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NEUTRON STREAMING THROUGH HYDROGENOUS MEDIA

By

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Type C

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ABSTRACT

The U. S. Naval Civil Engineering Laboratory is studying the design of various entranceways for protective structures. The particular portion of the work reported herein is con erned with air ducts in concrete. One of tl essential parameters for the design optimization of such ducts is the neutr energy spectra as a function of position in the duct. From this parameter r be determined the type and quantity of shielding materials necessary to ach a specified protection factor.

In order to achieve a uniform system of neutron dosimetry, it was deci to use the activation of bare and cadmium covered foils, foil sandwiches, a threshold foil detectors to measure flux spectra. This application represe one of the first times that foils were used to experimentally determine dif ferential flux over the energy range from 0.001 ev to 15 Mev. It is believ to be the first application to protective structure shielding experiments.

Preliminary to the experimental determination of neutron spectra by fo activation, it is essential that the responses of the selected foils be mea in a medium of known moderating and scattering properties. A hydrogenous m such as paraffin, meets this requirement and is experimentally simple. A s of nominally 14-Mev neutrons was directed at successively increasing thickn of paraffin made from 1-inch slabs 12x24 inches. Selected foils were place the opposite side of the paraffin and their response to the neutron irradia determined. From this study technology is developed by which the observed ponse of foils irradiated in complex shields may be related to neutron ener flux. The report of this technology will be made at the time neutron energ spectra for air ducts in concrete is reported. Herein is the report of the preliminary experiment where a study was made of neutrons streaming through hydrogenous media. The normalized activation responses of selected foils a given as a function of paraffin thickness.

Also described is the sequence of computer programs which process and analyze the radiometric data of such foils. These programs were specifically designed to handle the foil data associated with the experimental determination of neutron streaming through ducts; however, they are suitable for handling other radiometric analysis problems. By their use, radiometric analysis data may be rapidly processed with reasonable assurance of freedom from numerical error. Maximum utility of these programs is obtained when using automatic counting that punches data directly on cards usable as the computer input.

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INTRODUCTION

The application of foil activation for neutron flux measurement in the energy range above 1 Mev and below 0.5 ev has been described by Hughes.[1] Above 1 Mev threshold reactions are used and below 0.5 ev bare and cadmium responses are used. From the many foil techniques available for the measurement of neutrons with energy between 0.5 ev and 1 Mev, the application of foil sandwiches was selected. This application has been described by the author[2,3] after a method of Stehn[4] and the Staff of Argonne National Laboratory.[5]

The techniques for calculating neutron energy spectra from the activation response of several foils has been previously discussed.[6] Essential to such calculations is a knowledge of the various responses in a medium of known moderating and scattering properties. For this purpose a neutron generator employing the d,t reaction with an acceleration of 150 kev was used as a source of nominally 14-Mev neutrons. This source was directed at a praffin moderator so that the beam of deuterons was perpendicular to the exterior surface of the moderator. The response of selected foils was observed as a function of paraffin thickness in such a manner that no reflection was present. Each irradiation was normalized, maximizing the deuteron beam current by adjusting the focus, extraction, and accelerating voltage, and observing the counting rate of a slightly moderated BF_3 detector used as a flux monitor. The high voltage was adjusted last and assured that the incident neutron energy remained constant throughout the experiment. This is possible since the d,t reaction peaks at approximately 150 kev acceleration at which value the ejected neutrons have a most probable energy of 14 Mev.[7]

The activity of each foil was observed with an internal gas flow proportional detector with a "micromil" window and using "P" gas (90 percent argon, 10 percent methane). The detector was incorporated into an automatic counting system that directly punched cards. Data was identified by separate problem, sample, counting system, counting geometry, and observation numbers. All foils of the same type were of the same size and approximat mass and were irradiated for the same time. Data was corrected for detector resolution loss and decay after irradiation. Data was normalized in such a manner that knowledge of the distance from foil to the tritium target, counting efficiency, foil cross section, and irradiation time was not part of the analysis.

EXPERIMENT

The experiment consisted of irradiating certain selected foils, listed in Table I, with neutrons. Various thicknesses of paraffin were placed between the neutron source and the foils so as to moderate their initial nominal 14-Mev energy and to cause the neutrons to take on differing energy distributi No paraffin was placed behind the foils so as to minimize response to neutron backscatter. For each specific foil material the same foil dimensions were used throughout the series of experiments; however, variations occurred betwee different foil materials. The neutrons were produced by accelerating deuterium to approximately 150 kev before impinging on a tritium target. The accelerator operating conditions were optimized throughout the experiment by adjusting beam focus, extraction and acceleration voltage so as to maximize the beam current. It should be noted that the d(t,n) cross section is near its maximum value at 150 kev energy. At this energy of bombardment, the neutrons have a most probable energy of about 14 Mev. All foils for threshold detectors were irradiated 30 minutes. The aluminum-manganese foil sandwiches were irradiated for 10 minutes followed by a 10-minute period for manipulation and counting. This in turn was followed by a 15-minute irradiation for all copper foil sandwiches. The bare and cadmium covered indium foil combinations were irradiated at the same time; they were placed for irradiation to begin with the 10-minute irradiation of the aluminum-manganese sandwich and were removed after the 15-minute copper sandwich irradiation. Since the irradiation time of each specific foil was the same, no corrections were made for activity buildup during irradiation. A slightly moderated BF_3 detector was placed in a fixed position near the generator. The count of this detector integrated over the irradiation period was used as a relative measure of neutron flux which in turn was used to normalize all observed foil activities. No corrections were made for very slight differences in mass between different foils of the same material or for counter efficiency. However, inverse square corrections were made for the varying distance between the foils and the tritium target. All observed foil activities were corrected for decay between the end of irradiation and the time of observation. Particular attention was directed toward precision. Care was taken to insure the purity and cleanliness of foils.

Foil activities were observed with an internal gas flow proportional detector having a micromil window. This detector was placed in an automatic sample changer. The counting gas was 90 percent argon and 10 percent methane, and counts were observed at the center of the beta plateau. A RaDEF source electro deposited on a platinum disk supplied by the National Bureau of Standards was used as a long lived standard to assist in obtaining uniform counter response during the period of the experiments. The output of the counter was the input to a data converter which punched on IBM cards the counting data. Other information necessary to the experiments and analysis of data was manually punched on these and other cards. A complete description of the data format on these cards and the information that they require will be found in the following section: Data Reduction. All counting data was analyzed by the methods described therein, which included statistical analysis of variance.

DATA REDUCTION

Data experimentally obtained from automatic counting systems during experiments that measure neutron streaming through ducts may best be reduced by computer techniques. Computer programs are also suitable for handling other types of radiometric analysis. The processing of data by a digital computer insures accurate reduction and rapid handling, thus affording immediate review between experiments. The programs about to be presented were used to reduce the data from the experiment just discussed. However, to illustrate the broader applications of these programs, numerical examples are included from reduction of other counting data.

All output data from these programs may be used as data with which to calculate neutron flux. The calculations of this program are performed basically as has already been delineated.[8] Only departures from previous work and new information is presented herein. The programs described are: pre- and post-data compiler, PDC I, II; three data organizations, DATORG I, II, III; resolution, RESOL; two decisions, DCISON I, II; Chi Square, CHISQ; three analyses of variance, VAR I, Prep VAR, VAR II; three decay analyses, DECAY I, II, III; dead-time determination, DEAD; and backing thickness determination, BACKTH. The latter two programs are not part of the routine analysis, but are included for completeness.

The program sequence is shown by the block diagram of Figure 1. All programs were written in Fortran I and were designed to be compiled with the PDQ processor, using the IBM 1620 computer. This computer was selected since it is available near the experimental facility. It is, however, possible to modify the program for use on larger computers (e.g., 7090 or 7094 as a chain job with a control program). This would be accomplished by changing a few input and output statements.

PDC takes the counting data as punched by automatic counting equipment, whose format is shown in Figure 2, preceded by a deck of program definition cards. The format of the problem definition cards is shown in Figure 3. The following programs are designed to be run in sequence according to on-line comments. For specialized cases of radiometric data certain of the programs could be omitted from the running sequence; however, the experimentor is cautioned that such omission could result in a data format that the computer does not properly recognize.

PDC organizes all data by problem number and sample number and into a format most suitable for further reduction. Its output is the input to DATORG which sorts the data according to counting systems, and geometry. These various sortings allow the intermixing of data, thus affording flexibility of counting operations. Its output is the input to RESOLN which corrects observed counts for detector dead time. Data is then fed to DCISON which corrects observ counts for decay during the counting period. DCISON also tests to determine if decay has occurred between two successive observations on the same sample. If so, each observation is called "number one", but if not, the observation number is advanced sequentially, regardless of the observation number punched on the card. The output from this program is the input either to DECAY or to CHISQ, according to a predetermined code number.

DECAY corrects for decay between count observations and adjusts these observations to that estimated for a previous time. CHISQ is customarily used only when a new system is put into operation or its performance is questioned. It determines if a series of observations is from the Poisson distribution associated with the characteristic randomness of radioactive disintegration. Correct performance is exhibited only if such a distribution exists. The output of DECAY is the input to VAR which averages the counts, corrected to a particular time, that are associated with like samples. The error associated with this average is also estimated along with the number of additional samples necessary for a smaller error. Not directly associated with the data processing, but included for completeness, are two programs, DEAD and BACKTH. The former calculates the counter dead time used in RESOL, and the latter calculates the thickness of sample backing material by three different methods: first, from data given in milligrams per square centimeter; second, from data given in mils along with the material density; third, from the ratio of the observed counts of another source with and without the backing material.

The input and output formats, flow charts, and program listings will be presented later herein when each of the several programs is considered in more detail.

Program Description - Pre-Data Compiler

PDC sorts the counting data problem number, the major data breakdown, and transforms the raw data, punched by the automatic counting equipment, into a format more suitable for further reduction. The first cards read are all of the constants and problem identifying numbers required for further data reduction, such as sample numbers that should be compared, background data, decay constants, number of decay components, and special code numbers. Next, the data furnished by the automatic counting equipment is read. It should be noted that the sample counting time does not have the decimal point included on the card (a requirement of the counting equipment). Thus, this entry is immediately transferred from a fixed point number (no decimal point) to a floating point number (with decimal point). With the particular counting equipment utilized, the omitted decimal point on the input data card necessitates dividing the punched number by 100 in order to obtain the counting time in minutes. After preliminary sorting of data into separate problems, the input constants on cards are punched, followed by the data cards as they are processed. These comprise the input to post-data compiler, which organizes the problem by sample number and similarly punches the data in the same format. Table II lists the source program; the input and output data for a sample problem are given in Tables IIIa and IIIb, respectively.

Data Organization

DATORG consists of a sequence of programs beginning with the output of PDC. It arranges the data in ascending order with respect to system number, and geometry number, associating with each group the appropriate input constan The input data is punched in time sequence so that each field will be organized in time. If the data is already organized, this sequence of programs may be bypassed and the output of PDC used directly as input to RESOL. Once the data has been stored, a loop in the program performs the task of making the necessary changes to the sequence of data cards for their organization. After the data is sequenced appropriately in the storage array, duplicate cards are punched in an identical sequence. At this point, the next set of raw data is loaded, to be arranged in similar manner. Tables VI, VIII, and X list the source program, and the output listing of a sample problem is shown in Tables VII, IX, XI, for DATORG I, II, and III.

Resolution

RESOLN corrects the observed counts for detector dead time loss. It should be noted that if the counting rate of the data is sufficiently low so as not to exhibit the effects of resolution loss, this program may be bypassed, and the data used as input directly to DCISON. RESOL obtains the dead time from the data cards associated with the corresponding system. After processing data for a particular system, a new system number and value of resolution time is associated from the input with the counting data. The analysis is then repeated. Table XII is the source program listing and Table XIII lists the output for a sample problem.

Determining Dead Time

Dead time is calculated from a series of count rate observations made on a highly active, rapidly decaying radioactive sample. The analysis utilizes two data sets, N, the true count rate obtained by extrapolating low count rate observations with a known half-life, and M', the observed high count rate observations. For every point M' there must be an associated point N. A curve of the form for dead time corrections

$$N = \frac{M'}{1-M'\tau}$$

where τ is dead time, is then fitted to the data by the least-squares method. The program is limited to 100 data points for each of the M' and N sets. Input data is obtained from DCISON I, bypassing RESOLN. Table XIV is a listing of the source program, and the output data is listed in Table XV.

Decision

DCISON determines whether or not radioactive decay is significant. It also supplies background count data and the decay constant of principal intersect. There are two parts of this program: One, DCISON I, is used when the sample observed contains only one radioisotope (i.e. decays with a constant half-life) and the other, DCISON II, is used with a mixture of radioisotopes. Input data is obtained from RESOLN which senses the correct program and prints on-line instructions to the computer operator. If no background count information is given along with the counting data, the program searches for this information in the experimental constants section of the input data. It then determines if a decay constant is given by the counting data cards. If not, an effective decay constant is estimated by the relation

$$A_{i+1} = A_i e^{-\lambda t}$$

where A_i and A_{i+1} are two observations of count rate less background (made on the same sample using the same problem, system, and geometry numbers), A_{i+1} is the first observation made after observation A_i, t is the time difference between the two count rate observations, and λ is the effective decay constant. It should be noted that the value of λ for the second to the last card, $i = n-1$, is also used for the last card, $i = n$. The time difference is obtained by multiplying the difference in days by 24 and adding that number to the difference in hours. The result is multiplied by 60 and added to the remaining difference in fractional minutes. The effective decay constant thus determined is used only for computations within this program and is not otherwise transmitted to the output data.

Both forms of DCISON make additional tests and computations to correct for decay during counting and to determine if there is significant decay between observations. It is arbitrarily chosen that if the product of λt_c, t_c being the duration of count observations, is greater than 0.01, the observed counts (less background) are corrected for decay during observation by the relation

$$A_o = \frac{A\lambda t}{(1-e^{-\lambda t})}$$

where A is the observed counts and A_o is the corrected counts. For each such card, the observation number is set equal to one. If the count observation includes background, then it is necessary to convert sample and background counts to rates, subtracting the latter from the former, before making the above correction. If the product of the time difference, t_d, between observations and the decay constant, λ, is greater than 0.01, significant decay is said to have occurred between observations. If such is the case, the observation number is set equal to one and the time at which the observation is made is unadjusted. If, however, the product λt_d is less than 0.01, then the time of observation is set equal to that time of the first data and the observation number is set equal to that of one plus the data immediately preceding. The source programs are listed in Table XVI, XVIII and the output listing for both forms of DCISON is given in Table XVIIab, XIX.

Chi Square

CHISQ is a program used to determine if a counting system is performing satisfactorily. This program obtains its input data from DCISON but it is not part of normal data reduction; rather, it is used when testing a counting system. Data for CHISQ is obtained as a series of count rate observations, each for an equal interval of time. It should be noted that any counting system should exhibit only the Poisson variations of random disintegration process except for minor long term changes. The source program is listed in Table XX, and in Table XXI is the output listing for a sample program.

Decay

DECAY is a program used to correct for radioactive decay in the countin rate of a sample. In the present scheme of analysis three programs are pro vided depending upon whether there are one, two or three components of deca The number of decay components (i.e., decay constants), is sensed by the preceding program DCISON, and appropriate on-line instructions are provided to the computer operator. For this program the cards associated with the problem constants provide the decay constants. The program interprets thes decay constants as the slope of straight lines on similog paper and fits th observed counting rate data to the straight lines such that the sum of the straight line components, one for each decay component, is equal to the observed counting data; as a function of time the smooth curve through the counting rate data is optimized by the least-squares process. The source programs are listed in Tables XXII, XXIV, and XXXI, for Decay I, II, and II corresponding to 1, 2, and 3 components of radioactivity. The program estimates the most probable counting rate for each component of the radioacti sample, up to a maximum of three components. This estimate is at either a given day and time, which must be less than the lowest day and time, or the lowest day and time depending upon the information given in the data of problem constants. Additionally, each data point is corrected back to that time so that the resulting output data which is shown in Tables XXIII, XXV, XXVII, respectively for Decay I, II, and III consists of the average counting rate for each component as well as the average total counting rate of the sample along with the counting rate of each observation broken into its constituent radioactive components along with the sum of these components. In all cases the other experimental parameters such as time of observation, background counting, and time of observation of the background counts, number of samples, and number of observations per sample, are preserved so that subsequent programs can associate confidence limits with these count-rate estimates. Although some variance of data points from the idealized curve is possible, extreme variations are not tolerated by the present program. This is because weighting is not employed to allow counting rates that more closely approximate the predicted value (based upon known half-life) to be considered more important than those counting rates which deviate considerably from the predicted values. For the same reason, gross errors can result if the absolute magnitude of one component of radioactive decay is small in comparison with the absolute magnitude of the sum total of all components of radioactive decay present in the sample. These limitations, however, do not impose serious restrictions for practical radiometric analysis, and the incorporation of these limitations together with those concerning the duration of time of observation and number of observations per sample, which will be discussed as part of the following program VAR, greatly simplify the mathematical analysis and required computer programming.

Analysis of Variance

VAR is a program for determining the average counting rate of a series of observations made over a period of time. As such, there are possible mechanical, sampling, chemical, (when more than one sample is being compared) and non-Poisson counting errors in addition to the Poisson variation of radioactive decay process. Its input is the count rate of the sample and background counting rate provided by DCISON. The program also estimates the confidence interval associated with the average count rate.

The program considers m samples whose hypothetical true count rate is the average of an infinite number of observations made on an infinite number of samples. Thus, the m samples represent a random collection from the sample population. This population has a mean and a standard deviation, whose estimates based upon m samples observed a finite number of times are, respectively, $\tilde{\mu}$ and $\tilde{\sigma}$. These parameters, along with identification data, are provided as output data. It is assumed that each sample is observed for the same number of times, that each time duration of observation is the same, and that a separate background determination is made for each observation.

In addition to determining the best estimate of the counting rate, an estimate is made of the confidence limit associated with the standard deviation, 0.90, 0.95, and 0.99-level of significance. This level is used in calculating the upper and lower limits of the confidence interval associated with $\tilde{\mu}$. Additionally, the number of additional samples, or observations, in the case of single sample, required to reduce the estimated error of the measurement is calculated and punched on cards together with the other output data. The program is listed in Table XXVIII, for the case of one sample, and the output of a sample program is listed in Table XXIX. The result is the best estimate of the counting rate of each component of radioactive material, up to a maximum of three, at a given day and time, along with the confidence interval of these estimates. This best estimate is based upon a series of observations made on a series of samples. Similar source programs for the case of many samples, are listed in Tables XXX and XXXII. The corresponding sample output data listings are in Tables XXXI and XXXIII.

Backing Thickness

BACKTH calculates the thickness, XF, of backing material for radioactive samples by three different methods. First, the data may already be given in the desired units, mg/cm^2, which merely entails punching the sample number with its associated thickness. Second, the thickness may be given in mils, in which case the density, ρ, of the backing material must accompany the value of thickness. Third, the data may be given as the ratio of counts observed when the backing is used as a absorber. Input data is obtained from the output of DECAY I, since this program is also not part of the regular reduction routine. If the density is missing, this indicates that the backing thickness is already in the desired units, mg/cm^2. If the density is present, then the thickness is in mils, which requires changing these units to milligrams per square centimeter. This is accomplished by multiplying the given value of XF(I) by

$$10^{-3}(\text{in}) \quad 2.54\ (\text{cm/in}) \quad \rho(\text{mg/cm}^3)$$

where ρ = the density of the backing material. Thus, XF(I) is now in the desired units. On the other hand, if the value of XF(I) is missing, then the data card must contain the maximum beta energy for this particular isotope, E, the counts observed when the backing is used as an absorber, AA, and the counts when the backing is not used as an absorber, A0. A zero value of XF(I) instructs the program to check the geometry number given for the present execution of BACKTH. A geometry code number less than 10 indicates narrow geometry. If this is the case, the above entries on the current data card are used in obtaining a value of the mass absorption coefficient, α, by employing the following equation for narrow geometry

$$\alpha = \frac{22}{E^{1.33}} \ , \quad cm^2/gm$$

where E = energy, Mev. If the geometry code number is greater than or equal to 10, indicating wide geometry (2π or 4π), then the given value of the maximum beta energy, E, is checked to see if it is less than 1.45 Mev. If so, the following equation for wide geometry is used to determine α

$$\alpha = \frac{60}{E^{1.54}}$$

If the value of E is greater or equal to 1.45 Mev., the equation, also for wide geometry, is employed

$$\alpha = \frac{200}{E^{6.25}}$$

After the appropriate value of α is determined, it is used in calculating the corresponding value of XF(I). This is done by substituting the values of AO, AA and α into the following expression

$$XF(I) = \frac{\ln (AO)}{\alpha} - \frac{\ln (AA)}{\alpha}$$

Immediately, this value of XF(I) and its associated sample number are punched on cards. The source program is listed in Table XXXIV and Table XXXV lists the output data for a sample problem. It should be noted that these programs do not handle the case where the geometry is actually neither narrow or wide but somewhere between the two special cases.

RESULTS

The response of the selected foils to moderated neutrons is shown in Figure 4. In this Figure the response of each foil was normalized by dividing the observed activity by the maximum observed activity. This normalized activity is the linear left ordinate and is plotted versus the paraffin thickness, measured in inches along the logarithmic abscissa. The only exception is the cadmium ratio determinations. The cadmium ratio was calculated by dividing the activity of the bare foil by the activity of the foil covered with 20 mils of cadmium. This ratio is the linear right ordinate plotted against the same abscissa. The reciprocal of the cadmium ratio is the fraction of the total number of neutrons having energies greater than the effective cadmium cutoff energy (N.B., for the cadmium thickness specified above and for an ambient temperature of 23°C, the effective cadmium cutoff energy is 0.48 ev). From the cadmium ratio an estimate may be visually obtained of the average neutron energy. This may be used as a comparison basis for the foil response.

It will be seen in Figure 3 that the response of each foil is fairly narrow and does not overlap more than a portion of the adjacent foil. Further, it will be seen that there is no energy at which some foil does not have a significant response. Most of the foils have responses between 1 and 16 Mev. This is the energy region where most resolution is needed in the study of the penetration of 14-Mev neutrons through shielded structures.[5]

CONCLUSIONS

Twelve feet of paraffin will thermalize at least 99 percent of all 14-Mev neutrons as evidenced by the measured cadmium ratio of indium. The response of each selected foil, ordered in decreasing energy, overlap no more than the response of the adjacent foils and there is no energy "gap" for which there is no response of at least one foil. The resolution of foil response, i.e., the width of the response curve, is most suitable for measuring neutron streaming through ducted entranceways of protective structures.

A series of computer programs is most useful for the reduction of foil activation data. The programs are written for particular application to shielding studies where several different foils are irradiated in many different locations in the shield. The programs take care of the "bookkeeping" for such an experimental program, such as foil positions, foil type, radiometric system and geometry, and different observations for the statistical analysis incorporated in the program.

ACKNOWLEDGEMENTS

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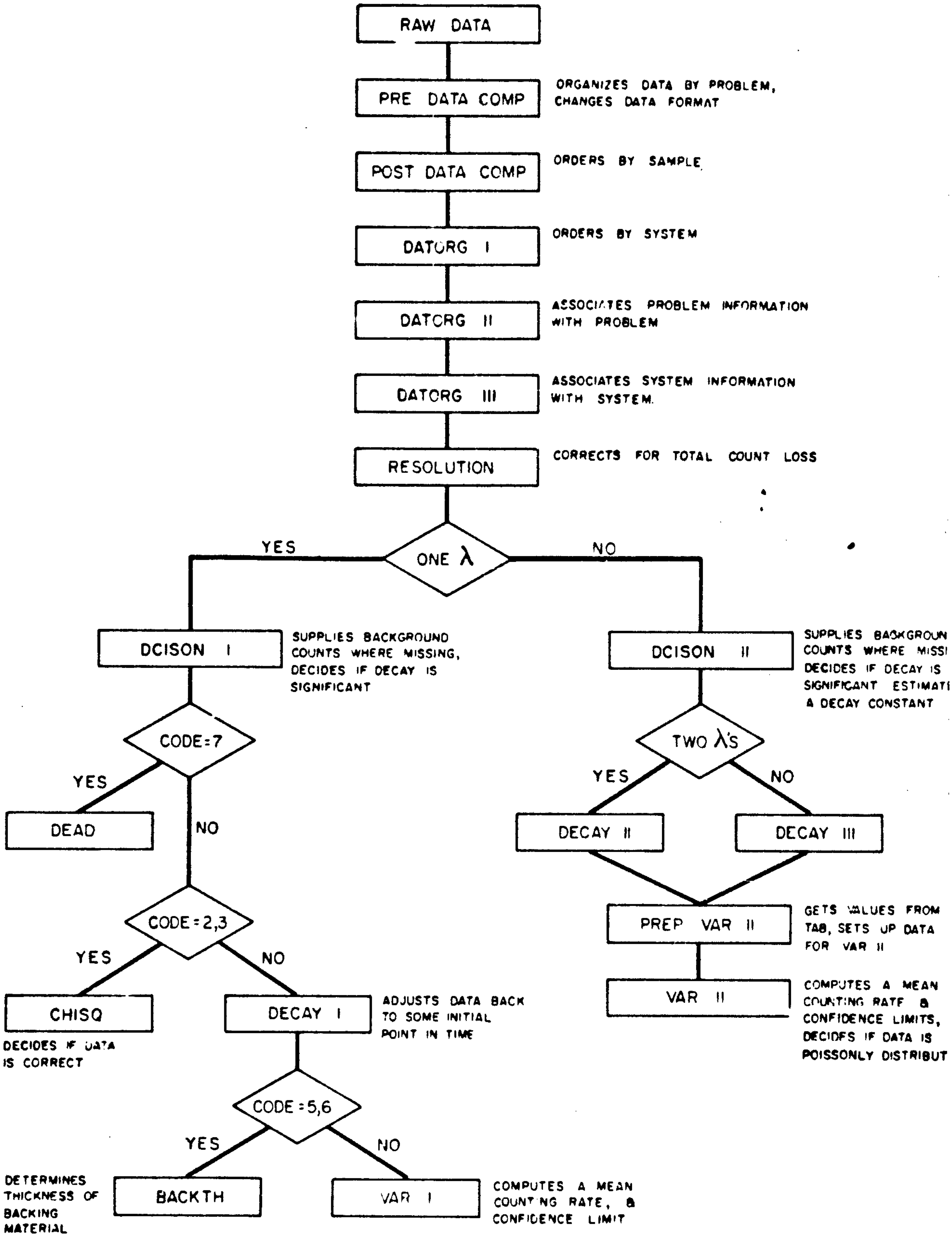

Figure 1. Program Sequence.

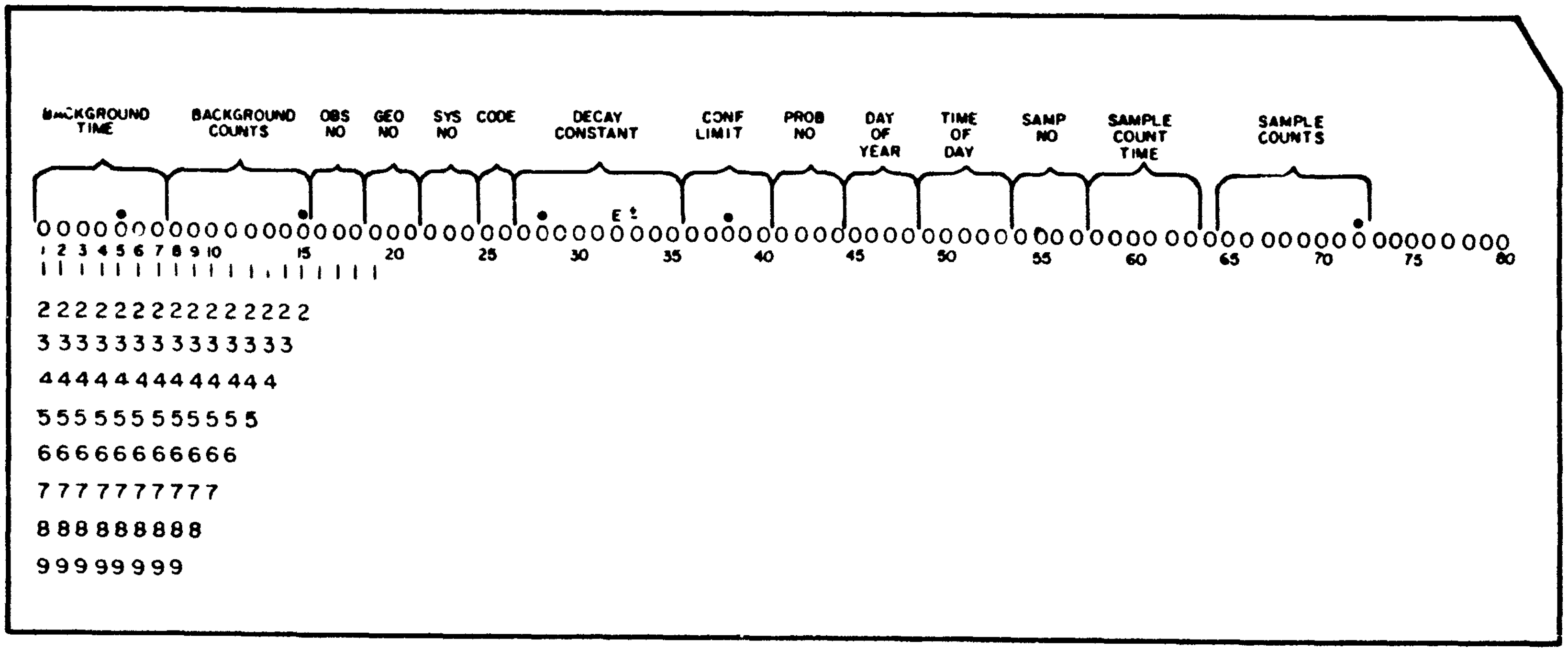

Figure 2. Format of Counting Input Data.

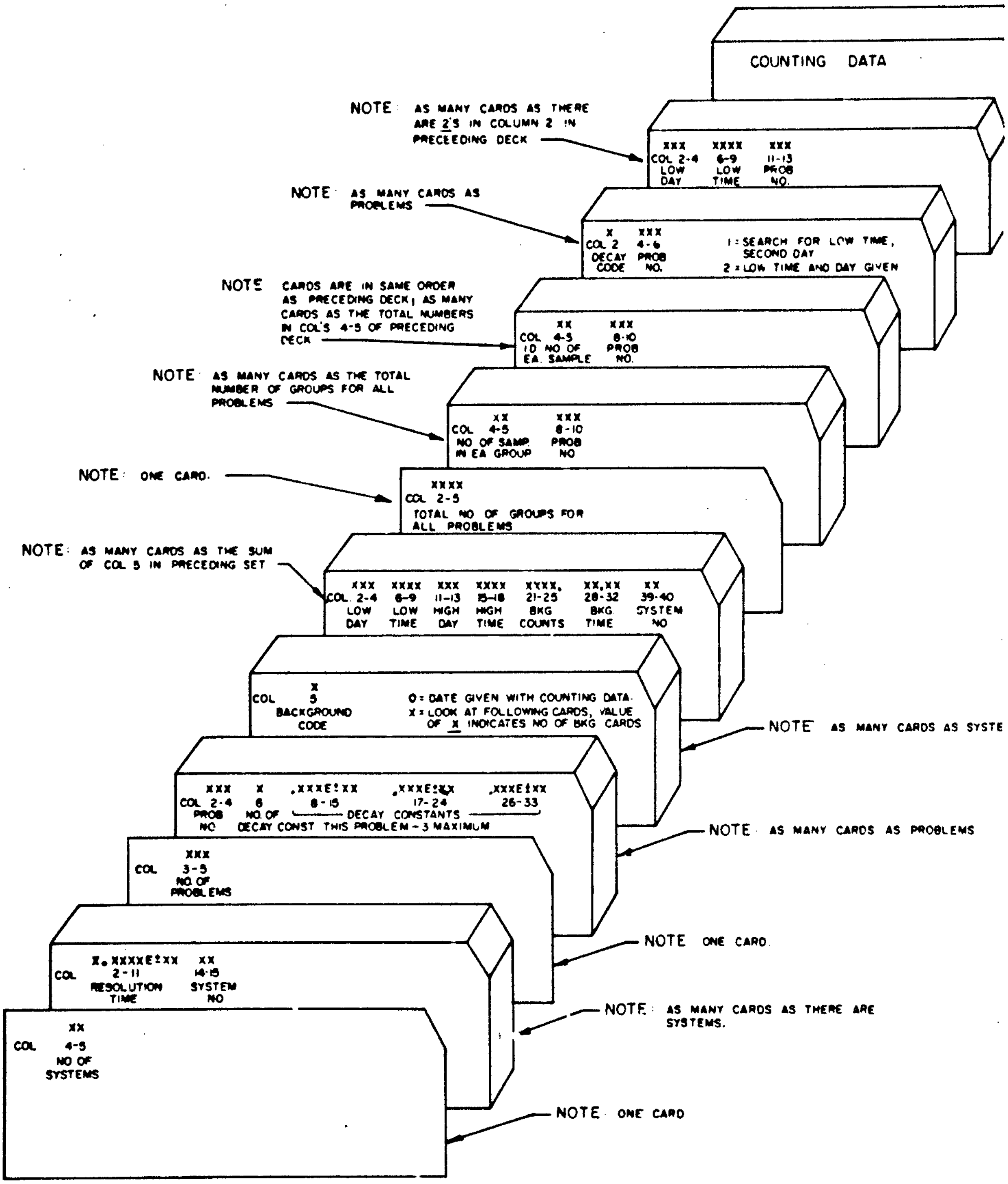

Figure 3. Format of problem definition cards.

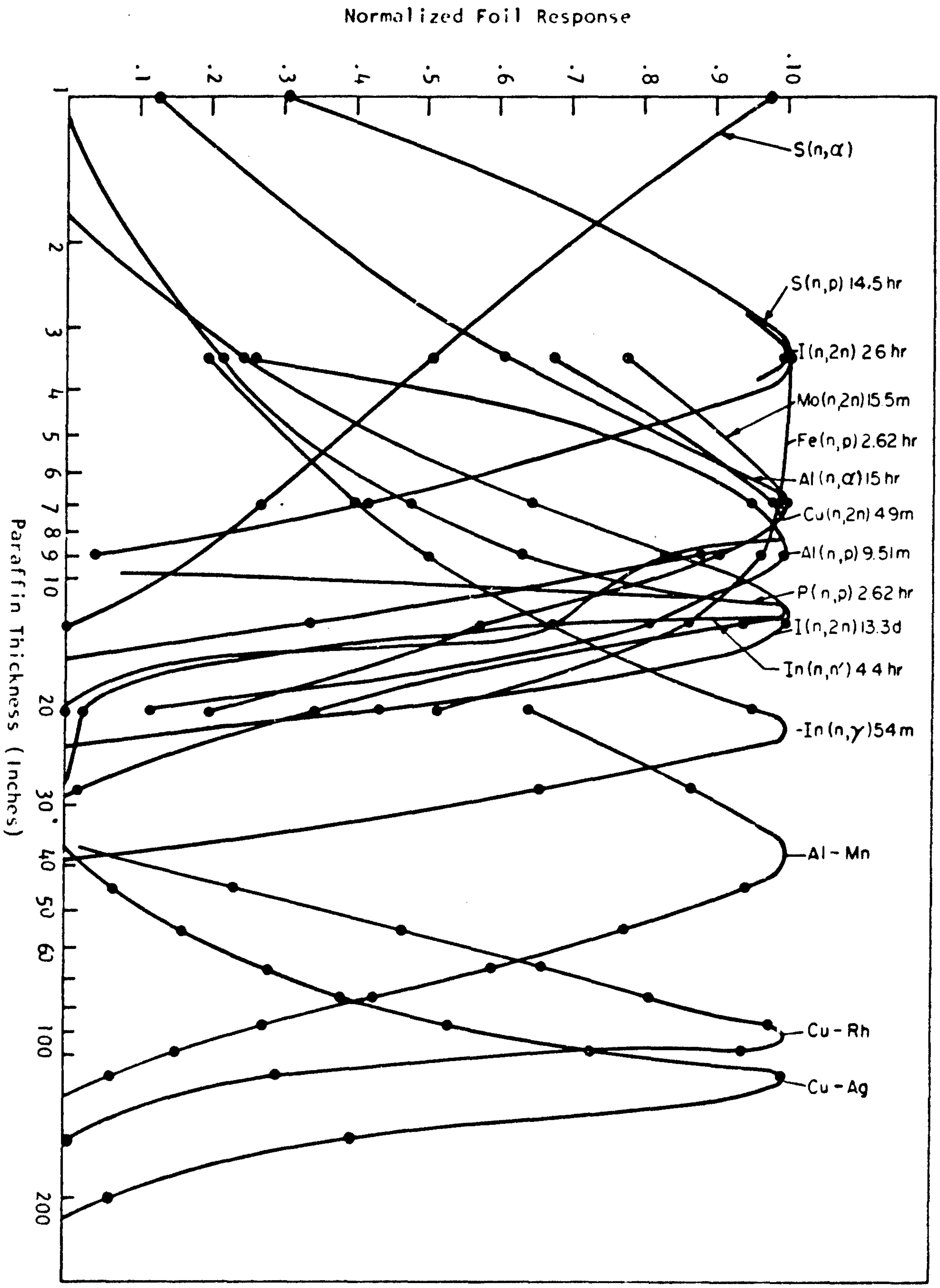

Figure 4. Response of selected foils to moderated neutrons.

TABLE I. List of Foils

Foil Reaction	Daughter Half-Life
In^{115} (n,n') In^{115m}	4.4 hr
In^{115} (n,γ) In^{116}	54 min
Cu^{63} (n,2n) Cu^{62}	9.9 min
I^{127} (n,2n) In^{126}	13.3 d
S^{32} (n,p) P^{32}	14.3 d
S^{34} (n,α) Si^{31}	2.62 hr
P^{31} (n,p) Si^{31}	2.62 hr
Fe^{56} (n,p) Mn^{56}	2.56 hr
Mo^{92} (n,2n) Mo^{91}	15.5 min
Al^{27} (n,p) Mg^{27}	9.51 min
Al^{27} (n,α) Na^{24}	15 hr
Al^{27} (n,γ) Al^{28}	2.3 min
Cu^{65} (n γ) Cu^{66}	5.1 min

TABLE II PRE DATA COMPILER SOURCE PROGRAM

```
C     PRE-DATA COMPILER
      DIMENSION MM(125)
         K=1
   10 READ 105,N1
  105 FORMAT(I5)
      PUNCH 105,N1
      DO 200 I=1,N1
      READ 106,NYX
  200 PUNCH 106,NYX
  106 FORMAT(40H
     132H                                              ,I2)
      READ 105,N
      PUNCH 105,N
      DO 201 I=1,N
      READ 807,MM(I)
  201 PUNCH 807,MM(I)
      N3=0
      DO 202 I=1,N1
      READ 105,N2
      N3=N3+N2
  202 PUNCH 105,N2
      DO 203 I=1,N3
      READ 106,NYX
  203 PUNCH 106,NYX
      READ 105,N5
      PUNCH 105,N5
      N6=0
      DO 205 I=1,N5
      READ 401,N7,NNM
      N6=N6+N7
  205 PUNCH 401,N7,NNM
      DO 206 I=1,N6
      READ 106,NYX
  206 PUNCH 106,NYX
      J=0
      DO 208 I=1,N
      READ 408,IC,IP
      IF(IC-2)208,209,208
  209 J=J+1
  408 FORMAT(I2,I4)
  208 PUNCH 408,IC,IP
      DO 210 I=1,J
      READ 106,NYX
  210 PUNCH 106,NYX
      IZ=-1
```

```
      PUNCH 109,IZ
  109 FORMAT(40X,32X,I2)
    3 READ 100, B4,B3,IA7,IA6,IA2,IA5,D,B6,IB5,IA3,IA4,IA1,IB2,B1
      IF(IB5)5,30,5
   30 PUNCH 110
  110 FORMAT(40X,40X)
      PRINT 808
  808 FORMAT(27HEND OF PROBLEM, REREAD DATA)
      PAUSE
      K=K+1
     IF(K-N)10,10,300
    5 IF(IB5-MM(K))3,4,3
    4 C2=IB2
      B2=C2/100.
      IF(B4) 1,2,1
    1 PUNCH 101, IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,D,B6
      GO TO 3
    2 PUNCH 102, IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,IB5,D,B6
      GO TO 3
  300 IZ=-9
      PUNCH 109,IZ
      PRINT 500
      STOP
  500 FORMAT(13HLOAD POST PDC)
  100 FORMAT(F7.2,F8.0,3I3,I2,E9.3,F5.2,2I4,I5,I4,I6,1X,F8.0)
  101 FORMAT(I4,I3,I4,I5,I2,2I3,F8.0,F7.2,F8.0,F7.2,I4,E9.3,F5.2)
  102 FORMAT(I4,I3,I4,I5,I2,2I3,F8.0,F7.2,15X,I4,E9.3,F5.2)
  401 FORMAT(2I5)
  807 FORMAT(I4,35H                                   )
      END
```

TABLE IIIA INPUT TO PRE DATA COMPILER

```
   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   8
  6 1 .100E+01                                          4
  7 2 .400E-04 .400E-05                                 5
 10 3 .400E-03 .400E-04 .400E-05                        6
 20 1 .100E-10                                          7
 21 1 .100E-10                                          8
 22 1 .100E-10                                          9
 23 1 .128E-01                                         10
 90 1                                                  11
    1     1                                            12
    4     2
    1    11
119 0800 119 1600  1800.  60.00      1
119 0800 119 1200  1800.  60.00      2
119 1200 119 1600  2400.  60.00      2
220 0800 220 1200  1800.  60.00      2
220 1200 220 1600  1800.  60.00      2
119 0800 119 1600  6600.  60.00     11
    2
    2     7                                            17
    2    10                                            18
    1     7                                            19
    2     7                                            20
    1    10                                            21
    2    10                                            22
2   6                                                  23
1   7                                                  24
2  10                                                  25
1  20                                                  26
1  21                                                  27
1  22                                                  28
1  23                                                  29
1  90                                                  30
```

```
119 0830   6                                                                              33
220 0830  10                                                                              34
                1 11 11 2 .100E+01 1.96    6 119 0832   1   100     9218.    35
                2 11 11 2 .100E+01 1.96    6 119 0835   1   100     8607.    36
                3 11 11 2 .100E+01 1.96    6 119 0838   1   100     7421.    37
                1 11 11 2 .100E+01 1.96    6 119 0841   1   100     6298.    38
                1 11 11 2 .100E+01 1.96    6 119 0843   1   100     5516.    39
                1 11 11 1 .100E-10 1.96   20 119 0855   1   200     6064.    40
 60.00   1832.  1  1  2 4 .100E-10+1.96   90 119 0900   1   100    12642.
                2 11 11 1 .100E-10 1.96   20 119 0901   1   200     5964.    41
 60.00   1832.  2  1  2 4 .100E-10+1.96   90 119 0903   1   100    12580.
                3 11 11 1 .100E-10 1.96   20 119 0905   1   200     5980.    42
 60.00   1832.  3  1  2 4 .100E-10+1.96   90 119 0907   1   100    12673.
                4 11 11 1 .100E-10 1.96   20 119 0908   1   200     6020.    43
                5 11 11 1 .100E-10 1.96   20 119 0913   1   200     5887.    44
                6 11 11 1 .100E-10 1.96   20 119 0916   1   200     5864.    45
                7 11 11 1 .100E-10 1.96   20 119 0920   1   200     6064.    46
                8 11 11 1 .100E-10 1.96   20 119 0923   1   200     6078.    47
                9 11 11 1 .100E-10 1.96   20 119 0927   1   200     6094.    48
               10 11 11 1 .100E-10 1.96   20 119 0931   1   200     5984.    49
 60.00   1821   1 01 02 1 .100E-10 1.96   21 119 0935   1   100    14954.    50
 60.00   1821   1 01 02 1 .100E-10 1.96   21 119 0938   1   100    14867.    51
 60.00   1821   1 01 02 1 .100E-10 1.96   21 119 0944   1   100    14498.    52
                1 11 11 5 .100E-10 1.96   22 119 1011   1   100     3467.    53
                1 11 11 5 .100E-10 1.96   22 119 1015   1   100     3451.    54
                1 11 11 6 .100E-10 1.96   22 119 1017   1   100     1728.    55
                1 11 11 6 .100E-10 1.96   22 119 1022   1   100     1720.    56
                1  1  1 7 .128E-01 1.96   23 119 1030   1   100   103000.    57
                1  1  1 7 .128E-01 1.96   23 119 1037   1   100   100000.    58
                1  1  1 7 .128E-01 1.96   23 119 1044   1   100    95000.    59
                1  1  1 7 .128E-01 1.96   23 119 1051   1   100    90000.    60
                1  1  1 7 .128E-01 1.96   23 119 1058   1   100    85000.    61
                1  1  1 7 .128E-01 1.96   23 119 1105   1   100    8000C.    62
                1  1  1 7 .128E-01 1.96   23 119 1112   1   100    75000.    63
                1  1  1 7 .128E-01 1.96   23 119 1119   1   100    70000.    64
                1  1  1 7 .128E-01 1.96   23 119 1126   1   100    65000.    65
                1  1  1 7 .128E-01 1.96   23 119 1133   1   100    60000.    66
                1  1  1 7 .128E-01 1.96   23 119 1140   1   100    55000.    67
                1  1  1 7 .128E-01 1.96   23 119 1147   1   100    50000.    68
                1  1  1 7 .128E-01 1.96   23 119 1158   1   100    45000.    69
```

		1	1	1	7	.128E-01	1.96	23	119	1208	1	100	40000.	70
		1	1	1	7	.128E-01	1.96	23	119	1219	1	100	35000.	71
		1	1	1	7	.128E-01	1.96	23	119	1311	1	100	20000.	72
		1	1	2	4	.400E-04	1.96	7	220	0823	1	100	9600.	73
60.00	1821.	1	11	11	4	.400E-03	1.96	10	220	0851	1	100	11263.	74
60.00	1792.	1	1	2	4	.400E-04	1.96	7	222	0832	2	100	9012.	75
60.00	1803.	1	11	11	4	.400E-03	1.96	10	222	0841	2	100	6913.	76
60.00	1822.	1	1	2	4	.400E-04	1.96	7	224	0816	1	100	8605.	77
60.00	1798.	1	11	11	4	.400E-03	1.96	10	224	0820	1	100	5321.	78
60.00	1791.	1	11	11	4	.400E-03	1.96	10	225	0835	41	100	47829.	79
60.00	1800.	1	11	11	4	.400E-03	1.96	10	226	0841	41	100	43108.	80
60.00	1803.	1	1	2	4	.400E-04	1.96	7	228	0833	2	100	7123.	81
60.00	1821.	1	11	11	4	.400E-03	1.96	10	228	0839	2	100	3794.	82
60.00	1818.	1	1	2	4	.400E-04	1.96	7	229	0841	1	100	6684.	83
60.00	1831.	1	11	11	4	.400E-03	1.96	10	229	0855	1	100	3728.	84
60.00	1801.	1	1	2	4	.400E-04	1.96	7	231	0823	2	100	5859.	85
60.00	1792.	1	11	11	4	.400E-03	1.96	10	231	0829	2	100	3452.	86
60.00	1798.	1	1	2	4	.400E-04	1.96	7	233	0835	1	100	5128.	87
60.00	1801.	1	11	11	4	.400E-03	1.96	10	233	0840	1	100	3207.	88
60.00	1816.	1	11	11	4	.400E-03	1.96	10	234	0829	41	100	30968.	89
60.00	1821.	1	11	11	4	.400E-03	1.96	10	235	0830	41	100	30026.	90
60.00	1821.	1	11	11	4	.400E-03	1.96	10	235	0830	2	100	3007.	91
60.00	1821.	1	11	11	4	.400E-03	1.96	10	235	0835	1	100	2980.	92
60.00	1821.	1	11	11	4	.400E-03	1.96	10	235	0841	2	100	3196.	93
60.00	1821.	2	11	11	4	.400E-03	1.96	10	235	0843	1	100	2907.	94
60.00	1821.	2	11	11	4	.400E-03	1.96	10	235	0845	2	100	3012.	95

TABLE IIIB OUTPUT OF PRE DATA COMPILER - INPUT TO POST PDC

```
    3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
    8
  6 1 .100E+01
  7 2 .400E-04 .400E-05
 10 3 .400E-03 .400E-04 .400E-05
 20 1 .100E-10
 21 1 .100E-10
 22 1 .100E-10
 23 1 .128E-01
 90 1
    1
    4
    1
119 0800 119 1600  1800.  60.00     1                        0
119 0800 119 1200  1800.  60.00     2                        0
119 1200 119 1600  2400.  60.00     2                        0
220 0800 220 1200  1800.  60.00     2                        0
220 1200 220 1600  1800.  60.00     2                        0
119 0800 119 1600  6600.  60.00    11                        0
    2
    2    7
    2   10
    1    7                                                   0
    2    7                                                   0
    1   10                                                   0
    2   10                                                   0
2   6
1   7
2  10
1  20
1  21
1  22
1  23
1  90
```

```
119 0830    6                                                                              0
220 0830   10                                                                              0
                                                                                          -1
  1 11 119  832 2 11  1   9218.    1.00                           6 .100E 01 1.96
  1 11 119  835 2 11  2   8607.    1.00                           6 .100E 01 1.96
  1 11 119  838 2 11  3   7421.    1.00                           6 .100E 01 1.96
  1 11 119  841 2 11  1   6298.    1.00                           6 .100E 01 1.96
  1 11 119  843 2 11  1   5516.    1.00                           6 .100E 01 1.96

   3
1.2370E-06  01
1.2370F-06  02
0.3829E-05  11
   8
  6 1 .100E+01
  7 2 .400E-04 .400E-05
 10 3 .400E-03 .400E-04 .400E-05
 20 1 .100E-10
 21 1 .100E-10
 22 1 .100E-10
 23 1 .128E-01
 90 1
   1
   4
   1
119 0800 119 1600  1800.  60.00       1                                               0
119 0800 119 1200  1800.  60.00       2                                               0
119 1200 119 1600  2400.  60.00       2                                               0
220 0800 220 1200  1800.  60.00       2                                               0
220 1200 220 1600  1800.  60.00       2                                               0
119 0800 119 1600  6600.  60.00      11                                               0
   2
   2     7
   2    10
   1     7                                                                            0
   2     7                                                                            0
   1    10                                                                            0
   2    10                                                                            0
2   6
```

```
2  10
1  20
1  21
1  22
1  23
1  90
119 0830   6
220 0830  10                                                                                 0
                                                                                             0
                                                                                            -1
  1  2 220  823 4  1  1   9600.   1.00                           7 .400E-04 1.96
  2  2 222  832 4  1  1   9012.   1.00     1792.    60.00        7 .400E-04 1.96
  1  2 224  816 4  1  1   8605.   1.00     1822.    60.00        7 .400E-04 1.96
  2  2 228  833 4  1  1   7123.   1.00     1803.    60.00        7 .400E-04 1.96
  1  2 229  841 4  1  1   6684.   1.00     1818.    60.00        7 .400E-04 1.96
  2  2 231  823 4  1  1   5859.   1.00     1801.    60.00        7 .400E-04 1.96
  1  2 233  835 4  1  1   5128.   1.00     1798.    60.00        7 .400E-04 1.96

   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   8
  6 1 .100E+01
  7 2 .400E-04 .400E-05
 10 3 .400E-03 .400E-04 .400E-05
 20 1 .100E-10
 21 1 .100E-10
 22 1 .100E-10
 23 1 .128E-01
 90 1
   1
   4
   1
119 0800 119 1600  1800.  60.00       1                                                      0
119 0800 119 1200  1800.  60.00       2                                                      0
119 1200 119 1600  2400.  60.00       2                                                      0
220 0800 220 1200  1800.  60.00       2                                                      0
220 1200 220 1600  1800.  60.00       2                                                      0
119 0800 119 1600  6600.  60.00      11                                                      0
   2
```

```
    2    7
    2   10
    1    7                                                                                  0
    2    7                                                                                  0
    1   10                                                                                  0
    2   10                                                                                  0
2   6
1   7
2  10
1  20
1  21
1  22
1  23
1  90
119 0830   6                                                                                0
220 0830  10                                                                                0
                                                                                           -1
  1 11 220   851 4 11   1   11263.    1.00    1821.   60.00   10 .400E-03 1.96
  2 11 222   841 4 11   1    6913.    1.00    1803.   60.00   10 .400E-03 1.96
  1 11 224   820 4 11   1    5321.    1.00    1798.   60.00   10 .400E-03 1.96
 41 11 225   835 4 11   1   47829.    1.00    1791.   60.00   10 .400E-03 1.96
 41 11 226   841 4 11   1   43108.    1.00    1800.   60.00   10 .400E-03 1.96
  2 11 228   839 4 11   1    3794.    1.00    1821.   60.00   10 .400E-03 1.96
  1 11 229   855 4 11   1    3728.    1.00    1831.   60.00   10 .400E-03 1.96
  2 11 231   829 4 11   1    3452.    1.00    1792.   60.00   10 .400E-03 1.96
  1 11 233   840 4 11   1    3207.    1.00    1801.   60.00   10 .400E-03 1.96
 41 11 234   829 4 11   1   30968.    1.00    1816.   60.00   10 .400E-03 1.96
 41 11 235   830 4 11   1   30026.    1.00    1821.   60.00   10 .400E-03 1.96
  2 11 235   830 4 11   1    3007.    1.00    1821.   60.00   10 .400E-03 1.96
  1 11 235   835 4 11   1    2980.    1.00    1821.   60.00   10 .400E-03 1.96
  2 11 235   841 4 11   1    3196.    1.00    1821.   60.00   10 .400E-03 1.96
  1 11 235   843 4 11   2    2907.    1.00    1821.   60.00   10 .400E-03 1.96
  2 11 235   845 4 11   2    3012.    1.00    1821.   60.00   10 .400E-03 1.96

    3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
    8
  6 1 -100E+01
```

```
  7 2 .400E-04 .400E-05
 10 3 .400E-03 .400E-04 .400E-05
 20 1 .100E-10
 21 1 .100E-10
 22 1 .100E-10
 23 1 .128E-01
 90 1
   1
   4
   1
119 0800 119 1600   1800.   60.00      1                                     0
119 0800 119 1200   1800.   60.00      2                                     0
119 1200 119 1600   2400.   60.00      2                                     0
220 0800 220 1200   1800.   60.00      2                                     0
220 1200 220 1600   1800.   60.00      2                                     0
119 0800 119 1600   6600.   60.00     11                                     0
   2
   2    7
   2   10
   1    7                                                                    0
   2    7                                                                    0
   1   10                                                                    0
   2   10                                                                    0
2   6
1   7
2  10
1  20
1  21
1  22
1  23
1  90
119 0830   6                                                                 0
220 0830  10                                                                 0
                                                                            -1
  1 11 '19  855 1 11  1   6064.   2.00                    20 .100E-10 1.96
  1 11 1i9  901 1 11  2   5964.   2.00                    20 .100E-10 1.96
  1 11 119  905 1 11  3   5980.   2.00                    20 .100E-10 1.96
  1 11 119  908 1 11  4   6020.   2.00                    20 .100E-10 1.96
  1 11 119  913 1 11  5   5887.   2.00                    20 .100E-10 1.96
  1 11 119  916 1 11  6   5864.   2.00                    20 .100E-10 1.96
```

```
  1 11 119   920 1 11  7    6064.    2.00                        20 .100E-10 1.96
  1 11 119   923 1 11  8    6078.    2.00                        20 .100E-10 1.96
  1 11 119   927 1 11  9    6094.    2.00                        20 .100E-10 1.96
  1 11 119   931 1 11 10    5984.    2.00                        20 .100E-10 1.96

    3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
    8
  6 1 .100E+01
  7 2 .400E-04 .400E-05
 10 3 .400E-03 .400E-04 .400E-05
 20 1 .100E-10
 21 1 .100E-10
 22 1 .100E-10
 23 1 .128E-01
 90 1
    1
    4
    1
119 0800 119 1600  1800.  60.00      1                          0
119 0800 119 1200  1800.  60.00      2                          0
119 1200 119 1600  2400.  60.00      2                          0
220 0800 220 1200  1800.  60.00      2                          0
220 1200 220 1600  1800.  60.00      2                          0
119 0800 119 1600  6600.  60.00     11                          0
    2
    2    7
    2   10
    1    7                                                      0
    2    7                                                      0
    1   10                                                      0
    2   10                                                      0
2   6
1   7
2  10
1  20
1  21
```

```
1   23
1   90
119 0830   6                                                                              0
220 0830  10                                                                              0
                                                                                         -1
  1  2 119   935 1  1  1  14954.   1.00  18210.  60.00  21 .100E-10 1.96
  1  2 119   938 1  1  1  14867.   1.00  18210.  60.00  21 .100E-10 1.96
  1  2 119   944 1  1  1  14498.   1.00  18210.  60.00  21 .100E-10 1.96

   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   8
  6 1 .100E+01
  7 2 .400E-04 .400E-05
 10 3 .400E-03 .400E-04 .40ι ̄-05
 20 1 .100E-10
 21 1 .100E-10
 22 1 .100E-10
 23 1 .128E-01
 90 1
   1
   4
   1
119 0800 119 1600  1800.  60.00      1                                                    0
119 0800 119 1200  1800.  60.00      2                                                    0
119 1200 119 1600  2400.  60.00      2                                                    0
220 0800 220 1200  1800.  60.00      2                                                    0
220 1200 220 1600  1800.  60.00      2                                                    0
119 0800 119 1600  6600.  60.00     11                                                    0
   2
   2    7
   2   10
   1    7                                                                                 0
   2    7                                                                                 0
   1   10                                                                                 0
   2   10                                                                                 0
2   6
1   7
```

```
2 · 10
1   20
1   21
1   22
1   23
1   90
119 0830   6
220 0830  10                                                                   0
                                                                               0
  1 11 119 1011 5 11  1    3467.    1.00                                      -1
  1 11 119 1015 5 11  1    3451.    1.00                    22 .100E-10 1.96
  1 11 119 1017 6 11  1    1728.    1.00                    22 .100E-10 1.96
  1 11 119 1022 6 11  1    1720.    1.00                    22 .100E-10 1.96
                                                            22 .100E-10 1.96
   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   8
  6 1 .100E+01
  7 2 .400E-04 .400E-05
 10 3 .400E-03 .400E-04 .400E-05
 20 1 .100E-10
 21 1 .100E-10
 22 1 .100E-10
 23 1 .128E-01
 90 1
   1
   4
   1
119 0800 119 1600  1800.  60.00      1                                       0
119 0800 119 1200  1800.  60.00      2                                       0
119 1200 119 1600  2400.  60.00      2                                       0
220 0800 220 1200  1800.  60.00      2                                       0
220 1200 220 1600  1800.  60.00      2                                       0
119 0800 119 1600  6600.  60.00     11                                       0
   2
   2    7
   2   10
```

```
                                                                              0



    2    7                                                                    0
    1   10                                                                    0
    2   10                                                                    0
2    6
1    7
2   10
1   20
1   21
1   22
1   23
1   90
119 0830    6
220 0830   10                                                                 0
                                                                              0
                                                                             -1
  1  1 119 1030 7  1  1 103000.    1.00             23 .128E-01 1.96
  1  1 119 1037 7  1  1 100000.    1.00             23 .128E-01 1.96
  1  1 119 1044 7  1  1  95000.    1.00             23 .128E-01 1.96
  1  1 119 1051 7  1  1  90000.    1.00             23 .128E-01 1.96
  1  1 119 1058 7  1  1  85000.    1.00             23 .128E-01 1.96
  1  1 119 1105 7  1  1  80000.    1.00             23 .128E-01 1.96
  1  1 119 1112 7  1  1  75000.    1.00             23 .128E-01 1.96
  1  1 119 1119 7  1  1  70000.    1.00             23 .128E-01 1.96
  1  1 119 1126 7  1  1  65000.    1.00             23 .128E-01 1.96
  1  1 119 1133 7  1  1  60000.    1.00             23 .128E-01 1.96
  1  1 119 1140 7  1  1  55000.    1.00             23 .128E-01 1.96
  1  1 119 1147 7  1  1  50000.    1.00             23 .128E-01 1.96
  1  1 119 1158 7  1  1  45000.    1.00             23 .128E-01 1.96
  1  1 119 1208 7  1  1  40000.    1.00             23 .128E-01 1.96
  1  1 119 1219 7  1  1  35000.    1.00             23 .128E-01 1.96
  1  1 119 1311 7  1  1  20000.    1.00             23 .128E-01 1.96

    3
1.2370E-06   01
1.2370E-06   02
0.3829E-05   11
    8
  6 1 .100E+01
  7 2 .400E-04 .400E-05
 10 3 .400E-03 .400E-04 .400E-05
 20 1 .100E-10
```

```
 21 1 .100E-10
 22 1 .100E-10
 23 1 .128E-01
 90 1
   1
   4
   1
119 0800 119 1600  1800.  60.00      1                                  0
119 0800 119 1200  1800.  60.00      2                                  0
119 1200 119 1600  2400.  60.00      2                                  0
220 0800 220 1200  1800.  60.00      2                                  0
220 1200 220 1600  1800.  60.00      2                                  0
119 0800 119 1600  6600.  60.00     11                                  0
   2
   2    7
   2   10
   1    7                                                               0
   2    7                                                               0
   1   10                                                               0
   2   10                                                               0
2   6
1   7
2  10
1  20
1  21
1  22
1  23
1  90
119 0830   6                                                            0
220 0830  10                                                            0
                                                                       -1
  1  2 119  900 4  1  1  12642.   1.00   1832.  60.00  90 .100E-10 1.96
  1  2 119  903 4  1  2  12580.   1.00   1832.  60.00  90 .100E-10 1.96
  1  2 119  907 4  1  3  12673.   1.00   1832.  60.00  90 .100E-10 1.96

                                                                       -9
```

TABLE IV POST DATA COMPILER SOURCE PROGRAM

```
C     POST DATA COMPILER
      DIMENSION NS(100)
    2 I=1
    1 READ 100,NYX
      PUNCH 100,NYX
      IF(NYX+1)1,10,1
   10 READ 101, IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,D,B6,NYX
      NS(I)=IA1
   11 READ 101, IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,D,B6,NYX
      IF(IA1)16,15,16
   16 J=1
   13 IF(NS(J)-IA1)12,11,12
   12 J=J+1
      IF(J-I)13,13,14
   14 I=I+1
      NS(I)=IA1
      GO TO 11
   15 PRINT 102
      IF(I-1)400,400,408
  408 N=I
      DO 300 I=2,N
      J=I
  402 IF(NS(J)-NS(J-1))401,300,300
  401 KEP=NS(J)
      NS(J)=NS(J-1)
      NS(J-1)=KEP
      IF(J-2)40,300,40
   40 J=J-1
      GO TO 402
  300 CONTINUE
      I=N
  400 DO 2000 J=1,I
  200 READ 100,NYX
      IF(NYX+1)200,204,200
  204 READ 101, IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,D,B6,NYX
      IF(IA1)202,2001,202
  202 IF(IA1-NS(J))204,203,204
  203 PUNCH 101,IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,D,B6,NYX
      GO TO 204
 2001 IF(J-I)2002,2000,2002
 2002 PRINT 102
 2000 CONTINUE
      PRINT 103
      PUNCH 101,IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,D,B6,NYX
      PAUSE
```

```
      GO TO 2
  100 FORMAT(40H                                                           ,
     132H                                         ,I2)
  101 FORMAT(I4,I3,I4,I5,I2,2I3,F8.0,F7.2,F8.0,F7.2,I4,E9.3,F5.2,
  102 FORMAT(11HREREAD DATA)
  103 FORMAT(16HREAD NEW PROBLEM)
      END
```

TABLE V OUTPUT POST DATA COMPILER - INPUT DATORG I

```
   3                                                                   0
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   8                                                                   0
  6 1 .100E+01                                                         0
  7 2 .400E-04 .400E-05                                                0
 10 3 .400E-03 .400E-04 .400E-05                                       0
 20 1 .100E-10                                                         0
 21 1 .100E-10                                                         0
 22 1 .100E-10                                                         0
 23 1 .128E-01                                                         0
 90 1                                                                  0
   1                                                                   0
   4                                                                   0
   1                                                                   0
119 0800 119 1600  1800.  60.00       1                                0
119 0800 119 1200  1800.  60.00       2                                0
119 1200 119 1600  2400.  60.00       2                                0
220 0800 220 1200  1800.  60.00       2                                0
220 1200 220 1600  1800.  60.00       2                                0
119 0800 119 1600  6600.  60.00      11                                0
   2                                                                   0
   2    7                                                              0
   2   10                                                              0
   1    7                                                              0
   2    7                                                              0
   1   10                                                              0
   2   10                                                              0
2   6                                                                  0
1   7                                                                  0
2  10                                                                  0
1  20                                                                  0
1  21                                                                  0
1  22                                                                  0
1  23                                                                  0
1  90                                                                  0
```

```
119 0830   6                                                                                   0
220 0830  10                                                                                   0
                                                                                              -1
  1 11 119   832 2 11  1    9218.    1.00           .      .00   6     1.000 1.96 0
  1 11 119   835 2 11  2    8607.    1.00           .      .00   6     1.000 1.96 0
  1 11 119   838 2 11  3    7421.    1.00           .      .00   6     1.000 1.96 0
  1 11 119   841 2 11  1    6298.    1.00           .      .00   6     1.000 1.96 0
  1 11 119   843 2 11  1    5516.    1.00           .      .00   6     1.000 1.96 0
  0  0   0     0 0  0  0        .     .00           .      .00   0      .000  .00 0

   3                                                                                           0
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   8                                                                                           0
  6 1 .100E+01                                                                                 0
  7 2 .400E-04 .400E-05                                                                        0
 10 3 .400E-03 .400E-04 .400E-05                                                               0
 20 1 .100E-10                                                                                 0
 21 1 .100E-10                                                                                 0
 22 1 .100E-10                                                                                 0
 23 1 .128E-01                                                                                 0
 90 1                                                                                          0
   1                                                                                           0
   4                                                                                           0
   1                                                                                           0
119 0800 119 1600  1800.  60.00      1                                                         0
119 0800 119 1200  1800.  60.00      2                                                         0
119 1200 119 1600  2400.  60.00      2                                                         0
220 0800 220 1200  1800.  60.00      2                                                         0
220 1200 220 1600  1800.  60.00      2                                                         0
119 0800 119 1600  6600.  60.00     11                                                         0
   2                                                                                           0
   2    7                                                                                      0
   2   10                                                                                      0
   1    7                                                                                      0
   2    7                                                                                      0
   1   10                                                                                      0
   2   10                                                                                      0
```

```
1    7                                                                                    0
2   10                                                                                    0
1   20                                                                                    0
1   21                                                                                    0
1   22                                                                                    0
1   23                                                                                    0
1   90                                                                                    0
119 0830    6                                                                             0
220 0830   10                                                                             0
                                                                                         -1
  1  2 220   823 4  1  1    9600.    1.00         .     .00   7    .000 1.96 0
  1  2 224   816 4  1  1    8605.    1.00     1822.   60.00   7    .000 1.96 0
  1  2 229   841 4  1  1    6684.    1.00     1818.   60.00   7    .000 1.96 0
  1  2 233   835 4  1  1    5128.    1.00     1798.   60.00   7    .000 1.96 0
  2  2 222   832 4  1  1    9012.    1.00     1792.   60.00   7    .000 1.96 0
  2  2 228   833 4  1  1    7123.    1.00     1803.   60.00   7    .000 1.96 0
  2  2 231   823 4  1  1    5859.    1.00     1801.   60.00   7    .000 1.96 0
  0  0   0     0 0  0  0        .     .00         .     .00   0    .000  .00 0

   3                                                                                      0
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   8                                                                                      0
  6 1 .100E+01                                                                            0
  7 2 .400E-04 .400E-05                                                                   0
 10 3 .400E-03 .400E-04 .400E-05                                                          0
 20 1 .100E-10                                                                            0
 21 1 .100E-10                                                                            0
 22 1 .100E-10                                                                            0
 23 1 .128E-01                                                                            0
 90 1                                                                                     0
   1                                                                                      0
   4                                                                                      0
   1                                                                                      0
119 0800 119 1600  1800.  60.00      1                                                    0
119 0800 119 1200  1800.  60.00      2                                                    0
119 1200 119 1600  2400.  60.00      2                                                    0
220 0800 220 1200  1800.  60.00      2                                                    0
220 1200 220 1600  1800.  60.00      2                                                    0
```

```
119 0800 119 1600  6600.  60.00      11                                              0
   2                                                                                 0
   2    7                                                                            0
   2   10                                                                            0
   1    7                                                                            0
   2    7                                                                            0
   1   10                                                                            0
   2   10                                                                            0
2   6                                                                                0
1   7                                                                                0
2  10                                                                                0
1  20                                                                                0
1  21                                                                                0
1  22                                                                                0
1  23                                                                                0
1  90                                                                                0
119 0830   6                                                                         0
220 0830  10                                                                         0
                                                                                    -1
  1 11 220  851 4 11  1  11263.   1.00   1821.  60.00  10      .000 1.96 0
  1 11 224  820 4 11  1   5321.   1.00   1798.  60.00  10      .000 1.96 0
  1 11 229  855 4 11  1   3728.   1.00   1831.  60.00  10      .000 1.96 0
  1 11 233  840 4 11  1   3207.   1.00   1801.  60.00  10      .000 1.96 0
  1 11 225  835 4 11  1   2980.   1.00   1821.  60.00  10      .000 1.96 0
  1 11 225  843 4 11  2   2907.   1.00   1821.  60.00  10      .000 1.96 0
  2 11 222  841 4 11  1   6913.   1.00   1803.  60.00  10      .000 1.96 0
  2 11 228  839 4 11  1   3794.   1.00   1821.  60.00  10      .000 1.96 0
  2 11 231  829 4 11  1   3452.   1.00   1792.  60.00  10      .000 1.96 0
  2 11 235  830 4 11  1   3007.   1.00   1821.  60.00  10      .000 1.96 0
  2 11 235  841 4 11  1   3196.   1.00   1821.  60.00  10      .000 1.96 0
  2 11 235  845 4 11  2   3012.   1.00   1821.  60.00  10      .000 1.96 0
 41 11 235  835 4 11  1  47829.   1.00   1791.  60.00  10      .000 1.96 0
 41 11 236  841 4 11  1  43108.   1.00   1800.  60.00  10      .000 1.96 0
 41 11 234  829 4 11  1  30968.   1.00   1816.  60.00  10      .000 1.96 0
 41 11 235  330 4 11  1  30026.   1.00   1821.  60.00  10      .000 1.96 0
  0  0   0    0 0  0  0       .    .00       .    .00   0      .000  .00 0

  3                                                                      0
1.2370E-06  01
```

```
0.3829E-05  11
   8
  6 1 .100E+01                                                          0
  7 2 .400E-04 .400E-05                                                 0
 10 3 .400E-03 .400E-04 .400E-05                                        0
 20 1 .100E-10                                                          0
 21 1 .100E-10                                                          0
 22 1 .100E-10                                                          0
 23 1 .128E-01                                                          0
 90 1                                                                   0
   1                                                                    0
   4                                                                    0
   1                                                                    0
119 0800 119 1600  1800.  60.00      1                                  0
119 0800 119 1200  1800.  60.00      2                                  0
119 1200 119 1600  2400.  60.00      2                                  0
220 0800 220 1200  1800.  60.00      2                                  0
220 1200 220 1600  1800.  60.00      2                                  0
119 0800 119 1600  6600.  60.00     11                                  0
   2                                                                    0
   2    7                                                               0
   2   10                                                               0
   1    7                                                               0
   2    7                                                               0
   1   10                                                               0
   2   10                                                               0
2   6                                                                   0
1   7                                                                   0
2  10                                                                   0
1  20                                                                   0
1  21                                                                   0
1  22                                                                   0
1  23                                                                   0
1  90                                                                   0
119 0830   6                                                            0
220 0830  10                                                            0
                                                                        0
                                                                       -1
  1 11 119  855 1 11  1  6064.   2.00     .   .00  20    .000 1.96 0
  1 11 119  901 1 11  2  5964.   2.00     .   .00  20    .000 1.96 0
  1 11 119  905 1 11  3  5980.   2.00     .   .00  20    .000 1.96 0
```

```
 1 11 119  908 1 11  4   6020.    2.00          .    .00  20     .000 1.96 0
 1 11 119  913 1 11  5   5887.    2.00          .    .00  20     .000 1.96 0
 1 11 119  916 1 11  6   5864.    2.00          .    .00  20     .000 1.96 0
 1 11 119  920 1 11  7   6064.    2.00          .    .00  20     .000 1.96 0
 1 11 119  923 1 11  8   6078.    2.00          .    .00  20     .000 1.96 0
 1 11 119  927 1 11  9   6094.    2.00          .    .00  20     .000 1.96 0
 1 11 119  931 1 11 10   5984.    2.00          .    .00  20     .000 1.96 0
 0  0   0    0 0  0  0       .     .00          .    .00   0     .000  .00 0

  3                                                                       0
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
  8                                                                       0
  6 1 .100E+01                                                            0
  7 2 .400E-C4 .400E-05                                                   0
 10 3 .400E-03 .400E-04 .400E-05                                          0
 20 1 .100E-10                                                            0
 21 1 .100E-10                                                            0
 22 1 .100E-10                                                            0
 23 1 .128E-01                                                            0
 90 1                                                                     0
  1                                                                       0
  4                                                                       0
  1                                                                       0
119 0800 119 1600  1800.  60.00       1                                   0
119 0800 119 1200  1800.  60.00       2                                   0
119 1200 119 1600  2400.  60.00       2                                   0
220 0800 220 1200  1800.  60.00       2                                   0
220 1200 220 1600  1800.  60.00       2                                   0
119 0800 119 1600  6600.  60.00      11                                   0
  2                                                                       0
  2    7                                                                  0
  2   10                                                                  0
  1    7                                                                  0
  2    7                                                                  0
  1   10                                                                  0
  2   10                                                                  0
2   6                                                                     0
```

```
2   10                                                                                    0
1   20                                                                                    0
1   21                                                                                    0
1   22                                                                                    0
1   23                                                                                    0
1   90                                                                                    0
119 0830    6                                                                             0
220 0830   10                                                                             0
                                                                                         -1
  1   2 119   935 1  1  1  14954.    1.00  18210.  60.00  21     .000 1.96 0
  1   2 119   938 1  1  1  14867.    1.00  18210.  60.00  21     .000 1.96 0
  1   2 119   944 1  1  1  14498.    1.00  18210.  60.00  21     .000 1.96 0
  0   0   0     0 0  0  0       .     .00       .    .00   0     .000  .00 0

   3                                                                                      0
1.2370E-06   01
1.2370E-06   02
0.3829E-05   11                                                                           0
   8                                                                                      0
  6 1 .100E+01                                                                            0
  7 2 .400E-04 .400E-05                                                                   0
 10 3 .400E-03 .400E-04 .400E-05                                                          0
 20 1 .100E-10                                                                            0
 21 1 .100E-10                                                                            0
 22 1 .100E-10                                                                            0
 23 1 .128E-01                                                                            0
 90 1                                                                                     0
   1                                                                                      0
   4                                                                                      0
   1                                                                                      0
119 0800 119 1600  1800.  60.00       1                                                   0
119 0800 119 1200  1800.  60.00       2                                                   0
119 1200 119 1600  2400.  60.00       2                                                   0
220 0800 220 1200  1800.  60.00       2                                                   0
220 1200 220 1600  1800.  60.00       2                                                   0
119 0800 119 1600  6600.  60.00      11                                                   0
   2                                                                                      0
   2    7                                                                                 0
   2   10                                                                                 0
   1    7                                                                                 0
```

```
   2    7                                                                                               0
   1   10                                                                                               0
   2   10                                                                                               0
2   6                                                                                                   0
1   7                                                                                                   0
2  10                                                                                                   0
1  20                                                                                                   0
1  21                                                                                                   0
1  22                                                                                                   0
1  23                                                                                                   0
1  90                                                                                                   0
119 0830   6                                                                                            0
220 0830  10                                                                                            0
                                                                                                       -1
  1 11 119 1011 5 11  1   3467.   1.00          .     .00  22     .000 1.96 0
  1 11 119 1015 5 11  1   3451.   1.00          .     .00  22     .000 1.96 0
  1 11 119 1017 6 11  1   1728.   1.00          .     .00  22     .000 1.96 0
  1 11 119 1022 6 11  1   1720.   1.00          .     .00  22     .000 1.96 0
  0  0   0    0 0  0  0       .    .00          .     .00   0     .000  .00 0

   3                                                                        0
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   8                                                                        0
  6 1 .100E+01                                                              0
  7 2 .400E-04 .400E-05                                                     0
 10 3 .400E-03 .400E-04 .400E-05                                            0
 20 1 .100E-10                                                              0
 21 1 .100E-10                                                              0
 22 1 .100E-10                                                              0
 23 1 .128E-01                                                              0
 90 1                                                                       0
   1                                                                        0
   4                                                                        0
   1                                                                        0
119 0800 119 1600  1800.  60.00      1                                      0
119 0800 119 1200  1800.  60.00      2                                      0
119 1200 119 1600  2400.  60.00      3                                      0
```

```
220 1200 220 1600  1800.  60.00      2
119 0800 119 1600  6600.  60.00     11                                          0
    2                                                                           0
    2    7                                                                      0
    2   10                                                                      0
    1    7                                                                      0
    2    7                                                                      0
    1   10                                                                      0
    2   10                                                                      0
2   6                                                                           0
1   7                                                                           0
2  10                                                                           0
1  20                                                                           0
1  21                                                                           0
1  22                                                                           0
1  23                                                                           0
1  90                                                                           0
119 0830   6                                                                    0
220 0830  10                                                                    0
                                                                                0
                                                                               -1
  1  1 119 1030 7  1  1 103000.   1.00       .   .00  23    .012 1.96 0
  1  1 119 1037 7  1  1 100000.   1.00       .   .00  23    .012 1.96 0
  1  1 119 1044 7  1  1  95000.   1.00       .   .00  23    .012 1.96 0
  1  1 119 1051 7  1  1  90000.   1.00       .   .00  23    .012 1.96 0
  1  1 119 1058 7  1  1  85000.   1.00       .   .00  23    .012 1.96 0
  1  1 119 1105 7  1  1  80000.   1.00       .   .00  23    .012 1.96 0
  1  1 119 1112 7  1  1  75000.   1.00       .   .00  23    .012 1.96 0
  1  1 119 1119 7  1  1  70000.   1.00       .   .00  23    .012 1.96 0
  1  1 119 1126 7  1  1  65000.   1.00       .   .00  23    .012 1.96 0
  1  1 119 1133 7  1  1  60000.   1.00       .   .00  23    .012 1.96 0
  1  1 119 1140 7  1  1  55000.   1.00       .   .00  23    .012 1.96 0
  1  1 119 1147 7  1  1  50000.   1.00       .   .00  23    .012 1.96 0
  1  1 119 1158 7  1  1  45000.   1.00       .   .00  23    .012 1.96 0
  1  1 119 1203 7  1  1  40000.   1.00       .   .00  23    .012 1.96 0
  1  1 119 1219 7  1  1  35000.   1.00       .   .00  23    .012 1.96 0
  1  1 119 1311 7  1  1  20000.   1.00       .   .00  23    .012 1.96 0
  0  0   0    0 0  0  0       .    .00       .   .00   0    .000  .00 0

   3
1.2370E-06  01                                                          0
```

```
1.2370E-06  02
0.3829E-05  11
   8                                                                                   0
  6 1 .100E+01                                                                         0
  7 2 .400E-04 .400E-05                                                                0
 10 3 .400E-03 .400E-04 .400E-05                                                       0
 20 1 .100E-10                                                                         0
 21 1 .100E-10                                                                         0
 22 1 .100E-10                                                                         0
 23 1 .128E-01                                                                         0
 90 1                                                                                  0
   1                                                                                   0
   4                                                                                   0
   1                                                                                   0
119 0800 119 1600  1800.  60.00      1                                                 0
119 0800 119 1200  1800.  60.00      2                                                 0
119 1200 119 1600  2400.  60.00      2                                                 0
220 0800 220 1200  1800.  60.00      2                                                 0
220 1200 220 1600  1800.  60.00      2                                                 0
119 0800 119 1600  6600.  60.00     11                                                 0
   2                                                                                   0
   2    7                                                                              0
   2   10                                                                              0
   1    7                                                                              0
   2    7                                                                              0
   1   10                                                                              0
   2   10                                                                              0
2   6                                                                                  0
1   7                                                                                  0
2  10                                                                                  0
1  20                                                                                  0
1  21                                                                                  0
1  22                                                                                  0
1  23                                                                                  0
1  90                                                                                  0
119 0830   6                                                                           0
220 0830  10                                                                           0
                                                                                      -1
  1  2 119  900 4  1  1  12642.   1.00   1832.  60.00  90      .000 1.96 0
```

1	2	119	907	4	1	3	12673.	1.00	1832.	60.00	90	.000	1.96	0
0	0	0	0	0	0	0	.	.00	.	.00	0	.000	.00	0
														-9

TABLE VI DATORG I SOURCE PROGRAM

```
C       DATA ORG I
        DIMENSION NN(200)
  400   K=1
        READ 100,N1
        PUNCH 100,N1
        DO 3 I=1,N1
        READ 101,TAU,NN(I)
    3   PUNCH 101,TAU,NN(I)
    4   READ 102,NYX
        PUNCH 102,NYX
        IF(NYX+1)4,5,4
    5   IF(N1-1)901,900,901
  901   DO 800 I=2,N1
        J=I
  402   IF(NN(J)-NN(J-1))401,800,800
  401   KEP=NN(J)
        NN(J)=NN(J-1)
        NN(J-1)=KEP
        IF(J-2)40,800,40
   40   J=J-1
        GO TO 402
  800   CONTINUE
   22   READ 103,IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,DK,B6
        IF(IA2-NN(K))20,21,20
   21   PUNCH 103, IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,DK,
        GO TO 22
   20   IF(IA2)22,23,22
   23   K=K+1
        IF(K-N1)24,24,300
   24   PRINT 801
  801   FORMAT(23HREREAD DATA, PUSH START)
        PAUSE
  500   READ 102,NYX
        IF(NYX+1)500,22,500
  300   PRINT 108
        PUNCH 110
  110   FORMAT(40X,40X)
        PAUSE
        GO TO 400
  900   K=1
        GO TO 22
  108   FORMAT(17HLOAD NEXT PROBLEM)
  100   FORMAT(I5)
  101   FORMAT(E11.4,I4)
  102   FORMAT(40H
```

```
     132H                                              ,12)
 103 FORMAT(I4,I3,I4,I5,I2,2I3,F8.0,F7.2,F8.0,F7.2,I4,E9.3,F5.2)
     END
```

TABLE VII OUTPUT DATORG I - INPUT DATORG II

```
   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   8                                                                      0
  6 1 .100E+01                                                            0
  7 2 .400E-04 .400E-05                                                   0
 10 3 .400E-03 .400E-04 .400E-05                                          0
 20 1 .100E-10                                                            0
 21 1 .100E-10                                                            0
 22 1 .100E-10                                                            0
 23 1 .128E-01                                                            0
 90 1                                                                     0
   1                                                                      0
   4                                                                      0
   1                                                                      0
119 0800 119 1600  1800.  60.00      1                                    0
119 0800 119 1200  1800.  60.00      2                                    0
119 1200 119 1600  2400.  60.00      2                                    0
220 0800 220 1200  1800.  60.00      2                                    0
220 1200 220 1600  1800.  60.00      2                                    0
119 0800 119 1600  6600.  60.00     11                                    0
   2                                                                      0
   2    7                                                                 0
   2   10                                                                 0
   1    7                                                                 0
   2    7                                                                 0
   1   10                                                                 0
   2   10                                                                 0
2   6                                                                     0
1   7                                                                     0
2  10                                                                     0
1  20                                                                     0
1  21                                                                     0
1  22                                                                     0
1  23                                                                     0
```

```
119 0830   6                                                                        0
220 0830  10                                                                        0
                                                                                   -1
  1 11 119  832 2 11  1   9218.   1.00        .   .00   6           1.96
  1 11 119  835 2 11  2   8607.   1.00        .   .00   6           1.96
  1 11 119  838 2 11  3   7421.   1.00        .   .00   6           1.96
  1 11 119  841 2 11  1   6298.   1.00        .   .00   6           1.96
  1 11 119  843 2 11  1   5516.   1.00        .   .00   6           1.96

   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   8                                                                                0
  6 1 .100E+01                                                                      0
  7 2 .400E-04 .400E-05                                                             0
 10 3 .400E-03 .400E-04 .400E-05                                                    0
 20 1 .100E-10                                                                      0
 21 1 .100E-10                                                                      0
 22 1 .100E-10                                                                      0
 23 1 .128E-01                                                                      0
 90 1                                                                               0
   1                                                                                0
   4                                                                                0
   1                                                                                0
119 0800 119 1600  1800.  60.00      1                                              0
119 0800 119 1200  1800.  60.00      2                                              0
119 1200 119 1600  2400.  60.00      2                                              0
220 0800 220 1200  1800.  60.00      2                                              0
220 1200 220 1600  1800.  60.00      2                                              0
119 0800 119 1600  6600.  60.00     11                                              0
   2                                                                                0
   2    7                                                                           0
   2   10                                                                           0
   1    7                                                                           0
   2    7                                                                           0
   1   10                                                                           0
   2   10                                                                           0
2    6                                                                              0
```

```
1   7                                                                                                  0
2  10                                                                                                  0
1  20                                                                                                  0
1  21                                                                                                  0
1  22                                                                                                  0
1  23                                                                                                  0
1  90                                                                                                  0
119 0830   6                                                                                           0
220 0830  10                                                                                           0
                                                                                                      -1
   1  2 220  823 4  1  1   9600.   1.00       .    .00   7          1.96
   1  2 224  816 4  1  1   8605.   1.00   1822.  60.00   7          1.96
   1  2 229  841 4  1  1   6684.   1.00   1818.  60.00   7          1.96
   1  2 233  835 4  1  1   5128.   1.00   1798.  60.00   7          1.96
   2  2 222  832 4  1  1   9012.   1.00   1792.  60.00   7          1.96
   2  2 228  833 4  1  1   7123.   1.00   1803.  60.00   7          1.96
   2  2 231  823 4  1  1   5859.   1.00   1801.  60.00   7          1.96

    3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
    8                                                                                                  0
   6 1 .100E+01                                                                                        0
   7 2 .400E-04 .400E-05                                                                               0
  10 3 .400E-03 .400E-04 .400E-05                                                                      0
  20 1 .100E-10                                                                                        0
  21 1 .100E-10                                                                                        0
  22 1 .100E-10                                                                                        0
  23 1 .128E-01                                                                                        0
  90 1                                                                                                 0
    1                                                                                                  0
    4                                                                                                  0
    1                                                                                                  0
119 0800 11) 1600  1800.  60.00       1                                                                0
119 0800 119 1200  1800.  60.00       2                                                                0
119 1200 119 1600  2400.  60.00       2                                                                0
220 0800 220 1200  1800.  60.00       2                                                                0
```

```
119 0800 119 1600  6600.  60.00    11                                          0
    2                                                                          0
    2    7                                                                     0
    2   10                                                                     0
    1    7                                                                     0
    2    7                                                                     0
    1   10                                                                     0
    2   10                                                                     0
2    6                                                                         0
1    7                                                                         0
2   10                                                                         0
1   20                                                                         0
1   21                                                                         0
1   22                                                                         0
1   23                                                                         0
1   90                                                                         0
119 0830   6                                                                   0
220 0830  10                                                                   0
                                                                              -1
  1 11 220  851 4 11 1  11263.  1.00  1821.  60.00  10                  1.96
  1 11 224  820 4 11 1   5321.  1.00  1798.  60.00  10                  1.96
  1 11 229  855 4 11 1   3728.  1.00  1831.  60.00  10                  1.96
  1 11 233  840 4 11 1   3207.  1.00  1801.  60.00  10                  1.96
  1 11 225  835 4 11 1   2980.  1.00  1821.  60.00  10                  1.96
  1 11 225  843 4 11 2   2907.  1.00  1821.  60.00  10                  1.96
  2 11 222  841 4 11 1   6913.  1.00  1803.  60.00  10                  1.96
  2 11 228  839 4 11 1   3794.  1.00  1821.  60.00  10                  1.96
  2 11 231  829 4 11 1   3452.  1.00  1792.  60.00  10                  1.96
  2 11 235  830 4 11 1   3007.  1.00  1821.  60.00  10                  1.96
  2 11 235  841 4 11 1   3196.  1.00  1821.  60.00  10                  1.96
  2 11 235  845 4 11 2   3012.  1.00  1821.  60.00  10                  1.96
 41 11 235  835 4 11 1  47829.  1.00  1791.  60.00  10                  1.96
 41 11 236  841 4 11 1  43108.  1.00  1800.  60.00  10                  1.96
 41 11 234  829 4 11 1  30968.  1.00  1816.  60.00  10                  1.96
 41 11 235  830 4 11 1  30026.  1.00  1821.  60.00  10                  1.96

   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
```

```
   8                                                          0
  6 1 .100E+01                                                0
  7 2 .400E-04 .400E-05                                       0
 10 3 .400E-03 .400E-04 .400E-05                              0
 20 1 .100E-10                                                0
 21 1 .100E-10                                                0
 22 1 .100E-10                                                0
 23 1 .128E-01                                                0
 90 1                                                         0
   1                                                          0
   4                                                          0
   1                                                          0
119 0800 119 1600  1800.  60.00      1                        0
119 0800 119 1200  1800.  60.00      2                        0
119 1200 119 1800  2400.  60.00      2                        0
220 0800 220 1200  1800.  60.00      2                        0
220 1200 220 1600  1800.  60.00      2                        0
119 0800 119 1600  6600.  60.00     11                        0
   2                                                          0
   2    7                                                     0
   2   10                                                     0
   1    7                                                     0
   2    7                                                     0
   1   10                                                     0
   2   10                                                     0
2   6                                                         0
1   7                                                         0
2  10                                                         0
1  20                                                         0
1  21                                                         0
1  22                                                         0
1  23                                                         0
1  90                                                         0
119 0830   6                                                  0
220 0830  10                                                  0
                                                             -1
  1 11 119  855 1 11  1  6064.  2.00      .  .00  20       1.96
  1 11 119  901 1 11  2  5964.  2.00      .  .00  20       1.96
  1 11 119  905 1 11  3  5980.  2.00      .  .00  20       1.96
  1 11 119  908 1 11  4  6020.  2.00      .  .00  20       1.96
```

```
 1 11 119   913 1 11  5    5887.    2.00        .     .00  20          1.96
 1 11 119   916 1 11  6    5864.    2.00        .     .00  20          1.96
 1 11 119   920 1 11  7    6064.    2.00        .     .00  20          1.96
 1 11 119   923 1 11  8    6078.    2.00        .     .00  20          1.96
 1 11 119   927 1 11  9    6094.    2.00        .     .00  20          1.96
 1 11 119   931 1 11 10    5984.    2.00        .     .00  20          1.96

   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   8                                                                  0
  6 1 .100E+01                                                        0
  7 2 .400E-04 .400E-05                                               0
 10 3 .400E-03 .400E-04 .400E-05                                      0
 20 1 .100E-10                                                        0
 21 1 .100E-10                                                        0
 22 1 .100E-10                                                        0
 23 1 .128E-01                                                        0
 90 1                                                                 0
   1                                                                  0
   4                                                                  0
   1                                                                  0
119 0800 119 1600  1800.  60.00       1                               0
119 0800 119 1200  1800.  60.00       2                               0
119 1200 119 1600  2400.  60.00       2                               0
220 0800 220 1200  1800.  60.00       2                               0
220 1200 220 1600  1800.  60.00       2                               0
119 0800 119 1600  6600.  60.00      11                               0
   2                                                                  0
   2    7                                                             0
   2   10                                                             0
   1    7                                                             0
   2    7                                                             0
   1   10                                                             0
   2   10                                                             0
2   6                                                                 0
1   7                                                                 0
2  10                                                                 0
```

```
1  20                                                                                              0
1  21                                                                                              0
1  22                                                                                              0
1  23                                                                                              0
1  90                                                                                              0
119 0830   6                                                                                       0
220 0830  10                                                                                       0
                                                                                                  -1
  1  2 119  935 1  1  1  14954.   1.00  18210.  60.00  21                                    1.96
  1  2 119  938 1  1  1  14867.   1.00  18210.  60.00  21                                    1.96
  1  2 119  944 1  1  1  14498.   1.00  18210.  60.00  21                                    1.96

   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   8                                                                                               0
  6 1 .100E+01                                                                                     0
  7 2 .400E-04 .400E-05                                                                            0
 10 3 .400E-03 .400E-04 .400E-05                                                                   0
 20 1 .100E-10                                                                                     0
 21 1 .100E-10                                                                                     0
 22 1 .100E-10                                                                                     0
 23 1 .128E-01                                                                                     0
 90 1                                                                                              0
    1                                                                                              0
    4                                                                                              0
    1                                                                                              0
119 0800 119 1600  1800.  60.00        1                                                           0
119 0800 119 1200  1800.  60.00        2                                                           0
119 1200 119 1600  2400.  60.00        2                                                           0
220 0800 220 1200  1800.  60.00        2                                                           0
220 1200 220 1600  1800.  60.00        2                                                           0
119 0800 119 1600  6600.  60.00       11                                                           0
    2                                                                                              0
    2    7                                                                                         0
    2   10                                                                                         0
    1    7                                                                                         0
    2    7                                                                                         0
```

```
   1   10                                                                                  0
   2   10                                                                                  0
2   6                                                                                      0
1   7                                                                                      0
2  10                                                                                      0
1  20                                                                                      0
1  21                                                                                      0
1  22                                                                                      0
1  23                                                                                      0
1  90                                                                                      0
119 0830   6                                                                               0
220 0830  10                                                                               0
  1 11 119 1011 5 11  1   3467.   1.00       .   .00  22          1.96                    -1
  1 11 119 1015 5 11  1   3451.   1.00       .   .00  22          1.96
  1 11 119 1017 6 11  1   1728.   1.00       .   .00  22          1.96
  1 11 119 1022 6 11  1   1720.   1.00       .   .00  22          1.96

   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   8                                                                                       0
  6 1 .100E+01                                                                             0
  7 2 .400E-04 .400E-05                                                                    0
 10 3 .400E-03 .400E-04 .400E-05                                                           0
 20 1 .100E-10                                                                             0
 21 1 .100E-10                                                                             0
 22 1 .100E-10                                                                             0
 23 1 .128E-01                                                                             0
 90 1                                                                                      0
   1                                                                                       0
   4                                                                                       0
   1                                                                                       0
119 0800 119 1600  1800.  60.00      1                                                     0
119 0800 119 1200  1800.  60.00      2                                                     0
119 1200 119 1600  2400.  60.00      2                                                     0
220 0800 220 1200  1800.  60.00      2                                                     0
220 1200 220 1600  1800.  60.00      2                                                     0
```

```
119 0800 119 1600  6600.  60.00     11                              0
   2                                                                0
   2    7                                                           0
   2   10                                                           0
   1    7                                                           0
   2    7                                                           0
   1   10                                                           0
   2   10                                                           0
2   6                                                               0
1   7                                                               0
2  10                                                               0
1  20                                                               0
1  21                                                               0
1  22                                                               0
1  23                                                               0
1  90                                                               0
119 0830   6                                                        0
220 0830  10                                                        0
                                                                   -1
  1  1 119 1030 7  1  1 103000.   1.00      .   .00  23           1.96
  1  1 119 1037 7  1  1 100000.   1.00      .   .00  23           1.96
  1  1 119 1044 7  1  1  95000.   1.00      .   .00  23           1.96
  1  1 119 1051 7  1  1  90000.   1.00      .   .00  23           1.96
  1  1 119 1058 7  1  1  85000.   1.00      .   .00  23           1.96
  1  1 119 1105 7  1  1  80000.   1.00      .   .00  23           1.96
  1  1 119 1112 7  1  1  75000.   1.00      .   .00  23           1.96
  1  1 119 1119 7  1  1  70000.   1.00      .   .00  23           1.96
  1  1 119 1126 7  1  1  65000.   1.00      .   .00  23           1.96
  1  1 119 1133 7  1  1  60000.   1.00      .   .00  23           1.96
  1  1 119 1140 7  1  1  55000.   1.00      .   .00  23           1.96
  1  1 119 1147 7  1  1  50000.   1.00      .   .00  23           1.96
  1  1 119 1158 7  1  1  45000.   1.00      .   .00  23           1.96
  1  1 119 1208 7  1  1  40000.   1.00      .   .00  23           1.96
  1  1 119 1219 7  1  1  35000.   1.00      .   .00  23           1.96
  1  1 119 1311 7  1  1  20000.   1.00      .   .00  23           1.96

   3
1.2370E-06  01
1.2370E-06  02
```

```
0.3829E-05   11
    8                                                                     0
  6 1 .100E+01                                                            0
  7 2 .400E-04  .400E-05                                                  0
 10 3 .400E-03  .400E-04  .400E-05                                        0
 20 1 .100E-10                                                            0
 21 1 .100E-10                                                            0
 22 1 .100E-10                                                            0
 23 1 .128E-01                                                            0
 90 1                                                                     0
    1                                                                     0
    4                                                                     0
    1                                                                     0
119 0800 119 1600   1800.   60.00        1                                0
119 0800 119 1200   1800.   60.00        2                                0
119 1200 119 1600   2400.   60.00        2                                0
220 0800 220 1200   1800.   60.00        2                                0
220 1200 220 1600   1800.   60.00        2                                0
119 0800 119 1600   6600.   60.00       11                                0
    2                                                                     0
    2     7                                                               0
    2    10                                                               0
    1     7                                                               0
    2     7                                                               0
    1    10                                                               0
    2    10                                                               0
2   6                                                                     0
1   7                                                                     0
2  10                                                                     0
1  20                                                                     0
1  21                                                                     0
1  22                                                                     0
1  23                                                                     0
1  90                                                                     0
119 0830    6                                                             0
220 0830   10                                                             0
                                                                         -1
  1  2 119   900 4  1  1  12642.   1.00   1832.  60.00  90         1.96
  1  2 119   903 4  1  2  12580.   1.00   1832.  60.00  90         1.96
  1  2 119   907 4  1  3  12673.   1.00   1832.  60.00  90         1.96
```

TABLE VIII DATORG II SOURCE PROGRAM

```
C       DATA ORG II
      1 READ 200,NYX
        IF(NYX+1)1,2,1
      2 READ 201,IB5
        IX5=IB5
        PRINT 202
        PAUSE
        READ 100,N1
        PUNCH 100,N1
        DO 10 I=1,N1
        READ 200,NYX
     10 PUNCH 200,NYX
        READ 100,N2
        DO 20 I=1,N2
        READ 204,IPROB,NLM,XLAM1,XLAM2,XLAM3
        IF(IPROB-IB5)20,21,20
     21 IY1=IPROB
        IY2=NLM
        XX1=XLAM1
        XX2=XLAM2
        XX3=XLAM3
     20 CONTINUE
        NN=0
        DO 22 I=1,N1
        READ 205,N3,N4
        PUNCH 205,N3,N4
     22 NN=NN+N3
        DO 23 I=1,NN
        READ 200,NYX
     23 PUNCH 200,NYX
        NYX=-2
        PUNCH 203,NYX
        PUNCH 204,IY1,IY2,XX1,XX2,XX3
        READ 100,N5
        NN=0
        DO 25 I=1,N5
        READ 205,N3,N4
        NN=NN+N3
        IF(N4-IX5)25,26,25
     26 PUNCH 205,N3,N4
     25 CONTINUE
        DO 27 I=1,NN
        READ 205,N3,N4
        IF(N4-IX5)27,28,27
     28 PUNCH 205,N3,N4
```

```
   27 CONTINUE
      NYX=-3
      PUNCH 203,NYX
      NN=0
      DO 29 I=1,N2
      READ 209,N
      IF(N-2)29,30,29
   30 NN=NN+1
   29 CONTINUE
      IF(NN)31,32,31
   31 DO 33 I=1,NN
      READ 206,J1,J2,J3
      IF(J3-IX5)33,34,33
   34 PUNCH 206,J1,J2,J3
   33 CONTINUE
   32 READ 200,NYX
      PUNCH 200,NYX
      IF(NYX+1)32,35,32
   35 READ 207,IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,DK,B6
      IF(IA1)36,37,36
   36 PUNCH 207, IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,DK,B6
      GO TO 35
   37 NYX=-9
      PUNCH 203,NYX
      PRINT 208
      PAUSE
      GO TO 1
  100 FORMAT(I5)
  200 FORMAT(40H                                        ,
     132H                                ,I2)
  201 FORMAT(40X,14X,I4)
  202 FORMAT(11HREREAD DATA)
  203 FORMAT(40X,32X,I2)
  204 FORMAT(I4,I2,3E9.3)
  205 FORMAT(2I5)
  206 FORMAT(I4,I5,I4)
  207 FORMAT(I4,I3,I4,I5,I2,2I3,F8.0,F7.2,F8.0,F7.2,I4,E9.3,F5.2)
  208 FORMAT(14HLOAD NEXT PROB)
  209 FORMAT(I2)
      END
```

TABLE IX OUTPUT DATORG II - INPUT DATORG III

```
   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   1     0
   4     0
   1     0
119 0800 119 1600  1800.   60.00        1                                          0
119 0800 119 1200  1800.   60.00        2                                          0
119 1200 119 1600  2400.   60.00        2                                          0
220 0800 220 1200  1800.   60.00        2                                          0
220 1200 220 1600  1800.   60.00        2                                          0
119 0800 119 1600  6600.   60.00       11                                          0
                                                                                  -2
  6 1 .100E 01 .000E-50 .000E-50
                                                                                  -3
                                                                                  -3
119  830   6
                                                                                  -1
  1 11 119   832 2 11  1   9218.   1.00       .     .00   6          1.96
  1 11 119   835 2 11  2   8607.   1.00       .     .00   6          1.96
  1 11 119   838 2 11  3   7421.   1.00       .     .00   6          1.96
  1 11 119   841 2 11  1   6298.   1.00       .     .00   6          1.96
  1 11 119   843 2 11  1   5516.   1.00       .     .00   6          1.96
                                                                                  -9

   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   1     0
   4     0
   1     0
119 0800 119 1600  1800.   60.00        1                                          0
119 0800 119 1200  1800.   60.00        2                                          0
119 1200 119 1600  2400.   60.00        2                                          0
220 0800 220 1200  1800.   60.00        2                                          0
```

```
220 1200 220 1600  1800.  60.00      2
119 0800 119 1600  6600.  60.00     11                                          0
                                                                                0
  7 2 .400E-04 .400E-05 .000E-50                                               -2
   2    7
   1    7
   2    7

                                                                               -3
                                                                               -3
                                                                               -1
  1  2 220  823 4  1  1  9600.  1.00      .    .00   7              1.96
  1  2 224  816 4  1  1  8605.  1.00  1822.  60.00   7              1.96
  1  2 229  841 4  1  1  6684.  1.00  1818.  60.00   7              1.96
  1  2 233  835 4  1  1  5128.  1.00  1798.  60.00   7              1.96
  2  2 222  832 4  1  1  9012.  1.00  1792.  60.00   7              1.96
  2  2 228  833 4  1  1  7123.  1.00  1803.  60.00   7              1.96
  2  2 231  823 4  1  1  5859.  1.00  1801.  60.00   7              1.96
                                                                               -9
   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   1    0
   4    0
   1    0
119 0800 119 1600  1800.  60.00      1
119 0800 119 1200  1800.  60.00      2                                          0
119 1200 119 1600  2400.  60.00      2                                          0
220 0800 220 1200  1800.  60.00      2                                          0
220 1200 220 1600  1800.  60.00      2                                          0
119 0800 119 1600  6600.  60.00     11                                          0
                                                                                0
 10 3 .400E-03 .400E-04 .400E-05                                               -2
   2   10
   1   10
   2   10

                                                                               -3
220  830  10                                                                   -3
```

```
                                                                                  -1
  1 11 220  851 4 11  1  11263.   1.00   1821.  60.00  10          1.96
  1 11 224  820 4 11  1   5321.   1.00   1798.  60.00  10          1.96
  1 11 229  855 4 11  1   3728.   1.00   1831.  60.00  10          1.96
  1 11 233  840 4 11  1   3207.   1.00   1801.  60.00  10          1.96
  1 11 225  835 4 11  1   2980.   1.00   1821.  60.00  10          1.96
  1 11 225  843 4 11  2   2907.   1.00   1821.  60.00  10          1.96
  2 11 222  841 4 11  1   6913.   1.00   1803.  60.00  10          1.96
  2 11 228  839 4 11  1   3794.   1.00   1821.  60.00  10          1.96
  2 11 231  829 4 11  1   3452.   1.00   1792.  60.00  10          1.96
  2 11 235  830 4 11  1   3007.   1.00   1821.  60.00  10          1.96
  2 11 235  841 4 11  1   3196.   1.00   1821.  60.00  10          1.96
  2 11 235  845 4 11  2   3012.   1.00   1821.  60.00  10          1.96
 41 11 235  835 4 11  1  47829.   1.00   1791.  60.00  10          1.96
 41 11 236  841 4 11  1  43108.   1.00   1800.  60.00  10          1.96
 41 11 234  829 4 11  1  30968.   1.00   1816.  60.00  10          1.96
 41 11 235  830 4 11  1  30026.   1.00   1821.  60.00  10          1.96
                                                                                  -9

   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   1    0
   4    0
   1    0
119 0800 119 1600  1800.  60.00      1                                             0
119 0800 119 1200  1800.  60.00      2                                             0
119 1200 119 1600  2400.  60.00      2                                             0
220 0800 220 1200  1800.  60.00      2                                             0
220 1200 220 1600  1800.  60.00      2                                             0
119 0800 119 1600  6600.  60.00     11                                             0
                                                                                  -2
 20 1 .100E-10 .000E-50 .000E-50
                                                                                  -3
                                                                                  -3
                                                                                  -1
  1 11 119  855 1 11  1   6064.   2.00       .     .00  20         1.96
  1 11 119  901 1 11  2   5964.   2.00       .     .00  20         1.96
  1 11 119  905 1 11  3   5980.   2.00       .     .00  20         1.96
```

```
  1 11 119   908 1 11  4    6020.    2.00          .    .00  20         1.96
  1 11 119   913 1 11  5    5887.    2.00          .    .00  20         1.96
  1 11 119   916 1 11  6    5864.    2.00          .    .00  20         1.96
  1 11 119   920 1 11  7    6064.    2.00          .    .00  20         1.96
  1 11 119   923 1 11  8    6078.    2.00          .    .00  20         1.96
  1 11 119   927 1 11  9    6094.    2.00          .    .00  20         1.96
  1 11 119   931 1 11 10    5984.    2.00          .    .00  20         1.96
                                                                            -9

   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   1    0
   4    0
   1    0
119 0800 119 1600  1800.  60.00      1                                       0
119 0800 119 1200  1800.  60.00      2                                       0
119 1200 119 1600  2400.  60.00      2                                       0
220 0800 220 1200  1800.  60.00      2                                       0
220 1200 220 1600  1800.  60.00      2                                       0
119 0800 119 1600  6600.  60.00     11                                       0
                                                                            -2
 21 1 .100E-10 .000E-50 .000E-50

                                                                            -3
                                                                            -3
                                                                            -1
  1  2 119   935 1  1  1  14954.   1.00  18210.  60.00  21             1.96
  1  2 119   938 1  1  1  14867.   1.00  18210.  60.00  21             1.96
  1  2 119   944 1  1  1  14498.   1.00  18210.  60.00  21             1.96
                                                                            -9

   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   1    0
   4    0
   1    0
119 0800 119 1600  1800.  60.00      1                                       0
```

```
119 0800 119 1200  1800.  60.00      2                                  0
119 1200 119 1600  2400.  60.00      2                                  0
220 0800 220 1200  1800.  60.00      2                                  0
220 1200 220 1600  1800.  60.00      2                                  0
119 0800 119 1600  6600.  60.00     11                                  0
                                                                       -2
 22 1 .100E-10 .000E-50 .000E-50
                                                                       -3
                                                                       -3
                                                                       -1
  1 11 119 1011 5 11  1   3467.   1.00       .   .00  22          1.96
  1 11 119 1015 5 11  1   3451.   1.00       .   .00  22          1.96
  1 11 119 1017 6 11  1   1728.   1.00       .   .00  22          1.96
  1 11 119 1022 6 11  1   1720.   1.00       .   .00  22          1.96
                                                                       -9

   3
1.2370E-06  01
1.2370E-06  02
0.3829E-05  11
   1    0
   4    0
   1    0
119 0800 119 1600  1800.  60.00      1                                  0
119 0800 119 1200  1800.  60.00      2                                  0
119 1200 119 1600  2400.  60.00      2                                  0
220 0800 220 1200  1800.  60.00      2                                  0
220 1200 220 1600  1800.  60.00      2                                  0
119 0800 119 1600  6600.  60.00     11                                  0
                                                                       -2
 23 1 .128E-01 .000E-50 .000E-50
                                                                       -3
                                                                       -3
                                                                       -1
  1  1 119 1030 7  1  1 103000.   1.00       .   .00  23          1.96
  1  1 119 1037 7  1  1 100000.   1.00       .   .00  23          1.96
  1  1 119 1044 7  1  1  95000.   1.00       .   .00  23          1.96
  1  1 119 1051 7  1  1  90000.   1.00       .   .00  23          1.96
  1  1 119 1058 7  1  1  85000.   1.00       .   .00  23          1.96
  1  1 119 1105 7  1  1  80000.   1.00       .   .00  23          1.96
```

```
  1   1 119 1112 7  1  1   75000.   1.00         .     .00  23       1.96
  1   1 119 1119 7  1  1   70000.   1.00         .     .00  23       1.96
  1   1 119 1126 7  1  1   65000.   1.00         .     .00  23       1.96
  1   1 119 1133 7  1  1   60000.   1.00         .     .00  23       1.96
  1   1 119 1140 7  1  1   55000.   1.00         .     .00  23       1.96
  1   1 119 1147 7  1  1   50000.   1.00         .     .00  23       1.96
  1   1 119 1158 7  1  1   45000.   1.00         .     .00  23       1.96
  1   1 119 1208 7  1  1   40000.   1.00         .     .00  23       1.96
  1   1 119 1219 7  1  1   35000.   1.00         .     .00  23       1.96
  1   1 119 1311 7  1  1   20000.   1.00         .     .00  23       1.96
                                                                          -9

   3
1.2370E-06   01
1.2370E-06   02
0.3829E-05   11
   1    0
   4    0
   1    0
119 0800 119 1600  1800.  60.00      1                                    0
119 0800 119 1200  1800.  60.00      2                                    0
119 1200 119 1600  2400.  60.00      2                                    0
220 0800 220 1200  1800.  60.00      2                                    0
220 1200 220 1600  1800.  60.00      2                                    0
119 0800 119 1600  6600.  60.00     11                                    0
                                                                          -2
 90 1 .000E-50 .000E-50 .000E-50

                                                                          -3
                                                                          -3
                                                                          -1
  1   2 119  900 4  1  1   12642.   1.00   1832.  60.00  90       1.96
  1   2 119  903 4  1  2   12580.   1.00   1832.  60.00  90       1.96
  1   2 119  907 4  1  3   12673.   1.00   1832.  60.00  90       1.96
                                                                          -9
```

TABLE X DATORG III SOURCE PROGRAM

```
C       DATA ORG III
        DIMENSION TAU(50),ISYS(50),INTD(100),INTT(100),IFD(100),BKGC(100)
        DIMENSION BKGT(100),IFT(100),ISM(100)
      1 READ 100,N1,NYX
      2 DO 10 I=1,N1
     10 READ 101,TAU(I),ISYS(I)
        NX=0
        DO 11 I=1,N1
        READ 200,N2,ISMM
     11 NX=NX+N2
        DO 12 I=1,NX
     12 READ 102,INTD(I),INTT(I),IFD(I),IFT(I),BKGC(I),BKGT(I),ISM(I)
     15 READ 103,NYX
        PUNCH 103,NYX
        IF(NYX+1)15,14,15
     14 READ 104,A1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,DKC,B6,NYX
     34 IX2=IA2
        IY5=IB5
        DO 16 I=1,N1
        IF(IA2-ISYS(I))16,17,16
     17 PUNCH 101,TAU(I),ISYS(I)
        J=I
     16 CONTINUE
        DO 50 I=1,NX
        IF(ISM(I)-IX2)50,51,50
     51 PUNCH 102,INTD(I),INTT(I),IFD(I),IFT(I),BKGC(I),BKGT(I),ISM(I)
     50 CONTINUE
        NYX=-5
        PUNCH 300,NYX
        NYX=0
     52 PUNCH 104,A1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,DKC,B6,NYX
        IGD=IA5
        READ 104,A1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,DKC,B6,NYX
        IF(IA2-IX2)53,52,53
     53 IF(NYX+9)60,54,60
     60 NYX=-6
        PUNCH 300,NYX
        GO TO 34
     54 PUNCH 300,NYX
    300 FORMAT(40X,32X,I2)
    100 FORMAT(I5,35H
       132H                                  ,I2)
    101 FORMAT(E11.4,I4)
    200 FORMAT(I5,I5)
    102 FORMAT(I4,I5,I4,I5,F8.0,F7.2,I7)
```

```
103 FORMAT(40H                                                  ,
   132H                                     ,I2)
104 FORMAT(I4,I3,I4,I5,I2,2I3,F8.0,F7.2,F8.0,F7.2,I4,E9.3,F5.2,I2)
204 FORMAT(21HEND DATA ORG PROGRAMS)
800 FORMAT(13HLOAD NEW PROB)
    END
```

TABLE XI OUTPUT DATORG III - INPUT RESOLUTION

```
                                                                                    -2
   6 1 .100E 01 .000E-50 .000E-50
                                                                                     0
                                                                                    -3
                                                                                    -3
 119   830    6
                                                                                     0
                                                                                    -1
 0.3829E-05   11
 119   800 119 1600    6600.   60.00       11
                                                                                    -5
   1 11 119   832 2 11  1    9218.    1.00            .      .00    6          1.96 0
   1 11 119   835 2 11  2    8607.    1.00            .      .00    6          1.96 0
   1 11 119   838 2 11  3    7421.    1.00            .      .00    6          1.96 0
   1 11 119   841 2 11  1    6298.    1.00            .      .00    6          1.96 0
   1 11 119   843 2 11  1    5516.    1.00            .      .00    6          1.96 0
                                                                                    -9

                                                                                    -2
   7 2 .400E-04 .400E-05 .000E-50
    2     7                                                                          0
    1     7                                                                          0
    2     7                                                                          0
                                                                                     0
                                                                                    -3
                                                                                    -3
                                                                                    -1
 1.2370E-06   02
 119   800 119 1200    1800.   60.00        2
 119  1200 119 1600    2400.   60.00        2
 220   800 220 1200    1800.   60.00        2
 220  1200 220 1600    1800.   60.00        2
                                                                                    -5
   1   2 220   823 4   1  1    9600.    1.00          .      .00    7          1.96 0
   1   2 224   816 4   1  1    8605.    1.00    1822.    60.00    7          1.96 0
   1   2 229   841 4   1  1    6684.    1.00    1818.    60.00    7          1.96 0
   1   2 233   835 4   1  1    5128.    1.00    1798.    60.00    7          1.96 0
   2   2 222   832 4   1  1    9012.    1.00    1792.    60.00    7          1.96 0
   2   2 228   833 4   1  1    7123.    1.00    1803.    60.00    7          1.96 0
   2   2 231   823 4   1  1    5859.    1.00    1801.    60.00    7          1.96 0
```

```
                                                                                                  -9

                                                                                                  -2
                                                                                                  -2
  10 3 .400E-03 .400E-04 .400E-05                                                                  0
   2   10                                                                                          0
   1   10                                                                                          0
   2   10                                                                                          0
                                                                                                  -3
                                                                                                  -3
220  830  10                                                                                       0
                                                                                                  -1
0.3829E-05  11
119  800 119 1600   6600.  60.00     11
                                                                                                  -5
  1 11 220  851 4 11  1  11263.   1.00   1821.  60.00  10                                     1.96 0
  1 11 224  820 4 11  1   5321.   1.00   1798.  60.00  10                                     1.96 0
  1 11 229  855 4 11  1   3728.   1.00   1831.  60.00  10                                     1.96 0
  1 11 233  840 4 11  1   3207.   1.00   1801.  60.00  10                                     1.96 0
  1 11 225  835 4 11  1   2980.   1.00   1821.  60.00  10                                     1.96 0
  1 11 225  843 4 11  2   2907.   1.00   1821.  60.00  10                                     1.96 0
  2 11 222  841 4 11  1   6913.   1.00   1803.  60.00  10                                     1.96 0
  2 11 228  839 4 11  1   3794.   1.00   1821.  60.00  10                                     1.96 0
  2 11 231  829 4 11  1   3452.   1.00   1792.  60.00  10                                     1.96 0
  2 11 235  830 4 11  1   3007.   1.00   1821.  60.00  10                                     1.96 0
  2 11 235  841 4 11  1   3196.   1.00   1821.  60.00  10                                     1.96 0
  2 11 235  845 4 11  2   3012.   1.00   1821.  60.00  10                                     1.96 0
 41 11 235  835 4 11  1  47829.   1.00   1791.  60.00  10                                     1.96 0
 41 11 236  841 4 11  1  43108.   1.00   1800.  60.00  10                                     1.96 0
 41 11 234  829 4 11  1  30968.   1.00   1816.  60.00  10                                     1.96 0
 41 11 235  830 4 11  1  30026.   1.00   1821.  60.00  10                                     1.96 0
                                                                                                  -9

                                                                                                  -2
  20 1 .100E-10 .000E-50 .000E-50                                                                  0
                                                                                                  -3
                                                                                                  -3
                                                                                                  -1
0.3829E-05  11
119  800 119 1600   6600.  60.00     11
```

```
                                                                          -5
 1 11 119  855 1 11  1   6064.   2.00         .      .00  20        1.96 0
 1 11 119  901 1 11  2   5964.   2.00         .      .00  20        1.96 0
 1 11 119  905 1 11  3   5980.   2.00         .      .00  20        1.96 0
 1 11 119  908 1 11  4   6020.   2.00         .      .00  20        1.96 0
 1 11 119  913 1 11  5   5887.   2.00         .      .00  20        1.96 0
 1 11 119  916 1 11  6   5864.   2.00         .      .00  20        1.96 0
 1 11 119  920 1 11  7   6064.   2.00         .      .00  20        1.96 0
 1 11 119  923 1 11  8   6078.   2.00         .      .00  20        1.96 0
 1 11 119  927 1 11  9   6094.   2.00         .      .00  20        1.96 0
 1 11 119  931 1 11 10   5984.   2.00         .      .00  20        1.96 0
                                                                          -9

                                                                          -2
 21 1 .100E-10 .000E-50 .000E-50                                           0
                                                                          -3
                                                                          -3
                                                                          -1
1.2370E-06  02
119  800 119 1200   1800.  60.00     2
119 1200 119 1600   2400.  60.00     2
220  800 220 1200   1800.  60.00     2
220 1200 220 1600   1800.  60.00     2
                                                                          -5
 1  2 119  935 1  1  1  14954.   1.00  18210.  60.00  21        1.96 0
 1  2 119  938 1  1  1  14867.   1.00  18210.  60.00  21        1.96 0
 1  2 119  944 1  1  1  14498.   1.00  18210.  60.00  21        1.96 0
                                                                          -9

                                                                          -2
 22 1 .100E-10 .000E-50 .000E-50                                           0
                                                                          -3
                                                                          -3
                                                                          -1
0.3829E-05  11
119  800 119 1600   6600.  60.00     11
                                                                          -5
 1 11 119 1011 5 11  1   3467.   1.00         .      .00  22        1.96 0
 1 11 119 1015 5 11  1   3451.   1.00         .      .00  22        1.96 0
 1 11 119 1017 6 11  1   1728.   1.00         .      .00  22        1.96 0
```

```
 1 11 119 1022 6 11  1   1720.   1.00        .    .00  22        1.96 0
                                                                      -9

 23 1 .128E-01 .000E-50 .000E-50                                      -2
                                                                       0
                                                                      -3
                                                                      -3
1.2370E-06  01                                                        -1
119  800 119 1600   1800.  60.00      1

                                                                      -5
 1  1 119 1030 7  1  1 103000.   1.00        .    .00  23        1.96 0
 1  1 119 1037 7  1  1 100000.   1.00        .    .00  23        1.96 0
 1  1 119 1044 7  1  1  95000.   1.00        .    .00  23        1.96 0
 1  1 119 1051 7  1  1  90000.   1.00        .    .00  23        1.96 0
 1  1 119 1058 7  1  1  85000.   1.00        .    .00  23        1.96 0
 1  1 119 1105 7  1  1  80000.   1.00        .    .00  23        1.96 0
 1  1 119 1112 7  1  1  75000.   1.00        .    .00  23        1.96 0
 1  1 119 1119 7  1  1  70000.   1.00        .    .00  23        1.96 0
 1  1 119 1126 7  1  1  65000.   1.00        .    .00  23        1.96 0
 1  1 119 1133 7  1  1  60000.   1.00        .    .00  23        1.96 0
 1  1 119 1140 7  1  1  55000.   1.00        .    .00  23        1.96 0
 1  1 119 1147 7  1  1  50000.   1.00        .    .00  23        1.96 0
 1  1 119 1158 7  1  1  45000.   1.00        .    .00  23        1.96 0
 1  1 119 1208 7  1  1  40000.   1.00        .    .00  23        1.96 0
 1  1 119 1219 7  1  1  35000.   1.00        .    .00  23        1.96 0
 1  1 119 1311 7  1  1  20000.   1.00        .    .00  23        1.96 0
                                                                      -9

                                                                      -2
 90 1 .000E-50 .000E-50 .000E-50                                       0
                                                                      -3
                                                                      -3
                                                                      -1
1.2370E-06  02
119  800 119 1200   1800.  60.00      2
119 1200 119 1600   2400.  60.00      2
220  800 220 1200   1800.  60.00      2
220 1200 220 1600   1800.  60.00      2

                                                                      -5
```

1	2	119	900	4	1	1	12642.	1.00	1832.	60.00	90	1.96	0
1	2	119	903	4	1	2	12580.	1.00	1832.	60.00	90	1.96	0
1	2	119	907	4	1	3	12673.	1.00	1832.	60.00	90	1.96	0
													-9

TABLE XII RESOLUTION SOURCE PROGRAM

```
C       RESOLUTION
      1 READ 201,NYX
        PUNCH 201,NYX
        IF(NYX+1)1,10,1
     10 READ 100,TAU,ISY
     11 READ 201,NYX
        PUNCH 201,NYX
        IF(NYX+5)11,12,11
     12 READ  101,IA1,IA2,IA3,IA4,IA5,IA6,IA7,  B1,B2,B3,B4,IB5,D,B6,NYX
        IF(ISY-IA2)13,14,13
     13 PRINT 104
        PAUSE
        GO TO 1
     14 C=B1/B2
        FTAU=1.-C*TAU
        TRUE=B1/FTAU
        PUNCH 101,IA1,IA2,IA3,IA4,IA5,IA6,IA7,TRUE,B2,B3,B4,IB5,D,B6,NYX
        READ  101,IA1,IA2,IA3,IA4,IA5,IA6,IA7,  B1,B2,B3,B4,IB5,D,B6,NYX
        IF(NYX+6)16,15,16
     16 IF(NYX+9)14,20,14
     20 PRINT 105
        PUNCH 202,NYX
        PAUSE
        GO TO 1
     15 PUNCH 202,NYX
        GO TO 10
    100 FORMAT(E11.4,I4)
    101 FORMAT(I4,I3,I4,I5,I2,2I3,F8.0,F7.2,F8.0,F7.2,I4,E9.3,F5.2,I2)
    104 FORMAT(27HERROR, MIXED SYSTEM NUMBERS)
    105 FORMAT(16HLOAD NEW PROBLEM)
    201 FORMAT(40H                                        ,
       132H                                ,I2)
    202 FORMAT(40X,32X,I2)
        END
```

TABLE XIII OUTPUT RESOLUTION - INPUT DECISION I

```
                                                                                          -2
   6 1 .100E 01 .000E-5C .000E-50                                                          0
                                                                                          -3
                                                                                          -3
 119  830   6                                                                              0
                                                                                          -1
 119  800 119 1600    6600.  60.00      11                                                 0
                                                                                          -5
   1 11 119  832 2 11  1   9555.    1.00          .     .00   6 .000E-50 1.96 000
   1 11 119  835 2 11  2   8900.    1.00          .     .00   6 .000E-50 1.96 000
   1 11 119  838 2 11  3   7638.    1.00          .     .00   6 .000E-50 1.96 000
   1 11 119  841 2 11  1   6453.    1.00          .     .00   6 .000E-50 1.96 000
   1 11 119  843 2 11  1   5635.    1.00          .     .00   6 .000E-50 1.96 000
                                                                                          -9

                                                                                          -2
   7 2 .400E-04 .400E-05 .000E-50                                                          0
    2    7                                                                                 0
    1    7                                                                                 0
    2    7                                                                                 0
                                                                                          -3
                                                                                          -3
                                                                                          -1
 119  800 119 1200    1800.  60.00       2                                                 0
 119 1200 119 1600    2400.  60.00       2                                                 0
 220  800 220 1200    1800.  60.00       2                                                 0
 220 1200 220 1600    1800.  60.00       2                                                 0
                                                                                          -5
   1  2 220  823 4  1  1   9715.    1.00          .     .00   7 .000E-50 1.96 000
   1  2 224  816 4  1  1   8697.    1.00     1822.   60.00   7 .000E-50 1.96 000
   1  2 229  841 4  1  1   6739.    1.00     1818.   60.00   7 .000E-50 1.96 000
   1  2 233  835 4  1  1   5160.    1.00     1798.   60.00   7 .000E-50 1.96 000
   2  2 222  832 4  1  1   9113.    1.00     1792.   60.00   7 .000E-50 1.96 000
   2  2 228  833 4  1  1   7186.    1.00     1803.   60.00   7 .000E-50 1.96 000
   2  2 231  823 4  1  1   5901.    1.00     1801.   60.00   7 .000E-50 1.96 000
                                                                                          -9
```

```
                                                                                          -2
 10 3 .400E-03 .400E-04 .400E-05                                                           0
   2   10                                                                                  0
   1   10                                                                                  0
   2   10                                                                                  0
                                                                                          -3
220  830  10                                                                              -3
                                                                                           0
119  800 119 1600   6600.  60.00     11                                                   -1
                                                                                           0
                                                                                          -5
  1 11 220  851 4 11  1  11770.   1.00    1821.  60.00  10 .000E-50 1.96 000
  1 11 224  820 4 11  1   5431.   1.00    1798.  60.00  10 .000E-50 1.96 000
  1 11 229  855 4 11  1   3781.   1.00    1831.  60.00  10 .000E-50 1.96 000
  1 11 233  840 4 11  1   3246.   1.00    1801.  60.00  10 .000E-50 1.96 000
  1 11 235  835 4 11  1   3014.   1.00    1821.  60.00  10 .000E-50 1.96 000
  1 11 235  843 4 11  2   2939.   1.00    1821.  60.00  10 .000E-50 1.96 000
  2 11 222  841 4 11  1   7100.   1.00    1803.  60.00  10 .000E-50 1.96 000
  2 11 228  839 4 11  1   3849.   1.00    1821.  60.00  10 .000E-50 1.96 000
  2 11 231  829 4 11  1   3498.   1.00    1792.  60.00  10 .000E-50 1.96 000
  2 11 235  830 4 11  1   3042.   1.00    1821.  60.00  10 .000E-50 1.96 000
  2 11 235  841 4 11  1   3235.   1.00    1821.  60.00  10 .000E-50 1.96 000
  2 11 235  845 4 11  2   3047.   1.00    1821.  60.00  10 .000E-50 1.96 000
 41 11 225  835 4 11  1  58552.   1.00    1791.  60.00  10 .000E-50 1.96 000
 41 11 226  841 4 11  1  51630.   1.00    1800.  60.00  10 .000E-50 1.96 000
 41 11 234  829 4 11  1  35134.   1.00    1816.  60.00  10 .000E-50 1.96 000
 41 11 235  830 4 11  1  33926.   1.00    1821.  60.00  10 .000E-50 1.96 000
                                                                                          -9

                                                                                          -2
 20 1 .100E-10 .000E-50 .000E-50                                                           0
                                                                                          -3
                                                                                          -3
119  800 119 1600   6600.  60.00     11                                                   -1
                                                                                           0
                                                                                          -5
  1 11 119  855 1 11  1   6135.   2.00       .      .00  20 .000E-50 1.96 000
  1 11 119  901 1 11  2   6032.   2.00       .      .00  20 .000E-50 1.96 000
  1 11 119  905 1 11  3   6049.   2.00       .      .00  20 .000E-50 1.96 000
  1 11 119  908 1 11  4   6090.   2.00       .      .00  20 .000E-50 1.96 000
```

```
  1 11 119   913 1 11  5    5954.    2.00           .     .00  20 .000E-50 1.96 000
  1 11 119   916 1 11  6    5930.    2.00           .     .00  20 .000E-50 1.96 000
  1 11 119   920 1 11  7    6135.    2.00           .     .00  20 .000E-50 1.96 000
  1 11 119   923 1 11  8    6149.    2.00           .     .00  20 .000E-50 1.96 000
  1 11 119   927 1 11  9    6165.    2.00           .     .00  20 .000E-50 1.96 000
  1 11 119   931 1 11 10    6053.    2.00           .     .00  20 .000E-50 1.96 000
                                                                              -9

                                                                              -2
 21 1 .100E-10 .000E-50 .000E-50                                               0
                                                                              -3
                                                                              -3
                                                                              -1
119   800 119 1200   1800.  60.00      2                                       0
119  1200 119 1600   2400.  60.00      2                                       0
220   800 220 1200   1800.  60.00      2                                       0
220  1200 220 1600   1800.  60.00      2                                       0
                                                                              -5
  1  2 119   935 1  1  1   15235.    1.00  18210.   60.00  21 .000E-50 1.96 000
  1  2 119   938 1  1  1   15145.    1.00  18210.   60.00  21 .000E-50 1.96 000
  1  2 119   944 1  1  1   14762.    1.00  18210.   60.00  21 .000E-50 1.96 000
                                                                              -9

                                                                              -2
 22 1 .100E-10 .000E-50 .000E-50                                               0
                                                                              -3
                                                                              -3
                                                                              -1
119   800 119 1600   6600.  60.00     11                                       0
                                                                              -5
  1 11 119 1011 5 11  1    3513.    1.00           .     .00  22 .000E-50 1.96 000
  1 11 119 1015 5 11  1    3497.    1.00           .     .00  22 .000E-50 1.96 000
  1 11 119 1017 6 11  1    1739.    1.00           .     .00  22 .000E-50 1.96 000
  1 11 119 1022 6 11  1    1731.    1.00           .     .00  22 .000E-50 1.96 000
                                                                              -9

                                                                              -2
 23 1 .128E-01 .000E-50 .000E-50                                               0
                                                                              -3
                                                                              -3
```

```
                                                                               -1
119   800 119 1600    1800.   60.00       1                                     0
                                                                               -5
  1   1 119 1030 7   1   1 118039.    1.00         .     .00  23 .000E-50 1.96 000
  1   1 119 1037 7   1   1 114116.    1.00         .     .00  23 .000E-50 1.96 000
  1   1 119 1044 7   1   1 107650.    1.00         .     .00  23 .000E-50 1.96 000
  1   1 119 1051 7   1   1 101274.    1.00         .     .00  23 .000E-50 1.96 000
  1   1 119 1058 7   1   1   94987.   1.00         .     .00  23 .000E-50 1.96 000
  1   1 119 1105 7   1   1   88786.   1.00         .     .00  23 .000E-50 1.96 000
  1   1 119 1112 7   1   1   82669.   1.00         .     .00  23 .000E-50 1.96 000
  1   1 119 1119 7   1   1   76635.   1.00         .     .00  23 .000E-50 1.96 000
  1   1 119 1126 7   1   1   70683.   1.00         .     .00  23 .000E-50 1.96 000
  1   1 119 1133 7   1   1   64810.   1.00         .     .00  23 .000E-50 1.96 000
  1   1 119 1140 7   1   1   59015.   1.00         .     .00  23 .000E-50 1.96 000
  1   1 119 1147 7   1   1   53296.   1.00         .     .00  23 .000E-50 1.96 000
  1   1 119 1158 7   1   1   47652.   1.00         .     .00  23 .000E-50 1.96 000
  1   1 119 1208 7   1   1   42082.   1.00         .     .00  23 .000E-50 1.96 000
  1   1 119 1219 7   1   1   36583.   1.00         .     .00  23 .000E-50 1.96 000
  1   1 119 1311 7   1   1   20507.   1.00         .     .00  23 .000E-50 1.96 000
                                                                               -9

                                                                               -2
 90 1 .000E-50 .000E-50 .000E-50                                                0
                                                                               -3
                                                                               -3
                                                                               -1
119   800 119 1200    1800.   60.00       2                                     0
119  1200 119 1600    2400.   60.00       2                                     0
220   800 220 1200    1800.   60.00       2                                     0
220  1200 220 1600    1800.   60.00       2                                     0
                                                                               -5
  1   2 119  900 4   1   1   12842.   1.00    1832.  60.00  90 .000E-50 1.96 000
  1   2 119  903 4   1   2   12778.   1.00    1832.  60.00  90 .000E-50 1.96 000
  1   2 119  907 4   1   3   12874.   1.00    1832.  60.00  90 .000E-50 1.96 000
                                                                               -9
```

TABLE XIV DEAD SOURCE PROGRAM

```
C         GM DEAD TIME LOSS CALCULATION
      DIMENSION AMP(200),AN(200),IT(200)
   90 READ 100,NYX
      READ 107,IPRB,NSLAM,XLAM
  107 FORMAT(I4,I2,E9.3)
   10 READ 100,NYX
      IF(NYX-1)10,11,10
   11 READ 101,IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,NYX
      IF(IA5-7)71,12,71
   12 ISMP=IA1
      ISYS=IA2
      IDY=IA3
      IGEO=IA6
      I=0
      GO TO 200
  201 READ 101,IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,NYX
      IF(IA1-ISMP)205,202,205
  202 IF(ISYS-IA2)205,203,205
  203 IF(IDY-IA3)205,204,205
  204 IF(IGEO-IA6)205,200,205
  200 I=I+1
      AMP(I)=B1
  222 LFT=IA4/100
      IT(I)=IA4-LFT*100+LFT*60
      GO TO 201
   71 PRINT 103
  103 FORMAT(12HNOT TAU DATA)
      PAUSE
      GO TO 90
  205 J=I
      AN(J)=AMP(J)
      N=J-1
      DO 300 I=1,N
      TIME=IT(J)-IT(I)
  300 AN(I)=AN(J)*EXP(XLAM*TIME)
      SUMT = 0.0
      SUMB = 0.0
      DO 40  I=1,J
      ST = AMP(I)*(1.-AMP(I)/AN(I))
      SUMT = SUMT + ST
      SB = AMP(I)**2
   40 SUMB = SUMB + SB
      DT = SUMT/SUMB
      IF(DT)400,402,402
  400 DT=0.
```

```
402 PUNCH 106
    PUNCH 105,ISYS,IDY,DT
 13 IF(NYX+9)700,70,700
 70 PRINT 102
102 FORMAT(16HREAD NEW PROBLEM)
    GO TO 90
700 IF(NYX+6)701,11,701
701 PUNCH 100,NYX
    GO TO 11
100 FORMAT(40H                                                   ,
   132H                                   ,I2)
101 FORMAT(I4,I3,I4,I5,I2,2I3,F8.0,F7.2,F8.0,F7.2,18X,I2)
105 FORMAT(2I5,2X,E10.4)
106 FORMAT(6HSYSTEM,4H DAY,9H      TAU)
    END
```

TABLE XV DEAD OUT

SYSTEM	DAY	TAU
1	119	.2720E-05

ABLE XVI DECISION I SOURCE PROGRAM

```
      DECISION I
      DIMENSION X( 30,6)
  202 FORMAT(16HLOAD DECISION II)
  203 FORMAT(16HBKG INFO MISSING)
  112 FORMAT(16HREAD NEW PROBLEM)
  300 READ 200,NYX
      READ 201,PN,NRLM,    XL,XLAM2,XLAM3
      IF(NRLM-1)250,350,250
  250 PRINT 202
      STOP
  350 PUNCH 200,NYX
      PUNCH 201,PN,NRLM,    XL,XLAM2,XLAM3
  210 READ 200,NYX
      PUNCH 200,NYX
      IF(NYX+1)210,211,210
  211 LL=0
      KKK=0
  221 READ 100,IC1,IC2,IC3,IC4,C5,C6,NYX
      IF(NYX+5)212,34,212
  212 I=LL+1
      X(I,1)=IC1
      X(I,2)=IC2
      X(I,3)=IC3
      X(I,4)=IC4
      X(I,5)=C5
      X(I,6)=C6
      LL=LL+1
      GO TO 221
   34 READ 102, IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,XLL,B6,NYX
      IF(KKK)4000,4004,4000
 4004 KKK=1
 4001 IG=IA6
      LRR=IA5
      ISM=IA1
      ID=0
      IT=0
      J=1
 4000 IF(NYX+9)215,216,215
  216 PRINT 112
      PUNCH 877,NYX
  877 FORMAT(40X,32X,I2)
      IF(LRR-7)7001,7002,7001
 7002 PRINT 7004
 7004 FORMAT(17HTHIS PROB TO DEAD)
 7001 PAUSE
```

```
      GO TO 300
  215 IF(NYX+6)4002,270,4002
 4002 IF(IA6-IG)4001,6,4001
    6 IF(IA1-ISM)4001,53,4001
  270 PUNCH 877,NYX
      GO TO 211
   53 IF(ID)7,46,7
   46 ID1=IA3
      IT1=IA4
    7 IF(IA5-1) 8,10,13
   13 IF(IA5-2) 8,10,9
    8 PRINT 104
      PAUSE
      GO TO 34
    9 IF(B3) 11,12,11
   11 IF(B4) 22,12,22
   12 A3=IA3
      A4=IA4
      I=1
      GO TO 14
   17 IF(I-LL)15,15,16
   15 I=I+1
   14 IF(A3-X(I,1)) 17,18,19
   18 IF(A4-X(I,2)) 17,19,19
   19 IF(A3-X(I,3)) 20,20,17
   20 IF(A4-X(I,4)) 21,21,17
   16 PRINT 109
      GO TO 10
   21 B3=X(I,5)
      B4=X(I,6)
      IA3=A3
      IA4=A4
   22 C=B1/B2-B3/B4
      GO TO 64
   10 C=B1/B2
   64 U=XL*B2
      IF(U-.01) 28,29,29
   29 C=C*U/(1.0-EXP(-U))
      IA7=1
   28 IF(IA3-ID) 30,31,32
   30 PRINT 107
      GO TO 32
   31 IF(IA4-IT) 30,32,32
   32 IF(ID) 33,36,33
   36 A=24*(IA3-ID)
      B=IA4-IT
      GO TO 37
   33 A=24*(IA3-ID1)
```

```
      B=IA4-IT1
   37 D=0.
      K=1
      GO TO 38
   41 D=D+100.
      K=K+1
   38 IF(B-D) 39,40,41
   40 BD=0.
      GO TO 42
   61 D=D-100.
   67 BD=B-D
      GO TO 42
   39 IF(K-1) 60,60,61
   60 D=-100.
   65 IF(B-D) 66,40,67
   66 D=D-100.
      GO TO 65
   42 T=60.*A+.6*D+BD
      IF(XL*T-.01) 43,44,44
   44 IA7=1
      GO TO 47
   43 IA7=J
      J=J+1
   49 PUNCH 102,IA1,IA2,ID1,IT1,IA5,IA6,IA7, C,B2,B3,B4,IB5,XL,B6,NYX
      ID=IA3
      IT=IA4
      GO TO 34
   47 PUNCH 102,IA1,IA2,IA3,IA4,IA5,IA6,IA7, C,B2,B3,B4,IB5,XL,B6,NYX
      ID=IA3
      IT=IA4
      ID1=IA3
      IT1=IA4
      GO TO 34
  100 FORMAT(I4,I5,I4,I5,F8.0,F7.2,39X,I2)
  102 FORMAT(I4,I3,I4,I5,I2,2I3,F8.0,F7.2,F8.0,F7.2,I4,E9.3,F5.2,I2)
  104 FORMAT(28HERROR, BKG SUBT DATA MISSING)
  107 FORMAT(30HERROR, INCORRECT TIME SEQUENCE)
  109 FORMAT(46HERROR, DATA CARD DOES NOT FIT GIVEN TIME RANGE)
  201 FORMAT(I4,I2,3E9.3)
  200 FORMAT(40H                                                   ,
     132H                                   ,I2)
      END
```

TABLE XVIIA OUTPUT DECISION I - INPUT DECAY I

```
                                                                                  -2
  6 1 .100E 01 .000E-50 .000E-50
                                                                                  -3
 119  830   6                                                                     0
                                                                                  -1
  1 11 119  832 2 11  1  15115.   1.00           .     .00   6 .100E 01 1.96 000
  1 11 119  835 2 11  1  14079.   1.00           .     .00   6 .100E 01 1.96 000
  1 11 119  838 2 11  1  12083.   1.00           .     .00   6 .100E 01 1.96 000
  1 11 119  841 2 11  1  10208.   1.00           .     .00   6 .100E 01 1.96 000
  1 11 119  843 2 11  1   8914.   1.00           .     .00   6 .100E 01 1.96 000
                                                                                  -9

                                                                                  -2
 21 1 .100E-10 .000E-50 .000E-50
                                                                                  -3
                                                                                  -1
  1  2 119  935 2  1  1  15235.   1.00  18210.   60.00  21 .100E-10 1.96 000
  1  2 119  935 2  1  2  15145.   1.00  18210.   60.00  21 .100E-10 1.96 000
  1  2 119  935 2  1  3  14762.   1.00  18210.   60.00  21 .100E-10 1.96 000
                                                                                  -9

                                                                                  -2
 22 1 .100E-10 .000E-50 .000E-50
                                                                                  -3
                                                                                  -1
  1 11 119 1011 5 11  1   3403.   1.00   6600.   60.00  22 .100E-10 1.96 000
  1 11 119 1011 5 11  2   3387.   1.00   6600.   60.00  22 .100E-10 1.96 000
  1 11 119 1011 6 11  3   1629.   1.00   6600.   60.00  22 .100E-10 1.96 000
  1 11 119 1011 6 11  4   1621.   1.00   6600.   60.00  22 .100E-10 1.96 000
                                                                                  -9
```

TABLE XVIIB OUTPUT DECISION I - INPUT CHISQ

20 1 .100E-10 .000E-50 .000E-50 -2

-3
-1

1	11	119	855	1	11	1	3067.	2.00	.	.00	20	.100E-10	1.96	000
1	11	119	855	1	11	2	3016.	2.00	.	.00	20	.100E-10	1.96	000
1	11	119	855	1	11	3	3024.	2.00	.	.00	20	.100E-10	1.96	000
1	11	119	855	1	11	4	3045.	2.00	.	.00	20	.100E-10	1.96	000
1	11	119	855	1	11	5	2977.	2.00	.	.00	20	.100E-10	1.96	000
1	11	119	855	1	11	6	2965.	2.00	.	.00	20	.100E-10	1.96	000
1	11	119	855	1	11	7	3067.	2.00	.	.00	20	.100E-10	1.96	000
1	11	119	855	1	11	8	3074.	2.00	.	.00	20	.100E-10	1.96	000
1	11	119	855	1	11	9	3082.	2.00	.	.00	20	.100E-10	1.96	000
1	11	119	855	1	11	10	3026.	2.00	.	.00	20	.100E-10	1.96	000

-9

90 1 .000E-50 .000E-50 .000E-50 -2

-3
-1

1	2	119	900	3	1	1	12811.	1.00	1832.	60.00	90	.100E-10	1.96	000
1	2	119	900	3	1	2	12747.	1.00	1832.	60.00	90	.100E-10	1.96	000
1	2	119	900	3	1	3	12843.	1.00	1832.	60.00	90	.100E-10	1.96	000

-9

TABLE XVIII DECISION II SOURCE PROGRAM

```
C     DECISION II
      DIMENSION X( 30,6)
  200 FORMAT(40H
     132H                                     ,I2)
  202 FORMAT(15HLOAD DECISION I)
  203 FORMAT(16HBKG INFO MISSING)
  112 FORMAT(16HREAD NEW PROBLEM)
      NY=0
  300 READ 200,NYX
      PUNCH 200,NYX
      READ 201,PN,NRLM,XLAM1,XLAM2,XLAM3
      PUNCH 201,PN,NRLM,XLAM1,XLAM2,XLAM3
      IF(NRLM-1)210,250,210
  250 PRINT 202
      STOP
  210 READ 200,NYX
      PUNCH 200,NYX
      IF(NYX+1)210,211,210
  211 LL=0
      IY1=0
      ID=0
      IT=0
      K=2
      J=1
  221 READ 100,IC1,IC2,IC3,IC4,C5,C6,NYX
      IF(NYX+5)212,34,212
  212 I=LL+1
      X(I,1)=IC1
      X(I,2)=IC2
      X(I,3)=IC3
      X(I,4)=IC4
      X(I,5)=C5
      X(I,6)=C6
      LL=LL+1
      GO TO 221
   83 IY1=IA1
      IY2=IA2
      IY3=IA3
      IY4=IA4
      IY5=IA5
      IY6=IA6
      IY7=IA7
      G1=C
      Y2=B2
      Y3=B3
```

```
      Y4=B4
      JY5=IB5
      Y6=B6
   34 READ 102, IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,D,B6,NYX
      IF(IA1)53,1000,53
 1000 K=3
      GO TO 84
  701 PUNCH 115,NYX
  115 FORMAT(40X,32X,I2)
      IF(NYX+9)211,216,211
  216 PRINT 112
      PAUSE
      GO TO 300
   53 IF(ID)7,46,7
   46 ID1=IA3
      IT1=IA4
    7 IF(IA5-1) 8,10,13
   13 IF(IA5-2) 8,10,9
    8 PRINT 104
      PAUSE
      GO TO 34
    9 IF(B3) 11,12,11
   11 IF(B4) 22,12,22
   12 A3=IA3
      A4=IA4
      I=1
      GO TO 14
   17 IF(I-LL)15,15,16
   15 I=I+1
   14 IF(A3-X(I,1)) 17,18,19
   18 IF(A4-X(I,2)) 17,19,19
   19 IF(A3-X(I,3)) 20,20,17
   20 IF(A4-X(I,4)) 21,21,17
   16 PRINT 109
      GO TO 10
   21 B3=X(I,5)
      B4=X(I,6)
      IA3=A3
      IA4=A4
   22 C=B1/B2-B3/B4
      GO TO 23
   10 C=B1/B2
   23 IF(K-2)1001,57,1001
   57 K=1
      NMU=0
      GO TO 83
 1001 IF(IY1-IA1)1003,1002,1003
 1002 IF(IY6-IA6)1003,58,1003
```

```
1003 K=2
     GO TO 84
  58 W=24*(IA3-IY3)
     Y=IA4-IY4
     Z=0.
     J=1
     GO TO 59
  62 Z=Z+100.
     J=J+1
  59 IF(Y-Z) 60,61,62
  61 YZ=0.
     GO TO 63
  91 Z=Z-100.
  94 YZ=Y-Z
     GO TO 63
  60 IF(J-1) 90,90,91
  90 Z=-100.
  92 IF(Y-Z) 93,61,94
  93 Z=Z-100.
     GO TO 92
  63 T=60.*W+.6*Z+YZ
     XXL=LOG(G1)/T-LOG(C)/T
  84 V=XXL*Y2
     IF(V-0.1) 65,66,66
  66 G1=G1*V/(1.0-EXP(-V))
     J=1
  65 IF(IY3-ID) 67,68,69
  67 PRINT 107
     PAUSE
     GO TO 34
  68 IF(IY4-IT) 67,69,69
  69 IF(ID) 70,71,70
  71 A=24*(IY3-ID)
     B=IY4-IT
     GO TO 72
  70 A=24*(IY3-ID1)
     B=IY4-IT1
  72 D=100.
     GO TO 73
  76 D=D+100.
  73 IF(B-D) 74,75,76
  75 BD=0.
     GO TO 77
  74 D=D-100.
     BD=B-D
  77 T=60.*A+.6*D+BD
     IF(XXL*T-.01)78,79,79
  79 IY7=1
```

```
      GO TO 80
   78 IY7=NMU+1
      NMU=NMU+1
      PUNCH 102, IY1,IY2,ID1,IT1,IY5,IY6,IY7,G1,Y2,Y3,Y4,JY5,XXL,Y6,NY
      ID=IY3
      IT=IY4
      GO TO 1009
   80 PUNCH 102, IY1,IY2,IY3,IY4,IY5,IY6,IY7,G1,Y2,Y3,Y4,JY5,XXL,Y6,NY
      NMU=1
      ID=IY3
      IT=IY4
      ID1=IY3
      IT1=IY4
 1009 IF(K-1)1007,83,1007
 1007 IF(K-2)701,1008,701
 1008 ID=0
      IT=0
      GO TO 53
  100 FORMAT(I4,I5,I4,I5,F8.0,F7.2,39X,I2)
  102 FORMAT(I4,I3,I4,I5,I2,2I3,F8.0,F7.2,F8.0,F7.2,I4,E9.3,F5.2,I2)
  103 FORMAT(17HERROR, MIXED DATA)
  104 FORMAT(28HERROR, BKG SUBT DATA MISSING)
  105 FORMAT(I4,E9.3)
  107 FORMAT(30HERROR, INCORRECT TIME SEQUENCE)
  109 FORMAT(46HERROR, DATA CARD DOES NOT FIT GIVEN TIME RANGE)
  114 FORMAT(45HUSE SAME DECAY CONST FOR LAST AND 2ND TO LAST,1X4HCARD)
  201 FORMAT(I4,I2,3E9.3)
      END
```

TABLE XIX OUTPUT DECISION II - INPUT DECAY II-III

```
                                                                                    -2
  7 2 .400E-04 .400E-05 .000E-50
   2    7                                                                            0
   1    7                                                                            0
   2    7                                                                            0
                                                                                    -3
                                                                                    -1
  1   2 220   823 4   1   1    9685.    1.00    1800.   60.00   7     .000 1.96 0
  1   2 224   816 4   1   1    8666.    1.00    1822.   60.00   7     .000 1.96 0
  1   2 229   841 4   1   1    6708.    1.00    1818.   60.00   7     .000 1.96 0
  1   2 233   835 4   1   1    5130.    1.00    1798.   60.00   7     .000 1.96 0
  2   2 222   832 4   1   1    9083.    1.00    1792.   60.00   7     .000 1.96 0
  2   2 228   833 4   1   1    7155.    1.00    1803.   60.00   7     .000 1.96 0
  2   2 231   823 4   1   1    5870.    1.00    1801.   60.00   7     .000 1.96 0
  0   0   0     0 0   0   0        .     .00        .     .00   0     .000  .00-9

                                                                                    -2
 10 3 .400E-03 .400E-04 .400E-05
   2   10                                                                            0
   1   10                                                                            0
   2   10                                                                            0
                                                                                    -3
220  830  10                                                                         0
                                                                                    -1
  1 11 220   851 4 11   1   11739.    1.00    1821.   60.00  10     .000 1.96 0
  1 11 224   820 4 11   1    5401.    1.00    1798.   60.00  10     .000 1.96 0
  1 11 229   855 4 11   1    3750.    1.00    1831.   60.00  10     .000 1.96 0
  1 11 233   840 4 11   1    3215.    1.00    1801.   60.00  10     .000 1.96 0
  1 11 235   835 4 11   1    2983.    1.00    1821.   60.00  10     .003 1.96 0
  1 11 235   843 4 11   1    2908.    1.00    1821.   60.00  10     .003 1.96 0
  2 11 222   841 4 11   1    7069.    1.00    1803.   60.00  10     .000 1.96 0
  2 11 228   839 4 11   1    3818.    1.00    1821.   60.00  10     .000 1.96 0
  2 11 231   829 4 11   1    3468.    1.00    1792.   60.00  10     .000 1.96 0
  2 11 231   829 4 11   2    3011.    1.00    1821.   60.00  10    -.005 1.96 0
  2 11 235   841 4 11   1    3204.    1.00    1821.   60.00  10     .015 1.96 0
  2 11 235   845 4 11   1    3016.    1.00    1821.   60.00  10     .015 1.96 0
 41 11 225   835 4 11   1   58522.    1.00    1791.   60.00  10     .000 1.96 0
```

41	11	226	841	4	11	1	51600.	1.00	1800.	60.00	10	.000	1.96	0
41	11	234	829	4	11	1	35103.	1.00	1816.	60.00	10	.000	1.96	0
41	11	235	830	4	11	1	33895.	1.00	1821.	60.00	10	.000	1.96	0
0	0	0	0	0	0	0	.	.00	.	.00	0	.000	.00	-9

TABLE XX CHISQ SOURCE PROGRAM

```
C       CHI SQUARE SECTION
        DIMENSION T(30),SN(30),B(4),C(4)
        B(1)=21.5
        B(2)=14.6
        B(3)=4.00
        B(4)=2.00
        C(1)=40.0
        C(2)=27.2
        C(3)=11.6
        C(4)=7.50
        I=1
  302 READ 205,NYX
      KK=1
      READ 201,PN,NRLM,XLAM1,XLAM2,XLAM3
      IF(NRLM-1)301,300,301
  301 PRINT 304
  304 FORMAT(30HTHIS DATA WITH DECAY II OR III)
      PAUSE
      GO TO 302
  300 READ 205,NYX
      IF(NYX+1)300,305,300
  305 READ 800,IA1,IA2,IA3,IA4,IA5,IA7,IA8,B1,B2,B3,B4,IB5,D,B6,NYX
      GO TO(102,100,102,100),IA5
  100 PRINT 309
  309 FORMAT(27HNOT CHISQ DATA,LOAD DECAY I)
      PAUSE
      GO TO 302
   80 READ 800,IA1,IA2,IA3,IA4,IA5,IA7,IA8,B1,B2,B3,B4,IB5,D,B6,NYX
      IF(NYX+9)311,315,311
  311 IF(NYX+6)313,316,313
  313 IF(KEP-IA1)12,81,12
   81 IF(KEP1-IA2) 12,82,12
   82 IF(KEP2-IA3) 12,83,12
   83 IF(KEP3-IA4) 12,84,12
   84 IF(KEP4-IA7) 12,85,12
   85 IF(KEP5-IB5) 12,1,12
    1 SN(I)=B1
      T(I)=B2
      I=I+1
      GO TO 80
  102 KEP=IA1
      KEP1=IA2
      KEP2=IA3
      KEP3=IA4
      KEP4=IA7
```

```
      KEP5=IB5
      GO TO 1
   12 MA=I-1
      IF(MA-2)500,13,13
   13 DO 40 I=2,MA
      IF(T(1)-T(I))41,40,41
   41 PRINT 104
      GO TO 102
   40 CONTINUE
  500 MT=MA/10+1
      DO 70 I=1,MT
      N=10*I
      IF(N-MA)51,51,50
   50 N=MA
      L=1
      GO TO 52
   51 L=N-9
   52 SSN=0.
      SSNS=0.
      MM=N-L+1
      EM=MM
      DO 55 J=L,N
      SSN=SSN+SN(J)
   55 SSNS=SSNS+SN(J)**2
      CHIS=(EM*SSNS/SSN-SSN)*T(1)
      DO 60 J=1,4
      IF(EM-10.)56,57,56
   57 P=B(J)
      GO TO 58
   56 P=(EM-10.)/10.*(C(I)-B(I))+B(I)
   58 IF(P-CHIS)61,60,60
   60 CONTINUE
      J=5
   61 GO TO(71,70,69,70,71),J
   70 CONTINUE
      GO TO 71
   69 PUNCH 200
      PUNCH 6,KEP1,KEP2,KEP3,CHIS,MM
      I=1
      IF(KK-9)317,319,317
   71 PUNCH 200
      PUNCH 7,KEP1,KEP2,KEP3,CHIS,MM
      I=1
      IF(KK-9)317,319,317
  317 IF(KK-6)102,300,102
  319 PRINT 320
  320 FORMAT(16HREAD NEW PROBLEM)
      PAUSE
```

```
      GO TO 302
  315 KK=9
      GO TO 12
  316 KK=6
      GO TO 12
    3 FORMAT(2X14,1X14,1X15,1XE10.4,18HSAMPLE REJECTED ONI5,4H OBS)
  200 FORMAT(28HSYSTEM   DAY   TIME          CHIS)
    4 FORMAT(2X14,1X14,1X15,1XE10.4,18HSAMPLE ACCEPTED ONI5,4H OBS)
  104 FORMAT(21H*TIMES* ARE NOT EQUAL)
  200 FORMAT(40H                                                   ,
     132H                                   ,I2)
  201 FORMAT(I4,I2,3E9.3)
  800 FORMAT(I4,I3,I4,I5,I2,2I3,F8.0,F7.2,F8.0,F7.2,I4,E9.3,F5.2,I2)
      END
```

TABLE XXI OUTPUT CHISQ

```
SYSTEM  DAY  TIME       CHIS
    11  119   855  .9688E 01SAMPLE ACCEPTED ON  010 OBS
SYSTEM  DAY  TIME       CHIS
     2  119   900  .3720E 00SAMPLE REJECTED ON  003 OBS
```

TABLE XXII DECAY I SOURCE PROGRAM

```
      DECAY I
  320 READ 100,NYX
      PUNCH 100,NYX
      READ 101,IP,NRLM,XL,XLAM2,XLAM3
      PUNCH 101,IP,NRLM,XL,XLAM2,XLAM3
      IF(NRLM-1)340,300,340
  300 READ 100,NYX
      PUNCH 100,NYX
      IF(NYX+3)300,301,300
  301 READ 102,LD,LT,IPM,NYX
      PUNCH 102,LD,LT,IPM,NYX
   11 IF(NYX+1)10,302,10
   10 READ 100,NYX
      PUNCH 100,NYX
      GO TO 11
  302 READ 105, IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,D,B6,NYX
      IF(XL)304,500,304
  500 XL=D
  304 ISM=IA1
      IGD=IA5
      IG=IA6
      IF(LD)20,305,20
  305 LD=IA3
      LT=IA4
   20 IA4=IA4-40*(IA4/100)-LT+40*(LT/100)
      XUA1=IA3-LD
      XUA2=IA4
   25 T=XUA1*1440.+XUA2
      ATO=B1*EXP(XL*T)
      PUNCH 104,IA1,IA2,LD,LT,IA5,IA6,IA7,IB5,ATO,B2,B3,B4,XL,B6,NYX
      READ 105, IA1,IA2,IA3,IA4,IA5,IA6,IA7,B1,B2,B3,B4,IB5,D,B6,NYX
      IF(NYX+9)310,309,310
  310 IF(NYX+6)312,311,312
  312 IF(ISM-IA1)304,313,304
  313 IF(IG-IA6)304,20,304
  309 PUNCH 100,NYX
      IF(IGD-3)501,502,502
  502 PRINT 304
  304 FORMAT(27HLOAD THIS PROBLEM WITH BKTH)
  501 PRINT 330
  330 FORMAT(16HLOAD NEW PROBLEM)
      PAUSE
      GO TO 320
  311 PUNCH 100,NYX
      GO TO 10
```

```
340 PRINT 333
333 FORMAT(20HLOAD DECAY 11 OR 111)
    PAUSE
    GO TO 320
104 FORMAT(I4,I3,I4,I5,I2,3I3,E9.3,F7.2,F8.0,F7.2,E9.3,F5.2,I2)
105 FORMAT(I4,I3,I4,I5,I2,2I3,F8.2,F7.2,F8.0,F7.2,I4,E9.3,F5.2,I2)
101 FORMAT(I4,I2,3E9.3)
102 FORMAT(I4,I5,I4,59X,I2)
100 FORMAT(40H                                        ,
   132H                                  ,I2)
    END
```

TABLE XXIII OUTPUT DECAY I - INPUT VAR I

```
                                                                                  -2
  6 1 .100E 01 .000E-50 .000E-50
                                                                                  -3
119  830   6                                                                       0
                                                                                  -1
  1 11 119  830 2 11  1  6 .111E 06   1.00          .    .00 .100E 01 1.96 000
  1 11 119  830 2 11  1  6 .208E 07   1.00          .    .00 .100E 01 1.96 000
  1 11 119  830 2 11  1  6 .360E 08   1.00          .    .00 .100E 01 1.96 000
  1 11 119  830 2 11  1  6 .611E 09   1.00          .    .00 .100E 01 1.96 000
  1 11 119  830 2 11  1  6 .394E 10   1.00          .    .00 .100E 01 1.96 000
                                                                                  -9

                                                                                  -2
 20 1 .100E-10 .000E-50 .000E-50
                                                                                  -3
  0    0    0                                                                     -1
  1 11 119  855 1 11  1 20 .306E 04   2.00          .    .00 .100E-10 1.96 000
  1 11 119  855 1 11  2 20 .301E 04   2.00          .    .00 .100E-10 1.96 000
  1 11 119  855 1 11  3 20 .302E 04   2.00          .    .00 .100E-10 1.96 000
  1 11 119  855 1 11  4 20 .304E 04   2.00          .    .00 .100E-10 1.96 000
  1 11 119  855 1 11  5 20 .297E 04   2.00          .    .00 .100E-10 1.96 000
  1 11 119  855 1 11  6 20 .296E 04   2.00          .    .00 .100E-10 1.96 000
  1 11 119  855 1 11  7 20 .306E 04   2.00          .    .00 .100E-10 1.96 000
  1 11 119  855 1 11  8 20 .307E 04   2.00          .    .00 .100E-10 1.96 000
  1 11 119  855 1 11  9 20 .308E 04   2.00          .    .00 .100E-10 1.96 000
  1 11 119  855 1 11 10 20 .302E 04   2.00          .    .00 .100E-10 1.96 000
                                                                                  -9

                                                                                  -2
 21 1 .100E-10 .000E-50 .000E-50
                                                                                  -3
  0    0    0                                                                     -1
  1  2 119  935 1  1  1 21 .152E 05   1.00  18210.  60.00 .100E-10 1.96 000
  1  2 119  935 1  1  2 21 .151E 05   1.00  18210.  60.00 .100E-10 1.96 000
  1  2 119  935 1  1  3 21 .147E 05   1.00  18210.  60.00 .100E-10 1.96 000
                                                                                  -9
```

```
90 1 .000E-50 .000E-50 .000E-50                                                       -2

 0     0   0                                                                          -3
 1   2 119   900 4   1   1 90 .128E 05    1.00    1832.   60.00 .100E-10 1.96         -1
 1   2 119   900 4   1   2 90 .127E 05    1.00    1832.   60.00 .100E-10 1.96 000
 1   2 119   900 4   1   3 90 .128E 05    1.00    1832.   60.00 .100E-10 1.96 000
                                                                                 000
                                                                                      -9
```

TABLE XXIV DECAY II SOURCE PROGRAM

```
C       DECAY II
        DIMENSION SST(3,30)
  502 FORMAT(3F10.2)
        DO 503 I=1,30
  503 READ 502,SST(1,I),SST(2,I),SST(3,I)
        DIMENSION SN(60),T(60),X1(60),X2(60),KK(60)
    1 READ 200,NYX
        PUNCH 200,NYX
        READ 219,NP,NI,XLAM1,XLAM2,XLAM3
        PUNCH 219,NP,NI,XLAM1,XLAM2,XLAM3
        IF(NI-2)217,202,217
  217 PRINT 218
  218 FORMAT(17HNOT DECAY II DATA)
        PAUSE
        GO TO 1
  202 READ 200,NYX
        PUNCH 200,NYX
        IF(NYX+3)202,602,202
  602 READ 203,LD,LT,NP,NYX
        PUNCH 203,LD,LT,NP,NYX
  206 READ 200,NYX
        PUNCH 200,NYX
        IF(NYX+1)206,207,206
  207 READ 704,IA1,IA2,IA3,IA4,IA5,IA6,IA7,SNBAR,B2,YT,B4,IB5,D,B6,NYX
  215 IF(LD)209,208,209
  208 LD=IA3
        LT=IA4
  209 I=1
        ISMP=IA1
        IG=IA6
        IX2=IA2
        IX5=IA5
        XX2=B2
        YYT=YT
        X4=B4
        IY5=IB5
        X6=B6
        GO TO 20
    3 READ 704,IA1,IA2,IA3,IA4,IA5,IA6,IA7,SNBAR,B2,YT,B4,IB5,D,B6,NYX
        IF(NYX+6)210,16,210
  210 IF(NYX+9)212,16,212
  212 IF(IA1-ISMP)16,213,16
  213 IF(IA6-IG)16,20,16
   20 IA4=IA4-40*(IA4/100)-LT+40*(LT/100)
        XUA1=IA3-LD
```

```
      XUA2=IA4
   25 T(I)=XUA1*1440.+XUA2
      KK(I)=IA7
      SN(I)=SNBAR
      I=I+1
      GO TO 3
   16 N=I-1
      PRINT 120,N
      DO 57 I=1,N
      X1(I)=EXP(-XLAM1*T(I))
   57 X2(I)=EXP(-XLAM2*T(I))
      X1SQ=0.
      X12=0.
      X2SQ=0.
      DO 30 I=1,N
      X1SQ=X1SQ+X1(I)*X1(I)
      X2SQ=X2SQ+X2(I)*X2(I)
   30 X12=X12+X1(I)*X2(I)
      C11=X2SQ/(X1SQ*X2SQ-X12*X12)
      C12=-(C11*X12)*X2SQ
      C22=X1SQ/(X1SQ*X2SQ-X12*X12)
      C12=-(C22*X12)/X1SQ
      Z1=0.
      Z2=0.
      DO 40 I=1,N
      Z1=Z1+SN(I)*X1(I)
   40 Z2=Z2+SN(I)*X2(I)
      A01=C11*Z1+C12*Z2
      A02=C12*Z1+C22*Z2
      SMSQ=0.
      DO 50 I=1,N
      SNBR=A01*X1(I)+A02*X2(I)
   50 SMSQ=SMSQ+(SN(I)-SNBR)*(SN(I)-SNBR)
      N=N-2
      EN=N
      IF(X6-1.96)403,402,403
  402 I=2
      GO TO 410
  403 IF(X6-1.65)405,404,405
  404 I=1
      GO TO 410
  405 I=3
  410 J=N
      IF(N-30)407,407,408
  408 J=30
  407 ST=SST(I,J)
      XLA01=A01-ST*SQRT(C11*SMSQ/EN)
      XUA01=A01+ST*SQRT(C11*SMSQ/EN)
```

```
      XLA02=A02-ST*SQRT(C22*SMSQ/EN)
      XUA02=A02+ST*SQRT(C22*SMSQ/EN)
      NY=6
      PUNCH 513,NY
      PUNCH 501,A01,XLA01,XUA01
      PUNCH 501,A02,XLA02,XUA02
      NY=7
      PUNCH 513,NY
      N=N+2
      DO 400 I=1,N
      E1=-XLAM1*T(I)
      E2=-XLAM2*T(I)
      ABOX=A01*EXP(E1)+A02*EXP(E2)
      RATIO=SN(I)/ABOX
      A01C=RATIO*A01
      A02C=RATIO*A02
      M=ISMP
      NY=0
      PUNCH 204,M,IX2,LD,LT,IX5,IG,KK(I),IY5,A01C,XX2,YYT,X4,XLAM1,X6,NY
  400 PUNCH 204,M,IX2,LD,LT,IX5,IG,KK(I),IY5,A02C,XX2,YYT,X4,XLAM2,X6,NY
      IF(NYX+6)240,250,240
  240 IF(NYX+9)215,230,215
  230 PRINT 231
      PUNCH 200,NYX
  231 FORMAT(13HREAD NEW DATA)
      IF(IX5-5)701,702,702
  702 PRINT 705
  705 FORMAT(14HLOAD WITH BKTH)
  701 GO TO 1
  250 PUNCH 200,NYX
      GO TO 207
  513 FORMAT(40X,32X,I2)
  501 FORMAT(3E12.5)
  200 FORMAT(40H
     132H                                   ,I2)
  219 FORMAT(I4,I2,3E9.3)
  203 FORMAT(I4,I5,I4,40X,19X,I2)
  120 FORMAT(3HN =,I4)
  204 FORMAT(I4,I3,I4,I5,I2,3I3,E9.3,F7.2,F8.0,F7.2,E9.3,F5.2,I2)
  704 FORMAT(I4,I3,I4,I5,I2,2I3,F8.2,F7.2,F8.0,F7.2,I4,E9.3,F5.2,I2)
      END
```

TABLE XXV OUTPUT DECAY II

```
                                                                                      -2
 7 2 .400E-04 .400E-05 .000E-50
  2     7                                                                              0
  1     7                                                                              0
  2     7                                                                              0
                                                                                      -3
 0     0    0                                                                         -3
                                                                                      -1
                                                                                       6
.83836E 04  .28785E 04  .13888E 05
.16077E 04 -.26357E 04  .58512E 04
                                                                                       7
 1   2 220  823 4   1   1   7 .812E 04   1.00    1800.   60.00 .400E-04 1.96 000
 1   2 220  823 4   1   1   7 .155E 04   1.00    1800.   60.00 .400E-05 1.96 000
 1   2 220  823 4   1   1   7 .882E 04   1.00    1800.   60.00 .400E-04 1.96 000
 1   2 220  823 4   1   1   7 .169E 04   1.00    1800.   60.00 .400E-05 1.96 000
 1   2 220  823 4   1   1   7 .863E 04   1.00    1800.   60.00 .400E-04 1.96 000
 1   2 220  823 4   1   1   7 .165E 04   1.00    1800.   60.00 .400E-05 1.96 000
 1   2 220  823 4   1   1   7 .788E 04   1.00    1800.   60.00 .400E-04 1.96 000
 1   2 220  823 4   1   1   7 .151E 04   1.00    1800.   60.00 .400E-05 1.96 000
                                                                                       6
.83750E 04 -.81295E 04  .24879E 05
.17080E 04 -.10326E 05  .13742E 05
                                                                                       7
 2   2 220  823 4   1   1   7 .831E 04   1.00    1792.   60.00 .400E-04 1.96 000
 2   2 220  823 4   1   1   7 .169E 04   1.00    1792.   60.00 .400E-05 1.96 000
 2   2 220  823 4   1   1   7 .866E 04   1.00    1792.   60.00 .400E-04 1.96 000
 2   2 220  823 4   1   1   7 .176E 04   1.00    1792.   60.00 .400E-05 1.96 000
 2   2 220  823 4   1   1   7 .812E 04   1.00    1792.   60.00 .400E-04 1.96 000
 2   2 220  823 4   1   1   7 .165E 04   1.00    1792.   60.00 .400E-05 1.96 000
                                                                                      -9
```

TABLE XXVI DECAY III SOURCE PROGRAM

```
C     DECAY III
      DIMENSION SST(30),XLM(3),XLA(3),XUA(3),AO(3)
      DIMENSION X3(20),A(3,3)
      DIMENSION SN(20),T(20),X1(20),X2(20)
  502 FORMAT(F10.2)
      DO 503 I=1,30
  503 READ 502,SST(I)
    1 READ 200,NYX
      I=1
      PUNCH 200,NYX
      READ 219,NP,NI,XLM(1),XLM(2),XLM(3)
      PUNCH 219,NP,NI,XLM(1),XLM(2),XLM(3)
  206 READ 200,NYX
      PUNCH 200,NYX
      IF(NYX+1)617,3,617
  617 IF(NYX-3)206,202,206
  202 READ 203,LD,LT,NP,NYX
      PUNCH 203,LD,LT,NP,NYX
      GO TO 206
  215 IF(LD)209,208,209
  208 LD=IA3
      LT=IA4
  209 ISMP=IA1
      I=1
      IG=IA6
      IX2=IA2
      IX5=IA5
      KK=IA7
      XX2=B2
      YYT=YT
      X4=B4
      IY5=IB5
      X6=B6
      GO TO 20
    3 READ 904,IA1,IA2,IA3,IA4,IA5,IA6,IA7,SNBAR,B2,YT,B4,IB5,D,B6[illegible]
      IF(I-1)560,215,560
  560 IF(NYX+6)210,16,210
  210 IF(NYX+9)212,16,212
  212 IF(IA1-ISMP)16,213,16
  213 IF(IA6-IG)16,20,16
   20 IA4=IA4-40*(IA4/100)-LT+40*(LT/100)
      XUA(1)=IA3-LD
      XUA(2)=IA4
      T(I)=XUA(1)*1440.+XUA(2)
      SN(I)=SNBAR
```

```
      I=I+1
      GO TO 3
   16 N=I-1
      PRINT 120,N
  702 DO 57 I=1,N
      X1(I)=EXP(-XLM(1)*T(I))
      X2(I)=EXP(-XLM(2)*T(I))
   57 X3(I)=EXP(-XLM(3)*T(I))
      DO 600 I=1,3
      DO 600 J=1,3
  600 A(I,J)=0.
      DO 30 I=1,N
      A(1,1)=A(1,1)+X1(I)*X1(I)
      A(2,2)=A(2,2)+X2(I)*X2(I)
      A(3,3)=A(3,3)+X3(I)*X3(I)
      A(1,2)=A(1,2)+X1(I)*X2(I)
      A(1,3)=A(1,3)+X1(I)*X3(I)
   30 A(2,3)=A(2,3)+X2(I)*X3(I)
      A(2,1)=A(1,2)
      A(3,1)=A(1,3)
      A(3,2)=A(2,3)
      DO 170 I=1,3
      DUMP=A(I,I)
      A(I,I)=1.
      IF(DUMP)130,110,130
  110 PUNCH 131
  131 FORMAT(20HOCAN,T INVERT MATRIX)
      STOP
  130 DO 140 J=1,3
  140 A(I,J)=A(I,J)/DUMP
      DO 170 K=1,3
      IF(K-I)150,170,150
  150 DUMP=A(K,I)
      A(K,I)=0.
      DO 160 J=1,3
  160 A(K,J)=A(K,J)-DUMP*A(I,J)
  170 CONTINUE
      Z1=0.
      Z2=0.
      Z3=0.
      DO 40 I=1,N
      Z1=Z1+SN(I)*X1(I)
      Z2=Z2+SN(I)*X2(I)
   40 Z3=Z3+SN(I)*X3(I)
      AO(1)=A(1,1)*Z1+A(2,1)*Z2+A(3,1)*Z3
      AO(2)=A(1,2)*Z1+A(2,2)*Z2+A(3,2)*Z3
      AO(3)=A(1,3)*Z1+A(2,3)*Z2+A(3,3)*Z3
      SMSQ=0.
```

```
      DO 50 I=1,N
      SNBR=A0(1)*X1(I)+A0(2)*X2(I)-A0(3)*X3(I)
      RELER=ABS(SNBR-SN(I))/SNBR-.2
      IF(RELER)50,50,700
   50 SMSQ=SMSQ+(SN(I)-SNBR)*(SN(I)-SNBR)
      N=N-3
      EN=N
  410 J=N
      IF(N-30)407,407,408
  408 J=30
  407 ST=SST(J)
      DO 571 J=1,3
      A(J,J)=ST*SQRT(A(J,J)*SMSQ/EN)
      XLA(J)=A0(J)-A(J,J)
  571 XUA(J)=A0(J)+A(J,J)
      NY=6
      PUNCH 513,NY
      DO 572 J=1,3
  572 PUNCH 501,A0(J),XLA(J),XUA(J)
      NY=7
      PUNCH 513,NY
      N=N+3
      DO 400 I=1,N
      ABOX=A0(1)*X1(I)+A0(2)*X2(I)+A0(3)*X3(I)
      RATIO=SN(I)/ABOX
      M=ISMP
      NY=0
      DO 400 J=1,3
      A(J,J)=RATIO*A0(J)
  400 PUNCH 204,M,IX2,LD,LT,IX5,IG,KK,IY5,A(J,J),XX2,YYT,X4,XLM(J),X6,N
      IF(NYX+6)240,250,240
  240 IF(NYX+9)215,230,215
  230 PRINT 231
      PUNCH 200,NYX
  231 FORMAT(13HREAD NEW DATA)
      IF(IX5-5)901,902,902
  902 PRINT 905
  905 FORMAT(14HLOAD WITH BKTH)
  901 GO TO 1
  250 PUNCH 200,NYX
      I=1
      GO TO 3
  700 NP=N-1
      DO 701 J=I,NP
      SN(J)=SN(J+1)
  701 T(J)=T(J+1)
      N=N-1
      GO TO 702
```

```
513 FORMAT(40X,32X,I2)
501 FORMAT(3E12.5)
200 FORMAT(40H
   132H                                          ,I2)
219 FORMAT(I4,I2,3E9.3)
203 FORMAT(I4,I5,I4,40X,19X,I2)
120 FORMAT(3HN =,I4)
204 FORMAT(I4,I3,I4,I5,I2,3I3,E9.3,F7.2,F8.0,F7.2,E9.3,F5.2,I2)
904 FORMAT(I4,I3,I4,I5,I2,2I3,F8.^,F7.2,F8.0,F7.2,I4,E9.3,F5.2,I2)
    END
```

TABLE XXVII OUTPUT DECAY III

```
                                                                                    -2
 10 3 .400E-03 .400E-04 .400E-05
   2   10                                                                            0
   1   10                                                                            0
   2   10                                                                            0
                                                                                    -3
220  830  10                                                                         0
                                                                                    -1
                                                                                     6
 .60425E 04  .56520E 04  .64329E 04
 .47236E 04  .40018E 04  .54454E 04
 .10305E 04  .61331E 03  .14478E 04
                                                                                     7
  1 11 220  830 4 11  1 10 .604E 04   1.00   1821.  60.00 .400E-03 1.96 000
  1 11 220  830 4 11  1 10 .472E 04   1.00   1821.  60.00 .400E-04 1.96 000
  1 11 220  830 4 11  1 10 .103E 04   1.00   1821.  60.00 .400E-05 1.96 000
  1 11 220  830 4 11  1 10 .608E 04   1.00   1821.  60.00 .400E-03 1.96 000
  1 11 220  830 4 11  1 10 .475E 04   1.00   1821.  60.00 .400E-04 1.96 000
  1 11 220  830 4 11  1 10 .103E 04   1.00   1821.  60.00 .400E-05 1.96 000
  1 11 220  830 4 11  1 10 .592E 04   1.00   1821.  60.00 .400E-03 1.96 000
  1 11 220  830 4 11  1 10 .463E 04   1.00   1821.  60.00 .400E-04 1.96 000
  1 11 220  830 4 11  1 10 .101E 04   1.00   1821.  60.00 .400E-05 1.96 000
  1 11 220  830 4 11  1 10 .608E 04   1.00   1821.  60.00 .400E-03 1.96 000
  1 11 220  830 4 11  1 10 .475E 04   1.00   1821.  60.00 .400E-04 1.96 000
  1 11 220  830 4 11  1 10 .103E 04   1.00   1821.  60.00 .400E-05 1.96 000
  1 11 220  830 4 11  1 10 .613E 04   1.00   1821.  60.00 .400E-03 1.96 000
  1 11 220  830 4 11  1 10 .479E 04   1.00   1821.  60.00 .400E-04 1.96 000
  1 11 220  830 4 11  1 10 .104E 04   1.00   1821.  60.00 .400E-05 1.96 000
  1 11 220  830 4 11  1 10 .598E 04   1.00   1821.  60.00 .400E-03 1.96 000
  1 11 220  830 4 11  1 10 .467E 04   1.00   1821.  60.00 .400E-04 1.96 000
  1 11 220  830 4 11  1 10 .102E 04   1.00   1821.  60.00 .400E-05 1.96 000
                                                                                     6
 .89775E 04  .25643E 04  .15390E 05
 .21912E 04 -.28820E 04  .72646E 04
 .23220E 04 -.44269E 03  .50867E 04
                                                                                     7
  2 11 220  830 4 11  1 10 .897E 04   1.00   1803.  60.00 .400E-03 1.96 000
```

2	11	220	830	4	11	1	10	.219E 04	1.00	1803.	60.00	.400E-04	1.96	000
2	11	220	830	4	11	1	10	.232E 04	1.00	1803.	60.00	.400E-05	1.96	000
2	11	220	830	4	11	1	10	.929E 04	1.00	1803.	60.00	.400E-03	1.96	000
2	11	220	830	4	11	1	10	.226E 04	1.00	1803.	60.00	.400E-04	1.96	000
2	11	220	830	4	11	1	10	.240E 04	1.00	1803.	60.00	.400E-05	1.96	000
2	11	220	830	4	11	1	10	.927E 04	1.00	1803.	60.00	.400E-03	1.96	000
2	11	220	830	4	11	1	10	.226E 04	1.00	1803.	60.00	.400E-04	1.96	000
2	11	220	830	4	11	1	10	.239E 04	1.00	1803.	60.00	.400E-05	1.96	000
2	11	220	830	4	11	1	10	.804E 04	1.00	1803.	60.00	.400E-03	1.96	000
2	11	220	830	4	11	1	10	.196E 04	1.00	1803.	60.00	.400E-04	1.96	000
2	11	220	830	4	11	1	10	.208E 04	1.00	1803.	60.00	.400E-05	1.96	000
2	11	220	830	4	11	1	10	.941E 04	1.00	1803.	60.00	.400E-03	1.96	000
2	11	220	830	4	11	1	10	.229E 04	1.00	1803.	60.00	.400E-04	1.96	000
2	11	220	830	4	11	1	10	.243E 04	1.00	1803.	60.00	.400E-05	1.96	000
2	11	220	830	4	11	1	10	.886E 04	1.00	1803.	60.00	.400E-03	1.96	000
2	11	220	830	4	11	1	10	.216E 04	1.00	1803.	60.00	.400E-04	1.96	000
2	11	220	830	4	11	1	10	.229E 04	1.00	1803.	60.00	.400E-05	1.96	000

6

.21592E 06	.73059E 05	.35878E 06
.34457E 05	.99214E 04	.58992E 05
.21184E 05	.91790E 04	.33189E 05

7

41	11	220	830	4	11	1	10	.215E 06	1.00	1791.	60.00	.400E-03	1.96	000
41	11	220	830	4	11	1	10	.344E 05	1.00	1791.	60.00	.400E-04	1.96	000
41	11	220	830	4	11	1	10	.211E 05	1.00	1791.	60.00	.400E-05	1.96	000
41	11	220	830	4	11	1	10	.215E 06	1.00	1791.	60.00	.400E-03	1.96	000
41	11	220	830	4	11	1	10	.344E 05	1.00	1791.	60.00	.400E-04	1.96	000
41	11	220	830	4	11	1	10	.211E 05	1.00	1791.	60.00	.400E-05	1.96	000
41	11	220	830	4	11	1	10	.216E 06	1.00	1791.	60.00	.400E-03	1.96	000
41	11	220	830	4	11	1	10	.345E 05	1.00	1791.	60.00	.400E-04	1.96	000
41	11	220	830	4	11	1	10	.212E 05	1.00	1791.	60.00	.400E-05	1.96	000
41	11	220	830	4	11	1	10	.215E 06	1.00	1791.	60.00	.400E-03	1.96	000
41	11	220	830	4	11	1	10	.343E 05	1.00	1791.	60.00	.400E-04	1.96	000
41	11	220	830	4	11	1	10	.211E 05	1.00	1791.	60.00	.400E-05	1.96	000

TABLE XXVIII VAR I SOURCE PROGRAM

```
C      VAR I
       DIMENSION T(3,31),X(200)
       DO 1 I=1,31
     1 READ 103,T(1,I),T(2,I),T(3,I)
   103 FORMAT(3E10.5)
    10 READ 100,NYX
       IF(NYX+1)10,11,10
    11 READ 101, IA1,IA2,IA3,IA4,IA5,IA6,IA7,IB5,B1,B2,B3,B4,XLL,B6,NY)
    12 N=1
       ISMP=IA1
       JGD=IA5
       IG=IA6
       X(N)=B1
       IPROB=IB5
       ISY=IA2
       XEP=B6
    17 READ 101, IA1,IA2,IA3,IA4,IA5,IA6,IA7,IB5,B1,B2,B3,B4,XLL,B6,NY)
       IF(NYX+6)13,50,13
    13 IF(NYX+9)14,50,14
    14 IF(IA6-IG)50,15,50
    15 IF(IA1-ISMP)50,16,50
    16 N=N+1
       X(N)=B1
       GO TO 17
    50 M=N-1
       XBAR=0.
       SXSQ=0.
       DO 18 I=1,N
       XBAR=XBAR+X(I)
    18 SXSQ=SXSQ+(X(I)*X(I))
       XN=N
       SSX=XBAR*XBAR/XN
       XBAR=XBAR/XN
       IF(N-1)20,70,20
    20 SIGWG=(SXSQ-SSX)/(XN-1.)
       SIGWG=SQRT(SIGWG)
       SXBR=SIGWG/SQRT(XN)
       IF(M-31)72,72,21
    21 M=31
    72 IF(XEP-1.65)63,62,63
    62 I=1
       GO TO 22
    63 IF(XEP-1.96)65,64,65
    64 I=2
       GO TO 22
```

```
 65 I=3
 22 XL=XBAR-SXBR*T(I,M)
    U=XBAR+SXBR*T(I,M)
    PCERR=(SXBR*T(I,M)/XBAR)*100.
    N1=100*N-N
    N2=100*N/4-N
    N3=100*N/9-N
    N4=100*N/16-N
    N5=100*N/25-N
    N6=100*N/36-N
    N7=100*N/49-N
    N8=100*N/64-N
    N9=100*N/81-N
    N10=0
    PUNCH 110
    PUNCH 105,IPROB,ISY,ISMP,IG,N
    PUNCH 111
    PUNCH 106,XBAR,SIGWG,SXBR,PCERR
    PUNCH 112
    PUNCH 107,XL,U
    PUNCH 113
    PUNCH 108,N1,N2,N3,N4,N5,N6,N7,N8,N9,N10
    IF(NYX+6)61,11,61
 61 IF(NYX+9)507,80,507
 61 IF(NYX+9)12,80,12
 70 PUNCH 110
    PUNCH 105,IPROB,ISY,ISMP,IG,N
 80 PRINT 200
    PAUSE
    GO TO 10
507 IF(JGD-8)509,508,509
508 PRINT 510
510 FORMAT(15HLOAD WITH CALIB)
    GO TO 12
509 IF(JGD-9)12,512,12
512 PRINT 513
513 FORMAT(14HLOAD WITH FLUX)
    GO TO 12
200 FORMAT(16HREAD NEW PROBLEM)
110 FORMAT(3X,7HPROBLEM,4X,6HSYSTEM,4X6HSAMPLE,2X,8HGEOMETRY,4X,
   16HNUMBER)
107 FORMAT(2F10.1)
108 FORMAT(10I6)
111 FORMAT(10HMEAN COUNT,7X,3HSIG,6X,4HSXBR,2X,11HPERCENT ERR)
105 FORMAT(4X,I6,4X,I6,4X,I6,4X,I6,4X,I6)
106 FORMAT(F10.0,F10.5,2F10.4)
101 FORMAT(I4,I3,I4,I5,I2,3I3,E9.3,F7.2,F8.0,F7.2,E9.3,F5.2,I2)
112 FORMAT(20H LOW LIMIT  UP LIMIT)
```

```
100 FORMAT(A2H
   1 32H                                              ))
113 FORMAT(3X,3H.1E,3X,3H.2E,3X,3H.3E,3X,3H.4E,3X,3H.5E,3X,3H.6E,3X
   13H.7E,3X,3H.8E,3X,3H.9E,3X3H1.E)
    END
```

```
      PUNCH 433,YMU,SIGMA,YEST,ISIS
  433 FORMAT(3E9.3,I5)
      PUNCH 734
  734 FORMAT(16HSAMPLES IN GROUP)
      PUNCH 735,I(1),I(2),I(3),I(4),I(5),I(6),I(7),I(8),I(9),I(10)
  735 FORMAT(10I4)
      PUNCH 407
  407 FORMAT(13HPERCENT ERROR)
      PUNCH 113,ZZ(1),ZZ(2),ZZ(3),ZZ(4),ZZ(5),ZZ(6),ZZ(7),ZZ(8),ZZ(9)
     1ZZ(10)
      PUNCH 409
  409 FORMAT(15HNR SMPLS NEEDED)
      S=0.
      PUNCH 113,XM1,XM2,XM3,XM4,XM5,XM6,XM7,XM8,XM9,S
      IF(NYX+6)700,300,700
  700 CONTINUE
      PRINT 255
  255 FORMAT(16HLOAD NEW PROBLEM)
      PAUSE
      GO TO 41
  104 FORMAT(I4,I3,I4,I5,2X,I3,3X,I3,E9.3,22X,E9.3,5X,I3)
  200 FORMAT(40H                                                            ,
     132H                                          ,I2)
  201 FORMAT(2I5,40X,32X,I2)
  105 FORMAT(14HR IS IMAGINARY)
  113 FORMAT(10F7.1)
      END
```

TABLE XXXIII OUTPUT VAR II

```
 PROB   DAY TIME   GEO   LAMDA
    7   220   823     1 .400E-04
        MU     SIGMA       YEST SYSTEM
 .836E 04 .000E-50 .529E 01   002
SAMPLES IN GROUP
   1    2    0    0    0    0    0    0    0    0
PERCENT ERROR
     .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
NR SMPLS NEEDED
   198.0    48.0    20.2    10.5     6.0     3.5     2.0     1.1      .4      .0

 PROB   DAY TIME   GEO   LAMDA
    7   220   823     1 .400E-05
        MU     SIGMA       YEST SYSTEM
 .163E 04 .583E 02 .635E 03   002
SAMPLES IN GROUP
   1    2    0    0    0    0    0    0    0    0
PERCENT ERROR
    3.8     7.6    11.5    15.3    19.2    23.0    26.9    30.7    34.6    38.4
NR SMPLS NEEDED
   198.0    48.0    20.2    10.5     6.0     3.5     2.0     1.1      .4      .0
```

TABLE XXX PREF VAR II SOURCE PROGRAM

```
C       PREF FOR VAR II
C       MAX 25 GEOMETRIES
        DIMENSION EC1(9),EC2(9),EC3(9),IG(25),ST(9)
        DO 501 J=1,9
  501   READ 210,EC1(J),EC2(J),EC3(J)
        DO 302 J=1,9
  302   READ 303,ST(J)
  303   FORMAT(F10.4)
    1   KZ=1
        DO 900 I=1,25
  900   IG(I)=0
        NGOS=0
   70   READ 201,NYX
        PUNCH 201,NYX
        READ 200,IPROB,NRLAM
        PUNCH 200,IPROB,NRLAM
        READ 202,NGC
        PUNCH 202,NGC
  221   READ 201,NYX
        PUNCH 201,NYX
        IF(NYX-7)221,21,221
   21   READ 204,IA6,NYX
        IF(NYX-6)400,401,400
  401   READ 204,IA6,NYY
        IF(NYX-7)401,21,401
  400   IF(NYX+6)50,81,50
   81   PUNCH 204,IA6,NYX
        GO TO 21
   50   IF(NYX+9)30,601,30
   30   GO TO(31,32,33),KZ
   31   PUNCH 204,IA6,NYX
        READ 204,IA6,NYX
        GO TO(760,700,61),NRLAM
   61   READ 204,IA6,NYX
        GO TO 700
   32   READ 204,IA6,NYX
        PUNCH 204,IA6,NYX
        GO TO(760,21,61),NRLAM
   62   READ 204,IA6,NYX
        GO TO 21
   33   READ 204,IA6,NYX
   63   READ 204,IA6,NYX
        PUNCH 204,IA6,NYX
        GO TO 21
  700   KK=1
```

```
      DO 701 I=1,25
      IF(IA6-IG(I))701,702,701
  702 KK=0
  701 CONTINUE
      IF(KK)704,21,704
  704 DO 706 I=1,25
      IF(IG(I))706,705,706
  706 CONTINUE
  705 IG(I)=IA6
      NGOS=NGOS+1
      GO TO 21
  601 PUNCH 204,IA6,NYX
      PUNCH 208,NGOS
  208 FORMAT(I3)
      IDF=NGC-1
      DF=IDF
      PUNCH 209,DF,EC1(IDF),EC2(IDF),EC3(IDF)
      DO 503 J=1,25,5
      I=J+1
      K=J+2
      L=J+3
      M=J+4
  503 PUNCH 504,IG(J),IG(I),IG(K),IG(L),IG(M)
  504 FORMAT(5I5)
      PUNCH 303,ST(IDF)
      IF(KZ-NRLAM)602,760,760
  602 KZ=KZ+1
      PRINT 780
  780 FORMAT(11HREREAD DATA)
      GO TO 70
  760 PRINT 603
  603 FORMAT(16HREAD NEW PROBLEM)
      PAUSE
      GO TO 1
  209 FORMAT(4F10.6)
  204 FORMAT(18H                    ,I3,19H                         ,
     132H                              ,I2)
  201 FORMAT(40H                                        ,
     132H                              ,I2)
  200 FORMAT(I4,I2,34H                                  ,
     132H                              ,I2)
  202 FORMAT(I5,35H                                   ,
     132H                              ,I2)
  210 FORMAT(3F10.3)
      END
```

TABLE [illegible] OUTPUT PREP VAR II

```
 7 2 .400E-04 .400E-05 .000E-50                                                -2
  2    7
  1    7
  2    7                                                                          0
                                                                                  0
 0     0    0                                                                    -3
                                                                                 -3
                                                                                 -1
.83836E 04  .28785E 04  .13888E 05                                                6
.16077E 04 -.26357E 04  .58512E 04                                                0
                                                                                  0
                                                                                  7
 1  2 220  823 4  1  1  7 .812E 04   1.00   1800.  60.00 .400E-04 1.96 0
 1  2 220  823 4  1  1  7 .882E 04   1.00   1800.  60.00 .400E-04 1.96 0
 1  2 220  823 4  1  1  7 .863E 04   1.00   1800.  60.00 .400E-04 1.96 0
 1  2 220  823 4  1  1  7 .788E 04   1.00   1800.  60.00 .400E-04 1.96 0
 2  2 220  823 4  1  1  7 .831E 04   1.00   1792.  60.00 .400E-04 1.96 0
 2  2 220  823 4  1  1  7 .866E 04   1.00   1792.  60.00 .400E-04 1.96 0
 2  2 220  823 4  1  1  7 .812E 04   1.00   1792.  60.00 .400E-04 1.96 0
                  0                                                    -9
1
1.000000   .000560   .000066  6.640000
  1     0     0     0     0
  0     0     0     0     0
  0     0     0     0     0
  0     0     0     0     0
  0     0     0     0     0
 12.7000

 7 2 .400E-04 .400E-05 .000E-50                                                -2
  2    7
  1    7
  2    7                                                                          0
                                                                                  0
 0     0    0                                                                    -3
                                                                                 -3
                                                                                 -1
                                                                                  6
```

```
.83836E 04   .28785E 04   .13888E 05                                                  0
.16077E 04  -.26357E 04   .58512E 04                                                  0
                                                                                      7
 1  2 220   823 4  1  1  7 .155E 04   1.00   1800.  60.00 .400E-05 1.96 0
 1  2 220   823 4  1  1  7 .169E 04   1.00   1800.  60.00 .400E-05 1.96 0
 1  2 220   823 4  1  1  7 .165E 04   1.00   1800.  60.00 .400E-05 1.96 0
 1  2 220   823 4  1  1  7 .151E 04   1.00   1800.  60.00 .400E-05 1.96 0
 2  2 220   823 4  1  1  7 .169E 04   1.00   1792.  60.00 .400E-05 1.96 0
 2  2 220   823 4  1  1  7 .176E 04   1.00   1792.  60.00 .400E-05 1.96 0
 2  2 220   823 4  1  1  7 .165E 04   1.00   1792.  60.00 .400E-05 1.96 0
                   0                                                   -9
1
1.000000    .000660    .000066   6.640000
  1     0     0     0     0
  0     0     0     0     0
  0     0     0     0     0
  0     0     0     0     0
  0     0     0     0     0
 12.7000

                                                                       -2
10 3 .400E-03 .400E-04 .400E-05
  2    10
  1    10
  2    10                                                               0
                                                                        0
220   830   10                                                         -3
                                                                        0
                                                                       -1
                                                                        6
.60425E 04   .56520E 04   .64329E 04                                    0
.47236E 04   .40018E 04   .54454E 04                                    0
.10305E 04   .61331E 03   .14478E 04                                    0
                                                                        7
 1 11 220   830 4 11   1 10 .604E 04   1.00   1821.  60.00 .400E-03 1.96 0
 1 11 220   830 4 11   1 10 .608E 04   1.00   1821.  60.00 .400E-03 1.96 0
 1 11 220   830 4 11   1 10 .592E 04   1.00   1821.  60.00 .400E-03 1.96 0
 1 11 220   830 4 11   1 10 .608E 04   1.00   1821.  60.00 .400E-C3 1.96 0
 1 11 220   830 4 11   1 10 .613E 04   1.00   1821.  60.00 .400E-03 1.96 0
 1 11 220   830 4 11   1 10 .598E 04   1.00   1821.  60.00 .400E-03 1.96 0
 2 11 220   830 4 11   1 10 .897E 04   1.00   1803.  60.00 .400E-03 1.96 0
```

```
 2 11 220  830 4 11  1 10 .929E 04   1.00   1803.  60.00 .400E-03 1.96 0
 2 11 220  830 4 11  1 10 .927E 04   1.00   1803.  60.00 .400E-03 1.96 0
 2 11 220  830 4 11  1 10 .804E 04   1.00   1803.  60.00 .400E-03 1.96 0
 2 11 220  830 4 11  1 10 .941E 04   1.00   1803.  60.00 .400E-03 1.96 0
 2 11 220  830 4 11  1 10 .885E 04   1.00   1803.  60.00 .400E-03 1.96 0
41 11 220  830 4 11  1 10 .215E 06   1.00   1791.  60.00 .400E-03 1.96 0
41 11 220  830 4 11  1 10 .215E 06   1.00   1791.  60.00 .400E-03 1.96 0
41 11 220  830 4 11  1 10 .216E 06   1.00   1791.  60.00 .400E-03 1.96 0
41 11 220  830 4 11  1 10 .215E 06   1.00   1791.  60.00 .400E-03 1.96 0
                 0                                                     -9
1
1.000000   .000660   .000066  6.640000
 11     0     0     0     0
  0     0     0     0     0
  0     0     0     0     0
  0     0     0     0     0
  0     0     0     0     0
 12.7000
                                                                       -2
10 3 .400E-03 .400E-04 .400E-05
  2   10
  1   10
  2   10                                                                0
                                                                        0
220  830  10                                                           -3
                                                                        0
                                                                       -1
                                                                        5
.60425E 04  .56520E 04  .64329E 04                                      0
.47236E 04  .40018E 04  .54454E 04                                      0
.10305E 04  .61331E 03  .14478E 04                                      0
                                                                        7
 1 11 220  830 4 11  1 10 .472E 04   1.00   1821.  60.00 .400E-04 1.96 0
 1 11 220  830 4 11  1 10 .475E 04   1.00   1821.  60.00 .400E-04 1.96 0
 1 11 220  830 4 11  1 10 .463E 04   1.00   1821.  60.00 .400E-04 1.96 0
 1 11 220  830 4 11  1 10 .475E 04   1.00   1821.  60.00 .400E-04 1.96 0
 1 11 220  830 4 11  1 10 .479E 04   1.00   1821.  60.00 .400E-04 1.96 0
 1 11 220  830 4 11  1 10 .467E 04   1.00   1821.  60.00 .400E-04 1.96 0
 2 11 220  830 4 11  1 10 .219E 04   1.00   1803.  60.00 .400E-04 1.96 0
 2 11 220  830 4 11  1 10 .226E 04   1.00   1803.  60.00 .400E-04 1.96 0
 2 11 220  830 4 11  1 10 .226E 04   1.00   1803.  60.00 .400E-04 1.96 0
```

```
 2 11 220   830 4 11   1 10 .196E 04    1.00    1803.   60.00  .400E-04 1.96 0
 2 11 220   830 4 11   1 10 .229E 04    1.00    1803.   60.00  .400E-04 1.96 0
 2 11 220   830 4 11   1 10 .216E 04    1.00    1803.   60.00  .400E-04 1.96 0
41 11 220   830 4 11   1 10 .344E 05    1.00    1791.   60.00  .400E-04 1.96 0
41 11 220   830 4 11   1 10 .344E 05    1.00    1791.   60.00  .400E-04 1.96 0
41 11 220   830 4 11   1 10 .345E 05    1.00    1791.   60.00  .400E-04 1.96 0
41 11 220   830 4 11   1 10 .343E 05    1.00    1791.   60.00  .400E-04 1.96 C
                   0                                                          -9
1
1.000000   .000660   .000066  6.640000
 11     0     0     0     0
  0     0     0     0     0
  0     0     0     0     0
  0     0     0     0     0
  0     0     0     0     0
 12.7000

10 3 .400E-03 .400E-04 .400E-05                                               -2
  2    10
  1    10
  2    10                                                                      0
                                                                               0
220   830   10                                                                -3
                                                                               0
                                                                              -1
.60425E 04   .56520E 04   .64329E 04                                           6
.47236E 04   .40018E 04   .54454E 04                                           0
.10305E 04   .61331E 03   .14478E 04                                           0
                                                                               0
                                                                               7
 1 11 220   830 4 11   1 10 .103E 04    1.00    1821.   60.00  .400E-05 1.96 0
 1 11 220   830 4 11   1 10 .103E 04    1.00    1821.   60.00  .400E-05 1.96 0
 1 11 220   830 4 11   1 10 .101E 04    1.00    1821.   60.00  .400E-05 1.96 0
 1 11 220   830 4 11   1 10 .103E 04    1.00    1821.   60.00  .400E-05 1.96 0
 1 11 220   830 4 11   1 10 .104E 04    1.00    1821.   60.00  .400E-05 1.96 0
 1 11 220   830 4 11   1 10 .102E 04    1.00    1821.   60.00  .400E-05 1.96 0
 2 11 220   830 4 11   1 10 .232E 04    1.00    1803.   60.00  .400E-05 1.96 0
 2 11 220   830 4 11   1 10 .240E 04    1.00    1803.   60.00  .400E-05 1.96 0
 2 11 220   830 4 11   1 10 .239E 04    1.00    1803.   60.00  .400E-05 1.96 0
 2 11 220   830 4 11   1 10 .208E 04    1.00    1803.   60.00  .400E-05 1.96 0
 2 11 220   830 4 11   1 10 .243E 04    1.00    1803.   60.00  .400E-05 1.96 0
```

```
 2 11 220  830 4 11  1 10 .229E 04   1.00   1803.  60.00 .400E-05 1.96 0
41 11 220  830 4 11  1 10 .211E 05   1.00   1791.  60.00 .400E-05 1.96 0
41 11 220  830 4 11  1 10 .211E 05   1.00   1791.  60.00 .400E-05 1.96 0
41 11 220  830 4 11  1 10 .212E 05   1.00   1791.  60.00 .400E-05 1.96 0
41 11 220  830 4 11  1 10 .211E 05   1.00   1791.  60.00 .400E-05 1.96 0
                    0                                                  -9
1
1.000000    .000660    .000066  6.640000
 11      0       0       0       0
  0      0       0       0       0
  0      0       0       0       0
  0      0       0       0       0
  0      0       0       0       0
 12.7000
```

TABLE XXXII VAR II SOURCE PROGRAM

```
C     VAR II
      DIMENSION IG(25),FV(9),I(10),SUM(10),SUMSQ(10),L(10),ZZ(10)
      DIMENSION FT(102),XNBAR(10)
   41 READ 501,NGOS
      READ 502,DF,EC1,EC2,EC3
  501 FORMAT(I3)
  502 FORMAT(4F10.4)
      DO 503 J=1,25,5
      II=J+1
      K=J+2
      LL=J+3
      M=J+4
  503 READ 504,IG(J),IG(II),IG(K),IG(LL),IG(M)
  504 FORMAT(5I5)
      READ 303,ST
  303 FORMAT(F10.4)
      IDF=DF
      DO 910 J=1,102
      READ 202,FV(1),FV(2),FV(3),FV(4),FV(5),FV(6),FV(7),FV(8),FV(9)
  910 FT(J)=FV(IDF)
  202 FORMAT(9F7.2)
    1 DO 700 KX=1,NGOS
      IF(KX-1)827,817,827
  827 PRINT 254
  254 FORMAT(11HREREAD DATA)
  817 READ 200,NYX
      READ 940,IPROB,NLAM
  940 FORMAT(I4,I2)
      READ 201,NGC,IPROB,NYX
      XM=NGC
      IF(NGC)211,212,211
  212 PRINT 213
  213 FORMAT(10HVAR I DATA)
      PAUSE
      GO TO 1
  211 DO 215 J=1,NGC
  215 READ 201,I(J),IPROB
  216 READ 200,NYX
      IF(NYX-7)216,300,216
  300 DO 230 J=1,10
      L(J)=0
      SUM(J)=0.
  230 SUMSQ(J)=0.
      S=0.
      SSQ=0.
```

```
      EVS=0.
      ETS=0.
      T=0.
      YMU1=0.
      R2=0.
      SIG1=0.
  235 READ 104,IA1,IA2,IA3,IA4,IA6,IB5,B1,XLAM,NYX
      IF(NYX+9)225,219,225
  225 IF(NYX+6)226,219,226
  226 DO 232 J=1,NGC
      IF(IA1-I(J))232,233,232
  233 IF(IA6-IG(KX))235,224,235
  232 CONTINUE
  224 SUM(J)=SUM(J)+B1
      SUMSQ(J)=SUMSQ(J)+B1*B1
      L(J)=L(J)+1
      IDY=IA3
      ITEM=IA4
      ISIS=IA2
      ZLAM=XLAM
      GO TO 235
  219 DO 241 K=1,NGC
      S=S+SUM(K)
      SSQ=SSQ SUMSQ(K)
      XNI=L(K)
      T=T+XNI
      SIG1=SIG1+1./XNI
      SOS=(SUM(K)*SUM(K))/XNI
      EVS=EVS+(SUMSQ(K)-SOS)
      XNBAR(K)=(1./XNI)*SUM(K)
      YMU1=YMU1+XNBAR(K)
  241 YMU=(1./XM)*YMU1
      DO 16 K=1,NGC
   16 R2=R2+(XNBAR(K)-YMU)*(XNBAR(K)-YMU)
      C=S*S/T
      ETS=SSQ-C
      EHS=ETS-EVS
      ETD=T-1.
      EHD=XM-1.
      EVD=ETD-EHD
      EHM=EHS/EHD
      EVM=EVS/EVD
      ETM=ETS/ETD
      EF=EHM/EVM
      XMM=XM*XM-XM
      R1=R2/XMM
      IF(R1) 11,12,12
   11 PRINT 105
```

```
      GO TO 700
   12 R=SQRT(R1)
      LOBS=EVD
      IF(LOBS-100)902,902,903
  902 TC=FT(LOBS)
      GO TO 1000
  903 IF(LOBS-400)904,904,905
  904 TC=LOBS-100
      TC=TC*EC1
      TC=TC+FT(100)
      GO TO 1000
  905 IF(LOBS-1000)906,906,907
  906 TC=LOBS-400
      TC=TC*EC2
      TC=TC+FT(101)
      GO TO 1000
  907 TC=EC3
 1000 IF(EF-TC)100,101,101
  101 PUNCH 340
  340 FORMAT(8HVAR SMPS)
  100 TC=ST
      YEST=R*TC
      Z=100.*(YEST/YMU)
      PQ=0.
      DO 271 K=1,10
      PQ=PQ+.1
  271 ZZ(K)=PQ*Z
      XM1=XM/0.01-XM
      XM2=XM/0.04-XM
      XM3=XM/0.09-XM
      XM4=XM/0.16-XM
      XM5=XM/0.25-XM
      XM6=XM/0.36-XM
      XM7=XM/0.49-XM
      XM8=XM/0.64-XM
      XM9=XM/0.81-XM
      SIG2=(EVM/(XM*XM))*SIG1
      SIG3=XM*(R*R-SIG2)
      IF(SIG3) 14,15,15
   14 SIGMA=0.
      GO TO 49
   15 SIGMA=SQRT(SIG3)
   49 PUNCH 109
  109 FORMAT(5H PROB,5H  DAY,5H TIME,5H  GEO,7H  LAMDA)
      PUNCH 110,IPROB,IDY,ITEM,IG(KX),ZLAM
  110 FORMAT(4I5,E9.3)
      PUNCH 108
  108 FORMAT(7X,2HMU,4X,5HSIGMA,5X,4HYEST,1X,6HSYSTEM)
```

```
      PUNCH 433,YMU,SIGMA,YEST,ISIS
  433 FORMAT(3E9.3,I5)
      PUNCH 734
  734 FORMAT(16HSAMPLES IN GROUP)
      PUNCH 735,I(1),I(2),I(3),I(4),I(5),I(6),I(7),I(8),I(9),I(10)
  735 FORMAT(10I4)
      PUNCH 407
  407 FORMAT(13HPERCENT ERROR)
      PUNCH 113,ZZ(1),ZZ(2),ZZ(3),ZZ(4),ZZ(5),ZZ(6),ZZ(7),ZZ(8),ZZ(9
     1ZZ(10)
      PUNCH 409
  409 FORMAT(15HNR SMPLS NEEDED)
      S=0.
      PUNCH 113,XM1,XM2,XM3,XM4,XM5,XM6,XM7,XM8,XM9,S
      IF(NYX+6)700,300,700
  700 CONTINUE
      PRINT 255
  255 FORMAT(16HLOAD NEW PROBLEM)
      PAUSE
      GO TO 41
  104 FORMAT(I4,I3,I4,I5,2X,I3,3X,I3,E9.3,22X,E9.3,5X,I3)
  200 FORMAT(40H                                        .
     132H                               ,I2)
  201 FORMAT 2,5,40X,22X,I2)
  105 FORMAT(14HR IS IMAGINARY)
  113 FORMAT(10F7.1)
      END
```

TABLE XXXIII OUTPUT VAR II

```
 PROB  DAY TIME  GEO  LAMDA
    7  220  823    1 .400E-04
       MU     SIGMA      YEST SYSTEM
 .836E 04 .000E-50 .529E 01  002
SAMPLES IN GROUP
   1    2    0    0    0    0    0    0    0    0
PERCENT ERROR
     .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
NR SMPLS NEEDED
  198.0    48.0    20.2    10.5     6.0     3.5     2.0     1.1      .4      .0

 PROB  DAY TIME  GEO  LAMDA
    7  220  823    1 .400E-05
       MU     SIGMA      YEST SYSTEM
 .163E 04 .583E 02 .635E 03  002
SAMPLES IN GROUP
   1    2    0    0    0    0    0    0    0    0
PERCENT ERROR
    3.8     7.6    11.5    15.3    19.2    23.0    26.9    30.7    34.6    38.4
NR SMPLS NEEDED
  198.0    48.0    20.2    10.5     6.0     3.5     2.0     1.1      .4      .0
```

TABLE XXXIV BAKTH SOURCE PROGRAM

```
C       THICKNESS OF BACKING MATERIAL DETERMINATION
      3 READ 100,EA,IGARD
    100 FORMAT(F10.3,I4)
        IF(IGARD-999)300,304,300
    300 PRINT 301
    301 FORMAT(19HMAX BETA CARD CHECK)
        PAUSE
        GO TO 3
    304 READ 110,NYX
        IF(NYX-1)304,305,304
    305 READ 102,ISMP,ISYS,IA5,IG,IPROB,B1,NYX
    602 ISMS=ISMP
        I=0
        J=0
        AA=0
        AO=0
    400 IF(IA5-5)404,403,404
    403 AO=B1+AO
        I=I+1
        GO TO 500
    404 IF(IA5-6)406,405,406
    405 AA=B1+AA
        J=J+1
        GO TO 500
    406 IF(NYX+9)608,501,608
    608 IF(NYX+6)609,501,609
    609 PRINT 407
    407 FORMAT(13HNOT BKTH DATA)
        PAUSE
        GO TO 3
    500 READ 102,ISMP,ISYS,IA5,IG,IPROB,B1,NYX
        IF(ISMS-ISMP)501,400,501
    501 X=I
        AO=AO/X
        X=J
        AA=AA/X
      7 IF(IG-10) 10,11,11
     10 ALPHA=33./(EA**1.33)
        GO TO 12
     11 IF(EA-1.45) 13,14,14
     13 ALPHA=60./(EA**1.54)
        GO TO 12
     14 ALPHA=200./(EA**6.25)
     12 XF=-LOG(AO)/ALPHA-LOG(AA)/ALPHA
      9 PUNCH 105,ISMS,XF
```

```
      IF(NYX+9)601,901,601
  601 IF(NYX+6)602,305,602
  901 PRINT 902
  902 FORMAT(16HREAD NEW PROBLEM)
      PAUSE
      GO TO 3
  105 FORMAT(/15HSAMPLE NUMBER =,I4,3X,11HTHICKNESS =,F9.6)
  102 FORMAT(I4,I3,9X,I2,I3,3X,I3,E9.3,36X,I2)
  110 FORMAT(40H                                        ,
     132H                                ,I2)
      END
```

TABLE XXXV OUTPUT BAKTH

SAMPLE NUMBER = 1 THICKNESS = .001826