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ENVIRONMENTAL SURVEILLANCE AT HANFORD FOR CY-1973 DATA

Battelle
Pacific Northwest Laboratories
Richland, Washington 99352

APRIL 1974

Prepared for the U.S. Atomic Energy Commission under Contract AT(45-1):1830

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ENVIRONMENTAL SURVEILLANCE AT HANFORD FOR CY-1973 DATA

by

W. L. Nees and J. P. Corley
Occupational and Environmental Safety Department

April 1974

BATTELLE
PACIFIC NORTHWEST LABORATORIES
RICHLAND, WASHINGTON 99352

During 1973, Hanford facilities were operated for the U.S. Atomic Energy Commission by: Atlantic Richfield Hanford Company, Pacific-Northwest Laboratories of Battelle Memorial Institute, United Nuclear Industries, Inc., Westinghouse Hanford Company, and Hanford Environmental Health Foundation.

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 1973. The significance of these data is discussed in the parent report, BNWL-1811.

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" where 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 R.G. Anderson, 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 U.S. Atomic Energy Commission.

The majority of the radioanalyses documented here were performed by the U. S. Testing Company, Richland, Washington, under contract to the Atomic Energy Commission. Large volume water samples and core samples were obtained and analyses provided by the Radiological Chemistry section of Battelle Northwest Laboratories, R. W. Perkins, Manager.

April 1974

W. L. Nees
J. P. Corley

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APPENDIX A
RADIONUCLIDES IN COLUMBIA RIVER WATER

APPENDIX A

TABLE 1

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT VERNITA
(MONTHLY COMPOSITES OF WEEKLY GRAB SAMPLES) - 1973

(Units of 10^{-9} μCi/ml of Water)

Date	Alpha	^{3}H	^{46}Sc	^{51}Cr	^{60}Co	^{65}Zn	^{90}Sr	^{131}I	^{137}Cs-^{137m}Ba	^{239}Pu
Anal. Limit	0.2	250	25	250	18	2.0	0.06	1.5	1.0	0.01
1/2		940	*	*	*	*		*	*	
1/29	0.24	640	*	*	*	2.8	0.27	*	*	
2/26	0.48						1.4	*		*
3/27	0.80	600	*	*	*	*	0.31	*	*	
4/24		1,100								
5/29		500								
6/25		300								
7/24		510								
8/28		370								
9/25		380								
10/29		310								
11/27		280								
12/26		*								
Jan-Mar Avg.	0.51		*1.6	*1.2	*5.6	*	0.66	*0.71	*0.07	*0.003
Annual Avg.		510								

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

APPENDIX A

TABLE 2

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT RICHLAND (CUMULATIVE SAMPLES) - 1973

(Units of 10^{-9} μCi/ml of Water)

Date	^{46}Sc	^{51}Cr	^{60}Co	^{65}Zn	^{131}I	^{137}Cs-^{137m}Ba
Analytical Limit	25	250	18	39	1.0	20
1/2-1/9	*	*	*	*	1.3	*
1/10-1/16	*	*	*	*		*
1/16-1/23	*	*	*	*	1.2	*
1/23-1/30	*	*	*	*		*
1/30-2/6	*	*	*	*	*	*
2/6-2/13	*	*	47	*		*
2/13-2/20	*	*	*	52	*	*
2/20-2/27	*	*	23	*		*
2/27-3/6	*	*	*	*	*	*
3/6-3/13	*	*	*	*		*
3/13-3/20	*	*	*	*	*	*
3/20-3/27	*	*	*	*		*
3/29-4/3	*	*	*	*	*	*
4/3-4/10	*	*	*	*		*
4/10-4/17	*	*	*	*	*	*
4/17-4/24	*	*	*	*		*
4/24-5/1	*	*	*	*	2.6	*
5/1-5/8	*	*	*	*		*
5/8-5/15	*	*	*	*	*	*
5/15-5/22	*	*	*	*		*
5/22-5/29	*	*	*	*	1.1	*
5/29-6/5	*	*	*	*		*
6/5-6/12	*	*	*	*	*	*
6/12-6/19	*	*	*	*		*
6/19-6/26	*	*	*	*	*	*
6/26-7/3	*	*	*	*		*
7/3-7/10	*	*	*	*	*	*
7/10-7/17	*	*	*	*		*
7/17-7/24	*	*	*	*	*	*
7/24-7/31	*	*	*	*		*
7/31-8/7	*	*	*	*	2.0	*

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

APPENDIX A

TABLE 2 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT RICHLAND (CUMULATIVE SAMPLES) - 1973

(Units of 10^{-9} μCi/ml of Water)

Date	^{46}Sc	^{51}Cr	^{60}Co	^{65}Zn	^{131}I	^{137}Cs-^{137m}Ba
Analytical Limit	25	250	18	39	1.0	20
8/7-8/14	*	*	*	*		*
8/14-8/21	*	*	*	*	*	*
8/21-8/28	*	*	*	*		*
8/28-9/4	*	*	*	*	1.8	*
9/4-9/11	*	*	*	*		*
9/11-9/18	*	*	*	*	1.2	*
9/18-9/25	*	*	*	*		*
9/25-10/2	*	*	*	*	*	*
10/2-10/9	*	*	*	*		*
10/9-10/16	*	*	*	*	*	*
10/16-10/23	*	*	*	*		*
10/23-10/30	*	*	*	*	*	*
10/30-11/6	*	*	*	*		*
11/6-11/13	*	*	*	*	1.9	*
11/13-11/20	*	*	*	*		*
11/20-11/27	*	*	*	*	*	*
11/27-12/4	*	*	*	*		*
12/4-12/11	*	*	*	*	*	*
12/11-12/18	*	*	*	*	1.9	*
12/18-12/26	*	*	*	*	*	*
Annual Average	*	*40	*5.6	*7.3	0.99	*2.3

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

APPENDIX A

TABLE 3

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT RICHLAND
(MONTHLY COMPOSITE OF WEEKLY CUMULATIVE SAMPLES) - 1973

(Units of 10^{-9} μCi/ml of Water)

Date	Alpha	^{3}H	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba	^{239}Pu
Analytical Limit	0.25	200	39	0.06	1.0	0.01
1/2-1/30	0.48	330		0.26	*	
1/30-2/27	0.32	980	*	0.40	*	*
2/27-3/27	0.42	790		0.34	*	
3/27-4/24	0.27	1,100		0.39	*	
4/24-5/29	0.87	510	*	0.38	*	*
5/29-6/26	0.80	410		0.31	*	
6/26-7/31	0.45	530		0.34	*	
7/31-8/28	0.61	480	*	0.43	*	*
8/28-9/25	0.54	500		0.32	*	
9/25-10/30	0.27	740		0.35	*	
10/30-11/27	0.32	200	*	0.32	*	*
11/27-12/26	0.53	750		0.16	*	
Annual Average	0.49	610	*0.58	0.33	*0.20	*.004

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

APPENDIX A

TABLE 4

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT 100-B (CUMULATIVE SAMPLES) - 1973

(Units of 10^{-9} μCi/ml of Water)

Date	^{46}Sc	^{51}Cr	^{60}Co	^{65}Zn	^{90}Sr	^{131}I	^{137}Cs-^{137m}Ba	^{239}Pu	Alpha
Anal. Limit	25	210	15	39	0.06	1.2	20.	0.006	0.17
2/26-3/5	*	*	*	*		*	*		
3/5-3/12	*	*	*	*		*	*		
3/12-3/19	*	*	*	*		*	*		0.46
3/19-3/26	*	*	*	*		1.2	*		0.58
3/26-4/2	*	*	*	*		2.5	*		
4/2-4/9	*	*	*	*		1.7	*		
4/9-4/16	*	*	*	*		*	*		
4/16-4/30	*	*	*	*	0.39		*	0.006	0.60
4/30-5/29	*	*	*	*	0.26		*		0.80
5/29-6/25	*	*	*	*	0.24		*		0.49
6/25-7/23	*	*	*	*			*		0.31
6/25-7/30					0.37				
7/30-8/27	*	*	*	*	0.35		*		0.59
8/27-9/25	*	*	*	*	*		*	0.012	0.52
9/25-10/29	*	*	*	*	0.38		*		0.27
10/29-11/26	*	*	*	*	0.44		*		0.17
11/26-12/26	*	*	*	*	0.24		*	*	0.53
Annual Avg.	*	*13	*1.3	*1.9	0.34	1.2	*1.2	0.007	0.48

*Result was less than the analytical limit shown.
No entry indicates no measurement was made.

APPENDIX A

TABLE 5

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT 100-N (GRAB SAMPLES) - 1973

(Units of 10^{-9} μCi/ml of Water)

Date	^{3}H	^{46}Sc	^{51}Cr	^{60}Co	^{131}I	^{137}Cs-^{137m}Ba
Analytical Limit	250	25	250	18	1.2	20
1/18	310,000	*	*	38	140	*
4/25	13,000					
7/26	1,900					
10/11	2,600					
Annual Average	81,000					

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

APPENDIX A

TABLE 6

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT 100-D (GRAB SAMPLES) - 1973

(Units of 10^{-9} μCi/ml of Water)

Date	^{3}H	^{46}Sc	^{51}Cr	^{60}Co	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba
Anal. Limit	250	25	300	28	35	0.05	20
1/18	15,000	*	*	*	*		*
2/21	6,600	*	*	*	*		*
3/16	10,000	*	*	*	*		*
4/23	2,400	*	*	*	*	0.49	*
5/18	7,800	*	*	*	*	0.70	*
6/14	4,300	*	*	*	*	0.84	*
7/26	1,400	*	*	*	*	0.05	*
8/13	7,800	*	*	*	*	0.78	*
9/7	9,500	*	*	*	*	0.85	*
10/11	2,700	*	*	*	*	0.63	*
11/8	1,900	*	*	*	*	0.78	*
12/7	2,400	*	*	*	*	0.77	*
Annual Average	6,000	*0.44	*51	*8.3	*12	0.66	*3.3

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

APPENDIX A

TABLE 7

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT BONNEVILLE DAM (MONTHLY COMPOSITE OF WEEKLY CUMULATIVE SAMPLES) - 1973

(Units of 10^{-9} μCi/ml of Water)

Date	^{65}Zn
Analytical Limit	8.0
12/25-1/29	*
1/29-2/26	*
2/26-3/19	*
3/19-4/27	*
4/27-5/29	*
5/29-6/26	*
6/26-7/30	*
7/30-8/27	*
8/27-9/24	*
9/24-10/29	*
10/29-11/26	*
11/26-12/29	*
Annual Average	*

*Result was less than the analytical limit shown.

APPENDIX A

TABLE 8

ESTIMATED RATE OF TRANSPORT OF RADIONUCLIDES IN THE COLUMBIA RIVER WATER AT RICHLAND (CUMULATIVE SAMPLES) - 1973

(Average Ci/Day)

Date	^{46}Sc	^{51}Cr	^{60}Co	^{65}Zn	^{131}I
1/2-1/9	0	0	*1.3	0	0.36
1/10-1/16	0	0	*1.7	0	
1/16-1/23	0	0	*2.0	0	0.22
1/23-1/30	0	0	*3.1	0	
1/30-2/6	0	0	*0.96	0	*0.23
2/6-2/13	0	0	12.	*8.0	
2/13-2/20	0	0	*4.3	12.	0.17
2/20-2/27	*1.8	0	5.2	0	
2/27-3/6	*0.48	0	*2.6	0	0.11
3/6-3/13	0	0	*2.4	0	
3/13-3/20	0	5.8	*0.52	0	*0.38
3/20-3/27	*1.7	0	*0.10	0	
3/29-4/3	*1.2	0	*2.6	0	0.11
4/3-4/10	0	0	*4.0	*5.6	
4/10-4/17	0	0	*0.47	0	*0.14
4/17-4/24	*0.72	*14.	*3.6	*0.54	
4/24-5/1	0	0	*1.9	0	0.56
5/1-5/8	0	0	*2.8	0	
5/8-5/15	0	0	*0.84	0	*0.21
5/15-5/22	0	*12.	*1.1	*2.1	
5/22-5/29	0	0	*0.81	*0.46	0.19
5/29-6/5	*1.0	0	0	*2.2	
6/5-6/12	*0.02	0	*3.4	0	*0.14
6/12-6/19	0	*6.9	0	*2.1	
6/19-6/26	0	*26.	0	*3.5	*0.07
6/26-7/3	0	*19.	*3.2	*5.4	
7/3-7/10	0	*8.8	*3.2	0	*0.12
7/10-7/17	0.01	*40.	*0.04	0	
7/17-7/24	0	*8.0	0	*8.2	*0.21
7/24-7/31	0	*41.	*0.90	*5.3	
7/31-8/7	0	0	*0.03	*2.7	0.52
8/7-8/14	0	*7.0	*0.04	*0.16	
8/14-8/21	0	*40.	*1.6	*0.79	*0.08
8/21-8/28	*2.7	*19.	*0.03	*1.4	

*Less than.
No entry indicates no specific analysis was made.

APPENDIX A

TABLE 8 (Continued)

ESTIMATED RATE OF TRANSPORT OF RADIONUCLIDES IN THE COLUMBIA RIVER WATER AT RICHLAND (CUMULATIVE SAMPLES) - 1973

(Average Ci/Day)

Date	^{46}Sc	^{51}Cr	^{60}Co	^{65}Zn	^{131}I
8/28-9/4	*1.4	*41.	*0.03	5.4	0.36
9/4-9/11	*0.60	0	0	5.1	
9/11-9/18	0	*29	0	0	0.20
9/18-9/25	0	*0.06	*0.03	*0.01	
9/25-10/2	0	*11.	*0.74	*0	*0.08
10/2-10/9	0	*49.	*2.2	*3.1	
10/9-10/16	0	*47.	*1.5	0	*0.15
10/16-10/23	*0.01	*5.8	*0.03	0	
10/23-10/30	0	*7.3	*2.3	*2.7	*0.06
10/30-11/6	0	*5.1	*0.40	*0.12	
11/6-11/13	*0.65	*2.4	*0.74	*3.7	0.30
11/13-11/20	0	*30.	*0.58	*0.98	
11/20-11/27	0	*22.	0	*4.5	*0.13
11/27-12/4	*2.3	*27.	*0.02	*1.7	*0.94
12/4-12/11	0	0	*0.67	0	*0.75
12/11-12/18	0	*5.6	0	*5.9	*4.1
12/18-12/26	*0.10	0	*0.002	*0.06	
Annual Avg.	*0.31	*11.	*1.5	*2.0	*0.35

*Less than.
No entry indicates no specific analysis was made.

APPENDIX A

TABLE 9

ESTIMATED RATE OF TRANSPORT OF RADIONUCLIDES IN THE COLUMBIA RIVER AT RICHLAND (MONTHLY COMPOSITE CUMULATIVE SAMPLES) - 1973

(Average Ci/Day)

Date	Alpha	^{3}H	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba	^{239}Pu
1/2-1/30	0.11	84		0.06	0	
1/30-2/27	0.08	240	*0.03	0.10	0	0.0005
2/27-3/27	0.10	190		0.08	*0.0005	
3/29-4/24	0.06	280		0.10	*0.100	
4/24-5/29	0.17	100	*0.28	0.08	*0.08	*0.0008
5/29-6/26	0.16	85		0.06	*0.17	
6/26-7/24	0.11	130		0.09	*0.21	
7/24-8/28	0.15	120	*0.09	0.11	0	*0.001
8/28-9/25	0.10	97		0.06	*0.04	
9/25-10/30	0.05	140		0.07	*0.03	
10/30-11/27	0.05	32	*0.06	0.05	*0.15	*0.0003
11/27-12/26	0.11	190		0.04	*0.08	
Annual Average	0.10	140	*0.11	0.07	*0.07	*0.0006

No entry indicates no specific analysis was made.

APPENDIX A

TABLE 10

ESTIMATED RATE OF TRANSPORT OF RADIONUCLIDES IN THE COLUMBIA RIVER WATER AT BONNEVILLE DAM (MONTHLY COMPOSITE CUMULATIVE SAMPLES) - 1973

(Average Ci/Day)

Date	^{65}Zn
12/25-1/29	*0.5
1/29-2/26	0
2/26-3/19	0
3/19-4/27	0
4/27-5/29	0
5/29-6/26	*1.4
6/26-7/30	0
7/30-8/27	*0.3
8/27-9/24	*0.2
9/24-10/29	*1.7
10/29-11/26	*0.2
11/26-12/29	*1.8
Annual Average	*0.50

*Less than.

APPENDIX A

TABLE 11

BETA ACTIVITY IN THE COLUMBIA RIVER AT RICHLAND (CUMULATIVE SAMPLES) - 1973

(Units of Counts/Minute/Milliliter)

Date	Beta	Date	Beta
Analytical Limit	0.005	Analytical Limit	0.005
1/2-1/9	*	7/3-7/10	0.005
1/9-1/16	*	7/10-7/17	*
1/16-1/23	*	7/17-7/24	*
1/23-1/30	*	7/24-7/31	*
1/30-2/6	*	7/31-8/7	*
2/6-2/13	0.007	8/7-8/14	*
2/13-2/20	0.005	8/14-8/21	*
2/20-2/27	*	8/21-8/22	*
2/27-3/6	*	8/22-8/29	
3/6-3/13	*	8/29-9/4	*
3/13-3/20	*	9/4-9/11	*
3/20-3/27	*	9/11-9/18	*
3/29-4/3	*	9/18-9/25	*
4/3-4/10	*	9/25-10/2	*
4/10-4/17	*	10/2-10/9	*
4/17-4/24	*	10/9-10/16	*
4/24-5/1	0.005	10/16-10/23	*
5/1-5/8	*	10/23-10/30	*
5/8-5/15	*	10/30-11/6	*
5/15-5/22	*	11/6-11/13	*
5/22-5/29	*	11/13-11/20	*
5/29-6/5	0.008	11/20-11/27	*
6/5-6/12	*	11/27-12/4	*
6/12-6/19	0.005	12/4-12/11	*
6/19-6/26	0.006	12/11-12/18	*
6/26-7/3	*	12/18-12/26	
Annual Average			0.003

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

APPENDIX A

TABLE 12

BETA ACTIVITY IN THE COLUMBIA RIVER AT 100-B (CUMULATIVE SAMPLES) - 1973

(Units of Counts/Minute/Milliliter)

Date	Beta
Analytical Limit	0.005
2/26-3/5	*
3/5-3/12	*
3/12-3/19	*
3/19-3/26	*
3/26-4/2	*
4/2-4/9	*
4/9-4/16	*
4/16-4/30	*
4/30-5/29	*
5/29-6/25	*
6/25-7/23	*
7/23-8/27	*
8/27-9/25	*
9/25-10/29	*
10/29-11/26	*
11/26-12/26	*
Annual Average	*0.002

*Result was less than the analytical limit shown.

APPENDIX A

TABLE 13

BETA ACTIVITY IN THE COLUMBIA RIVER AT 100-N (GRAB SAMPLES) - 1973

(Units of Counts/Minute/Milliliter)

Date	Beta
Analytical Limit	0.010
1/18	0.15
4/25	0.02
7/26	*
10/11	0.02
Annual Average	0.05

*Result was less than the analytical limit shown.

APPENDIX A

TABLE 14

BETA ACTIVITY IN THE COLUMBIA RIVER AT 100-D (GRAB SAMPLES) - 1973

(Units of Counts/Minute/Milliliter)

Date	Beta
Analytical Limit	0.005
1/18	*
2/21	*
3/16	*
4/23	*
5/18	0.007
6/14	*
7/26	*
8/13	*
9/7	*
10/11	*
11/8	0.004
12/7	*
Annual Average	0.005

*Result was less than the analytical limit shown.

APPENDIX A

TABLE 15 (Part A)

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT THE 300 Area - 1973

FILTRATION ION EXCHANGE COLUMN - SOLUBLE SAMPLES

(Units of 10^{-9} µCi/ml)

Sampling Interval	^{40}K	^{54}MN	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{106}Ru	^{137}Cs	^{152}Eu	^{226}Ra	^{228}Th
Approximate Detection Level	0.009	0.014	0.00045	0.0045	0.0045	0.0045	0.0045	0.018	0.0023	0.00045
4/11 - 4/19		0.059	0.043	0.081	*	0.11	*	*	0.072	*
4/19 - 5/4		*	0.006	0.015	*	0.051	*	*	0.015	*
5/31 - 6/26		0.023	0.010	0.008	*	0.036	*	*		0.003
6/26 - 7/10	0.56	0.068	0.020	0.006	*	0.97	*	*	0.023	0.003
7/10 - 7/24	0.61	0.018	0.010	0.008	*	0.066	*	*	0.009	*
7/24 - 8/10	0.69	0.015	0.009	0.008	*	0.072	*	*		*
8/10 - 8/23	0.65	0.016	0.007	0.013	*	0.058	*	*	0.006	*
8/23 - 9/6	0.58	*	0.011	0.006	*	0.063	*	*		*
9/6 - 9/25	0.46	*	0.013	0.006	*	0.050	*	*		*
9/25 - 10/10	0.71	0.017	0.013	0.014	*	0.078	*	*	0.025	0.002
10/10 - 10/24	0.71	*	0.013	0.014	*	0.059	*	*	0.010	*
10/24 - 11/7	0.62	*	0.013	0.014	*	0.050	*	*	0.010	0.002
11/7 - 11/21	0.77	0.015	0.014	0.014	*	0.066	*	*		*
11/21 - 12/5	0.66	0.015	0.011	0.016	*	0.058	*	*	0.011	0.004
12/5 - 12/13	0.77	0.028	0.021	0.027	*	0.073	*	*	0.029	0.011
12/13 - 12/21	0.82	0.023	0.014	0.012	*	0.067	*	*	0.015	0.009
Average	0.66	0.02	0.01	0.02	*	0.07	*	*	0.02	0.002

* Less than the approximate detection level
No entry indicates no analysis was made.

APPENDIX A

TABLE 15 (Part B)

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT THE 300 Area - 1973

FILTRATION ION EXCHANGE COLUMN - PARTICULATE SAMPLES

(Units of 10^{-9} µCi/ml)

Sampling Interval	^{40}K	^{54}Mn	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{106}Ru	^{137}Cs	^{152}Eu	^{226}Ra	^{228}Th
Approximate Detection Level	0.009	0.014	0.00045	0.0045	0.0045	0.0045	0.0045	0.018	0.0023	0.00045
4/11 - 4/19		0.91	0.50	0.11	*	0.09	*	*	*	0.009
4/19 - 5/4		0.05	0.061	0.027	*	0.10	*	*	0.015	0.002
5/31 - 6/26		0.41	0.19	0.18	*	0.016	*	*		0.002
6/26 - 7/10		0.28	0.13	0.054	*	0.009	*	*	0.004	0.001
7/10 - 7/24	0.081	0.11	0.067	0.21	*	0.008	*	*	0.003	0.002
7/24 - 8/10	0.036	0.059	0.044	0.010	*	0.006	*	*	*	0.001
8/10 - 8/23	0.027	0.028	0.040	0.005	*	0.003	*	*	*	0.001
8/23 - 9/6	0.025	0.042	0.047	0.009	*	0.006	*	*		0.0004
9/6 - 9/25		0.023	0.030	0.009	*	*	*	*		*
9/25 - 10/10	0.019	0.028	0.040	0.012	*	*	*	*	*	0.0004
10/10 - 10/24	0.019	0.022	0.037	0.006	*	*	*	*	*	0.001
10/24 - 11/7	0.18	0.018	0.038	0.007	*	*	*	*	*	0.007
11/7 - 11/21	0.025	*	0.016	0.004	*	*	*	*		*
11/21 - 12/5	0.12	*	0.019	0.005	*	*	*	*	0.003	0.001
12/5 - 12/13		0.033	0.039	0.043	*	*	*	*	*	0.001
12/13 - 12/21	0.008	0.014	0.021	0.019	*	*	*	*	0.026	0.002
Average	0.05	0.13	0.08	0.04	*	0.02	*	*	0.006	0.002

* Less than the approximate detection level
No entry indicates no analysis was made

APPENDIX A

TABLE 16

CONCENTRATION OF RADIONUCLIDES IN THE COLUMBIA RIVER AT McNARY DAM - 1973

(Units of 10^{-9} μCi/ml)

Date	^{40}K	^{46}Sc	^{54}Mn	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{106}Ru	^{137}Cs	^{152}Eu	^{226}Ra	^{228}Th
Insoluble Samples											
1-18	1.8	*	*	0.038	0.069	0.040	0.009	0.076	*	0.040	0.047
2-15	0.17	*	0.008	0.024	0.006	*	0.002	*	0.004	0.002	0.003
3-19	0.36	0.002	*	0.042	0.021	0.053	0.009	0.015	0.011	*	0.007
4-27	0.30	*	0.046	0.081	0.043	*	0.006	0.016	0.016	0.009	0.018
5-15	0.49	0.0007	0.028	0.044	0.038	0.004	0.008	0.017	0.014	0.004	0.008
7-12	1.2	*	0.16	0.20	0.050	*	0.015	0.074	0.094	0.020	0.020
8-6	0.049	*	0.032	0.035	0.016	*	0.008	0.018	0.023	0.006	0.006
11-8	0.21	*	0.02	0.048	0.009	*	*	0.018	0.18	0.004	0.004
Average	.52	*	0.04	0.06	0.03	*	0.008	0.03	0.04	0.01	0.01
Soluble Samples											
1-18	3.0	*	*	0.006	0.043	0.020	0.032	0.023	*	*	0.002
2-15	1.1	*	*	0.003	0.024	*	0.007	*	*	0.010	0.005
3-19	1.4	*	*	0.016	0.016	*	*	*	*	*	0.009
4-27	1.2	*	*	0.017	0.014	*	0.015	*	*	*	0.002
5-15	1.4	*	*	0.006	*	*	0.008	*	*	0.020	0.004
7-12	0.99	*	*	0.009	*	*	0.008	*	*	0.033	0.007
8-6	0.54	0.001	*	0.040	*	*	*	*	*	0.011	0.008
11-8	1.5	*	*	0.009	*	*	*	*	*	0.013	0.003
Average	1.3	*	*	0.02	0.02	*	0.01	*	*	0.01	0.005

* Less than detection level

APPENDIX B
RADIONUCLIDES IN DRINKING WATER

APPENDIX B

TABLE 1

CONCENTRATIONS OF RADIONUCLIDES IN RICHLAND DRINKING WATER (CUMULATIVE SAMPLES) - 1973

(Units of 10^{-9} μCi/ml of Water)

Date	^{46}Sc	^{51}Cr	^{60}Co	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba	Alpha
Analy. Limit	25.	360	18	39	0.03	20	0.12
1/2-1/8	*	*	*	*		*	0.35
1/8-1/15	*	*	24.	*		*	0.44
1/15-1/22	*	*	*	*	0.03	*	*
1/22-1/29	*	*	*	*		*	*
1/29-2/5	*	*	*	*		*	0.37
2/5-2/12	*	*	*	*		*	1.0
2/12-2/20	*	*	*	*	*	*	1.0
2/20-2/26	*	*	*	*		*	0.97
2/26-3/5	*	*	*	*		*	1.3
3/5-3/12	*	*	*	*		*	1.2
3/12-3/19	*	*	*	*		*	0.76
3/19-3/26	*	*	*	*	0.26	*	0.71
3/26-4/2	*	*	*	*		*	1.1
4/2-4/9	*	*	*	*		*	0.95
4/9-4/16	*	*	*	*		*	0.60
4/16-4/23	*	*	*	*	0.29	*	0.95
4/23-4/30	*	*	*	*		*	0.85
4/30-5/7	*	*	*	*		*	0.88
5/7-5/14	*	*	*	*		*	0.79
5/14-5/21	*	*	*	*	0.24	*	0.32
5/21-5/29	*	*	*	*		*	0.71
5/29-6/4	*	*	*	*		*	0.60
6/4-6/11	*	*	*	*		*	0.64
6/11-6/18	*	*	*	*		*	0.39
6/18-6/25	*	*	*	*	0.33	*	0.88
6/25-7/2	*	*	*	*		*	0.51
7/2-7/9	*	*	*	*		*	0.35
7/9-7/16	*	*	*	*		*	0.42
7/16-7/23	*	*	*	*	0.27	*	0.58
7/23-7/30	*	*	*	*		*	0.40
7/30-8/6	*	*	*	*		*	1.4
8/6-8/13	*	*	*	*		*	0.69

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

APPENDIX B

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN RICHLAND DRINKING WATER
(CUMULATIVE SAMPLES) - 1973

(Units of 10^{-9} μCi/ml of Water)

Date	^{46}Sc	^{51}Cr	^{60}Co	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba	Alpha
Analy. Limit	25.	360	18.	39.	0.03	20.	0.12
8/13-8/20	*	*	*	*	0.22	*	0.69
8/20-8/27	*	*	*	*		*	0.58
8/27-9/4	*	*	*	*		*	1.0
9/4-9/10	*	*	*	*		*	0.64
9/10-9/17	*	*	*	*		*	0.79
9/17-9/24	*	*	*	*	1.5	*	0.39
9/24-10/1	*	*	*	*		*	0.48
10/1-10/8	*	*	*	*		*	0.38
10/8-10/15	*	*	*	*		*	0.69
10/15-10/22	*	*	*	*	0.36	*	0.42
10/22-10/29	*	*	*	*		*	0.58
10/29-11/5	*	*	*	*		*	1.6
11/5-11/12	*	*	*	*		*	0.60
11/12-11/19	*	*	*	*	0.39	*	0.86
11/19-11/26	*	*	*	*		*	1.5
11/26-12/3	*	*	*	*		*	0.65
12/3-12/10	*	*	*	*		*	0.66
12/10-12/17	*	*	*	*		*	0.37
12/17-12/21	*	*	*	*		*	*
12/21-12/31	*	*	*	*	0.26	*	1.0
Annual Average	*0.72	*73.	*5.8	*7.6	0.34	*1.8	0.70

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

APPENDIX B

TABLE 2

CONCENTRATIONS OF RADIONUCLIDES IN 300 AREA DRINKING WATER
(CUMULATIVE SAMPLES) - 1973

(Units of 10^{-9} μCi/ml of Water)

Date	^{46}Sc	^{51}Cr	^{60}Co	^{65}Zn	^{137}Cs-^{137m}Ba	Alpha
Analy. Limit	25.	265	18.	39.	20.	0.30
1/2-1/8	*	*	*	*	*	0.51
1/8-1/15	*	*	*	*	*	0.67
1/15-1/22	*	*	*	*	*	0.35
1/22-1/29	*	*	*	*	*	*
1/29-2/5	*	*	*	*	*	0.35
2/5-2/12	*	*	*	*	*	1.7
2/12-2/20	*	*	29.	*	*	*
2/20-2/26	*	*	23.	*	*	0.86
2/26-3/5	*	*	20.	*	*	0.39
3/5-3/12	*	*	*	*	*	0.68
3/12-3/19	*	*	*	*	*	0.35
3/19-3/26	*	*	*	*	*	*
3/26-4/2	*	*	*	*	*	*
4/2-4/9	*	*	*	*	*	0.35
4/9-4/16	*	*	*	*	*	0.61
4/16-4/23	*	*	*	*	*	0.56
4/23-4/30	*	*	*	*	*	0.71
4/30-5/7	*	*	*	*	*	1.1
5/7-5/14	*	*	*	*	*	0.53
5/14-5/21	*	*	*	*	*	0.38
5/21-5/29	*	*	*	*	*	0.53
5/29-6/4	*	*	*	*	*	0.56
6/4-6/11	*	*	*	*	*	*
6/11-6/18	*	*	*	*	*	0.44
6/18-6/25	*	*	*	*	*	*
6/25-7/2	*	*	*	*	*	*
7/2-7/9	*	*	*	*	*	0.37
7/9-7/16	*	*	*	*	*	0.44
7/16-7/23	*	*	*	*	*	*
7/23-7/30	*	*	*	*	*	0.37
7/30-8/6	*	*	*	*	*	0.66
8/6-8/13	*	*	*	*	*	0.32

*Result was less than the analytical limit shown.
No entry indicates no analysis was made.

APPENDIX B

TABLE 2 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN 300-AREA DRINKING WATER (CUMULATIVE SAMPLES) - 1973

(Units of 10^{-9} μCi/ml of Water)

Date	^{46}Sc	^{51}Cr	^{60}Co	^{65}Zn	^{137}Cs-^{137m}Ba	Alpha
Analy. Limit	25.	265	18.	39.	20.	0.30
8/13-8/20	*	*	*	*	*	0.99
8/20-8/27	*	*	*	*	*	0.44
8/27-9/4	*	*	*	*	*	0.72
9/4-9/10	*	*	*	*	*	0.57
9/10-9/17	*	*	*	*	*	0.53
9/17-9/24	*	*	*	*	*	0.53
9/24-10/1	*	*	*	*	*	0.65
10/1-10/8	*	*	*	*	*	0.62
10/8-10/15	*	*	*	*	*	0.60
10/15-10/22	*	*	*	*	*	0.37
10/22-10/29	*	*	*	*	*	0.72
10/29-11/5	*	*	*	*	*	0.95
11/5-11/12	*	*	*	*	*	0.86
11/12-11/19	*	*	*	*	*	0.76
11/19-11/26	*	*	*	*	*	0.90
11/26-12/3	*	*	*	*	*	0.88
12/3-12/10	*	*	*	*	*	1.1
12/10-12/17	*	*	*	*	*	1.0
12/17-12/21	*	*	*	*	*	0.51
12/21-12/31	*	*	*	*	*	0.39
Annual Average	*0.04	*40.	*4.2	*6.8	*1.2	0.57

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

APPENDIX B

TABLE 3

BETA ACTIVITY IN RICHLAND DRINKING WATER
(CUMULATIVE SAMPLES) - 1973

(Units of Counts/Minutes/Milliliter)

Date	c/m/ml	Date	c/m/ml
Analytical Limit	0.005	Analytical Limit	0.005
1/2-1/8	*	7/2-7/9	*
1/8-1/15	*	7/9-7/16	*
1/15-1/22	*	7/16-7/23	*
1/22-1/29	*	7/23-7/30	*
1/29-2/5	*	7/30-8/6	*
2/5-2/12	*	8/6-8/13	*
2/12-2/20	*	8/13-8/20	*
2/20-2/26	*	8/20-8/27	*
2/26-3/5	*	8/27-9/4	*
3/5-3/12	*	9/4-9/10	*
3/12-3/19	*	9/10-9/17	*
3/19-3/26	*	9/17-9/24	*
3/26-4/2	*	9/24-10/1	*
4/2-4/9	*	10/1-10/8	*
4/9-4/16	*	10/8-10/15	*
4/16-4/23	*	10/15-10/22	*
4/23-4/30	0.005	10/22-10/29	*
4/30-5/7	*	10/29-11/5	*
5/7-5/14	*	11/5-11/12	*
5/14-5/21	*	11/12-11/19	*
5/21-5/29	*	11/19-11/26	*
5/29-6/4	0.009	11/26-12/3	*
6/4-6/11	*	12/3-12/10	*
6/11-6/18	*	12/10-12/17	*
6/18-6/25	*	12/17-12/21	*
6/25-7/2	*	12/21-12/31	*
Annual Average			*0.003

*Result was less than the analytical limit shown.

APPENDIX B

TABLE 4

BETA ACTIVITY IN 300 AREA DRINKING WATER
(CUMULATIVE SAMPLES) - 1973

(Units of Counts/Minutes/Milliliter)

Date	c/m/ml	Date	c/m/ml
Analytical Limit	0.005	Analytical Limit	0.005
1/2-1/8	*	7/2-7/9	*
1/8-1/15	*	7/9-7/16	*
1/15-1/22	*	7/16-7/23	*
1/22-1/29	*	7/23-7/30	*
1/29-2/5	*	7/30-8/6	*
2/5-2/12	*	8/6-8/13	*
2/12-2/20	0.008	8/13-8/20	*
2/20-2/26	*	8/20-8/27	*
2/26-3/5	*	8/27-9/4	*
3/5-3/12	*	9/4-9/10	*
3/12-3/19	*	9/10-9/17	*
3/19-3/26	*	9/17-9/24	*
3/26-4/2	*	9/24-10/1	*
4/2-4/9	*	10/1-10/8	*
4/9-4/16	*	10/8-10/15	*
4/16-4/23	*	10/15-10/22	*
4/23-4/30	*	10/22-10/29	*
4/30-5/7	*	10/29-11/5	*
5/7-5/14	*	11/5-11/12	*
5/14-5/21	0.005	11/12-11/19	*
5/21-5/29	*	11/19-11/26	0.005
5/29-6/4	0.008	11/26-12/3	*
6/4-6/11	*	12/3-12/10	*
6/11-6/18	*	12/10-12/17	*
6/18-6/25	*	12/17-12/21	*
6/25-7/2	*	12/21-12/31	*
Annual Average			*0.003

*Result was less than the analytical limit shown.

APPENDIX B

TABLE 5

BETA ACTIVITY IN 100-N DRINKING WATER (CUMULATIVE SAMPLES) - 1973

(Units of Counts/Minutes/Milliliter)

Date	c/m/ml	Date	c/m/ml
Analytical Limit	0.005	Analytical Limit	0.005
1/2-1/8	*	7/9-7/16	*
1/8-1/15	*	7/16-7/23	*
1/15-1/22	*	7/23-7/30	0.005
1/22-1/29	0.006	7/30-8/6	*
1/29-2/5	*	8/6-8/13	*
2/5-2/12	0.005	8/13-8/20	*
2/12-2/20	*	8/20-8/27	*
2/20-2/26	*	8/27-9/4	*
2/26-3/5	*	9/4-9/10	*
3/5-3/12	*	9/10-9/17	0.006
3/12-3/19	*	9/17-9/24	*
3/19-3/26	*	9/24-10/1	*
3/26-4/2	*	10/1-10/8	*
4/2-4/9	*	10/8-10/15	*
4/9-4/16	*	10/15-10/22	*
4/16-4/23	*	10/22-10/29	*
4/23-4/30	*	10/29-11/5	*
4/30-5/7	*	11/5-11/12	*
5/7-5/14	*	11/12-11/19	*
5/14-5/21	*	11/19-11/26	*
5/21-5/29	*	11/26-12/3	*
5/29-6/4	0.007	12/3-12/10	0.010
6/4-6/11	0.006	12/10-12/17	*
6/11-6/18	*	12/17-12/21	*
6/18-6/25	*	12/21-12/31	*
6/25-7/2	*		
Annual Average			*0.003

*Result was less than the analytical limit shown.

APPENDIX C
RADIONUCLIDES IN FISH AND WILDFOWL

APPENDIX C

TABLE 1

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF WHITEFISH TAKEN FROM THE COLUMBIA RIVER - 1973

Units of 10^{-6} μCi/gm (wet weight)

Date	^{32}P	^{40}K	^{58}Co	^{60}Co	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba
Analytical Limit	1.0	1.0	0.08	0.05	0.09	0.002	0.05
1/25	*	3.2	*	*	0.11	0.003	0.08
2/8	*	3.1	*	0.13	0.16	0.03	0.14
2/26	*	3.2	*	0.18	0.11	*	0.11
3/14	*	3.7	*	*	0.13	*	0.16
3/23	*	4.0	*	0.20	0.25	0.006	0.21
4/9	*	3.6	*	0.10	0.13	0.003	0.10
4/24	*	3.2	*	0.06	*	*	*
5/8	*	2.8	*	0.10	*	*	0.06
5/22	*	3.1	*	0.18	0.19	*	0.14
6/11	*	3.2	*	0.19	0.31	0.004	0.20
6/21	*	3.3	*	0.10	*	0.013	0.08
7/6	*	3.6	*	0.12	0.11	*	0.14
7/24	*	3.7	*	0.11	*	0.02	0.06
8/6	*	3.6	0.08	0.12	0.14	0.003	0.16
8/23	*	2.8	*	0.15	0.25	0.005	0.13
9/14	*	3.1	*	0.15	0.10	0.04	0.12
9/28	*	3.5	*	0.17	*	0.008	0.15
10/12	*	3.5	*	0.17	0.14	*	0.19
10/19	*	3.7	*	0.13	*	*	0.14
11/7	*	2.9	*	*	*	*	0.10
11/16	*	3.6	*	0.16	*	*	0.17
12/5	*	4.0	*	*	*	*	0.11
Annual Average	*0.33	3.4	*0.007	0.11	0.11	0.005	0.12

*Result was less than the analytical limit shown.

APPENDIX C

TABLE 2

CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE MUSCLE OF WATER-FOWL SAMPLES ALONG THE RIVER IN THE HANFORD ENVIRONS - 1973

Units of 10^{-6} μCi/gm (wet weight)

Date	Species	^{40}K	^{60}Co	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba
Analytical Limit		1.4	0.08	0.2	0.002	0.10
DUCKS						
100-H						
11/15/73	Merganser	2.4	*	*	0.005	*
100-F						
2/2/73	Mallard	2.2	*	*	0.006	*
10/26/73	Mallard	3.2	*	*	*	*
11/1/73	Mallard	3.7	*	*	0.017	0.10
11/1/73	Mallard	2.4	*	*	0.006	*
11/5/73	Mallard	2.6	*	*	0.003	0.18
11/5/73	Mallard	2.8	*	*	0.01	*
11/5/73	Mallard	2.6	*	*	*	0.16
11/5/73	Mallard	2.9	*	*	0.002	*
11/5/73	Mallard	3.3	*	*	*	*
11/5/73	Mallard	2.9	*	*	*	*
11/6/73	Mallard	2.7	*	*	*	0.13
11/15/73	Mallard	2.2	*	*	*	*
12/4/73	Mallard	1.6	0.10	*	*	*
12/20/73	Mallard	4.5	*	*	*	*
12/20/73	Mallard	6.8	*	*	0.003	*
1/9/74	Mallard	2.1	*	*	*	*
1/9/74	Mallard	2.6	*	*	*	*
1/9/74	Mallard	3.0	*	*	*	*
Average		3.0	*0.02	*0.02	0.003	*0.05
Hanford						
1/11/73	Mallard	2.4	*	*	0.004	*
1/24/73	Mallard	1.8	*	*	*	*
1/24/73	Mallard	2.1	*	*	*	*

*Result was less than the analytical limit shown.

APPENDIX C

TABLE 2 (Continued)

CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE MUSCLE OF WATER-FOWL SAMPLES ALONG THE RIVER IN THE HANFORD ENVIRONS - 1973

Units of 10^{-6} μCi/gm (wet weight)

Date	Species	^{40}K	^{60}Co	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba
Analytical Limit		1.4	0.08	0.2	0.002	0.10
Hanford (Cont'd)						
11/2/73	Mallard	3.3	*	*	*	*
11/2/73	Mallard	3.6	*	*	0.009	0.41
11/2/73	Gr. Wing Teal	4.5	*	*	0.005	*
11/5/73	Mallard	3.5	*	*	*	0.26
11/7/73	Mallard	2.6	*	*	*	0.14
11/7/73	Mallard	3.2	*	*	0.006	*
11/7/73	Mallard	2.5	*	*	*	*
11/7/73	Mallard	2.6	*	*	*	*
11/7/73	Mallard	2.9	*	*	*	*
11/15/73	Mallard	4.9	*	0.29	0.002	*
11/15/73	Mallard	2.8	*	*	*	*
12/3/73	Mallard	2.8	*	*	*	*
12/19/73	Mallard	2.4	*	*	*	*
12/19/73	Mallard	4.9	*	0.65	0.003	*
1/3/74	Mallard	2.5	*	*	0.003	*
Average		3.1	*0.008	*0.04	0.002	0.08
300 Area						
10/1	Mallard	1.6	*	*	0.004	0.12
GEESE						
100-B						
12/6/73	Can. Lesser	2.7	*	*		*
100-N						
1/19/73	Can. Common	*	*	*		0.21

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

APPENDIX C

TABLE 2 (Continued)

CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE MUSCLE OF WATER-FOWL SAMPLES ALONG THE RIVER IN THE HANFORD ENVIRONS - 1973

Units of 10^{-6} μCi/gm (wet weight)

Date	Species	^{40}K	^{60}Co	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba
Analytical Limit		1.4	0.08	0.2	0.002	0.10
100-H						
1/19/73	Can. Lesser	2.0	*	*		0.19
10/25/73	Can. Common	2.7	*	*		0.14
2/19/73	Can. Lesser	2.0	*	*		*
2/19/73	Can. Lesser	2.5	*	*		*
2/19/73	Can. Lesser	2.6	*	*		*
2/19/73	Can. Lesser	2.2	*	*		*
2/19/73	Can. Lesser	2.2	*	*		*
2/19/73	Can. Lesser	2.8	*	*		0.18
2/19/73	Can. Lesser	2.5	*	*		*
Average		2.4	*0.004	*		0.05
100-F						
11/5/73	Can. Common	2.4	*	*		*
11/5/73	Can. Common	3.5	*	*		*
Average		2.9	*0.03	*0.003		*0.04
Hanford						
12/20/73	Can. Lesser	6.5	*	*		*
White Bluffs						
1/23/73	Can. Common	2.4	*	*		*
12/3/73	Can. Lesser	3.0	*	*		*
12/3/73	Can. Lesser	2.9	*	*		*
12/4/73	Can. Lesser	3.0	*	*		*
12/4/73	Can. Lesser	2.2	0.08	*		*
12/4/73	Can. Lesser	1.4	*	*		*
12/4/73	Can. Lesser	2.3	*	*		*
12/4/73	Can. Lesser	2.2	*	*		*
12/19/73	Can. Lesser	2.3	*	*		*
Average		2.4	*0.002	*		*0.02

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

APPENDIX C

TABLE 3

CONCENTRATIONS OF RADIONUCLIDES IN UPLAND GAME BIRD SAMPLES IN THE HANFORD ENVIRONS - 1973

Units of 10^{-6} μCi/gm (wet weight)

Date	Species	^{40}K	^{60}Co	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba
Analytical Limit		1.4	0.08	0.2	0.002	0.09
100-D						
10/26/73	Pheasant	2.6	*	*	*	*
10/26/73	Pheasant	3.6	*	*	0.004	*
Average		3.1	*0.01	*0.07	0.002	*0.01
100-F						
10/23/73	Pheasant	2.5	*	*	*	*
Hanford						
10/22/73	Pheasant	3.2	*	*	*	*
10/26/73	Pheasant	2.6	*	*	0.019	*
11/7/73	Pheasant	2.6	*	*	*	*
1/3/74	Pheasant	3.2	*	*	*	*
Average		2.9	*0.02	*0.04	0.005	*0.02
White Bluffs						
11/2/73	Pheasant	3.1	*	*	*	*
11/2/73	Pheasant	3.6	*	*	0.003	*
11/6/73	Pheasant	2.7	*	*	*	*
1/3/74	Pheasant	2.6	*	*	*	*
1/3/74	Pheasant	3.5	*	*	*	*
1/3/74	Pheasant	2.9	*	*	*	*
1/3/74	Pheasant	2.5	*	*	*	*
1/3/74	Pheasant	3.2	*	*	*	*
1/3/74	Pheasant	2.7	*	*	*	*
1/9/74	Pheasant	3.6	*	*	*	*
Average		3.0	*0.03	*	*0.0005	*0.01

*Result was less than the analytical limit shown.

APPENDIX D
RADIONUCLIDES IN SHELLFISH

APPENDIX D

TABLE 1

CONCENTRATION OF RADIONUCLIDES IN OYSTERS FROM WILLAPA BAY, WASHINGTON - 1973

Units of 10^{-6} μCi/gm (wet weight)

Date	^{40}K	^{65}Zn	^{137}Cs - ^{137m}Ba
Analytical Limit	1.0	0.2	0.03
1/8	1.6	0.91	*
2/6	1.4	0.72	*
3/12	1.5	0.69	*
4/2	1.8	0.86	*
5/14	1.8	0.48	*
6/4	2.1	0.87	0.03
7/9	2.0	0.36	*
10/1	1.7	0.24	*
11/5	1.6	0.22	0.03
12/8	1.4	0.30	*
Average	1.7	0.57	*0.02

*Result was less than the analytical limit shown.

APPENDIX E
RADIONUCLIDES IN THE ATMOSPHERE

APPENDIX E

TABLE 1

CONCENTRATIONS OF ^{131}I IN THE AIR OF THE HANFORD ENVIRONS - 1973

Units of 10^{-12} μCi/ml of Air (continuous samples)

Approx. Wk. on Date	Eastern Quadrant			
	Ringold	Byers Landing	Richland	Cooke Bros.
1/2	*	*	*	*
1/8	*	*	*	*
1/15	*	*	*	*
1/22	*	*	*	*
1/29	*	*	*	*
2/5	*	*	*	*
2/12	*	*	*	*
2/20	*	*	*	*
2/26	*	*	*	*
3/5	*	*	*	*
3/12	*	*	*	*
3/19	*	*	*	*
3/26	*	*	*	*
4/2	*	*	*	*
4/9	*	*	*	*
4/16	*	*	*	*
4/23	*	*	*	*
4/30	*	*	*	*
5/7	*	*	*	*
5/14	*	*	*	*
5/21	*	*	*	*
5/29	*	*	*	*
6/4	*	*	*	*
6/11	*	*	*	*
6/18	*	*	*	*
6/25	*	*	*	*
7/2	*	*	*	*
7/9	*	*	*	*
7/16	*	*	*	*
7/23	*	*	*	*
7/30	*	*	*	*
8/6	*	*	*	*
8/13	*	*	*	*
8/20	*	*	*	*
8/27	*	*	*	*

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

*Indicates the results were 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 - 1973

Units of 10^{-12} μCi/ml of Air (continuous samples)

Approx. Wk. on Date	Eastern Quadrant			
	Ringold	Byers Landing	Richland	Cooke Bros.
9/4	*	*	*	*
9/10	*	*	*	*
9/17	*	*	*	*
9/24	*	*	*	*
10/1	*	*	*	*
10/8	*	*	*	*
10/15	*	*	*	*
10/22	*	*	*	*
10/29	*	*	*	*
11/5	*	*	*	*
11/12	*	*	*	*
11/19	*	*	*	*
11/26	*	*	*	*
12/3	*	*	*	*
12/10	*	*	*	*
12/17	*	*	*	*
12/21	*	*	*	*
Annual Average	*	*	*	*

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

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

APPENDIX E

TABLE 2 (Part A)

CONCENTRATIONS OF RADIOACTIVE BETA PARTICULATES IN THE AIR OF THE HANFORD ENVIRONS - 1973

Units of 10^{-12} μCi/ml of Air (continuous samples)

Eastern Quadrant

Approx. Wk. on Date	Ringold	Byers Landing	Richland	Pasco	Othello	Connell	Berg Ranch	Wahluke Watermaster	Cooke Bros.
1/2	0.10	0.05	0.04	0.04	0.08		0.10	0.04	0.08
1/8	0.10	0.08	0.08	0.07	0.08		0.10	0.04	0.08
1/15	0.04	0.08	0.08	0.07	0.05		0.05	0.03	0.02
1/22	0.04	0.06	0.04	0.05	0.05		0.05	0.03	0.02
1/29	0.07	0.06	0.04	0.05	0.06		0.06	0.05	0.06
2/5	0.07	0.06	0.05	0.06	0.06		0.06	0.05	0.06
2/12	0.06	0.06	0.05	0.06	0.02	0.05	0.06	0.04	0.05
2/20	0.06	0.05	0.05	0.05	0.02	0.05	0.06	0.04	0.05
2/26	0.02	0.05	0.05	0.05	**	0.03	0.02	0.02	0.02
3/5	0.02	0.03	0.03	0.02	**	0.03	0.02	0.02	0.02
3/12	0.04	0.03	0.03	0.02	0.02	0.03	0.06	0.05	0.03
3/19	0.04	0.04	0.04	0.04	0.02	0.03	0.06	0.05	0.03
3/26	0.02	0.04	0.04	0.04	0.09	0.06	0.05	0.06	0.05
4/2	0.02	0.06	0.06	0.05	0.09	0.06	0.05	0.06	0.05
4/9	0.04	0.06	0.06	0.05	0.04	0.04	0.04		0.04
4/16	0.04	0.04	0.03	0.03	0.04	0.04	0.04		0.04
4/23	0.03	0.04	0.03	0.03	0.04	0.04	0.04	0.02	
4/30	0.03	0.05	0.02	0.05	0.04	0.04	0.04	0.02	
5/7	0.21	0.05	0.02	0.05	0.04	0.06	0.11	0.10	0.05
5/14	0.21	0.06	0.08	0.06	0.04	0.06	0.11	0.10	0.05
5/21	0.02	0.06	0.08	0.06	0.03	0.03	0.04	0.03	0.02
5/29	0.02	0.05	0.04	**	0.03	0.03	0.04	0.03	0.02
6/4	0.03	0.05	0.04	**	0.03	0.02	0.03	0.02	0.02
6/11	0.03	0.03	0.03	0.02	0.03	0.02	0.03	0.02	0.02
6/18	0.04	0.03	0.03	0.02	0.03	0.03	0.04	**	
6/25	0.04	0.07	0.03	0.04	0.03	0.03	0.04	**	0.04
6/27	'	'	0.10	'	'	'	'	'	'
6/28	'	'	0.08	'	'	'	'	'	'
6/29	'	'	0.04	'	'	'	'	'	'
6/30	'	'	0.05	'	'	'	'	'	'
7/1	'	'	0.05	'	'	'	'	'	'
7/2	0.05	0.07	0.10	0.04	0.07	0.07	0.06	0.07	0.01
7/3	'	'	0.10	'	'	'	'	'	'
7/5	'	'	0.04	'	'	'	'	'	'
7/6	'	'	0.02	'	'	'	'	'	'

As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated.
*Result was less than the analytical limit of 0.02×10^{-12} μCi/ml.
**Invalid sample
No entry indicates no analysis was made.

APPENDIX E

TABLE 2 (Part A) (Continued)

CONCENTRATIONS OF RADIOACTIVE BETA PARTICULATES IN THE AIR OF THE HANFORD ENVIRONS - 1973

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	Cooke Bros.
7/7	'	'	0.10	'	'	'	'	'	'
7/8	'	'	0.76	'	'	'	'	'	'
7/9	0.05	0.07	0.30	0.06	0.07	0.07	0.06	0.07	0.01
7/11	'	'	0.04	'	'	'	'	'	'
7/13	'	'	0.06	'	'	'	'	'	'
7/15	0.07	0.07	0.05	0.06	0.04	0.06	0.07	0.04	0.04
7/17	'	'	0.05	'	'	'	'	'	'
7/23	0.07	0.07	0.04	0.05	0.04	0.06	0.07	0.04	0.04
7/30	0.07	0.07	0.04	0.05	0.04	0.04	0.08	0.05	0.04
8/6	0.07	0.06	0.02	0.02	0.04	0.04	0.08	0.05	0.04
8/13	0.04	0.06	0.02	0.02	0.03	0.04	0.05	0.04	0.01
8/20	0.04	0.04	0.04	0.03	0.03	0.04	0.05	0.04	0.01
8/27	0.05	0.04	0.04	0.03	0.04	0.04	0.05	0.02	**
9/4	0.05	0.06	0.05	0.06	0.04	0.04	0.05	0.02	**
9/10	0.04	0.06	0.05	0.06	0.04	0.05	0.04	0.03	0.04
9/17	0.04	0.05	0.03	0.04	0.04	0.05	0.04	0.03	0.04
9/24	0.04	0.05	0.03	0.04	**	0.04	0.06	0.04	0.04
10/1	0.04	0.05	0.04	0.04	**	0.04	0.06	0.04	0.04
10/8	0.04	0.05	0.04	0.04	0.05	**	0.06	0.05	0.05
10/15	0.04	0.05	0.05	0.05	0.05	**	0.06	0.05	0.05
10/22	0.03	0.05	0.05	0.05	0.03	0.04	0.03	0.03	0.03
10/29	0.03	0.04	0.04	0.04	0.03	0.04	0.03	0.03	0.03
11/5	0.04	0.04	0.04	0.04	0.02	0.03	0.04	0.04	0.02
11/12	0.04	0.01	0.03	0.02	0.02	0.03	0.04	0.04	0.02
11/19	0.02	0.01	0.03	0.02	0.03	0.02	0.03	0.03	0.02
11/26	0.02	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.02
12/3	0.04	0.03	0.03	0.03	0.04	0.04	0.04	0.03	0.04
12/10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.04
12/21	0.03	0.04	0.05	0.05	0.04	0.04	0.04	0.05	0.04
Annual Average	0.05	0.05	0.05	0.04	0.04	0.04	0.05	0.04	0.03

As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated.
*Result was less than the analytical limit of 0.02×10^{-12} μCi/ml.
**Invalid sample
No entry indicates no analysis was made.

APPENDIX E

TABLE 2 - PART B

CONCENTRATION OF RADIOACTIVE BETA PARTICULATES IN THE AIR OF THE HANFORD ENVIRONS - 1973

Units of 10^{-12} μCi/ml of Air (continuous samples)

	Perimeter Communities					
Approx. Wk. on Date	Moses Lake	Washtucna	Walla Walla	McNary Dam	Ellensburg	Sunnyside
12/29	0.03		0.08	0.10	0.02	0.02
1/5	0.08		0.08	0.10	0.06	0.08
1/12	0.08		0.03		0.06	0.08
1/19	0.05		0.03		0.03	0.03
1/26	0.05		0.03	0.05	0.03	0.03
2/2	0.05	0.05	0.07	0.05	0.05	0.05
2/9	0.05	0.05	**	**	0.05	0.05
2/16	0.05	0.04	**	**	0.03	0.04
2/23	0.05	0.04	**	**	0.03	0.04
3/2	0.03	0.02	**	**	0.02	0.02
3/9	0.03	0.02	0.03	0.02	0.02	0.02
3/16	0.04	0.04	0.03	0.02	0.03	0.03
3/23	0.04	0.04	0.03	0.03	0.03	0.03
3/30	0.05	0.03	0.03	0.03	0.03	0.03
4/6	0.05	0.03	0.04	0.04	0.03	0.03
4/13	0.04	0.04	0.04	0.04	0.03	0.05
4/20	0.04	0.04	0.04	0.04	0.03	0.05
4/27	0.04	0.10	0.04	0.04	0.03	0.04
5/4	0.04	0.10	0.04	0.04		0.04
5/11	0.04	0.10	0.04	0.04	0.04	0.05
5/18	0.04	0.10	0.04	0.03	0.07	0.05
5/25	0.03	0.11	0.04	0.03	0.07	0.09
6/1	0.03	0.11	0.03	0.03	0.07	0.09
6/8	0.03	0.03	0.03	0.03	0.02	0.03
6/15	0.03	0.03	0.04	0.03	0.02	0.03
6/22	0.03	0.04	0.04	0.03	0.02	0.03

As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated.
*Result was less than the analytical limit of 0.02×10^{-12} μCi/ml.
**Invalid sample
No entry indicates no measurement was made.

APPENDIX E

TABLE 2 - PART B (Continued)

CONCENTRATION OF RADIOACTIVE BETA PARTICULATES IN THE AIR OF THE HANFORD ENVIRONS - 1973

Units of 10^{-12} μCi/ml of Air (continuous samples)

Perimeter Communities

Approx. Wk. on Date	Moses Lake	Washtucna	Walla Walla	McNary Dam	Ellensburg	Sunnyside
6/29	0.03	0.06	0.50	0.66	0.03	0.03
7/6	0.05	0.06	0.50	0.66	0.03	0.02
7/13	0.05	0.06	0.06	0.04	0.03	0.02
7/20	0.05	0.06	0.06	0.04	0.03	0.06
7/27	0.05	0.06	0.05	0.04	0.03	0.06
8/3	0.06	0.05	0.05	0.04	0.03	0.04
8/10	0.06	0.05	0.06	0.04	0.04	0.04
8/17	0.02	0.04	0.06	0.04	0.04	0.04
8/24	0.02	0.04	0.04	0.04	*	0.04
8/31	0.04	0.04	0.04	0.04	0.04	0.04
9/7	0.04	0.04	0.05	0.04	0.04	0.04
9/14	0.04	0.04	0.04	0.04	0.05	0.05
9/21	0.04	0.04	0.04	0.04	0.05	0.05
9/28	0.04	0.04	0.04	0.04	0.03	0.03
10/5	0.04	0.04	0.04	0.05	0.03	0.03
10/12	0.04	0.05	0.04	0.05	0.05	0.05
10/19	0.03	0.05	0.04	0.04	0.05	0.05
10/26	0.05	0.03	0.04	0.04	0.04	0.02
11/2	0.05	0.03	0.03	0.03	0.04	0.02
11/9	0.03	0.03	0.03	0.03	0.02	0.01
11/16	0.03	0.02	0.03	0.02	0.02	0.01
11/23	0.03	0.02	0.03	0.02	0.02	0.01
11/30	0.03	0.02	0.04	0.03	0.02	0.01
12/7	0.05	0.04	0.04	0.03	0.03	0.03
12/14	0.05	0.04	0.04	0.03	0.03	0.03
12/21	0.04	0.06	0.04	0.03	0.06	0.03
Annual Average	0.04	0.05	0.06	0.06	0.04	0.04

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

*Results were less than the analytical limit of 0.02×10^{-12} μCi/ml.

APPENDIX E

TABLE 3 (Part A)

CONCENTRATIONS OF RADIOACTIVE ALPHA PARTICULATES IN THE AIR OF THE HANFORD ENVIRONS - 1973

Units of 10^{-12} μCi/ml of Air (continuous samples)

Approx. Wk. on Date	Eastern Quadrant					
	Ringold	Byers Landing	Richland	Pasco	Othello	Berg Ranch
1/2	0.004	0.001	0.001	0.001	0.002	0.003
1/8	0.004	0.002	0.002	0.002	0.002	0.003
1/15	0.001	0.002	0.002	0.002	0.002	0.001
1/22	0.001	0.001	0.001	0.002	0.002	0.001
1/29	0.002	0.001	0.001	0.002	0.002	0.002
2/5	0.002	0.002	0.002	0.002	0.002	0.002
2/12	0.001	0.002	0.002	0.002	0.0008	0.002
2/20	0.001	0.001	0.001	0.001	0.0008	0.002
2/26	0.0008	0.001	0.001	0.001	0.0006	0.0006
3/5	0.0008	0.0008	0.0006	0.001	0.0006	0.0006
3/12	0.002	0.0008	0.0006	0.001	0.0009	0.002
3/19	0.002	0.002	0.001	0.001	0.0009	0.002
3/26	**	0.002	0.001	0.001	0.003	0.002
4/2	**	0.002	0.002		0.003	0.002
4/9	0.002	0.002	0.002			0.002
4/16	0.002	0.001	0.001			0.002
4/23	0.0007	0.001	0.001			0.001
4/30	0.0007	0.002	0.001			0.001
5/7	0.001	0.002	0.001			0.002
5/14	0.001	0.002	0.001			0.002
5/21	0.002	0.002	0.001			0.0009
5/29	0.002	0.001	0.002			0.0009
6/4	0.002	0.001	0.002			0.001
6/11	0.002	0.002	0.002			0.001
6/18	0.001	0.002	0.002			0.001
6/25	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.

*Result was less than the analytical limit of 0.0004×10^{-12} μCi/ml.

**Invalid sample

No entry indicates no analysis was made.

APPENDIX E

TABLE 3 (Part A) (Continued)

CONCENTRATIONS OF RADIOACTIVE ALPHA PARTICULATES IN THE AIR OF THE HANFORD ENVIRONS - 1973

Units of 10^{-12} μCi/ml of Air (continuous samples)

Eastern Quadrant

Approx. Wk. on Date	Ringold	Byers Landing	Richland	Pasco	Othello	Berg Ranch
7/2	*	0.001				0.001
7/9	*	0.002				0.001
7/16	0.002	0.002	0.003			0.003
7/23	0.002	0.001	0.002			0.003
7/30	0.001	0.001	0.002			0.002
8/6	0.001	0.001	0.002			0.002
8/13	0.001	0.001	0.002			0.001
8/20	0.001	0.002	0.001			0.001
8/27	0.002	0.002	0.001			0.002
9/4	0.002	0.002	0.002			0.002
9/10	0.003	0.002	0.002			0.002
9/17	0.003	0.001	0.0008			0.002
9/24	0.003	0.001	0.0008			0.001
10/1	0.003	0.002	0.005			0.001
10/8	0.002	0.002	0.005			0.002
10/15	0.002	0.002	0.002			0.002
10/22	0.0004	0.002	0.002			0.0007
10/29	0.0004	0.0006	0.001			0.0007
11/5	0.001	0.0006	0.001			0.0007
11/12	0.001	0.0004	0.0004			0.0007
11/19	*	0.0004	0.0004			*
11/26	*	0.0007	0.0004			*
12/3	0.0007	0.0007	0.0004			0.001
12/10	0.0007	0.0009	0.0009			0.001
12/21		0.001	0.0009			0.001
Annual Average	0.001	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.

*Results were less than the analytical limit of 0.0004×10^{-12} μCi/ml.

**Invalid sample

No entry indicates no analysis was made.

APPENDIX E

TABLE 3 (Part B)

CONCENTRATIONS OF RADIOACTIVE ALPHA PARTICULATES IN THE AIR OF THE HANFORD ENVIRONS - 1973

Units of 10^{-12} µCi/ml of Air (continuous samples)

Perimeter Communities

Approx. Wk. on Date	Walla Walla	McNary	Approx. Wk. on Date	Walla Walla	McNary
Analy. Limit	0.0004		Analy. Limit	0.0004	
12/29	0.003	0.003	6/29	0.0008	0.001
1/5	0.003	0.003	7/6	0.0008	0.001
1/12	0.0006		7/13	0.002	
1/19	0.0006		7/20	0.002	
1/26	0.0006	0.001	7/27	0.001	0.0007
2/2	0.002	0.001	8/3	0.001	0.0007
2/9	0.001	*	8/10	0.001	0.002
2/16	0.001	*	8/17	0.001	0.002
2/23	0.001	0.0003	8/24	0.003	0.002
3/2	0.001	0.0003	8/31	0.003	0.002
3/9	0.0007	0.001	9/7	0.002	0.002
3/16	0.0007	0.001	9/14	0.005	0.002
3/23	0.0009	0.001	9/21	0.0008	0.001
3/30	0.0009	0.001	9/28	0.0008	0.001
4/6	*	0.001	10/5	0.001	0.002
4/13	*	0.001	10/12	0.001	0.002
4/20	0.0007	0.001	10/19	0.001	0.0008
4/27	0.0007	0.001	10/26	0.001	0.0008
5/4	0.0007	0.002	11/2	0.004	0.0008
5/11	0.0007	0.002	11/9	0.004	0.0008
5/18	0.0007	0.001	11/16	0.0005	0.003
5/25	0.0007	0.001	11/23	0.0005	0.003
6/1	0.0006	0.001	11/30	0.0005	0.0005
6/8	0.0006	0.001	12/2	*	0.0005
6/15	0.001	0.001	12/14	0.001	0.0008
6/22	0.001	0.001	12/21	0.001	0.0008
			Annual Average	0.001	0.001

*Indicates the results were less than the analytical limit of 0.0004×10^{-12} µCi/ml.
No entry indicates no analysis was made.

APPENDIX E

TABLE 4

CONCENTRATIONS OF SPECIFIC RADIONUCLIDES ON SELECTED AIR FILTER COMPOSITES - 1973

Units of 10^{-12} μCi/ml of Air (continuous samples)

Date	^{54}Mn	^{60}Co	^{90}Sr	$^{95}ZrNb$	^{103}Ru	^{106}Ru	^{134}Cs	^{137}Cs	Total Pu
Analytical Limit	0.003	0.003	0.000003	0.002	0.01	0.044	0.003	0.003	0.000001
				Inner Northeast Quadrant					
1/31	*	0.012		*	*	0.20	*	*	
2/28	*	*		*	*	*	*	*	
3/30	*	*	0.0004	*	*	0.12	*	*	0.00007
4/27	*	*		*	*	0.18	*	*	
5/25	*	*		*	*	0.19	*	*	
6/22	*	*	0.001	*	0.012	0.03	*	*	0.00002
7/20	*	*		*	*	0.15	*	*	
8/31	*	*		*	*	0.16	*	*	
9/28	*	*	0.0002	*	*	0.18	*	*	0.000009
10/26	*	*		0.002	*	0.15	*	*	
11/26	*	*		0.002	*	0.05	*	*	
12/21	*	*	0.000003	0.006	*	0.07	*	*	
Annual Average	*0.000008	*0.001	0.0004	*0.0004	*0.001	0.12	*	*	0.00003
				Inner Southeast Quadrant					
1/22	*	*		*	*	0.09	*	*	
2/20	*	*		*	*	0.12	*	*	
3/19	*	*	0.0004	*	*	0.17	*	*	0.00009
4/30	*	*		*	*	0.16	*	*	
5/29	*	*		*	*	0.14	*	*	
6/30	*	*	0.0008	*	*	0.17	*	*	0.00006
7/23	*	0.004		*	*	0.19	*	*	
8/20	*	*		*	*	0.13	*	*	
9/17	*	*	0.0002	*	*	0.25	*	*	0.00001
10/29	*	*		*	*	0.14	*	*	
11/26	*	*		*	*	0.09	*	*	
12/21	*	*	0.00003	0.008	*	*	*	*	
Annual Average	*	*0.0006	0.0004	*0.0006	*	0.14	*	*	0.00005

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

APPENDIX E

TABLE 4 (Continued)

CONCENTRATIONS OF SPECIFIC RADIONUCLIDES ON SELECTED AIR FILTER COMPOSITES - 1973

Units of 10^{-12} μCi/ml of Air (continuous samples)

Date	^{60}Co	^{90}Sr	$^{95}ZrNb$	^{103}Ru	^{106}Ru	^{134}Cs	^{137}Cs	$^{140}BaLa$	$^{144}CePr$	Total Pu
Analytical Limit	0.003	0.000003	0.002	0.01	0.044	0.10	0.003	0.10	0.033	0.000001
					Outer Southeast Quadrant					
1/26	*		*	*	*	*	*	0.16	*	
2/23	*		*	*	*	*	*	*	*	
3/23	*	0.0006	*	*	*	*	*	0.14	*	0.00002
4/20	*		*	*	0.13	*	*	*	*	
5/18	*		*	*	0.16	*	*	*	*	
6/29	*	0.0009	*	*	0.14	*	*	*	*	0.00005
7/27	0.007		*	*	0.31	*	*	*	*	
8/24	*		*	*	0.21	*	*	*	*	
9/21	*	*	0.003	*	0.21	*	*	*	*	0.00001
10/19	*		*	*	0.19	*	*	*	*	
11/30	*		0.003	*	0.11	*	*	*	*	
12/28	*	0.00003	0.005	*	0.06	*	*	*	*	
Annual Average	*	0.0004	*	*	0.12	*0.0001	*	*0.02	*	0.00002
					Outer Western Quadrant					
1/29	*		*	*	0.07	*	*	*	*	
2/26	*		*	*	0.12	*	*	*	*	
3/26	*	0.0005	*	*	0.11	*	*	*	*	0.00009
4/23	*		*	*	0.17	*	*	*	*	
5/18	*		*	*	0.25	*	*	*	*	
6/18	*	0.0008	*	0.01	*	*	*	*	*	0.00006
7/16	*		*	*	0.15	*	*	*	*	
8/27	*		*	*	0.14	*	*	*	*	
9/24	*	*	*	*	0.24	*	*	*	*	0.000006
10/30	*		*	*	0.33	*	*	*	*	
11/23	*		*	*	0.10	*	*	*	*	
12/17	*	0.00002	*	*	*	*	*	*	*	
Annual Average	*0.001	0.0003	*	*0.0008	0.15	*0.0007	*	*	*0.0009	0.00005

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

APPENDIX E

TABLE 4 (Continued)

CONCENTRATIONS OF SPECIFIC RADIONUCLIDES ON SELECTED AIR FILTER COMPOSITES - 1973

Units of 10^{-12} μCi/ml of Air (continuous samples)

Date	^{58}Co	^{60}Co	^{90}Sr	$^{95}ZrNb$	^{103}Ru	^{106}Ru	^{137}Cs	Total Pu
Analytical Limit	0.003	0.003	0.000003	0.002	0.01	0.044	0.003	0.000001
			Outer Northeast Quadrant					
1/19	*	0.01		*	*	0.12	*	
2/16	*	*		*	*	*	*	
3/16	*	*	0.0005	*	*	0.09	*	0.00008
4/13	*	*		*	*	0.17	*	
5/25	*	*		*		0.16	*	
6/22	*	*	0.001	*	0.02	*	*	0.00008
7/17	*	*		*	*	0.17	*	
8/17	0.01	*		*	*	0.17	*	
9/25	*	*	0.0002	*	*	0.24	*	0.00001
10/26	*	*		0.004	*	0.19	*	
11/26	*	*		0.004	*	0.11	*	
12/21	*	*	0.00003	0.004	*	0.08	*	
Annual Average	*0.001	*0.002	0.0004	*0.0004	*0.001	0.12	*	0.00006

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

APPENDIX F
RADIONUCLIDES IN FARM PRODUCE AND COMMERCIAL FOODSTUFFS

APPENDIX F

TABLE 1

CONCENTRATIONS OF RADIONUCLIDES IN MILK - 1973

(Units of 10^{-9} μCi/ml of Milk)

Date	^{40}K	^{65}Zn	^{89}Sr	^{90}Sr	^{131}I	^{137}Cs-^{137m}Ba
Anal. Limit	470	54	2	2	2	29
	Riverview Irrigation District - Farm #1					
1/8	700	*			*	*
1/22	1,000	*	*	*	*	*
2/5	960	*			*	*
2/20	980	*			*	*
3/5	1,000	*			*	*
3/19	1,000	*			*	*
4/2	1,100	*			*	*
4/16	940	*	*	*	*	*
4/30	1,000	*			*	*
5/14	1,100	*			*	*
5/29	1,200	*			*	*
6/11	1,200	*			*	*
6/25	1,100	*			*	*
7/9	1,100	*	*	*	*	*
7/23	1,100	*			*	*
8/6	820	*			*	*
8/20	1,300	*			*	*
9/4	880	*			*	*
9/17	1,200	*			*	*
10/1	1,200	*	*	*	*	*
10/15	1,200	*			*	*
10/29	1,000	*			*	*
11/12	1,000	*			*	*
11/26	970	*			*	*
12/10	1,200	*			*	*
12/21	960	*			*	*
Annual Average	1,000	*18	*1.1	*1.1	*0.62	*5.9

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

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK - 1973

(Units of 10^{-9} μCi/ml of Milk)

Date	^{40}K	^{65}Zn	^{89}Sr	^{90}Sr	^{131}I	^{137}Cs-^{137m}Ba
Anal. Limit	470	54	2	2	2	29
			Wahluke Watermaster			
2/8	1,000	*			*	*
2/22	1,200	*			*	*
3/8	920	*			*	*
3/23	1,300	*			*	*
4/5	1,000	*			*	*
4/19	1,100	*			*	*
5/3	1,200	*		2.9	*	*
5/17	1,200	*			*	*
5/31	1,200	*			*	*
6/14	1,200	*			*	*
6/28	1,200	*			*	*
7/12	1,300	*			4.6	*
7/26	1,100	*			*	34
8/9	1,100	*		*	*	*
8/23	1,200	*			*	*
9/6	1,000	*			*	*
9/20	1,100	*			*	*
10/4	1,200	*			*	*
10/18	960	*			*	*
11/1	890	*		*	*	*
11/15	1,200	*			*	*
11/29	1,000	*			*	*
12/13	1,100	*			*	*
12/27	890	*			*	*
Annual Average	1,000	*8.6		2.0	*0.72	*9.1
			Columbia Basin Composite #2			
1/11	1,200	*			*	*
1/25	860	*			*	*
2/8	990	*		2.0	*	*

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

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK - 1973

(Units of 10^{-9} μCi/ml of Milk)

Date	^{40}K	^{65}Zn	^{89}Sr	^{90}Sr	^{131}I	^{137}Cs-^{137m}Ba
Anal. Limit	470	54	2	2	2	29
			Columbia Basin Composite #2 (Cont'd)			
2/22	1,300	*			*	*
3/8	1,200	*			*	*
3/22	1,200	*			*	*
4/5	1,300	*			*	*
4/19	1,300	*			*	*
5/3	1,300	*		*	*	*
5/17	1,200	*			*	*
5/31	1,300	*			*	*
6/14	1,100	*			*	*
6/28	1,200	*			*	*
7/12	1,300	*			*	*
7/26	1,100	*			*	*
8/9	1,300	*		2.4	*	*
8/23	1,400	*			*	*
9/6	1,100	*			*	*
9/20	1,200	*			*	*
10/4	1,300	*			*	*
10/18					*	
11/1	980	*		*	*	*
11/15	1,100	*			*	*
11/29	1,200	*			*	*
12/13	1,400	*			*	*
12/27	860	*			*	*
Annual Average	1,200	*11		*1.7	*0.58	*6.4
			Columbia Basin Composite #3			
1/4	960	*			*	*
1/18	1,200	*			*	*
2/1	1,000	*			*	*
2/15	970	*			*	*

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

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK - 1973

(Units of 10^{-9} μCi/ml of Milk)

Date	^{40}K	^{65}Zn	^{89}Sr	^{90}Sr	^{131}I	^{137}Cs-^{137m}Ba
Anal. Limit	470	54	2	2	2	29
	Columbia Basin Composite #3 (Cont'd)					
3/1	1,100	*			*	*
3/15	1,200	*			*	*
3/29	1,200	*			*	*
4/12	950	*			*	*
4/26	1,300	*			*	*
5/10	1,100	*			*	*
5/24	1,200	*			*	*
6/7	1,200	*			*	*
6/21	1,000	*			*	*
7/5	1,100	*			*	*
7/19	1,300	*			*	*
8/2	950	*			*	*
8/16	1,200	*			*	*
8/30	1,100	*			*	*
9/13	1,000	*			*	*
9/27	1,200	*			*	*
10/11	950	*			*	*
10/25	1,200	*			*	*
11/8	1,000	*			*	*
11/21	970	*			*	*
12/6	920	*			*	*
12/20	930	*			*	*
Annual Average	1,100	*6.9			*0.56	*6.1
	Benton City Composite					
1/4	980	*			*	*
1/18	920	*			*	*
2/1	870	*			*	*
2/15	930	*			*	*
3/1	800	*		*	*	*

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

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK - 1973

(Units of 10^{-9} μCi/ml of Milk)

Date	^{40}K	^{65}Zn	^{89}Sr	^{90}Sr	^{131}I	^{137}Cs-^{137m}Ba
Anal. Limit	470	54	2	2	2	29
			Benton City Composite (Cont'd)			
3/15	1,200	*			*	*
3/29	740	*			*	*
4/12	750	*			*	*
4/26	870	*			*	*
5/10	1,000	*			*	*
5/24	1,000	*			*	*
6/7	1,100	*		3.5	*	*
6/21	730	*			*	*
7/5	1,000	*			*	*
7/19	1,200	*			*	*
8/2	1,000	*			*	*
8/16	1,000	*			*	*
8/30	1,000	*		*	*	*
9/13	860	*			*	*
9/27	870	*			*	*
10/11	1,200	*			*	*
10/25	1,200	*			*	*
11/8	1,300	*			*	*
11/21	1,100	*			*	*
12/6	1,000	*		2.0	*	*
12/20	950	*			*	*
Annual Average	990	*9.0		2.2	*0.86	*4.4
			West Richland Farm #1			
1/11	870	*			2.5	*
1/25	890	*			*	*
2/8	740	*			*	*
2/22	1,200	*			*	*
3/22	1,100	*			2.1	*
4/5	940	*			*	*

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

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK - 1973

(Units of 10^{-9} μCi/ml of Milk)

Date	^{40}K	^{65}Zn	^{89}Sr	^{90}Sr	^{131}I	^{137}Cs-^{137m}Ba
Anal. Limit	470	54	2	2	2	29
			West Richland Farm #1 (Cont'd)			
4/19	1,200	*			*	*
5/3	1,100	*			*	*
5/17	900	*			*	*
5/31	910	*			*	*
6/14	1,000	*			*	*
6/28	1,100	*			*	*
7/12	1,200	*			5.4	*
7/26	810	*			*	*
8/9	860	*			*	*
8/23	1,200	*			*	*
9/6	1,400	*			*	*
9/20	850	*			*	*
10/4	1,100	*			1.8	*
10/18	770	*			*	*
11/1	600	*			*	*
11/15	870	*			*	*
11/29	640	*			*	*
12/13	780	*			*	*
12/27	720	*			*	*
Annual Average	960	*11			*0.94	*5.5
			Commercial Brand H			
1/4	1,100	*			*	*
2/1	1,100	*		2.4	*	*
3/21	1,300	*			*	*
4/12	820	*			*	*
5/10	1,200	*		7.6	*	*
6/7	1,300	*			*	*
7/5	1,300	*			*	*
8/2	1,100	*		*	*	*

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

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK - 1973

(Units of 10^{-9} μCi/ml of Milk)

Date	^{40}K	^{65}Zn	^{89}Sr	^{90}Sr	^{131}I	^{137}Cs-^{137m}Ba
Anal. Limit	470	54	2	2	2	29
		Commercial Brand H (Cont'd)				
9/14	860	*			*	*
10/11	990	*			*	*
11/9	1,400	*			*	*
12/6	1,000	*		*	*	*
Annual Average	1,100	*10		3.0	*0.57	*12
		Commercial Composite				
1/4	990	*			*	*
1/18	1,200	*			*	*
2/1	1,200	*			*	*
2/15	950	*			*	*
3/15	1,100	*			*	*
3/29	1,000	*			*	*
4/12	930	*			*	*
4/26	1,000	*			*	*
5/10	1,200	*			*	*
5/24	1,300	*			*	*
6/7	1,200	*		2.4	*	*
6/21	980	*			*	*
7/5	1,200	*			*	*
7/19	1,400	*			*	*
8/2	900	*			*	*
8/16	1,400	*			*	*
8/30	1,200	*		*	*	*
9/13	920	*			*	*
9/27	960	*			*	*
10/11	1,000	*			*	*
11/8	1,000	*			*	*
11/21	1,100	*			*	*
12/6	820	*		*	*	*
12/20	850	*			*	*
Annual Average	980	*8.2		*1.7	*0.55	*6.6

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

APPENDIX F

TABLE 2

CONCENTRATIONS OF RADIONUCLIDES IN LOCALLY PURCHASED MEAT - 1973

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

Date	Type	^{40}K	^{65}Zn	^{90}Sr	^{137}Cs-^{137m}Ba
Anal. Limit		0.43	0.05	0.0007	0.027
			Commercial		
1/18	Beef	2.4	*	*	0.034
2/15	Beef	2.2	*	*	*
3/15	Beef	2.5	*	*	0.056
4/12	Beef	2.3	*	*	*
5/10	Beef	1.9	*	0.001	*
6/7	Beef	2.2	*	*	*
7/5	Beef	1.9	*	*	0.044
8/2	Beef	1.9	*	*	*
8/30	Beef	2.4	*	0.005	*
9/28	Beef	2.6	*	*	*
10/25	Beef	2.2	*	*	*
11/21	Beef	2.7	*	*	*
12/20	Beef	2.3	*	*	*
Annual Average		2.2	*0.004	0.0009	0.015
			Riverview Farm		
3/8	Beef	2.2	*	0.003	*

*Result was less than the analytical limit shown.

APPENDIX F

TABLE 3

CONCENTRATIONS OF RADIONUCLIDES IN LOCALLY PURCHASED LEAFY VEGETABLES - 1973

Units of 10^{-6} μCi/gm of Leafy Vegetables (wet weight)

Date	^{40}K	^{60}Co	^{65}Zn	^{89}Sr	^{90}Sr	$^{95}ZrNb$	^{106}Ru	^{131}I	^{137}Cs-^{137m}Ba	$^{140}BaLa$	$^{144}CePr$
Anal. Limit	0.80	0.055	0.099	0.002	0.002	0.029	0.80	0.078	0.05	0.44	0.44
						Riverview Farm					
7/12	4.9	*	*			*	1.4	*	*	*	*
8/9	2.1	*	*		0.012	*	*	*	*	*	*
9/6	2.0	*	*			*	*	*	*	*	*
Annual Average	3.0	*0.002	*		0.012	*0.0007	*0.43	*0.003	*0.01	*0.10	*0.12
						Commercial					
5/24	3.9	*	*	*	0.009	*	*	*	*	*	*
6/21	3.8	*	*			*	*	*	*	*	*
7/26	2.2	*	*			*	*	*	*	*	*
8/23	2.6	*	*			*	*	*	*	*	*
10/25	4.0	*	*			*	*	*	*	*	*
Annual Average	3.3	*0.006	*0.017	*0.002	0.009	*0.002	*0.137	*0.006	*	*	*

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

APPENDIX F

TABLE 4

CONCENTRATIONS OF RADIONUCLIDES IN LOCALLY PURCHASED CHICKEN AND EGGS

Units of 10^{-6} μCi/gm (wet weight)

Date	^{40}K	^{60}Co	^{65}Zn	^{90}Sr	$^{95}ZrNb$	^{137}Cs-^{137m}Ba	$^{140}BaLa$
Anal. Limit	0.44	0.05	0.05	0.002	0.016	0.027	0.32
			Chicken (Riverview Farm)				
9/6	2.2	*	*	*	*	*	0.41
12/13	2.0	*	*	*	*	0.028	*
Annual Average	2.1	*	*0.008	*0.0006	*	0.027	0.21
			Eggs (Riverview Farm)				
1/11	0.84	*	*		*	*	*
2/8	0.85	*	*		*	*	*
3/8	0.66	*	*	0.004	*	*	*
4/5	0.94	*	*		*	*	*
5/3	1.0	*	*		*	*	*
5/31	0.81	*	*	*	*	*	*
7/12	0.98	*	*		*	*	*
8/9	0.72	*	*		*	*	*
9/6	1.2	*	*		*	*	*
10/4	1.0	*	*		*	*	*
11/1	0.91	*	*		*	*	*
12/13	1.0	*	*	0.003	*	*	*
Annual Average	0.91	*0.0002	*0.005	0.003	*	*0.006	*
			Chicken (Commercial)				
9/6	1.8	*	*	*	*	*	*
			Eggs (Commercial)				
9/6	1.2	*	*	0.005	*	*	*

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

APPENDIX G
RADIONUCLIDES IN SOIL AND VEGETATION

APPENDIX G

TABLE 1

CONCENTRATIONS OF RADIONUCLIDES IN PERIMETER SOIL SAMPLES - 1973

(Units of 10^{-6} μCi/gm of Soil)

Location	^{40}K	^{58}Co	^{60}Co	^{65}Zn	^{90}Sr	$^{95}ZrNb$	$^{106}RuRh$
Analytical Limit	0.5	0.03	0.03	0.07	0.002	0.2	0.4
Benton City	18.	0.08	*	*	0.12	*	0.47
ERC	16.	0.07	*	*	0.08	0.20	1.7
Rt. 240, CP # 54	15.	*	*	0.14	0.04	*	0.59
Rattlesnake Springs	15.	*	*	0.16	0.07	*	*
Yakima Barricade	20.	0.05	0.12	*	0.17	0.26	0.64
Vernita Bridge	18.	0.04	0.06	0.07	0.13	*	0.46
Wahluke Slope # 2	20.	0.14	*	*	0.37	0.22	0.78
Berg Ranch	18.	*	0.14	0.10	0.32	*	0.45
Ringold	22.	0.04	*	0.13	0.04	*	1.4
Byers Pumphouse	16.	*	0.13	*	0.01	*	*
Byers Landing	21.	*	*	0.12	0.19	*	1.4
Riverview	18.	*	0.09	*	0.06	*	*
North Richland	17.	0.09	*	*	0.12	*	0.51
Maximum	22.	0.14	0.14	0.16	0.37	0.26	1.7
Minimum	15.	*	*	*	0.01	*	*
Average	18.	0.04	0.04	*0.06	0.13	*0.11	0.72

*Result was less than the analytical limit shown.

APPENDIX G

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN PERIMETER SOIL SAMPLES - 1973

(Units of 10^{-6} μCi/gm of Soil)

Location	^{134}Cs	^{137}Cs	$^{144}CePr$	^{224}Ra	^{226}Ra	^{238}Pu	$^{239-240}Pu$	Total U
Analytical Limit	0.03	0.03	0.3	0.04	0.06	0.003	0.001	0.015
Benton City	*	0.81	1.5	2.5	0.94	*	0.01	0.67
ERC	0.06	1.3	0.31	2.4	0.79	*	0.02	0.39
Rt. 240, CP # 54	*	0.18	1.1	2.1	0.46	*	0.004	0.37
Rattlesnake Springs	0.10	1.5	0.97	2.0	0.70	*	0.04	0.52
Yakima Barricade	0.17	0.59	0.35	1.8	0.76	*	0.01	0.30
Vernita Bridge	0.09	0.39	0.91	0.88	0.38	*	0.01	0.28
Wahluke Slope # 2	*	1.0	1.2	2.1	0.51	*	0.02	0.53
Berg Ranch	0.07	0.82	1.0	1.6	0.62	*	0.02	0.36
Ringold	0.10	*	*	2.2	0.44	*	*	0.50
Byers Pumphouse	*	0.14	0.58	0.94	0.42	*	0.003	0.28
Byers Landing	0.08	0.76	0.43	1.8	0.58	*	0.005	0.18
Riverview	*	0.84	0.83	1.4	0.62	0.006	0.02	0.14
North Richland	*	0.84	*	1.1	0.57	*	0.02	0.35
Maximum	0.17	1.5	1.5	2.5	0.94	0.006	0.04	0.67
Minimum	*	*	*	0.88	0.38	*	*	0.14
Average	0.05	0.70	0.71	1.8	0.60	*0.001	0.01	0.37

*Result was less than the analytical limit shown.

APPENDIX G

TABLE 2

CONCENTRATIONS OF RADIONUCLIDES IN PERIMETER VEGETATION SAMPLES - 1973

(Units of 10^{-6} μCi/gm of Vegetation)

Location	^{40}K	^{58}Co	^{60}Co	^{65}Zn	^{90}Sr	$^{95}ZrNb$	$^{106}RuRh$
Analytical Limit	0.3	0.05	0.05	0.08	0.002	0.01	0.4
Benton City	13.	*	*	0.77	0.03	0.16	*
ERC	9.9	*	*	0.54	0.06	0.40	*
Rt. 240, CP # 54	12.	*	*	0.48	0.08	0.48	*
Rattlesnake Springs	20.	*	*	1.6	0.04	0.48	*
Yakima Barricade	12.	*	*	1.2	0.04	0.32	*
Vernita Bridge	14.	*	*	0.55	0.04	0.40	*
Wahluke Slope # 2	14.	*	*	1.5	0.07	0.52	*
Berg Ranch	11.	*	*	0.63	0.09	0.30	*
Ringold	15.	*	*	*	0.05	*	*
Byers Pumphouse	16.	*	*	0.76	0.04	0.17	*
Byers Landing	7.8	*	*	0.83	0.02	0.37	*
Riverview	15.	*	*	1.4	0.02	0.22	*
North Richland	9.3	*	*	0.59	0.21	0.22	*
Maximum	20.	*	*	1.6	0.21	0.52	*
Minimum	7.8	*	*	*	0.02	*	*
Average	13.	*	*	0.83	0.06	0.31	*

*Result was less than the analytical limit shown.

APPENDIX G

TABLE 2 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN PERIMETER VEGETATION SAMPLES - 1973

(Units of 10^{-6} μCi/gm of Vegetation)

Location	^{131}I	^{137}Cs	$^{140}BaLa$	$^{144}CePr$	^{238}Pu	$^{239-240}Pu$	Total U
Analytical Limit	0.06	0.02	0.2	0.4	0.003	0.001	0.015
Benton City	*	0.24	18.	*	*	0.001	0.05
ERC	*	0.44	18.	*	*	*	*
Rt. 240, CP # 54	*	0.69	11.	*	*	0.006	*
Rattlesnake Springs	*	0.62	24.	*	*	0.004	0.07
Yakima Barricade	*	0.50	16.	*	0.003	*	*
Vernita Bridge	*	0.27	22.	*	*	*	*
Wahluke Slope # 2	*	1.9	27.	*	*	0.005	0.11
Berg Ranch	2.0	0.51	11.	*	0.004	*	0.04
Ringold	*	*	19.	*	*	*	0.05
Byers Pumphouse	*	0.27	13.	*	*	*	*
Byers Landing	*	0.51	23.	*	*	0.002	0.02
Riverview	*	0.25	19.	*	*	0.002	0.04
North Richland	*	0.36	12.	*	*	0.003	*
Maximum	2.0	1.9	27.	*	0.004	0.006	0.11
Minimum	*	*	11.	*	*	*	*
Average	*	0.50	18.	*	0.001	0.002	0.04

*Result was less than the analytical limit shown.

APPENDIX H
MEASUREMENTS OF EXTERNAL RADIATION EXPOSURE

APPENDIX H

TABLE 1

TLD MEASUREMENTS IN THE COLUMBIA RIVER - 1973

(Units of mR/day)

Measurement Period	Exposure Rate	Measurement Period	Exposure Rate
	Above 100-D		
12/19-1/18	0.38	8/13-9/7	0.14
1/18-2/21	0.19	9/7-10/11	0.10
2/21-3/16	0.14	10/11-11/8	0.13
3/16-4/23	0.07	11/8-12/7	0.10
4/23-5/18	0.14	12/7-1/21	0.13
5/18-6/14	0.10		
6/14-7/13	0.10		
7/13-8/13	0.07	Annual Average	0.13
	Below 100-N		
12/19-1/18	0.23	8/13-9/7	0.20
1/18-2/21	lost	9/7-10/11	0.16
2/21-3/16	0.16	10/11-11/8	0.28
3/16-4/23	0.13	11/8-12/7	
4/23-5/18	0.21	12/7-1/21	0.20
5/18-6/14	0.16		
6/14-7/13	0.12		
7/13-8/13	0.11	Annual Average	0.17
	D-Island		
12/19-1/18	0.14	8/13-9/7	0.18
1/18-2/21	0.14	9/7-10/11	0.12
2/21-3/16	0.12	10-11/18	0.28
3/16-4/23		11/8-12/7	0.13
4/23-5/18	0.17	12/7-1/21	
5/18-6/14	0.13		
6/14-7/13	0.15		
7/13-8/13	0.09	Annual Average	0.15

No entry indicates no measurement was made.

APPENDIX H

TABLE 1 (Continued)

TLD MEASUREMENTS IN THE COLUMBIA RIVER - 1973

(Units of mR/day)

Measurement Period	Exposure Rate	Measurement Period	Exposure Rate
	100-F		
12/19-1/18	0.19	8/13-9/7	0.17
1/18-2/21	0.19	9/7-10/11	0.14
2/21-3/16	0.12	10/11-11/8	0.16
3/16-4/23		11/8-12/7	0.21
4/23-5/18	0.17	12/7-1/21	0.22
5/18-6/14	0.13		
6/14-7/13	0.15		
7/13-8/13	0.14	Annual Average	0.17
	South Wooded Island		
12/19-1/10		8/13-9/7	0.11
1/10-2/7	0.15	9/7-10/11	0.11
2/7-3/7	0.13	10/11-11/8	0.10
3/7-4/4	0.13	11/8-12/7	0.10
4/4-5/2	0.14	12/7-1/21	0.12
5/2-5/30	0.20		
5/30-7/13	0.09		
7/13-8/13	0.09	Annual Average	0.12
	Richland Pump House		
12/21-1/22	0.12	8/6-9/4	0.11
1/22-2/20	0.11	9/4-10/1	0.11
2/20-3/19	0.13	10/1-10/29	0.10
3/19-4/16	0.13	10/29-11/26	0.11
4/16-5/14	0.13	11/26-12/21	0.11
5/14-6/11	0.11	12/21-1/21	0.09
6/11-7/9	0.11		
7/9-8/6	0.08	Annual Average	0.11

No entry indicates no measurement was made.

APPENDIX H

TABLE 1 (Continued)

TLD MEASUREMENTS IN THE COLUMBIA RIVER - 1973

(Units of mR/day)

Measurement Period	Exposure Rate	Measurement Period	Exposure Rate
	Hanford Powerline		
12/19-1/18		8/13-9/7	0.17
1/18-2/21	0.14	9/7-10/11	0.16
2/21-3/16	0.12	10/11-11/8	0.16
3/16-4/23	0.22	11/8-12/7	0.15
4/23-5/18	0.22	12/7-1/21	0.19
5/18-6/14	0.19		
6/14-7/13	0.18		
7/13-8/13	0.14	Annual Average	0.17
	Coyote Rapids		
1/19-2/21	0.16	8/13-9/7	0.14
2/21-3/16	0.16	9/7-10/11	0.13
3/16-4/23	0.09	10/11-11/8	0.14
4/23-5/18	0.30	11/8-12/7	
5/18-6/14	0.14	12/7-1/21	0.15
6/14-7/13	0.13		
7/13-8/13	0.13	Annual Average	0.15

No entry indicates no measurement was made.

APPENDIX H

TABLE 2

EXTERNAL EXPOSURE RATE MEASUREMENT AT 3 FEET ABOVE THE COLUMBIA RIVER SHORELINE AT VERNITA, RICHLAND, AND SACAJAWEA PARK - 1973

(Units of mR/day)

Date	Exposure Rate
Vernita	
3/6	0.29
4/3	0.19
5/1	0.19
6/12	0.26
7/10	0.24
8/7	0.17
10/2	0.19
12/11	0.24
Annual Average	0.22

Date	Exposure Rate
Richland Pump House	
1/18	0.29
2/21	0.24
3/16	0.29
4/23	0.24
5/18	0.29
6/14	0.22
7/13	0.24
8/13	0.34
9/7	0.29
10/11	0.19
11/8	0.29
12/7	0.31
Annual Average	0.26

Sacajawea	
1/12	0.31
1/19	0.19
1/26	0.24
2/9	0.26
2/23	0.29
4/6	0.24
4/20	0.24
5/4	0.24
5/25	0.24
6/1	0.22
6/15	0.24
6/29	0.22
7/13	0.29
7/27	0.24
8/24	0.24
9/7	0.53
9/21	0.84
10/5	0.29
10/10	0.24
10/19	0.29
11/2	0.26
11/16	0.29
11/30	0.19
12/14	0.24
12/28	0.53
Annual Average	0.29

APPENDIX H

TABLE 3 - PART A

TLD MEASUREMENTS AT 3 FEET ABOVE THE GROUND - 1973

(Units of mR/day)

Eastern Quadrant

Date	Ringold	Byers Landing	Richland	Pasco	Eltopia	Connell	Othello	Cooke Bros.	Berg Ranch	Wahluke Watermaster
12/29	0.18	0.22	0.18	0.19	0.24	0.17	0.18	0.24	0.19	0.22
1/5	0.18	0.22	0.18	0.19	0.23	0.17	0.18	0.24	0.20	0.24
1/12	0.19	0.21	0.17	0.19	0.23	0.17	0.18	0.24	0.20	0.24
1/19	0.19	0.21	0.17	0.19	0.23		0.19	0.20	0.20	0.24
1/26	0.19	0.21	0.18	0.19	0.23		0.19	0.20	0.20	0.24
2/2	0.19	0.21	0.18	0.19	0.18		0.19	0.20	0.21	0.23
2/9	0.19	0.22	0.20	0.20	0.18		0.19	0.20	0.21	0.23
2/16	0.19	0.22	0.20	0.20	0.18	0.17	0.17	0.19	0.21	0.23
2/23	0.19	0.22	0.20	0.20	0.18	0.17	0.17	0.19	0.21	0.23
3/2	0.19	0.22	0.20	0.20	0.17	0.17	0.17	0.19	0.21	0.20
3/9	0.17	0.23	0.17	0.20	0.17	0.17	0.17	0.19	0.21	0.20
3/16	0.17	0.23	0.17	0.20	0.17	0.16	0.17	0.19	0.21	0.20
3/23	0.17	0.23	0.19	0.20	0.17	0.16	0.18	0.19	0.21	0.20
3/30	0.17	0.23	0.19	0.20	0.19	0.16	0.18	0.19	0.22	0.21
4/6	0.18	0.22	0.18	0.20	0.19	0.16	0.18	0.19	0.22	0.21
4/13	0.18	0.22	0.18	0.20	0.19	0.16	0.18	0.20	0.22	0.21
4/20	0.18	0.22	0.18	0.20	0.19	0.16	0.18	0.20	0.22	0.21
4/27	0.18	0.22	0.18	0.20	0.18	0.16	0.18	0.20	0.23	0.21
5/4	0.18	0.21	0.18	0.18	0.18	0.16	0.18	0.20	0.23	0.21
5/11	0.18	0.21	0.18	0.18	0.18	0.16	0.17	0.19	0.23	0.21
5/18	0.18	0.21	0.17	0.18	0.18	0.16	0.17	0.19	0.23	0.21
5/25	0.18	0.21	0.17	0.18	0.18	0.16	0.17	0.19	0.23	0.21
6/1	0.18	0.21	0.18	0.21	0.18	0.16	0.17	0.19	0.23	0.21
6/8	0.18	0.21	0.18	0.21	0.18	0.18	0.18	0.19	0.23	0.21
6/15	0.18	0.21	0.17	0.21	0.18	0.18	0.18	0.19	0.23	0.21
6/22	0.18	0.21	0.17	0.21	0.17	0.18	0.18	0.19	0.21	0.20
6/29	0.17	0.19	0.16	0.18	0.17	0.18	0.18	0.19	0.21	0.20
7/6	0.17	0.19	0.16	0.18	0.17	0.16	0.16		0.21	0.20

No entry indicates no measurement was made.

APPENDIX H

TABLE 3 - PART A (Continued)

TLD MEASUREMENTS AT 3 FEET ABOVE THE GROUND - 1973

(Units of mR/day)

Eastern Quadrant

Date	Ringold	Byers Landing	Richland	Pasco	Eltopia	Connell	Othello	Cooke Bros.	Berg Ranch	Wahluke Watermaster
7/13	0.17	0.19	0.16	0.18	0.17	0.16	0.16		0.21	0.20
7/20	0.17	0.19	0.16	0.18	0.15	0.16	0.16		0.20	0.18
7/27	0.16	0.21	0.15	0.18	0.15	0.16	0.16		0.20	0.18
8/3	0.16	0.21	0.15	0.18	0.15	0.19	0.19	0.18	0.20	0.18
8/10	0.16	0.21	0.16	0.18	0.15	0.19	0.19	0.18	0.20	0.18
8/17	0.16	0.21	0.16	0.18	0.18	0.19	0.19	0.18	0.22	0.21
8/24	0.18	0.21	0.17	0.19	0.18	0.19	0.19	0.18	0.22	0.21
8/31	0.18	0.21	0.17	0.19	0.18	0.19	0.17	0.20	0.22	0.21
9/7	0.18	0.21	0.17	0.19	0.18	0.19	0.17	0.20	0.22	0.21
9/14	0.18	0.21	0.16	0.19	0.19	0.19	0.17	0.20	0.23	0.22
9/21	0.18	0.23	0.16	0.21	0.19	0.19	0.17	0.20	0.23	0.22
9/28	0.18	0.23	0.16	0.21	0.19	0.18	0.16	0.20	0.23	0.22
10/5	0.18	0.23	0.18	0.21	0.19	0.18	0.16	0.20	0.23	0.22
10/12	0.18	0.23	0.18	0.21	0.19	0.18	0.16	0.20	0.21	0.23
10/19	0.17	0.23	0.17	0.20	0.19	0.18	0.16	0.20	0.21	0.23
10/26	0.17	0.23	0.17	0.20	0.19	0.20	0.19	0.19	0.21	0.23
11/2	0.17	0.23	0.18	0.20	0.19	0.20	0.19	0.19	0.21	0.23
11/9	0.17	0.23	0.18	0.20	0.18	0.20	0.19	0.19	0.21	0.22
11/16	0.18	0.21	0.19	0.20	0.18	0.20	0.19	0.19	0.21	0.22
11/23	0.18	0.23	0.19	0.20	0.18	0.20	0.19	0.17	0.21	0.22
11/30	0.18	0.23	0.19	0.20	0.18	0.18	0.18	0.17	0.21	0.22
12/7	0.18	0.23	0.19	0.20	0.18	0.18	0.18	0.17	0.21	0.21
12/14	0.18	0.21	0.16	0.20	0.18	0.18	0.18	0.17	0.21	0.21
12/21	0.18	0.21	0.16	0.20	0.18	0.17	0.16	0.20	0.21	0.21
12/28	0.18	0.21	0.16	0.20	0.18	0.17	0.16	0.20	0.21	0.21
Annual Average	0.18	0.22	0.18	0.20	0.18	0.18	0.18	0.19	0.21	0.21

No entry indicates no measurement was made.

APPENDIX H

TABLE 3 - PART B

TLD MEASUREMENTS AT 3 FEET ABOVE THE GROUND - 1973

(Units of mR/day)
Perimeter Communities

Date	Sunnyside	Ellensburg	Moses Lake	Washtucna	Walla Walla	McNary Dam
12/29	0.19	0.16	0.16	0.32	0.18	0.20
1/5	0.19	0.16	0.16	0.32	0.18	0.20
1/12	0.19	0.16	0.16	0.32	0.18	0.20
1/19	0.18	0.16	0.17	0.23	0.24	0.22
1/26	0.18	0.16	0.17	0.23	0.24	0.22
2/2	0.18	0.16	0.17	0.23	0.24	0.22
2/9	0.18	0.16	0.17	0.23	0.19	0.20
2/16	0.18	0.16	0.17	0.20	0.19	0.20
2/23	0.18	0.16	0.17	0.20	0.19	0.20
3/2	0.24	0.20	0.17	0.20	0.19	0.20
3/9	0.24	0.20	0.17	0.20	0.26	0.20
3/16	0.17	0.15	0.17	0.21	0.26	0.20
3/23	0.17	0.15	0.17	0.21	0.26	0.20
3/30	0.17	0.15	0.17	0.21	0.26	0.20
4/6	0.17	0.15	0.17	0.21	0.17	0.19
4/13	0.19	0.16		0.20	0.17	0.19
4/20	0.19	0.16		0.20	0.17	0.19
4/27	0.19	0.16		0.20	0.17	0.19
5/4	0.19	0.16		0.20	0.21	0.20
5/11	0.18	0.16	0.16	0.18	0.21	0.20
5/18	0.18	0.16	0.16	0.18	0.21	0.20
5/25	0.18	0.16	0.16	0.18	0.21	0.20
6/1	0.18	0.16	0.16	0.18	0.21	0.20
6/8	0.15	0.15		0.19	0.21	0.20
6/15	0.15	0.15		0.19	0.21	0.20
6/22	0.15	0.15		0.19	0.21	0.20
6/29	0.15	0.15		0.19	0.20	0.18
7/6	0.15	0.15	0.17	0.18	0.20	0.18

No entry indicates no measurement was made.

APPENDIX H

TABLE 3 - PART B (Continued)

TLD MEASUREMENTS AT 3 FEET ABOVE THE GROUND - 1973

(Units of mR/day)
Perimeter Communities

Date	Sunnyside	Ellensburg	Moses Lake	Washtucna	Walla Walla	McNary Dam
7/13	0.19	0.17	0.17	0.18	0.20	0.18
7/20	0.19	0.17	0.17	0.18	0.20	0.18
7/27	0.19	0.17	0.17	0.18	0.19	0.18
8/3	0.17	0.16	0.18	0.21	0.19	0.18
8/10	0.17	0.16	0.18	0.21	0.19	0.18
8/17	0.17	0.16	0.18	0.21	0.19	0.18
8/24	0.17	0.16	0.18	0.21	0.20	0.19
8/31	0.18	0.15	0.18	0.18	0.20	0.19
9/7	0.18	0.15	0.18	0.18	0.20	0.19
9/14	0.18	0.15	0.18	0.18	0.20	0.19
9/21	0.18	0.15	0.18	0.18	0.21	0.21
9/28	0.18	0.16	0.17	0.19	0.21	0.21
10/5	0.18	0.16	0.17	0.19	0.21	0.21
10/12	0.18	0.16	0.17	0.19	0.21	0.21
10/19	0.18	0.16	0.17	0.19	0.20	0.20
10/26	0.19	0.17	0.19	0.20	0.20	0.20
11/2	0.19	0.17	0.19	0.20	0.20	0.20
11/9	0.19	0.17	0.19	0.20	0.20	0.20
11/16	0.19	0.17	0.19	0.20	0.21	0.20
11/23	0.16	0.15	0.19	0.20	0.21	0.20
11/30	0.16	0.15	0.18	0.18	0.21	0.20
12/7	0.16	0.15	0.18	0.18	0.21	0.20
12/14	0.16	0.15	0.18	0.18	0.18	0.19
12/21	0.17	0.15	0.18	0.17	0.18	0.19
12/28	0.17	0.15	0.18	0.17	0.18	0.19
Annual Average	0.18	0.16	0.17	0.20	0.20	0.20

No entry indicates no measurement was made.

APPENDIX H

TABLE 3 - PART C

TLD MEASUREMENTS AT 3 FEET ABOVE THE GROUND - 1973

(Units of mR/day)

	Other Locations				
Date	Yakima Barricade	Vernita	Wahluke #2	Benton City	Baxter Substation
12/29	0.21	0.29	0.20	0.20	
1/5	0.21	0.26	0.20	0.20	
1/12	0.21	0.26	0.20	0.19	
1/19	0.21	0.26	0.20	0.19	
1/26	0.21	0.26	0.20	0.19	
2/2	0.21	0.25	0.24	0.19	
2/9	0.21	0.25	0.24	0.16	
2/16	0.21	0.25	0.24	0.16	
2/23	0.21	0.25	0.24	0.16	
3/2	0.21	0.23	0.20	0.16	
3/9	0.20	0.23	0.20	0.16	
3/16	0.20	0.23	0.20	0.16	
3/23	0.20	0.23	0.20	0.16	
3/30	0.20	0.23	0.22	0.16	
4/6	0.21	0.23	0.22	0.16	
4/13	0.21	0.23	0.22	0.16	
4/20	0.21	0.23	0.22	0.16	
4/27	0.21	0.22	0.21	0.16	
5/4	0.21	0.22	0.21	0.16	
5/11	0.21	0.22	0.21	0.16	
5/18	0.21	0.22	0.21	0.16	0.24
5/25	0.21	0.23	0.23	0.16	0.24
6/1	0.21	0.23	0.23	0.16	0.24
6/8	0.21	0.23	0.23	0.16	0.19
6/15	0.21	0.23	0.23	0.16	0.19
6/22	0.21	0.20	0.19	0.16	0.19
6/29	0.20	0.20	0.19	0.15	0.19
7/6	0.20	0.20	0.19	0.15	0.18
7/13	0.20	0.20	0.19	0.15	0.18
7/20	0.20	0.20	0.19	0.15	0.18
7/27	0.20	0.20	0.19	0.16	0.18
8/3	0.20	0.20	0.19	0.16	0.19
8/10	0.20	0.20	0.19	0.16	0.19

No entry indicates no measurement was made.

APPENDIX H

TABLE 3 - PART C (Continued)

TLD MEASUREMENTS AT 3 FEET ABOVE THE GROUND - 1973

(Units of mR/day)

	Other Locations				
Date	Yakima Barricade	Vernita	Wahluke #2	Benton City	Baxter Substation
8/17	0.20	0.21	0.22	0.16	0.19
8/24	0.20	0.21	0.22	0.16	0.19
8/31	0.20	0.21	0.22	0.16	
9/7	0.20	0.21	0.22	0.16	
9/14	0.20	0.23	0.23	0.16	
9/21	0.24	0.23	0.23	0.18	
9/28	0.24	0.23	0.23	0.18	0.20
10/5	0.24	0.23	0.23	0.18	0.20
10/12	0.24	0.23	0.23	0.18	0.20
10/19	0.21	0.23	0.23	0.17	0.20
10/26	0.21	0.23	0.23	0.17	0.19
11/2	0.21	0.23	0.23	0.17	0.19
11/9	0.21	0.24	0.23	0.17	0.19
11/16	0.22	0.24	0.23	0.19	0.19
11/23	0.22	0.24	0.23	0.19	0.17
11/30	0.22	0.24	0.23	0.19	0.17
12/7	0.22	0.21	0.20	0.19	0.17
12/14	0.19	0.21	0.20	0.16	0.17
12/21	0.19	0.21	0.20	0.16	0.21
12/28	0.19	0.21	0.20	0.16	0.21
Annual Average	0.21	0.23	0.22	0.17	0.20

No entry indicates no measurement was made.

APPENDIX I
WATER QUALITY MEASUREMENTS OF COLUMBIA RIVER WATER

APPENDIX I

TABLE 1

NITRATES IN COLUMBIA RIVER WATER AT VERNITA AND RICHLAND - 1973

(Units of ppm of Water)

Date	Vernita	Richland	Date	Vernita	Richland
Analy. Limit	0.10		Analy. Limit	0.10	
1/2	0.47	0.55	7/3	*	*
1/9	0.31	0.35	7/10	0.18	0.16
1/16	0.39	0.47	7/17	*	*
1/23	0.41	0.46	7/24	*	*
1/30	0.35	0.39	7/31	*	0.10
2/6	0.44	0.37	8/7	*	*
2/13	0.31	0.28	8/14	0.20	*
2/20	0.35	0.40	8/21	0.20	*
2/27	0.48	0.84	8/28	0.20	*
3/6	0.53	0.52	9/4	0.25	0.41
3/13	0.57	0.58	9/11	0.35	0.20
3/20	0.51	0.46	9/18	0.51	0.23
3/27	0.67	0.53	9/25	0.38	0.24
4/3	0.41	0.39	10/2	0.32	0.22
4/10	0.26	0.19	10/9	0.32	0.23
4/17	0.20	0.17	10/16	0.36	0.29
4/24	0.13	0.12	10/23	0.28	0.33
5/1	0.10	*	10/30	0.32	0.25
5/8	*	*	11/6		
5/15	*	*	11/13	0.41	0.51
5/22	*	*	11/20	0.85	0.33
5/29	0.40	0.49	11/27	0.31	0.33
6/5	*	0.24	12/4	0.30	0.34
6/12	*	*	12/11	0.37	0.46
6/19		0.13	12/18	0.43	0.47
6/26	*	0.43	12/26	0.56	0.47
Annual Average				0.32	0.30

*Result was less than the analytical limit shown

No entry indicates no analysis was made.

APPENDIX I

TABLE 2

WATER QUALITY MEASUREMENTS IN COLUMBIA RIVER WATER AT VERNITA - 1973

Date	pH	Turbidity (JTU)[a]	Diss. O_2
1/9	8.0		10.8
1/16	8.0		12.2
1/23	7.95	1.4	9.1
1/30	7.9		9.1
2/6	8.0	1.0	8.7
2/13	8.1	0.8	9.2
2/20	8.0	0.7	
2/27	8.0	2.1	9.2
3/6	8.0	4.3	10.6
3/13	8.3	1.4	9.0
3/20	8.3	3.7	8.7
3/27	7.9		8.6
4/3	8.0	1.8	10.4
4/10	8.1	1.5	10.6
4/17	8.2	2.0	
4/24	8.0	1.8	
5/1	8.3	1.2	12.0
5/8	8.5	2.0	
5/15	8.3	1.8	9.3
5/22	8.8	2.0	9.4
5/29		1.9	
6/5	8.5	2.3	10.8
6/12	8.6	2.4	10.2
6/19	9.1	1.7	10.6
6/26	8.9	0.9	10.5
7/3	8.8	1.4	12.2
7/10	8.5	1.7	11.6
7/17	8.8	1.5	12.4
7/24	7.6	2.5	9.3
7/31	8.15	1.5	10.9
8/7	8.6		13.1
8/14	8.5	1.2	14.1
8/21	8.4	1.0	11.4
8/28	8.5	1.1	11.7

[a] Jackson turbidity units.

No entry indicates no analysis was made.

APPENDIX I

TABLE 2 (Continued)

WATER QUALITY MEASUREMENTS IN COLUMBIA RIVER WATER AT VERNITA - 1973

Date	pH	Turbidity (JTU)[a]	Diss. O_2
9/4		1.2	
9/11	8.4	0.8	
9/18	8.5	1.0	11.3
9/25	8.7	1.0	10.7
10/2	8.6		11.0
10/9	8.4	0.9	9.2
10/16	8.2	0.8	11.0
10/23	8.1		
10/30	8.6	1.0	
11/6	8.2	1.0	
11/13	8.4	0.8	
11/20	8.6	0.5	
11/27	8.8	0.8	
12/4	8.6	0.8	
12/18	8.3	0.8	11.4
12/26	8.4	1.3	9.3
Annual Average	8.4	1.5	10.5

[a] Jackson turbidity units.

No entry indicates no analysis was made.

APPENDIX I

TABLE 3

WATER QUALITY MEASUREMENTS IN COLUMBIA RIVER WATER AT THE 300 AREA - 1973

Date	pH	Turbidity (JTU)(a)	Diss O_2 (ppm)
1/2	7.9		10.9
1/3	7.8		10.5
1/4	7.9		10.8
1/5	7.8		10.4
1/8	8.3		13.0
1/9	8.0		11.3
1/10	8.0		11.2
1/11	8.0	1.7	9.4
1/12	7.3	2.0	11.2
1/15	7.4	1.4	13.7
1/16	8.0		12.6
1/18	8.1	1.9	13.9
1/19	7.8	1.3	13.9
1/22	7.8	1.4	14.1
1/23	7.9	1.4	9.8
1/24	7.9	1.5	8.6
1/25	7.9	1.6	8.3
1/26	7.9	1.7	10.4
1/29	8.0		10.7
1/30	8.1		10.8
1/31	7.8		9.3
2/1	7.8		9.2
2/2	7.9		
2/5	7.9		
2/6	8.0	1.0	9.3
2/7	8.3	0.8	11.7
2/8	8.2	0.6	9.6
2/9	8.3	0.6	9.2
2/12	8.4	0.7	9.4
2/13	8.1	0.7	9.5
2/15	8.2	0.9	8.8
2/16	8.3	0.8	8.7
2/20	7.9	0.7	10.2
2/22	8.2	0.9	9.2
2/23	8.1	0.9	8.8
2/26	8.3	1.0	10.0

(a) Jackson turbidity units.

No entry indicates no measurement was made.

APPENDIX I

TABLE 3 (Continued)

WATER QUALITY MEASUREMENTS IN COLUMBIA RIVER WATER AT THE 300 AREA - 1973

Date	pH	Turbidity (JTU)(a)	Diss O_2 (ppm)
2/27	8.0	1.7	9.5
2/28	8.2		9.7
3/1	8.1	1.9	8.3
3/2	8.1	2.5	8.2
3/5	8.1	3.8	9.0
3/6	8.0	2.0	8.9
3/7	8.0	3.0	8.8
3/8	7.9	4.0	8.2
3/9	8.1	3.9	8.1
3/12	8.1	2.7	8.0
3/13	7.9	1.5	9.0
3/15	7.9	1.8	
3/16	8.1	1.75	
3/19	7.9	1.5	10.3
3/20		3.5	8.3
3/21	8.2	1.7	8.6
3/22	8.0	1.7	9.3
3/23	8.0	1.8	9.7
3/26	7.9	2.2	7.7
3/27	7.9	5.0	9.0
3/27	8.6	5.2	8.1
3/28	7.9	2.5	9.3
3/28	8.7	2.5	9.3
3/29	7.8	2.7	9.6
3/29		2.2	9.3
3/30	7.9	1.9	8.6
3/30		1.9	8.6
4/2	7.7	1.8	9.1
4/3	7.7	2.0	9.6
4/4	7.9	2.0	10.0
4/5	7.8	1.8	9.4
4/6	7.9	2.2	10.4
4/9	7.9	1.9	9.8
4/10	8.0	1.7	10.4
4/11	7.8	1.8	10.2

(a) Jackson turbidity units.

No entry indicates no measurement was made.

APPENDIX I

TABLE 3 (Continued)

WATER QUALITY MEASUREMENTS IN COLUMBIA RIVER WATER AT THE 300 AREA - 1973

Date	pH	Turbidity (JTU)[a]	Diss O_2 (ppm)
4/12	7.4	1.7	
4/13	7.9	1.5	9.4
4/16	8.2	1.3	
4/17	8.0	1.5	
4/18	7.9	1.4	
4/19	8.0	1.4	
4/20	8.0	1.5	
4/23	8.3	1.4	
4/24	8.0	1.7	
4/25	8.1	1.8	
4/26	7.9	1.8	
4/27	8.2	1.4	
4/30	8.1	1.0	
5/1	8.1	1.2	10.4
5/2	8.3	1.2	10.0
5/3	8.0	1.4	9.4
5/4	8.2	1.4	8.8
5/7	8.5	1.8	10.8
5/8	8.3	1.4	
5/10	8.2	1.7	
5/11	8.3	1.7	
5/14	8.5	1.8	8.9
5/15	8.5	1.9	8.5
5/17	8.8	2.1	10.2
5/18	8.4	1.8	10.0
5/21	8.5	1.5	9.4
5/22	8.6	1.7	9.6
5/23	8.5	1.7	9.7
5/24	8.2	1.9	9.4
5/25	8.3	1.7	9.8
5/29	8.5	1.6	9.1
5/30	8.6	2.2	9.9
5/31	8.4	2.3	9.4
6/4	8.4	2.5	9.5
6/6	8.5	2.3	9.4

[a] Jackson turbidity units.

No entry indicates no measurement was made.

APPENDIX I

TABLE 3 (Continued)

WATER QUALITY MEASUREMENTS IN COLUMBIA RIVER WATER AT THE 300 AREA - 1973

Date	pH	Turbidity (JTU)(a)	Diss O_2 (ppm)
6/7	8.6	2.3	
6/8	8.4	2.2	10.0
6/11	8.4	2.0	9.4
6/12	8.4	2.2	9.2
6/13	8.5	2.2	9.4
6/14	8.5	2.2	10.5
6/15	8.5	2.0	10.0
6/18	8.4	1.8	9.5
6/19	8.7	2.7	9.7
6/20	8.7	1.4	9.9
6/21	8.4	1.5	9.6
6/22	8.3	1.5	9.9
6/25	8.3	1.0	9.1
6/26	8.7	1.2	10.0
6/27	9.1	1.0	12.8
6/28	8.6		10.8
6/29	8.5		12.8
7/2	8.5	1.2	10.6
7/3	8.5	1.2	11.0
7/5	8.5	1.1	11.2
7/9	8.5	1.6	10.4
7/10	8.4	1.8	9.7
7/12	8.5	1.7	12.4
7/16	8.5	1.5	11.2
7/17	8.4	2.0	12.2
7/19	8.2	1.5	11.7
7/20	8.3	1.3	11.6
7/23	7.9	2.0	10.5
7/24	7.9	2.5	11.0
7/25	7.8	1.7	12.0
7/26	7.5	2.5	8.3
7/27	7.6	1.3	9.2
7/30	8.1	1.2	10.3
7/31	7.6	1.5	10.0

(a) Jackson turbidity units.

No entry indicates no measurement was made.

APPENDIX I

TABLE 3 (Continued)

WATER QUALITY MEASUREMENTS IN COLUMBIA RIVER WATER AT THE 300 AREA - 1973

Date	pH	Turbidity (JTU)[a]	Diss O_2 (ppm)[2]
8/1	7.75	1.2	9.8
8/2	7.8	2.5	9.8
8/3	7.95	1.2	9.6
8/6	7.9	1.2	11.2
8/7	8.2	1.3	12.1
8/8	8.3	2.5	11.2
8/9	8.3	1.2	12.0
8/10	8.3	1.5	12.2
8/13	8.5	1.2	11.6
8/14	8.3	1.4	12.3
8/15	8.6	1.5	11.0
8/16	8.3	1.3	11.2
8/17	8.1	1.0	11.2
8/20	8.6	1.0	13.2
8/21	8.1	1.1	10.8
8/22	8.3	1.0	11.7
8/23	8.5	1.5	11.3
8/24	8.3	1.0	11.3
8/27	8.6	0.8	10.1
8/28	8.5	1.2	11.2
8/29	8.2	1.2	12.2
8/30	8.7	1.3	11.4
9/4	8.5	1.0	10.6
9/5	8.3	1.2	10.1
9/6	8.2	1.1	11.5
9/7	8.3	1.2	11.4
9/10	8.5	1.1	11.0
9/11	8.3	1.0	
9/12		0.8	
9/13	8.3	0.8	12.0
9/14	8.4	1.0	11.6
9/17	8.6	0.8	11.4
9/18	8.4	1.0	11.2
9/19	8.2	1.0	11.3
9/20	8.2	1.0	10.5

[a] Jackson turbidity units.

No entry indicates no measurement made.

APPENDIX I

TABLE 3 (Continued)

WATER QUALITY MEASUREMENTS IN COLUMBIA RIVER WATER AT THE 300 AREA - 1973

Date	pH	Turbidity (JTU)[a]	Diss O_2 (ppm)[2]
9/21	8.1	1.0	10.3
9/24	8.2		11.4
9/25	8.2	1.0	10.8
9/26	8.3	1.5	10.1
9/27	8.3		9.9
9/28	8.2		10.8
10/1	8.3		10.1
10/2	8.2		9.9
10/3	8.2		10.7
10/4	8.2	1.0	10.2
10/5	8.2	0.75	9.9
10/8	8.2	0.80	9.4
10/9	8.1	1.0	9.2
10/10	8.0	0.9	8.9
10/11	7.9	1.1	9.9
10/12	8.0	0.8	10.4
10/15	8.1	0.8	10.8
10/16	7.9	0.8	11.0
10/17	8.45	0.8	10.8
10/18	8.0	0.8	10.2
10/19	8.0		9.6
10/22	8.3		
10/23	7.9		
10/24	8.0	0.8	
10/25	8.2	1.3	
10/26	8.2	1.3	
10/29	8.2	0.9	
10/30	7.9	1.0	
11/1	8.0	1.4	
11/2	7.9	0.8	
11/5	7.9	0.8	
11/6	8.6	1.0	
11/7	8.3	1.2	
11/8	7.7	0.8	
11/9	7.8	0.8	

[a] Jackson turbidity units.

No entry indicates no measurement was made.

APPENDIX I

TABLE 3 (Continued)

WATER QUALITY MEASUREMENTS IN COLUMBIA RIVER WATER AT THE 300 AREA - 1973

Date	pH	Turbidity (JTU)[a]	Diss O_2 (ppm)
11/12	7.6	0.8	
11/13	7.8	0.8	
11/14	8.0	0.8	
11/15	8.2	0.7	
11/16	7.8	0.8	
11/19	8.0	0.8	
11/20	8.1	0.7	
11/26	8.2	0.7	
11/27	7.9	0.8	
11/29	8.0	1.1	
11/30	7.7	1.0	
12/3	7.8	0.7	
12/4	7.8	0.8	
12/5	7.8	0.7	
12/6	7.8	0.8	
12/7	8.3	0.7	
12/10	8.2	0.5	
12/11	7.8	0.7	
12/12	7.7	0.7	
12/13	8.0	0.8	
12/14	7.8	0.8	
12/17	7.7	0.6	
12/18	8.1	0.8	11.4
12/21	7.8	1.3	11.7
12/26	8.1	1.1	9.2
12/27	8.0	1.2	9.3
12/28	7.8	1.8	9.5
12/31	7.7	1.3	9.6
Annual Average	8.1	1.4	10.2

[a] Jackson turbidity units.

No entry indicates no measurement was made.

APPENDIX I

TABLE 4

BIOLOGICAL MEASUREMENTS OF COLUMBIA RIVER WATER AT VERNITA AND RICHLAND - 1973

	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)
1/9	3.0	3.0		31.	1.0	
2/6	2.5	3.5	1.6	18.	1.5	1.8
3/6	9.0	2.0	0.6	11.	3.5	0.6
4/3	18.	12.	4.2	4.0	15.	3.5
5/8	10.	50.	2.9	70.	160.	1.3
6/7	30.	80.	2.1	80.	60.	1.8
7/11	70.	20.	2.5	50.	80.	2.2
8/7	40.	15.	2.8	110.	65.	3.9
9/11	180.	90.	0.95	330.	340.	2.1
10/2	220.	100.	2.2	270.	240.	1.9
11/27	40.	10.	1.5	30.	50.	2.0
12/11	20.	6.0	1.2	25.	13.	2.0
Annual Average	54.	33.	2.0	85.	86.	2.1

APPENDIX I

TABLE 5

TEMPERATURES OF COLUMBIA RIVER WATER AT PRIEST RAPIDS DAM AND RICHLAND - 1973

(Monthly Average °C)

Date	Priest Rapids Dam	Richland
January	2.3	3.2
February	2.8	3.0
March	4.8	4.6
April	7.7	8.0
May	12.5	12.9
June	15.4	15.6
July	17.6	18.3
August	18.8	19.6
September	17.8	18.3
October	15.2	15.0
November	10.3	9.9
December	7.7	7.6
Annual Average	11.1	11.3

APPENDIX J

NITRATE ION IN DRINKING WATER

APPENDIX J

TABLE 1

NITRATE ION IN 300 AREA AND RICHLAND DRINKING WATER (CUMULATIVE SAMPLES) - 1973

(Units of ppm of Water)

Date	300 Area	Richland	Date	300 Area	Richland
1/8-1/15	0.45	0.27	7/9-7/16	0.38	0.15
1/15-1/22	0.50	0.40	7/16-7/23	0.31	0.50
1/22-1/29	0.65	0.45	7/23-7/30	0.24	0.74
1/29-2/5	0.62	0.98	7/30-8/6	0.30	0.30
2/5-2/12	0.60	0.39	8/6-8/13	0.32	0.32
2/12-2/20	0.68	0.58	8/13-8/20	0.82	0.14
2/20-3/5	0.74	3.05	8/20-8/27	1.17	0.40
3/5-3/12	0.80	2.40	8/27-9/4	0.84	0.23
3/12-3/19	0.82	0.72	9/4-9/10	0.51	0.63
3/19-3/26	0.62	0.57	9/10-9/17	0.68	0.42
3/26-4/2	1.25	2.48	9/17-9/24	0.78	1.00
4/2-4/9	0.82	0.78	9/24-10/1		
4/9-4/16	0.55	0.42	10/1-10/8		
4/16-4/23	0.50	0.23	10/8-10/15		
4/23-4/30	0.45	0.18	10/15-10/22		
4/30-5/7	0.68	0.39	10/22-10/29	1.13	1.37
5/7-5/14	0.57	0.24	10/29-11/5	1.16	0.95
5/14-5/21	0.95	0.21	11/5-11/12	0.48	1.09
5/21-5/28			11/12-11/19	1.67	1.19
5/28-6/4	0.78	0.14	11/19-11/26	0.97	0.89
6/4-6/11	0.48	0.15	11/26-12/3	1.22	1.18
6/11-6/18	0.23	0.13	12/3-12/10	1.15	1.92
6/18-6/25	0.32	0.04	12/10-12/17	0.71	0.86
6/25-7/2	0.42	0.25	12/17-12/21	0.96	1.24
7/2-7/9	0.69	1.00	12/21-12/31	0.84	4.10
Annual Average				0.73	0.80

No entry indicates no analysis was made.

APPENDIX K
SUSPENDED PARTICULATES AND NITROGEN IN THE ATMOSPHERE

APPENDIX K

TABLE 1 - PART A

SUSPENDED PARTICULATES IN THE AIR AT RICHLAND, 747 BLDG. - 1973

Units of $\mu g/m^3$ of Air (continuous samples)

Date	Suspended Particulates	Date	Suspended Particulates
1/1	93	2/27	110
1/2	92	2/28	90
1/3	220	3/1	350
1/4	110	3/4	48
1/7	67	3/5	91
1/8	120	3/6	140
1/9	160	3/7	74
1/10	72	3/8	120
1/11	39	3/11	170
1/14	28	3/12	170
1/15	49	3/13	64
1/16	13	3/14	120
1/17	99	3/15	180
1/18	33	3/18	320
1/21	67	3/19	100
1/22	120	3/20	92
1/23	160	3/21	91
1/24	98	3/22	140
1/25	160	3/25	200
1/28	81	3/26	160
1/29	93	3/27	150
1/30	52	3/28	120
1/31	43	3/29	370
2/1	80	4/1	140
2/4	100	4/2	130
2/5	79	4/3	160
2/6	140	4/4	200
2/7	180	4/5	2,000
2/8	180	4/8	230
2/11	54	4/9	170
2/13	84	4/10	160
2/14	60	4/11	190
2/15	53	4/12	230
2/19	58	4/15	180
2/21	79	4/16	550
2/22	150	4/17	170
2/25	89	4/18	320
2/26	69	4/19	150

APPENDIX K

TABLE 1 - PART A (Continued)

SUSPENDED PARTICULATES IN THE AIR AT RICHLAND, 747 BLDG. - 1973

Units of $\mu g/m^3$ of Air (continuous samples)

Date	Suspended Particulates
4/22	180
4/23	190
4/24	150
4/25	360
4/26	420
4/29	540
4/30	250
5/1	240
5/2	270
5/3	380
5/6	300
5/7	530
5/8	1,800
5/9	1,000
5/10	390
5/13	300
5/14	470
5/17	320
5/20	410
5/21	330
5/28	160
5/29	350
5/30	330
5/31	1,100
6/3	530
6/4	400
6/5	230
6/6	530
6/24	580
6/28	310
7/1	250
7/2	150
7/4	360
7/5	140
7/16	140
7/19	1,100
7/22	71
7/23	66
7/24	89
7/25	80
7/26	97
7/29	98
7/30	130
7/31	92
8/1	110
8/2	92
8/5	230
8/7	88
8/8	99
8/9	300
8/12	220
8/13	130
8/14	94
8/15	120
8/16	660
Jan.-Aug. Average	250

APPENDIX K

TABLE 1 - PART B

SUSPENDED PARTICULATES IN THE AIR AT RICHLAND, FEDERAL BLDG. - 1973

Units of $\mu g/m^3$ of Air (continuous samples)

Date	Particulates	Date	Particulates
9/13	140	10/16	62
9/16	130	10/17	74
9/17	66	10/18	76
9/18	29	10/21	38
9/20	19	10/22	16
9/23	14	10/23	9
9/24	11	10/25	18
9/25	24	10/28	27
9/26	43	10/29	27
9/27	52	10/31	28
9/30	49	11/1	8
10/1	34	11/4	12
10/2	43	11/5	12
10/3	57	11/6	16
10/4	73	11/7	25
10/7	36	11/8	9
10/8	26	11/12	15
10/9	52	11/13	10
10/10	76	11/14	15
10/11	29	11/18	13
10/14	45		
10/15	54	Sept.-Nov. Average	38

APPENDIX K

TABLE 2

NITROGEN DIOXIDE IN THE AIR AT THE HOBKIRK RANCH - 1973

(Units of ppm in Air)

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

APPENDIX K

TABLE 3

NITROGEN DIOXIDE IN THE AIR AT THE GILLIUM RANCH - 1973

(Units of ppm in Air)

Date	Concentrations NO_2	Date	Concentrations NO_2
3/1	0.003	6/22	0.007
3/2	0.001	6/23	0.002
3/3	0.004	6/24	0.011
3/4	0.007	6/25	0.004
3/5	0.004	6/26	0.004
3/6	0.005	7/5	0.008
3/7	0.007	7/6	0.010
3/14	0.002	7/7	0.007
3/15	0.004	7/8	0.005
3/16	0.004	7/9	0.004
3/17	0.007	7/10	0.003
3/18	0.007	7/11	0.008
3/19	0.006	9/27	0.025
3/20	0.007	9/28	0.028
3/28	0.006	9/29	0.016
3/29	0.006	9/30	0.019
3/30	0.003	10/1	0.019
3/31	0.004	10/2	0.007
4/1	0.004	10/3	0.017
4/2	0.007	10/10	0.011
4/3	0.009	10/11	0.006
4/25	0.013	10/12	0.005
4/26	0.010	10/13	0.006
4/27	0.006	10/14	0.004
4/28	0.007	10/15	0.004
4/29	0.007	10/16	0.006
4/30	0.003	10/25	0.008
5/1	0.009	10/26	0.015
5/23	0.004	10/27	0.007
5/24	0.007	10/28	0.013
5/25	0.003	10/29	0.005
5/27	0.005	10/30	0.006
5/28	0.004	10/31	0.004
5/29	0.006		
6/20	0.011		
6/21	0.005	Average	0.007

APPENDIX K

TABLE 4

NITROGEN DIOXIDE IN THE AIR AT THE SULLIVAN RANCH - 1973

(Units of ppm in Air)

Date	Concentrations NO_2	Date	Concentrations NO_2
3/14	0.010	8/26	0.005
3/15	0.013	8/27	0.003
3/16	0.008	8/28	0.005
3/17	0.005	8/29	0.019
3/18	0.004	8/30	0.016
3/19	0.006	9/27	0.019
3/20	0.007	9/28	0.020
3/28	0.005	9/29	0.008
3/29	0.003	9/30	0.018
3/30	0.003	10/1	0.011
3/31	0.002	10/2	0.022
4/1	0.003	10/3	0.024
4/2	0.004	10/10	0.006
4/3	0.003	10/11	0.005
4/11	0.007	10/12	0.005
4/12	0.006	10/13	0.004
4/13	0.007	10/14	0.003
4/14	0.007	10/15	0.003
4/15	0.007	10/16	0.005
4/16	0.006	10/25	0.004
4/17	0.004	10/26	0.004
4/25	0.007	10/27	0.003
4/26	0.008	10/28	0.002
4/27	0.005	10/29	0.003
4/28	0.007	10/30	0.005
4/29	0.007	10/31	0.004
4/30	0.009	11/16	0.005
5/1	0.008	11/17	0.006
5/23	0.008	11/19	0.007
5/24	0.005	11/20	0.004
5/25	0.002	11/21	0.004
5/26	0.004		
5/27	0.005		
5/28	0.004		
5/29	0.005		
8/24	0.011		
8/25	0.006	Average	0.007

APPENDIX K

TABLE 5

NITROGEN DIOXIDE IN THE AIR AT THE KEYS RANCH - 1973

(Units of ppm in Air)

Date	Concentrations NO_2	Date	Concentrations NO_2
3/28	0.007	5/28	0.004
3/29	0.005	5/29	0.008
3/30	0.007	6/20	0.004
3/31	0.003	6/21	0.004
4/1	0.006	6/22	0.004
4/2	0.007	6/23	0.002
4/3	0.010	6/24	0.003
4/25	0.008	6/25	<0.001
4/26	0.007	6/26	0.003
4/27	0.004	7/5	0.005
4/28	0.002	7/6	0.004
4/29	0.002	7/7	0.005
4/30	0.007	7/8	0.003
5/1	0.006	7/9	0.003
5/9	0.004	7/10	0.006
5/10	0.005	7/11	0.005
5/11	0.005	8/24	0.008
5/12	0.004	8/25	0.006
5/13	0.005	8/26	0.004
5/14	0.008	8/27	0.004
5/15	0.008	8/28	0.002
5/23	0.007	8/29	0.005
5/24	0.007	8/30	0.006
5/25	0.004		
5/26	0.006		
5/27	0.006	Average	0.005

APPENDIX L
SEDIMENT SAMPLES FROM THE COLUMBIA RIVER

APPENDIX L

TABLE 1

SEDIMENT SAMPLES FROM THE COLUMBIA RIVER - 1973

(Units of 10^{-6} μCi/gm of Dry Sediment)

Sediment Cores from the McNary Reservoir

3/6/73	^{40}K	^{46}Sc	^{54}Mn	^{60}Co	^{65}Zn	^{137}Cs	^{152}Eu	^{226}Ra	^{228}Th
				400 Yds. Upstream from McNary Dam - Oregon Side					
1"	12	<0.5	0.54	4.32	3.33	1.94	3.02	0.87	0.52
2"	12	<0.5	<0.5	3.65	2.75	1.71	2.43	1.04	0.47
3"	12	<0.5	0.5	3.69	2.34	1.89	1.80	1.51	0.50
4"	12	<0.5	0.68	4.46	2.12	1.89	2.16	0.65	0.48
5"	12	<0.5	0.72	5.45	3.65	2.21	3.69	0.29	0.31
6"	12	<0.5	0.90	9.64	8.15	2.97	6.62	0.48	0.33
7"	12	0.59	1.0	12.3	9.50	3.29	8.06	0.56	0.40
8"	12	0.5	1.4	12.2	9.05	3.20	7.25	0.97	0.28
9"	12	0.54	2.0	14.5	10.2	3.38	8.38	0.58	0.40
10"	12	0.63	2.6	16.5	12.8	4.05	10.4	0.54	0.39
11"	12	<0.5	2.2	23.3	16.3	4.14	18.0	0.72	0.35
12"	12	<0.5	1.5	22.6	15.2	4.37	19.3	0.79	0.50
13"	12	<0.5	1.3	22.3	12.9	3.87	20.3	1.26	0.47
14"	12	<0.5	0.77	20.0	9.91	4.41	21.9	0.25	0.48
15"	12	<0.5	0.50	18.2	7.57	5.23	23.8	1.26	0.47
16"	12	<0.5	<0.5	17.3	5.27	4.86	25.5	1.16	0.40
17"	12	<0.5	<0.5	15.6	3.60	5.05	22.7	1.13	0.48
18"	12	<0.5	<0.5	11.3	1.62	4.64	17.7	1.14	0.34
19"	12	<0.5	<0.5	11.4	1.13	4.50	15.9	1.12	0.35
20"	12	<0.5	<0.5	12.8	1.44	4.68	17.7	1.03	0.48
21"	12	<0.5	<0.5	17.3	1.94	5.18	21.4	1.11	0.48
22"	12	<0.5	<0.5	21.7	2.66	6.53	25.8	0.64	0.38
8/27/73									
1"	12	<0.5	0.90	6.31	2.25	2.7	3.6	0.65	0.34
2"	12	<0.5	<0.5	3.60	1.8	1.8	3.15	1.10	0.40
3"	12	<0.5	<0.5	3.60	1.35	1.8	2.7	0.77	0.31

APPENDIX L

TABLE 1 (Continued)

SEDIMENT SAMPLES FROM THE COLUMBIA RIVER - 1973

(Units of 10^{-6} μCi/gm of Dry Sediment)

Sediment Cores from the McNary Reservoir

8/27/73	^{40}K	^{46}Sc	^{54}Mn	^{60}Co	^{65}Zn	^{137}Cs	^{152}Eu	^{226}Ra	^{228}Th
			400 Yds. Upstream from McNary Dam - Oregon Side						
4"	12	<0.5	<0.5	3.60	1.35	1.8	3.15	1.25	0.47
5"	12	<0.5	<0.5	6.31	3.15	2.25	4.5	1.15	0.38
6"	12	<0.5	0.90	10.4	5.86	3.6	7.21	0.49	0.45
7"	12	<0.5	1.35	13.5	6.31	3.6	8.11	1.36	0.39
8-9"	12	<0.5	1.35	20.3	10.4	4.0	18.9	0.82	0.48
10"	12	<0.5	0.90	20.3	8.11	4.05	19.8	1.34	0.46
11"	12	<0.5	<0.5	18.5	6.31	4.05	22.5	0.19	0.36
12"	12	<0.5	<0.5	17.1	2.7	4.95	24.3	1.01	0.25
13"	12	<0.5	<0.5	14.9	2.7	5.41	23.0	0.38	0.40
14"	12	<0.5	<0.5	12.2	1.35	4.95	19.8	0.93	0.35
15"	12	<0.5	<0.5	10.4	0.91	4.95	18.0	0.87	0.40
16"	12	<0.5	<0.5	9.91	0.45	4.5	16.7	0.48	0.45
17"	12	<0.5	<0.5	10.8	0.91	4.5	14.9	1.03	0.30
18"	12	<0.5	<0.5	14.9	<0.5	4.95	19.8	1.22	0.36
19"	12	<0.5	<0.5	16.2	<0.5	5.41	24.3	0.68	0.44
20"	12	<0.5	<0.5	16.2	0.91	6.76	24.8	1.08	0.47
21"	12	<0.5	<0.5	7.66	<0.5	4.95	14.4	1.42	0.28
22"	12	<0.5	<0.5	13.5	<0.5	6.76	23.0	1.14	0.36
3/6/73			1.5 Mi. Upstream from McNary Dam - Oregon Side						
1"	12	<0.5	<0.5	4.05	2.7	2.25	3.15	1.06	0.40
2"	12	<0.5	<0.5	3.6	2.25	1.8	2.7	0.93	0.31
3"	12	<0.5	<0.5	3.15	1.8	1.8	2.25	1.14	0.41
4"	12	<0.5	<0.5	3.6	1.8	1.8	2.7	1.17	0.34
5"	12	<0.5	0.9	4.95	3.6	2.25	3.15	0.63	0.39
6"	12	<0.5	1.35	10.4	9.91	3.15	4.05	1.15	0.48
7"	12	<0.5	0.9	10.8	9.01	3.15	7.21	0.90	0.43

APPENDIX L

TABLE 1 (Continued)

SEDIMENT SAMPLES FROM THE COLUMBIA RIVER - 1973

(Units of 10^{-6} μCi/gm of Dry Sediment)

Sediment Cores from the McNary Dam Reservoir

3/6/73	^{40}K	^{46}Sc	^{54}Mn	^{60}Co	^{65}Zn	^{137}Cs	^{152}Eu	^{226}Ra	^{228}Th
			1.5 Mi. Upstream from McNary Dam - Oregon Side						
8"	12	<0.5	1.35	10.4	9.01	3.15	6.31	1.13	0.51
9"	12	<0.5	1.8	11.3	8.56	3.6	7.66	1.98	0.27
10"	12	0.9	2.7	16.2	11.7	4.05	9.46	0.70	0.42
11"	12	0.9	1.8	18.5	13.1	3.6	16.2	0.75	0.43
12"	12	<0.5	1.35	20.7	14.4	4.05	17.6	0.26	0.35
13"	12	<0.5	0.9	20.7	12.6	4.05	19.4	0.41	0.50
14"	12	<0.5	<0.5	18.5	9.01	4.05	20.3	0.83	0.55
15"	12	<0.5	<0.5	17.6	8.56	4.05	21.6	0.16	0.46
16"	12	<0.5	<0.5	17.1	7.66	4.5	20.3	1.31	0.42
17"	12	<0.5	<0.5	15.3	6.31	4.5	21.2	1.11	0.41
18"	12	<0.5	<0.5	14.9	4.05	4.95	22.5	0.55	0.36
19"	12	<0.5	<0.5	13.1	2.25	4.95	18.9	0.91	0.37
20"	12	<0.5	<0.5	11.3	1.35	4.5	18.0	0.46	0.33
21"	12	<0.5	<0.5	14.4	1.35	5.41	18.9	0.48	0.57
22"	12	<0.5	<0.5	15.3	1.8	6.31	23.0	1.05	0.30
3/23/73			10 Mi. Upstream from McNary Dam - Oregon Side						
1"	12	<0.5	<0.5	3.6	2.25	1.35	3.6	0.96	0.44
2"	12	<0.5	<0.5	2.7	1.8	1.35	2.7	1.04	0.35
3"	12	<0.5	<0.5	1.8	2.25	1.35	1.8	1.05	0.41
4"	12	<0.5	<0.5	3.15	1.8	1.8	1.8	0.94	0.32
5"	12	<0.5	<0.5	3.15	1.8	1.35	1.8	1.18	0.42
6"	12	<0.5	<0.5	3.6	2.7	1.8	2.25	1.0	0.42
7"	12	<0.5	0.9	6.76	5.86	2.7	4.95	1.16	0.36
8"	12	<0.5	0.9	9.0	6.76	2.7	6.31	0.95	0.29
9"	12	<0.5	0.9	8.11	6.76	2.7	4.5	1.48	0.44
10"	12	<0.5	<0.5	14.4	4.5	4.5	21.2	0.84	0.47

APPENDIX L

TABLE 1 (Continued)

SEDIMENT SAMPLES FROM THE COLUMBIA RIVER - 1973

(Units of 10^{-6} μCi/gm of Dry Sediment)

Sediment Cores from the McNary Dam Reservoir

3/23/73	^{40}K	^{46}Sc	^{54}Mn	^{60}Co	^{65}Zn	^{137}Cs	^{152}Eu	^{226}Ra	^{228}Th
10 Mi. Upstream from McNary Dam - Oregon Side									
11"	12	<0.5	2.25	14.0	9.91	3.15	8.11	0.64	0.35
12"	12	<0.5	1.35	15.8	12.2	3.6	13.1	0.50	0.57
13"	12	<0.5	1.35	18.0	11.7	3.6	15.8	0.97	0.41
14"	12	<0.5	0.9	17.6	10.8	3.6	17.6	0.53	0.43
15"	12	<0.5	0.5	15.8	8.11	3.6	18.0	0.78	0.49
16"	12	<0.5	0.5	14.9	7.66	3.6	17.6	0.78	0.47
17"	12	<0.5	<0.5	15.3	6.31	3.6	18.5	0.70	0.52
18"	12	<0.5	1.35	9.91	6.76	2.7	6.3	0.88	0.48
19"	12	<0.5	<0.5	15.8	4.5	4.95	19.8	0.88	0.48
20"	12	<0.5	<0.5	15.8	3.6	4.95	22.5	0.73	0.55
21"	12	<0.5	<0.5	12.2	2.7	4.5	18.5	0.74	0.41
22"	12	<0.5	<0.5	9.01	1.35	3.6	14.9	0.53	0.31
23"	12	<0.5	<0.5	9.01	1.35	4.05	13.5	0.61	0.43
3/23/73		**10 Mi. Upstream from McNary Dam - Washington Side**							
1"	9	<0.5	0.95	7.16	4.5	4.23	5.68	1.24	0.40
2"	9	<0.5	0.63	10.0	7.34	3.74	8.65	1.28	0.44
3"	9	0.68	1.04	17.3	12.9	4.95	14.7	1.17	0.33
4"	9	0.77	1.71	22.2	16.1	5.23	17.4	1.01	0.45
5"	9	<0.5	<0.5	13.6	0.5	6.8	24.3	0.98	0.35
6"	9	<0.5	0.5	25.0	11.6	6.35	28.6	0.9	0.55
7"	9	<0.5	0.63	21.9	8.24	6.40	23.0	1.21	0.44
8"	9	<0.5	<0.5	18.2	1.8	7.52	28.2	1.11	0.45
9"	9	<0.5	0.99	26.7	16.1	5.99	27.7	1.04	0.35
10"	9	<0.5	<0.5	11.4	<0.5	6.26	22.5	0.71	0.49
11"	9	<0.5	<0.5	8.38	<0.5	4.46	14.2	1.14	0.36
12"	9	<0.5	<0.5	9.68	<0.5	5.18	18.2	0.87	0.31
13"	9	<0.5	<0.5	13.5	<0.5	6.67	26.5	1.01	0.32

APPENDIX L

TABLE 1 (Continued)

SEDIMENT SAMPLES FROM THE COLUMBIA RIVER - 1973

(Units of 10^{-6} μCi/gm of Dry Sediment)

Sediment Cores from the McNary Dam Reservoir

3/15/73	^{40}K	^{46}Sc	^{54}Mn	^{60}Co	^{65}Zn	^{137}Cs	^{152}Eu	^{226}Ra	^{228}Th
20 Mi. Upstream from McNary Dam - Oregon Side									
1"	13	<0.5	0.54	1.76	1.08	1.17	1.31	1.07	0.38
2"	13	<0.5	<0.5	1.22	0.99	1.04	0.99	1.19	0.33
3"	13	<0.5	<0.5	3.69	3.33	1.71	2.75	1.26	0.25
4"	13	<0.5	<0.5	3.74	3.24	1.49	2.79	1.20	0.25
5"	13	<0.5	0.86	9.5	9.77	2.75	8.74	1.27	0.32
6"	13	<0.5	0.63	13.5	7.61	2.79	11.5	1.19	0.35
7"	13	<0.5	<0.5	7.93	2.84	2.12	9.37	0.72	0.32
8-9"	13	<0.5	<0.5	10.3	2.43	3.47	14.3	1.40	0.43
10"	13	<0.5	<0.5	8.65	1.17	3.38	12.5	1.2	0.40
11"	13	<0.5	<0.5	7.07	0.63	3.24	11.5	1.18	0.33
12"	13	<0.5	<0.5	6.89	0.54	4.14	10.6	0.95	0.39
13"	13	<0.5	<0.5	4.46	<0.5	3.47	7.3	1.2	0.30
14"	13	<0.5	<0.5	2.12	<0.5	2.12	3.83	0.96	0.30
15"	13	<0.5	<0.5	1.17	<0.5	1.44	1.58	0.79	0.34
16"	13	<0.5	<0.5	1.22	<0.5	1.22	1.8	1.06	0.27
17"	13	<0.5	<0.5	6.67	<0.5	4.86	13.2	1.08	0.28
18"	13	<0.5	<0.5	6.76	<0.5	4.55	13.4	1.24	0.42

APPENDIX L

TABLE 2

McNARY RESERVOIR SURFACE SEDIMENT - 1973

(Units of 10^{-6} μCi/gm of Dry Sediment)

	^{40}K	^{46}Sc	^{54}Mn	^{60}Co	^{65}Zn	^{137}Cs	^{152}Eu	^{226}Ra	^{228}Th
				1 Mi. Upstream from McNary Dam - Oregon Side					
2/28/73	10.6	<0.5	1.08	7.57	5.63	2.48	5.81	1.53	0.41
	10.5	<0.5	0.86	7.88	5.18	2.7	5.59	1.14	0.34
	10.2	<0.5	1.4	9.10	6.44	2.66	7.12	1.17	0.41
	12.8	<0.5	1.58	7.88	4.59	2.48	3.78	1.22	0.35
	10.7	<0.5	0.99	7.52	5.23	2.75	6.17	1.17	0.40
	12.0	<0.5	0.99	7.52	4.5	2.66	4.86	1.38	0.52
	10.2	<0.5	0.90	7.57	4.01	4.01	7.21	1.06	0.43
3/15/73	13.5	<0.5	1.13	3.6	0.72	1.13	0.99	0.66	0.44
	14.8	<0.5	0.72	2.03	0.95	0.99	0.90	0.73	0.39
8/27/73	10.6	<0.5	3.06	8.06	2.75	2.57	4.86	0.96	0.44
	10.9	<0.5	2.75	8.47	2.88	2.57	5.27	1.63	0.34
	12.8	<0.5	1.17	8.87	2.88	2.97	4.64	1.42	0.30
	10.9	<0.5	1.17	8.65	2.7	3.69	7.75	1.63	0.35
	10.1	<0.5	1.08	8.06	2.21	4.19	6.22	0.92	0.29
	11.7	<0.5	0.86	6.58	1.94	3.15	6.49	0.82	0.30
	13.0	<0.5	<0.5	2.61	0.81	2.12	3.42	0.79	0.32
				1 Mi. Upstream from McNary Dam - Washington Side					
2/28/73	13.2	<0.5	0.81	5.27	2.84	2.79	4.86	1.32	0.34
3/15/73	13.1	<0.5	1.49	3.56	1.04	1.04	1.08	1.09	0.55
8/27/73	12.6	<0.5	<0.5	2.75	0.86	1.53	2.84	1.07	0.34

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