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Final Report

EXPERIMENTAL INVESTIGATION OF PLANT UPTAKE CONTAMINATION FACTORS

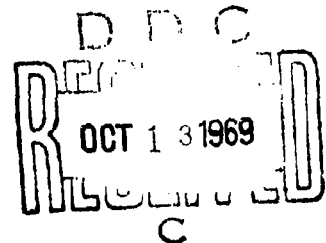
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NAVAL RADIOLOGICAL DEFENSE LABORATORY
SAN FRANCISCO, CALIFORNIA 94135

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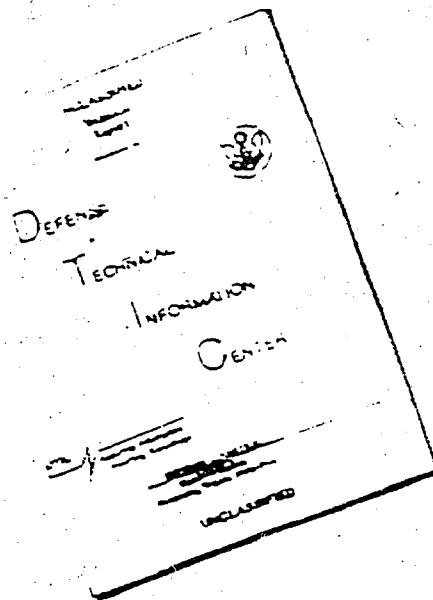
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EXPERIMENTAL INVESTIGATION OF PLANT UPTAKE CONTAMINATION FACTORS

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ABSTRACT

The uptake of four radionuclides (Sr-85, Ru-106, Cs-137, and Ce-144) was measured for four plants (wheat, tomatoes, corn and potatoes) grown in four different soil types (sandy loam, sandy clay loam, silty clay and clay). Plants were grown in large soil containers that allowed most of the root system to develop under normal field conditions. Plant uptake contamination factors (a_{SU}) were calculated for each sample harvested. Comparisons of the uptake for various plant part-soil-radionuclide combinations at crop maturity showed that the a_{SU} values for Sr-85 were the largest in all instances, usually by an order of magnitude. The a_{SU} values for the edible portion of each plant were lowest in every case, and usually the leafy portions of the plants had the largest a_{SU} value.

Additional experiments included measurements of changes in radionuclide uptake caused by available calcium levels, growing crops in large fields, and contaminant form and solubility.

PREFACE

This report summarizes research conducted by Stanford Research Institute under Contract No. N0028867C2036. The work was performed under the sponsorship of the Office of Civil Defense through the Technical Management Office of the U.S. Naval Radiological Defense Laboratory.

The authors wish to thank the U.S. Naval Radiological Defense Laboratory for the use of their Camp Parks Test Station. We particularly wish to thank Melvin J. Nuckolls and James L. Thomas of that laboratory for their assistance and cooperation.

We also thank Mr. Robert Schultz for his efforts and cooperation in growing our field crops at the University of California Kearney Horticultural Field Station.

In addition, we wish to express our appreciation for the work of Charles Bubics of the Pleasanton Nursery who assisted in all experimental phases of the work and was responsible for the maintenance of the crops used in the experiment.

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SUMMARY

This report describes the results of experiments conducted for the purposes of evaluating the uptake of selected fission product radio-nuclides through their root systems, and for evaluating the dependence of the contamination factors on such parameters as plant type, soil type, plant age, soil nutrients, and fallout solubility. It was also necessary to correlate the measured plant uptake contamination factors with soil characteristics for subsequent application in mathematical root uptake contamination models.

The approach taken followed earlier work in which plants were grown in large containers under conditions designed to reproduce, as closely as possible, the growth of food crops under actual field conditions. In addition, during the current work, a limited number of field tests were conducted to test the hypothesis that the large containers used provided a realistic simulation of an actual environment. Primary consideration was given to the study of radiostrontium with crops also grown in Cs-137, Ru-106, and Ce-144 soil containers which were available from previous experiments. The farmland plots were contaminated only with radio-strontium. Test soils included sand, loam, and clay soils from previous work and two additional soils representing widely distributed California agricultural soils. The crops studied were wheat, tomatoes, corn, and potatoes.

Sampling started as soon as the plants sprouted and continued at frequent intervals depending on growth characteristics of the plant. Plant uptake contamination factors (a_{SO}) were calculated for each of the

samples harvested. Comparisons of the uptake for various plant part-soil-radionuclide combinations at crop maturity showed that the a_{SU} values for Sr-85 were the largest in all instances, usually by an order of magnitude. The a_{SU} values for Cs-137, Ru-106, and Ce-144 showed no consistent pattern and were distributed randomly high and low among the plant part-soil combinations. The a_{SU} values for the edible portion of each plant were lowest in every case, and usually the leafy portion of the plants had the largest a_{SU} value. These general observations support and extend the results of previous experiments.

Only limited data were available for evaluating the effects of available calcium on radionuclide uptake but, taken with the results of previous work, supported the postulated decrease in uptake in a manner approximately inversely proportional to the exchangeable calcium concentration in the soil. These results again emphasized the generally lower uptake values observed in the work as compared to literature values. The lower values in these experiments have been attributed to the growing of crops in large containers, as opposed to values based on literature data which are reported for experiments using small pot containers. The large soil containers allowed the plant root systems to develop in a manner closer to field conditions.

To test this assumption further some field studies were conducted in which crops were grown on all test plots at two different field locations. The data were not extensive enough to confirm the validity of the large container approach but were in sufficiently good agreement to support the continuing application of the large container data to estimations of postattack food contamination levels. As part of the field studies, a limited number of additional experiments were conducted to compare measured a_{SU} values for various methods of mixing the contaminant with the soil and also to compare the results obtained by applying the contaminant in normal particle form and also as a solution. In all cases no significant differences were found.

By far the largest changes in a_{SU} values were produced when the availability of the radionuclides for uptake was reduced by thermal pretreatment of the fallout simulant. The results verified the previous reductions in a_{SU} values for wheat by as much as a factor of 10. In the present work the observations were extended to include the three additional crops of tomatoes, corn, and potatoes and similar reductions in a_{SU} values were found.

INTRODUCTION

Evaluation of the biological consequences from ingesting radionuclides in foods depends first on a knowledge of the paths by which radionuclides enter the food chains and second on the availability of information about the uptake or assimilation processes. The two major paths of entry into food chains of plants are: (1) foliar contamination by deposited fallout particles followed by foliar adsorption of soluble radionuclides, and (2) uptake of radioelements by the plants through root assimilation. In both paths, the biological availability of a given radioelement for uptake depends on its solubility in the aqueous media that is in contact with the plant tissues since transfer across plant membranes generally requires an ionic form.

The dependence of nuclide solubility on the conditions of fallout formation and the methods for relating plant contamination to gross fallout deposition levels are discussed in Reference 1; these fallout properties and the related solubility behavior of all the fission product radioelements are described in terms of a set of contour ratios that are defined as the ratio of the surface density of some property of fallout to the standard intensity in roentgens per hour at one hour. Use of the standard intensity as derived from fallout models--or from postattack monitoring data--would serve as input data for a systematic method of estimating or predicting the relative amount of each radioelement in the fallout that various food crops would assimilate.

The radiological hazard to humans and animals from food contaminated by fallout from a set of hypothetical nuclear attacks on the continental United States was evaluated in a study conducted for the Office of Civil

Defense, Department of Defense,² using a series of computational models.^{3,4,5,6} The conclusions of the study were derived from analyses of available data on direct plant-foliar contamination, the initial contamination of drinking water sources, and the uptake by plants through their root systems.

Analyses of available plant uptake data⁷ indicated that additional experiments were needed to provide root uptake contamination factors for many plants, fission product radionuclides, soil types, and plant age combinations. Experimental verification of these plant uptake contamination factors is needed to provide an improved technical basis for establishing requirements for long term postattack countermeasures and for planning future postattack research program needs on the internal contamination problem and on the cycling of radionuclides in the food chain.

Background

During the past two years, research efforts⁸ were initiated to obtain the required plant uptake data. This research included the establishment of experimental facilities at the U.S. Naval Radiological Defense Laboratory Test Station (Camp Parks, Pleasanton, California) for growing plants in soil containing radionuclides and conducting full scale experiments to obtain plant uptake contamination factors of five radionuclides (Sr-85,^a Zr-95, Ru-106, Cs-137, and Ce-144) for seven crops (wheat, beans, tomatoes, lettuce, carrots, clover, and radishes) grown in three different soil types (sand, loam, and clay).

Plants were grown in large soil containers that allowed most of the root system to develop as it would under normal field conditions. Sampling started as soon as the plants sprouted and continued at frequent

^a Used as a tracer for fission product Sr-90.

intervals depending upon growth characteristics of the plant. Plant uptake contamination factors were calculated for each of the harvested samples.

Comparisons of the contamination factors for the various combinations of plant parts, soils, and radionuclides showed that, at crop maturity, the contamination factors for radiostrontium were usually an order of magnitude larger than for the other radionuclides tested. The values of the contamination factors for Cs-137, Ru-106, Zr-95 and Ce-144 were approximately equal with the highest and lowest values distributed randomly among the tested plant part and soil combinations. For all radionuclides, values of the contamination factors for the edible portion of each plant were lowest.

Analysis and correlation of the measured plant uptake contamination factors revealed that the concentration of radionuclides in plant parts and the concentration of available calcium in the test soils were related as predicted by a mathematical model which took the form

$$a_{SU} = a_{SU}^0 \left[Ca^{++} \right]^{-m} \text{ where } a_{SU}^0 \text{ and } m \text{ are empirical constants and } \left[Ca^{++} \right]$$

is a measure of the calcium concentration in the soil. Constants for the equation were derived for each plant part-soil-radionuclide combination, and the derived a_{SU} values were found to be in disagreement with those reported in Reference 7. It was noted, however, that the literature values reported in Reference 7 were computed on the basis of experiments in which plants had been grown in small containers where the root systems were contained in contaminated soil throughout the growth period. This situation was avoided in the current series of experiments by growing plants in large soil containers, with a "plow layer" of contaminated soil, which allowed the root system to develop beyond this layer. As a result

of this more realistic simulation, the derived a_{SU} values were lower, some by a factor of 10, than those measured for plants grown in small containers.

The analysis of the data indicated that further experiments should be conducted to measure additional plant-soil-radionuclide combinations and to supplement the experiments using a soil with a high calcium content. The extension of the work to field experiments involving the actual contamination of farmland, followed by normal cultivation practices, was also recommended for the purpose of verifying the uptake factors obtained in the large size containers.

Theory

Major factors that influence the uptake of radionuclides by plants through their root systems are:

1. Physicochemical properties of the ions of the radioelement
2. Plant species
3. Soil type and physical-chemical characteristics
4. Soil management practices

Assimilation of nutrients or inorganic ions by roots of plants usually involves soluble, exchangeable ions in the native soil. When foreign ions, for example, from a mineral fertilizer are introduced into the soil, they compete with and replace the native soil ions on available exchange sites in the soil. In some reactions with the soil, the new ions become non-exchangeable and, to the extent that these reactions occur in a soil, some portion of the new ion becomes unavailable for uptake. Thus, in the case of fallout particles, it would be expected that the types of interactions between soluble radionuclides and soil constituents would determine the availability of the radionuclides for uptake from the soil.

Soil management practices include the addition of organic matter, mineral fertilizers, and amendments (such as lime) to the soil, plus various cultivation techniques. These practices influence the chemical composition of the plant.

Since the availability of a given radioelement for uptake from soil is generally related to the concentration of the exchangeable portion of the radioelement in soil, the foliage or plant part contamination factor is conveniently defined in terms of its concentration in soil. Thus, the plant part soil uptake contour ratio, UN_i^0 , as given in Reference 5, is

$$UN_i^0 = N_i^0 (1 - a_{L L} w_L) a_{SU} w_p / \rho D \frac{\text{atoms per plant part}}{\text{square foot of soil area}} \quad (1)$$

in which

N_i^0 is the number of soluble atoms per square foot of "open field" area of the i th nuclide corrected to detonation time,

a_{SU} is the plant uptake contamination factor, in atoms of i th nuclide in plant part (atoms per gram of dry plant part) divided by the atoms of i th nuclide in soil (atoms per gram of soil),

w_p is the surface density of the plant part, in grams of dry plant part per square foot of soil area,

$a_{L L}$ is the foliage contamination factor in atoms per gram of dry foliage divided by the number of atoms per square foot of soil area,

w_L is the foliage surface density in grams of dry foliage per square foot of soil area,

ρ is the bulk density of the soil, in grams per cubic foot,

and

D is the depth of plowing in feet.

The term $(1 - a_{L L} w_L)$ is the fraction of N_i^0 that is deposited on the soil; on bare soil, w_L is zero. The surface deposit density, $(1 - a_{L L} w_L) N_i^0$

divided by D gives the effective concentration of the soluble radionuclide per gram of soil. The fraction of a radionuclide taken up by a plant part is given by $a_{SU} w_p / \rho D$.

The plant uptake contamination factor, a_{SU} , depends on the various chemical equilibrium and exchange processes among the soil minerals, roots, and plant tissues. These experiments were concerned with the measurements of a_{SU} .

Objectives

The objectives of this study were to:

1. Measure experimentally the uptake of fission product radionuclides by plants through their root systems and to evaluate the dependence of the contamination factors on such parameters as plant type, soil type, plant age, soil nutrients, and fallout solubility.
2. Correlate the measured plant uptake contamination factors with radionuclide soil characteristics for application in mathematical root uptake contamination models.

Approach

The physical properties of particle size and deposited mass level for the simulant were determined from the fallout models developed by Miller.¹ These models provide a means of estimating fallout particle size and deposited mass levels as functions of weapon yield, dose rate, and downwind distance. Clark has presented these relationships in a form readily applicable for use in the design of realistic experiments using fallout simulants.⁹ For the present experiment, a deposited mass level of 24 grams per square foot and a particle size range of 88 to 177 microns were chosen. These values have been calculated for a fallout

deposit that would be expected 90 miles downwind from a 14 MT land surface detonation. The experimental procedures were designed to reproduce, as closely as possible, the growth of food crops under actual field conditions. In this experiment, as in previous work, the selected crops were planted in cubic yard soil containers. Crops were also planted in plots of contaminated farmland and grown under actual field conditions to test the hypothesis that the large containers provide realistic simulation of an actual field environment.

In the present experiment, primary consideration was given to the study of radiostrontium, the importance of which was demonstrated in the previous work, where a_{SV} values were usually an order of magnitude greater than those obtained for other radionuclides. Crops were also grown in the Cs-137, Ru-106, and Ce-144 soil containers which were available from the previous experiment. The farmland plots were contaminated only with radiostrontium.

Additional tests were conducted with thermally treated synthetic fallout since previous work had indicated that such treatment resulted in a reduced uptake of radiostrontium.

The three soils (sand, loam, and clay) were used again, along with two widely distributed agricultural soils in California. The two new soils, a Hanford sandy clay loam and a Yolo loam, were obtained from University of California field test stations. A few tests were conducted with soil from the Camp Parks area. Test soils with a range of calcium concentrations were prepared by adding gypsum to Hanford sandy clay loam. Crops studied in this experiment included wheat and tomatoes which were included in the previous experiment and two additional crops (corn and potatoes which are important food in the U.S. diet).

Table 1 outlines the crops, radionuclides, and soils studied. Details of the experimental approach and experimental procedures are further described in the following section.

Table 1

EXPERIMENTAL OUTLINE

Crops		
Family	Common Name	Plant Parts
Gramineae	Wheat	Shoot, stalks, leaves, heads, <u>grain</u> ,* chaff
Solanaceae	Tomato	Roots, stems, leaves, flower, <u>fruit</u> , peel, meat
Gramineae	Corn	Shoot, stalks, leaves, <u>grain</u>
Solanaceae	Potato	Roots, stalks, leaves, <u>tuber</u> , peel, meat

Radionuclides	
Isotope	Half-Life
Sr-85	54 days
Cs-137	30 years
Ru-106	1.06 years
Ce-144	285 days

Soil Types

Oakley sandy loam
 Hanford sandy clay loam
 Yolo silty clay
 Pleasanton loam
 Clear Lake clay
 Camp Parks clay

* Plant part underlined indicates the primary part from the standpoint of human ingestion.

EXPERIMENTAL PROCEDURES

Through the auspices of the sponsoring agency, the Office of Civil Defense, the U.S. Naval Radiological Defense Laboratory (USNRDL) made available its test facilities located at Camp Parks, near Pleasanton, California. These facilities include hot-cells for handling curie amounts of radioisotopes, and large land areas with controlled access. In addition, the University of California made available a plot of farmland at their Kearney Horticultural Field Station, Reedley, California, for the growing of crops under open field conditions.

Growing Facility

A 100 x 100-foot paved test area, enclosed with an eight-foot high solid board fence served as a growing facility for the root-uptake experiment. Electrical power, water, and lights were conveniently located within the area. A covered work space for plant handling and soil processing filled the west side. Laboratory bench tops and a sink that drained to a large stainless steel holding tank were provided for processing harvested plants. A large oven for drying the plants was located in the work area.

Climatological measurements in the plant growing facility during the experiment included: (1) a continuous recording of the temperature and humidity with a U.S. Weather Bureau recording hydrothermograph exposed in a standard instrument shelter, and (2) a measure of precipitation with a standard U.S. Weather Bureau rain and snow gauge.

The recorded rainfall, maximum and minimum temperatures, and relative humidity over the time span of the experiment are summarized in Table 2.

Table 2

CLIMATOLOGICAL SUMMARY

Pleasanton, California

Latitude: 37.39N Longitude: 121.53W

Date 1967	Temperature in Degrees F					Precipitation in Inches	Percent Relative Humidity		
	Monthly Mean	Averages		Extremes			Daily Averages		
		Daily Minimum	Daily Maximum	Minimum	Maximum		6 a.m.	12 p.m.	8 p.m.
April	49.6°	36.0°	60.8°	34.8°	64.6°	1.97	78.6%	35.2%	66.8%
May	61.5	48.4	74.8	38.4	95.2	0.21	82.4	36.0	63.0
June	62.8	52.0	75.1	44.2	96.1	0.27	79.5	38.8	63.0
July	71.6	55.6	85.0	48.6	102.4	0.00	76.8	29.5	52.8
August	72.0	56.1	87.9	50.8	100.7	0.00	79.9	25.2	41.7

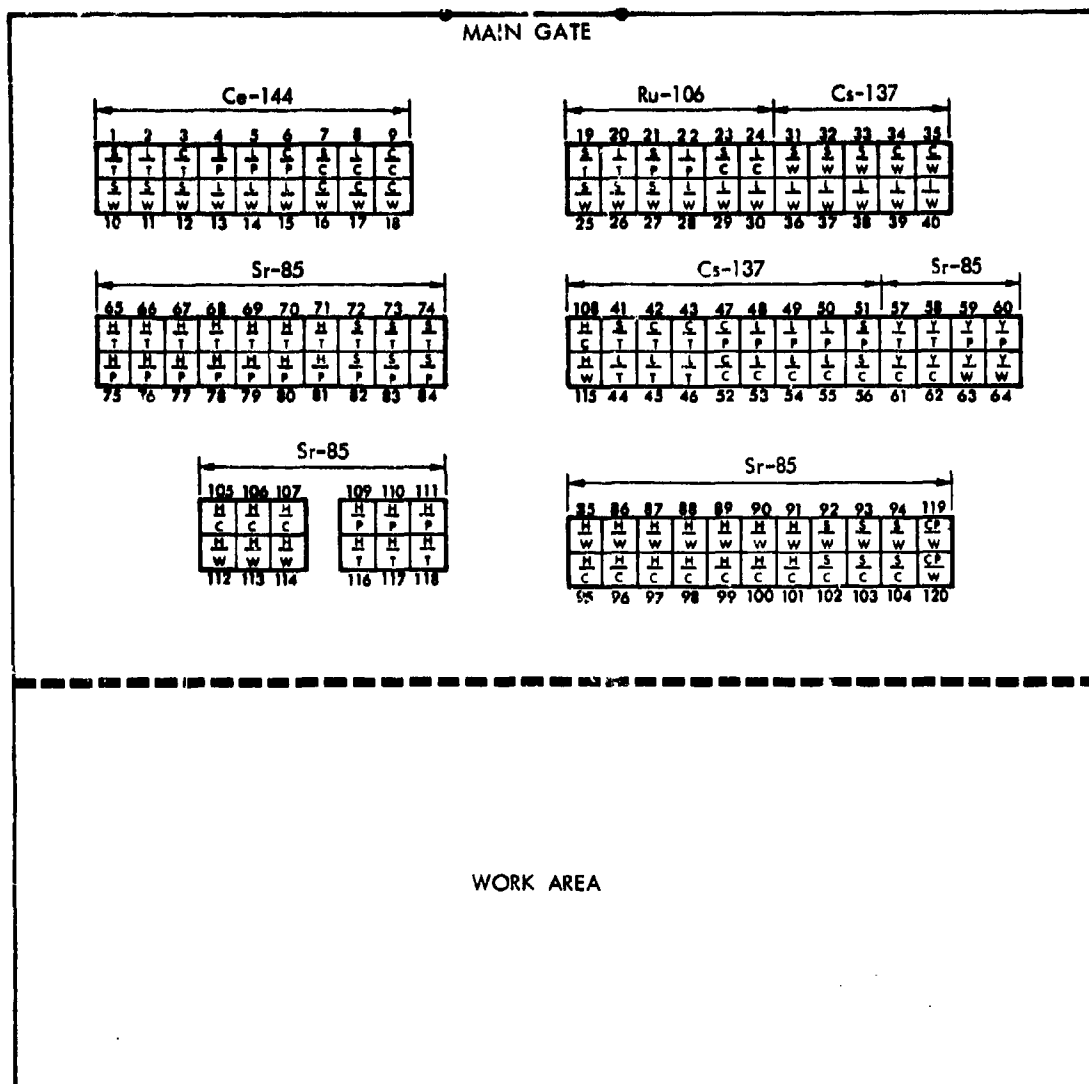
Redwood boxes, three feet on a side (soil surface area of 7.3 square feet) served as soil containers. Each box contained about one cubic yard of soil and the three-foot depth allowed the root system of most of the crops to develop in a manner similar to that expected under normal field conditions (at least during the seedlings' early growth stages). The arrangement of the boxes within the test facility is shown by Figure 1. Four factors determined the box arrangement: (1) boxes containing the same radionuclide were kept together to prevent cross contamination among different radionuclides; (2) similar crops within each row were placed adjacent to each other to facilitate planting and maintenance; (3) a 10-foot aisle between rows was provided for moving boxes with a fork lift; and (4) boxes were placed to minimize the effect of the shadow line of fences.

Polyethylene sheeting lined the inside of each box, except the bottom, to prevent evaporation through the seams in the sides of the box. A 4-inch layer of pea gravel in the bottom of the boxes facilitated drainage of excess irrigation water. Galvanized trays were positioned beneath each box to catch this water.

Field Plots

Extension of the experiments to growing crops in contaminated plots of farmland was carried out at two locations, Camp Parks and the University of California Kearney Horticultural Field Station, Reedley, California. At both locations, the land areas were enclosed by a 6-foot high exclusion fence.

The layout of the farmland area utilized at the Kearney Horticultural Field Station is given in Figure 2. Four 25' x 45' plots were constructed. Each plot was surrounded by a one foot high berm and a 15' x 25' area inside the berm was contaminated with the Sr-85 fallout simulant. At Camp Parks, a single 25' x 45' plot was utilized.



CROP CODE

W - WHEAT
T - TOMATOES
P - POTATOES
C - CORN

SOIL CODE

S - OAKLEY SANDY LOAM
L - PLEASANTON LOAM
C - CLEAR LAKE CLAY
H - HANFORD SANDY CLAY LOAM
Y - YOLO LOAM
CP - CAMP PARKS CLAY

FIGURE 1 LAYOUT OF SOIL CONTAINERS IN PLANT GROWING FACILITY

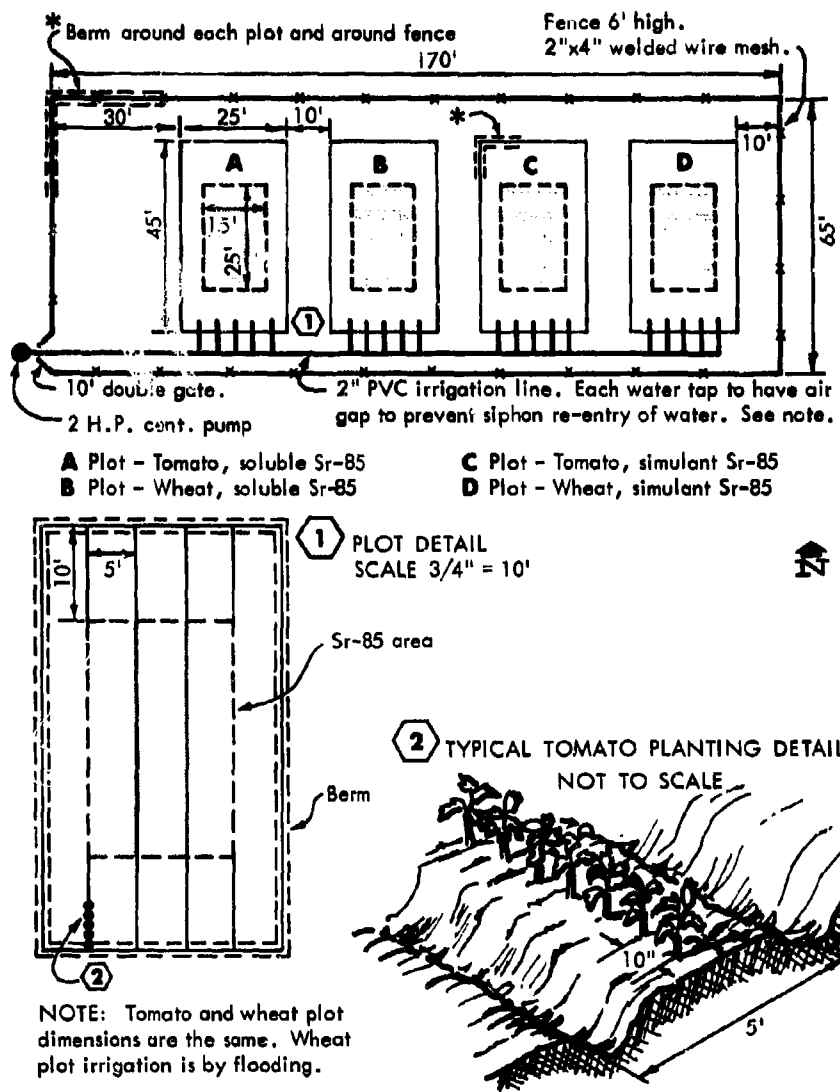


FIGURE 2 Sr-85 UPTAKE EXPERIMENT AT KEARNY HORTICULTURAL FIELD STATION, REEDLEY, CALIFORNIA

Soils

Soils selected for this study included the three test soils used in the previous plant uptake experiment⁸ and two additional soils representative of agricultural soils found in California. The two additional soils, a Hanford sandy clay loam and a Yolo loam, were obtained from University of California field test stations.

Sufficient stocks of the previously used soils were on hand at Camp Parks, and sixty tons of each of the new soils were provided by random shoveling the top 8 inches from the surface at each site and trucking it to the plant growing facility.

Each redwood box was filled with a selected soil to within 10 inches of the top. Four hundred and fifty pounds of the same soil was then barreled and reserved for later addition as an 8-inch plow layer of radioactive soil. The soil was tamped and moistened during the filling process to approximate its original field compactness.

Table 3 lists a description of the test soils and where each was obtained. Samples of each soil were sent to commercial soil testing laboratories for chemical analysis. Tables 4 and 5 list the results of these analyses.

Radionuclides

Strontium-90, because of its relatively long half-life of 28 years and its appreciable yield in the fission process, accounts for a considerable fraction of the total activity of fission products that are several years old. Strontium and calcium are divalent alkaline earth elements, and since calcium is essential to plant life, strontium competes with it for entry into the root system of plants. Not all calcium in soil is available for uptake through the root system because some natural calcium compounds in soil are insoluble and are not available as plant food until

Table 3

DESCRIPTION OF TEST SOILS

Soil Number	Location	Soil Series	Soil Texture*	Mechanical Analysis			Organic Material† (percent)
				Size Classes			
				in Percent			
				Sand	Silt	Clay	
1	California: Contra Costa County, 2 miles west of Antioch	Oakley	Sandy loam	73.5%	18.4%	8.1%	0.15%
2	California: Alameda County, 1 mile north of Pleasanton	Pleasanton	Loam	29.8	45.5	24.7	2.15
3	California: Alameda County, 3 miles north of Livermore	Clear Lake	Clay	19.0	25.3	55.7	1.75
4	California: Yolo County, Univ. of Cal. Davis Field Station, Davis	Hanford	Sandy Clay Loam	49.6	28.6	21.8	0.59
5	California: Fresno County, Univ. of Cal. Kearney Horticultural Field Station, Reedley	Yolo	Silty Clay	9.9	42.7	47.4	1.98
6	California: Alameda County, Camp Parks, Pleasanton	Camp Parks	Clay	27.3	20.6	52.0	1.83

* As described by U.S. Survey Textural Classification Triangle.

† Analysis performed by Nelson Laboratories, 1145 West Fremont Street, Stockton, California.

Table 4

CHEMICAL COMPOSITION OF TEST SOILS

	Oakley Sandy Loam		Pleasanton Loam		Camp Parks Clay		Clear Lake Clay		Yolo Silty Clay		Hanford Loam	
	SRI†	UCB†	SRI	UCB	SRI	UCB	SRI	UCB	SRI	UCB	SRI	UCB
pH - soil paste	6.8 (6.7)	6.3	(6.85)	6.41	7.15	7.45	(7.5)	6.7	6.92	6.72	7.0	6.42
Cation exchange capacity (meq/100 gms)	5.0 (4.25)	5.43	(12.72)	14.42	29.7	32.25	(38.75)	44.96	23.0	24.81	4.36	5.04
Soluble Sat. Ext. (ppm)												
Chlorides	16.0 (38.1)		(123.)		122.		(26.7)		16.3		14.0	
Boron	0.53 (0.18)		(1.06)		0.55		(0.46)		0.75		0.79	
Carbonates	none	trace	trace		trace		trace		none		none	
Bicarbonates	61.		(3.4)		176.		(4.37)		47.		107.	
Soluble: Calcium	0.01 (2.5)‡	0.10	(3.96)	0.25	0.14	0.22	(0.62)	0.03	0.05	0.07	0.03	0.02
(meq/100 gms) Magnesium	0.69 (1.75)	0.05	(4.1)	0.32	0.10	0.16	(0.60)	0.07	0.07	0.14	0.06	0.02
Sodium	0.01 (1.21)	0.01	(10.26)	0.39	0.29	0.17	(5.04)	0.35	0.06	0.04	0.02	0.01
Exchangeable: Calcium	3.04 (3.2)	2.79	(9.66)	7.80	19.16	18.47	(19.11)	13.66	10.00	10.13	3.45	3.31
(meq/100 gms) Magnesium	1.66 (1.55)	1.64	(5.29)	4.46	10.90	9.56	(24.86)	23.30	12.67	12.36	0.89	0.90
Sodium	0.12 (0.12)	0.059	(0.50)	0.54	0.97	0.54	(2.02)	2.56	0.49	0.17	0.10	0.045
Potassium	0.127 (0.09)	0.087	(0.31)	0.41	1.26	0.45	(0.475)	0.478	1.71	0.96	0.25	0.14
Ammonium	0.03 (0.06)		(0.10)		0.17		(0.04)		0.20		0.06	
Strontium		0.0133		0.0501		0.128		0.147		0.0498		0.0134
Electrical conductivity (μ mhos/cm)	0.44 (0.56)		(1.8)		0.81		(0.56)		0.44		0.60	

* Analysis performed by Nelson Laboratories, 1145 West Fremont Street, Stockton, California, 1967; the values in () were reported in 1966.

† Analysis performed by University of California at Berkeley, Soil Science Department, 1967.

‡ Soluble Ca, Mg, and Na values were reported in me/liter by Nelson Labs in 1966.

Table 5

SPECTROGRAPHIC ANALYSIS OF TEST SOILS*

Soil No.	Soil Texture	Weight Percent of Element as Oxide									
		Si	Al	Na	K	Ti	Mn	Fe	Mg	Cr	
1	Sandy loam	70.24	15.00	2.75	2.50	0.50	0.07	3.50	2.25	0.025	
2	Loam	69.01	15.00	2.50	3.00	0.70	0.10	4.00	4.00	0.03	
3	Clay	71.35	15.00	2.25	1.50	0.80	0.15	4.00	2.75	0.02	
4	Sandy clay loam	70.47	15.00	3.00	4.00	0.50	0.04	2.50	0.85	0.002	
5	Silty clay	72.84	12.50	1.00	1.50	0.60	0.08	7.50	2.75	0.07	
6	Clay	76.93	12.50	1.75	1.00	0.80	0.07	4.00	1.25	0.015	
Soil No.	Texture	V	Cu	Ca	Zr	Ni	Co	Sr	Sn	Ba	
1	Sandy loam	0.008	0.003	3.00	0.015	0.005	0.001	0.05	0.002	0.08	
2	Loam	0.015	0.008	1.50	0.010	0.02	0.002	0.015	0.002	0.08	
3	Clay	0.02	0.015	2.00	0.015	0.01	0.003	0.03	0.002	0.08	
4	Sandy clay loam	0.007	0.002	3.50	0.03	0.002	--	0.05	0.002	0.04	
5	Silty clay	0.015	0.01	1.00	0.03	0.04	0.003	0.03	0.002	0.03	
6	Clay	0.01	0.006	1.50	0.05	0.005	0.001	0.05	0.002	0.05	

* Analysis performed by American Spectrographic Laboratories, Inc., 557 Minna Street, San Francisco, California.

they have been converted into soluble compounds. For this reason, it is desirable to relate the uptake of Sr-90 to the exchangeable calcium content of soils. It was assumed that plants cannot discriminate among the different isotopes of a chemical element. For this reason, and because of the desire to analyze the radioactivity in the plant samples by means of counting gamma activity, the isotope strontium-85 was used as a tracer for the radiostrontium to take advantage of counting the gamma activity of its 0.51 mev photon.

Cesium-137 has a radioactive half-life of 30 years and is of particular interest in fallout that is more than a year old because cesium is the principal constituent whose radioactive decay is accompanied by the emission of gamma rays. The chemical properties of cesium resemble those of potassium, another essential element in the nutrition of plants.

Fallout Simulant

Fallout particles from a land surface nuclear explosion consist of fused, sintered, and unaltered grains of soil minerals and other materials present at the point of detonation. Analysis of fallout particles from surface and near-surface detonations at weapons tests in both Eniwetok Proving Ground and the Nevada Test Site have shown that radioactive elements are located within the interior of the fused and sintered particles and deposited on the surface of all three types of particles.¹

The fallout formation process consists of two distinct periods. In the first period, the condensation of volatile radioelements occurs by deposition onto and diffusion into large molten (soil) particles and by agglomeration of smaller particles. The radioelements thus condensed become fused within the volumes of the molten particles when they cool and solidify. In the second period, the remaining volatile radioelements condense onto the surface of relatively cool or solid particles. The fraction of a radioelement that condenses during the second period of

formation is partially soluble and therefore potentially available for biological assimilation in plants. Radionuclides in worldwide fallout are known to be quite soluble; but only limited data exist on nuclide solubility of local fallout. Because of the general lack of reliable solubility data for local fallout, approximate methods were developed for estimating the potential solubility of the various radioelements carried by fallout particles. Studies to measure solubility and thus improve the input data for the solubility model are in progress.^{10,11,12}

The basic fallout simulant employed in this study consisted of radionuclides adsorbed on the surface of sized mineral particles. The adsorption process simulates the second period of the fallout formation process, making the adsorbed radionuclides potentially available for uptake. The radionuclides were adsorbed on the particles from carrier solutions containing stable atoms of the major fission product elements. Sufficient activity was added to ensure measurable counting rates in the harvested plant samples.

Albite, a widely distributed variety of feldspar, was used as the mineral matrix on which the strontium was adsorbed. The albite was crushed, pulverized, and sieved to obtain particles in the 88-175 micron diameter size range. Magnetic separation removed the ferrous material that was introduced during the crushing and pulverizing operation.

The Sr-85 for this experiment was produced by neutron irradiation. A total of 0.073 grams of enriched $\text{Sr}(\text{NO}_3)_2$ was purchased from Oak Ridge National Laboratory. The enrichment in Sr-84 was given as 83.3 percent of total strontium and on this basis it was estimated that the compound contained 1.77×10^{20} atoms of Sr-84. The compound was sealed in a quartz capsule and delivered to the General Electric Company, Vallecitos, California, for insertion in the GETR.* The capsule was irradiated in a

* General Electric Test Reactor.

neutron flux of approximately 4×10^{14} neutrons $\text{cm}^{-2} \cdot \text{sec}^{-1}$ for one cycle (one month).

The quartz vial containing the strontium nitrate was opened in the Camp Parks hot cell, dissolved in approximately 250 ml. of IN HNO_3 . An aliquot of the solution was assayed in the 4-pi ionization chamber and gave 2.10 mc/ml at 1000, 24 May 1967, or a total activity of approximately 525 mc Sr^{88} . Decayed to the time of reactor shut-down, this would indicate a total production of approximately 590 mc.

On May 25, 1967, the solution was taken to dryness and then taken up in 200 ml. of IN HCl . An assay of the solution gave 2.49 mc/ml at 1015 May 25, 1967, or a total of 499 mc. This solution was used for the preparation of a number of batches of synthetic fallout as described in the following paragraphs:

1. A portion of sized albite of about 2-5 kilograms was poured into a twin shell blender* which had been modified to include a copper tube spray nozzle which could be inserted through a hole drilled in one of the bearing supports.
2. As the blender rotated, a measured aliquot of carrier solution containing one of the nuclides of interest was transferred by air pressure through plastic tubing connected to the spray nozzle. The transfer lines were then rinsed with two aliquots of wash solution which were also sprayed into the blender.
3. Following thorough mixing of the liquid and mineral, a mild stream of warm air was introduced via the spray nozzle. The drying operation was assisted by the use of an infra-red heat lamp directed onto the surfaces of the rotating blender.

* Manufactured by Patterson & Kelley Co., East Stroudsburg, Pennsylvania.

4. After drying, 175-gram portions of the fallout simulant were poured into tared plastic containers. Between portions, a small aliquot of about 1-2 grams was placed in test tubes for later assay in a gamma ionization chamber.
5. The 175-gram lots were finally placed in a lead shielded container and transferred to the plant growing facility for mixing with the test soils.

One exception to the above procedure consisted of a relatively large batch of simulant which was prepared for the field plantings. This batch was prepared in a small concrete mixer which had been modified to include a cover through which the spray nozzle could be inserted. Approximately 32,000 grams (70.5 pounds) of albite were placed in the mixer and sprayed with Sr^{88} solution containing approximately 133 mc total activity. Two 100 ml. rinses were added and the mixture was tumbled until dry. A summary of the strontium tagged synthetic fallout data is presented in Table 6 along with the re-assay values for the previously used Ce-144, Ru-106, and Cs-137. The indicated values are decay corrected to the date of planting. Table 6 also includes assay data for three batches of synthetic fallout which had been heated to successively higher temperatures of 880, 1027, and 1071°C.

Soil Contamination

Soluble radionuclides from fallout contaminated soil are made available for uptake by (1) surface penetration with rain water or natural erosion processes, and (2) mechanical mixing into the soil by cultivation processes. It has been demonstrated^{13, 14, 15} that fallout particles deposited on open land areas are not susceptible to any large degree of redistribution by wind and rain and, after several years of weathering, still are retained within the top 1/4 to 1/2 inch of surface soil. The

Table 6

SUMMARY OF SYNTHETIC FALLOUT AND CONTAMINATED SOIL ACTIVITY

Radio-nuclide	Soil Type	Planting Date	Synthetic Fallout	Soil
			Activity on Planting Date (d/s/gm)	Activity (d/s/gm)
Ce-144	Oakley Sandy Loam	April 20	5.39×10^5	4.72×10^2
	Pleasanton Loam		"	4.81×10^2
	Clear Lake Clay		"	4.68×10^2
Ru-106	Oakley Sandy Loam	April 20	2.33×10^5	2.06×10^2
	Pleasanton Loam		"	2.10×10^2
Cs-137	Oakley Sandy Loam	April 25	2.07×10^6	1.84×10^3
	Pleasanton Loam		"	1.86×10^3
	Clear Lake Clay		"	1.79×10^3
	Hanford Sandy Clay Loam	June 14	1.62×10^6	1.42×10^3
Sr-85	Oakley Sandy Loam	June 2	4.56×10^5	4.01×10^2
	Yolo Silty Clay	June 14	3.56×10^5	3.27×10^2
	Camp Parks Clay	June 19	3.32×10^5	3.00×10^2
	Hanford Sandy Clay Loam	June 2	5.09×10^5	4.47×10^2
	Hanford Loam + Ca	June 5	3.50×10^5	3.08×10^2
	Hanford Loam + T1*	June 14	4.14×10^5	3.60×10^2
	Hanford Loam + T2	June 14	4.29×10^5	3.73×10^2
	Hanford Loam + T3	June 14	4.29×10^5	3.73×10^2
	Camp Parks Field	June 19	1.51×10^5	1.81×10^2
	Hanford at Reedley	June 28	1.31×10^5	1.15×10^2

* T1, T2, and T3 indicate three temperature levels (880°, 1027°, and 1071°C) to which synthetic fallout was heated before mixing in soil.

soluble radioelements that leach from deposited fallout particles from either local or world-wide fallout, penetrate no more than 2 to 3 inches, even after eight years.¹⁸ Mixing the fallout with the soil to the depth of cultivation is, therefore, the principal method by which radioelements from fallout would penetrate into the seed-bed.

As plowing is probably the most extensive form of cultivation, many experiments have been directed to a study of the effectiveness of various depths of plowing in reducing surface fallout levels. In most cases, little advantage was found for plowing to a depth greater than 6 to 8 inches. To simulate the mixing of fallout particles to this depth of cultivation, the fallout simulants prepared in this experiment were thoroughly mixed with the top eight-inch layer of soil in each container. This was accomplished by placing 450 pounds of a particular soil type into a modified concrete mixer and adding 175 grams of tagged particles (synthetic fallout). Twenty minutes of mixing was adequate to thoroughly blend the tagged particles with the soil. The contaminated soil was then dumped into hoppers and transferred to a partially filled soil box where it was tamped into place to simulate an 8-inch depth of cultivation or plow-layer. Table 7 summarizes the fallout simulant batches and lists the number of contaminated growing boxes which were prepared.

In addition to the naturally occurring exchangeable calcium in the native soils, higher calcium concentrations were obtained by adding an agricultural gypsum* to the plow-layer (450 pounds) of Hanford sandy clay loam. The measured exchangeable calcium content of 3.45 meq per 100 grams of native soil was adjusted with gypsum by the additions noted in Table 8. The measured amount of agricultural gypsum for each addition was added to the soil along with fallout simulant in the rotating concrete mixer to ensure blending.

* Chemical form; calcium sulfate dihydrate, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$.

Table 7

SUMMARY OF FALLOUT SIMULANT PREPARATION

Date Simulant Prepared	Radionuclide	Albite Particles (grams)	Number of Soil Boxes Prepared			
			Sand	Loam	Clay	Total
July 2, 1965*	Ce-144	3685	6	6	6	18
July 7, 1965*	Ru-106	2400	6	6	0	12
July 14, 1965*	Cs-137	5200	6	14	6	26
May 25, 1967	Cs-137	1520	0	2	0	2
May 26, 1967	Sr-85	3400	12	0	0	12
May 31, 1967	Sr-85	3400	0	12	0	12
June 2, 1967	Sr-85	3400	0	16	0	16
June 13, 1967	Sr-85	1850	0	8	2	10
June 14, 1967	Sr-85	2800	0	12	0	12
June 16, 1967	Sr-85	32,000		Field	Field	
Total						120

* Soil boxes replanted; fallout aliquots reassayed.

Table 8

CALCIUM ADDITIONS TO HANFORD SANDY CLAY LOAM

<u>Crop</u>	<u>Box Number</u>	<u>Additional Calcium</u>		<u>Agricultural Gypsum*</u> (grams)
		<u>(percent)</u>	<u>(grams)</u>	
Tomato	69	50%	65.4	290
	70	100	130.8	580
	71	200	261.6	1158
	68	300	392.4	1738
Potato	79	50	65.4	290
	80	100	130.8	580
	81	200	261.6	1158
	78	300	392.4	1738
Wheat	89	50	65.4	290
	90	100	130.8	580
	91	200	261.6	1158
	88	300	392.4	1738
Corn	99	50	65.4	290
	100	100	130.8	580
	101	200	261.6	1158
	98	300	392.4	1738

* Molecular weight of $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ = 172.17 grams, 97% purity.

A commercial fertilizer (Loamite) with a fertilizer ratio* of 2-6-2 was also added to the rotating concrete mixer. Since the recommended rate of application for the crops and soils used was 750 pounds per acre, 0.125 pound was added for the 7.3 square foot soil surface in each box.

Contamination of the farmland plots at the Kearney Field Station and at Camp Parks was accomplished by dispersing the fallout simulant from a handpulled garden fertilizer spreader. An aluminum angle frame was used as guide rails for the spreader, and careful positioning of the frame for each swath ensured a uniform and complete deposition. A total of 14,130 grams (31.1 pounds) of the material was spread on the Camp Parks farm area over a measured plot of 20 x 22 foot dimensions. The spreading took place on June 19, 1967, and ion chamber assay of counting aliquots gave 4.07 $\mu\text{c}/\text{gram}$ as of 0930 on June 19, 1967. Planting took place on the same date. A small amount (130 grams) of fallout remained after spreading so that the final deposition was 14,000 grams per (20 x 22) square feet times 4.07 $\mu\text{c}/\text{gram}$ to give 129.5 μc per square foot at a surface density of 31.8 grams per square foot.

The remaining dry fallout (weighed at 41.9 pounds or 19,022.6 grams) was dispersed over two plots at the U.C. Agricultural Station, Reedley, California, on June 27, 1967. The contaminated areas were 15'7" x 25' and 15'8" x 25' for a total of 781.25 square feet. Following dispersal, the residual fallout was weighed at 286.5 grams to give a total surface density of 23.98 grams per square foot. The assay was 4.07 $\mu\text{c}/\text{gram}$ as of 0930 on June 19, 1967.

* Fertilizer ratio is the proportion of the three principal nutrients in a mixed fertilizer; namely, phosphoric acid, nitrogen, and potash.

Crops

The crops studied in this experiment included two analyzed in the previous plant uptake experiment, wheat and tomatoes and two additional crops, corn and potatoes, which are also important food crops in the U.S. diet. Table 9 presents the botanical classification of the selected crops. The variety with respect to human diet includes a grain crop (wheat), a vegetable crop (tomato), a root crop (potato), and a grain and animal fodder crop (corn). At planting time, the top 2-inch layer of soil in each box was cultivated to provide suitable conditions for seed germination. The surface of the clay and loam soils which became abnormally hard and cracked when dry, was treated with an organic humus which was mixed into the top 2-inch layer of soil. Table 10 presents a planting summary listing all boxes planted, the radionuclide, and the date of planting.

Table 9

BOTANICAL CLASSIFICATION OF CROPS SELECTED FOR STUDY

<u>Common Name</u>	<u>Family</u>	<u>Species</u>	<u>Variety</u>
Wheat	Gramineae	<i>Triticum aestivum</i>	Ramona 50
Tomato	Solanaceae	<i>Lycopersicon esculentum</i>	Early Pack No. 7
Potato	Solanaceae	<i>Solanum Tuberosum</i>	White Rose
Corn	Gramineae	<i>Zea Mays</i>	Sweet

Source: Manual of Cultivated Plants, L. Bailey, MacMillan, 1961.

Table 10

PLANTING SUMMARY

<u>Radio-nuclide</u>	<u>Box Numbers</u>	<u>Planting Date</u>	<u>Day of the Year</u>
Ce-144	1 through 18	April 20	110
Ru-106	19 through 30	April 20	110
Cs-137	31 through 56	April 25	115
Cs-137	108 and 115	June 14	165
Sr-85	72 through 77	June 2	153
	82 through 87		
	92 through 97		
	102, 103, and 104		
Sr-85	68 through 71	June 5	156
	78 through 81		
	88 through 91		
	98 through 101		
Sr-85	57 through 67	June 14	165
	105 through 118*		
Sr-85	119 and 120	June 19	170
	Camp Parks field		
	201 through 205		
Sr-85	Reedley field	June 28	179
	301 through 304		
	306 through 308		
	310 through 313		
	315 through 317		

* Boxes 108 and 115 contain soils contaminated with Cs-137.

Planting Procedure

The procedures for planting in the soil containers were chosen to allow the crops to grow as near actual field conditions as possible. Depth of planting, row spacing, crop density, and growth characteristics were determined after consulting with personnel from the College of Agriculture, University of California, Davis, California. Table 11 lists these factors for each of the crops planted.

Certified seeds of each crop were obtained to ensure trueness to type and to eliminate the possibility of seed-borne diseases. The Agricultural Experiment Station, University of California College of Agriculture, Davis, California, provided certified seeds of field crops (wheat and potatoes), and Ferry-Morse Seed Company, Mountain View, California, provided certified seeds of vegetable crops (tomatoes and corn). Sufficient quantities of each type of seed were obtained to allow successive plantings.

Table 11

PLANTING PROCEDURES IN SOIL CONTAINERS

<u>Crop</u>	<u>Depth of Planting (inches)</u>	<u>Number of Rows</u>	<u>Row Spacing (inches)</u>	<u>Thinned Plant Spacing (inches)</u>
Wheat	1-1/2	5	6	2
Tomatoes	1	2	12	4 plants/box
Potatoes	4	2	12	4 plants/box
Corn	2	2	12	12

A commercial nursery* provided the routine care required to ensure proper growth of the plants. This included watering, cultivating, fertilizing, and spraying for insect control as required.

Table 12 summarizes the crops planted at the two farmland locations. As indicated earlier, wheat was planted at both locations. Additional crops consisted of tomatoes at the Kearney Field Station and corn at Camp Parks. The wheat at both locations was hand broadcast and then raked into the surface layer of soil, and the tomatoes were transplanted at the Kearney Field station from seed flats of the Hanford sandy clay loam. The tomatoes were approximately two weeks old at the time they were transplanted.

Plant Sampling and Analysis

The soil boxes and field plots were assigned a number to identify with a crop-soil-radionuclide combination. A summary of the various combinations is presented in Table 13. With the assigned number as the prefix, successive samples from each area were numbered serially by adding two digits. Thus, sample 104 indicated the fourth sample from box number 1; sample 11518 indicated the 18th sample from box number 115.

Plant sampling started soon after the plants emerged from the ground and continued at frequent intervals thereafter (at least seven days between samples), depending on the growth characteristics of the plant. The frequent sampling facilitated the thinning process that is usually required. When the plants were thinned to the desired spacings, sampling intervals were lengthened to ensure sufficient samples at harvest time. Sampling procedures depended on the type and age of the plant. Table 14 summarizes the plant parts sampled at each stage of growth. In the early stages, the whole plant was sampled; however, when the root system

* Pleasanton Nursery, 3654 South Rita Road, Pleasanton, California.

Table 12

PLANTING PROCEDURE IN FIELD PLOTS

<u>Location</u>	<u>Crop</u>	<u>Plot Number</u>	<u>Planting Date</u>	<u>Planting Depth (inches)</u>	<u>Number of Rows</u>	<u>Row Spacing (inches)</u>	<u>Plant Spacing (inches)</u>
Camp Parks Field	Wheat	201 through 204	170	1/2	broadcast		
	Corn	205	170	2	3	12	12
Kearney Field	Wheat	301 through 304	179	1/2	broadcast		
		310 through 313					
	Tomatoes	305 through 309	179	2	5	60	12
		314 through 318					

Table 13

PLANTING SUMMARY

Cs-144			Cs-137		
Box Number	Crop	Soil	Box Number	Crop	Soil
1	Tomato	Oakley	31	Wheat	Oakley
2	Tomato	Pleasanton	32	Wheat	Oakley
3	Tomato	Clear Lake	33	Wheat	Oakley
4	Potato	Oakley	34	Wheat	Clear Lake
5	Potato	Pleasanton	35	Wheat	Clear Lake
6	Potato	Clear Lake	36	Wheat	Pleasanton
7	Corn	Oakley	37	Wheat	Pleasanton
8	Corn	Pleasanton	38	Wheat	Pleasanton
9	Corn	Clear Lake	39	Wheat	Pleasanton
10	Wheat	Oakley	40	Wheat	Pleasanton
11	Wheat	Oakley	41	Tomato	Oakley
12	Wheat	Oakley	42	Tomato	Clear Lake
13	Wheat	Pleasanton	43	Tomato	Clear Lake
14	Wheat	Pleasanton	44	Tomato	Pleasanton
15	Wheat	Pleasanton	45	Tomato	Pleasanton
16	Wheat	Clear Lake	46	Tomato	Pleasanton
17	Wheat	Clear Lake	47	Potato	Clear Lake
18	Wheat	Clear Lake	48	Potato	Pleasanton
Ru-106			49	Potato	Pleasanton
19	Tomato	Oakley	50	Potato	Pleasanton
20	Tomato	Pleasanton	51	Potato	Oakley
21	Potato	Oakley	52	Corn	Clear Lake
22	Potato	Pleasanton	53	Corn	Pleasanton
23	Corn	Oakley	54	Corn	Pleasanton
24	Corn	Pleasanton	55	Corn	Pleasanton
25	Wheat	Oakley	56	Corn	Oakley
26	Wheat	Oakley			
27	Wheat	Oakley	108	Corn	Hanford
28	Wheat	Pleasanton	115	Wheat	Hanford
29	Wheat	Pleasanton			
30	Wheat	Pleasanton			

Table 13 (continued)

Sr-85			Sr-85 (continued)		
Box Number	Crop	Soil	Box Number	Crop	Soil
57	Tomato	Yolo	90	Wheat	Hanford + Ca
58	Tomato	Yolo	91	Wheat	Hanford + Ca
59	Potato	Yolo	92	Wheat	Oakley
60	Potato	Yolo	93	Wheat	Oakley
61	Corn	Yolo	94	Wheat	Oakley
62	Corn	Yolo	95	Corn	Hanford
63	Wheat	Yolo	96	Corn	Hanford
64	Wheat	Yolo	97	Corn	Hanford
65	Tomato	Hanford	98	Corn	Hanford + Ca
66	Tomato	Hanford	99	Corn	Hanford + Ca
67	Tomato	Hanford	100	Corn	Hanford + Ca
68	Tomato	Hanford + Ca	101	Corn	Hanford + Ca
69	Tomato	Hanford + Ca	102	Corn	Oakley
70	Tomato	Hanford + Ca	103	Corn	Oakley
71	Tomato	Hanford + Ca	104	Corn	Oakley
72	Tomato	Oakley	105	Corn	Hanford + T1
73	Tomato	Oakley	106	Corn	Hanford + T2
74	Tomato	Oakley	107	Corn	Hanford + T3
75	Potato	Hanford	109	Potato	Hanford + T1
76	Potato	Hanford	110	Potato	Hanford + T2
77	Potato	Hanford	111	Potato	Hanford + T3
78	Potato	Hanford + Ca	112	Wheat	Hanford + T1
79	Potato	Hanford + Ca	113	Wheat	Hanford + T2
80	Potato	Hanford + Ca	114	Wheat	Hanford + T3
81	Potato	Hanford + Ca	116	Tomato	Hanford + T1
82	Potato	Oakley	117	Tomato	Hanford + T2
83	Potato	Oakley	118	Tomato	Hanford + T3
84	Potato	Oakley	119	Wheat	Camp Parks
85	Wheat	Hanford	120	Wheat	Camp Parks
86	Wheat	Hanford			
87	Wheat	Hanford			
88	Wheat	Hanford + Ca			
89	Wheat	Hanford + Ca			

Table 13 (Concluded)

SR-85 (continued)		
Plot Number	Crop	Soil
201	Wheat	Camp Parks Field
202	Wheat	Camp Parks Field
203	Wheat	Camp Parks Field
204	Wheat	Camp Parks Field
205	Corn	Camp Parks Field
301	Wheat	Reedley Field
302	Wheat	Reedley Field
303	Wheat	Reedley Field
304	Wheat	Reedley Field
306	Tomato	Reedley Field
307	Tomato	Reedley Field
308	Tomato	Reedley Field
310	Wheat	Reedley Field
311	Wheat	Reedley Field
312	Wheat	Reedley Field
313	Wheat	Reedley Field
315	Tomato	Reedley Field
316	Tomato	Reedley Field
317	Tomato	Reedley Field

Table 14

SUMMARY OF PLANT PARTS SAMPLED

<u>Plant</u>	<u>Plant Age (days)</u>	<u>Sampled Parts</u>
Corn	21 - 47	Shoot
	29 - 70	Stalk, leaves
	58 - 84	Stalk, leaves, tassel
	76 - 119	Stalk, leaves, tassel, silk, husk, ear
Potatoes	99 - 126	Stem, leaves, tuber (meat, peel), root
Tomatoes	27 - 34	Shoot
	42 - 54	Vine
	41 - 70	Stem, leaves
	70 - 89	Stem, leaves, flower
	99 - 195	Stem, leaves, fruit (meat, peel), root
Wheat	21 - 50	Shoot
	41 - 97	Stalk, leaves, head
	90 - 110	Stalk, leaves, head, grain, chaff

developed, the plant stalk was cut off above soil level to avoid disturbing the soil around adjacent plants. Only at the final harvest were the roots sampled for analysis.

Generally, in the sampling process, washing of the plants was minimized to avoid the possible loss of soluble radionuclides. Yet, care was taken to ensure the removal of all soil particles from the sampled plants. Consequently, the root crop plant (potatoes) was carefully processed to remove soil particles. A portion of each potato crop was peeled after washing and the peel and meat portions analyzed separately.

After harvesting and washing, plants were separated into parts as indicated in Table 13. Plant parts were put into separate plastic containers and placed in a large forced air drying oven for a minimum of 24 hours at 70°C,* or longer if required, to yield a constant weight. The crops that contained large quantities of water, such as tomatoes and potatoes, were dehydrated before being dried to a constant weight.

Plant Radioactivity Assay

Dry plant samples were transferred from the large drying oven in the growing facility to a smaller oven in a nearby field laboratory. Samples were then removed from the oven and weighed on a semi-micro balance (Mettler Model B-6). After weighing, a portion, or all of the plant sample was placed into "Nalgene" test tubes for gamma activity measurement in a scintillation counter. The Nalgene tubes are made of a plain polypropylene, 32 x 172 mm with a 100 ml capacity. To ensure good counting efficiency in the well crystal, the dry plant material was compressed to a volume which generally ranged between 10 and 30 cubic centimeters. Care was taken not to exceed the latter volume which corresponded to the top of the crystal well. Approximately 20 grams of dry plant material could be counted in this manner.

* Association of Official Agricultural Chemists, 12.2 p. 116, 1945.

The scintillation counter consisted of a 3 x 3-inch NaI crystal with a 1-3/8 x 2-1/4-inch deep well mounted on an EMI type 95768 3-inch multiplier phototube whose output was fed directly into a Systron model 1091-3 scaler. The scaler gate was controlled by a Nuclear Dual Timer. A John Fluke Model 412A high-voltage power supply provided dynode string voltage for the multiplier phototube. Shielding consisted of a lead cylinder 3 inches thick, 9 inches I.D. and 22 inches high. A 2-inch thick lead cover moved back and forth to permit access to the well crystal.

The well crystal was calibrated by observing the count rate of small aliquots of radionuclide solution which contained a known amount of radioactivity. The counting aliquots were transferred to the "Nalgene" tubes from 10 ml volumetric flasks that had been assayed for total activity in a 4-pi gamma ionization chamber of known efficiency.* To determine the efficiency of the scintillator counter response for increasing volumes, the small aliquots were successively diluted with weak acid to yield the results shown by Figure 3. These curves served as a basis for conversion of observed counting rates of each plant sample to disintegration rates according to the following procedures:

1. After compressing with the punch and die the volume of the dry plant material in the counting tube was estimated by comparing it with an identical 100 ml tube which was calibrated in cubic centimeters.

* The 4-pi gamma ionization chamber is an argon filled (600 psig at 70°F) steel ionization chamber 11 inches in diameter by 14 inches high, shielded with 3 inches of lead. The ionization current produced in the chamber is read out on a microammeter. The useful ionization current output ranges between 4×10^{-10} and 3×10^{-5} milliamps (ma). Readings are normalized to a standard response of 5.60×10^{-7} ma for 100 micrograms of radium. The response of the 4-pi ionization chamber to many radioisotopes has been determined.¹⁷

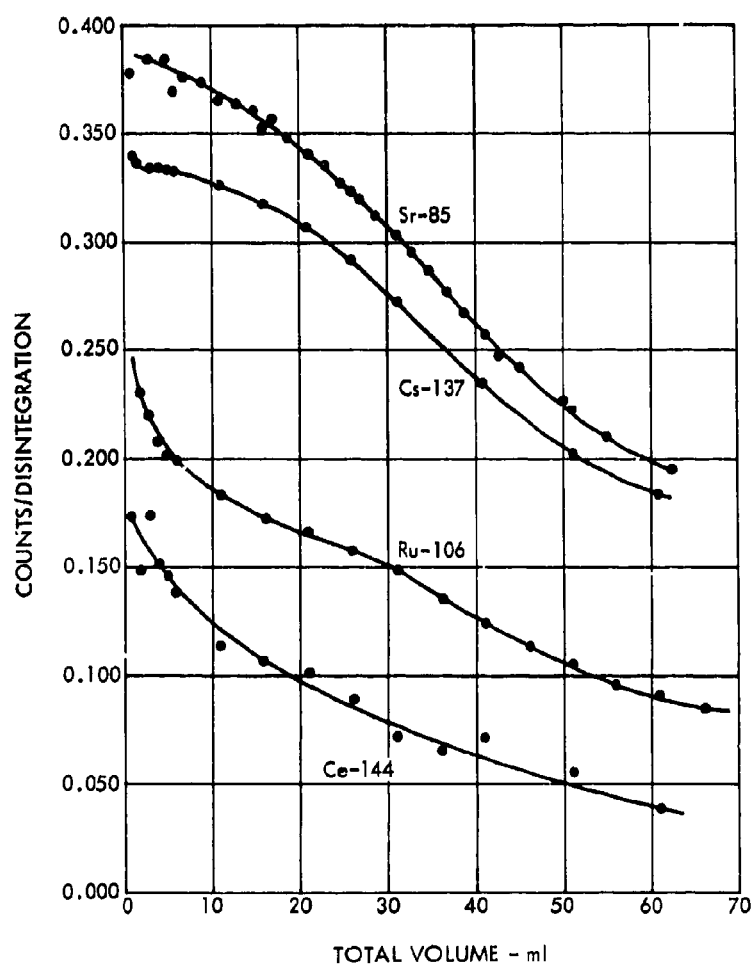


FIGURE 3 VARIATION OF SCINTILLATION COUNTER RESPONSE WITH TOTAL SOLUTION VOLUME (NALGENE TEST TUBES)

2. The sample was counted for gross activity after which its counting rate was corrected for background* and normalized to a Cs-137 standard.
3. The net corrected count rate was then converted to disintegration rate from using the appropriate curve of Figure 3.

* Samples were counted for at least one minute or until the accumulated counts were at least five times the background counts per minute.

RESULTS

Plant Uptake Contamination Factors

A plant uptake contamination factor (a_{SU}) is defined as the concentration of a radionuclide in a plant part (atoms per gram of dry plant part) divided by the concentration of the same radionuclide in the soil (atoms per gram of dry soil). It will be noted that:

$$a_{SU} = \frac{\text{atoms/gm of dry plant}}{\text{atoms/gm of soil}} = \frac{\text{d/s/gm of dry plant}}{\text{d/s/gm of soil}}$$

Disintegration rates, decay corrected to planting date, were used to calculate the a_{SU} values reported herein.

Appendix A presents a summary sheet for each soil container. Information in each summary sheet includes: (1) plant age in days from date of planting, (2) number of plants harvested, (3) dry weight in grams per plant, (4) dry weight (grams) of counting sample, (5) specific activity of the sample in disintegrations per second per gram (d/s/gm), and (6) uptake contamination factors (a_{SU}) for each sample harvested. Specific activity of the soil, date of planting, and plant emergence date are also listed.

Computed Values of a_{SU} at Crop Maturity

Average a_{SU} values for each crop at maturity are summarized in Tables 15 through 17. These values were obtained for plants at final harvest when the edible portion had matured to a marketable stage.

The a_{SU} values listed in Table 17 for Ce-144 and Ru-106 plant-soil combinations, however, should be treated at a low confidence level. The

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Table 15

PLANT UPTAKE CONTAMINATION FACTORS (a_{SU})* AT CROP MATURITY
Sr-85

Plant	Plant Part	Soil Type			
		Oakley Sandy Loam	Hanford Sandy Clay Loam	Yolo Silty Clay	Camp Parks Clay
Tomato	Leaves	23.8	28.0	4.04	--
	Stem	9.11	10.68	2.62	--
	Fruit	0.374	0.396	0.0418	--
	Peel	0.711	0.653	0.222	--
	Meat	0.494	0.341	0.123	--
	Root	9.40	8.32	1.35	--
Potato	Leaves	18.8	14.8	3.96	--
	Stem	18.4	18.4	2.86	--
	Tuber	0.590	0.409	0.123	--
	Peel	1.06	1.09	0.355	--
	Meat	0.346	0.275	0.142	--
	Root	13.1	14.9	3.18	--
Wheat	Leaves	5.15	3.99	1.00	1.78
	Stalk	3.11	2.66	0.592	1.29
	Head	0.427	0.367	0.0636	0.108
	Grain	0.265	0.208	0.0324	0.0742
	Chaff	0.896	0.782	0.134	0.380
Corn	Leaves	6.64	4.64	0.609	1.09
	Stalk	2.06	1.29	0.276	0.184
	Cob	0.285	0.213	0.0607	0.0300
	Kernel	0.0416	0.0364	0.0182	0.0067
	Husk	0.522	0.353	0.060	0.0429
	Silk	0.517	0.352	0.0325	0.115
	Tassel	2.64	2.13	0.231	0.234

* Average of all boxes at final harvest.

Table 16

PLANT UPTAKE CONTAMINATION FACTORS (μ _{SU})* AT CROP MATURITY
Cs-137

Plant	Plant Part	Soil Type			
		Oakley Sandy Loam	Pleasanton Loam	Clear Lake Clay	Hanford Sandy Clay Loam
Tomato	Leaves	0.134	0.00738	0.0550	--
	Stem	0.0775	0.00325	0.0238	--
	Fruit	0.106	0.00257	0.0449	--
	Peel	0.137	0.00170	0.0396	--
	Meat	0.163	0.00278	0.0468	--
	Root	0.153	0.0227	0.0396	--
Potato	Leaves	0.111	0.0155	0.0591	--
	Stem	0.176	0.0129	0.0423	--
	Tuber	0.117	0.00486	0.0371	--
	Peel	0.156	0.00809	0.0226	--
	Meat	0.0952	0.00338	0.0205	--
	Root	0.155	0.0269	0.0476	--
Wheat	Leaves	0.0526	0.00633	0.0244	0.0231
	Stalk	0.0272	0.00338	0.0150	0.0104
	Head	0.0304	0.00207	0.0102	0.00546
	Grain	0.0116	0.00144	0.00742	0.00584
	Chaff	0.0574	0.00395	0.0150	0.00994
Corn	Leaves	0.117	0.0070	0.0376	0.0735
	Stalk	0.103	0.0044	0.0260	0.0337
	Cob	0.0441	0.0018	0.0132	0.0181
	Kernel	0.0274	0.00093	0.0062	0.00902
	Husk	0.0955	0.0028	0.0190	0.0165
	Silk	0.151	0.0057	0.0315	0.0517
	Tassel	0.0917	0.0035	0.0186	0.0542

* Average of all boxes at final harvest.

Table 17

PLANT UPTAKE CONTAMINATION FACTORS (a_{SU})* AT CROP MATURITY
Ce-144 and Ru-106

Plant	Plant Part	Ce-144 Soil Type			Ru-106 Soil Type	
		Oakley	Pleasanton	Clear	Oakley	Pleasanton
		Sandy Loam	Loam	Lake Clay	Sandy Loam	Loam
Tomato	Leaves	0.0426	0.00410	0.0160	0.103	0.0198
	Stem	0.00858	0.00279	0.00295	0.0177	0.00215
	Fruit	0.00304	0.00350	0.000395	0.00325	0.0208
	Peel	0.0105	0.000920	0.000567	0.00547	0.0125
	Meat	0.00436	0.00459	0.00519	0.0100	0.00591
	Root	0.113	0.0234	0.0514	0.0753	0.214
Potato	Leaves	0.143	0.0404	0.123	0.356	0.0567
	Stem	0.0325	0.0220	0.0144	0.0453	0.0138
	Tuber	0.00182	0.00880	0.00304	0.0147	0.00222
	Peel	0.00866	0.00509	0.00128	0.0338	0.0118
	Meat	0.00137	0.00149	0.00352	0.00279	0.00166
	Root	0.140	0.0542	0.00557	0.355	0.0903
Wheat	Leaves	0.00908	0.00668	0.00639	0.342	0.0447
	Stalk	0.00194	0.00477	0.00156	0.166	0.0248
	Head	0.00159	0.00211	0.000670	0.0813	0.00225
	Grain	0.00149	0.00128	0.000767	0.0102	0.00198
	Chaff	0.00837	--	0.00254	0.194	0.00273
Corn	Leaves	0.0096	0.0088	0.0113	0.0690	0.0242
	Stalk	0.0044	0.0046	0.00391	0.00822	0.00275
	Cob	0.0028	0.0015	0.0015	0.00102	0.00096
	Kernel	0.0007	0.0001	0.00091	0.00098	0.0005
	Husk	0.0034	0.0013	0.0021	0.00505	0.00107
	Silk	0.0015	0.0019	0.0056	0.0148	0.00253
	Tassel	0.0062	0.0011	0.0049	0.0211	0.00204

* Average of all boxes at final harvest.

Ru-106 and Ce-144 soil containers were those utilized in the 1965 plant uptake experiments,⁸ and the soil activity had decayed to a level which was too low to provide adequate gamma counting rates in the harvested plant samples. The computed values for Ru-106 and Ce-144 will be used only for general comparisons.

Comparisons of a_{SU} values derived for various plant part-soil radionuclide combinations at crop maturity are given in Tables 18 and 19. In Table 18, a_{SU} values for radionuclides are compared for each plant part for crops grown in Oakley Sandy Loam, and in Table 19, a_{SU} values are compared for each radionuclide-soil combination.

Table 18 shows that a_{SU} values for Sr-85 are the highest in all instances, usually by an order of magnitude. This is in agreement with the results obtained in the 1965 plant uptake experiments.⁸ In tomato and corn samples, Cs-137 is found to be the next in order of importance. In wheat and potato samples, Cs-137 and Ru-106 are found to be next in order of importance, with Ru-106 higher in wheat samples, and Cs-137 higher in potato samples. Ce-144 is generally found to be the least important in all plant samples.

Table 19 shows that a_{SU} values for the edible portion of each plant was the lowest in all cases except for tomato samples, where Cs-137 a_{SU} values in the harvested fruit were not significantly lower than other portions of the plant. The leafy portion of all plants usually had the highest a_{SU} values.

Dependence of a_{SU} on Exchangeable Soil Cations

The relationship between a_{SU} and relative cation ionic or available concentration was discussed earlier and an equation was proposed which

Table 18

COMPARISON OF a_{SU} VALUES BY RADIONUCLIDES
(Crops Grown in Oakley Sandy Loam)

Tomato	Wheat	Potato	Corn
<u>Leaves</u>	<u>Leaves</u>	<u>Leaves</u>	<u>Leaves</u>
Sr >> Cs = Ru > Ce	Sr > Ru > Cs >> Ce	Sr >> Ru = Ce = Cs	Sr >> Cs = Ru > Ce
<u>Stem</u>	<u>Stalk</u>	<u>Stem</u>	<u>Stalk</u>
Sr >> Cs > Ru > Ce	Sr >> Ru >> Cs > Ce	Sr >> Cs > Ru = Ce	Sr >> Cs >> Ru = Ce
<u>Fruit</u>	<u>Head</u>	<u>Tuber</u>	<u>Cob</u>
Sr > Cs >> Ru = Ce	Sr > Ru >> Cs = Ce	Sr > Cs > Ru >> Ce	Sr > Cs >> Ce > Ru
<u>Peel</u>	<u>Grain</u>	<u>Peel</u>	<u>Kernel</u>
Sr > Cs >> Ce > Ru	Sr >> Cs = Ru > Ce	Sr > Cs >> Ru > Ce	Sr = Cs >> Ru = Ce
<u>Meat</u>	<u>Chaff</u>	<u>Meat</u>	<u>Husk</u>
Sr > Cs >> Ru > Ce	Sr > Ru > Cs > Ce	Sr > Cs >> Ru = Ce	Sr > Cs >> Ru > Ce
<u>Root</u>	<u>Root</u>	<u>Root</u>	<u>Silk</u>
Sr > Cs = Ce > Ru		Sr >> Ru > Cs = Ce	Sr > Cs >> Ru > Ce
			<u>Tassel</u>
			Sr >> Cs > Ru > Ce

Notes:

>> Indicates a factor of 10 or more.

> Indicates a factor of more than 2 but less than 10.

= Indicates approximately equal to within a factor of 2.

Table 19

COMPARISON OF a_{SU} VALUES BY PLANT PART

Radionuclide	Soil	Potato	Tomato	Wheat	Corn
Sr-85	Oakley Sandy Loam	Leaves = stem = root = peel > tuber = meat	Leaves > root > stem > peel > meat > fruit	Leaves = stalk > chaff > head = grain	Leaves > tassel = stalk > husk > cob > kernel
	Hanford Sandy Clay Loam	Stem = root = leaves > peel > tuber > meat	Leaves > stem > root > peel > fruit > meat	Leaves = stalk > chaff > head = grain	Leaves > tassel = stalk > husk > cob > kernel
	Yolo Silty Clay	Leaves = root = stem > peel > meat = tuber	Leaves > stem > root > peel > meat > fruit	Leaves = stalk > chaff > head = grain	Leaves > stalk = tassel > husk > cob > kernel
Cs-137	Oakley Sandy Loam	Stem = peel = root = tuber = leaves = meat	Meat = root = peel = leaves = fruit > stem	Chaff = leaves = head = stalk = grain	Leaves = stalk = husk - tassel > cob > kernel
	Pleasanton Loam	Root = leaves = stem = peel > tuber = meat	Root > leaves > stem = meat = fruit = peel	Leaves = chaff = stalk = head = grain	Leaves = stalk = tassel = husk > cob > kernel
	Clear Lake Clay	Leaves = root = stem = tuber = peel = meat	Leaves - meat = fruit = root = peel = stem	Leaves = stalk = chaff = head > grain	Leaves = stalk = husk = tassel = cob > kernel
Ru-106	Oakley Sandy Loam	Root = leaves > stem = peel > tuber > meat	Leaves = root > stem = meat = peel = fruit	Leaves > chaff = stalk > head > grain	Leaves > tassel = stalk = husk > cob > kernel
	Pleasanton Loam	Root > leaves > stem = peel > tuber = meat	Root > fruit > leaves > peel > meat > stem	Leaves > stalk > chaff = head = grain	Leaves > stalk = tassel > husk > cob > kernel
	Oakley Sandy Loam	Leaves = root > stem > peel > tuber = meat	Root > leaves > peel > stem > meat = fruit	Leaves = stalk = chaff = head > grain	Leaves = stalk = husk - tassel > cob > kernel
Ce-144	Pleasanton Loam	Leaves = root > stem > peel > tuber = meat	Root > meat = leaves = fruit = stem > peel	Leaves = chaff = stalk = head = grain	Leaves = stalk = tassel = husk > cob > kernel
	Clear Lake Clay	Leaves > stem > root = meat = tuber > peel	Root > leaves > meat > stem > peel = fruit	Leaves = stalk = chaff = head > grain	Leaves > stalk = tassel = husk > cob > kernel
Sr-85	Oakley Sandy Loam			Leaves = stalk > chaff > head = grain	Leaves > tassel = stalk > husk > cob > kernel
	Hanford Sandy Clay Loam			Leaves = stalk > chaff > head = grain	Leaves > tassel = stalk > husk > cob > kernel
	Yolo Silty Clay			Leaves = stalk > chaff > head = grain	Leaves > stalk = tassel > husk > cob > kernel
Cs-137	Oakley Sandy Loam			Chaff = leaves = head = stalk = grain	Leaves = stalk = husk - tassel > cob > kernel
	Pleasanton Loam			Leaves = chaff = stalk = head = grain	Leaves = stalk = tassel = husk > cob > kernel
	Clear Lake Clay			Leaves = stalk = chaff = head > grain	Leaves = stalk = husk = tassel = cob > kernel
Ru-106	Oakley Sandy Loam			Leaves > chaff = stalk > head > grain	Leaves > tassel = stalk = husk > cob > kernel
	Pleasanton Loam			Leaves > stalk > chaff = head = grain	Leaves > stalk = tassel > husk > cob > kernel
	Oakley Sandy Loam			Leaves = chaff > stalk = head = grain	Leaves = tassel = stalk = husk = cob > kernel
Ce-144	Pleasanton Loam			Leaves = stalk = chaff > head = grain	Leaves = stalk > cob = husk = tassel > kernel
	Clear Lake Clay			Leaves > chaff = stalk > grain = head	Leaves > tassel > stalk = husk > cob > kernel

>> Indicates much greater than (a factor of 10 or more)

> Indicates greater than (a factor of more than 2 and less than 10)

= Indicates approximately equal to (within a factor of 2)

relates the uptake factor to the available cation concentration; for example, calcium, according to $a_{SU} = a_{SU}^0 [Ca^{++}]^{-m}$ where a_{SU}^0 and m are empirical constants and $[Ca^{++}]$ is the available calcium concentration in milligrams of calcium per gram of soil. An approximate measure of the latter is provided by the soil analysis data for total chemically extractable calcium (exchangeable plus soluble). As noted in Table 4, however, the soluble calcium values are relatively low with respect to the exchangeable concentrations, and the latter values were taken as representative of the total soil available calcium for determination of the equation constants.

Using the data measured for mature samples, the equation constants were determined by least square fits to plots of a_{SU} versus exchangeable calcium for the crops and soils employed in the present studies. The results are summarized in Table 20 and are compared where possible with values from earlier experiments. In general, the agreement is only fair, but probably consistent with the limited number of experiments and test soils.

As in the previous work, only a limited number of soils were employed and the derived constants are based at most on no more than three to four values for exchangeable calcium in the native soils. In a few cases, however, the experiments were repeated for a given crop-radionuclide combination on additional soils. An example is illustrated in Figure 4 for wheat and radiostrontium. In this figure the combined data are shown for the last two experiments. The similarity in slopes for the three plant parts is evident readily as is the order of a_{SU} values ranging from the lower values for the grain to the higher values in the leaves. The similarity in slopes appears to be reasonable, since it would be expected that lower available strontium to the root system (at higher soil calcium levels) would equally affect all plant parts. Further experiments would

Table 20

COMPARISON OF DERIVED CONSTANTS
FOR THE EQUATION $a_{SU} = a_{SU}^0 [Ca^{++}]^{-m}$

Crop	Part	Sr-85		Cs-137	
		A_{SU}^0	m	A_{SU}^0	m
Wheat	Leaves	^a 2.77	0.862	0.0243	0.495
		^b (2.52)	(0.819)	(0.0546)	(1.58)
	Stalk	1.66	0.760	0.0123	0.371
		(1.26)	(0.809)	(0.0254)	(2.44)
	Grain	0.161	0.833	0.0058	0.371
		(0.201)	(1.11)	(0.0120)	(3.28)
Tomato	Leaves	13.0	1.49	0.0538	0.700
		(3.15)	(1.13)	(0.0780)	(1.59)
	Stem	5.87	1.19	0.0802	0.866
		(3.35)	(1.48)	(0.0794)	(0.781)
	Fruit	0.162	1.97	0.0336	0.757
		(0.134)	(0.904)	(0.0145)	(2.13)
Corn	Leaves	2.36	1.98		
	Stalk	0.821	1.60		
	Kernel	0.029	0.678		
Potato	Leaves	9.58	1.28	0.0596	0.487
	Stem	8.99	1.64	0.0732	0.934
	Tuber	0.288	1.24	0.0423	0.850

^a First value from 1967 crop year (present work).

^b Values in parentheses are those reported in reference 8 for 1965 crop year.

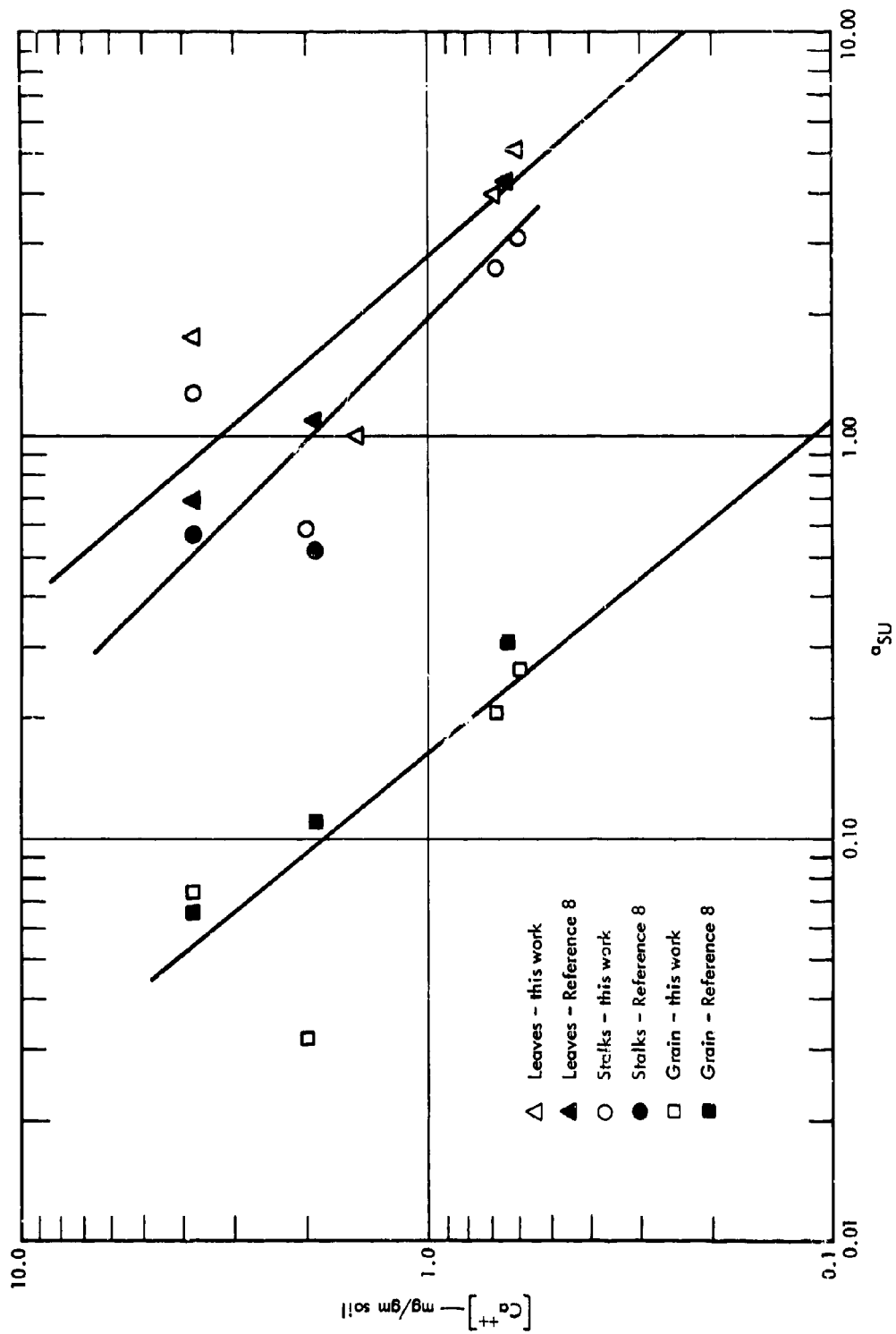


FIGURE 4 VARIATION OF a_{SU} FOR SR-85 WITH EXCHANGEABLE CALCIUM, WHEAT - GRAIN, LEAVES AND STALKS

be required to confirm this observation and to provide improved confidence in the desired value for the slope.

The effect of added calcium on a_{SU} values for radiostrontium was determined for all crops grown in Hanford sandy clay loam soils. Calcium in the form of hydrous calcium sulfate was added to the as-received loam in amounts of 290, 580, 1158, and 1738 grams of gypsum, or 50, 100, 200, and 300 percent of the total exchangeable calcium level. Four boxes were prepared for each level and planted with tomatoes, potatoes, wheat, and corn. The resulting a_{SU} values for these crops grown in the amended loam soils are given in Table 21.

The a_{SU} values for all crops grown with a 50 percent amendment, as compared to the values with no additional calcium, showed a decrease in a_{SU} in all cases, with the largest change noted for wheat leaves and the smallest for corn kernels. In all cases the smallest variation was found in the edible portion. These findings agree with those reported in References 7 and 8. The a_{SU} values obtained with 100 percent calcium addition showed a decrease in a_{SU} from the 50 percent amendment in only 42 percent of the samples, while the subsequent calcium additions of 200 and 300 percent showed no significant decrease over those obtained with the initial 50 percent amendment.

Comparison of Soil Container and Field Experiments

The measured a_{SU} values for samples grown in fields at Camp Parks and at Hanford are summarized in Table 22 along with the corresponding values for crops grown in soil containers. The paired values for each plant part have been plotted in Figure 5 in which the 45° line represents equal values.

Both crops grown in the Hanford soil, tomatoes and wheat, show reasonably good agreement between container and field data with a slight bias

Table 21

EFFECT ON PLANT UPTAKE CONTAMINATION
 FACTOR (a_{SU}) BY CALCIUM ADDITIONS
 TO Sr-85 CONTAMINATED HANFORD SANDY CLAY LOAM

<u>Plant</u>	<u>Plant Part</u>	<u>Calcium Additions</u>				
		<u>Control</u>	<u>50%</u>	<u>100%</u>	<u>200%</u>	<u>300%</u>
Tomato	Leaves	28.07	13.1	12.6	12.5	13.9
	Stem	10.7	5.93	7.38	5.22	6.11
	Fruit	0.396	0.335	0.175	0.177	0.398
	Peel	0.653	0.397	0.540	1.51	0.327
	Meat	0.341	0.196	0.202	0.636	0.0956
	Root	8.32	4.58	5.85	4.64	4.82
Potato	Leaves	14.77	11.1	10.3	9.83	11.4
	Stem	18.43	12.0	9.80	10.4	11.2
	Tuber	0.409	0.314	0.213	0.335	0.174
	Peel	1.09	0.587	1.92	0.618	0.569
	Meat	0.275	0.141	0.178	0.193	0.118
	Root	14.87	8.72	8.98	7.71	9.13
Wheat	Leaves	4.00	3.23	3.56	3.52	4.16
	Stalk	2.62	1.83	2.12	2.15	2.28
	Head	0.367	0.277	0.253	0.226	0.227
	Grain	0.208	0.153	0.0997	0.128	0.134
	Chaff	0.782	0.603	0.509	0.478	0.702
Corn	Leaves	4.64	3.25	3.33	3.78	3.17
	Stalk	1.29	0.790	1.12	0.863	1.12
	Cob	0.213	0.166	0.159	0.269	0.163
	Kernel	0.0364	0.0290	0.0346	0.0276	0.0222
	Husk	0.353	0.286	0.168	0.197	0.301
	Silk	0.352	0.200	0.285	0.170	0.201
	Tassel	2.13	1.58	1.75	1.42	1.14

Table 22

COMPARISON OF PLANT UPTAKE CONTAMINATION FACTORS (a_{SU})
 OBTAINED FROM PLANTS GROWN IN SOIL CONTAINERS AND
 PLANTS GROWN UNDER FIELD CONDITIONS
 Sr-85

<u>Plant</u>	<u>Plant Part</u>	<u>Hanford</u>		<u>Camp Parks Clay</u>	
		<u>Sandy Clay Loam</u>			
		<u>Field</u>	<u>Soil Container</u>	<u>Field</u>	<u>Soil Container</u>
Tomato	Leaves	12.2	28.1	--	--
	Stem	7.08	10.68	--	--
	Fruit	0.511	0.396	--	--
	Peel	0.340	0.653	--	--
	Meat	0.413	0.341	--	--
	Root		8.32	--	--
Wheat	Leaves	6.17	4.00	0.520	1.78
	Stalk	3.02	2.62	0.281	1.29
	Head	1.02	0.367	0.042	0.107
	Grain	0.532	0.208	0.031	0.079
	Chaff	--	0.782	0.101	0.373

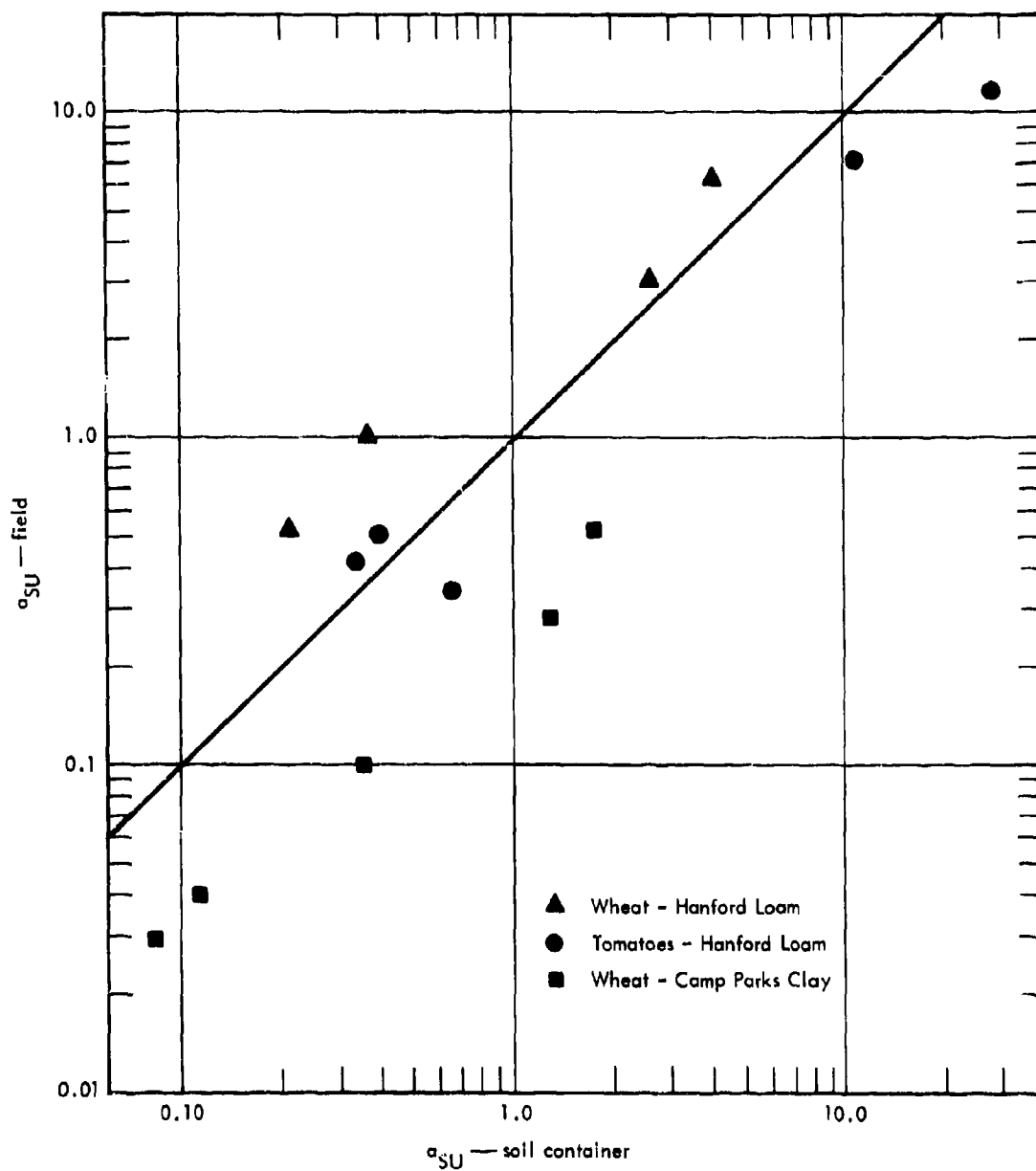


FIGURE 5 COMPARISON OF RADIOSTRONTIUM a_{SU} VALUES FOR SAMPLES GROWN IN SOIL CONTAINERS AND IN THE FIELD

in favor of higher a_{SU} values indicated for wheat samples grown in the field. An opposite effect is shown for the wheat crop grown in Camp Parks clay, which gave the largest variation between the containers and the field. On the average, the container a_{SU} values for Camp Parks wheat were slightly more than three times higher than the field samples. For all of the paired values taken as a whole, eight values were higher in crops grown in the soil containers and six were higher in the field samples. The average ratio of high to low value was 2.8 for the former and 1.8 for the pairs which gave higher field values.

The purpose of these experiments was to test the hypothesis that the large soil containers used in this work provide realistic simulation of an actual field environment. These rather limited experiments clearly do not verify the hypothesis for general application. On the other hand, neither do they disprove it. In fact, the agreement appears to be adequate to support the continuing application of the soil container data to post-attack predictions of food contamination,* at least in the absence of additional experimental work.

As part of the field experiments a limited number of additional tests were undertaken to derive information relating to several experimental variables. These included comparisons of a_{SU} values measured for various methods of application of the synthetic particle fallout, seeded (first crop) wheat with volunteer (second crop) wheat, and synthetic

* These considerations apply to the early postattack period when the uptake route is relatively less important than other sources of contamination. The uncertainties reflected in the data would undoubtedly assume increasing importance for purposes of assessing the longer-term hazard, or for evaluating uptake of world-wide fallout.

particle fallout with solution simulant. The results are presented, respectively, in Tables 23 through 25. In nearly every case the agreement appears to be well within the experimental uncertainty and indicates no appreciable difference in the results by the various methods. A possible exception is the higher a_{SU} values for the first wheat crop at Reedley (Table 24), which may be related to a relatively poor crop yield as compared to the volunteer wheat crop yield. The latter winter crop received additional rainfall which allowed for a normal root penetration.

The good agreement between the particle and solution simulant results supports the previously unproven contention that little difference is to be expected between the two methods of application, at least for this type of study and radionuclide-soil combination. From an experimental point of view, however, the particle type of fallout provides a considerably more convenient vehicle than a solution form for application to field plots, and in any event simulates more realistically the physical mixing of soil and fallout particles. For certain types of soils such mixing may have an important influence on the uptake process.

Effect of Heat Treatment on Observed Uptake

In the previous experiments a limited number of tests were undertaken in which samples of synthetic fallout were subjected to successively higher temperatures prior to mixing with the soil. The results indicated a marked decrease in the available radionuclide with corresponding lower a_{SU} values, by as much as a factor of ten or more. The experiments were repeated more extensively in the present work with the results shown in Table 26. Also shown is the solubility of the radiostrontium used, as measured in water and 0.1 N HCl. In general, and as expected, the decrease in a_{SU} for the heated simulant corresponds more closely to the decreased solubility in water.

Table 23

COMPARISON OF Sr-85 UPTAKE BY WHEAT GROWN IN HANFORD SOIL
CONTAMINATED BY SYNTHETIC FALLOUT MIXED INTO PLOWLAYER AND
WITH SYNTHETIC FALLOUT APPLIED TO SOIL SURFACE

<u>Plant</u>	<u>Plant Part</u>	<u>Simulant on Surface (^a SU)</u>	<u>Simulant Mixed into Plow Depth (^a SU)</u>
Wheat	Leaves	7.48	6.17
	Stalk	5.84	3.02
	Head	1.64	1.02
	Grain	0.824	0.532

Table 24

COMPARISON OF Sr-85 UPTAKE IN GRAIN FOR SEEDED WHEAT
(FIRST CROP) WITH VOLUNTEER WHEAT (SECOND
CROP) ON FARMLAND PLOTS

	<u>First Crop (^a SU)</u>	<u>Second Crop (^a SU)</u>
Camp Parks plot, synthetic fallout	0.0312	0.0232
Reedley plot, synthetic fallout surface application	0.824	0.281
Mixed in plowlayer	0.532	0.407
Solution mixed in plowlayer	0.451	0.253

Table 25

COMPARISON OF Sr-85 UPTAKE FROM HANFORD SOIL CONTAMINATED BY
SOLUTION SIMULANT AND BY SYNTHETIC FALLOUT

<u>Plant</u>	<u>Plant Part</u>	<u>Solution Simulant (^aSU)</u>	<u>Fallout Simulant (^aSU)</u>
Tomato	Leaves	12.0	12.2
	Stem	7.40	7.08
	Fruit	0.308	0.511
	Peel	0.557	0.340
	Meat	0.359	0.413
Wheat	Leaves	3.44	6.17
	Stalk	2.28	3.02
	Head	0.860	1.02
	Grain	0.451	0.532

Table 2C

**COMPARISON OF Sr-85 a_{SU} UPTAKE FROM HANFORD SOIL CONTAMINATED
WITH HEATED SYNTHETIC FALLOUT**

<u>Plant</u>	<u>Plant Part</u>	<u>Synthetic Fallout Treatment</u>			
		<u>Control</u>	<u>888°C</u>	<u>1027°C</u>	<u>1071°C</u>
Tomato	Leaves	28.07	0.280	0.199	0.125
	Stem	10.68	0.0892	0.108	0.0601
	Fruit	0.396	0.0121	0.0175	0.0965
	Peel	0.653	0.0336	0.0083	0.0167
	Meat	0.341	0.00959	0.00490	0.00146
	Root	8.32	0.139	0.0485	0.104
Potato	Leaves	14.77	0.240	0.0800	0.192
	Stem	18.43	0.155	0.0696	0.198
	Tuber	0.409	0.214	0.00202	0.00933
	Peel	1.09	0.00786	0.00774	0.00441
	Meat	0.275	0.0222	0.00275	0.00796
	Root	14.87	0.140	0.0677	0.157
Wheat	Leaves	4.00	0.0683	0.0104	0.0880
	Stalk	2.62	0.431	0.0261	0.0429
	Head	0.367	0.00438	0.00356	0.00465
	Grain	0.208	0.00322	0.00257	0.00237
	Chaff	0.782	0.0203	0.00537	0.0141
Corn	Leaves	4.64	0.296	0.0224	0.0834
	Stalk	1.29	0.0503	0.0109	0.0309
	Cob	0.213	0.0163	0.000912	0.00720
	Kernel	0.0364	0.00317	0.000417	0.00211
	Husk	0.353	0.0175	0.00662	0.00998
	Silk	0.352	0.0498	0.0124	0.00712
	Tassel	2.13	0.105	0.0102	0.0486
Sr-85	percent soluble in water	86.6%	1.4%	1.4%	1.5%
Sr-85	percent soluble in 0.1 N HCl	99.4	75.9	17.4	13.1

Although the present studies were conducted only with radiostrontium, laboratory work^{10,11,12} with additional radionuclides provides evidence that similar decreases would be expected. These results are significant with respect to expected levels of radionuclides in crops, for a given level of fallout contamination, and clearly indicate the necessity for specifying the degree of availability of radionuclides for a given type of fallout.

CONCLUSIONS

The uptake of four radionuclides (Sr-85, Ru-106, Cs-137, and Ce-144) was measured for four plants (wheat, tomatoes, corn and potatoes) grown in four different soil types (sandy loam, sandy clay loam, silty clay and clay). Plants were grown in large soil containers that allowed most of the root system to develop under normal field conditions. Sampling started as soon as the plants sprouted and continued at frequent intervals depending on growth characteristics of the plant. Plant uptake contamination factors (a_{SU}) were calculated for each of the samples harvested. Comparisons of the uptake for various plant part-soil-radionuclide combinations at crop maturity show that the a_{SU} values for Sr-85 are the largest in all instances, usually by an order of magnitude. The a_{SU} values for Cs-137, Ru-106, Zr-Nb-95, and Ce-144 show no consistent pattern and are randomly distributed high and low among the plant part-soil combinations. The a_{SU} values for the edible portion of each plant were lowest in every case, and usually the leafy portion of the plants had the largest a_{SU} value. These general observations support and extend the results of previous experiments.

Only limited data were available for evaluating the effects of available calcium on radionuclide uptake but, taken with the results of previous work, supported the postulated decrease in uptake in a manner approximately inversely proportional to the exchangeable calcium concentration in the soil. These results again emphasized the generally lower uptake values observed in the work as compared to literature values. The lower values in these experiments have been attributed to the growing of crops in large containers, as opposed to values based on literature

data which are reported for experiments using small pot containers. The large soil containers allowed the plant root systems to develop in a manner more nearly approximating field conditions.

To test this assumption further some field studies were conducted in which crops were grown on small test plots at two different field locations. The data were not extensive enough to confirm the validity of the large container approach but were in sufficiently good agreement to support the continuing application of the large container data to estimations of early postattack period food contamination levels. As part of the field studies, a limited number of additional experiments were conducted to compare measured a_{SU} values for various methods of mixing the contaminant with the soil and also to compare the results obtained by applying the contaminant in normal particle form and also as a solution. In all cases no significant differences were found.

By far the largest changes in a_{SU} values were produced when the availability of the radionuclides for uptake was reduced by thermal pre-treatment of the fallout simulant. The results verified the previous reductions in a_{SU} values for wheat by as much as a factor of 10. In the present work the observations were extended to include the three additional crops of tomatoes, corn and potatoes and similar reductions in a_{SU} values were found.

Recommendations

In view of the generally low uptake values observed in this and previous work it appears very likely that relatively little postattack hazard to humans can be anticipated from the consumption of foods grown in soils which have been contaminated up to the levels employed in these experiments. The primary contribution of the current series of experiments has been to significantly extend the amount of available data for

analyses of postattack food supply problems. It is recommended that the data be included in subsequent analytical studies directed to evaluations of human survival following nuclear attack.

Possibly the most serious problem encountered in the conduct of the work has been associated with the difficulty in attempting to generalize the results. Although the number of radionuclides and crops studied are probably adequate to cover a wide range of postattack situations, the work has of necessity been restricted to only a limited number of soil types. Although undertaking additional work would clearly be dependent on research priorities, it is recommended that any additional studies be specifically oriented toward an emphasis on soil variables.

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Appendix A

PLANT UPTAKE SUMMARY SHEETS

INDEX TO PLANT UPTAKE SUMMARY SHEETS

Box No.	Crop	Soil	Box No.	Crop	Soil	Box No.	Crop	Soil	Box No.	Crop	Soil	Box No.	Crop	Soil	Box No.	Crop	Soil
C-144																	
1	Tomato	Oakley	31	Wheat	Oakley	57	Tomato	Yolo	90	Wheat	Manford + 100% Ca	201	Wheat	Camp Parks Field			
2	Tomato	Pleasanton	32	Wheat	Oakley	58	Tomato	Yolo	91	Wheat	Manford + 200% Ca	202	Wheat	Camp Parks Field			
3	Tomato	Clear Lake	33	Wheat	Oakley	59	Tomato	Yolo	92	Wheat	Oakley	203	Wheat	Camp Parks Field			
4	Potato	Oakley	34	Wheat	Clear Lake	60	Potato	Yolo	93	Wheat	Oakley	204	Wheat	Camp Parks Field			
5	Potato	Pleasanton	35	Wheat	Clear Lake	61	Corn	Yolo	94	Wheat	Oakley	205	Corn	Camp Parks Field			
6	Potato	Clear Lake	36	Wheat	Pleasanton	62	Corn	Yolo	95	Corn	Manford	201	Wheat	Bedley Field			
7	Corn	Oakley	37	Wheat	Pleasanton	63	Wheat	Yolo	96	Corn	Manford	202	Wheat	Bedley Field			
8	Corn	Pleasanton	38	Wheat	Pleasanton	64	Wheat	Yolo	97	Corn	Manford	203	Wheat	Bedley Field			
9	Corn	Clear Lake	39	Wheat	Pleasanton	65	Tomato	Manford	98	Corn	Manford + 300% Ca	204	Wheat	Bedley Field			
10	Wheat	Oakley	40	Wheat	Pleasanton	66	Tomato	Manford	99	Corn	Manford + 50% Ca	205	Wheat	Bedley Field			
11	Wheat	Oakley	41	Tomato	Oakley	67	Tomato	Manford	100	Corn	Manford + 100% Ca	206	Tomato	Bedley Field			
12	Wheat	Oakley	42	Tomato	Clear Lake	68	Tomato	Manford + 300% Ca	101	Corn	Manford + 200% Ca	207	Tomato	Bedley Field			
13	Wheat	Pleasanton	43	Tomato	Clear Lake	69	Tomato	Manford + 50% Ca	102	Corn	Oakley	208	Tomato	Bedley Field			
14	Wheat	Pleasanton	44	Tomato	Pleasanton	70	Tomato	Manford + 100% Ca	103	Corn	Oakley	209	Tomato	Bedley Field			
15	Wheat	Pleasanton	45	Tomato	Pleasanton	71	Tomato	Manford + 200% Ca	104	Corn	Oakley	210	Wheat	Bedley Field			
16	Wheat	Clear Lake	46	Tomato	Pleasanton	72	Tomato	Oakley	105	Corn	Manford + T1*	211	Wheat	Bedley Field			
17	Wheat	Clear Lake	47	Potato	Clear Lake	73	Tomato	Oakley	106	Corn	Manford + T2	212	Wheat	Bedley Field			
18	Wheat	Clear Lake	48	Potato	Pleasanton	74	Tomato	Oakley	107	Corn	Manford + T3	213	Wheat	Bedley Field			
19	Tomato	Oakley	53	Corn	Pleasanton	77	Potato	Manford	110	Potato	Manford + T3	216	Tomato	Bedley Field			
20	Tomato	Pleasanton	54	Corn	Pleasanton	78	Potato	Manford + 300% Ca	111	Potato	Manford + T1	217	Tomato	Bedley Field			
21	Potato	Oakley	80	Potato	Pleasanton	79	Potato	Manford + 50% Ca	112	Wheat	Manford + T2						
22	Potato	Pleasanton	55	Corn	Pleasanton	81	Potato	Manford + 100% Ca	113	Wheat	Manford + T3						
23	Corn	Oakley	56	Corn	Pleasanton	82	Potato	Oakley	116	Tomato	Manford + T1						
24	Corn	Pleasanton	108	Corn	Manford	83	Potato	Oakley	117	Tomato	Manford + T2						
25	Wheat	Oakley	115	Wheat	Manford	84	Potato	Oakley	118	Tomato	Manford + T3						
26	Wheat	Oakley				85	Wheat	Camp Parks	119	Wheat	Camp Parks						
27	Wheat	Oakley				86	Wheat	Camp Parks	120	Wheat	Camp Parks						
28	Wheat	Pleasanton				87	Wheat	Manford									
29	Wheat	Pleasanton				88	Wheat	Manford + 300% Ca									
30	Wheat	Pleasanton				89	Wheat	Manford + 50% Ca									
S-45																	
S-45 (continue)																	
S-45																	

* T1, T2 and T3 indicate three temperature levels synthetic fallow heated prior to mixing in soil.

TABLE A- 1

PLANT UPTAKE SUMMARY: TOMATO

SOIL: OAKLEY SANDY LOAM CONTAINER NUMBER: 1
 RADIONUCLIDE: CS-134 DATE PLANTED: 110
 INITIAL SOIL ACTIVITY (D/S/GM): 471.80 DATE EMERGED: 125

SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
101	SHOOT	34	20	0.0580	1.9592	27.250	5.788-02
102	VINE	47	40	0.3478	13.9118	24.410	6.232-02
103	STEM	54	12	0.7795	9.3540	34.546	7.322-02
104	LEAVES	54	12	0.2487	3.2240	17.977	3.818-02
105	LEAVES	70	2	5.5057	11.0114	23.216	4.922-02
106	STEM	70	2	2.9324	5.6648	9.124	1.932-02
107	LEAVES	84	2	12.9445	9.7010	7.478	1.598-02
108	STEM	84	2	11.7900	10.8020	7.299	4.872-03
109	FLOWER	84	2	0.4825	0.9650	10.575	2.332-02
110	LEAVES	175	1	17.6092	5.8092	20.117	4.262-02
111	STEM	175	1	15.9499	4.3599	4.047	8.582-03
112	PEELS	175	1	17.6947	0.8747	4.937	1.052-02
113	MEAT	175	1	59.9400	4.6600	2.057	4.362-02
114	FRUIT	175	3	115.3700	9.8100	2.478	5.682-03
115	ROOT	175	1	2.6756	2.6356	52.250	1.132-01

TABLE A- 2

PLANT UPTAKE SUMMARY: TOMATO

SOIL: PLEASANTON LOAM CONTAINER NUMBER: 2
 RADIONUCLIDE: CE-144 DATE PLANTED: 110
 INITIAL SOIL ACTIVITY (D/S/GM): 480.80 DATE EMERGED: 125

SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
201	SHOOT	34	20	0.0686	1.3722	4.394	1.968-02
202	VINE	47	40	0.2324	9.2978	11.705	2.442-02
203	STEM	54	12	0.2199	3.8336	14.043	2.922-02
204	LEAVES	54	12	0.1167	1.3998	5.545	1.112-02
205	LEAVES	70	4	2.7251	10.9004	8.058	1.662-02
206	STEM	70	4	3.2841	13.1365	3.545	7.382-03
207	LEAVES	84	2	11.5730	14.8930	0.674	1.402-03
208	STEM	84	2	10.6019	9.4381	2.740	5.702-03
209	FLOWER	84	2	0.2806	0.7212	0.539	1.122-03
210	LEAVES	175	1	17.9377	4.9177	1.970	4.102-03
211	STEM	175	1	35.2060	3.7460	1.342	2.792-03
212	PEELS	175	1	15.8999	0.9099	0.442	9.202-04
213	MEAT	175	1	89.7000	4.7800	2.206	4.592-03
214	FRUIT	175	3	102.4233	7.5400	3.019	6.282-03
215	ROOT	175	1	3.1556	3.1556	11.226	2.342-02

TABLE A- 3

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: CLEAR LAKE CLAY				CONTAINER NUMBER: 1			
RADIOISOTOPE: CE-144				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 400.00				DATE EMERGED: 125			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
301	SHOOT	24	20	0.1262	1.1230	11.004	0.448-02
302	VINE	47	25	0.5930	14.0240	11.003	2.940-02
303	STEM	54	9	1.1054	10.4701	4.788	1.020-02
304	LEAVES	54	9	0.4991	4.4921	3.755	0.020-03
305	LEAVES	70	3	7.1198	21.3394	4.177	0.920-03
306	STEM	70	3	2.0104	6.0317	4.207	9.150-03
307	LEAVES	84	2	9.4327	9.0225	1.003	4.020-03
308	STEM	84	2	10.9738	11.7320	2.019	4.310-03
309	FLOWER	84	2	0.7712	1.5425	2.047	4.410-03
310	LEAVES	175	1	17.4230	3.7430	7.507	1.000-02
311	STEM	175	1	29.7339	4.2839	1.379	2.950-03
312	PEELS	175	1	15.6044	1.0944	0.266	5.470-04
313	MEAT	175	1	84.5000	3.9200	2.430	5.190-03
314	FRUIT	175	3	101.3167	12.3100	1.404	3.400-03
315	ROOT	175	1	5.0844	5.0844	24.072	5.140-02

TABLE A- 4

PLANT UPTAKE SUMMARY: POTATO							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 4			
RADIOISOTOPE: CE-144				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 471.00				DATE EMERGED: 127			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
401	LEAVES	76	1	48.0005	12.3305	67.398	1.430-01
402	STEM	76	1	47.0794	14.0494	15.313	3.250-02
403	TUBER	76	1	89.2470	32.2580	0.829	1.020-03
404	MEAT	76	1	69.4415	29.4255	0.646	1.370-03
405	PEELS	76	1	18.1512	18.1512	4.086	0.660-03
406	ROOT	76	1	3.7323	3.7323	66.065	1.400-01
407	LEAVES	104	2	13.1031	11.2562	130.139	2.760-01
408	STEM	104	2	19.2975	14.0505	30.076	6.370-02
409	TUBER	104	2	42.2753	30.9515	9.321	1.980-02
410	ROOT	104	2	2.0872	4.1745	58.311	1.240-01

TABLE A- 5

PLANT UPTAKE SUMMARY: POTATO							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 7			
RADIOISOTOPE: CE-144				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 480.60				DATE EMERGED: 129			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
501	LEAVES	104	2	19.6271	16.6841	19.411	4.048-02
502	STEM	104	2	9.6148	19.2295	10.552	2.208-02
503	TUBER	104	1	49.1490	27.8240	4.230	8.808-03
504	MEAT	104	1	27.1382	27.1382	0.717	1.498-03
505	PEELS	104	1	8.1682	8.1682	2.447	5.098-03
506	RCCT	104	2	2.6720	5.3440	26.048	5.428-02

TABLE A- 6

PLANT UPTAKE SUMMARY: POTATO							
SOIL: CLEAR LAKE CLAY				CONTAINER NUMBER: 6			
RADIOISOTOPE: CE-144				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 468.40				DATE EMERGED: 128			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
601	LEAVES	104	4	16.9633	21.9030	57.736	1.238-01
602	STEM	104	4	11.3072	12.1589	6.741	1.448-02
603	TUBER	104	3	31.6403	34.1008	1.622	3.048-03
604	MEAT	104	1	75.6805	26.2105	1.648	3.528-03
605	PEELS	104	1	51.9955	28.0155	0.600	1.288-03
606	RCCT	104	4	3.5499	14.1995	2.608	5.578-03

TABLE A- 7

PLANT UPTAKE SUMMARY: CORN							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 7			
RADIOISOTOPE: CE-144				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 471.80				DATE EMERGED: 127			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
701	SHOOT	34	4	0.3779	3.4479	10.777	2.288-02
702	SHOOT	47	19	1.0452	15.6789	13.200	2.818-02
703	LEAVES	54	9	0.8463	7.7966	8.864	1.718-02
704	STALK	54	9	0.3078	2.7700	12.787	2.718-02
705	LEAVES	70	3	4.3461	3.2961	4.229	8.368-03
706	STALK	70	3	2.3074	6.9223	0.374	7.978-04
707	LEAVES	84	1	40.8260	7.0060	1.286	4.858-03
708	STALK	84	1	46.4620	17.8390	0.442	1.368-03
709	TASSEL	84	1	8.1320	8.1320	0.150	1.398-03
710	SILK	84	1	3.3850	3.3850	0.115	1.308-03
711	LEAVES	119	2	30.6210	8.0420	4.404	9.358-03
712	STALK	119	2	37.1843	13.9989	2.069	4.388-03
713	TASSEL	119	2	7.8108	15.6218	1.111	6.178-03
714	SILK	119	4	2.0816	8.3265	1.489	3.378-03
715	MUSK	119	4	43.2474	11.0603	0.127	1.848-03
716	KERNEL	119	4	74.0854	49.1425	0.311	6.948-04
717	COR	119	4	43.4280	14.7920	1.387	2.778-03

TABLE A- 8

PLANT UPTAKE SUMMARY: CORN							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 8			
RADIOISOTOPE: CE-144				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 480.80				DATE EMERGED: 127			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
801	SHOOT	34	6	0.1870	1.1220	4.450	9.638-03
802	SHOOT	54	4	0.3213	1.2050	9.889	2.808-02
803	LEAVES	70	3	3.6175	3.9821	3.004	1.178-02
804	STALK	70	3	1.6998	5.0675	2.910	6.068-03
805	LEAVES	84	1	23.1250	6.7450	1.297	2.318-03
806	STALK	84	1	28.6175	15.2670	0.295	6.148-04
807	TASSEL	84	1	4.1830	4.1830	0.666	1.398-03
808	LEAVES	119	1	33.2055	6.5355	4.209	8.768-03
809	STALK	119	1	26.5200	7.8600	2.224	4.638-03
810	TASSEL	119	2	3.7410	7.4820	0.524	1.698-03
811	SILK	119	4	2.1366	8.5466	0.907	1.898-03
812	MUSK	119	3	10.9478	10.7939	0.611	1.278-03
813	KERNEL	119	4	19.1661	27.2645	0.051	1.068-04
814	COR	119	4	28.8578	12.2510	0.718	1.498-03

TABLE A- 9

PLANT UPTAKE SUMMARY: CORN

SOIL: CLEAR LAKE CLAY							CONTAINER NUMBER: 9
RADIOISOTOPE: CE-144							DATE PLANTED: 110
INITIAL SOIL ACTIVITY (D/S/GM): 448.40							DATE EMERGED: 127
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
901	SHOOT	34	6	0.6082	3.6495	7.328	1.978-02
902	SHOOT	47	15	0.7095	10.6419	13.006	2.788-02
903	LEAVES	54	12	0.4113	4.9354	4.107	1.308-02
904	STALK	54	12	0.1844	2.2130	9.834	2.108-02
905	LEAVES	70	3	5.8590	4.8287	4.738	1.018-02
906	STALK	70	3	2.1976	6.5927	3.413	7.298-03
907	LEAVES	84	1	23.3410	6.9210	1.326	2.838-03
908	STALK	84	1	33.6436	15.3044	0.024	5.628-05
909	TASSEL	84	1	6.2640	6.2640	0.374	1.238-03
910	LEAVES	119	1	25.1355	5.5355	5.316	1.138-02
911	STALK	119	1	31.0560	7.1560	1.833	1.918-03
912	TASSEL	119	2	2.6440	5.2880	2.272	4.858-03
913	STALK	119	3	2.1803	6.8410	2.613	5.588-03
914	HUSK	119	3	13.8663	8.3990	0.958	2.058-03
915	KERNEL	119	3	54.2565	54.2135	0.425	2.088-04
916	COR	119	3	41.9196	13.5567	0.712	1.928-03

TABLE A- 10

PLANT UPTAKE SUMMARY: WHEAT

SOIL: OAKLEY SANDY LOAM							CONTAINER NUMBER: 10
RADIOISOTOPE: CE-144							DATE PLANTED: 110
INITIAL SOIL ACTIVITY (D/S/GM): 471.80							DATE EMERGED: 119
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
1001	SHOOT	28	40	0.0386	2.3430	6.164	1.318-02
1002	SHOOT	39	50	0.1829	9.1459	17.527	3.718-02
1003	SEL	54	10	0.8336	8.3361	2.520	5.348-03
1004	HEAD	54	10	0.1785	1.7850	0.668	1.428-03
1005	SEL	70	10	1.0192	10.1922	1.721	3.658-03
1006	HEAD	70	10	0.3196	3.1963	0.385	8.158-04
1007	LEAVES	70	10	0.1641	1.6409	3.461	7.348-03
1008	STALK	84	10	0.4501	4.5009	1.658	3.518-03
1009	HEAD	84	10	0.5080	5.0796	1.378	2.928-03
1010	HEAD	110	248	0.4281	22.9800	0.393	8.338-04
1011	STALK	110	248	0.6055	10.6185	0.782	1.668-03
1012	LEAVES	110	248	0.2245	8.5350	5.350	1.138-02
1013	GRAIN	110	238	0.3413	20.0000	0.613	1.308-03
1014	CHAFF	110	238	0.0410	5.0000	4.958	1.058-02

TABLE A- 11

PLANT UPTAKE SUMMARY: MMSAT

SOIL: OAKLEY SANDY LOAM CONTAINER NUMBER: 11
 RADIONUCLIDE: CE-144 DATE PLANTED: 110
 INITIAL SOIL ACTIVITY (D/S/GM): 471.80 DATE EMERGED: 119

SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
1101	SHOOT	28	40	0.0542	2.2443	4.744	1.418-02
1102	SHOOT	39	50	0.2349	11.7445	14.907	3.168-02
1103	SEL	54	10	1.0253	10.2554	3.928	8.348-03
1104	HEAD	54	7	0.1823	1.2744	6.980	1.398-02
1105	SEL	70	10	0.3794	9.7945	3.238	4.848-03
1106	HEAD	70	10	0.2744	2.7457	10.307	2.188-02
1107	LEAVES	84	10	0.2573	2.5727	11.501	2.448-02
1108	STALK	84	10	0.4737	4.7349	2.059	4.368-03
1109	HEAD	84	10	0.4933	4.9334	0.726	1.548-03
1110	HEAD	110	308	0.3373	19.3942	0.574	1.228-03
1111	STALK	110	308	0.4924	7.6143	0.670	1.428-03
1112	LEAVES	110	308	0.3132	11.4150	2.409	5.338-03
1113	GRAIN	110	298	0.3177	20.0000	0.631	1.348-03
1114	CHAFF	110	298	0.0393	5.0000	4.456	9.458-03

TABLE A- 12

PLANT UPTAKE SUMMARY: WHEAT

SOIL: OAKLEY SANDY LOAM CONTAINER NUMBER: 12
 RADIONUCLIDE: CE-144 DATE PLANTED: 110
 INITIAL SOIL ACTIVITY (D/S/GM): 471.80 DATE EMERGED: 119

SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
1201	SHOOT	28	40	0.0579	2.3145	5.948	1.268-02
1202	SHOOT	39	50	0.2418	12.0908	9.548	2.838-02
1203	SHOOT	54	10	0.8041	8.0407	4.700	9.968-03
1204	SEL	70	10	1.1986	11.9860	2.200	4.868-03
1205	HEAD	70	10	0.2847	2.8448	0.031	6.518-05
1206	LEAVES	84	10	0.3343	3.3425	21.462	4.558-02
1207	STALK	84	10	0.6623	6.6226	2.779	5.898-03
1208	HEAD	84	10	0.4728	4.7277	1.972	4.188-03
1209	HEAD	110	307	0.5853	18.9440	1.096	2.328-03
1210	STALK	110	307	0.5264	6.4202	1.287	2.738-03
1211	LEAVES	110	307	0.3418	7.2476	4.886	1.048-02
1212	GRAIN	110	247	0.3515	20.0000	0.860	1.828-03
1213	CHAFF	110	247	0.0349	5.0000	2.435	5.168-03

TABLE A- 13

PLANT UPTAKE SUMMARY: WHEAT							
SCIL: PLEASANTON LOAM				CONTAINER NUMBER: 13			
RADIOISOTOPE: CE-144				DATE PLANTED: 110			
INITIAL SCIL ACTIVITY (D/S/GM): 480.60				DATE EMERGED: 119			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
1301	SHOOT	28	40	0.0723	2.9007	4.944	1.028-02
1302	SHOOT	39	50	0.1991	9.5557	4.834	1.428-02
1303	SHOOT	54	10	0.8213	8.3131	1.253	2.618-03
1304	SEL	70	10	1.2147	12.1473	2.952	6.148-03
1305	HEAD	70	10	0.3193	3.1930	1.095	2.288-03
1306	LEAVES	84	10	0.3104	3.1037	7.946	1.658-02
1307	STALK	84	10	0.8704	8.7041	1.393	2.908-03
1308	HEAD	84	10	0.3400	3.4004	0.050	1.058-04
1309	HEAD	110	383	0.6582	19.7629	0.883	1.848-03
1310	STALK	110	383	0.5269	5.9785	2.902	6.048-03
1311	LEAVES	110	383	1.2134	9.0668	2.804	5.848-03
1312	GRAIN	110	373	0.4381	20.0000	1.785	1.638-03
1313	CHAFF	110	373	0.0317	5.0000	0.090	1.868-04

TABLE A- 14

PLANT UPTAKE SUMMARY: WHEAT							
SCIL: PLEASANTON LOAM				CONTAINER NUMBER: 14			
RADIOISOTOPE: CE-144				DATE PLANTED: 110			
INITIAL SCIL ACTIVITY (D/S/GM): 480.60				DATE EMERGED: 119			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
1401	SHOOT	28	40	0.0409	2.5375	6.011	1.258-02
1402	SHOOT	39	50	0.1723	8.6160	7.577	1.588-02
1403	SEL	54	10	0.6291	6.9909	1.745	3.618-03
1404	HEAD	54	10	0.1442	1.4423	0.392	8.168-04
1405	SEL	70	10	1.0750	10.7504	1.457	3.038-03
1406	HEAD	70	10	0.3029	3.0295	1.851	3.858-03
1407	LEAVES	84	10	0.2252	2.2521	7.727	1.618-02
1408	STALK	84	10	0.6446	6.6457	3.324	6.928-03
1409	HEAD	84	10	0.4334	4.3349	0.254	1.158-03
1410	HEAD	110	383	0.7495	21.9265	1.284	2.678-03
1411	STALK	110	383	0.5566	8.0370	1.273	2.658-03
1412	LEAVES	110	383	0.2759	8.1628	3.603	7.508-03
1413	GRAIN	110	383	0.4898	20.0000	0.590	1.278-03
1414	CHAFF	110	383	0.0389	5.0000	5.060	1.058-02

TABLE A- 13

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 13			
RADIOISOTOPE: CE-144				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GH): 488.68				DATE EMERGED: 119			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GH)	ASU
1501	SHOOT	28	40	0.0633	2.3328	2.644	2.130-03
1502	SHOOT	39	90	0.1952	7.7989	0.629	1.868-02
1503	SEL	54	10	0.6384	4.3838	1.743	1.618-01
1504	HEAD	54	9	0.1618	1.4540	1.274	2.698-03
1505	SEL	70	10	0.3121	2.1212	0.549	1.238-02
1506	HEAD	70	10	0.3010	3.0098	3.764	7.838-03
1507	LEAVES	84	10	0.2686	2.6838	2.823	1.898-02
1508	STALK	84	10	0.7004	7.0838	0.899	1.868-03
1509	HEAD	84	10	0.6728	6.7287	0.542	1.178-01
1510	HEAD	110	366	0.6621	19.5442	0.877	1.838-03
1511	STALK	110	366	0.3163	6.3338	2.766	3.638-03
1512	LEAVES	110	366	0.2435	9.5499	3.217	6.498-03
1513	GRAIN	110	358	0.3380	20.8000	0.479	0.268-04
1514	CHAFF	110	350	0.0362	5.0000	3.022	6.298-03

TABLE A- 16

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: CLEAR LAKE CLAY				CONTAINER NUMBER: 16			
RADIOISOTOPE: CE-144				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GH): 468.40				DATE EMERGED: 119			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GH)	ASU
1601	SHOOT	28	40	0.0530	2.1182	2.891	6.178-03
1602	SHOOT	39	90	0.2131	10.4953	4.833	1.038-02
1603	SEL	54	10	0.8687	8.6867	0.313	1.188-01
1604	HEAD	54	9	0.1673	1.6857	0.649	1.398-03
1605	SEL	70	10	1.0666	10.8662	2.411	3.138-03
1606	HEAD	70	10	0.2924	2.9238	1.824	3.898-03
1607	LEAVES	84	10	0.2770	2.7700	1.203	2.378-02
1608	STALK	84	10	0.6405	8.4093	1.448	3.098-03
1609	HEAD	84	10	0.6873	6.8727	0.033	2.378-02
1610	HEAD	110	310	0.6112	19.5960	0.048	1.468-04
1611	STALK	110	310	0.6429	6.8333	0.447	2.518-04
1612	LEAVES	110	310	0.2471	6.7600	3.847	8.218-03
1613	GRAIN	141	300	0.3304	20.8000	0.224	4.788-04
1614	CHAFF	141	300	0.0447	5.0000	1.896	4.058-03

TABLE A- 17

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: CLEAR LAKE CLAY				CONTAINER NUMBER: 17			
RADIONUCLIDE: CE-144				DATE PLANTED: 119			
INITIAL SOIL ACTIVITY (D/S/GM): 468.40				DATE EMERGED: 119			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
1701	SHOOT	28	40	0.0563	2.2502	2.691	5.738-03
1702	SHOOT	39	50	0.2448	12.2421	5.036	1.258-02
1703	SHOOT	54	10	0.7843	7.8428	3.234	6.908-03
1704	SEL	70	10	1.0469	10.4687	1.204	2.748-03
1705	HEAD	70	10	0.2773	2.7733	1.689	3.608-03
1706	LEAVES	84	10	0.2635	2.6352	3.464	7.838-03
1707	STALK	84	10	0.8897	8.8975	6.585	1.388-02
1708	HEAD	84	10	0.6430	6.4295	0.113	2.428-04
1709	HEAD	110	389	0.6222	19.3268	0.470	1.008-03
1710	STALK	110	389	0.6241	4.9315	3.108	6.638-03
1711	LEAVES	110	389	0.2504	9.2730	2.021	4.328-03
1712	GRAIN	141	389	0.4075	20.0000	0.414	8.838-04
1713	CHAFF	141	389	0.0318	5.0000	0.620	1.478-03

TABLE A- 18

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: CLEAR LAKE CLAY				CONTAINER NUMBER: 18			
RADIONUCLIDE: CE-144				DATE PLANTED: 119			
INITIAL SOIL ACTIVITY (D/S/GM): 468.40				DATE EMERGED: 119			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
1801	SHOOT	28	40	0.0577	2.3067	1.445	3.098-03
1802	SHOOT	39	50	0.1975	9.8759	5.188	1.118-02
1803	SHOOT	54	10	0.8454	8.4240	3.256	6.958-03
1804	SEL	70	10	1.0660	10.6603	2.743	5.868-03
1805	HEAD	70	10	0.2832	2.8324	0.073	1.368-04
1806	LEAVES	84	10	0.2618	2.6182	3.888	8.308-03
1807	STALK	84	10	0.3304	5.3045	0.670	1.438-03
1808	HEAD	84	10	0.5425	5.4247	0.931	1.998-03
1809	HEAD	110	378	0.6660	24.0797	0.405	8.448-04
1810	STALK	110	378	0.5871	5.4230	1.409	3.018-03
1811	LEAVES	110	378	0.2506	5.3775	3.118	6.468-03
1812	GRAIN	141	388	0.4334	20.0000	0.440	9.408-04
1813	CHAFF	141	388	0.0350	5.0000	1.034	2.218-03

TABLE A- 19

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: GAWLEY SANDY LOAM				CONTAINER NUMBER: 19			
RADIOISOTOPE: RU-106				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 202.88				DATE EMERGED: 127			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
1901	SHOOT	34	20	0.0717	1.4363	21.203	1.528-01
1902	VINE	47	25	0.1359	4.1375	29.369	1.238-01
1903	VINE	54	11	0.3008	3.3089	22.950	1.128-01
1904	LEAVES	70	3	3.9489	8.8450	16.458	8.008-02
1905	STEM	70	3	1.1480	3.4441	4.138	2.048-02
1906	LEAVES	84	1	19.6201	19.6201	14.854	7.238-02
1907	STEM	84	1	17.3388	8.7880	1.304	6.348-02
1908	FLOWER	84	1	0.5765	0.5765	18.926	9.208-02
1909	LEAVES	175	1	14.7734	6.0554	21.208	1.038-01
1910	STEM	175	1	40.8623	5.3525	2.399	1.178-02
1911	PEELS	175	1	17.1321	1.3421	1.126	2.478-02
1912	MEAT	175	1	93.2900	3.7308	2.064	1.008-02
1913	FRUIT	175	3	110.3967	14.7700	1.238	6.428-02
1914	ROOT	175	1	6.6988	6.6988	15.493	7.538-02

TABLE A- 20

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 20			
RADIOISOTOPE: RU-106				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 209.50				DATE EMERGED: 127			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
2001	VINE	47	20	0.2328	4.6560	16.533	7.818-02
2002	VINE	54	3	0.4113	1.2359	7.486	3.578-02
2003	LEAVES	70	3	2.9717	8.9151	6.973	3.338-02
2004	STEM	70	3	1.8332	5.4995	3.888	1.868-02
2005	LEAVES	84	1	13.5145	13.5145	3.134	1.508-02
2006	STEM	84	1	12.2710	12.2710	0.512	2.448-03
2007	FLOWER	84	1	0.9970	0.9970	5.004	2.348-02
2008	LEAVES	175	1	22.7548	6.5048	4.141	1.988-02
2009	STEM	175	1	60.2742	5.8442	0.421	2.158-03
2010	PEELS	175	1	20.4667	0.7387	2.625	1.258-02
2011	MEAT	175	1	114.0200	2.1900	1.238	2.918-03
2012	FRUIT	175	3	133.1647	4.7900	4.422	2.218-02
2013	ROOT	175	1	5.5764	5.5764	46.809	2.148-01

TABLE A- 21

PLANT UPTAKE SUMMARY: POTATO							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 21			
RADIOISOTOPE: RU-106				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 209.80				DATE EMERGED: 129			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
2101	LEAVES	104	1	22.1423	19.2270	52.698	2.568-01
2102	STEM	104	1	21.1748	17.6248	9.323	4.938-02
2103	TUBER	104	2	77.4000	61.6000	3.017	1.478-02
2104	MEAT	104	1	42.8990	42.8990	0.574	2.798-03
2105	PEELS	104	1	11.9140	11.9140	8.947	3.388-02
2106	ROOT	104	1	1.9423	9.8270	73.130	3.958-01

TABLE A- 22

PLANT UPTAKE SUMMARY: POTATO							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 22			
RADIOISOTOPE: RU-106				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 209.50				DATE EMERGED: 129			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
2201	LEAVES	104	1	49.2020	19.9020	11.885	5.678-02
2202	STEM	104	1	37.5070	16.3970	2.887	1.388-02
2203	TUBER	104	1	57.0663	24.6363	0.465	2.228-03
2204	MEAT	104	1	23.6750	23.6750	0.349	1.668-03
2205	PEELS	104	1	4.0070	4.0070	2.478	1.188-02
2206	ROOT	104	1	4.0470	4.0470	18.921	9.038-02
2207	PEELS	125	1	13.3665	13.3665	3.494	1.678-02
2208	MEAT	125	1	60.7900	60.7900	2.209	1.058-02
2209	TUBER	125	1	60.7300	30.1800	2.573	1.238-02

TABLE A- 23

PLANT UPTAKE SUMMARY: CORN							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 24			
RADIOISOTOPE: RU-106				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 205.00				DATE EMERGED: 127			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
2301	SHOOT	34	6	0.6157	1.6740	19.129	9.228-02
2302	SHOOT	47	15	1.0144	19.2193	9.596	4.668-02
2303	LEAVES	54	12	0.8971	8.0620	8.214	3.828-02
2304	STALK	64	12	0.1943	2.3317	3.653	1.778-02
2305	LEAVES	70	3	4.4878	5.0615	3.016	1.478-02
2306	STALK	70	3	2.9806	8.9418	1.893	9.018-03
2307	LEAVES	84	1	20.4340	4.4340	2.439	1.288-02
2308	STALK	84	1	32.1560	16.2030	0.974	4.738-03
2309	TASSEL	84	1	4.1525	6.1525	9.764	3.718-02
2310	LEAVES	119	1	26.4360	7.1960	14.196	6.408-02
2311	STALK	119	1	21.9873	5.1873	1.892	8.228-03
2312	TASSEL	119	2	3.0034	6.0068	4.355	2.118-02
2313	SILK	119	3	1.6455	4.9335	3.044	1.488-02
2314	MUSK	119	3	13.4482	7.7245	1.040	9.098-03
2315	KERNEL	119	3	81.3423	51.2480	0.201	9.758-04
2316	COB	119	3	42.4569	10.1707	0.209	1.028-03

TABLE A- 24

PLANT UPTAKE SUMMARY: CORN							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 24			
RADIOISOTOPE: RU-106				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 209.50				DATE EMERGED: 127			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
2401	SHOOT	34	6	0.3399	3.2391	12.216	5.838-02
2402	SHOOT	47	10	0.6890	6.8904	6.403	3.068-02
2403	LEAVES	54	6	0.2887	1.7322	1.097	3.248-03
2404	STALK	54	6	0.0902	0.9412	3.948	1.888-02
2405	LEAVES	70	3	5.5947	4.2240	7.997	3.828-02
2406	STALK	70	3	2.0974	6.2922	1.112	5.318-03
2407	LEAVES	84	1	24.0210	6.2810	1.164	3.558-03
2408	STALK	84	1	15.4415	15.4415	29.767	1.428-01
2409	TASSEL	84	1	2.3020	2.3020	0.983	4.698-03
2410	LEAVES	119	1	24.7910	5.7910	5.063	2.428-02
2411	STALK	119	1	30.1032	7.4952	0.577	2.758-03
2412	TASSEL	119	2	4.2655	8.5310	0.428	2.048-03
2413	SILK	119	3	2.6487	7.9560	0.529	2.532-03
2414	MUSK	119	3	10.1017	7.9850	0.225	1.078-03
2415	KERNEL	119	3	32.2147	33.0940	0.011	3.368-05
2416	COB	119	3	37.7065	17.9195	0.200	9.568-04

TABLE A- 25

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 25			
RADIOISOTOPE: RU-106				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 203.00				DATE EMERGED: 119			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
2501	SHOOT	28	40	0.0022	2.4070	5.365	2.618-02
2502	SHOOT	39	50	0.2539	12.6929	6.426	3.128-02
2503	SEL	54	10	0.9204	9.2040	2.121	1.038-02
2504	HEAD	54	10	0.2230	2.2297	0.045	2.218-04
2505	SEL	70	10	1.2934	12.0338	1.521	1.718-02
2506	HEAD	70	10	0.3721	3.7204	0.089	4.328-04
2507	LEAVES	84	10	0.3257	3.2567	11.922	5.798-02
2508	STALK	84	10	0.7871	7.9767	6.451	3.138-02
2509	HEAD	84	10	0.3080	3.0794	2.394	1.108-02
2510	HEAD	110	305	0.5023	20.1560	10.478	8.108-02
2511	STALK	110	305	0.5528	6.7581	40.110	1.368-01
2512	LEAVES	110	305	0.2763	7.1925	17.466	8.498-02
2513	GRAIN	110	295	0.2302	20.0000	2.093	1.028-02
2514	CHAFF	110	295	0.0359	5.0000	38.629	1.888-01

TABLE A- 26

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 26			
RADIOISOTOPE: RU-106				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 203.00				DATE EMERGED: 119			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
2601	SHOOT	28	40	0.0382	2.3285	5.020	2.448-02
2602	SHOOT	39	50	0.2534	12.6703	7.361	1.588-02
2603	SEL	54	10	0.8320	8.3197	1.412	6.847-03
2604	HEAD	54	10	0.1694	1.6942	0.097	4.708-04
2605	SEL	70	10	1.0951	10.9512	4.093	1.958-02
2606	HEAD	70	10	0.3016	3.0198	0.998	4.858-03
2607	LEAVES	84	10	0.3186	3.1856	23.922	1.148-01
2608	STALK	84	10	0.7441	7.4413	8.142	3.968-02
2609	HEAD	84	10	0.6499	6.4990	3.428	2.448-02
2610	HEAD	110	282	0.4397	17.4390	13.546	6.588-02
2611	STALK	110	282	0.5399	8.2425	17.424	8.478-02
2612	LEAVES	110	282	0.2731	8.3400	22.563	1.108-01
2613	GRAIN	110	272	0.2201	20.0000	1.803	8.768-03
2614	CHAFF	110	272	0.0345	5.0000	38.514	1.878-01

TABLE A- 27

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 27			
RADIOISOTOPE: RU-106				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 209.80				DATE EMERGED: 119			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
2701	SHOOT	28	40	0.0620	2.4791	3.728	1.812-02
2702	SHOOT	39	50	0.2489	12.4491	6.065	2.958-02
2703	SEL	54	10	1.0610	17.6102	2.131	1.858-02
2704	HEAD	54	10	0.1445	1.6445	0.788	3.038-03
2705	SEL	70	10	1.3621	13.6207	6.772	3.258-02
2706	HEAD	70	10	0.2928	2.9276	2.373	1.158-02
2707	LEAVES	84	10	0.3257	3.2570	25.785	1.258-01
2708	STALK	84	10	0.9086	9.0836	10.954	5.328-02
2709	HEAD	84	10	0.7199	7.1989	3.606	1.758-02
2710	HEAD	110	267	0.6216	16.9100	19.476	9.718-02
2711	STALK	110	267	0.6143	6.3560	44.895	2.188-01
2712	LEAVES	110	267	0.4200	7.3279	30.262	1.478-01
2713	GRAIN	110	267	0.3322	20.0000	2.268	1.158-02
2714	CHAFF	110	267	0.0481	9.0000	42.654	2.088-01

TABLE A- 28

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 28			
RADIOISOTOPE: RU-106				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 209.50				DATE EMERGED: 119			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
2801	SHOOT	28	40	0.0569	2.2760	4.337	2.078-02
2802	SHOOT	39	50	0.2198	10.9907	3.195	1.938-02
2803	SEL	54	10	0.7290	7.2201	0.606	2.898-03
2804	HEAD	54	10	0.1692	1.6920	0.185	8.010-04
2805	SEL	70	10	1.0029	10.0297	3.256	1.558-02
2806	HEAD	70	10	0.2612	2.6116	0.150	7.148-04
2807	LEAVES	84	10	0.3582	3.5821	6.619	3.168-02
2808	STALK	84	10	0.6890	6.8895	2.911	1.398-02
2809	HEAD	84	10	0.5683	5.6833	1.731	8.268-03
2810	HEAD	110	356	0.7117	21.9545	1.272	6.078-03
2811	STALK	110	356	0.6922	9.3175	5.138	2.458-02
2812	LEAVES	110	356	0.3280	10.5745	15.369	6.388-02
2813	GRAIN	110	356	0.4176	20.0000	0.479	2.298-03
2814	CHAFF	110	356	0.0372	5.0000	5.912	2.828-02

TABLE A- 29

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 29			
RADIOISOTOPE: RU-106				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 209.50				DATE EMERGED: 119			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
2901	SHOOT	28	40	0.0490	2.7620	1.528	7.288-03
2902	SHOOT	39	50	0.2448	12.2235	1.428	6.828-03
2903	SEL	54	10	0.6807	4.8604	0.889	4.248-03
2904	HEAD	54	10	0.2869	2.0689	0.271	1.298-03
2905	SEL	70	10	1.1903	11.9025	3.526	1.688-02
2906	HEAD	70	10	0.2931	2.9313	0.043	2.058-04
2907	LEAVES	84	10	0.2613	2.6125	4.658	2.228-02
2908	STALK	84	10	0.7094	7.0995	1.775	8.478-03
2909	HEAD	84	10	0.7361	7.3604	1.373	6.558-03
2910	HEAD	110	384	0.6487	18.5835	1.774	8.478-03
2911	STALK	110	384	0.8780	7.3390	4.138	1.988-02
2912	LEAVES	110	384	0.3180	10.2290	5.827	2.708-02
2913	GRAIN	110	374	0.3994	20.0000	0.537	2.568-03
2914	CHAFF	110	374	0.0399	5.0000	5.405	2.568-02

TABLE A- 30

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 30			
RADIOISOTOPE: RU-106				DATE PLANTED: 110			
INITIAL SOIL ACTIVITY (D/S/GM): 209.50				DATE EMERGED: 119			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
3001	SHOOT	28	40	0.0635	2.3409	3.369	1.708-02
3002	SHOOT	39	50	0.2410	12.0517	2.476	1.188-02
3003	SEL	54	10	0.5391	2.3903	1.185	1.188-03
3004	HEAD	54	10	0.1544	1.5439	0.084	3.518-04
3005	SEL	70	10	0.8265	8.2653	0.650	2.138-02
3006	HEAD	70	10	0.2985	2.9847	0.060	2.008-04
3007	LEAVES	84	10	0.2221	2.2209	0.000	0.038-02
3008	STALK	84	10	0.8820	6.8196	0.000	0.378-03
3009	HEAD	84	10	0.5871	2.8704	0.000	1.428-03
3010	HEAD	110	480	0.5551	15.2625	0.000	1.228-02
3011	STALK	110	480	0.4323	7.0563	0.000	3.028-02
3012	LEAVES	110	480	0.1974	10.0057	0.912	4.258-02
3013	GRAIN	110	480	0.3354	20.0000	0.229	1.098-03
3014	CHAFF	110	480	0.0283	5.0000	5.842	2.798-02

TABLE A- 31

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 31			
RADIONUCLIDE: CS-137				DATE PLANTED: 115			
INITIAL SOIL ACTIVITY (D/S/GM): 1037.00				DATE EMERGED: 122			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
3101	SHOOT	23	40	0.0553	2.2109	111.076	4.058-02
3102	SHOOT	34	50	0.1869	9.3443	103.358	5.638-02
3103	SHOOT	50	10	0.7246	7.2436	99.157	3.408-02
3104	SEL	65	10	1.0704	10.7055	88.609	4.828-02
3105	HEAD	65	10	0.1976	1.9760	126.480	4.892-02
3106	LEAVES	79	10	0.2990	2.9902	117.432	4.398-02
3107	STALK	79	10	0.7669	7.6685	79.332	4.328-02
3108	HEAD	79	10	0.4959	4.9590	92.160	5.028-02
3109	HEAD	108	300	0.6150	19.6768	84.865	4.628-02
3110	STALK	108	100	0.6024	5.9535	54.254	2.958-02
3111	LEAVES	108	100	0.1834	4.2635	134.299	7.318-02
3112	GRAIN	108	290	0.3877	20.0000	27.421	1.498-02
3113	CHAFF	108	290	0.0323	5.0000	212.892	1.168-01

TABLE A- 32

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 32			
RADIONUCLIDE: CS-137				DATE PLANTED: 115			
INITIAL SOIL ACTIVITY (D/S/GM): 1037.00				DATE EMERGED: 122			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
3201	SHOOT	23	40	0.0488	1.9507	198.752	8.648-02
3202	SHOOT	34	50	0.1713	8.5635	109.321	5.958-02
3203	SHOOT	50	10	0.6177	6.1767	55.879	3.048-02
3204	SEL	65	10	1.8879	18.8787	49.815	2.898-02
3205	HEAD	65	10	0.3776	3.7761	44.818	2.448-02
3206	LEAVES	79	10	0.5039	3.0390	59.159	3.228-02
3207	STALK	79	10	1.0697	10.6975	29.738	1.628-02
3208	HEAD	79	10	0.6985	6.9850	26.607	1.458-02
3209	HEAD	108	290	0.7616	22.9625	34.918	1.708-02
3210	STALK	108	116	0.7903	4.7505	41.738	2.278-02
3211	LEAVES	108	116	0.2483	5.3060	67.645	3.688-02
3212	GRAIN	108	283	0.4804	20.0000	29.095	1.588-02
3213	CHAFF	108	283	0.0386	5.0000	44.071	2.488-02

TABLE A- 33

PLANT UPTAKE SUMMARY: WHEAT

SOIL: BAKLEY SANDY LOAM				CONTAINER NUMBER: 33			
RADIOISOTOPE: CS-137				DATE PLANTED: 115			
INITIAL SOIL ACTIVITY (D/S/GM): 1027.00				DATE EMERGED: 122			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASW
3301	SHOOT	23	40	0.0565	2.2595	100.607	3.928-02
3302	SHOOT	34	50	0.1791	8.9332	199.801	1.078-01
3303	SHOOT	50	10	0.7320	7.3281	79.378	4.358-02
3304	SEL	45	10	1.0715	10.7140	41.053	3.328-02
3305	HEAD	45	10	0.2661	2.6609	47.221	3.668-02
3306	LEAVES	79	10	0.3771	3.7710	94.979	5.178-02
3307	STALK	79	10	0.8610	8.6105	43.576	2.378-02
3308	HEAD	79	10	0.6904	6.9040	41.610	2.278-02
3309	HEAD	108	270	0.5239	21.5120	47.883	2.688-02
3310	STALK	108	120	0.7406	9.2915	54.142	2.958-02
3311	LEAVES	108	120	0.2920	7.2870	87.871	4.788-02
3312	GRAIN	108	200	0.3380	20.0800	32.464	1.778-02
3313	CHAFF	108	200	0.0515	5.0800	38.771	1.218-02

TABLE A- 34

PLANT UPTAKE SUMMARY: WHEAT

SOIL: CLEAR LAKE CLAY				CONTAINER NUMBER: 34			
RADIOISOTOPE: CS-137				DATE PLANTED: 115			
INITIAL SOIL ACTIVITY (D/S/GM): 1792.00				DATE EMERGED: 122			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASW
3401	SHOOT	23	40	0.0562	1.8473	38.724	2.168-02
3402	SHOOT	34	50	0.1795	8.9740	37.474	2.098-02
3403	SHOOT	50	10	0.6201	6.2010	28.178	1.978-02
3404	SEL	45	10	1.3814	13.8141	23.913	1.318-02
3405	HEAD	45	10	0.3272	3.2791	24.628	1.498-02
3406	LEAVES	79	10	0.3243	3.2430	32.055	1.798-02
3407	STALK	79	10	0.9119	9.1195	17.050	9.518-03
3408	HEAD	79	10	0.7497	7.4970	13.227	7.388-03
3409	HEAD	108	382	0.6886	23.1460	13.712	7.658-03
3410	STALK	108	114	0.6135	6.2435	29.519	1.658-02
3411	LEAVES	108	284	0.2801	7.6570	44.342	2.478-02
3412	GRAIN	108	593	0.3869	20.0800	11.623	6.488-03
3413	CHAFF	108	382	0.0283	3.0800	21.280	1.198-02

TABLE A- 32

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: CLEAR LAKE CLAY				CONTAINER NUMBER: 32			
RADIOISOTOPE: CS-137				DATE PLANTED: 115			
INITIAL SOIL ACTIVITY (D/S/GM): 1793.00				DATE EMERGED: 122			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
3501	SHOOT	23	40	0.0437	1.7475	35.483	1.988-02
3502	SHOOT	34	50	0.1398	4.9885	14.383	9.148-03
3503	SHOOT	50	10	0.6698	4.6979	32.420	1.812-02
3504	SEL	65	10	1.3125	13.1248	25.630	1.438-02
3505	HEAD	65	10	0.3284	3.2844	33.978	1.908-02
3506	LEAVES	79	10	0.3094	3.0940	45.917	2.968-02
3507	STALK	79	10	0.4916	4.9160	21.531	1.288-02
3508	HEAD	79	10	0.5750	5.7500	24.815	1.388-02
3509	HEAD	108	321	0.8185	20.9735	22.904	1.288-02
3510	STALK	108	125	0.7536	5.7555	24.031	1.348-02
3511	LEAVES	108	128	0.2314	2.6705	43.055	2.408-02
3512	GRAIN	108	311	0.5539	20.0000	15.011	8.378-03
3513	CHAFF	108	311	0.0440	5.0000	32.243	1.808-02

TABLE A- 34

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 34			
RADIOISOTOPE: CS-137				DATE PLANTED: 119			
INITIAL SOIL ACTIVITY (D/S/GM): 1812.00				DATE EMERGED: 122			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
3601	SHOOT	23	40	0.0573	2.2990	4.224	3.318-03
3602	SHOOT	34	50	0.1281	4.4050	4.901	3.908-03
3603	SHOOT	50	10	0.6059	4.0586	4.671	2.518-03
3604	SEL	65	10	1.2798	12.7982	5.885	3.178-03
3605	HEAD	65	10	0.2823	2.8227	8.505	4.588-03
3606	LEAVES	79	10	0.3700	3.7000	10.032	5.408-03
3607	STALK	79	10	0.9401	9.4085	4.016	2.168-03
3608	HEAD	79	10	0.7481	7.4815	3.324	1.798-03
3609	HEAD	108	347	0.8877	28.3488	2.293	1.238-03
3610	STALK	108	118	0.7266	4.9425	4.914	2.648-03
3611	LEAVES	108	118	0.3286	7.3880	11.329	6.098-03
3612	GRAIN	108	337	0.6080	20.0000	2.218	1.198-03
3613	CHAFF	108	337	0.0344	5.0000	5.165	2.788-03

TABLE A- 37

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 37			
RADIOISOTOPE: CS-137				DATE PLANTED: 114			
INITIAL SOIL ACTIVITY (D/S/GM): 1859.00				DATE EMERGED: 122			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY HEIGHT (CM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
3701	SHOOT	23	40	0.8672	2.7170	9.383	5.022-03
3702	SHOOT	34	40	0.1889	7.9570	0.340	4.498-03
3703	SHOOT	50	10	0.8248	8.2479	5.129	2.748-03
3704	SEL	65	10	1.1916	11.9162	19.143	8.158-03
3705	HEAD	65	10	0.2788	2.7884	6.460	3.482-03
3706	LEAVES	79	10	0.3494	3.4940	6.801	3.668-03
3707	STALK	79	10	0.7154	7.1555	3.744	2.912-03
3708	HEAD	79	10	0.5449	5.4492	3.628	1.458-03
3709	HEAD	108	372	0.7810	21.1765	2.972	1.608-03
3710	STALK	108	134	0.6077	5.7780	4.974	2.688-03
3711	LEAVES	108	134	0.3161	6.4495	8.525	4.592-03
3712	GRAIN	108	382	0.5395	20.0000	1.541	8.298-04
3713	CHAFF	108	382	0.0240	5.0000	10.144	5.462-03

TABLE A- 38

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 38			
RADIOISOTOPE: CS-137				DATE PLANTED: 115			
INITIAL SOIL ACTIVITY (D/S/GM): 1859.00				DATE EMERGED: 122			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY HEIGHT (CM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
3801	SHOOT	23	40	0.9428	1.7132	6.462	3.482-03
3802	SHOOT	34	30	0.1714	0.9705	19.018	1.028-02
3803	SHOOT	50	10	0.7426	7.4355	13.284	7.158-03
3804	SEL	65	10	1.0200	10.1999	11.562	6.228-03
3805	HEAD	65	10	0.3883	3.9326	11.806	6.332-03
3806	LEAVES	79	10	0.3894	3.5940	16.388	8.828-03
3807	STALK	79	10	0.8112	8.1720	7.074	3.812-03
3808	HEAD	79	10	0.6499	6.4985	7.015	3.778-03
3809	HEAD	108	257	0.7560	18.4783	5.919	3.188-03
3810	STALK	108	163	0.7009	5.1370	11.594	6.248-03
3811	LEAVES	108	163	0.2183	7.4340	19.762	1.068-02
3812	GRAIN	108	247	0.5046	20.0000	4.691	2.528-03
3813	CHAFF	108	247	0.0446	5.0000	8.939	4.812-03

TABLE A- 39

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 39			
RADIOISOTOPE: CS-137				DATE PLANTED: 115			
INITIAL SOIL ACTIVITY (D/S/GH): 1859.00				DATE EMERGED: 122			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GH)	ASU
3901	SHOOT	23	40	0.0482	1.9292	3.213	1.778-03
3902	SHOOT	34	50	0.1851	9.2979	9.609	5.288-03
3903	SHOOT	50	10	0.7837	7.0173	8.518	4.588-03
3904	SEL	65	10	1.0290	10.2896	14.080	7.978-03
3905	HEAD	65	10	0.2236	2.2336	7.342	3.958-03
3906	LEAVES	79	10	0.3764	3.7639	8.021	4.318-03
3907	STALK	79	10	0.7084	7.0838	2.218	1.158-03
3908	HEAD	79	10	0.4469	4.4685	4.299	2.318-03
3909	HEAD	108	395	0.7438	12.0262	3.239	1.818-03
3910	STALK	108	108	0.6535	4.7988	4.518	2.438-03
3911	LEAVES	108	108	0.2812	7.2410	7.489	4.078-03
3912	GRAIN	108	386	0.5265	20.0000	2.410	1.308-03
3913	CHAFF	108	386	0.0155	9.0000	6.158	3.218-03

TABLE A- 40

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 40			
RADIOISOTOPE: CS-137				DATE PLANTED: 115			
INITIAL SOIL ACTIVITY (D/S/GH): 1859.00				DATE EMERGED: 122			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GH)	ASU
4001	SHOOT	23	40	0.0694	2.7765	6.422	3.458-03
4002	SHOOT	34	50	0.1544	7.7180	7.882	4.248-03
4003	SHOOT	50	10	0.5668	5.6678	5.615	3.028-03
4004	SEL	65	10	1.0290	10.2899	7.424	3.998-03
4005	HEAD	65	10	0.2460	2.4596	7.979	4.278-03
4006	LEAVES	79	10	0.3615	3.6149	8.152	4.398-03
4007	STALK	79	10	0.7889	7.2885	4.704	2.538-03
4008	HEAD	79	10	0.5367	5.3669	4.697	2.518-03
4009	HEAD	108	381	0.8033	18.5019	4.762	2.568-03
4010	STALK	108	155	0.7112	5.0910	5.440	2.938-03
4011	LEAVES	108	155	0.1863	4.1820	11.669	6.288-03
4012	GRAIN	108	341	0.5569	20.0000	2.542	1.378-03
4013	CHAFF	108	341	0.0325	9.0000	6.302	3.378-03

TABLE A- 41

PLANT UPTAKE SUMMARY: TENNESSEE

SOIL: BAKLEY SANDY LOAM CONTAINER NUMBER: 41

RADIOISOTOPE: CS-137 DATE PLANTED: 115

INITIAL SOIL ACTIVITY (D/S/GM): 1007.00 DATE EMERGED: 127

SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
4101	SHOOT	34	20	0.0010	1.2200	2.071	1.210-01
4102	VINE	42	20	0.2452	12.2420	227.902	1.240-01
4103	STEM	50	12	0.1770	2.1240	181.732	9.840-02
4104	LEAVES	50	12	0.4852	2.4430	290.740	1.940-01
4105	LEAVES	62	2	0.2122	12.0200	282.090	1.220-01
4106	STEM	65	2	2.2426	6.4072	180.897	1.030-01
4107	LEAVES	79	1	14.4422	10.0220	172.724	9.760-02
4108	STEM	79	1	14.5000	14.5000	93.367	5.080-02
4109	FLOWER	79	1	0.7282	0.7282	140.434	7.640-02
4110	LEAVES	170	1	25.9301	7.1291	244.404	1.340-01
4111	STEM	170	1	22.2572	9.0272	142.281	7.780-02
4112	PEELS	170	1	19.8513	0.4913	251.894	1.370-01
4113	MEAT	170	1	112.9200	4.9000	200.122	1.030-01
4114	FRUIT	170	3	133.1533	10.2000	210.360	1.190-01
4115	ROOT	170	1	4.2000	4.2000	280.947	1.230-01

TABLE A- 42

PLANT UPTAKE SUMMARY: TENNESSEE

SOIL: CLEAR LAKE CLAY CONTAINER NUMBER: 42

RADIOISOTOPE: CS-137 DATE PLANTED: 115

INITIAL SOIL ACTIVITY (D/S/GM): 1792.00 DATE EMERGED: 127

SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
4201	SHOOT	34	20	0.0010	1.2200	24.782	3.060-02
4202	VINE	42	20	0.2096	6.2070	44.680	2.490-02
4203	STEM	50	10	0.0067	0.0074	40.720	2.170-02
4204	LEAVES	50	10	0.3950	2.9902	93.950	2.990-02
4205	LEAVES	62	2	0.0210	11.0027	50.016	2.230-02
4206	STEM	65	2	2.6170	5.2949	19.363	1.080-02
4207	LEAVES	79	1	19.8420	19.7420	128.460	7.160-02
4208	STEM	79	1	19.6220	19.6220	48.076	2.680-02
4209	FLOWER	79	1	0.0440	0.0440	58.197	3.250-02
4210	LEAVES	170	1	20.0929	4.3029	100.442	5.600-02
4211	STEM	170	1	29.7976	6.9176	48.912	2.730-02
4212	PEELS	170	1	14.2000	0.6600	112.479	6.270-02
4213	MEAT	170	1	80.2200	3.2200	127.721	7.680-02
4214	FRUIT	170	3	15.6447	16.0100	81.024	4.520-02
4215	ROOT	170	1	1.0002	1.0002	84.139	4.690-02

TABLE A- 43

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: CLEAR LAKE CLAY				CONTAINER NUMBER: 32			
RADIOISOTOPE: CS-137				DATE PLANTED: 115			
INITIAL SOIL ACTIVITY (D/S/GM): 1793.00				DATE EMERGED: 127			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
4301	SHOOT	34	20	0.0635	1.2705	47.294	2.648-02
4302	VINE	42	25	0.2142	9.3940	40.019	2.238-02
4303	STEM	50	8	0.1222	1.2915	21.879	1.228-02
4304	LEAVES	50	8	0.9409	4.4841	33.382	1.868-02
4305	LEAVES	65	4	2.9449	11.7794	22.707	1.278-02
4306	STEM	65	4	0.7240	2.8959	20.437	1.178-02
4307	LEAVES	79	1	8.1335	8.1335	44.149	2.478-02
4308	STEM	79	1	8.4455	8.4455	17.307	9.688-03
4309	FLOWER	79	1	4.3990	0.1990	22.369	1.228-02
4310	LEAVES	170	1	23.9917	6.7117	97.004	3.418-02
4311	STEM	170	1	41.8544	4.4764	18.346	2.028-02
4312	PEELS	170	1	19.7440	0.8040	29.529	1.658-02
4313	MEAT	170	1	111.4900	4.4000	30.147	1.678-02
4314	FRUIT	170	3	133.7500	23.2900	60.402	3.378-02
4315	ROOT	170	1	5.0330	2.0330	59.204	3.318-02

TABLE A- 44

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 44			
RADIOISOTOPE: CS-137				DATE PLANTED: 115			
INITIAL SOIL ACTIVITY (D/S/GM): 1839.00				DATE EMERGED: 129			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
4401	SHOOT	34	20	0.0480	0.9790	17.654	9.508-03
4402	STEM	50	8	0.1106	0.8849	15.292	8.202-03
4403	LEAVES	50	8	0.3830	3.0650	42.048	2.268-02
4404	LEAVES	65	2	3.8094	7.6188	11.793	6.348-03
4405	STEM	65	2	1.7209	7.4418	2.283	1.238-02
4406	LEAVES	79	1	17.2200	17.2200	7.686	4.138-03
4407	STEM	79	1	12.3560	12.3560	2.633	1.428-03
4408	FLOWER	79	1	0.6310	0.6310	2.690	1.438-03
4409	LEAVES	170	1	48.3901	8.4701	7.206	3.888-03
4410	STEM	170	1	42.9554	4.4654	3.381	1.828-03
4411	PEELS	170	1	17.0562	0.6662	4.623	2.498-03
4412	MEAT	170	1	96.1400	3.2900	4.346	2.348-03
4413	FRUIT	170	3	119.4233	27.5000	2.981	1.608-03
4414	ROOT	170	1	4.7357	4.7357	51.751	2.788-02

TABLE A- 43

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 43			
RADIOISOTOPE: C1-137				DATE PLANTED: 115			
INITIAL SOIL ACTIVITY (10/5/64): 1059.00				DATE EMERGED: 129			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (10/5/64)	ASU
4501	SHOOT	34	20	0.0262	1.1235	38.249	1.798-02
4502	VINE	42	39	0.1338	0.1034	39.027	1.088-02
4503	STEM	50	12	0.1244	1.6245	9.284	2.112-02
4504	LEAVES	50	12	0.4237	9.0847	18.020	9.708-02
4505	LEAVES	65	4	2.2730	19.0920	7.291	1.878-02
4506	STEM	65	4	1.7127	4.8910	1.514	8.168-04
4507	LEAVES	79	1	12.2338	12.2338	2.326	1.798-02
4508	STEM	79	1	12.1730	12.1730	1.037	9.988-04
4509	FLOWER	79	1	0.2120	0.2120	2.122	1.692-02
4510	LEAVES	170	1	27.0633	0.9633	19.368	8.278-02
4511	STEM	170	1	27.9271	4.1271	6.992	1.788-02
4512	PEELS	170	1	17.8912	0.5712	0.612	4.978-04
4513	MEAT	170	1	22.4208	2.9880	4.232	2.288-02
4514	FRUIT	170	3	123.6738	27.6200	4.845	2.628-02
4515	ROOT	170	1	9.8818	2.9718	42.867	2.368-02

TABLE A- 44

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 44			
RADIOISOTOPE: C1-137				DATE PLANTED: 115			
INITIAL SOIL ACTIVITY (10/5/64): 1059.00				DATE EMERGED: 129			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (10/5/64)	ASU
4601	SHOOT	34	20	0.0264	1.1281	28.979	1.568-02
4602	VINE	42	39	0.2642	9.2460	29.020	1.918-02
4603	STEM	50	12	0.1818	2.1819	8.107	4.268-02
4604	LEAVES	50	12	0.9018	6.0220	18.503	9.858-02
4605	LEAVES	65	4	2.7347	14.9472	14.646	7.888-02
4606	STEM	65	1	4.9409	6.9409	8.067	4.348-02
4607	LEAVES	79	1	14.2803	14.2803	6.028	2.248-02
4608	STEM	79	1	10.9133	13.9133	2.985	1.618-02
4609	FLOWER	79	1	0.6133	0.6133	2.991	1.618-02
4610	LEAVES	170	1	22.1820	4.6120	17.844	9.608-02
4611	STEM	170	1	22.2609	4.2609	7.750	4.178-02
4612	PEELS	170	1	13.7043	0.8343	4.010	2.168-02
4613	MEAT	170	1	74.6399	2.7100	2.432	1.958-02
4614	FRUIT	170	3	91.3267	16.6000	3.779	2.038-02
4615	ROOT	170	1	2.9848	2.7848	31.321	1.688-02

TABLE A- 47

PLANT UPTAKE SUMMARY: POTATO							
SOIL: CLEAR LAKE CLAY				CONTAINER NUMBER: 47			
RADIOISOTOPE: CS-137				DATE PLANTED: 119			
INITIAL SOIL ACTIVITY (D/S/GH): 1792.00				DATE EMERGED: 134			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GH)	ASU
4701	LEAVES	120	4	7.4870	13.9480	186.026	3.918-02
4702	STEM	120	4	5.3324	21.3295	75.925	4.238-02
4703	PEELS	120	1	13.8810	13.8810	66.456	3.718-02
4704	MEAT	120	1	101.0660	38.5660	36.727	2.098-02
4705	TUBER	120	3	67.4585	32.5758	40.611	2.268-02
4706	ROOT	120	4	1.3806	5.5223	89.318	4.768-02

TABLE A- 48

PLANT UPTAKE SUMMARY: POTATO							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 48			
RADIOISOTOPE: CS-137				DATE PLANTED: 115			
INITIAL SOIL ACTIVITY (D/S/GH): 1829.00				DATE EMERGED: 136			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GH)	ASU
4801	LEAVES	120	4	23.2225	22.3900	31.207	1.688-02
4802	STEM	120	4	17.9851	12.2405	21.779	1.718-02
4803	PEELS	120	1	5.2105	5.2105	19.819	8.318-03
4804	MEAT	120	1	50.1210	19.9410	6.890	3.718-03
4805	TUBER	120	3	32.4307	18.8922	11.049	2.948-03
4806	ROOT	120	4	1.7668	7.0673	48.191	2.598-02

TABLE A- 49

PLANT UPTAKE SUMMARY: POTATO							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 49			
RADIONUCLIDE: Cs-137				DATE PLANTED: 115			
INITIAL SOIL ACTIVITY (D/S/GM): 1829.00				DATE EMERGED: 136			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
4901	LEAVES	120	1	29.8110	29.8110	22.294	1.752-02
4902	STEM	120	1	17.9439	17.9439	20.818	1.128-02
4903	PEELS	120	1	7.3885	7.3885	21.397	1.158-02
4904	MEAT	120	1	48.5924	21.3724	8.975	4.618-03
4905	TUBER	120	1	37.9796	23.8288	10.346	3.678-03
4906	ROOT	120	1	3.8873	3.8873	58.874	3.178-02

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PLANT UPTAKE SUMMARY: POTATO							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 50			
RADIONUCLIDE: Cs-137				DATE PLANTED: 115			
INITIAL SOIL ACTIVITY (D/S/GM): 1829.00				DATE EMERGED: 138			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
5001	LEAVES	120	1	28.5313	28.5313	22.820	1.238-02
5002	STEM	120	1	23.9893	23.9893	19.587	1.058-02
5003	PEELS	120	1	6.4200	6.4200	7.895	4.258-03
5004	MEAT	120	1	48.9293	16.4693	3.377	1.828-03
5005	TUBER	120	2	29.4323	17.4370	9.367	2.698-03
5006	ROOT	120	1	5.8895	5.8895	43.163	2.328-02

TABLE A- 51

PLANT UPTAKE SUMMARY: POTATO							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 91			
RADIOISOTOPE: CS-137				DATE PLANTED: 119			
INITIAL SOIL ACTIVITY (D/S/GM): 1037.00				DATE EMERGED: 130			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
9101	LEAVES	120	1	16.0773	16.0773	203.927	1.118-01
9102	STEM	120	1	17.5130	17.5130	322.981	1.768-01
9103	PEELS	120	1	10.9835	10.9835	286.401	1.568-01
9104	MEAT	120	1	79.6773	22.7773	174.917	9.928-02
9105	TUBER	120	2	19.7376	27.2127	215.796	1.178-01
9106	ROOT	120	1	3.7280	3.7280	285.240	1.958-01

TABLE A- 52

PLANT UPTAKE SUMMARY: CORN							
SOIL: CLEAR LAKE CLAY				CONTAINER NUMBER: 92			
RADIOISOTOPE: CS-137				DATE PLANTED: 119			
INITIAL SOIL ACTIVITY (D/S/GM): 1793.00				DATE EMERGED: 127			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
9201	SHOOT	34	6	0.4929	2.9573	88.475	4.958-02
9202	SHOOT	42	8	0.6228	4.9822	67.089	3.748-02
9203	STALK	50	8	0.1909	1.2036	48.133	2.488-02
9204	LEAVES	50	8	0.3939	3.1915	44.414	2.488-02
9205	LEAVES	62	6	2.2355	4.4452	83.434	4.458-02
9206	STALK	65	6	0.7956	4.7736	75.010	4.188-02
9207	LEAVES	79	1	19.2605	6.8105	52.980	2.958-02
9208	STALK	79	1	12.6720	12.6720	31.167	1.748-02
9209	TASSEL	79	1	2.5785	2.5785	47.401	2.648-02
9210	LEAVES	114	1	33.4335	5.2065	67.392	3.768-02
9211	STALK	114	1	31.2653	5.7553	46.664	2.608-02
9212	TASSEL	114	2	2.8790	5.7580	33.283	1.868-02
9213	SILK	114	4	2.0868	8.2670	56.569	3.158-02
9214	MUSK	114	3	12.8478	9.9235	34.034	1.908-02
9215	KERNEL	114	3	53.7166	39.5958	11.159	6.228-03
9216	CDB	114	3	39.4207	18.6620	23.757	1.328-02

TABLE A- 53

PLANT UPTAKE SUMMARY: CORN							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 53			
RADIONUCLIDE: CS-137				DATE PLANTED: 119			
INITIAL SOIL ACTIVITY (D/S/GM): 1859.00				DATE EMERGED: 125			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
5301	SHOOT	34	4	0.4682	2.8090	20.410	1.108-02
5302	SHOOT	42	10	0.7401	7.4005	31.178	1.688-02
5303	STALK	50	12	0.2746	3.2957	19.610	1.058-02
5304	LEAVES	50	12	0.5860	7.0322	18.774	1.018-02
5305	LEAVES	65	4	0.4069	3.3474	26.721	1.988-02
5306	STALK	65	4	3.1074	12.4299	19.886	1.078-02
5307	LEAVES	79	1	26.8633	7.8633	16.166	8.788-03
5308	STALK	79	1	29.5255	29.5255	7.671	4.158-03
5309	TASSEL	79	1	8.3600	6.3600	9.887	5.218-03
5310	LEAVES	114	1	25.3310	5.7110	9.858	5.308-03
5311	STALK	114	1	26.7090	9.4090	4.274	2.108-03
5312	TASSEL	114	2	2.7697	5.5393	4.832	2.408-03
5313	SILK	114	4	1.5653	8.2620	7.035	5.788-03
5314	HUSK	114	3	11.9742	10.4227	4.543	2.478-03
5315	KERNEL	114	3	46.5798	24.9695	1.501	8.078-04
5316	COR	114	3	34.9626	21.6877	2.334	1.268-03

TABLE A- 54

PLANT UPTAKE SUMMARY: CORN							
SOIL: PLEASANTON LOAM				CONTAINER NUMBER: 54			
RADIONUCLIDE: CS-137				DATE PLANTED: 115			
INITIAL SOIL ACTIVITY (D/S/GM): 1859.00				DATE EMERGED: 127			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
5401	SHOOT	34	4	0.6807	4.0843	30.672	1.652-02
5402	SHOOT	42	19	0.7019	10.5290	24.962	1.348-02
5403	STALK	50	10	0.3367	3.3665	14.885	8.018-03
5404	LEAVES	50	10	0.5712	5.7115	15.450	8.318-03
5405	LEAVES	65	3	3.5300	3.0931	26.174	1.418-02
5406	STALK	65	3	4.8168	14.4504	13.285	7.158-03
5407	LEAVES	79	1	26.4600	7.5100	12.290	6.618-03
5408	STALK	79	1	27.6456	27.6456	6.150	3.318-03
5409	TASSEL	79	1	7.1440	7.1440	9.568	5.158-03
5410	LEAVES	114	1	25.6803	7.1603	13.481	7.258-03
5411	STALK	114	1	19.4645	6.5745	9.764	5.258-03
5412	TASSEL	114	2	2.4474	5.2948	6.879	3.708-03
5413	SILK	114	4	1.6680	6.6720	8.731	4.708-03
5414	HUSK	114	3	9.6297	9.3890	7.261	3.918-03
5415	KERNEL	114	3	60.2276	36.2427	1.531	8.248-04
5416	COR	114	3	40.4345	18.1835	3.830	2.068-03

TABLE A- 53

PLANT UPTAKE SUMMARY: CORN

SOIL: PLEASANTON LOAM

CONTAINER NUMBER: 53

RADIONUCLIDE: CS-137

DATE PLANTED: 115

INITIAL SOIL ACTIVITY (D/S/GM): 1859.00

DATE EMERGED: 127

SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
5501	SHOOT	34	4	0.9640	3.0240	21.321	1.158-02
5502	SHOOT	42	10	0.9675	9.6748	22.642	1.768-02
5503	STALK	50	8	0.3349	7.6795	15.927	8.578-03
5504	LEAVES	50	8	0.7473	1.9781	15.028	8.088-03
5505	LEAVES	65	3	8.7396	4.1139	16.087	8.628-02
5506	STALK	65	3	4.6916	13.9944	15.093	8.128-03
5507	LEAVES	79	1	23.8350	8.5350	13.792	7.428-03
5508	STALK	79	1	19.6300	19.6300	6.739	3.628-03
5509	TASSEL	79	1	4.8556	4.8556	9.570	5.158-03
5510	LEAVES	114	1	24.6460	7.0160	15.862	8.538-03
5511	STALK	114	1	22.9949	7.6945	10.736	5.788-03
5512	TASSEL	114	2	3.0950	6.1100	7.790	4.178-03
5513	SILK	114	3	2.1703	6.5110	16.253	8.748-03
5514	MUSK	114	3	10.5707	11.9620	3.404	1.988-03
5515	KERNEL	114	2	59.8675	36.8350	2.171	1.178-03
5516	COB	114	2	41.3885	14.8770	3.846	2.078-03

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PLANT UPTAKE SUMMARY: CORN

SOIL: DAKLEY SANDY LOAM

CONTAINER NUMBER: 54

RADIONUCLIDE: CS-137

DATE PLANTED: 115

INITIAL SOIL ACTIVITY (D/S/GM): 1837.00

DATE EMERGED: 127

SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
5601	SHOOT	34	6	0.4538	2.7227	237.851	1.298-01
5602	SHOOT	42	11	1.0371	11.4081	162.728	8.868-02
5603	STALK	50	6	0.3005	1.8023	157.959	8.608-02
5604	LEAVES	50	6	0.9612	5.7674	156.814	8.548-02
5605	STALK	65	3	6.7025	3.8775	157.416	8.578-02
5606	LEAVES	65	3	3.0492	9.2074	155.325	8.468-02
5607	LEAVES	79	1	18.4845	6.2845	141.593	7.718-02
5608	STALK	79	1	24.1390	24.1390	63.466	3.458-02
5609	TASSEL	79	1	3.8335	3.8335	89.192	4.868-02
5610	LEAVES	114	1	20.9515	9.2015	215.527	1.178-01
5611	STALK	114	1	17.7839	2.8338	188.881	1.038-01
5612	TASSEL	114	2	2.3195	4.6390	168.389	4.178-02
5613	SILK	114	4	1.6610	6.6440	276.549	1.518-01
5614	MUSK	114	3	11.7190	8.4570	175.501	8.558-02
5615	KERNEL	114	4	37.9725	37.9899	50.299	2.748-02
5616	COB	114	4	55.4845	14.6380	40.928	4.418-02

TABLE A- 57

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: VOLC SILTY CLAY				CONTAINER NUMBER: 57			
RADIONUCLIDE: SR- 85				DATE PLANTED: 165			
INITIAL SOIL ACTIVITY (D/S/GM): 126.00				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
5701	SHOOT	29	3	8.2222	1.9413	1728.894	2.298+00
5702	LEAVES	42	10	8.2374	2.3738	2894.823	3.528+00
5703	STEM	42	10	8.8872	8.8721	1881.778	2.312+00
5704	LEAVES	58	4	1.9528	6.2110	746.994	2.298+00
5705	STEM	58	4	8.8381	2.4888	1891.204	2.488+00
5706	LEAVES	70	1	21.7587	21.7587	1889.213	2.338+00
5707	STEM	70	1	18.2687	18.2687	522.987	1.622+00
5708	FLOWER	70	1	2.7188	2.7188	62.989	1.928-01
5709	LEAVES	120	1	18.8823	2.2222	1729.989	2.328+00
5710	STEM	120	1	38.9728	6.2228	682.413	1.848+00
5711	FRUIT	120	1	12.2242	8.8842	74.142	2.228-01
5712	HEAT	120	1	78.7488	8.8888	43.293	1.328-01
5713	FRUIT	120	1	27.8823	21.2222	28.299	6.218-02
5714	ROOT	120	1	3.7388	3.7388	451.163	1.588+00

TABLE A- 58

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: VOLC SILTY CLAY				CONTAINER NUMBER: 58			
RADIONUCLIDE: SR- 85				DATE PLANTED: 165			
INITIAL SOIL ACTIVITY (D/S/GM): 126.00				DATE EMERGED: 117			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
5801	SHOOT	29	3	8.2212	1.9288	2122.674	2.608+00
5802	LEAVES	42	3	8.9794	4.8871	2173.572	2.668+00
5803	STEM	42	3	8.2824	1.9172	1722.248	2.208+00
5804	LEAVES	58	4	2.9767	18.2868	738.188	2.268+00
5805	STEM	58	4	1.8214	4.2223	1142.294	2.588+00
5806	LEAVES	70	1	18.1888	18.1888	928.188	2.838+00
5807	STEM	70	1	14.9828	14.9828	244.243	1.678+00
5808	FLOWER	70	1	1.1913	1.1913	109.488	1.358-01
5809	LEAVES	120	1	12.1823	2.2223	881.757	2.708+00
5810	STEM	120	1	34.2269	9.4269	454.711	1.398+00
5811	FRUIT	120	1	17.8242	1.2242	62.484	2.128-01
5812	HEAT	120	1	95.9888	7.1488	37.058	1.128-01
5813	FRUIT	120	1	118.8723	48.8222	24.222	7.428-02
5814	ROOT	120	1	4.2224	4.2224	429.988	1.528+00

TABLE A- 39

PLANT UPTAKE SUMMARY: POTATO							
SOIL: YOLO SILTY CLAY				CONTAINER NUMBER: 89			
RADIONUCLIDE: SR- 85				DATE PLANTED: 145			
INITIAL SOIL ACTIVITY (D/S/GM): 326.80				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
5901	LEAVES	126	1	9.8115	9.8115	1212.494	3.712+00
5902	STEM	126	1	9.4610	9.4610	986.726	3.028+00
5903	TUBER	126	1	33.7304	29.1811	37.662	1.152-01
5904	MEAT	126	1	30.1423	30.1423	27.397	8.388-02
5905	PEELS	126	1	5.0264	5.0264	95.324	2.928-01
5906	ROOT	126	1	1.3244	1.3244	1420.919	4.358+00

TABLE A- 40

PLANT UPTAKE SUMMARY: POTATO							
SOIL: YOLO SILTY CLAY				CONTAINER NUMBER: 60			
RADIONUCLIDE: SR- 85				DATE PLANTED: 145			
INITIAL SOIL ACTIVITY (D/S/GM): 326.80				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
6001	LEAVES	126	1	14.6977	14.6977	1380.902	4.228+00
6002	STEM	126	1	43.6684	10.2284	879.674	2.698+00
6003	TUBER	126	1	37.7407	37.7407	42.859	1.318-01
6004	MEAT	126	1	24.8483	24.8483	44.416	1.988-01
6005	PEELS	126	1	4.0998	4.0998	136.563	4.188-01
6006	ROOT	126	1	1.5979	1.5979	657.750	2.018+00

TABLE A- 41

PLANT UPTAKE SUMMARY: CORN							
SOIL: YOLD SILTY CLAY				CONTAINER NUMBER: 61			
RADIOMUCLIDE: SR- 85				DATE PLANTED: 165			
INITIAL SOIL ACTIVITY (D/S/GM): 326.80				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
6101	LEAVES	29	10	0.4953	6.9535	677.088	2.078+00
6102	STALK	29	10	0.2131	2.1310	547.937	1.888+00
6103	LEAVES	42	2	7.1285	14.2571	555.210	1.768+00
6104	STALK	42	2	3.3030	6.7699	368.771	1.138+00
6105	LEAVES	58	1	18.9290	3.9490	203.341	8.228-01
6106	STALK	58	1	14.3920	14.3920	95.377	2.928-01
6107	TASSEL	58	1	3.4410	3.4410	29.566	9.048-02
6108	LEAVES	76	1	24.2190	9.0390	239.129	7.328-01
6109	STALK	76	1	28.6760	8.8160	112.883	3.458-01
6110	TASSEL	76	1	3.2390	3.2390	69.372	2.738-01
6111	EAR	76	1	3.6688	3.6688	33.068	1.018-01
6112	SILK	76	1	1.0036	1.0036	18.749	5.748-02
6113	MUSK	76	1	4.7215	4.7215	48.228	1.418-01
6114	TASSEL	90	2	3.4239	3.4239	69.940	2.148-01
6115	STALK	90	1	27.8174	19.5174	84.979	2.608-01
6116	LEAVES	90	1	23.0912	6.6312	192.216	5.888-01
6117	MUSK	90	1	7.7569	7.7569	16.466	3.038-02
6118	SILK	90	1	1.2241	1.2241	13.274	4.048-02
6119	KERNEL	90	6	9.5588	26.6327	4.616	1.418-02
6120	CDB	90	6	10.5358	12.5154	10.037	3.078-02

TABLE A- 42

PLANT UPTAKE SUMMARY: CORN							
SOIL: YOLD SILTY CLAY				CONTAINER NUMBER: 62			
RADIOMUCLIDE: SR- 85				DATE PLANTED: 165			
INITIAL SOIL ACTIVITY (D/S/GM): 326.80				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
6201	LEAVES	29	10	0.8281	8.2810	709.077	2.178+00
6202	STALK	29	10	0.2728	2.7279	587.451	1.808+00
6203	LEAVES	42	4	2.9225	11.7300	476.429	1.468+00
6204	STALK	42	4	1.2496	4.9984	348.584	1.078+00
6205	LEAVES	58	1	22.4923	4.8923	239.260	7.328-01
6206	STALK	58	1	14.4049	5.9049	109.537	3.358-01
6207	TASSEL	58	1	2.1410	3.1410	37.751	1.168-01
6208	LEAVES	76	1	17.1269	5.4669	191.575	5.868-01
6209	STALK	76	1	23.1059	9.3959	86.368	2.648-01
6210	TASSEL	76	1	3.2125	3.2125	50.565	1.558-01
6211	EAR	76	1	1.7115	1.7115	37.236	1.158-01
6212	SILK	76	1	1.0296	1.0296	8.069	2.478-02
6213	MUSK	76	1	3.0186	3.0186	50.386	1.548-01
6214	TASSEL	90	1	4.3207	4.3207	81.003	2.488-01
6215	STALK	90	1	19.1374	9.8074	95.466	2.928-01
6216	LEAVES	90	1	28.7547	6.8747	205.879	6.308-01
6217	MUSK	90	1	8.1424	8.1424	22.656	6.938-02
6218	SILK	90	1	1.4831	1.4831	7.929	2.438-02
6219	KERNEL	90	6	6.9849	21.6393	7.293	2.238-02
6220	CDB	90	6	7.9119	13.9006	29.651	9.078-02

TABLE A- 63

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: YOLO SILTY CLAY				CONTAINER NUMBER: 43			
RADIOISOTOPE: SR- 85				DATE PLANTED: 165			
INITIAL SOIL ACTIVITY (D/S/GM): 326.80				DATE EMERGED: 171			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
6301	SHOOT	29	40	0.0903	1.6287	297.945	9.128-01
6302	SEL	42	10	0.5994	9.9941	171.467	9.298-01
6303	HEAD	42	10	0.2202	2.2024	42.140	1.328-01
6304	HEAD	58	10	0.6132	6.1320	30.040	9.198-02
6305	STALK	58	10	0.6414	6.4140	78.984	2.408-01
6306	LEAVES	58	10	0.2325	2.3250	279.674	8.948-01
6307	HEAD	85	10	1.4638	14.6376	11.378	3.548-02
6308	STALK	85	10	0.6484	6.4837	123.044	9.778-01
6309	LEAVES	85	10	0.2372	2.3723	242.993	7.448-01
6310	HEAD	85	10	1.6488	16.4878	14.686	4.498-02
6311	STALK	85	10	0.7797	7.7967	122.705	3.758-01
6312	LEAVES	85	10	0.2036	2.0364	240.018	7.348-01
6313	HEAD	90	242	1.1624	11.7256	17.068	5.128-02
6314	STALK	90	10	0.6082	6.0822	180.577	9.538-01
6315	LEAVES	90	10	0.1201	1.2010	325.477	9.148-01
6316	GRAIN	90	232	0.8841	20.0000	11.755	3.608-02
6317	CHAFF	90	232	0.0380	9.0000	40.201	1.278-01

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PLANT UPTAKE SUMMARY: WHEAT							
SOIL: YOLO SILTY CLAY				CONTAINER NUMBER: 44			
RADIOISOTOPE: SR- 85				DATE PLANTED: 165			
INITIAL SOIL ACTIVITY (D/S/GM): 326.80				DATE EMERGED: 171			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
6401	SHOOT	29	40	0.1166	4.6640	271.466	8.918-01
6402	SEL	42	10	0.9443	9.4428	179.603	9.508-01
6403	HEAD	42	10	0.2140	2.1397	34.254	1.028-01
6404	HEAD	58	10	0.9857	5.8572	33.470	1.028-01
6405	STALK	58	10	0.8257	8.2575	85.792	2.438-01
6406	LEAVES	58	10	0.3047	3.0445	298.183	9.128-01
6407	HEAD	76	10	1.3892	13.8922	15.852	4.858-02
6408	STALK	76	10	0.7777	7.7772	127.976	3.928-01
6409	LEAVES	76	10	0.2379	2.3787	263.220	8.058-01
6410	HEAD	85	10	1.4500	14.4995	33.628	1.038-01
6411	STALK	85	10	0.7172	7.1723	209.555	6.418-01
6412	LEAVES	85	10	0.1946	1.9463	263.112	8.028-01
6413	HEAD	90	298	1.2912	17.8701	24.550	7.318-02
6414	STALK	90	10	0.8128	8.1280	204.160	6.258-01
6415	LEAVES	90	10	0.1815	1.8147	330.974	1.018-02
6416	GRAIN	90	288	0.9809	20.0000	9.388	2.878-02
6417	CHAFF	90	288	0.0303	9.0000	47.457	1.458-01

TABLE A- 65

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 65			
RADIOISOTOPE: SR- 85				DATE PLANTED: 192			
INITIAL SOIL ACTIVITY (D/S/GM): 446.70				DATE EMERGED: 192			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
4501	SHOOT	27	30	0.0779	2.3372	11249.059	2.592+01
4502	LEAVES	41	10	0.5704	9.7042	10924.027	2.458+01
4503	STEM	41	10	0.1995	1.9990	12086.034	2.718+01
4504	LEAVES	54	4	2.6202	10.4810	8943.706	2.008+01
4505	STEM	54	4	1.2837	6.3337	5851.973	1.518+01
4506	LEAVES	61	2	5.0345	11.6490	9032.994	2.028+01
4507	STEM	61	2	4.1038	8.2075	5701.844	1.288+01
4508	LEAVES	132	1	19.3305	4.0805	9390.640	2.108+01
4509	STEM	132	1	23.0648	4.2448	4933.667	1.108+01
4510	PEELS	132	1	11.1210	0.0910	360.940	0.268-01
4511	MEAT	132	1	62.9800	4.6900	122.991	2.988-01
4512	FRUIT	132	3	73.4267	14.5600	206.511	4.628-01
4513	ROOT	132	1	1.6073	1.6073	3404.724	7.628+00

TABLE A- 66

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 66			
RADIOISOTOPE: SR- 85				DATE PLANTED: 192			
INITIAL SOIL ACTIVITY (D/S/GM): 446.70				DATE EMERGED: 192			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
6601	SHOOT	27	30	0.0877	1.7313	12404.559	2.788+01
6602	LEAVES	41	10	0.5068	5.0675	15140.542	3.398+01
6603	STEM	41	10	0.1965	1.2645	14391.802	3.228+01
6604	LEAVES	54	4	3.0242	12.0960	11701.124	2.648+01
6605	STEM	54	4	1.6734	4.6334	5333.427	1.198+01
6606	LEAVES	61	2	11.2210	22.4435	8511.136	1.918+01
6607	STEM	61	2	0.0043	12.0005	6032.803	1.368+01
6608	LEAVES	132	1	12.1203	12.1203	14788.066	3.310+01
6609	STEM	132	1	22.6947	7.8047	4392.462	9.838+00
6610	PEELS	132	1	13.6162	1.2062	221.318	4.958-01
6611	MEAT	132	1	76.9200	7.0200	134.263	2.018-01
6612	FRUIT	132	3	90.2500	24.2600	155.976	3.498-01
6613	ROOT	132	1	1.7311	1.7311	3202.840	7.358+00

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PLANT UPTAKE SUMMARY: TOMATO							
SOIL: HAMFORD SANDY CLAY LOAM				CONTAINER NUMBER: 67			
RADIONUCLIDE: SR- 85				DATE PLANTED: 193			
INITIAL SOIL ACTIVITY (D/S/GM): 446.70				DATE EMERGED: 165			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
6701	SHOOT	27	30	0.0557	1.4720	11584.722	2.598+01
6702	LEAVES	41	10	0.4452	4.4523	14312.666	3.208+01
6703	STEM	41	10	0.1822	1.8220	12238.161	2.798+01
6704	LEAVES	54	3	2.7782	8.3346	11999.260	2.668+01
6705	STEM	54	3	1.2746	4.1237	7112.896	1.608+01
6706	LEAVES	61	2	7.2293	14.4566	9998.834	2.148+01
6707	STEM	61	2	4.7954	9.5909	4385.811	1.438+01
6708	LEAVES	132	1	6.4614	6.4614	13434.864	3.018+01
6709	STEM	132	1	17.4982	6.3982	4999.284	1.128+01
6710	PEELS	132	1	13.0484	0.8084	289.429	6.398-01
6711	MEAT	132	1	79.1900	9.8000	189.806	4.238-01
6712	FRUIT	132	1	83.9433	27.0400	167.927	3.748-01
6713	ROOT	132	1	2.1419	2.1419	4499.135	9.988+00

TABLE A- 68

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: HAMFORD LOAM + 30% CALCIUM				CONTAINER NUMBER: 68			
RADIONUCLIDE: SR- 85				DATE PLANTED: 196			
INITIAL SOIL ACTIVITY (D/S/GM): 367.60				DATE EMERGED: 171			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
6801	SHOOT	30	33	0.0342	1.1273	4991.952	1.618+01
6802	LEAVES	43	10	0.3563	3.5630	4865.478	1.588+01
6803	STEM	43	10	0.0965	0.9653	2019.890	1.638+01
6804	LEAVES	51	9	1.5972	7.9860	4681.082	1.528+01
6805	STEM	51	9	0.9709	2.9128	3607.201	1.178+01
6806	LEAVES	58	2	5.3669	10.7798	9442.001	1.128+01
6807	STEM	58	2	2.5611	5.1221	2498.179	7.938+00
6808	LEAVES	129	1	4.7697	4.7697	4265.379	1.398+01
6809	STEM	129	1	17.0452	6.0752	1879.495	6.118+00
6810	PEELS	129	1	14.2182	1.1882	100.653	3.278-01
6811	MEAT	129	1	89.2900	7.2600	29.402	9.568-02
6812	FRUIT	129	1	98.4000	18.8200	122.567	3.988-01
6813	ROOT	129	1	2.0334	2.0334	1483.698	4.628+00

TABLE A- 69

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: MANFORD LOAM + 99% CALCIUM				CONTAINER NUMBER: 69			
RADIOMUCLIDE: SR- 89				DATE PLANTED: 126			
INITIAL SOIL ACTIVITY (D/S/GM): 307.60				DATE EMERGED: 171			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
6901	SHOOT	30	10	0.0224	0.5235	2224.988	1.708±01
6902	LEAVES	43	10	0.2688	2.6885	4779.337	1.998±01
6903	STEM	43	10	0.8706	0.7685	4218.136	1.478±01
6904	LEAVES	51	5	0.4403	2.3014	4813.658	1.948±01
6905	STEM	51	5	0.1522	0.7110	4524.371	1.448±01
6906	LEAVES	129	1	9.0573	4.4873	4041.332	1.318±01
6907	STEM	129	1	19.5794	4.6194	1823.811	2.928±00
6908	PEELS	129	1	22.0609	1.1709	122.294	3.978±01
6909	MEAT	129	1	125.2100	7.1400	40.234	1.968±01
6910	FRUIT	129	3	147.5033	24.7400	102.934	3.358±01
6911	ROOT	129	1	1.6500	1.6500	1408.814	4.288±00

TABLE A- 70

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: MANFORD LOAM + 100% CALCIUM				CONTAINER NUMBER: 70			
RADIOMUCLIDE: SR- 89				DATE PLANTED: 126			
INITIAL SOIL ACTIVITY (D/S/GM): 307.60				DATE EMERGED: 171			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
7001	SHOOT	30	20	0.0766	1.5326	6041.434	1.968±01
7002	LEAVES	43	10	0.4049	6.0460	3304.440	1.078±01
7003	STEM	43	10	0.2041	2.0405	3314.275	1.088±01
7004	LEAVES	51	5	2.1075	10.5374	4069.866	1.328±01
7005	STEM	51	5	0.8919	4.4597	3143.060	1.028±01
7006	LEAVES	58	2	8.9847	17.9493	3728.946	1.218±01
7007	STEM	58	2	2.3129	11.0297	2424.280	7.888±00
7008	LEAVES	129	1	6.4651	6.4651	3677.319	1.248±01
7009	STEM	129	1	29.0875	4.3875	2270.325	7.388±00
7010	PEELS	129	1	14.2747	0.5947	166.241	5.408±01
7011	MEAT	129	1	82.2900	4.7800	62.053	2.028±01
7012	FRUIT	129	3	99.7800	25.7400	53.864	1.752±01
7013	ROOT	129	1	2.5441	2.5441	1798.382	5.658±00

TABLE A- 71

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: HANFORD LOAM + 2008 CALCIUM				CONTAINER NUMBER: 71			
RADIONUCLIDE: SR- 85				DATE PLANTED: 126			
INITIAL SOIL ACTIVITY (D/S/GM): 387.90				DATE EMERGED: 171			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
7101	SHOOT	20	20	0.0599	1.1989	3228.071	1.818+01
7102	LEAVES	43	10	0.3983	3.9830	3040.183	1.498+01
7103	STEM	43	10	0.1189	1.1890	4038.444	1.318+01
7104	LEAVES	51	3	2.3832	7.1496	4399.740	1.438+01
7105	STEM	51	3	1.0979	3.2938	2931.878	9.248+00
7106	LEAVES	58	2	4.8305	13.6409	4630.324	1.518+01
7107	STEM	58	2	4.3768	8.7533	2363.908	7.698+00
7108	LEAVES	129	1	14.6350	4.3490	3842.313	1.298+01
7109	STEM	129	1	32.8486	3.5496	1406.661	3.228+00
7110	PEELS	129	1	14.3109	0.3089	444.704	1.518+00
7111	MEAT	129	1	82.8600	4.6000	192.309	6.388+01
7112	FRUIT	129	3	98.3133	18.7300	94.987	1.778+01
7113	ROOT	129	1	2.9322	2.9322	1627.673	4.648+00

TABLE A- 72

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 72			
RADIONUCLIDE: SR- 85				DATE PLANTED: 153			
INITIAL SOIL ACTIVITY (D/S/GM): 400.40				DATE EMERGED: 165			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
7201	SHOOT	27	40	0.0570	2.2795	9634.736	2.418+01
7202	LEAVES	41	9	0.6553	5.8980	10462.156	2.618+01
7203	STEM	41	9	0.1991	1.7920	9474.621	2.378+01
7204	LEAVES	54	3	4.2596	12.7787	6306.823	1.578+01
7205	STEM	54	3	2.1298	6.3895	4832.021	1.218+01
7206	LEAVES	61	2	11.1480	22.3360	5992.335	1.908+01
7207	STEM	61	2	8.1261	4.3081	4440.442	1.118+01
7208	LEAVES	132	1	4.3957	4.3957	5476.932	1.378+01
7209	STEM	132	1	20.3013	3.3213	3312.674	0.278+00
7210	PEELS	132	1	10.2148	1.0448	71.986	1.808+01
7211	MEAT	132	1	39.6600	7.7300	203.248	3.128+01
7212	FRUIT	132	3	46.0533	14.8400	47.793	2.448+01
7213	ROOT	132	1	3.0446	3.0446	3069.627	7.668+00

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PLANT UPTAKE SUMMARY: TOMATO

SCIL: OAKLEY SANDY LOAM

CONTAINER NUMBER: 73

RADIONUCLIDE: SR- 85

DATE PLANTED: 153

INITIAL SOIL ACTIVITY (D/S/GM): 400.40

DATE EMERGED: 165

SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
7301	SHOOT	27	40	0.0806	3.2253	11787.841	2.942+01
7302	LEAVES	41	8	0.4673	3.7360	12985.656	3.248+01
7303	STEM	41	8	0.1620	1.2960	12021.536	3.008+01
7304	LEAVES	54	5	2.7449	13.7346	8793.456	2.208+01
7305	STEM	54	5	1.2252	7.6262	5700.031	1.428+01
7306	LEAVES	61	2	7.1906	14.3812	7403.031	1.858+01
7307	STEM	61	2	3.3266	10.8332	4658.127	1.168+01
7308	LEAVES	132	1	2.5581	2.5581	13110.449	3.278+01
7309	STEM	132	1	14.5357	5.0457	4052.248	1.018+01
7310	PEELS	132	1	9.0714	0.9214	387.404	9.678-01
7311	MEAT	132	1	22.8400	4.4100	198.618	4.918-01
7312	FRUIT	132	3	61.6700	14.0900	245.640	6.138-01
7313	ROOT	132	1	3.3937	3.3937	3982.445	9.948+00

TABLE A- 74

PLANT UPTAKE SUMMARY: TOMATO

SCIL: OAKLEY SANDY LOAM

CONTAINER NUMBER: 74

RADIONUCLIDE: SR- 85

DATE PLANTED: 153

INITIAL SOIL ACTIVITY (D/S/GM): 400.60

DATE EMERGED: 165

SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
7401	SHOOT	27	40	0.0841	3.3648	11020.976	2.758+01
7402	LEAVES	41	10	0.9962	9.9615	9523.176	2.382+01
7403	STEM	41	10	0.3496	3.4960	8309.436	2.078+01
7404	LEAVES	54	2	5.3582	10.7163	7866.041	1.968+01
7405	STEM	54	2	3.0215	6.0430	5173.926	1.298+01
7406	LEAVES	61	2	8.2963	16.5925	6691.571	1.678+01
7407	STEM	61	2	5.6010	10.8020	4611.233	1.158+01
7408	LEAVES	132	1	7.7151	7.7151	10039.436	2.518+01
7409	STEM	132	1	22.0843	6.5843	3622.977	9.078+00
7410	PEELS	132	1	10.7336	1.1236	394.546	9.853-01
7411	MEAT	132	1	61.2800	4.8000	191.510	4.788-01
7412	FRUIT	132	3	48.5467	13.3700	186.243	4.658-01
7413	ROOT	132	1	3.7829	3.7829	4236.643	1.068+01

TABLE A- 75

PLANT UPTAKE SUMMARY: POTATO							
SOIL: HAMFORD SANDY CLAY LOAM				CONTAINER NUMBER: 75			
RADIONUCLIDE: SR- 85				DATE PLANTED: 193			
INITIAL SOIL ACTIVITY (D/S/GM): 446.70				DATE EMERGED: 165			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
7501	LEAVES	111	1	22.4258	22.4258	6113.923	1.378+01
7502	STEM	111	1	24.6151	24.6151	8933.595	1.918+01
7503	TUBER	111	3	80.1074	31.3223	200.244	4.488-01
7504	PEELS	111	1	7.8450	7.8450	599.050	1.348+00
7505	MEAT	111	1	25.0245	25.0245	119.441	2.678-01
7506	ROOT	111	1	26.2622	4.8422	6494.066	1.458+01

TABLE A- 76

PLANT UPTAKE SUMMARY: POTATO							
SOIL: HAMFORD SANDY CLAY LOAM				CONTAINER NUMBER: 76			
RADIONUCLIDE: SR- 85				DATE PLANTED: 193			
INITIAL SOIL ACTIVITY (D/S/GM): 446.70				DATE EMERGED: 165			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
7601	LEAVES	111	1	23.3040	23.3040	7196.550	1.618+01
7602	STEM	111	1	32.0716	12.2316	8088.919	1.818+01
7603	TUBER	111	3	59.8750	29.0280	176.348	3.958-01
7604	PEELS	111	1	14.9225	14.9225	411.039	9.878-01
7605	MEAT	111	1	76.2292	24.3092	140.124	3.148-01
7606	ROOT	111	1	1.8911	1.8911	8303.033	1.868+01

TABLE A- 77

PLANT UPTAKE SUMMARY: PCTATO							
SOIL: MANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 77			
RADIONUCLIDE: SR- 85				DATE PLANTED: 193			
INITIAL SOIL ACTIVITY (D/S/GH): 446.70				DATE EMERGED: 165			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GH)	ASU
7701	LEAVES	111	1	23.0095	23.0095	6670.782	1.458+01
7702	STEM	111	1	22.2869	10.6969	8099.159	1.818+01
7703	TUBER	111	3	69.5307	29.3620	189.793	3.588-01
7704	PEELS	111	1	15.0917	15.0917	425.144	9.528-01
7705	MEAT	111	1	61.2054	25.3054	108.988	2.448-01
7706	ROOT	111	1	2.9517	2.9517	9142.893	1.198+01

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PLANT UPTAKE SUMMARY: PCTATO							
SOIL: MANFORD LOAM + 3008 CALCIUM				CONTAINER NUMBER: 78			
RADIONUCLIDE: SR- 85				DATE PLANTED: 156			
INITIAL SOIL ACTIVITY (D/S/GH): 307.60				DATE EMERGED: 165			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GH)	ASU
7801	LEAVES	108	1	33.6684	12.2784	3913.419	1.148+01
7802	STEM	108	1	33.6736	16.7636	3455.032	1.128+01
7803	TUBER	108	3	39.6277	22.1832	53.600	1.748-01
7804	PEELS	108	1	20.9894	20.9894	174.884	5.698-01
7805	MEAT	108	1	137.3558	25.8558	36.208	1.188-01
7806	ROOT	108	1	3.6356	3.6356	2808.362	9.138+00

TABLE A- 79

PLANT UPTAKE SUMMARY: POTATO

SOIL: HANFORD LOAM + 50% CALCIUM							CONTAINER NUMBER: 79
RADIOISOTOPE: SR- 85							DATE PLANTED: 194
INITIAL SOIL ACTIVITY (D/S/GH): 307.60							DATE EMERGED: 169
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GH/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GH)	ASU
7901	LEAVES	100	1	36.8472	7.7472	2407.643	1.118+01
7902	STEM	100	1	34.7616	8.1916	3680.894	1.268+01
7903	TUBER	100	3	47.4480	22.4740	96.619	2.148-01
7904	PEELS	100	1	14.8900	14.8900	186.328	5.878-01
7905	MEAT	100	1	84.2867	17.8467	43.304	1.418-01
7906	ROOT	100	1	4.9903	4.9903	2462.031	6.728+00

TABLE A- 80

PLANT UPTAKE SUMMARY: POTATO

SOIL: HANFORD LOAM + 100% CALCIUM							CONTAINER NUMBER: 80
RADIOISOTOPE: SR- 85							DATE PLANTED: 194
INITIAL SOIL ACTIVITY (D/S/GH): 307.60							DATE EMERGED: 169
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GH/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GH)	ASU
8001	LEAVES	100	1	29.8343	7.5043	3161.483	1.038+01
8002	STEM	100	1	30.3076	7.2776	3013.596	9.868+00
8003	TUBER	100	3	59.3294	20.2162	63.386	2.138-01
8004	PEELS	100	1	13.3418	13.3418	591.604	1.928+00
8005	MEAT	100	1	81.5279	20.5179	54.708	1.788-01
8006	ROOT	100	1	1.7263	1.7263	2761.431	8.988+00

TABLE A- 81

PLANT UPTAKE SUMMARY: POTATO

SOIL: HANFORD LOAM + 2009 CALCIUM						CONTAINER NUMBER: 81	
RADIOISOTOPE: SR- 85						DATE PLANTED: 194	
INITIAL SOIL ACTIVITY (D/S/GM): 307.60						DATE EMERGED: 145	
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
8101	LEAVES	108	1	22.4472	10.4972	3023.971	9.838+00
8102	STEM	108	1	39.7842	8.4742	3195.573	1.048+01
8103	TUBER	108	1	46.6333	20.2529	101.162	2.328-01
8104	PEELS	108	1	21.9174	21.9174	190.232	6.188-01
8105	MEAT	108	1	28.8309	19.0000	29.421	1.938-01
8106	ROOT	108	1	4.4638	4.4638	2373.125	7.718+00

TABLE A- 82

PLANT UPTAKE SUMMARY: POTATO

SOIL: OAKLEY SANDY LOAM						CONTAINER NUMBER: 82	
RADIOISOTOPE: SR- 85						DATE PLANTED: 153	
INITIAL SOIL ACTIVITY (D/S/GM): 400.60						DATE EMERGED: 145	
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
8201	LEAVES	111	1	19.2664	8.2344	7704.930	1.928+01
8202	STEM	111	1	18.4598	9.4698	6455.147	1.618+01
8203	TUBER	111	1	21.9223	10.1029	268.489	6.708-01
8204	PEELS	111	1	16.0218	16.0218	268.146	6.692-01
8205	MEAT	111	1	23.7742	18.2942	151.225	3.782-01
8206	ROOT	111	1	1.7550	1.7550	5798.102	1.458+01

TABLE A- 83

PLANT UPTAKE SUMMARY: BEYARD							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 83			
RADIONUCLIDE: SR- 85				DATE PLANTED: 123			
INITIAL SOIL ACTIVITY (D/S/GM): 400.00				DATE EMERGED: 145			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
8301	LEAVES	111	1	17.2317	17.2317	4917.772	1.738+01
8302	STEM	111	1	14.8953	8.0093	9381.984	2.348+01
8303	TUBER	111	1	45.9987	22.9860	219.874	9.998+01
8304	PEELS	111	1	13.2544	13.2544	902.946	1.268+00
8305	MEAT	111	1	50.9979	18.0979	124.193	3.118+01
8306	ROOT	111	1	1.9551	1.9551	5065.244	1.268+01

TABLE A- 84

PLANT UPTAKE SUMMARY: POTATO							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 84			
RADIONUCLIDE: SR- 85				DATE PLANTED: 123			
INITIAL SOIL ACTIVITY (D/S/GM): 400.00				DATE EMERGED: 145			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
8401	LEAVES	111	1	20.3814	9.5614	8081.900	2.088+01
8402	STEM	111	1	17.1066	7.4066	6323.232	1.988+01
8403	TUBER	111	1	18.9983	15.9408	200.883	9.018+01
8404	PEELS	111	1	22.0094	22.0094	916.700	1.298+00
8405	MEAT	111	1	97.1012	25.1812	161.928	4.048+01
8406	ROOT	111	1	2.7736	2.7736	4910.151	1.298+01

TABLE A- 85

PLANT UPTAKE SUMMARY: WHEAT

SOIL: HAMFORD SANDY CLAY LOAM					CONTAINER NUMBER: 85		
RADIOISOTOPE: SR- 85					DATE PLANTED: 123		
INITIAL SOIL ACTIVITY (D/S/GM): 446.70					DATE EMERGED: 129		
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
8501	SHOOT	27	40	0.1308	5.2302	1836.548	6.118+00
8502	SEL	41	10	0.4841	4.8408	1075.185	2.418+00
8503	HEAD	41	5	0.1158	0.5790	182.747	6.098-01
8504	LEAVES	54	10	0.2000	2.0004	1444.390	3.238+00
8505	STALK	54	10	0.4686	4.6858	406.271	9.098-01
8506	HEAD	54	10	0.2444	2.4444	239.311	5.348-01
8507	HEAD	70	10	1.0761	10.7605	110.949	2.488-01
8508	STALK	70	10	0.6277	6.2770	738.376	1.658+00
8509	LEAVES	70	10	0.2014	2.0140	1829.121	6.098+00
8510	HEAD	88	10	1.7451	17.4513	123.620	2.778-01
8511	STALK	88	10	0.7249	7.2487	1191.083	2.678+00
8512	LEAVES	88	10	0.2373	2.3729	2506.640	5.798+00
8513	HEAD	97	10	1.2149	12.1485	133.085	3.008-01
8514	STALK	97	10	0.4992	4.9922	1031.114	2.318+00
8515	LEAVES	97	10	0.2356	2.3564	2036.916	4.968+00
8516	HEAD	102	385	0.6907	13.6658	119.639	2.688-01
8517	STALK	102	10	0.5324	5.3244	1130.274	2.538+00
8518	LEAVES	102	10	0.2121	2.1211	1789.488	4.018+00
8519	GRAIN	102	376	0.5139	20.0000	90.347	2.028-01
8520	CHAFF	102	375	0.2930	5.0000	333.547	7.478-01

TABLE A- 86

PLANT UPTAKE SUMMARY: WHEAT

SOIL: HAMFORD SANDY CLAY LOAM					CONTAINER NUMBER: 86		
RADIOISOTOPE: SR- 85					DATE PLANTED: 123		
INITIAL SOIL ACTIVITY (D/S/GM): 446.70					DATE EMERGED: 129		
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
8601	SHOOT	27	40	0.0970	3.8789	1598.960	3.588+00
8602	SEL	41	10	0.5244	5.2435	1027.030	2.308+00
8603	HEAD	41	8	0.1398	1.1181	165.613	3.718-01
8604	STALK	54	10	0.2731	2.7310	1367.482	3.068+00
8605	LEAVES	54	10	0.6253	6.2527	447.163	1.008+00
8606	HEAD	54	10	0.3172	3.1722	276.044	6.188-01
8607	HEAD	70	10	0.8902	8.9020	137.320	3.528-01
8608	STALK	70	10	0.6085	6.0845	862.747	1.938+00
8609	LEAVES	70	10	0.2742	2.7415	1687.201	3.788+00
8610	HEAD	88	10	1.4088	14.0860	133.534	2.998-01
8611	STALK	88	10	0.6090	6.0904	927.704	2.148+00
8612	LEAVES	88	10	0.2336	2.3397	2030.091	4.548+00
8613	HEAD	97	10	1.0020	10.0194	176.485	3.958-01
8614	STALK	97	10	0.3901	3.9009	1520.461	3.408+00
8615	LEAVES	97	10	0.2204	2.2039	2552.489	5.718+00
8616	HEAD	102	218	0.8811	12.7739	132.381	3.418-01
8617	STALK	102	10	0.5079	5.0788	1104.412	2.478+00
8618	LEAVES	102	10	0.1308	1.3077	1294.886	2.908+00
8619	GRAIN	102	208	0.6496	20.0000	97.578	2.188-01
8620	CHAFF	102	208	0.0679	5.0000	328.243	7.358-01

TABLE A- 87

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: MANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 87			
RADIONUCLIDE: SR- 83				DATE PLANTED: 193			
INITIAL SOIL ACTIVITY (D/S/GM): 446.70				DATE EMERGED: 163			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
8701	SHOOT	27	40	0.0994	3.9755	1436.747	3.228+00
8702	SEL	41	10	0.9182	5.1821	1063.896	2.268+00
8703	HEAD	41	8	0.1238	0.9905	173.037	3.878-01
8704	LEAVES	54	10	0.2648	2.6477	1527.177	3.428+00
8705	STALK	54	10	0.5713	5.7123	289.017	6.478-01
8706	HEAD	54	10	0.3336	3.3358	231.289	3.168-01
8707	HEAD	70	10	1.1663	11.6625	105.033	2.338-01
8708	STALK	70	10	0.6832	6.8315	755.498	1.698+00
8709	LEAVES	70	10	0.2418	2.4180	1670.892	3.758+00
8710	HEAD	88	10	1.3913	13.9127	133.383	2.998-01
8711	STALK	88	10	0.8934	8.9340	981.926	2.288+00
8712	LEAVES	88	10	0.2217	2.2171	1695.889	3.800+00
8713	HEAD	97	10	1.3028	13.0282	141.932	3.168-01
8714	STALK	97	10	0.5288	5.2876	1135.937	2.958+00
8715	LEAVES	97	10	0.2435	2.4354	2093.937	4.608+00
8716	HEAD	102	230	0.8852	19.2054	219.653	4.928-01
8717	STALK	102	10	0.6026	6.0257	1271.880	2.838+00
8718	LEAVES	102	10	0.1940	1.9399	2270.345	5.088+00
8719	GRAIN	102	280	0.6525	20.0000	90.805	2.038-01
8720	CHAFF	102	220	0.0363	5.0000	386.021	8.648-01

TABLE A- 88

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: MANFORD LOAM + 3008 CALCIUM				CONTAINER NUMBER: 88			
RADIONUCLIDE: SR- 83				DATE PLANTED: 126			
INITIAL SOIL ACTIVITY (D/S/GM): 307.60				DATE EMERGED: 163			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
8801	SHOOT	30	30	0.0839	2.5165	710.494	2.318+00
8802	SEL	43	5	0.6904	3.2920	60.023	1.958-01
8803	HEAD	43	10	0.2290	2.2897	618.026	2.018+00
8804	LEAVES	51	10	0.2175	2.1744	849.981	2.768+00
8805	STALK	51	10	0.5692	5.6917	259.482	6.468-01
8806	HEAD	51	10	0.2957	2.9973	127.540	4.158-01
8807	HEAD	67	10	0.2672	9.6720	60.685	1.978-01
8808	STALK	67	10	0.7828	7.8278	343.691	1.128+00
8809	LEAVES	67	10	0.2264	2.2640	1039.668	3.388+00
8810	HEAD	85	10	1.2583	12.5833	66.820	2.178-01
8811	STALK	85	10	0.5012	5.0116	561.850	1.838+00
8812	LEAVES	85	10	0.1645	1.6455	1053.752	3.438+00
8813	HEAD	94	10	1.4133	14.1329	64.248	2.098-01
8814	STALK	94	10	0.5372	5.3718	629.054	2.058+00
8815	LEAVES	94	10	0.2221	2.2215	1220.404	3.978+00
8816	HEAD	99	238	1.1600	16.5224	69.793	2.278-01
8817	STALK	99	10	0.6214	6.2144	702.582	2.288+00
8818	LEAVES	99	10	0.1907	1.9066	1280.883	4.168+00
8819	GRAIN	99	228	0.8921	20.0000	41.273	1.348-01
8820	CHAFF	99	228	0.0455	5.0000	215.982	7.028-01

TABLE A- 89

PLANT UPTAKE SUMMARY: WHEAT

SOIL: MANFORD LOAM + 50% CALCIUM CONTAINER NUMBER: 89
 RADIONUCLIDE: SR- 89 DATE PLANTED: 156
 INITIAL SOIL ACTIVITY (D/S/GH): 307.60 DATE EMERGED: 163

SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GH)	ASU
8901	SHOOT	30	30	0.0865	2.5936	676.683	2.208+00
8902	SEL	43	5	0.5224	2.6120	348.593	1.138+00
8903	HEAD	43	10	0.2244	2.2440	104.723	3.408-01
8904	LEAVES	51	10	0.1854	1.8540	665.742	2.168+00
8905	STALK	51	10	0.4433	4.4531	236.598	7.898-01
8906	HEAD	51	10	0.2315	2.3148	128.378	4.178-01
8907	HEAD	67	10	0.7536	7.9360	67.719	2.208-01
8908	STALK	67	10	0.6590	6.5897	304.446	9.908-01
8909	LEAVES	67	10	0.1846	1.8461	867.009	2.828+00
8910	HEAD	85	10	1.3460	13.6597	78.843	2.568-01
8911	STALK	85	10	0.9398	5.3983	597.373	1.348+00
8912	LEAVES	85	10	0.2440	2.4397	1013.585	3.308+00
8913	HEAD	94	10	1.1363	11.3635	88.816	2.898-01
8914	STALK	94	10	0.4178	4.1783	669.517	2.188+00
8915	LEAVES	94	10	0.1497	1.4968	1147.105	3.738+00
8916	HEAD	99	210	1.0482	14.1045	85.068	2.778-01
8917	STALK	99	10	0.4214	4.2163	563.093	1.838+00
8918	LEAVES	99	10	0.3229	3.2291	994.823	3.238+00
8919	GRAIN	99	208	0.8113	20.0000	47.175	1.538-01
8920	CHAFF	99	209	0.0546	5.0000	185.456	6.038-01

TABLE A- 90

PLANT UPTAKE SUMMARY: WHEAT

SOIL: MANFORD LOAM + 100% CALCIUM CONTAINER NUMBER: 90
 RADIONUCLIDE: SR- 85 DATE PLANTED: 156
 INITIAL SOIL ACTIVITY (D/S/GH): 307.60 DATE EMERGED: 163

SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GH)	ASU
9001	SHOOT	30	30	0.1034	3.1013	597.063	1.948+00
9002	SEL	43	5	0.6905	3.4525	398.337	1.298+00
9003	HEAD	43	10	0.2801	2.8010	80.546	2.623-01
9004	LEAVES	51	10	0.1876	1.8760	818.764	2.668+00
9005	STALK	51	10	0.3980	3.9800	297.916	9.698-01
9006	HEAD	51	10	0.1716	1.7162	125.493	4.008-01
9007	HEAD	67	10	0.8691	8.6908	73.550	2.398-01
9008	STALK	67	10	0.8523	8.5230	316.845	1.058+00
9009	LEAVES	67	10	0.2238	2.2380	890.882	2.908+00
9010	HEAD	85	10	1.5098	15.0984	65.116	2.128-01
9011	STALK	85	10	0.6086	6.0858	565.736	1.848+00
9012	LEAVES	85	10	0.1703	1.7032	1098.617	3.578+00
9013	HEAD	94	10	1.1928	11.9280	71.123	2.318-01
9014	STALK	94	10	0.9193	5.1925	648.368	2.118+00
9015	LEAVES	94	10	0.1649	1.6485	1132.753	3.688+00
9016	HEAD	99	220	1.1612	13.0465	77.851	2.538-01
9017	STALK	99	10	0.5113	5.1134	623.484	2.128+00
9018	LEAVES	99	10	0.1752	1.7522	1094.904	3.568+00
9019	GRAIN	99	210	0.9003	20.0000	30.662	9.978-02
9020	CHAFF	99	210	0.0683	5.0000	156.586	5.098-01

TABLE A- 91

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: HAMFORD LOAM + 2002 CALCIUM				CONTAINER NUMBER: 91			
RADIOISOTOPE: SR- 85				DATE PLANTED: 124			
INITIAL SOIL ACTIVITY (D/S/GM): 107.60				DATE EMERGED: 143			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
9101	SHOOT	30	10	0.1049	3.1482	784.481	2.452+00
9102	SEL	43	10	0.4501	4.5013	472.934	1.348+00
9103	HEAD	43	10	0.2404	2.4057	82.243	2.672-01
9104	LEAVES	51	9	0.2250	2.0252	788.478	2.568+00
9105	STALK	51	9	0.8224	5.8013	204.113	4.802-01
9106	HEAD	51	9	0.2985	2.6864	95.634	3.118-01
9107	HEAD	67	10	0.7764	7.7641	64.476	2.102-01
9108	STALK	67	10	0.4473	6.4730	411.774	1.348+00
9109	LEAVES	67	10	0.2040	2.0040	1003.248	3.268+00
9110	HEAD	85	10	1.5620	15.8201	63.351	2.868-01
9111	STALK	85	10	0.8502	8.5023	462.062	2.092+00
9112	LEAVES	85	10	0.2122	2.1221	1156.889	3.768+00
9113	HEAD	94	10	1.4378	14.3775	74.225	2.412-01
9114	STALK	94	10	0.5050	5.8499	657.805	2.148+00
9115	LEAVES	94	10	0.2122	2.1217	1242.799	4.048+00
9116	HEAD	99	210	1.1920	18.2326	69.414	2.268-01
9117	STALK	99	10	0.8845	8.8451	660.418	2.192+00
9118	LEAVES	99	10	0.2279	2.2747	1081.805	3.928+00
9119	GRAIN	99	200	0.8951	20.0000	39.351	1.288-01
9120	CHAFF	99	200	0.0520	5.0000	146.883	4.788-01

TABLE A- 92

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 92			
RADIOISOTOPE: SR- 85				DATE PLANTED: 123			
INITIAL SOIL ACTIVITY (D/S/GM): 400.60				DATE EMERGED: 159			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
9201	SHOOT	27	40	0.1022	4.0895	1277.018	3.192+00
9202	SEL	41	10	0.5265	5.2645	771.448	1.938+00
9203	HEAD	41	9	0.1375	1.2375	224.365	3.602-01
9204	LEAVES	54	11	0.1969	2.1697	1453.328	3.638+00
9205	STALK	54	11	0.4022	4.4246	840.722	1.392+00
9206	HEAD	54	11	0.2580	2.8381	342.759	8.562-01
9207	HEAD	70	10	0.7159	7.1585	203.910	5.092-01
9208	STALK	70	10	0.4879	4.8785	917.712	2.298+00
9209	LEAVES	70	10	0.1895	1.8950	1740.684	4.352+00
9210	HEAD	88	10	1.0883	10.8830	164.069	4.102-01
9211	STALK	88	10	0.3811	3.8112	1168.741	2.922+00
9212	LEAVES	88	10	0.1660	1.6602	2036.895	5.088+00
9213	HEAD	97	10	0.9522	9.5219	152.534	3.812-01
9214	STALK	97	10	0.3893	3.8924	1270.249	3.178+00
9215	LEAVES	97	10	0.1422	1.4224	2085.836	5.712+00
9216	HEAD	102	232	0.9047	12.3264	183.508	4.588-01
9217	STALK	102	10	0.4228	4.2278	1363.827	3.402+00
9218	LEAVES	102	10	0.1084	1.0843	2036.972	5.082+00
9219	GRAIN	102	222	0.4249	20.0000	101.602	2.542-01
9220	CHAFF	102	222	0.0426	5.0000	372.320	9.298-01

TABLE A- 93

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 93			
RADIOISOTOPE: SR- 85				DATE PLANTED: 153			
INITIAL SOIL ACTIVITY (D/S/GM): 400.40				DATE EMERGED: 159			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
9301	SHOOT	27	40	0.0973	3.8920	1609.475	4.028+00
9302	SEL	41	10	0.5139	5.1390	792.936	1.988+00
9303	HEAD	41	9	0.1837	1.4715	177.523	4.438-01
9304	LEAVES	54	10	0.1929	1.9285	1254.462	3.138+00
9305	STALK	54	10	0.4566	4.5654	406.744	1.018+00
9306	HEAD	54	10	0.3721	3.7209	255.968	6.348-01
9307	HEAD	70	10	0.9802	9.0023	139.028	3.478-01
9308	STALK	70	10	0.5574	5.5755	897.973	2.248+00
9309	LEAVES	70	10	0.1748	1.7483	1724.451	4.318+00
9310	HEAD	88	10	1.3499	13.4989	132.957	3.328-01
9311	STALK	88	10	0.4449	4.4488	1188.456	2.968+00
9312	LEAVES	88	10	0.2162	2.1624	1808.765	4.928+00
9313	HEAD	97	10	1.4256	14.2558	129.660	3.248-01
9314	STALK	97	10	0.4774	4.7738	1311.345	3.278+00
9315	LEAVES	97	10	0.1737	1.7349	2233.751	5.588+00
9316	HEAD	102	342	0.8912	12.8711	151.080	3.778-01
9317	STALK	102	10	0.3949	3.9486	1179.281	2.948+00
9318	LEAVES	102	10	0.2027	2.0269	2042.831	5.108+00
9319	GRAIN	102	332	0.6652	20.0000	95.024	2.338-01
9320	CHAFF	102	332	0.0449	5.0000	330.617	8.258-01

TABLE A- 94

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 94			
RADIOISOTOPE: SR- 85				DATE PLANTED: 153			
INITIAL SOIL ACTIVITY (D/S/GM): 400.40				DATE EMERGED: 159			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
9401	SHOOT	27	40	0.0856	3.4224	1651.239	4.128+00
9402	SEL	41	10	0.4877	4.8765	828.334	2.078+00
9403	HEAD	41	9	0.1377	1.2390	205.966	5.148-01
9404	LEAVES	54	10	0.1726	1.7262	1512.490	3.788+00
9405	STALK	54	10	0.4953	4.9532	491.171	1.238+00
9406	HEAD	54	10	0.2381	2.3808	418.495	1.058+00
9407	HEAD	70	10	0.8856	8.8555	228.493	5.838-01
9408	STALK	70	10	0.4771	4.7705	861.874	2.158+00
9409	LEAVES	70	10	0.1130	1.1297	1934.734	4.838+00
9410	HEAD	88	10	0.7885	7.8852	176.638	4.418-01
9411	STALK	88	10	0.3070	3.0700	1293.922	3.238+00
9412	LEAVES	88	10	0.1124	1.1242	2102.163	5.258+00
9413	HEAD	97	10	0.8324	8.5245	179.832	4.498-01
9414	STALK	97	10	0.2998	2.9977	1248.694	3.128+00
9415	LEAVES	97	10	0.1511	1.4108	2082.462	5.158+00
9416	HEAD	102	313	0.7519	9.4073	178.988	4.478-01
9417	STALK	102	10	0.4297	4.2973	1201.455	3.008+00
9418	LEAVES	102	10	0.1401	1.4008	2113.036	5.278+00
9419	GRAIN	102	303	0.5325	20.0000	98.570	2.468-01
9420	CHAFF	102	303	0.0456	5.0000	374.529	9.358-01

TABLE A- 95

PLANT UPTAKE SUMMARY: CORN							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 95			
RADIONUCLIDE: SR- 85				DATE PLANTED: 123			
INITIAL SOIL ACTIVITY (D/S/GM): 44A-70				DATE EMERGED: 161			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
9501	SHOOT	27	10	0.9504	5.5001	1511.442	7.872+00
9502	LEAVES	41	4	3.1154	9.3115	3767.111	4.198+00
9503	STALK	41	4	1.2570	5.0200	2581.881	9.782+00
9504	LEAVES	54	1	13.6107	19.6107	1885.944	4.228+00
9505	STALK	54	1	8.0200	8.0200	1502.941	3.502+00
9506	LEAVES	61	1	22.0289	4.9489	1981.952	3.102+00
9507	STALK	61	1	16.7681	8.4881	1601.697	3.162+00
9508	LEAVES	70	1	19.6195	4.6695	1736.849	3.898+00
9509	STALK	70	1	14.7500	9.3200	1204.380	2.782+00
9510	TASSEL	70	1	6.7990	6.7990	284.080	6.348-01
9511	TASSEL	102	1	3.9679	3.9679	722.320	1.782+00
9512	STALK	102	1	30.1317	12.4317	617.067	1.988+00
9513	LEAVES	102	1	28.9679	6.3379	1885.335	4.862+00
9514	MUSK	102	1	10.0211	10.0211	132.023	2.908-01
9515	SILK	102	1	0.7060	0.7060	111.273	2.692-01
9516	KERNEL	102	6	25.0810	44.7862	14.954	3.358-02
9517	COR	102	6	9.8911	9.8905	112.842	2.532-01

TABLE A- 96

PLANT UPTAKE SUMMARY: CORN							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 96			
RADIONUCLIDE: SR- 85				DATE PLANTED: 123			
INITIAL SOIL ACTIVITY (D/S/GM): 44A-70				DATE EMERGED: 161			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
9601	SHOOT	27	10	0.4304	4.9944	3910.049	8.758+00
9602	LEAVES	41	4	4.0030	4.5818	2645.760	5.928+00
9603	STALK	41	4	1.9888	7.9470	2372.714	8.762+00
9604	LEAVES	54	1	19.0944	19.0994	1980.953	4.438+00
9605	STALK	54	1	9.0836	9.0836	1580.412	3.548+00
9606	LEAVES	61	1	12.6331	3.9831	1776.751	3.988+00
9607	STALK	61	1	7.9385	7.9385	1625.143	3.642+00
9608	LEAVES	70	1	15.9860	4.8860	1434.199	3.218+00
9609	STALK	70	1	21.9270	9.2770	951.539	2.132+00
9610	TASSEL	70	1	4.7540	4.7540	333.578	7.478-01
9611	TASSEL	102	1	3.0220	3.0220	1117.506	2.502+00
9612	STALK	102	1	24.8922	14.0622	584.822	1.918+00
9613	LEAVES	102	1	24.1810	8.4310	2187.188	4.902+00
9614	MUSK	102	1	9.5272	9.5272	166.128	3.728-01
9615	SILK	102	1	1.0360	1.0360	192.286	4.378-01
9616	KERNEL	102	6	21.9511	50.3064	17.451	3.918-02
9617	COR	102	6	9.2533	11.2195	87.906	1.882-01

TABLE A- 97

PLANT UPTAKE SUMMARY: CORN							
SOIL: MANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 97			
RADIOISOTOPE: SR- 85				DATE PLANTED: 193			
INITIAL SOIL ACTIVITY (D/S/GM): 444.70				DATE EMERGED: 161			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
9701	SHOOT	27	10	0.5169	5.1494	3235.136	7.698+00
9702	LEAVES	41	10	1.0914	4.4142	2710.084	6.078+00
9703	STALK	41	4	1.2450	5.0600	2301.782	5.158+00
9704	LEAVES	54	1	17.7743	17.7743	1071.716	4.198+00
9705	STALK	54	1	10.9539	50.9539	1479.663	3.318+00
9706	LEAVES	61	1	16.4107	4. . . 7	1037.744	2.328+00
9707	STALK	41	1	10.6678	10.6678	940.950	2.118+00
9708	LEAVES	70	1	16.6519	4.1919	1943.194	3.458+00
9709	STALK	70	1	21.0225	10.7725	1094.497	2.458+00
9710	TASSEL	70	1	8.1185	8.1185	295.428	6.618-01
9711	TASSEL	102	1	4.5245	4.5245	973.321	2.188+00
9712	STALK	102	1	39.1900	5.3600	925.749	1.188+00
9713	LEAVES	102	1	38.1934	6.9534	2223.550	4.988+00
9714	HUSK	102	1	10.8445	10.8445	174.842	3.918-01
9715	SILK	102	1	0.8899	0.8899	163.359	3.708-01
9716	KERNEL	102	6	19.4898	50.0948	16.327	3.658-02
9717	COB	102	6	8.0805	13.8831	87.989	1.978-01

TABLE A- 98

PLANT UPTAKE SUMMARY: CORN							
SOIL: MANFORD LOAM + 300% CALCIUM				CONTAINER NUMBER: 98			
RADIOISOTOPE: SR- 85				DATE PLANTED: 196			
INITIAL SOIL ACTIVITY (D/S/GM): 307.60				DATE EMERGED: 161			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
9801	LEAVES	30	10	0.9922	9.9215	1546.871	5.038+00
9802	STALK	30	10	0.3980	3.5201	1366.046	4.448+00
9803	LEAVES	43	6	4.1356	5.1335	1262.379	4.108+00
9804	STALK	43	6	2.0577	12.3469	1027.799	3.348+00
9805	LEAVES	51	1	13.2458	13.2458	1051.284	3.428+00
9806	STALK	51	1	7.2154	7.2194	814.21	2.458+00
9807	LEAVES	58	1	21.3613	3.6413	911.554	2.968+00
9808	STALK	58	1	14.1079	6.5579	688.302	2.248+00
9809	LEAVES	67	1	17.1680	5.1980	829.026	2.708+00
9810	STALK	67	1	29.6645	11.4945	420.625	1.378+00
9811	TASSEL	67	1	9.9845	9.9845	176.235	5.738-01
9812	TASSEL	99	1	3.2055	3.2055	352.160	1.148+00
9813	STALK	99	1	27.7918	11.3118	345.370	1.128+00
9814	LEAVES	99	1	30.0062	9.2562	973.602	3.178+00
9815	HUSK	99	1	7.4588	7.4588	92.691	3.018-01
9816	SILK	99	1	69.6811	0.8811	61.866	2.018-01
9817	KERNEL	99	5	27.9217	45.3087	4.827	2.228-02
9818	COB	99	5	11.9904	10.7516	50.265	1.638-01

TABLE A-99

PLANT UPTAKE SUMMARY: CORN							
SOIL: HANFORD LOAM + 50% CALCIUM				CONTAINER NUMBER: 55			
RADIOISOTOPE: SR-85				DATE PLANTED: 156			
INITIAL SOIL ACTIVITY (D/S/GM): 307.60				DATE EMERGED: 166			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
9901	LEAVES	30	10	1.1332	11.1317	1495.375	4.868+00
9902	STALK	30	10	0.3909	3.9047	1393.009	4.408+00
9903	LEAVES	43	6	1.2476	1.8045	787.367	2.588+00
9904	STALK	43	6	10.6119	16.4714	1110.150	3.618+00
9905	LEAVES	51	1	11.7012	11.7012	682.383	2.228+00
9906	STALK	51	1	6.0739	6.0739	688.043	2.248+00
9907	LEAVES	58	1	19.8488	3.7988	944.801	3.072+00
9908	STALK	58	1	13.4966	7.3266	639.348	2.088+00
9909	LEAVES	67	1	14.2335	5.1835	759.216	2.468+00
9910	STALK	67	1	22.4660	9.2660	914.566	1.478+00
9911	TASSEL	67	1	4.7875	4.7875	106.286	1.392-01
9912	TASSEL	99	1	3.6885	3.6885	486.894	1.588+00
9913	STALK	99	1	10.6027	4.8627	243.085	7.402-01
9914	LEAVES	99	1	25.1328	7.6428	999.629	3.292+00
9915	MUSK	99	1	11.8173	11.8173	88.801	2.882-01
9916	SILK	99	1	1.0267	1.0267	61.418	2.008-01
9917	KERNEL	99	6	19.6417	34.1983	8.208	2.802-02
9918	COR	99	6	8.7907	10.1742	51.136	1.668-01

TABLE A-100

PLANT UPTAKE SUMMARY: IN							
SOIL: HANFORD LOAM + 100% CALCIUM				CONTAINER NUMBER: 100			
RADIOISOTOPE: SR-85				DATE PLANTED: 156			
INITIAL SOIL ACTIVITY (D/S/GM): 307.60				DATE EMERGED: 166			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
10001	LEAVES	30	10	1.0325	10.3249	1572.010	5.112+00
10002	STALK	30	10	0.3828	3.8284	1399.389	4.548+00
10003	LEAVES	43	4	7.7805	5.1218	1310.028	4.262+00
10004	STALK	43	4	2.4027	9.6110	1130.254	3.678+00
10005	LEAVES	51	1	11.0505	11.0505	902.450	2.932+00
10006	STALK	51	1	7.0878	7.0878	748.835	2.438+00
10007	LEAVES	58	1	21.2962	3.4262	810.909	2.852+00
10008	STALK	58	1	24.2285	7.2285	816.896	2.668+00
10009	LEAVES	67	1	12.7300	4.2800	667.627	2.172+00
10010	STALK	67	1	19.7303	8.4003	635.684	2.078+00
10011	TASSEL	67	1	5.0866	5.0866	127.590	4.132-01
10012	TASSEL	99	1	2.8970	2.8970	538.576	1.752+00
10013	STALK	99	1	22.6963	22.6963	346.206	1.122+00
10014	LEAVES	99	1	21.3893	7.2593	1023.878	3.338+00
10015	MUSK	99	1	8.2618	8.2618	51.606	1.682-01
10016	SILK	99	1	0.7209	0.7209	87.749	2.852-01
10017	KERNEL	99	6	17.1190	36.4341	10.645	3.462-02
10018	COR	99	6	8.4375	7.9850	48.852	1.592-01

TABLE A-101

PLANT UPTAKE SUMMARY: CORN							
SOIL: HAMFORD LOAM + 200% CALCIUM				CONTAINER NUMBER: 101			
RADIOISOTOPE: SR- 85				DATE PLANTED: 1/6			
INITIAL SOIL ACTIVITY (D/S/GM): 307.60				DATE EMERGED: 1/6			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
10101	LEAVES	30	10	0.9892	9.8913	1443.918	4.498+00
10102	STALK	30	10	0.3050	3.0498	1397.187	4.548+00
10103	LEAVES	43	4	4.8337	7.2448	1095.383	3.548+00
10104	STALK	43	4	2.2298	8.9018	1087.375	3.548+00
10105	LEAVES	51	1	10.6367	10.6367	1080.848	3.518+00
10106	STALK	51	1	9.9080	9.9080	1010.116	3.288+00
10107	LEAVES	58	1	21.8574	4.9774	877.747	2.858+00
10108	STALK	58	1	18.1901	6.5981	781.744	2.548+00
10109	LEAVES	67	1	18.4840	6.2340	888.971	2.828+00
10110	STALK	67	1	22.7089	9.3885	489.128	1.958+00
10111	TASSEL	67	1	8.3808	8.3808	117.259	1.818-01
10112	TASSEL	99	1	2.9970	2.9970	436.118	1.428+00
10113	STALK	99	1	20.0149	20.0149	243.463	8.633-01
10114	LEAVES	99	1	26.8965	9.5965	1163.631	3.788+00
10115	MUSK	99	1	8.7216	8.7216	80.529	1.978-01
10116	STLK	99	1	0.9137	0.9137	52.293	1.708-01
10117	KERNEL	99	6	25.8930	32.4581	8.484	2.768-02
10118	CGB	99	6	8.8279	4.8976	82.884	2.698-01

TABLE A-102

PLANT UPTAKE SUMMARY: CORN							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 102			
RADIOISOTOPE: SR- 85				DATE PLANTED: 1/3			
INITIAL SOIL ACTIVITY (D/S/GM): 400.60				DATE EMERGED: 1/6			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
10201	SHOOT	27	10	0.7779	7.7794	3343.082	8.358+00
10202	LEAVES	41	2	8.8371	4.0942	2677.807	6.688+00
10203	STALK	41	2	4.7442	9.4883	2729.691	6.818+00
10204	LEAVES	54	1	14.6848	14.6848	2164.524	5.408+00
10205	STALK	54	1	8.3673	8.3673	2084.292	5.208+00
10206	LEAVES	61	1	21.7326	9.1326	2527.699	6.318+00
10207	STALK	61	1	19.6743	7.5853	1389.210	3.478+00
10208	TASSEL	61	1	7.4394	7.4394	389.748	9.738-01
10209	LEAVES	70	1	21.5522	2.3522	2196.919	5.488+00
10210	STALK	70	1	25.3360	8.8860	1308.009	3.278+00
10211	TASSEL	70	1	7.1080	7.1080	384.762	9.608-01
10212	TASSEL	102	1	3.4556	3.4556	1016.145	2.548+00
10213	STALK	102	1	23.4101	9.9901	1014.042	2.538+00
10214	LEAVES	102	1	24.7433	9.3133	1442.673	6.108+00
10215	MUSK	102	1	6.6875	6.6875	226.708	5.668-01
10216	SILK	102	1	0.6839	0.6839	229.927	5.748-01
10217	KERNEL	102	6	23.3484	36.9407	15.731	3.938-02
10218	CGB	102	6	7.6395	10.6769	106.285	2.658-01

TABLE A-103

PLANT UPTAKE SUMMARY: CORN							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 103			
RADIOISOTOPE: SR- 89				DATE PLANTED: 152			
INITIAL SOIL ACTIVITY (D/S/GM): 400.60				DATE EMERGED: 166			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
10301	SHOOT	27	10	1.0111	10.1113	3091.124	7.428+00
10302	LEAVES	41	2	7.1816	3.7132	2686.053	6.718+00
10303	STALK	41	2	3.4557	6.9115	2664.583	6.658+00
10304	LEAVES	54	1	13.8629	13.8629	2598.234	6.408+00
10305	STALK	54	1	5.7891	5.7891	1948.492	4.868+00
10306	LEAVES	61	1	27.0326	4.3526	2237.191	5.368+00
10307	STALK	61	1	16.0152	8.4152	1059.007	2.668+00
10308	TASSEL	61	1	11.1519	11.1519	373.325	9.328-01
10309	LEAVES	70	1	26.2393	5.9393	2786.746	6.968+00
10310	STALK	70	1	27.4400	8.7900	1293.353	3.238+00
10311	TASSEL	70	1	6.1333	6.1333	1359.323	3.398+00
10312	MUSK	70	1	2.7715	2.7715	922.406	1.308+00
10313	EAR	70	1	1.2370	1.2370	364.176	9.698-01
10314	SILK	70	1	0.6020	0.6020	138.761	3.468-01
10315	TASSEL	102	1	3.3646	3.3646	1158.561	2.898+00
10316	STALK	102	1	24.7413	12.9013	758.160	1.898+00
10317	LEAVES	102	1	24.5574	6.2774	3078.492	7.688+00
10318	MUSK	102	1	9.3946	9.3946	263.089	5.078-01
10319	SILK	102	1	1.2346	1.2346	196.819	4.918-01
10320	KERNEL	102	6	30.4823	45.2339	14.020	3.508-02
10321	COR	102	6	10.0668	8.3207	121.677	3.048-01

TABLE A-104

PLANT UPTAKE SUMMARY: CORN							
SOIL: OAKLEY SANDY LOAM				CONTAINER NUMBER: 104			
RADIOISOTOPE: SR- 89				DATE PLANTED: 152			
INITIAL SOIL ACTIVITY (D/S/GM): 400.60				DATE EMERGED: 161			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
10401	SHOOT	27	10	0.6648	6.6482	2914.678	7.288+00
10402	LEAVES	41	2	8.5645	4.4790	2730.484	6.828+00
10403	STALK	41	2	3.5093	7.0183	2566.367	6.418+00
10404	LEAVES	54	1	10.7603	10.7603	1707.678	4.268+00
10405	STALK	54	1	5.1391	5.1391	2089.189	5.228+00
10406	LEAVES	61	1	22.5223	4.7223	2061.011	5.148+00
10407	STALK	61	1	17.5935	7.6135	1381.362	3.458+00
10408	TASSEL	61	1	2.8766	2.8766	369.569	9.238-01
10409	LEAVES	70	1	21.4793	5.5793	1835.796	4.588+00
10410	STALK	70	1	41.5942	12.5442	691.939	1.738+00
10411	TASSEL	70	1	3.0040	3.0040	676.353	1.698+00
10412	MUSK	70	1	2.4060	2.4060	208.738	5.218-01
10413	EAR	70	1	1.6920	1.6920	89.130	2.228-01
10414	SILK	70	1	1.1620	1.1620	537.195	1.348+00
10415	TASSEL	102	1	3.8544	3.8544	997.188	2.498+00
10416	STALK	102	1	31.0329	10.5329	702.164	1.758+00
10417	LEAVES	102	1	24.9299	7.4299	3465.848	6.128+00
10418	MUSK	102	1	11.7220	11.7220	197.529	4.938-01
10419	SILK	102	1	0.9053	0.9053	176.238	4.858-01
10420	KERNEL	102	6	26.3450	33.1902	26.262	5.068-02
10421	COR	102	6	8.5097	7.2879	114.702	2.868-01

TABLE A-105

PLANT UPTAKE SUMMARY: CORN							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 105			
RADIOISOTOPE: SR-85 HEATED TO 220 DEGREES C				DATE PLANTED: 145			
INITIAL SOIL ACTIVITY (D/S/GM): 359.70				DATE EMERGED: 161			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
10501	SHOOT	21	10	0.3559	3.5587	149.976	4.178-01
10502	LEAVES	34	6	2.8334	4.4401	107.268	2.988-01
10503	STALK	34	6	1.0459	4.7951	83.281	2.328-01
10504	LEAVES	42	1	7.8159	7.8159	101.309	2.828-01
10505	STALK	42	1	3.2627	3.2627	119.342	3.328-01
10506	LEAVES	58	1	17.3440	4.7640	40.596	1.138-01
10507	STALK	58	1	17.2135	11.4735	60.884	1.148-01
10508	TASSEL	58	1	6.3140	6.3140	7.541	2.108-02
10509	LEAVES	76	1	21.9325	4.1625	61.802	1.728-01
10510	STALK	76	1	45.0153	12.6253	21.490	6.038-02
10511	TASSEL	76	1	4.1690	4.1690	33.423	1.298-02
10512	EAR	76	1	3.1113	3.1113	9.419	2.628-02
10513	SILK	76	1	0.7964	0.7964	7.432	2.078-02
10514	MUSK	76	1	9.0184	9.0184	9.749	1.608-02
10515	TASSEL	90	1	3.5447	3.5447	37.791	1.058-01
10516	STALK	90	1	23.9004	3.0608	18.093	5.038-02
10517	LEAVES	90	1	18.3118	7.4608	100.467	2.968-01
10518	MUSK	90	1	6.8319	6.8319	6.304	1.758-02
10519	SILK	90	1	0.5749	0.5749	17.912	4.988-02
10520	KERNEL	90	6	10.0705	28.4027	1.139	3.178-03
10521	COR	90	6	5.4285	8.8412	5.845	1.638-02

TABLE A-106

PLANT UPTAKE SUMMARY: CORN							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 106			
RADIOISOTOPE: SR-85 HEATED TO 1027 DEGREES C				DATE PLANTED: 145			
INITIAL SOIL ACTIVITY (D/S/GM): 372.90				DATE EMERGED: 161			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
10601	SHOOT	21	10	0.3994	3.9945	21.760	5.848-02
10602	LEAVES	34	6	2.2881	5.2485	14.144	3.798-02
10603	STALK	34	6	0.8810	5.2863	8.598	2.318-02
10604	LEAVES	42	1	10.6559	10.6559	11.809	3.178-02
10605	STALK	42	1	4.6106	4.6106	11.296	3.038-02
10606	LEAVES	58	1	37.6760	7.0260	9.660	2.648-02
10607	STALK	58	1	26.2750	9.8250	5.486	1.478-02
10608	TASSEL	58	1	8.3630	8.3630	1.612	4.328-03
10609	LEAVES	76	1	22.8601	3.9701	10.403	2.798-02
10610	STALK	76	1	43.9686	13.5386	2.077	5.578-03
10611	TASSEL	76	1	3.7879	3.7879	3.246	8.718-03
10612	EAR	76	1	6.1388	6.1388	0.920	2.478-03
10613	SILK	76	1	1.0328	1.0328	21.702	5.828-02
10614	MUSK	76	1	9.6896	9.6896	0.904	2.438-03
10615	TASSEL	90	1	3.7147	3.7147	3.805	1.028-02
10616	STALK	90	1	36.5239	10.6339	4.046	1.098-02
10617	LEAVES	90	1	23.3567	7.8267	8.369	2.248-02
10618	MUSK	90	1	12.6122	12.6122	2.483	6.668-03
10619	SILK	90	1	1.0235	1.0235	4.619	1.248-02
10620	KERNEL	90	6	14.5568	30.0190	0.150	4.028-04
10621	COR	90	6	7.8007	10.6043	0.335	8.998-04

TABLE A-107

PLANT UPTAKE SUMMARY: CORN							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 107			
RADIOISOTOPE: SR-89 HEATED TO 107.1 DEGREES C				DATE PLANTED: 122			
INITIAL SOIL ACTIVITY (D/S/GM): 372.90				DATE EMERGED: 141			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
10701	SHOOT	21	10	0.4511	4.5107	49.027	1.328-01
10702	LEAVES	34	4	1.8475	4.1748	47.244	1.118-01
10703	STALK	34	4	0.8063	4.8380	41.432	1.168-01
10704	LEAVES	42	1	10.6439	10.6439	41.800	1.268-01
10705	STALK	42	1	5.5819	5.5819	41.689	1.098-01
10706	LEAVES	58	1	18.7040	5.8540	27.087	7.268-02
10707	STALK	58	1	16.3470	9.4470	18.044	4.848-02
10708	TASSEL	58	1	4.8900	4.8900	4.322	1.168-02
10709	LEAVES	76	1	17.2213	5.8013	30.304	8.188-02
10710	STALK	76	1	26.3310	14.6210	14.879	3.998-02
10711	TASSEL	76	1	2.4165	2.4165	13.669	4.288-02
10712	EAR	76	1	7.2585	7.2585	2.924	7.048-03
10713	SILK	76	1	0.8327	0.8327	0.147	3.928-04
10714	MUSK	76	1	5.7554	5.7554	3.905	1.058-02
10715	TASSEL	90	1	2.3880	2.3880	18.132	4.868-02
10716	STALK	90	1	20.8461	11.9461	11.539	3.098-02
10717	LEAVES	90	1	5.9626	5.9626	31.112	8.368-02
10718	MUSK	90	1	16.9217	6.3817	3.722	9.988-03
10719	SILK	90	1	0.5279	0.5279	2.655	7.128-03
10720	KERNEL	90	4	7.6098	24.7587	0.785	2.108-03
10721	COR	90	4	4.7979	8.9372	2.689	7.218-03

TABLE A-108

PLANT UPTAKE SUMMARY: CORN							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 108			
RADIOISOTOPE: CS-137				DATE PLANTED: 142			
INITIAL SOIL ACTIVITY (D/S/GM): 1422.00				DATE EMERGED: 161			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
10801	SHOOT	21	10	0.3756	3.7558	41.294	2.908-02
10802	LEAVES	34	8	1.3398	10.7180	42.757	3.018-02
10803	STALK	34	8	0.5288	4.2300	41.532	2.928-02
10804	LEAVES	42	1	9.2200	9.2200	146.567	1.038-01
10805	STALK	42	1	5.5919	5.5919	113.694	8.088-02
10806	LEAVES	58	2	14.1850	4.4699	185.802	1.318-01
10807	STALK	58	2	10.7000	8.1000	94.621	4.658-02
10808	TASSEL	58	1	7.1955	7.1955	127.601	8.978-02
10809	LEAVES	76	1	15.5661	4.9161	117.648	8.278-02
10810	STALK	76	1	25.9162	8.5362	33.074	3.738-02
10811	TASSEL	76	1	2.8762	2.8762	103.937	7.318-02
10812	EAR	76	1	1.2139	1.2139	37.059	2.618-02
10813	SILK	76	1	0.7309	0.7309	58.349	4.128-02
10814	MUSK	76	1	3.1795	3.1795	41.725	2.938-02
10815	TASSEL	90	1	1.5247	1.5247	77.142	5.428-02
10816	STALK	90	1	25.6187	12.8187	47.937	3.578-02
10817	LEAVES	90	1	27.7825	6.2725	104.914	7.358-02
10818	MUSK	90	1	6.5712	6.5712	23.484	1.658-02
10819	SILK	90	1	0.4197	0.4197	73.548	5.178-02
10820	KERNEL	90	6	9.4797	22.3581	12.031	9.028-03
10821	COR	90	6	5.8174	5.0883	25.807	1.818-02

TABLE A-109

PLANT UPTAKE SUMMARY: POTATO							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 109			
RADIOISOTOPE: SR-85 HEATED TO 800 DEGREES C				DATE PLANTED: 145			
INITIAL SOIL ACTIVITY (D/S/GM): 139.70				DATE EMERGED: 173			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
10901	LEAVES	99	1	14.5853	8.9453	84.151	2.408-01
10902	STEM	99	1	34.7149	10.4940	59.449	1.558-01
10903	TUBER	99	2	20.8141	1.0581	74.937	2.148-01
10904	PEELS	99	1	13.7205	13.7205	2.826	7.868-03
10905	MEAT	99	1	61.3612	16.6612	7.977	2.228-02
10906	ROOT	99	1	3.2359	3.2359	90.220	1.408-01

TABLE A-110

PLANT UPTAKE SUMMARY: POTATO							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 110			
RADIOISOTOPE: SR-85 HEATED TO 1027 DEGREES C				DATE PLANTED: 145			
INITIAL SOIL ACTIVITY (D/S/GM): 372.90				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
11001	LEAVES	99	1	23.5689	9.4789	29.838	8.008-02
11002	STEM	99	1	44.0936	3.0036	29.954	6.968-02
11003	TUBER	99	3	27.3631	13.6493	0.757	2.028-03
11004	PEELS	99	1	10.4243	10.4243	2.885	7.748-03
11005	MEAT	99	1	48.2554	14.3354	1.027	2.758-03
11006	ROOT	99	1	3.4977	3.4977	29.231	6.778-02

TABLE A-111

PLANT UPTAKE SUMMARY: POTATO

SOIL: HANFORD SANDY CLAY LOAM					CONTAINER NUMBER: 111		
RADIONUCLIDE: SR- 89 HEATED TO 1073 DEGREES C					DATE PLANTED: 165		
INITIAL SOIL ACTIVITY (D/S/GM): 372.90					DATE EMERGED: 177		
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
11101	LEAVES	99	1	16.1970	9.3970	71.422	1.928-01
11102	STEM	99	1	26.3179	8.6779	70.984	1.898-01
11103	TUBER	99	1	24.6913	16.2600	1.488	9.328-01
11104	PEELS	99	1	27.4960	27.4960	1.646	4.418-01
11105	MEAT	99	1	24.8677	14.8277	2.966	7.968-01
11106	ROOT	99	1	5.0061	5.0061	96.924	1.978-01

TABLE A-112

PLANT UPTAKE SUMMARY: WHEAT

SOIL: HANFORD SANDY CLAY LOAM					CONTAINER NUMBER: 112		
RADIONUCLIDE: SR- 85 HEATED TO 880 DEGREES C					DATE PLANTED: 165		
INITIAL SOIL ACTIVITY (D/S/GM): 359.70					DATE EMERGED: 171		
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
11201	SHOOT	21	30	0.0417	1.3104	8.614	2.352-02
11202	SHOOT	34	30	0.2085	6.2936	32.537	9.058-02
11203	LEAVES	42	10	0.2070	2.0783	19.922	4.438-02
11204	STALK	42	10	0.3058	3.0579	9.921	1.698-02
11205	HEAD	42	10	0.1328	1.9583	2.370	7.148-03
11206	HEAD	58	10	0.4953	4.9533	2.054	9.718-03
11207	STALK	58	10	0.3732	3.7315	5.804	1.610-02
11208	LEAVES	58	10	0.1953	1.9526	16.968	4.728-02
11209	HEAD	74	10	1.2877	12.8765	4.922	1.388-02
11210	STALK	74	10	0.6179	6.1791	16.396	4.958-02
11211	LEAVES	74	10	0.2094	2.0944	5.787	1.618-02
11212	HEAD	85	10	1.1326	11.3258	2.009	5.488-03
11213	STALK	85	10	0.3159	3.1589	10.029	2.808-02
11214	LEAVES	85	10	0.1507	1.5073	23.482	6.338-02
11215	HEAD	90	282	1.0331	12.4902	1.277	4.388-03
11216	STALK	90	10	0.4941	4.9407	15.495	4.318-02
11217	LEAVES	90	10	0.1466	1.4658	24.559	6.832-02
11218	GRAIN	90	282	0.7910	20.0000	1.158	3.228-03
11219	CHAFF	90	282	0.0220	5.0000	7.309	2.038-02

TABLE A-113

PLANT UPTAKE SUMMARY: WHEAT

SOIL: HANFORD SANDY CLAY LOAM CONTAINER NUMBER: 113
 RADIONUCLIDE: SR-85 HEATED TO 1027 DEGREES C DATE PLANTED: 165
 INITIAL SOIL ACTIVITY (D/S/GM): 372.90 DATE EMERGED: 171

SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
11301	SHOOT	21	30	0.0801	1.8044	12.053	3.238-02
11302	SHOOT	34	30	0.2065	4.1947	9.231	2.408-02
11303	LEAVES	42	10	0.2038	2.0377	8.635	2.328-02
11304	STALK	42	10	0.3185	3.1894	2.937	7.888-03
11305	HEAD	42	10	0.1835	1.4350	1.440	3.868-03
11306	HEAD	58	10	0.5299	5.2985	0.949	2.558-03
11307	STALK	58	10	0.7172	7.1723	2.681	7.192-03
11308	LEAVES	58	10	0.2611	2.6112	9.301	2.498-02
11309	HEAD	74	10	1.3184	13.1845	1.325	3.358-03
11310	STALK	74	10	0.6151	4.1508	4.985	1.348-02
11311	LEAVES	74	10	0.2329	2.3294	4.934	1.328-02
11312	HEAD	85	10	1.4496	14.4958	0.996	2.678-03
11313	STALK	85	10	0.6005	6.0053	6.076	1.638-02
11314	LEAVES	85	10	0.1634	1.6343	9.796	2.638-02
11315	HEAD	90	248	1.0887	10.8152	1.326	3.368-03
11316	STALK	90	10	0.4421	4.4213	9.743	2.618-02
11317	LEAVES	90	10	0.1516	1.5137	3.896	1.048-02
11318	GRAIN	90	238	0.8628	20.0000	0.957	2.578-03
11319	CHAFF	90	238	0.0472	5.0000	2.001	5.378-03

TABLE A-114

PLANT UPTAKE SUMMARY: WHEAT

SOIL: HANFORD SANDY CLAY LOAM CONTAINER NUMBER: 114
 RADIONUCLIDE: SR-85 HEATED TO 1071 DEGREES C DATE PLANTED: 165
 INITIAL SOIL ACTIVITY (D/S/GM): 372.90 DATE EMERGED: 171

SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
11401	SHOOT	21	30	0.0521	1.5619	19.695	5.288-02
11402	SHOOT	34	30	0.2277	6.8719	18.661	5.008-02
11403	LEAVES	42	10	0.2178	2.1762	21.202	9.698-02
11404	STALK	42	10	0.3386	3.3861	6.636	1.788-02
11405	HEAD	42	10	0.1856	1.8561	3.231	8.668-03
11406	HEAD	58	10	0.4830	4.8295	2.698	7.238-03
11407	STALK	58	10	0.7040	7.0403	6.712	1.808-02
11408	LEAVES	58	10	0.2376	2.3760	20.830	5.592-02
11409	HEAD	74	10	1.4532	14.5317	2.871	7.705-03
11410	STALK	74	10	0.7237	7.2369	9.794	2.634-02
11411	LEAVES	74	10	0.2492	2.4917	6.633	1.788-02
11412	HEAD	85	10	1.4431	14.4309	1.196	3.218-03
11413	STALK	85	10	0.5440	5.4598	18.357	4.928-02
11414	LEAVES	85	10	0.1868	1.8675	26.000	6.978-02
11415	HEAD	90	281	1.1812	14.3828	1.736	4.652-03
11416	STALK	90	10	0.5286	5.2855	15.997	4.298-02
11417	LEAVES	90	10	0.1662	1.6620	32.807	8.802-02
11418	GRAIN	90	241	0.9198	20.0000	0.883	2.378-03
11419	CHAFF	90	241	0.0605	5.0000	5.272	1.416-02

TABLE A-115

PLANT UPTAKE SUMMARY: WHEAT

SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 115			
RADIONUCLIDE: C5-137				DATE PLANTED: 165			
INITIAL SOIL ACTIVITY (D/S/GM): 1622.00				DATE EMERGED: 171			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
11501	SHOOT	21	30	0.0516	1.5493	48.279	3.488-02
11502	SHOOT	29	40	0.0946	3.8693	21.452	1.518-02
11503	SEL	42	10	0.6127	4.1273	37.348	2.678-02
11504	HEAD	42	10	0.2036	2.0361	36.118	2.548-02
11505	HEAD	50	10	0.3882	3.8823	22.830	1.618-02
11506	STALK	58	10	0.6856	6.8557	18.611	1.178-02
11507	LEAVES	58	10	0.2869	2.8693	63.008	4.438-02
11508	HEAD	76	10	1.4938	14.9376	8.400	5.918-03
11509	HEAD	76	10	0.8963	8.9626	18.244	7.208-02
11510	LEAVES	76	10	0.2872	2.8722	38.342	2.708-02
11511	HEAD	85	10	1.6340	16.3397	9.961	4.198-03
11512	STALK	85	10	0.6025	6.0254	11.986	8.378-03
11513	LEAVES	85	10	0.1676	1.6763	27.233	1.928-02
11514	HEAD	90	300	1.3624	18.7353	7.765	5.468-03
11515	STALK	90	10	0.8020	8.0297	14.755	1.048-02
11516	LEAVES	90	10	0.1794	1.7938	32.786	2.318-02
11517	GRAIN	90	290	1.0419	20.0000	8.304	2.848-03
11518	CHAFF	90	290	0.0386	5.0000	14.130	9.948-03

TABLE A-116

PLANT UPTAKE SUMMARY: TOMATO

SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 116			
RADIONUCLIDE: SR-85 HEATED TO 800 DEGREES C				DATE PLANTED: 165			
INITIAL SOIL ACTIVITY (D/S/GM): 359.70				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
11601	SHOOT	29	10	0.1948	1.9480	103.024	2.878-01
11602	LEAVES	42	10	0.9495	9.4949	91.488	2.548-01
11603	STEM	42	10	0.3566	3.5652	68.188	1.908-01
11604	LEAVES	58	2	5.3778	10.7555	68.202	1.908-01
11605	STEM	58	2	3.4887	6.8174	45.834	1.278-01
11606	LEAVES	70	1	10.1545	10.1545	69.930	1.948-01
11607	STEM	70	1	9.8265	9.8265	32.012	8.908-02
11608	FLOWER	70	1	2.7077	2.7077	3.824	1.068-02
11609	LEAVES	121	1	18.3127	3.4927	100.464	2.808-01
11610	STEM	121	1	22.3176	4.6276	32.091	8.928-02
11611	PEELS	121	1	8.7711	1.2911	12.079	3.368-02
11612	MEAT	121	1	50.8800	7.6800	3.449	9.598-03
11613	FRUIT	121	3	59.3900	26.7500	4.331	1.218-02
11614	ROOT	121	1	3.8803	3.8803	49.924	1.398-01

TABLE A-117

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 117			
RADIOISOTOPE: SR- 85 HEATED TO 1027 DEGREES C				DATE PLANTED: 165			
INITIAL SOIL ACTIVITY (D/S/GM): 372.90				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
11701	SHOOT	29	10	0.1362	1.5620	78.260	2.108-01
11702	LEAVES	42	3	0.4700	1.4101	60.433	1.628-01
11703	STEM	42	3	0.2090	0.6119	47.931	1.298-01
11704	LEAVES	58	3	4.9918	13.7755	46.974	1.268-01
11705	STEM	58	3	2.4402	7.3205	37.665	1.018-01
11706	LEAVES	70	1	11.6750	11.6750	28.499	7.708-02
11707	STEM	70	1	9.9999	9.9999	19.280	5.178-02
11708	FLOWER	70	1	0.1976	0.1976	11.358	3.058-02
11709	LEAVES	121	1	13.7271	3.9171	74.117	1.998-01
11710	STEM	121	1	24.6592	3.9592	40.099	1.068-01
11711	PEELS	121	1	13.7507	1.1307	3.096	8.308-03
11712	MEAT	121	1	77.3406	5.8206	1.828	4.908-03
11713	FRUIT	121	1	272.1100	19.7000	1.389	3.728-03
11714	ROOT	121	1	4.3133	4.3133	18.082	4.858-02

TABLE A-118

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 118			
RADIOISOTOPE: SR- 85 HEATED TO 1071 DEGREES C				DATE PLANTED: 165			
INITIAL SOIL ACTIVITY (D/S/GM): 372.90				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
11801	SHOOT	29	10	0.1689	1.6890	129.075	3.468-01
11802	LEAVES	42	3	0.4942	1.4825	119.276	3.208-01
11803	STEM	42	3	0.1819	0.5457	115.697	3.108-01
11804	LEAVES	58	2	8.1550	16.3100	71.111	1.918-01
11805	STEM	58	2	5.5268	11.0455	57.593	1.548-01
11806	LEAVES	70	1	8.2239	8.2239	74.487	2.008-01
11807	STEM	70	1	7.5239	7.5239	37.448	1.008-01
11808	FLOWER	70	1	0.2659	0.2659	6.122	1.648-02
11809	LEAVES	121	1	26.8705	3.0905	46.774	1.228-01
11810	STEM	121	1	38.9324	2.5324	22.399	6.018-02
11811	PEELS	121	1	9.4365	1.5765	6.228	1.478-02
11812	MEAT	121	1	54.6400	10.1100	0.546	1.468-03
11813	FRUIT	121	3	59.7567	22.1000	6.042	1.628-02
11814	ROOT	121	1	1.1824	1.1824	38.877	1.048-01

TABLE A-119

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: CAMP PARKS CLAY				CONTAINER NUMBER: 119			
RADIOISOTOPE: SR- 85				DATE PLANTED: 170			
INITIAL SOIL ACTIVITY (D/S/GM): 300.50				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
11901	SHOOT	24	10	0.0921	0.9203	667.323	2.228+00
11902	SHOOT	37	10	0.2602	2.6022	415.219	1.388+00
11903	HEAD	53	10	0.2474	2.4737	63.726	2.128-01
11904	STALK	53	10	0.3919	3.9195	191.094	6.368-01
11905	LEAVES	53	10	0.1624	1.6239	723.041	2.518+00
11906	HEAD	71	10	0.9449	9.4489	31.829	1.048-01
11907	STALK	71	10	0.6951	6.9510	153.454	5.118-01
11908	LEAVES	71	10	0.3447	3.4470	441.191	1.478+00
11909	HEAD	80	10	1.0077	10.0767	78.267	1.278-01
11910	STALK	80	10	0.4540	4.5400	241.419	8.038-01
11911	LEAVES	80	10	0.2098	2.0982	581.383	1.938+00
11912	HEAD	94	10	1.2758	12.7580	32.107	1.078-01
11913	STALK	94	10	0.5020	5.0188	252.445	8.418-01
11914	LEAVES	94	10	0.2573	2.5732	599.958	2.008+00
11915	HEAD	107	220	0.8048	17.6929	30.334	1.018-01
11916	STALK	107	10	0.4765	4.7652	390.353	1.308+00
11917	LEAVES	107	10	0.1101	1.1006	523.710	1.748+00
11918	GRAIN	107	220	0.4200	20.0000	22.721	7.948-02
11919	CHAFF	107	220	0.0227	5.0000	104.887	3.498-01

TABLE A-120

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: CAMP PARKS CLAY				CONTAINER NUMBER: 120			
RADIOISOTOPE: SR- 85				DATE PLANTED: 170			
INITIAL SOIL ACTIVITY (D/S/GM): 300.50				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
12001	SHOOT	24	20	0.0394	0.7880	670.580	2.238+00
12002	SHOOT	37	10	0.1361	1.3610	435.138	1.458+00
12003	HEAD	53	10	0.1506	1.5056	62.180	2.078-01
12004	STALK	53	10	0.2543	2.5425	220.432	7.948-01
12005	LEAVES	53	10	0.1671	1.6707	703.031	2.348+00
12006	HEAD	71	10	0.4360	4.3601	42.918	1.438-01
12007	STALK	71	10	0.5397	5.3974	154.070	5.138-01
12008	LEAVES	71	10	0.2821	2.8214	479.197	1.598+00
12009	HEAD	80	10	0.6781	6.7807	88.203	2.948-01
12010	STALK	80	10	0.4638	4.6375	228.258	7.608-01
12011	LEAVES	80	10	0.2163	2.1631	326.646	1.758+00
12012	HEAD	94	10	1.0991	10.9907	40.324	1.348-01
12013	STALK	94	10	0.4176	4.1761	255.698	8.518-01
12014	LEAVES	94	10	0.2644	2.6641	584.757	1.958+00
12015	HEAD	107	185	0.4277	11.4173	34.131	1.148-01
12016	STALK	107	10	0.4252	4.2516	384.602	1.288+00
12017	LEAVES	107	10	0.1482	1.4823	547.430	1.828+00
12018	GRAIN	107	175	0.4662	20.0000	24.790	8.258-02
12019	CHAFF	107	175	0.0286	5.0000	123.232	4.108-01

TABLE A-201

PLANT UPTAKE SUMMARY: WHEAT

SOIL: CAMP PARKS CLAY					CONTAINER NUMBER: 201		
RADIOISOTOPE: SR-92					DATE PLANTED: 170		
INITIAL SOIL ACTIVITY (D/S/GM): 180.80					DATE EMERGED: 177		
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
20101	SHOOT	24	20	0.8627	1.2548	186.732	1.028E-00
20102	SHOOT	37	30	0.0747	2.2996	99.781	5.528E-01
20103	HEAD	53	10	0.2666	2.6633	10.171	5.612E-02
20104	STALK	53	10	0.3727	3.7270	26.447	1.468E-01
20105	LEAVES	53	10	0.2325	2.3250	91.377	5.852E-01
20106	HEAD	71	10	0.4235	4.2350	15.184	8.408E-02
20107	STALK	71	10	0.7883	7.8833	28.220	1.568E-01
20108	LEAVES	71	10	0.3440	3.4399	71.001	3.938E-01
20109	HEAD	80	11	0.6845	7.3300	8.223	4.532E-02
20110	STALK	80	11	0.7520	8.2725	35.845	1.948E-01
20111	LEAVES	80	11	0.3860	3.3679	64.396	3.572E-01
20112	HEAD	94	10	1.1834	11.8740	10.437	5.778E-02
20113	STALK	94	10	0.8564	8.6438	56.873	3.102E-01
20114	LEAVES	94	10	0.2798	2.7984	96.996	5.368E-01
20115	HEAD	107	66	1.0615	9.2682	18.270	3.682E-02
20116	STALK	107	10	0.5619	5.6186	69.390	3.618E-01
20117	LEAVES	107	10	0.1563	1.5633	66.866	3.702E-01
20118	HEAD	107	81	1.0728	12.2101	7.406	4.108E-02
20119	STALK	107	10	0.4666	4.6655	23.585	1.307E-01
20120	LEAVES	107	10	0.1219	1.2194	217.920	1.208E+00
20121	GRAIN	118	127	0.9212	20.0000	6.400	3.548E-02
20122	CHAFF	118	127	0.0394	5.0000	19.265	1.078E-01
20123	Grain	2nd crop			20.000	4.200	2.32E-02

TABLE A-202

PLANT UPTAKE SUMMARY: WHEAT

SOIL: CAMP PARKS CLAY					CONTAINER NUMBER: 202		
RADIOISOTOPE: SR-92					DATE PLANTED: 170		
INITIAL SOIL ACTIVITY (D/S/GM): 180.80					DATE EMERGED: 177		
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
20201	SHOOT	24	30	0.0948	2.8360	123.675	6.848E-01
20202	SHOOT	37	30	0.0976	2.9274	102.980	5.708E-01
20203	HEAD	53	10	0.2536	2.5300	12.394	6.868E-02
20204	STALK	53	10	0.4061	4.0615	29.134	1.618E-01
20205	LEAVES	53	10	0.1752	1.7515	88.069	4.768E-01
20206	HEAD	71	10	0.5404	5.4038	8.122	4.498E-02
20207	STALK	71	10	0.7935	7.9347	21.952	1.218E-01
20208	LEAVES	71	10	0.3107	3.1066	56.907	3.158E-01
20209	HEAD	80	10	0.5937	5.9266	8.750	4.848E-02
20210	STALK	80	10	0.5870	5.8698	34.558	1.918E-01
20211	LEAVES	80	10	0.1915	1.9120	71.084	3.938E-01
20212	HEAD	94	10	0.9431	9.6386	7.385	4.088E-02
20213	STALK	94	10	0.6153	6.1527	64.891	3.588E-01
20214	LEAVES	94	10	0.2161	2.1609	97.833	5.418E-01
20215	HEAD	107	95	1.0513	9.2105	16.166	3.628E-02
20216	STALK	107	10	0.3640	3.6402	58.992	3.268E-01
20217	LEAVES	107	10	0.1187	1.1871	82.613	4.578E-01
20218	HEAD	107	80	1.0626	11.2307	9.562	5.298E-02
20219	STALK	107	10	0.3560	3.9601	59.237	3.298E-01
20220	LEAVES	107	10	0.1687	1.6867	88.285	4.888E-01
20221	GRAIN	118	140	0.9213	20.0000	5.823	3.248E-02
20222	CHAFF	118	140	0.0357	5.0000	22.902	1.278E-01

TABLE A-203

PLANT UPTAKE SUMMARY: WHEAT							
SCILL: CAMP PARKS CLAY				CONTAINER NUMBER: 203			
RADIONUCLIDE: SR- 85				DATE PLANTED: 170			
INITIAL SOIL ACTIVITY (D/S/GM): 180.80				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
20301	SHOOT	24	30	0.0774	2.3220	162.084	8.988-01
20302	SHOOT	37	30	0.1104	3.3134	60.017	3.788-01
20303	HEAD	53	10	0.2287	2.3870	14.995	8.278-02
20304	STALK	53	10	0.4483	4.4833	24.799	1.378-01
20305	LEAVES	53	10	0.1955	1.9550	102.032	3.458-01
20306	HEAD	71	10	0.4124	4.1242	11.027	6.108-02
20307	STALK	71	10	0.4810	4.8096	26.374	1.478-01
20308	LEAVES	71	10	0.2984	2.9842	73.325	4.068-01
20309	HEAD	80	10	0.9020	9.0199	6.395	3.458-02
20310	STALK	80	10	0.7890	7.8897	20.717	1.908-01
20311	LEAVES	80	10	0.2291	2.2907	61.181	3.388-01
20312	HEAD	94	10	1.3070	11.0704	4.862	3.398-02
20313	STALK	94	10	0.5879	5.8788	50.009	2.778-01
20314	LEAVES	94	10	0.2042	2.0423	79.579	4.188-01
20315	HEAD	107	83	1.0378	11.2564	9.849	3.468-02
20316	STALK	107	10	0.9099	9.0588	68.577	3.798-01
20317	LEAVES	107	10	0.1800	1.4996	104.278	3.778-01
20318	HEAD	107	89	1.0493	11.8847	4.303	2.388-02
20319	STALK	107	10	0.5199	5.1986	11.778	6.518-02
20320	LEAVES	107	10	0.1404	1.4043	16.893	9.348-02
20321	GRAIN	107	143	0.2897	20.0000	9.223	3.038-02
20322	CHAFF	107	145	0.0349	9.0000	13.498	7.988-02

TABLE A-204

PLANT UPTAKE SUMMARY: WHEAT							
SCILL: CAMP PARKS CLAY				CONTAINER NUMBER: 204			
RADIONUCLIDE: SR- 85				DATE PLANTED: 170			
INITIAL SOIL ACTIVITY (D/S/GM): 180.80				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
20401	SHOOT	24	30	0.1091	3.2749	123.351	8.828-01
20402	SHOOT	37	30	0.0936	2.8041	92.212	9.108-01
20403	HEAD	53	10	0.2176	2.1739	18.240	1.818-01
20404	STALK	53	10	0.4097	4.0970	28.225	1.968-01
20405	LEAVES	53	10	0.1885	1.8825	92.672	3.138-01
20406	HEAD	71	10	0.3948	3.9482	11.387	6.958-02
20407	STALK	71	10	0.5389	5.3892	28.018	1.528-01
20408	LEAVES	71	10	0.2936	2.9362	80.508	4.498-01
20409	HEAD	80	11	0.7137	8.3132	9.329	3.168-02
20410	STALK	80	11	0.8415	9.2970	38.257	2.128-01
20411	LEAVES	80	11	0.2865	3.1211	96.678	3.228-01
20412	HEAD	94	10	1.1161	11.1687	8.944	4.958-02
20413	STALK	94	10	0.5828	5.8279	59.391	3.288-01
20414	LEAVES	94	10	0.2004	2.0045	95.035	9.308-01
20415	HEAD	107	85	1.0225	8.1803	11.677	6.468-02
20416	STALK	107	10	0.6970	6.9701	50.322	2.788-01
20417	LEAVES	107	10	0.1872	1.8725	79.634	4.428-01
20418	HEAD	107	79	1.0620	12.3857	8.674	4.918-02
20419	STALK	107	10	0.4878	4.0778	69.720	3.868-01
20420	LEAVES	107	10	0.1252	1.2516	97.087	5.378-01
20421	GRAIN	107	139	0.9304	20.0000	9.444	3.028-02
20422	CHAFF	107	139	0.0360	9.0000	17.673	4.778-02

TABLE A-209

PLANT UPTAKE SUMMARY: CORN							
SOIL: CAMP PARKS (LAY				CONTAINER NUMBER: 209			
RADIOISOTOPE: SR- 85				DATE PLANTED: 170			
INITIAL SOIL ACTIVITY (D/S/GM): 180.80				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
20501	SHOOT	24	10	0.2929	2.9290	291.941	1.618+00
20502	LEAVES	37	7	1.3743	9.6200	194.286	0.938-01
20503	STALK	37	7	0.4537	3.1756	121.089	6.492-01
20504	LEAVES	53	2	13.2630	4.9240	194.386	0.948-01
20505	STALK	53	2	6.3225	7.3930	129.688	7.172-01
20506	TASSEL	71	1	7.5225	1.5225	26.543	1.478-01
20507	STALK	71	1	0.000000	5.3325	143.743	8.282-01
20508	LEAVES	71	1	17.8457	10.1757	47.004	2.638-01
20509	TASSEL	80	1	2.9656	2.9656	33.334	1.842-01
20510	STALK	80	1	31.0096	7.8096	23.032	1.328-01
20511	LEAVES	80	1	21.0704	5.3004	114.713	6.352-01
20512	EAR	80	1	4.6559	6.6559	13.996	7.742-02
20513	SILK	80	1	1.7790	1.7790	10.670	5.902-02
20514	MUSK	80	1	18.1184	7.1084	7.688	4.252-02
20515	TASSEL	94	1	3.8350	3.8350	51.989	2.872-01
20516	STALK	94	1	32.9305	5.9105	25.244	1.408-01
20517	LEAVES	94	1	23.7173	4.9273	178.361	9.302-01
20518	SILK	94	1	1.1925	1.1925	9.793	5.398-02
20519	MUSK	94	1	21.4453	21.4453	8.380	4.662-02
20520	KERNEL	94	1	18.3357	18.3357	2.102	1.162-02
20521	COR	94	1	21.0298	11.4598	7.270	4.022-02
20522	TASSEL	107	1	2.2052	2.2052	42.313	2.348-01
20523	STALK	107	1	31.9150	10.4150	33.239	1.842-01
20524	LEAVES	107	1	46.2236	3.4136	197.571	1.098+00
20525	SILK	107	1	0.4423	0.4423	20.254	1.152-01
20526	MUSK	107	1	11.6478	11.6478	7.759	4.292-02
20527	KERNEL	107	1	24.5712	24.5712	1.213	6.712-03
20528	COR	107	1	13.2312	13.2312	5.424	3.002-02

TABLE A-301

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 301			
RADIOISOTOPE: SR- 85				DATE PLANTED: 179			
INITIAL SOIL ACTIVITY (D/S/GM): 115.10				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
30101	SHOOT	22	20	0.0787	1.5736	722.603	6.288+00
30102	SHOOT	36	12	0.1798	2.1573	682.897	5.938+00
30103	LEAVES	49	10	0.0452	0.4518	749.712	6.512+00
30104	STALK	49	10	0.1323	1.3230	228.523	1.998+00
30105	HEAD	49	10	0.0685	0.6820	182.189	1.582+00
30106	HEAD	65	10	0.1188	1.1875	135.412	1.188+00
30107	STALK	65	10	0.0829	0.8286	311.282	2.702+00
30108	LEAVES	65	10	0.0340	0.3397	593.688	4.818+00
30109	HEAD	78	10	0.1386	1.3856	214.202	1.862+00
30110	STALK	78	10	0.0591	0.5909	788.093	6.852+00
30111	LEAVES	78	10	0.0256	0.2585	897.624	7.802+00
30112	HEAD	94	107	0.0651	6.9643	182.837	1.598+00
30113	STALK	94	10	0.0345	0.3444	587.187	4.232+00
30114	LEAVES	94	10	0.0385	0.1852	615.225	5.352+00
30115	HEAD	94	85	0.0463	2.4664	211.837	1.842+00
30116	STALK	94	10	0.0639	0.6389	709.370	6.132+00
30117	LEAVES	94	10	0.0192	0.1921	1049.661	9.092+00
30118	GRAIN	94			20.0000	88.322	7.672-01
30119	GRAIN				20.000	32.24	2.810-01

TABLE A-302

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 302			
RADIONUCLIDE: SR-85				DATE PLANTED: 179			
INITIAL SOIL ACTIVITY (D/S/GM): 115.10				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
30201	SHOOT	22	30	0.1030	3.0913	757.753	6.588+00
30202	SHOOT	36	18	0.1195	2.1506	636.877	7.278+00
30203	LEAVES	49	10	0.0399	0.3983	321.648	2.792+00
30204	STALK	49	10	0.0987	0.9871	131.388	1.148+00
30205	HEAD	49	10	0.0849	0.8492	81.080	7.042-01
30206	HEAD	65	10	0.1442	1.4424	96.134	8.358-01
30207	STALK	65	10	0.0771	0.7707	422.416	3.678+00
30208	LEAVES	65	10	0.0324	0.3241	573.891	4.992+00
30209	HEAD	78	10	0.1634	1.6342	160.952	1.408+00
30210	STALK	78	10	0.0836	0.8364	457.759	5.718+00
30211	LEAVES	78	10	0.0264	0.2642	911.110	7.928+00
30212	HEAD	99	92	0.1070	5.5616	150.945	1.318+00
30213	STALK	99	10	0.0623	0.6226	560.191	4.878+00
30214	LEAVES	99	10	0.0147	0.1472	824.200	7.168+00
30215	HEAD	99	88	0.0894	7.8887	204.104	1.792+00
30216	STALK	99	10	0.0602	0.6017	936.734	8.148+00
30217	LEAVES	99	10	0.0183	0.1829	957.280	8.328+00
30218	GRAIN	99	1	20.0000	20.0000	101.316	8.808-01

TABLE A-303

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 303			
RADIONUCLIDE: SR-85				DATE PLANTED: 179			
INITIAL SOIL ACTIVITY (D/S/GM): 115.10				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
30301	SHOOT	22	10	0.1011	1.0110	568.626	4.948+00
30302	SHOOT	36	20	0.1050	2.1002	259.766	2.248+00
30303	LEAVES	49	10	0.0459	0.4585	389.516	3.388+00
30304	STALK	49	10	0.1290	1.2895	139.898	1.228+00
30305	HEAD	49	10	0.0662	0.6625	114.999	9.998-01
30306	HEAD	65	10	0.1812	1.8118	117.709	1.028+00
30307	STALK	65	10	0.1272	1.2722	301.946	2.628+00
30308	LEAVES	65	10	0.0470	0.4699	574.093	4.992+00
30309	HEAD	78	10	0.1484	1.4045	99.565	8.658-01
30310	STALK	78	10	0.0674	0.6744	242.251	2.108+00
30311	LEAVES	78	10	0.0210	0.2100	422.625	3.678+00
30312	HEAD	99	84	0.1136	9.5413	104.410	9.078-01
30313	STALK	99	10	0.0677	0.6769	393.402	3.428+00
30314	LEAVES	99	10	0.0154	0.1545	641.712	5.588+00
30315	HEAD	99	109	0.0722	7.8711	112.423	1.008+00
30316	STALK	99	10	0.0466	0.6659	404.612	3.528+00
30317	LEAVES	99	10	0.0155	0.1555	1132.588	9.878+00
30318	GRAIN	99			20.0000	61.297	5.338-01
30319	GRAIN	2nd Crop			20.0000	46.831	4.07-01

TABLE A-304

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 303			
RADIONUCLIDE: SR- 85				DATE PLANTED: 179			
INITIAL SOIL ACTIVITY (D/S/GM): 119.10				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
30401	SHOOT	22	20	0.0778	1.3565	405.669	5.268+00
30402	SHOOT	36	20	0.1297	2.5949	334.427	2.918+00
30403	LEAVES	49	10	0.0437	0.4370	353.265	3.078+00
30404	STALK	49	10	0.1196	1.1961	134.881	1.178+00
30405	HEAD	49	10	0.0611	0.6105	106.993	9.308-01
30406	HEAD	65	10	0.1461	1.4609	109.162	9.488-01
30407	STALK	65	10	0.1000	0.9997	295.141	2.568+00
30408	LEAVES	65	10	0.0493	0.4935	416.729	5.368+00
30409	HEAD	78	10	0.1603	1.6031	93.035	8.088-01
30410	STALK	78	10	0.0842	0.8423	271.401	2.368+00
30411	LEAVES	78	10	0.0277	0.2772	562.018	4.888+00
30412	HEAD	99	93	0.0974	9.0619	114.428	9.948-01
30413	STALK	99	10	0.0958	0.9577	269.931	2.338+00
30414	LEAVES	99	10	0.0253	0.2530	405.102	3.528+00
30415	HEAD	99	73	0.1266	9.2247	126.566	1.168+00
30416	STALK	99	10	0.1022	1.0218	319.404	2.728+00
30417	LEAVES	99	10	0.0172	0.1719	656.926	5.718+00
30418	GRAIN	99	1	20.8000	20.0000	61.276	5.328-01

TABLE A-306

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 306			
RADIONUCLIDE: SR- 85				DATE PLANTED: 179			
INITIAL SOIL ACTIVITY (D/S/GM): 119.10				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
30601	LEAVES	22	2	0.9819	1.9619	4229.303	3.678+01
30602	STEM	22	2	0.3581	0.7162	3358.044	2.928+01
30603	LEAVES	36	1	4.5107	6.5307	3350.829	2.918+01
30604	STEM	36	1	5.6881	5.6881	1996.834	1.748+01
30605	LEAVES	49	1	12.5510	12.5510	2468.204	2.148+01
30606	STEM	49	1	16.6678	16.6678	1336.028	1.168+01
30607	FLOWER	49	1	0.3289	0.3289	711.097	6.188+00
30608	LEAVES	65	1	19.5037	19.5037	2144.363	1.868+01
30609	STEM	65	1	22.1373	7.8673	1374.929	1.198+01
30610	FLOWER	65	1	0.4866	0.4866	723.575	6.298+00
30611	LEAVES	78	1	18.1392	18.1392	979.524	8.518+00
30612	STEM	78	1	27.2077	10.1077	682.544	5.938+00
30613	FLOWER	78	1	0.3253	0.3253	398.651	3.468+00
30614	LEAVES	99	1	20.2253	9.1453	1372.589	1.198+01
30615	STEM	99	1	33.8470	9.1370	584.866	5.088+00
30616	FRUIT	99	1	4.1929	4.1929	49.670	4.328-01
30617	PEELS	112	1	0.6964	0.6964	16.182	1.418-01
30618	MEAT	112	1	2.8000	2.8000	46.266	4.028-01
30619	FRUIT	112	1	3.6100	3.6100	62.556	3.708-01
30620	FRUIT	112	1	3.4400	3.4400	28.336	2.468-01
30621	FRUIT	112	1	3.1700	3.1700	29.036	2.528-01
30622	FRUIT	112	1	4.8400	4.8400	26.864	2.338-01
30623	FRUIT	112	1	3.0200	3.0200	30.271	2.638-01

TABLE A-307

PLANT UPTAKE SUMMARY: TCHATO							
SCIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 307			
RADIOISOTOPE: SR- 89				DATE PLANTED: 179			
INITIAL SOIL ACTIVITY (D/S/GM): 118.10				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
30701	LEAVES	22	2	1.9023	3.8045	4097.801	3.368+01
30702	STEM	22	2	0.7065	1.4129	3026.202	2.638+01
30703	LEAVES	36	1	8.0548	6.0958	3377.500	2.918+01
30704	STEM	36	1	5.1196	5.1196	2243.740	1.958+01
30705	LEAVES	49	1	17.6770	17.6770	1059.138	2.668+01
30706	STEM	49	1	15.3340	15.3340	1900.925	1.658+01
30707	FLOWER	49	1	0.5080	0.5080	651.176	5.498+00
30708	LEAVES	65	1	11.8169	11.8169	1904.864	1.658+01
30709	STEM	65	1	17.8473	17.8473	1206.262	1.058+01
30710	FLOWER	65	1	0.2085	0.2085	461.590	4.028+00
30711	LEAVES	78	1	14.7773	14.7773	280.831	2.448+00
30712	STEM	78	1	18.3263	8.3163	215.994	1.888+00
30713	FLOWER	78	1	0.8001	0.8001	18.880	7.768+01
30714	LEAVES	99	1	14.5791	4.2791	1103.140	1.038+01
30715	STEM	99	1	22.3851	6.1651	555.892	5.188+00
30716	FRUIT	99	1	4.5638	4.5638	67.143	5.638+01
30717	PEELS	112	1	0.9898	0.9898	35.281	3.418+01
30718	MEAT	112	1	2.9100	2.9100	57.930	5.038+01
30719	FRUIT	112	1	3.7500	3.7500	52.024	4.528+01
30720	FRUIT	112	1	4.7300	4.7300	33.665	2.928+01
30721	FRUIT	112	1	5.5200	5.5200	27.683	3.018+01
30722	FRUIT	112	1	3.3100	3.3100	47.366	4.128+01
30723	FRUIT	112	1	7.7100	7.7100	52.236	4.528+01

TABLE A-308

PLANT UPTAKE SUMMARY: TCHATO							
SCIL: HANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 308			
RADIOISOTOPE: SR- 89				DATE PLANTED: 179			
INITIAL SOIL ACTIVITY (D/S/GM): 115.10				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
30801	LEAVES	22	2	1.1957	2.3914	4215.356	3.868+01
30802	STEM	22	2	0.4554	0.8708	3250.085	2.828+01
30803	LEAVES	36	1	6.9510	6.9510	3212.732	2.728+01
30804	STEM	36	1	5.0612	5.0612	1843.126	1.608+01
30805	LEAVES	49	1	12.8707	12.8707	3194.921	2.788+01
30806	STEM	49	1	18.9255	18.9255	1704.054	1.488+01
30807	FLOWER	49	1	0.2957	0.2957	868.967	7.328+00
30808	LEAVES	65	1	12.8788	12.8788	1595.577	1.398+01
30809	STEM	65	1	21.5977	21.5977	1339.259	1.108+01
30810	FLOWER	65	1	1.1126	1.1126	289.406	2.918+00
30811	LEAVES	78	1	18.3470	6.8070	2168.879	1.888+01
30812	STEM	78	1	36.0473	5.3473	1344.823	1.178+01
30813	FLOWER	78	1	1.0013	1.0013	1136.927	9.888+00
30814	LEAVES	99	1	7.5691	7.5691	1657.290	1.448+01
30815	STEM	99	1	22.8331	7.1731	1266.928	1.108+01
30816	SHOOT	99	1	4.1028	4.1028	20.998	1.828+01
30817	PEELS	112	1	0.7982	0.7982	81.914	5.288+01
30818	MEAT	112	1	2.9100	2.9100	38.491	3.348+01
30819	FRUIT	112	1	3.7800	3.7800	63.968	5.568+01
30820	FRUIT	112	1	4.6100	4.6100	47.854	4.148+01
30821	FRUIT	112	1	1.8990	1.8990	100.344	8.728+01
30822	FRUIT	112	1	4.7900	4.7900	26.156	2.278+01
30823	FRUIT	112	1	5.3600	5.3600	59.551	5.178+01

TABLE A-310

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: MANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 310			
RADIOISOTOPE: SR- 82				DATE PLANTED: 179			
INITIAL SOIL ACTIVITY (D/S/GM): 84.70				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
31001	SHOOT	22	17	0.2278	3.8728	443.280	5.238+00
31002	SHOOT	34	19	0.1384	2.4309	289.900	3.428+00
31003	STALK	49	10	0.0496	0.4960	294.362	3.488+00
31004	LEAVES	49	10	0.1208	1.2080	113.082	1.348+00
31005	HEAD	49	10	0.0734	0.7337	78.856	9.318-01
31006	HEAD	65	10	0.1152	1.1524	84.784	1.008+00
31007	STALK	65	10	0.1044	1.0437	186.704	2.208+00
31008	LEAVES	65	10	0.0872	0.3717	398.795	4.718+00
31009	HEAD	78	10	0.1489	1.4890	79.275	9.368-01
31010	STALK	78	10	0.0743	0.7433	232.376	2.748+00
31011	LEAVES	78	10	0.0310	0.3101	435.503	5.148+00
31012	HEAD	99	95	0.0942	8.9448	105.162	1.248+00
31013	STALK	99	10	0.0826	0.9259	142.071	1.688+00
31014	LEAVES	99	10	0.0201	0.2010	289.638	3.428+00
31015	HEAD	99	89	0.1235	11.1687	68.726	8.118-01
31016	STALK	99	10	0.0776	0.7762	318.057	3.768+00
31017	LEAVES	99	10	0.0270	0.2703	443.535	5.248+00
31018	GRAIN	99			20.0000	49.670	5.398-01

TABLE A-311

PLANT UPTAKE SUMMARY: WHEAT							
SOIL: MANFORD SANDY CLAY LOAM				CONTAINER NUMBER: 311			
RADIOISOTOPE: SR- 82				DATE PLANTED: 179			
INITIAL SOIL ACTIVITY (D/S/GM): 84.70				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
31101	SHOOT	22	40	0.0401	1.6030	499.845	5.908+00
31102	SHOOT	34	18	0.1179	2.1150	256.299	3.038+00
31103	STALK	49	10	0.0449	0.4490	266.181	3.148+00
31104	LEAVES	49	10	0.1168	1.1685	113.381	1.348+00
31105	HEAD	49	10	0.0760	0.7604	74.225	8.768-01
31106	HEAD	65	10	0.1320	1.3199	71.510	8.448-01
31107	STALK	65	10	0.1050	1.0497	181.523	2.148+00
31108	LEAVES	65	10	0.0435	0.4348	408.025	4.828+00
31109	HEAD	78	10	0.1394	1.3942	77.396	9.148-01
31110	STALK	78	10	0.0608	0.6077	205.364	2.428+00
31111	LEAVES	78	10	0.0219	0.2186	397.966	4.708+00
31112	HEAD	99	103	0.0978	10.0700	69.167	8.178-01
31113	STALK	99	10	0.0641	0.6408	256.438	3.038+00
31114	LEAVES	99	10	0.0309	0.3086	279.747	3.308+00
31115	HEAD	99	78	0.1406	10.9694	74.346	8.788-01
31116	STALK	99	10	0.0735	0.7352	155.287	1.838+00
31117	LEAVES	99	10	0.0206	0.2062	235.925	2.798+00
31118	GRAIN	99			20.0000	43.604	5.158-01

TABLE A-312

PLANT UPTAKE SUMMARY: WHEAT

SOIL: HANFORD SANDY CLAY LOAM					CONTAINER NUMBER: 312		
RADIOISOTOPE: IR-82					DATE PLANTED: 179		
INITIAL SOIL ACTIVITY (D/S/GM): 84.70					DATE EMERGED: 177		
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
31201	SHOOT	22	14	0.1200	1.6806	382.449	4.338+00
31202	SHOOT	36	12	0.1035	1.2416	273.092	3.228+00
31203	STALK	49	10	0.0640	0.6409	323.301	3.828+00
31204	LEAVES	49	10	0.1394	1.3945	125.646	1.488+00
31205	HEAD	49	10	0.0630	0.6305	84.837	1.838+00
31206	HEAD	65	10	0.1407	1.4072	52.309	6.188-01
31207	STALK	65	10	0.1374	1.3736	112.362	1.338+00
31208	LEAVES	65	10	0.0504	0.5036	289.648	3.428+00
31209	HEAD	78	10	0.2439	2.4389	38.559	4.558-01
31210	STALK	78	10	0.0882	0.8822	144.746	1.718+00
31211	LEAVES	78	10	0.0338	0.3375	379.201	4.488+00
31212	HEAD	99	92	0.1955	10.1673	72.460	8.998-01
31213	STALK	99	10	0.1012	1.0115	191.420	2.268+00
31214	LEAVES	99	10	0.0303	0.3032	323.375	3.828+00
31215	HEAD	99	70	0.0839	5.8703	78.535	9.278-01
31216	STALK	99	10	0.0968	0.9679	231.535	2.738+00
31217	LEAVES	99	10	0.0275	0.2747	476.945	5.638+00
31218	GRAIN	99			20.0000	32.693	3.868-01
31219	GRAIN	2nd Crop			20.000	21.447	2.632-01

TABLE A-313

PLANT UPTAKE SUMMARY: WHEAT

SOIL: HANFORD SANDY CLAY LOAM					CONTAINER NUMBER: 313		
RADIOISOTOPE: IR- 82					DATE PLANTED: 179		
INITIAL SOIL ACTIVITY (D/S/GM): 84.70					DATE EMERGED: 177		
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
31301	SHOOT	22	30	0.1119	3.3571	348.289	4.118+00
31302	SHOOT	36	14	0.0979	1.3706	211.873	2.508+00
31303	STALK	49	10	0.0575	0.5748	226.696	2.688+00
31304	LEAVES	49	10	0.1208	1.2079	95.277	1.128+00
31305	HEAD	49	10	0.0631	0.6306	51.132	6.048-01
31306	HEAD	65	10	0.1682	1.6820	34.305	4.058-01
31307	STALK	65	10	0.1487	1.4866	81.495	9.628-01
31308	LEAVES	65	10	0.0533	0.5332	210.172	2.688+00
31309	HEAD	78	10	0.2435	2.4349	36.057	4.268-01
31310	STALK	78	10	0.1126	1.1257	129.871	1.538+00
31311	LEAVES	78	10	0.0326	0.3255	201.524	2.388+00
31312	HEAD	99	93	0.0564	8.9630	84.160	9.948-01
31313	STALK	99	10	0.0838	0.8381	164.323	1.948+00
31314	LEAVES	99	10	0.0182	0.1823	136.905	1.628+00
31315	HEAD	99	88	0.0923	8.1229	29.625	3.508-01
31316	STALK	99	10	0.0630	0.6297	82.943	9.798-01
31317	LEAVES	99	10	0.0230	0.2305	145.948	1.728+00
31318	GRAIN	99			20.0000	30.893	3.658-01

TABLE A-315

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: HAMFORD SANDY CLAY LOAM				CONTAINER NUMBER: 315			
RADIONUCLIDE: SR- 85				DATE PLANTED: 179			
INITIAL SOIL ACTIVITY (D/S/GM): 84.70				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
31501	LEAVES	22	2	1.0695	2.1390	2092.284	2.658+01
31502	STEM	22	2	0.3254	0.6512	2270.431	2.688+01
31503	LEAVES	34	1	8.3673	8.3673	2714.362	3.208+01
31504	STEM	34	1	0.3877	0.3877	1667.180	1.978+01
31505	LEAVES	49	1	21.0260	21.0260	2709.472	3.208+01
31506	STEM	49	1	22.4805	22.4805	1277.345	1.518+01
31507	FLOWER	65	1	0.6600	0.6600	787.436	0.678+00
31508	LEAVES	65	1	26.7094	26.7094	939.210	1.118+01
31509	STEM	65	1	18.1210	18.1210	489.417	1.788+00
31510	FLOWER	65	1	4.4944	4.4944	40.944	4.838-01
31511	LEAVES	78	1	18.1940	18.2240	739.428	9.338+00
31512	STEM	78	1	57.3847	10.1047	338.457	4.008+00
31513	FLOWER	78	1	0.3661	0.3661	91.816	1.088+00
31514	LEAVES	99	1	11.9274	6.0774	662.738	7.828+00
31515	STEM	99	1	23.8202	7.8702	424.949	3.048+00
31516	FRUIT	99	1	3.2954	3.2954	17.605	2.008-01
31517	PEELS	112	1	1.0015	1.0015	19.811	4.238-01
31518	MEAT	112	1	4.2500	4.2500	23.835	2.818-01
31519	FRUIT	112	1	3.4900	3.4900	25.071	2.968-01
31520	FRUIT	112	1	4.1300	4.1300	19.995	2.318-01
31521	FRUIT	112	1	3.0900	3.0900	31.766	3.758-01
31522	FRUIT	112	1	3.6900	3.6900	28.037	3.318-01
31523	FRUIT	112	1	5.9200	5.9200	8.336	1.018-01

TABLE A-316

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: HAMFORD SANDY CLAY LOAM				CONTAINER NUMBER: 316			
RADIONUCLIDE: SR- 85				DATE PLANTED: 179			
INITIAL SOIL ACTIVITY (D/S/GM): 84.70				DATE EMERGED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GR/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
31601	LEAVES	22	2	1.0949	2.1898	2304.858	3.438+01
31602	STEM	22	2	0.3461	0.7363	2334.378	2.998+01
31603	LEAVES	34	1	8.0474	8.0474	3050.310	3.468+01
31604	STEM	34	1	4.8360	4.8360	2119.971	2.908+01
31605	LEAVES	49	1	12.0815	12.0815	3030.974	3.598+01
31606	STEM	49	1	14.7174	14.7174	1834.019	2.178+01
31607	FLOWER	65	1	0.4565	0.4565	806.663	1.028+01
31608	LEAVES	65	1	29.3494	29.3494	1515.854	1.798+01
31609	STEM	65	1	40.2183	3.4183	1097.862	1.308+01
31610	FLOWER	65	1	4.6023	4.6023	96.274	1.148+00
31611	LEAVES	78	1	27.7442	11.4742	282.214	3.248+00
31612	STEM	78	1	44.7393	11.2693	177.982	2.108+00
31613	FLOWER	78	1	1.4031	1.4031	184.370	2.188+00
31614	LEAVES	99	1	46.7822	3.7922	1705.063	2.818+01
31615	STEM	99	1	29.8856	8.0956	962.091	1.118+01
31616	FRUIT	99	1	4.5160	2.5474	41.401	7.298-01
31617	PEELS	112	1	0.9137	0.9137	49.456	3.378-01
31618	MEAT	112	1	3.3900	3.3900	42.419	5.018-01
31619	FRUIT	112	1	6.7500	6.7500	34.138	4.038-01
31620	FRUIT	112	1	3.3800	3.3800	13.080	1.548-01
31621	FRUIT	112	1	4.9000	4.9000	24.411	4.068-01
31622	FRUIT	112	1	4.9900	4.9900	45.150	3.338-01
31623	FRUIT	112	1	4.7300	4.7300	4.416	3.218-02

TABLE A-317

PLANT UPTAKE SUMMARY: TOMATO							
SOIL: HAMFORD SANDY CLAY LOAM				CONTAINER NUMBER: 317			
RADIONUCLIDE: SR- 85				DATE PLANTED: 179			
INITIAL SOIL ACTIVITY (C/S/GM): 84.70				DATE HARVESTED: 177			
SAMPLE NUMBER	PLANT PART	AGE (DAYS)	NUMBER OF PLANTS	DRY WEIGHT (GM/PLANT)	COUNTING DRY WEIGHT (GRAMS)	SPECIFIC ACTIVITY (D/S/GM)	ASU
31701	LEAVES	22	2	1.0320	2.0440	3120.475	3.682+01
31702	STEM	22	2	0.3571	0.7142	2805.555	3.088+01
31703	LEAVES	36	1	4.8587	4.8587	873.980	1.832+01
31704	STEM	36	1	2.7219	2.7219	4016.041	4.748+01
31705	LEAVES	49	1	23.2375	23.2375	1604.086	1.662+01
31706	STEM	49	1	27.4590	16.8920	565.060	6.678+00
31707	FLOWER	49	1	0.7015	0.7015	355.563	4.702+00
31708	LEAVES	65	1	23.7608	23.7608	852.918	1.018+01
31709	STEM	65	1	33.5133	8.7933	358.380	4.232+00
31710	FLOWER	65	1	3.9563	3.9563	97.116	1.158+00
31711	LEAVES	78	1	50.4191	4.7691	481.930	5.718+00
31712	STEM	78	1	68.5143	4.7343	615.926	7.278+00
31713	FLOWER	78	1	2.3049	2.3049	399.198	4.712+00
31714	LEAVES	99	1	15.0805	4.5005	678.027	8.018+00
31715	STEM	99	1	9.4368	9.4368	522.173	6.162+00
31716	FRUIT	99	1	4.3432	4.3432	29.578	3.498+01
31717	PEELS	112	1	0.5669	0.5669	60.268	7.128+01
31718	MEAT	112	1	2.7800	2.7800	24.844	2.948+01
31719	FRUIT	112	1	4.5200	4.5200	19.560	2.318+01
31720	FRUIT	112	1	3.3100	3.3100	44.744	5.288+01
31721	FRUIT	112	1	4.0200	4.0200	16.579	1.968+01
31722	FRUIT	112	1	2.9200	2.9200	5.958	7.038+02
31723	FRUIT	112	1	5.1500	5.1500	35.427	4.182+01

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EXPERIMENTAL INVESTIGATION OF PLANT UPTAKE CONTAMINATION FACTORS,

by James D. Sartor, Pamela G. Kruzic, William B. Lane, and
James L. Mackin, 167 pp, September 1968, UNCLASSIFIED

SRI Project No. MU-6502, Contract No. N00228-67-C-2036, OCD Work
Unit No. 3143B

The uptake of four radionuclides (Sr-85, Ru-106, Cs-137, and Ce-144) was measured for four plants (wheat, tomatoes, corn and potatoes) grown in four different soil types (sandy loam, sandy clay loam, silty clay and clay). Plants were grown in large soil containers that allowed most of the root system to develop under normal field conditions. Plant uptake contamination factors (a_{su}) were calculated for each sample harvested. Comparisons of the uptake for various plant part-soil-radionuclide combinations at crop maturity showed that the a_{su} values for Sr-85 were the largest in all instances, usually by an order of magnitude. The a_{su} values for the edible portion of each plant were lowest in every case, and usually the leafy portions of the plants had the largest a_{su} value.

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EXPERIMENTAL INVESTIGATION OF PLANT
UPTAKE CONTAMINATION FACTORS

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James D. Sartor, Pamela G. Kruzic,
William B. Lane and James L. Mackin

Stanford Research Institute

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Contract N00228-67-C-2036

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DETACHABLE SUMMARY

This report describes the results of experiments conducted for the purposes of evaluating the uptake of selected fission product radio-nuclides through their root systems, and for evaluating the dependence of the contamination factors on such parameters as plant type, soil type, plant age, soil nutrients, and fallout solubility. It was also necessary to correlate the measured plant uptake contamination factors with soil characteristics for subsequent application in mathematical root uptake contamination models.

The approach taken followed earlier work in which plants were grown in large containers under conditions designed to reproduce, as closely as possible, the growth of food crops under actual field conditions. In addition, during the current work, a limited number of field tests were conducted to test the hypothesis that the large containers used provided a realistic simulation of an actual environment. Primary consideration was given to the study of radiostrontium with crops also grown in Cs-137, Ru-106 and Ce-144 soil containers which were available from previous experiments. The farmland plots were contaminated only with radiostrontium.

Test soils included sand, loam and clay soils from previous work and two additional soils representing widely distributed California agricultural soils. The crops studied were wheat, tomatoes, corn and potatoes.

Sampling started as soon as the plants sprouted and continued at frequent intervals depending on growth characteristics of the plant. Plant uptake contamination factors (a_{SU}) were calculated for each of the samples harvested. Comparisons of the uptake for various plant part-soil-radionuclide combinations at crop maturity showed that the a_{SU} values for Sr-85 were the largest in all instances, usually by an order of magnitude. The a_{SU} values for Cs-137, Ru-106, and Ce-144 showed no consistent pattern and were distributed randomly high and low among the plant part-soil combinations. The a_{SU} values for the edible portion of each plant were lowest in every case, and usually the leafy portion of the plants had the largest a_{SU} value. These general observations support and extend the results of previous experiments.

Only limited data were available for evaluating the effects of available calcium on radionuclide uptake but, taken with the results of previous work, supported the postulated decrease in uptake in a manner approximately inversely proportional to the exchangeable calcium concentration in the soil. These results again emphasized the generally lower uptake values observed in the work as compared to literature values. The lower values in these experiments have been attributed to the growing of crops in large containers, as opposed to values based on literature data which are reported for experiments using small pot containers. The large soil containers allowed the plant root systems to develop in a manner closer to field conditions.

To test this assumption further some field studies were conducted in which crops were grown on small test plots at two different field locations. The data were not extensive enough to confirm the validity of the large

container approach but were in sufficiently good agreement to support the continuing application of the large container data to estimations of postattack food contamination levels. As part of the field studies, a limited number of additional experiments were conducted to compare measured a_{SU} values for various methods of mixing the contaminant with the soil and also to compare the results obtained by applying the contaminant in normal particle form and also as a solution. In all cases no significant differences were found.

By far the largest changes in a_{SU} values were produced when the availability of the radionuclides for uptake was reduced by thermal pretreatment of the fallout simulant. The results verified the previous reductions in a_{SU} values for wheat by as much as a factor of 10. In the present work the observations were extended to include the three additional crops of tomatoes, corn and potatoes and similar reductions in a_{SU} values were found.

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13. ABSTRACT			
The uptake of four radionuclides (Sr-85, Ru-106, Cs-137, and Ce-144) was measured for four plants (wheat, tomatoes, corn and potatoes) grown in four different soil types (sandy loam, sandy clay loam, silty clay and clay). Plants were grown in large soil containers that allowed most of the root system to develop under normal field conditions. Plant uptake contamination factors (a_{SU}) were calculated for each sample harvested. Comparisons of the uptake for various plant part-soil-radionuclide combinations at crop maturity showed that the a_{SU} values for Sr-85 were the largest in all instances, usually by an order of magnitude. The a_{SU} values for the edible portion of each plant were lowest in every case, and usually the leafy portions of the plants had the largest a_{SU} value. Additional experiments included measurements of changes in radionuclide uptake caused by available calcium levels, growing crops in large fields, and contaminant form and solubility.			

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Plant Growth						