Lawrence Livermore Laboratory

SELECTION OF THE "BEST" MODEL FOR CONVERTING BETA BACKSCATTER COUNT READINGS INTO THICKNESS MEASUREMENTS

N.G. Smiriga

September 23, 1976

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I. INTRODUCTION

This report compares two models for converting beta backscatter count readings into thickness measurements.

Section II describes the two phases of the beta backscatter method and the two models; the section also lists the necessary formulas to be used in an unweighted and weighted regression analysis. In Section III it is decided whether one should perform a regression analysis using the five available standard thicknesses or whether one should, in addition to these standard thicknesses, use zero as a standard thickness. Section IV compares, for each model, a weighted regression analysis with an unweighted one. Section V selects the "best" model and finally in Section VI the conclusions of the analysis are presented.

II. MODELS FOR CONVERTING BETA BACKSCATTER COUNT READINGS INTO THICKNESS MEASUREMENTS

Beta backscatter measuring equipment is used to measure the thickness of physical vapor deposited aluminum on Kapton. The technique consists of two phases:

Phase 1, often called the calibration phase, consists of taking, during 100 second time intervals, the count readings c_{air} , c_{∞} , c_0 , c_i , $i = 1, \dots, 5$. All the readings are taken three times and then averaged. The count c_{air} is taken with the sensor off the material, the count c_{∞} corresponds to infinite thick material (i.e. material thick enough to give an estimate of maximum or saturation count), the count c_0 corresponds to zero thickness and c_i , $i = 1, \dots, 5$ are the counts of five standards which have thicknesses t_i , $i = 1, \dots, 5$. From previous studies it is reasonable to assume that the relation between a thickness t and a count c is of the form $f(c) = a + bt$ where $f(c)$ is some function of c . For a given $f(c)$, a and b are estimated. This ends phase 1.

Phase 2, On thirty specified locations of a part, count readings are taken, each reading is taken once during a 100 second interval. Then the relation $t = (f(c) - a)/b$ is used to evaluate the thickness at these locations.

In this memorandum we shall evaluate two models:

Model 1: $f(c) = c$,

Model 2: $f(c) = \ln \left(\frac{c_{\infty} - c}{c_{\infty} - c_0} \right)$.

We assume that the standard thicknesses are exact (i.e. they have no error).

Analytically we can describe the models as

$$f(c_i) = a + b t_i + \epsilon_i ,$$

where $i = 0, 1, \dots, 5$ if we include zero thickness as a standard thickness or $i = 1, \dots, 5$ if we do not; the ϵ_i 's are assumed to be independent and normally distributed with mean zero and variance σ_i^2 , or, equivalently, we have that the $f(c_i)$'s are independent and normally distributed with mean $a + b t_i$ and variance σ_i^2 . Unless $\sigma_i^2 = \sigma^2$ for all i , a weighted regression analysis is appropriate. Let $w_i = \frac{1}{\sigma_i^2}$, then in phase 1 the following quantities can be computed (see Appendix 1 for a derivation of (1) - (5) and (9))

$$\hat{a} = \frac{\sum w_i f(c_i)}{\sum w_i} - \hat{b} \frac{\sum w_i t_i}{\sum w_i}, \quad (1)$$

$$\hat{b} = \frac{\sum w_i t_i f(c_i) - (\sum w_i t_i)(\sum w_i f(c_i))/\sum w_i}{\sum w_i t_i^2 - (\sum w_i t_i)^2/\sum w_i}, \quad (2)$$

$$\text{Var } \hat{a} = \frac{\sum w_i t_i^2/\sum w_i}{\sum w_i t_i^2 - (\sum w_i t_i)^2/\sum w_i}, \quad (3)$$

$$\text{Var } \hat{b} = \frac{1}{\sum w_i t_i^2 - (\sum w_i t_i)^2/\sum w_i}, \quad (4)$$

$$\text{cov}(\hat{a}, \hat{b}) = \frac{-\sum w_i t_i/\sum w_i}{\sum w_i t_i^2 - (\sum w_i t_i)^2/\sum w_i}, \quad (5)$$

where $\hat{a}$ and $\hat{b}$ are the estimators of a and b , $\text{Var } \hat{a}$ and $\text{Var } \hat{b}$ are the variances of the estimators and $\text{cov}(\hat{a}, \hat{b})$ is their covariance. The residual sum of squares is defined as

$$\text{R.S.S.} = \sum w_i (f(c_i) - \hat{a} - \hat{b} t_i)^2 \quad (6)$$

and the coefficient of determination is defined as

$$R^2 = \frac{\sum w_i (\widehat{f(c_i)} - \widetilde{f(c)})^2}{\sum w_i (f(c_i) - \widetilde{f(c)})^2} \quad (7)$$

where $\widehat{f(c_i)} = \hat{a} + \hat{b} t_i$ and $\widetilde{f(c)} = \sum w_i f(c_i) / \sum w_i$. In phase 2 we compute

$$t_i = \frac{f(c_i) - \hat{a}}{\hat{b}}, \quad i = 1, \dots, 30 \quad (8)$$

where c_i , $i = 1, \dots, 30$ are the counts obtained at the thirty locations and $\hat{a}$ and $\hat{b}$ are obtained from phase 1. From Appendix 1 we have

$$\text{Var } t_i = t_i^2 \left(\frac{\sigma_i^2 + \text{Var } \hat{a}}{(f(c_i) - \hat{a})^2} + \frac{\text{Var } \hat{b}}{\hat{b}^2} + 2 \frac{\text{cov}(\hat{a}, \hat{b})}{(f(c_i) - \hat{a}) \hat{b}} \right) \quad (9)$$

For an evaluation of σ_i^2 consult Appendix 2. For an unweighted regression analysis (i.e. the case $\sigma_i^2 = \sigma^2$ for all i) the above formulas reduce to

$$\hat{a} = \frac{\sum f(c_i)}{n} - \hat{b} \frac{\sum t_i}{n} \quad (10)$$

$$\hat{b} = \frac{\sum t_i f(c_i) - (\sum t_i)(\sum f(c_i))/n}{\sum t_i^2 - (\sum t_i)^2/n}, \quad (11)$$

$$\text{Var } \hat{a} = \frac{\sigma^2 (\sum t_i^2)/n}{\sum t_i^2 - (\sum t_i)^2/n}, \quad (12)$$

$$\text{Var } \hat{b} = \frac{\sigma^2}{\sum t_i^2 - (\sum t_i)^2/n}, \quad (13)$$

$$\text{cov } (\hat{a}, \hat{b}) = \frac{-\sigma^2 (\sum t_i)/n}{\sum t_i^2 - (\sum t_i)^2/n}, \quad (14)$$

where n is the number of standards used (i.e. n is 5 or 6). The residual sum of squares in the unweighted regression analysis is defined as

$$\text{R.S.S.} = \sum (f(c_i) - \hat{a} - \hat{b} t_i)^2 \quad (15)$$

and the coefficient of determination is defined as

$$R^2 = \frac{\sum (\widehat{f(c_i)} - \overline{f(c)})^2}{\sum (f(c_i) - \overline{f(c)})^2} \quad (16)$$

where $\widehat{f(c_i)} = \hat{a} + \hat{b} t_i$ and $\overline{f(c)} = \sum f(c_i)/n$. In phase 2, the variance of t_i , is given by

$$\text{Var } t_i = t_i^2 \left(\frac{\sigma^2 + \text{Var } \hat{a}}{(f(c_i) - \hat{a})^2} + \frac{\text{Var } \hat{b}}{\hat{b}^2} + 2 \frac{\text{cov } (\hat{a}, \hat{b})}{(f(c_i) - \hat{a}) \hat{b}} \right). \quad (17)$$

When σ^2 is not known, it is replaced by the estimate $s^2 = \text{R.S.S.}/(n-2)$.

For each model we considered four cases:

- A. an unweighted regression using 6 standards (i.e. including zero as a standard),
- B. an unweighted regression using 5 standards (i.e. excluding zero as a standard),
- C. a weighted regression using 6 standards,
- D. a weighted regression using 5 standards.

For the analysis we have used three data sets:

data set 1 from 7/15/76, tester no: 100, part name: R's, serial no: L-0590,
 data set 2 from 7/21/76, tester no: 100, part name: R's, serial no: L-0608,
 data set 3 from 7/23/76, tester no: 100, part name: R's, serial no: L-0619.

We shall now proceed to analyze the models.

III. SHOULD ZERO THICKNESS BE USED AS A STANDARD?

We first examined whether it is better to use 6 versus 5 standards by comparing case A with case B and case C with case D. For all three data sets we found that the residual sum of squares is smaller when using 5 standards instead of 6. This indicates that it is better to consider the 5 standards and excluding zero as a standard. The results are tabulated below. Note that for the unweighted regression analysis, formulas (10) - (17) are used with σ^2 replaced by s^2 . For a detailed computer output, see Appendix 3.

	Data Set 1	Data Set 2	Data Set 3
Case A	66.5×10^6	77.5×10^6	75.8×10^6
Case B	1.6×10^6	0.3×10^6	1.4×10^6

Table 1.

Table of Residual Sum of Squares for Model 1
 Using an Unweighted Regression Analysis.

	Data Set 1	Data Set 2	Data Set 3
Case C	85.8×10	100.4×10	98.5×10
Case D	2.1×10	0.4×10	1.7×10

Table 2.

Table of Residual Sum of Squares for Model 1
 Using a Weighted Regression Analysis.

	Data Set 1	Data Set 2	Data Set 3
Case A	30.1×10^{-5}	9.8×10^{-5}	53.2×10^{-4}
Case B	20.4×10^{-5}	9.7×10^{-5}	52.3×10^{-4}

Table 3.

Table of Residual Sum of Squares for Model 2
Using an Unweighted Regression Analysis.

	Data Set 1	Data Set 2	Data Set 3
Case C	12.0	3.5771	16.074
Case D	7.4	3.5770	16.073

Table 4.

Table of Residual Sum of Squares for Model 2
Using a Weighted Regression Analysis.
(for data set 2 and 3 more digits were displayed
to show that R.S.S. (case C) $\geq$ R.S.S. (case D))

The tables show that, for both models and for all three data sets, R.S.S. (case A) $>$ R.S.S. (case B) and R.S.S. (case C) $>$ R.S.S. (case D). This indicates that it is better to exclude zero as a standard. We shall therefore no longer consider cases A and C. Next, we compare case B and D for each model.

IV. WEIGHTED VERSUS UNWEIGHTED REGRESSION ANALYSIS?

Because of the nature of the data we felt that a weighted regression analysis was appropriate. We shall now illustrate that this is the case. If an unweighted regression analysis is correct, then the estimators $\hat{a}$ and $\hat{b}$ obtained by using formulas (10) and (11) are BLUE (Best Linear Unbiased Estimators), which means that they should have smaller variance than the estimators obtained by using formulas (1) and (2).

	Data Set 1	Data Set 2	Data Set 3
Case B	$\text{Var } \hat{a} \approx 185.9 \times 10^5$ $\text{Var } \hat{b} \approx 1.5 \times 10^5$	$\text{Var } \hat{a} \approx 33.8 \times 10^5$ $\text{Var } \hat{b} \approx 0.3 \times 10^5$	$\text{Var } \hat{a} \approx 154.5 \times 10^5$ $\text{Var } \hat{b} \approx 1.3 \times 10^5$
Case D	$\text{Var } \hat{a} \approx 26.8 \times 10^5$ $\text{Var } \hat{b} \approx 0.2 \times 10^5$	$\text{Var } \hat{a} \approx 26.8 \times 10^5$ $\text{Var } \hat{b} \approx 0.2 \times 10^5$	$\text{Var } \hat{a} \approx 26.8 \times 10^5$ $\text{Var } \hat{b} \approx 0.2 \times 10^5$

Table 5.

Table of the Computed Variances of $\hat{a}$ and $\hat{b}$ for Model 1.

	Data Set 1	Data Set 2	Data Set 3
Case B	$\text{Var } \hat{a} \approx 233.5 \times 10^{-5}$ $\text{Var } \hat{b} \approx 1.9 \times 10^{-5}$	$\text{Var } \hat{a} \approx 111.1 \times 10^{-5}$ $\text{Var } \hat{b} \approx 0.91 \times 10^{-5}$	$\text{Var } \hat{a} \approx 597.6 \times 10^{-5}$ $\text{Var } \hat{b} \approx 4.9 \times 10^{-5}$
Case D	$\text{Var } \hat{a} \approx 99.3 \times 10^{-5}$ $\text{Var } \hat{b} \approx 0.8 \times 10^{-5}$	$\text{Var } \hat{a} \approx 103.7 \times 10^{-5}$ $\text{Var } \hat{b} \approx 0.88 \times 10^{-5}$	$\text{Var } \hat{a} \approx 102.4 \times 10^{-5}$ $\text{Var } \hat{b} \approx 0.9 \times 10^{-5}$

Table 6.

Table of the Computed Variances of $\hat{a}$ and $\hat{b}$ for Model 2.

Table 5 and 6 show that $\text{Var } \hat{a} \text{ (case B)} > \text{Var } \hat{a} \text{ (case D)}$ and $\text{Var } \hat{b} \text{ (case B)} > \text{Var } \hat{b} \text{ (case D)}$ and therefore it is not correct to perform an unweighted regression analysis. Besides that the larger variances in case B will in general lead to $\max_{1 \leq i \leq 30} \sigma_{t_i} \text{ (case B)} > \max_{1 \leq i \leq 30} \sigma_{t_i} \text{ (case D)}$ where the meaning of $\max \sigma_{t_i}$ is explained in Section IV. Therefore, we will no longer consider case B. Next we compare, for case D only, the two models.

IV. WHICH IS THE BEST MODEL?

So far we have shown that it is better to use weighted regression which does not include zero as a standard. Next we shall choose between model 1 and 2. A good model must have R^2 , the coefficient of determination, close to one. Both models have for the three data sets a value of R^2 of at least 0.99 indicating a good fit. We also want the thickness at the 30 locations evaluated as accurately as possible and we shall therefore select the model for which $\max_{1 \leq i \leq 30} \sigma_{t_i}$ is the smallest where σ_{t_i} is the standard deviation of the estimated thickness t_i at the i th location.

	Data Set 1	Data Set 2	Data Set 3
Model 1	0.08	0.12	0.09
Model 2	0.09	0.14	0.09

Table 7.

Table of the values $\max_{1 \leq i \leq 30} \sigma_{t_i}$ where σ_{t_i} is the standard deviation of the estimated thickness t_i at the i th location.

From Table 7 it follows that model 1 is slightly better than model 2 and, since model 1 is the simplest model, it is natural to select it.

VI. CONCLUSION

We compared the models $c = a + b t$ and $\ln \left(\frac{c_\infty - c}{c_\infty - c_0} \right) = a + b t$ for converting count data to thickness measurements. We assumed that the standard thicknesses are exact. We found that the best fit is obtained by

- (i) excluding zero as a standard thickness,
- (ii) performing a weighted regression analysis,
- (iii) using the simple model $c = a + b t$.

APPENDIX 1

Computation of $\hat{a}$, $\hat{b}$, $\text{Var } \hat{a}$, $\text{Var } \hat{b}$ and $\text{cov } (\hat{a}, \hat{b})$
for Phase 1 and $\text{Var } t$ for Phase 2.

From phase 1 of the beta backscatter technique we obtain the set of data $(t_i, f(c_i))$, $i = 1, \dots, n$ where n is the number of standards. We assume that the following linear model holds

$$f(c_i) = a + b t_i + \epsilon_i, \quad i = 1, \dots, n$$

where the ϵ_i 's are independent $N(0, \sigma_i^2)$. The best estimators of a and b , say $\hat{a}$ and $\hat{b}$, are obtained by minimizing

$$\text{R.S.S.} = \sum w_i (f(c_i) - (a + b t_i))^2$$

where $w_i = \frac{1}{\sigma_i^2}$. Solving $\frac{\partial \text{R.S.S.}}{\partial a} = 0$ and $\frac{\partial \text{R.S.S.}}{\partial b} = 0$ yields

$$\hat{a} = \frac{\sum w_i f(c_i)}{\sum w_i} - \hat{b} \frac{\sum w_i t_i}{\sum w_i}$$

and

$$\hat{b} = \frac{\sum w_i t_i f(c_i) - (\sum w_i t_i)(\sum w_i f(c_i))/\sum w_i}{\sum w_i t_i^2 - (\sum w_i t_i)^2/\sum w_i}$$

Hence

$$\text{Var } \hat{b} = \frac{\sum w_i^2 \left(t_i - \frac{\sum w_i t_i}{\sum w_i} \right)^2 \frac{1}{w_i}}{(\sum w_i t_i^2 - (\sum w_i t_i)^2/\sum w_i)^2} = \frac{1}{\sum w_i t_i^2 - (\sum w_i t_i)^2/\sum w_i}$$

and

$$\begin{aligned}\text{Var } \hat{a} &= \frac{\sum w_i^2 \cdot \frac{1}{w_i}}{(\sum w_i)^2} + \frac{(\sum w_i t_i)^2}{(\sum w_i)^2} \text{Var } \hat{b} \\ &= \frac{1}{\sum w_i} + \frac{(\sum w_i t_i)^2}{(\sum w_i)^2} \cdot \frac{1}{\sum w_i t_i - (\sum w_i t_i)^2 / \sum w_i} \\ &= \frac{\sum w_i t_i^2 / \sum w_i}{\sum w_i t_i^2 - (\sum w_i t_i)^2 / \sum w_i}\end{aligned}$$

since $\text{cov} \left(\frac{\sum w_i f(c_i)}{\sum w_i}, \hat{b} \right) = 0$. Indeed let $x = \sum d_i f(c_i)$ and $y = \sum e_i f(c_i)$

then $\text{cov}(x, y) = \sum_i d_i e_i \sigma_i^2$. Now we can write $\hat{a}$ in the form

$$\hat{a} = x - \left(\frac{\sum w_i t_i}{\sum w_i} \right) y$$

where $x = (\sum w_i f(c_i)) / \sum w_i$ with $d_i = w_i / \sum w_i$ and $y = \hat{b}$ with $e_i = w_i (t_i - (\sum w_i t_i) / \sum w_i) / [\sum w_i t_i^2 - (\sum w_i t_i)^2 / \sum w_i]$. Thus letting k be a constant we can write $\text{cov}(x, y) = \sum d_i e_i \sigma_i^2 = k \sum [w_i^2 (t_i - (\sum w_i t_i) / \sum w_i)] / w_i = 0$ as was to be shown. We also have

$$\begin{aligned}\text{cov}(\hat{a}, \hat{b}) &= \text{cov} \left(\frac{\sum w_i f(c_i)}{\sum w_i} - \hat{b} \frac{\sum w_i t_i}{\sum w_i}, \hat{b} \right) \\ &= - \frac{\sum w_i t_i}{\sum w_i} \text{Var } \hat{b} = \frac{- \sum w_i t_i / \sum w_i}{\sum w_i t_i^2 - (\sum w_i t_i)^2 / \sum w_i}\end{aligned}$$

In phase 2 if we set $x = f(c) - \hat{a}$ and $y = \hat{b}$ then we have

$$t = \frac{x}{y} \approx \frac{\langle x \rangle}{\langle y \rangle} + (x - \langle x \rangle) \frac{1}{\langle y \rangle} \\ + (y - \langle y \rangle) \left(- \frac{\langle x \rangle}{\langle y \rangle^2} \right) + \dots$$

where $\langle \rangle$ is used to denote expectation. Hence

$$\begin{aligned} \text{Var } t &\approx \frac{1}{\langle y \rangle^2} \text{Var } x + \frac{\langle x \rangle^2}{\langle y \rangle^2} \text{Var } y - \frac{2\langle x \rangle}{\langle y \rangle^2} \text{cov } (x, y) \\ &\approx \frac{1}{y^2} \text{Var } x + \frac{x^2}{y^2} \text{Var } y - 2 \frac{x}{y^3} \text{cov } (x, y) \\ &= \frac{x^2}{y^2} \left(\frac{\text{Var } x}{x^2} + \frac{\text{Var } y}{y^2} - 2 \frac{\text{cov } (x, y)}{x y} \right) \\ &= t^2 \left(\frac{\text{Var } (f(c) - \hat{a})}{(f(c) - \hat{a})^2} + \frac{\text{Var } \hat{b}}{\hat{b}^2} - 2 \frac{\text{cov } (f(c) - \hat{a}, \hat{b})}{(f(c) - \hat{a}) \hat{b}} \right) \\ &= t^2 \left(\frac{\text{Var } f(c) + \text{Var } \hat{a}}{(f(c) - \hat{a})^2} + \frac{\text{Var } \hat{b}}{\hat{b}^2} + 2 \frac{\text{cov } (\hat{a}, \hat{b})}{(f(c) - \hat{a}) \hat{b}} \right) \end{aligned}$$

Thus for the i th location we have approximately that

$$\text{Var } t_i = t_i^2 \left(\frac{\sigma_i^2 + \text{Var } \hat{a}}{(f(c_i) - \hat{a})^2} + \frac{\text{Var } \hat{b}}{\hat{b}^2} + 2 \frac{\text{cov } (\hat{a}, \hat{b})}{(f(c_i) - \hat{a}) \hat{b}} \right)$$

where $\sigma_i^2 = \text{Var } f(c_i)$.

APPENDIX 2

Evaluation of Var (f(c)).

Model 1: $c = a + b t$.

Note that we are dealing with Poisson counts. For the location on the parts we have $\text{Var } f(c_i) = \text{Var } c_i = \sigma_i^2 = \text{Poisson parameter corresponding to the } i^{\text{th}} \text{ count}$. An estimate of this parameter is the count itself. Therefore,

$$\text{Var } f(c_i) = \text{Var } c_i = \sigma_i^2 \approx c_i .$$

For the standards, each reported count was actually the average of three counts, i.e. $c_i = \frac{c_{i1} + c_{i2} + c_{i3}}{3}$ and therefore

$$\text{Var } f(c_i) = \text{Var } c_i = \sigma_i^2 = \frac{1}{9} (\text{Var } c_{i1} + \text{Var } c_{i2} + \text{Var } c_{i3})$$

$$\approx \frac{c_{i1} + c_{i2} + c_{i3}}{9} = \frac{c_i}{3} .$$

Model 2: $\ln \left(\frac{c_\infty - c_i}{c_\infty - c_0} \right) = a + b t$.

Note that $\text{Var } c_0 \approx \frac{c_0}{3}$ and $\text{Var } c_\infty \approx \frac{c_\infty}{3}$. Furthermore $\text{Var } c_i \approx \frac{c_i}{3}$ if c_i is the count of a standard and $\text{Var } c_i \approx c_i$ if c_i is the count corresponding to a location on a part. Since $\frac{\partial}{\partial c_i} \ln \left(\frac{c_\infty - c_i}{c_\infty - c_0} \right) = \frac{-1}{c_\infty - c_i}$, $\frac{\partial}{\partial c_0} \ln \left(\frac{c_\infty - c_i}{c_\infty - c_0} \right)$

$$= \frac{1}{c_\infty - c_0} \text{ and } \frac{\partial}{\partial c_\infty} \ln \left(\frac{c_\infty - c_i}{c_\infty - c_0} \right) = \frac{c_i - c_0}{(c_\infty - c_0)(c_\infty - c_i)} ,$$

we have

$$\begin{aligned} \ln \left(\frac{c_{\infty} - c_i}{c_{\infty} - c_0} \right) &\approx \ln \left(\frac{\langle c_{\infty} \rangle - \langle c_i \rangle}{\langle c_{\infty} \rangle - \langle c_0 \rangle} \right) - \frac{1}{\langle c_{\infty} \rangle - \langle c_i \rangle} \cdot (c_i - \langle c_i \rangle) \\ &+ \frac{1}{\langle c_{\infty} \rangle - \langle c_0 \rangle} \cdot (c_0 - \langle c_0 \rangle) \\ &+ \frac{\langle c_i \rangle - \langle c_0 \rangle}{(\langle c_{\infty} \rangle - \langle c_0 \rangle)(\langle c_{\infty} \rangle - \langle c_i \rangle)} (c_{\infty} - \langle c_{\infty} \rangle) . \end{aligned}$$

Hence

$$\begin{aligned} \text{Var } f(c_i) = \sigma_i^2 &= \text{Var } \ln \left(\frac{c_{\infty} - c_i}{c_{\infty} - c_0} \right) \approx \left(\frac{1}{\langle c_{\infty} \rangle - \langle c_i \rangle} \right)^2 \text{Var } c_i \\ &+ \frac{1}{(\langle c_{\infty} \rangle - \langle c_0 \rangle)^2} \text{Var } c_0 \\ &+ \frac{(\langle c_i \rangle - \langle c_0 \rangle)^2}{(\langle c_{\infty} \rangle - \langle c_0 \rangle)^2 (\langle c_{\infty} \rangle - \langle c_i \rangle)^2} \text{Var } c_{\infty} \\ &\approx \frac{1}{(c_{\infty} - c_i)^2} \text{Var } c_i + \frac{1}{(c_{\infty} - c_0)^2} \text{Var } c_0 \\ &+ \frac{(c_i - c_0)^2}{(c_{\infty} - c_0)^2 (c_{\infty} - c_i)^2} \text{Var } c_{\infty} . \end{aligned}$$

APPENDIX 3

The programming was done by P.A. Renard. The output corresponding to case A and B has the heading "Uniform Weighting" and the output corresponding to case C and D has the heading "Non-Uniform Weighting." Note that the computer output RESIDUAL is the R.S.S., and the computer output SQ. of CORRELATION is R^2 . For case A and B we also have the computer output SQ. ERROR which is s^2 . We have:

PP. 15 to 30 refer to Data Set 1,

PP. 31 to 46 refer to Data Set 2, and

PP. 47 to 62 refer to Data Set 3.

Note that each case has two pages of computer output, the first page corresponds to phase 1 and the second page corresponds to phase 2. For phase 2, the bottom 30 lines refer to the part.

1 BETA BACKSCATTER DATA
 REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-15-76

***** UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRV'TNS	Y(I)=	C(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGD		12805.00	3.00				
(INF)=LARGE		300603.00	3.00				
0	0	116945.00	3.00		1.169450E+05	1.183009E+05	-1.355864E+03
1	9.7300	227797.00	3.00		2.277970E+05	2.228489E+05	4.948131E+03
2	10.4700	234285.00	3.00		2.342850E+05	2.308001E+05	3.484895E+03
3	11.2000	238475.00	3.00		2.384750E+05	2.386439E+05	-1.688913E+02
4	11.5100	239955.00	3.00		2.399550E+05	2.419748E+05	-2.019814E+03
5	12.1700	244178.00	3.00		2.441780E+05	2.490665E+05	-4.888457E+03

AVERAGE= 2.169392E+05

NO. OF STANDARDS CONSIDERED= 6

A= 1.1830E+05 VAR(A)= 1.6147E+07 DEV(A)= 4.0183E+03
 B= 1.0745E+04 VAR(B)= 1.5374E+05 DEV(B)= 3.9842E+02
 COV(A,B)= -1.4572E+06
 R.SS=RESIDUAL= 6.6472E+07
 S^2=SQ. ERROR= 1.6618E+07
 R^2=SQ. OF CORRELATION= 9.9453E-01

DATA SET 1
 Model 1, Case A

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-15-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
0		116945.00	1.169450E+05	- .1262	2.8700E-01	5.3572E-01
1		227797.00	2.277970E+05	10.1905	1.6933E-01	4.1150E-01
2		234285.00	2.342850E+05	10.7943	1.7151E-01	4.1414E-01
3		238475.00	2.384750E+05	11.1843	1.7345E-01	4.1647E-01
4		239955.00	2.399550E+05	11.3220	1.7424E-01	4.1741E-01
5		244178.00	2.441780E+05	11.7150	1.7676E-01	4.2043E-01

1	1.00	240272.00	2.402720E+05	11.3515	1.7441E-01	4.1762E-01
2	221.00	239231.00	2.392310E+05	11.2546	1.7384E-01	4.1695E-01
3	166.00	240450.00	2.404500E+05	11.3681	1.7451E-01	4.1774E-01
4	111.00	239835.00	2.398350E+05	11.3109	1.7417E-01	4.1734E-01
5	56.00	239441.00	2.394410E+05	11.2742	1.7396E-01	4.1708E-01
6	248.00	239141.00	2.391410E+05	11.2463	1.7380E-01	4.1689E-01
7	193.00	238915.00	2.389150E+05	11.2252	1.7368E-01	4.1675E-01
8	138.00	238861.00	2.388610E+05	11.2202	1.7365E-01	4.1671E-01
9	83.00	239500.00	2.395000E+05	11.2797	1.7399E-01	4.1712E-01
10	28.00	239459.00	2.394590E+05	11.2759	1.7397E-01	4.1709E-01
11	235.00	239093.00	2.390930E+05	11.2418	1.7377E-01	4.1686E-01
12	180.00	238883.00	2.388830E+05	11.2223	1.7366E-01	4.1673E-01
13	125.00	239433.00	2.394330E+05	11.2734	1.7395E-01	4.1708E-01
14	70.00	239031.00	2.390310E+05	11.2360	1.7374E-01	4.1682E-01
15	15.00	238605.00	2.386050E+05	11.1964	1.7352E-01	4.1655E-01
16	263.00	238253.00	2.382530E+05	11.1636	1.7334E-01	4.1634E-01
17	208.00	238070.00	2.380700E+05	11.1466	1.7324E-01	4.1623E-01
18	153.00	239034.00	2.390340E+05	11.2363	1.7374E-01	4.1682E-01
19	98.00	237785.00	2.377850E+05	11.1201	1.7310E-01	4.1606E-01
20	43.00	238075.00	2.380750E+05	11.1471	1.7325E-01	4.1623E-01
21	45.00	236488.00	2.364880E+05	10.9994	1.7248E-01	4.1530E-01
22	265.00	237064.00	2.370640E+05	11.0530	1.7275E-01	4.1563E-01
23	210.00	238034.00	2.380340E+05	11.1432	1.7323E-01	4.1620E-01
24	155.00	238144.00	2.381440E+05	11.1535	1.7328E-01	4.1627E-01
25	100.00	238200.00	2.382000E+05	11.1587	1.7331E-01	4.1631E-01
26	10.00	237949.00	2.379490E+05	11.1353	1.7318E-01	4.1615E-01
27	230.00	236975.00	2.369750E+05	11.0447	1.7271E-01	4.1558E-01
28	175.00	238389.00	2.383890E+05	11.1763	1.7341E-01	4.1642E-01
29	120.00	238333.00	2.383330E+05	11.1711	1.7338E-01	4.1639E-01
30	65.00	238020.00	2.380200E+05	11.1419	1.7322E-01	4.1620E-01

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DATA SET 1
Model 1, Case A

1 BETA BACKSCATTER DATA
 REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-15-76

***** UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRVTS	Y(I)=	C(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGRD		12805.00	3.00				
(INF)=LARGE		300603.00	3.00				
0	.0	116945.00	3.00		1.169450E+05	1.647706E+05	-4.782560E+04
1	9.7300	227797.00	3.00		2.277970E+05	2.285132E+05	-7.162290E+02
2	10.4700	234285.00	3.00		2.342850E+05	2.333611E+05	9.239246E+02
3	11.2000	238475.00	3.00		2.384750E+05	2.381434E+05	3.315895E+02
4	11.5100	239955.00	3.00		2.399550E+05	2.401743E+05	-2.192651E+02
5	12.1700	244178.00	3.00		2.441780E+05	2.444980E+05	-3.200201E+02
AVERAGE=				2.369380E+05			

NO. OF STANDARDS CONSIDERED= 5

A=	1.6477E+05	VAR(A)=	1.8588E+07	DEV(A)=	4.3114E+03
B=	6.5511E+03	VAR(B)=	1.5228E+05	DEV(B)=	3.9023E+02
COV(A,B)=		-1.6775E+06			
RESIDUAL=		1.6271E+06			
SQ. ERROR=		5.4235E+05			
SQ. OF CORRELATION=		9.8947E-01			

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DATA SET 1
 Model 1, Case B

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-15-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
1		227797.00	2.277970E+05	9.6207	2.2073E-02	1.4857E-01
2		234285.00	2.342850E+05	10.6110	1.5746E-02	1.2548E-01
3		238475.00	2.384750E+05	11.2506	1.5360E-02	1.2393E-01
4		239955.00	2.399550E+05	11.4765	1.5917E-02	1.2616E-01
5		244178.00	2.441780E+05	12.1212	1.9498E-02	1.3964E-01

1	1.00	240272.00	2.402720E+05	11.5249	1.6084E-02	1.2682E-01
2	221.00	239231.00	2.392310E+05	11.3660	1.5599E-02	1.2490E-01
3	166.00	240450.00	2.404500E+05	11.5521	1.6184E-02	1.2722E-01
4	111.00	239835.00	2.398350E+05	11.4582	1.5858E-02	1.2593E-01
5	56.00	239441.00	2.394410E+05	11.3981	1.5683E-02	1.2523E-01
6	248.00	239141.00	2.391410E+05	11.3523	1.5566E-02	1.2476E-01
7	193.00	238915.00	2.389150E+05	11.3178	1.5488E-02	1.2445E-01
8	138.00	238861.00	2.388610E+05	11.3095	1.5470E-02	1.2438E-01
9	83.00	239500.00	2.395000E+05	11.4071	1.5707E-02	1.2533E-01
10	28.00	239459.00	2.394590E+05	11.4008	1.5690E-02	1.2526E-01
11	235.00	239093.00	2.390930E+05	11.3450	1.5549E-02	1.2469E-01
12	180.00	238883.00	2.388830E+05	11.3129	1.5477E-02	1.2441E-01
13	125.00	239433.00	2.394330E+05	11.3968	1.5679E-02	1.2522E-01
14	70.00	239031.00	2.390310E+05	11.3355	1.5527E-02	1.2461E-01
15	15.00	238605.00	2.386050E+05	11.2705	1.5394E-02	1.2407E-01
16	263.00	238253.00	2.382530E+05	11.2167	1.5308E-02	1.2372E-01
17	208.00	238070.00	2.380700E+05	11.1888	1.5271E-02	1.2357E-01
18	153.00	239034.00	2.390340E+05	11.3359	1.5528E-02	1.2461E-01
19	98.00	237785.00	2.377850E+05	11.1453	1.5224E-02	1.2339E-01
20	43.00	238075.00	2.380750E+05	11.1896	1.5271E-02	1.2358E-01
21	45.00	236488.00	2.364880E+05	10.9473	1.5181E-02	1.2321E-01
22	265.00	237064.00	2.370640E+05	11.0352	1.5166E-02	1.2315E-01
23	210.00	238034.00	2.380340E+05	11.1833	1.5264E-02	1.2355E-01
24	155.00	238144.00	2.381440E+05	11.2001	1.5285E-02	1.2363E-01
25	100.00	238200.00	2.382000E+05	11.2086	1.5296E-02	1.2368E-01
26	10.00	237949.00	2.379490E+05	11.1703	1.5249E-02	1.2349E-01
27	230.00	236975.00	2.369750E+05	11.0216	1.5165E-02	1.2314E-01
28	175.00	238389.00	2.383890E+05	11.2375	1.5339E-02	1.2385E-01
29	120.00	238333.00	2.383330E+05	11.2289	1.5325E-02	1.2380E-01
30	65.00	238020.00	2.380200E+05	11.1812	1.5261E-02	1.2354E-01

1 BETA BACKSCATTER DATA
 REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-15-76

***** UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRVTS	Y(I) = LN($\frac{CINF-C(I)}{CINF-CO}$)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGD		12805.00	3.00			
(INF)=LARGE		300503.00	3.00			
0	.0	116945.00	3.00	-3.996803E-15	1.656156E-03	-1.656156E-03
1	9.7300	227797.00	3.00	-9.252770E-01	-9.391681E-01	1.389113E-02
2	10.4700	234285.00	3.00	-1.018614E+00	-1.010721E+00	-7.892965E-03
3	11.2000	238475.00	3.00	-1.083879E+00	-1.081307E+00	-2.571554E-03
4	11.5100	239955.00	3.00	-1.107989E+00	-1.111282E+00	3.293205E-03
5	12.1700	244178.00	3.00	-1.180163E+00	-1.175099E+00	-5.063659E-03

AVERAGE= -8.859869E-01

NO. OF STANDARDS CONSIDERED= 6

A= 1.6562E-03 VAR(A)= 7.3142E-05 DEV(A)= 8.5523E-03
 B= -9.6693E-02 VAR(B)= 7.1905E-07 DEV(B)= 8.4797E-04
 COV(A,B)= -6.6009E-06
 RESIDUAL= 3.0110E-04
 SQ. ERROR= 7.5276E-05
 SQ. OF CORRELATION= 9.9969E-01

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DATA SET 1
 Model 2, Case A

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-15-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
0		116945.00	-3.996803E-15	.0171	1.5850E-02	1.2590E-01
1		227797.00	-9.252770E-01	9.5863	9.4059E-03	9.6984E-02
2		234285.00	-1.018614E+00	10.5516	9.5379E-03	9.7662E-02
3		238475.00	-1.083879E+00	11.2266	9.7153E-03	9.8566E-02
4		239955.00	-1.107989E+00	11.4759	9.7986E-03	9.8988E-02
5		244178.00	-1.180163E+00	12.2224	1.0105E-02	1.0052E-01

1	1.00	240272.00	-1.113229E+00	11.5301	9.8179E-03	9.9085E-02
2	221.00	239231.00	-1.096122E+00	11.3532	9.7564E-03	9.8774E-02
3	166.00	240450.00	-1.116184E+00	11.5607	9.8291E-03	9.9142E-02
4	111.00	239835.00	-1.106012E+00	11.4555	9.7914E-03	9.8951E-02
5	56.00	239441.00	-1.099549E+00	11.3887	9.7683E-03	9.8835E-02
6	248.00	239141.00	-1.094656E+00	11.3381	9.7513E-03	9.8749E-02
7	193.00	238915.00	-1.090986E+00	11.3001	9.7388E-03	9.8686E-02
8	138.00	238861.00	-1.090111E+00	11.2911	9.7359E-03	9.8671E-02
9	83.00	239500.00	-1.100514E+00	11.3986	9.7717E-03	9.8852E-02
10	28.00	239459.00	-1.099844E+00	11.3917	9.7694E-03	9.8840E-02
11	235.00	239093.00	-1.093876E+00	11.3300	9.7487E-03	9.8735E-02
12	180.00	238883.00	-1.090467E+00	11.2947	9.7371E-03	9.8677E-02
13	125.00	239433.00	-1.099418E+00	11.3873	9.7679E-03	9.8833E-02
14	70.00	239031.00	-1.092868E+00	11.3196	9.7452E-03	9.8718E-02
15	15.00	238605.00	-1.085973E+00	11.2483	9.7221E-03	9.8601E-02
16	263.00	238253.00	-1.080312E+00	11.1897	9.7038E-03	9.8508E-02
17	208.00	238070.00	-1.077381E+00	11.1594	9.6945E-03	9.8461E-02
18	153.00	239034.00	-1.092917E+00	11.3201	9.7454E-03	9.8719E-02
19	98.00	237785.00	-1.072834E+00	11.1124	9.6803E-03	9.8389E-02
20	43.00	238075.00	-1.077461E+00	11.1602	9.6947E-03	9.8462E-02
21	45.00	236488.00	-1.052397E+00	10.9010	9.6210E-03	9.8086E-02
22	265.00	237064.00	-1.061421E+00	10.9943	9.6463E-03	9.8216E-02
23	210.00	238034.00	-1.076805E+00	11.1534	9.6927E-03	9.8451E-02
24	155.00	238144.00	-1.075565E+00	11.1716	9.6982E-03	9.8480E-02
25	100.00	238200.00	-1.079462E+00	11.1809	9.7011E-03	9.8494E-02
26	10.00	237949.00	-1.075448E+00	11.1394	9.6884E-03	9.8430E-02
27	230.00	236975.00	-1.060022E+00	10.9799	9.6423E-03	9.8195E-02
28	175.00	238389.00	-1.082495E+00	11.2123	9.7108E-03	9.8543E-02
29	120.00	238333.00	-1.081596E+00	11.2030	9.7079E-03	9.8529E-02
30	65.00	238020.00	-1.076582E+00	11.1511	9.6920E-03	9.8448E-02

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DATA SET 1
Model 2, Case A

1 BETA BACKSCATTER DATA
 REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-15-76

***** UNIFORM WEIGHTING *****

CALIBRATION DATA

STANDARD THICKNESS	GEIGER COUNTS C(I)	NO OF OBSRVTS	Y(I) = LN($\frac{CINF-C(I)}{CINF-CO}$)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGD (INF)=LARGE 0	12805.00 300603.00 116945.00	3.00 3.00 3.00	-3.996803E-15	5.841787E-02	-5.841787E-02
1	9.7300	227797.00	3.00	-9.322492E-01	6.972242E-03
2	10.4700	234285.00	3.00	-1.007593E+00	-1.102113E-02
3	11.2000	238475.00	3.00	-1.083879E+00	-1.960228E-03
4	11.5100	239955.00	3.00	-1.113481E+00	5.492535E-03
5	12.1700	244178.00	3.00	-1.180680E+00	5.165820E-04
AVERAGE= -1.063184E+00					

NO. OF STANDARDS CONSIDERED= 5

A= 5.8418E-02 VAR(A)= 2.3346E-03 DEV(A)= 4.8318E-02
 B= -1.0182E-01 VAR(B)= 1.9126E-05 DEV(B)= 4.3733E-03
 COV(A,B)= -2.1069E-04
 RESIDUAL= 2.0435E-04
 SQ. ERROR= 6.8118E-05
 SQ. OF CORRELATION= 9.9450E-01

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DATA SET 1
 Model 2, Case B

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-15-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
1		227797.00	-9.252770E-01	9.6615	1.1270E-02	1.0616E-01
2		234285.00	-1.018614E+00	10.5782	8.2388E-03	9.0768E-02
3		238475.00	-1.083879E+00	11.2193	7.9615E-03	8.9227E-02
4		239955.00	-1.107989E+00	11.4561	8.2425E-03	9.0788E-02
5		244178.00	-1.180163E+00	12.1649	1.0321E-02	1.0159E-01

1	1.00	240272.00	-1.113229E+00	11.5075	8.3310E-03	9.1274E-02
2	221.00	239231.00	-1.096122E+00	11.3395	8.0783E-03	8.9880E-02
3	166.00	240450.00	-1.116184E+00	11.5365	8.3852E-03	9.1571E-02
4	111.00	239835.00	-1.106012E+00	11.4366	8.2117E-03	9.0618E-02
5	56.00	239441.00	-1.099549E+00	11.3732	8.1206E-03	9.0114E-02
6	248.00	239141.00	-1.094656E+00	11.3251	8.0615E-03	8.9786E-02
7	193.00	238915.00	-1.090986E+00	11.2891	8.0228E-03	8.9570E-02
8	138.00	238861.00	-1.090111E+00	11.2805	8.0143E-03	8.9523E-02
9	83.00	239500.00	-1.100514E+00	11.3826	8.1333E-03	9.0185E-02
10	28.00	239459.00	-1.099844E+00	11.3761	8.1244E-03	9.0136E-02
11	235.00	239093.00	-1.093876E+00	11.3174	8.0529E-03	8.9738E-02
12	180.00	238883.00	-1.090467E+00	11.2840	8.0177E-03	8.9542E-02
13	125.00	239433.00	-1.099418E+00	11.3719	8.1189E-03	9.0105E-02
14	70.00	239031.00	-1.092868E+00	11.3075	8.0421E-03	8.9678E-02
15	15.00	238605.00	-1.085973E+00	11.2398	7.9777E-03	8.9318E-02
16	263.00	238253.00	-1.080312E+00	11.1842	7.9375E-03	8.9092E-02
17	208.00	238070.00	-1.077381E+00	11.1554	7.9211E-03	8.9001E-02
18	153.00	239034.00	-1.092917E+00	11.3080	8.0426E-03	8.9680E-02
19	98.00	237785.00	-1.072834E+00	11.1108	7.9018E-03	8.8892E-02
20	43.00	238075.00	-1.077461E+00	11.1562	7.9215E-03	8.9003E-02
21	45.00	236488.00	-1.052397E+00	10.9101	7.9060E-03	8.8915E-02
22	265.00	237064.00	-1.061421E+00	10.9987	7.8858E-03	8.8802E-02
23	210.00	238034.00	-1.076805E+00	11.1498	7.9183E-03	8.8965E-02
24	155.00	238144.00	-1.076565E+00	11.1671	7.9273E-03	8.9036E-02
25	100.00	238200.00	-1.079462E+00	11.1759	7.9324E-03	8.9064E-02
26	10.00	237949.00	-1.075448E+00	11.1364	7.9120E-03	8.8949E-02
27	230.00	236975.00	-1.060022E+00	10.9849	7.8870E-03	8.8809E-02
28	175.00	238389.00	-1.082495E+00	11.2057	7.9516E-03	8.9172E-02
29	120.00	238333.00	-1.081596E+00	11.1968	7.9456E-03	8.9138E-02
30	65.00	238020.00	-1.076582E+00	11.1476	7.9172E-03	8.8979E-02

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DATA SET 1

Model 2, Case B

1 BETA BACKSCATTER DATA
 REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-15-76

***** NON-UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRVTNS	Y(I)=	C(I)	STN. DEV. IN Y(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGD		12905.00	3.00					
(INF)=LARGE		300503.00	3.00					
0	0	116945.00	3.00		1.169450E+05	1.974378E+02	1.176291E+05	-3.465081E+00
1	9.7300	227797.00	3.00		2.277970E+05	2.755582E+02	2.228386E+05	1.799404E+01
2	10.4700	234285.00	3.00		2.342850E+05	2.794548E+02	2.308401E+05	1.232708E+01
3	11.2000	238475.00	3.00		2.384750E+05	2.819427E+02	2.387335E+05	-9.170287E-01
4	11.5100	239955.00	3.00		2.399550E+05	2.828162E+02	2.420855E+05	-7.533326E+00
5	12.1700	244178.00	3.00		2.441780E+05	2.852940E+02	2.492221E+05	-1.768021E+01
AVERAGE=	9.1800			WEIGHTED AVERAGE=	2.022562E+05			

NO. OF STANDARDS CONSIDERED= 6

A=	1.1763E+05	VAR(A)=	3.8422E+04	DEV(A)=	1.9602E+02
B=	1.0813E+04	VAR(B)=	4.4382E+02	DEV(B)=	2.1067E+01
	COV(A,B)=	-3.4736E+03			
	RESIDUAL=	8.5793E+02			
	SQ. OF CORRELATION=	9.9675E-01			

DATA SET 1
 Model 1, Case C

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-15-76

	POSITION	COUNTS	Y()=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
0		116945.00	1.169450E+05	-.0633	6.6581E-04	2.5803E-02
1		227797.00	2.277970E+05	10.1886	7.6673E-04	2.7690E-02
2		234285.00	2.342850E+05	10.7886	7.9735E-04	2.8237E-02
3		238475.00	2.384750E+05	11.1761	8.1858E-04	2.8611E-02
4		239955.00	2.399550E+05	11.3130	8.2635E-04	2.8746E-02
5		244178.00	2.441780E+05	11.7035	8.4931E-04	2.9143E-02

1	1.00	240272.00	2.402720E+05	11.3423	2.1981E-03	4.6883E-02
2	221.00	239231.00	2.392310E+05	11.2460	2.1866E-03	4.6761E-02
3	166.00	240450.00	2.404500E+05	11.3587	2.2000E-03	4.6904E-02
4	111.00	239835.00	2.398350E+05	11.3019	2.1933E-03	4.6832E-02
5	56.00	239441.00	2.394410E+05	11.2654	2.1889E-03	4.6786E-02
6	248.00	239141.00	2.391410E+05	11.2377	2.1856E-03	4.6751E-02
7	193.00	238915.00	2.389150E+05	11.2168	2.1832E-03	4.6724E-02
8	138.00	238861.00	2.388610E+05	11.2118	2.1826E-03	4.6718E-02
9	83.00	239500.00	2.395000E+05	11.2709	2.1896E-03	4.6793E-02
10	28.00	239459.00	2.394590E+05	11.2671	2.1891E-03	4.6788E-02
11	235.00	239093.00	2.390930E+05	11.2332	2.1851E-03	4.6745E-02
12	180.00	238883.00	2.388830E+05	11.2138	2.1828E-03	4.6721E-02
13	125.00	239433.00	2.394330E+05	11.2647	2.1888E-03	4.6785E-02
14	70.00	239031.00	2.390310E+05	11.2275	2.1844E-03	4.6738E-02
15	15.00	238605.00	2.386050E+05	11.1881	2.1798E-03	4.6688E-02
16	263.00	238253.00	2.382530E+05	11.1556	2.1759E-03	4.6647E-02
17	208.00	238070.00	2.380700E+05	11.1386	2.1739E-03	4.6626E-02
18	153.00	239034.00	2.390340E+05	11.2278	2.1845E-03	4.6738E-02
19	98.00	237785.00	2.377850E+05	11.1123	2.1709E-03	4.6592E-02
20	43.00	238075.00	2.380750E+05	11.1391	2.1740E-03	4.6626E-02
21	45.00	236488.00	2.364880E+05	10.9923	2.1568E-03	4.6442E-02
22	265.00	237064.00	2.370640E+05	11.0456	2.1630E-03	4.6508E-02
23	210.00	238034.00	2.380340E+05	11.1353	2.1736E-03	4.6621E-02
24	155.00	238144.00	2.381440E+05	11.1455	2.1748E-03	4.6634E-02
25	100.00	238200.00	2.382000E+05	11.1507	2.1754E-03	4.6641E-02
26	10.00	237949.00	2.379490E+05	11.1274	2.1726E-03	4.6612E-02
27	230.00	236975.00	2.369750E+05	11.0374	2.1621E-03	4.6498E-02
28	175.00	238389.00	2.383890E+05	11.1681	2.1774E-03	4.6663E-02
29	120.00	238333.00	2.383330E+05	11.1630	2.1768E-03	4.6656E-02
30	65.00	238020.00	2.380200E+05	11.1340	2.1734E-03	4.6620E-02

1 BETA BACKSCATTER DATA
 REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-15-76

***** NON-UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRVTNS	Y(I)=	C(I)	STN. DEV. IN Y(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGRD		12805.00	3.00					
(INF)=LARGE		300603.00	3.00					
0	0	116945.00	3.00		1.169450E+05	1.974378E+02	1.646371E+05	-2.415552E+02
1	9.7300	227797.00	3.00		2.277970E+05	2.755582E+02	2.284964E+05	-2.538172E+00
2	10.4700	234285.00	3.00		2.342850E+05	2.794548E+02	2.333531E+05	3.334586E+00
3	11.2000	238475.00	3.00		2.384750E+05	2.819427E+02	2.381442E+05	1.173210E+00
4	11.5100	239955.00	3.00		2.399550E+05	2.828162E+02	2.401788E+05	-7.913041E-01
5	12.1700	244178.00	3.00		2.441780E+05	2.852940E+02	2.445105E+05	-1.165333E+00
AVERAGE=	11.0160			WEIGHTED AVERAGE=	2.368062E+05			

NO. OF STANDARDS CONSIDERED= 5

A=	1.6464E+05	VAR(A)=	2.6785E+06	DEV(A)=	1.6366E+03
B=	6.5631E+03	VAR(B)=	2.2021E+04	DEV(B)=	1.4840E+02
	COV(A,B)=	-2.4215E+05			
	RESIDUAL=	2.0922E+01			
	SQ. OF CORRELATION=	9.8942E-01			

DATA SET 1
 Model 1, Case D

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-15-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
1		227797.00	2.277970E+05	9.6234	3.0926E-03	5.5611E-02
2		234285.00	2.342850E+05	10.6120	2.2550E-03	4.7486E-02
3		238475.00	2.384750E+05	11.2504	2.2450E-03	4.7381E-02
4		239955.00	2.399550E+05	11.4759	2.3411E-03	4.8385E-02
5		244178.00	2.441780E+05	12.1193	2.9010E-03	5.3861E-02

1	1.00	240272.00	2.402720E+05	11.5242	6.0871E-03	7.8020E-02
2	221.00	239231.00	2.392310E+05	11.3656	5.9901E-03	7.7396E-02
3	166.00	240450.00	2.404500E+05	11.5513	6.1062E-03	7.8142E-02
4	111.00	239835.00	2.398350E+05	11.4576	6.0433E-03	7.7738E-02
5	56.00	239441.00	2.394410E+05	11.3976	6.0076E-03	7.7509E-02
6	248.00	239141.00	2.391410E+05	11.3519	5.9830E-03	7.7350E-02
7	193.00	238915.00	2.389150E+05	11.3174	5.9658E-03	7.7239E-02
8	138.00	238861.00	2.388610E+05	11.3092	5.9619E-03	7.7213E-02
9	83.00	239500.00	2.395000E+05	11.4066	6.0127E-03	7.7542E-02
10	28.00	239459.00	2.394590E+05	11.4003	6.0092E-03	7.7519E-02
11	235.00	239093.00	2.390930E+05	11.3446	5.9792E-03	7.7325E-02
12	180.00	238883.00	2.388830E+05	11.3126	5.9635E-03	7.7224E-02
13	125.00	239433.00	2.394330E+05	11.3964	6.0069E-03	7.7504E-02
14	70.00	239031.00	2.390310E+05	11.3351	5.9745E-03	7.7295E-02
15	15.00	238605.00	2.386050E+05	11.2702	5.9442E-03	7.7099E-02
16	263.00	238253.00	2.382530E+05	11.2166	5.9225E-03	7.6958E-02
17	208.00	238070.00	2.380700E+05	11.1887	5.9124E-03	7.6892E-02
18	153.00	239034.00	2.390340E+05	11.3356	5.9747E-03	7.7296E-02
19	98.00	237785.00	2.377850E+05	11.1453	5.8982E-03	7.6800E-02
20	43.00	238075.00	2.380750E+05	11.1895	5.9126E-03	7.6894E-02
21	45.00	236488.00	2.364880E+05	10.9476	5.8579E-03	7.6537E-02
22	265.00	237064.00	2.370640E+05	11.0354	5.8708E-03	7.6621E-02
23	210.00	238034.00	2.380340E+05	11.1832	5.9105E-03	7.6880E-02
24	155.00	238144.00	2.381440E+05	11.2000	5.9164E-03	7.6918E-02
25	100.00	238200.00	2.382000E+05	11.2085	5.9195E-03	7.6938E-02
26	10.00	237949.00	2.379490E+05	11.1703	5.9061E-03	7.6851E-02
27	230.00	236975.00	2.369750E+05	11.0219	5.8683E-03	7.6605E-02
28	175.00	238389.00	2.383890E+05	11.2373	5.9305E-03	7.7010E-02
29	120.00	238333.00	2.383330E+05	11.2288	5.9272E-03	7.6988E-02
30	65.00	238020.00	2.380200E+05	11.1811	5.9097E-03	7.6875E-02

1 BETA BACKSCATTER DATA
 REMARKS: TESTER NO: 10C PART NO: R'S DATE 7-15-76

***** NON-UNIFORM WEIGHTING *****

CALIBRATION DATA

STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRVTS	Y(I)= LN($\frac{C(INF)-C(I)}{C(INF)-C(0)}$)	STN. DEV. IN Y(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)	
(AIR)=BGRD	12805.00	3.00					
(INF)=LARGE	300603.00	3.00					
0	0	116945.00	3.00	-3.996803E-15	1.520321E-03	1.575246E-04	-1.036127E-01
1	9.7300	227797.00	3.00	-9.252770E-01	4.729399E-03	-9.383927E-01	2.773225E+00
2	10.4700	234285.00	3.00	-1.018614E+00	5.311524E-03	-1.009773E+00	-1.664561E+00
3	11.2000	238475.00	3.00	-1.083879E+00	5.754733E-03	-1.080188E+00	-6.413080E-01
4	11.5100	239955.00	3.00	-1.107989E+00	5.926408E-03	-1.110090E+00	3.546415E-01
5	12.1700	244178.00	3.00	-1.180163E+00	6.467229E-03	-1.173754E+00	-9.910530E-01
AVERAGE=	9.1800		WEIGHTED AVERAGE=	-2.854761E-01			

NO. OF STANDARDS CONSIDERED= 6

A=	1.5752E-04	VAR(A)=	2.3060E-06	DEV(A)=	1.5186E-03
B=	-9.6459E-02	VAR(B)=	7.1436E-08	DEV(B)=	2.6727E-04
	COV(A,B)=	-2.1153E-07			
	RESIDUAL=	1.1992E+01			
	SQ. OF CORRELATION=	9.9991E-01			

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DATA SET 1
 Model 2, Case C

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-15-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
0		116945.00	-3.996803E-15	.0016	4.9618E-04	2.2275E-02
1		227797.00	-9.252770E-01	9.5940	2.9222E-03	5.4058E-02
2		234285.00	-1.018614E+00	10.5617	3.6562E-03	6.0466E-02
3		238475.00	-1.083879E+00	11.2383	4.2658E-03	6.5313E-02
4		238955.00	-1.107989E+00	11.4882	4.5136E-03	6.7183E-02
5		244178.00	-1.18C163E+00	12.2364	5.3362E-03	7.3049E-02

1	1.00	24C272.00	-1.113229E+00	11.5425	9.2989E-03	9.6431E-02
2	221.00	239231.00	-1.096122E+00	11.3652	8.9409E-03	9.4556E-02
3	166.00	24C450.00	-1.116184E+00	11.5732	9.3621E-03	9.6758E-02
4	111.00	239835.00	-1.106012E+00	11.4677	9.1463E-03	9.5636E-02
5	56.00	239441.00	-1.099549E+00	11.4007	9.0116E-03	9.4929E-02
6	248.00	239141.00	-1.094656E+00	11.3500	8.9108E-03	9.4397E-02
7	193.00	238915.00	-1.09C986E+00	11.3119	8.8359E-03	9.4000E-02
8	138.00	238861.00	-1.09C111E+00	11.3029	8.8182E-03	9.3905E-02
9	83.00	238500.00	-1.10C514E+00	11.4107	9.0316E-03	9.5035E-02
10	28.00	238459.00	-1.099344E+00	11.4038	9.0177E-03	9.4961E-02
11	235.00	238093.00	-1.093376E+00	11.3419	8.8948E-03	9.4313E-02
12	180.00	238883.00	-1.09C467E+00	11.3066	8.8254E-03	9.3944E-02
13	125.00	238433.00	-1.099418E+00	11.3994	9.0089E-03	9.4915E-02
14	70.00	238031.00	-1.092368E+00	11.3315	8.8743E-03	9.4203E-02
15	15.00	238605.00	-1.089973E+00	11.2600	8.7346E-03	9.3459E-02
16	263.00	238253.00	-1.08C312E+00	11.2013	8.6214E-03	9.2852E-02
17	208.00	238070.00	-1.077381E+00	11.1709	8.5634E-03	9.2538E-02
18	153.00	238034.00	-1.092917E+00	11.3320	8.8753E-03	9.4209E-02
19	98.00	237785.00	-1.072334E+00	11.1238	8.4740E-03	9.2054E-02
20	43.00	238075.00	-1.077461E+00	11.1717	8.5650E-03	9.2547E-02
21	45.00	236488.00	-1.052397E+00	10.9119	8.0830E-03	8.9905E-02
22	265.00	237064.00	-1.061421E+00	11.0054	8.2536E-03	9.0849E-02
23	210.00	236034.00	-1.076305E+00	11.1649	8.5520E-03	9.2477E-02
24	155.00	236144.00	-1.076565E+00	11.1832	8.5868E-03	9.2665E-02
25	100.00	236200.00	-1.079462E+00	11.1925	8.6046E-03	9.2761E-02
26	10.00	237949.00	-1.075448E+00	11.1509	8.5253E-03	9.2332E-02
27	230.00	236975.00	-1.06CJ22E+00	10.9909	8.2269E-03	9.0702E-02
28	175.00	236389.00	-1.082495E+00	11.2239	8.6649E-03	9.3085E-02
29	120.00	238333.00	-1.081596E+00	11.2146	8.6470E-03	9.2989E-02
30	65.00	238020.00	-1.076582E+00	11.1626	8.5476E-03	9.2453E-02

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DATA SET 1

Model 2, Case C

1 BETA BACKSCATTER DATA
 REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-15-76

***** NON-UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRVTNS	Y(I)= LN($\frac{CINF-C(I)}{CINF-CO}$)	STN. DEV. IN Y(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGD (INF)=LARGE 0	0	12805.00 300603.00 116945.00	3.00 3.00 3.00				
				-3.996803E-15	1.520321E-03	6.784233E-02	-4.462368E+01
1	9.7300	227797.00	3.00	-9.252770E-01	4.729399E-03	-9.311200E-01	1.235470E+00
2	10.4700	234285.00	3.00	-1.018614E+00	5.311524E-03	-1.007095E+00	-2.163768E+00
3	11.2000	238475.00	3.00	-1.083879E+00	5.754733E-03	-1.082042E+00	-3.190765E-01
4	11.5100	239955.00	3.00	-1.107989E+00	5.926408E-03	-1.113870E+00	9.923129E-01
5	12.1700	244178.00	3.00	-1.180163E+00	6.467229E-03	-1.181631E+00	2.269252E-01
AVERAGE=	11.0160			WEIGHTED AVERAGE=	-1.044454E+00		

NO. OF STANDARDS CONSIDERED= 5

A= 6.7842E-02 VAR(A)= 9.9315E-04 DEV(A)= 3.1514E-02
 B= -1.0267E-01 VAR(B)= 8.4091E-06 DEV(B)= 2.8998E-03
 COV(A,B)= -9.1103E-05
 RESIDUAL= 7.3679E+00
 SQ. OF CORRELATION= 9.9416E-01

DATA SET 1
 Model 2, Case D

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-15-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
1		227797.00	-9.252770E-01	9.6731	3.7799E-03	6.1481E-02
2		234285.00	-1.018614E+00	10.5822	3.3100E-03	5.7533E-02
3		238475.00	-1.083879E+00	11.2179	3.8424E-03	6.1987E-02
4		239955.00	-1.107989E+00	11.4527	4.2205E-03	6.4966E-02
5		244178.00	-1.180163E+00	12.1557	5.9448E-03	7.7102E-02

1	1.00	240272.00	-1.113229E+00	11.5038	8.4908E-03	9.2145E-02
2	221.00	239231.00	-1.096122E+00	11.3371	8.0392E-03	8.9662E-02
3	166.00	240450.00	-1.116184E+00	11.5325	8.5744E-03	9.2598E-02
4	111.00	239835.00	-1.106012E+00	11.4335	8.2935E-03	9.1069E-02
5	56.00	239441.00	-1.099549E+00	11.3705	8.1253E-03	9.0140E-02
6	248.00	239141.00	-1.094656E+00	11.3229	8.0031E-03	8.9460E-02
7	193.00	238915.00	-1.090986E+00	11.2871	7.9145E-03	8.8963E-02
8	138.00	238861.00	-1.090111E+00	11.2786	7.8937E-03	8.8846E-02
9	83.00	239500.00	-1.100514E+00	11.3799	8.1499E-03	9.0277E-02
10	28.00	239459.00	-1.099844E+00	11.3734	8.1328E-03	9.0182E-02
11	235.00	239093.00	-1.093876E+00	11.3153	7.9840E-03	8.9354E-02
12	180.00	238883.00	-1.090467E+00	11.2821	7.9021E-03	8.8894E-02
13	125.00	239433.00	-1.099418E+00	11.3692	8.1219E-03	9.0122E-02
14	70.00	239031.00	-1.092868E+00	11.3054	7.9596E-03	8.9217E-02
15	15.00	238605.00	-1.085973E+00	11.2383	7.7975E-03	8.8303E-02
16	263.00	238253.00	-1.080312E+00	11.1831	7.6710E-03	8.7584E-02
17	208.00	238070.00	-1.077381E+00	11.1546	7.6079E-03	8.7223E-02
18	153.00	239034.00	-1.092917E+00	11.3059	7.9608E-03	8.9223E-02
19	98.00	237785.00	-1.072834E+00	11.1103	7.5131E-03	8.6678E-02
20	43.00	238075.00	-1.077461E+00	11.1554	7.6096E-03	8.7233E-02
21	45.00	236488.00	-1.052397E+00	10.9113	7.1349E-03	8.4469E-02
22	265.00	237064.00	-1.061421E+00	10.9992	7.2924E-03	8.5395E-02
23	210.00	238034.00	-1.076805E+00	11.1490	7.5957E-03	8.7153E-02
24	155.00	238144.00	-1.078565E+00	11.1661	7.6332E-03	8.7368E-02
25	100.00	238200.00	-1.079462E+00	11.1749	7.6525E-03	8.7479E-02
26	10.00	237949.00	-1.075448E+00	11.1358	7.5671E-03	8.6989E-02
27	230.00	236975.00	-1.060022E+00	10.9855	7.2670E-03	8.5246E-02
28	175.00	238389.00	-1.082495E+00	11.2044	7.7191E-03	8.7858E-02
29	120.00	238333.00	-1.081596E+00	11.1956	7.6991E-03	8.7745E-02
30	65.00	238020.00	-1.076582E+00	11.1468	7.5909E-03	8.7126E-02

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DATA SET 1
Model 2, Case D

1 BETA BACKSCATTER DATA

REMARKS: TESTER NO: 100 PART NO: R'S SERIAL: L-0608 DATE: 7-21-76

***** UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRV TNS	Y(I)=	C(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGRD		12954.00	3.00				
(INF)=LARGE		299646.00	3.00				
0	0	116405.00	3.00		1.164050E+05	1.178840E+05	-1.479001E+03
1	9.7300	228932.00	3.00		2.289320E+05	2.226281E+05	6.303879E+03
2	10.4700	232999.00	3.00		2.329990E+05	2.305943E+05	2.404728E+03
3	11.2000	238115.00	3.00		2.381150E+05	2.384528E+05	-3.37725E+02
4	11.5100	240059.00	3.00		2.400590E+05	2.417899E+05	-1.730944E+03
5	12.1700	243734.00	3.00		2.437340E+05	2.488949E+05	-5.160889E+03
AVERAGE=				2.167073E+05			

NO. OF STANDARDS CONSIDERED= 6

A= 1.1788E+05 VAR(A)= 1.8815E+07 DEV(A)= 4.3376E+03
 B= 1.0765E+04 VAR(B)= 1.8496E+05 DEV(B)= 4.3007E+02

COV(A,B)= -1.6980E+06
 RESIDUAL= 7.7454E+07
 SQ. ERROR= 1.9364E+07
 SQ. OF CORRELATION= 9.9366E-01

DATA SET 2
 Model 1, Case A

1 TEST RESULTS
REMARKS: TESTER NO: 100

PART NO: R'S SERIAL: L-0608 DATE: 7-21-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
0		116405.00	1.164050E+05	- .1374	3.3350E-01	5.7749E-01
1		226932.00	2.289320E+05	10.3156	1.9700E-01	4.4384E-01
2		232999.00	2.329990E+05	10.6934	1.9859E-01	4.4564E-01
3		238115.00	2.381150E+05	11.1686	2.0125E-01	4.4861E-01
4		240059.00	2.400590E+05	11.3492	2.0245E-01	4.4994E-01
5		243734.00	2.437340E+05	11.6906	2.0500E-01	4.5277E-01

1	1.00	256881.00	2.568810E+05	12.9119	2.1717E-01	4.6601E-01
2	221.00	257523.00	2.575230E+05	12.9715	2.1788E-01	4.6678E-01
3	166.00	257445.00	2.574450E+05	12.9642	2.1779E-01	4.6669E-01
4	111.00	256712.00	2.567120E+05	12.8962	2.1698E-01	4.6581E-01
5	56.00	257833.00	2.578330E+05	13.0003	2.1823E-01	4.6715E-01
6	248.00	256413.00	2.564130E+05	12.8684	2.1665E-01	4.6546E-01
7	193.00	255669.00	2.556690E+05	12.7993	2.1585E-01	4.6459E-01
8	138.00	257424.00	2.574240E+05	12.9623	2.1777E-01	4.6666E-01
9	83.00	257311.00	2.573110E+05	12.9518	2.1764E-01	4.6652E-01
10	28.00	257479.00	2.574790E+05	12.9674	2.1783E-01	4.6673E-01
11	235.00	257607.00	2.576070E+05	12.9793	2.1798E-01	4.6688E-01
12	180.00	255958.00	2.559580E+05	12.8261	2.1616E-01	4.6493E-01
13	125.00	257310.00	2.573100E+05	12.9517	2.1764E-01	4.6652E-01
14	70.00	256236.00	2.562360E+05	12.8519	2.1646E-01	4.6525E-01
15	15.00	256130.00	2.561300E+05	12.8421	2.1634E-01	4.6513E-01
16	263.00	256996.00	2.569960E+05	12.9225	2.1729E-01	4.6615E-01
17	208.00	255469.00	2.554690E+05	12.7807	2.1563E-01	4.6436E-01
18	153.00	256506.00	2.565060E+05	12.8770	2.1675E-01	4.6557E-01
19	98.00	257223.00	2.572230E+05	12.9436	2.1755E-01	4.6642E-01
20	43.00	257600.00	2.576000E+05	12.9786	2.1797E-01	4.6687E-01
21	45.00	257106.00	2.571060E+05	12.9328	2.1742E-01	4.6628E-01
22	265.00	255675.00	2.556750E+05	12.7998	2.1585E-01	4.6460E-01
23	210.00	256171.00	2.561710E+05	12.8459	2.1639E-01	4.6517E-01
24	155.00	255872.00	2.558720E+05	12.8181	2.1606E-01	4.6483E-01
25	100.00	255587.00	2.555870E+05	12.7917	2.1576E-01	4.6450E-01
26	10.00	256013.00	2.560130E+05	12.8312	2.1622E-01	4.6499E-01
27	230.00	254163.00	2.541630E+05	12.6594	2.1426E-01	4.6288E-01
28	175.00	254000.00	2.540000E+05	12.6442	2.1409E-01	4.6270E-01
29	120.00	254705.00	2.547050E+05	12.7097	2.1482E-01	4.6349E-01
30	65.00	255411.00	2.554110E+05	12.7753	2.1557E-01	4.6429E-01

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DATA SET 2

Model 1, Case A

1

BETA BACKSCATTER DATA

REMARKS: TESTER NO: 100 PART NO: R'S SERIAL: L-0608 DATE: 7-21-76

***** UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRV'TNS	Y(I)=	C(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGND		12954.00	3.00				
(INF)=LARGE		299646.00	3.00				
0	.0	116405.00	3.00		1.164050E+05	1.685740E+05	-5.216904E+04
1	9.7300	223932.00	3.00		2.289320E+05	2.288069E+05	1.250914E+02
2	10.4700	232999.00	3.00		2.329990E+05	2.333878E+05	-3.888259E+02
3	11.2000	238115.00	3.00		2.381150E+05	2.379068E+05	2.081611E+02
4	11.5100	240059.00	3.00		2.400590E+05	2.398259E+05	2.331282E+02
5	12.1700	243734.00	3.00		2.437340E+05	2.439116E+05	-1.775548E+02
-- AVERAGE=				2.367678E+05			

NO. OF STANDARDS CONSIDERED= 5

A=	1.6857E+05	VAR(A)=	3.3821E+06	DEV(A)=	1.8390E+03
B=	6.1904E+03	VAR(B)=	2.7707E+04	DEV(B)=	1.6645E+02
COV(A,B)=		-3.0522E+05			
RESIDUAL=		2.9604E+05			
SQ. ERROR=		9.8680E+04			
SQ. OF CORRELATION=		9.9784E-01			

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DATA SET 2

Model 1, Case B

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S SERIAL: L-0608 DATE: 7-21-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
1		228932.00	2.289320E+05	9.7502	4.2485E-03	6.5181E-02
2		232999.00	2.329990E+05	10.4072	3.3581E-03	5.7949E-02
3		238115.00	2.381150E+05	11.2336	3.1243E-03	5.5895E-02
4		240059.00	2.400590E+05	11.5477	3.2944E-03	5.7397E-02
5		243734.00	2.437340E+05	12.1413	4.0057E-03	6.3290E-02

1	1.00	256881.00	2.568810E+05	14.2651	1.0723E-02	1.0355E-01
2	221.00	257523.00	2.575230E+05	14.3688	1.1218E-02	1.0591E-01
3	166.00	257445.00	2.574450E+05	14.3562	1.1157E-02	1.0563E-01
4	111.00	256712.00	2.567120E+05	14.2378	1.0595E-02	1.0293E-01
5	56.00	257833.00	2.578330E+05	14.4189	1.1462E-02	1.0706E-01
6	248.00	256413.00	2.564130E+05	14.1895	1.0372E-02	1.0184E-01
7	193.00	255669.00	2.556690E+05	14.0693	9.8305E-03	9.9149E-02
8	138.00	257424.00	2.574240E+05	14.3528	1.1140E-02	1.0555E-01
9	83.00	257311.00	2.573110E+05	14.3345	1.1052E-02	1.0513E-01
10	28.00	257479.00	2.574790E+05	14.3617	1.1183E-02	1.0575E-01
11	235.00	257607.00	2.576070E+05	14.3824	1.1284E-02	1.0622E-01
12	180.00	255958.00	2.559580E+05	14.1160	1.0038E-02	1.0019E-01
13	125.00	257310.00	2.573100E+05	14.3344	1.1052E-02	1.0513E-01
14	70.00	256236.00	2.562360E+05	14.1609	1.0241E-02	1.0120E-01
15	15.00	256130.00	2.561300E+05	14.1438	1.0163E-02	1.0081E-01
16	263.00	256996.00	2.569960E+05	14.2837	1.0810E-02	1.0397E-01
17	208.00	255469.00	2.554690E+05	14.0370	9.6886E-03	9.8431E-02
18	153.00	256506.00	2.565060E+05	14.2045	1.0441E-02	1.0218E-01
19	98.00	257223.00	2.572230E+05	14.3203	1.0984E-02	1.0481E-01
20	43.00	257600.00	2.576000E+05	14.3812	1.1278E-02	1.0620E-01
21	45.00	257106.00	2.571060E+05	14.3014	1.0894E-02	1.0438E-01
22	265.00	255675.00	2.556750E+05	14.0703	9.8348E-03	9.9170E-02
23	210.00	256171.00	2.561710E+05	14.1504	1.0193E-02	1.0096E-01
24	155.00	255872.00	2.558720E+05	14.1021	9.9761E-03	9.9880E-02
25	100.00	255587.00	2.555870E+05	14.0560	9.7721E-03	9.8854E-02
26	10.00	256013.00	2.560130E+05	14.1249	1.0078E-02	1.0039E-01
27	230.00	254163.00	2.541630E+05	13.8260	8.7992E-03	9.3804E-02
28	175.00	254000.00	2.540000E+05	13.7997	8.6927E-03	9.3235E-02
29	120.00	254705.00	2.547050E+05	13.9136	9.1605E-03	9.5710E-02
30	65.00	255411.00	2.554110E+05	14.0276	9.6477E-03	9.8223E-02

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DATA SET 2
Model 1, Case B

1

BETA BACKSCATTER DATA

REMARKS: TESTER NO: 100 PART NO: R'S SERIAL: L-0608 DATE: 7-21-76

***** UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRVTS	$Y(I) = \ln\left(\frac{C_{INF}-C(I)}{C_{INF}-C_0}\right)$	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGRD		12954.00	3.00			
(INF)=LARGE		299646.00	3.00			
0	0	116405.00	3.00	-7.549517E-15	1.705052E-04	-1.705052E-04
1	9.7300	228932.00	3.00	-9.521587E-01	-9.477843E-01	-4.374372E-03
2	10.4700	232999.00	3.00	-1.011392E+00	-1.019880E+00	8.487315E-03
3	11.2000	238115.00	3.00	-1.091261E+00	-1.091000E+00	-2.606409E-04
4	11.5100	240059.00	3.00	-1.123365E+00	-1.121203E+00	-2.162270E-03
5	12.1700	243734.00	3.00	-1.187023E+00	-1.185504E+00	-1.519527E-03
AVERAGE=				-8.942000E-01		

NO. OF STANDARDS CONSIDERED= 6

A=	1.7051E-04	VAR(A)=	2.3866E-05	DEV(A)=	4.8853E-03
B=	-9.7426E-02	VAR(B)=	2.3463E-07	DEV(B)=	4.8438E-04
COV(A,B)=		-2.1539E-06			
RESIDUAL=		9.8251E-05			
SQ. ERROR=		2.4563E-05			
SQ. OF CORRELATION=		9.9990E-01			

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DATA SET 2
Model 2, Case A

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S SERIAL: L-0608 DATE: 7-21-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
0		116405.00	-7.549517E-15	.0018	5.1014E-03	7.1424E-02
1		228932.00	-9.521587E-01	9.7749	3.0278E-03	5.5026E-02
2		232999.00	-1.011392E+00	10.3829	3.0548E-03	5.5271E-02
3		238115.00	-1.091261E+00	11.2027	3.1202E-03	5.5859E-02
4		240059.00	-1.123365E+00	11.5322	3.1558E-03	5.6177E-02
5		243734.00	-1.187023E+00	12.1856	3.2424E-03	5.6942E-02

1	1.00	256881.00	-1.455082E+00	14.9370	3.8383E-03	6.1954E-02
2	221.00	257523.00	-1.470208E+00	15.0923	3.8831E-03	6.2315E-02
3	166.00	257445.00	-1.468358E+00	15.0733	3.8776E-03	6.2270E-02
4	111.00	256712.00	-1.451138E+00	14.8965	3.8269E-03	6.1862E-02
5	56.00	257833.00	-1.477595E+00	15.1681	3.9054E-03	6.2493E-02
6	248.00	256413.00	-1.444198E+00	14.8253	3.8069E-03	6.1700E-02
7	193.00	255669.00	-1.427135E+00	14.6502	3.7587E-03	6.1308E-02
8	138.00	257424.00	-1.467861E+00	15.0682	3.8761E-03	6.2258E-02
9	83.00	257311.00	-1.465188E+00	15.0407	3.8681E-03	6.2194E-02
10	28.00	257479.00	-1.469164E+00	15.0816	3.8800E-03	6.2290E-02
11	235.00	257607.00	-1.472204E+00	15.1128	3.8891E-03	6.2363E-02
12	180.00	255958.00	-1.433729E+00	14.7178	3.7771E-03	6.1458E-02
13	125.00	257310.00	-1.465164E+00	15.0405	3.8681E-03	6.2194E-02
14	70.00	256236.00	-1.440112E+00	14.7834	3.7952E-03	6.1605E-02
15	15.00	256130.00	-1.437674E+00	14.7583	3.7883E-03	6.1549E-02
16	263.00	256996.00	-1.457775E+00	14.9646	3.8462E-03	6.2018E-02
17	208.00	255469.00	-1.422598E+00	14.6036	3.7462E-03	6.1206E-02
18	153.00	256506.00	-1.446352E+00	14.8474	3.8130E-03	6.1750E-02
19	98.00	257223.00	-1.463112E+00	15.0194	3.8620E-03	6.2145E-02
20	43.00	257600.00	-1.472038E+00	15.1110	3.8886E-03	6.2359E-02
21	45.00	257106.00	-1.460357E+00	14.9912	3.8538E-03	6.2079E-02
22	265.00	255675.00	-1.427272E+00	14.6516	3.7591E-03	6.1312E-02
23	210.00	256171.00	-1.438516E+00	14.7680	3.7909E-03	6.1571E-02
24	155.00	255872.00	-1.431762E+00	14.6976	3.7716E-03	6.1414E-02
25	100.00	255587.00	-1.425273E+00	14.6310	3.7536E-03	6.1266E-02
26	10.00	256013.00	-1.434388E+00	14.7308	3.7807E-03	6.1487E-02
27	230.00	254163.00	-1.393464E+00	14.3045	3.6682E-03	6.0566E-02
28	175.00	254000.00	-1.389386E+00	14.2678	3.6589E-03	6.0489E-02
29	120.00	254705.00	-1.405452E+00	14.4276	3.6998E-03	6.0826E-02
30	65.00	255411.00	-1.421286E+00	14.5901	3.7426E-03	6.1177E-02

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BETA BACKSCATTER DATA

REMARKS: TESTER NO: 100 PART NO: R'S SERIAL: L-0608 DATE: 7-21-76

***** UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRVTNS	$Y(I) = \ln\left(\frac{C_{INF}-C(I)}{C_{INF}-C_0}\right)$	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGD		12954.00	3.00			
(INF)=LARGE		299646.00	3.00			
0	0	116405.00	3.00	-7.549517E-15	6.014260E-03	-6.014260E-03
1	9.7300	228932.00	3.00	-9.521587E-01	-9.470720E-01	-5.086687E-03
2	10.4700	232999.00	3.00	-1.011392E+00	-1.019557E+00	8.165263E-03
3	11.2000	238115.00	3.00	-1.091261E+00	-1.091063E+00	-1.977035E-04
4	11.5100	240059.00	3.00	-1.123365E+00	-1.121429E+00	-1.935844E-03
5	12.1700	243734.00	3.00	-1.187023E+00	-1.186078E+00	-9.450277E-04

AVERAGE= -1.073040E+00

NO. OF STANDARDS CONSIDERED= 5

A= 6.0143E-03 VAR(A)= 1.1107E-03 DEV(A)= 3.3328E-02
 B= -9.7953E-02 VAR(B)= 9.0996E-06 DEV(B)= 3.0166E-03

COV(A,B)= -1.0024E-04
 RESIDUAL= 9.7226E-05
 SQ. ERROR= 3.2409E-05
 SQ. OF CORRELATION= 9.9716E-01

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DATA SET 2
 Model 2, Case B

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S SERIAL: L-0608 DATE: 7-21-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
1		228932.00	-9.521587E-01	9.7819	5.4976E-03	7.4146E-02
2		232999.00	-1.011392E+00	10.3866	4.4289E-03	6.6550E-02
3		238115.00	-1.091261E+00	11.2020	4.0861E-03	6.3922E-02
4		240059.00	-1.123365E+00	11.5298	4.3036E-03	6.5602E-02
5		243734.00	-1.187023E+00	12.1796	5.3374E-03	7.3058E-02

1	1.00	256881.00	-1.455082E+00	14.9162	1.8480E-02	1.3594E-01
2	221.00	257523.00	-1.470208E+00	15.0707	1.9645E-02	1.4016E-01
3	166.00	257445.00	-1.468358E+00	15.0518	1.9500E-02	1.3964E-01
4	111.00	256712.00	-1.451138E+00	14.8760	1.8184E-02	1.3485E-01
5	56.00	257833.00	-1.477595E+00	15.1461	2.0230E-02	1.4223E-01
6	248.00	256413.00	-1.444198E+00	14.8051	1.7670E-02	1.3293E-01
7	193.00	255669.00	-1.427135E+00	14.6309	1.6447E-02	1.2824E-01
8	138.00	257424.00	-1.467861E+00	15.0467	1.9461E-02	1.3950E-01
9	83.00	257311.00	-1.465188E+00	15.0194	1.9253E-02	1.3876E-01
10	28.00	257479.00	-1.469164E+00	15.0600	1.9563E-02	1.3987E-01
11	235.00	257607.00	-1.472204E+00	15.0910	1.9802E-02	1.4072E-01
12	180.00	255958.00	-1.433729E+00	14.6982	1.6912E-02	1.3005E-01
13	125.00	257310.00	-1.46564E+00	15.0192	1.9252E-02	1.3875E-01
14	70.00	256236.00	-1.44012E+00	14.7634	1.7372E-02	1.3180E-01
15	15.00	256130.00	-1.437674E+00	14.7385	1.7195E-02	1.3113E-01
16	263.00	256996.00	-1.457775E+00	14.9437	1.8684E-02	1.3669E-01
17	208.00	255469.00	-1.422598E+00	14.5846	1.6131E-02	1.2701E-01
18	153.00	256506.00	-1.446352E+00	14.8271	1.7828E-02	1.3352E-01
19	98.00	257223.00	-1.46312E+00	14.9982	1.9093E-02	1.3818E-01
20	43.00	257600.00	-1.472038E+00	15.0893	1.9789E-02	1.4067E-01
21	45.00	257106.00	-1.460357E+00	14.9701	1.8881E-02	1.3741E-01
22	265.00	255675.00	-1.427272E+00	14.6323	1.6456E-02	1.2828E-01
23	210.00	256171.00	-1.438616E+00	14.7481	1.7263E-02	1.3139E-01
24	155.00	255872.00	-1.431762E+00	14.6782	1.6773E-02	1.2951E-01
25	100.00	255587.00	-1.425273E+00	14.6119	1.6316E-02	1.2774E-01
26	10.00	256013.00	-1.434988E+00	14.7111	1.7002E-02	1.3039E-01
27	230.00	254163.00	-1.393464E+00	14.2872	1.4202E-02	1.1917E-01
28	175.00	254000.00	-1.389686E+00	14.2507	1.3976E-02	1.1822E-01
29	120.00	254705.00	-1.405452E+00	14.4096	1.4975E-02	1.2237E-01
30	65.00	255411.00	-1.421286E+00	14.5712	1.6040E-02	1.2665E-01

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BETA BACKSCATTER DATA

REMARKS: TESTER NO: 100 PART NO: R'S SERIAL: L-0608 DATE: 7-21-76

***** NON-UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO OF OBSRVTNS	Y(I)=	C(I)	STN. DEV. IN Y(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGRD		12954.00	3.00					
(INF)=LARGE		299646.00	3.00					
0	0	116405.00	3.00		1.164050E+05	1.969814E+02	1.171488E+05	-3.776139E+00
1	9.7300	228932.00	3.00		2.289320E+05	2.762439E+02	2.226131E+05	2.287449E+01
2	10.4700	232999.00	3.00		2.329990E+05	2.786868E+02	2.306340E+05	8.486293E+00
3	11.2000	238115.00	3.00		2.381150E+05	2.817298E+02	2.385465E+05	-1.531643E+00
4	11.5100	240059.00	3.00		2.400590E+05	2.828775E+02	2.419066E+05	-6.531534E+00
5	12.1700	243734.00	3.00		2.437340E+05	2.850345E+02	2.490504E+05	-1.868692E+01
AVERAGE=	9.1800			WEIGHTED AVERAGE=	2.018924E+05			

NO. OF STANDARDS CONSIDERED= 6

A= 1.1715E+05 VAR(A)= 3.8248E+04 DEV(A)= 1.9557E+02
 B= 1.0839E+04 VAR(B)= 4.4223E+02 DEV(B)= 2.1029E+01
 COV(A,B)= -3.4575E+03
 RESIDUAL= 1.0037E+03
 SQ. OF CORRELATION= 9.9624E-01

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DATA SET 2

Model 1, Case C

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S SERIAL: L-0608 DATE: 7-21-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
0		116405.00	1.164050E+05	- .0686	6.5988E-04	2.5688E-02
1		228932.00	2.289320E+05	10.3130	7.6843E-04	2.7721E-02
2		232999.00	2.329990E+05	10.6882	7.8754E-04	2.8063E-02
3		238115.00	2.381150E+05	11.1602	8.1309E-04	2.8515E-02
4		240059.00	2.400590E+05	11.3395	8.2324E-04	2.8692E-02
5		243734.00	2.437340E+05	11.6786	8.4309E-04	2.9036E-02

1	1.00	256881.00	2.568810E+05	12.8915	2.3788E-03	4.8773E-02
2	221.00	257523.00	2.575230E+05	12.9507	2.3866E-03	4.8853E-02
3	166.00	257445.00	2.574450E+05	12.9436	2.3856E-03	4.8843E-02
4	111.00	256712.00	2.567120E+05	12.8759	2.3768E-03	4.8752E-02
5	56.00	257833.00	2.578330E+05	12.9793	2.3903E-03	4.8891E-02
6	248.00	256413.00	2.564130E+05	12.8483	2.3732E-03	4.8716E-02
7	193.00	255669.00	2.556690E+05	12.7797	2.3643E-03	4.8624E-02
8	138.00	257424.00	2.574240E+05	12.9416	2.3854E-03	4.8840E-02
9	83.00	257311.00	2.573110E+05	12.9312	2.3840E-03	4.8826E-02
10	28.00	257479.00	2.574790E+05	12.9467	2.3860E-03	4.8847E-02
11	235.00	257607.00	2.576070E+05	12.9585	2.3876E-03	4.8863E-02
12	180.00	255958.00	2.559580E+05	12.8064	2.3678E-03	4.8660E-02
13	125.00	257310.00	2.573100E+05	12.9311	2.3840E-03	4.8826E-02
14	70.00	256236.00	2.562360E+05	12.8320	2.3711E-03	4.8694E-02
15	15.00	256130.00	2.561300E+05	12.8222	2.3698E-03	4.8681E-02
16	263.00	256996.00	2.569960E+05	12.9021	2.3802E-03	4.8788E-02
17	208.00	255469.00	2.554690E+05	12.7612	2.3619E-03	4.8599E-02
18	153.00	256506.00	2.565060E+05	12.8569	2.3743E-03	4.8727E-02
19	98.00	257223.00	2.572230E+05	12.9231	2.3830E-03	4.8816E-02
20	43.00	257600.00	2.576000E+05	12.9579	2.3875E-03	4.8862E-02
21	45.00	257106.00	2.571060E+05	12.9123	2.3815E-03	4.8801E-02
22	265.00	255675.00	2.556750E+05	12.7803	2.3644E-03	4.8625E-02
23	210.00	256171.00	2.561710E+05	12.8260	2.3703E-03	4.8686E-02
24	155.00	255872.00	2.558720E+05	12.7984	2.3667E-03	4.8649E-02
25	100.00	255587.00	2.555370E+05	12.7721	2.3633E-03	4.8614E-02
26	10.00	256013.00	2.560130E+05	12.8114	2.3684E-03	4.8666E-02
27	230.00	254163.00	2.541330E+05	12.6408	2.3464E-03	4.8439E-02
28	175.00	254000.00	2.540000E+05	12.6257	2.3444E-03	4.8419E-02
29	120.00	254705.00	2.547050E+05	12.6908	2.3528E-03	4.8506E-02
30	65.00	255411.00	2.554110E+05	12.7559	2.3612E-03	4.8592E-02

1 BETA BACKSCATTER DATA

REMARKS: TESTER NO: 100 PART NO: R'S SERIAL: L-0608 DATE: 7-21-76

***** NON-UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRV TNS	Y(I)=	C(I)	STN. DEV. IN Y(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGRD (INF)=LARGE 0	.0	12954.00 299646.00 116405.00	3.00 3.00 3.00		1.164050E+05	1.969814E+02	1.685677E+05	-2.648105E+02
1	9.7300	228932.00	3.00		2.289320E+05	2.762439E+02	2.288060E+05	4.562926E-01
2	10.4700	232999.00	3.00		2.329990E+05	2.786868E+02	2.333873E+05	-1.393232E+00
3	11.2000	236115.00	3.00		2.361150E+05	2.817298E+02	2.379067E+05	7.394005E-01
4	11.5100	240059.00	3.00		2.400590E+05	2.826775E+02	2.398259E+05	8.240604E-01
5	12.1700	243734.00	3.00		2.437340E+05	2.850345E+02	2.439119E+05	-6.242648E-01
AVERAGE=	11.0160			WEIGHTED AVERAGE=	2.366517E+05			

NO. OF STANDARDS CONSIDERED= 5

A= 1.6857E+05 VAR(A)= 2.6323E+06 DEV(A)= 1.6378E+03
 B= 6.1910E+03 VAR(B)= 2.2548E+04 DEV(B)= 1.4849E+02
 COV(A,B)= -2.4247E+05
 RESIDUAL= 3.7648E+00
 SQ. OF CORRELATION= 9.9784E-01

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DATA SET 2
Model 1, Case D

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S SERIAL: L-0608 DATE: 7-21-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
1		228932.00	2.289320E+05	9.7504	3.2970E-03	5.7419E-02
2		232999.00	2.329990E+05	10.4073	2.6382E-03	5.1364E-02
3		238115.00	2.381150E+05	11.2336	2.5146E-03	5.0146E-02
4		240059.00	2.400590E+05	11.5477	2.6736E-03	5.1707E-02
5		243734.00	2.437340E+05	12.1413	3.2841E-03	5.7307E-02

1	1.00	256881.00	2.568810E+05	14.2648	1.3256E-02	1.1513E-01
2	221.00	257523.00	2.575230E+05	14.3685	1.3668E-02	1.1691E-01
3	166.00	257445.00	2.574450E+05	14.3559	1.3618E-02	1.1669E-01
4	111.00	256712.00	2.567120E+05	14.2375	1.3149E-02	1.1467E-01
5	56.00	257833.00	2.578330E+05	14.4186	1.3872E-02	1.1778E-01
6	248.00	256413.00	2.564130E+05	14.1892	1.2962E-02	1.1385E-01
7	193.00	255669.00	2.556690E+05	14.0691	1.2510E-02	1.1185E-01
8	138.00	257424.00	2.574240E+05	14.3525	1.3604E-02	1.1664E-01
9	83.00	257311.00	2.573110E+05	14.3343	1.3531E-02	1.1632E-01
10	28.00	257479.00	2.574790E+05	14.3614	1.3640E-02	1.1679E-01
11	235.00	257607.00	2.576070E+05	14.3821	1.3723E-02	1.1715E-01
12	180.00	255958.00	2.559580E+05	14.1157	1.2684E-02	1.1262E-01
13	125.00	257310.00	2.573100E+05	14.3341	1.3530E-02	1.1632E-01
14	70.00	256236.00	2.562360E+05	14.1606	1.2853E-02	1.1337E-01
15	15.00	256130.00	2.561300E+05	14.1435	1.2788E-02	1.1309E-01
16	263.00	256996.00	2.569960E+05	14.2834	1.3329E-02	1.1545E-01
17	208.00	255469.00	2.554690E+05	14.0368	1.2391E-02	1.1132E-01
18	153.00	256506.00	2.565060E+05	14.2043	1.3020E-02	1.1411E-01
19	98.00	257223.00	2.572230E+05	14.3201	1.3474E-02	1.1608E-01
20	43.00	257600.00	2.576000E+05	14.3810	1.3719E-02	1.1713E-01
21	45.00	257106.00	2.571060E+05	14.3012	1.3399E-02	1.1575E-01
22	265.00	255675.00	2.556750E+05	14.0700	1.2514E-02	1.1186E-01
23	210.00	256171.00	2.561710E+05	14.1501	1.2813E-02	1.1320E-01
24	155.00	255872.00	2.558720E+05	14.1019	1.2632E-02	1.1239E-01
25	100.00	255587.00	2.555870E+05	14.0558	1.2461E-02	1.1163E-01
26	10.00	256013.00	2.560130E+05	14.1246	1.2717E-02	1.1277E-01
27	230.00	254163.00	2.541630E+05	13.8258	1.1645E-02	1.0791E-01
28	175.00	254000.00	2.540000E+05	13.7995	1.1556E-02	1.0750E-01
29	120.00	254705.00	2.547050E+05	13.9134	1.1949E-02	1.0931E-01
30	65.00	255411.00	2.554110E+05	14.0274	1.2357E-02	1.1116E-01

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DATA SET 2
Model 1, Case D

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BETA BACKSCATTER DATA

REMARKS: TESTER NO: 100 PART NO: R'S SERIAL: L-0608 DATE: 7-21-76

***** NON-UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRV/TNS	$Y(I) = \ln \left(\frac{CINF-C(I)}{CINF-CO} \right)$	STN. DEV. IN Y(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGD		12954.00	3.00				
(INF)=LARGE		299646.00	3.00				
0	0	116405.00	3.00	-7.549517E-15	1.520259E-03	7.643462E-07	-5.027737E-04
1	9.7300	226932.00	3.00	-9.521587E-01	4.893760E-03	-9.476868E-01	-9.137831E-01
2	10.4700	232999.00	3.00	-1.011392E+00	5.267338E-03	-1.019762E+00	1.588949E+00
3	11.2000	236115.00	3.00	-1.091261E+00	5.810208E-03	-1.090863E+00	-6.858169E-02
4	11.5100	240059.00	3.00	-1.123365E+00	6.041742E-03	-1.121056E+00	-3.821111E-01
5	12.1700	243734.00	3.00	-1.187023E+00	6.524683E-03	-1.185339E+00	-2.580965E-01
AVERAGE=	9.1800			WEIGHTED AVERAGE=	-2.829092E-01		

NO. OF STANDARDS CONSIDERED= 6

A= 7.6435E-07 VAR(A)= 2.3060E-06 DEV(A)= 1.5186E-03
 B= -9.7399E-02 VAR(B)= 7.2769E-08 DEV(B)= 2.6976E-04

COV(A,B)= -2.1137E-07
 RESIDUAL= 3.5771E+00
 SQ. OF CORRELATION= 9.9997E-01

DATA SET 2
 Model 2, Case C

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S SERIAL: L-0608 DATE: 7-21-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
0		116405.00	-7.549517E-15	.0000	4.8672E-04	2.2062E-02
1		228932.00	-9.521587E-01	9.7759	3.0651E-03	5.5363E-02
2		232999.00	-1.011392E+00	10.3841	3.5322E-03	5.9432E-02
3		238115.00	-1.091261E+00	11.2041	4.2653E-03	6.5310E-02
4		240059.00	-1.123365E+00	11.5337	4.5974E-03	6.7804E-02
5		243734.00	-1.187023E+00	12.1873	5.3269E-03	7.2986E-02

1	1.00	256881.00	-1.455082E+00	14.9395	1.9601E-02	1.4000E-01
2	221.00	257523.00	-1.470208E+00	15.0948	2.0259E-02	1.4233E-01
3	166.00	257445.00	-1.468358E+00	15.0758	2.0177E-02	1.4205E-01
4	111.00	256712.00	-1.451138E+00	14.8990	1.9433E-02	1.3940E-01
5	56.00	257833.00	-1.477595E+00	15.1706	2.0587E-02	1.4348E-01
6	248.00	256413.00	-1.444198E+00	14.8277	1.9140E-02	1.3835E-01
7	193.00	255669.00	-1.427135E+00	14.6525	1.8439E-02	1.3579E-01
8	138.00	257424.00	-1.467361E+00	15.0707	2.0155E-02	1.4197E-01
9	83.00	257311.00	-1.465188E+00	15.0432	2.0038E-02	1.4156E-01
10	28.00	257479.00	-1.469164E+00	15.0841	2.0213E-02	1.4217E-01
11	235.00	257607.00	-1.472204E+00	15.1153	2.0347E-02	1.4264E-01
12	180.00	255958.00	-1.433729E+00	14.7202	1.8707E-02	1.3677E-01
13	125.00	257310.00	-1.465164E+00	15.0430	2.0037E-02	1.4155E-01
14	70.00	256236.00	-1.440112E+00	14.7858	1.8970E-02	1.3773E-01
15	15.00	256130.00	-1.437674E+00	14.7607	1.8869E-02	1.3737E-01
16	263.00	256996.00	-1.457775E+00	14.9671	1.9717E-02	1.4042E-01
17	208.00	255469.00	-1.422598E+00	14.6060	1.8256E-02	1.3512E-01
18	153.00	256506.00	-1.446352E+00	14.8498	1.9231E-02	1.3868E-01
19	98.00	257223.00	-1.463112E+00	15.0219	1.9948E-02	1.4124E-01
20	43.00	257600.00	-1.472038E+00	15.1136	2.0340E-02	1.4262E-01
21	45.00	257106.00	-1.460357E+00	14.9936	1.9828E-02	1.4081E-01
22	265.00	255675.00	-1.427272E+00	14.6539	1.8444E-02	1.3581E-01
23	210.00	256171.00	-1.438616E+00	14.7704	1.8908E-02	1.3751E-01
24	155.00	255872.00	-1.431762E+00	14.7000	1.8627E-02	1.3648E-01
25	100.00	255587.00	-1.425273E+00	14.6334	1.8364E-02	1.3551E-01
26	10.00	256013.00	-1.432988E+00	14.7332	1.8759E-02	1.3696E-01
27	230.00	254163.00	-1.393464E+00	14.3068	1.7125E-02	1.3086E-01
28	175.00	254000.00	-1.389886E+00	14.2701	1.6991E-02	1.3035E-01
29	120.00	254705.00	-1.405452E+00	14.4299	1.7582E-02	1.3260E-01
30	65.00	255411.00	-1.421286E+00	14.5925	1.8204E-02	1.3492E-01

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DATA SET 2

Model 2, Case C

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BETA BACKSCATTER DATA

REMARKS: TESTER NO: 100 PART NO: R'S SERIAL: L-0608 DATE: 7-21-76

***** NON-UNIFORM WEIGHTING *****

CALIBRATION DATA

STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRVTNS	Y(I)= LN($\frac{CINF-C(I)}{CINF-CO}$)	STN. DEV. IN Y(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGD	12954.00	3.00				
(INF)=LARGE	299646.00	3.00				
0	116405.00	3.00	-7.549517E-15	1.520259E-03	3.437668E-04	-2.261238E-01
1	9.7300	228932.00	3.00	-9.521587E-01	4.893760E-03	-9.476497E-01
2	10.4700	232999.00	3.00	-1.011392E+00	5.267338E-03	-1.019748E+00
3	11.2000	238115.00	3.00	-1.091261E+00	5.810208E-03	-1.090872E+00
4	11.5100	240059.00	3.00	-1.123365E+00	6.041742E-03	-1.121075E+00
5	12.1700	243734.00	3.00	-1.187023E+00	6.524683E-03	-1.185379E+00
AVERAGE=	11.0160		WEIGHTED AVERAGE=	-1.056151E+00		

NO. OF STANDARDS CONSIDERED= 5

A= 3.4377E-04 VAR(A)= 1.0372E-03 DEV(A)= 3.2205E-02
 B= -9.7430E-02 VAR(B)= 8.7668E-06 DEV(B)= 2.9609E-03

COV(A,B)= -9.5064E-05
 RESIDUAL= 3.5770E+00
 SQ. OF CORRELATION= 9.9671E-01

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DATA SET 2

Model 2, Case D

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S SERIAL: L-0608 DATE: 7-21-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
1		228932.00	-9.521587E-01	9.7763	4.2405E-03	6.5119E-02
2		232999.00	-1.011392E+00	10.3842	3.7832E-03	6.1507E-02
3		238115.00	-1.091261E+00	11.2040	4.3417E-03	6.5891E-02
4		240059.00	-1.123365E+00	11.5335	4.9504E-03	7.0359E-02
5		243734.00	-1.187523E+00	12.1869	6.8165E-03	8.2562E-02

1	1.00	256881.00	-1.455382E+00	14.9382	3.4449E-02	1.8560E-01
2	221.00	257523.00	-1.470208E+00	15.0934	3.6273E-02	1.9046E-01
3	166.00	257445.00	-1.468358E+00	15.0744	3.6047E-02	1.8986E-01
4	111.00	256712.00	-1.451138E+00	14.8977	3.3983E-02	1.8435E-01
5	56.00	257833.00	-1.477595E+00	15.1692	3.7188E-02	1.9284E-01
6	248.00	256413.00	-1.444198E+00	14.8265	3.3176E-02	1.8214E-01
7	193.00	255669.00	-1.427135E+00	14.6513	3.1246E-02	1.7677E-01
8	138.00	257424.00	-1.467361E+00	15.0693	3.5986E-02	1.8970E-01
9	83.00	257311.00	-1.465188E+00	15.0419	3.5661E-02	1.8884E-01
10	28.00	257479.00	-1.469164E+00	15.0827	3.6145E-02	1.9012E-01
11	235.00	257607.00	-1.472204E+00	15.1139	3.6519E-02	1.9110E-01
12	180.00	255958.00	-1.433729E+00	14.7190	3.1982E-02	1.7884E-01
13	125.00	257310.00	-1.465164E+00	15.0417	3.5658E-02	1.8883E-01
14	70.00	256236.00	-1.440112E+00	14.7845	3.2706E-02	1.8085E-01
15	15.00	256130.00	-1.437374E+00	14.7595	3.2428E-02	1.8008E-01
16	263.00	256996.00	-1.457775E+00	14.9658	3.4769E-02	1.8646E-01
17	208.00	255469.00	-1.422598E+00	14.6048	3.0747E-02	1.7535E-01
18	153.00	256506.00	-1.446352E+00	14.8486	3.3425E-02	1.8282E-01
19	98.00	257223.00	-1.463112E+00	15.0206	3.5409E-02	1.8817E-01
20	43.00	257600.00	-1.472338E+00	15.1122	3.6499E-02	1.9105E-01
21	45.00	257106.00	-1.460357E+00	14.9923	3.5078E-02	1.8729E-01
22	265.00	255675.00	-1.427272E+00	14.6527	3.1261E-02	1.7681E-01
23	210.00	256171.00	-1.438516E+00	14.7692	3.2535E-02	1.8038E-01
24	155.00	255872.00	-1.431762E+00	14.6988	3.1761E-02	1.7822E-01
25	100.00	255587.00	-1.425273E+00	14.6322	3.1040E-02	1.7618E-01
26	10.00	256013.00	-1.434988E+00	14.7319	3.2124E-02	1.7923E-01
27	230.00	254163.00	-1.393464E+00	14.3057	2.7674E-02	1.6636E-01
28	175.00	254000.00	-1.389886E+00	14.2690	2.7313E-02	1.6527E-01
29	120.00	254705.00	-1.405452E+00	14.4288	2.8910E-02	1.7003E-01
30	65.00	255411.00	-1.421286E+00	14.5913	3.0603E-02	1.7494E-01

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DATA SET 2
Model 2, Case D

1 BETA BACKSCATTER DATA
 REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-23-76

***** UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRV'TNS	Y(I)=	C(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGD		12938.00	3.00				
(INF)=LARGE		299918.00	3.00				
0	.0	116381.00	3.00		1.163810E+05	1.178339E+05	-1.452939E+03
1	9.7300	228611.00	3.00		2.286110E+05	2.223494E+05	6.261640E+03
2	10.4700	233204.00	3.00		2.332040E+05	2.302981E+05	2.905882E+03
3	11.2000	236575.00	3.00		2.365750E+05	2.381395E+05	-1.564460E+03
4	11.5100	239926.00	3.00		2.399260E+05	2.414693E+05	-1.543345E+03
5	12.1700	243952.00	3.00		2.439520E+05	2.485588E+05	-4.606778E+03
				AVERAGE=	2.164415E+05		

NO. OF STANDARDS CONSIDERED= 6

A= 1.1783E+05 VAR(A)= 1.8416E+07 DEV(A)= 4.2914E+03
 B= 1.0742E+04 VAR(B)= 1.8105E+05 DEV(B)= 4.2550E+02
 COV(A,B)= -1.6620E+06
 RESIDUAL= 7.5815E+07
 SQ. ERROR= 1.8954E+07
 SQ. OF CORRELATION= 9.9376E-01

DATA SET 3
 Model 1, Case A

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-23-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
0		116381.00	1.163910E+05	- .1353	3.2781E-01	5.7255E-01
1		228611.00	2.286110E+05	10.3129	1.9366E-01	4.4007E-01
2		233204.00	2.332040E+05	10.7405	1.9547E-01	4.4212E-01
3		236575.00	2.365750E+05	11.0544	1.9716E-01	4.4403E-01
4		239926.00	2.399260E+05	11.3663	1.9915E-01	4.4626E-01
5		243952.00	2.439520E+05	11.7411	2.0194E-01	4.4938E-01

1	1.00	226551.00	2.265510E+05	10.1212	1.9304E-01	4.3936E-01
2	221.00	225918.00	2.259180E+05	10.0622	1.9287E-01	4.3917E-01
3	166.00	226165.00	2.261550E+05	10.0852	1.9294E-01	4.3924E-01
4	111.00	225561.00	2.255510E+05	10.0290	1.9278E-01	4.3907E-01
5	56.00	225959.00	2.259590E+05	10.0660	1.9288E-01	4.3918E-01
6	248.00	224824.00	2.248240E+05	9.9604	1.9261E-01	4.3887E-01
7	193.00	224801.00	2.248010E+05	9.9582	1.9260E-01	4.3886E-01
8	138.00	226097.00	2.260970E+05	10.0789	1.9292E-01	4.3922E-01
9	83.00	226239.00	2.262390E+05	10.0921	1.9295E-01	4.3927E-01
10	28.00	224686.00	2.246860E+05	9.9475	1.9257E-01	4.3883E-01
11	235.00	224592.00	2.245920E+05	9.9388	1.9255E-01	4.3881E-01
12	180.00	225510.00	2.255100E+05	10.0242	1.9277E-01	4.3905E-01
13	125.00	224778.00	2.247780E+05	9.9561	1.9259E-01	4.3886E-01
14	70.00	225352.00	2.253520E+05	10.0095	1.9273E-01	4.3901E-01
15	15.00	224283.00	2.242830E+05	9.9100	1.9249E-01	4.3873E-01
16	263.00	224754.00	2.247540E+05	9.9539	1.9259E-01	4.3885E-01
17	208.00	224656.00	2.246560E+05	9.9447	1.9257E-01	4.3882E-01
18	153.00	225398.00	2.253980E+05	10.0138	1.9274E-01	4.3902E-01
19	98.00	224494.00	2.244940E+05	9.9297	1.9253E-01	4.3878E-01
20	43.00	225090.00	2.250900E+05	9.9851	1.9267E-01	4.3894E-01
21	45.00	220458.00	2.204580E+05	9.5539	1.9187E-01	4.3803E-01
22	265.00	223594.00	2.235940E+05	9.8459	1.9235E-01	4.3857E-01
23	210.00	223917.00	2.239170E+05	9.8759	1.9241E-01	4.3865E-01
24	155.00	223904.00	2.239040E+05	9.8747	1.9241E-01	4.3864E-01
25	100.00	224690.00	2.246900E+05	9.9479	1.9257E-01	4.3883E-01
26	10.00	223913.00	2.239130E+05	9.8756	1.9241E-01	4.3864E-01
27	230.00	222734.00	2.227340E+05	9.7658	1.9219E-01	4.3839E-01
28	175.00	224242.00	2.242420E+05	9.9062	1.9248E-01	4.3872E-01
29	120.00	222902.00	2.229020E+05	9.7814	1.9222E-01	4.3843E-01
30	65.00	223108.00	2.231080E+05	9.8006	1.9225E-01	4.3847E-01

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DATA SET 3

Model 1, Case A

1 BETA BACKSCATTER DATA
 REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-23-76

***** UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRV TNS	Y(I)=	C(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BG RD		12938.00	3.00				
(INF)=LARGE		299918.00	3.00				
0	.0	116381.00	3.00		1.163810E+05	1.676308E+05	-5.124975E+04
1	9.7300	228611.00	3.00		2.286110E+05	2.284193E+05	1.917304E+02
2	10.4700	233204.00	3.00		2.332040E+05	2.330424E+05	1.615543E+02
3	11.2000	236575.00	3.00		2.365750E+05	2.376031E+05	-1.028146E+03
4	11.5100	239926.00	3.00		2.399260E+05	2.395399E+05	3.861176E+02
5	12.1700	243952.00	3.00		2.439520E+05	2.436633E+05	2.887442E+02
AVERAGE=				2.364536E+05			

NO. OF STANDARDS CONSIDERED= 5

A= 1.6763E+05 VAR(A)= 1.5450E+07 DEV(A)= 3.9307E+03
 B= 6.2475E+03 VAR(B)= 1.2658E+05 DEV(B)= 3.5577E+02

COV(A,B)= -1.3944E+06
 RESIDUAL= 1.3524E+06
 SQ. ERROR= 4.5080E+05
 SQ. OF CORRELATION= 9.9037E-01

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DATA SET 3
 Model 1, Case B

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-23-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
1		228611.00	2.286110E+05	9.7607	1.8970E-02	1.3773E-01
2		233204.00	2.332040E+05	10.4959	1.4737E-02	1.2140E-01
3		236575.00	2.365750E+05	11.0354	1.3861E-02	1.1773E-01
4		239926.00	2.399260E+05	11.5718	1.4861E-02	1.2191E-01
5		243952.00	2.439520E+05	12.2162	1.8531E-02	1.3613E-01

1	1.00	226551.00	2.265510E+05	9.4310	2.2007E-02	1.4835E-01
2	221.00	225918.00	2.259180E+05	9.3296	2.3082E-02	1.5193E-01
3	166.00	226165.00	2.261650E+05	9.3692	2.2654E-02	1.5051E-01
4	111.00	225561.00	2.255610E+05	9.2725	2.3717E-02	1.5400E-01
5	56.00	225959.00	2.259590E+05	9.3362	2.3010E-02	1.5169E-01
6	248.00	224824.00	2.248240E+05	9.1545	2.5096E-02	1.5842E-01
7	193.00	224801.00	2.248010E+05	9.1508	2.5141E-02	1.5856E-01
8	138.00	226097.00	2.260970E+05	9.3583	2.2771E-02	1.5090E-01
9	83.00	226239.00	2.262390E+05	9.3810	2.2528E-02	1.5009E-01
10	28.00	224686.00	2.246860E+05	9.1324	2.5365E-02	1.5926E-01
11	235.00	224592.00	2.245920E+05	9.1174	2.5549E-02	1.5984E-01
12	180.00	225510.00	2.255100E+05	9.2643	2.3810E-02	1.5430E-01
13	125.00	224778.00	2.247780E+05	9.1472	2.5185E-02	1.5870E-01
14	70.00	225352.00	2.253520E+05	9.2390	2.4099E-02	1.5524E-01
15	15.00	224283.00	2.242830E+05	9.0679	2.6166E-02	1.6176E-01
16	263.00	224754.00	2.247540E+05	9.1433	2.5232E-02	1.5885E-01
17	208.00	224656.00	2.246560E+05	9.1276	2.5423E-02	1.5945E-01
18	153.00	225398.00	2.253980E+05	9.2464	2.4015E-02	1.5497E-01
19	98.00	224494.00	2.244940E+05	9.1017	2.5743E-02	1.6045E-01
20	43.00	225090.00	2.250900E+05	9.1971	2.4588E-02	1.5681E-01
21	45.00	220458.00	2.204580E+05	8.4557	3.5117E-02	1.8740E-01
22	265.00	223594.00	2.235940E+05	8.9577	2.7599E-02	1.6613E-01
23	210.00	223917.00	2.239170E+05	9.0094	2.6918E-02	1.6407E-01
24	155.00	223904.00	2.239040E+05	9.0073	2.6945E-02	1.6415E-01
25	100.00	224690.00	2.246900E+05	9.1331	2.5357E-02	1.5924E-01
26	10.00	223913.00	2.239130E+05	9.0087	2.6926E-02	1.6409E-01
27	230.00	222734.00	2.227340E+05	8.8200	2.9498E-02	1.7175E-01
28	175.00	224242.00	2.242420E+05	9.0614	2.6249E-02	1.6202E-01
29	120.00	222902.00	2.229020E+05	8.8469	2.9118E-02	1.7064E-01
30	65.00	223108.00	2.231080E+05	8.8799	2.8657E-02	1.6928E-01

1 BETA BACKSCATTER DATA
 REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-23-76

***** UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRVTS	Y(I) = LN($\frac{CINF-C(I)}{CINF-CO}$)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGRD		12938.00	3.00			
(INF)=LARGE		299918.00	3.00			
0	.0	116381.00	3.00	-3.996803E-15	5.166635E-04	-5.166635E-04
1	9.7300	228611.00	3.00	-9.454218E-01	-9.410838E-01	-4.337997E-03
2	10.4700	233204.00	3.00	-1.012001E+00	-1.012696E+00	6.942854E-04
3	11.2000	236575.00	3.00	-1.063852E+00	-1.083340E+00	1.948809E-02
4	11.5100	239926.00	3.00	-1.118205E+00	-1.113340E+00	-4.865490E-03
5	12.1700	243952.00	3.00	-1.187672E+00	-1.177210E+00	-1.046222E-02

AVERAGE= -8.878587E-01

NO. OF STANDARDS CONSIDERED= 6

A= 5.1666E-04 VAR(A)= 1.2935E-04 DEV(A)= 1.1373E-02
 B= -9.6773E-02 VAR(B)= 1.2716E-06 DEV(B)= 1.1276E-03
 COV(A,B)= -1.1673E-05
 RESIDUAL= 5.3248E-04
 SQ. ERROR= 1.3312E-04
 SQ. OF CORRELATION= 9.9946E-01

DATA SET 3
 Model 2, Case A

1 TEST RESULTS:
REMARKS: TESTER NO: 100

PART NO: R'S DATE 7-23-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
0		116381.00	-3.996303E-15	.0053	2.8013E-02	1.6737E-01
1		226611.00	-9.454218E-01	9.7748	1.6632E-02	1.2896E-01
2		233204.00	-1.012301E+00	10.4628	1.6807E-02	1.2964E-01
3		236575.00	-1.063352E+00	10.9986	1.7033E-02	1.3051E-01
4		239926.00	-1.118205E+00	11.5603	1.7353E-02	1.3173E-01
5		243952.00	-1.187572E+00	12.2781	1.7887E-02	1.3374E-01

1	1.00	226551.00	-9.169420E-01	9.4805	1.6596E-02	1.2883E-01
2	221.00	225918.00	-9.083512E-01	9.3918	1.6590E-02	1.2880E-01
3	166.00	226165.00	-9.116346E-01	9.4263	1.6592E-02	1.2881E-01
4	111.00	225561.00	-9.035385E-01	9.3420	1.6587E-02	1.2879E-01
5	56.00	225959.00	-9.089054E-01	9.3975	1.6590E-02	1.2880E-01
6	248.00	224824.00	-8.936756E-01	9.2401	1.6584E-02	1.2878E-01
7	193.00	224801.00	-8.933594E-01	9.2369	1.6584E-02	1.2878E-01
8	138.00	226097.00	-9.107730E-01	9.4168	1.6591E-02	1.2881E-01
9	83.00	226239.00	-9.126385E-01	9.4367	1.6593E-02	1.2881E-01
10	28.00	224686.00	-8.918396E-01	9.2211	1.6584E-02	1.2878E-01
11	235.00	224592.00	-8.905309E-01	9.2082	1.6584E-02	1.2878E-01
12	180.00	225510.00	-9.028528E-01	9.3349	1.6587E-02	1.2879E-01
13	125.00	224778.00	-8.930532E-01	9.2338	1.6584E-02	1.2878E-01
14	70.00	225352.00	-9.007316E-01	9.3130	1.6586E-02	1.2879E-01
15	15.00	224283.00	-8.864371E-01	9.1659	1.6584E-02	1.2878E-01
16	263.00	224754.00	-8.927439E-01	9.2305	1.6584E-02	1.2878E-01
17	208.00	224656.00	-8.914409E-01	9.2170	1.6584E-02	1.2878E-01
18	153.00	225398.00	-9.013487E-01	9.3194	1.6587E-02	1.2879E-01
19	98.00	224494.00	-8.892308E-01	9.1948	1.6584E-02	1.2878E-01
20	43.00	225090.00	-8.972241E-01	9.2768	1.6585E-02	1.2878E-01
21	45.00	220458.00	-8.371625E-01	8.6561	1.6621E-02	1.2892E-01
22	265.00	223594.00	-8.774288E-01	9.0722	1.6585E-02	1.2878E-01
23	210.00	223917.00	-8.816598E-01	9.1160	1.6584E-02	1.2878E-01
24	155.00	223904.00	-8.814387E-01	9.1143	1.6584E-02	1.2878E-01
25	100.00	224690.00	-8.918328E-01	9.2217	1.6584E-02	1.2878E-01
26	10.00	223913.00	-8.816172E-01	9.1155	1.6584E-02	1.2878E-01
27	230.00	222734.00	-8.662241E-01	8.9564	1.6591E-02	1.2880E-01
28	175.00	224242.00	-8.859552E-01	9.1603	1.6584E-02	1.2878E-01
29	120.00	222902.00	-8.684031E-01	8.9790	1.6589E-02	1.2880E-01
30	65.00	223108.00	-8.710314E-01	9.0066	1.6588E-02	1.2879E-01

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DATA SET 3

Model 2, Case A

1 BETA BACKSCATTER DATA
 REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-23-76

***** UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRVTNS	Y(I) = LN($\frac{CINF-C(I)}{CINF-CO}$)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGRD (INF)=LARGE 0	0	12938.00 299918.00 116381.00	3.00 3.00 3.00	-3.996803E-15	1.822436E-02	-1.822436E-02
1	9.7300	228611.00	3.00	-9.454218E-01	-9.389253E-01	-6.496451E-03
2	10.4700	233204.00	3.00	-1.012001E+00	-1.011720E+00	-2.815946E-04
3	11.2000	236575.00	3.00	-1.063852E+00	-1.083531E+00	1.967880E-02
4	11.5100	239926.00	3.00	-1.118205E+00	-1.114026E+00	-4.179376E-03
5	12.1700	243952.00	3.00	-1.187672E+00	-1.178951E+00	-8.721382E-03
AVERAGE=				-1.065430E+00		

NO. OF STANDARDS CONSIDERED= 5

A=	1.8224E-02	VAR(A)=	5.9757E-03	DEV(A)=	7.7303E-02
B=	-9.8371E-02	VAR(B)=	4.8956E-05	DEV(B)=	6.9968E-03
	COV(A,B)=	-5.3929E-04			
	RESIDUAL=	5.2307E-04			
	SQ. ERROR=	1.7436E-04			
	SQ. OF CORRELATION=	9.8505E-01			

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DATA SET 3
 Model 2, Case B

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-23-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
1		228611.00	-9.454218E-01	9.7960	2.9151E-02	1.7074E-01
2		233204.00	-1.012001E+00	10.4729	2.3114E-02	1.5203E-01
3		236575.00	-1.063852E+00	11.0000	2.1623E-02	1.4705E-01
4		239926.00	-1.118205E+00	11.5525	2.3077E-02	1.5191E-01
5		243952.00	-1.187672E+00	12.2587	2.9434E-02	1.7156E-01

1	1.00	226551.00	-9.169420E-01	9.5065	3.3148E-02	1.8207E-01
2	221.00	225918.00	-9.083512E-01	9.4192	3.4521E-02	1.8580E-01
3	166.00	226165.00	-9.116946E-01	9.4532	3.3978E-02	1.8433E-01
4	111.00	225561.00	-9.035385E-01	9.3703	3.5323E-02	1.8795E-01
5	56.00	225959.00	-9.089054E-01	9.4248	3.4430E-02	1.8555E-01
6	248.00	224824.00	-8.936756E-01	9.2700	3.7044E-02	1.9247E-01
7	193.00	224801.00	-8.933694E-01	9.2669	3.7099E-02	1.9261E-01
8	138.00	226097.00	-9.107730E-01	9.4438	3.4126E-02	1.8473E-01
9	83.00	226239.00	-9.126985E-01	9.4634	3.3817E-02	1.8389E-01
10	28.00	224686.00	-8.918396E-01	9.2513	3.7375E-02	1.9333E-01
11	235.00	224592.00	-8.905909E-01	9.2387	3.7603E-02	1.9391E-01
12	180.00	225510.00	-9.028528E-01	9.3633	3.5440E-02	1.8825E-01
13	125.00	224778.00	-8.930632E-01	9.2638	3.7154E-02	1.9275E-01
14	70.00	225352.00	-9.007316E-01	9.3417	3.5803E-02	1.8922E-01
15	15.00	224283.00	-8.864971E-01	9.1970	3.8360E-02	1.9586E-01
16	263.00	224754.00	-8.927439E-01	9.2605	3.7212E-02	1.9290E-01
17	208.00	224656.00	-8.914409E-01	9.2473	3.7448E-02	1.9351E-01
18	153.00	225398.00	-9.013487E-01	9.3480	3.5697E-02	1.8894E-01
19	98.00	224494.00	-8.892908E-01	9.2254	3.7841E-02	1.9453E-01
20	43.00	225090.00	-8.972241E-01	9.3061	3.6413E-02	1.9082E-01
21	45.00	220458.00	-8.371625E-01	8.6955	4.8862E-02	2.2105E-01
22	265.00	223594.00	-8.774288E-01	9.1049	4.0099E-02	2.0025E-01
23	210.00	223917.00	-8.816698E-01	9.1480	3.9275E-02	1.9818E-01
24	155.00	223904.00	-8.814987E-01	9.1462	3.9308E-02	1.9826E-01
25	100.00	224690.00	-8.918928E-01	9.2519	3.7366E-02	1.9330E-01
26	10.00	223913.00	-8.816172E-01	9.1474	3.9285E-02	1.9821E-01
27	230.00	222734.00	-8.662241E-01	8.9909	4.2368E-02	2.0583E-01
28	175.00	224242.00	-8.859552E-01	9.1915	3.8461E-02	1.9612E-01
29	120.00	222902.00	-8.684031E-01	9.0131	4.1916E-02	2.0473E-01
30	65.00	223108.00	-8.710814E-01	9.0403	4.1368E-02	2.0339E-01

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DATA SET 3
Model 2, Case B

1 BETA BACKSCATTER DATA
 REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-23-76

***** NON-UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRVTNS	Y(I)=	C(I)	STN. DEV. IN Y(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGRD		12938.00	3.00					
(INF)=LARGE		299918.00	3.00					
0	0	116381.00	3.00		1.163810E+05	1.969611E+02	1.171129E+05	-3.716107E+00
1	9.7300	228611.00	3.00		2.286110E+05	2.760501E+02	2.223345E+05	2.273668E+01
2	10.4700	233204.00	3.00		2.332040E+05	2.788094E+02	2.303370E+05	1.028300E+01
3	11.2000	236575.00	3.00		2.365750E+05	2.808173E+02	2.382313E+05	-5.898237E+00
4	11.5100	239926.00	3.00		2.399260E+05	2.827991E+02	2.415837E+05	-5.861797E+00
5	12.1700	243952.00	3.00		2.439520E+05	2.851619E+02	2.487210E+05	-1.672399E+01
AVERAGE=	9.1800			WEIGHTED AVERAGE=	2.016881E+05			

NO. OF STANDARDS CONSIDERED= 6

A=	1.1711E+05	VAR(A)=	3.8240E+04	DEV(A)=	1.9555E+02
B=	1.0814E+04	VAR(B)=	4.4201E+02	DEV(B)=	2.1024E+01
		COV(A,B)=	-3.4569E+03		
		RESIDUAL=	9.8535E+02		
		SQ. OF CORRELATION=	9.9629E-01		

DATA SET 3
 Model 1, Case C

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-23-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
0		116381.00	1.163810E+05	- .0677	6.6274E-04	2.5744E-02
1		228611.00	2.286110E+05	10.3104	7.7086E-04	2.7764E-02
2		233204.00	2.332040E+05	10.7351	7.9262E-04	2.8154E-02
3		236575.00	2.365750E+05	11.0468	8.0946E-04	2.8451E-02
4		239926.00	2.399260E+05	11.3567	8.2694E-04	2.8756E-02
5		243952.00	2.439520E+05	11.7290	8.4889E-04	2.9136E-02

1	1.00	226551.00	2.265510E+05	10.1199	2.0530E-03	4.5310E-02
2	221.00	225918.00	2.259180E+05	10.0614	2.0466E-03	4.5239E-02
3	166.00	226165.00	2.261650E+05	10.0842	2.0491E-03	4.5267E-02
4	111.00	225561.00	2.255610E+05	10.0284	2.0430E-03	4.5200E-02
5	56.00	225959.00	2.259590E+05	10.0652	2.0470E-03	4.5244E-02
6	248.00	224824.00	2.248240E+05	9.9602	2.0356E-03	4.5117E-02
7	193.00	224801.00	2.248010E+05	9.9581	2.0353E-03	4.5115E-02
8	138.00	226097.00	2.260970E+05	10.0779	2.0484E-03	4.5259E-02
9	83.00	226239.00	2.262390E+05	10.0911	2.0499E-03	4.5275E-02
10	28.00	224686.00	2.246860E+05	9.9474	2.0342E-03	4.5102E-02
11	235.00	224592.00	2.245920E+05	9.9388	2.0332E-03	4.5092E-02
12	180.00	225510.00	2.255100E+05	10.0236	2.0425E-03	4.5194E-02
13	125.00	224778.00	2.247780E+05	9.9560	2.0351E-03	4.5112E-02
14	70.00	225352.00	2.253520E+05	10.0090	2.0409E-03	4.5176E-02
15	15.00	224283.00	2.242830E+05	9.9102	2.0302E-03	4.5057E-02
16	263.00	224754.00	2.247540E+05	9.9537	2.0349E-03	4.5110E-02
17	208.00	224656.00	2.246560E+05	9.9447	2.0339E-03	4.5099E-02
18	153.00	225398.00	2.253980E+05	10.0133	2.0414E-03	4.5181E-02
19	98.00	224494.00	2.244940E+05	9.9297	2.0323E-03	4.5081E-02
20	43.00	225090.00	2.250900E+05	9.9848	2.0383E-03	4.5147E-02
21	45.00	220458.00	2.204580E+05	9.5565	1.9923E-03	4.4636E-02
22	265.00	223594.00	2.235940E+05	9.8465	2.0233E-03	4.4981E-02
23	210.00	223917.00	2.239170E+05	9.8763	2.0265E-03	4.5017E-02
24	155.00	223904.00	2.239040E+05	9.8751	2.0264E-03	4.5015E-02
25	100.00	224690.00	2.246900E+05	9.9478	2.0342E-03	4.5102E-02
26	10.00	223913.00	2.239130E+05	9.8760	2.0265E-03	4.5016E-02
27	230.00	222734.00	2.227340E+05	9.7669	2.0147E-03	4.4886E-02
28	175.00	224242.00	2.242420E+05	9.9064	2.0297E-03	4.5053E-02
29	120.00	222902.00	2.229020E+05	9.7825	2.0164E-03	4.4904E-02
30	65.00	223108.00	2.231080E+05	9.8015	2.0184E-03	4.4927E-02

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DATA SET 3
Model 1, Case C

1 BETA BACKSCATTER DATA
 REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-23-76

***** NON-UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRVTNS	Y(I)=	C(I)	STN. DEV. IN Y(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGD		12938.00	3.00					
(IN)=LARGE		299918.00	3.00					
0	.0	116381.00	3.00		1.163810E+05	1.969611E+02	1.676995E+05	-2.605515E+02
1	9.7300	228611.00	3.00		2.286110E+05	2.760501E+02	2.284263E+05	6.691243E-01
2	10.4700	233204.00	3.00		2.332040E+05	2.788094E+02	2.330448E+05	5.711099E-01
3	11.2000	236575.00	3.00		2.365750E+05	2.808173E+02	2.376008E+05	-3.653046E+00
4	11.5100	239926.00	3.00		2.399260E+05	2.827991E+02	2.395356E+05	1.380459E+00
5	12.1700	243952.00	3.00		2.439520E+05	2.851619E+02	2.436548E+05	1.042238E+00
AVERAGE=	11.0160			WEIGHTED AVERAGE=	2.363346E+05			

NO. OF STANDARDS CONSIDERED= 5

A=	1.6770E+05	VAR(A)=	2.6812E+06	DEV(A)=	1.6374E+03
B=	6.2412E+03	VAR(B)=	2.2040E+04	DEV(B)=	1.4846E+02
	COV(A,B)=	-2.4238E+05			
	RESIDUAL=	1.7111E+01			
	SQ. OF CORRELATION=	9.9041E-01			

DATA SET 3
 Model 1, Case D

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-23-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
1		228611.00	2.286110E+05	9.7596	3.2273E-03	5.6810E-02
2		233204.00	2.332040E+05	10.4955	2.5425E-03	5.0423E-02
3		236575.00	2.365750E+05	11.0356	2.4298E-03	4.9293E-02
4		239926.00	2.399260E+05	11.5726	2.6450E-03	5.1429E-02
5		243952.00	2.439520E+05	12.2176	3.3349E-03	5.7749E-02

1	1.00	226551.00	2.265510E+05	9.4295	7.6110E-03	8.7241E-02
2	221.00	225918.00	2.259180E+05	9.3281	7.7805E-03	8.8207E-02
3	166.00	226165.00	2.261650E+05	9.3677	7.7129E-03	8.7823E-02
4	111.00	225561.00	2.255610E+05	9.2709	7.8812E-03	8.8776E-02
5	56.00	225959.00	2.259590E+05	9.3347	7.7691E-03	8.8143E-02
6	248.00	224824.00	2.248240E+05	9.1528	8.1008E-03	9.0005E-02
7	193.00	224801.00	2.248010E+05	9.1491	8.1079E-03	9.0044E-02
8	138.00	226097.00	2.260970E+05	9.3568	7.7314E-03	8.7928E-02
9	83.00	226239.00	2.262390E+05	9.3795	7.6931E-03	8.7710E-02
10	28.00	224686.00	2.246860E+05	9.1307	8.1437E-03	9.0243E-02
11	235.00	224592.00	2.245920E+05	9.1156	8.1732E-03	9.0406E-02
12	180.00	225510.00	2.255100E+05	9.2627	7.8959E-03	8.8859E-02
13	125.00	224778.00	2.247780E+05	9.1454	8.1151E-03	9.0084E-02
14	70.00	225352.00	2.253520E+05	9.2374	7.9419E-03	8.9117E-02
15	15.00	224283.00	2.242830E+05	9.0661	8.2721E-03	9.0951E-02
16	263.00	224754.00	2.247540E+05	9.1416	8.1225E-03	9.0125E-02
17	208.00	224656.00	2.246560E+05	9.1259	8.1531E-03	9.0295E-02
18	153.00	225398.00	2.253980E+05	9.2448	7.9284E-03	8.9042E-02
19	98.00	224494.00	2.244940E+05	9.0999	8.2043E-03	9.0578E-02
20	43.00	225090.00	2.250900E+05	9.1954	8.0197E-03	8.9553E-02
21	45.00	220458.00	2.204580E+05	8.4533	9.7256E-03	9.8619E-02
22	265.00	223594.00	2.235940E+05	8.9557	8.5025E-03	9.2209E-02
23	210.00	223917.00	2.239170E+05	9.0075	8.3928E-03	9.1612E-02
24	155.00	223904.00	2.239040E+05	9.0054	8.3972E-03	9.1636E-02
25	100.00	224690.00	2.246900E+05	9.1314	8.1425E-03	9.0236E-02
26	10.00	223913.00	2.239130E+05	9.0069	8.3941E-03	9.1620E-02
27	230.00	222734.00	2.227340E+05	8.8179	8.8095E-03	9.3859E-02
28	175.00	224242.00	2.242420E+05	9.0596	8.2854E-03	9.1024E-02
29	120.00	222902.00	2.229020E+05	8.8449	8.7479E-03	9.3530E-02
30	65.00	223108.00	2.231080E+05	8.8779	8.6734E-03	9.3131E-02

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DATA SET 3
Model 1, Case D

1 BETA BACKSCATTER DATA
 REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-23-76

***** NON-UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO. OF OBSRV'TNS	Y(I) = LN($\frac{CINF-C(I)}{CINF-CO}$)	STN. DEV. IN Y(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGD		12938.00	3.00				
(INF)=LARGE		299918.00	3.00				
0	0	116381.00	3.00	-3.996803E-15	1.517651E-03	2.168574E-06	-1.428902E-03
1	9.7300	228611.00	3.00	-9.454218E-01	4.846671E-03	-9.407095E-01	-9.722705E-01
2	10.4700	233204.00	3.00	-1.012001E+00	5.264736E-03	-1.012254E+00	4.794409E-02
3	11.2000	236575.00	3.00	-1.063852E+00	5.611710E-03	-1.082831E+00	3.382131E+00
4	11.5100	239926.00	3.00	-1.118205E+00	5.996600E-03	-1.112803E+00	-9.009038E-01
5	12.1700	243952.00	3.00	-1.187672E+00	6.521779E-03	-1.176613E+00	-1.695761E+00
AVERAGE=	9.1800			WEIGHTED AVERAGE= -2.845502E-01			

NO. OF STANDARDS CONSIDERED= 6

A= 2.1686E-06 VAR(A)= 2.2981E-06 DEV(A)= 1.5159E-03
 B= -9.6682E-02 VAR(B)= 7.1566E-08 DEV(B)= 2.6752E-04
 COV(A,B)= -2.1063E-07
 RESIDUAL= 1.6074E+01
 SQ. OF CORRELATION= 9.9988E-01

DATA SET 3
 Model 2, Case C

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-23-76

	POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)
0		116381.00	-3.995803E-15	9.0000	4.9226E-04	2.2187E-02
1		228611.00	-9.454218E-01	9.7787	3.0503E-03	5.5230E-02
2		233204.00	-1.012001E+00	10.4674	3.5783E-03	5.9819E-02
3		236575.00	-1.063852E+00	11.0037	4.0460E-03	6.3608E-02
4		239926.00	-1.118205E+00	11.5659	4.5958E-03	6.7792E-02
5		243952.00	-1.187672E+00	12.2844	5.3980E-03	7.3471E-02

1	1.00	226551.00	-9.169420E-01	9.4842	5.8490E-03	7.6479E-02
2	221.00	225918.00	-9.083512E-01	9.3953	5.7308E-03	7.5702E-02
3	166.00	226165.00	-9.116946E-01	9.4299	5.7765E-03	7.6004E-02
4	111.00	225561.00	-9.035385E-01	9.3455	5.6656E-03	7.5270E-02
5	56.00	225959.00	-9.089054E-01	9.4010	5.7384E-03	7.5752E-02
6	248.00	224824.00	-8.936756E-01	9.2435	5.5340E-03	7.4391E-02
7	193.00	224801.00	-8.933694E-01	9.2404	5.5300E-03	7.4364E-02
8	138.00	226097.00	-9.107730E-01	9.4204	5.7639E-03	7.5920E-02
9	83.00	226239.00	-9.126985E-01	9.4403	5.7903E-03	7.6094E-02
10	28.00	224686.00	-8.918396E-01	9.2245	5.5098E-03	7.4228E-02
11	235.00	224592.00	-8.905909E-01	9.2116	5.4935E-03	7.4118E-02
12	180.00	225510.00	-9.028528E-01	9.3384	5.6563E-03	7.5209E-02
13	125.00	224778.00	-8.930632E-01	9.2372	5.5260E-03	7.4337E-02
14	70.00	225352.00	-9.007316E-01	9.3165	5.6279E-03	7.5019E-02
15	15.00	224283.00	-8.864971E-01	9.1693	5.4401E-03	7.3757E-02
16	263.00	224754.00	-8.927439E-01	9.2339	5.5217E-03	7.4308E-02
17	208.00	224656.00	-8.914409E-01	9.2204	5.5046E-03	7.4193E-02
18	153.00	225398.00	-9.013487E-01	9.3229	5.6361E-03	7.5074E-02
19	98.00	224494.00	-8.892908E-01	9.1982	5.4764E-03	7.4003E-02
20	43.00	225090.00	-8.972241E-01	9.2802	5.5810E-03	7.4706E-02
21	45.00	220458.00	-8.371625E-01	8.6590	4.8330E-03	6.9520E-02
22	265.00	223594.00	-8.774288E-01	9.0755	5.3234E-03	7.2962E-02
23	210.00	223917.00	-8.816698E-01	9.1193	5.3777E-03	7.3333E-02
24	155.00	223904.00	-8.814987E-01	9.1176	5.3755E-03	7.3318E-02
25	100.00	224690.00	-8.918928E-01	9.2251	5.5105E-03	7.4233E-02
26	10.00	223913.00	-8.816172E-01	9.1188	5.3770E-03	7.3328E-02
27	230.00	222734.00	-8.662241E-01	8.9596	5.1826E-03	7.1990E-02
28	175.00	224242.00	-8.859552E-01	9.1637	5.4330E-03	7.3709E-02
29	120.00	222902.00	-8.684031E-01	8.9821	5.2097E-03	7.2178E-02
30	65.00	223108.00	-8.710814E-01	9.0098	5.2432E-03	7.2410E-02

1 BETA BACKSCATTER DATA
 REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-23-76

***** NON-UNIFORM WEIGHTING *****

CALIBRATION DATA

	STANDARD THICKNESS	GEIGER COUNTS C(I)	NO OF OBSRVTS	Y(I)= LN($\frac{CINF-C(I)}{CINF-CO}$)	STN. DEV. IN Y(I)	ESTIMATED Y(I)	RESIDUAL IN Y(I)
(AIR)=BGR		12938.00	3.00				
(INF)=LARGE		299918.00	3.00				
	.0	116381.00	3.00	-3.996803E-15	1.517651E-03	9.660404E-04	-6.365368E-01
	9.7300	228611.00	3.00	-9.454218E-01	4.846671E-03	-9.406052E-01	-9.937870E-01
	10.4700	233204.00	3.00	-1.012001E+00	5.264736E-03	-1.012215E+00	4.055374E-02
	11.2000	236575.00	3.00	-1.063852E+00	5.611710E-03	-1.082857E+00	3.386690E+00
	11.5100	239926.00	3.00	-1.118205E+00	5.996600E-03	-1.112856E+00	-8.920705E-01
	12.1700	243952.00	3.00	-1.187672E+00	6.521779E-03	-1.176724E+00	-1.678699E+00
AVERAGE=	11.0160			WEIGHTED AVERAGE= -1.048457E+00			

NO. OF STANDARDS CONSIDERED= 5

A= 9.6604E-04 VAR(A)= 1.0237E-03 DEV(A)= 3.1996E-02
 B= -9.6770E-02 VAR(B)= 8.6524E-06 DEV(B)= 2.9415E-03

COV(A,B)= -9.3831E-05
 RESIDUAL= 1.6073E+01
 SQ. OF CORRELATION= 9.8537E-01

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DATA SET 3
 Model 2, Case D

1 TEST RESULTS:
REMARKS: TESTER NO: 100 PART NO: R'S DATE 7-23-76

POSITION	COUNTS	Y(I)=(ABOVE)	ESTIMATED THICKNESS T(I)	VAR(T)	DEV(T)	
1	228611.00	-9.454218E-01	9.7798	4.2162E-03	6.4933E-02	
2	233204.00	-1.012001E+00	10.4678	3.7513E-03	6.1248E-02	
3	236578.00	-1.063852E+00	11.0036	4.0466E-03	6.3613E-02	
4	239926.00	-1.118205E+00	11.5653	4.9803E-03	7.0571E-02	
5	243952.00	-1.187672E+00	12.2831	7.1146E-03	8.4348E-02	
1	1.00	226551.00	-9.169420E-01	9.4855	7.6990E-03	8.7744E-02
2	221.00	225918.00	-9.083512E-01	9.3967	7.8201E-03	8.8431E-02
3	166.00	226165.00	-9.116946E-01	9.4312	7.7710E-03	8.8153E-02
4	111.00	225561.00	-9.035385E-01	9.3470	7.8952E-03	8.8855E-02
5	56.00	225959.00	-9.089054E-01	9.4024	7.8118E-03	8.8384E-02
6	248.00	224824.00	-8.936756E-01	9.2450	8.0655E-03	8.9808E-02
7	193.00	224801.00	-8.933694E-01	9.2419	8.0711E-03	8.9839E-02
8	138.00	226097.00	-9.107730E-01	9.4217	7.7843E-03	8.8229E-02
9	83.00	226239.00	-9.126985E-01	9.4416	7.7568E-03	8.8072E-02
10	28.00	224686.00	-8.918396E-01	9.2261	8.0996E-03	8.9998E-02
11	235.00	224592.00	-8.905909E-01	9.2132	8.1232E-03	9.0129E-02
12	180.00	225510.00	-9.028528E-01	9.3399	7.9064E-03	8.8918E-02
13	125.00	224778.00	-8.930632E-01	9.2387	8.0768E-03	8.9871E-02
14	70.00	225352.00	-9.007316E-01	9.3180	7.9415E-03	8.9115E-02
15	15.00	224283.00	-8.864971E-01	9.1709	8.2031E-03	9.0571E-02
16	263.00	224754.00	-8.927439E-01	9.2354	8.0827E-03	8.9904E-02
17	208.00	224656.00	-8.914409E-01	9.2219	8.1071E-03	9.0039E-02
18	153.00	225398.00	-9.013487E-01	9.3243	7.9311E-03	8.9057E-02
19	58.00	224494.00	-8.892908E-01	9.1997	8.1482E-03	9.0267E-02
20	43.00	225090.00	-8.972241E-01	9.2817	8.0017E-03	8.9452E-02
21	45.00	220458.00	-8.371625E-01	8.6610	9.4607E-03	9.7266E-02
22	265.00	223594.00	-8.774288E-01	9.0771	8.3935E-03	9.1616E-02
23	210.00	223917.00	-8.816698E-01	9.1210	8.3022E-03	9.1116E-02
24	155.00	223904.00	-8.814987E-01	9.1192	8.3058E-03	9.1136E-02
25	100.00	224690.00	-8.918928E-01	9.2266	8.0986E-03	8.9992E-02
26	10.00	223913.00	-8.816172E-01	9.1204	8.3033E-03	9.1122E-02
27	230.00	222734.00	-8.662241E-01	8.9614	8.6542E-03	9.3028E-02
28	175.00	224242.00	-8.859552E-01	9.1653	8.2140E-03	9.0631E-02
29	120.00	222902.00	-8.684031E-01	8.9839	8.6013E-03	9.2743E-02
30	65.00	223108.00	-8.710814E-01	9.0116	8.5378E-03	9.2400E-02

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DATA SET 3

Model 2, Case D

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