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Phase I Summaries of Radionuclide Concentration Data for Vegetation, River Water, Drinking Water, and Fish

**Hanford Environmental Dose
Reconstruction Project**

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June 1993

This document has been reviewed and approved
by the Technical Steering Panel.

J. E. Till, Chair
Technical Steering Panel

June 14, 1993
Date

Preface

Project Objectives

The primary objective of the Hanford Environmental Dose Reconstruction (HEDR) Project is to estimate the radiation dose (with descriptions of the uncertainties inherent in such estimates) that individuals could have received as a result of emissions, since 1944, from the U.S. Department of Energy (DOE) Hanford Site near Richland, Washington. An independent Technical Steering Panel (TSP) directs the project conducted by Battelle, Pacific Northwest Laboratories (BNW) under contract to the Centers for Disease Control and Prevention. A secondary objective is to release Hanford-originated documents of potential interest and/or use and project-generated reports to the public through the U.S. National Technical Information Service and the DOE Richland Operations Office Public Reading Room, Richland, Washington.

In this report, the term Phase I refers to the first of four phases originally planned for the HEDR Project. Phase I of the HEDR Project was a feasibility study, intended to determine whether sufficient information existed or could be reconstructed from incomplete records to justify a dose reconstruction study. The ability to recover, reconstruct, compile, evaluate, and utilize historical environmental monitoring data was demonstrated during Phase I. Phase I officially ended in July 1990. In February 1991, the TSP decided to shift the project planning approach away from phases — which were centered on completion of major portions of technical activities — to individual fiscal years, which extend from October of one year through September of the next.

During the remaining life of the HEDR Project, scientists will evaluate, enhance, and expand the Phase I databases; evaluate uncertainties in the data; define geographic areas, radionuclides, and pathways of interest; support the Hanford Thyroid Disease Study; and conduct activities that will result in improved dose estimates for real and representative individuals.

Project Tasks

The HEDR Project work is conducted under several technical and administrative tasks, one of which is the Environmental Monitoring Data Task (Task 05). A relatively large body of historical documents and files containing environmental contamination data exist for the Hanford Site. Radionuclide concentrations in the air, Columbia River water, drinking water, fish, foods, soil, waterfowl, and other environmental media have been measured at various times and locations. Members of the Environmental Monitoring Data Task assemble, evaluate, and summarize key historical measurements of radionuclide concentrations in the environment around the Hanford Site. Publication of these data summaries provides documentation of the task activities and is important for the technical and public credibility toward the project. These activities also provide information used by the Environmental Transport Task to determine environmental transport modeling needs and by the Environmental Pathways and Dose Estimates Task for model validation and/or direct estimation of radiation doses potentially received by the public.

Report Overview

This report summarizes the environmental monitoring data retrieval and evaluation activities conducted during Phase I of the HEDR Project. The report describes the data retrieval process and discusses the development of several databases containing the monitoring results for the period, spatial domain, and media of concern for Phase I. The data recovered and described in this report were used in the Phase I HEDR activities and in the development of other Phase I reports. In addition, data were used in some cases for estimating doses that individuals may have received as a result of operations at Hanford. This document is one of several reports that summarize Phase I HEDR work. The data in this report were published in 1989 and reviewed by the TSP. The report is being published now in final form to incorporate the TSP review comments and to provide the reader with background information on the data.

A glossary of terms commonly used throughout this report immediately precedes the Contents. Appendices to the report contain detailed and summary data, related to vegetation (Appendix A), water (Appendix B), and fish (Appendix C). Such data were recovered and compiled as a result of Phase I activities. Appendix D is a record of TSP review comments on the draft version of this report and the Battelle responses to those comments. The resolution to these comments is flagged with the comment number and italicized text. Whenever a table or figure is involved, only the title is italicized. Narrative text was rewritten or added to respond to the TSP comments.

Objectives of This Report

This report summarizes the efforts involved in locating, retrieving, inventorying, and utilizing historical environmental monitoring data. Phase I activities for Task 05 are summarized and monitoring data summaries are presented for the time period, spatial domain, and environmental media of concern for Phase I. The report discusses the document search, review, and inventory process and identifies the number of reports entered into the Environmental Monitoring Document Database. It also documents the off-site vegetation data for the years 1945 through 1947 and the ranges of Columbia River water, drinking water, and fish data for the mid-1960s.

Quality Assurance

The work described in this report was conducted in accordance with the requirements of ANSI/ASME NQA-1 1986 Edition, Quality Assurance Program Requirements for Nuclear Facilities, as interpreted by Battelle's Procedures for Quality Assurance (PNL-MA-70).

Summary

The objective of the Hanford Environmental Dose Reconstruction (HEDR) Project is to estimate the radiation doses that individuals and populations could have received from nuclear operations at the Hanford Site since 1944. As part of the HEDR Project, the Environmental Monitoring Data Task (Task 05) staff assemble, evaluate, and summarize key historical measurements of radionuclide concentrations in the environment as a result of Hanford operations.

This report is one of several reports prepared by HEDR staff to document the activities and results of Phase I of the HEDR Project. This report specifically provides a summary of the Phase I activities of the Environmental Monitoring Data Task. Information generated as a result of these activities was used within other HEDR Tasks in the development of environmental transport and pathway conceptual approaches and in preliminary estimates of potential doses received by the public.

The scope of work performed during Phase I included initiating the search, recovery, and inventory of environmental reports. These reports contained information relative to Hanford environmental monitoring that had been conducted since the beginning of Hanford Site operations in 1944. Summaries of the environmental monitoring data that were recovered and evaluated are presented for specific periods of interest. These periods include vegetation monitoring data (primarily sagebrush) for the years 1945 through 1947, Columbia River water and drinking water monitoring data for the years 1963 through 1966, and fish monitoring data for the years 1964 through 1966. Concern was limited to those radionuclides identified as the most likely major contributors to the dose potentially received by the public during the times of interest: phosphorous-32, copper-64, zinc-65, arsenic-76, and neptunium-239 in Columbia River fish and drinking water taken from the river, and iodine-131 in vegetation.

This report documents the achievement of the Phase I objectives of the Environmental Monitoring Data Task. Sufficient historical environmental monitoring data were identified, located, and retrieved to allow for preliminary dose calculations. An Environmental Monitoring Document Database^(a) (EMDD) was established into which more than 1200 documents were entered during Phase I. This database does not include individual data values, but lists the document title, authors, date, and the type of data available in the original document. Vegetation monitoring data for the years 1945 through 1947 were recovered and entered into a medium-specific database. Biases in the early vegetation data were identified, along with conversion/correction factors that were applied to the early counting data, based on the current understanding of historical analytical and counting processes. Databases established for the years 1963 through 1966 include Columbia River water and fish monitoring data, as well as drinking water data for those localities using the river as the source of potable water.

(a) The EMDD is available in the Public Reading Room of the U.S. Department of Energy Richland Operations Office located at the Tri-Cities University Center, Richland, Washington.

Acknowledgments

This report builds on a draft provided by staff members who searched documents to determine the concentrations of radionuclides in selected environmental media (iodine-131 in vegetation and activation/fission products in the Columbia River and fish) surrounding the Hanford Site during the first 20 years of Hanford operations.

The authors would especially like to acknowledge the contributions made by Shirley Gydesen and Kim Lessor in identifying documents and their content.

Glossary

<u>Acronym/Term</u>	<u>Definition</u>
AEC	Atomic Energy Commission
Bioaccumulation Factor	Ratio of radionuclide concentration in fish to that in water from which fish was obtained (units of L/Kg)
BNW	Battelle Pacific Northwest Laboratories
CDC	Centers for Disease Control and Prevention
CI	A 90 per cent Confidence Interval based on a <i>t</i> -distribution
comp sample	A composite or grouping of samples taken from several locations at approximately the same time or from one location over an extended time
cpm	counts per minute
DOE	Department of Energy
EMDD	Environmental Monitoring Document Database
GM	Geiger-Mueller detector
grab sample	A single sample obtained in a random manner
HEDR	Hanford Environmental Dose Reconstruction
nr	not reported
pCi/g	picocurie per gram
pCi/L	picocurie per liter
PNL	Pacific Northwest Laboratory
RM	River Mile; reported as upstream river miles along the Columbia from its mouth
SD	Standard Deviation
SE/SEM	Standard Error/Standard Error of the calculated Mean, the standard deviation of the data divided by the square root of the number of data values
μ Ci/kg	microcurie per kilogram

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1.0 Introduction

Throughout the history of Hanford operations, radionuclide concentrations have been measured in air, drinking water, food, fish, the Columbia River, soil, vegetation, and other environmental media. During Phase I of the Hanford Environmental Dose Reconstruction (HEDR) Project, the efforts of the Environmental Monitoring Data Task (Task 05) focused specifically on measurements of total beta activity on vegetation for the period 1945 through 1947, and on radionuclide concentrations in Columbia River water, drinking water, and fish for the period 1963 through 1966. Phase I activities were intended to demonstrate the ability to locate, retrieve, inventory, and utilize historical environmental monitoring data in subsequent HEDR dose calculation efforts. This report summarizes Task 05 activities for Phase I and provides monitoring data summaries for the period, spatial domain, and media of concern for Phase I.

The recovery and evaluation of historical environmental monitoring data is an integral part of the environmental dose reconstruction process. The data generated through historical environmental monitoring programs may be used in development and application of environmental transport and dose models. In addition, environmental monitoring data are essential to the verification of model calculations and to validation of the models themselves. An important aspect of the data evaluation, especially for the vegetation data, was to assess the accuracy of the data and the magnitude of the analytical uncertainty in the reported results. Photostatic copies of old laboratory notebooks that contained counting data for vegetation samples collected from early 1945 to August 1946 were discovered during the search for other documents. These documents were copied many years ago, and the photonegative images (white lettering on a black background) were sometimes difficult to read and almost impossible to copy on modern copy machines. As a result, such data are only available on the photostatic copies.

Note that throughout this report samples are identified as one of two types: grab or comp. A grab sample is defined as a single sample taken at a given location and time. On the other hand, a comp (or composite) sample is a grouping of grab samples from several locations at approximately the same time or from one location over an extended time. This collection is thoroughly mixed and a single sample is extracted and analyzed. The results of the comp sampling method represent integrated or average values.

This letter report includes four additional sections that describe results obtained during Phase I. Section 2.0 summarizes the document/data search, review and inventory. Section 3.0 summarizes vegetation monitoring data. Sections 4.0 and 5.0 summarize Columbia River monitoring data and Columbia River fish sampling data, respectively. References within the text are listed in full either in Section 6 or Section 7.

2.0 Document/Data Search, Review and Inventory

The processes outlined in the following paragraphs were used during Phase I to locate, review, and inventory potentially important historical environmental monitoring data. Archived historical Hanford documents were the primary sources of environmental data. Pertinent documents were identified through searches of library card files, listings of historical logbooks, and files of historical serial and periodic documents about or from Hanford. Reviews of summary document reference lists and extensive discussions with key former Hanford employees (Denham et al. 1988) produced further documentation. Physical copies of documents were obtained from historical files, the Hanford Technical Library, the DOE Records Holding Area (Building 712 in Richland, Washington), and the Federal Records Center in Seattle, Washington. Other sources of published historical environmental monitoring data related to Hanford operations included the states of Washington, and Oregon, the U.S. Army Corps of Engineers, the U.S. Geologic Survey, and various universities.

In addition to published reports, potentially important archived records, including environmental data, were located by reviewing storage records and the card index at the Richland DOE Records Holding Area. Records retained at the DOE Records Holding Area were also located by working with staff within the Information Resources Task (Task 11) who were familiar with the disposition of historical Hanford records and with personnel associated with the DOE Records Holding Area. The card index lists boxed records that were either in storage at the DOE Records Holding Area, had been transferred to the Seattle Federal Records Center, or in some cases had already been destroyed. Boxes that appeared to contain potentially relevant documents were requested, their contents reviewed and summarized, and then returned to the appropriate storage facility. An examination of the contents of each box was usually necessary because the index listings and the box labels were often cursory, incomplete, or nonexistent. In many cases, the box numbers were the only identifiers for the data the boxes contained.

Hard copies of more than 1200 documents were collected during Phase I. Copies of documents that appeared germane to the study were inserted into the Environmental Monitoring Data Task files for future reviews and reference. The remaining documents were returned to the appropriate records holding area. Titles and other pertinent information were added to the Environmental Monitoring Document Database (EMDD).

Historical environmental data contained in 63 record boxes were obtained from the Richland DOE Records Holding Area and the Federal Records Center in Seattle. Generally, these record boxes contained old files, old papers, draft documents, old notebooks, instrument charts, counting room records, old reports, and many other miscellaneous items. In some cases, the material was well organized, even bound, but in most instances they were quite unorganized. Whenever possible, individual notebooks were removed from boxes containing other, extraneous materials. Brief summaries of the contents of each box were prepared.

3.0 Vegetation Monitoring Data

Locating and sorting vegetation monitoring data for the years 1945 through 1947 proved to be demanding and time consuming. Although many historical documents were available for review, and usable, most contained only summaries or average concentration values. To allow evaluation of the accuracy and variability of individual data, data from individual samples or measurements were preferred. The search ultimately focused on locating original counting data for samples collected at offsite locations. Some of these original records were located in the archived boxes at the DOE Records Holding Area, Richland, Washington.

Some notebooks containing original vegetation counting data could not be located for late 1946 or most of 1947. As a result, reported average vegetation concentrations were entered into the database whenever original counting data could not be found (see Tables A.2 and A.3).

3.1 Database Development

The preliminary data for 1945 through 1947 included in Appendix A are the most representative of the available information compiled from a search of the historical documents. Most of the results are original individual raw counting rates obtained from photostatic copies of old laboratory notebooks discovered during a search of the historic files at the DOE Records Holding Area, Richland, Washington. However, some results are only sample averages taken from the published and unpublished historic records.

Data for total beta radioactivity on vegetation for the years 1945 through 1947 were collected and compiled into databases. Information was obtained from published weekly, biweekly, and monthly reports and from laboratory and counting room notebooks.

The data recorded in each database consist of:

- reported net counting rates (counts per minute corrected for instrument background)
- reported concentration values ($\mu\text{Ci/kg}$)
- sampling locations
- sampling dates
- vegetation types
- document numbers for the sources of the data
- location by county
- notes.

In many cases, the same sample results were reported in more than one document. To sort out redundant data, and to identify the original source of data, the data were compared by indexing the entire database according to sample location and/or sample date. These comparisons also helped ensure that identical sampling locations had the same location name.

Early sampling priorities and incomplete records had some impact on the content of these compilations. For instance, many of the vegetation samples collected during 1945 and 1946 were collected on and near the Hanford Site. This reflected the early need to monitor the relationship between facility operations and environmental concentrations in order to help control worker exposures. This resulted in only a limited amount of data being collected for the distant offsite locations of primary interest to the Phase I HEDR study. Additionally, many of the offsite data were unusable because sampling locations were not defined in sufficient detail to be clearly located with respect to the Hanford Site.

Information on sample weights and vegetation types was also limited (Bulow 1945, Dickinson 1946). Individual sample weights were rarely provided on the counting room data sheets. Based on reports published at the time and accounts from former workers (Denham et al. 1988), the Phase I study was based on the assumption that all weights were one gram. Identification of vegetation, other than sagebrush and some of the other more common native plants, tended to be nonspecific. Thus, many of the samples were listed simply as vegetation. The availability of agricultural crop data was limited because most vegetation samples were from native vegetation, usually sagebrush.

The data listings in Appendix A, Tables A.1, A.2, and A.3, contain the reported off-site individual counts per minute (CPM $\pm$ 1 SD column) or the reported concentration data (REPORTED column), or both. These tables also indicate the sample date, sample location, county, sample type, and the reference from which the data were obtained.

The accuracy (in terms of transcription errors) of the data extracted from the original sources and entered into a computer database was verified by comparing a printout of the nonindexed database with information in the corresponding historical documents. A computer disk and a hard copy of each verified database, signed and dated by the person who compiled the data and another person who verified the data entries, were prepared as part of the Quality Assurance/Quality Control (QA/QC) record.

The original counting data for the individual 1-g vegetation samples were entered into the database whenever available. Average concentrations were entered for those periods when the original data were not available. The complete databases for 1945, 1946, and 1947 consist of approximately 1350, 3280, and 220 entries respectively.

3.2 Data Corrections and Uncertainties

The practice of measuring radioactivity in environmental media was relatively new in the initial days of Hanford operations. In fact, most of the early measurements were only qualitative and were used to compare the relative contamination levels at different locations with the need for additional controls to reduce potential worker exposures. Beta-counting technology had not yet been developed

to a point where concentrations of radioactivity in vegetation could be accurately determined. Hence, several types of corrections or conversions may be necessary to convert the observed instrument counting rates to estimate the actual radioactivity/concentrations in each sample at the time of collection.

In the period from 1945 through 1947, some of the appropriate corrections were applied to the instrument readings. As the need for more accurate measurements became apparent and the means to obtain them became available, analytical techniques were improved and more correction factors were included, enhancing the accuracy of reported vegetation monitoring data. Nonetheless, beta concentrations reported in the original Hanford documents were biased low. The degree of bias in reported levels varied from 1945 through 1947 depending on the correction factors in use at the time. For example, some reported historical data was originally corrected for decay, but was not corrected for measurement efficiency. The biases and the development of reconstructed conversion and correction factors are discussed in a companion report by Mart et al. (1993).

The main components that affected the observed counting rates from the detector systems used at that time included:

1. *Decay correction factors*, D_e , which account for radioactive decay occurring between the time of sample collection and measurement.
2. *Reconstructed measurement conversion factor*, M , (dpm/cpm), which accounts for the geometry of the measurement system (only a small fraction of the radiation emanating from the sample moved toward the detector), including absorption, reflection, backscattering within the sample/detector system.
3. *The iodine-131 assumption correction factor*, I_{cf} , which accounts for the assumption that most of the activity originated from the decay of iodine-131 and not other radionuclides.

The historical conversion factors were identified by examining the historical records and through discussions with veteran Hanford employees who were familiar with 1945 through 1947 vegetation sampling and counting methods (Denham et al. 1988). Historically, conversion factors changed with time, and experience revealed additional factors. The reconstructed measurement conversion factors were determined by evaluating all of the components that affected the measurement of the beta disintegrations from environmental samples.

The factors for correcting reported raw counting rates (cpm) for vegetation samples and converting them to reconstructed concentrations ($\mu\text{Ci/kg}$) are discussed in Mart et al. (1993). A document by Gilbert et al. (1992) estimates the uncertainties inherent in the iodine-131 concentrations.

3.3 Data Quality Objectives

Summaries of the vegetation monitoring activities and results have been prepared to convey the information necessary for decision making relative to planning subsequent HEDR activities. Material included in the summaries (Appendices A, B, and C) includes the media sampled, sample locations, constituents measured or reported, sampling or reporting frequency, sample methods, sample results, and the references. Although data quality objectives were not implemented at the time this report was drafted, they are included here to be consistent with the current HEDR project directives. The following data quality objectives apply to vegetation data, as well as water and fish data (Sections 4 and 5).

- **Accuracy -** The objective was to verify or reconstruct actual concentrations reported. This was done by checking the processes and procedures for validity. Accuracy was verified by direct comparisons or extrapolations of the reported data based on the methods used.
- **Precision -** The objective was to quantify uncertainties in reported and reconstructed concentrations. This was done for vegetation (Gilbert et al. 1992) through uncertainty analyses and will be similarly done for other media using the techniques of Simpson and Ramsdell (1993).
- **Completeness -** The objective was to provide averages and ranges of concentrations for each medium. The goal was to achieve a high level of confidence that finding new information at a later date would not exceed these ranges by more than 5 percent. All known and discoverable sources of vegetation, water, and fish monitoring data were investigated. The approach to ensure completeness was to use an approved search and inventory plan. Completeness will be evaluated through peer review and TSP approval.
- **Representativeness -** The objective was that the ranges of actual concentrations observed represented those that could have occurred in the environmental media. Representativeness was ensured by comparison of concentrations generated using different methods and other source analyses.
- **Comparability -** The objective was that all information be comparable or that differences be technically explainable. To achieve this, direct comparisons of on- and off-site data were made to verify comparability.

To meet these data quality objectives, accuracy was verified by direct comparison; precision was substantiated through uncertainty analyses; completeness will be assured through peer and TSP reviews; representativeness was supported by the quantity of environmental monitoring data examined; and comparability was achieved through comparison of on- and off-site data trends. Hence, these data quality objectives were met.

4.0 Columbia River Water Monitoring Data

The HEDR Phase I study focused on the period from 1963 through 1966 for the surface-water pathway. The Columbia River monitoring data for that period were collected and entered into media-specific databases. Routine monitoring of the Columbia River was initiated shortly after the startup of the original plutonium production reactors. Data from samples of treated drinking water and raw river water, routinely collected in Pasco, Kennewick, and Richland, were reported in annual Hanford environmental monitoring reports. These reports included concentrations of various radionuclides at sampling locations from the Priest Rapids Dam area to the coastal beaches of Washington and Oregon. Samples included raw water and processed drinking water obtained from the Columbia River. Sediment samples from the Columbia River were not routinely collected or reported during this period. However, limited sediment data were collected and reported as special studies. The sediment data were obtained and inventoried, but were not assembled in specific databases as part of the Phase I effort.

4.1 Columbia River Water and Drinking Water Database Development

Development of the Phase I river water and drinking water databases for the period 1963 through 1966 was much more straightforward and less cumbersome than that of the vegetation database, primarily because of improved sampling and analytical techniques. Routine monitoring programs had benefited from nearly 20 years of operation. The development of the health physics discipline and a better understanding of radioactive materials and their behavior in the environment allowed for more streamlined programs that produced more meaningful information. Technological advances in the analytical field allowed the generation of more specific and more accurate sample results. Experience showed the importance of providing better documentation of methods, rationale, results, and interpretations, including discussions of the uncertainties associated with the various processes.

The initiation of the annual environmental monitoring reports consolidated the majority of the Hanford derived river-related data into a single comprehensive document for each year of interest. The river water and drinking water database files consist entirely of data included in the 1963 through 1966 Hanford Site annual environmental monitoring reports (Foster and Wilson 1964; Foster and Wilson 1965; Foster et al. 1966; Honstead and Essig 1967).

All Columbia River water sample results and all sample results from those drinking water systems using the river for their water source that were reported in the 1963 through 1966 annual environmental monitoring reports have been entered into separate database files. The databases were organized by sample location and radionuclide. Data included sampling location, radionuclide, collection date, sample type, sampling frequency, and sample result (concentration, in pCi/L). The resultant databases (Appendix B) were verified through the comparison of hardcopy printouts with the corresponding historical documents.

Figures 4.1 and 4.2 illustrate the Columbia River water sampling locations (identified by river mile [RM] from the mouth of the Columbia River) with respect to the Hanford Site. Tables 4.1 through 4.4 summarize the Columbia River and drinking water monitoring data available for the years 1963 through 1966.

80211075.2

S9211075.3

Figure 4.2. Columbia River Sampling Locations — Washington/Oregon

The databases contain individual as well as collective sample results (Appendix B, Tables B.1 and B.2). These include monthly and annual summaries for the various radionuclides in river water (Appendix B, Tables B.3 and B.4) and annual summaries for specific radionuclides in drinking water (Appendix B, Table B.5). At those locations where two types of sampling systems were employed, data summaries were prepared for each sample type. That is, grab sample data were not included in summaries of composite sample data and vice versa. Each summary report was organized by year and location. Specific information included for each database entry were the collection year, sampling location, sample type, radionuclide, number of samples included in the summary, the maximum concentration observed during the summary period, the minimum concentration observed during the summary period, and the mean concentration for the summary period, including the uncertainty (two-standard-error term around the mean, 2SEM).

Special studies conducted during the years 1963 through 1966 provide additional river water data. However, these studies provided data for just a few locations over a short period of time. In addition, the data generated during these special studies were sometimes reported in units other than those in the routine programs; therefore, these results were not comparable without further data manipulation, which was not undertaken in Phase I.

Phosphorous-32, copper-64, zinc-65, arsenic-76, and neptunium-239 have been identified as the radionuclides (Napier 1991) which would have contributed the majority of the dose through the water pathway during this time period for those persons consuming fish or drinking water derived from the Columbia River. *Figures 4.3 through 4.7 illustrate the annual average concentrations of these radionuclides in grab samples of Columbia River water during the period of interest (1963 through 1966). These figures are representative of the graphics available for the other sample results included in the Phase I Columbia River and Drinking Water Monitoring databases, and the data represented in*

the figures are contained in the databases. Data generated in outside monitoring programs are not included in these figures. In some cases, data are not continuous throughout the year; therefore, the figures may not represent true annual averages in all cases. For additional information, refer to Appendix B.

4.2 Data Uncertainties

The analytical methods used from 1963 through 1966 were well established. The uncertainties associated with the various radiochemical analyses of water were documented (Holt et al. 1964). Review of this documentation provided needed information about the accuracy of the data generated

Table 4.1. 1963 Columbia River and Drinking Water Database Summaries

<u>Location</u>	<u>Type</u>	<u>Frequency^(a)</u>	<u>Analysis</u>
<u>Columbia River</u>			
Hanford Ferry (Franklin County side)	Grab ^(b)	Bi-W	²⁴ Na, ³² P, ⁵¹ Cr, ⁶⁴ Cu, ⁶⁵ Zn, ⁷⁶ As, ⁸⁹ Sr, ⁹⁰ Sr, ¹³¹ I, ²³⁹ Np, RE + Y ^(c)
Richland Pumphouse	Grab	Bi-W	²⁴ Na, ³² P, ⁵¹ Cr, ⁶⁴ Cu, ⁶⁵ Zn, ⁷⁶ As, ⁹⁰ Sr, ¹³¹ I, ²³⁹ Np, RE + Y
Pasco	Grab	Bi-W	²⁴ Na, ³² P, ⁵¹ Cr, ⁶⁴ Cu, ⁶⁵ Zn, ⁷⁶ As, ⁸⁹ Sr, ⁹⁰ Sr, ¹³¹ I, ²³⁹ Np, RE + Y
Vancouver	Grab	Bi-W	³² P, ⁵¹ Cr, ⁶⁵ Zn, ²³⁹ Np, RE + Y
<u>Drinking Water</u>			
Richland Pumphouse	Grab	Bi-W	²⁴ Na, ³² P, ⁵¹ Cr, ⁶⁴ Cu, ⁶⁵ Zn, ⁷⁶ As, ⁹⁰ Sr, ¹³¹ I, ²³⁹ Np, RE + Y
Pasco	Grab	W	²⁴ Na, ³² P, ⁵¹ Cr, ⁶⁴ Cu, ⁶⁵ Zn, ⁷⁶ As, ⁹⁰ Sr, ¹³¹ I, ²³⁹ Np, RE + Y
Kennewick	Grab	M	²⁴ Na, ³² P, ⁵¹ Cr, ⁶⁴ Cu, ⁶⁵ Zn, ⁷⁶ As, ⁹⁰ Sr, ¹³¹ I, ²³⁹ Np, RE + Y

(a) Bi-weekly (Bi-W), weekly (W), or monthly (M)

(b) Grab - Refer to Section 1.0

(c) Rare Earths + Yttrium

during this period. Uncertainties associated with the individual sample results have been documented as generally within ± 25 percent at the 68 percent confidence interval (on those samples having radionuclide concentrations approximately 10 times the analytical detection level).

Table 4.2. 1964 Columbia River and Drinking Water Database Summaries

<u>Location</u>	<u>Type</u>	<u>Frequency^(a)</u>	<u>Analysis</u>
<u>Columbia River</u>			
300 Area	Grab	M	^{24}Na , ^{32}P , ^{51}Cr , ^{64}Cu , ^{65}Zn , ^{76}As , ^{90}Sr , ^{131}I , ^{239}Np , RE + Y ^(b)
	Comp ^(c)	W ^(d)	^{32}P , ^{51}Cr , ^{54}Mn , ^{60}Co , ^{65}Zn , ^{90}Sr , ^{131}I
Richland Pumphouse	Grab	M	^{24}Na , ^{32}P , ^{51}Cr , ^{64}Cu , ^{65}Zn , ^{76}As , ^{90}Sr , ^{131}I , ^{239}Np , RE + Y
	Comp	W ^(e)	^{32}P , ^{51}Cr , ^{60}Co , ^{65}Zn , ^{131}I
Pasco Water Treatment Plant	Grab	Bi-W	^{24}Na , ^{32}P , ^{51}Cr , ^{64}Cu , ^{65}Zn , ^{76}As , ^{90}Sr , ^{131}I , ^{239}Np , RE + Y
	Comp	W	^{32}P , ^{51}Cr , ^{65}Zn , ^{131}I
McNary Dam	Comp	W	^{32}P , ^{51}Cr , ^{60}Co , ^{65}Zn , ^{131}I
The Dalles Dam	Comp	W	^{32}P , ^{51}Cr , ^{65}Zn , ^{131}I
Bonneville Dam	Comp	W	^{32}P , ^{51}Cr , ^{65}Zn , ^{131}I
Vancouver	Grab	M ^(f)	^{32}P , ^{51}Cr , ^{65}Zn , ^{131}I , ^{239}Np
<u>Drinking Water</u>			
Richland Pumphouse	Grab	Bi-W	^{24}Na , ^{32}P , ^{51}Cr , ^{64}Cu , ^{65}Zn , ^{76}As , ^{90}Sr , ^{131}I , ^{239}Np , RE + Y
	Comp	W	^{32}P , ^{51}Cr , ^{65}Zn , ^{131}I
Pasco	Grab	Bi-W	^{24}Na , ^{32}P , ^{51}Cr , ^{64}Cu , ^{65}Zn , ^{76}As , ^{90}Sr , ^{131}I , ^{239}Np , RE + Y
	Comp	W	^{32}P , ^{51}Cr , ^{65}Zn , ^{90}Sr , ^{131}I
Kennewick	Grab	M	^{24}Na , ^{32}P , ^{51}Cr , ^{64}Cu , ^{65}Zn , ^{76}As , ^{90}Sr , ^{131}I , ^{239}Np , RE + Y

(a) Sampled monthly (M), weekly (W), or bi-weekly (Bi-W)

(b) Rare Earths + Yttrium

(c) Composite - Refer to Section 1.0

(d) Sampled through August 1964

(e) Sampled during the second half of 1964

(f) Routine sampling discontinued during first half of 1964.

Table 4.3. 1965 Columbia River and Drinking Water Database Summaries

<u>Location</u>	<u>Type</u>	<u>Frequency^(a)</u>	<u>Analysis</u>
<u>Columbia River</u>			
Vernita Bridge	Grab	Bi-W	Total Alpha, Total Beta, ³ H, ⁹⁰ Sr
Hanford (Franklin County)	Grab	M	²⁴ Na, ³² P, ⁵¹ Cr, ⁵⁶ Mn, ⁶⁴ Cu, ⁶⁵ Zn, ⁷² Ga, ⁷⁶ As, ²³⁹ Np, RE + ^(b)
Ringold (Franklin County)	Grab	M	²⁴ Na, ³² P, ⁵¹ Cr, ⁵⁶ Mn, ⁶⁴ Cu, ⁶⁵ Zn, ⁷² Ga, ⁷⁶ As, ²³⁹ Np, RE + Y
Richland Pumphouse	Grab	M	³ H, ²⁴ Na, ³² P, ⁵¹ Cr, ⁶⁴ Cu, ⁶⁵ Zn, ⁷⁶ As, ⁹⁰ Sr, ¹³¹ I, ²³⁹ Np, RE + Y
	Comp	W	³² P, ⁵¹ Cr, ⁶⁵ Zn, ¹³¹ I
Pasco	Comp	W	³² P, ⁵¹ Cr, ⁶⁵ Zn, ¹³¹ I
McNary Dam	Comp	W	³² P, ⁵¹ Cr, ⁶⁵ Zn, ¹³¹ I
The Dalles Dam	Comp	W	³² P, ⁵¹ Cr, ⁶⁵ Zn, ¹³¹ I
Bonneville Dam	Comp	W	³² P, ⁵¹ Cr, ⁶⁵ Zn, ¹³¹ I
<u>Drinking Water</u>			
Richland Pumphouse	Grab	M	²⁴ Na, ³² P, ⁵¹ Cr, ⁶⁴ Cu, ⁶⁵ Zn, ⁷⁶ As, ²³⁹ Np, RE + Y
	Comp	W	³² P, ⁵¹ Cr, ⁶⁵ Zn, ⁹⁰ Sr, ¹³¹ I
Pasco	Grab	M	²⁴ Na, ³² P, ⁵¹ Cr, ⁶⁴ Cu, ⁷⁶ As, ²³⁹ Np, RE + Y
	Comp	W	³² P, ⁵¹ Cr, ⁶⁵ Zn, ⁹⁰ Sr, ¹³¹ I
Kennewick	Grab	M	²⁴ Na, ³² P, ⁵¹ Cr, ⁶⁴ Cu, ⁶⁵ Zn, ⁷⁶ As, ¹³¹ I, ²³⁹ Np

(a) Sampled bi-weekly (Bi-W), monthly (M), or weekly (W)

(b) Rare Earths + Yttrium

Table 4.4. 1966 Columbia River and Drinking Water Database Summaries

<u>Location</u>	<u>Type</u>	<u>Frequency^(a)</u>	<u>Analysis</u>
<u>Columbia River</u>			
Priest Rapids Dam	Grab	W ^(b)	Total Alpha, ³ H, ⁹⁰ Sr
Vernita Ferry	Grab	Bi-W	Total Alpha, ³ H, ⁹⁰ Sr
Ringold	Grab	M	²⁴ Na, ³² P, ⁵¹ Cr, ⁵⁵ Mn, ⁶⁴ Cu, ⁶⁵ Zn, ⁷² Ga, ⁷⁶ As, ²³⁹ Np, RE + Y ^(c)
Richland Pumphouse	Grab	M	³ H, ²⁴ Na, ³² P, ⁵¹ Cr, ⁶⁴ Cu, ⁶⁵ Zn, ⁷⁶ As, ⁹⁰ Sr, ¹³¹ I, ²³⁹ Np, RE + Y
	Comp	W	³² P, ⁵¹ Cr, ⁶⁵ Zn, ¹³¹ I
McNary Dam	Comp	W	³² P, ⁵¹ Cr, ⁶⁵ Zn, ¹³¹ I
Bonneville Dam	Comp	Bi-W	³² P, ⁵¹ Cr, ⁶⁵ Zn, ¹³¹ I
<u>Drinking Water</u>			
Richland	Grab	M	²⁴ Na, ³² P, ⁵¹ Cr, ⁶⁴ Cu, ⁷⁶ As, ⁹⁰ Sr, ²³⁹ Np, RE + Y
	Comp	W	³² P, ⁶⁵ Zn, ¹³¹ I
Pasco	Grab	M	²⁴ Na, ³² P, ⁵¹ Cr, ⁶⁴ Cu, ⁷⁶ As, ⁹⁰ Sr, ²³⁹ Np, RE + Y
	Comp	W	³² P, ⁶⁵ Zn, ¹³¹ I
Kennewick	Grab	M	²⁴ Na, ³² P, ⁵¹ Cr, ⁶⁴ Cu, ⁷⁶ As, ²³⁹ Np

(a) Sampled weekly (W), bi-weekly (Bi-W), or monthly (M)

(b) Initiated in June 1966

(c) Rare Earths + Yttrium

*Routine sampling at Vancouver was discontinued during the first half of 1964.

S9112068.4

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Figure 4.3. Phosphorous-32 in Columbia River Water

Note: The data represented in this figure is taken solely from Hanford annual environmental monitoring reports (Foster and Wilson, 1964; Foster and Wilson, 1965; Foster et al. 1966; Honstead and Essig, 1967). Data from other offsite agencies may provide additional information. Only Columbia River water at Richland was consistently sampled by site staff. This note applies to Figures 4.3 through 4.7.

*Routine sampling at Vancouver was discontinued during the first half of 1964.

S9112068.7

Figure 4.4. Copper-64 in Columbia River Water

Refer to Note under Figure 4.3.

*Routine sampling at Vancouver was discontinued during the first half of 1964.

S9112068.5

Figure 4.5. Zinc-65 in Columbia River Water

Refer to Note under Figure 4.3.

* Routine sampling at Vancouver was discontinued during the first half of 1964.

S9112068.6

Figure 4.6. Arsenic-76 in Columbia River Water

Refer to Note under Figure 4.3.

* Routine Sampling Discontinued During First Half of 1964.

S9112063.3

Figure 4.7. Neptunium-239 in Columbia River Water

Refer to Note under Figure 4.3.

5.0 Columbia River Fish Monitoring Data

During the period 1963 through 1966, a significant amount of fish sampling was conducted as part of the routine environmental surveillance program at Hanford. To assemble the available data, the annual monitoring reports and archived records found in the appendices to these annual environmental monitoring reports (Foster and Wilson 1964, Foster and Wilson 1965, Foster et al. 1966, Honstead and Essig 1967) were reviewed. However, no original, uncompiled data were ever found. Some archived records that may have contained relevant information had been destroyed under federal records-holding policies.

5.1 Database Development

Like the Columbia River data, the retrieval of fish monitoring data was considerably more straightforward than the retrieval of the vegetation monitoring data. The tables of data contained in the annual environmental monitoring reports were electronically scanned and transferred to computer files. Hard copies of each file were verified prior to the creation of the fish monitoring database and the calculation of descriptive statistics for each fish species. The database was organized into six parts, corresponding to six Columbia River sampling areas between Priest Rapids Dam and McNary Dam, as shown in Table 5.1. Each year was divided into five periods: January through March; April and May; June through August; September and October, and November and December.

Data files were established for bass, bullhead, carp, catfish, crappie, perch, steelhead, sturgeon, sucker, sunfish, trout, and whitefish whenever an adequate number of samples were present for statistical characterization. The data were reported on a wet-weight basis (pCi/g) for the most prevalent radio-nuclides in fish filets.

The following discussion of radionuclide concentrations in fish tissues focuses on edible sport fish that might have been harvested from the six regions of the Columbia River between Priest Rapids and McNary Dam. The consumable sport fish discussed are limited to bass, bullhead, catfish, crappie, perch, sunfish, and whitefish. A very large data summary containing statistics for these and other fish species, sample location, and sample period was assembled as input data to the Environmental Pathways and Dose Assessment Task. The data for consumable sport fish for the years 1964 through 1966 are condensed and summarized in Appendix C, Tables C.1 through C.12.

Considerable variation in radionuclide concentrations in fish tissue arises from biological and environmental factors. Most noteworthy is the fact that fish do not consistently occupy the same area of the river and their movements may cover considerable distances. For instance, fish tagged in the Hanford area have been recaptured in the Yakima River. As a result, when fish are collected from the Columbia River, it is not known how long the fish resided in the collection area. In the data summarized in Appendix C, the minimum and maximum values for a data set are generally within an order of magnitude of each other. In some cases, however, the spread can be as high as two orders of

Table 5.1. Designated Sample Areas for Dose Reconstruction Relating to Consumption of Columbia River Fish

<u>Sampling Region</u>	<u>River Mile</u>		<u>Name</u>	<u>Geographical Boundaries</u>
	<u>Upriver</u>	<u>Downriver</u>		
1	397	384	Priest Rapids	Priest Rapids Dam to B-C Reactor ^(a)
2	384	361	Hanford	B-C Reactor to Hanford Townsite
3	361	348	Ringold	Hanford Townsite to Ben Franklin Dam Site ^(b)
4	348	335	Richland	Ben Franklin Dam Site to Yakima River
5	335	315	Burbank	Yakima River to Walla Walla River
6	315	292	McNary	Walla Walla River to McNary Dam

(a) In the early years, some fish were sampled as far as 30 miles above the B-C Area.

(b) Proposed dam site north of Richland. (See Figure 4.1.)

magnitude. A review of the fish statistics summary tables for 1964 through 1966 provides a good indication of the magnitude of variation in fish samples, as indicated by the coefficient of variation, percentile values, and maximum and minimum values for each data set.

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Whitefish data were used for these characterizations because whitefish typically contained the highest radionuclide concentrations of any Columbia River sport fish; whitefish were also available for year-round sampling. The high concentrations are probably attributable to their bottom-dwelling and benthic feeding habits. Because concentrations were high, more data were collected for whitefish over a longer period of time than for other fish species. Whitefish continue to be the primary species of fish monitored by the environmental monitoring program.

Other species of fish may have different seasonal radionuclide concentration cycles than whitefish. For example, the data for crappie collected from Burbank in 1965 indicate the highest levels of phosphorous-32 in late summer and early fall. The difference may also reflect preferences for food by species. However, no firm conclusions can be drawn without considering fluctuations in the concentrations of phosphorous-32 and zinc-65 in the Columbia River water and other key variables that influence radionuclide concentrations in sport fish.

Phosphorous-32 and zinc-65 were found to be the major contributors to the total estimated doses to humans who consumed Columbia River fish during the 1964 through 1966 period. Monitoring data for these radionuclides in fish tissue are available throughout the period of interest. Arsenic-76 and neptunium-239 were estimated to be the next major contributors to dose resulting from the consumption of fish. However, detectable levels of arsenic-76 and neptunium-239 in fish fillets were not reported during this period. Cesium-137, cobalt-58, and cobalt-60 were reported when detected in fish tissue samples.

Mean ($\pm$ approximate 90 percent confidence interval) monthly concentrations of phosphorous-32 and zinc-65 in whitefish tissues during 1964 are presented in Figures 5.1 and 5.2, respectively. Seasonal cycles in the radionuclide concentrations in fish tissue are apparent, and similar patterns were observed during 1965 and 1966. For example, Foster and McConnon (1962) reported seasonal fluctuations of phosphorous-32 and zinc-65 concentrations in whitefish collected at Hanford and Ringold from January 1961 through April 1962. Peak concentrations from 1964 through 1966 were observed during May, although the Foster and McConnon (1962) report indicates peak values during the winter months.

5.2 Accuracy and Uncertainty

Information relating to the uncertainty associated with the analytical results was not found in the routine monitoring reports. Consequently, a document search and review of archived records was initiated. An investigation was conducted to assess the accuracy, precision, and detection limits for the reported radionuclides during the Phase I period of interest. This period encompassed the time when Hanford was undergoing contractor diversification. In 1965, U.S. Testing Company (UST) assumed responsibility from General Electric Company for routine analytical services. However, since the staff, facilities, and procedures remained the same, this change did not result in the introduction of any laboratory versus laboratory bias.

Detection limits for all radionuclides generally decreased over the study period, as shown in Table 5.2. The uncertainties associated with the gamma spectroscopy analytical technique were reported

Figure 5.1. Mean Phosphorous-32 in Whitefish $\pm$ 90% CI

Figure 5.2. Mean Zinc-65 in Whitefish $\pm$ 90% CI

by Holt et al. (1964) as ± 100 percent at the detection level; as ± 10 percent for single radionuclides; and as ± 25 percent for mixtures of radionuclides at concentrations 10 times the detection limit. Estimates of precision were not reported by Holt et al. (1964) for radionuclides detected by gamma spectroscopy because the presence of multiple peaks in samples requires solving simultaneous equations.

A major void in the information located to date is the absence of complete analytical detection limit, accuracy, and precision information for phosphorous-32. The method for measuring phosphorous-32 in fish involved quantification of bremsstrahlung radiation with a gamma spectrometer. The standard procedures for environmental samples (Holt et al. 1964) did not contain a section for the measurement of phosphorous-32 in fish. Efforts to locate additional information have not yet produced significant results. A review of archived files generated by U.S. Testing Company produced one page of an apparently multipage letter report that contained a section addressing the reproducibility of radiophosphorus determinations obtained from gamma counts. A copy of the raw data was attached to the report page, but without the full report the applicability of the data and interpretations must be considered somewhat speculative.

The one page of raw data contained 7 analyses of zinc-65 and phosphorous-32 counted over 15 days. The results of these analyses covered a range from 2410 pCi to 69,732 pCi of phosphorous-32 per sample. The detection limit for the gamma-bremsstrahlung technique was listed as 1400 pCi of phosphorous-32 per sample. The reported standard deviations for samples generally decreased as the concentrations of phosphorous-32 and zinc-65 increased. The precision for zinc-65 at a 95 percent confidence interval for all counts over the sample range was ± 6.2 percent. The precision for phosphorous-32 at a 95 percent confidence interval for all counts over the sample range was ± 20.4 percent.

Table 5.2. Detection Limits for Radiochemical Analysis of Biological Samples

Radionuclide ^(a)	Detection Limits (pCi/g)			
	Holt et al. (1964)	Wilson and Foster (1965)	Foster et al. (1966)	Honstead et al. (1967)
³² P	NR ^(b)	2	1	1
⁶⁵ Zn	0.4	5	0.2	0.2
⁵⁸ Co	0.3	0.7	0.2	0.2
⁶⁰ Co	0.3	0.6	0.2	0.2
¹³⁷ Cs	0.2	0.7	0.1	0.1

- (a) Naturally occurring potassium-40 was routinely detected in biological samples, but is not included here with the radionuclides attributed to Hanford.
- (b) NR = not reported

5.3 Bioaccumulation Factors in Columbia River Fish

The objective of this portion of Task 05 was to develop bioaccumulation factors for food fish harvested from the Columbia River during 1964 through 1966. Bioaccumulation represents the ratio between the concentration of a radionuclide in fish to the concentration of the same radionuclide found in the water where the fish lives. Bioaccumulation factors are routinely used to estimate concentrations of radionuclides in fish from reported concentrations in water, which are generally more readily available. Concentration values can vary depending on the specific body of water, fish species, and season. An effort to determine locally applicable values was therefore considered appropriate.

The approach was to examine the existing radionuclide concentration data (such as that for phosphorous-32 and zinc-65) for fish flesh and river water to determine the availability of data for determining bioaccumulation factors for those radionuclides and fish species that have been estimated to contribute significantly to dose.

Bioaccumulation factors for phosphorous-32 and zinc-65 were reviewed. Generally, bioaccumulation factors show a seasonal fluctuation that is apparently related to river temperature and flow rates. Phosphorus-32 and zinc-65 concentrations in fish collected from the same locale have varied by as much as a factor of 500 and 100, respectively, giving rise to highly variable bioaccumulation factors (Foster and McConnon 1962). An evaluation of radionuclide concentrations in river water and the concentrations in fish tissue during 1964 through 1966 also indicates considerable variability in bioaccumulation factors.

Water data have been reported in annual monitoring reports as either grab or composite (weekly) samples. From 1963 through 1966, sampling schedules varied with respect to time of sampling, sampling locations, and type of sample collected. This resulted in a discontinuous water monitoring data set. Fish sampling was also discontinuous. A review of the summary documents reveals inconsistencies in the collection of fish by sample site, sample period, and species. The longest period of continuous cumulative measurement of radionuclides in river water was at the Richland Pumphouse location. Unfortunately, most of the fish data collected from the Richland area are incomplete when viewed on a seasonal or species basis. For example, whitefish were collected in 1965 at Richland during all months from January through October. In 1966, however, whitefish were collected only during January, April, May, and June (Honstead et al. 1967).

Originally scientists envisioned that, by developing ratios between the concentrations of phosphorus-32 and zinc-65 in water and fish tissue for those years when adequate data were available (1960s), it would be possible to estimate concentrations in fish tissue for those years when only water data were available. In view of the variability in radionuclide concentrations in fish tissues and the number of factors influencing the concentrations, it is evident that a simplified approach using factors based on river water concentrations may not accurately estimate concentrations in fish tissue. However, in the absence of monitoring data, modeling concentrations of radionuclides in fish as a function of river water concentration, river temperature, river flow, reactor operating level, species, season, and location may be the only method available for estimating historical concentrations of radionuclides other than phosphorus-32 and zinc-65 in fish tissue.

6.0 References

- Denham, D. H., E. I. Mart, and R. K. Woodruff. 1988. Notes from Key Former Hanford Employees Workshop on Vegetation Biases and Uncertainties 1944 to 1948, September 19-21, 1988. PNL-SA-16497, Pacific Northwest Laboratory, Richland, Washington.
- Foster, R. F., and D. McConnon. 1962. "Relationships between the Concentration of Radionuclides in Columbia River Water and Fish." In Biological Problems in Water Pollution, C. M. Tarzwell, ed. U.S. PHS Publ. 999-WP-25, U.S. Public Health Service, Washington, D.C.
- Foster, R. F., and R. H. Wilson. 1964. Evaluation of Radiological Conditions in the Vicinity of Hanford for 1963. General Electric Company, Richland, Washington.
- Foster, R. F., and R. H. Wilson. 1965. Evaluation of Radiological Conditions in the Vicinity of Hanford for 1964. AEC Research and Development Report BNWL-90, Battelle-Northwest, Richland, Washington.
- Foster, R. F., J. K. Soldat, and T. H. Essig. 1966. Evaluation of Radiological Conditions in the Vicinity of Hanford for 1965. AEC Research and Development Report BNWL-316, Battelle-Northwest, Richland, Washington.
- Foster, R. F., D. Moore, and T. H. Essig. 1966. Evaluation of Radiological Conditions in the Vicinity of Hanford for 1965, Appendices. AEC Research and Development Report BNWL-316 APP, Battelle-Northwest, Richland, Washington.
- Gilbert, R. O., et al. 1992. Uncertainty and Sensitivity Analysis of Historical Measurements of Iodine-131 for Vegetation in 1945-1947. PNWD-1978 HEDR, Battelle, Pacific Northwest Laboratories, Richland, Washington.
- Honstead, J. F., and T. H. Essig. 1967. Evaluation of Radiological Conditions in the Vicinity of Hanford for 1966, Appendices. AEC Research and Development Report, BNWL-439 APP, May 1967, Battelle-Northwest, Richland, Washington.
- Honstead, J. F., T. H. Essig, and J. K. Soldat. 1967. Evaluation of Radiological Conditions in the Vicinity of Hanford for 1966. AEC Research and Development Report, BNWL-439, May 1967, Battelle-Northwest, Richland, Washington.
- Mart, E. I., D. H. Denham, and M. E. Thiede. 1993. Conversion and Correction Factors for Historical Measurements of Iodine-131 in Hanford-Area Vegetation, 1945-1947. PNWD-2133 HEDR, Battelle, Pacific Northwest Laboratories, Richland, Washington.
- Napier, B. A. 1991. Selection of Dominant Radionuclides for Phase I of the Hanford Environmental Dose Reconstruction Project. PNL-7231. Pacific Northwest Laboratory, Richland, Washington.

Poston, T. M., and D. C. Klopfer. 1988. Concentration Factors Used in the Assessment of Radiation Dose to Consumers of Fish: A Review of 27 Radionuclides. Health Physics 55(5):751-766.

Procedures for Quality Assurance. PNL-MA-70. Pacific Northwest Laboratory, Richland, Washington.

Simpson, J.C., and Ramsdell, J.V. 1993. Uncertainty and Sensitivity Analyses Plan. PNWD-2124 HEDR, Battelle, Pacific Northwest Laboratories, Richland, Washington.

Walters, W. J., R. L. Dirkes, and B. A. Napier. 1992. Literature and Data Review for the Surface-Water Pathway: Columbia River and Adjacent Coastal Areas. PNWD-2034 HEDR, Battelle, Pacific Northwest Laboratories, Richland, Washington.

7.0 Resources

This section includes a list of resources used by researchers to build the databases documented in this report. Most of the items refer to reports. The remaining items are box contents, primarily notebooks. References to these boxes are found in the Appendix A tables. The boxes are now stored in the Records Holding Area.

HW-7-1115. Parker, H. M. and C. C. Gamertsfelder. 1945. Weekly H. I. Reports on 200 Area and Environs for 1-5-45 thru 2-13-46. E. I. Dupont de Nemours and Company, Hanford Engineering Works, Richland, Washington.

HW-7-1228. Parker, H. M. 1945. Monthly Reports - H. I. Section - for 1945. E. I. Dupont de Nemours and Company, Hanford Engineering Works, Richland Washington.

HW-7-3322. Gamertsfelder, C. C. 1946. H. I. Section Report for January 1946. E. I. DuPont de Nemours and Company, Hanford Engineering Works, Richland, Washington.

HW-7-3517. Gamertsfelder, C. C. 1946. H. I. Section Report for February 1946. E. I. DuPont de Nemours and Company, Hanford Engineering Works Richland, Washington.

HW-7-3694. Gamertsfelder, C. C. 1946. H. I. Section Report for March 1946. E. I. DuPont de Nemours and Company, Hanford Engineering Works, Richland, Washington.

HW-7-3933. Gamertsfelder, C. C. 1946. H. I. Section Report for April 1946. E. I. DuPont de Nemours and Company, Hanford Engineering Works, Richland, Washington.

HW-7-4312. Gamertsfelder, C. C. 1946. H. I. Section Report for June 1946. E. I. DuPont de Nemours and Company, Hanford Engineering Works, Richland, Washington.

HW-7-4423. Gamertsfelder, C. C. 1946. H. I. "Environs" Report for Week Ending July 17, 1946. E. I. DuPont de Nemours and Company, Hanford Engineering Works, Richland, Washington.

HW-7-4440. Gamertsfelder, C. C. 1946. H. I. "Environs" Report for Week Ending July 24, 1946. E. I. DuPont de Nemours and Company, Hanford Engineering Works, Richland, Washington.

HW-7-4474. Gamertsfelder, C. C. 1946. H. I. Section Report for July 1946. E. I. DuPont de Nemours and Company, Hanford Engineering Works, Richland, Washington.

HW-7-4699. Gamertsfelder, C. C. 1946. H. I. Section Report for August 1946. E. I. DuPont de Nemours and Company, Hanford Engineering Works, Richland, Washington.

HW-7-5042. Healy, J. W., and C. C. Gamertsfelder. 1947. H. I. Environs Reports -- September, 1946 through May, 1947. General Electric Company, Richland, Washington.

HW-7-5145. Parker, H. M. 1946. H. I. Section Report for September 1946. E. I. Dupont de Nemours and Company, Hanford Engineering Works, Richland, Washington.

HW-7-5301. Parker, H. M. 1946. H. I. Section Report for October 1946. General Electric Company, Richland, Washington.

HW-7-5428. Parker, H. M. 1946. H. I. Section Report for November 1946. General Electric Company, Richland, Washington.

HW-7-5605. Parker, H. M. 1947. H. I. Section Report for December 1946. General Electric Company, Richland, Washington.

HW-7-5882. Parker, H. M. 1947. H. I. Section Report for February, 1947. General Electric Company, Richland, Washington.

HW-7-6047. Parker, H. M. 1947. H. I. Section Report for March, 1947. General Electric Company, Richland, Washington.

HW-7-6152. Parker, H. M. 1947. H. I. Section Report for April, 1947. General Electric Company, Richland, Washington.

HW-7-6392. Parker, H. M. 1947. H. I. Section Report as of 5/31/47. General Electric Company, Richland, Washington.

HW-7046. Parker, H. M. 1947. Health Instrument Section Report for Month of June, 1947. General Electric Company, Richland, Washington.

HW-7281. Parker, H. M. 1947. Health Instrument Section Report for Month of July, 1947. General Electric Company, Richland, Washington.

HW-7534. Parker, H. M. 1947. Health Instrument Section Report for Month of August, 1947. General Electric Company, Richland, Washington.

HW-7831. Gamertsfelder, C. C. 1947. H. I. Environs Report for the Month of September, 1947. General Electric Company, Richland, Washington.

HW-8027. Gamertsfelder, C. C. 1947. H. I. "Environs" Report for the Month of October, 1947. General Electric Company, Richland, Washington.

HW-8243. Gamertsfelder, C. C. 1947. H. I. "Environs" Report for the Month of November, 1947. General Electric Company, Richland, Washington.

HW-8486. Singlevich, W. 1947. H. I. "Environs" Report for the Month of December, 1947. General Electric Company, Richland, Washington.

HEW-494-L. Healy, J. W. 1945. H. I. Department Technical Logbook. "B" III Special Samples for the Period 7/24/45 through 12/10/45. Photostatic copy of unpublished notebook.

HEW-578-L. Healy, J. W. 1946. H. I. Department Technical Logbook. "B" III Special Samples for the Period 10/23/45 through 1/21/46. Photostatic copy of unpublished notebook.

HEW-584-L. Bulow, W. F. 1946. Logbook, H. I. Survey Counter Record Miscellaneous for the Period Covering 12/12/45 through 8/28/46. Photostatic copy of unpublished notebook.

HEW-616-T. Dickinson, P. 1946. Technical Notebook, Site Survey Water, Vegetation and Special Sample Data for the Period Covering 1/20/36 through 8/29/46. Photostatic copy of unpublished notebook.

HEW-652-L. Turner, L. D. 1946. Logbook, H. I. Survey Hanford Area for the Period Covering 4/17/46 through 7/28/46. Photostatic copy of unpublished notebook.

HEW-6660-T. Bulow, W. F. 1945. Vegetation Sampling and Analysis 7/1/45 through 12/21/45 and Water Samples and Analysis 4/23/45 for the Columbia River, Hanford Site and Tri Cities. Unpublished notebook.

Box # 85854:

Notebook HEW-652-L. Hanford Area. Includes vegetation count data. 4-17-46 thru 7-28-46. Photostatic copy.

Appendix A

Vegetation Monitoring Data

Appendix A

Vegetation Monitoring Data

This appendix presents a summary of iodine-131 (as total Beta) data for vegetation samples collected from many locations surrounding the Hanford site during the years 1945 through 1947. Most of this information was obtained from photostatic copies of old laboratory record books discovered during a search of the historic records at the Richland DOE Records Holding Area. However, data for the last four months of 1946 through 1947 were obtained from periodic status reports that were published at 2-week intervals. The data from unpublished notebooks appear to be actual counting-room records for individual vegetation samples. The published data were identified as 2-week averages and may or may not have been individual sample results. Average values were used because individual sample counting data for the last part of 1946 and for 1947 have not yet been located. Generally, if counting data were available, average numbers were not used. Table A.1 presents data for 1945, Table A.2 data for 1946, and Table A.3 for 1947.

Comments on Data Table Listings

An explanation of the data listings is necessary to facilitate a full understanding of their contents. A short description of each category, or data column, follows:

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Sampling Location: *It is not uncommon to find the same sampling location described in several different ways. Whenever possible, attempts were made to standardize location names. This made it easier to compare data obtained from different source documents.*

Date: This date (expressed as month, day, year) provided with the sampling data is assumed to be the date the sample was collected. Occasionally, dates were listed as *week or month ending dates*. An asterisk (*) entry in the *Notes* column indicates the sample was obtained sometime during the week ending on that date.

County:	This is the name of the County in which samples were obtained.
Sample Type:	Vegetation type is included in this column, if it was noted in the reference document. The word, vegetation, is used when the type of plant was unknown. The predominant vegetation in the area is commonly referred to as sage or sagebrush. Other sample type entries were taken directly from the original records and no attempt was made to clarify the abbreviations.
CPM	<p>These are the net counting rates (cpm, corrected for background only), plus or minus one standard deviation (SD) of the counting uncertainties as reported in the reference documents. Entries of <i>NR</i> in this column indicate not reported.</p> <p>The number of significant figures shown in the <u>CPM</u> and <u>Reported</u> columns of the Appendix A tables is an artifact of converting the database values (stored in scientific notation) to non-scientific notation, rather than an indication of the precision of the reported values. In general, only two significant figures are appropriate for the data provided in these tables. For example, the first <u>Reported</u> value of 0.210 $\mu\text{Ci/kg}$ more appropriately should have been listed as 0.21 $\mu\text{Ci/kg}$.</p>
Notes:	This is a comment column. For instance, the symbols < and > (less than and greater than) refer to the reported $\mu\text{Ci/kg}$ value. If the reported $\mu\text{Ci/kg}$ concentration was an average value, AVG is entered in this column; if a maximum value, MAX is entered in this column.
Reported $\mu\text{Ci/kg}$:	Sometimes both the raw counting data and the concentrations were reported in the reference document. However, where known, only the reported concentration values (in microcurie per kilogram) are entered in this column. Entries of <i>NR</i> indicate not reported.
Reference:	Reference column numbers starting with <i>HEW</i> or <i>HW</i> are the assigned document numbers, which may refer to internal memoranda, laboratory notebooks, and weekly, monthly, quarterly, or annual reports. A <i>Box</i> entry indicates the data is stored in a records holding area within a numbered box.

Table A.1. 1945 Iodine-131 Vegetation Contamination Data from Locations Surrounding the Hanford Site

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Benton City	10/31/45	Benton	Sagebrush	nr		0.210	HW-7-1228 DEL
Benton City	11/30/45	Benton	Vegetation	nr		0.550	HW-7-1228 DEL
Benton City	12/31/45	Benton	Vegetation	nr		2.000	HW-7-1228 DEL
Benton City	10/31/45	Benton	Vegetation	nr		0.210	HW-7-1115
Benton City	11/07/45	Benton	Vegetation	nr		0.085	HW-7-1115
Benton City	11/14/45	Benton	Vegetation	nr		0.100	HW-7-1115
Benton City	11/21/45	Benton	Vegetation	nr		0.550	HW-7-1115
Benton City	11/28/45	Benton	Vegetation	nr		0.140	HW-7-1115
Benton City	12/05/45	Benton	Vegetation	nr		0.410	HW-7-1115
Benton City	12/12/45	Benton	Vegetation	nr		0.240	HW-7-1115
Benton City	12/19/45	Benton	Vegetation	nr		2.100	HW-7-1115
Benton City	12/26/45	Benton	Vegetation	nr		2.000	HW-7-1115
Benton City	12/20/45	Benton	Sagebrush	334.00 $\pm$ 14		2.000	HEW-6660-T
Benton City	12/16/45	Benton	Sagebrush	350.00 $\pm$ 14		2.100	HEW-6660-T
Benton City	12/03/45	Benton	Sagebrush	43.00 $\pm$ 3		nr	HEW-6660-T
Benton City	12/03/45	Benton	Sagebrush	42.00 $\pm$ 5		nr	HEW-6660-T
Benton City	11/30/45	Benton	Sagebrush	72.00 $\pm$ 5		nr	HEW-6660-T
Benton City	11/23/45	Benton	Sagebrush	24.00 $\pm$ 3		0.140	HEW-6660-T
Benton City	11/16/45	Benton	Sagebrush	97.00 $\pm$ 6		0.550	HEW-6660-T
Benton City	11/10/45	Benton	Sagebrush	18.00 $\pm$ 2		0.100	HEW-6660-T
Benton City	10/31/45	Benton	Sagebrush	15.00 $\pm$ 3		0.085	HEW-6660-T
Benton City	10/26/45	Benton	Sagebrush	38.00 $\pm$ 3		nr	HEW-6660-T
Benton City	10/23/45	Benton	Sagebrush	38.40 $\pm$ 3.2		nr	HEW-578-L
Benton City	10/31/45	Benton	Sagebrush	14.90 $\pm$ 2.7		nr	HEW-578-L
Benton City	11/05/45	Benton	Sagebrush	17.60 $\pm$ 2.4		nr	HEW-578-L
Benton City	11/15/45	Benton	Sagebrush	97.30 $\pm$ 6.1		nr	HEW-578-L
Benton City	11/20/45	Benton	Sagebrush	24.00 $\pm$ 3.2		nr	HEW-578-L
Benton City	11/29/45	Benton	Sagebrush	72.40 $\pm$ 5.3		nr	HEW-578-L
Benton City	12/05/45	Benton	Sagebrush	43.00 $\pm$ 3.4		nr	HEW-578-L
Benton City	12/07/45	Benton	Sagebrush	42.40 $\pm$ 4.5		nr	HEW-578-L
Benton City	12/12/45	Benton	Sagebrush	349.80 $\pm$ 14.2		nr	HEW-578-L
Benton City	12/20/45	Benton	Sagebrush	333.60 $\pm$ 14		nr	HEW-578-L
Benton City	12/27/45	Benton	Sagebrush	291.00 $\pm$ 13.2		nr	HEW-578-L
Benton City 614 Bldg.	10/31/45	Benton	Vegetation	nr	Avg	0.770	Box #34143
Benton City 614 Bldg.	11/30/45	Benton	Vegetation	nr	Avg	0.730	Box #34143
Benton City 614 Bldg.	12/31/45	Benton	Vegetation	nr	Avg	4.100	Box #34143
Berkeley, CA.	12/12/45	Alameda	Vegetation	nr		0.010	HW-7-1115
Berkeley, CA.	12/05/45	Alameda	Sagebrush	5.90 $\pm$ 1.8		nr	HEW-578-L
Berkeley, CA.	12/10/45	Alameda	Sagebrush	0.70 $\pm$ 1.8		nr	HEW-578-L
Connell, WA.	10/31/45	Franklin	Sagebrush	nr		0.030	HW-7-1228 DEL
Connell, WA.	10/31/45	Franklin	Vegetation	nr		0.034	HW-7-1115
Connell, WA., edge of, on US-395	10/23/45	Franklin	Sagebrush	5.90 $\pm$ 2.4		nr	HEW-578-L
Connell, WA., on US-395	10/26/45	Franklin	Sagebrush	6.00 $\pm$ 2		nr	HEW-6660-T
Grandview, WA, 5 miles E.	12/12/45	Benton	Vegetation	nr		0.260	HW-7-1115

Table A.1. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Grandview, WA.	12/12/45	Yakima	Vegetation	nr		0.040	HW-7-1115
Grandview, WA.	12/03/45	Yakima	Sagebrush	7.00 $\pm$ 2		nr	HEW-6660-T
Grandview, WA.	12/07/45	Yakima	Sagebrush	6.70 $\pm$ 1.8		nr	HEW-578-L
Grandview, WA., 5 miles E.	12/03/45	Benton	Sagebrush	46.00 $\pm$ 5		nr	HEW-6660-T
Grandview, WA., 5 miles E.	12/07/45	Benton	Sagebrush	45.50 $\pm$ 4.5		nr	HEW-578-L
Kennewick	10/31/45	Benton	Sagebrush	nr		0.220	HW-7-1228 DEL
Kennewick	11/30/45	Benton	Vegetation	nr		0.310	HW-7-1228 DEL
Kennewick	12/31/45	Benton	Vegetation	nr		6.900	HW-7-1228 DEL
Kennewick	10/31/45	Benton	Vegetation	nr	Avg	0.600	Box #34143
Kennewick	11/30/45	Benton	Vegetation	nr	Avg	0.680	Box #34143
Kennewick	12/31/45	Benton	Vegetation	nr	Avg	12.220	Box #34143
Kennewick	10/17/45	Benton	Vegetation	nr		0.100	HW-7-1115
Kennewick	10/24/45	Benton	Vegetation	nr		0.160	HW-7-1115
Kennewick	10/31/45	Benton	Vegetation	nr		0.200	HW-7-1115
Kennewick	11/07/45	Benton	Vegetation	nr		0.260	HW-7-1115
Kennewick	11/14/45	Benton	Vegetation	nr		0.310	HW-7-1115
Kennewick	11/21/45	Benton	Vegetation	nr		0.034	HW-7-1115
Kennewick	11/28/45	Benton	Vegetation	nr		0.150	HW-7-1115
Kennewick	12/05/45	Benton	Vegetation	nr		4.300	HW-7-1115
Kennewick	12/12/45	Benton	Vegetation	nr		0.300	HW-7-1115
Kennewick	12/19/45	Benton	Vegetation	nr		2.000	HW-7-1115
Kennewick	12/26/45	Benton	Vegetation	nr	Max	6.900	HW-7-1115
Kennewick	12/26/45	Benton	Vegetation	nr	Avg	5.000	HW-7-1115
Kennewick	11/09/45	Benton	Sagebrush	55.00 $\pm$ 5		0.310	HEW-6660-T
Kennewick	10/17/45	Benton	Sagebrush	28.00 $\pm$ 3		0.160	HEW-6660-T
Kennewick	11/08/45	Benton	Sagebrush	54.50 $\pm$ 5.1		nr	HEW-578-L
Kennewick	10/03/45	Benton	Sage	38.50 $\pm$ 13.1		nr	HEW-494-L
Kennewick	10/18/45	Benton	Sage	28.30 $\pm$ 3		nr	HEW-494-L
Kennewick, Golf Club House, 100 ft. E.	12/20/45	Benton	Sagebrush	959.80 $\pm$ 24		nr	HEW-578-L
Kennewick, Golf Club House, 100 ft. W.	12/20/45	Benton	Sagebrush	644.00 $\pm$ 19		nr	HEW-578-L
Kennewick, Golf Course	12/16/45	Benton	Sagebrush	346.00 $\pm$ 14		2.000	HEW-6660-T
Kennewick, Golf Course	12/13/45	Benton	Sagebrush	346.40 $\pm$ 14.2		nr	HEW-578-L
Kennewick, Golf, 100 ft E. of Club House	12/20/45	Benton	Sagebrush	960.00 $\pm$ 24		5.600	HEW-6660-T
Kennewick, Golf, 100 ft W. of Club House	12/20/45	Benton	Sagebrush	644.00 $\pm$ 19		3.800	HEW-6660-T
Kennewick, High School	12/21/45	Benton	Sagebrush	761.00 $\pm$ 22		4.500	HEW-6660-T
Kennewick, High School	12/21/45	Benton	Sagebrush	760.90 $\pm$ 21.5		nr	HEW-578-L
Kennewick, Kennewick Ave. & E. Washington	12/21/45	Benton	Sagebrush	436.00 $\pm$ 16		2.600	HEW-6660-T
Kennewick, Kennewick Ave. & E. Washington	12/21/45	Benton	Sagebrush	435.70 $\pm$ 15.9		nr	HEW-578-L
Kennewick, Kennewick Ave. & Lyle St.	11/30/45	Benton	Sagebrush	722.00 $\pm$ 21		nr	HEW-6660-T

Table A.1. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Kennewick, Kennewick Ave. & Lyle St.	11/23/45	Benton	Sagebrush	27.00 $\pm$ 3		0.150	HEW-6660-T
Kennewick, Kennewick Ave. & Lyle St.	10/31/45	Benton	Sagebrush	46.00 $\pm$ 3		0.260	HEW-6660-T
Kennewick, Kennewick Ave. & Lyle St.	10/25/45	Benton	Sagebrush	36.00 $\pm$ 3		0.200	HEW-6660-T
Kennewick, Kennewick Ave. & Lyle St.	10/11/45	Benton	Sagebrush	18.00 $\pm$ 3		nr	HEW-6660-T
Kennewick, Kennewick Ave. & Lyle St.	10/25/45	Benton	Sagebrush	31.50 $\pm$ 2.9		nr	HEW-578-L
Kennewick, Kennewick Ave. & Lyle St.	10/31/45	Benton	Sagebrush	46.10 $\pm$ 3.4		nr	HEW-578-L
Kennewick, Kennewick Ave. & Lyle St.	11/20/45	Benton	Sagebrush	27.30 $\pm$ 3.3		nr	HEW-578-L
Kennewick, Kennewick Ave. & Lyle St.	11/29/45	Benton	Sagebrush	721.80 $\pm$ 20.5		nr	HEW-578-L
Kennewick, N.	10/02/45	Benton	Sagebrush	39.00 $\pm$ 3		nr	HEW-6660-T
Kennewick, N. Center	12/27/45	Benton	Sagebrush	277.80 $\pm$ 12.8		nr	HEW-578-L
Kennewick, N. on Hill Rd. before RR track	12/21/45	Benton	Sagebrush	1020.9 $\pm$ 24		nr	HEW-578-L
Kennewick, N. on Hill Rd. before RR track	12/21/45	Benton	Sagebrush	1021.0 $\pm$ 24		6.100	HEW-6660-T
Kennewick, N.E.	10/03/45	Benton	Vegetation	nr		0.150	HW-7-1115
Kennewick, N.E.	12/21/45	Benton	Sagebrush	740.00 $\pm$ 21		4.400	HEW-6660-T
Kennewick, N.E.	12/03/45	Benton	Sagebrush	52.00 $\pm$ 4		nr	HEW-6660-T
Kennewick, N.E.	12/05/45	Benton	Sagebrush	51.50 $\pm$ 4.4		nr	HEW-578-L
Kennewick, N.E., Columbia Hiway & Ave. F	12/21/45	Benton	Sagebrush	1147.0 $\pm$ 26		6.900	HEW-6660-T
Kennewick, N.E., Columbia Hiway & Ave. F	12/21/45	Benton	Sagebrush	1147.2 $\pm$ 25.8		nr	HEW-578-L
Kennewick, N.E., S. of Golf Course	12/21/45	Benton	Sagebrush	740.30 $\pm$ 20.8		nr	HEW-578-L
Kennewick, N.W.	11/16/45	Benton	Sagebrush	6.00 $\pm$ 2		0.034	HEW-6660-T
Kennewick, N.W.	11/16/45	Benton	Sagebrush	5.50 $\pm$ 1.7		nr	HEW-578-L
Kennewick, S.E.	12/21/45	Benton	Sagebrush	1129.0 $\pm$ 25		6.800	HEW-6660-T
Kennewick, S.E.	12/21/45	Benton	Sagebrush	1129.4 $\pm$ 25		nr	HEW-578-L
Kennewick, S.W. River flats	12/21/45	Benton	Sagebrush	585.00 $\pm$ 17		3.500	HEW-6660-T
Kennewick, S.W. River flats	12/21/45	Benton	Sagebrush	585.40 $\pm$ 18.6		nr	HEW-578-L
Pasco	10/31/45	Franklin	Vegetation	nr	Avg	1.220	Box 34143
Pasco	11/30/45	Franklin	Vegetation	nr	Avg	1.210	Box 34143
Pasco	12/31/45	Franklin	Vegetation	nr	Avg	7.010	Box 34143
Pasco	10/17/45	Franklin	Vegetation	nr		0.190	HW-7-1115
Pasco	10/24/45	Franklin	Vegetation	nr		0.440	HW-7-1115
Pasco	10/31/45	Franklin	Vegetation	nr		0.630	HW-7-1115
Pasco	11/07/45	Franklin	Vegetation	nr		0.340	HW-7-1115
Pasco	11/14/45	Franklin	Vegetation	nr		0.400	HW-7-1115
Pasco	11/21/45	Franklin	Vegetation	nr		0.120	HW-7-1115

Table A.1. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Pasco	11/28/45	Franklin	Vegetation	nr		0.057	HW-7-1115
Pasco	12/05/45	Franklin	Vegetation	nr		0.600	HW-7-1115
Pasco	12/12/45	Franklin	Vegetation	nr		0.620	HW-7-1115
Pasco	12/19/45	Franklin	Vegetation	nr		0.500	HW-7-1115
Pasco	12/26/45	Franklin	Vegetation	nr		1.900	HW-7-1115
Pasco	12/20/45	Franklin	Sagebrush	326.00 $\pm$ 14		1.900	HEW-6660-T
Pasco	11/23/45	Franklin	Sagebrush	10.00 $\pm$ 2		0.057	HEW-6660-T
Pasco	11/09/45	Franklin	Sagebrush	70.00 $\pm$ 5		0.400	HEW-6660-T
Pasco	10/17/45	Franklin	Sagebrush	77.00 $\pm$ 4		0.440	HEW-6660-T
Pasco	11/08/45	Franklin	Sagebrush	69.80 $\pm$ 5.4		nr	HEW-578-L
Pasco	11/20/45	Franklin	Sagebrush	9.50 $\pm$ 1.8		nr	HEW-578-L
Pasco	12/20/45	Franklin	Sagebrush	326.20 $\pm$ 14		nr	HEW-578-L
Pasco	10/18/45	Franklin	Sage	77.40 $\pm$ 4		nr	HEW-494-L
Pasco, 10 miles E. on US-410	10/26/45	Walla Walla	Sagebrush	24.00 $\pm$ 3		nr	HEW-6660-T
Pasco, 10 miles E. on US-410	10/23/45	Walla Walla	Sagebrush	24.00 $\pm$ 2.8		nr	HEW-578-L
Pasco, 10 miles N. on US-395	10/26/45	Franklin	Sagebrush	39.00 $\pm$ 3		nr	HEW-6660-T
Pasco, 10 miles N. on US-395	10/23/45	Franklin	Sagebrush	38.50 $\pm$ 3.2		nr	HEW-578-L
Pasco, 10 miles N. on US-395	10/26/45	Franklin	Sagebrush	39.00 $\pm$ 3		nr	HEW-6660-T
Pasco, 10 miles N. on US-395	10/23/45	Franklin	Sagebrush	38.50 $\pm$ 3.2		nr	HEW-578-L
Pasco, 10 miles S.E. on US-410	11/16/45	Walla Walla	Sagebrush	24.00 $\pm$ 3		0.140	HEW-6660-T
Pasco, 10 miles S.E. on US-410	11/14/45	Walla Walla	Sagebrush	23.50 $\pm$ 2.6		nr	HEW-578-L
Pasco, 15 miles E. on US-410	10/26/45	Walla Walla	Sagebrush	19.00 $\pm$ 3		nr	HEW-6660-T
Pasco, 15 miles E. on US-410	10/23/45	Walla Walla	Sagebrush	19.40 $\pm$ 2.6		nr	HEW-578-L
Pasco, 15 miles N. on US-395	10/26/45	Franklin	Sagebrush	23.00 $\pm$ 3		nr	HEW-6660-T
Pasco, 15 miles N. on US-395	10/23/45	Franklin	Sagebrush	23.30 $\pm$ 2.7		nr	HEW-578-L
Pasco, 15 miles N. on US-395	10/23/45	Franklin	Sagebrush	23.30 $\pm$ 2.7		nr	HEW-578-L
Pasco, 15 miles S.E. on US-410	11/16/45	Walla Walla	Sagebrush	11.00 $\pm$ 2		0.063	HEW-6660-T
Pasco, 15 miles S.E. on US-410	11/14/45	Walla Walla	Sagebrush	11.10 $\pm$ 2.3		nr	HEW-578-L
Pasco, 20 miles N. on US-395	10/26/45	Franklin	Sagebrush	11.00 $\pm$ 3		nr	HEW-6660-T
Pasco, 20 miles N. on US-395	10/23/45	Franklin	Sagebrush	10.60 $\pm$ 2.6		nr	HEW-578-L
Pasco, 20 miles S.E. on US-410	11/21/45	Walla Walla	Vegetation	nr		0.280	HW-7-1115
Pasco, 20 miles S.E. on US-410	11/16/45	Walla Walla	Sagebrush	47.00 $\pm$ 4		0.280	HEW-6660-T
Pasco, 25 mile N. on US-395	10/26/45	Franklin	Sagebrush	34.00 $\pm$ 3		nr	HEW-6660-T
Pasco, 25 miles N. on US-395	10/23/45	Franklin	Sagebrush	33.50 $\pm$ 2.9		nr	HEW-578-L
Pasco, 25 miles S.E. on US-410	11/16/45	Walla Walla	Sagebrush	15.00 $\pm$ 2		0.086	HEW-6660-T
Pasco, 25 miles S.E. on US-410	11/14/45	Walla Walla	Sagebrush	14.90 $\pm$ 2.4		nr	HEW-578-L
Pasco, 30 miles N. on US-395	10/26/45	Franklin	Sagebrush	13.00 $\pm$ 3		nr	HEW-6660-T
Pasco, 30 miles N. on US-395	10/23/45	Franklin	Sagebrush	12.60 $\pm$ 2.7		nr	HEW-578-L
Pasco, 30 miles S.E. on US-410	11/16/45	Walla Walla	Sagebrush	20.00 $\pm$ 3		0.110	HEW-6660-T
Pasco, 30 miles S.E. on US-410	11/14/45	Walla Walla	Sagebrush	19.70 $\pm$ 3.3		nr	HEW-578-L
Pasco, 30 miles S.E. on US-410	11/14/45	Walla Walla	Sagebrush	19.70 $\pm$ 3.3		nr	HEW-578-L
Pasco, 35 miles S.E. on US-410	11/16/45	Walla Walla	Sagebrush	16.00 $\pm$ 3		0.091	HEW-6660-T
Pasco, 35 miles S.E. on US-410	11/14/45	Walla Walla	Sagebrush	15.70 $\pm$ 3.1		nr	HEW-578-L
Pasco, 35 miles S.E. on US-410	11/16/45	Walla Walla	Sagebrush	16.00 $\pm$ 3		0.091	HEW-6660-T
Pasco, 35 miles S.E. on US-410	11/14/45	Walla Walla	Sagebrush	15.70 $\pm$ 3.1		nr	HEW-578-L
Pasco, 40 miles S.E. on US-410	11/21/45	Walla Walla	Vegetation	nr		0.063	HW-7-1115

Table A.1. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Pasco, 40 miles S.E. on US-410	11/16/45	Walla Walla	Sagebrush	11.00 $\pm$ 2		0.063	HEW-6660-T
Pasco, 40 miles S.E. on US-410	11/14/45	Walla Walla	Sagebrush	11.10 $\pm$ 2.3		nr	HEW-578-L
Pasco, 40 miles S.E. on US-410	11/16/45	Walla Walla	Sagebrush	11.00 $\pm$ 2		0.063	HEW-6660-T
Pasco, 40 miles S.E. on US-410	11/14/45	Walla Walla	Sagebrush	11.10 $\pm$ 2.3		nr	HEW-578-L
Pasco, 45 miles S.E. on US-410	11/16/45	Walla Walla	Sagebrush	9.00 $\pm$ 2		0.057	HEW-6660-T
Pasco, 45 miles S.E. on US-410	11/14/45	Walla Walla	Sagebrush	9.40 $\pm$ 2.3		nr	HEW-578-L
Pasco, 5 miles E. on US-410	10/26/45	Walla Walla	Sagebrush	33.00 $\pm$ 3		nr	HEW-6660-T
Pasco, 5 miles E. on US-410	10/23/45	Walla Walla	Sagebrush	33.10 $\pm$ 2.7		nr	HEW-578-L
Pasco, 5 miles N. on US-395	10/26/45	Franklin	Sagebrush	29.00 $\pm$ 3		nr	HEW-6660-T
Pasco, 5 miles N. on US-395	10/23/45	Franklin	Sagebrush	29.20 $\pm$ 3		nr	HEW-578-L
Pasco, 5 miles N. on US-395	10/26/45	Franklin	Sagebrush	29.00 $\pm$ 3		nr	HEW-6660-T
Pasco, 5 miles N. on US-395	10/23/45	Franklin	Sagebrush	29.20 $\pm$ 3		nr	HEW-578-L
Pasco, 5 miles S.E. on US-410	11/16/45	Walla Walla	Sagebrush	23.00 $\pm$ 3		0.130	HEW-6660-T
Pasco, 5 miles S.E. on US-410	11/14/45	Walla Walla	Sagebrush	22.60 $\pm$ 3.4		nr	HEW-578-L
Pasco, H & R Depot	10/25/45	Franklin	Sagebrush	110.20 $\pm$ 4.4		nr	HEW-578-L
Pasco, H & R Entrance	11/30/45	Franklin	Sagebrush	107.00 $\pm$ 6		nr	HEW-6660-T
Pasco, H & R Entrance	11/29/45	Franklin	Sagebrush	106.70 $\pm$ 6.3		nr	HEW-578-L
Pasco, H & R Point	12/16/45	Franklin	Sagebrush	86.00 $\pm$ 6		0.500	HEW-6660-T
Pasco, H & R Point	10/31/45	Franklin	Sagebrush	60.00 $\pm$ 4		0.340	HEW-6660-T
Pasco, H & R Point	10/25/45	Franklin	Sagebrush	110.20 $\pm$ 4		0.630	HEW-6660-T
Pasco, H & R Point	10/31/45	Franklin	Sagebrush	59.80 $\pm$ 3.7		nr	HEW-578-L
Pasco, H & R Point	12/13/45	Franklin	Sagebrush	86.00 $\pm$ 5.5		nr	HEW-578-L
Pasco, L & R	10/11/45	Franklin	Sagebrush	34.00 $\pm$ 3		nr	HEW-6660-T
Pasco, L & R	10/12/45	Franklin	Sage	34.20 $\pm$ 3.2		nr	HEW-494-L
Pasco, N.	10/02/45	Franklin	Sagebrush	32.00 $\pm$ 3		nr	HEW-6660-T
Pasco, N.	10/03/45	Franklin	Sage	32.00 $\pm$ 2.9		nr	HEW-494-L
Pasco, N.E.	10/03/45	Franklin	Vegetation	nr		0.120	HW-7-1115
Pasco, N.E.	12/27/45	Franklin	Sagebrush	212.00 $\pm$ 11.5		nr	HEW-578-L
Pasco, N.W.	12/21/45	Franklin	Sagebrush	578.00 $\pm$ 18		3.400	HEW-6660-T
Pasco, N.W.	12/03/45	Franklin	Sagebrush	107.00 $\pm$ 7		nr	HEW-6660-T
Pasco, N.W.	11/16/45	Franklin	Sagebrush	21.00 $\pm$ 3		0.120	HEW-6660-T
Pasco, N.W.	11/16/45	Franklin	Sagebrush	20.90 $\pm$ 3.1		nr	HEW-578-L
Pasco, N.W.	12/05/45	Franklin	Sagebrush	107.00 $\pm$ 6.5		nr	HEW-578-L
Pasco, N.W.	12/21/45	Franklin	Sagebrush	578.30 $\pm$ 18.2		nr	HEW-578-L
Pasco, S.E.	12/21/45	Franklin	Sagebrush	756.00 $\pm$ 21		4.500	HEW-6660-T
Pasco, S.E.	12/21/45	Franklin	Sagebrush	755.80 $\pm$ 21		nr	HEW-578-L
Pasco, S.W.	12/21/45	Franklin	Sagebrush	636.00 $\pm$ 20		3.800	HEW-6660-T
Pasco, S.W.	12/21/45	Franklin	Sagebrush	636.30 $\pm$ 19		nr	HEW-578-L
Pendleton, OR.	12/14/45	Umatilla	Sagebrush	3.20 $\pm$ 1.8		nr	HEW-578-L
Portland, OR.	12/12/45	Multnomah	Vegetation	nr		<0.010	HW-7-1115
Portland, OR.	12/04/45	Multnomah	Sagebrush	0.0		nr	HEW-578-L
Portland, OR.	12/10/45	Multnomah	Sagebrush	0.70 $\pm$ 1.8		nr	HEW-578-L
Prosser	12/12/45	Benton	Vegetation	nr		0.067	HW-7-1115
Prosser	12/03/45	Benton	Sagebrush	12.00 $\pm$ 3		nr	HEW-6660-T
Prosser	12/07/45	Benton	Sagebrush	11.50 $\pm$ 2.9		nr	HEW-578-L
Prosser, 6 miles E.	12/12/45	Benton	Vegetation	nr		0.140	HW-7-1115

Table A.1. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported μCi/kg	Reference
Prosser, 6 miles E.	12/03/45	Benton	Sagebrush	25.00 ±3		nr	HEW-6660-T
Prosser, 6 miles E.	12/07/45	Benton	Sagebrush	24.70 ±3.1		nr	HEW-578-L
Richland	06/30/45	Benton	Sagebrush	100.00		nr	HW-7-1228 DEL
Richland	09/30/45	Benton	Vegetation	nr	Avg	0.070	HW-7-1228 DEL
Richland	09/30/45	Benton	Vegetation	nr	Max	0.170	HW-7-1228 DEL
Richland	10/31/45	Benton	Sagebrush	nr		0.270	HW-7-1228 DEL
Richland	11/30/45	Benton	Vegetation	nr		0.500	HW-7-1228 DEL
Richland	12/31/45	Benton	Vegetation	nr		4.000	HW-7-1228 DEL
Richland	10/31/45	Benton	Vegetation	nr		0.680	Box #34143
Richland	11/30/45	Benton	Vegetation	nr	Avg	0.620	Box #34143
Richland	12/31/45	Benton	Vegetation	nr	Avg	5.770	Box #34143
Richland	06/01/45	Benton	Sagebrush	35.00		nr	HW-7-1115
Richland	06/29/45	Benton	Sagebrush	140.00		nr	HW-7-1115
Richland	07/20/45	Benton	Sagebrush	0.0±9		nr	HW-7-1115
Richland	07/27/45	Benton	Sagebrush	9.00 ±3		nr	HW-7-1115
Richland	08/17/45	Benton	Vegetation	nr	Max	0.230	HW-7-1115
Richland	08/17/45	Benton	Vegetation	nr	Avg	0.110	HW-7-1115
Richland	08/24/45	Benton	Vegetation	nr		0.360	HW-7-1115
Richland	09/14/45	Benton	Vegetation	nr	Avg	0.110	HW-7-1115
Richland	09/21/45	Benton	Vegetation	nr	Avg	0.120	HW-7-1115
Richland	10/03/45	Benton	Vegetation	nr	Avg	0.130	HW-7-1115
Richland	11/07/45	Benton	Vegetation	nr	Avg	0.250	HW-7-1115
Richland	12/26/45	Benton	Vegetation	nr	Avg	2.400	HW-7-1115
Richland "Y"	10/31/45	Benton	Vegetation	nr	Avg	0.420	Box #34143
Richland "Y"	11/30/45	Benton	Vegetation	nr	Avg	0.780	Box #34143
Richland "Y"	12/31/45	Benton	Vegetation	nr	Avg	4.220	Box #34143
Richland "Y"	10/03/45	Benton	Vegetation	nr		0.053	HW-7-1115
Richland "Y"	10/17/45	Benton	Vegetation	nr		0.140	HW-7-1115
Richland "Y"	12/12/45	Benton	Vegetation	nr		1.000	HW-7-1115
Richland "Y"	12/19/45	Benton	Vegetation	nr		0.950	HW-7-1115
Richland "Y"	12/21/45	Benton	Sagebrush	427.00 ±16		2.500	HEW-6660-T
Richland "Y"	12/20/45	Benton	Sagebrush	238.00 ±12		1.400	HEW-6660-T
Richland "Y"	12/16/45	Benton	Sagebrush	162.00 ±10		0.950	HEW-6660-T
Richland "Y"	12/03/45	Benton	Sagebrush	184.00 ±11		nr	HEW-6660-T
Richland "Y"	11/30/45	Benton	Sagebrush	93.00 ±6		nr	HEW-6660-T
Richland "Y"	11/23/45	Benton	Sagebrush	18.00 ±2		0.100	HEW-6660-T
Richland "Y"	11/16/45	Benton	Sagebrush	23.00 ±3		0.130	HEW-6660-T
Richland "Y"	11/09/45	Benton	Sagebrush	31.00 ±4		0.180	HEW-6660-T
Richland "Y"	10/31/45	Benton	Sagebrush	57.00 ±4		0.320	HEW-6660-T
Richland "Y"	10/25/45	Benton	Sagebrush	27.00 ±3		0.150	HEW-6660-T
Richland "Y"	10/11/45	Benton	Sagebrush	25.00 ±3		nr	HEW-6660-T
Richland "Y"	10/02/45	Benton	Sagebrush	14.00 ±2		nr	HEW-6660-T
Richland "Y"	10/25/45	Benton	Sagebrush	27.10 ±2.9		nr	HEW-578-L
Richland "Y"	10/31/45	Benton	Sagebrush	56.60 ±3.7		nr	HEW-578-L
Richland "Y"	11/08/45	Benton	Sagebrush	31.30 ±3.5		nr	HEW-578-L
Richland "Y"	11/16/45	Benton	Sagebrush	22.90 ±2.5		nr	HEW-578-L

Table A.1. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Richland "Y"	11/21/45	Benton	Sagebrush	17.70 $\pm$ 1.7		nr	HEW-578-L
Richland "Y"	11/29/45	Benton	Sagebrush	92.90 $\pm$ 5.8		nr	HEW-578-L
Richland "Y"	12/05/45	Benton	Sagebrush	184.10 $\pm$ 10.9		nr	HEW-578-L
Richland "Y"	12/13/45	Benton	Sagebrush	162.40 $\pm$ 10		nr	HEW-578-L
Richland "Y"	12/20/45	Benton	Sagebrush	237.80 $\pm$ 112.2		nr	HEW-578-L
Richland "Y"	12/21/45	Benton	Sagebrush	426.90 $\pm$ 16		nr	HEW-578-L
Richland "Y"	12/27/45	Benton	Sagebrush	85.40 $\pm$ 5.7		nr	HEW-578-L
Richland "Y"	10/03/45	Benton	Sage	13.50 $\pm$ 2.4		nr	HEW-494-L
Richland "Y"	10/12/45	Benton	Sage	25.40 $\pm$ 2.9		nr	HEW-494-L
Richland "Y", 1.5 miles S. on Kenn./Rich.	12/21/45	Benton	Sagebrush	414.00 $\pm$ 16		2.400	HEW-6660-T
Richland "Y", 1.5 miles S. on Kenn./Rich.	12/21/45	Benton	Sagebrush	413.60 $\pm$ 15.8		nr	HEW-578-L
Richland "Y", 10 miles W. on US-410	10/26/45	Benton	Sagebrush	23.00 $\pm$ 3		0.130	HEW-6660-T
Richland "Y", 10 miles W. on US-410	10/23/45	Benton	Sagebrush	22.70 $\pm$ 2.8		nr	HEW-578-L
Richland "Y", 12 miles W. on US-410 (Cobbs)	10/26/45	Benton	Sagebrush	27.00 $\pm$ 2		nr	HEW-6660-T
Richland "Y", 12 miles W. on US-410 (Cobbs)	10/23/45	Benton	Sagebrush	27.20 $\pm$ 1.9		nr	HEW-578-L
Richland "Y", 2 miles W. on US-410	10/26/45	Benton	Sagebrush	24.00 $\pm$ 3		nr	HEW-6660-T
Richland "Y", 2 miles W. on US-410	10/23/45	Benton	Sagebrush	24.30 $\pm$ 2.7		nr	HEW-578-L
Richland "Y", 3 miles S. on Kenn./Rich. Hi	12/21/45	Benton	Sagebrush	955.00 $\pm$ 23		5.600	HEW-6660-T
Richland "Y", 3 miles S. on Kenn./Rich. Hi	12/21/45	Benton	Sagebrush	954.50 $\pm$ 23		nr	HEW-578-L
Richland "Y", 4 miles W. on US-410	10/26/45	Benton	Sagebrush	21.00 $\pm$ 3		nr	HEW-6660-T
Richland "Y", 4 miles W. on US-410	10/23/45	Benton	Sagebrush	21.00 $\pm$ 3.7		nr	HEW-578-L
Richland "Y", 6 miles S. on Kenn./Rich. Hi	12/21/45	Benton	Sagebrush	351.00 $\pm$ 15		2.000	HEW-6660-T
Richland "Y", 6 miles S. on Kenn./Rich. Hi	12/21/45	Benton	Sagebrush	351.00 $\pm$ 14.9		nr	HEW-578-L
Richland "Y", 6 miles W. on US-410	10/26/45	Benton	Sagebrush	17.00 $\pm$ 3		nr	HEW-6660-T
Richland "Y", 6 miles W. on US-410	10/23/45	Benton	Sagebrush	16.60 $\pm$ 2.6		nr	HEW-578-L
Richland "Y", 8 miles W. on US-410	10/26/45	Benton	Sagebrush	28.00 $\pm$ 3		nr	HEW-6660-T
Richland "Y", 8 miles W. on US-410	10/23/45	Benton	Sagebrush	28.00 $\pm$ 3		nr	HEW-6660-T
Richland Airport	09/12/45	Benton	Sagebrush	24.00 $\pm$ 3			HEW-6660-T
Richland Hotel, Riverbank Behind	09/12/45	Benton	Sage	16.50 $\pm$ 2.5		nr	HEW-494-L
Richland Park	08/08/45	Benton	Sage	11.70 $\pm$ 2.3		nr	HEW-494-L

Table A.1. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Richland, Airport	08/21/45	Benton	Sagebrush	40.00 $\pm$ 3		nr	HEW-6660-T
Richland, Airport	08/22/45	Benton	Sage	39.60 $\pm$ 3.1		nr	HEW-494-L
Richland, Bus Terminal	10/03/45	Benton	Vegetation	nr		0.310	HW-7-1115
Richland, Central	10/24/45	Benton	Vegetation	nr		0.150	HW-7-1115
Richland, Collum and Abbott St.	08/08/45	Benton	Sage	16.70 $\pm$ 2.6		nr	HEW-494-L
Richland, Eng. Club	08/21/45	Benton	Sagebrush	64.00 $\pm$ 4		nr	HEW-6660-T
Richland, Eng. Club	08/22/45	Benton	Sage	63.80 $\pm$ 3.6		nr	HEW-494-L
Richland, Geo. Wash. Way & Williams	08/08/45	Benton	Sage	18.70 $\pm$ 2.6		nr	HEW-494-L
Richland, Geo. Wash. Way N.W.	10/05/45	Benton	Sage	32.70 $\pm$ 2.5		nr	HEW-494-L
Richland, Geo. Wash. Way N.W.	10/17/45	Benton	Sage	29.50 $\pm$ 2.8		nr	HEW-494-L
Richland, Geo. Wash. Way S.W.	10/05/45	Benton	Sage	32.50 $\pm$ 2.3		nr	HEW-494-L
Richland, Geo. Wash. Way and Benham St.	08/08/45	Benton	Sage	19.40 $\pm$ 2.6		nr	HEW-494-L
Richland, Goethals and Benham	08/08/45	Benton	Sage	51.40 $\pm$ 3.4		nr	HEW-494-
Richland, Hunt Point	08/08/45	Benton	Sage	28.50 $\pm$ 2.9		nr	HEW-494-
Richland, Kadlec Hospital	09/21/45	Benton	Vegetation	nr	Max	0.220	HW-7-1115
Richland, Kadlec Hospital	10/03/45	Benton	Vegetation	nr		0.230	HW-7-1115
Richland, Kadlec Hospital	10/17/45	Benton	Vegetation	nr		0.230	HW-7-1115
Richland, Kadlec Hospital	12/20/45	Benton	Sagebrush	51.00 $\pm$ 4		0.300	HEW-6660-T
Richland, Kadlec Hospital	12/16/45	Benton	Sagebrush	259.00 $\pm$ 13		1.500	HEW-6660-T
Richland, Kadlec Hospital	12/03/45	Benton	Sagebrush	36.00 $\pm$ 3		nr	HEW-6660-T
Richland, Kadlec Hospital	11/30/45	Benton	Sagebrush	31.00 $\pm$ 3		nr	HEW-6660-T
Richland, Kadlec Hospital	11/23/45	Benton	Sagebrush	15.00 $\pm$ 2		0.073	HEW-6660-T
Richland, Kadlec Hospital	11/16/45	Benton	Sagebrush	13.00 $\pm$ 2		0.074	HEW-6660-T
Richland, Kadlec Hospital	11/10/45	Benton	Sagebrush	15.00 $\pm$ 2		0.086	HEW-6660-T
Richland, Kadlec Hospital	10/31/45	Benton	Sagebrush	29.00 $\pm$ 3		0.160	HEW-6660-T
Richland, Kadlec Hospital	10/26/45	Benton	Sagebrush	23.00 $\pm$ 3		nr	HEW-6660-T
Richland, Kadlec Hospital	10/17/45	Benton	Sagebrush	26.00 $\pm$ 2		0.150	HEW-6660-T
Richland, Kadlec Hospital	10/08/45	Benton	Sagebrush	41.00 $\pm$ 3		0.230	HEW-6660-T
Richland, Kadlec Hospital	10/04/45	Benton	Sagebrush	60.00 $\pm$ 4		nr	HEW-6660-T
Richland, Kadlec Hospital	09/19/45	Benton	Sagebrush	39.00 $\pm$ 3		nr	HEW-6660-T
Richland, Kadlec Hospital	10/24/45	Benton	Sagebrush	23.40 $\pm$ 2.6		nr	HEW-578-L
Richland, Kadlec Hospital	10/31/45	Benton	Sagebrush	29.40 $\pm$ 3		nr	HEW-578-L
Richland, Kadlec Hospital	11/05/45	Benton	Sagebrush	15.00 $\pm$ 2.1		nr	HEW-578-L
Richland, Kadlec Hospital	11/15/45	Benton	Sagebrush	12.70 $\pm$ 1.9		nr	HEW-578-L
Richland, Kadlec Hospital	11/23/45	Benton	Sagebrush	12.90 $\pm$ 1.7		nr	HEW-578-L
Richland, Kadlec Hospital	11/29/45	Benton	Sagebrush	31.40 $\pm$ 3.4		nr	HEW-578-L
Richland, Kadlec Hospital	12/05/45	Benton	Sagebrush	35.70 $\pm$ 3.4		nr	HEW-578-L
Richland, Kadlec Hospital	12/13/45	Benton	Sagebrush	258.80 $\pm$ 12.6		nr	HEW-578-L
Richland, Kadlec Hospital	12/20/45	Benton	Sagebrush	51.40 $\pm$ 3.8		nr	HEW-578-L
Richland, Kadlec Hospital	12/27/45	Benton	Sagebrush	159.10 $\pm$ 6.8		nr	HEW-578-L
Richland, Kadlec Hospital	08/08/45	Benton	Sage	15.10 $\pm$ 2.4		nr	HEW-494-L
Richland, Kadlec Hospital	10/17/45	Benton	Sage	26.00 $\pm$ 2.3		nr	HEW-494-L
Richland, Kadlec Hospital N.W.	10/05/45	Benton	Sage	60.30 $\pm$ 3.6		nr	HEW-494-L
Richland, N.	08/31/45	Benton	Vegetation	nr	Max	0.140	HW-7-1115

Table A.1. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Richland, N.	09/07/45	Benton	Vegetation	nr		0.260	HW-7-1115
Richland, N.	12/05/45	Benton	Vegetation	nr		1.300	HW-7-1115
Richland, N.	12/12/45	Benton	Vegetation	nr		0.540	HW-7-1115
Richland, N.E.	10/17/45	Benton	Vegetation	nr		0.350	HW-7-1115
Richland, N.E.	10/24/45	Benton	Vegetation	nr		0.130	HW-7-1115
Richland, N.E.	11/14/45	Benton	Vegetation	nr		0.500	HW-7-1115
Richland, N.E.	12/20/45	Benton	Sagebrush	323.00 $\pm$ 14		1.900	HEW-6660-T
Richland, N.E.	12/16/45	Benton	Sagebrush	116.00 $\pm$ 6		0.670	HEW-6660-T
Richland, N.E.	12/03/45	Benton	Sagebrush	80.00 $\pm$ 6		nr	HEW-6660-T
Richland, N.E.	11/30/45	Benton	Sagebrush	232.00 $\pm$ 12		nr	HEW-6660-T
Richland, N.E.	11/23/45	Benton	Sagebrush	11.00 $\pm$ 2		0.063	HEW-6660-T
Richland, N.E.	11/16/45	Benton	Sagebrush	57.00 $\pm$ 5		0.320	HEW-6660-T
Richland, N.E.	11/10/45	Benton	Sagebrush	88.00 $\pm$ 6		0.500	HEW-6660-T
Richland, N.E.	10/31/45	Benton	Sagebrush	13.00 $\pm$ 2		0.075	HEW-6660-T
Richland, N.E.	10/26/45	Benton	Sagebrush	27.00 $\pm$ 3		nr	HEW-6660-T
Richland, N.E.	10/08/45	Benton	Sagebrush	62.00 $\pm$ 4		nr	HEW-6660-T
Richland, N.E.	10/24/45	Benton	Sagebrush	27.00 $\pm$ 2.8		nr	HEW-578-L
Richland, N.E.	10/31/45	Benton	Sagebrush	12.90 $\pm$ 2.4		nr	HEW-578-L
Richland, N.E.	11/05/45	Benton	Sagebrush	88.20 $\pm$ 5.5		nr	HEW-578-L
Richland, N.E.	11/15/45	Benton	Sagebrush	56.80 $\pm$ 5		nr	HEW-578-L
Richland, N.E.	11/23/45	Benton	Sagebrush	11.40 $\pm$ 1.8		nr	HEW-578-L
Richland, N.E.	11/29/45	Benton	Sagebrush	232.20 $\pm$ 12		nr	HEW-578-L
Richland, N.E.	12/05/45	Benton	Sagebrush	80.40 $\pm$ 5.6		nr	HEW-578-L
Richland, N.E.	12/13/45	Benton	Sagebrush	116.20 $\pm$ 6.3		nr	HEW-578-L
Richland, N.E.	12/20/45	Benton	Sagebrush	322.80 $\pm$ 14		nr	HEW-578-L
Richland, N.E.	12/26/45	Benton	Sagebrush	179.70 $\pm$ 7.5		nr	HEW-578-L
Richland, N.E.	10/11/45	Benton	Sage	62.00 $\pm$ 2.8		nr	HEW-494-L
Richland, N.E., Airport	10/04/45	Benton	Sagebrush	47.00 $\pm$ 3		nr	HEW-6660-T
Richland, N.E., Airport	10/05/45	Benton	Sage	47.40 $\pm$ 2.8		nr	HEW-494-L
Richland, N.E., Airport	10/17/45	Benton	Sage	22.60 $\pm$ 2.3		nr	HEW-494-L
Richland, N.W.	10/17/45	Benton	Vegetation	nr		0.310	HW-7-1115
Richland, N.W.	10/24/45	Benton	Vegetation	nr		0.170	HW-7-1115
Richland, N.W.	11/21/45	Benton	Vegetation	nr		0.750	HW-7-1115
Richland, N.W.	12/19/45	Benton	Vegetation	nr		4.200	HW-7-1115
Richland, N.W.	12/20/45	Benton	Sagebrush	688.00 $\pm$ 20		4.000	HEW-6660-T
Richland, N.W.	12/16/45	Benton	Sagebrush	708.00 $\pm$ 21		4.200	HEW-6660-T
Richland, N.W.	12/03/45	Benton	Sagebrush	110.00 $\pm$ 6		nr	HEW-6660-T
Richland, N.W.	11/30/45	Benton	Sagebrush	221.00 $\pm$ 12		nr	HEW-6660-T
Richland, N.W.	11/23/45	Benton	Sagebrush	24.00 $\pm$ 3		0.140	HEW-6660-T
Richland, N.W.	11/16/45	Benton	Sagebrush	43.00 $\pm$ 4		0.250	HEW-6660-T
Richland, N.W.	11/10/45	Benton	Sagebrush	44.00 $\pm$ 4		0.250	HEW-6660-T
Richland, N.W.	10/31/45	Benton	Sagebrush	50.00 13		0.290	HEW-6660-T
Richland, N.W.	10/26/45	Benton	Sagebrush	25.00 $\pm$ 3		nr	HEW-6660-T
Richland, N.W.	10/17/45	Benton	Sagebrush	30.00 $\pm$ 3		0.170	HEW-6660-T
Richland, N.W.	10/08/45	Benton	Sagebrush	56.00 $\pm$ 3		nr	HEW-6660-T
Richland, N.W.	10/04/45	Benton	Sagebrush	33.00 $\pm$ 3		nr	HEW-6660-T

Table A.1. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Richland, N.W.	10/24/45	Benton	Sagebrush	25.40 $\pm$ 2.7		nr	HEW-578-L
Richland, N.W.	10/31/45	Benton	Sagebrush	49.50 $\pm$ 3.3		nr	HEW-578-L
Richland, N.W.	11/05/45	Benton	Sagebrush	43.80 $\pm$ 3.6		nr	HEW-578-L
Richland, N.W.	11/15/45	Benton	Sagebrush	43.30 $\pm$ 3.8		nr	HEW-578-L
Richland, N.W.	11/23/45	Benton	Sagebrush	24.20 $\pm$ 3.1		nr	HEW-578-L
Richland, N.W.	11/29/45	Benton	Sagebrush	221.40 $\pm$ 11.9		nr	HEW-578-L
Richland, N.W.	12/05/45	Benton	Sagebrush	110.40 $\pm$ 6.3		nr	HEW-578-L
Richland, N.W.	12/13/45	Benton	Sagebrush	707.50 $\pm$ 21		nr	HEW-578-L
Richland, N.W.	12/20/45	Benton	Sagebrush	687.60 $\pm$ 20		nr	HEW-578-L
Richland, N.W.	12/26/45	Benton	Sagebrush	214.90 $\pm$ 10.6		nr	HEW-578-L
Richland, N.W.	10/11/45	Benton	Sage	56.30 $\pm$ 3		nr	HEW-494-L
Richland, River Bank Behind Hotel	09/12/45	Benton	Sagebrush	17.00 $\pm$ 3		nr	HEW-6660-T
Richland, S.	08/10/45	Benton	Vegetation	51.00 $\pm$ 3	Max	nr	HW-7-1115
Richland, S.	09/07/45	Benton	Vegetation	nr		0.110	HW-7-1115
Richland, S.	12/05/45	Benton	Vegetation	nr		0.900	HW-7-1115
Richland, S.	12/12/45	Benton	Vegetation	nr		0.950	HW-7-1115
Richland, S.E.	09/28/45	Benton	Vegetation	nr		0.140	HW-7-1115
Richland, S.E.	10/17/45	Benton	Vegetation	nr		0.200	HW-7-1115
Richland, S.E.	10/24/45	Benton	Vegetation	nr		0.170	HW-7-1115
Richland, S.E.	10/31/45	Benton	Vegetation	nr		0.310	HW-7-1115
Richland, S.E.	11/07/45	Benton	Vegetation	nr		0.600	HW-7-1115
Richland, S.E.	11/28/45	Benton	Vegetation	nr		0.180	HW-7-1115
Richland, S.E.	12/19/45	Benton	Vegetation	nr		1.400	HW-7-1115
Richland, S.E.	12/20/45	Benton	Sagebrush	478.00 $\pm$ 15		3.800	HEW-6660-T
Richland, S.E.	12/16/45	Benton	Sagebrush	236.00 $\pm$ 12		1.400	HEW-6660-T
Richland, S.E.	12/03/45	Benton	Sagebrush	121.00 $\pm$ 7		nr	HEW-6660-T
Richland, S.E.	11/30/45	Benton	Sagebrush	200.00 $\pm$ 11		nr	HEW-6660-T
Richland, S.E.	11/23/45	Benton	Sagebrush	31.00 $\pm$ 3		0.180	HEW-6660-T
Richland, S.E.	11/16/45	Benton	Sagebrush	8.00 $\pm$ 2		0.045	HEW-6660-T
Richland, S.E.	11/10/45	Benton	Sagebrush	61.00 $\pm$ 5		0.350	HEW-6660-T
Richland, S.E.	10/31/45	Benton	Sagebrush	104.00 $\pm$ 5		0.600	HEW-6660-T
Richland, S.E.	10/26/45	Benton	Sagebrush	54.00 $\pm$ 3		nr	HEW-6660-T
Richland, S.E.	10/17/45	Benton	Sagebrush	31.00 $\pm$ 2		0.170	HEW-6660-T
Richland, S.E.	10/08/45	Benton	Sagebrush	36.00 $\pm$ 3		nr	HEW-6660-T
Richland, S.E.	10/04/45	Benton	Sagebrush	50.00 $\pm$ 3		nr	HEW-6660-T
Richland, S.E.	08/28/45	Benton	Sagebrush	14.00 $\pm$ 3		nr	HEW-6660-T
Richland, S.E.	10/24/45	Benton	Sagebrush	54.40 $\pm$ 3.4		nr	HEW-578-L
Richland, S.E.	10/31/45	Benton	Sagebrush	103.50 $\pm$ 4.5		nr	HEW-578-L
Richland, S.E.	11/05/45	Benton	Sagebrush	60.50 $\pm$ 5.1		nr	HEW-578-L
Richland, S.E.	11/15/45	Benton	Sagebrush	8.10 $\pm$ 1.9		nr	HEW-578-L
Richland, S.E.	11/23/45	Benton	Sagebrush	30.80 $\pm$ 3.2		nr	HEW-578-L
Richland, S.E.	12/29/45	Benton	Sagebrush	200.40 $\pm$ 10.9		nr	HEW-578-L
Richland, S.E.	12/05/45	Benton	Sagebrush	121.10 $\pm$ 6.5		nr	HEW-578-L
Richland, S.E.	12/13/45	Benton	Sagebrush	235.60 $\pm$ 12		nr	HEW-578-L
Richland, S.E.	12/20/45	Benton	Sagebrush	478.30 $\pm$ 15		nr	HEW-578-L

Table A.1. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Richland, S.E.	12/26/45	Benton	Sagebrush	33.40 $\pm$ 3.2		nr	HEW-578-L
Richland, S.E.	08/29/45	Benton	Sage	14.20 $\pm$ 2.5		nr	HEW-494-L
Richland, S.E.	09/27/45	Benton	Sage	37.50 $\pm$ 3		nr	HEW-494-L
Richland, S.E.	10/11/45	Benton	Sage	36.00 $\pm$ 3.2		nr	HEW-494-L
Richland, S.E., at Yakima River Bridge	09/26/45	Benton	Sagebrush	38.00 $\pm$ 3		nr	HEW-6660-T
Richland, S.W.	10/17/45	Benton	Vegetation	nr		0.180	HW-7-1115
Richland, S.W.	10/24/45	Benton	Vegetation	nr		0.097	HW-7-1115
Richland, S.W.	12/20/45	Benton	Sagebrush	335.00 $\pm$ 14		2.000	HEW-6660-T
Richland, S.W.	12/16/45	Benton	Sagebrush	154.00 $\pm$ 7		0.900	HEW-6660-T
Richland, S.W.	12/03/45	Benton	Sagebrush	214.00 $\pm$ 9		nr	HEW-6660-T
Richland, S.W.	11/30/45	Benton	Sagebrush	122.00 $\pm$ 7		nr	HEW-6660-T
Richland, S.W.	11/23/45	Benton	Sagebrush	9.00 $\pm$ 2		0.051	HEW-6660-T
Richland, S.W.	11/16/45	Benton	Sagebrush	20.00 $\pm$ 3		0.110	HEW-6660-T
Richland, S.W.	11/10/45	Benton	Sagebrush	17.00 $\pm$ 2		0.100	HEW-6660-T
Richland, S.W.	10/31/45	Benton	Sagebrush	27.00 $\pm$ 3		0.150	HEW-6660-T
Richland, S.W.	10/26/45	Benton	Sagebrush	23.00 $\pm$ 2		nr	HEW-6660-T
Richland, S.W.	10/17/45	Benton	Sagebrush	17.00 $\pm$ 2		0.097	HEW-6660-T
Richland, S.W.	10/08/45	Benton	Sagebrush	32.00 $\pm$ 3		nr	HEW-6660-T
Richland, S.W.	10/04/45	Benton	Sagebrush	33.00 $\pm$ 3		nr	HEW-6660-T
Richland, S.W.	09/26/45	Benton	Sagebrush	14.00 $\pm$ 2		nr	HEW-6660-T
Richland, S.W.	08/28/45	Benton	Sagebrush	17.00 $\pm$ 3		nr	HEW-6660-T
Richland, S.W.	10/24/45	Benton	Sagebrush	23.00 $\pm$ 1.8		nr	HEW-578-L
Richland, S.W.	10/31/45	Benton	Sagebrush	26.90 $\pm$ 3		nr	HEW-578-L
Richland, S.W.	11/05/45	Benton	Sagebrush	17.10 $\pm$ 2		nr	HEW-578-L
Richland, S.W.	11/15/45	Benton	Sagebrush	20.00 $\pm$ 2.7		nr	HEW-578-L
Richland, S.W.	11/23/45	Benton	Sagebrush	9.00 $\pm$ 2.1		nr	HEW-578-L
Richland, S.W.	11/29/45	Benton	Sagebrush	121.80 $\pm$ 6.5		nr	HEW-578-L
Richland, S.W.	12/05/45	Benton	Sagebrush	213.70 $\pm$ 9.3		nr	HEW-578-L
Richland, S.W.	12/12/45	Benton	Sagebrush	153.50 $\pm$ 6.9		nr	HEW-578-L
Richland, S.W.	12/20/45	Benton	Sagebrush	335.00 $\pm$ 14		nr	HEW-578-L
Richland, S.W.	12/27/45	Benton	Sagebrush	585.00 $\pm$ 18.6		nr	HEW-578-L
Richland, S.W.	08/29/45	Benton	Sage	17.00 $\pm$ 2.6		nr	HEW-494-L
Richland, S.W.	09/27/45	Benton	Sage	15.50 $\pm$ 2.4		nr	HEW-494-L
Richland, S.W.	10/11/45	Benton	Sage	32.30 $\pm$ 2.6		nr	HEW-494-L
Richland, Swift and Willard St.	08/08/45	Benton	Sage	14.50 $\pm$ 2.4		nr	HEW-494-L
Richland, Symons at Columbia River	09/19/45	Benton	Sagebrush	24.00 $\pm$ 3		nr	HEW-6660-T
Richland, Thayer & Geo. Wash. Way S.W.	10/17/45	Benton	Sage	16.80 $\pm$ 2.3		nr	HEW-494-L
Richland, Thayer & Hoffman St.	08/08/45	Benton	Sage	30.50 $\pm$ 3.9		nr	HEW-494-L
Richland, Thayer Drive	10/05/45	Benton	Sage	49.30 $\pm$ 2.8		nr	HEW-494-L
Richland, Thayer Drive S.E.	10/18/45	Benton	Sage	30.50 $\pm$ 2.2		nr	HEW-494-L
Richland, Van Geisen & Geo. Wash. Way	09/14/45	Benton	Vegetation	nr		0.180	HW-7-1115
Richland, Van Geisen & Goethals	09/19/45	Benton	Sagebrush	11.00 $\pm$ 2		nr	HEW-6660-T

Table A.1. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Richland, Van Geisen & Perkins	08/03/45	Benton	Sagebrush	50.00 $\pm$ 4		nr	HW-7-1115
Richland, Van Geisen & Perkins	09/12/45	Benton	Sagebrush	7.00 $\pm$ 2		nr	HEW-6660-T
Richland, Van Geisen & Thayer	09/19/45	Benton	Sagebrush	25.00 $\pm$ 3		nr	HEW-6660-T
Richland, Van Giesen & Bus Terminal	08/21/45	Benton	Sagebrush	35.00 $\pm$ 3		nr	HEW-6660-T
Richland, Van Giesen & Geo. Wash. Way	09/12/45	Benton	Sagebrush	35.00 $\pm$ 3		nr	HEW-6660-T
Richland, Van Giesen & Geo. Wash. Way	09/12/45	Benton	Sage	35.30 $\pm$ 3		nr	HEW-494-L
Richland, Van Giesen & Perkins	09/12/45	Benton	Sage	7.30 $\pm$ 2.3		nr	HEW-494-L
Richland, Van Giesen & Perkins	08/02/45	Benton	Sage	9.30 $\pm$ 2.4		nr	HEW-494-L
Richland, Van Giesen & Stevens	08/08/45	Benton	Sage	23.50 $\pm$ 2.8		nr	HEW-494-L
Richland, Williams Blvd.	09/12/45	Benton	Sagebrush	13.00 $\pm$ 2		nr	HEW-6660-T
Richland, Williams Blvd.	09/12/45	Benton	Sage	12.80 $\pm$ 2.4		nr	HEW-494-L
Sunnyside, WA.	12/12/45	Yakima	Vegetation	nr		0.034	HW-7-1115
Sunnyside, WA.	12/03/45	Yakima	Sagebrush	6.00 $\pm$ 2		nr	HEW-6660-T
Sunnyside, WA.	12/07/45	Yakima	Sagebrush	5.90 $\pm$ 1.8		nr	HEW-578-L
Sunnyside, WA., 5 miles E.	12/12/45	Yakima	Vegetation	nr		0.310	HW-7-1115
Sunnyside, WA., 5 miles E.	12/03/45	Yakima	Sagebrush	56.00 $\pm$ 5		nr	HEW-6660-T
Sunnyside, WA., 5 miles E.	12/07/45	Yakima	Sagebrush	56.40 $\pm$ 5		nr	HEW-578-L
Van Giesen, Bus Terminal	08/21/45	Benton	Sage	43.90 $\pm$ 2.9		nr	HEW-494-L
Van Giesen, Mile 1	09/26/45	Benton	Sagebrush	24.00 $\pm$ 3		nr	HEW-6660-T
Van Giesen, Mile 1	08/28/45	Benton	Sagebrush	25.00 $\pm$ 3		nr	HEW-6660-T
Van Giesen, Mile 1	08/14/45	Benton	Sagebrush	29.00 $\pm$ 3		nr	HEW-6660-T
Van Giesen, Mile 1	07/27/45	Benton	Sagebrush	nr $\pm$ 3		nr	HEW-6660-T
Van Giesen, Mile 1	08/17/45	Benton	Sage	29.10 $\pm$ 2.8		nr	HEW-494-L
Van Giesen, Mile 1	08/29/45	Benton	Sage	24.80 $\pm$ 2.8		nr	HEW-494-L
Van Giesen, Mile 1	09/27/45	Benton	Sage	24.10 $\pm$ 2.8		nr	HEW-494-L
Van Giesen, Mile 2	09/26/45	Benton	Sagebrush	11.00 $\pm$ 2		nr	HEW-6660-T
Van Giesen, Mile 2	08/28/45	Benton	Sagebrush	26.00 $\pm$ 3		nr	HEW-6660-T
Van Giesen, Mile 2	08/14/45	Benton	Sagebrush	47.00 $\pm$ 3		nr	HEW-6660-T
Van Giesen, Mile 2	07/27/45	Benton	Sagebrush	9.00 $\pm$ 3		mr	HEW-6660-T
Van Giesen, Mile 2	08/14/45	Benton	Sage	46.90 $\pm$ 3		nr	HEW-494-L
Van Giesen, Mile 2	08/29/45	Benton	Sage	26.00 $\pm$ 2.8		nr	HEW-494-L
Van Giesen, Mile 2	09/27/45	Benton	Sage	11.30 $\pm$ 2.4		nr	HEW-494-L
Van Giesen, Mile 3	09/26/45	Benton	Sagebrush	11.00 $\pm$ 2		nr	HEW-6660-T
Van Giesen, Mile 3	08/28/45	Benton	Sagebrush	22.00 $\pm$ 3		nr	HEW-6660-T
Van Giesen, Mile 3	08/14/45	Benton	Sagebrush	28.00 $\pm$ 3		nr	HEW-6660-T
Van Giesen, Mile 3	07/27/45	Benton	Sagebrush	3.00 $\pm$ 2		nr	HEW-6660-T
Van Giesen, Mile 3	08/17/45	Benton	Sage	28.30 $\pm$ 2.8		nr	HEW-494-L
Van Giesen, Mile 3	08/30/45	Benton	Sage	22.00 $\pm$ 2.7		nr	HEW-494-L
Van Giesen, Mile 3	09/27/45	Benton	Sage	10.90 $\pm$ 2.4		nr	HEW-494-L
Van Giesen, Near Yakima Bridge	08/02/45	Benton	Sage	65.60 $\pm$ 2.6		nr	HEW-494-L
Van Giesen, Riding Stables	08/02/45	Benton	Sage	76.00 $\pm$ 3.2		nr	HEW-494-L
Walla Walla	11/30/45	Walla Walla	Vegetation	nr		0.180	HW-7-1228 DEL
Walla Walla, 9th Ave.	11/16/45	Walla Walla	Sagebrush	16.00 $\pm$ 3		0.091	HEW-6660-T

Table A.1. (contd)

<u>Sampling Location</u>	<u>Date</u>	<u>County</u>	<u>Sample Type</u>	<u>CPM +/-1 SD</u>	<u>Notes</u>	<u>Reported $\mu\text{Ci/kg}$</u>	<u>Reference</u>
Walla Walla, 9th Ave.	11/14/45	Walla Walla	Sagebrush	15.50 $\pm$ 3.1		nr	HEW-578-L
Walla Walla, N.W.	11/21/45	Walla Walla	Vegetation	nr		0.180	HW-7-1115
Walla Walla, Penitentiary	11/16/45	Walla Walla	Sagebrush	31.00 $\pm$ 3		0.180	HEW-6660-T
Walla Walla, Penitentiary	11/14/45	Walla Walla	Sagebrush	30.60 $\pm$ 3.4		nr	HEW-578-L
Walla Walla, central	11/21/45	Walla Walla	Vegetation	nr		0.091	HW-7-1115
Walla Walla, WA.	10/31/45	Walla Walla	Sagebrush	nr		0.140	HW-7-1228 DEL
Walla Walla, WA.	10/31/45	Walla Walla	Vegetation	nr		0.140	HW-7-1115
Walla Walla, WA., on US-410	10/26/45	Walla Walla	Sagebrush	25.00 $\pm$ 3		nr	HEW-6660-T
Walla Walla, WA., on US-410	10/23/45	Walla Walla	Sagebrush	24.50 $\pm$ 2.8		nr	HEW-578-L
Yakima Barricade, 10 miles W.	12/03/45	Yakima	Sagebrush	20.00 $\pm$ 3		nr	HEW-6660-T
Yakima Barricade, 10 miles W.	12/07/45	Yakima	Sagebrush	20.20 $\pm$ 3.2		nr	HEW-578-L
Yakima Barricade, 15 miles S.W.	12/03/45	Yakima	Sagebrush	16.00 $\pm$ 3		nr	HEW-6660-T
Yakima Barricade, 15 miles S.W.	12/07/45	Yakima	Sagebrush	16.00 $\pm$ 2.9		nr	HEW-578-L

Table A.2. 1946 Iodine-131 Vegetation Contamination Data from Locations Surrounding the Hanford Site

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
200 Areas, 45 Miles N.E. of	01/31/46	Adams	Vegetation	nr		0.200	HW-7-3322
Benson Ranch	07/24/46	Benton	Vegetation	nr		0.070	HW-7-4440
Benson Ranch	04/26/46	Benton	Cheat Grass	5.00 $\pm$ 1		nr	HEW-616-T
Benson Ranch	05/07/46	Benton	Vegetation	6.00 $\pm$ 2		nr	HEW-616-T
Benson Ranch	05/15/46	Benton	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Benson Ranch	01/22/46	Benton	Sage	28.00		0.180	HEW-584-L
Benson Ranch, 1 Mile S.	04/17/46	Benton	Green Sage	4.00 $\pm$ 2		nr	HEW-616-T
Benson Ranch, 1 Mile S. of House	04/17/46	Benton	Vegetation	13.00 $\pm$ 3		nr	HEW-616-T
Benson Ranch, 1 Mile S. of House	04/17/46	Benton	Vegetation	8.00 $\pm$ 2		nr	HEW-616-T
Benson Ranch, 12 Miles S.	01/22/46	Benton	Sage	42.00		0.270	HEW-584-L
Benson Ranch, 15 Miles S.	01/22/46	Benton	Sage	48.00		0.300	HEW-584-L
Benson Ranch, 16 Miles S.	01/22/46	Benton	Sage	66.00		0.420	HEW-584-L
Benson Ranch, 3 Miles S.	01/22/46	Benton	Sage	45.00		0.280	HEW-584-L
Benson Ranch, 6 Miles S.	01/22/46	Benton	Sage	28.00		0.180	HEW-584-L
Benson Ranch, 9 Miles S.	01/22/46	Benton	Sage	43.00		0.270	HEW-584-L
Benson Ranch, N. Gate	04/03/46	Benton	D Oak Weed	17.00 $\pm$ 2		nr	HEW-616-T
Benson Ranch, N. Gate	04/17/46	Benton	Vegetation	25.00 $\pm$ 3		nr	HEW-616-T
Benson Ranch, N. Gate	04/17/46	Benton	Vegetation	12.00 $\pm$ 3		nr	HEW-616-T
Benson Ranch, N. Gate	04/17/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Benson Ranch, Road Fence	04/17/46	Benton	Vegetation	12.00 $\pm$ 2		nr	HEW-616-T
Benson Ranch, Road Fence	04/17/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Benson Ranch, Road Fence	04/17/46	Benton	Dead Grass	3.00 $\pm$ 2		nr	HEW-616-T
Benson Ranch, S., at Foot of Rattlesnake	04/17/46	Benton	Vegetation	7.00 $\pm$ 2		nr	HEW-616-T
Benson Ranch, S., at Foot of Rattlesnake	04/17/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Benson Ranch, S., at Foot of Rattlesnake	04/17/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Benson Ranch, Well	04/03/46	Benton	Cheat Grass	10.00 $\pm$ 2		nr	HEW-616-T
Benson Ranch, Well	04/17/46	Benton	Vegetation	7.00 $\pm$ 2		nr	HEW-616-T
Benson Ranch, Well	04/17/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Benson Ranch, Well	04/17/46	Benton	Sage	3.00 $\pm$ 2		nr	HEW-616-T
Benton City	03/31/46	Benton	Vegetation	nr	Avg	0.270	HW-7-3694
Benton City	04/30/46	Benton	Vegetation	nr	Avg	0.200	HW-7-3933
Benton City	02/28/46	Benton	Vegetation	nr		0.700	HW-7-3517
Benton City	01/31/46	Benton	Vegetation	nr		0.690	HW-7-3322
Benton City	06/30/46	Benton	Vegetation	nr	Avg	0.130	HW-7-4312
Benton City	07/31/46	Benton	Vegetation	nr	Avg	0.070	HW-7-4474
Benton City	05/31/46	Benton	Vegetation	nr	Avg	0.050	HW-7-4312
Benton City	08/31/46	Benton	Vegetation	nr		0.060	HW-7-4699
Benton City	09/30/46	Benton	Vegetation	nr		0.070	HW-7-5145
Benton City	10/31/46	Benton	Vegetation	nr	Avg	0.090	HW-7-5301
Benton City	11/30/46	Benton	Vegetation	nr	Avg	0.060	HW-7-5428
Benton City	12/31/46	Benton	Vegetation	nr	Avg	0.310	HW-7-5605
Benton City	09/30/46	Benton	Vegetation	nr	Max	0.110	HW-7-5042

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Benton City	09/30/46	Benton	Vegetation	nr	Avg	0.080	HW-7-5042
Benton City	10/16/46	Benton	Vegetation	nr	Max	0.140	HW-7-5042
Benton City	10/16/46	Benton	Vegetation	nr	Avg	0.100	HW-7-5042
Benton City	10/31/46	Benton	Vegetation	nr	Max	0.100	HW-7-5042
Benton City	10/31/46	Benton	Vegetation	nr	Avg	0.070	HW-7-5042
Benton City	11/19/46	Benton	Vegetation	nr	Max	0.140	HW-7-5042
Benton City	11/19/46	Benton	Vegetation	nr	Avg	0.060	HW-7-5042
Benton City	11/30/46	Benton	Vegetation	nr	Max	0.120	HW-7-5042
Benton City	11/30/46	Benton	Vegetation	nr	Avg	0.070	HW-7-5042
Benton City	12/16/46	Benton	Vegetation	nr	Max	0.610	HW-7-5042
Benton City	12/16/46	Benton	Vegetation	nr	Avg	0.330	HW-7-5042
Benton City	12/31/46	Benton	Vegetation	nr	Max	0.630	HW-7-5042
Benton City	12/31/46	Benton	Vegetation	nr	Avg	0.300	HW-7-5042
Benton City	01/03/46	Benton	Sagebrush	202.70 $\pm$ 11		nr	HEW-578-L
Benton City	01/09/46	Benton	Sagebrush	119.30 $\pm$ 6.4		nr	HEW-578-L
Benton City	01/16/46	Benton	Vegetation	102.40 $\pm$ 5.9		0.600	HEW-616-T
Benton City	01/23/46	Benton	Vegetation	72.10 $\pm$ 4.8		0.400	HEW-616-T
Benton City	01/30/46	Benton	Vegetation	69.00 $\pm$ 5		1.200	HEW-616-T
Benton City	02/06/46	Benton	Vegetation	39.00 $\pm$ 4		0.700	HEW-616-T
Benton City	02/13/46	Benton	Vegetation	30.00 $\pm$ 2		0.510	HEW-616-T
Benton City	03/06/46	Benton	Vegetation	2.00 $\pm$ 1		nr	HEW-616-T
Benton City	05/07/46	Benton	Green Asp.	0.0		nr	HEW-616-T
Benton City	04/15/46	Benton	Vegetation	27.00 $\pm$ 2		nr	HEW-616-T
Benton City N., 614 Bldg.	05/13/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Benton City, 0.5 Miles S. of 614 Bldg.	04/29/46	Benton	Vegetation	4.00 $\pm$ 1		nr	HEW-616-T
Benton City, 2 Miles S. of 614 Bldg.	04/08/46	Benton	Green	14.00 $\pm$ 3		nr	HEW-616-T
Benton City, 2 Miles W. on Van Giesen	04/19/46	Benton	Vegetation	6.00 $\pm$ 2		nr	HEW-616-T
Benton City, 2 Miles from 614 Bldg.	03/20/46	Benton	Green	5.00 $\pm$ 1		nr	HEW-616-T
Benton City, 3 Miles E. of Van Giesen Intersection	06/04/46	Benton	Vegetation	0.0		nr	HEW-616-T
Benton City, 3 Miles W. on Van Giesen	06/25/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Benton City, 4 Miles W. on Van Giesen	04/19/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Benton City, 6 Miles E. of Van Giesen Intersection	06/04/46	Benton	Vegetation	0.0		nr	HEW-616-T
Benton City, 6 Miles W. on Van Giesen	06/25/46	Benton	Vegetation	0.0		nr	HEW-616-T
Benton City, 6 Miles W. on Van Giesen	04/19/46	Benton	Vegetation	6.00 $\pm$ 2		nr	HEW-616-T
Benton City, 614 Bldg	06/25/46	Benton	Vegetation	10.00 $\pm$ 2		nr	HEW-616-T
Benton City, 614 Bldg.	02/20/46	Benton	Vegetation	10.00 $\pm$ 2		nr	HEW-616-T
Benton City, 614 Bldg.	03/06/46	Benton	Vegetation	4.00 $\pm$ 1		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Benton City, 614 Bldg.	03/13/46	Benton	Cheat Or.	25.00 $\pm$ 3		nr	HEW-616-T
Benton City, 614 Bldg.	03/20/46	Benton	Vegetation	11.00 $\pm$ 2		nr	HEW-616-T
Benton City, 614 Bldg.	04/01/46	Benton	Green Sage	25.00 $\pm$ 2		nr	HEW-616-T
Benton City, 614 Bldg.	04/08/46	Benton	Green	4.00 $\pm$ 2		nr	HEW-616-T
Benton City, 614 Bldg.	04/15/46	Benton	Vegetation	4.00 $\pm$ 1		nr	HEW-616-T
Benton City, 614 Bldg.	04/22/46	Benton	Vegetation	5.00 $\pm$ 1		nr	HEW-616-T
Benton City, 614 Bldg.	04/29/46	Benton	Green	0.0 $\pm$ 1		nr	HEW-616-T
Benton City, 614 Bldg.	05/06/46	Benton	Vegetation	0.0 $\pm$ 1		nr	HEW-616-T
Benton City, 614 Bldg.	06/04/46	Benton	Vegetation	7.00 $\pm$ 2		nr	HEW-616-T
Benton City, 614 Bldg.	07/16/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Benton City, 614 Bldg.	08/06/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Benton City, 7 Miles E. on Van Giesen	05/14/46	Benton	Vegetation	1.00 $\pm$ 1		nr	HEW-616-T
Benton City, 8 Miles W. on Van Giesen	04/19/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Benton City, 9 Miles E. on Van Giesen	05/14/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Benton City, 9 Miles E. on Van Giesen	06/04/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Benton City, 9 Miles W. on Van Giesen	06/25/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Benton City, Grange Hill	03/13/46	Benton	Dead Weed	21.00 $\pm$ 3		nr	HEW-616-T
Benton City, High School	03/13/46	Benton	D Wt Fl Wd	23.00 $\pm$ 3		nr	HEW-616-T
Benton City, High School	04/01/46	Benton	Green Sage	17.00 $\pm$ 2		nr	HEW-616-T
Benton City, High School	04/22/46	Benton	Vegetation	4.00 $\pm$ 1		nr	HEW-616-T
Benton City, High School	05/13/46	Benton	Vegetation	8.00 $\pm$ 1		nr	HEW-616-T
Benton City, High School	06/04/46	Benton	Vegetation	7.00 $\pm$ 2		nr	HEW-616-T
Benton City, High School	06/25/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Benton City, High School	07/16/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Benton City, High School	08/06/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Benton City, Intersection with Van Giesen	06/04/46	Benton	Vegetation	7.00 $\pm$ 2		nr	HEW-616-T
Benton City, N, 614 Bldg.	07/24/46	Benton	Vegetation	nr	<	0.040	HW-7-4440
Benton City, N.	05/20/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Benton City, N.	05/28/46	Benton	Vegetation	10.00 $\pm$ 2		nr	HEW-616-T
Benton City, N.	06/18/46	Benton	Vegetation	10.00 $\pm$ 2		nr	HEW-616-T
Benton City, N.	07/02/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Benton City, N.	07/09/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Benton City, N.	07/23/46	Benton	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Benton City, N.	07/30/46	Benton	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Benton City, N. 614 Bldg.	07/17/46	Benton	Vegetation	nr		0.070	HW-7-4423
Benton City, N. 614 Bldg.	09/18/46	Benton	Vegetation	nr	Max	0.070	HW-7-5042
Benton City, N. 614 Bldg.	09/18/46	Benton	Vegetation	nr	Avg	0.050	HW-7-5042
Benton City, N. E.	06/12/46	Benton	Cherry Lvs	5.00 $\pm$ 2		nr	HEW-616-T
Benton City, N.E.	06/12/46	Benton	Cherry	2.00 $\pm$ 2		nr	HEW-616-T
Benton City, Post Office	02/20/46	Benton	Vegetation	20.00 $\pm$ 2		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Benton City, R.R. Trestle 4 Mi. E. on Van Giesen	05/14/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Benton City, S.	07/24/46	Benton	Vegetation	nr	<	0.040	HW-7-4440
Benton City, S.	07/17/46	Benton	Vegetation	nr		0.070	HW-7-4423
Benton City, S.	09/18/46	Benton	Vegetation	nr	Max	0.090	HW-7-5042
Benton City, S.	09/18/46	Benton	Vegetation	nr	Avg	0.080	HW-7-5042
Benton City, S.	05/20/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Benton City, S.	05/28/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Benton City, S.	06/17/46	Benton	Vegetation	8.00 $\pm$ 2		nr	HEW-616-T
Benton City, S.	07/02/46	Benton	Vegetation	0.0 $\pm$ 3		nr	HEW-616-T
Benton City, S.	07/09/46	Benton	Vegetation	16.00 $\pm$ 3		nr	HEW-616-T
Benton City, S.	07/23/46	Benton	Vegetation	1.00 $\pm$ 3		nr	HEW-616-T
Benton City, S.	07/30/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Benton City, Van Giesen Intersection	05/14/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Benton City, Van Giesen Intersection	06/25/46	Benton	Vegetation	6.00 $\pm$ 2		nr	HEW-616-T
Benton City, Van Giesen Intersection	08/06/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Benton City, Van Giesen Intersection	04/19/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Benton City, Yakima Bridge	05/06/46	Benton	Vegetation	0.0 $\pm$ 1		nr	HEW-616-T
Bingen +15 Miles, 15 ft. Above Water Level	02/09/46	Klickitat	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
Bingen +5 Miles, 2.5 ft. Above Water Level	02/09/46	Klickitat	Vegetation	1.00 $\pm$ 2	<	0.040	HEW-616-T
Bonneville +17 Miles, 200 ft. Above Water Level	02/09/46	Multnomah	Vegetation	0.0 $\pm$ 2	<	0.040	HEW-616-T
Bonneville Dam	02/09/46	Multnomah	Vegetation	1.00 $\pm$ 2	<	0.040	HEW-616-T
Bonneville Dam +10 Miles, Highway 30	02/09/46	Multnomah	Vegetation	0.0 $\pm$ 2	<	0.040	HEW-616-T
Bonneville Dam +20 Miles, 100 ft. Above Water Level	02/09/46	Multnomah	Vegetation	0.0 $\pm$ 2	<	0.040	HEW-616-T
Calfon Hill, 10 Miles thru	02/09/46	Whitman	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
Calfon Hill, 20 Miles thru	02/09/46	Whitman	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
Camas +10 Miles, 100 ft. Above Water Level	02/09/46	Clark	Vegetation	nr $\pm$ 2	<	0.040	HEW-616-T
Camas, W. End of Town	02/09/46	Clark	Vegetation	1.00 $\pm$ 2	<	0.040	HEW-616-T
Cashmere +16 Miles	04/24/46	Douglas	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Cashmere +26 Miles	04/24/46	Douglas	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Cashmere +36 Miles	04/24/46	Douglas	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Cashmere +46 Miles	04/24/46	Douglas	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Cashmere +56 Miles	04/24/46	Douglas	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Cashmere +6 Miles	04/24/46	Douglas	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Cheney	04/23/46	Spokane	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Cheney +10 Miles	04/23/46	Spokane	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Cobbs Corner, 10 Miles from, on Van Giesen	05/07/46	Benton	Vegetation	0.0 $\pm$ 1		nr	HEW-616-T
Cobbs Corner, 2 Miles from, on Van Giesen	05/07/46	Benton	Vegetation	7.00 $\pm$ 1		nr	HEW-616-T
Cobbs Corner, 5 Miles from, on Van Giesen	05/07/46	Benton	Vegetation	7.00 $\pm$ 1		nr	HEW-616-T
Colfax S+10 Miles	04/13/46	Whitman	Vegetation	2.00 $\pm$ 3		nr	HEW-616-T
Colfax S+50 Miles	04/13/46	Whitman	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Colfax S+60 Miles	04/13/46	Whitman	Vegetation	4.00 $\pm$ 3		nr	HEW-616-T
Colfax S+70 Miles	04/13/46	Whitman	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Colfax S+80 Miles	04/13/46	Whitman	Vegetation	7.00 $\pm$ 3		nr	HEW-616-T
Colfax S+90 Miles	04/13/46	Whitman	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Colfax S-20	04/13/46	Whitman	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Colfax S-30	04/13/46	Whitman	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Colfax S-40	04/13/46	Whitman	Vegetation	2.00 $\pm$ 3		nr	HEW-616-T
Colored Mess Hall, "B" St.	04/17/46	Benton	Dead Weed	45.00 $\pm$ 3		0.770	HEW-652-L
Columbia Camp	07/24/46	Benton	Vegetation	nr	<	0.040	HW-7-4440
Columbia Camp	07/17/46	Benton	Vegetation	nr		0.090	HW-7-4423
Columbia Camp	09/18/46	Benton	Vegetation	nr	Max	0.170	HW-7-5042
Columbia Camp	09/18/46	Benton	Vegetation	nr	Avg	0.100	HW-7-5042
Columbia Camp	01/23/46	Benton	Vegetation	38.40 $\pm$ 4.1		0.210	HEW-616-T
Columbia Camp	02/13/46	Benton	Vegetation	33.00 $\pm$ 3		0.560	HEW-616-T
Columbia Camp	02/20/46	Benton	Vegetation	15.00 $\pm$ 2		nr	HEW-616-T
Columbia Camp	03/13/46	Benton	Cheat Grass	42.00 $\pm$ 4		nr	HEW-616-T
Columbia Camp	03/20/46	Benton	Green	9.00 $\pm$ 2		nr	HEW-616-T
Columbia Camp	04/01/46	Benton	Yel Flower	9.00 $\pm$ 2		nr	HEW-616-T
Columbia Camp	04/08/46	Benton	Green	6.00 $\pm$ 2		nr	HEW-616-T
Columbia Camp	04/15/46	Benton	Vegetation	9.00 $\pm$ 1		nr	HEW-616-T
Columbia Camp	04/22/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Columbia Camp	04/29/46	Benton	Green Sage	6.00 $\pm$ 1		nr	HEW-616-T
Columbia Camp	05/06/46	Benton	Vegetation	5.00 $\pm$ 1		nr	HEW-616-T
Columbia Camp	05/13/46	Benton	Vegetation	8.00 $\pm$ 1		nr	HEW-616-T
Connell	02/28/46	Franklin	Vegetation	nr		0.040	HW-7-3517
Connell	01/31/46	Franklin	Vegetation	nr		0.240	HW-7-3322
Connell +17 Miles	04/23/46	Franklin	Vegetation	7.00 $\pm$ 2		nr	HEW-616-T
Connell +24 Miles	04/23/46	Franklin	Vegetation	1.00 $\pm$ 3		nr	HEW-616-T
Connell +4 Miles	04/23/46	Franklin	Vegetation	8.00 $\pm$ 2		nr	HEW-616-T
Coulee Dam +10 Miles	04/23/46	Okanogan	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Coulee Dam +20 Miles	04/23/46	Okanogan	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Coulee Dam +30 Miles	04/24/46	Okanogan	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Coulee Dam +40 Miles	04/24/46	Okanogan	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Coulee Dam +50 Miles	04/24/46	Okanogan	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Dayton, 18 Miles N. on US-410	01/12/46	Columbia	Vegetation	1.70 $\pm$ 2.3		nr	HEW-616-T
Dayton, 48 Miles N. on US-295	01/12/46	Whitman	Vegetation	2.40 $\pm$ 2.3		nr	HEW-616-T
Dayton, 8 Miles N. on US-410	01/12/46	Columbia	Vegetation	0.0 $\pm$ 2.4		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Dixie Valley, 7 Miles N. on US-410	01/12/46	Walla Walla	Vegetation	0.80 $\pm$ 2.3		nr	HEW-616-T
Dusty Valley, 4 Miles W. on Rt. 11-B	01/12/46	Whitman	Vegetation	4.60 $\pm$ 2.3		nr	HEW-616-T
Dusty Valley, N.W. of, on Rt. 11-B	01/12/46	Whitman	Vegetation	5.80 $\pm$ 2.4		nr	HEW-616-T
Ellensburg +14 Miles	04/24/46	Kittitas	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Ellensburg +24 Miles	04/24/46	Kittitas	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Ellensburg +34 Miles	04/24/46	Kittitas	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Ellensburg +4 Miles	04/24/46	Kittitas	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Ellensburg, Outskirts	01/12/46	Kittitas	Vegetation	1.00 $\pm$ 2.3		nr	HEW-616-T
Ephrata	04/24/46	Grant	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Ephrata +10 Miles	04/24/46	Grant	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Ephrata +20 Miles	04/24/46	Grant	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Ephrata +30 Miles	04/24/46	Grant	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Ephrata +40 Miles	04/24/46	Grant	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Foster Ranch	09/18/46	Franklin	Vegetation	nr	Max	0.220	HW-7-5042
Foster Ranch	09/18/46	Franklin	Vegetation	nr	Avg	0.130	HW-7-5042
Freewater OR, 1 Mile N. on Rt. 11	01/12/46	Umatilla	Orchard	13.30 $\pm$ 2.9		nr	HEW-616-T
Goldendale +5 Miles	02/09/46	Klickitat	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
Grand Coulee Dam	04/23/46	Grant	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Grandview +2 Miles	04/24/46	Yakima	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Grandview +5 Miles	02/09/46	Yakima	Vegetation	8.00 $\pm$ 2		0.140	HEW-616-T
Hermiston, Outskirts on Rt. 207	03/09/46	Umatilla	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Hood River, Or, +5 Miles, 300 ft Above Water Level	02/09/46	Hood River	Vegetation	1.00 $\pm$ 2	<	0.040	HEW-616-T
Hooper Valley, 6 Miles S.W. on Rt. 11-B	01/12/46	Whitman	Vegetation	2.70 $\pm$ 2.3		nr	HEW-616-T
Kahlotus, 10 Miles W.	02/09/46	Franklin	Vegetation	6.00 $\pm$ 2		0.100	HEW-616-T
Kahlotus, 13 Miles S. on Rt. 11-B	01/12/46	Franklin	Vegetation	5.20 $\pm$ 2.9		nr	HEW-616-T
Kahlotus, 20 Miles W.	02/09/46	Franklin	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
Kahlotus, 22 Miles S. on Rt. 11-B	01/12/46	Franklin	Vegetation	8.60 $\pm$ 2.4		nr	HEW-616-T
Kahlotus, 3 Miles S.	01/12/46	Franklin	Vegetation	20.60 $\pm$ 3		nr	HEW-616-T
Kahlotus, 30 Miles W.	02/09/46	Franklin	Vegetation	4.00 $\pm$ 2		0.070	HEW-616-T
Kahlotus, 33 Miles S. on Rt. 11-B	01/12/46	Franklin	Vegetation	30.20 $\pm$ 3.4		nr	HEW-616-T
Kahlotus, 37 Miles S. on Rt. 11-B	01/12/46	Franklin	Vegetation	6.30 $\pm$ 2.4		nr	HEW-616-T
Kahlotus, 4 Miles W. of LaCrosse @ Kahlotus Gorge	02/09/46	Franklin	Vegetation	5.00 $\pm$ 2		0.080	HEW-616-T
Kennewick	03/31/46	Benton	Vegetation	nr	Avg	0.210	HW-7-3694
Kennewick	04/30/46	Benton	Vegetation	nr	Avg	0.240	HW-7-3933
Kennewick	02/28/46	Benton	Vegetation	nr		0.100	HW-7-3517
Kennewick	01/31/46	Benton	Vegetation	nr		0.640	HW-7-3322
Kennewick	06/30/46	Benton	Vegetation	nr	Avg	0.050	HW-7-4312
Kennewick	07/31/46	Benton	Vegetation	nr	Avg	0.040	HW-7-4474
Kennewick	07/24/46	Benton	Vegetation	nr	Avg <	0.040	HW-7-4440
Kennewick	05/31/46	Benton	Vegetation	nr	Avg	0.050	HW-7-4312

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Kennewick	08/31/46	Benton	Vegetation	nr		0.080	HW-7-4699
Kennewick	09/30/46	Benton	Vegetation	nr		0.140	HW-7-5145
Kennewick	10/31/46	Benton	Vegetation	nr	Avg	0.090	HW-7-5301
Kennewick	11/30/46	Benton	Vegetation	nr	Avg	0.190	HW-7-5428
Kennewick	12/31/46	Benton	Vegetation	nr	Avg	0.400	HW-7-5605
Kennewick	09/18/46	Benton	Vegetation	nr	Avg	0.170	HW-7-5042
Kennewick	09/30/46	Benton	Vegetation	nr	Max	0.220	HW-7-5042
Kennewick	09/30/46	Benton	Vegetation	nr	Avg	0.110	HW-7-5042
Kennewick	10/16/46	Benton	Vegetation	nr	Max	0.270	HW-7-5042
Kennewick	10/16/46	Benton	Vegetation	nr	Avg	0.120	HW-7-5042
Kennewick	10/31/46	Benton	Vegetation	nr	Max	0.130	HW-7-5042
Kennewick	10/31/46	Benton	Vegetation	nr	Avg	0.060	HW-7-5042
Kennewick	11/19/46	Benton	Vegetation	nr	Max	0.360	HW-7-5042
Kennewick	11/19/46	Benton	Vegetation	nr	Avg	0.130	HW-7-5042
Kennewick	11/30/46	Benton	Vegetation	nr	Max	0.460	HW-7-5042
Kennewick	11/30/46	Benton	Vegetation	nr	Avg	0.280	HW-7-5042
Kennewick	12/16/46	Benton	Vegetation	nr	Max	2.700	HW-7-5042
Kennewick	12/16/46	Benton	Vegetation	nr	Avg	0.600	HW-7-5042
Kennewick	12/31/46	Benton	Vegetation	nr	Max	0.460	HW-7-5042
Kennewick	12/31/46	Benton	Vegetation	nr	Avg	0.200	HW-7-5042
Kennewick	01/03/46	Benton	Sagebrush	238.20 $\pm$ 14.2		nr	HEW-578-L
Kennewick	01/17/46	Benton	Vegetation	53.20 $\pm$ 4.4		0.300	HEW-616-T
Kennewick	02/07/46	Benton	Vegetation	8.00 $\pm$ 2		0.100	HEW-616-T
Kennewick	02/14/46	Benton	Vegetation	12.00 $\pm$ 2		0.200	HEW-616-T
Kennewick N.E., Golf Course	04/01/46	Benton	Dead Weed	17.00 $\pm$ 5		nr	HEW-616-T
Kennewick, Columbia River	03/21/46	Benton	Dry Grass	15.00 $\pm$ 3		nr	HEW-616-T
Kennewick, E.	03/28/46	Benton	Yel Flower	15.00 $\pm$ 2		nr	HEW-616-T
Kennewick, E.	02/09/46	Benton	Vegetation	16.00 $\pm$ 3		0.270	HEW-616-T
Kennewick, Golf Course	01/10/46	Benton	Sagebrush	187.70 $\pm$ 10		nr	HEW-578-L
Kennewick, Golf Course	01/31/46	Benton	Vegetation	46.00 $\pm$ 4		0.780	HEW-616-T
Kennewick, Golf Course	02/21/46	Benton	Vegetation	27.00 $\pm$ 2		nr	HEW-616-T
Kennewick, Golf Course	03/07/46	Benton	Vegetation	3.00 $\pm$ 1		nr	HEW-616-T
Kennewick, Golf Course	03/14/46	Benton	Weed	19.00 $\pm$ 2		nr	HEW-616-T
Kennewick, Golf Course	03/21/46	Benton	White Dry	16.00 $\pm$ 3		nr	HEW-616-T
Kennewick, Hilands	06/11/46	Benton	Grape Lvs.	2.00 $\pm$ 2		nr	HEW-616-T
Kennewick, Hilands	06/11/46	Benton	Cherry Skn	1.00 $\pm$ 3		nr	HEW-616-T
Kennewick, N.E.	07/24/46	Benton	Vegetation	nr		0.040	HW-7-4440
Kennewick, N.E.	07/17/46	Benton	Vegetation	nr		0.070	HW-7-4423
Kennewick, N.E.	09/18/46	Benton	Vegetation	nr	Max	0.270	HW-7-5042
Kennewick, N.E.	09/18/46	Benton	Vegetation	nr	Avg	0.160	HW-7-5042
Kennewick, N.E.	03/14/46	Benton	Weed	15.00 $\pm$ 2		nr	HEW-616-T
Kennewick, N.E.	03/28/46	Benton	Vegy Weed	4.00 $\pm$ 1		nr	HEW-616-T
Kennewick, N.E.	04/08/46	Benton	Dry Grass	2.00 $\pm$ 2		nr	HEW-616-T
Kennewick, N.E.	04/22/46	Benton	Vegetation	1.00 $\pm$ 1		nr	HEW-616-T
Kennewick, N.E.	05/06/46	Benton	Vegetation	4.00 $\pm$ 1		nr	HEW-616-T
Kennewick, N.E.	05/13/46	Benton	Vegetation	7.00 $\pm$ 1		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Kennewick, N.E.	05/20/46	Benton	Vegetation	nr ± 2		nr	HEW-616-T
Kennewick, N.E.	05/27/46	Benton	Vegetation	3.00 ± 2		nr	HEW-616-T
Kennewick, N.E.	06/03/46	Benton	Vegetation	4.00 ± 2		nr	HEW-616-T
Kennewick, N.E.	06/10/46	Benton	Vegetation	4.00 ± 2		nr	HEW-616-T
Kennewick, N.E.	06/17/46	Benton	Vegetation	2.00 ± 2		nr	HEW-616-T
Kennewick, N.E.	06/24/46	Benton	Vegetation	9.00 ± 2		nr	HEW-616-T
Kennewick, N.E.	07/01/46	Benton	Vegetation	2.00 ± 2		nr	HEW-616-T
Kennewick, N.E.	07/08/46	Benton	Vegetation	2.00 ± 2		nr	HEW-616-T
Kennewick, N.E.	07/15/46	Benton	Vegetation	4.00 ± 2		nr	HEW-616-T
Kennewick, N.E.	07/22/46	Benton	Vegetation	2.00 ± 2		nr	HEW-616-T
Kennewick, N.E.	07/29/46	Benton	Vegetation	2.00 ± 2		nr	HEW-616-T
Kennewick, N.E.	08/05/46	Benton	Vegetation	5.00 ± 2		nr	HEW-616-T
Kennewick, N.E.	04/15/46	Benton	Vegetation	2.00 ± 1		nr	HEW-616-T
Kennewick, N.E.	04/29/46	Benton	Vegetation	2.00 ± 1		nr	HEW-616-T
Kennewick, N.W.	07/24/46	Benton	Vegetation	nr	<	0.040	HW-7-4440
Kennewick, N.W.	07/17/46	Benton	Vegetation	nr		0.040	HW-7-4423
Kennewick, N.W.	09/18/46	Benton	Vegetation	nr	Max	0.200	HW-7-5042
Kennewick, N.W.	09/18/46	Benton	Vegetation	nr	Avg	0.130	HW-7-5042
Kennewick, N.W.	03/28/46	Benton	D Wht Fl W	52.00 ± 4		nr	HEW-616-T
Kennewick, N.W.	04/08/46	Benton	Vegetation	7.00 ± 2		nr	HEW-616-T
Kennewick, N.W.	04/22/46	Benton	Vegetation	8.00 ± 1		nr	HEW-616-T
Kennewick, N.W.	05/06/46	Benton	Vegetation	2.00 ± 1		nr	HEW-616-T
Kennewick, N.W.	05/13/46	Benton	Vegetation	1.00 ± 1		nr	HEW-616-T
Kennewick, N.W.	05/20/46	Benton	Vegetation	1.00 ± 2		nr	HEW-616-T
Kennewick, N.W.	05/27/46	Benton	Vegetation	4.00 ± 2		nr	HEW-616-T
Kennewick, N.W.	06/03/46	Benton	Vegetation	6.00 ± 2		nr	HEW-616-T
Kennewick, N.W.	06/10/46	Benton	Vegetation	0.0 ± 2		nr	HEW-616-T
Kennewick, N.W.	06/17/46	Benton	Vegetation	0.0 ± 3		nr	HEW-616-T
Kennewick, N.W.	06/24/46	Benton	Vegetation	1.00 ± 2		nr	HEW-616-T
Kennewick, N.W.	07/01/46	Benton	Vegetation	3.00 ± 2		nr	HEW-616-T
Kennewick, N.W.	07/08/46	Benton	Vegetation	4.00 ± 2		nr	HEW-616-T
Kennewick, N.W.	07/15/46	Benton	Vegetation	2.00 ± 2		nr	HEW-616-T
Kennewick, N.W.	07/22/46	Benton	Vegetation	0.0 ± 2		nr	HEW-616-T
Kennewick, N.W.	07/29/46	Benton	Vegetation	3.00 ± 2		nr	HEW-616-T
Kennewick, N.W.	08/05/46	Benton	Vegetation	5.00 ± 2		nr	HEW-616-T
Kennewick, N.W.	04/15/46	Benton	Vegetation	12.00 ± 1		nr	HEW-616-T
Kennewick, N.W.	04/29/46	Benton	Vegetation	3.00 ± 1		nr	HEW-616-T
Kennewick, N.W. 3 Miles	03/07/46	Benton	Vegetation	14.00 ± 2		nr	HEW-616-T
Kennewick, N.W., USO	04/01/46	Benton	Vegetation	14.00 ± 2		nr	HEW-616-T
Kennewick, R.R. Bridge	03/21/46	Benton	Vegetation	65.00 ± 4		nr	HEW-616-T
Kennewick, S.E.	07/24/46	Benton	Vegetation	nr	<	0.040	HW-7-4440
Kennewick, S.E.	07/17/46	Benton	Vegetation	nr	<	0.040	HW-7-4423
Kennewick, S.E.	09/18/46	Benton	Vegetation	nr	Max	0.100	HW-7-5042
Kennewick, S.E.	09/18/46	Benton	Vegetation	nr	Avg	0.060	HW-7-5042
Kennewick, S.E.	03/14/46	Benton	Cheat Gr.	11.00 ± 2		nr	HEW-616-T
Kennewick, S.E.	04/01/46	Benton	Green Sage	12.00 ± 2		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Kennewick, S.E.	04/08/46	Benton	Vegetation	11.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.E.	04/15/46	Benton	Vegetation	7.00 $\pm$ 1		nr	HEW-616-T
Kennewick, S.E.	04/22/46	Benton	Vegetation	6.00 $\pm$ 1		nr	HEW-616-T
Kennewick, S.E.	05/06/46	Benton	Vegetation	0.0 $\pm$ 1		nr	HEW-616-T
Kennewick, S.E.	05/13/46	Benton	Vegetation	1.00 $\pm$ 1		nr	HEW-616-T
Kennewick, S.E.	05/20/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Kennewick, S.E.	05/27/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.E.	06/03/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.E.	06/10/46	Benton	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.E.	06/17/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.E.	06/24/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.E.	07/01/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.E.	07/08/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.E.	07/15/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Kennewick, S.E.	07/22/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Kennewick, S.E.	07/29/46	Benton	Vegetation	17.00 $\pm$ 3		nr	HEW-616-T
Kennewick, S.E.	08/05/46	Benton	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.E.	04/29/46	Benton	Vegetation	0.40 $\pm$ 1		nr	HEW-616-T
Kennewick, S.E. 1 Mile	03/07/46	Benton	Vegetation	3.00 $\pm$ 1		nr	HEW-616-T
Kennewick, S.E. 3 Miles	03/07/46	Benton	Vegetation	3.00 $\pm$ 1		nr	HEW-616-T
Kennewick, S.W.	07/24/46	Benton	Vegetation	nr		0.040	HW-7-4440
Kennewick, S.W.	07/17/46	Benton	Vegetation	nr		0.040	HW-7-4423
Kennewick, S.W.	09/18/46	Benton	Vegetation	nr	Max	0.580	HW-7-5042
Kennewick, S.W.	09/18/46	Benton	Vegetation	nr	Avg	0.340	HW-7-5042
Kennewick, S.W.	04/01/46	Benton	Dead Weed	49.00 $\pm$ 4		nr	HEW-616-T
Kennewick, S.W.	04/08/46	Benton	Green	5.00 $\pm$ 1		nr	HEW-616-T
Kennewick, S.W.	04/22/46	Benton	Vegetation	5.00 $\pm$ 1		nr	HEW-616-T
Kennewick, S.W.	05/06/46	Benton	Vegetation	3.00 $\pm$ 1		nr	HEW-616-T
Kennewick, S.W.	05/13/46	Benton	Vegetation	3.00 $\pm$ 1		nr	HEW-616-T
Kennewick, S.W.	05/20/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.W.	05/27/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Kennewick, S.W.	06/03/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.W.	06/10/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.W.	06/17/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Kennewick, S.W.	06/24/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.W.	07/01/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.W.	07/08/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.W.	07/15/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.W.	07/22/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.W.	07/29/46	Benton	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.W.	08/05/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.W.	04/15/46	Benton	Vegetation	23.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.W.	04/29/46	Benton	Vegetation	5.00 $\pm$ 1		nr	HEW-616-T
Kennewick, S.W. River Flats	03/14/46	Benton	Weed	19.00 $\pm$ 2		nr	HEW-616-T
Kennewick, S.W. River Flats	03/28/46	Benton	D Wht Fl W	42.00 $\pm$ 3		nr	HEW-616-T
Kennewick, W. Kennewick Ave.	01/24/46	Benton	Vegetation	48.00 $\pm$ 5		0.270	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Kennewick, War Housing Project	03/21/46	Benton	Green	14.00 $\pm$ 2		nr	HEW-616-T
LaCrosse	02/09/46	Whitman	Vegetation	1.00 $\pm$ 2	<	0.040	HEW-616-T
LaCrosse Valley, 13 Miles W. on Rt. 11-B	01/12/46	Whitman	Vegetation	8.60 $\pm$ 3		nr	HEW-616-T
LaCrosse, 10 Miles W.	02/09/46	Whitman	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
LaCrosse, 20 Miles W.	02/09/46	Adams	Vegetation	5.00 $\pm$ 2		0.080	HEW-616-T
LaCrosse, 30 Miles W. (Washtucna, 5 Miles W.)	02/09/46	Franklin	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
LaCrosse, 4 Miles from	03/09/46	Nez Perce	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Lewiston ID, Outskirts on Rt. 195/410	03/09/46	Nez Perce	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Lewiston, ID	02/09/46	Nez Perce	Vegetation	1.00 $\pm$ 2	<	0.040	HEW-616-T
Lewiston, ID.	03/31/46	Nez Perce	Vegetation	nr	Avg <	0.040	HEW-616-T
Lewiston, ID.	02/28/46	Nez Perce	Vegetation	nr		0.040	HEW-616-T
Lind +13 Miles	04/23/46	Adams	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Lind +3 Miles	04/23/46	Adams	Vegetation	8.00 $\pm$ 2		nr	HEW-616-T
Lind +8 Miles	04/23/46	Adams	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Maryhill +14 Miles, Rt. 830	02/09/46	Klickitat	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Maryhill +4 Miles, Rt. 830	02/09/46	Klickitat	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Mess Hall #2, "B" St.	04/17/46	Benton	Cheat Gr.	37.00 $\pm$ 2		0.630	HEW-652-L
Midway	09/18/46	Benton	Vegetation	nr	Max	0.100	HW-7-5042
Midway	09/18/46	Benton	Vegetation	nr	Avg	0.060	HW-7-5042
Pasco	07/17/46	Franklin	Vegetation	nr	Avg	0.070	HW-7-4423
Pasco	09/30/46	Franklin	Vegetation	nr		0.140	HW-7-5145
Pasco	10/31/46	Franklin	Vegetation	nr	Avg	0.110	HW-7-5301
Pasco	11/30/46	Franklin	Vegetation	nr	Avg	0.300	HW-7-5428
Pasco	12/31/46	Franklin	Vegetation	nr	Avg	0.250	HW-7-5605
Pasco	09/18/46	Franklin	Vegetation	nr	Avg	0.150	HW-7-5042
Pasco	09/30/46	Franklin	Vegetation	nr	Max	0.290	HW-7-5042
Pasco	09/30/46	Franklin	Vegetation	nr	Avg	0.120	HW-7-5042
Pasco	10/16/46	Franklin	Vegetation	nr	Max	0.710	HW-7-5042
Pasco	10/16/46	Franklin	Vegetation	nr	Avg	0.160	HW-7-5042
Pasco	10/31/46	Franklin	Vegetation	nr	Max	0.150	HW-7-5042
Pasco	10/31/46	Franklin	Vegetation	nr	Avg	0.060	HW-7-5042
Pasco	11/19/46	Franklin	Vegetation	nr	Max	0.220	HW-7-5042
Pasco	11/19/46	Franklin	Vegetation	nr	Avg	0.090	HW-7-5042
Pasco	11/30/46	Franklin	Vegetation	nr	Max	1.200	HW-7-5042
Pasco	11/30/46	Franklin	Vegetation	nr	Avg	0.620	HW-7-5042
Pasco	12/16/46	Franklin	Vegetation	nr	Avg	0.260	HW-7-5042
Pasco	12/31/46	Franklin	Vegetation	nr	Max	0.600	HW-7-5042
Pasco	12/31/46	Franklin	Vegetation	nr	Avg	0.240	HW-7-5042
Pasco	01/10/46	Franklin	Sagebrush	99.30 $\pm$ 5.8		nr	HEW-578-L
Pasco	02/07/46	Franklin	Vegetation	8.00 $\pm$ 2		0.100	HEW-616-T
Pasco	04/29/46	Franklin	Green	2.00 $\pm$ 1		nr	HEW-616-T
Pasco +10 Miles	04/23/46	Franklin	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Pasco +20 Miles	04/23/46	Franklin	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Pasco +30 Miles	04/23/46	Franklin	Vegetation	6.00 $\pm$ 2		nr	HEW-616-T
Pasco S.E., H & R Depot	03/14/46	Franklin	Vegetation	25.00 $\pm$ 2		nr	HEW-616-T
Pasco, 12 Miles from	03/09/46	Franklin	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Pasco, 12th St. S.E.	05/13/46	Franklin	Vegetation	6.00 $\pm$ 1		nr	HEW-616-T
Pasco, 7 Miles from	02/09/46	Franklin	Vegetation	11.00 $\pm$ 2		0.020	HEW-616-T
Pasco, 9 Miles N.W. on US-410	01/12/46	Franklin	Vegetation	49.40 $\pm$ 3.8		nr	HEW-616-T
Pasco, Court House	03/21/46	Franklin	Green Dry	6.00 $\pm$ 2		nr	HEW-616-T
Pasco, H & R	01/03/46	Franklin	Sagebrush	187.80 $\pm$ 7.6		nr	HEW-578-L
Pasco, H & R Depot	01/31/46	Franklin	Vegetation	25.00 $\pm$ 2		0.420	HEW-616-T
Pasco, H & R Depot	02/21/46	Franklin	Vegetation	16.00 $\pm$ 2		nr	HEW-616-T
Pasco, H & R Depot	05/13/46	Franklin	Vegetation	2.00 $\pm$ 1		nr	HEW-616-T
Pasco, H & R Point	01/24/46	Franklin	Vegetation	31.00 $\pm$ 3		0.170	HEW-616-T
Pasco, H & R Point	03/07/46	Franklin	Vegetation	4.00 $\pm$ 1		nr	HEW-616-T
Pasco, High School	03/21/46	Franklin	Dry	10.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.E.	07/24/46	Franklin	Vegetation	nr		0.040	HW-7-4440
Pasco, N.E.	07/17/46	Franklin	Vegetation	nr		0.090	HW-7-4423
Pasco, N.E.	09/18/46	Franklin	Vegetation	nr	Max	0.200	HW-7-5042
Pasco, N.E.	09/18/46	Franklin	Vegetation	nr	Avg	0.150	HW-7-5042
Pasco, N.E.	03/14/46	Franklin	Wheat	5.00 $\pm$ 1		nr	HEW-616-T
Pasco, N.E.	03/28/46	Franklin	Dead Sage	12.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.E.	04/10/46	Franklin	Gn Alfalfa	4.00 $\pm$ 1		nr	HEW-616-T
Pasco, N.E.	04/08/46	Franklin	Green	4.00 $\pm$ 1		nr	HEW-616-T
Pasco, N.E.	04/22/46	Franklin	Vegetation	2.00 $\pm$ 1		nr	HEW-616-T
Pasco, N.E.	05/06/46	Franklin	Vegetation	2.00 $\pm$ 1		nr	HEW-616-T
Pasco, N.E.	05/20/46	Franklin	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.E.	05/27/46	Franklin	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.E.	06/03/46	Franklin	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.E.	06/10/46	Franklin	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.E.	06/17/46	Franklin	Vegetation	0.0 $\pm$ 3		nr	HEW-616-T
Pasco, N.E.	06/17/46	Franklin	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.E.	06/24/46	Franklin	Vegetation	1.00 $\pm$ 3		nr	HEW-616-T
Pasco, N.E.	07/01/46	Franklin	Vegetation	4.00 $\pm$ 3		nr	HEW-616-T
Pasco, N.E.	07/08/46	Franklin	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Pasco, N.E.	07/15/46	Franklin	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.E.	07/22/46	Franklin	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.E.	07/29/46	Franklin	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.E.	08/05/46	Franklin	Vegetation	8.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.E.	04/08/46	Franklin	Vegetation	4.00 $\pm$ 1		nr	HEW-616-T
Pasco, N.E.	04/15/46	Franklin	Vegetation	10.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.E.	04/29/46	Franklin	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Pasco, N.W.	07/24/46	Franklin	Vegetation	nr		0.070	HW-7-4440
Pasco, N.W.	07/17/46	Franklin	Vegetation	nr		0.040	HW-7-4423
Pasco, N.W.	09/18/46	Franklin	Vegetation	nr	Max	0.040	HW-7-5042
Pasco, N.W.	09/18/46	Franklin	Vegetation	nr	Avg <	0.040	HW-7-5042
Pasco, N.W.	01/17/46	Franklin	Vegetation	36.10 $\pm$ 3.9		0.210	HEW-616-T
Pasco, N.W.,	03/14/46	Franklin	Yel Flower	15.00 $\pm$ 2		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Pasco, N.W.	03/28/46	Franklin	Wht Lf Wd	12.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.W.	04/01/46	Franklin	Yel Flower	4.00 $\pm$ 1		nr	HEW-616-T
Pasco, N.W.	04/08/46	Franklin	Green	4.00 $\pm$ 1		nr	HEW-616-T
Pasco, N.W.	04/22/46	Franklin	Vegetation	1.00 $\pm$ 1		nr	HEW-616-T
Pasco, N.W.	05/06/46	Franklin	Vegetation	5.00 $\pm$ 1		nr	HEW-616-T
Pasco, N.W.	05/13/46	Franklin	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Pasco, N.W.	05/20/46	Franklin	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.W.	05/27/46	Franklin	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Pasco, N.W.	06/03/46	Franklin	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.W.	06/10/46	Franklin	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.W.	06/17/46	Franklin	Vegetation	5.00 12		nr	HEW-616-T
Pasco, N.W.	06/24/46	Franklin	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.W.	07/01/46	Franklin	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Pasco, N.W.	07/08/46	Franklin	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Pasco, N.W.	07/15/46	Franklin	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.W.	07/22/46	Franklin	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.W.	07/29/46	Franklin	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Pasco, N.W.	08/05/46	Franklin	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Pasco, N.W.	04/15/46	Franklin	Vegetation	6.00 $\pm$ 1		nr	HEW-616-T
Pasco, N.W.	04/29/46	Franklin	Vegetation	4.00 $\pm$ 1		nr	HEW-616-T
Pasco, Roundhouse	03/21/46	Franklin	Green	4.00 $\pm$ 2		nr	HEW-616-T
Pasco, Rt. 395	02/09/46	Franklin	Vegetation	11.00 $\pm$ 2		0.190	HEW-616-T
Pasco, S.E.	07/24/46	Franklin	Vegetation	nr		0.120	HW-7-4440
Pasco, S.E.	07/17/46	Franklin	Vegetation	nr		0.120	HW-7-4423
Pasco, S.E.	09/18/46	Franklin	Vegetation	nr	Max	0.510	HW-7-5042
Pasco, S.E.	09/18/46	Franklin	Vegetation	nr	Avg	0.280	HW-7-5042
Pasco, S.E.	04/01/46	Franklin	Yel Flower	45.00 $\pm$ 3		nr	HEW-616-T
Pasco, S.E.	04/08/46	Franklin	Green	7.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.E.	04/15/46	Franklin	Vegetation	3.00 $\pm$ 1		nr	HEW-616-T
Pasco, S.E.	04/22/46	Franklin	Vegetation	1.00 $\pm$ 1		nr	HEW-616-T
Pasco, S.E.	05/06/46	Franklin	Vegetation	0.0 $\pm$ 1		nr	HEW-616-T
Pasco, S.E.	05/20/46	Franklin	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.E.	05/27/46	Franklin	Vegetation	0.0 $\pm$ 1		nr	HEW-616-T
Pasco, S.E.	06/03/46	Franklin	Vegetation	6.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.E.	06/10/46	Franklin	Vegetation	5.00 $\pm$ 3		nr	HEW-616-T
Pasco, S.E.	06/17/46	Franklin	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Pasco, S.E.	06/24/46	Franklin	Vegetation	6.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.E.	07/01/46	Franklin	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Pasco, S.E.	07/08/46	Franklin	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Pasco, S.E.	07/15/46	Franklin	Vegetation	7.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.E.	07/22/46	Franklin	Vegetation	7.00 $\pm$ 1		nr	HEW-616-T
Pasco, S.E.	07/29/46	Franklin	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.E.	08/05/46	Franklin	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.E.	04/29/46	Franklin	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Pasco, S.E. 1 Mile	03/07/46	Franklin	Vegetation	10.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.E. 3 Miles	03/07/46	Franklin	Vegetation	9.00 $\pm$ 2		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/Kg}$	Reference
Pasco, S.E., USO Bldg.	03/28/46	Franklin	Dd Alfalfa	9.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.W.	07/24/46	Franklin	Vegetation	nr		0.030	HW-7-4440
Pasco, S.W.	07/17/46	Franklin	Vegetation	nr		0.040	HW-7-4423
Pasco, S.W.	09/18/46	Franklin	Vegetation	nr	Max	0.270	HW-7-5042
Pasco, S.W.	09/18/46	Franklin	Vegetation	nr	Avg	0.150	HW-7-5042
Pasco, S.W.	03/14/46	Franklin	Cheat Gr.	8.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.W.	04/01/46	Franklin	Yel Flower	8.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.W.	04/08/46	Franklin	Green	4.00 $\pm$ 1		nr	HEW-616-T
Pasco, S.W.	04/15/46	Franklin	Vegetation	4.00 $\pm$ 1		nr	HEW-616-T
Pasco, S.W.	04/22/46	Franklin	Vegetation	1.00 $\pm$ 1		nr	HEW-616-T
Pasco, S.W.	04/29/46	Franklin	Vegetation	nr $\pm$ 2		nr	HEW-616-T
Pasco, S.W.	05/06/46	Franklin	Vegetation	2.00 $\pm$ 1		nr	HEW-616-T
Pasco, S.W.	05/13/46	Franklin	Vegetation	6.00 $\pm$ 1		nr	HEW-616-T
Pasco, S.W.	05/20/46	Franklin	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.W.	05/27/46	Franklin	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.W.	06/03/46	Franklin	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.W.	06/10/46	Franklin	Vegetation	6.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.W.	06/24/46	Franklin	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.W.	07/01/46	Franklin	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.W.	07/08/46	Franklin	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.W.	07/15/46	Franklin	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.W.	07/22/46	Franklin	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.W.	07/29/46	Franklin	Vegetation	6.00 $\pm$ 3		nr	HEW-616-T
Pasco, S.W.	08/05/46	Franklin	Vegetation	6.00 $\pm$ 2		nr	HEW-616-T
Pasco, S.W., H & R Depot	03/28/46	Franklin	D Wht Fl W	50.00 $\pm$ 4		nr	HEW-616-T
Pasco, W.	03/21/46	Franklin	Green	38.00 $\pm$ 3		nr	HEW-616-T
Pasco, Washington Highway Dept.	03/07/46	Franklin	Vegetation	3.00 $\pm$ 1		nr	HEW-616-T
Pendleton, E. Outskirts on Rt. 11	03/09/46	Umatilla	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Pendleton, OR	02/28/46	Umatilla	Vegetation	nr		0.100	HW-7-3517
Pendleton, OR	01/31/46	Umatilla	Vegetation	nr		0.030	HW-7-3322
Pendleton, W. Outskirts on Rt. 30	03/09/46	Umatilla	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Portland OR, 2 Miles S. of Town Center	02/09/46	Multnomah	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Portland, OR	02/28/46	Multnomah	Vegetation	nr		0.050	HW-7-3517
Prosser +15 Miles	04/24/46	Benton	Vegetation	8.00 $\pm$ 2		nr	HEW-616-T
Prosser +25 Miles	04/24/46	Benton	Vegetation	9.00 $\pm$ 3		nr	HEW-616-T
Prosser +3 Miles	02/09/46	Benton	Vegetation	6.00 $\pm$ 2		0.100	HEW-616-T
Prosser +5 Miles	04/24/46	Benton	Vegetation	0.0 $\pm$ 3		nr	HEW-616-T
Pullman	03/09/46	Whitman	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Richland	03/31/46	Benton	Vegetation	nr	Avg	0.240	HW-7-3694
Richland	04/30/46	Benton	Vegetation	nr	Avg	0.140	HW-7-3933
Richland	02/28/46	Benton	Vegetation	nr		0.200	HW-7-3517
Richland	01/31/46	Benton	Vegetation	nr		1.000	HW-7-3322
Richland	06/30/46	Benton	Vegetation	nr	Avg	0.060	HW-7-4312
Richland	07/31/46	Benton	Vegetation	nr	Avg	0.070	HW-7-4474
Richland	07/24/46	Benton	Vegetation	nr	Avg	0.100	HW-7-4440

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Richland	07/17/46	Benton	Vegetation	nr	Avg	0.110	HW-7-4423
Richland	05/31/46	Benton	Vegetation	nr	Avg	0.060	HW-7-4312
Richland	08/31/46	Benton	Vegetation	nr		0.060	HW-7-4699
Richland	09/30/46	Benton	Vegetation	nr		0.070	HW-7-5145
Richland	10/31/46	Benton	Vegetation	nr	Avg	0.130	HW-7-5301
Richland	11/30/46	Benton	Vegetation	nr	Avg	0.210	HW-7-5428
Richland	12/31/46	Benton	Vegetation	nr	Avg	0.460	HW-7-5605
Richland	09/18/46	Benton	Vegetation	nr	Avg	0.080	HW-7-5042
Richland	09/30/46	Benton	Vegetation	nr	Max	0.140	HW-7-5042
Richland	09/30/46	Benton	Vegetation	nr	Avg	0.060	HW-7-5042
Richland	10/16/46	Benton	Vegetation	nr	Max	0.390	HW-7-5042
Richland	10/16/46	Benton	Vegetation	nr	Avg	0.180	HW-7-5042
Richland	10/31/46	Benton	Vegetation	nr	Max	0.170	HW-7-5042
Richland	10/31/46	Benton	Vegetation	nr	Avg	0.080	HW-7-5042
Richland	11/19/46	Benton	Vegetation	nr	Max	1.160	HW-7-5042
Richland	11/19/46	Benton	Vegetation	nr	Avg	0.280	HW-7-5042
Richland	11/30/46	Benton	Vegetation	nr	Max	0.240	HW-7-5042
Richland	11/30/46	Benton	Vegetation	nr	Avg	0.110	HW-7-5042
Richland	12/16/46	Benton	Vegetation	nr	Max	1.260	HW-7-5042
Richland	12/16/46	Benton	Vegetation	nr	Avg	0.570	HW-7-5042
Richland	12/31/46	Benton	Vegetation	nr	Max	0.610	HW-7-5042
Richland	12/31/46	Benton	Vegetation	nr	Avg	0.350	HW-7-5042
Richland	05/07/46	Benton	Green Asp.	0.0 $\pm$ 1			HEW-616-T
Richland "Y"	07/24/46	Benton	Vegetation	nr	<	0.040	HW-7-4440
Richland "Y"	07/17/46	Benton	Vegetation	nr	<	0.040	HW-7-4423
Richland "Y"	09/18/46	Benton	Vegetation	nr	Max	0.070	HW-7-5042
Richland "Y"	09/18/46	Benton	Vegetation	nr	Avg	0.050	HW-7-5042
Richland "Y"	09/30/46	Benton	Vegetation	nr	Max	0.050	HW-7-5042
Richland "Y"	09/30/46	Benton	Vegetation	nr	Avg <	0.040	HW-7-5042
Richland "Y"	10/16/46	Benton	Vegetation	nr	Max	0.090	HW-7-5042
Richland "Y"	10/16/46	Benton	Vegetation	nr	Avg	0.050	HW-7-5042
Richland "Y"	10/31/46	Benton	Vegetation	nr	Max	0.040	HW-7-5042
Richland "Y"	10/31/46	Benton	Vegetation	nr	Avg <	0.040	HW-7-5042
Richland "Y"	11/19/46	Benton	Vegetation	nr	Max	0.260	HW-7-5042
Richland "Y"	11/19/46	Benton	Vegetation	nr	Avg	0.140	HW-7-5042
Richland "Y"	11/30/46	Benton	Vegetation	nr	Max	0.070	HW-7-5042
Richland "Y"	11/30/46	Benton	Vegetation	nr	Avg	0.060	HW-7-5042
Richland "Y"	12/16/46	Benton	Vegetation	nr	Max	0.370	HW-7-5042
Richland "Y"	12/16/46	Benton	Vegetation	nr	Avg	0.290	HW-7-5042
Richland "Y"	12/31/46	Benton	Vegetation	nr	Max	0.440	HW-7-5042
Richland "Y"	12/31/46	Benton	Vegetation	nr	Avg	0.250	HW-7-5042
Richland "Y"	01/03/46	Benton	Sagebrush	153.80 $\pm$ 7.2		nr	HEW-578-L
Richland "Y"	01/10/46	Benton	Sagebrush	38.10 $\pm$ 4.3		nr	HEW-578-L
Richland "Y"	01/17/46	Benton	Vegetation	85.30 $\pm$ 5.7		0.500	HEW-616-T
Richland "Y"	01/31/46	Benton	Vegetation	51.00 $\pm$ 3		0.860	HEW-616-T
Richland "Y"	02/07/46	Benton	Vegetation	4.00 $\pm$ 1		0.100	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Richland "Y"	01/24/46	Benton	Vegetation	44.00 $\pm$ 4		0.250	HEW-616-T
Richland "Y"	02/14/46	Benton	Vegetation	15.00 $\pm$ 2		0.250	HEW-616-T
Richland "Y"	02/21/46	Benton	Vegetation	10.00 $\pm$ 2		nr	HEW-616-T
Richland "Y"	03/07/46	Benton	Vegetation	10.00 $\pm$ 2		nr	HEW-616-T
Richland "Y"	03/14/46	Benton	Cheat Gr.	9.00 $\pm$ 2		nr	HEW-616-T
Richland "Y"	03/21/46	Benton	Vegetation	11.00 $\pm$ 2		nr	HEW-616-T
Richland "Y"	03/28/46	Benton	Dead Sage	21.00 $\pm$ 2		nr	HEW-616-T
Richland "Y"	04/01/46	Benton	Dead Weed	57.00 $\pm$ 5		nr	HEW-616-T
Richland "Y"	04/08/46	Benton	Vegetation	3.00 $\pm$ 1		nr	HEW-616-T
Richland "Y"	04/22/46	Benton	Vegetation	0.7 $\pm$ 2		nr	HEW-616-T
Richland "Y"	05/06/46	Benton	Vegetation	0.0 $\pm$ 1		nr	HEW-616-T
Richland "Y"	05/13/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Richland "Y"	05/20/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland "Y"	05/27/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Richland "Y"	06/03/46	Benton	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Richland "Y"	06/10/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Richland "Y"	06/17/46	Benton	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Richland "Y"	06/24/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Richland "Y"	07/01/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Richland "Y"	07/08/46	Benton	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Richland "Y"	07/15/46	Benton	Vegetation	0.0 $\pm$ 3		nr	HEW-616-T
Richland "Y"	07/29/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Richland "Y"	08/05/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland "Y"	01/12/46	Benton	Vegetation	22.40 $\pm$ 3		nr	HEW-616-T
Richland "Y"	04/15/46	Benton	Vegetation	5.00 $\pm$ 1		nr	HEW-616-T
Richland "Y"	04/29/46	Benton	Vegetation	5.00 $\pm$ 1		nr	HEW-616-T
Richland "Y" + 10 Miles	02/09/46		Vegetation	9.00 $\pm$ 2		0.160	HEW-616-T
Richland "Y" + 20 Miles	02/09/46		Vegetation	22.00 $\pm$ 3		0.390	HEW-616-T
Richland "Y", 50.2 Miles from, on US410	01/12/46	Yakima	Vegetation	10.20 $\pm$ 3		nr	HEW-616-T
Richland Barricade	04/22/46	Benton	Vegetation	4.00 $\pm$ 1		nr	HEW-616-T
Richland Barricade	05/13/46	Benton	Vegetation	5.00 $\pm$ 1		nr	HEW-616-T
Richland, Geo. Wash. Way and Van Giesen	05/13/46	Benton	Vegetation	2.00 $\pm$ 1		nr	HEW-616-T
Richland, Kadlec Hospital	07/24/46	Benton	Vegetation	nr		0.090	HW-7-4440
Richland, Kadlec Hospital	07/17/46	Benton	Vegetation	nr	<	0.040	HW-7-4423
Richland, Kadlec Hospital	06/08/46	Benton	Vegetation	nr	Max	0.100	HW-7-5042
Richland, Kadlec Hospital	09/18/46	Benton	Vegetation	nr	Avg	0.060	HW-7-5042
Richland, Kadlec Hospital	01/03/46	Benton	Sagebrush	161.30 $\pm$ 7.4		nr	HEW-578-L
Richland, Kadlec Hospital	01/09/46	Benton	Sagebrush	150.60 $\pm$ 10		nr	HEW-578-L
Richland, Kadlec Hospital	01/16/46	Benton	Vegetation	59.50 $\pm$ 4.9		0.350	HEW-616-T
Richland, Kadlec Hospital	01/23/46	Benton	Vegetation	118.10 $\pm$ 6.1		0.660	HEW-616-T
Richland, Kadlec Hospital	01/30/46	Benton	Vegetation	12.00 $\pm$ 2		0.200	HEW-616-T
Richland, Kadlec Hospital	02/06/46	Benton	Vegetation	0.0 $\pm$ 1	<	0.030	HEW-616-T
Richland, Kadlec Hospital	02/13/46	Benton	Vegetation	19.00 $\pm$ 2		0.320	HEW-616-T
Richland, Kadlec Hospital	02/20/46	Benton	Vegetation	9.00 $\pm$ 2		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Richland, Kadlec Hospital	03/13/46	Benton	Sage	7.00 $\pm$ 2		nr	HEW-616-T
Richland, Kadlec Hospital	03/20/46	Benton	Dry Grass	14.00 $\pm$ 2		nr	HEW-616-T
Richland, Kadlec Hospital	04/01/46	Benton	Green Sage	43.00 $\pm$ 3		nr	HEW-616-T
Richland, Kadlec Hospital	04/08/46	Benton	Dry Grass	7.00 $\pm$ 2		nr	HEW-616-T
Richland, Kadlec Hospital	04/22/46	Benton	Alfalfa	2.00 $\pm$ 1		nr	HEW-616-T
Richland, Kadlec Hospital	04/29/46	Benton	Vegetation	6.00 $\pm$ 1		nr	HEW-616-T
Richland, Kadlec Hospital	05/06/46	Benton	Vegetation	1.00 $\pm$ 1		nr	HEW-616-T
Richland, Kadlec Hospital	05/13/46	Benton	Vegetation	1.00 $\pm$ 1		nr	HEW-616-T
Richland, Kadlec Hospital	05/20/46	Benton	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Richland, Kadlec Hospital	05/27/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Richland, Kadlec Hospital	06/03/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Richland, Kadlec Hospital	06/10/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, Kadlec Hospital	06/17/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Richland, Kadlec Hospital	06/24/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, Kadlec Hospital	07/01/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, Kadlec Hospital	07/08/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Richland, Kadlec Hospital	07/15/46	Benton	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Richland, Kadlec Hospital	07/22/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Richland, Kadlec Hospital	07/29/46	Benton	Vegetation	10.00 $\pm$ 3		nr	HEW-616-T
Richland, Kadlec Hospital	08/05/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Richland, Kadlec Hospital	04/15/46	Benton	Vegetation	9.00 $\pm$ 1		nr	HEW-616-T
Richland, N.E.	07/24/46	Benton	Vegetation	nr		0.120	HW-7-4440
Richland, N.E.	07/17/46	Benton	Vegetation	nr		0.340	HW-7-4423
Richland, N.E.	09/18/46	Benton	Vegetation	nr	Max	0.220	HW-7-5042
Richland, N.E.	09/18/46	Benton	Vegetation	nr	Avg	0.120	HW-7-5042
Richland, N.E.	01/03/46	Benton	Sagebrush	251.90 $\pm$ 14.5		nr	HEW-578-L
Richland, N.E.	01/16/46	Benton	Vegetation	89.50 $\pm$ 5.6		0.530	HEW-616-T
Richland, N.E.	01/23/46	Benton	Vegetation	42.90 $\pm$ 4.1		0.240	HEW-616-T
Richland, N.E.	01/30/46	Benton	Vegetation	37.00 $\pm$ 3		0.630	HEW-616-T
Richland, N.E.	02/06/46	Benton	Vegetation	20.00 $\pm$ 3		0.300	HEW-616-T
Richland, N.E.	02/13/46	Benton	Vegetation	4.00 $\pm$ 2		0.070	HEW-616-T
Richland, N.E.	02/20/46	Benton	Vegetation	22.00 $\pm$ 2		nr	HEW-616-T
Richland, N.E.	03/06/46	Benton	Vegetation	5.00 $\pm$ 1		nr	HEW-616-T
Richland, N.E.	03/13/46	Benton	Cheat Gr.	33.00 $\pm$ 3		nr	HEW-616-T
Richland, N.E.	03/20/46	Benton	Green Sage	9.00 $\pm$ 2		nr	HEW-616-T
Richland, N.E.	04/01/46	Benton	Dead Weed	65.00 $\pm$ 5		nr	HEW-616-T
Richland, N.E.	04/08/46	Benton	Green Sage	6.00 $\pm$ 1		nr	HEW-616-T
Richland, N.E.	04/15/46	Benton	Vegetation	7.00 $\pm$ 1		nr	HEW-616-T
Richland, N.E.	04/22/46	Benton	Vegetation	15.00 $\pm$ 1		nr	HEW-616-T
Richland, N.E.	04/29/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Richland, N.E.	05/06/46	Benton	Vegetation	2.00 $\pm$ 1		nr	HEW-616-T
Richland, N.E.	05/20/46	Benton	Vegetation	6.00 $\pm$ 3		nr	HEW-616-T
Richland, N.E.	05/27/46	Benton	Vegetation	9.00 $\pm$ 2		nr	HEW-616-T
Richland, N.E.	06/03/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Richland, N.E.	06/10/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Richland, N.E.	06/17/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Richland, N.E.	06/24/46	Benton	Vegetation	9.00 $\pm$ 2		nr	HEW-616-T
Richland, N.E.	07/01/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Richland, N.E.	07/01/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, N.E.	07/08/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Richland, N.E.	07/15/46	Benton	Vegetation	20.00 $\pm$ 3		nr	HEW-616-T
Richland, N.E.	07/22/46	Benton	Vegetation	7.00 $\pm$ 2		nr	HEW-616-T
Richland, N.E.	07/29/46	Benton	Vegetation	0.0 $\pm$ 3		nr	HEW-616-T
Richland, N.E.	08/06/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	07/24/46	Benton	Vegetation	nr		0.050	HW-7-4440
Richland, N.W.	07/17/46	Benton	Vegetation	nr	<	0.040	HW-7-4423
Richland, N.W.	09/18/46	Benton	Vegetation	nr	Max	0.120	HW-7-5042
Richland, N.W.	09/18/46	Benton	Vegetation	nr	Avg	0.070	HW-7-5042
Richland, N.W.	01/03/46	Benton	Sagebrush	511.30 $\pm$ 17		nr	HEW-578-L
Richland, N.W.	01/09/46	Benton	Sagebrush	233.30 $\pm$ 12		nr	HEW-578-L
Richland, N.W.	01/09/46	Benton	Sagebrush	110.80 $\pm$ 6.1		nr	HEW-578-L
Richland, N.W.	01/16/46	Benton	Vegetation	57.80 $\pm$ 4.9		0.330	HEW-616-T
Richland, N.W.	01/23/46	Benton	Vegetation	177.00 $\pm$ 7.5		0.990	HEW-616-T
Richland, N.W.	01/30/46	Benton	Vegetation	21.00 $\pm$ 2		0.350	HEW-616-T
Richland, N.W.	02/06/46	Benton	Vegetation	12.00 $\pm$ 3		0.100	HEW-616-T
Richland, N.W.	02/13/46	Benton	Vegetation	8.00 $\pm$ 2		0.140	HEW-616-T
Richland, N.W.	02/20/46	Benton	Vegetation	4.00 $\pm$ 1		nr	HEW-616-T
Richland, N.W.	03/06/46	Benton	Vegetation	11.00 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	03/13/46	Benton	Wht Fir Wd	18.00 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	03/20/46	Benton	Green Sage	6.00 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	04/01/46	Benton	Vegetation	52.00 $\pm$ 3		nr	HEW-616-T
Richland, N.W.	04/08/46	Benton	Dry Grass	5.00 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	04/15/46	Benton	Vegetation	4.00 $\pm$ 1		nr	HEW-616-T
Richland, N.W.	04/22/46	Benton	Vegetation	3.00 $\pm$ 1		nr	HEW-616-T
Richland, N.W.	05/06/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	05/13/46	Benton	Vegetation	4.00 $\pm$ 1		nr	HEW-616-T
Richland, N.W.	05/20/46	Benton	Vegetation	6.00 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	05/27/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	06/03/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	06/10/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	06/17/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	06/24/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	07/01/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	07/01/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	07/08/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	07/15/46	Benton	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	07/22/46	Benton	Vegetation	3.00 $\pm$ 3		nr	HEW-616-T
Richland, N.W.	07/29/46	Benton	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	08/05/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Richland, N.W.	04/29/46	Benton	Vegetation	4.00 $\pm$ 1		nr	HEW-616-T
Richland, S.E.	07/24/46	Benton	Vegetation	nr		0.190	HW-7-4440
Richland, S.E.	07/17/46	Benton	Vegetation	nr		0.070	HW-7-4423

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Richland, S.E.	09/18/46	Benton	Vegetation	nr	Max	0.120	HW-7-5042
Richland, S.E.	09/18/46	Benton	Vegetation	nr	Avg	0.100	HW-7-5042
Richland, S.E.	01/09/46	Benton	Sagebrush	261.90 $\pm$ 11.4		nr	HEW-578-L
Richland, S.E.	01/16/46	Benton	Vegetation	13.80 $\pm$ 2.8		0.080	HEW-616-T
Richland, S.E.	01/23/46	Benton	Vegetation	42.40 $\pm$ 4.3		0.240	HEW-616-T
Richland, S.E.	01/30/46	Benton	Vegetation	28.00 $\pm$ 3		0.470	HEW-616-T
Richland, S.E.	02/06/46	Benton	Vegetation	7.00 $\pm$ 2		0.100	HEW-616-T
Richland, S.E.	02/13/46	Benton	Vegetation	14.00 $\pm$ 2		0.240	HEW-616-T
Richland, S.E.	02/20/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	03/06/46	Benton	Vegetation	8.00 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	03/13/46	Benton	Cheat Gr.	19.00 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	03/20/46	Benton	Grass	6.00 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	04/01/46	Benton	Cheat Gr.	71.00 $\pm$ 5		nr	HEW-616-T
Richland, S.E.	04/08/46	Benton	Vegetation	4.00 $\pm$ 1		nr	HEW-616-T
Richland, S.E.	04/22/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	04/29/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	05/06/46	Benton	Vegetation	2.00 $\pm$ 1		nr	HEW-616-T
Richland, S.E.	05/13/46	Benton	Vegetation	2.00 $\pm$ 1		nr	HEW-616-T
Richland, S.E.	05/20/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	05/27/46	Benton	Vegetation	7.00 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	06/03/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	06/10/46	Benton	Vegetation	7.00 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	06/17/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	06/24/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	07/01/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	07/02/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	07/08/46	Benton	Vegetation	5.00 $\pm$ 3		nr	HEW-616-T
Richland, S.E.	07/15/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	07/22/46	Benton	Vegetation	11.00 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	07/22/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	07/29/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	08/05/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Richland, S.E.	04/15/46	Benton	Vegetation	4.00 $\pm$ 1		nr	HEW-616-T
Richland, S.W.	07/24/46	Benton	Vegetation	nr		0.070	HW-7-4440
Richland, S.W.	07/17/46	Benton	Vegetation	nr		0.090	HW-7-4423
Richland, S.W.	09/18/46	Benton	Vegetation	nr	Max	0.070	HW-7-5042
Richland, S.W.	09/18/46	Benton	Vegetation	nr	Avg	0.050	HW-7-5042
Richland, S.W.	01/03/46	Benton	Sagebrush	105.40 $\pm$ 6.2		nr	HEW-578-L
Richland, S.W.	01/09/46	Benton	Sagebrush	101.30 $\pm$ 5.8		nr	HEW-578-L
Richland, S.W.	01/16/46	Benton	Vegetation	28.30 $\pm$ 3.3		0.160	HEW-616-T
Richland, S.W.	01/23/46	Benton	Vegetation	43.40 $\pm$ 4.1		0.240	HEW-616-T
Richland, S.W.	01/30/46	Benton	Vegetation	22.00 $\pm$ 3		0.370	HEW-616-T
Richland, S.W.	02/06/46	Benton	Vegetation	31.00 $\pm$ 2		0.500	HEW-616-T
Richland, S.W.	02/13/46	Benton	Vegetation	11.00 $\pm$ 2		0.190	HEW-616-T
Richland, S.W.	02/20/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Richland, S.W.	03/06/46	Benton	Vegetation	9.00 $\pm$ 2		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Richland, S.W.	03/13/46	Benton	Cheat Gr.	29.00 $\pm$ 3		nr	HEW-616-T
Richland, S.W.	03/20/46	Benton	White	26.00 $\pm$ 2		nr	HEW-616-T
Richland, S.W.	04/01/46	Benton	Green Sage	17.00 $\pm$ 2		nr	HEW-616-T
Richland, S.W.	04/08/46	Benton	Vegetation	7.00 $\pm$ 2		nr	HEW-616-T
Richland, S.W.	04/15/46	Benton	Vegetation	8.00 $\pm$ 1		nr	HEW-616-T
Richland, S.W.	04/22/46	Benton	Vegetation	7.00 $\pm$ 1		nr	HEW-616-T
Richland, S.W.	05/06/46	Benton	Vegetation	2.00 $\pm$ 1		nr	HEW-616-T
Richland, S.W.	05/13/46	Benton	Vegetation	6.00 $\pm$ 1		nr	HEW-616-T
Richland, S.W.	05/20/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, S.W.	05/27/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, S.W.	06/03/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Richland, S.W.	06/10/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Richland, S.W.	06/17/46	Benton	Vegetation	0.0 $\pm$ 3		nr	HEW-616-T
Richland, S.W.	07/01/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Richland, S.W.	07/08/46	Benton	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Richland, S.W.	07/15/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Richland, S.W.	07/22/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Richland, S.W.	07/29/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Richland, S.W.	08/05/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Richland, S.W.	04/29/46	Benton	Vegetation	6.00 $\pm$ 1		nr	HEW-616-T
Richland, Van Giesen	08/06/46	Benton	Apple	2.00 $\pm$ 2		nr	HEW-616-T
Richland, Van Giesen	08/06/46	Benton	Apple Lvs.	4.00 $\pm$ 2		nr	HEW-616-T
Richland-Benton City Highway, Junction w/Prosser	07/16/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Riding Academy, Near	06/11/46	Benton	Vegetation	0.0		nr	HEW-616-T
Ringold Barr, 1 Mile Above	05/08/46	Franklin	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Ringold Barr, 6 Miles Above	05/08/46	Franklin	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Ringold Barricade	05/08/46	Franklin	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Ringold Barricade, 3 Miles Above	05/08/46	Franklin	Vegetation	6.00 $\pm$ 2		nr	HEW-616-T
Ringold Barricade, 4 Miles Above	05/08/46	Franklin	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Ringold Barricade, 7 Miles Above	05/08/46	Franklin	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Ritzville	03/31/46	Adams	Vegetation	nr	Avg	0.140	HW-7-3694
Ritzville	04/30/46	Adams	Vegetation	nr	Avg	0.170	HW-7-3933
Ritzville	02/28/46	Adams	Vegetation	nr		0.300	HW-7-3517
Ritzville	01/31/46	Adams	Vegetation	nr		0.030	HW-7-3322
Ritzville	05/31/46	Adams	Vegetation	nr	Avg	0.040	HW-7-4312
Ritzville +15 Miles	04/23/46	Adams	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Ritzville +17 Miles	04/23/46	Adams	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Ritzville +5 Miles	04/23/46	Adams	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Ritzville N+10 Miles	04/13/46	Adams	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Ritzville N+20 Miles	04/13/46	Adams	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Ritzville N+30 Miles	04/13/46	Adams	Vegetation	1.00 $\pm$ 3		nr	HEW-616-T
Ritzville N+50 Miles	04/13/46	Adams	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Ritzville N+60 Miles	04/13/46	Adams	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Ritzville N-1 Mile	04/13/46	Adams	Vegetation	4.00 $\pm$ 3		nr	HEW-616-T
Ritzville N-40	04/13/46	Adams	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Ritzville, Rt. 395	04/23/46	Adams	Vegetation	1.00 $\pm$ 3		nr	HEW-616-T
Riverland	07/24/46	Benton	Vegetation	nr		0.050	HW-7-4440
Riverland	09/18/46	Benton	Vegetation	nr	Max	0.100	HW-7-5042
Riverland	09/18/46	Benton	Vegetation	nr	Avg	0.070	HW-7-5042
Riverland	04/03/46	Benton	Cheat Gr.	22.00 $\pm$ 3		nr	HEW-616-T
Riverland	04/24/46	Benton	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Riverland	05/07/46	Benton	Vegetation	6.00 $\pm$ 2		nr	HEW-616-T
Riverland	05/15/46	Benton	Vegetation	6.00 $\pm$ 2		nr	HEW-616-T
Roberts Ranch, Rattlesnake Mountain	05/15/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Route 97, The Dalles Ferry #30	04/13/46	Wasco	Vegetation	3.00 $\pm$ 3		nr	HEW-616-T
Rowena, 15 Miles from Hood River	02/09/46	Wasco	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
Rt. 97, 3 Miles from Yakima	01/12/46	Yakima	Vegetation	5.10 $\pm$ 2.5		nr	HEW-616-T
Rt. 1, 0 Miles from Pasco	05/26/46	Franklin	Vegetation	1.00 $\pm$ 2	*	nr	HEW-616-T
Rt. 10, 1 Mile from Ellensburg	04/13/46	Kittitas	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Rt. 10, 1 Mile from Moses Lake	04/13/46	Grant	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Rt. 10, 10 Miles from Ellensburg	01/12/46	Kittitas	Vegetation	4.80 $\pm$ 2.7		nr	HEW-616-T
Rt. 10, 100 Miles from Ellensburg	01/12/46	Adams	Vegetation	2.00 $\pm$ 2.3		nr	HEW-616-T
Rt. 10, 101 Miles from Ellensburg	04/13/46	Adams	Vegetation	15.00 $\pm$ 2		nr	HEW-616-T
Rt. 10, 11 Miles from Ellensburg	04/13/46	Kittitas	Vegetation	0.0 $\pm$ 3		nr	HEW-616-T
Rt. 10, 110 Miles from Ellensburg	01/12/46	Adams	Vegetation	4.50 $\pm$ 2.4		nr	HEW-616-T
Rt. 10, 111 Miles from Ellensburg	04/13/46	Adams	Vegetation	10.00 $\pm$ 2		nr	HEW-616-T
Rt. 10, 16 Miles E. of Burke	02/09/46	Grant	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Rt. 10, 16 Miles E. of Moses Lake	02/09/46	Adams	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Rt. 10, 18 Miles E. of Ellensburg	02/09/46	Kittitas	Vegetation	4.00 $\pm$ 2		0.070	HEW-616-T
Rt. 10, 20 Miles from Ellensburg	01/12/46	Kittitas	Vegetation	2.50 $\pm$ 2.3		nr	HEW-616-T
Rt. 10, 21 Miles from Ellensburg	04/13/46	Kittitas	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Rt. 10, 26 Miles E. of Burke	02/09/46	Grant	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
Rt. 10, 26 Miles E. of Moses Lake	02/09/46	Adams	Vegetation	7.00 $\pm$ 2		0.120	HEW-616-T
Rt. 10, 28 Miles E. of Ellensburg	02/09/46	Kittitas	Vegetation	4.00 $\pm$ 2		0.070	HEW-616-T
Rt. 10, 30 Miles from Ellensburg (Vantage + 1 Mile)	01/12/46	Kittitas	Vegetation	6.20 $\pm$ 2.5		nr	HEW-616-T
Rt. 10, 31 Miles from Ellensburg	04/13/46	Grant	Vegetation	1.00 $\pm$ 3		nr	HEW-616-T
Rt. 10, 36 Miles E. of Moses Lake	02/09/46	Adams	Vegetation	0.30 $\pm$ 2		0.300	HEW-616-T
Rt. 10, 40 Miles from Ellensburg	01/12/46	Grant	Vegetation	2.60 $\pm$ 2.4		nr	HEW-616-T
Rt. 10, 41 Miles from Ellensburg	04/13/46	Grant	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Rt. 10, 50 Miles from Ellensburg	01/12/46	Grant	Vegetation	2.80 $\pm$ 2.8		nr	HEW-616-T
Rt. 10, 51 Miles from Ellensburg	04/13/46	Grant	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Rt. 10, 6 Miles E. of Burke	02/09/46	Grant	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Rt. 10, 6 Miles E. of Moses Lake	02/09/46	Grant	Vegetation	5.00 $\pm$ 2		0.080	HEW-616-T
Rt. 10, 60 Miles from Ellensburg	01/12/46	Grant	Vegetation	11.30 $\pm$ 3		nr	HEW-616-T
Rt. 10, 61 Miles from Ellensburg	04/13/46	Grant	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Rt. 10, 8 Miles E. of Ellensburg	02/09/46	Kittitas	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
Rt. 10, 8 Miles N.E. of Vantage	02/09/46	Grant	Vegetation	1.00 $\pm$ 2	<	0.040	HEW-616-T
Rt. 10, 80 Miles from Ellensburg	01/12/46	Grant	Vegetation	37.40 $\pm$ 3.4		nr	HEW-616-T
Rt. 10, 81 Miles from Ellensburg	04/13/46	Grant	Vegetation	9.00 $\pm$ 3		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Rt. 10, 90 Miles from Ellensburg	01/12/46	Adams	Vegetation	6.30 $\pm$ 2.4		nr	HEW-616-T
Rt. 10, 91 Miles from Ellensburg	04/13/46	Adams	Vegetation	8.00 $\pm$ 3		nr	HEW-616-T
Rt. 11, 10 Miles from Pendleton	02/09/46	Umatilla	Vegetation	4.00 $\pm$ 2		0.070	HEW-616-T
Rt. 11, 10 Miles from Pendleton	02/09/46	Umatilla	Vegetation	6.00 $\pm$ 2		0.100	HEW-616-T
Rt. 11, 10 Miles from Pendleton	03/09/46	Umatilla	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Rt. 11, 13 Miles N. E. of Pendleton	01/12/46	Umatilla	Vegetation	5.20 $\pm$ 2.4		nr	HEW-616-T
Rt. 11, 20 Miles from Pendleton	02/09/46	Umatilla	Vegetation	4.00 $\pm$ 2		0.070	HEW-616-T
Rt. 11, 20 Miles from Pendleton	03/09/46	Umatilla	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Rt. 11, 30 Miles from Pendleton	02/09/46	Umatilla	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Rt. 11, 30 Miles from Pendleton	03/09/46	Umatilla	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Rt. 11, 40 Miles from Pendleton	03/09/46	Walla Walla	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Rt. 11, 8 Miles N.E. of Pendleton	01/12/46	Umatilla	Vegetation	5.60 $\pm$ 2.4		nr	HEW-616-T
Rt. 11, Between Walla Walla and College Place	01/12/46	Walla Walla	Pasture	16.80 $\pm$ 3		nr	HEW-616-T
Rt. 11, Mile 0	04/05/46	Benton	Cheat Gr.	51.00 $\pm$ 4		nr	HEW-616-T
Rt. 11-B, 14 Miles from LaCrosse	03/09/46	Adams	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Rt. 11-B, 24 Miles from LaCrosse	03/09/46	Adams	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Rt. 11-B, 25 Miles from Colfax	03/09/46	Whitman	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Rt. 11-B, 34 Miles from LaCrosse	03/09/46	Franklin	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Rt. 11A, 10 Miles W. of Sunnyside Junction	02/09/46	Yakima	Vegetation	28.00 $\pm$ 3		0.780	HEW-616-T
Rt. 11A, 10 Miles from Yakima Barricade	04/13/46	Yakima	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Rt. 11A, 20 Miles W. of Sunnyside-Yakima Junction	02/09/46	Yakima	Vegetation	5.00 $\pm$ 2		0.080	HEW-616-T
Rt. 11A, 30 Miles from Yakima Barricade	04/13/46	Yakima	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Rt. 11A, 5 Miles W. of Moxee City	02/09/46	Yakima	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Rt. 11A, Sunnyside-Yakima Junction	02/09/46	Yakima	Vegetation	11.00 $\pm$ 2		0.200	HEW-616-T
Rt. 195, 10 Miles from Pullman	03/09/46	Whitman	Vegetation	0.0 $\pm$ 1		nr	HEW-616-T
Rt. 195, 10 Miles from top of Lewiston Grade	02/09/46	Whitman	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Rt. 195, 20 Miles from Lewiston	02/09/46	Nez Perce	Vegetation	1.00 $\pm$ 2	<	0.040	HEW-616-T
Rt. 195, 20 Miles from Lewiston	03/09/46	Whitman	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Rt. 195, 30 Miles from Lewiston	02/09/46	Whitman	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Rt. 195, 30 Miles from Lewiston	03/09/46	Whitman	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Rt. 195, 5 Miles from Pullman	02/09/46	Whitman	Vegetation	0.0 $\pm$ 2	<	0.040	HEW-616-T
Rt. 195, at Calfon Hill	02/09/46	Whitman	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Rt. 195/410, Top of Lewiston Grade	03/09/46	Nez Perce	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Rt. 2, Mile 8	03/15/46	Benton	Gr. Sage	6.00 $\pm$ 2		nr	HEW-616-T
Rt. 295, 15 Miles from Colfax	03/09/46	Whitman	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Rt. 295, 5 Miles from Colfax	03/09/46	Whitman	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Rt. 30, 1 Mile S. of Umatilla	01/12/46	Umatilla	Vegetation	3.00 $\pm$ 2.3		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Rt. 30, 10 Miles from Hermiston	03/09/46	Umatilla	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Rt. 30, 10 Miles from The Dalles, OR	01/12/46	Wasco	Vegetation	7.90 $\pm$ 3		nr	HEW-616-T
Rt. 30, 13 Miles from Umatilla	02/09/46	Umatilla	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Rt. 30, 15.7 Miles from Arlington, OR	01/12/46		Vegetation	4.40 $\pm$ 2.5		nr	HEW-616-T
Rt. 30, 20 Miles from Hermiston	03/09/46	Umatilla	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Rt. 30, 20 Miles from The Dalles, OR	01/12/46	Wasco	Vegetation	4.80 $\pm$ 2.4		nr	HEW-616-T
Rt. 30, 23 Miles from Umatilla	02/09/46	Umatilla	Vegetation	4.00 $\pm$ 2		0.070	HEW-616-T
Rt. 30, 25.5 Miles from Arlington, OR	01/12/46	Sherman	Vegetation	14.10 $\pm$ 2.9		nr	HEW-616-T
Rt. 30, 30 Miles from The Dalles, OR	01/12/46	Sherman	Vegetation	4.20 $\pm$ 2.4		nr	HEW-616-T
Rt. 30, 33 Miles from Umatilla	02/09/46	Umatilla	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Rt. 30, 36.5 Miles from Arlington, OR	01/12/46	Morrow	Vegetation	6.80 $\pm$ 3		nr	HEW-616-T
Rt. 30, 4 Miles West of Pendleton	01/12/46	Umatilla	Vegetation	4.50 $\pm$ 2.7		nr	HEW-616-T
Rt. 30, 40 Miles from The Dalles, OR	01/12/46	Gilliam	Vegetation	2.40 $\pm$ 2.4		nr	HEW-616-T
Rt. 30, 5 Miles S. of Heaton	01/12/46	Umatilla	Vegetation	15.10 $\pm$ 3.1		nr	HEW-616-T
Rt. 30, 5 Miles from Umatilla	02/09/46	Umatilla	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Rt. 30, 5.6 Miles from Arlington, OR	01/12/46	Gilliam	Vegetation	6.40 $\pm$ 2.4		nr	HEW-616-T
Rt. 30, 50 Miles from The Dalles, OR	01/12/46	Gilliam	Vegetation	4.30 $\pm$ 2.7		nr	HEW-616-T
Rt. 30, 6 Miles E. of 207 Junction	01/12/46	Umatilla	Vegetation	0.20 12.3		nr	HEW-616-T
Rt. 30, Arlington #10	04/13/46	Gilliam	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Rt. 30, Arlington #20	04/13/46	Morrow	Vegetation	1.00 $\pm$ 3		nr	HEW-616-T
Rt. 30, Arlington #30	04/13/46	Morrow	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Rt. 30, Arlington #40	04/13/46	Morrow	Vegetation	0.0 $\pm$ 3		nr	HEW-616-T
Rt. 30, Arlington #50	04/13/46	Morrow	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Rt. 30, Edge of The Dalles, OR	01/12/46	Wasco	Vegetation	1.80 $\pm$ 2.4		nr	HEW-616-T
Rt. 30, Pasco #70	04/13/46	Umatilla	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Rt. 30, Pasco #80	04/13/46	Umatilla	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Rt. 30, Pasco #90	04/13/46	Umatilla	Vegetation	0.0 $\pm$ 3		nr	HEW-616-T
Rt. 30, Pendleton	01/12/46	Umatilla	Vegetation	3.60 $\pm$ 2.4		nr	HEW-616-T
Rt. 395, 0.5 Miles from Ritzville	01/12/46	Adams	Vegetation	5.30 $\pm$ 2.4		nr	HEW-616-T
Rt. 395, 1 Mile N. of Pasco	04/13/46	Franklin	Vegetation	11.00 $\pm$ 3		nr	HEW-616-T
Rt. 395, 1 Mile S. of Rt. 10 Intersection	02/09/46	Adams	Vegetation	4.00 $\pm$ 2		0.070	HEW-616-T
Rt. 395, 10 Miles from Ritzville	01/12/46	Adams	Vegetation	0.80 $\pm$ 2.7		nr	HEW-616-T
Rt. 395, 10 Miles from Ritzville	04/13/46	Adams	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Rt. 395, 11 Miles S. of Rt. 10	02/09/46	Adams	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
Rt. 395, 15 Miles S. of Lind	02/09/46	Adams	Vegetation	8.00 $\pm$ 2		0.140	HEW-616-T
Rt. 395, 16 Miles S. of Connell	02/09/46	Franklin	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
Rt. 395, 20 Miles from Ritzville	01/12/46	Adams	Vegetation	6.40 $\pm$ 2.4		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Rt. 395, 20 Miles from Ritzville	04/13/46	Adams	Vegetation	7.00 $\pm$ 3		nr	HEW-616-T
Rt. 395, 21 Miles S. of Rt. 10	02/09/46	Adams	Vegetation	6.00 $\pm$ 2		0.100	HEW-616-T
Rt. 395, 22 Miles Below Pasco	03/09/46	Walla Walla	Vegetation	12.00 $\pm$ 2		nr	HEW-616-T
Rt. 395, 25 Miles S. of Lind	02/09/46	Franklin	Vegetation	8.00 $\pm$ 2		0.140	HEW-616-T
Rt. 395, 30 Miles from Ritzville	01/12/46	Adams	Vegetation	2.50 $\pm$ 2.3		nr	HEW-616-T
Rt. 395, 30 Miles from Ritzville	04/13/46	Adams	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Rt. 395, 32 Miles Below Pasco	03/09/46	Umatilla	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Rt. 395, 40 Miles from Ritzville	01/12/46	Franklin	Vegetation	43.00 $\pm$ 3.8		nr	HEW-616-T
Rt. 395, 40 Miles from Ritzville	04/13/46	Franklin	Vegetation	1.00 $\pm$ 3		nr	HEW-616-T
Rt. 395, 50 Miles from Ritzville	01/12/46	Franklin	Vegetation	3.70 $\pm$ 2.8		nr	HEW-616-T
Rt. 395, 50 Miles from Ritzville	04/13/46	Franklin	Vegetation	10.00 $\pm$ 2		nr	HEW-616-T
Rt. 395, 6 Miles S. of Connell	02/09/46	Franklin	Vegetation	1.00 $\pm$ 2	<	0.040	HEW-616-T
Rt. 395, 6 Miles from Wallula	02/09/46	Walla Walla	Vegetation	10.00 $\pm$ 2		0.180	HEW-616-T
Rt. 395, 60 Miles from Ritzville	01/12/46	Franklin	Vegetation	10.80 $\pm$ 2.7		nr	HEW-616-T
Rt. 395, 60 Miles from Ritzville	04/13/46	Franklin	Vegetation	7.00 $\pm$ 2		nr	HEW-616-T
Rt. 395, 70 Miles from Ritzville	01/12/46	Franklin	Vegetation	5.30 $\pm$ 2.4		nr	HEW-616-T
Rt. 395, 70 Miles from Ritzville	04/13/46	Franklin	Vegetation	12.00 $\pm$ 2		nr	HEW-616-T
Rt. 395, 8 Miles S. of Eltopia	02/09/46	Franklin	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
Rt. 395, Pasco #10	04/13/46	Walla Walla	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Rt. 395/730, Pasco #20	04/13/46	Walla Walla	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Rt. 395/730, Pasco #30	04/13/46	Umatilla	Vegetation	0.0 $\pm$ 3		nr	HEW-616-T
Rt. 3A, Toppenish #14	04/13/46	Yakima	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Rt. 3A, Toppenish +25 Miles	04/13/46	Yakima	Vegetation	9.00 $\pm$ 2		nr	HEW-616-T
Rt. 4, 0 Miles from Pasco	05/14/46	Franklin	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Rt. 410, 10 Miles from Walla Walla	02/09/46	Walla Walla	Vegetation	5.00 $\pm$ 2		0.080	HEW-616-T
Rt. 410, 10 Miles from Walla Walla	03/09/46	Walla Walla	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Rt. 410, 10.6 Miles from Richland "Y"	01/12/46	Benton	Vegetation	68.00 $\pm$ 4.8		nr	HEW-616-T
Rt. 410, 100 Miles from Walla Walla	03/09/46	Asotin	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Rt. 410, 20 Miles from Richland "Y"	01/12/46	Benton	Vegetation	41.20 $\pm$ 3.5		nr	HEW-616-T
Rt. 410, 20 Miles from Walla Walla	02/09/46	Walla Walla	Vegetation		<	0.040	HEW-616-T
Rt. 410, 20 Miles from Walla Walla	02/09/46	Walla Walla	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
Rt. 410, 20 Miles from Walla Walla	03/09/46	Walla Walla	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Rt. 410, 30 Miles from Walla Walla	02/09/46	Columbia	Vegetation	4.00 $\pm$ 2		0.070	HEW-616-T
Rt. 410, 30 Miles from Walla Walla	03/09/46	Columbia	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Rt. 410, 30.1 Miles from Richland "Y"	01/12/46	Benton	Vegetation	14.40 $\pm$ 2.9		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Rt. 410, 30.2 Miles from Richland "Y" (Prosser)	01/12/46	Benton	Vegetation	10.10 $\pm$ 2.7		nr	HEW-616-T
Rt. 410, 35 Miles from Walla Walla	02/09/46	Columbia	Vegetation	4.00 $\pm$ 2		0.070	HEW-616-T
Rt. 410, 38.2 Miles Above Umatilla	01/12/46	Walla Walla	Vegetation	43.50 $\pm$ 3.8		nr	HEW-616-T
Rt. 410, 4.2 Miles Above Pasco	01/12/46	Franklin	Vegetation	113.30 $\pm$ 5.2		nr	HEW-616-T
Rt. 410, 40 Miles from Walla Walla	02/09/46	Columbia	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Rt. 410, 40 Miles from Walla Walla	03/09/46	Columbia	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Rt. 410, 50 Miles from Walla Walla	02/09/46	Columbia	Vegetation	4.00 $\pm$ 2		0.070	HEW-616-T
Rt. 410, 50 Miles from Walla Walla	02/09/46	Columbia	Vegetation	5.00 $\pm$ 2		0.080	HEW-616-T
Rt. 410, 50 Miles from Walla Walla	03/09/46	Columbia	Vegetation	0.0 $\pm$ 1		nr	HEW-616-T
Rt. 410, 60 Miles from Walla Walla	02/09/46	Garfield	Vegetation	0.0 $\pm$ 2	<	0.040	HEW-616-T
Rt. 410, 60 Miles from Walla Walla	03/09/46	Garfield	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Rt. 410, 70 Miles from Walla Walla	02/09/46	Garfield	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
Rt. 410, 70 Miles from Walla Walla	03/09/46	Garfield	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Rt. 410, 80 Miles from Walla Walla	02/09/46	Garfield	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Rt. 410, 80 Miles from Walla Walla	03/09/46	Garfield	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Rt. 410, 90 Miles from Walla Walla	03/09/46	Asotin	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Rt. 410, E. Outskirts of Walla Walla	03/09/46	Walla Walla	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Rt. 410, Toppenish #35	04/13/46	Yakima	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Rt. 410, Toppenish #45	04/13/46	Yakima	Vegetation	3.00 $\pm$ 1		nr	HEW-616-T
Rt. 410, Toppenish #55	04/13/46	Yakima	Vegetation	2.00 $\pm$ 1		nr	HEW-616-T
Rt. 730, 10 Miles from Wallula	02/09/46	Umatilla	Vegetation	4.00 $\pm$ 2		0.070	HEW-616-T
Rt. 730, 20 Miles Below Wallula	02/09/46	Umatilla	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
Rt. 730, Pasco #40	04/13/46	Umatilla	Vegetation	1.00 $\pm$ 3		nr	HEW-616-T
Rt. 730, Pasco #50	04/13/46	Umatilla	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Rt. 730, Pasco #60	04/13/46	Umatilla	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Rt. 730/395, 18.3 Miles Above Umatilla	01/12/46	Benton	Vegetation	10.80 $\pm$ 2.7		nr	HEW-616-T
Rt. 730/395, 28.2 Miles Above Umatilla	01/12/46	Benton	Vegetation	20.80 $\pm$ 3.4		nr	HEW-616-T
Rt. 730/395, 8.2 Miles from Umatilla	01/12/46	Umatilla	Vegetation	11.70 $\pm$ 2.7		nr	HEW-616-T
Rt. 830, 18.2 Miles Below Maryhill, WA	01/12/46	Klickitat	Vegetation	11.60 $\pm$ 2.7		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Rt. 830, 8.2 Miles Below Maryhill, WA	01/12/46	Klickitat	Vegetation	6.40 $\pm$ 2.4		nr	HEW-616-T
Rt. 830, Lyle +7 Miles, 50 ft. Above Water Level	02/09/46	Klickitat	Vegetation	7.00 $\pm$ 2		0.120	HEW-616-T
Rt. 830, Smithville +3 Miles, 20' Above Col. River	02/09/46	Klickitat	Vegetation	nr $\pm$ 2	<	0.040	HEW-616-T
Rt. 830, The Dalles Ferry #10	04/13/46	Klickitat	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Rt. 97, 0.5 Miles N. of The Dalles Ferry	04/13/46	Klickitat	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Rt. 97, 1.7 Miles from Toppenish, WA	01/12/46	Yakima	Vegetation	3.40 $\pm$ 2.4		nr	HEW-616-T
Rt. 97, 11.8 Miles from Goldendale, WA	01/12/46	Yakima	Vegetation	4.40 $\pm$ 2.7		nr	HEW-616-T
Rt. 97, 12 Miles from Yakima	04/13/46	Yakima	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Rt. 97, 12.8 Miles from Toppenish, WA	01/12/46	Yakima	Vegetation	9.60 $\pm$ 2.4		nr	HEW-616-T
Rt. 97, 13 Miles from Yakima	01/12/46	Kittitas	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Rt. 97, 15 Miles N. of Yakima	02/09/46	Kittitas	Vegetation	3.00 $\pm$ 2		0.050	HEW-616-T
Rt. 97, 22 Miles from Yakima	04/13/46	Kittitas	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Rt. 97, 22.8 Miles from Toppenish, WA	01/12/46	Yakima	Vegetation	1.90 $\pm$ 2.5		nr	HEW-616-T
Rt. 97, 23 Miles, from Yakima	01/12/46	Kittitas	Vegetation	0.40 $\pm$ 2.3		nr	HEW-616-T
Rt. 97, 25 Miles N. of Yakima	02/09/46	Kittitas	Vegetation	1.00 $\pm$ 2	<	0.040	HEW-616-T
Rt. 97, 32 Miles from Yakima	04/13/46	Kittitas	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Rt. 97, 32.8 Miles from Toppenish, WA	01/12/46	Klickitat	Vegetation	1.50 $\pm$ 2.8		nr	HEW-616-T
Rt. 97, 33 Miles from Yakima	01/12/46	Kittitas	Vegetation	2.20 $\pm$ 2.3		nr	HEW-616-T
Rt. 97, 35 Miles N. of Yakima	02/09/46	Kittitas	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
Rt. 97, 42.8 Miles from Toppenish, WA	01/12/46	Klickitat	Vegetation	0.80 $\pm$ 2.3		nr	HEW-616-T
Rt. 97, 5 Miles N. of Yakima	02/09/46	Yakima	Vegetation	1.00 $\pm$ 2	<	0.040	HEW-616-T
Snake River, 2.5 Miles N. on US-295	01/12/46	Whitman	Vegetation	0.10 $\pm$ 2.4		nr	HEW-616-T
Snively Ranch, at Springs	05/15/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Spokane	04/13/46	Spokane	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Spokane +10 Miles	04/23/46	Spokane	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Spokane +20, Hwy 10	04/23/46	Spokane	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Spokane +30 Miles	04/23/46	Spokane	Vegetation	8.00 $\pm$ 2		nr	HEW-616-T
Spokane +40 Miles	04/23/46	Spokane	Vegetation	3.00 $\pm$ 3		nr	HEW-616-T
Spokane +50 Miles	04/23/46	Spokane	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Spokane +60 Miles	04/23/46	Spokane	Vegetation	6.00 $\pm$ 2		nr	HEW-616-T
Spokane +70 Miles	04/23/46	Spokane	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Spokane +80 Miles	04/23/46	Spokane	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Spokane S +10 Miles	04/13/46	Spokane	Vegetation	nr $\pm$ 3		nr	HEW-616-T
Spokane S +20 Miles	04/13/46	Spokane	Vegetation	4.00 $\pm$ 2		nr	HEW-616-T
Spokane S +30 Miles	04/13/46	Spokane	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Spokane S +40 Miles	04/13/46	Spokane	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Spokane S +50 Miles	04/13/46	Spokane	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Spokane, W. Edge	04/23/46	Spokane	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Sprague	04/23/46	Lincoln	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Sprague +10 Miles	04/23/46	Lincoln	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Sprague +20 Miles	04/23/46	Lincoln	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Stevenson +2 Miles, 20 ft. Above Water Level	02/09/46	Skamania	Vegetation	0.0 $\pm$ 2	<	0.040	HEW-616-T
Sunnyside	04/24/46	Yakima	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Sunnyside +7 Miles	02/09/46	Yakima	Vegetation	6.00 $\pm$ 2		0.100	HEW-616-T
The Dalles +20 Miles, Celilo +5	02/09/46	Wasco	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
The Dalles +30 Miles	02/09/46	Wasco	Vegetation	1.00 $\pm$ 2	<	0.040	HEW-616-T
The Dalles +40 Miles	02/09/46	Wasco	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
The Dalles +50 Miles	02/09/46	Wasco	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
The Dalles Ferry, Washington Side	04/13/46	Wasco	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
The Dalles OR, +10 Miles	02/09/46	Wasco	Vegetation	0.0 $\pm$ 2	<	0.040	HEW-616-T
The Dalles, OR	02/28/46	Wasco	Vegetation	nr		0.050	HW-7-3517
The Dalles, OR	01/31/46	Wasco	Vegetation	nr		0.070	HW-7-3322
The Dalles, OR	05/31/46	Wasco	Vegetation	nr	Avg	0.150	HW-7-4312
The Dalles, OR	02/09/46	Wasco	Vegetation	0.0 $\pm$ 2	<	0.040	HEW-616-T
Toppenish +17 Miles	02/09/46	Yakima	Vegetation	2.00 $\pm$ 2		0.040	HEW-616-T
Toppenish +27 Miles	02/09/46	Yakima	Vegetation	1.00 $\pm$ 2	<	0.040	HEW-616-T
Toppenish +37 Miles, Satus Pass	02/09/46	Yakima	Vegetation	0.0 $\pm$ 2	<	0.040	HEW-616-T
Toppenish +7 Miles	02/09/46	Yakima	Vegetation	4.00 $\pm$ 2		0.070	HEW-616-T
Toppenish, 2.8 Miles from on US-410	01/12/46	Yakima	Vegetation	1.80 $\pm$ 2.3		nr	HEW-616-T
Umatilla Valley OR, +12 Miles	02/09/46	Umatilla	Vegetation	6.00 $\pm$ 2		0.100	HEW-616-T
Umatilla Valley OR, +18 Miles	02/09/46	Umatilla	Vegetation	4.00 $\pm$ 2		0.070	HEW-616-T
Umatilla Valley OR, +2 Miles	02/09/46	Umatilla	Vegetation	7.00 $\pm$ 2		0.120	HEW-616-T
Umatilla Valley OR, +28 Miles	02/09/46	Walla Walla	Vegetation	4.00 $\pm$ 2		0.070	HEW-616-T
Umatilla Valley OR, +38 Miles (Pasco)	02/09/46	Franklin	Vegetation	8.00 $\pm$ 2		0.140	HEW-616-T
Umatilla Valley OR, +8 Miles	02/09/46	Umatilla	Vegetation	3.00 $\pm$ 2		0.040	HEW-616-T
Van Giesen, 3 Mi. E. of R.R. Underpass	07/17/46	Benton	Vegetation	nr		0.090	HW-7-4423
Van Giesen, 3 Mi. E. of R.R. Underpass	07/16/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Van Giesen, 6 Mi. E. of R.R. Underpass	07/17/46	Benton	Vegetation	nr		0.090	HW-7-4423
Van Giesen, 6 Mi. E. of R.R. Underpass	07/16/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Van Giesen, Inter. with Underpass	06/18/46	Benton	Vegetation	3.00 $\pm$ 3		nr	HEW-616-T
Van Giesen, Junction with US-410	07/24/46	Benton	Vegetation	nr		0.050	HW-7-4440
Van Giesen, Junction with US-410	07/17/46	Benton	Vegetation	nr		0.050	HW-7-4423
Van Giesen, Junction with US-410	09/18/46	Benton	Vegetation	nr	Max	0.120	HW-7-5042
Van Giesen, Junction with US-410	09/18/46	Benton	Vegetation	nr	Avg	0.080	HW-7-5042
Van Giesen, Junction with US-410	06/11/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Van Giesen, Junction with US-410	07/02/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T

Table A.2. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Van Giesen, Junction with US-410	07/09/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Van Giesen, Junction with US-410	07/23/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Van Giesen, Junction with US-410	07/30/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Van Giesen, R.R. Underpass	07/24/46	Benton	Vegetation	nr	<	0.040	HW-7-4440
Van Giesen, R.R. Underpass	07/17/46	Benton	Vegetation	nr	<	0.040	HW-7-4423
Van Giesen, R.R. Underpass	09/18/46	Benton	Vegetation	nr	Max <	0.040	HW-7-5042
Van Giesen, R.R. Underpass	09/18/46	Benton	Vegetation	nr	Avg <	0.040	HW-7-5042
Van Giesen, R.R. Underpass	05/28/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Van Giesen, R.R. Underpass	06/11/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Van Giesen, R.R. Underpass	06/18/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Van Giesen, R.R. Underpass	07/02/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Van Giesen, R.R. Underpass	07/09/46	Benton	Vegetation	22.00 $\pm$ 3		nr	HEW-616-T
Van Giesen, R.R. Underpass	07/16/46	Benton	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Van Giesen, R.R. Underpass	07/23/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Van Giesen, R.R. Underpass	07/30/46	Benton	Vegetation	1.00 $\pm$ 3		nr	HEW-616-T
Van Giesen, R.R. Underpass	08/06/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Van Giesen, Riding Stables	07/24/46	Benton	Vegetation	nr		0.050	HW-7-4440
Van Giesen, Riding Stables	09/18/46	Benton	Vegetation	nr	Max	0.240	HW-7-5042
Van Giesen, Riding Stables	09/18/46	Benton	Vegetation	nr	Avg	0.130	HW-7-5042
Van Giesen, Riding Stables	06/18/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Van Giesen, Riding Stables	07/02/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Van Giesen, Riding Stables	07/09/46	Benton	Vegetation	2.00 $\pm$ 2		nr	HEW-616-T
Van Giesen, Riding Stables	07/23/46	Benton	Vegetation	3.00 $\pm$ 2		nr	HEW-616-T
Van Giesen, Riding Stables	07/30/46	Benton	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Van Giesen, Tract-h	08/08/46	Benton	Peach Lvs	0.0 $\pm$ 2		nr	HEW-616-T
Van Giesen, Tract-h	08/08/46	Benton	Peaches	0.0 $\pm$ 2		nr	HEW-616-T
Van Giesen, Yakima Bridge	05/28/46	Benton	Vegetation	19.00 $\pm$ 3		nr	HEW-616-T
Van Giesen, Yakima Bridge	08/06/46	Benton	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Waitsburg Valley, 7 Miles N. on US-410	01/12/46	Columbia	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Walla Walla	02/28/46	Walla Walla	Vegetation	nr		0.080	HW-7-3517
Walla Walla	01/31/46	Walla Walla	Vegetation	nr		0.100	HW-7-3322
Walla Walla	04/13/46	Walla Walla	Vegetation	5.00 $\pm$ 3		nr	HEW-616-T
Walla Walla +20 Miles	04/13/46	Walla Walla	Vegetation	5.00 $\pm$ 2		nr	HEW-616-T
Walla Walla W +10 Miles	04/13/46	Walla Walla	Vegetation	2.00 $\pm$ 3		nr	HEW-616-T
Walla Walla W +28 Miles	04/13/46	Columbia	Vegetation	1.00 $\pm$ 2		nr	HEW-616-T
Walla Walla, 9 Miles N.E. on US-410	01/12/46	Walla Walla	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Washtucna, 7 Miles S.W. on Rt. 11-B	01/12/46	Adams	Vegetation	5.40 $\pm$ 2.4		nr	HEW-616-T
Wenatchee +10 Miles	04/24/46	Douglas	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T
Weston OR, +10 Miles	03/22/46	Umatilla	Vegetation	2.00 $\pm$ 1		nr	HEW-616-T
Weston OR, +15 Miles	03/22/46	Umatilla	Vegetation	1.00 $\pm$ 1		nr	HEW-616-T
Weston OR, +20 Miles	03/22/46	Umatilla	Vegetation	1.00 $\pm$ 1		nr	HEW-616-T
Weston OR, +5 Miles	03/22/46	Umatilla	Vegetation	2.00 $\pm$ 1		nr	HEW-616-T
Weston OR, 3 Miles N. on Rt. 11	01/12/46	Umatilla	Vegetation	0.0 $\pm$ 2		nr	HEW-616-T

Table A.2. (contd)

<u>Sampling Location</u>	<u>Date</u>	<u>County</u>	<u>Sample Type</u>	<u>CPM +/-1 SD</u>	<u>Notes</u>	<u>Reported μCi/kg</u>	<u>Reference</u>
Weston, OR	03/22/46	Umatilla	Vegetation	2.00 ±1		nr	HEW-616-T
Wills Ranch	09/18/46	Benton	Vegetation	nr	Max	0.440	HW-7-5042
Wills Ranch	09/18/46	Benton	Vegetation	nr	Avg	0.440	HW-7-5042
Yakima +16 Miles	04/24/46	Yakima	Vegetation	nr ±2		nr	HEW-616-T
Yakima +26 Miles	04/24/46	Yakima	Vegetation	2.00 ±2		nr	HEW-616-T
Yakima +6 Miles	04/24/46	Yakima	Vegetation	1.00 ±2		nr	HEW-616-T
Yakima Barricade	04/24/46	Benton	Vegetation	0.0 ±2		nr	HEW-616-T
Yakima Barricade, 5 Miles from	04/13/46	Benton	Vegetation	6.00 ±2		nr	HEW-616-T
Yakima Barricade, on Rt. 11A	04/13/46	Benton	Vegetation	0.0 ±2		nr	HEW-616-T
Yakima, 2 Miles from	04/13/46	Yakima	Vegetation	0.0 ±2		nr	HEW-616-T
Zillah +2 Miles	02/09/46	Yakima	Vegetation	5.00 ±2		0.080	HEW-616-T
Zillah, 1.5 Miles from, on US-410	01/12/46	Yakima	Vegetation	10.10 ±2.7		nr	HEW-616-T

Table A.3. 1947 Iodine-131 Vegetation Contamination Data from Locations Surrounding the Hanford Site

<u>Sampling Location</u>	<u>Date</u>	<u>County</u>	<u>Sample Type</u>	<u>CPM +/-1 SD</u>	<u>Notes</u>	<u>Reported μCi/kg</u>	<u>Reference</u>
Benton City	01/31/47	Benton	Vegetation	nr	Avg	0.460	HW-7-5882
Benton City	02/28/47	Benton	Vegetation	nr	Max	0.310	HW-7-5882
Benton City	02/28/47	Benton	Vegetation	nr	Avg	0.140	HW-7-5882
Benton City	03/31/47	Benton	Vegetation	nr	Max	0.310	HW-7-6047
Benton City	03/31/47	Benton	Vegetation	nr	Avg	0.160	HW-7-6047
Benton City	04/30/47	Benton	Vegetation	nr	Max	0.070	HW-7-6152
Benton City	04/30/47	Benton	Vegetation	nr	Avg	0.030	HW-7-6152
Benton City	05/31/47	Benton	Vegetation	nr	Max	0.100	HW-7-6392
Benton City	05/31/47	Benton	Vegetation	nr	< Avg	0.040	HW-7-6392
Benton City	06/30/47	Benton	Vegetation	nr	Max	0.110	HW-7046
Benton City	06/30/47	Benton	Vegetation	nr	< Avg	0.040	HW-7046
Benton City	07/31/47	Benton	Vegetation	nr	Max	0.060	HW-7281
Benton City	07/31/47	Benton	Vegetation	nr	< Avg	0.040	HW-7281
Benton City	08/31/47	Benton	Vegetation	nr	Max	0.060	HW-7534
Benton City	08/31/47	Benton	Vegetation	nr	< Avg	0.040	HW-7534
Benton City	09/30/47	Benton	Vegetation	nr	Max	0.075	HW-7831
Benton City	09/30/47	Benton	Vegetation	nr	Avg	0.050	HW-7831
Benton City	10/31/47	Benton	Vegetation	nr	Max	0.110	HW-8027
Benton City	10/31/47	Benton	Vegetation	nr	< Avg	0.040	HW-8027
Benton City	11/30/47	Benton	Vegetation	nr	Max	0.060	HW-8243
Benton City	11/30/47	Benton	Vegetation	nr	< Avg	0.040	HW-8243
Benton City	12/31/47	Benton	Vegetation	nr	Max	0.130	HW-8486
Benton City	12/31/47	Benton	Vegetation	nr	Avg	0.060	HW-8486
E. End Yakima Bridge 11A	09/25/47	Benton	Vegetation	8.2			Box HA-40313
Enterprise, Ore., 1 mile E.	10/27/47	Union	Vegetation	-3.56 ± 8.9		-0.016	Box HA-40313
Kennewick	01/31/47	Benton	Vegetation	nr	Avg	0.180	HW-7-5882
Kennewick	02/28/47	Benton	Vegetation	nr	Max	0.370	HW-7-5882
Kennewick	02/28/47	Benton	Vegetation	nr	Avg	0.120	HW-7-5882
Kennewick	03/31/47	Benton	Vegetation	nr	Max	0.440	HW-7-6047
Kennewick	03/31/47	Benton	Vegetation	nr	Avg	0.210	HW-7-6047
Kennewick	04/30/47	Benton	Vegetation	nr	Max	0.290	HW-7-6152
Kennewick	04/30/47	Benton	Vegetation	nr	Avg	0.070	HW-7-6152
Kennewick	05/31/47	Benton	Vegetation	nr	Max	0.150	HW-7-6392
Kennewick	05/31/47	Benton	Vegetation	nr	Avg	0.070	HW-7-6392
Kennewick	06/30/47	Benton	Vegetation	nr	Max	0.200	HW-7046
Kennewick	06/30/47	Benton	Vegetation	nr	Avg	0.050	HW-7046
Kennewick	07/31/47	Benton	Vegetation	nr	Max	0.090	HW-7281
Kennewick	07/31/47	Benton	Vegetation	nr	< Avg	0.040	HW-7281
Kennewick	08/31/47	Benton	Vegetation	nr	Max	0.090	HW-7534
Kennewick	08/31/47	Benton	Vegetation	nr	< Avg	0.040	HW-7534
Kennewick	09/30/47	Benton	Vegetation	nr	Max	0.110	HW-7831
Kennewick	09/30/47	Benton	Vegetation	nr	< Avg	0.040	HW-7831
Kennewick	10/31/47	Benton	Vegetation	nr	Max	0.160	HW-8027
Kennewick	10/31/47	Benton	Vegetation	nr	Avg	0.040	HW-8027
Kennewick	11/30/47	Benton	Vegetation	nr	Max	0.100	HW-8243

Table A.3. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Benton City	01/31/47	Benton	Vegetation	nr	Avg	0.460	HW-7-5882
Kennewick	11/30/47	Benton	Vegetation	nr	< Avg	0.040	HW-8243
Kennewick	12/31/47	Benton	Vegetation	nr	Max	0.240	HW-8486
Kennewick	12/31/47	Benton	Vegetation	nr	Avg	0.050	HW-8486
Langdon Lake, 1 Mile E.	10/27/47	Umatilla	Vegetation	4.46 $\pm$ 8.9		0.020	Box HA-40313
Langdon Lake, 10 Miles E.	10/27/47	Union	Vegetation	2.23 $\pm$ 8.9		0.010	Box HA-40313
Langdon Lake, 16.5 Miles E.	10/27/47	Union	Vegetation	4.46 $\pm$ 8.9		0.020	Box HA-40313
Langdon Lake, 18 Miles from	10/27/47	Union	Vegetation	-3.56 $\pm$ 8.9		-0.016	Box HA-40313
Langdon Lake, 2.5 Miles E.	10/27/47	Union	Vegetation	-2.67 $\pm$ 8.9		0.012	Box HA-40313
Lostine, Ore., Hilltop E. of	10/27/47	Wallowa	Vegetation	-1.34 $\pm$ 8.9		-0.006	Box HA-40313
Minam Hill, Summit	10/27/47	Union	Vegetation	-7.14 $\pm$ 8.9		-0.032	Box HA-40313
Moxee City, E. Side	09/25/47	Yakima	Vegetation	16.40 $\pm$ 8.2		0.074	Box HA-40313
Pasco	01/31/47	Franklin	Vegetation	nr	Avg	0.220	HW-7-5882
Pasco	02/28/47	Franklin	Vegetation	nr	Max	0.310	HW-7-5882
Pasco	02/28/47	Franklin	Vegetation	nr	Avg	0.110	HW-7-5882
Pasco	03/31/47	Franklin	Vegetation	nr	Max	0.740	HW-7-6047
Pasco	03/31/47	Franklin	Vegetation	nr	Avg	0.130	HW-7-6047
Pasco	04/30/47	Franklin	Vegetation	nr	Max	0.100	HW-7-6152
Pasco	04/30/47	Franklin	Vegetation	nr	Avg	0.050	HW-7-6152
Pasco	05/31/47	Franklin	Vegetation	nr	Max	0.200	HW-7-6392
Pasco	05/31/47	Franklin	Vegetation	nr	Avg	0.060	HW-7-6392
Pasco	06/30/47	Franklin	Vegetation	nr	Max	0.120	HW-7046
Pasco	06/30/47	Franklin	Vegetation	nr	Avg	0.040	HW-7046
Pasco	07/31/47	Franklin	Vegetation	nr	Max	0.130	HW-7281
Pasco	07/31/47	Franklin	Vegetation	nr	Avg	0.040	HW-7281
Pasco	08/31/47	Franklin	Vegetation	nr	Max	0.070	HW-7534
Pasco	08/31/47	Franklin	Vegetation	nr	< Avg	0.040	HW-7534
Pasco	09/30/47	Franklin	Vegetation	nr	Max	0.100	HW-7831
Pasco	09/30/47	Franklin	Vegetation	nr	< Avg	0.040	HW-7831
Pasco	10/31/47	Franklin	Vegetation	nr	Max	0.110	HW-8027
Pasco	10/31/47	Franklin	Vegetation	nr	< Avg	0.040	HW-8027
Pasco	11/30/47	Franklin	Vegetation	nr	Max	0.260	HW-8243
Pasco	11/30/47	Franklin	Vegetation	nr	Avg	0.050	HW-8243
Pasco	12/31/47	Franklin	Vegetation	nr	Max	0.240	HW-8486
Pasco	12/31/47	Franklin	Vegetation	nr	Avg	0.050	HW-8486
Richland	01/31/47	Benton	Vegetation	nr	Avg	0.430	HW-7-5882
Richland	02/28/47	Benton	Vegetation	nr	Max	0.360	HW-7-5882
Richland	02/28/47	Benton	Vegetation	nr	Avg	0.190	HW-7-5882
Richland	03/31/47	Benton	Vegetation	nr	Max	0.770	HW-7-6047
Richland	03/31/47	Benton	Vegetation	nr	Avg	0.220	HW-7-6047
Richland	04/30/47	Benton	Vegetation	nr	Max	0.360	HW-7-6152
Richland	04/30/47	Benton	Vegetation	nr	Avg	0.060	HW-7-6152
Richland	05/31/47	Benton	Vegetation	nr	Max	0.130	HW-7-6392
Richland	05/31/47	Benton	Vegetation	nr	Avg	0.050	HW-7-6392
Richland	06/30/47	Benton	Vegetation	nr	Max	0.420	HW-7046
Richland	06/30/47	Benton	Vegetation	nr	Avg	0.070	HW-7046

Table A.3. (contd)

Sampling Location	Date	County	Sample Type	CPM +/-1 SD	Notes	Reported $\mu\text{Ci/kg}$	Reference
Benton City	01/31/47	Benton	Vegetation	nr	Avg	0.460	HW-7-5882
Richland	07/31/47	Benton	Vegetation	nr	Max	0.200	HW-7281
Richland	07/31/47	Benton	Vegetation	nr	Avg	0.040	HW-7281
Richland	08/31/47	Benton	Vegetation	nr	<Max	0.040	HW-7534
Richland	08/31/47	Benton	Vegetation	nr	<Avg	0.040	HW-7534
Richland	09/30/47	Benton	Vegetation	nr	Max	0.090	HW-7831
Richland	09/30/47	Benton	Vegetation	nr	<Avg	0.040	HW-7831
Richland	10/31/47	Benton	Vegetation	nr	Max	0.070	HW-8027
Richland	10/31/47	Benton	Vegetation	nr	<Avg	0.040	HW-8027
Richland	11/30/47	Benton	Vegetation	nr	Max	0.070	HW-8243
Richland	11/30/47	Benton	Vegetation	nr	<Avg	0.040	HW-8243
Richland	12/31/47	Benton	Vegetation	nr	Max	0.130	Box-8486
Richland	12/31/47	Benton	Vegetation	nr	Avg	0.050	HW-8486
Richland "Y"	01/31/47	Benton	Vegetation	nr	Avg	0.260	HW-7-5882
Richland "Y"	02/28/47	Benton	Vegetation	nr	Max	0.120	HW-7-5882
Richland "Y"	02/28/47	Benton	Vegetation	nr	Avg	0.090	HW-7-5882
Richland "Y"	03/31/47	Benton	Vegetation	nr	Max	0.260	HW-7-6047
Richland "Y"	03/31/47	Benton	Vegetation	nr	Avg	0.150	HW-7-6047
Richland "Y"	04/30/47	Benton	Vegetation	nr	Max	0.310	HW-7-6152
Richland "Y"	04/30/47	Benton	Vegetation	nr	Avg	0.100	HW-7-6152
Richland "Y"	05/31/47	Benton	Vegetation	nr	Max	0.120	HW-7-6392
Richland "Y"	05/31/47	Benton	Vegetation	nr	Avg	0.070	HW-7-6392
Richland "Y"	06/30/47	Benton	Vegetation	nr	Max	0.380	HW-7046
Richland "Y"	06/30/47	Benton	Vegetation	nr	Avg	0.130	HW-7046
Richland "Y"	07/31/47	Benton	Vegetation	nr	Max	0.060	HW-7281
Richland "Y"	07/31/47	Benton	Vegetation	nr	<Avg	0.040	HW-7281
Richland "Y"	08/31/47	Benton	Vegetation	nr	<Max	0.040	HW-7534
Richland "Y"	08/31/47	Benton	Vegetation	nr	<Avg	0.040	HW-7534
Richland "Y"	09/30/47	Benton	Vegetation	nr	Max	0.090	HW-7831
Richland "Y"	09/30/47	Benton	Vegetation	nr	<Avg	0.040	HW-7831
Richland "Y"	10/31/47	Benton	Vegetation	nr	Max	0.040	HW-8027
Richland "Y"	10/31/47	Benton	Vegetation	nr	<Avg	0.040	HW-8027
Richland "Y"	11/30/47	Benton	Vegetation	nr	Max	0.040	HW-8243
Richland "Y"	11/30/47	Benton	Vegetation	nr	<Avg	0.040	HW-8243
Richland "Y"	12/31/47	Benton	Vegetation	nr	Max	0.130	HW-8486
Richland "Y"	12/31/47	Benton	Vegetation	nr	Avg	0.070	HW-8486
Sunnyside & Yakima Y 11A	09/25/47	Yakima	Vegetation	4.10 $\pm$ 8.2		0.019	Box HA-40313
Tollgate Road past Sunken Road	10/27/47	Umatilla	Vegetation	0.89 $\pm$ 8.9		0.004	Box HA-40313
Wahluke Slope	02/28/47	Grant	Vegetation	nr	Max	0.040	HW-7-5882
Wahluke Slope	02/28/47	Grant	Vegetation	nr	Avg	0.120	HW-7-5882

Appendix B

Columbia River and Drinking Water Monitoring Databases

Appendix B

Columbia River and Drinking Water Monitoring Databases

B.1 Columbia River Monitoring Database 1963 Through 1966

The Columbia River Monitoring Database 1963 through 1966 consists of water sample results as reported in the annual environmental monitoring reports. The data in these reports are organized by location and radionuclide. Within each location/radionuclide combination, the data are arranged chronologically. Each data entry contains the location, radionuclide, sample date, sample type, sample frequency, and sample result in picocuries per liter. Table B.1 provides the Columbia River Monitoring Database. One page of this database is shown in Table B.1 as an example.

B.2 Drinking Water Monitoring Database 1963 Through 1966

3 The structure of the Drinking Water Monitoring Database 1963 through 1966 is exactly the same as that of the Columbia River Monitoring Database. *The Drinking Water Monitoring Database is slightly smaller, consisting of 61 pages. Table B.2 provides a single page as an example of the Drinking Water Monitoring Database.*

B.3 Columbia River Annual Summary Database

The Columbia River Annual Summary Database 1963 through 1966 provides a basic statistical summary of yearly water sample results during this period. The data are organized by year and location in the annual summary database. Each entry contains the location/sample type, the nuclide, the number (#) of samples included in the summary, maximum concentration observed during the summary period, minimum concentration observed during the summary period, and the mean concentration (all concentrations expressed in pCi/L), and the +/- two standard errors of the calculated mean (2SEM). Table B.3 provides a sample of the Columbia River Annual Summary Database.

B.4 Columbia River Monthly Summary Database

The Columbia River Monthly Summary Database 1963 through 1966 is similar to the annual summary database, except that monthly statistical summaries, rather than annual summaries, are provided. This database is organized by location and year. Each data entry includes the month, nuclide, sample type, the number (#) of samples included in the summary, frequency of collection,

maximum concentration observed during the summary period, minimum concentration observed during the summary period, and the mean concentration (all concentrations expressed in pCi/L), and the +/- two standard errors of the calculated mean (2SEM). Table B.4 presents a single page of the Columbia River Monthly Summary Database. The database is composed of 42 pages similar to the example page provided.

B.5 Drinking Water Annual Summary Database

The Drinking Water Annual Summary Database 1963 through 1966 for Richland, Kennewick, and Pasco is organized by year. Each data entry includes the sample type (by location), the radionuclide, the number (#) of samples, the maximum, minimum, and average concentrations (in pCi/L) observed during the month, and the standard error of the mean. The database is composed of five pages. The first page is shown as an example.

Table B.1. 1963 Through 1966 Columbia River Monitoring Database (a)

<u>Location</u>	<u>Nuclide</u>	<u>Date</u>	<u>Type</u>	<u>Freq</u>	<u>pCi/L</u>
As76					
300 Area	As76	01/08/64	Grab	M	1900.00
300 Area	As76	01/22/64	Grab	M	1400.00
300 Area	As76	02/05/64	Grab	M	2500.00
300 Area	As76	02/19/64	Grab	M	2200.00
300 Area	As76	03/11/64	Grab	M	1500.00
300 Area	As76	04/08/64	Grab	M	1900.00
300 Area	As76	05/06/64	Grab	M	880.00
300 Area	As76	06/03/64	Grab	M	1100.00
300 Area	As76	07/21/64	Grab	M	400.00
300 Area	As76	08/11/64	Grab	M	930.00
Co60					
300 Area	Co60	06/15/64	Comp	W	<7.90
300 Area	Co60	06/22/64	Comp	W	<7.90
300 Area	Co60	06/29/64	Comp	W	<8.00
300 Area	Co60	07/06/64	Comp	W	<8.00
300 Area	Co60	07/13/64	Comp	W	<8.00
300 Area	Co60	07/20/64	Comp	W	<8.00
300 Area	Co60	07/27/64	Comp	W	<8.00
300 Area	Co60	08/03/64	Comp	W	<8.00
300 Area	Co60	08/10/64	Comp	W	<8.00
Cr51					
300 Area	Cr51	01/06/64	Comp	W	12000.00
300 Area	Cr51	01/13/64	Comp	W	11000.00
300 Area	Cr51	01/20/64	Comp	W	10000.00
300 Area	Cr51	01/27/64	Comp	W	8400.00
300 Area	Cr51	02/03/64	Comp	W	11000.00
300 Area	Cr51	02/10/64	Comp	W	9800.00
300 Area	Cr51	02/17/64	Comp	W	15000.00
300 Area	Cr51	02/24/64	Comp	W	14000.00
300 Area	Cr51	03/02/64	Comp	W	15000.00
300 Area	Cr51	03/09/64	Comp	W	13000.00
300 Area	Cr51	03/16/64	Comp	W	11000.00
300 Area	Cr51	03/23/64	Comp	W	15000.00
300 Area	Cr51	03/30/64	Comp	W	13000.00
300 Area	Cr51	04/06/64	Comp	W	12000.00
300 Area	Cr51	04/13/64	Comp	W	39000.00
300 Area	Cr51	04/17/64	Comp	W	7500.00
300 Area	Cr51	4/17/64	Comp	W	7500.00

(a) Page 1 of 300 Area Data for 1964.

Table B.2. 1963 Through 1966 Drinking Water Monitoring Database^(a)

<u>Location</u>	<u>Nuclide</u>	<u>Date</u>	<u>Type</u>	<u>Freq</u>	<u>pCi/L</u>
Kennewick	As76	01/28/63	Grab	M	<75.00
Kennewick	As76	03/25/63	Grab	M	<99.00
Kennewick	As76	04/22/63	Grab	M	<76.00
Kennewick	As76	05/20/63	Grab	M	<64.00
Kennewick	As76	06/17/63	Grab	M	<61.00
Kennewick	As76	07/29/63	Grab	M	<63.00
Kennewick	As76	08/19/63	Grab	M	<57.00
Kennewick	As76	09/30/63	Grab	M	<55.00
Kennewick	As76	10/28/63	Grab	M	<64.00
Kennewick	As76	11/11/63	Grab	M	<47.00
Kennewick	As76	12/02/63	Grab	M	<48.00
Kennewick	As76	01/20/64	Grab	M	<58.00
Kennewick	As76	02/24/64	Grab	M	<62.00
Kennewick	As76	03/30/64	Grab	M	<61.00
Kennewick	As76	04/27/64	Grab	M	66.00
Kennewick	As76	05/25/64	Grab	M	<51.00
Kennewick	As76	06/29/64	Grab	M	<51.00
Kennewick	As76	07/27/64	Grab	M	<44.00
Kennewick	As76	08/31/64	Grab	M	<44.00
Kennewick	As76	09/29/64	Grab	M	18.00
Kennewick	As76	10/26/64	Grab	M	<15.00
Kennewick	As76	11/16/64	Grab	M	31.00
Kennewick	As76	03/15/65	Grab	M	13.00
Kennewick	As76	04/19/65	Grab	M	18.00
Kennewick	As76	05/17/65	Grab	M	30.00
Kennewick	As76	06/21/65	Grab	M	5.80
Kennewick	As76	07/19/65	Grab	M	5.30
Kennewick	As76	08/16/65	Grab	M	17.00
Kennewick	As76	09/20/65	Grab	M	15.00
Kennewick	As76	10/18/65	Grab	M	24.00
Kennewick	As76	11/15/65	Grab	M	20.00
Kennewick	As76	12/20/65	Grab	M	16.00
Kennewick	As76	01/17/66	Grab	M	17.00
Kennewick	As76	02/14/66	Grab	M	12.00
Kennewick	As76	03/14/66	Grab	M	10.00
Kennewick	As76	04/18/66	Grab	M	7.30
Kennewick	As76	05/16/66	Grab	M	14.80
Kennewick	As76	06/20/66	Grab	M	9.00
Kennewick	As76	07/18/66	Grab	M	<5.00
Kennewick	As76	8/15/66	Grab	M	<6.00

(a) Page 1 of Kennewick data for As76 only.

Table B.3. 1963 Through 1966 Columbia River Annual Summary Database^(a)

<u>Location/Type</u>	<u>Nuclide</u>	<u>#</u>	<u>Maximum pCi/L</u>	<u>Minimum pCi/L</u>	<u>Mean pCi/L</u>	<u>+/- 2SEM</u>
Hanford						
Grab	As76	15	5000.00	650.00	2274.00	739.56
Grab	Cr51	15	23000.00	3400.00	9020.00	2594.37
Grab	Cu64	15	26000.00	3400.00	14066.67	3317.47
Grab	I131	15	19.00	5.00	11.68	2.08
Grab	Na24	15	13000.00	3200.00	7586.67	1755.41
Grab	Np239	15	6400.00	860.00	3077.33	779.99
Grab	P32	15	650.00	130.00	332.00	85.06
Grab	RE+Y	15	6000.00	350.00	2128.67	756.21
Grab	Sr89+90	13	12.00	3.40	8.16	1.54
Grab	Sr90	15	2.10	0.53	0.84	0.20
Grab	Zn65	15	950.00	180.00	534.67	141.12
Pasco						
Grab	As76	24	1700.00	180.00	754.58	171.95
Grab	Cr51	25	16000.00	2000.00	6736.00	1729.31
Grab	Cu64	24	3800.00	1100.00	2279.17	295.62
Grab	I131	23	17.00	2.40	7.87	1.72
Grab	Na24	25	3100.00	750.00	1630.00	224.28
Grab	Np239	25	6300.00	530.00	1608.80	457.87
Grab	P32	25	430.00	54.00	193.72	42.95
Grab	RE+Y	25	1800.00	120.00	436.80	161.74
Grab	Sr89+90	11	400.00	3.90	42.58	71.50
Grab	Sr90	23	4.50	0.44	1.26	0.41
Grab	Zn65	25	540.00	87.00	218.16	45.24
Richland						
Grab	As76	8	1800.00	540.00	1236.25	396.30
Grab	Cr51	8	21000.00	3700.00	10825.00	5348.13
Grab	Cu64	8	7900.00	2500.00	5600.00	1180.19
Grab	I131	8	17.00	2.70	8.59	3.53
Grab	Na24	8	4600.00	2300.00	3400.00	552.91
Grab	Np239	8	3700.00	1000.00	2237.50	761.52
Grab	P32	8	490.00	71.00	276.38	123.74
Grab	RE+Y	8	1100.00	190.00	492.50	217.25
Grab	Sr90	8	2.00	0.66	1.32	0.43
Grab	Zn65	8	1200.00	130.00	411.25	245.34
Vancouver						
Grab	Cr51	23	5600.00	1000.00	2634.78	489.83
Grab	Np239	12	190.00	0.00	82.17	41.56
Grab	P32	21	93.00	5.00	32.37	11.02
Grab	RE+Y	12	30.00	6.20	15.62	4.33
Grab	Zn65	22	220.00	17.00	62.59	20.34

(a) Page 1 of 1963 data.

Table B.4. 1963 Through 1966 Columbia River Monthly Summary Database^(a)

Month	Nuclide	Type	Freq	#	Maximum pCi/L	Minimum pCi/L	Mean pCi/L	+/- 2SEM
January	Cr51	Comp	W	4	12000.00	8400.00	10350.00	1535.14
January	I131	Comp	W	4	20.00	9.40	13.85	4.51
January	P32	Comp	W	4	300.00	97.00	194.25	100.79
January	Sr90	Comp	W	4	2.20	1.70	1.93	0.21
January	Zn65	Comp	W	4	330.00	260.00	287.50	30.96
February	Cr51	Comp	W	4	15000.00	9800.00	12450.00	2451.53
February	I131	Comp	W	4	13.00	8.10	11.03	2.11
February	Mn54	Comp	W	2	31.00	10.00	20.50	21.00
February	P32	Comp	W	4	300.00	240.00	270.00	25.82
February	Sr90	Comp	W	4	1.80	1.10	1.57	0.32
February	Zn65	Comp	W	4	390.00	270.00	315.00	54.47
March	Cr51	Comp	W	5	15000.00	11000.00	13400.00	1496.66
March	I131	Comp	W	5	23.00	13.00	17.40	3.93
March	Mn54	Comp	W	5	19.00	13.00	15.40	2.06
March	P32	Comp	W	5	390.00	150.00	282.00	79.60
March	Sr90	Comp	W	5	1.70	1.50	1.62	0.10
March	Zn65	Comp	W	5	360.00	270.00	316.00	37.20
April	Cr51	Comp	W	4	39000.00	7500.00	16775.00	14939.96
April	I131	Comp	W	4	67.00	19.00	32.00	23.37
April	Mn54	Comp	W	3	18.00	15.00	17.00	2.00
April	P32	Comp	W	4	430.00	150.00	317.50	129.97
April	Sr90	Comp	W	4	1.20	0.91	1.05	0.13
April	Zn65	Comp	W	4	900.00	270.00	440.00	306.92
May	Cr51	Comp	W	4	10000.00	3700.00	6150.00	2764.66
May	I131	Comp	W	4	19.00	7.40	12.35	4.99
May	Mn54	Comp	W	4	40.00	8.90	19.48	14.08
May	P32	Comp	W	4	440.00	180.00	292.50	120.38
May	Sr90	Comp	W	4	1.30	0.73	1.04	0.26
May	Zn65	Comp	W	4	530.00	250.00	345.00	132.03
June	Co60	Comp	W	3	8.00	7.90	7.93	0.07
June	Cr51	Comp	W	5	2900.00	2000.00	2220.00	342.93
June	I131	Comp	W	5	6.90	3.30	4.20	1.38
June	Mn54	Comp	W	5	10.00	6.50	8.76	1.31
June	P32	Comp	W	5	120.00	13.00	49.00	38.39
June	Sr90	Comp	W	5	1.00	0.73	0.91	0.10
June	Zn65	Comp	W	5	180.00	110.00	134.00	24.98
July	Co60	Comp	W	4	8.00	8.00	8.00	0.00
July	Cr51	Comp	W	4	2500.00	1700.00	2025.00	340.34
July	I131	Comp	W	4	5.60	2.70	4.23	1.19
July	Mn54	Comp	W	4	8.60	5.00	6.92	1.95
July	P32	Comp	W	4	50.00	26.00	36.25	10.21
July	Sr90	Comp	W	4	1.00	0.76	0.88	0.13
July	Zn65	Comp	W	4	160.00	68.00	101.50	43.74
August	Co60	Comp	W	2	8.00	8.00	8.00	0.00

(a) Page 1 of 1964 data for the 300 Area.

Table B.5. 1963 Through 1966 Drinking Water Annual Summary Database^(a)

<u>Location/Type</u>	<u>Nuclide</u>	<u>#</u>	<u>Maximum pCi/L</u>	<u>Minimum pCi/L</u>	<u>Mean pCi/L</u>	<u>+/- 2SEM</u>
Kennewick						
Grab	As76	11	99.00	47.00	64.45	8.89
Grab	Cr51	12	5700.00	210.00	2583.33	1004.28
Grab	Cu64	12	220.00	25.00	89.83	33.83
Grab	I131	12	4.20	1.00	3.32	0.51
Grab	Na24	12	190.00	20.00	89.00	28.03
Grab	Np239	12	110.00	0.00	27.63	19.22
Grab	P32	12	13.00	8.30	9.72	1.07
Grab	RE+Y	12	27.00	4.80	9.96	4.12
Grab	Sr90	5	0.65	0.34	0.54	0.11
Grab	Zn65	12	22.00	17.00	18.83	0.81
Pasco						
Grab	As76	48	520.00	47.00	187.00	737.50
Grab	Cr51	50	12000.00	1400.00	5382.00	859.88
Grab	Cu64	50	1400.00	26.00	396.50	88.77
Grab	I131	50	10.00	2.10	5.29	0.53
Grab	Na24	50	2200.00	99.00	639.76	129.44
Grab	Np239	50	1700.00	180.00	771.00	110.43
Grab	P32	50	120.00	8.40	36.90	7.21
Grab	RE+Y	50	170.00	14.00	47.80	9.10
Grab	Sr90	48	2.60	0.34	1.01	0.18
Grab	Zn65	50	250.00	19.00	87.74	14.95
Richland						
Grab	As76	11	940.00	51.00	452.09	233.58
Grab	Cr51	12	18000.00	380.00	7263.33	3916.80
Grab	Cu64	12	5200.00	9.30	1379.03	1124.43
Grab	I131	11	16.00	3.90	7.87	2.36
Grab	Na24	12	4400.00	27.00	1245.83	944.43
Grab	Np239	7	3000.00	24.00	1694.57	961.20
Grab	P32	12	230.00	6.00	58.20	42.19
Grab	RE+Y	11	170.00	2.80	45.15	36.23
Grab	Sr90	10	2.30	0.57	1.50	0.41
Grab	Zn65	12	140.00	19.00	45.92	23.

(a) Page 1 of 1963 data.

Appendix C

Columbia River Fish Monitoring Data

Appendix C

Columbia River Fish Monitoring Data

The following tables summarize levels of ^{32}P and ^{65}Zn in Columbia River fish for the period 1964 through October 1966. Fish were collected as part of an Environmental Monitoring Program conducted by the General Electric Company at Hanford. Where adequate numbers of fish were collected for specific sample periods or sample locations, mean values and approximate 90 percent confidence intervals (CI) are reported.

Table C.1. Concentrations of ^{32}P and ^{65}Zn in Whitefish (pCi/g wet weight) in the Columbia River Between Priest Rapids Dam and McNary Dam, 1964

<u>Location</u>	<u>Months</u>	<u>^{32}P</u>		<u>Sample Size</u>	<u>^{65}Zn</u>		<u>Sample Size</u>
		<u>Mean</u>	<u>+/- 90% CI</u>		<u>Mean</u>	<u>+/- 90% CI</u>	
Priest Rapids	Jan-Mar	51	11	79	40	4	92
	Aug	228	212	10	15	10	6
	Oct	192	145	4	23	8	3
	Nov-Dec	151	101	5	31	7	4
Hanford	Jan-Mar	138	30	25	39	4	25
	Apr-May	471	109	19	33	2	19
	Jun-Aug	169	56	43	31	4	38
	Sept	284	84	12	18	3	12
	Nov	344	121	7	29	3	7
Ringold	Jan-Mar	450	109	18	49	3	30
	Apr-May	1350	349	25	54	7	25
	Jun-Aug	216	80	55	24	3	50
	Sept-Oct	768	112	17	35	4	17
	Nov-Dec	704	186	9	50	9	9
Richland	Jul	81	26	48	15	3	43
	Oct	691	350	7	44	8	7
Island View	Apr	(a)	(a)	(a)	12	4	12
	Jun	8	8	10	8	3	9
Burbank	Nov	145	71	7	25	5	7
McNary	July	80	39	4	21	6	4

(a) Insufficient data.

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Table C.2. Concentrations of ^{32}P and ^{65}Zn in Bass (pCi/g wet weight) in Samples Collected from the Columbia River Between Hanford and Burbank, 1964

<u>Location</u>	<u>Months</u>	<u>^{32}P</u>		<u>Sample Size</u>	<u>^{65}Zn</u>		<u>Sample Size</u>
		<u>Mean</u>	<u>+/- 90% CI</u>		<u>Mean</u>	<u>+/- 90% CI</u>	
Hanford	Apr-May	35	21	6	31	5	6
	Oct	840	290	7	30	6	7
Ringold	Apr	19	3	39	25	2	39
Burbank	Jun-Aug	32	50	4	14	2	5

Table C.3. Concentrations of ^{32}P and ^{65}Zn in Fillets of Perch, Crappie, and Sunfish (pCi/g wet weight) Collected from the Columbia River, 1964

<u>Location</u>	<u>Months</u>	<u>³²P</u>		<u>Sample Size</u>	<u>⁶⁵Zn</u>		<u>Sample Size</u>
		<u>Mean</u>	<u>+/- 90% CI</u>		<u>Mean</u>	<u>+/- 90% CI</u>	
<u>Perch</u>							
Richland	Jan-Mar	18	3	14	30	6	18
Burbank	Jan-Mar	9	2	12	18	3	16
	Apr-May	5	2	7	15	2	12
	Jun-Aug	18	7	11	13	2	12
	Oct	185	131	3	20	2	3
<u>Crappie</u>							
Burbank	Apr-May	16	3	26	17	1	28
	Jun-Aug	20	5	46	13	1	47
	Sept-Oct	214	96	6	19	6	6
<u>Bluegill Sunfish</u>							
Burbank	Jun	10	6	4	15	4	4
	Aug	76	24	5	11	1	5

Table C.4. Concentrations of ^{32}P and ^{65}Zn in Fillets of Bullhead and Catfish (pCi/g wet weight)
Collected from the Columbia River Between Hanford and Burbank, 1964

Specie/ Location	Months	³² p		Sample Size	⁶⁵ Zn		Sample Size
		Mean	+/- 90% CI		Mean	+/- 90% CI	
<u>Bullhead</u>							
Hanford	Apr-May	49	25	4	22	5	4
Richland	Mar	(a)	(a)	(a)	6	1	5
	Jun	11	5	7	6	2	3
Burbank	Jun	11	4	3	12	3	3
	Sept	163	54	3	14	2	3
<u>Catfish</u>							
Burbank	Jan-Mar	6	2	8	12	3	10
	Apr-May	8	2	21	13	1	33
	Jun-Aug	29	6	58	14	1	63
	Sept-Oct	88	21	8	15	1	8

(a) Insufficient data.

Table C.5. Concentrations of ^{32}P and ^{65}Zn in Whitefish (pCi/g wet weight) Collected from the Columbia River Between Priest Rapids Dam and McNary Dam, 1965

<u>Location</u>	<u>Months</u>	<u>^{32}P</u>		<u>Sample Size</u>	<u>^{65}Zn</u>		<u>Sample Size</u>
		<u>Mean</u>	<u>+/- 90% CI</u>		<u>Mean</u>	<u>+/- 90% CI</u>	
Priest Rapids	Jan	12	10	5	9	5	11
	Jun-Jul	7	11	7	12	1	12
	Nov-Dec	166	98	6	33	18	6
Hanford	Jan-Mar	68	16	31	24	3	30
	Apr-May	29	10	19	16	3	20
	Jun-Aug	45	15	27	14	2	27
	Sept-Oct	269	63	17	26	4	17
	Nov-Dec	186	46	17	34	4	17
Ringold	Jan-Mar	131	33	32	36	4	32
	Apr-May	94	41	13	13	3	13
	Jun-Aug	292	154	19	16	4	20
	Sept-Oct	667	87	25	39	4	25
	Nov-Dec	512	73	12	57	8	12
Richland	Jan-Mar	52	15	33	32	2	32
	Apr-May	85	32	18	26	4	19
	Jun-Aug	216	117	18	16	3	19
	Sept-Oct	263	93	6	24	3	6
Burbank	Sept-Oct	143	60	6	20	4	6
	Nov-Dec	111	103	4	17	5	4
McNary	Jan-Mar	74	28	10	21	5	10

Table C.6. Concentrations of ^{32}P and ^{65}Zn in Bass (pCi/g wet weight) Collected Between Hanford and Burbank, 1965

<u>Location</u>	<u>Months</u>	<u>^{32}P</u>		<u>Sample Size</u>	<u>^{65}Zn</u>		<u>Sample Size</u>
		<u>Mean</u>	<u>+/- 90% CI</u>		<u>Mean</u>	<u>+/- 90% CI</u>	
Hanford	Apr-May	(a)	(a)	(a)	13	6	5
	Jun-Aug	104	209	4	12	7	4
Ringold	Apr-May	16	5	14	14	1	16
Richland	Jun	91	115	3	13	5	3
	Sept-Oct	308	72	6	18	3	6
Burbank	Jun-Jul	(a)	(a)	(a)	10	5	3

(a) Insufficient data.

Table C.7. Concentrations of ^{32}P and ^{65}Zn in Crappie and Perch (pCi/g wet weight) Collected from the Columbia River at Burbank, 1965

<u>Specie</u>	<u>Months</u>	<u>³²P</u>		<u>Sample Size</u>	<u>⁶⁵Zn</u>		<u>Sample Size</u>
		<u>Mean</u>	<u>+/- 90 % CI</u>		<u>Mean</u>	<u>+/- 90 % CI</u>	
<u>Crappie</u>							
	Apr-May	(a)	(a)	(a)	9	3	9
	Jun-Aug	40	48	4	7	2	8
	Sept-Oct	148	32	14	17	3	14
	Nov-Dec	57	17	8	18	2	8
<u>Perch</u>							
	Feb-Mar	(a)	(a)	(a)	11	4	3
	Apr-May	16	7	5	11	2	12
	Jun-Aug	32	26	7	9	1	19
	Sept-Oct	49	14	6	10	2	6
	Nov-Dec	41	12	12	17	3	12

(a) Insufficient data.

Table C.8. Concentrations of ^{32}P and ^{65}Zn in Catfish (pCi/g wet weight) Collected from the Columbia River at Burbank, 1965

<u>Specie</u>	<u>Months</u>	<u>^{32}P</u>		<u>Sample Size</u>	<u>^{65}Zn</u>		<u>Sample Size</u>
		<u>Mean</u>	<u>+/- 90% CI</u>		<u>Mean</u>	<u>+/- 90% CI</u>	
<u>Catfish</u>	Feb-Mar	23	39	6	8	1	17
	Apr-May	9	12	5	9	1	16
	Jun-Aug	14	8	16	9	1	27
	Sept-Oct	60	20	8	10	2	8
	Nov-Dec	64	27	6	12	3	6

Table C.9. Concentrations of ^{32}P and ^{65}Zn in Fillets of Whitefish (pCi/g wet weight) Collected from the Columbia River Between Priest Rapids Dam and Burbank, 1966

<u>Location</u>	<u>Months</u>	<u>^{32}P</u>		<u>Sample Size</u>	<u>^{65}Zn</u>		<u>Sample Size</u>
		<u>Mean</u>	<u>+/- 90% CI</u>		<u>Mean</u>	<u>+/- 90% CI</u>	
Priest Rapids	Nov	62	33	13	11	4	14
Hanford	Jan-Mar	51	14	46	31	3	46
	Apr-May	123	57	9	24	5	9
	Jun-Aug	25	5	28	16	2	28
	Sept-Oct	155	33	10	20	1	10
	Nov-Dec	133	38	14	21	3	14
Ringold	Jan-Mar	152	53	24	37	4	24
	Apr-May	177	44	40	23	3	40
	Jun-Aug	44	11	135	17	1	137
	Sept-Oct	134	31	61	16	1	61
	Dec	254	98	7	33	8	7
Richland	Jan	64	19	8	46	7	8
	Apr-May	100	54	16	24	5	16
	Jun	32	9	16	17	4	16
Island View	Sept	110	42	17	11	3	17
	Nov-Dec	102	274	3	21	25	3
Burbank	Jan-Mar	27	9	8	21	6	8
	Nov-Dec	51	23	19	15	2	19

Table C.10. Concentrations of ^{32}P and ^{65}Zn in Fillets of Bass (pCi/g wet weight) Collected from the Columbia River Between Hanford and Ringold, 1966

<u>Location</u>	<u>Months</u>	<u>^{32}P</u>		<u>Sample Size</u>	<u>^{65}Zn</u>		<u>Sample Size</u>
		<u>Mean</u>	<u>+/- 90% CI</u>		<u>Mean</u>	<u>+/- 90% CI</u>	
Hanford	Apr-May	15	11	3	16	5	3
	Jun-Jul	38	60	3	16	8	3
Ringold	Mar	4	1	3	13	1	8
	Apr	27	23	3	16	7	3

Table C.11. Concentrations of ^{32}P and ^{65}Zn in Fillets of Crappie and Perch (pCi/g wet weight) Collected from the Columbia River at Hanford and Burbank, 1966

Specie/ Location	Months	³² P		Sample Size	⁶⁵ Zn		Sample Size
		Mean	+/- 90% CI		Mean	+/- 90% CI	
<u>Crappie</u>							
Burbank	Jan-Mar	(a)	(a)	(a)	14	2	4
	Apr-May	2	1	8	23	19	8
	Aug	14	7	6	10	5	6
<u>Perch</u>							
Hanford	Aug	31	23	3	12	7	3
Burbank	Jan-Mar	7	4	11	16	3	13
	Apr-May	9	10	12	11	1	17
	Jun-Aug	16	4	30	10	1	31
	Sept-Oct	37	14	9	9	1	10
	Nov-Dec	8	4	8	10	1	9

(a) Insufficient data.

Table C.12. Concentrations of ^{32}P and ^{65}Zn in Fillets of Catfish (pCi/g wet weight) Collected from the Columbia River Between Island View and Burbank, 1966

<u>Location</u>	<u>Months</u>	<u>^{32}P</u>		<u>Sample Size</u>	<u>^{65}Zn</u>		<u>Sample Size</u>
		<u>Mean</u>	<u>+/- 90% CI</u>		<u>Mean</u>	<u>+/- 90% CI</u>	
Island View	Jul	5	2	4	2	1	4
	Sept	4	3	3	3	1	5
	Nov-Dec	23	63	3	2	0	4
Burbank	Jan-Mar	3	1	8	11	2	14
	Apr-May	5	2	14	9	2	20
	Jun-Aug	4	1	27	9	1	28
	Sept-Oct	43	23	6	8	2	6

Appendix D

Summary of Technical Steering Panel Comments and Battelle, Pacific Northwest Laboratories Responses

Summary of TSP Comments and ENW Responses

Document Number PNL-SA-17641 HEDR Document Title Preliminary Summaries for Vegetation, River and Drinking Water and Fish Radionuclide Concentration Data (DRAFT)

Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
1.	J. Stohr	Figure 4.3 through Figure 4.7 and Section 4.1, last paragraph	Figures 6.3.4-2 to 6.3.4-6: The figures indicate that the bar graph represents annual averages. This suggests to the reader that at least 12 monthly values are used. In fact, this is not the case. The headings should be changed somehow to reflect this difference.	The references on the figures referring to Annual Averages were removed. The data are not continuous throughout the year, and, therefore, may not represent true annual averages in all cases. Text refers the reader to the actual data in Appendix B.
2.	J. Stohr	Table 6.2.1 is now Table B.1	Data from 10 additional sampling times for 1964 could have been included. Why is only the 300 Area shown in this table? And there is existing information on at least nine additional isotopes.	Table B.1 contains only the first page of 91 pages in the database file (DBase III Plus, Version 1.0). This table is provided as an example of the information in the database file, and is so stated in Section 4.1, Paragraph 4.
3.	J. Stohr	Table 6.2.1 is now Table B.2	Same questions asked about Table 6.2.1. I also don't see how the values listed here relate to what is shown in the annual summary of drinking water in Table 6.2.5.	As in Comment 2, Table B.2 is only an example, the first page taken from the drinking water DBase file which consists of 61 pages. The text in Section 4.1, Paragraph 4 states this is an example, and also, the Appendix B forward states this is one example of 61 pages of database files on this subject.
4.	J. Stohr		It should be noted that less-than values are being used directly as listed in the calculation of the 2 SEM (standard error on the mean). This may be an issue that requires more statistical sophistication.	This has been discussed with the Statistics Task personnel and will be addressed in future activities.

Appendix D

Summary of TSP Comments and BNW Responses

Document Number PNL-SA-17641 HEDR Document Title Preliminary Summaries for Vegetation, River and Drinking Water and Fish Radionuclide Concentration Data (DRAFT)

Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
5.	J. Stohr		Could the means and 2 SEM values at specific sites for individual isotopes be combined to enhance the information reflected by the distribution about the mean?	It is possible to combine means for specific sites for individual isotopes, if the means and SEM are considered statistically the same. However, the purpose of the Phase I report is to show what kinds of data are available. It is the responsibility of the end users to determine how they may need to present these data to answer specific questions.
6.	J. Stohr	Section 5.1, Paragraph 7	It should also be noted that whitefish consistently showed higher concentrations of radionuclides in the samples analyzed.	The text in Section 5.1, Paragraph 7 was revised to reflect that whitefish contained the highest radionuclide concentrations of any Columbia sport fish.
7.	J. Stohr		We will probably want to review an extensive number of additional documents to see how other water or fish measurements taken outside of the Hanford environmental monitoring program compare to the values being used.	This subject was addressed in Walters et al. (1992).
8.	A. Conklin	Appendix A, Paragraph 3	Appendix - Radionuclide Concentrations for Vegetation: I recommend organizing the data first by census tract, followed by date, so that the contamination levels in each area can be more easily tracked over a period of time.	The vegetation database files (DBase III Plus, Version 1.0) print according to specifications needed by the user. The preliminary review report sorted by date. In this final report, the data were sorted by sampling location for easier reading.

Summary of TSP Comments and BNW Responses

Document Number PNL-SA-17641 HEDR Document Title Preliminary Summaries for Vegetation, River and Drinking Water and Fish Radionuclide Concentration Data (DRAFT)

Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
9.	B. Shleien	Deleted from text	The factor $5.7 \times E-6$ appears to be correctional information based on counting efficiency and dpm per Ci. Needs further explanation. I assume this is a multiplier, but it is not clear. How, why, and from where was it derived?	This report originally contained preliminary correction factors. These factors are now outdated and, therefore, deleted. Current factors are extensively discussed in a report by Mart et al. (1993).
10.	B. Shleien	Section was deleted from paper	Calculation section indicates a counting efficiency (CPM/DPM $\times 100$) of 1.7 % prior to June 30, 1946, and 1.5 %. The report requires calculational data on how the counting efficiency or this factor (if it is not counting efficiency) was derived.	The data were originally issued without explanatory text at the request of the TSP to provide the data as quickly as possible. The explanation for the correction factors has since been published in Mart et al. (1993).
11.	B. Shleien	Deleted from text	Report indicates that in late 1946 and 1947 the average $\mu\text{Ci/kg}$ concentrations were adjusted by multiplying each value by 1.73. No explanation is offered why this was done.	The adjustment factors originally given in this paper were preliminary at the time of document review and were not adequately discussed. This portion was determined to be inappropriate for this paper and was, therefore, removed from this report. The adjustment factor is discussed in detail in Mart et al. (1993)
12.	B. Shleien	Deleted from text	Can't find 6.3.3 relative to calculations $\mu\text{Ci/kg}$	The draft did not include text. The calculations relative to $\mu\text{Ci/kg}$ are provided in Mart et al. (1993).

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Summary of TSP Comments and BNW Responses

Document Number PNL-SA-17641 HEDR Document Title Preliminary Summaries for Vegetation, River and Drinking Water and Fish Radionuclide Concentration Data (DRAFT)

Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
13.	B. Shleien		Introduction in general: The calculational process is not described in adequate detail. No independent reader could possibly follow how the correction factors were devised or why they were employed. This is completely unacceptable.	The data were originally issued without explanatory text at the request of the TSP to provide the data as quickly as possible. The explanation for the correction factors has since been published in Mart et al. (1993) and, therefore, corrected data and their calculational processes are not described in this report.
14.	B. Shleien		I also checked reference HW-7046 in both reports. Exact data abstracted.	Good, we appreciate the verification of the abstracted data.
15.	B. Shleien		There are numerous abstracted reports in the July 9, 1989, Shleien document which do not appear to be referenced in the HEDR draft report. Has Battelle checked the references in this work? Have they made comparisons with it?	Phase I efforts were re-directed, resulting in no additional activity with respect to document search and reference cross-checks. Such activities have been re-instituted and final report(s) should address this issue.

Appendix D

Summary of TSP Comments and BNW Responses

Document Number PNL-SA-17641 HEDR Document Title Preliminary Summaries for Vegetation, River and Drinking Water and Fish Radionuclide Concentration Data (DRAFT)

Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
16.	B. Shleien		A check of average monthly results with independently graphed results at Richland indicates that general shape of the curve was the same for 1946. However, except for the first 2 months, the HEDR draft data were generally higher. Require explanation of why this is the case.	Corrected data have been deleted from this Phase I document because at the time this document was first written, the historical data and their correction and conversion factors were under research development, and the "corrected" data were presented as examples. Only historical data are presented in this report. A companion report (Mart et al. 1993) discusses the reconstructed measurement conversion factors that correspond to the data presented in this report.
17.	M. Blazek		Has any attempt been made to correlate vegetation contamination data with known releases? If not, when will this correlation be made?	The validation work will look at these correlations.
18.	MB		A map with shaded areas to indicate where sample contamination was greatest by county would be helpful.	Final dose reports will include maps. The model reliability report will include how well the maps compare to monitoring data.
19.	MB		What was the sampling frequency of each sampling location by county?	Variable—this item will be clarified in the final report(s) to the extent possible.
20.	MB		Are there enough data to make statistically significant estimates of vegetation contamination on a daily or weekly basis?	Final dose calculations will include uncertainties related to deposition.

Appendix D

Summary of TSP Comments and BNW Responses

Document Number PNL-SA-17641 HEDR Document Title Preliminary Summaries for Vegetation, River and Drinking Water and Fish Radionuclide Concentration Data (DRAFT)

Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
21.	MB		There is no figure for chromium-51 in the water section. In 1965, Oregon found 2800 pCi/L of chromium-51 in Columbia River water at The Dalles. Oregon monitoring information should be used in future phases.	Phase I included primarily Hanford area data and only the top five contributor (radionuclides) to dose. Future work will include the study of data outside the Hanford area and additional radionuclides as determined by the TSP.
22.	MB		Chromium-51 and iodine-131 figure need to be added	Future work as determined by the TSP.
23.	MB		Oregon monitoring records show: 110 pCi/L at The Dalles and 47.8 pCi/L at Rooster rock in 1965; and 50 pCi/L at The Dalles and 31 pCi/L at Rooster Rock in 1966. This figure should be corrected.	Data from outside the Hanford area were not included in the Phase I activities. These data were included in Walters et al. (1992).
24.	A. Slickpoo		Closer study is needed on our native foods and plants, especially those consumed by the American Indians. Vegetation is important, not only to milk cows, but deer and other animals as well.	Limited data have been found concerning radionuclides in native foods and plants.

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K6-13
K6-09
K6-13
K1-06
K3-70
P8-55

**DATE
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9/15/93

END