0	0.1	0.012	0.002	0.007
ME: Orono	4	0.0	0.0	0.0	0.005	0.001	0.003
ME: Portland	7	0.0	-0.0	0.0	0.006	0.001	0.004
MI: Bay City 48708	8	0.1	0.0	0.0	0.012	0.003	0.007
MI: Detroit	8	0.3	0.0	0.1	0.014	0.004	0.007
MI: Grand Rapids	8	0.1	0.0	0.0	0.013	0.003	0.007
MN: Duluth	3	0.1	0.0	0.1	0.008	0.004	0.005
MN: St. Paul	4	0.2	0.1	0.1	0.019	0.007	0.011
MN: Welch/510	8	0.2	0.0	0.1	0.036	0.005	0.014
MO: Jefferson City	8	0.6	0.2	0.4	0.017	0.004	0.011
MO: Springfield	9	0.1	0.0	0.0	0.016	0.004	0.011
MS: Jackson/Deq	6	0.6	0.1	0.3	0.019	0.005	0.011
MT: Billings	3	0.0	0.0	0.0	0.019	0.012	0.014
NC: Charlotte	8	0.2	0.0	0.1	0.017	0.004	0.009
NC: Wilmington	4				0.011	0.004	0.009
ND: Bismarck	7	0.6	0.0	0.2	0.019	0.004	0.008
NE: Kearney	6	0.5	0.1	0.3	0.012	0.003	0.007
NE: Lincoln	8	1.2	0.2	0.7	0.013	0.005	0.009
NE: Omaha	4	0.0	0.0	0.0	0.014	0.004	0.009
NJ: Edison	7	0.0	-0.0	0.0	0.008	0.002	0.005
NJ: Trenton	9	0.4	0.1	0.2	0.014	0.003	0.008
NM: Albuquerque	7	0.0	0.0	0.0	0.013	0.006	0.010
NM: Navajo Lake St Park	4	0.1	0.0	0.1	0.007	0.005	0.006
NM: Santa Fe	4	1.0	0.0	0.5	0.040	0.010	0.019
NV: Las Vegas/913	4	1.5	0.0	0.7	0.016	0.008	0.011
NV: Reno	3	0.2	0.0	0.1	0.012	0.009	0.010
NY: Albany	7	0.1	0.0	0.1	0.010	0.003	0.007
NY: Hauppauge	5	0.1	-0.0	0.0	0.009	0.002	0.006
NY: Lockport	9	0.0	0.0	0.0	0.012	0.002	0.006
NY: Rochester	8	0.1	0.0	0.1	0.006	0.002	0.004
NY: Yaphank	5	0.0	-0.0	0.0	0.004	0.001	0.003
OH: Cincinnati	9	0.2	0.0	0.1	0.019	0.004	0.010
OH: Cleveland	8	0.1	0.0	0.0	0.019	0.004	0.007
OH: Painesville	8	0.1	0.0	0.0	0.013	0.003	0.007

Table 2 (continued)
Gross Beta in Airborne Particulates
October 2010

Location	Number of Samples	5-hour Field Estimate Max (pCi/m³)	5-hour Field Estimate Min (pCi/m³)	5-hour Field Estimate Avg (pCi/m³)	NAREL Lab Measurement Max (pCi/m³)	NAREL Lab Measurement Min (pCi/m³)	NAREL Lab Measurement Avg (pCi/m³)
OH: Toledo	8	1.2	0.1	0.6	0.023	0.004	0.011
OK: Tulsa	8				0.017	0.004	0.011
OR: Portland	9	0.3	0.0	0.1	0.023	0.006	0.010
PA: Pittsburgh	5	0.2	0.0	0.1	0.021	0.004	0.009
RI: Providence	3	0.1	0.0	0.0	0.003	0.002	0.002
SC: Barnwell	5	0.2	0.0	0.1	0.020	0.009	0.016
SC: Columbia	3	0.1	0.0	0.0	0.020	0.009	0.015
SD: Pierre	9	0.9	0.0	0.5	0.013	0.006	0.009
TN: Knoxville	6	1.2	0.3	0.8	0.059	0.011	0.030
TN: Memphis	6	0.1	0.0	0.0	0.030	0.008	0.018
TN: Nashville	4	0.1	0.0	0.0	0.015	0.006	0.010
TN: Oak Ridge/Bethel	4	0.9	0.6	0.7	0.032	0.008	0.016
TN: Oak Ridge/K25	8	1.4	0.3	1.0	0.030	0.006	0.018
TN: Oak Ridge/Melton	8	1.2	0.2	0.8	0.034	0.007	0.017
TN: Oak Ridge/Y12 E	8	1.0	0.2	0.7	0.030	0.006	0.016
TN: Oak Ridge/Y12 W	8	0.6	0.1	0.4	0.033	0.005	0.017
TX: Amarillo	9	1.3	0.6	0.9	0.015	0.006	0.010
TX: Austin	5	0.3	0.0	0.2	0.018	0.009	0.012
TX: Dallas	8	1.1	0.0	0.4	0.020	0.005	0.011
TX: El Paso	8	2.3	0.6	1.1	0.025	0.008	0.018
TX: Ft. Worth	4	0.3	0.1	0.2	0.017	0.016	0.016
TX: Houston	8				0.017	0.001	0.009
TX: Laredo	8	0.9	0.1	0.4	0.013	0.005	0.010
TX: Lubbock	4				0.023	0.012	0.019
TX: San Angelo	8	0.0	0.0	0.0	0.017	0.003	0.010
TX: San Antonio	8	0.7	0.1	0.4	0.013	0.006	0.010
VA: Harrisonburg	9	1.5	0.2	0.7	0.019	0.005	0.011
VA: Lynchburg	8	1.0	0.3	0.6	0.021	0.005	0.012
VA: Richmond	6	0.0	0.0	0.0	0.014	0.003	0.009
VA: Virginia Beach	9	0.1	0.0	0.0	0.012	0.004	0.007
WA: Olympia	8	0.1	0.0	0.0	0.007	0.001	0.004
WA: Seattle	7	0.0	0.0	0.0	0.010	0.002	0.005
WA: Spokane	7	0.6	0.1	0.2	0.018	0.007	0.012
WI: Milwaukee	8	0.0	-0.1	-0.0	0.015	0.003	0.008
WV: Charleston	6	0.0	-0.0	-0.0	0.017	0.007	0.011

Table 3
Gross Beta in Airborne Particulates
November 2010

Location	Number of Samples	5-hour Field Estimate (pCi/m³) Max	Min	Avg	NAREL Lab Measurement (pCi/m³) Max	Min	Avg
AK: Anchorage	9	0.0	-0.0	0.0	0.010	0.001	0.003
AK: Fairbanks	7	0.0	0.0	0.0	0.010	0.004	0.007
AK: Juneau	5	0.0	-0.0	0.0	0.007	0.001	0.003
AL: Birmingham	9	0.1	0.0	0.0	0.027	0.007	0.014
AL: Montgomery/408	9	0.6	0.0	0.1	0.020	0.009	0.014
AR: Little Rock	7	0.2	0.0	0.1	0.020	0.007	0.012
AZ: Phoenix	7	3.1	0.9	1.9	0.018	0.009	0.013
AZ: Phoenix/956	3	0.8	0.5	0.6	0.019	0.012	0.015
AZ: Tucson	8	0.0	0.0	0.0	0.015	0.007	0.010
CA: Anaheim	6	0.0	0.0	0.0	0.014	0.005	0.008
CA: Bakersfield	6	4.5	0.3	2.1	0.039	0.009	0.019
CA: Eureka	4	0.0	0.0	0.0	0.004	0.001	0.002
CA: Fresno	6	0.7	0.0	0.2	0.019	0.007	0.013
CA: Los Angeles	7	0.2	0.0	0.1	0.018	0.004	0.010
CA: Richmond	5	0.1	0.0	0.1	0.007	0.003	0.004
CA: Riverside	8	0.0	0.0	0.0	0.020	0.004	0.008
CA: Sacramento	9	0.7	0.1	0.3	0.016	0.002	0.008
CA: San Bernardino Cty.	5	0.0	0.0	0.0	0.017	0.004	0.010
CA: San Francisco	4	0.0	0.0	0.0	0.005	0.002	0.004
CA: San Jose	4	0.1	0.0	0.1	0.007	0.004	0.005
CO: Colorado Springs	5				0.014	0.009	0.010
CO: Denver	9	0.7	0.2	0.3	0.011	0.004	0.006
CO: Grand Junction	7	0.4	0.3	0.3	0.012	0.005	0.008
CT: Hartford	8	0.1	0.0	0.0	0.010	0.002	0.006
DC: Washington	9	0.0	0.0	0.0	0.008	0.001	0.004
DE: Dover	8	0.1	0.0	0.0	0.013	0.003	0.007
FL: Tallahassee	4	0.0	0.0	0.0	0.007	0.005	0.006
GA: Augusta	5	0.3	0.0	0.1	0.008	0.004	0.006
HI: Hilo	9	0.0	0.0	0.0	0.003	0.002	0.002
HI: Honolulu	9	0.1	-0.0	0.0	0.004	0.001	0.002
IA: Des Moines	7	0.5	0.1	0.3	0.020	0.007	0.013
IA: Mason City	4	0.3	0.0	0.1	0.023	0.006	0.012
IL: Aurora	8	1.1	0.2	0.5	0.029	0.008	0.017
IL: Chicago	5	0.5	0.0	0.2	0.020	0.006	0.011
IN: Indianapolis	9	0.6	0.1	0.3	0.024	0.008	0.016
KS: Kansas City	7	0.4	0.0	0.2	0.016	0.006	0.009
KS: Topeka	7	1.0	0.1	0.3	0.022	0.010	0.014
KY: Lexington	7	0.0	0.0	0.0	0.016	0.005	0.010

Table 3 (continued)
Gross Beta in Airborne Particulates
November 2010

Location	Number of Samples	5-hour Field Estimate Max (pCi/m³)	5-hour Field Estimate Min (pCi/m³)	5-hour Field Estimate Avg (pCi/m³)	NAREL Lab Measurement Max (pCi/m³)	NAREL Lab Measurement Min (pCi/m³)	NAREL Lab Measurement Avg (pCi/m³)
KY: Louisville	8	0.6	0.0	0.2	0.019	0.006	0.012
LA: Baton Rouge	7	0.2	0.0	0.1	0.011	0.004	0.007
LA: Shreveport	9	0.1	0.0	0.0	0.017	0.005	0.009
MA: Worcester	6	0.1	0.0	0.0	0.013	0.002	0.007
MD: Baltimore	8	0.1	0.0	0.0	0.017	0.004	0.010
ME: Orono	4	0.0	0.0	0.0	0.006	0.004	0.005
ME: Portland	8	0.0	-0.0	0.0	0.006	0.002	0.004
MI: Bay City 48708	9	0.4	0.0	0.1	0.022	0.004	0.010
MI: Detroit	8	0.4	0.1	0.2	0.015	0.005	0.009
MI: Grand Rapids	7	0.1	0.0	0.1	0.015	0.005	0.010
MN: Duluth	3	0.1	0.0	0.1	0.008	0.004	0.006
MN: St. Paul	1	0.1	0.1	0.1	0.006	0.006	0.006
MN: Welch/510	6	0.4	0.0	0.2	0.037	0.005	0.017
MO: Jefferson City	8	0.4	0.1	0.2	0.015	0.006	0.008
MO: Springfield	8	0.1	0.0	0.1	0.016	0.006	0.010
MS: Jackson/Deq	8	0.2	0.0	0.1	0.016	0.006	0.009
MT: Billings	3	0.0	0.0	0.0	0.026	0.007	0.014
NC: Charlotte	8	0.2	0.0	0.1	0.013	0.004	0.009
NC: Wilmington	5				0.008	0.005	0.006
ND: Bismarck	7	0.1	0.0	0.0	0.013	0.005	0.009
NE: Kearney	3	0.7	0.4	0.6	0.009	0.005	0.008
NE: Lincoln	7	0.6	0.2	0.4	0.011	0.005	0.008
NJ: Edison	7	0.0	0.0	0.0	0.009	0.002	0.005
NJ: Trenton	9	0.5	0.1	0.2	0.024	0.004	0.011
NM: Albuquerque	5	0.0	0.0	0.0	0.008	0.004	0.006
NM: Carlsbad	1				0.014	0.014	0.014
NM: Navajo Lake St Park	5	0.2	0.1	0.1	0.005	0.003	0.004
NM: Santa Fe	4	1.6	0.0	0.4	0.013	0.006	0.009
NV: Las Vegas/913	5	0.1	0.0	0.0	0.009	0.004	0.006
NV: Reno	3	0.1	0.0	0.1	0.011	0.003	0.008
NY: Albany	8	0.1	0.0	0.0	0.018	0.002	0.008
NY: Hauppauge	5	0.1	0.0	0.0	0.016	0.004	0.009
NY: Lockport	9	0.1	-0.0	0.0	0.011	0.004	0.008
NY: Rochester	7	0.1	0.0	0.0	0.007	0.002	0.004
NY: Yaphank	5	0.0	0.0	0.0	0.007	0.001	0.004
OH: Cincinnati	6	0.3	0.0	0.1	0.018	0.005	0.011
OH: Cleveland	8	0.1	0.0	0.0	0.013	0.004	0.008
OH: Painesville	6	0.1	0.0	0.1	0.015	0.006	0.010

Table 3 (continued)
Gross Beta in Airborne Particulates
November 2010

Location	Number of Samples	5-hour Field Estimate Max (pCi/m³)	5-hour Field Estimate Min (pCi/m³)	5-hour Field Estimate Avg (pCi/m³)	NAREL Lab Measurement Max (pCi/m³)	NAREL Lab Measurement Min (pCi/m³)	NAREL Lab Measurement Avg (pCi/m³)
OH: Toledo	9	1.1	0.1	0.5	0.029	0.008	0.016
OK: Tulsa	8				0.016	0.004	0.010
OR: Portland	7	0.1	0.0	0.0	0.020	0.004	0.008
PA: Philadelphia	4				0.023	0.004	0.011
PA: Pittsburgh	6	0.2	0.0	0.1	0.015	0.004	0.009
RI: Providence	2	0.0	-0.0	0.0	0.002	0.001	0.002
SC: Barnwell	3	0.1	0.1	0.1	0.012	0.006	0.009
SC: Columbia	4	0.1	0.0	0.1	0.015	0.007	0.011
SD: Pierre	8	1.1	0.2	0.6	0.014	0.008	0.011
TN: Knoxville	7	0.9	0.1	0.4	0.027	0.011	0.017
TN: Memphis	7	0.0	0.0	0.0	0.021	0.009	0.014
TN: Nashville	1	0.1	0.1	0.1	0.006	0.006	0.006
TN: Oak Ridge/Bethel	7	0.6	0.2	0.4	0.028	0.010	0.017
TN: Oak Ridge/K25	7	0.8	0.3	0.6	0.030	0.011	0.018
TN: Oak Ridge/Melton	7	0.5	0.2	0.4	0.027	0.009	0.016
TN: Oak Ridge/Y12 E	7	0.6	0.2	0.3	0.030	0.009	0.017
TN: Oak Ridge/Y12 W	7	0.3	0.1	0.2	0.030	0.010	0.017
TX: Amarillo	8	1.0	0.2	0.6	0.010	0.005	0.007
TX: Austin	3	0.2	0.0	0.1	0.012	0.004	0.008
TX: Dallas	6	0.4	0.1	0.2	0.016	0.004	0.008
TX: El Paso	8	1.6	0.3	1.1	0.023	0.008	0.016
TX: Ft. Worth	3	0.3	0.2	0.3	0.012	0.008	0.010
TX: Houston	6				0.011	0.005	0.007
TX: Laredo	9	0.5	0.1	0.2	0.010	0.004	0.007
TX: San Angelo	8	0.0	0.0	0.0	0.012	0.004	0.008
TX: San Antonio	9	0.4	0.1	0.2	0.010	0.004	0.007
VA: Harrisonburg	5	1.2	0.3	0.6	0.023	0.005	0.012
VA: Lynchburg	8	0.9	0.4	0.6	0.019	0.008	0.012
VA: Richmond	8	0.0	0.0	0.0	0.016	0.003	0.007
VA: Virginia Beach	8	0.1	0.0	0.1	0.016	0.004	0.007
WA: Olympia	8	0.0	0.0	0.0	0.006	0.001	0.003
WA: Seattle	6	0.0	0.0	0.0	0.006	0.002	0.003
WA: Spokane	8	0.3	0.0	0.1	0.013	0.003	0.008
WI: Milwaukee	8	0.1	-0.1	-0.0	0.022	0.005	0.012
WV: Charleston	6	0.0	0.0	0.0	0.018	0.008	0.013

Table 4
Gross Beta in Airborne Particulates
December 2010

Location	Number of Samples	5-hour Field Estimate (pCi/m³) Max	Min	Avg	NAREL Lab Measurement (pCi/m³) Max	Min	Avg
AK: Anchorage	8	0.0	0.0	0.0	0.008	0.003	0.005
AK: Fairbanks	8	0.0	0.0	0.0	0.018	0.012	0.015
AK: Juneau	8	0.0	0.0	0.0	0.012	0.002	0.007
AL: Birmingham	9	0.1	0.0	0.0	0.024	0.008	0.015
AL: Montgomery/408	8	0.1	0.0	0.0	0.027	0.009	0.017
AR: Little Rock	7	0.1	0.0	0.1	0.019	0.007	0.013
AZ: Phoenix	7	4.2	1.2	3.0	0.031	0.010	0.018
AZ: Phoenix/956	3	2.2	0.6	1.6	0.027	0.014	0.021
AZ: Tucson	6	0.2	0.0	0.0	0.020	0.010	0.014
CA: Anaheim	5	0.0	0.0	0.0	0.009	0.003	0.007
CA: Bakersfield	8	2.0	0.1	0.9	0.041	0.003	0.017
CA: Eureka	4	0.0	0.0	0.0	0.002	0.001	0.002
CA: Fresno	4	0.0	0.0	0.0	0.021	0.003	0.011
CA: Los Angeles	7	0.2	0.0	0.1	0.040	0.002	0.012
CA: Richmond	4	0.1	0.0	0.1	0.012	0.003	0.006
CA: Riverside	7	0.0	-0.1	-0.0	0.012	0.002	0.007
CA: Sacramento	9	0.3	0.0	0.1	0.025	0.002	0.008
CA: San Francisco	5	0.0	0.0	0.0	0.007	0.002	0.004
CA: San Jose	5	0.0	0.0	0.0	0.012	0.003	0.006
CO: Colorado Springs	3				0.010	0.006	0.009
CO: Denver	7	0.7	0.2	0.4	0.012	0.004	0.007
CO: Grand Junction	6	0.7	0.3	0.5	0.028	0.008	0.018
CT: Hartford	8	0.0	0.0	0.0	0.007	0.002	0.004
DC: Washington	9	0.0	0.0	0.0	0.007	0.002	0.004
DE: Dover	6	0.0	0.0	0.0	0.008	0.003	0.006
FL: Jacksonville	7	0.1	0.0	0.0	0.011	0.004	0.008
FL: Miami	4	0.0	0.0	0.0	0.008	0.006	0.007
FL: Orlando	8	0.2	0.0	0.1	0.014	0.005	0.009
FL: Tallahassee	4	0.0	0.0	0.0	0.017	0.009	0.013
FL: Tampa	6	0.1	0.0	0.0	0.014	0.006	0.010
GA: Atlanta	5	0.0	0.0	0.0	0.016	0.010	0.012
GA: Augusta	4	0.3	0.0	0.1	0.011	0.006	0.009
HI: Hilo	9	0.0	0.0	0.0	0.004	0.001	0.002
HI: Honolulu	9	0.1	0.0	0.0	0.004	0.001	0.002
IA: Des Moines	9	0.3	0.0	0.2	0.027	0.008	0.018
IA: Mason City	3	0.3	0.1	0.2	0.020	0.015	0.017
IL: Aurora	7	0.2	-0.1	0.1	0.027	0.009	0.019
IL: Chicago	6	0.2	0.0	0.0	0.019	0.008	0.012

Table 4 (continued)
Gross Beta in Airborne Particulates
December 2010

Location	Number of Samples	5-hour Field Estimate Max (pCi/m³)	5-hour Field Estimate Min (pCi/m³)	5-hour Field Estimate Avg (pCi/m³)	NAREL Lab Measurement Max (pCi/m³)	NAREL Lab Measurement Min (pCi/m³)	NAREL Lab Measurement Avg (pCi/m³)
IN: Indianapolis	9	0.1	0.0	0.0	0.038	0.007	0.016
KS: Kansas City	6	0.4	0.0	0.2	0.020	0.009	0.014
KS: Topeka	9	0.9	0.3	0.6	0.039	0.014	0.024
KY: Lexington	8	0.0	-0.0	0.0	0.017	0.004	0.011
KY: Louisville	6	0.1	0.1	0.1	0.028	0.005	0.015
LA: Baton Rouge	9	0.2	-0.1	0.1	0.013	0.004	0.008
LA: Shreveport	7	0.1	0.0	0.0	0.016	0.009	0.013
MA: Worcester	6	0.0	0.0	0.0	0.007	0.002	0.005
MD: Baltimore	7	0.0	0.0	0.0	0.012	0.006	0.009
ME: Orono	4	0.0	0.0	0.0	0.007	0.002	0.005
ME: Portland	7	0.0	-0.0	0.0	0.010	0.001	0.005
MI: Bay City 48708	8	0.1	0.0	0.0	0.019	0.003	0.010
MI: Detroit	8	0.1	0.0	0.0	0.020	0.002	0.009
MI: Grand Rapids	6	0.0	0.0	0.0	0.019	0.004	0.009
MN: Duluth	5	0.1	0.0	0.0	0.012	0.005	0.009
MN: Welch/510	9	0.2	0.0	0.0	0.033	0.006	0.020
MO: Jefferson City	9	0.4	0.1	0.2	0.023	0.008	0.014
MO: Springfield	6	0.1	0.0	0.0	0.024	0.013	0.017
MS: Jackson/Deq	8	0.2	0.0	0.1	0.014	0.004	0.010
MT: Billings	2	0.0	0.0	0.0	0.022	0.015	0.019
NC: Charlotte	8	0.1	0.0	0.0	0.011	0.004	0.008
NC: Wilmington	4				0.008	0.005	0.007
ND: Bismarck	5	0.7	0.0	0.1	0.024	0.009	0.014
NE: Lincoln	6	1.4	0.3	0.7	0.027	0.013	0.018
NJ: Edison	7	0.0	0.0	0.0	0.009	0.002	0.005
NJ: Trenton	5	0.2	0.0	0.1	0.015	0.005	0.009
NM: Albuquerque	5	0.1	0.0	0.0	0.014	0.006	0.009
NM: Navajo Lake St Park	3	0.1	0.0	0.1	0.007	0.004	0.006
NM: Santa Fe	2	0.0	0.0	0.0	0.012	0.007	0.009
NV: Las Vegas/913	7	0.3	0.0	0.1	0.017	0.004	0.008
NV: Reno	6	0.7	0.1	0.4	0.010	0.005	0.008
NY: Albany	8	0.1	0.0	0.0	0.010	0.002	0.006
NY: Hauppauge	5	0.0	0.0	0.0	0.012	0.004	0.008
NY: Lockport	9	0.0	0.0	0.0	0.017	0.002	0.009
NY: Rochester	8	0.0	-0.0	0.0	0.007	0.001	0.004
NY: Yaphank	5	0.0	0.0	0.0	0.006	0.002	0.004
OH: Cincinnati	10	0.0	0.0	0.0	0.023	0.003	0.014
OH: Cleveland	5	-0.0	-0.0	-0.0	0.011	0.004	0.008

Table 4 (continued)
Gross Beta in Airborne Particulates
December 2010

Location	Number of Samples	5-hour Field Estimate Max (pCi/m³)	5-hour Field Estimate Min (pCi/m³)	5-hour Field Estimate Avg (pCi/m³)	NAREL Lab Measurement Max (pCi/m³)	NAREL Lab Measurement Min (pCi/m³)	NAREL Lab Measurement Avg (pCi/m³)
OH: Painesville	6	0.0	0.0	0.0	0.016	0.004	0.009
OH: Toledo	9	0.2	0.0	0.1	0.021	0.003	0.012
OK: Tulsa	8				0.031	0.012	0.020
OR: Corvallis	1	0.0	0.0	0.0	0.003	0.003	0.003
OR: Portland	7	0.0	0.0	0.0	0.014	0.003	0.008
PA: Philadelphia	4				0.009	0.005	0.008
PA: Pittsburgh	5	0.1	0.0	0.0	0.010	0.004	0.008
RI: Providence	2	0.0	-0.0	0.0	0.004	0.002	0.003
SC: Columbia	3	0.1	0.0	0.1	0.014	0.012	0.013
SD: Pierre	8	0.8	0.1	0.4	0.037	0.010	0.019
TN: Knoxville	6	0.3	0.1	0.1	0.014	0.010	0.012
TN: Memphis	5	0.0	0.0	0.0	0.032	0.008	0.018
TN: Nashville	3	0.0	0.0	0.0	0.013	0.007	0.010
TN: Oak Ridge/Bethel	6	0.5	0.1	0.2	0.023	0.012	0.016
TN: Oak Ridge/K25	6	0.7	0.1	0.3	0.021	0.013	0.016
TN: Oak Ridge/Melton	6	0.3	0.1	0.2	0.019	0.010	0.014
TN: Oak Ridge/Y12 E	6	0.3	0.1	0.2	0.055	0.010	0.021
TN: Oak Ridge/Y12 W	6	0.2	0.1	0.1	0.018	0.012	0.015
TX: Amarillo	5	1.2	0.6	0.8	0.029	0.009	0.014
TX: Austin	5	0.4	0.0	0.2	0.020	0.010	0.015
TX: Dallas	6	0.5	0.1	0.3	0.017	0.008	0.012
TX: El Paso	5	1.9	0.5	0.9	0.031	0.009	0.017
TX: Ft. Worth	3	0.4	0.2	0.3	0.016	0.015	0.016
TX: Houston	9	1.0	1.0	1.0	0.018	0.001	0.009
TX: Laredo	7	0.8	0.1	0.3	0.020	0.005	0.012
TX: Lubbock	8	3.3	0.1	1.1	0.040	0.007	0.018
TX: San Angelo	6	0.0	0.0	0.0	0.036	0.009	0.016
TX: San Antonio	9	1.0	0.2	0.5	0.029	0.005	0.013
VA: Lynchburg	7	0.4	0.1	0.2	0.014	0.006	0.011
VA: Richmond	7	0.0	0.0	0.0	0.012	0.006	0.008
VA: Virginia Beach	6	0.0	0.0	0.0	0.009	0.006	0.008
WA: Olympia	9	0.0	-0.0	0.0	0.004	0.001	0.002
WA: Seattle	7	0.0	0.0	0.0	0.004	0.001	0.002
WA: Spokane	9	0.0	0.0	0.0	0.015	0.002	0.009
WI: Milwaukee	6	0.0	-0.1	-0.0	0.015	0.008	0.012
WV: Charleston	5	0.0	-0.0	0.0	0.025	0.004	0.013

Table 5
Specific Gamma in Precipitation
October 2010

Location	Nuclide	pCi/L ± 2*u*	
AL: Montgomery/408		ND	
AR: Little Rock	Be7	63	65
	Tl208	1.8	1.4
AZ: Phoenix		ND	
CA: Richmond	K40	10	12
CO: Denver		ND	
CT: Hartford		ND	
ID: Idaho Falls		ND	
KS: Kansas City		ND	
MI: Lansing		ND	
MN: St. Paul		ND	
MN: Welch/510	K40	15	12
NC: Charlotte		ND	
NC: Wilmington		ND	
NY: Albany		ND	
NY: Yaphank		ND	
OH: Painesville		ND	
OR: Portland	Tl208	1.4	1.4
PA: Harrisburg		ND	
TN: Knoxville	Pb212	1.3	1.2
TN: Nashville		ND	
TN: Oak Ridge/K25		ND	
TN: Oak Ridge/Melton		ND	
TN: Oak Ridge/Y12 E		ND	
UT: Salt Lake City		ND	
VA: Lynchburg		ND	
WA: Olympia		ND	

Table 6
Specific Gamma in Precipitation
November 2010

Location	Nuclide	pCi/L ± 2*u*	
AL: Montgomery/408		ND	
AR: Little Rock		ND	
AZ: Phoenix		ND	
CA: Richmond		ND	
CO: Denver		ND	
CT: Hartford		ND	
FL: Jacksonville		ND	
ID: Idaho Falls		ND	
KS: Kansas City		ND	
MI: Lansing	Pb212	6.1	2.7
MN: St. Paul		ND	
NC: Charlotte		ND	
NC: Wilmington		ND	
NY: Albany		ND	
NY: Yaphank	K40	12	12
OH: Painesville		ND	
OR: Portland		ND	
PA: Harrisburg		ND	
TN: Knoxville	K40	9	13
TN: Oak Ridge/K25		ND	
TN: Oak Ridge/Melton	Pb212	2.7	3.0
TN: Oak Ridge/Y12 E		ND	
UT: Salt Lake City		ND	
VA: Lynchburg	Pb212	2.4	2.9
WA: Olympia		ND	

Table 7
Specific Gamma in Precipitation
December 2010

Location	Nuclide	pCi/L ± 2*u*	
AL: Montgomery/408		ND	
AR: Little Rock		ND	
AZ: Phoenix	Pb212	1.6	1.8
CA: Richmond		ND	
CT: Hartford	K40	9	12
FL: Jacksonville	Tl208	1.7	1.3
GA: Atlanta		ND	
MN: St. Paul		ND	
MN: Welch/510		ND	
NC: Charlotte		ND	
NC: Wilmington		ND	
NY: Albany		ND	
NY: Yaphank		ND	
OR: Portland		ND	
PA: Harrisburg		ND	
TN: Knoxville		ND	
TN: Oak Ridge/K25	Be7	110	110
TN: Oak Ridge/Melton	Be7	135	88
	Pb212	1.9	1.3
TN: Oak Ridge/Y12 E		ND	
TX: Austin		ND	
UT: Salt Lake City		ND	
VA: Lynchburg	K40	7	11
WA: Olympia		ND	

Table 8
Tritium in Precipitation
October - December 2010

Location	October 2010 pCi/L	± 2*u*	November 2010 pCi/L	± 2*u*	December 2010 pCi/L	± 2*u*
AL: Montgomery/408	4	78	-15	87	13	86
AR: Little Rock	53	81	-76	85	-2	85
AZ: Phoenix	-4	88	NS		-58	83
CA: Richmond	-50	85	-40	86	-16	84
CO: Denver	30	79	11	89	NS	
CT: Hartford	-30	77	-17	87	-13	84
FL: Jacksonville	NS		-8	88	19	86
GA: Atlanta	NS		NS		2	86
ID: Idaho Falls	16	89	24	89	NS	
KS: Kansas City	72	82	-27	87	NS	
MI: Lansing	92	84	68	92	NS	
MN: St. Paul	68	81	-36	86	28	87
MN: Welch/510	22	90	NS		19	86
NC: Charlotte	53	80	55	91	19	87
NC: Wilmington	0	78	4	89	-49	83
NY: Albany	1440	150	-55	85	-9	86
NY: Yaphank	19	79	13	89	2	86
OH: Painesville	89	82	19	89	NS	
OR: Portland	8	88	6	89	14	85
PA: Harrisburg	106	84	6	89	11	86
TN: Knoxville	61	81	-11	92	-21	85
TN: Nashville	-6	77	NS		NS	
TN: Oak Ridge/K25	51	81	15	89	350	100
TN: Oak Ridge/Melton	199	88	265	95	172	94
TN: Oak Ridge/Y12 E	68	81	34	89	26	87
TX: Austin	NS		NS		6	86
UT: Salt Lake City	91	83	-19	87	36	88
VA: Lynchburg	71	82	-11	88	-25	84
WA: Olympia	10	90	-33	84	41	87

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.

Table 9
Plutonium and Uranium in Airborne Particulates
January - December 2010 Composites

Location	^{238}Pu		$^{239-240}$Pu		^{234}U		^{235}U		^{238}U	
	aCi/m³	± 2*u*	aCi/m³	± 2*u*	aCi/m³	± 2*u*	aCi/m³	± 2*u*	aCi/m³	± 2*u*
AK: Anchorage	-0.39	0.94	-0.13	0.86	12.2	4.8	0.3	1.4	9.0	4.1
AK: Fairbanks	0.29	0.94	0.00	0.46	7.1	2.8	0.36	0.98	9.4	3.2
AK: Juneau	0.08	0.71	-0.08	0.51	34.8	6.3	2.3	1.4	9.9	2.7
AL: Birmingham	0.9	1.8	0.0	1.1	29.5	8.8	1.5	2.6	28.9	8.8
AL: Montgomery/408	0.43	0.66	0.16	0.46	10.7	2.9	0.70	0.80	9.7	2.7
AR: Fort Smith	1.2	2.1	-0.4	1.1	14.0	5.5	-0.7	1.3	11.9	5.1
AR: Little Rock	0.06	0.81	0.18	0.53	14.3	3.6	1.4	1.2	13.6	3.5
AZ: Phoenix	-0.2	1.2	0.2	1.7	22.9	7.7	1.9	2.6	21.6	7.5
AZ: Phoenix/956	1.8	3.2	0.9	2.6	36	13	4.4	5.6	32	12
AZ: Tucson	3.1	3.6	0.0	1.5	28.5	9.6	3.7	4.0	29.1	9.8
CA: Anaheim	1.4	2.2	0.5	1.4	18.9	5.9	2.2	2.2	17.3	5.7
CA: Bakersfield	1.2	3.1	1.7	3.1	60	15	3.9	4.3	33	10
CA: Eureka	0.35	0.73	0.17	0.50	2.0	1.3	0.60	0.81	2.7	1.4
CA: Fresno	2.1	3.3	-0.4	1.3	37.5	9.7	2.7	2.7	30.2	8.5
CA: Los Angeles	-0.5	1.2	0.0	1.0	14.0	5.4	2.5	2.7	18.0	6.3
CA: Richmond	0.00	0.53	0.25	0.73	5.9	2.7	0.32	0.93	5.2	2.5
CA: Riverside	-0.2	1.5	0.0	1.0	27.5	8.9	2.5	3.2	22.0	7.9
CA: Sacramento	-0.1	1.5	0.0	1.2	9.3	3.8	1.1	1.6	7.7	3.4
CA: San Bernardino Cty.	4.4	5.2	0.0	2.2	37	13	3.5	4.8	17.7	9.2
CA: San Diego	1.1	1.7	0.00	0.87	20.4	6.2	0.9	1.6	17.6	5.7
CA: San Francisco	-0.17	0.60	-0.17	0.60	4.3	2.1	1.6	1.5	3.2	1.8
CA: San Jose	0.34	0.93	0.17	0.76	9.2	3.4	2.1	1.9	9.3	3.5
CO: Colorado Springs	-0.7	1.3	0.5	1.5	21.1	7.3	0.0	1.3	26.4	8.2
CO: Denver	-0.39	0.95	1.1	1.6	24.0	6.5	2.5	2.3	16.6	5.2
CO: Grand Junction	0.9	2.3	0.0	1.2	28.2	8.6	6.9	4.5	33.1	9.4
CT: Hartford	-0.40	0.54	0.00	0.42	6.4	2.4	0.23	0.68	6.7	2.4
DC: Washington	0.08	0.96	0.00	0.53	8.5	3.5	0.3	1.2	6.8	3.2
DE: Dover	0.07	0.31	0.10	0.30	8.9	2.4	0.55	0.63	6.7	2.0
FL: Jacksonville	-0.25	0.39	0.15	0.56	11.5	2.8	0.85	0.81	9.5	2.5
FL: Miami	0.76	0.73	-0.13	0.32	9.5	2.6	1.5	1.1	8.7	2.4
FL: Orlando	0.21	0.45	2.4	1.2	9.2	2.3	0.73	0.66	8.3	2.1
FL: Tallahassee	-0.40	0.36	-0.08	0.28	6.3	1.9	0.09	0.52	6.3	1.9
FL: Tampa	0.08	0.70	0.46	0.81	48.0	8.8	2.5	1.8	41.2	7.8
GA: Atlanta	0.14	0.41	0.14	0.52	18.5	3.9	0.69	0.80	13.5	3.2
GA: Augusta	-0.30	0.57	0.00	0.48	12.6	3.6	1.8	1.5	11.0	3.3
HI: Hilo	0.4	1.3	-0.16	0.54	4.2	2.1	0.09	0.82	1.7	1.4
HI: Honolulu	-0.45	0.84	0.00	0.70	3.6	2.1	0.29	0.85	4.0	2.1
IA: Des Moines	-0.40	0.54	0.00	0.42	13.4	3.7	1.7	1.4	14.9	4.0
IA: Mason City	0.27	0.74	0.14	0.61	12.2	3.4	0.9	1.0	7.8	2.6
ID: Idaho Falls	-0.2	1.0	-0.2	1.0	24.0	7.4	1.3	2.3	21.6	7.0

Note: NA = No Analysis

Table 9 (continued)
Plutonium and Uranium in Airborne Particulates
January - December 2010 Composites

Location	^{238}Pu aCi/m³	± 2*u*	$^{239–240}$Pu aCi/m³	± 2*u*	^{234}U aCi/m³	± 2*u*	^{235}U aCi/m³	± 2*u*	^{238}U aCi/m³	± 2*u*
IL: Aurora	0.6	2.2	0.0	1.3	16.0	7.3	1.7	3.0	13.8	6.8
IL: Chicago	-0.2	1.8	0.4	1.7	18.8	7.3	2.1	2.9	23.5	8.2
IN: Fort Wayne	-1.1	1.3	0.8	1.7	16.0	6.3	2.5	2.9	14.8	5.6
IN: Indianapolis	0.9	1.3	0.6	1.1	11.4	4.5	1.2	1.8	9.9	4.1
KS: Kansas City	0.08	0.71	-0.08	0.51	23.5	5.9	1.3	1.5	18.1	5.0
KS: Topeka	-0.3	1.1	0.00	0.99	17.1	6.5	1.7	2.6	15.5	6.3
KS: Wichita	-0.23	0.55	0.08	0.70	15.3	4.3	1.0	1.3	17.7	4.7
KY: Lexington	0.6	1.0	-0.10	0.65	11.5	3.6	1.1	1.3	9.0	3.1
KY: Louisville	-0.45	0.44	0.25	0.55	8.7	2.4	0.95	0.86	9.2	2.5
LA: Baton Rouge	2.1	3.1	1.0	2.0	16.0	7.0	1.8	3.2	23.3	8.6
LA: Shreveport	-0.72	0.85	0.21	0.92	7.4	3.3	0.8	1.3	9.0	3.7
MA: Worcester	0.0	1.5	0.00	0.98	15.9	6.0	1.2	2.1	18.9	6.6
MD: Baltimore	-0.3	1.0	-0.21	0.72	8.7	4.0	1.3	2.0	7.0	3.6
ME: Orono	1.6	1.5	0.22	0.64	5.5	2.3	0.42	0.90	5.2	2.2
ME: Portland	0.0	1.7	-0.3	1.0	27.7	7.7	1.7	2.2	27.3	7.6
MI: Bay City 48708	0.2	1.5	0.19	0.87	7.4	3.6	0.3	1.3	10.4	4.4
MI: Detroit	-0.18	0.63	0.00	0.86	8.7	3.4	-0.11	0.75	9.3	3.5
MI: Grand Rapids	-0.19	0.67	0.00	0.61	5.5	2.5	0.10	0.93	6.6	2.8
MN: Duluth	0.10	0.46	-0.05	0.34	4.6	2.0	0.14	0.63	3.2	1.7
MN: St. Paul	0.0	1.3	-0.10	0.65	8.4	3.5	-0.12	0.81	9.8	3.8
MN: Welch/510	0.3	1.5	0.3	1.2	12.9	5.0	1.1	2.0	12.2	4.8
MO: Jefferson City	0.41	0.63	0.00	0.32	6.7	2.1	0.79	0.79	8.1	2.3
MO: Springfield	-0.12	0.42	-0.12	0.42	10.5	2.8	0.66	0.75	7.5	2.3
MO: St. Louis	-0.55	0.50	0.17	0.48	14.6	3.5	1.1	1.0	11.8	3.1
MS: Jackson	-0.22	0.41	-0.05	0.36	10.6	2.7	1.4	1.0	10.0	2.6
MS: Jackson/Deq	0.00	0.51	0.00	0.51	9.5	3.6	1.6	1.7	9.5	3.6
MT: Billings	-0.6	2.1	0.4	1.9	27.2	9.1	3.0	3.4	27.6	9.1
NC: Charlotte	-0.05	0.47	-0.15	0.35	7.8	2.4	1.3	1.1	7.5	2.3
NC: Wilmington	0.19	0.55	0.00	0.40	6.5	2.6	0.7	1.2	4.2	2.2
ND: Bismarck	-0.27	0.92	0.5	1.5	13.3	5.1	0.8	1.7	8.1	3.9
NE: Kearney	0.36	0.79	0.00	0.68	17.0	4.4	1.5	1.4	15.0	4.1
NE: Lincoln	-0.8	1.2	0.00	0.96	18.4	6.6	1.5	2.3	15.4	5.9
NE: Omaha	0.45	0.95	-0.07	0.50	19.8	4.7	1.4	1.3	18.9	4.6
NH: Concord	-0.7	3.0	0.7	2.2	12.7	6.4	3.3	4.1	8.4	5.5
NJ: Edison	0.00	0.59	0.5	1.0	8.1	3.4	0.4	1.1	5.8	2.9
NJ: Trenton	0.2	1.0	0.2	1.0	9.3	3.7	-0.13	0.88	7.3	3.3
NM: Albuquerque	0.00	0.93	-0.4	1.1	23.0	8.2	1.9	2.9	21.4	7.8
NM: Carlsbad	0.3	1.4	0.00	0.96	19.2	6.6	0.6	1.6	15.8	5.9
NM: Navajo Lake St Park	0.17	0.50	0.17	0.50	9.8	3.2	0.6	1.1	15.1	4.1
NM: Santa Fe	0.09	0.83	-0.18	0.62	22.4	5.5	1.3	1.5	21.5	5.4

Note: NA = No Analysis

Table 9 (continued)
Plutonium and Uranium in Airborne Particulates
January - December 2010 Composites

Location	^{238}Pu		$^{239-240}$Pu		^{234}U		^{235}U		^{238}U	
	aCi/m³	± 2*u*	aCi/m³	± 2*u*	aCi/m³	± 2*u*	aCi/m³	± 2*u*	aCi/m³	± 2*u*
NV: Las Vegas/913	0.00	0.53	0.25	0.74	25.4	7.3	0.3	1.5	18.1	6.0
NV: Reno	0.0	1.3	0.00	0.87	17.2	5.7	0.00	0.99	17.5	5.8
NY: Albany	0.2	1.4	-0.2	1.0	9.9	4.7	3.6	3.3	12.9	5.3
NY: Hauppauge	0.00	0.65	0.00	0.44	6.3	2.8	0.6	1.1	4.6	2.3
NY: Lockport	0.06	0.58	-0.13	0.44	3.9	1.8	-0.08	0.52	5.4	2.2
NY: Rochester	0.0	1.3	0.00	0.58	5.5	2.9	-0.28	0.95	5.5	2.9
NY: Yaphank	0.0	1.0	0.52	0.91	6.5	3.0	-0.12	0.80	5.3	2.7
OH: Cincinnati	0.46	0.98	0.27	0.80	9.0	3.7	0.3	1.2	7.4	3.4
OH: Cleveland	0.00	0.72	0.00	0.72	18.1	5.5	1.6	1.9	10.0	4.0
OH: Painesville	-0.14	0.47	0.41	0.72	10.8	3.1	0.49	0.88	6.5	2.4
OH: Toledo	0.00	0.74	-0.12	0.78	16.1	5.5	-0.2	1.0	14.1	5.2
OK: Oklahoma City	-0.13	0.31	-0.08	0.29	6.6	1.9	0.52	0.59	4.8	1.6
OK: Tulsa	-0.9	1.4	0.4	1.7	21.6	8.0	1.2	2.6	30.3	9.7
OR: Corvallis	0.7	3.2	0.5	2.2	3.0	4.6	0.0	3.8	-0.8	3.3
OR: Portland	-0.3	1.0	-0.10	0.68	9.9	3.8	0.7	1.3	6.5	3.0
PA: Harrisburg	-0.19	0.67	-0.10	0.64	6.1	2.6	0.8	1.2	7.1	2.9
PA: Philadelphia	0.24	0.88	0.24	0.69	15.8	4.2	0.9	1.2	14.7	4.1
PA: Pittsburgh	-0.21	0.39	-0.05	0.34	9.6	2.7	1.04	0.93	9.9	2.7
RI: Providence	1.12	0.94	-0.10	0.35	4.2	1.8	0.13	0.74	3.7	1.7
SC: Barnwell	-0.10	0.18	-0.05	0.17	6.5	1.7	0.18	0.32	5.9	1.6
SC: Columbia	0.09	0.50	-0.04	0.29	18.0	3.7	2.0	1.1	12.8	2.9
SD: Pierre	-0.3	1.9	0.5	1.4	21.4	7.9	1.0	2.6	15.4	6.7
SD: Rapid City	0.2	2.1	-0.2	1.6	10.3	5.5	3.6	3.9	11.4	5.8
TN: Knoxville	-0.12	0.30	0.25	0.44	10.9	2.7	0.20	0.54	9.7	2.5
TN: Memphis	-0.16	0.54	0.00	0.49	13.1	3.8	0.27	0.78	15.1	4.2
TN: Nashville	0.08	0.47	-0.12	0.30	9.7	2.6	2.0	1.2	8.9	2.5
TN: Oak Ridge/Bethel	0.77	0.73	0.09	0.40	14.1	3.2	0.43	0.58	7.9	2.2
TN: Oak Ridge/K25	0.84	0.95	0.42	0.74	16.2	3.8	0.70	0.88	5.7	2.1
TN: Oak Ridge/Melton	-0.50	0.45	0.20	0.55	7.7	2.3	0.58	0.72	6.1	2.0
TN: Oak Ridge/Y12 E	0.00	0.62	0.6	1.0	45.1	9.1	2.9	2.1	14.7	4.5
TN: Oak Ridge/Y12 W	0.17	0.99	0.44	0.94	125	19	7.9	3.1	36.3	7.2
TX: Amarillo	-0.7	1.2	-0.2	1.1	15.2	6.3	3.2	3.2	14.3	6.0
TX: Austin	0.17	0.73	0.00	0.35	11.0	3.1	1.0	1.1	12.3	3.2
TX: Corpus Christi	1.3	3.8	0.0	2.1	12.3	6.4	1.7	3.1	11.8	6.4
TX: Dallas	-0.28	0.52	0.00	0.44	11.4	3.3	0.53	0.94	12.6	3.5
TX: El Paso	1.0	2.1	0.0	1.8	47	12	5.0	3.8	38	10
TX: Ft. Worth	-0.36	0.87	0.6	1.3	24.1	6.8	3.6	2.7	24.8	6.9
TX: Harlingen	0.17	0.61	-0.06	0.37	8.4	2.6	0.44	0.78	6.7	2.3
TX: Houston	-0.12	0.60	-0.06	0.41	9.4	2.7	0.56	0.75	12.0	3.1
TX: Laredo	-0.13	0.89	0.4	1.5	14.9	5.8	2.5	2.7	12.0	5.2

Note: NA = No Analysis

Table 9 (continued)
Plutonium and Uranium in Airborne Particulates
January - December 2010 Composites

Location	^{238}Pu		$^{239–240}$Pu		^{234}U		^{235}U		^{238}U	
	aCi/m³	± 2*u*	aCi/m³	± 2*u*	aCi/m³	± 2*u*	aCi/m³	± 2*u*	aCi/m³	± 2*u*
TX: Lubbock	1.6	2.9	0.2	2.1	26	10	0.3	3.1	23.4	9.8
TX: San Angelo	-1.1	1.7	0.0	2.0	17.0	7.1	0.3	2.3	17.2	7.1
TX: San Antonio	0.9	1.1	-0.08	0.54	12.1	3.6	1.5	1.4	9.9	3.2
UT: Salt Lake City	-0.7	1.6	0.0	1.4	25.0	9.2	2.3	3.5	23.4	9.0
VA: Harrisonburg	0.59	0.80	-0.20	0.47	7.9	2.5	0.39	0.68	9.3	2.8
VA: Lynchburg	0.08	0.34	0.00	0.35	14.7	3.0	0.30	0.47	4.9	1.5
VA: Richmond	0.8	1.6	0.30	0.87	7.9	3.2	0.34	0.99	10.1	3.6
VA: Virginia Beach	-0.09	0.58	0.18	0.79	9.1	3.1	0.5	1.0	11.3	3.5
WA: Olympia	-0.18	0.60	0.12	0.54	3.2	1.7	0.15	0.66	3.0	1.6
WA: Richland	0.25	0.92	-0.17	0.57	5.6	2.7	0.9	1.3	4.7	2.4
WA: Seattle	-0.07	0.63	0.00	0.41	3.8	1.6	0.46	0.72	2.8	1.4
WA: Spokane	-0.5	1.1	0.2	1.4	13.6	5.6	2.6	2.8	16.0	5.9
WI: Madison	-0.35	0.66	0.26	0.77	10.9	3.8	0.1	1.0	6.8	3.0
WI: Milwaukee	0.19	0.85	0.29	0.83	7.9	3.3	1.4	1.6	7.7	3.2
WV: Charleston	1.0	1.7	0.09	0.82	11.5	4.3	0.8	1.5	9.4	3.9

Note: NA = No Analysis

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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, 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 on annual composites; (d) iodine-131 on one quarterly sample per year for each station; and (e) 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 on annual composites; and (f) strontium-90 on one-fourth of the annual composites on a four year rotating schedule.

Table 10
Tritium in Drinking Water
October - December 2010

Location	Date Collected	^{3}H pCi/L	± 2*u*
AK: Fairbanks	10/20/10	-23	79
AL: Dothan	10/06/10	-20	76
AL: Muscle Shoals	10/14/10	155	90
AL: Scottsboro	10/13/10	159	89
AR: Little Rock	10/08/10	25	86
CA: Los Angeles	10/11/10	-8	84
CA: Richmond	10/12/10	-21	83
CO: Denver	10/14/10	6	81
CT: Hartford	10/13/10	-71	80
DE: Dover	10/07/10	-6	83
FL: Tampa	10/07/10	15	82
GA: Baxley	10/19/10	-21	80
GA: Savannah	11/18/10	-102	76
HI: Honolulu	11/04/10	-75	77
IA: Cedar Rapids	10/26/10	41	82
ID: Boise	12/02/10	-9	80
ID: Idaho Falls	10/26/10	41	83
IL: Morris	10/04/10	-56	75
IL: W. Chicago	11/01/10	62	83
LA: New Orleans	12/20/10	147	91
MD: Baltimore	10/08/10	-65	81
MD: Conowingo	10/19/10	42	82
MI: Detroit	11/10/10	135	86
MN: St. Paul	10/25/10	92	85
MN: Welch	10/19/10	43	82
MO: Jefferson City	10/08/10	23	85
MS: Jackson	11/02/10	12	81
MS: Port Gibson	11/02/10	76	84
MT: Helena	10/26/10	41	83
NC: Raleigh	12/02/10	0	80
ND: Bismarck	10/11/10	-43	83
NE: Lincoln	10/14/10	13	81
NJ: Trenton	10/12/10	-55	78
NJ: Waretown	10/12/10	-61	78
NM: Santa Fe	12/22/10	-48	77
NV: Las Vegas	10/05/10	-4	77
NY: Albany	10/20/10	8	81
NY: New York City	10/13/10	-70	82
NY: Niagara Falls	10/19/10	46	83
NY: Syracuse	10/15/10	27	82

Table 10 (continued)
Tritium in Drinking Water
October - December 2010

Location	Date Collected	^{3}H pCi/L	± 2*u*
OH: Cincinnati	10/07/10	106	89
OH: Columbus	11/23/10	11	81
OH: E. Liverpool	10/20/10	50	83
OH: Painesville	11/08/10	413	99
OH: Toledo	10/08/10	93	89
OK: Oklahoma City	10/07/10	-43	75
OR: Portland	12/30/10	27	81
PA: Columbia	10/20/10	101	85
PA: Harrisburg	10/20/10	-33	79
PA: Philadelphia/Baxter	10/18/10	47	83
PA: Philadelphia/Belmont	10/18/10	8	81
PA: Philadelphia/Queen	10/18/10	127	87
PA: Pittsburgh	10/18/10	14	81
RI: Providence	11/03/10	33	82
SC: Barnwell	10/13/10	-27	79
SC: Columbia	10/14/10	-31	79
SC: Jenkinsville	10/13/10	12	81
SC: Seneca	10/11/10	-2	80
TN: Chattanooga	10/08/10	154	91
TN: Knoxville	11/29/10	-43	78
TN: Oak Ridge/#360	10/11/10	19	85
TN: Oak Ridge/#371	10/11/10	67	86
TN: Oak Ridge/#4442	10/11/10	21	85
TN: Oak Ridge/#768	10/11/10	-15	84
TN: Oak Ridge/#772	10/11/10	-23	82
TX: Austin	10/08/10	39	87
VA: Ashland	10/14/10	1940	170
VA: Lynchburg	10/14/10	-19	79
WA: Richland	10/25/10	98	86
WA: Seattle	11/19/10	-51	78

Table 11
Plutonium and Uranium Analyses
Selected Drinking Water Composite Samples
January - December 2010

Location	^{238}Pu pCi/L ± 2*u*	$^{239-240}$Pu pCi/L ± 2*u*	^{234}U pCi/L ± 2*u*	^{235}U pCi/L ± 2*u*	^{238}U pCi/L ± 2*u*
CA: Los Angeles	0.011 0.032	0.011 0.041	1.87 0.34	0.086 0.079	1.70 0.32
IL: Morris	-0.003 0.031	0.006 0.029	0.39 0.14	0.013 0.037	0.049 0.053
IL: W. Chicago	-0.014 0.029	0.000 0.018	0.206 0.099	0.013 0.038	0.011 0.031
MN: Welch	-0.013 0.032	0.000 0.028	0.061 0.077	0.080 0.091	0.011 0.050

Note: NA = No Analysis

Table 12
Iodine-131 in Drinking Water
January - December 2010

Location	Date Collected	^{131}I pCi/L	± 2*u*
AK: Fairbanks	04/22/10	0.01	0.17
AL: Dothan	04/09/10	-0.06	0.16
AL: Montgomery	01/11/10	-0.14	0.33
AL: Muscle Shoals	01/07/10	0.13	0.26
AL: Scottsboro	10/13/10	0.07	0.22
AR: Little Rock	01/12/10	-0.03	0.30
CA: Los Angeles	01/12/10	-0.02	0.17
CA: Richmond	01/07/10	-0.01	0.15
CO: Denver	01/07/10	0.00	0.17
CT: Hartford	01/11/10	-0.04	0.13
DE: Dover	04/06/10	0.02	0.12
FL: Tampa	01/21/10	0.08	0.26
GA: Baxley	02/02/10	0.05	0.15
GA: Savannah	11/18/10	0.05	0.34
HI: Honolulu	02/04/10	-0.24	0.25
IA: Cedar Rapids	01/22/10	-0.07	0.14
ID: Boise	03/02/10	0.06	0.12
ID: Boise	08/23/10	0.10	0.25
ID: Idaho Falls	04/23/10	0.03	0.17
IL: Morris	02/17/10	-0.10	0.23
IL: W. Chicago	04/26/10	0.01	0.11
LA: New Orleans	09/28/10	0.00	0.26
MD: Baltimore	01/07/10	-0.13	0.31
MD: Conowingo	04/20/10	0.04	0.17
MI: Detroit	03/04/10	0.02	0.13
MI: Grand Rapids	07/28/10	-0.04	0.26
MN: St. Paul	04/05/10	0.01	0.13
MN: Welch	07/14/10	-0.02	0.14
MO: Jefferson City	01/08/10	0.26	0.22
MS: Jackson	02/19/10	0.06	0.28
MS: Port Gibson	04/13/10	-0.11	0.43
MT: Helena	01/25/10	-0.01	0.15
NC: Raleigh	02/26/10	0.03	0.11
ND: Bismarck	01/11/10	0.12	0.20
NE: Lincoln	04/07/10	0.32	0.25
NJ: Trenton	04/08/10	-0.04	0.23
NJ: Waretown	04/13/10	-0.30	0.35
NM: Santa Fe	09/30/10	0.06	0.16
NV: Las Vegas	10/05/10	-0.04	0.23
NY: Albany	10/20/10	-0.18	0.37
NY: New York City	07/13/10	-0.03	0.16

Table 12 (continued)
Iodine-131 in Drinking Water
January - December 2010

Location	Date Collected	^{131}I pCi/L	± 2*u*
NY: Niagara Falls	01/12/10	-0.11	0.33
NY: Syracuse	02/24/10	0.01	0.16
OH: Cincinnati	05/06/10	-0.07	0.22
OH: Columbus	11/23/10	-0.06	0.18
OH: E. Liverpool	01/27/10	0.10	0.14
OH: Painesville	08/13/10	-0.16	0.29
OH: Toledo	04/05/10	0.19	0.20
OK: Oklahoma City	01/11/10	0.00	0.20
OR: Portland	09/30/10	0.05	0.20
PA: Columbia	10/20/10	0.11	0.23
PA: Harrisburg	04/22/10	0.16	0.15
PA: Philadelphia/Baxter	02/02/10	0.52	0.17
PA: Philadelphia/Baxter	05/18/10	0.40	0.16
PA: Philadelphia/Baxter	08/04/10	0.68	0.19
PA: Philadelphia/Baxter	10/18/10	0.40	0.42
PA: Philadelphia/Belmont	02/02/10	0.31	0.37
PA: Philadelphia/Belmont	05/18/10	0.94	0.20
PA: Philadelphia/Belmont	08/04/10	2.44	0.27
PA: Philadelphia/Belmont	10/18/10	0.39	0.44
PA: Philadelphia/Queen	02/02/10	0.23	0.15
PA: Philadelphia/Queen	05/18/10	0.89	0.19
PA: Philadelphia/Queen	08/04/10	3.92	0.41
PA: Philadelphia/Queen	10/18/10	2.11	0.45
PA: Pittsburgh	07/14/10	0.03	0.14
RI: Providence	04/08/10	0.21	0.29
RI: Providence	11/03/10	0.3	1.0
SC: Barnwell	10/13/10	-0.02	0.23
SC: Columbia	01/15/10	0.08	0.17
SC: Jenkinsville	04/14/10	0.14	0.29
SC: Seneca	10/11/10	0.18	0.26
TN: Chattanooga	01/11/10	0.08	0.15
TN: Knoxville	01/08/10	0.07	0.25
TN: Oak Ridge/#360	01/12/10	0.11	0.33
TN: Oak Ridge/#371	01/12/10	-0.14	0.31
TN: Oak Ridge/#4442	01/12/10	-0.13	0.31
TN: Oak Ridge/#768	01/12/10	-0.03	0.16
TN: Oak Ridge/#772	01/12/10	0.07	0.19
TX: Austin	01/08/10	0.06	0.24
VA: Ashland	07/13/10	0.03	0.15
VA: Lynchburg	04/08/10	0.03	0.19

Table 12 (continued)
Iodine-131 in Drinking Water
January - December 2010

Location	Date Collected	^{131}I pCi/L	± 2*u*
WA: Richland	03/01/10	0.03	0.13
WA: Seattle	07/09/10	0.10	0.23

Table 13
Drinking Water
Alpha, Beta, and Sr-90 Concentrations
Composites
January - December 2010

Location	Total Solids (mg/L)	Gross Beta pCi/L ± 2*u*	Gross Alpha pCi/L ± 2*u*	^{90}Sr pCi/L ± 2*u*
AK: Fairbanks	67.0	1.5 1.6	-1.5 2.1	
AL: Dothan	50.4	1.4 1.9	0.3 2.5	
AL: Montgomery	36.8	1.1 1.1	-0.1 1.4	
AL: Muscle Shoals	60.5	2.5 1.4	0.5 1.5	
AL: Scottsboro	45.6	1.9 1.5	0.7 2.0	0.13 0.20
AR: Little Rock	39.5	0.87 0.63	0.10 0.68	
CA: Los Angeles	118.0	7.3 2.3	3.8 3.1	
CA: Richmond	51.8	0.46 0.56	0.47 0.82	
CO: Denver	88.2	2.34 0.81	0.18 0.89	
CT: Hartford	46.4	0.82 0.61	0.30 0.77	
DE: Dover	63.9	6.8 3.4	1.4 4.1	
FL: Miami	25.5	1.9 2.9	0.5 3.2	0.01 0.19
FL: Tampa	69.4	1.7 1.5	0.8 2.0	0.07 0.30
GA: Baxley	42.5	6.0 3.3	-0.6 3.3	-0.04 0.23
GA: Savannah	74.9	3.2 1.7	0.2 2.0	0.01 0.27
HI: Honolulu	82.7	2.4 1.6	0.0 2.2	
IA: Cedar Rapids	65.1	2.7 1.3	-0.1 1.5	
ID: Boise	39.1	2.0 1.5	0.4 2.0	
ID: Idaho Falls	44.3	1.6 2.8	1.3 4.1	
IL: Morris	41.4	14.3 6.9	4.0 7.4	0.02 0.24
IL: W. Chicago	41.7	6.9 3.4	2.8 4.1	-0.05 0.29
LA: New Orleans	55.1	3.6 3.0	-0.2 3.7	
MD: Baltimore	59.9	1.0 1.6	1.1 2.1	
MD: Conowingo	37.1	2.1 2.8	-0.1 3.5	
MI: Detroit	51.8	1.2 1.5	-1.0 1.7	0.34 0.24
MI: Grand Rapids	69.1	2.5 1.6	0.4 2.0	0.29 0.32
MN: St. Paul	57.6	2.2 1.6	0.3 1.8	0.31 0.32
MN: Welch	29.2	5.4 6.0	6.4 7.9	0.22 0.31
MO: Jefferson City	76.0	6.0 2.0	-0.6 1.8	
MS: Jackson	36.0	2.3 1.3	-0.3 1.3	0.26 0.24
MS: Port Gibson	57.5	5.4 3.2	1.8 4.0	-0.11 0.31
MT: Helena	76.2	2.1 1.1	-0.2 1.3	
NC: Raleigh	48.1	4.2 1.5	0.6 1.5	0.05 0.36
ND: Bismarck	65.0	4.4 1.8	0.2 2.1	
NE: Lincoln	33.4	3.1 2.1	0.8 2.4	
NJ: Trenton	77.7	1.5 1.1	0.3 1.4	
NJ: Waretown	66.5	2.07 0.78	0.12 0.78	

Table 13 (continued)
Drinking Water
Alpha, Beta, and Sr-90 Concentrations
Composites
January - December 2010

Location	Total Solids (mg/L)	Gross Beta pCi/L ± 2*u*	Gross Alpha pCi/L ± 2*u*	^{90}Sr pCi/L ± 2*u*
NM: Santa Fe	37.2	0.7 1.5	0.3 1.7	
NV: Las Vegas	86.2	8.3 3.0	-0.9 3.2	
NY: Albany	60.9	1.3 1.0	0.0 1.3	
NY: New York City	44.2	0.59 0.58	0.04 0.72	
NY: Niagara Falls	66.0	1.0 1.4	-0.2 1.9	
NY: Syracuse	65.9	1.3 1.6	0.4 1.9	
OH: Cincinnati	70.1	5.4 2.4	-0.3 2.6	
OH: Columbus	48.4	4.5 3.0	-1.2 3.5	
OH: E. Liverpool	40.3	4.1 3.1	0.5 3.4	
OH: Painesville	70.0	1.8 1.6	-0.4 1.9	
OH: Toledo	46.8	1.3 1.5	-0.7 1.7	
OK: Oklahoma City	82.1	3.7 1.8	0.1 2.0	
OR: Portland	20.4	0.72 0.60	0.49 0.78	
PA: Columbia	62.5	2.0 1.6	0.1 1.8	
PA: Harrisburg	64.5	1.8 1.6	0.9 2.1	
PA: Philadelphia/Baxter	45.3	2.8 1.7	-0.5 1.7	
PA: Philadelphia/Belmont	48.9	3.1 2.9	-0.7 3.5	
PA: Philadelphia/Queen	48.6	4.5 3.2	1.5 3.7	
PA: Pittsburgh	39.9	3.5 3.0	0.4 3.6	
RI: Providence	34.0	0.8 1.2	0.5 1.4	
SC: Barnwell	41.0	1.50 0.70	1.69 0.99	0.32 0.35
SC: Columbia	86.7	2.82 0.84	0.44 0.90	0.02 0.32
SC: Jenkinsville	70.1	2.28 0.79	0.40 0.81	-0.02 0.46
SC: Seneca	46.8	1.01 0.62	0.16 0.74	0.06 0.23
TN: Chattanooga	43.2	0.9 1.5	0.0 1.7	0.15 0.28
TN: Knoxville	50.1	3.8 1.7	-0.1 1.8	0.19 0.25
TN: Oak Ridge/#360	52.4	3.2 1.4	0.9 1.6	0.01 0.26
TN: Oak Ridge/#371	83.7	2.1 1.3	0.9 1.7	0.09 0.22
TN: Oak Ridge/#4442	74.9	2.0 1.4	1.1 1.7	0.22 0.23
TN: Oak Ridge/#768	81.2	0.8 1.2	-0.2 1.6	0.20 0.21
TN: Oak Ridge/#772	80.1	1.7 1.3	0.2 1.6	0.03 0.27
TX: Austin	51.0	2.0 1.6	-0.5 1.8	
VA: Ashland	35.7	3.0 1.4	-0.1 1.3	
VA: Lynchburg	31.8	1.0 1.0	0.0 1.1	
WA: Richland	55.5	0.86 0.72	0.9 1.2	
WA: Seattle	18.2	0.39 0.51	0.39 0.74	

Table 14
Drinking Water
Radium and Gamma-Emitting Radionuclides
Composites
January - December 2010

Location	^{226}Ra pCi/L	± 2*u*	^{228}Ra pCi/L	± 2*u*	Gamma-Emitting Radionuclides Nuclide	pCi/L	± 2*u*
AK: Fairbanks	NA		NA		K40	12	12
					Tl208	1.1	1.4
AL: Dothan	NA		NA		K40	10	17
AL: Montgomery	NA		NA		Pb212	2.4	3.7
AL: Muscle Shoals	NA		NA			ND	
AL: Scottsboro	NA		NA			ND	
AR: Little Rock	NA		NA			ND	
CA: Los Angeles	0.126	0.096	NA			ND	
CA: Richmond	NA		NA			ND	
CO: Denver	NA		NA			ND	
CT: Hartford	NA		NA			ND	
DE: Dover	NA		NA		K40	12	12
FL: Miami	NA		NA			ND	
FL: Tampa	NA		NA			ND	
GA: Baxley	NA		NA			ND	
GA: Savannah	NA		NA		K40	9	12
HI: Honolulu	NA		NA			ND	
IA: Cedar Rapids	NA		NA			ND	
ID: Boise	NA		NA			ND	
ID: Idaho Falls	NA		NA			ND	
IL: Morris	1.34	0.31	NA		K40	9	13
IL: W. Chicago	0.79	0.24	NA		Tl208	1.4	1.7
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		Pb212	2.7	2.0
					Tl208	1.19	0.85
MN: St. Paul	NA		NA		Pb212	2.1	2.2
MN: Welch	1.35	0.32	NA		Pb212	2.8	3.6
					Tl208	1.2	1.5
MO: Jefferson City	NA		NA		K40	10	12
MS: Jackson	NA		NA			ND	
MS: Port Gibson	NA		NA		K40	21	14
MT: Helena	NA		NA		K40	15	12

Note: ND = Not Detected
NA = No Analysis

Table 14 (continued)
Drinking Water
Radium and Gamma-Emitting Radionuclides
Composites
January - December 2010

Location	^{226}Ra pCi/L ± 2*u*	^{228}Ra pCi/L ± 2*u*	Gamma-Emitting Radionuclides Nuclide	pCi/L ± 2*u*
NC: Raleigh	NA	NA	Tl208	1.1 1.4
ND: Bismarck	NA	NA		ND
NE: Lincoln	NA	NA		ND
NJ: Trenton	NA	NA		ND
NJ: Waretown	NA	NA	K40	9 12
NM: Santa Fe	NA	NA		ND
NV: Las Vegas	NA	NA	Pb212	6.5 7.5
NY: Albany	NA	NA		ND
NY: New York City	NA	NA		ND
NY: Niagara Falls	NA	NA	Tl208	0.56 0.61
NY: Syracuse	NA	NA		ND
OH: Cincinnati	NA	NA	Pb212	1.4 1.7
			Tl208	0.96 0.86
OH: Columbus	NA	NA	Pb212	1.1 2.0
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	Tl208	1.3 1.5
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		ND
SC: Barnwell	NA	NA		ND
SC: Columbia	NA	NA		ND
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		ND
TN: Oak Ridge/#371	NA	NA	Tl208	0.80 0.76
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 2010

Location	^{226}Ra pCi/L ± 2*u*	^{228}Ra pCi/L ± 2*u*	Gamma-Emitting Radionuclides Nuclide	pCi/L ± 2*u*
TN: Oak Ridge/#768	NA	NA	Pb212	2.4 2.9
TN: Oak Ridge/#772	NA	NA		ND
TX: Austin	NA	NA		ND
VA: Ashland	NA	NA		ND
VA: Lynchburg	NA	NA	Tl208	1.48 0.79
WA: Richland	NA	NA		ND
WA: Seattle	NA	NA		ND

Note: ND = Not Detected
NA = No Analysis

3. Milk Program

Pasteurized Milk

Milk is a reliable indicator of the general population's intake of certain radionuclides since it is consumed fresh by a large segment of the population and can contain several of the biologically significant radionuclides that result from environmental releases from nuclear activities. A primary function of this program is to obtain reliable monitoring data relative to current radionuclide concentrations and determine any long-term trends.

Quarterly samples are collected at approximately 55 sampling sites. The samples are composited, according to production, from the major milk suppliers representing more than 80 percent of the milk consumed in a given population center.

The samples are analyzed for gamma-emitting nuclides, including iodine-131, barium-140, cesium-137, and potassium-40. Total potassium concentrations in g/L are determined from potassium-40 activities assuming natural isotopic abundances. During the third quarter collection, one-fourth of the samples are also analyzed for strontium-90 on a four year rotating schedule.

Table 15

Radionuclides in Pasteurized Milk

October - December 2010

Location	Date Collected	K g/L ± 2*u*	^{137}Cs pCi/L ± 2*u*	^{140}Ba pCi/L ± 2*u*	^{131}I pCi/L ± 2*u*
AR: Little Rock	11/30/10	1.49 0.19	ND	ND	ND
AZ: Phoenix	12/31/10	1.64 0.21	ND	ND	ND
CA: Los Angeles	11/08/10	1.54 0.20	ND	ND	ND
CA: San Francisco	10/18/10	1.67 0.20	ND	ND	ND
CT: Hartford	10/13/10	1.51 0.19	ND	ND	ND
FL: Tampa	10/27/10	1.50 0.19	ND	ND	ND
HI: Hilo	11/15/10	1.62 0.20	ND	ND	ND
IA: Des Moines	12/08/10	1.61 0.20	ND	ND	ND
KS: Wichita	11/16/10	1.55 0.20	ND	ND	ND
KY: Louisville	10/12/10	1.61 0.20	ND	ND	ND
MD: Baltimore	10/12/10	1.55 0.19	ND	ND	ND
MI: Detroit	11/16/10	1.63 0.20	ND	ND	ND
MO: Jefferson City	11/10/10	1.60 0.20	ND	ND	ND
NJ: Trenton	10/12/10	1.61 0.20	ND	ND	ND
NM: Albuquerque	10/14/10	1.55 0.20	ND	ND	ND
NY: Buffalo	11/22/10	1.69 0.20	ND	ND	ND
NY: Syracuse	10/22/10	1.57 0.20	ND	ND	ND
OH: Cincinnati	12/06/10	1.57 0.19	ND	ND	ND
OH: Cleveland	12/15/10	1.70 0.21	ND	ND	ND
OR: Portland	10/25/10	1.66 0.21	ND	ND	ND
PA: Pittsburgh	10/27/10	1.51 0.19	ND	ND	ND
TN: Chattanooga	11/23/10	1.56 0.19	ND	ND	ND
TN: Knoxville	11/22/10	1.57 0.19	ND	ND	ND
TN: Memphis	12/13/10	1.61 0.21	ND	ND	ND
TX: San Antonio	10/12/10	1.32 0.17	ND	ND	ND
VT: Montpelier	10/06/10	1.56 0.20	2.5 2.3	ND	ND
VT: Montpelier	12/30/10	1.68 0.20	ND	ND	ND
WA: Spokane	12/16/10	1.51 0.19	ND	ND	ND
WA: Tacoma	12/29/10	1.64 0.20	ND	ND	ND
WV: Charleston	10/13/10	1.57 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, the data that are generated or publication and distribution of ERD should be directed to:

Charles M. Petko
Office of the Director
National Air and Radiation Environmental Laboratory
540 South Morris Avenue
Montgomery, Alabama 36115-2601
e-mail: petko.charles@epa.gov

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

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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