

ENVIRONMENTAL

RADIATION

DATA

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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](http://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/m <sup>3</sup>	0.0015
	Water	pCi/L	2
	Precipitation	pCi/L	2
Tritium	Water	pCi/L	150
	Milk	pCi/L	150
* Plutonium-238,239/240	Air	aCi/m <sup>3</sup>	0.75
	Water	pCi/L	0.1
† Uranium-234,235,238	Air	aCi/m <sup>3</sup>	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 m<sup>3</sup>. Measurement by alpha spectrometry includes combined activities of <sup>239</sup>Pu and <sup>240</sup>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<sup>3</sup>.

‡ 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<sup>3</sup>. 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 composite of the March, April, and May precipitation samples is analyzed for plutonium-238, combined plutonium-239 and 240, and uranium-234, 235, and 238.

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**  
**July 1998**

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m <sup>3</sup> )	Avg	Max	Min (pCi/m <sup>3</sup> )	Avg
AK: Fairbanks	2	0.0	0.0	0.0	0.004	0.004	0.004
AL: Montgomery	8	0.2	0.0	0.1	0.033	0.014	0.022
AR: Little Rock	7	0.4	0.0	0.1	0.021	0.012	0.017
AZ: Phoenix	3	0.4	0.2	0.3	0.015	0.013	0.014
CA: Berkeley	8	0.1	0.0	0.0	0.016	0.002	0.006
CA: Los Angeles	8	0.1	0.0	0.1	0.012	0.007	0.009
CO: Denver	8	0.5	0.3	0.5	0.014	0.009	0.011
CT: Hartford	8	0.2	0.1	0.1	0.015	0.005	0.008
DE: Wilmington	8	0.3	0.1	0.2	0.014	0.007	0.010
FL: Jacksonville	7	0.2	0.0	0.0	0.013	0.007	0.012
FL: Miami	3	0.0	0.0	0.0	0.013	0.008	0.011
HI: Honolulu	7	0.2	0.1	0.1	0.004	0.002	0.003
IA: Iowa City	8	2.8	0.2	0.7	0.036	0.008	0.014
ID: Boise	8	0.5	0.2	0.3	0.014	0.009	0.011
ID: Idaho Falls	7				0.018	0.005	0.010
IN: Indianapolis	7	0.6	0.1	0.4	0.018	0.006	0.013
KS: Topeka	8	1.5	0.2	1.0	0.018	0.009	0.013
ME: Augusta	6	0.4	0.0	0.2	0.014	0.004	0.009
MI: Lansing	8	0.4	0.1	0.3	0.017	0.006	0.010
MN: Welch	16	1.3	0.1	0.5	0.017	0.006	0.010
MS: Jackson	8	0.4	0.1	0.3	0.020	0.008	0.015
NC: Charlotte	2	0.0	0.0	0.0	0.017	0.013	0.015
NC: Wilmington	3				0.014	0.009	0.011
ND: Bismarck	3	0.7	0.1	0.4	0.011	0.005	0.008
NH: Concord	8	0.4	0.0	0.2	0.016	0.004	0.009
NV: Las Vegas	8	0.1	0.1	0.1	0.011	0.009	0.010
NY: Albany	4	0.1	0.1	0.1	0.016	0.008	0.011
NY: New York City	5	0.2	0.0	0.1	0.018	0.008	0.012
NY: Yaphank	8	0.4	0.0	0.1	0.018	0.006	0.009
OH: Columbus	3				0.014	0.010	0.012
OH: Painesville	7	0.3	0.1	0.2	0.021	0.007	0.012
OH: Ross	7				0.019	0.009	0.013
PA: Harrisburg	8	0.8	0.2	0.4	0.020	0.008	0.013
SC: Barnwell	2	0.1	0.0	0.0	0.008	0.005	0.007
SC: Columbia	6	0.4	0.1	0.2	0.020	0.008	0.014
SD: Pierre	6	0.4	0.0	0.2	0.015	0.008	0.011
TN: Knoxville	8	0.9	0.4	0.7	0.026	0.016	0.020
TN: Nashville	8	0.3	0.1	0.2	0.023	0.010	0.016

**Table 2 (continued)**  
**Gross Beta in Airborne Particulates**  
**July 1998**

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m <sup>3</sup> )	Avg	Max	Min (pCi/m <sup>3</sup> )	Avg
TN: Oak Ridge/Bethel	8	1.2	0.5	0.7	0.019	0.011	0.015
TN: Oak Ridge/K25	8	1.0	0.4	0.7	0.018	0.012	0.015
TN: Oak Ridge/Melton	8	1.5	0.6	0.8	0.020	0.011	0.016
TN: Oak Ridge/Y12 E	8	1.0	0.4	0.6	0.022	0.012	0.016
TN: Oak Ridge/Y12 W	8	0.5	0.3	0.4	0.021	0.012	0.016
TX: Austin	7	0.2	0.1	0.2	0.013	0.008	0.012
TX: El Paso	6	0.7	0.2	0.4	0.016	0.008	0.011
UT: Salt Lake City	7	0.2	0.1	0.1	0.018	0.014	0.016
VA: Lynchburg	8	0.9	0.3	0.6	0.014	0.010	0.011
WA: Olympia	3	0.1	0.0	0.1	0.004	0.003	0.003
WA: Spokane	8	0.3	0.1	0.2	0.017	0.006	0.009
WI: Madison	8	0.5	0.1	0.3	0.016	0.007	0.010

**Table 3**  
**Gross Beta in Airborne Particulates**  
**August 1998**

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m <sup>3</sup> )	Avg	Max	Min (pCi/m <sup>3</sup> )	Avg
AK: Fairbanks	2	0.0	0.0	0.0	0.004	0.003	0.003
AL: Montgomery	9	0.4	0.0	0.1	0.043	0.002	0.023
AR: Little Rock	8	0.3	0.0	0.1	0.032	0.015	0.020
AZ: Phoenix	4	0.8	0.1	0.4	0.019	0.014	0.017
CA: Berkeley	8	0.1	0.0	0.1	0.006	0.003	0.004
CA: Los Angeles	8	0.2	0.1	0.1	0.012	0.008	0.011
CO: Denver	9	0.7	0.3	0.5	0.015	0.008	0.011
CT: Hartford	9	0.2	0.1	0.1	0.020	0.005	0.009
DE: Wilmington	9	0.3	0.1	0.2	0.020	0.006	0.013
FL: Jacksonville	7	0.1	0.0	0.0	0.016	0.003	0.007
FL: Miami	4	0.0	0.0	0.0	0.014	0.006	0.008
HI: Honolulu	9	0.2	0.1	0.1	0.004	0.002	0.003
IA: Iowa City	8	0.8	0.1	0.4	0.029	0.009	0.016
ID: Boise	8	0.6	0.2	0.4	0.023	0.008	0.012
ID: Idaho Falls	9				0.014	0.007	0.009
IN: Indianapolis	8	0.6	0.1	0.3	0.024	0.011	0.015
KS: Topeka	9	2.1	0.4	1.2	0.025	0.011	0.018
ME: Augusta	8	0.4	0.0	0.2	0.015	0.005	0.009
MI: Lansing	9	0.4	0.1	0.3	0.017	0.006	0.011
MN: Welch	16	1.5	0.1	0.4	0.018	0.009	0.013
MS: Jackson	8	0.6	0.2	0.3	0.030	0.013	0.021
NC: Charlotte	5	0.1	0.0	0.1	0.030	0.010	0.017
NC: Wilmington	3				0.012	0.006	0.008
ND: Bismarck	4	0.7	0.2	0.5	0.016	0.008	0.011
NH: Concord	8	0.3	0.1	0.2	0.012	0.005	0.010
NJ: Trenton	8				0.027	0.005	0.013
NV: Las Vegas	9	0.2	0.1	0.1	0.015	0.008	0.012
NY: Albany	4	0.3	0.1	0.1	0.015	0.007	0.011
NY: New York City	9	0.1	0.0	0.1	0.019	0.008	0.011
NY: Yaphank	8	0.6	0.0	0.1	0.014	0.006	0.009
OH: Columbus	3				0.023	0.012	0.018
OH: Painesville	8	0.5	0.2	0.2	0.020	0.009	0.013
OH: Ross	8				0.102	0.012	0.028
OR: Portland	5	0.2	0.0	0.1	0.005	0.003	0.004
PA: Harrisburg	9	0.8	0.1	0.4	0.022	0.009	0.014
SC: Barnwell	1	0.1	0.1	0.1	0.011	0.011	0.011
SC: Columbia	7	0.5	0.2	0.3	0.019	0.009	0.013
SD: Pierre	3	0.2	0.1	0.1	0.018	0.013	0.016

**Table 3 (continued)**  
**Gross Beta in Airborne Particulates**  
**August 1998**

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m <sup>3</sup> )	Avg	Max	Min (pCi/m <sup>3</sup> )	Avg
TN: Knoxville	4	0.8	0.1	0.4	0.039	0.020	0.027
TN: Nashville	7	0.5	0.2	0.4	0.032	0.014	0.023
TN: Oak Ridge/Bethel	9	1.2	0.0	0.5	0.031	0.012	0.020
TN: Oak Ridge/K25	9	1.1	0.0	0.5	0.028	0.011	0.018
TN: Oak Ridge/Melton	9	1.2	0.0	0.5	0.026	0.013	0.018
TN: Oak Ridge/Y12 E	9	1.0	0.0	0.5	0.035	0.016	0.021
TN: Oak Ridge/Y12 W	9	0.6	0.0	0.3	0.030	0.012	0.019
TX: Austin	7	0.3	0.1	0.2	0.021	0.006	0.013
TX: El Paso	9	0.9	0.1	0.5	0.017	0.005	0.011
UT: Salt Lake City	8	0.2	0.0	0.1	0.018	0.010	0.013
VA: Lynchburg	9	1.3	0.4	0.6	0.019	0.007	0.012
WA: Olympia	3	0.1	0.0	0.0	0.005	0.002	0.004
WA: Spokane	9	0.4	0.0	0.2	0.021	0.003	0.011
WI: Madison	8	0.5	0.1	0.4	0.025	0.009	0.014

**Table 4**  
**Gross Beta in Airborne Particulates**  
**September 1998**

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m <sup>3</sup> )	Avg	Max	Min (pCi/m <sup>3</sup> )	Avg
AK: Fairbanks	2	0.0	0.0	0.0	0.005	0.003	0.004
AL: Montgomery	8	0.1	0.0	0.0	0.038	0.015	0.024
AR: Little Rock	8	0.9	0.0	0.3	0.028	0.011	0.018
AZ: Phoenix	5	0.8	0.3	0.5	0.025	0.014	0.018
CA: Berkeley	9	0.1	0.0	0.1	0.010	0.005	0.006
CA: Los Angeles	9	0.3	0.0	0.1	0.016	0.009	0.012
CO: Denver	8	1.4	0.4	0.8	0.024	0.010	0.015
CT: Hartford	8	0.2	0.1	0.2	0.013	0.004	0.009
DE: Wilmington	8	1.3	0.2	0.4	0.024	0.007	0.015
FL: Jacksonville	6	0.0	0.0	0.0	0.018	0.004	0.009
FL: Miami	4	0.0	0.0	0.0	0.013	0.004	0.009
HI: Honolulu	4	0.2	0.1	0.2	0.004	0.002	0.003
IA: Iowa City	8	0.7	0.1	0.3	0.020	0.005	0.012
ID: Boise	9	0.9	0.3	0.6	0.018	0.004	0.013
ID: Idaho Falls	8				0.020	0.006	0.011
IN: Indianapolis	9	0.4	0.2	0.3	0.022	0.006	0.015
KS: Topeka	7	1.9	0.3	0.7	0.030	0.008	0.016
ME: Augusta	9	0.3	0.0	0.1	0.013	0.005	0.009
MI: Lansing	8	0.6	0.1	0.4	0.019	0.004	0.012
MN: Welch	18	1.4	0.2	0.6	0.022	0.002	0.012
MS: Jackson	8	0.8	0.1	0.3	0.042	0.008	0.019
NC: Charlotte	2	0.1	0.1	0.1	0.023	0.016	0.020
NC: Wilmington	1				0.008	0.008	0.008
ND: Bismarck	3	1.5	0.0	0.8	0.023	0.006	0.015
NH: Concord	9	0.3	0.1	0.2	0.018	0.004	0.010
NJ: Trenton	5				0.018	0.004	0.013
NV: Las Vegas	8	0.3	0.1	0.2	0.017	0.010	0.014
NY: Albany	5	0.1	0.0	0.1	0.016	0.013	0.014
NY: New York City	8	0.5	0.0	0.1	0.018	0.005	0.012
NY: Yaphank	8	0.4	0.0	0.1	0.016	0.006	0.012
OH: Columbus	4	0.1	0.0	0.1	0.019	0.012	0.017
OH: Painesville	9	0.6	0.1	0.2	0.025	0.006	0.014
OH: Ross	9				0.028	0.008	0.019
OR: Portland	7	0.2	0.0	0.1	0.007	0.004	0.005
PA: Harrisburg	7	1.0	0.1	0.4	0.029	0.007	0.018
PA: Pittsburgh	5				0.023	0.009	0.019
SC: Barnwell	1	0.0	0.0	0.0	0.013	0.013	0.013
SC: Columbia	9	0.5	0.1	0.3	0.030	0.011	0.018



**Table 4 (continued)**  
**Gross Beta in Airborne Particulates**  
**September 1998**

Location	Number of Samples	5-hour Field Estimate			NAREL Lab Measurement		
		Max	Min (pCi/m <sup>3</sup> )	Avg	Max	Min (pCi/m <sup>3</sup> )	Avg
SD: Pierre	5	0.4	0.1	0.2	0.025	0.013	0.019
TN: Nashville	9	0.6	0.2	0.4	0.041	0.009	0.023
TN: Oak Ridge/Bethel	8	2.0	0.2	0.8	0.030	0.007	0.021
TN: Oak Ridge/K25	8	1.8	0.2	0.8	0.030	0.007	0.021
TN: Oak Ridge/Melton	8	2.4	0.1	1.0	0.029	0.007	0.021
TN: Oak Ridge/Y12 E	8	2.4	0.2	0.9	0.036	0.005	0.023
TN: Oak Ridge/Y12 W	8	1.2	0.1	0.4	0.033	0.006	0.022
TX: Austin	5	0.3	0.1	0.2	0.024	0.009	0.016
TX: El Paso	9	1.1	0.1	0.7	0.025	0.011	0.018
UT: Salt Lake City	5	0.3	0.0	0.1	0.014	0.009	0.012
VA: Lynchburg	8	1.4	0.4	0.8	0.027	0.007	0.017
WA: Spokane	8	0.4	0.2	0.3	0.018	0.006	0.012
WI: Madison	7	0.6	0.1	0.3	0.018	0.006	0.013

**Table 5**  
**Gross Beta and Specific Gamma in Precipitation**  
**July 1998**

Location	Gross Beta Activity		Specific Gamma Activity	
	pCi/L $\pm 2\sigma$		Nuclide	pCi/L $\pm 2\sigma$
AL: Montgomery	3.71	0.44	Be7	43 32
AR: Little Rock	1.72	0.32	Be7	37 39
AZ: Phoenix	2.12	0.37		ND
CO: Denver	2.10	0.37	Be7	83 26
CT: Hartford	7.41	0.59	Be7	105 18
DE: Wilmington	3.66	0.44	Be7	68 18
FL: Jacksonville	1.88	0.34		ND
FL: Miami	0.77	0.27		ND
HI: Honolulu	2.15	0.36		ND
	5.02	0.50		ND
IA: Iowa City	1.41	0.32		ND
ID: Idaho Falls	1.24	0.31	Pb212	4.4 7.7
ME: Augusta	7.13	0.58	Be7	89 18
MI: Lansing	1.53	0.32		ND
MN: Minneapolis	1.14	0.28		ND
MN: Welch	1.42	0.31		ND
NC: Charlotte	4.17	0.46	Be7	91 50
NC: Wilmington	2.47	0.38		ND
ND: Bismarck	1.97	0.35		ND
NE: Lincoln	2.25	0.37		ND
NH: Concord	3.61	0.42	Be7	86 19
			Tl208	1.7 1.7
NM: Santa Fe	1.99	0.43	Be7	37 33
NV: Las Vegas	4.30	0.48	Be7	79 35
NY: Albany	3.96	0.45	Be7	56 20
NY: Yaphank	13.41	0.80		ND
OH: Painesville	2.48	0.39	Be7	80 43
OR: Portland	3.30	0.42	Be7	175 37
PA: Harrisburg	3.66	0.44	Be7	34 31
			K40	89 35
			Pb212	6.5 8.0
SC: Barnwell	2.97	0.40		ND
SC: Columbia	6.17	0.54	Pb212	6.2 7.2
TN: Knoxville	1.73	0.34	K40	82 32
TN: Nashville	3.44	0.42	Be7	31 33
			Tl208	4.2 3.6
TX: Austin	0.70	0.34		ND

Note: ND = Not Detected

**Table 5 (continued)**  
**Gross Beta and Specific Gamma in Precipitation**  
**July 1998**

Location	Gross Beta Activity		Specific Gamma Activity	
	pCi/L $\pm 2\sigma$		Nuclide	pCi/L $\pm 2\sigma$
TX: El Paso	3.81	0.52		ND
UT: Salt Lake City	1.70	0.34		ND
VA: Lynchburg	5.57	0.51	Pb212	6.3 6.2
			Ra224	41 42
WI: Madison	1.54	0.31		ND

Note: ND = Not Detected

**Table 6**  
**Gross Beta and Specific Gamma in Precipitation**  
**August 1998**

Location	Gross Beta Activity		Specific Gamma Activity	
	pCi/L $\pm 2\sigma$		Nuclide	pCi/L $\pm 2\sigma$
AL: Montgomery	2.78	0.38	Be7	57 27
AR: Little Rock	2.06	0.35	Be7	43 36
AZ: Phoenix	1.92	0.34	Be7	53 40
CO: Denver	1.60	0.33	Be7	64 33
CT: Hartford	2.18	0.41	Pb212	9.2 8.4
DE: Wilmington	1.85	0.38	Be7	26 23
FL: Jacksonville	2.50	0.36	Be7	58 29
			Pb212	3.2 4.3
FL: Miami	0.88	0.26		ND
HI: Honolulu	2.24	0.37		ND
IA: Iowa City	0.57	0.25		ND
ID: Idaho Falls	10.11	0.79	Be7	28 30
ME: Augusta	5.09	0.54	Be7	120 35
MI: Lansing	1.18	0.30		ND
MN: Minneapolis	1.04	0.29	Be7	46 40
			Bi212	40 60
MN: Welch	4.85	0.51	Be7	77 31
			Pb212	4.7 6.2
NC: Charlotte	1.47	0.37		ND
NC: Wilmington	2.89	0.44		ND
ND: Bismarck	0.70	0.26		ND
NE: Lincoln	0.59	0.24	Tl208	1.9 3.5
NH: Concord	5.67	0.56	Be7	74 39
			Pb212	6.6 8.3
NY: Albany	1.69	0.36	Be7	43 28
NY: Yaphank	14.11	0.82	Be7	65 35
			K40	25 41
			Pb212	8.5 8.4
OH: Painesville	2.09	0.34	Be7	73 42
			Tl208	3.7 4.6
PA: Harrisburg	1.77	0.37	Be7	37 26
			K40	20 24
SC: Barnwell	2.77	0.38		ND
SC: Columbia	2.34	0.37	K40	20 28
TN: Knoxville	1.91	0.34	Pb212	4.5 5.9
TN: Nashville	6.81	0.56	Be7	73 32
TX: Austin	1.19	0.31		ND

Note: ND = Not Detected

**Table 6 (continued)**  
**Gross Beta and Specific Gamma in Precipitation**  
**August 1998**

Location	Gross Beta Activity		Specific Gamma Activity	
	pCi/L $\pm 2u$		Nuclide	pCi/L $\pm 2u$
TX: El Paso	3.80	0.47		ND
UT: Salt Lake City	3.30	0.46	Be7	58 37
			K40	28 46
VA: Lynchburg	10.09	0.67		ND
WI: Madison	1.85	0.34	Tl208	3.6 5.1

Note: ND = Not Detected

**Table 7**  
**Gross Beta and Specific Gamma in Precipitation**  
**September 1998**

Location	Gross Beta Activity		Specific Gamma Activity	
	pCi/L $\pm 2\sigma$		Nuclide	pCi/L $\pm 2\sigma$
AL: Montgomery	1.35	0.31		ND
AR: Little Rock	0.71	0.27		ND
AZ: Phoenix	2.95	0.41	Be7	33 26
CT: Hartford	3.94	0.44	Be7	75 42
DE: Wilmington	3.54	0.43	Be7	37 18
FL: Jacksonville	1.24	0.29	Tl208	4.3 3.1
FL: Miami	1.02	0.28		ND
HI: Honolulu	5.27	0.52		ND
IA: Iowa City	1.70	0.33		ND
ID: Idaho Falls	27.4	1.2	Be7	91 37
ME: Augusta	5.29	0.51	Be7	105 18
MI: Lansing	1.05	0.28		ND
MN: Minneapolis	1.47	0.31		ND
MN: Welch	4.33	0.73	Tl208	2.5 3.6
NC: Charlotte	1.17	0.28		ND
ND: Bismarck	1.41	0.31		ND
NE: Lincoln	2.10	0.36		ND
NH: Concord	3.48	0.42	Be7	70 18
NV: Las Vegas	8.55	0.66	Be7	75 21
NY: Albany	2.07	0.35	Be7	34 20
NY: Yaphank	8.02	0.60		ND
OH: Painesville	3.61	0.42	Be7	89 37
			Tl208	2.5 4.7
SC: Barnwell	1.77	0.33		ND
SC: Columbia	0.47	0.24		ND
TN: Knoxville	2.91	0.40	Pb212	4.2 6.1
TN: Nashville	3.36	0.43		ND
TX: Austin	0.16	0.21		ND
UT: Salt Lake City	1.87	0.33		ND
VA: Lynchburg	4.49	0.48	Pb212	3.5 5.8
			Tl208	2.4 4.7
WI: Madison	0.57	0.24		ND

Note: ND = Not Detected

**Table 8**  
**Tritium in Precipitation**  
**July - September 1998**

Location	July 1998		August 1998		September 1998	
	pCi/L $\pm 2u$		pCi/L $\pm 2u$		pCi/L $\pm 2u$	
AL: Montgomery	21	79	-18	76	-41	80
AR: Little Rock	46	78	70	76	-55	79
AZ: Phoenix	13	77	86	77	-37	80
CO: Denver	41	78	39	75	NS	
CT: Hartford	30	80	36	79	98	77
DE: Wilmington	-16	78	3	77	90	77
FL: Jacksonville	-41	77	-19	76	-28	71
FL: Miami	10	79	-10	76	-42	79
HI: Honolulu	0	76	-11	73	21	81
IA: Iowa City	11	77	53	75	-31	79
ID: Idaho Falls	21	78	81	77	52	82
ME: Augusta	51	81	58	79	107	78
MI: Lansing	78	79	46	79	-18	80
MN: Minneapolis	119	81	86	77	-3	81
MN: Welch	121	81	34	75	-58	78
NC: Charlotte	25	79	74	80	-26	81
NC: Wilmington	94	82	55	79	NS	
ND: Bismarck	5	77	88	77	8	82
NE: Lincoln	-3	76	42	75	-23	80
NH: Concord	30	80	66	79	77	76
NM: Santa Fe	-2	77	NS		NS	
NV: Las Vegas	16	77	NS		48	82
NY: Albany	6	79	21	77	121	78
NY: Yaphank	30	80	19	77	61	76
OH: Painesville	19	76	78	77	-2	81
OR: Portland	30	78	NS		NS	
PA: Harrisburg	14	79	13	77	NS	
SC: Barnwell	282	89	328	90	32	82
SC: Columbia	87	82	104	81	-11	81
TN: Knoxville	-21	78	84	80	-60	79
TN: Nashville	64	81	52	79	-31	80
TX: Austin	8	77	37	75	-29	80
TX: El Paso	30	78	67	76	NS	
UT: Salt Lake City	69	79	5	73	7	82
VA: Lynchburg	21	80	54	79	15	82
WI: Madison	77	80	34	79	-46	80

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.



## **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 operating or future 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 9**  
**Tritium in Surface Water**  
**July - September 1998**

Location	Source	Date Collected	<sup>3</sup> H pCi/L ± 2σ	
AL: Decatur	Tennessee River	07/01/98	192	85
AL: Gordon	Chattahoochee River	07/15/98	62	80
AR: Little Rock	Arkansas River	07/10/98	13	78
CA: Clay Station	Folsom S. Canal	07/28/98	-3	78
CA: Diablo Canyon	Pacific Ocean	07/02/98	5	79
CA: Diablo Canyon	Pacific Ocean	09/29/98	1890	130
CA: Eureka	Humboldt Bay	07/10/98	-46	77
CA: San Onofre	Pacific Ocean	07/09/98	93	74
CO: Platteville	South Platte River	07/13/98	48	81
CT: E. Haddam	Connecticut River	09/03/98	35	80
CT: Waterford	Long Island Sound	09/03/98	25	79
FL: Crystal River	Gulf Of Mexico	07/06/98	0	77
FL: Ft. Pierce	Atlantic Ocean	07/28/98	57	81
FL: Homestead	Biscayne Bay	07/27/98	161	85
GA: Baxley	Altamaha River	07/08/98	21	78
IA: Cedar Rapids	Cedar River	07/08/98	27	79
ID: Buhl	Snake River	07/06/98	14	79
IL: Moline	Mississippi River	08/26/98	43	80
IL: Morris	Illinois River	07/17/98	740	110
IL: Zion	Lake Michigan	09/01/98	81	79
KS: Le Roy	Neosho River	09/24/98	28	84
LA: New Orleans	Mississippi River	09/08/98	42	79
MA: Plymouth	Cape Cod Bay	08/14/98	16	78
MD: Conowingo	Susquehanna River	07/14/98	225	94
MD: Lusby	Chesapeake Bay	07/14/98	6	83
ME: Wiscasset	Montseway Bay	07/21/98	81	82
MI: Bridgman	Lake Michigan	07/14/98	110	83
MI: Charlevoix	Lake Michigan	07/08/98	32	79
MI: Monroe	Lake Erie	07/13/98	88	83
MI: S. Haven	Lake Michigan	07/14/98	85	82
MN: Monticello	Mississippi River	08/03/98	54	81
MN: Red Wing	Mississippi River	08/10/98	44	80
MS: Port Gibson	Mississippi River	07/07/98	16	80
NC: Charlotte	Catawba River	07/13/98	267	96
NC: Southport	Atlantic Ocean	07/30/98	-21	78
NJ: Bayside	Delaware River	07/10/98	5	79
NJ: Oyster Creek	Oyster Creek	07/10/98	5	80
NV: Boulder City	Colorado River	08/20/98	-9	78
NY: Chelsea	Hudson River	07/27/98	49	80
NY: Croton-On-Hudson	Hudson River	07/23/98	69	81

**Table 9 (continued)**  
**Tritium in Surface Water**  
**July - September 1998**

Location	Source	Date Collected	<sup>3</sup> H pCi/L ± 2 <i>u</i>	
OH: Toledo	Lake Erie	07/14/98	28	79
OR: Bradwood	Columbia River	07/15/98	13	82
PA: Danville	Susquehanna River	07/15/98	53	82
PA: Philadelphia	Delaware River - Baxter	07/08/98	11	78
PA: Philadelphia	Schuylkill River - Queen Lane	07/08/98	84	81
PA: Philadelphia	Schuylkill River - Belmont	07/08/98	47	79
SC: Allendale	Savannah River	07/14/98	1070	120
SC: Broad River	Broad River	07/20/98	197	87
SC: Hartsville	Lake Robinson	07/16/98	520	100
TN: Daisy	Tennessee River	07/30/98	940	110
TN: Kingston	Clinch River	07/07/98	168	85
TN: Oak Ridge	Clinch River	09/01/98	-28	82
TX: Matagorda	Colorado River	07/01/98	43	80
VA: Doswell	North Anna River	07/01/98	1750	130
VA: Newport News	James River	07/06/98	125	84
VT: Vernon	Connecticut River	07/21/98	51	81
WA: Northport	Columbia River	07/21/98	58	82
WA: Richland	Columbia River	07/14/98	14	79
WI: Two Creeks	Lake Michigan	07/02/98	102	82
WI: Victory	Mississippi River	07/14/98	48	81
WV: Wheeling	Ohio River	07/08/98	8	78

## **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 10**  
**Tritium in Drinking Water**  
**July - September 1998**

Location	Date Collected	<sup>3</sup> H pCi/L ± 2 <i>u</i>	
AK: Fairbanks	09/10/98	23	78
AL: Dothan	07/16/98	-98	82
AL: Montgomery	07/01/98	102	82
AL: Muscle Shoals	07/01/98	50	80
AR: Little Rock	07/09/98	20	79
CA: Berkeley	07/23/98	-30	76
CA: Los Angeles	07/02/98	39	80
CO: Denver	07/15/98	25	86
CO: Platteville	07/08/98	51	88
CT: Hartford	07/02/98	22	78
DC: Washington	07/10/98	-12	85
DE: Dover	07/21/98	23	78
FL: Miami	07/02/98	27	79
FL: Tampa	08/13/98	-18	76
GA: Baxley	07/08/98	-41	76
GA: Savannah	09/10/98	-12	76
HI: Honolulu	07/02/98	-13	77
IA: Cedar Rapids	07/07/98	-18	77
ID: Boise	07/02/98	18	79
ID: Idaho Falls	07/16/98	-8	85
IL: Morris	07/10/98	-63	83
IL: W. Chicago	07/01/98	-13	76
KS: Topeka	07/01/98	24	78
LA: New Orleans	07/07/98	71	81
MD: Baltimore	07/01/98	-3	77
MD: Conowingo	07/14/98	160	91
ME: Augusta	07/08/98	37	80
MI: Detroit	07/08/98	176	86
MI: Grand Rapids	07/14/98	83	89
MN: Minneapolis	08/10/98	9	77
MN: Red Wing	07/27/98	7	77
MO: Jefferson City	07/02/98	11	78
MS: Jackson	07/21/98	9	77
MS: Port Gibson	07/02/98	-12	77
MT: Helena	07/13/98	30	79
NC: Charlotte	07/13/98	238	95
NC: Wilmington	07/16/98	-13	85
ND: Bismarck	07/08/98	7	78
NE: Lincoln	07/16/98	3	86
NH: Concord	07/20/98	5	85

**Table 10 (continued)**  
**Tritium in Drinking Water**  
**July - September 1998**

Location	Date Collected	<sup>3</sup> H pCi/L ± 2 <i>u</i>	
NJ: Trenton	07/10/98	-51	83
NJ: Waretown	07/10/98	-50	76
NM: Santa Fe	08/05/98	18	78
NV: Las Vegas	07/01/98	59	80
NY: Albany	07/01/98	10	78
NY: Niagara Falls	09/30/98	99	86
NY: Syracuse	07/24/98	103	82
OH: Cincinnati	09/17/98	7	77
OH: Columbus	08/26/98	19	77
OH: E. Liverpool	07/30/98	67	80
OH: Painesville	07/06/98	119	83
OH: Toledo	07/14/98	99	82
OK: Oklahoma City	09/22/98	-3	76
OR: Portland	07/01/98	21	78
PA: Columbia	07/16/98	10	86
PA: Harrisburg	07/16/98	-66	83
PA: Philadelphia - Baxter	07/08/98	30	80
PA: Philadelphia - Belmont	07/08/98	85	82
PA: Philadelphia - Queen	07/08/98	-18	77
PA: Pittsburgh	07/30/98	42	79
PC: Corozal	07/16/98	41	79
RI: Providence	07/02/98	44	80
SC: Barnwell	07/10/98	-7	78
SC: Columbia	07/17/98	43	87
SC: Jenkinsville	07/17/98	13	86
SC: Seneca	07/07/98	57	81
TN: Chattanooga	07/06/98	-21	76
TN: Oak Ridge - Anderson Co #768	09/30/98	-73	81
TN: Oak Ridge - Anderson Co #772	09/30/98	-55	80
TN: Oak Ridge - Knox Co #371	09/30/98	-29	82
TN: Oak Ridge - Roane Co #360	09/29/98	-34	82
TN: Oak Ridge - Roane Co #4442	09/29/98	-34	82
TX: Austin	07/10/98	-27	77
VA: Doswell	07/17/98	-10	85
VA: Lynchburg	07/07/98	105	83
WA: Richland	07/14/98	13	86
WA: Seattle	07/01/98	50	80
WI: Genoa	07/14/98	-83	82
WI: Madison	07/06/98	24	78

### **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 11**  
**Radionuclides in Pasteurized Milk**  
**July 1998**

Location	Date Collected	K g/L $\pm 2u$		<sup>137</sup> Cs pCi/L $\pm 2u$		<sup>140</sup> Ba pCi/L $\pm 2u$	<sup>131</sup> I pCi/L $\pm 2u$
AL: Montgomery	07/02/98	1.644	0.049	ND		ND	ND
AR: Little Rock	07/07/98	1.49	0.14	ND		ND	ND
AZ: Phoenix	07/15/98	1.656	0.049	ND		ND	ND
CA: Los Angeles	07/07/98	1.680	0.090	ND		ND	ND
CA: Sacramento	07/07/98	1.585	0.082	ND		ND	ND
CA: San Francisco	07/07/98	1.63	0.10	ND		ND	ND
CT: Hartford	07/09/98	1.644	0.049	ND		ND	ND
DE: Wilmington	07/14/98	1.704	0.093	ND		ND	ND
FL: Tampa	07/06/98	1.632	0.048	2.3	1.4	ND	ND
GA: Atlanta	07/27/98	1.644	0.049	ND		ND	ND
HI: Honolulu	07/06/98	1.79	0.15	ND		ND	ND
IA: Des Moines	07/06/98	1.49	0.12	ND		ND	ND
KS: Wichita	07/07/98	1.68	0.10	ND		ND	ND
KY: Louisville	07/06/98	1.67	0.13	ND		ND	ND
MA: Boston	07/07/98	1.597	0.092	ND		ND	ND
MD: Baltimore	07/02/98	1.597	0.048	ND		ND	ND
ME: Portland	07/27/98	1.632	0.049	ND		ND	ND
MI: Detroit	07/07/98	1.740	0.094	ND		ND	ND
MI: Grand Rapids	07/06/98	1.668	0.050	ND		ND	ND
MO: Jefferson City	07/21/98	1.728	0.050	ND		ND	ND
MS: Jackson	07/07/98	1.549	0.092	ND		ND	ND
NC: Charlotte	07/16/98	1.609	0.079	ND		ND	ND
NJ: Trenton	07/09/98	1.656	0.049	ND		ND	ND
NM: Albuquerque	07/20/98	1.621	0.049	ND		ND	ND
NV: Las Vegas	07/22/98	1.644	0.049	ND		ND	ND
NY: Buffalo	07/03/98	1.49	0.14	ND		ND	ND
NY: Syracuse	07/06/98	1.644	0.049	ND		ND	ND
OH: Cincinnati	07/21/98	1.644	0.049	ND		ND	ND
OH: Cleveland	07/28/98	1.680	0.050	ND		ND	ND
OR: Portland	07/07/98	1.692	0.049	ND		ND	ND
PA: Philadelphia	07/06/98	1.656	0.050	ND		ND	ND
PA: Pittsburgh	07/06/98	1.621	0.049	ND		ND	ND
PR: San Juan	07/28/98	1.54	0.13	ND		ND	ND
PR: San Juan	07/31/98	1.609	0.048	ND		ND	ND
SC: Charleston	07/14/98	1.656	0.049	ND		ND	ND
SD: Rapid City	07/31/98	1.609	0.090	ND		ND	ND
TN: Chattanooga	07/07/98	1.61	0.13	ND		ND	ND
TN: Knoxville	07/06/98	1.668	0.049	ND		ND	ND
TX: Austin	07/21/98	1.561	0.048	ND		ND	ND

Note: ND = Not Detected



**Table 11 (continued)**  
**Radionuclides in Pasteurized Milk**  
**July 1998**

Location	Date Collected	K g/L $\pm 2u$	<sup>137</sup> Cs pCi/L $\pm 2u$	<sup>140</sup> Ba pCi/L $\pm 2u$	<sup>131</sup> I pCi/L $\pm 2u$
TX: Ft. Worth	07/07/98	1.704 0.051	ND	ND	ND
VA: Norfolk	07/09/98	1.525 0.087	ND	ND	ND
VT: Burlington	07/27/98	1.692 0.049	ND	ND	ND
WA: Seattle	07/07/98	1.57 0.12	ND	ND	ND
WA: Spokane	07/13/98	1.656 0.091	ND	ND	ND
WV: Charleston	07/06/98	1.49 0.12	ND	ND	ND

Note: ND = Not Detected

**Table 12**  
**Radionuclides in Pasteurized Milk**  
**August 1998**

Location	Date Collected	K g/L $\pm 2u$		<sup>137</sup> Cs pCi/L $\pm 2u$		<sup>140</sup> Ba pCi/L $\pm 2u$	<sup>131</sup> I pCi/L $\pm 2u$
AL: Montgomery	08/10/98	1.621	0.091	ND		ND	ND
AR: Little Rock	08/25/98	1.55	0.13	ND		ND	ND
AZ: Phoenix	08/19/98	1.692	0.068	ND		ND	ND
CA: Los Angeles	08/05/98	1.680	0.086	ND		ND	ND
CA: Sacramento	08/05/98	1.704	0.068	ND		ND	ND
CA: San Francisco	08/06/98	1.597	0.087	ND		ND	ND
CT: Hartford	08/13/98	1.775	0.096	ND		ND	ND
DE: Wilmington	08/26/98	1.51	0.14	ND		ND	ND
FL: Tampa	08/05/98	1.632	0.049	4.1	1.6	ND	ND
HI: Honolulu	08/04/98	1.60	0.12	ND		ND	ND
IA: Des Moines	08/10/98	1.63	0.13	ND		ND	ND
IL: Chicago	08/06/98	1.573	0.091	ND		ND	ND
IN: Indianapolis	08/10/98	1.63	0.15	ND		ND	ND
KS: Wichita	08/17/98	1.728	0.068	ND		ND	ND
KY: Louisville	08/05/98	1.64	0.12	ND		ND	ND
MA: Boston	08/07/98	1.716	0.092	ND		ND	ND
MD: Baltimore	08/06/98	1.692	0.093	ND		ND	ND
MI: Detroit	08/04/98	1.787	0.096	ND		ND	ND
MI: Grand Rapids	08/11/98	1.573	0.079	ND		ND	ND
MO: Jefferson City	08/05/98	1.692	0.088	ND		ND	ND
MS: Jackson	08/04/98	1.537	0.087	ND		ND	ND
NC: Charlotte	08/20/98	1.58	0.13	ND		ND	ND
NJ: Trenton	08/12/98	1.454	0.084	ND		ND	ND
NV: Las Vegas	08/17/98	1.668	0.068	ND		ND	ND
NY: Buffalo	08/10/98	1.680	0.090	ND		ND	ND
NY: Syracuse	08/04/98	1.644	0.049	ND		ND	ND
OH: Cincinnati	08/06/98	1.621	0.049	ND		ND	ND
OH: Cleveland	08/10/98	1.597	0.084	ND		ND	ND
OR: Portland	08/04/98	1.728	0.069	ND		ND	ND
PA: Philadelphia	08/05/98	1.63	0.14	ND		ND	ND
PA: Pittsburgh	08/04/98	1.644	0.049	ND		ND	ND
PC: Cristobal	08/19/98	1.561	0.087	4.7	2.6	ND	ND
PR: San Juan	08/12/98	1.573	0.086	ND		ND	ND
SD: Rapid City	08/31/98	1.66	0.13	ND		ND	ND
TN: Chattanooga	08/06/98	1.549	0.088	ND		ND	ND
TN: Knoxville	08/03/98	1.49	0.14	ND		ND	ND
TN: Memphis	08/05/98	1.656	0.049	ND		ND	ND
TX: Austin	08/10/98	1.704	0.093	ND		ND	ND
TX: Ft. Worth	08/05/98	1.704	0.050	ND		ND	ND

Note: ND = Not Detected

**Table 12 (continued)**  
**Radionuclides in Pasteurized Milk**  
**August 1998**

Location	Date Collected	K g/L $\pm 2u$	<sup>137</sup> Cs pCi/L $\pm 2u$	<sup>140</sup> Ba pCi/L $\pm 2u$	<sup>131</sup> I pCi/L $\pm 2u$
VA: Norfolk	08/10/98	1.621 0.082	ND	ND	ND
VT: Burlington	08/11/98	1.632 0.087	ND	ND	ND
WA: Seattle	08/04/98	1.525 0.078	ND	ND	ND
WA: Spokane	08/05/98	1.573 0.087	ND	ND	ND
WV: Charleston	08/03/98	1.56 0.12	ND	ND	ND

Note: ND = Not Detected

**Table 13**  
**Radionuclides in Pasteurized Milk**  
**September 1998**

Location	Date Collected	K g/L $\pm 2u$		<sup>137</sup> Cs pCi/L $\pm 2u$		<sup>140</sup> Ba pCi/L $\pm 2u$	<sup>131</sup> I pCi/L $\pm 2u$
AL: Montgomery	09/08/98	1.609	0.092	ND		ND	ND
AR: Little Rock	09/15/98	1.573	0.091	ND		ND	ND
AZ: Phoenix	09/15/98	1.69	0.14	ND		ND	ND
CA: Los Angeles	09/08/98	1.728	0.094	ND		ND	ND
CA: Sacramento	09/28/98	1.585	0.083	ND		ND	ND
CA: San Francisco	09/09/98	1.72	0.15	ND		ND	ND
DE: Wilmington	09/28/98	1.632	0.049	ND		ND	ND
FL: Tampa	09/08/98	1.45	0.12	2.7	3.1	ND	ND
GA: Atlanta	09/22/98	1.644	0.082	ND		ND	ND
HI: Honolulu	09/08/98	1.74	0.14	ND		ND	ND
IA: Des Moines	09/08/98	1.79	0.14	ND		ND	ND
IL: Chicago	09/10/98	1.54	0.12	ND		ND	ND
IN: Indianapolis	09/11/98	1.55	0.13	ND		ND	ND
KS: Wichita	09/08/98	1.656	0.093	ND		ND	ND
KY: Louisville	09/09/98	1.57	0.13	ND		ND	ND
MA: Boston	09/04/98	1.656	0.094	ND		ND	ND
MD: Baltimore	09/04/98	1.537	0.081	ND		ND	ND
MI: Detroit	09/01/98	1.68	0.13	ND		ND	ND
MI: Grand Rapids	09/16/98	1.55	0.12	ND		ND	ND
MO: Jefferson City	09/03/98	1.466	0.090	ND		ND	ND
MS: Jackson	09/08/98	1.53	0.10	ND		ND	ND
NJ: Trenton	09/23/98	1.561	0.089	ND		ND	ND
NM: Albuquerque	09/28/98	1.60	0.10	ND		ND	ND
NY: Buffalo	09/03/98	1.61	0.10	ND		ND	ND
NY: Syracuse	09/16/98	1.561	0.082	ND		ND	ND
OH: Cincinnati	09/08/98	1.55	0.10	ND		ND	ND
OH: Cleveland	09/10/98	1.561	0.081	ND		ND	ND
OR: Portland	09/16/98	1.68	0.15	ND		ND	ND
PA: Philadelphia	09/08/98	1.72	0.13	ND		ND	ND
PA: Pittsburgh	09/09/98	1.50	0.14	ND		ND	ND
PC: Cristobal	09/24/98	1.585	0.048	5.4	1.5	ND	ND
SD: Rapid City	09/29/98	1.692	0.070	ND		ND	ND
TN: Chattanooga	09/13/98	1.64	0.13	ND		ND	ND
TN: Knoxville	09/21/98	1.561	0.087	ND		ND	ND
TN: Memphis	09/29/98	1.549	0.088	ND		ND	ND
TX: Ft. Worth	09/03/98	1.585	0.091	ND		ND	ND
VT: Burlington	09/18/98	1.55	0.10	ND		ND	ND
WA: Seattle	09/08/98	1.609	0.082	ND		ND	ND
WA: Spokane	09/08/98	1.48	0.14	ND		ND	ND

Note: ND = Not Detected

**Table 13 (continued)**  
**Radionuclides in Pasteurized Milk**  
**September 1998**

Location	Date Collected	K g/L $\pm 2u$	<sup>137</sup> Cs pCi/L $\pm 2u$	<sup>140</sup> Ba pCi/L $\pm 2u$	<sup>131</sup> I pCi/L $\pm 2u$
WV: Charleston	09/14/98	1.51    0.14	ND	ND	ND

Note:    ND = Not Detected

**Table 14**

**Strontium-90 in Pasteurized Milk  
July 1998**

Strontium-90 results will be reported at a later date.

## **For More Information**

*Environmental Radiation Data* (ERD) is published quarterly by the U.S. Environmental Protection Agency's Office of Radiation and Indoor Air.

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