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# Environmental Surveillance at Hanford for CY-1975 Data

April 1976

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# ENVIRONMENTAL SURVEILLANCE AT HANFORD FOR CY-1975 DATA

By Peggy J. Blumer
Jack J. Fix
Dwayne R. Speer

Occupational and Environmental Safety Department

April 1976

BATTELLE
PACIFIC NORTHWEST LABORATORIES
RICHLAND, WASHINGTON 99352

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# ENVIRONMENTAL SURVEILLANCE AT HANFORD FOR CY-1975 DATA

## INTRODUCTION

This document contains detailed data collected by the Hanford Environmental Surveillance program during 1975. Summaries and evaluation of the data appear in the parent report BNWL-1979. Environmental Surveillance responsibilities at Hanford are divided between Hanford Environmental Health Foundation (HEHF) and Battelle-Northwest (BNW). HEHF is responsible for measuring all nonradiological air quality and sanitary water parameters of interest. BNW is responsible for measuring radiological parameters in all environmental media of significance and for measuring both radiological and nonradiological parameters of Columbia River water and ground water.

A brief description of the method of sample collection, a description of the locations of sample collection during 1975, and a list of tables are available at the beginning of each section. Any questions regarding specific entries should be referred to the authors.

# I. RADIOLOGICAL PARAMETERS MEASURED IN THE ATMOSPHERE DURING 1975

# I. RADIOLOGICAL PARAMETERS MEASURED IN THE ATMOSPHERE DURING 1975

Radioactivity in the atmosphere was sampled by a network of 17 perimeter and 5 distant continuous air samplers during 1975. These locations are shown in Figure I-1. Each air sampler maintains a flow of 2.5 $m^3$/hr through a particle filter (Hollingsworth and Vose Company, HV-70) and a 6-inch long charcoal cartridge. The filters are collected biweekly and analyzed for gross beta and alpha activity after waiting 7 days to allow the short-lived radon and thoron daughters to decay. The filters are composited into groups according to geographical location and analyzed by gamma spectrometry monthly and for Sr-90 and plutonium quarterly. The composite groups are:

Inner Northeast Quadrant: Consists of filters from Othello, Connell, Berg Ranch, Wahluke Wm, and Cooke Bros.

Inner Southeast Quadrant: Consists of filters from Richland, Pasco, Byers Landing, Baxter Substation, RRC CP #63, and RRC CP #64.

Inner Southwest Quadrant: Consists of filters from Rattlesnake Spring, ERC, Benton City, and Prosser Barricade.

Inner Northwest Quadrant: Consists of filters from Yakima Barricade, Vernita, and Wahluke #2.

Outer Northeast Quadrant: Consists of filters from Moses Lake and Washtucna.

Outer Southeast Quadrant: Consists of filters from Walla Walla and McNary Dam.

Outer Western Quadrant: Consists of filters from Sunnyside.

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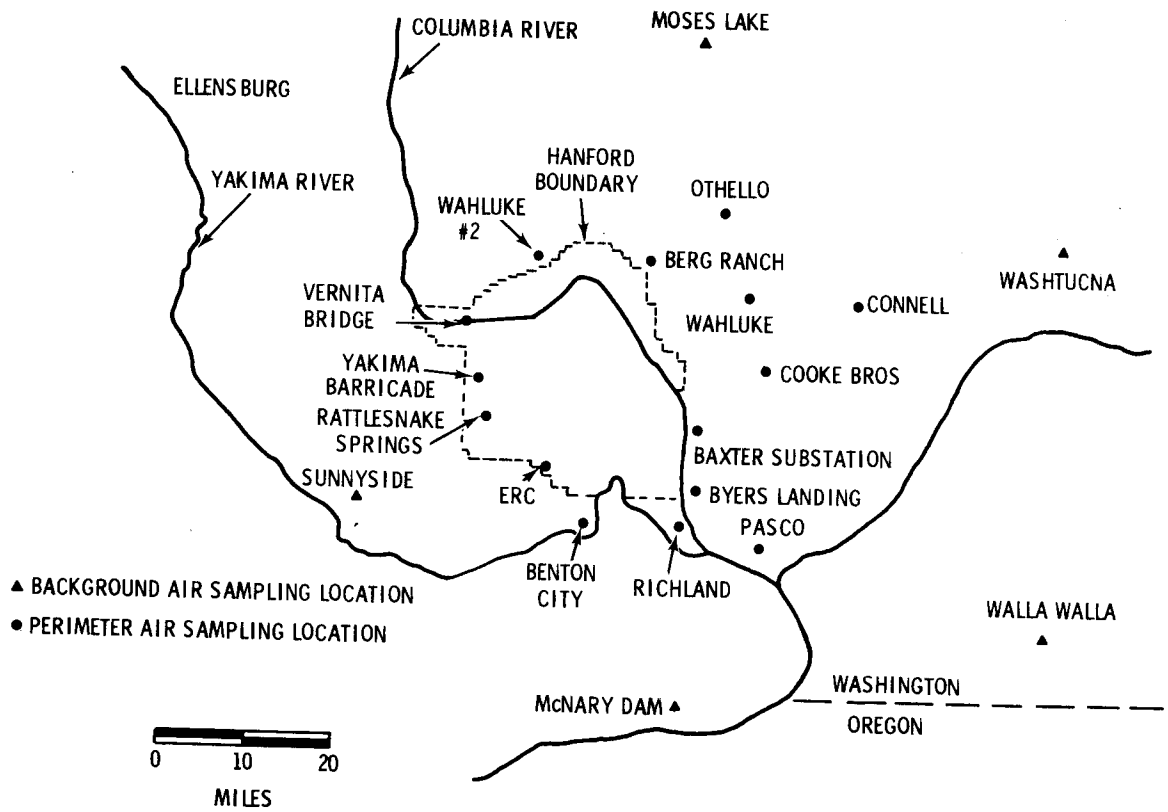


FIGURE I-1. Hanford Environmental Air Sampling Locations During 1975

## TABLE I-1, Part A. Concentrations of Radioactive Beta Particulates in the Air of the Hanford Environs - 1975[a]

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

| Approx.[b] Wk. on Date | Perimeter Communities | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Benton City | ERC | Rattlesnake Springs | Yakima Barricade | Vernita Bridge | Wahluke #2 | Othello | Connell | Berg Ranch | Wahluke Watermaster | Cooke Bros. | Baxter Substation | Byers Landing | Richland | Pasco | RRC CP#63 | RRC CP#64 |
| 1/2 | | | | | | 0.13 | 0.13 | 0.11 | 0.11 | 0.11 | | 0.11 | | | | | |
| 1/8 | 0.16 | 0.12 | 0.13 | 0.06 | 0.12 | | | | | | 0.16 | | 0.17 | 0.14 | 0.12 | | |
| 1/15 | | | | | | 0.17 | 0.16 | 0.14 | 0.14 | 0.15 | | 0.13 | | | | | |
| 1/22 | 0.16 | 0.18 | 0.18 | 0.18 | 0.17 | | | | | | 0.16 | | 0.19 | 0.16 | 0.20 | | |
| 1/29 | | | | | | 0.21 | 0.19 | 0.17 | 0.20 | 0.19 | | 0.16 | | | | | |
| 2/5 | 0.19 | 0.18 | 0.13 | 0.22 | 0.17 | | | | | | 0.16 | | * | 0.16 | 0.20 | | |
| 2/12 | | | | | | 0.16 | 0.17 | 0.16 | 0.28 | 0.15 | | 0.11 | | | | | |
| 2/19 | 0.17 | 0.17 | 0.14 | 0.17 | 0.17 | | | | | | 0.21 | | 0.20 | 0.12 | 0.17 | | |
| 2/26 | | | | | | 0.26 | 0.22 | 0.21 | 0.14 | 0.23 | | 0.13 | | | | | |
| 3/5 | 0.20 | 0.18 | 0.21 | 0.18 | 0.21 | | | | | | 0.18 | | 0.22 | 0.12 | 0.21 | | |
| 3/12 | | | | | | 0.12 | 0.15 | 0.14 | 0.17 | 0.13 | | 0.08 | | | | | |
| 3/19 | 0.12 | 0.16 | 0.16 | 0.16 | 0.13 | | | | | | 0.13 | | 0.14 | 0.05 | 0.15 | | |
| 3/26 | | | | | | 0.10 | 0.16 | 0.18 | 0.18 | 0.16 | | 0.13 | | | | | |
| 4/2 | 0.17 | * | * | 0.19 | 0.14 | | | | | | 0.17 | | 0.16 | 0.18 | 0.18 | | |
| 4/9 | | | | | | 0.16 | 0.19 | 0.16 | 0.20 | * | | 0.15 | | | | | |
| 4/16 | 0.18 | 0.10 | * | 0.20 | 0.16 | | | | | | 0.07 | | 0.15 | 0.16 | 0.17 | | |
| 4/23 | | | | | | 0.17 | 0.19 | 0.17 | 0.05 | 0.12 | | 0.12 | | | | | |
| 4/30 | 0.18 | 0.23 | 0.11 | 0.21 | 0.20 | | | | | | 0.18 | | 0.17 | 0.25 | 0.18 | | |
| 5/7 | | | | | | 0.13 | 0.18 | 0.14 | 0.22 | 0.11 | | 0.13 | | | | | |
| 5/14 | 0.10 | 0.06 | 0.12 | 0.12 | 0.13 | | | | | | 0.09 | | 0.14 | 0.14 | 0.14 | | |
| 5/21 | | | | | | 0.12 | 0.12 | 0.16 | 0.16 | 0.13 | | 0.11 | | | | | |
| 5/28 | 0.14 | 0.18 | 0.15 | 0.15 | 0.14 | | | | | | 0.13 | | 0.14 | 0.12 | 0.14 | | |
| 6/4 | | | | | | 0.09 | 0.17 | 0.12 | 0.09 | 0.09 | | 0.08 | | | | | |
| 6/11 | 0.08 | 0.07 | 0.10 | 0.08 | 0.08 | | | | | | 0.06 | | 0.11 | 0.09 | 0.09 | | |
| 6/18 | | | | | | 0.06 | * | 0.08 | 0.08 | 0.06 | | 0.07 | | | | | |
| 6/25 | 0.08 | 0.11 | 0.08 | 0.13 | 0.08 | | 0.10 | | | 0.09 | 0.10 | | 0.09 | 0.06 | 0.11 | 0.08 | 0.09 |

* Invalid sample.
(a) The tabled values are generally for 2-week periods, the week in which the value is tabled and the following week.
(b) As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated.

## TABLE I-1, Part A. (Cont'd) Concentrations of Radioactive Beta Particulates in the Air of the Hanford Environs - 1975[a]

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

| Approx.[b] Wk. on Date | Perimeter Communities | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Benton City | ERC | Rattlesnake Springs | Yakima Barricade | Vernita Bridge | Wahluke #2 | Othello | Connell | Berg Ranch | Wahluke Watermaster | Cooke Bros. | Baxter Substation | Byers Landing | Richland | Pasco | RRC CP#63 | RRC CP#64 |
| 7/2 | | | | | | 0.09 | 0.13 | 0.10 | 0.12 | 0.14 | 0.14 | 0.09 | | | | | |
| 7/9 | 0.08 | 0.06 | 0.08 | 0.09 | 0.07 | | 0.08 | | | 0.08 | 0.07 | | 0.08 | 0.06 | 0.08 | 0.07 | 0.06 |
| 7/16 | | | | | | 0.07 | 0.04 | 0.08 | 0.07 | 0.06 | 0.05 | * | | | | | |
| 7/23 | 0.06 | 0.06 | 0.06 | 0.07 | 0.06 | | 0.05 | | | 0.06 | 0.07 | | 0.06 | 0.05 | * | 0.04 | 0.05 |
| 7/30 | | | | | | * | 0.04 | 0.06 | 0.03 | 0.03 | 0.05 | 0.04 | | | | | |
| 8/6 | 0.04 | 0.05 | 0.04 | 0.07 | 0.04 | | 0.04 | | | 0.03 | 0.04 | | 0.05 | 0.04 | 0.05 | 0.05 | 0.03 |
| 8/13 | | | | | | 0.04 | 0.03 | 0.03 | 0.03 | * | | 0.04 | | | | | |
| 8/20 | 0.03 | 0.04 | 0.02 | 0.04 | 0.03 | | | | | | 0.02 | | 0.03 | * | 0.03 | 0.03 | 0.03 |
| 8/27 | | | | | | 0.05 | 0.03 | 0.05 | 0.05 | 0.04 | | 0.04 | | | | | |
| 9/3 | 0.05 | 0.06 | 0.05 | 0.08 | 0.06 | | | | | | 0.07 | | 0.06 | 0.03 | 0.07 | 0.06 | 0.05 |
| 9/10 | | | | | | 0.08 | 0.06 | 0.07 | 0.08 | 0.09 | | 0.07 | | | | | |
| 9/17 | 0.05 | 0.05 | 0.06 | 0.05 | 0.05 | | | | | | 0.05 | | 0.06 | 0.04 | 0.06 | 0.06 | 0.06 |
| 9/24 | | | | | | 0.05 | 0.04 | 0.06 | 0.03 | 0.04 | | 0.04 | | | | | |
| 10/1 | 0.06 | 0.05 | 0.04 | 0.04 | 0.04 | | | | | | 0.04 | | 0.04 | 0.05 | 0.05 | 0.03 | 0.03 |
| 10/8 | | | | | | 0.04 | * | 0.02 | 0.04 | 0.03 | | 0.04 | | | | | |
| 10/15 | 0.02 | 0.04 | 0.03 | 0.04 | 0.03 | | | | | | 0.03 | | 0.03 | 0.03 | 0.02 | 0.03 | 0.02 |
| 10/22 | | | | | | 0.03 | 0.04 | 0.04 | 0.03 | 0.02 | | * | | | | | |
| 10/29 | 0.02 | 0.02 | 0.02 | * | 0.02 | | | | | | 0.01 | | 0.03 | 0.03 | 0.02 | 0.03 | 0.02 |
| 11/5 | | | | | | 0.02 | 0.03 | 0.04 | 0.02 | 0.03 | | * | | | | | |
| 11/12 | 0.04 | 0.05 | 0.07 | * | 0.04 | | | | | | 0.05 | | 0.03 | 0.04 | 0.04 | 0.04 | 0.05 |
| 11/19 | | | | | | 0.05 | 0.04 | 0.04 | 0.04 | 0.05 | | * | | | | | |
| 11/26 | 0.03 | 0.02 | 0.03 | 0.03 | 0.02 | | | | | | 0.03 | | 0.04 | 0.03 | 0.04 | 0.03 | 0.02 |
| 12/3 | | | | | | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | | 0.01 | | | | | |
| 12/10 | 0.05 | 0.05 | 0.04 | 0.05 | 0.05 | | | | | | 0.04 | | 0.04 | 0.05 | 0.04 | 0.04 | 0.05 |
| 12/17 | | | | | | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | | 0.04 | | | | | |
| 12/23 | 0.04 | 0.03 | 0.05 | 0.05 | 0.07 | | | | | | 0.05 | | 0.04 | 0.05 | 0.04 | 0.03 | 0.03 |
| Average±2 sample deviations | 0.10±0.12 | 0.09±0.12 | 0.09±0.11 | 0.11±0.13 | 0.10±0.12 | 0.10±0.12 | 0.10±0.13 | 0.10±0.12 | 0.10±0.15 | 0.09±0.11 | 0.09±0.11 | 0.09±0.09 | 0.10±0.12 | 0.09±0.12 | 0.10±0.13 | 0.05±0.04 | 0.04±0.04 |

* Invalid sample
(a) The tabled values are generally for 2-week periods, the week in which the value is tabled and the following week.
(b) As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated.

TABLE I-1, Part B. Concentration of Radioactive Beta Particulates in the Air of the Hanford Environs - 1975[a]

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

| Approx. Wk. on Date[b] | Distant Communities | | | | |
|---|---|---|---|---|---|
| | Moses Lake | Washtucna | Walla Walla | McNary | Sunnyside |
| 1/3 | 0.09 | 0.10 | 0.11 | | 0.09 |
| 1/10 | | | | 0.15 | |
| 1/17 | 0.15 | 0.18 | | | 0.13 |
| 1/24 | | | | 0.15 | |
| 1/31 | 0.19 | | 0.18 | | 0.18 |
| 2/7 | | 0.17 | 0.17 | 0.17 | |
| 2/14 | 0.16 | | | | 0.11 |
| 2/21 | | 0.19 | 0.17 | 0.15 | |
| 2/28 | 0.22 | | | | 0.20 |
| 3/7 | | 0.20 | 0.16 | 0.17 | |
| 3/14 | 0.16 | | | | 0.12 |
| 3/21 | | * | 0.16 | 0.15 | |
| 3/28 | 0.18 | 0.06 | | | 0.18 |
| 4/4 | | | 0.15 | 0.19 | |
| 4/11 | 0.23 | 0.16 | | | 0.20 |
| 4/18 | | | 0.22 | 0.20 | |
| 4/25 | 0.18 | | | | 0.17 |
| 5/2 | | 0.09 | 0.19 | 0.20 | |
| 5/9 | 0.16 | | | | 0.20 |
| 5/16 | | | 0.14 | 0.12 | |
| 5/23 | 0.16 | | | | 0.12 |
| 5/30 | | | 0.14 | 0.13 | |
| 6/6 | 0.10 | | | | 0.08 |
| 6/13 | | | 0.06 | 0.04 | |
| 6/20 | 0.07 | 0.07 | | | 0.06 |
| 6/27 | | | 0.07 | 0.08 | |

* Invalid sample

(a) The tabled values are generally for 2-week periods, the week in which the value is tabled and the following week.

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

TABLE I-1, Part B. (cont'd) Concentration of Radioactive Beta Particulates in the Air of the Hanford Environs - 1975[a]

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

| Approx. Wk. on Date[b] | Distant Communities | | | | |
|---|---|---|---|---|---|
| | Moses Lake | Washtucna | Walla Walla | McNary | Sunnyside |
| 7/7 | 0.13 | | | | 0.09 |
| 7/11 | | 0.05 | | 0.07 | |
| 7/18 | 0.06 | | | | 0.07 |
| 7/25 | | | 0.06 | 0.04 | |
| 8/1 | 0.05 | 0.05 | | | 0.04 |
| 8/8 | | | 0.04 | 0.04 | |
| 8/15 | 0.04 | | | | |
| 8/22 | | 0.03 | 0.03 | 0.03 | |
| 8/29 | 0.04 | | | | 0.04 |
| 9/5 | | 0.04 | | 0.05 | |
| 9/12 | 0.08 | | 0.07 | | 0.06 |
| 9/19 | | | | 0.10 | |
| 9/26 | 0.05 | | 0.04 | | 0.05 |
| 10/3 | | | | 0.03 | |
| 10/10 | 0.03 | 0.04 | 0.04 | | 0.03 |
| 10/17 | | | | 0.03 | |
| 10/24 | 0.03 | 0.03 | 0.04 | | 0.04 |
| 10/31 | | | | 0.04 | |
| 11/7 | 0.02 | 0.03 | 0.03 | | * |
| 11/14 | | | | 0.04 | |
| 11/21 | 0.04 | 0.03 | | | 0.03 |
| 11/28 | | | | 0.02 | |
| 12/5 | 0.02 | 0.04 | 0.03 | | 0.03 |
| 12/12 | | | | 0.03 | |
| 12/19 | 0.04 | 0.04 | 0.03 | | * |
| 12/26 | | | | 0.08 | |
| Average ±2 sample standard deviations | 0.10±0.14 | 0.08±0.12 | 0.10±0.13 | 0.09±0.13 | 0.10±0.12 |

* Invalid sample

(a) The tabled values are generally for 2-week periods, the week in which the value is tabled and the following week.

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

TABLE I-2, Part A. Concentrations of Radioactive Alpha Particulates in the Air of the Hanford Environs - 1975[a]

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

| Approx. Wk. on Date[b] | Perimeter Communities | | | |
|---|---|---|---|---|
| | Richland | Byers Landing | Berg Ranch | Benton City |
| 1/2 | | | * | |
| 1/8 | 0.001 | 0.002 | | 0.001 |
| 1/15 | | | 0.0007 | |
| 1/22 | 0.001 | 0.002 | | 0.0008 |
| 1/29 | | | 0.002 | |
| 2/5 | 0.002 | ** | | 0.002 |
| 2/12 | | | 0.002 | |
| 2/19 | 0.0009 | * | | 0.002 |
| 2/26 | | | * | |
| 3/5 | 0.002 | 0.002 | | 0.001 |
| 3/12 | | | 0.001 | |
| 3/19 | * | 0.002 | | 0.001 |
| 3/26 | | | 0.002 | |
| 4/2 | 0.002 | 0.001 | | 0.001 |
| 4/9 | | | 0.001 | |
| 4/16 | 0.002 | 0.001 | | * |
| 4/23 | | | * | |
| 4/30 | 0.001 | 0.001 | | 0.002 |
| 5/7 | | | 0.001 | |
| 5/14 | 0.001 | * | | 0.001 |
| 5/21 | | | 0.001 | |
| 5/28 | 0.0008 | 0.0008 | | 0.0008 |
| 6/4 | | | 0.0009 | |
| 6/11 | 0.001 | 0.0009 | | 0.001 |
| 6/18 | | | * | |
| 6/25 | 0.002 | 0.001 | | 0.001 |

* Result was less than the analytical limit of 0.0004 x $10^{-12}$ μCi/ml.
** Invalid sample
(a) The tabled values are generally for 2-week periods, the week in which the value is tabled and the following week.
(b) As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated.

TABLE I-2 Part A (cont'd) Concentrations of Radioactive Alpha Particulates in the Air of the Hanford Environs - 1975[a]

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

| Approx. Wk. on Date[b] | Perimeter Communities | | | |
|---|---|---|---|---|
| | Richland | Byers Landing | Berg Ranch | Benton City |
| 7/2 | | | 0.002 | |
| 7/9 | 0.0008 | 0.001 | | 0.0009 |
| 7/16 | | | 0.001 | |
| 7/23 | 0.001 | 0.002 | | 0.001 |
| 7/30 | | | 0.0005 | |
| 8/6 | 0.001 | 0.001 | | 0.0008 |
| 8/13 | | | 0.0009 | |
| 8/20 | ** | 0.001 | | 0.002 |
| 8/27 | | | 0.001 | |
| 9/3 | 0.003 | 0.003 | | 0.002 |
| 9/10 | | | 0.002 | |
| 9/17 | 0.001 | 0.002 | | 0.001 |
| 9/24 | | | 0.0008 | |
| 10/1 | 0.001 | 0.001 | | 0.0008 |
| 10/8 | | | 0.001 | |
| 10/15 | 0.001 | 0.001 | | 0.0009 |
| 10/22 | | | 0.0009 | |
| 10/29 | 0.002 | 0.003 | | 0.0006 |
| 11/5 | | | 0.0008 | |
| 11/12 | 0.001 | 0.001 | | 0.002 |
| 11/19 | | | 0.001 | |
| 11/26 | 0.001 | 0.002 | | 0.001 |
| 12/3 | | | 0.0006 | |
| 12/10 | 0.002 | 0.001 | | 0.002 |
| 12/17 | | | 0.002 | |
| 12/23 | 0.003 | 0.002 | | 0.001 |
| Annual Average[c] | <0.001 | <0.001 | <0.001 | <0.001 |

* Result was less than the analytical limit of 0.0004 x $10^{-12}$ μCi/ml.
** Invalid sample.
(a) The tabled values are generally for 2-week periods, the week in which the value is tabled and the following week.
(b) As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated.
(c) The annual average has been calculated from the result reported for each analysis including "less-than analytical limit" values.

TABLE I-2, Part B. Concentrations of Radioactive Alpha Particulates in the Air of the Hanford Environs - 1975[a]

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

Distant Communities

| Approx.[b] Wk. on Date | Walla Walla | McNary | Approx.[b] Wk. on Date | Walla Walla | McNary |
|---|---|---|---|---|---|
| 1/3 | 0.0008 | | 7/4 | | |
| 1/10 | | 0.001 | 7/11 | | 0.001 |
| 1/17 | | | 7/18 | | |
| 1/24 | | 0.001 | 7/25 | 0.002 | 0.001 |
| 1/31 | 0.002 | | 8/1 | | |
| 2/7 | 0.002 | 0.002 | 8/8 | 0.001 | 0.001 |
| 2/14 | | | 8/15 | | |
| 2/21 | 0.0005 | 0.0008 | 8/22 | 0.001 | 0.002 |
| 2/28 | | | 8/29 | | |
| 3/7 | 0.001 | 0.002 | 9/5 | | 0.002 |
| 3/14 | | | 9/12 | 0.002 | |
| 3/21 | 0.001 | 0.002 | 9/19 | | 0.002 |
| 3/28 | | | 9/26 | 0.001 | |
| 4/4 | 0.0009 | 0.001 | 10/3 | | 0.0007 |
| 4/11 | | | 10/10 | 0.002 | |
| 4/18 | 0.001 | 0.002 | 10/17 | | 0.002 |
| 4/25 | | | 10/24 | 0.002 | |
| 5/2 | 0.001 | 0.0009 | 10/31 | | 0.002 |
| 5/9 | | | 11/7 | 0.001 | |
| 5/16 | 0.002 | 0.001 | 11/14 | | 0.001 |
| 5/23 | | | 11/21 | | |
| 5/30 | 0.002 | 0.001 | 12/5 | 0.0008 | 0.0006 |
| 6/7 | | | 12/12 | | 0.002 |
| 6/13 | 0.0008 | 0.0005 | | | |
| 6/20 | | | | | |
| 6/27 | 0.0008 | 0.002 | Annual[c] Average | 0.001±0.001 | 0.001±0.001 |

(a) The tabled values are generally for 2-week periods, the week in which the value is tabled and the following week.

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

(c) Annual average ± 2 sample standard deviations.

TABLE I-3. Concentrations of $^{131}I$ in the Air of the Hanford Environs - 1975[a]

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

| Approx.[b] Wk. on Date | Baxter Substation | Byers Landing | Richland | Benton City |
|---|---|---|---|---|
| 1/2 | * | | | |
| 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 | | * | * | * |
| 5/7 | * | | | |
| 5/14 | | * | * | * |
| 5/21 | * | | | |
| 5/28 | | * | * | * |
| 6/4 | * | | | |
| 6/11 | | * | * | * |
| 6/18 | * | | | |
| 6/25 | | * | * | * |

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

(a) The tabled values are generally for 2-week periods, the week in which the value is tabled and the following week.

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

TABLE I-3 (Cont'd). Concentrations of $^{131}I$ in the Air of the Hanford Environs - 1975[a]

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

| Approx.[b] Wk. on Date | Baxter Substation | Byers Landing | Richland | Benton City |
|---|---|---|---|---|
| 7/2 | * | | | |
| 7/9 | | * | * | * |
| 7/16 | * | | | |
| 7/23 | | * | * | * |
| 7/30 | * | | | |
| 8/6 | | * | * | * |
| 8/13 | * | | | |
| 8/20 | | * | * | * |
| 8/27 | * | | | |
| 9/3 | | * | * | * |
| 9/10 | * | | | |
| 9/17 | | * | * | * |
| 9/24 | * | | | |
| 10/1 | | * | * | * |
| 10/8 | * | | | |
| 10/15 | | * | * | * |
| 10/22 | * | | | |
| 10/27 | | * | * | * |
| 11/5 | * | | | |
| 11/12 | | * | * | * |
| 11/19 | * | | | |
| 11/26 | | * | * | * |
| 12/3 | * | | | |
| 12/10 | | * | * | * |
| 12/17 | * | | | |
| 12/24 | | * | * | * |
| Annual Average | * | * | * | * |

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

(a) The tabled values are generally for 2-week periods, the week in which the value is tabled and the following week.

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

Table I-4. Concentrations of Tritium in the Air of the Hanford Environs - 1975[a]

(Units of $10^{-9}$ μCi/ml of Water)

| Approx. on Date[b] | Berg Ranch | Vol. Water (ml) | Baxter Substation | Vol. Water (ml) | Richland | Vol. Water (ml) |
|---|---|---|---|---|---|---|
| Anal. Limit | 370 | | 370 | | 370 | |
| 1/15 | * | 21 | * | 12 | | |
| 1/22 | | | | | * | 20 |
| 1/29 | * | 20 | * | 20 | | |
| 2/5 | | | | | 200 | 10 |
| 2/12 | 150 | 15 | * | 15 | | |
| 2/19 | | | | | 4100 | 15 |
| 2/26 | 760 | 15 | 1700 | 15 | | |
| 3/5 | | | | | 1300 | 12 |
| 3/12 | 570 | 10 | 320 | 10 | | |
| 3/19 | | | | | 460 | 5 |
| 3/26 | * | 20 | 420 | 10 | | |
| 4/2 | | | | | 550 | 18 |
| 4/9 | 210 | 15 | 190 | 20 | | |
| 4/16 | | | | | 230 | 5 |
| 4/23 | * | 20 | * | 12 | | |
| 4/30 | | | | | 520 | 8 |
| 5/7 | 270 | 10 | 630 | 22 | | |
| 5/14 | | | | | 690 | 16 |
| 5/21 | 590 | 20 | 1900 | 10 | | |
| 5/28 | | | | | * | 7 |
| 6/4 | 1900 | 12 | 500 | 5 | | |
| 6/11 | | | | | 350 | 15 |
| 6/18 | 2100 | 5 | 400 | 12 | | |
| 6/25 | | | | | 2800 | 4 |
| 7/2 | * | 18 | 5100 | 20 | | |
| 7/9 | | | | | * | 7 |
| 7/16 | 470 | 10 | * | 5 | | |
| 7/23 | | | | | * | 5 |
| 7/30 | 670 | 12 | 370 | 14 | | |

* Result was less than the analytical limit.

(a) The tabled values are generally for 2-week periods, the week in which the value is tabled and the following week.

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

Table I-4 (Cont'd). Concentrations of Tritium in the Air of the Hanford Environs - 1975[a]

(Units of $10^{-9}$ μCi/ml of Water)

| Approx. on Date[b] | Berg Ranch | Vol. Water (ml) | Baxter Substation | Vol. Water (ml) | Richland | Vol. Water (ml) |
|---|---|---|---|---|---|---|
| Anal. Limit | 370 | | 370 | | 370 | |
| 8/6 | | | | | 760 | 10 |
| 8/13 | 410 | 14 | 320 | 18 | | |
| 8/20 | | | | | ** | ** |
| 8/27 | 560 | 14 | 510 | 10 | | |
| 9/3 | | | | | * | 6 |
| 9/10 | 530 | 10 | 3000 | 11 | | |
| 9/17 | | | | | * | 10 |
| 9/24 | 30000 | 20 | 8300 | 12 | | |
| 10/1 | | | | | 2100 | 7 |
| 10/8 | 1900 | 12 | * | 2 | | |
| 10/15 | | | | | 660 | 20 |
| 10/22 | * | 28 | * | 20 | | |
| 10/29 | | | | | * | 20 |
| 11/5 | * | 32 | ** | ** | | |
| 11/12 | | | | | * | 25 |
| 11/19 | * | 15 | ** | ** | | |
| 11/26 | | | | | * | 22 |
| 12/3 | * | 23 | 640 | 18 | | |
| 12/10 | | | | | * | 8 |
| 12/17 | * | 30 | 100 | 17 | | |
| 12/26 | | | | | * | 38 |
| Annual Average[c] | <1600 | | <1100 | | <650 | |

* Result was less than the analytical limit.

** Invalid sample.

(a) The tabled values are generally for 2-week periods, the week in which the value is tabled and the following week.

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

(c) The annual average has been calculated from the result reported for each analysis including less-than values.

## TABLE I-5. Concentrations of Specific Radionuclides on Selected Air Filter Composites - 1975

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

| Date | $^{7}Be$ | $^{54}Mn$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ | $^{95}ZrNb$ | $^{106}Ru$ | $^{134}Cs$ | $^{137}Cs$ | $^{144}CePr$ | Total Pu |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Analytical Limit[a] | 0.04 | 0.002 | 0.004 | 0.007 | 0.0002 | 0.003 | 0.06 | 0.02 | 0.004 | 0.04 | 0.000002 |
| **Inner Southwest Quadrant** | | | | | | | | | | | |
| 1/22 | 0.03 | * | * | * | | 0.02 | 0.09 | * | * | * | |
| 2/19 | * | * | * | * | | 0.03 | * | * | * | 0.03 | |
| 3/19 | * | 0.007 | * | * | 0.002 | 0.03 | 0.16 | * | 0.003 | 0.07 | 0.00001 |
| 4/30 | 0.05 | 0.003 | * | * | | 0.02 | 0.09 | * | 0.005 | 0.04 | |
| 5/28 | 0.03 | * | * | * | | 0.03 | 0.20 | * | * | 0.05 | |
| 6/25 | 0.09 | * | * | * | 0.002 | 0.01 | 0.09 | * | * | 0.03 | 0.00001 |
| 7/23 | 0.12 | * | * | * | | 0.005 | * | * | * | * | |
| 8/20 | * | * | * | * | | * | 0.15 | * | * | * | |
| 9/17 | * | * | * | * | 0.0008 | * | 0.23 | * | * | * | 0.000008 |
| 10/29 | 0.05 | * | * | * | | * | 0.12 | * | * | * | |
| 11/26 | 0.03 | * | * | * | | * | 0.10 | * | * | * | |
| 12/23 | 0.04 | * | * | * | 0.003 | * | * | * | * | * | 0.000003 |
| Annual Average[b] | <0.04 | <0.0009 | * | * | 0.002 | <0.01 | <0.11 | * | <0.0006 | <0.02 | 0.000008 |
| **Inner Northwest Quadrant** | | | | | | | | | | | |
| 1/29 | * | * | * | * | | 0.02 | 0.12 | * | * | * | |
| 2/26 | 0.06 | * | * | * | | 0.04 | * | * | * | 0.06 | |
| 3/31 | 0.10 | 0.01 | * | * | 0.0004 | 0.03 | 0.04 | * | 0.005 | 0.06 | 0.00002 |
| 4/30 | 0.08 | 0.004 | * | * | | 0.02 | 0.04 | * | 0.006 | 0.03 | |
| 5/28 | 0.15 | * | * | * | | 0.03 | 0.06 | * | 0.007 | 0.04 | |
| 6/25 | 0.07 | * | * | * | 0.002 | 0.01 | 0.13 | * | * | * | 0.00004 |
| 7/30 | 0.08 | * | * | * | | 0.005 | 0.10 | * | * | * | |
| 8/27 | * | * | * | * | | * | 0.10 | * | * | * | |
| 9/29 | 0.09 | * | * | * | 0.0007 | * | 0.11 | * | * | * | 0.000009 |
| 10/29 | 0.09 | * | * | * | | * | * | * | * | * | |
| 11/26 | * | * | * | * | | * | 0.08 | * | * | * | |
| 12/31 | * | * | * | * | 0.001 | * | 0.10 | * | * | * | * |
| Annual Average[b] | <0.06 | <0.001 | * | * | 0.001 | <0.01 | <0.08 | * | <0.001 | <0.02 | <0.00002 |
| **Inner Northeast Quadrant** | | | | | | | | | | | |
| 1/31 | 0.03 | * | * | * | | 0.02 | 0.09 | * | * | 0.02 | |
| 2/28 | 0.03 | * | * | * | | 0.04 | * | * | * | 0.03 | |
| 3/28 | 0.05 | * | * | * | 0.0003 | 0.04 | 0.12 | * | 0.002 | 0.05 | 0.00002 |
| 4/25 | 0.08 | 0.005 | * | * | | 0.03 | 0.11 | * | 0.006 | 0.05 | |
| 5/29 | 0.07 | * | * | * | | 0.02 | 0.10 | * | 0.003 | 0.04 | |
| 6/24 | 0.03 | * | * | * | 0.003 | 0.01 | 0.20 | * | * | 0.04 | 0.00004 |
| 7/30 | 0.12 | * | * | * | | 0.004 | * | * | 0.002 | * | |
| 8/29 | 0.04 | * | * | * | | * | 0.06 | * | * | * | |
| 9/26 | 0.04 | * | * | * | 0.0004 | * | 0.18 | * | * | * | 0.000007 |
| 10/30 | 0.03 | * | * | * | | * | 0.10 | * | * | * | |
| 11/25 | 0.06 | * | * | * | | * | 0.04 | * | * | * | |
| 12/29 | 0.04 | * | * | * | 0.0002 | * | 0.08 | * | * | * | * |
| Annual Average[b] | 0.05 | <0.0004 | * | * | 0.001 | <0.01 | <0.09 | * | <0.0009 | <0.02 | <0.00002 |
| **Inner Southeast Quadrant** | | | | | | | | | | | |
| 1/20 | * | * | * | * | | 0.02 | 0.22 | * | * | * | |
| 2/18 | * | * | 0.09 | * | | 0.04 | * | * | * | 0.05 | |
| 3/31 | * | * | * | * | 0.002 | 0.03 | * | * | 0.003 | 0.05 | 0.00002 |
| 4/28 | 0.09 | 0.004 | * | * | | 0.03 | 0.07 | * | 0.007 | 0.07 | |
| 5/27 | 0.04 | * | * | * | | 0.02 | 0.16 | * | 0.004 | 0.03 | |
| 6/23 | * | * | * | * | * | 0.01 | 0.18 | * | * | * | 0.00009 |
| 7/30 | 0.06 | * | * | * | | 0.004 | 0.10 | * | * | * | |
| 8/27 | 0.04 | * | * | * | | 0.001 | 0.10 | * | * | * | |
| 9/29 | 0.07 | * | * | * | 0.00008 | * | 0.11 | * | * | * | 0.000008 |
| 10/31 | 0.04 | * | * | * | | * | 0.12 | * | * | * | |
| 11/24 | * | * | * | * | | * | 0.08 | * | * | * | |
| 12/29 | 0.04 | * | * | * | 0.0006 | * | 0.06 | * | * | * | 0.000006 |
| Annual Average[b] | <0.03 | <0.0003 | <0.007 | * | <0.0007 | <0.01 | <0.10 | * | <0.0009 | <0.02 | 0.00003 |

No entry indicates no analysis was made.
* Indicates result was less than analytical limit.
(a) The analytical limit shown is the average of the individual anlaytical limits for all samples.
(b) The annual average has been calculated from the result reported for each analysis including "less-than analytical limit" values.

TABLE I-5. (Cont'd) Concentrations of Specific Radionuclides on Selected Air Filter Composites - 1975

Units of $10^{-12}$ $\mu$Ci/ml of Air (Continuous Samples)

| Date | $^{7}Be$ | $^{54}Mn$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ | $^{95}ZrNb$ | $^{106}Ru$ | $^{134}Cs$ | $^{137}Cs$ | $^{144}CePr$ | Total Pu |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Analytical Limit[a] | 0.04 | 0.002 | 0.004 | 0.007 | 0.0002 | 0.003 | 0.06 | 0.02 | 0.004 | 0.04 | 0.000002 |
| | | | | | Outer Northeast Quadrant | | | | | | |
| 1/17 | * | * | * | * | | 0.02 | 0.16 | * | * | * | |
| 2/21 | * | * | * | * | | 0.03 | * | * | * | * | |
| 3/21 | * | 0.01 | * | * | 0.002 | 0.02 | 0.11 | * | * | 0.06 | 0.00002 |
| 4/25 | 0.10 | 0.004 | * | * | | 0.02 | * | * | 0.006 | * | |
| 5/23 | * | * | * | * | | 0.03 | 0.15 | * | * | * | |
| 6/20 | * | * | * | * | 0.003 | 0.01 | 0.15 | * | * | * | 0.0001 |
| 7/18 | 0.14 | * | * | * | | 0.007 | * | * | * | * | |
| 8/29 | * | * | * | * | | * | 0.09 | * | * | * | |
| 9/26 | * | * | * | * | 0.001 | * | 0.19 | * | * | * | 0.00002 |
| 10/24 | * | * | * | * | | * | 0.14 | * | * | * | |
| 11/21 | * | * | * | * | | * | 0.18 | * | * | * | |
| 12/19 | * | * | * | * | 0.001 | * | * | * | * | * | * |
| Annual Average[b] | <0.03 | <0.001 | * | * | 0.002 | <0.01 | <0.11 | * | <0.0008 | <0.01 | <0.00004 |
| | | | | | Outer Southeast Quadrant | | | | | | |
| 1/24 | * | * | * | * | | 0.02 | 0.19 | * | * | * | |
| 2/21 | 0.03 | * | * | * | | 0.03 | * | * | * | 0.03 | |
| 3/21 | * | * | * | * | 0.002 | 0.03 | 0.20 | * | * | * | 0.00002 |
| 4/19 | * | * | * | * | | 0.03 | 0.14 | * | * | * | |
| 5/30 | 0.07 | * | * | * | | 0.03 | 0.16 | * | * | * | |
| 6/26 | * | * | * | * | 0.002 | 0.02 | 0.14 | * | * | * | 0.00004 |
| 7/25 | 0.09 | * | * | * | | 0.005 | 0.10 | * | * | * | |
| 8/22 | * | * | * | * | | * | 0.22 | * | * | * | |
| 9/26 | 0.06 | * | * | * | 0.0008 | * | 0.14 | * | * | * | 0.00002 |
| 10/31 | * | * | * | * | | * | 0.15 | * | * | * | |
| 11/14 | * | * | * | * | | * | * | * | * | * | |
| 12/20 | 0.05 | * | * | * | 0.001 | * | 0.05 | * | * | * | 0.000006 |
| Annual Average[b] | <0.03 | * | * | * | 0.002 | <0.01 | <0.13 | * | * | <0.005 | 0.00002 |
| | | | | | Outer Western Quadrant | | | | | | |
| 1/27 | * | * | * | * | | 0.02 | 0.18 | * | * | * | |
| 2/24 | * | * | * | * | | 0.03 | * | * | * | * | |
| 3/24 | 0.18 | 0.01 | * | 0.02 | 0.01 | 0.03 | * | * | 0.01 | * | 0.00002 |
| 4/21 | 0.12 | * | * | * | | 0.03 | * | * | * | * | |
| 5/19 | * | * | * | * | | 0.04 | * | * | * | * | |
| 6/16 | * | * | * | * | 0.003 | * | 0.27 | * | * | * | 0.00006 |
| 7/28 | * | * | * | * | | * | 0.17 | * | * | * | |
| 8/27 | * | * | * | * | | * | * | * | * | * | |
| 9/22 | * | * | * | * | 0.0005 | * | * | * | * | * | 0.000005 |
| 10/20 | * | * | * | * | | * | * | * | * | * | |
| 11/17 | * | * | * | * | | * | * | * | * | * | |
| 12/29 | * | * | * | * | 0.001 | * | * | * | * | * | 0.00005 |
| Annual Average[b] | <0.03 | <0.001 | * | <0.001 | 0.004 | <0.01 | <0.09 | * | <0.002 | * | 0.00003 |

No entry indicates no analysis was made.
* Indicates result was less than analytical limit.
(a) The analytical limit shown is the average of the individual analytical limits for all samples.
(b) The annual average has been calculated from the result reported for each analysis including "less-than analytical limit" values.

# II. NONRADIOLOGICAL PARAMETERS MEASURED IN THE ATMOSPHERE

## II. NONRADIOLOGICAL PARAMETERS MEASURED IN THE ATMOSPHERE

HEHF, under contract to ERDA, has the responsibility for monitoring the nonradiological quality of the atmosphere in the Hanford environs. Monitoring activities during 1975 included 24-hour sequential sampling for $NO_2$ and $SO_2$ at three locations across the Columbia River from Richland, North Richland, and Hanford 300-Area operations. HEHF documents should be referred to for greater detail but the following tables, obtained from HEHF, contain data obtained during 1975 regarding $NO_2$ and $SO_2$ concentrations in the atmosphere of the Hanford environs.

The following tables are included in Section II:


| | | Page |
|---|---|---|
| Table II-1. | Nitrogen Dioxide in the Air at the Hobkirk Ranch - 1975 | II-2 |
| Table II-2. | Nitrogen Dioxide in the Air at the Gillum Ranch - 1975 | II-4 |
| Table II-3. | Nitrogen Dioxide in the Air at the Sullivan Ranch - 1975 | II-6 |
| Table II-4. | Sulfur Dioxide in the Air of the Hobkirk Ranch, the Gillum Ranch and at the Sullivan Ranch - 1975[a] | II-8 |

TABLE II-1. Nitrogen Dioxide in the Air[a] at the Hobkirk Ranch - 1975

(Units of ppm in Air)

| Date | Concentration $NO_2$ | Date | Concentration $NO_2$ |
|---|---|---|---|
| 1/8 | 0.002 | 4/2 | 0.003 |
| 1/9 | 0.002 | 4/3 | 0.004 |
| 1/10 | 0.001 | 4/4 | 0.003 |
| 1/11 | 0.001 | 4/5 | 0.003 |
| 1/12 | 0.003 | 4/6 | 0.003 |
| 1/13 | 0.002 | 4/7 | 0.004 |
| 1/14 | 0.002 | 4/8 | 0.005 |
| 1/22 | 0.009 | 4/16 | 0.004 |
| 1/23 | 0.004 | 4/17 | 0.003 |
| 1/24 | 0.003 | 4/18 | 0.002 |
| 1/25 | 0.002 | 4/19 | 0.002 |
| 1/26 | 0.002 | 4/20 | 0.004 |
| 1/27 | 0.0003 | 4/21 | 0.004 |
| 2/7 | 0.004 | 4/22 | 0.003 |
| 2/8 | 0.002 | 4/30 | 0.005 |
| 2/9 | 0.003 | 5/1 | 0.004 |
| 2/10 | 0.003 | 5/2 | 0.003 |
| 2/11 | 0.004 | 5/3 | 0.002 |
| 2/19 | 0.004 | 5/4 | 0.002 |
| 2/20 | 0.002 | 5/5 | 0.002 |
| 2/21 | 0.004 | 5/6 | 0.003 |
| 2/22 | 0.004 | 5/14 | 0.006 |
| 2/23 | 0.001 | 5/15 | 0.004 |
| 2/24 | 0.010 | 5/16 | 0.004 |
| 2/25 | 0.002 | 5/17 | 0.003 |
| 3/5 | 0.003 | 5/18 | 0.002 |
| 3/6 | 0.002 | 5/19 | 0.002 |
| 3/7 | 0.002 | 5/20 | 0.003 |
| 3/8 | 0.002 | 5/28 | 0.006 |
| 3/9 | 0.003 | 5/29 | 0.005 |
| 3/10 | 0.003 | 5/30 | 0.004 |
| 3/11 | 0.002 | 5/31 | 0.004 |
| 3/19 | 0.004 | 6/1 | 0.006 |
| 3/20 | 0.003 | 6/2 | 0.004 |
| 3/21 | 0.004 | 6/3 | 0.003 |
| 3/23 | 0.002 | 6/11 | 0.004 |
| 3/25 | 0.002 | 6/12 | 0.002 |

(a) HEHF supplied the tabled data. The reader is encouraged to refer to their documents for greater detail.

TABLE II-1. (Cont'd) Nitrogen Dioxide in the Air at the Hobkirk Ranch - 1975[a]

(Units of ppm in Air)

| Date | Concentration $NO_2$ | Date | Concentration $NO_2$ |
|---|---|---|---|
| 6/13 | 0.002 | 9/20 | 0.002 |
| 6/14 | 0.002 | 9/21 | 0.005 |
| 6/15 | 0.005 | 9/22 | 0.004 |
| 6/16 | 0.002 | 9/23 | 0.004 |
| 6/17 | 0.004 | 10/15 | 0.003 |
| 7/9 | 0.005 | 10/16 | 0.003 |
| 7/10 | 0.012 | 10/17 | 0.002 |
| 7/11 | 0.010 | 10/18 | 0.003 |
| 7/12 | 0.001 | 10/19 | 0.004 |
| 7/13 | 0.001 | 11/12 | 0.005 |
| 7/14 | 0.005 | 11/13 | 0.004 |
| 7/15 | 0.005 | 11/14 | 0.013 |
| 7/23 | 0.004 | 11/15 | 0.003 |
| 7/25 | 0.004 | 11/16 | 0.002 |
| 7/26 | 0.004 | 11/17 | 0.004 |
| 7/28 | 0.004 | 11/19 | 0.007 |
| 7/29 | 0.003 | 11/20 | 0.006 |
| 8/6 | 0.004 | 11/21 | 0.004 |
| 8/7 | 0.004 | 11/22 | 0.005 |
| 8/8 | 0.004 | 11/23 | 0.004 |
| 8/9 | 0.006 | 11/24 | 0.006 |
| 8/10 | 0.001 | 12/3 | 0.002 |
| 8/11 | 0.003 | 12/4 | 0.006 |
| 8/12 | 0.001 | 12/5 | 0.001 |
| 8/20 | 0.006 | 12/6 | 0.003 |
| 8/21 | 0.004 | 12/7 | 0.003 |
| 8/22 | 0.006 | 12/8 | 0.009 |
| 8/23 | 0.004 | 12/9 | 0.003 |
| 9/3 | 0.004 | 12/18 | 0.010 |
| 9/4 | 0.003 | 12/19 | 0.009 |
| 9/5 | 0.005 | 12/20 | 0.012 |
| 9/6 | 0.006 | 12/21 | 0.002 |
| 9/7 | 0.002 | 12/22 | 0.008 |
| 9/8 | 0.004 | 12/23 | 0.008 |
| 9/17 | 0.006 | | |
| 9/18 | 0.003 | Average | 0.004 |
| 9/19 | 0.008 | | |

(a) HEHF supplied the tabled data. The reader is encouraged to refer to their documents for greater detail.

TABLE II-2. Nitrogen Dioxide in the Air at the Gillum Ranch - 1975[a]

(Units of ppm in Air)

| Date | Concentration $NO_2$ | Date | Concentration $NO_2$ |
|---|---|---|---|
| 1/8 | 0.002 | 4/8 | 0.003 |
| 1/9 | 0.002 | 4/16 | 0.004 |
| 1/10 | 0.007 | 4/17 | 0.003 |
| 1/11 | 0.001 | 4/18 | 0.003 |
| 1/12 | 0.004 | 4/19 | 0.002 |
| 1/13 | 0.004 | 4/20 | 0.002 |
| 1/14 | 0.002 | 4/21 | 0.004 |
| 1/22 | 0.006 | 4/22 | 0.004 |
| 1/23 | 0.004 | 4/30 | 0.005 |
| 1/24 | 0.003 | 5/1 | 0.004 |
| 1/25 | 0.002 | 5/2 | 0.002 |
| 1/26 | 0.002 | 5/3 | 0.001 |
| 1/27 | 0.003 | 5/4 | 0.002 |
| 2/19 | 0.006 | 5/5 | 0.002 |
| 2/20 | 0.002 | 5/14 | 0.003 |
| 2/21 | 0.007 | 5/15 | 0.006 |
| 2/22 | 0.006 | 5/16 | 0.004 |
| 2/24 | 0.005 | 5/17 | 0.004 |
| 2/25 | 0.006 | 5/18 | 0.002 |
| 3/5 | 0.002 | 5/19 | 0.002 |
| 3/6 | 0.002 | 5/20 | 0.004 |
| 3/8 | 0.002 | 6/25 | 0.004 |
| 3/9 | 0.003 | 6/26 | 0.003 |
| 3/10 | 0.002 | 6/27 | 0.002 |
| 3/11 | 0.003 | 6/28 | 0.002 |
| 3/19 | 0.005 | 6/30 | 0.003 |
| 3/20 | 0.003 | 7/9 | 0.008 |
| 3/21 | 0.004 | 7/10 | 0.006 |
| 3/23 | 0.002 | 7/11 | 0.008 |
| 3/24 | 0.002 | 7/12 | 0.004 |
| 3/25 | 0.002 | 7/23 | 0.003 |
| 4/2 | 0.004 | 7/25 | 0.003 |
| 4/3 | 0.003 | 7/26 | 0.004 |
| 4/4 | 0.002 | 7/27 | 0.004 |
| 4/5 | 0.003 | 7/28 | 0.002 |
| 4/6 | 0.004 | 7/29 | 0.002 |
| 4/7 | 0.004 | 8/6 | 0.004 |

(a) HEHF supplied the tabled data. The reader is encouraged to refer to their documents for greater detail.

TABLE II-2. (Cont'd) Nitrogen Dioxide in the Air at the Gillum Ranch - 1975[a]

(Units of ppm in Air)

| Date | Concentration $NO_2$ | Date | Concentration $NO_2$ |
|---|---|---|---|
| 8/7 | 0.002 | 10/6 | 0.005 |
| 8/8 | 0.004 | 10/29 | 0.009 |
| 8/9 | 0.004 | 10/30 | 0.003 |
| 8/10 | 0.003 | 10/31 | 0.004 |
| 8/20 | 0.009 | 11/1 | 0.002 |
| 8/21 | 0.005 | 11/2 | 0.002 |
| 8/22 | 0.004 | 11/3 | 0.005 |
| 8/23 | 0.004 | 11/4 | 0.011 |
| 9/4 | 0.005 | 11/12 | 0.004 |
| 9/5 | 0.006 | 11/13 | 0.007 |
| 9/6 | 0.006 | 11/14 | 0.004 |
| 9/7 | 0.007 | 11/15 | 0.002 |
| 9/8 | 0.006 | 11/16 | 0.001 |
| 9/17 | 0.003 | 11/17 | 0.003 |
| 9/18 | 0.004 | 11/19 | 0.005 |
| 9/19 | 0.001 | 12/3 | 0.002 |
| 9/20 | 0.003 | 12/4 | 0.005 |
| 9/21 | 0.005 | 12/5 | 0.005 |
| 9/22 | 0.004 | 12/6 | 0.005 |
| 10/1 | 0.005 | 12/7 | 0.005 |
| 10/2 | 0.006 | 12/18 | 0.014 |
| 10/3 | 0.004 | 12/19 | 0.008 |
| 10/4 | 0.004 | 12/20 | 0.011 |
| 10/5 | 0.006 | | |
| | | Average | 0.004 |

(a) HEHF supplied the tabled data. The reader is encouraged to refer to their documents for greater detail.

TABLE II-3. Nitrogen Dioxide in the Air at the Sullivan Ranch - 1975[a]

(Units of ppm in Air)

| Date | Concentration $NO_2$ | Date | Concentration $NO_2$ |
|---|---|---|---|
| 1/8 | 0.001 | 4/17 | 0.003 |
| 1/9 | 0.001 | 4/18 | 0.002 |
| 1/10 | 0.002 | 4/19 | 0.003 |
| 1/11 | 0.001 | 4/20 | 0.003 |
| 1/12 | 0.001 | 4/21 | 0.006 |
| 1/13 | 0.001 | 4/22 | 0.004 |
| 1/14 | 0.001 | 6/25 | 0.004 |
| 1/22 | 0.005 | 6/26 | 0.001 |
| 1/23 | 0.004 | 6/27 | 0.002 |
| 1/24 | 0.003 | 6/28 | 0.003 |
| 1/25 | 0.002 | 6/29 | 0.003 |
| 1/26 | 0.003 | 6/30 | 0.003 |
| 1/27 | 0.004 | 7/1 | 0.004 |
| 2/8 | 0.005 | 8/20 | 0.004 |
| 2/9 | 0.011 | 8/21 | 0.005 |
| 2/10 | 0.003 | 8/22 | 0.006 |
| 2/19 | 0.004 | 8/23 | 0.001 |
| 2/20 | 0.004 | 9/3 | 0.001 |
| 2/22 | 0.006 | 9/4 | 0.001 |
| 2/23 | 0.004 | 9/5 | 0.002 |
| 2/24 | 0.005 | 9/6 | 0.002 |
| 2/25 | 0.003 | 9/7 | 0.001 |
| 3/18 | 0.004 | 9/8 | 0.010 |
| 3/20 | 0.002 | 9/9 | 0.004 |
| 3/21 | 0.003 | 9/17 | 0.006 |
| 3/22 | 0.002 | 9/18 | 0.002 |
| 3/23 | 0.002 | 9/19 | 0.003 |
| 3/24 | 0.004 | 9/20 | 0.002 |
| 3/25 | 0.002 | 9/21 | 0.003 |
| 4/2 | 0.002 | 9/22 | 0.003 |
| 4/3 | 0.003 | 9/23 | 0.004 |
| 4/4 | 0.002 | 10/15 | 0.001 |
| 4/5 | 0.004 | 10/16 | 0.003 |
| 4/6 | 0.003 | 10/17 | 0.002 |
| 4/7 | 0.006 | 10/18 | 0.003 |
| 4/8 | 0.005 | 10/19 | 0.002 |
| 4/16 | 0.004 | 10/20 | 0.002 |

(a) HEHF supplied the tabled data. The reader is encouraged to refer to their documents for greater detail.

TABLE II-3. (Cont'd) Nitrogen Dioxide in the Air at the Sullivan Ranch - 1975[a]

(Units of ppm in Air)

| Date | Concentration $NO_2$ | Date | Concentration $NO_2$ |
|---|---|---|---|
| 10/21 | 0.002 | 11/19 | 0.003 |
| 10/29 | 0.003 | 12/3 | 0.001 |
| 10/30 | 0.003 | 12/4 | 0.002 |
| 10/31 | 0.002 | 12/5 | 0.003 |
| 11/1 | 0.001 | 12/6 | 0.002 |
| 11/2 | 0.002 | 12/7 | 0.009 |
| 11/3 | 0.002 | 12/8 | 0.009 |
| 11/4 | 0.004 | 12/18 | 0.011 |
| 11/12 | 0.003 | 12/19 | 0.006 |
| 11/13 | 0.004 | 12/20 | 0.004 |
| 11/14 | 0.002 | 12/21 | 0.004 |
| 11/15 | 0.001 | 12/22 | 0.008 |
| 11/16 | 0.001 | 12/23 | 0.008 |
| 11/17 | 0.002 | | |
| | | Average | 0.003 |

(a) HEHF supplied the tabled data. The reader is encouraged to refer to their documents for greater detail.

TABLE II-4. Sulfur Dioxide in the Air at the Hobkirk Ranch, the Gillum Ranch and at the Sullivan Ranch - 1975[a]

A total of 327 samples were collected from the sequential monitoring stations and analyzed for $SO_2$ during CY-1975. All 24-hour integrated concentrations were less than 0.005 ppm.

(a) HEHF supplied this data. The reader is encouraged to refer to their documents for greater detail.

# III. RADIOLOGICAL PARAMETERS MEASURED IN COLUMBIA RIVER WATER

## III. RADIOLOGICAL PARAMETERS MEASURED IN COLUMBIA RIVER WATER

Columbia River water sampling locations during 1975 are as follows:

Priest Rapids: Continuous "Filter-Resin" sample.

Vernita Bridge: Weekly grab sample.

100-B: Cumulative sample.

Hanford Powerline: Monthly grab sample.

300 Area: Cumulative sample.

300 Area: Continuous "Filter-Resin" sample.

Richland pumping dock: Cumulative sample.

Richland pumping dock: Weekly grab sample.

Bonneville Dam: Cumulative sample.

The grab samples are simply a collection of a desired quantity of river water on a single occasion during either a weekly or monthly time period. Cumulative samplers collect approximately 30 milliliters of water every 30 minutes from a constant stream of pumped river water. The "filter ion-exchange-resin" sampler is operated by Battelle's Radiological Chemistry Section. The sampler operates continuously during which the river water flows ($\sim$3 liters/hour) through a nylon filter which removes all macro ($>5\mu$) particles, through a series of fiberglass filters which remove all particles greater than $0.3\mu$, and then the filtered water flows through the resin to remove all soluble radionuclides with the obvious exception of tritium. The filters and resin are changed biweekly and counted by Battelle's Radiological Chemistry Section with a high sensitivity multi-dimensional (coincidence) gamma ray spectrometer to measure the different radionuclides. All of the other samples are analyzed by U. S. Testing Company.

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TABLE III-1. Concentrations of Radionuclides in the Columbia River at Priest Rapids - (Filtration Ion Exchange Column - Soluble Samples) - 1975

(Units of $10^{-9}$ μCi/ml of Water)

| Sampling Interval | | $^{40}K$ | $^{54}Mn$ | $^{60}Co$ | $^{65}Zn$ | $^{95}Zr$-Nb | $^{106}Ru$ | $^{137}Cs$ | $^{152}Eu$ | $^{226}Ra$ | $^{228}Th$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Approximate Detection Level | | 0.009 | 0.014 | 0.00045 | 0.0045 | 0.0045 | 0.0045 | 0.0045 | 0.018 | 0.0023 | 0.00045 |
| 10/9 | 10/23 | 0.45 | * | 0.0032 | * | * | 0.06 | * | * | 0.01 | 0.004 |
| 10/23 | 11/6 | 0.41 | * | * | * | * | 0.06 | * | * | 0.01 | 0.002 |
| 11/6 | 11/20 | 0.69 | * | * | * | * | 0.05 | * | * | 0.04 | 0.001 |
| 11/20 | 12/4 | 0.62 | * | 0.00045 | * | * | 0.05 | * | * | 0.03 | 0.004 |
| 12/4 | 12/18 | 0.32 | * | * | * | * | 0.05 | * | * | 0.02 | 0.003 |
| 12/18 | 12/31 | 0.44 | * | * | * | * | 0.04 | * | * | 0.01 | 0.002 |
| Average[b] | | 0.49±0.28 | * | <0.0009 | * | * | 0.05 | * | * | 0.02±0.03 | 0.003±0.002 |

* Less than the approximate detection level.

(a) $^{90}Sr$ and $^{239}Pu$ data not available at time of publication.

(b) Average and two sample standard deviations shown if radionuclides detected in all samples. Otherwise a less-than number is calculated from the other results, including less-than values.

TABLE III-2. Concentrations of Radionuclides in the Columbia River at Priest Rapids - (Filtration Ion Exchange Column - Particulate Samples) - 1975

(Units of $10^{-9}$ μ Ci/ml of Water)

| Sampling Interval | | $^{40}K$ | $^{54}Mn$ | $^{60}Co$ | $^{65}Zn$ | $^{95}ZrNb$ | $^{106}Ru$ | $^{137}Cs$ | $^{152}Eu$ | $^{226}Ra$ | $^{228}Th$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Approximate Detection Level | | 0.009 | 0.014 | 0.00045 | 0.0045 | 0.0045 | 0.0045 | 0.0045 | 0.018 | 0.0023 | 0.00045 |
| 10/9 | 10/23 | 0.002 | * | * | 0.004 | * | 0.004 | * | * | 0.002 | 0.001 |
| 10/23 | 11/6 | 0.02 | * | * | | * | 0.007 | * | * | 0.003 | 0.002 |
| 11/6 | 11/20 | 0.02 | * | * | * | * | 0.004 | 0.0009 | * | 0.004 | * |
| 11/20 | 12/4 | * | * | * | * | * | * | * | * | 0.002 | 0.0009 |
| 12/4 | 12/18 | * | * | * | * | * | * | * | * | 0.002 | 0.001 |
| 12/18 | 12/31 | * | * | * | * | * | 0.002 | * | * | 0.002 | 0.0004 |
| Average[b] | | <0.02 | * | * | <0.001 | * | <0.004 | <0.003 | * | 0.002±0.002 | <0.001 |

* Less than the approximate detection level.

(a) $^{90}Sr$ and $^{239}Pu$ data not available at time of publication.

(b) Average and two sample standard deviations shown if radionuclide detected in all samples. Otherwise a less-than number is calculated from the other results including less-than values.

TABLE III-3. Concentrations of Tritium in the Columbia River at Vernita (Monthly Composites of Weekly Grab Samples) - 1975

(Units of $10^{-9}$ μCi/ml of Water)

| Date | $^3H$ |
|---|---|
| Analytical Limit(a) | 240 |
| 1/28 | 400 |
| 2/25 | * |
| 3/25 | 470 |
| 4/29 | 670 |
| 5/27 | * |
| 6/24 | 400 |
| 7/29 | 390 |
| 8/26 | 260 |
| 9/30 | * |
| 10/28 | 860 |
| 11/25 | 550 |
| 12/30 | * |
| Annual Average(b) | <370 |

* Result was less than the analytical limit.

(a) The analytical limit shown is the average of the individual analytical limits for all samples.

(b) The annual average has been calculated from the result reported for each analysis including less-than values.

TABLE III-4. Concentrations of Radionuclides in the Columbia River at 100-B (Monthly Composite of Weekly Cumulative Samples) - 1975

(Units of $10^{-9}$ μCi/ml of Water)

| Date | | $^{46}Sc$ | $^{51}Cr$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ | $^{137}Cs$ | $^{239}Pu$ | Alpha |
|---|---|---|---|---|---|---|---|---|---|
| Analytical Limit[a] | | 15 | 210 | 9.7 | 20 | 0.06 | 12 | 0.01 | 0.23 |
| 12/30 | 1/27 | * | * | 1.2 | * | 0.30 | * | | * |
| 1/27 | 2/24 | * | * | * | * | 0.65 | * | | 0.30 |
| 2/24 | 3/31 | * | * | * | * | 0.24 | * | * | 0.21 |
| 3/31 | 4/28 | * | * | * | * | 0.76 | * | | * |
| 4/28 | 5/27 | * | * | * | * | 0.39 | * | | * |
| 5/27 | 6/30 | * | * | * | * | 0.30 | * | | * |
| 6/30 | 7/28 | * | * | * | * | 0.14 | * | | * |
| 7/28 | 8/25 | * | * | * | * | 0.36 | * | | 0.59 |
| 8/25 | 9/29 | * | * | * | * | 0.28 | * | 0.04 | * |
| 9/29 | 10/27 | * | * | * | * | 0.17 | * | | * |
| 10/27 | 11/24 | * | * | * | * | 0.54 | * | | * |
| 11/24 | 12/29 | * | * | * | * | 0.14 | * | | * |
| Annual Average[b] | | * | * | <3.4 | * | 0.35±0.40 | * | <0.02 | <0.18 |

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

(b) Average and two sample standard deviations shown if radionuclides detected in all samples. Otherwise a less-than number is calculated from the other results, including less-than values.

No entry indicates no analysis was made.

TABLE III-5. Beta Activity in the Columbia River at 100-B (Cumulative Samples) - 1975

(Units of Counts/Minute/Milliliter)

| Date | | Beta |
|---|---|---|
| Anal. Limit[a] | | 0.002 |
| 12/30 | 1/27 | 0.003 |
| 1/27 | 2/24 | * |
| 2/24 | 3/31 | * |
| 3/31 | 4/28 | * |
| 4/28 | 5/27 | * |
| 5/27 | 6/30 | 0.003 |
| 6/30 | 7/28 | * |
| 7/28 | 8/25 | * |
| 8/25 | 9/29 | * |
| 9/29 | 10/27 | * |
| 10/27 | 11/24 | * |
| 11/24 | 12/29 | * |
| Annual Average[b] | | <0.003 |

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

(b) The annual average has been calculated from the result reported for each analysis including less-than values.

TABLE III-6. Concentrations of Radionuclides in the Columbia River at Hanford Powerline Crossing (Grab Samples) - 1975

(Units of $10^{-9}$ μCi/ml of Water)

| Date | $^{3}H$ | $^{46}Sc$ | $^{51}Cr$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ | $^{137}Cs$ | Alpha |
|---|---|---|---|---|---|---|---|---|
| Anal. Limit[a] | 260 | 7 | 120 | 5 | 10 | 0.12 | 3.8 | 0.20 |
| 1/9 | 1200 | * | * | * | * | 0.37 | * | 0.16 |
| 2/14 | * | * | * | * | * | 0.27 | * | 0.16 |
| 3/6 | 360 | * | * | * | * | 0.51 | * | 0.90 |
| 4/10 | 510 | * | * | * | * | 0.22 | * | * |
| 5/8 | 500 | * | * | * | * | 0.57 | * | * |
| 6/5 | * | * | * | * | * | 1.5 | 1.8 | * |
| 7/10 | * | * | * | * | * | 4.8 | * | * |
| 8/8 | * | * | * | * | * | 0.17 | * | * |
| 9/4 | * | * | * | * | * | 0.40 | * | 0.18 |
| 10/9 | * | * | * | * | * | 0.26 | * | * |
| 11/6 | 900 | * | * | * | * | 0.28 | * | 0.24 |
| 12/5 | * | * | * | * | * | 0.29 | * | 0.69 |
| Annual Average[b] | <360 | * | * | * | * | 0.80±2.6 | <0.36 | <0.27 |

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

(b) Average and two sample standard deviations shown if radionuclide detected in all samples. Otherwise a less-than number is calculated from the other results, including less-than values.

No entry indicates no analysis was made.

TABLE III-7. Concentrations of Radionuclides in the Columbia River at the 300 Area - (Filtration Ion Exchange Column - Soluble Samples) - 1974-1975

(Units of $10^{-9}$ μCi/ml of Water)

| Sampling Interval | | $^{40}K$ | $^{54}Mn$ | $^{60}Co$ | $^{65}Zn$ | $^{95}ZrNb$ | $^{106}Ru$ | $^{134}Cs$ | $^{137}Cs$ | $^{140}BaLa$ | $^{152}Eu$ | $^{226}Ra$ | $^{228}Th$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approximate Detection Level | | 0.009 | 0.01 | 0.005 | 0.005 | 0.005 | 0.005 | 0.0005 | 0.005 | 0.005 | 0.02 | 0.002 | 0.0005 |
| 1974[a] | | | | | | | | | | | | | |
| 11/11 | 12/3 | 0.67 | * | 0.007 | 0.003 | 0.006 | 0.14 | * | * | * | * | 0.04 | * |
| 12/3 | 12/18 | 0.64 | * | 0.007 | * | 0.02 | 0.12 | * | * | * | * | 0.05 | 0.002 |
| 12/18 | 1/2 | 0.65 | * | 0.008 | * | 0.02 | 0.13 | * | * | * | * | 0.04 | * |
| 1975 | | | | | | | | | | | | | |
| 2/26 | 3/14 | 0.65 | * | 0.004 | 0.002 | 0.05 | 0.09 | * | * | * | * | 0.04 | 0.003 |
| 3/14 | 3/28 | 0.41 | * | 0.005 | 0.002 | 0.04 | 0.09 | * | * | * | * | 0.04 | 0.002 |
| 3/28 | 4/17 | 0.43 | * | 0.006 | 0.002 | 0.04 | 0.08 | * | * | * | * | 0.05 | 0.002 |
| 4/17 | 5/9 | 0.39 | * | 0.004 | * | 0.03 | 0.10 | * | * | * | * | 0.03 | 0.003 |
| 5/9 | 5/28 | 0.22 | * | 0.02 | * | 0.05 | 0.16 | * | * | * | * | 0.06 | 0.002 |
| 5/28 | 6/17 | 0.70 | 0.05 | 0.009 | 0.003 | 0.07 | 0.12 | 0.06 | 0.29 | 0.24 | * | * | 0.0009 |
| 6/17 | 7/1 | 0.52 | 0.04 | 0.01 | * | 0.05 | 0.09 | 0.04 | 0.21 | * | * | * | 0.04 |
| 7/1 | 7/14 | 0.58 | 0.02 | 0.01 | * | 0.02 | 0.11 | 0.004 | 0.05 | * | * | 0.01 | 0.007 |
| 7/14 | 7/30 | 0.59 | * | 0.009 | * | 0.01 | 0.09 | 0.002 | 0.04 | * | * | 0.04 | 0.003 |
| 7/30 | 8/14 | 0.64 | * | 0.008 | * | * | 0.07 | * | | * | * | 0.03 | 0.002 |
| 8/14 | 9/4 | 0.58 | * | 0.01 | * | * | 0.06 | * | * | * | * | 0.03 | 0.003 |
| 9/4 | 9/18 | 0.64 | * | 0.01 | * | * | 0.06 | * | * | * | * | 0.04 | 0.01 |
| 9/18 | 10/7 | 0.36 | * | 0.01 | * | * | 0.06 | * | * | * | * | 0.02 | 0.004 |
| 10/7 | 10/21 | 0.60 | * | 0.01 | * | * | 0.08 | * | * | * | * | 0.02 | 0.003 |
| 10/21 | 11/4 | 0.60 | * | 0.008 | * | * | 0.07 | * | * | * | * | 0.02 | 0.001 |
| 11/4 | 11/18 | 0.52 | * | 0.01 | * | * | 0.07 | * | * | * | * | 0.03 | 0.001 |
| 11/18 | 12/2 | 0.41 | * | 0.007 | * | * | 0.06 | * | * | * | * | 0.03 | * |
| 12/2 | 12/16 | 0.42 | * | 0.009 | * | * | 0.06 | * | * | * | * | 0.02 | 0.001 |
| 12/16 | 12/30 | 0.22 | * | 0.008 | * | * | 0.06 | * | * | * | * | 0.02 | 0.001 |
| 1975 Average[b] | | 0.50±0.28 | <0.01 | 0.009±0.007 | <0.004 | <0.02 | 0.08±0.05 | <0.006 | <0.04 | <0.02 | * | <0.03 | <0.005 |

* Less than approximate detection level.

(a) November and December 1974 data is shown in this table as it was omitted in the 1974 data report.

(b) Average and two sample standard deviations shown if radionuclide detected in all samples. Otherwise a less-than number is calculated from the other results, including less-than values.

TABLE III-8. Concentrations of Radionuclides in the Columbia River at the 300 Area (Filtration Ion Exchange Column - Particulate Samples) - 1974-1975

(Units of $10^{-9}$ μCi/ml of Water)

| Sampling Interval | | $^{40}K$ | $^{54}Mn$ | $^{60}Co$ | $^{65}Zn$ | $^{95}ZrNb$ | $^{106}Ru$ | $^{134}Cs$ | $^{137}Cs$ | $^{140}BaLa$ | $^{152}Eu$ | $^{226}Ra$ | $^{228}Th$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approximate Detection Level | | 0.009 | 0.01 | 0.0005 | 0.005 | 0.005 | 0.005 | 0.0005 | 0.005 | 0.005 | 0.02 | 0.002 | 0.005 |
| 1974[a] | | | | | | | | | | | | | |
| 11/11 | 12/3 | * | * | 0.005 | 0.001 | 0.008 | 0.007 | * | * | * | * | * | 0.005 |
| 12/3 | 12/18 | * | * | 0.003 | 0.002 | 0.02 | 0.006 | * | * | * | * | * | 0.001 |
| 12/18 | 1/2 | * | * | 0.005 | 0.004 | 0.01 | 0.006 | * | * | * | * | * | 0.001 |
| 1975 | | | | | | | | | | | | | |
| 2/26 | 3/14 | * | * | 0.002 | * | 0.02 | 0.006 | * | * | * | * | * | 0.0009 |
| 3/14 | 3/28 | * | * | 0.002 | * | 0.03 | 0.006 | * | * | * | * | * | 0.001 |
| 3/28 | 4/17 | * | * | 0.008 | * | 0.03 | 0.01 | * | * | * | * | * | 0.001 |
| 4/17 | 5/9 | * | * | 0.006 | 0.007 | 0.03 | 0.01 | * | * | * | * | 0.002 | 0.002 |
| 5/9 | 5/28 | 0.02 | 0.02 | 0.008 | 0.004 | 0.04 | 0.02 | 0.002 | 0.02 | * | * | 0.005 | 0.003 |
| 5/28 | 6/17 | 0.11 | 0.54 | 0.11 | 0.09 | 0.38 | 0.07 | 0.03 | 0.13 | 0.04 | * | 0.06 | 0.004 |
| 6/17 | 7/1 | * | 0.14 | 0.03 | 0.01 | 0.08 | 0.02 | 0.006 | 0.02 | * | * | 0.003 | 0.002 |
| 7/1 | 7/14 | * | 0.03 | 0.01 | * | 0.04 | 0.009 | 0.002 | 0.01 | * | * | * | 0.003 |
| 7/14 | 7/30 | * | 0.02 | 0.009 | * | 0.01 | 0.007 | 0.002 | 0.007 | * | * | * | 0.001 |
| 7/30 | 8/14 | 0.02 | 0.02 | 0.01 | * | * | 0.01 | * | 0.009 | * | * | 0.005 | 0.003 |
| 8/14 | 9/4 | 0.01 | 0.01 | 0.009 | * | * | 0.007 | * | 0.007 | * | * | 0.003 | 0.003 |
| 9/4 | 9/18 | * | 0.01 | 0.01 | * | * | 0.004 | * | * | * | * | 0.006 | 0.003 |
| 9/18 | 10/7 | 0.01 | 0.01 | 0.01 | * | * | 0.004 | * | * | * | 0.002 | 0.004 | 0.004 |
| 10/7 | 10/21 | 0.03 | 0.02 | 0.02 | 0.004 | * | 0.007 | * | 0.01 | * | 0.005 | 0.004 | 0.002 |
| 10/21 | 11/4 | * | * | 0.01 | * | * | 0.006 | * | * | * | * | 0.004 | 0.002 |
| 11/4 | 11/18 | * | * | 0.007 | * | * | 0.004 | * | * | * | * | 0.003 | * |
| 11/18 | 12/2 | * | * | 0.006 | * | * | 0.002 | * | * | * | * | 0.002 | * |
| 12/2 | 12/16 | * | * | 0.006 | * | * | 0.008 | * | * | * | * | 0.003 | 0.002 |
| 12/16 | 12/30 | * | * | 0.004 | * | * | 0.003 | * | * | * | * | 0.003 | 0.0007 |
| 1975 Average[b] | | <0.02 | <0.04 | 0.02±0.05 | <0.008 | <0.04 | 0.01±0.03 | <0.002 | <0.01 | <0.006 | <0.005 | <0.006 | <0.002 |

* Less than approximate detection level.

(a) November and December 1974 data is shown in this table as it was omitted in the 1974 data report.

(b) Average and two sample standard deviation shown if radionuclide detected in all samples. Otherwise a less-than number is calculated from the other results including less-than values.

TABLE III-9. Concentrations of $^{90}Sr$ and $^{239}Pu$ in the Columbia River at the 300 Area (Filtration Ion Exchange Column) - 1975

(Units of $10^{-9}$ μCi/ml)

| Sampling Interval | | $^{90}Sr$ Soluble Sample | $^{90}Sr$ Particulate Sample | $^{239}Pu$ Soluble Sample | $^{239}Pu$ Particulate Sample |
|---|---|---|---|---|---|
| 7/1 | 10/7 | 0.18 | 0.0006 | 0.0013 | 0.000013 |
| 10/7 | 12/30 | 0.006 | (a) | 0.0012 | (a) |

(a) Data not available at time of publication.

TABLE III-10. Concentrations of Radionuclides in the Columbia River at Richland (Weekly Cumulative Samples) - 1975

(Units of $10^{-9}$ μCi/ml of Water)

| Date | | $^{46}Sc$ | $^{51}Cr$ | $^{60}Co$ | $^{65}Zn$ | $^{131}I$ | $^{137}Cs$ |
|---|---|---|---|---|---|---|---|
| Analytical Limit[a] | | 30 | 360 | 24 | 47 | 0.5 | 26 |
| 12/31 | 1/7 | * | * | * | * | * | * |
| 1/7 | 1/14 | * | * | * | * | | * |
| 1/14 | 1/21 | * | * | * | * | * | * |
| 1/21 | 1/28 | * | * | * | * | | * |
| 1/28 | 2/4 | * | * | * | * | * | * |
| 2/4 | 2/11 | * | * | * | * | | * |
| 2/11 | 2/18 | | | | | | |
| 2/19 | 2/25 | * | * | * | * | | * |
| 2/25 | 3/4 | * | * | * | * | * | * |
| 3/4 | 3/11 | * | * | * | * | | * |
| 3/11 | 3/18 | * | * | * | * | * | * |
| 3/18 | 3/25 | * | * | * | * | | * |
| 3/25 | 4/1 | * | * | * | * | * | * |
| 4/1 | 4/8 | * | * | * | * | | * |
| 4/8 | 4/15 | * | * | * | * | * | * |
| 4/15 | 4/22 | * | * | * | * | | * |
| 4/22 | 4/29 | * | * | * | * | * | * |
| 4/29 | 5/6 | * | * | * | * | | * |
| 5/6 | 5/13 | * | * | * | * | * | * |
| 5/13 | 5/19 | * | * | * | * | | * |
| 5/20 | 5/27 | * | * | * | * | * | * |
| 5/27 | 6/3 | * | * | * | * | | * |
| 6/3 | 6/10 | * | * | * | * | * | * |
| 6/10 | 6/17 | * | * | * | 62 | | * |
| 6/17 | 6/24 | * | * | * | * | * | * |
| 6/24 | 7/1 | * | * | * | * | | * |
| 7/1 | 7/8 | * | * | * | * | * | * |
| 7/8 | 7/15 | * | * | * | * | | * |
| 7/15 | 7/22 | * | * | * | * | * | * |
| 7/22 | 7/29 | * | * | * | * | | * |
| 7/29 | 8/5 | * | * | * | * | * | * |
| 8/5 | 8/12 | * | * | * | * | | * |
| 8/12 | 8/19 | * | * | * | * | | * |

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

No entry indicates no analysis was made.

TABLE III-10 (Cont'd). Concentrations of Radionuclides in the Columbia River at Richland (Weekly Cumulative Samples) - 1975

(Units of $10^{-9}$ μCi/ml of Water)

| Date | | $^{46}Sc$ | $^{51}Cr$ | $^{60}Co$ | $^{65}Zn$ | $^{131}I$ | $^{137}Cs$ |
|---|---|---|---|---|---|---|---|
| Analytical Limit[a] | | 30 | 360 | 24 | 47 | 0.5 | 26 |
| 8/19 | 8/26 | * | * | * | * | | * |
| 8/26 | 9/2 | * | * | * | * | * | * |
| 9/2 | 9/9 | * | * | * | * | | * |
| 9/9 | 9/16 | * | * | * | * | * | * |
| 9/16 | 9/23 | * | * | * | * | | * |
| 9/23 | 9/30 | * | * | * | * | * | * |
| 9/30 | 10/7 | * | * | * | * | | * |
| 10/7 | 10/14 | * | * | * | * | * | * |
| 10/14 | 10/21 | * | * | * | * | | * |
| 10/21 | 10/28 | * | * | * | * | * | * |
| 10/28 | 11/4 | * | * | * | * | | * |
| 11/4 | 11/11 | * | * | * | * | * | * |
| 11/11 | 11/18 | * | * | * | * | | * |
| 11/18 | 11/25 | * | * | * | * | * | * |
| 11/25 | 12/2 | * | * | * | * | | * |
| 12/2 | 12/9 | * | * | * | * | * | * |
| 12/9 | 12/16 | * | * | * | * | | * |
| 12/16 | 12/23 | * | * | * | * | * | * |
| 12/23 | 12/30 | * | * | * | * | | * |
| Annual Average[b] | | * | * | * | <3.6 | * | * |

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

(b) The annual average has been calculated from the result reported for each analysis including less-than values.

No entry indicates no analysis was made.

TABLE III-11. Concentrations of Radionuclides in the Columbia River at Richland (Monthly Composite of Weekly Cumulative Samples) - 1975

(Units of $10^{-9}$ μCi/ml of Water)

| Date | | Alpha | $^{3}H$ | $^{90}Sr$ | $^{137}Cs$ | $^{239}Pu$ |
|---|---|---|---|---|---|---|
| Analytical Limit[a] | | 0.25 | 360 | 0.07 | 1.3 | 0.011 |
| 12/31 | 1/28 | 0.32 | 940 | 0.36 | * | |
| 1/28 | 2/25 | 0.37 | 220 | 0.56 | * | |
| 2/25 | 3/25 | 0.30 | 400 | 0.09 | * | * |
| 3/25 | 4/29 | * | 640 | 0.57 | * | |
| 4/29 | 5/27 | * | 550 | 0.91 | * | |
| 5/27 | 6/24 | 0.34 | 130 | 0.73 | * | |
| 6/24 | 7/29 | * | | 0.21 | * | |
| 7/29 | 8/26 | 0.53 | 560 | 0.31 | * | |
| 8/26 | 9/30 | 0.53 | * | 0.39 | * | 0.02 |
| 9/30 | 10/28 | 0.24 | * | 0.14 | * | |
| 10/28 | 11/25 | 0.44 | 470 | 1.0 | * | |
| 11/25 | 12/30 | 0.83 | * | 0.28 | * | |
| Annual Average[b] | | <0.34 | <370 | 0.46±0.59 | * | <0.01 |

* Result was less-than analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

(b) Average and two standard deviations shown if radionuclide detected all samples. Otherwise a less-than number is calculated from the other results, including less-than values.

No entry indicates no analysis was made.

TABLE III-12. Concentrations of Tritium in the Columbia River at Richland (Monthly Composite of Weekly Grab Samples) - 1975

(Units of $10^{-9}$ μCi/ml of Water)

| Date | $^3H$ |
|---|---|
| Analytical Limit[a] | 327 |
| 6/27 | 380 |
| 7/29 | 480 |
| 8/26 | * |
| 9/30 | 360 |
| 10/28 | 820 |
| 11/25 | 390 |
| 12/30 | * |
| Annual Average[b] | <470 |

* Result was less-than analytical limit.

(a) The analytical limit shown is the average of the individual analytical limits for each sample.

(b) The annual average has been calculated from the result reported for each analysis including less-than values.

TABLE III-13. Beta Activity in the Columbia River at Richland (Cumulative Samples) - 1975

(Units of Counts/Minute/Milliliter)

| Date | | Beta |
|---|---|---|
| Anal. Limit[a] | | 0.005 |
| 12/31 | 1/7 | * |
| 1/7 | 1/14 | * |
| 1/14 | 1/21 | * |
| 1/21 | 1/28 | * |
| 1/28 | 2/4 | * |
| 2/4 | 2/11 | * |
| 2/11 | 2/18 | |
| 2/18 | 2/25 | * |
| 2/25 | 3/4 | * |
| 3/4 | 3/11 | * |
| 3/11 | 3/18 | * |
| 3/18 | 3/25 | * |
| 3/25 | 4/1 | * |
| 4/1 | 4/8 | * |
| 4/8 | 4/15 | * |
| 4/15 | 4/22 | * |
| 4/22 | 4/29 | * |
| 4/29 | 5/6 | * |
| 5/6 | 5/12 | * |
| 5/12 | 5/19 | * |
| 5/19 | 5/27 | * |
| 5/27 | 6/3 | * |
| 6/3 | 6/10 | * |
| 6/10 | 6/17 | * |
| 6/17 | 6/24 | * |
| 6/24 | 7/1 | 0.011 |
| 7/1 | 7/8 | * |
| 7/8 | 7/15 | * |
| 7/15 | 7/22 | * |
| 7/22 | 7/29 | * |
| 7/29 | 8/4 | * |
| 8/4 | 8/12 | * |
| 8/12 | 8/19 | * |
| 8/19 | 8/26 | * |
| 8/26 | 9/2 | * |
| 9/2 | 9/9 | * |
| 9/9 | 9/16 | * |
| 9/16 | 9/23 | * |
| 9/23 | 9/30 | * |
| 9/30 | 10/7 | * |
| 10/7 | 10/14 | * |
| 10/14 | 10/21 | * |
| 10/21 | 10/28 | * |
| 10/28 | 11/4 | * |
| 11/4 | 11/11 | * |
| 11/11 | 11/18 | * |
| 11/18 | 11/25 | * |
| 11/25 | 12/2 | * |
| 12/2 | 12/9 | * |
| 12/9 | 12/16 | * |
| 12/16 | 12/23 | * |
| 12/23 | 12/30 | * |
| Annaul Average[b] | | <0.003 |

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

(b) The annual average has been calculated from the result reported for each analysis including less-than values.

No entry indicates no analysis was made.

TABLE III-14. Concentrations of Radionuclides in the Columbia River at Bonneville Dam (Composite of Weekly Cumulative Samples) - 1975

(Units of $10^{-9}$ μCi/ml of Water)

| Date | $^{46}Sc$ | $^{51}Cr$ | $^{60}Co$ | $^{65}Zn$ | $^{137}Cs$ |
|---|---|---|---|---|---|
| Anal. Limit[a] | 40 | 420 | 32 | 55 | 29 |
| 11/25/74 1/10/75[a] | * | * | * | * | * |

* Result was less than the analytical limit.

(a) Sample was discontinued.

# IV. NONRADIOLOGICAL PARAMETERS MEASURED IN COLUMBIA RIVER WATER

## IV. NONRADIOLOGICAL PARAMETERS MEASURED IN COLUMBIA RIVER WATER

Physical and chemical parameters measured during 1975 included pH, turbidity, dissolved oxygen, nitrate ion and temperature. Biological measurements included coliform organisms and BOD. Enterococci measurements were made to clarify the types of coliforms present.

All parameters were measured upstream of Hanford operations at Vernita Bridge and downstream of the majority of Hanford operations at the Hanford 300 Area or at Richland.

The following tables are included in Section IV:


| | | Page |
|---|---|---|
| Table IV-1. | Water Quality Measurements of Columbia River at Vernita - 1975 | IV-2 |
| Table IV-2. | Water Quality Measurements in Columbia River at the 300 Area - 1975 | IV-4 |
| Table IV-3. | Nitrates in Columbia River Water at Vernita and Richland - 1975 | IV-11 |
| Table IV-4. | Temperatures of Columbia River Water at Vernita Bridge and Richland - 1975 | IV-12 |
| Table IV-5. | Biological Measurements of Columbia River Water at Vernita and Richland - 1975 | IV-13 |

TABLE IV-1. Water Quality Measurements of Columbia River at Vernita - 1975

| Date | pH | Turbidity (JTU) (a) | Diss. $O_2$ (ppm) |
|---|---|---|---|
| 1/7 | 7.7 | 1.4 | 11.3 |
| 1/21 | 8.0 | 1.4 | 11.6 |
| 1/28 | 8.1 | 1.2 | 12.6 |
| 2/11 | 8.3 | 1.2 | 12.5 |
| 2/25 | 8.1 | 1.2 | 13.2 |
| 3/4 | 7.7 | 0.8 | 12.8 |
| 3/11 | 7.8 | 1.0 | 13.0 |
| 3/18 | 8.2 | 0.7 | 13.8 |
| 3/25 | 8.1 | 0.4 | |
| 4/1 | 8.2 | 1.1 | |
| 4/8 | 8.2 | 1.3 | |
| 4/15 | 8.2 | 1.8 | 13.9 |
| 4/22 | 8.1 | 1.7 | |
| 4/29 | 8.3 | 1.9 | 13.9 |
| 5/6 | 8.4 | 3.2 | 13.4 |
| 5/13 | 8.2 | 3.4 | 13.8 |
| 5/20 | 8.1 | 5.4 | 12.5 |
| 6/3 | 8.3 | | 12.4 |
| 6/10 | 7.8 | | 9.8 |
| 6/17 | 8.3 | | 11.4 |
| 6/24 | 8.1 | | 11.8 |
| 7/1 | 8.5 | | 11.3 |
| 7/8 | 7.9 | | 11.6 |
| 7/15 | 7.7 | 2.6 | |
| 7/22 | 8.2 | 2.0 | |
| 8/5 | 7.7 | 2.7 | 10.5 |
| 8/12 | 8.0 | 1.4 | 10.5 |
| 8/19 | 8.3 | 1.8 | 10.7 |
| 8/27 | 7.8 | 3.0 | 10.3 |
| 9/2 | 8.3 | 1.8 | |
| 9/9 | 8.4 | 1.5 | 10.2 |
| 9/16 | 8.2 | 1.3 | 10.6 |
| 9/23 | 8.4 | 1.3 | 10.5 |
| 9/30 | 8.1 | 1.2 | 10.7 |

(a) Jackson Turbidity Units
No entry indicates no measurement was made.

TABLE IV-1 (Cont'd). Water Quality Measurements of Columbia River at Vernita - 1975

| Date | pH | Turbidity (JTU) (a) | Diss. $O_2$ (ppm) |
|---|---|---|---|
| 10/7 | 8.5 | 1.8 | 11.2 |
| 10/14 | 8.2 | 1.1 | 11.0 |
| 10/21 | 7.8 | 1.3 | |
| 10/28 | 8.3 | 1.0 | 9.5 |
| 11/4 | 8.4 | 1.2 | 9.9 |
| 11/11 | 8.0 | 1.2 | |
| 11/18 | 7.8 | 1.1 | 11.5 |
| 11/25 | 8.1 | 1.0 | 11.4 |
| 12/2 | 8.2 | 1.2 | 11.4 |
| 12/9 | 7.8 | 6.5 | 12.3 |
| 12/16 | 7.9 | 1.4 | 12.4 |
| 12/23 | 7.7 | 1.2 | 12.6 |
| 12/30 | 7.6 | 1.3 | 11.6 |
| Average[b] | | 1.7±2.3 | 11.7±2.4 |

(a) Jackson Turbidity Units
(b) Average and two sample standard deviations shown. No average is shown for pH because the arithmetic averaging process is not appropriate. pH is a log function (pH=log[H+]) and before determining an average pH, the hydrogen ion concentration, ([H+]), must be determined for each entry.

No entry indicates no measurement was made.

TABLE IV-2. Water Quality Measurements in Columbia River Water at the 300 Area - 1975

| Date | pH | Turbidity (JTU) (a) | Diss. $O_2$ (ppm) |
|---|---|---|---|
| 1/2 | 7.9 | 1.5 | 11.2 |
| 1/3 | 7.8 | 1.2 | 11.4 |
| 1/6 | 7.9 | 1.3 | 11.1 |
| 1/7 | 7.9 | 1.4 | 11.3 |
| 1/8 | 7.8 | 1.9 | 11.8 |
| 1/9 | 7.8 | 1.4 | 11.4 |
| 1/10 | 8.2 | 1.4 | 11.4 |
| 1/13 | 8.5 | 1.2 | 11.5 |
| 1/14 | 8.1 | 1.7 | 11.5 |
| 1/15 | 8.0 | 1.5 | 12.0 |
| 1/16 | 7.8 | 1.4 | 11.9 |
| 1/17 | 7.8 | 1.4 | 12.3 |
| 1/20 | 8.1 | 1.3 | 12.1 |
| 1/21 | 8.6 | 1.4 | 11.3 |
| 1/22 | 7.9 | 1.4 | 12.5 |
| 1/23 | 7.9 | | 11.8 |
| 1/24 | 8.2 | 2.1 | 12.2 |
| 1/27 | 8.0 | 2.4 | 12.6 |
| 1/28 | 7.9 | 1.2 | 12.2 |
| 1/29 | 8.1 | 1.1 | 12.3 |
| 1/30 | 8.0 | 1.1 | 12.1 |
| 1/31 | 8.4 | 1.2 | 12.2 |
| 2/3 | 8.3 | 1.0 | 13.7 |
| 2/4 | 8.0 | 1.1 | 12.0 |
| 2/5 | 8.0 | 1.2 | 11.7 |
| 2/6 | 7.9 | 1.0 | 11.0 |
| 2/7 | 8.8 | 1.2 | |
| 2/10 | 8.1 | 1.2 | 11.8 |
| 2/11 | 8.2 | 1.2 | 12.0 |
| 2/12 | 8.2 | 1.0 | 11.5 |
| 2/13 | 8.0 | 1.2 | 11.5 |
| 2/14 | 7.8 | 1.4 | 12.4 |
| 2/18 | 8.2 | 1.2 | 12.1 |
| 2/19 | 8.2 | 1.2 | 13.5 |
| 2/20 | 8.0 | 1.2 | 11.9 |
| 2/21 | 7.9 | 1.3 | 13.5 |

(a) Jackson Turbidity Units
No entry indicates no measurement was made.

TABLE IV-2 (Cont'd). Water Quality Measurements in Columbia River Water at the 300 Area - 1975

| Date | pH | Turbidity (JTU) (a) | Diss. $O_2$ (ppm) |
|---|---|---|---|
| 2/24 | 7.8 | 1.5 | |
| 2/25 | 8.4 | 1.5 | 13.6 |
| 2/26 | 8.0 | 0.6 | 12.3 |
| 2/27 | 7.9 | 0.6 | 14.0 |
| 2/28 | 7.8 | 0.7 | 12.6 |
| 3/3 | 8.0 | 0.7 | 12.9 |
| 3/4 | 7.7 | 0.8 | 12.8 |
| 3/5 | 7.9 | 0.8 | 13.7 |
| 3/6 | 8.0 | 1.3 | 14.0 |
| 3/7 | 7.8 | 1.1 | 12.4 |
| 3/10 | 8.0 | 1.4 | 12.8 |
| 3/11 | 7.7 | 1.0 | 12.8 |
| 3/12 | 7.9 | 1.0 | 14.1 |
| 3/13 | 7.9 | 0.9 | 13.5 |
| 3/14 | 8.8 | 1.1 | 13.5 |
| 3/17 | 8.0 | 0.7 | 13.1 |
| 3/18 | 7.9 | 0.7 | 13.6 |
| 3/19 | 8.0 | 0.7 | 13.0 |
| 3/20 | 8.0 | 1.1 | 12.6 |
| 3/21 | 8.1 | 0.8 | 12.8 |
| 3/24 | 8.2 | 1.1 | 12.6 |
| 3/25 | 8.0 | 0.4 | 13.4 |
| 3/26 | 8.0 | 0.4 | 12.8 |
| 3/27 | 8.2 | 0.4 | 13.2 |
| 3/28 | 7.9 | 1.1 | |
| 3/31 | 8.1 | 1.3 | |
| 4/1 | 8.1 | 1.1 | 13.8 |
| 4/2 | 8.0 | 1.0 | 13.7 |
| 4/3 | 8.6 | 1.2 | |
| 4/4 | 8.4 | 1.3 | 13.6 |
| 4/7 | 8.2 | 1.2 | 13.4 |
| 4/8 | 8.0 | 1.2 | |
| 4/10 | 8.1 | 1.3 | |
| 4/11 | 8.5 | 1.5 | |
| 4/14 | 8.5 | 1.8 | 13.5 |
| 4/15 | 8.1 | 1.7 | 13.5 |

(a) Jackson Turbidity Units
No entry indicates no measurements was made.

TABLE IV-2 (Cont'd). Water Quality Measurements in Columbia River Water at the 300 Area - 1975

| Date | pH | Turbidity (JTU) (a) | Diss. $O_2$ (ppm) |
|---|---|---|---|
| 4/16 | 8.0 | 2.2 | 13.0 |
| 4/17 | 8.0 | 1.8 | 14.0 |
| 4/18 | 8.2 | 1.8 | 13.9 |
| 4/21 | 8.1 | 0.7 | 13.6 |
| 4/22 | 8.0 | 2.2 | 13.8 |
| 4/23 | 8.0 | 3.3 | 13.6 |
| 4/24 | 7.9 | 3.2 | 13.4 |
| 4/25 | 8.0 | 2.7 | 13.8 |
| 4/28 | 8.2 | 2.0 | 13.3 |
| 4/29 | 8.0 | 2.0 | 13.3 |
| 4/30 | 8.2 | 2.0 | 14.1 |
| 5/1 | 8.1 | 2.2 | 13.8 |
| 5/2 | 8.1 | 3.1 | |
| 5/5 | 8.6 | 3.4 | 13.6 |
| 5/6 | 8.1 | 3.1 | 13.7 |
| 5/7 | 8.3 | 2.9 | 12.0 |
| 5/8 | 8.0 | 3.5 | 13.2 |
| 5/9 | 8.2 | 3.5 | 13.1 |
| 5/12 | 8.2 | 3.5 | 13.2 |
| 5/13 | 8.0 | 3.5 | 13.3 |
| 5/14 | 8.2 | 3.5 | |
| 5/15 | 8.4 | 4.2 | 12.8 |
| 5/16 | 7.9 | 3.6 | 13.2 |
| 5/19 | 8.2 | 3.1 | 12.2 |
| 5/20 | 7.8 | 3.7 | 12.2 |
| 5/21 | 8.1 | 5.0 | 14.0 |
| 5/22 | 7.8 | 5.2 | 13.3 |
| 5/23 | 7.9 | 4.5 | 12.4 |
| 5/27 | 7.9 | | 13.6 |
| 5/28 | 7.9 | | 13.2 |
| 5/29 | 8.0 | | 13.8 |
| 5/30 | 7.6 | | 13.2 |
| 6/2 | 7.9 | | 12.4 |
| 6/3 | 8.1 | | 13.0 |
| 6/4 | 8.1 | | 13.3 |
| 6/5 | 7.8 | | 12.8 |

(a) Jackson Turbidity Units
No entry indicates no measurement was made.

TABLE IV-2 (Cont'd). Water Quality Measurements in Columbia River Water at the 300 Area - 1975

| Date | pH | Turbidity (JTU) (a) | Diss. $O_2$ (ppm) |
|---|---|---|---|
| 6/6 | 7.7 | | 12.2 |
| 6/9 | 8.0 | | 12.0 |
| 6/10 | 7.8 | | 12.0 |
| 6/11 | 8.5 | | 10.2 |
| 6/12 | 8.0 | | 11.0 |
| 6/13 | 7.8 | | 10.8 |
| 6/16 | 8.4 | | 11.6 |
| 6/17 | 8.3 | | 11.3 |
| 6/18 | 7.9 | | 11.2 |
| 6/19 | 8.0 | | 10.6 |
| 6/20 | 7.8 | | 12.0 |
| 6/23 | 7.6 | | 10.2 |
| 6/24 | 7.7 | | 11.2 |
| 6/25 | 7.9 | | 11.3 |
| 6/26 | 7.5 | | 11.6 |
| 6/27 | 7.4 | | 11.6 |
| 6/30 | 7.9 | | 11.5 |
| 7/1 | 7.6 | | 11.8 |
| 7/2 | 7.7 | | 12.0 |
| 7/7 | 8.2 | | 11.8 |
| 7/8 | 8.6 | | 12.1 |
| 7/9 | 8.2 | | 12.2 |
| 7/10 | 7.9 | | 10.7 |
| 7/11 | 7.8 | | |
| 7/15 | 8.2 | | |
| 7/16 | 8.2 | | 10.6 |
| 7/17 | 7.9 | 2.0 | |
| 7/18 | 7.8 | 2.0 | |
| 7/21 | 8.2 | 1.6 | |
| 7/22 | 8.5 | 2.0 | |
| 7/23 | 8.0 | 1.9 | |
| 7/24 | 8.0 | 2.1 | |
| 7/25 | 8.5 | 1.9 | |
| 7/28 | 7.9 | 2.0 | |
| 7/29 | 7.8 | 2.2 | |
| 7/30 | 7.8 | 1.7 | |

(a) Jackson Turbidity Units
No entry indicates no measurement was made.

TABLE IV-2 (Cont'd). Water Quality Measurements in Columbia River Water at the 300 Area - 1975

| Date | pH | Turbidity (JTU) (a) | Diss. $O_2$ (ppm) |
|---|---|---|---|
| 7/31 | 7.9 | 2.0 | 10.1 |
| 8/1 | 8.1 | 1.7 | 10.7 |
| 8/4 | 8.3 | 1.9 | 10.5 |
| 8/5 | 8.5 | 3.0 | 11.0 |
| 8/6 | 8.0 | 2.3 | 10.7 |
| 8/7 | 8.1 | 1.8 | 10.8 |
| 8/8 | 8.2 | 2.3 | 10.9 |
| 8/11 | 7.8 | 1.9 | 10.3 |
| 8/12 | 8.6 | 2.0 | 10.9 |
| 8/13 | 8.5 | 2.2 | 10.6 |
| 8/14 | 7.7 | 2.1 | 10.6 |
| 8/15 | 8.0 | 1.5 | 11.1 |
| 8/18 | 7.9 | 2.0 | 10.3 |
| 8/19 | 7.8 | 1.3 | 10.1 |
| 8/20 | 7.8 | 1.7 | 10.2 |
| 8/21 | 7.8 | 1.8 | 10.5 |
| 8/22 | 7.9 | 1.8 | 10.9 |
| 8/25 | 7.7 | 4.3 | 9.7 |
| 8/26 | 7.7 | 3.3 | 10.1 |
| 8/27 | 7.4 | 2.4 | 10.1 |
| 8/28 | 7.6 | 2.3 | 10.0 |
| 8/29 | 7.6 | 2.3 | 9.9 |
| 9/2 | 7.5 | 2.0 | 9.8 |
| 9/3 | 8.0 | 1.6 | 11.4 |
| 9/4 | 8.0 | 1.9 | 11.4 |
| 9/5 | 7.8 | 2.2 | 11.6 |
| 9/8 | 8.4 | 2.8 | 9.8 |
| 9/9 | 7.9 | 3.2 | 10.0 |
| 9/10 | 7.7 | | 9.8 |
| 9/11 | 8.0 | 2.1 | 9.8 |
| 9/12 | 7.8 | 1.4 | 10.0 |
| 9/15 | 8.4 | 1.1 | 10.4 |
| 9/16 | 8.1 | 1.0 | 10.3 |
| 9/17 | 8.2 | 1.2 | 9.5 |
| 9/18 | 8.0 | 1.2 | 10.4 |
| 9/19 | 8.0 | 1.2 | 11.1 |

(a) Jackson Turbidity Units
No entry indicates no measurement was made.

TABLE IV-2 (Cont'd). Water Quality Measurements in Columbia River Water at the 300 Area - 1975

| Date | pH | Turbidity (JTU) (a) | Diss. $O_2$ (ppm) |
|---|---|---|---|
| 9/22 | 7.7 | 1.2 | 10.6 |
| 9/23 | 8.4 | 1.3 | 10.0 |
| 9/24 | 8.4 | 1.3 | 10.5 |
| 9/25 | 7.8 | 1.6 | 11.2 |
| 9/26 | 8.4 | 1.3 | 10.7 |
| 9/29 | 8.8 | 1.3 | 11.3 |
| 9/30 | 8.6 | 1.4 | 12.4 |
| 10/1 | 8.8 | 1.4 | 12.7 |
| 10/2 | 8.5 | 1.9 | 11.4 |
| 10/3 | 8.6 | 1.7 | 10.4 |
| 10/6 | 8.4 | 1.7 | 10.4 |
| 10/7 | 8.5 | 1.7 | 10.5 |
| 10/8 | 8.4 | 1.4 | 10.9 |
| 10/9 | 8.5 | 1.6 | 10.4 |
| 10/10 | 8.3 | 1.8 | 10.1 |
| 10/13 | 8.4 | 1.3 | 10.8 |
| 10/14 | 8.5 | 1.5 | 11.6 |
| 10/15 | 7.4 | 1.7 | 11.0 |
| 10/16 | 8.3 | 1.6 | 11.1 |
| 10/17 | 7.5 | 1.4 | 10.7 |
| 10/20 | 7.8 | 1.5 | |
| 10/21 | 7.8 | 1.3 | |
| 10/24 | 7.7 | 2.8 | |
| 10/27 | 8.3 | 1.5 | |
| 10/28 | 8.3 | 1.2 | 9.4 |
| 10/29 | 8.1 | 1.0 | 8.6 |
| 10/30 | 8.2 | 1.0 | |
| 10/31 | 8.4 | 1.0 | |
| 11/3 | 7.7 | 1.3 | 8.6 |
| 11/4 | 8.4 | 1.1 | 9.4 |
| 11/5 | 7.3 | 1.0 | 9.4 |
| 11/6 | 7.8 | 1.2 | 10.1 |
| 11/7 | 8.1 | 1.3 | 10.8 |
| 11/10 | 7.9 | 1.1 | 10.5 |
| 11/11 | 7.6 | 1.1 | |
| 11/12 | 7.6 | 1.0 | 9.5 |

(a) Jackson Turbidity Units
No entry indicates no measurement was made.

TABLE IV-2 (Cont'd). Water Quality Measurements in Columbia River Water at the 300 Area - 1975

| Date | pH | Turbidity (JTU) (a) | Diss. $O_2$ (ppm) |
|---|---|---|---|
| 11/13 | 7.9 | 1.2 | 10.9 |
| 11/14 | 7.9 | 1.0 | 10.3 |
| 11/17 | 7.6 | 1.0 | 10.7 |
| 11/18 | 7.7 | 1.1 | 10.2 |
| 11/19 | 7.9 | 1.1 | 11.7 |
| 11/20 | 7.6 | 1.0 | 11.0 |
| 11/21 | 7.7 | 1.2 | 11.1 |
| 11/24 | 7.9 | 1.1 | 11.0 |
| 11/25 | 7.6 | 1.1 | 11.2 |
| 11/26 | 7.8 | 1.1 | 11.1 |
| 12/1 | 7.8 | 1.2 | 11.4 |
| 12/2 | 7.8 | 1.8 | 10.9 |
| 12/3 | 7.7 | 1.5 | 10.8 |
| 12/4 | 7.6 | 1.3 | 11.2 |
| 12/5 | 7.6 | 1.2 | 10.9 |
| 12/8 | 7.8 | | 12.1 |
| 12/9 | 7.8 | 1.0 | 12.7 |
| 12/10 | 7.6 | 6.0 | 11.6 |
| 12/11 | 7.5 | 4.5 | 12.1 |
| 12/12 | 7.4 | 2.2 | 12.1 |
| 12/15 | 7.6 | 1.5 | 12.2 |
| 12/16 | 7.8 | 1.5 | 12.4 |
| 12/17 | 7.9 | 2.1 | 12.6 |
| 12/18 | 7.7 | 1.6 | 12.6 |
| 12/22 | 7.8 | 1.3 | 12.5 |
| 12/23 | 7.8 | 1.4 | 12.8 |
| 12/26 | 7.9 | 1.6 | 12.6 |
| 12/29 | 7.6 | 1.8 | 12.6 |
| 12/30 | 7.5 | 1.6 | 12.2 |
| 12/31 | 7.6 | 1.4 | |
| Average ± 2 sample standard deviations | (b) | 1.7±1.8 | 11.8±2.5 |

(a) Jackson Turbidity Units.
(b) No average is shown for pH because the arithmetic averaging process is not appropriate. pH is a log function (pH=log[H+]) and before determining an average pH, the hydrogen ion concentration, ([H+]), must be determined for each entry.
No entry indicates no measurement was made.

TABLE IV-3. Nitrates in Columbia River Water at Vernita and Richland - 1975

(Units of ppm in Water)

| Date | Vernita | Richland | Date | Vernita | Richland |
|---|---|---|---|---|---|
| Analytical Limit | 0.10 | 0.10 | | | |
| 1/7 | 0.22 | 0.33 | 8/5 | * | * |
| 1/9 | | 0.46 | 8/12 | * | * |
| 1/21 | 0.34 | 0.30 | 8/19 | 0.10 | 0.14 |
| 1/28 | 0.33 | 0.32 | 8/26 | 0.14 | 0.19 |
| 2/4 | 0.39 | 0.35 | 9/2 | 0.12 | 0.12 |
| 2/11 | 0.39 | 0.37 | 9/9 | 0.15 | 0.12 |
| 2/18 | 0.34 | 0.44 | 9/16 | * | * |
| 2/25 | 0.31 | 0.32 | 9/23 | 0.13 | 0.14 |
| 3/4 | 0.53 | 0.46 | 9/30 | 0.13 | 0.11 |
| 3/11 | 0.41 | 0.44 | 10/7 | 0.18 | 0.24 |
| 3/18 | 0.40 | 0.38 | 10/14 | 0.19 | 0.13 |
| 3/25 | 0.35 | 0.37 | 10/21 | 0.36 | 0.35 |
| 4/1 | 0.42 | 0.41 | 10/28 | 0.15 | 0.18 |
| 4/8 | 0.43 | 0.50 | 11/4 | 0.16 | 0.19 |
| 4/15 | 0.63 | 0.54 | 11/11 | 0.24 | 0.24 |
| 4/22 | 0.37 | 0.35 | 11/18 | 0.22 | 0.31 |
| 4/29 | 0.31 | 0.32 | 11/25 | 0.26 | 0.24 |
| 5/6 | 0.22 | 0.15 | 12/2 | 0.31 | 0.42 |
| 5/13 | 0.14 | 0.10 | 12/9 | 0.34 | 0.34 |
| 5/20 | 0.16 | 0.20 | 12/16 | 0.43 | 0.48 |
| 5/27 | 0.15 | 0.22 | 12/23 | 0.43 | 0.41 |
| 6/3 | 0.15 | 0.12 | 12/30 | 0.36 | 0.36 |
| 6/10 | 0.13 | 0.21 | | | |
| 6/17 | 0.14 | 0.10 | Annual Average | <0.25 | <0.26 |
| 6/24 | * | * | | | |
| 7/1 | * | * | | | |
| 7/8 | 0.10 | 0.14 | | | |
| 7/15 | * | * | | | |
| 7/22 | * | * | | | |
| 7/29 | * | * | | | |

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

TABLE IV-4. Temperatures of Columbia River Water at Vernita Bridge and Richland - 1975

(Monthly Average °C)

| Date | Vernita Bridge | Richland |
|---|---|---|
| January | 4.4 | 4.6 |
| February | 2.3 | 2.8 |
| March | 3.3 | 3.9 |
| April | 5.9 | 6.9 |
| May | 9.8 | 10.7 |
| June | 13.7 | 14.3 |
| July | 17.2 | 18.3 |
| August | 18.0 | 18.8 |
| September | 18.6 | 18.8 |
| October | 15.7 | 15.3 |
| November | 11.6 | 10.6 |
| December | 6.7 | 6.9 |
| Average ± 2 sample standard deviations | 10.6±11.7 | 11.0±11.7 |

TABLE IV-5. Biological Measurements of Columbia River Water at Vernita and Richland - 1975

| | Vernita | | | Richland | | |
|---|---|---|---|---|---|---|
| Date | Coliform (per 100 ml) | Enterococci (per 100 ml) | BOD (mg/l) | Coliform (per 100 ml) | Enterococci (per 100 ml) | BOD (mg/l) |
| 1/22 | 20 | 7 | 4.3 | 28 | 30 | 4.4 |
| 2/4 | | | | 54 | 51 | 5.8 |
| 3/5 | 12 | 4 | 4.2 | 8 | 16 | 3.6 |
| 4/29 | 26 | 11 | 4.5 | 42 | 36 | 4.0 |
| 5/28 | 22 | 14 | 3.0 | 34 | 24 | 4.3 |
| 8/20 | 30 | 25 | 3.8 | 50 | 30 | 3.3 |
| 9/16 | 64 | 26 | 4.0 | 56 | 38 | 4.0 |
| 11/19 | 44 | 19 | 4.2 | 40 | 13 | 4.0 |
| 12/16 | 21 | 8 | 3.5 | 10 | 3 | 2.4 |
| Average ± 2 standard deviations | 30±33 | 14±17 | 3.9±1.0 | 36±35 | 27±29 | 4.0±1.8 |

# V. RADIOLOGICAL PARAMETERS MEASURED IN DRINKING WATER

# V. RADIOLOGICAL PARAMETERS MEASURED IN DRINKING WATER

In addition to the samples of river water collected at Priest Rapids, Vernita Bridge, 100-B, Hanford Powerline, 300 Area, and Richland, cumulative sanitary water sampling (30 milliliters every 30 minutes) was conducted at 100-N, 300 Area, and Richland. The samples collected at the 300 Area were submitted on a weekly basis for gamma spectrometry, gross beta, and gross alpha analyses. The Richland samples were submitted weekly for gross beta and gross alpha analyses and composited monthly for gamma spectrometry and $^{90}Sr$ analyses. Samples from 100-N were submitted weekly for gross beta analysis and composited monthly for gamma spectrometry and $^{3}H$ analyses.

The following tables are included in Section V:


| | | Page |
|---|---|---|
| Table V-1 | Concentrations of Radionuclides in 100-N Drinking Water (Monthly Composite of Weekly Cumulative Samples) - 1975 | V-2 |
| Table V-2 | Beta Activity in Drinking Water at Richland, 300 Area, and 100-N (Cumulative Samples) - 1975 | V-3 |
| Table V-3 | Concentrations of Radionuclides in 300 Area Drinking Water (Cumulative Samples) - 1975 | V-5 |
| Table V-4 | Concentrations of Radionuclides in Richland Drinking Water (Cumulative Samples) - 1975 | V-7 |

TABLE V-1 Concentrations of Radionuclides in 100-N Drinking Water (Monthly Composite of Weekly Cumulative Samples) - 1975

(Units of $10^{-9}$ μCi/ml of Water)

| Date | | $^{3}H$ | $^{46}Sc$ | $^{51}Cr$ | $^{60}Co$ | $^{65}Zn$ | $^{137}Cs$ |
|---|---|---|---|---|---|---|---|
| Anal. Limit[a] | | 230 | 28 | 360 | 22 | 44 | 25 |
| 12/30 | 1/27 | 860 | | | | | |
| 1/27 | 2/24 | 480 | * | * | * | * | * |
| 2/24 | 3/24 | 560 | * | * | * | * | * |
| 3/24 | 4/28 | 490 | * | * | * | * | * |
| 4/28 | 5/27 | | * | * | * | * | * |
| 5/27 | 6/23 | 460 | * | * | * | * | * |
| 6/23 | 7/28 | 550 | | | | | |
| 7/28 | 8/25 | 350 | | | | | |
| 8/25 | 9/29 | | | | | | |
| 9/29 | 10/27 | 712 | | | | | |
| 10/27 | 11/24 | 420 | | | | | |
| 11/24 | 12/29 | | * | * | * | * | * |
| Avr ± 2[b] standard deviations | | 540±310 | * | * | * | * | * |

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limit for all samples.

(b) Average and two sample standard deviations shown if radionuclides detected in all samples. Otherwise, a less-than number is calculated from the other results, including less-than values.

No entry indicates no specific analysis was made.

TABLE V-2 Beta Activity in Drinking Water at Richland, 300 Area, and 100-N (Cumulative Samples) - 1975

(Units of Counts/Minute/Milliliter)

| Date | | Richland | 300 Area | 100-N |
|---|---|---|---|---|
| Anal. Limit[a] | | 0.005 | 0.005 | 0.005 |
| 12/30 | 1/6 | * | * | * |
| 1/6 | 1/13 | * | * | * |
| 1/13 | 1/20 | * | * | * |
| 1/20 | 1/27 | * | * | * |
| 1/27 | 2/3 | * | * | * |
| 2/3 | 2/10 | * | * | * |
| 2/10 | 2/18 | * | * | * |
| 2/18 | 2/24 | * | * | * |
| 2/24 | 3/3 | * | * | * |
| 3/3 | 3/10 | * | * | * |
| 3/10 | 3/17 | * | 0.005 | * |
| 3/17 | 3/24 | * | * | * |
| 3/24 | 3/31 | * | * | * |
| 3/31 | 4/7 | * | * | * |
| 4/7 | 4/14 | * | * | * |
| 4/14 | 4/21 | * | * | * |
| 4/21 | 4/28 | * | * | * |
| 4/28 | 5/5 | * | * | * |
| 5/5 | 5/12 | * | * | * |
| 5/12 | 5/19 | * | * | * |
| 5/19 | 5/27 | * | * | * |
| 5/27 | 6/2 | * | * | * |
| 6/2 | 6/9 | * | * | * |
| 6/9 | 6/16 | * | * | * |
| 6/16 | 6/23 | * | * | * |
| 6/23 | 6/30 | * | 0.007 | 0.006 |

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

TABLE V-2. (Cont'd) Beta Activity in Drinking Water at Richland, 300 Area and 100-N (Cumulative Samples) - 1975

(Units of Counts/Minute/Milliliter)

| Date | | Richland | 300 Area | 100-N |
|---|---|---|---|---|
| Anal. Limit[a] | | 0.005 | 0.005 | 0.005 |
| 6/30 | 7/7 | * | * | * |
| 7/7 | 7/14 | * | * | 0.006 |
| 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 | 9/2 | * | * | * |
| 9/2 | 9/8 | * | * | * |
| 9/8 | 9/15 | * | * | * |
| 9/15 | 9/22 | * | * | * |
| 9/22 | 9/29 | 0.006 | * | * |
| 9/29 | 10/6 | * | * | * |
| 10/6 | 10/13 | * | * | * |
| 10/13 | 10/20 | * | * | * |
| 10/20 | 10/27 | * | * | * |
| 10/27 | 11/3 | * | * | 0.006 |
| 11/3 | 11/10 | * | * | * |
| 11/10 | 11/17 | * | * | * |
| 11/17 | 11/24 | * | * | 0.005 |
| 11/24 | 12/1 | * | * | * |
| 12/1 | 12/8 | * | * | * |
| 12/8 | 12/15 | * | * | * |
| 12/15 | 12/22 | * | * | * |
| 12/22 | 12/29 | * | * | 0.024 |
| Annual Average[b] | | <0.003 | <0.003 | <0.005 |

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

(b) The annual average has been calculated from the result reported for each analysis including "less-than analytical limit" values.

TABLE V-3 Concentrations of Radionuclides in 300 Area Drinking Water (Cumulative Samples) - 1975

(Units of $10^{-9}$ μCi/ml of Water)

| Date | | $^{46}Sc$ | $^{51}Cr$ | $^{60}Co$ | $^{65}Zn$ | $^{137}Cs$ | Alpha |
|---|---|---|---|---|---|---|---|
| Anal. Limit[a] | | 30 | 380 | 24 | 47 | 26 | 0.40 |
| 12/30 | 1/6 | * | * | * | * | * | 0.37 |
| 1/6 | 1/13 | * | * | * | * | * | 0.30 |
| 1/13 | 1/20 | * | * | * | * | * | * |
| 1/20 | 1/27 | * | * | * | * | * | 0.53 |
| 1/27 | 2/3 | * | * | * | * | * | 0.45 |
| 2/3 | 2/10 | * | * | * | * | * | 0.23 |
| 2/10 | 2/18 | * | * | * | * | * | * |
| 2/18 | 2/24 | * | * | * | * | * | 0.57 |
| 2/24 | 3/3 | * | * | * | * | * | 0.74 |
| 3/3 | 3/10 | * | * | * | * | * | 1.0 |
| 3/10 | 3/17 | * | * | * | * | * | 0.39 |
| 3/17 | 3/24 | * | * | * | * | * | 0.86 |
| 3/24 | 3/31 | * | * | * | * | * | 0.88 |
| 3/31 | 4/7 | * | * | * | * | * | 0.88 |
| 4/7 | 4/14 | * | * | * | * | * | 0.88 |
| 4/14 | 4/21 | * | * | * | * | * | * |
| 4/21 | 4/28 | * | * | * | * | * | 0.46 |
| 4/28 | 5/5 | * | * | * | * | * | 0.58 |
| 5/5 | 5/12 | * | * | * | * | * | * |
| 5/12 | 5/19 | * | * | * | * | * | 1.2 |
| 5/19 | 5/27 | * | * | * | * | * | * |
| 5/27 | 6/2 | * | * | * | * | * | * |
| 6/2 | 6/9 | * | * | * | * | * | * |
| 6/9 | 6/16 | * | * | * | * | * | * |
| 6/16 | 6/23 | * | * | * | * | * | * |
| 6/23 | 6/30 | * | * | * | * | * | * |

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

TABLE V-3 (Cont'd) Concentrations of Radionuclides in 300 Area Drinking Water (Cumulative Samples) - 1975

(Units of $10^{-9}$ μCi/ml of Water)

| Date | | $^{46}Sc$ | $^{51}Cr$ | $^{60}Co$ | $^{65}Zn$ | $^{137}Cs$ | Alpha |
|---|---|---|---|---|---|---|---|
| Anal. Limit[a] | | 30 | 380 | 24 | 47 | 26 | 0.40 |
| 6/30 | 7/7 | * | * | * | * | * | 0.53 |
| 7/7 | 7/14 | * | * | * | * | * | * |
| 7/14 | 7/21 | * | * | * | * | * | * |
| 7/21 | 7/28 | * | * | * | * | * | * |
| 7/28 | 8/4 | * | * | * | * | * | 0.53 |
| 8/4 | 8/11 | * | * | * | * | * | * |
| 8/11 | 8/18 | * | * | * | * | * | 0.62 |
| 8/18 | 8/25 | * | * | * | * | * | 0.62 |
| 8/25 | 9/2 | * | * | * | * | * | * |
| 9/2 | 9/8 | * | * | * | * | * | 0.56 |
| 9/8 | 9/15 | * | * | * | * | * | 0.69 |
| 9/15 | 9/22 | * | * | * | * | * | 0.65 |
| 9/22 | 9/29 | * | * | * | * | * | 0.62 |
| 9/29 | 10/6 | * | * | * | * | * | 0.47 |
| 10/6 | 10/13 | * | * | * | * | * | * |
| 10/13 | 10/20 | * | * | * | * | * | 0.63 |
| 10/20 | 10/27 | * | * | * | * | * | 1.2 |
| 10/27 | 11/3 | * | * | * | * | * | * |
| 11/3 | 11/10 | * | * | * | * | * | 0.79 |
| 11/10 | 11/17 | * | * | * | * | * | 0.97 |
| 11/17 | 11/24 | * | * | * | * | * | 0.51 |
| 11/24 | 12/1 | * | * | * | * | * | 0.90 |
| 12/1 | 12/8 | * | * | * | * | * | 0.57 |
| 12/8 | 12/15 | * | * | * | * | * | 0.69 |
| 12/15 | 12/22 | | | | | | * |
| 12/22 | 12/29 | | | | | | 0.83 |
| Annual Average[b] | | * | * | * | * | * | <0.51 |

* Result was less than the analytical limit.

(a) The analytical limit for each isotope is the average of the individual analytical limits for all samples.

(b) The annual average has been calculated from the result reported for each analysis including "less-than analytical limit" values.

No entry indicates no analysis was made.

TABLE V-4 Concentrations of Radionuclides in Richland Drinking Water (Cumulative Samples) - 1975

(Units of $10^{-9}$ μCi/ml of Water)

| Date | | $^{46}Sc$ | $^{51}Cr$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ | $^{137}Cs$ | Alpha |
|---|---|---|---|---|---|---|---|---|
| Anal. Limit[a] | | 10 | 140 | 5.6 | 17 | 0.08 | 8.8 | 0.40 |
| 12/30 | 1/6 | | | | | | | 0.55 |
| 1/6 | 1/13 | | | | | | | * |
| 1/13 | 1/20 | | | | | | | * |
| 1/20 | 1/27 | * | * | * | * | 0.27 | * | * |
| 1/27 | 2/3 | | | | | | | * |
| 2/3 | 2/10 | | | | | | | * |
| 2/10 | 2/18 | | | | | | | 0.39 |
| 2/18 | 2/24 | | | | | 0.56 | | 0.38 |
| 2/24 | 3/3 | | | | | | | 0.74 |
| 3/3 | 3/10 | | | | | | | 1.2 |
| 3/10 | 3/17 | | | | | | | 0.39 |
| 3/17 | 3/24 | * | * | * | * | 0.39 | * | 0.57 |
| 3/24 | 3/31 | | | | | | | 0.76 |
| 3/31 | 4/7 | | | | | | | * |
| 4/7 | 4/14 | | | | | | | * |
| 4/14 | 4/21 | | | | | | | 0.53 |
| 4/21 | 4/28 | 1.9 | * | * | * | * | * | 0.35 |
| 4/28 | 5/5 | | | | | | | * |
| 5/5 | 5/12 | | | | | | | * |
| 5/12 | 5/19 | | | | | | | 0.79 |
| 5/19 | 5/27 | * | * | * | * | 0.34 | * | * |
| 5/27 | 6/2 | | | | | | | * |
| 6/2 | 6/9 | | | | | | | * |
| 6/9 | 6/16 | | | | | | | * |
| 6/16 | 6/23 | * | * | * | * | 0.83 | * | * |
| 6/23 | 6/30 | | | | | | | * |

No entry indicates no analysis was made.

* Result was less than the analytical limit shown.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

TABLE V-4 (Cont'd) Concentrations of Radionuclides in Richland Drinking Water (Cumulative Samples) - 1975

(Units of $10^{-9}$ μCi/ml of Water)

| Date | | $^{46}Sc$ | $^{51}Cr$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ | $^{137}Cs$ | Alpha |
|---|---|---|---|---|---|---|---|---|
| Anal. Limit[a] | | 10 | 140 | 5.6 | 17 | 0.08 | 8.8 | 0.40 |
| 6/30 | 7/7 | | | | | | | * |
| 7/7 | 7/14 | | | | | | | * |
| 7/14 | 7/21 | | | | | | | * |
| 7/21 | 7/28 | * | * | * | * | 0.17 | * | 0.51 |
| 7/28 | 8/4 | | | | | | | * |
| 8/4 | 8/11 | | | | | | | * |
| 8/11 | 8/18 | | | | | | | * |
| 8/18 | 8/25 | * | * | 4.0 | * | | 2.6 | 0.72 |
| 8/25 | 9/2 | | | | | | | * |
| 9/2 | 9/8 | | | | | | | * |
| 9/8 | 9/15 | | | | | | | 0.54 |
| 9/15 | 9/22 | | | | | | | * |
| 9/22 | 9/29 | * | * | * | * | 0.45 | * | * |
| 9/29 | 10/6 | | | | | | | * |
| 10/6 | 10/13 | | | | | | | 0.58 |
| 10/13 | 10/20 | | | | | | | 0.69 |
| 10/20 | 10/27 | * | * | * | * | 0.46 | * | 0.50 |
| 10/27 | 11/3 | | | | | | | 0.71 |
| 11/3 | 11/10 | | | | | | | * |
| 11/10 | 11/17 | | | | | | | 0.86 |
| 11/17 | 11/24 | * | * | * | * | 0.22 | * | 0.83 |
| 11/24 | 12/1 | | | | | | | 0.47 |
| 12/1 | 12/8 | | | | | | | 0.88 |
| 12/8 | 12/15 | | | | | | | 0.88 |
| 12/15 | 12/22 | * | * | * | * | | * | * |
| 12/22 | 12/29 | * | * | * | * | | * | 0.92 |
| Annual Average[b] | | * | * | <0.71 | * | <0.37 | <0.06 | <0.42 |

No entry indicates no analysis was made.

* Result was less than the analytical limit shown.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

(b) The annual average has been calculated from the result reported for each analysis including "less-than analytical limit" values.

# VI. NONRADIOLOGICAL PARAMETERS MEASURED IN DRINKING WATER

## VI. NONRADIOLOGICAL PARAMETERS MEASURED IN DRINKING WATER

HEHF routinely collects grab samples from all major sources of drinking water on the Hanford site for analyses of chemical and bacteriological purity. All bacteriological tests were negative and thus in compliance with the standard of no detectable coliform bacteria in Hanford drinking water.

HEHF routinely measures levels of nitrate ion in the 300 Area and Richland drinking water. These results are shown in Table VI-1; for greater detail, the reader is encouraged to refer to HEHF documents.

The following table is included in Section VI:


| | | Page |
|---|---|---|
| Table VI-1. | Nitrate Ion in 300 Area and Richland Drinking Water (Cumulative Samples) - 1975 | VI-2 |

TABLE VI-1 Nitrate Ion in 300 Area and Richland Drinking Water (Cumulative Samples) - 1975

(Units of ppm of Water)

| Date | | 300 Area | Richland | Date | | 300 Area | Richland |
|---|---|---|---|---|---|---|---|
| 12/30 | 1/6 | 0.54 | 0.46 | 7/21 | 7/28 | | 0.15 |
| 1/6 | 1/13 | 0.60 | 0.52 | 7/28 | 8/4 | 0.10 | 0.19 |
| 1/13 | 1/20 | 0.66 | 1.4 | 8/4 | 8/11 | 0.05 | 0.08 |
| 1/20 | 1/27 | 0.85 | 0.50 | 8/11 | 8/18 | 0.18 | 0.22 |
| 1/27 | 2/3 | 0.56 | 0.66 | 8/18 | 8/25 | 0.15 | 0.19 |
| 2/3 | 2/10 | 0.50 | 0.60 | 8/25 | 9/2 | | 0.10 |
| 2/10 | 2/17 | 0.44 | 0.60 | 9/2 | 9/8 | | 0.18 |
| 2/17 | 2/24 | 0.56 | 0.67 | 9/8 | 9/15 | <0.10 | 0.12 |
| 2/24 | 3/3 | | 0.50 | 9/15 | 9/22 | 0.17 | 0.18 |
| 3/3 | 3/10 | 0.60 | 0.61 | 9/22 | 9/29 | <0.10 | 0.20 |
| 3/10 | 3/17 | 0.59 | 1.7 | 9/29 | 10/6 | | 0.25 |
| 3/17 | 3/24 | 0.45 | 0.51 | 10/6 | 10/13 | <0.10 | 0.10 |
| 3/24 | 3/31 | 0.53 | 0.56 | 10/13 | 10/20 | 0.23 | 0.26 |
| 3/31 | 4/7 | 0.29 | 0.58 | 10/20 | 10/27 | 0.27 | 0.24 |
| 4/7 | 4/14 | 0.85 | 0.60 | 10/27 | 11/3 | 0.26 | 0.32 |
| 4/14 | 4/21 | 0.72 | 0.74 | 11/3 | 11/10 | 0.20 | 0.29 |
| 4/21 | 4/28 | 0.50 | 0.60 | 11/10 | 11/17 | 0.36 | 0.46 |
| 4/28 | 5/5 | 0.30 | 0.45 | 11/17 | 11/24 | 0.25 | 0.32 |
| 5/5 | 5/12 | 0.19 | 0.24 | 11/24 | 12/1 | 0.29 | 0.36 |
| 5/12 | 5/19 | 0.13 | 0.19 | 12/1 | 12/8 | 0.38 | 0.53 |
| 5/19 | 5/26 | <0.10 | 0.20 | 12/8 | 12/15 | 0.36 | 0.78 |
| 5/26 | 6/2 | | 0.10 | 12/15 | 12/22 | 0.55 | 0.86 |
| 6/2 | 6/9 | <0.10 | 0.12 | 12/22 | 12/29 | 0.57 | 2.8 |
| 6/9 | 6/16 | <0.10 | <0.10 | | | | |
| 6/16 | 6/23 | 0.19 | 0.24 | Annual Average | | <0.34 | <0.46 |
| 6/23 | 6/30 | 0.12 | 0.25 | | | | |
| 6/30 | 7/7 | <0.10 | <0.10 | | | | |
| 7/7 | 7/14 | 0.10 | 0.67 | | | | |
| 7/14 | 7/21 | 0.14 | 0.11 | | | | |

No entry indicates no analyses was made.

# VII. GROUND WATER SURVEILLANCE ANALYSES DURING 1975

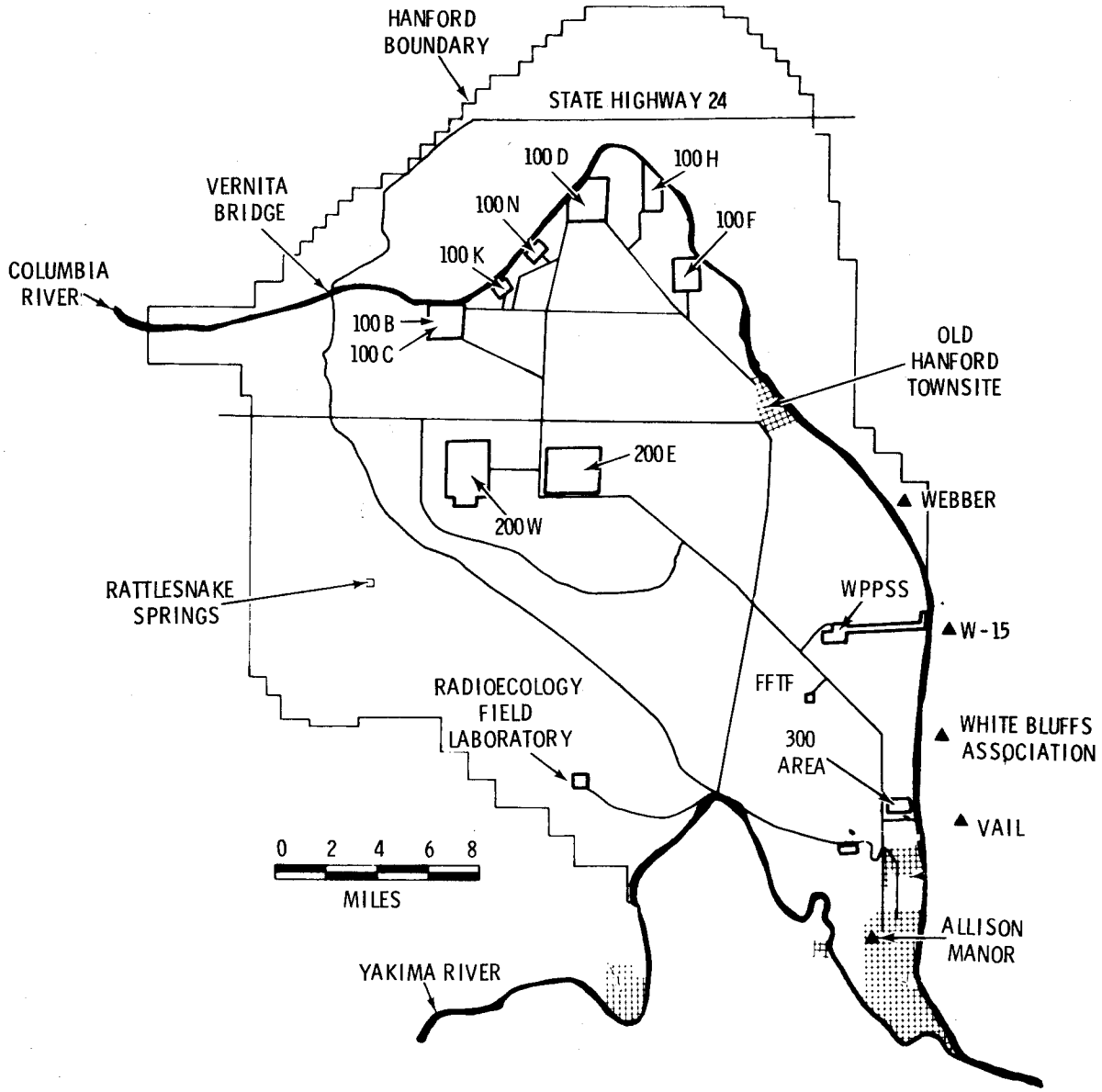
## VII. GROUND WATER SURVEILLANCE ANALYSES DURING 1975

BNW routinely samples ground water from 5 wells adjacent to the Hanford Site. Four of these wells are located on the east side of the Columbia River and the fifth is in Richland. The locations are shown in Figure VII-1.

The ground water samples were analyzed for tritium and nitrate ion.

The following tables are included in Section VII:


| | | Page |
|---|---|---|
| Table VII-1. | Concentrations of Tritium in the Wells in the Vicinity of Hanford - 1975 | VII-2 |
| Table VII-2. | Nitrate Ion in the Wells in the Vicinity of Hanford - 1975 | VII-2 |




▲GROUNDWATER SAMPLING LOCATIONS

FIGURE VII-1. Offsite Test Well Locations

TABLE VII-1. Concentrations of Tritium in the Wells in the Vicinity of Hanford - 1975

(Units of $10^{-9}$ μCi/ml of Water)

| Date | Webber | W-15 | White Bluffs Association | Vail | Allison Mannor |
|---|---|---|---|---|---|
| 4/4 | * | * | * | * | * |
| 10/3 | * | * | * | * | * |
| Average | * | * | * | * | * |

* Result was less than the analytical limit of $1.5 \times 10^{-7}$ μCi/ml of water.

TABLE VII-2. Nitrate Ion in the Wells in the Vicinity of Hanford - 1975

(Units of ppm of Water)

| Date | Webber | W-15 | White Bluffs Association | Vail | Allison Manor |
|---|---|---|---|---|---|
| 4/4 | * | * | * | * | * |
| 10/3 | * | * | * | * | * |
| Average | * | * | * | * | * |

* Result was less than the analytical limit of 0.5 ppm of water.

# VIII. RADIONUCLIDES IN SELECTED FOODSTUFFS

# VIII. RADIONUCLIDES IN SELECTED FOODSTUFFS

Foodstuffs, including milk, meat, chicken, eggs and leafy vegetables were collected from local farms and commercial outlets. Commercial milk was obtained from outlets representing two different watersheds: Commercial Brand H west of the Cascade Range, the other east.

The following tables are included in Section VIII:


| | | Page |
|---|---|---|
| Table VIII-1. | Concentrations of Radionuclides in Milk - 1975 | VIII-2 |
| Table VIII-2. | Concentrations of Radionuclides in Locally Purchased Meat - 1975 | VIII-9 |
| Table VIII-3. | Concentrations of Radionuclides in Locally Purchased Leafy Vegetables - 1975 | VIII-10 |
| Table VIII-4. | Concentrations of Radionuclides in Locally Purchased Chicken and Eggs - 1975 | VIII-11 |

TABLE VIII-1. Concentrations of Radionuclides in Milk - 1975

(Units of $10^{-9}$ μCi/ml of Milk)

| Date | $^{40}K$ | $^{65}Zn$ | $^{89}Sr$ | $^{90}Sr$ | $^{131}I$ | $^{137}Cs$ |
|---|---|---|---|---|---|---|
| Anal. Limit[a] | 560 | 65 | 0.99 | 0.73 | 0.40 | 35 |
| **Riverview Irrigation District - Farm #1** | | | | | | |
| 1/6 | 1200 | * | | | * | * |
| 1/20 | 880 | * | * | * | * | * |
| 2/3 | 970 | * | | | * | * |
| 2/18 | 980 | * | | | * | * |
| 3/3 | 930 | * | | | * | * |
| 3/17 | 840 | * | | | * | * |
| 3/31 | 930 | * | | | * | * |
| 4/14 | 880 | * | * | * | * | * |
| 4/28 | 900 | * | | | * | * |
| 5/12 | 810 | * | | | * | * |
| 5/27 | 790 | * | | | * | * |
| 6/9 | 1100 | * | | | * | * |
| 6/23 | 1000 | * | | | * | * |
| 7/7 | 810 | * | * | 2.4 | * | * |
| 7/21 | 760 | * | | | * | * |
| 8/4 | 750 | * | | | * | * |
| 8/18 | 820 | * | | | * | * |
| 9/2 | 1100 | * | | | 0.28 | * |
| 9/15 | 760 | * | | | * | * |
| 9/29 | 940 | * | * | 3.2 | * | * |
| 10/13 | 760 | * | | | * | * |
| 10/27 | 750 | * | | | * | * |
| 11/10 | 880 | * | | | * | * |
| 11/24 | 720 | * | | | * | * |
| 12/8 | 740 | * | | | * | * |
| 12/22 | 820 | * | | | 0.41 | * |
| Annual Average[b] | 880±250 | * | * | <1.7 | <0.19 | * |

No entry indicates no specific analysis was made.

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the analytical limits for all samples.

(b) Average and two standard deviations shown if radionuclide is detected in all samples. Otherwise a less than number is calculated including less-than values.

TABLE VIII-1 (Cont'd). Concentrations of Radionuclides in Milk - 1975

(Units of $10^{-9}$ μCi/ml of Milk)

| Date | $^{40}K$ | $^{65}Zn$ | $^{90}Sr$ | $^{131}I$ | $^{137}Cs$ |
|---|---|---|---|---|---|
| Anal. Limit[a] | 560 | 65 | 0.87 | 0.40 | 35 |
| | | Wahluke Watermaster | | | |
| 1/2 | 1000 | * | | * | * |
| 1/16 | 1100 | * | 370 | * | * |
| 1/30 | 1000 | * | | * | * |
| 2/13 | 1000 | * | | * | * |
| 2/27 | 1100 | * | | * | * |
| 3/13 | 780 | * | | * | * |
| 3/27 | 1100 | * | | * | * |
| 4/10 | 1000 | * | 1.0 | * | * |
| 4/24 | 820 | * | | * | * |
| 5/8 | 860 | * | | | * |
| 5/22 | 1100 | * | | * | * |
| 6/5 | 880 | * | | * | * |
| 6/19 | 1200 | * | | * | * |
| 7/7 | 920 | * | 1.1 | * | * |
| 7/17 | | | | * | * |
| 7/31 | 820 | * | | * | * |
| 8/14 | 920 | * | | * | * |
| 8/28 | 910 | * | | * | * |
| 9/11 | 1100 | * | | * | * |
| 9/25 | 880 | * | | * | * |
| 10/9 | 930 | * | 3.7 | * | * |
| 10/23 | 990 | * | | * | * |
| 11/6 | 990 | * | | * | * |
| 11/20 | 910 | * | | 0.42 | * |
| 12/4 | 790 | * | | * | * |
| 12/18 | 980 | * | | * | * |
| 12/30 | 1100 | * | | 0.40 | * |
| Annual Average[b] | 970±220 | * | 2.4±3.0 | <0.19 | * |

No entry indicates no specific analysis was made.

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the analytical limits for all samples.

(b) Average and two standard deviations shown if radionuclide is detected in all samples. Otherwise a less than number is calculated including less-than values.

TABLE VIII-1 (Cont'd). Concentrations of Radionuclides in Milk - 1975

(Units of $10^{-9}$ μCi/ml of Milk)

| Date | $^{40}K$ | $^{65}Zn$ | $^{90}Sr$ | $^{131}I$ | $^{137}Cs$ |
|---|---|---|---|---|---|
| Anal. Limit[a] | 560 | 65 | 0.94 | 0.40 | 35 |
| | | Benton City Farm #3 | | | |
| 1/2 | 1200 | * | | * | * |
| 1/16 | 1100 | * | | * | * |
| 1/30 | 980 | * | 6.1 | * | * |
| 2/13 | 1100 | * | | * | * |
| 2/27 | 1100 | * | | * | * |
| 3/13 | 630 | * | | * | * |
| 3/27 | 910 | * | | * | * |
| 4/10 | 880 | * | | * | * |
| 4/24 | 1100 | * | | * | * |
| 5/8 | 1000 | * | 2.6 | * | * |
| 5/22 | 830 | * | | * | * |
| 6/5 | 970 | * | | * | * |
| 6/19 | 1000 | * | | * | * |
| 7/7 | 934 | * | | * | * |
| 7/17 | 1000 | * | | * | * |
| 7/31 | 1000 | * | * | * | * |
| 8/14 | 1000 | * | | * | * |
| 8/29 | 1100 | * | | * | * |
| 9/11 | 1100 | * | | * | * |
| 9/25 | 820 | * | | * | * |
| 10/9 | 900 | * | | * | * |
| 10/23 | 1100 | * | | * | * |
| 11/6 | 900 | * | 5.0 | * | * |
| 11/20 | 970 | * | | * | * |
| 12/4 | 780 | * | | * | * |
| 12/18 | 900 | * | | * | * |
| 12/30 | 960 | * | | * | * |
| Annual Average[b] | 980±250 | * | <3.6 | * | * |

No entry indicates no specific analysis was made.

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the analytical limits for all samples.

(b) Average and two standard deviations shown if radionuclide is detected all samples. Otherwise a less-than number is calculated including less-than values.

TABLE VIII-1 (Cont'd). Concentrations of Radionuclides in Milk - 1975

(Units of $10^{-9}$ μCi/ml of Milk)

| Date | $^{40}K$ | $^{65}Zn$ | $^{90}Sr$ | $^{131}I$ | $^{137}Cs$ |
|---|---|---|---|---|---|
| Anal. Limit[a] | 560 | 65 | 0.54 | 0.40 | 35 |
| | | Benton City Farm #4 | | | |
| 1/2 | 810 | * | | * | * |
| 1/16 | 920 | * | | * | * |
| 1/30 | 990 | * | | * | * |
| 2/13 | 760 | * | | * | * |
| 2/27 | 830 | * | 1.2 | * | * |
| 3/13 | 870 | * | | * | * |
| 3/27 | 860 | * | | * | * |
| 4/10 | 970 | * | | * | * |
| 4/24 | 980 | * | | * | * |
| 5/8 | 870 | * | | * | * |
| 5/22 | 940 | * | | * | * |
| 6/5 | 300 | * | 1.2 | * | * |
| 6/19 | 820 | * | | * | * |
| 7/7 | 710 | * | | * | * |
| 7/17 | * | * | | * | * |
| 7/31 | 800 | * | | * | * |
| 8/14 | 790 | * | | * | * |
| 8/29 | * | * | 1.1 | * | * |
| 9/11 | * | * | | * | * |
| 9/25 | 720 | * | | * | * |
| Annual Average[b] | <820 | * | 1.2±0.08 | * | * |

No entry indicates no specific analysis was made.

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the analytical limits for all samples.

(b) Average and two standard deviations shown if radionuclide is detected in all samples. Otherwise a less than number is calculated including less than values.

TABLE VIII-1 (Cont'd). Concentrations of Radionuclides in Milk - 1975

(Units of $10^{-9}$ μCi/ml of Milk)

| Date | $^{40}K$ | $^{65}Zn$ | $^{90}Sr$ | $^{131}I$ | $^{137}Cs$ |
|---|---|---|---|---|---|
| Anal. Limit[a] | 660 | 77 | 1.4 | 0.28 | 41 |
| | | Benton City Farm #5 | | | |
| 10/23 | 980 | * | | * | * |
| 11/6 | 1100 | * | | 0.57 | * |
| 11/20 | 770 | * | | 0.43 | * |
| 12/4 | * | * | 1.4 | 0.22 | * |
| 12/18 | 970 | * | | * | * |
| 12/30 | 850 | * | | * | * |
| Annual Average[b] | <880 | * | | <0.25 | * |

No entry indicates no specific analysis was made.

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the analytical limits for all samples.

(b) The annual average has been calculated from the results reported for each analysis including less-than values.

TABLE VIII-1 (Cont'd). Concentrations of Radionuclides in Milk - 1975

(Units of $10^{-9}$ μCi/ml of Milk)

| Date | $^{40}K$ | $^{65}Zn$ | $^{90}Sr$ | $^{131}I$ | $^{137}Cs$ |
|---|---|---|---|---|---|
| Anal. Limit[a] | 560 | 65 | 0.59 | 0.40 | 35 |
| | | Commercial Brand H | | | |
| 1/2 | 1300 | * | | * | * |
| 1/23 | 960 | * | | * | * |
| 2/20 | 970 | * | 2.4 | * | * |
| 3/20 | 840 | * | | * | * |
| 4/17 | 1000 | * | | * | * |
| 5/15 | 1200 | * | 5.0 | * | * |
| 6/12 | 1200 | * | | * | * |
| 7/10 | 1000 | * | | * | * |
| 8/7 | 1100 | * | | * | * |
| 9/4 | 920 | * | | 0.37 | * |
| 10/2 | 1000 | * | | * | * |
| 10/30 | 1100 | * | 0.007 | * | * |
| 11/25 | 820 | * | | * | * |
| 12/22 | 1000 | * | | * | * |
| Annual Average[b] | 1000±270 | * | 2.4±4.9 | <0.15 | * |

No entry indicates no specific analysis was made.

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the analytical limits for all samples.

(b) Average and two standard deviation shown if radionuclide is detected in all samples. Otherwise a less-than number is calculated including less-than values.

TABLE VIII-1 (Cont'd). Concentrations of Radionuclides in Milk - 1975

(Units of $10^{-9}$ μCi/ml of Milk)

| Date | $^{40}K$ | $^{65}Zn$ | $^{90}Sr$ | $^{131}I$ | $^{137}Cs$ |
|---|---|---|---|---|---|
| Anal. Limit[a] | 560 | 65 | 0.81 | 0.40 | 35 |
| | | Commercial Composite | | | |
| 1/2 | 1000 | * | | * | * |
| 1/23 | 840 | * | | * | * |
| 2/20 | 880 | * | | * | * |
| 3/20 | 790 | * | * | * | * |
| 4/17 | 1000 | * | | * | * |
| 5/15 | 980 | * | | 0.76 | * |
| 6/12 | 1000 | * | 2.0 | * | * |
| 7/10 | 930 | * | | * | * |
| 8/7 | 980 | * | | * | * |
| 9/4 | 880 | * | 5.4 | * | * |
| 10/2 | 1200 | * | | * | * |
| 10/30 | 1100 | * | | * | * |
| 11/25 | 730 | * | 2.4 | * | * |
| 12/22 | 1200 | * | | 0.52 | * |
| Annual Average[b] | 960±270 | * | <2.6 | <0.25 | * |

No entry indicates no specific analysis was made.

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the analytical limits for all samples.

(b) Average and two standard deviation shown if radionuclide is detected in all samples. Otherwise a less than number is calculated including less-than values.

TABLE VIII-2. Concentrations of Radionuclides in Locally Purchased Meat - 1975

Units of $10^{-6}$ μCi/g of Meat (Wet Weight)

| Date | Type | $^{40}K$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ | $^{137}Cs$ |
|---|---|---|---|---|---|---|
| Anal. Limit[a] | | 0.57 | 0.04 | 0.07 | 0.001 | 0.04 |
| | | | Commercial | | | |
| 1/9 | Beef | 1.6 | * | * | 0.001 | * |
| 2/6 | Beef | 2.0 | * | * | 0.003 | * |
| 3/6 | Beef | 1.9 | * | * | * | * |
| 4/10 | Beef | 2.4 | * | * | * | * |
| 5/1 | Beef | 2.0 | * | * | * | * |
| 5/29 | Beef | 2.3 | * | * | 0.003 | * |
| 6/26 | Beef | 2.4 | * | * | * | * |
| 7/24 | Beef | 2.1 | * | * | 0.007 | * |
| 8/21 | Beef | 1.9 | * | * | 0.003 | * |
| 9/18 | Beef | 2.1 | * | * | * | * |
| 10/16 | Beef | 1.9 | * | 0.08 | 0.005 | * |
| 11/13 | Beef | 1.6 | * | * | 0.002 | * |
| 12/11 | Beef | 2.1 | * | * | 0.002 | * |
| Annual Average[b] | | 2.0±0.70 | * | <0.02 | <0.002 | * |
| | | | Riverview Farm | | | |
| 5/27 | Beef | 1.9 | * | * | 0.002 | 0.03 |

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the analytical limits for all samples.

(b) Average and two standard deviation shown if radionuclide is detected in all samples. Otherwise a less-than number is calculated including less-than values.

TABLE VIII-3. Concentrations of Radionuclides in Locally Purchased Leafy Vegetables - 1975

Units of $10^{-6}$ μCi/g of Leafy Vegetables (Wet Weight)

| Date | $^{40}K$ | $^{60}Co$ | $^{65}Zn$ | $^{89}Sr$ | $^{90}Sr$ | $^{95}ZrNb$ | $^{106}Ru$ | $^{137}Cs$ |
|---|---|---|---|---|---|---|---|---|
| Anal. Limit[a] | 1.5 | 0.09 | 0.17 | 0.006 | 0.003 | 0.06 | 1.3 | 0.09 |
| | | | Riverview Farm | | | | | |
| 6/5 | 3.3 | * | * | | 0.02 | * | * | * |
| 8/7 | 2.5 | * | * | | | * | * | * |
| 9/4 | 2.6 | * | * | | 0.06 | * | * | * |
| 10/9 | 2.1 | * | * | | | * | * | * |
| Average | 2.6 | * | * | | 0.04 | * | * | * |
| | | | Benton City Farm | | | | | |
| 9/4 | 1.4 | * | * | | 0.02 | * | * | * |
| | | | Commercial | | | | | |
| 5/22 | 2.4 | * | * | * | 0.004 | * | * | * |
| 6/19 | 2.1 | * | * | | | * | * | * |
| 7/24 | 2.2 | * | * | | | * | * | * |
| 8/21 | 3.2 | * | * | | | * | * | * |
| 9/18 | 5.1 | * | * | * | 0.03 | * | * | * |
| 10/23 | 4.9 | * | * | | | | | |
| Average | 3.3 | * | * | * | 0.02 | * | * | * |

No entry indicates no specific analysis was made.

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the analytical limits for all samples.

TABLE VIII-4. Concentrations of Radionuclides in Locally Purchased Chicken and Eggs - 1975

Units of $10^{-6}$ μCi/g (Wet Weight)

| Date | $^{40}K$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ | $^{137}Cs$ |
|---|---|---|---|---|---|
| Anal. Limit[a] | 0.53 | 0.03 | 0.06 | 0.002 | 0.03 |
| | | Chicken (Riverview Farm) | | | |
| 3/6 | 2.0 | * | * | * | * |
| 5/29 | 1.7 | * | * | 0.01 | * |
| 9/18 | 1.1 | * | * | 0.004 | * |
| 12/11 | 1.6 | * | * | 0.001 | * |
| Average | 1.6 | * | * | <0.005 | * |
| | | Eggs (Riverview Farm) | | | |
| 1/9 | 0.64 | * | * | | * |
| 2/6 | 0.97 | * | * | | * |
| 3/6 | 0.97 | * | * | 0.001 | * |
| 4/3 | 0.96 | * | * | | * |
| 5/1 | 0.79 | * | * | | * |
| 5/29 | 1.0 | * | * | * | * |
| 6/27 | 0.83 | * | * | | * |
| 7/24 | 0.94 | * | * | | * |
| 8/21 | 0.87 | * | * | | * |
| 9/18 | 0.94 | * | * | 0.001 | * |
| 10/16 | 1.0 | * | * | | * |
| 11/13 | 1.1 | * | * | | * |
| 12/11 | 0.95 | * | * | | * |
| Average | 0.92 | * | * | <0.0009 | * |

No entry indicates no specific analysis was made.

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the analytical limits for all samples.

TABLE VIII-4 (Cont'd). Concentrations of Radionuclides in Locally Purchased Chicken and Eggs - 1975

Units of $10^{-6}$ μCi/g (Wet Weight)

| Date | $^{40}K$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ | $^{137}Cs$ |
|---|---|---|---|---|---|
| Anal. Limit[a] | 0.53 | 0.03 | 0.06 | 0.002 | 0.03 |
| | | Chicken (Commercial) | | | |
| 2/27 | 1.5 | * | * | * | * |
| 9/11 | 1.3 | * | * | 0.006 | * |
| Average | 1.4 | * | * | <0.004 | * |
| | | Eggs (Commercial) | | | |
| 2/27 | 0.78 | * | * | 0.001 | * |
| 9/11 | 0.80 | * | * | 0.003 | * |
| Average | 0.79 | * | * | 0.002 | * |

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the analytical limits for all samples.

# IX. RADIONUCLIDES IN FISH AND WILDLIFE

# IX. RADIONUCLIDES IN FISH AND WILDLIFE

Wildlife, including fish and various game birds were collected from the Hanford environs and analyzed for levels of radioactivity. Fish, usually whitefish, were collected monthly from the Columbia River and the composite analyzed monthly by gamma spectrometry and a specific analysis for $^{90}Sr$. Game birds, such as ducks, pheasants, and geese, were collected during hunting season along the Columbia River. The game bird samples were analyzed individually by gamma spectrometry and a specific analysis for $^{90}Sr$ to determine the concentration of measurable radionuclides in muscle tissue.

Oysters were obtained from Willapa Bay during 1975. The August samples were analyzed by gamma spectrometry. A $^{65}Zn$ analysis was made on the May and November samples.

The following tables are included in Section IX: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| Table IX-1. | Concentrations of Radionuclides in Muscle of Whitefish Taken from the Columbia River - 1975 | IX-2 |
| Table IX-2. | Concentrations of Selected Radionuclides in the Muscle of Waterfowl Samples Along the River in the Hanford Environs - 1975 | IX-3 |
| Table IX-3. | Concentrations of Radionuclides in Upland Game Bird Samples in the Hanford Environs - 1975 | IX-6 |
| Table IX-4. | Concentration of Radionuclides in Oysters from Willapa Bay - 1975 | IX-8 |

TABLE IX-1. Concentrations of Radionuclides in Muscle of Whitefish Taken from the Columbia River - 1975

Units of $10^{-6}$ μCi/g (wet weight)

| Date | $^{32}P$ | $^{40}K$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ | $^{137}Cs$ |
|---|---|---|---|---|---|---|
| Anal. Limit[a] | 11 | 1.2 | 0.08 | 0.15 | 0.004 | 0.08 |
| 1/24 | * | 4.2 | * | * | 0.01 | * |
| 2/21 | 0.93 | 2.9 | 0.24 | * | 0.003 | 0.08 |
| 3/26 | * | 3.0 | 0.09 | * | * | 0.09 |
| 5/14 | * | 3.2 | * | * | 0.008 | * |
| 6/23 | * | 3.1 | * | * | * | 0.10 |
| 7/11 | * | 10. | 0.23 | * | 0.02 | 0.43 |
| 8/22 | * | 2.8 | 0.17 | * | 0.18 | 0.21 |
| 9/5 | * | 3.4 | * | * | * | 0.14 |
| 10/8 | * | 3.4 | * | * | * | 0.13 |
| Annual Average[b] | <5.0 | 4.0±4.8 | <0.10 | * | <0.03 | <0.13 |

No entry indicates no analysis was made.

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

(b) Average and two standard deviations shown if radionuclide detected in all samples. Otherwise a less-than number is calculated including less-than values.

TABLE IX-2. Concentrations of Selected Radionuclides in the Muscle of Waterfowl Samples Along the River in the Hanford Environs - 1975

Units of $10^{-6}$ μCi/g (wet weight)

| Date | Species | $^{40}K$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ | $^{137}Cs$ |
|---|---|---|---|---|---|---|
| Anal. Limit[a] | | 2.1 | 0.13 | 0.25 | 0.006 | 0.14 |
| | Ducks | | | | | |
| 100F | | | | | | |
| 1/10 | Mallard | 3.4 | * | * | 0.005 | * |
| 1/10 | Mallard | 3.4 | * | * | * | * |
| 1/20 | Mallard | 2.9 | * | * | * | * |
| 1/20 | Mallard | 3.4 | * | * | 0.004 | * |
| 1/20 | Mallard | 3.6 | * | * | * | * |
| 11/10 | Mallard | 2.7 | * | * | * | * |
| 12/10 | Widgeon | 3.8 | * | * | * | * |
| 12/10 | Widgeon | 2.7 | * | * | 0.02 | * |
| 12/11 | Mallard | 3.9 | * | * | 0.01 | * |
| 12/11 | Mallard | * | * | * | * | * |
| 12/11 | Mallard | 3.3 | * | * | * | * |
| 12/11 | Mallard | 4.1 | * | * | * | * |
| 12/11 | Mallard | * | * | * | * | * |
| 12/12 | Mallard | * | * | * | * | * |
| 12/12 | Mallard | * | * | * | 0.04 | * |
| 12/12 | Mallard | * | * | * | * | * |
| Average[b] | | <3.1 | * | * | <0.006 | * |
| 300 Area | | | | | | |
| 12/3 | Mallard | 2.7 | * | * | 0.009 | * |

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limit for all samples.

(b) The annual average has been calculated from the result reported for each analysis including less-than values.

TABLE IX-2 (Cont'd). Concentrations of Selected Radionuclides in the Muscle of Waterfowl Samples Along the River in the Hanford Environs - 1975

Units of $10^{-6}$ μCi/g (wet weight)

| Date | Species | $^{40}K$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ | $^{137}Cs$ |
|---|---|---|---|---|---|---|
| Anal. Limit[a] | | 2.1 | 0.13 | 0.25 | 0.006 | 0.14 |
| | Ducks | | | | | |
| Hanford | | | | | | |
| 1/6 | Mallard | 3.6 | * | * | * | 0.15 |
| 1/6 | Mallard | 2.3 | * | * | * | * |
| 1/10 | Mallard | 3.9 | * | * | 0.009 | 0.12 |
| 1/23 | Mallard | 3.5 | * | * | * | * |
| 11/5 | Mallard | 3.7 | * | * | * | * |
| 11/5 | Mallard | 3.9 | * | * | * | * |
| 11/5 | Mallard | 2.7 | * | * | 0.02 | * |
| 11/5 | Mallard | 3.2 | * | * | 0.05 | * |
| 12/10 | Mallard | 3.1 | * | * | * | * |
| 12/10 | Mallard | 2.4 | * | * | * | * |
| Average[b] | | 3.2±1.2 | * | * | <0.01 | <0.05 |
| | Geese | | | | | |
| 100B | | | | | | |
| 12/19 | Can. Common | 2.8 | * | * | | * |
| 100K | | | | | | |
| 12/17 | Can. Lesser | 2.4 | * | * | | * |
| 12/17 | Can. Lesser | 3.0 | * | * | | * |
| Average | | 2.7 | * | * | | * |

No entry indicates no analysis was made.

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

(b) Average and two standard deviations shown if radionuclide isdetected in all samples. Otherwise a less-than number is calculated from the other results, including less-than values.

TABLE IX-2 (Cont'd). Concentrations of Selected Radionuclides in the Muscle of Waterfowl Samples Along the River in the Hanford Environs - 1975

Units of $10^{-6}$ μCi/g (wet weight)

| Date | Species | $^{40}K$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ | $^{137}Cs$ |
|---|---|---|---|---|---|---|
| Anal. Limit[a] | | 2.1 | 0.13 | 0.25 | 0.006 | 0.14 |
| | Geese | | | | | |
| 100D | | | | | | |
| 12/16 | Can. Common | 2.1 | * | * | | * |
| 12/16 | Can. Common | 2.7 | * | * | | * |
| Average | | 2.4 | * | * | | * |
| 100F | | | | | | |
| 1/6 | Can. Common | 3.1 | * | * | | 0.16 |
| 1/6 | Can. Common | 2.5 | * | * | | 0.08 |
| 1/20 | Can. Common | 2.6 | * | * | | * |
| 1/20 | Can. Common | 2.7 | * | * | | * |
| 1/20 | Can. Common | 2.0 | * | * | | * |
| 11/7 | Can. Common | 2.5 | * | * | | 0.17 |
| Average[b] | | 2.6±0.72 | * | * | | <0.07 |
| Hanford | | | | | | |
| 12/10 | Can. Common | 2.7 | * | * | | * |
| 12/10 | Can. Common | 3.2 | * | * | | * |
| 12/10 | Can. Common | 2.7 | * | * | | * |
| 12/10 | Can. Common | 3.0 | * | * | | * |
| Average[b] | | 2.9±0.47 | * | * | | * |
| White Bluffs | | | | | | |
| 1/6 | Can. Common | 3.5 | * | * | | 0.17 |
| 11/20 | Can. Common | 9.5 | * | * | | * |
| Average | | 6.5 | * | * | | <0.16 |

No entry indicates no analysis was made.

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

(b) Average and two standard deviations shown if radionuclide is detected in all samples. Otherwise a less-than number is calculated from the other results including less-than values.

TABLE IX-3. Concentrations of Radionuclides in Upland Game Bird Samples in the Hanford Environs - 1975

Units of $10^{-6}$ μCi/g (wet weight)

| Date | Species | $^{40}K$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ | $^{137}Cs$ |
|---|---|---|---|---|---|---|
| Anal. Limit[a] | | 2.3 | 0.14 | 0.26 | 0.005 | 0.15 |
| 100 B | | | | | | |
| 1/7 | Pheasant | 3.8 | * | * | * | * |
| 12/15 | Pheasant | 3.4 | * | * | * | * |
| Average | | 3.6 | * | * | * | * |
| 100 D | | | | | | |
| 11/20 | Pheasant | 2.9 | * | * | * | * |
| 12/3 | Pheasant | * | * | * | * | * |
| 12/10 | Pheasant | * | * | * | 0.009 | * |
| Average | | <2.2 | * | * | <0.005 | * |
| 100 F | | | | | | |
| 1/7 | Pheasant | 2.7 | * | * | * | 0.09 |
| 11/10 | Pheasant | 3.0 | * | * | * | * |
| Average | | 2.8 | * | * | * | <0.09 |
| Hanford | | | | | | |
| 1/6 | Pheasant | 2.9 | * | * | * | * |
| 1/7 | Pheasant | 3.2 | * | * | * | * |
| 1/7 | Pheasant | 2.8 | * | * | * | 0.10 |
| 1/7 | Pheasant | 2.5 | * | * | * | * |
| 11/10 | Pheasant | 3.5 | * | * | * | * |
| Average[b] | | 3.0±0.74 | * | * | * | <0.07 |

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

(b) Average and two standard deviation is shown if radionuclide is detected in all samples. Otherwise a less-than number is calculated from the other results including less-than values.

TABLE IX-3 (Cont'd). Concentrations of Radionuclides in Upland Game Bird Samples in the Hanford Environs - 1975

Units of $10^{-6}$ μCi/g (wet weight)

| Date | Species | $^{40}K$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ | $^{137}Cs$ |
|---|---|---|---|---|---|---|
| Anal. Limit[a] | | 2.3 | 0.14 | 0.26 | 0.005 | 0.15 |
| White Bluffs | | | | | | |
| 11/7 | Pheasant | 3.1 | * | * | * | * |
| 11/10 | Pheasant | * | * | * | 0.009 | * |
| 11/20 | Pheasant | * | * | * | 0.01 | * |
| 11/20 | Pheasant | * | * | * | 0.08 | * |
| Average[b] | | <2.4 | * | * | <0.02 | * |

* Result was less than the analytical limit.

(a) The analytical limit shown for each isotope is the average of the individual analytical limits for all samples.

(b) The annual average has been calculated from the result reported for each analysis including less-than values.

TABLE IX-4. Concentration of Radionuclides in Oysters From Willapa Bay - 1975

Units of $10^{-6}$ μCi/g (Wet Weight)

| Date | $^{40}K$ | $^{65}Zn$ | $^{137}Cs$ |
|---|---|---|---|
| Anal. Limit[a] | 0.60 | 0.06 | 0.04 |
| 5/9 | | 0.08 | |
| 8/7 | 1.7 | * | * |
| 11/18 | | * | |
| Average[a] | | <0.06 | |

* Result was less than the analytical limit.

(a) The annual average has been calculated from the result reported for each analysis including less-than values.

# X. RADIONUCLIDES IN SOIL AND VEGETATION

# X. RADIONUCLIDES IN SOIL AND VEGETATION

Surface soil and perennial vegetation samples were collected from 8 different locations during the autumn of 1975. These samples were measured for radioactivity due to fallout and natural causes as well as to assess any potential buildup of radioactivity from Hanford operations. Each soil sample represents the composite of five "plugs" of soil from an approximate 10-meter square area. Each plug was approximately 2.5 centimeters (1 inch) in depth and 10 centimeters (4 inches) in diameter. The vegetation samples were collected in the immediate vicinity of each soil sampling location. Each sample consisted of approximately 2 kilograms of perennial vegetation, primarily the new growth from rabbit brush plants.

Both sets of samples were analyzed for gamma-emitting radionuclides using a lithium drifted Germanium detector, isotopes of plutonium using alpha spectroscopy, and $^{90}Sr$ and uranium by specific analyses.

Sediment samples from the Columbia River shoreline, islands, and slough areas were collected during 1975 at 21 different locations. Samples were collected from the top 1-inch of sediment at all locations and analyzed for gamma-emitting radionuclides. At 4 of the 21 locations, depth profiles of gamma-emitting radionuclides were obtained for 5 increments: 0-1", 1-2", 2-4", 4-6", and 6-8". $^{90}Sr$, $^{238}Pu$, and $^{239-240}Pu$ concentrations were also measured at the 4 locations in the 0-1" sediment sample. Replicate samples, consisting of 5 separate samples, were collected from one location and analyzed for gamma-emitting radionuclides.

Sample locations are shown in Figure X-1.

The following tables are included in Section X:


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| Table X-3. | Concentrations of Radionuclides in Sediment Sampled at Columbia River Island and Shoreline Locations - 1975 | X-4 |
| Table X-4. | Depth Profile of Radionuclide Concentrations in Sediment Sampled at Selected Columbia River Island and Shoreline Locations - 1975 | X-5 |

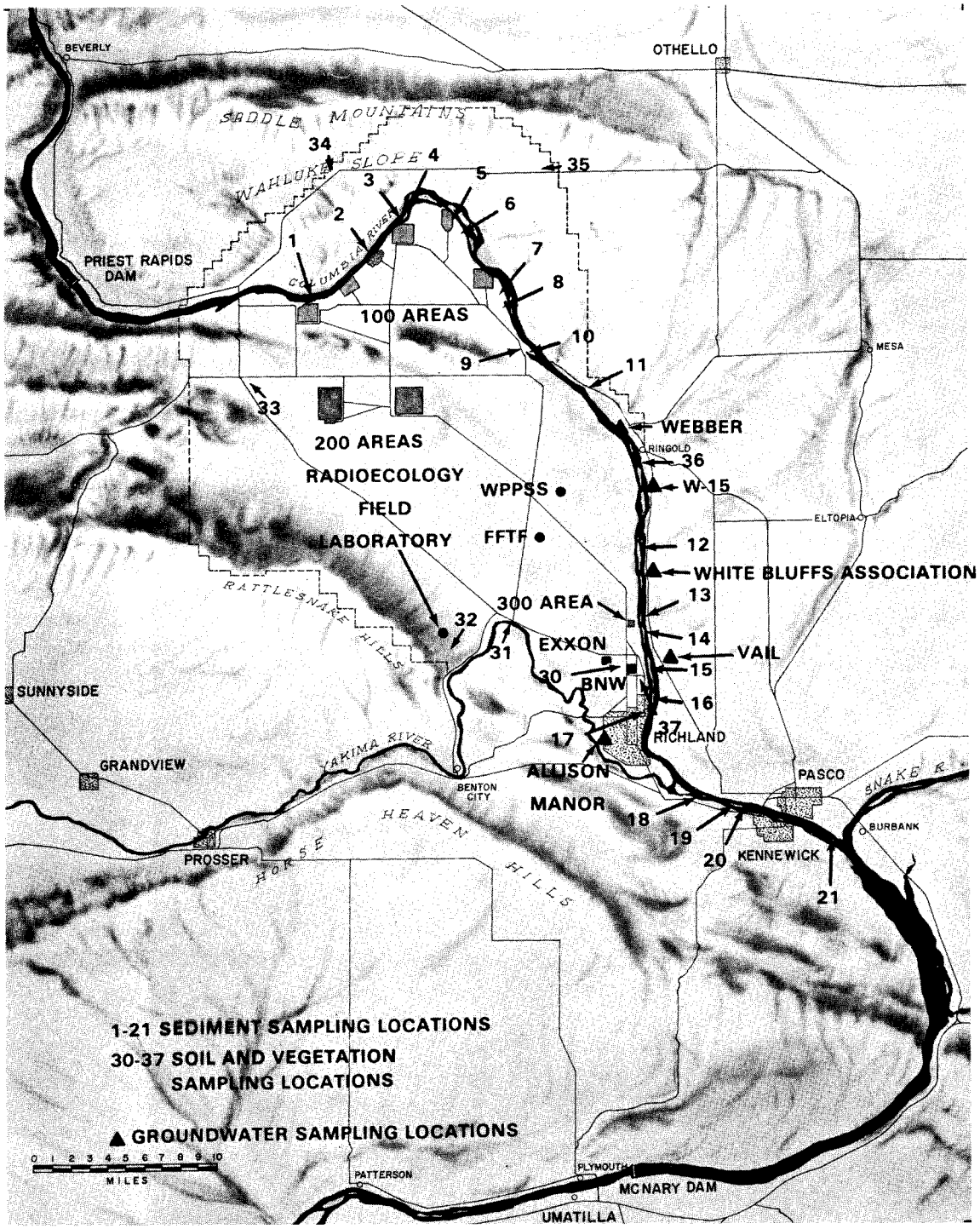


FIGURE X-1. Soil, Sediment, and Vegetation Sampling Locations During 1975

## TABLE X-1. Concentrations of Radionuclides in Perimeter Soil Samples - 1975

### Units of $10^{-6}$ μCi/g of Soil (Dry Weight)

| Sample Location | Map Location | Naturally Occurring Radionuclides | | | |
|---|---|---|---|---|---|
| | | $^{40}K$ | $^{224}Ra$ | $^{226}Ra$ | U-total |
| Analytical Limit | | 1.8 | 0.08 | 0.12 | 0.03 |
| Exxon Site | 30 | 13 | 0.59 | 0.38 | 0.14 |
| Prosser Barricade | 31 | 14 | 0.56 | 0.46 | 0.21 |
| ALE Field Lab | 32 | 13 | 1.3 | 0.80 | 0.15 |
| Yakima Barricade | 33 | 12 | 0.83 | 0.58 | 0.25 |
| Wahluke #2 | 34 | 11 | 0.83 | 0.51 | 0.19 |
| Berg Ranch | 35 | 12 | 0.83 | 0.66 | 0.26 |
| Ringold | 36 | 12 | 0.83 | 0.62 | 0.21 |
| 300 Area 331 Bldg. | 37 | 13 | 0.68 | 0.65 | 0.17 |
| Maximum | | 14 | 1.3 | 0.80 | 0.26 |
| Minimum | | 11 | 0.56 | 0.38 | 0.14 |
| Avr. ±2 Sample Deviations[a] | | 13±1.5 | 0.80±0.43 | 0.58±0.26 | 0.20±0.08 |

| Sample Location | Map Location | Artificially Produced Radionuclides | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $^{54}Mn$ | $^{58}Co$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ | $^{95}ZrNb$ | $^{106}Ru$-Rh | $^{134}Cs$ | $^{137}Cs$ | $^{144}Ce$ | $^{154}Eu$ | $^{238}Pu$ | $^{239-240}Pu$ |
| Analytical Limit | | 0.02 | 0.02 | 0.03 | 0.04 | 0.01 | 0.39 | 0.16 | 0.02 | 0.07 | 0.12 | 0.16 | 0.003 | 0.001 |
| Exxon Site | 30 | * | * | * | 0.14 | 0.56 | * | 0.29 | * | 0.67 | 0.20 | * | * | 0.02 |
| Prosser Barricade | 31 | * | * | * | * | 0.18 | * | 0.30 | 0.05 | 0.20 | * | * | * | * |
| ALE Field Lab | 32 | * | * | * | * | 0.47 | 0.20 | * | * | 1.6 | 0.27 | * | * | 0.01 |
| Yakima Barricade | 33 | * | * | 0.10 | 0.09 | 0.12 | * | 0.18 | * | 0.10 | 0.16 | 0.25 | * | 0.005 |
| Wahluke #2 | 34 | 0.03 | * | * | 0.10 | 0.10 | * | * | * | 0.31 | 0.16 | * | * | * |
| Berg Ranch | 35 | 0.03 | * | * | * | 0.18 | * | 0.40 | 0.03 | 0.32 | * | * | * | * |
| Ringold | 36 | * | 0.03 | * | * | 0.07 | * | 0.30 | * | 0.17 | 0.11 | * | * | 0.004 |
| 300 Area 331 Bldg. | 37 | * | * | * | 0.09 | 0.05 | 0.40 | * | * | 0.06 | 0.24 | * | * | * |
| Maximum | | 0.03 | 0.03 | 0.10 | 0.14 | 0.56 | 0.40 | 0.40 | 0.05 | 1.6 | 0.27 | 0.25 | * | 0.02 |
| Minimum | | * | * | * | * | * | * | * | * | 0.06 | * | * | * | * |
| Avr.± 2 Sample Deviations[a] | | <0.01 | <0.009 | <0.01 | <0.06 | 0.22±0.38 | * | <0.17 | <0.01 | 0.42±0.99 | <0.16 | <0.04 | <0.0004 | <0.007 |

* Indicates result was less than the analytical limit shown.

(a) Average and two sample standard deviations shown if radionuclide detected at all locations. Otherwise, a less-than number is calculated from the other results, including less-than values.

## TABLE X-2. Concentrations of Radionuclides in Perimeter Vegetation Samples - 1975

### Units of $10^{-6}$ μCi/g of Vegetation (Dry Weight)

| Sample Location | Map Location | Naturally Occurring Radionuclides | | Artifically Produced Radionuclides | | | | |
|---|---|---|---|---|---|---|---|---|
| | | $^{40}K$ | U-total | $^{54}Mn$ | $^{58}Co$ | $^{60}Co$ | $^{65}Zn$ | $^{90}Sr$ |
| Analytical Limit | | 3 | 0.03 | 0.09 | 0.10 | 0.10 | 0.2 | 0.01 |
| Exxon Site | 30 | 11 | 0.04 | * | * | 0.10 | * | 0.03 |
| Prosser Barricade | 31 | 12 | * | * | * | * | * | 0.14 |
| ALE Field Lab | 32 | 4.3 | * | * | * | * | * | 0.24 |
| Yakima Barricade | 33 | 6.8 | * | * | * | * | * | 0.06 |
| Wahluke #2 | 34 | 12 | 0.04 | * | * | * | * | 0.02 |
| Berg Ranch | 35 | 16 | * | * | * | * | * | 0.01 |
| Ringold | 36 | 16 | * | * | * | 0.11 | * | 0.02 |
| 300 Area 331 Bldg. | 37 | 40 | * | * | * | * | * | 0.48 |
| Maximum | | 40 | 0.04 | * | * | 0.11 | * | 0.48 |
| Minimum | | 4.3 | * | * | * | * | * | 0.01 |
| Avr ±2 Sample Deviations (a) | | 15±22 | <0.02 | * | * | <0.04 | * | 0.13±0.33 |

| Sample Location | Map Location | Artificially Produced Radionuclides | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | $^{95}ZrNb$ | $^{106}RuRh$ | $^{131}I$ | $^{134}Cs$ | $^{137}Cs$ | $^{141}Ce$ | $^{144}CePr$ | $^{238}Pu$ | $^{239-240}Pu$ |
| Analytical Limit | | 0.4 | 0.6 | 2.4 | 0.08 | 0.09 | 0.21 | 0.47 | 0.003 | 0.001 |
| Exxon Site | 30 | * | * | * | * | * | 0.25 | 0.56 | * | .002 |
| Prosser Barricade | 31 | * | * | * | * | 0.10 | * | 0.34 | * | .002 |
| ALE Field Lab | 32 | * | * | * | * | * | * | 0.58 | * | .002 |
| Yakima Barricade | 33 | * | * | * | * | 0.17 | * | 0.92 | * | .002 |
| Wahluke #2 | 34 | * | * | * | * | * | * | 0.34 | * | * |
| Berg Ranch | 35 | * | * | * | * | 0.12 | * | * | * | .001 |
| Ringold | 36 | * | * | * | * | * | * | * | * | .001 |
| 300 Area 331 Bldg. | 37 | * | * | * | * | * | * | 1.3 | * | * |
| Maximum | | * | * | * | * | 0.17 | 0.25 | 1.3 | * | 0.002 |
| Minimum | | * | * | * | * | * | * | * | * | * |
| Avr ± 2 Sample Deviations (a) | | * | * | * | * | <0.10 | * | <0.54 | * | <0.002 |

* Indicates result was less than the analytical limit shown.

(a) Average and two sample standard deviations shown if radionuclide detected at all locations. Otherwise, a less-than number is calculated from the other results, including less-than values.

## TABLE X-3. Concentrations of Radionuclides in Sediment Sampled at Columbia River Island and Shoreline Locations - 1975

Units of pCi/g (dry weight)

| River Mile | Map Location | Naturally Occurring Radionuclides | | | Artificially Produced Radionuclides | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $^{40}K$ | $^{224}Ra$ | $^{226}Ra$ | $^{54}Mn$ | $^{60}Co$ | $^{65}Zn$ | $^{106}Ru$ | $^{134}Cs$ | $^{137}Cs$ | $^{144}Ce$ | $^{152}Eu$ | $^{154}Eu$ | $^{155}Eu$ |
| | Detection Limit[a] | 1.8 | 0.08 | 0.12 | 0.02 | 0.03 | 0.04 | 0.16 | 0.02 | 0.07 | 0.12 | 0.06 | 0.16 | 0.04 |
| 384.3 | 1 | 11 | 1.3 | 0.4 | * | 0.2 | * | * | * | 0.4 | 0.1 | 0.2 | 0.1 | * |
| 379.8 | 2 | 11 | 1.8 | 0.7 | 0.05 | 0.6 | 0.4 | 0.15 | 0.02 | 0.7 | 0.4 | 0.3 | 0.8 | 0.3 |
| 377.3 | 3 | 9 | 2.9 | 0.6 | * | 2.4 | * | * | * | 0.6 | 0.6 | 1.5 | 0.5 | * |
| 376.6 | 4 | 11 | 2.8 | 0.9 | 0.2 | 9.6 | 0.2 | * | 0.1 | 0.8 | 0.9 | 0.4 | 0.6 | * |
| 370.6 | 6 | 12 | 1.3 | 0.4 | * | 0.06 | * | * | 0.02 | 0.07 | 0.2 | * | 0.2 | * |
| 368.0 | 7 | 12 | 2.1 | 0.7 | * | 1.1 | * | * | * | 1.7 | 0.2 | 1.6 | 0.4 | * |
| 363.1 | 9 | 13 | 2.2 | 0.7 | * | 1.0 | * | * | 0.04 | 1.0 | * | 0.7 | 0.1 | * |
| 362.6 | 10 | 14 | 1.8 | 0.6 | * | * | 0.1 | * | 0.03 | 0.2 | 0.3 | * | * | * |
| 359.0 | 11 | 14 | 3.2 | 0.7 | 0.04 | 0.7 | 0.1 | * | 0.05 | 0.4 | * | 0.3 | * | 0.1 |
| 346.0 | 13 | 14 | 1.5 | 0.6 | 0.2 | 6.2 | 0.1 | 0.2 | 0.02 | 1.8 | * | 2.2 | 0.8 | * |
| 344.6 | 14 | 11 | 2.2 | 0.8 | 0.07 | 2.4 | 0.1 | 0.3 | 0.03 | 0.5 | 0.4 | 0.7 | 0.2 | * |
| 342.7 | 15 | 12 | 1.7 | 0.8 | 0.02 | 2.1 | * | * | * | 0.7 | * | 0.3 | 0.4 | * |
| 340.3 | 16 | 14 | 1.0 | 0.4 | * | 0.6 | * | 0.7 | * | 1.0 | 0.08 | 0.6 | * | * |
| 333.3 | 18 | 13 | 1.1 | 0.4 | 0.1 | 2.5 | * | * | * | 0.5 | 0.1 | 0.6 | * | * |
| 332.2 | 19 | 13 | 1.6 | 0.8 | 0.06 | 2.1 | * | * | 0.05 | 1.0 | 0.1 | 0.9 | 0.2 | * |
| 332.0 | 20 | 12 | 2.8 | 1.1 | 0.04 | 3.2 | * | * | * | 1.6 | 0.4 | 1.9 | 1.2 | * |
| 324.5 | Replicates | | | | | | | | | | | | | |
| | 21-1 | 11 | 1.9 | 0.6 | 0.04 | 0.6 | * | 0.1 | * | 1.2 | * | 0.6 | 0.1 | * |
| | 21-2 | 12 | 1.5 | 0.5 | * | 0.2 | 0.1 | * | 0.03 | 0.5 | 0.08 | 0.1 | * | * |
| | 21-3 | 14 | 2.2 | 0.6 | * | 0.6 | * | * | * | 1.2 | 0.15 | 0.8 | 0.2 | * |
| | 21-4 | 11 | 1.6 | 0.6 | * | 0.2 | 0.1 | * | 0.02 | 0.6 | 0.14 | * | 0.2 | * |
| | 21-5 | 13 | 1.3 | 0.4 | * | * | 0.1 | * | * | 0.3 | * | 0.1 | * | * |
| | Averages[b] | 12±3 | 1.9±1.2 | 0.6±0.4 | <0.05 | <1.73 | <0.09 | <0.12 | <0.02 | 0.8±1.0 | <0.23 | <0.67 | <0.31 | <0.05 |

* Less than the analytical detection limit.

(a) The analytical detection limit listed is the average of individual analytical detection limit for each analyses.

(b) Average and two sample standard deviations shown if radionuclide detected at all locations. Otherwise, a less-than number is calculated from the other results, including less-than values.

## TABLE X-4. Depth Profile of Radionuclide Concentrations in Sediment Sampled at Selected Columbia River Island and Shoreline Locations - 1975

Units of pCi/g (dry weight)

| River Mile | Map Location | Naturally Occurring Radionuclides | | | Artificially Produced Radionuclides | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $^{40}K$ | $^{224}Ra$ | $^{226}Ra$ | $^{54}Mn$ | $^{60}Co$ | $^{65}Zn$ | $^{106}Ru$ | $^{134}Cs$ | $^{137}Cs$ | $^{144}Ce$ | $^{152}Eu$ | $^{154}Eu$ | $^{155}Eu$ | $^{90}Sr$ | $^{238}Pu$ | $^{239-240}Pu$ |
| Analytical Detection Limit[a] | | 1.8 | 0.08 | 0.12 | 0.02 | 0.03 | 0.04 | 0.16 | 0.02 | 0.07 | 0.12 | 0.06 | 0.16 | 0.04 | 0.01 | 0.003 | 0.001 |
| 371.4 | 5 - 0-1" | 14 | 7.5 | 1.1 | * | 1.0 | 0.06 | * | 0.06 | 1.6 | 0.5 | 0.7 | 0.2 | 0.05 | 0.05 | * | 0.004 |
| | 1-2" | 14 | 2.0 | 0.8 | * | 0.4 | * | * | 0.5 | 0.9 | * | 0.9 | 0.2 | * | | | |
| | 2-4" | 12 | 1.4 | 0.5 | * | 0.6 | * | 0.2 | * | 1.9 | 0.1 | 1.2 | * | * | | | |
| | 4-6" | 12 | 2.5 | 1.0 | 0.03 | 0.2 | * | 0.2 | 0.06 | 3.3 | 0.1 | 1.0 | * | 0.07 | | | |
| | 6-8" | 12 | 5.7 | 1.1 | * | 0.1 | * | * | * | 0.6 | 0.2 | 0.6 | * | * | | | |
| 367.3 | 8 - 0-1" | 12 | 2.5 | 0.9 | 0.04 | 3.3 | 0.05 | 0.3 | 0.06 | 1.7 | * | 2.8 | 1.0 | * | 0.03 | * | 0.013 |
| | 1-2" | 12 | 1.9 | 0.7 | 0.05 | 7.3 | 0.05 | 0.2 | * | 1.5 | 0.2 | 2.8 | 0.6 | * | | | |
| | 2-4" | 13 | 1.8 | 0.6 | * | 1.6 | * | * | 0.08 | 1.2 | * | 2.7 | 0.7 | * | | | |
| | 4-6" | 13 | 2.2 | 0.9 | 0.02 | 0.6 | 0.05 | * | * | 0.6 | * | 1.1 | 0.5 | 0.07 | | | |
| | 6-8" | 14 | 1.9 | 0.6 | * | 0.08 | 0.08 | * | * | 0.05 | 0.2 | 0.07 | 0.3 | * | | | |
| 349.8 | 12 - 0-1" | 12 | 2.0 | 0.7 | * | 1.7 | * | * | 0.07 | 1.8 | 0.1 | 1.8 | 0.3 | * | 0.3 | * | <0.1 |
| | 1-2" | 12 | 1.5 | 0.9 | 0.13 | 1.5 | * | 0.2 | 0.06 | 0.5 | 1.0 | 2.6 | 6.0 | 1.6 | | | |
| | 2-4" | 12 | 1.6 | 0.6 | * | 1.1 | * | * | 0.02 | 1.1 | 0.1 | 0.5 | 0.1 | 0.06 | | | |
| | 4-6" | 13 | 2.0 | 0.5 | * | 0.2 | * | * | 0.02 | 0.5 | 0.2 | 0.1 | * | * | | | |
| | 6-8" | 13 | 1.1 | 0.5 | * | 0.03 | 0.04 | * | * | 0.3 | * | * | 0.1 | * | | | |
| 340.0 | 17 - 0-1" | 16 | 1.1 | 0.5 | 0.04 | 1.4 | * | * | * | 0.6 | 0.2 | 0.6 | * | * | 0.1 | * | <0.1 |
| | 1-2" | 14 | 2.0 | 1.0 | * | 2.3 | * | * | * | 1.5 | * | 1.3 | 1.0 | * | | | |
| | 2-4" | 12 | 2.8 | 1.1 | * | 2.8 | 0.07 | * | * | 2.6 | 0.2 | 3.1 | 0.7 | * | | | |
| | 4-6" | 14 | 1.0 | 0.6 | * | 0.8 | 0.05 | * | 0.02 | 1.2 | 0.2 | 1.1 | 0.4 | * | | | |
| | 6-8" | 12 | 1.3 | 0.6 | * | 0.2 | 0.05 | * | 0.04 | 0.9 | 0.2 | 0.3 | * | * | | | |
| Averages[b] | 0-1" | 13.5±3.8 | 3.3±5.6 | 0.8±0.5 | <0.03 | 1.9±2 | <0.04 | <0.2 | <0.05 | 1.4±1.1 | <0.2 | 1.5±2.1 | <0.4 | <0.05 | 0.12 | 0.25 | * | <0.05 |
| | 1-2" | 13.0±2.3 | 1.9±0.5 | 0.9±0.3 | <0.05 | 2.9±6.1 | <0.04 | <0.2 | <0.15 | 1.1±1.0 | <0.3 | 1.9±1.9 | 2.0<5.4 | <0.43 | | | |
| | 2-4" | 12.3±1.0 | 1.9±1.2 | 0.7±0.5 | * | 1.5±1.9 | <0.04 | <0.1 | <0.03 | 1.7±1.4 | <0.1 | 1.9±2.5 | <0.4 | * | | | |
| | 4-6" | 13.0±1.6 | 1.9±1.3 | 0.8±0.5 | <0.02 | 0.5±0.6 | <0.04 | <0.1 | <0.03 | 1.4±2.6 | <0.1 | 0.8±1.0 | <0.3 | <0.06 | | | |
| | 6-8" | 12.8±1.9 | 4.0±4.3 | 0.7±0.5 | * | 0.1±0.1 | <0.05 | * | <0.02 | 0.5±0.7 | 0.2±0.0 | <0.3 | <0.1 | * | | | |

* Less than the analytical detection limit.

(a) The analytical detection limit listed is the average of individual analytical detection limit for each analyses.

(b) Average and two sample standard deviations shown if radionuclide detected at all locations. Otherwise, a less-than number is calculated from the other results, including less-than values.

# XI. EXTERNAL RADIATION EXPOSURE MEASUREMENTS

# XI. EXTERNAL RADIATION EXPOSURE MEASUREMENTS

External radiation levels in the Hanford environs were measured during 1975 with thermoluminescent dosimeters (TLDs) deployed at 12 perimeter and 5 distant locations. TLDs were also immersed at 4 locations in the Columbia River: Coyote Rapids, below 100-N, Hanford Powerline, and the Richland pumphouse. The TLD used consisted of 3 chips of $CaF_2$:Dy (Harshaw TLD-200) encased in an opaque plastic capsule lined with 0.010" of tantalum and 0.002" of lead to flatten the lower energy response. The dosimeters are mounted approximately one meter above ground level and changed either biweekly or monthly. The dosimeters deployed in the Columbia River are contained in a plastic bottle and anchored to the river bottom with a chain and lead weight. The dosimeters are changed monthly.

Portable instrument surveys using a Nuclear Enterprises Model 2601 low-level gamma survey meter were made along the shoreline at Vernita Bridge, Richland, and Sacajawea Park.

The following tables are included in Section XI:


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| Table XI-2. | TLD Measurements at 3 Feet Above Ground - 1975 (Perimeter Communities) | XI-4 |
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TABLE XI-1. TLD Measurements at 3 Feet Above the Ground - 1975

(Units of mR/day)

Distant Communities

| Week On[a] Date | Walla Walla | McNary | Moses Lake | Washtucna | Sunnyside |
|---|---|---|---|---|---|
| 1/3 | | | | | |
| 1/10 | 0.19 | 0.20 | | | |
| 1/17 | | | 0.18 | 0.19 | 0.19 |
| 1/24 | | | | | |
| 1/31 | | | | | |
| 2/7 | 0.20 | 0.20 | | | |
| 2/14 | | | 0.19 | 0.20 | 0.19 |
| 2/21 | | | | | |
| 2/28 | | | | | |
| 3/7 | 0.20 | 0.20 | | | |
| 3/14 | | | 0.19 | 0.19 | 0.18 |
| 3/21 | | | | | |
| 3/28 | | | | | |
| 4/4 | 0.21 | 0.20 | | | |
| 4/11 | | | 0.18 | 0.18 | 0.16 |
| 4/18 | | | | | |
| 4/25 | | | | | |
| 5/2 | 0.21 | 0.20 | | | |
| 5/9 | | | 0.19 | 0.19 | 0.18 |
| 5/16 | | | | | |
| 5/23 | | | | | |
| 5/30 | 0.21 | 0.20 | | | |
| 6/6 | | | 0.16 | 0.16 | 0.18 |
| 6/13 | | | | | |
| 6/20 | | | | | |
| 6/27 | 0.18 | 0.19 | | | |

(a) As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated. The measurements shown are continuous from one tabled value to the next tabled value.

TABLE XI-1 (Cont'd). TLD Measurements at 3 Feet Above the Ground - 1975

(Units of mR/day)

Distant Communities

| Week On[a] Date | Walla Walla | McNary | Moses Lake | Washtucna | Sunnyside |
|---|---|---|---|---|---|
| 7/7 | | | 0.18 | 0.19 | 0.19 |
| 7/14 | | | | | |
| 7/21 | | | | | |
| 7/28 | 0.20 | 0.18 | | | |
| 8/1 | | | 0.19 | 0.19 | 0.17 |
| 8/8 | | | | | |
| 8/15 | | | | | |
| 8/22 | 0.20 | 0.19 | | | |
| 8/29 | | | 0.18 | 0.17 | 0.17 |
| 9/5 | | | | | |
| 9/12 | | | | | |
| 9/19 | 0.20 | 0.19 | | | |
| 9/26 | | | 0.18 | 0.18 | 0.16 |
| 10/3 | | | | | |
| 10/10 | | | | | |
| 10/17 | 0.19 | (b) | | | |
| 10/24 | | | 0.18 | 0.18 | 0.18 |
| 10/31 | | | | | |
| 11/7 | | | | | |
| 11/14 | 0.21 | 0.21 | | | |
| 11/21 | | | 0.20 | 0.20 | 0.18 |
| 11/28 | | | | | |
| 12/5 | | | | | |
| 12/12 | 0.21 | 0.23 | | | |
| 12/19 | | | 0.19 | 0.19 | 0.19 |
| 12/26 | | | | | |
| Average ± 2 standard deviations | 0.20±0.02 | 0.20±0.02 | 0.18±0.02 | 0.19±0.02 | 0.18±0.02 |

(a) As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated. The measurements shown are continuous from one tabled value to the next tabled value.

(b) TLD was vandalized.

## TABLE XI-2. TLD Measurements at 3 Feet Above Ground - 1975

(Units of mR/day)

| Week On[a] Date | Perimeter Communities | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Benton City | Vernita | Berg Ranch | Othello | Connell | Wahluke Wm | Cooke Bros. | Baxter Substation | Ringold | Byers Landing | Richland | Pasco |
| 1/2 | | | 0.23 | | | (b) | | 0.19 | | | | |
| 1/8 | 0.17 | 0.24 | | | | | | | | 0.22 | 0.20 | 0.19 |
| 1/15 | | | | 0.16 | 0.18 | | | | | | | |
| 1/22 | | 0.22 | | | | | 0.19 | | | | 0.19 | |
| 1/29 | | | 0.20 | | | 0.20 | | 0.18 | | | | |
| 2/5 | 0.17 | 0.25 | | | | | | | | 0.20 | 0.19 | 0.20 |
| 2/12 | | | | 0.18 | 0.19 | | | | | | | |
| 2/19 | | 0.25 | | | | | 0.19 | | | | 0.21 | |
| 2/26 | | | 0.23 | | | 0.21 | | 0.19 | | | | |
| 3/5 | 0.17 | 0.28 | | | | | | | 0.23 | 0.21 | 0.21 | 0.20 |
| 3/12 | | | | 0.18 | 0.19 | | | | | | | |
| 3/19 | | 0.24 | | | | | 0.19 | | | | 0.20 | |
| 3/26 | | | 0.21 | | | 0.20 | | 0.19 | | | | |
| 4/2 | 0.17 | 0.25 | | | | | | | | 0.21 | 0.20 | 0.19 |
| 4/9 | | | | 0.16 | 0.17 | | | | 0.24 | | | |
| 4/16 | | 0.24 | | | | | 0.19 | | | | 0.19 | |
| 4/23 | | | 0.23 | | | 0.21 | | 0.20 | | | | |
| 4/30 | 0.16 | 0.24 | | | | | | | | 0.22 | 0.19 | 0.20 |
| 5/7 | | | | 0.18 | 0.18 | | | | 0.24 | | | |
| 5/14 | | 0.27 | | | | | 0.19 | | | | 0.20 | |
| 5/21 | | | 0.22 | | | (b) | | 0.17 | | | | |
| 5/28 | 0.16 | 0.25 | | | | | | | | 0.21 | 0.21 | 0.19 |
| 6/4 | | | | 0.15 | 0.15 | | | | 0.21 | | | |
| 6/11 | | 0.25 | | | | | 0.17 | | | | 0.20 | |
| 6/18 | | | 0.20 | | | 0.19 | | 0.17 | | | | |
| 6/25 | 0.14 | 0.23 | | | | | | | | 0.20 | 0.18 | 0.18 |

(a) As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated. The measurements shown are continuous from one tabled value to the next tabled value.

(b) TLD was vandalized.

## TABLE XI-2. (Cont'd) TLD Measurements at 3 Feet Above Ground - 1975

(Units of mR/day)

Perimeter Communities

| Week On[a] Date | Benton City | Vernita | Berg Ranch | Othello | Connell | Wahluke Wm | Cooke Bros. | Baxter Substation | Ringold | Byers Landing | Richland | Pasco |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7/2 | | | | | | | | | | | | |
| 7/9 | | 0.25 | | 0.16 | 0.18 | | 0.18 | | 0.22 | | 0.19 | |
| 7/16 | | | 0.20 | | | 0.19 | | 0.16 | | | | |
| 7/23 | 0.16 | 0.22 | | | | | | | | 0.20 | 0.19 | (b) |
| 7/30 | | | | 0.16 | 0.18 | | | | | | | |
| 8/6 | | 0.24 | | | | | 0.18 | | 0.24 | | 0.17 | |
| 8/13 | | | 0.21 | | | 0.20 | | 0.19 | | | | |
| 8/20 | 0.15 | 0.21 | | | | | | | | 0.21 | 0.19 | 0.18 |
| 8/27 | | | | 0.16 | 0.17 | | | | | | | |
| 9/3 | | 0.25 | | | | | 0.17 | | 0.22 | | 0.19 | |
| 9/10 | | | 0.21 | | | 0.19 | | 0.18 | | | | |
| 9/17 | 0.15 | 0.24 | | | | | | | | 0.22 | 0.19 | 0.18 |
| 9/24 | | | | 0.16 | 0.17 | | | | | | | |
| 10/1 | | 0.25 | | | | | 0.18 | | | | 0.19 | |
| 10/8 | | | 0.21 | | | 0.19 | | 0.18 | 0.23 | | | |
| 10/15 | 0.16 | 0.23 | | | | | | | | 0.21 | 0.19 | 0.19 |
| 10/22 | | | | 0.17 | 0.18 | | | | | | | |
| 10/29 | | 0.22 | | | | | 0.19 | | | | 0.18 | |
| 11/5 | | | 0.22 | | | 0.20 | | 0.18 | 0.24 | | | |
| 11/12 | 0.16 | 0.26 | | | | | | | | 0.21 | 0.20 | 0.20 |
| 11/19 | | | | 0.14 | 0.19 | | | | | | | |
| 11/26 | | 0.24 | | | | | 0.20 | | | | 0.19 | |
| 12/3 | | | 0.22 | | | 0.21 | | 0.20 | 0.25 | | | |
| 12/10 | 0.19 | 0.23 | | | | | | | | 0.25 | 0.20 | 0.22 |
| 12/17 | | | | 0.19 | 0.19 | | | | | | | |
| 12/24 | | | | | | | 0.20 | | | | 0.21 | |
| Avr. ± 2 standard deviations | 0.16±0.02 | 0.24±0.03 | 0.21±0.02 | 0.17±0.03 | 0.18±0.02 | 0.20±0.02 | 0.19±0.02 | 0.18±0.02 | 0.23±0.02 | 0.21±0.03 | 0.19±0.02 | 0.19±0.02 |

(a) As a result of sampling schedules, the on-date for some locations may differ by a few days from the date indicated. The measurements shown are continuous from one tabled value to the next tabled value.

(b) TLD was vandalized.

TABLE XI-3. TLD Measurements in the Columbia River - 1975

(Units of mR/day)

| Measurement Period | | Exposure Rate | Measurement Period | | Exposure Rate |
|---|---|---|---|---|---|
| | | | **Coyote Rapids** | | |
| 1/9 | 2/14 | 0.11 | 8/8 | 9/4 | 0.12 |
| 2/14 | 3/6 | 0.13 | 9/4 | 10/9 | 0.11 |
| 3/6 | 4/10 | 0.11 | 10/9 | 11/6 | 0.11 |
| 4/10 | 5/8 | 0.12 | 11/6 | 12/5 | 0.09 |
| 5/8 | 6/5 | 0.13 | 12/5 | 1/8 | 0.14 |
| 6/5 | 7/10 | 0.09 | | | |
| 7/10 | 8/8 | 0.10 | Annual Average[a] | | 0.11±0.03 |
| | | | **Below 100 N** | | |
| 1/9 | 2/14 | | 8/8 | 9/4 | 0.16 |
| 2/14 | 3/6 | 0.21 | 9/4 | 10/9 | 0.23 |
| 3/6 | 4/10 | 0.17 | 10/9 | 11/6 | 0.14 |
| 4/10 | 5/8 | 0.18 | 11/6 | 12/5 | 0.10 |
| 5/8 | 6/5 | 0.19 | 12/5 | 1/8 | 0.14 |
| 6/5 | 7/10 | | | | |
| 7/10 | 8/8 | 0.17 | Annual Average[a] | | 0.17±0.07 |
| | | | **Hanford Powerline** | | |
| 1/9 | 2/14 | 0.07 | 8/8 | 9/4 | 0.11 |
| 2/14 | 3/6 | 0.06 | 9/4 | 10/9 | |
| 3/6 | 4/10 | 0.08 | 10/9 | 11/6 | 0.11 |
| 4/10 | 5/8 | 0.09 | 11/6 | 1/12 | 0.14 |
| 5/8 | 6/5 | | | | |
| 6/5 | 7/10 | 0.09 | | | |
| 7/8 | 8/8 | 0.09 | Annual Average[a] | | 0.09±0.05 |
| | | | **Richland Pumphouse** | | |
| 12/23 | 1/20 | 0.09 | 7/7 | 8/8 | 0.10 |
| 1/20 | 2/18 | 0.11 | 8/8 | 9/2 | 0.10 |
| 2/18 | 3/17 | 0.10 | 9/2 | 9/29 | 0.09 |
| 3/17 | 4/14 | 0.09 | 9/29 | 10/27 | 0.08 |
| 4/14 | 5/12 | 0.09 | 10/27 | 11/24 | 0.09 |
| 5/12 | 6/9 | 0.09 | 11/24 | 12/22 | 0.10 |
| 6/9 | 7/7 | 0.10 | | | |
| | | | Annual Average[a] | | 0.09±0.02 |

No entry indicates the TLD was not retrievable from the river.
(a) Annual Average is ± 2 sample standard deviations.

TABLE XI-4. External Exposure Rate Measurement* at 3 Feet Above the Columbia River Shoreline at Vernita, Richland, and Sacajawea Park - 1975

(Units of mR/day)

| Date | Exposure Rate | Date | Exposure Rate |
|---|---|---|---|
| **Vernita** | | **Richland Pump House** | |
| 4/1 | 0.22 | 1/9 | 0.26 |
| 4/29 | 0.36 | 2/14 | 0.22 |
| 6/10 | 0.22 | 3/6 | 0.24 |
| 7/8 | 0.14 | 4/10 | 0.26 |
| 11/11 | 0.14 | 5/8 | 0.38 |
| 12/12 | 0.24 | 6/5 | 0.29 |
| | | 7/10 | 0.84[a] |
| Annual Average[b] | 0.22±0.16 | 8/8 | 0.34 |
| | | 9/4 | 0.26 |
| | | 10/9 | 0.24 |
| | | 11/6 | 0.36 |
| | | 12/5 | 0.19 |
| | | Annual Average[b] | 0.28±0.12 |
| **Sacajawea** | | | |
| 1/10 | 0.31 | 7/11 | 0.29 |
| 1/24 | 0.29 | 7/25 | 0.48 |
| 2/21 | 0.29 | 8/8 | 0.24 |
| 3/7 | 0.38 | 8/22 | 0.34 |
| 3/21 | 0.31 | 9/5 | 0.26 |
| 4/4 | 0.24 | 10/3 | 0.29 |
| 4/18 | 0.36 | 10/17 | 0.29 |
| 5/2 | 0.29 | 12/1 | 0.24 |
| 5/16 | 0.29 | 12/26 | 0.22 |
| 5/30 | 0.31 | | |
| 6/13 | 0.34 | Annual Average[b] | 0.30±0.12 |
| 6/27 | 0.34 | | |

* Portable instrument surveys using a Nuclear Enterprises Model 2601 low-level Gamma Survey Meter

(a) Instrument Calibration in error

(b) Annual average ± 2 sample standard deviation

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