

Rocky Flats Plant

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Monthly Environmental Monitoring Report

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Table of Contents

Executive Summary	iii
Introduction	1
Site Meteorology and Climatology	35
Appendix A - Radiation Standards for Protection of the Public	39
Appendix B - National Pollution Discharge Elimination System/Federal Facilities Compliance Agreement Volatile Organic Compounds	43
Appendix C - Colorado Water Quality Control Commission Standards	45
Appendix D - Corrections and Updates for Previously Reported Information	47
Distribution	89

List of Tables

Table 1 - Plutonium and Americium Airborne Effluent Data	4
Table 2 - Uranium Airborne Effluent Data	6
Table 3 - Tritium and Beryllium Airborne Effluent Data	8
Table 4 - Plutonium Concentrations in Ambient Air for Onsite Samplers	10
Table 5 - Plutonium Concentrations in Ambient Air for Perimeter Samplers	11
Table 6 - Plutonium Concentrations in Ambient Air for Community Samplers	12
Table 7 - Onsite Water Sample Results - Plutonium and Americium	16
Table 8 - Onsite Water Sample Results - Uranium	17
Table 9 - Offsite Water Sample Results - Plutonium and Americium	22
Table 10 - Offsite Water Sample Results - Uranium	23
Table 11 - Onsite and Offsite Water Sample Results - Tritium	24
Table 12 - Offsite Water Sample Results - Nitrate as Nitrogen	25
Table 13 - NPDES/FFCA Permit Water Sample Results	26

Table 14 - NPDES/FFCA Effluent Monitoring	28
Table 15 - Water Sample Results, Nonradioactive Parameters	30
Table 16 - Daily Flow Data Recorded at the Walnut Creek at Indiana Gaging Station Ponds A-4 and B-5	31
Table 17 - Daily Flow Data Recorded at Ponds C-1 and C-2 (Woman Creek)	32
Table 18 - Daily Transfer Flow Data Recorded for Pond B-5 to Pond A-4	33
Table 19 - Rocky Flats Plant Wind Direction Frequency (Percent) by Four Wind-Speed Classes	37
Table 20 Precipitation Report	37

List of Figures

Figure 1 - Location of Onsite and Perimeter Air Samplers	14
Figure 2 - Location of Community Air Samplers	15
Figure 3 - Holding Pond and Liquid Effluent Water Courses	18

Executive Summary

The Rocky Flats Plant is part of a nationwide Department of Energy complex for the research, development, and production of nuclear weapons. The plant is responsible for fabricating nuclear weapons components from plutonium, uranium, beryllium, and stainless steel. Primary production activities include metal fabrication and assembly, chemical recovery and purification of process-produced transuranic radionuclides, and related quality control functions.

Because radioactive and chemically hazardous materials are used or handled at the Rocky Flats Plant, the plant maintains an extensive environmental protection program. Included in that program is regular monitoring for radioactive and hazardous constituents at onsite, plant boundary, and offsite locations. This Environmental Monitoring Report provides a monthly summary of environmental monitoring data collected by the Rocky Flats Plant. Summarized below are highlights from the major data categories presented. Remaining data presented in this report are within the ranges historically measured for their respective parameters and locations.

Radiation standards for protection of the public are discussed in Appendix A of this report. The primary standards are based on calculations of radiation dose. These calculations are performed annually using monitoring data presented in the Monthly Environmental Monitoring Report. Radiation doses to the public from Rocky Flats Plant operations are typically well below any regulatory limit and far less than are received from naturally occurring radiation sources in the Denver metropolitan area (see Appendix A).

The Rocky Flats Plant Radiological Health Laboratory had been shut down for much of January through March 1991 because of needed maintenance on its process wastewater transfer system. Environmental monitoring sample analyses for beryllium, plutonium, uranium, and americium in air and surface water and for tritium in surface water were not performed during this shutdown. The maintenance has been completed, and the laboratory now is fully operational. Analyses for beryllium and for isotope-specific radioactive materials on environmental monitoring samples have resumed. All analytical results for samples impacted by the shutdown have been reported when available. Many of those results are included in this report (see Appendix D).

**EXECUTIVE SUMMARY
(CONTINUED)**

**Onsite and
Offsite surface
Water Monitoring
Results**

Missing Pond A-4 Samples - During the Pond A-4 discharge in April 1991, the daily samples for plutonium, uranium and americium for April 3 - 5 were collected, but never delivered to the Radiological Health Laboratory for analysis. Because the Laboratory had been shut down from January through March (see preceding discussion on the laboratory shutdown) the samples were being stored temporarily in a contractor's trailer. It is believed that the samples were lost in transfer from the trailer to the laboratory. The samples for plutonium, uranium, and americium for Walnut Creek at the Indiana Street location - which would have received the Pond A-4 discharge - for the same time period showed concentrations at typical levels for this location.

Corrected and Updated Monitoring Data - Considerable corrected and updated data are included in Appendix D of this month's report. Much of the data have footnotes associated with the results. Many analyses, particularly for samples for americium in May and June 1991, were rerun in duplicate if sufficient sample water was available. The reruns were made to verify original results which were slightly above those historically seen for their respective locations. The footnotes provide all results meeting quality assurance criteria from the original aliquot and rerun aliquots. These results were used to calculate a mean concentration for each sample. This mean concentration was used to calculate the volume-weighted average concentration or arithmetic average concentration shown in the tables. It is also the concentration that will be used in all other calculations, including the *Rocky Flats Plant Annual Site Environmental Report*.

May 1991 Americium Results - There will be no americium-241 result available for the Pond C-1 location for the sampling composite period May 13 - 17, 1991, nor for Walnut Creek at Indiana Street location for the sampling composite period May 20 - 24, 1991. Both the original and the rerun aliquots for these samples failed to meet laboratory quality assurance criteria. There is no remaining sample for further reruns. Plutonium in July 1991 Pond C-1 Sample - Analytical results for the original aliquot of the July 15 - 19, 1991, plutonium composite sample failed to meet laboratory quality assurance criteria. Two rerun aliquots of the sample yielded plutonium concentrations of 0.055 ± 0.057 pCi/l and 0.400 ± 0.120 pCi/l, respectively. The latter value is significantly above the concentrations typically seen for

**EXECUTIVE SUMMARY
(CONTINUED)**

**Onsite and
Offsite surface
Water Monitoring
Results**

surface water samples at the Rocky Flats Plant. Since all quality assurance criteria for the sample were met for the reruns, the results of both rerun analyses are being accepted as valid values. There is no remaining sample water for further reruns. The mean of the two rerun concentrations will be used in all calculations for the sample.

No Rocky Flats Plant activities have been identified which would have contributed to the increased concentrations. Samples collected from Pond C-1 immediately before and after the July 15 - 19 sampling period showed no unusual results. Hydrographs for Woman Creek at Indiana Street and for Mower Ditch at Indiana Street indicate that no flow occurred at these locations during the July 15 - 19 period, and no surface water flow from Pond C-1 would have reached offsite locations.

Quality Assurance Upgrade - In a continued effort to improve the quality of radionuclide analyses, the Rocky Flats Plant Radiological Health Laboratory has implemented a new acceptance criterion for the lower limit of percent chemical recovery, beginning with data for the September 1991 sampling period. Previously, the lower limit for recovery for plutonium, uranium, and americium was 10%. The new lower limit for plutonium and americium will be 20% and for uranium will be 30%.

**September
1991**

Rocky Flats Plant Environmental Monitoring Report

Introduction

This report summarizes the effluent and environmental monitoring programs at the Rocky Flats Plant (RFP) for the month of September 1991. The data presented herein reflect the best information available to the RFP at this time. Should subsequent analyses indicate that any data presented herein are inaccurate or misleading, appropriate revisions will be issued promptly.

Tables 1 through 3 show monitoring results for radioactive and nonradioactive airborne effluents continuously sampled from plant buildings. Tables 4 through 6 summarize environmental monitoring data from the RFP ambient air sampling network. This network is comprised of continuously operating outdoor air samplers located on plantsite, around the plant boundary, and in neighboring communities.

Water sampling results for radioactive constituents are given in Tables 7 through 11. Results are summarized for plant surface water control ponds, for nearby drinking water reservoirs, and for tap water for neighboring communities. Nitrate monitoring for Great Western Reservoir and Standley Lake, the two drinking water reservoirs that can receive surface water discharges from the plant, are summarized in Table 12. Surface water discharges from RFP currently are being diverted around these drinking water reservoirs.

The Environmental Protection Agency (EPA) has issued to the plant a National Pollutant Discharge Elimination System (NPDES) permit for control of surface water discharges. Water sampling results associated with the NPDES permit, as modified by a March 25, 1991, Federal Facilities Compliance Agreement (FFCA) with EPA, are reported in Table 13. Applicable NPDES/FFCA limits are included in Table 13 for comparison. Monitoring results for which no limits have been established under the NPDES/FFCA are reported in Table 14. Appendix B

lists the volatile organic compounds for which monitoring is required under the NPDES/FFCA. Analytical results for nonradioactive parameters in water at the Walnut Creek at Indiana Street location are summarized in Table 15. Daily flow data for surface water from the two plant drainage systems (Walnut Creek and Woman Creek) are given in Tables 16 and 17. Daily flow data for water transferred from Pond B-5 to Pond A-4, for subsequent discharge offsite, are given in Table 18. Meteorological data, including percent wind direction frequency by wind speed class and daily precipitation, are given in Tables 19 and 20.

Appendix D contains corrections and updates on previously reported information.

Error terms in the form of "a±b" are included with some of the data. For a single sample, "a" is the analytical-blank corrected value; for multiple samples it represents the arithmetic mean, the volume-weighted mean, or the annual total, as indicated in the table. The error term "b" accounts for the propagated statistical counting uncertainty of the sample(s) and the associated analytical blanks at the 95 percent confidence level. These error terms represent a minimum estimate of error for the data.

Plutonium, uranium, americium, tritium, and beryllium measured concentrations are given in this report. Most of the measured concentrations are at or very near background levels, and often there is little or no amount of these materials in the media being analyzed. When this occurs, the results of the laboratory analyses can be expected to show a statistical distribution of positive and negative numbers near zero and numbers that are less than the calculated minimum detectable concentration for the analyses. The laboratory analytical blanks, used to correct for background contributions to the measurements, show a similar statistical distribution around their average values. Negative sample values result when the measured value for a laboratory analytical blank is subtracted from a sample analytical result smaller than the analytical blank value. Results that are less than calculated minimum detectable levels indicate that the results are below the level of statistical confidence in the actual numerical values. All reported results - including negative values and values that are less than minimum detectable levels - are included in any arithmetic calculations on the data set. Reporting all values allows all of the data to be evaluated using appropriate statistical treatment. This assists in

identifying any bias in the analyses, allows better evaluation of distributions and trends in environmental data, and helps in estimating the true sensitivity of the measurement process.

The reader should use caution in interpreting individual values that are negative or less than minimum detectable levels. A negative value has no physical significance. Values less than minimum detectable levels lack statistical confidence as to what the actual number is, although it is known with high confidence that it is below the specified detection level. Such values should not be interpreted as being the actual amount of material in the sample, but should be seen as reflecting a range (from zero to the minimum detectable level) in which the actual amount would likely lie. These values are significant, however, when taken together with other analytical results that indicate that the distribution is near zero.

The data provided in this report are provided as a matter of courtesy and should not be construed as an application for a permit or license, or in support of such an application. Approval of the Department of Energy should be obtained before publication of any data contained in this report.

Abbreviations used within this report are as defined.

Abbreviations

C Average	Average concentration
C Maximum	Maximum concentration
C Minimum	Minimum concentration
m ³	Cubic meter
m/s	Meters per second
mCi	Millicurie
mg/l	Milligrams per liter
mrem	Millirem
pCi/l	Picocuries per liter
pCi/m ³	Picocuries per cubic meter
pH	Hydrogen ion concentration
SU	Standard Unit
µg/m ³	Micrograms per cubic meter
#/100 ml	Number per 100 milliliter
µCi	Microcurie

Table 1

Plutonium and Americium Airborne Effluent Data

Month	Plutonium-239, -240 (08/15/91 - 08/17/91)		Americium-241 (07/15/91 - 08/16/91)	
	Release (μCi)	C Maximum (pCi/m^3)	Release (μCi)	C Maximum (pCi/m^3)
CY1990	1.039	0.0078 \pm 0.0018	0.396	0.0014 \pm 0.0002
January	0.030 \pm 0.007	0.0005 \pm 0.0001	0.0075 \pm 0.0030	0.0006 \pm 0.0001
February	0.017 \pm 0.007	0.0002 \pm 0.0001	0.0076 \pm 0.0032	0.0001 \pm 0.0001
March	0.018 \pm 0.007	0.0001 \pm 0.0000	0.0008 \pm 0.0039	0.0001 \pm 0.0000
April	0.029 \pm 0.008	0.0001 \pm 0.0000	0.0046 \pm 0.0044 ^a	0.0000 \pm 0.0000
May	0.220 \pm 0.035	0.0030 \pm 0.0006	0.0070 \pm 0.0100	0.0002 \pm 0.0001
June	0.036 \pm 0.007 ^a	0.0001 \pm 0.0000	0.0093 \pm 0.0032 ^a	0.0000 \pm 0.0000
July	0.097 \pm 0.016	0.0009 \pm 0.0002	0.0221 \pm 0.0076 ^a	0.0002 \pm 0.0000
August	0.039 \pm 0.008 ^a	0.0003 \pm 0.0001	0.0092 \pm 0.0054	0.0001 \pm 0.0000
September	0.026 \pm 0.007 ^b	0.0002 \pm 0.0001		
October				
November				
December				
Year to Date	0.511 \pm 0.101	0.0030 \pm 0.0006	0.068 \pm 0.041	0.0006 \pm 0.0001

^a Previously reported as incomplete data.

^b The data for 1 plutonium location is missing because of failure of Quality Assurance Criteria. The sample is being rerun.

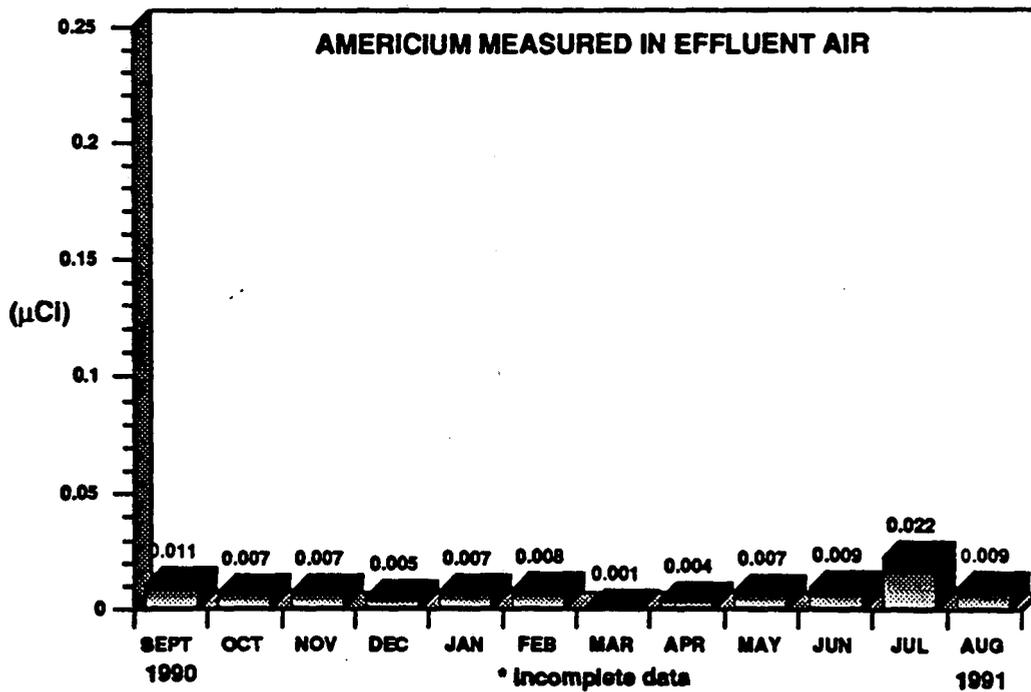
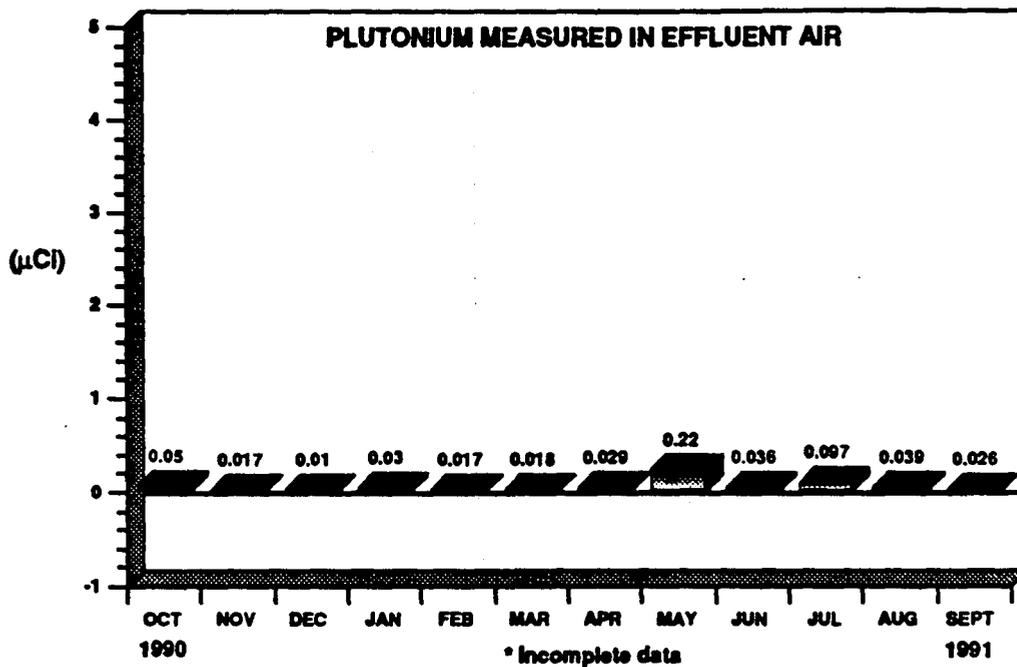


Table 2

Uranium Airborne Effluent Data

Month	Uranium-233, -234 (08/15/91 - 09/17/91)				Uranium-238 (08/15/91 - 09/17/91)			
	Release (μCi)		C Maximum (pCi/m^3)		Release (μCi)		C Maximum (pCi/m^3)	
CY 1990	0.098		0.0026 \pm	0.0005	0.508		0.0003 \pm	0.0001
January	0.003 \pm	0.013	0.0001 \pm	0.0001	0.020 \pm	0.013	0.0002 \pm	0.0001
February	0.004 \pm	0.013	0.0001 \pm	0.0000	0.001 \pm	0.011	0.0001 \pm	0.0000
March	0.026 \pm	0.021	0.0001 \pm	0.0001	0.033 \pm	0.012	0.0001 \pm	0.0000
April	0.036 \pm	0.013	0.0001 \pm	0.0001	0.039 \pm	0.012	0.0002 \pm	0.0001
May	0.143 \pm	0.029	0.0001 \pm	0.0001	0.163 \pm	0.030	0.0001 \pm	0.0001
June	0.127 \pm	0.023	0.0001 \pm	0.0001	0.147 \pm	0.021	0.0003 \pm	0.0001
July	0.080 \pm	0.018	0.0001 \pm	0.0001	0.119 \pm	0.018	0.0005 \pm	0.0002
August	0.032 \pm	0.019 ^a	0.0001 \pm	0.0001	0.076 \pm	0.019 ^a	0.0002 \pm	0.0001
September	0.041 \pm	0.019	0.0001 \pm	0.0001	0.063 \pm	0.020	0.0001 \pm	0.0001
October								
November								
December								
Year to Date	0.491 \pm	0.167	0.0001 \pm	0.0001	0.662 \pm	0.156	0.0005 \pm	0.0002

^a Previously reported as incomplete data.

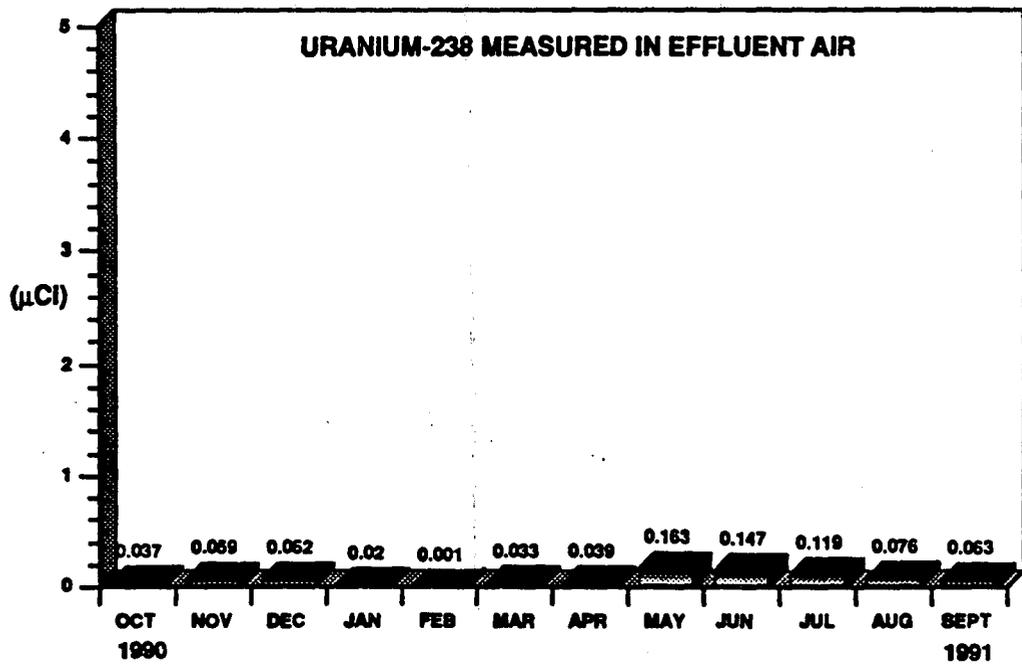
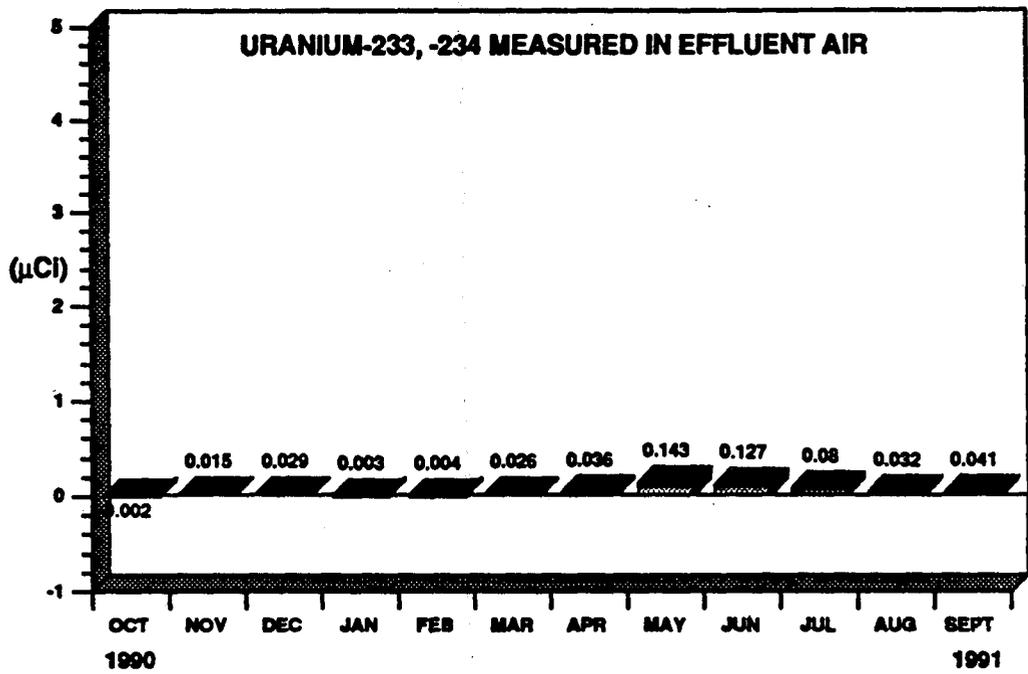


Table 3

Tritium and Beryllium Airborne Effluent Data

Month	Tritium, H-3 (08/30/91 - 09/30/91)		Beryllium (08/15/91 - 09/17/91)	
	Release (mCi)	C Maximum (pCi/m ³)	Release (grams)	C Maximum (µg/m ³)
CY 1990	3.849	88 ± 7	1.4991	0.00136
January	0.082	19 ± 8	0.1468 ± 0.011	0.00059
February	0.147	30 ± 18	0.1212 ± 0.009	0.00049
March	0.179	27 ± 9	0.1051 ± 0.007	0.00032
April	0.358	40 ± 17	0.1300 ± 0.008	0.00184
May	0.121	21 ± 6	0.1016 ± 0.007	0.00043
June	0.450	94 ± 55	0.2200 ± 0.014	0.00065
July	0.857	68 ± 10	0.0893 ± 0.006	0.00034
August	0.483	61 ± 13	0.0695 ± 0.004	0.00022
September	0.330	46 ± 15	0.0802 ± 0.005	0.00062
October				
November				
December				
Year to Date	3.007	94 ± 55	1.0638 ± 0.072	0.00184

NOTE: Beryllium measured at the remaining 44 locations was below the screening level of 0.1 gram per month. Beryllium emissions from Rocky Flats Plant are regulated by the State of Colorado under Colorado Air Quality Control Regulation #8. The limit for beryllium air emissions is 10 grams per stationary source in a 24-hour period.

The calibration methodology for the beryllium analyses was changed beginning with the September 1990 samples to improve quality assurance. The previous procedure used the single-point, "simple method of additions," one of the methods recommended by the manufacturer of the graphite furnace atomic absorption analytical equipment. The current method is based on EPA Contract Laboratory Program protocol. It uses multi-point calibration curves, periodic validation of the curve with EPA validation standards, and periodic blank and sample checks to assure absence of equipment contamination and matrix effects during the analysis. No blank corrections are made to any beryllium data.

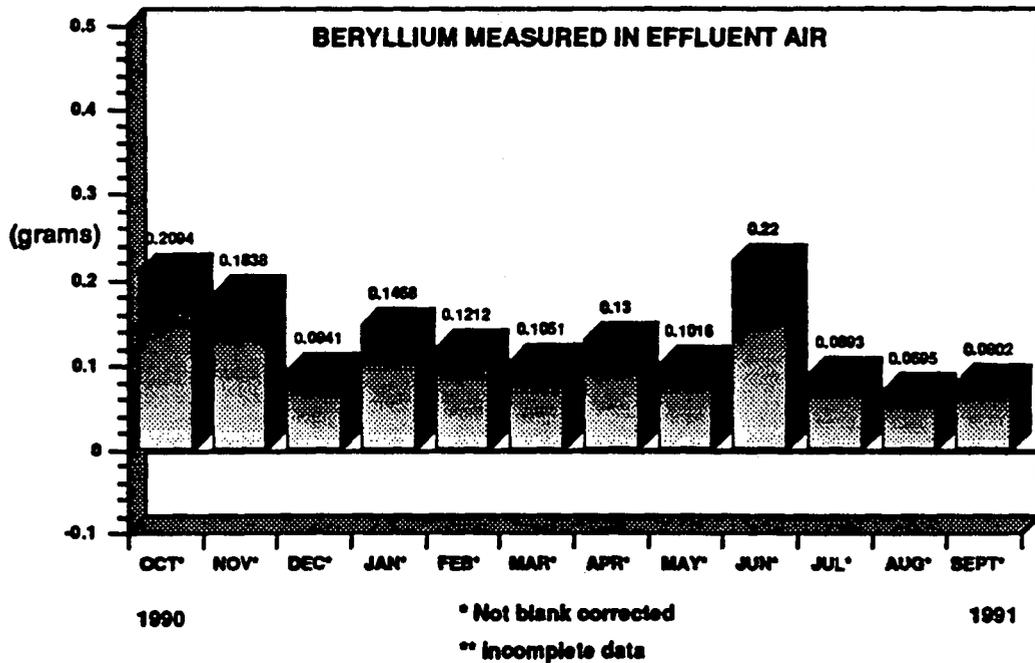
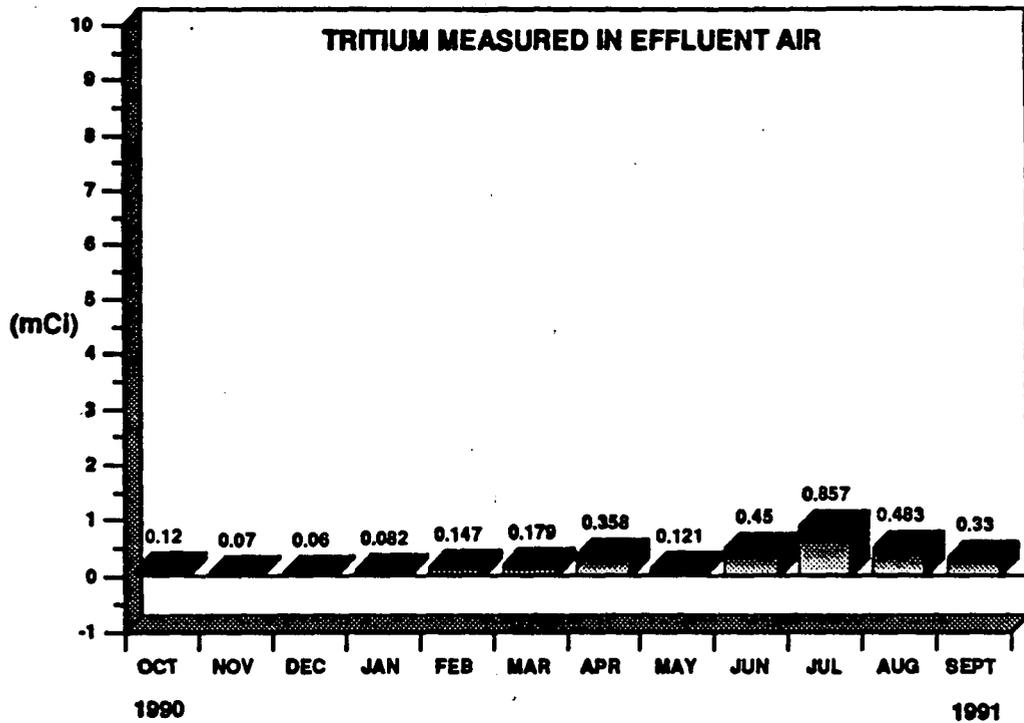


Table 4**Plutonium Concentrations in Ambient Air for Onsite Samplers**

(08/27/91 - 09/30/91)

<u>Location</u>	<u>Number Composited Monthly Samples</u>	<u>Volume (m3)</u>	<u>Plutonium Concentration (pCi/m3)</u>	<u>± 95 percent Confidence Interval (pCi/m3)</u>
S-01 ^a				
S-02	1	43000	0.000006	0.000002
S-03 ^a				
S-04	1	45000	0.000015	0.000003
S-05	1	45000	0.000076	0.000012
S-06	1	44000	0.000161	0.000021
S-07	1	42000	0.000081	0.000014
S-08	1	49000	0.000125	0.000017
S-08B	1	45000	0.000041	0.000008
S-09	1	45000	0.000002	0.000001
S-10	1	46000	0.000016	0.000004
S-11	1	46000	0.000005	0.000002
S-12 ^b				
S-13	1	46000	0.000002	0.000001
S-14	1	47000	0.000001	0.000001
S-15 ^b				
S-16	1	49000	0.000001	0.000001
S-17	1	43000	0.000005	0.000002
S-18	1	48000	0.000015	0.000003
S-19	1	43000	0.000015	0.000004
S-20	1	44000	0.000014	0.000004
S-21 ^c	1			
S-22	1	42000	0.000008	0.000002
S-23	1	48000	0.000006	0.000002
S-24	1	44000	0.000004	0.000002
S-81	1	50866	0.000005	0.000002

^a Sampler was inoperable during the sampling period.

^b These samplers were removed from the RAAMP network and will be used at the new community operated monitoring stations.

^c Incomplete laboratory analyses.

Table 5**Plutonium Concentrations in Ambient Air for Perimeter Samplers****(08/27/91 - 09/24/91)**

Location	Number Composited Monthly Samples	Volume (m3)	Plutonium Concentration (pCi/m3)	± 95 percent Confidence Interval (pCi/m3)
S-31	1	32000	0.000002	0.000003
S-32	1	34000	0.000001	0.000001
S-33	1	31000	0.000000	0.000001
S-34	1	31000	0.000000	0.000001
S-35	1	34000	0.000000	0.000001
S-36	1	32000	-0.000001	0.000001
S-37	1	31000	0.000003	0.000002
S-38	1	28000	0.000000	0.000001
S-39	1	29000	0.000001	0.000002
S-40	1	33000	0.000001	0.000001
S-41	1	33000	0.000001	0.000001
S-42	1	30000	0.000000	0.000001
S-43	1	33000	0.000001	0.000002
S-44	1	29000	0.000000	0.000001

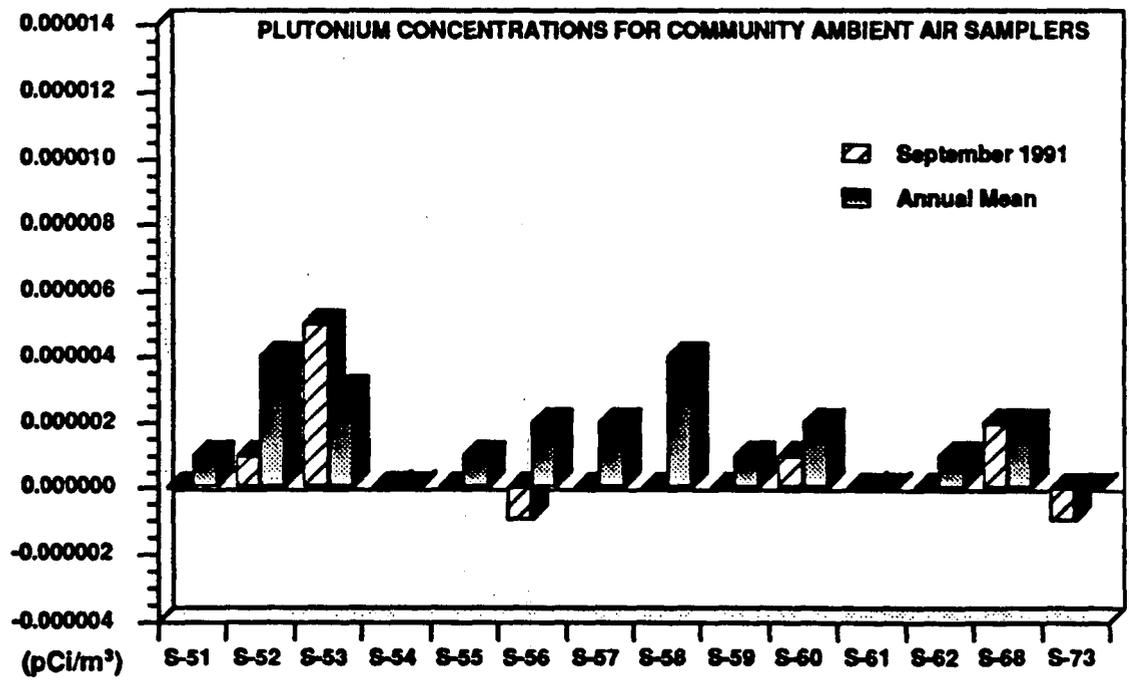
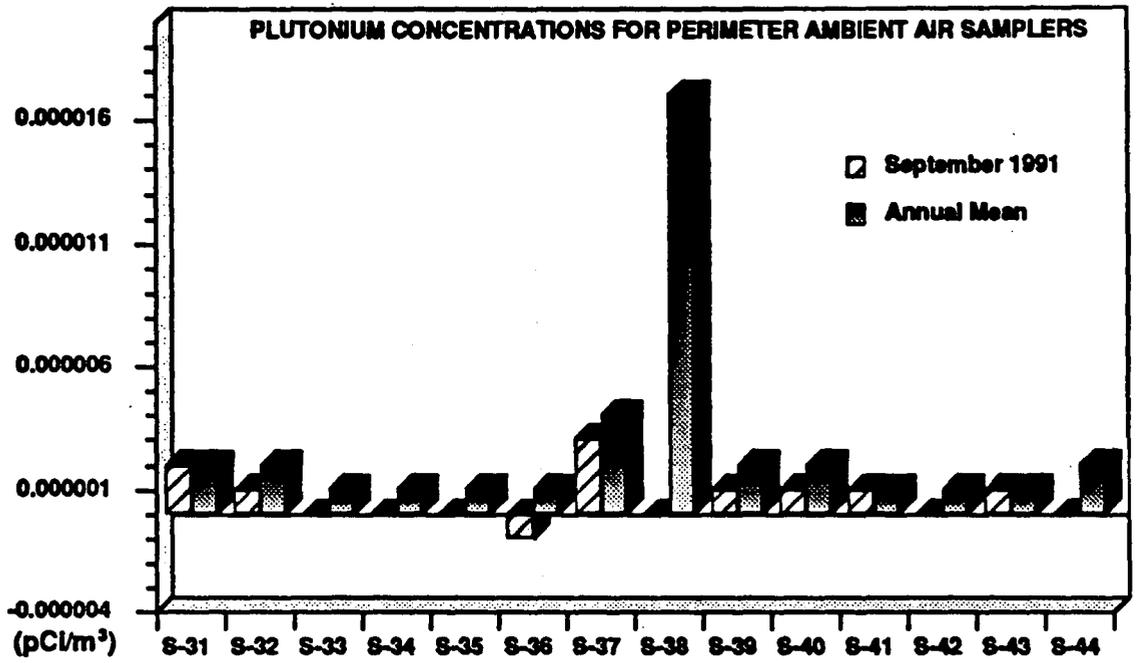
Table 6

Plutonium Concentrations in Ambient Air for Community Samplers

(08/28/91 - 09/25/91)

<u>Location</u>	<u>Community Name</u>	<u>Number Composited Monthly Samples</u>	<u>Volume (m3)</u>	<u>Plutonium Concentration (pCi/m3)</u>	<u>± 95 percent Confidence Interval (pCi/m3)</u>
S-51 ^c	Marshall				
S-52	Jeffco Airport	1	32000	0.000001	0.000002
S-53	Superior	1	32000	0.000005	0.000003
S-54	Boulder	1	33000	0.000000	0.000001
S-55 ^d	Lafayette				
S-56	Broomfield	1	30000	-0.000001	0.000001
S-57 ^d	Walnut Creek				
S-58	Wagner	1	32000	0.000000	0.000001
S-59	Leyden	1	32000	0.000000	0.000001
S-60 ^a	Westminster	1	30000	0.000001	0.000002
S-61 ^b	Denver				
S-62	Golden	1	29000	0.000000	0.000002
S-68	Lakeview Pointe	1	29000	0.000002	0.000002
S-73 ^a	Cotton Creek	1	29000	-0.000001	0.000001

- ^a This volume was estimated due to mechanical problems with the hour meter.
- ^b Sampler S-61 located in Denver was inoperative during this period. This sampler has been temporarily removed because of construction activities on the building where it is installed.
- ^c This sampler was inoperative during the sampling period.
- ^d This sampler was damaged beyond repair and must be replaced.



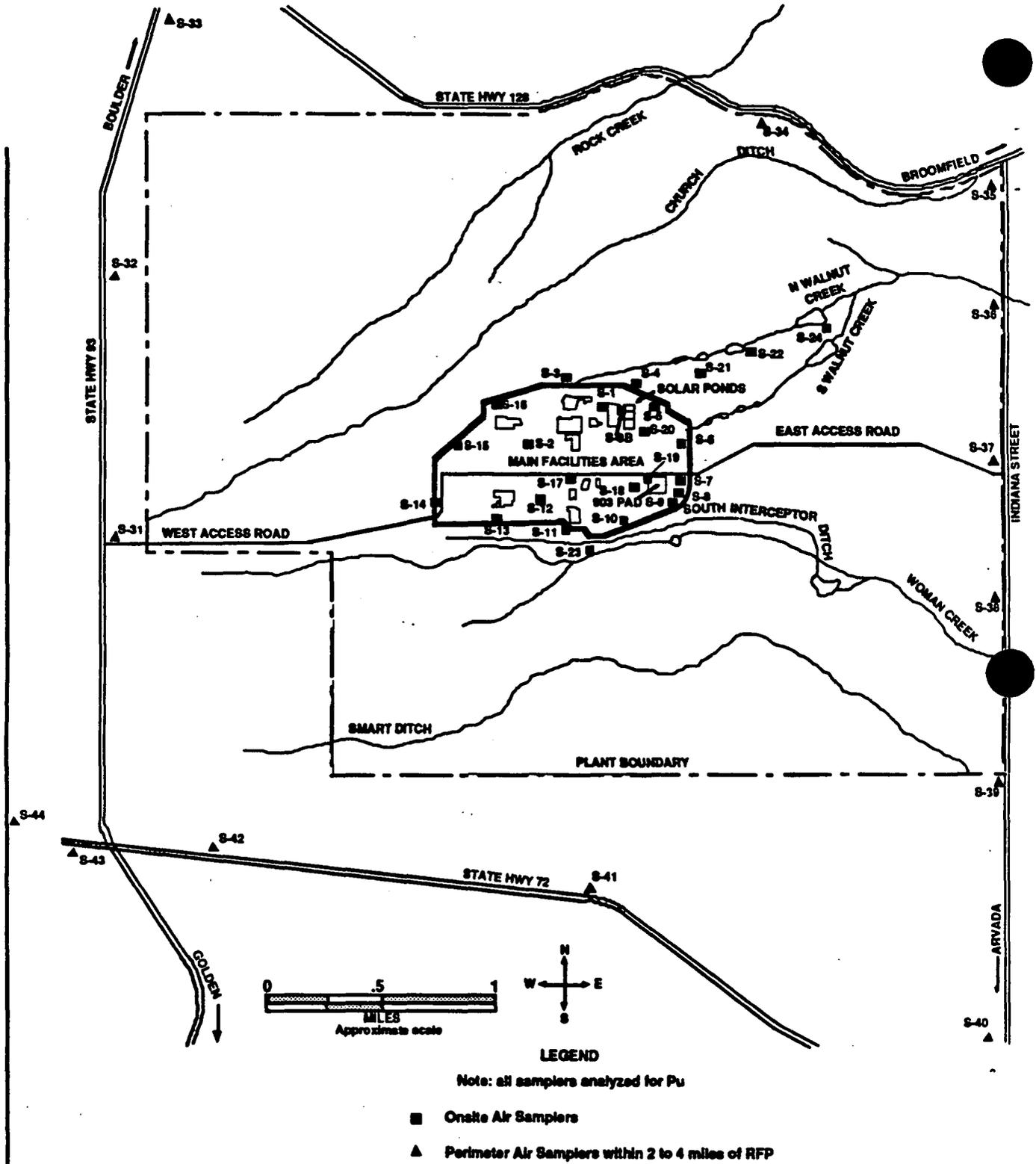


Figure 1: Location of Onsite and Perimeter Air Samplers

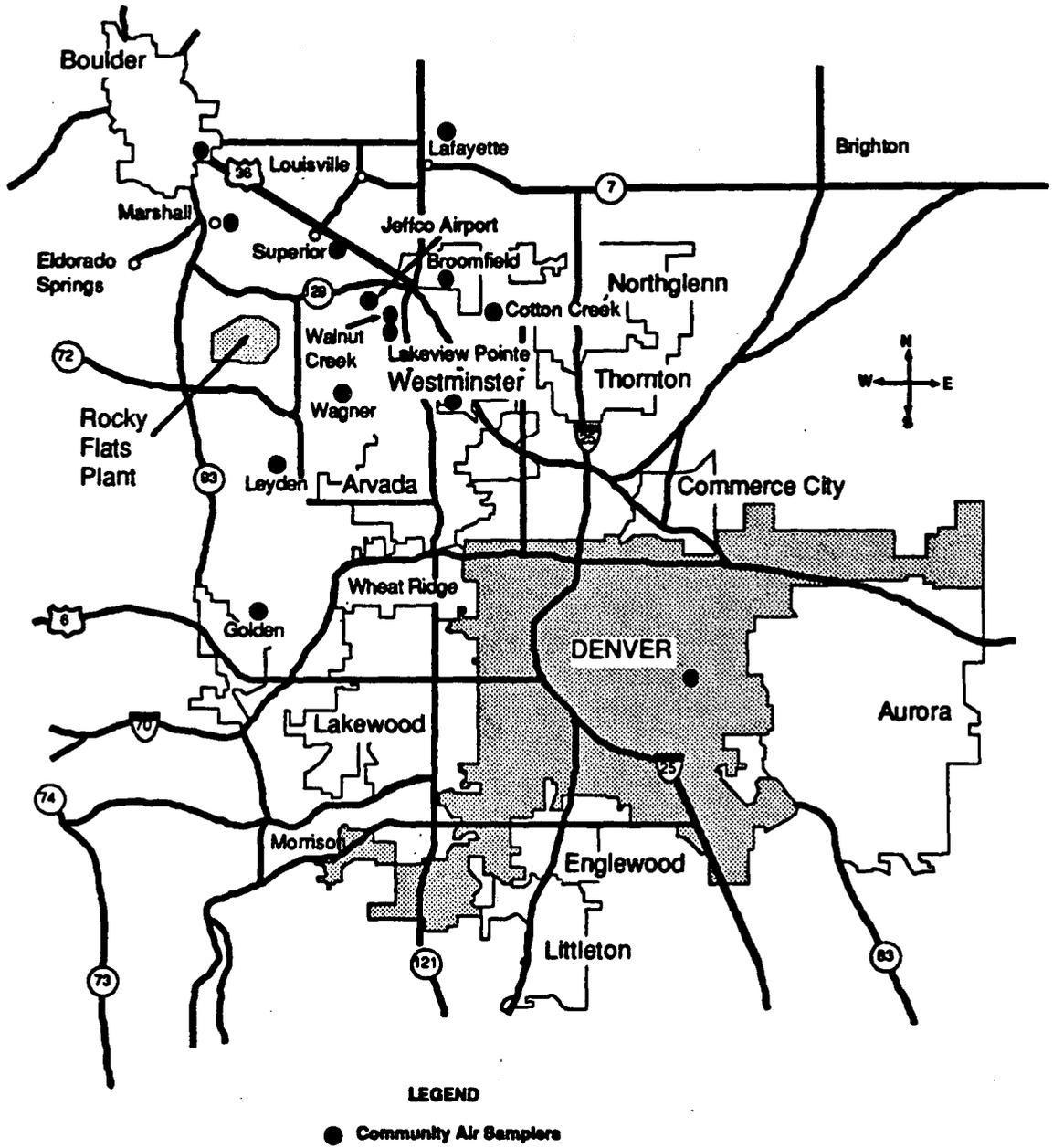


Figure 2: Location of Community Air Samplers

Table 7**Onsite Water Sample Results - Plutonium and Americium****Holding Pond Outfall (pCi/l)**

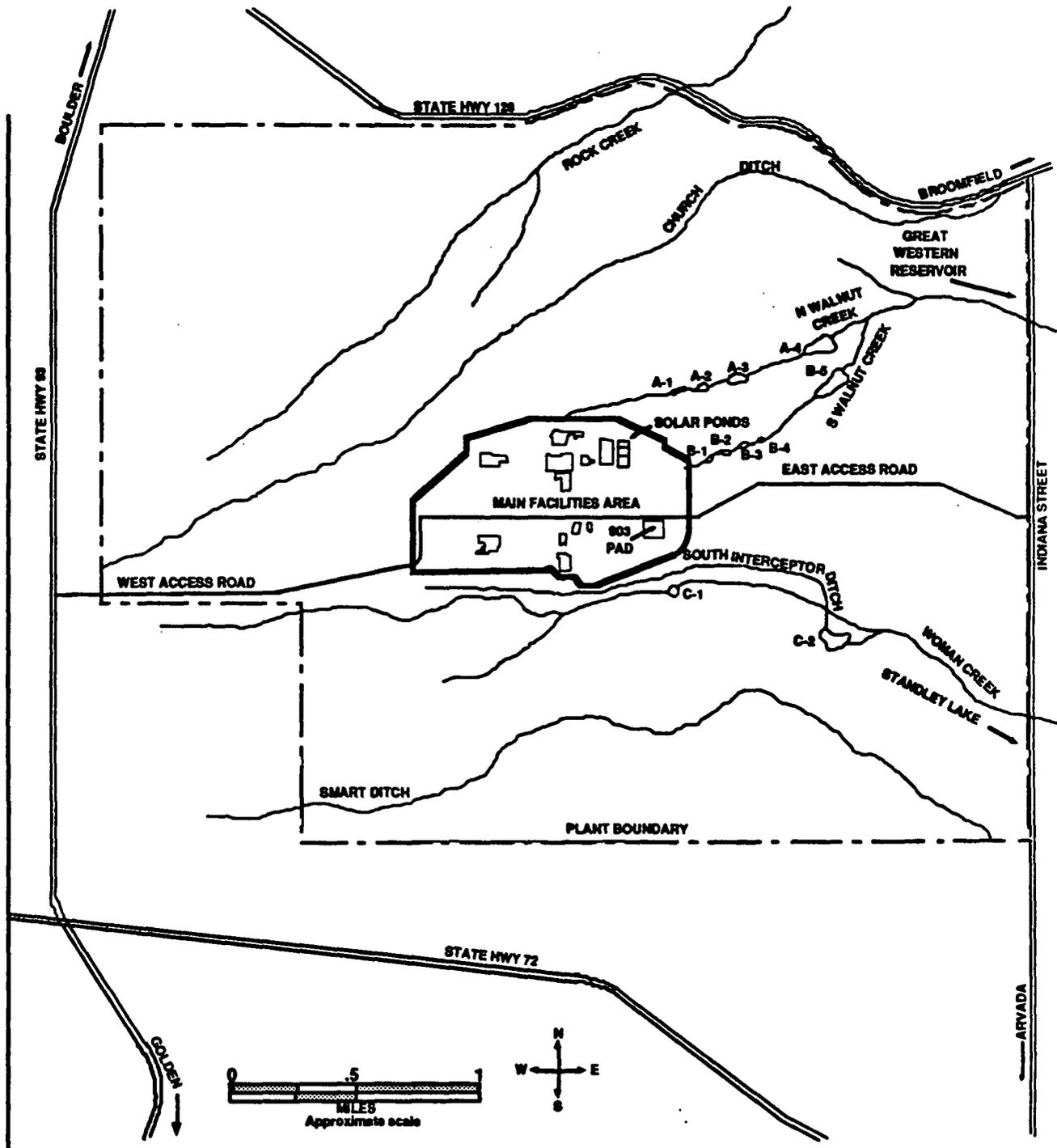
Location	Plutonium-239, -240		Americium-241	
<u>Pond A-4</u>				
08/31/91 - 09/03/91	-0.019	± 0.019	0.056	± 0.066 ^b
09/06/91 - 09/08/91	-0.002	± 0.024	0.086	± 0.078 ^b
09/09/91 - 09/13/91	-0.026	± 0.018	0.011	± 0.039
09/14/91 - 09/16/91	-0.001	± 0.024	-0.006	± 0.030
Volume weighted average concentration	-0.015	± 0.010		a
<u>Pond B-5</u> - No discharge				
<u>Pond C-1</u>				
09/02/91 - 09/06/91	0.014	± 0.015	-0.002	± 0.008
09/09/91 - 09/13/91	0.004	± 0.023	0.000	± 0.030
09/16/91 - 09/20/91	-0.007	± 0.019	0.020	± 0.029
09/23/91 - 09/27/91		a	-0.003	± 0.005
09/30/91 - 10/04/91	0.031	± 0.017		a
Average concentration		a		a
<u>Pond C-2</u> - No discharge				
<u>Walnut Creek at Indiana</u>				
08/31/91 - 09/03/91	0.002	± 0.009	0.022	± 0.014
09/07/91 - 09/08/91	-0.008	± 0.019	0.000	± 0.035
09/09/91 - 09/13/91	-0.016	± 0.015	0.001	± 0.025
09/14/91 - 09/16/91	-0.031	± 0.031	0.007	± 0.027
Volume weighted average concentration	-0.013	± 0.009	0.008	± 0.012

a Incomplete lab analysis.

b Sample being rerun to verify results.

Table 8**Onsite Water Sample Results - Uranium****Holding Pond Outfall (pCi/l)**

<u>Location</u>	<u>Uranium-233, -234</u>		<u>Uranium-238</u>	
<u>Pond A-4</u>				
08/31/91 - 09/03/91	0.71	± 0.18	0.60	± 0.15
09/06/91 - 09/08/91	0.42	± 0.11	0.38	± 0.10
09/09/91 - 09/13/91	0.69	± 0.16	0.64	± 0.15
09/14/91 - 09/16/91	0.54	± 0.14	0.62	± 0.15
Volume weighted average concentration	0.62	± 0.08	0.59	± 0.08
<u>Pond B-5 - No discharge</u>				
<u>Pond C-1</u>				
09/02/91 - 09/06/91	0.82	± 0.19	0.65	± 0.16
09/09/91 - 09/13/91	0.64	± 0.16	0.61	± 0.15
09/16/91 - 09/20/91	0.91	± 0.22	0.60	± 0.16
09/23/91 - 09/27/91	0.76	± 0.17	0.63	± 0.15
09/30/91 - 10/04/91	0.81	± 0.20	0.54	± 0.15
Average concentration		a		a
<u>Pond C-2 - No discharge</u>				
<u>Walnut Creek at Indiana</u>				
08/31/91 - 09/03/91	0.41	± 0.12	0.42	± 0.12
09/07/91 - 09/08/91	0.32	± 0.12	0.33	± 0.12
09/09/91 - 09/13/91	0.38	± 0.13	0.37	± 0.12
09/14/91 - 09/16/91		a		a
Volume weighted average concentration		a		a
a Incomplete lab analysis.				



Note: Stream flow in the Rocky Flats area is to the east.

Figure 3: Holding Pond and Liquid Effluent Water Courses

Graphs for Plutonium in Ponds A-4 and B-5 are not available.

Graphs for Plutonium in Ponds C-1 and C-2 are not available.

Graph for Plutonium in Walnut Creek at Indiana Street is not available.

Table 9**Offsite Water Sample Results - Plutonium and Americium**

Location	Number of Samples	Reservoirs (pCi/l)		Americium-241
		Plutonium-239, -240		
Great Western	1 ^a	-0.006 ± 0.006		^b
Standley Lake	1 ^a	0.002 ± 0.008		-0.001 ± 0.008
Community Tap Water (pCi/l)				
Boulder	1 ^a	-0.003 ± 0.006		-0.003 ± 0.010
Broomfield	1 ^a	-0.003 ± 0.006		-0.001 ± 0.009
Westminster	1 ^a	0.003 ± 0.011		^b
Arvada	1	0.014 ± 0.029		-0.014 ± 0.021
Denver	1	-0.012 ± 0.019		-0.006 ± 0.025
Golden	1	-0.009 ± 0.020		-0.018 ± 0.019
Lafayette	1	0.024 ± 0.032		0.029 ± 0.032
Louisville	1	-0.016 ± 0.028		-0.004 ± 0.023
Thornton	1	-0.025 ± 0.018		-0.017 ± 0.022

^a Plutonium and Americium analyses were performed on one sample composited from four weekly grab samples.

^b Incomplete analysis.

Table 10**Offsite Water Sample Results - Uranium**

Location	Number of Samples	Reservoirs (pCi/l)		Uranium-238	
		Uranium-233, -234			
Great Western	1 ^a	0.41	± 0.12	0.38	± 0.11
Standley Lake	1 ^a	0.48	± 0.15	0.33	± 0.12
Community Tap Water (pCi/l)					
Boulder	1 ^a		^b		^b
Broomfield	1 ^a	0.16	± 0.07	0.19	± 0.07
Westminster	1 ^a	0.12	± 0.06	0.14	± 0.06
Arvada	1	0.10	± 0.05	0.10	± 0.05
Denver	1	0.77	± 0.19	0.37	± 0.12
Golden	1	0.35	± 0.09	0.35	± 0.08
Lafayette	1	0.06	± 0.05	0.05	± 0.04
Louisville	1	0.02	± 0.03	0.01	± 0.02
Thornton	1	2.87	± 0.58	2.16	± 0.45

^a Uranium analyses were performed on one sample composited from four weekly grab samples.

^b Incomplete analysis.

Table 11**Onsite and Offsite Water Sample Results - Tritium**

Tritium (pCi/l)				
<u>Location</u>	<u>Number of Samples</u>	<u>C. Minimum</u>	<u>C. Maximum</u>	<u>C. Average</u>
Pond A-4 ^a	14	-70 ± 180	290 ± 200	110 ± 50
Pond C-1	5	-150 ± 170	190 ± 200	100 ± 130
Boulder	4	-150 ± 190	20 ± 180	60 ± 180
Broomfield	4	-100 ± 191	120 ± 200	-20 ± 190
Great Western	4	-120 ± 190	100 ± 200	20 ± 190
Standley Lake	4	-130 ± 190	-10 ± 190	-70 ± 190
Westminster	4	-150 ± 190	60 ± 190	-20 ± 190
Walnut at Indiana ^a	13	-130 ± 180	160 ± 210	30 ± 50
Arvada	1	-30 ± 180	-30 ± 180	-30 ± 180
Denver	1	170 ± 210	170 ± 210	170 ± 210
Golden	1	170 ± 210	170 ± 210	170 ± 210
Lafayette	1	90 ± 200	90 ± 200	90 ± 200
Louisville	1	140 ± 200	140 ± 200	140 ± 200
Thornton	1	80 ± 200	80 ± 200	80 ± 200

^a Volume weighted average concentration.

Table 12

Offsite Water Sample Results - Nitrate as Nitrogen

Nitrate (as N) at Great Western Reservoir

<u>Sample Date</u>	<u>Nitrate (as N) (mg/l)</u>
09/05/91	0.07
09/12/91	0.13
09/19/91	0.11
09/26/91	0.05

Nitrate (as N) at Standley Lake

09/05/91	0.08
09/12/91	0.11
09/19/91	0.06
09/26/91	0.03

Note: For some nonradioactive parameters, the concentrations that are measured at or below the minimum detectable concentration (MDC) are assigned to MDC. The less than symbol (<) indicates MDC values and calculated values that include one or more MDCs.

Table 13

NPDES/FFCA Permit Water Sample Results

Discharge 001-A (Pond B-3)		Continuous discharge from 09/01/91 through 09/30/91.			
<u>Parameters</u>		<u>Measured 30-Day Average</u>	<u>Limit 30-Day Average</u>	<u>Measured Max. 7-Day Average</u>	<u>Limit Max. 7-Day Average</u>
Nitrate	mg/l	7.9	10	10.9	20
Total Residual Chlorine	mg/l		<u>Measured Maximum</u> 0.07	<u>Limit Maximum</u> 0.50	
Discharge 001-B (Sewage Treatment Plant)		Continuous discharge from 09/01/91 through 09/30/91.			
<u>Parameters</u>		<u>Measured 30-Day Average</u>	<u>Limit 30-Day Average</u>	<u>Measured Maximum</u>	<u>Limit Maximum</u>
CBOD5	mg/l	1.3	10	2.5	25
Total Phosphorus	mg/l	0.2	8	0.5	12
Total Chromium	mg/l	0.0056	50	0.0069	100
Fecal Coliforms	#/100 ml	<u>Measured 30-Day Average</u> 2(Geometric)	<u>Limit 30-Day Average</u> 200(Geometric)	<u>Measured Max. 7-Day Average</u> 3(Geometric)	<u>Limit Max. 7-Day Average</u> 400(Geometric)
Total Suspended Solids	mg/l	3	30	7.7	45
pH	SU	<u>Measured Minimum</u> 6.2	<u>Limit Minimum</u> 6.0	<u>Measured Maximum</u> 7.1	<u>Limit Maximum</u> 9.0
Oil and Grease		<u>Observed Sheen</u> No visual	<u>Limit Sheen</u> No visual		
Discharge 002 (Pond A-3)		Discharge from 09/23/91 through 09/26/91.			
<u>Parameters</u>		<u>Measured 30-Day Average</u>	<u>Limit 30-Day Average</u>	<u>Measured Maximum</u>	<u>Limit Maximum</u>
Nitrates as N	mg/l	0.7	10	0.8	20
pH	SU	<u>Measured Minimum</u> 8.1	<u>Limit Minimum</u> 6.0	<u>Measured Maximum</u> 8.2	<u>Limit Maximum</u> 9.0

Table 13

NPDES/FFCA Permit Water Sample Results (Continued)

Discharge 003 (RO Pilot Plant) and Discharge 004 (RO Plant) are inactive outfalls and will be eliminated from the new NPDES permit.

Discharge 005 (Pond A-4) Discharge from 09/01/91 through 09/03/91 and 09/06/91 through 09/16/91.

<u>Parameters</u>		<u>Measured Maximum</u>	<u>Limit Maximum</u>
Total Chromium	mg/l	0.006	0.05

Discharge 006 (Pond B-5) - No Discharge.

<u>Parameters</u>		<u>Measured Maximum</u>	<u>Limit Maximum</u>
Nitrate as N	mg/l		
Total Residual Chlorine	mg/l		
Total Chromium	mg/l		

Discharge 007 (Pond C-2) - No Discharge.

<u>Parameters</u>		<u>Measured Maximum</u>	<u>Limit Maximum</u>
Total Chromium	mg/l		

Table 14

NPDES/FFCA Effluent Monitoring

Discharge 001-A (Pond B-3) - Continuous discharge from 09/01/91 through 09/30/91.

<u>Parameters</u>		<u>Measured Maximum</u>	<u>Measured 30-Day Average</u>
BOD5	mg/l	7.9	5.0
CBOD5	mg/l	3.7	2.4
Total Suspended Solids	mg/l	27	11

Discharge 001-B (Sewage Treatment Plant [STP]) - Continuous discharge from 09/01/91 through 09/30/91.

<u>Parameters</u>		<u>Measured Maximum</u>	<u>Measured 30-Day Average</u>
BOD5	mg/l	2.5	1.3
Nitrate as N	mg/l	13.7	7.42
Total Residual Chlorine	mg/l	0.31	0.09

Whole Effluent Toxicity^a

Ceriodaphnia	% Eff to LC50:	>100
Fathead Minnows	% Eff to LC50:	>100

Metals were sampled on 09/04/91 and 09/11/91.

Metals , total ug/l	<u>Measured 30-Day Average</u>
Antimony	<38
Arsenic	1.3
Beryllium	<1
Cadmium	<4
Copper	<7
Iron	52.9
Lead	<1.5
Manganese	36.4
Mercury	<0.2
Nickel	<15
Silver	<5
Zinc	38.4

**Concentrations
that were above
PQL**

<u>PQL^b</u>	<u>PQL</u>	
Volatile Organic Compounds (VOCs)	ug/l	
Chloroform	5 ug/L	6 ug/L Sample date 09/04/91

Table 14

NPDES/FFCA Effluent Monitoring (Continued)

Discharge 003 (Reverse Osmosis Pilot Plant) and Discharge 004 (Reverse Osmosis Plant) are inactive outfalls and will be eliminated from the new NPDES permit.

Discharge 005 (Pond A-4) - Discharge from 09/01/91 through 09/03/91 and 09/06/91 through 09/16/91.

Whole Effluent Toxicity^a

Ceriodaphnia	% Eff to LC50:	>100
Fathead Minnows	% Eff to LC50:	>100

Discharge 006 (Pond B-5) - No Discharge.

Whole Effluent Toxicity^a

Ceriodaphnia	% Eff to LC50:	
Fathead Minnows	% Eff to LC50:	

Discharge 007 (Pond C-2) - No Discharge.

Whole Effluent Toxicity^a

Ceriodaphnia	% Eff to LC50:	
Fathead Minnows	% Eff to LC50:	

- ^a Results for whole effluent toxicity are given in percentage of effluent sample that will cause mortality to half the test result organisms within the time frame of the test. For example, >100 percent indicates that 100 percent pure effluent did not cause acute toxicity to at least half of the organisms. A lower percentage LC₅₀ (lethal concentration to 50 percent of test organisms) indicates a greater toxic effect since less of the sample is required to observe a sufficiently extensive adverse effect.
- ^b PQL is the Practical Quantitation Limit. It is equal to ten times the Method Detection Limit and represents the quantity at which 70 percent of laboratories can report in the 95 percent confidence interval.

Table 15

Water Sample Results, Nonradioactive Parameters

Walnut Creek at Indiana Street

<u>Parameters</u>		<u>Number of Samples</u>	<u>C Minimum</u>	<u>C Maximum</u>	<u>C Average</u>
pH	SU	13	7.43	8.19	N/A
Nitrate as N	mg/l	13	3.68	5.18	4.66

Table 16

Daily Flow Data Recorded at the Walnut Creek at Indiana Gaging Station, Ponds A-4 and B-5

Date	Walnut Creek at Indiana (Gallons)	Pond A-4 (Gallons)	Pond B-5 (Gallons)
09/01/91	1,161,552	709,000	No discharge
09/02/91	1,268,310	974,000	
09/03/91	986,929	948,000	
09/04/91	No discharge	No discharge	
09/05/91			
09/06/91		274,000	
09/07/91	696,616	721,000	
09/08/91	974,988	1,015,000	
09/09/91	1,302,045	923,000	
09/10/91	1,055,892	1,206,000	
09/11/91	961,378	892,000	
09/12/91	1,174,313	906,000	
09/13/91	1,080,009	1,019,000	
09/14/91	915,792	946,000	
09/15/91	987,726	941,000	
09/16/91	1,407,035	1,045,000	
09/17/91	No discharge	No discharge	
09/18/91			
09/19/91			
09/20/91			
09/21/91			
09/22/91			
09/23/91			
09/24/91			
09/25/91			
09/26/91			
09/27/91			
09/28/91			
09/29/91			
09/30/91	No discharge	No discharge	
Total	13,412,469	12,519,000	No discharge

Table 17

Daily Flow Data Recorded at Ponds C-1 and C-2 (Woman Creek)

<u>Date</u>	<u>Pond C-1 (Gallons)</u>	<u>Pond C-2 (Gallons)</u>
09/01/91	3,885	No discharge
09/02/91	3,108	
09/03/91	2,814	
09/04/91	3,557	
09/05/91	3,483	
09/06/91	2,763	
09/07/91	3,944	
09/08/91	6,280	
09/09/91	4,107	
09/10/91	2,935	
09/11/91	12,354	
09/12/91	49,262	
09/13/91	47,040	
09/14/91	48,224	
09/15/91	27,233	
09/16/91	21,678	
09/17/91	19,695	
09/18/91	33,664	
09/19/91	52,753	
09/20/91	43,070	
09/21/91	29,713	
09/22/91	21,416	
09/23/91	31,772	
09/24/91	29,707	
09/25/91	29,144	
09/26/91	22,882	
09/27/91	23,040	
09/28/91	20,521	
09/29/91	19,544	
09/30/91	57,211	
Total	676,799	No discharge

Table 18

Daily Transfer Flow Data Recorded for Pond B-5 to Pond A-4

<u>Date</u>	<u>Pond B-5 to Pond A-4 (gallons)</u>
09/01/91	499,500
09/02/91	418,300
09/03/91	249,450
09/04/91	No transfer
09/05/91	
09/06/91	
09/07/91	
09/08/91	
09/09/91	
09/10/91	
09/11/91	
09/12/91	
09/13/91	
09/14/91	
09/15/91	
09/16/91	270,900
09/17/91	592,100
09/18/91	586,900
09/19/91	515,300
09/20/91	476,050
09/21/91	464,700
09/22/91	415,000
09/23/91	464,950
09/24/91	467,600
09/25/91	509,000
09/26/91	616,800
09/27/91	307,000
09/28/91	No transfer
09/29/91	
09/30/91	No transfer
Total	6,853,550

Site Meteorology and Climatology

Meteorological data were collected on the plantsite from instrumentation installed on a 61-meter (200-foot) tower located in the west buffer zone during September 1991. Meteorological information in this report represents over 97 percent data recovery. Table 19 is the September 1991 summary of the percent frequency of wind directions (16 compass points) divided into four wind-speed categories. The compass point designations indicate the true bearing when facing against the wind. These frequency values are represented graphically in the accompanying wind rose. The wind rose vectors also represent the bearing against the wind (i.e., wind along each vector blows toward the center).

The high frequency of winds with a westerly component is normal at the RFP (when there are no strong synoptic systems). The low frequency of winds greater than 7 meters per second (m/s) (15.6 mph) with easterly components is also normal.

The weather in September 1991 was typical along the front range, with some mild weather and some cool weather. Mild conditions that prevailed over the first two weeks were ushered out by a fall air mass on the 14th of the month. The wet summer pattern of 1991 ended in August, and this is reflected in the total monthly rainfall for September.

The mean wind speed for September 1991 was 3.3 m/s (7.4 mph). The highest wind gust for September 1991 was 21.9 m/s (48.9 mph) that occurred with a cold front on September 14, at approximately 9:15 p.m.

The mean temperature recorded for September 1991 was 15.4 °C (59.7 °F). The maximum temperature recorded was 26.5 °C (79.7 °F) on September 1 and 4. The minimum temperature recorded was 1.5 °C (34.7 °F) on September 18, 1991, at 5:45 a.m.

In September 1991, the RFP recorded 2.13 centimeters (.84 inches) of precipitation. The maximum precipitation for a 15-minute period was .33 centimeters (.13 inches), which occurred at approximately 11:15 p.m. on September 29. The most precipitation recorded for a 24-hour period was 1.22 centimeters (.48 inches) that fell on the night of the 29th and the morning of the 30th.

Table 19

Rocky Flats Plant Wind Direction Frequency (Percent) by Four Wind-Speed Classes

(Fifteen-Minute Averages - September 1991)

	<u>Calm</u>	<u>1-3</u> <u>(m/s)</u>	<u>3-7</u> <u>(m/s)</u>	<u>7-15</u> <u>(m/s)</u>	<u>>15</u> <u>(m/s)</u>	<u>Total</u>
-	1.78	-	-	-	-	1.78
N	-	2.86	3.78	0.18	0.00	6.82
NNE	-	3.00	2.64	0.39	0.00	6.03
NE	-	3.21	1.75	0.07	0.00	5.03
ENE	-	2.32	1.07	0.00	0.00	3.39
E	-	3.64	1.11	0.00	0.00	4.75
ESE	-	4.25	1.07	0.00	0.00	5.31
SE	-	3.35	1.93	0.00	0.00	5.20
SSE	-	2.36	2.21	0.04	0.00	4.61
S	-	2.18	2.18	0.04	0.00	4.40
SSW	-	2.03	1.89	0.00	0.00	3.92
SW	-	3.28	2.78	0.04	0.00	6.27
WSW	-	3.71	5.46	0.14	0.00	9.31
W	-	4.18	3.07	1.36	0.00	8.60
WNW	-	4.81	3.96	2.64	0.00	10.78
NW	-	3.25	3.03	0.75	0.00	7.03
NNW	-	3.21	3.60	0.04	0.00	6.85
Totals	1.78	51.00	41.53	5.69	0.00	100.0

Table 20

Precipitation Report

<u>Date</u>	<u>Daily Total</u>
09-02-91	.02 inches
09-10-91	.05 inches
09-11-91	.13 inches
09-12-91	.01 inches
09-13-91	.10 inches
09-18-91	.05 inches
09-29-91	.35 inches
09-30-91	.13 inches
Total Precipitation	.84 inches

Wind Rose for the Rocky Flats Plant - September 1991

Appendix A

Radiation Standards for Protection of the Public

Calculation of Potential Plant Contribution to Public Radiation Dose

The primary standards for protection of the public from radiation are based on radiation dose. Radiation dose is a means of quantifying the biological damage or risk of ionizing radiation. The unit of radiation dose is the rem or the millirem (1 rem = 1,000 mrem). Radiation protection standards for the public are annual standards, based on the projected radiation dose from a year's exposure to or intake of radioactive materials.

Radiation dose is a calculated value. It is calculated by multiplying radioactivity concentrations in air and water or on contaminated surfaces by assumed intake rates (for internal exposures) or by exposure times (for external exposure to penetrating radiation), then by the appropriate radiation dose conversion factors. That is:

$$\text{Radiation Dose} = \frac{\text{Radioactivity Concentration} \times \text{Intake Rate/Exposure Time}}{\text{Dose Conversion Factor}}$$

Radioactivity concentrations can be determined either by measurements in the environment or by calculations using computer models. These computer models perform airborne dispersion/dose modeling of measured building radioactivity effluents and estimated diffuse source term emissions (e.g., from resuspension from contaminated soil areas).

Assumed intake rates and dose conversion factors used are based on recommendations of national and international radiation protection advisory organizations, such as the National Council on Radiation Protection and Measurements (NCRP) and the International Commission on Radiological Protection (ICRP).

Radioactive materials of importance in calculating radiation dose to the public from Rocky Flats Plant (RFP) activities include plutonium, uranium, americium, and tritium. Alpha radiation emissions from plutonium, uranium, and americium are primary contributors to the projected radiation dose.

DOE Radiation Protection Standards for the Public
ICRP-Recommended Standards for all Pathways:
Temporary Increase - 500 mrem/year Effective Dose Equivalent (with prior approval of DOE EH-2)
Normal Operations - 100 mrem/year Effective Dose Equivalent
EPA Clean Air Act Standards for the Air Pathway Only:
10 mrem-year Effective Dose Equivalent

DOE Derived Concentration Guides for Radionuclides of Interest at the Rocky Flats Plant

Air Inhalation:

Radionuclide	DCG (pCi/m ³)
Plutonium-239, -240	0.02

Water Ingestion:

Radionuclide	DCG (pCi/l)
Plutonium-239, -240	30
Americium-241	30
Uranium-233, -234	500
Uranium-238	600
Hydrogen-3 (Tritium)	2,000,000

DOE Derived Concentration Guides

Potential public radiation dose commitments, which could have resulted from plant operations and from background (i.e., non-Plant) contributions, are calculated from average radionuclide concentrations measured at the Department of Energy (DOE) property boundary and in surrounding communities. Inhalation and water ingestion are the principal potential pathways of human exposure.

On February 8, 1990, DOE adopted DOE Order 5400.5, "Radiation Protection of the Public and the Environment," a radiation protection standard for DOE environmental activities (US 90). This standard incorporates guidance from the International Commission on Radiological Protection (ICRP), as well as from the Environmental Protection Agency Clean Air Act air emission standards (as implemented in 40 CFR 61, Subpart H). Included in DOE Order 5400.5 is a revision of the dose limits for members of the public. Tables of radiation dose conversion factors currently used for calculating dose from intakes of radioactive materials were issued in July 1988 (US88a, US88b). The dose factors are based on the ICRP Publications 30 and 48 methodology and biological models for radiation dosimetry. The DOE Order 5400.5 and the dose conversion factor tables are used for assessment of any potential RFP contribution to public radiation dose. On December 15, 1989, EPA published revised Clean Air Act air emission standards for DOE facilities (US89). DOE radiation standards for protection of the public are given in this Appendix and include the December 15, 1989, EPA Clean Air Act air pathway standards.

Secondary radioactivity concentration guides can be calculated from the primary radiation dose standards and used as comparison values for measured radioactivity concentrations. DOE provides tables of these "Derived Concentration Guides" - in Order 5400.5. Derived Concentration Guides (DCGs) are the concentrations that would result in an effective dose equivalent of 100 mrem from one year's chronic exposure or intake. In calculating air inhalation DCGs, DOE assumes that the exposed individual inhales 8,400 cubic meters of air at the calculated DCG during the year. Ingestion DCGs

assume a water intake of 730 liters at the calculated DCG for the year. The table on page 40 lists the most restrictive air and water DCGs for the principal radionuclides of interest at the RFP.

● **Compliance with EPA
Clean Air Act Standards**

To determine compliance with the EPA air emissions standards, measured airborne effluent radioactivity emissions are entered into the EPA-approved atmospheric dispersion/dose calculation computer model, AIRDOS-PC, for calculation of the maximum radiation dose that an individual in the public could receive from the air pathway only.

For comparison with the annual radiation dose standards for protection of the public, the maximum annual effective dose equivalent that a member of the public could receive as a result of RFP activities is typically less than 1 mrem, or less than 1 percent of the recommended annual standard for all pathways.

Dose Equivalent and Effective Dose Equivalent

Dose equivalent is a calculated value used to quantify radiation dose; it reflects the degree of biological effect from ionizing radiation. Differences in the biological effect of different types of ionizing radiation (e.g., alpha, beta, gamma, or x-rays) are accounted for in the calculation of dose equivalent.

Effective dose equivalent is a calculated value used to allow comparisons of total health risk (based primarily on the risk of cancer mortality) from exposures of different types of ionizing radiation to different body organs. It is calculated by first calculating the dose equivalent to those organs receiving significant exposures, multiplying each organ dose equivalent by a health risk weighting factor, and then summing those products. One millirem effective dose equivalent from natural background radiation would have the same health risk as one millirem effective dose equivalent from an artificially produced source of radiation.

References

US88a DOE/EH-0070, "External Dose-Rate Conversion Factors for Calculation of Dose to the Public," United States Department of Energy, Asst. Secretary for Environment, Safety and Health, July 1988.

US88b DOE/EH-0071, "Internal Dose Conversion Factors for Calculation of Dose to the Public," United States Department of Energy, Asst. Secretary of Environment, Safety and Health, July 1988.

US89 United States Environmental Protection Agency, Code of Federal Regulations 40 CFR 61, Subpart H, "National Emission Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities," Washington, D.C., December 15, 1989.

US90 United States Department of Energy, DOE Order 5400.5, "Radiation Protection of the Public and the Environment," Washington, D.C., February 8, 1990.

Appendix B

National Pollution Discharge Elimination System/Federal Facilities Compliance Agreement Volatile Organic Compounds

The following is a list of volatile organic compounds (VOCs) for which monitoring is required by the Environmental Protection Agency National Pollution Discharge Elimination System/Federal Facilities Compliance Agreement (NPDES/FFCA).

<u>Compound</u>	<u>PQL (ug/l)</u>	<u>Compound</u>	<u>PQL (ug/l)</u>
Acrolein ^a	5	1,2-dichloropropane	5
Acrylonitrile ^a	5	1,3-dichloropropylene	5
Benzene	5	Ethylbenzene	5
Bromoform	5	Methyl bromide	10
Carbon Tetrachloride	5	Methyl chloride	10
Chlorobenzene	5	Methylene chloride	5
Chlorodibromomethane	5	1,1,2,2-tetrachloroethane	5
Chloroethane	10	Tetrachloroethylene	5
2-chloroethylvinyl ether ^a	10	Toluene	5
Chloroform	5	1,2-trans-dichloroethylene	5
Dichlorobromomethane	5	1,1,1-trichloroethane	5
1,1-dichloroethane	5	1,1,2-trichloroethane	5
1,2-dichloroethane	5	Trichloroethylene	5
1,1-dichloroethylene	5	Vinyl chloride	10

- ^a Indicates compounds that are currently being analyzed at an offsite laboratory because the onsite laboratory lacks the proper instrumentation and standards to perform these analyses. Because the RFP does not maintain an inventory of these compounds or use them in manufacturing processes, none are expected to be found in the STP effluent. As a result, EPA may eliminate the requirement to monitor for these compounds in the future based on the results of the offsite laboratory analyses.

Appendix C

Colorado Water Quality Control Commission Standards

The Colorado Water Quality Control Commission has promulgated new standards for the Walnut Creek and Woman Creek drainages downstream from the Rocky Flats Plant. The Environmental Protection Agency has not yet written a new National Pollutant Discharge Elimination System permit that reflects these standards; however, in the spirit of the Agreement in Principle completed between the Department of Energy and the State of Colorado, the plant is attempting to meet the standards at this time.

Appendix D

***Corrections and Updates
for Previously Reported Information***

Table 7 - Errata January 1991

Onsite Water Sample Results - Plutonium and Americium

Holding Pond Outfall (pCi/l)

<u>Location</u>	<u>Plutonium-239, -240</u>	<u>Americium-241</u>
<u>Pond A-4</u>		
01/24/91 - 01/27/91	-0.016 ± 0.013	0.011 ± 0.027
01/28/91	-0.007 ± 0.018	0.039 ± 0.041 ^a
Volume weighted average concentration	-0.014 ± 0.011	0.018 ± 0.023
<u>Pond B-5 - No discharge</u>		
<u>Pond C-1</u>		
12/31/90 - 01/04/91	0.035 ± 0.020	0.012 ± 0.011
01/07/91 - 01/11/91	0.022 ± 0.021	0.007 ± 0.009
01/14/91 - 01/18/91	0.039 ± 0.023	0.005 ± 0.007
01/21/91 - 01/25/91	0.021 ± 0.013	0.003 ± 0.005
01/28/91 - 02/01/91	-0.001 ± 0.003	-0.004 ± 0.002
Average concentration	0.023 ± 0.014	0.005 ± 0.005
<u>Pond C-2 - No discharge</u>		
<u>Walnut Creek at Indiana</u>		
01/25/91 - 01/27/91	0.001 ± 0.020	0.015 ± 0.030
01/28/91 - 01/29/91	-0.004 ± 0.002	0.003 ± 0.005
Volume weighted average concentration	-0.001 ± 0.014	0.011 ± 0.021

^a Result is mean of original aliquot (0.065 ± 0.047 pCi/l) and one rerun aliquot (0.013 ± 0.035 pCi/l). Second rerun aliquot did not meet laboratory quality assurance criteria.

Table 8 - Errata January 1991

Onsite Water Sample Results - Uranium

Holding Pond Outfall (pCi/l)

<u>Location</u>	<u>Uranium-233, -234</u>	<u>Uranium-238</u>
<u>Pond A-4</u>		
01/24/91 - 01/27/91	1.05 ± 0.30	1.10 ± 0.22
01/28/91	0.87 ± 0.29	0.94 ± 0.21
Volume weighted average concentration	1.01 ± 0.24	1.06 ± 0.17
<u>Pond B-5 - No discharge</u>		
<u>Pond C-1</u>		
12/31/90 - 01/04/91	0.81 ± 0.32	0.71 ± 0.21
01/07/91 - 01/11/91	1.34 ± 0.33	0.92 ± 0.19
01/14/91 - 01/18/91	1.32 ± 0.36	0.89 ± 0.21
01/21/91 - 01/25/91	4.98 ± 0.87 ^a	-0.02 ± 0.03
01/28/91 - 02/01/91	1.25 ± 0.32	0.81 ± 0.17
Average concentration	1.94 ± 0.77	0.66 ± 0.34
<u>Pond C-2 - No discharge</u>		
<u>Walnut Creek at Indiana</u>		
01/25/91 - 01/27/91	1.41 ± 0.33	1.46 ± 0.26
01/28/91 - 01/29/91	1.33 ± 0.28	1.22 ± 0.20
Volume weighted average concentration	1.39 ± 0.24	1.39 ± 0.19

^a Sample was rerun to verify results. Rerun aliquot did not meet laboratory quality assurance criteria.

Table 9 - Errata January 1991

Offsite Water Sample Results - Plutonium and Americium

Location	Number of Samples	Reservoirs (pCi/l)	
		Plutonium-239, -240	Americium-241
Great Western	1 ^a	-0.005 ± 0.002	0.002 ± 0.004
Standley Lake	1 ^a	-0.005 ± 0.002	0.000 ± 0.003
Community Tap Water (pCi/l)			
Boulder	1 ^a	-0.004 ± 0.003	-0.001 ± 0.003
Broomfield	1 ^a	-0.001 ± 0.004	0.001 ± 0.004
Westminster	1 ^a	-0.003 ± 0.003	0.000 ± 0.003

^a Plutonium and americium analyses are performed on one sample composited from weekly grab samples.

Table 10 - January 1991

Offsite Water Sample Results - Uranium

Location	Number of Samples	Reservoirs (pCi/l)	
		Uranium-233, -234	Uranium-238
Great Western	1 ^a	0.41 ± 0.18	0.36 ± 0.09
Standley Lake	1 ^a	0.71 ± 0.22	0.60 ± 0.13
Community Tap Water (pCi/l)			
Boulder	1 ^a	0.13 ± 0.18	0.08 ± 0.06
Broomfield	1 ^a	0.45 ± 0.26	0.28 ± 0.12
Westminster	1 ^a	0.40 ± 0.19	0.32 ± 0.09

^a Uranium analyses are performed on one sample composited from weekly grab samples.

Table 11 - Errata January 1991

Onsite and Offsite Water Sample Results - Tritium

Tritium (pCi/l)				
<u>Location</u>	<u>Number of Samples</u>	<u>C. Minimum</u>	<u>C. Maximum</u>	<u>C. Average</u>
Pond A-4 ^a	5	-30 ± 110	40 ± 150	10 ± 70
Pond C-1	4	-170 ± 150	70 ± 150	-30 ± 150
Boulder	4	-70 ± 150	10 ± 150	-40 ± 140
Broomfield	4	-100 ± 150	-30 ± 150	-50 ± 150
Great Western	4	-120 ± 150	0 ± 150	-50 ± 140
Standley Lake	4	-50 ± 110	90 ± 160	30 ± 140
Westminster	4	-90 ± 150	60 ± 150	-10 ± 150
Walnut at Indiana ^a	4	-100 ± 140	120 ± 180	-10 ± 90

^a Volume weighted average concentration.

Table 7 - Errata February 1991

Onsite Water Sample Results - Plutonium and Americium

Holding Pond Outfall (pCi/l)			
Location	<u>Plutonium-239, -240</u>		<u>Americium-241</u>
<u>Pond A-4</u>			
02/02/91 - 02/03/91	-0.024	± 0.009	0.002 ± 0.028
02/04/91 - 02/08/91	-0.026	± 0.016	-0.011 ± 0.015
02/09/91 - 02/10/91	0.126	± 0.057 ^a	-0.010 ± 0.025
02/11/91 - 02/15/91	-0.013	± 0.019	-0.015 ± 0.013
02/16/91 - 02/17/91	-0.013	± 0.020	-0.001 ± 0.024
02/18/91 - 02/22/91	-0.015	± 0.017	-0.016 ± 0.012
02/23/91 - 02/24/91	-0.022	± 0.017	-0.004 ± 0.029
02/25/91 - 03/01/91	-0.019	± 0.013	0.005 ± 0.027
Volume weighted average concentration	-0.007	± 0.008	-0.007 ± 0.007
<u>Pond B-5 - No discharge</u>			
<u>Pond C-1</u>			
02/04/91 - 02/08/91	0.010	± 0.009	0.015 ± 0.029
02/11/91 - 02/15/91	0.002	± 0.008	-0.001 ± 0.021
02/28/91 - 02/22/91	0.002	± 0.005	-0.002 ± 0.003
02/25/91 - 03/01/91	0.006	± 0.007	0.108 ± 0.081 ^b
Average concentration	0.005	± 0.007	0.030 ± 0.044
<u>Pond C-2 - No discharge</u>			
<u>Walnut Creek at Indiana</u>			
02/02/91 - 02/03/91	-0.015	± 0.013	-0.002 ± 0.017
02/04/91 - 02/08/91	0.002	± 0.006	0.003 ± 0.025
02/09/91 - 02/10/91	-0.029	± 0.010	-0.016 ± 0.018
02/11/91 - 02/15/91	0.003	± 0.008	0.022 ± 0.031
02/16/91 - 02/17/91	-0.019	± 0.013	-0.019 ± 0.012
02/18/91 - 02/22/91	0.000	± 0.006	0.001 ± 0.005
02/23/91 - 02/24/91	-0.022	± 0.017	-0.013 ± 0.022
02/25/91 - 03/01/91	0.000	± 0.005	0.000 ± 0.033
Volume weighted average concentration	-0.006	± 0.003	0.001 ± 0.010

- ^a Result is mean of original aliquot (0.094 ± 0.061 pCi/l) and one rerun aliquot (0.158 ± 0.053 pCi/l). Second rerun aliquot did not meet laboratory quality assurance criteria.
- ^b Original aliquot was invalid because of failed accuracy and precision. Result shown above is rerun aliquot. Insufficient sample remained to rerun again to confirm.

Table 8 - Errata February 1991

Onsite Water Sample Results - Uranium

Holding Pond Outfall (pCi/l)

<u>Location</u>	<u>Uranium-233, -234</u>		<u>Uranium-238</u>	
<u>Pond A-4</u>				
02/01/91 - 02/03/91	1.06	± 0.31	1.15	± 0.24
02/04/91 - 02/08/91	0.89	± 0.26	0.94	± 0.19
02/09/91 - 02/10/91	0.86	± 0.24	0.94	± 0.26
02/11/91 - 02/15/91	0.88	± 0.23	0.87	± 0.16
02/16/91 - 02/17/91	0.89	± 0.25	0.87	± 0.16
02/18/91 - 02/22/91	0.80	± 0.26	0.85	± 0.18
02/23/91 - 02/24/91	0.92	± 0.34	0.99	± 0.25
02/25/91 - 03/01/91	0.78	± 0.27	0.85	± 0.18
Volume weighted average concentration	0.87	± 0.10	0.91	± 0.07
<u>Pond B-5 - No discharge</u>				
<u>Pond C-1</u>				
02/04/91 - 02/08/91	0.78	± 0.21	0.49	± 0.10
02/11/91 - 02/15/91	0.66	± 0.20	0.52	± 0.11
02/18/91 - 02/22/91	0.85	± 0.26	0.61	± 0.14
02/25/91 - 03/01/91	0.99	± 0.28	0.83	± 0.17
Average concentration	0.76	± 0.24	0.61	± 0.13
<u>Pond C-2 - No discharge</u>				
<u>Walnut Creek at Indiana</u>				
02/02/91 - 02/03/91	1.08	± 0.26	1.33	± 0.22
02/04/91 - 02/08/91	1.74	± 0.28	2.23	± 0.27
02/09/91 - 02/10/91	0.98	± 0.25	1.07	± 0.19
02/11/91 - 02/15/91	0.99	± 0.24	1.06	± 0.18
02/16/91 - 02/17/91	0.99	± 0.28	1.08	± 0.22
02/18/91 - 02/22/91	1.08	± 0.29	1.15	± 0.22
02/23/91 - 02/24/91	1.01	± 0.27	0.99	± 0.19
02/25/91 - 03/01/91	0.97	± 0.30	0.88	± 0.19
Volume weighted average concentration	1.14	± 0.10	1.26	± 0.08

Table 9 - Errata February 1991

Offsite Water Sample Results - Plutonium and Americium

Location	Number of Samples	Reservoirs (pCi/l)	
		Plutonium-239, -240	Americium-241
Great Western	1 ^a	0.022 ± 0.014	0.010 ± 0.009
Standley Lake	1 ^a	-0.001 ± 0.006	-0.001 ± 0.004
Community Tap Water (pCi/l)			
Boulder	1 ^a	-0.005 ± 0.003	-0.002 ± 0.005
Broomfield	1 ^a	0.031 ± 0.016	0.010 ± 0.009
Westminster	1 ^a	0.003 ± 0.007	0.000 ± 0.005

^a Plutonium and americium analyses are performed on one sample composited from weekly grab samples.

Table 10 - Errata February 1991

Offsite Water Sample Results - Uranium

<u>Location</u>	<u>Number of Samples</u>	<u>Reservoirs (pCi/l)</u>	
		<u>Uranium-233, -234</u>	<u>Uranium-238</u>
Great Western	1 ^a	0.68 ± 0.26	0.40 ± 0.12
Standley Lake	1 ^a	0.71 ± 0.27	0.59 ± 0.15
Community Tap Water (pCi/l)			
Boulder	1 ^a	0.23 ± 0.15	0.15 ± 0.06
Broomfield	1 ^a	0.23 ± 0.23	0.16 ± 0.10
Westminster	1 ^a	0.47 ± 0.29	0.37 ± 0.16

^a Uranium analyses are performed on one sample composited from weekly grab samples.

Table 11 - Errata February 1991

Onsite and Offsite Water Sample Results - Tritium

<u>Location</u>	<u>Number of Samples</u>	<u>Tritium (pCi/l)</u>		
		<u>C Minimum</u>	<u>C Maximum</u>	<u>C Average</u>
Pond A-4 ^a	28	-250 ± 230	250 ± 230	30 ± 40
Pond C-1	4	-80 ± 170	30 ± 180	-30 ± 40
Boulder	4	0 ± 180	60 ± 190	20 ± 30
Broomfield	4	-200 ± 180	150 ± 190	0 ± 140
Great Western	4	-110 ± 180	90 ± 190	10 ± 90
Standley Lake	4	-120 ± 180	110 ± 180	10 ± 100
Westminster	4	-110 ± 180	150 ± 200	40 ± 120
Walnut at Indiana ^a	27	-170 ± 180	250 ± 240	30 ± 40

^a Volume weighted average concentration.

Table 7 - Errata March 1991

Onsite Water Sample Results - Plutonium and Americium

Holding Pond Outfall (pCi/l)

<u>Location</u>	<u>Plutonium-239, -240</u>			<u>Americium-241</u>		
<u>Pond A-4</u>						
03/02/91 - 03/03/91	-0.020	±	0.033	-0.001	±	0.036
03/04/91 - 03/08/91	0.001	±	0.031	0.035	±	0.039
03/09/91 - 03/10/91	0.016	±	0.038	-0.038	±	0.053
03/11/91 - 03/15/91	-0.001	±	0.040	-0.007	±	0.067
03/16/91 - 03/17/91	0.009	±	0.048	-0.007	±	0.031
03/18/91 - 03/22/91	-0.021	±	0.023	0.021	±	0.033 ^a
03/23/91 - 03/24/91	-0.019	±	0.044	0.001	±	0.024
03/25/91 - 03/29/91	0.005	±	0.032	-0.018	±	0.027
03/30/91 - 03/31/91	0.074	±	0.049 ^b	0.014	±	0.038
Volume weighted average concentration		c		0.003	±	0.016
<u>Pond B-5 - No discharge</u>						
<u>Pond C-1</u>						
03/04/91 - 03/08/91	-0.020	±	0.038	0.016	±	0.022
03/11/91 - 03/15/91	0.017	±	0.021	0.012	±	0.013
03/18/91 - 03/22/91	0.111	±	0.119 ^d	0.111	±	0.041 ^e
03/25/91 - 03/29/91	0.058	±	0.050 ^f	0.000	±	0.031
Average concentration	0.042	±	0.068	0.035	±	0.029
<u>Pond C-2 - No discharge</u>						
<u>Walnut Creek at Indiana</u>						
03/02/91 - 03/03/91	0.014	±	0.046	0.048	±	0.041
03/04/91 - 03/08/91	0.002	±	0.010	0.009	±	0.016
03/09/91 - 03/10/91	-0.012	±	0.028	0.017	±	0.047
03/11/91 - 03/15/91		c			c	
03/16/91 - 03/17/91	0.035	±	0.022	0.051	±	0.047 ^g
03/18/91 - 03/22/91	0.001	±	0.010	0.006	±	0.010
03/23/91 - 03/24/91	0.008	±	0.055	0.018	±	0.037
03/25/91 - 03/29/91	-0.002	±	0.009	0.013	±	0.012
03/30/91 - 03/31/91	0.007	±	0.033	-0.020	±	0.023
Volume weighted average concentration		c			c	

- ^a Result is mean of original analysis (0.051 ± 0.062 pCi/l) and one rerun aliquot (-0.009 ± 0.024 pCi/l). Second rerun aliquot did not meet laboratory quality assurance criteria.
- ^b Sample is being rerun to verify result. As of 10/20/91 rerun still incomplete.
- ^c Incomplete lab analysis.
- ^d Original aliquot was invalid because of low recovery. Rerun aliquot is result shown above. Insufficient sample remained to analyze again to confirm.
- ^e Result is mean of original aliquot (0.203 ± 0.047 pCi/l) and one rerun aliquot (0.018 ± 0.034 pCi/l). Second rerun aliquot did not meet laboratory quality assurance criteria.
- ^f Insufficient sample remained to rerun sample to confirm result.
- ^g Result is mean of original aliquot (0.073 ± 0.067 pCi/l) and one rerun aliquot (0.029 ± 0.065 pCi/l). Second rerun aliquot did not meet laboratory quality assurance criteria.

Table 8 - Errata March 1991

Onsite Water Sample Results - Uranium

Holding Pond Outfall (pCi/l)

<u>Location</u>	<u>Uranium-233, -234</u>		<u>Uranium-238</u>	
<u>Pond A-4</u>				
03/02/91 - 03/03/91	0.79	± 0.19	0.85	± 0.20
03/04/91 - 03/08/91	0.70	± 0.22	0.69	± 0.22
03/09/91 - 03/10/91	0.91	± 0.49	0.61	± 0.38
03/11/91 - 03/15/91		■		■
03/16/91 - 03/17/91	0.71	± 0.16	0.69	± 0.15
03/18/91 - 03/22/91	0.77	± 0.17	0.76	± 0.17
03/23/91 - 03/24/91	0.85	± 0.18	0.74	± 0.16
03/25/91 - 03/29/91	1.38	± 0.28	1.51	± 0.30
03/30/91 - 03/31/91	1.37	± 0.24	1.62	± 0.27
Volume weighted average concentration		■		■
<u>Pond B-5 - No discharge</u>				
<u>Pond C-1</u>				
03/04/91 - 03/08/91	0.86	± 0.21	0.57	± 0.15
03/11/91 - 03/15/91	0.94	± 0.22	0.79	± 0.20
03/18/91 - 03/22/91	0.84	± 0.18	0.63	± 0.14
03/25/91 - 03/29/91	1.05	± 0.31	0.80	± 0.25
Average concentration	0.92	± 0.24	0.70	± 0.19
<u>Pond C-2 - No discharge</u>				
<u>Walnut Creek at Indiana</u>				
03/02/91 - 03/03/91	1.04	± 0.23	1.06	± 0.23
03/04/91 - 03/08/91	1.11	± 0.26	0.85	± 0.21
03/09/91 - 03/10/91	0.99	± 0.20	0.99	± 0.20
03/11/91 - 03/15/91	0.91	± 0.19	0.91	± 0.19
03/16/91 - 03/17/91	1.02	± 0.20	0.90	± 0.18
03/18/91 - 03/22/91	1.03	± 0.22	1.01	± 0.21
03/23/91 - 03/24/91	1.03	± 0.26	0.89	± 0.23
03/25/91 - 03/29/91	1.11	± 0.23	1.08	± 0.22
03/30/91 - 03/31/91	1.46	± 0.26	1.92	± 0.32
Volume weighted average concentration	1.07	± 0.08	1.04	± 0.08
■ Incomplete lab analysis.				

Table 9 - Errata March 1991

Offsite Water Sample Results - Plutonium and Americium

Location	Number of Samples	Reservoirs (pCi/l)	
		Plutonium-239, -240	Americium-241
Great Western	1 ^a	0.014 ± 0.022	0.004 ± 0.027
Standley Lake	1 ^a	0.002 ± 0.009	-0.008 ± 0.023
Community Tap Water (pCi/l)			
Boulder	1 ^a	0.002 ± 0.008	-0.017 ± 0.021
Broomfield	1 ^a	0.005 ± 0.011	-0.002 ± 0.024
Westminster	1 ^a	-0.007 ± 0.005	0.002 ± 0.029
Arvada	1	-0.018 ± 0.015	-0.022 ± 0.015
Denver	1	-0.015 ± 0.016	0.050 ± 0.036 ^b
Golden	1	0.030 ± 0.042	0.005 ± 0.032
Lafayette	1	0.005 ± 0.025	0.031 ± 0.049
Louisville	1	-0.030 ± 0.009	-0.022 ± 0.017
Thornton	1	-0.005 ± 0.024	0.003 ± 0.037

^a Plutonium and americium analyses are performed on one sample composited from weekly grab samples.
^b Result is mean of original aliquot (0.112 ± 0.068 pCi/l) and one rerun aliquot (-0.013 ± 0.025 pCi/l). Second rerun aliquot did not meet laboratory quality assurance criteria.

Table 10 - Errata March 1991

Offsite Water Sample Results - Uranium

<u>Location</u>	<u>Number of Samples</u>	<u>Reservoirs (pCi/l)</u>		<u>Uranium-238</u>	
		<u>Uranium-233, -234</u>			
Great Western	1 ^a	0.59	± 0.14	0.52	± 0.13
Standley Lake	1 ^a	0.80	± 0.17	0.67	± 0.14
Community Tap Water (pCi/l)					
Boulder	1 ^a	0.40	± 0.12	0.33	± 0.10
Broomfield	1 ^a	0.40	± 0.11	0.25	± 0.08
Westminster	1 ^a	0.30	± 0.09	0.26	± 0.08
Arvada	1	0.28	± 0.08	0.24	± 0.07
Denver	1	0.27	± 0.08	0.23	± 0.07
Golden	1	0.94	± 0.25	1.04	± 0.26
Lafayette	1	0.54	± 0.19	0.13	± 0.09
Louisville	1	0.16	± 0.07	0.09	± 0.05
Thornton	1	0.86	± 0.18	0.76	± 0.17

^a Uranium analyses are performed on one sample composited from weekly grab samples.

Table 11 - Errata March 1991

Onsite and Offsite Water Sample Results - Tritium

Tritium (pCi/l)						
<u>Location</u>	<u>Number of Samples</u>	<u>C Minimum</u>		<u>C Maximum</u>		<u>C Average</u>
Pond A-4 ^a	31	-160	± 170	210	± 210	40 ± 40
Pond C-1	4	70	± 190	120	± 190	100 ± 20
Boulder	4	-170	± 170	190	± 180	30 ± 150
Broomfield	4	-110	± 190	60	± 210	-10 ± 70
Great Western	4	-110	± 170	140	± 180	-20 ± 110
Standley Lake	4	-50	± 190	130	± 190	50 ± 90
Westminster	4	-140	± 180	230	± 200	50 ± 160
Walnut at Indiana ^a	31	-160	± 180	250	± 190	40 ± 40
Arvada	1	-10	± 180	-10	± 180	-10 ± 180
Denver	1	10	± 180	10	± 180	10 ± 180
Golden	1	10	± 180	10	± 180	10 ± 180
Lafayette	1	-60	± 170	-60	± 170	-60 ± 170
Louisville	1	-150	± 150	-150	± 150	-150 ± 150
Thornton	1	60	± 180	60	± 180	60 ± 180

^a Volume weighted average concentration.

Table 7 - Errata April 1991

Onsite Water Sample Results - Plutonium and Americium

Holding Pond Outfall (pCi/l)			
<u>Location</u>	<u>Plutonium-239, -240</u>		<u>Americium-241</u>
<u>Pond A-4</u>			
04/01/91 - 04/02/91 ^a	-0.002	± 0.025	0.000 ± 0.031
04/06/91 - 04/07/91	0.016	± 0.033	-0.006 ± 0.022
04/08/91 - 04/12/91	0.003	± 0.032	0.025 ± 0.032
04/19/91 - 04/21/91	0.037	± 0.059	-0.001 ± 0.030
04/22/91 - 04/26/91	-0.021	± 0.016	0.025 ± 0.055
04/27/91 - 04/28/91	0.024	± 0.031	0.005 ± 0.038
04/29/91 - 05/03/91	0.036	± 0.039	-0.022 ± 0.022
Volume weighted average concentration	0.010	± 0.013	0.003 ± 0.014
<u>Pond B-5 - No discharge</u>			
<u>Pond C-1</u>			
04/01/91 - 04/05/91	0.017	± 0.020	0.011 ± 0.012
04/08/91 - 04/12/91	0.012	± 0.022 ^b	0.009 ± 0.045
04/15/91 - 04/19/91	0.024	± 0.014	0.007 ± 0.024
04/22/91 - 04/26/91	0.042	± 0.023	0.002 ± 0.005
04/29/91 - 05/03/91	-0.024	± 0.014	0.001 ± 0.007
Average concentration	0.014	± 0.021	0.006 ± 0.004
<u>Pond C-2 - No discharge</u>			
<u>Walnut Creek at Indiana</u>			
04/01/91 - 04/05/91	0.020	± 0.023	0.005 ± 0.011
04/06/91 - 04/07/91	-0.012	± 0.023	-0.013 ± 0.017
04/08/91 - 04/12/91	0.018	± 0.016 ^c	0.000 ± 0.032
04/20/91 - 04/21/91	-0.007	± 0.026	-0.010 ± 0.017
04/22/91 - 04/26/91	0.024	± 0.026	0.003 ± 0.006
04/27/91 - 04/28/91	0.030	± 0.039	0.006 ± 0.040
04/29/91 - 05/03/91	0.024	± 0.031	0.021 ± 0.023
Volume weighted average concentration	0.018	± 0.011	0.005 ± 0.008

- a. Daily discharge samples from A-4 for 4/3/91 to 4/5/91 were collected but never delivered to lab for analysis. See executive summary for details.
- b. Original analysis (0.210 ± 0.132 pCi/l) reported was calculated as a 1 liter sample rather than a 5 liter sample. Sample was rerun in duplicate. Result reported above is mean of correctly calculated original result (0.034 ± 0.022 pCi/l) and one rerun aliquot (-0.010 ± 0.022 pCi/l). Second rerun aliquot did not meet laboratory quality assurance criteria.
- c. Result is mean of original aliquot (0.054 ± 0.028 pCi/l) and one rerun aliquot (-0.019 ± 0.014 pCi/l). Second rerun aliquot did not meet laboratory quality assurance criteria.

Table 8 - Errata April 1991

Onsite Water Sample Results - Uranium

Holding Pond Outfall (pCi/l)

<u>Location</u>	<u>Uranium-233, -234</u>		<u>Uranium-238</u>
<u>Pond A-4</u>			
04/01/91 - 04/02/91 ^a	1.68	± 0.32	1.79 ± 0.33
04/06/91 - 04/07/91	1.77	± 0.36	1.94 ± 0.39
04/08/91 - 04/12/91	1.96	± 0.45	2.21 ± 0.49
04/19/91 - 04/21/91	0.90	± 0.28	1.31 ± 0.36
04/22/91 - 04/26/91	1.58	± 0.34	1.87 ± 0.39
04/27/91 - 04/28/91	1.53	± 0.43	1.60 ± 0.45
04/29/91 - 05/03/91	0.88	± 0.29	1.01 ± 0.31
Volume weighted average concentration	1.47	± 0.14	1.66 ± 0.16
<u>Pond B-5 - No discharge</u>			
<u>Pond C-1</u>			
04/01/91 - 04/05/91	1.09	± 0.21	0.74 ± 0.15
04/08/91 - 04/12/91	1.24	± 0.36	0.72 ± 0.25
04/15/91 - 04/19/91	0.96	± 0.20	0.56 ± 0.13
04/22/91 - 04/26/91	1.05	± 0.21	0.69 ± 0.15
04/29/91 - 05/03/91	0.77	± 0.25	0.46 ± 0.18
Average concentration	0.82	± 0.39	0.63 ± 0.11
<u>Pond C-2 - No discharge</u>			
<u>Walnut Creek at Indiana</u>			
04/01/91 - 04/05/91	1.44	± 0.34	1.62 ± 0.38
04/06/91 - 04/07/91	1.41	± 0.33	1.39 ± 0.32
04/08/91 - 04/12/91	1.60	± 0.32	1.55 ± 0.31
04/20/91 - 04/21/91	2.45	± 0.54	2.21 ± 0.50
04/22/91 - 04/26/91	2.09	± 0.66	1.93 ± 0.62
04/27/91 - 04/28/91	1.28	± 0.30	1.11 ± 0.27
04/29/91 - 05/03/91	1.16	± 0.33	1.02 ± 0.30
Volume weighted average concentration	1.59	± 0.19	1.52 ± 0.18

^a Daily discharge samples from A-4 for 4/3/91 to 4/5/91 were collected but never delivered to lab for analysis. See executive summary for details.

Table 9 - Errata April 1991

Offsite Water Sample Results - Plutonium and Americium

Location	Number of Samples	Reservoirs (pCi/l)	
		Plutonium-239, -240	Americium-241
Great Western	1 ^a	-0.003 ± 0.005	-0.004 ± 0.004
Standley Lake	1 ^a	-0.007 ± 0.003	-0.005 ± 0.004
Community Tap Water (pCi/l)			
Boulder	1 ^a	0.003 ± 0.010	0.006 ± 0.011
Broomfield	1 ^a	-0.006 ± 0.004	-0.005 ± 0.003
Westminster	1 ^a	-0.006 ± 0.003	-0.007 ± 0.005

^a Plutonium and americium analyses are performed on one sample composited from weekly grab samples.

Table 10 - Errata April 1991

Offsite Water Sample Results - Uranium

Location	Number of Samples	Reservoirs (pCi/l)	
		Uranium-233, -234	Uranium-238
Great Western	1 ^a	0.60 ± 0.16	0.57 ± 0.16
Standley Lake	1 ^a	0.91 ± 0.20	0.74 ± 0.17
Community Tap Water (pCi/l)			
Boulder	1 ^a	0.01 ± 0.03	0.00 ± 0.02
Broomfield	1 ^a	0.28 ± 0.09	0.29 ± 0.09
Westminster	1 ^a	0.17 ± 0.07	0.23 ± 0.08

^a Uranium analyses are performed on one sample composited from weekly grab samples.

Table 11 - Errata April 1991

Onsite and Offsite Water Sample Results - Tritium

Tritium (pCi/l)

<u>Location</u>	<u>Number of Samples</u>	<u>C Minimum</u>	<u>C Maximum</u>	<u>C Average</u>
Pond A-4 ^a	24	-110 ± 170	330 ± 200	70 ± 40
Pond C-1	5	200 ± 210	210 ± 210	10 ± 150
Boulder	4	-100 ± 220	160 ± 190	50 ± 190
Broomfield	4	-130 ± 220	120 ± 180	40 ± 200
Great Western	4	40 ± 180	100 ± 190	70 ± 200
Standley Lake	4	-200 ± 220	130 ± 180	0 ± 190
Westminster	4	-20 ± 230	70 ± 190	50 ± 190
Walnut at Indiana ^a	23	-180 ± 200	220 ± 200	30 ± 40

^a Volume weighted average concentration.

Table 7 - Errata May 1991

Onsite Water Sample Results - Plutonium and Americium

Holding Pond Outfall (pCi/l)

Location	Plutonium-239, -240			Americium-241		
<u>Pond A-4</u>						
05/04/91 - 05/05/91	0.010	±	0.028	0.016	±	0.041
05/06/91 - 05/10/91	0.012	±	0.034	0.108	±	0.101 ^a
05/11/91 - 05/12/91	0.003	±	0.031	0.027	±	0.058
05/13/91 - 05/17/91	0.002	±	0.022	0.009	±	0.008
05/18/91 - 05/19/91	-0.018	±	0.016	0.025	±	0.036
05/20/91 - 05/24/91	0.022	±	0.031	0.016	±	0.037
05/25/91 - 05/26/91	-0.002	±	0.022	0.016	±	0.031
05/27/91 - 05/31/91	-0.024	±	0.021	0.007	±	0.054
Volume weighted average concentration	-0.002	±	0.010	0.025	±	0.019
<u>Pond B-5</u> - No discharge						
<u>Pond C-1</u>						
05/06/91 - 05/10/91	0.034	±	0.021	0.007	±	0.014
05/13/91 - 05/17/91	0.024	±	0.012			b
05/20/91 - 05/24/91	0.128	±	0.048 ^c	0.008	±	0.010
05/27/91 - 05/31/91	0.001	±	0.005	0.005	±	0.009
Average concentration	0.047	±	0.055	0.007	±	0.010
<u>Pond C-2</u> - No discharge						
<u>Walnut Creek at Indiana</u>						
05/04/91 - 05/05/91	-0.006	±	0.020	0.032	±	0.047 ^d
05/06/91 - 05/10/91	0.000	±	0.007	-0.003	±	0.004
05/11/91 - 05/12/91	-0.017	±	0.015	0.031	±	0.038
05/13/91 - 05/17/91	0.019	±	0.011	0.038	±	0.030 ^e
05/18/91 - 05/19/91	-0.004	±	0.023	0.034	±	0.067 ^f
05/20/91 - 05/24/91	0.025	±	0.012			b
05/25/91 - 05/26/91	0.000	±	0.023	0.043	±	0.036 ^g
05/27/91 - 05/31/91	0.004	±	0.006	0.017	±	0.009
Volume weighted average concentration	0.008	±	0.005	0.022	±	0.011

- ^a Result is mean of original aliquot (0.067 ± 0.074 pCi/l) and one rerun (0.149 ± 0.067 pCi/l). Second rerun aliquot did not meet laboratory quality assurance criteria.
- ^b Original and rerun aliquot did not meet quality assurance criteria. Insufficient sample remained for further analysis. No americium data will be available for this location and time period.
- ^c Result is mean of original aliquot (0.224 ± 0.065 pCi/l) and two rerun aliquots (0.122 ± 0.058 pCi/l and 0.039 ± 0.040 pCi/l).
- ^d Result is mean of original aliquot (0.065 ± 0.090 pCi/l) and one rerun (-0.001 ± 0.027 pCi/l). Second rerun aliquot did not meet laboratory quality assurance criteria.
- ^e Result is mean of original aliquot (0.052 ± 0.035 pCi/l) and one rerun aliquot (0.024 ± 0.049 pCi/l). Second rerun aliquot did not meet laboratory quality assurance criteria.
- ^f Result is mean of original aliquot (0.052 ± 0.040 pCi/l) and one rerun aliquot (0.015 ± 0.127 pCi/l). Second rerun aliquot did not meet laboratory quality assurance criteria.
- ^g Result is mean of original aliquot (0.066 ± 0.058 pCi/l) and two rerun aliquots (0.027 ± 0.028 pCi/l and 0.037 ± 0.032 pCi/l).

Table 8 - Errata May 1991

Onsite Water Sample Results - Uranium

Holding Pond Outfall (pCi/l)

<u>Location</u>	<u>Uranium-233, -234</u>		<u>Uranium-238</u>	
<u>Pond A-4</u>				
05/04/91 - 05/05/91	0.83	± 0.30	0.45	± 0.20
05/06/91 - 05/10/91	0.88	± 0.19	0.94	± 0.20
05/11/91 - 05/12/91	0.49	± 0.19	0.43	± 0.19
05/13/91 - 05/17/91	0.81	± 0.21	0.77	± 0.20
05/18/91 - 05/19/91	0.90	± 0.35	0.47	± 0.24
05/20/91 - 05/24/91	0.70	± 0.23	0.48	± 0.18
05/25/91 - 05/26/91	0.63	± 0.15	0.74	± 0.17
05/27/91 - 05/31/91	0.50	± 0.11	0.60	± 0.13
Volume weighted average concentration	0.70	± 0.08	0.063	± 0.07
<u>Pond B-5 - No discharge</u>				
<u>Pond C-1</u>				
05/06/91 - 05/10/91	0.67	± 0.14	0.52	± 0.12
05/13/91 - 05/17/91	0.79	± 0.20	0.61	± 0.17
05/20/91 - 05/24/91	0.58	± 0.15	0.36	± 0.11
05/27/91 - 05/31/91	0.63	± 0.13	0.49	± 0.11
Average concentration	0.67	± 0.09	0.50	± 0.10
<u>Pond C-2 - No discharge</u>				
<u>Walnut Creek at Indiana</u>				
05/04/91 - 05/05/91	0.74	± 0.25	0.83	± 0.26
05/06/91 - 05/10/91	0.83	± 0.34	0.79	± 0.32
05/11/91 - 05/12/91	0.42	± 0.14	0.30	± 0.11
05/13/91 - 05/17/91	0.55	± 0.21	0.54	± 0.21
05/18/91 - 05/19/91	0.44	± 0.11	0.40	± 0.10
05/20/91 - 05/24/91	0.82	± 0.18	0.65	± 0.15
05/25/91 - 05/26/91	1.43	± 0.24	1.00	± 0.18
05/27/91 - 05/31/91	0.57	± 0.15	0.54	± 0.15
Volume weighted average concentration	0.73	± 0.08	0.63	± 0.07

Table 9 - Errata May 1991

Offsite Water Sample Results - Plutonium and Americium

Location	Number of Samples	Reservoirs (pCi/l)	
		Plutonium-239, -240	Americium-241
Great Western	1 ^a	0.000 ± 0.005	0.003 ± 0.008
Standley Lake	1 ^a	0.000 ± 0.005	0.015 ± 0.011
Community Tap Water (pCi/l)			
Boulder	1 ^a	-0.001 ± 0.005	0.000 ± 0.005
Broomfield	1 ^a	0.000 ± 0.005	-0.004 ± 0.003
Westminster	1 ^a	0.001 ± 0.006	0.017 ± 0.010

^a Plutonium and americium analyses were performed on one sample composited from four weekly grab samples.

Table 10 - Errata May 1991

Offsite Water Sample Results - Uranium

<u>Location</u>	<u>Number of Samples</u>	<u>Reservoirs (pCi/l)</u>		<u>Uranium-238</u>
		<u>Uranium-233, -234</u>		
Great Western	1 ^a	0.78	± 0.17	0.56 ± 0.13
Standley Lake	1 ^a	0.58	± 0.13	0.48 ± 0.11
Community Tap Water (pCi/l)				
Boulder	1 ^a	0.03	± 0.03	0.02 ± 0.02
Broomfield	1 ^a	0.57	± 0.15	0.46 ± 0.13
Westminster	1 ^a	0.44	± 0.13	0.42 ± 0.13

^a Uranium analyses were performed on one sample composited from weekly grab samples.

Table 11 - Errata May 1991

Onsite and Offsite Water Sample Results - Tritium

Tritium (pCi/l)				
<u>Location</u>	<u>Number of Samples</u>	<u>C. Minimum</u>	<u>C. Maximum</u>	<u>C. Average</u>
Pond A-4 ^a	31	-160 ± 180	170 ± 180	10 ± 40
Pond C-1	4	-120 ± 180	120 ± 190	10 ± 190
Boulder	4	-180 ± 170	140 ± 190	-20 ± 180
Broomfield	4	-80 ± 180	190 ± 180	50 ± 180
Great Western	4	-10 ± 180	270 ± 190	100 ± 180
Standley Lake	4	-60 ± 180	110 ± 180	20 ± 180
Westminster	4	30 ± 190	160 ± 190	90 ± 180
Walnut at Indiana ^a	31	-140 ± 170	230 ± 190	0 ± 40

^a Volume weighted average concentration.

Table 7 - Errata June 1991

Onsite Water Sample Results - Plutonium and Americium

Holding Pond Outfall (pCi/l)

<u>Location</u>	<u>Plutonium-239, -240</u>	<u>Americium-241</u>
<u>Pond A-4</u>		
06/01/91 - 06/02/91	-0.021 ± 0.018	0.034 ± 0.068
06/03/91 - 06/07/91	-0.010 ± 0.024	0.127 ± 0.056 ^a
06/08/91 - 06/09/91	-0.006 ± 0.022	0.055 ± 0.045 ^b
06/10/91 - 06/14/91	-0.009 ± 0.020	-0.009 ± 0.017
06/15/91 - 06/16/91	-0.013 ± 0.021	-0.021 ± 0.016
06/17/91 - 06/21/91	0.035 ± 0.033	0.004 ± 0.031
06/22/91 - 06/23/91	-0.010 ± 0.026	-0.005 ± 0.033
06/24/91 - 06/28/91	-0.006 ± 0.022	-0.001 ± 0.032
06/29/91 - 06/30/91	0.031 ± 0.039	-0.004 ± 0.029
Volume weighted average concentration	0.016 ± 0.016	0.029 ± 0.015
<u>Pond B-5 - No discharge</u>		
<u>Pond C-1</u>		
06/03/91 - 06/07/91	0.026 ± 0.022 ^c	0.000 ± 0.008
06/10/91 - 06/14/91	0.017 ± 0.010	0.001 ± 0.007
06/17/91 - 06/21/91	0.010 ± 0.007	0.003 ± 0.010
06/24/91 - 06/28/91	0.003 ± 0.007	0.001 ± 0.012
Average concentration	0.014 ± 0.010	0.001 ± 0.001
<u>Pond C-2</u>		
06/06/91 - 06/07/91	0.010 ± 0.025	0.011 ± 0.028
06/08/91 - 06/09/91	0.045 ± 0.034	-0.002 ± 0.031
06/10/14 - 06/14/91	-0.007 ± 0.019	0.001 ± 0.023
06/15/91 - 06/16/91	0.014 ± 0.029	0.023 ± 0.040
06/17/91 - 06/21/91	0.010 ± 0.018	-0.002 ± 0.016
06/22/91 - 06/23/91	0.035 ± 0.037	0.066 ± 0.057 ^d
06/24/91	0.054 ± 0.037 ^e	-0.015 ± 0.017
Volume weighted average concentration	0.013 ± 0.010	0.007 ± 0.012
<ul style="list-style-type: none"> ^a Result is mean of original aliquot (0.113 ± 0.066 pCi/l) and two subsequent reruns (0.205 ± 0.080 pCi/l and 0.064 ± 0.042 pCi/l). ^b Sample was submitted for rerun in duplicate, however both reruns were not valid. Second rerun aliquot did not meet laboratory quality assurance criteria. ^c Insufficient sample remained to rerun americium. ^d Result is mean of original aliquot (0.067 ± 0.071 pCi/l) and one rerun (0.019 ± 0.041 pCi/l). Second rerun aliquot did not meet laboratory quality assurance criteria. ^e Result is mean of original aliquot (0.064 ± 0.034 pCi/l) and two rerun aliquots (0.040 ± 0.038 pCi/l and 0.057 ± 0.039 pCi/l). 		

Table 7 - Errata June 1991 (continued)

Onsite Water Sample Results - Plutonium and Americium

Holding Pond Outfall (pCi/l)

<u>Location</u>	<u>Plutonium-239, -240</u>	<u>Americium-241</u>
<u>Walnut Creek at Indiana</u>		
06/01/91 - 06/02/91	0.022 ± 0.028	0.043 ± 0.041 ^a
06/03/91 - 06/07/91	-0.009 ± 0.023	0.014 ± 0.015
06/08/91 - 06/09/91	0.042 ± 0.030	0.033 ± 0.029
06/10/91 - 06/14/91	0.024 ± 0.017	0.010 ± 0.009
06/15/91 - 06/16/91	0.002 ± 0.026	-0.016 ± 0.016
06/17/91 - 06/21/91	0.005 ± 0.006	0.010 ± 0.010
06/22/91 - 06/23/91	-0.009 ± 0.028	-0.028 ± 0.012
06/24/91 - 06/28/91	-0.003 ± 0.004	-0.001 ± 0.013
06/29/91 - 06/30/91	0.015 ± 0.029	0.008 ± 0.023
Volume weighted average concentration	0.004 ± 0.007	0.012 ± 0.008

^a Result is mean of original aliquot (0.060 ± 0.040 pCi/l) and one rerun aliquot (-0.008 ± 0.019 pCi/l). Second rerun aliquot did not meet laboratory quality assurance criteria.

Table 8 - Errata June 1991

Onsite Water Sample Results - Uranium

Holding Pond Outfall (pCi/l)						
<u>Location</u>	<u>Uranium-233, -234</u>			<u>Uranium-238</u>		
<u>Pond A-4</u>						
06/01/91 - 06/02/91	0.55	±	0.12	0.61	±	0.13
06/03/91 - 06/07/91	0.58	±	0.14	0.44	±	0.11
06/08/91 - 06/09/91	0.22	±	0.08	0.28	±	0.09
06/10/91 - 06/14/91	0.40	±	0.14	0.37	±	0.13
06/15/91 - 06/16/91	0.37	±	0.14	0.43	±	0.15
06/17/91 - 06/21/91	0.64	±	0.16	0.68	±	0.16
06/22/91 - 06/23/91	0.60	±	0.17	0.61	±	0.17
06/24/91 - 06/28/91	0.34	±	0.13	0.28	±	0.11
06/29/91 - 06/30/91	0.55	±	0.19	0.38	±	0.15
Volume weighted average concentration	0.46	±	0.05	0.44	±	0.05
<u>Pond B-5 - No discharge</u>						
<u>Pond C-1</u>						
06/03/91 - 06/07/91	0.39	±	0.10	0.32	±	0.08
06/10/91 - 06/14/91	0.74	±	0.19	0.47	±	0.13
06/17/91 - 06/21/91	0.42	±	0.14	0.38	±	0.12
06/24/91 - 06/28/91	0.58	±	0.15	0.47	±	0.13
Average concentration	0.53	±	0.16	0.41	±	0.07
<u>Pond C-2</u>						
06/06/91 - 06/07/91	1.01	±	0.23	1.02	±	0.23
06/08/91 - 06/09/91	0.95	±	0.24	0.95	±	0.24
06/10/91 - 06/14/91	0.89	±	0.22	1.09	±	0.25
06/15/91 - 06/16/91	0.95	±	0.22	0.84	±	0.20
06/17/91 - 06/21/91	0.69	±	0.09	1.00	±	0.12
06/22/91 - 06/23/91	0.88	±	0.28	1.02	±	0.31
06/24/91	0.76	±	0.21	0.89	±	0.23
Volume weighted average concentration	0.85	±	0.09	1.00	±	0.10
<u>Walnut Creek at Indiana</u>						
06/01/91 - 06/02/91	0.46	±	0.14	0.53	±	0.15
06/03/91 - 06/07/91	0.52	±	0.13	0.48	±	0.12
06/08/91 - 06/09/91	0.36	±	0.16	0.45	±	0.17
06/10/91 - 06/14/91	0.66	±	0.17	0.70	±	0.17
06/15/91 - 06/16/91	0.57	±	0.16	0.61	±	0.16
06/17/91 - 06/21/91	0.62	±	0.28	1.02	±	0.37
06/22/91 - 06/23/91	0.57	±	0.17	0.48	±	0.15
06/24/91 - 06/28/91	0.39	±	0.14	0.29	±	0.11
06/29/91 - 06/30/91	0.38	±	0.13	0.31	±	0.11
Volume weighted average concentration	0.52	±	0.06	0.58	±	0.07

Table 9 - Errata June 1991

Offsite Water Sample Results - Plutonium and Americium

Location	Number of Samples	Reservoirs (pCi/l)	
		Plutonium-239, -240	Americium-241
Great Western	1	0.001 ± 0.007	0.063 ± 0.033 ^a
Standley Lake	1	0.005 ± 0.009	-0.002 ± 0.009
Community Tap Water (pCi/l)			
Boulder	1	-0.005 ± 0.005	0.000 ± 0.006
Broomfield	1	-0.004 ± 0.005	-0.007 ± 0.007
Westminster	1	-0.006 ± 0.004	-0.001 ± 0.009
Arvada	1	-0.022 ± 0.030	-0.014 ± 0.042
Denver	1	0.014 ± 0.036 ^b	0.048 ± 0.073
Golden	1	0.020 ± 0.033	0.004 ± 0.071
Lafayette	1	-0.023 ± 0.027	0.027 ± 0.081
Louisville	1	0.021 ± 0.051	-0.015 ± 0.056
Thornton	1	0.022 ± 0.059	0.072 ± 0.076 ^c

^a Sample being rerun to verify results. As of 10/20/91 sample rerun was still in process.
^b Result is mean of original aliquot (0.051 ± 0.072) and one rerun aliquot (-0.023 ± 0.012 pCi/l).
^c Result is mean of original aliquot (0.109 ± 0.135 pCi/l) and one rerun aliquot (0.034 ± 0.032 pCi/l).

Table 10 - Errata June 1991

Offsite Water Sample Results - Uranium

<u>Location</u>	<u>Number of Samples</u>	<u>Reservoirs (pCi/l)</u>		<u>Uranium-238</u>	
		<u>Uranium-233, -234</u>			
Great Western	1	0.64	± 0.19	0.73	± 0.20
Standley Lake	1	0.81	± 0.18	0.64	± 0.14
 <u>Community Tap Water (pCi/l)</u>					
Boulder	1	0.07	± 0.12	0.04	± 0.08
Broomfield	1	0.58	± 0.16	0.46	± 0.13
Westminster	1	0.32	± 0.12	0.31	± 0.11
Arvada	1	0.51	± 0.18	0.23	± 0.12
Denver	1	0.17	± 0.07	0.04	± 0.04
Golden	1	0.25	± 0.08	0.17	± 0.07
Lafayette	1	0.03	± 0.04	0.00	± 0.02
Louisville	1	0.04	± 0.04	0.01	± 0.02
Thornton	1	1.02	± 0.22	0.76	± 0.18

Table 11 - Errata June 1991

Onsite and Offsite Water Sample Results - Tritium

Tritium (pCi/l)				
<u>Location</u>	<u>Number of Samples</u>	<u>C. Minimum</u>	<u>C. Maximum</u>	<u>C. Average</u>
Pond A-4a	30	-180 ± 190	350 ± 200	60 ± 40
Pond C-2a	19	-140 ± 180	350 ± 210	80 ± 50
Pond C-1	4	-160 ± 180	130 ± 210	40 ± 140
Boulder	4	-10 ± 180	160 ± 190	70 ± 70
Broomfield	4	-190 ± 170	-40 ± 180	-120 ± 60
Great Western	4	-50 ± 180	100 ± 190	40 ± 60
Standley Lake	4	-10 ± 180	110 ± 190	40 ± 50
Westminster	4	-40 ± 180	90 ± 190	40 ± 60
Walnut at Indiana ^a	30	-200 ± 180	230 ± 200	40 ± 40
Arvada	1	40 ± 190	40 ± 190	40 ± 190
Denver	1	180 ± 200	180 ± 200	180 ± 200
Golden	1	30 ± 190	30 ± 190	30 ± 190
Lafayette	1	20 ± 190	20 ± 190	20 ± 190
Louisville	1	100 ± 200	100 ± 200	100 ± 200
Thornton	1	140 ± 190	140 ± 190	140 ± 190

^a Volume weighted average concentration.

Table 7 - Errata July 1991

Onsite Water Sample Results - Plutonium and Americium

Holding Pond Outfall (pCi/l)

<u>Location</u>	<u>Plutonium-239, -240</u>	<u>Americium-241</u>
<u>Pond A-4</u>		
07/01/91 - 07/05/91	0.005 ± 0.044	0.022 ± 0.029
Volume weighted average concentration	0.005 ± 0.044	0.022 ± 0.029
<u>Pond B-5 - No discharge</u>		
<u>Pond C-1</u>		
07/01/91 - 07/05/91	0.022 ± 0.012	0.009 ± 0.010
07/08/91 - 07/12/91	0.026 ± 0.018	0.003 ± 0.009
07/15/91 - 07/19/91	0.230 ± 0.089 ^a	0.024 ± 0.016
07/22/91 - 07/26/91	0.035 ± 0.052 ^b	0.043 ± 0.018
07/29/91 - 08/02/91	0.029 ± 0.028	-0.018 ± 0.019
Average concentration	0.068 ± 0.054	0.012 ± 0.020
<u>Pond C-2 - No discharge</u>		
<u>Walnut Creek at Indiana</u>		
07/01/91 - 07/05/91	0.010 ± 0.011	-0.001 ± 0.006
07/06/91	0.019 ± 0.047	-0.028 ± 0.018
Volume weighted average concentration	0.010 ± 0.011	-0.002 ± 0.006

- ^a Sample was rerun to verify results of the original aliquot (0.055 pCi/l). Only one (0.400 ± 0.120 pCi/l) of the two rerun aliquots met quality assurance (QA) criteria. Result reported is the mean of the original value and the QA-acceptable rerun value.
- ^b Result is mean of original aliquot (0.068 ± 0.063 pCi/l) and one rerun aliquot (0.001 ± 0.041 pCi/l). Second rerun aliquot did not meet laboratory quality assurance criteria.

Table 8 - Errata July 1991

Onsite Water Sample Results - Uranium

Holding Pond Outfall (pCi/l)

<u>Location</u>	<u>Uranium-233, -234</u>		<u>Uranium-238</u>	
<u>Pond A-4</u>				
07/01/91 - 07/05/91	0.21	± 0.14	0.25	± 0.15
Volume weighted average concentration	0.21	± 0.14	0.25	± 0.15
<u>Pond B-5 - No discharge</u>				
<u>Pond C-1</u>				
07/01/91 - 07/05/91	0.62	± 0.16	0.46	± 0.13
07/08/91 - 07/12/91	0.55	± 0.15	0.33	± 0.11
07/15/91 - 07/19/91	0.50	± 0.13	0.38	± 0.11
07/22/91 - 07/26/91	0.41	± 0.12	0.25	± 0.08
07/29/91 - 08/02/91	0.54	± 0.30	0.37	± 0.26
Average concentration	0.52	± 0.10	0.36	± 0.08
<u>Pond C-2 - No discharge</u>				
<u>Walnut Creek at Indiana</u>				
07/01/91 - 07/05/91	0.45	± 0.12	0.36	± 0.10
07/06/91	0.41	± 0.13	0.33	± 0.11
Volume weighted average concentration	0.45	± 0.12	0.36	± 0.10

Table 9 - Errata July 1991

Offsite Water Sample Results - Plutonium and Americium

Location	Number of Samples	Reservoirs (pCi/l)	
		Plutonium-239, -240	Americium-241
Great Western	1 ^a	-0.015 ± 0.057	-0.002 ± 0.010
Standley Lake	1 ^a	-0.012 ± 0.025	-0.007 ± 0.007
Community Tap Water (pCi/l)			
Boulder	1 ^a	-0.002 ± 0.015	0.014 ± 0.014
Broomfield	1 ^a	0.010 ± 0.020	0.018 ± 0.016
Westminster	1 ^a	0.045 ± 0.034	0.025 ± 0.018

^a Plutonium and americium analyses were performed on one sample composited from four weekly grab samples.

Table 10 - Errata July 1991

Offsite Water Sample Results - Uranium

Location	Number of Samples	Reservoirs (pCi/l)	
		Uranium-233, -234	Uranium-238
Great Western	1 ^a	0.46 ± 0.15	0.46 ± 0.15
Standley Lake	1 ^a	0.58 ± 0.16	0.60 ± 0.16
Community Tap Water (pCi/l)			
Boulder	1 ^a	0.02 ± 0.03	-0.01 ± 0.02
Broomfield	1 ^a	0.33 ± 0.10	0.24 ± 0.08
Westminster	1 ^a	0.21 ± 0.12	0.18 ± 0.10

^a Uranium analyses were performed on one sample composited from four weekly grab samples.

Table 11 - Errata July 1991

Onsite and Offsite Water Sample Results - Tritium

<u>Location</u>	<u>Number of Samples</u>	<u>Tritium (pCi/l)</u>		
		<u>C Minimum</u>	<u>C Maximum</u>	<u>C Average</u>
Pond A-4 ^a	5	-30 ± 170	110 ± 200	20 ± 80
Pond C-1	5	-10 ± 190	170 ± 190	70 ± 60
Boulder	1	0 ± 180	200 ± 190	50 ± 110
Broomfield	1	-150 ± 180	100 ± 190	-30 ± 100
Great Western	1	-120 ± 180	0 ± 180	-80 ± 80
Standley Lake	1	-120 ± 180	80 ± 190	-50 ± 190
Westminster	1	-160 ± 180	110 ± 190	10 ± 120
Walnut at Indiana ^a	6	-60 ± 170	70 ± 180	0 ± 80

^a Volume weighted average concentration.

Table 7 - Errata August 1991

Onsite Water Sample Results - Plutonium and Americium

Holding Pond Outfall (pCi/l)

<u>Location</u>	<u>Plutonium-239, -240</u>	<u>Americium-241</u>
<u>Pond A-4</u>		
08/24/91 - 08/25/91	a	-0.006 ± 0.032
08/26/91 - 08/30/91	-0.001 ± 0.025	-0.004 ± 0.026
Volume weighted average concentration	a	-0.004 ± 0.022
<u>Pond B-5 - No discharge</u>		
<u>Pond C-1</u>		
08/05/91 - 08/09/91	0.005 ± 0.008	-0.002 ± 0.008
08/12/91 - 08/16/91	-0.004 ± 0.004	0.004 ± 0.008
08/19/91 - 08/23/91	0.004 ± 0.014	a
08/26/91 - 08/30/91	0.037 ± 0.037	-0.005 ± 0.027
Average concentration	0.011 ± 0.020	a
<u>Pond C-2 - No discharge</u>		
<u>Walnut Creek at Indiana</u>		
08/07/91 ^b	0.005 ± 0.029	-0.011 ± 0.021
08/25/91	0.017 ± 0.026	-0.026 ± 0.021
08/26/91 - 08/30/91	0.045 ± 0.040	-0.002 ± 0.026
Volume weighted average concentration	0.039 ± 0.032	-0.006 ± 0.021

a Incomplete lab analysis.
 b Rain event sampling

Table 8 - Errata August 1991

Onsite Water Sample Results - Uranium

Holding Pond Outfall (pCi/l)

<u>Location</u>	<u>Uranium-233, -234</u>	<u>Uranium-238</u>
<u>Pond A-4</u>		
08/24/91 - 08/25/91	a	a
08/26/91 - 08/30/91	a	a
Volume weighted average concentration	a	a
<u>Pond B-5 - No discharge</u>		
<u>Pond C-1</u>		
08/05/91 - 08/09/91	0.40 ± 0.14	0.26 ± 0.11
08/12/91 - 08/16/91	0.31 ± 0.16	0.27 ± 0.14
08/19/91 - 08/23/91	0.52 ± 0.13	0.40 ± 0.11
08/26/91 - 08/30/91	a	a
Average concentration	a	a
<u>Pond C-2 - No discharge</u>		
<u>Walnut Creek at Indiana</u>		
08/07/91 ^b	0.38 ± 0.10	0.37 ± 0.10
08/25/91	a	a
08/26/91 - 08/30/91	a	a
Volume weighted average concentration	a	a
<p>a Incomplete lab analysis. b Rain event sampling</p>		

Table 9 - Errata August 1991

Offsite Water Sample Results - Plutonium and Americium

Location	Number of Samples	Reservoirs (pCi/l)	
		Plutonium-239, -240	Americium-241
Great Western	1 ^a	-0.016 ± 0.020	-0.003 ± 0.005
Standley Lake	1 ^a	-0.010 ± 0.021	-0.001 ± 0.005
Community Tap Water (pCi/l)			
Boulder	1 ^a	-0.010 ± 0.021	0.004 ± 0.010
Broomfield	1 ^a	-0.013 ± 0.020	0.011 ± 0.010
Westminster	1 ^a	0.038 ± 0.044	-0.002 ± 0.007

^a Plutonium and americium analyses were performed on one sample composited from four weekly grab samples.

Table 10 - Errata August 1991

Offsite Water Sample Results - Uranium

<u>Location</u>	<u>Number of Samples</u>	<u>Reservoirs (pCi/l)</u>		<u>Uranium-238</u>	
		<u>Uranium-233, -234</u>			
Great Western	1 ^a	0.43	± 0.12	0.30	± 0.09
Standley Lake	1 ^a	0.45	± 0.12	0.48	± 0.12
Community Tap Water (pCi/l)					
Boulder	1 ^a	0.01	± 0.04	-0.01	± 0.02
Broomfield	1 ^a	0.26	± 0.09	0.26	± 0.09
Westminster	1 ^a	0.31	± 0.12	0.20	± 0.09

^a Uranium analyses are performed on one sample composited from weekly grab samples.

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Denver, CO 80202-2413

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999 18th Street, Suite 500
8 HWM-FF
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Colorado Water Conservation Board
Attn: N.C. Ioannides
823 State Centennial Building
1313 Sherman Street
Denver, CO 80203

Denver Regional Council of
Governments
Attn: L. Mugler
2480 W. 27th Avenue, #200B
Denver, CO 80211

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1313 Sherman Street
Denver, CO 80203

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1536 Cole Blvd., Suite 325
Denver West Office Park #4
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8101 Ralston Road
Arvada, CO 80002

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Attn: J. Piper, A. Struthers
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Boulder, CO 80302

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Fort Collins, CO 80525

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9500 Civic Center Drive
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City of Westminster
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4800 W. 92nd Avenue
Westminster, CO 80030

Denver Water Department
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1600 W. 12th Avenue
Denver, CO 80254

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Boulder City/County Health
Department - Division of
Environmental Health
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3450 Broadway
Boulder, CO 80020

Colorado Department of Health
4210 E. Eleventh Avenue
Denver, CO 80020
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260 South Kipling
Lakewood, CO 80226

Tri County District Health
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4301 E. 72nd Avenue
Commerce City, CO 80022

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350 Terry Street
Longmont, CO 80501

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