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ENVIRONMENTAL RADIATION DATA

REPORT 96

October - December 1998

United States Environmental Protection Agency

Office of Radiation and Indoor Air

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Preface

Environmental Radiation Data (ERD) is compiled and published quarterly by the Office of Radiation and Indoor Air's National Air and Radiation Environmental Laboratory (NAREL) in Montgomery, Alabama, and contains data from the Environmental Radiation Ambient Monitoring System (ERAMS). ERD is published in both hard-copy and electronic formats. Electronic reports are available online at www.epa.gov/narel.

The United States Environmental Protection Agency established ERAMS in 1973 with an emphasis on identifying trends in the accumulation of long-lived radionuclides in the environment. ERAMS is comprised of a nationwide network of sampling stations that provide air, precipitation, surface water, drinking water, and milk samples.

Sampling locations are selected to provide optimal population coverage while functioning to monitor fallout from nuclear devices and other forms of radioactive contamination of the environment. The radiation analyses performed on these samples include gross alpha and gross beta analyses, gamma analyses, and radionuclide-specific analyses for uranium, plutonium, strontium, iodine, radium, and tritium. This monitoring effort also provides ancillary information on natural background levels and on routine and accidental releases into the environment from stationary sources.

The radiochemical procedures used by NAREL to analyze the ERAMS samples are contained in the *Eastern Environmental Radiation Facility Radiochemistry Procedures Manual* (EPA 520/5-84-006). Station operation and sample collection are in accordance with procedures contained in the *ERAMS Manual* (EPA 520/5-84-007, 008, 009).

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Acknowledgments

All sampling for the Environmental Radiation Ambient Monitoring System (ERAMS) is performed by volunteer collectors who are frequently members of the health departments or related environmental agencies of their respective states. The National Air and Radiation Environmental Laboratory (NAREL) on behalf of the U.S. Environmental Protection Agency would like to acknowledge the time and effort of these volunteer collectors, who are so essential to the successful operation of ERAMS. The efforts of the sample collectors are especially appreciated during times of emergency operation when sampling frequencies are increased and schedules are sometimes demanding.

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Data Reporting Conventions

Every laboratory measurement involves uncertainty. When there is little or no radioactivity in a sample, one consequence of measurement uncertainty is the possibility of obtaining a measured value that is less than zero. Such a negative result occurs when random effects in the measurement process cause the measured value for the sample to be less than that of the blank or background, which is subtracted from it. From April 1991 to December 1995, negative results were reported as "not detected" or "ND," and gamma analysis results that were less than their estimated measurement uncertainties were also reported as "ND." In January 1996 both of these practices were discontinued. Although negative activities are physically impossible, the inclusion of negative results in the report allows better statistical analysis of the data.

Results of gamma analyses are still reported as "ND" when gamma-emitting radionuclides are not detected.

Measurement Uncertainty

Each measured value y is reported with an expanded uncertainty $U = k\,u_c(y)$, which is determined from the combined standard uncertainty $u_c(y)$ and the coverage factor $k = 2$. The interval from $y - U$ to $y + U$ is estimated to have a level of confidence of approximately 95%.

Significant Figures

Expanded uncertainties are reported to two significant figures. Measurement results are rounded to the corresponding number of decimal places.

Detection Capability

The minimum detectable concentrations (MDCs) for each radionuclide are shown in Table 1. The MDC is defined as the minimum concentration that gives a 95% probability of detection when the detection criteria are chosen to give only a 5% probability of false detection in a blank sample.

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Table 1

Reporting Units and Minimum Detectable Concentrations for Radionuclide Analyses

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

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

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

‡ Activity as of the day of counting.

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1. Air Program

Airborne Particulates and Precipitation

Gross beta radioactivity measurements and certain specific analyses are performed on air particulates and precipitation samples as indicator measurements in assessing the general (national) impact of all contributing sources on environmental levels of radiation.

Airborne particulates are collected continuously at field stations representing wide geographic coverage, including present and potential sources of environmental radioactivity. Sampling sites are located 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 at 5 hours after collection to allow for decay of natural radon isotopes and their progeny. Field estimates are reported to appropriate EPA officials by telephone or mail depending on the activity levels found.

The filters are sent to NAREL for more sensitive analyses in a low background beta counter. Gamma scans are performed on all filters showing gross beta counts greater than 1 pCi/m^3. The laboratory obtained values are usually lower than the field estimates due to the decay of naturally occurring radionuclides between the times of the two measurements.

Precipitation samples are collected at most field stations collecting 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 1998

Location	Number of Samples	5-hour Field Estimate (pCi/m³)			NAREL Lab Measurement (pCi/m³)		
		Max	Min	Avg	Max	Min	Avg
AK: Fairbanks	1	0.0	0.0	0.0	0.008	0.008	0.008
AL: Montgomery	9	0.2	0.0	0.1	0.063	0.012	0.035
AR: Little Rock	9	0.2	0.0	0.1	0.020	0.006	0.013
AZ: Phoenix	4	1.0	0.4	0.7	0.025	0.009	0.017
CA: Berkeley	8	0.2	0.1	0.1	0.017	0.004	0.008
CA: Los Angeles	9	0.3	0.1	0.2	0.023	0.008	0.015
CO: Denver	9	2.0	0.5	1.0	0.020	0.007	0.015
CT: Hartford	9	0.1	0.0	0.1	0.011	0.002	0.007
DE: Wilmington	9	0.3	0.1	0.2	0.016	0.003	0.010
FL: Jacksonville	6	0.1	0.0	0.0	0.016	0.007	0.011
FL: Miami	4	0.0	0.0	0.0	0.006	0.005	0.005
IA: Iowa City	9	0.4	0.1	0.2	0.030	0.006	0.012
ID: Boise	9	0.9	0.2	0.6	0.023	0.005	0.011
ID: Idaho Falls	9				0.017	0.006	0.011
IN: Indianapolis	9	0.9	0.1	0.2	0.019	0.006	0.012
KS: Topeka	8	1.2	0.2	0.5	0.015	0.005	0.010
ME: Augusta	8	0.1	0.0	0.1	0.007	0.004	0.006
MI: Lansing	9	0.6	0.1	0.3	0.019	0.005	0.010
MN: Welch	18	1.2	0.1	0.3	0.021	0.004	0.010
MS: Jackson	9	0.7	0.1	0.5	0.030	0.009	0.017
NC: Charlotte	5	0.1	0.0	0.1	0.025	0.013	0.016
ND: Bismarck	5	0.7	0.2	0.4	0.021	0.007	0.013
NH: Concord	9	0.1	0.0	0.1	0.009	0.002	0.006
NJ: Trenton	6				0.014	0.007	0.010
NV: Las Vegas	9	0.3	0.1	0.2	0.021	0.007	0.013
NY: Albany	4	0.1	0.0	0.1	0.012	0.003	0.009
NY: New York City	7	0.1	0.0	0.1	0.011	0.003	0.008
NY: Yaphank	8	0.1	0.0	0.1	0.010	0.003	0.008
OH: Columbus	3	0.1	0.0	0.1	0.017	0.012	0.015
OH: Painesville	8	0.3	0.1	0.2	0.017	0.006	0.011
OH: Ross	9				0.023	0.008	0.015
OR: Portland	9	0.4	0.0	0.1	0.018	0.003	0.008
PA: Harrisburg	9	0.7	0.1	0.4	0.022	0.004	0.013
PA: Pittsburgh	9				0.029	0.006	0.014
SC: Barnwell	1	0.0	0.0	0.0	0.010	0.010	0.010
SC: Columbia	9	0.7	0.0	0.3	0.024	0.010	0.015
SD: Pierre	2	0.1	0.0	0.1	0.012	0.006	0.009
TN: Nashville	9	0.6	0.1	0.3	0.021	0.010	0.017

Table 2 (continued)

Gross Beta in Airborne Particulates
October 1998

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min	Avg	Max	Min	Avg
		(pCi/m³)			(pCi/m³)		
TN: Oak Ridge/Bethel	9	1.2	0.4	0.8	0.024	0.009	0.016
TN: Oak Ridge/K25	9	1.3	0.4	0.8	0.024	0.008	0.016
TN: Oak Ridge/Melton	9	1.4	0.5	0.8	0.022	0.009	0.015
TN: Oak Ridge/Y12 E	9	2.1	0.2	0.9	0.025	0.009	0.015
TN: Oak Ridge/Y12 W	9	0.7	0.2	0.4	0.025	0.009	0.015
TX: Austin	9	0.4	0.0	0.1	0.023	0.006	0.010
TX: El Paso	8	0.8	0.1	0.5	0.024	0.005	0.013
UT: Salt Lake City	5	0.2	0.1	0.1	0.031	0.009	0.015
VA: Lynchburg	9	0.7	0.4	0.6	0.018	0.006	0.011
WA: Olympia	2	1.2	0.1	0.7	0.015	0.003	0.009
WA: Spokane	9	0.5	0.1	0.3	0.035	0.005	0.013
WI: Madison	8	0.4	0.1	0.2	0.019	0.005	0.010

Table 3

Gross Beta in Airborne Particulates
November 1998

Location	Number of Samples	5-hour Field Estimate (pCi/m³)			NAREL Lab Measurement (pCi/m³)		
		Max	Min	Avg	Max	Min	Avg
AK: Fairbanks	1	0.0	0.0	0.0	0.013	0.013	0.013
AL: Montgomery	9	0.1	0.0	0.1	0.041	0.014	0.025
AR: Little Rock	8	0.2	0.0	0.1	0.020	0.009	0.016
AZ: Phoenix	4	1.0	0.4	0.7	0.029	0.016	0.023
CA: Berkeley	8	0.1	0.0	0.1	0.008	0.002	0.005
CA: Los Angeles	7	0.4	0.1	0.2	0.019	0.005	0.013
CO: Denver	8	1.1	0.2	0.6	0.014	0.007	0.009
CT: Hartford	9	0.1	0.0	0.1	0.015	0.003	0.008
DE: Wilmington	9	0.4	0.1	0.3	0.021	0.007	0.012
FL: Jacksonville	7	0.2	0.0	0.1	0.020	0.008	0.013
FL: Miami	4	0.0	0.0	0.0	0.013	0.004	0.008
IA: Iowa City	4	0.2	0.0	0.1	0.015	0.008	0.012
ID: Boise	7	0.6	0.1	0.3	0.014	0.006	0.009
ID: Idaho Falls	7				0.016	0.006	0.012
IN: Indianapolis	7	0.1	0.0	0.1	0.018	0.008	0.013
KS: Topeka	8	0.6	0.1	0.3	0.017	0.007	0.013
ME: Augusta	6	0.2	0.0	0.1	0.014	0.001	0.007
MI: Lansing	9	0.3	0.1	0.2	0.019	0.005	0.011
MN: Welch	18	0.7	0.1	0.3	0.023	0.004	0.012
MS: Jackson	7	0.8	0.1	0.3	0.019	0.013	0.016
NC: Charlotte	3	0.1	0.0	0.0	0.028	0.021	0.026
ND: Bismarck	4	0.7	0.1	0.3	0.023	0.009	0.017
NH: Concord	8	0.2	0.0	0.1	0.012	0.002	0.007
NJ: Trenton	6				0.021	0.005	0.012
NV: Las Vegas	9	0.3	0.0	0.2	0.023	0.007	0.014
NY: Albany	4	0.1	0.0	0.0	0.019	0.007	0.012
NY: New York City	7	0.1	0.0	0.1	0.017	0.005	0.011
NY: Yaphank	6	0.1	0.0	0.1	0.022	0.004	0.011
OH: Columbus	3	0.1	0.0	0.1	0.019	0.016	0.018
OH: Painesville	8	0.4	0.1	0.2	0.020	0.005	0.012
OH: Ross	7				0.022	0.008	0.016
OR: Portland	7	0.2	0.0	0.1	0.009	0.002	0.005
PA: Harrisburg	10	1.4	0.1	0.4	0.024	0.006	0.014
PA: Pittsburgh	9				0.020	0.007	0.014
SC: Barnwell	2	0.1	0.0	0.0	0.019	0.015	0.017
SC: Columbia	7	0.7	0.1	0.3	0.024	0.014	0.018
SD: Pierre	6	0.2	0.0	0.1	0.021	0.011	0.014
TN: Knoxville	4	1.7	0.5	1.1	0.040	0.022	0.030

Table 3 (continued)

Gross Beta in Airborne Particulates
November 1998

Location	Number of Samples	5-hour Field Estimate (pCi/m³)			NAREL Lab Measurement (pCi/m³)		
		Max	Min	Avg	Max	Min	Avg
TN: Nashville	7	0.3	0.1	0.2	0.023	0.015	0.018
TN: Oak Ridge/Bethel	9	0.8	0.3	0.6	0.037	0.014	0.019
TN: Oak Ridge/K25	9	0.9	0.4	0.6	0.019	0.013	0.016
TN: Oak Ridge/Melton	9	0.8	0.3	0.5	0.022	0.012	0.016
TN: Oak Ridge/Y12 E	9	1.0	0.4	0.6	0.023	0.013	0.017
TN: Oak Ridge/Y12 W	9	0.6	0.2	0.3	0.022	0.014	0.017
TX: Austin	8	0.1	0.0	0.1	0.015	0.006	0.011
TX: El Paso	7	1.4	0.1	0.9	0.040	0.013	0.022
UT: Salt Lake City	4	0.2	0.1	0.1	0.015	0.006	0.012
VA: Lynchburg	8	0.9	0.4	0.7	0.019	0.008	0.013
WA: Olympia	5	0.1	0.0	0.0	0.005	0.001	0.004
WA: Spokane	9	0.4	0.1	0.2	0.018	0.002	0.009
WI: Madison	8	0.6	0.2	0.3	0.023	0.008	0.014

Table 4

Gross Beta in Airborne Particulates
December 1998

Location	Number of Samples	5-hour Field Estimate (pCi/m³)			NAREL Lab Measurement (pCi/m³)		
		Max	Min	Avg	Max	Min	Avg
AK: Fairbanks	3	0.0	0.0	0.0	0.037	0.014	0.025
AL: Montgomery	9	0.4	0.0	0.1	0.024	0.010	0.019
AR: Little Rock	8	0.4	0.0	0.1	0.015	0.010	0.014
AZ: Phoenix	5	0.5	0.2	0.4	0.028	0.018	0.023
CA: Berkeley	7	0.4	0.0	0.1	0.011	0.003	0.007
CA: Los Angeles	10	0.5	0.0	0.2	0.026	0.005	0.013
CO: Denver	7	1.4	0.1	0.8	0.019	0.004	0.009
CT: Hartford	9	0.4	0.0	0.1	0.015	0.006	0.010
DE: Wilmington	9	0.5	0.1	0.2	0.021	0.008	0.014
FL: Jacksonville	6	0.2	0.0	0.1	0.012	0.006	0.009
FL: Miami	2	0.0	0.0	0.0	0.008	0.006	0.007
IA: Iowa City	8	0.9	0.1	0.4	0.020	0.009	0.015
ID: Boise	10	0.7	0.1	0.3	0.035	0.003	0.013
ID: Idaho Falls	8				0.025	0.005	0.012
IN: Indianapolis	10	0.4	0.1	0.2	0.017	0.009	0.013
KS: Topeka	9	0.9	0.4	0.6	0.022	0.013	0.016
ME: Augusta	8	0.1	0.0	0.1	0.025	0.007	0.012
MI: Lansing	8	0.3	0.1	0.2	0.019	0.007	0.012
MN: Welch	6	1.9	0.1	0.8	0.019	0.011	0.016
MS: Jackson	6	0.3	0.0	0.1	0.022	0.011	0.014
NC: Charlotte	3	0.1	0.0	0.1	0.016	0.011	0.014
NC: Wilmington	1				0.009	0.009	0.009
ND: Bismarck	3	0.6	0.1	0.4	0.012	0.006	0.010
NH: Concord	10	0.3	0.0	0.1	0.020	0.006	0.010
NJ: Trenton	1				0.006	0.006	0.006
NV: Las Vegas	9	0.3	0.1	0.2	0.027	0.004	0.015
NY: Albany	5	0.1	0.0	0.0	0.024	0.010	0.017
NY: New York City	7	0.2	0.0	0.1	0.021	0.009	0.013
NY: Yaphank	6	0.1	0.0	0.0	0.016	0.007	0.011
OH: Columbus	5	0.1	0.0	0.1	0.024	0.012	0.019
OH: Painesville	6	0.4	0.1	0.2	0.017	0.009	0.013
OH: Ross	7				0.018	0.009	0.014
OR: Portland	7	0.1	0.0	0.0	0.012	0.002	0.005
PA: Harrisburg	9	0.8	0.2	0.4	0.025	0.010	0.016
PA: Pittsburgh	9				0.021	0.009	0.015
SC: Barnwell	1	0.0	0.0	0.0	0.012	0.012	0.012
SC: Columbia	8	0.8	0.0	0.3	0.020	0.009	0.012
SD: Pierre	7	0.3	0.1	0.2	0.014	0.004	0.010

Table 4 (continued)

Gross Beta in Airborne Particulates
December 1998

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min	Avg	Max	Min	Avg
		(pCi/m³)			(pCi/m³)		
TN: Knoxville	8	1.5	0.0	0.6	0.024	0.010	0.019
TN: Nashville	8	0.2	0.0	0.1	0.024	0.007	0.016
TN: Oak Ridge/Bethel	9	1.0	0.0	0.3	0.019	0.007	0.015
TN: Oak Ridge/K25	9	1.1	0.0	0.3	0.019	0.006	0.014
TN: Oak Ridge/Melton	9	0.7	0.0	0.3	0.018	0.007	0.014
TN: Oak Ridge/Y12 E	9	0.7	0.0	0.3	0.018	0.007	0.014
TN: Oak Ridge/Y12 W	9	0.3	0.0	0.2	0.020	0.007	0.015
TX: Austin	8	0.3	0.0	0.1	0.017	0.007	0.013
TX: El Paso	8	2.7	0.4	1.2	0.037	0.011	0.021
UT: Salt Lake City	5	0.1	0.0	0.1	0.029	0.007	0.017
VA: Lynchburg	6	0.7	0.2	0.5	0.015	0.006	0.010
WA: Olympia	4	0.0	0.0	0.0	0.003	0.002	0.002
WA: Spokane	9	0.2	0.0	0.1	0.019	0.001	0.008
WI: Madison	5	1.0	0.2	0.5	0.024	0.008	0.015

Table 5

Gross Beta and Specific Gamma in Precipitation
October 1998

Location	Gross Beta Activity		Specific Gamma Activity		
	pCi/L	± 2*u*	Nuclide	pCi/L	± 2*u*
AL: Montgomery	1.09	0.27		ND	
AR: Little Rock	1.84	0.34	Be7	53	28
AZ: Phoenix	4.88	0.49		ND	
CO: Denver	13.57	0.78		ND	
CT: Hartford	2.18	0.35	Be7	56	29
DE: Wilmington	1.49	0.31	Be7	47	25
FL: Jacksonville	2.07	0.35		ND	
FL: Miami	0.38	0.24		ND	
IA: Iowa City	0.67	0.25		ND	
ID: Idaho Falls	1.70	0.32		ND	
ME: Augusta	2.31	0.37	Be7	67	31
MI: Lansing	1.73	0.34		ND	
MN: Minneapolis	2.64	0.39	Tl208	3.0	5.2
MN: Welch	8.48	0.71	K40	24	42
NC: Charlotte	1.89	0.34	Be7	37	20
			Pb212	3.8	3.3
			Tl208	1.7	1.7
NC: Wilmington	0.67	0.26		ND	
ND: Bismarck	0.99	0.28		ND	
NE: Lincoln	1.42	0.30		ND	
NH: Concord	1.60	0.32		ND	
NM: Santa Fe	5.26	0.52	Be7	89	40
NY: Albany	1.21	0.30		ND	
NY: Yaphank	24.4	1.0		ND	
OH: Painesville	1.47	0.31	Be7	48	18
OR: Portland	0.80	0.26		ND	
PA: Harrisburg	1.89	0.34	Be7	37	28
SC: Barnwell	2.03	0.35		ND	
SC: Columbia	1.40	0.31		ND	
TN: Knoxville	0.92	0.26		ND	
TN: Nashville	0.67	0.25	Pb212	2.9	3.5
TX: Austin	0.34	0.23	Bi212	43	37
TX: El Paso	0.67	0.26		ND	
UT: Salt Lake City	2.61	0.39		ND	
VA: Lynchburg	39.0	1.4	K40	42	43
WI: Madison	0.70	0.25		ND	

Note: ND = Not Detected

Table 6

Gross Beta and Specific Gamma in Precipitation
November 1998

Location	Gross Beta Activity		Specific Gamma Activity		
	pCi/L	± 2*u*	Nuclide	pCi/L	± 2*u*
AL: Montgomery	1.34	0.31	Be7	50	18
			Pb212	4.7	3.0
AR: Little Rock	2.73	0.39	Be7	61	28
			Tl208	2.7	4.2
AZ: Phoenix	1.32	0.31		ND	
CO: Denver	2.41	0.36	Be7	42	19
CT: Hartford	3.18	0.40	Be7	64	17
DE: Wilmington	1.58	0.32		ND	
FL: Jacksonville	1.16	0.30	Be7	26	28
FL: Miami	0.39	0.24	Tl208	2.3	1.8
IA: Iowa City	1.45	0.31		ND	
ID: Idaho Falls	3.62	0.45		ND	
ME: Augusta	3.64	0.43	Be7	78	17
MI: Lansing	1.42	0.31	K40	9	13
MN: Minneapolis	1.28	0.30		ND	
MN: Welch	6.26	0.61		ND	
NC: Charlotte	2.28	0.35	Be7	47	18
			Tl208	1.8	1.8
ND: Bismarck	1.83	0.35	Pb212	5.3	6.5
			Tl208	2.3	4.1
NE: Lincoln	0.68	0.26		ND	
NH: Concord	2.12	0.36	Pb212	5.1	6.9
NM: Santa Fe	1.69	0.33	Be7	40	26
			Tl208	2.1	3.6
NY: Albany	2.99	0.39	Be7	73	18
NY: Yaphank	3.83	0.44		ND	
OH: Painesville	1.89	0.33	Be7	58	18
OR: Portland	1.43	0.31	Be7	59	24
PA: Harrisburg	3.29	0.51	Be7	37	26
SC: Barnwell	17.87	0.95	Pb212	4.2	6.0
SC: Columbia	2.35	0.37		ND	
TN: Nashville	2.92	0.43		ND	
TX: Austin	0.46	0.23		ND	
UT: Salt Lake City	1.16	0.29		ND	
VA: Lynchburg	12.55	0.76	K40	26	38
WA: Olympia	0.28	0.21		ND	
WI: Madison	3.72	0.43	Be7	33	19

Note: ND = Not Detected

Table 7

Gross Beta and Specific Gamma in Precipitation
December 1998

Location	Gross Beta Activity		Specific Gamma Activity		
	pCi/L	± 2*u*	Nuclide	pCi/L	± 2*u*
AL: Montgomery	3.53	0.44	Be7	72	35
AR: Little Rock	1.86	0.35		ND	
AZ: Phoenix	1.83	0.41	Tl208	3.4	4.9
CT: Hartford	7.98	0.61	Be7	109	35
DE: Wilmington	4.01	0.45		ND	
FL: Jacksonville	2.47	0.40	Be7	60	48
FL: Miami	1.07	0.29	K40	33	37
IA: Iowa City	1.11	0.33		ND	
ID: Boise	1.44	0.36		ND	
ID: Idaho Falls	5.40	0.57		ND	
ME: Augusta	6.57	0.57	Be7	71	31
MI: Lansing	2.93	0.40		ND	
MN: Minneapolis	1.28	0.36		ND	
MN: Welch	4.23	0.46		ND	
NC: Charlotte	2.51	0.37	Be7	50	32
NC: Wilmington	0.74	0.26		ND	
NY: Albany	2.66	0.39	Be7	55	36
NY: Yaphank	2.66	0.38		ND	
OH: Painesville	3.99	0.46	Be7	81	25
OR: Portland	1.54	0.35	Pb212	4.5	6.5
SC: Barnwell	2.81	0.39	K40	20	32
SC: Columbia	2.15	0.36		ND	
TN: Knoxville	3.65	0.44		ND	
TN: Nashville	2.45	0.38	Be7	68	29
TX: Austin	1.75	0.37		ND	
UT: Salt Lake City	3.80	0.50		ND	
VA: Lynchburg	15.93	0.85	K40	28	28
WA: Olympia	1.34	0.34	Be7	54	23

Note: ND = Not Detected

Table 8

Tritium in Precipitation
October - December 1998

Location	October 1998		November 1998		December 1998	
	pCi/L	± 2*u*	pCi/L	± 2*u*	pCi/L	± 2*u*
AL: Montgomery	-64	76	5	76	21	79
AR: Little Rock	9	73	129	81	15	79
AZ: Phoenix	18	74	54	78	8	79
CO: Denver	5	73	105	79	NS	
CT: Hartford	-15	79	127	78	45	76
DE: Wilmington	77	83	32	77	61	77
FL: Jacksonville	-21	72	-5	75	-23	73
FL: Miami	23	80	5	76	23	79
IA: Iowa City	44	74	-9	75	-10	78
ID: Boise	NS		NS		21	79
ID: Idaho Falls	46	75	57	77	15	79
ME: Augusta	60	82	-5	72	52	76
MI: Lansing	15	80	39	77	32	80
MN: Minneapolis	26	73	21	76	31	80
MN: Welch	26	74	0	75	81	82
NC: Charlotte	13	80	151	82	125	80
NC: Wilmington	-16	79	NS		63	77
ND: Bismarck	-5	72	26	76	NS	
NE: Lincoln	35	74	24	76	NS	
NH: Concord	23	80	56	78	NS	
NM: Santa Fe	82	76	23	75	NS	
NY: Albany	11	80	51	78	81	78
NY: Yaphank	-8	79	118	81	84	78
OH: Painesville	44	75	54	78	52	81
OR: Portland	23	73	-2	74	37	80
PA: Harrisburg	16	80	37	77	NS	
SC: Barnwell	15	80	500	96	40	80
SC: Columbia	-11	79	86	79	60	77
TN: Knoxville	16	80	NS		6	79
TN: Nashville	3	80	28	77	93	78
TX: Austin	26	74	56	77	-31	77
TX: El Paso	46	75	NS		NS	
UT: Salt Lake City	-2	72	60	77	26	79
VA: Lynchburg	-5	79	9	76	77	78
WA: Olympia	NS		42	76	-8	78
WI: Madison	35	74	16	76	NS	

Note: NS = No Sample

Plutonium and Uranium in Airborne Particulates and Precipitation

Environmental radiation levels of plutonium and uranium are determined by the analysis of annually composited samples (air filters) collected from the continuously operating airborne particulate samplers.

Concentrations of plutonium-238, combined plutonium-239 and 240, and uranium-234, 235, and 238 are determined by alpha spectrometry following chemical separation. The volume of air represented by the annual composite 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 1998 Composites

Location	^{238}Pu aCi/m³	± 2*u*	$^{239-240}$Pu aCi/m³	± 2*u*	^{234}U aCi/m³	± 2*u*	^{235}U aCi/m³	± 2*u*	^{238}U aCi/m³	± 2*u*
AK: Fairbanks	0.11	0.16	0.07	0.11	9.1	1.4	0.92	0.48	7.6	1.3
AL: Montgomery	0.17	0.33	0.03	0.17	23.2	2.9	1.28	0.66	20.7	2.7
AR: Little Rock	0.14	0.46	0.05	0.14	24.1	2.9	2.9	1.0	21.3	2.7
AZ: Phoenix	0.53	0.75	0.63	0.63	47.5	6.2	4.3	1.9	35.9	5.3
CA: Berkeley	0.12	0.18	-0.034	0.048	6.5	1.2	0.74	0.45	4.9	1.0
CA: Los Angeles	0.16	0.49	0.02	0.15	20.2	3.2	1.78	0.96	16.0	2.8
CO: Denver	0.53	0.96	0.19	0.55	32.7	4.2	2.2	1.1	29.2	3.9
CT: Hartford	-0.15	0.31	0.03	0.14	8.6	1.3	0.53	0.36	8.1	1.3
DE: Wilmington	0.20	0.25	-0.036	0.051	16.3	2.3	1.47	0.73	15.4	2.2
FL: Jacksonville	0.00	0.21	0.20	0.23	17.5	2.5	1.53	0.74	18.1	2.5
FL: Miami	0.11	0.20	0.27	0.26	16.3	1.9	1.25	0.51	13.9	1.7
HI: Honolulu	0.15	0.19	0.09	0.14	4.62	0.99	0.72	0.44	3.10	0.80
IA: Iowa City	0.23	0.46	0.18	0.22	12.0	1.8	0.85	0.51	13.3	1.9
ID: Boise	0.20	0.35	0.15	0.18	18.4	2.4	1.61	0.70	15.4	2.1
ID: Idaho Falls	0.15	0.23	0.11	0.17	12.2	1.9	0.91	0.55	10.0	1.6
IN: Indianapolis	0.34	0.70	0.03	0.22	24.5	3.5	2.5	1.1	24.7	3.5
KS: Topeka	0.16	0.47	0.05	0.17	16.4	2.5	1.30	0.72	17.4	2.6
ME: Augusta	-0.49	0.56	0.10	0.24	19.7	2.7	2.49	0.97	18.3	2.6
MI: Lansing	0.15	0.58	0.12	0.33	15.9	2.3	1.02	0.60	15.9	2.3
MN: Welch	0.27	0.42	0.0	0.0	11.3	2.0	1.05	0.68	13.9	2.3
MN: Welch	0.041	0.058	0.009	0.026	11.2	1.9	1.04	0.60	10.4	1.8
MS: Jackson	0.18	0.40	0.14	0.32	19.7	2.9	2.4	1.0	17.5	2.7
NC: Charlotte	0.18	0.63	0.16	0.23	19.2	3.0	2.7	1.2	22.2	3.2
NC: Wilmington	-0.22	0.35	-0.01	0.15	16.0	2.0	0.93	0.49	15.1	1.9
ND: Bismarck	0.09	0.36	0.12	0.19	17.5	2.7	0.85	0.68	16.0	2.5
NH: Concord	0.06	0.12	0.08	0.12	12.3	1.4	0.58	0.30	11.2	1.3
NJ: Trenton	-0.101	0.083	0.05	0.10	13.2	1.9	0.79	0.47	12.9	1.9
NM: Santa Fe	-0.03	0.25	0.014	0.095	18.2	2.3	1.05	0.55	16.0	2.2
NV: Las Vegas	0.00	0.58	0.19	0.43	63.4	7.5	5.4	2.1	44.7	6.1
NY: Albany	-0.09	0.22	0.00	0.20	19.3	2.8	1.54	0.84	17.3	2.7
NY: New York City	0.25	0.29	-0.02	0.14	11.8	1.7	0.84	0.47	10.1	1.6
NY: Yaphank	0.08	0.15	-0.024	0.033	4.75	0.89	0.46	0.30	4.71	0.88
OH: Columbus	-0.22	0.36	0.07	0.20	15.9	1.9	1.58	0.58	15.0	1.8
OH: Painesville	-0.05	0.55	0.17	0.32	12.1	1.9	1.49	0.67	13.0	1.9
OH: Ross	0.92	0.70	0.14	0.30	30.8	4.6	2.0	1.2	27.1	4.3
OR: Portland	0.27	0.66	0.11	0.25	7.2	1.2	1.13	0.50	4.79	0.94
PA: Harrisburg	0.09	0.16	0.13	0.18	10.0	1.6	1.14	0.55	9.0	1.5
PA: Pittsburgh	0.11	0.45	0.30	0.24	19.0	2.4	2.15	0.80	19.5	2.4
SC: Barnwell	0.36	0.37	0.24	0.21	10.4	1.1	0.87	0.31	11.9	1.2
SC: Columbia	0.19	0.25	0.19	0.22	26.4	3.1	1.83	0.78	23.5	2.9

Note: NA = No Analysis

Table 9 (continued)

Plutonium and Uranium in Airborne Particulates
January - December 1998 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*
SD: Pierre	0.23	0.41	0.08	0.17	14.4	2.5	1.45	0.82	13.8	2.5
TN: Knoxville	0.12	0.28	18.9	3.0	28.7	4.6	3.6	1.7	23.9	4.1
TN: Nashville	0.15	0.27	0.07	0.23	20.7	2.8	2.6	1.0	19.6	2.7
TN: Oak Ridge/Bethel	0.03	0.22	0.12	0.14	13.9	1.6	1.60	0.51	13.9	1.5
TN: Oak Ridge/K25	0.07	0.25	0.26	0.19	27.3	2.4	2.88	0.68	50.3	3.9
TN: Oak Ridge/Melton	0.16	0.29	0.10	0.15	8.6	1.1	0.69	0.30	10.5	1.2
TN: Oak Ridge/Y12 E	0.03	0.61	-0.06	0.22	30.0	3.8	3.5	1.3	23.9	3.3
TN: Oak Ridge/Y12 W	-0.10	0.46	-0.042	0.059	82.4	6.2	6.6	1.3	40.4	3.6
TX: Austin	-0.03	0.28	0.07	0.15	12.0	2.0	1.20	0.68	13.0	2.0
TX: El Paso	1.0	1.4	0.84	0.75	63.4	7.7	5.0	2.1	53.9	7.0
UT: Salt Lake City	1.4	2.6	0.6	1.1	51.4	6.8	4.6	2.0	38.1	5.7
VA: Lynchburg	-0.13	0.21	0.013	0.073	66.4	5.0	3.37	0.78	9.6	1.3
WA: Olympia	0.16	0.18	-0.01	0.10	2.97	0.88	0.57	0.41	3.39	0.93
WA: Spokane	0.13	0.24	0.22	0.27	12.1	2.6	1.16	0.83	10.1	2.3
WI: Madison	0.31	0.43	0.13	0.28	11.8	1.8	0.96	0.52	12.4	1.8

Note: NA = No Analysis

2. Water Program

The ERAMS water program provides data on radionuclide concentrations in the nation's rivers, streams, and drinking water supplies.

Surface Water

Quarterly grab samples are taken downstream from nuclear facilities in as many as 58 stations. Surface water samples are analyzed for tritium quarterly and gamma-emitting radionuclides annually. Tritium is a primary potential radioactive pollutant from nuclear power plants and weapons production activities.

Table 10

Tritium in Surface Water
October - December 1998

Location	Source	Date Collected	^{3}H pCi/L	± 2*u*
AL: Decatur	Tennessee River	10/06/98	422	92
AL: Gordon	Chattahoochee River	10/13/98	7	77
AL: Scottsboro	Tennessee River	10/05/98	246	86
AR: Little Rock	Arkansas River	10/07/98	155	82
CA: Clay Station	Folsom S. Canal	10/20/98	55	81
CA: Diablo Canyon	Pacific Ocean	12/28/98	960	110
CA: Eureka	Humboldt Bay	10/09/98	-5	76
CO: Platteville	South Platte River	10/13/98	58	82
CT: E. Haddam	Connecticut River	12/23/98	-13	81
CT: Waterford	Long Island Sound	12/23/98	-21	77
FL: Crystal River	Gulf Of Mexico	10/07/98	83	79
FL: Ft. Pierce	Atlantic Ocean	10/14/98	19	78
FL: Homestead	Biscayne Bay	10/14/98	29	81
GA: Baxley	Altamaha River	10/07/98	13	76
IA: Cedar Rapids	Cedar River	10/06/98	67	78
ID: Buhl	Snake River	10/13/98	56	79
IL: Zion	Lake Michigan	12/31/98	-19	80
KS: Le Roy	Neosho River	12/17/98	34	84
LA: New Orleans	Mississippi River	11/10/98	28	80
MA: Plymouth	Cape Cod Bay	11/30/98	31	80
MD: Conowingo	Susquehanna River	10/06/98	52	78
MD: Lusby	Chesapeake Bay	10/13/98	-7	76
ME: Wiscasset	Montseway Bay	10/12/98	28	78
MI: Bridgman	Lake Michigan	10/12/98	78	83
MI: Charlevoix	Lake Michigan	10/06/98	123	81
MI: Monroe	Lake Erie	10/12/98	53	81
MI: S. Haven	Lake Michigan	10/12/98	26	81
MN: Monticello	Mississippi River	10/26/98	241	88
MN: Red Wing	Mississippi River	10/19/98	-15	79
MS: Port Gibson	Mississippi River	10/13/98	51	79
NC: Charlotte	Catawba River	10/05/98	317	88
NC: Southport	Atlantic Ocean	10/08/98	34	78
NV: Boulder City	Colorado River	12/15/98	0	79
NY: Chelsea	Hudson River	10/19/98	36	81
NY: Croton-On-Hudson	Hudson River	12/04/98	116	83
NY: Oswego	Lake Ontario	10/13/98	142	83
OH: Toledo	Lake Erie	10/14/98	-18	76
OR: Bradwood	Columbia River	10/22/98	2	80
PA: Danville	Susquehanna River	10/07/98	60	78
PA: Philadelphia	Schuylkill River - Belmont	10/14/98	11	77

Table 10 (continued)

Tritium in Surface Water
October - December 1998

Location	Source	Date Collected	^{3}H pCi/L	± 2*u*
PA: Philadelphia	Schuylkill River - Queen Lane	10/14/98	62	80
PA: Philadelphia	Delaware River - Baxter	10/14/98	-25	76
SC: Allendale	Savannah River	10/09/98	1280	120
SC: Broad River	Broad River	10/29/98	136	85
SC: Hartsville	Lake Robinson	10/13/98	640	100
TN: Daisy	Tennessee River	10/27/98	170	86
TN: Kingston	Clinch River	10/15/98	35	78
TX: Matagorda	Colorado River	10/06/98	2	76
VA: Doswell	North Anna River	10/07/98	3200	160
VA: Newport News	James River	10/13/98	18	84
VT: Vernon	Connecticut River	10/29/98	24	80
WA: Northport	Columbia River	11/23/98	10	79
WA: Richland	Columbia River	10/12/98	135	82
WI: Two Creeks	Lake Michigan	10/08/98	79	80
WI: Victory	Mississippi River	10/13/98	136	83
WV: Wheeling	Ohio River	10/06/98	100	79

Table 11

Surface Water Annual Gamma Analysis
January - December 1998

Location	Source	Date Collected	Specific Gamma Activity		
			Nuclide	pCi/L ± 2*u*	
AL: Decatur	Tennessee River	04/08/98		ND	
AL: Gordon	Chattahoochee River	04/13/98		ND	
AL: Scottsboro	Tennessee River	04/07/98	Pb212	2.8	5.1
		06/30/98		ND	
AR: Little Rock	Arkansas River	04/02/98		ND	
CA: Clay Station	Folsom S. Canal	04/21/98		ND	
CA: Eureka	Humboldt Bay	04/10/98	K40	237	52
CO: Platteville	South Platte River	04/14/98	I131	9.4	8.0
CT: E. Haddam	Connecticut River	06/22/98		ND	
CT: Waterford	Long Island Sound	06/24/98	K40	257	79
			Pb212	4.7	6.8
FL: Crystal River	Gulf Of Mexico	04/07/98	Tl208	2.3	4.2
FL: Ft. Pierce	Atlantic Ocean	04/28/98		ND	
GA: Baxley	Altamaha River	04/14/98		ND	
IA: Cedar Rapids	Cedar River	04/06/98	Tl208	3.2	2.7
ID: Buhl	Snake River	04/09/98		ND	
IL: Moline	Mississippi River	04/03/98		ND	
IL: Morris	Illinois River	04/29/98		ND	
IL: Zion	Lake Michigan	06/30/98		ND	
KS: Le Roy	Neosho River	06/29/98		ND	
LA: New Orleans	Mississippi River	04/30/98		ND	
MA: Plymouth	Cape Cod Bay	04/06/98	K40	33	67
MD: Conowingo	Susquehanna River	04/14/98		ND	
MD: Lusby	Chesapeake Bay	04/21/98	K40	77	71
ME: Wiscasset	Montseway Bay	04/08/98	K40	126	47
MI: Bridgman	Lake Michigan	04/06/98	K40	68	41
MI: Charlevoix	Lake Michigan	04/04/98		ND	
MI: Monroe	Lake Erie	04/06/98	Tl208	2.8	2.7
MI: S. Haven	Lake Michigan	04/06/98		ND	
MN: Monticello	Mississippi River	04/27/98	Pb212	3.3	6.1
MN: Red Wing	Mississippi River	04/20/98		ND	
MS: Port Gibson	Mississippi River	04/07/98		ND	
NC: Charlotte	Catawba River	04/22/98		ND	
NC: Southport	Atlantic Ocean	04/23/98	K40	200	75
NV: Boulder City	Colorado River	04/30/98		ND	
NY: Chelsea	Hudson River	04/13/98	K40	25	40
			Pb212	6.0	8.2

Note: ND = Not Detected

Table 11 (continued)

Surface Water Annual Gamma Analysis
January - December 1998

Location	Source	Date Collected	Specific Gamma Activity	
			Nuclide	pCi/L ± 2*u*
NY: Oswego	Lake Ontario	06/15/98		ND
OH: Toledo	Lake Erie	05/27/98		ND
OR: Bradwood	Columbia River	04/23/98		ND
PA: Danville	Susquehanna River	04/15/98		ND
PA: Philadelphia	Schuylkill River - Belmont	04/22/98		ND
	Schuylkill River - Queen Lane	04/22/98	K40	51 60
			Tl208	3.6 3.4
	Delaware River - Baxter	04/22/98	K40	33 40
SC: Allendale	Savannah River	05/09/98	K40	36 32
			Tl208	3.1 4.2
SC: Broad River	Broad River	05/05/98		ND
SC: Hartsville	Lake Robinson	04/06/98		ND
TN: Daisy	Tennessee River	04/09/98	K40	35 56
TN: Kingston	Clinch River	04/07/98	Tl208	1.9 3.6
TX: Matagorda	Colorado River	04/15/98	K40	27 33
VA: Doswell	North Anna River	04/01/98		ND
VA: Newport News	James River	04/24/98	K40	98 45
			Pb212	8.6 7.7
VT: Vernon	Connecticut River	04/14/98	K40	52 46
WA: Northport	Columbia River	04/29/98		ND
WA: Richland	Columbia River	04/06/98		ND
WI: Two Creeks	Lake Michigan	04/14/98	Pb212	6.1 6.9
WI: Victory	Mississippi River	04/13/98		ND
WV: Wheeling	Ohio River	04/01/98	K40	26 36

Note: ND = Not Detected

Drinking Water

This program monitors ambient radiation levels in drinking water in as many as 78 sites. These data serve 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.

Grab samples are taken at the 78 sites which are either major population centers or selected nuclear facility environs.

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 12

Tritium in Drinking Water
October - December 1998

Location	Date Collected	^{3}H pCi/L	± 2*u*
AK: Fairbanks	12/07/98	26	79
AL: Dothan	10/13/98	-59	74
AL: Montgomery	10/02/98	-26	78
AL: Muscle Shoals	10/06/98	196	89
AL: Scottsboro	10/05/98	253	91
AR: Little Rock	10/08/98	37	79
CA: Berkeley	10/22/98	-11	76
CA: Los Angeles	10/05/98	260	91
CO: Denver	10/13/98	63	79
CO: Platteville	10/13/98	-19	75
CT: Hartford	10/06/98	0	81
DE: Dover	11/05/98	-61	75
FL: Miami	10/08/98	-19	76
FL: Tampa	11/19/98	-2	78
GA: Baxley	10/07/98	-23	76
HI: Honolulu	10/06/98	-25	76
IA: Cedar Rapids	10/05/98	20	82
ID: Boise	10/05/98	-56	80
ID: Idaho Falls	10/15/98	75	79
IL: Morris	12/14/98	-43	75
IL: W. Chicago	10/14/98	0	76
KS: Topeka	10/05/98	-2	81
MD: Baltimore	10/02/98	21	81
MD: Conowingo	10/06/98	-2	76
ME: Augusta	10/29/98	-54	73
MI: Detroit	10/06/98	146	83
MI: Grand Rapids	10/21/98	48	79
MN: Minneapolis	10/26/98	93	80
MN: Red Wing	10/19/98	-14	75
MO: Jefferson City	10/06/98	26	83
MS: Jackson	10/13/98	7	77
MS: Port Gibson	10/13/98	-26	76
MT: Helena	10/26/98	0	76
NC: Charlotte	10/05/98	-23	81
NC: Wilmington	10/08/98	0	77
ND: Bismarck	10/05/98	121	86
NE: Lincoln	10/06/98	-59	79
NH: Concord	10/14/98	39	78
NM: Santa Fe	11/30/98	-31	76
NV: Las Vegas	10/02/98	-34	76

Table 12 (continued)

Tritium in Drinking Water
October - December 1998

Location	Date Collected	^{3}H pCi/L	± 2*u*
NY: Albany	10/05/98	65	84
NY: Niagara Falls	11/04/98	112	81
NY: Syracuse	12/07/98	47	81
OH: Cincinnati	11/10/98	66	81
OH: Columbus	12/30/98	24	80
OH: E. Liverpool	10/16/98	-2	76
OH: Painesville	10/05/98	-52	79
OH: Toledo	10/14/98	114	82
OK: Oklahoma City	11/04/98	-32	76
OR: Portland	10/08/98	-26	75
PA: Columbia	10/06/98	-16	81
PA: Harrisburg	10/08/98	-21	76
PA: Philadelphia - Belmont	10/14/98	21	77
PA: Philadelphia - Baxter	10/14/98	-18	76
PA: Philadelphia - Queen Lane	10/14/98	64	79
PA: Pittsburgh	10/16/98	63	79
PC: Corozal	10/13/98	-4	76
RI: Providence	10/05/98	-16	81
SC: Barnwell	10/07/98	-30	75
SC: Columbia	10/07/98	145	83
SC: Jenkinsville	11/06/98	-12	75
SC: Seneca	10/28/98	33	78
TN: Chattanooga	10/06/98	7	77
TN: Knoxville	10/05/98	-7	82
TN: Oak Ridge - Anderson Co #768	12/14/98	80	79
TN: Oak Ridge - Anderson Co #772	12/14/98	3	78
TN: Oak Ridge - Knox Co #371	12/14/98	3	78
TN: Oak Ridge - Roan Co. #360	12/29/98	26	77
TN: Oak Ridge - Roan Co. # 4442	12/29/98	650	100
TX: Austin	10/22/98	-47	74
VA: Doswell	10/05/98	-11	82
VA: Lynchburg	10/06/98	-31	80
WA: Richland	10/12/98	129	82
WA: Seattle	10/05/98	-44	80
WI: Genoa	10/13/98	-39	74
WI: Madison	10/05/98	-67	79

Table 13

Iodine-131 in Drinking Water
January - December 1998

Location	Date Collected	^{131}I pCi/L	± 2*u*
AK: Fairbanks	09/10/98	0.080	0.074
AL: Dothan	01/06/98	0.045	0.079
AL: Montgomery	01/08/98	0.00	0.12
AL: Muscle Shoals	01/14/98	0.010	0.068
AL: Scottsboro	01/13/98	-0.021	0.076
AR: Little Rock	04/07/98	0.02	0.10
CA: Berkeley	02/26/98	-0.04	0.10
CA: Berkeley	07/23/98	0.026	0.098
CA: Los Angeles	01/05/98	-0.027	0.072
CO: Denver	04/14/98	0.08	0.10
CO: Denver	07/15/98	0.008	0.090
CO: Platteville	04/14/98	0.010	0.099
CO: Platteville	10/13/98	0.02	0.17
CT: Hartford	07/02/98	0.028	0.076
DE: Dover	01/14/98	0.13	0.20
DE: Dover	04/14/98	0.03	0.10
FL: Miami	10/08/98	-0.044	0.088
FL: Tampa	03/09/98	0.02	0.11
GA: Baxley	04/14/98	0.047	0.092
GA: Savannah	02/12/98	-0.10	0.10
HI: Honolulu	01/05/98	0.000	0.078
IA: Cedar Rapids	04/07/98	-0.034	0.091
ID: Boise	04/06/98	0.10	0.11
ID: Idaho Falls	07/16/98	0.071	0.090
IL: Chicago	04/01/98	0.12	0.10
IL: Morris	01/06/98	-0.05	0.26
KS: Topeka	04/02/98	0.055	0.085
LA: New Orleans	01/05/98	0.039	0.075
MD: Baltimore	01/05/98	-0.12	0.11
MD: Conowingo	01/13/98	-0.22	0.25
MD: Conowingo	04/14/98	0.11	0.10
ME: Augusta	01/27/98	0.07	0.10
ME: Augusta	04/15/98	-0.037	0.090
ME: Augusta	07/08/98	0.059	0.078
MI: Detroit	01/06/98	0.17	0.24
MI: Grand Rapids	04/17/98	0.05	0.15
MN: Minneapolis	01/28/98	0.109	0.085
MN: Minneapolis	08/10/98	0.034	0.067
MN: Minneapolis	10/26/98	-0.07	0.10
MN: Red Wing	01/28/98	0.032	0.093
MN: Red Wing	04/20/98	-0.060	0.093

Table 13 (continued)

Iodine-131 in Drinking Water
January - December 1998

Location	Date Collected	^{131}I pCi/L	± 2*u*
MO: Jefferson City	01/05/98	0.081	0.073
MS: Jackson	01/07/98	0.03	0.12
MS: Port Gibson	01/06/98	0.02	0.23
MT: Helena	05/12/98	0.11	0.21
NC: Charlotte	01/07/98	-0.01	0.13
NC: Wilmington	04/23/98	0.11	0.10
ND: Bismarck	07/08/98	0.015	0.092
NE: Lincoln	07/16/98	0.000	0.078
NH: Concord	01/05/98	0.13	0.11
NM: Santa Fe	05/06/98	0.070	0.083
NV: Las Vegas	01/05/98	0.03	0.15
NY: Albany	01/05/98	-0.011	0.078
NY: Niagara Falls	01/14/98	-0.21	0.25
NY: Niagara Falls	05/12/98	-0.039	0.070
NY: Niagara Falls	11/04/98	-0.020	0.095
NY: Syracuse	01/15/98	0.31	0.15
NY: Syracuse	05/14/98	0.052	0.085
OH: Cincinnati	06/08/98	0.030	0.074
OH: Columbus	08/26/98	0.093	0.095
OH: E. Liverpool	01/28/98	0.08	0.10
OH: E. Liverpool	06/03/98	0.110	0.081
OH: Painesville	01/05/98	0.14	0.11
OH: Toledo	01/07/98	-0.02	0.12
OK: Oklahoma	01/27/98	0.041	0.085
OK: Oklahoma City	06/30/98	0.07	0.10
OR: Portland	04/01/98	0.017	0.093
OR: Portland	07/01/98	0.066	0.083
PA: Columbia	01/15/98	-0.02	0.22
PA: Columbia	04/16/98	0.112	0.079
PA: Harrisburg	01/15/98	0.05	0.19
PA: Harrisburg	07/16/98	0.024	0.099
PA: Philadelphia - Queen	01/06/98	0.43	0.26
PA: Philadelphia - Belmont	01/06/98	0.53	0.23
PA: Philadelphia - Baxter	01/06/98	0.106	0.097
PA: Pittsburgh	01/28/98	-0.01	0.14
PC: Corozal	01/06/98	0.24	0.24
RI: Providence	01/08/98	-0.07	0.11
SC: Columbia	01/07/98	0.08	0.21
SC: Jenkinsville	04/10/98	0.024	0.081
SC: Jenkinsville	11/06/98	0.001	0.079
SC: Seneca	04/07/98	0.05	0.11

Table 13 (continued)

Iodine-131 in Drinking Water
January - December 1998

Location	Date Collected	^{131}I pCi/L	± 2*u*
TN: Chattanooga	01/07/98	0.12	0.13
TN: Knoxville	01/05/98	0.024	0.075
TN: Oak Ridge - Roane Co #4442	03/24/98	0.007	0.096
TN: Oak Ridge - Roane Co #360	03/24/98	0.11	0.10
TN: Oak Ridge - Knox Co #371	03/25/98	-0.009	0.086
TN: Oak Ridge - Anderson Co #768	03/25/98	0.009	0.096
TN: Oak Ridge - Anderson Co #772	03/25/98	0.021	0.093
TX: Austin	02/12/98	0.08	0.10
VA: Doswell	05/26/98	0.064	0.071
VA: Lynchburg	01/05/98	0.03	0.11
WA: Richland	04/06/98	0.004	0.077
WA: Seattle	01/06/98	-0.02	0.26
WI: Genoa	07/14/98	0.00	0.11
WI: Madison	04/10/98	0.072	0.068

Table 14

Drinking Water
Alpha, Beta, and Sr-90 Concentrations
January - December 1998 Composites

Location	Total Solids (mg/L)	Gross Beta pCi/L ± 2*u*		Gross Alpha pCi/L ± 2*u*		^{90}Sr* pCi/L ± 2*u*
AK: Fairbanks	141.7	5.09	0.81	0.04	0.85	
AL: Dothan	73.1	2.4	1.0	0.8	1.2	
AL: Montgomery	65.7	2.61	0.64	0.79	0.89	
AL: Muscle Shoals	85.4	2.53	0.69	-0.37	0.34	
AL: Scottsboro	101.3	2.70	0.65	0.50	0.75	
AR: Little Rock	22.0	1.75	0.58	0.48	0.35	
CA: Berkeley	52.9	0.95	0.50	0.07	0.44	
CA: Los Angeles	49.7	5.4	2.7	5.6	3.5	
CO: Denver	78.2	2.61	0.63	0.75	0.81	
CO: Platteville	10.3	2.1	2.1	-0.2	1.0	
CT: Hartford	46.5	2.09	0.57	0.03	0.37	
DC: Washington	80.2	4.4	1.2	0.4	1.3	
DE: Dover	101.8	4.9	1.2	1.3	2.4	
FL: Miami	117.0	4.2	1.0	0.9	1.5	
FL: Tampa	131.0	4.2	1.1	0.5	1.3	
GA: Baxley	192.5	3.05	0.86	1.1	2.0	
GA: Savannah	156.0	3.01	0.80	1.3	1.6	
HI: Honolulu	92.6	3.13	0.81	0.9	1.1	
IA: Cedar Rapids	105.3	3.39	0.71	1.2	1.1	
ID: Boise	52.1	1.06	0.50	0.66	0.60	
ID: Idaho Falls	88.2	2.92	0.92	0.8	1.0	
IL: Morris	140.1	22.5	3.0	12.6	5.9	
IL: W. Chicago	135.5	12.5	1.8	16.1	5.0	
KS: Topeka	116.1	8.0	1.5	1.2	2.0	
LA: New Orleans	113.1	3.83	0.98	0.6	1.4	
MA: Lawrence	90.2	3.15	0.68	-0.28	0.60	
MD: Baltimore	114.0	3.22	0.77	0.00	0.72	
MD: Conowingo	120.5	4.27	0.89	0.39	0.77	
ME: Augusta	86.4	2.72	0.66	1.1	1.0	
MI: Detroit	82.5	1.96	0.60	0.04	0.48	
MI: Grand Rapids	134.6	2.67	0.68	1.4	1.4	
MN: Minneapolis	88.5	2.99	0.65	0.33	0.66	
MN: Red Wing	76.5	9.7	1.4	16.0	3.5	
MO: Jefferson City	84.4	7.3	1.3	4.2	2.1	
MS: Jackson	67.5	3.85	0.77	0.59	0.68	
MS: Port Gibson	136.8	5.4	1.5	1.4	1.8	
MT: Helena	40.2	2.41	0.60	0.35	0.45	

* Results will be reported at a later date.

Table 14 (continued)

Drinking Water
Alpha, Beta, and Sr-90 Concentrations
January - December 1998 Composites

Location	Total Solids (mg/L)	Gross Beta pCi/L ± 2*u*		Gross Alpha pCi/L ± 2*u*		^{90}Sr* pCi/L ± 2*u*
NC: Charlotte						
NC: Wilmington	44.9	2.99	0.67	0.22	0.48	
ND: Bismarck	84.3	3.79	0.70	1.17	0.79	
NE: Lincoln	103.3	3.9	1.0	1.4	1.3	
NH: Concord	133.3	15.6	2.0	16.0	5.2	
NJ: Trenton	82.5	1.89	0.58	0.74	0.78	
NJ: Waretown	90.2	3.26	0.66	0.38	0.63	
NM: Santa Fe	68.4	3.70	0.78	0.60	0.89	
NV: Las Vegas	121.9	11.1	1.7	29.6	6.0	
NY: Albany	106.7	7.6	2.1	8.4	4.7	
NY: Niagara Falls	91.8	2.66	0.78	0.42	0.93	
NY: Syracuse	122.9	4.43	0.85	0.3	1.1	
OH: Cincinnati	138.5	3.57	0.81	-0.4	1.3	
OH: Columbus	126.4	3.37	0.80	0.68	0.94	
OH: E. Liverpool	98.5	4.4	1.2	0.3	1.4	
OH: Painesville	115.6	3.74	0.84	1.5	1.2	
OH: Toledo	57.1	3.91	0.86	0.65	0.68	
OK: Oklahoma City	86.1	2.48	0.71	1.53	0.95	
OR: Portland	59.6	3.49	0.67	-0.17	0.27	
PA: Columbia	21.6	0.65	0.52	0.17	0.30	
PA: Harrisburg	128.3	3.85	0.82	0.9	1.2	
PA: Philadelphia - Belmont	31.0	3.00	0.85	0.00	0.61	
PA: Philadelphia - Queen	112.5	6.0	1.2	0.9	1.3	
PA: Philadelphia - Baxter	121.4	6.3	1.2	1.2	1.9	
PA: Pittsburgh	83.9	4.3	1.1	0.5	1.2	
PC: Corozal	127.5	2.79	0.77	1.0	1.0	
RI: Providence	82.6	3.20	0.67	0.06	0.56	
SC: Barnwell	65.2	2.44	0.60	0.12	0.45	
SC: Columbia	24.8	1.41	0.53	0.40	0.37	
SC: Jenkinsville	55.5	2.54	0.62	0.22	0.45	
SC: Seneca	84.9	4.51	0.91	5.3	2.1	
TN: Chattanooga	30.6	1.03	0.47	0.16	0.32	
TN: Knoxville	79.6	2.41	0.62	0.16	0.56	
TN: Oak Ridge - Anderson Co	107.7	3.22	0.65	0.20	0.65	
#768	105.6	2.90	0.75	0.0	1.6	
TN: Oak Ridge - Anderson Co	51.4	2.35	0.64	0.00	0.37	
#772	85.0	2.85	0.71	0.70	0.57	
TN: Oak Ridge - Roane Co #4442	44.2	2.04	0.66	0.39	0.46	
TN: Oak Ridge - Roane Co #360						

* Results will be reported at a later date.

Table 14 (continued)

Drinking Water
Alpha, Beta, and Sr-90 Concentrations
January - December 1998 Composites

Location	Total Solids (mg/L)	Gross Beta pCi/L ± 2*u*		Gross Alpha pCi/L ± 2*u*		^{90}Sr* pCi/L ± 2*u*
TN: Oak Ridge - Knox Co #371	66.2	2.20	0.60	0.18	0.56	
TX: Austin	102.1	4.30	0.90	1.1	1.1	
VA: Doswell	133.2	7.2	1.1	2.2	1.7	
VA: Lynchburg	85.6	2.62	0.64	0.48	0.66	
WA: Richland	60.9	1.04	0.59	0.73	0.57	
WA: Seattle	25.6	0.46	0.64	0.12	0.42	
WI: Genoa	85.5	2.28	0.71	3.5	1.7	
WI: Madison	85.3	3.3	1.1	6.7	2.6	

* Results will be reported at a later date.

Table 15

Drinking Water
Radium and Gamma-Emitting Radionuclides
January - December 1998 Composites

Location	^{226}Ra		^{228}Ra		Specific Gamma Activity		
	pCi/L	± 2*u*	pCi/L	± 2*u*	Nuclide	pCi/L	± 2*u*
AK: Fairbanks	NA		NA		K40	31	36
AL: Dothan	NA		NA			ND	
AL: Montgomery	NA		NA			ND	
AL: Muscle Shoals	NA		NA			ND	
AL: Scottsboro	NA		NA		Tl208	3.4	5.7
AR: Little Rock	NA		NA			ND	
CA: Berkeley	NA		NA			ND	
CA: Los Angeles	0.079	0.014	NA			ND	
CO: Denver	NA		NA		K40	23	37
CO: Platteville	NA		NA			ND	
CT: Hartford	NA		NA			ND	
DC: Washington	NA		NA			ND	
DE: Dover	NA		NA			ND	
FL: Miami	NA		NA			ND	
FL: Tampa	NA		NA		Pb212	2.9	4.7
GA: Baxley	NA		NA			ND	
GA: Savannah	NA		NA			ND	
HI: Honolulu	NA		NA			ND	
IA: Cedar Rapids	NA		NA		Bi214	7.7	8.5
ID: Boise	NA		NA			ND	
ID: Idaho Falls	NA		NA		Pb212	6.9	7.6
IL: Morris	1.58	0.18	NA		K40	23	41
IL: W. Chicago	2.64	0.31	1.51	0.47	K40	29	37
KS: Topeka	NA		NA			ND	
LA: New Orleans	NA		NA			ND	
MA: Lawrence	NA		NA			ND	
MD: Baltimore	NA		NA		K40	9	13
					Pb212	3.7	4.4
MD: Conowingo	NA		NA			ND	
ME: Augusta	NA		NA			ND	
MI: Detroit	NA		NA			ND	
MI: Grand Rapids	NA		NA			ND	
MN: Minneapolis	NA		NA			ND	
MN: Red Wing	NA		NA		K40	33	58
MO: Jefferson City	0.094	0.016	NA		K40	20	36
MS: Jackson	NA		NA			ND	

Note: ND = Not Detected
NA = No Analysis

Table 15 (continued)

Drinking Water
Radium and Gamma-Emitting Radionuclides
January - December 1998 Composites

Location	^{226}Ra		^{228}Ra		Specific Gamma Activity		
	pCi/L	± 2*u*	pCi/L	± 2*u*	Nuclide	pCi/L	± 2*u*
MS: Port Gibson	NA		NA		K40	25	44
MT: Helena	NA		NA			ND	
NC: Charlotte	NA		NA			ND	
NC: Wilmington	NA		NA			ND	
ND: Bismarck	NA		NA			ND	
NE: Lincoln	0.236	0.031	NA			ND	
NH: Concord	NA		NA			ND	
NJ: Trenton	NA		NA		Bi212	43	59
					K40	31	52
NJ: Waretown	NA		NA			ND	
NM: Santa Fe	0.149	0.021	NA		K40	21	27
NV: Las Vegas	0.149	0.022	NA			ND	
NY: Albany	NA		NA			ND	
NY: Niagara Falls	NA		NA			ND	
NY: Syracuse	NA		NA			ND	
OH: Cincinnati	NA		NA			ND	
OH: Columbus	NA		NA			ND	
OH: E. Liverpool	NA		NA		K40	28	46
OH: Painesville	NA		NA			ND	
OH: Toledo	NA		NA		K40	25	38
OK: Oklahoma City	NA		NA			ND	
OR: Portland	NA		NA			ND	
PA: Columbia	NA		NA			ND	
PA: Harrisburg	NA		NA			ND	
PA: Philadelphia - Belmont	NA		NA			ND	
PA: Philadelphia - Queen	NA		NA			ND	
PA: Philadelphia - Baxter	NA		NA			ND	
PA: Pittsburgh	NA		NA			ND	
PC: Corozal	NA		NA		K40	93	36
RI: Providence	NA		NA			ND	
SC: Barnwell	NA		NA		K40	32	43
SC: Columbia	NA		NA			ND	
SC: Jenkinsville	0.674	0.080	NA			ND	
SC: Seneca	NA		NA			ND	
TN: Chattanooga	NA		NA			ND	
TN: Knoxville	NA		NA		Tl208	3.8	5.2

Note: ND = Not Detected
NA = No Analysis

Table 15 (continued)

Drinking Water
Radium and Gamma-Emitting Radionuclides
January - December 1998 Composites

Location	^{226}Ra		^{228}Ra		Specific Gamma Activity		
	pCi/L	± 2*u*	pCi/L	± 2*u*	Nuclide	pCi/L	± 2*u*
TN: Oak Ridge - Anderson Co #768	NA		NA		K40	51	24
TN: Oak Ridge - Anderson Co #772	NA		NA		Tl208	3.1	4.3
TN: Oak Ridge - Roane Co #4442	NA		NA		Pb214	10.2	7.1
TN: Oak Ridge - Roane Co #360	NA		NA		Bi214	19.0	7.0
TN: Oak Ridge - Knox Co #371	NA		NA		Pb212	9.1	7.7
TX: Austin	0.211	0.028	NA			ND	
VA: Doswell	NA		NA			ND	
VA: Lynchburg	NA		NA			ND	
WA: Richland	NA		NA			ND	
WA: Seattle	0.497	0.059	NA		Bi212	41	46
WI: Genoa	0.424	0.052	NA		K40	26	42
WI: Madison						ND	

Note: ND = Not Detected
NA = No Analysis

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3. Milk Program

Pasteurized Milk

Milk is a reliable indicator of the general population's intake of 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.

Monthly 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. All samples collected in July are analyzed for strontium-90.

Iodine-131, barium-140, cesium-137, and potassium-40 are determined by gamma spectral analysis. Strontium-90 is determined by beta counting a total strontium precipitate that has been chemically separated by ion exchange.

Table 16

Radionuclides in Pasteurized Milk
October 1998

Location	Date Collected	K g/L ± 2*u*	^{137}Cs pCi/L ± 2*u*	^{140}Ba pCi/L ± 2*u*	^{131}I pCi/L ± 2*u*
AL: Montgomery	10/09/98	1.525 0.089	ND	ND	ND
AZ: Phoenix	10/21/98	1.56 0.10	ND	ND	ND
CA: Los Angeles	10/06/98	1.656 0.049	ND	ND	ND
CA: Sacramento	10/19/98	1.585 0.090	ND	ND	ND
CA: San Francisco	10/13/98	1.632 0.082	ND	ND	ND
CT: Hartford	10/05/98	1.680 0.049	ND	ND	ND
DE: Wilmington	10/26/98	1.549 0.081	ND	ND	ND
FL: Tampa	10/05/98	1.621 0.049	1.7 1.5	ND	ND
GA: Atlanta	10/26/98	1.57 0.14	ND	ND	ND
HI: Honolulu	10/06/98	1.668 0.050	ND	ND	ND
IA: Des Moines	10/05/98	1.597 0.048	ND	ND	ND
IN: Indianapolis	10/05/98	1.609 0.048	ND	ND	ND
KS: Wichita	10/14/98	1.656 0.049	ND	ND	ND
KY: Louisville	10/06/98	1.680 0.049	ND	ND	ND
MA: Boston	10/08/98	1.597 0.082	ND	ND	ND
MD: Baltimore	10/02/98	1.621 0.049	ND	ND	ND
MI: Detroit	10/06/98	1.621 0.049	ND	ND	ND
MI: Grand Rapids	10/07/98	1.621 0.049	ND	ND	ND
MO: Jefferson City	10/20/98	6.54 0.16	ND	ND	ND
MO: Jefferson City*	10/20/98	6.33 0.23	ND	ND	ND
MS: Jackson	10/07/98	1.537 0.088	ND	ND	ND
NC: Charlotte	10/15/98	1.55 0.11	ND	ND	ND
NJ: Trenton	10/19/98	1.597 0.089	ND	ND	ND
NM: Albuquerque	10/19/98	1.513 0.079	ND	ND	ND
NV: Las Vegas	10/08/98	1.621 0.048	ND	ND	ND
NV: Las Vegas	10/19/98	1.597 0.081	ND	ND	ND
NY: Buffalo	10/09/98	1.585 0.087	ND	ND	ND
NY: Syracuse	10/05/98	1.609 0.049	ND	ND	ND
OH: Cincinnati	10/19/98	1.525 0.081	ND	ND	ND
OH: Cleveland	10/05/98	1.632 0.049	ND	ND	ND
OR: Portland	10/06/98	1.692 0.049	ND	ND	ND
PA: Philadelphia	10/05/98	1.632 0.049	ND	ND	ND
PA: Pittsburgh	10/05/98	1.537 0.081	ND	ND	ND
PC: Cristobal	10/16/98	1.561 0.079	ND	ND	ND
PR: San Juan	10/09/98	1.609 0.080	ND	ND	ND
SD: Rapid City	10/29/98	1.644 0.092	ND	ND	ND
TN: Chattanooga	10/01/98	1.644 0.049	ND	ND	ND
TN: Knoxville	10/01/98	1.585 0.048	ND	ND	ND
TN: Memphis	10/08/98	1.632 0.049	ND	ND	ND

Note: ND = Not Detected
* Recount to verify concentration

Table 16 (continued)

Radionuclides in Pasteurized Milk
October 1998

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*
TX: Austin	10/07/98	1.573 0.089	ND	ND	ND
TX: Ft. Worth	10/13/98	1.644 0.050	ND	ND	ND
VT: Burlington	10/26/98	1.64 0.11	ND	ND	ND
WA: Seattle	10/05/98	1.644 0.049	ND	ND	ND
WA: Spokane	10/08/98	1.62 0.10	ND	ND	ND
WV: Charleston	10/05/98	1.513 0.081	ND	ND	ND

Note: ND = Not Detected

Table 17

Radionuclides in Pasteurized Milk
November 1998

Location	Date Collected	K g/L ± 2*u*		^{137}Cs pCi/L ± 2*u*	^{140}Ba pCi/L ± 2*u*	^{131}I pCi/L ± 2*u*
AL: Montgomery	11/06/98	1.597	0.089	ND	ND	ND
AR: Little Rock	11/05/98	1.61	0.12	ND	ND	ND
CA: Los Angeles	11/04/98	1.56	0.10	ND	ND	ND
CA: Sacramento	11/10/98	1.561	0.089	ND	ND	ND
CA: San Francisco	11/12/98	1.57	0.14	ND	ND	ND
DE: Wilmington	11/16/98	1.60	0.13	ND	ND	ND
FL: Tampa	11/10/98	1.54	0.13	ND	ND	ND
GA: Atlanta	11/23/98	1.644	0.082	ND	ND	ND
HI: Honolulu	11/05/98	1.656	0.049	ND	ND	ND
IA: Des Moines	11/02/98	1.63	0.10	ND	ND	ND
IL: Chicago	11/04/98	1.63	0.12	ND	ND	ND
IN: Indianapolis	11/09/98	1.644	0.068	ND	ND	ND
KS: Wichita	11/17/98	1.56	0.12	ND	ND	ND
KY: Louisville	11/13/98	1.53	0.12	ND	ND	ND
MA: Boston	11/06/98	1.644	0.092	ND	ND	ND
MD: Baltimore	11/06/98	1.656	0.081	ND	ND	ND
MI: Detroit	11/03/98	1.55	0.10	ND	ND	ND
MI: Grand Rapids	11/12/98	1.58	0.13	ND	ND	ND
MO: Jefferson City	11/16/98	1.60	0.14	ND	ND	ND
NC: Charlotte	11/19/98	1.62	0.10	ND	ND	ND
NJ: Trenton	11/23/98	1.47	0.13	ND	ND	ND
NV: Las Vegas	11/23/98	1.53	0.13	ND	ND	ND
NY: Buffalo	11/06/98	1.621	0.081	ND	ND	ND
NY: Syracuse	11/05/98	1.561	0.068	ND	ND	ND
OH: Cincinnati	11/16/98	1.53	0.11	ND	ND	ND
OH: Cleveland	11/17/98	1.573	0.090	ND	ND	ND
OR: Portland	11/05/98	1.64	0.13	ND	ND	ND
PA: Philadelphia	11/04/98	1.63	0.13	ND	ND	ND
PA: Pittsburgh	11/02/98	1.621	0.089	ND	ND	ND
PR: San Juan	11/06/98	1.561	0.081	ND	ND	ND
SD: Rapid City	11/20/98	1.597	0.080	ND	ND	ND
TN: Chattanooga	11/23/98	1.537	0.081	ND	ND	ND
TN: Knoxville	11/23/98	1.561	0.092	ND	ND	ND
TN: Memphis	11/25/98	1.644	0.081	ND	ND	ND
TX: Austin	11/25/98	1.50	0.15	ND	ND	ND
VA: Norfolk	11/06/98	1.585	0.080	ND	ND	ND
VT: Burlington	11/20/98	1.680	0.094	ND	ND	ND
WA: Seattle	11/03/98	1.61	0.13	ND	ND	ND
WA: Spokane	11/16/98	1.55	0.13	ND	ND	ND

Note: ND = Not Detected

Table 17 (continued)

Radionuclides in Pasteurized Milk
November 1998

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*
WV: Charleston	11/04/98	1.55 0.14	ND	ND	ND

Note: ND = Not Detected

Table 18

Radionuclides in Pasteurized Milk
December 1998

Location	Date Collected	K g/L ± 2*u*		^{137}Cs pCi/L ± 2*u*		^{140}Ba pCi/L ± 2*u*	^{131}I pCi/L ± 2*u*
AL: Montgomery	12/07/98	1.680	0.068	ND		ND	ND
AR: Little Rock	12/17/98	1.501	0.088	ND		ND	ND
AZ: Phoenix	12/16/98	1.621	0.080	ND		ND	ND
CA: Los Angeles	12/08/98	1.537	0.090	ND		ND	ND
CA: Sacramento	12/29/98	1.621	0.091	ND		ND	ND
CA: San Francisco	12/07/98	1.656	0.095	ND		ND	ND
CT: Hartford	12/01/98	1.644	0.081	ND		ND	ND
DE: Wilmington	12/07/98	1.632	0.093	ND		ND	ND
FL: Tampa	12/09/98	1.668	0.068	2.8	2.0	ND	ND
GA: Atlanta	12/07/98	1.50	0.14	ND		ND	ND
HI: Honolulu	12/07/98	1.58	0.15	ND		ND	ND
IA: Des Moines	12/07/98	1.609	0.081	ND		ND	ND
IN: Indianapolis	12/08/98	1.56	0.12	ND		ND	ND
KS: Wichita	12/09/98	1.632	0.081	ND		ND	ND
KY: Louisville	12/08/98	1.644	0.089	ND		ND	ND
MD: Baltimore	12/04/98	1.57	0.10	ND		ND	ND
ME: Portland	12/09/98	1.740	0.096	ND		ND	ND
MI: Detroit	12/01/98	1.632	0.081	ND		ND	ND
MI: Grand Rapids	12/07/98	1.573	0.091	ND		ND	ND
MO: Jefferson City	12/03/98	1.585	0.079	ND		ND	ND
MS: Jackson	12/01/98	1.513	0.092	ND		ND	ND
NC: Charlotte	12/17/98	1.656	0.067	ND		ND	ND
NM: Albuquerque	12/14/98	1.609	0.081	ND		ND	ND
NV: Las Vegas	12/07/98	1.609	0.081	ND		ND	ND
NY: Buffalo	12/07/98	1.66	0.10	ND		ND	ND
NY: Syracuse	12/07/98	1.56	0.10	ND		ND	ND
OH: Cincinnati	12/15/98	1.68	0.10	ND		ND	ND
OH: Cleveland	12/07/98	1.64	0.15	ND		ND	ND
OR: Portland	12/10/98	1.68	0.11	ND		ND	ND
PA: Philadelphia	12/08/98	1.704	0.068	ND		ND	ND
PA: Pittsburgh	12/09/98	1.549	0.089	ND		ND	ND
PC: Cristobal	12/02/98	1.442	0.087	4.7	2.4	ND	ND
PR: San Juan	12/09/98	1.644	0.090	ND		ND	ND
SD: Rapid City	12/22/98	1.621	0.067	ND		ND	ND
TN: Chattanooga	12/02/98	1.644	0.094	ND		ND	ND
TN: Chattanooga	12/31/98	1.60	0.12	ND		ND	ND
TN: Knoxville	12/02/98	1.525	0.089	ND		ND	ND
TN: Memphis	12/15/98	1.513	0.087	ND		ND	ND
TX: Austin	12/07/98	1.501	0.078	ND		ND	ND

Note: ND = Not Detected

Table 18 (continued)

Radionuclides in Pasteurized Milk
December 1998

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*
TX: Ft. Worth	12/01/98	1.549 0.080	ND	ND	ND
TX: Ft. Worth	12/15/98	1.609 0.080	ND	ND	ND
VA: Norfolk	12/03/98	1.585 0.080	ND	ND	ND
VT: Burlington	12/22/98	1.62 0.12	ND	ND	ND
WA: Seattle	12/07/98	1.48 0.10	ND	ND	ND
WA: Spokane	12/04/98	1.54 0.12	ND	ND	ND
WV: Charleston	12/08/98	1.609 0.066	ND	ND	ND

Note: ND = Not Detected

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