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Radionuclide Cycling in A Utah Dairy Farm

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FIELD 4 JULY 1961 - SORGHUM
NOV 1961 - BARLEY WITH ALFALFA
1962 - 1968 - ALFALFA

FIELD 5 1953 - 1968 - ALFALFA

FIELD 6 1962 - 1968 - ALFALFA

● WOOD STAKE @ EACH 1/5 FIELD BOUNDARY LOCATED ON FENCE LINE

○ 1 INCH PIPE @ 1/5 FIELD BOUNDARY LOCATED WEST SHOULDER DITCH

FIGURE 1. Leo Syphus Farm, Saint George, Utah

monthly collections of fallout through the alfalfa growing season from early April until the fifth cutting in late October. Three pots were exposed during the growth period of barley and ensilage crops. All pots and funnels were exposed from the last alfalfa crop through the winter into April for fallout collection and determination of intercalibration factors.

Steel templates were positioned at randomly-selected coordinates and used to enclose alfalfa shoots (0.91 m² area) prior to excision by hand clippers (Figure B4). The shoots were cut at "mower" height, immediately enclosed in tared bags to avoid contact with the ground surface and moisture loss, and held out of the sun until "chopped". A large paper cutter was used to reduce the shoots to approximately 10 cm lengths which were returned to the labeled sack and frozen with dry ice for transportation to the laboratory. Subsequent processing was identical to that for hay specimens described previously (Hawthorne, 1967). Soil samples were collected with a coring device (Figure B5). Cesium-137 and strontium-90 determinations were by wet-chemistry techniques (Harley, 1962; Wood et al., 1968).

Many of the mathematical models were fit to observed data by the method of nonlinear least-squares using the "linearization method" (Draper and Smith, 1968) in a program written in BASIC language for the Univac 1108 computer. Several computer simulation models were used in the course of the study and were also implemented on the Univac computer in either FORTRAN or BASIC codes.

3.0 PREVIOUS MATHEMATICAL MODELS

The basic formulation for studies of radionuclide uptake and retention is an "input-output" or "compartment" model, where the inputs in the present case are radionuclides deposited on alfalfa either from rainfall or as "dry" fallout. The outputs are losses due to washoff in rains, winds and other mechanical actions, loss or removal of plant parts, transport to roots, and physical decay. Previous studies have usually incorporated inputs in terms of radionuclide concentrations in surface air, as well as in rainfall. Thus, Peirson and Keane (1962) show the equation:

$$\frac{dC_g}{dt} + \lambda C_g = v_g C_a + b R C_r - k R C_g \quad (1)$$

where:

C_g = quantity of fission product on a unit area of grass

C_a, C_r = concentrations per unit volume of air and rain, respectively

R = rate of rainfall

λ = radioactivity decay rate

b = fraction retained of current wet deposition

k = fraction of deposition washed off by unit rainfall

and v_g is the "deposition velocity" for dry fallout:

$$v_g = \frac{\text{rate of deposition (pCi/cm}^2\text{/sec)}}{\text{concentration in air (pCi/cm}^3\text{)}}$$

They then fit a similar equation with multiple regression methods.

Pelletier and Voillequé (1971) gave their basic equation as:

$$\frac{dA_v}{dt} = aD_a + bD_r - (\lambda + \lambda_r)A_v - RC_v \quad (2)$$

where:

A_v = activity on vegetation per unit area of ground

C_v = concentration on vegetation (per unit mass)

D_a = dry deposition rate per unit area

D_r = wet deposition rate per unit area

λ = radioactivity decay rate

λ_r = rate of loss from vegetation

R = rate of removal of grass by cattle

a, b = interception factors.

Since the above equation incorporates a removal factor (cattle) that operates on mass of vegetation, it is necessary to convert to concentrations to accommodate this removal and the growth of vegetation (assumed to occur at a constant rate), giving:

$$\frac{dC_v}{dt} = (4530 k_r r + k_a)C_a - (\lambda_e + \frac{K}{Y})C_v \quad (3)$$

where:

C_v = activity on vegetation per unit mass

r = rainfall rate

C_a = concentration of radioactivity in surface air

quantities of ^{90}Sr and ^{137}Cs measured in fallout collectors (Figures 4 and 5). Since fallout collectors were not always changed exactly on alfalfa harvest dates, we calculated daily collector accumulations and then integrated these estimates by the procedure outlined under models below. There appears to be a tendency for differences in pattern between harvests, a feature which appears to be associated with harvest yields (cf. Figure 10). Two different dates were used for beginning of fallout exposures for first harvests. The earliest date (about March 20) was selected by interpolation in a table given by Hanson (1972:409), and is generally in accord with a rule-of-thumb developed during the course of growth chamber studies associated with this investigation [growth commences after 4 consecutive days where the average 24-hour temperature, $(\text{maximum temperature} - \text{minimum temperature})/2$ exceeds 55°F]. See Figure B15 where a portion of the weather data at Saint George is presented in this manner. Complete weather documentation for the study period is in Appendix A, Tables 3, 4 and 5. The later date ("short" period in Figures 4 and 5; beginning about April 1) coincides with the dates when fallout collectors (funnels) were first changed each spring. Data for the two dates are shown in Figures 4 and 5 to indicate magnitudes of change introduced by use of one or the other. In the remainder of the paper the "long" interval (beginning March 20) is used.

There are two opposing factors affecting the accumulation of fallout on alfalfa plants during the growth of a crop. One is the exponential decline in fallout levels and the other is growth of foliage. Evidently growth provides more surface area so that an individual plant will presumably intercept a larger fraction of fallout as it grows. Expressing the data on a per unit mass basis might tend to compensate for growth, but there are a number of features of growth that could complicate any such interpretation. Moreover, Wilson's (1968) experimental work showed that at least two compartments ("external" and "internal") are needed to adequately represent an alfalfa plant, and the associated losses and transfers may be expected to contribute to overall complexity.

The differential equations implicit in the compartmental model of Figure 3, assuming constant loss (μ, γ) and transfer (C_1, C_2) rates, and an exponentially declining input are:

$$\frac{dy_E}{dt} = C_1 \lambda_1 e^{-kt} - (\mu + C_2)y_E \quad (7)$$

$$\frac{dy_I}{dt} = C_2 y_E - \gamma y_I \quad (8)$$

with solutions:

FIGURE 2. Field 3 Looking Southwest From Northeast Corner of Syphus Dairy Farm

2.0 METHODS

To assess radionuclide movement and to construct a material(s) balance (an early objective) intensive radionuclide concentration measurements were made on fallout, field grown alfalfa and other crops, soil, irrigation water, and various feed constituents. Ancillary measurements included cow feces and urine samples and measurements on materials for specialized studies. Although stable elements and other radioelement analyses were done, we report only ^{90}Sr and ^{137}Cs results here. Details relative to sampling frequencies and collection periods are in the appropriate section of this report. Weather data were taken from records kept by the Saint George Power House and published in Department of Commerce (Weather Bureau) publications for Utah.

Aerial deposition of radionuclides was sampled in a series of conventional stainless steel pots (0.108 m^2 , Figure B1) and polyethylene funnels (0.078 m^2 , Figure B2) mounted above a polyethylene collection flask (9.5 liters) spaced along the boundary between two fields (8 and 6.8 acres in size, Figure B3) of the 32.6 acre farm. Funnels were changed at the initiation of each alfalfa harvest. Duplicate steel pots were exposed for

FIGURE 4. Levels of ^{137}Cs on Alfalfa Contrasted with Quantities in Fallout Collectors

were counted. Horizontal soil composites were devised to represent the soil profile in each of several fields and increments were submitted for radioanalysis to assess movement of both radioisotopes into the soil layer. The data available at this writing are presented in Appendix A, Tables A12-A17. In addition, ^{137}Cs and ^{90}Sr concentration values and their ratios (taken from Tables A15-A17) are presented in Figures B16 and B17 for the means of three fields (data from field 8Q was not used). The nonlinear, least-squares fits to these data indicate the $^{137}\text{Cs}/^{90}\text{Sr}$ ratios change predictably with depth and that the majority of the change can be associated with ^{137}Cs movement.

The implications of this finding for a deep-rooted plant such as alfalfa are probably confounded by soil-plant factors but should not be ignored in future studies. The data available in A14 allowed us to calculate the ratio of change for the two years sampled. These calculations indicate that ^{137}Cs increased (1965 vs 1962) in the uppermost and lower levels of the soil profile while ^{90}Sr (pCi/kg) decreased below 2 inches. Comparable ratios (1965/1962) calculated from vertical composites (A18 and A19) indicate there may be some slight net increase for both radioisotopes in the total soil profile. Ratios $^{137}\text{Cs}/^{90}\text{Sr}$ for vertical soil composites for 1962 and 1965 are shown in Tables A20-A22. Ratios for 1962 averaged 1.48 ± 0.36 while the average for 1965 was 1.58 ± 0.24 . The small sample size for 1962 ($n=5$) and the size of the calculated standard deviations preclude any conclusions relative to changes over the 3-year interval.

Another factor which influences soil radionuclide burden is elements dissolved in irrigation water and/or associated with particulate matter contained therein. Irrigation water used on the farm came from the Virgin River, which drains the Zion National Park area of Southern Utah, thus, flow rates can be influenced by summer thundershowers and spring runoff. For purposes of this study, solids were defined as insoluble material $>0.45\mu$. Samples were collected (18 liters) at a single point in the irrigation ditch above each field, filtered, dried, weighed, and resolubilized for radioisotope determination. Because of limited numbers of samples analyzed and some unexplained high values, we simply present the available data in Table A23. Further analysis will depend on the availability of flow records which at this writing are still in strip chart form.

4.5 TESTS FOR LINEARITY

Another way to appraise the data shown in Figure 6 is to test for linearity on the regression lines. The mature alfalfa crops were sampled (at harvest time) by clipping a number of randomly selected areas (square yards, approximately 1 m^2). Consequently, these independent determinations of radionuclide burden can be used in a test of linearity (Draper and Smith, 1966). These tests showed highly significant deviations from linearity in all cases for the pCi/ m^2 data (details are in A24 and

regression calculations using pCi/kg are in A25). The results may be both an indication that the regression model [equation (17)] is only a first-order approximation to the complex underlying model [equation (11)] and a consequence of factors not accounted for by the model (eg. remobilization of radionuclides from root stocks, soil chemistry or irrigation water). The fact that the regression model provides estimates of the parameter k in accord with independent estimates (Tables 3 and 6) lends support to its utility as an approximation.

A further appraisal of the utility of the regression lines of Figure 6 can be accomplished by noting that the intercepts $[\log(C_1 C_f \lambda)]$ in equation (17)] should vary from year to year in proportion to the current "spring peak" level of fallout (λ). The spring peak values (λ) have been independently estimated from fallout-collector data (see Appendix A26 for details), and Figure 8 shows the relationship between the two quantities. The slope of the line in Figure 8 (20.6) then estimates $C_1 C_f$, a quantity which we assume to be constant throughout. The generally good fit to a straight line in Figure 8 supports that assumption and its foundation in the assumed suitability of equation (17) as an approximation to the overall model of equation (11).

FIGURE 8. Comparison of Estimates of λ Calculated from Fallout Collector Data with Intercepts of Linear Regressions [Equation 17] using Alfalfa Data

FIGURE 9. Calculated Daily ^{137}Cs from Fallout for Saint George, Utah (pCi/m²) and Ft. Collins, Colorado (pCi/m³)

The above procedure necessarily fails for those periods containing the "spring peak" of fallout. To derive estimates for these periods, we estimated the actual date of the spring peak from a joint solution of the equations representing the preceding ("increase phase") and succeeding ("decrease phase") fallout collections (B19). The collection judged to include the spring peak was then divided into sections corresponding to increasing and decreasing fallout on the basis of the estimated peak fallout date, total in the collector, and the two values of k given above (B20). The complete calculation is illustrated in Appendix B21 and the daily numerical results for both ^{137}Cs and ^{90}Sr are in A31. Collector data used; data files TEMP and SRFALL, respectively, and the computer subroutine (TFALL2) are in A28.

There are various other procedures that might have been utilized to derive fallout inputs to the simulation model. The method we chose was largely based on our feeling that the identity of the individual fallout collections should be preserved insofar as possible, as a way of examining overall consistency of the data. An inspection of Figure 9 will show that the input data do in fact seem to follow a consistent pattern and that the pattern of the collectors is in accord with the Colorado air data (Wilson, 1968). Exceptions are the last two "decrease phase" periods of 1963 and the peak period in 1964. Considerably more detail of the procedure and the algebra is in Thomas et al., 1975b.

5.3 ALFALFA PLANTS

The next stage of the model involves deposition of fallout on alfalfa plant surfaces [Wilson's (1968) "exterior" compartment]. The major difficulty here has to do with the problem of devising a satisfactory model for the interception of fallout by plants, including the related matter of determining how interception changes as plants grow. So far as we know, none of the many previous studies of fallout on plants have satisfactorily resolved these difficulties, so we have simply introduced empirical corrections, as described below. Since a comparison of fits of equation (17) to concentration of fallout on alfalfa plants seemed more satisfactory when concentration was expressed on the basis of pCi/m^2 (as in Figure 6), we have elected to use that representation in the simulation (rather than pCi/kg , Figure 7).

A comparison of fallout accumulation by alfalfa with the quantities estimated to be in collectors (calculated by summing appropriate quantities in A31) during the same time intervals (Table 8) shows a pronounced decrease among succeeding harvests, within years.

If these ratios are compared to alfalfa yields (Figure 10), there is definite evidence of higher fallout interception at the larger yields.

TABLE 8. Ratios of ^{137}Cs Accumulation by Alfalfa to Quantities in Fallout Collectors

Year	Harvest				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
1963	0.228	0.183	0.187	0.107	0.052
1964	0.239	0.171	0.091	0.097	0.189
1965	0.237	0.260	0.116	0.154	0.066
1966	0.582	0.269	--	0.485	0.473

Consequently, we have introduced simple weighting factors into the model based on the average yield for each harvest (averaged over the 4 years, see Appendix A8). These factors were calculated by assigning a weight of unity in the first harvest, and reducing fallout collection efficiency in succeeding harvests by a fraction calculated as the mean yield in that harvest divided by that for the first harvest. The resulting coefficients are 1.00, 0.678, 0.658, 0.550, and 0.366 for the five harvests. Milbourn and Taylor (1965) and Ward et al., (1965) have shown a similar relationship between retention and crop yield. In effect, these coefficients serve to replace the growth model of equation (12).

We calculated an "interception factor" or "transfer coefficient" (from daily fallout quantities to deposition on alfalfa plants) by running the simulation model with that coefficient set at unity (line 108, main program, A28) and then calculating the coefficient (C_1 of Figure 3) as:

$$\text{transfer coefficient} = \frac{\sum \text{observed } ^{137}\text{Cs concentration on alfalfa}}{\sum \text{simulated } ^{137}\text{Cs concentration on alfalfa}} \quad (19)$$

The value thus obtained (0.488) applies directly to only the first alfalfa harvest of each year. The effective interception coefficients for the remaining harvests must be adjusted by the factors listed in the paragraph just above. Thus the sequence of fractions intercepted by successive harvests become 0.488, 0.330, 0.321, 0.268, 0.178 (line 110, main program, A28).

The exterior compartment loses radionuclides in two ways--by transfer to the interior, and by losses directly from the surface (through wind action, rain, and other agencies). This latter factor has been assessed in a sizable number of studies, and the consensus seems to be that a rate of about 0.05 of the quantity present is lost per day (or an effective half-time of about 14 days). While we have adopted that value for the present

FIGURE 10. Ratios of ^{137}Cs Levels (Alfalfa/Collectors) Compared to Alfalfa Yields

Inasmuch as the results of 27 different feeding trials, expressed as a simple transfer coefficient, were quite consistent (Hawthorne, 1966), we have simply used the mean value of these transfer coefficients as an equilibrium value for the simulated "cow", in place of the rather complex model required if dietary inputs are permitted to fluctuate (Cf. Pelletier and Voilleque, 1971). A factor complicating our analysis of the data is the fact that it was necessary, on three occasions in 1964, to feed hay from another location (Enterprise, Utah). These data sets are excluded from Figure 12, which shows observed and simulated milk levels for the remaining data sets (the excluded data sets are included in Appendix A29). With the exception of the last harvest of 1963 and the first harvest of 1964, it appears that the observed and simulated data are generally in satisfactory agreement.

FIGURE 12. Comparison of Observed and Simulated Levels for ^{137}Cs in Milk

6.0 COMPARISONS WITH OTHER MODELS

6.1 INTRODUCTION

Ideally, a model should be "validated" by testing on data that has not been used in its development. One way to attempt such a test is to partition the original data into two sets, one to be used in model construction, the other for validation. This does not seem to be a reasonable approach in the present case, in consequence of the low levels of fallout in the last full year of the study and the evidence of a significant contribution of ^{137}Cs burden in foliage by transfer from root stocks. A more compelling argument against such tests over time is that those biases associated with the derivation of parameters from part of a set of data are likely to remain constant throughout the entire set and may go undetected. Therefore, comparisons with other, similar models are needed for an appraisal of our results. Various comparisons with independent estimates of the parameters have already been presented in development of the model, so we deal here with certain broader comparisons having to do with model structure.

6.2 PEIRSON AND KEANE

Peirson and Keane (1962) derived their parameter estimates from the coefficients of a multiple regression model based on a differential equation [equation (1) above] and fit to observed data. Since their observations mainly concerned barium-140 and iodine-131 on "pasture grass," we cannot expect to make exact comparisons. For ^{140}Ba , the main parameters and standard errors were estimated by Peirson and Keane (1962) as:

$$\text{dry deposition velocity (cm/sec)} = v_g = 0.26 \pm 0.24$$

$$\text{fractional retention of rain-deposited radioactivity} = b = 1.00 \pm 0.3$$

$$\text{fractional removal of radioactivity per unit rainfall (mm)} = k = 0.009 \pm 0.018$$

The magnitude of the standard errors associated with the parameters prohibits any exactness in comparisons. In any case, we are mainly concerned here with the question of whether or not parameters having to do with retention and washoff, both resulting from the same events, i.e., rainfall, might reliably be estimated from observed data alone. Before actually fitting the data, Peirson and Keane arbitrarily introduced a change of variable, $b = 1 - mR$ (R is ratio of rainfall and m an unknown constant), that does not seem necessary if the model is in fact the appropriate realization of actual phenomena. We, therefore, fit equation (1) directly to the data [Table 3 of Peirson and Keane (1962)]. Since Peirson and Keane indicate (Fig. 2 of their paper) that v_g decreases markedly during the course

of the observational period, we also studied a modified form of their equation (1) by introducing the reciprocal of time (weeks) into the term containing v_g . Fits to the two equations yielded the coefficients given in Table 10.

TABLE 10. Estimated Coefficients for ^{140}Ba Deposition on Pasture Grass

	<u>Dry deposition v_g (cm/sec)</u>	<u>Retention b</u>	<u>Wash-off k</u>
Direct fit to equation (1) of Peirson and Keane	0.37 ± 0.46	0.91 ± 0.32	0.03 ± 0.24
Term in v_g modified	0.26 ± 0.79	0.83 ± 0.32	-0.10 ± 0.15
Results of Peirson and Keane	0.26 ± 0.24	1.00 ± 0.30	0.009 ± 0.018

The results of chief interest here are that the parameters v_g and b remain fairly stable in the several versions, but the wash-off factor k varies considerably, even changing sign (a result inconsistent with definition of the factor). We note, however, that these results may be entirely spurious inasmuch as only the coefficient b turns out to be statistically significant in the regression analysis for the two models we considered. Another shortcoming of the model is that it does not include a term for losses that occur independently of rainfall, a factor shown by later investigators to be of considerable importance.

Since we do not have records of air concentration at Saint George, we are able to make a direct comparison only with the retention factor, b , which in the Saint George data ranges from 0.49 (first harvest) down to 0.19 in the fifth harvest, one-fourth to one-half the value observed by Peirson and Keane (*ibid.*).

6.3 PELLETIER AND VOILLEQUÉ

Pelletier and Voillequé (1971) start with an equation similar to that of Peirson and Keane, apart from addition of a term to represent removals by cattle, but convert the equation to represent concentration per unit mass (pCi/kg) before fitting it to data. They use only air concentration data, introducing "washout" by rain in terms of an equation using an overall deposition rate which they define as:

$$D = C_a(V_d + g \cdot r) \quad (20)$$

where:

D = deposition rate on collectors ($\text{pCi}/\text{m}^2/\text{day}$)

C_a = average air concentration (pCi/m^3)

V_d = empirical constant for dry deposition (m/day)

g = empirical constant for washout by rain ($\text{m}/\text{cm rain}$)

r = rainfall rate ($\text{cm rain}/\text{day}$)

Using results of a previous study (Pelletier et al., 1965), Pelletier and Voillequé convert the above equation to

$$D = C_a (200 + 4530r) \quad (21)$$

For comparison to Saint George data, we note that the ratio D/C_a corresponds to the deposition velocity constant as usually defined (rate of deposition/concentration in air) so we can calculate it as:

$$V_g = \frac{D}{C_a} = 200 + 4530r \quad (22)$$

Using the mean annual rainfall for 1963-1966 at Saint George (7.4 inches, A4), we calculate a value of V_g as 433 m/day, using Pelletier and Voillequé's equation. The only comparison available to us is a value of V_g calculated by using the Saint George fallout collector data and the Colorado (Ft. Collins) air concentrations shown in Figure 9. The overall ratio of these two sets of data is 530 m/day. It is of interest here that Wilson (1968) shows a general agreement between the Ft. Collins air data and observations made at Chicago. A graphical comparison with the 1964 and 1965 air concentration data given by Pelletier and Whipple (1968) shows very much the same pattern as the Chicago data. These comparisons do not, of course, establish any correspondence between air concentration at the other sites and those that existed at Saint George. We note, however, that Peirson and Keane (1962) found dry deposition velocities (^{140}Ba) of 0.5 cm/sec (430 m/day) to an artificial grass surface in England, while Wilson, Ward, and Johnson (1967) cite some Norwegian data yielding 500 m/day for fallout beta activity in collectors.

Pelletier and Voillequé (1971) use equation (3) as their model for fitting observed radionuclide data on pasture grass. The loss rate from vegetation (λ_e) is that generally reported (14 day half-time) and used in the Saint George study. The factor K is a (linear) growth rate for grass, for which values are not given by Pelletier and Voillequé. The essential part of their model for comparison to Saint George data is that concerning transfer from air to grass:

$$D_v = (k_a + 4530 \cdot k_r \cdot r) C_a \quad (23)$$

where D_v is ^{137}Cs concentration (pCi/kg) on grass, r is rainfall rate (cm/day), 4530 is the empirical constant described above in conjunction with equation (20), k_a represents "deposition velocity per unit areal grass density ($\text{m}^3/\text{kg}/\text{day}$)," and k_r is the "fraction of the activity intercepted and retained per unit grass density (m^2/kg)." Values for k_r and k_g are obtained by a trial and error process that seeks to minimize the normalized absolute mean difference (Δ) between observed and simulated data while also selecting that set of parameters that minimizes the standard deviation of the calculated values of Δ . The technique thus is regression-like in its properties (apart from a complication introduced by the attempt to "normalize" around zero, the technique corresponds directly to the method of least squares and thus to regression calculations). There is thus, as with Peirson and Keane's (1962) study, the question of whether regression methods can be depended on to accurately estimate deposition and retention coefficients from observed data.

Pelletier and Voillequé estimated k_r for ^{137}Cs as $1.2 \text{ m}^2/\text{kg}$ (Table 2 of their paper), and report average grass density to be $0.062 \text{ kg}/\text{m}^2$, from which we estimate retention per square meter to be $1.2(0.062) = 0.074$, which suggests a rather low interception efficiency in terms of the various experiments in which radionuclides have been artificially sprayed on pasture plants (Milbourn and Taylor, 1965; Middleton, 1960). Combining the various coefficients of equation (23) yields an overall predictive relationship for ^{137}Cs of:

$$D_v = [950 + 4530(1.2)0.25] = 2309 C_a \quad (24)$$

(using the average rainfall of $0.25 \text{ cm}/\text{day}$ in the 24 week study of Pelletier and Voillequé). Comparison with the Saint George data is again hampered by our lack of air concentration data. We can, however, use Pelletier and Voilleque's conversion equation [equation (21) above] to translate to an equivalent fallout rate to collectors, giving:

$$D = C_a[200 + 4530(0.25)] = 1330 C_a (\text{pCi}/\text{m}^2/\text{day}) \quad (25)$$

Changing D_v above to a per unit area basis is accomplished by using their average grass density of $0.062 \text{ kg}/\text{m}^2$, giving:

$$\text{fallout on grass per unit area} = D_f = 0.062(\text{kg}/\text{m}^2) \cdot D_v (\text{pCi}/\text{kg})$$

$$D_f = 0.062(2309)C_a = 143 C_a \quad (26)$$

and,

$$\text{total interception efficiency} = \frac{D_f}{D} = \frac{143}{1330} = 0.11 \quad (27)$$

It may be noted that this is a somewhat lower value than our calculation of an efficiency of 0.18 for fifth harvest alfalfa mentioned in Section 5.3. However, Figure 10 shows a generally good correlation between interception and yield (excepting the 1966 data, which we believe was affected by remobilization of ^{137}Cs from root stocks), and also shows virtually all of the St. George yields to be in excess of 0.20 kg/m^2 as contrasted to 0.06 kg/m^2 in the Michigan study.

6.4 WILSON

In the models discussed thus far, there are questions as to how well regression or regression-like techniques can be used to jointly estimate the relative contributions of dry and wet deposition of fallout radionuclides to burdens observed on plants. In the Colorado studies (Wilson, 1968; Wilson et al., 1967) direct experimental evidence was obtained (see particularly Wilson et al., 1967) indicating that contamination levels of ^{137}Cs on alfalfa were not dependent on rainfall, and suggesting dry fallout to be the primary contaminating source. In the absence of air concentration data for Saint George, we have necessarily been constrained to use transfer coefficients based on fallout accumulation in collectors. Our comparisons with the other studies thus must depend on conversion of the published results to correspond to the Saint George data.

The predictive model obtained in the Colorado study depends essentially on a "transfer rate" obtained by regression analysis. The relationship is given by Wilson et al., (1967, Figure 2, p. 128) and Wilson (1968, p. 108) as:

$$A_n = a_0 k_n V_{\max} + S \quad (28)$$

where:

A_n = foliar contamination level (pCi/m^2)

a_0 = air concentration level as crop begins growth

k_n = plant contamination factor (expressed in days)

S = contribution from soil to foliar contamination

$V_{\max}$ = upper limit to deposition velocity

The plant contamination factor, k_n , represents the accumulated burden at the n th day in a two-compartment model representing an alfalfa plant (Cf. Figure 13 of Wilson, 1968). Wilson's procedure was to regress observed alfalfa contamination levels (A_n) on the products of a_0 (separate values used for each of the alfalfa harvests) and k_n to obtain estimates of $V_{\max}$ (990) and S (-60). Since S turned out to have a negative coefficient (not

7.0 ACKNOWLEDGMENTS

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APPENDIX A

APPENDIX A

TABLE A1. ^{90}Sr and ^{137}Cs in Individual Funnel Fallout Collectors

Collection	Days Exposed	Individual Funnels		Ratio Cs/Sr	Statistics for Each Collection					
		Field	pCi/m ²		^{137}Cs		^{90}Sr		Ratio	
		Location	^{137}Cs	^{90}Sr	Mean	CV	Mean	CV	Mean	CV
6/20/61-8/30/61	71	NF	--	391.4	--					
		CF	157.0	604.6	0.26					
		SF	--	88.6	--	157	--	362	72	0.26
8/30/61-12/1/61	93	NF	405.8	705.9	0.57					
		CF	231.6	--	--	319	--	706	--	0.57
12/1/61-2/24/62	85	NF	--	1974.0	--					
		CF	--	1799.0	--					
		SF	3085.0	1208.0	2.6	3085	--	1660	24	2.60
2/24/62-6/21/62	117	NF	1312.0	1021.0	1.3					
		CF	--	695.7	--	1312	--	858	--	1.30
6/21/62-7/21/62	30	NF	--	228.0	--			228		
7/21/62-8/27/62	37	NF	290.5	--	--					
		SF	704.0	301.7	2.3	497	--	302	--	2.30
8/27/62-10/11/62	45	CF	864.5	--	--					
		SF	601.4	615.7	0.97	732	--	616	--	0.97
10/11/62-11/16/62	36	NF	--	534.5	--					
		SF	--	577.9	--	--	--	556	--	--

TABLE A1. (Continued 2)

Collection	Days Exposed	Individual Funnels				Ratio Cs/Sr	Statistics for Each Collection					
		Field Location	¹³⁷ Cs		⁹⁰ Sr		¹³⁷ Cs		⁹⁰ Sr		Ratio	
							Mean	CV	Mean	CV	Mean	CV
11/16/62-4/2/63	137	NF	--	433.0	--							
		CF	3902	4698.0	0.83							
		SF	3730	5505.0	0.68	3816	--	4844	12	0.76	--	--
4/2/63-5/21/63	49	CF	3953	--	--							
		SF	--	1153	--	3953	--	1153	--	--	--	--
5/21/63-6/21/63	31	NF	2060	--	--							
		CF	1919	1355	1.4	1990	--	1355	--	1.4	--	--
6/21/63-7/26/63	35	CF	--	404.8	--	--	--	405	--	--	--	--
7/26/63-8/30/63	35	NF	--	952.0	--							
		CF	--	660.1	--							
		SF	--	719.7	--	--	--	777	20	--	--	--
8/30/63-10/9/63	40	NF	--	647.0	--	--	--	647	--	--	--	--
10/9/63-1/7/64	90	NF	1203	--	--							
		CF	3318	--	--							
		SF	1081	589.2	1.8	1867	67	589	--	1.8	--	--
1/7/64-4/2/64	85	NF	4472	1235	3.6							
		CF	1939	1319.	1.4							
		SF	1892	1402	1.3	2768	53	1319	6	2.1	62	62
4/2/64-5/19/64	47	NF	--	3180	--	--	--	3296	--	--	--	--
		SF	--	3411	--	--	--	--	--	--	--	--

TABLE A1. (Continued 3)

Collection	Days Exposed	Individual Funnels			Ratio Cs/Sr	Statistics for Each Collection					
		Field	pCi/m ²			¹³⁷ Cs		⁹⁰ Sr		Ratio	
		Location	¹³⁷ Cs	⁹⁰ Sr		Mean	CV	Mean	CV	Mean	CV
5/19/64-6/23/64	35	NF	--	1120							
		CF	--	--							
		SF	--	1088	--		1104				
6/23/64-7/22/64	29	NF	--	550.2		--		550.2			
7/21/64-8/30/64	40	NF	705.2	508.1	1.4						
		CF	603.7	564.3	1.1						
		SF	566.2	390.5	1.4	625.0	12	488	18	1.3	13
8/30/64-10/19/64	50	NF	137.1	75.82	1.8						
		CF	101.6	60.55	1.7						
		SF	92.57	--	--	110.4	21	68.2		1.8	--
10/19/64-2/1/65	105	NF	1128	782.1	1.4						
		CF	1253	902.3	1.4						
		SF	1496	981.7	1.5	1292	15	888.7	11	1.4	4
2/15/65-4/3/65	47	1F	1058	674.9	1.6						
		2F	1081	803.5	1.3						
		NF	--	765.1	--						
		CF	1109	945.4	1.2						
		SF	1051	690.2	1.5	1075	2	775.8	14	1.4	13
4/3/65-5/15/65	42	1F	1527	953.5	1.6						
		2F	1667	1004	1.7						
		NF	2116	1337	1.6						
		CF	1701	1125	1.5						
		SF	1699	1235	1.4	1742	13	1131	14	1.6	7

TABLE A1. (Continued 4)

Collection	Days Exposed	Individual Funnels			Ratio Cs/Sr	Statistics for Each Collection					
		Field	pCi/m ²			¹³⁷ Cs		⁹⁰ Sr		Ratio	
		Location	¹³⁷ Cs	⁹⁰ Sr		Mean	CV	Mean	CV	Mean	CV
5/15/65-6/23/65	39	1F	--	--							
		2F	807.7	516.7	1.6						
		NF	893.9	--	--						
		CF	1040	617.5	1.7						
		SF	--	503.2	--	913.9	13	545.8	11	1.6	
6/23/65-7/25/65	32	1F	197.7	84.91	2.3						
		2F	279.7	136.4	2.1						
		NF	232.3	136.8	1.7						
		SF	199.4	93.54	2.1	2273	17	112.8	24	2.0	12
7/25/65-8/31/65	37	1F	185.7	133.0	1.4						
		2F	197.0	112.2	1.7						
		NF	221.9	122.5	1.8						
		CF	209.2	99.42	2.1						
		SF	201.0	123.2	1.6	203.0	7	118.1	10	1.7	15
8/31/65-10/10/65	40	1F	76.81	99.80	.8						
		2F	79.92	45.82	1.7						
		NF	1033	--	--						
		CF	67.69	--	--						
		SF	211.3	--	--	293.7	142	72.81		1.2	
11/11/65-4/1/66	141	1F	510.1	302.5	1.7						
		2F	528.2	332.5	1.6						
		NF	--	--	--						
		CF	441.2	223.2	1.9						
		SF	392.6	283.9	1.4	468.2	13	285.5		1.6	13

TABLE A1. (Continued 5)

Collection	Days Exposed	Individual Funnels				Statistics for Each Collection					
		Field	pCi/m ²		Ratio Cs/Sr	¹³⁷ Cs		⁹⁰ Sr		Ratio	
		Location	¹³⁷ Cs	⁹⁰ Sr		Mean	CV	Mean	CV	Mean	CV
4/1/66-5/18/66	47	1F	421.7	273.0	1.5						
		2F	578.3	--	--						
		NF	435.4	--	--						
		CF	147.2	285.3	.5						
		SF	448.5	279.1	1.6	406.2	38	279.1	2	1.2	50
5/18/66-6/19/66	32	1F	89.24	57.87	1.5						
		2F	90.74	--	--						
		NF	155.70	--	--						
		CF	87.40	49.96	1.7						
		SF	96.79	56.30	1.7	104.0	28	54.71	8	1.6	7
6/19/66-7/27/66	38	1F	69.97	42.32	1.6						
		2F	93.19	43.53	2.1						
		NF	71.60	50.29	1.4						
		CF	70.07	--	--						
		SF	73.28	--	--	75.62	13	45.28	10	1.7	21
7/27/66-8/27/66	31	NF	60.17	--	--						
		CF	61.63	--	--	60.90		--		--	
8/27/66-10/13/66	47	1F	55.64	49.29	1.1						
		NF	--	43.77	--	55.64		46.53		1.1	
10/13/66-4/5/67	174	1F	352.2	232.4	1.5						
		2F	314.5	196.9	1.6						
		NF	362.5	234.8	1.5						
		CF	187.3	--	--						
		SF	242.5	179.9	1.3	291.8	25	210.9	13	1.5	9

TABLE A1. (Continued 6)

Collection	Days Exposed	Individual Funnels			Ratio Cs/Sr	Statistics for Each Collection					
		Field	pCi/m ²			¹³⁷ Cs		⁹⁰ Sr		Ratio	
		Location	¹³⁷ Cs	⁹⁰ Sr		Mean	CV	Mean	CV	Mean	CV
4/5/67-5/10/67	35	1F	180.7	133.3	1.3						
		2F	130.1	42.23	3						
		NF	158.0	--	--						
		CF	172.4	75.67	2.2						
		SF	168.5	101.7	1.6	161.9	12	88.22	43	2.0	37

TABLE A2. ^{90}Sr and ^{137}Cs in Individual Pot Fallout Collectors

Collection	Days Exposed	Individual Pots				Statistics for Each Collection			
		Field Location	pCi/m ²		Ratio Cs/Sr	^{137}Cs		^{90}Sr	
			^{137}Cs	^{90}Sr		Mean	CV	Mean	CV
8/27/62-10/11/62	45	P1	--	205.4	--	--	--	205.4	--
11/16/62-4/2/63	137	P1	4429	3086	1.4				
		P2	5377	3606	1.5				
		P3	--	3141	--				
		P4	3672	3019	1.2	4493	19	3213	8
									11
4/2/63-7/2/63	91	P2	3284	--	--				
		P3	--	2291	--	3284		2291	
6/2/63-8/1/63	60	P4	1494	486.5	3.0	1494		486.5	3.0
6/3/63-10/8/63	127	P2	--	642.4	--	--		642.4	--
7/2/63-7/23/63	21	P1	--	488.7	--			488.7	
8/1/63-9/3/63	33	P2	--	705.0					
		P4	1593	803.7	1.9	1593		754.3	1.9
9/3/63-11/4/63	62	P1	--	910.1					
		P3	1825	969.4	1.9	1825		939.7	1.9
10/8/63-11/12/63	35	P2		734					
11/4/63-12/3/63	29	P1	547.8			547.8			

TABLE A2. (Continued 2)

Collection	Days Exposed	Individual Pots				Ratio Cs/Sr	Statistics for Each Collection					
		Field	pCi/m ²		¹³⁷ Cs		⁹⁰ Sr		Ratio			
		Location	¹³⁷ Cs	⁹⁰ Sr	Mean		CV	Mean	CV	Mean	CV	
11/12/63-1/6/63	55	P2 P4	580.3 1953	228.9 226.9	2.5 8.6	1267		227.8		5.5		
1/6/64-4/2/64	86	P1 P2 P3 P4	1704 1860 2125 1823	1171 1168 1229 1233	1.4 1.6 1.7 1.5	1878	9	1200	3	1.6	8	
4/2/64-5/15/64	43	P2 P4	4818 4295	2796 2800	1.7 1.5	4557		2798		1.6		
4/2/64-7/6/64	95	P1 P3	-- 6743	3702 4003	-- 1.7	3853		6743		1.7		
5/15/64-7/1/64	47	P2 P4	2001 2074	1309 --	1.5	2038		1309		1.5		
7/1/64-8/4/64	34	P2 P4	538 509.1	-- 353	-- 1.4	523				1.4		
8/4/64-9/1/64	28	P2 P4	239.7 254.1	172.8 173.8	1.3 1.4	246.9		173.3		1.3		
9/1/64-10/1/64		P2 P4	93.6 105.9	59.88 64.24	1.5 1.6	99.75		62.06		1.5		
9/6/64-2/1/65		P1 P3	2166 1984	1263 1270	1.7 1.6	2075		1267		1.6		

TABLE A2. (Continued 3)

Collection	Days Exposed	Individual Pots			Ratio Cs/Sr	Statistics for Each Collection					
		Field	pCi/m ²			¹³⁷ Cs		⁹⁰ Sr		Ratio	
		Location	¹³⁷ Cs	⁹⁰ Sr		Mean	CV	Mean	CV	Mean	CV
10/1/64-2/1/65	123	P2	1195	790.8	1.5						
		P4	1362	718.8	1.9	1279		754.8		1.7	
2/15/65-4/3/65	47	P1	1202	738.4	1.6						
		P2	1324	826.7	1.6						
		P3	1155	759.8	1.5						
		P4	1142	--	--						
		P5	1241	716.9	1.7						
		P6	1196	777.9	1.5	1210	5	763.9	5	1.6	5
4/3/65-5/1/65	28	P2	1475	929.9	1.6						
		P4	1478	998.3	1.5						
		P6	1525	981.0	1.5	1493	2	969.7	4	1.5	4
4/3/65-5/15/65	42	P1	2149	1327	1.6						
		P3	1889	1302	1.4						
		P5	2078	1302	1.6	2039	7	1310	1	1.5	8
5/1/65-6/2/65	32	P2	885.7	510.2	1.7						
		P4	982.2	657.7	1.5						
		P6	922.5	657.0	1.4	930.1	5	608.3	14	1.6	7
6/2/65-6/28/65	26	P2	632.7	431.2	1.5						
		P4	519.8	--	--						
		P6	569.3	342.0	1.7	573.9	10	386.6		1.6	
6/2/65-8/1/65	34	P2	122.2	65.89	1.8						
		P4	104.6	69.47	1.5						
		P6	108.7	64.27	1.6	111.8	8	66.54	4	1.6	9

TABLE A2. (Continued 4)

Collection	Days Exposed	Individual Pots				Statistics for Each Collection					
		Field	pCi/m ²		Ratio Cs/Sr	¹³⁷ Cs		⁹⁰ Sr		Ratio	
		Location	¹³⁷ Cs	⁹⁰ Sr		Mean	CV	Mean	CV	Mean	CV
5/15/65-9/19/65	127	P1	1314	808.1	1.6						
		P3	1091	721	1.5						
		P5	1188	878.2	1.3	1198	9	802.4	10	1.5	10
8/1/65-9/1/65	31	P2	162	110.2	1.5						
		P4	170.1	106.3	1.6						
		P6	166.3	86.16	1.9	166.1	2	100.9	13	1.7	12
9/1/65-9/30/65	29	P2	210.6	--							
		P4	87.69	60.81	1.4						
		P6	92.59	--		130.3	53	60.81		1.4	
6/30/65-11/11/65	134	P2	102.6	65.35	1.6						
		P4	112.3	65.29	1.7						
		P6	98.83	--		104.6	6	65.32		1.6	
11/11/65-4/1/66	141	P1	687.8	448.5	1.5						
		P2	704.0	--	--						
		P3	738.0	459.5	1.6						
		P4	325.6	299.3	1.1						
		P5	686.0	397.3	1.7						
		P6	764.8	439.6	1.7	651.0	25	408.8	16	1.5	17
4/1/66-5/15/66	44	P1	526.0	323.4	1.6						
		P3	481.2	318.9	1.5						
		P5	398.5	304.2	1.3	468.5	14	315.5	3	1.5	10
4/1/66-5/18/66	47	P2	482.2	314.1	1.5						
		P4	469.5	314.0	1.5						
		P6	445.1	298.4	1.5	465.6	4	308.8	2	1.5	2

TABLE A2. (Continued 5)

Collection	Days Exposed	Individual Pots			Statistics for Each Collection					
		Field Location	pCi/m ²		Ratio Cs/Sr	¹³⁷ Cs		⁹⁰ Sr		Ratio Mean CV
			¹³⁷ Cs	⁹⁰ Sr		Mean	CV	Mean	CV	
6/1/66-7/1/66	30	P2	615.8	477.6	1.3					
		P4	711.6	533.2	1.3					
		P6	779.7	545.8	1.4	702.4	12	518.9	7	1.3 4
5/15/66-8/27/66	104	P1	158.8	123.4	1.3					
		P3	162.2	105.4	1.5					
		P5	195.3	--		172.1	12	114.4		1.4
7/1/66-8/1/66	31	P2	56.25	--						
		P6	66.56	40.76	1.6	61.4		40.76		1.6
8/1/66-8/28/66	27	P2	124.6	--						
		P4	53.42	--		89.01				
10/13/66-4/5/67	174	P1	357.2	178.9	1.9					
		P2	412.5	193.0	2.1					
		P3	394.8	298.8	1.3					
		P4	421.0	314.5	1.3					
		P5	387.4	271.3	1.4					
		P6	453.1	326.2	1.4	404.3	8	263.8	24	1.6 22
4/5/67-5/3/67	28	P2	169.5	127.8	1.3					
		P4	287.6	150.9	1.9					
		P5	186.0	129.4	1.4	214.4	30	136.0	9	1.5 21
4/5/67-5/10/67	35	P1	234.4	137.3	1.7					
		P3	230.4	150.5	1.5					
		P6	207.1	--		224.0	7	143.9		1.6

TABLE A3. Mean Monthly Deviation From the 29 Year
Mean of the Daily Temperature Range at
Saint George Power House

Month	Year						Normal ¹
	<u>61-62</u>	<u>62-63</u>	<u>63-64</u>	<u>64-65</u>	<u>65-66</u>	<u>66-67</u>	
November	-0.5	4.2	4.3	-1.8	3.0	5.4	48.0
December	-1.5	-0.1	-1.5	1.6	0.2	1.4	40.8
January	0.02	-3.8	-1.2	5.4	-1.7	1.6	39.2
February	3.2	6.1	-1.7	1.8	-3.8	2.9	44.5
March	-3.6	-0.5	-3.1	-1.6	2.1	4.5	51.8
April	4.9	-4.0	-1.5	-1.9	0.8	-5.2	60.5
May	-2.1	3.3	-1.0	-2.6	3.9	1.0	68.3
June	0.03	-2.5	0.10	-2.5	3.2	-0.5	76.6
July	-1.3	-1.3	2.2	-0.3	1.5	4.7	83.7
August	1.0	-0.3	0.7	-0.6	3.6	4.6	82.1
September	2.6	0.3	-0.6	-5.6	3.7	2.3	74.7
October	2.0	3.1	5.5	0.9	2.3	4.1	62.1

¹ Normals are climatological normals based on the period 1931-1960. Daily average maximum and minimum temperatures are used to calculate monthly averages. Monthly maximum and minimum values are averaged again to obtain the monthly average temperature. The tabled values result when the average temperature is compared to the climatological normal above.

TABLE A4. Mean Monthly Deviation From The 29 Year
Mean of The Daily Precipitation at
Saint George Power House

<u>Month</u>	<u>Years</u>						<u>Normal</u> ¹
	<u>61-62</u>	<u>62-63</u>	<u>63-64</u>	<u>64-65</u>	<u>65-66</u>	<u>66-67</u>	<u>Inches</u>
November	0.27	-0.28	0.01	-0.10	1.55	0.07	0.58
December	-0.57	-0.77	-1.03	-0.56	1.22	0.74	1.03
January	-0.31	-0.15	-0.67	-0.72	-0.42	0.48	0.98
February	0.08	0.40	-1.03	0.01	-0.59	-1.03	1.03
March	-0.37	-0.25	-0.10	0.09	-0.89	-0.77	0.91
April	-0.45	0.16	0.28	1.86	-0.10	0.22	0.48
May	-0.29	-0.38	0.41	0.22	-0.26	-0.20	0.39
June	-0.08	-0.21	0.07	-0.10	-0.17	-0.05	0.24
July	-0.54	-0.45	0.45	-0.39	-0.17	-0.37	0.60
August	-0.59	0.73	-0.01	0.38	-0.57	-0.24	0.61
September	-0.06	0.76	-0.59	-0.30	-0.13	1.42	0.60
October	-0.26	-0.43	-0.68	-0.50	-0.43	-0.68	0.68
Total	-3.17	-0.87	-2.89	-0.05	-0.96	-0.41	8.13

¹ Normals are based on averages for the period 1931-1960.

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TABLE A5. Daily Temperature and Precipitation Record for Saint George
Power House (1963-1966)

MONTH: JANUARY				1963				1964				1965				1966			
				TEMPERATURE				TEMPERATURE				TEMPERATURE				TEMPERATURE			
				1963				1964				1965				1966			
				MAX. MIN. MEAN				MAX. MIN. MEAN				MAX. MIN. MEAN				MAX. MIN. MEAN			
				PREC. PREC. PREC.				PREC. PREC. PREC.				PREC. PREC. PREC.				PREC. PREC. PREC.			
DAY	MAX.	MIN.	MEAN	PREC.	PREC.	PREC.	PREC.	MAX.	MIN.	MEAN	PREC.	PREC.	PREC.	PREC.	PREC.	MAX.	MIN.	MEAN	PREC.
1	55	23	39	.00	.00	.00	.00	52	29	44	.00	.00	.00	.00	.00	46	29	38	.35
2	56	21	39	.00	.00	.00	.00	62	23	42	.00	.00	.00	.00	.00	42	18	30	.00
3	45	33	39	.41	.00	.00	.00	56	31	44	.00	.00	.00	.00	.00	48	17	33	.00
4	54	35	45	.05	.00	.00	.00	53	20	36	.00	.00	.00	.00	.00	51	18	35	.00
5	54	27	41	.00	.00	.00	.00	48	23	36	.00	.00	.00	.00	.00	50	21	36	.00
6	54	24	39	.00	.00	.00	.00	50	20	35	.00	.00	.00	.00	.00	52	23	38	.00
7	53	23	38	.00	.00	.00	.00	54	27	41	.00	.00	.00	.00	.00	56	23	39	.00
8	54	23	39	.00	.00	.00	.00	57	25	40	.00	.00	.00	.00	.00	55	38	47	.00
9	53	20	36	.00	.00	.00	.00	45	13	29	.00	.00	.00	.00	.00	57	35	46	.00
10	56	23	39	.00	.00	.00	.00	50	13	32	.00	.00	.00	.00	.00	60	26	43	.00
11	49	16	33	.20	.00	.00	.00	52	12	32	.00	.00	.00	.00	.00	63	30	47	.00
12	33	6	20	.00	.00	.00	.00	48	19	33	.00	.00	.00	.00	.00	60	25	42	.00
13	29	2	16	.00	.00	.00	.00	49	11	30	.00	.00	.00	.00	.00	57	22	39	.00
14	42	8	25	.00	.00	.00	.00	46	14	30	.00	.00	.00	.00	.00	56	25	41	.00
15	47	12	30	.00	.00	.00	.00	51	13	32	.00	.00	.00	.00	.00	52	25	39	.00
16	47	15	31	.00	.00	.00	.00	49	15	32	.00	.00	.00	.00	.00	52	25	39	.00
17	46	15	30	.00	.00	.00	.00	53	19	36	.00	.00	.00	.00	.00	56	21	39	.00
18	46	14	31	.00	.00	.00	.00	52	23	38	.00	.00	.00	.00	.00	54	19	36	.00
19	41	18	30	.00	.00	.00	.00	47	24	36	.00	.00	.00	.00	.00	53	19	36	.00
20	45	12	29	.01	.00	.00	.00	59	32	45	.00	.00	.00	.00	.00	49	27	38	.00
21	53	16	35	.00	.00	.00	.00	59	31	45	.00	.00	.00	.00	.00	44	13	29	.00
22	55	19	36	.00	.00	.00	.00	51	33	42	.00	.00	.00	.00	.00	49	12	30	.00
23	59	18	39	.00	.00	.00	.00	50	37	44	.00	.00	.00	.00	.00	50	20	35	.00
24	61	13	37	.00	.00	.00	.00	45	20	33	.01	.00	.00	.00	.00	51	16	33	.00
25	57	12	35	.00	.00	.00	.00	46	20	33	.00	.00	.00	.00	.00	54	18	36	.00
26	57	21	39	.01	.00	.00	.00	58	26	43	.00	.00	.00	.00	.00	53	18	36	.00
27	56	17	36	.00	.00	.00	.00	57	27	42	.00	.00	.00	.00	.00	58	18	38	.00
28	55	15	35	.00	.00	.00	.00	61	25	43	.00	.00	.00	.00	.00	58	18	38	.00
29	60	27	44	.00	.00	.00	.00	59	25	42	.00	.00	.00	.00	.00	57	20	39	.00
30	59	40	56	.08	.00	.00	.00	61	28	45	.00	.00	.00	.00	.00	45	20	33	.00
31	55	46	45	.09	.00	.00	.00	64	27	45	.00	.00	.00	.00	.00	52	27	39	.21

TABLE A5. (Continued 2)

MONTH: FEBRUARY									
1965					1966				
TEMPERATURE		TEMPERATURE		PREC.	TEMPERATURE		TEMPERATURE		PREC.
DAY	MAX.	MIN.	MEAN		MAX.	MIN.	MEAN	MAX.	
1	63	34	49	.00	61	24	42	53	.00
2	69	37	53	.10	60	33	46	45	.00
3	66	41	53	.00	53	25	39	47	.00
4	66	35	51	.00	55	20	38	48	.00
5	73	36	55	.00	65	23	44	50	.53
6	74	34	54	.05	65	29	47	53	.34
7	74	35	55	.00	55	17	37	45	.00
8	74	36	55	.00	51	22	42	41	.00
9	74	43	58	.00	63	25	44	42	.05
10	71	44	57	.67	55	25	45	37	.00
11	55	33	47	.43	65	29	43	33	.00
12	52	37	45	.00	55	35	51	35	.00
13	55	24	39	.00	54	28	37	38	.00
14	51	26	33	.00	49	30	39	42	.05
15	55	25	42	.00	50	15	35	42	.07
16	53	25	42	.00	55	24	40	38	.00
17	63	25	44	.00	65	23	45	35	.00
18	65	29	47	.00	62	26	44	39	.00
19	70	34	52	.00	65	28	47	44	.00
20	73	40	57	.55	59	32	45	44	.00
21	75	37	55	.00	57	33	43	45	.00
22	57	42	55	.18	55	29	44	45	.00
23	67	35	50	.00	57	32	45	42	.00
24	68	33	51	.10	51	25	42	45	.00
25	72	35	53	.00	51	37	49	42	.00
26	74	35	55	.00	51	23	55	47	.12
27	70	44	57	.00	59	22	41	45	.00
28	64	39	51	.00	67	21	44	45	.00
29				.00	54	32	48	45	.00

TABLE A5. (Continued 3)

DAY	MARCH			1964			1965			1966		
	TEMPERATURE			TEMPERATURE			TEMPERATURE			TEMPERATURE		
	MAX.	MIN.	MEAN	PREC.	MAX.	MIN.	MEAN	PREC.	MAX.	MIN.	MEAN	PREC.
1	73	52	52	.00	59	27	43	.00	65	30	51	.00
2	73	51	52	.00	57	35	46	.00	62	30	46	.02
3	65	38	52	.00	53	32	42	.20	55	16	32	.00
4	55	30	42	.00	62	25	44	.00	48	15	32	.00
5	58	25	42	.00	64	39	52	.00	60	24	42	.00
6	63	36	47	.00	50	25	38	.00	66	36	52	.00
7	64	27	45	.00	50	25	38	.00	71	27	49	.00
8	68	38	53	.00	51	27	39	.00	69	35	51	.00
9	69	32	51	.00	53	24	39	.00	76	36	56	.00
10	64	35	50	.00	57	32	45	.00	75	35	55	.00
11	66	32	49	.00	66	26	46	.00	74	36	56	.00
12	61	41	51	.00	56	44	55	.00	79	34	57	.00
13	60	27	44	.00	61	38	50	.25	78	45	61	.00
14	67	27	47	.02	57	36	48	.00	79	38	56	.00
15	68	33	51	.20	64	35	50	.00	79	38	58	.00
16	60	27	44	.36	67	39	53	.00	77	37	57	.00
17	46	27	36	.08	74	35	54	.00	72	39	55	.00
18	58	27	42	.00	72	35	54	.00	72	32	52	.00
19	63	30	47	.00	66	31	48	.00	76	37	57	.00
20	72	32	52	.00	54	26	45	.00	75	39	57	.00
21	80	36	56	.00	71	34	52	.00	72	36	54	.00
22	80	44	62	.00	66	27	47	.00	72	30	51	.00
23	74	43	57	.00	56	35	45	.00	67	30	48	.00
24	69	42	55	.00	51	33	42	.32	67	37	52	.00
25	70	52	57	.00	55	31	44	.06	75	35	54	.00
26	76	50	57	.00	63	33	48	.00	72	41	57	.00
27	79	42	61	.00	74	30	55	.00	78	43	61	.00
28	77	57	57	.00	75	39	57	.00	85	43	64	.00
29	73	55	54	.00	80	42	61	.00	85	44	64	.00
30	77	56	56	.00	85	45	65	.00	85	43	64	.00
31	77	55	56	.00	85	45	65	.00	86	43	66	.00

TABLE A5. (Continued 4)

MONTH: APRIL																
1963				1964				1965				1966				
TEMPERATURE				TEMPERATURE				TEMPERATURE				TEMPERATURE				
DAY	MAX.	MIN.	MEAN	PREC.	MAX.	MIN.	MEAN	PREC.	MAX.	MIN.	MEAN	PREC.	MAX.	MIN.	MEAN	PREC.
1	70	45	56	.00	80	54	67	.00	79	45	62	.15	89	50	70	.00
2	58	34	46	.03	61	44	52	.32	61	42	52	.19	90	45	67	.00
3	66	30	48	.00	62	41	52	.03	63	44	54	.26	89	50	70	.00
4	78	34	56	.00	62	54	58	.00	54	44	49	.32	77	38	58	.00
5	77	30	54	.00	59	45	52	.01	52	42	47	.10	78	33	55	.00
6	80	43	61	.00	57	36	47	.25	63	43	54	.02	83	35	59	.00
7	79	49	64	.00	65	33	49	.02	60	43	52	.26	84	40	62	.00
8	76	55	67	.00	70	37	54	.00	56	44	50	.37	85	40	63	.00
9	74	46	60	.00	77	42	60	.00	54	39	47	.18	82	45	64	.00
10	68	37	52	.00	77	42	60	.00	52	38	45	.27	76	37	57	.00
11	74	36	56	.00	77	43	60	.00	57	34	45	.01	75	50	63	.00
12	61	37	59	.00	77	46	61	.00	49	35	44	.15	74	45	60	.00
13	83	40	61	.00	78	41	60	.00	61	38	50	.08	77	43	60	.00
14	66	53	71	.00	82	44	63	.00	66	37	52	.00	82	45	64	.00
15	78	48	63	.05	88	45	67	.00	74	36	56	.00	85	45	65	.00
16	66	39	52	.00	37	45	66	.00	74	43	58	.00	86	41	64	.00
17	63	39	51	.10	35	53	72	.00	78	41	60	.00	86	44	65	.00
18	61	31	46	.05	80	43	61	.00	79	50	64	.00	79	42	61	.13
19	67	40	54	.00	74	40	57	.13	83	51	68	.00	54	38	46	.17
20	63	36	51	.00	70	35	58	.00	67	53	70	.00	59	31	45	.08
21	62	34	48	.00	75	44	60	.00	86	54	70	.00	74	34	54	.00
22	65	29	47	.00	78	44	61	.00	87	56	72	.00	73	45	59	.00
23	73	33	53	.00	75	44	60	.00	86	57	72	.00	75	42	58	.00
24	77	35	56	.00	67	39	53	.00	80	50	65	.00	84	44	64	.00
25	79	39	59	.00	62	35	48	.00	82	53	67	.00	85	46	66	.00
26	73	45	59	.40	71	33	52	.00	77	49	63	.00	85	48	67	.00
27	65	43	54	.06	83	44	64	.00	78	54	66	.00	86	44	65	.00
28	74	43	58	.00	85	49	67	.00	82	49	66	.00	79	42	61	.00
29	79	44	61	.00	77	33	65	.00	87	52	70	.00	83	45	64	.00
30	87	47	67	.00	75	35	67	.00	85	53	76	.00	87	46	67	.00

TABLE A5. (Continued 5)

JULY: MAY				1904				1905				1906				
DAY	TEMPERATURE			PREC.	TEMPERATURE			PREC.	TEMPERATURE			PREC.	TEMPERATURE			PREC.
	MAX.	MIN.	MEAN		MAX.	MIN.	MEAN		MAX.	MIN.	MEAN		MAX.	MIN.	MEAN	
1	88	50	69	.00	77	40	58	.00	89	25	72	.00	91	47	69	.00
2	87	48	67	.00	70	39	55	.00	87	20	69	.00	93	48	70	.00
3	87	53	70	.00	69	38	54	.00	80	49	64	.00	93	50	72	.00
4	88	51	70	.00	69	47	58	.00	72	42	57	.00	91	53	72	.00
5	91	51	71	.00	63	53	58	.00	76	41	58	.00	92	59	76	.00
6	96	50	74	.00	57	42	50	.00	76	38	57	.00	94	59	77	.00
7	92	57	75	.00	54	34	44	.69	68	40	54	.00	94	58	76	.00
8	96	55	76	.00	68	35	52	.11	67	34	51	.00	85	62	73	.04
9	85	55	70	.00	77	40	58	.00	72	40	56	.00	76	60	68	.02
10	84	59	72	.00	82	47	64	.00	74	45	60	.00	72	51	61	.05
11	80	52	66	.00	86	52	69	.00	79	44	61	.00	74	48	61	.02
12	74	43	58	.00	90	52	71	.00	82	48	65	.00	75	42	58	.00
13	85	53	69	.00	91	56	73	.00	80	54	67	.00	84	44	64	.00
14	82	52	69	.00	92	53	73	.00	79	57	68	.00	87	51	69	.00
15	87	49	68	.00	94	54	74	.00	84	56	70	.02	83	55	72	.00
16	89	51	70	.00	93	56	75	.00	89	55	72	.00	90	51	70	.00
17	95	50	73	.00	90	52	71	.00	91	57	74	.00	93	56	75	.00
18	98	52	75	.00	94	51	73	.00	92	61	77	.00	95	59	77	.00
19	98	54	76	.00	96	53	75	.00	92	60	76	.00	97	53	75	.00
20	98	57	77	.00	95	57	76	.00	89	66	77	.00	97	52	75	.00
21	97	61	79	.00	95	59	77	.00	86	59	73	.00	96	48	72	.00
22	94	56	75	.00	95	59	77	.00	86	54	70	.00	90	65	77	.00
23	69	61	75	.00	94	59	77	.00	74	48	61	.06	90	54	72	.00
24	90	53	72	.00	91	61	76	.00	57	46	52	.42	96	52	74	.00
25	90	54	72	.00	88	45	67	.00	72	57	64	.01	100	52	76	.00
26	91	54	73	.00	89	45	73	.00	76	45	61	.10	100	59	80	.00
27	91	53	72	.00	88	53	73	.00	79	47	63	.00	97	60	79	.00
28	91	52	72	.00	86	48	64	.00	88	50	69	.00	96	61	79	.00
29	90	53	72	.00	84	56	70	.00	53	51	72	.00	95	58	77	.00
30	89	52	70	.00	86	55	72	.00	95	56	76	.00	93	54	73	.00
31	93	52	74	.00	95	57	76	.00	95	59	76	.00	91	51	71	.00

TABLE A5. (Continued 6)

MONTH: JUNE									
1963					1964				
TEMPERATURE		TEMPERATURE		TEMPERATURE		TEMPERATURE		TEMPERATURE	
DAY	MAX.	MIN.	MEAN	PREC.	DAY	MAX.	MIN.	MEAN	PREC.
1965					1966				
TEMPERATURE		TEMPERATURE		TEMPERATURE		TEMPERATURE		TEMPERATURE	
DAY	MAX.	MIN.	MEAN	PREC.	DAY	MAX.	MIN.	MEAN	PREC.
1	92	62	77	.02	1	98	59	79	.00
2	88	55	72	.00	2	90	62	76	.00
3	87	52	70	.00	3	95	54	75	.00
4	86	56	71	.00	4	95	54	75	.00
5	82	49	66	.00	5	95	60	77	.00
6	82	51	67	.00	6	95	58	77	.00
7	81	48	64	.00	7	91	58	75	.10
8	85	43	67	.00	8	81	45	63	.21
9	85	51	68	.00	9	80	59	70	.00
10	85	56	70	.00	10	78	51	64	.00
11	90	48	69	.00	11	88	50	69	.00
12	89	58	73	.00	12	92	54	73	.00
13	88	51	70	.00	13	95	62	79	.00
14	94	56	75	.00	14	98	61	80	.00
15	94	57	76	.00	15	98	59	79	.00
16	95	58	77	.00	16	97	72	85	.00
17	98	60	79	.00	17	90	42	66	.00
18	98	62	80	.01	18	89	54	72	.00
19	100	64	82	.00	19	89	60	75	.00
20	100	66	83	.00	20	92	63	77	.00
21	93	70	82	.00	21	92	58	80	.00
22	95	65	80	.00	22	90	60	75	.00
23	94	64	79	.00	23	97	59	78	.00
24	83	54	71	.00	24	104	60	82	.00
25	96	53	75	.00	25	108	64	86	.00
26	99	52	76	.00	26	103	74	89	.00
27	99	56	77	.00	27	101	74	88	.00
28	97	59	76	.00	28	97	65	80	.00
29	94	57	76	.00	29	97	64	80	.00
30	95	55	76	.00	30	100	62	81	.00

TABLE A5. (Continued 7)

MONTH: JULY				1964			1965			1966		
TEMPERATURE				TEMPERATURE			TEMPERATURE			TEMPERATURE		
DAY	MAX.	MIN.	MEAN	PREC.	MAX.	MIN.	MEAN	PREC.	MAX.	MIN.	MEAN	PREC.
1	99	59	79	.00	100	63	82	.00	99	61	80	.00
2	100	54	77	.00	102	64	83	.00	99	58	79	.00
3	100	59	80	.00	103	61	82	.00	102	60	81	.00
4	99	59	79	.00	101	66	83	.00	104	63	83	.00
5	98	59	79	.00	101	59	80	.00	104	66	85	.00
6	100	60	80	.00	102	57	80	.00	101	56	79	.00
7	101	62	82	.00	105	60	83	.00	101	64	83	.00
8	102	65	83	.00	100	64	82	.00	102	71	86	.00
9	100	71	86	.00	95	76	86	.00	102	66	84	.00
10	98	63	80	.00	101	68	85	.00	100	71	86	.00
11	100	54	82	.00	104	69	86	.00	100	78	89	.00
12	101	62	82	.00	110	79	95	.00	97	73	86	.00
13	103	62	83	.00	101	74	86	.00	99	65	82	.00
14	104	63	83	.00	102	77	89	.00	102	68	85	.00
15	103	62	83	.00	101	76	89	.00	100	74	87	.00
16	101	75	88	.00	103	69	86	.00	100	70	85	.00
17	100	67	83	.00	106	68	87	.00	98	75	86	.00
18	102	62	82	.00	107	69	88	.00	91	73	82	.00
19	103	59	81	.00	108	67	88	.00	94	69	81	.00
20	99	69	84	.00	105	71	88	.00	97	65	81	.00
21	100	61	80	.00	105	69	87	.00	97	64	80	.00
22	104	74	89	.00	104	77	91	.00	97	71	84	.00
23	104	66	86	.15	106	76	91	.00	94	57	80	.00
24	106	66	86	.00	107	75	91	.00	94	69	82	.00
25	109	65	87	.00	100	72	86	.00	96	60	78	.00
26	103	64	85	.00	94	70	82	.00	100	63	82	.00
27	101	62	82	.00	94	64	79	.00	101	68	85	.00
28	101	62	82	.00	104	71	88	.00	104	67	86	.00
29	99	61	80	.00	106	69	86	.00	102	77	89	.00
30	100	57	80	.00	103	73	88	.00	97	71	84	.00
31	103	65	84	.00	96	74	86	.00	100	71	86	.00

TABLE A5. (Continued 8)

MONTH: AUGUST				1964			1965			1966		
TEMPERATURE				TEMPERATURE			TEMPERATURE			TEMPERATURE		
DAY	MAX.	MIN.	MEAN	PREC.	MAX.	MIN.	MEAN	PREC.	MAX.	MIN.	MEAN	PREC.
1	102	72	87	.00	94	74	84	.02	102	71	86	.00
2	97	68	83	.00	97	77	87	.00	102	68	85	.00
3	97	64	80	.51	99	70	85	.00	100	68	84	.00
4	99	67	83	.00	101	72	86	.00	101	64	83	.00
5	98	69	83	.04	99	70	85	.00	102	64	83	.00
6	96	64	80	.05	98	72	85	.00	105	65	85	.00
7	93	67	80	.01	106	74	90	.00	104	61	83	.00
8	94	66	80	.00	105	76	91	.00	105	74	89	.00
9	100	65	83	.00	105	74	90	.00	105	70	86	.00
10	104	64	84	.00	102	82	92	.00	102	73	88	.06
11	102	64	83	.00	100	69	85	.00	103	71	87	.00
12	104	65	85	.00	99	70	85	.00	100	67	85	.45
13	104	67	86	.00	100	69	85	.02	99	69	84	.00
14	109	66	88	.00	95	63	80	.56	96	71	83	.26
15	106	67	86	.00	98	72	85	.00	96	71	83	.00
16	101	70	85	.02	99	70	85	.00	94	68	81	.17
17	95	69	82	.04	104	63	83	.00	93	67	80	.00
18	97	65	81	.00	102	62	82	.00	89	62	76	.00
19	99	65	82	.00	95	67	81	.00	92	59	76	.03
20	93	64	82	.00	93	62	77	.00	94	62	78	.00
21	101	72	86	.00	93	58	76	.00	95	65	80	.00
22	96	64	81	.25	99	59	79	.00	93	58	76	.00
23	96	67	80	.00	104	58	81	.00	93	58	76	.00
24	93	63	80	.00	102	50	81	.00	97	57	77	.00
25	97	64	80	.95	101	65	85	.00	98	57	77	.00
26	95	65	80	.00	100	70	85	.00	99	55	77	.00
27	92	65	77	.00	92	64	80	.00	100	54	77	.00
28	99	61	80	.00	94	58	76	.00	96	60	79	.00
29	101	57	79	.00	94	54	74	.00	98	65	82	.00
30	89	51	75	.37	95	60	77	.00	95	69	82	.00
31	89	57	73	.00	93	51	72	.00	96	65	80	.00

TABLE A5. (Continued 9)

MONTH: SEPTEMBER																
1963																
TEMPERATURE																
DAY	MAX.	MIN.	MEAN	PREC.	1964			1965			1966					
					MAX.	MIN.	MEAN	PREC.	MAX.	MIN.	MEAN	PREC.	MAX.	MIN.	MEAN	PREC.
1	90	56	73	.00	93	49	71	.00	97	55	81	.00	86	57	72	.00
2	98	57	77	.00	87	53	70	.00	97	65	81	.00	92	56	74	.00
3	100	56	78	.00	94	50	72	.00	94	65	80	.00	95	56	76	.00
4	98	61	80	.00	94	50	72	.00	92	59	76	.00	97	61	79	.00
5	92	62	77	.08	98	51	75	.00	90	67	79	.03	102	60	81	.00
6	92	57	75	.00	100	52	76	.00	90	62	76	.00	100	61	80	.00
7	97	59	78	.00	98	60	79	.00	90	62	76	.14	102	61	82	.00
8	101	58	80	.00	94	54	74	.00	90	58	74	.00	101	62	82	.00
9	100	61	80	.07	94	61	77	.00	85	50	67	.00	102	58	80	.00
10	98	60	79	.00	94	58	76	.00	90	48	69	.00	98	70	84	.00
11	100	60	80	.04	94	55	75	.00	92	48	70	.00	96	74	85	.00
12	101	61	81	.00	97	56	77	.00	92	56	74	.00	92	68	80	.00
13	99	61	80	.07	98	56	77	.00	92	50	71	.00	89	65	77	.00
14	86	50	68	.38	97	62	80	.01	93	47	70	.00	86	68	77	.00
15	92	54	73	.00	94	64	79	.00	93	43	70	.00	90	48	69	.00
16	92	65	79	.02	92	54	73	.00	90	50	70	.00	94	52	73	.00
17	88	59	73	.04	97	54	76	.00	88	48	68	.00	100	55	77	.00
18	82	54	68	.62	93	54	73	.00	80	38	52	.03	98	62	80	.00
19	85	53	69	.04	92	68	80	.00	67	37	52	.10	95	62	79	.46
20	85	55	70	.00	85	55	70	.00	73	37	55	.00	94	61	77	.01
21	86	49	67	.00	35	46	66	.00	74	39	57	.00	99	65	82	.00
22	93	50	72	.00	83	58	70	.00	85	42	64	.00	102	67	85	.00
23	91	49	70	.00	91	52	72	.00	91	45	68	.00	101	66	83	.00
24	94	50	72	.00	92	54	73	.00	93	49	71	.00	97	64	80	.00
25	95	51	73	.00	93	55	74	.00	93	50	72	.00	97	64	80	.00
26	94	50	72	.00	93	63	76	.00	92	50	71	.00	91	61	76	.00
27	96	52	75	.00	87	47	67	.00	91	54	73	.00	84	64	74	.00
28	94	53	76	.00	92	56	74	.00	90	53	72	.00	92	57	75	.00
29	100	51	75	.00	91	54	73	.00	72	39	55	.00	94	59	77	.00
30	99	50	75	.00	91	54	73	.00	79	42	61	.00	90	60	75	.00

TABLE A5. (Continued 10)

MONTH: OCTOBER											
1963			1964			1965			1966		
TEMPERATURE			TEMPERATURE			TEMPERATURE			TEMPERATURE		
DAY	MAX.	MIN.	MEAN	PREC.	MAX.	MIN.	MEAN	PREC.	MAX.	MIN.	MEAN
PREC.											PREC.
1	97	51	74	.00	91	51	71	.00	85	39	62
2	99	51	75	.00	93	49	71	.00	90	43	67
3	96	50	73	.00	95	53	74	.00	89	44	67
4	92	49	70	.00	94	49	72	.00	91	43	67
5	86	54	70	.04	97	54	76	.00	90	47	69
6	90	47	69	.07	95	54	75	.00	90	40	68
7	91	48	70	.00	93	54	75	.00	92	47	70
8	90	48	69	.00	94	54	74	.00	90	45	67
9	91	50	70	.00	94	54	74	.00	91	44	67
10	91	47	69	.00	95	53	74	.00	92	47	70
11	91	48	70	.00	92	55	73	.00	91	46	69
12	85	45	65	.00	90	51	70	.00	89	46	67
13	78	44	61	.00	95	49	72	.00	84	45	64
14	67	36	51	.00	92	46	69	.00	87	43	65
15	89	39	64	.00	95	48	72	.00	83	54	69
16	87	39	63	.00	92	48	70	.00	72	43	58
17	83	54	69	.03	89	52	70	.00	66	41	54
18	80	43	61	.05	85	50	70	.00	73	41	57
19	64	48	56	.10	84	49	67	.00	76	39	56
20	73	50	61	.01	82	42	62	.00	60	41	61
21	80	44	62	.00	86	43	64	.00	65	43	63
22	80	40	60	.00	85	40	63	.00	63	42	65
23	70	39	55	.00	84	41	63	.00	82	39	61
24	60	45	63	.00	84	40	62	.00	77	33	56
25	80	40	60	.00	76	37	57	.00	62	40	61
26	82	43	63	.00	78	36	57	.00	62	40	61
27	83	41	62	.00	82	40	61	.00	82	40	61
28	83	44	64	.00	91	44	67	.00	82	39	61
29	83	44	64	.00	84	52	68	.00	79	36	58
30	81	43	62	.00	77	39	58	.00	79	37	58
31	77	41	59	.04	75	40	58	.00	80	37	58

TABLE A5. (Continued 11)

MONTH: NOVEMBER									
1963					1964				
TEMPERATURE					TEMPERATURE				
DAY	MAX.	MIN.	MEAN	PREC.	DAY	MAX.	MIN.	MEAN	PREC.

1	73	31	52	.00	77	41	59	.00	82
2	74	34	54	.00	75	41	58	.00	81
3	68	33	53	.03	72	42	57	.00	74
4	70	48	59	.00	71	38	55	.00	73
5	72	46	59	.00	75	34	55	.00	73
6	72	47	60	.00	75	32	54	.00	74
7	70	38	54	.43	71	32	52	.00	76
8	63	40	52	.00	69	31	50	.00	71
9	68	35	52	.00	75	33	54	.00	69
10	70	47	58	.00	74	35	55	.00	68
11	76	45	61	.00	70	38	54	.12	66
12	78	43	61	.00	59	32	45	.11	66
13	69	45	58	.00	56	39	48	.00	63
14	74	43	58	.00	56	34	45	.06	60
15	74	54	64	.04	49	30	39	.00	60
16	63	48	55	.00	43	22	33	.00	59
17	60	22	41	.00	44	29	36	.19	61
18	63	34	48	.00	41	22	32	.00	66
19	65	33	49	.00	47	16	32	.00	65
20	62	37	50	.00	49	22	36	.00	63
21	57	43	50	.00	51	22	36	.00	63
22	54	33	44	.00	57	24	41	.00	61
23	59	29	44	.00	61	27	44	.00	66
24	62	50	50	.00	53	26	42	.00	65
25	58	33	45	.00	59	27	43	.00	60
26	60	34	47	.00	59	29	44	.00	52
27	62	32	47	.00	64	34	49	.00	52
28	64	34	49	.00	64	37	51	.00	52
29	61	39	50	.00	64	32	48	.00	55
30	60	31	45	.00	64	30	47	.00	56

TABLE A5. (Continued 12)

MONTH: DECEMBER				1964				1965				1966				
TEMPERATURE				TEMPERATURE				TEMPERATURE				TEMPERATURE				
DAY	MAX.	MIN.	MEAN	PREC.	MAX.	MIN.	MEAN	PREC.	MAX.	MIN.	MEAN	PREC.	MAX.	MIN.	MEAN	PREC.
Monthly Record																
Missing																
1					65	29	48	.00	56	25	41	.00	69	35	52	.00
2					64	37	51	.02	57	25	41	.00	60	43	52	.00
3					61	41	51	.00	58	24	41	.00	58	48	53	.18
4					59	39	49	.10	60	26	43	.00	56	35	45	.11
5					56	28	42	.00	59	26	42	.00	54	44	49	.33
6					56	35	45	.00	61	27	44	.00	66	50	58	.58
7					53	27	40	.00	66	30	48	.00	63	39	51	.25
8					51	25	38	.00	60	41	51	.00	58	31	45	.00
9					50	24	37	.00	59	45	52	.22	54	30	42	.00
10					58	35	47	.00	52	43	48	.79	54	31	42	.00
11					59	26	42	.00	55	38	47	.10	53	29	41	.00
12					54	25	39	.00	53	39	46	.11	52	30	41	.00
13					54	34	44	.05	48	33	41	.18	54	28	41	.00
14					45	18	32	.00	46	32	40	.03	58	31	45	.00
15					49	15	32	.00	46	34	40	.03	57	31	44	.00
16					47	19	33	.00	46	28	37	.00	56	26	42	.00
17					51	16	33	.00	45	28	38	.00	57	28	42	.00
18					50	19	35	.00	46	20	34	.00	57	27	42	.00
19					47	21	34	.02	45	22	33	.00	56	26	42	.00
20					39	32	36	.25	52	19	36	.00	56	26	41	.00
21					43	36	42	.00	50	20	35	.00	56	30	43	.00
22					56	39	48	.00	45	31	38	.50	55	24	39	.00
23					58	32	45	.00	47	31	39	.02	53	24	39	.00
24					60	42	51	.00	47	21	34	.00	55	26	41	.00
25					65	42	54	.00	51	21	36	.00	55	22	39	.00
26					66	34	50	.00	51	27	39	.00	44	34	39	.00
27					64	34	49	.00	53	25	39	.00	45	24	35	.00
28					64	45	55	.00	52	27	39	.00	43	19	31	.00
29					62	41	52	.02	55	30	42	.00	40	19	30	.00
30					51	25	38	.01	50	36	46	.27	41	27	34	.32
31					50	19	35	.00	50	25	41	.00	40	16	28	.00

TABLE A6. Mean ¹³⁷Cesium Concentration per Kilogram and per Square Meter and Statistics for Each Alfalfa Harvest

Date	Number of Samples	pCi/m ²			pCi/kg		
		Mean	Standard Deviation	Coefficient of Variation	Mean	Standard Deviation	Coefficient of Variation
7-18-62	1	29.02	--	--	134.2	--	--
8-22-62	3	115.30	38.360	33.20	348.7	134.50	38.60
10-10-62	2	108.00	9.485	8.79	764.9	103.50	13.50
5-14-63	11	930.50	147.500	15.90	1667.0	230.50	13.80
6-18-63	7	453.10	84.350	18.60	1281.0	165.50	12.90
7-22-63	12	152.30	53.750	35.30	418.4	154.70	37.00
8-26-63	10	153.30	65.460	42.70	539.9	183.30	34.00
10-6-63	11	78.63	21.630	27.70	720.9	153.60	21.30
5-14-64	11	1248.00	358.500	28.70	3058.0	236.80	7.74
6-16-64	11	281.40	68.460	24.30	1031.0	125.80	12.20
7-20-64	6	72.60	24.760	34.10	287.6	86.66	30.10
8-25-64	7	56.29	14.090	25.00	228.2	23.30	10.20
10-18-64	74	30.77	7.804	2.54	194.5	43.09	22.20
5-11-65	46	479.20	150.800	31.50	1200.2	201.40	16.80
6-16-65	20	245.20	37.130	15.10	800.4	91.78	11.50
7-20-65	63	36.95	8.550	23.10	125.0	17.38	13.90
8-26-65	64	32.00	7.160	22.40	122.8	17.43	14.20
10-8-65	69	20.19	3.870	19.20	114.9	14.95	13.00
5-11-66	16	265.00	38.910	14.70	552.4	86.02	15.60
6-16-66	70	37.54	14.780	39.40	118.0	39.60	33.60
8-26-66	7	33.36	29.590	88.70	131.1	95.45	72.80
10-13-66	70	26.60	7.212	27.10	119.1	38.01	31.90
5-9-67	12	122.20	13.070	10.00	329.9	44.20	13.40

TABLE A7. Mean ⁹⁰Strontium Concentration per Kilogram and per Square Meter and Statistics for Each Alfalfa Harvest

Date	Number	pCi/m ²			pCi/kg		
		Mean	Standard Deviation	Coefficient of Variation	Mean	Standard Deviation	Coefficient of Variation
7-18-62	4	49.98	9.302	18.6	273.6	34.14	12.50
8-22-62	2	131.90	43.540	33.0	403.3	--	20.80
10-10-62	5	85.62	23.800	27.8	623.1	112.20	18.00
5-14-63	6	921.70	301.400	32.7	1618.0	243.90	15.10
6-18-63	9	460.60	67.630	14.7	1324.0	96.34	7.27
7-22-63	12	145.54	27.600	19.0	396.6	40.81	10.30
8-26-63	11	139.10	42.450	30.5	479.0	85.31	17.80
10-6-63	16	79.88	25.890	32.4	661.2	63.56	9.61
5-14-64	8	1044.00	253.500	24.3	2459.0	196.20	7.97
6-16-64	6	343.90	43.650	12.7	249.3	141.00	11.30
7-20-64	5	95.73	12.590	13.2	398.3	29.16	7.32
8-25-64	5	93.81	14.860	15.8	382.8	35.73	9.34
10-18-64	69	65.63	13.420	20.4	415.6	63.83	15.40
5-11-65	68	502.40	118.000	23.5	1258.0	140.30	11.10
6-16-65	58	268.40	36.570	13.6	830.0	93.18	11.20
7-20-65	69	111.30	20.980	18.9	379.4	44.00	11.60
8-26-65	63	100.10	16.960	17.0	390.0	49.71	12.80
10-8-65	73	66.13	11.480	17.4	376.9	43.24	11.50
5-11-66	68	402.00	69.520	17.3	751.6	73.21	9.74
6-16-66	65	110.70	23.490	21.2	348.2	40.11	11.50
8-26-66	12	74.05	22.390	30.2	322.0	74.78	23.20
10-13-66	71	76.98	15.200	19.7	337.5	36.59	10.80
5-9-67	20	239.20	35.400	14.8	559.2	87.78	15.70

TABLE A8. Alfalfa Yield (kg/m²) for Each Harvest

Date	Yield (kg/m ²)				⁹⁰ Sr Samples			
	¹³⁷ Cs Samples		Coefficient of Variation		Standard Deviation		Coefficient of Variation	
	Number of Samples	Mean	Standard Deviation	Number of Samples	Mean	Standard Deviation	Number of Samples	Coefficient of Variation
7-18-62	1	.2163	--	4	.1819	.0126	6.93	
8-22-62	3	.3345	.0178	2	.3228	.0409	12.70	
10-10-62	2	.1416	.0067	5	.1368	.0257	18.80	
5-14-63	11	.5626	.0915	6	.5617	.1152	20.50	
6-18-63	7	.3526	.0426	9	.3480	.0457	13.10	
7-22-63	12	.3655	.0446	12	.3656	.0447	12.20	
8-26-63	10	.2795	.0493	11	.2871	.0530	18.50	
10-6-63	11	.1119	.0352	16	.1213	.0379	31.20	
5-14-64	11	.4054	.1011	8	.4243	.0994	23.40	
6-16-64	11	.2730	.0509	6	.2752	.0150	5.47	
7-20-64	6	.2515	.0424	5	.2418	.0393	16.20	
8-25-64	7	.2435	.0308	5	.2452	.0353	14.40	
10-18-64	74	.1596	.0320	69	.1595	.0326	20.50	
5-11-65	46	.3940	.0839	68	.3981	.0751	18.90	
6-16-65	20	.3070	.0351	58	.3259	.0482	14.80	
7-20-65	63	.2960	.0568	59	.2956	.0543	18.40	
8-26-65	64	.2597	.0374	63	.2573	.0325	12.60	
10-8-65	69	.1756	.0256	73	.1754	.0253	14.40	
5-11-66	16	.4874	.0825	68	.5362	.0863	16.10	
6-16-66	70	.3176	.0606	65	.3192	.0624	19.60	
8-26-66	7	.2340	.0460	12	.2262	.0358	15.80	
10-13-66	70	.2268	.0383	71	.2284	.0380	16.70	
5-9-67	12	.4044	.0808	20	.4422	.1072	24.20	

TABLE A9. CESIUM-137 IN INDIVIDUAL ALFALFA SAMPLES

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2

SAMPLES COLLECTED 5/14/63				
1	NF	1036.22	1966.00	.5271
2	CF	952.26	1822.00	.5226
3	SF	884.56	1881.00	.4703
4	P1	843.09	1795.00	.4694
5	P2	953.63	1757.00	.5421
6	P3	1047.31	1773.00	.5907
7	P4	935.09	1729.00	.5408
8	22	614.11	1229.00	.4997
9	28	843.48	1373.00	.6121
10	29	1202.30	1522.00	.7899
11	30	922.29	1479.00	.6236
SAMPLES COLLECTED 6/18/63				
1	NF	527.03	1281.00	.4114
2	CF	511.22	1268.00	.4032
3	SF	402.71	1203.00	.3348
4	P1	395.95	1128.00	.3510
5	P2	457.20	1407.00	.3249
6	P3	321.09	1103.00	.2911
7	P4	556.04	1576.00	.3528
SAMPLES COLLECTED 7/22/63				
1	NF	105.17	354.30	.2968
2	CF	206.75	448.90	.4606
3	SF	157.21	458.50	.3429
4	P1	146.22	405.10	.3609
5	P2	176.48	410.00	.4304
6	P3	122.71	380.30	.3227
7	P4	143.28	406.10	.3528
8	96	109.83	297.00	.3698
9	97	293.84	880.30	.3338
10	99	118.96	318.10	.3740
11	100	136.49	356.30	.3831
12	102	110.05	306.30	.3593
SAMPLES COLLECTED 8/26/63				
1	NF	252.36	919.80	.2744
2	CF	202.26	681.10	.2970
3	P1	264.66	703.40	.3763
4	P2	150.30	537.50	.2796
5	P3	104.70	487.70	.2147

TABLE A9. (Continued 2)

CESIUM-137 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
6	126	148.91	453.90	.3015
7	127	125.04	512.90	.2442
8	128	103.11	392.40	.2623
9	131	75.80	347.10	.2184
10	132	105.84	323.70	.3270

SAMPLES COLLECTED 10/ 6/63

1	NF	69.16	843.00	.0820
2	SF	74.81	939.20	.0797
3	P1	105.85	1015.00	.1043
4	P2	50.42	707.30	.0713
5	P3	85.93	729.40	.1178
6	169	116.68	608.60	.1917
7	171	56.91	512.20	.1111
8	172	83.78	600.30	.1396
9	173	49.05	617.60	.0794
10	174	94.09	708.10	.1329
11	174	78.31	649.60	.1206

SAMPLES COLLECTED 5/14/64

1	CF	935.75	2685.00	.3485
2	SF	859.70	2657.00	.3009
3	P2	957.10	3029.00	.3160
4	P3	816.03	2777.00	.2939
5	187	1360.78	3262.00	.4172
6	188	1420.77	3229.00	.4400
7	189	1952.03	3375.00	.5784
8	190	1450.16	3138.00	.4621
9	191	1533.87	2884.00	.5019
10	192	992.25	3363.00	.2950
11	194	1445.34	3041.00	.4756

SAMPLES COLLECTED 6/16/64

1	CF	233.84	840.60	.2782
2	SF	260.63	1001.00	.2604
3	P2	246.34	839.00	.2936
4	P3	256.32	974.60	.2630
5	252	263.57	1025.00	.2571
6	261	312.99	1051.00	.2973
7	262	279.48	1069.00	.2614
8	265	416.02	1296.00	.3210
9	266	318.86	1048.00	.3043
10	268	353.92	1082.00	.3271
11	270	154.12	1109.00	.1390

TABLE A9. (Continued 3)

CESIUM-137 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	FCI/M2	PCI/KG	KG/M2

SAMPLES COLLECTED 7/20/64				
1	NF	102.08	437.50	.2333
2	CF	60.86	242.10	.2514
3	SF	63.38	216.30	.2930
4	P1	66.34	268.50	.2471
5	P3	40.38	219.50	.1639
6	P4	102.53	341.70	.3001
7	NF	51.98	218.30	.2351
SAMPLES COLLECTED 8/25/64				
1	CF	71.68	254.40	.2618
2	SF	39.19	199.70	.1963
3	P1	62.77	242.20	.2592
4	P2	73.40	250.40	.2931
5	P3	56.25	234.70	.2397
6	P4	38.75	157.70	.1960
SAMPLES COLLECTED 10/16/64				
1	NF	30.39	203.90	.1490
2	CF	31.29	234.00	.1337
3	SF	26.32	211.40	.1245
4	P1	36.01	202.70	.1875
5	P2	29.44	236.00	.1247
6	P3	34.46	227.20	.1517
7	P4	30.17	212.50	.1420
8	581	28.92	181.80	.1591
9	582	25.41	181.40	.1400
10	583	30.01	243.40	.1233
11	584	25.93	155.30	.1670
12	585	33.63	212.40	.1583
13	586	31.50	199.70	.1578
14	587	47.19	265.50	.1777
15	588	36.57	289.30	.1264
16	589	9.99	81.10	.1232
17	591	14.15	128.60	.1100
18	592	30.58	170.10	.1798
19	593	44.22	210.20	.2104
20	594	41.37	192.70	.2147
21	595	24.88	187.60	.1326
22	596	55.22	266.40	.2073
23	597	40.37	190.50	.2119
24	598	30.04	161.10	.1865
25	599	30.74	191.10	.1609

TABLE A9. (Continued 4)

CESIUM-137 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
26	600	26.58	183.50	.1448
27	602	43.63	348.10	.1253
28	603	25.44	227.70	.1117
29	604	20.03	153.40	.1306
30	605	20.30	182.50	.1112
31	606	23.35	210.60	.1109
32	607	34.33	213.90	.1605
33	608	24.74	204.60	.1209
34	609	28.36	178.40	.1589
35	610	51.61	398.80	.1294
36	611	27.78	207.20	.1341
37	612	36.79	189.30	.1943
38	614	23.39	176.00	.1329
39	615	24.49	201.90	.1213
40	616	23.67	156.60	.1512
41	617	32.46	179.40	.1810
42	618	33.31	171.70	.1940
43	619	33.67	186.80	.1602
44	620	27.22	186.40	.1460
45	621	25.10	188.70	.1330
46	622	22.64	164.50	.1377
47	623	27.44	173.40	.1582
48	624	21.17	167.00	.1268
49	625	47.94	214.60	.2234
50	626	32.51	193.50	.1680
51	627	30.67	199.40	.1538
52	628	25.84	167.50	.1543
53	629	27.18	187.50	.1450
54	630	28.77	155.30	.1853
55	631	37.70	182.00	.2071
56	632	27.44	167.60	.1637
57	633	32.11	178.50	.1799
58	634	35.81	175.50	.2040
59	635	39.75	164.70	.2414
60	636	33.99	171.70	.1979
61	637	29.90	152.80	.1957
62	638	26.48	189.00	.1507
63	639	30.60	172.20	.1777
64	640	36.90	180.20	.2159
65	641	28.52	144.60	.1972
66	642	23.82	171.10	.1392
67	643	21.98	185.60	.1184
68	644	38.00	205.90	.1845
69	645	31.20	173.10	.1802
70	646	26.96	182.40	.1478
71	647	34.89	195.50	.1784
72	648	29.06	178.80	.1625

TABLE A9. (Continued 5)

CESIUM-137 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
73	649	23.73	221.70	.1070
74	650	33.14	192.70	.1720
SAMPLES COLLECTED 5/11/65				
1	NF	546.62	1355.00	.4034
2	CF	443.78	1341.00	.3309
3	CF	342.18	1034.00	.3309
4	SF	539.53	1343.00	.4017
5	F1	588.96	1463.00	.4026
6	F2	633.20	1443.00	.4388
7	PS	503.52	808.70	.6226
8	P1	689.58	1384.00	.4982
9	P2	486.90	1245.00	.3911
10	P3	352.66	839.60	.4200
11	P4	708.91	1602.00	.4425
12	P5	323.29	933.40	.3464
13	P6	533.57	1441.00	.3703
14	P6	450.26	1216.00	.3703
15	811	748.57	1410.00	.5309
16	820	912.92	1548.00	.5897
17	821	186.81	895.10	.2087
18	823	395.03	1137.00	.3474
19	825	535.04	1272.00	.4206
20	832	503.56	1249.00	.4032
21	836	546.45	1393.00	.3923
22	839	620.74	1346.00	.4612
23	840	609.00	1340.00	.4545
24	841	600.66	1312.00	.4578
25	844	262.18	965.30	.2716
26	848	318.42	1040.00	.3062
27	849	317.77	973.60	.3264
28	850	349.37	1090.00	.3205
29	852	431.64	950.00	.4544
30	855	254.50	1029.00	.2473
31	856	396.37	975.90	.4062
32	861	485.01	1099.00	.4413
33	862	346.17	1202.00	.2880
34	864	548.86	1469.00	.3736
35	866	492.83	1176.00	.4191
36	867	452.81	1257.00	.3602
37	869	450.81	1152.00	.3913
38	873	324.42	961.90	.3373
39	875	322.03	973.10	.3309
40	876	647.27	1334.00	.4852
41	879	373.89	1244.00	.3006
42	883	514.78	1206.00	.4268

TABLE A9. (Continued 8)

CESIUM-137 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2

SAMPLES COLLECTED 8/26/65				
1	NF	33.80	137.80	,2453
2	CF	43.52	141.10	,3084
3	SF	36.21	133.80	,2707
4	F1	39.50	131.20	,3010
5	F2	44.04	151.30	,2911
6	PS	39.26	100.10	,3922
7	PS	34.23	121.90	,2808
8	P1	46.88	154.50	,3034
9	P2	37.91	126.90	,2988
10	P3	34.63	155.50	,2227
11	P4	28.69	122.90	,2335
12	P5	36.23	134.40	,2696
13	P6	53.29	166.50	,3200
14	1661	19.75	86.10	,2294
15	1663	29.15	113.70	,2564
16	1667	32.06	110.80	,2893
17	1669	28.37	104.40	,2717
18	1670	31.93	106.20	,3007
19	1672	23.03	78.20	,2945
20	1677	23.70	99.60	,2380
21	1678	29.65	119.90	,2473
22	1679	27.82	112.20	,2479
23	1680	24.07	103.70	,2321
24	1681	28.47	111.30	,2558
25	1682	19.78	98.90	,2000
26	1683	29.75	109.00	,2729
27	1685	26.59	131.00	,2030
28	1686	25.77	116.90	,2204
29	1687	28.60	109.70	,2607
30	1688	25.09	104.70	,2397
31	1689	24.65	113.60	,2170
32	1691	27.10	123.60	,2192
33	1692	23.60	98.90	,2386
34	1693	36.35	138.90	,2617
35	1694	34.93	125.90	,2775
36	1696	27.74	102.10	,2717
37	1697	26.11	136.60	,1911
38	1698	28.51	128.70	,2215
39	1699	27.09	107.40	,2522
40	1700	29.76	120.20	,2476
41	1701	29.29	122.40	,2393
42	1702	34.51	139.70	,2641
43	1703	29.62	118.50	,2500
44	1704	36.00	136.00	,2647

TABLE A9. (Continued 9)

CESIUM-137 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
45	1706	35.21	117.40	.3000
46	1707	34.68	132.00	.2628
47	1708	28.11	141.60	.1985
48	1709	30.13	117.90	.2556
49	1711	39.58	136.70	.2895
50	1712	29.50	129.20	.2283
51	1713	28.99	121.20	.2392
52	1714	38.83	152.80	.2541
53	1715	39.00	146.50	.2662
54	1716	41.19	134.90	.3053
55	1717	34.56	125.60	.2752
56	1718	37.11	122.10	.3039
57	1719	27.23	121.90	.2234
58	1722	24.05	106.40	.2260
59	1723	31.98	122.90	.2602
60	1724	29.76	115.30	.2581
61	1725	47.96	150.20	.3193
62	1726	22.91	108.30	.2116
63	1727	22.61	114.30	.1978
64	1728	47.11	143.70	.3278

SAMPLES COLLECTED 10/ 8/65

1	NF	19.46	138.10	.1409
2	CF	18.06	119.20	.1515
3	SF	20.67	125.90	.1642
4	F2	22.20	119.00	.1866
5	P1	21.95	115.30	.1904
6	P2	21.53	136.20	.1581
7	P3	16.04	108.50	.1478
8	P4	7.37	78.90	.0934
9	P6	22.66	120.30	.1884
10	1939	14.52	105.10	.1381
11	1941	21.02	116.30	.1807
12	1942	16.42	100.80	.1629
13	1943	19.87	92.90	.2138
14	1946	20.38	115.30	.1768
15	1947	16.96	96.80	.1752
16	1948	15.74	89.20	.1764
17	1949	14.26	91.20	.1563
18	1950	18.94	96.70	.1959
19	1951	22.36	129.00	.1733
20	1952	18.35	109.60	.1674
21	1953	21.31	111.50	.1911
22	1954	19.47	121.30	.1605
23	1955	18.05	102.20	.1766
24	1956	16.73	100.70	.1661

TABLE A9. (Continued 10)

CESIUM-137 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
25	1957	21.91	111.30	.1969
26	1958	24.62	113.40	.2171
27	1959	18.40	102.20	.1800
28	1961	16.27	98.80	.1647
29	1962	16.32	132.20	.1234
30	1964	16.22	95.80	.1694
31	1965	14.55	93.20	.1561
32	1967	18.19	108.80	.1664
33	1968	17.03	111.40	.1528
34	1971	21.79	118.00	.1847
35	1972	15.48	98.00	.1580
36	1973	22.34	117.70	.1898
37	1974	18.69	110.10	.1697
38	1975	21.03	113.90	.1769
39	1976	24.45	135.20	.1795
40	1977	16.05	103.60	.1549
41	1978	19.79	122.00	.1622
42	1979	20.18	126.10	.1600
43	1980	20.37	124.40	.1637
44	1981	23.83	121.80	.1957
45	1982	26.51	142.20	.1865
46	1983	17.76	115.80	.1533
47	1984	23.63	154.10	.1533
48	1985	19.69	121.30	.1617
49	1986	18.02	115.20	.1564
50	1987	25.52	140.20	.1820
51	1988	24.44	120.40	.2030
52	1989	14.75	78.90	.1869
53	1990	22.64	116.30	.1947
54	1991	29.48	115.60	.2550
55	1992	25.29	112.40	.2250
56	1993	27.68	137.10	.2019
57	1994	23.15	118.60	.1952
58	1995	24.40	118.00	.2068
59	1996	23.86	126.60	.1885
60	1997	17.10	95.50	.1790
61	1999	24.43	126.70	.1928
62	2000	20.52	119.40	.1719
63	2001	25.00	123.90	.2018
64	2002	16.84	117.60	.1432
65	2003	24.89	139.70	.1782
66	2005	24.62	110.40	.2231
67	2006	17.75	131.00	.1355
68	2007	19.52	114.40	.1707
69	2008	23.71	109.10	.2173

TABLE A9. (Continued 11)

CESIUM-137 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2

SAMPLES COLLECTED 5/11/66				
1	NF	249.25	552.60	.4509
2	CF	337.91	643.00	.5255
3	F1	224.21	575.40	.3897
4	F2	221.65	568.50	.3899
5	PS	203.02	520.70	.3899
6	P1	293.41	664.30	.4492
7	P2	286.01	637.20	.4489
8	P3	257.98	606.60	.4253
9	P4	278.80	601.90	.4632
10	P5	298.22	597.40	.4992
11	P6	319.81	605.30	.5279
12	2324	277.47	453.40	.6120
13	2348	232.36	559.40	.4154
14	2351	245.66	413.70	.5938
15	2366	222.74	362.90	.6138
16	2389	286.84	475.30	.6035
SAMPLES COLLECTED 6/16/66				
1	NF	35.81	107.10	.3344
2	CF	32.67	101.50	.3218
3	SF	33.81	98.70	.3425
4	F1	29.69	112.70	.2635
5	F2	28.44	93.00	.3058
6	PS	39.24	92.50	.4242
7	P1	24.91	101.70	.2449
8	P2	31.66	106.50	.2973
9	P3	36.09	108.40	.3330
10	P4	22.83	86.60	.2636
11	P5	34.30	109.00	.3147
12	P6	21.16	91.90	.2302
13	2600	30.87	113.70	.2715
14	2601	30.12	116.30	.2546
15	2603	31.22	118.60	.2632
16	2604	23.47	120.70	.1945
17	2605	36.12	114.40	.3332
18	2606	22.51	128.30	.1755
19	2607	32.58	117.00	.2784
20	2608	43.43	142.80	.3045
21	2609	18.14	96.10	.1887
22	2610	25.29	123.90	.2042
23	2612	27.80	107.70	.2581
24	2613	29.06	120.30	.2416
25	2614	35.15	118.00	.2979

TABLE A9. (Continued 12)

CESIUM-137 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
26	2617	34.66	114.00	.3025
27	2618	33.14	106.70	.3106
28	2619	37.24	125.70	.2962
29	2620	39.50	125.30	.3153
30	2621	33.36	121.90	.2735
31	2622	35.62	132.80	.2583
32	2623	37.80	123.90	.3056
33	2624	36.33	127.10	.2814
34	2626	40.07	123.40	.3296
35	2627	39.03	121.60	.3210
36	2628	27.91	96.70	.2886
37	2629	34.43	102.00	.3375
38	2630	31.37	89.00	.3525
39	2631	41.85	102.00	.4103
40	2633	31.61	94.50	.3345
41	2634	36.74	100.20	.3667
42	2635	21.97	90.20	.2436
43	2637	29.22	103.40	.2826
44	2638	29.05	95.40	.3045
45	2639	32.20	93.20	.3455
46	2640	43.50	101.20	.4298
47	2641	32.53	96.10	.3385
48	2642	34.98	108.70	.3218
49	2644	36.02	115.70	.3113
50	2645	40.98	113.50	.3611
51	2647	45.89	111.60	.4112
52	2648	43.13	119.90	.3601
53	2649	49.12	123.70	.3971
54	2650	31.95	106.00	.3014
55	2651	32.42	93.80	.3456
56	2652	42.69	114.30	.3735
57	2654	42.41	118.00	.3594
58	2655	32.63	100.60	.3244
59	2656	44.60	109.80	.4062
60	2657	40.40	110.60	.3653
61	2659	43.63	113.90	.3831
62	2660	56.44	119.20	.4735
63	2661	32.57	112.90	.2885
64	2663	127.29	393.30	.3236
65	2664	42.77	123.20	.3472
66	2665	52.28	146.00	.3581
67	2666	33.33	117.90	.2827
68	2667	58.87	123.90	.4752
69	2668	68.31	212.10	.3221
70	2669	76.95	214.90	.3581

TABLE A9. (Continued 13)

CESIUM-137 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2

SAMPLES COLLECTED 8/26/66				
1	NF	13.99	60.50	.2313
2	SF	14.64	76.60	.1911
3	F1	46.28	177.00	.2614
4	F2	37.96	135.80	.2795
5	P3	93.08	324.70	.2367
6	P4	15.16	67.10	.2259
7	P5	12.36	76.30	.1521
SAMPLES COLLECTED 10/13/66				
1	NF	28.10	126.40	.2223
2	CF	24.98	133.30	.1874
3	SF	27.76	119.90	.2317
4	F1	27.69	121.90	.2271
5	F2	22.47	95.10	.2363
6	PS	48.98	273.00	.1794
7	F1	21.93	111.00	.1981
8	P2	24.59	144.00	.1708
9	P3	22.69	111.60	.2033
10	F4	20.23	107.40	.1884
11	P5	25.05	116.80	.2144
12	P6	24.70	102.40	.2412
13	3320	29.88	137.80	.2166
14	3321	34.41	146.40	.2350
15	3322	26.87	124.40	.2160
16	3324	25.00	115.00	.2174
17	3326	21.91	93.60	.2341
18	3329	24.31	96.10	.2530
19	3334	29.62	111.70	.2652
20	3335	29.91	111.20	.2690
21	3336	32.78	109.40	.2996
22	3338	29.18	90.90	.3210
23	3340	33.06	107.80	.3067
24	3342	19.05	116.00	.1642
25	3344	22.38	111.80	.2002
26	3345	21.99	96.10	.2288
27	3346	18.66	87.40	.2135
28	3347	28.16	105.30	.2574
29	3348	21.34	101.90	.2094
30	3349	30.32	108.10	.2805
31	3350	28.32	107.50	.2635
32	3351	39.28	109.30	.3594
33	3352	23.63	106.30	.2223
34	3353	28.19	107.00	.2635

TABLE A9. (Continued 14)

CESIUM-137 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
35	3354	25.35	103.30	.2461
36	3355	24.61	118.30	.2075
37	3357	25.73	119.30	.2156
38	3360	21.69	137.70	.1575
39	3361	28.57	126.60	.2257
40	3363	26.76	143.90	.1860
41	3365	21.29	108.90	.1955
42	3366	24.97	116.10	.2150
43	3367	26.45	102.20	.2538
44	3369	69.30	369.30	.1377
45	3370	19.81	90.30	.2193
46	3371	33.92	131.80	.2574
47	3372	26.01	125.20	.2077
48	3374	19.23	96.30	.1997
49	3376	19.29	115.20	.1674
50	3377	25.94	112.50	.2306
51	3378	22.40	113.50	.1973
52	3379	16.07	102.60	.1567
53	3380	25.81	109.10	.2366
54	3382	25.05	116.80	.2144
55	3384	23.68	107.90	.2195
56	3388	26.90	118.50	.2270
57	3390	26.57	110.10	.2595
58	3391	30.35	104.50	.2904
59	3393	30.15	114.90	.2624
60	3396	25.14	115.90	.2170
61	3401	25.06	109.60	.2287
62	3402	24.15	110.10	.2193
63	3404	29.09	112.30	.2591
64	3408	19.47	97.40	.1998
65	3409	20.17	110.00	.1833
66	3411	27.18	107.90	.2519
67	3413	25.62	123.10	.2031
68	3415	29.74	115.60	.2573
69	3418	25.13	122.00	.2059
70	3419	25.88	131.40	.1970

TABLE A10. STRONTIUM-90 IN INDIVIDUAL ALFALFA SAMPLES

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2

SAMPLES COLLECTED 5/14/63				
1	1252	1488.26	1884.00	,7899
2	3825	564.13	1169.00	,4997
3	3832	908.14	1723.00	,5271
4	3834	847.37	1563.00	,5421
5	3844	807.44	1717.00	,4703
6	3846	894.52	1654.00	,5408
SAMPLES COLLECTED 6/18/63				
1	NF	352.12	1342.00	,4114
2	CF	483.40	1199.00	,4032
3	SF	424.81	1269.00	,3348
4	P1	427.54	1218.00	,3510
5	P2	461.10	1419.00	,3249
6	P4	481.24	1364.00	,3528
7	48	397.21	1399.00	,2839
8	51	561.12	1468.00	,3822
9	56	356.82	1240.00	,2678
SAMPLES COLLECTED 7/22/63				
1	NF	116.78	393.40	,2968
2	CF	193.40	419.90	,4606
3	SF	124.61	363.40	,3429
4	P1	146.22	405.10	,3609
5	P2	201.66	468.50	,4304
6	P4	145.96	413.70	,3528
7	P3	145.24	450.10	,3227
8	3804	130.20	362.40	,3593
9	3819	151.58	395.70	,3831
10	3821	120.10	359.80	,3338
11	3837	151.80	405.90	,3740
12	3841	118.85	321.40	,3698
SAMPLES COLLECTED 8/26/63				
1	NF	142.42	519.10	,2744
2	CF	176.22	593.40	,2970
3	P1	193.96	515.50	,3763
4	P2	128.40	459.20	,2796
5	P3	104.36	486.10	,2147
6	P4	213.48	589.50	,3621
7	3811	116.05	475.20	,2442
8	3824	83.58	318.10	,2628

TABLE A10. (Continued 2)

STRONTIUM-90 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
9	3827	122.39	374.30	.3270
10	3840	159.47	528.90	.3015
11	3843	89.56	410.10	.2184
SAMPLES COLLECTED 10/ 6/63				
1	NF	55.16	672.30	.0820
2	SF	57.79	725.50	.0797
3	P1	85.30	817.90	.1043
4	P2	49.58	695.60	.0713
5	P3	72.80	618.00	.1178
6	169	141.54	738.30	.1917
7	170	82.54	634.90	.1300
8	172	98.08	702.70	.1396
9	175	53.99	677.50	.0871
10	177	92.97	574.10	.1619
11	3792	80.06	602.50	.1329
12	3813	48.16	606.40	.0794
13	3818	125.54	654.80	.1917
14	3828	76.02	630.60	.1206
15	3829	70.20	631.80	.1111
16	3839	83.21	596.20	.1396
SAMPLES COLLECTED 5/14/64				
1	NF	698.31	2250.00	.3104
2	P1	759.51	2244.00	.3385
3	P2	815.23	2580.00	.3160
4	187	1093.38	2621.00	.4172
5	188	1183.61	2690.00	.4400
6	189	1396.21	2414.00	.5784
7	190	1218.63	2637.00	.4621
8	191	1187.10	2232.00	.5319
SAMPLES COLLECTED 6/16/64				
1	CF	362.01	1379.00	.2625
2	SF	293.17	1126.00	.2604
3	P1	343.38	1183.00	.2903
4	P2	348.81	1188.00	.2936
5	P3	302.18	1149.00	.2630
6	P4	413.61	1471.00	.2812
SAMPLES COLLECTED 7/20/64				
1	NF	89.53	383.70	.2333
2	CF	106.24	422.60	.2514

TABLE A10. (Continued 3)

STRONTIUM-90 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
3	SF	103.64	353.70	,2930
4	P1	102.79	416.00	,2471
5	P3	76.43	415.50	,1839
SAMPLES COLLECTED 8/25/64				
1	NF	106.01	445.20	,2381
2	P1	95.12	367.00	,2592
3	P2	106.76	364.20	,2931
4	P3	90.93	379.40	,2397
5	P4	70.22	358.20	,1960
SAMPLES COLLECTED 10/18/64				
1	NF	54.14	363.30	,1490
2	CF	93.97	702.80	,1337
3	P2	63.71	510.70	,1247
4	P4	67.38	474.60	,1420
5	581	73.97	465.00	,1591
6	582	65.22	465.70	,1400
7	583	57.88	469.40	,1233
8	584	64.35	385.40	,1670
9	585	69.28	437.50	,1583
10	587	68.48	385.30	,1777
11	588	54.22	428.90	,1264
12	589	40.48	328.60	,1232
13	591	39.23	356.50	,1100
14	593	86.72	412.20	,2104
15	594	82.61	384.80	,2147
16	595	55.92	421.60	,1326
17	596	87.84	423.80	,2073
18	597	85.00	401.10	,2119
19	598	78.98	423.60	,1865
20	599	70.41	437.70	,1609
21	600	60.44	417.30	,1448
22	602	74.21	592.10	,1253
23	603	53.29	477.10	,1117
24	604	61.80	473.20	,1306
25	605	42.94	386.10	,1112
26	606	47.02	424.10	,1109
27	607	72.35	450.80	,1605
28	608	52.88	437.30	,1209
29	609	62.55	393.50	,1589
30	610	51.14	395.20	,1294
31	611	55.52	414.10	,1341
32	612	80.56	414.50	,1943
33	614	52.79	397.30	,1329

TABLE A10. (Continued 4)

STRONTIUM-90 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
34	615	41.71	343.90	.1213
35	616	56.58	374.30	.1512
36	617	71.66	396.00	.1810
37	618	79.73	411.00	.1940
38	619	82.93	460.10	.1802
39	620	62.18	425.80	.1460
40	621	53.01	398.60	.1330
41	622	52.65	382.50	.1377
42	623	54.98	347.50	.1582
43	624	49.85	393.20	.1268
44	625	78.10	349.60	.2234
45	626	62.01	369.00	.1680
46	627	59.56	387.90	.1538
47	628	53.83	348.90	.1543
48	629	59.98	413.80	.1450
49	630	58.86	317.70	.1853
50	631	77.18	372.60	.2071
51	632	61.66	376.60	.1637
52	633	51.70	287.40	.1799
53	634	78.23	383.40	.2040
54	635	85.10	352.60	.2414
55	636	79.17	400.00	.1979
56	637	64.73	330.80	.1957
57	638	59.43	394.40	.1507
58	639	66.01	371.40	.1777
59	640	78.90	365.50	.2159
60	641	67.05	340.00	.1972
61	642	59.53	427.60	.1392
62	643	53.89	455.10	.1184
63	644	80.57	436.60	.1845
64	645	85.13	472.30	.1802
65	646	72.52	490.60	.1478
66	647	93.65	524.80	.1784
67	648	79.30	487.90	.1625
68	649	51.51	481.20	.1070
69	650	77.82	452.50	.1720

SAMPLES COLLECTED 5/11/65

1	NF	464.72	1152.00	.4034
2	CF	410.02	1239.00	.3309
3	SF	453.96	1130.00	.4017
4	F1	483.08	1200.00	.4026
5	F2	547.19	1247.00	.4388
6	PS	610.43	980.40	.6226
7	P1	531.13	1066.00	.4982
8	P2	464.22	1187.00	.3911

TABLE A10. (Continued 5)

STRONTIUM-90 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
9	P4	578.37	1307.00	.4425
10	P5	362.98	1048.00	.3464
11	P6	423.97	1145.00	.3703
12	811	695.48	1310.00	.5309
13	820	947.71	1607.00	.5897
14	821	200.12	958.90	.2087
15	823	515.24	1483.00	.3474
16	824	441.99	1125.00	.3929
17	825	543.03	1291.00	.4206
18	826	486.67	1200.00	.4056
19	827	475.20	1104.00	.4304
20	828	495.24	1264.00	.3913
21	830	637.34	1436.00	.4438
22	832	468.48	1162.00	.4032
23	834	610.70	1348.00	.4530
24	835	587.34	1351.00	.4347
25	836	503.30	1283.00	.3923
26	837	488.99	1394.00	.3508
27	838	360.12	1129.00	.3190
28	839	584.77	1268.00	.4612
29	840	624.45	1374.00	.4545
30	841	544.35	1169.00	.4578
31	843	386.15	1093.00	.3533
32	844	394.10	1451.00	.2716
33	845	459.54	1183.00	.3885
34	848	410.58	1341.00	.3062
35	849	427.24	1309.00	.3264
36	850	373.73	1166.00	.3205
37	851	492.63	1141.00	.4318
38	852	557.49	1227.00	.4544
39	853	608.42	1510.00	.4029
40	854	448.86	1237.00	.3629
41	855	243.52	984.60	.2473
42	856	547.50	1348.00	.4062
43	858	574.98	1228.00	.4682
44	860	308.62	1065.00	.2898
45	861	586.51	1329.00	.4413
46	862	418.45	1453.00	.2880
47	863	540.51	1394.00	.3877
48	864	474.88	1271.00	.3736
49	865	363.88	1204.00	.3022
50	866	452.18	1079.00	.4191
51	867	489.19	1358.00	.3602
52	869	483.29	1235.00	.3913
53	870	577.08	1235.00	.4673
54	871	500.66	1247.00	.4015
55	873	443.51	1315.00	.3373

TABLE A10. (Continued 6)

STRONTIUM-90 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
56	875	437.82	1323.00	.3309
57	876	627.86	1294.00	.4852
58	877	543.36	1131.00	.4804
59	878	632.06	1397.00	.4524
60	879	364.57	1213.00	.3006
61	880	544.40	1243.00	.4380
62	882	572.33	1269.00	.4510
63	883	531.35	1246.00	.4268
64	884	633.29	1575.00	.4021
65	885	851.75	1577.00	.5401
66	886	387.13	1259.00	.3075
67	887	502.56	1444.00	.3480
68	889	429.31	1170.00	.3669

SAMPLES COLLECTED 6/16/65

1	NF	251.12	986.70	.2545
2	CF	205.50	790.00	.2601
3	SF	284.29	1000.00	.2843
4	F1	271.12	932.90	.2906
5	F2	334.82	1165.00	.2874
6	F2	248.97	866.30	.2874
7	P1	286.89	964.90	.2973
8	P2	321.44	917.30	.3504
9	P3	243.65	865.80	.2814
10	P4	283.28	992.70	.2854
11	P6	376.15	1010.00	.3724
12	1102	221.54	865.60	.2559
13	1103	281.26	797.20	.3528
14	1104	325.51	750.60	.4337
15	1105	248.61	750.70	.3312
16	1106	236.16	762.10	.3099
17	1108	230.09	883.70	.2604
18	1110	209.04	718.10	.2911
19	1111	295.07	823.20	.3584
20	1112	291.83	784.10	.3722
21	1113	282.11	720.90	.3913
22	1113	339.71	868.10	.3913
23	1114	236.47	789.00	.2997
24	1115	298.46	904.50	.3300
25	1117	266.46	830.10	.3210
26	1120	298.40	817.50	.3650
27	1122	221.47	831.90	.2662
28	1123	291.69	885.60	.3294
29	1124	313.23	866.30	.3534
30	1126	260.78	875.70	.2975
31	1127	263.76	846.60	.3116

TABLE A10. (Continued 7)

STRONTIUM-90 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
32	1128	197.18	871.40	.2263
33	1130	207.85	913.70	.2275
34	1131	269.35	882.50	.3052
35	1133	256.25	824.40	.3108
36	1134	234.31	776.20	.3019
37	1136	259.27	848.80	.3055
38	1138	264.01	866.00	.3049
39	1139	296.15	861.90	.3436
40	1141	291.11	785.70	.3705
41	1143	254.37	868.80	.2928
42	1145	269.61	746.20	.3613
43	1147	249.74	725.30	.3443
44	1148	235.11	727.00	.3234
45	1149	207.67	751.70	.2763
46	1150	226.66	759.30	.2985
47	1151	272.51	710.70	.3834
48	1152	301.86	714.40	.4225
49	1153	245.03	746.10	.3284
50	1155	257.27	648.90	.3965
51	1156	249.40	752.00	.3316
52	1157	286.44	730.40	.3922
53	1161	301.21	750.00	.4016
54	1161	304.98	759.40	.4016
55	1163	289.97	844.20	.3435
56	1164	272.52	741.50	.3675
57	1168	251.95	833.00	.3025
58	1169	298.18	816.90	.3650

SAMPLES COLLECTED 7/20/65

1	NF	87.51	310.70	.2817
2	SF	93.12	299.70	.3107
3	PS	140.07	360.80	.3882
4	P1	103.17	303.20	.3403
5	P2	121.17	343.80	.3525
6	P3	101.23	329.10	.3076
7	P3	110.98	360.80	.3076
8	P4	109.54	357.20	.3067
9	P5	118.59	357.20	.3320
10	P6	106.76	294.90	.3620
11	1380	121.64	407.00	.2989
12	1382	82.39	374.40	.2201
13	1383	105.38	389.00	.2709
14	1384	93.08	312.30	.2980
15	1385	92.89	381.30	.2436
16	1386	75.60	360.40	.2098
17	1387	107.89	419.20	.2574

TABLE A10. (Continued 8)

STRONTIUM-90 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
18	1389	69.12	483.60	.1429
19	1390	85.91	393.80	.2181
20	1390	95.40	437.30	.2181
21	1391	124.74	386.00	.3232
22	1392	141.75	371.20	.3819
23	1393	120.41	385.30	.3125
24	1394	105.09	395.10	.2660
25	1395	148.23	462.80	.3203
26	1396	96.52	360.30	.2679
27	1396	100.01	373.30	.2679
28	1397	84.40	379.80	.2222
29	1398	116.16	358.80	.3238
30	1400	101.31	413.40	.2451
31	1403	138.45	436.50	.3172
32	1404	111.39	356.70	.3123
33	1405	71.59	418.60	.1710
34	1406	95.26	345.10	.2760
35	1407	131.32	477.60	.2750
36	1408	84.75	420.30	.2016
37	1409	114.84	331.00	.3470
38	1411	110.91	370.80	.2991
39	1412	94.78	388.10	.2442
40	1413	97.79	420.80	.2324
41	1414	107.26	392.50	.2733
42	1415	108.36	339.60	.3191
43	1416	126.82	452.20	.2805
44	1417	113.75	363.30	.3131
45	1418	137.10	405.50	.3381
46	1419	125.22	332.50	.3766
47	1421	125.52	360.90	.3478
48	1422	93.08	310.20	.3001
49	1423	133.49	429.80	.3106
50	1424	104.83	398.60	.2630
51	1425	98.83	350.90	.2817
52	1426	116.41	388.70	.2995
53	1428	93.38	338.00	.2763
54	1429	120.11	357.40	.3351
55	1431	114.78	377.10	.3044
56	1433	125.73	331.10	.3797
57	1434	160.98	433.50	.3714
58	1436	105.91	338.90	.3125
59	1438	134.16	330.90	.4054
60	1439	101.37	370.60	.2735
61	1441	143.88	372.80	.3859
62	1442	100.02	369.40	.2708
63	1443	128.20	374.00	.3428
64	1444	114.36	402.60	.2840

TABLE A10. (Continued 9)

STRONTIUM-90 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
65	1445	146.61	412.20	,3557
66	1446	131.43	406.70	,3232
67	1447	112.50	455.30	,2471
68	1448	170.60	479.80	,3556
69	1449	71.84	376.60	,1908

SAMPLES COLLECTED 8/26/65

1	CF	96.45	312.70	,3084
2	SF	82.39	304.40	,2707
3	PS	95.98	341.80	,2808
4	P1	100.95	332.70	,3034
5	P2	114.27	382.50	,2988
6	P3	81.48	365.90	,2227
7	P6	106.61	333.10	,3200
8	1661	78.34	341.50	,2294
9	1662	120.18	475.10	,2530
10	1663	85.64	334.00	,2564
11	1664	87.37	351.90	,2483
12	1665	100.26	360.70	,2779
13	1667	125.13	432.50	,2893
14	1668	110.04	399.70	,2753
15	1669	107.47	395.50	,2717
16	1670	119.49	397.40	,3007
17	1672	110.98	376.90	,2945
18	1673	93.01	377.50	,2464
19	1676	97.28	410.40	,2370
20	1677	101.86	428.00	,2380
21	1678	109.05	440.90	,2473
22	1679	99.82	402.60	,2479
23	1680	92.35	397.80	,2321
24	1681	94.71	370.20	,2558
25	1682	78.01	390.10	,2000
26	1683	108.87	398.90	,2729
27	1685	84.29	415.30	,2030
28	1686	90.92	412.50	,2204
29	1687	106.90	410.00	,2607
30	1688	80.87	337.40	,2397
31	1689	80.25	369.90	,2170
32	1691	88.70	404.60	,2192
33	1692	75.85	317.90	,2386
34	1693	92.16	352.20	,2617
35	1694	93.42	336.70	,2775
36	1696	93.75	345.00	,2717
37	1697	82.91	433.80	,1911
38	1698	93.80	423.50	,2215
39	1699	84.20	333.80	,2522

TABLE A10. (Continued 10)

STRONTIUM-90 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
40	1700	103.29	417.20	,2476
41	1701	90.03	376.20	,2393
42	1702	105.50	399.50	,2641
43	1703	87.86	351.50	,2500
44	1704	94.30	356.30	,2647
45	1706	96.29	321.00	,3000
46	1707	109.25	415.80	,2628
47	1708	81.10	408.50	,1985
48	1709	101.70	397.90	,2556
49	1711	93.38	322.50	,2895
50	1712	88.88	389.30	,2283
51	1713	76.78	321.00	,2392
52	1714	99.83	392.80	,2541
53	1715	101.35	380.70	,2662
54	1716	111.63	365.60	,3053
55	1717	115.11	418.30	,2752
56	1718	125.54	413.10	,3039
57	1719	105.05	470.20	,2234
58	1722	114.99	508.70	,2260
59	1723	118.44	455.10	,2602
60	1724	134.80	522.30	,2581
61	1725	147.53	462.00	,3193
62	1727	89.18	450.80	,1978
63	1728	165.75	505.60	,3278

SAMPLES COLLECTED 10/ 8/65

1	NF	47.82	339.40	,1409
2	CF	51.88	342.40	,1515
3	SF	47.18	287.30	,1642
4	F1	52.17	350.40	,1489
5	F2	55.36	350.30	,1866
6	PS	60.08	321.40	,1869
7	P1	65.86	345.90	,1904
8	P3	52.06	352.20	,1478
9	P4	23.26	249.00	,0934
10	P5	59.91	352.00	,1702
11	P6	69.07	366.70	,1884
12	1939	49.66	359.50	,1381
13	1941	72.66	402.10	,1807
14	1942	68.46	420.30	,1629
15	1943	81.00	378.80	,2138
16	1946	66.38	375.50	,1768
17	1947	68.60	391.50	,1752
18	1948	93.02	470.60	,1764
19	1949	66.06	422.60	,1563
20	1950	71.15	363.20	,1959

TABLE A10. (Continued 11)

STRONTIUM-90 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
21	1951	70.88	409.00	,1733
22	1952	66.41	396.60	,1674
23	1953	73.75	385.90	,1911
24	1954	72.53	451.90	,1605
25	1955	71.79	406.40	,1766
26	1956	69.51	418.40	,1661
27	1957	81.54	414.20	,1969
28	1958	79.17	364.70	,2171
29	1959	70.58	392.10	,1800
30	1961	73.19	444.40	,1647
31	1962	46.27	374.90	,1234
32	1963	58.81	393.70	,1494
33	1964	68.28	403.20	,1694
34	1965	69.97	448.30	,1561
35	1967	73.52	441.90	,1664
36	1968	48.15	315.00	,1528
37	1971	63.80	345.50	,1847
38	1972	57.62	364.70	,1580
39	1973	76.11	401.00	,1898
40	1974	59.30	349.40	,1697
41	1975	60.14	340.00	,1769
42	1976	42.78	238.30	,1795
43	1977	52.66	340.00	,1549
44	1978	62.18	383.40	,1622
45	1979	58.22	363.80	,1600
46	1980	64.53	394.10	,1637
47	1981	75.21	384.40	,1957
48	1982	72.47	388.70	,1865
49	1983	61.68	402.30	,1533
50	1984	58.51	381.60	,1533
51	1985	55.62	344.00	,1617
52	1986	55.80	356.70	,1564
53	1987	62.42	342.90	,1820
54	1988	70.00	344.90	,2030
55	1989	68.06	364.10	,1869
56	1990	71.38	366.60	,1947
57	1991	82.28	322.70	,2550
58	1992	82.94	368.70	,2250
59	1993	74.25	367.80	,2019
60	1994	74.31	380.70	,1952
61	1995	74.67	361.10	,2068
62	1996	69.97	371.20	,1885
63	1997	74.23	414.60	,1790
64	1998	68.72	358.90	,1915
65	1999	68.04	352.90	,1928
66	2000	71.51	416.10	,1719
67	2001	67.77	335.90	,2018

TABLE A10. (Continued 12)

STRONTIUM-90 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
68	2002	60.23	420.70	.1432
69	2003	74.49	418.00	.1782
70	2005	86.97	389.90	.2231
71	2006	60.10	443.50	.1355
72	2007	77.99	457.00	.1707
73	2008	94.42	434.50	.2173

SAMPLES COLLECTED 5/11/66

1	NF	350.61	777.60	.4509
2	CF	451.10	858.40	.5255
3	SF	311.35	647.10	.4811
4	F1	246.77	633.30	.3897
5	F2	292.54	750.30	.3899
6	PS	269.96	692.40	.3899
7	P1	359.53	801.00	.4489
8	P2	352.13	784.50	.4489
9	P3	308.63	725.70	.4253
10	P4	319.52	689.80	.4632
11	P6	396.14	750.40	.5279
12	2320	398.48	756.20	.5270
13	2321	492.02	852.80	.5769
14	2322	500.69	769.00	.6511
15	2323	368.60	660.80	.5578
16	2325	380.53	722.30	.5268
17	2326	422.58	718.30	.5883
18	2328	376.26	725.40	.5187
19	2329	334.89	665.90	.5029
20	2331	442.25	681.50	.6439
21	2332	393.96	668.30	.5395
22	2333	517.72	727.90	.7113
23	2334	471.05	698.70	.6742
24	2335	452.31	743.00	.6088
25	2337	321.26	740.60	.4338
26	2338	460.93	754.80	.6107
27	2339	488.61	753.90	.6481
28	2341	414.46	622.50	.6658
29	2342	578.75	870.50	.6648
30	2343	428.12	825.00	.5189
31	2344	417.39	789.40	.5287
32	2345	480.73	814.00	.5906
33	2346	410.57	838.10	.4899
34	2347	530.59	864.30	.6139
35	2348	374.12	900.70	.4154
36	2349	445.11	789.00	.5641
37	2350	404.68	882.30	.4587
38	2351	495.24	834.00	.5938

TABLE A10. (Continued 13)

STRONTIUM-90 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
39	2353	377.61	953.30	.3961
40	2354	468.76	708.50	.6016
41	2355	389.07	741.70	.5246
42	2356	525.64	814.20	.6456
43	2357	402.20	730.60	.5505
44	2358	347.78	628.60	.5533
45	2363	370.27	763.30	.4851
46	2364	473.80	725.70	.6529
47	2365	299.29	634.50	.4717
48	2366	412.47	710.50	.5805
49	2367	441.06	672.10	.6562
50	2368	466.04	759.30	.6138
51	2369	390.58	819.30	.4767
52	2370	408.12	764.60	.5338
53	2371	378.11	769.40	.4914
54	2372	348.93	654.00	.5335
55	2374	330.42	783.10	.4219
56	2375	400.78	687.40	.5830
57	2376	370.60	690.60	.5366
58	2377	378.91	666.00	.5689
59	2378	385.52	769.50	.5010
60	2380	390.49	713.20	.5475
61	2381	279.84	663.60	.4217
62	2382	360.78	835.40	.4319
63	2383	405.94	855.60	.4744
64	2384	450.35	859.90	.5237
65	2385	257.29	750.10	.3430
66	2387	470.81	709.30	.6638
67	2388	432.02	727.10	.5942
68	2389	463.12	767.40	.6035

SAMPLES COLLECTED 6/16/66

1	NF	105.97	316.90	.3344
2	CF	115.80	359.80	.3218
3	SF	101.70	296.90	.3425
4	F1	85.84	325.60	.2635
5	F2	93.18	304.70	.3058
6	PS	149.83	353.20	.4242
7	P1	76.69	313.10	.2449
8	P2	99.48	334.60	.2973
9	P3	112.97	339.30	.3330
10	P4	76.26	289.30	.2636
11	P5	114.66	364.40	.3147
12	P6	64.74	281.20	.2302
13	2600	105.85	389.90	.2715
14	2601	89.32	350.80	.2546

TABLE A10. (Continued 14)

STRONTIUM-90 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
15	2603	106.77	405.60	.2632
16	2604	72.75	374.10	.1945
17	2605	133.01	399.20	.3332
18	2606	64.16	365.70	.1755
19	2607	98.81	354.90	.2784
20	2608	111.87	367.40	.3045
21	2609	64.79	343.30	.1887
22	2610	76.88	376.60	.2042
23	2612	97.28	376.90	.2581
24	2613	92.63	383.40	.2416
25	2614	117.68	395.00	.2979
26	2617	119.41	394.80	.3025
27	2618	116.04	373.60	.3106
28	2619	114.26	385.70	.2962
29	2620	109.99	348.90	.3153
30	2621	103.41	377.90	.2736
31	2622	99.60	371.30	.2683
32	2623	150.83	493.60	.3056
33	2624	102.35	363.70	.2814
34	2626	144.01	436.90	.3296
35	2628	94.34	326.90	.2886
36	2629	104.22	308.80	.3375
37	2630	115.29	327.10	.3525
38	2631	148.46	361.80	.4103
39	2633	108.95	325.70	.3345
40	2634	117.56	320.60	.3667
41	2637	94.22	333.40	.2826
42	2638	96.22	316.00	.3045
43	2640	126.37	294.00	.4298
44	2641	107.53	317.70	.3335
45	2643	137.24	369.20	.3717
46	2644	103.01	330.90	.3113
47	2645	133.13	368.70	.3611
48	2647	121.96	296.60	.4112
49	2648	113.62	315.50	.3601
50	2649	161.57	406.90	.3971
51	2651	115.34	333.70	.3456
52	2652	124.56	333.50	.3735
53	2654	117.23	326.20	.3594
54	2656	117.54	289.40	.4062
55	2657	105.70	289.40	.3653
56	2659	104.31	272.30	.3831
57	2660	167.99	354.80	.4735
58	2661	86.66	300.40	.2885
59	2663	107.19	331.20	.3236
60	2664	134.29	366.80	.3472
61	2665	123.72	345.50	.3581

TABLE A10. (Continued 15)

STRONTIUM-90 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
62	2666	108.09	382.30	.2827
63	2667	177.90	374.40	.4752
64	2668	102.65	318.70	.3221
65	2669	130.66	364.90	.3581

SAMPLES COLLECTED 8/26/66

1	NF	67.75	292.90	.2313
2	CF	79.16	361.90	.2187
3	SF	60.58	317.00	.1911
4	F1	75.22	287.70	.2614
5	F2	104.67	374.50	.2795
6	PS	69.09	309.60	.2232
7	P1	66.39	297.50	.2232
8	P2	82.88	412.00	.2012
9	P3	108.74	379.30	.2807
10	P4	74.40	329.30	.2259
11	P5	19.93	123.00	.1621
12	P6	79.79	379.70	.2101

SAMPLES COLLECTED 10/13/66

1	NF	66.28	298.10	.2223
2	CF	55.77	297.60	.1874
3	SF	72.70	313.80	.2317
4	F1	59.98	264.10	.2271
5	F2	67.12	284.00	.2363
6	PS	59.02	329.00	.1794
7	P1	57.50	290.30	.1981
8	P2	53.18	311.40	.1708
9	P3	66.10	325.10	.2033
10	P4	58.83	312.30	.1884
11	P5	66.58	310.50	.2144
12	P6	69.45	287.90	.2412
13	3320	72.10	332.50	.2168
14	3321	83.78	356.50	.2350
15	3322	70.91	328.30	.2160
16	3324	83.45	383.80	.2174
17	3326	78.50	335.40	.2341
18	3329	88.36	349.30	.2530
19	3331	89.90	383.90	.2342
20	3334	85.17	321.20	.2652
21	3335	112.73	419.10	.2690
22	3336	92.31	308.10	.2996
23	3338	96.17	299.60	.3210
24	3340	110.21	359.40	.3067
25	3342	54.71	333.20	.1642

TABLE A10. (Continued 16)

STRONTIUM-90 IN ALFALFA (CONT.)

SAMPLE NUMBER	FIELD LOCATION	PCI/M2	PCI/KG	KG/M2
26	3344	72.86	363.90	.2002
27	3345	73.35	320.60	.2288
28	3346	80.06	375.00	.2135
29	3347	79.80	298.40	.2674
30	3348	79.64	380.30	.2094
31	3349	95.33	339.90	.2805
32	3350	91.69	348.00	.2635
33	3351	135.85	378.00	.3594
34	3352	89.71	403.50	.2223
35	3353	108.89	413.30	.2635
36	3354	88.41	359.20	.2461
37	3360	62.12	394.40	.1575
38	3361	75.17	333.10	.2257
39	3365	70.55	360.80	.1955
40	3366	72.92	339.10	.2150
41	3367	94.36	364.60	.2588
42	3369	66.56	354.70	.1877
43	3370	73.11	333.30	.2193
44	3371	87.61	340.40	.2574
45	3372	81.77	393.30	.2077
46	3374	74.76	374.30	.1997
47	3376	65.03	388.40	.1674
48	3377	66.29	287.50	.2306
49	3378	62.77	318.10	.1973
50	3379	63.42	404.80	.1567
51	3380	74.99	317.00	.2366
52	3382	67.44	314.50	.2144
53	3384	66.91	304.90	.2195
54	3388	72.32	318.60	.2270
55	3390	79.52	306.40	.2595
56	3391	84.65	291.50	.2904
57	3393	82.66	315.00	.2624
58	3396	68.73	316.80	.2170
59	3397	91.54	336.00	.2724
60	3401	90.49	395.70	.2287
61	3402	60.01	273.60	.2193
62	3404	92.84	358.40	.2591
63	3408	73.32	366.90	.1998
64	3409	51.68	281.90	.1833
65	3411	87.70	348.20	.2519
66	3413	75.92	364.80	.2081
67	3414	63.63	292.00	.2179
68	3415	80.37	312.40	.2573
69	3417	79.58	356.20	.2234
70	3418	73.87	358.70	.2059
71	3419	64.51	327.50	.1970

TABLE A11. CS-137/SR-90 RATIOS IN ALFALFA SAMPLES

SAMPLE NUMBER	FIELD LOC.	137-CS PCI/M2	90-SR PCI/M2	RATIO	KG/M2

SAMPLES COLLECTED 6/18/63					
1	NF	527,00	552,10	,9545	,4114
2	CF	511,20	483,40	1,0575	,4032
3	SE	402,70	424,80	,9480	,3348
4	P1	396,00	427,50	,9263	,3510
5	P2	457,20	461,10	,9915	,3249
6	P4	556,00	481,20	1,1554	,3528
SAMPLES COLLECTED 7/22/63					
1	NF	105,20	116,80	,9007	,2968
2	CF	206,80	193,40	1,0693	,4606
3	SF	157,20	124,60	1,2616	,3429
4	P1	146,20	146,20	1,0000	,3609
5	P2	176,50	201,70	,8751	,4304
6	P3	122,70	145,20	,8450	,3227
SAMPLES COLLECTED 8/26/63					
1	NF	252,40	142,40	1,7725	,2744
2	CF	202,30	176,20	1,1481	,2970
3	P1	264,70	194,00	1,3644	,3763
4	P2	150,30	128,40	1,1706	,2796
5	P3	104,70	104,40	1,0029	,2147
SAMPLES COLLECTED 10/ 6/63					
1	NF	69,20	55,20	1,2536	,0820
2	SF	74,80	57,80	1,2941	,0797
3	P1	105,90	85,30	1,2415	,1043
4	P2	50,40	49,60	1,0161	,0713
5	P3	85,90	72,80	1,1799	,1178
6	169	116,70	141,50	,8247	,1917
7	172	83,80	98,10	,8542	,1396
SAMPLES COLLECTED 5/14/64					
1	P2	957,10	815,20	1,1741	,3160
2	187	1360,80	1093,40	1,2446	,4172
3	188	1420,80	1183,60	1,2004	,4400
4	189	1952,00	1396,20	1,3981	,5784
5	190	1450,20	1218,60	1,1901	,4621
6	191	1533,90	1187,10	1,2921	,5319

TABLE A11. (Continued 2)

CS-137/SR-90 RATIOS (CONT.)

SAMPLE NUMBER	FIELD LOC,	137-CS PCI/M2	90-SR PCI/M2	RATIO	KG/M2

SAMPLES COLLECTED 6/16/64					
1	CF	233,80	362,00	,6459	,2625
2	SF	260,60	293,20	,8888	,2604
3	R2	246,30	348,80	,7061	,2936
4	R3	256,30	302,20	,8481	,2630
SAMPLES COLLECTED 7/20/64					
1	NF	102,10	89,50	1,1408	,2333
2	CF	60,90	106,20	,5734	,2514
3	SF	63,40	103,60	,6120	,2930
4	R1	66,30	102,80	,6449	,2471
5	P3	40,40	76,40	,5288	,1839
SAMPLES COLLECTED 8/25/64					
1	P1	62,80	95,10	,6604	,2592
2	P2	73,40	106,80	,6873	,2931
3	P3	56,30	90,90	,6194	,2397
4	P4	38,80	70,20	,5527	,1960
SAMPLES COLLECTED 10/18/64					
1	NF	30,40	54,10	,5619	,1490
2	CF	31,30	94,00	,3330	,1337
3	P2	29,40	63,70	,4615	,1247
4	P4	30,20	67,40	,4481	,1420
5	581	28,90	74,00	,3905	,1591
6	582	25,40	65,20	,3896	,1400
7	583	30,00	57,90	,5181	,1233
8	584	25,90	64,30	,4028	,1670
9	585	33,60	69,30	,4848	,1583
10	587	47,20	68,50	,6891	,1777
11	588	36,60	54,20	,6753	,1264
12	589	10,00	40,50	,2469	,1232
13	591	14,10	39,20	,3597	,1100
14	593	44,20	86,70	,5098	,2104
15	594	41,40	82,60	,5012	,2147
16	595	24,90	55,90	,4454	,1326
17	596	55,20	87,80	,6287	,2073
18	597	40,40	85,00	,4753	,2119
19	598	30,00	79,00	,3797	,1865
20	599	30,70	70,40	,4361	,1609
21	600	26,60	60,40	,4404	,1448
22	602	43,60	74,20	,5876	,1253

TABLE A11. (Continued 3)

CS-137/SR-90 RATIOS (CONT.)

SAMPLE NUMBER	FIELD LOC.	137-CS PCI/M2	90-SR PCI/M2	RATIO	KG/M2
23	603	25,40	53,30	,4765	,1117
24	604	20,00	61,80	,3236	,1306
25	605	20,30	42,90	,4732	,1112
26	606	23,30	47,00	,4957	,1109
27	607	34,30	72,40	,4738	,1605
28	608	24,70	52,90	,4669	,1209
29	609	28,40	62,50	,4544	,1589
30	610	51,60	51,10	1,0098	,1294
31	611	27,80	55,50	,5009	,1341
32	612	36,80	80,60	,4566	,1943
33	614	23,40	52,80	,4432	,1329
34	615	24,50	41,70	,5875	,1213
35	616	23,70	56,60	,4187	,1512
36	617	32,50	71,70	,4533	,1810
37	618	33,30	79,70	,4178	,1940
38	619	33,70	82,90	,4065	,1802
39	620	27,20	62,20	,4373	,1460
40	621	25,10	53,00	,4736	,1330
41	622	22,60	52,70	,4288	,1377
42	623	27,40	55,00	,4982	,1582
43	624	21,20	49,80	,4257	,1268
44	625	47,90	78,10	,6133	,2234
45	626	32,50	62,00	,5242	,1680
46	627	30,70	59,70	,5142	,1538
47	628	25,80	53,80	,4796	,1543
48	629	27,20	60,00	,4533	,1450
49	630	28,80	58,90	,4890	,1853
50	631	37,70	77,20	,4883	,2071
51	632	27,40	61,70	,4441	,1637
52	633	32,10	51,70	,6209	,1799
53	634	35,80	78,20	,4578	,2040
54	635	39,80	85,10	,4677	,2414
55	636	34,00	79,20	,4293	,1979
56	637	29,90	64,70	,4621	,1957
57	638	28,50	59,40	,4798	,1507
58	639	30,60	66,00	,4636	,1777
59	640	38,90	78,90	,4930	,2159
60	641	28,50	67,10	,4247	,1972
61	642	23,80	59,50	,4000	,1392
62	643	22,00	53,90	,4082	,1184
63	644	38,00	80,60	,4715	,1845
64	645	31,20	85,10	,3666	,1802
65	646	27,00	72,50	,3724	,1478
66	647	34,90	93,60	,3729	,1784
67	648	29,10	79,30	,3670	,1625
68	649	23,70	51,50	,4602	,1070
69	650	33,10	77,80	,4254	,1720

TABLE A11. (Continued 4)

CS-137/SR-90 RATIOS (CONT.)

SAMPLE NUMBER	FIELD LOC.	137-CS PCI/M2	90-SR PCI/M2	RATIO	KG/M2

SAMPLES COLLECTED 5/11/65					
1	NE	546,60	464,70	1,1762	,4034
2	CF	443,80	410,00	1,0824	,3309
3	SE	539,50	454,00	1,1883	,4017
4	F1	589,00	483,10	1,2192	,4026
5	F2	633,20	547,20	1,1572	,4388
6	PS	503,50	610,40	,8249	,6226
7	R1	689,60	531,10	1,2984	,4982
8	P2	486,90	464,20	1,0489	,3911
9	P4	708,90	578,40	1,2256	,4425
10	P5	323,30	363,00	,8906	,3464
11	P6	533,60	424,00	1,2585	,3703
12	811	748,60	695,50	1,0763	,5309
13	820	912,90	947,70	,9633	,5897
14	821	186,80	200,10	,9335	,2087
15	823	395,00	515,20	,7667	,3474
16	825	535,00	543,00	,9853	,4206
17	832	503,60	468,50	1,0749	,4032
18	836	546,50	503,30	1,0858	,3923
19	839	620,70	584,80	1,0614	,4612
20	840	609,00	624,40	,9753	,4545
21	841	600,70	544,40	1,1034	,4578
22	844	262,20	394,10	,6653	,2716
23	848	318,40	410,60	,7755	,3062
24	849	317,80	427,20	,7439	,3264
25	850	349,40	373,70	,9350	,3205
26	852	431,60	557,50	,7742	,4544
27	855	254,50	243,50	1,0452	,2473
28	856	396,40	547,50	,7240	,4062
29	861	485,00	586,50	,8269	,4413
30	862	346,20	418,50	,8272	,2880
31	864	548,90	474,90	1,1558	,3736
32	866	492,80	452,20	1,0898	,4191
33	867	452,80	489,20	,9256	,3602
34	869	450,80	483,30	,9328	,3913
35	873	324,40	443,50	,7315	,3373
36	875	322,00	437,80	,7355	,3309
37	876	647,30	627,90	1,0309	,4852
38	879	373,90	364,60	1,0255	,3006
39	883	514,80	531,90	,9679	,4268
40	884	557,30	633,30	,8800	,4021
41	885	727,50	851,70	,8542	,5401
42	886	284,20	387,10	,7342	,3075
43	887	384,20	502,60	,7644	,3480

TABLE A11. (Continued 5)

CS-137/SR-90 RATIOS (CONT.)

SAMPLE NUMBER	FIELD LOC.	137-CS PCI/M2	90-SR PCI/M2	RATIO	KG/M2

SAMPLES COLLECTED 6/16/65					
1	NF	229,20	251,10	,9128	,2545
2	CF	210,40	205,50	1,0238	,2601
3	SF	222,60	284,30	,7830	,2843
4	F1	213,30	271,10	,7868	,2906
5	F2	205,70	334,80	,6144	,2874
6	R1	260,80	286,90	,9090	,2973
7	P2	306,70	321,40	,9543	,3504
8	P3	254,10	243,60	1,0431	,2814
9	P4	223,10	283,30	,7875	,2854
10	P6	340,10	376,20	,9040	,3724
11	1115	220,30	298,50	,7380	,3300
12	1126	188,70	260,80	,7235	,2978
13	1163	253,90	290,00	,8755	,3435

SAMPLES COLLECTED 7/20/65

1	NF	35,70	87,50	,4080	,2817
2	SF	44,00	93,10	,4726	,3107
3	PS	45,00	140,10	,3212	,3882
4	P1	40,80	103,20	,3953	,3403
5	P2	40,90	121,20	,3375	,3525
6	P3	32,40	101,20	,3202	,3076
7	P4	33,50	109,50	,3059	,3067
8	P5	39,70	118,60	,3347	,3320
9	P6	42,80	106,80	,4007	,3620
10	1380	43,80	121,60	,3602	,2989
11	1382	31,80	82,40	,3859	,2201
12	1383	41,80	105,40	,3966	,2709
13	1384	41,90	93,10	,4501	,2980
14	1385	36,10	92,90	,3886	,2436
15	1386	26,50	75,60	,3505	,2098
16	1387	38,50	107,90	,3568	,2574
17	1389	23,00	69,10	,3329	,1429
18	1390	32,00	85,90	,3725	,2181
19	1391	57,70	124,70	,4627	,3232
20	1392	55,60	141,80	,3921	,3819
21	1393	52,40	120,40	,4352	,3125
22	1394	34,00	105,10	,3235	,2660
23	1396	31,20	96,50	,3233	,2679
24	1397	29,70	84,40	,3519	,2222
25	1398	44,50	116,20	,3830	,3238
26	1400	28,10	101,30	,2774	,2451
27	1403	42,60	138,40	,3078	,3172
28	1404	37,10	111,40	,3330	,3123

TABLE A11. (Continued 6)

CS-137/SR-90 RATIOS (CONT.)

SAMPLE NUMBER	FIELD LOC.	137-CS PCI/M2	90-SR PCI/M2	RATIO	KG/M2
29	1412	25,90	94,80	,2732	,2442
30	1413	24,20	97,80	,2474	,2324
31	1414	28,10	107,30	,2619	,2733
32	1416	33,60	126,80	,2650	,2805
33	1417	41,60	113,80	,3656	,3131
34	1421	42,90	125,50	,3418	,3478
35	1424	32,60	104,80	,3111	,2630
36	1434	44,20	161,00	,2745	,3714
37	1444	35,80	114,40	,3129	,2840
38	1446	40,10	131,40	,3052	,3232
39	1448	44,60	170,60	,2614	,3556
40	1415	34,50	108,40	,3183	,3191
41	1419	48,50	125,20	,3874	,3766
42	1423	29,00	133,50	,2172	,3106
43	1426	31,60	93,40	,3383	,2763
44	1431	39,30	114,80	,3423	,3044
45	1433	44,40	125,70	,3532	,3797
46	1438	55,80	134,20	,4158	,4054
47	1439	29,90	101,40	,2949	,2735
48	1441	47,40	143,90	,3294	,3859
49	1442	30,90	100,00	,3090	,2708
50	1443	41,90	128,20	,3268	,3428
51	1445	40,80	146,60	,2783	,3557
52	1447	23,40	112,50	,2080	,2471
53	1449	27,40	71,80	,3816	,1908

SAMPLES COLLECTED 8/26/65

1	CF	43,50	96,50	,4508	,3084
2	SF	36,20	82,40	,4393	,2707
3	PS	39,30	96,00	,4094	,2808
4	P1	46,90	100,90	,4648	,3034
5	P2	37,90	114,30	,3316	,2988
6	P3	34,60	81,50	,4245	,2227
7	P6	53,30	106,60	,5000	,3200
8	1661	19,80	78,30	,2529	,2294
9	1663	29,20	85,60	,3411	,2564
10	1667	32,10	125,10	,2566	,2893
11	1669	28,40	107,50	,2642	,2717
12	1670	31,90	119,50	,2669	,3007
13	1672	23,00	111,00	,2072	,2945
14	1677	23,70	101,90	,2326	,2380
15	1678	29,70	109,00	,2725	,2473
16	1679	27,80	99,80	,2786	,2479
17	1680	24,10	92,30	,2611	,2321
18	1681	28,50	94,70	,3010	,2558
19	1682	19,80	78,00	,2538	,2000

TABLE A11. (Continued 7)

CS-137/SR-90 RATIOS (CONT.)

SAMPLE NUMBER	FIELD LOC.	137-CS PCI/M2	90-SR PCI/M2	RATIO	KG/M2
20	1683	29,70	108,90	,2727	,2729
21	1685	26,60	84,30	,3155	,2030
22	1686	25,80	90,90	,2838	,2204
23	1687	28,60	106,90	,2675	,2607
24	1688	25,10	80,90	,3103	,2397
25	1689	24,60	80,30	,3064	,2170
26	1691	27,10	88,70	,3055	,2192
27	1692	23,60	75,90	,3109	,2386
28	1693	36,30	92,20	,3937	,2617
29	1694	34,90	93,40	,3737	,2775
30	1696	27,70	93,70	,2956	,2717
31	1697	26,10	82,90	,3148	,1911
32	1698	28,50	93,80	,3038	,2215
33	1699	27,10	84,20	,3219	,2522
34	1700	29,80	103,30	,2885	,2476
35	1701	29,30	90,00	,3256	,2393
36	1702	34,50	105,50	,3270	,2641
37	1703	29,60	87,90	,3367	,2500
38	1704	36,00	94,30	,3818	,2647
39	1706	35,20	96,30	,3655	,3000
40	1707	34,70	109,30	,3175	,2628
41	1708	28,10	81,10	,3465	,1985
42	1709	30,10	101,70	,2960	,2556
43	1711	39,60	93,40	,4240	,2895
44	1712	29,50	88,90	,3318	,2283
45	1713	29,00	76,80	,3776	,2392
46	1714	38,80	99,80	,3888	,2541
47	1715	39,00	101,40	,3846	,2662
48	1716	41,20	111,60	,3692	,3053
49	1717	34,60	115,10	,3006	,2752
50	1718	37,10	125,50	,2956	,3039
51	1719	27,20	105,00	,2590	,2234
52	1722	24,10	115,00	,2096	,2260
53	1723	32,00	118,40	,2703	,2602
54	1724	29,80	134,80	,2211	,2581
55	1725	48,00	147,50	,3254	,3193
56	1727	22,60	89,20	,2534	,1978
57	1728	47,10	165,70	,2842	,3278

SAMPLES COLLECTED 10/ 8/65

1	NF	19,50	47,80	,4079	,1409
2	CF	18,10	51,90	,3487	,1515
3	SE	20,70	47,20	,4386	,1642
4	F2	22,20	65,40	,3394	,1866
5	P1	22,00	65,90	,3338	,1904
6	P3	16,00	52,10	,3071	,1478

TABLE A11. (Continued 8)

CS-137/SR-90 RATIOS (CONT.)

SAMPLE NUMBER	FIELD LOC.	137-CS PCI/M2	90-SR PCI/M2	RATIO	KG/M2
7	P4	7,40	23,30	,3176	,0934
8	P4	22,70	69,10	,3285	,1884
9	1939	14,50	49,70	,2918	,1381
10	1941	21,00	72,70	,2889	,1807
11	1942	16,40	68,50	,2394	,1629
12	1943	19,90	81,00	,2457	,2138
13	1946	20,40	66,40	,3072	,1768
14	1947	17,00	68,60	,2478	,1752
15	1948	15,70	83,00	,1892	,1764
16	1949	14,30	66,10	,2163	,1563
17	1950	18,90	71,20	,2654	,1959
18	1951	22,40	70,90	,3159	,1733
19	1952	18,40	66,40	,2771	,1674
20	1953	21,30	73,80	,2886	,1911
21	1954	19,50	72,50	,2690	,1605
22	1955	18,10	71,80	,2521	,1766
23	1956	16,70	69,50	,2403	,1661
24	1957	21,90	81,50	,2687	,1969
25	1958	24,60	79,20	,3106	,2171
26	1959	18,40	70,60	,2606	,1800
27	1961	16,30	73,20	,2227	,1647
28	1962	16,30	46,30	,3521	,1234
29	1964	16,20	68,30	,2372	,1694
30	1965	14,50	70,00	,2071	,1561
31	1967	18,10	73,50	,2463	,1664
32	1968	17,00	48,10	,3534	,1528
33	1971	21,80	63,80	,3417	,1847
34	1972	15,50	57,60	,2691	,1580
35	1973	22,30	76,10	,2930	,1898
36	1974	18,70	59,30	,3153	,1697
37	1975	21,00	60,10	,3494	,1769
38	1976	24,50	42,80	,5724	,1795
39	1977	16,00	52,70	,3036	,1549
40	1978	19,80	62,20	,3183	,1622
41	1979	20,20	58,20	,3471	,1600
42	1980	20,40	64,50	,3163	,1637
43	1981	23,80	75,20	,3165	,1957
44	1982	26,50	72,50	,3655	,1865
45	1983	17,80	61,70	,2885	,1533
46	1984	23,60	58,50	,4034	,1533
47	1985	19,70	55,60	,3543	,1617
48	1986	18,00	55,80	,3226	,1564
49	1987	25,50	62,40	,4087	,1820
50	1988	24,40	70,00	,3486	,2030
51	1989	14,70	68,10	,2159	,1869
52	1990	22,60	71,40	,3165	,1947
53	1991	29,50	82,30	,3584	,2550

TABLE A11. (Continued 9)

CS-137/SR-90 RATIOS (CONT.)

SAMPLE NUMBER	FIELD LOC.	137-CS PCI/M2	90-SR PCI/M2	RATIO	KG/M2
54	1992	25,30	82,90	,3052	,2250
55	1993	27,70	74,30	,3728	,2019
56	1994	23,10	74,30	,3109	,1952
57	1995	24,40	74,70	,3266	,2068
58	1996	23,90	70,00	,3414	,1885
59	1997	17,10	74,20	,2305	,1790
60	1999	24,40	68,00	,3588	,1928
61	2000	20,50	71,50	,2867	,1719
62	2001	25,00	67,80	,3687	,2018
63	2002	16,80	60,20	,2791	,1432
64	2003	24,90	74,50	,3342	,1782
65	2005	24,60	87,00	,2828	,2231
66	2006	17,80	60,10	,2962	,1355
67	2007	19,50	78,00	,2500	,1707
68	2008	23,70	94,40	,2511	,2173

SAMPLES COLLECTED 5/11/66

1	NF	249,30	350,60	,7111	,4509
2	CF	337,90	451,10	,7491	,5255
3	F1	224,20	246,80	,9084	,3897
4	F2	221,70	292,50	,7579	,3899
5	PS	203,00	270,00	,7519	,3899
6	P1	298,40	359,50	,8300	,4489
7	P2	286,00	352,10	,8123	,4489
8	P3	258,00	308,60	,8360	,4253
9	P4	278,80	319,50	,8726	,4632
10	P6	319,80	396,10	,8074	,5279
11	2348	232,40	374,10	,6212	,4154
12	2351	245,70	495,20	,4962	,5938
13	2368	222,70	466,00	,4779	,6138
14	2389	286,80	463,10	,6193	,6035

SAMPLES COLLECTED 6/16/66

1	NF	35,80	106,00	,3377	,3344
2	CF	32,70	115,80	,2824	,3218
3	SF	33,80	101,70	,3324	,3425
4	F1	29,70	85,80	,3462	,2635
5	F2	28,40	93,20	,3047	,3058
6	PS	39,20	149,80	,2617	,4242
7	P1	24,90	76,70	,3246	,2449
8	P2	31,70	99,50	,3186	,2973
9	P3	36,10	113,00	,3195	,3330
10	P4	22,80	76,30	,2988	,2636
11	P5	34,30	114,70	,2990	,3147
12	P6	21,20	64,70	,3277	,2302

TABLE A11. (Continued 10)

CS-137/SR-90 RATIOS (CONT.)

SAMPLE NUMBER	FIELD LOC.	137-CS PCI/M2	90-SR PCI/M2	RATIO	KG/M2
13	2600	30,90	105,90	,2918	,2715
14	2601	30,10	89,30	,3371	,2546
15	2603	31,20	106,80	,2921	,2632
16	2604	23,50	72,80	,3228	,1945
17	2605	38,10	133,00	,2865	,3332
18	2606	22,50	64,20	,3505	,1755
19	2607	32,60	98,80	,3300	,2784
20	2608	43,50	111,90	,3887	,3045
21	2609	18,10	64,80	,2793	,1887
22	2610	25,30	76,90	,3290	,2042
23	2612	27,80	97,30	,2857	,2581
24	2613	29,10	92,60	,3143	,2416
25	2614	35,20	117,70	,2991	,2979
26	2617	34,70	119,40	,2906	,3025
27	2618	33,10	116,00	,2853	,3106
28	2619	37,20	114,30	,3255	,2962
29	2620	39,50	110,00	,3591	,3153
30	2621	33,40	103,40	,3230	,2736
31	2622	35,60	99,60	,3574	,2683
32	2623	37,90	150,80	,2513	,3056
33	2624	36,30	102,40	,3545	,2814
34	2626	40,70	144,00	,2826	,3296
35	2628	27,90	94,30	,2959	,2886
36	2629	34,40	104,20	,3301	,3375
37	2630	31,40	115,30	,2723	,3525
38	2631	41,90	148,50	,2822	,4103
39	2633	31,60	109,00	,2899	,3345
40	2634	36,70	117,60	,3121	,3667
41	2637	29,20	94,20	,3100	,2826
42	2638	29,00	96,20	,3015	,3045
43	2640	43,50	126,40	,3441	,4298
44	2641	32,50	107,50	,3023	,3385
45	2644	36,00	103,00	,3495	,3113
46	2645	41,00	133,10	,3080	,3611
47	2647	45,90	122,00	,3762	,4112
48	2648	43,20	113,60	,3803	,3601
49	2649	49,10	161,60	,3038	,3971
50	2651	32,40	115,30	,2810	,3456
51	2652	42,70	124,60	,3427	,3735
52	2654	42,40	117,20	,3618	,3594
53	2656	44,60	117,50	,3796	,4062
54	2657	40,40	105,70	,3822	,3653
55	2659	43,60	104,30	,4180	,3831
56	2660	56,40	168,00	,3357	,4735
57	2661	32,60	86,70	,3760	,2885
58	2663	127,30	107,20	1,1875	,3236
59	2664	42,80	134,30	,3187	,3472

TABLE A11. (Continued 11)

CS-137/SR-90 RATIOS (CONT.)

SAMPLE NUMBER	FIELD LOC.	137-CS PCI/M2	90-SR PCI/M2	RATIO	KG/M2
60	2665	52,30	123,70	,4228	,3581
61	2666	33,30	108,10	,3080	,2827
62	2667	58,90	177,90	,3311	,4752
63	2668	68,30	102,60	,6657	,3221
64	2669	77,00	130,70	,5891	,3581

SAMPLES COLLECTED 8/26/66

1	NF	14,00	67,70	,2068	,2313
2	SF	14,60	60,60	,2409	,1911
3	F1	46,30	75,20	,6157	,2614
4	F2	38,00	104,70	,3629	,2795
5	P3	93,10	108,70	,8565	,2867
6	P4	15,20	74,40	,2043	,2259
7	P5	12,40	19,90	,6231	,1621

SAMPLES COLLECTED 10/13/66

1	NF	28,10	66,30	,4238	,2223
2	CF	25,00	55,80	,4480	,1874
3	SF	27,80	72,70	,3824	,2317
4	F1	27,70	60,00	,4617	,2271
5	F2	22,50	67,10	,3353	,2363
6	PS	49,00	59,00	,8305	,1794
7	P1	22,00	57,50	,3826	,1981
8	P2	24,60	53,20	,4624	,1708
9	P3	22,70	66,10	,3434	,2033
10	P4	20,20	58,80	,3435	,1884
11	P5	25,00	66,60	,3754	,2144
12	P6	24,70	69,50	,3554	,2412
13	3320	29,90	72,10	,4147	,2168
14	3321	34,40	83,80	,4105	,2350
15	3322	26,90	70,90	,3794	,2160
16	3324	25,00	83,40	,2998	,2174
17	3326	21,90	78,50	,2790	,2341
18	3329	24,30	88,40	,2749	,2530
19	3334	29,60	85,20	,3474	,2652
20	3335	29,90	112,70	,2653	,2690
21	3336	32,80	92,30	,3554	,2996
22	3338	29,20	96,20	,3035	,3210
23	3340	33,10	110,20	,3004	,3067
24	3342	19,00	54,70	,3473	,1642
25	3344	22,40	72,90	,3073	,2002
26	3345	22,00	73,40	,2997	,2288
27	3346	18,70	80,10	,2335	,2135
28	3347	28,20	79,80	,3534	,2674
29	3348	21,30	79,60	,2676	,2094

TABLE A11. (Continued 12)

CS-137/SR-90 RATIOS (CONT.)

SAMPLE NUMBER	FIELD LOC.	137-CS PCI/M2	90-SR PCI/M2	RATIO	KG/M2
30	3349	30,30	95,30	,3179	,2805
31	3350	28,30	91,70	,3086	,2635
32	3351	39,30	135,90	,2892	,3594
33	3352	23,60	89,70	,2631	,2223
34	3353	28,20	108,90	,2590	,2635
35	3354	25,40	88,40	,2873	,2461
36	3360	21,70	62,10	,3494	,1575
37	3361	28,60	75,20	,3803	,2257
38	3365	21,30	70,60	,3017	,1955
39	3366	25,00	72,90	,3429	,2150
40	3367	26,50	94,40	,2807	,2588
41	3369	69,30	66,60	1,0405	,1877
42	3370	19,80	73,10	,2709	,2193
43	3371	33,90	87,60	,3870	,2574
44	3372	26,00	81,80	,3178	,2077
45	3374	19,20	74,80	,2567	,1997
46	3376	19,30	65,00	,2969	,1674
47	3377	25,90	66,30	,3906	,2306
48	3378	22,40	62,80	,3567	,1973
49	3379	16,10	63,40	,2539	,1567
50	3380	25,80	75,00	,3440	,2366
51	3382	25,00	67,40	,3709	,2144
52	3384	23,70	66,90	,3543	,2195
53	3388	26,90	72,30	,3721	,2270
54	3390	28,60	79,50	,3597	,2595
55	3391	30,30	84,60	,3582	,2904
56	3393	30,10	82,70	,3640	,2624
57	3396	25,10	68,70	,3654	,2170
58	3401	25,10	90,50	,2773	,2287
59	3402	24,10	60,00	,4017	,2193
60	3404	29,10	92,80	,3136	,2591
61	3408	19,50	73,30	,2660	,1998
62	3409	20,20	51,70	,3907	,1833
63	3411	27,20	87,70	,3101	,2519
64	3413	25,60	75,90	,3373	,2081
65	3415	29,70	80,40	,3694	,2573
66	3418	25,10	73,90	,3396	,2059
67	3419	25,90	64,50	,4016	,1970

TABLE A12. ^{90}Sr (pCi/kg) with Soil Depth in Three Fields (1962)

Soil Increment (Inches)	Field Number										Summary Statistics		
	4A				4B				5E		Number of Locations	Overall Mean	Coefficient of Variation
	Sample Size	Mean	c v	Sample Size	Mean	c v	Sample Size	Mean	c v				
0-1	1	161.8	--	5	258.3	21	3	222.7	133	3	214.3	22.8	
1-2	1	166.3	--	4	236.6	21	3	172.9	37	3	191.9	20.2	
2-3	1	180.9	--	4	355.8	86	4	174.5	20	3	237.1	43.4	
3-4	1	324.8	--	5	315.1	74	4	227.2	80	3	289.0	18.6	
4-5	1	315.7	--	4	244.9	41	2	149.2	--	3	236.6	35.3	
5-6	2	202.3	--	5	212.5	27	3	227.5	66	3	214.1	5.9	
6-8	1	155.4	--	4	257.0	27	2	137.1	--	3	183.2	35.3	
8-10	--	--	--	5	192.3	99	3	147.9	54	2	170.1	--	
10-12	--	--	--	6	117.0	41	3	119.8	43	2	117.4	--	
12-14	--	--	--	1	120.6	--	2	57.0	--	2	88.8	--	
14-18	--	--	--	4	165.9	55	2	88.8	--	2	127.4	--	

TABLE A13. ^{137}Cs Concentration in Horizontal Composites in Four Fields (1962)

Horizontal Increment (Inches)	$^{137}\text{Cs} - (\text{pCi/kg})$										Summary Statistics		
	Field Number										Mean of Locations	Standard Deviation	Coefficient of Variation
	4A	Mean	n	Mean	n	Mean	n	Mean	n	Mean			
0-1	1	497.80	1	304.20	1	546.80	1	548.1	1	548.1	474.2	115.7	24.4
1-2	1	397.00	1	266.30	1	474.10	1	352.5	1	352.5	372.5	86.8	23.3
2-3	1	399.80	2	267.50	1	358.70	1	306.3	1	306.3	333.1	58.1	17.4
3-4	1	378.10	1	300.90	1	337.60	1	299.1	1	299.1	328.9	37.3	11.3
4-5	1	340.60	1	277.70	1	339.20	1	275.2	1	275.2	308.2	36.6	11.9
5-6	2	287.00	1	292.30	1	374.40	1	271.9	1	271.9	306.4	46.1	15.1
6-8	1	237.00	1	332.20	1	395.20	1	260.7	1	260.7	306.3	71.8	23.4
8-10	1	77.95	1	210.90	1	213.50	1	163.8	1	163.8	164.0	61.0	37.2
10-12	1	29.82	1	114.50	1	93.10	2	78.96	1	78.96	79.1	35.9	45.4
12-14	1	37.07	1	19.80	1	74.51	1	50.69	1	50.69	45.5	23.1	50.7
14-18	1	11.63	1	11.53	1	43.89	1	39.67	1	39.67	26.7	17.5	65.7
$^{137}\text{Cs} - (\text{pCi/m}^2) \times 10^{-2}$													
0-1	1	128.5	1	98.5	1	171.1	1	188.0	1	188.0	146.5	40.63	27.7
1-2	1	125.9	1	93.3	1	153.3	1	118.1	1	118.1	122.7	24.71	20.1
2-3	1	125.1	1	91.7	1	118.4	1	102.5	1	102.5	109.4	15.16	13.9
3-4	1	115.9	2	99.3	1	108.2	1	99.8	1	99.8	105.8	7.87	7.4
4-5	1	103.8	1	98.6	1	108.2	1	94.2	1	94.2	101.2	6.10	6.0
5-6	2	84.3	1	97.7	1	120.0	1	92.1	1	92.1	98.5	15.32	15.5
6-8	1	140.6	1	222.6	1	246.7	1	182.0	1	182.0	197.9	46.65	23.6
8-10	1	48.7	1	151.5	1	132.6	1	120.0	1	120.0	113.2	44.91	39.7
10-12	1	19.4	1	83.9	1	61.9	2	56.4	1	56.4	55.4	26.78	48.3
12-14	1	242.0	1	14.3	1	48.5	1	36.7	1	36.7	30.9	14.90	48.2
14-18	1	15.0	1	17.2	1	61.8	1	60.3	1	60.3	38.6	25.98	67.4

*Number of samples of a composite sent to radiochemistry. Questions relative to compositing and the subsequent interpretation of these data should be directed to Dr. Hawthorne.

TABLE A14. Comparison of Mean Values (pCi/kg) of ^{90}Sr and ^{137}Cs for 1962 vs 1965 in Horizontal Composites

Soil Increment (Inches)	¹³⁷ Cs						Ratio 1965 1962
	1962			1965			
	Number of Locations	Coefficient of Variation	Mean	Number of Locations	Coefficient of Variation	Mean	
0-1	4	24	474.2	4	23	1174.8	2.477
1-2	4	23	372.5	4	48	527.0	1.414
2-3	4	17	333.1	4	32	348.0	1.045
3-4	4	11	328.9	4	32	286.6	0.871
4-5	4	12	303.2	4	22	251.8	0.830
5-6	4	15	306.4	4	38	226.9	0.741
6-8	4	23	306.3	4	35	200.6	0.655
8-10	4	37	164.0	3	24	169.3	1.032
10-12	4	45	79.1	3	18	93.03	1.176
12-14	4	51	45.5	2	--	71.69	1.576
14-18	4	66	26.7	1	--	78.18	2.928
			Σ weighted/inch = 3414.9			4197.1	
			mean/inch = 189.71			233.17	
	⁹⁰ Sr						
0-1	3	23	214.3	4	29	317.4	1.48
1-2	3	20	191.9	4	18	253.9	1.32
2-3	3	44	237.1	4	13	212.8	0.899
3-4	3	19	289.0	4	19	214.8	0.744
4-5	3	36	236.6	4	10	198.4	0.837
5-6	3	6	214.1	4	16	180.6	0.846
6-8	3	35	183.2	4	27	175.8	0.961
8-10	2	--	170.1	4	28	138.6	0.817
10-12	2	--	117.4	4	43	104.9	0.894
12-14	2	--	88.8	3	24	87.4	0.979
14-18	2	--	127.4	3	37	57.8	0.455
			Σ weighted/inch = 3011.6			2622.5	
			mean/inch = 167.31			145.69	

TABLE A15. ¹³⁷Cs Concentration in Horizontal Composites in Four Fields (1965)

Horizontal Increment (Inches)	(pCi/kg)										Summary Statistics		
	Field Number										Mean of Locations	Standard Deviation	Coefficient of Variation
	5D		5E		5F		8Q						
	n*	Mean	n	Mean	n	Mean	n	Mean					
0-1	2	1472.0	1	1015.0	2	1188.0	2	1024.0	1175.0	213.5	18.2		
1-2	2	832.7	1	495.0	2	606.3	1	174.0	527.0	274.0	52.0		
2-3	2	500.1	1	308.9	2	379.7	2	203.4	348.0	124.6	35.8		
3-4	2	408.3	1	249.8	2	297.6	2	190.8	286.6	92.1	32.1		
4-5	2	331.5	1	208.9	2	271.4	2	195.5	251.8	62.5	24.8		
5-6	2	287.5	1	198.4	2	305.1	1	116.6	226.9	87.1	38.4		
6-8	2	265.9	1	198.9	2	239.1	2	98.4	200.6	73.4	36.6		
8-10	2	216.3	1	122.1	2	169.4	-	--	169.3	47.1	27.8		
10-12	1	111.6	-	--	1	92.2	2	75.3	93.0	18.1	19.5		
12-14	-	--	-	--	1	72.1	1	71.3	71.7	--	--		
14-18	-	--	-	--	-	--	2	78.2	78.2	--	--		
0-1	2	491.4	1	339.5	2	360.8	2	296.9	372.2	83.7	22.5		
1-2	2	269.6	1	179.3	2	205.3	1	62.9	179.3	86.4	48.2		
2-3	2	160.6	1	111.8	2	132.9	2	71.2	119.1	37.6	31.6		
3-4	2	128.9	1	86.3	2	101.7	2	67.5	96.1	25.9	27.0		
4-5	2	107.4	1	74.4	2	94.0	2	66.1	85.5	18.7	21.9		
5-6	2	92.1	1	69.6	2	103.9	1	38.1	75.9	28.9	38.1		
6-8	2	175.1	1	140.4	2	165.9	2	67.9	137.3	61.3	35.4		
8-10	2	139.9	1	84.8	2	121.5	-	--	115.4	28.0	24.3		
10-12	2	73.9	-	--	2	67.9	2	51.3	64.4	11.7	18.2		
12-14	-	--	-	--	1	53.0	1	47.1	50.0	--	--		
14-18	-	--	-	--	-	--	2	88.0	88.0	--	--		

*Number of samples of a composite sent to radiochemistry. Questions relative to compositing and the subsequent interpretation of these data should be directed to Dr. Hawthorne.

TABLE A16. ⁹⁰Sr Concentrations in Horizontal Soil Composites (1965)

Horizontal Increment (Inches)	(pCi/kg)										Summary Statistics		
	Field Number										Mean of Locations	Standard Deviation	Coefficient of Variation
	5D		5E		5F		5G		5H				
	n*	Mean	n	Mean	n	Mean	n	Mean	n	Mean			
0-1	2	280.4	1	219.7	2	332.3	2	437.3	317.4	92.4	29.1		
1-2	2	304.3	1	203.3	2	280.1	2	228.2	253.9	46.5	18.3		
2-3	2	249.8	1	185.4	1	204.5	2	211.8	212.8	27.0	12.7		
3-4	2	270.3	1	172.9	1	200.2	2	216.0	214.8	41.0	19.1		
4-5	2	210.8	1	168.7	2	203.2	2	210.9	198.4	20.0	10.1		
5-6	2	202.0	1	198.5	2	181.4	1	140.6	180.6	28.2	15.6		
6-8	2	213.8	1	165.5	2	210.3	2	113.6	175.8	46.9	26.7		
8-10	2	184.3	1	108.3	2	157.6	2	104.3	138.6	38.9	28.1		
10-12	1	167.6	1	68.9	2	109.4	1	73.9	104.9	45.4	43.3		
12-14	2	64.2	-	--	2	104.8	2	93.4	87.4	21.0	24.0		
14-18	2	41.7	-	--	1	50.1	2	81.8	57.8	21.1	36.5		
(pCi/m ²)													
0-1	2	93.5	1	73.5	2	101.2	2	126.6	98.7	21.9	22.2		
1-2	2	99.3	1	73.7	2	95.1	2	80.8	87.2	12.0	13.8		
2-3	2	80.5	1	67.1	1	71.2	2	74.5	73.3	5.6	7.7		
3-4	2	85.6	1	59.7	1	70.3	2	76.6	73.0	10.9	14.9		
4-5	2	68.3	1	60.1	2	70.4	2	72.4	67.8	5.4	7.9		
5-6	2	64.7	1	69.6	2	61.9	1	45.9	60.5	10.2	16.9		
6-8	2	141.3	1	116.8	2	145.7	2	78.5	120.6	30.9	25.6		
8-10	2	119.1	1	75.2	2	112.9	2	71.2	94.6	24.9	26.3		
10-12	1	114.0	1	48.5	2	80.5	1	52.8	73.9	30.2	40.9		
12-14	2	43.2	-	--	2	77.9	2	64.8	62.0	17.5	28.2		
14-18	2	48.2	-	--	2	68.4	2	91.3	69.3	21.6	31.1		

*Number of samples of a composite sent to radiochemistry. Questions relative to compositing and the subsequent interpretation of these data should be directed to Dr. Hawthorne.

TABLE A17. Comparison of $^{137}\text{Cs}/^{90}\text{Sr}$ Ratios in Horizontal Soil Composites for 1965

Horizontal Increment (Inches)	$^{137}\text{Cs}/^{90}\text{Sr}$				Summary Statistics		
	Field Number				Mean of Locations	Standard Deviation	Coefficient of Variation
	5D	5E	5F	8Q			
0-1	5.25	4.62	3.57	2.34	3.95	1.27	32.4
1-2	2.73	2.43	2.16	0.76	2.02	0.87	43.2
2-3	2.00	1.67	1.86	0.96	1.62	0.46	28.5
3-4	1.51	1.45	1.49	0.88	1.33	0.30	22.8
4-5	1.57	1.24	1.34	0.93	1.27	0.27	20.9
5-6	1.42	0.99	1.68	0.83	1.23	0.39	31.7
6-8	1.24	1.20	1.14	0.86	1.11	0.17	15.5
8-10	1.17	1.13	1.07	--	1.12	0.05	4.5
10-12	0.66	--	0.84	1.02	0.84	0.18	21.4
12-14	--	--	0.68	0.76	0.72	--	--
14-18	--	--	--	0.96	0.96	--	--

TABLE A18. Comparison of ^{137}Cs Concentrations in Vertical Soil Composites for 1965 vs 1962

Field and Location	1962			1965			Ratio 1965 1962
	Sample Size	Mean	Sample Size	Mean	Sample Size	Mean	
4a	1	153.3	2	234.8			1.53
4b	3	136.7	4	192.8			1.41
5d	7	200.6	10	278.2			1.39
5e	3	205.1	8	172.8			0.842
5f	5	177.8	9	230.8			1.30
6g	10	161.2	8	221.9			1.38
6h	10	164.4	10	203.6			1.24
6i	10	152.4	8	222.7			1.46
$\frac{\Sigma 1351.5}{\text{Unweighted Mean } 168.94} = 1.30$							1.32
$\frac{\Sigma 1965}{\text{Ratio of } \Sigma 1965} = 1.30$							0.212
							16.09
							1757.6
							219.7

TABLE A19.
Comparison of ^{90}Sr Concentrations in Vertical Soil
Composites for 1965 vs 1962

[illegible]

TABLE A20. ^{137}Cs and ^{90}Sr Concentration and Ratios in Vertical Soil Composites (1962)

Field and Location	¹³⁷ Cs			⁹⁰ Sr			¹³⁷ Cs/ ⁹⁰ Sr
	(pCi/kg)						
	Mean	Sample Size	Coefficient of Variation	Mean	Sample Size	Coefficient of Variation	
4a*	153.3	1	--	85.7	1	--	1.79
4b	136.7	3	12.8	120.6	7	25.1	1.13
5d	200.6	7	8.4	166.7	10	29.4	1.20
5e	205.1	3	6.2	105.8	10	18.1	1.94
5f	177.8	5	22.5	134.5	9	16.9	1.32
6g	161.2	10	42.9	--	-	--	--
6h	164.4	10	31.3	--	-	--	--
6i	152.4	10	33.9	--	-	--	--
	(pCi/m ²) x 10 ⁻²						
4a	869.9	1	--	486.5	1	--	1.79
4b	790.7	3	14.1	647.6	7	14.8	1.22
5d	1146.0	7	11.1	959.5	10	30.9	1.19
5e	781.0	3	9.1	609.5	10	30.4	1.28
5f	1122.0	5	23.3	848.0	9	17.9	1.32
6g	939.4	10	40.1	--	-	--	--
6h	968.6	10	27.9	--	-	--	--
6i	971.6	10	35.1	--	-	--	--

*Letters refer to different locations in the same field (see text Figure 1 and B5).

TABLE A21. ^{137}Cs and ^{90}Sr Concentration and Ratios in Vertical Soil Composites (1965)

Field and Location	^{137}Cs			^{90}Sr			$^{137}\text{Cs}/^{90}\text{Sr}$
	Mean	Sample Size	Coefficient of Variation	Mean	Sample Size	Coefficient of Variation	
2m*	273.0	3	17.8	177.6	4	26.5	1.54
2n	198.0	1	--	131.5	4	46.9	1.51
3o	233.1	4	19.5	137.2	5	22.3	1.70
4a	234.8	2	--	139.4	5	11.7	1.68
4b	192.8	4	20.2	115.7	5	11.5	1.67
4c	205.7	4	15.2	128.3	3	6.4	1.60
5d	278.2	10	16.7	158.9	10	14.8	1.75
5e	172.8	8	17.4	116.8	10	30.9	1.48
5f	230.8	9	21.3	145.9	10	12.3	1.58
6g	221.9	8	7.9	127.0	9	16.7	1.75
6h	203.6	10	17.5	120.0	8	17.7	1.70
6i	222.7	8	19.6	151.1	10	22.4	1.47
7j	256.5	6	26.2	123.8	9	17.6	2.07
7k	209.5	6	25.5	112.0	6	16.1	1.87
7l	189.0	4	25.8	131.8	5	15.3	1.43
8p	176.9	5	23.7	202.0	5	26.0	0.88
8q	207.6	4	65.5	139.1	5	30.2	1.49
8r	124.4	3	38.0	89.4	5	28.1	1.39

* Letters refer to different locations in the same field (see text Figure 1 and B5).

TABLE A22. ¹³⁷Cs and ⁹⁰Sr Area1 Concentration and Ratios in Vertical Soil Composites (1965)

Field and Location	¹³⁷ Cs			⁹⁰ Sr			¹³⁷ Cs/ ⁹⁰ Sr
	(pCi/m ²) × 10 ⁻²						
	Mean	Sample Size	Coefficient of Variation	Mean	Sample Size	Coefficient of Variation	
2m*	1417.0	3	15.7	902.5	4	24.4	1.57
2n	1083.0	1	--	741.0	4	36.5	1.46
3o	1374.0	4	17.2	777.9	5	14.5	1.77
4a	1331.0	2	--	807.6	5	9.8	1.65
4b	1252.0	4	15.5	752.6	5	9.9	1.66
4c	1387.0	4	18.4	874.1	3	9.1	1.59
5d	1599.0	10	18.1	911.5	10	14.7	1.75
5e	1089.0	8	15.5	734.2	10	30.0	1.48
5f	1453.0	9	21.1	916.4	10	13.1	1.59
6g	1445.0	8	9.9	820.8	9	15.1	1.76
6h	1312.0	10	18.1	766.0	8	18.5	1.71
6i	1397.0	8	17.5	938.2	10	18.2	1.49
7j	1683.0	6	30.1	799.4	9	20.2	2.11
7k	1307.0	6	24.1	701.7	6	13.4	1.86
7l	1201.0	4	24.7	826.8	5	10.7	1.45
8p	1005.0	5	29.1	1143.0	5	29.5	0.88
8q	1141.0	4	56.9	769.5	5	27.4	1.48
8r	811.8	3	38.3	583.5	5	27.8	1.39

*Letters refer to different locations in the same field (see text Figure 1 and B5).

TABLE A23. ^{137}Cs and ^{90}Sr Concentration (pCi/l) and Solids (mg/l) in Irrigation Water

		Radionuclide in Water (pCi/l)						Solids in Water (mg/l)		
Date	Field	¹³⁷ Cs		⁹⁰ Sr		Ratio ¹³⁷ Cs/ ⁹⁰ Sr		Water In	Water Out	Out/In
		Water In	Water Out	Water In	Water Out	Water In	Water Out			
5-23-63	2	--	17.850	--	2.980	--	6.000	64.3	387.0	6.02
	4	--	--	--	--	--	--	13.6	--	--
	5	2888.000	--	--	--	--	--	95.4	--	--
	6	0.615	--	0.869	--	0.700	--	54.6	633.0	11.60
	7	1947.000	--	0.944	6.810	2063.000	--	48.7	349.0	7.17
6-23-63	2	--	--	1.734	--	--	--	4.7	--	--
	4	--	--	0.521	--	--	--	16.6	10.3	0.62
6-26-63	5	0.471	1.775	0.440	4.732	1.070	0.249	13.0	30.0	2.31
	6	--	--	0.498	--	--	--	23.2	173.7	7.49
	7	--	1.798	0.875	5.570	--	0.323	16.8	32.7	1.95
7-28-63	-	--	--	2.100	--	--	--	921.6	1046.3	1.14
7-31-63	-	--	--	--	3.571	--	--	52.0	29.0	0.56
8-11-63	-	--	--	--	--	--	--	39405.0	--	--
8-18-63	-	--	--	--	--	--	--	85122.0	--	--
8-31-63	6	--	--	--	--	--	--	18035.0	--	--
9-5-63	-	--	--	--	--	--	--	22070.0	--	--
9-9-63	-	--	--	--	--	--	--	3646.0	--	--
9-22-63	-	--	--	2.304	--	--	--	494.6	--	--

TABLE A23. (Continued 2)

Date	Field	Radionuclide in Water (pCi/l)						Solids in Water (mg/l)		
		¹³⁷ Cs		⁹⁰ Sr		Ratio ¹³⁷ Cs/ ⁹⁰ Sr		Water In	Water Out	Out/In
		Water In	Water Out	Water In	Water Out	Water In	Water Out			
10-1-63	-	--	--	--	--	--	--	981.2	--	--
12-7-63	6	--	--	1.184	--	--	--	561.6	--	--
	7	--	1.073	1.007	2.037	--	0.527	281.7	608.1	2.16
12-9-63	6	--	1.061	--	2.860	--	0.371	--	446.3	--
3-22-64	-	--	59.290	1.155	16.360	--	3.620	279.9	2284.7	8.22
4-12-64	-	--	6.749	14.850	10.160	--	0.664	2091.5	537.7	0.26
4-19-64	4	--	0.934	7.059	7.990	--	0.117	56.5	--	--
	5	--	1.799	--	7.621	--	0.236	121.6	203.6	1.67
4-28-64	-	--	5.192	2.258	8.105	--	0.641	379.6	212.2	0.56
5-02-64	4	--	144.100	3.398	70.210	--	2.050	3748.0	450.4	0.12
5-06-64	-	--	133.600	6.705	32.270	--	4.140	450.3	1823.9	4.05
5-24-64	-	1.164	--	3.172	4.637	0.360	--	201.9	678.0	3.36
5-27-64	-	5681.0	3.735	--	12.790	--	0.292	9054.3	822.4	0.09
6-5-64	-	--	0.603	--	2.501	--	0.241	136.9	596.6	4.36
6-13-64	-	--	0.691	--	4.512	--	0.153	27.7	9.0	0.33

TABLE A23. (Continued 3)

Date	Field	Radionuclide in Water (pCi/l)										Solids in Water (mg/l)			
		¹³⁷ Cs				⁹⁰ Sr				Ratio ¹³⁷ Cs/ ⁹⁰ Sr		Water		Water	
		Water In	Water Out	Water In	Water Out	Water In	Water Out	Water In	Water Out	Water In	Water Out	Water In	Water Out	Water In	Water Out
6-27-64	-	356.900	1.214	1.312	5.305	272.020	0.229					53.4	13.4	0.25	
7-8-64	-	118.700	294.300	--	--	--	--	--	--	--	--	190.3	119.2	0.62	
7-12-64	-	--	--	--	--	--	--	--	--	--	--	287.0	--	--	--
7-21-64	-	1.854	0.688	1.710	4.443	1.080	0.155					37.7	--	--	--
8-1-64	-	--	--	--	--	--	--	--	--	--	--	14091.5	--	--	--
8-3-64	4	224.9	5.947	--	21.680	--	0.274					2776.6	789.5	0.28	
8-8-64	5	--	3.122	2676.000	11.150	--	0.280					5216.6	908.1	0.17	
9-4-64	7	2.171	0.437	--	3.211	--	0.136					80.9	126.3	1.57	
9-7-64	-	0.835	--	1.558	--	0.536	--					217.3	--	--	--
9-16-64	-	--	2.165	4.227	5.323	--	0.407					592.6	954.1	1.61	
9-24-64	5	1.020	1.228	1.230	3.468	0.829	0.354					272.2	163.3	0.60	
10-4-64	6	1.032	0.677	1.108	2.721	0.931	0.249					285.3	95.2	0.33	
12-7-64	5	--	--	--	--	--	--					--	183.2	--	--
3-25-65	5	--	0.757	--	5.163	--	0.147					--	116.5	--	--
4-3-65	4	--	--	--	--	--	--					--	189.8	--	--

TABLE A23. (Continued 4)

		Radionuclide in Water (pCi/l)						Solids in Water (mg/l)				
Date	Field	¹³⁷ Cs		⁹⁰ Sr		Ratio ¹³⁷ Cs/ ⁹⁰ Sr		Water In	Water Out	Water In	Water Out	Out/In
		Water In	Water Out	Water In	Water Out	Water In	Water Out					
4-11-65	-	92.330	--	26.370	--	3.500	--	4723.9	--	--	--	--
4-22-65	5	--	2.463	--	5.319	--	0.463	7605.8	981.7	0.1	0.1	0.1
5-16-65	7	64.220	38.630	1.178	14.670	54.500	2.630	2788.1	4863.8	1.74	1.74	1.74
6-7-65	5	92.240	0.472	--	3.260	--	0.145	431.7	67.9	0.16	0.16	0.16
6-24-65	7	0.492	--	1.039	2.756	0.473	--	134.8	1147.4	8.51	8.51	8.51
6-28-65	4	0.314	0.444	0.949	5.168	0.333	0.086	91.8	61.5	0.67	0.67	0.67
7-21-65	5	2.196	--	2.214	--	0.990	--	827.2	--	--	--	--
8-02-65	4	--	--	--	3.070	--	--	--	6.4	--	--	--
8-16-65	4	--	--	18.670	--	--	--	21281.6	32322.3	1.52	1.52	1.52
8-25-65	4	--	0.645	29.080	4.911	--	0.131	1081.9	221.3	0.20	0.20	0.20
10-22-65	-	0.415	--	--	2.723	--	--	341.6	39.7	0.12	0.12	0.12
11-1-65	5	0.243	--	1.327	--	0.180	--	485.7	--	--	--	--
11-5-65	5	--	--	--	2.794	--	--	--	53.3	--	--	--
3-10-66	-	--	--	--	19.010	--	--	--	1929.1	--	--	--

TABLE A23. (Continued 5)

		Radionuclide in Water (pCi/ℓ)								Solids in Water (mg/ℓ)					
Date	Field	¹³⁷ Cs		⁹⁰ Sr		Ratio ¹³⁷ Cs/ ⁹⁰ Sr		Water In	Water Out	Water In	Water Out	Water In	Water Out	Water In	Water Out
		Water In	Water Out	Water In	Water Out	Water In	Water Out								
3-10-66	5	36.340	--	--	--	--	--	--	--	380.4	--	--	--	--	--
3-25-66	5	1.766	--	1.766	--	1.000	--	--	--	744.9	--	--	--	--	--
4-3-66	4	3.474	--	3.296	--	1.050	--	--	--	968.1	--	--	--	--	--
4-4-66	5	0.932	90.210	1.652	--	0.560	--	--	--	689.1	185.8	0.27	0.27	0.27	0.27
4-8-66	-	0.966	0.488	1.444	2.52 0	0.670	0.194	0.194	0.194	841.0	359.1	0.43	0.43	0.43	0.43
4-30-66	-	0.393	88.720	1.525	63.840	0.260	1.390	1.390	1.390	110.4	141.2	1.28	1.28	1.28	1.28
5-3-66	5	--	--	--	--	--	--	--	--	124.4	--	--	--	--	--
5-5-66	-	--	53.080	--	23.120	--	2.300	2.300	2.300	--	439.8	--	--	--	--
5-31-66	5	--	--	--	2.471	--	--	--	--	--	18.1	--	--	--	--
	6	--	0.775	0.577	2.785	--	0.278	0.278	0.278	67.2	466.6	6.94	6.94	6.94	6.94
6-3-66	4	--	0.211	0.417	2.629	--	0.080	0.080	0.080	213.0	16.9	0.08	0.08	0.08	0.08
6-12-66	-	--	--	0.460	3.020	--	--	--	--	95.0	5309.7	55.89	55.89	55.89	55.89
6-24-66	-	--	--	--	--	--	--	--	--	31.3	69.7	2.23	2.23	2.23	2.23
6-29-66	4	--	--	3.948	--	--	--	--	--	22.3	18.0	0.81	0.81	0.81	0.81
7-1-66	-	--	0.243	--	0.836	--	0.291	0.291	0.291	--	15.8	--	--	--	--

TABLE A23. (Continued 6)

Date	Field	Radionuclide in Water (pCi/ℓ)								Solids in Water (mg/ℓ)		
		¹³⁷ Cs		⁹⁰ Sr		Ratio ¹³⁷ Cs/ ⁹⁰ Sr				Water In	Water Out	Out/In
		Water In	Water Out	Water In	Water Out	Water In	Water Out	Water In	Water Out			
7-18-66	-	--	--	3.600	--	--	--	92.0	--	--	--	--
7-21-66	-	--	--	--	3.128	--	--	--	44.2	--	--	--
8-1-66	4	5360.000	571.600	9292.000	--	0.576	--	--	8428.4	--	--	--
8-2-66	4	0.475	--	0.902	--	0.520	--	38.2	--	--	--	--
8-4-66	6	1.972	0.446	5.611	--	0.350	--	437.0	45.5	0.10	0.13	0.10
8-22-66	5	--	199.000	--	--	--	--	11987.4	1569.5	0.13	0.13	0.13
9-3-66	-	1.099	--	1.857	--	0.590	--	--	851.1	--	--	--
9-29-66	-	--	0.449	376.30	2.347	--	0.191	31.0	86.7	2.80	2.80	2.80
10-7-66	7	--	64.290	--	37.240	--	1.730	--	783.5	--	--	--
12-17-66	5	0.504	--	0.650	--	0.775	--	248.3	--	--	--	--

TABLE A24. Summary of Tests of Linearity for "Square Yard" (pci/m²)
Alfa1fa Samples [$\log y_t = \log(C_1 C_{f\lambda}) - k\tau$]

Year	n	$\log C_1 C_{f\lambda}$	$C_1 C_{f\lambda}$ e	Regression Calculations			Pure Error (ms)	Lack of Fit (ms)	F statistic
				k	s_k				
				¹³⁷ Cesium					
1963	51	7.56577	1931	0.016938	0.00106	0.06634	1.45577		21.94**
1964	109	7.68087	2167	0.020341	0.00069	0.07374	3.63583		49.31**
1965	262	6.81630	913	0.020503	0.00060	0.05762	17.38406		301.70**
1966	163	4.58209	98	0.006905	0.00074	0.10266	19.22740		187.29**
				⁹⁰ Strontium					
1963	54	7.40442	1643	0.015889	0.00010	0.06807	1.13567		16.68**
1964	93	7.29291	1470	0.014851	0.00066	0.04206	2.27995		54.21**
1965	331	6.72138	830	0.013331	0.00029	0.03688	4.81707		131.33**
1966	216	6.03340	417	0.008973	0.00047	0.04543	17.59305		387.25**

TABLE A25. Results of Linear Regressions for "Square Yard"
(pCi/kg) Samples [$\log y_t = \log(C_f C_f^\lambda) - k\tau$]

Year	¹³⁷ Cesium				⁹⁰ Strontium			
	n	$C_f C_f^\lambda$	k	s_k	n	$C_f C_f^\lambda$	k	s_k
1963	51	1791	0.006698	0.00132	54	1514	0.005659	0.00121
1964	109	4392	0.014991	0.00060	93	2794	0.091859	0.00056
1965	262	1748	0.015451	0.00061	331	1581	0.008220	0.00028
1966	163	214	0.003361	0.00060	216	708	0.004049	0.00030

TABLE A26. Calculation of Values Used in Figure 8

Year	Combined Estimate of k (Table 3)	Combined Yearly Estimate of λ/k (Table 4)	(1) Estimate of λ [$k \cdot (\lambda/k)$]	(2) Estimate of $C_1 C_f \lambda$ (A24) on 20 March	Ratio (2/1) = $C_1 C_f$
<u>$^{137}\text{Cesium}$</u>					
1963	0.013	7344	95.5	1931 (1652)*	20.2
1964	0.013	8838	114.9	2166 (1853)	18.9
1965	0.013	4018	52.2	913 (781)	17.5
1966	0.013	892	11.6	98 (84)	8.5
<u>$^{90}\text{Strontium}$</u>					
1963	0.0159	3471	55.2	1643 (1358)	29.8
1964	0.0159	5174	82.3	1470 (1215)	17.9
1965	0.0159	2432	38.7	830 (686)	21.4
1966	0.0159	552	8.8	417 (344)	47.4
mean ratio = 22.7 ± 11.6 (Sd)					
$\frac{\Sigma C_1 C_f \lambda}{\Sigma \lambda} = \frac{9468}{459.2} = 20.6$					

*Numbers in parentheses are estimates of $C_1 C_f \lambda$ on 2 April [i.e., e^{-12k} x value in column (2)]. These values are coincident on the date of first placement of collectors in the field. The resulting ratio is $\Sigma C_1 C_f \lambda / \Sigma \lambda = 7973/459.2 = 17.4$.

TABLE A27. BASIC Computer Program to Make Direct Estimates of
Compartment Parameters in the Alfa1fa Model

TABLE A27. (Continued 2)

```

85. REM DATED JANUARY 15, 1975.
90. REM
91. REM * * * PROGRAM TO MAKE DIRECT * * *
92. REM * * * ESTIMATES OF PARAMETERS * * *
93. REM * * * IN ALFALFA MODEL * * *
94. REM
100. REM NON-LINEAR LEAST-SQUARES USING FIRST TERM OF TAYLOR SERIES
110. REM EXPANSION TO LINEARIZE EQUATIONS
120. DIM Y(50,1),T(50),P(10),X(10,50),F(50,1),E(10,1)
130. DIM S(10,10),V(10,10),B(50,10),A(10,10),D(10,1)
140. DIM Q(10),R(50,1),H(2,366),J(5,13),K(5,13),L(10,10)
170. DIM C(5,10),G(10,10),I(5),M(10),N(10),O(10),U(5),W(5)
190. PRINT "HOW MANY DATA POINTS"
200. INPUT N
210. PRINT "HOW MANY PARAMETERS"
220. INPUT M
230. PRINT "USING A DATA FILE? 1 = YES; 0 = NO"
240. INPUT D1
250. IF D1 = 0 GO TO 280
260. GO SUB 890
270. GO TO 360
280. PRINT "LIST OBSERVATIONS ON ALFALFA CONCENTRATION"
290. FOR I = 1 TO N
300. INPUT Y(I,1)
310. NEXT I
320. PRINT "LIST HARVEST TIMES AS 1, 2, ..., 5"
330. FOR I = 1 TO N
340. INPUT T(I)
350. NEXT I
360. REM INPUT FROM FILES OR KEYBOARD FINISHED NOW IN
361. PRINT "FALLOUT FROM FUNNEL-COLLECTORS = 1, AIR DATA(FT. COLLINS) = 2"
362. INPUT Q1
363. IF Q1<>1 GO TO 370
364. PRINT "FILE NAME - CONTAINING FUNNEL DATA"
365. INPUT B$
366. FILES B$

```

TABLE A27. (Continued 3)

```

367. RESTORE #1
368. REM END OF FUNNEL FILE SETUP: * * * * *
369. GO TO 470
370. FILES FALOUT
380. RESTORE #1
390. FOR I = 1 TO 5
400. FOR J = 1 TO 12
410. IF END #1 GO TO 450
420. INPUT #1, J(I,J), K(I,J)
430. NEXT J
440. NEXT I
450. REM
460. FILES
465. REM END OF DATA INPUT FROM AIR * * * * *
470. PRINT "PROVIDE TRIAL VALUES OF THE PARAMETERS"
480. FOR I=1 TO M
490. INPUT P(I)
500. NEXT I
505. PRINT
510. PRINT "SIMULATION ONLY?, NO ATTEMPT TO FIT PARAMETERS"
512. PRINT "1 = YES; 0 = NO"
513. INPUT G1
530. REM FOR J=1 TO 4
535. REM GET FALLOUT INPUT
540. GO SUB 1010
545. IF G1=1 GO TO 750
547. PRINT "PARAMETERS & CONVERGENCE"
550. MAT B(N,M)=TRN(X(M,N))
560. MAT S(M,M)=X(M,N)*B(N,M)
570. MAT A(M,M)=INV(S(M,M))
580. MAT D(M,1)=X(M,N)*R(N,1)
590. MAT E(M,1)=A(M,M)*D(M,1)
600. FOR I=1 TO M
610. Q(I)=P(I)
620. P(I)=0
630. P(I)=C(I)+E(I,1)

```

' X TRANSPOSE
 ' INVERSE
 ' ESTIMATES OF REG. COEF.

TABLE A27. (Continued 4)

```

640. NEXT I
650. FOR I=1 TO M
660. H(1,I)=P(I)
670. NEXT I
680. H(1,M+1)=C8
690. H(1,M+2)=C9
695. H(1,M+3)=C7
700. MAT PRINT H(1,M+3)
710. REM
720. PRINT "TYPE 0 FOR MORE ITERATIONS"
730. INPUT Q3
735. Q4 = 1
740. IF Q3= 0 GO TO 530
750. PRINT " TIME OBSERVED
760. FOR I=1 TO N
770. PRINT T(I),Y(I,1),F(I,1), R(I,1)
780. V1=V1+((Y(I,1)-F(I,1))J2)
790. NEXT I
800. V1=V1/(N-M)
810. MAT V(M,M)=(V1)*A(M,M)
820. PRINT "VARIANCE-COVARIANCE MATRIX"
830. MAT PRINT V(M,M)
840. V1=0
850. PRINT "PARAMETERS, CONVERGENCE CRITERION"
860. PRINT
870. MAT PRINT H(1,M+3)
875. PRINT "WANT DATA RESULTS LISTED? - TYPE *GO TO 3020*"
880. PRINT
882. END
885. REM * * * * *
890. REM SUBROUTINE TO READ DATA FILE (CONCENTRATION & TIME)
891. REM * * * * *
900. PRINT "ENTER FILE NAME"
910. INPUT B$
920. FILES B$
930. RESTORE #1
RETURN TO SUBROUTINE
EXPECTED DEVIATIONS"
'END OF ITERATION LOOP

```

TABLE A27. (Continued 5)

```

940.      FOR I=1 TO N
950.      IF END #1 GO TO 980
960.      INPUT #1,T(I),Y(I,1)
970.      NEXT I
980.      REM *****CLOSE FILES
990.      FILES
1000.     RETURN
1010.     REM THIS LOCATION FOR FALLOUT INPUT *****
1015.     REM CONVERTS MID-MONTH AIR VALUES BY *****
1016.     REM LINEAR EXTRAPOLATION TO DAILY VALUES *****
1017.     REM FOR FT. COLLINS *****
1018.     REM CALCULATES DAILY VALUES FOR FUNNELS *****
1019.     REM SET SUBROUTINE AT LINE 2700 *****
1020.     C8=0
1030.     C9=0
1035.     C7=0
1040.     D2=1
1050.     FOR I=1 TO 4
1060.     J8=1
1070.     IF I<>2 GO TO 1100
1080.     J7=366
1090.     GO TO 1110
1100.     J7=365
1110.     FOR J2=1 TO J7
1112.     REM READ DATA CARDS FOR FUNNELS AT 1282 * * * *
1115.     IF Q1=1 GO TO 1275
1120.     IF I<>1 GO TO 1160
1130.     IF J2>15 GO TO 1160
1140.     Y5=K(I,J8)
1150.     GO TO 1290
1160.     REM *****
1170.     IF J(I,J8)>J2 GO TO 1190
1180.     J8=J8+1
1190.     IF J8>13 GO TO 1250
1200.     IF I>1 AND J8=1 GO TO 1220
1210.     GO TO 1272

```


TABLE A27. (Continued 6)

```

1220. J(I,0)= -(J7-J(I-1,12))
1230. K(I,0)=K(I-1,12)
1240. GO TO 1272
1250. J(I,13)=J(I+1,1)+ J(I,12)+(J7-J(I,12))
1260. K(I,13)=K(I+1,1)
1270. J8=13
1272. Y5=K(I,J8-1)+(K(I,J8)-K(I,J8-1))/(J(I,J8)-J(I,J8-1))*(J2-J(I,J8-1))
1275. IF Q1<>1 GO TO 1290
1280. IF Q4 = 1 THEN 1296
1281. REM
1282. GOSUB 2700
1290. H(2,J2)=Y5
1292. GO TO 1300
1296. Y5 = Z(I,J)
1300. REM ALFALFA GROWING SEASONS
1310. REM IF STATEMENTS FOR HARVEST DATE BEGININGS*****
1320. ON I GO TO 1330,1390,1450,1510,1570
1330. IF J2 = 79 GO TO 1590
1340. IF J2= 135 GO TO 1590
1350. IF J2 = 170 GO TO 1590
1360. IF J2 = 204 GO TO 1590
1370. IF J2 = 239 GO TO 1590
1380. GO TO 1680
1390. IF J2 = 79 GO TO 1590
1400. IF J2 = 136 GO TO 1590
1410. IF J2 = 169 GO TO 1590
1420. IF J2 = 203 GO TO 1590
1430. IF J2 = 239 GO TO 1590
1440. GO TO 1680
1450. IF J2 = 79 GO TO 1590
1460. IF J2 = 132 GO TO 1590
1470. IF J2 =168 GO TO 1590
1480. IF J2 = 202 GO TO 1590
1490. IF J2 = 239 GO TO 1590
1500. GO TO 1680
1510. IF J2= 79 GO TO 1590

```

TABLE A27. (Continued 7)

```

1520. IF J2 = 132 GO TO 1590
1530. IF J2 = 168 GO TO 1590
1540. IF J2 = 203 GO TO 1590
1550. IF J2 = 239 GO TO 1590
1560. GO TO 1680
1570. REM NO DATA FOR YEAR 1967 * * * *
1580. GO TO 1680
1590. FOR J3=1 TO 4
1600. C(1,J3)=0
1610. C(2,J3)=0
1620. NEXT J3
1680. REM DIFFERENTIAL EQUATIONS FOR ALFALFA
1685. REM SMALL INCREMENTS ADDED TO EACH PARAMETER
1690. H1=.001
1700. H2=.0005
1705. H3=.0005
1710. REM INPUTS
1720. I(1)=P(1)
1730. I(2)=P(1)+H1
1740. I(3)=P(1)
1745. I(4)=P(1)
1750. REM FIRST LOSS (EXTERIOR)
1760. O(1)=P(2)
1770. O(2)=P(2)
1780. O(3)=P(2)+H2
1785. O(4)=P(2)
1790. REM TRANSFER TO INTERIOR
1800. U(1)=P(3)
1810. U(2)=P(3)
1820. U(3)=P(3)
1825. U(4)=P(3)+H3
1830. REM SECOND LOSS (FROM INTERIOR)
1840. W(1)=.007
1850. W(2)=.007
1860. W(3)=.007
1865. W(4)=.007

```

TABLE A27. (Continued 8)

```

1870. FOR J3=1 TO 4
1880. C(1,J3)=C(1,J3)+D2*(I(J3)*Y5-O(J3)*C(1,J3)-U(J3)*C(1,J3))
1890. C(2,J3)=C(2,J3)+D2*(U(J3)*C(1,J3)-W(J3)*C(2,J3))
1900. NEXT J3
1910. REM IF STATEMENTS TO GET CORRECT HARVEST TIMES*****
1920. ON I GO TO 1930,1990,2050,2110,2170
1930. IF J2= 134 GO TO 2190
1940. IF J2= 169 GO TO 2190
1950. IF J2= 203 GO TO 2190
1960. IF J2= 238 GO TO 2190
1970. IF J2= 279 GO TO 2190
1980. GO TO 2200
1990. IF J2= 135 GO TO 2190
2000. IF J2= 168 GO TO 2190
2010. IF J2= 202 GO TO 2190
2020. IF J2= 238 GO TO 2190
2030. IF J2= 292 GO TO 2190
2040. GO TO 2200
2050. IF J2= 131 GO TO 2190
2060. IF J2= 167 GO TO 2190
2070. IF J2= 201 GO TO 2190
2080. IF J2= 238 GO TO 2190
2090. IF J2= 281 GO TO 2190
2100. GO TO 2200
2110. IF J2= 131 GO TO 2190
2120. IF J2= 167 GO TO 2190
2130. IF J2=202 GO TO 2190
2140. IF J2= 238 GO TO 2190
2150. IF J2= 286 GO TO 2190
2160. GO TO 2200
2170. REM NO DATA THIS YEAR *****
2180. GO TO 2200
2185. REM CALCULATE PARTIAL ESTIMATES
2190. GO SUB 2260
2200. NEXT J2
2210. NEXT I

```

TABLE A27. (Continued 9)

```

2220. C4=0
2230. Y4=0
2240. J1=0
2250. RETURN
2260. J1=J1+1
2270. F(J1,1)=C(1,1)+C(2,1)
2280. R(J1,1)=Y(J1,1)-F(J1,1)
2290. X(1,J1)=(C(1,2)+C(2,2))-F(J1,1))/H1
2300. X(2,J1)=(C(1,3)+C(2,3))-F(J1,1))/H2
2305. X(3,J1)=(C(1,4)+C(2,4))-F(J1,1))/H3
2310. C8=C8+R(J1,1)*X(1,J1)
2320. C9=C9+R(J1,1)*X(2,J1)
2325. C7=C7+R(J1,1)*X(3,J1)
2330. RETURN
2340. END
2350. REM SUBROUTINE TO EXAMINE SUM OF SQUARES
2360. REM TO USE, BREAK OUT OF MAIN PROGRAM ,TYPE GO TO 2350
2370. REM
2380. PRINT "HOW MANY TRIAL VALUES"
2390. INPUT K
2400. PRINT "TYPE PARAM VALUES ON TWO LINES"
2410. MAT INPUT M(K)
2420. MAT INPUT N(K)
2430. FOR I1=1 TO K
2440. FOR I2=1 TO K
2450. P(1)=M(I1)
2460. P(2)=N(I2)
2470. GO SUB 1010
2480. FOR I4= 1 TO N
2490. L(I1,I2)=L(I1,I2)+R(I4,1)J2
2500. NEXT I4
2510. G(I1,I2)=C7+C8
2520. NEXT I2
2530. NEXT I1
2540. PRINT "SUMS OF SQUARES"
2550. PRINT

```

TABLE A27. (Continued 10)

```

2560. MAT PRINT L(K,K)
2570. PRINT "VALUES OF NORMAL EQUATION"
2580. MAT PRINT G(K,K)
2590. PRINT "CHANGE PARAMS IF RETURNING TO MAIN PROGRAM"
2600. S1=0
2610. END
2620. REM SUBROUTINE TO GET FUNNEL INPUT FROM CARDS * *
2700. REM * * * * *
2701. REM
2702. REM SUBROUTINE FUNN ( BASIC VERSION OF FALL2 )
2703. REM
2704. REM * * * * *
2705. REM
2706. REM CALCULATE AIR CONCENTRATION FROM FUNNELL COLLECTORS
2708. REM
2714. REM * * * * *
2715. REM P1 = COUNTER TO SET TIME EQUAL TO 1 AFTER SPRING PEAK
2716. REM * * * * *
2717. REM J = J2
2718. REM IF J = 1 THEN 2720
2719. REM GO TO 2722
2720. REM P1 = 0
2721. REM
2722. REM * * CHECK FOR FIRST CARD IN A YEAR * *
2723. REM
2724. REM J4 = 1, GO TO SPRING PEAK CALCULATION
2726. REM IF J4 = 1 GO TO 2934
2727. REM DIM Z(4,366)
2728. REM I = YEAR NUMBER
2730. REM J = DAY OF A YEAR
2732. REM IF J <> 1 THEN 2836
2734. REM K1 IS RATE UP TO SPRING PEAK
2736. REM K2 IS RATE OF DECAY FROM SPRING PEAK
2738. REM K1=0.012
2740. REM K2=0.017
2742. REM

```

TABLE A27. (Continued 11)

```

2743. REM
2746. REM
2748. REM
2750. REM
2752. REM
2754. REM
2756. REM
2758. REM
2760. REM
2762. REM
2764. REM
2766. REM
2768. REM
2770. REM
2772. REM
2774. REM
2776. REM
2778. REM
2780. REM
2782. REM
2784. REM
2786. REM
2788. REM
2790. REM
2792. REM
2794. REM
2796. REM
2798. REM
2800. REM
2802. REM
2804. REM
2806. REM
2808. REM
2810. REM
2811. REM
2812. REM

      INPUT #1, D3, L2, R2, M3, N2, E2, G2, E1, S2

      D3 = TOTAL (PCI/M2) IN A FUNNEL
      L2 = TOTAL COLLECTION DAYS
      R2 = UPTAKE = 0, RETENTION = 1
      M3 = DAY OF A YEAR (LOWER LIMIT)
      N2 = DAY OF A YEAR (UPPER LIMIT)
      E2 = DAY (LOWER LIMIT) OF FUNNEL USED IN CALCULATION
      G2 = DAY (UPPER LIMIT) OF FUNNEL USED IN CALCULATION
      E1 = YEAR NUMBER
      S2 = IDENTIFY THREE YEARLY COLLECTORS USED TO CALCULATE
           LOCATION AND APPORTION TOTAL OVER THE SPRING PEAK
      IF S2<> 1 THEN 2794

      SAVE FIRST CARD OF SPRING PEAK SERIES

      A2=D3
      L1 = L2
      R1 = R2
      M1=M3
      N1 = N2
      E1 = E2
      G3 = G2

      CONTINUE
      T1 = E2

      CALCULATE DAILY VALUES

      IF R2 = 0 THEN 2820
      * * * * *
      CALCULATE T1 FOR DECAY
      * * * * *
      A4=(K2*D3)/(1-EXP(-K2*L2))

      GO TO 2826

```

TABLE A27. (Continued 12)

```

2814. REM      * * * * *
2816. REM      CALCULATE T1 FOR UPTAKE
2818. REM      * * * * *
2820. REM      A4=(K1*D3)/(EXP(K1*L2)-1)
2822. REM      Y3=A4*EXP(K1*T1)
2824. REM      GO TO 2978
2826. REM      Y3 = A4 * EXP(-K2 * T1)
2828. REM      GO TO 2978
2830. REM      IF TRUE - NEXT CARD CONTAINS SPRING PEAK
2832. REM      J4 = JUMP
2834. REM      J = DAY OF A YEAR
2836. REM      IF J > N2 AND S2 = 1 THEN 2854
2838. REM      READ A NEW CARD WHEN TIME OF FUNNEL COLLECTION IS DONE
2840. REM      IF J > N2 THEN 2743
2842. REM      T1 = T1 + 1
2844. REM      IF R2 = 0 THEN 2822
2846. REM      GO TO 2826

2848. REM      SPRING PEAK SECTION -- READ 2ND AND 3RD FUNNEL CARDS
2850. REM
2852. REM
2854. REM      INPUT #1, A3, A1, A5, A6, A7, A8, A9, B2, B3
2856. REM      INPUT #1, D3, L2, R2, M3, N2, E2, G2, E1, S2
2858. REM
2860. REM      SET SWITCH JUMP (J4) TO RETURN HERE ON SUBROUTINE CALLS
2862. REM      UNTIL PEAK CALCULATION IS COMPLETED
2864. REM
2866. REM      J4 = 1
2868. REM      * * * * *
2870. REM      CALCULATE W1
2872. REM      * * * * *
2874. REM      W1=(A2*K1)/(EXP(K1*L1)-1)
2876. REM      IF I = 2 GO TO 2884
2878. REM      IF I = 3 GO TO 2884
2880. REM      (CALCULATE W1 AT T1=0 WHEN 1ST FUNNEL CROSSES 0 FOR A YEAR)
2882. REM      W1=W1*(EXP((L1-N1)*K1))
2884. REM      CONTINUE

```

TABLE A27. (Continued 13)

```

2886. REM * * * * *
2888. REM CALCULATE W3 AND X4 (X4= PEAK TIME)
2890. REM * * * * *
2892. W3=(D3*K2)/(1-EXP(-K2*L2))
2894. X4 = LOG(W3/W1)+K2*(M3-M1)
2895. X4 = TMAX
2896. REM (CALCULATE X4 + DISPLACEMENT FROM 0 FOR FIRST FUNNEL)
2898. X4 = X4 / (K1 + K2)
2900. IF I = 2 GO TO 2904
2902. IF I = 3 GO TO 2904
2903. GO TO 2906
2904. X4 = X4 + M1
2906. REM * * * * *
2908. REM CALCULATE W2
2910. REM * * * * *
2911. REM
2912. B1 = EXP(K1*(X4-(N1+1)))
2914. C1 = EXP(-K2 * (M3-X4))
2916. A4=A3/((1./K1)*(B1-1.))+B1*(1./K2)*(1-C1))
2918. REM * * * * *
2920. REM SET TIME = 1
2922. REM * * * * *
2924. T1 = A8
2925. REM H4 = ITMAX
2926. H4 = X4 + 0.5
2928. REM * * * * *
2930. REM UPTAKE SIDE OF PEAK
2932. REM * * * * *
2934. IF H4 >= J THEN 2936
2935. GO TO 2938
2936. Y3 = A4 * EXP(K1 * T1)
2938. IF H4 >= J THEN 2958
2940. P1 = P1 + 1
2942. IF P1 > 1 THEN 2948
2944. A4 = Y3
2946. T1 = A8

```


TABLE A27.

10

TABLE A28. FORTRAN Computer Program Used to Simulate ¹³⁷Cs Cycling from Air to Milk

```

9.      C MAIN PROGRAM - CONTAINS MODEL AND OUTPUT OPTIONS
10.     C TO SIMULATE CS-137 IN ALFALFA AND MILK
11.     DIMENSION YSD(366),YSM(5,12),Y(4)
12.     DIMENSION ALF1(6),ALF2(6),ALF3(6),ALF4(6),ALF5(6)
13.     DIMENSION SILO(6), CONCS(6), FACT(5)
14.     * * * * *
15.     C ALFALFA GROWTH FACTORS FOR EACH HARVEST
16.     * * * * *
17.     FACT(1) = 1.0
18.     FACT(2) = .6775
19.     FACT(3) = .658
20.     FACT(4) = .5498
21.     FACT(5) = .3658
22.
23.     C TIME INTERVAL FOR SIMULATION AND INITIAL
24.     C VALUE FOR SINE FUNCTION.
25.     DT = 1.
26.     YS = 0.3
27.
28.     C SELECT OUTPUT TO PLOT
29.     1 FOR AIR CONC., 2 FOR HAY, 3 FOR MILK, 4 FOR NO OUTPUT
30.
31.     NO=2
32.
33.     C CALCULATE SURFACE AIR CONCENTRATION (SINE CURVE OR FUNNELS).
34.
35.     C MAIN DO LOOPS -- YEARS = I, DAY/YEAR = II,
36.     DO 10 I=1,4
37.     IHVST=0
38.     IF(I.EQ.2) II=366
39.     IF(I.NE.2) II=365
40.     DO 20 J=1,II
41.
42.     * * * * *
43.     C FALLOUT SECTION
44.     * * * * *
45.

```

TABLE A28. (Continued 2)

```

46. C      * * CHOOSE FALLOUT SIMULATION * *
47. C
48. C      FF = 2 (FOR SINE FUNCTION)
49. C      FF = 1 (FOR FALLOUT COLLECTORS)
50. C
51. C      FF=1
52. C
53. C      * * * FALLOUT FROM COLLECTORS * * *
54. C
55. C      IF(FF.EQ.1) CALL TFALL2(I,J,YSS,II)
56. C      IF(FF.EQ.1) GO TO 40
57. C      COUNT THE TIME IN DAYS FROM JAN. 1, 1963.
58. C      CT = CT+1.
59. C
60. C      * * FALLOUT USING SINE CURVE * *
61. C
62. C      INITIAL VALUES FOR FALLOUT
63. C      LOSS RATE SURFACE AIR
64. C      RC = .005
65. C      INPUT OF FALLOUT(UPPER ATMOSPHERE)
66. C      RC = .00243
67. C      RL = .001
68. C      RINS = RL * EXP(-RC*CT)
69. C      LOSS RATE
70. C      * * SURFACE AIR CONCENTRATION * *
71. C      YS = YS + DT * (RINS-YS * RO)
72. C      SINE CURVE
73. C      C1 = 000.5
74. C      C2 = 000.8
75. C      C3 = 120.0
76. C      B = C1*(1. + C2*COS((6.283185*(CT-C3))/360))
77. C      YSS = YS * B
78. C      IF(CT.LT.60) YSS=.1
79. C      IF(CT.GT.150.AND.CT.LT.300) YSS=.025
80. C      CONTINUE
81. C      STORES DAILY AIR CONCENTRATION

```

TABLE A28. (Continued 3)

```

82. C
83. IF(FF.EQ.2) YSD(J) = YSS
84. IF(FF.EQ.1) YSD(J) = YSS/530.2
85. C
86. * * * * *
87. C ALFALFA SECTION
88. * * * * *
89. C DAY EACH HARVEST BEGINS
90. IF (J.LE.78) GO TO 20
91. IF (J.GE.293) GO TO 20
92. IF(J.EQ.79) GO TO 550
93. GO TO(200,300,400,500), I
94. IF (J.EQ.135.OR.J.EQ.170.OR.J.EQ.204.OR.J.EQ.239) GO TO 550
95. GO TO 551
96. IF (J.EQ.136.OR.J.EQ.169.OR.J.EQ.203.OR.J.EQ.239) GO TO 550
97. GO TO 551
98. IF (J.EQ.132.OR.J.EQ.168.OR.J.EQ.202.OR.J.EQ.239) GO TO 550
99. GO TO 551
100. IF (J.EQ.132.OR.J.EQ.168.OR.J.EQ.203.OR.J.EQ.239) GO TO 550
101. GO TO 551
102. C INITIALIZE INTERIOR AND EXTERIOR COMPARTMENTS
103. AE=0.
104. IHVST=IHVST+1
105. AI = 0
106. C CONTINUE
107. C TRANSFER COEF. SURFACE AIR TO EXTERNAL COMPARTMENT
108. TCA= .48841
109. C ADJUST FOR GROWTH
110. TCA=TCA*(FACT(IHVST))
111. C FALLOUT ON ALFALFA PLANT
112. AEIN=TCA*YSS
113. C EXTERIOR ACCUMULATION
114. AE=AE+DT*(AEIN-(AE*.05+AE*.026))
115. C TRANSFER TO INTERIOR
116. AIIN=.026*AE
117. C INTERIOR ACCUMULATION

```

TABLE A28. (Continued 4)

```

118.      C      AI=AI+DT*(AIIN-.007*AI)
119.      ALFALFA PLANT = SUM OF TWO COMPARTMENTS
120.      ALF=AI+AE
121.      * * ALFALFA HARVEST DATES * *
122.      GO TO (210, 220, 240, 250), I
123.      1963.
124.      IF(J.EQ.134) ALF1(I)=ALF
125.      IF(J.EQ.169) ALF2(I)=ALF
126.      IF(J.EQ.203) ALF3(I)=ALF
127.      IF(J.EQ.238) ALF4(I)=ALF
128.      IF(J.EQ.279) ALF5(I)=ALF
129.      GO TO 390
130.      1964.
131.      220 IF(J.EQ.135) ALF1(I)=ALF
132.      IF(J.EQ.168) ALF2(I)=ALF
133.      IF(J.EQ.202) ALF3(I)=ALF
134.      IF(J.EQ.238) ALF4(I)=ALF
135.      IF(J.EQ.292) ALF5(I)=ALF
136.      GO TO 390
137.      1965.
138.      240 IF(J.EQ.131) ALF1(I)=ALF
139.      IF(J.EQ.167) ALF2(I)=ALF
140.      IF(J.EQ.201) ALF3(I)=ALF
141.      IF(J.EQ.238) ALF4(I)=ALF
142.      IF(J.EQ.281) ALF5(I)=ALF
143.      GO TO 390
144.      1966.
145.      250 IF(J.EQ.131) ALF1(I)=ALF
146.      IF(J.EQ.167) ALF2(I)=ALF
147.      IF(J.EQ.202) ALF3(I)=ALF
148.      IF(J.EQ.238) ALF4(I)=ALF
149.      IF(J.EQ.286) ALF5(I)=ALF
150.      390 CONTINUE
151.      C      INNER DO LOOP ON DAY/YEAR END
152.      20 CONTINUE
153.      C      STORE MID-MONTHLY VALUES OF AIR CONCENTRATION

```

TABLE A28. (Continued 5)

```

154.      IX=0
155.      DO 30 K=15,11,30
156.      IF(K.EQ.15) KL=1
157.      IF(K.EQ.15) GO TO 999
158.      KL=KL+1
159.      IF(K.GE.196) IX=3
160.      YSM(I,KL)=YSD(K+IX)
161.      CONTINUE
162.      OUTER DO LOOP ENDS
163.      CONTINUE
164.      CONTINUE
165.      PLOTTING OUTPUT CHOICES: SET AT LINE 31
166.      GO TO (70, 80, 90, 120), NO
167.      * * * * *
168.      * * * * * CALLS FOR PLOTS
169.      * * * * *
170.      AIR DATA
171.      CALL TCPLLOT(YSM, Y, NO)
172.      GO TO 120
173.      ALFALFA DATA
174.      CALL TAPRIN(ALF1,ALF2,ALF3,ALF4,ALF5,NO)
175.      GO TO 120
176.      MILK DATA
177.      CALL TMPLOT(ALF1,ALF2,ALF3,ALF4,ALF5,SILO,CONCST,Y)
178.      CONTINUE
179.      STOP
180.      END

```

TABLE A28. (Continued 6) Subroutine TCPLLOT-Calls for Plots of Air Concentration and Analysis of Covariance

```

158. C * * * * * PLOT AIR CONCENTRATION * * * * *
159. C * * * * *
160. C * * * * *
161. C * * * * *
162. C SUBROUTINE TCPLLOT (YSM, Y, NO)
163. C PLOTS OBSERVED AND SIMULATED SURFACE AIR CONCENTRATIONS
164. C DIMENSION YSM(5,12), Y(4), YDM(5,12)
165. C OBSERVED DATA ON SURFACE AIR CONCENTRATION (FORT COLLINS, COLORADO)
166. C DATA YDM/.124,.07,.022,.004,.003,.092,.079,.025,.005,.001
167. C 8,.155,.065,.029,.012,0,.255,.113,.034,.009,0,.094,.076,.044,
168. C 8,.023,0.
169. C 8,.098,.06,.019,.011,.001,.031,.039,.019,.001,.018
170. C 8,.033,.023,.005,.005,0,.013,.028,.002,.011,0.
171. C 8,.071,.011,.001,.006,0,.051,.034,.009,.004,0.
172. C 8,.065,.014,.006,.003,0. /
173. C WRITE(6,150)
174. C 150 FORMAT(/,2X, 'SURFACE AIR CONCENTRATIONS, +=PCI/M3 COLO,;
174.5 1 *+=PCI/M2 UTAH')
175. C YMIN=0.
176. C YMAX=.3
176.5 ZZ = 12.
177. C CALL TPLOT(X,Y,YMAX,YMIN,2,0,,ZZ)
178. C DO 10 I=1,4
179. C DO 20 J=1,12
180. C X=X+1.
181. C Y(1)=YSM(I,J)
182. C Y(2)=YDM(I,J)
183. C CALL TPLOT(X,Y,YMAX,YMIN,2,1,,ZZ)
184. C CONTINUE
185. C CONTINUE
186. C 20 CONTINUE
187. C 10 N=4
188. C M=12
189. C CALLS ANALYSIS OF COVARIANCE FOR AIR CONCENTRATION DATA
190. C CALL TREG(YDM, YSM, N, M, NO)
191. C RETURN
192. C END

```

TABLE A28. (Continued 7) Subroutine TAPRIN-Prints and/or Plots Observed and Simulated Alfalfa Values, and Contains Optional Call to Analysis of Covariance

```

2.  * * * * *
3.  * * * * *
4.  * * * * *
4.5 * * * * *
5.  * * * * *
6.  * * * * *
7.  * * * * *
8.  * * * * *
8.5 * * * * *
9.  * * * * *
10. * * * * *
11. * * * * *
12. * * * * *
13. * * * * *
14. * * * * *
15. * * * * *
16. * * * * *
17. * * * * *
18. * * * * *
19. * * * * *
20. * * * * *
21. * * * * *
22. * * * * *
23. * * * * *
23.5 * * * * *
24. * * * * *
25. * * * * *
26. * * * * *
26.5 * * * * *
26.6 * * * * *
27. * * * * *
28. * * * * *
29. * * * * *
30. * * * * *
31. * * * * *
32. * * * * *

      ALFALFA PRINTOUT AND PLOT
      * * * * *
      SUBROUTINE TAPRIN (ALF1, ALF2, ALF3, ALF4, ALF5, NO)
      PRINTS CS=137 CONCENTRATIONS BY CUTTING
      DIMENSION ALF1(6), ALF2(6), ALF3(6), ALF4(6), ALF5(6)
      DIMENSION AL01(6), AL02(6), AL03(6), AL04(6), AL05(6)
      DIMENSION Y(4), ALFS(5,12), ALF0(5,12)
      TICK MARK ON X-AXIS OF PLOT
      ZZ=8
      WRITE(6,160)
      FORMAT(/12X,'137-CS CONCENTRATION IN HAY BY CUTTING(PCI/M2)')
      WRITE(6,170)
      FORMAT(1X,'YEAR',5X,'1ST',9X,'2ND',9X,'3RD',9X,'4TH',9X,'5TH')
      WRITE(6,180)
      FORMAT(6X,'OBSD',3X,'SIM',4(2X,'OBSD',3X,'SIM'))
      C OBSERVED ALFALFA DATA
      DATA AL01/931.,1248.,479.,265.,0.,0./
      DATA AL02/453.,281.,245.,38.,0.,0./
      DATA AL03/152.,73.,37.,0.,0.,0./
      DATA AL04/153.,56.,32.,33.,0.,0./
      DATA AL05/79.,31.,20.,27.,0.,0./
      FORMAT(1X,3H196,I1,10F6.0)
      DO 10 I=1,4
      II = I + 2
      WRITE(6,20)II,AL01(I),ALF1(I),AL02(I),ALF2(I),AL03(I),ALF3(I),
      1AL04(I),ALF4(I),AL05(I),ALF5(I)
      10 CONTINUE
      WRITE(6,25)
      FORMAT(//)
      K=0
      J=0
      DO 30 I=1,4
      IT=I+2
      WRITE (6,50) IT
      FORMAT(/10X,'137-CS CONCENTRATION IN ALFALFA (PCI/M2) IN 196',I1)

```


TABLE A28. (Continued 8)

```

33.      YMIN=0
33.5     C   SET PLOT LIMITS BY YEAR FOR Y-AXIS
34.       IF(I.EQ.1) YMAX=1500
35.       IF(I.EQ.2) YMAX=1500
36.       IF(I.EQ.3) YMAX=500
37.       IF(I.EQ.4) YMAX=500
37.5     C   INITIALIZE PLOTTER
38.       CALL TPLLOT (X,Y,YMAX,YMIN,2,0,,ZZ)
39.       J=J+1
40.       X=X+1
41.       Y(1)=ALF1(J)
42.       Y(2)=AL01(J)
42.5     C   ARRAYS ALFO AND ALFS ARE USED AS REGRESSION INPUT AND IN FINAL PLOT (STMT 30)
43.       ALFO(I,J-K)=AL01(J)
44.       ALFS(I,J-K)=ALF1(J)
45.       CALL TPLLOT(X,Y,YMAX,YMIN,2,1,,ZZ)
46.       ALFS(I,J-K+1)=ALF2(J)
47.       ALFO(I,J-K+1)=AL02(J)
48.       Y(1)=ALF2(J)
49.       Y(2)=AL02(J)
50.       CALL TPLLOT (X,Y,YMAX,YMIN,2,1,,ZZ)
51.       Y(1)=ALF3(J)
52.       Y(2)=AL03(J)
53.       ALFO(I,J-K+2)=AL03(J)
54.       ALFS(I,J-K+2)=ALF3(J)
55.       CALL TPLLOT(X,Y,YMAX,YMIN,2,1,,ZZ)
56.       Y(1)=ALF4(J)
57.       Y(2)=AL04(J)
58.       ALFS(I,J-K+3)=ALF4(J)
59.       ALFO(I,J-K+3)=AL04(J)
60.       CALL TPLLOT(X,Y,YMAX,YMIN,2,1,,ZZ)
61.       ALFO(I,J-K+4)=AL05(J)
62.       ALFS(I,J-K+4)=ALF5(J)
63.       Y(1)=ALF5(J)
64.       Y(2)=AL05(J)
65.       CALL TPLLOT(X,Y,YMAX,YMIN,2,1,,ZZ)

```

TABLE A28. (Continued 9)

```

65.5 C PROVIDES EXTRA SPACE AT END OF EACH PLOT
65.6 C
66. DO 190 I7=1,3
67. Y(1)=0.0001
68. Y(2)=0.0001
69. CALL TPLOT(X,Y,YMAX,YMIN,2,1.,ZZ)
70. CONTINUE
71. CONTINUE
72. K=K+1
72.01 CONTINUE
72.1 * * * FINAL PLOT - ALL DATA * * *
72.2 WRITE(6,55)
72.3 FORMAT(//,10X,'137-CS CONCENTRATION IN ALFALFA(PCI/M2)-ALL DATA')
73.1 YMAX = 1300
73.2 ZZ = 5
73.3 CALL TPLOT (X, Y, YMAX, YMIN, 1, 0., ZZ)
73.4 DO 15 I = 1, 4
73.5 DO 15 J = 1, 5
73.6 Y(1) = ALFS(I,J)
73.7 Y(2) = ALFO(I,J)
73.8 CALL TPLOT (X, Y, YMAX, YMIN, 2, 1., ZZ)
73.9 CONTINUE
74. N=4
75. M=5
75.6 C CALLS ANALYSIS OF COVARIANCE FOR ALFALFA CONCENTRATION DATA
75.7 C
75.8 WRITE(6,17)
75.9 FORMAT(//5X,'ANALYSIS OF COVARIANCE - ALFALFA DATA')
76. CALL TREG(ALFO,ALFS,N,M,NO)
76.5 WRITE(6,18)
76.6 FORMAT(////////)
77. RETURN
78. END

```

TABLE A28. (Continued 10) Subroutine TEMPLLOT-Prints and/or Plots Observed and Simulated Milk Concentrations

```

284. C * * * * * * * * * * * * * * * *
285. C * * * * * * * * * * * * * * * *
286. C * * * * * * * * * * * * * * * *
287. SUBROUTINE TEMPLLOT(ALF1,ALF2,ALF3,ALF4,ALF5,SILO,CONCST,Y)
288. DIMENSION ALF1(6),ALF2(6),ALF3(6),ALF4(6),ALF5(6)
289. DIMENSION SILO(6), CONCST(6), Y(4), M(5,10),F(5,10)
290. REAL M
290.5 ZZ = 10.
291. C AVERAGE SILAGE VALUES (PCI/KG) FOR 1963, 1964, 1965.
292. SILO(1) = 677.
293. SILO(2) = 177.
294. SILO(3) = 104.
295. C AVERAGE GRAIN VALUES (PCI/KG) FOR 1963, 1964, 1965, 1966
296. CONCST(1) = 256.
297. CONCST(2) = 295.
298. CONCST(3) = 192.
299. CONCST(4) = 194.
300. C 1963 OBSERVED MILK (PCI/KG)
301. M(1,1) = 87.8
302. M(1,2) = 76.8
303. M(1,3) = 31.8
304. M(1,4) = 37.3
305. M(1,5) = 26.9
306. M(1,6) = 33.7
307. C 1964 OBSERVED MILK (PCI/KG)
308. M(2,1) = 130.5
309. M(2,2) = 75.6
310. M(2,3) = 83.9
311. M(2,4) = 24.4
312. M(2,5) = 33.6
313. M(2,6) = 17.1
314. M(2,7) = 56.9
315. C 1965 OBSERVED MILK (PCI/KG)
316. M(3,1) = 75.7
317. M(3,2) = 55.0
318. M(3,3) = 18.3

```

TABLE A28. (Continued 11)

```

319. M(3,4) = 19.5
320. M(3,5) = 11.9
321. M(3,6) = 49.6
322. 1966 OBSERVED MILK (PCI/KG)
323. M(4,1) = 31.0
324. M(4,2) = 9.9
325. F(2,5) = GREEN CHOP FROM HARVEST 5 1964 FED
326. F(2,3),F(2,5), F(2,7) = ENTERPRISE HAY FED
327. AVERAGE PCI/KG FROM THREE FEEDING TRIALS WAS 1407.
328. ALFALFA MULTIPLIERS ARE YIELD (KG/M2) TO CONVERT
329. SIMULATED PCI/M2 TO PCI/KG.
330. * * FEED INPUTS TO COWS *
331. F(1,1) = 10.8 * ALF1(1) / .563 + 3.1 * CONCST(1)
332. F(1,2) = 10.1 * ALF2(1) / .353 + 2.8 * CONCST(1)
333. F(1,3) = 11.1 * ALF3(1) / .365 + 3.1 * CONCST(1)
334. F(1,4) = 12.2 * ALF4(1) / .279 + 3.5 * CONCST(1)
335. F(1,5) = 11.3 * ALF5(1) / .112 + 3.4 * CONCST(1)
336. F(1,6) = 10.9 * ALF5(1) / .112 + 4.7 * SILO(1) + 3.9 * CONCST(1)
337. F(2,1) = 12.7 * ALF1(2) / .405 + 2.7 * CONCST(2)
338. F(2,2) = 11.8 * ALF2(2) / .273 + 3.3 * CONCST(2)
339. F(2,3) = 12.2 * 1407. + 3.8 * CONCST(2)
340. F(2,4) = 11.5 * ALF4(2) / .243 + 3.6 * CONCST(2)
341. F(2,5) = 6.6 * 1407. + 8.0 * 258. + 3.2 * CONCST(2)
342. F(2,6) = 8.5 * ALF5(2) / .160 + 4.0 * SILO(2) + 3.1 * CONCST(2)
343. F(2,7) = 9.7 * 1407. + 2.1 * SILO(2) + 3.6 * CONCST(2)
344. F(3,1) = 11.2 * ALF1(3) / .394 + 2.7 * CONCST(3)
345. F(3,2) = 12.1 * ALF2(3) / .307 + 2.9 * CONCST(3)
346. F(3,3) = 13.2 * ALF3(3) / .296 + 2.6 * CONCST(3)
347. F(3,4) = 9.5 * ALF4(3) / .259 + 2.8 * SILO(3) + 2.7 * CONCST(3)
348. F(3,5) = 11.6 * ALF5(3) / .175 + 3.0 * SILO(3) + 2.6 * CONCST(3)
349. F(3,6) = 15.5 * ALF1(3) / .394 + 2.9 * CONCST(3)
350. F(4,1) = 13.8 * ALF1(4) / .487 + 2.1 * CONCST(4)
351. F(4,2) = 14.2 * ALF3(4) / .234 + 2.1 * CONCST(4)
352. DO 10 I = 1,4
353. IZ = I + 2
354. 61 FORMAT (1X,F10,3,3X,F10,3)

```

TABLE A28. (Continued 12)

```

355. WRITE(6,30) IZ
356. FORMAT(/10X,'CONCENTRATION IN MILK(PCI/KG) BY ALFALFA HARVEST')
357. FORMAT(/18X,'CONCENTRATION IN MILK (PCI/KG) FOR 196',I1)
358. YMIN=0.
359. C SET Y-AXIS FOR EACH YEAR
360. IF(1.EQ.1) YMAX = 100.
361. IF(1.EQ.2) YMAX = 200.
362. IF(1.EQ.3) YMAX = 100.
363. IF(1.EQ.4) YMAX = 50.
364. C * FIRST CALL IS FOR SET UP * *
365. CALL TPLOT(X,Y,YMAX,YMIN,2,0,,ZZ)
366. DO 20 J=1,10
367. X=X+1.
368. C * TRANSFER COEFFICIENT (FEED TO MILK-% PER KG) * * *
369. TCM = .0046
370. C * * COW * *
371. Y(1) = TCM*F(I,J)
372. Y(2) = M(I,J)
373. C PLOT OBSERVED AND SIMULATED
374. CALL TPLOT(X,Y,YMAX,YMIN,2,1,,ZZ)
375. 20 CONTINUE
376. 10 CONTINUE
377. WRITE (6,62)
378. WRITE (6,77)
379. 77 FORMAT (6X,'OBSD',8X,'SIM')
380. DO 97 I = 1,4
381. II= I + 2
382. WRITE(6,98) II
383. 98 FORMAT(12X,3H196,I1)
384. DO 90 JK = 1,7
385. F(I,JK)= F(I,JK)*TCM
386. IF (M(I,JK).LE.0) GO TO 96
387. WRITE(6,61) M(I,JK),F(I,JK)
388. IF(JK.EQ.7) WRITE(6,95)

```

TABLE A28. (Continued 13)

389.	95	FORMAT (//)
390.	90	CONTINUE
391.	97	CONTINUE
392.		RETURN
393.		END

TABLE A28. (Continued 14) Subroutine TPLLOT-Plotting Called from TCPLLOT, TMPLOT, TAPRIN, and TREG

```
C      *      *      *      *      *      *      *      *      *      *
C      *      *      *      *      *      *      *      *      *      *
C      *      *      *      *      *      *      *      *      *      *
SUBROUTINE TPLOT(X,Y,YMAX,YMIN,N,SW,ZZ)
DIMENSION YP(71), Y(4), YN(6), PDQ(4)
DATA YN / '!', '+', '#', '@', '&', '$' /
DATA PDQ / ' ', 'I', '-', '.', 'X' /
YAVE=(YMAX+YMIN)/2.
SW = 0 FOR SET UP OF Y-AXIS
IF(SW.EQ.1.) GO TO 60
IF(ZZ.EQ.12.) WRITE(6,12) YMIN,YAVE,YMAX
FORMAT(F3.0,29X,F5.2,31X,F5.2)
IF(ZZ.NE.12.) WRITE(6,10) YMIN,YAVE,YMAX
FORMAT(F3.0,29X,F5.0,31X,F5.0)
DO 70 II=1,71
YP(II) = PDQ(3)
CONTINUE
SET UP AND PRINT SYMBOLS ON Y-AXIS
YP(1) = YN(2)
YP(35) = YN(2)
YP(71) = YN(2)
WRITE(6,40) (YP(KK),KK=1,71)
DO 80 JI=1,71
BLANK OUT FOR PLOT SYMBOLS - SECOND CALL
YP(JI)=PDQ(1)
CONTINUE
RETURN
*      *      *      *      *      *      *      *      *      *
CONTINUE
X-AXIS
YP(1)=PDQ(2)
X1=X1+1.
ZZ IS DUMMY VARIABLE - CONTROLS TICK MARKS FOR X-AXIS
IF(X1.EQ.ZZ) YP(1)=PDQ(4)
```

TABLE A28. (Continued 15)

```

350.      IF(X1.EQ.ZZ) X1=0.
355.      N IS NUMBER OF SYMBOLS / UNIT X-AXIS
360.      DO 30 IJ=1,N
365.      C CALCULATE RELATIVE POSITION
370.      NI=FIX(((Y(IJ)-YMIN)*71.)/(YMAX-YMIN))
375.      C IF VALUE TO PLOT IS > YMAX, SET TO YMAX
380.      IF(NI.GT.71) NI=71
385.      C IF VALUE TO PLOT IS < YMIN, SET TO 0
390.      IF(NI.LE.1) GO TO 30
400.      YP(NI)=YN(IJ)
410.      C CONTINUE
420.      WRITE(6,40) (YP(J),J=1,71)
430.      C FORMAT(1X,71A1)
440.      DO 50 K=1,71
445.      C BLANK OUT FOR NEXT UNIT (CALL) OF X-AXIS
450.      YP(K)=PDG(1)
460.      C CONTINUE
470.      RETURN
480.      END

```


TABLE A28. (Continued 16) Subroutine TREG - Performs Analysis of Covariance on
Blocks of Data (Called from TCPLLOT and TAPRIN)

```

421. C * * * * *
422. C * * * * * ANALYSIS OF COVARIANCE SUBROUTINE
423. C * * * * *
424. C * * * * * SUBROUTINE TREG(YOBS,YSIM,N,M, NO)
426. C N = NO, OF YEARS; M = MAXIMUM OBSERVATIONS/YEAR
427. C DIMENSION YOBS(5,12), YSIM(5,12), J(10), YM(10)
427.5 C DIMENSION ZM(10), YS(10), Y(4)
428. C REAL M1,M2,M3,M4
429. C DIMENSION ZS(10), PS(10), B(10), YSC(10)
431. C ZZ IS PLOT PARAMETER TO LOCATE TICK MARKS ON X-AXIS
432. C ZZ = 12
432.5 C CALCULATE SUMS, SUMS OF SQUARES, AND CROSS PRODUCTS/CELLS.
433. C DO 10 I1=1,N
434. C P1=0.
435. C Y1=0.
436. C M1=0.
437. C M2=0.
438. C Z1=0.
439. C DO 20 I2=1,M
440. C IF(YOBS(I1,I2).EQ.0.) GO TO 20
441. C Y1=Y1+YOBS(I1,I2)**2
442. C Z1=Z1+YSIM(I1,I2)**2
443. C P1=P1+YOBS(I1,I2)*YSIM(I1,I2)
443.1 C
443.5 C CALCULATE N/GROUP
443.9 C
444. C J(I1)=J(I1)+1
445. C M1=M1+YOBS(I1,I2)
446. C M2=M2+YSIM(I1,I2)
447. C M3=M3+YOBS(I1,I2)
448. C M4=M4+YSIM(I1,I2)
449. C VE=VE+(YOBS(I1,I2)-YSIM(I1,I2))**2
450. C CONTINUE
450.1 C
450.5 C CELL MEANS AND TOTAL N
450.9 C

```

TABLE A28. (Continued 17)

451.	M1=M1/J(I1)	
452.	M2=M2/J(I1)	
453.	NT=NT+J(I1)	
453.1		C
453.5	CALCULATE TOTAL SUMS OF SQUARES AND CROSS PRODUCTS	C
453.9		C
454.	Y2=Y2+Y1	
455.	Z2=Z2+Z1	
456.	P2=P2+P1	
456.1		C
456.5	STORE OBSERVED AND SIMULATED MEANS	C
456.9		C
457.	YM(I1)=M1	
458.	ZM(I1)=M2	
458.1		C
458.5	CORRECTED (SUMS OF SQUARES AND CROSS PRODUCTS/CELL)	C
458.9		C
459.	YS(I1)=Y1-J(I1)*(M1**2)	
460.	ZS(I1)=Z1-J(I1)*(M2**2)	
461.	PS(I1)=P1-J(I1)*M1*M2	
461.1		C
461.5	CELL SLOPES	C
461.6		C
461.9		C
462.	R(I1) = PS(I1)/ZS(I1)	
462.1		C
462.5	DEVIATIONS FROM REGRESSION(S2Y.X/CELL)	C
462.8		C
463.	YSC(I1) = YS(I1) -(B(I1)**2)*7S(I1)	
464.	YSC(I1) = YSC(I1)/(J(I1)-2)	
464.1		C
464.6	SUM OF THE CORRECTED SUMS OF SQUARES AND	C
464.7	CROSS PRODUCTS OVER ALL CELLS	C
464.9		C
465.	B1=B1+PS(I1)	
466.	B2=B2+ZS(I1)	

TABLE A28. (Continued 20)

```

515. 110 FORMAT(/5X,F10.5,5X,F10.5,5X,F13.5,6X,I10)
516. 120 CONTINUE
516.5 C * * * * *
516.6 C PUT C ON RETURN TO RUN ADJUSTED LINEAR REGRESSION
516.7 C * * * * *
517. RETURN
518. DO 130 I = 1, N
518.5 C
519. C TO PLOT SIMULATED VALUES ADJUSTED BY LINEAR REGRESSION
519.1 C
520. IF(N0.EQ.1.AND.I.EQ.1) YMAX=.3
521. IF(N0.EQ.1.AND.I.EQ.2) YMAX=.15
522. IF(N0.EQ.1.AND.I.EQ.3) YMAX=.05
523. IF(N0.EQ.1.AND.I.EQ.4) YMAX=.05
524. IF(N0.EQ.2) YMAX=4000.
525. IF(N0.EQ.3) YMAX=1000.
526. YMIN=0.
527. WRITE(6,832)
528. 832 FORMAT(//)
529. CALL TPLOT(X,Y,YMAX,YMIN,2,0.,ZZ)
530. A=YM(I)-B(I)*ZN(I)
531. X=0.
532. DO 160 J3=1,M
533. IF(YOBS(I,J3).GT..00001) GO TO 150
534. Y(1)=A+B(I)*YSIM(I,J3)
535. CALL TPLOT(X,Y,YMAX,YMIN,1,1.,ZZ)
536. GO TO 160
537. 150 Y(1)=A+B(I)*YSIM(I,J3)
538. Y(2)=YOBS(I,J3)
539. CALL TPLOT(X,Y,YMAX,YMIN,2,1.,ZZ)
540. CONTINUE
541. 160 CONTINUE
542. 130 RETURN
543. END
544.
545.

```

100.	C	* * * * *	(Continued 21)	Subroutine TFALL2 ~ Calculates Fallout Inputs from
101.		* * * * *		Funnel Collectors (Called from MAIN Program)
102.	C	* * * * *		
103.	C	* * * * *		
104.	C	* * * * *		
105.	C	* * * * *		
106.		* * * * *		
107.		* * * * *		
108.	C	* * * * *		
109.		* * * * *		
110.	C	* * * * *		
111.	C	* * * * *		
112.	C	* * * * *		
113.	C	* * * * *		
114.	C	* * * * *		
115.		* * * * *		
116.	C	* * * * *		
117.	C	* * * * *		
118.		* * * * *		
119.		* * * * *		
120.	10	* * * * *		
121.	C	* * * * *		
122.	C	* * * * *		
123.	C	* * * * *		
124.	C	* * * * *		
125.	C	* * * * *		
126.	C	* * * * *		
127.	C	* * * * *		
128.	C	* * * * *		
129.	C	* * * * *		
130.	C	* * * * *		
131.		* * * * *		
132.	20	* * * * *		
133.	C	* * * * *		
134.		* * * * *		
135.		* * * * *		

```

SUBROUTINE TFALL2(I,J,YSS,II)
* * * * *
CALCULATE AIR CONCENTRATION FROM FUNNELL COLLECTORS
* * * * *
DIMENSION GSS(4,366), DUM(10)
REAL K1,K2
PZ = COUNTER TO SET TIME = 1 AFTER SPRING PEAK-STMT 202
IF (J.EQ.1) PZ = 0
** CHECK FOR FIRST CARD IN A YEAR ***
(JUMP = 1 GO TO SPRING PEAK CALCULATION)
IF (JUMP.EQ.1) GO TO 2000
I = YEAR NUMBER
J = DAY OF A YEAR
IF (J.NE.1) GO TO 30
K1 IS RATE UP TO SPRING PEAK
K2 IS RATE OF DECAY FROM SPRING PEAK
K1=0.012
K2=0.017
READ(5,20) D, AL, ID, BY, EY, BF, EF, YR, SP
D = TOTAL (PCI/M2) IN A FUNNEL
AL = TOTAL COLLECTION DAYS
IP = UPTAKE = 0, RETENTION = 1
BY = DAY OF A YEAR (LOWER LIMIT)
EY = DAY OF A YEAR (UPPER LIMIT)
BF = DAY (LOWER LIMIT) OF FUNNEL USED IN CALCULATION
EF = DAY (UPPER LIMIT) OF FUNNEL USED IN CALCULATION
YR = YEAR NUMBER
SP = IDENTIFY THREE YEARLY COLLECTORS USED TO CALCULATE
LOCATION AND APPORTION TOTAL OVER THE SPRING PEAK
IF (SP.NE.1.) GO TO 100
FORMAT ( )
(SAVE FIRST CARD OF SPRING PEAK SERIES)
D1=D
AL1=AL

```

TABLE A28. (Continued 22)

```

136. ID1=ID
137. BY1=BY
138. EY1=EY
139. BF1=BF
140. EF1=EF
141.
142. C
143. 95 CONTINUE
144. 100 TO = BF
145. C
146. CALCULATE DAILY VALUES
147. C
148. IF (ID.EQ.0) GO TO 40
149. CALCULATE T(0) FOR DECAY
150. AA=(K2*D)/(1-EXP(-K2*AL))
151. GO TO 60
152. C
153. CALCULATE T(0) FOR UPTAKE
154. AA=(K1*D)/(EXP(K1*AL)-1)
155. YSS=AA*EXP(K1*TO)
156. GO TO 2500
157. YSS=AA*EXP(-K2*TO)
158. GO TO 2500
159. C
160. IF TRUE - NEXT CARD CONTAINS SPRING PEAK
161. IF (J.GT.EY.AND.SP.EQ.1.) GO TO 1000
162. READ A NEW CARD WHEN TIME OF FUNNEL COLLECTION IS DONE
163. IF (J.GT.EY) GO TO 10
164. TO = TO + 1
165. IF (ID.EQ. 0) GO TO 80
166. GO TO 60
167. C
168. (SPRING PEAK SECTION -- READ 2ND AND 3RD FUNNEL CARDS)
169. C
170. READ (5,20) D2, (DUM(IQ), IQ=1,8)
171. READ (5,20) D, AL, ID, BY, EY, BF, EF, YR, SP
      SET SWITCH JUMP TO RETURN HERE ON SUBROUTINE CALLS
      UNTIL PEAK CALCULATION IS COMPLETED

```

TABLE A28. (Continued 23)

```

172. C
173. C
174. C
175. C
176. C
177. C
178. C
179. C
180. C
181. C
182. C
183. C
184. C
185. C
186. C
187. C
188. C
189. C
190. C
191. C
192. C
193. C
194. C
195. C
196. C
197. C
198. C
199. C
200. C
201. C
202. C
203. C
204. C
205. C
206. C
207. C

JUMP=1
CALCULATE Y01
Y01=(D1*K1)/(EXP(K1*AL1)-1)
IF(I.EQ.2) GO TO 1060
IF(I.EQ.3) GO TO 1060
(CALCULATE Y01 AT T=0 WHEN 1ST FUNNEL CROSSES 0 FOR A YEAR)
Y01=Y01*(EXP((AL1-EY1)*K1))
CONTINUE
1060
C
C * * * CALCULATE Y03 AND TMAX (TMAX = PEAK TIME) * * *
C
Y03=(D*K2)/(1-EXP(-K2*AL))
TMAX=ALOG(Y03/Y01)+K2*(BY-BY1)
(CALCULATE TMAX+DISPLACEMENT FROM 0 FOR FIRST FUNNEL)
TMAX=TMAX/(K1+K2)
IF(I.EQ.2) TMAX=TMAX+BY1
IF(I.EQ.3) TMAX=TMAX+BY1
CONTINUE
CALCULATE Y02
BB=EXP(K1*(TMAX-(EY1+1)))
CC=EXP(-K2*(BY-TMAX))
AA=D2/((1./K1)*(BB-1.))+BB*(1./K2)*(1-CC)
SET TIME = 1
TO=DUM(5)
ITMAX=TMAX+0.5
(UPTAKE SIDE OF PEAK)
IF(ITMAX.GT.J.OR.ITMAX.EQ.J) YSS=AA*EXP(K1*TO)
IF(ITMAX.GT.J.OR.ITMAX.EQ.J) GO TO 1080
PZ = PZ + 1
IF(PZ.GT.1) GO TO 503
AA = YSS
TO = DUM(5)
CONTINUE
503
C (DECAY SIDE OF PEAK

```

TABLE A28. (Continued 24)

208.		YSS=AA*EXP(-K2*T0)
209.	1080	CONTINUE
210.		IBY=BY
211.	C	(DONE WITH PEAK?)
212.	C	(CONTINUE WITH THIRD CARD)
213.		IF (J.GT.(IBY-1)) JUMP=0
214.		IF (J.GT.(IBY-1)) GO TO 95
215.		T0 = T0 + 1
216.	2500	CONTINUE
217.	C	(STORE ANSWERS)
218.		GSS(I,J) = YSS
222.		RETURN
223.		END

TABLE A28. (Continued 25) Data File TEMP - Contains ^{137}Cs Data from Funnels
(See subroutine TFALL for Column Labels)

100.	3816.	137.	0	1.	92.	46.	137.	1.	1.
110.	3953.	49.	1	93.	141.	1.	49.	1.	2.
120.	1990.	31.	1	142.	172.	1.	31.	1.	3.
130.	1494.	60.	1	173.	213.	20.	60.	1.	0.
140.	1593.	33.	1	214.	246.	1.	33.	1.	0.
150.	1825.	62.	1	247.	282.	1.	36.	1.	0.
160.	1867.	90.	0	283.	365.	1.	83.	1.	0.
170.	1867.	90.	0	1.	7.	84.	90.	2.	0.
180.	2768.	86.	0	8.	93.	1.	86.	2.	1.
190.	4558.	43.	1	94.	136.	1.	43.	2.	2.
200.	2037.	47.	1	137.	183.	1.	47.	2.	3.
210.	524.	34.	1	184.	203.	1.	20.	2.	0.
220.	625.	40.	1	204.	243.	1.	40.	2.	0.
230.	110.	50.	1	244.	293.	1.	50.	2.	0.
240.	1292.	105.	0	294.	366.	1.	73.	2.	0.
250.	1292.	105.	0	1.	32.	74.	105.	3.	0.
260.	1.	14.	0	33.	46.	1.	14.	3.	0.
270.	1075.	47.	0	47.	93.	1.	47.	3.	1.
280.	1742.	42.	1	94.	135.	1.	42.	3.	2.
290.	914.	39.	1	136.	174.	1.	39.	3.	3.
300.	227.	32.	1	175.	206.	1.	32.	3.	0.
310.	203.	37.	1	207.	243.	1.	37.	3.	0.
320.	294.	40.	1	244.	283.	1.	40.	3.	0.
330.	1.	32.	0	284.	315.	1.	32.	3.	0.
335.	468.	141.	0	316.	365.	1.	50.	3.	0.
340.	468.	141.	0	1.	91.	51.	141.	4.	1.
350.	406.	47.	1	92.	138.	1.	47.	4.	2.
360.	104.	32.	1	139.	170.	1.	32.	4.	3.
370.	76.	38.	1	171.	208.	1.	38.	4.	0.
380.	61.	31.	1	209.	239.	1.	31.	4.	0.
390.	56.	47.	1	240.	286.	1.	47.	4.	0.
400.	292.	174.	0	287.	365.	1.	79.	4.	0.

TABLE A28. (Continued 26) Data File SRFALL - Contains ⁹⁰Sr Data from Funnel
(See Subroutine TFALL for Column Labels)

1.	4844.	137.	0	1.	92.	46.	137.	1.	1
2.	1153.	49.	1	93	141.	1.	49.	1.	2
3.	1355.	31.	1	142	172.	1.	31.	1.	3
4.	405.	35.	1	173	207.	1.	35.	1.	0
5.	777.	35.	1	208	242.	1.	35.	1.	0
6.	647.	40.	1	243	282.	1.	40.	1.	0
7.	589.	90.	0	283	365.	1.	83.	1.	0
8.	589.	90.	0	1	7.	84.	90.	2.	0
9.	1319.	86.	0	8	93.	1.	86.	2.	1
10.	3296.	47.	1	94	140.	1.	47.	2.	2
11.	1104.	35.	1	141	175.	1.	35.	2.	3
12.	550.	29.	1	176	204.	1.	29.	2.	0
13.	488.	39.	1	205	243.	1.	39.	2.	0
14.	68.	50.	1	244	293.	1.	50.	2.	0
15.	889.	105.	0	294.	366.	1.	73.	2.	0
16.	889.	105.	0	1.	32.	74.	105.	3.	0
17.	121.	14.	0	33.	46.	1.	14.	3.	0
18.	776.	47.	0	47.	93.	1.	47.	3.	1
19.	1131.	42.	1	94.	135.	1.	42.	3.	2
20.	546.	39.	1	136.	174.	1.	39.	3.	3
21.	113.	32.	1	175.	206.	1.	32.	3.	0
22.	118.	37.	1	207.	243.	1.	37.	3.	0
23.	73.	40.	1	244.	283.	1.	40.	3.	0
24.	1.	32.	0	284.	315.	1.	32.	3.	0
25.	286.	141.	0	316.	365.	1.	50.	3.	0
26.	286.	141.	0	1.	91.	51.	141.	4.	1
27.	279.	47.	1	92.	138.	1.	47.	4.	2
28.	55.	32.	1	139.	170.	1.	32.	4.	3
29.	45.	38.	1	171.	208.	1.	38.	4.	0
30.	56.	31.	1	209.	259.	1.	31.	4.	0
31.	46.	47.	1	240.	286.	1.	47.	4.	0
32.	211.	174.	0	287.	365.	1.	79.	4.	0

TABLE A29. (Continued 2) Analysis of Covariance-Air Concentration Data

* * *RESULTS OF COVARIANCE ANALYSIS* * *				
F-TEST OF SLOPE EQUALITY-AND-DF		,24525	3	40
F-TEST OF INTERCEPTS-IF-B(I)S-ARE-EQUAL		4,82166	3	43
ERROR MS; MS SIM VS OBSD		.00104		.00155
OVERALL SLOPE		.44251		
OVERALL SLOPE THRU ORIGIN		.79008		
CELL SLOPES				
	MEAN OBSERVED			
	MEAN SIMULATED			
.59078	1.17411			
.37075	.83178			
.41496	.70345			
.52390	1.26943			
MEAN OBSD.	MEAN SIM.	REG, VAR.		N
.09017	.07680	.00391		12
.05100	.06131	.00039		12
.01792	.02547	.00007		12
.00783	.00617	.00003		12

TABLE A29. (Continued 3)

137-CS CONCENTRATION IN HAY BY CUTTING (PCI/M2)

YEAR	1ST	2ND	3RD	4TH	5TH
	ORSD	SIM	ORSD	SIM	ORSD
1963	931.	998.	453.	434.	152.
1964	1248.	1277.	281.	295.	73.
1965	479.	493.	245.	162.	37.
1966	265.	103.	38.	24.	0.
					13.
					33.
					10.
					27.
					5.

137-CS CONCENTRATION IN ALFALFA (PCI/M2) IN 1963

0.	750.	1500.
+	+	+
I		
I		
I	++	
I		
I	+	
I	*	
I	+	
I		
I		
I		
I		
X		

137-CS CONCENTRATION IN ALFALFA (PCI/M2) IN 1964

0.	750.	1500.
+	+	+
I		
I		
I		
I	+	
I	*	
I	+	
I		
I		
I		
I		
I		
X		

137-CS CONCENTRATION IN ALFALFA (PCI/M2) IN 1965

0.	250.	500.
+	+	+
I		
I		
I	*	
I		
I	+	
I		
I	+	
I		
I		
I		
I		
X		

TABLE A29. (Continued 4)

TABLE A29. (Continued 5) * * *RESULTS OF COVARIANCE ANALYSIS* * *

ANALYSIS OF COVARIANCE - ALFALFA DATA				
F-TEST OF SLOPE EQUALITY-AND-DF	2,95057	3	11	
F-TEST OF INTERCEPTS-IF-B(I)S-ARE-EQUAL	2,18407	3	14	
ERROR MS: MS SIM VS OBSD	2363,62050	2840,37690		
OVERALL SLOPE	.98817			
OVERALL SLOPE THRU ORIGIN	.96694			
CELL SLOPES	MEAN OBSERVED			
	MEAN SIMULATED			
.96818	.91444			
.98918	.93910			
.98667	1.06466			
2.49960	2.56554			
MEAN OBSD.	MEAN SIM.	REG. VAR.	N	
353.60000	386.68422	2481.54560	5	
337.80000	359.70802	1071.35420	5	
162.60000	152.72514	2303.25980	5	
90.75000	35.37266	383.67090	4	

TABLE A29. (Continued 6) Observed and Simulated ^{137}Cs in Milk

TABLE A29. (Continued 7)

CONCENTRATION IN MILK (PCI/KG) FOR 1966	
0.	50.
+	+
I	+
I	+
I	+
I	+
I	+
I	+
I	+
I	+
I	+
I	+
I	+
X	+

CONCENTRATION IN MILK(PCI/KG) BY ALFALFA HARVEST

OBSD	SIM
1963	
87.800	91.709
76.800	60.390
31.800	23.411
37.300	49.793
26.900	66.356
33.700	79.381

1964	
130.500	187.886
75.600	63.127
83.900	84.117
24.400	22.661
33.600	56.553
17.100	10.234
56.900	69.375

1965	
75.700	66.906
55.000	31.885
18.300	13.014
19.500	8.694
11.900	11.889
49.600	91.855

1966	
31.000	15.355
9.900	5.411

TABLE A30. Estimated Values for Daily Fallout Rate (k_2)

Source	Value or Range of k_2
Yearly "Pot" ^{137}Cs	0.019-0.021
Yearly "Funnel" ^{137}Cs	0.017
Joint Fit "Pot" ^{137}Cs	0.013
Yearly "Pot" ^{90}Sr	0.005-0.019
Yearly "Funnel" ^{90}Sr	0.010-0.020
Joint Fit "Pot" ^{90}Sr	0.016
Joint Fit "Funnel" ^{90}Sr	0.017
Wilson (1969), ^{137}Cs in Air	0.015
Pelletier and Whipple (1968), ^{137}Cs Collectors	0.014-0.015
Pelletier and Whipple (1968), ^{137}Cs in Air	0.011-0.014

TABLE A31. Calculated Daily Fallout Values for ^{137}Cs and ^{90}Sr
(pCi/m²) at Saint George, Utah

	<u>Year</u>	<u>Day</u>	<u>^{137}Cs</u>	<u>^{90}Sr</u>
100	1	1	19,0448	24,17536
110	1	2	19,2747	24,46721
120	1	3	19,5074	24,76259
130	1	4	19,7429	25,06153
140	1	5	19,9813	25,36408
150	1	6	20,2225	25,67028
160	1	7	20,4666	25,98018
170	1	8	20,7137	26,29382
180	1	9	20,9638	26,61125
190	1	10	21,2169	26,93251
200	1	11	21,4730	27,25764
210	1	12	21,7322	27,58670
220	1	13	21,9946	27,91974
230	1	14	22,2601	28,25680
240	1	15	22,5288	28,59792
250	1	16	22,8008	28,94316
260	1	17	23,0761	29,29257
270	1	18	23,3546	29,64620
280	1	19	23,6366	30,00410
290	1	20	23,9219	30,36632
300	1	21	24,2107	30,73291
310	1	22	24,5030	31,10392
320	1	23	24,7988	31,47942
330	1	24	25,0982	31,85945
340	1	25	25,4012	32,24406
350	1	26	25,7078	32,63332
360	1	27	26,0182	33,02728
370	1	28	26,3323	33,42600
380	1	29	26,6502	33,82953
390	1	30	26,9719	34,23793
400	1	31	27,2975	34,65126
410	1	32	27,6271	35,06958
420	1	33	27,9606	35,49295
430	1	34	28,2981	35,92143
440	1	35	28,6396	36,35508
450	1	36	28,9855	36,79397
460	1	37	29,3354	37,23816
470	1	38	29,6896	37,68771
480	1	39	30,0480	38,14268
490	1	40	30,4107	38,60315
500	1	41	30,7779	39,06916
510	1	42	31,1494	39,54084
520	1	43	31,5255	40,01819
530	1	44	31,9061	40,50130
540	1	45	32,2912	40,99024
550	1	46	32,6811	41,48509
560	1	47	33,0756	41,98591
570	1	48	33,4749	42,49277
580	1	49	33,8790	43,00576
590	1	50	34,2880	43,52493
600	1	51	34,7020	44,05038
610	1	52	35,1209	44,58217

TABLE A31. (Continued 2)

620	1	53	35.5449	45.12038
630	1	54	35.9740	45.66508
640	1	55	36.4063	46.21636
650	1	56	36.8478	46.77430
660	1	57	37.2926	47.33893
670	1	58	37.7428	47.91046
680	1	59	38.1985	48.48885
690	1	60	38.6596	49.07423
700	1	61	39.1263	49.66666
710	1	62	39.5987	50.26625
720	1	63	40.0767	50.87308
730	1	64	40.5605	51.48724
740	1	65	41.0502	52.10881
750	1	66	41.5458	52.73788
760	1	67	42.0473	53.37455
770	1	68	42.5549	54.01890
780	1	69	43.0687	54.67103
790	1	70	43.5886	55.33104
800	1	71	44.1148	55.99901
810	1	72	44.6474	56.67504
820	1	73	45.1864	57.35924
830	1	74	45.7319	58.05170
840	1	75	46.2840	58.75252
850	1	76	46.8427	59.46179
860	1	77	47.4082	60.17963
870	1	78	47.9806	60.90614
880	1	79	48.5598	61.64142
890	1	80	49.1460	62.38557
900	1	81	49.7393	63.13870
910	1	82	50.3398	63.90093
920	1	83	50.9475	64.67236
930	1	84	51.5626	65.45311
940	1	85	52.1850	66.24328
950	1	86	52.8150	67.04293
960	1	87	53.4526	67.85235
970	1	88	54.0979	68.67148
980	1	89	54.7510	69.50050
990	1	90	55.4120	70.33953
1000	1	91	56.0809	71.18869
1010	1	92	56.7580	72.04810
1020	1	93	61.4782	22.87548
1030	1	94	62.2203	23.15164
1040	1	95	62.9715	23.43113
1050	1	96	63.7317	23.71400
1060	1	97	64.5011	24.00028
1070	1	98	65.2798	24.29002
1080	1	99	66.0678	24.58326
1090	1	100	66.8654	24.88003
1100	1	101	67.6726	25.18039
1110	1	102	68.4896	25.48438
1120	1	103	69.3164	25.79203
1130	1	104	70.1532	26.10340
1140	1	105	71.0001	26.41853
1150	1	106	71.8573	26.73746

TABLE A31. (Continued 3)

1160	1	107	72,7248	27,06025
1170	1	108	73,6027	27,38692
1180	1	109	74,4913	27,71755
1190	1	110	75,3906	28,05216
1200	1	111	76,3007	28,39082
1210	1	112	77,2218	28,73356
1220	1	113	78,1541	28,24921
1230	1	114	79,0976	27,77304
1240	1	115	80,0524	27,30489
1250	1	116	81,0189	26,84463
1260	1	117	81,9969	26,39212
1270	1	118	82,9866	25,94725
1280	1	119	83,9887	25,50988
1290	1	120	85,0026	25,07987
1300	1	121	86,0288	24,65712
1310	1	122	87,0673	24,24149
1320	1	123	88,1184	23,83287
1330	1	124	89,1822	23,43113
1340	1	125	90,2589	23,03617
1350	1	126	91,3485	22,64787
1360	1	127	92,4513	22,26611
1370	1	128	93,5674	21,89078
1380	1	129	94,6970	21,52179
1390	1	130	95,8402	21,15901
1400	1	131	96,9972	20,80234
1410	1	132	98,1682	20,45169
1420	1	133	99,3533	20,10695
1430	1	134	100,5527	19,76802
1440	1	135	98,8577	19,43481
1450	1	136	97,1914	19,10721
1460	1	137	95,5531	18,78513
1470	1	138	93,9424	18,46848
1480	1	139	92,3589	18,15717
1490	1	140	90,8021	17,85111
1500	1	141	89,2715	17,55021
1510	1	142	81,1953	55,28624
1520	1	143	79,8260	54,35432
1530	1	144	78,4811	53,43811
1540	1	145	77,1582	52,53734
1550	1	146	75,8576	51,65175
1560	1	147	74,5789	50,78110
1570	1	148	73,3218	49,92511
1580	1	149	72,0858	49,08356
1590	1	150	70,8707	48,25619
1600	1	151	69,6761	47,44277
1610	1	152	68,5015	46,64306
1620	1	153	67,3469	45,85683
1630	1	154	66,2117	45,08385
1640	1	155	65,0956	44,32390
1650	1	156	63,9984	43,57677
1660	1	157	62,9196	42,84222
1670	1	158	61,8590	42,12006
1680	1	159	60,8163	41,41007
1690	1	160	59,7911	40,71205

TABLE A31. (Continued 4)

1700	1	161	56.7833	40.02580
1710	1	162	57.7924	39.35111
1720	1	163	56.8182	38.68779
1730	1	164	55.8605	38.03566
1740	1	165	54.9189	37.39452
1750	1	166	53.9932	36.76418
1760	1	167	53.0830	36.14448
1770	1	168	52.1882	35.53521
1780	1	169	51.3085	34.93622
1790	1	170	50.4437	34.34732
1800	1	171	49.5934	33.76836
1810	1	172	48.7574	33.19915
1820	1	173	48.2724	32.64951
1830	1	174	47.7959	32.14007
1840	1	175	47.3273	31.68993
1850	1	176	46.8667	31.34399
1860	1	177	46.4138	31.10221
1870	1	178	45.9686	30.86450
1880	1	179	45.5309	30.63079
1890	1	180	45.1005	30.40103
1900	1	181	44.6774	30.17513
1910	1	182	44.2614	29.95305
1920	1	183	43.8525	29.73471
1930	1	184	43.4504	29.52005
1940	1	185	43.0551	29.30901
1950	1	186	42.6665	29.10152
1960	1	187	42.2844	28.89753
1970	1	188	41.9088	28.69699
1980	1	189	41.5395	28.49982
1990	1	190	41.1764	28.30597
2000	1	191	40.8194	28.11540
2010	1	192	40.4685	27.92803
2020	1	193	40.1235	27.74383
2030	1	194	39.7843	27.56272
2040	1	195	39.4508	27.38468
2050	1	196	39.1229	27.20963
2060	1	197	38.8006	27.03753
2070	1	198	38.4837	26.86834
2080	1	199	38.1721	26.70199
2090	1	200	37.8658	26.53845
2100	1	201	37.5646	26.37767
2110	1	202	37.2686	26.21960
2120	1	203	36.9775	26.06419
2130	1	204	36.6913	25.91140
2140	1	205	36.4099	25.76119
2150	1	206	36.1333	25.61350
2160	1	207	35.8614	25.46831
2170	1	208	35.5940	25.325910
2180	1	209	35.3312	25.187096
2190	1	210	35.0727	25.0519104
2200	1	211	34.8187	24.91922
2210	1	212	34.5689	24.789534
2220	1	213	34.3233	24.662929
2230	1	214	34.0895	24.53992

TABLE A31. (Continued 5)

2240	1	215	60.9642	25.71011
2250	1	216	59.9366	25.27674
2260	1	217	58.9263	24.85067
2270	1	218	57.9330	24.43177
2280	1	219	56.9565	24.01994
2290	1	220	55.9964	23.61506
2300	1	221	55.0525	23.21699
2310	1	222	54.1245	22.82564
2320	1	223	53.2122	22.44089
2330	1	224	52.3152	22.06261
2340	1	225	51.4334	21.69072
2350	1	226	50.5664	21.32509
2360	1	227	49.7140	20.96563
2370	1	228	48.8761	20.61223
2380	1	229	48.0522	20.26478
2390	1	230	47.2422	19.92319
2400	1	231	46.4459	19.58736
2410	1	232	45.6630	19.25719
2420	1	233	44.8933	18.93259
2430	1	234	44.1365	18.61345
2440	1	235	43.3925	18.29970
2450	1	236	42.6611	17.99123
2460	1	237	41.9420	17.68797
2470	1	238	41.2350	17.38981
2480	1	239	40.5399	17.09668
2490	1	240	39.8566	16.80850
2500	1	241	39.1847	16.52517
2510	1	242	38.5242	16.24661
2520	1	243	37.8749	21.91725
2530	1	244	37.2364	21.54780
2540	1	245	36.6086	21.18459
2550	1	246	35.9917	20.82749
2560	1	247	46.8211	20.47642
2570	1	248	46.0319	20.13126
2580	1	249	45.2559	19.79192
2590	1	250	44.4931	19.45830
2600	1	251	43.7431	19.13031
2610	1	252	43.0058	18.80784
2620	1	253	42.2806	18.49081
2630	1	254	41.5681	18.17912
2640	1	255	40.8674	17.87269
2650	1	256	40.1786	17.57142
2660	1	257	39.5013	17.27523
2670	1	258	38.8355	16.98404
2680	1	259	38.1808	16.69775
2690	1	260	37.5373	16.41629
2700	1	261	36.9045	16.13957
2710	1	262	36.2824	15.86751
2720	1	263	35.6709	15.60005
2730	1	264	35.0696	15.33709
2740	1	265	34.4784	15.07856
2750	1	266	33.8972	14.82439
2760	1	267	33.3259	14.57451
2770	1	268	32.7641	14.32883

TABLE A31. (Continued 6)

2780	1	269	32.2113	14.08730
2790	1	270	31.6689	13.84984
2800	1	271	31.1350	13.61638
2810	1	272	30.6102	13.38686
2820	1	273	30.0942	13.16121
2830	1	274	29.5870	12.93936
2840	1	275	29.0882	12.72125
2850	1	276	28.5979	12.50682
2860	1	277	28.1159	12.29600
2870	1	278	27.6419	12.08873
2880	1	279	27.1760	11.88496
2890	1	280	26.7179	11.68463
2900	1	281	26.2675	11.48767
2910	1	282	25.8248	11.29403
2920	1	283	11.6597	3.67841
2930	1	284	11.8005	3.72282
2940	1	285	11.9430	3.76776
2950	1	286	12.0871	3.81324
2960	1	287	12.2331	3.85928
2970	1	288	12.3807	3.90587
2980	1	289	12.5302	3.95302
2990	1	290	12.6815	4.00074
3000	1	291	12.8346	4.04904
3010	1	292	12.9895	4.09792
3020	1	293	13.1463	4.14739
3030	1	294	13.3050	4.19746
3040	1	295	13.4657	4.24814
3050	1	296	13.6282	4.29942
3060	1	297	13.7927	4.35132
3070	1	298	13.9592	4.40386
3080	1	299	14.1278	4.45702
3090	1	300	14.2983	4.51083
3100	1	301	14.4709	4.56528
3110	1	302	14.6456	4.62040
3120	1	303	14.8224	4.67617
3130	1	304	15.0014	4.73263
3140	1	305	15.1825	4.78976
3150	1	306	15.3658	4.84758
3160	1	307	15.5513	4.90610
3170	1	308	15.7390	4.96533
3180	1	309	15.9290	5.02528
3190	1	310	16.1213	5.08594
3200	1	311	16.3159	5.14734
3210	1	312	16.5129	5.20948
3220	1	313	16.7123	5.27237
3230	1	314	16.9140	5.33602
3240	1	315	17.1182	5.40044
3250	1	316	17.3249	5.46564
3260	1	317	17.5340	5.53162
3270	1	318	17.7457	5.59840
3280	1	319	17.9599	5.66598
3290	1	320	18.1767	5.73438
3300	1	321	18.3962	5.80361
3310	1	322	18.6183	5.87367

TABLE A31. (Continued 7)

3320	1	323	18.8430	5.94458
3330	1	324	19.0705	6.01635
3340	1	325	19.3007	6.08898
3350	1	326	19.5337	6.16249
3360	1	327	19.7695	6.23638
3370	1	328	20.0082	6.31217
3380	1	329	20.2497	6.38838
3390	1	330	20.4942	6.46550
3400	1	331	20.7416	6.54355
3410	1	332	20.9920	6.62255
3420	1	333	21.2454	6.70250
3430	1	334	21.5019	6.78341
3440	1	335	21.7615	6.86530
3450	1	336	22.0242	6.94818
3460	1	337	22.2901	7.03206
3470	1	338	22.5592	7.11696
3480	1	339	22.8315	7.20288
3490	1	340	23.1072	7.28983
3500	1	341	23.3861	7.37784
3510	1	342	23.6684	7.46690
3520	1	343	23.9542	7.55705
3530	1	344	24.2433	7.64828
3540	1	345	24.5360	7.74061
3550	1	346	24.8322	7.83406
3560	1	347	25.1320	7.92863
3570	1	348	25.4354	8.02435
3580	1	349	25.7425	8.12122
3590	1	350	26.0532	8.21926
3600	1	351	26.3678	8.31849
3610	1	352	26.6861	8.41891
3620	1	353	27.0082	8.52055
3630	1	354	27.3343	8.62341
3640	1	355	27.6643	8.72751
3650	1	356	27.9983	8.83287
3660	1	357	28.3363	8.93951
3670	1	358	28.6783	9.04743
3680	1	359	29.0246	9.15665
3690	1	360	29.3750	9.26719
3700	1	361	29.7296	9.37907
3710	1	362	30.0885	9.49229
3720	1	363	30.4517	9.60689
3730	1	364	30.8193	9.72286
3740	1	365	31.1914	9.84024
3750	2	1	31.5679	9.95904
3760	2	2	31.9490	10.07926
3770	2	3	32.3347	10.20095
3780	2	4	32.7251	10.32409
3790	2	5	33.1202	10.44873
3800	2	6	33.5200	10.57487
3810	2	7	33.9247	10.70253
3820	2	8	34.3671	10.83662
3830	2	9	34.8318	10.97306
3840	2	10	35.3091	11.11199
3850	2	11	35.7892	11.25163

TABLE A31. (Continued 8)

3860	2	12	19.5220	9.30259
3870	2	13	19.7577	9.41490
3880	2	14	19.9962	9.52856
3890	2	15	20.2376	9.64359
3900	2	16	20.4820	9.76001
3910	2	17	20.7292	9.87783
3920	2	18	20.9795	9.99708
3930	2	19	21.2327	10.11777
3940	2	20	21.4891	10.23991
3950	2	21	21.7485	10.36353
3960	2	22	22.0110	10.48864
3970	2	23	22.2768	10.61527
3980	2	24	22.5457	10.74342
3990	2	25	22.8179	10.87311
4000	2	26	23.0933	11.00438
4010	2	27	23.3721	11.13723
4020	2	28	23.6543	11.27168
4030	2	29	23.9398	11.40775
4040	2	30	24.2289	11.54547
4050	2	31	24.5214	11.68485
4060	2	32	24.8174	11.82591
4070	2	33	25.1170	11.96868
4080	2	34	25.4202	12.11317
4090	2	35	25.7271	12.25940
4100	2	36	26.0377	12.40740
4110	2	37	26.3520	12.55719
4120	2	38	26.6701	12.70878
4130	2	39	26.9921	12.86221
4140	2	40	27.3180	13.01748
4150	2	41	27.6477	13.17463
4160	2	42	27.9815	13.33368
4170	2	43	28.3193	13.49465
4180	2	44	28.6612	13.65756
4190	2	45	29.0072	13.82244
4200	2	46	29.3574	13.98931
4210	2	47	29.7118	14.15819
4220	2	48	30.0705	14.32911
4230	2	49	30.4335	14.50210
4240	2	50	30.8009	14.67717
4250	2	51	31.1728	14.85436
4260	2	52	31.5491	15.03368
4270	2	53	31.9299	15.21517
4280	2	54	32.3154	15.39885
4290	2	55	32.7055	15.58475
4300	2	56	33.1004	15.77290
4310	2	57	33.5000	15.96331
4320	2	58	33.9044	16.15603
4330	2	59	34.3137	16.35107
4340	2	60	34.7279	16.54846
4350	2	61	35.1472	16.74824
4360	2	62	35.5715	16.95043
4370	2	63	36.0009	17.15506
4380	2	64	36.4355	17.36216
4390	2	65	36.8754	17.57176

TABLE A31. (Continued 9)

4400	2	66	37,3206	17,78389
4410	2	67	37,7711	17,99858
4420	2	68	38,2271	18,21587
4430	2	69	38,6886	18,43578
4440	2	70	39,1556	18,65834
4450	2	71	39,6283	18,88359
4460	2	72	40,1067	19,11156
4470	2	73	40,5909	19,34228
4480	2	74	41,0809	19,57578
4490	2	75	41,5769	19,81211
4500	2	76	42,0788	20,05128
4510	2	77	42,5868	20,29335
4520	2	78	43,1009	20,53834
4530	2	79	43,6212	20,78628
4540	2	80	44,1479	21,03722
4550	2	81	44,6808	21,29119
4560	2	82	45,2202	21,54822
4570	2	83	45,7661	21,80836
4580	2	84	46,3186	22,07163
4590	2	85	46,8778	22,33809
4600	2	86	47,4437	22,60776
4610	2	87	48,0165	22,88069
4620	2	88	48,5962	23,15691
4630	2	89	49,1828	23,43647
4640	2	90	49,7766	23,71940
4650	2	91	50,3775	24,00574
4660	2	92	50,9857	24,29555
4670	2	93	51,6012	24,58885
4680	2	94	52,2240	24,88564
4690	2	95	52,8558	25,18494
4700	2	96	53,4961	25,48675
4710	2	97	54,1451	25,79135
4720	2	98	54,8028	26,09884
4730	2	99	55,4696	26,40932
4740	2	100	56,1454	26,72289
4750	2	101	56,8306	27,03963
4760	2	102	57,5245	27,35965
4770	2	103	58,2273	27,68294
4780	2	104	58,9392	28,00952
4790	2	105	59,6601	28,33938
4800	2	106	60,3901	28,67253
4810	2	107	61,1293	29,00906
4820	2	108	61,8778	29,34909
4830	2	109	62,6357	29,69271
4840	2	110	63,4031	30,04002
4850	2	111	64,1801	30,39113
4860	2	112	64,9668	30,74604
4870	2	113	65,7633	31,10485
4880	2	114	66,5697	31,46756
4890	2	115	67,3861	31,83417
4900	2	116	68,2126	32,20468
4910	2	117	69,0493	32,57909
4920	2	118	69,8962	32,95740
4930	2	119	70,7534	33,33961

TABLE A31. (Continued 12)

6020	2	228	14.0789	11.38163
6030	2	229	13.8416	11.18983
6040	2	230	13.6083	11.00121
6050	2	231	13.3789	10.81577
6060	2	232	13.1534	10.63345
6070	2	233	12.9317	10.45421
6080	2	234	12.7137	10.27799
6090	2	235	12.4994	10.10474
6100	2	236	12.2887	9.93441
6110	2	237	12.0815	9.76696
6120	2	238	11.8779	9.60232
6130	2	239	11.6777	9.44046
6140	2	240	11.4808	9.28133
6150	2	241	11.2873	9.12488
6160	2	242	11.0970	8.97107
6170	2	243	10.9100	8.81985
6180	2	244	3.2108	1.98488
6190	2	245	3.1567	1.95142
6200	2	246	3.1035	1.91853
6210	2	247	3.0512	1.88619
6220	2	248	2.9998	1.85440
6230	2	249	2.9492	1.82314
6240	2	250	2.8995	1.79241
6250	2	251	2.8506	1.76219
6260	2	252	2.8026	1.73249
6270	2	253	2.7553	1.70329
6280	2	254	2.7089	1.67458
6290	2	255	2.6632	1.64635
6300	2	256	2.6183	1.61860
6310	2	257	2.5742	1.59131
6320	2	258	2.5308	1.56449
6330	2	259	2.4881	1.53812
6340	2	260	2.4462	1.51219
6350	2	261	2.4050	1.48670
6360	2	262	2.3644	1.46164
6370	2	263	2.3246	1.43700
6380	2	264	2.2854	1.41278
6390	2	265	2.2469	1.38897
6400	2	266	2.2090	1.36555
6410	2	267	2.1717	1.34254
6420	2	268	2.1351	1.31990
6430	2	269	2.0991	1.29766
6440	2	270	2.0638	1.27573
6450	2	271	2.0290	1.25428
6460	2	272	1.9948	1.23313
6470	2	273	1.9612	1.21235
6480	2	274	1.9281	1.19191
6490	2	275	1.8956	1.17182
6500	2	276	1.8636	1.15207
6510	2	277	1.8322	1.13265
6520	2	278	1.8013	1.11356
6530	2	279	1.7710	1.09479
6540	2	280	1.7411	1.07633
6550	2	281	1.7118	1.05819

TABLE A31. (Continued 13)

6560	2	282	1.6829	1.04035
6570	2	283	1.6546	1.02282
6580	2	284	1.6267	1.00558
6590	2	285	1.5992	.98862
6600	2	286	1.5723	.97196
6610	2	287	1.5458	.95558
6620	2	288	1.5197	.93947
6630	2	289	1.4941	.92363
6640	2	290	1.4689	.90806
6650	2	291	1.4442	.89276
6660	2	292	1.4198	.87771
6670	2	293	1.3959	.86291
6680	2	294	6.2133	4.27524
6690	2	295	6.2083	4.32685
6700	2	296	6.3642	4.37909
6710	2	297	6.4410	4.43195
6720	2	298	6.5188	4.48546
6730	2	299	6.5975	4.53961
6740	2	300	6.6771	4.59441
6750	2	301	6.7578	4.64988
6760	2	302	6.8393	4.70601
6770	2	303	6.9219	4.76282
6780	2	304	7.0055	4.82032
6790	2	305	7.0900	4.87851
6800	2	306	7.1756	4.93741
6810	2	307	7.2623	4.99701
6820	2	308	7.3499	5.05734
6830	2	309	7.4387	5.11839
6840	2	310	7.5285	5.18018
6850	2	311	7.6193	5.24272
6860	2	312	7.7113	5.30601
6870	2	313	7.8044	5.37007
6880	2	314	7.8986	5.43490
6890	2	315	7.9940	5.50051
6900	2	316	8.0905	5.56691
6910	2	317	8.1882	5.63412
6920	2	318	8.2870	5.70213
6930	2	319	8.3871	5.77097
6940	2	320	8.4883	5.84064
6950	2	321	8.5908	5.91115
6960	2	322	8.6945	5.98251
6970	2	323	8.7995	6.05474
6980	2	324	8.9057	6.12783
6990	2	325	9.0132	6.20181
7000	2	326	9.1220	6.27668
7010	2	327	9.2321	6.35245
7020	2	328	9.3436	6.42914
7030	2	329	9.4564	6.50675
7040	2	330	9.5705	6.58530
7050	2	331	9.6861	6.66480
7060	2	332	9.8030	6.74526
7070	2	333	9.9214	6.82669
7080	2	334	10.0411	6.90911
7090	2	335	10.1624	6.99252

TABLE A31. (Continued 14)

7100	2	336	10.2850	7.07693
7110	2	337	10.4092	7.16237
7120	2	338	10.5349	7.24883
7130	2	339	10.6620	7.33634
7140	2	340	10.7908	7.42491
7150	2	341	10.9210	7.51455
7160	2	342	11.0529	7.60526
7170	2	343	11.1863	7.69708
7180	2	344	11.3213	7.79000
7190	2	345	11.4580	7.88404
7200	2	346	11.5963	7.97922
7210	2	347	11.7363	8.07555
7220	2	348	11.8780	8.17304
7230	2	349	12.0214	8.27171
7240	2	350	12.1665	8.37156
7250	2	351	12.3134	8.47263
7260	2	352	12.4621	8.57491
7270	2	353	12.6125	8.67843
7280	2	354	12.7648	8.78320
7290	2	355	12.9189	8.88923
7300	2	356	13.0748	8.99654
7310	2	357	13.2327	9.10515
7320	2	358	13.3924	9.21507
7330	2	359	13.5541	9.32632
7340	2	360	13.7177	9.43891
7350	2	361	13.8833	9.55286
7360	2	362	14.0510	9.66818
7370	2	363	14.2206	9.78490
7380	2	364	14.3923	9.90303
7390	2	365	14.5660	10.02258
7400	2	366	14.7418	10.14358
7410	3	1	14.9193	10.26603
7420	3	2	15.0999	10.38997
7430	3	3	15.2822	10.51540
7440	3	4	15.4667	10.64234
7450	3	5	15.6534	10.77082
7460	3	6	15.8424	10.90085
7470	3	7	16.0337	11.03245
7480	3	8	16.2272	11.16563
7490	3	9	16.4231	11.30043
7500	3	10	16.6214	11.43685
7510	3	11	16.8220	11.57492
7520	3	12	17.0251	11.71466
7530	3	13	17.2307	11.85608
7540	3	14	17.4387	11.99921
7550	3	15	17.6492	12.14407
7560	3	16	17.8623	12.29067
7570	3	17	18.0779	12.43905
7580	3	18	18.2961	12.58922
7590	3	19	18.5170	12.74120
7600	3	20	18.7406	12.89501
7610	3	21	18.9668	13.05069
7620	3	22	19.1958	13.20824
7630	3	23	19.4275	13.36769

TABLE A31. (Continued 15)

7640	3	24	19.6620	13.52907
7650	3	25	19.8994	13.69240
7660	3	26	20.1396	13.85769
7670	3	27	20.3828	14.02499
7680	3	28	20.6288	14.19430
7690	3	29	20.8779	14.36566
7700	3	30	21.1299	14.53909
7710	3	31	21.3850	14.71461
7720	3	32	21.6432	14.89225
7730	3	33	.0664	8.03299
7740	3	34	.0672	8.12997
7750	3	35	.0680	8.22812
7760	3	36	.0688	8.32745
7770	3	37	.0697	8.42798
7780	3	38	.0705	8.52973
7790	3	39	.0713	8.63270
7800	3	40	.0722	8.73692
7810	3	41	.0731	8.84239
7820	3	42	.0740	8.94914
7830	3	43	.0749	9.05718
7840	3	44	.0758	9.16652
7850	3	45	.0767	9.27718
7860	3	46	.0776	9.38918
7870	3	47	17.2310	12.43837
7880	3	48	17.4390	12.58853
7890	3	49	17.6495	12.74050
7900	3	50	17.8626	12.89431
7910	3	51	18.0782	13.04997
7920	3	52	18.2965	13.20751
7930	3	53	18.5174	13.36696
7940	3	54	18.7409	13.52833
7950	3	55	18.9672	13.69165
7960	3	56	19.1961	13.85694
7970	3	57	19.4279	14.02422
7980	3	58	19.6624	14.19352
7990	3	59	19.8998	14.36487
8000	3	60	20.1400	14.53829
8010	3	61	20.3832	14.71380
8020	3	62	20.6292	14.89143
8030	3	63	20.8783	15.07120
8040	3	64	21.1303	15.25315
8050	3	65	21.3854	15.43729
8060	3	66	21.6436	15.62365
8070	3	67	21.9049	15.81226
8080	3	68	22.1693	16.00315
8090	3	69	22.4370	16.19635
8100	3	70	22.7078	16.39188
8110	3	71	22.9820	16.58976
8120	3	72	23.2594	16.79004
8130	3	73	23.5402	16.99273
8140	3	74	23.8244	17.19788
8150	3	75	24.1120	17.40549
8160	3	76	24.4031	17.61562
8170	3	77	24.6977	17.82828

TABLE A31. (Continued 16)

8180	3	78	24,9958	18,04351
8190	3	79	25,2976	18,26133
8200	3	80	25,6030	18,48179
8210	3	81	25,9121	18,70491
8220	3	82	26,2249	18,93072
8230	3	83	26,5415	19,15926
8240	3	84	26,8619	19,39055
8250	3	85	27,1862	19,62464
8260	3	86	27,5144	19,86155
8270	3	87	27,8466	20,10133
8280	3	88	28,1827	20,34400
8290	3	89	28,5230	20,58960
8300	3	90	28,8673	20,83816
8310	3	91	29,2158	21,08972
8320	3	92	29,5685	21,34432
8330	3	93	29,9255	21,60200
8340	3	94	35,1269	24,74894
8350	3	95	35,5509	25,04772
8360	3	96	35,9801	25,35010
8370	3	97	36,4145	25,65613
8380	3	98	36,8541	25,96586
8390	3	99	37,2990	26,27933
8400	3	100	37,7493	26,59658
8410	3	101	38,2050	26,91766
8420	3	102	38,6662	27,24262
8430	3	103	39,1330	27,57150
8440	3	104	39,6054	27,90435
8450	3	105	40,0836	28,24122
8460	3	106	40,5675	28,58216
8470	3	107	41,0572	28,92721
8480	3	108	41,5529	29,27643
8490	3	109	42,0545	29,62986
8500	3	110	42,5622	29,98756
8510	3	111	43,0760	30,34958
8520	3	112	43,5960	30,71597
8530	3	113	44,1223	31,08678
8540	3	114	44,6550	31,46207
8550	3	115	45,1941	30,93174
8560	3	116	45,7397	30,41034
8570	3	117	46,2919	29,89773
8580	3	118	46,8507	29,39377
8590	3	119	47,4163	28,89830
8600	3	120	47,9887	28,41118
8610	3	121	48,5681	27,93227
8620	3	122	47,7494	27,46144
8630	3	123	46,9445	26,99854
8640	3	124	46,1532	26,54344
8650	3	125	45,3752	26,09602
8660	3	126	44,6104	25,65613
8670	3	127	43,8584	25,22367
8680	3	128	43,1191	24,79849
8690	3	129	42,3923	24,38048
8700	3	130	41,6777	23,96951
8710	3	131	40,9752	23,56547

TABLE A31. (Continued 17)

8720	3	132	40,2845	23,16825
8730	3	133	39,6054	22,77772
8740	3	134	38,9378	22,39377
8750	3	135	38,2815	22,01629
8760	3	136	31,5168	18,82731
8770	3	137	30,9855	18,50995
8780	3	138	30,4632	18,19794
8790	3	139	29,9497	17,89119
8800	3	140	29,4449	17,58961
8810	3	141	28,9486	17,29312
8820	3	142	28,4606	17,00162
8830	3	143	27,9808	16,71503
8840	3	144	27,5092	16,43328
8850	3	145	27,0455	16,15628
8860	3	146	26,5896	15,88394
8870	3	147	26,1414	15,61620
8880	3	148	25,7008	15,35296
8890	3	149	25,2675	15,09417
8900	3	150	24,8416	14,83974
8910	3	151	24,4229	14,58959
8920	3	152	24,0112	14,34367
8930	3	153	23,6065	14,10189
8940	3	154	23,2085	13,86418
8950	3	155	22,8173	13,63048
8960	3	156	22,4327	13,40072
8970	3	157	22,0546	13,17483
8980	3	158	21,6828	12,95276
8990	3	159	21,3173	12,73442
9000	3	160	20,9580	12,51977
9010	3	161	20,6047	12,30873
9020	3	162	20,2574	12,10125
9030	3	163	19,9159	11,89726
9040	3	164	19,5802	11,69672
9050	3	165	19,2502	11,49956
9060	3	166	18,9257	11,30572
9070	3	167	18,6067	11,11514
9080	3	168	18,2931	10,92778
9090	3	169	17,9847	10,74358
9100	3	170	17,6815	10,56248
9110	3	171	17,3835	10,38444
9120	3	172	17,0905	10,20940
9130	3	173	16,8024	10,03730
9140	3	174	16,5191	9,86811
9150	3	175	9,0423	4,50123
9160	3	176	8,8699	4,42536
9170	3	177	8,7400	4,35076
9180	3	178	8,5927	4,27743
9190	3	179	8,4479	4,20532
9200	3	180	8,3055	4,13444
9210	3	181	8,1655	4,06475
9220	3	182	8,0278	3,99623
9230	3	183	7,8925	3,92887
9240	3	184	7,7595	3,86264
9250	3	185	7,6287	3,79753

TABLE A31. (Continued 18)

9260	3	186	7.5001	3.73352
9270	3	187	7.3737	3.67059
9280	3	188	7.2494	3.60871
9290	3	189	7.1272	3.54788
9300	3	190	7.0070	3.48808
9310	3	191	6.8889	3.42928
9320	3	192	6.7728	3.37148
9330	3	193	6.6586	3.31465
9340	3	194	6.5464	3.25878
9350	3	195	6.4360	3.20384
9360	3	196	6.3276	3.14984
9370	3	197	6.2209	3.09674
9380	3	198	6.1160	3.04455
9390	3	199	6.0129	2.99323
9400	3	200	5.9116	2.94277
9410	3	201	5.8119	2.89317
9420	3	202	5.7140	2.84440
9430	3	203	5.6177	2.79645
9440	3	204	5.5230	2.74931
9450	3	205	5.4299	2.70297
9460	3	206	5.3383	2.65741
9470	3	207	7.2671	4.22422
9480	3	208	7.1446	4.15302
9490	3	209	7.0242	4.08301
9500	3	210	6.9053	4.01419
9510	3	211	6.7894	3.94653
9520	3	212	6.6749	3.88000
9530	3	213	6.5624	3.81460
9540	3	214	6.4518	3.75030
9550	3	215	6.3430	3.68708
9560	3	216	6.2361	3.62493
9570	3	217	6.1310	3.56383
9580	3	218	6.0276	3.50376
9590	3	219	5.9260	3.44470
9600	3	220	5.8262	3.38663
9610	3	221	5.7279	3.32954
9620	3	222	5.6314	3.27342
9630	3	223	5.5365	3.21824
9640	3	224	5.4431	3.16400
9650	3	225	5.3514	3.11066
9660	3	226	5.2612	3.05823
9670	3	227	5.1725	3.00668
9680	3	228	5.0853	2.95600
9690	3	229	4.9995	2.90617
9700	3	230	4.9153	2.85718
9710	3	231	4.8325	2.80902
9720	3	232	4.7510	2.76167
9730	3	233	4.6709	2.71512
9740	3	234	4.5922	2.66935
9750	3	235	4.5148	2.62436
9760	3	236	4.4387	2.58012
9770	3	237	4.3639	2.53663
9780	3	238	4.2903	2.49387
9790	3	239	4.2180	2.45183

TABLE A31. (Continued 19)

9800	3	240	4,1469	2,41050
9810	3	241	4,0770	2,36987
9820	3	242	4,0063	2,32992
9830	3	243	3,9407	2,29065
9840	3	244	3,8693	2,247289
9850	3	245	3,7914	2,203121
9860	3	246	3,7164	2,159022
9870	3	247	3,6441	2,114993
9880	3	248	3,5746	2,071032
9890	3	249	3,5077	2,027138
9900	3	250	3,4435	2,083309
9910	3	251	3,3819	2,139545
9920	3	252	3,3229	2,195844
9930	3	253	3,2664	2,252206
9940	3	254	3,2123	2,308629
9950	3	255	3,1607	2,365112
9960	3	256	3,1114	2,421655
9970	3	257	3,0645	2,478256
9980	3	258	3,0190	2,534914
9990	3	259	2,9756	2,591628
10000	3	260	2,9345	2,648398
10010	3	261	2,8956	2,705222
10020	3	262	2,8589	2,762100
10030	3	263	2,8243	2,819031
10040	3	264	2,7917	2,876013
10050	3	265	2,7612	2,933046
10060	3	266	2,7328	2,990129
10070	3	267	2,7063	3,047261
10080	3	268	2,6817	3,104442
10090	3	269	2,6590	3,161670
10100	3	270	2,6381	3,218945
10110	3	271	2,6190	3,276266
10120	3	272	2,6017	3,333632
10130	3	273	2,5861	3,391042
10140	3	274	2,5722	3,448496
10150	3	275	2,5600	3,505993
10160	3	276	2,5494	3,563532
10170	3	277	2,5404	3,621112
10180	3	278	2,5329	3,678734
10190	3	279	2,5269	3,736395
10200	3	280	2,5223	3,794096
10210	3	281	2,5190	3,851836
10220	3	282	2,5169	3,909614
10230	3	283	2,5159	3,967429
10240	3	284	2,5159	4,025294
10250	3	285	2,5169	4,083226
10260	3	286	2,5190	4,141227
10270	3	287	2,5223	4,199289
10280	3	288	2,5269	4,257422
10290	3	289	2,5329	4,315625
10300	3	290	2,5404	4,373898
10310	3	291	2,5494	4,432242
10320	3	292	2,5600	4,490656
10330	3	293	2,5722	4,549140

TABLE A31. (Continued 26)

13580	4	253	1.3638	1.12023
13590	4	254	1.3408	1.10135
13600	4	255	1.3182	1.08278
13610	4	256	1.2960	1.06453
13620	4	257	1.2741	1.04659
13630	4	258	1.2526	1.02894
13640	4	259	1.2315	1.01160
13650	4	260	1.2106	.99455
13660	4	261	1.1903	.97778
13670	4	262	1.1703	.96130
13680	4	263	1.1506	.94510
13690	4	264	1.1312	.92917
13700	4	265	1.1121	.91351
13710	4	266	1.0933	.89811
13720	4	267	1.0749	.88297
13730	4	268	1.0568	.86808
13740	4	269	1.0390	.85345
13750	4	270	1.0215	.83907
13760	4	271	1.0043	.82492
13770	4	272	.9873	.81102
13780	4	273	.9707	.79735
13790	4	274	.9543	.78391
13800	4	275	.9382	.77069
13810	4	276	.9224	.75770
13820	4	277	.9069	.74493
13830	4	278	.8916	.73237
13840	4	279	.8766	.72003
13850	4	280	.8618	.70789
13860	4	281	.8473	.69596
13870	4	282	.8330	.68423
13880	4	283	.8189	.67269
13890	4	284	.8051	.66135
13900	4	285	.7916	.65021
13910	4	286	.7782	.63925
13920	4	287	.7651	.62852
13930	4	288	.7522	.61799
13940	4	289	.7395	.60764
13950	4	290	.7271	.59746
13960	4	291	.7149	.58744
13970	4	292	.7029	.57758
13980	4	293	.6911	.56787
13990	4	294	.6795	.55831
14000	4	295	.6681	.54889
14010	4	296	.6569	.53961
14020	4	297	.6458	.53047
14030	4	298	.6349	.52147
14040	4	299	.6241	.51261
14050	4	300	.6135	.50388
14060	4	301	.6030	.49528
14070	4	302	.5927	.48681
14080	4	303	.5825	.47846
14090	4	304	.5725	.47023
14100	4	305	.5626	.46212
14110	4	306	.5528	.45413

TABLE A31. (Continued 27)

14120	4	307	.6378	.46085
14130	4	308	.6455	.46642
14140	4	309	.6533	.47205
14150	4	310	.6611	.47775
14160	4	311	.6691	.48351
14170	4	312	.6772	.48935
14180	4	313	.6854	.49526
14190	4	314	.6937	.50124
14200	4	315	.7020	.50729
14210	4	316	.7105	.51341
14220	4	317	.7191	.51961
14230	4	318	.7278	.52588
14240	4	319	.7365	.53223
14250	4	320	.7454	.53866
14260	4	321	.7544	.54516
14270	4	322	.7635	.55174
14280	4	323	.7728	.55840
14290	4	324	.7821	.56514
14300	4	325	.7915	.57197
14310	4	326	.8011	.57887
14320	4	327	.8108	.58586
14330	4	328	.8206	.59293
14340	4	329	.8305	.60009
14350	4	330	.8405	.60733
14360	4	331	.8506	.61467
14370	4	332	.8609	.62209
14380	4	333	.8713	.62960
14390	4	334	.8818	.63720
14400	4	335	.8925	.64489
14410	4	336	.9032	.65268
14420	4	337	.9141	.66055
14430	4	338	.9252	.66853
14440	4	339	.9363	.67660
14450	4	340	.9476	.68477
14460	4	341	.9591	.69303
14470	4	342	.9707	.70140
14480	4	343	.9824	.70987
14490	4	344	.9942	.71844
14500	4	345	1.0062	.72711
14510	4	346	1.0184	.73589
14520	4	347	1.0307	.74477
14530	4	348	1.0431	.75376
14540	4	349	1.0557	.76286
14550	4	350	1.0685	.77207
14560	4	351	1.0814	.78139
14570	4	352	1.0944	.79083
14580	4	353	1.1076	.80037
14590	4	354	1.1210	.81004
14600	4	355	1.1345	.81982
14610	4	356	1.1482	.82971
14620	4	357	1.1621	.83973
14630	4	358	1.1761	.84987
14640	4	359	1.1903	.86013
14650	4	360	1.2047	.87051

TABLE A31. (Continued 28))

14660	4	361	1.2192	.88102
14670	4	362	1.2339	.89166
14680	4	363	1.2488	.90242
14690	4	364	1.2639	.91331
14700	4	365	1.2792	.92434

TABLE A32. Comparison of ^{137}Cs Concentrations in "Square Yard",
at Harvest, and Feeding Trial Alfalfa Samples

Year	Harvest Number	Square Yards		At Harvest		Feeding Trial	
		n*	pCi/kg	Date Cut	n*	pCi/kg	Mid Date of Composite
1963	1	11	1667	5/14/63	4	1496	5/22/63
	2	7	1281	6/18/63	7	1845	6/21/63
	3	12	418	7/22/63	--	--	--
	4	10	540	8/26/63	6	512	9/3/63
	5	11	721	10/6/63	4	796	10/14/63
1964	1	11	3058	5/14/64	5	2455	5/21/64
	2	11	1028	6/16/64	8	1007	6/23/64
	3	6	288	7/20/64	5	409	7/30/64
	4	7	228	8/25/64	5	251	8/29/64
	5	74	195	10/18/64	3	251	10/27/64
1965	1	46	1200	5/11/65	1	1351	5/20/65
	2	20	800	6/16/65	1	711	6/26/65
	3	63	125	7/20/65	5	178	7/26/65
	4	64	123	8/26/65	7	105	9/2/65
	5	69	115	10/8/65	8	152	10/20/65
1966	1	16	552	5/11/66	8	495	5/20/66
	2	70	120	6/16/66	8	106	6/21/66
	3	--	--	7/21/66	1	66	7/28/66
	4	7	131	8/26/66	--	--	--
	5	70	119	10/13/66	--	--	--

* n = replicates

** n = replicates from a composite sample representing on the order of 300 bales of hay.

APPENDIX B

FIGURE B3. Spatial Arrangement of "Pot and Funnel" Fallout Collectors on the Syphus Dairy Farm

FIGURE B4. Procedure Used for Collecting "Square Yard" Alfalfa Samples

LEO SYPHUS FARM
SAINT GEORGE, UTAH

FIGURE B5. Random Soil Sampling Stations 1962-1963

FIGURE B6. Method Used to Collect Soil Core Samples

FIGURE B7. Models for Contents of Fallout Collectors

FIGURE B8. Nonlinear Least-Squares Fits of Cumulative "Funnel" ^{90}Sr Collector Data - Each Year Separately

FIGURE B9. Nonlinear Least-Squares Fits of Cumulative "Pot" ^{90}Sr Collector Data - Each Year Separately

FIGURE B10. Nonlinear Least-Squares Fits of Cumulative "Funnel" ^{137}Cs Collector Data - Each Year Separately

FIGURE B11. Nonlinear Least-Squares Fits of Cumulative "Pot" ^{137}Cs Collector Data - Each Year Separately

FIGURE B12. Nonlinear Least-Squares Fits of Cumulative "Funnel" ^{90}Sr Collector Data - Joint Fit

FIGURE B13. Nonlinear Least-Squares Fits of Cumulative "Pot" ^{90}Sr Data - Joint Fit

FIGURE B14. Nonlinear Least-Squares Fits of Cumulative "Pot" ^{137}Cs Collector Data - Joint Fit

TABLE B15. Temperature Data to Illustrate Possible Times for Onset of Alfalfa Growth

FIGURE B16. $^{137}\text{Cesium}$ and $^{90}\text{Strontium}$ Concentrations in the Soil Profile (1965 Data)

FIGURE B17. $^{137}\text{Cesium}/^{90}\text{Strontium}$ Ratios in the Soil Profile (1965 Data)

FIGURE B18. Examples of the Calculation of Daily Fallout Values

FIGURE B19. Calculation of Time of "Spring Peak" of Fallout - $t_{\max}$

FIGURE B20. Apportionment of "Spring Peak" Collector Total *See (Thomas et. al., 1975)

FIGURE B21. Complete Calculation of Daily Fallout Inputs to Alfalfa Plants

FIGURE B22. Comparison of Observed-Simulated Data for Alfalfa and Milk

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