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AEC Research and Development Report

ENVIRONMENTAL SURVEILLANCE AT HANFORD FOR CY-1971 DATA

AUGUST 1972

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ENVIRONMENTAL SURVEILLANCE AT HANFORD FOR CY-1971 (ADDENDUM)

by

P. E. Bramson and J. P. Corley
Occupational and Environmental Safety Department

August 1972

BATTELLE
PACIFIC NORTHWEST LABORATORIES
RICHLAND, WASHINGTON 99352

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Preface

This supplemental report is a compilation of results obtained from both analyses of environmental samples and from radiological measurements made in the Hanford environs during 1971. The significance of these data is discussed in the parent report (BNWL-1683).

The term "analytical limit" as used in this report is the concentration at which the laboratory can measure the radionuclide with a precision of ±100% at the 90% confidence level. The detection limit for a specific radionuclide varies with sample type, sample size, counting time, and the amounts of interfering radionuclides present. The "analytical limits" were chosen to represent upper bounds to these fluctuating detection limits.

The following rule has been applied for determining statistical detection levels for averaged data:

$$A.L._{avg.} = \frac{A.L._i}{\sqrt{n}}$$

The laboratory analytical level is divided by the square root of the number of averaged results to obtain the estimated analytical level for the average for the same confidence level and precision. This rule is applicable only when actual net counting data is available, as it is for most routine radioanalyses.

Air and sanitary water quality data included in this data tabulation were obtained and provided by M. J. Schults, of the Hanford Environmental Health Foundation, Richland, Washington. The latter organization conducts the routine surveillance program of this kind at the Hanford plant for the Atomic Energy Commission.

September 1972

P. E. Bramson
J. P. Corley

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APPENDIX A

APPENDIX A

TABLE 1

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT VERNITA (MONTHLY COMPOSITES OF WEEKLY GRAB SAMPLES)-1971

Units of 10^{-9} μCi/ml of Water

Date	^{3}H	^{90}Sr	Alpha
Analytical Limit	600	0.40	0.7
1/26/71	1200	*	0.94
2/23/71	1500	*	0.51
3/23/71	*	*	*
4/27/71	*	*	1.2
5/25/71	*	*	1.0
6/22/71	2000	*	*
7/28/71	*	*	1.1
8/24/71	1600	0.54	0.74
9/21/71	4300	*	1.1
10/26/71	*	0.44	*
11/23/71	*	*	0.74
12/28/71	*	0.40	1.1
Annual Average	1100	0.36	0.84

* Result was less than analytical limit.

TABLE 2

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT VERNITA (QUARTERLY GRAB SAMPLES)-1971

Units of 10^{-9} μCi/ml of Water

Date	^{137}Cs-^{137m}Ba	^{239}Pu
Analytical Limit	3.0	0.01
5/25/71		*
7/28/71	*	
8/24/71		0.24
9/21/71	*	
11/23/71	*	*
Annual Average	0.41	0.08

* Result was less than analytical limit.

No entry indicates no specific isotopic analysis was made.

APPENDIX A

TABLE 3

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT RICHLAND (GRAB SAMPLES)-1971

Units of 10^{-9} μCi/ml of Water

Date	^{24}Na	^{51}Cr	^{56}Mn	^{64}Cu	^{69m}Zn	^{76}As	^{122}Sb	^{239}Np	RE+Y
Analytical Limit	35	200	50	20	70	5	5	10	5
1/6/71	36.	*	*	*	*	*	5.6	13.	6.2
2/1/71	52.	370	300	82.	180	20.	14.	190.	92.
Sampling Discontinued									

* Result was less than analytical limit shown.

APPENDIX A

TABLE 4

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT RICHLAND (CUMULATIVE SAMPLES)-1971

Units of 10^{-9} μCi/ml of Water

Date	^{32}P	^{46}Sc	^{51}Cr	^{65}Zn	^{131}I
Analytical Limit	6.0	30.	200	35.	2.0
12/29/70-1/7171	17.	38.	280	*	*
1/7/71-1/11/71	8.9	49.	*	*	*
1/11/71-1/19/71	30.	50.	320	*	*
1/19/71-1/26/71	50.	*	360	35.	4.0
1/26/71-2/2/71	44.	*	*	*	2.6
2/2/71-2/9/71					*
2/9/71-2/16/71		*	*	*	
2/16/71-2/23/71		*	*	*	
2/23/71-3/2/71		*	*	*	
3/2/71-3/9/71		*	*	*	
3/9/71-3/16/71		*	*	*	
3/16/71-3/23/71		*	*	*	
3/23/71-3/30/71		*	*	*	
3/30/71-4/6/71		*	*	*	
4/6/71-4/13/71		*	*	72.	
4/13/71-4/20/71		*	*	*	
4/20/71-4/27/71		*	*	49.	
4/27/71-5/4/71		*	*	100	
5/4/71-5/11/71		38.	*	140	
5/11/71-5/18/71		41.	*	*	
5/18/71-5/25/71		*	*	*	
5/25/71-6/1/71		*	*	*	
6/1/71-6/8/71		*	*	*	
6/8/71-6/15/71		*	*	*	
6/15/71-6/22/71		*	*	*	
6/22/71-6/29/71		*	*	*	
6/29/71-7/6/71		*	*	*	
7/6/71-7/13/71		*	*	*	
7/13/71-7/20/71		*	*	*	
7/20/71-7/27/71		*	590	*	
7/27/7/-8/3/71		*	*	52.	
8/3/71-8/10/71		*	*	*	
8/10/71-8/17/71		*	*	*	
8/17/71-8/24/71		*	*	*	
8/24/71-8/31/71		*	*	*	
8/31/71-9/7/71		*	*	*	
9/7/71-9/14/71		*	*	*	

Indicates that the result was less than the analytical limit shown.

APPENDIX A

TABLE 4 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT RICHLAND (CUMULATIVE SAMPLES) - 1971

Units of 10^{-9} μCi/ml of Water

Date	^{32}P	^{46}Sc	^{51}Cr	^{65}Zn	^{131}I
Analytical Limit	6.0	30.	200	35.	2.0
9/14/71-9/21/71		*	*	*	
9/21/71-9/28/71		*	*	*	
9/28/71-10/5/71		*	380	*	
10/5/71-10/12/71		*	*	*	
10/12/ 1-10/19/71		*	*	*	
10/19/71-10/26/71		*	300	*	
10/26/71-11/2/71		*	*	*	*
11/2/71-11/9/71		*	400	49.	
11/9/71-11/16/71		*	310	*	*
11/16/71-11/23/71		*	*	*	
11/23/71-11/30/71		*	*	*	
11/30/71-12/7/71		*	*	*	
12/7/71-12/14/71		*	*	*	*
12/14/71-12/21/71		*	*	*	
12/21/71-12/28/71		*	*	*	*
Annual Average		7.5	85.	16	

* Result was less than analytical limit shown.

No entry indicates no specific isotopic analysis was made.

APPENDIX A

TABLE 5

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT RICHLAND (MONTHLY COMPOSITE OF WEEKLY CUMULATIVE SAMPLES)-1971

Units of 10^{-9} μCi/ml of Water

Date	^{3}H	^{46}Sc	^{65}Zn	^{90}Sr	Alpha	^{239}Pu
Analytical Limit	600	30.	35	0.4	0.7	0.01
12/29/70-1/26/71	640			*	1.0	
1/26/71-2/23/71	1100			*	1.4	
2/23/71-3/23/71	*			3.8	*	
3/23/71-4/27/71	*	*	*	1.1	0.72	
4/27/71-5/25/71	1300	*	*	*	1.0	*
5/25/71-6/22/71	1400	*	*	*	*	
6/22/71-7/27/71	1100	*	*	0.64	0.81	
7/27/71-8/24/71	1500	*	*	0.94	0.73	0.54
8/24/71-9/21/71	1100	*	*	0.60	1.8	
9/21/71-10/26/71	350	*	*	0.46	0.87	
10/26/71-11/23/71	*	*	*	*	1.6	*
11/23/71-12/28/71	*	*	*	0.40	0.90	
Annual Average	780	*3.1	*3.3	0.84	1.0	0.19

* Result was less than analytical limit shown.

No entry indicates no specific isotopic analysis was made.

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TABLE 6

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT BONNEVILLE DAM (MONTHLY COMPOSITE OF WEEKLY CUMULATIVE SAMPLES)-1971

Units of 10^{-9} μCi/ml of Water

Date	^{32}P	^{46}Sc	^{51}Cr	^{65}Zn
Analytical Limit	6	30.	70	35.
12/30/70-1/12/71	*		110	*
1/12/71-1/26/71	*		150	*
1/26/71-2/9/71	6.3		*	*
2/9/71-2/23/71	*		*	*
2/23/71-3/9/71				*
3/9/71-3/23/71				*
3/23/71-4/6/71				*
4/6/71-4/13/71		*		46.
4/13/71-5/11/71		*		*
5/11/71-6/22/71		*		*
6/22/71-7/26/71		*		*
7/26/71-8/26/71		*		*
8/26/71-9/28/71		*		*
9/28/71-10/26/71		*		*
10/26/71-11/30/71		*		*
11/30/71-12/28/71		*		*
Annual Average		*2.6		*5.9

* Result was less than analytical limit shown.

No entry indicates no specific isotopic analysis was made.

APPENDIX A

TABLE 7

ESTIMATED RATE OF TRANSPORT OF RADIONUCLIDES
IN THE COLUMBIA RIVER AT RICHLAND
(GRAB SAMPLES)-1971

Units of Curies/day

Date	^{24}Na	^{51}Cr	^{56}Mn	^{64}Cu	^{69m}Zn	^{76}As	^{122}Sb	^{239}Np	RE+Y
1-6-71	8.9	*5.7	*11	*0.05	*2.4	*0.52	1.4	3.3	1.5
2-1-71	10.	71	58	16	34	3.9	2.7	37	18

APPENDIX A

TABLE 8

ESTIMATED RATE OF TRANSPORT OF RADIONUCLIDES IN THE COLUMBIA RIVER WATER AT RICHLAND (CUMULATIVE SAMPLES)-1971

Units of Curies/day

Date	^{32}P	^{46}Sc	^{51}Cr	^{65}Zn	^{131}I
12/29/70-1/9/71	3.4	7.9	58.	5.5	*0.36
1/9/71-1/11/71	1.6	8.6	19.	*1.5	*0.34
1/11/71-1/19/71	5.8	9.5	61.	4.4	*0.30
1/19/71-1/26/71	7.6	4.2	55.	5.3	0.60
1/26/71-2/2/71	6.9	*0.14	14.	*3.1	0.40
2/2/71-2/9/71					*0.12
2/9/71-2/16/71		*	*	*0.11	
2/16/71-2/23/71		*0.16	0.36	*0.02	
2/23/71-3/2/71		*0.18	*	*0.16	
3/2/71-3/9/71		*0.21	*	*0.18	
3/9/71-3/16/71		*0.21	*	*0.19	
3/16/71-3/23/71		*0.19	*	*0.17	
3/23/71-3/30/71		*0.18	*	*0.16	
3/30/71-4/6/71		*	*	*10.	
4/6/71-4/13/71		*9.7	*	22.	
4/13/71-4/20/71		*	*	*3.8	
4/20/71-4/27/71		*4.4	*	15.	
4/27/71-5/4/71		*	*	35.	
5/4/71-5/11/71		17.	*	63.	
5/11/71-5/18/71		29.	120	*16.	
5/18/71-5/25/71		*19.	*	*	
5/25/71-6/1/71		*7.1	*	*	
6/1/71-6/8/71		*0.45	*1.0	*0.05	
6/8/71-6/15/71		*	*17.	*	
6/15/71-6/22/71		*2.0	*86.	*	
6/22/71-6/29/71		*0.26	*0.77	*0.10	
6/29/71-7/6/71		*0.22	*38.	*12.	
7/6/71-7/13/71		*1.2	*	*6.5	
7/13/71-7/20/71		*0.19	*0.55	*0.07	
7/20/71-7/27/71		*12.	300	*12.	
7/27/71-8/3/71		*6.1	*	22.	
8/3/71-8/10/71		*2.7	*98.	*	
8/10/71-8/17/71		*0.13	*19.	*9.2	
8/17/71-8/24/71		*1.7	*	*4.1	
8/24/71-8/31/71		*0.09	*12.	*2.5	

* Indicates the result was less than the analytical limit shown.

No entry indicates no specific isotopic analysis was made.

APPENDIX A

TABLE 8 (Continued)

ESTIMATED RATE OF TRANSPORT OF RADIONUCLIDES
IN THE COLUMBIA RIVER WATER AT RICHLAND
(CUMULATIVE SAMPLES)-1971

Units of Curies/day

Date	^{32}P	^{46}Sc	^{51}Cr	^{65}Zn	^{131}I
8/31/71-9/7/71		*0.08	* 0.22	*0.03	
9/7/71-9/14/71		*0.06	*15.	*0.02	
9/14/71-9/21/71		*0.06	*22.	*	
9/21/71-9/28/71		*0.14	*24.	*4.5	
9/28/71-10/5/71		*0.33	*66.	*	
10/5/71-10/12/71		*0.06	* 4.5	*0.02	
10/12/71-10/19/71		*0.07	*35.	*6.1	
10/19/71-10/26/71		*0.07	54.	*4.0	
10/26/71-11/2/71		*0.07	* 3.7	*0.03	*0.30
11/2/71-11/9/71		*3.6	86.	10.	
11/9/71-11/16/71		*1.4	63.	*7.0	*0.29
11/16/71-11/23/71		*0.07	* 0.21	*0.03	
11/23/71-11/30/71		*1.2	* 0.06	*	
11/30/71-12/7/71		*0.03	* 0.31	*	
12/7/71-12/14/71		*0.81	* 0.10	*	*0.07
12/14/71-12/21/71		*0.03	*41.	*5.3	
12/21/71-12/28/71		*0.05	* 0.22	*	*0.15
Annual Average		*2.5	*25.	*5.3	

No entry indicates no specific isotopic analysis was made.

* Indicates the result was less than the analytical limit shown.

APPENDIX A

TABLE 9

ESTIMATED RATE OF TRANSPORT OF RADIONUCLIDES IN THE COLUMBIA RIVER WATER AT BONNEVILLE DAM (MONTHLY COMPOSITE CUMULATIVE SAMPLES)-1971

Units of Curies/day

Date	^{32}P	^{46}Sc	^{51}Cr	^{65}Zn
12/30/70-1/12/71	*1.6		36.	*2.6
1/12/71-1/26/71	*2.2		68.	*3.4
1/26/71-2/9/71	2.8		*28.	*2.1
2/9/71-2/23/71	*1.5		*16.	*0.92
2/23/71-3/9/71				*0.51
3/9/71-3/23/71				*0.51
3/23/71-4/6/71				*0.56
4/6/71-4/13/71		*3.9		30.
4/13/71-5/11/71		*1.9		*15.
5/11/71-6/22/71		*3.5		*5.6
6/22/71-7/26/71		*0.31		*1.3
7/27/71-8/26/71		*0.77		*0.56
8/26/71-9/28/71		*0.61		*0.31
9/28/71-10/26/71		*0.91		*1.6
10/26/71-11/30/71		*0.02		*0.01
11/30/71-12/28/71		*1.5		*0.18
Annual Average		*1.5		*3.7

No entry indicates no specific isotopic analysis was made.
* Indicates the result was less than the analytical limit shown.

APPENDIX A

TABLE 10

BETA ACTIVITY IN THE COLUMBIA RIVER AT RICHLAND (CUMULATIVE SAMPLES)-1971

Units of counts/minute/milliliter of Water

Date	Beta	Date	Beta
2/9/71-2/16/71	*	7/27/71-8/3/71	*
2/16/71-2/23/71	*	8/3/71-8/10/71	*
2/23/71-3/2/71	*	8/10/71-8/17/71	*
3/2/71-3/9/71	*	8/17/71-8/24/71	*
3/9/71-3/16/71	*	8/24/71-8/30/71	*
3/16/71-3/23/71	*	8/30/71-9/7/71	*
3/23/71-3/30/71	*	9/7/71-9/14/71	*
3/30/71-4/6/71	*	9/14/71-9/21/71	*
4/6/71-4/13/71	*	9/21/71-9/28/71	*
4/13/71-4/20/71	*	9/28/71-10/5/71	*
4/20/71-4/27/71	*	10/5/71-10/12/71	*
4/27/71-5/4/71	*	10/12/71-10/19/71	*
5/4/71-5/11/71	*	10/19/71-10/26/71	*
5/11/71-5/18/71	*	10/26/71-11/2/71	*
5/18/71-5/25/71	*	11/2/71-11/9/71	*
5/25/71-6/1/71	*	11/9/71-11/16/71	*
6/1/71-6/8/71	*	11/16/71-11/23/71	*
6/8/71-6/15/71	*	11/23/71-11/30/71	*
6/15/71-6/22/71	*	11/30/71-12/7/71	*
6/22/71-6/29/71	*	12/7/71-12/14/71	*
6/29/71-7/6/71	*	12/14/71-12/21/71	*
7/6/71-7/13/71	*	12/21/71-12/28/71	*
7/13/71-7/20/71	*		
7/20/71-7/27/71	*	Annual Average	*0.02

TABLE 11

BETA ACTIVITY IN THE COLUMBIA RIVER AT RICHLAND (GRAB SAMPLES)-1971

Units of counts/minute/milliliter of Water

Date	c/m/mℓ
1/6/71	*
2/1/71	2.4

* Indicates the results were less than the analytical limit of 0.1

APPENDIX B

APPENDIX B

TABLE 1

CONCENTRATIONS OF RADIONUCLIDES IN DRINKING WATER (GRAB SAMPLES)-1971

Units of 10^{-9} μCi/ml of Water

Date	Location	^{24}Na	^{32}P	^{46}Sc	^{51}Cr	^{56}Mn	^{64}Cu	^{65}Zn	^{76}As	^{122}Sb	^{131}I	^{133}I	^{239}Np	RE+Y
Analytical Limit		35.	6.	30.	500	50.	140	35.	5.	5.	2.	10.	4.	5.
1-25-71	Richland	*									*	*		
1-18-71	300 Area	1200	21.	*	570	*	*	130	53.	55.	5.7	18.	230	24.
1-11-71	100 N	*		46.	*	1000	*	57.	*	*	4.4	37.	*	*

* Results were less than the analytical limit.

No entry indicates no specific isotopic analysis was made.

APPENDIX B

TABLE 2

CONCENTRATIONS OF RADIONUCLIDES IN RICHLAND DRINKING WATER (CUMULATIVE SAMPLES) -1971

Units of 10^{-9} μCi/ml of Water

Date	^{32}P	^{46}Sc	^{51}Cr	^{60}Co	^{65}Zn	^{90}Sr	^{131}I	Alpha
Analytical Limit	6.0	30.	500	2.0		0.4	2.0	0.7
12/28/70-1/4/71	25.				*		*	
1/4/71-1/11/71	6.4				*		*	
1/11/71-1/18/71	27.				*		*	
1/18/71-1/25/71	12.				*		*	
1/25/71-2/1/71	12.						2.0	
2/1/71-2/8/71	*				*		*	
2/8/71-2/16/71		*		*	*			
2/16/71-2/22/71		*	*	*	*			
2/22/71-3/1/71		*	*	*	*			
3/1/7/-3/8/71		*	*	*	*			
3/8/71-3/15/71		*	*	*	*			
3/15/71-3/22/71		*	*	*	*			
3/22/71-3/29/71		*	*	*	*			
3/29/71-4/5/71		*	*	*	*			
4/5/71-4/12/71		*	*	*	*			
4/12/71-4/19/71		*	*	*	50.			
4/19/71-4/26/71		*	*	*	74.			
4/26/71-5/3/71		*	*	*	69.			
5/3/71-5/10/71		*	*	*	120			
5/10/71-5/17/71		*	*	*	190			
5/17/71-5/24/71		*	*	*	*			
5/24/71-6/1/71		*	*	*	*			
6/1/71-6/7/71		*	*	*	*			
6/7/71-6/14/71		*	640	*	*			
6/14/71-6/21/71		*	*	*	*			
6/21/71-6/28/71		*	*	*	*			
6/28/71-7/6/71		*	*	*	*			
7/6/71-7/12/71		*	*	*	*			
7/12/71-7/19/71		*	*	*	*			
7/19/71-7/26/71		38.	690	*	*			
7/26/71-8/2/71		*	*	*	*			
8/2/71-8/9/71		*	720	*	*			
8/9/71-8/16/71		*	*	*	*			
8/16/71-8/23/71		*	*	*	*			
8/23/71-8/30/71		*	*	*	*			
8/30/71-9/7/71		*	*	*	*			

APPENDIX B

TABLE 2 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN RICHLAND DRINKING WATER (CUMULATIVE SAMPLES)-1971

Units of 10^{-9} μCi/ml of Water

Date	^{32}P	^{46}Sc	^{51}Cr	^{60}Co	^{65}Zn	^{90}Sr	^{131}I	Alpha
Analytical Limit	6.0	30.	500	2.0	35.	0.4	2.0	0.7
9/7/71-9/13/71		*	*	11.	*			
9/13/71-9/20/71		*	*	*	*			
9/20/71-9/27/71		*	*	*	*			
9/27/71-10/4/71		*	*	*	*			
10/4/71-10/11/71		*	*	*	*			
10/11/71-10/18/71		*	*	*	*			
10/18/71-10/26/71		*	*	23.	*			
10/26/71-11/1/71		*	*	*	*			*
11/1/71-11/8/71		*	*	*	*			1.0
11/8/71-11/15/71		*	*	*	*			1.2
11/15/71-11/22/71		*	*	*	*	*		2.1
11/22/71-11/29/71		*	*	24.	*			2.2
11/29/71-12/6/71		*	*	*	*			1.4
12/6/71-12/13/71		*	*	21.	*			1.8
12/13/71-12/20/71		*	*	*	*			*
12/20/71-12/27/71		*	*	*	*	0.40		0.39
Annual Average		*4.1	110	1.8	12.			

* Results were less than the analytical limit.

No entry indicates no specific isotopic analysis was made.

APPENDIX B

TABLE 3

CONCENTRATIONS OF RADIONUCLIDES IN 300 AREA DRINKING WATER (CUMULATIVE SAMPLES) - 1971

Units of 10^{-9} μCi/ml of Water

Date	^{46}Sc	^{51}Cr	^{60}Co	^{65}Zn	^{131}I	^{137}Cs-^{137m}Ba	Alpha
Analytical Limit	30.	500	2.0	35.	2.0	18.	0.7
12/29/70-1/5/71	*			*	2.3		
1/5 -1/12	*			*	*		
1/12 -1/19	*			*	2.4		
1/19 -1/26	*			*	3.7		
1/26 -2/2	*			*	*		
2/2 -2/9	*			*	*		
2/9 -3/23	DISCONTINUED						
3/23 -3/30	*	*	*	*		*	
3/30 -4/6	*	*	*	*		*	
4/6 -4/13	*	*	*	*		*	
4/13 -4/20	46.	*	*	*		*	
4/20 -4/27	*	*	*	68.		*	
4/27 -5/4	*	*	*	50.		*	
5/4 -5/11	*	*	*	180		*	
5/11 -5/18	*	*	*			*	
5/18 -5/25	*	*	*			*	
5/25 -6/1	*	*	*	*		*	
6/1 -6/8	*	*	*	*		*	
6/8 -6/15	*	*	*	*		*	
6/15 -6/22	*	*	*	*		*	
6/22 -6/29	*	*	*	*		*	
10/12 -10/18	*	*	23.	*		*	
10/18 -10/25	*	*	*	47.		*	
10/25 -11/1	*	*	*	*		*	*
11/1 -11/8	*	*	*	*		*	1.1
11/8 -11/15	*	*	*	*		*	0.85
11/15 -11/22	*	*	*	*		*	1.9
11/22 -11/29	*	*	26.	*		*	1.2
11/29 -12/6	*	*	*	*		*	3.0
12/6 -12/13	*	*	22.	*		*	*
12/13 -12/20	*	*	*	*		*	0.88
12/20 -12/27	*	*	*	*		*	0.76
Annual Average	5.5	*52.	3.1	16.		*1.7	

* Indicates the results were less than the analytical limit.

APPENDIX B

TABLE 4

CONCENTRATIONS OF RADIONUCLIDES
IN 100-N DRINKING WATER
(CUMULATIVE SAMPLES)-1971

Units of 10^{-9} μCi/ml of Water

Date	^{131}I
Analytical Limit	2.0
12/28/70-1/4/71	2.2
1/4/71-1/11/71	*
1/11/71-1/18/71	3.6
1/18/71-1/25/71	4.5
1/25/71-2/1/71	2.6
2/1/71-2/8/71	*
Discontinued	

* Results were less than the analytical limit shown.

APPENDIX B

TABLE 5

BETA ACTIVITY IN DRINKING WATER
(GRAB SAMPLES)-1971

Units of counts/minute/milliliter of Water

Date	Beta
Analytical Limit	0.10
Richland	
1-11	*
1-20	1.3
1-25	0.98
2-1	*
2-9	*
300 Area	
1-4	*
1-11	1.8
1-18	1.8
1-25	1.1
2-1	*
2-8	*
2-16	*
2-22	*
100-N	
1-4	*
1-11	5.5
1-18	8.8
1-25	6.6
2-8	*
2-22	*
B-Y Phone	
1-5	*
5-20	*

* Results were less than the analytical limit.

APPENDIX B

TABLE 6

BETA ACTIVITY IN RICHLAND DRINKING WATER
(CUMULATIVE SAMPLES)-1971

Units of counts/minute/milliliter of Water

Date	c/m/mℓ	Date	c/m/mℓ
Analytical Limit	0.1	7/19-7/29	*
2/8-2/16	*	7/29-8/2	*
2/16-2/22	**	8/2-8/9	*
3/1-3/8	*	8/9-8/16	*
3/8-3/15	*	8/16-8/23	*
3/15-3/22	*	8/23-8/30	*
3/22-3/29	*	8/30-9/7	*
3/29-4/5	*	9/7-9/13	*
4/5-4/12	*	9/13-9/20	*
4/12-4/19	*	9/20-9/27	*
4/19-4/26	*	9/27-10/4	*
4/26-5/3	*	10/4-10/11	*
5/3-5/10	*	10/11-10/18	*
5/10-5/17	*	10/18-10/26	*
5/17-5/24	*	10/26-11/1	*
5/24-6/1	*	11/1-11/8	*
6/1-6/7	*	11/8-11/15	*
6/7-6/14	*	11/15-11/22	*
6/14-6/21	*	11/22-11/29	*
6/21-6/28	*	11/29-12/6	*
6/28-7/6	*	12/6-12/13	*
7/6-7/12	*	12/13-12/20	*
7/12-7/19	*	12/20-12/27	*
		Annual Average	0.016

* Results were less than the analytical limit.

APPENDIX B

TABLE 7

BETA ACTIVITY IN 100-N DRINKING WATER
(CUMULATIVE SAMPLES)-1971

Units of counts/minute/milliliter of Water

Date	c/m/mℓ	Date	c/m/mℓ
Analytical Limit	0.1	7/19-7/26	*
		7/26-8/2	*
2/8-2/16	*	8/2-8/9	*
2/16-2/22	*	8/9-8/16	*
2/22-3/1	*	8/16-8/23	*
3/9-3/15	*	8/30-9/7	*
3/15-3/22	*	9/7-9/13	*
3/22-3/29	*	9/13-9/20	*
3/29-4/5	*	9/20-9/27	*
4/5-4/12	*	9/27-10/4	*
4/12-4/19	*	10/4-10/11	*
4/19-4/26	*	10/11-10/18	*
4/26-5/3	*	10/18-10/25	*
5/3-5/10	*	10/25-11/1	*
5/10-5/17	*	11/1-11/8	*
5/17-5/24	*	11/8-11/15	*
5/24-6/1	*	11/15-11/22	*
6/1-6/7	*	11/22-11/29	*
6/14-6/21	*	11/29-12/6	*
6/21-6/28	*	12/6-12/13	*
6/28-7/6	*	12/13-12/20	*
7/12-7/19	*	12/20-12/27	*
		Annual Average	0.017

* Results were less than the analytical limit.

APPENDIX B

TABLE 8

BETA ACTIVITY IN 300 AREA DRINKING WATER
(CUMULATIVE SAMPLES)-1971

Units of counts/minute/milliliter of Water

Date	c/m/mℓ
Analytical Limit	0.1
2/9-2/16	*
2/16-2/23	*
2/23-3/2	*
3/2-3/9	*
3/9-3/16	*
3/16-3/23	*
3/23-3/30	*
3/30-4/6	*
4/6-4/13	*
4/13-4/20	*
4/20-4/27	*
4/27-5/4	*
5/4-5/11	*
5/11-5/18	*
5/18-5/25	*
5/25-6/1	*
6/1-6/8	*
6/8-6/15	*
6/15-6/22	*
6/22-6/29	*
10/11-10/18	*
10/18-10/25	*
10/25-11/1	*
11/1-11/8	*
11/8-11/15	*
11/15-11/22	*
11/22-11/29	*
11/29-12/6	*
12/6-12/13	*
12/13-12/20	*
12/20-12/27	*
Annual Average	*0.016

* Results were less than the analytical limit.

APPENDIX C

APPENDIX C

TABLE 1

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF WHITEFISH TAKEN FROM THE COLUMBIA RIVER-1971

Units of 10^{-6} μCi/gm (wet weight)

Date	^{24}Na	^{32}P	^{40}K	^{58}Co	^{60}Co	^{65}Zn	^{137}Cs-^{137m}Ba
Analytical Limit	12.	1.0	1.0	0.15	0.15	0.2	0.1
1/12	*	13.					
1/12		7.0					
1/20		11.					
1/20		18.					
1/20		11.					
1/12-1/20 Comp.	*		3.5	0.23	0.66	4.9	0.44
1/25		25.					
1/25		18.					
1/25		10.					
1/25		11.					
1/25		36.					
1/25 Comp.	*		4.3	0.15	0.64	5.6	0.38
2/1		20.					
2/1		22.					
2/2		8.4					
2/2		4.8					
2/1-2/2 Comp.	*		3.0	0.15	0.55	4.2	0.52
3/12 Comp.	*	1.1	2.8	*	0.67	3.5	0.40
4/13 Comp.	*		4.1	*	0.36	2.4	0.42
4/26 Comp.	*		3.5	*	0.16	1.9	0.22
5/14 Comp.	*		4.2	*	*	1.7	0.18
5/25 Comp.	*		3.1	*	*	1.8	0.25
6/14 Comp.	*		6.9	*	0.33	4.2	0.44
6/21 Comp.	*		3.2	*	0.21	1.9	0.25
7/13 Comp.	*		3.6	*	0.24	1.4	0.19
7/28 Comp.	*		4.2	*	*	0.70	0.14
8/10 Comp.	*		3.4	*	0.24	1.2	0.26
8/30 Comp.	*		4.2	*	0.29	1.4	0.43
9/9 Comp.	*		3.6	*	0.18	1.3	0.28
9/23 Comp.	*		4.2	*	0.25	1.2	0.31
10/8 Comp.	*		3.3	*	0.21	1.4	0.30
10/26 Comp.	*		3.3	*	0.28	1.3	0.35
11/4 Comp.	*		3.7	*	*	1.2	0.25
11/30 Comp.	*	*	3.8	*	*	0.92	0.21
Annual Average	*2.0	7.4	3.7	0.07	0.30	2.4	0.32

* Results were less than the analytical limit shown.

Composites consisting of equal weights from five fish were analyzed for gamma-emitting radionuclides.

No entry indicates no specific isotopic analysis was made.

APPENDIX C

TABLE 2

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF CRAPPIE TAKEN FROM THE COLUMBIA RIVER-1971

Units of 10^{-6} μCi/gm (wet weight)

Date	^{32}P	^{40}K	^{65}Zn	^{137}Cs-^{137m}Ba
Analytical Limit	1.0	1.0	0.2	0.1
ISLAND VIEW				
1/12	*			
1/12	*			
2/9 Comp.	*	2.3	0.78	*
BURBANK				
1/14	*			
2/2 Comp.	5.1	2.0	2.1	0.12
HOVER				
2/3	*	2.3	2.4	*

* Results were less than the analytical limit shown.

No entry indicates no specific isotopic analysis was made.

Composites consisting of equal weights from five fish were analyzed for gamma-emitting radionuclides.

APPENDIX C

TABLE 3

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF PERCH TAKEN FROM THE COLUMBIA RIVER-1971

Units of 10^{-6} μCi/gm (wet weight)

Pci/gm

Date	^{32}P	^{40}K	^{58}Co	^{60}Co	^{65}Zn	^{137}Cs-^{137m}Ba
Analytical Limit	1.0	1.0	0.15	0.15	0.2	0.1
ISLAND VIEW						
1/12	*					
1/12	*					
2/9	*	2.1	*	*	1.2	*
BURBANK						
1/14	*					
2/2	*	2.1	*	*	2.2	0.23
HOVER						
2/3	*	2.0	*	*	1.4	1.0

* Results were less than the analytical limit.

Composites consisting of equal weights from five fish were analyzed for gamma-emitting radionuclides.

No entry indicates no specific isotopic analysis was made.

APPENDIX C

TABLE 4

CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE LIVERS OF WATERFOWL SAMPLES IN THE HANFORD ENVIRONS-1971

Units of 10^{-6} μCi/gm (wet weight)

Date	Species	U	^{239}Pu	^{241}Am
Analytical Limit		0.016	0.05	0.02
U SWAMP				
2/23	Mallard		0.98	
6/17	Ruddy Duck		*	
8/13	Mallard		*	
10/19	Widgen		0.69	
Annual Average			0.42	
REDOX SWAMP				
6/17	Redhead		0.11	0.03
300 AREA POND				
9/17	Mallard	*	*	
12/30	Mallard	*	*	
Annual Average		*0.004	*0.004	
100 F TRENCH				
7/1	Blue Wing Teal		*	
10/21	Mallard		*	
Annual Average			*0.004	

* Results were less than the analytical limit shown.

No entry indicates no specific isotopic analysis was made.

APPENDIX C

TABLE 5

CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE MUSCLE OF WATERFOWL SAMPLES ALONG THE RIVER IN THE HANFORD ENVIRONS - 1971

Units of 10^{-6} μCi/gm (wet weight)

Date	Species	^{24}Na	^{32}P	^{40}K	^{65}Zn	^{137}Cs-^{137m}Ba
Analytical Limit		2.0	2.0	3.0	0.2	0.1
DUCKS						
Ringold (River)						
11/24	Gr. Wing Teal	*		*	0.23	*
11/29	Gr. Wing Teal	*		*	*	*
11/29	Gr. Wing Teal	*		*	*	*
11/29	Gr. Wing Teal	*		*	*	*
Annual Average				1.6	*	*0.03
White Bluffs (River)						
2/24	Mallard	*	8.0	*	*	*
100-D (River)						
11/18	Golden Eye	*		3.9	*	0.13
Savage Island						
1/19	Mallard	*	*			
1/19	Mallard	*	3.7			
1/19	Mallard Comp.	*		*	2.0	*
1/27	Mallard		*			
1/27	Mallard		5.1			
1/27	Mallard Comp.	*		*	1.4	*
11/18	Mallard	*		*	*	*
Annual Average			2.9	2.7	0.89	*0.03

* Results were less than the analytical limit shown.

No entry indicates no specific isotopic analysis was made.

APPENDIX C

TABLE 5 (Continued)

CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE MUSCLE OF WATERFOWL SAMPLES ALONG THE RIVER IN THE HANFORD ENVIRONS - 1971

Units of 10^{-6} μCi/gm (wet weight)

Date	Species	^{24}Na	^{32}P	^{40}K	^{58}Co	^{60}Co	^{65}Zn	^{137}Cs-^{137m}Ba
Analytical Limit		2.0	2.0	3.0	0.15	0.15	0.2	0.1
DUCKS								
Hanford (River)								
1/4	Mallard		*				*	
1/5	Mallard		2.1				1.2	
1/5	Mallard		7.9					
1/5	Mallard		6.0					
1/5	Mallard		*					
1/5	Mallard		4.4					
1/5	Mallard		5.8					
1/5	Mallard Comp	*		3.1	*	*	2.2	*
1/11	Mallard		*					
1/11	Mallard		*					
1/11	Mallard		*					
1/11	Mallard		*					
1/11	Mallard		*					
1/11	Mallard Comp	*		*	*	*	1.5	*
1/19	Mallard		6.0					
1/19	Mallard		*					
1/19	Mallard		8.3					
1/19	Mallard Comp	*		*	*	*	1.7	*
1/19	Ruddy Duck	52.0	170.0	8.6	0.31	0.34	15.0	*
3/2	Mallard		*	*	*	*	0.75	*
3/9	Golden Eye	2.1	60.0	*	0.52	0.65	12.0	*
3/9	Mallard	*	4.9	*	*	*	0.47	*
10/25	Mallard	*		*	*	*	*	*
10/25	Mallard	*		*	*	*	*	*
10/25	Mallard	*		*	*	*	*	*
10/25	Mallard	*		3.0	*	*	*	0.22
10/26	Mallard	*		*	*	*	*	*
11/15	Mallard	*		*	*	*	*	*
11/15	Mallard	*		*	*	*	*	*
11/16	Mallard	*		*	*	*	*	*
11/16	Mallard	*		*	*	*	*	*
11/16	Mallard	*		3.2	*	*	*	0.24
11/16	Mallard	*		4.1	*	*	*	*
11/16	Mallard	*		*	*	*	*	*
11/16	Mallard	*		*	*	*	*	*
11/16	Mallard	*		*	*	*	*	*
11/18	Mallard	*		*	*	*	*	*
11/18	Mallard	*		*	*	*	*	*
11/18	Mallard	*		3.4	*	*	*	*
11/18	Golden Eye	*		*	*	*	*	*

* Indicates the results were less than the analytical limit shown.
No entry indicates no specific isotopic analysis was made.

APPENDIX C

TABLE 5 (Continued)

CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE MUSCLE OF WATERFOWL SAMPLES ALONG THE RIVER IN THE HANFORD ENVIRONS - 1971

Units of 10^{-6} μCi/gm (wet weight)

Date	Species	^{24}Na	^{40}K	^{58}Co	^{60}Co	^{65}Zn	^{137}Cs-^{137m}Ba
Analytical Limit		2.0	3.0	0.15	0.15	0.2	0.1
Hanford (River)							
11/23	Mallard	*	3.1	*	*	*	*
11/23	Mallard	*	*	*	*	*	*
11/23	Mallard	*	*	*	*	*	*
11/23	Mallard	*	3.5	*	*	*	0.15
11/23	Mallard	*	*	*	*	*	*
11/23	Mallard	*	*	*	*	*	*
11/23	Mallard	*	*	*	*	*	*
11/23	Mallard	*	3.2	*	*	*	*
11/23	Mallard	*	*	*	*	*	*
11/23	Mallard	*	*	*	*	*	*
11/23	Mallard	*	*	*	*	*	*
11/23	Mallard	*	3.5	*	*	*	*
11/24	Mallard	*	3.2	*	*	0.34	*
11/29	Mallard	*	*	*	*	*	*
11/29	Mallard	*	3.0	*	*	*	*
11/29	Mallard	*	*	*	*	*	0.17
11/29	Mallard	*	*	*	*	*	*
12/1	Mallard	*	3.0	*	*	*	*
12/1	Mallard	*	3.0	*	*	*	*
12/1	Mallard	*	3.1	*	*	*	*
12/2	Mallard	*	*	*	*	*	*
12/2	Mallard	*	*	*	*	*	*
12/7	Mallard	*	*	*	*	0.26	0.15
12/7	Mallard	*	3.2	*	*	*	0.19
Annual Average		3.2	2.4	0.06	0.004	1.7	*0.04

* Indicates the results were less than the analytical limit shown. No entry indicates no specific isotopic analysis was made.

APPENDIX C

TABLE 5 (Continued)

CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE MUSCLE OF WATERFOWL SAMPLES ALONG THE RIVER IN THE HANFORD ENVIRONS - 1971

Units of 10^{-6} μCi/gm (wet weight)

Date	Species	^{24}Na	^{32}P	^{40}K	^{58}Co	^{60}Co	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba
Analytical Limit		2.0	2.0	3.0	0.15	0.15	0.2	0.002	0.1
DUCKS									
100-F (River)									
1/7	Mallard		110.0						
1/7	Mallard		120.0						
1/7	Mallard		59.0						
1/7	Mallard Comp	*		3.3	*	*	6.1		0.12
1/21	Mallard	*	*	3.0	*	*	1.2		*
1/22	Mallard		2.8						
1/22	Mallard		*						
1/22	Mallard		*						
1/22	Mallard	*	2.4	*	*	*	2.0		*
10/25	Mallard	*		3.0	*	*	0.22		*
10/25	Mallard	*		*	*	*	*		0.24
11/24	Mallard	*		**	*	*	*		*
11/29	Mallard	*		*	*	*	*		*
11/29	Mallard	*		*	*	*	*		*
11/29	Mallard	*		*	*	*	*		*
11/30	Mallard	*		*	*	*	*		*
11/30	Mallard	*		*	*	*	*		*
11/30	Mallard	*		*	*	*	*		*
11/30	Mallard	*		*	*	*	*		*
11/30	Mallard	*		*	*	*	*		*
11/30	Mallard	*		*	*	*	*		*
11/30	Mallard	*		*	*	*	0.20		*
12/1	Mallard	*		*	*	*	*		*
12/1	Mallard	*		*	*	*	*		*
12/2	Mallard	*		*	*	*	*		*
12/2	Mallard	*		3.1	*	*	*		*
12/2	Mallard	*		*	*	*	*		*
Annual Average		*		2.8			0.85		0.07

* Indicates the results were less than the analytical limit shown.
No entry indicates no specific isotopic analysis was made.

APPENDIX C

TABLE 5 (Continued)

CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE MUSCLE OF WATERFOWL SAMPLES ALONG THE RIVER IN THE HANFORD ENVIRONS - 1971

Units of 10^{-6} μCi/gm (wet weight)

Date	Species	^{24}Na	^{32}P	^{40}K	^{58}Co	^{60}Co	^{65}Zn	^{137}Cs-^{137m}Ba
Analytical Limit		2.0	2.0	3.0	0.15	0.15	0.2	0.1
GEESE								
100-F (River)								
11/12	Can. Honker	*		*	*	*	*	0.55
100-D (River)								
12/2	Can. Honker	*		*	*	*	*	*
Hanford (River)								
3/15	Can. Honker	*	*	*	*	*	1.3	*
11/17	Can. Honker	*		*	*	*	0.5	*
11/17	Can. Honker	*		*	*	*	0.5	*
Annual Average				*			0.9	*0.03
White Bluffs (River)								
1/21	Can. Honker		*					
1/21	Can. Honker		*					
1/21	Can. Honker Comp	*	*	*	*	*	0.9	*
Savage Island								
1/19	Lesser Can. Goose	*	*	*	*	*	0.24	*
100-N (River)								
2/5	Can. Honker		*					
2/5	Can. Honker		*					
2/5	Can. Honker Comp.	*		3.1	*	*	1.4	0.12
2/8	Can. Honker		*					
2/8	Can. Honker		*					
2/8	Can. Honker		*					
2/8	Can. Honker Comp.	*		*	*	*	0.52	*
11/19	Can. Honker	*		3.2	*	*	*	*
Annual Average			0.76	*1.6			0.55	*0.04

* Indicates the results were less than the analytical limit shown.

No entry indicates no specific isotopic analysis was made.

APPENDIX C

TABLE 6

CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE MUSCLE OF WATERFOWL SAMPLES FROM THE PONDS IN THE HANFORD ENVIRONS - 1971

Units of 10^{-6} μCi/gm (wet weight)

Date	Species	^{24}Na	^{40}K	^{58}Co	^{60}Co	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba
Analytical Limit		2.0	3.0	0.15	0.15	0.2	0.002	0.1
DUCKS								
U Swamp								
2/23	Mallard	*	*	*	*	*	0.01	130
6/17	Ruddy Duck	*	4.7	*	*	*	0.02	39.
8/13	Mallard	*	*	3.8	*	*	0.02	80.
10/19	Widgen	*	*	*	*	*	*	58.
Annual Average		*0.62	2.9	0.94	*	*	0.01	78.
Redox Swamp								
3/18	Pintail	*	*	*	*	*	0.006	28.
6/17	Redhead	*	4.7	*	*	*	0.002	62.
9/2	Ruddy Duck	*	3.0	*	*	*	0.01	5.9
12/3	Scaup	*	*	*	*	*	0.003	110
Annual Average		*	3.0	*	*	*0.12	0.005	51.
Gable Swamp								
1/29	Gadwall	*	*	*	*	0.63	*	11.
5/26	Mallard	*	4.3	*	*	*	0.003	14.
10/11	Coot	*	*	*	*	0.61	0.016	36.
12/3	Gadwall	*	5.6	*	*	*	*	75.
Annual Average		*	3.9	*	*	0.34	0.005	34.
B Swamp								
3/30	Gr. Wing Teal	*	*	*	*	*	0.01	*
6/18	Coot	*	6.1	*	*	*	0.14	13.
8/12	Coot	*	*	*	*	*	0.02	0.28
12/8	Gr. Wing Teal	*	5.2	*	*	*	0.005	7.2
Annual Average		*	3.7	*	*	*0.03	0.04	2.2

* Indicates the results were less than the analytical limit shown.

APPENDIX C

TABLE 6 (Continued)

CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE MUSCLE OF WATERFOWL SAMPLES FROM THE PONDS IN THE HANFORD ENVIRONS - 1971

Units of 10^{-6} μCi/gm (wet weight)

Date	Species	^{40}K	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba
Analytical Limit		3.0	0.2	0.002	0.1
300 Area Pond					
9/17	Mallard	3.2	*	*	*
12/30	Mallard	3.0	*	*	0.12
Annual Average		3.1	*0.04	0.001	*0.06
100-F Trench					
7/1	Blue Wing Teal	4.5	0.47	0.14	*
10/21	Mallard	3.2	0.25	0.08	0.19
Annual Average		3.9	0.36	0.11	0.17

* Indicates the results were less than the analytical limit shown.

APPENDIX C

TABLE 7

CONCENTRATIONS OF RADIONUCLIDES IN UPLAND GAME BIRD SAMPLES IN THE HANFORD ENVIRONS - 1971

Units of 10^{-6} μCi/gm (wet weight)

Date	Species	^{24}Na	^{40}K	^{58}Co	^{60}Co	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba
Analytical Limit		2.0	3.0	0.15	0.15	0.2	0.002	0.1
100-D								
12/1	Pheasant	*	*	*	*	*	0.008	0.10
12/2	Pheasant	*	*	*	*	*	*	*
12/2	Pheasant	*	*	*	*	*	0.002	*
12/2	Pheasant	*	*	*	*	*	0.004	*
12/2	Pheasant	*	*	*	*	*	0.003	*
12/2	Pheasant	*	*	*	*	0.23	0.005	*
12/7	Pheasant	*	*	*	*	*	0.004	0.12
12/7	Pheasant	*	*	*	*	0.35	*	0.12
Annual Average		*0.03	2.2	*0.006	*0.014	0.12	0.004	*0.06
White Bluffs								
11/30	Pheasant	*	2.5	*	*	*	0.013	*
11/30	Pheasant	*	2.3	*	*	*	*	*
12/1	Pheasant	*	2.7	*	*	*	0.009	*
12/8	Pheasant	*	3.7	*	*	0.24	0.009	*
12/13	Pheasant	*	2.6	*	*	*	*	*
12/30	Pheasant	*	2.2	*	*	*	*	*
Annual Average			2.6			*0.13	0.006	*0.05
Hanford								
11/30	Pheasant	*	3.5	*	*	*	0.005	0.13
12/7	Pheasant	*	2.9	*	*	*	*	0.12
Annual Average			3.2			*0.12	0.004	0.13

* Indicates the results were less than the analytical limit shown.

No entry indicates no specific isotopic analysis was made.

APPENDIX D

APPENDIX D

TABLE 1

CONCENTRATION OF RADIONUCLIDES IN OYSTERS FROM WILLAPA BAY, WASHINGTON-1971

Units of 10^{-6} μCi/gm (Wet Weight)

Date	^{32}P	^{40}K	^{65}Zn	^{137}Cs-^{137m}Ba
Analytical Limit	1.0	1.0	0.2	0.1
1-5	*	1.7	7.1	*
2-1	1.5	*	4.0	*
3-8		1.4	7.0	*
4-5		1.8	5.6	*
5-5		2.1	5.1	*
6-8		2.0	4.9	*
7-26		2.4	4.2	*
8 16		2.6	3.7	*
9-7		1.8	4.5	*
10-13		1.8	4.5	*
11-8		2.0	3.0	*
12-9		1.4	2.1	*
Annual Average		1.8	4.6	0.04

* Results were less than the analytical limit shown.

No entry indicates no specific isotopic analysis was made.

APPENDIX E

APPENDIX E

TABLE 1

CONCENTRATIONS OF ^{131}I IN THE AIR OF THE HANFORD ENVIRONS - 1971

Units of 10^{-12} μCi/ml of Air (Continuous Samples)

Approx. Wk. On Date	Ringold	Byers Landing	Richland	Eastern Quadrant: Pasco	Eastern Quadrant: Othello	Eastern Quadrant: Connell	Berg Ranch	Wahluke Watermaster	New Moon
1/6	0.08	*	*	*	*	0.10	*	*	*
1/13	0.08	*	*	*	*	0.10	*	*	*
1/20	*	*	*	*	*	0.11	*	*	*
1/27	*	0.12	*	*	*	0.11	*	*	*
2/3	*	0.12	*	*	0.19	0.10	*	*	*
2/10	*	*	*	*	0.19	0.10	*	*	*
2/17	*	*	*	*	*	*	*	*	*
2/24	*	*	*	*	*	*	*	*	*
3/3	*	*	*	*	0.07	0.07	*	*	*
3/10	*	*	*	*	0.07	0.07	*	*	*
3/17	*	*	*	*	*	*	*	*	*
3/24	*	0.12	*	*	*	*	*	*	*
3/31	*	0.12	*	*	0.09	0.15	*	*	*
4/7	*	0.12	0.13	0.13	0.09	0.15	*	*	*
4/14	0.13	0.12	0.13	0.13	0.14	*	0.19	0.11	0.11
4/21	0.13	0.15	0.20	0.28	0.14	*	0.19	0.11	0.11
4/28	0.12	0.15	0.20	0.28	0.16	0.68	0.16	0.20	0.17
5/5	0.12	0.14	0.12	0.09	0.16	0.68	0.16	0.20	0.17
5/12	*	0.14	0.12	0.09	*	*	*	*	*
5/19	*	*	*	*	*	*	*	*	*
5/26	*	*	*	*	*	*	*	*	*
6/2	*	*	0.34	*	*	*	*	*	*
6/9	0.12	*	*	*	*	*	*	*	0.07
6/16	*	*	*	*	*	*	*	*	0.07
6/23	*	*	*	*	*	*	*	*	*

As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated.

* Indicates the result was less than the analytical limit of 0.07×10^{-12} μCi/ml.

APPENDIX E

TABLE 1 (Continued)

CONCENTRATIONS OF ^{131}I IN THE AIR OF THE HANFORD ENVIRONS - 1971

Units of 10^{-12} μCi/ml of Air (Continuous Samples)

Approx. Wk. On Date	Eastern Quadrant								
	Ringold	Byers Landing	Richland	Pasco	Othello	Connell	Berg Ranch	Wahluke Watermaster	New Moon
6/30	*	*	*	*	*	*	*	*	*
7/7	*	*	*	*	*	*	*	*	*
7/14	*	*	*	*	*	*	*	*	*
7/21	*	*	*	*	0.15	*	*	*	*
7/28	*	*	*	*	0.15	*	*	*	*
8/4	*	*	*	*	*	*	*	*	*
8/11	*	*	0.13	*	*	*	*	*	*
8/18	*	*	0.13	*	*	*	*	*	*
8/25	*	*	*	*	*	*	*	*	*
9/1	*	*	*	*	*	*	*	*	*
9/8	*	*	*	*	*	*	*	*	*
9/15	*	*	*	*	*	*	*	*	*
9/22	*	*	*	*	*	*	*	*	*
9/29	*	*	*	*	*	*	*	*	*
10/6	*	*	*	*	*	*	*	*	*
10/13	*	*	*	*	*	*	*	*	*
10/20	*	*	*	*	*	*	*	*	*
10/27	*	*	*	*	*	*	*	*	*
11/3	*	*	*	*	*	*	*	*	*
11/10	*	*	*	*	*	*	*	*	*
11/17	*	*	*	*	*	*	*	*	*
11/24	*	*	*	*	*	*	*	*	*
12/1	*	*	*	*	*	*	*	*	*
12/8	*	*	*	*	*	*	*	*	*
12/15	*	*	*	*	*	*	*	*	*
12/22	*	*	*	*	*	*	*	*	*
Annual Average	0.02	0.03	0.04	0.03	0.03	0.06	0.02	0.01	0.02

As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated.

* Indicates the result was less than the analytical limit of 0.07×10^{-12} μCi/ml.

APPENDIX E

TABLE 2 (Part A)

CONCENTRATION OF RADIOACTIVE BETA PARTICULATES IN THE AIR OF THE HANFORD ENVIRONS - 1971

Units of 10^{-12} μCi/ml of Air (Continuous Samples)

Approx. Wk. On Date	Eastern Quadrant										
	Ringold	Byers Landing	Richland	Pasco	Kennewick	Eltopia	Othello	Connell	Berg Ranch	Wahluke W. M.	New Moon
1/6	0.14	0.06	0.06	0.06	0.08	0.10	0.07	0.07	0.09	0.11	0.08
1/13	0.14	0.06	0.07	0.06	0.08	0.10	0.07	0.07	0.09	0.11	0.08
1/20	0.14	0.06	0.07	0.06	0.08	0.13	0.14	0.13	0.13	0.14	0.11
1/27	0.14	0.19	0.18	0.18	0.19	0.13	0.14	0.13	0.13	0.14	0.11
2/3	0.22	0.19	0.18	0.18	0.19	0.17	0.18	0.19	0.24	0.17	0.14
2/10	0.22	0.17	0.17	0.19	0.14	0.17	0.18	0.19	0.24	0.17	0.14
2/17	0.16	0.17	0.17	0.19	0.14	0.17	0.13	0.16	0.14	0.18	0.12
2/24	0.16	0.14	0.13	0.17	0.24	0.17	0.13	0.16	0.14	0.18	0.12
3/3	0.25	0.14	0.13	0.17	0.24	0.34	0.24	0.31	0.27	0.29	0.23
3/10	0.25	0.31	0.43	0.32	0.43	0.34	0.24	0.31	0.27	0.29	0.23
3/17	0.49	0.31	0.43	0.32	0.43	0.42	0.33	0.37	0.42	0.31	0.33
3/24	0.49	0.37	0.25	0.36	0.42	0.42	0.33	0.37	0.42	0.31	0.33
3/31	0.46	0.37	0.25	0.36	0.42	0.62	0.44	0.52	0.44	0.63	0.39
4/7	0.46	0.55	0.57	0.68	0.42	0.62	0.44	0.52	0.44	0.63	0.39
4/14	0.65	0.55	0.57	0.68	0.42	0.65	0.70	0.70	0.73	0.53	0.56
4/21	0.65	0.97	0.99	0.98	0.85	0.65	0.70	0.70	0.73	0.53	0.56
4/28	1.3	0.97	0.99	0.98	0.85	1.1	1.0	1.3	1.2	1.0	**
5/5	1.3	0.99	1.0	1.0	0.83	1.1	1.0	1.3	1.2	1.0	**
5/12	0.65	0.99	1.0	1.0	0.83	0.60	0.67	0.75	0.63	0.57	0.22
5/19	0.65	0.75	0.75	0.78	0.68	0.60	0.67	0.75	0.63	0.57	0.22
5/26	0.77	0.75	0.75	0.78	0.68	0.63	0.74	0.75	0.87	0.78	0.74
6/2	0.77	0.45	0.83	0.86	0.85	0.63	0.74	0.75	0.87	0.78	0.74
6/9	0.70	0.45	0.83	0.86	0.85	0.72	0.80	0.96	0.75	0.79	0.77
6/16	0.70	1.1	1.2	0.96	0.90	0.72	0.80	0.96	0.75	0.79	0.77
6/23	0.77	1.1	1.2	0.96	0.90	0.67	0.69	0.80	0.81	0.81	0.64

As a result of sampling schedules the on-date for some locations may differ by a few days from the date indicated.

** Indicates invalid data.

APPENDIX E

TABLE 2 (Part A Continued)

CONCENTRATION OF RADIOACTIVE BETA PARTICULATES IN THE AIR OF THE HANFORD ENVIRONS - 1971

Approx. Wk. On Date	Ringold	Byers Landing	Eastern Quadrant Richland	Pasco	Kennewick	Eltopia	Othello	Connell	Berg Ranch	Wahluke W. M.	New Moon
6/30	0.77	0.68	0.72	0.71	0.66	0.67	0.69	0.80	0.81	0.81	0.64
7/7	0.34	0.68	0.72	0.71	0.66	0.89	0.93	1.0	1.0	0.93	0.89
7/14	0.34	1.1	1.1	1.2	0.86	0.89	0.93	1.0	1.0	0.93	0.89
7/21	0.92	1.1	1.1	1.2	0.86	1.0	0.80	0.90	0.96	**	0.67
7/28	0.92	0.67	0.79	0.73	0.56	1.0	0.80	0.90	0.96	**	0.67
8/4	0.54	0.67	0.79	0.73	0.56	0.39	0.51	0.49	0.59	0.50	0.41
8/11	0.54	0.47	0.31	0.45	0.44	0.39	0.51	0.49	0.59	0.50	0.41
8/18	0.35	0.47	0.31	0.45	0.44	0.37	0.41	0.74	0.37	**	0.36
8/25	0.35	0.30	0.24	0.26	0.24	0.37	0.41	0.74	0.37	**	0.36
9/1	0.21	0.30	0.24	0.26	0.24	0.16	0.21	0.31	0.22	**	0.18
9/8	0.21	0.20	0.21	0.19	0.29	0.16	0.21	0.31	0.22	**	0.18
9/15	0.14	0.20	0.21	0.19	0.29	0.12	0.14	0.14	0.16	0.03	0.13
9/22	0.14	0.12	0.12	0.11	0.12	0.12	0.14	0.14	0.16	0.03	0.13
9/29	0.10	0.12	0.12	0.11	0.12	0.12	0.14	0.14	0.16	0.13	0.14
10/6	0.10	0.13	0.13	0.13	0.10	0.12	0.14	0.14	0.16	0.13	0.14
10/13	0.33	0.13	0.13	0.13	0.10	0.22	0.08	0.09	0.40	0.22	0.09
10/20	0.33	0.09	0.09	0.10	**	0.22	0.08	0.09	0.40	0.22	0.09
10/27	0.11	0.09	0.09	0.10	**	0.10	0.12	0.12	0.12	0.09	0.13
11/3	0.11	**	0.12	0.12	0.08	0.10	0.12	0.12	0.12	0.09	0.13
11/10	**	**	0.12	0.12	0.08	0.07	0.08	0.07	0.10	**	0.09
11/17	**	0.09	0.09	0.08	0.10	0.07	0.08	0.07	0.10	**	0.09
11/24	0.11	0.09	0.09	0.08	0.10	0.12	0.11	0.12	0.12	0.10	0.09
12/1	0.11	0.09	0.13	0.11	0.02	0.12	0.11	0.12	0.12	0.10	0.09
12/8	0.04	0.09	0.13	0.11	0.02	0.04	0.05	0.03	0.06	0.05	0.03
12/15	0.04	0.06	0.07	0.05	0.08	0.04	0.05	0.03	0.06	0.05	0.03
12/22	0.16	0.06	0.07	0.05	0.08	0.05	0.11	0.09	0.11	0.11	0.08
Annual Average	0.39	0.39	0.42	0.42	0.38	0.39	0.38	0.44	0.44	0.38	0.30

As a result of sampling schedules the on-date for some locations may differ by a few days from the date indicated.

** Indicates invalid data.

APPENDIX E

TABLE 2 (Part B)

CONCENTRATION OF RADIOACTIVE BETA PARTICULATES IN THE AIR OF THE HANFORD ENVIRONS - 1971

Units of 10^{-12} μCi/ml of Air (Continuous Samples)

	Perimeter Communities					
Date	Moses Lake	Washtucna	Walla Walla	McNary Dam	Ellensburg	Sunnyside
1/8	0.07	0.06	*	0.07	0.10	0.07
1/15	0.07	0.05	0.06	0.12	0.10	0.07
1/22	0.07	0.05	0.06	0.12		0.11
1/29	0.07	0.21	0.15	0.27		0.11
2/5	0.15	0.21	0.15	0.27	0.10	0.10
2/12	0.15	0.21	0.17	0.11	0.10	0.10
2/19	0.12	0.16	0.17	0.11	0.26	0.15
2/26	0.12	0.16	0.07	0.27	0.14	0.15
3/5	0.24	0.36	0.07	0.27	0.14	0.24
3/12	0.24	0.36	0.23	0.25	0.14	0.24
3/19	0.37	0.32	0.23	0.25	0.50	0.31
3/26	0.37	0.32	0.23	0.44	0.25	0.31
4/2	0.47	0.58	0.23	0.44	0.25	0.27
4/9	0.47	0.58	0.59	0.63	0.44	0.27
4/16	0.68	0.81	0.59	0.63	0.44	0.53
4/23	0.68	0.81	0.72	0.95	0.61	0.53
4/30	0.97	0.73	0.72	0.95	1.1	0.82
5/7	0.97	0.73	0.73	1.0	1.1	0.82
5/14	0.64	0.78	0.73	1.0	0.53	0.60
5/21	0.64	0.78	0.56	0.63	0.53	0.60
5/28	0.68	0.78	0.56	0.63	0.61	0.69
6/4	0.68	0.69	0.71	1.0	0.61	0.69
6/11	0.82	0.69	0.71	1.0	0.61	1.0
6/18	0.82	0.99	0.62	0.83	0.73	1.0
6/25	0.63	0.99	0.62	0.83	0.57	0.71
7/2	0.63	0.30	1.0	0.83	0.57	0.71
7/9	0.85	0.30	1.0	0.83	0.61	0.77
7/16	0.85	1.1	0.72	1.0	0.61	0.77
7/23	0.79	1.1	0.72	1.0	0.61	0.77
7/30	0.79	0.50	0.67	0.59	0.42	0.77
8/6	0.38	0.50	0.67	0.59	0.42	0.48
8/13	0.38	0.41	0.33	0.39	0.29	0.48
8/20		0.41	0.33	0.39	0.29	0.34
8/27		0.20	0.29	0.22	0.21	0.34

As a result of sampling schedules the on-date for some locations may differ by a few days from the date indicated.

No entry indicates no specific isotopic analysis was made.

APPENDIX E

TABLE 2 (Part B Continued)

CONCENTRATION OF RADIOACTIVE BETA PARTICULATES IN THE AIR OF THE HANFORD ENVIRONS - 1971

Units of 10^{-12} μCi/ml of Air (Continuous Samples)

Perimeter Communities

Date	Moses Lake	Washtucna	Walla Walla	McNary Dam	Ellensburg	Sunnyside
9/3	0.18	0.20	0.29	0.22	0.21	0.15
9/10	0.18	0.20	0.20	0.18	0.12	0.15
9/17	1.3	0.12	0.20	0.18	0.12	0.09
9/24	1.3	0.12	0.14	0.12		0.09
10/1	1.4	0.12	0.14	0.12		0.12
10/8	1.4	0.12	0.14	0.11	0.08	0.12
10/15	0.08	0.08	0.14	0.11	0.08	0.08
10/22	0.08	0.08	0.13	**	0.08	0.08
10/29	0.09	0.12	0.13	**	0.07	0.10
11/5	0.09	0.12	0.14	0.12	0.07	0.10
11/12	0.09	0.13	0.14	0.12	0.07	0.07
11/19	0.09	0.13	0.18	0.10	0.07	0.07
11/26	0.09	0.10	0.18	0.10	0.04	0.07
12/3	0.12	0.10	0.07	0.08	0.04	0.07
12/10	0.06	0.04	0.07	0.08	0.04	0.05
12/17	0.06	0.04	0.09	0.10	0.04	0.05
12/24	0.06		0.09	0.10	0.06	0.09
Annual Average	0.40	0.37	0.35	0.41	0.31	0.34

As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated.

** Indicates invalid data.

No entry indicates no specific isotopic analysis was made.

APPENDIX E

TABLE 3 (Part A)

CONCENTRATIONS OF RADIOACTIVE ALPHA PARTICULATES IN THE AIR OF THE HANFORD ENVIRONS - 1971

Units of 10^{-12} μCi/ml of Air (Continuous Samples)

Eastern Quadrant

Approx. Wk. On Date	Ringold	Byers Landing	Richland	Pasco	Othello	Berg Ranch	New Moon
1/6	0.01	0.006	0.006	0.005		0.005	
1/13	0.01	0.01	0.005	0.01		0.005	
1/20	0.01	0.01	0.005	0.01	0.002	0.007	0.002
1/27	0.01	0.01	0.01	0.02	0.002	0.007	0.002
2/3	0.02	0.01	0.01	0.02	0.001	0.02	0.002
2/10	0.02	0.006	0.007	0.007	0.001	0.02	0.002
2/17		0.006	0.007	0.007		0.002	
2/24		0.002	0.002	0.001		0.002	
3/3	0.001	0.002	0.002	0.001	0.001	0.002	
3/10	0.001	0.001	0.001	0.001	0.001	0.002	
3/17	0.001	0.001	0.001	0.001	0.001	0.002	0.002
3/24	0.001	0.001	0.001	0.002	0.001	0.002	0.002
3/31	0.002	0.001	0.001	0.002	0.001	0.001	0.002
4/7	0.002	0.001	0.002	0.001	0.001	0.001	0.002
4/14	0.002	0.001	0.002	0.001	0.001	0.001	0.002
4/21	0.002	0.002	0.002	0.002	0.001	0.001	0.002
4/28	0.002	0.002	0.002	0.002	0.001	0.002	*
5/5	0.002	0.002	0.002	0.001	0.001	0.002	*
5/12	0.001	0.002	0.002	0.001	0.001	0.001	*
5/19	0.001	*	0.001	0.001	0.001	0.001	*
5/26	0.001	*	0.001	0.001	*	0.001	*
6/2	0.001	*	0.001	0.001	*	0.001	*
6/9	0.001	*	0.001	0.001	0.001	0.001	0.002
6/16	0.001	0.002	0.002	0.002	0.001	0.001	0.002
6/23	*	0.002	0.002	0.002	0.001	0.001	0.001

As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated.

* Indicates the result was less than the analytical limit of 0.001×10^{-12} μCi/ml.

No entry indicates no specific isotopic analysis was made.

APPENDIX E

TABLE 3 (Part A Continued)

CONCENTRATIONS OF RADIOACTIVE ALPHA PARTICULATES IN THE AIR OF THE HANFORD ENVIRONS - 1971

Units of 10^{-12} μCi/ml of Air (Continuous Samples)

Eastern Quadrant

Approx. Wk. On Date	Ringold	Byers Landing	Richland	Pasco	Othello	Berg Ranch	New Moon
6/30	*	*	0.001	0.001	0.001	0.001	0.001
7/7	*	*	0.001	0.001	0.001	0.002	*
7/14	*	0.001	0.001	0.002	0.001	0.002	*
7/21	0.002	0.001	0.001	0.002	0.001	0.002	*
7/28	0.002	0.002	0.001	0.002	0.001	0.002	*
8/4	0.002	0.002	0.001	0.002	*	0.002	0.002
8/11	0.002	0.001	*	0.001	*	0.002	0.002
8/18	0.002	0.001	*	0.001	0.003	0.001	0.001
8/25	0.002	0.002	0.002	0.002	0.003	0.001	0.001
9/1	0.001	0.002	0.002	0.002	0.001	0.001	0.001
9/8	0.001	0.002	*	0.002	0.001	0.001	0.001
9/15	0.001	0.002	*	0.002	0.001	0.002	0.001
9/22	0.001	0.001	0.001	0.001	0.001	0.002	0.001
9/29	*	0.001	0.001	0.001	*	0.002	0.001
10/6	*	0.001	0.001	0.002	*	0.002	0.001
10/13	0.002	0.001	0.001	0.002	0.001	0.003	0.001
10/20	0.002	0.002	0.002	0.002	0.001	0.003	0.001
10/27	0.002	0.002	0.002	0.002	0.001	0.002	
11/3	0.002	**	0.002	0.002	0.001	0.002	
11/10	0.002	**	0.002	0.002	*	0.002	
11/17	0.002	*	0.002	*	*	0.002	
11/24	0.001	*	0.002	*	0.003	0.001	
12/1	0.001	0.002	0.001	0.001	0.003	0.001	
12/8	0.002	0.002	0.001	0.001	*	*	
12/15	0.002	*	0.002	*	*	*	
12/22	0.003	*	0.002	*	0.001	0.004	
Annual Average	0.003	0.002	0.001	0.003	0.001	0.002	0.001

As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated.

Indicates the result was less than the analytical limit of 0.001×10^{-12} μCi/ml.

Indicates the results were invalid.

No entry indicates no specific isotopic analysis was made.

APPENDIX E

TABLE 3 (Part B)

CONCENTRATIONS OF RADIOACTIVE ALPHA PARTICULATES IN THE AIR OF THE HANFORD ENVIRONS - 1971

Units of 10^{-12} μCi/ml of Air (Continuous Samples)

Perimeter Communities

Approx. Wk. On Date	Walla Walla	McNary Dam	Approx. Wk. On Date	Walla Walla	McNary Dam
1/29	0.001		7/16	*	0.001
2/5	0.001		7/23	*	0.001
2/12			7/30	0.002	0.002
2/19			8/7	0.002	0.002
2/26			8/13	*	0.001
3/5			8/20	*	0.001
3/12	*		8/27	0.003	0.002
3/19	*		9/3	0.003	0.002
3/26	*		9/10	0.001	0.001
4/2	*		9/17	0.001	0.001
4/9	*	0.002	9/24	0.001	0.001
4/16	*	0.002	10/1	0.001	0.001
4/23	0.002	0.002	10/8	0.002	0.002
4/30	0.002	0.002	10/15	0.002	0.002
5/7	*	0.002	10/22	0.002	*
5/14	*	0.002	10/29	0.002	*
5/21	*	0.002	11/5	0.001	0.001
5/28	*	0.002	11/12	0.001	0.001
6/4	0.001	*	11/19	*	0.002
6/11	0.001	*	11/26	*	0.002
6/18	*	0.001	12/3	*	0.002
6/25	*	0.001	12/10	*	0.002
7/1	0.001	0.003	12/17	*	*
7/8	0.001	0.003	12/24	*	*
			Annual Average	0.001	0.002

As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated.

* Indicates the result was less than the analytical limit of 0.001×10^{-12} μCi/ml.

No entry indicates no specific isotopic analysis was made.

APPENDIX E

TABLE 4

CONCENTRATIONS OF GAMMA-EMITTING RADIONUCLIDES ON SELECTED AIR FILTER COMPOSITES - 1971

Units of 10^{-12} μCi/ml of Air (Continuous Samples)

Date	^{65}Zn	^{90}Sr	$^{95}ZrNb$	^{103}Ru	$^{106}Ru-Rh$	^{134}Cs	$^{137}Cs-^{137m}Ba$	$^{140}BaLa$	^{141}Ce	$^{144}Ce-Pr$	^{239}Pu
Inner Northeast Quadrant											
1/22	*		0.01	*	0.06	*	*	*	*	0.02	
2/19	*		0.03	*	0.10	*	0.001	*	*	0.04	
3/31	*	0.002	0.06	*	0.20	*	*	*	*	0.07	0.000009
4/30	*		0.20	*	0.32	*	*	*	*	0.19	
5/28	*		0.30	0.04	0.11	*	*	0.03	0.03	0.20	
6/25	*	0.005	0.29	*	0.64	*	0.005	*	*	0.32	0.0002
7/23	*		0.29	*	0.64	0.007	0.01	*	*	0.39	
8/20	*		0.18	*	0.51	*	0.007	*	*	0.30	
9/30	*	0.004	0.04	*	0.28	*	0.004	*	*	0.10	0.00003
10/29	*		0.01	*	0.17	*	*	*	*	0.03	
11/24	*		0.01	*	0.12	*	*	*	*	0.02	
12/22	*	0.0009	0.001	*	*	*	*	*	*	*	0.000005
Annual Average	*	0.003	0.12	*0.004	0.27	*0.002	0.002	*0.008	*0.002	0.14	0.00006
Inner Southeast Quadrant											
1/29	*		0.006	*	0.03	*	0.002	0.04	*	*	
2/26	*		0.03	*	0.12	*	0.003	*	*	0.04	
3/31	*	0.002	0.09	*	0.43	*	0.008	*	*	0.10	0.0000009
4/28	*		0.17	*	0.27	*	*	*	*	0.19	
5/26	*		0.39	0.06	0.16	*	*	*	0.08	*	
6/28	*	0.006	0.28	*	0.64	*	0.007	*	*	0.32	0.0002
7/30	*		0.28	*	0.66	0.009	0.014	*	*	0.41	
8/27	*		0.14	*	0.42	*	0.007	*	*	0.24	
9/29	*	0.003	0.04	*	0.25	*	0.005	*	*	0.08	0.00003
10/27	*		0.01	*	0.16	*	*	*	*	0.03	
11/29	*		0.007	*	0.10	*	0.003	*	*	*	
12/28	*	0.002	0.002	*	0.13	*	*	*	*	*	0.00003
Annual Average	*	0.003	0.12	*0.005	0.28	*0.002	0.004	*0.0006	*0.007	0.12	0.00006

* Indicates the result was less than the analytical limit.
No entry indicates no specific isotopic analysis was made.

APPENDIX E

TABLE 4 (Continued)

CONCENTRATIONS OF GAMMA-EMITTING RADIONUCLIDES ON SELECTED AIR FILTER COMPOSITES - 1971

Units of 10^{-12} μCi/ml of Air (Continuous Samples)

Date	^{65}Zn	^{90}Sr	$^{95}ZrNb$	^{103}Ru	$^{106}Ru-Rh$	^{134}Cs	$^{137}Cs-^{137m}Ba$	$^{140}BaLa$	^{141}Ce	$^{144}Ce-Pr$	^{239}Pu
Outer Northeast Quadrant											
1/22	*		*	*	0.10	*	0.004	0.16	*	*	
2/19	*		0.03	*	0.07	*	*	*	*	*	
3/19	*	0.0002	0.12	*	0.57	*	0.02	*	*	0.14	0.00003
4/19	*		0.17	*	0.26	*	*	*	*	0.19	
5/28	*		0.31	0.04	0.14	*	*	*	0.06	*	
6/29	*	0.003	0.27	*	0.67	*	*	*	*	0.30	0.0001
7/29	*		0.28	*	0.68	*	0.02	*	*	0.41	
8/27	*		0.13	*	0.36	*	0.008	0.11	*	0.24	
9/17	*	0.003	0.05	*	0.26	*	*	*	*	0.14	0.0001
10/15	*		0.01	*	0.18	*	*	*	*	*	
11/26	*		0.006	*	0.08	*	*	*	*	*	
12/27	*	*	*	*	0.11	*	*	*	*	*	0.00002
Annual Average	*	0.002	0.11	*0.004	0.29	*0.003	0.005	0.01	*0.004	0.12	0.00006
Outer Southeast Quadrant											
1/29	*		0.008	*	0.04	*	*	*	*	*	
2/26	*		0.03	*	0.15	*	*	*	*	*	
3/26	*	0.002	0.10	*	0.48	*	0.02	*	*	0.11	0.00002
4/23	*		0.16	*	0.26	*	*	*	*	0.17	
5/21	*		0.36	0.06	0.16	*	*	*	0.09	*	
6/18	*	0.005	0.24	*	0.47	*	0.01	*	*	0.27	0.0001
7/30	*		0.26	*	0.67	0.01	0.01	*	*	0.39	
8/27	*		0.12	*	0.34	*	0.009	0.18	*	0.22	
9/24	*	0.003	0.04	*	0.28	*	0.004	*	*	0.10	0.00004
10/22	*		0.009	*	0.21	*	*	*	*	*	
11/19	*		0.008	*	0.11	*	*	*	*	*	
12/28	*	0.0009	0.003	*	0.12	*	*	*	*	*	0.000005
Annual Average	*	0.003	0.11	*0.005	0.27	*0.002	0.005	*0.01	*0.008	0.10	0.00004

* Indicates the result was less than the analytical limit.
No entry indicates no specific isotopic analysis was made.

APPENDIX E

TABLE 4 (Continued)

CONCENTRATIONS OF GAMMA-EMITTING RADIONUCLIDES ON SELECTED AIR FILTER COMPOSITES - 1971

Units of 10^{-12} μCi/ml of Air (Continuous Samples)

Date	^{60}Co	^{90}Sr	$^{95}ZrNb$	^{103}Ru	$^{106}Ru-Rh$	^{134}Cs	$^{137}Cs-^{137m}Ba$	$^{140}BaLa$	^{141}Ce	$^{144}Ce-Pr$	^{239}Pu
Outer Western Quadrant											
1/18	*		0.002	*	*	*	*	*	*	*	
2/19	*		0.02	*	*	*	*	*	*	*	
3/29	*	0.0009	0.04	*	0.12	*	*	*	*	0.04	0.00002
4/26	*		0.12	*	0.21	*	*	*	*	0.13	
5/28	*		0.31	0.05	0.14	*	*	*	0.06	*	
6/25	*	0.005	0.24	*	0.54	*	0.005	*	*	0.26	0.00006
7/19	*		0.21	*	0.47	*	0.02	*	*	0.32	
8/24	*		0.16	*	0.36	*	0.006	*	*	0.24	
9/27	*	0.002	0.04	*	0.25	*	0.008	*	*	0.12	0.00003
10/26	*		0.01	*	0.13	*	*	*	*	*	
11/22	*		0.005	*	0.07	*	*	*	*	*	
12/27	*	*	0.003	*	*	*	*	*	*	*	0.000006
Annual Average	*0.0002	0.002	0.10	*0.004	0.20	*0.002	0.002	*0.03	*0.005	0.10	0.00003

* Indicates the result was less than the analytical limit.

No entry indicates no specific isotopic analysis was made.

APPENDIX F

APPENDIX F

TABLE 1

CONCENTRATIONS OF RADIONUCLIDES IN MILK - 1971

Units of 10^{-9} μCi/ml of Milk

Date	^{32}P	^{40}K	^{65}Zn	^{89}Sr	^{90}Sr	^{131}I	^{137}Cs-^{137m}Ba
Analytical Limit	20	400	50	2	2	2	30
Riverview Irrigation District - Farm No. 1							
1/4	23.	1300	66.			*	*
1/11	28.	1200	60.			*	*
1/18	31.	960	*	*	3.4	*	*
1/25	52.	1100	*			*	*
2/1	100	1200	30.			*	*
2/8	74.	1000	*			*	*
2/17		1400	77.			*	*
2/22		1400	100			*	*
3/1		900	*			*	*
3/8		970	*			*	*
3/15		1200	*			*	*
3/22		1200	45.			*	*
3/29		1100	*			*	*
4/5		1100	*			*	*
4/19		1100	*	*	2.7		*
5/3		1400	94.				*
5/17		1200	220				*
6/1		930	*				*
6/14		690	*				*
6/28		500	*				*
7/12		750	*	2.7	2.5		*
7/26[a]	*	1000	71.		5.2		*
7/26		580	*				*
8/9		1500	*				*
8/23[a]	*	1300	71.				*
8/23		1200	*				*
9/7		1100	*				*
9/20[a]	24.	1300	69.				*
9/20		1200	66.				*
10/4		1200	*	2.4	*	*	*
10/18		1300	*			*	*
10/25[a]	36.	1400	77.		*		*
11/1		1100	*			*	*
11/15		1200	*			2.3	*
11/29		1500	*			*	*
12/13		1100	*			*	*
12/27		1100	*			*	*
Annual Average		1100	41.	1.6	2.6	1.0	13.

* Indicates the results were less than the analytical limit shown.

(a) Four samples were taken from another Riverview farm using sprinkler irrigation.

No entry indicates no specific isotopic analysis was made.

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK - 1971

Units of 10^{-9} μCi/ml of Milk

Date	^{32}P	^{40}K	^{65}Zn	^{90}Sr	^{131}I	^{137}Cs-^{137m}Ba
Analytical Limit	20	400	50	2	2	30
Benton City Farm No. 2						
1/7		1000	*		4.3	*
1/21		850	*		4.6	*
2/4		1000	*		*	*
2/18		1300	61.		*	*
3/4		920	*	2.8	*	*
3/18		800	*		*	*
4/1		900	*		*	*
4/15		1300	*		*	*
4/29		1200	*		*	*
5/13		1300	170		*	*
5/27		700	*		*	*
6/10		680	*	2.5	*	*
6/24		680	*		*	*
7/8		720	*		*	*
7/22		720	*		*	*
8/5		1200	*		*	*
8/19		1200	*		2.1	*
9/2		1500	*	3.3	*	*
9/16		1100	*		*	*
9/30		1200	*		*	*
10/14		1100	*		*	36.
10/28		1100	*		*	*
11/11		1300	79.		*	40.
11/22		1100	*		*	*
12/9		990	*	*	*	*
12/20		1200	*		*	*
Annual Average		1000	21.	2.2	1.2	16.

* Indicates the results were less than the analytical limit. No entry indicates no specific isotopic analysis was made.

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK - 1971

Units of 10^{-9} μCi/ml of Milk

Date	^{40}K	^{65}Zn	^{131}I	^{137}Cs-^{137m}Ba
Analytical Limit	400	50	2	30
West Richland-Benton City Composite				
1/14	950	*	*	*
1/28	830	*	*	*
2/11	900	*	*	*
2/25	960	*	*	*
3/11	1200	*	*	*
3/25	1000	*	*	*
4/8	1200	*	*	*
4/22	1200	*	*	*
5/6	1400	210	*	39.
5/20	1800	*	*	*
6/3	860	*	*	*
6/17	820	*	*	*
7/1	950	*	*	*
7/15	780	*	*	*
7/29	1200	*	*	*
8/12	1100	*	*	*
8/26	1600	69.	3.8	36.
9/7	1400	*	*	*
9/23	1200	*	*	31.
10/7	1100	*	*	*
10/21	860	*	*	*
11/4	1100	*	*	*
11/18	800	*	*	*
12/2	1300	63.	25.	*
12/16	950	*	*	*
12/27	1200	*	*	*
Annual Average	1700	23.	1.4	15.

* Indicates the results were less than the analytical limit.

No entry indicates no specific isotopic analysis was made.

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK - 1971

Units of 10^{-9} μCi/ml of Milk

Date	^{32}P	^{40}K	^{65}Zn	^{90}Sr	^{131}I	^{137}Cs-^{137m}Ba
Analytical Limit	20	400	50	2	2	30
Columbia Basin Composite No. 2						
1/14	47.	1100	*		*	*
1/28	*	1200	68.		*	*
2/11	70.	1200	*	*	*	*
2/25		1000	*		*	*
3/11		1100	*		*	*
3/25		1200	*		*	*
4/8		1400	*		*	*
4/22		1400	*		*	*
5/6		1500	200	*	*	*
5/20		1700	*		*	*
6/3		770	*		*	*
6/17		730	*		*	*
7/1	Discontinued	970	*		*	33.
7/15		810	*		*	*
7/29		1600	*		3.3	*
8/12		1100	*	*	*	*
8/26		1300	*		*	*
9/9		1300	*		*	32.
9/23		1200	*		*	*
10/7		1400	62.		*	*
10/21		1600	60.		2.5	50.
11/4		1200	*	*	*	*
11/18		1200	*		*	*
12/2		1200	*		*	*
12/16		1300	*		*	*
12/27		1100	*		*	*
Annual Average		1200	23.	1.6	0.67	18.

* Indicates the results were less than the analytical limit.
No entry indicates no specific isotopic analysis was made.

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK - 1971

Units of 10^{-9} μCi/ml of Milk

Date	^{40}K	^{65}Zn	^{131}I	^{137}Cs-^{137m}Ba
Analytical Limit	400	50	2	30
Columbia Basin Composite No. 3				
1/7	1300	61.	*	*
1/21	830	*	*	*
2/4	1300	*	*	*
2/18	1000	*	*	*
3/4	1000	*	*	*
3/18	1000	*	*	*
4/1	1200	*	*	*
4/15	1300	*	*	*
4/29	1200	*	*	*
5/13	1600	170	*	*
5/27	840	*	*	*
6/10	1200	*	*	*
6/24	960	*	*	*
7/8	940	*	*	*
7/22	830	*	*	35.
8/5	1440	*	*	*
8/19	1600	*	*	*
9/2	1400	*	*	*
9/16	1200	*	*	*
9/30	1400	*	2.8	*
10/14	1500	120	*	81.
10/28	1200	*	*	*
11/11	1900	100	*	45.
11/22	1000	*	2.2	*
12/9	1100	*	*	*
12/20	1200	*	*	42.
Annual Average	1200	26.	0.8	17.

* Indicates the results were less than the analytical limit. No entry indicates no specific isotopic analysis was made.

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK - 1971

Units of 10^{-9} μCi/ml in Milk

Date	^{40}K	^{65}Zn	^{90}Sr	^{131}I	^{137}Cs-^{137m}Ba
Analytical Limit	400	50	2	2	30
Brand H					
1/7	1100	*		*	*
2/4	1000	*	3.9	*	*
3/4	920	*			*
4/1	1100	*			*
5/13	1200	170	4.8	*	*
6/10	1200	*		*	33.
7/8	960	*		*	50.
8/5	1400	*	6.5	*	30.
9/2	1400	*		*	45.
9/30	1300	*		*	*
11/11	1500	*	5.6	*	36.
12/9	1000	*		*	*
Annual Average	1200	28.	5.2	0.8	26.

* Indicates the results were less than the analytical limit. No entry indicates no specific isotopic analysis was made.

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK - 1971

Units of 10^{-9} μCi/ml in Milk

Date	^{90}Sr	^{131}I
Analytical Limit	2	2
Commercial Composite		
1/7		2.2
1/21		*
2/4		*
4/1		*
4/15		*
5/13		*
5/27		*
6/10	*	*
6/24		3.1
7/8		*
7/22		*
8/5		*
8/19		*
9/2	3.6	*
9/16		*
9/30		*
10/14		*
11/11		*
11/22		2.1
12/9		*
12/20		*
Annual Average	2.1	1.0

* Indicates the results were less than the analytical limit.

No entry indicates no specific isotopic analysis was made.

APPENDIX F

TABLE 2

CONCENTRATIONS OF RADIONUCLIDES IN HAY - 1971

Units of 10^{-6} μCi/gram of Hay

Date	^{40}K	^{65}Zn	$^{95}ZrNb$	^{106}Ru-Rh	^{137}Cs-^{137m}Ba
Analytical Limit	0.27	.03	.01	1.0	.07
West Richland Farm No. 1					
12/2	22.	*	0.37	*	*

* Indicates the results were less than the analytical limit.

TABLE 3

CONCENTRATIONS OF RADIONUCLIDES IN LOCALLY PURCHASED MEAT - 1971

Units of 10^{-6} μCi/gram of Meat (wet weight)

Date	Type	^{32}P	^{40}K	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba
Analytical Limit		1.0	0.27	0.03	0.002	0.02
Commercial						
1/21	Pork Roast	*	2.2	*	0.002	0.04
1/21	Ground Round	*	2.5	*	*	0.19
2/24	Beef	Discontinued	2.1	*	0.013	0.04
4/22	Beef		2.0	*	*	0.03
5/27	Beef		2.3	*	*	0.06
6/24	Beef		1.2	*	0.002	0.03
7/22	Beef		1.2	*	0.004	*
8/26	Beef		2.4	*	*	0.12
9/23	Beef		2.1	*	0.003	0.04
10/28	Beef		1.6	*	*	0.04
11/22	Beef		1.1	*	0.004	*
12/20	Beef		2.2	*	*	*
Annual Average			1.9	*0.009	0.003	0.05

* Indicates the results were less than the analytical limit.
No entry indicates no specific isotopic analysis was made.

APPENDIX F

TABLE 4

CONCENTRATIONS OF RADIONUCLIDES IN LOCALLY PURCHASED LEAFY VEGETABLES - 1971

Units of 10^{-6} μCi/gram (wet weight)

Date	Produce	^{40}K	^{65}Zn	^{90}Sr	$^{95}ZrNb$	^{106}Ru-Rh	^{131}I	^{137}Cs-^{137m}Ba	^{144}Ce-Pr
Analytical Limit		0.27	0.08	0.002	0.02	0.50	0.025	0.04	0.50
Riverview Farm									
7/15	Composite	2.0	*		0.13	*		*	*
8/12	Composite	2.7	*		*	*		0.05	*
9/9	Composite	3.0	*		*	*		*	*
Annual Average		3.6	*0.01		0.02	*0.08		0.02	*0.04
Commercial									
5/27	Composite	3.6	*	0.04	0.24	*	*	0.02	*
6/24	Composite	2.6	*		*	3.3	*	0.18	1.8
7/29	Composite	0.87	*		*	*	*	*	*
8/26	Composite	4.7	*		*	0.8	0.2	*	5.3
10/28	Composite	2.7	*		*	*	*	*	*
Annual Average		2.9	*0.01		0.05	0.8	*0.04	0.05	1.5

* Indicates the results were less than the analytical limit.
No entry indicates no specific isotopic analysis was made.

APPENDIX F

TABLE 5

CONCENTRATIONS OF RADIONUCLIDES IN CHICKEN AND EGGS FROM LOCAL FARMS - 1971

Units of 10^{-6} μCi/g (wet weight)

Date	^{32}P	^{40}K	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba
Analytical Limit	1.0	1.0	0.2	0.002	0.03
CHICKEN					
Ringold					
6/17		2.3	0.38	0.003	*
9/15		*	*	*	*
EGGS					
Riverview and Pasco					
1/14	*	*	*		*
1/14	*	*	*		*
4/22		*	*		*
Annual Average	*0.1	0.9	*0.03		*0.001
EGGS					
Ringold					
2/18		*	0.22	0.006	*
5/20		*	*		0.03
6/17		*	0.25		*
7/15		*	0.93	0.003	*
8/19		1.6	0.39	0.012	0.04
9/9		1.0	0.22		*
10/28		1.1	*		*
Annual Average		1.0	0.3	0.007	0.02

* Indicates the results were less than the analytical limit. No entry indicates no specific isotopic analysis was made.

APPENDIX G

APPENDIX G

TABLE 1

IONIZATION CHAMBER MEASUREMENTS FOR THE HANFORD RESERVATION AND RICHLAND - 1971

Units of mR/day

Date	Richland	Hanford	Date	Richland	Hanford
12/31-1/4	0.35	0.41	6/1-6/4	0.32	0.42
1/4-1/8	0.37	> 0.73	6/4-6/7	0.29	0.30
1/8-1/11	0.30	0.38	6/7-6/11		
1/11-1/15	0.76	0.45	6/11-6/14	0.31	
1/15-1/18	0.31	0.40	6/14-6/18	0.34	0.37
1/18-1/22	0.34	> 0.73	6/18-6/21	0.30	0.33
1/22-1/25	0.58	0.45	6/21-6/25	0.35	0.36
1/25-1/29	0.33	0.40	6/25-6/28	0.30	0.32
1/29-2/1	0.35	0.47	6/28-7/2	0.32	0.42
2/1-2/5	0.45	0.40	7/2-7/6	0.30	0.33
2/5-2/8	0.29	0.42	7/6-7/8	0.29	0.53
2/8-2/12	0.29	0.49	7/8-7/12	0.32	0.26
2/12-2/16	0.36	0.39	7/12-7/16	0.34	0.42
2/16-2/19	0.44	0.40	7/16-7/19	0.30	0.32
2/19-2/22	0.34	0.42	7/19-7/23	0.30	0.32
2/22-2/26	0.40	0.49	7/23-7/26	0.31	0.33
2/26-3/1	0.35	0.33	7/26-7/30	0.36	0.40
3/1-3/5	0.45	0.44	7/30-8/2	0.31	0.36
3/5-3/8	0.34	0.32	8/2-8/6	0.29	0.41
3/8-3/12	0.29	0.37	8/6-8/9	0.33	0.34
3/12-3/15	0.32	0.35	8/9-8/13	0.34	0.37
3/15-3/19	0.31	0.39	8/13-8/16	0.29	0.32
3/19-3/22	0.36	0.37	8/16-8/20	0.31	0.39
3/22-3/26	0.37	0.45	8/20-8/23	0.33	0.34
3/26-3/29	0.58	> 0.75	8/23-8/27	0.30	0.42
3/29-4/2	0.31	0.40	8/27-8/30	0.34	0.37
4/2-4/5	0.33	0.39	8/30-9/3	0.27	0.39
4/5-4/9	0.29	0.41	9/3-9/7	0.33	0.37
4/9-4/12	0.29	0.37	9/7-9/10	0.29	0.48
4/12-4/16	0.36	0.37	9/10-9/13	0.33	0.35
4/16-4/19	0.34	0.36	9/13-9/16	0.34	0.57
4/19-4/23	0.35	0.34	9/16-9/20	0.38	0.33
4/23-4/26	0.27	0.36	9/20-9/24	0.35	0.44
4/26-4/30	0.31	0.41	9/24-9/27	0.31	0.38
4/30-5/3	0.32	0.38	9/27-10/1	0.27	0.32
5/3-5/7			10/1-10/4	0.36	0.40
5/7-5/10	0.29	0.33	10/4-10/8	0.34	0.43
5/10-5/14	0.35	0.43	10/8-10/11	0.38	0.46
5/14-5/17	0.40	0.38	10/11-10/15	0.35	0.46
5/17-5/21	0.32	0.43	10/15-10/18	0.38	0.43
5/21-5/24	0.38	0.35	10/18-10/22	0.30	0.36
5/24-6/1	0.27	0.19	10/22-10/25	0.35	0.42
			10/25-10/28	0.52	0.53

No entry indicates no measurement was made.

APPENDIX G

TABLE 1 (Continued)

IONIZATION CHAMBER MEASUREMENTS FOR THE HANFORD RESERVATION AND RICHLAND - 1971

Units of mR/day

Date	Richland	Hanford
10/28-11/1	0.28	0.28
11/1-11/4	0.48	0.56
11/4-11/8	0.27	0.32
11/8-11/12	0.39	0.44
11/12-11/15	0.36	0.38
11/15-11/19	0.40	0.47
11/19-11/22	0.35	0.44
11/22-11/29	0.36	> 0.42
11/29-12/3	0.38	0.39
12/3-12/6	0.36	0.40
12/6-12/10	0.27	0.28
12/10-12/13	0.31	0.34
12/13-12/17	0.35	0.32
12/17-12/20	0.35	0.41
12/20-12/22	0.39	0.41
12/22-12/27	0.39	0.42
12/27-12/30	0.33	0.37
Annual Average	0.34	0.40

No entry indicates no measurement was made.

APPENDIX G

TABLE 2

IONIZATION CHAMBER MEASUREMENTS IN THE COLUMBIA RIVER - 1971

Units of mR/day

Measurement Period	Exposure Rate	Measurement Period	Exposure Rate
Vernita			
12/29-1/19	0.10		
1/19-2/16	0.11		
Discontinued			
D. Island			
12/11-1/27	2.23		
1/27-2/18	0.68		
7/16-8/9	0.13		
8/9-11/18	1.04		
11/18-12/31	0.14		
100-F Barge			
12/11-1/27	0.66		
1/27-2/18	0.24		
Discontinued			
100-K Barge			
12/11-1/27	9.57	5/14-6/24	0.12
1/27-2/18	0.91	6/24-7/7	0.14
2/18-3/29	0.50	7/7-9/14	0.11
3/29-4/20	0.27	9/14-11/14	
4/20-5/14		11/14-12/31	0.16
Annual Average			1.2
South of Wooded Island			
12/30-1/29	0.57	9/15-10/13	0.11
1/29-3/17	0.45	10/13-11/10	0.10
3/17-7/19		11/10-12/8	0.10
7/19-8/10	0.11	12/8-12/31	0.12
8/10-9/15	0.24		
Annual Average			0.27
Richland			
12/28-1/25	0.50	7/12-8/9	0.14
1/25-2/22	0.31	8/9-9/7	0.12
2/22-3/22	0.29	9/7-10/4	0.12
3/22-4/19	0.24	10/4-11/1	0.13
4/19-6/17		11/1-11/29	0.14
6/17-7/12	0.11	11/29-12/27	0.14
Annual Average			0.20

No entry indicates no measurement was made.

APPENDIX G

TABLE 3

EXTERNAL EXPOSURE RATE MEASUREMENT AT 3' ABOVE THE COLUMBIA RIVER SHORELINE AT VERNITA, RICHLAND AND AT SACAJAWEA PARK - 1971

Units of μR/hour

Date	Exposure Rate	Date	Exposure Rate
Vernita			
2/16	13	9/13	9
3/16	10	10/11	5
5/17	10	11/16	10
6/7	10	12/6	5
7/13	8		
		Annual Average	9
Richland			
1/4	32	6/3	12
1/7	16	6/10	12
1/11	13	6/24	12
1/14	16	7/1	12
1/18	21	7/8	13
1/21	10	7/15	12
1/25	14	7/22	12
1/29	17	7/28	13
2/1	11	8/5	8
2/4	11	8/12	5
2/8	17	8/19	5
2/11	14	9/2	12
2/18	12	9/9	12
2/25	8	9/16	12
3/11	15	9/23	12
3/18	15	9/30	12
3/25	10	10/14	12
4/1	15	10/21	13
4/8	16	11/11	8
4/15	16	11/18	15
5/6	12	12/2	13
5/13	13	12/9	12
5/20	8	12/16	8
5/27	12	12/30	12
		Annual Average	12

APPENDIX G

TABLE 3 (Continued)

EXTERNAL EXPOSURE RATE MEASUREMENT AT 3' ABOVE THE COLUMBIA RIVER SHORELINE AT VERNITA, RICHLAND AND AT SACAJAWEA PARK - 1971

Units of μR/hour

Date	Exposure Rate
Sacajawea Park	
1/8	25
1/15	20
1/29	20
2/5	16
2/12	18
2/26	11
3/5	20
3/26	14
5/7	13
5/14	10
5/21	12
5/28	12
6/18	13
7/2	12
7/16	10
7/30	10
8/27	5
9/3	10
9/10	12
9/17	10
9/24	10
10/1	10
10/8	7
11/5	12
12/3	12
12/28	10
Annual Average	12

APPENDIX H

APPENDIX H

TABLE 1

CHEMICAL CHARACTERISTICS OF COLUMBIA RIVER WATER AT VERNITA - 1971

Units of Parts per Million

Date	Mg	Fe	Cu	Ca	SO_4	PO_4	Cl	Diss O_2	Phth Alk.	M.O. Alk.	Hardness	Solids	pH
1/5	6.0	0.02	0.003	17.	13.	0.18	0.33	11	2.	60.	68.	97.	
1/19	6.0	0.01	0.004	17.	15.	0.15	0.60	**	1.	63.	66.	110	
2/2	5.4	0.02	0.006	18.	14.	0.05	0.50		2.	66.	67.	110	
2/17	4.2	0.03	0.004	19.	16.	0.01	0.58		2.	65.	66.	70.	
3/2	4.7	0.03	0.003	19.	17.	0.01	0.66	13.	2.	64.	66.	87.	
3/16	4.5	0.17	0.004	17.	17.	0.10	0.73	13.	1.	62.	63.	90.	
3/30	5.9	0.07	0.005	18.	25.	0.04	0.70	13.	1.	68.	69.	89.	
4/13	5.8	0.06	0.003	19.	20.	0.02	0.40	13.	1.	59.	71.	69.	
5/4	5.8	0.08	0.003	18.	22.	0.02	0.40	12.	2.	63.	70.	93.	
5/18	4.0	0.17	0.004	15.	18.	0.02	0.45	12.	1.	51.	54.	86.	
6/1	4.0	0.12	0.004	18.	12.	0.01	0.63	12.	1.	44.	50.	63.	
6/15	3.7	0.05	0.003	15.	12.	0.02	0.43	11.	1.	49.	52.	80.	
6/29	3.7	0.06	0.002	15.	12.	0.02	0.33	12.	1.	50.	55.	72.	
8/3								10.					6.8
8/17								9.0					7.9
8/24								9.7					8.0
8/31								8.8					8.5
9/14								9.4					7.9
9/28								9.0					7.7
10/12								9.0					7.7
10/26								10.					9.2
11/2								11.					
11/9								9.2					7.8
11/16								9.7					7.8
11/23								9.0					7.8
11/30								10.					7.4
12/7								10.					8.1
12/14								10.					8.1
12/21								8.5					8.1
12/28													7.8
6-Month Average	5.0	0.07	0.004	17.	17.	0.05	0.52	12.	1.4	60.	64.	86.	7.9
Annual Average								11.					

** Indicates invalid data.
No entry indicates no specific chemical analysis was made

APPENDIX H

TABLE 2

CHEMICAL CHARACTERISTICS OF COLUMBIA RIVER WATER AT 100-F - 1971

Units of Parts per Million

Date	Mg	Fe	Cu	Ca	SO_4	PO_4	Cl	Diss O_2	Phth Alk.	M.O. Alk.	Hardness	Solids
1/5	5.2	.03	.003	18.	14.	0.11	0.40	8.8	1.	63.	67.	88.
1/19	6.0	.004	.002	17.	17.	0.11	0.46	**	1.	66.	68.	96.
2/2	4.7	.02	.005	21.	16.	0.05	0.59	11.	2.	68.	73.	100
2/17	4.3	.03	.005	21.	16.	0.01	0.50		2.	62.	69.	80.
3/2	4.9	.03	.004	19.	17.	0.01	0.63	13.	3.	65.	68.	89.
3/16	4.1	.18	.003	18.	16.	0.03	0.71	12.	2.	63.	63.	79.
3/31	5.9	.09	.007	17.	27.	0.07	0.60	13.	1.	70.	67.	93.
4/13	5.8	.06	.002	18.	21.	0.02	0.40	12.	1.	60.	70.	80.
5/4	5.8	.08	.004	18.	21.	0.02	0.45	11.	1.	59.	70.	99.
5/18	4.4	.14	.003	14.	15.	0.005	0.45	12.	1.	51.	54.	84.
6/1	4.6	.10	.005	18.	12.	0.01	0.42	12.	1.	45.	50.	76.
6/15	3.0	.05	.003	13.	12.	0.02	0.42	11.	2.	49.	45.	75.
6/29	3.4	.06	.002	16.	11.	0.02	0.20	11.	1.	47.	53.	78.
Discontinued												
6-Month Average	4.9	.07	.004	18.	17.	0.04	0.49	11.	1.3	60.	64.	87.

** Invalid data

No entry indicates no specific chemical analysis was made

APPENDIX H

TABLE 3

NITRATES IN COLUMBIA RIVER WATER AT VERNITA & RICHLAND - 1971

Units of ppm of Water

Date	Vernita	Date	Richland
1/6	0.40	1/4	4.8
1/12	0.40	1/11	0.50
1/19	0.40	1/18	0.60
1/26	0.50	1/25	0.70
2/2	0.60	2/1	
2/9	0.40	2/8	0.90
2/16	0.20	2/16	0.20
2/23	0.20	2/22	0.20
3/2	0.30	3/1	0.30
3/9	0.60	3/8	0.60
3/16	0.70	3/15	0.70
3/23	0.50	3/22	0.60
3/30	0.35	3/29	0.60
4/6	0.50	4/5	0.70
4/13	0.30	4/12	0.30
4/20	0.30	4/19	0.60
4/27	0.30	4/26	1.00
5/4	0.20	5/4	0.40
5/11	0.10	5/10	0.10
5/18	0.20	5/17	0.20
5/25	0.20	5/24	0.10
6/1	0.20	6/1	0.20
6/8	0.10	6/7	0.20
6/15	0.10	6/14	0.20
6/22	0.20	6/21	0.20
6/29	0.20	6/28	0.20
7/6	0.10	7/6	0.10
7/13	< 0.10	7/12	0.10
7/20	< 0.10	7/19	0.10
7/27	0.20	7/26	0.20
8/3	0.23	8/2	0.25
8/10	0.20	8/9	< 0.10
8/17	0.44	8/16	< 0.10
8/24	< 0.10	8/23	< 0.10
8/31	< 0.10	8/30	0.40
9/7	< 0.10	9/7	0.20
9/14	0.10	9/13	0.30
9/21	< 0.10	9/20	0.40
9/28	0.20	9/27	0.30

No entry indicates no measurement was made.

APPENDIX H

TABLE 3 (Continued)

NITRATES IN COLUMBIA RIVER WATER AT VERNITA & RICHLAND - 1971

Units of ppm of Water

Date	Vernita	Date	Richland
10/5	0.30	10/4	0.20
10/12	0.20	10/11	0.40
10/19	0.20	10/18	< 0.10
10/26	0.24	10/25	0.36
11/1	0.43	11/1	1.1
11/8	0.28	11/8	0.35
11/16	0.36	11/15	0.44
11/23	0.30	11/22	0.50
11/30	0.43	11/29	0.40
12/7	0.32	10/6	1.0
12/14	0.35	12/13	0.43
12/21	0.39	12/20	0.49
12/28	0.44	12/27	0.42
Average	0.28		0.47

APPENDIX H

TABLE 4

WATER QUALITY MEASUREMENTS IN COLUMBIA RIVER WATER AT THE 300 AREA - 1971

Date	pH	Turbidity (JTU)[a]	Diss O_2 (ppm)
1/4	7.7	0.4	11.
1/5	8.0	0.5	10.
1/6	7.9	1.8	12.
1/7	8.0	1.8	12.
1/8	7.9	0.7	11.
1/11	7.8	0.7	11.
1/12	7.4	0.2	8.8
1/13	8.3	0.7	11.
1/14	8.3	0.7	11.
1/15	8.3	0.7	11.
1/18	8.2	0.8	11.
1/19	8.2	0.8	11.
1/21	7.9	0.7	11.
1/25	8.2	1.2	11.
1/26	8.1	2.2	12.
1/27	8.3	0.8	12.
1/28	7.8	1.2	
1/29	8.2	0.7	12.
2/1	8.2	1.8	11.
2/2	7.8	0.6	12.
2/3	7.9	2.5	11.
2/4	8.0	4.5	11.
2/5		2.3	12.
2/8	8.3	1.5	12.
2/9	7.9	1.3	12.
2/10	7.7	1.6	12.
2/11	8.2	0.8	12.
2/12	8.2	0.9	12.
2/16	8.2	0.9	12.
2/18	8.2	0.9	12.
2/19	8.2	1.3	12.
2/22	8.2	1.7	12.
2/23	8.1	1.5	12.
2/24	8.0	1.2	12.
2/25	8.2	2.2	12.
2/26	8.3	1.7	12.
3/1	8.4	2.4	13.
3/2	8.2	4.0	13.
3/3	8.1	3.5	12.
3/4	7.8	2.2	13.

No entry indicates no analysis was made.

(a) Jackson turbidity units.

APPENDIX H

TABLE 4 (Continued)

WATER QUALITY MEASUREMENTS IN COLUMBIA RIVER WATER AT THE 300 AREA - 1971

Date	pH	Turbidity (JTU)[a]	Diss O_2 (ppm)
3/5	8.2	2.3	13.
3/8	8.2	2.3	13.
3/9	8.2	2.3	13.
3/10	8.2	2.6	13.
3/11	7.9	2.4	13.
3/12	7.9	2.4	13.
3/15	7.8	2.4	13.
3/16	7.8	2.4	13.
3/18	7.8	2.4	13.
3/19	8.2	5.0	12.
3/22	7.7	3.8	12.
3/23	7.7	3.2	12.
3/25	7.6	3.0	12.
3/26	8.1	9 1	13.
3/29	8.2	2.9	13.
3/30	8.2	2.7	12.
3/31	8.2	3.4	13.
4/1	8.0	3.3	12.
4/2	8.1	2.2	13.
4/5	8.3	2.5	13.
4/6	8.9	2.7	12.
4/7	8.9	2.3	13.
4/8	9.0	2.3	10.
4/9	9.0	2.5	10.
4/12	9.4	2.2	11.
4/13	8.5	2.2	10.
4/15	9.5	0.01	
4/20		3.1	12.
4/21		3.0	12.
4/23	7.9	6.2	
4/26	7.7	5.8	
4/27	8.2	3.4	
4/28	8.2	3.7	
4/29	8.3	4.3	
4/30	8.4	3.6	
5/3	8.4	4.0	
5/4	7.4	4.2	12.
5/5	7.8	4.0	12.
5/6	7.6	4.2	12.
5/7	7.8	4.8	9.4
5/8	7.6	5.0	11.
5/13	7.7	4.8	10.

No entry indicates no analysis was made.

(a) Jackson turbidity units.

APPENDIX H

TABLE 4 (Continued)

WATER QUALITY MEASUREMENTS IN COLUMBIA RIVER WATER AT THE 300 Area - 1971

Date	pH	Turbidity (JTU)[a]	Diss O_2 (ppm)
5/14	7.9	5.5	11.
5/17	7.8	12.	11.
5/20	7.7	12.	11.
5/21	7.7	6.3	12.
5/24	8.1	4.6	11.
5/26	7.8	6.2	11.
5/27	7.8	4.7	11.
5/28	7.6	4.6	11.
6/1	7.8	7.5	12.
6/2	7.6	7.7	12.
6/3	7.9	5.0	12.
6/4	7.2	7.5	13.
6/7	7.2	6.0	10.
6/10	7.2	7.0	10.
6/11	7.7	6.0	11.
6/15	7.8	4.5	12.
6/17	7.9	4.4	11.
6/24	8.0	2.8	12.
6/25	7.9	3.4	11.
6/28	8.0	4.0	11.
6/29	8.1	3.3	11.
6/30	8.1	3.6	11.
7/1	7.9	3.5	12.
7/2	8.1		12.
7/6	8.2		12.
7/8	8.2		11.
7/12	7.7		10.
7/13	7.8	2.7	10.
7/14	8.3	2.4	10.
7/16	8.2	2.7	12.
7/20	8.25	3.0	11.
7/23	8.1	1.8	11.
7/27	8.1	1.8	10.
7/28	8.0	1.8	10.
7/29	8.4	1.6	10.
7/30	8.4	2.0	10.
8/2	8.2		10.
8/3	8.2	1.2	10.
8/4	8.4		11.
8/5	7.9	1.2	11.
8/6	7.6		11.
8/10	8.0		11.

No entry indicates no analysis was made.

(a) Jackson turbidity units.

APPENDIX H

TABLE 4 (Continued)

WATER QUALITY MEASUREMENTS IN COLUMBIA RIVER WATER AT THE 300 AREA - 1971

Date	pH	Turbidity (JTU)[a]	Diss O_2 (ppm)
8/12	8.2		10.
8/13	7.8		10.
8/16	7.6		10.
8/18	8.2		10.
8/19	8.2		9.8
8/20	8.1		9.4
8/24	8.0	2.5	9.4
8/25	8.3	1.0	9.3
8.26	8.4	1.5	9.8
8/27	8.4	1.2	9.4
8/30	8.4	1.2	9.3
8/31	8.4	1.5	8.7
9/2	7.7	1.1	9.2
9/3	7.8	1.3	8.9
9/7	8.1	1.2	9.2
9/9	8.0	1.3	9.4
9/10	8.4	1.1	9.2
9/13	8.5	1.0	9.3
9/14	8.5	1.7	9.4
9/16	8.5	1.2	9.7
9/17	8.5		9.5
9/21	9.0	1.5	9.6
9/22	9.0	1.5	8.8
9/23	8.9	1.5	9.4
9/24	8.8	0.8	9.3
9/27	7.4		9.2
9/28	8.0		9.1
9/30	7.9	1.4	9.2
10/5	8.0		8.8
10/8	8.0		9.0
10/14	8.9		8.9
10/18	8.9	1.0	9.2
10/20	9.0	1.1	8.7
10/20	8.8	1.0	9.2
10/21	8.8	1.0	9.4
10/26	8.7	2.1	11.
10/27		2.0	9.7
10/28		2.0	9.6
10/29		1.5	9.8
11/2		0.9	11.
11/4	8.2	0.75	10.

No entry indicates no analysis was made.

(a) Jackson turbidity units.

APPENDIX H

TABLE 4 (Continued)

WATER QUALITY MEASUREMENTS IN COLUMBIA RIVER WATER AT THE 300 AREA - 1971

Date	pH	Turbidity (JTU)[a]	Diss O_2 (ppm)
11/5	8.0	1.0	9.5
11/8	7.5	1.1	10.
11/9	7.9	1.1	10.
11/10	8.1	1.0	9.9
11/11	8.1	1.2	10.
11/12	8.0	0.9	9.0
11/15	8.2	2.2	10.
11/16	8.2	0.7	9.8
11/17	8.1	0.8	10.
11/18	8.1	0.8	9.8
11/19	8.1	1.0	9.4
11/22	8.2	0.8	9.3
11/23	8.0	0.8	9.6
11/24	8.0	1.0	9.6
11/29	8.1	1.2	9.7
11/30	8.1	0.8	9.1
12/1	8.0	1.0	11.
12/2	8.0	1.0	11.
12/3	8.0	1.0	12.
12/4	8.1	1.0	12.
12/5	8.0	1.0	11.
12/6	7.7	0.7	11.
12/7	8.0	0.7	12.
12/8	8.0	2.5	11.
12/9	8.0	1.7	10.
12/10	7.9	1.0	10.
12/13	7.9	1.0	11.
12/14	8.0	1.3	11.
12/15	7.6	1.6	11.
12/16	8.1	0.3	11.
12/17	8.0	0.3	11.
12/20	7.4	0.15	
12/21	8.0	2.0	12.
12/27	7.8	1.0	13.
12/28	8.3	2.0	
12/30	7.6	1.5	
Average	8.1	2.4	11.

No entry indicates no analysis was made.

(a) Jackson turbidity units.

APPENDIX H

TABLE 5

Biological Measurements of Columbia River Water at Vernita and Richland

	Vernita			Richland		
Date	Coliform (per 100 ml)	Enterococci (per 100 ml)	BOD (mg/l)	Coliform (per 100 ml)	Enterococci (per 100 ml)	BOD (mg/l)
2-16	13.	2.	3.7	15.	2.	4.2
3-16	21.	1.	4.0	30.	1.	5.0
4-20	34.	8.	2.8	90.	5.	3.0
5-18	60.	6.	3.2	40.	18.	3.5
6-22	74.	8.	4.5	68.	21.	4.2
7-13	30.	10.	1.8	85.	18.	1.4
8-17	40.	60.	3.4	100	66.	3.0
9-14	40.	35.	2.8	50.	41.	3.4
10-12	40.	97.	1.4	200	110	1.7
11-16	13.	7.	3.4	30.	17.	2.2
12-14	4.0	6.	2.6	13.	4.	1.6
Annual Average	34.	22.	3.0	64.	28.	3.0

TABLE 6

Temperatures of Columbia River Water at Priest Rapids Dam and Richland, Monthly Average Temperature in °C

Date	Priest Rapids Dam	Richland
Jan	4.0	4.3
Feb	3.5	3.4
Mar	3.6	3.8
Apr	6.6	7.0
May	10.9	11.0
June	12.6	13.0
July	15.3	16.4
Aug	18.6	19.6
Sept	17.2	17.8
Oct	15.2	15.0
Nov	11.2	10.7
Dec	6.8	6.2
Annual Average	10.4	10.6

APPENDIX I

APPENDIX I

TABLE 1

CHEMICALS IN RICHLAND DRINKING WATER (CUMULATIVE SAMPLES) - 1971

Units of (ppm)

Date	NO_3^-	Cr^{+6}	F^-
12/30/70 - 1/5/71	0.32	0.005	
1/5 - 1/11	0.27	< 0.001	
1/11 - 1/18	0.25	0.004	
1/18 - 1/25	6.8	< 0.001	
1/25 - 2/2	5.8	< 0.001	
2/2 - 2/9	0.43	< 0.001	
2/9 - 2/16	< 0.10	0.002	
2/16 - 2/22	0.18	< 0.001	
2/22 - 3/1	0.15	0.002	
3/1 - 3/8	0.55	< 0.001	
3/8 - 3/15	0.70	0.002	
3/15 - 3/22	0.65	0.007	
3/22 - 3/29	3.5	< 0.001	
3/29 - 4/5	0.72	< 0.001	
4/5 - 4/12	0.29	< 0.001	
4/12 - 4/19	0.57	< 0.001	
4/19 - 4/26	0.96	< 0.001	
4/26 - 5/3	1.5	0.001	
5/3 - 5/10	0.15	< 0.001	
5/10 - 5/17	0.15	< 0.001	
5/17 - 5/24	0.33	< 0.001	
5/24 - 6/1	0.48	< 0.001	
6/1 - 6/8	0.06	< 0.001	
6/8 - 6/15	0.33	0.003	
6/15 - 6/22	0.35	< 0.001	
6/22 - 6/29	0.16	< 0.001	
6/29 - 7/6	0.13	< 0.001	
7/6 - 7/13	0.13	< 0.001	
7/13 - 7/20	0.12	< 0.001	
7/20 - 7/27	0.17	< 0.001	
7/27 - 8/3	0.44	< 0.001	
8/3 - 8/10	0.33	< 0.001	
8/10 - 8/17	0.55	< 0.001	
8/17 - 8/24	2.0	< 0.001	
8/24 - 8/31	0.68	< 0.001	
8/31 - 9/6	0.37	< 0.001	
9/6 - 9/13	0.51	< 0.001	
9/13 - 9/20	0.30	< 0.001	
9/20 - 9/27	0.36	< 0.001	
9/27 - 10/5	0.62	Discontinued	0.03

APPENDIX I

TABLE 1 (Continued)

CHEMICALS IN RICHLAND DRINKING WATER
(CUMULATIVE SAMPLES) - 1971

Units of (ppm)

Date		NO_3^-	Cr^{+6}	F^-
10/5	- 10/12	0.56		0.11
10/12	- 10/19	0.51		< 0.10
10/19	- 10/26	0.41		< 0.10
10/26	- 11/1	0.36		< 0.10
11/8	- 11/15	0.61		< 0.10
11/15	- 11/22			< 0.10
11/22	- 11/29			< 0.10
11/29	- 12/6	2.5		0.62
12/6	- 12/13	2.6		0.40
12/13	- 12/20	1.4		0.37
12/20	- 12/27	0.71		< 0.10
Average		0.86	< 0.002	0.18

No entry indicates no analysis was made.

APPENDIX J

APPENDIX J

TABLE 1

SUSPENDED PARTICULATES IN THE AIR AT RICHLAND (CONTINUOUS SAMPLES) - 1971

Units of μgm/ml of Air

Date	Suspended Particulates	Date	Suspended Particulates
12/31-1/8	64.	5/17-5/24	120
1/8-1/15	56.	5/24-6/2	50.
1/15-1/22	29.	6/29-7/2	140
1/29-2/5	180	7/16-7/28	160
2/5-2/11	440	7/28-8/2	220
2/11-2/16	100	8/2-8/5	140
2/16-2/21	51.	8/5-8/11	140
2/21-2/26	180	8/11-8/18	140
2/26-3/6	38.	8/18-8/24	140
3/6-3/12	56.	8/24-8/27	130
3/12-3/19	51.	8/27-9/2	93.
3/19-3/28	120	9/2-9/9	53.
3/28-4/2	120	9/9-9/15	87.
4/2-4/9	120	9/15-9/22	120
4/9-4/14	250	10/1-10/8	150
4/14-4/20	95.	11/28-12/3	48.
4/20-4/26	76.	12/3-12/9	23.
4/26-4/29	230	12/9-12/15	25.
4/29-5/5	150	12/15-12/20	32.
5/5-5/12	140	12/20-12/27	62.
5/12-5/17	270	12/27-12/30	51.
		Average	120

APPENDIX J

TABLE 2

NITROGEN IN THE AIR AT THE GILLIUM RANCH - 1971

Units of (ppm) in Air

Date	NO_2 in Air	Date	NO_2 in Air	Date	NO_2 in Air
1-1	0.001	3-13	0.005	6-28	0.002
1-2	0.002	3-14	0.004	6-29	0.002
1-3	0.001	3-15	0.004	6-30	0.004
1-4	0.002	3-16	3.0	7-1	0.002
1-5	0.001	5-5	0.003	7-2	0.003
1-6	<0.001	5-6	0.004	7-3	0.002
1-13	0.005	5-7	0.004	7-4	0.002
1-14	0.005	5-8	0.005	7-5	0.003
1-15	0.003	5-9	0.002	7-6	0.004
1-16	0.005	5-10	0.003	7-7	0.010
1-17	0.004	5-11	<0.001	7-8	0.016
1-18	0.003	5-19	0.002	7-9	0.013
1-19	0.007	5-20	0.003	7-10	0.010
1-27	<0.002	5-21	0.002	7-11	0.016
1-28	0.003	5-22	0.002	7-12	0.012
1-29	<0.002	5-23	0.002	7-13	0.012
1-30	<0.002	5-24	0.001	7-21	0.008
1-31	<0.002	5-25	0.001	7-22	0.011
2-1	<0.002	6-9	0.005	7-23	0.013
2-2	0.002	6-10	0.004	7-24	0.011
2-10	0.008	6-11	0.004	7-25	0.010
2-11	0.007	6-12	0.003	7-26	0.009
2-12	0.010	6-13	0.003	7-27	0.012
2-13	0.008	6-14	0.003	8-3	0.017
2-14	0.009	6-15	0.002	8-4	0.019
2-15	0.008	6-16	0.002	8-5	0.027
2-16	0.007	6-17	0.002	8-6	0.024
2-24	0.009	6-18	0.002	8-7	0.016
2-25	0.008	6-19	0.002	8-8	0.026
2-26	0.006	6-20	0.002	8-9	0.019
2-27	0.007	6-21	0.002	8-17	0.004
2-28	0.007	6-22	0.001	8-18	0.002
3-1	0.006	6-23	0.002	8-19	0.005
3-2	0.007	6-24	0.003	8-20	0.003
3-10	0.007	6-25	0.003	8-21	0.002
3-11	0.005	6-26	0.003	8-22	0.003
3-12	0.006	6-27	0.003	8-23	0.003

APPENDIX J

TABLE 2 (Continued)

NITROGEN IN THE AIR AT THE GILLIUM RANCH - 1971

Units of (ppm) in Air

Date	NO_2 in Air	Date	NO_2 in Air
9-1	0.004	11-19	0.003
9-2	0.004	11-20	0.003
9-3	0.007	11-21	0.002
9-4	0.004	11-22	0.002
9-5	0.005	11-23	0.002
9-6	0.004	12-8	0.004
9-7	0.005	12-9	0.002
9-15	0.003	12-10	0.003
9-16	0.004	12-11	0.002
9-17	0.003	12-12	0.002
9-18	0.002	12-13	0.002
9-19	0.003	12-14	0.002
9-20	0.002	12-22	0.005
9-21	0.002	12-23	0.006
10-6	0.005	12-24	0.004
10-7	0.004	12-25	0.004
10-8	0.005	12-26	0.006
10-9	0.004	12-27	0.004
10-10	0.005	12-28	0.004
10-11	0.004		
10-12	0.004		
10-20	0.004		
10-21	0.004	Average	0.024
10-22	0.002		
10-23	0.002		
10-24	0.002		
10-25	0.004		
10-26	0.003		
11-3	0.003		
11-4	0.004		
11-5	0.004		
11-6	0.003		
11-7	0.003		
11-8	0.003		
11-9	0.004		
11-17	0.004		
11-18	0.002		

APPENDIX J

TABLE 3

NITROGEN IN THE AIR AT THE HOBKIRK RANCH - 1971

Units of (ppm) in Air

Date	NO_2 in Air	Date	NO_2 in Air	Date	NO_2 in Air
1-1	0.001	3-14	0.004	5-25	0.002
1-2	0.001	3-15	0.003	6-9	0.004
1-3	0.002	3-16	0.003	6-10	0.003
1-4	0.002	3-24	0.013	6-11	0.005
1-5	0.003	3-25	0.002	6-12	0.003
1-13	0.006	3-26	0.003	6-13	0.003
1-14	0.009	3-27	0.002	6-14	0.003
1-15	0.004	3-28	0.002	6-15	0.003
1-16	0.003	3-29	0.002	6-16	0.003
1-17	0.005	3-30	0.002	6-17	0.002
1-18	0.005	4-7	0.010	6-18	0.003
1-19	0.010	4-8	0.007	6-19	0.002
1-27	0.005	4-9	0.003	6-20	0.002
1-28	0.003	4-10	0.006	6-21	0.002
1-29	0.004	4-11	0.006	6-22	0.002
1-30	<0.002	4-12	0.004	6-23	0.004
1-31	<0.002	4-13	0.004	6-24	0.001
2-1	<0.002	4-21	0.007	6-25	0.006
2-2	<0.002	4-22	0.004	6-26	0.001
2-10	0.015	4-23	0.005	6-27	0.003
2-11	0.014	4-24	0.004	6-28	0.003
2-12	0.010	4-25	0.004	6-29	0.002
2-13	0.009	4-26	0.004	6-30	0.004
2-14	0.012	4-27	0.006	7-1	0.001
2-15	0.012	5-5	0.002	7-2	0.003
2-16	0.010	5-6	0.003	7-3	0.001
2-24	0.009	5-7	0.002	7-4	0.002
2-25	0.009	5-8	0.002	7-5	0.001
2-26	0.004	5-9	0.002	7-6	0.001
2-27	0.006	5-10	0.002	7-7	0.010
2-28	0.008	5-11	0.002	7-8	0.009
3-1	0.009	5-19	0.002	7-9	0.008
3-2	0.007	5-20	<0.001	7-10	0.014
3-10	0.003	5-21	0.004	7-11	0.011
3-11	0.019	5-22	0.003	7-12	0.012
3-12	0.002	5-23	0.002	7-13	0.011
3-13	0.004	5-24	0.002		

APPENDIX J

TABLE 3 (Continued)

NITROGEN IN THE AIR AT THE HOBKIRK RANCH - 1971

Units of (ppm) in Air

Date	NO_2 in Air	Date	NO_2 in Air
7-21	0.007	10-8	0.005
7-22	0.008	10-9	0.003
7-23	0.008	10-10	0.005
7-24	0.005	10-11	0.003
7-25	0.004	10-12	0.002
7-26	0.007	10-20	0.003
7-27	0.003	10-21	0.002
8-3	0.013	10-22	0.003
8-4	0.015	10-23	0.002
8-5	0.017	10-24	0.002
8-6	0.017	10-25	0.002
8-7	0.018	10-26	0.003
8-8	0.014	11-17	0.008
8-9	0.018	11-18	0.004
8-17	0.003	11-19	0.005
8-18	0.002	11-20	0.004
8-19	0.001	11-21	0.002
8-20	0.004	11-22	0.004
8-21	0.003	11-23	0.003
8-22	0.002	12-8	0.002
8-23	0.002	12-9	0.002
9-1	0.005	12-10	0.005
9-2	0.006	12-11	0.004
9-3	0.006	12-12	0.002
9-4	0.003	12-13	0.004
9-5	0.004	12-14	0.004
9-6	0.003	12-22	0.007
9-7	0.003	12-23	0.002
9-15	0.008	12-24	0.006
9-16	0.002	12-25	0.007
9-17	0.009	12-26	0.005
9-18	0.003	12-27	0.004
9-19	0.006	12-28	0.005
9-20	0.002		
9-21	0.008		
10-6	0.010		
10-7	0.002	Average	0.005

APPENDIX J

TABLE 4

NITROGEN IN THE AIR AT KEY'S RANCH - 1971

Units of (ppm) in Air

Date	NO_2 in Air	Date	NO_2 in Air	Date	NO_2 in Air
1-1	0.001	3-15	0.004	6-10	0.004
1-2	0.001	3-16	0.002	6-11	0.002
1-3	0.001	3-24	0.005	6-12	0.004
1-4	0.001	3-25	0.006	6-13	0.004
1-5	0.001	3-26	0.005	6-14	0.004
1-13	0.004	3-27	0.004	6-15	0.005
1-14	0.005	3-28	0.004	6-16	0.005
1-15	0.004	3-29	0.005	6-17	0.003
1-16	0.003	3-30	0.006	6-18	0.003
1-17	0.005	4-7	0.009	6-19	0.006
1-18	0.004	4-8	0.007	6-20	0.003
1-19	0.007	4-9	0.008	6-21	0.003
1-27	0.002	4-10	0.006	6-22	0.003
1-28	0.002	4-11	0.005	6-23	0.005
1-29	0.003	4-12	0.006	6-24	0.005
1-30	0.002	4-13	0.004	6-25	0.004
1-31	0.002	4-21	0.006	6-26	0.004
2-2	0.002	4-22	0.011	6-27	0.004
2-3	0.002	4-23	0.007	6-28	0.007
2-10	0.011	4-24	0.009	6-29	0.007
2-11	0.011	4-25	0.010	7-7	0.015
2-12	0.008	4-26	0.010	7-8	0.013
2-13	0.010	4-27	0.009	7-9	0.017
2-14	0.010	5-5	0.005	7-10	0.013
2-15	0.008	5-6	0.006	7-11	0.018
2-16	0.013	5-7	0.003	7-12	0.010
2-24	0.011	5-8	0.002	7-13	0.014
2-25	0.009	5-9	0.002	7-21	0.009
2-26	0.007	5-10	0.002	7-22	0.011
2-27	0.011	5-11	0.002	7-23	0.006
2-28	0.011	5-19	0.003	7-24	0.010
3-1	0.011	5-20	0.003	7-25	0.012
3-2	0.005	5-21	0.002	7-26	0.008
3-10	0.004	5-22	0.002	7-27	0.009
3-11	0.003	5-23	0.003	8-3	0.019
3-12	0.004	5-24	0.002	8-4	0.018
3-13	0.002	5-25	0.003	8-5	0.020
3-14	0.001	6-9	0.005	8-6	0.017

APPENDIX J

TABLE 4 (Continued)

NITROGEN IN THE AIR AT KEY'S RANCH - 1971

Units of (ppm) in Air

Date	NO_2 in Air	Date	NO_2 in Air
8-7	0.021	11-3	0.003
8-8	0.026	11-4	0.004
8-9	0.028	11-5	0.003
8-17	0.007	11-6	0.003
8-18	0.005	11-7	0.003
8-19	0.004	11-8	0.003
8-20	0.004	11-9	0.002
8-21	0.003	11-17	0.005
8-22	0.004	11-18	0.004
8-23	0.003	11-19	0.003
9-1	0.006	11-20	0.004
9-2	0.006	11-21	0.003
9-3	0.023	11-22	0.003
9-4	0.006	11-23	0.003
9-5	0.006	12-8	0.005
9-6	0.006	12-9	0.006
9-7	0.004	12-10	0.004
9-15	0.003	12-11	0.004
9-16	0.004	12-12	0.002
9-17	0.006	12-13	0.005
9-18	0.008	12-14	0.001
9-19	0.004	12-22	0.005
9-20	0.004	12-23	0.002
9-21	0.003	12-24	0.005
10-6	0.004	12-25	0.004
10-7	0.004	12-26	0.004
10-8	0.002	12-27	0.003
10-9	0.004	12-28	0.005
10-10	0.002		
10-11	0.006		
10-12	0.004		
10-20	0.003	Average	0.006
10-21	0.004		
10-22	0.003		
10-23	0.003		
10-24	0.003		
10-25	0.004		
10-26	0.003		

APPENDIX J

TABLE 5

NITROGEN IN THE AIR AT THE McLANE RANCH - 1971

Units of (ppm) in Air

Date	NO_2 in Air	Date	NO_2 in Air	Date	NO_2 in Air
1-1	0.001	3-14	0.004	6-22	0.003
1-2	0.001	3-15	0.002	6-23	0.005
1-3	0.001	3-16	0.004	6-24	0.004
1-4	0.001	3-24	0.003	6-25	0.003
1-5	0.001	3-25	0.004	6-26	0.002
1-13	0.004	3-26	0.004	6-27	0.005
1-14	0.005	3-27	0.003	6-28	0.004
1-15	0.004	3-28	0.004	6-29	0.004
1-16	0.003	3-29	0.002	6-30	0.002
1-17	0.003	3-30	0.003	7-1	0.002
1-18	0.004	4-7	0.006	7-2	0.002
1-19	0.005	4-8	0.008	7-3	0.002
1-27	<0.002	4-9	0.006	7-4	0.002
1-28	<0.002	4-10	0.007	7-5	0.002
1-29	<0.002	4-11	0.006	7-6	0.002
1-30	<0.002	4-12	0.005	7-7	0.017
1-31	<0.002	4-13	0.006	7-8	0.013
2-1	<0.002	5-19	0.003	7-9	0.014
2-2	<0.002	5-20	0.004	7-10	0.013
2-10	0.018	5-21	0.004	7-11	0.012
2-11	0.018	5-22	0.004	7-12	0.011
2-12	0.011	5-23	0.006	7-13	0.015
2-13	0.015	5-24	0.004	7-21	0.013
2-14	0.010	5-25	0.006	7-22	0.001
2-15	0.014	6-9	0.006	7-23	0.010
2-16	0.011	6-10	0.008	7-24	0.010
2-24	0.006	6-11	0.004	7-25	0.010
2-25	0.005	6-12	0.005	7-26	0.007
2-26	0.006	6-13	0.004	7-27	0.008
2-27	0.004	6-14	0.004	8-3	0.024
2-28	0.004	6-15	0.004	8-4	0.024
3-1	0.006	6-16	0.006	8-5	0.021
3-2	0.004	6-17	0.006	8-6	0.028
3-10	0.002	6-18	0.003	8-7	0.024
3-11	0.003	6-19	0.003	8-8	0.024
3-12	0.003	6-20	0.002	8-9	0.023
3-13	0.003	6-21	0.004	8-17	0.005

APPENDIX J

TABLE 5 (Continued)

NITROGEN IN THE AIR AT THE McLANE RANCH - 1971

Units of (ppm) in Air

Date	NO_2 in Air	Date	NO_2 in Air
8-18	0.002	11-6	0.003
8-19	0.006	11-7	0.005
8-20	0.004	11-8	0.004
8-21	0.005	11-9	0.005
8-22	0.002	11-17	0.004
8-23	0.006	11-18	0.003
9-1	0.009	11-19	0.008
9-2	0.003	11-20	0.003
9-3	0.004	11-21	0.005
9-4	0.005	11-22	0.005
9-5	0.007	11-23	0.004
9-6	0.004		
9-7	0.007		
9-15	0.002		
9-16	0.005	Average	0.006
9-17	0.005		
9-18	0.004		
9-19	0.003		
9-20	0.004		
9-21	0.002		
10-5	0.004		
10-7	0.004		
10-8	0.004		
10-9	0.003		
10-10	0.002		
10-11	0.003		
10-12	0.002		
10-20	0.004		
10-21	0.004		
10-22	0.004		
10-23	0.003		
10-24	0.003		
10-25	0.003		
10-26	0.004		
11-3	0.004		
11-4	0.002		
11-5	0.006		

APPENDIX J

TABLE 6

NITROGEN IN THE AIR AT THE SULLIVAN RANCH - 1971

Units of (ppm) in Air

Date	NO_2 in Air	Date	NO_2 in Air	Date	NO_2 in Air
1-1	0.001	3-14	0.003	5-25	0.003
1-2	0.001	3-15	0.004	6-9	0.004
1-3	0.001	3-16	0.002	6-10	0.004
1-4	0.001	3-24	0.008	6-11	0.004
1-5	0.001	3-25	0.006	6-12	0.005
1-13	0.004	3-26	0.004	6-13	0.003
1-14	0.005	3-27	0.004	6-14	0.002
1-15	0.003	3-28	0.005	6-15	0.004
1-16	0.004	3-29	0.005	6-16	0.002
1-17	0.004	3-30	0.004	6-17	0.003
1-18	0.005	4-7	0.006	6-18	0.003
1-19	0.004	4-8	0.005	6-19	0.002
1-27	0.003	4-9	0.006	6-20	0.002
1-28	0.002	4-10	0.004	6-21	0.001
1-29	<0.002	4-11	0.004	6-22	0.002
1-30	<0.002	4-12	0.004	6-23	0.004
1-31	<0.002	4-13	0.004	6-24	0.003
2-1	<0.002	4-21	0.007	6-25	0.002
2-2	<0.002	4-22	0.006	6-26	0.004
2-10	0.008	4-23	0.005	6-27	0.003
2-11	0.009	4-24	0.006	6-28	0.003
2-12	0.010	4-25	0.007	6-29	0.005
2-13	0.014	4-26	0.006	7-7	0.012
2-14	0.014	4-27	0.007	7-8	0.010
2-15	0.011	5-5	0.002	7-9	0.012
2-16	0.009	5-6	0.002	7-10	0.013
2-24	0.010	5-7	0.003	7-11	0.012
2-25	0.010	5-8	0.002	7-12	0.013
2-26	0.009	5-9	0.002	7-13	0.011
2-27	0.010	5-10	0.002	7-21	0.013
2-28	0.009	5-11	0.002	7-22	0.011
3-1	0.009	5-19	0.002	7-23	0.010
3-2	0.010	5-20	0.001	7-24	0.009
3-10	0.005	5-21	0.003	7-25	0.006
3-11	0.007	5-22	0.002	7-26	0.008
3-12	0.004	5-23	0.003	7-27	0.007
3-13	0.004	5-24	0.002		

APPENDIX J

TABLE 6 (Continued)

NITROGEN IN THE AIR AT THE SULLIVAN RANCH - 1971

Units of (ppm) in Air

Date	NO_2 in Air	Date	NO_2 in Air
8-3	0.018	10-23	0.003
8-4	0.018	10-24	0.004
8-5	0.016	10-25	0.002
8-6	0.019	10-26	0.003
8-7	0.025	11-3	0.005
8-8	0.017	11-4	0.004
8-9	0.022	11-5	0.003
8-17	0.003	11-6	0.003
8-18	0.003	11-7	0.003
8-19	0.003	11-8	0.005
8-20	0.003	11-9	0.002
8-21	0.003	11-17	0.004
8-22	0.006	11-18	0.005
8-23	0.004	11-19	0.004
9-1	0.005	11-20	0.004
9-2	0.004	11-21	0.004
9-3	0.004	11-22	0.003
9-4	0.005	11-23	0.003
9-5	0.004	12-8	0.004
9-6	0.004	12-9	0.005
9-7	0.006	12-10	0.003
9-15	0.004	12-11	0.003
9-16	0.003	12-12	0.003
9-17	0.003	12-13	0.004
9-18	0.003	12-14	0.003
9-19	0.004	12-22	0.006
9-20	0.003	12-23	0.004
9-21	0.003	12-24	0.004
10-6	0.004	12-25	0.003
10-7	0.004	12-26	0.002
10-8	0.003	12-27	0.003
10-9	0.004	12-28	0.004
10-10	0.003		
10-11	0.003		
10-12	0.003		
10-20	0.004	Average	0.005
10-21	0.004		
10-22	0.003		

APPENDIX K

APPENDIX K

TABLE 1

CONCENTRATIONS OF RADIONUCLIDES IN PERIMETER SOIL SAMPLES - 1971

Units of (pCi/g) of Soil

	Co-60	Zn-65	Co-58	Cs-137	Cs-134	Ru-106	CePr-144	Pu-238	Pu-239,240	Sr-90
Benton City								*	0.02	0.22
ERC	0.04	0.16	0.008	0.80	*	0.12	0.91	*	0.01	0.10
Route 240, CP #54	0.10	0.20	*	0.33	*	0.63	0.27	*	*	0.03
Rattlesnake Springs	*	*	*	0.97	*	*	*	0.006	0.02	0.04
Yakima Barricade	0.07	0.29	*	0.52	*	0.81	0.70	0.004	0.009	*
Vernita Bridge	0.06	*	*	0.48	0.003	*	*	*	0.007	0.13
W.S. #2	0.12	*	0.05	0.47	0.07	*	*	0.004	0.004	0.09
Berg Ranch	*	0.06	0.03	0.57	0.08	0.10	0.16	0.007	0.01	0.08
Riverview	*	*	*	0.74	*	*	1.2	0.005	0.01	0.20
Byers Pumphouse	*	*	*	0.60	*	*	0.75	*	0.01	0.13
Byers Landing	0.03	*	0.08	1.3	0.06	0.48	1.1	*	0.01	0.28
Ringold	*	0.16	0.01	0.41	0.07	0.13	*	*	0.006	1.0
North Richland	*	*	*	0.42	*	0.04	0.47	0.004	0.01	0.05
Maximum	0.12	0.29	0.08	1.3	0.08	2.3	1.2	0.007	0.02	1.0
Minimum	0	0	0	0.33	0	0	0	0	*	0
Average	0.03	0.07	0.02	0.66	0.02	0.45	0.44	0.003	0.01	0.18

* Indicates analytical result less than the detection limit.

APPENDIX K

TABLE 2

CONCENTRATIONS OF RADIONUCLIDES IN PERIMETER VEGETATION SAMPLES - 1971

Units of (pCi/g) of Vegetation

	ZrNb-95	Cs-137	Ru-106	Ce-141	CePr-144	Sr-90	Pu-238	Pu-239,240
Benton City	0.86	0.15	*	*	1.4	0.07	*	*
ERC	1.0	0.21	*	*	2.7	0.14	*	0.002
Route 240	1.5	0.46	1.2	*	4.0	0.18	*	0.006
Rattlesnake Springs	2.2	0.72	*	*	5.9	0.23	*	0.005
Yakima Barricade	1.4	0.31	1.9	*	3.2	0.14	*	0.004
Vernita Bridge	1.6	0.39	*	*	3.7	0.20	*	0.002
W.S. #2	2.4	0.60	1.4	*	8.8	0.22	0.004	0.01
Berg Ranch	2.7	0.56	2.7	*	11.	0.18	*	*
Ringold	0.81	0.15	*	3.4	1.8	0.04	*	0.006
Byers Pumphouse	0.68	0.25	*	*	1.1	0.12	*	*
Byers Landing	2.4	0.82	*	*	6.5	0.78	*	0.005
Riverview	0.73	0.25	*	*	4.0	0.14	*	*
North Richland	2.4	0.67	*	*	7.5	0.26	*	0.005
Maximum	2.7	0.82	2.7		11.	0.78	0.004	0.011
Minimum	0.68	0.15	*		1.1	0.07	0	*
Average	1.6	0.43	0.95		4.7	0.21	*	0.004

* Indicates analytical result less than the detection limit.

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