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ENVIRONMENTAL SURVEILLANCE
AT HANFORD FOR CY-1970 DATA

by

J. P. Cortey

Occupational and Environmental
Safety Department



Battelle

Battelle Northwest Laboratories
Richland, Washington 99344

AUGUST 1973

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

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BATTELLE
PACIFIC NORTHWEST LABORATORIES
RICHLAND, WASHINGTON 99352

During 1970, Hanford facilities were operated for the Atomic Energy Commission by: Atlantic Richfield Hanford Company, Pacific Northwest Laboratories of Battelle Memorial Institute, Douglas United Nuclear, Incorporated, ITT Federal Support Services, Incorporated, 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 1970. The significance of these data is discussed in the parent report (BNWL-1669).

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

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

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

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

The radioanalyses documented here were performed by the U.S. Testing Company. River chemical data in Appendix H were supplied by Douglas-United Nuclear, Inc.

August 1973

J. P. Corley

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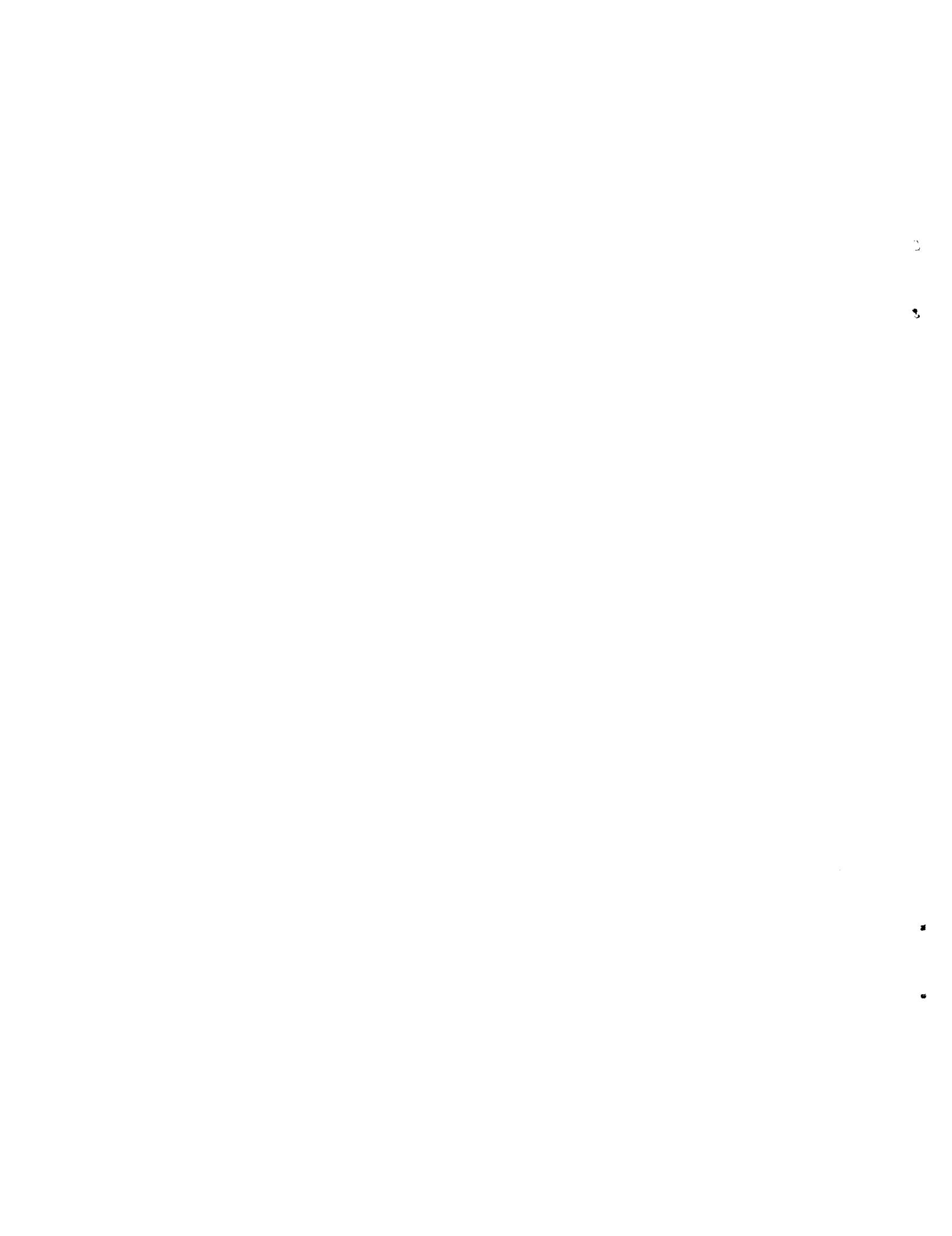
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APPENDIX A

APPENDIX A

TABLE 1

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT VERNITA
(Monthly Composites of Weekly Grab Samples) - 1970

<u>Date</u>	<u>^3H</u>	<u>^{90}Sr</u>	<u>Alpha</u>	<u>^{239}Pu</u>
Analytical Limit	1000	0.5	0.5	0.09
1/27	1600	0.61	.46	
2/24	*	*	.38	
3/24	1400	*	.97	
4/21	*	*	.55	
5/26	*	0.51	.97	
6/23	*	*	*	
7/28	*	*	*	
8/25	2600	*	*	*
9/22	*	*	.57	
10/27	*	*	.71	
11/25	*	*	.54	*
12/29	*	*	*	
Annual Average	840	0.44	0.59	

* Indicates the results were less than the analytical limit.

No entry indicates no analysis was made.

APPENDIX A

TABLE 2
CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT RICHLAND
(Grab Samples) - 1970

Date	<u>24Na</u>	<u>46Sc</u>	<u>51Cr</u>	<u>54Mn</u>	<u>56Mn</u>	<u>60Co</u>	<u>64Cu</u>	<u>65Zn</u>	<u>69mZn</u>	<u>76As</u>	<u>122Sb</u>	<u>239Np</u>	<u>RE+Y</u>
Analytical Limit	35	20	70	2	50	2	20	20	70	5	5	10	5
1/5	1000	590											
1/12	620	1800											
1/19	2300	1700											
1/26	2300	1400											
2/2	830	690											
3/30	820	550											
4/6	990	2200											
4/13	1000	800											
4/20	1100	690											
4/27	1200	360											
5/4	1600	560											
5/11	60	700											
5/18	760	420											
5/25	640	1000											
6/1	590	1300											
6/8	590	410											
6/15	730	1000											
6/22	650	360											
7/6	790	720											
8/3	760	590											
10/5	1500	1200											
11/2	870	540											
12/17	1600	560											
July-Dec Average													
Annual Average	900	360											

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

APPENDIX A

TABLE 3
CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT RICHLAND
(Cumulative Samples) - 1970

Date	<u>32P</u>	<u>46Cs</u>	<u>51Cr</u>	<u>60Co</u>	<u>65Zn</u>	<u>131I</u>	<u>137Cs</u>	<u>140BaLa</u>	<u>239Pu</u>	<u>239Np</u>
<u>Analytical Limit</u>										
12/29-1/5	58.	89.	690		79.	2	20	2	180	0.025
1/5-1/12	53.	59.	650		54.			5.2		
1/12-1/19	42.	64.	610		53.			2.8		
1/19-1/26	55.	74.	820		76.			5.4		
1/26-2/2	66.	92.	1200		99.			5.1		
2/2-2/9	*	37.			39.					
2/9-2/16	*	*			21.					
2/16-2/24	*	*			*					
2/24-3/2	*	*			*					
3/2-3/9	*	*			*					
3/9-3/16	*	*			*					
3/16-3/23	*	*			*					
3/23-3/30	9.1	27.	73.							
3/30-4/6	30.	*	260							
4/6-4/13	12.	50.	*							
4/13-4/20	40.	26.	360							
4/20-4/27	41.	40.	330							
4/27-5/4	65.	*	390							
5/4-5/11	93.	41.	400							
5/11-5/18	9.4	73.	100							
5/18-5/25	32.	45.	150							
5/25-6/1	34.	37.	180							
6/1-6/8	18.	33.	110							
6/8-6/15	32.	20.	280							

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

APPENDIX A

TABLE 3 (Continued)
 CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT RICHLAND
 (Cumulative Samples) - 1970

<u>Date</u>	<u>Analytical Limit</u>	Units of $10^{-9} \mu\text{Ci}/\text{ml}$								
		<u>^{32}P</u>	<u>^{46}Sc</u>	<u>^{51}Cr</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>^{131}I</u>	<u>^{137}Cs</u>	<u>$^{140}\text{BaLa}$</u>	<u>^{239}Pu</u>
6/15-6/22	26.	29.	300	20.	20.	*	*	*	*	*
6/22-6/30	11.	62.	160	*	*	*	*	*	*	*
6/30-7/7	28.	32.	220	32.	*	*	*	*	*	*
7/7-7/14	25.	33.	290	25.	*	*	*	*	*	*
7/14-7/21	55.	72.	350	73.	*	*	*	*	*	*
7/21-7/28	16.	27.	56.	30.	*	*	*	*	*	*
7/28-8/4	23.	29.	220	*	*	*	*	*	*	*
8/4-8/11	28.	59.	350	38.	*	*	*	*	*	*
8/11-8/18	20.	24.	150	36.	*	*	*	*	*	*
8/18-8/25	6.6	22.	*	*	*	*	*	*	*	*
8/25-9/1	*	33.	*	*	*	*	*	*	*	*
9/1-9/8	11.	28.	110	*	*	*	*	*	*	*
9/8-9/15	24.	30.	430	*	*	*	*	*	*	*
9/15-9/22	20.	35.	360	*	*	2.2	2.6	26.	*	*
9/22-9/29	36.	38.	470	20.	2.8	*	*	*	*	*
9/29-10/6	45.	28.	330	*	2.6	*	*	*	*	*
10/6-10/13	42.	32.	550	36.	*	2.4	2.4	*	*	120
10/13-10/20	31.	65.	210	*	*	2.4	2.4	*	*	*
10/20-10/27	Lost	57.	570	24.	3.0	470	470	470	470	154
10/27-11/3	46.	66.	420	32.	2.6	520	520	520	520	*
11/3-11/10	13.	71.	120	47.	*	*	*	*	*	400

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

APPENDIX A

TABLE 3 (Continued)
 CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT RICHLAND
 (Cumulative Samples) - 1970

<u>Date</u>	Units of 10^{-9} $\mu\text{Ci}/\text{ml}$							<u>^{239}Np</u>
	<u>^{32}P</u>	<u>^{46}Sc</u>	<u>^{51}Cr</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>^{131}I</u>	<u>^{137}Cs</u>	
Analytical Limit	6	20.	70.	2	20.	2	20.	0.025
11/10-11/17	27.	50.	290	*	3.1	*	*	80.
11/17-11/24	38.	49.	470	28.	2.5	260	*	100
11/24-12/1	36.	72.	560	40.	3.5	510		
12/1-12/8	16.	120	220	41.	*	270		
12/8-12/15	19.	29.	410	31.	*	32.		
12/15-12/22	Lost	Lost	Lost	Lost	*	510		
12/22-12/29	18.	42.	610	*		270		
Annual Average	27.	43.	300	84	34	1.8		
Sept. - Dec. Average					12.	330	*0.008	110

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

APPENDIX A

TABLE 4

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT RICHLAND
(Monthly Composite of Weekly Cumulative Samples) - 1970

Units of 10^{-9} $\mu\text{Ci/ml}$

<u>Date</u>	<u>^3H</u>	<u>^{90}Sr</u>	<u>Alpha</u>
Analytical Limit	1000	0.5	1.0
12/29-1/26	1200	0.53	*
1/26-2/24	2700	0.52	*
2/24-3/23	*	*	*
3/23-4/20	1500	*	*
4/20-5/25	*	*	*
5/25-6/22	1200	*	*
6/22-7/28	1400	0.63	*
7/28-8/25	1200	*	*
8/25-9/22	*	0.73	*
9/22-10/27	*	0.57	*
10/27-11/24	*	0.56	1.2
11/24-12/29	*	0.58	*
Annual Average	1100	0.51	0.58

* Results were less than analytical limit shown.

APPENDIX A

TABLE 5

CONCENTRATIONS OF RADIONUCLIDES IN THE COLUMBIA RIVER AT BONNEVILLE DAM
 (Bi-Weekly Composite of Weekly Cumulative Samples) - 1970

<u>Date</u>	<u>^{32}P</u>	<u>^{51}Cr</u>	<u>^{65}Zn</u>
Analytical Limit	6	70.	20.
12/30-1/13	10.	340	24.
1/13-1/27	6.3	320	*
2/10-2/17		150	*
2/17-3/3		*	*
3/2-3/17		*	*
3/17-3/31		*	*
3/31-4/14	*	*	*
4/14-4/28	*	*	*
4/28-5/12	8.9	*	*
5/12-5/26	11.	99.	25.
5/26-6/9	*	*	*
6/9-6/23	*	*	*
6/23-7/7	6.2	73.	*
7/7-7/21	*	*	*
7/21-8/4	*	*	*
8/4-8/18	6.7	*	*
8/18-9/1	*	78.	*
9/1-9/15	*	88.	*
9/15-9/29	*	*	*
9/29-10/13	*	*	*
10/13-10/27	*	110	*
10/27-11/10	*	83.	*
11/10-11/23	*	120	*
11/23-12/8	*	92.	*
12/8-12/22	*	160	*
Annual Average	5.0	100	10.

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

APPENDIX A

TABLE 6

ESTIMATED RATE OF TRANSPORT OF RADIONUCLIDES
IN THE COLUMBIA RIVER AT RICHLAND
(Grab Samples) - 1970

<u>Date</u>	<u>Average Ci/day</u>								
	<u>²⁴Na</u>	<u>⁵¹Cr</u>	<u>⁵⁶Mn</u>	<u>⁶⁴Cu</u>	<u>^{69m}Zn</u>	<u>⁷⁶As</u>	<u>¹²²Sb</u>	<u>²³⁹Np</u>	RE+Y
1/5	340	200							
1/12	160	450							
1/19	540	410							
1/26	520	320							
2/2	140	120							
3/30	200	130							
4/6	240	520							
4/13	240	190							
4/20	290	180							
4/27	270	160							
5/4	390	130							
5/11	14.	66.							
5/18	270	150							
5/25	350	540							
6/1	330	700							
6/8	240	140							
6/15	320	450							
6/22	280	150							
7/6	270	240	76.	200		16.	140	120	59.
8/3	200	160	17.	210	1.9	37.	11.	120	140
10/5	300	240	14.	310	18.	38.	15.	280	140
11/2	150	96.	11.	82.	1.1	29.	8.5	57.	38.
12/17	290	100	14.	120	14.	21.	11.	68.	23.
July-December Average			26	180	7.0	28.	36.	130	79.
Annual Average	230	190							

APPENDIX A

TABLE 7

ESTIMATED RATE OF TRANSPORT OF RADIONUCLIDES
IN THE COLUMBIA RIVER WATER AT RICHLAND
(Cumulative Samples) - 1970

Average Ci/day

<u>Date</u>	<u>32P</u>	<u>46Sc</u>	<u>51Cr</u>	<u>65Zn</u>	<u>131I</u>
12/29-1/5	14.	22.	170	19.	0.65
1/5-1/12	13.	15.	160	14.	1.3
1/12-1/19	8.8	14.	130	11.	0.60
1/19-1/26	11.	15.	170	16.	1.1
1/26-2/2	11.	6.1	8.4	6.4	0.84
2/2-2/9		6.5	8.9	6.8	
2/9-2/16		7.2	11.	4.0	
2/16-2/24		3.0	2.1	3.9	
2/24-3/2		1.8		2.2	
3/2-3/9		1.6		1.8	
3/9-3/16		0.77		1.3	
3/16-3/23		1.7		2.2	
3/23-3/30	2.0	5.8	16.	5.2	0.30
3/30-4/6	7.0	4.5	60.	11.	0.75
4/6-4/13	2.8	11.	6.0	11.	0.48
4/13-4/20	8.6	5.5	76.	10.	0.70
4/20-4/27	9.4	9.2	76.	13.	0.58
4/27-5/4	14.	2.5	86.	7.8	0.46
5/4-5/11	18.	8.1	79.	12.	0.60
5/11-5/18	1.9	15.	21.	6.7	0.72
5/18-5/25	13.	18.	60.	17.	0.85
5/25-6/1	18.	20.	95.	19.	0.65
6/1-6/8	9.6	18.	61.	14.	0.96
6/8-6/15	14.	8.7	120	15.	0.21
6/15-6/22	12.	13.	140	9.1	0.59
6/22-6/30	4.2	24.	64.	5.3	0.14
6/30-7/7	9.2	10.	71.	11.	0.36
7/7-7/14	8.3	11.	96.	8.3	0.33
7/14-7/21	16.	20.	100	21.	0.42
7/21-7/28	4.4	7.5	15.	8.2	0.20
7/28-8/4	6.7	8.3	64.	3.7	0.35
8/4-8/11	7.5	16.	95.	10.	0.35
8/11-8/18	5.2	6.2	40.	9.2	0.34
8/18-8/25	1.6	5.5	4.3	3.9	0.16
8/25-9/1	0.67	7.0	1.8	4.0	0.14

APPENDIX A

TABLE 7 (Continued)

ESTIMATED RATE OF TRANSPORT OF RADIONUCLIDES
IN THE COLUMBIA RIVER WATER AT RICHLAND
(Cumulative Samples) - 1970

<u>Date</u>	<u>Average Ci/day</u>				
	<u>³²P</u>	<u>⁴⁶Sc</u>	<u>⁵¹Cr</u>	<u>⁶⁵Zn</u>	<u>¹³¹I</u>
9/1-9/8	2.2	5.5	22.	1.6	0.27
9/8-9/15	4.3	5.5	78.	1.9	0.29
9/15-9/22	2.5	4.4	46.	2.5	0.28
9/22-9/29	0.60	6.3	77.	3.3	0.45
9/29-10/6	8.2	5.1	60.	1.4	0.48
10/6-10/13	7.4	5.7	98.	6.4	0.29
10/13-10/20	6.2	13.	42.	3.6	0.48
10/20-10/27		10.	110	4.4	0.56
10/27-11/3	8.2	12.	75.	5.7	0.46
11/3-11/10	2.4	13.	22.	8.8	0.13
11/10-11/17	5.2	9.7	56.	3.5	0.60
11/17-11/24	6.9	8.8	84.	5.0	0.44
11/24-12/1	6.4	13.	100	7.2	0.62
12/1-12/8	3.0	22.	42.	7.7	0.23
12/8-12/15	3.4	5.3	75.	5.7	0.21
12/22-12/29	3.4	7.9	110	3.7	0.36
Annual Average	6.6	9.9	64	7.8	0.42

APPENDIX A

TABLE 8

ESTIMATED RATE OF TRANSPORT OF RADIONUCLIDES IN THE
 COLUMBIA RIVER WATER AT BONNEVILLE DAM
(Bi-Weekly Composite Cumulative Samples) - 1970

Average Ci/day

<u>Date</u>	<u>³²P</u>	<u>⁵¹Cr</u>	<u>⁶⁵Zn</u>
12/30-1/13	3.6	110	8.2
1/13-1/27	2.7	140	7.7
1/27-2/17		56	5.0
2/17-3/3		22	3.6
3/3-3/17			2.6
3/17-3/31		0.69	1.0
3/31-4/14	0.74	21	6.0
4/14-4/28	1.5	22	2.5
4/28-5/12	3.6	25	4.2
5/12-5/26	7.1	66	16
5/26-6/9	4.2	39	18
6/9-6/23	5.1	60	7.9
6/23-7/7	4.1	48	9.0
7/7-7/21	1.5	22	4.3
7/21-8/4	1.2	17	3.3
8/4-8/18	2.3	17	2.5
8/18-9/1	0.56	19	1.9
9/1-9/15	1.4	23	1.2
9/15-9/29	0.40	19	1.6
9/29-10/13	0.56	12	0.23
10/13-10/27	0.72	32	0.38
10/27-11/10	1.0	24	0.31
11/10-11/23	1.6	36	1.4
11/23-12/8	1.1	30	1.1
12/8-12/22	1.6	54	2.8
Annual Average	2.3	40	4.7

APPENDIX A

TABLE 9

BETA ACTIVITY IN THE COLUMBIA RIVER AT RICHLAND
(Grab Samples) - 1970

Units of counts/minutes/milliliter

Date	c/m/ml
Analytical Limit	0.02
1/5	1.9
1/12	5.4
1/19	5.6
1/26	5.4
2/2	2.3
3/30	2.2
4/6	5.6
4/13	3.0
4/20	3.2
4/27	4.0
5/4	3.5
5/11	0.77
5/18	2.0
5/25	2.7
6/1	2.6
6/8	2.0
6/15	2.1
6/22	2.1
7/6	2.2
8/3	2.7
10/5	5.3
11/2	3.0
12/17	3.2
Annual Average	3.1

APPENDIX B



APPENDIX B

TABLE 1

CONCENTRATIONS OF RADIONUCLIDES IN RICHLAND DRINKING WATER
(Grab Samples) - 1970

<u>Date</u>	Units of 10^{-9} $\mu\text{Ci}/\text{ml}$ of Water							<u>RE+Y</u>
	<u>^{24}Na</u>	<u>^{51}Cr</u>	<u>^{76}As</u>	<u>^{122}Sb</u>	<u>^{131}I</u>	<u>^{133}I</u>	<u>^{239}Np</u>	
Analytical Limit	35.	70.	5.	5.	2.	10.	10.	5.
1/20	1000	1100	87.	44.	5.1	17.	520	36.
4/21	810	300	30.	61.	2.7	20.	190	21.
5/19	60.	*	7.7	7.2	*	*	35.	14.
6/16	420	230	42.	55.	2.3	*	150	33.
7/28	470				*	*		
9/21	880				5.3	10.		
10/26	840				6.1	17.		
11/23	1000				5.4	23.		
12/28	240				2.6	*		
Jan-June Average		410	41.	42.			220	26.
Annual Average	640				3.5	13.		

* Indicates the results were less than the analytical limit.

No entry indicates no analysis was made.

APPENDIX B

TABLE 2

CONCENTRATIONS OF RADIONUCLIDES IN RICHLAND DRINKING WATER
(Cumulative Samples) - 1970

<u>Date</u>	<u>^{32}P</u>	<u>^{46}Sc</u>	<u>^{65}Zn</u>	<u>^{131}I</u>
Analytical Limit	6	20	20	5
12/29-1/5	27.		52.	*
1/5-1/12	27.		40.	*
1/12-1/19	21.		47.	*
1/19-1/26	22.		43.	*
1/26-2/2	25.		63.	6.4
2/2-2/9		25.	45.	
2/9-2/16	*	*		
2/16-2/24	*	*		
2/24-3/2	*	*		
3/2-3/9	*	*		
3/9-3/16	*	*		
3/16-3/23	*	*		
3/23-3/30	*		*	*
3/30-4/6	5.1		22.	*
4/6-4/13	*		24.	*
4/13-4/20	6.6		27.	*
4/20-4/27	7.0		27.	*
4/27-5/4	35.		22.	*
5/4-5/11	38.		28.	*
5/11-5/18	*		*	*
5/18-5/25	13.		30.	*
5/25-6/1	14.		*	*
6/1-6/8	13.		*	*
6/8-6/15	13.		*	*
6/15-6/22	21.		*	*
6/22-6/29	11.		*	*
6/29-7/6	15.		*	*
7/6-7/13	17.		*	*
7/13-7/20	25.		*	*
7/20-7/27	6.4		*	*
7/27-8/3	12.		*	*

* Indicates the results were less than the analytical limit.

No entry indicates no analysis was made.

APPENDIX B

TABLE 2 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN RICHLAND DRINKING WATER
(Cumulative Samples) - 1970

<u>Date</u>	<u>^{32}P</u>	<u>^{46}Sc</u>	<u>^{65}Zn</u>	<u>^{131}I</u>
Analytical Limit	6	20	20	5
8/3-8/10	24.		*	*
8/10-8/17	19.		*	*
8/17-8/24	*		*	*
8/24-8/31	*		*	*
8/31-9/8	*		*	*
9/8-9/14	27.		*	*
9/14-9/21	15.		*	*
9/21-9/28	28.		*	*
9/28-10/5	39.		*	*
10/5-10/12	37.		*	*
10/12-10/19	14.		*	*
10/19-10/26	25.		35.	*
10/26-11/2	32.		*	*
11/2-11/9	16.		*	*
11/9-11/16	14.		*	5.8
11/16-11/23	28.		*	*
11/23-11/30	35.		*	*
11/30-12/7	24.		32.	*
12/7-12/14	13.		21.	*
12/14-12/21	19.		21.	*
12/21-12/28	32.		*	*
Annual Average	16.		20.	2.0

* Indicates the results were less than the analytical limit.

No entry indicates no analysis was made.

APPENDIX B

TABLE 3

CONCENTRATIONS OF RADIONUCLIDES IN PASCO DRINKING WATER
(Grab Samples) - 1970

<u>Date</u>	<u>^{24}Na</u>	<u>^{51}Cr</u>	<u>^{76}As</u>	<u>^{122}Sb</u>	<u>^{131}I</u>	<u>^{133}I</u>	<u>^{239}Np</u>	<u>RE+Y</u>
Analytical Limit	35.	70.	5.	5.	2.	10.	10.	5.
1/5	100	440	16.	28.	*	*	140	14.
2/2	230	840	29.	53.	2.9	*	250	26.
4/6	200	370	12.	42.	2.4	*	160	*
5/4	240	380	18.	69.	2.2	*	160	9.0
6/1	290	170	11.	40.	*	*	98.	15.
Jan-June Average	210	440	17.	46.	2.2	5.2	160	14.

* Indicates the results were less than the analytical limit.

No entry indicates no analysis was made.

APPENDIX B

TABLE 4

CONCENTRATIONS OF RADIONUCLIDES IN PASCO DRINKING WATER
(Cumulative Samples) - 1970

<u>Date</u>	<u>^{32}P</u>	<u>^{46}Sc</u>	<u>^{65}Zn</u>	<u>^{131}I</u>
Analytical Limit	6.	20.	20.	5.
12/29-1/5	24.		41.	*
1/5-1/12	14.		26.	*
1/12-1/19	19.		34.	*
1/19-1/26	17.		30.	*
1/26-2/2	7.9		33.	*
2/2-2/9		22.	41.	
2/9-2/16		*	21.	
2/16-2/24		*	21.	
2/24-3/2		*	*	
3/2-3/9		*	*	
3/9-3/16		*	*	
3/16-3/23		*	*	
3/23-3/30	*		*	*
3/30-4/6	16.		21.	*
4/6-4/13	8.2		*	*
4/13-4/20	*		*	*
4/20-4/27	*		21.	*
4/27-5/4	*		*	*
5/4-5/11	8.3		*	*
5/11-5/18	*		*	*
5/18-5/25	*		*	*
5/25-6/1	*		*	*
6/1-6/8	*		*	*
6/8-6/15	*		*	*
6/15-6/22	*		*	*
Jan-June Average	6.2		18.	1.6

* Indicates the results were less than the analytical limit.

No entry indicates no analysis was made.

APPENDIX B

TABLE 5
CONCENTRATIONS OF RADIONUCLIDES IN 100-N DRINKING WATER
(Grab Samples) - 1970

<u>Date</u>	<u>Units of 10^{-9} $\mu\text{Ci}/\text{ml}$ of Water</u>										<u>RE+Y</u>
	<u>^{24}Na</u>	<u>^{46}Sc</u>	<u>^{51}Cr</u>	<u>^{56}Mn</u>	<u>^{64}Cu</u>	<u>^{65}Zn</u>	<u>^{72}Ga</u>	<u>^{76}As</u>	<u>^{122}Sb</u>	<u>^{131}I</u>	
Analytical Limit	35.	20.	70.	50.	20.	20.	70.	5.	5.	2.	10.
1/7	2100	510	990	550	*	*	8.5	33.	11.	28.	270
2/4	*	90.	*	26.	*	*	*	*	*	*	35.
4/8	*	*	*	*	*	*	26.	30.	*	*	11.
4/23											5.9
5/6	2600	510	1400	720	*	85.	22.	120	5.9	43.	380
6/3	*	74.	*	74.	*	*	*	*	*	*	29.
7/14	1500	410	370	*	*	*	6.9	59.	4.3	38.	46.
8/11	1700	470	*	*	*	*	13.	64.	3.4	37.	6.7
10/12	270	76.	140	190	*	*	26.	16.	2.8	*	200
11/10	200	*	*	*	*	*	*	*	*	*	*
12/15	3200	67.	610	870	150	*	22.	75.	3.4	53.	340
Jan-June Average				480							16.
Annual Average	1200	280	280	40.	13.	37.	3.4	22.	180		

* Indicates the results were less than the analytical limit.

No entry indicates no analysis was made.

APPENDIX B

TABLE 6

CONCENTRATIONS OF RADIONUCLIDES IN 100-N DRINKING WATER
(Cumulative Samples) - 1970

Date	<u>32</u> _P	<u>46</u> _{Sc}	<u>65</u> _{Zn}	<u>131</u> _I
Analytical Limit	6	20	20	5
12/20-1/5	*		72.	*
1/5-1/12	*		56.	5.3
1/12-1/19	*		81.	5.9
1/19-1/26	6.8		87.	10.
1/26-2/2	*		150	8.2
2/2-2/9		*	43.	
2/9-2/16		*	22.	
2/16-2/24		22.	31.	
2/24-3/2		*	*	
3/2-3/9		*	*	
3/9-3/16		*	*	
3/16-3/23		*	*	
3/23-3/30	*		*	*
3/30-4/6	*		40.	*
4/6-4/13	*		22.	*
4/13-4/20	*		43.	*
4/20-4/27	*		37.	*
4/27-5/4	6.8		37.	*
5/4-5/11	*		27.	*
5/11-5/18	*		*	*
5/18-5/25	*		*	Lost
5/25-6/1	*		*	10.
6/1-6/8	*		*	*
6/8-6/15	*		*	*
6/15-6/22	*		*	*
6/22-6/29	*		*	*
6/29-7/6	*		*	*
7/6-7/13				*
7/13-7/20				*
7/20-7/27				*

* Indicates the results were less than the analytical limit.

No entry indicates no analysis was made.

APPENDIX B

TABLE 6 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN 100-N DRINKING WATER
(Cumulative Samples)-1970

	Units of 10^{-9} $\mu\text{Ci}/\text{ml}$ of Water			
Date	^{32}P	^{46}Sc	^{65}Zn	^{131}I
Analytical Limit	6	20	20	5
7/27-8/3				*
8/3-8/10				*
8/10-8/17				*
8/17-8/24				*
8/24-8/31				*
8/31-9/8				*
9/8-9/14				*
9/14-9/21				*
9/21-9/28				*
9/28-10/5				*
10/5-10/12				*
10/12-10/19				*
10/19-10/26				*
10/26-11/2				*
11/2-11/9				*
11/9-11/16				*
11/16-11/23				*
11/23-11/30				*
11/30-12/7				*
12/7-12/14				6.6
12/14-12/21				*
12/21-12/28				*
Jan.-June Average	2.2		35	
Annual Average				2.6

* Results were less than the analytical limit shown.
No entry indicates no analysis made.

APPENDIX B

TABLE 7

CONCENTRATIONS OF RADIONUCLIDES IN 300 AREA DRINKING WATER
(Grab Samples)-1970

Date	Units of 10^{-9} $\mu\text{Ci}/\text{ml}$ of Water											
	^{24}Na	^{32}P	^{46}Sc	^{51}Cr	^{65}Zn	^{76}As	^{122}Sb	^{131}I	^{133}I	$^{140}\text{BaLa}$	^{239}Np	RE+Y
Analytical Limit	35	6	20	70	50	5	5	2	10	0.5	10	5
7/20	780	*		380		8.1	57	2.1	11.		180	71.
8/17	*	*		*		*	*	*	*		*	*
11/16	1200	26.	*	540	78.	87.	48.	*	16.		280	38.
12/21	1100	12.	*	590	110	79.	59.	2.1	16.	310	270	16.
July-Dec. Avg.	770	12.		380	94.	44.	42.	1.3	11.		180	32.

* Results were less than the analytical limit shown.

No entry indicates no analysis made.

APPENDIX B

TABLE 8

CONCENTRATIONS OF RADIONUCLIDES IN 300 AREA DRINKING WATER
(Cumulative Samples)-1970

Date	^{46}Sc	^{65}Zn	^{131}I
Analytical Limit	20	20	5
7/14-7/21	*	*	*
7/21-7/28	*	*	*
7/28-8/4	*	*	*
8/4-8/11	*	*	*
8/11-8/18	*	*	*
8/18-8/25	*	*	*
8/25-9/1	*	*	*
9/1-9/8	*	*	*
9/8-9/14	*	*	*
11/3-11/10	*	*	*
11/10-11/17	*	*	*
11/17-11/23	*	20.	*
11/23-12/1	*	*	*
12/1-12/8	*	*	*
12/8-12/15	*	22.	*
12/15-12/22	20.	22.	*
12/22-12/29	*	36.	*
July-Dec. Average	5.9	12	1.8

* Results were less than analytical limit shown.

APPENDIX B

TABLE 9

BETA ACTIVITY IN RICHLAND DRINKING WATER
(Grab Samples)-1970

Units of counts/minute/millimeter of water

<u>Date</u>	<u>c/m/ml</u>	<u>Date</u>	<u>c/m/ml</u>	<u>Date</u>	<u>c/m/ml</u>
Analytical Limit	0.10				
1-1	1.5	4-13	1.6	6-19	0.98
1-5	1.2	4-15	1.5	6-22	1.2
1-7	0.91	4-20	1.0	6-24	1.7
1-9	1.8	4-21	1.7	6-26	*
1-12	1.8	4-22	0.91	6-30	*
1-14	2.7	4-24	1.6	7-7	1.3
1-16	1.7	4-27	1.2	7-14	1.0
1-19	2.4	4-29	1.9	7-21	0.32
1-20	2.7	5-1	1.6	7-28	0.77
1-21	1.6	5-4	3.0	8-4	1.4
1-23	1.1	5-6	1.4	8-11	1.4
1-26	2.2	5-8	1.7	8-18	*
1-28	3.3	5-11	0.26	8-25	0.10
1-30	1.2	5-13	*	9-1	*
2-2	2.3	5-15	*	9-8	0.90
2-4	0.19	5-18	0.90	9-15	0.40
2-9	*	5-19	*	9-21	1.8
2-16	*	5-20	0.33	9-22	0.46
2-24	*	5-22	1.1	9-29	1.1
3-2	*	5-25	0.92	10-6	1.7
3-9	*	5-27	1.1	10-13	0.46
3-16	0.10	5-28	0.90	10-20	2.3
3-23	*	6-1	1.1	10-26	1.6
3-25	1.1	6-3	*	10-27	1.6
3-27	*	6-5	0.78	11-3	1.6
3-30	1.2	6-8	0.89	11-10	*
4-1	1.1	6-10	0.93	11-17	0.96
4-3	1.0	6-12	1.0	11-23	2.4
4-6	1.9	6-15	0.90	11-24	2.1
4-8	*	6-16	1.1	12-1	1.1
4-10	*	6-17	1.1	12-8	*
				12-15	0.50
				12-22	1.9
				12-28	0.79
			Annual Average		1.0

* Results were less than analytical limit shown.

APPENDIX B

TABLE 10

BETA ACTIVITY IN PASCO DRINKING WATER
(Grab Samples)-1970

Units of count/minute/milliliter of Water

<u>Date</u>	<u>c/m/ml</u>	<u>Date</u>	<u>c/m/ml</u>
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Analytical Limit = 0.10

1-2	0.60	4-15	0.58
1-5	0.43	4-17	0.61
1-7	0.31	4-20	0.41
1-9	0.36	4-22	0.13
1-12	0.14	4-24	0.72
1-14	0.71	4-27	0.67
1-16	0.82	4-29	0.98
1-19	0.29	5-1	0.92
1-21	0.52	5-4	0.82
1-23	1.1	5-6	0.86
1-26	0.46	5-8	0.78
1-28	1.2	5-11	0.74
1-30	0.76	5-13	*
2-2	0.68	5-15	*
2-4	0.42	5-18	*
2-9	*	5-20	*
2-16	0.27	5-22	0.71
2-24	*	5-25	0.43
3-2	*	5-27	0.37
3-9	*	5-28	0.37
3-16	*	6-1	0.76
3-23	*	6-3	0.29
3-25	0.29	6-5	0.44
3-27	0.50	6-8	0.46
3-30	*	6-10	0.46
4-1	0.62	6-12	0.64
4-3	0.73	6-15	0.24
4-6	0.48	6-17	0.50
4-8	*	6-19	0.55
4-10	*	6-22	1.1
4-13	*	6-24	0.67

Jan.-June

Avg. 0.44

* Results were less than analytical limit shown.

APPENDIX B

TABLE 11

BETA ACTIVITY IN 100-N DRINKING WATER
(Grab Samples)-1970

Units of counts/minute/milliliter of water

<u>Date</u>	<u>c/m/ml</u>	<u>Date</u>	<u>c/m/ml</u>	<u>Date</u>	<u>c/m/ml</u>
Analytical Limit = 0.10					
1/2	5.9	4/15	1.8	6/26	*
1/5	4.0	4/17	0.30	6/29	*
1/7	5.2	4/20	3.8	7/6	2.9
1/9	11.	4/22	4.8	7/13	3.2
1/12	18.	4/24	5.0	7/14	2.9
1/14	15.	4/27	7.7	7/20	1.3
1/16	7.0	4/29	3.7	7/27	2.1
1/19	14.	5/1	7.0	8/3	3.6
1/21	10.	5/4	7.8	8/11	3.1
1/23	13.	5/6	5.2	8/17	*
1/26	27.	5/8	11.	8/24	*
1/28	29.	5/11	0.15	8/31	*
1/30	19.	5/13	*	9/8	8.1
2/2	0.32	5/15	*	9/14	1.2
2/4	*	5/18	0.86	9/21	4.6
2/9	*	5/20	2.3	9/28	5.1
2/16	*	5/22	2.6	10/12	0.72
2/24	*	5/25	0.54	10/19	4.7
3/2	*	5/27	0.82	10/26	3.9
3/9	*	5/28	0.81	11/2	8.2
3/16	*	6/1	0.73	11/9	*
3/23	3.4	6/3	*	11/10	0.31
3/25	8.2	6/5	0.70	11/16	4.0
3/27	*	6/8	1.2	11/23	8.4
3/30	5.1	6/10	1.3	11/30	6.2
4/1	4.1	6/12	1.7	12/7	*
4/3	3.2	6/15	1.5	12/14	10.
4/6	0.98	6/17	1.7	12/15	5.8
4/8	*	6/19	1.7	12/21	9.1
4/10	*	6/22	1.6	12/28	7.4
4/13	5.0	6/24	0.82	Annual Average	3.8

* Results were less than analytical average shown.

APPENDIX B

TABLE 12

BETA ACTIVITY IN 300 AREA DRINKING WATER
(Grab Samples)-1970

Units of counts/minute/milliliter of water

Date	c/m/ml	Date	c/m/ml
<u>Analytical Limit = 0.02</u>			
6/29	0.05	9/8	1.2
7/6	1.2	10/26	2.3
7/13	1.0	11/2	2.5
7/20	2.0	11/9	0.10
7/27	0.10	11/16	2.8
8/3	2.5	11/30	2.3
8/10	1.7	12/7	0.10
8/17	0.10	12/14	2.1
8/24	0.10	12/21	2.0
8/31	0.10	12/28	2.9
July-Dec. Average			1.5

TABLE 13

BETA ACTIVITY IN 100-K DRINKING WATER
(Grab Samples)-1970

Units of counts/minute/milliliter of water

Date	c/m/ml	Date	c/m/ml
<u>Analytical Limit = 0.02</u>			
1/5	*	3/2	*
1/12	*	3/9	0.025
1/19	*	3/16	*
1/26	*	3/23	*
2/2	*	3/30	*
2/9	*	4/6	*
2/16	*	5/4	*
2/24	*	6/8	*
Annual Average			0.01

* Results were less than analytical limit shown.

APPENDIX B

TABLE 14

BETA ACTIVITY IN 200-W DRINKING WATER
(Grab Samples)-1970

Units of counts/minute/milliliter of water

<u>Date</u>	<u>c/m/ml</u>	<u>Date</u>	<u>c/m/ml</u>
Analytical Limit = 0.10			
2/17	*	5/19	*
3/17	*	6/16	*
4/14	0.17	Annual Average	0.04

TABLE 15

BETA ACTIVITY IN B-Y PHONE DRINKING WATER
(Grab Samples)-1970

Units of counts/minute/milliliter of water

<u>Date</u>	<u>c/m/ml</u>
Analytical Limit = 0.10	
4/27	*
6/1	*
7/23	*
Annual Average	0.09

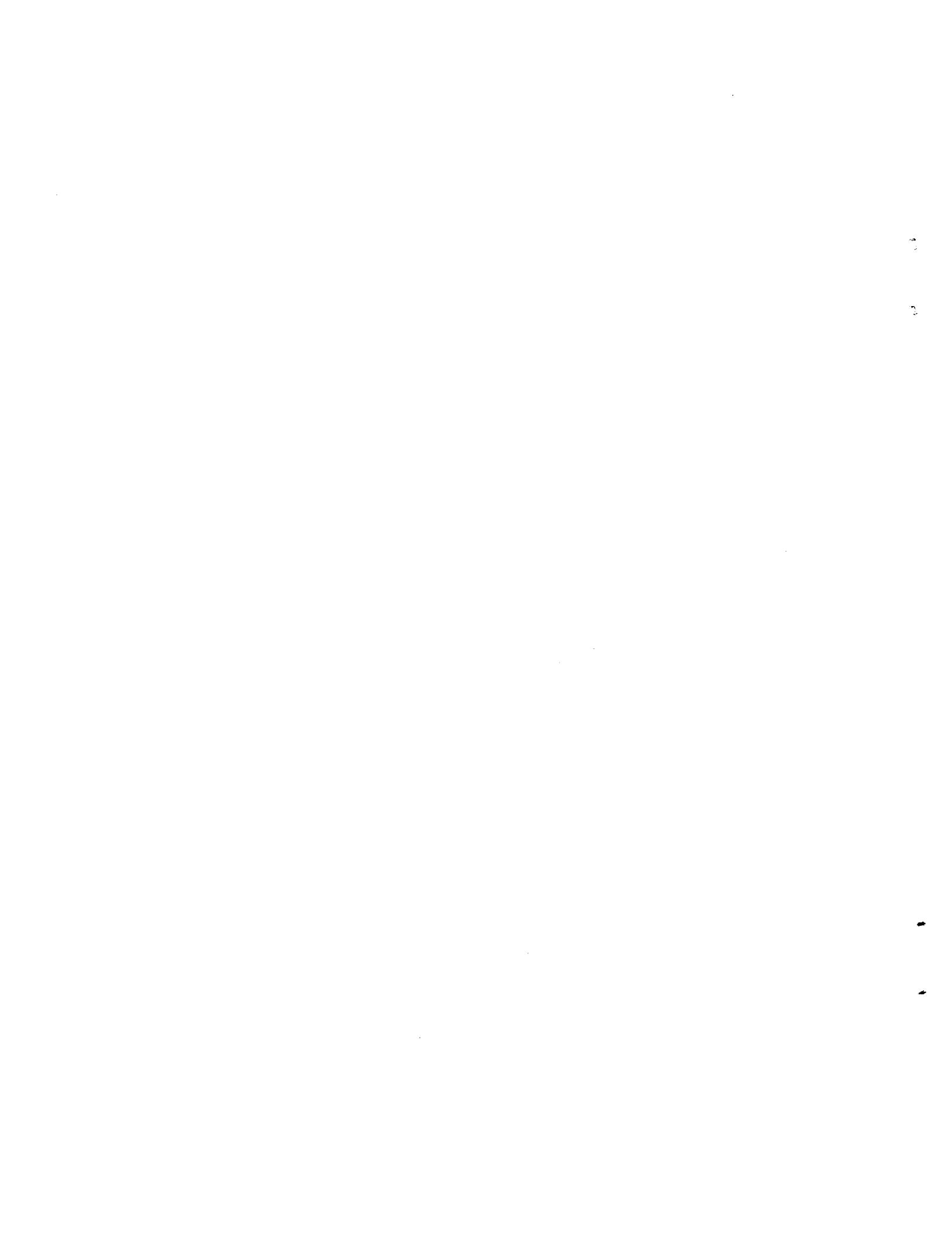
* Results were less than analytical limit shown.



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APPENDIX C



APPENDIX C

TABLE I

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF WHITEFISH
TAKEN FROM THE COLUMBIA RIVER-1970

	Units of 10^{-6} $\mu\text{Ci/gm}$ (wet weight)						
<u>Ringold</u>	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>^{137}Cs- ^{137}mBa</u>
<u>Analytical</u>							
Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1
1/19		5.4					
1/19		17.					
1/27		6.0					
1/27		5.4					
1/27		6.1					
1/27		8.0					
1/27		11.					
1/27		15.					
1/27							
Comp.**	18.		4.1	1.5	0.99	7.2	0.38
2/11		6.5					
2/11		5.2					
2/11		17.					
2/11		69.					
2/25		7.3					
2/25		3.3					
2/25		10.					
2/25		2.9					
2/25		*					
2/25		10.					
2/25							
Comp.			3.3	0.83	0.77	5.0	0.27
3/12		7.2					
3/12		1.1					
3/12		2.4					
3/12		8.4					
3/12							
Comp.	*		3.2	0.94	0.67	7.1	*
3/27		3.7					
3/27		3.4					
3/27		2.9					
3/27		1.0					
3/27		3.7					
3/27							
Comp.	7.7		3.1	1.1	1.1	7.6	0.30

* Results were less than analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis made.

APPENDIX C

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF WHITEFISH
TAKEN FROM THE COLUMBIA RIVER - 1970

Units of 10^{-6} $\mu\text{Ci}/\text{gm}$ (wet weight)							
	<u>24Na</u>	<u>32P</u>	<u>40K</u>	<u>58Co</u>	<u>60Co</u>	<u>65Zn</u>	<u>137Cs-137mBa</u>
<u>Ringold</u>							
<u>Date</u>							
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1
5/1		2.2					
5/1		*					
5/1		1.6					
5/1		1.8					
5/4		*					
5/27		4.7					
5/27		6.4					
5/27		5.6					
5/27		*					
5/27		22.					
5/27							
Comp.**	2.5		2.7	0.36	0.54	2.7	0.11
6/11		2.6					
6/11		1.6					
6/11		2.4					
6/11		8.9					
6/11		*					
6/11							
Comp.	160		5.0	*	0.27	1.8	*
6/23		3.3					
6/23		8.4					
6/23		9.3					
6/23		5.0					
6/23		8.9					
6/23							
Comp.	12.		2.7	0.27	0.81	3.0	0.23
7/9		1.9					
7/9		*					
7/9		2.1					
7/9		2.4					
7/9		6.0					
7/9							
Comp.	9.4		3.5	*	0.61	3.8	0.31

* Results were less than analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF WHITEFISH
TAKEN FROM THE COLUMBIA RIVER-1970

<u>Ringold</u>	Units of 10^{-6} $\mu\text{Ci/gm}$ (wet weight)						
	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>^{137}Cs-^{137}mBa</u>
Date							
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1
7/20		3.9				1.6	0.14
7/20			9.7				
7/20			4.7				
7/20				9.9		2.1	*
7/20			15.				
7/20							
Comp.**	5.3		4.3	*	0.34	2.7	0.16
8/10		3.7					
8/10	5.3		5.8	0.16	0.15	0.94	0.19
8/10			7.8				
8/10				10.		1.4	0.29
8/10			1.2				
8/10							
Comp.	6.3		2.9	*	*	0.92	0.10
8/24		8.7					
8/24		17.					
8/24			13.				
8/24			17.				
8/24			24.				
8/24							
Comp.			4.2			2.6	0.15
9/1		73.					
9/1		32.					
9/1		30.					
9/1		44.					
9/1		63.					
9/1							
Comp.	*		4.4	0.26	0.39	5.1	0.52
9/21		25.					
9/21		19.					
9/21		21.					
9/21		4.6					
9/21		24.					
9/21							
Comp.	570		3.6	0.19	0.70	4.8	0.57

* Results were less than analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF WHITEFISH
TAKEN FROM THE COLUMBIA RIVER-1970

		Units of $10^{-6} \mu\text{Ci/gm}$ (wet weight)						
<u>Ringold</u>	<u>Date</u>	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>$^{137}\text{Cs-Ba}$</u>
Analytical								
Limit		0.6	1.0	1.0	0.15	0.15	0.2	0.1
10/5		50.						
10/6		51.						
10/6		40.						
10/6		45.						
10/6		23.						
10/6								
Comp.	26.			4.1	0.24	0.68	4.8	0.58
10/27		24.						
10/27		28.						
10/27		21.						
10/27		30.						
10/27		37.						
10/27								
Comp.	10.		9.5	5.2	*	0.45	4.7	0.39
11/9		49.						
11/9		38.						
11/10		37.						
11/10		43.						
11/9								
Comp.	3.1			3.9	0.31	0.36	6.0	0.58
11/20		61.						
11/20		44.						
11/20		16.						
11/20		60.						
11/20		86.						
11/20								
Comp.	12.			4.3	0.32	0.40	5.5	0.53
12/17		27.						
12/17		26.						
12/17		22.						
12/17		1.3						
12/17								
Comp.**	17.			4.6	0.34	0.36	5.0	0.39

* Results were less than analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF WHITEFISH
TAKEN FROM THE COLUMBIA RIVER-1970

	Units of 10^{-6} $\mu\text{Ci}/\text{gm}$ (wet weight)						$^{137}\text{Cs}-$ ^{137}mBa
<u>Ringold</u>	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1
12/28		*					
12/28		12.					
12/28		26.					
12/28		26.					
12/28		14.					
12/28							
Comp.**	13.		5.8	0.28	0.58	4.3	0.57
Annual Average	45.	17.	4.3	0.47	0.57	4.7	0.32
<u>White Bluffs to Ringold</u>							
7/9		4.1					
8/31 Comp.		74.				4.2	
8/31 Comp.		51.					5.6
9/21 Comp.		22.					
9/21		22.					
10/26 Comp.		16.					
10/26		36.				5.7	
11/23 Comp.		34.					6.3
<u>White Bluffs to 100-K</u>							
7/8		6.5					
8/19		57.				7.2	
8/19		30.					
9/14		21.					
9/14		14.					
10/19		39.				6.0	
10/19		32.					
11/24		36.					8.1

* Results were less than analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C
TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF WHITEFISH
TAKEN FROM THE COLUMBIA RIVER-1970

Units of 10^{-6} $\mu\text{Ci/gm}$ (wet weight)

White Bluffs

Date	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>$^{137}\text{Cs-}$</u> <u>^{137}mBa</u>
Analytical Limit	0.6	1.6	1.0	0.15	0.15	0.2	0.1
6/15		4.8				3.1	
<u>Hanford</u>							
5/5		5.6				4.7	
5/5		4.8				6.2	
5/5		5.3				7.3	
5/5		13.				2.8	
5/5		20.				5.7	
6/15		2.6				2.6	

No entry indicates no analysis made.

APPENDIX C

TABLE 2

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF BASS
TAKEN FROM THE COLUMBIA RIVER-1970

Units of 10^{-6} $\mu\text{Ci/gm}$ (wet weight)							
<u>Island View</u>	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>$^{137}\text{Cs-}$</u> <u>^{137}mBa</u>
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1
2/19	*						
2/19							
Comp.**			4.4			3.8	*
6/25		1.3					
9/16							
Comp.		1.7	3.3			1.1	*
10/22							
Comp.		*	7.8			1.1	0.48
Annual Average		0.84	5.2			2.0	0.20
<u>Burbank</u>							
5/5		*					
6/4		*					
6/5		*					
6/25		1.7					
6/25		1.5					
6/26		*					
6/26		*					
6/26		1.2					
6/27		*					
7/14		*					
7/14		*					
9/2							
Comp.		9.2	3.3			1.8	*
Annual Average		2.5	3.3			1.8	*0.04

* Results were less than the analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C

TABLE 2 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF BASS
TAKEN FROM THE COLUMBIA RIVER-1970

<u>Hover</u>	Units of 10^{-6} $\mu\text{Ci/gm}$ (wet weight)						
<u>Date</u>	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>^{137}Cs</u> - <u>^{137}mBa</u>
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1
5/14		2.5					
5/14	*						
5/14							
Comp.**			3.6			3.9	0.18
6/9		1.8					
6/12		1.3					
6/29		8.7					
6/29		8.9					
6/29		5.4					
6/29							
Comp.			3.6			4.8	0.16
8/26							
Comp.	42.		6.3			4.5	*
9/18							
Comp.	72.		4.8			3.4	0.46
10/15							
Comp.	11.		3.9			3.0	0.29
Annual Average	26.	4.4				3.9	0.25

* Results were less than the analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C

TABLE 3

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF CATFISH
TAKEN FROM THE COLUMBIA RIVER-1970Units of 10^{-6} $\mu\text{Ci}/\text{gm}$ (wet weight)

<u>Island View</u>	<u>24Na</u>	<u>32P</u>	<u>40K</u>	<u>58Co</u>	<u>60Co</u>	<u>65Zn</u>	<u>137Cs-137mBa</u>
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1
2/18	*						
2/18	*						
2/18	*						
2/19	*						
2/19	*						
2/19	*						
Comp.**			3.1			0.58	*
3/25	*						
3/25	1.4						
3/25	*						
3/25	*						
3/25	*						
3/25	*						
3/25	*						
3/25	*						
3/25	*						
Comp.			2.4			2.8	0.18
4/1	*						
4/1	*						
4/1	*						
Comp.			2.7			1.2	*
4/14	*						
4/14	*						
4/16	*						
4/16	*						
4/17	*						
4/17	*						
4/17	*						
4/17	*						
4/17	*						
Comp.			2.6			2.6	0.26
5/19	*						
5/19	*						
5/19	2.3						
5/19	1.6						
5/21	*						
5/22	*						
5/22	*						
Comp.			2.9			1.3	*

* Results were less than the analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made

APPENDIX C

TABLE 3 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF CATFISH
TAKEN FROM THE COLUMBIA RIVER-1970Units of 10^{-6} $\mu\text{Ci}/\text{gm}$ (wet weight)Island View

<u>Date</u>	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>$^{137}\text{Cs}-$</u> <u>^{137}mBa</u>
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1
6/17	*						
6/17	*						
6/17	1.5						
6/17	*						
6/17	*						
6/17	*						
6/17	*						
6/17	*						
6/17	*						
7/10	*						
7/10	*						
7/10	*						
7/10	1.2						
7/23	1.6						
7/23	1.0						
7/23	*						
7/23	1.6						
8/20							
Comp.**			2.4			1.2	*
Annual Average	0.51	2.4				1.2	0.06

Burbank

2/20	*						
2/20							
Comp.**			4.2			8.0	*
3/20	*						
3/20	1.1						
3/20	*						
3/20	*						
3/20	*						
3/20	*						
3/20	*						
3/20	*						
3/20	2.2						
Comp.						3.4	*

* Results were less than analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates analysis was not made.

APPENDIX C

TABLE 3 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF CATFISH
TAKEN FROM THE COLUMBIA RIVER-1970

	Units of 10^{-6} $\mu\text{Ci/gm}$ (wet weight)						
	<u>24Na</u>	<u>32P</u>	<u>40K</u>	<u>58Co</u>	<u>60Co</u>	<u>65Zn</u>	<u>137Cs-137mBa</u>
<u>Analytical Limit</u>	0.6	1.0	1.0	0.15	0.15	0.2	0.1
3/31	*						
3/31	*						
3/31							
Comp.			2.2			2.2	0.21
5/5	*						
5/5	*						
5/5	*						
5/5	*						
5/5	*						
5/5	*						
5/5	*						
5/5	*						
5/5	*						
5/5	*						
5/5	*						
Comp.			2.2			2.5	*
6/3	*						
6/3	*						
6/3	*						
6/3	*						
6/3	*						
6/3	*						
6/3	*						
Comp.			2.1			2.5	*
6/4	*						
6/4	*						
6/4	*						
6/4	*						
6/17							
Comp.			3.6			0.20	*
7/14	*						
7/14	*						

* Results were less than analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C

TABLE 3 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF CATFISH
TAKEN FROM THE COLUMBIA RIVER-1970

Units of 10^{-6} $\mu\text{Ci}/\text{gm}$ (wet weight)

Burbank

<u>Date</u>	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>^{137}Cs- ^{137}mBa</u>
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1
7/14	*						
7/14	*						
7/14	*						
7/14	*						
7/14	*						
7/14	*						
7/14	1.0						
7/14	*						
8/18	*						
8/18	1.2						
8/18	1.0						
8/18	2.4						
8/18	5.4						
8/18	2.9						
8/18	4.8						
8/18	14.						
8/18	8.6						
8/18	*						
Annual Average		1.1	2.8			3.7	*0.04

Hover

6/8	1.1
6/8	*
6/8	2.9
6/9	*
6/9	1.1
6/12	*
6/12	3.7
7/20	3.9
7/23	*
8/4	1.7

* Results were less than the analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C

TABLE 3 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF CATFISH
TAKEN FROM THE COLUMBIA RIVER-1970

<u>Hover</u>							
<u>Date</u>	<u>²⁴Na</u>	<u>³²P</u>	<u>⁴⁰K</u>	<u>⁵⁸Co</u>	<u>⁶⁰Co</u>	<u>⁶⁵Zn</u>	<u>¹³⁷Cs- ^{137m}Ba</u>
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1
8/4		1.4					
8/4		*					
8/4		3.6					
8/4		4.0					
8/4		5.4					
8/4 Comp.**			3.1			2.8	0.10
8/11		6.2					
8/11		2.2					
8/11		6.0					
8/11		5.8					
Annual Average		2.9	3.1			2.8	0.1

* Results were less than the analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ³²P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C

TABLE 4

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF CRAPPIE
TAKEN FROM THE COLUMBIA RIVER-1970

<u>Island View</u>	Units of 10^{-6} $\mu\text{Ci/gm}$ (wet weight)						
<u>Date</u>	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>^{137}Cs- ^{137m}Ba</u>
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1
1/30	*						
1/30	*						
2/18	*						
3/25	*						
4/14	*						
4/16	*						
4/17	*						
6/17	*						
6/17	*						
6/17	*						
6/23	2.7						
7/10	*						
7/10	*						
7/10	1.2						
7/10	*						
7/23	1.2						
7/23	3.4						
7/23	*						
7/23	1.5						
8/20							
Comp.**		*				0.22	*
8/20							
Comp.	*		2.0	*	*	0.53	*
9/17							
Comp.	2.2		3.5			0.68	*
9/17	8.3						
10/22	*						
10/22							
Comp.	2.5		4.1			1.5	0.13
11/10							
Comp.	*	1.8	3.9	*	*	3.2	0.14
12/16							
Comp.	*		7.3			3.6	*
Annual Average	1.2	4.1				1.9	0.08

* Results were less than the analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C

TABLE 4 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF CRAPPIE
TAKEN FROM THE COLUMBIA RIVER-1970

<u>Burbank</u>	Units of 10^{-6} $\mu\text{Ci}/\text{gm}$ (wet weight)						^{137}Cs -
<u>Date</u>	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>^{137}mBa</u>
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1
3/20	*						
3/20	*						
3/20							
Comp.**			*2.8			3.6	*
3/31	*						
5/5	*						
5/8	*						
5/8	*						
5/8	*						
6/3	*						
6/4	*						
6/4	*						
6/4	5.6						
6/4	*						
6/4	*						
6/4	*						
6/5	1.0						
6/5	1.1						
6/5	*						
6/5							
Comp.			3.4			3.4	0.29
7/14	*						
7/14	*						
7/14	*						
7/14	*						
7/14	*						
7/21	1.5						
7/21	2.2						
7/21	4.3						
7/21	6.0						
7/21	1.2						
8/18	14.						
8/18	10.						
8/18							
Comp.			3.4			4.0	*

* Results were less than analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C

TABLE 4 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF CRAPPIE
TAKEN FROM THE COLUMBIA RIVER-1970

	Units of 10^{-6} $\mu\text{Ci}/\text{gm}$ (wet weight)							
<u>Burbank</u>	<u>Date</u>	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>$^{137}\text{Cs}-$ ^{137m}Ba</u>
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1	
9/2 Comp.		9.2	2.9			2.7	*	
9/2		12.						
10/15		28.	3.4			3.8	*	
11/12								
Comp.		3.4	2.7			2.9	*	
Annual Average		7.3	3.1			3.4	0.06	
<u>Hover</u>								
2/5		1.4						
2/6		1.3						
3/11		*						
5/15		3.0						
5/15								
Comp.**			*	*	*		3.2	*
6/8		1.9						
6/8		8.1						
6/8		5.2						
6/8		11.						
6/8		2.3						
6/9		1.6						
6/9		1.2						
6/12		3.3						
6/12		2.0						
6/12		3.0						
6/29		4.7						
7/15		3.2						
7/23		9.6						
8/11		6.6						
8/12		4.1						
8/12		10.						
8/12		31.						
8/13		18.						

* Results were less than the analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C

TABLE 4 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF CRAPPIE
TAKEN FROM THE COLUMBIA RIVER-1970

Units of 10^{-6} $\mu\text{Ci/gm}$ (wet weight)

<u>Hover</u>	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>^{137}Cs</u> - <u>^{137m}Ba</u>
<u>Analytical</u> <u>Limit</u>	0.6	1.0	1.0	0.15	0.15	0.2	0.1
8/13							
Comp.		9.3					
8/26							
Comp.			3.1			3.2	*
9/10							
Comp.		11.					
9/30							
Comp.		7.4					
10/15							
Comp.	14.		5.3			1.8	*
Annual Average	6.4	3.1				2.7	0.08

* Results were less than analytical limit shown.

** Composites consisting of equal weights from five fish
that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C

TABLE 5

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF PERCH
TAKEN FROM THE COLUMBIA RIVER-1970Units of 10^{-6} $\mu\text{Ci/gm}$ (wet weight)Island View

<u>Date</u>	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>$^{137}\text{Cs}-^{137m}\text{Ba}$</u>
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1
2/18	*						
5/12	*						
7/29	*						
9/16							
Comp.**	*				3.0	0.27	*
10/22							
Comp.	*		6.8			1.1	0.50
11/10							
Comp.	*	*	1.8	*	*	1.6	*
12/18							
Comp.		2.1	6.7			4.2	1.1
Annual Average		0.50	5.1		1.5	1.8	0.40

Burbank

2/13	*
2/13	*
2/13	*
2/13	*
2/13	*
2/18	*
2/18	*
2/18	*
2/18	*
2/18	*
2/18	*
3/20	*
3/20	*
3/20	20
3/20	*
3/20	*
3/20	*
3/20	*
3/20	*
3/20	*
3/20	*

* Results were less than analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C

TABLE 5 (Continued)

CONCENTRATION OF RADIONUCLIDES IN MUSCLE OF PERCH
TAKEN FROM THE COLUMBIA RIVER-1970

Units of 10^{-6} $\mu\text{Ci}/\text{gm}$ (wet weight)						
Burbank	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>
Date						
Analytical						
Limit	0.6	1.0	1.0	0.15	0.15	0.2
3/20						0.1
Comp.**			2.0			3.7
3/31	*					*
3/31	*					
3/31	*					
3/31	*					
3/31	*					
3/31	*					
3/31	*					
3/31	*					
3/31	*					
3/31	*					
3/31	*					
3/31	*					
3/31	*					
3/31	*					
3/31	*					
Comp.			2.4			3.3
6/2	*					*
6/2	*					
6/4	*					
7/14	*					
7/29	4.8					
7/29	6.3					
7/29	20					
7/29						
Comp.	10.					
9/3						
Comp.	8.4	3.1			2.4	*
10/8						
Comp.	3.4					
Annual						
Average	3.6	2.6			3.0	0.06

* Results were less than analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C

TABLE 5 (Continued)

CONCENTRATION OF RADIONUCLIDES IN MUSCLE OF PERCH
TAKEN FROM THE COLUMBIA RIVER-1970

<u>Hover</u>	Units of 10^{-6} $\mu\text{Ci/gm}$ (wet weight)						
<u>Date</u>	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>^{137}Cs</u> - <u>$^{137\text{m}}\text{Ba}$</u>
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1
3/24		*					
3/26		*					
5/11		*					
5/15		*					
5/15		1.8					
5/15		4.2					
6/10		*					
6/12		13.					
7/15		8.2					
7/15		13.					
7/23		11.					
7/23		12.					
8/4		14.					
8/4		16.					
8/11		17.					
8/13		15.					
8/4							
Comp.**			3.0			4.1	0.22
9/9							
Comp.		15.	3.7			3.6	*
9/30		6.5					
10/2							
Comp.		32.	3.8	*	*	4.4	0.24
Annual Average		11.	3.5			4.0	0.17

* Results were less than analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ^{32}P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C

TABLE 6

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF CARP
TAKEN FROM THE COLUMBIA RIVER-1970

Island View							
Date	<u>²⁴Na</u>	<u>³²P</u>	<u>⁴⁰K</u>	<u>⁵⁸Co</u>	<u>⁶⁰Co</u>	<u>⁶⁵Zn</u>	<u>¹³⁷Cs- ^{137m}Ba</u>
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1
1/30		1.5					
1/30		*					
1/30		*					
1/30							
Comp.**			2.7			5.4	*
2/19		*					
2/19		*					
2/19		*					
2/19							
Comp.			2.6			4.8	*
Annual Average	0.49	2.6				5.1	*0.01

* Results were less than analytical limit shown.

** Composites consisting of equal weights from five fish that were analyzed for ³²P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

TABLE 7

CONCENTRATIONS OF RADIONUCLIDES IN MUSCLE OF SUCKER
TAKEN FROM THE COLUMBIA RIVER-1970

Hover							
Date	<u>²⁴Na</u>	<u>³²P</u>	<u>⁴⁰K</u>	<u>⁵⁸Co</u>	<u>⁶⁰Co</u>	<u>⁶⁵Zn</u>	<u>¹³⁷Cs- ^{137m}Ba</u>
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.2	0.1
2/28		2.7					
2/28		*					
2/28		3.2					
2/28							
Comp.**			2.6			2.8	*
Annual Average	1.9	2.6				2.8	

* Results were less than analytical limit shown.

** Composites consisting of equal wieghts from five fish that were analyzed for ³²P were also analyzed for gamma-emitting radionuclides.

No entry indicates no analysis was made.

APPENDIX C

TABLE 8

CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE MUSCLE
OF WATERFOWL SAMPLES IN THE HANFORD ENVIRONS-1970

DUCKS		Species	^{24}Na	^{32}P	^{40}K	^{58}Co	^{60}Co	^{65}Zn	$^{137}\text{Cs} - 137\text{mBa}$
100 D	Date								
<u>Analytical Limit</u>									
12/1	Golden Eye	0.6	1.0	1.0	0.15	0.15	0.2	0.1	
		32.	170	8.6	0.47	0.16	0.33	0.23	
<u>Savage Island</u>									
1/27	Mallard	*		2.5					*
1/27	Mallard	1.0		2.4					*
1/27	Mallard	*		2.0					*
1/27	Mallard	2.1		3.3					*
1/27	Mallard	1.1		2.8					*
1/27	Mallard	*		3.2					*
1/27	Mallard	*		3.0					*
1/27	Mallard	2.2		3.5					*
1/27	Mallard	1.4		2.7					*
1/27	Mallard	1.0		2.3					*
10/21	Gr. Wing Teal	*		4.7					*
Annual Average				0.78		3.8		0.63	*

* Results were less than analytical limit shown.

No entry indicates no analysis was made.

APPENDIX C

TABLE 8 (Continued)

CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE MUSCLE
OF WATERFOWL SAMPLES IN THE HANFORD ENVIRONS-1970

DUCKS		Species	2 ⁴ Na	3 ² P	4 ⁰ K	5 ⁸ Co	6 ⁰ Co	6 ⁵ Zn	1 ³⁷ Cs-1 ³⁷ mBa	0.1
Date	Hanford									
Analytical Limit			0.6	1.0	1.0	0.15	0.15	0.2		
1/2	Mallard			1.3	3.0			2.0		*
1/2	Mallard		*		3.4			1.5		*
1/2	Mallard		10.		2.3			2.4		*
1/2	Mallard		*		3.7		*	*		*
1/2	Mallard		*		3.2		*	0.66		*
1/2	Mallard		*		1.7		*	0.41		*
1/2	Mallard		*		3.6		*	0.44		*
1/2	Mallard				2.2		*	1.1		*
1/2	Mallard				1.3		*	1.7		*
1/2	Mallard				5.4		*	3.1		*
1/2	Mallard		*		2.5		*	0.63		*
1/2	Mallard		*		2.0		*	1.0		*
1/2	Mallard				1.7		*	2.7		*
1/2	Mallard				6.4		*	2.7		*
1/2	Mallard				1.0		*	0.76		*
1/2	Mallard		*		1.7		*	1.1		*
1/2	Mallard				1.6		*	0.62		*
1/2	Mallard				2.2		*	1.7		*
1/2	Mallard				12.		*	5.2		*
1/2	Mallard		*				*	1.5		*
1/2	Mallard		*				*	0.54		*
1/2	Mallard						*	2.7		*
1/2	Mallard						*			*
							*			*

* Results were less than analytical limit shown.

No entry indicates no analysis was made.

APPENDIX C

TABLE 8 (Continued)

CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE MUSCLE
OF WATERFOWL SAMPLES IN THE HANFORD ENVIRONS-1970

DUCKS		Species	Analytical Limit	^{32}P		^{40}K		^{58}Co		^{60}Co		^{65}Zn		$^{137}\text{Cs}-^{137}\text{mBa}$		
Date	Hanford			2 ⁴ Na	0.6	32P	1.0	40K	1.0	58Co	0.15	60Co	0.15	65Zn	0.2	0.1
1/6	Mallard					8.2	4.4							2.0		*
1/6	Mallard					*	2.7							0.83		0.14
1/6	Mallard					15.	3.3							1.5		*
1/6	Mallard					4.4	4.5							1.2		0.16
1/6	Mallard					*	3.7							1.8		0.13
1/6	Mallard					20.	3.4							4.4		*
1/6	Mallard					4.0	3.9							2.4		*
1/6	Mallard					6.0	4.2							3.1		*
1/6	Mallard					1.8	4.3							1.4		*
1/6	Mallard					11.	5.6							9.2		0.32
1/6	Merganser					1.4	2.2							1.6		
1/29	Mallard					2.2	3.0							3.0		
1/29	Mallard					*	3.0							1.4		
1/30	Mallard					2.4	3.0							3.1		
1/30	Mallard					2.5	3.4							0.26		
10/19	Mallard					*	3.0							*		
10/19	Mallard					8.6	3.2							1.4		
10/19	Gr. Wing Teal					38.	*							1.0		
10/26	Ruddy Duck					*								*		
10/26																

* Results were less than the analytical limit shown.

No entry indicates no analysis was made.

APPENDIX C

TABLE 8 (Continued)
 CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE MUSCLE
 OF WATERFOWL SAMPLES IN THE HANFORD ENVIRONS-1970

DUCKS		Analytical Limit	^{24}Na	^{32}P	^{40}K	^{58}Co	^{60}Co	^{65}Zn	$^{137}\text{Cs}-137\text{mBa}$
Hanford	Date								
11/3	Mallard	0.6	*	1.0	1.0	0.15	0.15	0.2	0.1
11/3	Mallard	1.2	48.	3.4	*	*	0.48	0.48	0.15
11/3	Mallard	*	16.	3.0	*	*	0.88	*	*
11/3	Mallard		4.7	3.1	*	*	1.0	*	*
11/3	Mallard			4.7	3.9	*	0.83	*	*
11/3	Merganser	1.7	18.	1.6	*	*	4.5	0.12	0.12
11/3	Merganser		5.1	4.1	*	*	0.66	0.20	0.20
11/16	Mallard		5.5	2.0			0.87	*	*
11/24	Mallard	*		2.3			0.37	*	*
11/24	Mallard		6.1	2.2			0.85	*	*
12/3	Mallard		16.	4.3			3.3	0.14	0.14
12/16	Mallard		13.	5.7			2.7	0.13	0.13
12/21	Mallard		14.	7.3			3.2	0.25	0.25
12/21	Mallard	*		4.8			0.47	*	*
12/21	Mallard		*	4.6			0.33	*	*
12/21	Mallard		*	5.7			0.41	0.12	0.12
12/21	Mallard		1.9	5.0			2.1	0.14	0.14
12/29	Mallard		2.8	5.0			1.9	*	*
12/29	Mallard		8.8	5.0			0.41	0.18	0.18
12/29	Mallard		2.0	4.5			1.7	*	*
12/30	Merganser	*		4.9			0.21	*	*
12/30	Mallard		1.3	3.6			1.4	0.16	0.16
12/30	Mallard		12.	4.5			1.5	*	*
12/30	Mallard		4.9	4.7			2.4	*	*
12/30	Mallard		2.7	4.6			2.7	0.17	0.17
12/30	Mallard		1.8	4.2			1.4	*	*
12/30	Mallard		1.4	4.0			0.47	*	*
Annual Average			7.8	3.4			1.3	0.06	0.06

* Results were less than analytical limit shown.
 No entry indicates no analysis was made.

APPENDIX C

TABLE 8 (Continued)

CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE MUSCLE
OF WATERFOWL SAMPLES IN THE HANFORD ENVIRONS-1970

GESE		Units of 10^{-6} $\mu\text{Ci}/\text{gm}$ (wet weight)					
Savage Island	Species	^{24}Na	^{32}P	^{40}K	^{58}Co	^{60}Co	^{65}Zn
Date							
Analytical Limit		0.6	1.0	1.0	0.15	0.15	0.1
10/19	Lessor Can. Goose		27.	3.5			
River at 100 N						7.8	0.14
3/6	Can. Honker	*					
White Bluffs					22.	150	0.31
1/6	Lesser Can. Goose	*		4.6			*
1/6	Can. Honker	*		3.5			0.12
1/6	Can. Honker	2.5		4.6			0.83
1/6	Can. Honker	1.8		3.2			3.2
1/7	Can. Honker	1.9		4.7			6.2
1/7	Can. Honker	*		3.3			2.4
1/10	Lesser Can. Goose	28.		2.9			2.1
1/10	Lesser Can. Goose	49.		3.7			0.96
2/10	Can. Honker	19.		5.1			2.6
12/1	Can. Honker	*		4.0			9.0
12/1	Can. Honker	*		3.0			0.23
12/2	Can. Honker	*		5.2			1.5
12/7	Can. Honker	*		4.1			0.89
Annual Average		10.		4.3			4.2

* Results were less than the analytical limit shown.

No entry indicates no analysis was made.

APPENDIX C

TABLE 8 (Continued)

CONCENTRATIONS OF SELECTED RADIONUCLIDES IN THE MUSCLE
OF WATERFOWL SAMPLES IN THE HANFORD ENVIRONS-1970

GEESE		Units of 10^{-6} $\mu\text{Ci/gm}$ (wet weight)								
Hanford		<u>Species</u>		<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>$^{137}\text{Cs}-137\text{mBa}$</u>
Date	Analytical Limit									
12/2	Can. Honker	0.6		1.0		1.0	0.15	0.15	0.2	0.1
12/2	Can. Honker		1.4		3.6				3.4	*
12/6	Can. Honker		*		4.2				1.5	*
	Can. Honker			1.6	4.3			3.6	0.17	
Annual	Average			1.3	4.0			2.8	0.11	

* Results were less than the analytical limit shown.

No entry indicates no analysis was made.

APPENDIX C

TABLE 9

CONCENTRATIONS OF RADIONUCLIDES IN THE MUSCLE
OF GAMEBIRD SAMPLES IN THE HANFORD ENVIRONS - 1970

Units of 10^{-6} $\mu\text{Ci/gm}$ (wet weight)

PHEASANTWhite Bluffs

<u>Date</u>	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>^{137}Cs-^{137m}Ba</u>
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.20	0.1
1/10	26.	3.4				3.1	0.16
1/19	*	3.1				3.5	0.19
1/19	*	3.2				2.1	*
1/20	*	3.0				0.76	*
1/21	*	2.0				1.3	*
1/22	*	3.0				2.4	*
1/23	*	2.4	*	*		0.71	*
1/26	*	3.0				0.52	*
2/6	*	4.0				3.8	0.13
2/6	*	2.6				2.6	0.13
2/6	*	3.9				2.5	0.14
2/6	1.1	3.1				2.4	0.20
10/12	1.9	2.5				*	*
10/13	15.	3.4				1.4	*
10/13	11.	1.9				1.3	*
10/13	*	2.9				*	*
10/30	3.4	3.7				0.74	0.18
11/2	*	4.0				0.44	0.14
11/2	2.5	2.8				1.1	0.13
Annual Average	2.9	3.1				1.5	0.09
<u>Hanford</u>							
10/30	5.0	6.1				1.0	0.31
11/2	9.7	5.9				8.4	*
11/2	4.0	2.4	*	0.24		5.6	0.15
11/2	9.3	8.0				2.8	*
11/3	2.9	8.0	*	*	0.41	8.1	*
11/16	1.8	2.7				0.66	*
12/7	*	4.2				2.1	*
12/29	*	4.1				0.70	0.10
Annual Average	3.9	4.8	*0.04	0.33		2.5	0.15

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

APPENDIX C

TABLE 9 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN THE MUSCLE
OF GAME BIRD SAMPLES IN THE HANFORD ENVIRONS-1970Units of 10^{-6} $\mu\text{Ci}/\text{gm}$ (wet weight)PHEASANT100 K

<u>Date</u>	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>^{137}Cs- ^{137m}Ba</u>
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.20	0.10
1/20		*	2.9			1.4	*
2/12		*	3.4			3.2	*
Annual Average		*0.44	3.2			2.3	0.08

100 D

12/8	*	3.8		3.9	0.17
------	---	-----	--	-----	------

100 F

11/16	1.7	2.4		0.91	*
11/23	1.1	4.0		1.4	0.26
12/10	*	5.6		0.70	*
12/23	*	4.6		1.1	0.14
Annual Average	0.72	4.2		5.1	0.12

QUAILWhite Bluffs

1/10	16.	3.4		2.9	*
1/21	*	5.6		1.8	0.37
10/13	1.8	*		*	*
10/13	17.	*		1.9	*
10/13	1.9	*		*	*
10/13	*	3.6		*	*
11/23	1.1	6.4	*	1.2	*
12/7	2.2	*	6.6	*	0.28
12/10		*	7.0	0.69	*
Annual Average	2.2	3.6	4.6	0.97	0.12

* Results were less than the analytical limit shown.

No entry indicates no analysis was made.

APPENDIX C

TABLE 9 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN THE MUSCLE
OF GAME BIRD SAMPLES IN THE HANFORD ENVIRONS-1970

Units of 10^{-6} $\mu\text{Ci}/\text{gm}$ (wet weight)

QUAIL

100 D

Date	<u>^{24}Na</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{58}Co</u>	<u>^{60}Co</u>	<u>^{65}Zn</u>	<u>^{137}Cs</u> - <u>^{137m}Ba</u>
Analytical Limit	0.6	1.0	1.0	0.15	0.15	0.20	0.10
12/8	*	5.4				1.5	*
12/8	1.2	6.2				4.0	2.4
12/10	1.0	6.1				1.6	0.27
12/10	2.0	4.1				1.7	*
12/10	2.0	8.0				1.6	*
Annual Average	1.3	5.9				2.1	0.64
<u>100-F</u>							
10/2		*				1.3	*

Hanford

11/16	1.4	3.0	*	*
11/24	*	3.7	0.50	*
11/24	*	*	*	*
11/24	*	*	0.41	*
11/24	*	5.2	*	*
11/24	*	*	*	*
11/24	*	*	*	*
11/24	*	*	*	*
Annual Average	*0.005	2.7	0.11	*0.023

* Results were less than analytical limit shown.

No entry indicates that no analysis was made.

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BNWL-1669 ADD

APPENDIX D



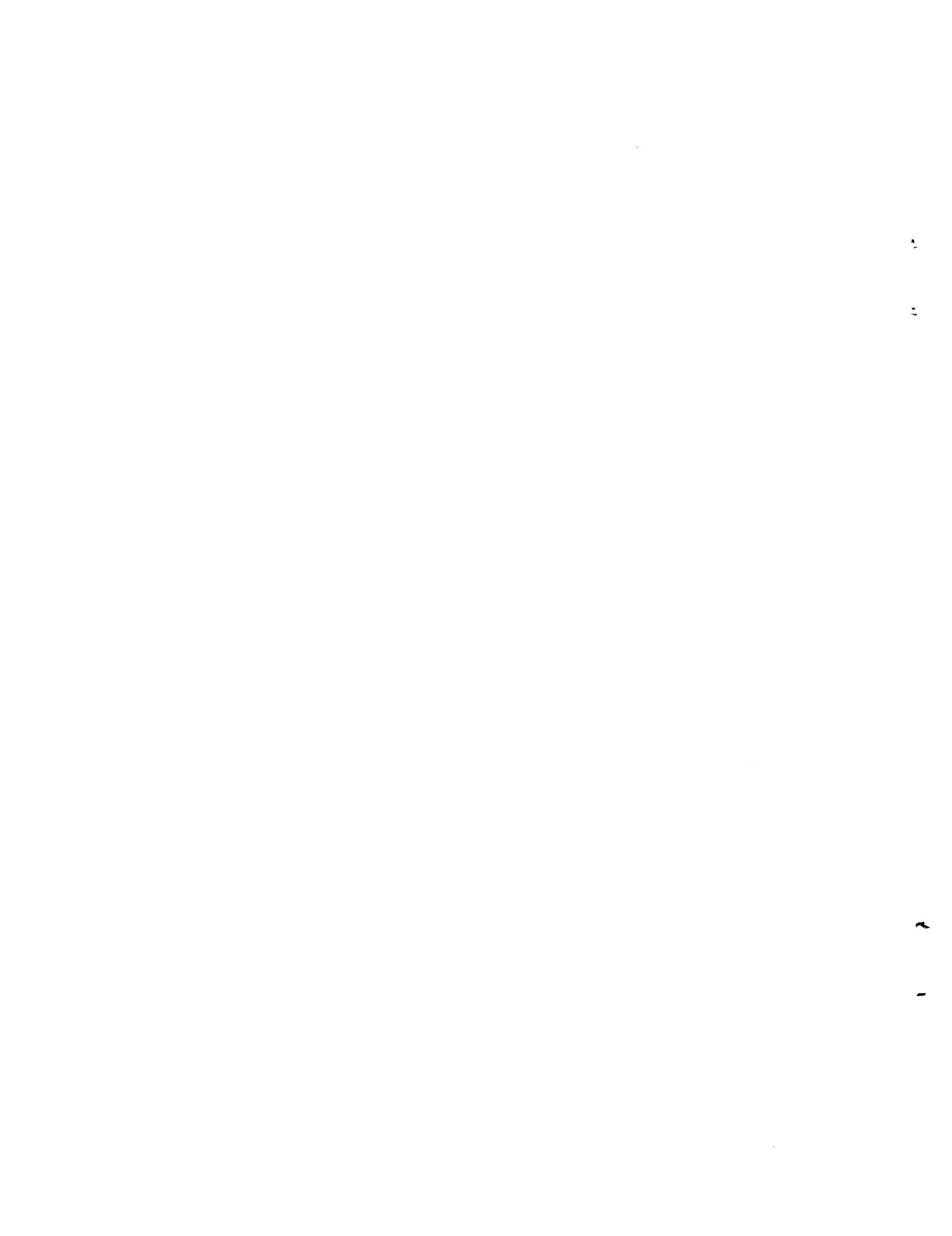
APPENDIX D

TABLE 1

CONCENTRATION OF RADIONUCLIDES IN OYSTERS
FROM WILLAPA BAY, WASHINGTON-1970

Date	^{32}P	^{40}K	^{65}Zn	$^{137}\text{Cs-}^{137\text{m}}\text{Ba}$
Analytical Limit	1.0	1.0	0.2	0.1
1/13	*	1.9	21.	*
2/9	*	1.9	17.	*
3/9	*	1.9	15.	*
4/7	*	2.0	19.	*
5/13	*	2.1	16.	*
6/2	*	1.8	13.	*
7/6	2.1	2.0	10.	*
8/7	*	2.0	11.	*
9/1	*	2.1	9.4	*
10/5	*	1.9	7.7	*
11/12	*	1.7	8.9	*
12/16	*	2.2	8.1	*
Annual Average	0.61	1.9	13.	0.04

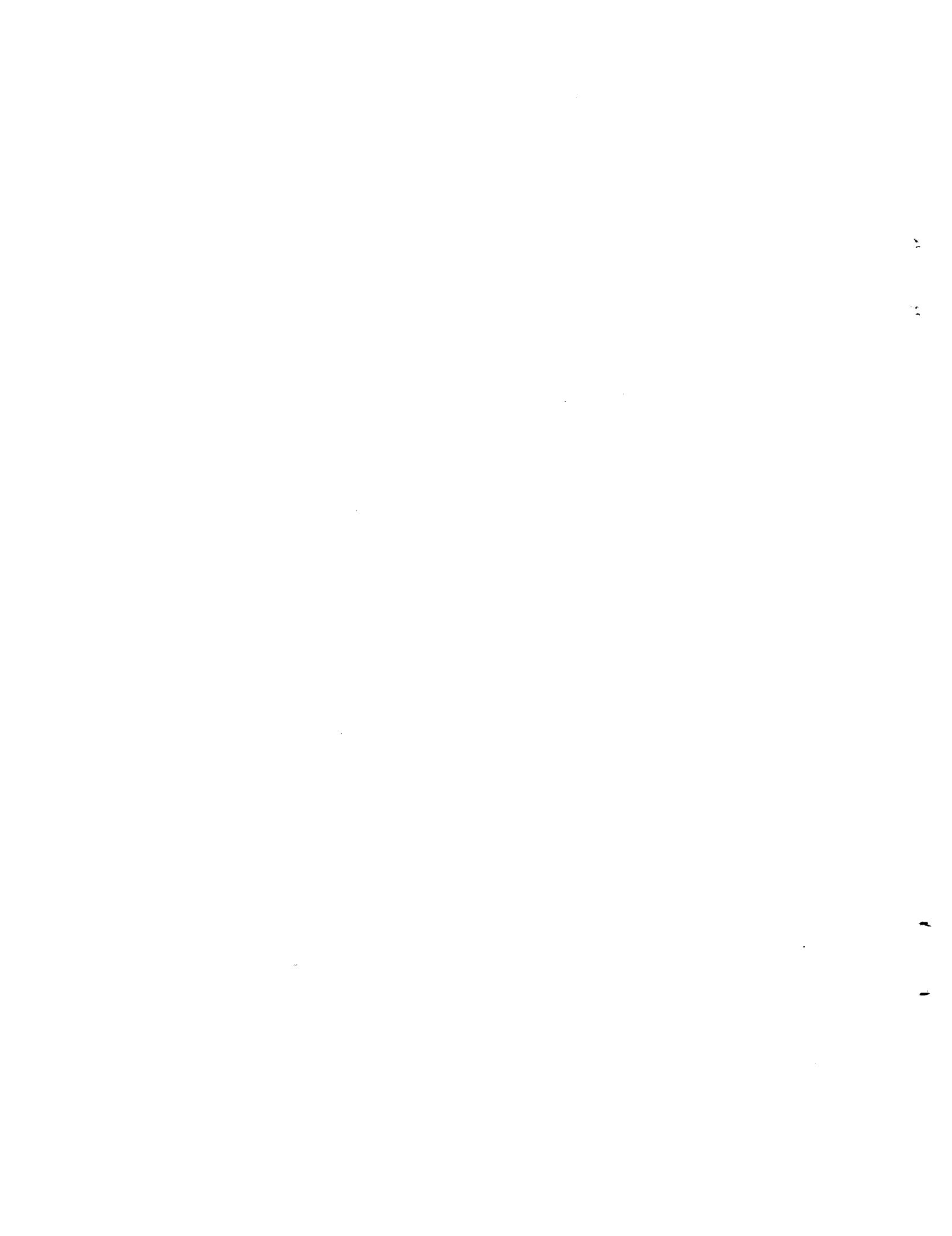
* Results were less than the analytical limit shown.
No entry indicates no analysis was made.



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BNWL-1669 ADD

APPENDIX E



APPENDIX E

TABLE 1 (PART A)

CONCENTRATIONS OF ^{131}I IN THE AIR OF THE HANFORD ENVIRONS-1970
CAUSTIC SCRUBBER SAMPLERSUnits of $10^{-12} \mu\text{Ci/ml}$ of Air

Approx. on Date	S. E. QUADRANT							
	Berg Ranch	Wahluke Slope #2	New Moon	Ringold	Byers Landing	Pasco	700 Area	Benton City
12/31	*		*	*	*	0.02	*	*
1/7	*		*	0.02	*	*	*	*
1/14	*		*	*	*	*	*	*
1/21	*		*	*	*	*	*	*
1/28	*		*	*	*	*	*	*
2/4	*		*	*	0.03	*	*	*
2/11	0.03		*	0.04	*	*	*	*
2/18	*		*	*	0.03	*	*	*
2/25	*		*	0.03	*	*	*	*
3/4	*		*	*	*	0.02	*	*
3/11	0.03		*	*	*	*	0.03	*
3/18	*		*	*	*	*	*	0.03
3/25	*		*	*	*	*	*	*
4/1	*		*	*	*	*	*	*
4/8	**		**	**	*	*	*	*
4/15	*		*	0.04	*	*	*	*
4/22	0.04		*	*	*	*	*	*
4/29	**		*	*	0.02	*	*	*
5/6	*	*	*	*	*	*	*	*
5/13		*	*	0.03	*	*	*	0.04
5/20	*	*	*	*	*	*	*	*
5/27	*	*	*	*	*	*	*	*
6/3	*	*	*	*	*	*	*	*
6/10	*	*	0.05	**	*	*	*	*
6/17	*	*	*	*	**	0.03	0.02	*
6/24	*	*	0.03	*	0.03	*	*	*
Jan.-June								
Avg.	0.01		0.01	0.02	0.008	0.009	0.007	0.009

* Results were less than the analytical limit of 0.02

** Analysis was invalid.

No entry indicates no analysis was made.

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

APPENDIX E
TABLE 1 (PART B)

CONCENTRATIONS OF ^{131}I IN THE AIR OF THE HANFORD ENVIRONS-1970
CHARCOAL CARTRIDGE SAMPLERS

Units of $10^{-12} \mu\text{Ci}/\text{ml}$ of Air

Approx. on Date	S. E. QUADRANT								
	Berg Ranch	Wahluke Wm.	New Moon	Ringold	Byers Land.	Pasco	Kenne- wick	700 Area	Benton City
7/1	*		0.12	0.12	*	0.11		0.07	*
7/8	*	*	0.12	*	*	0.11		0.07	*
7/15	*	*	*	*	*	*		*	*
7/22	0.18	0.10	*	*	*	*	*	*	*
7/29	0.18	0.10	*	*	0.21	0.18	*	*	*
8/5	*	0.15	*	*	0.21	0.18	*	*	*
8/12	*	0.15	*	*	*	*	*	*	*
8/19	*	0.07	*	0.09	*	*	*	*	*
8/26	*	0.07	0.08	0.09	*	*	*	*	0.10
9/2	0.19	*	0.08	*	*	*	*	*	0.10
9/9	0.19	*	*	*	*	*	*	*	*
9/16	0.11	0.14	*	0.26	*	*	0.07	*	*
9/23	0.11	0.14	*	0.26	0.10	0.10	0.07	0.18	0.07
9/30	*	*	*	*	0.10	0.10	*	0.18	0.07
10/7	*	*	*	*	0.07	0.10	*	0.08	0.11
10/14	0.18	0.08	*	*	0.07	0.10	*	0.08	0.11
10/21	0.18	0.08	**	*	0.11	0.16	*	0.11	*
10/28	0.20	0.20	**	0.15	0.11	0.16	*	0.11	*
11/4	0.20	0.20	*	0.15	*	*	*	*	*
11/11	*	*	*	*	*	*	*	*	*
11/18	*	*	*	*	0.11	0.13	*	0.10	*
11/25	0.08	0.16	*	0.23	0.11	0.13	*	0.10	*
12/2	0.08	0.16	0.08	0.23	0.18	0.16	*	*	*
12/9	0.39	0.28	0.08	*	0.18	0.16	0.08	*	*
12/16	0.39	0.28	0.25	*	0.10	0.08	0.08	*	0.12
12/23	0.15	0.07	0.25	0.17	0.10	0.08	0.12	*	0.12
July-Dec.									
Avg.	0.12		0.05	0.10	0.06	0.08	0.03	0.07	0.04

* Results were less than the analytical limit of 0.07

** Analysis was invalid.

No entry indicates no analysis was made.

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

APPENDIX E

TABLE 1 (PART B Continued)

CONCENTRATIONS OF ^{131}I IN THE AIR OF THE HANFORD ENVIRONS-1970
CHARCOAL CARTRIDGE SAMPLERS

Approx. on Date	Units of $10^{-12} \mu\text{Ci}/\text{ml}$ of Air	
	Perimeter Communities†	Communities‡
7/10	*	*
7/17	*	*
7/24	*	*
7/31	*	*
8/7	*	*
8/14	*	*
8/21	*	*
8/28	*	*
9/4	*	*
9/11	*	*
9/18	0.22	0.09
9/25	0.22	0.09
10/2	0.15	0.27
10/9	0.15	0.27
10/16	0.20	0.25
10/23	0.20	0.25
10/30	*	0.08
11/6	*	0.08
11/16	0.08	*
11/25	*	*
12/2	*	*
12/11	*	0.12
12/18	*	0.12
12/23	0.12	0.12
12/30	0.12	0.12
July-Dec Avg.	0.07	0.07

* Results were less than the analytical limit of 0.07

† Samples for ^{131}I analyses were not taken during the first half of 1970 at the Perimeter Communities.

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

No entry indicates no analysis was made.

APPENDIX E

TABLE 2

CONCENTRATION OF RADIOACTIVE BETA PARTICULATES
IN THE AIR OF THE HANFORD ENVIRONS-1970

Approx. on Date ⁺	Units of $10^{-12} \mu\text{Ci}/\text{ml}$ of Air									
	Berg Ranch	Wahluke Slope #1	Wahluke Slope #2	New Moon	Eltopia	Ringold	Byers Land.	Pasco	700 Area	Benton City
12/31	0.07			0.10	0.03	0.11	0.08	0.14	0.12	0.07
1/7	0.11	0.29		0.08	0.10	0.10	0.13	0.13	0.13	0.13
1/14	0.08	0.41		0.14	0.14	0.10	0.10	0.08	0.12	0.09
1/21	0.05	0.07		0.11	0.11	0.06	0.04		0.14	0.04
1/28	0.08	0.14		0.07	0.11	0.07	0.02	0.07	0.06	0.06
2/4	0.10	0.29		0.11	0.12	0.08	0.13	0.10	0.13	0.04
2/11	0.11	0.10		0.09	0.17	0.11	0.10	0.11	0.12	0.11
2/18	0.12	0.27		0.17	0.24	0.13	0.06	0.32	0.13	0.08
2/25	0.29	0.08		0.16	0.21	0.14	0.14	0.13	0.20	0.32
3/4	0.18			0.16	0.21	0.15	0.13	0.28	0.18	0.13
3/11	0.13			0.12	0.22	0.14	0.15	0.19	0.13	0.08
3/18	0.32			0.06	0.46	0.28	0.27	0.29	0.19	0.33
3/25	0.16			0.30	0.20	0.18	**	0.29	0.28	0.12
4/1	0.23			0.37	0.26	0.39	0.20	0.26	0.27	0.26
4/8	0.21			0.34	0.15	0.32	0.27	0.26	**	0.20
4/15	0.19			0.69	0.12	0.22	0.32	0.21	0.28	0.14
4/22	0.29			0.30	0.46	0.23	0.21	0.38	0.39	0.26
4/29	0.65			0.55	0.40	0.39	0.23	0.97	0.46	0.64
5/6	0.35	0.31	**	0.33	**	0.22	0.64	0.54	0.31	
5/13		0.75	0.73	0.41	0.20	0.53	0.76	0.69	0.74	
5/20	0.52	0.40	0.49	0.57	0.17	0.52	0.76	0.65	0.66	
5/27	0.58	0.57	0.51	0.33	0.26	0.38	0.29	0.36	0.46	
6/3	0.79	0.86	0.74	0.76	0.62	0.95	1.0	1.0	0.92	
6/16	0.43	0.37	0.51	0.68	0.60	0.45	0.38	0.53	0.38	
6/17	1.0	1.1	0.88	1.0	**	0.67	0.90	0.85	0.88	
6/24	0.56		0.60	0.27	0.50	0.45	0.65	0.99	0.80	0.54

⁺ 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 analytical limit of 0.02

** Indicates the analysis was invalid.

No entry indicates no analysis was made.

APPENDIX E
TABLE 2 (Continued)
CONCENTRATION OF RADIOACTIVE BETA PARTICULATES
IN THE AIR OF THE HANFORD ENVIRONS-1970

Approx. on Date†	Units of 10^{-12} $\mu\text{Ci}/\text{ml}$ of Air										
	Berg Ranch	Wahluke Wm.	Wahluke Slope #2	New Moon	Eltopia	Ringold	Byers Land.	700 Area	Pasco	Kenne- wick	Benton City
7/1	0.82		**	0.67	0.99	1.3	1.4	1.0	1.3		0.75
7/8	0.10	0.26	1.1	0.67	0.57	1.0	1.4	1.0	1.3		0.75
7/15	0.10	0.26	1.1	0.21	0.57	1.0	0.92	0.75	0.73		
7/22	0.47	0.50	0.49	0.21	**	0.63	0.92	0.75	0.73	0.42	0.69
7/29	0.47	0.50	0.49	0.28	**	0.63	0.46	0.58	0.44	0.42	0.63
8/5	0.40	0.84	0.44	0.28	0.51	0.55	0.46	0.58	0.44	0.50	0.63
8/12	0.40	0.84	0.44	0.31	0.51	0.55	1.2	1.3	1.3	0.50	0.71
8/19	0.57	0.49	0.53	0.31	0.52	0.56	1.2	1.3	1.3	0.47	0.71
8/26	0.57	0.49	0.53	0.17	0.52	0.56	0.33	0.40	0.06	0.47	0.24
9/2	0.18	0.20	0.34	0.17	0.26	0.17	0.33	0.40	0.06	0.24	0.24
9/9	0.18	0.20	0.34	0.11	0.26	0.17	0.21	0.18	0.15	0.24	0.12
9/16	0.19	0.41	0.39	0.11	0.39	0.26	0.21	0.18	0.15	0.21	0.12
9/23	0.19	0.41	0.39	0.03	0.39	0.26	0.26	0.27	*	0.21	0.28
9/30	0.17	**	0.21	0.03	0.22	0.20	0.26	0.27	*	0.23	0.28
10/7	0.17	**	0.21	0.10	0.22	0.20	0.19	0.18	0.13	0.23	0.18
10/14	0.13	0.21	0.34	0.10	0.27	0.15	0.19	0.18	0.13	0.17	0.18
10/21	0.13	0.21	0.34	**	0.27	0.15	0.14	0.13	0.10	0.17	0.23
10/28	0.20	0.24	0.13	**	0.39	0.26	0.14	0.13	0.10	0.21	0.23
11/4	0.20	0.24	0.13	0.05	0.39	0.26	0.16	0.14	**	0.21	0.10
11/11	0.09	0.10	0.03	0.05	0.09	0.10	0.16	0.14	**	0.11	0.10
11/18	0.09	0.10	0.03	0.09	0.09	0.10	0.10	0.11	0.08	0.11	0.10
11/25	0.08	0.10	0.05	0.09	0.03	0.08	0.10	0.11	0.08	0.09	0.10
12/2	0.08	0.10	0.05	0.07	0.03	0.08	0.09	0.08	0.06	0.09	0.08
12/9	0.14	0.31	0.05	0.07	0.32	0.30	0.09	0.08	0.06	*	0.08
12/16	0.14	0.31	0.05	0.26	0.32	0.30	0.16	0.19	0.20	*	0.23
12/23	0.09	0.12	0.12	0.26	0.18	0.10	0.16	0.19	0.20	0.24	0.23
July-Dec.											
Avg.		0.31								0.23	
Annual											
Avg.	0.27		0.41++	0.26	0.34	0.31	0.35	0.37	0.37		0.32

* Results were less than the analytical limit of 0.02

** Analysis was invalid

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

++ Average of May - December samples.

Approximately July 1 all filters were changed from HV-70 to Acropor.

No entry indicates no analysis was made.

APPENDIX E

TABLE 2 (Continued)
 CONCENTRATION OF RADIOACTIVE BETA PARTICULATES
 IN THE AIR OF THE HANFORD ENVIRONS-1970

Units of $10^{-12} \mu\text{Ci/ml}$ of Air

PERIMETER COMMUNITIES						
Approx. on Date†	Walla Walla	McNary Dam	Washtucna	Moses Lake	Ellensburg	Sunnyside
1/2	0.09	0.11	0.10	0.09	0.04	0.09
1/9	0.09	0.10	0.13	0.10	0.12	0.15
1/16	0.11	0.07	0.14		0.08	0.07
1/23	0.06	0.09	0.07	0.02		0.06
1/30	0.05	0.08	0.07			0.07
2/6	0.07	0.10	0.10			*
2/13	0.13	0.12	0.13			0.10
2/20	0.17	0.16	0.13			0.22
2/27	0.15	0.29	0.17	0.15		0.29
3/6	0.18	0.16	0.22	0.14		0.18
3/13	0.16	0.14	0.29	0.23	0.23	0.56
3/20	0.24	0.24	0.30	0.21	0.22	0.19
3/27	0.24	0.18	0.25	0.48	0.05	0.36
4/3	0.37	0.24	0.32	0.34		0.23
4/10	0.27	0.30	0.23	0.37		0.36
4/17	0.33	0.13	0.35	0.36	**	0.28
4/24	0.27	0.30	0.67	0.44	0.23	0.62
5/1	0.87	0.52	0.65	0.64	0.28	0.53
5/8	0.45	0.39	0.66	0.34	0.38	0.87
5/15	0.80	0.68	0.69	0.71	0.55	0.83
5/22	0.56	0.64	0.36	0.58	0.27	0.34
5/29	0.61	0.52	0.97	0.62	0.90	1.0
6/5	0.79	0.58	0.46	0.65	0.60	0.38
6/12	0.79	0.56	0.94	0.65	0.60	0.79
6/19	0.95	0.89	0.87		0.60	0.66
6/26	**	0.54			0.37	**

† 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

** Analysis was invalid.

Approximately July 1, all filters were changed from HV-70 to Acropor.

No entry indicates no analysis was made.

APPENDIX E
TABLE 2 (Continued)
CONCENTRATION OF RADIOACTIVE BETA PARTICULATES
IN THE AIR OF THE HANFORD ENVIRONS-1970

Units of $10^{-12} \mu\text{Ci}/\text{ml}$ of Air

Approx. on Date†	PERIMETER COMMUNITIES							
	Walla Walla	McNary Dam	Washtucna	Moses Lake	Ellensburg	Sunnyside	Othello	Connell
7/2	0.74	0.91	0.79	0.63	0.82	0.66		
7/10	0.74	0.91	0.67	0.68	1.2		0.54	0.57
7/17	0.40	0.62	1.2	0.81	0.32		0.54	0.57
7/24	0.40	0.62	0.49	0.53		**	0.49	0.17
7/31	0.61	0.48	0.41	0.53		**	0.49	0.17
8/7	0.61	0.48	0.41	0.19		**	0.38	0.17
8/14	0.50	1.0	0.40	0.19			0.38	0.17
8/21	0.50	1.0	0.40			0.57	0.39	0.32
8/28	0.17	0.23			0.32	0.40	0.39	0.32
9/4	0.17	0.23			0.32	0.29	0.14	0.16
9/11	0.14	0.14			0.15	0.14	0.14	0.16
9/18	0.14	0.14			0.15	0.13		
9/25	0.21	0.25			0.15	0.13		
10/2	0.21	0.25		0.12	0.06	0.16	0.35	0.14
10/9	0.19	0.16		0.12	0.06	0.16	0.35	0.14
10/16	0.18	0.16		0.12	0.06	0.10	0.13	0.18
10/23	0.11	0.15		0.12	0.06	0.10	0.13	0.18
10/30	0.11	0.15	0.36	0.12	0.11	0.16	0.21	0.22
11/6	0.05	0.08	0.12	0.12	0.11	0.16	0.21	0.22
11/13	0.05	0.08	0.12	0.04	0.11	0.07	0.02	0.10
11/20	0.05	0.07	0.29	0.04	0.04	0.07	0.02	0.10
11/27	0.05	0.07	0.29	0.04	0.04	0.05	0.06	0.06
12/4	0.05	0.08	0.02	0.04	0.04	0.05	0.06	0.06
12/11	0.05	0.08	0.02	0.04	0.04	0.12	0.04	0.45
12/18	1.5	0.36	0.38	0.04	0.04	0.12	0.04	0.45
12/23	0.03	0.36	0.38	0.04	0.04		0.09	0.08
July-Dec.							0.26	0.24
Avg.								
Annual								
Avg.	0.33	0.33	0.38	0.31	0.21	0.33		

† 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

** Analysis was invalid.

Approximately July 1, all filters were changed from HV-70 to Acropor.

No entry indicates no analysis was made.

APPENDIX E
TABLE 3
CONCENTRATIONS OF GAMMA-EMITTING RADIONUCLIDES
ON SELECTED AIR FILTERS-1970

<u>Date</u>	<u>⁹⁵ZrNb</u>	<u>¹⁰⁶Ru</u>	<u>¹³⁷Cs-^{137m}Ba</u>	<u>¹⁴⁰BaLa</u>	<u>¹⁴⁴CePr</u>
<u>RINGOLD</u>					
12/31-1/29	0.01	0.03	0.01	--	--
1/29-2/26	0.02	*0.05	--	--	--
2/26-3/26	0.06	0.13	*0.01	--	--
3/26-4/30	0.06	0.13	0.01	--	*0.06
4/30-5/28	0.01	0.10	*0.01	--	--
5/28-6/25	0.10	0.17	0.01	--	0.16
6/25-7/22	0.20	0.29	0.03	*0.14	0.36
7/22-8/19	0.04	0.29	0.03	--	0.31
8/19-9/30	0.07	0.20	0.01	--	0.20
9/30-10/28	0.03	0.21	0.01	--	--
10/28-11/25	0.02	0.09	*0.01	*0.04	*0.03
11/25-12/23	--	0.12	--	--	*0.04
Annual					
Average	0.05	0.15	0.01	0.02	0.10
<u>BYERS LANDING</u>					
12/29-1/26	0.02	*0.03	--	--	--
1/26-2/24	0.02	*0.04	*0.01	--	--
2/24-3/23	0.04	0.12	--	--	--
3/23-4/27	0.04	0.07	0.01	*0.04	--
4/27-5/25	0.19	0.23	*0.01	--	0.24
5/25-6/22	0.19	0.24	0.02	*0.07	0.30
6/22-7/27	0.27	0.31	0.05	0.22	0.62
7/27-8/24	0.13	0.27	0.02	--	0.32
8/24-9/21	0.07	0.16	*0.01	--	0.17
9/21-10/19	0.04	0.18	0.01	--	0.12
10/19-11/30	0.01	0.04	0.01	0.10	0.08
11/30-12/28	0.01	0.06	*0.01	*0.10	*0.03
Annual					
Average	0.08	0.15	0.01	0.04	0.16

* Nuclide was suspected to be present, but counting results were less than the analytical limit.

-- Radionuclide was not detected.

APPENDIX E

TABLE 3 (Continued)

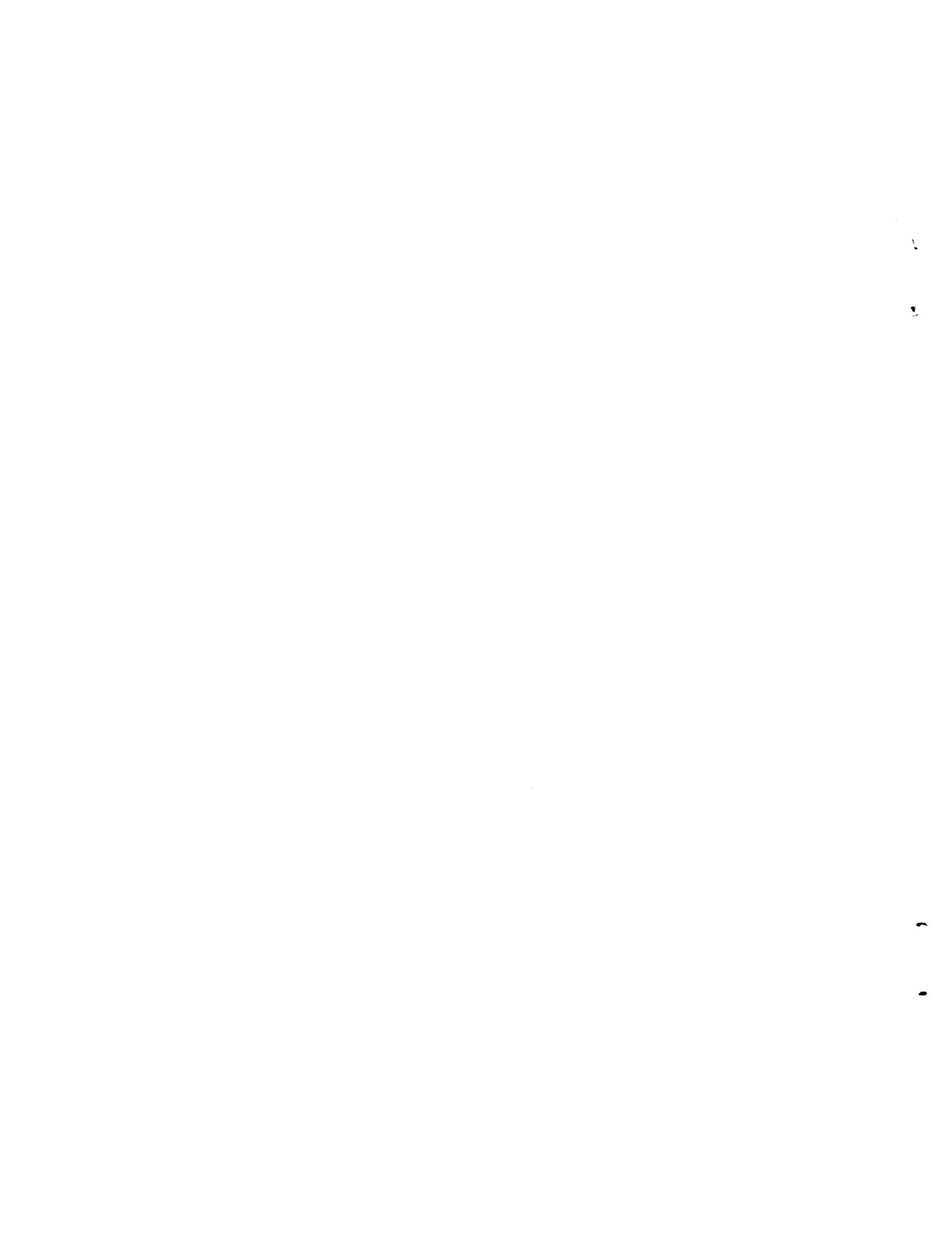
CONCENTRATIONS OF GAMMA-EMITTING RADIONUCLIDES
ON SELECTED AIR FILTERS-1970

Date	<u>95</u> Zr-Nb	<u>106</u> Ru	<u>131</u> I	<u>137</u> Cs- <u>137m</u> Ba	<u>140</u> BaLa	<u>144</u> CePr
<u>RICHLAND</u>						
6/29-7/27	0.19	0.20	--	0.03	0.24	0.48
7/27-8/24	0.14	0.19	--	0.02	0.12	0.29
8/24-9/21	0.06	0.17	--	*0.01	--	0.18
9/21-10/19	0.04	0.18	*0.08	0.01	--	--
10/19-11/30	0.01	0.06	--	*0.01	0.08	0.09
11/30-12/28	--	0.12	--	*0.01	--	*0.01
July-Dec.						
Average	0.07	0.15	0.01	0.01	0.07	0.17
<u>PERIMETER COMMUNITIES COMPOSITE</u>						
7/1-7/31	0.21	0.27		0.01	*0.01	0.34
7/31-8/26	0.10	0.13		0.01	0.08	0.22
8/26-9/30	0.05	0.09		0.01	0.07	0.13
9/30-10/28	0.02	0.02		0.01	--	0.04
10/28-11/30	0.01	0.10		--	--	0.05
11/30-12/31	0.01	0.10		--	--	0.01
July-Dec.						
Average	0.07	0.12		0.01	0.02	0.13
<u>SOUTHEAST QUADRANT COMPOSITE</u>						
7/1-7/31	0.15	0.18		0.01	0.04	0.26
7/31-8/26	0.12	0.20		0.01	0.04	0.29
8/26-9/30	0.06	0.11		0.01	0.05	0.12
9/30-10/28	0.03	0.04		0.01	--	0.04
10/28-11/30	0.01	0.11		*0.01	--	0.05
11/30-12/31	0.01	0.13		--	--	*0.01
July-Dec.						
Average	0.06	0.13		0.01	0.02	0.13

* Nuclide was suspected to be present, but counting results were less than the analytical limit.

-- Radionuclide was not detected.

No entry indicates no analysis was made.



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BNWL-1669 ADD

APPENDIX F

APPENDIX F

TABLE 1
CONCENTRATIONS OF RADIONUCLIDES IN MILK-1970
 Units of 10^{-9} $\mu\text{Ci}/\text{ml}$ of Milk

Date	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{65}Zn</u>	<u>^{89}Sr</u>	<u>^{90}Sr</u>	<u>^{131}I</u>	<u>$^{137}\text{Cs}-^{137m}\text{Ba}$</u>
<u>RIVERVIEW IRRIGATION DISTRICT FARM NO. 1</u>							
<u>Analytical Limit</u>							
1/5	*	1200	100			*	22.
1/12	*	1200	*	*	2.9	*	*
1/19	36.	900	*			*	*
1/26	23.	990	*			*	*
2/2	*	2100	100			*	*
2/9	53.	1000	*			*	*
2/16	*	1000	*			*	*
2/24	*	1200	*			*	*
3/2	*	980	*			*	
3/9	*	1200	*			*	*
3/16	20.	950	*			*	*
3/23	*	1100	*			*	*
3/30	*	960	*			*	*
4/6	*	1100	*			*	
4/13	*	860	*	*	3.0	*	*
4/20	*	1200	*			*	
4/27	*	1100	*			*	*
5/4	*	1100	*			*	*
5/11	90.	1200	*			*	*
5/18	220	1000	*			*	*
5/25	780	910	150			*	*
6/1	450	980	100			*	*
6/8	440	1100	130			*	*
6/15	1000	1100	210			*	
6/22	1200	1500	250			*	29.
6/29	940	980	240			*	*
7/6	790	1100	250			3.6	*
7/13	530	1100	220	*	9.0	*	30.
7/20	610	1400	220			*	*
7/27	490	1200	300			*	*
8/3	890	1200	240			*	*
8/10	260	1200	230			2.3	*
8/17	280	920	170			*	*
8/24	420	1100	210			*	*
8/31	310	1000	210			*	*

* Results were less than analytical limit shown.
 No entry indicates no analysis was made.

APPENDIX F

TABLE 1 (Continued)
CONCENTRATIONS OF RADIONUCLIDES IN MILK-1970

Date	^{32}P	^{40}K	^{65}Zn	^{89}Sr	^{90}Sr	^{131}I	^{137}Cs	^{137m}Ba
<u>RIVERVIEW IRRIGATION DISTRICT FARM NO. 1 (Continued)</u>								
Analytical								
Limit	20	400	100	2	2	2		20
9/8	190	1100	200			*		*
9/14	220	960	140			*		*
9/23	220	1300	230			*		*
9/28	160	1400	200			*		*
10/5	90.	1200	160			*		*
10/12	84.	1100	160			*		*
10/19	80.	1100	*			*		*
10/26	*	970	*			*		*
11/2	23.	920	100			*		*
11/9	*	1200	*			*		*
11/16	26.	1200	*			*		*
11/23	67.	920	*			*		*
11/30	35.	890	*			*		*
12/7	21.	1400	*			*		36.
12/14	48.	1800	100			*		49.
12/21	76.	1200	110			*		27.
12/28	*	1400	*			*		*
Annual								
Avg.	210	1100	120	1.8	5.0	0.84		7.8
<u>RIVERVIEW IRRIGATION DISTRICT FARM NO. 3</u>								
8/13	460	1400	330				*	
8/20	340	1500	360				*	
9/10	140	1500	330				*	
9/17	230	1400	300				*	
9/24	250	1400	400				*	
Aug.-Sept.								
Avg.	300	1500	340				10	

* Results were less than analytical limit shown.
No entry indicates no analysis was made.

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK--1970

Units of 10^{-9} $\mu\text{Ci}/\text{ml}$ of Milk

Date	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{65}Zn</u>	<u>^{89}Sr</u>	<u>^{90}Sr</u>	<u>^{131}I</u>	<u>$^{137}\text{Cs}-^{137m}\text{Ba}$</u>
<u>PASCO FARM NO. 2</u>							
Analytical Limit	20	400	100	2	2	2	20
1/8					*		
1/15					*		
1/22					*		
1/29					*		
2/5					*		
2/12					*		
2/19					*		
2/26					*		
3/5					*		
3/12					*		
3/19					*		
3/26					*		
4/2					*		
4/9					*		
4/16					*		
4/23					*		
4/30					*		
5/8					*		
5/14					*		
5/21					*		
5/28					*		
6/4					*		
6/11					*		
6/18					*		
6/25					*		
Jan-June Average					0.54		

* Results were less than analytical limit shown.

No entry indicates that no analysis was made.

APPENDIX F
TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK-1970

Units of 10^{-9} $\mu\text{Ci}/\text{ml}$ of Milk

Date	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{65}Zn</u>	<u>^{89}Sr</u>	<u>^{90}Sr</u>	<u>^{131}I</u>	<u>$^{137}\text{Cs}-^{137m}\text{Ba}$</u>
<u>ELTOPIA FARM NO. 2</u>							
<u>Analytical</u>							
Limit	20	400	100	2	2	2	20
1/8		1700	*		*		44.
1/15		1300	*		*		*
1/22		1100	*		*		*
1/29		1200	*		*		*
2/5		1300	*		*		*
2/12		1200	*		*		*
2/19		1100	*		*		*
2/26		1200	*		*		*
3/5		1100	*		*		*
3/12		1200	*		*		*
3/19		1200	*		*		*
3/26		1100	*		*		*
4/2		1300	*		*		*
4/9		1000	*		*		*
4/16		1200	*		*		*
4/23		1100	*		*		21.
4/30		1200	*		*		*
5/7		1300	*		*		*
5/14		1200	*		*		*
5/21		1300	*		*		*
5/28		1100	*		*		*
6/4		1100	*		*		*
6/11		1200	*		*		*
6/18		1000	*		*		*
6/25		1200	*		*		*
Jan.-June							
Average		1200	20.		0.7		5.4

* Results were less than analytical limit shown.

No entry indicates no analysis was made.

APPENDIX F
TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK-1970

Date	<u>³²P</u>	<u>⁴⁰K</u>	<u>⁶⁵Zn</u>	<u>⁸⁹Sr</u>	<u>⁹⁰Sr</u>	<u>¹³¹I</u>	<u>¹³⁷Cs-¹³⁷MBa</u>
<u>WEST RICHLAND FARM NO. 1</u>							
<u>Analytical</u>							
Limit	20	400	100	2	2	2	20
1/8		1200	*			*	*
1/15		1000	*			*	*
1/22		1100	*			*	*
1/29		1100	*			*	*
2/5		910	*			*	*
2/12		1300	*			*	*
2/19		1100	*			*	*
2/26		1000	*			*	*
3/5		860	*			*	*
3/12		980	*			*	*
3/19		850	*			*	*
3/26		730	*			*	*
4/2		780	*			*	*
4/9		950	*			*	*
4/16		760	*			*	*
4/23		920	*			*	*
4/30		810	*			*	*
5/7		820	*			*	*
5/14		1300	*			*	*
5/21		840	*			*	*
5/28		1200	*			*	*
6/4		740	*			*	*
6/11		800	*			*	*
6/18		830	*			*	*
6/25		860	*			*	*
Jan.-June							
Avg.		950	*18.			0.56	*3.3

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

APPENDIX F
TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK-1970

Units of 10^{-9} $\mu\text{Ci}/\text{ml}$ of Milk

<u>Date</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{65}Zn</u>	<u>^{89}Sr</u>	<u>^{90}Sr</u>	<u>^{131}I</u>	<u>^{137}Cs-^{137m}Ba</u>
<u>BENTON CITY FARM NO. 1</u>							
Analytical							
Limit	20	400	100	2	2		20
1/8					*		
1/15					*		
1/22					*		
1/29					*		
2/5					*		
2/12					*		
3/5					*		
3/12					*		
3/19					*		
3/26					*		
4/2					*		
4/9					*		
4/16					*		
4/23					*		
4/30					*		
5/7					*		
5/14					*		
5/21					*		
5/28					*		
6/4					*		
6/11					*		
6/18					*		
6/25					*		
Jan.-June							
Average						0.82	

* Results were less than analytical limit shown.

No entry indicates no analysis was made.

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK-1970Units of 10^{-9} $\mu\text{Ci}/\text{ml}$ of Milk

<u>Date</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{65}Zn</u>	<u>^{89}Sr</u>	<u>^{90}Sr</u>	<u>^{131}I</u>	<u>^{137}Cs-^{137}mBa</u>
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BENTON CITY FARM NO. 2

Analytical

Limit	20	400	100	2	2	2	20
8/13		1100	*		*		27.
8/20		1100	*		*		*
9/3		1200	*		3.5	*	23.
9/17		1300	*			*	*
10/1		1200	*			*	25.
10/15		1200	*			*	*
10/29		1000	*			*	*
11/12		980	*			*	*
11/23		910	*			*	*
12/10		1500	*		4.6	*	27.
12/22		1400	*			3.2	21.
Aug.-Dec.							
Average		1200	50		4.1	1.2	18

WEST RICHLAND - BENTON CITY COMPOSITE

7/2		980	*		*		*
7/16		870	*		*		20.
7/30		1100	*		*		*
8/13		970	*		*		*
8/27		870	*		*		*
9/10		900	*		*		*
9/24		1100	*		*		*
10/8		910	*		*		*
10/22		990	*		2.1		*
11/5		790	*		*		*
11/19		720	*		2.8		*
12/3		1000	*		*		*
12/17		1100	*		*		25.
12/31		1000	*		10.		23.
July-Dec.							
Average		940	38		1.9		8.4

* Results were less than the analytical limit shown.

No entry indicates no analysis was made.

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK-1970

Units of 10^{-9} $\mu\text{Ci}/\text{ml}$ of Milk

<u>Date</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{65}Zn</u>	<u>^{89}Sr</u>	<u>^{90}Sr</u>	<u>^{131}I</u>	<u>$^{137}\text{Cs}-^{137m}\text{Ba}$</u>
<u>MESA FARM</u>							
Analytical Limit	20	400	100	2	2	2	20
1/8					*		
1/15					*		
1/22					*		
1/29					*		
2/5					*		
2/12					*		
2/19					*		
2/26					*		
3/6					*		
3/12					*		
3/26					*		
4/3					*		
4/9					*		
4/17					*		
4/23					*		
5/1					*		
5/7					*		
5/15					*		
5/21					*		
5/28					*		
6/4					*		
6/11					*		
6/18					*		
6/25					*		
Jan.-June							
Average						0.66	

* Results were less than analytical limit shown.

No entry indicates analysis was not made.

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK-1970Units of 10^{-9} $\mu\text{Ci}/\text{ml}$ of Milk

<u>Date</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{65}Zn</u>	<u>^{89}Sr</u>	<u>^{90}Sr</u>	<u>^{131}I</u>	<u>^{137}Cs-^{137}mBa</u>
<u>COLUMBIA BASIN COMPOSITE NO. 2</u>							
<u>Analytical</u>							
Limit	20	400	100	2	2	2	20
1/15	54.	1100	*			*	*
1/29	27.	780	*			*	*
2/12	74.	1200	*		4.6	*	*
2/26	*	1300	*			*	*
3/12	*	1100	*			4.8	*
3/26	24	1100	*			*	*
4/9	*	1000	*			*	*
4/23	28	1300	*			*	*
5/7	*	1300	*		*	*	*
5/21	67.	1200	*			*	*
6/4	*	1100	*			2.5	*
6/18	*	1000	*			*	*
7/2	*	1200	*			*	*
7/16	*	1000	*			*	25.
7/30	46.	1100	*			*	*
8/13	*	1100	*		*	*	*
8/27	*	1200	*			*	*
9/10	*	1200	*			*	*
9/24	*	910	*			2.5	*
10/8	*	1200	*			*	*
10/22	25.	1200	*			*	31.
11/5	67.	1200	*		*	*	*
11/19	*	1000	*			*	*
12/3	*	1300	*			*	*
12/17	*	1400	*			*	31.
12/31	44.	1200	*			*	*
Annual Average	23	1100	32		2.2	1.1	7.2

* Results were less than analytical limit shown.

No entry indicates no analysis was made.

APPENDIX F
TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK-1970
Units of 10^{-9} $\mu\text{Ci}/\text{ml}$ of Milk

Date	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{65}Zn</u>	<u>^{89}Sr</u>	<u>^{90}Sr</u>	<u>^{131}I</u>	<u>$^{137}\text{Cs}-^{137m}\text{Ba}$</u>
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COLUMBIA BASIN COMPOSITE NO. 3

Analytical

Limit	20	400	100	2	2	2	20
7/9		1200	*		*		*
7/23		1400	*		*		*
8/6		1100	*		*		*
8/20		1300	*		*		*
9/3		1300	*		*		*
9/17		1200	*		*		*
10/1		1300	*		*		36.
10/16		1200	*		*		*
10/29		1100	*		*		*
11/12		1000	*		*		*
11/23		1200	*		*		24.
12/10		1500	*		*		22.
12/21		1200	*		4.4		24.
July-Dec.							
Average		1200	51		1.2		14

BRAND F

1/8		*
2/5		*
3/5		2.6
4/9		*
5/7		*
6/4		2.6
Jan.-June		
Average		2.6 *0.09

* Results were less than the analytical limit shown.

No entry indicates no analysis was made.

APPENDIX F

TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK-1970Units of 10^{-9} $\mu\text{Ci}/\text{ml}$ of Milk

<u>Date</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{65}Zn</u>	<u>^{89}Sr</u>	<u>^{90}Sr</u>	<u>^{131}I</u>	<u>$^{137}\text{Cs}-^{137}\text{mBa}$</u>
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BRAND H

Analytical

Limit	20	400	100	2	2	2	20
1/8		1400	*		3.4	*	30
2/5		1400	*			*	*
3/5		1200	*			*	*
4/9		1100	*		3.8	*	*
5/7		1000	*			*	25.
6/4		1200	*			*	*
7/9		980	*			*	22.
8/6		1400	*		7.8	*	30.
9/3		1000	*			*	34.
10/2		1300	*			*	25.
10/29		1500	*		9.5	*	25.
12/10		1400	*			*	*
Annual Average		1200	41		6.1	*0.4	5.7

BRAND L

1/15						*	
1/29						*	
2/12						*	
2/26						*	
3/12						*	
3/26					*	*	
4/9						*	
4/23						*	
4/14						*	
5/27						*	
6/11						*	
6/25					2.2	*	
Jan.-June Average					1.9	0.68	

* Results were less than analytical limit shown.

No entry indicates no analysis was made.

APPENDIX F
TABLE 1 (Continued)

CONCENTRATIONS OF RADIONUCLIDES IN MILK-1970

Units of 10^{-9} $\mu\text{Ci}/\text{ml}$ of Milk

Date	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{65}Zn</u>	<u>^{89}Sr</u>	<u>^{90}Sr</u>	<u>^{131}I</u>	<u>$^{137}\text{Cs}-^{137m}\text{Ba}$</u>
<u>BRAND Z</u>							
<u>Analytical</u>							
Limit	20	400	100	2	2	2	20
1/15		690	*			*	*
1/29		1100	*			*	*
2/12		900	*			*	*
2/26		1000	*			*	*
3/12		990	*			*	*
3/26		950	*		*	*	*
4/9		990	*			*	*
4/23		950	*			*	*
5/14		1100	*			*	*
6/11		760	*			*	*
6/25		1100	*		2.5	*	26.
7/16		1300	*			*	32.
Jan.-June							
Average	1000	29			2.1	*0.46	9.7
<u>COMMERCIAL COMPOSITE</u>							
7/9						*	
7/23						*	
8/6						*	
8/20						*	
9/3					3.5	*	
9/17						*	
10/2						*	
10/15						*	
10/29						*	
11/12						*	
11/23					2.3	*	
12/10						*	
12/22						21.	
12/31						3.2	
July-Dec.							
Average					2.9	2.1	

* Results were less than analytical limit shown.

No entry indicates no analysis was made.

APPENDIX F

TABLE 2

CONCENTRATIONS OF RADIONUCLIDES IN HAY AND PASTURE GRASS-1970

<u>Date</u>	<u>Units of 10^{-6} $\mu\text{Ci/gm}$</u>							
	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{65}Zn</u>	<u>$^{95}\text{ZrNb}$</u>	<u>^{106}Ru</u>	<u>^{131}I</u>	<u>$^{137}\text{Cs}-$ ^{137m}Ba</u>	<u>$^{144}\text{CePr}$</u>
<u>RIVERVIEW FARM NO. 1</u>								
Analytical Limit	1	0.4	0.5	0.03	0.6	0.05	0.02	1.0
7/20	*	23	*	1.3	1.9		0.24	1.8
<u>RIVERVIEW FARM NO. 3</u>								
8/13	1.4	4.9	0.95	0.15	*		*	*
<u>COLUMBIA BASIN</u>								
12/17		20.	*	0.17	0.61	*	0.08	
<u>BENTON CITY FARM NO. 1</u>								
12/17		23.	0.17	0.23	*	*	0.15	

* Results were less than the analytical limit shown.

No entry indicates no analysis was made.

APPENDIX F

TABLE 3

CONCENTRATIONS OF RADIONUCLIDES IN LOCALLY PURCHASED MEAT-1970Units of 10^{-6} $\mu\text{Ci/gm}$ of Meat (wet weight)

Date	Meat	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{51}Cr</u>	<u>^{65}Zn</u>	<u>^{90}Sr</u>	<u>$^{95}\text{Zr-Nb}$</u>	<u>$^{137}\text{Cs-137mBa}$</u>
<u>COMMERCIAL</u>								
<u>Analytical</u>								
Limit		1.0	6.4	0.4	0.05	0.002	0.03	0.02
1/13	Pork Roast	*	2.0		*	0.003		*
1/13	Beef	*	2.7		*	*		*
2/17	Beef	*	2.7		*	*		*
2/19	Pork Comp.	NA	1.8		*	NA		*
2/19	Ground Beef Comp.	NA	1.7		*	NA		*
4/14	Beef	*	3.0		*	*		*
4/14	Pork Roast	*	1.7		*	*		*
4/16	Pork Comp.	NA	1.2		*	NA		*
4/16	Beef Comp.	NA	1.9		*	NA		*
5/20	Beef	2.0	1.6		*	0.004		0.03
6/18	Calves Liver	NA	2.2		0.07	NA		0.03
6/18	Ground Beef	NA	2.3		0.08	NA		0.06
6/18	Pork	NA	2.4		*	NA		*
6/18	Beef	*	2.5		*	*		0.06
7/16	Beef	*	2.1		0.10	0.008		0.05
7/16	Pork Roast	*	2.7		0.12	0.013		0.07
8/19	Beef	*	2.4		*	*		0.02
8/20	Beef Comp.	NA	2.0		*	NA		0.03
8/20	Pork Comp.	NA	2.4		0.06	NA		0.04
9/17	Calves Liver	NA	2.3		*	NA		0.03
10/22	Beef Comp.	NA	1.8		*	NA		*
10/22	Pork Comp.	NA	1.8		*	NA		0.03
10/22	Beef	*	1.4		0.07	0.002		*
10/22	Pork	*	2.2		*	*		0.03
12/17	Pork Comp.	NA	1.9		0.06	NA		0.05
12/17	Beef Comp.	NA	2.0		0.08	NA		0.06
12/17	Beef	*	2.3		0.06	*		0.04
Annual Average		0.31	2.1		0.04	0.005		0.03
<u>FARM (RIVERVIEW)</u>								
1/4	Beef	*	2.0	*	1.5		*	*
3/17	Beef	*	2.2		2.1			*
6/9	Ground Beef	*	2.4		3.8			*
5/13	Ground Beef	NA	1.8	*	1.5		0.04	*
9/1	Ground Beef	*	2.2		1.5			0.04
10/5	Ground Beef	2.5	1.5		4.6			*
Annual Average		1.6	2.0	0.31	2.5		*0.008	0.02

* Results were less than the analytical limit shown.

NA - No analysis was made

No entry indicates the nuclide was not present.

APPENDIX F

TABLE 4

CONCENTRATIONS OF RADIONUCLIDES IN LOCALLY GROWN FRUITS-1970

Units of 10^{-6} $\mu\text{Ci}/\text{gm}$ (wet weight)

Date	Produce	^{32}P	^{40}K	^{65}Zn	^{90}Sr	^{131}I	$^{137}\text{Cs}-^{137m}\text{Ba}$
<u>PASCO AND RIVERVIEW AREA</u>							
	Analytical Limit	1.0	0.4	0.05	0.002	0.05	0.02
6/18	Fruit Comp.	*	1.8	*	NA	*	*
7/9	Fruit Comp.	*	2.8	*	0.025		*
7/24	Fruit Comp.	*	2.1	0.09	NA		*
8/6	Fruit Comp.	*	2.2	0.12	0.009		*
8/20	Fruit Comp.	*	2.8	0.10	NA		*
9/3	Fruit Comp.	*	2.3	0.10	0.005	*	0.03
9/17	Fruit Comp.	*	2.4	0.06	NA		*
10/15	Fruit Comp.	*	3.2	0.14	*		0.03
10/29	Fruit Comp.	*	2.0	0.12	NA		0.04
Annual Average		*0.04	2.4	0.09	0.01		0.02
<u>BENTON CITY</u>							
7/9	Fruit Comp.	NA	2.3	*	0.006		*
8/13	Fruit Comp.	NA	1.8	*	0.004		*
Annual Average			2.0	*0.04	0.005		*0.004

* Results were less than the analytical limit shown.

NA - No analysis was made.

No entry indicates the nuclide was not present.

APPENDIX F

TABLE 5

CONCENTRATIONS OF RADIONUCLIDES IN LOCALLY GROWN LEAFY VEGETABLES-1970

Date	Produce	Units of 10^{-6} $\mu\text{Ci/gm}$ (wet weight)						$^{137}\text{Cs-Ba}$	$^{144}\text{CePr}$
		^{32}P	^{40}K	^{65}Zn	^{89}Sr	^{90}Sr	$^{95}\text{Zr-Nb}$		
<u>PASCO & RIVERVIEW AREA</u>									
Analytical Limit		1.0	0.4	0.05	0.002	0.002	0.03	0.6	0.05
6/18	Leafy Veg. Comp.	*	4.8	0.25	NA	NA	0.71	*	*
7/9	Leafy Veg. Comp.	*	4.7	0.44	NA	0.06	0.26	0.67	*
7/24	Leafy Veg. Comp.	*	2.1	0.18	NA	NA	*	*	*
8/6	Leafy Veg. Comp.	*	2.9	0.28	0.004	0.04	*	*	1.3
8/20	Leafy Veg. Comp.	*	5.6	0.60	NA	NA	0.13	0.41	*
10/15	Leafy Veg. Comp.	*	3.2	*	*	0.05	*	*	*
10/29	Leafy Veg. Comp.	*	4.6	0.44	NA	NA	0.89	0.17	
Annual Average		*0.28	4.0	0.32	0.004	0.05	0.16	0.22	0.06
<u>BENTON CITY</u>									
6/25	Leafy Veg. Comp.	NA	4.7	0.20	NA	0.01	0.16	*	*
8/13	Leafy Veg. Comp.	NA	4.0	*	NA	0.03	0.14	*	*
Annual Average		4.4	0.13		0.02	0.15		0.04	0.43

* Results were less than the analytical limit shown.

NA - No analysis was made.

No entry indicates the nuclide was not present.

APPENDIX F

TABLE 6

CONCENTRATIONS OF RADIONUCLIDES IN OTHER LOCALLY GROWN VEGETABLES-1970Units of 10^{-6} $\mu\text{Ci/gm}$ (wet weight)

<u>Date</u>	<u>Produce</u>	<u>^{32}P</u>	<u>^{40}K</u>	<u>^{65}Zn</u>	<u>^{90}Sr</u>	<u>$^{137}\text{Cs}-^{137}\text{mBa}$</u>	<u>$^{144}\text{CePr}$</u>
<u>PASCO AND RIVERVIEW AREA</u>							
Analytical Limit		1.0	0.4	0.05	0.002	0.02	1.0
6/18	Veg. Comp.	*	2.0	0.21	NA	0.06	
7/9	Veg. Comp.	*	2.2	0.04	0.065	*	
7/23	Veg. Comp.	*	2.3	0.08	NA	*	
8/6	Veg. Comp.	*	1.6	0.08	0.006	*	
8/20	Veg. Comp.	*	1.5	0.09	NA	*	
9/3	Veg. Comp.	*	1.5	0.10	0.005	*	
9/17	Veg. Comp.	*	1.5	*	NA	*	
10/15	Veg. Comp.	*	2.6	0.09	0.006	*	*
10/29	Veg. Comp.	*	2.1	0.11	NA	*	
Annual Average		*0.06	1.9	0.09	0.02	0.01	
<u>BENTON CITY</u>							
6/25	Assorted Veg. Comp.	NA	1.8	0.1	0.022	*	
8/13	Assorted Veg. Comp.	NA	2.6	*	0.68	*	*
Annual Average			2.2	0.07	0.35	0.01	

* Results were less than analytical limit shown.

NA - No analysis was made.

No entry indicates the nuclide was not present.

APPENDIX F

TABLE 7

CONCENTRATIONS OF RADIONUCLIDES
IN LOCALLY PURCHASED LEAFY VEGETABLE COMPOSITES-1970

Date	Produce	Units of 10^{-6} $\mu\text{Ci/gm}$ (wet weight)						^{137}Cs - ^{137}mBa	$^{144}\text{Ce-Pr}$
		^{32}P	^{40}K	^{65}Zn	^{89}Sr	^{90}Sr	$^{95}\text{ZrNb}$		
<u>COMMERCIAL</u>									
Analytical Limit		1.0	0.4	0.05	0.002	0.002	0.03	0.08	1.0
5/20	Leafy Veg. Comp.	*	4.9	*	0.013	0.012	0.18	*	*
6/18	Leafy Veg. Comp.	*	3.1	*	0.033	0.031	0.26	*	*
7/23	Leafy Veg. Comp.	*	3.3	*	0.007	0.022	*	*	*
8/19	Leafy Veg. Comp.	*	2.5	*	0.005	*	*	*	*
9/17	Leafy Veg. Comp.	*	3.1	*	*	0.017	*	*	*
10/22	Leafy Veg. Comp.	*	2.1	0.12	0.003	0.011	*	*	*
Annual Average		*0.13	3.2	0.09	0.012	0.017	0.06	0.02	

* Results were less than the analytical limit shown.

No entry indicates that the nuclide was not present.

APPENDIX F
TABLE 8

CONCENTRATION OF RADIONUCLIDES
IN LOCALLY PURCHASED FRUIT AND VEGETABLE COMPOSITES-1970

Date	Analytical Limit	Produce	Units of 10^{-6} $\mu\text{Ci/gm}$ (wet weight)					
			^{32}P	^{40}K	^{65}Zn	^{90}Sr	$^{95}\text{ZrNb}$	^{131}I
6/18	Fruit & Veg.	Comp.	*	1.0	0.4	0.05	0.002	0.03
8/6	Fruit & Veg.	Comp.	*	2.6	0.08	0.006	*	0.05
9/3	Fruit & Veg.	Comp.	*	2.2	0.06	0.006	*	0.04
10/1	Fruit & Veg.	Comp.	*	1.9	0.12	0.008	*	*
Annual Average			*0.03	2.1	0.09	0.006		0.02

* Results were less than the analytical limit shown.

No entry indicates that the nuclide was not present.

APPENDIX F

TABLE 9

CONCENTRATIONS OF RADIONUCLIDES IN CHICKEN AND EGGS FROM LOCAL FARMS-1970

Date	Type	Units of 10^{-6} $\mu\text{Ci}/\text{gm}$ (wet weight)							^{137}Cs - ^{137}mBa		
		^{32}P	^{40}K	^{65}Zn	^{89}Sr	^{90}Sr	$^{95}\text{ZrNb}$	^{131}I			
<u>RIVERVIEW IRRIGATION DISTRICT</u>											
Analytical											
Limit		1.0	0.4	0.05	0.002	0.002	0.03	0.05	0.02		
2/12	Eggs	*	0.81	*	NA	NA		*	*		
3/12	Eggs	*	1.0	*	0.011	*			*		
3/12	Chicken	*	1.9	*	*	*			*		
4/17	Eggs	*	0.98	*	NA	NA			*		
5/14	Eggs	*	1.1	*	NA	NA			*		
7/19	Eggs	*	1.0	0.05	NA	NA			*		
8/13	Eggs	*	0.94	0.07	NA	NA			*		
9/17	Eggs	*	0.95	0.06	NA	NA			*		
9/23	Chicken	*	2.7	0.08	*	*		*	0.04		
10/15	Eggs	*	1.1	0.08	NA	NA			*		
11/12	Eggs	*	0.75	*	NA	NA			*		
12/10	Eggs	*	1.2	0.06	*	0.002			0.02		
12/10	Chicken	*	2.6	0.20	*	*			0.02		
Annual	Average	*0.053	1.4	0.06	*0.003	*0.0003		*0.008	0.013		
<u>RINGOLD</u>											
3/13	Chicken	*	2.9	0.65	NA	NA			*		
3/13	Chicken	*	2.6	0.72	NA	NA			*		
3/13	Eggs	*	0.90	0.70	NA	NA	*		*		
5/14	Eggs	*	0.99	0.47	NA	NA			*		
7/9	Eggs	4.5	0.89	1.1	NA	NA			*		
8/13	Eggs	5.6	1.3	1.1	NA	NA			*		
9/17	Eggs	3.3	1.0	2.5	NA	NA			*		
9/23	Chicken	*	2.5	1.1	NA	NA		*	*		
10/15	Eggs	4.2	0.96	2.2	NA	NA			*		
12/10	Chicken	*	3.3	1.0	NA	NA			0.04		
Annual	Average	1.8	1.4	1.2			*0.0005	*0.001	0.01		

* Results were less than the analytical limit shown.

No entry indicates nuclide was not present.

NA - No analysis was made.

APPENDIX F

TABLE 10

CONCENTRATIONS OF RADIONUCLIDES IN CHICKEN
AND EGGS PURCHASED FROM LOCAL STORES-1970

Units 10^{-6} $\mu\text{Ci/gm}$ (wet weight)

Date	Type	^{32}P	^{40}K	^{65}Zn	^{89}Sr	^{90}Sr	^{137}Cs
Analytical Limit		1.0	0.4	0.05			0.02
6/18	Chicken Comp.	NA	1.7	*	NA	NA	*
1/22	Eggs	NA	0.91	*	NA	NA	*
4/16	Eggs	NA	0.86	*	NA	NA	*
7/23	Eggs	NA	0.76	*	NA	NA	*
10/22	Eggs	NA	0.98	*	NA	NA	*
Annual Average			1.0	0.02			*0.002

* Results were less than the analytical limit shown.

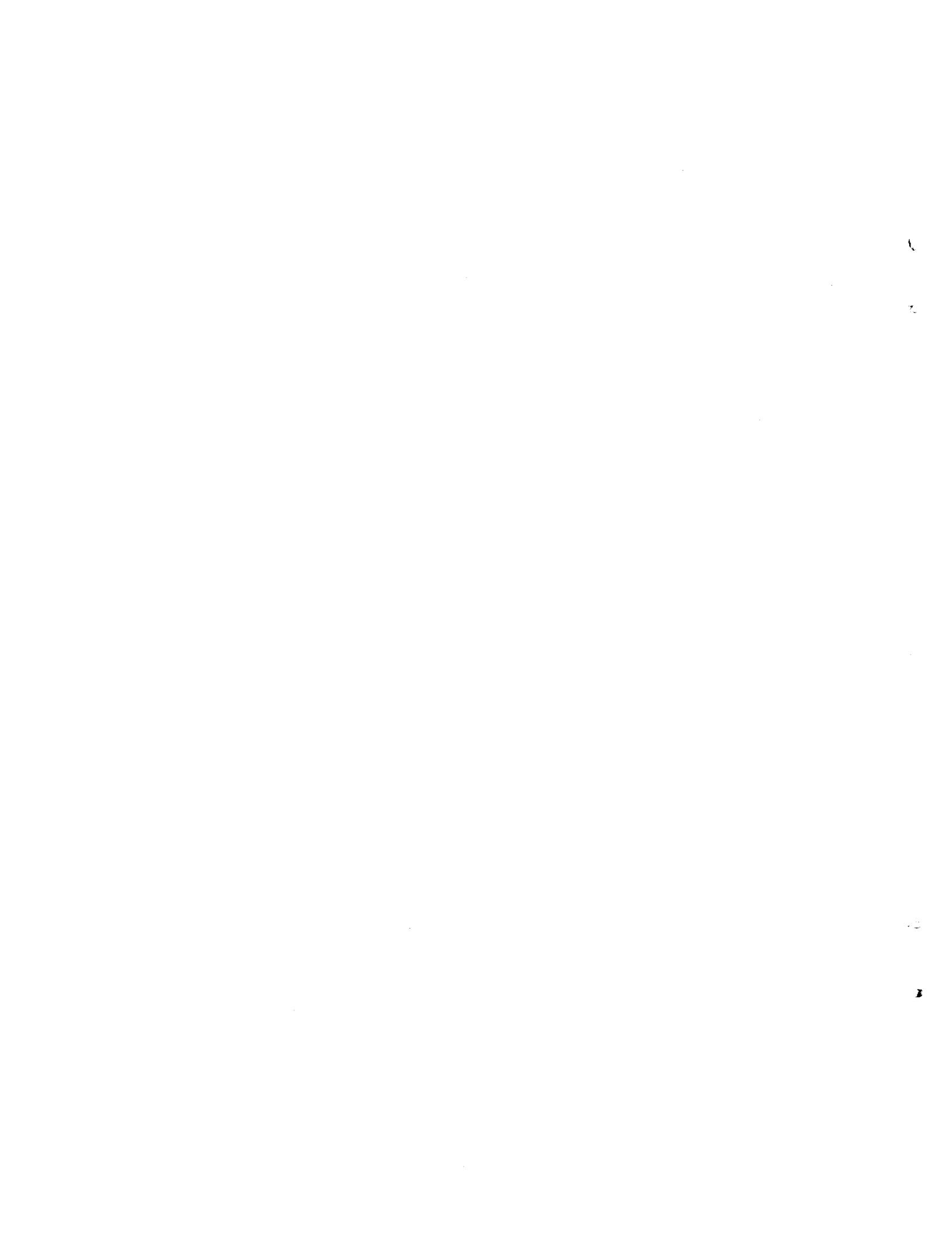
NA - No analysis was made.



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APPENDIX G



APPENDIX G

TABLE 1

IONIZATION CHAMBER MEASUREMENTS FOR THE HANFORD RESERVATION,
100N-WPPSS, AND RICHLAND--1970

<u>Date</u>	<u>Richland</u>	<u>Hanford</u>	<u>100N-WPPSS</u>
12/31-1/2	0.20	0.22	0.30
1/2-1/5	0.20	0.39	0.46
1/5-1/7	0.40	0.44	0.51
1/7-1/9	0.29	0.44	0.49
1/9-1/12	0.32	0.41	0.56
1/12-1/14	0.25	0.35	0.64
1/14-1/16	0.28	0.40	0.44
1/16-1/19	0.31	0.37	0.50
1/19-1/21	0.33	0.35	0.48
1/21-1/23	0.31	0.37	0.61
1/23-1/26	0.31	0.36	0.48
1/26-1/28	0.95	0.36	0.57
1/28-1/30	0.44	0.37	0.52
1/30-2/2	0.26	0.26	0.40
2/2-2/4	0.31	0.37	0.51
2/4-2/6	0.32	0.36	0.55
2/6-2/9	0.32	0.37	0.41
2/9-2/11	0.35	0.40	0.45
2/11-2/13	0.36	0.43	0.42
2/13-2/16	0.38	0.33	0.41
2/16-2/18	0.33	0.37	0.39
2/18-2/20	0.38	0.34	0.41
2/20-2/24	0.30	0.41	0.42
2/24-2/27	0.35	0.45	0.51
2/27-3/2	0.35	0.34	0.34
3/2-3/4	0.31	0.36	0.47
3/4-3/6	0.30	0.44	0.49
3/6-3/9	0.30	0.36	0.45
3/9-3/11	0.34	0.42	0.50
3/11-3/13	0.35	0.42	0.53
3/13-3/16	0.26	0.38	0.43
3/16-3/18	0.30	0.33	0.39
3/18-3/20	0.30	0.44	0.42
3/20-3/23	0.48	0.35	0.39
3/23-3/25	0.30	0.39	0.40
3/25-3/27	0.28	0.37	0.40
3/27-3/30	0.28	0.37	0.37
3/30-4/1	0.18	0.31	0.30
4/1-4/3	0.31	0.42	0.39
4/3-4/6	0.31	0.31	0.44

APPENDIX G

TABLE 1 (Continued)

IONIZATION CHAMBER MEASUREMENTS FOR THE HANFORD RESERVATION,
100N-WPPSS, AND RICHLAND--1970

<u>Date</u>	<u>Richland</u>	<u>Hanford</u>	<u>100N-WPPSS</u>
4/6-4/8	0.33	0.40	0.38
4/8-4/10	0.34	0.35	0.42
4/10-4/13	0.29	0.41	0.37
4/13-4/15	0.34	0.50	0.52
4/15-4/17	0.75	0.40	0.56
4/17-4/20	0.27	0.36	0.45
4/20-4/22	0.38	0.40	0.57
4/22-4/24	0.41	0.30	0.63
4/24-4/27	0.39	0.38	0.51
4/27-4/29	0.30	0.34	0.46
4/29-5/1	0.31	0.36	0.44
5/1-5/4	0.34	0.33	0.45
5/4-5/6	0.31	0.39	0.38
5/6-5/8	0.28	0.33	0.53
5/8-5/11	0.27	0.33	0.41
5/11-5/13	0.26	0.33	0.38
5/13-5/15	0.31	0.31	0.33
5/15-5/18	0.27	0.38	0.46
5/18-5/20	0.24	0.32	0.35
5/20-5/22	0.26	0.29	0.37
5/22-5/25	0.34	0.32	0.39
5/25-5/27	0.30	0.39	0.42
5/27-5/28		0.41	
5/28-6/1	0.35	0.36	
6/1-6/3	0.34	0.38	0.12
6/3-6/5	0.32	0.35	0.39
6/5-6/8	0.28	0.35	0.38
6/8-6/10	0.28	0.43	0.50
6/10-6/12	0.28	0.32	0.36
6/12-6/17	0.30	0.18	0.20
6/17-6/19	0.33	0.36	0.40
6/19-6/22		0.34	0.36
6/22-6/24	0.26	0.32	0.39
6/24-6/26	0.37	0.38	0.36
6/26-6/29	0.27	0.50	0.44
6/29-7/2	0.24	0.33	0.33
7/2-7/6	0.28	0.51	0.36
7/6-7/10	0.24	0.31	0.35
7/10-7/13	0.24	0.37	0.37
7/13-7/17	0.31	0.35	0.39

APPENDIX G

TABLE 1 (Continued)

IONIZATION CHAMBER MEASUREMENTS FOR THE HANFORD RESERVATION,
100N-WPPSS, AND RICHLAND--1970

Date	Richland	Hanford	100N-WPPSS
7/17-7/20	0.24	0.34	0.38
7/20-7/24	0.27	0.25	0.31
7/24-7/27	0.22	Lost	Lost
7/27-7/31	0.25	0.27	0.32
7/31-8/3	0.23	0.37	0.38
8/3-8/7	0.24	0.27	0.36
8/7-8/10	0.17	0.36	0.38
8/10-8/14	0.26	0.32	0.35
8/14-8/17	0.27	0.43	0.38
8/17-8/21	0.29	0.34	0.36
8/21-8/24	0.32	0.41	0.41
8/24-8/28	0.33	0.36	0.38
8/28-8/31	0.23	0.36	0.35
8/31-9/4	0.28	0.36	0.35
9/4-9/8	0.32	0.73	0.73
9/8-9/11	0.28	0.80	0.92
9/11-9/14	0.33	0.86	0.76
9/14-9/18	0.31	0.12	0.69
9/18-9/21	0.31	0.12	>0.29
9/21-9/25	0.35	0.12	>0.29
9/25-9/28	0.38	0.47	>0.29
9/28-10/2	0.36	0.67	0.50
10/2-10/5	0.39	0.45	0.50
10/5-10/9	0.28	0.40	0.42
10/9-10/12	0.34	0.42	0.46
10/12-10/16	>0.42	0.39	0.38
10/16-10/19	>0.42	0.52	0.54
10/19-10/23	0.35	0.37	>0.73
10/23-10/26	0.50	0.47	0.55
10/26-10/30	0.39	0.44	0.50
10/30-11/2	0.47	lost	lost
11/2-11/6	lost	0.45	0.58
11/6-11/9	0.38	0.48	0.51
11/9-11/13	>0.73	0.36	0.46
11/13-11/16	0.40	0.49	0.56
11/16-11/20	0.35	0.38	0.45
11/20-11/23	0.32	0.56	0.52
11/23-11/25	0.72	0.43	0.51
11/25-11/30	0.29	>0.58	>0.58
11/30-12/4	0.46	0.36	0.47
12/4-12/7	0.30	0.42	0.46
12/7-12/11	0.41	0.41	0.46
12/11-12/14	>0.97	0.49	0.52
12/14-12/18	0.31	0.37	0.46
12/18-12/21	0.38	0.49	0.52
12/21-12/23	0.45	>0.42	>0.42
12/23-12/28	0.37	>0.42	>0.42
12/28-12/31	0.36	0.41	0.59
Annual Average	0.34	0.39	0.45

APPENDIX G

TABLE 2 (Part A)

IONIZATION CHAMBER MEASUREMENTS IN THE COLUMBIA RIVER--1970
River Pencil Measurements

Approx. Wk. End Date	Vernita	Units of mR/day						Richland Pump House	Pasco Pump House	Plant Shore Power Line
		100 D	100 F	Hanford	Ringold					
1/7	0.48	0.73	5.1	1.4	1.3		4.1	1.2		
1/14	0.48	0.48	5.1	1.2	1.1		3.5	0.89		
1/21	0.23	0.72	4.8	1.3	1.4		3.1	1.1		
1/28	0.79	1.1	5.3	3.1	1.6		4.4	1.1		
2/4	0.23	1.1	5.0	3.1	1.5		2.6	1.2		
2/11	0.19	1.5	2.7	3.6	0.96		2.0	0.12		
2/18	0.30	1.6	2.4	2.5	0.63		2.6	0.92		
2/25	0.44	0.37	2.9	0.71	0.37		2.3	0.92		
3/4	0.36	1.6	2.6	0.54	0.50		2.9	0.64	1.5	
3/11	0.51		3.0	0.51	0.99		1.8	0.94	1.3	
3/18	0.33		2.1	0.60	0.43		0.74	0.99		
3/25	0.70		1.7	0.51	1.0		1.9	0.93	1.5	
4/1	0.39		2.7	0.84			3.0	1.0	1.4	
4/8	0.59		3.0	1.1	0.92		3.9	0.94	0.97	
4/15	0.41		2.5	0.79	1.0		1.5	0.77	1.0	
4/22	0.56		3.2	1.0			2.6	0.94	1.2	
4/29	0.27		3.4	1.5	1.3		2.1	0.91		
5/6			3.1	1.4	1.6		1.8	0.74		
5/13							2.1	0.89		
5/20	0.43		2.2				1.9			
6/4							1.7	0.70	1.1	
6/16							1.6			
Jan-June Average	0.43	1.2	3.1	1.5	1.1		2.4	0.88	1.2	

No entry indicates no measurement was made.

As a result of scheduling the off date for some locations may differ slightly from the date indicated.

APPENDIX G
TABLE 2 (PART B)

IONIZATION CHAMBER MEASUREMENTS IN THE COLUMBIA RIVER
River TLD Measurements*

Units of mR/day			
Measurement Period	Exposure Rate	Measurement Period	Exposure Rate
<u>VERNITA</u>			
6/23-7/21	0.10	10/8-11/13	7.4
7/21-8/18	0.09	11/13-12/11	7.9
10/20-11/17	0.10	12/11-12/31	9.6
11/17-12/22	0.15	July-Dec.	
July-Dec.		Average	8.0
Average	0.12	<u>100 K BARGE</u>	
<u>D ISLAND</u>			
7/8-8/6	1.8	10/8-11/13	0.56
8/6-9/4	2.1	11/13-12/11	0.82
9/4-10/8	1.9	12/11-12/31	0.66
10/8-11/13	2.0	July-Dec.	
11/13-12/11	4.0	Average	0.66
12/11-12/31	2.9	<u>RICHLAND PUMP HOUSE</u>	
July-Dec.		6/16-7/28	0.33
Average	2.3	7/28-8/24	0.29
<u>SOUTH OF WOODED ISLAND</u>			
7/31-8/28	0.50	8/24-9/21	0.29
8/28-9/25	0.50	9/21-10/26	0.40
10/30-11/25	0.69	10/26-11/23	0.59
11/25-12/23	0.64	11/23-12/28	0.60
July-Dec.		July-Dec.	
Average	0.61	Average	0.42

* The river pencils were replaced by river TLD's in July.

APPENDIX G

TABLE 3

EXTERNAL EXPOSURE RATE MEASUREMENT AT 3' ABOVE THE COLUMBIA RIVER SHORELINE
AT THE RICHLAND TRAVERSE AND AT SACAJAWEA--1970

<u>Date</u>	<u>Exposure Rate</u>	<u>Date</u>	<u>Exposure Rate</u>
<u>RICHLAND TRAVERSE</u>			
		8/10	19
		8/12	16
1/9	28	8/17	18
1/15	25	8/20	15
1/22	28	8/24	18
2/5	13	8/27	15
2/12	17	8/31	16
2/26	20	9/3	14
3/6	46	9/8	18
3/12	15	9/10	13
3/19	17	9/14	20
3/26	15	9/17	16
4/2	15	9/21	20
4/9	8	9/24	17
4/16	13	9/28	16
4/23	20	10/1	18
4/30	15	10/5	16
5/15	18	10/8	20
5/21	14	10/12	17
5/28	14	10/15	17
6/4	9	10/19	18
6/18	15	10/22	22
6/29	15	10/26	19
7/2	30	11/2	19
7/6	29	11/5	36
7/9	13	11/9	14
7/13	22	11/12	21
7/16	34	11/16	20
7/28	21	11/19	12
7/30	22	11/23	14
8/3	16	Annual	
8/6	14	Average	18

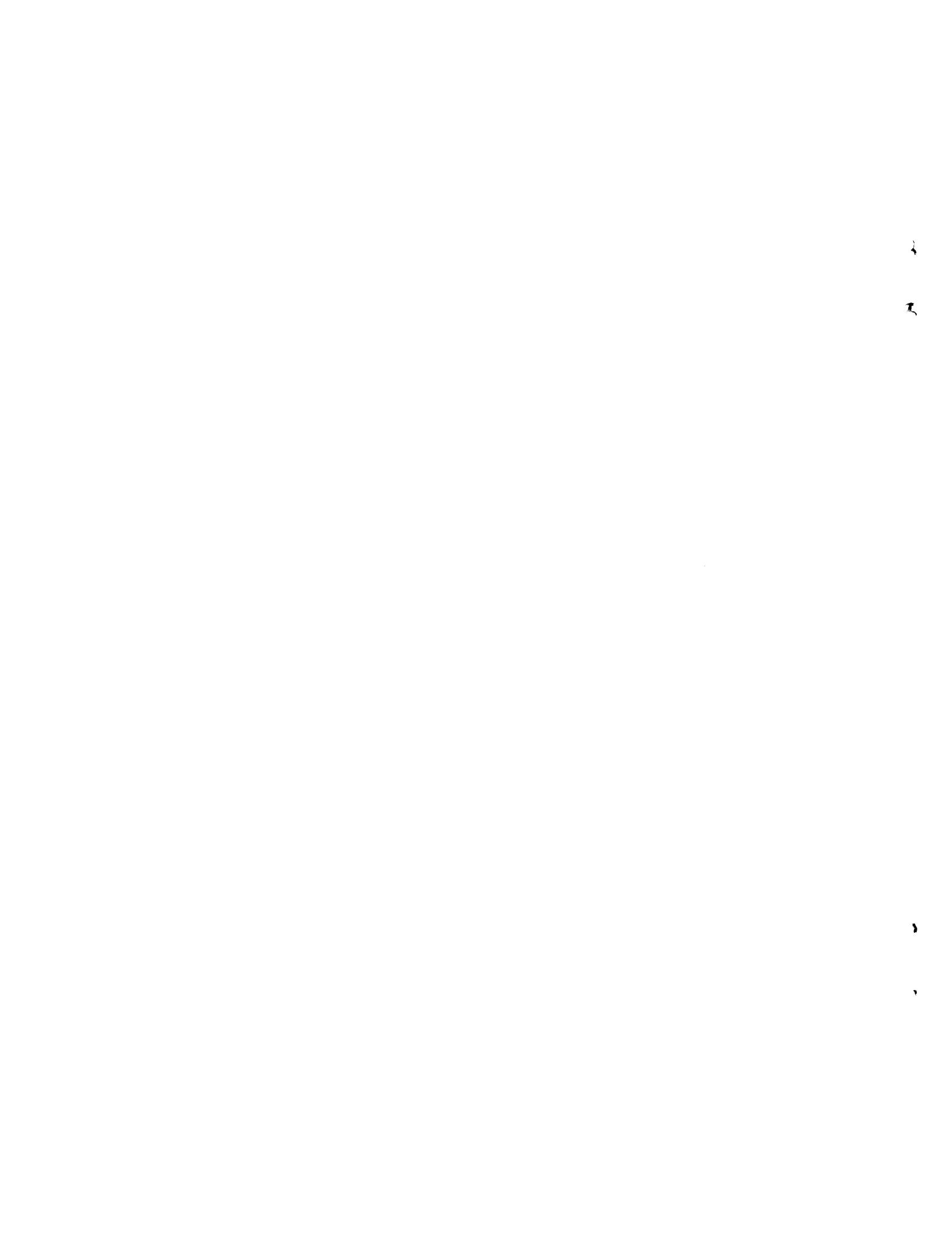
APPENDIX G

TABLE 3 (Continued)

EXTERNAL EXPOSURE RATE MEASUREMENT AT 3' ABOVE THE COLUMBIA RIVER SHORELINE
AT THE RICHLAND TRAVERSE AND AT SACAJAWEA--1970

Units of mR/day

<u>Date</u>	<u>Exposure Rate</u>	<u>Date</u>	<u>Exposure Rate</u>
<u>SACAJAWEA</u>			
1/8	20	5/22	56
1/9	34	5/28	16
1/16	24	6/5	22
1/29	15	6/12	22
1/30	21	6/19	24
2/6	22	6/26	14
2/13	18	7/17	18
2/20	18	7/31	14
2/27	18	8/7	17
3/6	22	8/14	17
3/12	20	8/28	13
3/27	19	9/11	18
4/3	10	9/18	18
4/10	18	9/25	18
4/17	18	11/6	18
4/24	18	11/13	42
5/1	20	11/20	18
5/8	50	12/28	20
5/15	50	12/31	22
		Annual Average	22



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APPENDIX H



APPENDIX H

TABLE 1
CHEMICAL CHARACTERISTICS OF
COLUMBIA RIVER WATER AT VERNITA--1970
Results in parts/million

Date	Mg	Fe	Cu	Ca	SO ₄	PO ₄	C1	Diss O ₂	Phth Alk	MO Alk	Hardness	Solids
1/6	6.0	0.02	0.002	19.	15.	0.00	0.36	12.	2.0	67.	74.	93.
1/20	4.0	0.01	0.002	23.	15.	0.03	0.30	NA	2.0	70.	74.	92.
2/3	4.0	0.02	0.003	21.	14.	0.04	0.52	12.	1.0	68.	72.	92.
2/17	4.0	0.00	0.01	23.	17.	0.01	0.50	8.2	1.0	68.	73.	89.
3/3	5.8	0.03	0.003	21.	16.	0.02	0.43	12.	1.0	63.	76.	89.
3/17	5.0	0.03	0.003	21.	17.	0.02	0.50	12.	1.0	66.	74.	90.
3/31	5.8	0.10	0.002	20.	16.	0.02	0.39	12.	2.0	67.	74.	74.
4/14	5.2	0.20	0.004	21.	20.	0.04	0.60	11.	2.0	67.	75.	93.
4/28	6.7	0.07	0.004	22.	28.	0.02	0.53	12.	2.0	69.	83.	110.
5/12	5.7	0.02	0.002	24.	22.	0.006	0.35	12.	2.0	70.	84.	100.
6/16	4.3	0.01	0.004	19.	13.	0.04	0.26	11.	2.0	55.	64.	66.
7/21	4.4	0.05	0.01	23.	13.	0.02	0.10	11.	1.0	59.	77.	90.
8/4	3.9	0.01	0.007	24.	16.	0.04	0.33	9.8	2.0	72.	76.	95.
8/14	3.8	0.02	0.004	24.	14.	0.01	0.24	9.0	2.0	66.	75.	100.
9/8	5.0	0.03	0.01	25.	15.	0.04	0.30	9.4	3.0	64.	83.	78.
9/22	5.2	0.02	0.005	17.	12.	0.03	0.28	8.3	2.0	60.	63.	77.
10/6	4.0	0.03	0.005	21.	23.	0.03	0.73	8.3	2.0	70.	70.	110.
10/20	5.2	0.02	0.003	12.	13.	0.01	0.40	9.7	0.0	91.	52.	72.
11/3	4.4	0.01	0.004	19.	15.	0.11	0.32	NA	3.0	66.	65.	79.
11/17	4.9	0.02	0.002	18.	16.	0.10	0.26	9.9	4.0	66.	65.	89.
12/1	4.3	0.01	0.002	19.	15.	0.18	0.41	NA	2.0	66.	65.	91.
12/15	6.2	0.01	0.001	16.	14.	0.16	0.16	NA	2.0	68.	66.	91.
Annual	4.8	0.03	0.006	21.	16.	0.04	0.36	10.	1.9	66.	72.	88.
Average												

NA indicates there was no analysis made.

APPENDIX H

TABLE 2
CHEMICAL CHARACTERISTICS OF
COLUMBIA RIVER WATER AT 100-F--1970
Results in parts/million

Date	Mg	Fe	Cu	Ca	SO ₄	PO ₄	C ₁	Diss O ₂	Phth Alk	M0 Alk	Hardness	Solids
1/6	6.0	0.03	0.002	20.	15.	0.00	0.33	NA	2.0	68.	74.	93.
1/20	4.0	0.01	0.004	22.	15.	0.05	0.36	7.8	2.0	71.	73.	84.
2/3	5.0	0.01	0.002	21.	13.	0.06	0.33	12.	2.0	69.	72.	100.
2/17	5.0	0.01	0.004	22.	19.	0.01	0.33	11.	2.0	68.	75.	100.
3/3	5.4	0.02	0.003	22.	17.	0.04	0.26	8.3	1.0	65.	76.	96.
3/17	6.2	0.03	0.004	19.	17.	0.02	0.50	13.	1.0	65.	73.	81.
3/31	6.2	0.07	0.005	20.	17.	0.02	0.39	12.	2.0	69.	76.	81.
4/14	4.4	0.22	0.002	24.	20.	0.05	0.60	12.	1.0	66.	77.	100.
4/28	6.3	0.12	0.005	22.	24.	0.02	0.56	12.	1.0	70.	82.	120.
5/12	5.5	0.02	0.02	25.	23.	0.005	0.40	12.	2.0	72.	85.	100.
6/16	4.6	0.00	0.01	22.	13.	0.04	0.29	11.	2.0	56.	68.	74.
7/21	4.2	0.09	0.007	23.	15.	0.02	0.16	9.6	1.0	61.	76.	75.
8/4	3.9	0.02	0.007	25.	17.	0.02	0.46	9.5	1.0	70.	78.	86.
8/18	4.0	0.03	0.004	24.	13.	0.02	0.26	8.9	1.0	70.	77.	110.
9/8	4.8	0.03	0.005	23.	15.	0.08	0.43	9.0	3.0	70.	77.	73.
9/22	5.3	0.02	0.002	17.	13.	0.03	0.26	9.4	2.0	63.	65.	87.
10/6	4.0	0.03	0.003	21.	20.	0.02	0.66	8.2	2.0	66.	70.	99.
10/20	5.4	0.02	0.006	16.	12.	0.01	0.32	11.	0.0	92.	66.	80.
11/3	5.3	0.01	0.001	19.	18.	0.11	0.49	NA	2.0	70.	68.	80.
11/16	4.9	0.02	0.003	20.	15.	0.11	0.58	9.8	6.0	69.	70.	86.
12/1	3.8	0.01	0.002	20.	16.	0.01	0.46	NA	2.0	66.	65.	92.
12/15	6.6	0.01	0.000	18.	16.	0.11	0.53	NA	2.0	76.	73.	97.
Annual	5.0	0.04	0.006	22.	16.	0.04	0.40	10.	1.8	68.	74.	90.
Average												

NA indicates there was no analysis made.

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