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FORECASTING WATER DEMAND IN WYOMING WITH THE MAIN II SYSTEM

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ABSTRACT

This project tested the applicability of the MAIN II (Municipal and Industrial Needs) Water Forecasting System to five Wyoming communities: Cheyenne, Casper, Glenrock, Rock Springs and Green River which are fairly representative of western communities. Errors found in the MAIN II program were corrected, and the program was modified. Certain kinds of data were difficult to obtain for the five communities. Using a base year, forecasts were made and compared with actual water demands. Three optional MAIN II projection methods (internal growth model, historical extrapolation of data and external projection) were tested. The results showed the latter two methods to be fairly reliable. The internal growth models were not representative of Wyoming cities due to the atypical growth patterns of Wyoming communities.

Key words: Municipal Water Demand/ Computer Model/ Forecasting Water Demand/ Wyoming

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FORECASTING WATER DEMAND

IN WYOMING

WITH THE MAIN II SYSTEM

CHAPTER I

INTRODUCTION

Considerable expenditures have been, and are continuing to be made by the public for the construction of municipal water supply systems. Over $2 billion annually will be invested in water supply facilities in the projected future (Boland, 1970). How well this money will be spent, and how well the projects will meet the public's need will depend on accurate estimates of future water requirements. Presently most estimates are based on population and per capita water demand projections, usually using national or regional average values, since detailed studies at the local level are seldom justified. However, at the local level conditions often vary greatly from the national average demands, frequently resulting in the construction of facilities that are not the most efficient or economical. Therefore, it is to the benefit of the public that the most accurate possible water forecasting be made part of city planning and management.

No one can project the future with absolute certainty. The best one can do is to make forecasts based on past and present conditions or to forecast several alternative futures based on various assumptions.

Boland (1970) points out that any method for water forecasting should automatically imply some idea of the nature of water demand and its causative agents. Municipalities do not grow uniformly, and an increase in water demand may or may not be attributed to population growth or industrial expansion; nevertheless, the usual approach is to assume that water demand is proportional to the population. This leads to the use of gallons per capita per day (gpcd) figures, for design criteria, demand estimates, and supply requirements for forecasting.

This approach has much in its favor. Fair, Geyer, and Okun (1966) point out that these figures "generalize the experience, (and) they are useful in comparing the results of different communities and estimating future needs of individual communities and areas." Boland (1970) also points out this logic: "water use is assumed to be perfectly correlated with population, and we are all prepared to admit that it is people who use water." Having accepted this premise, water forecasting becomes a matter of calculating the gpcd demand experienced in the past, investigating this record for trends and projecting per capita use in the future.

Thus the estimation of future water demands in the design of water supply systems for many years has been accomplished by projecting population growth and multiplying by the average gpcd to obtain an estimate of the total average use. Peak demands have been obtained by applying peak to average ratios.

Looking at historical water use, Clemens Herschel (1913) estimated daily water use in Rome in 97 A. D. to be about 38 gpcd. Parisians in 1550 used only .25 gpcd, but by 1890 use had increased to over 65 gpcd. In the United States, the national average use was 90 gpcd at the turn of the century. By 1940, it had reached 127 gpcd, and by 1954 it was 140 gpcd. Estimates of water use in recent years range from 100 gpcd to 200 gpcd. Most estimates indicate a 1 percent increase per year. At this point, the use of per capita water use as an estimating and forecasting tool may appear quite logical. The method is simple to use, and ample historical data are generally available. Certainly, for preliminary estimates where accuracy is secondary, the advantages of the method are quite real.

On the other hand, the problem that is paramount for most local water supply planners is the need to develop a specific estimate of future requirements for a specific place, accuracy being very crucial. Local gpcd demand frequently diverges from the national average. In fact, according to an analysis of data gathered from 1101 water utilities by the American Water Works Association in 1960, the local demand may vary from 29 to 543 gpcd.

Municipalities that expect great changes in growth patterns, population characteristics, or housing characteristics should ignore past history of gpcd, and use other criteria for forecasting techniques. The MAIN II System, developed under contract from the Office of Water Resources Research by Hittman Associates Inc., is an improved method of estimating future water requirements. The relatively large number of parameters used in the model allow for good definition of the local conditions, and the three optional methods of forecasting provide versatility. The model was developed using data from 65 Standard Metropolitan Statistical Areas and has proven to be accurate in tests in the four communities of Baltimore, Maryland; Park Forest, Illinois; Baton Rouge, Louisiana; and Kings Heights District, Anne Arundel County, Maryland (Boland, 1970).

Since the MAIN II System has not been tested on any communities west of the Mississippi River, the principal objective of this research project has been to test the model of the five Wyoming communities of Casper, Glenrock, Cheyenne, Rock Springs and Green River, which are fairly representative of western communities. Their populations, according to the preliminary 1970 census figures, are 39,145, 1,515, 40,020, 11,657 and 4,600 respectively. Casper has a sizable petroleum refining industry and a junior college. In addition, it provides goods and services for

much of central Wyoming's mining and agricultural industries. Glenrock has no industry of its own, but a majority of its working force is employed at the nearby Dave Johnston Power Plant. Cheyenne is the site of the state capital and Warren Air Force Base. It has a large railroad industry and provides goods and services for much of the agricultural industry of southeast Wyoming. Rock Springs and Green River have some railroad industry and provide goods and services for the mining and agricultural industries in southwestern Wyoming.

To test the MAIN II System, historical data were used as input for year by year forecasts through 1970. These values were then compared to the actual use of the community. If the MAIN II System were applicable to communities in Wyoming, the accurate forecasts would not only be beneficial to communities in the west, but to the nation as well, since the Federal Government frequently assists in the financing of municipal water projects.

In any instance, it was found that Wyoming communities obtain their new water supplies either from groundwater sources or by purchasing agricultural surface water rights from streams. In either instance, the incremental cost for new water is considerable and does not decrease as the total quantity increases. Therefore, in financial terms, it is extremely important to the community to be able to forecast water demands in advance of the needs as accurately as possible.

CHAPTER II

THE MAIN II SYSTEM

MAIN II is the acronym for Municipal and Industrial Needs. It consists of a complex computer program that applies a number of equations to forecasting water demands, and a library of water usage coefficients. The library contains such data as the residential equation constants, climatic data, category identification labels, and usage coefficients for the commercial/institutional, industrial and public/unaccounted submodels. The programs and library are available on separate magnetic tapes through the National Technical Information Service, U. S. Department of Commerce.

Table I indicates the levels of disaggregation that the MAIN II System provides. Municipal water use is first classified into four water demand sectors - residential, commercial/institutional, industrial, and public/unaccounted. These sectors are then divided into water user categories. The residential sector is categorized according to the existence or non-existence of a metered water rate, the type of wastewater disposal system, and location (east or west of the 100th meridian). The other sectors are based on studies of 30 commercial/institutional categories, 104 industrial categories and three public/unaccounted categories.

The MAIN II System uses three methods of estimating water requirements: mathematical models, unit use coefficients, and per capita coefficients. The method employed for a particular user category is based on the availability of previous research, proven techniques, or

TABLE I

ORGANIZATION OF THE MAIN II SYSTEM

Sector	Water Use Category	Computational Method
Residential	Metered, Sewered Residences Metered, Septic Tank Residences Flat Rate, Sewered Residences Flat Rate, Septic Tank Residences	Mathematical Model
Commercial/ Institutional	Up to 50 user categories, such as: Hotels, Restaurants, Elementary Schools, Hospitals, Office Buildings	Unit Use Coefficients
Industrial	Up to 200 user categories, presently including 104 SIC 3-digit manufacturing industry categories	Unit Use Coefficients
Public/ Unaccounted	Up to 30 user categories, such as: Distribution System Losses, Free Service, Airports	Unit Use Coefficients Per Capita Coefficients

useful data. Table II shows a typical mathematical model. Here the mathematical model is defined as a mathematical expression for estimating water use involving more than one independent variable or parameter. Table III presents an example of a unit use coefficient, a simple type of mathematical model using only one parameter. Here the water use estimate is obtained by multiplying the value of the parameter by the unit use coefficient. In this example, the mean annual water use for hospitals is an adaptation of work done by Wolff et al. (1966).

The MAIN II System also includes techniques for estimating water requirements for average day, maximum day, and peak hour demand for each user category, with the exception of some cases, such as the industrial sector where there is a lack of data. These values can be computed by mathematical models for maximum day requirements (e.g. residential), or by different parameters. For the residential sector, peak hour requirements are computed by an expression involving maximum day requirements and total number of dwellings.

MAIN II provides three optional methods for forecasting water demands. These are:

- Projection by internal growth models
- Projection by extrapolation of local historical data
- Use of projections made external to the MAIN II System

The first option, projection by internal growth models, uses statistical models of parameter growth to produce a projection requiring a minimum of specific information. Data for these statistical models were gathered from 65 Standard Metropolitan Statistical Areas throughout

TABLE II

EXAMPLE OF MATHEMATICAL MODEL

MEAN ANNUAL SPRINKLING USE FOR METERED, SEWERED

RESIDENCES IN UNITED STATES, EAST OF 100th MERIDIAN

$$q = (0.39 \times 0.164B^{-0.793} \times (E - 0.6R)^{2.93} \times p_s^{-1.57} \times V^{1.45}) N$$

where:

q = mean annual water use, gpd

B = irrigable land per residence, acres/unit

E = potential summer evapotranspiration, inches

R = summer precipitation, inches

p_s = marginal price of water in effect in summer, ¢/1000 gal.

V = median market value of residences

N = number of residences in value group with median V

TABLE III

EXAMPLE OF UNIT USE COEFFICIENT

MEAN ANNUAL WATER USE FOR HOSPITALS

$$q = C \times P$$

where:

C = water use coefficient for hospitals, mean annual = 346 gpd/bed

P = water use parameter for hospitals, number of beds

q = mean annual water use for hospitals, gpd

the coterminous United States. Such parameters as the number of chairs in barber shops, stations in beauty shops, persons in jail and prison, seats in theaters, etc., were used to generate models using regression analysis.

Unless otherwise specified, the MAIN II System uses the internal growth models to project all future parameters. If specific knowledge of some likely future behavior of a parameter is known, or a parameter is expected to behave atypically in a city under study, one of the other two projection options can be used. For example, resort cities are not expected to behave like industrially or commercially oriented cities. Here it would be wiser to use historical trends of recent years. The MAIN II System accommodates historical data by using as many data points as possible, covering at least ten years, and no more than the span covered by the projection. The MAIN II System then uses regression analysis on the data to project a value for the parameter from the base year. This value supersedes any value generated by MAIN II's internal growth models.

When a situation arises in which some degree of knowledge about the likely growth of some specific parameter is available, such as the case of a detailed study that indicates an industry's firm plan to relocate, or a plan by a commission for some new construction, it is then desirable to bypass the first two options and go to the third, which provides a means for inputting these external parameters. This third option provides the real strength for water planning use. Various water demands may be forecast by MAIN II for different alternative futures.

Each of the three options can be selected independently for each projection year. MAIN II even allows for using more than one method at a time. According to Hittman Associates, certain internal adjustments must be made to insure consistent projections. For example, the sum of the number of homes projected for all of the various value groups and housing categories must be adjusted to equal the total number of homes projected independently; the total employment projected for the various service industries cannot exceed the total services employment projected independently; and individual manufacturing industries employment must be adjusted to equal the sum of the total employment in manufacturing, generated independently.

As an example of the results obtained from the MAIN II System, the following pages contain some typical estimates for the city of Cheyenne, Wyoming for the year 1960. Table IV illustrates the residential requirements. In the $7500-9999 housing value range there are an estimated 1,715 housing units using an estimated 354,030 gpd (gallons per day) for domestic purposes and 260,147 gpd for sprinkling, totaling 614,177 gpd, a maximum daily use of 1,175,070 gpd, and a peak hourly value prorated to gpd of 2,942,926. Table V shows the commercial output. Due to a lack of data there are no models for maximum and peak values. As an example of the data presented, there are an estimated 68 barber chairs in Cheyenne, using an estimated average of 3,713 gpd. Table VI gives the industrial requirements. For example, in the food industry there are an estimated 162 people employed within the industry using an estimated 134,839 gpd. Table VII presents a summary of residential, commercial, industrial, and public/unaccounted sectors for Cheyenne. In the base year 1960, MAIN II estimates use at 7,271,278 gpd, maximum at 11,861,165 gpd, and a peak hourly use of 25,845,664 gpd.

TABLE IV

MUNICIPAL WATER REQUIREMENTS FOR THE CITY OF CHEYENNE, WYOMING FOR THE YEAR 1960

ANALYZED BY MAIN SYSTEM

CURRENT RESIDENTIAL WATER REQUIREMENTS BY CATEGORY

METERED AND SEWERED AREAS

VALUE RANGE ($)	NO. OF UNITS	ANNUAL AVERAGE DOMESTIC	ANNUAL AVERAGE SPRINKLING	ANNUAL AVERAGE TOTAL	MAX DAY	PEAK HOUR
2000. - 4999.	1280.	240936.	131049.	371985.	660643.	1760037.
5000. - 7499.	3105.	614059.	407683.	1021743.	1907680.	4884860.
7500. - 9999.	1715.	354030.	260147.	614177.	1175070.	2942926.
10000. - 12499.	1554.	334262.	262562.	596824.	1159598.	2857945.
12500. - 14999.	1800.	402776.	331468.	734244.	1441371.	3508445.
15000. - 17499.	1446.	336095.	286064.	622159.	1230031.	2963936.
17500. - 19999.	686.	165393.	144305.	309698.	615308.	1470200.
20000. - 24999.	679.	172532.	154453.	326985.	652684.	1543250.
25000. - 34999.	367.	102796.	94448.	197243.	395060.	919414.
35000. - 100000.	197.	80789.	71793.	152582.	300085.	671069.
TOTAL	12829.	2803666.	2143966.	4947635.	9537529.	23522048.

TABLE V

MUNICIPAL WATER REQUIREMENTS FOR THE CITY OF CHEYENNE, WYOMING FOR THE YEAR 1960

ANALYZED BY MAIN SYSTEM

TOTAL COMMERCIAL REQUIREMENTS IN GALLONS PER DAY

ANNUAL AVERAGE	MAXIMUM DAILY	PEAK HOURLY
730535.	1331217.	4471442.

WATER REQUIREMENTS BY TYPE OF COMMERCIAL ESTABLISHMENT

TYPE	UNITS	NUMBER OF UNITS	ANNUAL AVERAGE	MAXIMUM DAILY	PEAK HOURLY
			(GALLONS PER DAY)		
HOTELS	SQ. FT.	350000.	89600.	102900.	151550.
MOTELS	SQ. FT.	248075.	55569.	114363.	384516.
BARBER SHOPS	BARBER CHAIR	68.	3713.	5460.	26452.
BEAUTY SHOPS	STATION	136.	36584.	44608.	145520.
RESTAURANTS	SEAT	2501.	60524.	208583.	417667.
DRIVE-IN REST-NT	CAR SPACE	128.	13952.	18432.	70016.
HOSPITALS	BED	398.	137708.	219298.	362976.
NURSING HOMES	BED	71.	9443.	10366.	30104.
LAUNDRY	SQ. FT.	74712.	18902.	24356.	117298.
LAUNDROMATS	SQ. FT.	22587.	49014.	65502.	347840.
SCHOOL,ELEM.	STUDENT	6871.	36966.	66511.	337366.
SCHOOL, HIGH	STUDENT	2231.	14792.	43728.	269951.
BUS-RAIL DEPOTS	SQ. FT.	45150.	150349.	293475.	1128750.
CAR WASHES	INSIDE SQ. FT.	4000.	19120.	41200.	126000.
CHURCHES	MEMBER	138.	19.	119.	649.
JAIL + PRISONS	PERSON	46.	6118.	6118.	6118.
SERVICE STATIONS	INSIDE SQ. FT.	112203.	28163.	66200.	548673.

TABLE VI

MUNICIPAL WATER REQUIREMENTS FOR THE CITY OF CHEYENNE, WYOMING FOR THE YEAR 1960

ANALYZED BY MAIN SYSTEM

TOTAL INDUSTRIAL WATER REQUIREMENTS IN GALLONS PER DAY

ANNUAL AVERAGE	MAXIMUM DAILY	PEAK HOURLY
714766.	714766.	714766.

REQUIREMENTS BY TYPE OF INDUSTRY

CODE	INDUSTRY CATEGORY	NUMBER OF EMPLOYEES	GALLONS/DAY ANNUAL AVERAGE	GALLONS/DAY MAXIMUM DAY	GALLONS/DAY PEAK HOUR
200	FOOD-KINDRED PRD	162.	134839.	134839.	134839.
270	WHOL.PRINT IND.	294.	4410.	4410.	4410.
280	CHEM-ALLIED PRD	22.	32276.	32276.	32276.
330	PRIMARY METALS	4.	2060.	2060.	2060.
340	FAB. METAL IND.	731.	285740.	285740.	285740.
350	MACHINERY-NO ELE	70.	15375.	15375.	15375.
360	ELEC. MACHINERY	477.	96130.	96130.	96130.
370	TRANS. EQUIP.	250.	52237.	52237.	52237.
390	MISC. MFG	226.	70003.	70003.	70003.
399	MISCEL. MANUFACT	84.	21695.	21695.	21695.

TABLE VII

SUMMARY OF MUNICIPAL WATER REQUIREMENTS FOR CITY OF CHEYENNE, WYOMING

ESTIMATED WATER REQUIREMENTS FOR YEAR 1960.
(ALL VALUES IN GALLONS PER DAY)

	ANNUAL AVERAGE	MAXIMUM DAILY	PEAK HOURLY
MUNICIPAL	7271278.	11861165.	25845664.
RESIDENTIAL	4947635.	9537529.	23522048.
COMMERCIAL	730535.	1331217.	4471442.
INDUSTRIAL	714766.	714766.	714766.
PUBLIC AND UNACC.	878342.	878342.	878342.

CHAPTER III

PROBLEMS ENCOUNTERED WITH THE MAIN II SYSTEM

Two basic problems were encountered when the first applications of the MAIN II System were attempted. These were: 1) getting the program operational and 2) obtaining certain kinds of input data.

According to the MAIN II System User's Manual, the MAIN II System computer program was designed to be machine-independent, consistent with the relatively large size and complexity of the program. The manual states, "The minimum computer memory size requirement is a function of two factors: the need for an American Standards Association (ASA) Fortran IV compiler and the size of the MAIN II System computer program." Since this program had already been set up to run on both the UNIVAC 1108 and the IBM 360, the minimum computer configuration for both these machines is tabulated in the user's manual as:

Minimum memory size	IBM System 360 128,000 bytes (nonpartitioned)	UNIVAC 1108 or 1107 32,000 words
Card reader - read 80 columns	one	one
Printer - print 120 or more characters per line	one	one
Tape drive - seven track and 800 BPI density	one	one
Auxiliary storage device - tape, disc, or drum (up to 60,000 character capacity)	one	one

According to the manual, with minor program modification the MAIN II System could also be processed on any of the following second or third

generation computers that have an ASA Fortran IV compiler and a similar configuration as tabulated above: CDC 3600; CDC 6600; IBM 7090/7094; RCA Spectra Series; GE 400 series; GE 600 series.

It was felt that with the above specifications, the MAIN II System would be compatible with the University of Wyoming's XDS (Xerox Data System) Sigma 7 computer. The Sigma 7, a medium-sized computer, features a sophisticated software package which readily handles ASA Fortran IV, as well as Fortran IV-H and extended Fortran IV. It has two seven track tape drives, two RAD's (rapid access disks, 6 megabytes each), six disc packs (75 megabytes each), and 96K of 32-bit-word core storage.

For the first trial run, sample data supplied in the user's manual for Baltimore, Maryland were used. On repeated attempts the program failed to run. Close examination of the program revealed several errors. After correcting these errors, partial outputs were obtained before the program would abort. Finally, the program was checked, line by line, for errors - a very time consuming process. By making the necessary corrections, the program was finally made operational.

Considering that perhaps the original incompatibility was due to the University's facilities, the original program was put on an IBM 360, Model 65. The program failed to run, and consultation with an IBM 360 systems programmer confirmed suspicions that the program did not meet ASA standards and that it would not run on any conventional computer. Appendix I details the errors that were found, and the corrections that were made in the program.

Data collection presented additional problems. Since Wyoming has a small population (about 330,000), the amount of published data

available even for its larger cities is very limited; and for the smaller ones, non-existent. As a result of this limitation, the two main sources of information were field survey of project cities and the U. S. Census figures.

The U. S. Census for the State of Wyoming provided all the population figures needed for all five cities. However, values for other categories were not always available, since the U. S. Census only publishes detailed data for SMSA's (Standard Metropolitan Statistical Areas). A SMSA is a county or group of contiguous counties which contains at least one city of 50,000 inhabitants or more. Unfortunately, no city in Wyoming has a population of 50,000 or more; therefore, detailed SMSA data are not available for Wyoming.

By use of aerial photographs and field survey, property values and the number of units in each range for the residential sector for all communities except Glenrock were obtained. The owner-occupied units were placed in the metered water and sewered section, as this was the case for all five cities. Apartments should have been broken down into the flat rate and sewered category, but even the U. S. Census block statistics for Cheyenne (the only community with block statistics) did not give dwelling values or persons per unit. Therefore, all rentals were placed into the metered water and sewered category, using appraisal values for the rental units. On a national basis, single dwellings and duplexes are often appraised using a factor of 100 times the monthly rental prices. Larger units are often appraised at ten times the annual gross profit (before income taxes), which works out to be a slightly lower factor. Locally, rents are slightly higher than corresponding appraisals. Therefore, a factor of .95 was assumed.

Values were also obtained from the U. S. Census for many of the municipal identification sectors for the larger cities. Examples of such values are: service industry employment, per capita income, total employment, employment in the transportation, communications and utilities industries, and fraction of population within ages 20-39. Values for employment and per capita income were not available for Green River for base year 1960 and earlier. No values other than those for population were available for Glenrock.

In regard to historical data for Cheyenne, Casper, and Rock Springs, most values for 1950, 1960, and 1970 were available for: fraction of nonwhites, total number of occupied residential units, fraction of single owner-occupied units in medium or high value groups, median school year completed, number of students in grades 0-9 and 10-12, service industry employment, total industrial employment, and medical services employment. However, local historical data (used for forecasting by regression) proved a problem for the smaller communities. Values for Green River were not available for the school, medical, or housing categories (except housing values for 1970). No historical census data were available for Glenrock.

Some of the local historical data for Cheyenne were not in readily usable form. For example, data on the number of students were listed by age, not by grades. Therefore, age groups corresponding to certain grades were assumed.

Commercial data were not available for any cities from census records. Some data were available for the industrial sector. Unfortunately, it was not usable in the form given.

Industrial categories were all grouped by three-digit S. I. C. (Standard Industrial Classification) codes. Employment data were only available for the first two digits. For example, S. I. C. number 201 is for meats, 202 for dairies, 203 canned, frozen foods, etc., up to 209; 200's are for food and kindred products. The MAIN II System has the parameters needed for the three-digit S. I. C. categories, but not for the general classification. The U. S. Census, however, only had the two-digit, general values. It was therefore necessary to develop coefficients.

The U. S. Census of Water Use in Manufacturing report was used along with employment data for each two-digit category to obtain new coefficients consistent with the existing coefficients in the program. These new coefficients were added to the MAIN II Library.

Industrial values were available for Cheyenne and Casper, but not for the other communities. Fortunately, most industries providing employment in the three smaller communities are located outside the city limits. Green River and Rock Springs have only minor industries inside their city limits, and Glenrock has no industry at all.

Other data for residential and commercial sectors were obtained by field survey. For Cheyenne, the telephone directories for 1960 and 1970 from Mountain States Telephone Company were used to obtain commercial data. For Casper, Rock Springs and Green River, the local Polk City Directories were used instead because these cities did not keep their old phone directories on file. (Polk is a publishing

company that compiles city directories for many U. S. cities.) Names of firms and businesses in the commercial sector were copied down and the 1970 list was compared with the 1960 list to discover which businesses no longer existed.

Motels were surveyed to obtain number of units and number of employees they had in both 1960 and 1970. For restaurants, the number of seats and employees per establishment were counted. Sometimes a guess had to be made as to when a business had closed. Similar procedures were applied for barber shops, beauty shops, etc. Several laundries were paced to obtain their square footage. Approximate square footage was also obtained for car washes, gas stations, etc.

For input to the program, surveyed commercial values were averaged out and multiplied by the number of firms in each particular commercial category. Extreme values were not used in determining averages. Values for Cheyenne motels should be reliable, since only two motels out of 30 were not questioned. Values for churches were guessed, since data were difficult to obtain for this category.

The U. S. Census of Business, Selected Services, Area Statistics provided some employment values for movies, barbers, beauticians and laundries for Casper and Cheyenne, for the years 1958, 1963 and 1967. These were extrapolated for 1960 and 1970.

School values for Glenrock, Green River and Rock Springs were obtained from the local school superintendents. For Casper and Cheyenne, school records would have been more useful than census values.

Housing density was derived for Cheyenne using aerial photography. Homes were counted in each block and related to the U. S. Census Block

Statistics for Cheyenne, thus giving housing density for each range of housing values. Population density was obtained for Cheyenne by dividing the population by the area of the city. Areas for 1960 and 1970 were obtained from the county engineer's office.

Housing densities were not obtainable for the other cities. The same housing density was assumed for the other four cities, proportioned according to the respective populations; except Glenrock's value, which was obtained from the city engineer. Maps were used to determine population density.

Sometimes no records were available and the field survey did not provide sufficient data, as was the case for Glenrock. There were no records of any data which could be used in the program, and no records of past water usage. The city now has a computer billing system for water use; therefore, records will be kept in the future.

The cities of Green River and Rock Springs both have poor water usage records. Water for both of these towns is supplied by Pacific Power and Light Company of Portland, Oregon. The district manager in Rock Springs was helpful, but did not have records that could be employed in comparing MAIN II's forecast with actual use. The Pacific Power and Light Company did provide water use statistics for 1964, 1972 and 1973. The public utility boards of Casper and Cheyenne provided breakdowns of actual water use into commercial and municipal sectors for the past few years.

The only other source of water supply data available was the WRRI publication, Municipal Water and Sewage Systems in Wyoming, A Source Book of Data. It provided some total usage figures for Green River and Rock Springs which were compared with results obtained using MAIN II.

Experience gained from this study points out the need for better record keeping by Wyoming communities. These records would not only be useful for the MAIN II System, but for other planning projects. Since better record keeping and data collection are not likely to come about, there is a need to modify MAIN II to provide the option of internal values derived from regional estimates for commercial categories for those smaller communities that do not have data available. As the system now exists, the logistics involved in data collection for communities smaller than SMSA's make the application of MAIN II impractical for non-research type studies.

CHAPTER IV

RESULTS

Table VIII presents the projection results by use of internal growth models for Cheyenne for each of the years 1961 through 1972. Table IX gives the projection results obtained by extrapolation of local historical data for years 1961 through 1972. Table X gives the use of projections made external to the MAIN II System for the year 1970. In all cases, except where noted, the actual values are from the WRRI publication, Municipal Water and Sewage Systems in Wyoming, A Source Book of Data.

For the internal projections, the only values required are externally projected values for population and per capita income (in terms of 1960 dollars for each of the projected years. The historical projection required those data also. The number of homes in different ranges for the years 1950 and 1960 were used as historical data in this second option, as well as the number of employees in different S. I. C. Industrial categories in years 1950 and 1960. No commercial data were available prior to 1960 for use in this second option. The third optional projection, the use of projections made externally, used the data collected for the year 1970.

The results show that the internal growth models are not very accurate for Cheyenne, either due to the lack of data or the fact that Cheyenne did not experience the same growth as SMSA cities throughout the nation did. The results in Table X confirm the latter. Between

TABLE VIII

WATER DEMAND BY INTERNAL GROWTH FOR

CHEYENNE, WYOMING

BASE YEAR 1960

Year	Actual Demand in Gallons Per Day	Estimated Demand In Gallons Per Day	Percent Error
1960	6,740,000	7,271,278	7.88
1961	6,916,000	7,182,075	3.85
1962	6,431,300	7,582,369	17.90
1963	7,559,000	8,030,183	6.23
1964	9,655,990	8,464,020	-12.34
1965	9,050,000	8,899,525	-1.66
1966	7,757,000	9,342,202	20.44
1967	9,876,026	9,803,957	-.73
1968	8,012,589	10,269,568	28.17
1969	7,273,672	10,739,586	47.65
1970	8,240,000	11,217,632	36.14
1971	8,050,000	11,723,141	45.63
1972	8,180,000	12,291,787	50.27

TABLE IX

WATER DEMAND BY EXTRAPOLATION OF LOCAL

HISTORICAL DATA FOR CHEYENNE, WYOMING

BASE YEAR 1960

Year	Actual Demand in Gallons Per Day	Estimated Demand In Gallons Per Day	Percent Error
1960	6,740,000	7,271,278	7.88
1961	6,916,000	6,698,423	-3.15
1962	6,431,300	6,849,396	6.50
1963	7,559,000	7,006,155	-7.31
1964	9,655,990	7,156,952	-25.88
1965	9,050,000	6,368,451	-29.63
1966	7,757,000	7,458,003	-3.85
1967	9,876,026	7,608,871	-22.96
1968	8,012,589	7,762,078	-3.13
1969	7,273,672	7,915,042	8.82
1970	8,240,000	8,067,819	2.09
1971	8,050,000	8,229,110	2.22
1972	8,180,000	8,411,419	2.83

TABLE X

WATER DEMAND BY USE OF PROJECTIONS MADE EXTERNAL

TO THE MAIN II SYSTEM FOR CHEYENNE, WYOMING

BASE YEAR 1960

Year	Actual Demand in Gallons Per Day	Estimated Demand In Gallons Per Day	Percent Error
1960	6,740,000	7,271,278	7.88
1970	8,240,000	7,133,656	-13.43

1960 and 1970, the population and per capita income changed very little. Yet, MAIN II projected much higher values than actually used. For 1972, the error was 50.7%. Clearly, Cheyenne's growth does not reflect the national growth the internal models are based upon.

The second option proved more accurate. For projection year 1972, the error was only 2.83%. For some years, the error was as high as -29.63%, but fluctuation is expected, as growth is seldom uniform.

The third option proved less accurate than the second option for projection year 1970, with an error of -13.43%. This is about one order of magnitude higher, but far better than the first option error of 36.14%.

The results are shown in Tables XI, XII and XIII for Casper. As with Cheyenne, Casper experienced slow growth in the 1960's. The population went up very slowly and per capita income (in terms of 1960 dollars) experienced a slight drop.

Internal projections show a much higher growth than actually occurred, even higher than was the case for Cheyenne. For projection year 1972, the error was 91.94%. The historical projection gives much better results, showing an error of 12.61% for 1972. The third option provided the same magnitude of error as did the second method, -4.89% compared with 4.89%, for projection year 1970. The internal model gave an error of 69.12% for the same year.

Results for Glenrock are very poor. The only data available were for the year 1973. This was as the base year and forecasting was not

TABLE XI

WATER DEMAND BY INTERNAL GROWTH FOR

CASPER, WYOMING

BASE YEAR 1960

Year	Actual Demand in Gallons Per Day	Estimated Demand In Gallons Per Day	Percent Error
1960	6,355,808	5,965,094	-6.15
1961	5,867,729	6,547,178	11.58
1962	5,865,014	7,134,818	21.65
1963	6,731,896	7,727,653	14.79
1964	6,202,820	8,321,264	34.15
1965	5,468,564	8,895,590	62.67
1966	6,952,686	9,525,014	37.00
1967	5,434,222	10,128,365	86.38
1968	6,428,693	10,748,313	67.19
1969	7,320,959	11,370,701	55.32
1970	7,090,915	11,992,472	69.12
1971	6,715,605	12,577,653	87.29
1972	6,860,027	13,166,998	91.94

TABLE XII

WATER DEMAND BY EXTRAPOLATION OF LOCAL

HISTORICAL DATA FOR CASPER, WYOMING

BASE YEAR 1960

Year	Actual Demand in Gallons Per Day	Estimated Demand In Gallons Per Day	Percent Error
1960	6,355,808	5,965,094	-6.15
1961	5,867,729	5,861,506	-.11
1962	5,865,014	6,033,807	2.88
1963	6,731,896	6,206,076	7.81
1964	6,202,820	6,377,298	2.81
1965	5,468,564	6,536,761	19.53
1966	6,952,688	6,716,834	-3.39
1967	5,434,222	6,896,936	26.92
1968	6,428,693	7,079,774	10.13
1969	7,320,959	7,257,030	-.87
1970	7,090,915	7,437,432	4.89
1971	6,715,605	7,581,397	12.89
1972	6,860,027	7,725,265	12.61

TABLE XIII

WATER DEMAND BY USE OF PROJECTIONS MADE EXTERNAL

TO THE MAIN II SYSTEM FOR CASPER, WYOMING

BASE YEAR 1960

Year	Actual Demand in Gallons Per Day	Estimated Demand In Gallons Per Day	Percent Error
1960	6,355,808	5,965,094	-6.15
1970	7,090,915	6,172,529	-4.89

practical. Table XIV gives the results. The MAIN II projections are not applicable due to lack of data. Even the results for the base year 1973 varied from the actual demand.

The results for Rock Springs were similar to Cheyenne and Casper. Only the first two options were used, and the results are given in Tables XV and XVI. Errors for 1972 are 99.58% and -.36% for each projection option, respectively. The results appear to be fairly good for the historical projections of the early 60's. The 1972 actual demand figure is believed to be erroneous because Rock Springs has experienced a large growth in the past several years. But this value does not reflect it. Therefore, no conclusions are attempted for 1972.

Green River posed a difficult problem. There were almost no base data available for 1960, and none for 1950. The author therefore used 1970 for the base year and projected with internal growth models for the years 1971 and 1972. No other projections were made. Also, there are no actual demand records for the years 1970 and 1971, making it very difficult to evaluate the results that are given in Table XVII. The error for the only comparison year, 1972, was -11.68%, which is not too bad. However the projection is short range, so one would expect a fairly small error.

As a test to determine if the internal models were sensitive to the accuracy of the data, the effect of varying one parameter on the residential results was tested. The parameter chosen was the housing density for the city of Cheyenne, base year 1960 (3.9 dwelling units per acre). The results are given in Table XVIII and indicate the model to be not very sensitive to housing density. An increase of

TABLE XIV

WATER DEMAND ESTIMATES FOR

GLENROCK, WYOMING

BASE YEAR 1973

	Actual Demand in Gallons Per Day	Estimated Demand In Gallons Per Day	Percent Error
Residential	290,300	122,083	-57.95
Commercial	53,467	35,674	-33.28
Municipal (total)	343,767	188,209	-45.25

TABLE XV

WATER DEMAND BY INTERNAL GROWTH FOR

ROCK SPRINGS, WYOMING

BASE YEAR 1960

Year	Actual Demand in Gallons Per Day	Estimated Demand In Gallons Per Day	Percent Error
1960	1,531,934	1,400,534	-8.58
1961	1,428,816	1,549,630	8.46
1962	1,592,397	1,698,547	6.67
1963	1,593,693	1,823,599	14.43
1964	1,609,861	1,927,679	19.87
1965	1,531,090	2,036,925	33.04
1966	1,740,134	2,143,563	23.18
1967	Unknown	2,249,698	
1968	Unknown	2,355,584	
1969	Unknown	2,461,163	
1970	Unknown	2,599,458	
1971	Unknown	2,744,155	
1972	1,447,869*	2,889,669	99.58

* Pacific Power and Light Company of Portland, Oregon

TABLE XVI

WATER DEMAND BY EXTRAPOLATION OF LOCAL

HISTORICAL DATA FOR ROCK SPRINGS, WYOMING

BASE YEAR 1960

Year	Actual Demand in Gallons Per Day	Estimated Demand In Gallons Per Day	Percent Error
1960	1,531,934	1,400,534	-8.58
1961	1,428,816	1,466,892	2.26
1962	1,592,397	1,491,673	-6.33
1963	1,593,693	1,492,581	-6.34
1964	1,609,861	1,474,577	-8.40
1965	1,531,090	1,457,734	-4.79
1966	1,740,134	1,440,310	-17.23
1967	Unknown	1,422,439	
1968	Unknown	1,404,309	
1969	Unknown	1,385,931	
1970	Unknown	1,400,268	
1971	Unknown	1,421,032	
1972	1,447,869*	1,442,669	-.36

* Pacific Power and Light Company of Portland, Oregon

TABLE XVII

WATER DEMAND BY INTERNAL GROWTH FOR

GREEN RIVER, WYOMING

BASE YEAR 1970

Year	Actual Demand in Gallons Per Day	Estimated Demand In Gallons Per Day	Percent Error
1970	Unknown	606,063	Unknown
1971	Unknown	661,406	Unknown
1972	814,325.6*	719,235	-11.68

* Pacific Power and Light Company of Portland, Oregon

25.4% results in only a 9.75% total increase in residential usage. An increase of 40.6% results in only a 16.9% increase.

The accuracy of residential sprinkling models used in MAIN II was tested. Lawn sprinkling consumes a large percentage of the water in the residential sector, as can be seen in Table IV. The quantities computed by the Modified Blaney-Criddle and Modified Jensen-Haise empirical methods were then compared with the MAIN II results for Cheyenne, year 1960. These empirical methods related climatological data to consumptive requirements of lawns. The results are given in Table XIX.

The results indicate that MAIN II's sprinkling model is very accurate, according to the Modified Jensen-Haise formula, which many hydrologists believe to be more accurate than the Blaney-Criddle method.

TABLE XVIII

SENSITIVITY OF WATER DEMAND TO HOUSING DENSITY

FOR CHEYENNE, WYOMING

1960

Water Demand in Gallons per Day/Percent Change

Housing Density Units Per Acre	Domestic	Sprinkling	Total	Maximum Daily	Peak Hourly
3.93	2,804,194	1,299,275	4,103,469	11,440,346	27,378,176
25.5		29.2	9.3	-2.8	-2.4
4.93	2,804,194	1,678,731	4,482,925	11,128,996	26,732,032
40.6		45.2	16.9	-3.98	-3.3
6.93	2,804,194	2,437,439	5,241,635	10,686,510	25,839,536

TABLE XIX

COMPARISON OF RESIDENTIAL SPRINKLING REQUIREMENT

FOR CHEYENNE, WYOMING

1960

MAIN II Estimate Gallons Per Day	Modified Blaney-Criddle Gallons Per Day	Percent Difference	Modified Jensen-Haise Gallons Per Day	Percent Difference
2,144,859	1,482,126	44.7	2,152,193	-.34

CHAPTER V

CONCLUSIONS

Water demand estimating and forecasting has always been a difficult, but necessary task. Only recently has our technical capability reached a point where it can cope with the practical and conceptual difficulties of model building and the associated massive amounts of computation. The present day third and fourth generation computers have helped overcome this problem, and with their help it is hoped that the most efficient use can be made of our natural resources.

Two problems were encountered with the MAIN II System. One was the errors in the program. The program contained both logic and syntax errors, as well as keypunching errors. The other problem was data collection. MAIN II in its present form is more suitable to SMSA cities where the U. S. Census can provide more adequate and extensive data then it can for cities in Wyoming. This is reasonable since MAIN II was based on statistical analysis of dozens of SMSA cities throughout the U. S.

It was necessary to correct the errors in the program and to modify it for use on available data. The modification consisted of the addition of coefficients for general S.I.C. categories. Appendix II is a listing of the revised program and Appendix III presents the program flowchart. The program is believed to now be operational for most medium and large-sized computers as it was originally planned to be. Copies of the program and library are available at a nominal cost from WRRI upon request. A desirable addition to the system would be estimates on commercial and

institutional data for smaller communities where such data are not readily available.

Towns with populations greater than 10,000, such as Rock Springs, Casper and Cheyenne, had relatively more data available than smaller towns, such as Glenrock and Green River. It would be difficult at present to successfully apply the MAIN II System to smaller towns.

The results obtained clearly indicate that the internal growth projection method does not work well for the Wyoming communities tested. This is attributable to the fact that the communities tested have not followed national growth trends. Thus, internal growth projections acquired for any such community should only be used with great discretion.

The results from the historical trends and external projection methods were quite good. These methods appear to be very useful forecasting techniques for planners where sufficient data are available as input to the system.

MAIN II does not seem to be sensitive to variation in parameters such as housing density. This is helpful in cases where the reliability of input data is in question. The comparison study on sprinkling shows that the MAIN II sprinkling model is very accurate.

While the existing MAIN II System can be a very useful tool for municipal planning and design, there are some improvements that could be made to make the system more flexible and applicable to smaller communities. Included should be modifications to provide commercial and institutional parameter values internally when such data are not available as input.

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APPENDIX I

ERRORS AND CORRECTIONS

MADE IN THE MAIN II PROGRAM

The following is a list of most of the problems encountered with the MAIN II System and the corrections made to make the program operable.

Problem	Correction
Comma, instead of slash punched in at end of data statement CMLB in subroutine PUNCH	Changed to slash
Most labeled common statements not of equal length, not in accordance with ASA Fortran IV standards	All labeled common made equal length
IDIS in labeled common statement COMPRN never used	Left alone
MEDV mispunched as MEDN in PARNM data statement in subroutine REDINP	Changed to MEDV
Mixed mode in equivalence statement; program tried to use equivalence for mode conversion; not ASA Fortran IV	One variable used instead of using two variables in an equivalence statement
Mixed mode in labeled common	Corrected
ITYPE, used in a Do-loop in REDINP subroutine, not set to any value	ITYPE set equal to three, as used in other subroutines
UNPACK subroutine arguments had mode different from calling statement; UNPACK also had poor initialing procedure	Variable changed to eliminate mixed mode; subroutine rewritten to eliminate poor initializing

Problem	Correction
Block Data was not initialized	Data initialized to zero
Missing commercial usage coefficients in library tape	Tape rewritten to include values found in MAIN II manual
Mixed mode in read and write from binary file in INPRO and GROWTH subroutines	Corrected to real mode
Program did not have a stop routine	A stop routine was added
Declaration statements not in correct ASA order	Statements were rearranged into proper order
Program wrote over space already allocated for difference set of data, in labeled common statement PUBLC	150 additional spaces were allocated in PUBLC
KK=KK-4 set inside of do-loop in subroutine GROWTH. Result was that KK was reinitialed more than once	KK=KK-4 set outside of loop
ELONG was set equal to 110, instead of 100 as program intended	ELONG set equal to 100
Statements before and after calling statement to subroutine UNPACK failed to properly initialize variables	Statement rewritten
Precipitation and evapotranspiration values for longitude 43 and latitude 106 were missing from library	Values were determined from maps in MAIN II manual

APPENDIX II

PROGRAM LISTING

```
      BLOCK DATA                                                        BDT00100
      REAL ILIST,JLIST
      REAL IBL
C.....                                                                  BDT00200
      COMMON/COMMRL/CDUM(3),CNAME(50),CDATA(750)                        BDT00300
C.....                                                                  BDT00900
C.....THESE ARE RESIDENTIAL BLOCK DATA STATEMENTS                       BDT01000
C.....                                                                  BDT01100
C.....                                                                  BDT01200
      COMMON/RESIDL/RVAL(526)                                           BDT01300
C.....                                                                  BDT01500
C.....                                                                  BDT01600
C.....THESE ARE PUBLIC AND UNACCOUNTED BLOCK DATA STATEMENTS            BDT01700
C.....                                                                  BDT01800
C.....                                                                  BDT01900
      COMMON/PUBLC/PUBNAM(30),BDTDUM(516)
      COMMON/COMPRN/MACH,LBIN,LIBY,IPRJT,IPNCH,IDIS                     BDT02600
      COMMON/LISTIJ/ILIST(12),JLIST(5)                                  BDT02900
C.....                                                                  BDT03300
C.....                                                                  BDT03600
C.....MACH IS ASSIGN TO A DUMMY STORAGE DEVICE,DEFAULT = 3
C.....IPRJT IS ASSIGN TO A DUMMY SOTRAGE DEVICE, DEFAULT = 2
C.....LIBY IS AN OPTION FOR PRINTING THE LIBRARY DATA--THE DATA WILL NOTBDT03700
C.....  BE PRINTED UNLESS LIBY = 0 IS ADDED TO THE OPTIONS INPUT DATA   BDT03800
C.....LBIN IS A LIBRARY INPUT REFERENCE NUMBER                          BDT03900
C.....NOS IS THE NUMBER OF CNAMES                                       BDT04100
C.....IN IS THE READ REFERENCE NUMBER                                   BDT04200
C.....IO IS THE WRITE REFERENCE NUMBER                                  BDT04300
C.....IBL IS THE TEST FOR A BLANK FIELD ON A DATA CARD                  BDT04400
C.....                                                                  BDT04500
      COMMON/NUMBER/NOS                                                 BDT04600
      COMMON/ITEST/IBL                                                  BDT04800
C.....                                                                  BDT05000
C.....                                                                  BDT05100
C.....                                                                  BDT05200
      COMMON/IFILE/IN,IO                                                BDT05300
C.....                                                                  BDT05600
C.....                                                                  BDT05700
C.....                                                                  BDT05800
      DATA CDUM/3*0.0/
      DATA CNAME                                                        BDT00400
     */4HHOTL,4HMOTL,4HBARB,4HBEUT,4HEATN,4HEATO,4HNITE,4HHOSP,4HNURS,  BDT00500
     * 4HMEDL,4HLNDY,4HLNDM,4HSALE,4HSKLL,4HSKLH,4HDPOT,4HCARW,4HCHUR,  BDT00600
     * 4HCLUB,4HBOWL,4HCOLG,4HMOVI,4HOFFN,4HOFFO,4HJAIL,4HTHTR,4HYMCA,  BDT00700
     *4HGASS,4HETOT,21*0.0/                                            BDT00800
      DATA RVAL/526* 0.0/                                               BDT01400
      DATA PUBNAM                                                       BDT02400
     */4HLOSS,4HFSER,4HAIRP,27*0.0/                                     BDT02500
      DATA BDTDUM/516*0.0/
      DATA LBIN,LIBY,IPRJT,IPNCH,IDIS/1,1,2,-1,1/                       BDT02700
      DATA MACH/3/                                                      BDT02800

      DATA ILIST/4HHDFP,4HPDFP,4HNHFP,4HHDFW,4HPDFW,4HNHFW,             BDT03000
     2           4HHDMP,4HPDMP,4HNHMP,4HHDMW,4HPDMW,4HNHMW/             BDT03100
      DATA JLIST/4HCITY,4HCOMM,4HINDU,4HPUBL,4HENDY/                    BDT03200
      DATA NOS/28/                                                      BDT04700
      DATA IBL/4H                                                       BDT04900
      DATA IN/5/
      DATA IO/6/
      END                                                               BDT05900
C     THIS IS THE MAIN PROGRAM FOR OWRR                                 MAI00100
      COMMON/COMPRN/MACH,LBIN,LIBY,IPRJT,IPNCH,MAIDUM                   MAI00200
      COMMON/SUMRY/AYR,YEAR(25),ANNL(25),DAY(25),HOUR(25)               MAI00300
      COMMON/IFILE/IN,IO                                                MAI00400
      COMMON/CITDAT/CDATE,ALAT,ALONG,PO,PD,AGE,TEMPLT,EMPL4,            MAI00500
     2       CNCOME,CSERVE,FDAT,POPRO,PNCOME,ACRESP,                    MAI00600
     3       PDGROP,PSERVE,CIT(6),AMAICT(3)                             MAI00700
      EQUIVALENCE (PO,POPU)                                             MAI00800
   50 CONTINUE                                                          MAI00900
      AYR=C.0                                                           MAI01000
      JPROJ=0                                                           MAI01100
      IERR = 0                                                          MAI01200
      LERR = 0                                                          MAI01300
      IRES = 0                                                          MAI01400
      ICOM = 0                                                          MAI01500
      INDS = 0                                                          MAI01600
      IPUB = 0                                                          MAI01700
C.....JPROJ IS THE FLAG FOR THE NUMBER OF PROJECTION YEARS.             MAI01800
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C      IERR IS A VARIABLE TO COUNT ERRORS IN INPUT DATA. IF THERE ARE    MAI01900
C           ERRORS, THE PROGRAM WILL BE TERMINATED.                      MAI02000
C      LERR IS A VARIABLE TO COUNT ERRORS IN THE COEFFICIENTS DATA. IF   MAI02100
C           THERE ARE ERRORS, THE PROGRAM WILL BE TERMINATED.            MAI02200
C.....IRES IS A VARIABLE TO TEST FOR RESIDENTIAL INPUT DATA              MAI02300
C.....IPUB IS A VARIABLE TO TEST FOR PUBLIC AND UNACCOUNTED INPUT DATA   MAI02400
C.....INDS IS A VARIABLE TO TEST FOR INDUSTRIAL  INPUT DATA              MAI02500
C.....ICOM IS A VARIABLE TO TEST FOR COMMERCIAL INPUT DATA               MAI02600
C      READ MUNICIPAL INPUT DATA                                         MAI02700
  100 CALL REDINP (IERR,IRES,ICOM,INDS,IPUB,JPROJ)                       MAI02800
C                                                                       MAI02900
C      READ DATA FROM LIBRARY                                           MAI03000
  200 CALL REDCOF(LERR)                                                 MAI03100
      IF (IERR .GT. 0) GO TO 1300                                       MAI03200
      IF (LERR .GT.0) GO TO 1400                                        MAI03300
      REWIND IPRJT                                                      MAI03400
C                                                                       MAI03500
C      GO TO SUBPROGRAM TO INITIALIZE FOR CURRENT CALCULATIONS.         MAI03600
C                                                                       MAI03700
      CALL INPROJ(0)                                                    MAI03800
      GO TO 550                                                         MAI03900
C      COMPUTE RESIDENTIAL USAGE                                        MAI04000
  500 CONTINUE                                                          MAI04100
      CALL INPROJ(1)                                                    MAI04200
  550 CONTINUE                                                          MAI04300
      IF (IRES.LE.0) GO TO 600                                          MAI04400
      CALL RESDNT                                                       MAI04500
C      DISPLAY RESIDENTIAL USAGE CALLED FROM RESDNT ROUTINE             MAI04600
C      COMPUTE COMMERCIAL USAGE                                         MAI04700
  600 CONTINUE                                                          MAI04800
      IF (ICOM.LE.0) GO TO 800                                          MAI04900
  700 CALL COMMER                                                       MAI05000
C                                                                       MAI05100
C      DISPLAY COMMERCIAL USAGE CALLED FROM COMMER ROUTINE              MAI05200
C      COMPUTE INDUSTRIAL USAGE                                         MAI05300
  800 CONTINUE                                                          MAI05400
      IF (INDS.LE.0) GO TO 1100                                         MAI05500
  900 CALL INDSTL                                                       MAI05600
C      DISPLAY INDUSTRIAL USAGE CALLED FROM INDSTL SUBROUTINE           MAI05700
C      COMPUTE AND DISPLAY PUBLIC AND UNACCOUNTED USAGE                 MAI05800
 1100 CONTINUE                                                          MAI05900
      IF ((IPUB.LE.0).AND.(POPU.EQ.0.0)) GO TO 1200                     MAI06000
      CALL PUBLIC                                                       MAI06100
C      DISPLAY TOTAL MUNICIPAL USAGE                                    MAI06200
 1200 CALL DISPLY                                                       MAI06300
      JPROJ=JPROJ-1                                                     MAI06400
      IF (JPROJ.GE.0) GO TO 500                                         MAI06500
      REWIND IPRJT                                                      MAI06600
      CALL SUMARY                                                       MAI06700
      GO TO 55                                                          MAI06800
 1300 CONTINUE                                                          MAI06900
      WRITE (IO,1) IERR                                                 MAI07000
    1 FORMAT (1H1, 10HTHERE WERE,I3,1X, 72HERRORS IN THE MUNICIPAL INPUTMAI07100
     * DATA. PLEASE CORRECT AND RESUBMIT PROBLEM.)                      MAI07200
      IF (LERR .GT.0) GO TO 1400                                        MAI07300
      STOP                                                              MAI07400
 1400 WRITE (IO,2) LERR                                                 MAI07500
    2 FORMAT (1HO, 10HTHERE WERE,I3,1X, 77HERRORS IN THE LIBRARY COEFFICMAI07600
     *IENTS DATA. PLEASE CORRECT AND RESUBMIT PROBLEM.)                 MAI07700
 1500 CONTINUE                                                          MAI07800
      STOP                                                              MAI07900
      END                                                               MAI08000
      SUBROUTINE GROWTH (     IRES,ICOM,INDS,IPUB)                      GTH00100
      REAL MEFO
      INTEGER FSH,FTH                                                   GTH04000
      REAL MPLOW,MPMED,MPHIGH,MWLOW,MWMED,MWHIGH
      REAL MLIST,NLIST
      REAL MWNUM,MPNUM,SUMNTP,MWNUMF,MPNUMF                             GTH04100
      DIMENSION ILOW(11),JHIH(11),JLOW(10),IHIH(10)                     GTH00200
      DIMENSION CITF(6),PTEST(16),CTEST(16),F1(4)                       GTH00300
      DIMENSION RESPAR(800), RSPAR(12),RESIDL(300)                      GTH00400
      DIMENSION DETP(11),A(21),C(39),P(36)                              GTH00500
      COMMON/RESPAR/DUMFT(125),GFPDEN(25),PDCRFT(25),FPNUM(25),         GTH00600
     2              DUMFW(125),GFWDEN(25),PDCRFS(25),FWNUM(25),        GTH00700
     3              DUMMT(125),GMPDEN(25),PDCRMT(25),MPNUM(25),        GTH00800
     4              DUMMW(125),GMWDEN(25),PDCRMS(25),MWNUM(25),        GTH00900
     5              FPLOW,FPMED,FPHIGH,FWLOW,FWMED,FWHIGH,             GTH01000
     6              MPLOW,MPMED,MPHIGH,MWLOW,MWMED,MWHIGH              GTH01100
      COMMON/RESIDL/FPNUMF(25),PDPRFT(25),HDPRFT(25),                   GTH01200
     2              FWNUMF(25),PDPRFS(25),HDPRFS(25),                  GTH01300
     3              MPNUMF(25),PDPRMT(25),HDPRMT(25),                  GTH01400
     4              MWNUMF(25),PDPRMS(25),HDPRMS(25),                  GTH01500
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     5               PMWLOW,PMWMED,PMWHI,PMWTOT,                                GTH01600
     6               PMPLOW,PMPMED,PMPHI,PMPTOT,                                GTH01700
     7               PFWLOW,PFWMED,PFWHI,PFWTOT,                                GTH01800
     8               PFPLOW,PFPMED,PFPHI,PFPTOT,CMWLOW,CMWMED,CMWHI,            GTH01900
    9CMWTOT,CMPLOW,CMPMED,CMPHI,CMPTOT,CFWLOW,CFWMED,CFWHI,CFWTOT,              GTH02000
    *CFPLOW,CFPMED,CFPHI,CFPTOT,GTHRSD(194)                                     GTH02100
      COMMON/PUBLC/PUBDUM(180),GTHPUB(216),PUBPAR(150)                          GTH02200
      COMMON/CITDAT/CDATE,ALAT,ALONG,PO,PD,AGE,TEMPLT,EMPL4,                    GTH02300
     2               CNCOME,CSERVE,FDATE,POPRO,PNCOME,ACRESP,                   GTH02400
     3               HDGROP,PSERVE,GTHCIT(9)                                    GTH02500
      COMMON/LISTIJ/MLIST(12),NLIST(5)                                          GTH02600
      COMMON/COMPRN/IY(3),IPR,IGTHDM(2)                                         GTH02700
      COMMON/HISDAT/DPDTH,DPNWTH,DNTDTH,DN2DTH,DN3DTH,DYMDTH,                   GTH02800
     2               DSEDTH,DSHDTH,DSTDTH,C117TH,DPCITH,DEPFTH,                 GTH02900
     3               DE1DTH,DE2DTH,DE3DTH,DE4DTH,DE5DTH,DE6DTH,                 GTH03000
     4               DE7DTH,DE8DTH,DE9DTH,DE10TH,DE11TH,DTEFTH,                 GTH03100
     5               DMEFTH                                                     GTH03200
      COMMON/COMMRL/CDUM(503),E(50),CEMP(50),Z(50),PP(50),GTHCOM(100)           GTH03300
      COMMON/INDUST/DDUM(1403),EMP(200),EMPP(200),EMPM,GTHIND(399)              GTH03400
      EQUIVALENCE(CITF,FDATE)                                                   GTH03500
      EQUIVALENCE (PMWLOW,PTEST(1)),(CMWLOW,CTEST(1))                           GTH03600
      EQUIVALENCE (DUMFT(1),RESPAR(1)),(FPLOW, RSPAR(1))                        GTH03700
      EQUIVALENCE (FPNUME(1),RESIDL(1))                                         GTH03800
C....                                                                           GTH04200
      DATA P/ 0.001356065,  0.23359,    -0.0035744,                             GTH04300
     A        0.03493,     -0.0030098,   -0.000015904,                         GTH04400
     B        0.41563,     -0.000258613,  0.3152,                              GTH04500
     C        0.000387689,  -0.000000000001382,-0.0051765,                     GTH04600
     D        0.000036492,   0.16464,     0.000521444,                        GTH04700
     E       -0.000000021704,   -0.0002139,   -0.000320341,                    GTH04800
     F        0.0009603,    -0.02062,     0.000001437,                        GTH04900
     G       -0.0006646,    -0.000219727,    0.35843,                         GTH05000
     H        0.002321291,   -0.0056829,    0.07629,                         GTH05100
     I        0.000013332,    0.1955,    -0.000870205,                        GTH05200
     J        0.40891,    -0.370286,    0.001558391,                          GTH05300
     K       -0.000000075074,   -0.00000445,   -0.062943 /                    GTH05400
C.....                                                                          GTH05500
      DATA A/ 0.1505,         0.1017,         0.38751,                          GTH05600
     A       -97540.,        0.29338,        0.000000097,                      GTH05700
     B        0.10643,        0.424,         -0.036121,                        GTH05800
     C       -0.0008956,     -0.000000067,    0.31158,                         GTH05900
     D       -0.377,          -0.10734,        -0.27168,                       GTH06000
     E        0.0819373,       0.0001475,      -10.391,                        GTH06100
     F       -0.0378505,     0.0110124,     0.025125/                         GTH06200
C.....                                                                          GTH06300
      DATA C/ 501.5301,       0.32602,        0.07743,                        GTH06400
     A        0.165203,      -1.19209,        0.311873,                       GTH06500
     B        20.4796,        0.07764,        0.01850,                        GTH06600
     D        0.036191,      -0.07030,       -21598.0,                        GTH06700
     E       -0.28595,       0.047556,       18.01103,                        GTH06800
     F        0.00163803,      0.1771566,     -0.1422087,                     GTH06900
     G       -9.78924,        0.002336,      -0.0056347,                      GTH07000
     H        11.27902,       0.00147525,     0.038257,                       GTH07100
     I        -0.021728,       89.6963,        0.0332268,                      GTH07200

     J        0.718593,      -0.410774,       95.8166,                        GTH07300
     K        0.218327,      -0.101819,       21.2427,                        GTH07400
     L        0.0107481,      0.004156,       0.32774,                        GTH07500
     M       -100.784,        0.045532,       0.64449 /                       GTH07600
C  SET UP MINIMUM AND MAXIMUM TABLES FOR COMMERCIAL AND INSTITUTIONAL          GTH07700
C  CATEGORIES REPRESENTING EACH EQUATION IN THE COMMERCIAL SUBMODEL             GTH07800
      DATA JLOW/1,3,5,8,11,13,14,15,16,29/                                      GTH07900
      DATA IHIH/2,4,7,10,12,13,14,15,28,50/                                     GTH08000
C  SET UP MINIMUM AND MAXIMUM TABLES FOR THE VARIOUS SIC CATEGORIES             GTH08100
C  REPRESENTING EACH EQUATION IN THE INDUSTRIAL SUBMODEL.                       GTH08200
      DATA ILOW/1,21,41,81,101,111,121,131,151,171,181/                         GTH08300
      DATA JHIH /20,40,80,100,110,120,130,150,170,180,200/                      GTH08400
C.....                                                                          GTH08500
      IF (IRES.EQ.0) GO TO 6400                                                 GTH08600
C....                                                                           GTH08800
C     ******   RESIDENTIAL SUBMODEL   ******                                   GTH08900
C....                                                                           GTH09000
C....                                                                           GTH09100
      DT=FDATE-CDATE                                                            GTH09200
      DPDTP=(POPRO-PO)/DT                                                       GTH09300
      PERSPR=-156812.67+2.53698*PNCOME+79.6025*FDATE                            GTH09400
      PERSCR=-156812.67+2.53698*CNCOME+79.6025*CDATE                            GTH09500
      DIDTP=(PERSPR-PERSCR)/(PERSCR*DT*.01)                                     GTH09600
C....                                                                           GTH09700
C     RATE OF CHANGE IN TOTAL NUMBER OF HOMES IN AREA                           GTH09800
      DNTDTP=A(1)*DPDTH+A(2)*DPDTP+A(3)*DNTDTH+A(4)*DPNWTH+A(5)*PD              GTH09900
     **A(18)                                                                    GTH10000
C....                                                                           GTH10100
C     RATE OF CHANGE IN FRACTION OF HOMES IN LOW VALUE RANGE.                   GTH10200
      DN1FTP=A(6)*DNTDTH+A(7)*AGE+A(8)*DPNWTH+A(9)*DYMDTH+A(10)*DIDTP+          GTH10300
     *A(19)                                                                     GTH10400
C....                                                                           GTH10500
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C       RATE OF CHANGE IN FRACTION OF HOMES IN MEDIUM VALUE RANGE                GTH10600
        DN2FTP=A(11)*DNTDTH+A(12)*DN2DTH+A(13)*DPNWTH+A(20)                      GTH10700
C....                                                                            GTH10800
C       RATE OF CHANGE IN FRACTION OF HOMES IN HIGH VALUE RANGE                  GTH10900
        DN3FTP=A(14)*AGE+A(15)*DN3DTH+A(16)*DYMDTH+A(17)*DIDTP+A(21)             GTH11000
C....                                                                            GTH11100
C       CHANGE IN TOTAL NUMBER OF HOMES                                          GTH11200
        DNT=DNTDTP*DT                                                            GTH11300
C....                                                                            GTH11400
C       CHANGE IN FRACTION IN LOW VALUE RANGE                                    GTH11500
        DFN1=DN1FTP*DT                                                           GTH11600
C....                                                                            GTH11700
C       CHANGE IN FRACTION IN MEDIUM VALUE RANGE                                 GTH11800
        DFN2=DN2FTP*DT                                                           GTH11900
C....                                                                            GTH12000
C       CHANGE IN FRACTION IN HIGH VALUE RANGE                                   GTH12100
        DFN3=DN3FTP*DT                                                           GTH12200
C.....                                                                           GTH12300
C       NORMALIZE CHANGES IN FRACTIONS                                           GTH12400
C.....                                                                           GTH12500
        ADJ=(DFN1+DFN2+DFN3)/3.                                                  GTH12600
        DFN1=DFN1-ADJ                                                            GTH12700
        DFN2=DFN2-ADJ                                                            GTH12800
        DFN3=DFN3-ADJ                                                            GTH12900
C....                                                                            GTH13000
C       COMPUTE THE CURRENT VALUES.                                              GTH13100
C       INITIALIZE DATA FIELDS                                                   GTH13200
C....                                                                            GTH13300
        DO 90 I=1,16                                                             GTH13400
        CTEST(I)=0.0                                                             GTH13500
   90 CONTINUE                                                                   GTH13600
C....                                                                            GTH13700
C       NUMBER OF METERED SEWERED HOMES IN EACH RANGE.                           GTH13800
        IF (MWNUM(1).LE.0.0) GO TO 210                                           GTH13900
        J=1                                                                      GTH14000
        K=IFIX(MWLOW)                                                            GTH14100
        IF (MWLOW.EQ.0) GO TO 120                                                GTH14200
        DO 100 I=J,K                                                             GTH14300
        CMWLOW=CMWLOW+MWNUM(I)                                                   GTH14400
  100 CONTINUE                                                                   GTH14500
  120 IF (MWMED.EQ.0) GO TO 170                                                  GTH14600
        J=J+IFIX(MWLOW)                                                          GTH14700
        K=K+IFIX(MWMED)                                                          GTH14800
        DO 150 I=J,K                                                             GTH14900
        CMWMED=CMWMED+MWNUM(I)                                                   GTH15000
  150 CONTINUE                                                                   GTH15100
  170 IF (MWHIGH.EQ.0) GO TO 210                                                 GTH15200
        J=J+IFIX(MWMED)                                                          GTH15300
         K=K+IFIX(MWHIGH)                                                        GTH15400
        DO 205 I=J,K                                                             GTH15500
        CMWHI=CMWHI+MWNUM(I)                                                     GTH15600
  205 CONTINUE                                                                   GTH15700
  210 CONTINUE                                                                   GTH15800
        CMWTOT=CMWLOW+CMWMED+CMWHI                                               GTH15900
C....                                                                            GTH16000
C       NUMBER OF METERED SEPTIC TANK HOMES IN EACH RANGE                        GTH16100
C....                                                                            GTH16200
        IF(MPNUM(1).LE.0.0) GO TO 310                                            GTH16300
        J=1                                                                      GTH16400
        K=IFIX(MPLOW)                                                            GTH16500
        IF (MPLOW.EQ.0.)GO TO 230                                                GTH16600
        DO 220 I=J,K                                                             GTH16700
        CMPLOW=CMPLOW+MPNUM(I)                                                   GTH16800
  220 CONTINUE                                                                   GTH16900
  230 IF (MPMED.EQ.0.)GO TO 270                                                  GTH17000
        J=J+MPLOW                                                                GTH17100
        K=K+MPMED                                                                GTH17200
        DO 250 I=J,K                                                             GTH17300
        CMPMED=CMPMED+MPNUM(I)                                                   GTH17400
  250 CONTINUE                                                                   GTH17500
  270 IF (MPHIGH.EQ.0.)GO TO 310                                                 GTH17600
        J=J+IFIX(MPMED)                                                          GTH17700
        K=K+IFIX(MPHIGH)                                                         GTH17800
        DO 300 I=J,K                                                             GTH17900
        CMPHI=CMPHI+MPNUM(I)                                                     GTH18000
  300 CONTINUE                                                                   GTH18100
  310 CONTINUE                                                                   GTH18200
        CMPTOT=CMPLOW+CMPMED+CMPHI                                               GTH18300
C....                                                                            GTH18400
C       NUMBER OF FLAT RATE SEWERED HOMES IN EACH RANGE                          GTH18500
C....                                                                            GTH18600
        IF (FWNUM(1).LE.0.0) GO TO 410                                           GTH18700
        J=1                                                                      GTH18800
        K=IFIX(FWLOW)                                                            GTH18900
        IF(FWLOW.EQ.0.0) GO TO 330                                               GTH19000
        DO 320 I=J,K                                                             GTH19100
        CFWLOW=CFWLOW+FWNUM(I)                                                   GTH19200
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  320 CONTINUE                                                          GTH19300
  330 IF(FWMED.EQ.0.0) GO TO 370                                        GTH19400
      J=J+IFIX(FWLOW)                                                   GTH19500
      K=K+IFIX(FWMED)                                                   GTH19600
      DO 350 I=J,K                                                      GTH19700
      CFWMED=CFWMED+FWNUM(I)                                            GTH19800
  350 CONTINUE                                                          GTH19900
  370 IF(FWMED.EQ.0.0) GO TO 410                                        GTH20000
      J=J+IFIX(FWMED)                                                   GTH20100
      K=K+IFIX(FWHIGH)                                                  GTH20200
      DO 400 I=J,K                                                      GTH20300
      CFWHI=CFWHI+FWNUM(I)                                              GTH20400
  400 CONTINUE                                                          GTH20500
  410 CONTINUE                                                          GTH20600
      CFWTOT= CFWLOW+CFWMED +CFWHI                                      GTH20700
C....                                                                   GTH20800
C     NUMBER OF FLAT RATE SEPTIC HOMES IN EACH RANGE                    GTH20900
C....                                                                   GTH21000
      IF (FPNUM(1).LE.0.0) GO TO 590                                    GTH21100
      J=1                                                               GTH21200
      K=IFIX(FPLOW)                                                     GTH21300
      IF(FPLOW.EQ.0.0) GO TO 530                                        GTH21400
      DO 520 I=J,K                                                      GTH21500
      CFPLOW=CFPLOW+FPNUM(I)                                            GTH21600
  520 CONTINUE                                                          GTH21700
  530 IF(FPMED.EQ.0.0) GO TO 570                                        GTH21800
      J=J+IFIX(FPLOW)                                                   GTH21900
      K=K+IFIX(FPMED)                                                   GTH22000
      DO 550 I=J,K                                                      GTH22100
      CFPMED=CFPMED+FPNUM(I)                                            GTH22200
  550 CONTINUE                                                          GTH22300
  570 IF (FPHIGH.EQ.0.0) GO TO 590                                      GTH22400
      J=J+IFIX(FPMED)                                                   GTH22500
      K=K+IFIX(FPHIGH)                                                  GTH22600
      DO 580 I=J,K                                                      GTH22700
      CFPHI=CFPHI+FPNUM(I)                                              GTH22800
  580 CONTINUE                                                          GTH22900
  590 CONTINUE                                                          GTH23000
      CFPTOT=CFPLOW+CFPMED+CFPHI                                        GTH23100
C...                                                                    GTH23200
C     TOTAL NUMBER OF LOW VALUE HOMES                                   GTH23300
      TN1=CMWLOW+CMPLOW+CFWLOW+CFPLOW                                   GTH23400
C....                                                                   GTH23500
C     TOTAL NUMBER OF MEDIUM VALUE HOMES                                GTH23600
      TN2=CMWMED+CMPMED+CFWMED+CFPMED                                   GTH23700
C....                                                                   GTH23800
C     TOTAL NUMBER OF HIGH VALUE HOMES                                  GTH23900
      TN3=CMWHI+CMPHI+CFWHI+CFPHI                                       GTH24000
C....                                                                   GTH24100
C     GRAND TOTAL OF ALL HOMES                                          GTH24200
      TNC=TN1+TN2+TN3                                                   GTH24300
C....                                                                   GTH24400
C     CURRENT FRACTION OF LOW VALUE HOMES                               GTH24500
      FN1C=TN1/TNC                                                      GTH24600
C....                                                                   GTH24700
C     CURRENT FRACTION OF MEDIUM VALUE HOMES                            GTH24800
      FN2C=TN2/TNC                                                      GTH24900
C....                                                                   GTH25000
C     CURRENT FRACTION OF HIGH VALUE HOMES                              GTH25100
      FN3C=TN3/TNC                                                      GTH25200
C....                                                                   GTH25300
C....                                                                   GTH25400
C     COMPUTE PROJECTED QUANTITIES OF HOMES                             GTH25500
C....                                                                   GTH25600
C....                                                                   GTH25700
C     TOTAL NUMBER OF HOMES                                             GTH25800
      SUMNTP=TNC+DNT                                                    GTH25900
C....                                                                   GTH26000
C     FRACTION OF LOW VALUE HOMES                                       GTH26100
      FN1P=FN1C+DFN1                                                    GTH26200
      IF(FN1P.LT.0.) FN1P=0.                                            GTH26300
C....                                                                   GTH26400
C     FRACTION OF MEDIUM VALUE HOMES                                    GTH26500
      FN2P=FN2C+DFN2                                                    GTH26600
      IF(FN2P.LT.0.) FN2P=0.                                            GTH26700
C....                                                                   GTH26800
C     FRACTION OF HIGH VALUE HOMES                                      GTH26900
      FN3P=FN3C+DFN3                                                    GTH27000
      IF(FN3P.LT.0.) FN3P=0.                                            GTH27100
C....                                                                   GTH27200
C     MODIFY FRACTIONS SO THEIR SUM WILL EQUAL ONE                      GTH27300
      SUM=FN1P+FN2P+FN3P                                                GTH27400
      FN1P=FN1P/SUM                                                     GTH27500
      FN2P=FN2P/SUM                                                     GTH27600
      FN3P=FN3P/SUM                                                     GTH27700
C....                                                                   GTH27800
C     COMPUTE GROUP PROJECTED QUANTITIES                                GTH27900
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C....                                                                   GTH28000
C....                                                                   GTH28100
C     ADJUST PROJECTIONS OF TOTAL NUMBER OF HOMES AND FRACTIONS IN VALUEGTH28200
C     GROUPS TO PROVIDE FOR INPUT PROJECTIONS, IF REQUIRED              GTH28300
C....                                                                   GTH28400
      DO 1300 I=1,4                                                     GTH28500
      F1(I)=0.0                                                         GTH28600
      DO 1200 J=I,16,4                                                  GTH28700
      IF (PTEST(J).LT.0.0) GO TO 1200                                   GTH28800
      F1(I)=F1(I)+PTEST(J)                                              GTH28900
 1200 CONTINUE                                                          GTH29000
 1300 CONTINUE                                                          GTH29100
      IF (F1(4).GT.SUMNTP) SUMNTP=F1(4)                                 GTH29200
      DO 1400 I=1,3                                                     GTH29300
      F1(I)=F1(I)/SUMNTP                                                GTH29400
 1400 CONTINUE                                                          GTH29500
      F=F1(1)+F1(2)+F1(3)                                               GTH29600
      IF (F.LE.1.) GO TO 1500                                           GTH29700
      SUMNTP=F*SUMNTP                                                   GTH29800
      FN1P=F1(1)/F                                                      GTH29900
      FN2P=F1(2)/F                                                      GTH30000
      FN3P=F1(3)/F                                                      GTH30100
      GO TO 1600                                                        GTH30200
 1500 CONTINUE                                                          GTH30300
      I=1                                                               GTH30400
      IF (F1(1).GT.FN1P) I=I+2                                          GTH30500
      IF (F1(2).GT.FN2P) I=I+4                                          GTH30600
      IF (F1(3).GT.FN3P) I=I+8                                          GTH30700
      I=(I+1)/2                                                         GTH30800
      GO TO (1600,1560,1550,1530,1540,1520,1510),I                      GTH30900
 1510 CONTINUE                                                          GTH31000
      FN2P=F1(2)                                                        GTH31100
      FN3P=F1(3)                                                        GTH31200
      FN1P=1.-FN2P-FN3P                                                 GTH31300
      GO TO 1600                                                        GTH31400
 1520 CONTINUE                                                          GTH31500
      FN1P=F1(1)                                                        GTH31600
      FN3P=F1(3)                                                        GTH31700
      FN2P=1.-FN1P-FN3P                                                 GTH31800
      GO TO 1600                                                        GTH31900
 1530 CONTINUE                                                          GTH32000
      FN1P=F1(1)                                                        GTH32100
      FN2P=F1(2)                                                        GTH32200
      FN3P=1.-FN1P-FN2P                                                 GTH32300
      GO TO 1600                                                        GTH32400
 1540 CONTINUE                                                          GTH32500
      FN3P=F1(3)                                                        GTH32600
      FN1P=FN1P*(1.-FN3P)/(FN1P+FN2P)                                   GTH32700
      FN2P=1.-FN1P-FN3P                                                 GTH32800
      GO TO 1600                                                        GTH32900
 1550 CONTINUE                                                          GTH33000
      FN2P=F1(2)                                                        GTH33100
      FN1P=FN1P*(1.-FN2P)/(FN1P+FN3P)                                   GTH33200
      FN3P=1.-FN1P-FN2P                                                 GTH33300
      GO TO 1600                                                        GTH33400
 1560 CONTINUE                                                          GTH33500
      FN1P=F1(1)                                                        GTH33600
      FN2P=FN2P*(1.-FN1P)/(FN2P+FN3P)                                   GTH33700
      FN3P=1.-FN1P-FN2P                                                 GTH33800
      GO TO 1600                                                        GTH33900
 1600 CONTINUE                                                          GTH34000
C....                                                                   GTH34100
C     COMPUTE PROJECTED TOTAL HOMES IN EACH VALUE RANGE                 GTH34200
C....                                                                   GTH34300
      PN1=FN1P*SUMNTP                                                   GTH34400
      PN2=FN2P*SUMNTP                                                   GTH34500
      PN3=FN3P*SUMNTP                                                   GTH34600
C....                                                                   GTH34700
C     COMPUTE PROJECTED TOTAL HOMES IN EACH CATEGORY                    GTH34800
C....                                                                   GTH34900
      F=SUMNTP                                                          GTH35000
      S=TNC                                                             GTH35100
      SUM=0.                                                            GTH35200
      DO 2100 I=4,16,4                                                  GTH35300
      IF (PTEST(I).LT.0.) GO TO 2100                                    GTH35400
      F=F-PTEST(I)                                                      GTH35500
      S=S-CTEST(I)                                                      GTH35600
 2100 CONTINUE                                                          GTH35700
      IF (S.GT.0.) SUM=F/S                                              GTH35800
      DO 2200 I=4,16,4                                                  GTH35900
      IF (PTEST(I).LT.0.) PTEST(I)=SUM*CTEST(I)                         GTH36000
 2200 CONTINUE                                                          GTH36100
C....                                                                   GTH36200
C     COMPUTE PROJECTED LOW VALUE HOMES IN EACH CATEGORY                GTH36300
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C....                                                                   GTH36400
      F=PN1                                                             GTH36500
      S=TN1                                                             GTH36600
      SUM=0.                                                            GTH36700
      DO 3100 I=1,16,4                                                  GTH36800
      IF (PTEST(I).LT.0.) GO TO 3100                                    GTH36900
      F=F-PTEST(I)                                                      GTH37000
      S=S-CTEST(I)                                                      GTH37100
 3100 CONTINUE                                                          GTH37200
      IF (S.GT.0.) SUM=F/S                                              GTH37300
      DO 3200 I=1,16,4                                                  GTH37400
      IF (PTEST(I).LT.0.) PTEST(I)=SUM*CTEST(I)*(-1.)                   GTH37500
 3200 CONTINUE                                                          GTH37600
C....                                                                   GTH37700
C     COMPUTE PROJECTED MEDIUM VALUE HOMES IN EACH CATEGORY             GTH37800
C....                                                                   GTH37900
      F=PN2                                                             GTH38000
      S=TN2                                                             GTH38100
      SUM=0.                                                            GTH38200
      DO 4100 I=2,16,4                                                  GTH38300
      IF (PTEST(I).LT.0.) GO TO 4100                                    GTH38400
      F=F-PTEST(I)                                                      GTH38500
      S=S-CTEST(I)                                                      GTH38600
 4100 CONTINUE                                                          GTH38700
      IF (S.GT.0.) SUM=F/S                                              GTH38800
      DO 4200 I=2,16,4                                                  GTH38900
      IF (PTEST(I).LT.0.) PTEST(I)=SUM*CTEST(I)*(-1.)                   GTH39000
 4200 CONTINUE                                                          GTH39100
C....                                                                   GTH39200
C     COMPUTE PROJECTED HIGH VALUE HOMES IN EACH CATEGORY               GTH39300
C....                                                                   GTH39400
      F=PN3                                                             GTH39500
      S=TN3                                                             GTH39600
      SUM=0.                                                            GTH39700
      DO 5100 I=3,16,4                                                  GTH39800
      IF (PTEST(I).LT.0.) GO TO 5100                                    GTH39900
      F=F-PTEST(I)                                                      GTH40000
      S=S-CTEST(I)                                                      GTH40100
 5100 CONTINUE                                                          GTH40200
      IF (S.GT.0.) SUM=F/S                                              GTH40300
      DO 5200 I=3,16,4                                                  GTH40400
      IF (PTEST(I).LT.0.) PTEST(I)=SUM*CTEST(I)*(-1.)                   GTH40500
 5200 CONTINUE                                                          GTH40600
C....                                                                   GTH40700
C     NORMALIZE ALL COMPUTED VALUES TO ENSURE CONSISTENCY WITH TOTALS   GTH40800
C....                                                                   GTH40900
      DO 5330 I=1,16,4                                                  GTH41000
      F=PTEST(I+3)                                                      GTH41100
      S=0.                                                              GTH41200
      SUM=0.                                                            GTH41300
      II=I+2                                                            GTH41400
      DO 5310 J=I,II                                                    GTH41500
      IF (PTEST(J).GE.0.) F=F-PTEST(J)                                  GTH41600
      IF (PTEST(J).LT.0.) S=S-PTEST(J)                                  GTH41700
 5310 CONTINUE                                                          GTH41800
      IF (S.GT.0.) SUM=F/S                                              GTH41900
      DO 5320 J=I,II                                                    GTH42000
      IF (PTEST(J).LT.0.) PTEST(J)=PTEST(J)*(-SUM)                      GTH42100
      IF (ABS(PTEST(J)).LT.1.) PTEST(J)=0.                              GTH42200
 5320 CONTINUE                                                          GTH42300
 5330 CONTINUE                                                          GTH42400
C....                                                                   GTH42500
C....                                                                   GTH42600
C     COMPUTE DETAIL PROJECTIONS OF NUMBER OF HOMES                     GTH42700
C....                                                                   GTH42800
C....                                                                   GTH42900
      JJ=1                                                              GTH43000
      KK=0                                                              GTH43100
      DO 5700 I=1,4                                                     GTH43200
      II=(200*I)-24                                                     GTH43300
      III=75*(I-1)+1                                                    GTH43400
      IF (RESPAR(II).LE.0.) GO TO 5700                                  GTH43500
C....                                                                   GTH43600
C         - FOR EACH VALUE RANGE                                        GTH43700
C....                                                                   GTH43800
      DO 5600 J=1,3                                                     GTH43900
      KKK=3*(I-1)+J                                                     GTH44000
      IF(RSPAR(KKK).LE.0.0) GO TO 5600                                  GTH44100
      KK=KK+IFIX(RSPAR(KKK))                                            GTH44200
      K=4*(4-I)+J                                                       GTH44300
      G=PTEST(K)/CTEST(K)                                               GTH44400
C....                                                                   GTH44500
C         - FOR EACH GROUP                                              GTH44600
C....                                                                   GTH44700
      DO 5500 L=JJ,KK                                                   GTH44800
      RESIDL(III)=G*RESPAR(II)                                          GTH44900
      IF (RESIDL(III).LT.1.) RESIDL(III)=0.0                            GTH45000
      II=II+1                                                           GTH45100
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      III=III+1                                                          GTH45200
 5500 CONTINUE                                                           GTH45300
      JJ=JJ+IFIX(RSPAR(KKK))                                             GTH45400
 5600 CONTINUE                                                           GTH45500
 5700 CONTINUE                                                           GTH45600
C....                                                                    GTH45700
C....                                                                    GTH45800
C....                                                                    GTH45900
C                                                                        GTH46000
C CALCULATES PROJECTED POPULATION DENSITY                                GTH46100
C                                                                        GTH46200
      PDEN=PO/TNC                                                        GTH46300
      TOTPOP=POPRO/SUMNTP                                                GTH46400
      POPGRO=TOTPOP/PDEN                                                 GTH46500
C                                                                        GTH46600
C PROJECT POPULATION DENSITY FOR ALL VALUE RANGES INPUT TO THREE         GTH46700
C CATEGORIES.  POP DENSITY IS NOT CALCULATED FOR THE METERED-SEWERED     GTH46800
C PARAMETER.                                                             GTH46900
      MSH= IFIX(MPLOW+MWMED+MWHIGH)                                      GTH47000
      MTH= IFIX(MPLOW+MPMED+MPHIGH)                                      GTH47100
      FSH=IFIX(FWLOW+FWMED+FWHIGH)                                       GTH47200
      FTH=IFIX(FPLOW+FPMED+FPHIGH)                                       GTH47300
C                                                                        GTH47400
      DO 17 J=1,MTH                                                      GTH47500
   17 PDPRMT(J)=PDCRMT(J)*POPGRO                                         GTH47600
C                                                                        GTH47700
      DO 27 J=1,FSH                                                      GTH47800
   27 PDPRFS(J)=PDCRFS(J)*POPGRO                                         GTH47900
C                                                                        GTH48000
      DO 37 J=1,FTH                                                      GTH48100
   37 PDPRFT(J)=PDCRFT(J)*POPGRO                                         GTH48200
C                                                                        GTH48300
C                                                                        GTH48400
C     THE USER HAS THE OPTION TO CALCULATE HOUSING DENSITY IN THE        GTH48500
C    FOLLOWING WAYS **                                                   GTH48600
C                                                                        GTH48700
C               1) HE CAN DO NOTHING - USING THIS OPTION THE SYSTEM HOLDSGTH48800
C                  CURRENT HOUSING DENSITIES CONSTANT                    GTH48900
C                                                                        GTH49000
C               2) HE CAN INPUT ANY NUMBER OF HOUSING DENSITIES FOR ANY  GTH49100
C                  OF THE THREE CLASSES AND FOUR CATEGORIES OF HOMES -   GTH49200
C                                                                        GTH49300
C               3) HE CAN INPUT A PROJECTED HOUSING DENSITY TOTAL - USINGGTH49400
C                  THIS OPTION THE SYSTEM CALCULATES PROJECTED INDIVIDUALGTH49500
C                  HOUSING DENSITIES FOR SUBSEQUENT USE.                 GTH49600
C                                                                        GTH49700
C               4) HE CAN INPUT HISTORICAL TOTAL HOUSING DENSITIES WHICH GTH49800
C                  WILL BE USED WITH LIEAR REGRESSION ANALYSIS TO PROJECTGTH49900
C                  HOUSING DENSITY WHICH WILL BE USED AS IN =3.          GTH50000
C                                                                        GTH50100
C               5) HE CAN INPUT PROJECTED LAND ACREAGE AND CALCULATIONS  GTH50200
C                  FOR PROJECTED HOUSING DENSITY WILL BE MADE.           GTH50300
C                                                                        GTH50400
C   CALCULATE HOUSING DENSITY GROWTH RATES AND APPLY THEM TO PRESENT     GTH50500

C   HOUSING DENSITIES FOR PROJECTIONS.                                   GTH50600
      IF (ACRESP.GT.0.0)                                                 GTH50700
     *HDGROP=SUMNTP/ACRESP                                               GTH50800
C                                                                        GTH50900
C     SUM THE HOUSING DENSITIES IN EACH GROUP FOR ALL CATEGORIES.        GTH51000
      HDGROC=0.0                                                         GTH51100
      IF(MSH.LE.0)GO TO 5208                                             GTH51150
      DO5204 J=1,MSH                                                     GTH51200
 5204 HDGROC=HDGROC+(MWNUM(J)/GMWDEN(J))                                 GTH51300
 5208 IF(MTH.LE.0)GO TO 5209                                             GTH51350
      DO5205 J=1,MTH                                                     GTH51400
 5205 HDGROC=HDGROC+(MPNUM(J)/GMPDEN(J))                                 GTH51500
 5209 IF(FTH.LE.0)GO TO 5210                                             GTH51550
      DO5206 J=1,FSH                                                     GTH51600
 5206 HDGROC=HDGROC+(FWNUM(J)/GFWDEN(J))                                 GTH51700
 5210 IF(FTH.LE.0)GO TO 5211                                             GTH51750
      DO5207 J=1,FTH                                                     GTH51800
 5207 HDGROC=HDGROC+(FPNUM(J)/GFPDEN(J))                                 GTH51900
 5211 CONTINUE                                                           GTH51950
C                                                                        GTH52000
C     DIVIDE TOTAL NUMBER OF HOMES BY TOTAL ACREAGE,                     GTH52100
C     GIVING CURRENT MEAN HOUSING DENSITY.                               GTH52200
C                                                                        GTH52300
      HDGRCC=TNC/HDGROC                                                  GTH52400
C                                                                        GTH52500
      G=HDGROP/HDGROC                                                    GTH52600
      IF (G.LE.0.0) G=1.0                                                GTH52700
C                                                                        GTH52800
      DO6200 J=1,MSH                                                     GTH52900
      IF (HDPRMS(J).LE.0.0)                                              GTH53000
     *HDPRMS(J)=GMWDEN(J)*G                                              GTH53100
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 6200 CONTINUE                                                          GTH53200
      DO6201 J=1,MTH                                                    GTH53300
      IF (HDPRMT(J).LE.0.0)                                             GTH53400
     *HDPRMT(J)=GMPDEN(J)*G                                             GTH53500
 6201 CONTINUE                                                          GTH53600
      DO6202 J=1,FSH                                                    GTH53700
      IF (HDPRFS(J).LE.0.0)                                             GTH53800
     *HDPRFS(J)=GFWDEN(J)*G                                             GTH53900
 6202 CONTINUE                                                          GTH54000
      DO6203 J=1,FTH                                                    GTH54100
      IF (HDPRFT(J).LE.0.0)                                             GTH54200
     *HDPRFT(J)=GFPDEN(J)*G                                             GTH54300
 6203 CONTINUE                                                          GTH54400
C....                                                                   GTH54500
C     PUT ALL PROJECTED QUANTITIES ON AUXILARY STORAGE DEVICE.          GTH54600
C....                                                                   GTH54700
C....                                                                   GTH54800
C     TEST FOR METER-SEWER PROJECTION DATA                              GTH54900
C.....                                                                  GTH55000
      IF (MWNUM(1).LE.0.0) GO TO  6220                                  GTH55100
      WRITE (IPR) MLIST(10),MSH                                         GTH55200
      WRITE(IPR) (HDPRMS(I),I=1,MSH)                                    GTH55300
      WRITE (IPR) MLIST(12),MSH                                         GTH55400
      WRITE (IPR)(MWNUMF(I),I=1,MSH)                                    GTH55500
 6220 CONTINUE                                                          GTH55600
C.....                                                                  GTH55700
C     TEST FOR METER-SEPTIC TANK PROJECTION DATA                        GTH55800
C.....                                                                  GTH55900
      IF (MPNUM(1).LE.0.0) GO TO 6230                                   GTH56000
      WRITE (IPR) MLIST(7),MTH                                          GTH56100
      WRITE (IPR) (HDPRMT(I),I=1,MTH)                                   GTH56200
      WRITE (IPR) MLIST(8),MTH                                          GTH56300
      WRITE (IPR) (PDPRMT(I),I=1,MTH)                                   GTH56400
      WRITE (IPR) MLIST(9),MTH                                          GTH56500
      WRITE (IPR) (MPNUMF(I),I=1,MTH)                                   GTH56600
 6230 CONTINUE                                                          GTH56700
C.....                                                                  GTH56800
C     TEST FOR FLAT-RATE SEWER PROJECTION DATA.                         GTH56900
C.....                                                                  GTH57000
      IF (FWNUM(1).LE.0.0) GO TO 6240                                   GTH57100
      WRITE (IPR) MLIST(4),FSH                                          GTH57200
      WRITE (IPR) (HDPRFS(I), I=1,FSH)                                  GTH57300
      WRITE (IPR) MLIST(5),FSH                                          GTH57400
      WRITE (IPR) (PDPRFS(I),I=1,FSH)                                   GTH57500
      WRITE (IPR) MLIST(6),FSH                                          GTH57600
      WRITE (IPR) (FWNUMF(I),I=1,FSH)                                   GTH57700
 6240 CONTINUE                                                          GTH57800
C.....                                                                  GTH57900
C     TEST FOR FLAT-RATE SEPTIC-TANK PROJECTION DATA                    GTH58000
C.....                                                                  GTH58100
      IF (FPNUM(1).LE.0.0) GO TO 6250                                   GTH58200
      WRITE (IPR) MLIST(1),FTH                                          GTH58300
      WRITE (IPR) (HDPRFT(I),I=1,FTH)                                   GTH58400
      WRITE (IPR) MLIST(2),FTH                                          GTH58500
      WRITE (IPR) (PDPRFT(I),I=1,FTH)                                   GTH58600
      WRITE (IPR) MLIST(3),FTH                                          GTH58700
      WRITE (IPR) (FPNUMF(I),I=1,FTH)                                   GTH58800
 6250 CONTINUE                                                          GTH58900
C                                                                       GTH59000
 6400 IF (INDS.EQ.0) GO TO 7000                                         GTH59100
C....                                                                   GTH59200
C....                                                                   GTH59300
C     ******    INDUSTRIAL SUBMODEL    ******                         GTH59400
C....                                                                   GTH59500
C....                                                                   GTH59600
      MEFO=0.0                                                          GTH59700
      DO 6300 I=1,200                                                   GTH59800
 6300 MEFO=MEFO+EMP(I)                                                  GTH59900
      MEFO=MEFO/TEMPLT                                                  GTH60000
      EPFO=TEMPLT/PO                                                    GTH60100
      TEFO=EMPL4/TEMPLT                                                 GTH60200
      PCIO=CNCOME                                                       GTH60300
C                                                                       GTH60400
C  SUM THE EMPLOYEES FOR EACH EQUATION                                  GTH60500
      DO6401 I=1,11                                                     GTH60600
      M=ILOW(I)                                                         GTH60700
      N=JHIH(I)                                                         GTH60800
      E2=0.0                                                            GTH60900
      ET=0.0                                                            GTH61000
      EP=0.0                                                            GTH61100
      DO6402 J=M,N                                                      GTH61200
      IF (EMPP(J).GE.0.0) EP=EP+EMPP(J)                                 GTH61300
      E2=E2+EMP(J)                                                      GTH61400
 6402 CONTINUE                                                          GTH61500
      ET=E2/PO                                                          GTH61600
C                                                                       GTH61700
C     CALCULATE RATE OF CHANGE FOR EMPLOYEES IN EACH EQUATION.          GTH61800
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C                                                                       GTH61900
C  INDUSTRIAL EQUATIONS                                                 GTH62000
      GO TO (301,302,303,304,305,306,307,308,309,312,311),I             GTH62100
  301 DETP(1)=P(1)+P(2)*DE1DTH+P(3)*EPFO+P(4)*DEPFTH+P(5)*TEFO          GTH62200
      GO TO 405                                                         GTH62300
  302 DETP(2)=P(6)+P(7)*DE2DTH                                          GTH62400
      GO TO 405                                                         GTH62500
  303 DETP(3)=P(8)+P(9)*DE3DTH                                          GTH62600
      GO TO 405                                                         GTH62700
  304 DETP(4)=P(10)+P(11)*PO+P(12)*TEFO                                 GTH62800
      GO TO 405                                                         GTH62900
  305 DETP(5)=P(13)+P(14)*DE5DTH                                        GTH63000
      GO TO 405                                                         GTH63100
  306 DETP(6)=P(15)+P(16)*PCIO+P(17)*MEFO                               GTH63200
      GO TO 405                                                         GTH63300
  307 DETP(7)=P(18)+P(19)*EPFO+P(20)*DEPFTH+P(21)*DPCITH+P(22)*MEFO     GTH63400
      GO TO 405                                                         GTH63500
  308 DETP(8)=P(23)+P(24)*DE8DTH                                        GTH63600
      GO TO 405                                                         GTH63700
  309 DETP(9)=P(25)+P(26)*EPFO+P(27)*DEPFTH+P(28)*DPCITH+P(29)*DTEFTH   GTH63800
      GO TO 405                                                         GTH63900
  312 DETP(10)=P(30)+P(31)*DE10TH+P(32)*DMEFTH                          GTH64000
      GO TO 405                                                         GTH64100
  311 DETP(11)=P(33)+P(34)*PCIO+P(35)*DPCITH+P(36)*DMEFTH               GTH64200
      GO TO 405                                                         GTH64300
  405 CONTINUE                                                          GTH64400
C     CALCULATE PROJECTED EMPLOYEES RATIOS FOR THOSE NOT INPUT          GTH64500
      DELTE=DETP(I)*DT                                                  GTH64600
      X=((ET+DELTE)*PUPRO)-EP                                           GTH64700
      IF((E2-EP).LE.0.0)GO TO 9010                                      GTH64611
      X=X/(E2-EP)                                                       GTH64800
      GO TO 9011                                                        GTH64630
 9010 X=0.0                                                             GTH64640
 9011 DO 6410 J=M,N                                                     GTH64800
      IF (EMPP(J).LT.0.0) EMPP(J) = EMP(J)*X                            GTH65000
      IF(EMPP(J).LT.0.0) EMPP(J)=0.0                                    GTH65100
 6410 CONTINUE                                                          GTH65200
 6401 CONTINUE                                                          GTH65300
C....                                                                   GTH65400
C     ADJUST MANUFACTURING EMPLOYMENT TO PROJECTED VALUE, IF PROVIDED   GTH65500
C....                                                                   GTH65600
      IF (EMPM.LE.0.) GO TO 6440                                        GTH65700
      EMPMP=0.                                                          GTH65800
      DO 6420 I=1,200                                                   GTH65900
      EMPMP=EMPP(I)+EMPMP                                               GTH66000
 6420 CONTINUE                                                          GTH66100
      XP=EMPM/EMPMP                                                     GTH66200
      DO 6430 I=1,200                                                   GTH66300
      EMPP(I)=EMPP(I)*XP                                                GTH66400
 6430 CONTINUE                                                          GTH66500
 6440 CONTINUE                                                          GTH66600
C.....                                                                  GTH66700
C     WRITE INDUSTRIAL PROJECTION DATA                                  GTH66800
C.....                                                                  GTH66900
      INDP=200                                                          GTH67000
      WRITE(IPR) NLIST(3),INDP                                          GTH67100
      WRITE (IPR) (EMPP(I),I=1,INDP)                                    GTH67200
 7000 IF (ICOM.EQ.0) GO TO 9000                                         GTH67300
C.....                                                                  GTH67400
C.....                                                                  GTH67500
C     ******   COMMERCIAL/INSTITUTIONAL SUBMODEL   ******              GTH67600
C.....                                                                  GTH67700
C.....                                                                  GTH67800
      IF (PSERVE) 601,602,602                                           GTH67900
  601 DSTDTP=C(37)+C(38)*DPDTP+C(39)*DSTDTH                             GTH68000
      GO TO 603                                                         GTH68100
  602 DSTDTP=(PSERVE-CSERVE)/DT                                         GTH68200
  603 CONTINUE                                                          GTH68300
      PPP=0.0                                                           GTH68400
      DO 8000 I=1,10                                                    GTH68500
      M=JLOW(I)                                                         GTH68600
      N=IHIH(I)                                                         GTH68700
      MM=M                                                              GTH68800
      DO 7040 J=M,N                                                     GTH68900
      IF(Z(J).GT.0.0.OR.CEMP(J).GT.0.0.OR.PP(J).GT.0.0) GO TO 7040      GTH69000
      IF (MM.EQ.N) GO TO 8000                                           GTH69100
      MM=MM+1                                                           GTH69200
 7040 CONTINUE                                                          GTH69300
      DO 7050 J=M,N                                                     GTH69400
      IF (Z(J).LT.0.) Z(J)=0.0                                          GTH69500
 7050 CONTINUE                                                          GTH69600
      EP=0.0                                                            GTH69700
      ET=0.0                                                            GTH69800
      EPT=0.0                                                           GTH69900
      ETT=0.0                                                           GTH70000
      IF (I.LT.7.OR.I.GT.8) GO TO 7090                                  GTH70100
      DO 7080 J=M,N                                                     GTH70200
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      IF (PP(J).GE.0.) EP=EP+PP(J)                                      GTH70300
      IF (PP(J).GE.0.) ETT=ETT+Z(J)                                     GTH70400
      ET=ET+Z(J)                                                        GTH70500
 7080 CONTINUE                                                          GTH70600
      GO TO 7110                                                        GTH70700
 7090 CONTINUE                                                          GTH70800
      DO7100 J=M,N                                                      GTH70900
      IF(Z(J).LE.0.) GO TO 7100                                         GTH71000
      IF (CEMP(J).GE.0.) EP=EP+CEMP(J)                                  GTH71100
      IF (CEMP(J).GE.0.) ETT=ETT+E(J)                                   GTH71200
      ET=ET+E(J)                                                        GTH71300
 7100 CONTINUE                                                          GTH71400
 7110 CONTINUE                                                          GTH71500
      GO TO (610,620,630,640,650,660,670,680,690,700),I                 GTH71600
  670 DSEDTP=C(01)+C(02)*DPDTH+C(03)*DPDTP+C(04)*DNTDTH+C(05)*DSEDTH    GTH71700
     *       +C(06)*PD                                                  GTH71800
      EPT=DSEDTP*DT                                                     GTH71900
      GO TO 600                                                         GTH72000
  680 DSHDTP=C(07)+C(08)*DPDTH+C(09)*DPDTP+C(10)*DNTDTH+C(11)*DSEDTH    GTH72100
     *       +C(12)*DPNWTH+C(13)*DSHDTH+C(14)*PD                        GTH72200
      EPT=DSHDTP*DT                                                     GTH72300
      GO TO 600                                                         GTH72400
  610 C104TP=C(15)+C(16)*DPDTH +C(17)*DSTDTP+C(18)*DSTDTH               GTH72500
      EPT=C104TP*DT                                                     GTH72600
      GO TO 600                                                         GTH72700
  650 C106TP=C(19)+C(20)*DPDTP +C(21)*DSTDTP                            GTH72800
      EPT=C106TP*DT                                                     GTH72900
      GO TO 600                                                         GTH73000
  620 C107TP=C(22)+C(23)*DPDTH +C(24)*DSTDTP+C(25)*DSTDTH               GTH73100
      EPT=C107TP*DT                                                     GTH73200
      GO TO 600                                                         GTH73300
  660 C109TP=C(26)+C(27)*DPDTH +C(28)*DSTDTP+C(29)*DSTDTH               GTH73400
      EPT=C109TP*DT                                                     GTH73500
      GO TO 600                                                         GTH73600
  630 C111TP=C(30)+C(31)*DSTDTP+C(32)*DSTDTH                            GTH73700
      EPT=C111TP*DT                                                     GTH73800
      GO TO 600                                                         GTH73900
  640 C117TP=C(33)+C(34)*DPDTH + C(35)*DSTDTP+C(36)*C117TH              GTH74000
      EPT=C117TP*DT                                                     GTH74100
      GO TO 600                                                         GTH74200
  690 R=((DSTDTP*DT)+CSERVE)/CSERVE                                     GTH74300
      GO TO 710                                                         GTH74400
  700 R=((DSTDTP*DT)+CSERVE)/CSERVE                                     GTH74500
      GO TO 710                                                         GTH74600
  600 CONTINUE                                                          GTH74700
      R=(EPT+ET-EP)/(ET-ETT)                                            GTH74800
  710 CONTINUE                                                          GTH74900
      DO 7700 J=M,N                                                     GTH75000
      IF(CEMP(J).LT.0.0.AND.E(J).GE.0.0) CEMP(J)=R*E(J)                 GTH75100
      IF (PP(J).LT.0.0.AND.Z(J).GE.0.0) PP(J)=R*Z(J)                    GTH75200
      IF (I.EQ.7.OR.I.EQ.8) GO TO 7700                                  GTH75300
      PPP=PPP+CEMP(J)                                                   GTH75400
 7700 CONTINUE                                                          GTH75500
 8000 CONTINUE                                                          GTH75600
C....                                                                   GTH75700
C     REDUCE CALCULATED SERVICE EMPLOYMENT TO                           GTH75800
C     PROJECTED VALUE, IF REQUIRED                                      GTH75900
C....                                                                   GTH76000
      TSERVP=CSERVE+(DSTDTP*DT)                                         GTH76100
      IF (PPP.LE.TSERVP) GO TO 7950                                     GTH76200
      RP=TSERVP/PPP                                                     GTH76300
      DO 7900 I=1,10                                                    GTH76400
      M=JLOW(I)                                                         GTH76500
      N=IHIH(I)                                                         GTH76600
      IF (I.EQ.7.OR.I.EQ.8) GO TO 7900                                  GTH76700
      DO 7800 J=M,N                                                     GTH76800
      CEMP(J)=RP*CEMP(J)                                                GTH76900
      PP(J)=RP*PP(J)                                                    GTH77000
 7800 CONTINUE                                                          GTH77100
 7900 CONTINUE                                                          GTH77200
 7950 CONTINUE                                                          GTH77300
C....                                                                   GTH77400
C     WRITE COMMERCIAL PROJECTION DATA                                  GTH77500
C....                                                                   GTH77600
      ICOMP=50                                                          GTH77700
      WRITE (IPR) NLIST(2),ICOMP                                        GTH77800
      WRITE (IPR) (PP(I),I=1,ICOMP)                                     GTH77900
C.....                                                                  GTH78000
 9000 CONTINUE                                                          GTH78100
C....                                                                   GTH78200
C....                                                                   GTH78300
C     ******   PUBLIC/UNACCOUNTED SUBMODEL   ******                     GTH78400
C....                                                                   GTH78500
C....                                                                   GTH78600
C.....                                                                  GTH78700
C     WRITE PUBLIC-UNACCOUNTED PROJECTIONS                              GTH78800
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C.....                                                                  GTH78900
      IF (IPUB.EQ.0) GO TO 9500                                         GTH79000
C.....                                                                  GTH79100
C     PROJECT AIRPORT PARAMETER, IF REQUIRED                            GTH79200
C...                                                                    GTH79300
      IF (PUBDUM(33).LE.0.0) GO TO 9700                                 GTH79400
      IF (PUBPAR(3).GT.0.0)  GO TO 9600                                 GTH79500
      PUBPAR(3)=(PUBDUM(33)*POPRO)/PO                                   GTH79600
 9600 CONTINUE                                                          GTH79700
 9700 CONTINUE                                                          GTH79800
      M=150                                                             GTH79900
      WRITE (IPR) NLIST(4),M                                            GTH80000
      WRITE (IPR) (PUBPAR(I),I=1,M)                                     GTH80100
 9500 CONTINUE                                                          GTH80200
C.....                                                                  GTH80300
C     WRITE CITY PROJECTION DATA                                        GTH80400
C.....                                                                  GTH80500
      M=6                                                               GTH80600
      WRITE (IPR) NLIST(1),M                                            GTH80700
      WRITE (IPR) (CITF(I),I=1,M)                                       GTH80800
C.....                                                                  GTH80900
C     WRITE CITY PROJECTION DATA                                        GTH81000
C     WRITE END-OF-DATA FLAG                                            GTH81100
C.....                                                                  GTH81200
      IZERO=0                                                           GTH81300
      WRITE (IPR) NLIST(5),IZERO                                        GTH81400
      RETURN                                                            GTH81500
      END                                                               GTH81600
      SUBROUTINE DISPLY                                                 DIS00100
C     PRINTS OVERALL MUNICIPAL USAGE                                    DIS00200
C     NAMED COMMONS AND VARIABLES TO BE PRINTED BY THE DISPLY ROUTINE   DIS00300
      REAL IGALAV,IGALPK,IGALMX                                         DIS00900
      COMMON/SUMRY/AYR,YEAR(25),ANAV(25),PDAY(25),PHOUR(25)             DIS00400

      COMMON/RESIDL/DUM(4),RQAVE,RQMAX,RQPEK,DISRSD(519)                DIS00500
      COMMON/COMRL/CGALAV,CGALMX,CGALPK,DISCOM(800)                     DIS00600
      COMMON/INDUST/IGALAV,IGALMX,IGALPK,DISIND(2200)                   DIS00700
      COMMON/PUBLC/DUMP(390),TOTPAA,TOTPMD,TOTPPH,DISPUB(153)           DIS00800
      COMMON/IFILE/IN,IO                                                DIS01000
      COMMON/CITDAT/CDUM(16),CIT1(3),CIT2(3),DISCIT(3)                  DIS01100
      COMMON/COMPRN/ICOMPN(4),IPNCH,IDISDM                              DIS01200
      NYR=IFIX(AYR)
      ANNL=RQAVE + CGALAV + IGALAV + TOTPAA                             DIS01300
      DAY=AMAX1 (ANNL+RQMAX-RQAVE,                                      DIS01400
     2           ANNL+CGALMX-CGALAV,                                    DIS01500
     3           ANNL+IGALMX-IGALAV,                                    DIS01600
     4           ANNL+TOTPMD-TOTPAA)                                    DIS01700
C.....                                                                  DIS01800
      HOUR=AMAX1 (ANNL+RQPEK-RQAVE,                                     DIS01900
     2           ANNL+CGALPK-CGALAV,                                    DIS02000
     3           ANNL+IGALPK-IGALAV,                                    DIS02100
     4           ANNL+TOTPPH-TOTPAA)                                    DIS02200
C.....                                                                  DIS02300
      NYR=NYR+1                                                         DIS02400
      YEAR(NYR)=CDUM(11)                                                DIS02500
      ANAV(NYR)=ANNL                                                    DIS02600
      PDAY(NYR)=DAY                                                     DIS02700
      PHOUR(NYR)=HOUR                                                   DIS02800
      AYR=FLOAT(NYR)
C.....                                                                  DIS02900
      WRITE(IO,10) CIT1,CIT2                                            DIS03000
   10 FORMAT (1H1,20X,52HSUMMARY OF MUNICIPAL WATER REQUIREMENTS FOR CITDIS03100
     *Y OF , 6A4)                                                       DIS03200
      WRITE (IO,15)CDUM(11)                                             DIS03300
   15 FORMAT (//39X,37HESTIMATED WATER REQUIREMENTS FOR YEAR,F6.0)      DIS03400
      WRITE(IO,20)                                                      DIS03500
   20 FORMAT (45X,31H(ALL VALUES IN GALLONS PER DAY)//)                 DIS03600
      WRITE(IO,40)                                                      DIS03700
   40 FORMAT(/48X,6HANNUAL,9X,7HMAXIMUM,11X,4HPEAK)                     DIS03800
      WRITE(IO,50)                                                      DIS03900
   50 FORMAT(47X,7HAVERAGE,10X,5HDAILY,11X,6HHOURLY)                    DIS04000
C     CURRENT MUNICIPAL USAGE BY CALCULATION                            DIS04100
      WRITE(IO,55) ANNL,DAY,HOUR                                        DIS04200
   55 FORMAT(//26X,9HMUNICIPAL,F20.0,2F16.0)                            DIS04300
C     RESIDENTIAL CURRENT USAGE                                         DIS04400
      WRITE(IO,60) RQAVE,RQMAX,RQPEK                                    DIS04500
   60 FORMAT(/26X,11HRESIDENTIAL,F18.0,2F16.0)                          DIS04600
C     COMMERCIAL CURRENT USAGE                                          DIS04700
      WRITE(IO,65) CGALAV,CGALMX,CGALPK                                 DIS04800
   65 FORMAT(/26X,10HCOMMERCIAL,F19.0,2F16.0)                           DIS04900
C     INDUSTRIAL CURRENT USAGE                                          DIS05000
      WRITE(IO,70) IGALAV,IGALMX,IGALPK                                 DIS05100
   70 FORMAT(/26X,10HINDUSTRIAL,F19.0,2F16.0)                           DIS05200
C     PUBLIC CURRENT USAGE                                              DIS05300
      WRITE(IO,75) TOTPAA,TOTPMD,TOTPPH                                 DIS05400
   75 FORMAT(/26X,17HPUBLIC AND UNACC.,F12.0,2F16.0)                    DIS05500
      IF (IPNCH.LT.0) RETURN                                            DIS05600
      CALL PUNCH (IPNCH,CDUM(11))                                       DIS05700
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      RETURN                                                            DIS05800
      END                                                               DIS05900
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      SUBROUTINE SUMARY                                                 SUM00100
C.....                                                                  SUM00200
C.....                                                                  SUM00300
C     THIS SUBROUTINE PREPARES THE SUMMARY REPORT FOR THE PROJECTED     SUM00400
C     MUNICIPAL WATER REQUIREMENTS FOR THE CITY UNDER STUDY.            SUM00500
C.....                                                                  SUM00600
C.....                                                                  SUM00700
      COMMON/SUMRY/AYR,Y(25),A(25),D(25),H(25)                          SUM00800
      COMMON/CITDAT/COUM(16),CIT(6),SUMCIT(3)                           SUM00900
      COMMON/IFILE/IN,IO                                                SUM01000
C.....                                                                  SUM01100
      N=IFIX(AYR)
      IF (N.EQ.1) RETURN                                                SUM01200
C.....                                                                  SUM01300
      WRITE (IO,5)                                                      SUM01400
    5 FORMAT (1H1)                                                      SUM01500
      WRITE (IO,10)                                                     SUM01600
   10 FORMAT (///40X,40H****************************************,40X)   SUM01700
      WRITE(IO,15)                                                      SUM01800
      WRITE(IO,15)                                                      SUM01900
   15 FORMAT(40X,1H*,38X,1H*,40X)                                       SUM02000
      WRITE (IO,20)                                                     SUM02100
   20 FORMAT (40X,40H*  _M A I N     I I      S Y S T E M   *,40X)      SUM02200
      WRITE(IO,15)                                                      SUM02300
      WRITE(IO,15)                                                      SUM02400
      WRITE (IO,25)                                                     SUM02500
   25 FORMAT(40X,40H****************************************,40X)      SUM02600
      WRITE (IO,30)                                                     SUM02700
   30 FORMAT (///35X,49HSUMMARY OF PROJECTED MUNICIPAL WATER REQUIREMENTSUM02800
     1S,36X)                                                            SUM02900
      WRITE (IO,40)                                                     SUM03000
   40 FORMAT (/54X,11HFOR CITY OF,35X)                                  SUM03100
      WRITE (IO,50) CIT                                                 SUM03200
   50 FORMAT (/48X,6A4,48X)                                             SUM03300
      WRITE (IO,60)                                                     SUM03400
   60 FORMAT (//10X,99H.....GALLONSSUM03500
     1 PER DAY.....,11X)                                                SUM03600
      WRITE (IO,70)                                                     SUM03700
   70 FORMAT (10X,1H.,12X,1H.,12X,1H.,23X,1H.,23X,1H.,23X,1H.,11X)      SUM03800
      WRITE (IO,80)                                                     SUM03900
   80 FORMAT (10X,1H.,3X,3HRUN,6X,1H.,12X,1H.,9X,4HMEAN,10X,1H.,10X,3HMASUM04000
     1X,10X,1H.,9X,4HPEAK,10X,1H.,11X)                                  SUM04100
      WRITE (IO,90)                                                     SUM04200
   90 FORMAT (10X,1H.,3X,3HNO.,6X,1H.,4X,4HYEAR,4X,1H.,8X,6HANNUAL,9X,  SUM04300
     11H.,10X,3HDAY,10X,1H.,9X,4HHOUR,10X,1H.,11X)                      SUM04400
      WRITE (IO,100)                                                    SUM04500
  100 FORMAT (10X,99H.....SUM04600
     1.....,11X)                                                        SUM04700
  110 CONTINUE                                                          SUM04800
      DO 200 I=1,N                                                      SUM04900
      IYER=IFIX(Y(I))                                                   SUM05000
      WRITE (IO,150) I,IYER,A(I),D(I),H(I)                              SUM05100

  150 FORMAT (14X,I2,12X,I4,1X,3(F20.0,4X),25X)                         SUM05200
  200 CONTINUE                                                          SUM05300
      RETURN                                                            SUM05400
      END                                                               SUM05500
      SUBROUTINE INDSTL                                                 IND00100
C     SUBROUTINE TO COMPUTE INDUSTRIAL WATER USAGE                      IND00200
      REAL IGALAV,IGALMX,IGALPK,IUSEAV,ILABL                            IND00300
     1 ,IUSEMX,IUSEPK,IPARAM,IQAVE,IQMAX,IQPEK                          IND00400
      COMMON/INDUST/IGALAV,IGALMX,IGALPK,ILABL(800),IUSEAV(200),        IND00500
     2              IUSEMX(200),IUSEPK(200),IPARAM(200),                IND00600
     3              IQAVE(200),IQMAX(200),IQPEK(200)                    IND00700
C     COMPUTES CURRENT VALUES OF ANNUAL AVERAGE, MAX DAY, AND PEAK      IND00800
C        HOUR, RESPECTIVELY                                             IND00900
      CALL INITL (IQAVE,600,0.0)                                        IND01000
      IGALAV=0.                                                         IND01100
      IGALMX=0.                                                         IND01200
      IGALPK=0.                                                         IND01300
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      DO 3000  I=1,200                                                  IND01400
      IQAVE(I) = IUSEAV(I) * IPARAM(I)                                  IND01500
      IQMAX(I) = IUSEMX(I) * IPARAM(I)                                  IND01600
      IQPEK(I) = IUSEPK(I) * IPARAM(I)                                  IND01700
      IGALAV = IGALAV + IQAVE(I)                                        IND01800
      IGALMX = IGALMX + IQMAX(I)                                        IND01900
      IGALPK = IGALPK + IQPEK(I)                                        IND02000
 3000 CONTINUE                                                          IND02100
      CALL IDSPLY                                                       IND02200
      RETURN                                                            IND02300
      END                                                               IND02400
      SUBROUTINE PUNCH (IPNCH,ADAT)                                     PCH00100
      REAL INDX
      REAL INDUST,LAB(200)                                              PCH00200
      DIMENSION PNCHLB(28),INDX(10),ILAB(200),CMLB(32),DAT(200)         PCH00800
      COMMON/RESIDL/RESIDL(523),PCHRSD(3)                               PCH00300
      COMMON/RESPAR/RESPAR(800),PCHRSP(12)                              PCH00400
      COMMON/COMMRL/COMMRL(803)                                         PCH00500
      COMMON/PUBLC/PUBLC(393),PCHPUB(153)                               PCH00700
      COMMON/INDUST/INDUST(1403),PCHIND(700)                            PCH00600
      DATA INDX/2HFP,2HFW,2HMP,2HMW,1HC,1HI,1HP,1HA,1HM,1HP/            PCH01000
      DATA PNCHLB/4HFLTS,4HMETS,4HEPUS,4HEWUS,4HCOMM,4HAVEQ,4HAXQ ,     PCH01100
     1            4HPEKQ,4HINDA,4HVEGQ,4HINDM,4HAXMQ,4HINDP,4HEAKQ,     PCH01200
     2            4HPUBL,4HICAA,4HICMD,4HICPH,4HQDOM,4HQSAV,4HQSMX,     PCH01300
     3            4HQPEK,4HNUMB,4HLOSS,4HFREE,4HAIRP,4HENDD,4H    /     PCH01400
      DATA CMLB/4HC001,4HC002,4HC003,4HC004,4HC005,4HC006,4HC007,4HC008,PCH01500
     1          4HC009,4HC010,4HC011,4HC012,4HC013,4HC014,4HC015,4HC016,PCH01600
     2          4HC017,4HC018,4HC019,4HC020,4HC021,4HC022,4HC023,4HC024,PCH01700
     3          4HC025,4HC026,4HC027,4HC028,4HC029,4HC030,4HC031,4HC032/PCH01800
C....                                                                   PCH01900
C....                                                                   PCH02000
C     THIS ROUTINE PUNCHES OUTPUT DATA FOR EACH OF                      PCH02100
C     THE FOUR RESIDENTIAL CATEGORIES                                   PCH02200
C....                                                                   PCH02300
C....                                                                   PCH02400
      IDAT=IFIX(ADAT)
      II=-25                                                            PCH02600
      III=-102                                                          PCH02700
      DO 500 I=1,4                                                      PCH02800
      II=II+200                                                         PCH02900
      III=III+125                                                       PCH03000
      IF (RESPAR(II+1).LE.0.0) GO TO 500                                PCH03100
      J=((I-1)/2)+1                                                     PCH03200
      K=I-((I+1)/2)*2+4                                                 PCH03300
      IS=1                                                              PCH03400
      WRITE(IPNCH,1)PNCHLB(J),PNCHLB(K),IDAT,INDX(I),IDAT,IS            PCH03500
      DO 100 L=1,25                                                     PCH03600
      ILL=II+L                                                          PCH03700
      IL=III+L                                                          PCH03800
      QSMX=RESIDL(IL+75)-RESIDL(IL)                                     PCH03900
      IS=IS+1                                                           PCH04000
      WRITE(IPNCH,3)PNCHLB(19),RESIDL(IL),PNCHLB(20),RESIDL(IL+25),     PCH04100
     1         PNCHLB(21),QSMX,INDX(I),IDAT,IS                          PCH04200
      IS=IS+1                                                           PCH04300
      WRITE(IPNCH,8)PNCHLB(22),RESIDL(IL+100),PNCHLB(23),RESPAR(ILL),   PCH04400
     1         INDX(I),IDAT,IS                                          PCH04500
      IF (RESPAR(ILL+1).LE.0.0) GO TO 200                               PCH04600
  100 CONTINUE                                                          PCH04700
  200 CONTINUE                                                          PCH04800
      WRITE(IPNCH,1)PNCHLB(27)                                          PCH04900
  500 CONTINUE                                                          PCH05000
C....                                                                   PCH05100
C....                                                                   PCH05200
C     THIS ROUTINE PUNCHES OUTPUT DATA FOR                              PCH05300
C     THE COMMERCIAL/INSTITUTIONAL SECTOR                               PCH05400
C....                                                                   PCH05500
C....                                                                   PCH05600
 1000 CONTINUE                                                          PCH05700
      IF (COMMRL(1).LE.0.0) GO TO 2000                                  PCH05800
      I=3                                                               PCH05900
      DO 1600 J=1,3                                                     PCH06000
      II=603+J*50                                                       PCH06100
      IS=1                                                              PCH06200
      WRITE(IPNCH,2)PNCHLB(5),PNCHLB(J+5),IDAT,INDX(5),INDX(J+7),IDAT,ISPCH06300
      M=0                                                               PCH06400
      DO 1100 K=1,50                                                    PCH06500
      IK=I+K                                                            PCH06600
      IIK=II+K                                                          PCH06700
      IF (COMMRL(IIK).LE.0.0) GO TO 1100                                PCH06800
      M=M+1                                                             PCH06900
      DAT(M)=COMMRL(IIK)                                                PCH07000
      IF (K.GT.28) GO TO 1050                                           PCH07100
      LAB(M)=COMMRL(IK)                                                 PCH07200
      GO TO 1100                                                        PCH07300
 1050 CONTINUE                                                          PCH07400
      LAB(M)=CMLB(K-28)                                                 PCH07500
 1100 CONTINUE                                                          PCH07600
      MM=M-(M/3)*3                                                      PCH07700
      IF (MM-1) 1400,1200,1300                                          PCH07800
 1200 CONTINUE                                                          PCH07900
      DAT(M+2)=0.                                                       PCH08000
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      LAB(M+2)=PNCHLB(28)                                                PCH08100
 1300 CONTINUE                                                           PCH08200
      DAT(M+1)=0.                                                        PCH08300
      LAB(M+1)=PNCHLB(28)                                                PCH08400
 1400 CONTINUE                                                           PCH08500
      DO 1500 L=1,M,3                                                    PCH08600
      IS=IS+1                                                            PCH08700
      WRITE(IPNCH,4)LAB(L),DAT(L),LAB(L+1),DAT(L+1),LAB(L+2),DAT(L+2),   PCH08800
     1         INDX(5),INDX(J+7),IDAT,IS                                 PCH08900
 1500 CONTINUE                                                           PCH09000
      WRITE(IPNCH,1)PNCHLB(27)                                           PCH09100
 1600 CONTINUE                                                           PCH09200
C....                                                                    PCH09300
C....                                                                    PCH09400
C     THIS ROUTINE PUNCHES OUTPUT DATA FOR                               PCH09500
C     THE INDUSTRIAL SECTOR                                              PCH09600
C....                                                                    PCH09700
C....                                                                    PCH09800
 2000 CONTINUE                                                           PCH09900
      IF (INDUST(1).LE.0.0) GO TO 3000                                   PCH10000
      I=1403                                                             PCH10100
      DO 2500 J=1,3                                                      PCH10200
      II=I+J*200                                                         PCH10300
      IS=1                                                               PCH10400
      JJ=2*J                                                             PCH10500
      WRITE(IPNCH,2)PNCHLB(JJ+7),PNCHLB(JJ+8),IDAT,INDX(6),INDX(J+7),    PCH10600
     1         IDAT,IS                                                   PCH10700
      M=0                                                                PCH10800
      DO 2100 K=1,200                                                    PCH10900
      IIK=II+K                                                           PCH11000
      IF (INDUST(IIK).LE.0.) GO TO 2100                                  PCH11100
      M=M+1                                                              PCH11200
      DAT(M)=INDUST(IIK)                                                 PCH11300
      ILAB(M)=K+199                                                      PCH11400
 2100 CONTINUE                                                           PCH11500
      IM=(M/3)*3                                                         PCH11600
      MM=M-IM                                                            PCH11700
      DO 2200 L=1,IM,3                                                   PCH11800
      IS=IS+1                                                            PCH11900
      WRITE(IPNCH,5)INDX(6),ILAB(L),DAT(L),INDX(6),ILAB(L+1),DAT(L+1),   PCH12000
     1         INDX(6),ILAB(L+2),DAT(L+2),INDX(6),INDX(J+7),IDAT,IS      PCH12100
 2200 CONTINUE                                                           PCH12200
      IF (MM-1) 2450,2400,2300                                           PCH12300
 2300 CONTINUE                                                           PCH12400
      IS=IS+1                                                            PCH12500
      WRITE(IPNCH,6)INDX(6),ILAB(IM+1),DAT(IM+1),INDX(6),ILAB(IM+2),     PCH12600
     1         DAT(IM+2),INDX(6),INDX(J+7),IDAT,IS                       PCH12700
      GO TO 2450                                                         PCH12800
 2400 CONTINUE                                                           PCH12900
      IS=IS+1                                                            PCH13000
      WRITE(IPNCH,7)INDX(6),ILAB(IM+1),DAT(IM+1),INDX(6),INDX(J+7),      PCH13100
     2         IDAT,IS                                                   PCH13200
 2450 CONTINUE                                                           PCH13300
      WRITE(IPNCH,1)PNCHLB(27)                                           PCH13400
 2500 CONTINUE                                                           PCH13500
C....                                                                    PCH13600
C....                                                                    PCH13700
C     THIS ROUTINE PUNCHES OUTPUT DATA FOR                               PCH13800
C     THE PUBLIC/UNACCOUNTED SECTOR                                      PCH13900
C....                                                                    PCH14000
C....                                                                    PCH14100
 3000 CONTINUE                                                           PCH14200
      IF (PUBLC(391).LE.0.0) GO TO 4000                                  PCH14300
      I=60                                                               PCH14400
      DO 3500 J=1,3                                                      PCH14500
      II=I+J*30                                                          PCH14600
      IS=1                                                               PCH14700
      WRITE(IPNCH,2)PNCHLB(15),PNCHLB(J+15),IDAT,INDX(7),INDX(J+7),IDAT, PCH14800
     1         IS                                                        PCH14900
      IS=IS+1                                                            PCH15000
      WRITE(IPNCH,4)PNCHLB(24),PUBLC(II+1),PNCHLB(25),PUBLC(II+2),       PCH15100
     1         PNCHLB(26),PUBLC(II+3),INDX(7),INDX(J+7),IDAT,IS          PCH15200
      WRITE(IPNCH,1)PNCHLB(27)                                           PCH15300
 3500 CONTINUE                                                           PCH15400
 4000 CONTINUE                                                           PCH15500
      RETURN                                                             PCH15600
    1 FORMAT(1X,2A4,1X,I4,58X,A2,I4,I2)                                  PCH15700
    2 FORMAT(1X,2A4,1X,I4,58X,2A1,I4,I2)                                 PCH15800
    3 FORMAT(3(1X,A4,1X,F12.0,4X),6X,A2,I4,I2)                           PCH15900
    4 FORMAT(3(1X,A4,1X,F12.0,4X),6X,2A1,I4,I2)                          PCH16000
    5 FORMAT(3(1X,A1,I3 ,1X,F12.0,4X),6X,2A1,I4,I2)                      PCH16100
    6 FORMAT(2(1X,A1,I3,1X,F12.0,4X),28X,2A1,I4,I2)                      PCH16200
    7 FORMAT(1X,A1,I3,1X,F12.0,54X,2A1,I4,I2)                            PCH16300
    8 FORMAT(2(1X,A4,1X,F12.0,4X),28X,A2,I4,I2)                          PCH16400
      END                                                                PCH16500
      SUBROUTINE UNPACK (IT,AN,I,J,K)                                    UNP00100
C                                                                        UNP00200
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C....UNPACK RIGHT-MOST THREE DIGITS FROM WORD (NN)                      UNP00300
C  THESE DIGITS WILL BE CONVERTED TO INTEGER VARIABLES                  UNP00400
C  I, J, K, RESPECTIVELY.   THIS ROUTINE HAS BEEN                       UNP00500
C  REWRITTEN TO BE MACHINE INDEPENDENT AND REQUIRES THE                 UNP00600
C  ASSIGNMENT OF AN ADDITIONAL AUXILIARY STORAGE DEVICE                 UNP00700
C  (MACH) IN THE INPUT DECK.  IF THIS ASSIGNMENT IS NOT                 UNP00800
C  MADE, THE UNIT ASSIGNMENT IS TAKEN AS DEVICE 3.                      UNP00900
C  THIS DEVICE IS REFERED TO AS (IPK) IN THIS SUBROUTINE.               UNP01000
      INTEGER ITEST(10)                                                 UNP01200
      COMMON/COMPRN/IPK,IUNPDM(5)                                       UNP01100
      DATA ITEST/1H0,1H1,1H2,1H3,1H4,1H5,1H6,1H7,1H8,1H9/               UNP01300
C                                                                       UNP01400
C    CHANGE (IPK) ASSIGNMENT TO VALUE INPUT, IF ANY                     UNP01500
C                                                                       UNP01600
C
C
C.....IF THE MACHINE THAT IS USED HAS A FASTER METHOD OF UNPACKING THESE
C.....NUMBER, USING MACHINE INDEPENDENT FUNCTION, THEN THIS SUBROUTINE
C.....SHOULD BE REWRITTEN TO SPEED UP CALCULATION, MACH SHOULD NOT BE
C.....ASSIGN TO A DUMMY STORAGE DEVICE, SINCE THEN IT WILL BE UNNECESARY
C...
C
      IF (IT.EQ.0) GO TO 3                                              UNP01700
      IT = 0
    3 CONTINUE                                                          UNP02000
C                                                                       UNP02100
C    WRITE WORD (AN) TO STORAGE AND REREAD                              UNP02200
C                                                                       UNP02300
      REWIND IPK                                                        UNP02400
      WRITE (IPK,1) AN                                                  UNP02500
      REWIND IPK                                                        UNP02600
      READ (IPK,2) IX,JX,KX                                             UNP02700
C                                                                       UNP02800
C    TEST FOR VALID INTEGERS IN IX, JX, KX                              UNP02900
C                                                                       UNP03000
      I = 10                                                            UNP03100
      J = 10                                                            UNP03200
      K = 10                                                            UNP03300
      DO 10 II = 1,10                                                   UNP03400
      IF (IX.NE.ITEST(II)) GO TO 8                                      UNP03500
      I = II-1                                                          UNP03600
    8 IF (JX.NE.ITEST(II)) GO TO 9                                      UNP03700
      J = II-1                                                          UNP03800
    9 IF (KX.NE.ITEST(II)) GO TO 10                                     UNP03900
      K = II-1                                                          UNP04000
   10 CONTINUE                                                          UNP04100
C                                                                       UNP04200
C     TEST FOR ERRORS IN INTEGERS                                       UNP04300
C                                                                       UNP04400
      IF (I.GT.9.OR.J.GT.9.OR.K.GT.9) IT = 1                            UNP04500
      RETURN                                                            UNP04600
    1 FORMAT (1X,A4)                                                    UNP04700
    2 FORMAT (2X,3A1)                                                   UNP04800
      END                                                               UNP04900
      SUBROUTINE RESDNT                                                 RES00100
C     SUBROUTINE TO COMPUTE RESIDENTIAL WATER USAGE                     RES00200
C     VARIOUS NAMES AND ARRAYS ARE DEFINED AS FOLLOWS                   RES00300
C          RESCON= ARRAY CONTAINING RESIDENTIAL CONSTANTS               RES00400
      REAL MSPVLL,MSPVLU,MSPASM,MSPAPR,MSPSPR,MSPDEN,MSPPEP,MSPNUM      RES00900
      REAL MSWVLL,MSWVLU,MSWASM,MSWAPR,MSWSPR,MSWDEN,MSWPEP,MSWNUM      RES01000
      COMMON/CITDAT/CITDAT(22),RESCIT(3)                                RES00500
      COMMON /RESCON/ EQ1(6),EQ2(6),EQ3(6),EQ4(6),EQ5(6),EQ6(6),EQ7(6), RES00600
     1  EQ8(6),EQ9(6),EQ10(6),EQ11(6),EQ12(6),EQ13(6),EQ14(6),EQ15(6),  RES00700
     2 EQ16(6)                                                          RES00800
      COMMON /RESPAR/ FSPVLL(25),FSPVLU(25),FSPASM(25),FSPAPR(25),      RES01100
     1FSPSPR(25),FSPDEN(25),FSPPEP(25),FSPNUM(25),FSWVLL(25),FSWVLU(25),RES01200
     2FSWASM(25),FSWAPR(25),FSWSPR(25),FSWDEN(25),FSWPEP(25),FSWNUM(25),RES01300
     3MSPVLL(25),MSPVLU(25),MSPASM(25),MSPAPR(25),MSPSPR(25),MSPDEN(25),RES01400
     4MSPPEP(25),MSPNUM(25),MSWVLL(25),MSWVLU(25),MSWASM(25),MSWAPR(25),RES01500
     5MSWSPR(25),MSWDEN(25),MSWPEP(25),MSWNUM(25),RESRSP(12)            RES01600
      COMMON /RESIDL/ EVAPSM,RAINSM,EVAPMX,EVAPNT,RQAVE,RQMAX,RQPEK,    RES01700
     1                RFPNUM,RQFPDM,RQFPSP,RQFPTL,RFWNUM,RQFWDM,        RES01800
     2 RQFWSP,RQFWTL,RMPNUM,RQMPDM,RQMPSP,RQMPTL,RMWNUM,RQMWDM,RQMWSP,  RES01900
     3RQMWTL,QFPDOM(25),QFPSPK(25),QFPTOT(25),QFPMAX(25),QFPPEK(25),    RES02000
     4QFWDOM(25),QFWSPK(25),QFWTOT(25),QFWMAX(25),QFWPEK(25),QMPDOM(25),RES02100
     5QMPSPK(25),QMPTOT(25),QMPMAX(25),QMPPEK(25),QMWDOM(25),QMWSPK(25),RES02200
     6QMWTOT(25),QMWMAX(25),QMWPEK(25),RESRSD(3)                        RES02300
      EQUIVALENCE (WEST,ELONG),(CLONG,CITDAT(3))                        RES02400
      CALL INITL (RQAVE,519,0.0)                                        RES02500
      ELONG=100.
C     COMPUTES CURRENT METERED AND SEWERED VALUES                       RES02700
      DO 500  I=1,25                                                    RES02800
      IF (MSWNUM(I).LE.0.) GO TO 300                                    RES02900
      VALU = (MSWVLU(I) + MSWVLL(I)) / (2000.0*MSWASM(I))               RES03000
      QMWDOM(I) = (EQ1(1) + EQ1(2)*VALU + EQ1(3)*MSWAPR(I))*MSWNUM(I)   RES03100
      IF (CLONG .GE. WEST)  GO TO 100                                   RES03200
      B = EQ1(1)*MSWDEN(I)**EQ10(2)                                     RES03300
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      QMWSPK(I) = (EQ6(1)*EQ6(2)*(B**EQ6(3))*(EVAPNT**EQ6(4))*(MSWSPR(I)RES03400
     1 **EQ6(5))*(VALU**EQ6(6)))*MSWNUM(I)                              RES03500
      QMWMAX(I) = (EQ12(1)*(B**EQ12(2))*(EVAPMX**EQ12(3))*(MSWSPR(I)   RES03600
     1 **EQ12(4))*(VALU**EQ12(5)))*MSWNUM(I)                            RES03700
      GO TO 200                                                         RES03800
  100 QMWSPK(I) = (EQ5(1)*EQ5(2)*(MSWSPR(I)**EQ5(3))*(VALU**EQ5(4)))   RES03900
     1 *MSWNUM(I)                                                       RES04000
      QMWMAX(I) = (EQ11(1)*(EVAPMX**EQ11(2))*(VALU**EQ11(3)))*MSWNUM(I) RES04100
  200 QMWTOT(I) = QMWDOM(I) + QMWSPK(I)                                 RES04200
      QMWMAX(I) = QMWMAX(I) + QMWDOM(I)                                 RES04300
      QMWPEK(I) = EQ16(1)*MSWNUM(I) + EQ16(2)*QMWMAX(I)                 RES04400
      RMWNUM = RMWNUM + MSWNUM(I)                                       RES04500
      RQMWDM = RQMWDM + QMWDOM(I)                                       RES04600
      RQMWSP = RQMWSP + QMWSPK(I)                                       RES04700
      RQMWTL = RQMWTL + QMWTOT(I)                                       RES04800
  300 CONTINUE                                                          RES04900
C     COMPUTES CURRENT FLAT RATE AND SEWERED VALUES                     RES05000
      IF (FSWNUM(I).LE.0.) GO TO 400                                    RES05100
      VALU = (FSWVLU(I) + FSWVLL(I)) / (2000.0*FSWASM(I))               RES05200
      QFWDOM(I) = (EQ2(1)+EQ2(2)*VALU+EQ2(3)*FSWPEP(I))*FSWNUM(I)       RES05300
      QFWSPK(I) = (EQ7(1)*EQ7(2)*(VALU**EQ7(3)))*FSWNUM(I)              RES05400
      B = EQ10(1)*(FSWDEN(I)**EQ10(2))                                  RES05500
      QFWMAX(I) = (EQ13(1)*(B**EQ13(2))*(VALU**EQ13(3)))*FSWNUM(I)      RES05600
      QFWTOT(I) = QFWSPK(I) + QFWDOM(I)                                 RES05700
      QFWMAX(I) = QFWMAX(I) + QFWDOM(I)                                 RES05800
      QFWPEK(I) = EQ16(1)*FSWNUM(I)+EQ16(2)*QFWMAX(I)                   RES05900
       RFWNUM = RFWNUM + FSWNUM(I)                                      RES06000
      RQFWDM = RQFWDM + QFWDOM(I)                                       RES06100
      RQFWSP = RQFWSP + QFWSPK(I)                                       RES06200
      RQFWTL = RQFWTL + QFWTOT(I)                                       RES06300
  400 CONTINUE                                                          RES06400
C     COMPUTES CURRENT METERED AND SEPTIC TANK VALUES                   RES06500
      IF (MSPNUM(I).LE.0.) GO TO 450                                    RES06600
      VALU = (MSPVLU(I) + MSPVLL(I)) / (2000.0*MSPASM(I))               RES06700
      QMPDOM(I) = (EQ3(1) + EQ3(2)*MSPPEP(I))*MSPNUM(I)                 RES06800
      B = EQ10(1)*(MSPDEN(I)**EQ10(2))                                  RES06900
      QMPSPK(I) = (EQ8(1)*EQ8(2)*(B**EQ8(3))*(EVAPNT**EQ8(4))           RES07000
     1*(MSPSPR(I)**EQ8(5))*(VALU**EQ8(6)))*MSPNUM(I)                    RES07100
      QMPMAX(I) = (EQ14(1)*(B**EQ14(2))*(EVAPMX**EQ14(3))*(MSPSPR(I)    RES07200
     1 **EQ14(4))*(VALU**EQ14(5)))*MSPNUM(I)                            RES07300
      QMPTOT(I) = QMPSPK(I) + QMPDOM(I)                                 RES07400
      QMPMAX(I) = QMPMAX(I) + QMPDOM(I)                                 RES07500
       QMPPEK(I) = EQ16(1)*MSPNUM(I)+EQ16(2)*QMPMAX(I)                  RES07600
       RMPNUM = RMPNUM + MSPNUM(I)                                      RES07700
       RQMPDM = RQMPDM + QMPDOM(I)                                      RES07800
       RQMPSP = RQMPSP + QMPSPK(I)                                      RES07900
       RQMPTL = RQMPTL + QMPTOT(I)                                      RES08000
  450 CONTINUE                                                          RES08100
C     COMPUTES CURRENT FLAT RATE AND SEPTIC TANK VALUES                 RES08200
      IF (FSPNUM(I).LE.0.) GO TO 475                                    RES08300
      VALU = (FSPVLU(I) + FSPVLL(I)) / (2000.0*FSPASM(I))               RES08400
      QFPDOM(I) = (EQ4(1) + EQ4(2)*FSPPEP(I))*FSPNUM(I)                 RES08500
      B = EQ10(1)*FSPDEN(I)**EQ10(2)                                    RES08600
      QFPSPK(I) = (EQ9(1)*EQ9(2)*(VALU**EQ9(3)))* FSPNUM(I)             RES08700
      QFPMAX(I) = (EQ15(1)*(B**EQ15(2))*(VALU**EQ15(3)))*FSPNUM(I)      RES08800
      QFPTOT(I) = QFPSPK(I) + QFPDOM(I)                                 RES08900
      QFPMAX(I) = QFPMAX(I) + QFPDOM(I)                                 RES09000
      QFPPEK(I) = EQ16(1)*FSPNUM(I) +EQ16(2)*QFPMAX(I)                  RES09100
      RFPNUM = RFPNUM + FSPNUM(I)                                       RES09200
      RQFPDM = RQFPDM + QFPDOM(I)                                       RES09300
      RQFPSP = RQFPSP + QFPSPK(I)                                       RES09400
      RQFPTL = RQFPTL + QFPTOT(I)                                       RES09500
  475 CONTINUE                                                          RES09600
      RQMAX = RQMAX + QMPMAX(I)+QFPMAX(I)+QMWMAX(I)+QFWMAX(I)           RES09700
      RQPEK = RQPEK + QMPPEK(I)+QFPPEK(I)+QMWPEK(I)+QFWPEK(I)           RES09800
  500 CONTINUE                                                          RES09900
      RQAVE = RQMPTL + RQFPTL + RQMWTL + RQFWTL                         RES10000
C.....                                                                  RES10100
C     WHEN CURRENT AND FUTURE DATES ARE THE SAME DISPLAY CURRENT VALUES.RES10200
C.....                                                                  RES10300
      J=1                                                               RES10400
      IF (CITDAT(1).EQ.CITDAT(11))J=0                                   RES10500
      CALL RDSPLY (J)                                                   RES10600
C.....                                                                  RES10700
      RETURN                                                            RES10800
      END                                                               RES10900
      SUBROUTINE COMMER                                                 COM00100
C     THE COMMER SUBROUTINE COMPUTES CURRENT AND/OR PREDICTED COMMERCIALCOM00200
C       WATER CONSUMPTION FOR EACH TYPE OF COMMERCIAL ESTABLISHMENT AND COM00300
C       THE TOTAL FOR THE CITY.                                         COM00400
C     THE VARIABLE NAMES USED IN THIS SUBROUTINE ARE DEFINED AS FOLLOWS COM00500
C         CUSEAV IS THE AVERAGE ANNUAL USAGE COEFFICIENT FOR THE        COM00600
C            COMMERCIAL ESTABLISHMENT.                                  COM00700
C         CUSEMX IS THE MAXIMUM DAILY USAGE COEFFICIENT FOR THE         COM00800
C            COMMERCIAL ESTABLISHMENT.                                  COM00900
C         CUSEPK IS THE PEAK HOURLY USAGE COEFFICIENT FOR THE COMMERCIALCOM01000
C            ESTABLISHMENT.                                             COM01100
C         CUNIT IS THE UNIT FOR THE PARAMETER THAT BEST CORRELATES THE  COM01200
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C           WATER CONSUMPTION OF THE COMMERCIAL ESTABLISHMENT.  EXAMPLE COM01300
C           FOR SCHOOLS AND COLLEGES THE UNIT IS STUDENT.              COM01400
C         CPARAM IS THE NUMERIC VALUE FOR THE PARAMETER THAT BEST      COM01500
C           CORRELATES THE WATER CONSUMPTION OF THE COMMERCIAL         COM01600
C           ESTABLISHMENT.  EXAMPLE, FOR SCHOOLS AND COLLEGES THE      COM01700
C           PARAMETER IS THE NUMBER OF STUDENTS.                       COM01800
C         CGALAV IS THE TOTAL ANNUAL AVERAGE GALLONS OF WATER CONSUMED COM01900
C           BY THE COMMERCIAL SECTOR OF THE CITY.                      COM02000
C         CGALMX IS THE TOTAL MAXIMUM DAILY GALLONS CONSUMED BY THE    COM02100
C           COMMERCIAL SECTOR OF THE CITY.                             COM02200
C         CGALPK IS THE TOTAL PEAK HOURLY GALLONS CONSUMED BY THE      COM02300
C           COMMERCIAL SECTOR OF THE CITY.                             COM02400
      COMMON/COMMRL/CGALAV,CGALMX,CGALPK,CNAME(50),CUSEAV(50),CUSEMX(50)COM02600
     2 ,CUSEPK(50) ,CLABEL(200),CUNIT(200),CPARAM(50),CQAV(50),CQMX(50),COM02700
     3             CQPK(50)                                            COM02800
C     DETERMINES IF THE CURRENT COMMERCIAL WATER CONSUMPTION IS TO BE   COM03100
C       COMPUTED                                                        COM03200
C     INITIALIZE THE DUMMY VARIABLES TO COMPUTE CURRENT COMMERCIAL WATERCOM03300
C       CONSUMPTION                                                     COM03400
      CALL INITL (CQAV,150,0.0)                                         COM03500
      CGALAV=0.                                                         COM03600
      CGALMX=0.                                                         COM03700
      CGALPK=0.                                                         COM03800
      DO 800 I=1,50                                                     COM03900
      IF (CPARAM(I)-0.) 800,800,785                                     COM04000
  785 CONTINUE                                                          COM04100
      CQAV(I)=CQAV(I)+CUSEAV(I)*CPARAM(I)                               COM04200
      CQMX(I)=CQMX(I)+CUSEMX(I)*CPARAM(I)                               COM04300
      CQPK(I)=CQPK(I)+CUSEPK(I)*CPARAM(I)                               COM04400
      CGALAV=CGALAV+CQAV(I)                                             COM04500
      CGALMX=CGALMX+CQMX(I)                                             COM04600
      CGALPK=CGALPK+CQPK(I)                                             COM04700
  800 CONTINUE                                                          COM04800
      CALL CDSPLY                                                       COM04900
      RETURN                                                            COM05000
      END                                                               COM05100
      SUBROUTINE INITL (A,N,V)                                          INI00100
C.....                                                                  INI00200
C.....THIS IS A SUBROUTINE TO INITIALIZE VARIABLES TO CERTAIN QUANTITIESINI00300
C.....   A IS AN ARRAY NAME                                             INI00400
C.....   N IS THE NUMBER OF VALUES IN THE ARRAY                         INI00500
C.....   V IS THE VALUE TO WHICH THE ARRAY IS TO BE INITIALIZED         INI00600
      DIMENSION A(1)                                                    INI00700
      DO 100 I=1,N                                                      INI00800
      A(I)=V                                                            INI00900
  100 CONTINUE                                                          INI01000
      RETURN                                                            INI01100
      END                                                               INI01200
      SUBROUTINE PRWUC (A,B,C,D,E,F,G,H,P)                              PRW00100
C.....THIS IS A SUBROUTINE TO PRINT AND TOTAL RESIDENTIAL TABLES        PRW00200
C.....A(I) IS THE TITLE OF THE TABLE                                    PRW00300
C.....B(I) = VALUE RANGES                                               PRW00400
C.....C(I) = VALUE RANGES                                               PRW00500
C.....D(I), E(I), F(I), G(I), H(I), P(I) ARE VALUES FOR COLUMNS OF DATA PRW00600
      DIMENSION A(1), B(1), C(1), D(1), E(1), F(1), G(1), H(1), P(1)    PRW00700
      COMMON/IFILE/IN,IO                                                PRW00800
      IF (C(1).LE.0.0) GO TO 1000                                       PRW00900
      WRITE (IO,1) (A(I),I=1,8)                                         PRW01000
    1 FORMAT (1HO, 43X, 8A4)                                            PRW01100
      WRITE (IO,2)                                                      PRW01200
    2 FORMAT (1HO, 57X, 14HANNUAL AVERAGE/36X, 6HNO. OF, 49X, 3HMAX, 8X,PRW01300
     *4HPEAK/14X, 15HVALUE RANGE ($), 8X, 5HUNITS, 6X, 8HDOMESTIC, 2X, 1PRW01400
     *0HSPRINKLING, 7X, 5HTOTAL, 11X, 3HDAY, 8X, 4HHOUR/)               PRW01500
      DD=0.0                                                            PRW01600
      EE=0.0                                                            PRW01700
      FF=0.0                                                            PRW01800
      GG=0.0                                                            PRW01900
      HH=0.0                                                            PRW02000
      PP=0.0                                                            PRW02100
      DO 200 I=1,25                                                     PRW02200
C.....TEST TO SEE IF DATA EXHAUSTED                                     PRW02300
      IF (D(I).LE.0.0) GO TO 200                                        PRW02400
      WRITE (IO,3) B(I), C(I), D(I), E(I), F(I), G(I), H(I), P(I)       PRW02500
    3 FORMAT (13X, F7.0, 3H - , F7.0, 5X, F8.0, 2X, 3F12.0, 2X, 2F12.0) PRW02600
      DD=DD+D(I)                                                        PRW02700
      EE=EE+E(I)                                                        PRW02800
      FF=FF+F(I)                                                        PRW02900
      GG=GG+G(I)                                                        PRW03000
      HH=HH+H(I)                                                        PRW03100
      PP=PP+P(I)                                                        PRW03200
  200 CONTINUE                                                          PRW03300
C.....DD = TOTAL OF D(I)                                                PRW03400
C.....EE = TOTAL OF E(I)                                                PRW03500
C.....FF = TOTAL OF F(I)                                                PRW03600
C.....GG = TOTAL OF G(I)                                                PRW03700
C.....HH = TOTAL OF H(I)                                                PRW03800
C.....PP = TOTAL OF P(I)                                                PRW03900
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      WRITE (IO,4) DD, EE, FF, GG, HH, PP                                PRW04000
    4 FORMAT (25X, 5HTOTAL, 5X, F8.0, 2X, 3F12.0, 2X, 2F12.0)            PRW04100
 1000 RETURN                                                            PRW04200
      END                                                               PRW04300
      SUBROUTINE PUBLIC                                                 PUB00100
C     SUBROUTINE TO COMPUTE WATER USAGE FOR ALL PUBLIC AND UNACCOUNTED  PUB00200
C        ESTABLISHMENTS                                                 PUB00300
      COMMON/PUBLC/PUBNAM(30),PPARAM(30),PUGROW(30),QPUBAA(30),         PUB00400
     *             QPUBMD(30),QPUBPH(30),PCOFAA(30),PCOFMD(30),         PUB00500
     *             PCOFPH(30),PLABEL(120),TOTPAA,TOTPMD,TOTPPH,         PUB00600
     *             TTPAAF,TTPMDF,TTPPHF,PUTEMP(150)                     PUB00700
      COMMON/CITDAT/CDATE,ALAT,ALONG,PO,PD,AGE,TEMPLT,EMPL4,            PUB00800
     2       CNCOME,CSERVE,FDAT,POPRO,PNCOME,ACRESP,                    PUB00900
     3       HDGROP,PSERVE,CIT(6),PUBCIT(3)                             PUB01000
      COMMON/IFILE/IN,IO                                                PUB01100
      EQUIVALENCE (POPRO,POPU)                                          PUB01200
      PPARAM(1)=POPU                                                    PUB01300
      PPARAM(2)=POPU                                                    PUB01400
C     INITIALIZE THE DUMMY VARIABLES A, B, C                            PUB01500
      A=0.                                                              PUB01600
      B=0.                                                              PUB01700
      C=0.                                                              PUB01800
      IFDAT=IFIX(FDAT)                                                  PUB01900
      DO 7920 I=1,30                                                    PUB02000
C     DETERMINES IF THE ANNUAL USAGE OF THE PUBLIC-UNACCOUNTED TYPES ARE PUB02100
C         TO BE CALCULATED                                              PUB02200
      IF(QPUBAA(I)-0.0) 7900,7900,7915                                  PUB02300
 7900 CONTINUE                                                          PUB02400
C     DETERMINES IF A VALUE GREATER THAN ZERO HAS BEEN PROCESSED FOR THEPUB02500
C         USAGE COEFFICIENT--IF SO, CALCULATES THE ANNUAL USAGE         PUB02600
      IF (PCOFAA(I)-0.) 7920,7920,7910                                  PUB02700
 7910 CONTINUE                                                          PUB02800
C     CALCULATES ANNUAL AVERAGE USAGE FOR EACH PUBLIC-UNACCOUNTED TYPE  PUB02900
      QPUBAA(I)=PCOFAA(I)*PPARAM(I)                                     PUB03000
C     CALCULATES MAXIMUM DAILY USAGE FOR EACH PUBLIC-UNACCOUNTED TYPE   PUB03100
      QPUBMD(I)=PCOFMD(I)*PPARAM(I)                                     PUB03200
C     CALCULATES PEAK HOURLY USAGE FOR EACH PUBLIC-UNACCOUNTED TYPE     PUB03300
      QPUBPH(I)=PCOFPH(I)*PPARAM(I)                                     PUB03400
 7915 CONTINUE                                                          PUB03500
C     TOTALS ANNUAL AVERAGE USAGE FOR ALL PUBLIC-UNACCOUNTED TYPES      PUB03600
      A=A+QPUBAA(I)                                                     PUB03700
C     TOTALS MAXIMUM DAILY USAGE FOR ALL PUBLIC-UNACCOUNTED TYPES       PUB03800
      B=B+QPUBMD(I)                                                     PUB03900
C     TOTALS PEAK HOURLY USAGE FOR ALL PUBLIC-UNACCOUNTED TYPES         PUB04000
      C=C+QPUBPH(I)                                                     PUB04100
 7920 CONTINUE                                                          PUB04200
C     STORES TOTAL ANNUAL AVERAGE USAGE                                 PUB04300
      TOTPAA=A                                                          PUB04400
C     STORES TOTAL MAXIMUM DAILY                                        PUB04500
      TOTPMD=B                                                          PUB04600
C     STORES TOTAL PEAK HOURLY                                          PUB04700
      TOTPPH=C                                                          PUB04800
 7930 CONTINUE                                                          PUB04900
C     BEGINS PRINTOUT OF THE CURRENT USAGE ALONE                        PUB05000
 8030 CONTINUE                                                          PUB05100
C     PRINTS HEADING OF REPORT                                          PUB05200
      WRITE (IO,8040) CIT,IFDAT                                         PUB05300
 8040 FORMAT (1H1,16X,46HMUNICIPAL WATER REQUIREMENTS FOR THE CITY      PUB05400
     *,        6H OF ,3A4,3A4,2X,14HFOR THE YEAR,2X,I4//53X,           PUB05500
     *         26HANALYZED BY MAIN SYSTEM///34X,5HTOTAL,               PUB05600
     *         52H PUBLIC-UNACCOUNTED REQUIREMENTS IN GALLONS PER,     PUB05700
     *         5H DAY//42X,6HANNUAL,14X,7HMAXIMUM,15X,4HPEAK/41X,      PUB05800
     *         7HAVERAGE,15X,5HDAILY,15X,6HHOURLY//)                   PUB05900
C     PRINTS TOTAL P-U VALUES FOR ANNUAL AVERAGE, MAXIMUM DAILY, PEAK   PUB06000
C         HOURLY                                                        PUB06100
      WRITE (IO,8050) TOTPAA,TOTPMD,TOTPPH                              PUB06200
 8050 FORMAT (27X,3(5X,F16.0)///)                                       PUB06300
C     PRINTS HEADING FOR CONSUMPTION BY P-U TYPES                       PUB06400
      WRITE (IO,8060)                                                   PUB06500
 8060 FORMAT (27X,46HREQUIREMENTS BY TYPE OF PUBLIC-UNACCOUNTED,        PUB06600
     *         30H USAGE IN GALLONS PER DAY//38X,4HTYPE,18X,           PUB06700
     *         6HANNUAL,11X,7HMAXIMUM,11X,4HPEAK/59X,7HAVERAGE,12X,    PUB06800
     *         5HDAILY,11X,6HHOURLY//)                                 PUB06900
C     PRINTS THE P-U TYPE AND ITS ANNUAL AVERAGE, MAXIMUM DAILY, AND    PUB07000
C         PEAK HOURLY USAGE VALUES                                      PUB07100
      DO 8090 I=1,30                                                    PUB07200
      J=4*(I-1)+1                                                       PUB07300
      IF (QPUBAA(I)-0.) 8090,8090,8070                                  PUB07400
 8070 CONTINUE                                                          PUB07500
      WRITE (IO,8080) PLABEL(J),PLABEL(J+1),PLABEL(J+2),PLABEL(J+3),    PUB07600
     *                QPUBAA(I),QPUBMD(I),QPUBPH(I)                     PUB07700
 8080 FORMAT (32X,4A4,3(5X,F12.0))                                      PUB07800
 8090 CONTINUE                                                          PUB07900
```

```
      RETURN                                                                PUB08000
      END                                                                   PUB08100
      SUBROUTINE REDCOF(LERR)                                               RDC00100
C     SUBROUTINE TO READ IN ALL MUNICIPAL COEFFICIENTS                      RDC00200
      REAL IBL
      REAL LATD, LONG                                                       RDC00300
      REAL NPNAME(8)
      REAL NOCOF(4)                                                         RDC05700
      DIMENSION EVAPO(60,25),RAINFL(60,25)                                  RDC02400
      DIMENSION  CCOEF(10),ADATA(15)                                        RDC02500
      DIMENSION SGNAM(6)                                                    RDC02600
      DIMENSION ALIST(10),DATA(15)                                          RDC02700
      COMMON/COMPRN/MACH,LBIN,LIBY,IPRJT,IPNCH,IRDCDM                       RDC00500
      COMMON/ITEST/IBL                                                      RDC00600
      COMMON/NUMBER/NOS                                                     RDC00700
      COMMON/IFILE/IN,IO                                                    RDC00800
      COMMON /RESCON/ E(96)                                                 RDC00900
      COMMON /RESIDL/ EVAPSM,RAINSM,EVAPMX,EVAPNT,RQAVE,RQMAX,RQPEK,        RDC01000
     1                          RFPNUM,RQFPDM,RQFPSP,RQFPTL,RFWNUM,RQFWDM,  RDC01100
     2 RQFWSP,RQFWTL,RMPNUM,RQMPDM,RQMPSP,RQMPTL,RMWNUM,RQMWDM,RQMWSP,      RDC01200
     3RQMWTL,QFPDOM(25),QFPSPK(25),QFPTOT(25),QFPMAX(25),QFPPEK(25),        RDC01300
     4QFWDOM(25),QFWSPK(25),QFWTOT(25),QFWMAX(25),QFWPEK(25),QMPDOM(25),RDC01400
     5QMPSPK(25),QMPTOT(25),QMPMAX(25),QMPPEK(25),QMWDOM(25),QMWSPK(25),RDC01500
     6QMWTOT(25),QMWMAX(25),QMWPEK(25),RDCRSD(3)                            RDC01600
      COMMON/INDUST/DDATA(2203)                                             RDC01700
      COMMON/PUBLC/PUBNAM(30),PDATA(516)                                    RDC01800
      COMMON/COMMRL/CDUM(3),CNAME(50),CDATA(750)                            RDC01900
      COMMON/CITDAT/CDATE,ALAT,ALONG,PD,PD,AGE,TEMPLT,EMPL4,                RDC02000
     2        CNCOME,CSERVE,FDAT,POPRO,PNCOME,ACRESP,                       RDC02100
     3        HDGROP,PSERVE,CIT(6),RDCCIT(3)                                RDC02200
C                                                                           RDC02300
C.....                                                                      RDC02900
      EQUIVALENCE (NOS,NTYPE)                                               RDC04800
      EQUIVALENCE (ALAT,LATD),(ALONG,LONG)                                  RDC04900
      DATA RLATD/4HLATD/                                                    RDC03000
      DATA  BLANK/4H    /                                                   RDC03100
      DATA  RAIN/4HRAIN/                                                    RDC03200
      DATA  EVAP/4HEVAP/                                                    RDC03300
      DATA RLONG/4HLONG/                                                    RDC03400
      DATA  CCOEF/4HCOMM,4HAVEG,4HCOMM,4HAXDY,4HCOMM,4HPEAK,4HCOML,         RDC03500
     *            4HABEL,4HCOMM,4HUNIT/                                     RDC03600
      DATA  ENDI/4HENDI/                                                    RDC03700
      DATA  ENDD/4HENDD/                                                    RDC03800
      DATA SGNAM/4HEVAP,4HTRAN,4HCONS,4HTANT,4HENDI,4HNPUT/                 RDC03900
      DATA ALIST/4HINDL,4HABEL,4HINDA,4HNAVE,4HINDM,4HXDAY,4HINDP,4HEKHRRDC04000
     1  ,4HENDI,4HNPUT/                                                    RDC04100
      DATA EOD/4HENDD/                                                      RDC04200
      DATA NPNAME/4HPUBC,4HOFAA,4HPUBC,4HOFMD,4HPUBC,4HOFPH,4HPUBL,         RDC04300
     *            4HABEL/                                                   RDC04400
      DATA  TYPE/3/                                                         RDC04500
      DATA NOCOF/4H ** ,4HNO C,4HOEFF,4H. **/                               RDC05800
C.....                                                                      RDC04700
      IT=LBIN                                                               RDC05000
C....                                                                       RDC05200

C....                                                                       RDC05300
C     INITIALIZE INDUSTRIAL LABELS                                          RDC05400
C....                                                                       RDC05500
C....                                                                       RDC05600
      DO 99 I=3,802,4                                                       RDC05900
      DO 98 J=1,4                                                           RDC06000
      K=I+J                                                                 RDC06100
      CDATA(K)=NOCOF(J)                                                     RDC06200
   98 CONTINUE                                                              RDC06300
   99 CONTINUE                                                              RDC06400
C.....                                                                      RDC06500
C.....                                                                      RDC06600
  100 READ (IT,10) ANAME1,ANAME2                                            RDC06700
   10 FORMAT (1X,2A4,1X)                                                    RDC06800
C.....LIBY IS AN OPTION FOR PRINTING THE LIBRARY DATA--THE DATA WILL NOTRDC06900
C.....  BE PRINTED UNLESS LIBY = 0 IS ADDED TO THE OPTIONS INPUT DATA      RDC07000
      IF (LIBY.EQ.0)                                                        RDC07100
     *WRITE (IO,11) ANAME1,ANAME2                                           RDC07200
   11 FORMAT (1X,6HREDCOF,2X,2A4///)                                        RDC07300
C.....TEST FOR END OF INPUT                                                 RDC07400
      IF (ANAME1.EQ. ENDI) GO TO 9000                                       RDC07500
C     DETERMINES THE BLOCK OF INPUT DATA TO BE PROCESSED                    RDC07600
C.....                                                                      RDC07700
C.....                                                                      RDC07800
C.....TEST TO SEE IF IT IS A COMMERCIAL SUBGROUP NAME CARD                  RDC07900
C.....                                                                      RDC08000
C.....                                                                      RDC08100
      DO 20 I=1,10,2                                                        RDC08200
      IF ( ANAME1.EQ. CCOEF(I) .AND. ANAME2.EQ. CCOEF(I+1) ) GO TO 530      RDC08300
   20 CONTINUE                                                              RDC08400
C.....                                                                      RDC08500
C.....                                                                      RDC08600
C.....TEST TO SEE IF IT IS A RESIDENTIAL SUBGROUP NAME CARD                 RDC08700
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C.....                                                                  RDC08800
C.....                                                                  RDC08900
      DO 30 I=1,6,2                                                     RDC09000
      IF ( ANAME1.EQ.SGNAM(I) .AND. ANAME2.EQ.SGNAM(I+1) ) GO TO        RDC09100
     1   705                                                            RDC09200
   30 CONTINUE                                                          RDC09300
C.....                                                                  RDC09400
C.....                                                                  RDC09500
C.....TEST TO SEE IF IT IS A INDUSTRIAL SUBGROUP NAME CARD              RDC09600
C.....                                                                  RDC09700
C.....                                                                  RDC09800
      DO 40 II=2,10,2                                                   RDC09900
      IF( ANAME1.EQ.ALIST(II-1)  .AND. ANAME2.EQ.ALIST(II) )            RDC10000
     1    GO TO 2010                                                    RDC10100
   40 CONTINUE                                                          RDC10200
C.....                                                                  RDC10300
C.....                                                                  RDC10400
C.....TEST TO SEE IF IT IS A PUBLIC AND UNACCOUNTED SUBGROUP NAME CARD  RDC10500
C.....                                                                  RDC10600
C.....                                                                  RDC10700
      DO 50 I=1,8,2                                                     RDC10800
      IF ( ANAME1.EQ.NPNAME(I) .AND. ANAME2.EQ.NPNAME(I+1) ) GO TO 7610 RDC10900
   50 CONTINUE                                                          RDC11000
      LERR=LERR+1                                                       RDC11100
C.....                                                                  RDC11200
C     ERROR MESSAGE                                                     RDC11300
C.....                                                                  RDC11400
      WRITE (IO,60) ANAME1,ANAME2                                       RDC11500
   60 FORMAT (2X, 70HTHE FOLLOWING CONTROL CARD DOES NOT CONTAIN A CORRERDC11600
     *CT SUBGROUP NAME.../5X,2A4)                                       RDC11700
C     CHECKS THE DATA FOLLOWING A BAD CONTROL CARD FOR ERRORS IN        RDC11800
C     IDENTIFICATION NAMES                                              RDC11900
      WRITE (IO,70)                                                     RDC12000
   70 FORMAT (1X,42HCHECKING DATA FOLLOWING A BAD CONTROL CARD)         RDC12100
      DO 120 J=1,1000                                                   RDC12200
      READ (IT,80) (ADATA(N),N=1,15)                                    RDC12300
   80 FORMAT (3(1X,A4,1X,4A4))                                          RDC12400
      IF (ADATA(1).EQ. ENDD) GO TO 100                                  RDC12500
  120 CONTINUE                                                          RDC12600
C.....                                                                  RDC12700
C.....                                                                  RDC12800
C.....THE FOLLOWING READS IN COMMERCIAL COEFFICIENTS                    RDC12900
C.....                                                                  RDC13000
C.....                                                                  RDC13100
C     THE REDCOF SUBROUTINE PROCESSES THE COEFFICIENTS FOR THE          RDC13200
C       COMMERCIAL WATER CONSUMPTION IN THE FOLLOWING MANNER.           RDC13300
C         THE FIRST CARD OF EACH BLOCK OF INPUT DATA MUST CONTAIN ONE OFRDC13400
C         THE FOLLOWING NAMES, WHICH IDENTIFIES THE TYPE OF DATA TO BE  RDC13500
C         PROCESSED,                                                    RDC13600
C              IF CARD COLUMNS TWO THROUGH NINE (2-9) CONTAIN THE NAME  RDC13700
C                COMMAVEG, THE COEFFICIENTS FOR THE ANNUAL AVERAGE USAGERDC13800
C              IF CARD COLUMNS TWO THROUGH NINE (2-9) CONTAIN THE NAME  RDC13900
C                FOR THE COMMERCIAL ESTABLISHMENTS WILL BE PROCESSED.   RDC14000
C                COMMAXDY, THE COEFFICIENTS FOR THE MAXIMUM DAILY USAGE RDC14100
C                FOR THE COMMERCIAL ESTABLISHMENTS WILL BE PROCESSED.   RDC14200
C              IF CARD COLUMNS TWO THROUGH NINE (2-9) CONTAIN THE NAME  RDC14300
C                COMMPEAK, THE COEFFICIENTS FOR THE PEAK HOURLY USAGE   RDC14400
C                FOR THE COMMERCIAL ESTABLISHMENTS WILL BE PROCESSED.   RDC14500
C              IF CARD COLUMNS TWO THROUGH NINE (2-9) CONTAIN THE NAME  RDC14600
C                COMLABEL, THE NAMES OF THE COMMERCIAL ESTABLISHMENTS   RDC14700
C                WILL BE PROCESSED.                                     RDC14800
C              IF CARD COLUMNS TWO THROUGH NINE (2-9) CONTAIN THE NAME  RDC14900
C                COMMUNIT, THE UNITS OF THE PARAMETERS BEST DESCRIBING  RDC15000
C                THE WATER CONSUMPTION OF THE COMMERCIAL ESTABLISHMENTS RDC15100
C                WILL BE PROCESSED.                                     RDC15200
  530 CONTINUE                                                          RDC15300
C     DETERMINES IF THE NAMES AND THE UNITS DATA FOR THE COMMERCIAL     RDC15400
C     ESTABLISHMENTS ARE TO BE PROCESSED                                RDC15500
      IF (I .GT. 6) GO TO 610                                           RDC15600
      ISECT = 25 * (I -1)                                               RDC15700
C     PROCESSES THE ANNUAL AVERAGE, MAXIMUM DAILY, AND PEAK HOURLY DATA RDC15800
C     FOR THE COMMERCIAL ESTABLISHMENTS                                 RDC15900
      DO 600 I=1,1000                                                   RDC16000
      READ (IT,540) (ADATA(N),N=1,6)                                    RDC16100
      IF (LIBY.EQ.0)                                                    RDC16200
     *WRITE (IO,540) (ADATA(N),N=1,6)                                   RDC16300
  540 FORMAT (3(1X,A4,1X,F16.3))                                        RDC16400
      IF (ADATA(1).EQ. ENDD) GO TO 100                                  RDC16500
      DO 590 K=1,6,2                                                    RDC16600
      IF (ADATA(K).EQ.IBL) GO TO 590                                    RDC16700
      DO 550 L=1,NOS                                                    RDC16800
      IF (ADATA(K).EQ. CNAME(L)) GO TO 570                              RDC16900
  550 CONTINUE                                                          RDC17000
      CALL UNPACK (ITEST,ADATA(K),JJ,KK,LL)                             RDC17100
      IF (ITEST.GT.0) GO TO 560                                         RDC17200
      JSECT=NTYPE+10*KK+LL                                              RDC17300
      GO TO 575                                                         RDC17400
C     ERROR MESSAGE                                                     RDC17500
                                                                        RDC17600
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  560 WRITE (IO,565) ADATA(K)
  565 FORMAT (1X,57HFOLLOWING IS A BAD LABEL FOR THE COMMERCIAL ESTABLISRDC17700
     *HMENT,2X,A4)                                                      RDC17800
      LERR=LERR+1                                                       RDC17900
      GO TO 590                                                         RDC18000
  570 CONTINUE                                                          RDC18100
       JSECT=L                                                          RDC18200
C     INDEX FOR INPUT DATA IN DATA TABLE                                RDC18300
  575 CONTINUE                                                          RDC18400
      IJ=ISECT+JSECT                                                    RDC18500
C     PUTS THE INPUT DATA IN THE PROPER PLACE IN THE PROPER TABLE       RDC18600
      CDATA(IJ)=ADATA(K+1)                                              RDC18700
  590 CONTINUE                                                          RDC18800
  600 CONTINUE                                                          RDC18900
C     READS AND SETS UP TABLES OF UNITS AND LABELS FOR COMMERCIAL       RDC19000
C     ESTABLISHMENTS                                                    RDC19100
  610 CONTINUE                                                          RDC19200
      READ (IT,620) (ADATA(N),N=1,15)                                   RDC19300
      IF (LIBY.EQ.0)                                                    RDC19400
     *WRITE (IO,620) (ADATA(N),N=1,15)                                  RDC19500
  620 FORMAT (3(1X,A4,1X,4A4))                                          RDC19600
      IF (ADATA(1).EQ. ENDD) GO TO 100                                  RDC19700
      ISECT=150+100*(I-7)                                               RDC19800
      DO 670 K=1,15,5                                                   RDC19900
      IF (ADATA(K).EQ.IBL) GO TO 670                                    RDC20000
      DO 630 L=1,NOS                                                    RDC20100
      IF (ADATA(K).EQ.CNAME(L)) GO TO 650                               RDC20200
  630 CONTINUE                                                          RDC20300
      CALL UNPACK (ITEST,ADATA(K),JJ,KK,LL)                             RDC20400
      IF (ITEST.GT.0) GO TO 642                                         RDC20500
       L=NTYPE+10*KK+LL                                                 RDC20600
      GO TO 650                                                         RDC20700
C     ERROR MESSAGE                                                     RDC20800
  642 WRITE (IO,643) ADATA(K)                                           RDC20900
  643 FORMAT (1X,57HFOLLOWING IS A BAD LABEL FOR THE COMMERCIAL ESTABLISRDC21000
     *HMENT,2X,A4)                                                      RDC21100
      LERR=LERR+1                                                       RDC21200
      GO TO 670                                                         RDC21300
  650 CONTINUE                                                          RDC21400
      JSECT=(L-1)*4+1                                                   RDC21500
C     INDEX FOR INPUT DATA IN DATA TABLE                                RDC21600
      IJ=ISECT+JSECT                                                    RDC21700
C     PUTS THE INPUT DATA IN THE PROPER PLACE IN THE PROPER TABLE       RDC21800
      CDATA(IJ)=ADATA(K+1)                                              RDC21900
      CDATA(IJ+1)=ADATA(K+2)                                            RDC22000
      CDATA(IJ+2)=ADATA(K+3)                                            RDC22100
      CDATA(IJ+3)=ADATA(K+4)                                            RDC22200
  670 CONTINUE                                                          RDC22300
  680 CONTINUE                                                          RDC22400
      GO TO 610                                                         RDC22500
C.....                                                                  RDC22600
C.....THE FOLLOWING READS IN RESIDENTIAL COEFFICIENTS                   RDC22700
C.....                                                                  RDC22800
C.....                                                                  RDC22900
  705 IF (I-3) 720,710,706                                              RDC23000
  706 GO TO 100                                                         RDC23100
C                                                                       RDC23200
C BRING IN CONSTANTS                                                    RDC23300
C                                                                       RDC23400
  710 READ (IT,711)(DATA(I), I=1,6)                                     RDC23500
      IF (LIBY.EQ.0)                                                    RDC23600
     *WRITE (IO,711)(DATA(I), I=1,6)                                    RDC23700
  711 FORMAT (3(1X,A4,1X,F16.3))                                        RDC23800
      DO 715 I=1,6,2                                                    RDC23900
      IF (DATA(I).EQ.EOD)  GO TO 100                                    RDC24000
      IF (DATA(I) .EQ. BLANK) GO TO 715                                 RDC24100
      CALL UNPACK (ITEST,DATA(I),J,K,L)                                 RDC24200
      IF (ITEST.GT.0) GO TO 712                                         RDC24300
      JK = 6*(10*J+K-1)+L                                               RDC24400
      E(JK) = DATA(I+1)                                                 RDC24500
      GO TO 715                                                         RDC24600
  712 WRITE (IO,713) DATA(I)                                            RDC24700
  713 FORMAT (1X,54HTHE FOLLOWING IS A BAD LABEL FOR RESIDENTIAL CONSTANRDC24800
     *TS,2X,A4)                                                         RDC24900
      LERR=LERR+1                                                       RDC25000
  715 CONTINUE                                                          RDC25100
       GO TO 710                                                        RDC25200
C                                                                       RDC25300
C BRING IN EVAPTRAN DATA                                                RDC25400
C                                                                       RDC25500
  720   CONTINUE                                                        RDC25600
      PREC=0.                                                           RDC25700
      VAPOR=0.                                                          RDC25800
      LONGI=0.                                                          RDC25900
      LAT=0.                                                            RDC26000
C     READS IN A DATA CARD                                              RDC26100
      READ (IT,1) (ADATA(I),I=1,8)                                      RDC26200
      IF (LIBY.EQ.0)                                                    RDC26300
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      *WRITE (IO,1) (ADATA(I),I=1,8)                                    RDC26400
     1 FORMAT (4(1X,A4,1X,F12.3))                                       RDC26500
C       TEST FOR END OF INPUT DATA                                      RDC26600
        IF (ADATA(1).EQ. ENDD) GO TO 1000                               RDC26700
        DO 800 I=1,8,2                                                  RDC26800
C       TEST FOR BLANK DATA FIELDS                                      RDC26900
        IF (ADATA(I).EQ. BLANK) GO TO 800                               RDC27000
C       TEST FOR LATITUDE DATA                                          RDC27100
        IF (ADATA(I).NE.RLATD) GO TO 730                                RDC27200
        LAT=ADATA(I+1)-24.99                                            RDC27300
        GO TO 800                                                       RDC27400
C       TEST FOR LONGITUDE DATA                                         RDC27500
   730  IF (ADATA(I).NE.RLONG) GO TO 740                                RDC27600
        LONGI=ADATA(I+1)-64.99                                          RDC27700
        GO TO 800                                                       RDC27800
C       TEST FOR RAINFALL DATA                                          RDC27900
   740  IF (ADATA(I).NE. RAIN) GO TO 760                                RDC28000
        PREC=ADATA(I+1)                                                 RDC28100
        GO TO 800                                                       RDC28200
C       TEST FOR EVAPOTRANSPIRATION DATA                                RDC28300
   760  IF (ADATA(I).NE. EVAP) GO TO 780                                RDC28400
        VAPOR=ADATA(I+1)                                                RDC28500
        GO TO 800                                                       RDC28600
C       ERROR MESSAGE                                                   RDC28700
   780  WRITE (IO,790) ADATA(I)                                         RDC28800
   790  FORMAT (1X,34HFOLLOWING IS A BAD CONTROL CARD...,2X,A4)         RDC28900
        LERR=LERR+1                                                     RDC29000
   800  CONTINUE                                                        RDC29100
C       DETERMINES IF LATITUDE AND/OR LONGITUDE DATA HAVE BEEN PROCESSED--RDC29200
C           IF NOT, GOES BACK AND READS NEXT DATA CARD                  RDC29300
        IF ((LAT.LE.0).OR.(LONGI.LE.0)) GO TO 720                       RDC29400
C       DETERMINES IF EVAPOTRANSPIRATION AND/OR PRECIPITATION DATA HAVE RDC29500
C           BEEN PROCESSED--IF NOT, GOES BACK AND READS NEXT DATA CARD  RDC29600
        IF ((VAPOR.EQ.0.).OR.(PREC.EQ.0.)) GO TO 720                    RDC29700
        RAINFL(LONGI,LAT)=PREC                                          RDC29800
        EVAPO(LONGI,LAT)=VAPOR                                          RDC29900
        GO TO 720                                                       RDC30000
  1000  CONTINUE                                                        RDC30100
C       THE LATITUDE OF THE UNITED STATES RANGES FROM 25 TO 50 DEGREES. RDC30200
C       THE LATITUDINAL DATA FOR THE UNITED STATES ARE GIVEN IN ONE DEGREERDC30300
C           INTEGRAL INCREMENTS.                                        RDC30400
C       THE LONGITUDE OF THE UNITED STATES RANGES FROM 65 TO 125 DEGREES. RDC30500
C       THE LONGITUDINAL DATA FOR THE UNITED STATES ARE ALSO GIVEN IN ONE RDC30600
C           DEGREE, INTEGRAL INCREMENTS.                                RDC30700
C       IN ORDER TO OBTAIN THE CLIMATOLOGICAL DATA FOR THE CITY, MUST   RDC30800
C           LOCATE THE CITY BY INTERPOLATION OF THE LATITUDINAL AND     RDC30900
C           LONGITUDINAL DATA FROM THE LIBRARY FILE BASED ON THE VALUES OFRDC31000
C           LATITUDE AND LONGITUDE SUPPLIED BY THE CITY.                RDC31100
C       LATD AND LONG ARE THE LATITUDE AND LONGITUDE FOR THE CITY       RDC31200
C                                                                       RDC31300
C                                                                       RDC31400
C                       0         $               0   LAT1             RDC31500
C                        3        6                2                   RDC31600
C                                                                       RDC31700
C                                                                       RDC31800
C                              * LATD                                   RDC31900
C                                LONG                                   RDC32000
C                                                                       RDC32100
C                                                                       RDC32200
C                       0         $               0   LAT              RDC32300
C                        4        5                1                   RDC32400
C                                                                       RDC32500
C                       LONGI1                     LONGI                RDC32600
C           FILE                                                        RDC35200
C                                                                       RDC32700
C                                                                       RDC32800
C       SYMBOLS---O REPRESENTS THE DATA POINTS SURROUNDING THE CITY     RDC32900
C                 * REPRESENTS THE CITY                                 RDC33000
C                 $ REPRESENTS INTERPOLATED POINTS                      RDC33100
C                                                                       RDC33200
C                                                                       RDC33300
C                                                                       RDC33400
C       REFERRING TO THE ABOVE DIAGRAM, THE FOLLOWING CALCULATIONS ARE  RDC33500
C                                                                       RDC33600
C                                                                       RDC33700
C       DETERMINES THE LATITUDE FOR POINTS 1 AND 4                      RDC33800
C       VALUES FOR LAT RANGE FROM 1 TO 24                               RDC33900
        LAT=LATD-25.0                                                   RDC34000
C       DETERMINES THE LATITIDE FOR POINTS 2 AND 3                      RDC34100
C       VALUES FOR LAT1 RANGE FROM 2 TO 25                              RDC34200
        LAT1=LAT+1                                                      RDC34300
C       DETERMINES THE LONGITUDE FOR POINTS 1 AND 2                     RDC34400
C       VALUES FOR LONGI RANGE FROM 1 TO 59                             RDC34500
        LONGI=LONG-65.0                                                 RDC34600
C       DETERMINES THELONGITUDE FOR POINTS  4 AND 3                     RDC34700
C       VALUES FOR LONGI1 RANGE FROM 2 TO 60                            RDC34800
        LONGI1=LONGI+1
```

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                                                                      RDC34900
C     R1, R2, R3 AND R4 ARE THE RAINFALL DATA FOR POINTS 1, 2, 3 AND 4, RDC35000
C         RESPECTIVELY---RAINFALL DATA ARE OBTAINED FROM THE LIBRARY    RDC35100
      R1=RAINFL(LONGI,LAT)                                            RDC35300
      R2=RAINFL(LONGI,LAT1)                                           RDC35400
      R3=RAINFL(LONGI1,LAT1)                                          RDC35500
      R4=RAINFL(LONGI1,LAT)                                           RDC35600
C     V1, V2, V3 AND V4 ARE THE EVAPOTRANSPIRATION DATA FOR POINTS 1, 2,RDC35700
C         3 AND 4, RESPECTIVELY---EVAPOTRANSPIRATION DATA ARE OBTAINED  RDC35800
C         FROM THE LIBRARY FILE.                                        RDC35900
      V1=EVAPO(LONGI,LAT)                                             RDC36000
      V2=EVAPO(LONGI,LAT1)                                            RDC36100
      V3=EVAPO(LONGI1,LAT1)                                           RDC36200
      V4=EVAPO(LONGI1,LAT)                                            RDC36300
C     DLAT IS THE FRACTIONAL DEGREE OF LATITUDE REPRESENTING THE        RDC36400
C         DISTANCE BETWEEN THE CITY AND THE ADJACENT INTEGRAL DEGREE OF RDC36500
C         LATITUDE SOUTH OF THE CITY.                                   RDC36600
C     DLAT=LATD-25.0-FLOAT(LAT)                                       RDC36700
C     DLONG IS THE FRACTIONAL DEGREE OF LONGITUDE REPRESENTING THE      RDC36800
C         DISTANCE BETWEEN THE CITY AND THE ADJACENT INTEGRAL DEGREE OF RDC36900
C         LONGITUDE EAST OF THE CITY.                                   RDC37000
C     DLONG=LONG-65.0 -FLOAT(LONGI)                                   RDC37100
C     CALCULATES THE RAINFALL FOR THE POINT AT LATITUDE LAT AND         RDC37200
C         LONGITUDE OF THE CITY VIA INTERPOLATING RAINFALL DATA FOR     RDC37300
C         POINTS 1 AND 4.                                               RDC37400
C     R5=R1+(R4-R1)*DLONG                                             RDC37500
C     CALCULATES THE RAINFALL FOR THE POINT AT LATITUDE LAT1 AND        RDC37600
C         LONGITUDE OF THE CITY VIA INTERPOLATING RAINFALL DATA FOR     RDC37700
C         POINTS 2 AND 3                                                RDC37800

C     R6=R2+(R3-R2)*DLONG                                             RDC37900
C     CALCULATES THE SUMMER PRECIPITATION FOR THE CITY VIA INTERPOLATINGRDC38000
C         BETWEEN THE CALCULATED VALUES OF RAINFALL FOR POINTS 5 AND 6. RDC38100
      RAINSM=(R1 + R2 + R3 + R4)/4.0                                  RDC38200
C     CALCULATES THE EVAPOTRANSPIRATION FOR THE POINT AT LATITUDE LAT   RDC38300
C         AND LONGITUDE OF THE CITY VIA INTERPOLATING EVAPOTRANSPIRATIONRDC38400
C         DATA FOR POINTS 1 AND 4                                       RDC38500
C     V5=V1+(V4-V1)*DLONG                                             RDC38600
C     CALCULATES THE EVAPOTRANSPIRATION FOR THE POINT AT LATITUDE LAT1  RDC38700
C         AND LONGITUDE OF THE CITY VIA INTERPOLATING EVAPOTRANSPIRATIONRDC38800
C         DATA FOR POINTS 2 AND 3                                       RDC38900
C     V6=V2+(V3-V3)*DLONG                                             RDC39000
C     CALCULATES AND STORES THE SUMMER EVAPOTRANSPIRATION FOR THE CITY  RDC39100
C         VIA OF INTERPOLAITNG BETWEEN THE CALCULATED VALUES OF         RDC39200
C         EVAPOTRANSPIRATION FOR POINTS 5 AND 6.                        RDC39300
      EVAPSM=(V1+V2+V3+V4)/4.0                                        RDC39400
C     STORES THE MAXIMUM DAILY EVAPOTRANSPIRATION FOR THE CITY          RDC39500
      EVAPMX=0.29                                                     RDC39600
      ELONG=100.
C     DETERMINES IF THE CITY IS LOCATED WEST OF THE ROCKY MOUNTAINS--IF RDC39800
C         SO, THE MAXIMUM DAILY EVAPOTRANSPIRATION FOR THE CITY CHANGES RDC39900
      IF (LONG.GE.ELONG) EVAPMX=0.25                                  RDC40000
C     EVAPNT IS THE NET EVAPOTRANSPIRATION---USED IN SPRINKLING EQUATIONRDC40100
      EVAPNT=EVAPSM-0.6*RAINSM                                        RDC40200
C                                                                     RDC40300
C                                                                     RDC40400
      GO TO 100                                                       RDC40500
C.....                                                                RDC40600
C.....                                                                RDC40700
C.....THE FOLLOWING READS IN INDUSTRIAL COEFFICIENTS                  RDC40800
C.....                                                                RDC40900
C.....                                                                RDC41000
C                                                                     RDC41100
C     TEST FOR END OF INPUT TO SUBROUTINE                             RDC41200
C                                                                     RDC41300
 2010 IF (II .EQ. 10) GO TO 100                                       RDC41400
C                                                                     RDC41500
C     TEST FOR CATEGORY LABELS INPUT                                  RDC41600
C                                                                     RDC41700
      IF (II.EQ.2) GO TO 2400                                         RDC41800
C                                                                     RDC41900
C     OTHERWISE IT WILL BE INDUSTRY USAGE COEFFICIENTS                RDC42000
C                                                                     RDC42100
      II=100*(II-4)+804                                               RDC42200
 2100 READ (IT,2101) (DATA(I),I=1,6)                                  RDC42300
      IF (LIBY.EQ.0)                                                  RDC42400
     *WRITE (IO,2101) (DATA(I),I=1,6)                                 RDC42500
 2101 FORMAT (3(1X,A4,1X,F16.3))                                      RDC42600
      DO 2300 I=1,6,2                                                 RDC42700
C                                                                     RDC42800
C     TEST FOR END OF DATA CARD                                       RDC42900
C                                                                     RDC43000
      IF (DATA(I).EQ.EOD) GO TO 100                                   RDC43100
      IF (DATA(I) .EQ. BLANK) GO TO 2300                              RDC43200
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C                                                                       RDC43300
C     DECODE IDENTITY AND STORE COEFFICIENTS                            RDC43400
C                                                                       RDC43500
      CALL UNPACK (ITEST,DATA(I),J,K,L)                                 RDC43600
      IF (ITEST.GT.0) GO TO 2200                                        RDC43700
      INDX=100*(J-2)+10*K+L+II                                          RDC43800
      DDATA(INDX)=DATA(I+1)                                             RDC43900
      GO TO 2300                                                        RDC44000
 2200 WRITE (IO,2201) DATA(I)                                           RDC44100
 2201 FORMAT(1HO,A4,37H IS NOT A VALID COEFFICIENT IDENTITY.)           RDC44200
      LERR=LERR+1                                                       RDC44300
 2300 CONTINUE                                                          RDC44400
      GO TO 2100                                                        RDC44500
C                                                                       RDC44600
C     DECODE IDENTITY AND STORE LABELS                                  RDC44700
C                                                                       RDC44800
 2400 CONTINUE                                                          RDC44900
 2500 READ(IT,2501)(DATA(I),I=1,15)                                     RDC45000
      IF (LIBY.EQ.0)                                                    RDC45100
     *WRITE(IO,2501)(DATA(I),I=1,15)                                    RDC45200
 2501 FORMAT (3(1X,A4,1X,4A4))                                          RDC45300
      DO 2800 I=1,15,5                                                  RDC45400
C                                                                       RDC45500
C     TEST FOR END OF DATA CARD                                         RDC45600
C                                                                       RDC45700
      IF (DATA(I).EQ.EOD) GO TO 100                                     RDC45800
      IF (DATA(I) .EQ. BLANK) GO TO 2800                                RDC45900
C                                                                       RDC46000
C     DECODE AND STORE LABELS                                           RDC46100
C                                                                       RDC46200
      CALL UNPACK (ITEST,DATA(I),J,K,L)                                 RDC46300
      IF (ITEST.GT.0) GO TO 2700                                        RDC46400
      INDX=4*(100*(J-2)+10*K+L)+4                                       RDC46500
      DDATA(INDX)=DATA(I+1)                                             RDC46600
      DDATA(INDX+1)=DATA(I+2)                                           RDC46700
      DDATA(INDX+2)=DATA(I+3)                                           RDC46800
      DDATA(INDX+3)=DATA(I+4)                                           RDC46900
      GO TO 2800                                                        RDC47000
 2700 WRITE (IO,2701)DATA(I)                                            RDC47100
 2701 FORMAT (1HO,A4,31H IS NOT A VALID INDUSTRY LABEL.)                RDC47200
      LERR=LERR+1                                                       RDC47300
 2800 CONTINUE                                                          RDC47400
      GO TO 2500                                                        RDC47500
C.....                                                                  RDC47600
C.....                                                                  RDC47700
C.....THE FOLLOWING READS IN PUBLIC AND UNACCOUNTED COEFFICIENTS        RDC47800
C.....                                                                  RDC47900
C.....                                                                  RDC48000
 7610 CONTINUE                                                          RDC48100
C     NDATA EQUALS THE NUMBER OF VARIABLES IN THE PDATA MASTER TABLE UP  RDC48200
C          TO PCOFAA TABLE                                              RDC48300
      NDATA=5*30                                                        RDC48400
C     CALCULATES THE SUBSCRIPT OF THE DATA TABLES                       RDC48500
      ISECT=(I-1)*15 + NDATA                                            RDC48600
C     DETERMINES IF THE NAMES FOR THE PUBLIC USAGE TYPES ARE TO BE      RDC48700
C          PROCESSED                                                    RDC48800
       IF (ANAME2.EQ.NPNAME(8)) GO TO 7710                              RDC48900
C     PROCESSES THE ANNUAL AVERAGE,MAXIMUM DAILY,AND PEAK HOURLY DATA   RDC49000
C          FOR THE PUBLIC USAGES TYPES                                  RDC49100
      DO 7700 I=1,1000                                                  RDC49200
       READ (IT,7640) (ADATA(N),N=1,6)                                  RDC49300
      IF (LIBY.EQ.0)                                                    RDC49400
     *WRITE (IO,7640) (ADATA(N),N=1,6)                                  RDC49500
 7640 FORMAT (3(1X,A4,1X,F16.3))                                        RDC49600
C     TEST FOR END OF BLOCK OF COEFFICIENT DATA                         RDC49700
      IF (ADATA(1).EQ. ENDD) GO TO 100                                  RDC49800
C     TEST FOR BLANK DATA FIELDS                                        RDC49900
      DO 7690 K=1,6,2                                                   RDC50000
      IF (ADATA(K).EQ.IBL) GO TO 7690                                   RDC50100
C     MATCH INPUT LABELS WITH THOSE OF PUBNAM                           RDC50200
      DO 7650 L=1,3                                                     RDC50300
      IF (ADATA(K).EQ.PUBNAM(L)) GO TO 7670                             RDC50400
 7650 CONTINUE                                                          RDC50500
C     CALLS UNPACK TO DETERMINE IF THE INPUT LABEL IS FOR ONE OF THE    RDC50600
C          EXTRA PUBLIC CATEGORIES                                      RDC50700
      CALL UNPACK (ITEST,ADATA(K),JJ,KK,LL)                             RDC50800
      IF (ITEST.GT.0) GO TO 7660                                        RDC50900
C     CALCULATES THE SUBSCRIT WITHIN THE DATA TABLE                     RDC51000
      L=ITYPE+10*KK+LL                                                  RDC51100
      GO TO 7670                                                        RDC51200
C     ERROR MESSAGE                                                     RDC51300
 7660 WRITE (IO,7665) ADATA(K)                                          RDC51400
 7665 FORMAT (1X,63HFOLLOWING IS A BAD LABEL FOR THE PUBLIC-UNACCOUNTED RDC51500
     *USAGE TYPES,2X,A4)                                                RDC51600
      LERR=LERR+1                                                       RDC51700
      GO TO 7690                                                        RDC51800
C     SETS JSECT EQUAL TO THE VALUE OF SUBSCRIPT WITHIN THE DATA TABLE  RDC51900
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 7670 CONTINUE                                                          RDC52000
      JSECT=L                                                           RDC52100
C     COMPLETE INDEX FOR INPUT DATA IN THE DATA TABLE.                  RDC52200
      IJ=ISECT+JSECT                                                    RDC52300
C     PUTS THE INPUT DATA IN THE PROPER PLACE IN THE PROPER TABLE       RDC52400
      PDATA(IJ)=ADATA(K+1)                                              RDC52500
 7690 CONTINUE                                                          RDC52600
 7700 CONTINUE                                                          RDC52700
C     READS AND SETS UP TABLES OF UNITS AND LABELS FOR PUBLIC USAGE TYPERDC52800
 7710 CONTINUE                                                          RDC52900
      DO 7780 I=1,1000                                                  RDC53000
      READ (IT,7720) (ADATA(N),N=1,15)                                  RDC53100
      IF (LIBY.EQ.0)                                                    RDC53200
     *WRITE (IO,7720) (ADATA(N),N=1,15)                                 RDC53300
 7720 FORMAT (3(1X,A4,1X,4A4))                                          RDC53400
C     TEST FOR END OF BLOCK OF INPUT DATA                               RDC53500
      IF (ADATA(1).EQ. ENDD) GO TO 100                                  RDC53600
C     TEST FOR BLANK DATA FIELDS                                        RDC53700
      DO 7770 K=1,15,5                                                  RDC53800
      IF (ADATA(K).EQ.IBL) GO TO 7770                                   RDC53900
C     MATCH INPUT LABELS WITH THOSE OF PUBNAM                           RDC54000

      DO 7730 L=1,3                                                     RDC54100
      IF (ADATA(K).EQ.PUBNAM(L)) GO TO 7750                             RDC54200
 7730 CONTINUE                                                          RDC54300
C     CALLS UNPACK TO DETERMINE IF INPUT LABEL IS FOR ONE OF THE        RDC54400
C         EXTRA PUBLIC CATEGORIES                                       RDC54500
      CALL UNPACK (ITEST,ADATA(K),JJ,KK,LL)                             RDC54600
      IF (ITEST.GT.0) GO TO 7740                                        RDC54700
C     COMPUTES THE SUBSCRIPT WITHIN THE DATA TABLE, BASED ON LABEL      RDC54800
      L=ITYPE+10*KK+LL                                                  RDC54900
      GO TO 7750                                                        RDC55000
C     ERROR MESSAGE                                                     RDC55100
 7740 WRITE (IO,7745) ADATA(K)                                          RDC55200
 7745 FORMAT (1X,63HFOLLOWING IS A BAD LABEL FOR THE PUBLIC-UNACCOUNTED RDC55300
     *USAGE TYPES,2X,A4)                                                RDC55400
      LERR=LERR+1                                                       RDC55500
      GO TO 7770                                                        RDC55600
 7750 CONTINUE                                                          RDC55700
C     MAKES CORRECTION FOR SUBSCRIPT WITHIN THE UNITS AND LABEL TABLES  RDC55800
      JSECT=(L-1)*4+1                                                   RDC55900
C     COMPLETES INDEX INPUT DATA IN DATA TABLE                          RDC56000
      IJ=ISECT+JSECT                                                    RDC56100
C     PUTS THE INPUT DATA IN THE PROPER PLACE IN THE PROPER TABLE       RDC56200
      PDATA(IJ)=ADATA(K+1)                                              RDC56300
      PDATA(IJ+1)=ADATA(K+2)                                            RDC56400
      PDATA(IJ+2)=ADATA(K+3)                                            RDC56500
      PDATA(IJ+3)=ADATA(K+4)                                            RDC56600
 7770 CONTINUE                                                          RDC56700
 7780 CONTINUE                                                          RDC56800
 7790 GO TO 100                                                         RDC56900
 9000 CONTINUE                                                          RDC57000
      IF (IT.NE.IN) REWIND IT                                           RDC57100
      RETURN                                                            RDC57200
      END                                                               RDC57300
      SUBROUTINE HISTRY(I)                                              HIS00100
C....                                                                   HIS00200
C     THE FOLLOWING READS IN THE HISTORICAL INPUT DATA USING HISTRY.    HIS00300
C....                                                                   HIS00400
C....                                                                   HIS00600
      REAL IBL
      DIMENSION          ADATA(6),D(5),YR(5),DUS(5,26)                  HIS03400
      REAL ILIST(2),JLIST(4)
      DIMENSION MIN(15),MAX(15)
      COMMON/IFILE/IN,IO                                                HIS00700
      COMMON/HISDAT/SLOPES(25)                                          HIS00800
C....                                                                   HIS00900
C     THE ARRAY SLOPES CONTAINS HISTORICAL RATES OF CHANGE OF THE       HIS01000
C         FOLLOWING:
C                                                                       HIS01200
C      SLOPES                          DESCRIPTION                      HIS01300
C     LOCATION                                                          HIS01400
C                                                                       HIS01500
C        1          TOTAL CITY POPULATION                              HIS01600
C        2          FRACTION OF CITY POPULATION THAT IS NON-WHITE       HIS01700
C        3          TOTAL NUMBER OF OCCUPIED HOMES IN THE CITY         HIS01800
C        4          FRACTION OF OCCUPIED HOMES IN MEDIUM VALUE RANGE   HIS01900
C        5          FRACTION OF OCCUPIED HOMES IN HIGH VALUE RANGE     HIS02000
C        6          MEDIAN SCHOOL YEARS COMPLETED                      HIS02100
C        7          ELEMENTARY SCHOOL ENROLLMENT IN THE CITY           HIS02200
C        8          HIGH SCHOOL ENROLLMENT IN THE CITY                 HIS02300
C        9          TOTAL SERVICES EMPLOYMENT IN THE CITY              HIS02400
C        10         MEDICAL SERVICES EMPLOYMENT IN THE CITY            HIS02500
C        12         TOTAL EMPLOYMENT TO TOTAL POPULATION               HIS02700
C        11         PER CAPITA INCOME                                  HIS02600
C        13                                                            HIS02800
C       THRU        INDUSTRY GROUPS 1 TO 11 TO TOTAL POPULATION        HIS02900
C        23                                                            HIS03000
C        24         TOTAL EMP IN TRANS, COMM, AND PU TO CITY EMPLOYMENT HIS03100
C        25         TOTAL MFG EMPLOYMENT TO TOTAL CITY EMPLOYMENT      HIS03200
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C....                                                                   HIS03300
C....                                                                   HIS03600
      DATA ILIST /4HYEAR,4HDATA/                                        HIS03700
      DATA JLIST/4HYEAR,4HPOPU,4HICOM,4HEMPL/                           HIS03800
      DATA MIN  /3,4,5,7,9,13,15,16,17,18,20,22,23,25,26/               HIS03900
      DATA MAX  /3,4,6,8,12,14,15,16,17,19,21,22,24,25,26/              HIS04000
      DATA  END /4HENDD/                                                HIS04100
      DATA IBL /4H    /                                                 HIS04200
C....                                                                   HIS04300
C....                                                                   HIS04400
C     INITIALIZE YR TO ZERO.                                            HIS04500
C....                                                                   HIS04600
      CALL INITL (YR,5,0.0)                                             HIS04700
C....                                                                   HIS04800
C     IF IT IS INDUSTRIAL HISTORY DATA PERFORM INDUSTRIAL HISTORY CALCS.HIS04900
      IF (I.EQ.21) GO TO 1000                                           HIS05000
C....                                                                   HIS05100
C....                                                                   HIS05200
C     INITIALIZE A COUNTER (N).                                         HIS05300
      N=0                                                               HIS05400
C....                                                                   HIS05500
C     THE FOLLOWING READS IN ALL HISTORICAL DATA EXCEPT INDUSTRIAL DATA.HIS05600
C....                                                                   HIS05700
   75 READ(IN,10)ADATA                                                  HIS05800
   10 FORMAT (3(1X,A4,1X,F16.3))                                        HIS05900
      WRITE(IO,10)ADATA                                                 HIS06000
C....                                                                   HIS06100
C     TEST FOR END OF DATA.                                             HIS06200
C....                                                                   HIS06300
      IF (ADATA(1).EQ. END) GO TO 200                                   HIS06400
C....                                                                   HIS06500
C....                                                                   HIS06600
C     DATA CARDS CONTAIN INFORMATION IN PAIRS CONTAINING A YEAR AND THE HIS06700
C     ASSOCIATED DATA FOR THAT YEAR.                                    HIS06800
C     READ IN VALID DATA CARDS.                                         HIS06900
      DO 150 J=1,6,2                                                    HIS07000
      IF(ADATA(J).EQ.IBL) GO TO 150                                     HIS07100
      IF (ADATA(J).EQ.ILIST(1)) GO TO 100                               HIS07200
      IF (ADATA(J).EQ.ILIST(2)) GO TO 125                               HIS07300
      IERR = IERR + 1                                                   HIS07400
      WRITE (IO,20)ADATA(J)                                             HIS07500
   20 FORMAT (1HO,A4,37H IS NOT A VALID HISTORICAL DATA CARD.)          HIS07600
      GO TO 150                                                         HIS07700
C....                                                                   HIS07800
C....                                                                   HIS07900
  100 N=N+1                                                             HIS08000
      YR(N) = ADATA(J+1)                                                HIS08100
      GO TO 150                                                         HIS08200
  125 D(N)=ADATA(J+1)                                                   HIS08300
  150 CONTINUE                                                          HIS08400
      GO TO 75                                                          HIS08500
  200 CONTINUE                                                          HIS08600
C....                                                                   HIS08700
C     ALL DATA IS IN --- DETERMINE THE SLOPE.                           HIS08800
C....                                                                   HIS08900
C....                                                                   HIS09000
C     NORMALIZE YEARS TO ONE DIGIT.                                     HIS09100
      A=YR(1)-1.0                                                       HIS09200
      DO 300 J=1,N                                                      HIS09300
      YR(J)=YR(J)-A                                                     HIS09400
  300 CONTINUE                                                          HIS09500
C....                                                                   HIS09600
C....                                                                   HIS09700
C     CALL A LINEAR REGRESSION SUBROUTINE TO DEVELOPE THE HISTORICAL    HIS09800
C     RATE OF CHANGE IN THE DATA.                                       HIS09900
      CALL LREGRS (N,YR,D,SLOPE,C)                                      HIS10000
C     SAVE THE SLOPES IN AN ARRAY FOR FUTURE USE.                       HIS10100
      J=(I+1)/2                                                         HIS10200
      SLOPES(J)=SLOPE                                                   HIS10300
      RETURN                                                            HIS10400
C....                                                                   HIS10500
C....                                                                   HIS10600
C     THE FOLLOWING READS IN INDUSTRIAL HISTORICAL DATA.                HIS10700
C....                                                                   HIS10800
 1000 CONTINUE                                                          HIS10900
      CALL INITL (DUS,130,0.0)                                          HIS11000
      N=0                                                               HIS11100
 1100 READ(IN,10)ADATA                                                  HIS11200
      WRITE(IO,10)ADATA                                                 HIS11300
      IF (ADATA(1).EQ. END) GO TO 1300                                  HIS11400
      DO 1200 J=1,6,2                                                   HIS11500
      IF (ADATA(J).EQ.IBL) GO TO 1200                                   HIS11600
      DO 1125 K=1,4                                                     HIS11700
      IF (ADATA(J).EQ.JLIST(K)) GO TO 1150                              HIS11800
 1125 CONTINUE                                                          HIS11900
C....                                                                   HIS12000
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C      INITIALIZE K TO ZERO AND UNPACK INFORMATION IN IDATA.                HIS12100
       K=0                                                                  HIS12200
       CALL UNPACK(II,ADATA(J),L1,L2,L3)                                    HIS12300
       IF (II.EQ.0) GO TO 1150                                              HIS12400
       IERR=IERR+1                                                          HIS12500
       WRITE (IO,20)ADATA(J)                                                HIS12600
       GO TO 1200                                                           HIS12700
 1150 CONTINUE                                                              HIS12800
C....                                                                       HIS12900
C....                                                                       HIS13000
C      STORE DATA IN DUS ARRAY IN ITS PROPER PLACE.  MAXIMUM OF 5 YEARS     HIS13100
C      AND TWENTY FIVE ENTRIES PER YEAR                                     HIS13200
       IF (K.EQ.0) K=10*(L1-2)+L2+5                                         HIS13300
       IF (K.GT.1) GO TO 1175                                               HIS13400
       N=N+1                                                                HIS13500
       DUS (N,26)=N                                                         HIS13600
 1175 DUS (N,K)=ADATA(J+1)                                                  HIS13700
 1200 CONTINUE                                                              HIS13800
       GO TO 1100                                                           HIS13900
 1300 CONTINUE                                                              HIS14000
C....                                                                       HIS14100
C      ALL DATA CARDS HAVE BEEN INPUT AND PROCESSED                         HIS14200
C....                                                                       HIS14300
C....                                                                       HIS14400
C      NORMALIZE YEARS TO ONE DIGIT AND FOLLOW WITH PROPER DATA.            HIS14500
       A=DUS(1,1)-1.0                                                       HIS14600
       DO 1400 J=1,N                                                        HIS14700
       DUS(J,1)=DUS(J,1)-A                                                  HIS14800
       YR(J)=DUS(J,1)                                                       HIS14900
       SUM=0.0                                                              HIS15000
       DO 1350 L=5,24                                                       HIS15100
C.....                                                                      HIS15200
C      SUMS SIC CATEGORIES EXCEPT 400 SERIES                                HIS15300
C.....                                                                      HIS15400
       SUM=SUM+DUS(J,L)                                                     HIS15500
C.....                                                                      HIS15600
C      DIVIDE BY TOTAL POPULATION TO GET FRACTION IN EACH SIC CATEGORY      HIS15700
C.....                                                                      HIS15800
       DUS(J,L)=DUS(J,L)/DUS(J,2)                                           HIS15900
 1350 CONTINUE                                                              HIS16000
C.....                                                                      HIS16100
C      CALCULATE FRACTION OF EMPLOYED IN SIC CATEGORY 400                   HIS16200
C.....                                                                      HIS16300
       DUS(J,25)=DUS(J,25)/DUS(J,4)                                         HIS16400
C.....                                                                      HIS16500
C      CALCULATE FRACTION OF EMPLOYED IN MANUFACTURING EXCEPT SIC 400       HIS16600
C.....                                                                      HIS16700
       DUS(J,26)=SUM/DUS(J,4)                                               HIS16800
C.....                                                                      HIS16900
C      CALCULATE FRACTION OF POPULATION EMPLOYED                            HIS17000
C.....                                                                      HIS17100
       DUS(J,4)=DUS(J,4)/DUS(J,2)                                           HIS17200
 1400 CONTINUE                                                              HIS17300
       DO 1500 J=1,15                                                       HIS17400
       L1=MIN(J)                                                            HIS17500
       L2=MAX(J)                                                            HIS17600
C....                                                                       HIS17700
C      INITIALIZE DATA TO ZEROS.                                            HIS17800
       CALL INITL(D,5,0.0)                                                  HIS17900
C....                                                                       HIS18000
C      SUM THE PROPER COMBINATIONS OF S.I.C. EMPLOYEES.                     HIS18100
       DO 1450 L=L1,L2                                                      HIS18200
       DO 1425 M=1,N                                                        HIS18300
       D(M)=D(M)+DUS(M,L)                                                   HIS18400
 1425 CONTINUE                                                              HIS18500
 1450  CONTINUE                                                             HIS18600
C....                                                                       HIS18700
C      DEVELOPE THE SLOPES FOR THE INDUSTRIAL HISTORICAL DATA.              HIS18800
       CALL LREGRS (N,YR,D,SLOPE,C)                                         HIS18900
       K=J+10                                                               HIS19000
       SLOPES(K)=SLOPE                                                      HIS19100
 1500 CONTINUE                                                              HIS19200
       RETURN                                                               HIS19300
       END                                                                  HIS19400
       SUBROUTINE LREGRS (N,X,Y,S,C)                                        LRG00100
C....                                                                       LRG00200
C....                                                                       LRG00300
C      THIS IS THE SUBROUTINE THAT CALCULATES THE LINEAR REGRESSIONS.       LRG00400
C....                                                                       LRG00500
C....                                                                       LRG00600
       DIMENSION X(1),Y(1)                                                  LRG00700
       SUMX = 0.0                                                           LRG00800
       SUMXSQ=0.0                                                           LRG00900
       SUMY  =0.0                                                           LRG01000
       SUMXY=0.0                                                            LRG01100
C....                                                                       LRG01200
       DO 100 I = 1,N                                                       LRG01300
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C....                                                                   LRG01400
      SUMX  =SUMX+X(I)                                                  LRG01500
      SUMXSQ=SUMXSQ+X(I)**2                                             LRG01600
      SUMY  =SUMY+Y(I)                                                  LRG01700
      SUMXY = SUMXY+X(I)*Y(I)                                           LRG01800
  100 CONTINUE                                                          LRG01900
C....                                                                   LRG02000
C     CALCULATE THE SLOPE                                               LRG02100
      FN=N                                                              LRG02200
      S=(FN*SUMXY-SUMX*SUMY)/(FN*SUMXSQ-SUMX**2)                        LRG02300
C....                                                                   LRG02400
C     CALCULATE THE INTERCEPT                                           LRG02500
      C=(SUMY/FN)-(S*SUMX/FN)                                           LRG02600
      RETURN                                                            LRG02700
      END                                                               LRG02800
      SUBROUTINE INPROJ(NN)                                             INP00100
C.....                                                                  INP00200
C.....                                                                  INP00300
C     THIS SUBROUTINE READS THE PROJECTION DATA FOR ONE YEAR FROM AN    INP00400
C     AUXILIARY DEVICE.  THE DATA IS ALREADY IN BINARY AND A MODIFIED   INP00500
C     READ STATEMENT IS USED, NO FORMAT REQUIRED.                       INP00600
C.....                                                                  INP00700
C.....                                                                  INP00800
C.....                                                                  INP00900
      REAL KLIST,ILIST,JLIST
       COMMON/IFILE/IN,IO                                               INP01000
      COMMON/LISTIJ/ILIST(12),JLIST(5)                                  INP01100
      COMMON/COMPRN/IA(3),IPR,INPDUM(2)                                 INP01200
      COMMON/COMMRL/CDUM(603),CPARM(50),CC(150)                         INP01300
      COMMON/RESPAR/RESDAT(812)                                         INP01400
      COMMON/CITDAT/CITDAT(16),CTDUM(6),CCBN,CCBL,CCAL                  INP01500
      COMMON/INDUST/DDUM(1403),DPARM(200),DD(600)                       INP01700
      COMMON/PUBLC/PUB(30),PPAR(150),PP(366)                            INP01800
      DATA CCAN/103./                                                   INP01600
C.....                                                                  INP01900
C                                                                       INP02000
      IF (NN.GT.0) GO TO 90                                             INP02100
C     TO PERFORM CURRENT CALCS AND PUT DATA IN FUTURE AREAS.            INP02200
      CITDAT(11) = CITDAT(1)                                            INP02300
      CITDAT(12) = CITDAT(4)                                            INP02400
      CITDAT(13) = CITDAT(9)                                            INP02500
      CITDAT(16) = CITDAT(10)                                           INP02600
C....                                                                   INP02700
C     ADJUST ASSESSMENT FACTORS FOR BASE YEAR CONSTRUCTION COST INDEX   INP02800
C....                                                                   INP02900
      CI=1.                                                             INP03000
      IF (CCBN.GT.0.) CI=CCBN/CCAN                                      INP03100
      IF (CCBL.GT.0..AND.CCAL.GT.0.) CI=CCBL/CCAL                       INP03200
      N=-150                                                            INP03300
      DO 50 I=1,4                                                       INP03400
      N=N+200                                                           INP03500
      DO 40 J=1,25                                                      INP03600
      II=N+J                                                            INP03700
      RESDAT(II)=CI*RESDAT(II)                                          INP03800
   40 CONTINUE                                                          INP03900
   50 CONTINUE                                                          INP04000
      RETURN                                                            INP04100
C.....                                                                  INP04200
   90 CONTINUE                                                          INP04300
      CALL INITL (PPAR,150,0.0)                                         INP04400
  100 READ (IPR) KLIST,N                                                INP04500
      DO 200 I=1,12                                                     INP04600
      IF (KLIST.EQ.ILIST(I)) GO TO 400                                  INP04700
  200 CONTINUE                                                          INP04800
      DO 300 I=1,5                                                      INP04900
      IF (KLIST.EQ.JLIST(I)) GO TO 500                                  INP05000
  300 CONTINUE                                                          INP05100
      WRITE (IO,10) KLIST                                               INP05200
   10 FORMAT (1X,87HFILE CONTAINS TEMPORARY PROJECTIONS AND HAS AN INVALINP05300
     1ID IDENTIFICATION VARIABLE WHICH IS,2X,A4)                        INP05400
      STOP                                                              INP05500
  400 CONTINUE                                                          INP05600
      J=(I+2)/3                                                         INP05700
      K=I-3*(J-1)                                                       INP05800
      L=200*(J-1)+125+25*(K-1)                                          INP05900
      M=L+N                                                             INP06000
      L=L+1                                                             INP06100
      READ (IPR) (RESDAT(I), I=L,M)                                     INP06200
      GO TO 100                                                         INP06300
  500 GO TO (600,650,700,750,800),I                                     INP06400
  600 L=11                                                              INP06500
      M=16                                                              INP06600
      READ (IPR) (CITDAT(J),J=L,M)                                      INP06700
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      GO TO 100                                                          INP06800
  650 L=1                                                                INP06900
      M=N                                                                INP07000
      READ (IPR) (CPARM(J), J=L,M)                                       INP07100
      GO TO 100                                                          INP07200
  700 L=1                                                                INP07300
      M=N                                                                INP07400
      READ (IPR) (DPARM(J), J=L,M)                                       INP07500
      GO TO 100                                                          INP07600
  750 L=1                                                                INP07700
      M=N                                                                INP07800
      READ (IPR) (PPAR(J),J=L,M)                                         INP07900
      GO TO 100                                                          INP08000
  800 CONTINUE                                                           INP08100
      RETURN                                                             INP08200
      END                                                                INP08300
      SUBROUTINE CDSPLY                                                  CDS00100
C     THE CDSPLY SUBROUTINE CONTROLS THE DISPLAY OF THE COMMERICAL       CDS00200
C     CONSUMPTION INFORMATION                                            CDS00300
      COMMON/COMMRL/CGALAV,CGALMX,CGALPK,CNAME(50),CUSEAV(50),CUSEMX(50)CDS00400
     2   ,CUSEPK(50),CLABEL(200),CUNIT(200),CPARAM(50),CQAV(50),CQMX(50)CDS00500
     3              ,CQPK(50)                                           CDS00600
      COMMON/CITDAT/CDATE,ALAT,ALONG,PO,PD,AGE,TEMPLT,EMPL4,             CDS00700
     2       CNCOME,CSERVE,FDAT,POPRO,PNCOME,ACRESP,                    CDS00800
     3       HDGROP,PSERVE,CIT(6),CDSCIT(3)                             CDS00900
      COMMON/IFILE/IN,IO                                                 CDS01000
      ICDAT=IFIX(FDAT)                                                   CDS01100
C     PRINTS PAGE HEADING                                                CDS01200
 1500 FORMAT (1H1,15X,50HMUNICIPAL  WATER  REQUIREMENTS  FOR  THE  CITY CDS01300
     * OF,2X,3A4,3A4,2X,14HFOR  THE  YEAR,2X,I4// 53X,26HANALYZED  BY  MCDS01400
     *AIN  SYSTEM//)                                                    CDS01500
C     DETERMINES IF THE CURRENT COMMERICAL WATER CONSUMPTION IS TO BE    CDS01600
C     PRINTED                                                            CDS01700
      WRITE (IO,1500) CIT,ICDAT                                          CDS01800
      WRITE (IO,1510)                                                    CDS01900
 1510 FORMAT (38X,54HTOTAL  COMMERCIAL  REQUIREMENTS  IN  GALLONS  PER   CDS02000
     *DAY)                                                              CDS02100
      WRITE (IO,1520)                                                    CDS02200
 1520 FORMAT (1HO,43X,6HANNUAL,13X,7HMAXIMUM,15X,4HPEAK/43X,7HAVERAGE,   CDS02300
     *         14X,5HDAILY,15X,6HHOURLY/)                               CDS02400
      WRITE (IO,1530) CGALAV,CGALMX,CGALPK                               CDS02500
 1530 FORMAT (1HO,29X,3(4X,F16.0)//)                                     CDS02600
      WRITE (IO,1531)                                                    CDS02700
 1531 FORMAT (1HO,33X,60HWATER  REQUIREMENTS  BY  TYPE  OF  COMMERCIAL   CDS02800
     *ESTABLISHMENT//19X,4HTYPE,14X,5HUNITS,19X,6HNUMBER,8X,6HANNUAL,7X,CDS02900
     *7HMAXIMUM, 9X,4HPEAK,/60X,8HOF UNITS,7X,7HAVERAGE,7X,5HDAILY,9X,6HCDS03000
     *HOURLY/79X,24H( GALLONS   PER   DAY  ))                           CDS03100
      DO 1544 J=1,50                                                     CDS03200
      I=4*(J-1)+1                                                        CDS03300
      IF (CPARAM(J).LE.0.) GO TO 1544                                    CDS03400
      WRITE (IO,1532) CLABEL(I),CLABEL(I+1),CLABEL(I+2),CLABEL(I+3),     CDS03500
     *                CUNIT(I),CUNIT(I+1),CUNIT(I+2),CUNIT(I+3),        CDS03600
     *                CPARAM(J),CQAV(J),CQMX(J),CQPK(J)                 CDS03700
 1532 FORMAT (19X,4A4,2X,4A4,4F14.0)                                     CDS03800

 1544 CONTINUE                                                           CDS03900
 1700 RETURN                                                             CDS04000
      END                                                                CDS04100
      SUBROUTINE IDSPLY                                                  IDS00100
C     SUBROUTINE TO PRINT OUT INDUSTRIAL CALCULATIONS                    IDS00200
      REAL IBL
      REAL IGALAV,IGALMX,IGALPK,ILABL,IUSEAV,IUSEMX,IUSEPK,IPARAM,
     1IQAVE,IQMAX,IQPEK
      COMMON/IFILE/IN,IO                                                 IDS00300
      COMMON/CITDAT/CDATE,ALAT,ALONG,PO,PD,AGE,TEMPLT,EMPL4,             IDS00400
     2       CNCOME,CSERVE,FDAT,POPRO,PNCOME,ACRESP,                    IDS00500
     3       HDGROP,PSERVE,CIT(6),IDSCIT(3)                             IDS00600
      COMMON/INDUST/IGALAV,IGALMX,IGALPK,ILABL(800),IUSEAV(200),         IDS00700
     2              IUSEMX(200),IUSEPK(200),IPARAM(200),                IDS00800
     3              IQAVE(200),IQMAX(200),IQPEK(200)                    IDS00900
      DATA IBL/4H    /                                                   IDS01000
      IFDAT=IFIX(FDAT)                                                   IDS01100
C     PRINTS PAGE HEADING                                                IDS01200
      WRITE (IO,80) CIT,IFDAT                                            IDS01300
   80 FORMAT (1H1,12X,50HMUNICIPAL  WATER  REQUIREMENTS  FOR  THE  CITY IDS01400
     * OF,2X,3A4,3A4,2X,14HFOR  THE  YEAR,2X,I4//49X,26HANALYZED  BY  MAIDS01500
     *IN  SYSTEM//)                                                     IDS01600
      WRITE (IO,90)                                                      IDS01700
   90 FORMAT (35X,54HTOTAL INDUSTRIAL WATER REQUIREMENTS IN GALLONS PER  IDS01800
     1DAY/1HO,29X,14HANNUAL AVERAGE,7X,13HMAXIMUM DAILY,9X,              IDS01900
     2 11HPEAK HOURLY)                                                   IDS02000
      WRITE (IO  ,91)  IGALAV,IGALMX,IGALPK                              IDS02100
   91 FORMAT (24X,3F20.0)                                                IDS02200
   93 WRITE(IO  ,98)                                                     IDS02300
   98 FORMAT (//1HO,41X,32HREQUIREMENTS BY TYPE OF INDUSTRY//76X, 11HGALIDS02400
     *LONS/DAY                                                          IDS02500
     */49X, 9HNUMBER OF, 9X, 6HANNUAL, 8X, 7HMAXIMUM, 11X, 4HPEAK/20X   IDS02600
     *, 4HCODE, 2X, 17HINDUSTRY CATEGORY, 6X, 9HEMPLOYEES, 8X, 7HAVERAGEIDS02700
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     *, 12X, 3HDAY, 11X, 4HHOUR)                                        IDS02800
      DO 100  I=1,200                                                   IDS02900
      J = 4*(I-1) + 1                                                   IDS03000
C     TEST TO SEE IF THERE IS A CATEGORY DEFINED AND AN INPUT PARAMETER IDS03100
C     IF THER IS NONE--DO NOT PRINT                                     IDS03200
      IF ((ILABL(J).EQ.IBL) .OR. (IPARAM(I).EQ.0.)) GO TO 100           IDS03300
      ICODE=199+I                                                       IDS03400
      WRITE (IO  ,99) ICODE,ILABL(J),ILABL(J+1),ILABL(J+2),ILABL(J+3),  IDS03500
     1  IPARAM(I),IQAVE(I),IQMAX(I),IQPEK(I)                           IDS03600
   99 FORMAT (20X,I4,3X,4A4,4F15.0)                                     IDS03700
  100 CONTINUE                                                          IDS03800
      RETURN                                                            IDS03900
      END                                                               IDS04000
      SUBROUTINE PROINP (IERR,IRES,ICOM,INDS,IPUB)                      PR000100
C....                                                                   PR000200
C....                                                                   PR000300
C     THIS SUBROUTINE READS IN THE KEY AND OPTIONAL PROJECTIONS MADE BY PR000400
C     THE MAIN II USER                                                  PR000500
C....                                                                   PR000600
C....                                                                   PR000700
C     POPT IS THE ARRAY CONTAINING THE SUBGROUP NAMES FOR THE OPTIONAL  PR000800
C             PROJECTIONS.                                              PR000900
C     AKEY CONTAINS THE DATA NAMES OF THE THREE KEY PROJECTIONS (YEAR   PR001000
C             POPULATION, AND INCOME) AS WELL AS ACREAGE, HOUSING DENS- PR001100
C             ITY AND TOTAL SERVICES.                                   PR001200
C     HOMN CONTAINS THE DATA NAMES FOR THE TOTAL NUMBER OF HOMES IN EACHPR001300
C             CLASS FOR THE FOUR CATEGORIES MS, MT, FS, FT AND TOTALS   PR001400
C             FOR EACH CATEGORY.                                        PR001500
C....                                                                   PR001600
      REAL MAN                                                          PR002600
      DIMENSION POPT(24),AKEY(6),HOMN(16)                               PR002700
      DIMENSION          ADATA(6),TSTORE(200,7),YEAR(7),X(7),Y(7)       PR001700
      COMMON/PUBLC /PUBNM(30),PPD(150),PROPUB(216),PPAR(150)            PR001800
      COMMON/INDUST/DDATA(1603),PRIN(201),PROIND(399)                   PR001900
      COMMON/IFILE/IN,IO                                                PR002000
      COMMON/CITDAT/CITDUM(10),PKEY(6),BDUM(6),PROCIT(3)                PR002100
      COMMON/RESIDL/RDUM(300),HNUM(16),PRORSD(210)                      PR002200
      COMMON/NUMBER/NOS                                                 PR002300
      COMMON/COMMRL/CDUM(3),CNAME(50),CD(450),CCEMP(50),                PR002400
     2              CEMP(50),P(50),CPAR(50),PROCOM(100)                 PR002500
C....                                                                   PR002800
      EQUIVALENCE (DDATA(1),TSTORE(1,1))                                PR004300
C....                                                                   PR002900
      DATA  EOD/4HENDD/                                                 PR003000
      DATA  EOY/4HENDY/                                                 PR003100
      DATA POPT/4HNUMH,4HOMES,4HCOMF,4HEMPL,4HCOMF,4HPARM,4HINDP,4HROJT,PR003200
     1          4HPUBP,4HARAM,4HPUBA,4HNAVE,4HPUBM,4HAXDY,4HPUBP,4HEKHR,PR003300
     2          4HHNUM,4HHOMS,4HHCOM,4HPARM,4HHIND,4HPARM,4HHPUB,4HPARM/PR003400
      DATA AKEY/4HYEAR,4HPOPU,4HICOM,4HACRE,4HDENS,4HTSER/              PR003500
      DATA  BLANK/4H    /                                               PR003600
      DATA HOMN/4HMWLO,4HMWMD,4HMWHI,4HMWTL,4HMPLO,4HMPMD,4HMPHI,4HMPTL,PR003700
     1          4HFWLO,4HFWMD,4HFWHI,4HFWTL,4HFPLO,4HFPMD,4HFPHI,4HFPTL/ PR003800
      DATA  MAN/4HEMPM/                                                 PR003900
C....                                                                   PR004100
C....                                                                   PR004200
C....                                                                   PR004300
      ITYPE=3                                                           PR004400
C....                                                                   PR004500
C     INITIALIZE ALL DATA FIELDS TO MINUS ONE.                          PR004600
C....                                                                   PR004700
      CALL INITL (PPAR ,150,-1.0)                                       PR004800
      CALL INITL (HNUM , 16,-1.0)                                       PR004900
      CALL INITL (PKEY ,  6,-1.0)                                       PR005000
      CALL INITL (CEMP , 50,-1.0)                                       PR005100
      CALL INITL (CPAR , 50,-1.0)                                       PR005200
      CALL INITL (PRIN, 200,-1.0)                                       PR005300
   30 CONTINUE                                                          PR005400
C....                                                                   PR005500
C     READ DATA CARDS FOLLOWING NEW YEAR AND TEST FOR A MATCH.  END OF  PR005600
C     DATA, OR END OF THAT YEARS PROJECTIONS BLANK FIELDS ARE BYPASSED. PR005700
C....                                                                   PR005800
      READ (IN,10) (ADATA(N),N=1,6)                                     PR005900
      WRITE(IO,10)(ADATA(N),N=1,6)                                      PR006000
   10 FORMAT (3(1X,A4,1X,F16.3))                                        PR006100
      IF (ADATA(1).EQ. EOY) GO TO 9000                                  PR006200
      IF (ADATA(1).EQ. EOD) GO TO 1000                                  PR006300
      DO 200 K=1,6,2                                                    PR006400
      IF (ADATA(K).EQ. BLANK) GO TO 200                                 PR006500
      DO 40 L=1,6                                                       PR006600
      IF (ADATA(K).EQ.AKEY(L)) GO TO 80                                 PR006700
   40 CONTINUE                                                          PR006800
C....                                                                   PR006900
C....                                                                   PR007000
C     ERROR MESSAGE                                                     PR007100
C....                                                                   PR007200
      WRITE (IO,75) ADATA(K)                                            PR007300
   75 FORMAT (1X,41HTHE FOLLOWING IS INVALID PROJECTION INPUT,2X,A4)    PR007400
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      IERR=IERR+1                                                       PR007600
      GO TO 200                                                         PR007700
   80 CONTINUE                                                          PR007800
C....                                                                   PR007900
C     IF A MATCH IS MADE STORE THE DATA AND CONTINUE UNTIL ENDD    OR   PR008000
C         ENDYEAR.  WHEN ENDDATA IS ENCOUNTERED SEARCH FOR ANOTHER      PR008100
C         SUBGROUP NAME CARD.  WHEN ENDYEAR CALL GROWTH TO MAKE PROJECT-PR008200
C         IONS AND RETURN TO REDINP.                                    PR008300
C....                                                                   PR008400
      PKEY(L)=ADATA(K+1)                                                PR008500
  200 CONTINUE                                                          PR008600
      GO TO 30                                                          PR008700
 1000 CONTINUE                                                          PR008800
C....                                                                   PR008900
C     TEST FOR MATCH ON SUBGROUP NAME CARD.                             PR009000
C....                                                                   PR009100
 1010 READ(IN,1020)ANAME1,ANAME2                                        PR009200
      WRITE(IO,1020)ANAME1,ANAME2                                       PR009300
 1020 FORMAT (1X,2A4)                                                   PR009400
      IF (ANAME1.EQ. EOY) GO TO 9000                                    PR009500
 1040 CONTINUE                                                          PR009600
      DO 1100 KP=1,24,2                                                 PR009700
      IF (ANAME1.EQ.POPT(KP).AND.ANAME2.EQ.POPT(KP+1)) GO TO 1045       PR009800
C....                                                                   PR009900
C     NO MATCH --- ERROR                                                PR010000
C....                                                                   PR010100
 1100 CONTINUE                                                          PR010200
      IERR=IERR+1                                                       PR010300
      WRITE (IO,1110) ANAME1,ANAME2                                     PR010400
 1110 FORMAT (1X,2A4,2X,69HIS AN INVALID SUBGROUP NAME CARD.  DATA CARDSPR010500
     1 READ BUT NOT PROCESSED.)                                         PR010600
 1120 READ (IN,10)(ADATA(N),N=1,6)                                      PR010700
      WRITE(IO,10)(ADATA(N),N=1,6)                                      PR010800
      IF (ADATA(1).EQ. EOD) GO TO 1000                                  PR010900
      IF (ADATA(1).EQ. EOY) GO TO 9000                                  PR011000
      GO TO 1120                                                        PR011100
 1045 CONTINUE                                                          PR011200
      IYR=0                                                             PR011300
 1050 CONTINUE                                                          PR011400
C....                                                                   PR011500
C....                                                                   PR011600
C     READ DATA CARDS.  TEST FOR BLANKS,ENDDATA, AND ENDYEAR.           PR011700

C....                                                                   PR011800
C....                                                                   PR011900
      READ (IN,10)  (ADATA(N),N=1,6 )                                   PR012000
      WRITE(IO,10)(ADATA(N),N=1,6)                                      PR012100
      KK=(KP+1)/2                                                       PR012200
      IF (ADATA(1).EQ. EOD.AND.KK.LE.8.)GO TO 1000                      PR012300
      IF (ADATA(1).EQ. EOD.AND.KK.GT.8.)GO TO 8000                      PR012400
 1060 CONTINUE                                                          PR012500
      IF (ADATA(1).EQ. EOY) GO TO 9000                                  PR012600
      GO TO (1200,1300,1400,1500,1600,1600,1600,1600,1700,1800,1900,    PR012700
     1       2000),KK                                                   PR012800
 1190 CONTINUE                                                          PR012900
 1200 CONTINUE                                                          PR013000
C....                                                                   PR013100
C....                                                                   PR013200
C     THIS ROUTINE STORES DATA FOR NO. OF HOMES IF VALID DATA NAME      PR013300
C         EXISTS. OTHERWISE AN ERROR MESSAGE IS PRINTED.                PR013400
C....                                                                   PR013500
C....                                                                   PR013600
      DO 1280 K=1,6,2                                                   PR013700
      IF (ADATA(K).EQ. BLANK) GO TO 1280                                PR013800
      DO 1260 L=1,16                                                    PR013900
      IF (ADATA(K).EQ.HOMN(L)) GO TO 1270                               PR014000
 1260 CONTINUE                                                          PR014100
      WRITE(IO,1250) ADATA(K)                                           PR014200
 1250 FORMAT (1X,A4,2X,24HIS AN INVALID DATA NAME.)                     PR014300
      GO TO 1280                                                        PR014400
 1270 HNUM(L)=ADATA(K+1)                                                PR014500
 1280 CONTINUE                                                          PR014600
      GO TO 1050                                                        PR014700
 1300 CONTINUE                                                          PR014800
C....                                                                   PR014900
C....                                                                   PR015000
C     THIS ROUTINE STORES DATA FOR COMMERCIAL EMPLOYEES IF VALID.       PR015100
C....                                                                   PR015200
      DO 1350 K=1,6,2                                                   PR015300
      IF (ADATA(K).EQ. BLANK) GO TO 1350                                PR015400
C....                                                                   PR015500
      DO 1320 L=1,NOS                                                   PR015600
      IF (ADATA(K).EQ.CNAME(L)) GO TO 1340                              PR015700
 1320 CONTINUE                                                          PR015800
      CALL UNPACK (ITEST,ADATA(K),JJ,MM,LL)                             PR015900
      IF (ITEST.GT.0) GO TO 1330                                        PR016000
      L=28+10*MM+LL                                                     PR016100
      GO TO 1340                                                        PR016200
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 1330 CONTINUE                                                          PRO16300
      WRITE (IO,1335)ADATA(K)                                           PRO16400
 1335 FORMAT (1X,A4,2X,42HIS A BAD LABEL FOR COMMERCIAL PROJECTIONS.)   PRO16500
      IERR=IERR+1                                                       PRO16600
      GO TO 1350                                                        PRO16700
 1340 CONTINUE                                                          PRO16800
      CEMP(L)=ADATA(K+1)                                                PRO16900
 1350 CONTINUE                                                          PRO17000
      GO TO 1050                                                        PRO17100

 1400 CONTINUE                                                          PRO17200
C....                                                                   PRO17300
C....                                                                   PRO17400
C     THIS ROUTINE STORES DATA FOR COMMERCIAL PARAMETERS IF VALID.      PRO17500
      DO 1450 K=1,6,2                                                   PRO17600
      IF (ADATA(K).EQ. BLANK) GO TO 1450                                PRO17700
C....                                                                   PRO17800
C....                                                                   PRO17900
      DO 1420 L=1,NOS                                                   PRO18000
      IF (ADATA(K).EQ.CNAME(L)) GO TO 1440                              PRO18100
 1420 CONTINUE                                                          PRO18200
      CALL UNPACK(ITEST, ADATA(K),JJ,MM,LL)                             PRO18300
      IF (ITEST.GT.0) GO TO 1430                                        PRO18400
      L=28+10*MM+LL                                                     PRO18500
      GO TO 1440                                                        PRO18600
 1430 CONTINUE                                                          PRO18700
      WRITE (IO,1335) ADATA(K)                                          PRO18800
      IERR=IERR+1                                                       PRO18900
      GO TO 1450                                                        PRO19000
 1440  CONTINUE                                                         PRO19100
      CPAR(L)=ADATA(K+1)                                                PRO19200
 1450 CONTINUE                                                          PRO19300
      GO TO 1050                                                        PRO19400
 1500 CONTINUE                                                          PRO19500
C....                                                                   PRO19600
C....                                                                   PRO19700
C     THIS ROUTINE STORES THE DATA FOR THE PROJECTED INDUSTRIAL EMPL.   PRO19800
C....                                                                   PRO19900
      DO 1550 K=1,6,2                                                   PRO20000
      IF (ADATA(K).EQ. BLANK) GO TO 1550                                PRO20100
      IF (ADATA(K).EQ. MAN) GO TO 1520                                  PRO20200
C....                                                                   PRO20300
      CALL UNPACK(ITEST,ADATA(K),JJ,MM,LL)                              PRO20400
      IF (ITEST.GT.0) GO TO 1530                                        PRO20500
      L=100*(JJ-2)+10*MM+LL+1                                           PRO20600
      IF (L.GT.200) GO TO 1550                                          PRO20700
      GO TO 1540                                                        PRO20800
 1520 CONTINUE                                                          PRO20900
      PRIN(201)=ADATA(K+1)                                              PRO21000
      GO TO 1550                                                        PRO21100
 1530 CONTINUE                                                          PRO21200
      WRITE (IO,1535) ADATA(K)                                          PRO21300
 1535 FORMAT (1X,A4,2X,42HIS A BAD LABEL FOR INDUSTRIAL PROJECTIONS.)   PRO21400
      IERR=IERR+1                                                       PRO21500
      GO TO 1550                                                        PRO21600
 1540 CONTINUE                                                          PRO21700
      PRIN(L)=ADATA(K+1)                                                PRO21800
 1550 CONTINUE                                                          PRO21900
      GO TO 1050                                                        PRO22000
C....                                                                   PRO22100
C.....                                                                  PRO22200
C     THIS SECTION STORES PUBLIC UNACCOUNTED WATER USAGE AND PARAMETERS PRO22300
C.....                                                                  PRO22400
 1600 CONTINUE                                                          PRO22500

      KK=KK-4                                                           PRO24500
      IF (KK .GT. 1) KK = KK + 1                                        PRO24600
      DO 1680 K=1,6,2                                                   PRO22600
      IF (ADATA(K).EQ. BLANK) GO TO 1680                                PRO22700
      DO 1620 I=1,ITYPE                                                 PRO22800
      IF ( PURNM(I).EQ.ADATA(K)) GO TO 1660                             PRO22900
C....                                                                   PRO23000
 1620 CONTINUE                                                          PRO23100
C     TEST FOR OTHER THAN ESTABLISHED PUBLIC-UNACCOUNTED CATEGORIES.    PRO23200
      CALL UNPACK(ITEST, ADATA(K),JJ,MM,LL)                             PRO23300
      IF (ITEST.EQ.0) GO TO 1650                                        PRO23400
      WRITE (IO,1630) ADATA(K)                                          PRO23500
 1630 FORMAT (1X,A4,2X54HIS A BAD LABEL FOR PUBLIC-UNACCOUNTED PROJECTIOPRO23600
     1N DATA.)                                                          PRO23700
      IERR=IERR+1                                                       PRO23800
      GO TO 1680                                                        PRO23900
C....                                                                   PRO24000
 1650 CONTINUE                                                          PRO24100
      I = ITYPE + 10 * LL + MM                                          PRO24200
C.....                                                                  PRO24300
 1660 CONTINUE                                                          PRO24400
      M = 30 * (KK - 1) + I                                             PRO24700
      PPAR(M) = ADATA(K+1)                                              PRO24800
C.....                                                                  PRO24900
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 1680 CONTINUE                                                          PRO25000
      GO TO 1050                                                        PRO25100
C.....                                                                  PRO25200
C....                                                                   PRO25300
C....                                                                   PRO25400
C     THIS ROUTINE PROCESSES HISTORICAL RECORD OF RESIDENTIAL PARAMETERSPRO25500
C....                                                                   PRO25600
C....                                                                   PRO25700
 1700 CONTINUE                                                          PRO25800
      DO 1770 K=1,6,2                                                   PRO25900
      IF (ADATA(K).EQ. BLANK) GO TO 1770                                PRO26000
      IF (ADATA(K).EQ.AKEY(1)) GO TO 1730                               PRO26100
      IF (IYR.GT.0) GO TO 1740                                          PRO26200
C....                                                                   PRO26300
C     NO YEAR PROVIDED --- ERROR                                        PRO26400
C....                                                                   PRO26500
 1710 CONTINUE                                                          PRO26600
      WRITE(IO,1720) (ADATA(I),I=1,6,2)                                 PRO26700
      IERR=IERR+1                                                       PRO26800
 1720 FORMAT(1X,9HVARIABLES,2X,3(A4,2X),26HDO NOT FOLLOW A YEAR NAME.)  PRO26900
      GO TO 1050                                                        PRO27000
 1730 CONTINUE                                                          PRO27100
C....                                                                   PRO27200
C     READ YEAR NAME                                                    PRO27300
C....                                                                   PRO27400
      IYR=IYR+1                                                         PRO27500
      YEAR(IYR)=ADATA(K+1)                                              PRO27600
      GO TO 1770                                                        PRO27700
 1740 CONTINUE                                                          PRO27800
C....                                                                   PRO27900

C     READ DATA FOLLOWING YEAR NAME                                     PRO28000
C....                                                                   PRO28100
      DO 1750 L=1,16                                                    PRO28200
      IF (ADATA(K).EQ.HOMN(L)) GO TO 1760                               PRO28300
 1750 CONTINUE                                                          PRO28400
C....                                                                   PRO28500
C     INVALID DATA NAME --- ERROR                                       PRO28600
C....                                                                   PRO28700
      WRITE(IO,1250) ADATA(K)                                           PRO28800
      IERR=IERR+1                                                       PRO28900
      GO TO 1770                                                        PRO29000
 1760 CONTINUE                                                          PRO29100
      TSTORE(L,IYR)=ADATA(K+1)                                          PRO29200
 1770 CONTINUE                                                          PRO29300
      GO TO 1050                                                        PRO29400
C....                                                                   PRO29500
C....                                                                   PRO29600
C     THIS ROUTINE PROCESSES HISTORICAL RECORD OF COMMERCIAL PARAMETERS PRO29700
C....                                                                   PRO29800
C....                                                                   PRO29900
 1800 CONTINUE                                                          PRO30000
      DO 1870 K=1,6,2                                                   PRO30100
      IF (ADATA(K).EQ. BLANK) GO TO 1870                                PRO30200
      IF (ADATA(K).EQ.AKEY(1)) GO TO 1820                               PRO30300
      IF (IYR.GT.0) GO TO 1830                                          PRO30400
C....                                                                   PRO30500
C     NO YEAR PROVIDED --- ERROR                                        PRO30600
C....                                                                   PRO30700
 1810 CONTINUE                                                          PRO30800
      WRITE(IO,1720) (ADATA(I),I=1,6,2)                                 PRO30900
      IERR=IERR+1                                                       PRO31000
      GO TO 1050                                                        PRO31100
 1820 CONTINUE                                                          PRO31200
C....                                                                   PRO31300
C     READ YEAR NAME                                                    PRO31400
C....                                                                   PRO31500
      IYR=IYR+1                                                         PRO31600
      YEAR(IYR)=ADATA(K+1)                                              PRO31700
      GO TO 1870                                                        PRO31800
 1830 CONTINUE                                                          PRO31900
C....                                                                   PRO32000
C     READ DATA FOLLOWING YEAR NAME                                     PRO32100
C....                                                                   PRO32200
      DO 1840 L=1,NOS                                                   PRO32300
      IF (ADATA(K).EQ.CNAME(L)) GO TO 1860                              PRO32400
 1840 CONTINUE                                                          PRO32500
      CALL UNPACK(ITEST, ADATA(K),JJ,MM,LL)                             PRO32600
      IF (ITEST.GT.0) GO TO 1850                                        PRO32700
      L=28+10*MM+LL                                                     PRO32800
      GO TO 1860                                                        PRO32900
 1850 CONTINUE                                                          PRO33000
C....                                                                   PRO33100
C     INVALID DATA NAME --- ERROR                                       PRO33200
C....                                                                   PRO33300
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      WRITE(IO,1250) ADATA(K)                                          PR033400
      IERR=IERR+1                                                      PR033500
      GO TO 1870                                                       PR033600
 1860 CONTINUE                                                         PR033700
      TSTORE(L,IYR)=ADATA(K+1)                                         PR033800
 1870 CONTINUE                                                         PR033900
      GO TO 1050                                                       PR034000
C....                                                                  PR034100
C....                                                                  PR034200
C     THIS ROUTINE PROCESSES HISTORICAL RECORD OF INDUSTRIAL PARAMETERS PR034300
C....                                                                  PR034400
C....                                                                  PR034500
 1900 CONTINUE                                                         PR034600
      DO 1960 K=1,6,2                                                  PR034700
      IF (ADATA(K).EQ. BLANK) GO TO 1960                               PR034800
      IF (ADATA(K).EQ.AKEY(1)) GO TO 1920                              PR034900
      IF (IYR.GT.0) GO TO 1930                                         PR035000
C....                                                                  PR035100
C     NO YEAR PROVIDED --- ERROR                                       PR035200
C....                                                                  PR035300
 1910 CONTINUE                                                         PR035400
      WRITE(IO,1720) (ADATA(I),I=1,6,2)                                PR035500
      IERR=IERR+1                                                      PR035600
      GO TO 1050                                                       PR035700
 1920 CONTINUE                                                         PR035800
C....                                                                  PR035900
C     READ YEAR NAME                                                   PR036000
C....                                                                  PR036100
      IYR=IYR+1                                                        PR036200
      YEAR(IYR)=ADATA(K+1)                                             PR036300
      GO TO 1960                                                       PR036400
 1930 CONTINUE                                                         PR036500
C....                                                                  PR036600
C     READ DATA FOLLOWING YEAR NAME                                    PR036700
C....                                                                  PR036800
      CALL UNPACK(ITEST, ADATA(K),JJ,MM,LL)                            PR036900
      IF (ITEST.GT.0) GO TO 1940                                       PR037000
      L=100*(JJ-2)+10*MM+LL+1                                          PR037100
      IF (L.GT.200.OR.L.LE.0) GO TO 1940                               PR037200
      GO TO 1950                                                       PR037300
 1940 CONTINUE                                                         PR037400
C....                                                                  PR037500
C     INVALID DATA NAME --- ERROR                                      PR037600
C....                                                                  PR037700
      WRITE(IO,1250) ADATA(K)                                          PR037800
      IERR=IERR+1                                                      PR037900
      GO TO 1960                                                       PR038000
 1950 CONTINUE                                                         PR038100
      TSTORE(L,IYR)=ADATA(K+1)                                         PR038200
 1960 CONTINUE                                                         PR038300
      GO TO 1050                                                       PR038400
C....                                                                  PR038500
C....                                                                  PR038600
C     THIS ROUTINE PROCESSES HISTORICAL RECORD OF PUBLIC/UNACC. PARAMETEPR038700
C....                                                                  PR038800
C....                                                                  PR038900
 2000 CONTINUE                                                         PR039000
      DO 2070 K=1,6,2                                                  PR039100
      IF (ADATA(K).EQ. BLANK) GO TO 2070                               PR039200
      IF (ADATA(K).EQ.AKEY(1)) GO TO 2020                              PR039300
      IF (IYR.GT.0) GO TO 2030                                         PR039400
C....                                                                  PR039500
C     NO YEAR PROVIDED --- ERROR                                       PR039600
C....                                                                  PR039700
 2010 CONTINUE                                                         PR039800
      WRITE(IO,1720) (ADATA(I),I=1,6,2)                                PR039900
      IERR=IERR+1                                                      PR040000
      GO TO 1050                                                       PR040100
 2020 CONTINUE                                                         PR040200
C....                                                                  PR040300
C     READ YEAR NAME                                                   PR040400
C....                                                                  PR040500
      IYR=IYR+1                                                        PR040600
      YEAR(IYR)=ADATA(K+1)                                             PR040700
      GO TO 2070                                                       PR040800
 2030 CONTINUE                                                         PR040900
C....                                                                  PR041000
C     READ DATA FOLLOWING YEAR NAME                                    PR041100
C....                                                                  PR041200
      DO 2040 L=1,ITYPE                                                PR041300
      IF (ADATA(K).EQ. PUBNM(L)) GO TO 2060                            PR041400
 2040 CONTINUE                                                         PR041500
      CALL UNPACK(ITEST, ADATA(K),JJ,MM,LL)                            PR041600
      IF (ITEST.GT.0) GO TO 2050                                       PR041700
      L=ITYPE+10*MM+LL                                                 PR041800
      IF (L.GT.30.OR.L.LE.0) GO TO 2050                                PR041900
      GO TO 2060                                                       PR042000
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 2050 CONTINUE                                                          PRO42100
C....                                                                   PRO42200
C     INVALID DATA NAME --- ERROR                                       PRO42300
C....                                                                   PRO42400
      WRITE(IO,1250) ADATA(K)                                           PRO42500
      IERR=IERR+1                                                       PRO42600
      GO TO 2070                                                        PRO42700
 2060 CONTINUE                                                          PRO42800
      TSTORE(L,IYR)=ADATA(K+1)                                          PRO42900
 2070 CONTINUE                                                          PRO43000
      GO TO 1050                                                        PRO43100
C....                                                                   PRO43200
C....                                                                   PRO43300
C     EXTRAPOLATE PROJECTED VALUES OF PARAMETERS FROM HISTORICAL RECORD PRO43400
C....                                                                   PRO43500
C....                                                                   PRO43600
 8000 CONTINUE                                                          PRO43700
      KKK=KK-8                                                          PRO43800
      DO 8500 I=1,200                                                   PRO43900
      NNN=0                                                             PRO44000
      DO 8010 J=1,7                                                     PRO44100
      IF (TSTORE(I,J).LE.0.0) GO TO 8010                                PRO44200
      NNN=NNN+1                                                         PRO44300
      X(NNN)=YEAR(J)                                                    PRO44400
      Y(NNN)=TSTORE(I,J)                                                PRO44500
 8010 CONTINUE                                                          PRO44600
C....                                                                   PRO44700
C     PERFORM LINEAR REGRESSION ON TWO OR MORE DATA POINTS              PRO44800
C....                                                                   PRO44900
      IF (NNN-1) 8500,8050,8090                                         PRO45000
 8050 CONTINUE                                                          PRO45100
C....                                                                   PRO45200
C     ONE DATA POINT --- ERROR                                          PRO45300
C....                                                                   PRO45400
      WRITE(IO,8060)                                                    PRO45500
 8060 FORMAT(1X,56HWARNING --- ABOVE DATA INPUT FOR A SINGLE YEAR, IGNORPRO45600
     1ED.)                                                              PRO45700
      GO TO 8500                                                        PRO45800
 8090 CONTINUE                                                          PRO45900
      CALL LREGRS (NNN,X,Y,S,C)                                         PRO46000
C....                                                                   PRO46100
C     COMPUTE PROJECTED VALUE                                           PRO46200
C....                                                                   PRO46300
      TEMP=C+(S*PKEY(1))                                                PRO46400
      IF (TEMP.LE.0.0) TEMP=0.0                                         PRO46500
C....                                                                   PRO46600
C     STORE PROJECTED VALUE                                             PRO46700
C....                                                                   PRO46800
      GO TO (8100,8200,8300,8400),KKK                                   PRO46900
 8100 CONTINUE                                                          PRO47000
      IF (HNUM(I).LT.0.0) HNUM(I)=TEMP                                  PRO47100
      GO TO 8500                                                        PRO47200
 8200 CONTINUE                                                          PRO47300
      IF (CPAR(I).LT.0.0) CPAR(I)=TEMP                                  PRO47400
      GO TO 8500                                                        PRO47500
 8300 CONTINUE                                                          PRO47600
      IF (PRIN(I).LT.0.0) PRIN(I)=TEMP                                  PRO47700
      GO TO 8500                                                        PRO47800
 8400 CONTINUE                                                          PRO47900
      IF (PPAR(I).LT.0.0) PPAR(I)=TEMP                                  PRO48000
      GO TO 8500                                                        PRO48100
 8500 CONTINUE                                                          PRO48200
      CALL INITL (TSTORE,1400,0.0)                                      PRO48300
      CALL INITL (TSTORE,1400,0.0)                                      PRO48400
      GO TO 1000                                                        PRO48500
C....                                                                   PRO48600
C....                                                                   PRO48700
C     TEST FOR KEY PROJECTIONS                                          PRO48800
C....                                                                   PRO48900
C....                                                                   PRO49000
C....                                                                   PRO49100
 9000 CONTINUE                                                          PRO49200
      IF (IERR.GT.0) RETURN                                             PRO49300
      DO 9100 K=1,3                                                     PRO49400
      IF (PKEY(K).GT.0.0) GO TO 9100                                    PRO49500
      WRITE (IO,9050) AKEY(K)                                           PRO49600
 9050 FORMAT (/10HTHE KEY PROJECTION,2X,A4,2X,48HHAS NOT BEEN INPUT.  PRPRO49700
     1OJECTION IS NOT POSSIBLE.)                                        PRO49800
      IERR = IERR + 1                                                   PRO49900
      RETURN                                                            PRO50000
 9100 CONTINUE                                                          PRO50100
C....                                                                   PRO50200
C     ALL PROJECTION DATA HAS BEEN STORED                               PRO50300
C....                                                                   PRO50400
      CALL GROWTH (IRES,ICON,INDS,IPUB)                                 PRO50500
      RETURN                                                            PRO50600
      END                                                               PRO50700
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      SUBROUTINE RDSPLY(IF)                                                 RDS00100
C                                                                           RDS00200
C PRINT RESIDENTIAL WATER USAGE CALCULATIONS                                RDS00300
C                                                                           RDS00400
C                                                                           RDS00500
C IF=0, CURRENT DATA.     IF=1, PREDICTED DATA                              RDS00600
C                                                                           RDS00700
      REAL MSPVLL,MSPVLU,MSPASM,MSPAPR,MSPSPR,MSPDEN,MSPPEP,MSPNUM,
     1MSWVLL,MSWVLU,MSWASM,MSWAPR,MSWSPR,MSWDEN,MSWPEP,MSWNUM
      DIMENSION TITLE(6), H1(8), H2(8), H3(8), H4(8),H5(8)              RDS02500
      COMMON/CITDAT/CDATE,ALAT,ALONG,PO,PD,AGE,TEMPLT,EMPL4,            RDS00800
     2       CNCOME,CSERVE,FDAT,POPRO,PNCOME,ACRESP,                    RDS00900
     3       HDGROP,PSERVE,CIT(6),RDSCIT(3)                             RDS01000
      COMMON/IFILE/IN,IO                                                RDS01100
      COMMON /RESPAR/ FSPVLL(25),FSPVLU(25),FSPASM(25),FSPAPR(25),      RDS01200
     1FSPSPR(25),FSPDEN(25),FSPPEP(25),FSPNUM(25),FSWVLL(25),FSWVLU(25),RDS01300
     2FSWASM(25),FSWAPR(25),FSWSPR(25),FSWDEN(25),FSWPEP(25),FSWNUM(25),RDS01400
     3MSPVLL(25),MSPVLU(25),MSPASM(25),MSPAPR(25),MSPSPR(25),MSPDEN(25),RDS01500
     4MSPPEP(25),MSPNUM(25),MSWVLL(25),MSWVLU(25),MSWASM(25),MSWAPR(25),RDS01600
     5MSWSPR(25),MSWDEN(25),MSWPEP(25),MSWNUM(25),RDSRSP(12)            RDS01700
      COMMON /RESIDL/ EVAPSM,RAINSM,EVAPMX,EVAPNT,RQAVE,RQMAX,RQPEK,    RDS01800
     1                RFPNUM,RQFPDM,RQFPSP,RQFPTL,RFWNUM,RQFWDM,        RDS01900
     2 RQFWSP,RQFWTL,RMPNUM,RQMPDM,RQMPSP,RQMPTL,RMWNUM,RQMWDM,RQMWSP,  RDS02000
     3RQMWTL,QFPDOM(25),QFPSPK(25),QFPTOT(25),QFPMAX(25),QFPPEK(25),    RDS02100
     4QFWDOM(25),QFWSPK(25),QFWTOT(25),QFWMAX(25),QFWPEK(25),QMPDOM(25),RDS02200
     5QMPSPK(25),QMPTOT(25),QMPMAX(25),QMPPEK(25),QMWDOM(25),QMWSPK(25),RDS02300
     6QMWTOT(25),QMWMAX(25),QMWPEK(25),RDSRSD(3)                        RDS02400
      DATA TITLE/4H     ,4HCURR,4HENT ,4H  PR,4HEDIC,4HTED /            RDS02600
      DATA H1/4H     ,4HMETE,4HRED ,4HAND ,4HSEWE,4HRED ,4HAREA,4HS   / RDS02700
      DATA H2/4H    F,4HLAT ,4HRATE,4H AND,4H SEW,4HERED,4H ARE,4HAS  / RDS02800
      DATA H3/4H  ME,4HTERE,4HD AN,4HD SE,4HPTIC,4H TAN,4HK AR,4HEAS /  RDS02900
      DATA H4/4H FLA,4HT RA,4HTE A,4HND S,4HEPTI,4HC TA,4HNK A,4HREAS/  RDS03000
      DATA H5/4H     ,4H    ,4H    ,4H  TO,4HTAL ,4H    ,4H    ,4H    / RDS03100
      IFDAT=IFIX(FDAT)                                                  RDS03200
      IX = IF*3+1                                                       RDS03300
      IE = IX+2                                                         RDS03400
      IF (RQMWTL.LE.0.0) GO TO 450                                      RDS03500
C     PRINTS PAGE HEADING                                               RDS03600
      WRITE (IO,300) CIT,IFDAT                                          RDS03700
  300 FORMAT (1H1,10X,50HMUNICIPAL  WATER  REQUIREMENTS  FOR  THE  CITY RDS03800
     * OF,2X,3A4,3A4,2X,14HFOR  THE  YEAR,2X,I4//48X,26HANALYZED  BY  MARDS03900
     *IN  SYSTEM//)                                                     RDS04000
      WRITE (IO,400) (TITLE(I),I=IX,IE)                                 RDS04100
  400 FORMAT (32X,3A4,42HRESIDENTIAL WATER REQUIREMENTS BY CATEGORY)    RDS04200
      CALL PRWUC (H1,MSWVLL,MSWVLU,MSWNUM,QMWDOM,QMWSPK,QMWTOT,QMWMAX,  RDS04300
     1            QMWPEK)                                               RDS04400
  450 CONTINUE                                                          RDS04500
      IF (RQFWTL.LE.0.0) GO TO 500                                      RDS04600
      WRITE (IO,300) CIT,IFDAT                                          RDS04700
      WRITE (IO,400) (TITLE(I),I=IX,IE)                                 RDS04800
      CALL PRWUC (H2,FSWVLL,FSWVLU,FSWNUM,QFWDOM,QFWSPK,QFWTOT,QFWMAX,  RDS04900
     1            QFWPEK)                                               RDS05000
  500 CONTINUE                                                          RDS05100
      IF (RQMPTL.LE.0.0) GO TO 550                                      RDS05200
      WRITE (IO,300) CIT,IFDAT                                          RDS05300
      WRITE (IO,400) (TITLE(I),I=IX,IE)                                 RDS05400
      CALL PRWUC (H3,MSPVLL,MSPVLU,MSPNUM,QMPDOM,QMPSPK,QMPTOT,QMPMAX,  RDS05500
     1            QMPPEK)                                               RDS05600
  550 CONTINUE                                                          RDS05700
      IF (RQFPTL.LE.0.0) GO TO 600                                      RDS05800
      WRITE (IO,300) CIT,IFDAT                                          RDS05900
      WRITE (IO,400) (TITLE(I),I=IX,IE)                                 RDS06000
      CALL PRWUC (H4,FSPVLL,FSPVLU,FSPNUM,QFPDOM,QFPSPK,QFPTOT,QFPMAX,  RDS06100
     1            QFPPEK)                                               RDS06200
  600 CONTINUE                                                          RDS06300
      WRITE (IO,300) CIT,IFDAT                                          RDS06400
      WRITE (IO,401) (TITLE(I),I=IX,IE)                                 RDS06500
  401 FORMAT (31X,3A4,49HRESIDENTIAL WATER REQUIREMENTS IN GALLONS PER DRDS06600
     1AY///1HO,43X,6HANNUAL,8X,7HMAXIMUM,10X,4HPEAK/                    RDS06700
     2  43X,7HAVERAGE,9X,5HDAILY,10X,6HHOURLY)                         RDS06800
       WRITE (IO,402)  RQAVE,RQMAX,RQPEK                                RDS06900
  402 FORMAT (F50.0,F15.0,F15.0)                                        RDS07000
      WRITE (IO,403)                                                    RDS07100
  403 FORMAT (1HO//43X,37HREQUIREMENTS BY TYPE - ANNUAL AVERAGE/        RDS07200
     1 1HO,34X,4HTYPE,20X,6HNO. OF,12X,15HGALLONS PER DAY/              RDS07300
     2      60X,5HUNITS,4X,8HDOMESTIC,2X,10HSPRINKLING,7X,5HTOTAL)     RDS07400
      IF (RMWNUM .NE. 0.0) WRITE (IO,404) H1,RMWNUM,RQMWDM,RQMWSP,RQMWTLRDS07500
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      T1 = RMWNUM                                                        RDS07600
      T2 = RQMWDM                                                        RDS07700
      T3 = RQMWSP                                                        RDS07800
      T4 = RQMWTL                                                        RDS07900
      IF (RFWNUM .NE. 0.0) WRITE (IO,404) H2,RFWNUM,RQFWDM,RQFWSP,RQFWTLRDS08000
      T1 = T1 + RFWNUM                                                   RDS08100
      T2 = T2 + RQFWDM                                                   RDS08200
      T3 = T3 + RQFWSP                                                   RDS08300
      T4 = T4 + RQFWTL                                                   RDS08400
      IF (RMPNUM .NE. 0.0) WRITE (IO,404) H3,RMPNUM,RQMPDM,RQMPSP,RQMPTLRDS08500
      T1 = T1 + RMPNUM                                                   RDS08600
      T2 = T2 + RQMPDM                                                   RDS08700
      T3 = T3 + RQMPSP                                                   RDS08800
      T4 = T4 + RQMPTL                                                   RDS08900
      IF (RFPNUM .NE. 0.0) WRITE (IO,404) H4,RFPNUM,RQFPDM,RQFPSP,RQFPTLRDS09000
      T1 = T1 + RFPNUM                                                   RDS09100
      T2 = T2 + RQFPDM                                                   RDS09200
      T3 = T3 + RQFPSP                                                   RDS09300
      T4 = T4 + RQFPTL                                                   RDS09400
C     PRINTS TOTALS                                                      RDS09500
      WRITE (IO,404)  H5,T1,T2,T3,T4                                     RDS09600
  404 FORMAT (21X,8A4,4F12.0)                                            RDS09700
C     PRINTS SUMMER RAIN AND EVAPOTRANSPIRATION                          RDS09800
      WRITE (IO,405) EVAPSM,RAINSM,EVAPMX                                RDS09900
  405 FORMAT (1HO/1HO,38X,36HSUMMER EVAPOTRANSPIRATION (INCHES) =,F10.2/RDS10000
     1 1HO,43X,31HSUMMER PRECIPITATION (INCHES) =,F10.2/                 RDS10100
     2 1HO,36X,38HMAX. DAY EVAPOTRANSPIRATION (INCHES) =,F10.2)          RDS10200
      RETURN                                                             RDS10300
      END                                                                RDS10400
      SUBROUTINE REDINP (IERR,IRES,ICOM,INDS,IPUB,JPR)                   RDI00100
C.....                                                                   RDI00200
C     SUBROUTINE TO READ IN MUNICIPAL DATA FOR MAIN II SYSTEM            RDI00300
C     VARIOUS NAMES AND ARRAYS ARE DEFINED AS FOLLOWS                    RDI00400
C         LLIST = ARRAY CONTAINING INDUSTRIAL SUBGROUP NAMES             RDI00500
C         ICONAM= ARRAY CONTAINING COMMERCIAL SUBGROUP NAMES             RDI00600
C         NSGRP = ARRAY CONTAINING RESIDENTIAL SUBGROUP NAMES            RDI00700
C         IPNAME= ARRAY CONTAINING PUBLIC AND UNACCOUNTED SUBGROUP NAMESRDI00800
C         ICITY = ARRAY CONTAINING WORD CITY DATA                        RDI00900
C         CIT   = ARRAY CONTAINING CITY NAME                             RDI01000
C.....                                                                   RDI01100
      REAL IBL
      INTEGER COMPRN                                                     RDI01200
      REAL NSGRP(10),PARNM(12)
      REAL IGALAV,IGALMX,ILABL,IUSEAV,IUSEMX,IUSEPK,IPARAM,IQAVE,IQMAX,
     1IQPEK
      INTEGER OPTC
      REAL PRTOPT(6),NDC(3)
      DIMENSION ALIST(4)                                                 RDI02900
      DIMENSION HLIST(22),PROJ(2)
       DIMENSION  CONAM(4),ADATA(6)                                      RDI03000
      DIMENSION  OPT(2)                                                  RDI03100
      DIMENSION DATA(6)                                                  RDI03200
      DIMENSION  PNAME(8)                                                RDI03400
      DIMENSION  CITY(2),CIT1(3),CIT2(3)                                 RDI03500
      DIMENSION CITNAM(10)
      DIMENSION CDATA(750),DDATA(2203),CDUM(3)                           RDI03700
      COMMON/COMMRL/CGALAV,CGALMX,CGALPK,CNAME(50),CUSEAV(50),CUSEMX(50)RDI01300
     2 ,CUSEPK(50) ,CLABEL(200),CUNIT(200),CPARAM(50),CQAV(50),CQMX(50),RDI01400
     3             CQPK(50)                                              RDI01500
      COMMON/NUMBER/NOS                                                  RDI01600
      COMMON/ITEST/IBL                                                   RDI01700
      COMMON/RESPAR/PAR(800),APAR(12)                                    RDI01800
      COMMON/INDUST/IGALAV,IGALMX,IGALPK,ILABL(800),IUSEAV(200),         RDI01900
     2              IUSEMX(200),IUSEPK(200),IPARAM(200),                 RDI02000
     3              IQAVE(200),IQMAX(200),IQPEK(200)                     RDI02100
      COMMON/PUBLC/PUBNAM(30),PDATA(516)                                 RDI02200
      COMMON/IFILE/IN,IO                                                 RDI02300
      COMMON/CITDAT/CITDAT(16),CIT1,CIT2,CIND(3)                         RDI02400
      COMMON/COMPRN/COMPRN(6)                                            RDI02500
      COMMON/RESIDL/RVAL(526)                                            RDI02600
C.....                                                                   RDI02700
C.....                                                                   RDI02800
      EQUIVALENCE (NOS,NTYPE),(CDATA,CUSEAV),
     2            (DDATA,IGALAV),(CDUM,CGALAV)                           RDI06700
      EQUIVALENCE (IPRJT,COMPRN(4))                                      RDI06800
C....                                                                    RDI03900
C....                                                                    RDI04000
      DATA  CONAM/4HCOMM,4HPARM,4HCOMM,4HEMPL/                           RDI04100
      DATA EOD/4HENDD/                                                   RDI04200
      DATA  ENDI/4HENDI/                                                 RDI04300
      DATA  ENDD/4HENDD/                                                 RDI04400
      DATA  OPT/4HOPTI,4HONS /                                           RDI04500
      DATA NSGRP/4HFLAT,4HSEPT,4HFLAT,4HSEWR,4HMETR,4HSEPT,4HMETR,       RDI04700
     *           4HSEWR,4HENDI,4HNPUT/                                   RDI04800
      DATA BLANK/4H    /                                                 RDI04900
      DATA PARNM/4HVALN,4HVALX,4HASMT,4HANPR,4HSMPR,4HDENS,4HPEPL,       RDI05000
     *           4HNUMB,4HLOWV,4HMEDV,4HHIGH,4HENDD/                     RDI05100
      DATA ALIST/4HINDP,4HARAM,4HENDI,4HNPUT/                            RDI05200
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      DATA  PNAME/4HPUBP,4HARAM,4HPUBA,4HNAVE,4HPUBM,                    RDI05300
     *            4HAXDY,4HPUBP,4HEKHR/                                 RDI05400
      DATA  TYPE/3/                                                     RDI05500
      DATA  CITY /4HCITY,4HDATA/                                        RDI05600
      DATA HLIST/4HPOPU,4HLATN,4HNONW,4HWHITE,4HALLH,4HOMES,4HMEDH,4HOMESRDI05700
     *          ,4HHIGH,4HOMES,4HSKOL,4HYEAR,4HELEM,4HSKOL,4HHIGH,4HSKOLRDI05800
     *          ,4HTSER,4HVICE,4HMEDI,4HCALS,4HINDH,4HISTY/             RDI05900
      DATA PROJ/4HNEWY,4HEAR /                                          RDI06000
      DATA CITNAM /4HCDAT,4HLATD,4HLONG,4HPOPU,4HPDEN,                  RDI06100
     1            4HPOPP,4HEMPL,4HEMTC,4HICOM,4HTSER/                  RDI06200
      DATA PRTOPT/4HMACH,4HLBIN,4HLIBY,4HPROJ,4HPNCH,4HOPTD/            RDI06300
      DATA  NDC/4HCCBN,4HCCBL,4HCCAL/                                   RDI06400
      DATA STOP/4HSTOP/
C....                                                                   RDI06500
C....                                                                   RDI06900
      OPTC=6                                                            RDI07000
      NUM=10                                                            RDI07100
      ITYPE=3
C....                                                                   RDI07200
      CALL INITL (CDUM        ,   3,0.0)                                RDI07300
      CALL INITL (CDATA       , 750,0.0)                                RDI07400
      CALL INITL (PAR         , 812,0.0)                                RDI07500
          CALL INITL (PAR( 51),25,1.0)                                  RDI07600
          CALL INITL (PAR(251),25,1.0)                                  RDI07700
          CALL INITL (PAR(451),25,1.0)                                  RDI07800
          CALL INITL (PAR(651),25,1.0)                                  RDI07900
      CALL INITL (DDATA       ,2203,0.0)                                RDI08000
      CALL INITL (PDATA       , 366,0.0)                                RDI08100
      CALL INITL (RVAL        , 526,0.0)                                RDI08200
      CALL INITL (CITDAT,25,0.0)                                        RDI08300
      WRITE (IO,1)                                                      RDI08400
    1 FORMAT (1H1)                                                      RDI08500
C     DETERMINES THE BLOCK OF INPUT DATA TO BE PROCESSED                RDI08600
C....                                                                   RDI08700
  100 READ (IN,10) ANAME1,ANAME2                                        RDI08800
   10 FORMAT (1X,2A4)                                                   RDI08900
      WRITE (IO,11) ANAME1,ANAME2                                       RDI09000
   11 FORMAT (1X,6HREDINP,2X,2A4///)                                    RDI09100
C.....                                                                  RDI09200
C.....                                                                  RDI09300
C.....TEST FOR END OF INPUT                                             RDI09400
C.....                                                                  RDI09500
C.....                                                                  RDI09600
      IF(ANAME1.EQ.STOP) STOP
      IF (ANAME1.EQ. ENDI) GO TO 9000                                   RDI09700
C.....                                                                  RDI09800
C.....                                                                  RDI09900
C.....TEST TO SEE IF IT IS A COMMERCIAL SUBGROUP NAME CARD              RDI10000
C.....                                                                  RDI10100
C.....                                                                  RDI10200
      DO 20 I=1,4,2                                                     RDI10300
      IF ( ANAME1.EQ. CONAM(I) .AND. ANAME2.EQ. CONAM(I+1) ) GO TO 130  RDI10400
   20 CONTINUE                                                          RDI10500
C.....                                                                  RDI10600
C.....                                                                  RDI10700
C.....TEST TO SEE IF IT IS A RESIDENTIAL SUBGROUP NAME CARD             RDI10800
C.....                                                                  RDI10900
C.....                                                                  RDI11000
      DO 30 I=1,10,2                                                    RDI11100
      IF ( ANAME1 .EQ. NSGRP(I)  .AND.  ANAME2 .EQ. NSGRP(I+1) )        RDI11200
     1  GO TO 310                                                      RDI11300
   30  CONTINUE                                                         RDI11400
C                                                                       RDI11500
C                                                                       RDI11600
C     TEST TO SEE IF IT IS A CITY OPTIONS SUBGROUP NAME CARD            RDI11700
C                                                                       RDI11800
C                                                                       RDI11900
      IF ( ANAME1.EQ. OPT(1 ).AND. ANAME2.EQ. OPT(2) ) GO TO 1978       RDI12000
   35 CONTINUE                                                          RDI12100
C.....                                                                  RDI12200
C.....                                                                  RDI12300
C.....TEST TO SEE IF IT IS A INDUSTRIAL SUBGROUP NAME CARD              RDI12400
C.....                                                                  RDI12500
      IF (ANAME1.EQ.ALIST(1) .AND. ANAME2.EQ.ALIST(2)) GO TO 1010       RDI12600
C                                                                       RDI12700
C                                                                       RDI12800
C     TEST TO SEE IF IT IS A CITY SUBGROUP NAME CARD                    RDI12900
C                                                                       RDI13000
C                                                                       RDI13100
      IF ( ANAME1.EQ. CITY(1) .AND. ANAME2.EQ. CITY(2) ) GO TO 1860     RDI13200
   45 CONTINUE                                                          RDI13300
C.....                                                                  RDI13400
C.....                                                                  RDI13500
C.....TEST TO SEE IF IT IS A PUBLIC AND UNACCOUNTED SUBGROUP NAME CARD  RDI13600
C.....                                                                  RDI13700
C.....                                                                  RDI13800
      DO 50 I=1,8,2                                                     RDI13900
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      IF ( ANAME1.EQ. PNAME(I) .AND. ANAME2.EQ. PNAME(I+1) ) GO TO 7090 RDI14000
   50 CONTINUE                                                          RDI14100
C....                                                                   RDI14200
C....                                                                   RDI14300
C     TEST TO SEE IF IT IS A HISTORICAL SUBGROUP NAME CARD.             RDI14400
C....                                                                   RDI14500
C....                                                                   RDI14600
      DO 55 I=1,22,2                                                    RDI14700
      IF ( ANAME1.EQ.HLIST(I) .AND. ANAME2.EQ.HLIST(I+1) ) GO TO 2100   RDI14800
C....                                                                   RDI14900
   55 CONTINUE                                                          RDI15000
C....                                                                   RDI15100
      IF (ANAME1.EQ.PROJ(1).AND.ANAME2.EQ.PROJ(2)) GO TO 2200           RDI15200
C....                                                                   RDI15300
      IERR=IERR + 1                                                     RDI15400
C     ERROR MESSAGE                                                     RDI15500
      WRITE (IO,60) ANAME1,ANAME2                                       RDI15600
   60 FORMAT (2X,70HTHE FOLLOWING CONTROL CARD DOES NOT CONTAIN A CORREC RDI15700
     *T SUBGROUP NAME...//5X,2A4)                                       RDI15800
      WRITE (IO,70)                                                     RDI15900
   70 FORMAT (1X,42HCHECKING DATA FOLLOWING A BAD CONTROL CARD)         RDI16000
      DO 120 J=1,1000                                                   RDI16100
      READ (IN,80) (ADATA(N),N=1,6)                                     RDI16200
   80 FORMAT (3(1X,A4,1X,F16.3))                                        RDI16300
      IF (ADATA(1).EQ. ENDD) GO TO 100                                  RDI16400
  120 CONTINUE                                                          RDI16500
      GO TO 100                                                         RDI16600
C.....                                                                  RDI16700
C.....                                                                  RDI16800
C.....THE FOLLOWING READS IN THE COMMERCIAL DATA                        RDI16900
C.....                                                                  RDI17000
C     THIS SUBROUTINE PROCESSES THE MUNICIPAL COMMERCIAL PARAMETER INPUT RDI17100
C     DATA IN THE FOLLOWING MANNER.                                     RDI17200
C.....                                                                  RDI17300
  130 CONTINUE                                                          RDI17400
      ICOM = 1                                                          RDI17500
      ISECT = 1                                                         RDI17600
C.....                                                                  RDI17700
C....                                                                   RDI17800
C     NO. OF EMPLOYEES STARTS AT CDATA(451), PARAMETERS AT CDATA(551) . RDI17900
C....                                                                   RDI18000
C....                                                                   RDI18100
      ISUB=550-((I-1)/2)*100                                            RDI18200
C....                                                                   RDI18300
C     PROCESS INPUT DATA AND ESTABLISH PROPER DATA TABLE                RDI18400
C....                                                                   RDI18500
  140 CONTINUE                                                          RDI18600
      READ (IN,150) (ADATA(N),N=1,6)                                    RDI18700
  150 FORMAT (3(1X,A4,1X,F16.3))                                        RDI18800
      WRITE (IO,150) (ADATA(N),N=1,6)                                   RDI18900
      IF (ADATA(1).EQ. ENDD) GO TO 100                                  RDI19000
      DO 230 K=1,6,2                                                    RDI19100
      IF (ADATA(K).EQ.IBL) GO TO 230                                    RDI19200
      DO 160 L=1,NOS                                                    RDI19300
      IF (ADATA(K).EQ.CNAME(L)) GO TO 180                               RDI19400
  160 CONTINUE                                                          RDI19500
      CALL UNPACK (ITEST,ADATA(K),JJ,KK,LL)                             RDI19600
      IF (ITEST.GT.0) GO TO 170                                         RDI19700
      L=NOS+10*KK+LL                                                    RDI19800
      GO TO 180                                                         RDI19900
C....                                                                   RDI20000
C     ERROR MESSAGE                                                     RDI20100
C....                                                                   RDI20200
  170 WRITE (IO,175) ADATA(K)                                           RDI20300
  175 FORMAT (1X,57HFOLLOWING IS A BAD LABEL FOR THE COMMERCIAL ESTABLIS RDI20400
     *HMENT,2X,A4)                                                      RDI20500
      IERR=IERR + 1                                                     RDI20600
      GO TO 230                                                         RDI20700
  180 CONTINUE                                                          RDI20800
C     INDEX FOR INPUT DATA IN DATA TABLE                                RDI20900
      IJ=ISUB+L                                                         RDI21000
C     PUTS THE INPUT DATA IN THE PROPER PLACE IN THE PROPER TABLE       RDI21100
      CDATA(IJ)=ADATA(K+1)                                              RDI21200
  230 CONTINUE                                                          RDI21300
      GO TO 140                                                         RDI21400
C.....                                                                  RDI21500
C.....                                                                  RDI21600
C.....THE FOLLOWING READS IN THE RESIDENTIAL                            RDI21700
C.....                                                                  RDI21800
C.....                                                                  RDI21900
  310 CONTINUE                                                          RDI22000
      IRES= 1                                                           RDI22100
C     TEST FOR END OF INPUT                                             RDI22200
      IF (I.EQ.9) GO TO 100                                             RDI22300
      IP = (I+1)/2                                                      RDI22400
      K=0                                                               RDI22500
  311 READ (IN,312) DATA                                                RDI22600
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  312 FORMAT (3(1X,A4,1X,F16.3))                                        RDI22700
      WRITE (IO,312) DATA                                               RDI22800
C     TEST FOR END OF DATA                                              RDI22900
      IF (DATA(1).NE.PARNM(12)) GO TO 315                               RDI23000
      GO TO 100                                                         RDI23100
C....                                                                   RDI23200
C TEST IF VALN IS IN POSITION 1 OR VALX IS IN POSITION 2 OF INPUT CARD. RDI23300
C ALL OTHER DATA IN EACH SUBGROUP CAN BE INPUT IN ANY ORDER. BLANKS ARE RDI23400
C ALLOWED.                                                              RDI23500
C....                                                                   RDI23600
  315 IF ( DATA(1).EQ.PARNM(1)  .OR.  DATA(1).EQ.PARNM(2) ) K=K+1       RDI23700
      DO  320 L=1,6,2                                                   RDI23800
C     TEST FOR BLANK DATA CARD                                          RDI23900
      IF (DATA(L) .EQ. BLANK)  GO TO 320                                RDI24000
      DO 316 M=1,11                                                     RDI24100
      IF (DATA(L) .EQ. PARNM(M))  GO TO 318                             RDI24200
  316 CONTINUE                                                          RDI24300
      IERR=IERR + 1                                                     RDI24400
      WRITE (IO,317) DATA(L)                                            RDI24500
  317 FORMAT (1HO,A4,31H IS NOT A VALID PARAMETER NAME.)                RDI24600
      GO TO 320                                                         RDI24700
  318 I=200*(IP-1)+25*(M-1)+K                                           RDI24800
      IF (M.GT.8) GO TO 319                                             RDI24900
      PAR(I) = DATA(L+1)                                                RDI25000
      GO TO 320                                                         RDI25100
  319 I=3*(IP-1)+M-8                                                    RDI25200
      APAR(I)=DATA(L+1)                                                 RDI25300
  320 CONTINUE                                                          RDI25400
      GO TO 311                                                         RDI25500
C.....                                                                  RDI25600
C.....                                                                  RDI25700
C.....THE FOLLOWING READS IN THE INDUSTRIAL DATA                        RDI25800
C.....                                                                  RDI25900
 1010 CONTINUE                                                          RDI26000
      INDS = 1                                                          RDI26100
C                                                                       RDI26200
C                                                                       RDI26300
C READ AND STORE MUNICIPAL INDUSTRIAL INPUT                             RDI26400
C                                                                       RDI26500
      II=1404                                                           RDI26600
 1100 READ(IN,1101) (DATA(I),I=1,6)                                     RDI26700
 1101 FORMAT (3(1X,A4,1X,F16.3))                                        RDI26800
      WRITE (IO,1101) (DATA(I),I=1,6)                                   RDI26900
      DO 1300  I=1,6,2                                                  RDI27000
C                                                                       RDI27100
C TEST FOR END OF DATA                                                  RDI27200
C                                                                       RDI27300
      IF(DATA(I).EQ.EOD) GO TO 100                                      RDI27400
      IF (DATA(I) .EQ. BLANK) GO TO 1300                                RDI27500
      CALL UNPACK(ITEST,DATA(I),J,K,L)                                  RDI27600
      IF (ITEST.GT.0) GO TO 1200                                        RDI27700
      INDX = 100*(J-2) + K*10 + L+ II                                   RDI27800
      DDATA(INDX) = DATA(I+1)                                           RDI27900
      GO TO 1300                                                        RDI28000
 1200 WRITE(IO  ,1201) DATA(I)                                          RDI28100
 1201 FORMAT (1HO,A4,42H IS NOT A VALID INDUSTRIAL INPUT IDENTITY.)     RDI28200
      IERR=IERR + 1                                                     RDI28300
 1300 CONTINUE                                                          RDI28400
      GO TO 1100                                                        RDI28500
C                                                                       RDI28600
C                                                                       RDI28700
C     THE FOLLOWING READS IN THE CITY INPUT DATA                        RDI28800
C                                                                       RDI28900
C                                                                       RDI29000
 1860 CONTINUE                                                          RDI29100
C     CHECKS THE CITY DATA FOR ERRORS IN IDENTIFYING NAMES              RDI29200
      WRITE (IO,1870)                                                   RDI29300
 1870 FORMAT (6X,10HCITY  DATA//)                                       RDI29400
C     READ CITY NAME                                                    RDI29500
      READ (IN,1880) CIT1,CIT2                                          RDI29600
 1880 FORMAT (1X,3A4,3A4)                                               RDI29700
      WRITE (IO,1881) CIT1,CIT2                                         RDI29800
 1881 FORMAT (1X,3A4,3A4)                                               RDI29900
 1885 CONTINUE                                                          RDI30000
      READ (IN,1900) (ADATA(N),N=1,6)                                   RDI30100
 1900 FORMAT (3(1X,A4,1X,F16.3))                                        RDI30200
      WRITE (IO,1900) (ADATA(N),N=1,6)                                  RDI30300
C     TEST FOR END OF DATA                                              RDI30400
      IF (ADATA(1).EQ. ENDD) GO TO 1970                                 RDI30500
      DO 1950 K=1,6,2                                                   RDI30600
C     TEST FOR BLANK DATA CARD                                          RDI30700
      IF (ADATA(K).EQ.IBL) GO TO 1950                                   RDI30800
C     TEST FOR CONSTRUCTION COST INDICES                                RDI30900
      DO 1905 L=1,3                                                     RDI31000
      IF (ADATA(K).EQ. NDC(L)) GO TO 1906                               RDI31100
 1905 CONTINUE                                                          RDI31200
      GO TO 1907                                                        RDI31300
 1906 CONTINUE                                                          RDI31400
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      CIND(L)=ADATA(K+1)                                                RDI31500
      GO TO 1885                                                        RDI31600
 1907 CONTINUE                                                          RDI31700
      DO 1910 L=1,NUM                                                   RDI31800
      IF (ADATA(K).EQ.CITNAM(L)) GO TO 1930                             RDI31900
 1910 CONTINUE                                                          RDI32000
      IERR=IERR + 1                                                     RDI32100
C     ERROR MESSAGE                                                     RDI32200
      WRITE (IO,1920) ADATA(K)                                          RDI32300
 1920 FORMAT (1X,45HTHE FOLLOWING IS A BAD IDENTIFICATION NAME...,A4)   RDI32400
      GO TO 1950                                                        RDI32500
 1930 CONTINUE                                                          RDI32600
      CITDAT(L)=ADATA(K+1)                                              RDI32700
 1950 CONTINUE                                                          RDI32800
      GO TO 1885                                                        RDI32900
 1970 CONTINUE                                                          RDI33000
      IF (CIND(1).GT.0..OR.(CIND(2).GT.0..AND.CIND(3).GT.0.))GO TO 100  RDI33100
C     ERROR MESSAGE                                                     RDI33200
      IERR=IERR+1                                                       RDI33300
      WRITE (IO,1975)                                                   RDI33400
 1975 FORMAT(1X,60HCONSTRUCTION COST INDEX HAS NOT BEEN PROVIDED IN PROPRDI33500
     1ER FORM)                                                          RDI33600
 1976 CONTINUE                                                          RDI33700
      GO TO 100                                                         RDI33800
C                                                                       RDI33900
C                                                                       RDI34000
C     THE FOLLOWING READS IN THE OPTIONS DATA                           RDI34100
C                                                                       RDI34200
C                                                                       RDI34300
C     CHECKS THE COMMERCIAL DISPLAY OPTIONS                             RDI34400
 1978 WRITE (IO,1980)                                                   RDI34500
 1980 FORMAT (//6X,15HDISPLAY OPTIONS//)                                RDI34600
 1985 CONTINUE                                                          RDI34700
      READ (IN,1990) (ADATA(N),N=1,6)                                   RDI34800
 1990 FORMAT (3(1X,A4,1X,F16.3))                                        RDI34900
      WRITE (IO,1990) (ADATA(N),N=1,6)                                  RDI35000
C     TEST FOR END OF DATA                                              RDI35100
      IF (ADATA(1).EQ. ENDD) GO TO 2060                                 RDI35200
      DO 2040 K=1,6,2                                                   RDI35300
C     TEST FOR BLANK DATA CARD                                          RDI35400
      IF (ADATA(K).EQ.IBL) GO TO 2040                                   RDI35500
      DO 2000 L=1,OPTC                                                  RDI35600
      IF (ADATA(K).EQ.PRTOPT(L)) GO TO 2020                             RDI35700
 2000 CONTINUE                                                          RDI35800
      IERR=IERR + 1                                                     RDI35900
C     ERROR MESSAGE                                                     RDI36000
      WRITE (IO,2010) ADATA(K)                                          RDI36100
 2010 FORMAT (1X,45HTHE FOLLOWING IS A BAD IDENTIFICATION NAME...,A4)   RDI36200
      GO TO 2040                                                        RDI36300
 2020 CONTINUE                                                          RDI36400
      COMPRN(L)=IFIX(ADATA(K+1))                                        RDI36500
 2040 CONTINUE                                                          RDI36600
 2050 CONTINUE                                                          RDI36700
      GO TO 1985                                                        RDI36800
 2060 CONTINUE                                                          RDI36900
      REWIND IPRJT                                                      RDI37000
C                                                                       RDI37100
      GO TO 100                                                         RDI37500
C.....                                                                  RDI37600
 2100 CONTINUE                                                          RDI37700
      CALL HISTRY(I)                                                    RDI37800
      GO TO 100                                                         RDI37900
C.....                                                                  RDI38000
C     THE FOLLOWING READS IN PROJECTIONS USING PROINP.                  RDI38100
C.....                                                                  RDI38200
 2200 CONTINUE                                                          RDI38300
      JER=0                                                             RDI38400
      CALL PROINP (JER,IRES,ICOM,INDS,IPUB)                             RDI38500
      IF (JER.EQ.0) GO TO 2220                                          RDI38600
      IERR=IERR+JER                                                     RDI38700
      GO TO 100                                                         RDI38800
 2220 CONTINUE                                                          RDI38900
      JPR=JPR+1                                                         RDI39000
      GO TO 100                                                         RDI39100
C.....                                                                  RDI39200
C.....                                                                  RDI39300
C.....THE FOLLOWING READS IN THE PUBLIC AND UNACCOUNTED DATA            RDI39400
C.....                                                                  RDI39500
C.....                                                                  RDI39600
C     DETERMINES WHICH OF THE DATA TABLES IS TO BE ESTABLISHED---PPARAM,RDI39700
C          PANAVE,PMAXDY, OR PPEKHR                                     RDI39800
 7090 CONTINUE                                                          RDI39900
      IPUB = 1                                                          RDI40000
      ISECT=I                                                           RDI40100
C     COMPUTES SUBSCRIPT FOR DATA TABLE                                 RDI40200
      ISUB=((ISECT-1)/2)*30                                             RDI40300
      IF (ISECT .GT. 1) ISUB = ISUB + 30                                RDI40400
C     PROCESS INPUT DATA AND ESTABLISH PROPER DATA TABLE                RDI40500
 7100 CONTINUE                                                          RDI40600
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      READ (IN,7110) (ADATA(N),N=1,6)                                    RDI40700
 7110 FORMAT (3(1X,A4,1X,F16.3))                                         RDI40800
      WRITE (IO,7110) (ADATA(N),N=1,6)                                   RDI40900
C     TEST FOR END OF DATA                                               RDI41000
      IF (ADATA(1).EQ. ENDD) GO TO 100                                   RDI41100
      DO 7160 K=1,6,2                                                    RDI41200
C     TEST FOR BLANK DATA CARD                                           RDI41300
      IF (ADATA(K).EQ.IBL) GO TO 7160                                    RDI41400
      DO 7120 L=1,ITYPE                                                  RDI41500
      IF (ADATA(K).EQ.PUBNAM(L)) GO TO 7140                              RDI41600
 7120 CONTINUE                                                           RDI41700
      CALL UNPACK (ITEST,ADATA(K),JJ,KK,LL)                              RDI41800
      IF (ITEST.GT.0) GO TO 7130                                         RDI41900
      L=ITYPE+10*KK+LL                                                   RDI42000
      GO TO 7140                                                         RDI42100
C     ERROR MESSAGE                                                      RDI42200
 7130 WRITE (IO,7135) ADATA(K)                                           RDI42300
 7135 FORMAT (1X,59HFOLLOWING IS A BAD LABEL FOR PUBLIC-UNACCOUNTED USAGRDI42400
     *E TYPES,2X,A4)                                                     RDI42500
      IERR=IERR + 1                                                      RDI42600
      GO TC 7160                                                         RDI42700
 7140 CONTINUE                                                           RDI42800
      JSECT=L                                                            RDI42900
C     INDEX FOR INPUT DATA IN DATA TABLE                                 RDI43000
      IJ=ISUB+JSECT                                                      RDI43100
C     STORE DATA IN PROPER DATA TABLE                                    RDI43200
      PDATA(IJ)=ADATA(K+1)                                               RDI43300
 7160 CONTINUE                                                           RDI43400
      GO TO 7100                                                         RDI43500
C                                                                        RDI43600
 9000 RETURN                                                             RDI43700
      END                                                                RDI43800
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LIBRARY COEFFICIENTS

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1CONSTANT
 E011 206.0          E012 3.47           E013 -1.30
 E021 28.9           E022 4.39           E023 33.6
 E031 30.2           E032 39.5           E041 30.2
 E042 39.5           E051 0.48           E052 1130.0
 E053 -0.703         E054 0.429          E061 0.39
 E062 0.164          E063 -0.793         E064 2.93
 E065 -1.57          E066 1.45           E071 0.41
 E072 100.0          E073 0.783          E081 0.34
 E082 0.164          E083 -0.793         E084 2.93
 E085 -1.57          E086 1.45           E091 0.41
 E092 100.           E093 -0.783         E094 2.93
 E095 -1.57          E096 1.45           E101 0.803
 E102 -1.26          E111 3400.0         E112 2.06
 E113 0.413          E121 0.0106         E122 0.118
 E123 -10.4          E124 -1.25          E125 0.931
 E131 2750.0         E132 0.943          E133 0.523
 E141 0.0106         E142 0.118          E143 -10.4
 E144 -1.25          E145 0.931          E151 2750.
 E152 0.943          E153 0.523          E154 1.25
 E155 0.931          E161 334.0          E162 2.017
 ENDD
1EVAPTRAN
 LATD 48.        LONG 67.        RAIN 9.         EVAP 12.
 LATD 47.        LONG 67.        RAIN 8.         EVAP 13.
 LATD 46.        LONG 67.        RAIN 7.         EVAP 13.
 LATD 45.        LONG 67.        RAIN 7.         EVAP 13.
 LATD 44.        LONG 67.        RAIN 7.         EVAP 13.
 LATD 48.        LONG 68.        RAIN 9.         EVAP 12.
 LATD 47.        LONG 68.        RAIN 9.         EVAP 12.
 LATD 46.        LONG 68.        RAIN 7.         EVAP 13.
 LATD 45.        LONG 68.        RAIN 7.         EVAP 13.
 LATD 44.        LONG 68.        RAIN 7.         EVAP 13.
 LATD 48.        LONG 69.        RAIN 9.         EVAP 12.
 LATD 47.        LONG 69.        RAIN 8.         EVAP 12.
 LATD 46.        LONG 69.        RAIN 8.         EVAP 13.
 LATD 45.        LONG 69.        RAIN 8.         EVAP 13.
 LATD 44.        LONG 69.        RAIN 7.         EVAP 13.
 LATD 43.        LONG 69.        RAIN 7.         EVAP 14.
 LATD 42.        LONG 69.        RAIN 6.         EVAP 14.
 LATD 41.        LONG 69.        RAIN 5.         EVAP 13.
 LATD 48.        LONG 70.        RAIN 9.         EVAP 12.
 LATD 47.        LONG 70.        RAIN 9.         EVAP 12.
 LATD 46.        LONG 70.        RAIN 8.         EVAP 13.
 LATD 45.        LONG 70.        RAIN 8.         EVAP 13.
 LATD 44.        LONG 70.        RAIN 7.         EVAP 13.
 LATD 43.        LONG 70.        RAIN 7.         EVAP 14.
 LATD 42.        LONG 70.        RAIN 6.         EVAP 14.
 LATD 41.        LONG 70.        RAIN 5.         EVAP 13.
 LATD 47.        LONG 71.        RAIN 10.        EVAP 12.
 LATD 46.        LONG 71.        RAIN 10.        EVAP 12.
 LATD 45.        LONG 71.        RAIN 9.         EVAP 13.
 LATD 44.        LONG 71.        RAIN 20.        EVAP 11.
 LATD 43.        LONG 71.        RAIN 7.         EVAP 14.
 LATD 42.        LONG 71.        RAIN 7.         EVAP 15.
 LATD 41.        LONG 71.        RAIN 6.         EVAP 15.
 LATD 46.        LONG 72.        RAIN 10.        EVAP 12.
 LATD 45.        LONG 72.        RAIN 17.        EVAP 13.
 LATD 44.        LONG 72.        RAIN 10.        EVAP 13.
 LATD 43.        LONG 72.        RAIN 8.         EVAP 14.
 LATD 42.        LONG 72.        RAIN 7.         EVAP 15.
 LATD 41.        LONG 72.        RAIN 6.         EVAP 15.
 LATD 40.        LONG 72.        RAIN 5.         EVAP 17.
 LATD 46.        LONG 73.        RAIN 11.        EVAP 12.
 LATD 45.        LONG 73.        RAIN 11.        EVAP 13.
 LATD 44.        LONG 73.        RAIN 10.        EVAP 14.
 LATD 43.        LONG 73.        RAIN 9.         EVAP 14.
 LATD 42.        LONG 73.        RAIN 9.         EVAP 15.
 LATD 41.        LONG 73.        RAIN 5.         EVAP 15.
 LATD 40.        LONG 73.        RAIN 6.         EVAP 17.
 LATD 46.        LONG 74.        RAIN 10.        EVAP 12.
 LATD 45.        LONG 74.        RAIN 10.        EVAP 13.
 LATD 44.        LONG 74.        RAIN 9.         EVAP 14.
 LATD 43.        LONG 74.        RAIN 9.         EVAP 15.
 LATD  42.       LONG  74.       RAIN  8.        EVAP  15.
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LATD 41.	LONG 74.	RAIN 5.	EVAP 17.
LATD 40.	LONG 74.	RAIN 9.	EVAP 17.
LATD 39.	LONG 74.	RAIN 11.	EVAP 17.
LATD 38.	LONG 74.	RAIN 10.	EVAP 17.
LATD 46.	LONG 75.	RAIN 10.	EVAP 12.
LATD 45.	LONG 75.	RAIN 10.	EVAP 13.
LATD 44.	LONG 75.	RAIN 9.	EVAP 14.
LATD 43.	LONG 75.	RAIN 8.	EVAP 15.
LATD 42.	LONG 75.	RAIN 8.	EVAP 15.
LATD 41.	LONG 75.	RAIN 6.	EVAP 16.
LATD 40.	LONG 75.	RAIN 8.	EVAP 16.
LATD 39.	LONG 75.	RAIN 10.	EVAP 16.
LATD 38.	LONG 75.	RAIN 10.	EVAP 17.
LATD 37.	LONG 75.	RAIN 11.	EVAP 17.
LATD 36.	LONG 75.	RAIN 13.	EVAP 17.
LATD 35.	LONG 75.	RAIN 16.	EVAP 17.
LATD 45.	LONG 76.	RAIN 8.	EVAP 13.
LATD 44.	LONG 76.	RAIN 7.	EVAP 14.
LATD 43.	LONG 76.	RAIN 6.	EVAP 15.
LATD 42.	LONG 76.	RAIN 7.	EVAP 14.
LATD 41.	LONG 76.	RAIN 6.	EVAP 15.
LATD 40.	LONG 76.	RAIN 6.	EVAP 17.
LATD 39.	LONG 76.	RAIN 7.	EVAP 16.
LATD 38.	LONG 76.	RAIN 8.	EVAP 16.
LATD 37.	LONG 76.	RAIN 11.	EVAP 17.
LATD 36.	LONG 76.	RAIN 14.	EVAP 16.
LATD 35.	LONG 76.	RAIN 16.	EVAP 17.
LATD 34.	LONG 76.	RAIN 20.	EVAP 18.
LATD 45.	LONG 77.	RAIN 7.	EVAP 13.
LATD 44.	LONG 77.	RAIN 7.	EVAP 14.
LATD 43.	LONG 77.	RAIN 6.	EVAP 15.
LATD 42.	LONG 77.	RAIN 7.	EVAP 15.
LATD 41.	LONG 77.	RAIN 8.	EVAP 14.
LATD 40.	LONG 77.	RAIN 6.	EVAP 17.
LATD 39.	LONG 77.	RAIN 7.	EVAP 17.
LATD 38.	LONG 77.	RAIN 8.	EVAP 16.
LATD 37.	LONG 77.	RAIN 10.	EVAP 16.
LATD 36.	LONG 77.	RAIN 15.	EVAP 16.
LATD 35.	LONG 77.	RAIN 20.	EVAP 17.
LATD 34.	LONG 77.	RAIN 25.	EVAP 18.
LATD 44.	LONG 78.	RAIN 7.	EVAP 14.
LATD 43.	LONG 78.	RAIN 7.	EVAP 15.
LATD 42.	LONG 78.	RAIN 9.	EVAP 15.
LATD 41.	LONG 78.	RAIN 8.	EVAP 14.
LATD 40.	LONG 78.	RAIN 7.	EVAP 15.
LATD 39.	LONG 78.	RAIN 7.	EVAP 15.
LATD 38.	LONG 78.	RAIN 8.	EVAP 15.
LATD 37.	LONG 78.	RAIN 8.	EVAP 16.
LATD 36.	LONG 78.	RAIN 16.	EVAP 16.
LATD 35.	LONG 78.	RAIN 16.	EVAP 17.
LATD 34.	LONG 78.	RAIN 31.	EVAP 18.
LATD 33.	LONG 78.	RAIN 23.	EVAP 19.
LATD 44.	LONG 79.	RAIN 8.	EVAP 13.
LATD 43.	LONG 79.	RAIN 10.	EVAP 14.
LATD 42.	LONG 79.	RAIN 10.	EVAP 15.
LATD 41.	LONG 79.	RAIN 9.	EVAP 14.
LATD 40.	LONG 79.	RAIN 8.	EVAP 14.
LATD 39.	LONG 79.	RAIN 8.	EVAP 14.
LATD 38.	LONG 79.	RAIN 7.	EVAP 15.
LATD 37.	LONG 79.	RAIN 7.	EVAP 16.
LATD 36.	LONG 79.	RAIN 15.	EVAP 17.
LATD 35.	LONG 79.	RAIN 15.	EVAP 17.
LATD 34.	LONG 79.	RAIN 22.	EVAP 17.
LATD 33.	LONG 79.	RAIN 19.	EVAP 18.
LATD 32.	LONG 79.	RAIN 19.	EVAP 19.
LATD 43.	LONG 80.	RAIN 10.	EVAP 14.
LATD 42.	LONG 80.	RAIN 10.	EVAP 15.
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LATD 38.	LONG 80.	RAIN 9.	EVAP 15.
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LATD 36.	LONG 80.	RAIN 15.	EVAP 17.
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LATD 26.	LONG 80.	RAIN 28.	EVAP 19.
LATD 25.	LONG 80.	RAIN 28.	EVAP 20.

LATD 24.	LONG 80.	RAIN 28.	EVAP 21.
LATD 43.	LONG 81.	RAIN 10.	EVAP 14.
LATD 42.	LONG 81.	RAIN 10.	EVAP 14.
LATD 41.	LONG 81.	RAIN 9.	EVAP 15.
LATD 40.	LONG 81.	RAIN 9.	EVAP 14.
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LATD 33.	LONG 81.	RAIN 16.	EVAP 18.
LATD 32.	LONG 81.	RAIN 18.	EVAP 18.
LATD 31.	LONG 81.	RAIN 19.	EVAP 17.
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LATD 29.	LONG 81.	RAIN 23.	EVAP 18.
LATD 28.	LONG 81.	RAIN 23.	EVAP 18.
LATD 27.	LONG 81.	RAIN 26.	EVAP 18.
LATD 26.	LONG 81.	RAIN 28.	EVAP 19.
LATD 25.	LONG 81.	RAIN 20.	EVAP 20.
LATD 24.	LONG 81.	RAIN 20.	EVAP 21.
LATD 46.	LONG 82.	RAIN 10.	EVAP 12.
LATD 45.	LONG 82.	RAIN 10.	EVAP 12.
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LATD 28.	LONG 82.	RAIN 22.	EVAP 19.
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LATD 26.	LONG 82.	RAIN 28.	EVAP 20.
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LATD 34.	LONG 83.	RAIN 12.	EVAP 17.
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LATD 29.	LONG 83.	RAIN 24.	EVAP 19.
LATD 28.	LONG 83.	RAIN 21.	EVAP 19.
LATD 27.	LONG 83.	RAIN 27.	EVAP 20.
LATD 26.	LONG 83.	RAIN 28.	EVAP 20.
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LATD 36.	LONG 84.	RAIN 12.	EVAP 17.
LATD 35.	LONG 84.	RAIN 12.	EVAP 17.
LATD 34.	LONG 84.	RAIN 12.	EVAP 17.
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LATD 29.	LONG 84.	RAIN 32.	EVAP 19.
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LATD 46.	LONG 85.	RAIN 9.	EVAP 13.
LATD 45.	LONG 85.	RAIN 8.	EVAP 13.

LATD 44.	LONG 85.	RAIN 7.	EVAP 14.
LATD 43.	LONG 85.	RAIN 7.	EVAP 14.
LATD 42.	LONG 85.	RAIN 9.	EVAP 14.
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LATD 39.	LONG 85.	RAIN 9.	EVAP 16.
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LATD 34.	LONG 85.	RAIN 12.	EVAP 16.
LATD 33.	LONG 85.	RAIN 14.	EVAP 17.
LATD 32.	LONG 85.	RAIN 15.	EVAP 18.
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LATD 30.	LONG 85.	RAIN 32.	EVAP 18.
LATD 29.	LONG 85.	RAIN 32.	EVAP 19.
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LATD 32.	LONG 86.	RAIN 16.	EVAP 19.
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LATD 30.	LONG 86.	RAIN 32.	EVAP 19.
LATD 29.	LONG 86.	RAIN 32.	EVAP 20.
LATD 48.	LONG 87.	RAIN 7.	EVAP 12.
LATD 47.	LONG 87.	RAIN 7.	EVAP 13.
LATD 46.	LONG 87.	RAIN 9.	EVAP 14.
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LATD 31.	LONG 87.	RAIN 16.	EVAP 18.
LATD 30.	LONG 87.	RAIN 18.	EVAP 20.
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LATD 35.	LONG 88.	RAIN 11.	EVAP 19.
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LATD 32.	LONG 88.	RAIN 11.	EVAP 18.
LATD 31.	LONG 88.	RAIN 16.	EVAP 19.
LATD 30.	LONG 88.	RAIN 15.	EVAP 20.
LATD 49.	LONG 89.	RAIN 11.	EVAP 12.
LATD 48.	LONG 89.	RAIN 11.	EVAP 12.
LATD 47.	LONG 89.	RAIN 10.	EVAP 12.
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LATD 36.	LONG 89.	RAIN 9.	EVAP 19.
LATD 35.	LONG 89.	RAIN 8.	EVAP 19.

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LATD 34.    LONG 89.    RAIN 9.     EVAP 19.
LATD 33.    LONG 89.    RAIN 10.    EVAP 18.
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LATD 32.    LONG 92.    RAIN 10.    EVAP 19.
LATD 31.    LONG 92.    RAIN 12.    EVAP 19.
LATD 30.    LONG 92.    RAIN 15.    EVAP 19.
LATD 29.    LONG 92.    RAIN 16.    EVAP 20.
LATD 49.    LONG 93.    RAIN 12.    EVAP 13.
LATD 48.    LONG 93.    RAIN 12.    EVAP 13.
LATD 47.    LONG 93.    RAIN 14.    EVAP 13.
LATD 46.    LONG 93.    RAIN 14.    EVAP 14.
LATD 45.    LONG 93.    RAIN 12.    EVAP 14.
LATD 44.    LONG 93.    RAIN 11.    EVAP 15.
LATD 43.    LONG 93.    RAIN 15.    EVAP 15.
LATD 42.    LONG 93.    RAIN 15.    EVAP 15.
LATD 41.    LONG 93.    RAIN 10.    EVAP 16.
LATD 40.    LONG 93.    RAIN 10.    EVAP 16.
LATD 39.    LONG 93.    RAIN 13.    EVAP 16.
LATD 38.    LONG 93.    RAIN 10.    EVAP 16.
LATD 37.    LONG 93.    RAIN 12.    EVAP 17.
LATD 36.    LONG 93.    RAIN 10.    EVAP 18.
LATD 35.    LONG 93.    RAIN 11.    EVAP 18.
LATD 34.    LONG 93.    RAIN 12.    EVAP 18.
LATD 33.    LONG 93.    RAIN 11.    EVAP 19.
LATD 32.    LONG 93.    RAIN 8.     EVAP 20.
LATD 31.    LONG 93.    RAIN 12.    EVAP 20.
LATD 30.    LONG 93.    RAIN 14.    EVAP 20.
LATD 29.    LONG 93.    RAIN 16.    EVAP 21.
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LATD 50.	LONG 94.	RAIN 12.	EVAP 14.
LATD 49.	LONG 94.	RAIN 12.	EVAP 14.
LATD 48.	LONG 94.	RAIN 12.	EVAP 14.
LATD 47.	LONG 94.	RAIN 14.	EVAP 14.
LATD 46.	LONG 94.	RAIN 14.	EVAP 15.
LATD 45.	LONG 94.	RAIN 13.	EVAP 16.
LATD 44.	LONG 94.	RAIN 12.	EVAP 16.
LATD 43.	LONG 94.	RAIN 10.	EVAP 16.
LATD 42.	LONG 94.	RAIN 9.	EVAP 16.
LATD 41.	LONG 94.	RAIN 10.	EVAP 16.
LATD 40.	LONG 94.	RAIN 11.	EVAP 17.
LATD 39.	LONG 94.	RAIN 17.	EVAP 17.
LATD 38.	LONG 94.	RAIN 12.	EVAP 17.
LATD 37.	LONG 94.	RAIN 12.	EVAP 17.
LATD 36.	LONG 94.	RAIN 8.	EVAP 18.
LATD 35.	LONG 94.	RAIN 8.	EVAP 19.
LATD 34.	LONG 94.	RAIN 12.	EVAP 19.
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LATD 32.	LONG 94.	RAIN 6.	EVAP 20.
LATD 31.	LONG 94.	RAIN 12.	EVAP 20.
LATD 30.	LONG 94.	RAIN 16.	EVAP 21.
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LATD 47.	LONG 105.	RAIN 6.	EVAP 15.

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LATD 42.	LONG 109.	RAIN 4.	EVAP 14.

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LATD 49.	LONG 110.	RAIN 8.	EVAP 13.
LATD 48.	LONG 110.	RAIN 7.	EVAP 14.
LATD 47.	LONG 110.	RAIN 6.	EVAP 14.
LATD 46.	LONG 110.	RAIN 5.	EVAP 14.
LATD 45.	LONG 110.	RAIN 5.	EVAP 16.
LATD 44.	LONG 110.	RAIN 4.	EVAP 14.
LATD 43.	LONG 110.	RAIN 3.	EVAP 14.
LATD 42.	LONG 110.	RAIN 3.	EVAP 14.
LATD 41.	LONG 110.	RAIN 3.	EVAP 15.
LATD 40.	LONG 110.	RAIN 3.	EVAP 15.
LATD 39.	LONG 110.	RAIN 3.	EVAP 15.
LATD 38.	LONG 110.	RAIN 3.	EVAP 15.
LATD 37.	LONG 110.	RAIN 3.	EVAP 16.
LATD 35.	LONG 110.	RAIN 3.	EVAP 15.
LATD 34.	LONG 110.	RAIN 4.	EVAP 16.
LATD 33.	LONG 110.	RAIN 5.	EVAP 16.
LATD 32.	LONG 110.	RAIN 5.	EVAP 16.
LATD 31.	LONG 110.	RAIN 5.	EVAP 21.
LATD 50.	LONG 111.	RAIN 6.	EVAP 12.
LATD 49.	LONG 111.	RAIN 8.	EVAP 13.
LATD 48.	LONG 111.	RAIN 7.	EVAP 13.
LATD 47.	LONG 111.	RAIN 5.	EVAP 14.
LATD 46.	LONG 111.	RAIN 5.	EVAP 14.
LATD 45.	LONG 111.	RAIN 4.	EVAP 15.
LATD 44.	LONG 111.	RAIN 4.	EVAP 14.
LATD 43.	LONG 111.	RAIN 3.	EVAP 14.
LATD 42.	LONG 111.	RAIN 3.	EVAP 15.
LATD 41.	LONG 111.	RAIN 3.	EVAP 15.
LATD 40.	LONG 111.	RAIN 3.	EVAP 15.
LATD 39.	LONG 111.	RAIN 3.	EVAP 16.
LATD 38.	LONG 111.	RAIN 2.	EVAP 16.
LATD 37.	LONG 111.	RAIN 3.	EVAP 16.
LATD 36.	LONG 111.	RAIN 4.	EVAP 16.
LATD 35.	LONG 111.	RAIN 5.	EVAP 14.
LATD 34.	LONG 111.	RAIN 5.	EVAP 16.
LATD 33.	LONG 111.	RAIN 5.	EVAP 16.
LATD 32.	LONG 111.	RAIN 5.	EVAP 21.
LATD 31.	LONG 111.	RAIN 5.	EVAP 21.
LATD 50.	LONG 112.	RAIN 6.	EVAP 12.
LATD 49.	LONG 112.	RAIN 7.	EVAP 13.
LATD 48.	LONG 112.	RAIN 7.	EVAP 13.
LATD 47.	LONG 112.	RAIN 5.	EVAP 13.
LATD 46.	LONG 112.	RAIN 4.	EVAP 14.
LATD 45.	LONG 112.	RAIN 4.	EVAP 15.
LATD 44.	LONG 112.	RAIN 3.	EVAP 14.
LATD 43.	LONG 112.	RAIN 2.	EVAP 14.
LATD 42.	LONG 112.	RAIN 3.	EVAP 15.
LATD 41.	LONG 112.	RAIN 3.	EVAP 16.
LATD 40.	LONG 112.	RAIN 3.	EVAP 16.
LATD 39.	LONG 112.	RAIN 2.	EVAP 16.
LATD 38.	LONG 112.	RAIN 2.	EVAP 16.
LATD 37.	LONG 112.	RAIN 2.	EVAP 16.
LATD 36.	LONG 112.	RAIN 3.	EVAP 16.
LATD 35.	LONG 112.	RAIN 3.	EVAP 12.
LATD 34.	LONG 112.	RAIN 2.	EVAP 23.
LATD 33.	LONG 112.	RAIN 2.	EVAP 22.
LATD 32.	LONG 112.	RAIN 3.	EVAP 21.
LATD 31.	LONG 112.	RAIN 4.	EVAP 21.
LATD 50.	LONG 113.	RAIN 6.	EVAP 12.
LATD 49.	LONG 113.	RAIN 7.	EVAP 12.
LATD 48.	LONG 113.	RAIN 7.	EVAP 12.
LATD 47.	LONG 113.	RAIN 5.	EVAP 12.
LATD 46.	LONG 113.	RAIN 4.	EVAP 12.
LATD 45.	LONG 113.	RAIN 4.	EVAP 15.
LATD 44.	LONG 113.	RAIN 2.	EVAP 16.
LATD 43.	LONG 113.	RAIN 2.	EVAP 13.
LATD 42.	LONG 113.	RAIN 2.	EVAP 15.
LATD 41.	LONG 113.	RAIN 2.	EVAP 16.
LATD 40.	LONG 113.	RAIN 1.	EVAP 15.
LATD 39.	LONG 113.	RAIN 1.	EVAP 17.
LATD 38.	LONG 113.	RAIN 2.	EVAP 15.
LATD 37.	LONG 113.	RAIN 2.	EVAP 15.
LATD 36.	LONG 113.	RAIN 2.	EVAP 15.
LATD 35.	LONG 113.	RAIN 2.	EVAP 23.
LATD 34.	LONG 113.	RAIN 2.	EVAP 23.
LATD 33.	LONG 113.	RAIN 2.	EVAP 23.

LATD 32.	LONG 113.	RAIN 3.	EVAP 23.
LATD 31.	LONG 113.	RAIN 3.	EVAP 23.
LATD 50.	LONG 114.	RAIN 6.	EVAP 12.
LATD 49.	LONG 114.	RAIN 7.	EVAP 12.
LATD 48.	LONG 114.	RAIN 7.	EVAP 13.
LATD 47.	LONG 114.	RAIN 5.	EVAP 13.
LATD 46.	LONG 114.	RAIN 4.	EVAP 14.
LATD 45.	LONG 114.	RAIN 3.	EVAP 15.
LATD 44.	LONG 114.	RAIN 2.	EVAP 13.
LATD 43.	LONG 114.	RAIN 2.	EVAP 16.
LATD 42.	LONG 114.	RAIN 2.	EVAP 16.
LATD 41.	LONG 114.	RAIN 2.	EVAP 15.
LATD 40.	LONG 114.	RAIN 1.	EVAP 17.
LATD 39.	LONG 114.	RAIN 2.	EVAP 15.
LATD 38.	LONG 114.	RAIN 2.	EVAP 15.
LATD 37.	LONG 114.	RAIN 2.	EVAP 15.
LATD 36.	LONG 114.	RAIN 2.	EVAP 15.
LATD 35.	LONG 114.	RAIN 2.	EVAP 23.
LATD 34.	LONG 114.	RAIN 2.	EVAP 23.
LATD 33.	LONG 114.	RAIN 2.	EVAP 23.
LATD 32.	LONG 114.	RAIN 3.	EVAP 24.
LATD 31.	LONG 114.	RAIN 3.	EVAP 24.
LATD 50.	LONG 115.	RAIN 6.	EVAP 12.
LATD 49.	LONG 115.	RAIN 7.	EVAP 12.
LATD 48.	LONG 115.	RAIN 6.	EVAP 12.
LATD 47.	LONG 115.	RAIN 5.	EVAP 13.
LATD 46.	LONG 115.	RAIN 4.	EVAP 14.
LATD 45.	LONG 115.	RAIN 3.	EVAP 16.
LATD 44.	LONG 115.	RAIN 1.	EVAP 16.
LATD 43.	LONG 115.	RAIN 2.	EVAP 14.
LATD 42.	LONG 115.	RAIN 2.	EVAP 15.
LATD 41.	LONG 115.	RAIN 2.	EVAP 17.
LATD 40.	LONG 115.	RAIN 1.	EVAP 14.
LATD 39.	LONG 115.	RAIN 2.	EVAP 13.
LATD 38.	LONG 115.	RAIN 2.	EVAP 13.
LATD 37.	LONG 115.	RAIN 2.	EVAP 15.
LATD 36.	LONG 115.	RAIN 1.	EVAP 23.
LATD 35.	LONG 115.	RAIN 1.	EVAP 23.
LATD 34.	LONG 115.	RAIN 2.	EVAP 23.
LATD 33.	LONG 115.	RAIN 2.	EVAP 23.
LATD 32.	LONG 115.	RAIN 2.	EVAP 24.
LATD 50.	LONG 116.	RAIN 6.	EVAP 12.
LATD 49.	LONG 116.	RAIN 6.	EVAP 12.
LATD 48.	LONG 116.	RAIN 6.	EVAP 12.
LATD 47.	LONG 116.	RAIN 4.	EVAP 14.
LATD 46.	LONG 116.	RAIN 4.	EVAP 14.
LATD 45.	LONG 116.	RAIN 3.	EVAP 16.
LATD 44.	LONG 116.	RAIN 1.	EVAP 14.
LATD 43.	LONG 116.	RAIN 1.	EVAP 15.
LATD 42.	LONG 116.	RAIN 2.	EVAP 15.
LATD 41.	LONG 116.	RAIN 2.	EVAP 13.
LATD 40.	LONG 116.	RAIN 2.	EVAP 14.
LATD 39.	LONG 116.	RAIN 2.	EVAP 13.
LATD 38.	LONG 116.	RAIN 2.	EVAP 13.
LATD 37.	LONG 116.	RAIN 1.	EVAP 14.
LATD 36.	LONG 116.	RAIN 1.	EVAP 15.
LATD 35.	LONG 116.	RAIN 1.	EVAP 15.
LATD 34.	LONG 116.	RAIN 1.	EVAP 15.
LATD 33.	LONG 116.	RAIN 1.	EVAP 15.
LATD 32.	LONG 116.	RAIN 1.	EVAP 24.
LATD 50.	LONG 117.	RAIN 5.	EVAP 12.
LATD 49.	LONG 117.	RAIN 5.	EVAP 14.
LATD 48.	LONG 117.	RAIN 3.	EVAP 13.
LATD 47.	LONG 117.	RAIN 2.	EVAP 14.
LATD 46.	LONG 117.	RAIN 4.	EVAP 15.
LATD 45.	LONG 117.	RAIN 3.	EVAP 16.
LATD 44.	LONG 117.	RAIN 2.	EVAP 15.
LATD 43.	LONG 117.	RAIN 1.	EVAP 14.
LATD 42.	LONG 117.	RAIN 2.	EVAP 13.
LATD 41.	LONG 117.	RAIN 2.	EVAP 13.
LATD 40.	LONG 117.	RAIN 1.	EVAP 14.
LATD 39.	LONG 117.	RAIN 2.	EVAP 13.
LATD 38.	LONG 117.	RAIN 2.	EVAP 13.
LATD 37.	LONG 117.	RAIN 1.	EVAP 13.
LATD 36.	LONG 117.	RAIN 1.	EVAP 14.
LATD 35.	LONG 117.	RAIN 1.	EVAP 15.
LATD 34.	LONG 117.	RAIN 0.	EVAP 15.
LATD 33.	LONG 117.	RAIN 0.	EVAP 14.
LATD 32.	LONG 117.	RAIN 0.	EVAP 12.
LATD 50.	LONG 118.	RAIN 4.	EVAP 12.
LATD 49.	LONG 118.	RAIN 4.	EVAP 12.
LATD 48.	LONG 118.	RAIN 3.	EVAP 13.
LATD 47.	LONG 118.	RAIN 2.	EVAP 14.
LATD 46.	LONG 118.	RAIN 4.	EVAP 16.
LATD 45.	LONG 118.	RAIN 5.	EVAP 12.
LATD 44.	LONG 118.	RAIN 2.	EVAP 15.
LATD 43.	LONG 118.	RAIN 3.	EVAP 13.
LATD 42.	LONG 118.	RAIN 2.	EVAP 13.

LATD 41.	LONG 118.	RAIN 1.	EVAP 13.
LATD 40.	LONG 118.	RAIN 2.	EVAP 14.
LATD 39.	LONG 118.	RAIN 2.	EVAP 13.
LATD 38.	LONG 118.	RAIN 1.	EVAP 13.
LATD 37.	LONG 118.	RAIN 1.	EVAP 16.
LATD 36.	LONG 118.	RAIN 0.	EVAP 13.
LATD 35.	LONG 118.	RAIN 0.	EVAP 15.
LATD 34.	LONG 118.	RAIN 0.	EVAP 15.
LATD 33.	LONG 118.	RAIN 0.	EVAP 12.
LATD 32.	LONG 118.	RAIN 0.	EVAP 12.
LATD 50.	LONG 119.	RAIN 2.	EVAP 10.
LATD 49.	LONG 119.	RAIN 2.	EVAP 12.
LATD 48.	LONG 119.	RAIN 2.	EVAP 12.
LATD 47.	LONG 119.	RAIN 2.	EVAP 14.
LATD 46.	LONG 119.	RAIN 2.	EVAP 14.
LATD 45.	LONG 119.	RAIN 2.	EVAP 14.
LATD 44.	LONG 119.	RAIN 3.	EVAP 13.
LATD 43.	LONG 119.	RAIN 3.	EVAP 13.
LATD 42.	LONG 119.	RAIN 2.	EVAP 13.
LATD 41.	LONG 119.	RAIN 2.	EVAP 13.
LATD 40.	LONG 119.	RAIN 2.	EVAP 14.
LATD 39.	LONG 119.	RAIN 2.	EVAP 13.
LATD 38.	LONG 119.	RAIN 1.	EVAP 13.
LATD 37.	LONG 119.	RAIN 0.	EVAP 12.
LATD 36.	LONG 119.	RAIN 0.	EVAP 12.
LATD 35.	LONG 119.	RAIN 0.	EVAP 13.
LATD 34.	LONG 119.	RAIN 0.	EVAP 12.
LATD 33.	LONG 119.	RAIN 0.	EVAP 12.
LATD 32.	LONG 119.	RAIN 0.	EVAP 12.
LATD 50.	LONG 120.	RAIN 1.	EVAP 10.
LATD 49.	LONG 120.	RAIN 1.	EVAP 10.
LATD 48.	LONG 120.	RAIN 1.	EVAP 10.
LATD 47.	LONG 120.	RAIN 2.	EVAP 13.
LATD 46.	LONG 120.	RAIN 2.	EVAP 14.
LATD 45.	LONG 120.	RAIN 2.	EVAP 14.
LATD 44.	LONG 120.	RAIN 2.	EVAP 13.
LATD 43.	LONG 120.	RAIN 3.	EVAP 13.
LATD 42.	LONG 120.	RAIN 3.	EVAP 13.
LATD 41.	LONG 120.	RAIN 2.	EVAP 14.
LATD 40.	LONG 120.	RAIN 2.	EVAP 13.
LATD 39.	LONG 120.	RAIN 1.	EVAP 12.
LATD 38.	LONG 120.	RAIN 1.	EVAP 18.
LATD 37.	LONG 120.	RAIN 0.	EVAP 18.
LATD 36.	LONG 120.	RAIN 0.	EVAP 18.
LATD 35.	LONG 120.	RAIN 0.	EVAP 11.
LATD 34.	LONG 120.	RAIN 0.	EVAP 11.
LATD 33.	LONG 120.	RAIN 0.	EVAP 11.
LATD 32.	LONG 120.	RAIN 0.	EVAP 11.
LATD 50.	LONG 121.	RAIN 2.	EVAP 10.
LATD 49.	LONG 121.	RAIN 2.	EVAP 10.
LATD 48.	LONG 121.	RAIN 2.	EVAP 10.
LATD 47.	LONG 121.	RAIN 2.	EVAP 13.
LATD 46.	LONG 121.	RAIN 2.	EVAP 14.
LATD 45.	LONG 121.	RAIN 2.	EVAP 14.
LATD 44.	LONG 121.	RAIN 2.	EVAP 14.
LATD 43.	LONG 121.	RAIN 3.	EVAP 13.
LATD 42.	LONG 121.	RAIN 3.	EVAP 13.
LATD 41.	LONG 121.	RAIN 2.	EVAP 14.
LATD 40.	LONG 121.	RAIN 2.	EVAP 13.
LATD 39.	LONG 121.	RAIN 1.	EVAP 12.
LATD 38.	LONG 121.	RAIN 1.	EVAP 15.
LATD 37.	LONG 121.	RAIN 0.	EVAP 10.
LATD 36.	LONG 121.	RAIN 0.	EVAP 10.
LATD 35.	LONG 121.	RAIN 0.	EVAP 10.
LATD 34.	LONG 121.	RAIN 0.	EVAP 10.
LATD 33.	LONG 121.	RAIN 0.	EVAP 10.
LATD 32.	LONG 121.	RAIN 0.	EVAP 10.
LATD 50.	LONG 122.	RAIN 2.	EVAP 10.
LATD 49.	LONG 122.	RAIN 2.	EVAP 10.
LATD 48.	LONG 122.	RAIN 3.	EVAP 10.
LATD 47.	LONG 122.	RAIN 2.	EVAP 13.
LATD 46.	LONG 122.	RAIN 1.	EVAP 13.
LATD 45.	LONG 122.	RAIN 2.	EVAP 13.
LATD 44.	LONG 122.	RAIN 2.	EVAP 14.
LATD 43.	LONG 122.	RAIN 3.	EVAP 14.
LATD 42.	LONG 122.	RAIN 3.	EVAP 14.
LATD 41.	LONG 122.	RAIN 2.	EVAP 13.
LATD 40.	LONG 122.	RAIN 1.	EVAP 19.
LATD 39.	LONG 122.	RAIN 0.	EVAP 16.
LATD 38.	LONG 122.	RAIN 0.	EVAP 13.
LATD 37.	LONG 122.	RAIN 0.	EVAP 10.
LATD 36.	LONG 122.	RAIN 0.	EVAP 10.
LATD 35.	LONG 122.	RAIN 0.	EVAP 10.
LATD 50.	LONG 123.	RAIN 2.	EVAP 10.
LATD 49.	LONG 123.	RAIN 2.	EVAP 10.
LATD 48.	LONG 123.	RAIN 3.	EVAP 10.
LATD 47.	LONG 123.	RAIN 3.	EVAP 11.
LATD 46.	LONG 123.	RAIN 1.	EVAP 12.

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 LATD 45.          LONG 123.          RAIN 2.          EVAP 13.
 LATD 44.          LONG 123.          RAIN 1.          EVAP 13.
 LATD 43.          LONG 123.          RAIN 2.          EVAP 13.
 LATD 42.          LONG 123.          RAIN 2.          EVAP 13.
 LATD 41.          LONG 123.          RAIN 1.          EVAP 12.
 LATD 40.          LONG 123.          RAIN 1.          EVAP 19.
 LATD 39.          LONG 123.          RAIN 0.          EVAP 9.
 LATD 38.          LONG 123.          RAIN 0.          EVAP 9.
 LATD 37.          LONG 123.          RAIN 0.          EVAP 9.
 LATD 36.          LONG 123.          RAIN 0.          EVAP 10.
 LATD 49.          LONG 124.          RAIN 2.          EVAP 10.
 LATD 48.          LONG 124.          RAIN 2.          EVAP 10.
 LATD 47.          LONG 124.          RAIN 3.          EVAP 10.
 LATD 46.          LONG 124.          RAIN 3.          EVAP 11.
 LATD 45.          LONG 124.          RAIN 1.          EVAP 11.
 LATD 44.          LONG 124.          RAIN 1.          EVAP 11.
 LATD 43.          LONG 124.          RAIN 1.          EVAP 11.
 LATD 42.          LONG 124.          RAIN 1.          EVAP 11.
 LATD 41.          LONG 124.          RAIN 1.          EVAP 11.
 LATD 40.          LONG 124.          RAIN 1.          EVAP 9.
 LATD 39.          LONG 124.          RAIN 0.          EVAP 9.
 LATD 38.          LONG 124.          RAIN 0.          EVAP 9.
 LATD 37.          LONG 124.          RAIN 0.          EVAP 9.
 LATD 49.          LONG 125.          RAIN 2.          EVAP 10.
 LATD 48.          LONG 125.          RAIN 2.          EVAP 10.
 LATD 47.          LONG 125.          RAIN 3.          EVAP 10.
 LATD 46.          LONG 125.          RAIN 3.          EVAP 10.
 LATD 45.          LONG 125.          RAIN 1.          EVAP 11.
 LATD 44.          LONG 125.          RAIN 1.          EVAP 11.
 LATD 43.          LONG 125.          RAIN 1.          EVAP 11.
 LATD 42.          LONG 125.          RAIN 1.          EVAP 11.
 LATD 41.          LONG 125.          RAIN 1.          EVAP 9.
 LATD 40.          LONG 125.          RAIN 1.          EVAP 9.
 ENDD
1COMLABEL
 BARB BARBER SHOPS      BEUT BEAUTY SHOPS      DPOT BUS-RAIL DEPOTS
 CARW CAR WASHES        CHUR CHURCHES          CLUB GOLF-SWIM CLUBS
 BOWL BOWLING ALLEYS    COLG COLLEGES RESID.   HOSP HOSPITALS
 HOTL HOTELS            LNDM LAUNDROMATS       LNDY LAUNDRY
 MEDL MEDICAL OFFICES   MOTL MOTELS            MOVI DRIVE-IN MOVIES
 NURS NURSING HOMES     OFFN NEW OFFICE BLDG.  OFFO OLD OFFICE BLDG.
 JAIL JAIL + PRISONS    EATN RESTAURANTS       EATO DRIVE-IN REST-NT
 NITE NIGHT CLUBS       SALE RETAIL SPACE      SKLL SCHOOL,ELEM.
 SKLH SCHOOL, HIGH      THTR THEATERS          YMCA YMCA-YWCA FACIL.
 GASS SERVICE STATIONS
 ENDD
1COMMUNIT
 BARB BARBER CHAIR      BEUT STATION           DPOT SQ. FT.
 CARW INSIDE SQ. FT.    CHUR MEMBER            CLUB MEMBER
 BOWL ALLEY             COLG STUDENT           HOSP BED
 HOTL SQ. FT.           LNDM SQ. FT.           LNDY SQ. FT.
 MEDL SQ. FT.           MOTL SQ. FT.           MOVI CAR STALL
 NURS BED               OFFN SQ. FT.           OFFO SQ. FT.
 JAIL PERSON            EATN SEAT              EATO CAR SPACE
 NITE PERSON SERVED     SALE SALES SQ. FT.     SKLL STUDENT
 SKLH STUDENT           THTR SEAT              YMCA PERSON
 GASS INSIDE SQ. FT.
 ENDD
1COMMAVEG       EXPECTED USAGE VALUES
 BARB      54.6         BEUT      269.         CARW      4.78
 CHUR      .138         CLUB      22.2         COLG      106.
 HOSP      346.         HOTL      .256         LNDY      .253
 BOWL      133.         MOTL      .224         MOVI      5.33
 NURS      133.         OFFO      .142         JAIL      133.
 EATN      24.2         NITE      1.33         SALE      .106
 SKLL      5.38         SKLH      6.63         THTR      3.33
 YMCA      33.3         GASS      .251         LNDM      2.17
 EATO      109.         DPOT      3.33
 OFFN      .093         MEDL      .618
 ENDD
1COMMAXDY       EXPECTED USAGE VALUES
 BARB      80.3         BEUT      328.         CARW      10.3
 CHUR      .862         CLUB      22.2         COLG      114.
 HOSP      551.         HOTL      .294         LNDY      .326
 BOWL      133.         MOTL      .461         MOVI      5.33
 NURS      146.         OFFO      .264         JAIL      133.
 EATN      83.4         NITE      1.33         SALE      .154
 SKLL      9.68         SKLH      19.6         THTR      3.33
 YMCA      33.3         GASS      .590         LNDM      2.90
 EATO      144.         DPOT      6.5
 OFFN      .173         MEDL      1.66
 ENDD
1COMMPEAK       EXPECTED USAGE VALUES
 BARB      389.         BEUT      1070.        CARW      31.5
 CHUR      4.70         CLUB      22.2         COLG      250.
 HOSP      912.         HOTL      .433         LNDY      1.57
 BOWL      133.         MOTL      1.55         MOVI      5.33
 NURS      424.         OFFO      .797         JAIL      133.
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 EATN      167.          NITE      1.33          SALE     .271
 SKLL      49.1          SKLH      121.          THTR     3.33
 YMCA      33.3          GASS      4.89          LNDM     15.4
 EATO      547.          DPOT      25.0
 OFFN      .521          MEDL      4.97
 ENDO
1INDLABEL
 I200 FOOD-KINDRED PRD  I210 TOBACCO MFG       I220 TEXTILE MILL PRD
 I240 LUMBER-WOOD PRD   I250 FURNITURE   FIX.  I260 PAPER-ALLIED PRD
 I280 CHEM-ALLIED PRD   I290 PETROLEUM   COAL  I300 RUBBER-PLASTERS
 I310 LEATHER PRODUCTS  I320 STONE-CLAY-GLASS  I330 PRIMARY METALS
 I340 FAB. METAL IND.   I350 MACHINERY-NO ELE  I360 ELEC. MACHINERY
 I370 TRANS. EQUIP.     I380 INSTRUMENTS REL.  I390 MISC. MFG
 I201 MEAT PRODUCTS     I202 DAIRIES           I203 CAN, FROZEN FOOD
 I204 GRAIN MILLS       I205 BAKERY PRODUCTS   I206 SUGAR
 I207 CANDY             I208 BEVERAGES         I209 MISCELL. FOODS
 I211 CIGARETTES        I221 WEAVING, COTTON   I222 WEAVING, SYNTH.
 I223 WEAVING, WOOL     I225 KNITTING MILLS    I226 TEXTILE FINISH.
 I227 FLOOR COVERING    I228 YARN-THREAD MILL  I229 MISCELL. TEXTILE
 I242 SAW-PLANING MILL  I243 MILLWORK          I244 WOOD CONTAINERS
 I249 MISCELL. WOOD     I251 HOME FURNITURE    I259 FURITURE-FIXTURE
 I261 PULP MILLS        I262 PAPER MILLS       I263 PAPERBOARD MILLS
 I264 PAPER PRODUCTS    I265 PAPERBOARD BOXES  I266 BLDG PAPER MILLS
 I281 BASIC CHEMICALS   I282 FIBERS, PLASTICS  I283 DRUGS
 I284 SOAP-TOILET GOOD  I285 PAINT-ALLIED PRD  I286 GUM-WOOD CHEM.
 I287 AGRICULTURE CHEM  I289 MISCELL. CHEMICL  I291 PETROLEUM REFIN.
 I295 PAVING-ROOFING    I301 TIRES + TUBES     I302 RUBBER FOOTWEAR
 I303 RECLAIMED RUBBER  I306 RUBBER PRODUCTS   I307 PLASTIC PRODUCTS
 I311 LEATHER TANNING   I321 FLAT GLASS        I322 PRESS-BLOWN GLAS
 I323 PROD.PURCH.GLASS  I324 CEMENT,HYDRAULIC  I325 STRUCTURAL CLAY
 I326 POTTERY PRODUCTS  I327 CEMENT-PLASTER    I328 CUT STONE PROD.
 I329 NONMETALLIC MNRL  I331 STEEL ROLLING     I332 IRON-STEEL FOUND
 I333 PRIME NONFERROUS  I334 SEC. NONFERROUS   I335 NONFERROUS ROLLG
 I336 NONFERROUS FOUND  I339 PRIME METAL IND.  I341 METAL CANS
 I342 CUTLERY,HARDWARE  I343 PLUMBING,HEATING  I344 STRUCTURE METAL
 I345 SCREW MACHINE     I346 METAL STAMPINGS   I347 METAL SERVICES
 I348 FABRICATED WIRE   I349 FABRICATED METAL  I351 ENGINES,TURBINES
 I352 FARM MACHINERY    I353 CONSTRUCT. EQUIP  I354 METALWORK.MACHRY
 I355 SPECL INDUS.MACH  I356 GENRL IND. MACH.  I357 OFFICE MACHINES
 I358 SERV. IND. MACH.  I359 MISCELL. MACHINE  I361 ELECT.DISTR.PROD
 I362 ELECT.IND.APPART  I363 HOME APPLIANCES   I364 LIGHT-WIRING FIX
 I365 RADIO TV RECEIV.  I366 COMMUNICATION EQ  I367 ELECTRONIC COMP.
 I369 ELECT. PRODUCTS   I371 MOTOR VEHICLES    I372 AIRCRAFT + PARTS
 I373 SHIP + BOAT BLDG  I374 RAILROAD EQUIP.   I375 MOTORCYCLE, BIKE
 I381 SCIENTIFIC INSTR  I382 MECHAN. MEASURE   I384 MEDICAL INSTRUM.
 I386 PHOTO EQUIPMENT   I387 WATCHES, CLOCKS   I391 JEWELRY, SILVER
 I394 TOYS,SPORT GOODS  I396 COSTUME JEWELRY   I398 MISCEL. MANUFACT
 I230 WHL.APPAREL IND.  I270 WHOL.PRINT IND.
 I399 MISCEL. MANUFACT
 ENDO
1INDANAVE
 I200      832.34       I210      178.31       I220      307.71
 I240      221.65       I250      112.69       I260     2722.29
 I280     1467.11       I290     2622.11       I300      369.69
 I310      537.14       I320      360.54       I330      515.04
 I340      390.89       I350      219.64       I360      201.53
 I370      208.95       I380      168.65       I390      309.75
 I201          903.890  I202          791.350  I203          784.739
 I204          488.249  I205          220.608  I206         1433.611
 I207          244.306  I208         1144.868  I209         1077.360
 I211          193.613  I221          171.434  I222          344.259
 I223          464.439  I225          273.439  I226          810.741
 I227          297.392  I228           63.558  I229          346.976
 I242          223.822  I243          316.420  I249          144.745
 I251          122.178  I261        13494.110  I262         2433.856
 I263         2464.478  I264          435.790  I265          154.804
 I266          583.355  I281         2744.401  I282          864.892
 I283          457.356  I284          672.043  I285          845.725
 I286          332.895  I287          449.836  I289          984.415
 I291         3141.100  I295          829.592  I301          375.211
 I302           82.592  I303         1031.523  I306          371.956
 I307          527.784  I311          899.500  I321          590.140
 I322          340.753  I323          872.246  I324          279.469
 I325          698.197  I326          326.975  I327          353.787
 I328          534.789  I329          439.561  I331          494.356
 I332          411.052  I333          716.626  I334         1016.596
 I335          675.475  I336          969.586  I339          498.331
 I341          162.547  I342          459.300  I343          411.576
 I344          319.875  I345          433.193  I346          463.209
 I347         1806.611  I348          343.367  I349          271.186
 I351          197.418  I352          320.704  I353          218.365
 I354          196.255  I355          290.494  I356          246.689
 I357          138.025  I358          334.203  I359          238.839
 I361          272.001  I362          336.016  I363          411.914
 I364          369.592  I365          235.763  I366           86.270
 I367          203.289  I369          393.272  I371          318.233
 I372          154.769  I373          166.074  I374          238.798
 I375          414.859  I381          181.007  I382          237.021
```

```
 I384          506.325 I386          120.253 I387          164.815
 I391          306.491 I394          213.907 I396          423.124
 I399          258.270
 I230               20. I270               15.
 I244          238.000 I259          122.178 I398          258.270
 ENDD
1INDMXDAY
 I200     832.34       I210     178.31       I220     307.71
 I240     221.65       I250     112.69       I260     2722.29
 I280     1467.11      I290     2622.11      I300     369.69
 I310     537.14       I320     360.54       I330     515.04
 I340     390.89       I350     219.64       I360     201.53
 I370     208.95       I380     168.65       I390     309.75
 I201          903.890 I202          791.350 I203          784.739
 I204          488.249 I205          220.608 I206         1433.611
 I207          244.306 I208         1144.868 I209         1077.360
 I211          193.613 I221          171.434 I222          344.259
 I223          464.439 I225          273.439 I226          810.741
 I227          297.392 I228           63.558 I229          346.976
 I242          223.822 I243          316.420 I249          144.745
 I251          122.178 I261        13494.110 I262         2433.856
 I263         2464.478 I264          435.790 I265          154.804
 I266          583.355 I281         2744.401 I282          864.892
 I283          457.356 I284          672.043 I285          845.725
 I286          332.895 I287          449.836 I289          984.415
 I291         3141.100 I295          829.592 I301          375.211
 I302           82.592 I303         1031.523 I306          371.956
 I307          527.784 I311          899.500 I321          590.140
 I322          340.753 I323          872.246 I324          279.469
 I325          698.197 I326          326.975 I327          353.787
 I328          534.789 I329          439.561 I331          494.356
 I332          411.052 I333          716.626 I334         1016.596
 I335          675.475 I336          969.586 I339          498.331
 I341          172.747 I342          479.300 I343          411.777
 I344          319.877 I347          433.193 I347          473.209
 I347         1807.711 I348          343.377 I349          271.187
 I371          197.418 I372          320.704 I373          218.377
 I374          197.277 I377          290.494 I377          247.789
 I357          138.025 I358          334.203 I359          238.839
 I361          272.001 I362          336.016 I363          411.914
 I364          369.592 I365          235.763 I366           86.270
 I367          203.289 I369          393.272 I371          318.233
 I372          154.769 I373          166.074 I374          238.798
 I375          414.859 I381          181.007 I382          237.021
 I384          506.325 I386          120.253 I387          164.815
 I391          306.491 I394          213.907 I396          423.124
 I399          258.270
 I230               20. I270               15.
 I244          238.000 I259          122.178 I398          258.270
 ENDD
1INDPEKHR
 I200     832.34       I210     178.31       I220     307.71
 I240     221.65       I250     112.69       I260     2722.29
 I280     1467.11      I290     2622.11      I300     369.69
 I310     537.14       I320     360.54       I330     515.04
 I340     390.89       I350     219.64       I360     201.53
 I370     208.95       I380     168.65       I390     309.75
 I201          903.890 I202          791.350 I203          784.739
 I204          488.249 I205          220.608 I206         1433.611
 I207          244.306 I208         1144.868 I209         1077.360
 I211          193.613 I221          171.434 I222          344.259
 I223          464.439 I225          273.439 I226          810.741
 I227          297.392 I228           63.558 I229          346.976
 I242          223.822 I243          316.420 I249          144.745
 I251          122.178 I261        13494.110 I262         2433.856
 I263         2464.478 I264          435.790 I265          154.804
 I266          583.355 I281         2744.401 I282          864.892
 I283          457.356 I284          672.043 I285          845.725
 I286          332.895 I287          449.836 I289          984.415
 I291         3141.100 I295          829.592 I301          375.211
 I302           82.592 I303         1031.523 I306          371.956
 I307          527.784 I311          899.500 I321          590.140
 I322          340.753 I323          872.246 I324          279.469
 I325          698.197 I326          326.975 I327          353.787
 I328          534.789 I329          439.561 I331          494.356
 I332          411.052 I333          716.626 I334         1016.596
 I335          675.475 I336          969.586 I339          498.331
 I341          162.547 I342          459.300 I343          411.576
 I344          319.875 I345          433.193 I346          463.209
 I347         1806.611 I348          343.367 I349          271.186
```

```
 I351          197.418 I352          320.704 I353          218.365
 I354          196.255 I355          290.494 I356          246.689
 I357          138.025 I358          334.203 I359          238.839
 I361          272.001 I362          336.016 I363          411.914
 I364          369.592 I365          235.763 I366           86.270
 I367          203.289 I369          393.272 I371          318.233
 I372          154.769 I373          166.074 I374          238.798
 I375          414.859 I381          181.007 I382          237.021
 I384          506.325 I386          120.253 I387          164.815
 I391          306.491 I394          213.907 I396          423.124
 I399          258.270
 I230              20. I270              15.
 I244          238.000 I259          122.178 I398          258.270
 ENDD
1PUBCOFAA
 LOSS 14.9             FSER 5.2              AIRP 5.0
 ENDD
1PUBCOFMD
 LOSS 14.9             FSER 5.2              AIRP 5.0
 ENDD
1PUBCOFPH
 LOSS 14.9             FSER 5.2              AIRP 5.0
 ENDD
1PUBLABEL
 LOSS DISTRIB. LOSSES  FSER FREE SERVICES    AIRP AIRPORTS
 ENDD
 ENDI
```

APPENDIX III

PROGRAM FLOWCHART

```
      BLOCK DATA                                                        BDT00100
      REAL ILIST,JLIST
      REAL IBL

***.....                                                                ***BDT00200
      COMMON/COMMRL/CDUM(3),CNAME(50),CDATA(750)                          BDT00300

***.....                                                                ***BDT00900
***.....THESE ARE RESIDENTIAL BLOCK DATA STATEMENTS                     ***BDT01000
***.....                                                                ***BDT01100
***.....                                                                ***BDT01200
      COMMON/RESIDL/RVAL(526)                                           BDT01300

***.....                                                                ***BDT01500
***.....                                                                ***BDT01600
***.....THESE ARE PUBLIC AND UNACCOUNTED BLOCK DATA STATEMENTS          ***BDT01700
***.....                                                                ***BDT01800
***.....                                                                ***BDT01900
      COMMON/PUBLC/PUBNAM(30),BDTDUM(516)
      COMMON/COMPRN/MACH,LBIN,LIBY,IPRJT,IPNCH,IDIS                     BDT02600
      COMMON/LISTIJ/ILIST(12),JLIST(5)                                  BDT02900

***.....                                                                ***BDT03300
***.....                                                                ***BDT03600
***.....MACH IS ASSIGN TO A DUMMY STORAGE DEVICE,DEFAULT = 3            ***
***.....IPRJT IS ASSIGN TO A DUMMY SOTRAGE DEVICE, DEFAULT = 2          ***
***.....LIBY IS AN OPTION FOR PRINTING THE LIBRARY DATA--THE DATA WILL NOT***BDT03700
***.....  BE PRINTED UNLESS LIBY = 0 IS ADDED TO THE OPTIONS INPUT DATA  ***BDT03800
***.....LBIN IS A LIBRARY INPUT REFERENCE NUMBER                        ***BDT03900
***.....NOS IS THE NUMBER OF CNAMES                                     ***BDT04100
***.....IN IS THE READ REFERENCE NUMBER                                 ***BDT04200
***.....IO IS THE WRITE REFERENCE NUMBER                                ***BDT04300
***.....IBL IS THE TEST FOR A BLANK FIELD ON A DATA CARD                ***BDT04400
***.....                                                                ***BDT04500
      COMMON/NUMBER/NOS                                                 BDT04600
      COMMON/ITEST/IBL                                                  BDT04800

***.....                                                                ***BDT05000
***.....                                                                ***BDT05100
***.....                                                                ***BDT05200
      COMMON/IFILE/IN,IO                                                BDT05300

***.....                                                                ***BDT05600
***.....                                                                ***BDT05700
***.....                                                                ***BDT05800
      DATA CDUM/3*0.0/
      DATA CNAME
     1    /4HHOTL,4HMOTL,4HBARB,4HBEUT,4HEATN,4HEATO,4HNITE,4HHOSP,4HNU   BDT00400
     2    RS,   4HMEDL,4HLNDY,4HLNDM,4HSALE,4HSKLL,4HSKLH,4HDPOT,4HCARW
     3    ,4HCHUR,   4HCLUB,4HBOWL,4HCOLG,4HMOVI,4HOFFN,4HOFFO,4HJAIL,4
     4    HTHTR,4HYMCA,  4HGASS,4HETOT,21*0.0/

      DATA RVAL/526* 0.0/
      DATA PUBNAM                                                       BDT01400
     1    /4HLOSS,4HFSER,4HAIRP,27*0.0/                                 BDT02400

      DATA BDTDUM/516*0.0/
      DATA LBIN,LIBY,IPRJT,IPNCH,IDIS/1,1,2,-1,1/
      DATA MACH/3/                                                      BDT02700
      DATA ILIST/4HHDFP,4HPDFP,4HNHFP,4HHDFW,4HPDFW,4HNHFW,             BDT02800
     1           4HHDMP,4HPDMP,4HNHMP,4HHDMW,4HPDMW,4HNHMW/             BDT03000

      DATA JLIST/4HCITY,4HCOMM,4HINDU,4HPUBL,4HENDY/
      DATA NOS/28/                                                      BDT03200
      DATA IBL/4H    /                                                  BDT04700
      DATA IN/5/                                                        BDT04900
      DATA IO/6/

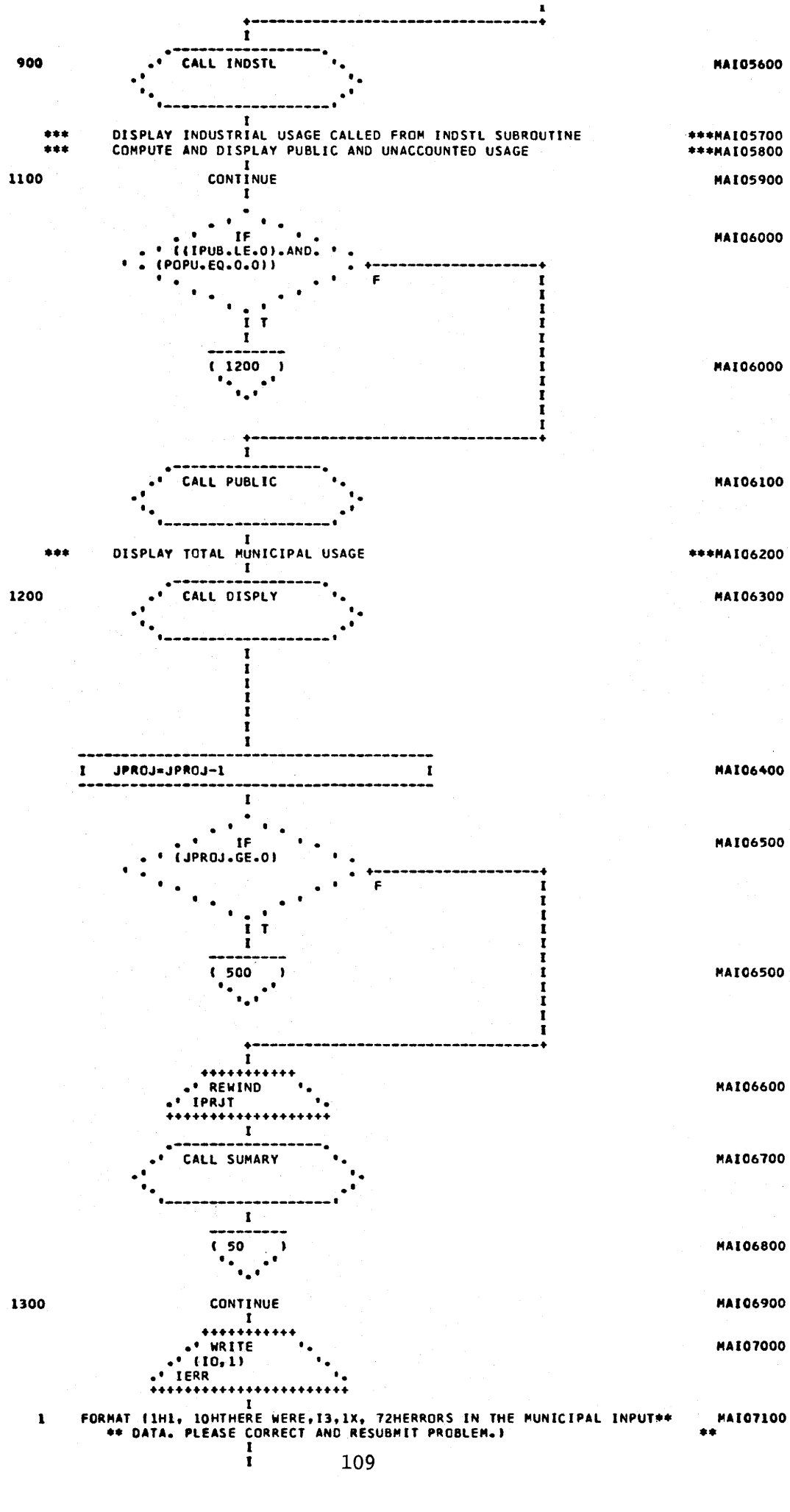
***END*******END*******END*******END*******END*******END*******END*******END*******END*******END*******END***  BDT05900
```

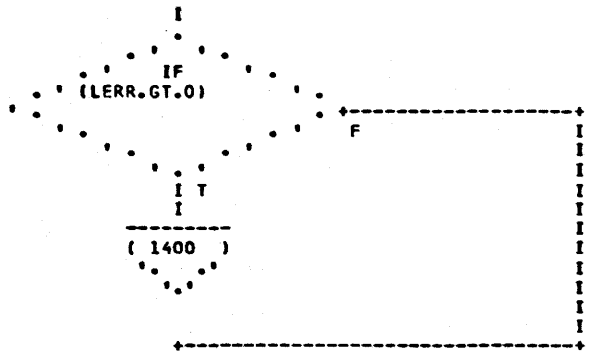
```
***      THIS IS THE MAIN PROGRAM FOR OWRR                                        ***MAI00100
      COMMON/COMPRN/MACH,LBIN,LIBY,IPRJT,IPNCH,MAIDUM                                MAI00200
      COMMON/SUMRY/AYR,YEAR(25),ANNL(25),DAY(25),HOUR(25)                            MAI00300
      COMMON/IFILE/IN,IO                                                             MAI00400
      COMMON/CITDAT/CDATE,ALAT,ALONG,PO,PD,AGE,TEMPLT,EMPL4,                         MAI00500
                 CNCOME,CSERVE,FDAT,POPRO,PNCOME,ACRESP,
                     HDGROP,PSERVE,CIT(6),AMAICT(3)

      EQUIVALENCE (PO,POPU)                                                          MAI00800
 50                     CONTINUE                                                     MAI00900
                           I
      -----------------------------------------
      I   AYR=0.0                             I                                      MAI01000
      I   JPROJ=0                             I                                      MAI01100
      I   IERR=0                              I                                      MAI01200
      I   LERR=0                              I                                      MAI01300
      I   IRES=0                              I                                      MAI01400
      I   ICOM=0                              I                                      MAI01500
      I   INDS=0                              I                                      MAI01600
      I   IPUB=0                              I                                      MAI01700
      -----------------------------------------
                           I
***.....JPROJ IS THE FLAG FOR THE NUMBER OF PROJECTION YEARS.                     ***MAI01800
***      IERR IS A VARIABLE TO COUNT ERRORS IN INPUT DATA. IF THERE ARE           ***MAI01900
***           ERRORS, THE PROGRAM WILL BE TERMINATED.                             ***MAI02000
***      LERR IS A VARIABLE TO COUNT ERRORS IN THE COEFFICIENTS DATA. IF          ***MAI02100
***           THERE ARE ERRORS, THE PROGRAM WILL BE TERMINATED.                   ***MAI02200
***.....IRES IS A VARIABLE TO TEST FOR RESIDENTIAL INPUT DATA                     ***MAI02300
***.....IPUB IS A VARIABLE TO TEST FOR PUBLIC AND UNACCOUNTED INPUT DATA          ***MAI02400
***.....INDS IS A VARIABLE TO TEST FOR INDUSTRIAL  INPUT DATA                     ***MAI02500
***.....ICOM IS A VARIABLE TO TEST FOR COMMERCIAL INPUT DATA                      ***MAI02600
***      READ MUNICIPAL INPUT DATA                                                ***MAI02700
                           I
                .------------------.
100           .'  CALL REDINP (IE   '.                                               MAI02800
            .'    RR,IRES,ICOM,IN     '.
             '.   DS,IPUB,JPROJ)    .'
               '------------------'
                           I
***                                                                               ***MAI02900
***      READ DATA FROM LIBRARY                                                   ***MAI03000
                           I
                .------------------.
200           .'  CALL REDCOF(LER   '.                                               MAI03100
            .'    R)                  '.
             '.                     .'
               '------------------'
                           I
                           I
                           I
                           I
                           .
                      . '     ' .
                  . '    IF       ' .                                                MAI03200
              . '   (IERR.GT.0)       ' .
                  .                 .   +--------------------+
                      .         .     F                      I
                          . .                                I
                          I T                                I
                           I                                 I
                       ---------                             I
                       ( 1300  )                             I               MAI03200
                         '. .'                               I
                          '.'                                I
                                                             I
                           +---------------------------------+
                           I
                           .
                      . '     ' .
                  . '    IF       ' .                                                MAI03300
              . '   (LERR.GT.0)       ' .
                  .                 .   +--------------------+
                      .         .     F                      I
                          . .                                I
                          I T                                I
                           I                                 I
                       ---------                             I
                       ( 1400  )                             I               MAI03300
                         '. .'                               I
                          '.'                                I
                                                             I
                           +---------------------------------+
                           I
                   +++++++++++
                 .' REWIND     '.                                                    MAI03400
               .' IPRJT          '.
               +++++++++++++++++++
                           I
***                                                                               ***MAI03500
***      GO TO SUBPROGRAM TO INITIALIZE FOR CURRENT CALCULATIONS.                 ***MAI03600
***                                                                               ***MAI03700
                           I
                           I
                           I
                           I
                           I
                           I
```

```
                                 I
                       .-------------------.
                     .'  CALL INPROJ(O)     '.                              MAI03800
                    '.                       .'
                      '-------------------'
                                 I
                             ---------
                             ( 550   )                                      MAI03900
                              '.   .'
                                '.'

      ***      COMPUTE RESIDENTIAL USAGE                                  ***MAI04000
500                         CONTINUE                                        MAI04100
                                 I
                       .-------------------.
                     .'  CALL INPROJ(1)     '.                              MAI04200
                    '.                       .'
                      '-------------------'
                                 I
550                         CONTINUE                                        MAI04300
                                 I
                                 .
                             .  '  '  .
                          . '    IF     ' .                                 MAI04400
                       . ' (IRES.LE.O)     ' .
                      .                       . +--------------------+
                       .                     .    F                  I
                          .                .                         I
                             .          .                            I
                                 . .                                 I
                                 I T                                 I
                                 I                                   I
                             ---------                               I
                             ( 600   )                               I      MAI04400
                              '.   .'                                I
                                '.'                                  I
                                                                     I
                                 +-----------------------------------+
                                 I
                       .-------------------.
                     .'  CALL RESDNT        '.                              MAI04500
                    '.                       .'
                      '-------------------'
                                 I
      ***      DISPLAY RESIDENTIAL USAGE CALLED FROM RESDNT ROUTINE       ***MAI04600
                                 I
                                 I
      ***      COMPUTE COMMERCIAL USAGE                                   ***MAI04700
                                 I
600                         CONTINUE                                        MAI04800
                                 I
                                 .
                             .  '  '  .
                          . '    IF     ' .                                 MAI04900
                       . ' (ICOM.LE.O)     ' .
                      .                       . +--------------------+
                       .                     .    F                  I
                          .                .                         I
                             .          .                            I
                                 . .                                 I
                                 I T                                 I
                                 I                                   I
                             ---------                               I
                             ( 800   )                               I      MAI04900
                              '.   .'                                I
                                '.'                                  I
                                                                     I
                                 +-----------------------------------+
                                 I
                       .-------------------.
700                  .'  CALL COMMER        '.                              MAI05000
                    '.                       .'
                      '-------------------'
                                 I
      ***                                                                 ***MAI05100
      ***      DISPLAY COMMERCIAL USAGE CALLED FROM COMMER ROUTINE        ***MAI05200
      ***      COMPUTE INDUSTRIAL USAGE                                   ***MAI05300
                                 I
800                         CONTINUE                                        MAI05400
                                 I
                                 .
                             .  '  '  .
                          . '    IF     ' .                                 MAI05500
                       . ' (INDS.LE.O)     ' .
                      .                       . +--------------------+
                       .                     .    F                  I
                          .                .                         I
                             .          .                            I
                                 . .                                 I
                                 I T                                 I
                                 I                                   I
                             ---------                               I
                             ( 1100  )                               I      MAI05500
                              '.   .'                                I
                                '.'                                  I
                                                                     I
                                                                     I
```


900 CALL INDSTL MAI05600
*** DISPLAY INDUSTRIAL USAGE CALLED FROM INDSTL SUBROUTINE ***MAI05700
*** COMPUTE AND DISPLAY PUBLIC AND UNACCOUNTED USAGE ***MAI05800
1100 CONTINUE MAI05900
IF MAI06000
((IPUB.LE.0).AND. (POPU.EQ.0.0))
F
T
(1200) MAI06000
CALL PUBLIC MAI06100
*** DISPLAY TOTAL MUNICIPAL USAGE ***MAI06200
1200 CALL DISPLY MAI06300
JPROJ=JPROJ-1 MAI06400
IF MAI06500
(JPROJ.GE.0)
F
T
(500) MAI06500
REWIND MAI06600
IPRJT
CALL SUMARY MAI06700
(50) MAI06800
1300 CONTINUE MAI06900
WRITE MAI07000
(IO,1)
IERR
1 FORMAT (1H1, 10HTHERE WERE,I3,1X, 72HERRORS IN THE MUNICIPAL INPUT** MAI07100
** DATA. PLEASE CORRECT AND RESUBMIT PROBLEM.) **




```
                                                                                MAI07300
                                                                                MAI07300
                                                                                MAI07400
                                                                                MAI07500
1400                WRITE                                                       MAI07500
                   (IO,2)
                  LERR
                                                                                MAI07600
   2    FORMAT (1HO, 10HTHERE WERE,I3,1X, 77HERRORS IN THE LIBRARY COEFFIC**     MAI07600
          **IENTS DATA. PLEASE CORRECT AND RESUBMIT PROBLEM.)                  **
                                                                                MAI07800
1500                CONTINUE                                                    MAI07800
                                                                                MAI07900
                    STOP                                                        MAI07900

***END*******END*******END*******END*******END***  SUBROUTINE GROWTH  ******END*******END*******END*******END***   MAI08000

                    **                        **
                    ** SUBROUTINE GROWTH      **                                GTH00100
                    ** (     IRES,ICOM,IND   **
                    ** S,IPUB)                **
                    **                        **
                    **************************
      REAL MEFO
      INTEGER FSH,FTH                                                           GTH04000
      REAL MPLOW,MPMED,MPHIGH,MWLOW,MWMED,MWHIGH
      REAL MLIST,NLIST
      REAL MWNUM,MPNUM,SUMNTP,MWNUMF,MPNUMF                                     GTH04100
      DIMENSION ILOW(11),JHIH(11),JLOW(10),IHIH(10)                             GTH00200
      DIMENSION CITF(6),PTEST(16),CTEST(16),F1(4)                               GTH00300
      DIMENSION RESPAR(800), RSPAR(12),RESIDL(300)                              GTH00400
      DIMENSION DETP(11),A(21),C(39),P(36)                                      GTH00500
      COMMON/RESPAR/DUMFT(125),GFPDEN(25),PDCRFT(25),FPNUM(25),                 GTH00600
                    DUMFW(125),GFWDEN(25),PDCRFS(25),FWNUM(25),
                         DUMMT(125),GMPDEN(25),PDCRMT(25),MPNUM(25)
                              DUMMW(125),GMWDEN(25),PDCRMS(25),MWNU
     ,                             FPLOW,FPMED,FPHIGH,FWLOW,FWMED,F
     M(25),                              MPLOW,MPMED,MPHIGH,MWLOW,MW
     WHIGH,
     MED,MWHIGH
```

```
            SUBROUTINE GROWTH

                ***********
                *  PAUSE  *                                                  GTH01800
                *  W,PFW  *
                ***********
      COMMON/PUBLC/PUBDUM(180),GTHPUB(216),PUBPAR(150)                        GTH02200
      COMMON/CITDAT/CDATE,ALAT,ALONG,PO,PD,AGE,TEMPLT,EMPL4,                  GTH02300
                    CNCOME,CSERVE,FDATE,POPRO,PNCOME,ACRESP,
                       HDGROP,PSERVE,GTHCIT(9)

      COMMON/LISTIJ/MLIST(12),NLIST(5)                                        GTH02600
      COMMON/COMPRN/IY(3),IPR,IGTHDM(2)                                       GTH02700
      COMMON/HISDAT/DPDTH,DPNWTH,DNTDTH,DN2DTH,DN3DTH,DYMDTH,                 GTH02800
                    DSEDTH,DSHDTH,DSTDTH,C117TH,DPCITH,DEPFTH,
                         DE1DTH,DE2DTH,DE3DTH,DE4DTH,DE5DTH,DE6DTH,
                              DE7DTH,DE8DTH,DE9DTH,DE10TH,DE11TH,DT
          EFTH,                    DMEFTH

      COMMON/COMMRL/CDUM(503),E(50),CEMP(50),Z(50),PP(50),GTHCOM(100)         GTH03300
      COMMON/INDUST/DDUM(1403),EMP(200),EMPP(200),EMPM,GTHIND(399)            GTH03400
      EQUIVALENCE(CITF,FDATE)                                                 GTH03500
      EQUIVALENCE (PMWLOW,PTEST(1)),(CMWLOW,CTEST(1))                         GTH03600
      EQUIVALENCE (DUMFT(1),RESPAR(1)),(FPLOW, RSPAR(1))                      GTH03700
      EQUIVALENCE (FPNUMF(1),RESIDL(1))                                       GTH03800
                  I
***....                                                                       ***GTH04200


            SUBROUTINE GROWTH
          0.0009603,   -0.02062,    0.000001437,                             GTH04900
             -0.0006646,   -0.000219727,    0.35843,
                   0.002321291,   -0.0056829,    0.07629,
                        0.000013332,    0.1955,   -0.000870205,
                             0.40891,   -0.370286,    0.001558391,
                                -0.00000075074,   -0.00000445,   -
          0.062943 /

***.....                                                                      ***GTH05500


            SUBROUTINE GROWTH
         -0.0378505,    0.0110124,    0.025125/                             GTH06200

                                                                              ***GTH06300
***.....
```

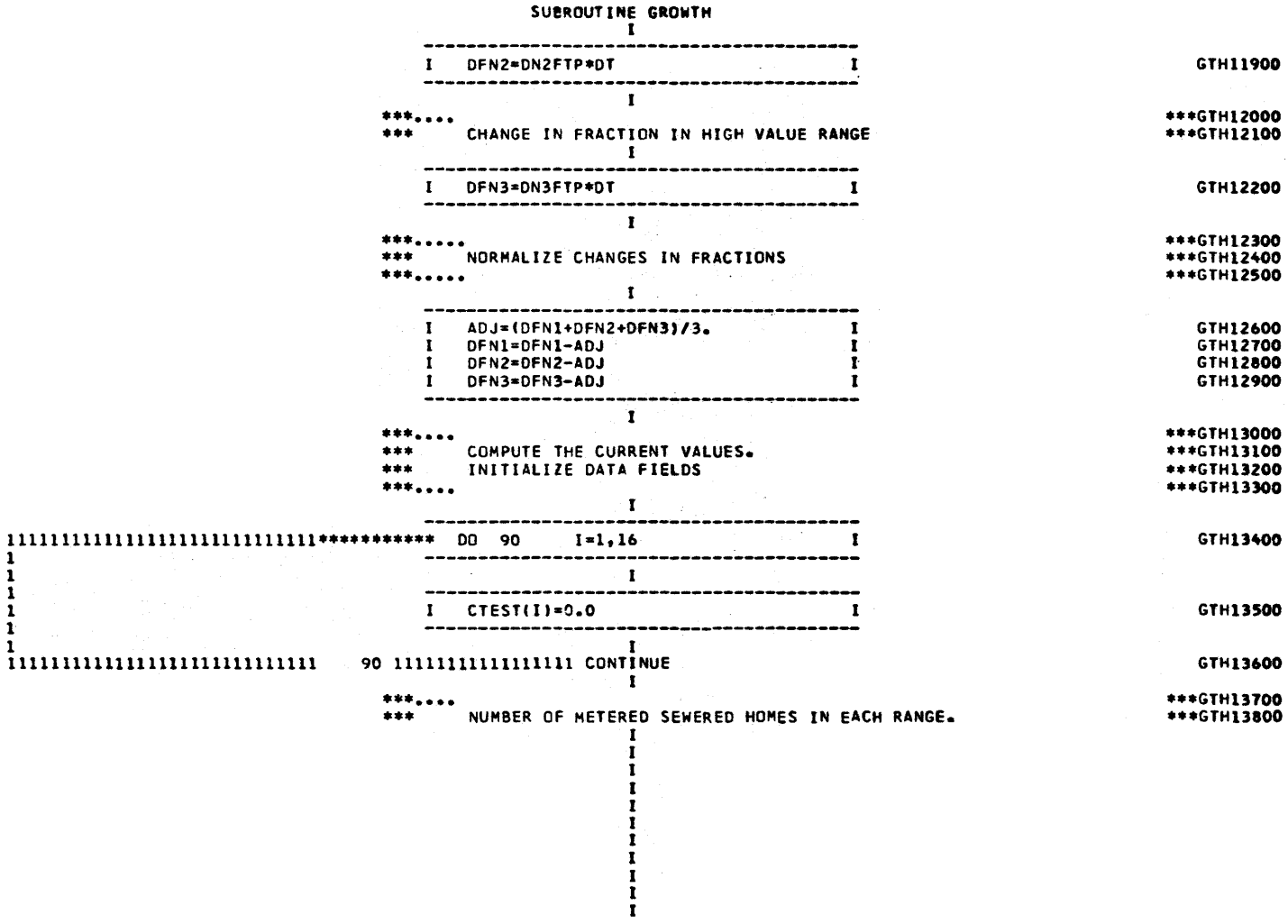
```
     -100.784,        0.045532,        0.64449 /                               GTH07600
*** SET UP MINIMUM AND MAXIMUM TABLES FOR COMMERCIAL AND INSTITUTIONAL      ***GTH07700
*** CATEGORIES REPRESENTING EACH EQUATION IN THE COMMERCIAL SUBMODEL        ***GTH07800
    DATA JLOW/1,3,5,8,11,13,14,15,16,29/                                       GTH07900
    DATA IHIH/2,4,7,10,12,13,14,15,28,50/                                      GTH08000

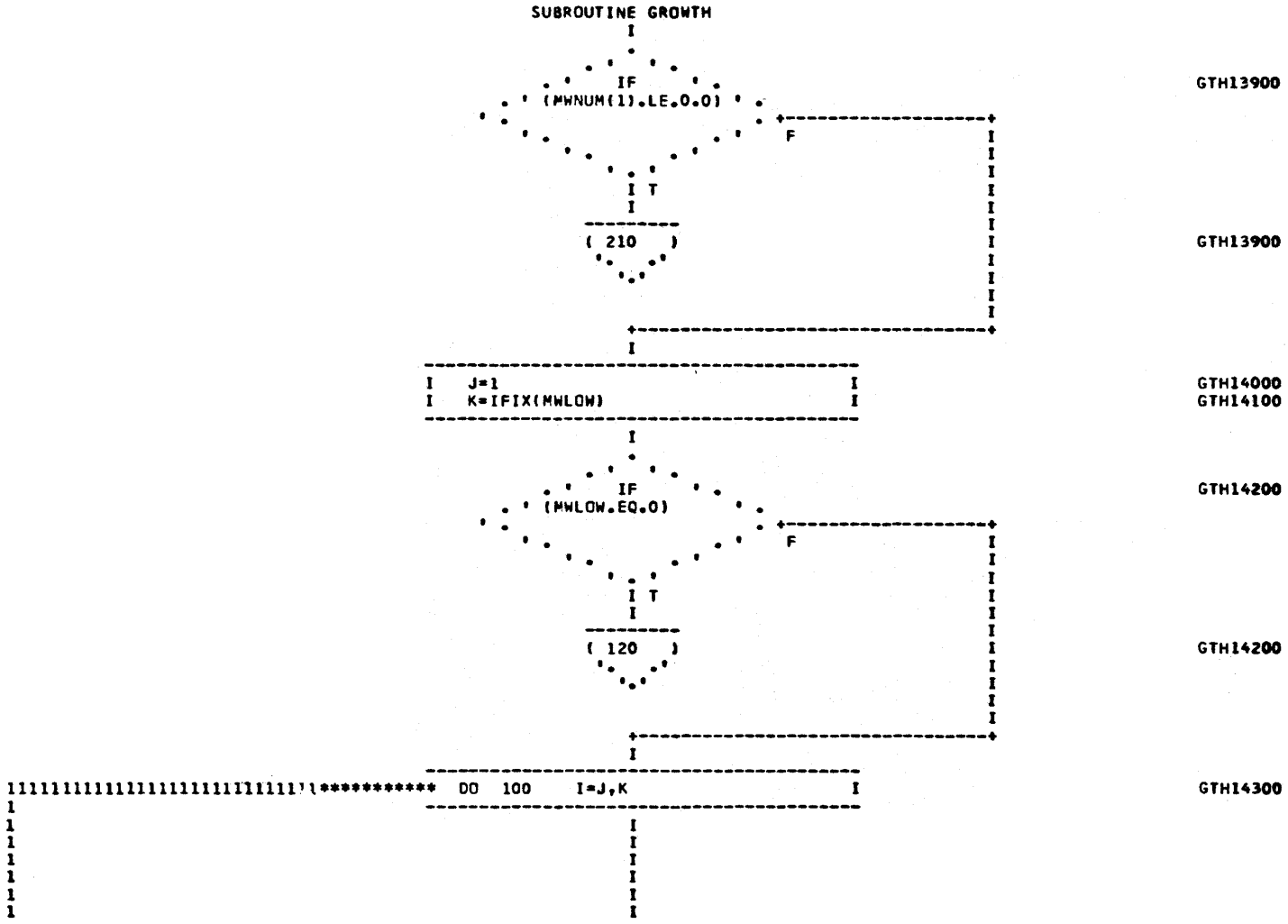
*** SET UP MINIMUM AND MAXIMUM TABLES FOR THE VARIOUS SIC CATEGORIES        ***GTH08100
*** REPRESENTING EACH EQUATION IN THE INDUSTRIAL SUBMODEL.                  ***GTH08200
    DATA ILOW/1,21,41,81,101,111,121,131,151,171,181/                          GTH08300
    DATA JHIH /20,40,80,100,110,120,130,150,170,180,200/                       GTH08400

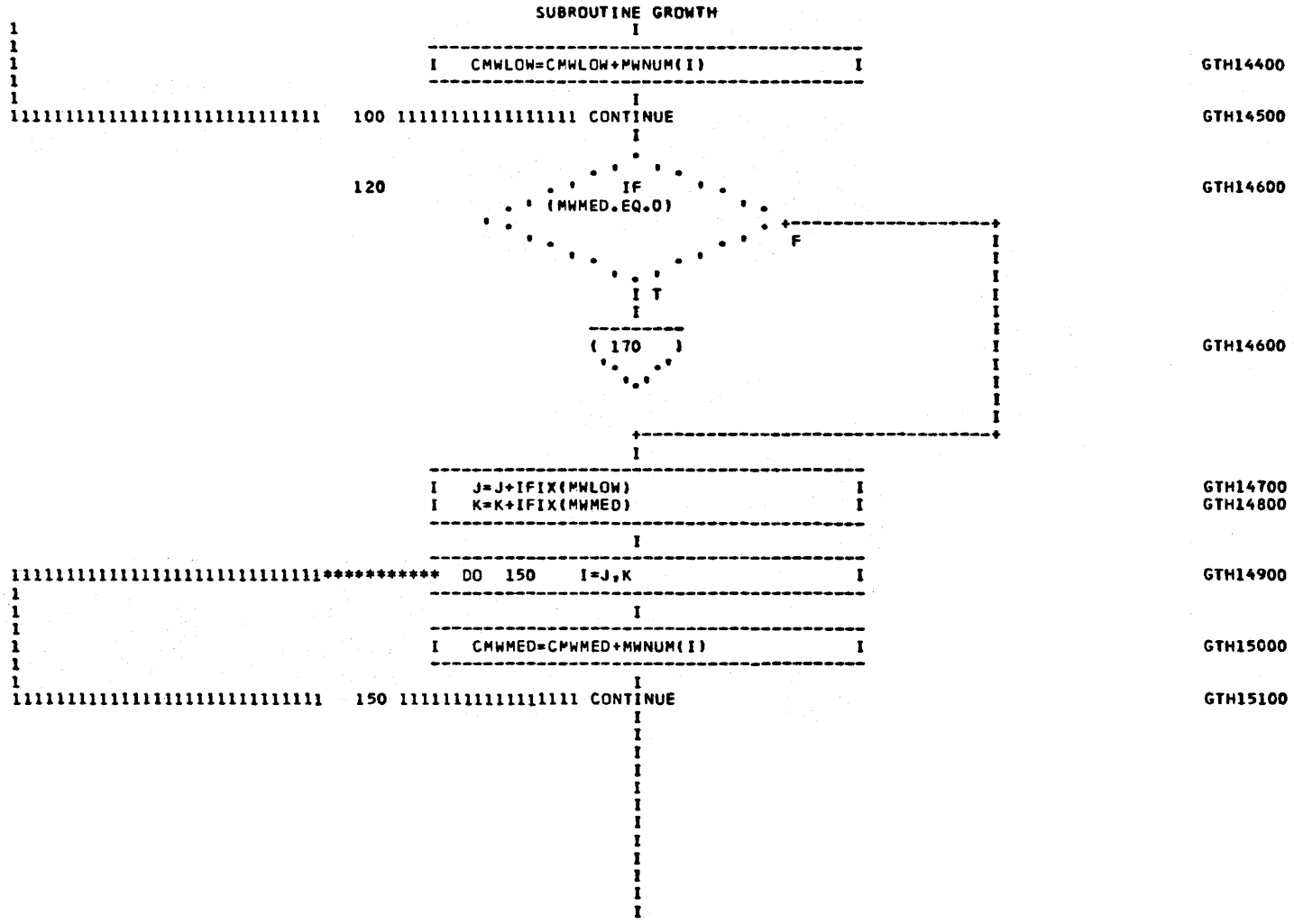
***.....                                                                    ***GTH08500

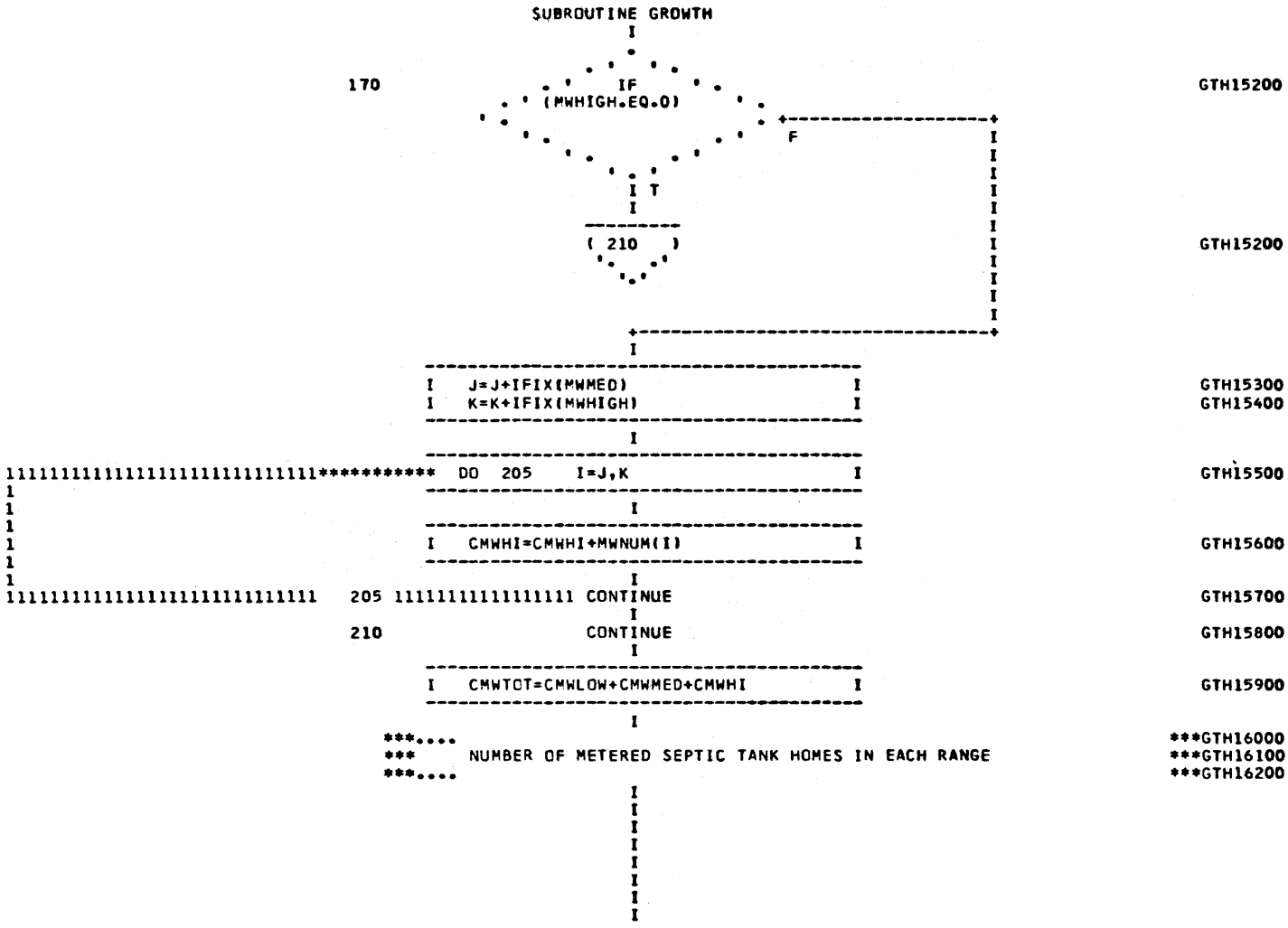
                    .
                .'     '.
            . '    IF     ' .                                                  GTH08600
        . ' (IRES.EQ.0)       ' .
      '.                         . +--------------------+
          '.                 . '     F                  I
              '.         . '                            I
                  '. . '                                I
                   I T                                  I
                   I                                    I
               ---------                                I
               ( 6400  )                                I                      GTH08600
                '.   .'                                 I
                  '.'                                   I
                                                        I
                                                        I
                   +------------------------------------+
                   I
***....                                                                     ***GTH08800
***     ******   RESIDENTIAL SUBMODEL   ******                              ***GTH08900
***....                                                                     ***GTH09000
***....                                                                     ***GTH09100
                   I
    ----------------------------------------
    I  DT=FDATE-CDATE                      I                                   GTH09200
    I  DPDTP=(POPRO-PO)/DT                 I                                   GTH09300
    I  PERSPR=-156812.67+2.53698*PNCOME+7  I                                   GTH09400
    I       9.6025*FDATE                   I
    I  PERSCR=-156812.67+2.53698*CNCOME+7  I                                   GTH09500
    I       9.6025*CDATE                   I
    I  DIDTP=(PERSPR-PERSCR)/(PERSCR*DT*.  I                                   GTH09600
    I       01)                            I
    ----------------------------------------
                   I
***....                                                                     ***GTH09700
                   I
                   I
```

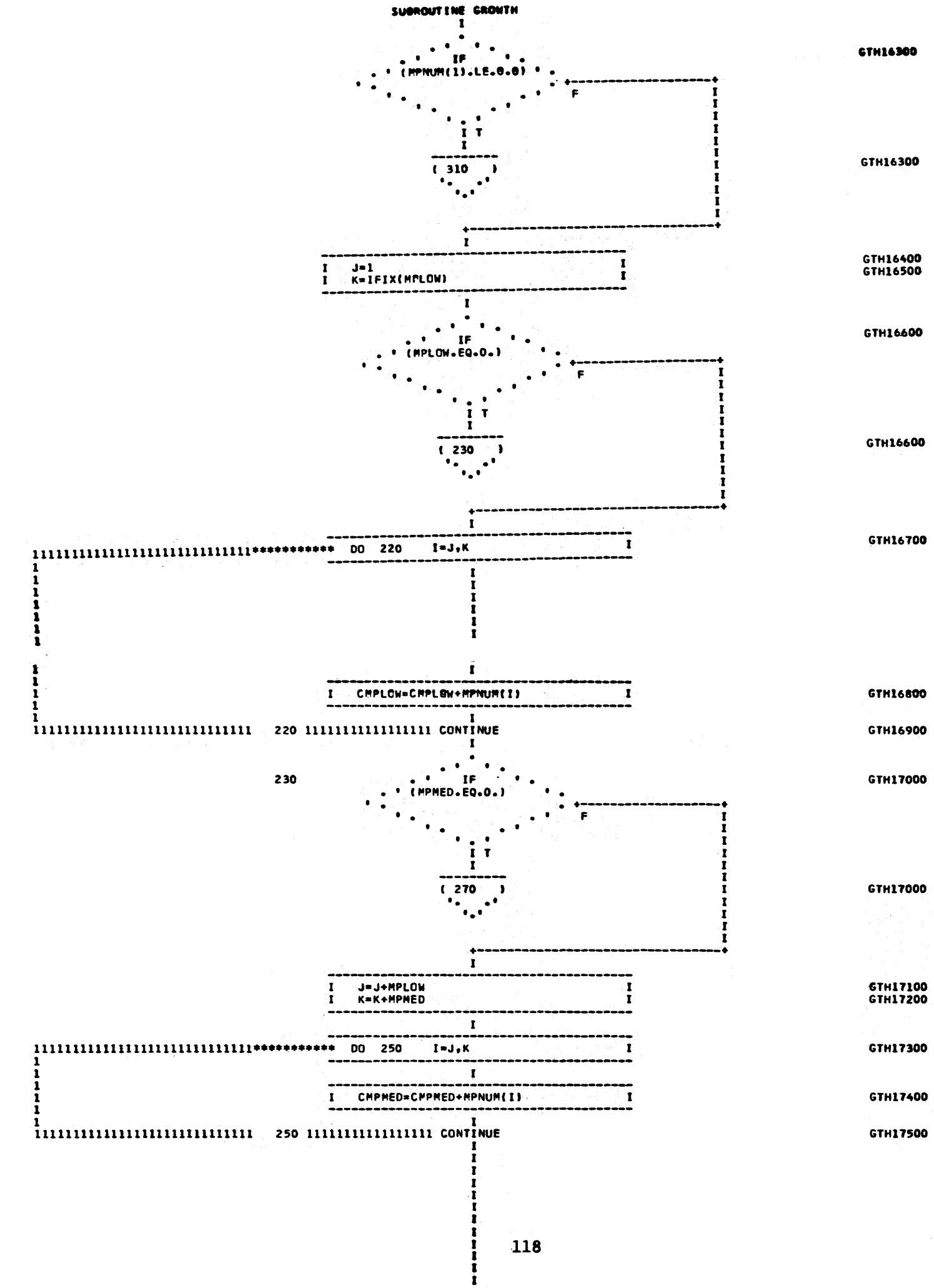
```
                SUBROUTINE GROWTH
***     RATE OF CHANGE IN TOTAL NUMBER OF HOMES IN AREA                  ***GTH09800
                        I
    ----------------------------------------
    I   DNTDTP=A(1)*DPDTH+A(2)*DPDTP+A(3)*  I                              GTH09900
    I        DNTDTH+A(4)*DPNWTH+A(5)*PD+A(  I
    I        18)                            I
    ----------------------------------------
                        I
***.....                                                                 ***GTH10100
***     RATE OF CHANGE IN FRACTION OF HOMES IN LOW VALUE RANGE.          ***GTH10200
                        I
    ----------------------------------------
    I   DN1FTP=A(6)*DNTDTH+A(7)*AGE+A(8)*D  I                              GTH10300
    I        PNWTH+A(9)*DYMDTH+A(10)*DIDTP  I
    I        +A(19)                         I
    ----------------------------------------
                        I
***.....                                                                 ***GTH10500
***     RATE OF CHANGE IN FRACTION OF HOMES IN MEDIUM VALUE RANGE        ***GTH10600
                        I
    ----------------------------------------
    I   DN2FTP=A(11)*DNTDTH+A(12)*DN2DTH+A  I                              GTH10700
    I        (13)*DPNWTH+A(20)              I
    ----------------------------------------
                        I
***.....                                                                 ***GTH10800
***     RATE OF CHANGE IN FRACTION OF HOMES IN HIGH VALUE RANGE          ***GTH10900
                        I
    ----------------------------------------
    I   DN3FTP=A(14)*AGE+A(15)*DN3DTH+A(16  I                              GTH11000
    I        )*DYMDTH+A(17)*DIDTP+A(21)     I
    ----------------------------------------
                        I
***.....                                                                 ***GTH11100
***     CHANGE IN TOTAL NUMBER OF HOMES                                  ***GTH11200
                        I
    ----------------------------------------
    I   DNT=DNTDTP*DT                       I                              GTH11300
    ----------------------------------------
                        I
***.....                                                                 ***GTH11400
***     CHANGE IN FRACTION IN LOW VALUE RANGE                            ***GTH11500
                        I
    ----------------------------------------
    I   DFN1=DN1FTP*DT                      I                              GTH11600
    ----------------------------------------
                        I
***.....                                                                 ***GTH11700
***     CHANGE IN FRACTION IN MEDIUM VALUE RANGE                         ***GTH11800
                        I
                        I
```

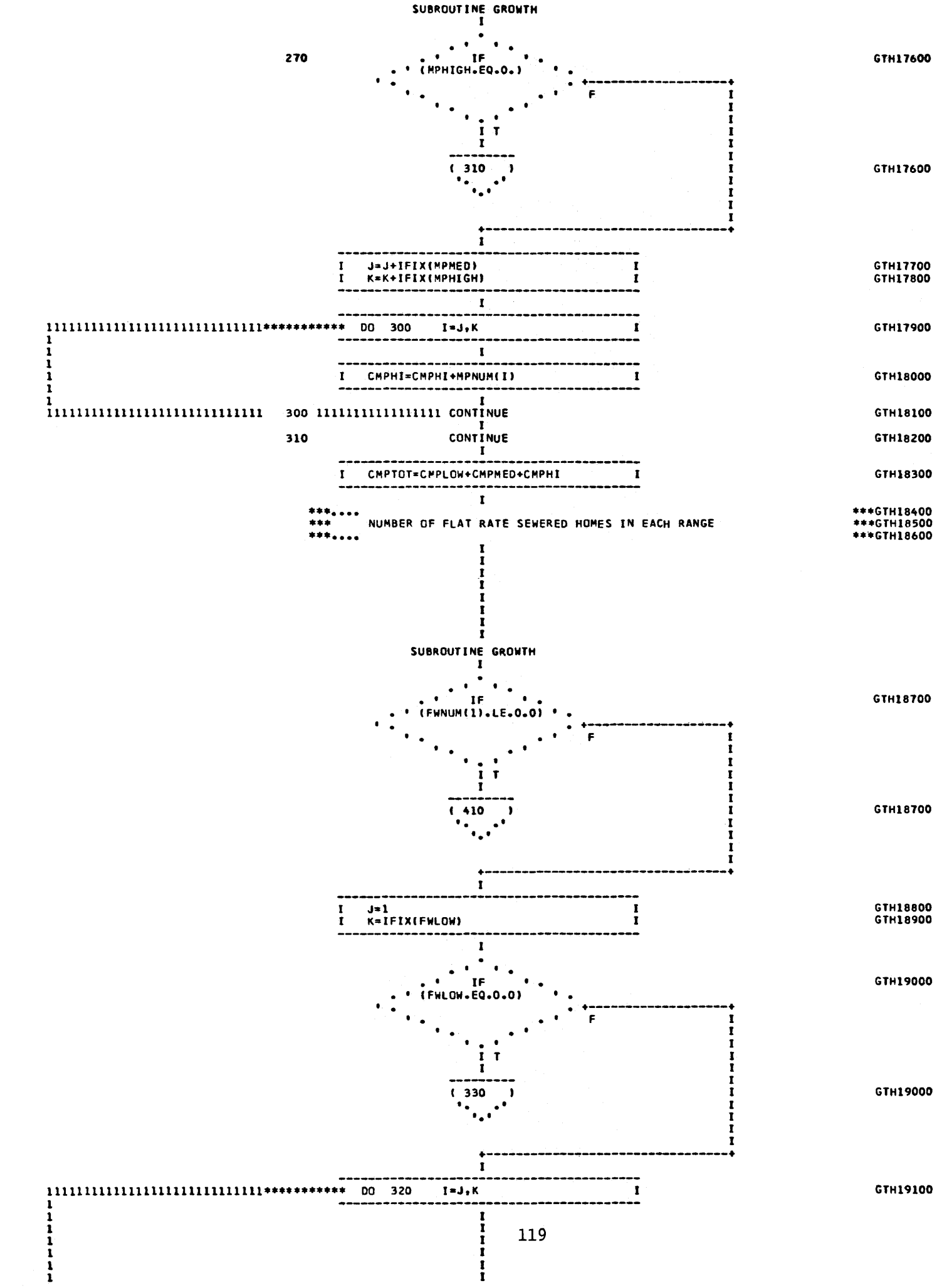

SUBROUTINE GROWTH
DFN2=DN2FTP*DT
GTH11900
***.... ***GTH12000
*** CHANGE IN FRACTION IN HIGH VALUE RANGE ***GTH12100
DFN3=DN3FTP*DT
GTH12200
***..... ***GTH12300
*** NORMALIZE CHANGES IN FRACTIONS ***GTH12400
***..... ***GTH12500
ADJ=(DFN1+DFN2+DFN3)/3. GTH12600
DFN1=DFN1-ADJ GTH12700
DFN2=DFN2-ADJ GTH12800
DFN3=DFN3-ADJ GTH12900
***.... ***GTH13000
*** COMPUTE THE CURRENT VALUES. ***GTH13100
*** INITIALIZE DATA FIELDS ***GTH13200
***.... ***GTH13300
DO 90 I=1,16 GTH13400
CTEST(I)=0.0 GTH13500
90 CONTINUE GTH13600
***.... ***GTH13700
*** NUMBER OF METERED SEWERED HOMES IN EACH RANGE. ***GTH13800


SUBROUTINE GROWTH
IF
(MWNUM(1).LE.0.0)
F
T
(210)
J=1
K=IFIX(MWLOW)
IF
(MWLOW.EQ.0)
F
T
(120)
DO 100 I=J,K
GTH13900
GTH13900
GTH14000
GTH14100
GTH14200
GTH14200
GTH14300

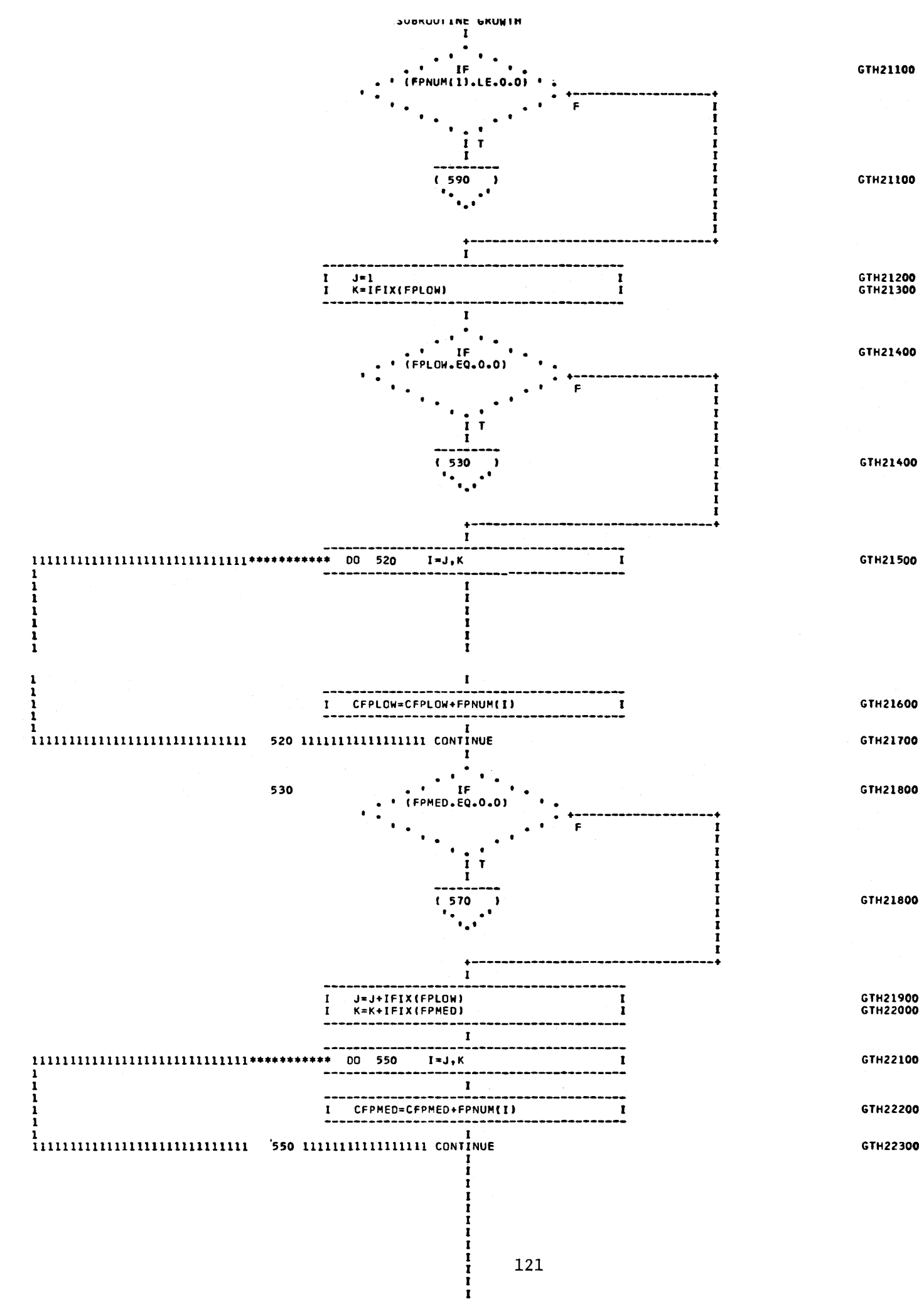

SUBROUTINE GROWTH
CMWLOW=CMWLOW+MWNUM(I)
GTH14400
100 CONTINUE
GTH14500
120
IF
(MWMED.EQ.0)
GTH14600
F
T
(170)
GTH14600
J=J+IFIX(MWLOW)
GTH14700
K=K+IFIX(MWMED)
GTH14800
DO 150 I=J,K
GTH14900
CMWMED=CMWMED+MWNUM(I)
GTH15000
150 CONTINUE
GTH15100

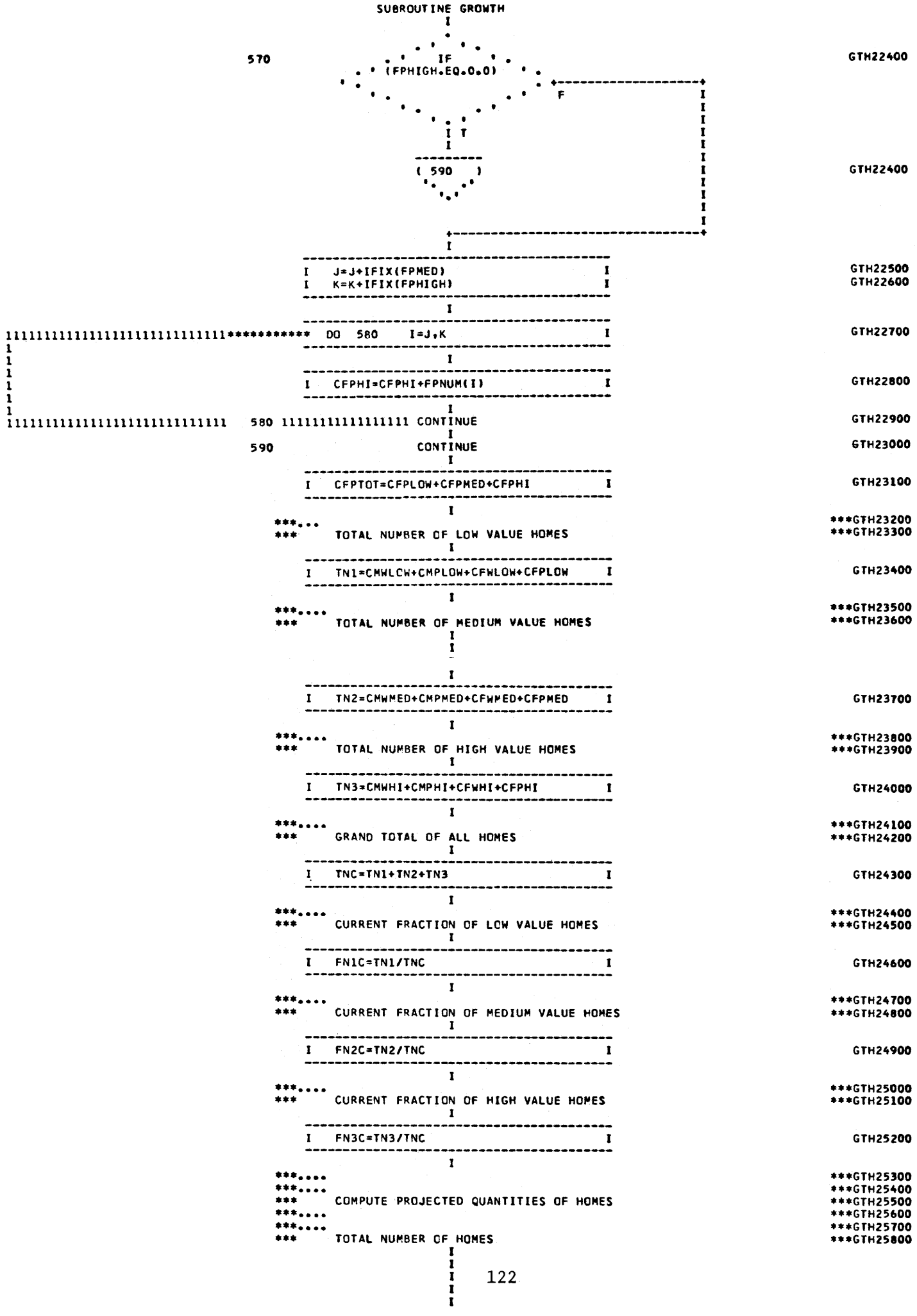

SUBROUTINE GROWTH
170 IF (MWHIGH.EQ.0)
F
T
(210)
J=J+IFIX(MWMED)
K=K+IFIX(MWHIGH)
DO 205 I=J,K
CMWHI=CMWHI+MWNUM(I)
205 CONTINUE
CONTINUE
CMWTOT=CMWLOW+CMWMED+CMWHI
*** NUMBER OF METERED SEPTIC TANK HOMES IN EACH RANGE
GTH15200
GTH15200
GTH15300
GTH15400
GTH15500
GTH15600
GTH15700
GTH15800
GTH15900
***GTH16000
***GTH16100
***GTH16200


SUBROUTINE GROWTH
GTH16300
IF
(MPNUM(1).LE.0.0)
F
T
310
GTH16300
GTH16400
J=1
K=IFIX(MPLOW)
GTH16500
GTH16600
IF
(MPLOW.EQ.0.)
F
T
230
GTH16600
GTH16700
DO 220 I=J,K
GTH16800
CMPLOW=CMPLOW+MPNUM(I)
GTH16900
220 CONTINUE
GTH17000
230
IF
(MPMED.EQ.0.)
F
T
270
GTH17000
GTH17100
J=J+MPLOW
GTH17200
K=K+MPMED
GTH17300
DO 250 I=J,K
GTH17400
CMPMED=CMPMED+MPNUM(I)
GTH17500
250 CONTINUE


SUBROUTINE GROWTH
270 IF (MPHIGH.EQ.0.) F
T
(310)
J=J+IFIX(MPMED)
K=K+IFIX(MPHIGH)
DO 300 I=J,K
CMPHI=CMPHI+MPNUM(I)
300 CONTINUE
310 CONTINUE
CMPTOT=CMPLOW+CMPMED+CMPHI
NUMBER OF FLAT RATE SEWERED HOMES IN EACH RANGE
SUBROUTINE GROWTH
IF (FWNUM(1).LE.0.0)
F
T
(410)
J=1
K=IFIX(FWLOW)
IF (FWLOW.EQ.0.0)
F
T
(330)
DO 320 I=J,K

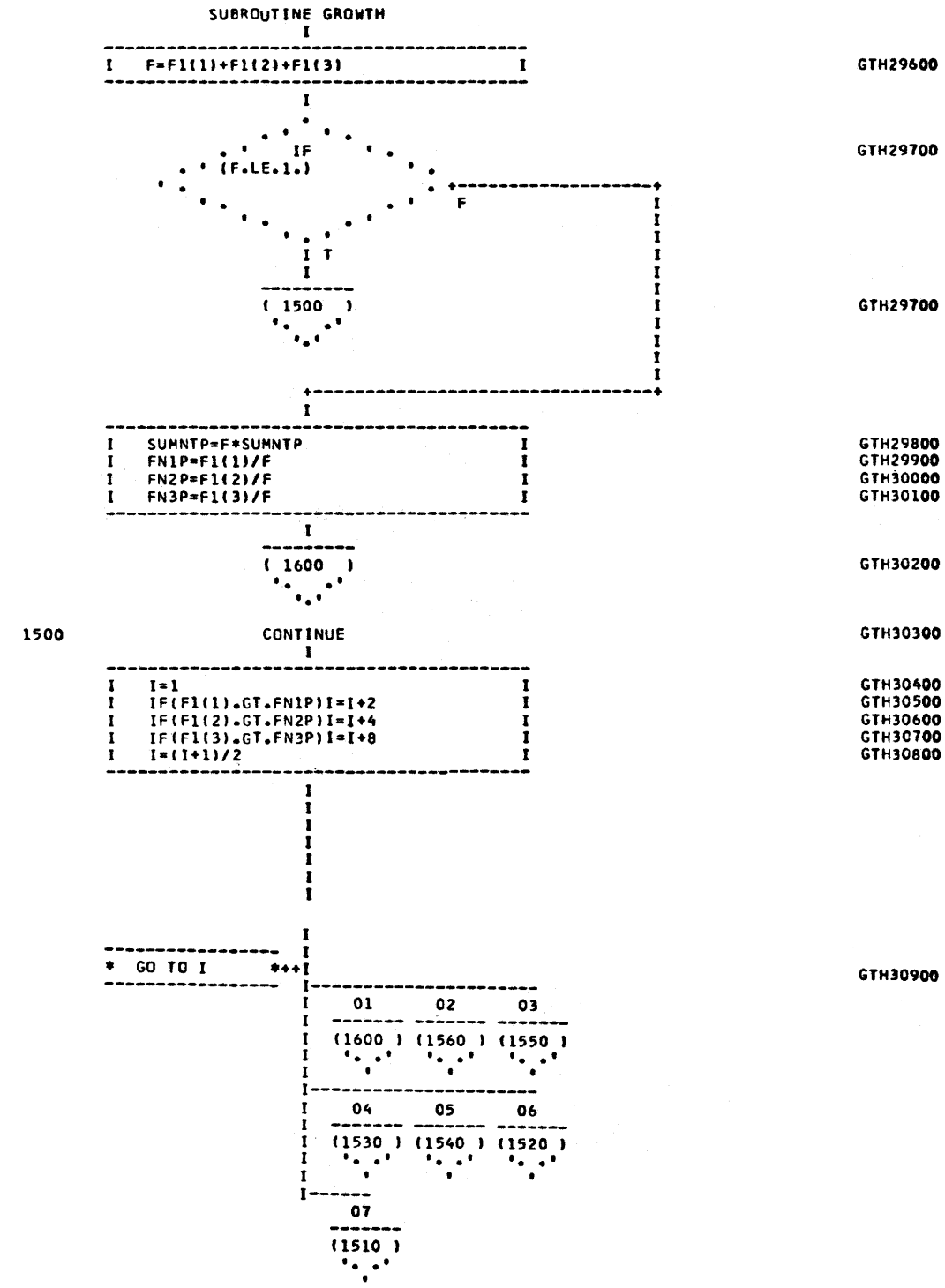
```
                                                       I
1
1                                   ----------------------------------------
1                                   I   CFWLOW=CFWLOW+FWNUM(I)             I                GTH19200
1                                   ----------------------------------------
1                                                      I
111111111111111111111111111111   320 1111111111111111 CONTINUE                              GTH19300
                                                       I
                                                       .
                                                 .  '     '  .
                              330            . '      IF      ' .                           GTH19400
                                          . '  (FWMED.EQ.0.0)   ' .
                                        ' .                       . +--------------------+
                                            ' .                 . '  F                    I
                                                ' .          . '                          I
                                                    ' .  . '                              I
                                                       I T                                I
                                                       I                                  I
                                                   ---------                              I
                                                   ( 370   )                              I   GTH19400
                                                    '.   .'                               I
                                                      '.'                                 I
                                                                                          I
                                                       +----------------------------------+
                                                       I
                                    ----------------------------------------
                                    I   J=J+IFIX(FWLOW)                    I                GTH19500
                                    I   K=K+IFIX(FWMED)                    I                GTH19600
                                    ----------------------------------------
                                                       I
                                    ----------------------------------------
111111111111111111111111111111***********   DO  350     I=J,K              I                GTH19700
1                                   ----------------------------------------
1                                                      I
1                                   ----------------------------------------
1                                   I   CFWMED=CFWMED+FWNUM(I)             I                GTH19800
1                                   ----------------------------------------
1                                                      I
111111111111111111111111111111   350 1111111111111111 CONTINUE                              GTH19900
                                                       I
                                                       I
                                                       I
                                                       I
                                                       I
                                                       I
                                                       I
                                                       I
                                                       I
                                                       I
                                                       I
                                                       I
                                                       .
                                                 .  '     '  .
                              370            . '      IF      ' .                           GTH20000
                                          . '  (FWMED.EQ.0.0)   ' .
                                        ' .                       . +--------------------+
                                            ' .                 . '  F                    I
                                                ' .          . '                          I
                                                    ' .  . '                              I
                                                       I T                                I
                                                       I                                  I
                                                   ---------                              I
                                                   ( 410   )                              I   GTH20000
                                                    '.   .'                               I
                                                      '.'                                 I
                                                                                          I
                                                       +----------------------------------+
                                                       I
                                    ----------------------------------------
                                    I   J=J+IFIX(FWMED)                    I                GTH20100
                                    I   K=K+IFIX(FWHIGH)                   I                GTH20200
                                    ----------------------------------------
                                                       I
                                    ----------------------------------------
111111111111111111111111111111***********   DO  400     I=J,K              I                GTH20300
1                                   ----------------------------------------
1                                                      I
1                                   ----------------------------------------
1                                   I   CFWHI=CFWHI+FWNUM(I)               I                GTH20400
1                                   ----------------------------------------
1                                                      I
111111111111111111111111111111   400 1111111111111111 CONTINUE                              GTH20500
                                                       I
                                 410                CONTINUE                                GTH20600
                                                       I
                                    ----------------------------------------
                                    I.  CFWTOT=CFWLOW+CFWMED+CFWHI         I                GTH20700
                                    ----------------------------------------
                                                       I
                                 ***....                                                 ***GTH20800
                                 ***     NUMBER OF FLAT RATE SEPTIC HOMES IN EACH RANGE  ***GTH20900
                                 ***....                                                 ***GTH21000
                                                       I
                                                       I
                                                       I
                                                       I
                                                       I
                                                       I
                                                       I
```


SUBROUTINE GROWTH
IF (FPNUM(1).LE.0.0)
F
T
(590)
J=1
K=IFIX(FPLOW)
IF (FPLOW.EQ.0.0)
F
T
(530)
DO 520 I=J,K
CFPLOW=CFPLOW+FPNUM(I)
520 CONTINUE
530
IF (FPMED.EQ.0.0)
F
T
(570)
J=J+IFIX(FPLOW)
K=K+IFIX(FPMED)
DO 550 I=J,K
CFPMED=CFPMED+FPNUM(I)
550 CONTINUE
GTH21100
GTH21100
GTH21200
GTH21300
GTH21400
GTH21400
GTH21500
GTH21600
GTH21700
GTH21800
GTH21800
GTH21900
GTH22000
GTH22100
GTH22200
GTH22300

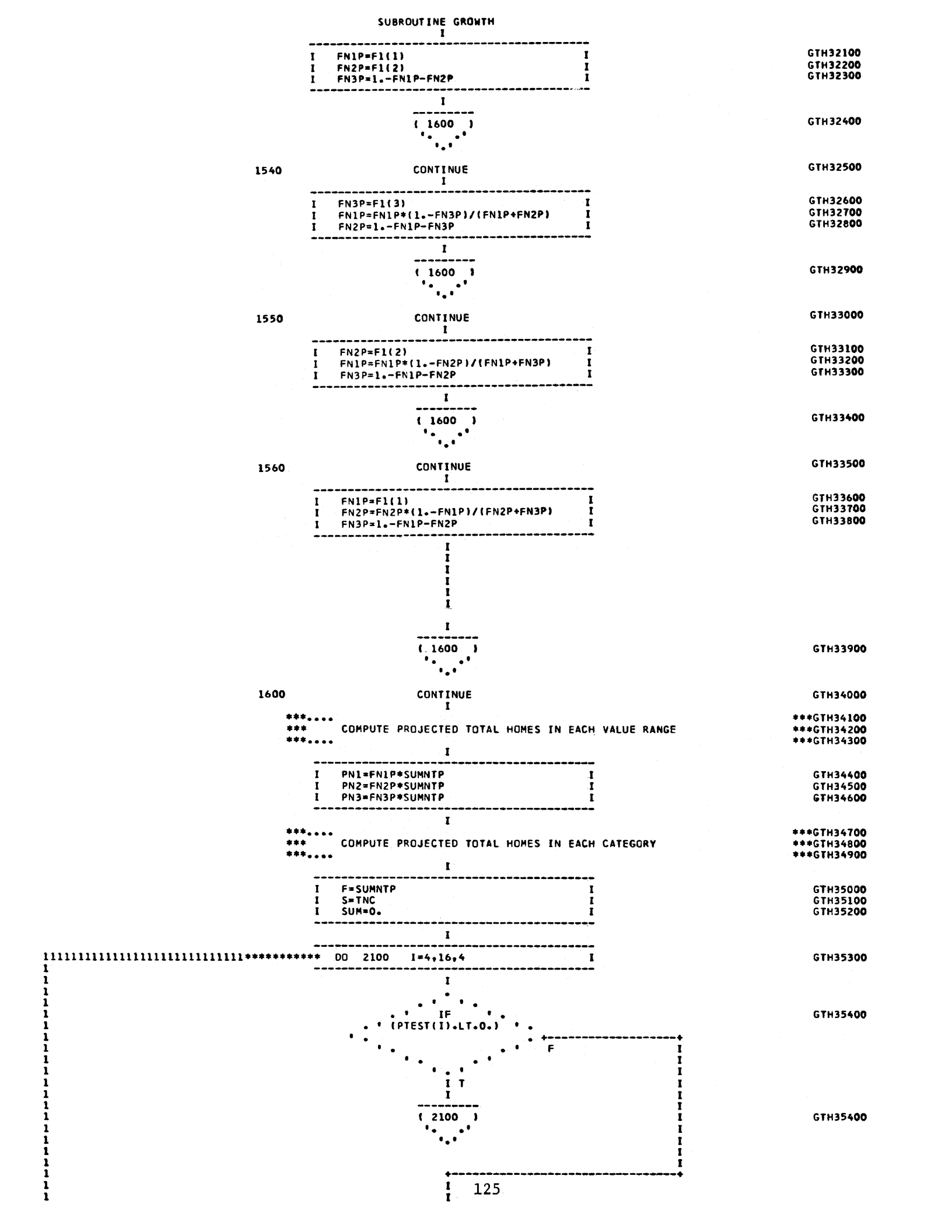

SUBROUTINE GROWTH
570 IF (FPHIGH.EQ.0.0)
F
T
590
GTH22400
GTH22400
J=J+IFIX(FPMED)
K=K+IFIX(FPHIGH)
GTH22500
GTH22600
DO 580 I=J,K
GTH22700
CFPHI=CFPHI+FPNUM(I)
GTH22800
580 CONTINUE
GTH22900
590 CONTINUE
GTH23000
CFPTOT=CFPLOW+CFPMED+CFPHI
GTH23100
*** TOTAL NUMBER OF LOW VALUE HOMES
***GTH23200
***GTH23300
TN1=CMWLOW+CMPLOW+CFWLOW+CFPLOW
GTH23400
*** TOTAL NUMBER OF MEDIUM VALUE HOMES
***GTH23500
***GTH23600
TN2=CMWMED+CMPMED+CFWMED+CFPMED
GTH23700
*** TOTAL NUMBER OF HIGH VALUE HOMES
***GTH23800
***GTH23900
TN3=CMWHI+CMPHI+CFWHI+CFPHI
GTH24000
*** GRAND TOTAL OF ALL HOMES
***GTH24100
***GTH24200
TNC=TN1+TN2+TN3
GTH24300
*** CURRENT FRACTION OF LOW VALUE HOMES
***GTH24400
***GTH24500
FN1C=TN1/TNC
GTH24600
*** CURRENT FRACTION OF MEDIUM VALUE HOMES
***GTH24700
***GTH24800
FN2C=TN2/TNC
GTH24900
*** CURRENT FRACTION OF HIGH VALUE HOMES
***GTH25000
***GTH25100
FN3C=TN3/TNC
GTH25200
*** COMPUTE PROJECTED QUANTITIES OF HOMES
***GTH25300
***GTH25400
***GTH25500
***GTH25600
***GTH25700
*** TOTAL NUMBER OF HOMES
***GTH25800

```
                                                 SUBROUTINE GROWTH
                                                         I
                                   -----------------------------------------
                                   I   SUMNTP=TNC+DNT                      I                     GTH25900
                                   -----------------------------------------
                                                         I
                                ***....                                                        ***GTH26000
                                ***     FRACTION OF LOW VALUE HOMES                            ***GTH26100
                                                         I
                                   -----------------------------------------
                                   I   FN1P=FN1C+DFN1                      I                     GTH26200
                                   I   IF(FN1P.LT.0.)FN1P=0.               I                     GTH26300
                                   -----------------------------------------
                                                         I
                                ***....                                                        ***GTH26400
                                ***     FRACTION OF MEDIUM VALUE HOMES                         ***GTH26500
                                                         I
                                   -----------------------------------------
                                   I   FN2P=FN2C+DFN2                      I                     GTH26600
                                   I   IF(FN2P.LT.0.)FN2P=0.               I                     GTH26700
                                   -----------------------------------------
                                                         I
                                ***....                                                        ***GTH26800
                                ***     FRACTION OF HIGH VALUE HOMES                           ***GTH26900
                                                         I
                                   -----------------------------------------
                                   I   FN3P=FN3C+DFN3                      I                     GTH27000
                                   I   IF(FN3P.LT.0.)FN3P=0.               I                     GTH27100
                                   -----------------------------------------
                                                         I
                                ***....                                                        ***GTH27200
                                ***     MODIFY FRACTIONS SO THEIR SUM WILL EQUAL ONE           ***GTH27300
                                                         I
                                   -----------------------------------------
                                   I   SUM=FN1P+FN2P+FN3P                  I                     GTH27400
                                   I   FN1P=FN1P/SUM                       I                     GTH27500
                                   I   FN2P=FN2P/SUM                       I                     GTH27600
                                   I   FN3P=FN3P/SUM                       I                     GTH27700
                                   -----------------------------------------
                                                         I
                                ***....                                                        ***GTH27800
                                ***     COMPUTE GROUP PROJECTED QUANTITIES                     ***GTH27900
                                ***....                                                        ***GTH28000
                                ***....                                                        ***GTH28100
                                ***     ADJUST PROJECTIONS OF TOTAL NUMBER OF HOMES AND FRACTIONS IN VALUE***GTH28200
                                ***     GROUPS TO PROVIDE FOR INPUT PROJECTIONS, IF REQUIRED   ***GTH28300
                                ***....                                                        ***GTH28400
                                                         I
                                   -----------------------------------------
111111111111111111111111111111***********  DO  1300   I=1,4                I                     GTH28500
1                                  -----------------------------------------
1                                                        I

1                                                        I
1                                  -----------------------------------------
1                                  I   F1(I)=0.0                           I                     GTH28600
1                                  -----------------------------------------
1                                                        I
1                                  -----------------------------------------
1 2222222222222222222222222222***********  DO  1200   J=I,16,4             I                     GTH28700
1 2                                -----------------------------------------
1 2                                                      I
1 2                                                   .  .  .
1 2                                               .        IF       .                              GTH28800
1 2                                           .   (PTEST(J).LT.0.0)   .
1 2                                         .                           . +--------------------+
1 2                                           .                       .   F                    I
1 2                                               .               .                            I
1 2                                                   .  .  .                                  I
1 2                                                      I T                                   I
1 2                                                      I                                     I
1 2                                                  --------                                  I
1 2                                                  ( 1200  )                                 I   GTH28800
1 2                                                   .    .                                   I
1 2                                                     ..                                     I
1 2                                                                                            I
1 2                                                      +-------------------------------------+
1 2                                                      I
1 2                                -----------------------------------------
1 2                                I   F1(I)=F1(I)+PTEST(J)                I                     GTH28900
1 2                                -----------------------------------------
1 2                                                      I
1 2222222222222222222222222222  1200 2222222222222222 CONTINUE                                   GTH29000
1                                                        I
111111111111111111111111111111  1300 1111111111111111 CONTINUE                                   GTH29100
                                                         I
                                   -----------------------------------------
                                   I   IF(F1(4).GT.SUMNTP)SUMNTP=F1(4)     I                     GTH29200
                                   -----------------------------------------
                                                         I
                                   -----------------------------------------
111111111111111111111111111111***********  DO  1400   I=1,3                I                     GTH29300
1                                  -----------------------------------------
1                                                        I
1                                  -----------------------------------------
1                                  I   F1(I)=F1(I)/SUMNTP                  I                     GTH29400
1                                  -----------------------------------------
1                                                        I
111111111111111111111111111111  1400 1111111111111111 CONTINUE                                   GTH29500
                                                         I
                                                         I
                                                         I
```



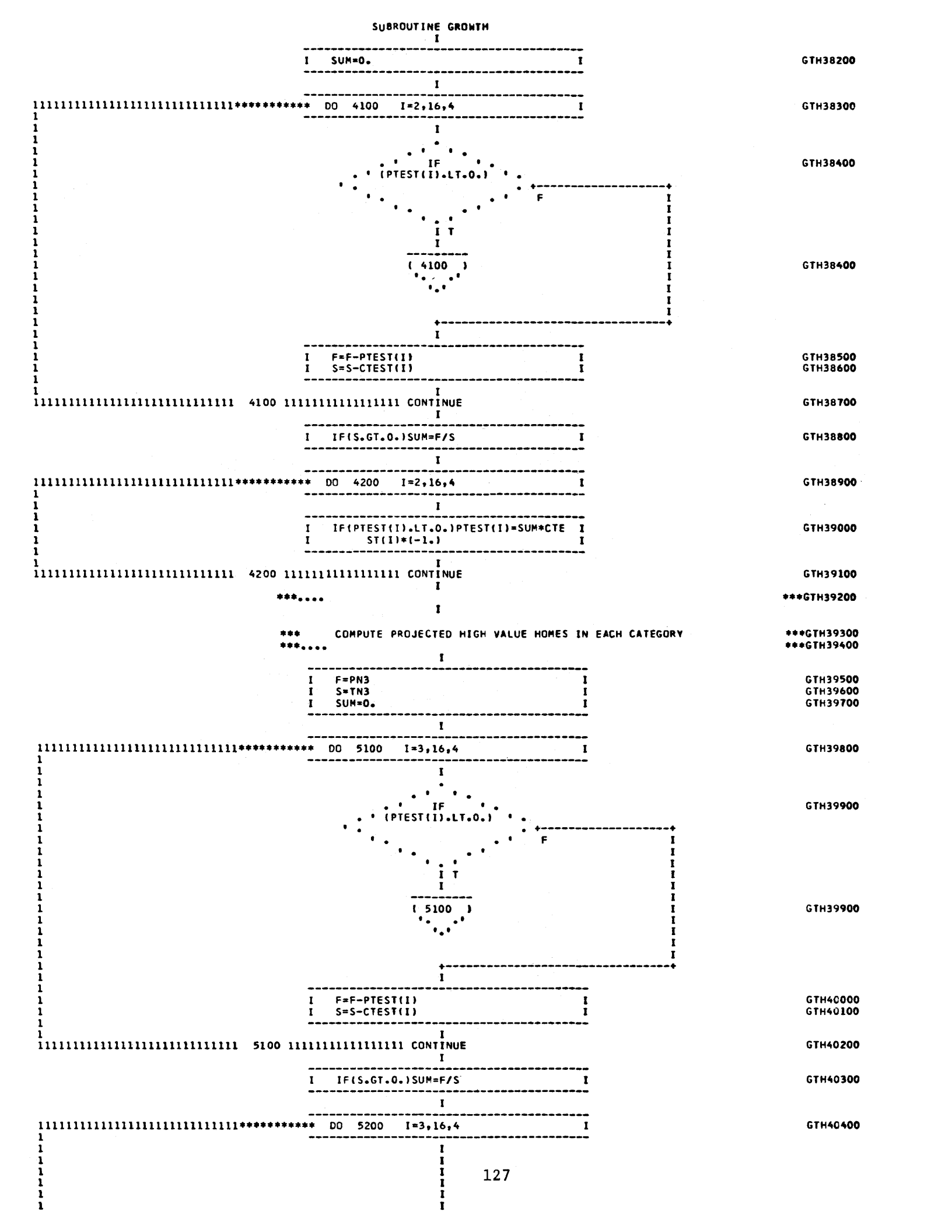
GTH29600
GTH29700
GTH29700
GTH29800
GTH29900
GTH30000
GTH30100
GTH30200
GTH30300
GTH30400
GTH30500
GTH30600
GTH30700
GTH30800
GTH30900
GTH31000
GTH31100
GTH31200
GTH31300
GTH31400
GTH31500
GTH31600
GTH31700
GTH31800
GTH31900
GTH32000


SUBROUTINE GROWTH
FN1P=F1(1)
FN2P=F1(2)
FN3P=1.-FN1P-FN2P
GTH32100
GTH32200
GTH32300
(1600)
GTH32400
1540 CONTINUE
GTH32500
FN3P=F1(3)
FN1P=FN1P*(1.-FN3P)/(FN1P+FN2P)
FN2P=1.-FN1P-FN3P
GTH32600
GTH32700
GTH32800
(1600)
GTH32900
1550 CONTINUE
GTH33000
FN2P=F1(2)
FN1P=FN1P*(1.-FN2P)/(FN1P+FN3P)
FN3P=1.-FN1P-FN2P
GTH33100
GTH33200
GTH33300
(1600)
GTH33400
1560 CONTINUE
GTH33500
FN1P=F1(1)
FN2P=FN2P*(1.-FN1P)/(FN2P+FN3P)
FN3P=1.-FN1P-FN2P
GTH33600
GTH33700
GTH33800
(1600)
GTH33900
1600 CONTINUE
GTH34000
***.... ***GTH34100
*** COMPUTE PROJECTED TOTAL HOMES IN EACH VALUE RANGE ***GTH34200
***.... ***GTH34300
PN1=FN1P*SUMNTP
PN2=FN2P*SUMNTP
PN3=FN3P*SUMNTP
GTH34400
GTH34500
GTH34600
***.... ***GTH34700
*** COMPUTE PROJECTED TOTAL HOMES IN EACH CATEGORY ***GTH34800
***.... ***GTH34900
F=SUMNTP
S=TNC
SUM=0.
GTH35000
GTH35100
GTH35200
DO 2100 I=4,16,4
GTH35300
IF (PTEST(I).LT.0.)
GTH35400
F
T
(2100)
GTH35400

SUBROUTINE GROWTH

```
                                                    I
1                                  -------------------------------------
1                                  I  F=F-PTEST(I)                     I          GTH35500
1                                  I  S=S-CTEST(I)                     I          GTH35600
1                                  -------------------------------------
1                                                   I
111111111111111111111111111111  2100 1111111111111111 CONTINUE                    GTH35700
                                                    I
                                   -------------------------------------
                                   I  IF(S.GT.0.)SUM=F/S               I          GTH35800
                                   -------------------------------------
                                                    I
                                   -------------------------------------
111111111111111111111111111111*********** DO  2200   I=4,16,4          I          GTH35900
1                                  -------------------------------------
1                                                   I
1                                  -------------------------------------
1                                  I  IF(PTEST(I).LT.0.)PTEST(I)=SUM*CTE  I       GTH36000
1                                  I        ST(I)                      I
1                                  -------------------------------------
1                                                   I
111111111111111111111111111111  2200 1111111111111111 CONTINUE                    GTH36100
                                                    I
                              ***....                                          ***GTH36200
                              ***     COMPUTE PROJECTED LOW VALUE HOMES IN EACH CATEGORY   ***GTH36300
                              ***....                                          ***GTH36400
                                                    I
                                   -------------------------------------
                                   I  F=PN1                            I          GTH36500
                                   I  S=TN1                            I          GTH36600
                                   I  SUM=0.                           I          GTH36700
                                   -------------------------------------
                                                    I
                                   -------------------------------------
111111111111111111111111111111*********** DO  3100   I=1,16,4          I          GTH36800
1                                  -------------------------------------
1                                                   I
1                                                   I
1                                                   I

1                                                   I
1                                                   .
1                                              .  '   ' .
1                                          . '     IF      ' .                    GTH36900
1                                      . '  (PTEST(I).LT.0.)  ' .
1                                    ' .                        . +--------------------+
1                                        ' .                . '     F              I
1                                            ' .        . '                        I
1                                                ' .  .                            I
1                                                  I T                             I
1                                                  I                               I
1                                              ---------                           I
1                                              ( 3100  )                           I      GTH36900
1                                               '.   .'                            I
1                                                 '.'                              I
1                                                                                  I
1                                                  +-------------------------------+
1                                                  I
1                                  -------------------------------------
1                                  I  F=F-PTEST(I)                     I          GTH37000
1                                  I  S=S-CTEST(I)                     I          GTH37100
1                                  -------------------------------------
1                                                   I
111111111111111111111111111111  3100 1111111111111111 CONTINUE                    GTH37200
                                                    I
                                   -------------------------------------
                                   I  IF(S.GT.0.)SUM=F/S               I          GTH37300
                                   -------------------------------------
                                                    I
                                   -------------------------------------
111111111111111111111111111111*********** DO  3200   I=1,16,4          I          GTH37400
1                                  -------------------------------------
1                                                   I
1                                  -------------------------------------
1                                  I  IF(PTEST(I).LT.0.)PTEST(I)=SUM*CTE  I       GTH37500
1                                  I        ST(I)*(-1.)                I
1                                  -------------------------------------
1                                                   I
111111111111111111111111111111  3200 1111111111111111 CONTINUE                    GTH37600
                                                    I
                              ***....                                          ***GTH37700
                              ***     COMPUTE PROJECTED MEDIUM VALUE HOMES IN EACH CATEGORY   ***GTH37800
                              ***....                                          ***GTH37900
                                                    I
                                   -------------------------------------
                                   I  F=PN2                            I          GTH38000
                                   I  S=TN2                            I          GTH38100
                                   -------------------------------------
                                                    I
                                                    I
```


SUBROUTINE GROWTH
SUM=0.
DO 4100 I=2,16,4
IF (PTEST(I).LT.0.)
F
T
4100
F=F-PTEST(I)
S=S-CTEST(I)
4100 CONTINUE
IF(S.GT.0.)SUM=F/S
DO 4200 I=2,16,4
IF(PTEST(I).LT.0.)PTEST(I)=SUM*CTE
ST(I)*(-1.)
4200 CONTINUE
COMPUTE PROJECTED HIGH VALUE HOMES IN EACH CATEGORY
F=PN3
S=TN3
SUM=0.
DO 5100 I=3,16,4
IF (PTEST(I).LT.0.)
F
T
5100
F=F-PTEST(I)
S=S-CTEST(I)
5100 CONTINUE
IF(S.GT.0.)SUM=F/S
DO 5200 I=3,16,4

```
                                              SUBROUTINE GROWTH
1                                                      I
1                                       ---------------------------------------
1                                       I   IF(PTEST(I).LT.0.)PTEST(I)=SUM*CTE  I                          GTH40500
1                                       I          ST(I)*(-1.)                  I
1                                       ---------------------------------------
1                                                      I
111111111111111111111111111111  5200 1111111111111111 CONTINUE                                          GTH40600
                                                       I
                                  ***....                                                            ***GTH40700
                                  ***      NORMALIZE ALL COMPUTED VALUES TO ENSURE CONSISTENCY WITH TOTALS   ***GTH40800
                                  ***....                                                            ***GTH40900
                                                       I
                                        ---------------------------------------
111111111111111111111111111111***********  DO  5330   I=1,16,4               I                          GTH41000
1                                       ---------------------------------------
1                                                      I
1                                       ---------------------------------------
1                                       I   F=PTEST(I+3)                      I                          GTH41100
1                                       I   S=0.                              I                          GTH41200
1                                       I   SUM=0.                            I                          GTH41300
1                                       I   II=I+2                            I                          GTH41400
1                                       ---------------------------------------
1                                                      I
1                                       ---------------------------------------
1 2222222222222222222222222222***********  DO  5310   J=I,II                 I                          GTH41500
1 2                                     ---------------------------------------
1 2                                                    I
1 2                                     ---------------------------------------
1 2                                     I   IF(PTEST(J).GE.0.)F=F-PTEST(J)    I                          GTH41600
1 2                                     I   IF(PTEST(J).LT.0.)S=S-PTEST(J)    I                          GTH41700
1 2                                     ---------------------------------------
1 2                                                    I
1 2222222222222222222222222222  5310 2222222222222222 CONTINUE                                          GTH41800
1                                                      I
1                                       ---------------------------------------
1                                       I   IF(S.GT.0.)SUM=F/S                I                          GTH41900
1                                       ---------------------------------------
1                                                      I
1                                       ---------------------------------------
1 2222222222222222222222222222***********  DO  5320   J=I,II                 I                          GTH42000
1 2                                     ---------------------------------------
1 2                                                    I
1 2                                     ---------------------------------------
1 2                                     I   IF(PTEST(J).LT.0.)PTEST(J)=PTEST(J  I                        GTH42100
1 2                                     I        )*(-SUM)                       I
1 2                                     I   IF(ABS(PTEST(J)).LT.1.)PTEST(J)=0.  I                        GTH42200
1 2                                     ---------------------------------------
1 2                                                    I
1 2222222222222222222222222222  5320 2222222222222222 CONTINUE                                          GTH42300
1                                                      I
1                                                      I

1                                                      I
111111111111111111111111111111  5330 1111111111111111 CONTINUE                                          GTH42400
                                                       I
                                  ***....                                                            ***GTH42500
                                  ***....                                                            ***GTH42600
                                  ***      COMPUTE DETAIL PROJECTIONS OF NUMBER OF HOMES             ***GTH42700
                                  ***....                                                            ***GTH42800
                                  ***....                                                            ***GTH42900
                                                       I
                                        ---------------------------------------
                                        I   JJ=1                              I                          GTH43000
                                        I   KK=0                              I                          GTH43100
                                        ---------------------------------------
                                                       I
                                        ---------------------------------------
111111111111111111111111111111***********  DO  5700   I=1,4                  I                          GTH43200
1                                       ---------------------------------------
1                                                      I
1                                       ---------------------------------------
1                                       I   II=(200*I)-24                     I                          GTH43300
1                                       I   III=75*(I-1)+1                    I                          GTH43400
1                                       ---------------------------------------
1                                                      I
1                                                      .
1                                                  .  '  ' .
1                                             . '     IF      ' .                                        GTH43500
1                                          . ' (RESPAR(II).LE.0. ' .
1                                        ' . )                      . +--------------------+
1                                             ' .                . '   F                    I
1                                                 ' .        . '                            I
1                                                     ' . '                                 I
1                                                      I T                                  I
1                                                      I                                    I
1                                                  ---------                                I
1                                                  ( 5700  )                                I    GTH43500
1                                                   '.   .'                                 I
1                                                     '.'                                   I
1                                                                                           I
1                                                                                           I
1                                                      +------------------------------------+
1                                                      I
1                                 ***....                                                            ***GTH43600
1                                 ***          - FOR EACH VALUE RANGE                                ***GTH43700
1                                 ***....                                                            ***GTH43800
1                                                      I
1                                       ---------------------------------------
1 2222222222222222222222222222***********  DO  5600   J=1,3                  I                          GTH43900
1 2                                     ---------------------------------------
1 2                                                    I
1 2                                                    I
1 2                                                    I
```

```
                                              SUBROUTINE GROWTH
1 2                                                   I
1 2                                 ----------------------------------------
1 2                                 I   KKK=3*(I-1)+J                      I          GTH44000
1 2                                 ----------------------------------------
1 2                                                   I
1 2                                                   .
1 2                                               . '   ' .
1 2                                            . '   IF     ' .                       GTH44100
1 2                                        . ' (RSPAR(KKK).LE.0. ' .
1 2                                       ' . 0)                    . +-------------------+
1 2                                          ' .                  . '   F               I
1 2                                              ' .          . '                       I
1 2                                                  ' .  . '                           I
1 2                                                   I T                               I
1 2                                                   I                                 I
1 2                                                -------                              I
1 2                                               ( 5600 )                              I   GTH44100
1 2                                                '.  .'                               I
1 2                                                  '.'                                I
1 2                                                                                     I
1 2                                                   +---------------------------------+
1 2                                                   I
1 2                                 ----------------------------------------
1 2                                 I   KK=KK+IFIX(RSPAR(KKK))             I          GTH44200
1 2                                 I   K=4*(4-I)+J                        I          GTH44300
1 2                                 I   G=PTEST(K)/CTEST(K)                I          GTH44400
1 2                                 ----------------------------------------
1 2                                                   I
1 2                              ***....                                           ***GTH44500
1 2                              ***        - FOR EACH GROUP                       ***GTH44600
1 2                              ***....                                           ***GTH44700
1 2                                                   I
1 2                                 ----------------------------------------
1 2 3333333333333333333333333***********  DO  5500    L=JJ,KK              I          GTH44800
1 2 3                               ----------------------------------------
1 2 3                                                 I
1 2 3                               ----------------------------------------
1 2 3                               I   RESIDL(III)=G*RESPAR(II)           I          GTH44900
1 2 3                               I   IF(RESIDL(III).LT.1.)RESIDL(III)=0 I          GTH45000
1 2 3                               I        .0                            I
1 2 3                               I   II=II+1                            I          GTH45100
1 2 3                               I   III=III+1                          I          GTH45200
1 2 3                               ----------------------------------------
1 2 3                                                 I
1 2 3333333333333333333333333  5500 3333333333333333 CONTINUE                         GTH45300
1 2                                                   I
1 2                                                   I
1 2                                                   I
1 2                                                   I
1 2                                                   I

1 2                                                   I
1 2                                 ----------------------------------------
1 2                                 I   JJ=JJ+IFIX(RSPAR(KKK))             I          GTH45400
1 2                                 ----------------------------------------
1 2                                                   I
1 22222222222222222222222222222  5600 2222222222222222 CONTINUE                       GTH45500
1                                                     I
111111111111111111111111111111  5700 1111111111111111 CONTINUE                        GTH45600
                                                      I
                                 ***....                                           ***GTH45700
                                 ***....                                           ***GTH45800
                                 ***....                                           ***GTH45900
                                 ***                                               ***GTH46000
                                 *** CALCULATES PROJECTED POPULATION DENSITY       ***GTH46100
                                 ***                                               ***GTH46200
                                                      I
                                    ----------------------------------------
                                    I   PDEN=PO/TNC                        I          GTH46300
                                    I   TOTPOP=PCPRO/SUMNTP                I          GTH46400
                                    I   POPGRO=TOTPOP/PDEN                 I          GTH46500
                                    ----------------------------------------
                                                      I
                                 ***                                               ***GTH46600
                                 *** PROJECT POPULATION DENSITY FOR ALL VALUE RANGES INPUT TO THREE   ***GTH46700
                                 *** CATEGORIES.  POP DENSITY IS NOT CALCULATED FOR THE METERED-SEWERED ***GTH46800
                                 *** PARAMETER.                                    ***GTH46900
                                                      I
                                    ----------------------------------------
                                    I   MSH=IFIX(MPLOW+MWMED+MWHIGH)       I          GTH47000
                                    I   MTH=IFIX(MPLOW+MPMED+MPHIGH)       I          GTH47100
                                    I   FSH=IFIX(FWLOW+FWMED+FWHIGH)       I          GTH47200
                                    I   FTH=IFIX(FPLOW+FPMED+FPHIGH)       I          GTH47300
                                    ----------------------------------------
                                                      I
                                 ***                                               ***GTH47400
                                                      I
                                    ----------------------------------------
111111111111111111111111111111***********  DO  17      J=1,MTH             I          GTH47500
1                                   ----------------------------------------
1                                                     I
1                                   ----------------------------------------
111111111111111111111111111111     17 1111  PDPRMT(J)=PDCRMT(J)*POPGRO     I          GTH47600
                                    ----------------------------------------
                                                      I
                                 ***                                               ***GTH47700
                                                      I
                                    ----------------------------------------
111111111111111111111111111111***********  DO  27      J=1,FSH             I          GTH47800
1                                   ----------------------------------------
1                                                     I
1                                                     I
```

```
                                    SUBROUTINE GROWTH
1                                          I
1                                 ---------------------------------------
11111111111111111111111111111    27 111I   PDPRFS(J)=PDCRFS(J)*POPGRO          I                                    GTH47900
                                  ---------------------------------------
                                           I
                                  ***                                                                                    ***GTH48000
                                           I
                                  ---------------------------------------
1111111111111111111111111111111********** DO  37     J=1,FTH                 I                                    GTH48100
1                                 ---------------------------------------
1                                          I
1                                 ---------------------------------------
11111111111111111111111111111    37 111I   PDPRFT(J)=PDCRFT(J)*POPGRO          I                                    GTH48200
                                  ---------------------------------------
                                           I
                                  ***                                                                                    ***GTH48300
                                  ***                                                                                    ***GTH48400
                                  ***     THE USER HAS THE OPTION TO CALCULATE HOUSING DENSITY IN THE                    ***GTH48500
                                  ***    FOLLOWING WAYS **                                                               ***GTH48600
                                  ***                                                                                    ***GTH48700
                                  ***              1) HE CAN DO NOTHING - USING THIS OPTION THE SYSTEM HOLDS             ***GTH48800
                                  ***                 CURRENT HOUSING DENSITIES CONSTANT                                 ***GTH48900
                                  ***                                                                                    ***GTH49000
                                  ***              2) HE CAN INPUT ANY NUMBER OF HOUSING DENSITIES FOR ANY            ***GTH49100
                                  ***                 OF THE THREE CLASSES AND FOUR CATEGORIES OF HOMES -             ***GTH49200
                                  ***                                                                                    ***GTH49300
                                  ***              3) HE CAN INPUT A PROJECTED HOUSING DENSITY TOTAL - USING          ***GTH49400
                                  ***                 THIS OPTION THE SYSTEM CALCULATES PROJECTED INDIVIDUAL          ***GTH49500
                                  ***                 HOUSING DENSITIES FOR SUBSEQUENT USE.                           ***GTH49600
                                  ***                                                                                    ***GTH49700
                                  ***              4) HE CAN INPUT HISTORICAL TOTAL HOUSING DENSITIES WHICH           ***GTH49800
                                  ***                 WILL BE USED WITH LIEAR REGRESSION ANALYSIS TO PROJECT          ***GTH49900
                                  ***                 HOUSING DENSITY WHICH WILL BE USED AS IN =3.                    ***GTH50000
                                  ***                                                                                    ***GTH50100
                                  ***              5) HE CAN INPUT PROJECTED LAND ACREAGE AND CALCULATIONS            ***GTH50200
                                  ***                 FOR PROJECTED HOUSING DENSITY WILL BE MADE.                     ***GTH50300
                                  ***                                                                                    ***GTH50400
                                  ***    CALCULATE HOUSING DENSITY GROWTH RATES AND APPLY THEM TO PRESENT                ***GTH50500
                                  ***    HOUSING DENSITIES FOR PROJECTIONS.                                              ***GTH50600
                                           I
                                  ---------------------------------------
                                  I    IF(ACRESP.GT.0.0)HDGROP=SUMNTP/ACR  I                                             GTH50700
                                  I         ESP                            I
                                  ---------------------------------------
                                           I
                                  ***                                                                                    ***GTH50900
                                  ***     SUM THE HOUSING DENSITIES IN EACH GROUP FOR ALL CATEGORIES.                    ***GTH51000
                                           I
                                           I
                                           I
                                           I

                                           I
                                  ---------------------------------------
                                  I    HDGROC=0.0                          I                                             GTH51100
                                  ---------------------------------------
                                           I
                                           .
                                         .   .                                                                           GTH51150
                                       .       .
                                     .    IF     .
                                     .  (MSH.LE.0)  .
                                       .       .    +--------------------+
                                         .   .      F                    I
                                           .        I                    I
                                           I T      I                    I
                                           I        I                    I
                                        ---------   I                    I
                                        ( 5208  )   I                    I                                             GTH51150
                                         .   .      I                    I
                                           .        I                    I
                                           I        I                    I
                                           I        I                    I
                                           +--------+--------------------+
                                           I
                                  ---------------------------------------
1111111111111111111111111111111********** DO  5204   J=1,MSH                 I                                    GTH51200
1                                 ---------------------------------------
1                                          I
1                                 ---------------------------------------
11111111111111111111111111111  5204 111I   HDGROC=HDGROC+(MWNUM(J)/GMWDEN(J))  I                                    GTH51300
                                  ---------------------------------------
                                           I
                                           .
                                  5208   .   .                                                                          GTH51350
                                       .       .
                                     .    IF     .
                                     .  (MTH.LE.0)  .
                                       .       .    +--------------------+
                                         .   .      F                    I
                                           .        I                    I
                                           I T      I                    I
                                           I        I                    I
                                        ---------   I                    I
                                        ( 5209  )   I                    I                                             GTH51350
                                         .   .      I                    I
                                           .        I                    I
                                           I        I                    I
                                           I        I                    I
                                           +--------+--------------------+
                                           I
                                           I
                                           I
```

SUBROUTINE GROWTH

```
                                                          I
                                           -----------------------------------------
111111111111111111111111111111***********  DO  5205    J=1,MTH                    I        GTH51400
1                                          -----------------------------------------
1                                                         I
1                                          -----------------------------------------
111111111111111111111111111111  5205 1111   HDGROC=HDGROC+(MPNUM(J)/GMPDEN(J))   I         GTH51500
                                           -----------------------------------------
                                                          I
                                                          .
                                                    . '  '  .
                                5209          . '     IF      ' .                          GTH51550
                                          . '   (FTH.LE.0)       ' .
                                        '                           . +-------------------+
                                          .                      .   F                   I
                                             .                .                          I
                                                 .         .                             I
                                                    .   .                                I
                                                     I T                                 I
                                                     I                                   I
                                                  --------                               I
                                                  ( 5210  )                              I  GTH51550
                                                   '.  .'                                I
                                                     '.'                                 I
                                                                                         I
                                                          +------------------------------+
                                                          I
                                           -----------------------------------------
111111111111111111111111111111***********  DO  5206    J=1,FSH                    I        GTH51600
1                                          -----------------------------------------
1                                                         I
1                                          -----------------------------------------
111111111111111111111111111111  5206 1111   HDGROC=HDGROC+(FWNUM(J)/GFWDEN(J))   I         GTH51700
                                           -----------------------------------------
                                                          I
                                                          .
                                                    . '  '  .
                                5210          . '     IF      ' .                          GTH51750
                                          . '   (FTH.LE.0)       ' .
                                        '                           . +-------------------+
                                          .                      .   F                   I
                                             .                .                          I
                                                 .         .                             I
                                                    .   .                                I
                                                     I T                                 I
                                                     I                                   I
                                                  --------                               I
                                                  ( 5211  )                              I  GTH51750
                                                   '.  .'                                I
                                                     '.'                                 I
                                                                                         I
                                                          +------------------------------+
                                                          I
                                           -----------------------------------------
111111111111111111111111111111***********  DO  5207    J=1,FTH                    I        GTH51800
1                                          -----------------------------------------
1                                                         I
1                                          -----------------------------------------
111111111111111111111111111111  5207 1111   HDGROC=HDGROC+(FPNUM(J)/GFPDEN(J))   I         GTH51900
                                           -----------------------------------------
                                                          I
                                5211                  CONTINUE                             GTH51950
                                                          I
                                   ***                                                  ***GTH52000
                                   ***      DIVIDE TOTAL NUMBER OF HOMES BY TOTAL ACREAGE,  ***GTH52100
                                   ***      GIVING CURRENT MEAN HOUSING DENSITY.        ***GTH52200
                                   ***                                                  ***GTH52300
                                                          I
                                           -----------------------------------------
                                           I   HDGROC=TNC/HDGROC                      I        GTH52400
                                           -----------------------------------------
                                                          I
                                   ***                                                  ***GTH52500
                                                          I
                                           -----------------------------------------
                                           I   G=HDGROP/HDGROC                        I        GTH52600
                                           I   IF(G.LE.0.0)G=1.0                      I        GTH52700
                                           -----------------------------------------
                                                          I
                                   ***                                                  ***GTH52800
                                                          I
                                           -----------------------------------------
111111111111111111111111111111***********  DO  6200    J=1,MSH                    I        GTH52900
1                                          -----------------------------------------
1                                                         I
1                                          -----------------------------------------
1                                          I   IF(HDPRMS(J).LE.0.0)HDPRMS(J)=GMWD  I         GTH53000
1                                          I        EN(J)*G                        I
1                                          -----------------------------------------
1                                                         I
111111111111111111111111111111  6200 1111111111111111 CONTINUE                             GTH53200
                                                          I
                                           -----------------------------------------
111111111111111111111111111111***********  DO  6201    J=1,MTH                    I        GTH53300
1                                          -----------------------------------------
1                                                         I
1                                                         I
1                                                         I
1                                                         I
1                                                         I
1                                                         I
```

SUBROUTINE GROWTH

```
                                                  I
1
1                                   ---------------------------------------------
1                                   I   IF(HDPRMT(J).LE.0.0)HDPRMT(J)=GMPD  I          GTH53400
1                                   I        EN(J)*G                        I
1                                   ---------------------------------------------
1                                                 I
11111111111111111111111111111  6201 1111111111111111 CONTINUE                         GTH53600
                                                  I
                                    ---------------------------------------------
11111111111111111111111111111*********** DO  6202    J=1,FSH                I          GTH53700
1                                   ---------------------------------------------
1                                                 I
1                                   ---------------------------------------------
1                                   I   IF(HDPRFS(J).LE.0.0)HDPRFS(J)=GFWD  I          GTH53800
1                                   I        EN(J)*G                        I
1                                   ---------------------------------------------
1                                                 I
11111111111111111111111111111  6202 1111111111111111 CONTINUE                         GTH54000
                                                  I
                                    ---------------------------------------------
11111111111111111111111111111*********** DO  6203    J=1,FTH                I          GTH54100
1                                   ---------------------------------------------
1                                                 I
1                                   ---------------------------------------------
1                                   I   IF(HDPRFT(J).LE.0.0)HDPRFT(J)=GFPD  I          GTH54200
1                                   I        EN(J)*G                        I
1                                   ---------------------------------------------
1                                                 I
11111111111111111111111111111  6203 1111111111111111 CONTINUE                         GTH54400
                                                  I
                              ***....                                                ***GTH54500
                              ***     PUT ALL PROJECTED QUANTITIES ON AUXILARY STORAGE DEVICE.   ***GTH54600
                              ***....                                                ***GTH54700
                              ***....                                                ***GTH54800
                              ***     TEST FOR METER-SEWER PROJECTICN DATA            ***GTH54900
                              ***.....                                               ***GTH55000
                                                  I
                                                  I
                                                  I
                                                  I
                                                  I
                                                  I
                                                  I
                                                  I
                                                  I
                                                  I
                                                  I
                                                  I
                                                  I
                                                  I
                                                  I

                                                  I
                                                  .
                                             .  '   '  .
                                          . '    IF      ' .
                                       . '  (MWNUM(1).LE.0.0)  ' .                    GTH55100
                                      .                          . +-----------------+
                                        .                      .   F                 I
                                           .                .                        I
                                              .    .   .                             I
                                                 I T                                 I
                                                 I                                   I
                                              --------                               I
                                              ( 6220  )                              I   GTH55100
                                               .    .                                I
                                                 ..                                  I
                                                                                     I
                                                 +-----------------------------------+
                                                 I
                                           +++++++++++
                                        .' WRITE      '.                              GTH55200
                                      .' (IPR)          '.
                                    .' MLIST(10),MSH      '.
                                    +++++++++++++++++++++++
                                                 I
                                           +++++++++++
                                        .' WRITE      '.                              GTH55300
                                      .' (IPR)          '.
                                    .' (HDPRMS(I),I=1,MSH'.
                                  .')                      '.
                                  +++++++++++++++++++++++++++
                                                 I
                                           +++++++++++
                                        .' WRITE      '.                              GTH55400
                                      .' (IPR)          '.
                                    .' MLIST(12),MSH      '.
                                    +++++++++++++++++++++++
                                                 I
                                           +++++++++++
                                        .' WRITE      '.                              GTH55500
                                      .' (IPR)          '.
                                    .'(MWNUMF(I),I=1,MSH)'.
                                    +++++++++++++++++++++++
                                                 I
                         6220                CONTINUE                                 GTH55600
                                                 I
                              ***.....                                               ***GTH55700
                              ***     TEST FOR METER-SEPTIC TANK PROJECTION DATA       ***GTH55800
                              ***.....                                               ***GTH55900
                                                 I
                                                 I
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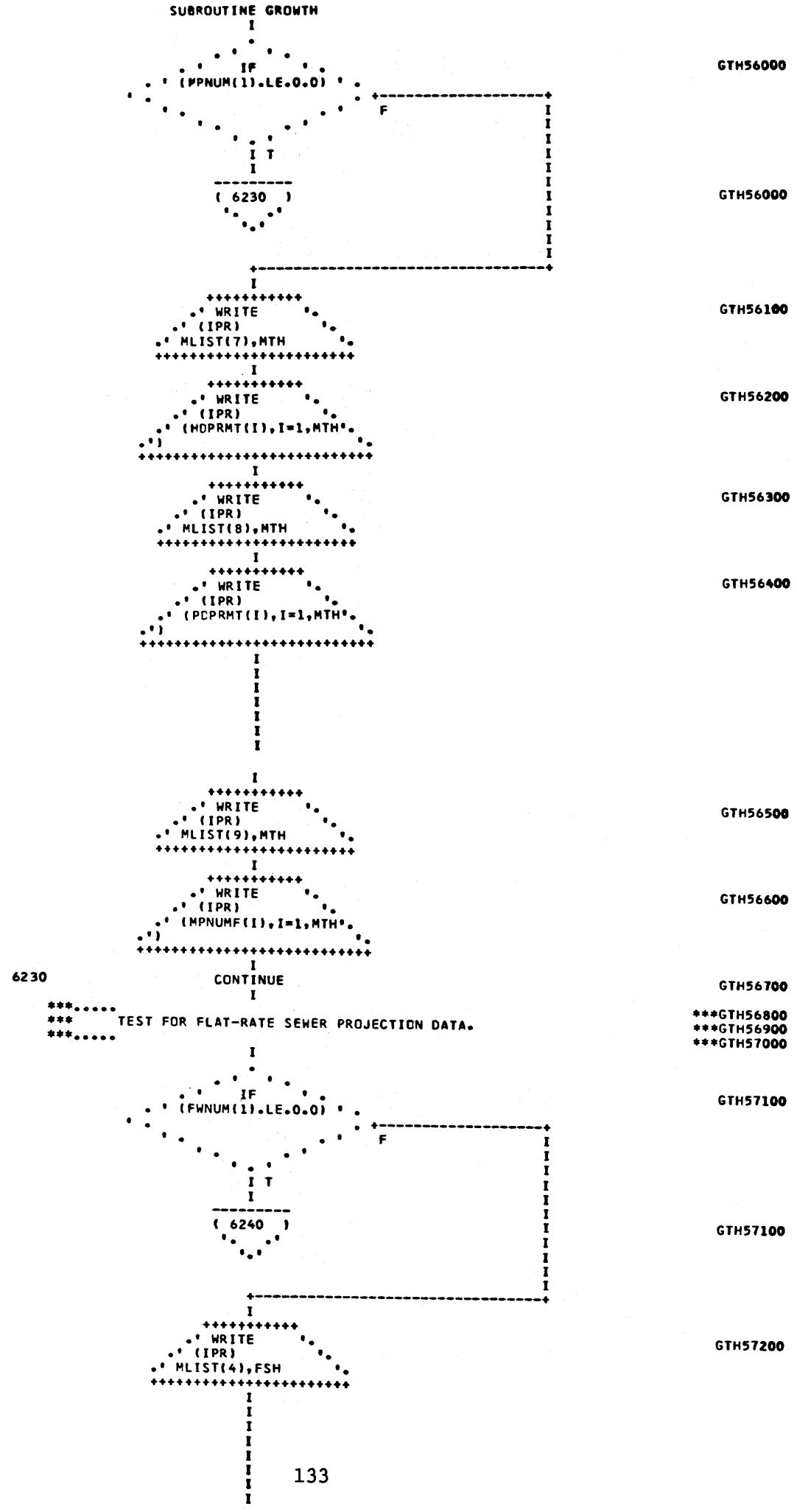
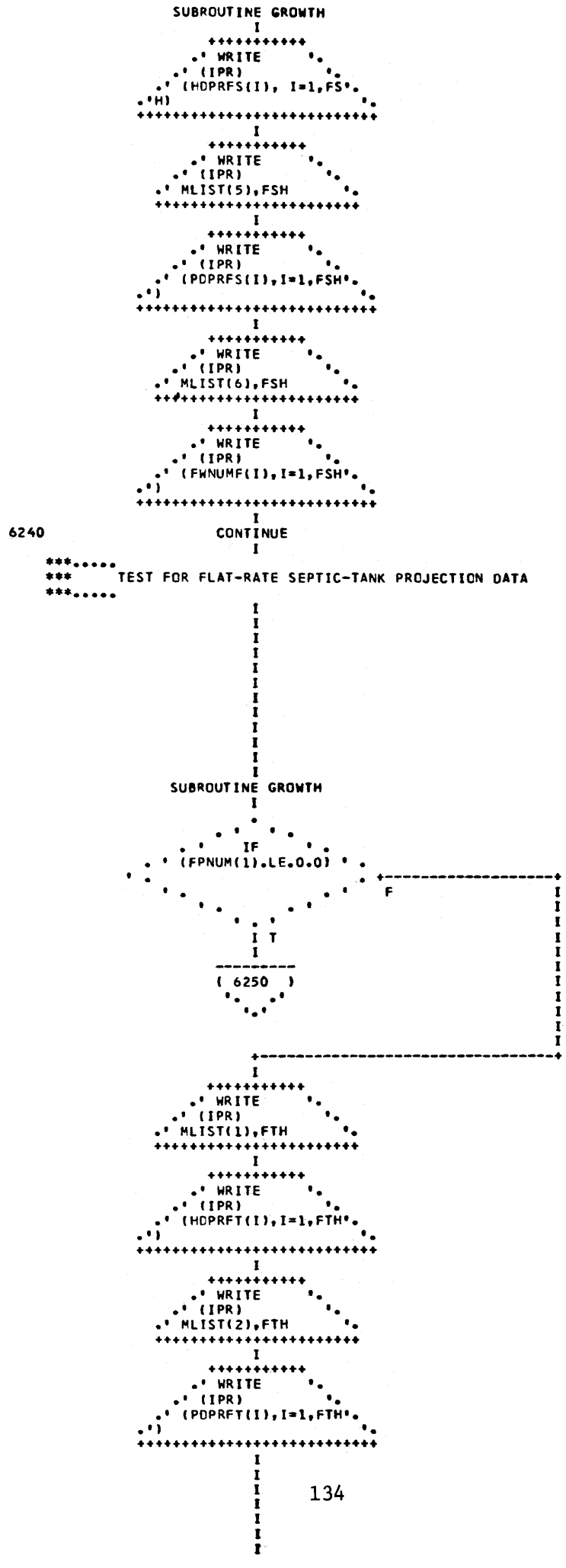
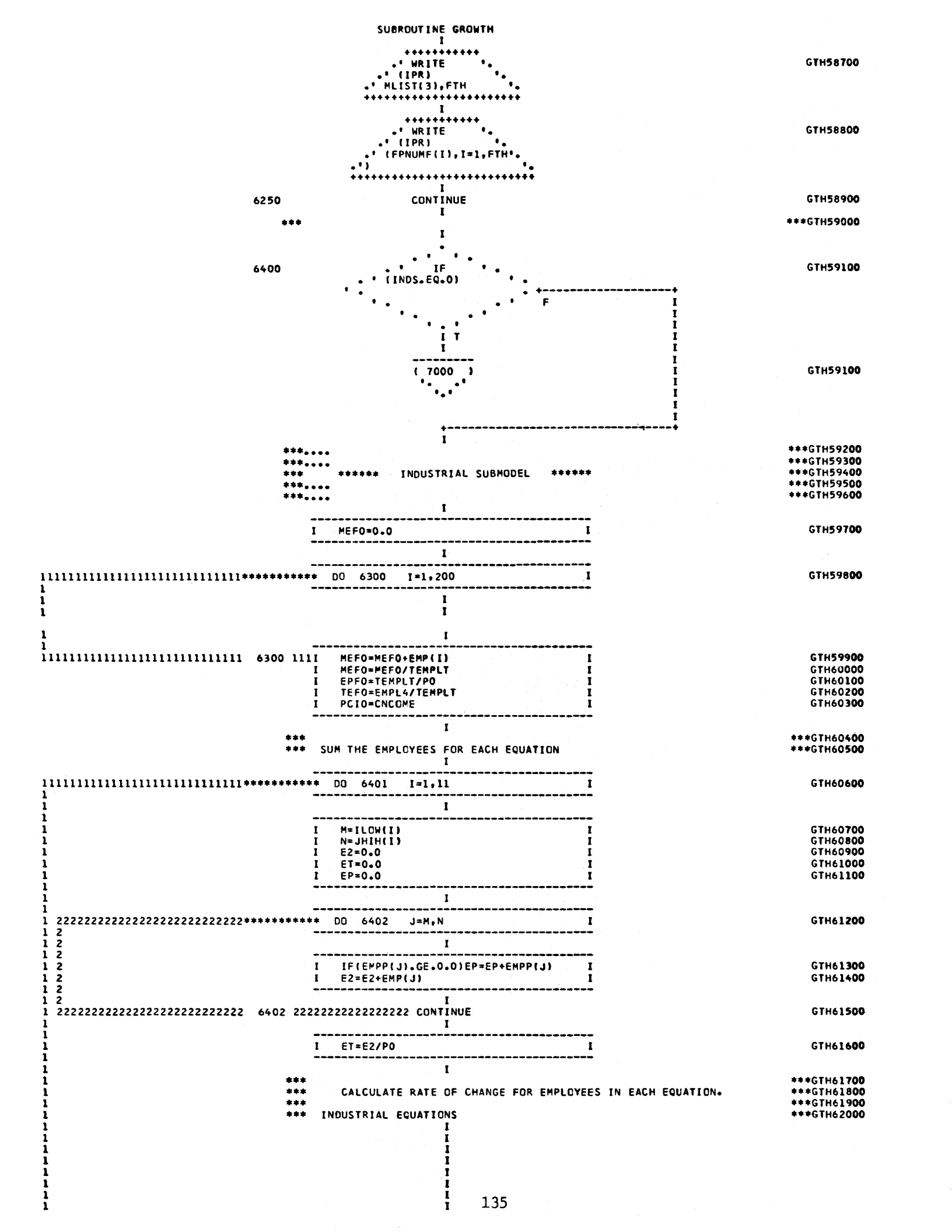
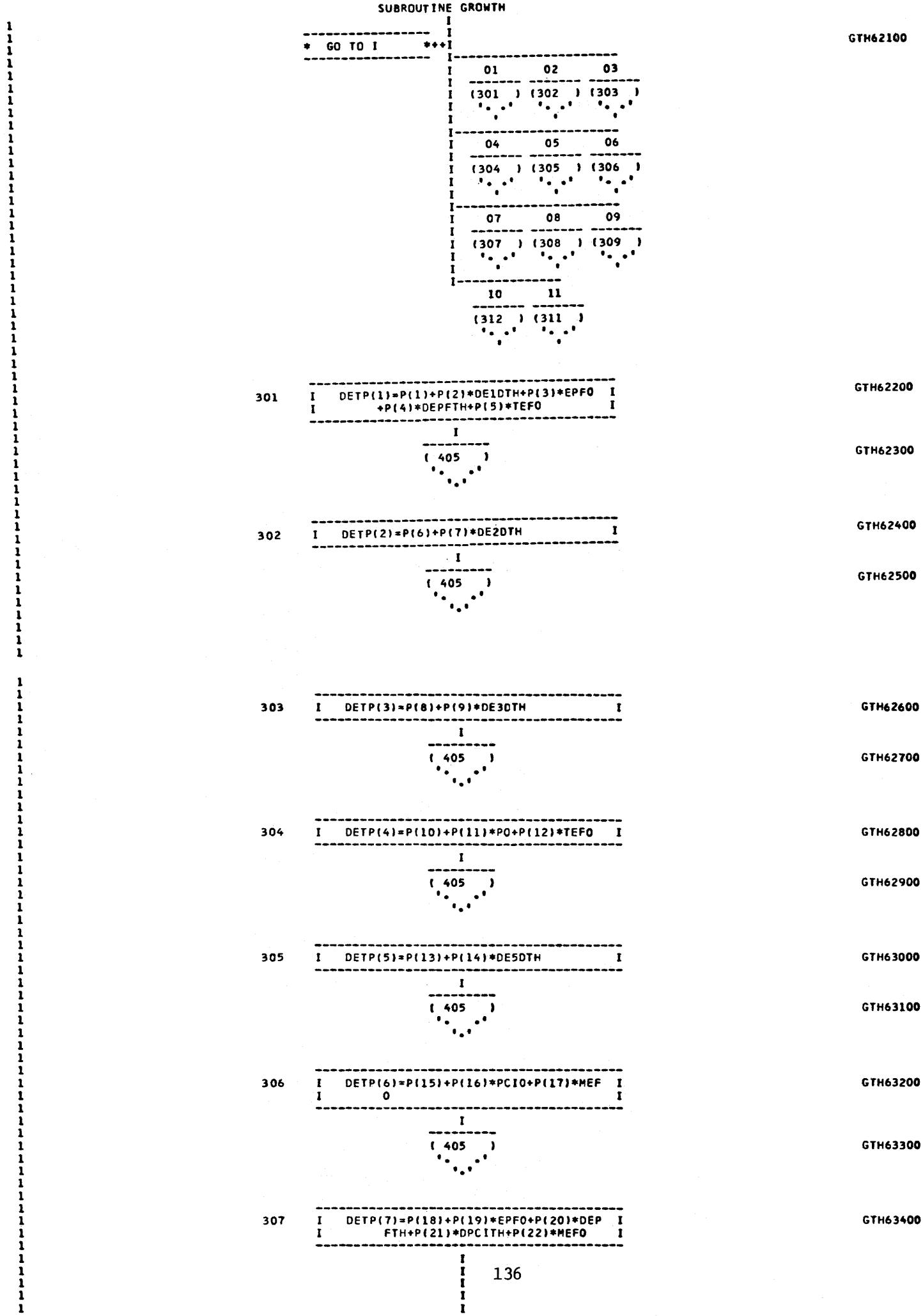

SUBROUTINE GROWTH
IF (MPNUM(1).LE.0.0)
F
T
6230
WRITE (IPR) MLIST(7),MTH
WRITE (IPR) (MOPRMT(I),I=1,MTH)
WRITE (IPR) MLIST(8),MTH
WRITE (IPR) (POPRMT(I),I=1,MTH)
WRITE (IPR) MLIST(9),MTH
WRITE (IPR) (MPNUMF(I),I=1,MTH)
6230 CONTINUE
*** TEST FOR FLAT-RATE SEWER PROJECTION DATA.
IF (FWNUM(1).LE.0.0)
F
T
6240
WRITE (IPR) MLIST(4),FSH
GTH56000
GTH56000
GTH56100
GTH56200
GTH56300
GTH56400
GTH56500
GTH56600
GTH56700
***GTH56800
***GTH56900
***GTH57000
GTH57100
GTH57100
GTH57200



GTH57300
GTH57400
GTH57500
GTH57600
GTH57700
GTH57800
***GTH57900
***GTH58000
***GTH58100
GTH58200
GTH58200
GTH58300
GTH58400
GTH58500
GTH58600


SUBROUTINE GROWTH
WRITE (IPR) MLIST(3),FTH
WRITE (IPR) (FPNUMF(I),I=1,FTH)
6250 CONTINUE
*** ***GTH59000
6400 IF (INDS.EQ.0)
F
T
(7000)
*** ****** INDUSTRIAL SUBMODEL ******
MEFO=0.0
DO 6300 I=1,200
6300 MEFO=MEFO+EMP(I)
MEFO=MEFO/TEMPLT
EPFO=TEMPLT/PO
TEFO=EMPL4/TEMPLT
PCIO=CNCOME
SUM THE EMPLOYEES FOR EACH EQUATION
DO 6401 I=1,11
M=ILOW(I)
N=JHIH(I)
E2=0.0
ET=0.0
EP=0.0
DO 6402 J=M,N
IF(EMPP(J).GE.0.0)EP=EP+EMPP(J)
E2=E2+EMP(J)
6402 CONTINUE
ET=E2/PO
CALCULATE RATE OF CHANGE FOR EMPLOYEES IN EACH EQUATION.
INDUSTRIAL EQUATIONS


SUBROUTINE GROWTH
* GO TO I
01
02
03
(301)
(302)
(303)
04
05
06
(304)
(305)
(306)
07
08
09
(307)
(308)
(309)
10
11
(312)
(311)
GTH62100
301
DETP(1)=P(1)+P(2)*DE1DTH+P(3)*EPF0
+P(4)*DEPFTH+P(5)*TEF0
GTH62200
(405)
GTH62300
302
DETP(2)=P(6)+P(7)*DE2DTH
GTH62400
(405)
GTH62500
303
DETP(3)=P(8)+P(9)*DE3DTH
GTH62600
(405)
GTH62700
304
DETP(4)=P(10)+P(11)*P0+P(12)*TEF0
GTH62800
(405)
GTH62900
305
DETP(5)=P(13)+P(14)*DE5DTH
GTH63000
(405)
GTH63100
306
DETP(6)=P(15)+P(16)*PCI0+P(17)*MEF
0
GTH63200
(405)
GTH63300
307
DETP(7)=P(18)+P(19)*EPF0+P(20)*DEP
FTH+P(21)*DPCITH+P(22)*MEF0
GTH63400

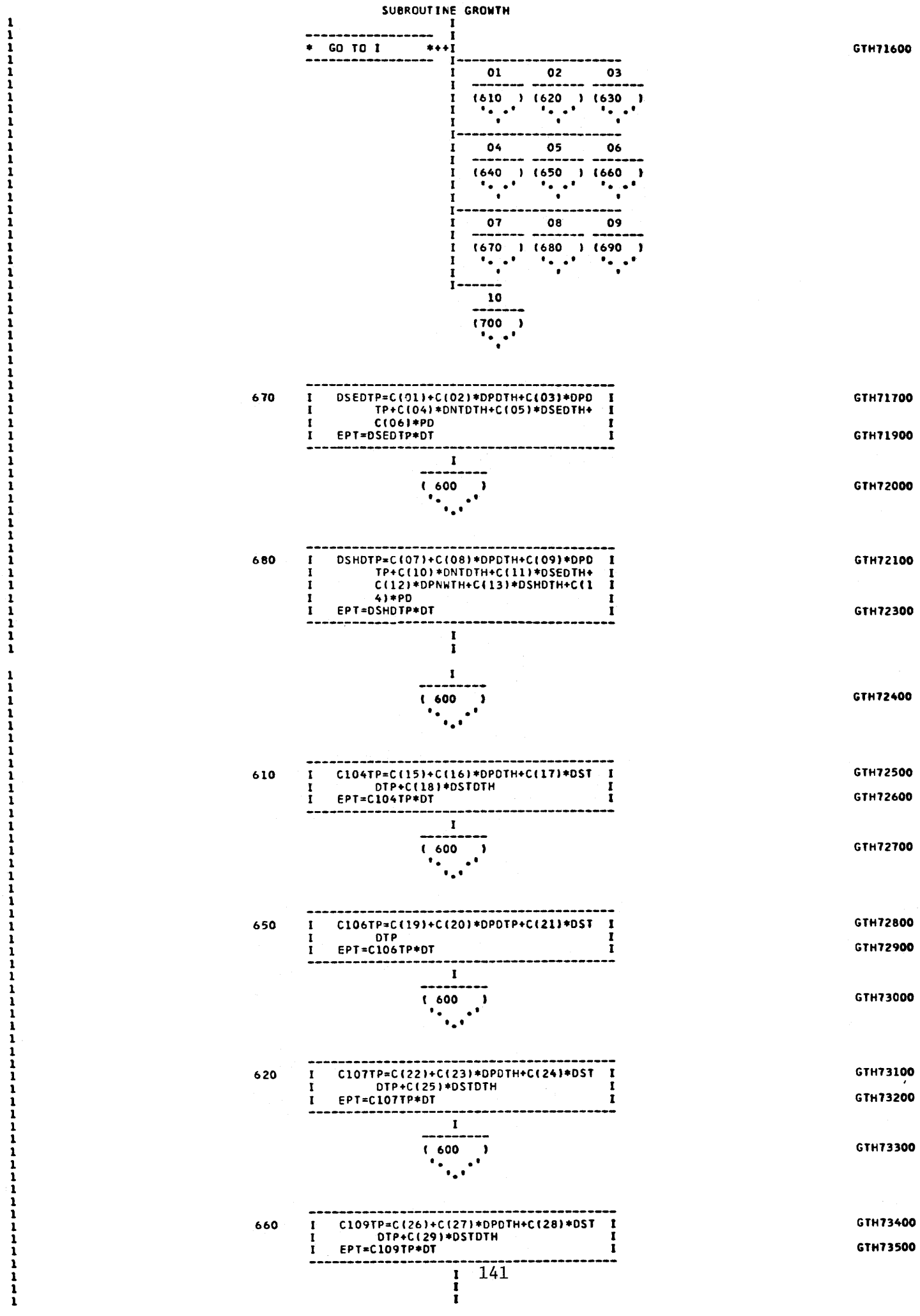
```
                                   I
                               ---------
                               ( 405   )                                      GTH63500
                                '.   .'
                                  '.'

             --------------------------------------------
     308     I   DETP(8)=P(23)+P(24)*DE8DTH             I                     GTH63600
             --------------------------------------------
                                   I
                               ---------
                               ( 405   )                                      GTH63700
                                '.   .'
                                  '.'

             --------------------------------------------
     309     I   DETP(9)=P(25)+P(26)*EPFO+P(27)*DEP     I                     GTH63800
             I          FTH+P(28)*DPCITH+P(29)*DTEFTH   I
             --------------------------------------------
                                   I
                               ---------
                               ( 405   )                                      GTH63900
                                '.   .'
                                  '.'

             --------------------------------------------
     312     I   DETP(10)=P(30)+P(31)*DE10TH+P(32)*     I                     GTH64000
             I          DMEFTH                          I
             --------------------------------------------
                                   I
                               ---------
                               ( 405   )                                      GTH64100
                                '.   .'
                                  '.'

             --------------------------------------------
     311     I   DETP(11)=P(33)+P(34)*PCIO+P(35)*DP     I                     GTH64200
             I          CITH+P(36)*DMEFTH               I
             --------------------------------------------
                                   I
                               ---------
                               ( 405   )                                      GTH64300
                                '.   .'
                                  '.'

     405                       CONTINUE                                       GTH64400
                                   I
       ***     CALCULATE PROJECTED EMPLOYEES RATIOS FOR THOSE NOT INPUT    ***GTH64500
                                   I
             --------------------------------------------
             I   DELTE=DETP(I)*DT                       I                     GTH64600
             I   X=((ET+DELTE)*POPRO)-EP                I                     GTH64700
             --------------------------------------------
                                   I
                                   .
                              . '     ' .
                          . '     IF      ' .                                 GTH64611
                      . '  ((E2-EP).LE.0.0)  ' .
                     .                          . +--------------------+
                      ' .                     . '   F                  I
                          ' .             . '                          I
                              ' .     . '                              I
                                   I T                                 I
                                   I                                   I
                               ---------                               I
                               ( 9010  )                               I      GTH64611
                                '.   .'                                I
                                  '.'                                  I
                                                                       I
                                   +-----------------------------------+
                                   I
             --------------------------------------------
             I   X=X/(E2-EP)                            I                     GTH64800
             --------------------------------------------
                                   I
                               ---------
                               ( 9011  )                                      GTH64630
                                '.   .'
                                  '.'

             --------------------------------------------
     9010    I   X=0.0                                  I                     GTH64640
             --------------------------------------------
                                   I
             --------------------------------------------
     9011 ****   DO  6410    J=M,N                      I                     GTH64800
             --------------------------------------------
                                   I
             --------------------------------------------
             I   IF(EMPP(J).LT.0.0)EMPP(J)=EMP(J)*X     I                     GTH65000
             I   IF(EMPP(J).LT.0.0)EMPP(J)=0.0          I                     GTH65100
             --------------------------------------------
                                   I
                                   I
```

```
1 2                                                I
1 222222222222222222222222222  6410 22222222222222222 CONTINUE                                GTH65200
1                                                  I
11111111111111111111111111111  6401 1111111111111111 CONTINUE                                 GTH65300
                                                   I
                           ***....                                                         ***GTH65400
                           ***     ADJUST MANUFACTURING EMPLOYMENT TO PROJECTED VALUE, IF PROVIDED  ***GTH65500
                           ***....                                                         ***GTH65600
                                                   I
                                                   .
                                              .  '   ' .
                                          . '     IF      ' .                                 GTH65700
                                      . '   (EMPM.LE.0.)     ' .
                                      '  .                     . +-------------------+
                                          .  .             .  .  F                   I
                                              .  .     .  .                          I
                                                  . . .                              I
                                                   I T                               I
                                                   I                                 I
                                              ---------                              I
                                              ( 6440  )                              I    GTH65700
                                               '.   .'                               I
                                                 '.'                                 I
                                                                                     I
                                                                                     I
                                                   +---------------------------------+
                                                   I
                                  ----------------------------------------
                                  I   EMPMP=0.                           I                     GTH65800
                                  ----------------------------------------
                                                   I
                                  ----------------------------------------
111111111111111111111111111111***********  DO  6420   I=1,200            I                     GTH65900
1                                 ----------------------------------------
1                                                  I
1                                 ----------------------------------------
1                                 I   EMPMP=EMPP(I)+EMPMP                I                     GTH66000
1                                 ----------------------------------------
1                                                  I
11111111111111111111111111111  6420 1111111111111111 CONTINUE                                 GTH66100
                                                   I
                                  ----------------------------------------
                                  I   XP=EMPM/EMPMP                      I                     GTH66200
                                  ----------------------------------------
                                                   I
                                  ----------------------------------------
111111111111111111111111111111***********  DO  6430   I=1,200            I                     GTH66300
1                                 ----------------------------------------
1                                                  I
1                                                  I
1                                                  I

1                                                  .
1                                 ----------------------------------------
1                                 I   EMPP(I)=EMPP(I)*XP                 I                     GTH66400
1                                 ----------------------------------------
1                                                  I
11111111111111111111111111111  6430 1111111111111111 CONTINUE                                 GTH66500
                                                   I
                           6440                CONTINUE                                       GTH66600
                                                   I
                           ***.....                                                        ***GTH66700
                           ***     WRITE INDUSTRIAL PROJECTION DATA                        ***GTH66800
                           ***.....                                                        ***GTH66900
                                                   I
                                  ----------------------------------------
                                  I   INDP=200                           I                     GTH67000
                                  ----------------------------------------
                                                   I
                                            +++++++++++
                                          .' WRITE      '.                                     GTH67100
                                        .' (IPR)          '.
                                      .' NLIST(3),INDP      '.
                                      ++++++++++++++++++++++
                                                   I
                                            +++++++++++
                                          .' WRITE      '.                                     GTH67200
                                        .' (IPR)          '.
                                      .' (EMPP(I),I=1,INDP)'.
                                      ++++++++++++++++++++++
                                                   I
                                                   .
                                              .  '   ' .
                           7000           . '     IF      ' .                                 GTH67300
                                      . '   (ICOM.EQ.0)      ' .
                                      '  .                     . +-------------------+
                                          .  .             .  .  F                   I
                                              .  .     .  .                          I
                                                  . . .                              I
                                                   I T                               I
                                                   I                                 I
                                              ---------                              I
                                              ( 9000  )                              I    GTH67300
                                               '.   .'                               I
                                                 '.'                                 I
                                                                                     I
                                                   +---------------------------------+
                                                   I
                           ***.....                                                        ***GTH67400
                           ***.....                                                        ***GTH67500
                                                   I
                                                   I
```

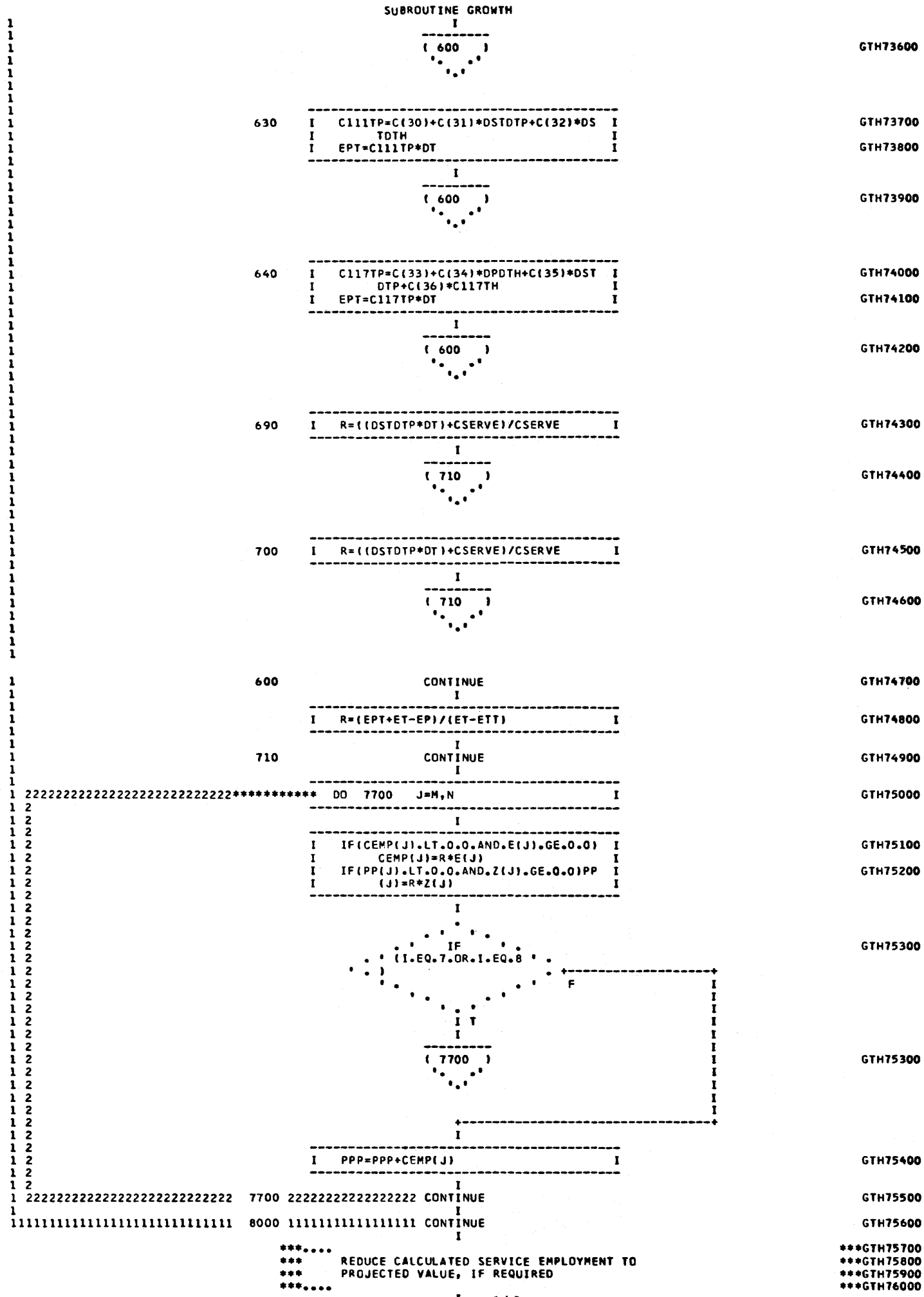
```
                         SUBROUTINE GROWTH
          ***     ******   COMMERCIAL/INSTITUTIONAL SUBMODEL    ******            ***GTH67600
          ***.....                                                                ***GTH67700
          ***.....                                                                ***GTH67800

                                   I
                                   .
                               . '   ' .
                           . '    IF     ' .                                         GTH67900
                       . '   (PSERVE)        ' .
                   +-'                           '-+
                   I   ' .                   . '   I
                   I       ' .           . '       I
                   I           ' .   . '           I
                   I -             I 0             I +
                   I            ---+---         ---+---
                   I            (602  )         (602  )
                   I             '.  .'          '.  .'
                   I               .               .
                   I
                   +---------------+
                                   I
                 ------------------------------------------
  601            I    DSTDTP=C(37)+C(38)*DPDTP+C(39)*DST  I                          GTH68000
                 I          DTH                           I
                 ------------------------------------------
                                   I
                               ---------
                               ( 603   )                                             GTH68100
                                '.   .'
                                  '.'

                 ------------------------------------------
  602            I    DSTDTP=(PSERVE-CSERVE)/DT           I                          GTH68200
                 ------------------------------------------
                                   I
  603                          CONTINUE                                              GTH68300
                                   I
                 ------------------------------------------
                 I    PPP=0.0                             I                          GTH68400
                 ------------------------------------------
                                   I
                 ------------------------------------------
1111111111111111111111111111111*********** DO   8000   I=1,10                I       GTH68500
1                ------------------------------------------
1                                  I
1                ------------------------------------------
1                I    M=JLOW(I)                           I                          GTH68600
1                I    N=IHIH(I)                           I                          GTH68700
1                ------------------------------------------
1                                  I
1                                  I

1                                  I
1                ------------------------------------------
1                I    MM=M                                I                          GTH68800
1                ------------------------------------------
1                                  I
1                ------------------------------------------
1 222222222222222222222222222222*********** DO   7040   J=M,N                I       GTH68900
1 2              ------------------------------------------
1 2                                I
1 2                                .
1 2                            . '   ' .
1 2                        . '    IF     ' .                                         GTH69000
1 2                    . ' (Z(J).GT.0.0.OR.C ' .
1 2                  ' . EMP(J).GT.0.0.OR.PP(J . +--------------------+
1 2                    ' . ).GT.0.0)         . '   F                  I
1 2                        ' .           . '                          I
1 2                            ' .   . '                              I
1 2                                I T                                I
1 2                                I                                  I
1 2                            ---------                              I
1 2                            ( 7040   )                             I              GTH69000
1 2                             '.   .'                               I
1 2                               '.'                                 I
1 2                                                                   I
1 2                                                                   I
1 2                                +----------------------------------+
1 2                                I
1 2                                .
1 2                            . '   ' .
1 2                        . '    IF     ' .                                         GTH69100
1 2                    . '  (MM.EQ.N)        ' .
1 2                  ' .                     . +--------------------+
1 2                    ' .               . '   F                  I
1 2                        ' .       . '                          I
1 2                            ' . . '                            I
1 2                                I T                            I
1 2                                I                              I
1 2                            ---------                          I
1 2                            ( 8000   )                         I                  GTH69100
1 2                             '.   .'                           I
1 2                               '.'                             I
1 2                                                               I
1 2                                                               I
1 2                                +------------------------------+
1 2                                I
1 2              ------------------------------------------
1 2              I    MM=MM+1                             I                          GTH69200
1 2              ------------------------------------------
1 2                                I
1 222222222222222222222222222  7040 2222222222222222 CONTINUE                        GTH69300
1                                  I
```

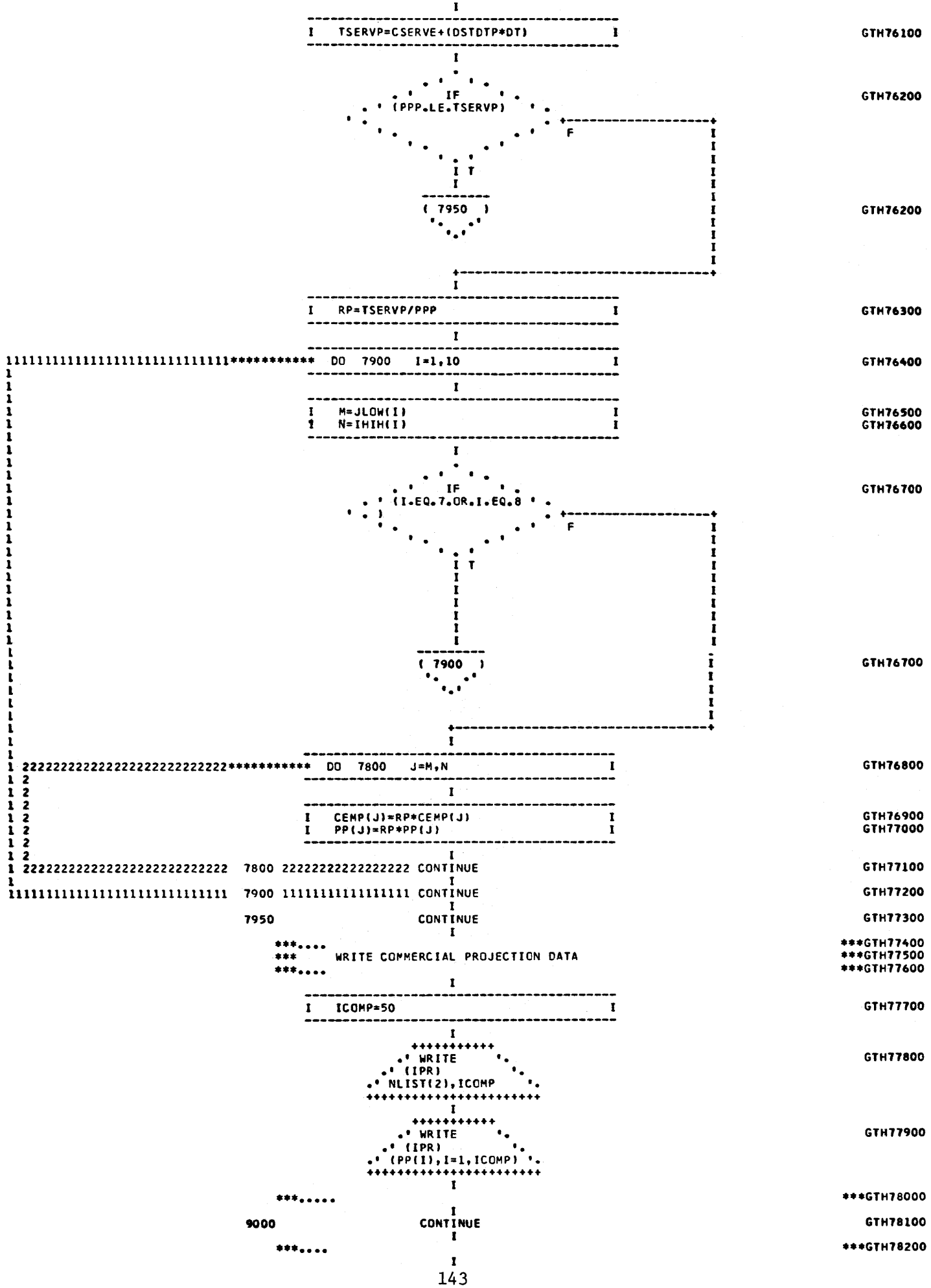
SUBROUTINE GROWTH

```
1                                                  I
1                                 ------------------------------------------------
1 2222222222222222222222222222***********  DO  7050    J=M,N                    I          GTH69400
1 2                               ------------------------------------------------
1 2                                                I
1 2                               ------------------------------------------------
1 2                               I   IF(Z(J).LT.0.)Z(J)=0.0                     I          GTH69500
1 2                               ------------------------------------------------
1 2                                                I
1 222222222222222222222222222  7050 2222222222222222 CONTINUE                               GTH69600
1                                                  I
1                                 ------------------------------------------------
1                                 I   EP=0.0                                     I          GTH69700
1                                 I   ET=0.0                                     I          GTH69800
1                                 I   EPT=0.0                                    I          GTH69900
1                                 I   ETT=0.0                                    I          GTH70000
1                                 ------------------------------------------------
1                                                  I
1                                                  .
1                                           .  '   '   .
1                                       . '       IF      ' .                                GTH70100
1                                   . ' (I.LT.7.OR.I.GT.8   ' .
1                                 ' . )                        . +-----------------------+
1                                     ' .                   . '  F                       I
1                                         ' .           . '                              I
1                                             ' .   . '                                  I
1                                                 I T                                    I
1                                                 I                                      I
1                                             ---------                                  I
1                                             ( 7090  )                                  I   GTH70100
1                                               '. .'                                    I
1                                                 .                                      I
1                                                                                        I
1                                                 +--------------------------------------+
1                                                 I
1                                 ------------------------------------------------
1 2222222222222222222222222222***********  DO  7080    J=M,N                    I          GTH70200
1 2                               ------------------------------------------------
1 2                                                I
1 2                               ------------------------------------------------
1 2                               I   IF(PP(J).GE.0.)EP=EP+PP(J)                 I          GTH70300
1 2                               I   IF(PP(J).GE.0.)ETT=ETT+Z(J)                I          GTH70400
1 2                               I   ET=ET+Z(J)                                 I          GTH70500
1 2                               ------------------------------------------------
1 2                                                I
1 222222222222222222222222222  7080 2222222222222222 CONTINUE                               GTH70600
1                                                  I
1                                                  I
1                                                  I
1                                                  I

1                                                  I
1                                              ---------
1                                              ( 7110  )                                    GTH70700
1                                                '. .'
1                                                  .
1
1                              7090              CONTINUE                                   GTH70800
1                                                  I
1                                 ------------------------------------------------
1 2222222222222222222222222222***********  DO  7100    J=M,N                    I          GTH70900
1 2                               ------------------------------------------------
1 2                                                I
1 2                                                .
1 2                                         .  '   '   .
1 2                                     . '       IF      ' .                               GTH71000
1 2                                 . ' (Z(J).LE.0.)          ' .
1 2                               ' .                            . +---------------------+
1 2                                   ' .                     . '  F                     I
1 2                                       ' .             . '                            I
1 2                                           ' .     . '                                I
1 2                                                I T                                   I
1 2                                                I                                     I
1 2                                            ---------                                 I
1 2                                            ( 7100  )                                 I  GTH71000
1 2                                              '. .'                                   I
1 2                                                .                                     I
1 2                                                                                      I
1 2                                                +-------------------------------------+
1 2                                                I
1 2                               ------------------------------------------------
1 2                               I   IF(CEMP(J).GE.0.)EP=EP+CEMP(J)             I          GTH71100
1 2                               I   IF(CEMP(J).GE.0.)ETT=ETT+E(J)              I          GTH71200
1 2                               I   ET=ET+E(J)                                 I          GTH71300
1 2                               ------------------------------------------------
1 2                                                I
1 222222222222222222222222222  7100 2222222222222222 CONTINUE                               GTH71400
1                                                  I
1                              7110              CONTINUE                                   GTH71500
1                                                  I
1                                                  I
1                                                  I
1                                                  I
1                                                  I
1                                                  I
1                                                  I
1                                                  I
1                                                  I
1                                                  I
1                                                  I
1                                                  I
```

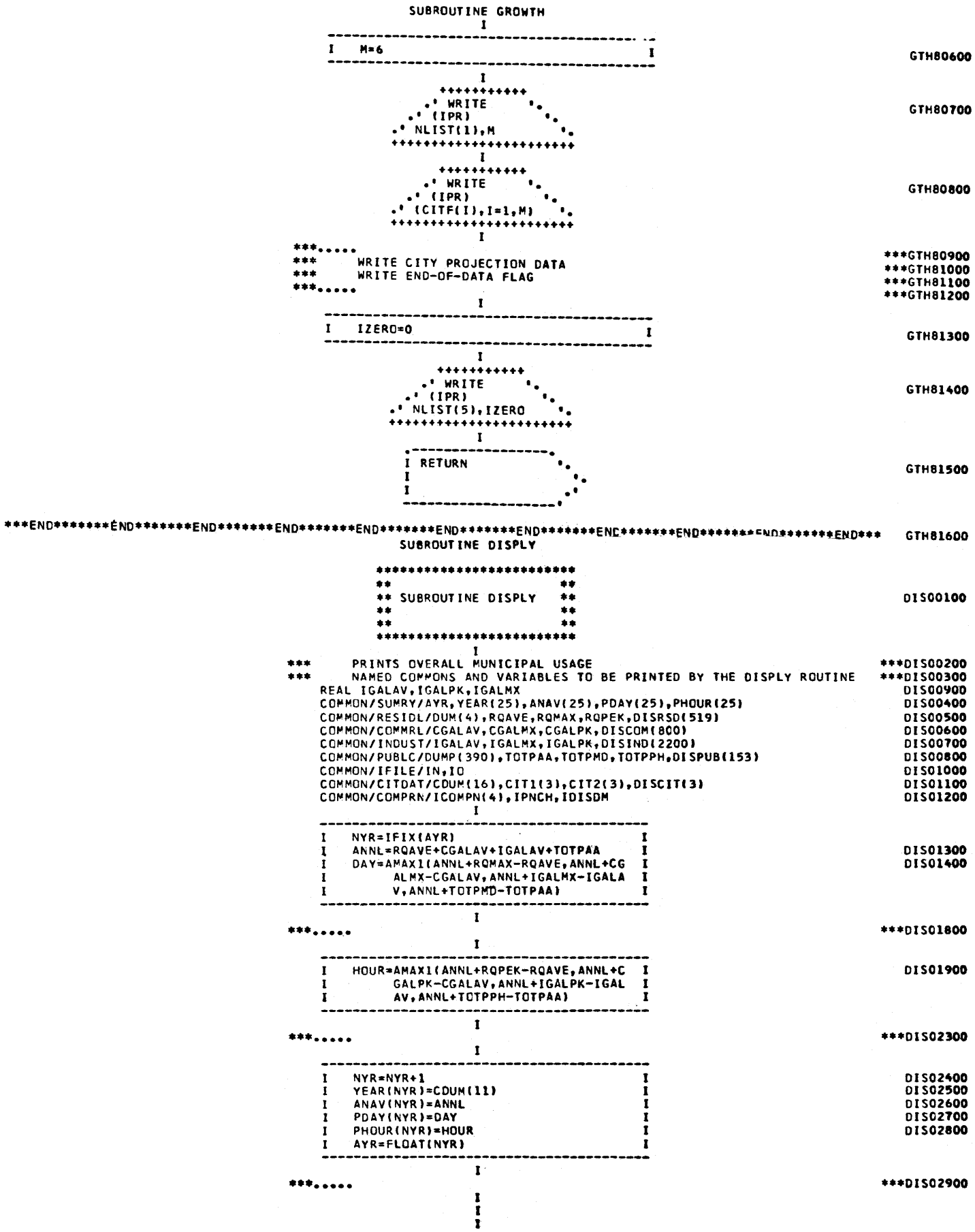


GTH71600 GTH71700 GTH71900 GTH72000 GTH72100 GTH72300 GTH72400 GTH72500 GTH72600 GTH72700 GTH72800 GTH72900 GTH73000 GTH73100 GTH73200 GTH73300 GTH73400 GTH73500


SUBROUTINE GROWTH
GTH73600
630 C111TP=C(30)+C(31)*DSTDTP+C(32)*DS TDTH
EPT=C111TP*DT
GTH73700
GTH73800
GTH73900
640 C117TP=C(33)+C(34)*DPDTH+C(35)*DST DTP+C(36)*C117TH
EPT=C117TP*DT
GTH74000
GTH74100
GTH74200
690 R=((DSTDTP*DT)+CSERVE)/CSERVE
GTH74300
GTH74400
700 R=((DSTDTP*DT)+CSERVE)/CSERVE
GTH74500
GTH74600
600 CONTINUE
GTH74700
R=(EPT+ET-EP)/(ET-ETT)
GTH74800
710 CONTINUE
GTH74900
DO 7700 J=M,N
GTH75000
IF(CEMP(J).LT.0.0.AND.E(J).GE.0.0) CEMP(J)=R*E(J)
IF(PP(J).LT.0.0.AND.Z(J).GE.0.0)PP (J)=R*Z(J)
GTH75100
GTH75200
IF (I.EQ.7.OR.I.EQ.8)
GTH75300
F
T
7700 CONTINUE
GTH75300
PPP=PPP+CEMP(J)
GTH75400
7700 CONTINUE
GTH75500
8000 CONTINUE
GTH75600
*** REDUCE CALCULATED SERVICE EMPLOYMENT TO
*** PROJECTED VALUE, IF REQUIRED
***GTH75700
***GTH75800
***GTH75900
***GTH76000


SUBROUTINE GROWTH
TSERVP=CSERVE+(DSTDTP*DT)
IF (PPP.LE.TSERVP)
F
T
7950
RP=TSERVP/PPP
DO 7900 I=1,10
M=JLOW(I)
N=IHIH(I)
IF (I.EQ.7.OR.I.EQ.8
F
T
7900
DO 7800 J=M,N
CEMP(J)=RP*CEMP(J)
PP(J)=RP*PP(J)
7800 CONTINUE
7900 CONTINUE
7950 CONTINUE
WRITE COMMERCIAL PROJECTION DATA
ICOMP=50
WRITE (IPR) NLIST(2),ICOMP
WRITE (IPR) (PP(I),I=1,ICOMP)
9000 CONTINUE
GTH76100
GTH76200
GTH76200
GTH76300
GTH76400
GTH76500
GTH76600
GTH76700
GTH76700
GTH76800
GTH76900
GTH77000
GTH77100
GTH77200
GTH77300
***GTH77400
***GTH77500
***GTH77600
GTH77700
GTH77800
GTH77900
***GTH78000
GTH78100
***GTH78200

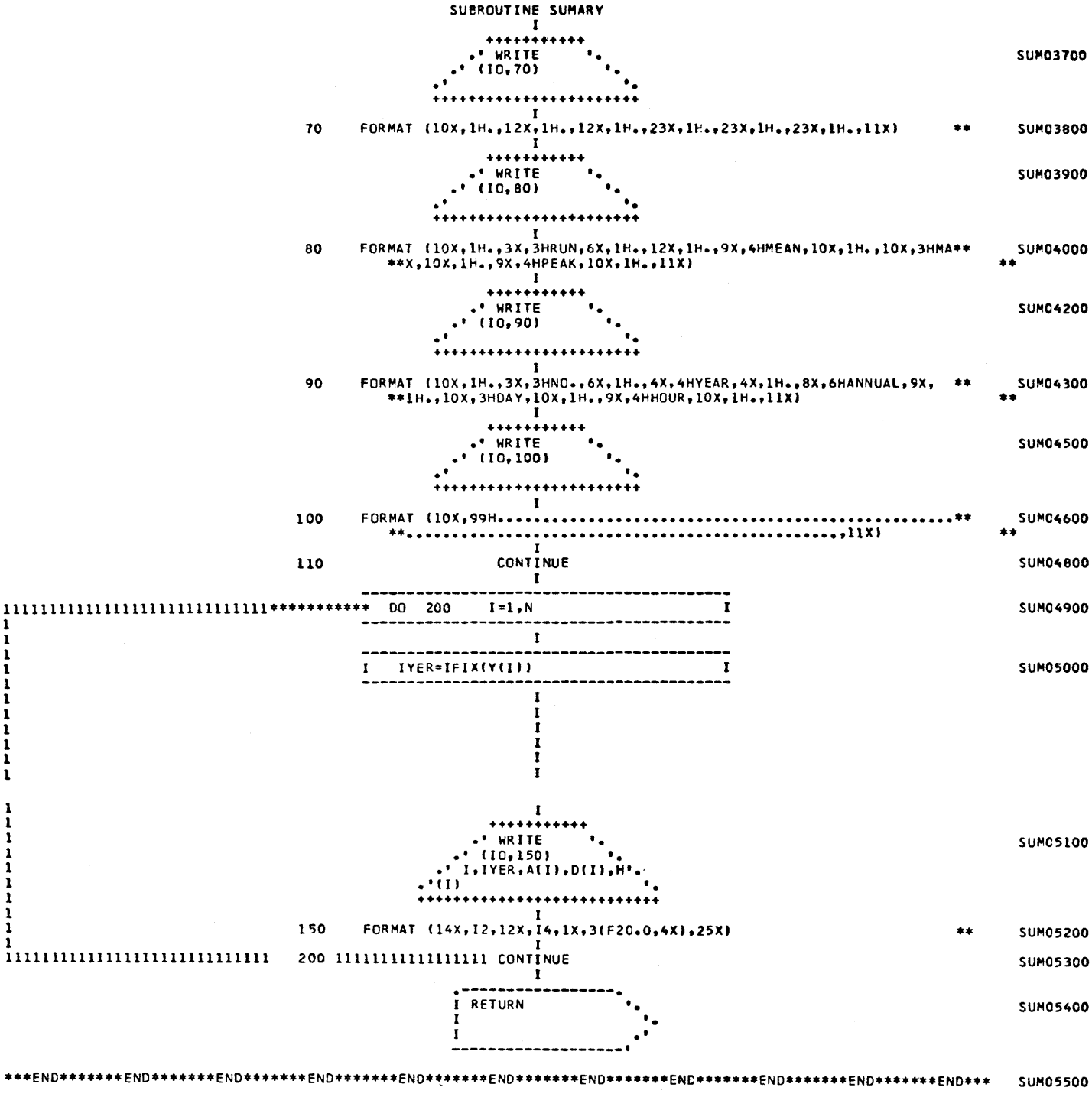
```
                    SUBROUTINE GROWTH
***....                                                        ***GTH78300
***     ******   PUBLIC/UNACCOUNTED SUBMODEL   ******         ***GTH78400
***....                                                        ***GTH78500
***....                                                        ***GTH78600
***.....                                                       ***GTH78700
***     WRITE PUBLIC-UNACCOUNTED PROJECTIONS                   ***GTH78800
***.....                                                       ***GTH78900
                       I
                IF                                              GTH79000
          (IPUB.EQ.0)        +-----------------+
                              F                I
                       I T                     I
                       I                       I
                   ( 9500 )                    I                GTH79000
                       I                       I
                       +-----------------------+
                       I
***....                                                        ***GTH79100
***     PROJECT AIRPORT PARAMETER, IF REQUIRED                 ***GTH79200
***...                                                         ***GTH79300
                       I
                IF                                              GTH79400
        (PUBDUM(33).LE.0.    +-----------------+
         0)                   F                I
                       I T                     I
                       I                       I
                   ( 9700 )                    I                GTH79400
                       I                       I
                       +-----------------------+
                       I
                       I
                IF                                              GTH79500
        (PUBPAR(3).GT.0.0    +-----------------+
         )                    F                I
                       I T                     I
                       I                       I
                   ( 9600 )                    I                GTH79500
                       I                       I
                       +-----------------------+
                       I
         ---------------------------------------
         I   PUBPAR(3)=(PUBDUM(33)*POPRO)/PO   I                GTH79600
         ---------------------------------------
                       I
9600               CONTINUE                                     GTH79700
                       I
9700               CONTINUE                                     GTH79800
                       I
         ---------------------------------------
         I   M=150                             I                GTH79900
         ---------------------------------------
                       I
                 ++++++++++++
                 WRITE                                          GTH80000
                 (IPR)
                 NLIST(4),M
              ++++++++++++++++++++++
                       I
                 ++++++++++++
                 WRITE                                          GTH80100
                 (IPR)
                 (PUBPAR(I),I=1,M)
              ++++++++++++++++++++++
                       I
9500               CONTINUE                                     GTH80200
                       I
***.....                                                       ***GTH80300
***     WRITE CITY PROJECTION DATA                             ***GTH80400
***.....                                                       ***GTH80500
                       I
                       I
                       I
```


SUBROUTINE GROWTH
M=6
WRITE (IPR) NLIST(1),M
WRITE (IPR) (CITF(I),I=1,M)
WRITE CITY PROJECTION DATA
WRITE END-OF-DATA FLAG
IZERO=0
WRITE (IPR) NLIST(5),IZERO
RETURN
GTH80600
GTH80700
GTH80800
***GTH80900
***GTH81000
***GTH81100
***GTH81200
GTH81300
GTH81400
GTH81500
GTH81600
SUBROUTINE DISPLY
** SUBROUTINE DISPLY **
DIS00100
PRINTS OVERALL MUNICIPAL USAGE
NAMED COMMONS AND VARIABLES TO BE PRINTED BY THE DISPLY ROUTINE
***DIS00200
***DIS00300
REAL IGALAV,IGALPK,IGALMX
DIS00900
COMMON/SUMRY/AYR,YEAR(25),ANAV(25),PDAY(25),PHOUR(25)
DIS00400
COMMON/RESIDL/DUM(4),RQAVE,RQMAX,RQPEK,DISRSD(519)
DIS00500
COMMON/COMMRL/CGALAV,CGALMX,CGALPK,DISCOM(800)
DIS00600
COMMON/INDUST/IGALAV,IGALMX,IGALPK,DISIND(2200)
DIS00700
COMMON/PUBLC/DUMP(390),TOTPAA,TOTPMD,TOTPPH,DISPUB(153)
DIS00800
COMMON/IFILE/IN,IO
DIS01000
COMMON/CITDAT/CDUM(16),CIT1(3),CIT2(3),DISCIT(3)
DIS01100
COMMON/COMPRN/ICOMPN(4),IPNCH,IDISDM
DIS01200
NYR=IFIX(AYR)
ANNL=RQAVE+CGALAV+IGALAV+TOTPAA
DAY=AMAX1(ANNL+RQMAX-RQAVE,ANNL+CGALMX-CGALAV,ANNL+IGALMX-IGALAV,ANNL+TOTPMD-TOTPAA)
DIS01300
DIS01400
***DIS01800
HOUR=AMAX1(ANNL+RQPEK-RQAVE,ANNL+CGALPK-CGALAV,ANNL+IGALPK-IGALAV,ANNL+TOTPPH-TOTPAA)
DIS01900
***DIS02300
NYR=NYR+1
YEAR(NYR)=CDUM(11)
ANAV(NYR)=ANNL
PDAY(NYR)=DAY
PHOUR(NYR)=HOUR
AYR=FLOAT(NYR)
DIS02400
DIS02500
DIS02600
DIS02700
DIS02800
***DIS02900

```
                 SUBROUTINE DISPLY
                         I
                    +++++++++++
                  .' WRITE     '.                                DIS03000
                .' (IO,10)       '.
              .' CIT1,CIT2         '.
              ++++++++++++++++++++++
                         I
10    FORMAT (1H1,20X,52HSUMMARY OF MUNICIPAL WATER REQUIREMENTS FOR CIT**    DIS03100
         **Y OF , 6A4)                                                   **
                         I
                    +++++++++++
                  .' WRITE     '.                                DIS03300
                .' (IO,15)       '.
              .'CDUM(11)           '.
              ++++++++++++++++++++++
                         I
15    FORMAT (//39X,37HESTIMATED WATER REQUIREMENTS FOR YEAR,F6.0)      **    DIS03400
                         I
                    +++++++++++
                  .' WRITE     '.                                DIS03500
                .' (IO,20)       '.
              .'                   '.
              ++++++++++++++++++++++
                         I
20    FORMAT (45X,31H(ALL VALUES IN GALLONS PER DAY)//)                 **    DIS03600
                         I
                    +++++++++++
                  .' WRITE     '.                                DIS03700
                .' (IO,40)       '.
              .'                   '.
              ++++++++++++++++++++++
                         I
40    FORMAT(/48X,6HANNUAL,9X,7HMAXIMUM,11X,4HPEAK)                     **    DIS03800
                         I
                    +++++++++++
                  .' WRITE     '.                                DIS03900
                .' (IO,50)       '.
              .'                   '.
              ++++++++++++++++++++++
                         I
50    FORMAT(47X,7HAVERAGE,10X,5HDAILY,11X,6HHOURLY)                    **    DIS04000
                         I
  ***     CURRENT MUNICIPAL USAGE BY CALCULATION                         ***DIS04100
                         I
                         I
                         I
                         I
                         I
                         I
                         I
                         I


                         I
                    +++++++++++
                  .' WRITE     '.                                DIS04200
                .' (IO,55)       '.
              .' ANNL,DAY,HOUR     '.
              ++++++++++++++++++++++
                         I
55    FORMAT(//26X,9HMUNICIPAL,F20.0,2F16.0)                            **    DIS04300
                         I
  ***     RESIDENTIAL CURRENT USAGE                                      ***DIS04400
                         I
                    +++++++++++
                  .' WRITE     '.                                DIS04500
                .' (IO,60)       '.
              .' RQAVE,RQMAX,RQPEK '.
              ++++++++++++++++++++++
                         I
60    FORMAT(/26X,11HRESIDENTIAL,F18.0,2F16.0)                          **    DIS04600
                         I
  ***     COMMERCIAL CURRENT USAGE                                       ***DIS04700
                         I
                    +++++++++++
                  .' WRITE     '.                                DIS04800
                .' (IO,65)       '.
              .' CGALAV,CGALMX,CGAL'.
            .'PK                     '.
            ++++++++++++++++++++++++++
                         I
65    FORMAT(/26X,10HCOMMERCIAL,F19.0,2F16.0)                           **    DIS04900
                         I
  ***     INDUSTRIAL CURRENT USAGE                                       ***DIS05000
                         I
                    +++++++++++
                  .' WRITE     '.                                DIS05100
                .' (IO,70)       '.
              .' IGALAV,IGALMX,IGAL'.
            .'PK                     '.
            ++++++++++++++++++++++++++
                         I
70    FORMAT(/26X,10HINDUSTRIAL,F19.0,2F16.0)                           **    DIS05200
                         I
  ***     PUBLIC CURRENT USAGE                                           ***DIS05300
                         I
                    +++++++++++
                  .' WRITE     '.                                DIS05400
                .' (IO,75)       '.
              .' TOTPAA,TOTPMD,TOTP'.
            .'PH                     '.
            ++++++++++++++++++++++++++
                         I
                         I
```

```
                    SUBROUTINE DISPLY
                           I
75    FORMAT(/26X,17HPUBLIC AND UNACC.,F12.0,2F16.0)                  **    DIS05500
                           I
                      IF                                                    DIS05600
                 (IPNCH.LT.0)
                                  +--------------------+
                                   F                   I
                          I T                          I
                          I                            I
                  .-----------------.                  I
                  I RETURN           .                 I                    DIS05600
                  I                   .                I
                  I                  .                 I
                  ------------------'                  I
                          +----------------------------+
                          I
                 .-------------------.
                   CALL PUNCH (IPN                                          DIS05700
                   CH,CDUM(11))
                 '-------------------'
                          I
                  .-----------------.
                  I RETURN           .                                      DIS05800
                  I                   .
                  I                  .
                  ------------------'

**END*******END*******END*******END*******END*******END*******END*******END*******END*******END*******END***    DIS05900

                  **************************
                  **                      **
                  ** SUBROUTINE SUMARY    **                                SUM00100
                  **                      **
                  **                      **
                  **************************
                            I
      ***.....                                                           ***SUM00200
      ***.....                                                           ***SUM00300
      ***      THIS SUBROUTINE PREPARES THE SUMMARY REPORT FOR THE PROJECTED ***SUM00400
      ***      MUNICIPAL WATER REQUIREMENTS FOR THE CITY UNDER STUDY.    ***SUM00500
      ***.....                                                           ***SUM00600
      ***.....                                                           ***SUM00700
          COMMON/SUMRY/AYR,Y(25),A(25),D(25),H(25)                          SUM00800
          COMMON/CITDAT/CDUM(16),CIT(6),SUMCIT(3)                           SUM00900
          COMMON/IFILE/IN,IO                                                SUM01000
                            I
      ***.....                                                           ***SUM01100
                            I
          ----------------------------------------
          I   N=IFIX(AYR)                        I
          ----------------------------------------
                            I
                       IF                                                   SUM01200
                   (N.EQ.1)
                                   +--------------------+
                                    F                   I
                           I T                          I
                           I                            I
                   .-----------------.                  I
                   I RETURN           .                 I                   SUM01200
                   I                   .                I
                   I                  .                 I
                   ------------------'                  I
                           +----------------------------+
                           I
      ***.....                                                           ***SUM01300
                           I
                           I
                           I
                           I
                           I
                           I
                           I
                           I
```

```
                SUBROUTINE SUMARY
                      I
                 +++++++++++
              .' WRITE     '.                                          SUM01400
           .' (IO,5)         '.
         .'                    '.
         ++++++++++++++++++++++++
                      I
 5    FORMAT (1H1)                                                **     SUM01500
                      I
                 +++++++++++
              .' WRITE     '.                                          SUM01600
           .' (IO,10)        '.
         .'                    '.
         ++++++++++++++++++++++++
                      I
10    FORMAT (///40X,40H****************************************,40X)  **     SUM01700
                      I
                 +++++++++++
              .' WRITE     '.                                          SUM01800
           .' (IO,15)        '.
         .'                    '.
         ++++++++++++++++++++++++
                      I
                 +++++++++++
              .' WRITE     '.                                          SUM01900
           .' (IO,15)        '.
         .'                    '.
         ++++++++++++++++++++++++
                      I
15    FORMAT(40X,1H*,38X,1H*,40X)                                 **     SUM02000
                      I
                 +++++++++++
              .' WRITE     '.                                          SUM02100
           .' (IO,20)        '.
         .'                    '.
         ++++++++++++++++++++++++
                      I
20    FORMAT (40X,40H*   M A I N     I I      S Y S T E M   *,40X)    **     SUM02200
                      I
                 +++++++++++
              .' WRITE     '.                                          SUM02300
           .' (IO,15)        '.
         .'                    '.
         ++++++++++++++++++++++++
                      I
                      I
                      I

                      I
                 +++++++++++
              .' WRITE     '.                                          SUM02400
           .' (IO,15)        '.
         .'                    '.
         ++++++++++++++++++++++++
                      I
                 +++++++++++
              .' WRITE     '.                                          SUM02500
           .' (IO,25)        '.
         .'                    '.
         ++++++++++++++++++++++++
                      I
25    FORMAT(40X,40H****************************************,40X)    **     SUM02600
                      I
                 +++++++++++
              .' WRITE     '.                                          SUM02700
           .' (IO,30)        '.
         .'                    '.
         ++++++++++++++++++++++++
                      I
30    FORMAT (///35X,49HSUMMARY OF PROJECTED MUNICIPAL WATER REQUIREMENT**     SUM02800
        **S,36X)                                                     **
                      I
                 +++++++++++
              .' WRITE     '.                                          SUM03000
           .' (IO,40)        '.
         .'                    '.
         ++++++++++++++++++++++++
                      I
40    FORMAT (/54X,11HFOR CITY OF,35X)                            **     SUM03100
                      I
                 +++++++++++
              .' WRITE     '.                                          SUM03200
           .' (IO,50)        '.
         .' CIT                '.
         ++++++++++++++++++++++++
                      I
50    FORMAT (/48X,6A4,48X)                                       **     SUM03300
                      I
                 +++++++++++
              .' WRITE     '.                                          SUM03400
           .' (IO,60)        '.
         .'                    '.
         ++++++++++++++++++++++++
                      I
60    FORMAT (//10X,99H.....................................GALLONS**     SUM03500
        ** PER DAY.....................................,11X)           **
                      I
                      I
                      I
```


SUBROUTINE SUMARY
WRITE (IO,70)
70 FORMAT (10X,1H.,12X,1H.,12X,1H.,23X,1H.,23X,1H.,23X,1H.,11X) **
WRITE (IO,80)
80 FORMAT (10X,1H.,3X,3HRUN,6X,1H.,12X,1H.,9X,4HMEAN,10X,1H.,10X,3HMA**
**X,10X,1H.,9X,4HPEAK,10X,1H.,11X) **
WRITE (IO,90)
90 FORMAT (10X,1H.,3X,3HNO.,6X,1H.,4X,4HYEAR,4X,1H.,8X,6HANNUAL,9X, **
**1H.,10X,3HDAY,10X,1H.,9X,4HHOUR,10X,1H.,11X) **
WRITE (IO,100)
100 FORMAT (10X,99H.....**
**.....,11X) **
110 CONTINUE
DO 200 I=1,N
IYER=IFIX(Y(I))
WRITE (IO,150)
I,IYER,A(I),D(I),H*
(I)
150 FORMAT (14X,I2,12X,I4,1X,3(F20.0,4X),25X) **
200 CONTINUE
RETURN
SUM03700
SUM03800
SUM03900
SUM04000
SUM04200
SUM04300
SUM04500
SUM04600
SUM04800
SUM04900
SUM05000
SUM05100
SUM05200
SUM05300
SUM05400
END****END*******END*******END*******END*******END*******END*******END*******END*******END*******END*** SUM05500

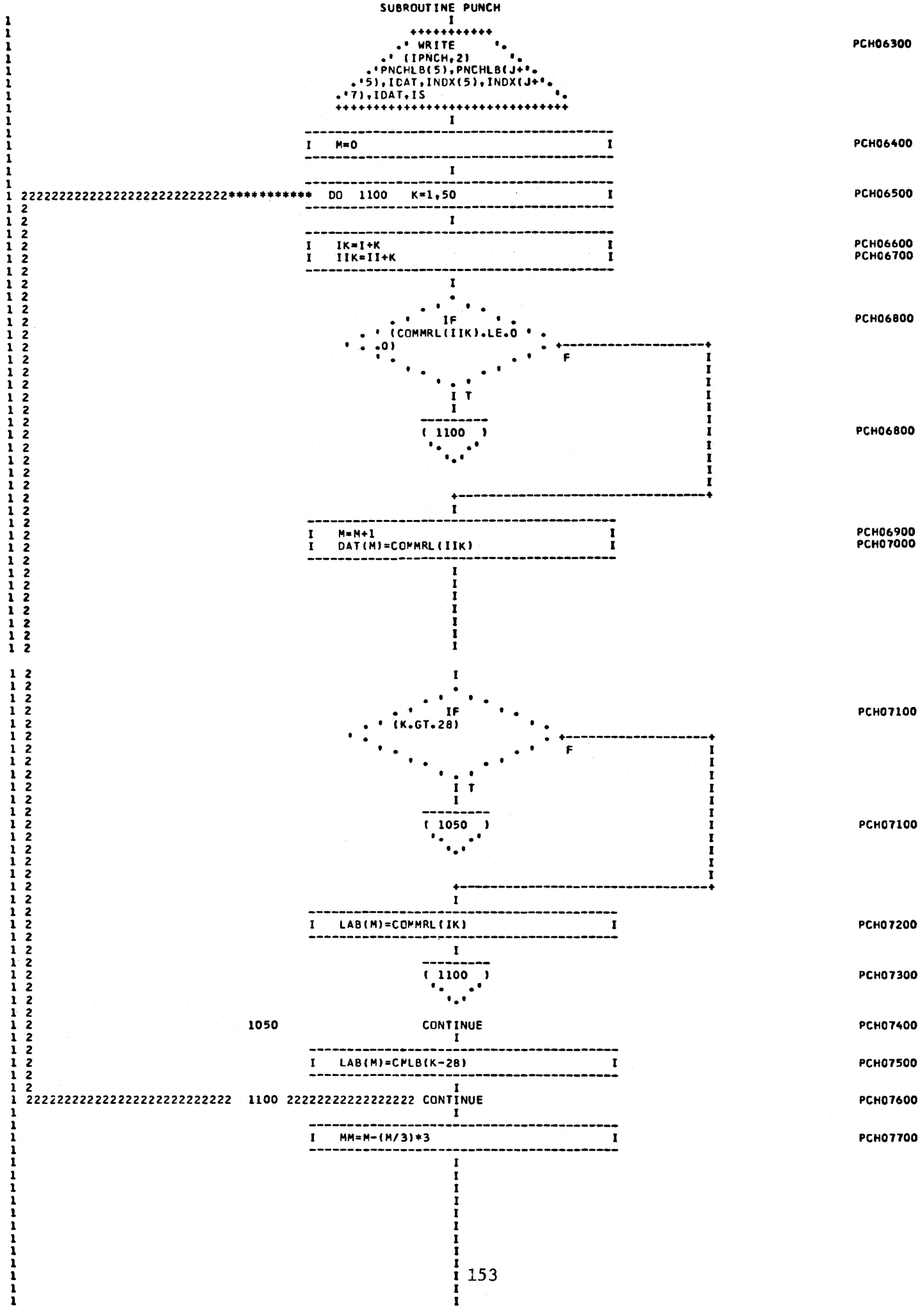
```
                                   SUBROUTINE INDSTL

                                 *************************
                                 **                     **
                                 ** SUBROUTINE INDSTL   **                                   IND00100
                                 **                     **
                                 **                     **
                                 *************************
                                            I
                          ***     SUBROUTINE TO COMPUTE INDUSTRIAL WATER USAGE                ***IND00200
                             REAL IGALAV,IGALMX,IGALPK,IUSEAV,ILABL                              IND00300
                                 ,IUSEMX,IUSEPK,IPARAM,IQAVE,IQMAX,IQPEK

                             COMMON/INDUST/IGALAV,IGALMX,IGALPK,ILABL(800),IUSEAV(200),          IND00500
                                         IUSEMX(200),IUSEPK(200),IPARAM(200),
                                            IQAVE(200),IQMAX(200),IQPEK(200)

                                            I
                          ***     COMPUTES CURRENT VALUES OF ANNUAL AVERAGE, MAX DAY, AND PEAK ***IND00800
                          ***        HOUR, RESPECTIVELY                                       ***IND00900
                                            I
                                  .-----------------.
                                .'  CALL INITL (IQA  '.                                          IND01000
                               .'   VE,600,0.0)        '.
                                '.                    .'
                                  '-----------------'
                                            I
                             ----------------------------------------
                             I   IGALAV=0.                          I                            IND01100
                             I   IGALMX=0.                          I                            IND01200
                             I   IGALPK=0.                          I                            IND01300
                             ----------------------------------------
                                            I
                             ----------------------------------------
1111111111111111111111111111*********** DO  3000    I=1,200         I                            IND01400
1                            ----------------------------------------
1                                           I
1                            ----------------------------------------
1                            I   IQAVE(I)=IUSEAV(I)*IPARAM(I)       I                            IND01500
1                            I   IQMAX(I)=IUSEMX(I)*IPARAM(I)       I                            IND01600
1                            I   IQPEK(I)=IUSEPK(I)*IPARAM(I)       I                            IND01700
1                            I   IGALAV=IGALAV+IQAVE(I)             I                            IND01800
1                            I   IGALMX=IGALMX+IQMAX(I)             I                            IND01900
1                            I   IGALPK=IGALPK+IQPEK(I)             I                            IND02000
1                            ----------------------------------------
1                                           I
1111111111111111111111111111  3000 1111111111111111 CONTINUE                                     IND02100
                                            I
                                            I
                                            I
                                            I
                                            I

                                            I
                                  .-----------------.
                                .'  CALL IDSPLY       '.                                         IND02200
                               .'                       '.
                                '.                     .'
                                  '-------------------'
                                            I
                                  .-----------------.
                                  I RETURN            '.                                         IND02300
                                  I                     '.
                                  I                     .'
                                  ------------------'

***END*******END*******END*******END*******END*******END*******END*******END*******END*******END*******END***   IND02400
```

SUBROUTINE PUNCH

```
              *************************
              **                     **
              ** SUBROUTINE PUNCH    **
              ** (IPNCH,ADAT)        **
              **                     **
              *************************
      REAL INDX
      REAL INDUST,LAB(200)
      DIMENSION PNCHLB(28),INDX(10),ILAB(200),CMLB(32),DAT(200)
      COMMON/RESIDL/RESIDL(523),PCHRSD(3)
      COMMON/RESPAR/RESPAR(800),PCHRSP(12)
      COMMON/COMMRL/COMMRL(803)
      COMMON/PUBLC/PUBLC(393),PCHPUB(153)
      COMMON/INDUST/INDUST(1403),PCHIND(700)
      DATA INDX/2HFP,2HFW,2HMP,2HMW,1HC,1HI,1HP,1HA,1HM,1HP/
      DATA PNCHLB/4HFLTS,4HMETS,4HEPUS,4HEWUS,4HCOMM,4HAVEQ,4HAXQ ,
                   4HPEKQ,4HINDA,4HVEGQ,4HINDM,4HAXMQ,4HINDP,4HEAKQ,
                        4HPUBL,4HICAA,4HICMD,4HICPH,4HQDOM,4HQSAV,4H
           QSMX,              4HCPEK,4HNUMB,4HLOSS,4HFREE,4HAIRP,4HEN
           DD,4H    /
      DATA CMLB/4HC001,4HC002,4HC003,4HC004,4HC005,4HC006,4HC007,4HC008,
                 4HC009,4HC010,4HC011,4HC012,4HC013,4HC014,4HC015,4H
           C016,      4HC017,4HC018,4HC019,4HC020,4HC021,4HC022,4HC0
           23,4HC024,       4HC025,4HC026,4HC027,4HC028,4HC029,4HC030
           ,4HC031,4HC032/
                          I
  ***....
  ***....
  ***     THIS ROUTINE PUNCHES OUTPUT DATA FOR EACH OF
  ***     THE FOUR RESIDENTIAL CATEGORIES
  ***....
  ***....
                          I
      ------------------------------------------
      I   IDAT=IFIX(ADAT)                      I
      I   II=-25                               I
      I   III=-102                             I
      ------------------------------------------
                          I
      ------------------------------------------
111111111111111111111111111111*********** DO  500    I=1,4   I
1     ------------------------------------------
1                         I
1     ------------------------------------------
1     I   II=II+200                            I
1     I   III=III+125                          I
1     ------------------------------------------
1                         I
1                         I
1                         I

1                         I
1                         .
1                   .  '     ' .
1                . '     IF      ' .
1             . ' (RESPAR(II+1).LE. ' .
1            ' . 0.0)                 . +----------------------+
1                ' .               . '   F                     I
1                    ' .       . '                             I
1                        ' . '                                 I
1                         I T                                  I
1                         I                                    I
1                     ---------                                I
1                     ( 500    )                               I
1                       ' .  . '                               I
1                          .                                   I
1                                                              I
1                                                              I
1                         +------------------------------------+
1                         I
1     ------------------------------------------
1     I   J=((I-1)/2)+1                        I
1     I   K=I-((I+1)/2)*2+4                    I
1     I   IS=1                                 I
1     ------------------------------------------
1                         I
1                    +++++++++++
1                 .' WRITE      '.
1               .' (IPNCH,1)      '.
1             .'PNCHLB(J),PNCHLB(K)'.
1           .',IDAT,INDX(I),IDAT,IS  '.
1           ++++++++++++++++++++++++++++
1                         I
1     ------------------------------------------
1 2222222222222222222222222222*********** DO  100    L=1,25   I
1 2   ------------------------------------------
1 2                       I
1 2   ------------------------------------------
1 2   I   ILL=II+L                             I
1 2   I   IL=III+L                             I
1 2   I   QSMX=RESIDL(IL+75)-RESIDL(IL)        I
1 2   I   IS=IS+1                              I
1 2   ------------------------------------------
1 2                       I
1 2                       I
1 2                       I
1 2                       I
1 2                       I
1 2                       I
1 2                       I
1 2                       I
1 2                       I
```

SUBROUTINE PUNCH

```
                                    WRITE                                       PCH04100
                                    (IPNCH,3)
                                    PNCHLB(19),RESIDL(I
                                    L),PNCHLB(20),RESIDL(IL
                                    +25),         PNCHLB(21
                                    ),QSMX,INDX(I),IDAT,IS

                              I  IS=IS+1                     I                  PCH04300

                                    WRITE                                       PCH04400
                                    (IPNCH,8)
                                    PNCHLB(22),RESIDL(I
                                    L+100),PNCHLB(23),RESPA
                                    R(ILL),        INDX(I),I
                                    DAT,IS

                                    IF                                          PCH04600
                                    (RESPAR(ILL+1).LE
                                    0.0)                     F
                                    T
                                    ( 200 )                                     PCH04600

1 2222222222222222222222222   100 2222222222222222 CONTINUE                    PCH04700
1                             200                  CONTINUE                    PCH04800

1                                   WRITE                                       PCH04900
1                                   (IPNCH,1)
1                                   PNCHLB(27)
11111111111111111111111111111  500 1111111111111111 CONTINUE                   PCH05000

                        ***....                                              ***PCH05100
                        ***....                                              ***PCH05200
                        ***     THIS ROUTINE PUNCHES OUTPUT DATA FOR         ***PCH05300
                        ***     THE COMMERCIAL/INSTITUTIONAL SECTOR          ***PCH05400
                        ***....                                              ***PCH05500
                        ***....                                              ***PCH05600

                       1000                 CONTINUE                            PCH05700

                                    IF                                          PCH05800
                                    (COMMRL(1).LE.0.0
                                    )                        F
                                    T
                                    ( 2000 )                                    PCH05800

                              I  I=3                         I                  PCH05900

11111111111111111111111111111**********  DO  1600   J=1,3    I                  PCH06000
1
1                             I  II=603+J*50                 I                  PCH06100
1                             I  IS=1                        I                  PCH06200
```

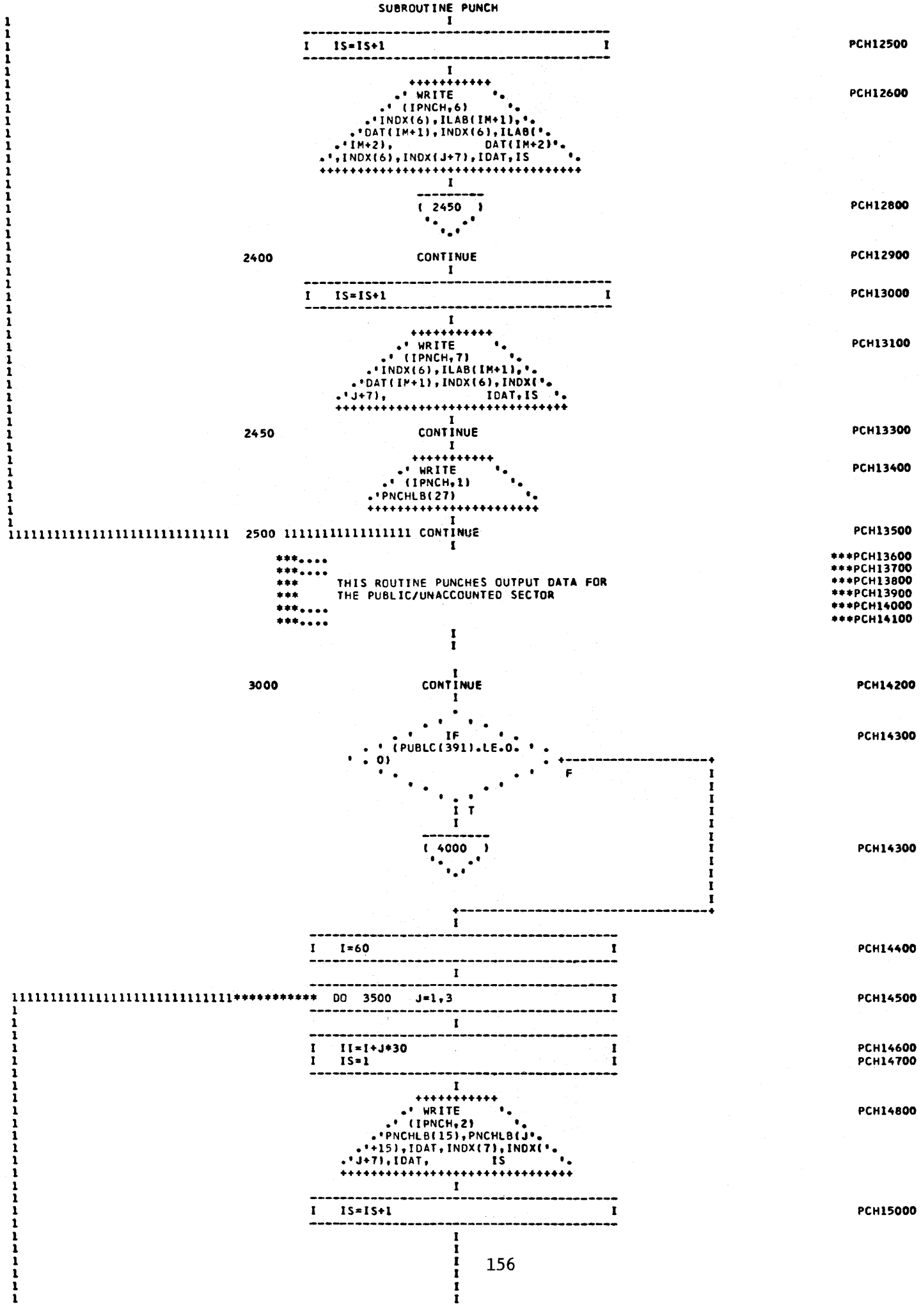

SUBROUTINE PUNCH
WRITE (IPNCH,2) PNCHLB(5),PNCHLB(J+5),IDAT,INDX(5),INDX(J+7),IDAT,IS
M=0
DO 1100 K=1,50
IK=I+K
IIK=II+K
IF (COMMRL(IIK).LE.0.0)
T
F
1100
M=M+1
DAT(M)=COMMRL(IIK)
IF (K.GT.28)
T
F
1050
1100
LAB(M)=COMMRL(IK)
1100
1050 CONTINUE
LAB(M)=CMLB(K-28)
1100 CONTINUE
MM=M-(M/3)*3
PCH06300
PCH06400
PCH06500
PCH06600
PCH06700
PCH06800
PCH06800
PCH06900
PCH07000
PCH07100
PCH07100
PCH07200
PCH07300
PCH07400
PCH07500
PCH07600
PCH07700

SUBROUTINE PUNCH

```
                                       IF                                  PCH07800
                                     (MM-1)
                         I -           I 0           I +
                       (1400 )         I           (1300 )

                    1200               CONTINUE                            PCH07900
                         I   DAT(M+2)=0.                          I        PCH08000
                         I   LAB(M+2)=PNCHLB(28)                  I        PCH08100
                    1300               CONTINUE                            PCH08200
                         I   DAT(M+1)=0.                          I        PCH08300
                         I   LAB(M+1)=PNCHLB(28)                  I        PCH08400
                    1400               CONTINUE                            PCH08500
1 22222222222222222222222222*********** DO  1500   L=1,M,3        I        PCH08600
1 2                      I   IS=IS+1                              I        PCH08700
1 2                             WRITE                                      PCH08800
1 2                            (IPNCH,4)
1 2                          LAB(L),DAT(L),LAB(L
1 2                         +1),DAT(L+1),LAB(L+2),D
1 2                         AT(L+2),         INDX(5),I
1 2                        NDX(J+7),IDAT,IS
1 2
1 22222222222222222222222222  1500 2222222222222222 CONTINUE               PCH09000
1                               WRITE                                      PCH09100
1                              (IPNCH,1)
1                             PNCHLB(27)
11111111111111111111111111111  1600 1111111111111111 CONTINUE              PCH09200
                      ***....                                           ***PCH09300
                      ***....                                           ***PCH09400
                      ***      THIS ROUTINE PUNCHES OUTPUT DATA FOR     ***PCH09500
                      ***      THE INDUSTRIAL SECTOR                    ***PCH09600
                      ***....                                           ***PCH09700
                      ***....                                           ***PCH09800
                    2000               CONTINUE                            PCH09900
                                       IF                                  PCH10000
                               (INDUST(1).LE.0.0
                               )                    F
                                       I T
                                     ( 3000 )                              PCH10000

                         I   I=1403                               I        PCH10100
1111111111111111111111111111*********** DO  2500   J=1,3          I        PCH10200
1
1
```

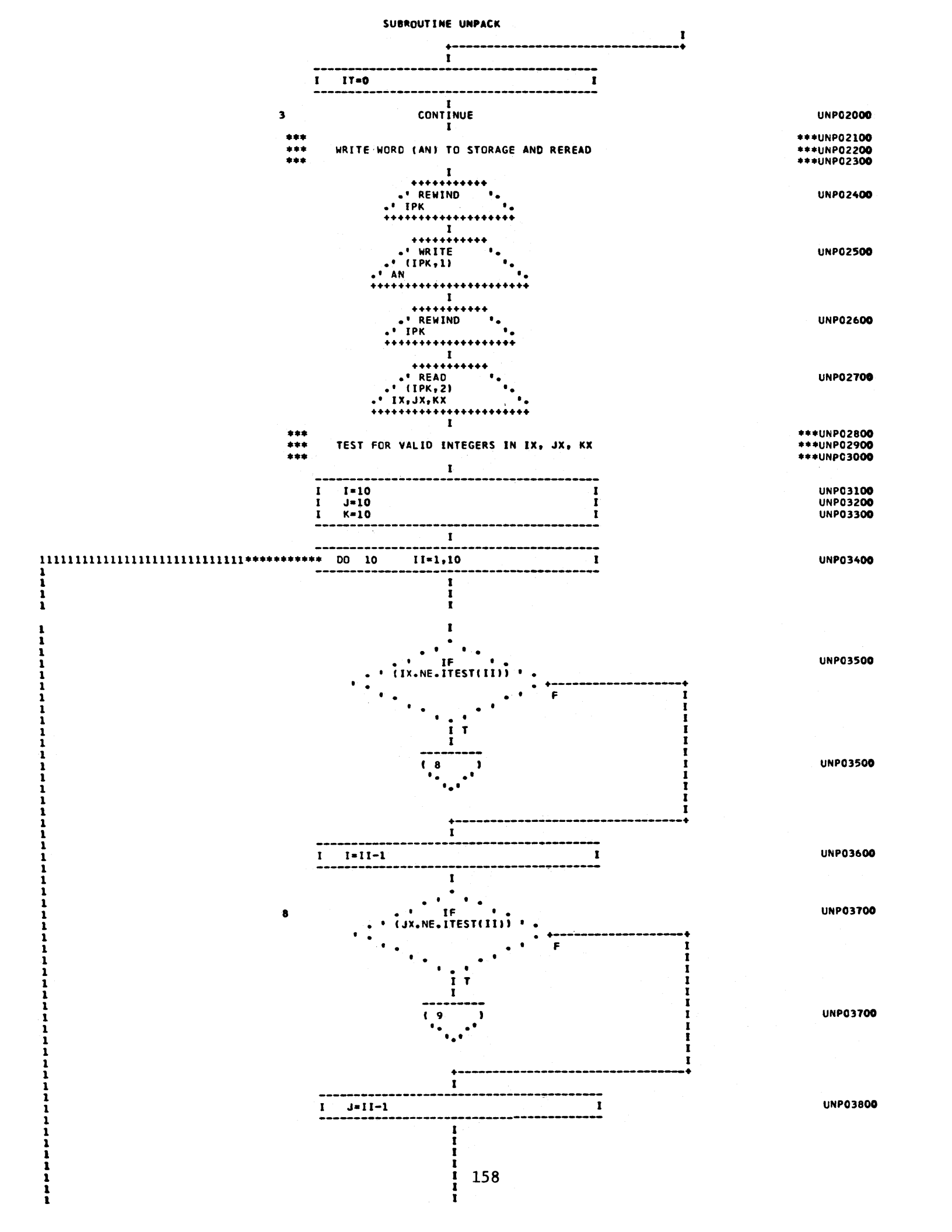
SUBROUTINE PUNCH

```
                                       SUBROUTINE PUNCH
1                                             I
1                           ------------------------------------------
1                           I   II=I+J*200                           I                       PCH10300
1                           I   IS=1                                 I                       PCH10400
1                           I   JJ=2*J                               I                       PCH10500
1                           ------------------------------------------
1                                             I
1                                        +++++++++++
1                                      .' WRITE      '.                                     PCH10600
1                                    .'  (IPNCH,2)      '.
1                                  .'PNCHLB(JJ+7),PNCHLB'.
1                                .'(JJ+8),IDAT,INDX(6),IND'.
1                              .'X(J+7),           IDAT,IS   '.
1                              +++++++++++++++++++++++++++++++
1                                             I
1                           ------------------------------------------
1                           I   M=0                                  I                       PCH10800
1                           ------------------------------------------
1                                             I
1                           ------------------------------------------
1 222222222222222222222222222*********** DO  2100    K=1,200        I                       PCH10900
1 2                         ------------------------------------------
1 2                                           I
1 2                         ------------------------------------------
1 2                         I   IIK=II+K                             I                       PCH11000
1 2                         ------------------------------------------
1 2                                           I
1 2                                       .  '  .
1 2                                   .'      IF      '.                                    PCH11100
1 2                             .  ' (INDUST(IIK).LE.0 '  .
1 2                           '  .  .)                     .  +----------------------+
1 2                               '.                   . '   F                       I
1 2                                   '.           .'                                I
1 2                                        '  .  '                                   I
1 2                                          I T                                     I
1 2                                          I                                       I
1 2                                      ---------                                   I
1 2                                      ( 2100  )                                   I       PCH11100
1 2                                        '. .'                                     I
1 2                                         '.'                                      I
1 2                                                                                  I
1 2                                          +---------------------------------------+
1 2                                          I
1 2                         ------------------------------------------
1 2                         I   M=M+1                                I                       PCH11200
1 2                         I   DAT(M)=INDUST(IIK)                   I                       PCH11300
1 2                         ------------------------------------------
1 2                                          I
1 2                                          I

1 2                                          I
1 2                         ------------------------------------------
1 2                         I   ILAB(M)=K+199                        I                       PCH11400
1 2                         ------------------------------------------
1 2                                          I
1 222222222222222222222222222  2100 2222222222222222 CONTINUE                                 PCH11500
1                                            I
1                           ------------------------------------------
1                           I   IM=(M/3)*3                           I                       PCH11600
1                           I   MM=M-IM                              I                       PCH11700
1                           ------------------------------------------
1                                            I
1                           ------------------------------------------
1 222222222222222222222222222*********** DO  2200    L=1,IM,3       I                       PCH11800
1 2                         ------------------------------------------
1 2                                          I
1 2                         ------------------------------------------
1 2                         I   IS=IS+1                              I                       PCH11900
1 2                         ------------------------------------------
1 2                                          I
1 2                                      +++++++++++
1 2                                    .' WRITE      '.                                     PCH12000
1 2                                  .'  (IPNCH,5)      '.
1 2                                .'INDX(6),ILAB(L),DAT'.
1 2                              .'(L),INDX(6),ILAB(L+1),D'.
1 2                            .'AT(L+1),           INDX(6),I'.
1 2                          .'LAB(L+2),DAT(L+2),INDX(6),INDX('.
1 2                        .'J+7),IDAT,IS                         '.
1 2                        +++++++++++++++++++++++++++++++++++++++++
1 2                                          I
1 222222222222222222222222222  2200 2222222222222222 CONTINUE                                 PCH12200
1                                            I
1                                         .  '  .
1                                     .'      IF      '.                                    PCH12300
1                                 .  ' (MM-1)            '  .
1                            +-'  .                          .  '-+
1                            I       '.                  .'       I
1                            I            '.        .'            I
1                            I                '  .  '             I
1                            I -                I 0               I +
1                          ---+---           ---+---              I
1                          (2450 )           (2400 )              I
1                           '. .'             '. .'               I
1                             '                 '                 I
1                                                                 I
1                                               +-----------------+
1                                               I
1                      2300                 CONTINUE                                           PCH12400
1                                               I
1                                               I
```



PCH12500 PCH12600 PCH12800 PCH12900 PCH13000 PCH13100 PCH13300 PCH13400 PCH13500 ***PCH13600 ***PCH13700 ***PCH13800 ***PCH13900 ***PCH14000 ***PCH14100 PCH14200 PCH14300 PCH14300 PCH14400 PCH14500 PCH14600 PCH14700 PCH14800 PCH15000

```
                                      SUBROUTINE PUNCH
1                                           I
1                                       +++++++++++
1                                     .' WRITE     '.                                                    PCH15100
1                                    .' (IPNCH,4)    '.
1                                   .'PNCHLB(24),PUBLC(II'.
1                                  .'+1),PNCHLB(25),PUBLC(II'.
1                                .'+2),             PNCHLB(26'.
1                               .'),PUBLC(II+3),INDX(7),INDX(J+7)'.
1                              .',IDAT,IS                        '.
1                              +++++++++++++++++++++++++++++++++++
1                                           I
1                                       +++++++++++
1                                     .' WRITE     '.                                                    PCH15300
1                                    .' (IPNCH,1)    '.
1                                   .'PNCHLB(27)       '.
1                                   +++++++++++++++++++++
1                                           I
1111111111111111111111111111111  3500 1111111111111111 CONTINUE                                         PCH15400
                                            I
                                 4000        CONTINUE                                                   PCH15500
                                            I
                                    .-----------------.
                                    I RETURN          '.                                                PCH15600
                                    I                   '.
                                    I                   .'
                                    -------------------'

                                      1    FORMAT(1X,2A4,1X,I4,58X,A2,I4,I2)                      **     PCH15700

                                      2    FORMAT(1X,2A4,1X,I4,58X,2A1,I4,I2)                     **     PCH15800

                                      3    FORMAT(3(1X,A4,1X,F12.0,4X),6X,A2,I4,I2)               **     PCH15900

                                      4    FORMAT(3(1X,A4,1X,F12.0,4X),6X,2A1,I4,I2)              **     PCH16000

                                      5    FORMAT(3(1X,A1,I3 ,1X,F12.0,4X),6X,2A1,I4,I2)          **     PCH16100

                                      6    FORMAT(2(1X,A1,I3,1X,F12.0,4X),28X,2A1,I4,I2)          **     PCH16200

                                      7    FORMAT(1X,A1,I3,1X,F12.0,54X,2A1,I4,I2)                **     PCH16300

                                      8    FORMAT(2(1X,A4,1X,F12.0,4X),28X,A2,I4,I2)              **     PCH16400

***END*******END*******END*******END*******END*******END*******END*******END*******END*******END***    PCH16500
                                      SUBROUTINE UNPACK

                                      ************************
                                      **                    **
                                      ** SUBROUTINE UNPACK   **                                          UNP00100
                                      ** (IT,AN,I,J,K)       **
                                      **                    **
                                      ************************
                                                I
                                  ***                                                                   ***UNP00200
                                  ***....UNPACK RIGHT-MOST THREE DIGITS FROM WORD (NN)                  ***UNP00300
                                  ***  THESE DIGITS WILL BE CONVERTED TO INTEGER VARIABLES              ***UNP00400
                                  ***  I, J, K, RESPECTIVELY.   THIS ROUTINE HAS BEEN                  ***UNP00500
                                  ***  REWRITTEN TO BE MACHINE INDEPENDENT AND REQUIRES THE            ***UNP00600
                                  ***  ASSIGNMENT OF AN ADDITIONAL AUXILIARY STORAGE DEVICE            ***UNP00700
                                  ***  (MACH) IN THE INPUT DECK.  IF THIS ASSIGNMENT IS NOT            ***UNP00800
                                  ***  MADE, THE UNIT ASSIGNMENT IS TAKEN AS DEVICE 3.                 ***UNP00900
                                  ***  THIS DEVICE IS REFERED TO AS (IPK) IN THIS SUBROUTINE.          ***UNP01000
                                      INTEGER ITEST(10)                                                   UNP01200
                                      COMMON/COMPRN/IPK,IUNPDM(5)                                         UNP01100
                                      DATA ITEST/1H0,1H1,1H2,1H3,1H4,1H5,1H6,1H7,1H8,1H9/                 UNP01300
                                                I
                                  ***                                                                   ***UNP01400
                                  ***    CHANGE (IPK) ASSIGNMENT TO VALUE INPUT, IF ANY                 ***UNP01500
                                  ***                                                                   ***UNP01600
                                  ***                                                                   ***
                                  ***                                                                   ***
                                  ***.....IF THE MACHINE THAT IS USED HAS A FASTER METHOD OF UNPACKING THESE***
                                  ***.....NUMBER, USING MACHINE INDEPENDENT FUNCTION, THEN THIS SUBROUTINE  ***
                                  ***.....SHOULD BE REWRITTEN TO SPEED UP CALCULATION, MACH SHOULD NOT BE   ***
                                  ***.....ASSIGN TO A DUMMY STORAGE DEVICE, SINCE THEN IT WILL BE UNNECESARY***
                                  ***...                                                                ***
                                  ***                                                                   ***
                                                I
                                                .
                                              .   .
                                            .       .
                                          .     IF    .                                                 UNP01700
                                        .   (IT.EQ.0)     .
                                      .                     .  +-------------------+
                                        .                 .      F                 I
                                          .             .                        I
                                            .         .                          I
                                              .     .                            I
                                                I T                              I
                                                I                                I
                                              ---------                          I
                                              ( 3     )                          I                      UNP01700
                                                '.  .'                           I
                                                  '.'                            I
                                                                                 I
                                                                                 I
                                                                                 I
                                                                                 I
                                                                                 I
```


SUBROUTINE UNPACK
IT=0
3 CONTINUE
*** WRITE WORD (AN) TO STORAGE AND REREAD
REWIND IPK
WRITE (IPK,1) AN
REWIND IPK
READ (IPK,2) IX,JX,KX
*** TEST FOR VALID INTEGERS IN IX, JX, KX
I=10
J=10
K=10
DO 10 II=1,10
IF (IX.NE.ITEST(II))
F
T
(8)
I=II-1
8
IF (JX.NE.ITEST(II))
F
T
(9)
J=II-1

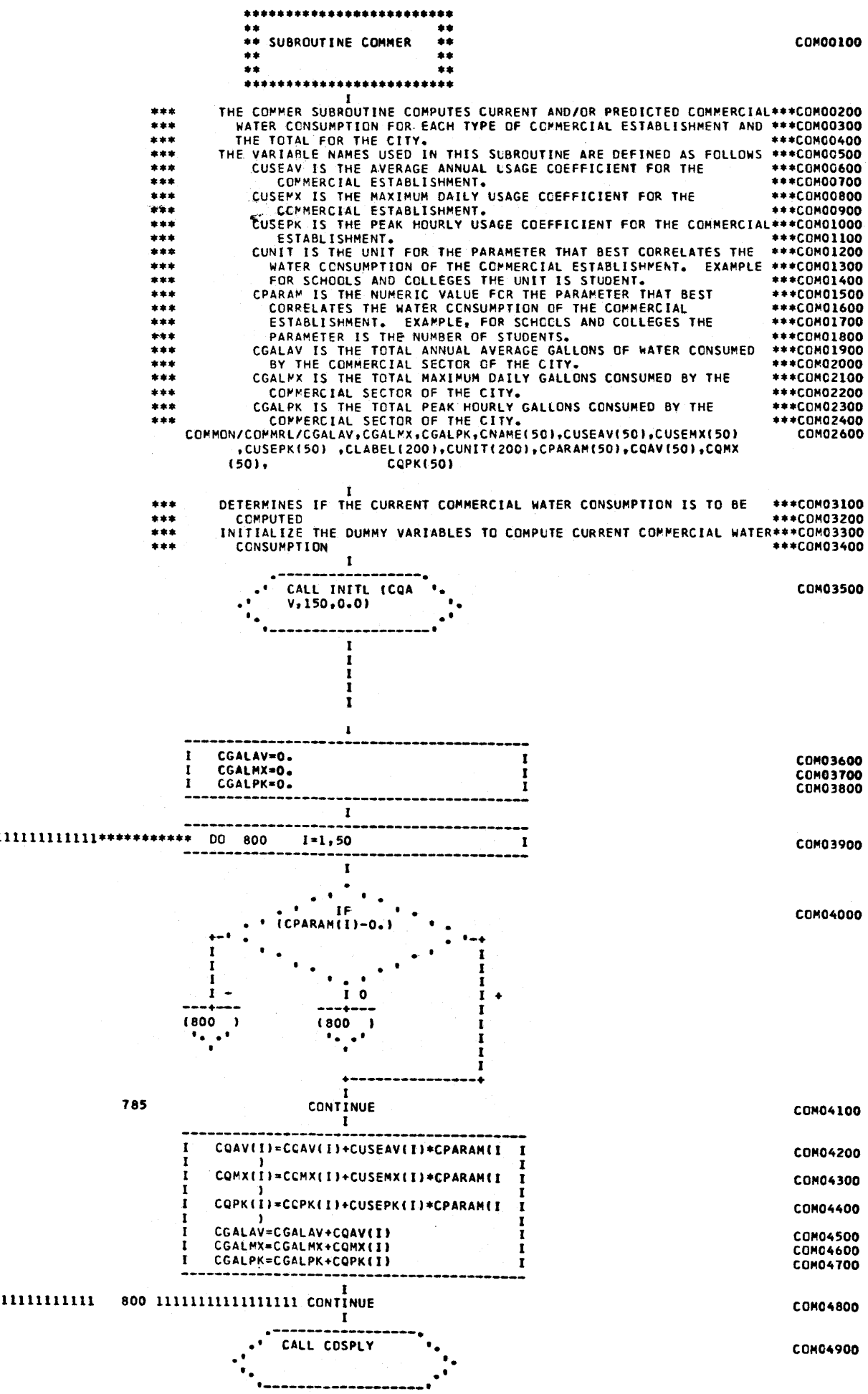
```
                                              SUBROUTINE UNPACK
1                                                    I
1                                                    .
1                                                .  '  '  .
1                              9             .  '    IF     '  .                                      UNP03900
1                                        . ' (KX.NE.ITEST(II))  ' .
1                                      .                           .  +-------------------+
1                                        .  .                  .  .    F                 I
1                                             .  .         .  .                          I
1                                                   .  .  .                              I
1                                                    I T                                 I
1                                                    I                                   I
1                                                ---------                               I
1                                                ( 10     )                              I        UNP03900
1                                                 ' .   . '                              I
1                                                    '.'                                 I
1                                                                                        I
1                                                                                        I
1                                                    +-----------------------------------+
1                                                    I
1                                  ----------------------------------------
1                                  I   K=II-1                             I                           UNP04000
1                                  ----------------------------------------
1                                                    I
11111111111111111111111111111    10 111111111111111 CONTINUE                                         UNP04100
                                                     I
                              ***                                                                 ***UNP04200
                              ***     TEST FOR ERRORS IN INTEGERS                                 ***UNP04300
                              ***                                                                 ***UNP04400
                                                     I
                                   ----------------------------------------
                                   I  IF(I.GT.9.OR.J.GT.9.OR.K.GT.9)IT=1  I                          UNP04500
                                   ----------------------------------------
                                                     I
                                           .-----------------.
                                           I RETURN            '.                                     UNP04600
                                           I                     '.
                                           I                    .'
                                           -------------------'

                              1    FORMAT (1X,A4)                                              **     UNP04700

                              2    FORMAT (2X,3A1)                                             **     UNP04800
***END*******END*******END*******END*******END*******END*******END*******END*******END*******END*******END***   UNP04900
                                         SUBROUTINE RESDNT

                                      ************************
                                      **                    **
                                      ** SUBROUTINE RESDNT  **                                       RES00100
                                      **                    **
                                      **                    **
                                      ************************
                                                 I
                             ***     SUBROUTINE TO COMPUTE RESIDENTIAL WATER USAGE                ***RES00200
                             ***     VARIOUS NAMES AND ARRAYS ARE DEFINED AS FOLLOWS              ***RES00300
                             ***         RESCCN= ARRAY CONTAINING RESIDENTIAL CONSTANTS           ***RES00400
                                 REAL MSPVLL,MSPVLU,MSPASM,MSPAPR,MSPSPR,MSPDEN,MSPPEP,MSPNUM          RES00900
                                 REAL MSWVLL,MSWVLU,MSWASM,MSWAPR,MSWSPR,MSWDEN,MSWPEP,MSWNUM          RES01000
                                 COMMON/CITDAT/CITDAT(22),RESCIT(3)                                    RES00500
                                 COMMON /RESCON/ EQ1(6),EQ2(6),EQ3(6),EQ4(6),EQ5(6),EQ6(6),EQ7(6),     RES00600
                                        EQ8(6),EQ9(6),EQ10(6),EQ11(6),EQ12(6),EQ13(6),EQ14(6),EQ15(
                                     6),   EQ16(6)

                                 COMMON /RESPAR/ FSPVLL(25),FSPVLU(25),FSPASM(25),FSPAPR(25),          RES01100
                                      FSPSPR(25),FSPDEN(25),FSPPEP(25),FSPNUM(25),FSWVLL(25),FSWVLU
                                      (25),FSWASM(25),FSWAPR(25),FSWSPR(25),FSWDEN(25),FSWPEP(25),F
                                      SWNUM(25),MSPVLL(25),MSPVLU(25),MSPASM(25),MSPAPR(25),MSPSPR(
                                      25),MSPDEN(25),MSPPEP(25),MSPNUM(25),MSWVLL(25),MSWVLU(25),MS
                                      WASM(25),MSWAPR(25),MSWSPR(25),MSWDEN(25),MSWPEP(25),MSWNUM(2
                                      5),RESRSP(12)
```

```
                              SUBROUTINE RESDNT
                              QMWTOT(25),QMWMAX(25),QMWPEK(25),RESRSD(3)                  RES02300
                              EQUIVALENCE (WEST,ELONG),(CLONG,CITDAT(3))                  RES02400

                               .'-----------------'.
                              .'  CALL INITL (RQA   '.                                    RES02500
                             .    VE,519,0.0)        .
                              '.                   .'
                                '-----------------'
                                        I
                              ------------------------------------
                              I   ELONG=100.                     I
                              ------------------------------------
                                        I
                       ***     COMPUTES CURRENT METERED AND SEWERED VALUES             ***RES02700
                                        I
                              ------------------------------------
111111111111111111111111111111********** DO  500    I=1,25       I                    RES02800
1                             ------------------------------------
1                                       I
1                                     IF                                              RES02900
1                               (MSWNUM(I).LE.0.)  ----------------------+
1                                                 F                      I
1                                       I T                              I
1                                       I                                I
1                                    ( 300   )                           I            RES02900
1                                                                        I
1                                       +--------------------------------+
1                                       I
1                             ------------------------------------
1                             I   VALU=(MSWVLU(I)+MSWVLL(I))/(2000.0  I              RES03000
1                             I        *MSWASM(I))                    I
1                             I   QMWDOM(I)=(EQ1(1)+EQ1(2)*VALU+EQ1(  I              RES03100
1                             I        3)*MSWAPR(I))*MSWNUM(I)        I
1                             ------------------------------------
1                                       I

1                                       I
1                                     IF                                              RES03200
1                               (CLONG.GE.WEST)  -----------------------+
1                                                 F                      I
1                                       I T                              I
1                                       I                                I
1                                    ( 100   )                           I            RES03200
1                                                                        I
1                                       +--------------------------------+
1                                       I
1                             ------------------------------------
1                             I   B=EQ10(1)*MSWDEN(I)**EQ10(2)          I            RES03300
1                             I   QMWSPK(I)=(EQ6(1)*EQ6(2)*(B**EQ6(3    I            RES03400
1                             I        ))*(EVAPNT**EQ6(4))*(MSWSPR(I    I
1                             I        )**EQ6(5))*(VALU**EQ6(6)))*MS    I
1                             I        WNUM(I)                          I
1                             I   QMWMAX(I)=(EQ12(1)*(B**EQ12(2))*(E    I            RES03600
1                             I        VAPMX**EQ12(3))*(MSWSPR(I)**E    I
1                             I        Q12(4))*(VALU**EQ12(5)))*MSWN    I
1                             I        UM(I)                            I
1                             ------------------------------------
1                                       I
1                                    ( 200   )                                        RES03800
1
1                             ------------------------------------
1                      100    I   QMWSPK(I)=(EQ5(1)*EQ5(2)*(MSWSPR(I    I            RES03900
1                             I        )**EQ5(3))*(VALU**EQ5(4)))*MS    I
1                             I        WNUM(I)                          I
1                             I   QMWMAX(I)=(EQ11(1)*(EVAPMX**EQ11(2    I            RES04100
1                             I        ))*(VALU**EQ11(3)))*MSWNUM(I)    I
1                             ------------------------------------
1                                       I
1                             ------------------------------------
1                      200    I   QMWTOT(I)=QMWDOM(I)+QMWSPK(I)         I            RES04200
1                             I   QMWMAX(I)=QMWMAX(I)+QMWDOM(I)         I            RES04300
1                             ------------------------------------
1                                       I
1                                       I
```

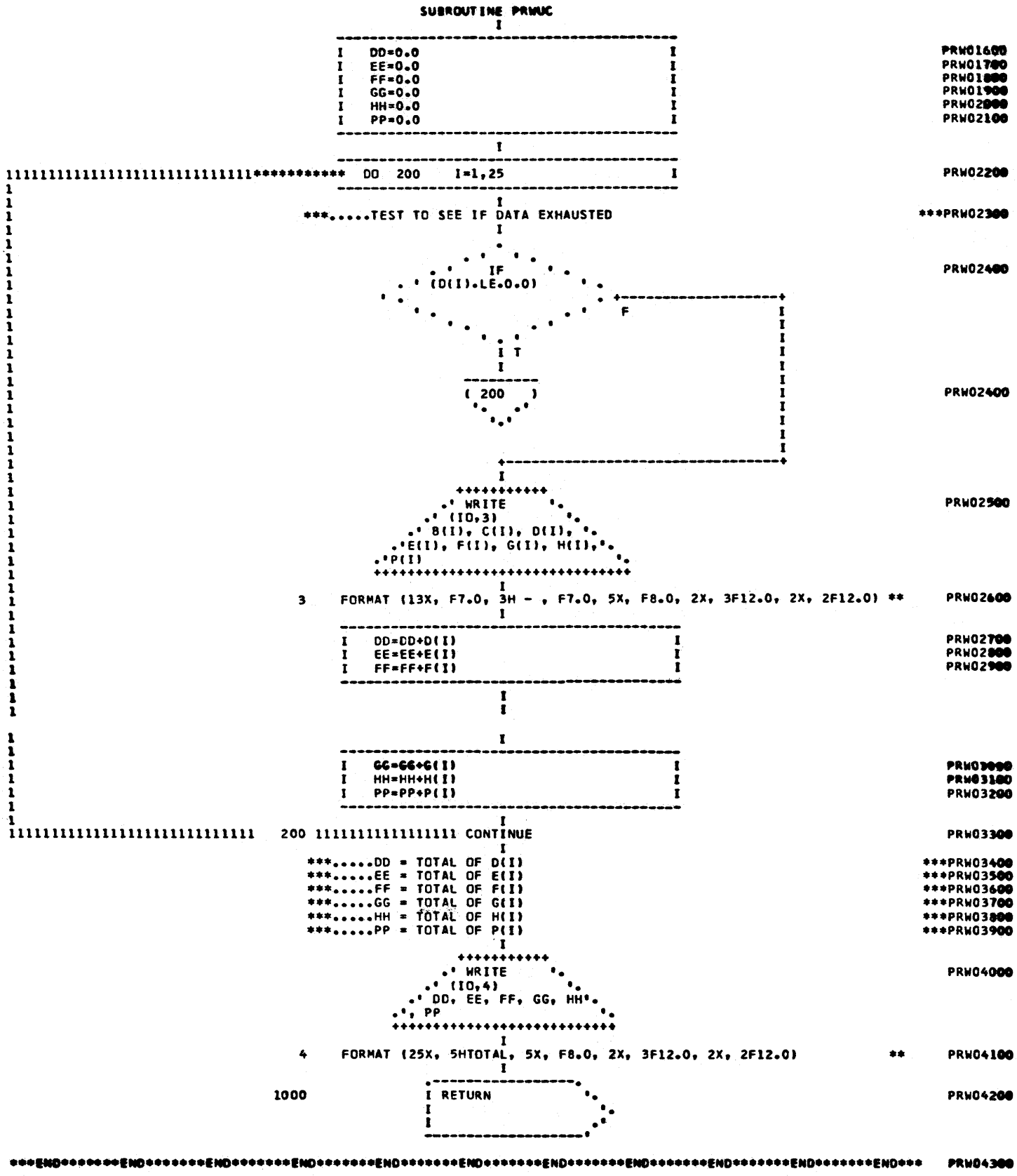
SUBROUTINE RESDNT

```
                                    I
          ---------------------------------------------
          I   QMWPEK(I)=EQ16(1)*MSWNUM(I)+EQ16(2   I          RES04400
          I        )*QMWMAX(I)                     I
          I   RMWNUM=RMWNUM+MSWNUM(I)              I          RES04500
          I   RQMWDM=RQMWDM+QMWDOM(I)              I          RES04600
          I   RQMWSP=RQMWSP+QMWSPK(I)              I          RES04700
          I   RQMWTL=RQMWTL+QMWTOT(I)              I          RES04800
          ---------------------------------------------
                                    I
   300                          CONTINUE                      RES04900
                                    I
 ***    COMPUTES CURRENT FLAT RATE AND SEWERED VALUES      ***RES05000
                                    I
                                    .
                               IF                             RES05100
                      (FSWNUM(I).LE.0.)       +----------------+
                                              F                I
                                    I T                        I
                                    I                          I
                                ---------                      I
                                ( 400   )                      I  RES05100
                                                               I
                                    +--------------------------+
                                    I
          ---------------------------------------------
          I   VALU=(FSWVLU(I)+FSWVLL(I))/(2000.0   I          RES05200
          I        *FSWASM(I))                     I
          I   QFWDOM(I)=(EQ2(1)+EQ2(2)*VALU+EQ2(   I          RES05300
          I        3)*FSWPEP(I))*FSWNUM(I)         I
          I   QFWSPK(I)=(EQ7(1)*EQ7(2)*(VALU**EQ   I          RES05400
          I        7(3)))*FSWNUM(I)                I
          I   B=EQ10(1)*(FSWDEN(I)**EQ10(2))       I          RES05500
          I   QFWMAX(I)=(EQ13(1)*(B**EQ13(2))*(V   I          RES05600
          I        ALU**EQ13(3)))*FSWNUM(I)        I
          I   QFWTOT(I)=QFWSPK(I)+QFWDOM(I)        I          RES05700
          I   QFWMAX(I)=QFWMAX(I)+QFWDOM(I)        I          RES05800
          I   QFWPEK(I)=EQ16(1)*FSWNUM(I)+EQ16(2   I          RES05900
          I        )*QFWMAX(I)                     I
          I   RFWNUM=RFWNUM+FSWNUM(I)              I          RES06000
          I   RQFWDM=RQFWDM+QFWDOM(I)              I          RES06100
          ---------------------------------------------
                                    I
                                    I

                                    I
          ---------------------------------------------
          I   RQFWSP=RQFWSP+QFWSPK(I)              I          RES06200
          I   RQFWTL=RQFWTL+QFWTOT(I)              I          RES06300
          ---------------------------------------------
                                    I
   400                          CONTINUE                      RES06400
                                    I
 ***    COMPUTES CURRENT METERED AND SEPTIC TANK VALUES    ***RES06500
                                    I
                                    .
                               IF                             RES06600
                      (MSPNUM(I).LE.0.)       +----------------+
                                              F                I
                                    I T                        I
                                    I                          I
                                ---------                      I
                                ( 450   )                      I  RES06600
                                                               I
                                    +--------------------------+
                                    I
          ---------------------------------------------
          I   VALU=(MSPVLU(I)+MSPVLL(I))/(2000.0   I          RES06700
          I        *MSPASM(I))                     I
          I   QMPDOM(I)=(EQ3(1)+EQ3(2)*MSPPEP(I)   I          RES06800
          I        )*MSPNUM(I)                     I
          I   B=EQ10(1)*(MSPDEN(I)**EQ10(2))       I          RES06900
          I   QMPSPK(I)=(EQ8(1)*EQ8(2)*(B**EQ8(3   I          RES07000
          I        ))*(EVAPNT**EQ8(4))*(MSPSPR(I   I
          I        )**EQ8(5))*(VALU**EQ8(6)))*MS   I
          I        PNUM(I)                         I
          I   QMPMAX(I)=(EQ14(1)*(B**EQ14(2))*(E   I          RES07200
          I        VAPMX**EQ14(3))*(MSPSPR(I)**E   I
          I        Q14(4))*(VALU**EQ14(5)))*MSPN   I
          I        UM(I)                           I
          I   QMPTOT(I)=QMPSPK(I)+QMPDOM(I)        I          RES07400
          I   QMPMAX(I)=QMPMAX(I)+QMPDOM(I)        I          RES07500
          I   QMPPEK(I)=EQ16(1)*MSPNUM(I)+EQ16(2   I          RES07600
          I        )*QMPMAX(I)                     I
          I   RMPNUM=RMPNUM+MSPNUM(I)              I          RES07700
          I   RQMPDM=RQMPDM+QMPDOM(I)              I          RES07800
          ---------------------------------------------
                                    I
                                    I
```

```
                                   SUBROUTINE RESDNT
                                          I
                        -----------------------------------------
                        I   RQMPSP=RQMPSP+QMPSPK(I)             I          RES07900
                        I   RQMPTL=RQMPTL+QMPTOT(I)             I          RES08000
                        -----------------------------------------
                                          I
                450                   CONTINUE                             RES08100
                                          I
                  ***     COMPUTES CURRENT FLAT RATE AND SEPTIC TANK VALUES     ***RES08200
                                          I
                                         IF                                RES08300
                                 (FSPNUM(I).LE.0.)  ----------------+
                                                     F              I
                                          I T                       I
                                          I                         I
                                      ( 475   )                     I      RES08300
                                                                    I
                                          +-------------------------+
                                          I
                        -----------------------------------------
                        I   VALU=(FSPVLU(I)+FSPVLL(I))/(2000.0  I          RES08400
                        I        *FSPASM(I))
                        I   QFPDOM(I)=(EQ4(1)+EQ4(2)*FSPPEP(I)  I          RES08500
                        I        )*FSPNUM(I)                    I
                        I   B=EQ10(1)*FSPDEN(I)**EQ10(2)        I          RES08600
                        I   QFPSPK(I)=(EQ9(1)*EQ9(2)*(VALU**EQ  I          RES08700
                        I        9(3)))*FSPNUM(I)               I
                        I   QFPMAX(I)=(EQ15(1)*(B**EQ15(2))*(V  I          RES08800
                        I        ALU**EQ15(3)))*FSPNUM(I)       I
                        I   QFPTOT(I)=QFPSPK(I)+QFPDOM(I)       I          RES08900
                        I   QFPMAX(I)=QFPMAX(I)+QFPDOM(I)       I          RES09000
                        I   QFPPEK(I)=EQ16(1)*FSPNUM(I)+EQ16(2  I          RES09100
                        I        )*QFPMAX(I)                    I
                        I   RFPNUM=RFPNUM+FSPNUM(I)             I          RES09200
                        I   RQFPDM=RQFPDM+QFPDOM(I)             I          RES09300
                        I   RQFPSP=RQFPSP+QFPSPK(I)             I          RES09400
                        I   RQFPTL=RQFPTL+QFPTOT(I)             I          RES09500
                        -----------------------------------------
                                          I
                475                   CONTINUE                             RES09600
                                          I
                                          I

                                          I
                        -----------------------------------------
                        I   RQMAX=RQMAX+QMPMAX(I)+QFPMAX(I)+QM  I          RES09700
                        I        WMAX(I)+QFWMAX(I)              I
                        I   RQPEK=RQPEK+QMPPEK(I)+QFPPEK(I)+QM  I          RES09800
                        I        WPEK(I)+QFWPEK(I)              I
                        -----------------------------------------
                                          I
1111111111111111111111111111111   500 1111111111111111 CONTINUE            RES09900
                                          I
                        -----------------------------------------
                        I   RQAVE=RQMPTL+RQFPTL+RQMWTL+RQFWTL   I          RES10000
                        -----------------------------------------
                                          I
                  ***.....                                              ***RES10100
                  ***     WHEN CURRENT AND FUTURE DATES ARE THE SAME DISPLAY CURRENT VALUES.***RES10200
                  ***.....                                              ***RES10300
                                          I
                        -----------------------------------------
                        I   J=1                                 I          RES10400
                        I   IF(CITDAT(1).EQ.CITDAT(11))J=0      I          RES10500
                        -----------------------------------------
                                          I
                              CALL RDSPLY (J)                              RES10600
                                          I
                  ***.....                                              ***RES10700
                                          I
                             I RETURN                                      RES10800

***END*******END*******END*******END*******END*******END*******END*******END*******END*******END*******END***    RES10900
```


SUBROUTINE COMMER
COM00100
*** THE COMMER SUBROUTINE COMPUTES CURRENT AND/OR PREDICTED COMMERCIAL ***COM00200
*** WATER CONSUMPTION FOR EACH TYPE OF COMMERCIAL ESTABLISHMENT AND ***COM00300
*** THE TOTAL FOR THE CITY. ***COM00400
*** THE VARIABLE NAMES USED IN THIS SUBROUTINE ARE DEFINED AS FOLLOWS ***COM00500
*** CUSEAV IS THE AVERAGE ANNUAL USAGE COEFFICIENT FOR THE ***COM00600
*** COMMERCIAL ESTABLISHMENT. ***COM00700
*** CUSEMX IS THE MAXIMUM DAILY USAGE COEFFICIENT FOR THE ***COM00800
*** COMMERCIAL ESTABLISHMENT. ***COM00900
*** CUSEPK IS THE PEAK HOURLY USAGE COEFFICIENT FOR THE COMMERCIAL ***COM01000
*** ESTABLISHMENT. ***COM01100
*** CUNIT IS THE UNIT FOR THE PARAMETER THAT BEST CORRELATES THE ***COM01200
*** WATER CONSUMPTION OF THE COMMERCIAL ESTABLISHMENT. EXAMPLE ***COM01300
*** FOR SCHOOLS AND COLLEGES THE UNIT IS STUDENT. ***COM01400
*** CPARAM IS THE NUMERIC VALUE FOR THE PARAMETER THAT BEST ***COM01500
*** CORRELATES THE WATER CONSUMPTION OF THE COMMERCIAL ***COM01600
*** ESTABLISHMENT. EXAMPLE, FOR SCHOOLS AND COLLEGES THE ***COM01700
*** PARAMETER IS THE NUMBER OF STUDENTS. ***COM01800
*** CGALAV IS THE TOTAL ANNUAL AVERAGE GALLONS OF WATER CONSUMED ***COM01900
*** BY THE COMMERCIAL SECTOR OF THE CITY. ***COM02000
*** CGALMX IS THE TOTAL MAXIMUM DAILY GALLONS CONSUMED BY THE ***COM02100
*** COMMERCIAL SECTOR OF THE CITY. ***COM02200
*** CGALPK IS THE TOTAL PEAK HOURLY GALLONS CONSUMED BY THE ***COM02300
*** COMMERCIAL SECTOR OF THE CITY. ***COM02400
COMMON/COMMRL/CGALAV,CGALMX,CGALPK,CNAME(50),CUSEAV(50),CUSEMX(50) COM02600
,CUSEPK(50) ,CLABEL(200),CUNIT(200),CPARAM(50),CQAV(50),CQMX
(50), CQPK(50)
*** DETERMINES IF THE CURRENT COMMERCIAL WATER CONSUMPTION IS TO BE ***COM03100
*** COMPUTED ***COM03200
*** INITIALIZE THE DUMMY VARIABLES TO COMPUTE CURRENT COMMERCIAL WATER***COM03300
*** CONSUMPTION ***COM03400
CALL INITL (CQA V,150,0.0) COM03500
CGALAV=0. COM03600
CGALMX=0. COM03700
CGALPK=0. COM03800
DO 800 I=1,50 COM03900
IF (CPARAM(I)-0.) COM04000
(800)
(800)
785 CONTINUE COM04100
CQAV(I)=CQAV(I)+CUSEAV(I)*CPARAM(I) COM04200
CQMX(I)=CQMX(I)+CUSEMX(I)*CPARAM(I) COM04300
CQPK(I)=CQPK(I)+CUSEPK(I)*CPARAM(I) COM04400
CGALAV=CGALAV+CQAV(I) COM04500
CGALMX=CGALMX+CQMX(I) COM04600
CGALPK=CGALPK+CQPK(I) COM04700
800 CONTINUE COM04800
CALL CDSPLY COM04900

```
                                      SUBROUTINE COMMER
                                            I
                                      .-----------------.
                                      I RETURN          '.                                                    COM05000
                                      I                   '.
                                      I                   .'
                                      -------------------'

***END*******END*******END*******END*******END*******END*******END*******END*******END*******END*******END***   COM05100
                                      SUBROUTINE INITL

                                     *************************
                                     **                     **
                                     ** SUBROUTINE INITL    **                                               INI00100
                                     ** (A,N,V)             **
                                     **                     **
                                     *************************
                                                 I
                                 ***.....                                                                  ***INI00200
                                 ***.....THIS IS A SUBROUTINE TO INITIALIZE VARIABLES TO CERTAIN QUANTITIES***INI00300
                                 ***.....   A IS AN ARRAY NAME                                             ***INI00400
                                 ***.....   N IS THE NUMBER OF VALUES IN THE ARRAY                         ***INI00500
                                 ***.....   V IS THE VALUE TO WHICH THE ARRAY IS TO BE INITIALIZED         ***INI00600
                                     DIMENSION A(1)                                                           INI00700
                                                 I
                                     ----------------------------------------
1111111111111111111111111111111**********  DO  100    I=1,N                 I                               INI00800
1                                    ----------------------------------------
1                                               I
1                                    ----------------------------------------
1                                    I   A(I)=V                             I                               INI00900
1                                    ----------------------------------------
1                                               I
11111111111111111111111111111   100 1111111111111111 CONTINUE                                              INI01000
                                               I
                                      .-----------------.
                                      I RETURN          '.                                                    INI01100
                                      I                   '.
                                      I                   .'
                                      -------------------'

***END*******END*******END*******END*******END*******END*******END*******END*******END*******END*******END***   INI01200
                                      SUBROUTINE PRWUC

                                     *************************
                                     **                     **
                                     ** SUBROUTINE PRWUC    **                                               PRW00100
                                     ** (A,B,C,D,E,F,G,H,P) **
                                     **                     **
                                     **                     **
                                     *************************
                                                 I
                                 ***.....THIS IS A SUBROUTINE TO PRINT AND TOTAL RESIDENTIAL TABLES        ***PRW00200
                                 ***.....A(I) IS THE TITLE OF THE TABLE                                   ***PRW00300
                                 ***.....B(I) = VALUE RANGES                                              ***PRW00400
                                 ***.....C(I) = VALUE RANGES                                              ***PRW00500
                                 ***.....D(I), E(I), F(I), G(I), H(I), P(I) ARE VALUES FOR COLUMNS OF DATA ***PRW00600
                                     DIMENSION A(1), B(1), C(1), D(1), E(1), F(1), G(1), H(1), P(1)           PRW00700
                                     COMMON/IFILE/IN,IO                                                       PRW00800
                                                 I
                                                 .
                                               .   .                                                        PRW00900
                                             .   IF  .
                                           .  (C(1).LE.0.0)    .
                                         .                       .  +-------------------+
                                       .                           .   F                 I
                                         .                   .       I                   I
                                           .               .           I                   I
                                             .           .           I T                 I
                                               .       .             I                   I
                                                 .   .           ---------             I
                                                   .           ( 1000  )               I                    PRW00900
                                                               '.     .'               I
                                                                 '. .'                 I
                                                                                       I
                                                                                       I
                                                                                       I
                                                 +-------------------------------------+
                                                 I
                                               +++++++++++
                                             .' WRITE     '.                                                 PRW01000
                                           .' (IO,1)        '.
                                         .' (A(I),I=1,8)      '.
                                         ++++++++++++++++++++++++
                                                 I
                                 1     FORMAT (1HO, 43X, 8A4)                                      **         PRW01100
                                                 I
                                               +++++++++++
                                             .' WRITE     '.                                                 PRW01200
                                           .' (IO,2)        '.
                                         .'                   '.
                                         ++++++++++++++++++++++++
                                                 I
                                 2     FORMAT (1HO, 57X, 14HANNUAL AVERAGE/36X, 6HNO. OF, 49X, 3HMAX, 8X,**     PRW01300
                                        **4HPEAK/14X, 15HVALUE RANGE ($), 8X, 5HUNITS, 6X, 8HDOMESTIC, 2X, 1**
                                        **0HSPRINKLING, 7X, 5HTOTAL, 11X, 3HDAY, 8X, 4HHOUR/)                **
                                                 I
```


SUBROUTINE PRWUC
DD=0.0
EE=0.0
FF=0.0
GG=0.0
HH=0.0
PP=0.0
DO 200 I=1,25
***.....TEST TO SEE IF DATA EXHAUSTED
IF (D(I).LE.0.0)
T
F
200
WRITE (IO,3) B(I), C(I), D(I), E(I), F(I), G(I), H(I), P(I)
3 FORMAT (13X, F7.0, 3H - , F7.0, 5X, F8.0, 2X, 3F12.0, 2X, 2F12.0) **
DD=DD+D(I)
EE=EE+E(I)
FF=FF+F(I)
GG=GG+G(I)
HH=HH+H(I)
PP=PP+P(I)
200 CONTINUE
***.....DD = TOTAL OF D(I)
***.....EE = TOTAL OF E(I)
***.....FF = TOTAL OF F(I)
***.....GG = TOTAL OF G(I)
***.....HH = TOTAL OF H(I)
***.....PP = TOTAL OF P(I)
WRITE (IO,4) DD, EE, FF, GG, HH, PP
4 FORMAT (25X, 5HTOTAL, 5X, F8.0, 2X, 3F12.0, 2X, 2F12.0) **
1000 RETURN

SUBROUTINE PUBLIC

```
                              *************************
                              **                     **
                              ** SUBROUTINE PUBLIC   **                          PUB00100
                              **                     **
                              **                     **
                              *************************
                                          I
          ***     SUBROUTINE TO COMPUTE WATER USAGE FOR ALL PUBLIC AND UNACCOUNTED  ***PUB00200
          ***         ESTABLISHMENTS                                                ***PUB00300
             COMMON/PUBLC/PUBNAM(30),PPARAM(30),PUGROW(30),QPUBAA(30),              PUB00400
                         QPUBMD(30),QPUBPH(30),PCOFAA(30),PCOFMD(30),
                            PCOFPH(30),PLABEL(120),TOTPAA,TOTPMD,TOTPPH
                                TTPAAF,TTPMDF,TTPPHF,PUTEMP(150)

             COMMON/CITDAT/CDATE,ALAT,ALONG,PO,PD,AGE,TEMPLT,EMPL4,                 PUB00800
                    CNCOME,CSERVE,FDAT,POPRO,PNCOME,ACRESP,
                       HDGROP,PSERVE,CIT(6),PUBCIT(3)

             COMMON/IFILE/IN,IO                                                     PUB01100
             EQUIVALENCE (POPRO,POPU)                                               PUB01200
                                          I
             ---------------------------------------
             I   PPARAM(1)=POPU                    I                                PUB01300
             I   PPARAM(2)=POPU                    I                                PUB01400
             ---------------------------------------
                                          I
          ***     INITIALIZE THE DUMMY VARIABLES A, B, C                            ***PUB01500
                                          I
             ---------------------------------------
             I   A=0.                              I                                PUB01600
             I   B=0.                              I                                PUB01700
             I   C=0.                              I                                PUB01800
             I   IFDAT=IFIX(FDAT)                  I                                PUB01900
             ---------------------------------------
                                          I
             ---------------------------------------
1111111111111111111111111111111*********** DO  7920   I=1,30         I               PUB02000
1            ---------------------------------------
1                                         I
1         ***     DETERMINES IF THE ANNUAL USAGE OF THE PUBLIC-UNACCOUNTED TYPES ARE***PUB02100
1         ***         TO BE CALCULATED                                              ***PUB02200
1                                         I

1                                         I
1                                        IF                                         PUB02300
1                                  (QPUBAA(I)-0.0)
1                  +-'                                         '-+
1                  I                                             I
1                  I -                    I 0                    I +
1                  I                      I                   ---+---
1                  I                      I                   (7915 )
1                  +----------------------I
1                                         I
1        7900                          CONTINUE                                     PUB02400
1                                         I
1         ***     DETERMINES IF A VALUE GREATER THAN ZERO HAS BEEN PROCESSED FOR THE***PUB02500
1         ***         USAGE COEFFICIENT--IF SO, CALCULATES THE ANNUAL USAGE         ***PUB02600
1                                         I
1                                        IF                                         PUB02700
1                                  (PCOFAA(I)-0.)
1                  +-'                                         '-+
1                  I                                             I
1                  I -                    I 0                    I +
1               ---+---                ---+---                   I
1               (7920 )                (7920 )                   I
1                                         +----------------------+
1                                         I
1        7910                          CONTINUE                                     PUB02800
1                                         I
1         ***     CALCULATES ANNUAL AVERAGE USAGE FOR EACH PUBLIC-UNACCOUNTED TYPE  ***PUB02900
1                                         I
1            ---------------------------------------
1            I   QPUBAA(I)=PCOFAA(I)*PPARAM(I)      I                               PUB03000
1            ---------------------------------------
1                                         I
1         ***     CALCULATES MAXIMUM DAILY USAGE FOR EACH PUBLIC-UNACCOUNTED TYPE   ***PUB03100
1                                         I
1                                         I
```

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                      SUBROUTINE PUBLIC
1                           I
1                 ------------------------------------------
1                 I   QPUBMD(I)=PCOFMD(I)*PPARAM(I)       I                                    PUB03200
1                 ------------------------------------------
1                           I
1                     ***     CALCULATES PEAK HOURLY USAGE FOR EACH PUBLIC-UNACCOUNTED TYPE     ***PUB03300
1                           I
1                 ------------------------------------------
1                 I   QPUBPH(I)=PCOFPH(I)*PPARAM(I)       I                                    PUB03400
1                 ------------------------------------------
1                           I
1                 7915              CONTINUE                                                   PUB03500
1                           I
1                     ***     TOTALS ANNUAL AVERAGE USAGE FOR ALL PUBLIC-UNACCOUNTED TYPES      ***PUB03600
1                           I
1                 ------------------------------------------
1                 I   A=A+QPUBAA(I)                        I                                   PUB03700
1                 ------------------------------------------
1                           I
1                     ***     TOTALS MAXIMUM DAILY USAGE FOR ALL PUBLIC-UNACCOUNTED TYPES       ***PUB03800
1                           I
1                 ------------------------------------------
1                 I   B=B+QPUBMD(I)                        I                                   PUB03900
1                 ------------------------------------------
1                           I
1                     ***     TOTALS PEAK HOURLY USAGE FOR ALL PUBLIC-UNACCOUNTED TYPES         ***PUB04000
1                           I
1                 ------------------------------------------
1                 I   C=C+QPUBPH(I)                        I                                   PUB04100
1                 ------------------------------------------
1                           I
1111111111111111111111111111111   7920 1111111111111111 CONTINUE                               PUB04200
                            I
                        ***     STORES TOTAL ANNUAL AVERAGE USAGE                              ***PUB04300
                            I
                    ------------------------------------------
                    I   TOTPAA=A                            I                                  PUB04400
                    ------------------------------------------
                            I
                        ***     STORES TOTAL MAXIMUM DAILY                                     ***PUB04500
                            I
                    ------------------------------------------
                    I   TOTPMD=B                            I                                  PUB04600
                    ------------------------------------------
                            I
                        ***     STORES TOTAL PEAK HOURLY                                       ***PUB04700
                                I
                                I
                                I
                                I
                                I

                            I
                    ------------------------------------------
                    I   TOTPPH=C                            I                                  PUB04800
                    ------------------------------------------
                            I
                    7930              CONTINUE                                                 PUB04900
                            I
                        ***     BEGINS PRINTOUT OF THE CURRENT USAGE ALONE                      ***PUB05000
                            I
                    8030              CONTINUE                                                 PUB05100
                            I
                        ***     PRINTS HEADING OF REPORT                                       ***PUB05200
                            I
                                ++++++++++++
                              .' WRITE      '.
                            .' (IO,8040)      '.                                               PUB05300
                          .' CIT,IFDAT          '.
                          ++++++++++++++++++++++++
                            I
                    8040    FORMAT (1H1,16X,46HMUNICIPAL  WATER  REQUIREMENTS  FOR  THE  CITY **     PUB05400
                               **,        6H  OF  ,3A4,3A4,2X,14HFOR  THE  YEAR,2X,I4//53X,       **
                               **        26HANALYZED  BY  MAIN  SYSTEM///34X,5HTOTAL,              **
                               **        52H  PUBLIC-UNACCOUNTED  REQUIREMENTS  IN  GALLONS  PER,  **
                               **        5H  DAY//42X,6HANNUAL,14X,7HMAXIMUM,15X,4HPEAK/41X,       **
                               **        7HAVERAGE,15X,5HDAILY,15X,6HHOURLY//)                     **
                            I
                        ***     PRINTS TOTAL P-U VALUES FOR ANNUAL AVERAGE, MAXIMUM DAILY, PEAK  ***PUB06000
                        ***         HOURLY                                                     ***PUB06100
                            I
                                ++++++++++++
                              .' WRITE      '.
                            .' (IO,8050)      '.                                               PUB06200
                          .' TOTPAA,TOTPMD,TOTP'.
                        .'PH                    '.
                        ++++++++++++++++++++++++++++
                            I
                    8050    FORMAT (27X,3(5X,F16.0)///)                          **            PUB06300
                            I
                        ***     PRINTS HEADING FOR CONSUMPTION BY P-U TYPES                     ***PUB06400
                            I
                                ++++++++++++
                              .' WRITE      '.
                            .' (IO,8060)      '.                                               PUB06500
                          .'                    '.
                          ++++++++++++++++++++++++
                            I
                    8060    FORMAT (27X,46HREQUIREMENTS  BY  TYPE  OF  PUBLIC-UNACCOUNTED,    **     PUB06600
                               **        30H  USAGE  IN  GALLONS  PER  DAY//38X,4HTYPE,18X,        **
                               **        6HANNUAL,11X,7HMAXIMUM,11X,4HPEAK/59X,7HAVERAGE,12X,      **
                               **        5HDAILY,11X,6HHOURLY//)                                   **
                                I
```

```
                                SUBROUTINE PUBLIC
                                      I
                          ***     PRINTS THE P-U TYPE AND ITS ANNUAL AVERAGE, MAXIMUM DAILY, AND     ***PUB07000
                          ***         PEAK HOURLY USAGE VALUES                                       ***PUB07100
                                      I
                                ---------------------------------------
1111111111111111111111111111111**********  DO  8090   I=1,30                    I                     PUB07200
1                               ---------------------------------------
1                                     I
1                               ---------------------------------------
1                               I   J=4*(I-1)+1                              I                        PUB07300
1                               ---------------------------------------
1                                     I
1                                     .
1                                   .   .   .
1                                 .       IF      .                                                  PUB07400
1                               .   (CPUBAA(I)-0.)      .
1                             +-.                         .   .-+
1                             I     .                   .       I
1                             I         .           .           I
1                             I             .   .               I
1                             I -             I 0               I +
1                           ---+---         ---+---             I
1                           (8090 )         (8090 )             I
1                            '.  .'          '.  .'             I
1                              '               '               I
1                                                              I
1                                     +----------------+
1                                     I
1                         8070                CONTINUE                                               PUB07500
1                                             I
1                                          ++++++++++
1                                       .' WRITE     '.                                               PUB07600
1                                     .' (IO,8080)     '.
1                                   .' PLABEL(J),PLABEL(J'.
1                                 .'+1),PLABEL(J+2),PLABEL('.
1                               .'J+3),                   QP'.
1                             .'UBAA(I),CPUBMD(I),QPUBPH(I)    '.
1                             ++++++++++++++++++++++++++++++++++
1                                             I
1                         8080    FORMAT (32X,4A4,3(5X,F12.0))                          **             PUB07800
1                                             I
1111111111111111111111111111111  8090 1111111111111111 CONTINUE                                      PUB07900
                                              I
                                        .-----------------.
                                        I RETURN          '.                                         PUB08000
                                        I                   '.
                                        I                   .'
                                        -------------------'

***END*******END*******END*******END*******END*******END*******END*******END*******END*******END*******END***   PUB08100
                                SUBROUTINE REDCOF

                                      ************************
                                      **                    **
                                      ** SUBROUTINE REDCOF   **                                       RDC00100
                                      ** (LERR)              **
                                      **                    **
                                      ************************
                                              I
                                ***     SUBROUTINE TO READ IN ALL MUNICIPAL COEFFICIENTS              ***RDC00200
                                    REAL IBL
                                    REAL LATD, LONG                                                   RDC00300
                                    REAL NPNAME(8)
                                    REAL NOCOF(4)                                                     RDC05700
                                    DIMENSION EVAPO(60,25),RAINFL(60,25)                              RDC02400
                                    DIMENSION  CCOEF(10),ADATA(15)                                    RDC02500
                                    DIMENSION SGNAM(6)                                                RDC02600
                                    DIMENSION ALIST(10),DATA(15)                                      RDC02700
                                    COMMON/COMPRN/MACH,LBIN,LIBY,IPRJT,IPNCH,IRDCOM                   RDC00500
                                    COMMON/ITEST/IBL                                                  RDC00600
                                    COMMON/NUMBER/NOS                                                 RDC00700
                                    COMMON/IFILE/IN,IO                                                RDC00800
                                    COMMON /RESCON/ E(96)                                             RDC00900
```

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                      SUBROUTINE REDCOF
     QMWTOT(25),QMWMAX(25),QMWPEK(25),RDCRSD(3)                                    RDC01600
     COMMON/INDUST/DDATA(2203)                                                     RDC01700
     COMMON/PUBLC/PUBNAM(30),PDATA(516)                                            RDC01800
     COMMON/COMMRL/CDUM(3),CNAME(50),CDATA(750)                                    RDC01900
     COMMON/CITDAT/CDATE,ALAT,ALONG,PO,PD,AGE,TEMPLT,EMPL4,                        RDC02000
                  CNCOME,CSERVE,FDAT,POPRO,PNCOME,ACRESP,
                       HDGROP,PSERVE,CIT(6),RDCCIT(3)


***                                                                              ***RDC02300
***.....                                                                         ***RDC02900
     EQUIVALENCE (NOS,NTYPE)                                                       RDC04800
     EQUIVALENCE (ALAT,LATD),(ALONG,LONG)                                          RDC04900
     DATA RLATD/4HLATD/                                                            RDC03000
     DATA  BLANK/4H    /                                                           RDC03100
     DATA  RAIN/4HRAIN/                                                            RDC03200
     DATA  EVAP/4HEVAP/                                                            RDC03300
     DATA RLONG/4HLONG/                                                            RDC03400
     DATA  CCOEF/4HCOMM,4HAVEG,4HCOMM,4HAXDY,4HCOMM,4HPEAK,4HCOML,                 RDC03500
                 4HABEL,4HCOMM,4HUNIT/

     DATA  ENDI/4HENDI/                                                            RDC03700
     DATA  ENDD/4HENDD/                                                            RDC03800
     DATA SGNAM/4HEVAP,4HTRAN,4HCONS,4HTANT,4HENDI,4HNPUT/                         RDC03900
     DATA ALIST/4HINDL,4HABEL,4HINDA,4HNAVE,4HINDM,4HXDAY,4HINDP,4HEKHR            RDC04000
          ,4HENDI,4HNPUT/

     DATA EOD/4HENDD/                                                              RDC04200
     DATA NPNAME/4HPUBC,4HOFAA,4HPUBC,4HOFMD,4HPUBC,4HOFPH,4HPUBL,                 RDC04300
                 4HABEL/

     DATA  TYPE/3/                                                                 RDC04500
     DATA NOCOF/4H ** ,4HNO C,4HOEFF,4H. **/                                       RDC05800

***.....                                                                         ***RDC04700

     ----------------------------------------
     I   IT=LBIN                              I                                   RDC05000
     ----------------------------------------
                         I
***.....                                                                         ***RDC05200
***.....                                                                         ***RDC05300
***     INITIALIZE INDUSTRIAL LABELS                                             ***RDC05400
***.....                                                                         ***RDC05500
***.....                                                                         ***RDC05600
                         I
     ----------------------------------------
1111111111111111111111111111111**********  DO  99     I=3,802,4                 I  RDC05900
     ----------------------------------------
1                        I
1                        I

1                        I
1
     ----------------------------------------
1 2222222222222222222222222222**********  DO  98     J=1,4                     I  RDC06000
1 2  ----------------------------------------
1 2                      I
1 2  ----------------------------------------
1 2  I   K=I+J                           I                                       RDC06100
1 2  I   DDATA(K)=NOCOF(J)               I                                       RDC06200
1 2  ----------------------------------------
1 2                      I
1 2222222222222222222222222222    98 22222222222222222 CONTINUE                 RDC06300
1                        I
1111111111111111111111111111111   99 1111111111111111 CONTINUE                  RDC06400
                         I
***.....                                                                         ***RDC06500
***.....                                                                         ***RDC06600
                         I
                    ++++++++++++
                  .' READ      '.                                                RDC06700
                .' (IT,10)       '.
              .' ANAME1,ANAME2     '.
              ++++++++++++++++++++++++
                         I
 10    FORMAT (1X,2A4,1X)                                                **      RDC06800
                         I
***.....LIBY IS AN OPTION FOR PRINTING THE LIBRARY DATA--THE DATA WILL NOT***RDC06900
***.....  BE PRINTED UNLESS LIBY = 0 IS ADDED TO THE OPTIONS INPUT DATA   ***RDC07000
                         I
                         .
                       .   .
                     .       .
                   .    IF     .                                                RDC07100
                 .  (LIBY.EQ.0)    .
               .                     .  +-------------------+
             .                         .  F                 I
               .                     .                      I
                 .                 .                        I
                   .             .                          I
                     .         .                            I
                       .   .                                I
                         I T                                I
                         I                                  I
                    ++++++++++++                            I
                  .' WRITE     '.                           I                     RDC07100
                .' (IO,11)       '.                         I
              .' ANAME1,ANAME2     '.                       I
              ++++++++++++++++++++++++                      I
                         I                                  I
                         +----------------------------------+
                         I
 11    FORMAT (1X,6HREDCOF,2X,2A4///)                              **      RDC07300
                         I
***.....TEST FOR END OF INPUT                                                    ***RDC07400
                         I
                         I
```
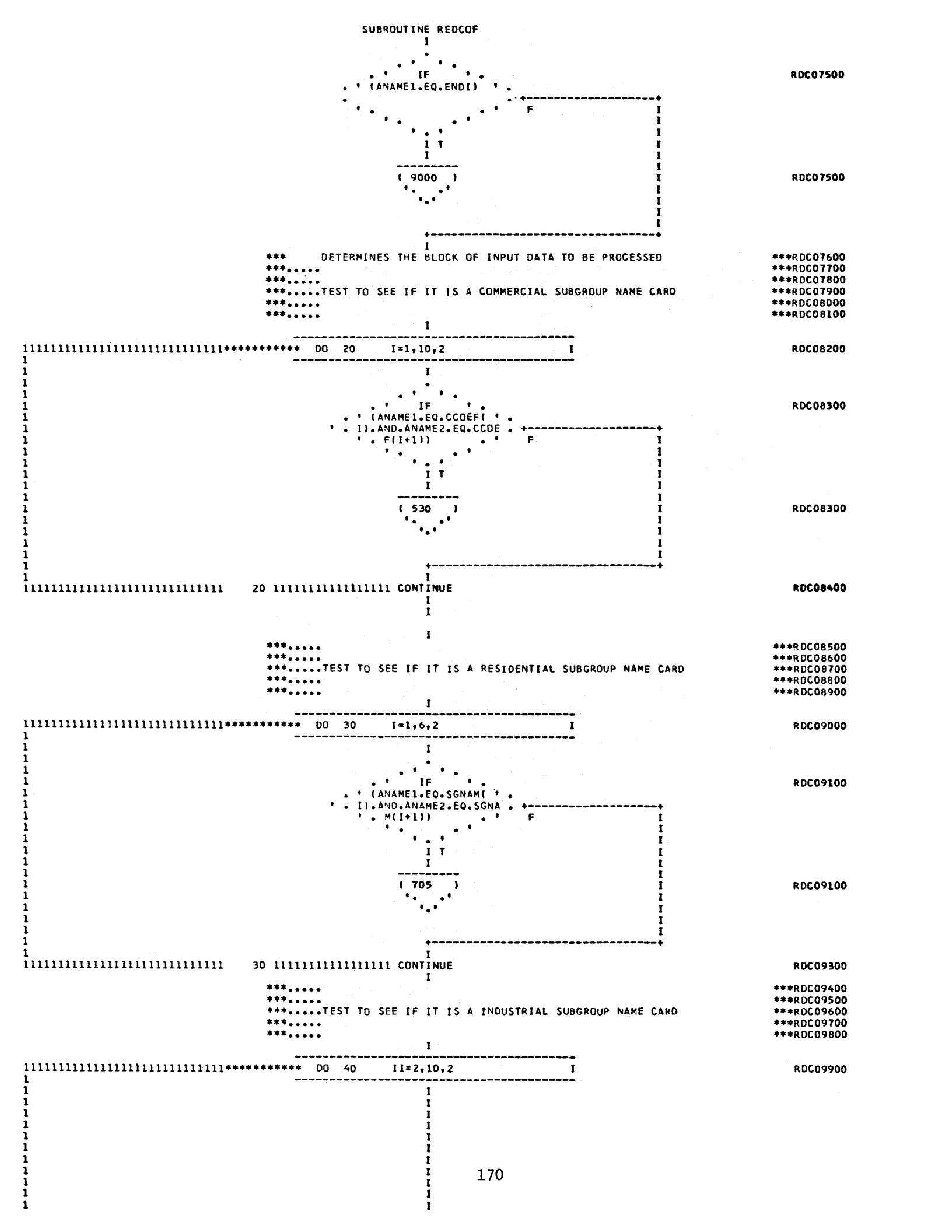
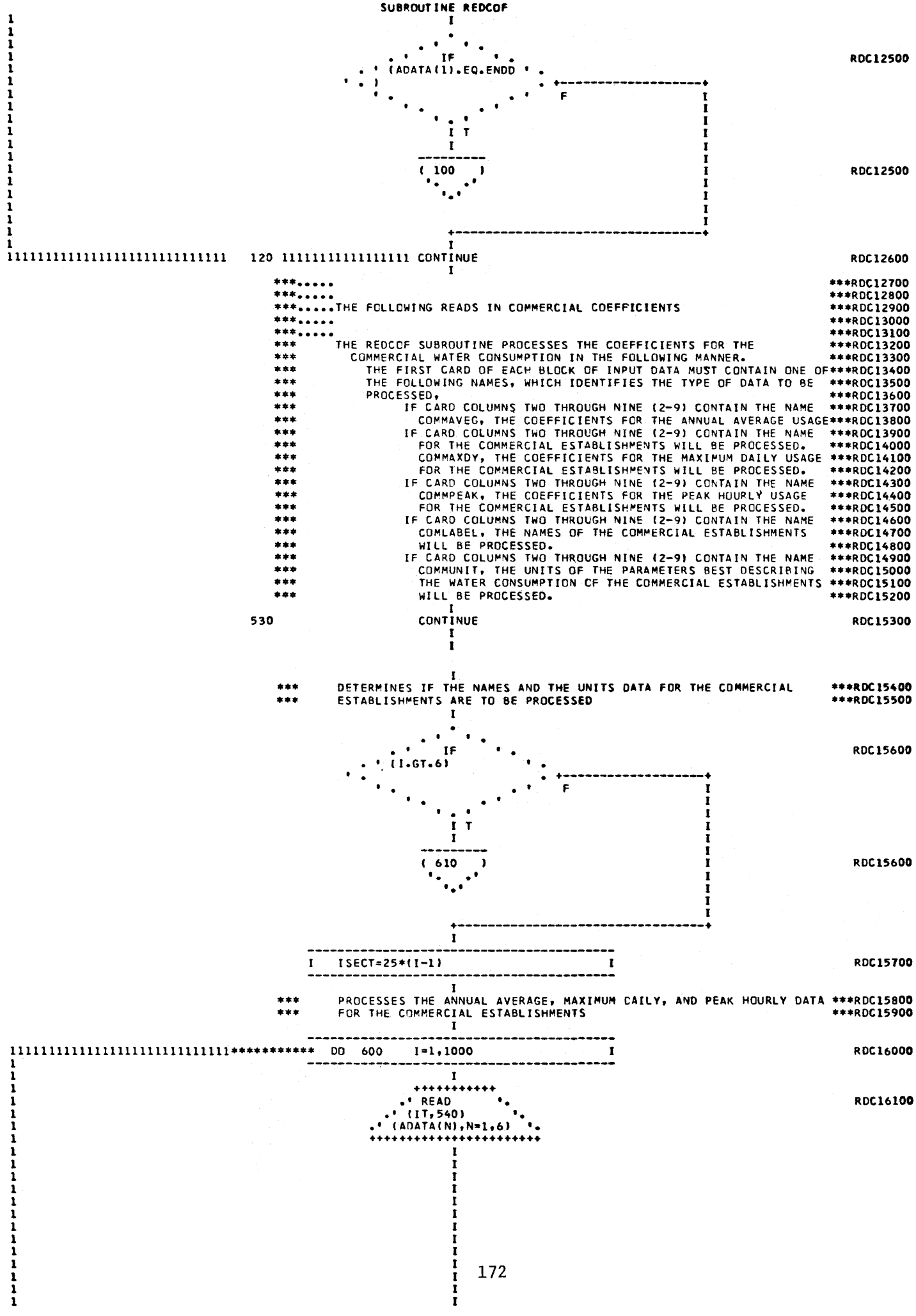
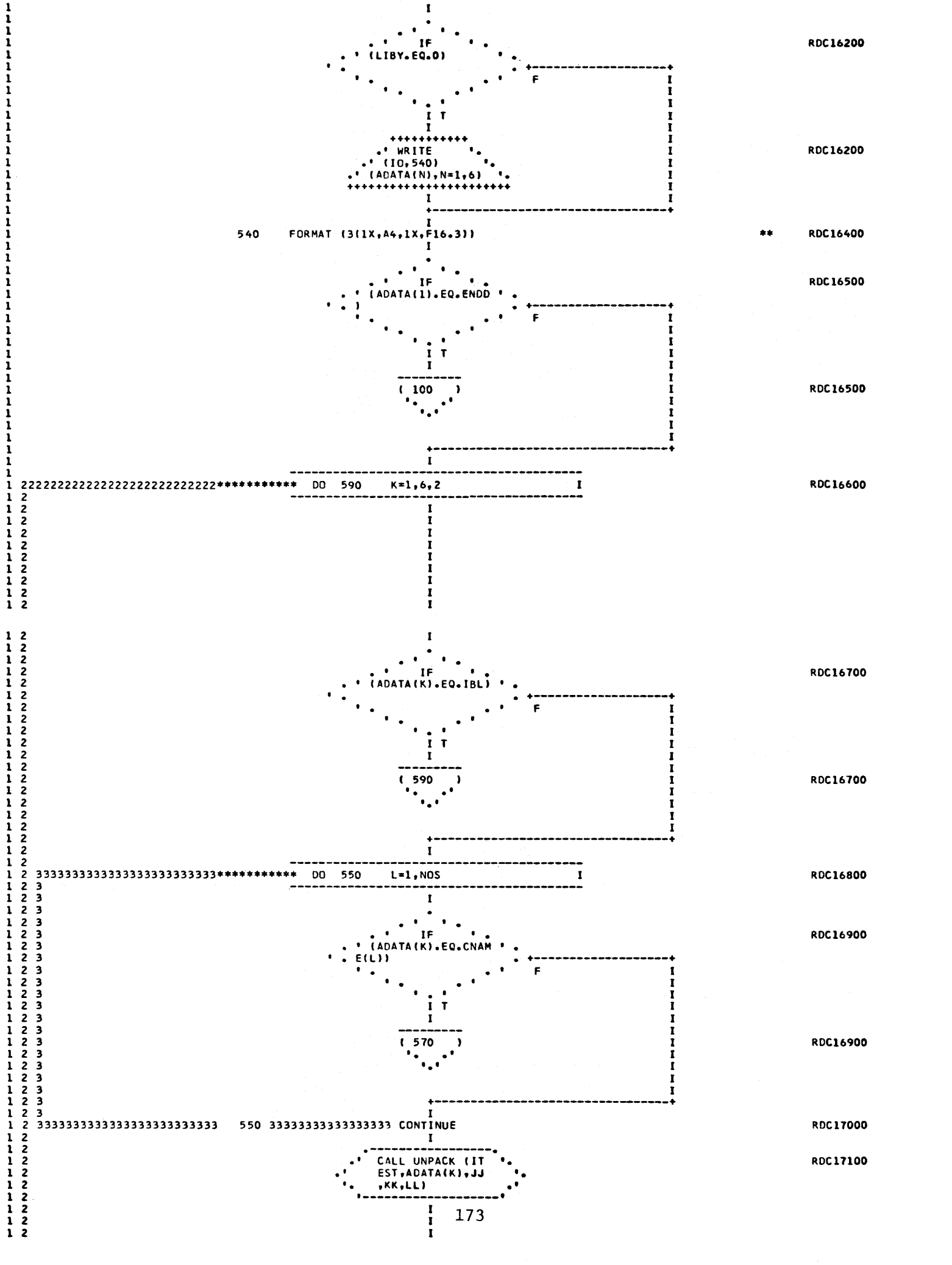
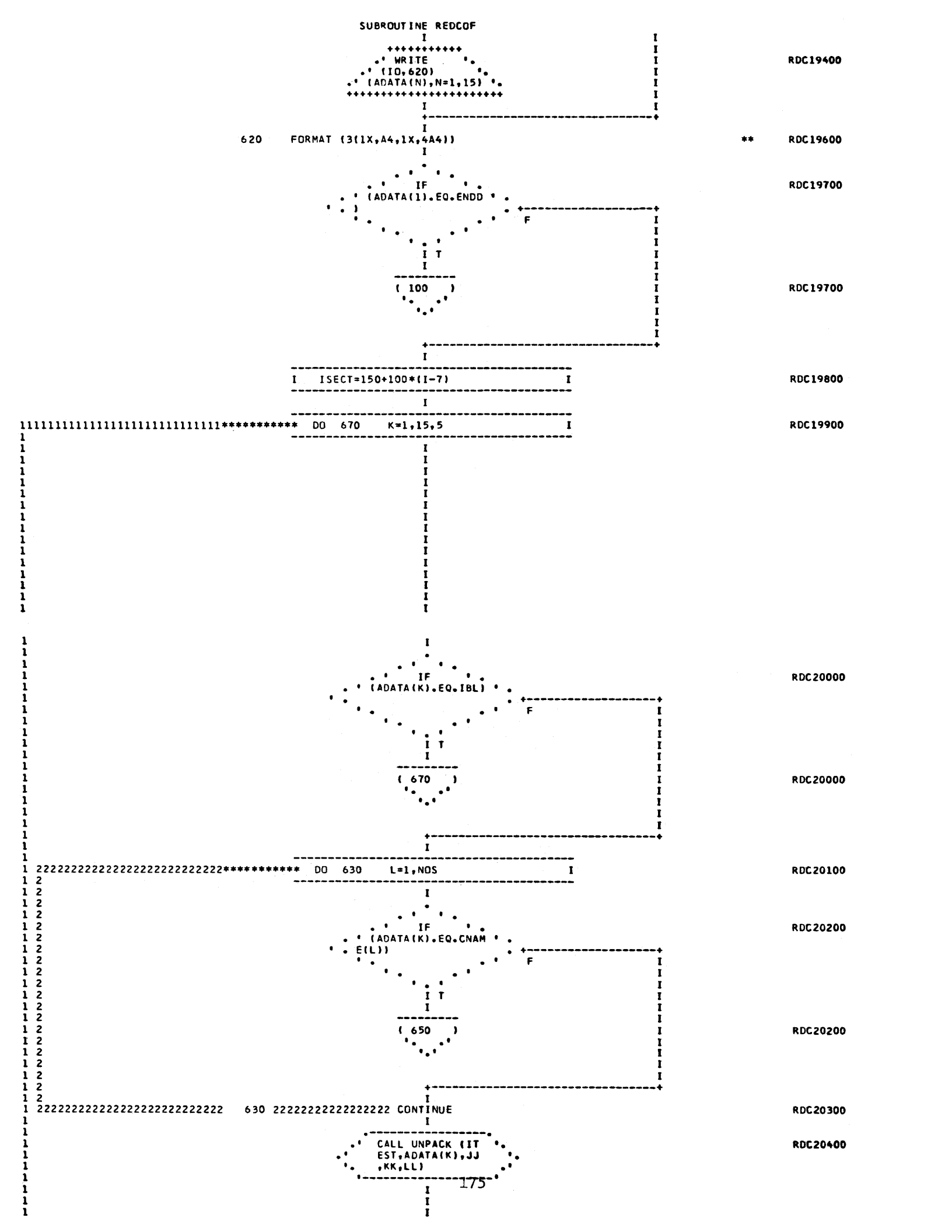


SUBROUTINE REDCOF
IF (ANAME1.EQ.ENDI)
F
T
9000
RDC07500
*** DETERMINES THE BLOCK OF INPUT DATA TO BE PROCESSED
***.....TEST TO SEE IF IT IS A COMMERCIAL SUBGROUP NAME CARD
DO 20 I=1,10,2
IF (ANAME1.EQ.CCOEF(I).AND.ANAME2.EQ.CCDE F(I+1))
530
20 CONTINUE
***.....TEST TO SEE IF IT IS A RESIDENTIAL SUBGROUP NAME CARD
DO 30 I=1,6,2
IF (ANAME1.EQ.SGNAM(I).AND.ANAME2.EQ.SGNA M(I+1))
705
30 CONTINUE
***.....TEST TO SEE IF IT IS A INDUSTRIAL SUBGROUP NAME CARD
DO 40 II=2,10,2

```
                               SUBROUTINE REDCOF
1                                      I
1                                 .  IF  .                                       RDC10000
1                        (ANAME1.EQ.ALIST(
1                       II-1).AND.ANAME2.EQ.A  +--------------------+
1                          LIST(II))          F                     I
1                                  I T                              I
1                                  I                                I
1                              ( 2010 )                             I            RDC10000
1                                                                   I
1                                  +--------------------------------+
1                                  I
111111111111111111111111111111   40 1111111111111111 CONTINUE                     RDC10200
                                   I
                     ***.....                                                  ***RDC10300
                     ***.....                                                  ***RDC10400
                     ***.....TEST TO SEE IF IT IS A PUBLIC AND UNACCOUNTED SUBGROUP NAME CARD ***RDC10500
                     ***.....                                                  ***RDC10600
                     ***.....                                                  ***RDC10700
                                   I
111111111111111111111111111111*********** DO 50     I=1,8,2          I         RDC10800
1                                  I
1                                 .  IF  .                                       RDC10900
1                         (ANAME1.EQ.NPNAME
1                        (I).AND.ANAME2.EQ.NPN  +--------------------+
1                          AME(I+1))          F                     I
1                                  I T                              I
1                                  I                                I
1                              ( 7610 )                             I            RDC10900
1                                                                   I
1                                  +--------------------------------+
1                                  I
111111111111111111111111111111   50 1111111111111111 CONTINUE                     RDC11000
                                   I

                                   I
                     I   LERR=LERR+1                         I                   RDC11100
                                   I
                     ***.....                                                  ***RDC11200
                     ***      ERROR MESSAGE                                    ***RDC11300
                     ***.....                                                  ***RDC11400
                                   I
                                WRITE                                            RDC11500
                                (IO,60)
                              ANAME1,ANAME2
                                   I
                 60    FORMAT (2X, 70HTHE FOLLOWING CONTROL CARD DOES NOT CONTAIN A CORRE**  RDC11600
                          **CT SUBGROUP NAME...//5X,2A4)                          **
                                   I
                 ***      CHECKS THE DATA FOLLOWING A BAD CONTROL CARD FOR ERRORS IN   ***RDC11800
                 ***      IDENTIFICATION NAMES                                 ***RDC11900
                                   I
                                WRITE                                            RDC12000
                                (IO,70)
                                   I
                 70    FORMAT (1X,42HCHECKING DATA FOLLOWING A BAD CONTROL CARD)     **   RDC12100
                                   I
111111111111111111111111111111*********** DO 120    J=1,1000         I         RDC12200
1                                  I
1                               READ                                             RDC12300
1                               (IT,80)
1                            (ADATA(N),N=1,15)
1                                  I
1                80    FORMAT (3(1X,A4,1X,4A4))                             **   RDC12400
1                                  I
1                                  I
1                                  I
```

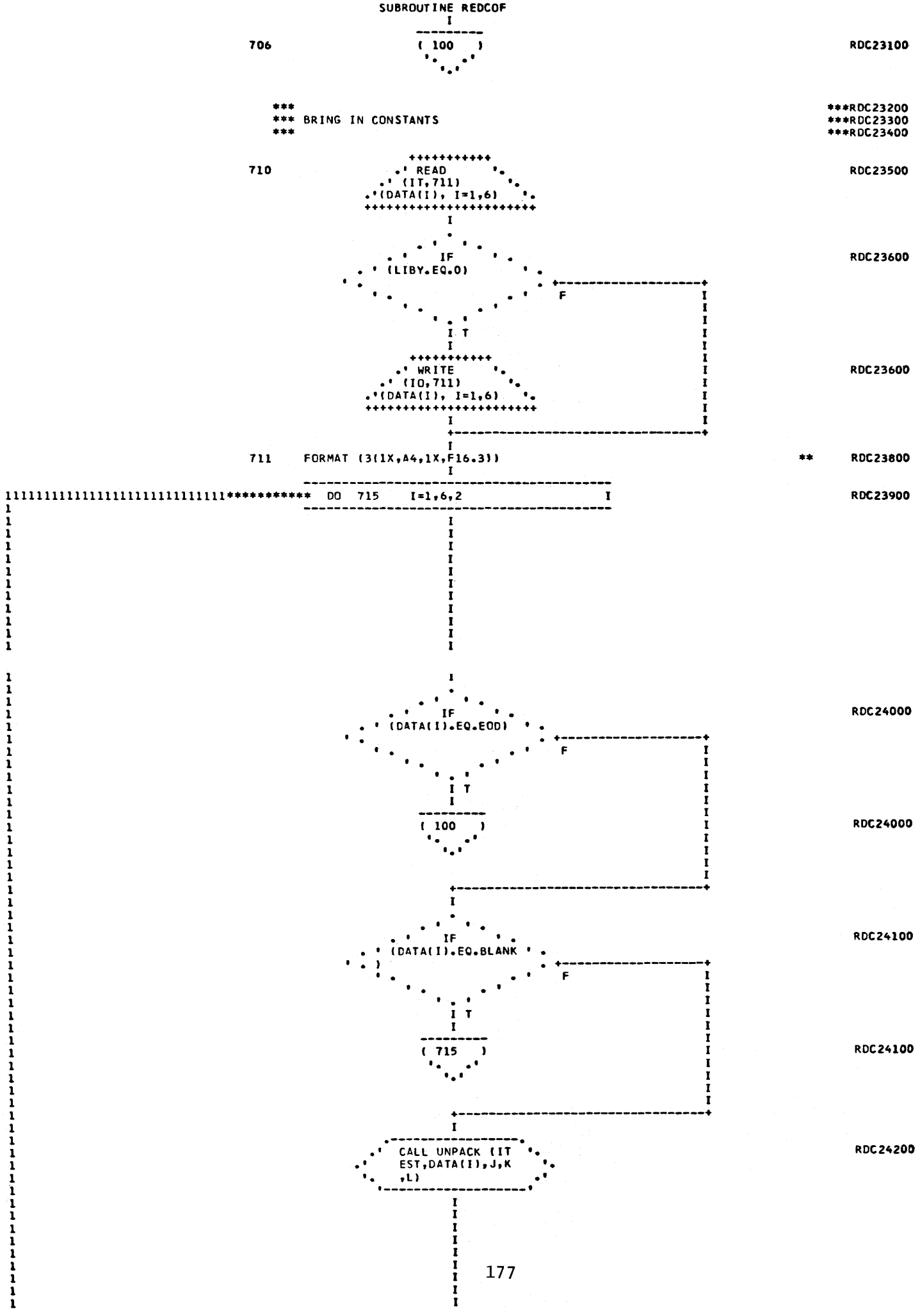

SUBROUTINE REDCOF
IF (ADATA(1).EQ.ENDD
F
T
100
RDC12500
120 CONTINUE
RDC12600
***..... ***RDC12700
***..... ***RDC12800
***.....THE FOLLOWING READS IN COMMERCIAL COEFFICIENTS ***RDC12900
***..... ***RDC13000
***..... ***RDC13100
*** THE REDCOF SUBROUTINE PROCESSES THE COEFFICIENTS FOR THE ***RDC13200
*** COMMERCIAL WATER CONSUMPTION IN THE FOLLOWING MANNER. ***RDC13300
*** THE FIRST CARD OF EACH BLOCK OF INPUT DATA MUST CONTAIN ONE OF***RDC13400
*** THE FOLLOWING NAMES, WHICH IDENTIFIES THE TYPE OF DATA TO BE ***RDC13500
*** PROCESSED, ***RDC13600
*** IF CARD COLUMNS TWO THROUGH NINE (2-9) CONTAIN THE NAME ***RDC13700
*** COMMAVEG, THE COEFFICIENTS FOR THE ANNUAL AVERAGE USAGE***RDC13800
*** IF CARD COLUMNS TWO THROUGH NINE (2-9) CONTAIN THE NAME ***RDC13900
*** FOR THE COMMERCIAL ESTABLISHMENTS WILL BE PROCESSED. ***RDC14000
*** COMMAXDY, THE COEFFICIENTS FOR THE MAXIMUM DAILY USAGE ***RDC14100
*** FOR THE COMMERCIAL ESTABLISHMENTS WILL BE PROCESSED. ***RDC14200
*** IF CARD COLUMNS TWO THROUGH NINE (2-9) CONTAIN THE NAME ***RDC14300
*** COMMPEAK, THE COEFFICIENTS FOR THE PEAK HOURLY USAGE ***RDC14400
*** FOR THE COMMERCIAL ESTABLISHMENTS WILL BE PROCESSED. ***RDC14500
*** IF CARD COLUMNS TWO THROUGH NINE (2-9) CONTAIN THE NAME ***RDC14600
*** COMLABEL, THE NAMES OF THE COMMERCIAL ESTABLISHMENTS ***RDC14700
*** WILL BE PROCESSED. ***RDC14800
*** IF CARD COLUMNS TWO THROUGH NINE (2-9) CONTAIN THE NAME ***RDC14900
*** COMMUNIT, THE UNITS OF THE PARAMETERS BEST DESCRIBING ***RDC15000
*** THE WATER CONSUMPTION OF THE COMMERCIAL ESTABLISHMENTS ***RDC15100
*** WILL BE PROCESSED. ***RDC15200
530 CONTINUE
RDC15300
*** DETERMINES IF THE NAMES AND THE UNITS DATA FOR THE COMMERCIAL ***RDC15400
*** ESTABLISHMENTS ARE TO BE PROCESSED ***RDC15500
IF (I.GT.6)
RDC15600
F
T
610
RDC15600
I ISECT=25*(I-1) I
RDC15700
*** PROCESSES THE ANNUAL AVERAGE, MAXIMUM DAILY, AND PEAK HOURLY DATA ***RDC15800
*** FOR THE COMMERCIAL ESTABLISHMENTS ***RDC15900
I DO 600 I=1,1000 I
RDC16000
READ (IT,540) (ADATA(N),N=1,6)
RDC16100

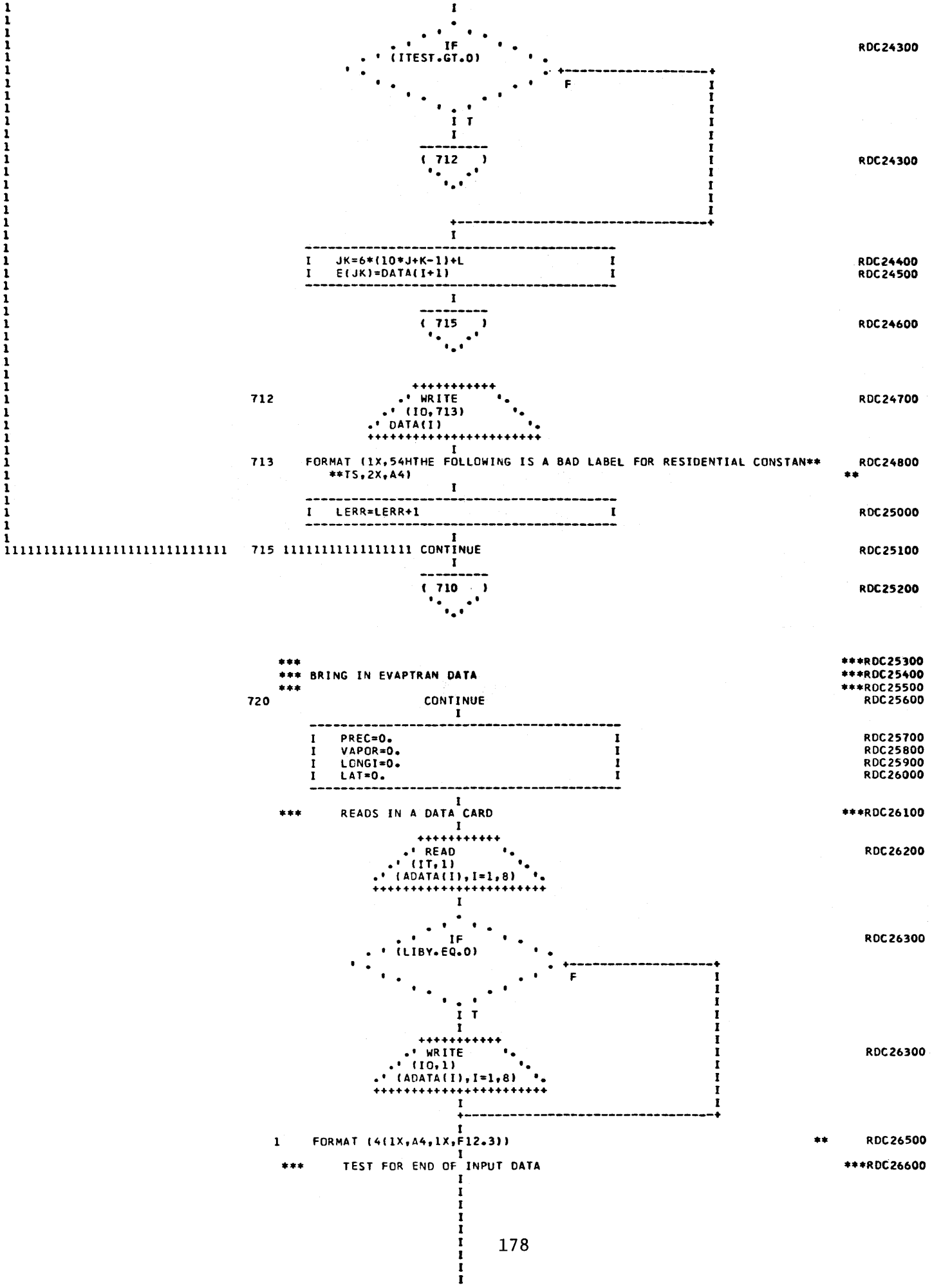

SUBROUTINE REDCOF
IF
(LIBY.EQ.0)
F
T
WRITE
(IO,540)
(ADATA(N),N=1,6)
RDC16200
RDC16200
540 FORMAT (3(1X,A4,1X,F16.3))
**
RDC16400
IF
(ADATA(1).EQ.ENDD
)
RDC16500
F
T
100
RDC16500
DO 590 K=1,6,2
RDC16600
IF
(ADATA(K).EQ.IBL)
RDC16700
F
T
590
RDC16700
DO 550 L=1,NOS
RDC16800
IF
(ADATA(K).EQ.CNAM
E(L))
RDC16900
F
T
570
RDC16900
550 CONTINUE
RDC17000
CALL UNPACK (IT
EST,ADATA(K),JJ
,KK,LL)
RDC17100

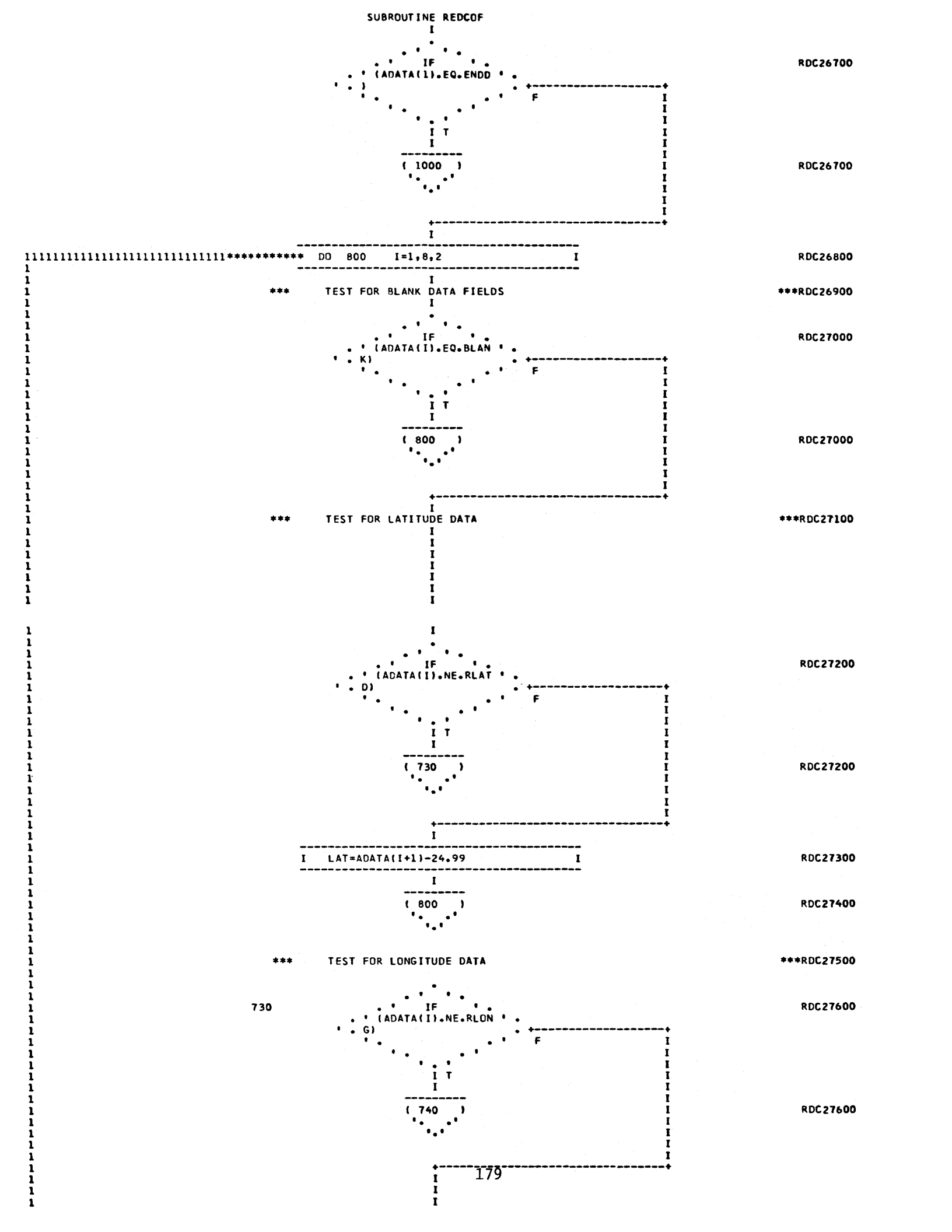
```
                                        SUBROUTINE REDCOF
                                                I
                                                .
                                          IF                                              RDC17200
                                     (ITEST.GT.0)
                                                  +------------------+
                                                  F                  I
                                                I T                  I
                                                I                    I
                                            ( 560  )                 I               RDC17200
                                                I                    I
                                                +--------------------+
                                                I
                                ----------------------------------------
                                I   JSECT=NTYPE+10*KK+LL               I            RDC17300
                                ----------------------------------------
                                                I
                                            ( 575  )                                 RDC17400

                       ***     ERROR MESSAGE                                      ***RDC17500

                        560              WRITE                                       RDC17600
                                        (IO,565)
                                        ADATA(K)
                                                I
                        565     FORMAT (1X,57HFOLLOWING IS A BAD LABEL FOR THE COMMERCIAL ESTABLIS**   RDC17700
                                   **HMENT,2X,A4)                                      **
                                                I
                                ----------------------------------------
                                I   LERR=LERR+1                        I            RDC17900
                                ----------------------------------------
                                                I
                                            ( 590  )                                 RDC18000


                        570                 CONTINUE                                 RDC18100
                                                I
                                ----------------------------------------
                                I   JSECT=L                            I            RDC18200
                                ----------------------------------------
                                                I
                       ***     INDEX FOR INPUT DATA IN DATA TABLE                 ***RDC18300
                                                I
                        575                 CONTINUE                                 RDC18400
                                                I
                                ----------------------------------------
                                I   IJ=ISECT+JSECT                     I            RDC18500
                                ----------------------------------------
                                                I
                       ***     PUTS THE INPUT DATA IN THE PROPER PLACE IN THE PROPER TABLE   ***RDC18600
                                                I
                                ----------------------------------------
                                I   CDATA(IJ)=ADATA(K+1)               I            RDC18700
                                ----------------------------------------
                                                I
1 2222222222222222222222222222  590 22222222222222222 CONTINUE                       RDC18800
1                                               I
111111111111111111111111111111  600 11111111111111111 CONTINUE                       RDC18900
                                                I
                       ***     READS AND SETS UP TABLES OF UNITS AND LABELS FOR COMMERCIAL   ***RDC19000
                       ***     ESTABLISHMENTS                                     ***RDC19100
                                                I
                        610                 CONTINUE                                 RDC19200
                                                I
                                          READ                                       RDC19300
                                        (IT,620)
                                     (ADATA(N),N=1,15)
                                                I
                                          IF                                         RDC19400
                                     (LIBY.EQ.0)
                                                  +------------------+
                                                  F                  I
                                                I T                  I
                                                I                    I
```


SUBROUTINE REDCOF
WRITE (IO,620) (ADATA(N),N=1,15)
RDC19400
620 FORMAT (3(1X,A4,1X,4A4))
**
RDC19600
IF (ADATA(1).EQ.ENDD)
RDC19700
F
T
100
RDC19700
ISECT=150+100*(I-7)
RDC19800
DO 670 K=1,15,5
RDC19900
IF (ADATA(K).EQ.IBL)
RDC20000
F
T
670
RDC20000
DO 630 L=1,NOS
RDC20100
IF (ADATA(K).EQ.CNAM(L))
RDC20200
F
T
650
RDC20200
630 CONTINUE
RDC20300
CALL UNPACK (IT EST,ADATA(K),JJ ,KK,LL)
RDC20400

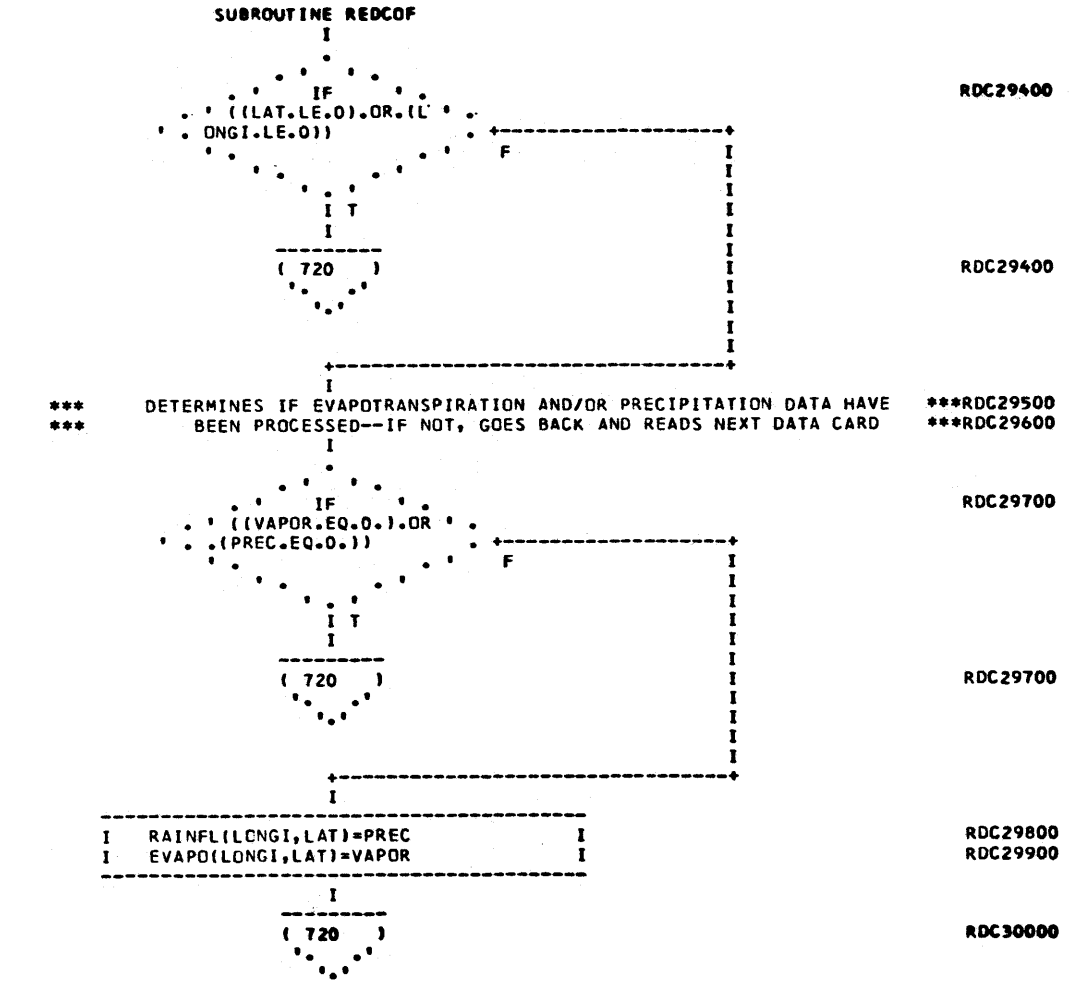
```
                          SUBROUTINE REDCOF
                                I
                             .' IF '.                                 RDC20500
                           . (ITEST.GT.0) .
                             '.       .'  +---------------------+
                                '. .'     F                     I
                                I T                             I
                                I                               I
                            ---------                           I
                            ( 642   )                           I     RDC20500
                             '.   .'                            I
                                '                               I
                                +-------------------------------+
                                I
              -----------------------------------------
              I   L=NTYPE+10*KK+LL                    I               RDC20600
              -----------------------------------------
                                I
                            ---------
                            ( 650   )                                 RDC20700
                             '.   .'

        ***      ERROR MESSAGE                                     ***RDC20800

                          +++++++++++
   642                  .' WRITE     '.                               RDC20900
                      .' (IO,643)      '.
                    .' ADATA(K)          '.
                    +++++++++++++++++++++++
                                I
   643        FORMAT (1X,57HFOLLOWING IS A BAD LABEL FOR THE COMMERCIAL ESTABLIS**   RDC21000
                 **HMENT,2X,A4)                                              **
                                I
              -----------------------------------------
              I   LERR=LERR+1                         I               RDC21200
              -----------------------------------------
                                I
                            ---------
                            ( 670   )                                 RDC21300
                             '.   .'

   650                                                                RDC21400
                                I
              -----------------------------------------
              I   JSECT=(L-1)*4+1                     I               RDC21500
              -----------------------------------------
                                I
        ***      INDEX FOR INPUT DATA IN DATA TABLE                ***RDC21600
                                I
              -----------------------------------------
              I   IJ=ISECT+JSECT                      I               RDC21700
              -----------------------------------------
                                I
        ***      PUTS THE INPUT DATA IN THE PROPER PLACE IN THE PROPER TABLE   ***RDC21800
                                I
              -----------------------------------------
              I   CDATA(IJ)=ADATA(K+1)                I               RDC21900
              I   CDATA(IJ+1)=ADATA(K+2)              I               RDC22000
              I   CDATA(IJ+2)=ADATA(K+3)              I               RDC22100
              I   CDATA(IJ+3)=ADATA(K+4)              I               RDC22200
              -----------------------------------------
                                I
   670 1111111111111111 CONTINUE                                      RDC22300
                                I
   680                      CONTINUE                                  RDC22400
                                I
                            ---------
                            ( 610   )                                 RDC22500
                             '.   .'

        ***.....                                                   ***RDC22600
        ***.....THE FOLLOWING READS IN RESIDENTIAL COEFFICIENTS    ***RDC22700
        ***.....                                                   ***RDC22800
        ***.....                                                   ***RDC22900

                              .' IF '.
   705                      . (I-3)    .                              RDC23000
                  +-'  .              .  '-+
                  I      '.        .'      I
                  I         '.  .'         I
                  I -          I 0         I +
               ---+---      ---+---        I
               (720  )      (710  )        I
                '. .'        '. .'         I
                                +----------+
                                I
```


SUBROUTINE REDCOF
706
(100)
RDC23100
*** BRING IN CONSTANTS
***RDC23200
***RDC23300
***RDC23400
710
READ (IT,711) (DATA(I), I=1,6)
RDC23500
IF (LIBY.EQ.0)
RDC23600
F
T
WRITE (IO,711) (DATA(I), I=1,6)
RDC23600
711 FORMAT (3(1X,A4,1X,F16.3))
** RDC23800
DO 715 I=1,6,2
RDC23900
IF (DATA(I).EQ.EOD)
RDC24000
F
T
(100)
RDC24000
IF (DATA(I).EQ.BLANK)
RDC24100
F
T
(715)
RDC24100
CALL UNPACK (IT EST,DATA(I),J,K ,L)
RDC24200


SUBROUTINE REDCOF
IF (ITEST.GT.0)
F
T
712
JK=6*(10*J+K-1)+L
E(JK)=DATA(I+1)
715
712 WRITE (IO,713) DATA(I)
713 FORMAT (1X,54HTHE FOLLOWING IS A BAD LABEL FOR RESIDENTIAL CONSTAN** **TS,2X,A4)
LERR=LERR+1
715 CONTINUE
710
*** BRING IN EVAPTRAN DATA
720 CONTINUE
PREC=0.
VAPOR=0.
LONGI=0.
LAT=0.
*** READS IN A DATA CARD
READ (IT,1) (ADATA(I),I=1,8)
IF (LIBY.EQ.0)
F
T
WRITE (IO,1) (ADATA(I),I=1,8)
1 FORMAT (4(1X,A4,1X,F12.3))
*** TEST FOR END OF INPUT DATA


SUBROUTINE REDCOF
IF (ADATA(I).EQ.ENDD) GO TO 1000
F
T
RDC26700
RDC26700
DO 800 I=1,8,2
RDC26800
*** TEST FOR BLANK DATA FIELDS
***RDC26900
IF (ADATA(I).EQ.BLAN) GO TO 800
RDC27000
RDC27000
*** TEST FOR LATITUDE DATA
***RDC27100
IF (ADATA(I).NE.RLAT) GO TO 730
RDC27200
RDC27200
LAT=ADATA(I+1)-24.99
RDC27300
GO TO 800
RDC27400
*** TEST FOR LONGITUDE DATA
***RDC27500
730 IF (ADATA(I).NE.RLON) GO TO 740
RDC27600
RDC27600

RDC27700 RDC27800 RDC27900 RDC28000 RDC28000 RDC28100 RDC28200 RDC28300 RDC28400 RDC28400 RDC28500 RDC28600 RDC28700 RDC28800 RDC28900 RDC29000 RDC29100 RDC29200 RDC29300



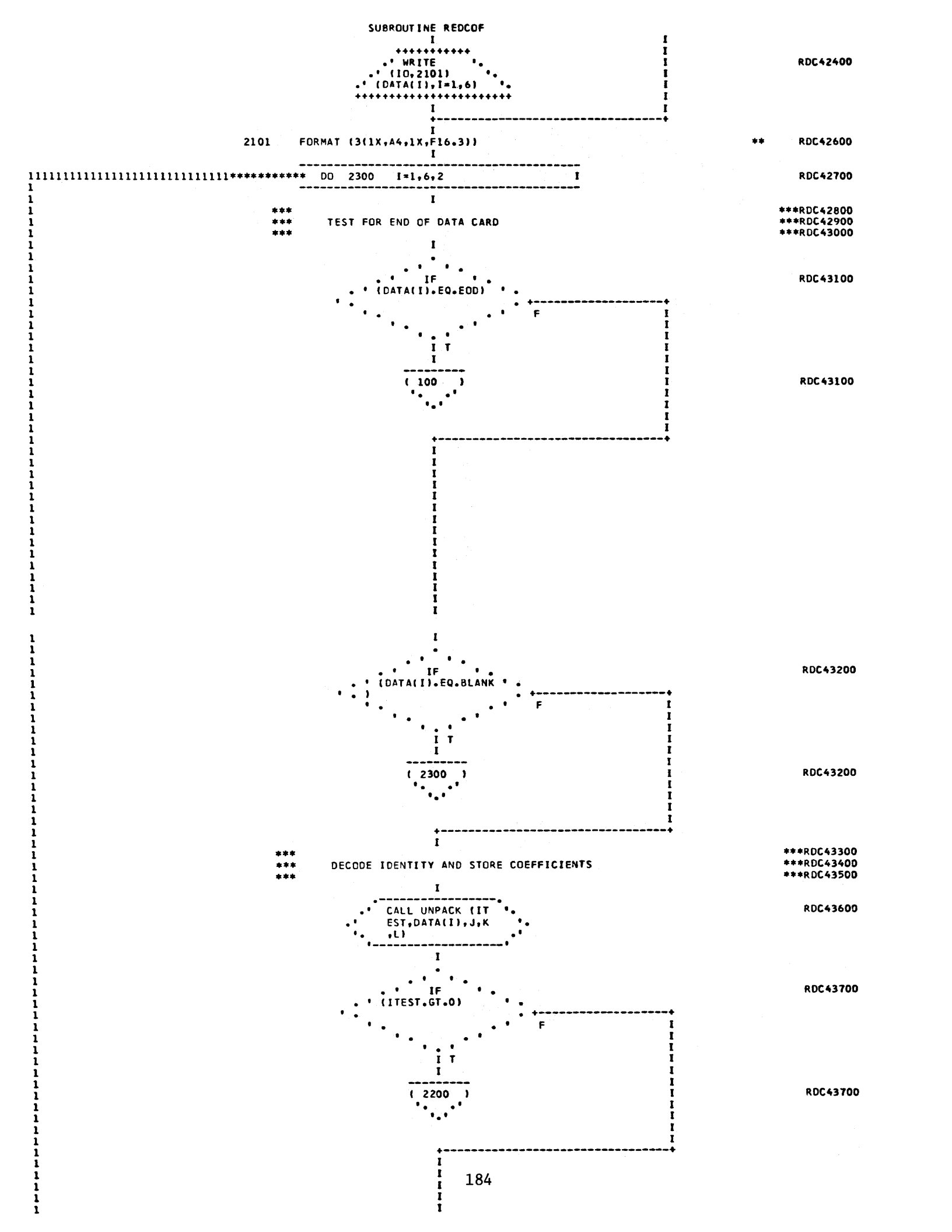
RDC29400
RDC29400
***DETERMINES IF EVAPOTRANSPIRATION AND/OR PRECIPITATION DATA HAVE ***RDC29500
***BEEN PROCESSED--IF NOT, GOES BACK AND READS NEXT DATA CARD ***RDC29600
RDC29700
IF
((VAPOR.EQ.0.).OR
.(PREC.EQ.0.))
F
T
720
RDC29700
RDC29800
RDC29900
720
RDC30000

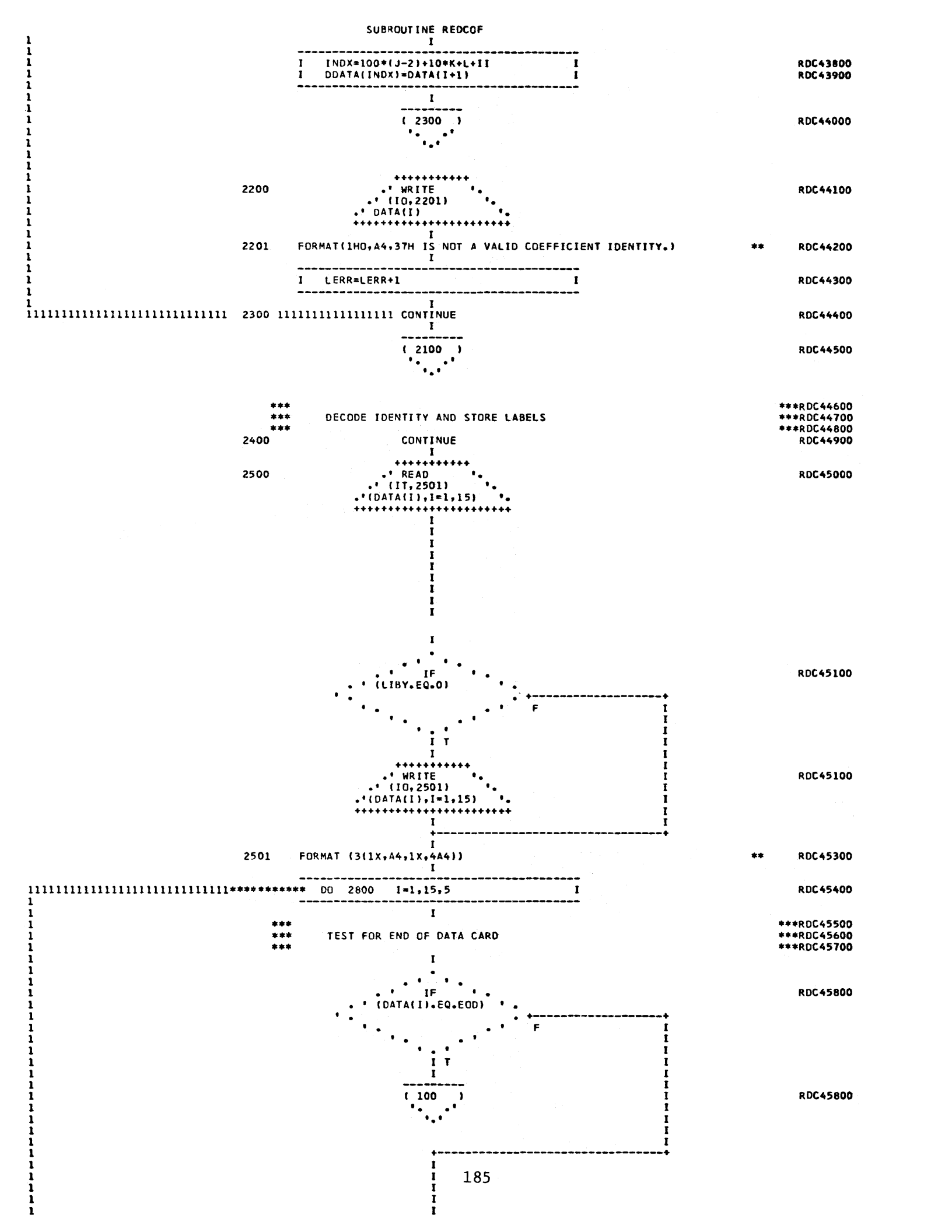
1000 RDC30100

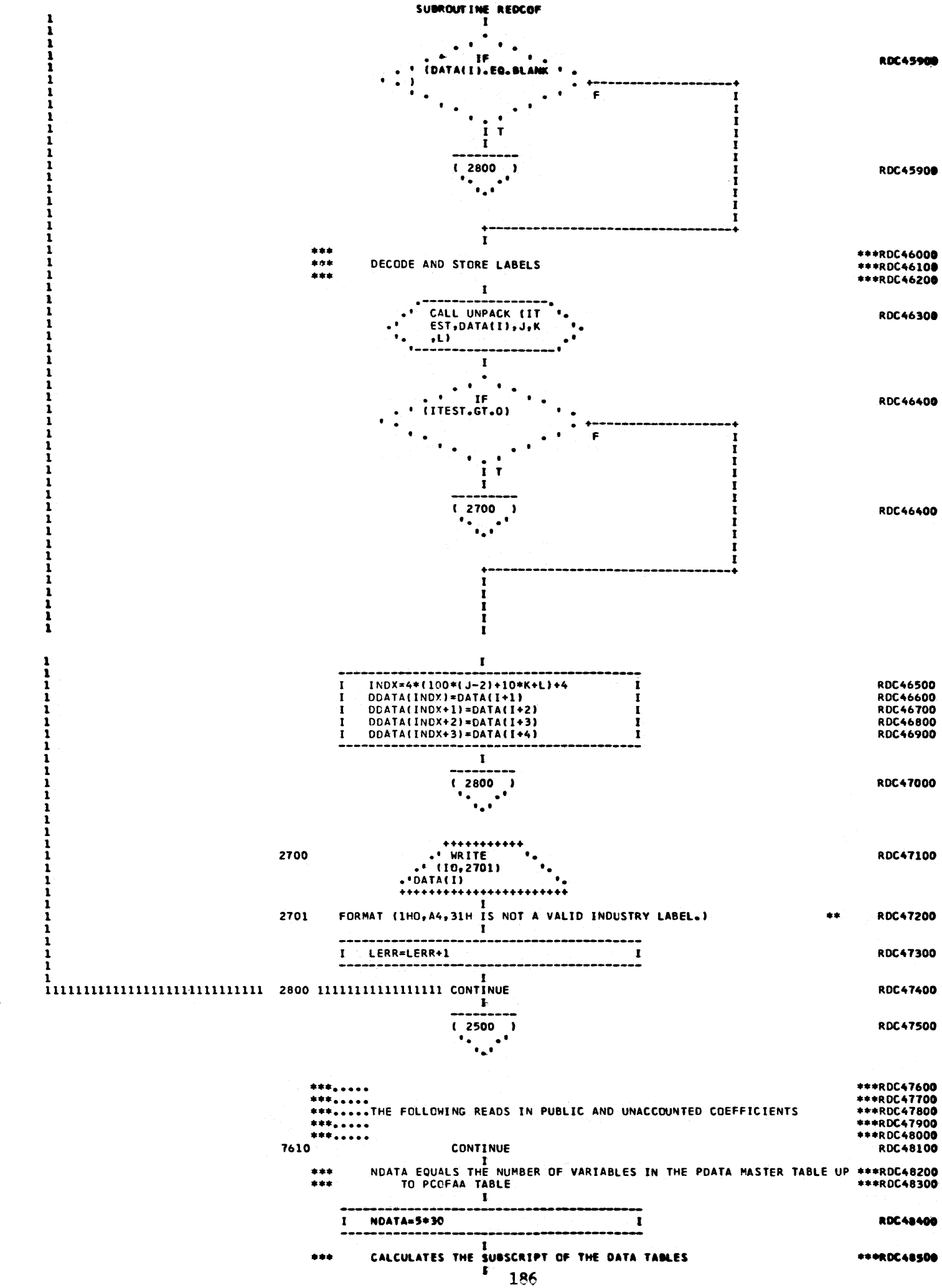
```
***     THE LATITUDE OF THE UNITED STATES RANGES FROM 25 TO 50 DEGREES.   ***RDC30200
***     THE LATITUDINAL DATA FOR THE UNITED STATES ARE GIVEN IN ONE DEGREE***RDC30300
***         INTEGRAL INCREMENTS.                                          ***RDC30400
***     THE LONGITUDE OF THE UNITED STATES RANGES FROM 65 TO 125 DEGREES. ***RDC30500
***     THE LONGITUDINAL DATA FOR THE UNITED STATES ARE ALSO GIVEN IN ONE ***RDC30600
***         DEGREE, INTEGRAL INCREMENTS.                                  ***RDC30700
***     IN ORDER TO OBTAIN THE CLIMATOLOGICAL DATA FOR THE CITY, MUST     ***RDC30800
***         LOCATE THE CITY BY INTERPOLATION OF THE LATITUDINAL AND       ***RDC30900
***         LONGITUDINAL DATA FROM THE LIBRARY FILE BASED ON THE VALUES OF***RDC31000
***         LATITUDE AND LONGITUDE SUPPLIED BY THE CITY.                  ***RDC31100
***     LATD AND LONG ARE THE LATITUDE AND LONGITUDE FOR THE CITY         ***RDC31200
***                                                                       ***RDC31300
***                                                                       ***RDC31400
***                     0       $             0   LAT1                    ***RDC31500
***                      3       6             2                          ***RDC31600
***                                                                       ***RDC31700
***                                                                       ***RDC31800
***                             * LATD                                    ***RDC31900
***                               LONG                                    ***RDC32000
***                                                                       ***RDC32100
***                                                                       ***RDC32200
***                     0       $             0   LAT                     ***RDC32300
***                      4       5             1                          ***RDC32400
***                                                                       ***RDC32500
***                     LONGI1                LONGI                       ***RDC32600
***         FILE                                                          ***RDC35200
***                                                                       ***RDC32700
***                                                                       ***RDC32800
***     SYMBOLS---O REPRESENTS THE DATA POINTS SURROUNDING THE CITY       ***RDC32900
***               * REPRESENTS THE CITY                                   ***RDC33000
***               $ REPRESENTS INTERPOLATED POINTS                        ***RDC33100
***                                                                       ***RDC33200
***                                                                       ***RDC33300
***                                                                       ***RDC33400
***     REFERRING TO THE ABOVE DIAGRAM, THE FOLLOWING CALCULATIONS ARE    ***RDC33500
***                                                                       ***RDC33600
***                                                                       ***RDC33700
***     DETERMINES THE LATITUDE FOR POINTS 1 AND 4                        ***RDC33800
***     VALUES FOR LAT RANGE FROM 1 TO 24                                 ***RDC33900
                        I
      ------------------------------------
      I   LAT=LATD-25.0                  I                               RDC34000
      ------------------------------------
                        I
***     DETERMINES THE LATITIDE FOR POINTS 2 AND 3                        ***RDC34100
***     VALUES FOR LAT1 RANGE FROM 2 TO 25                                ***RDC34200
                        I
                        I
                        I
```

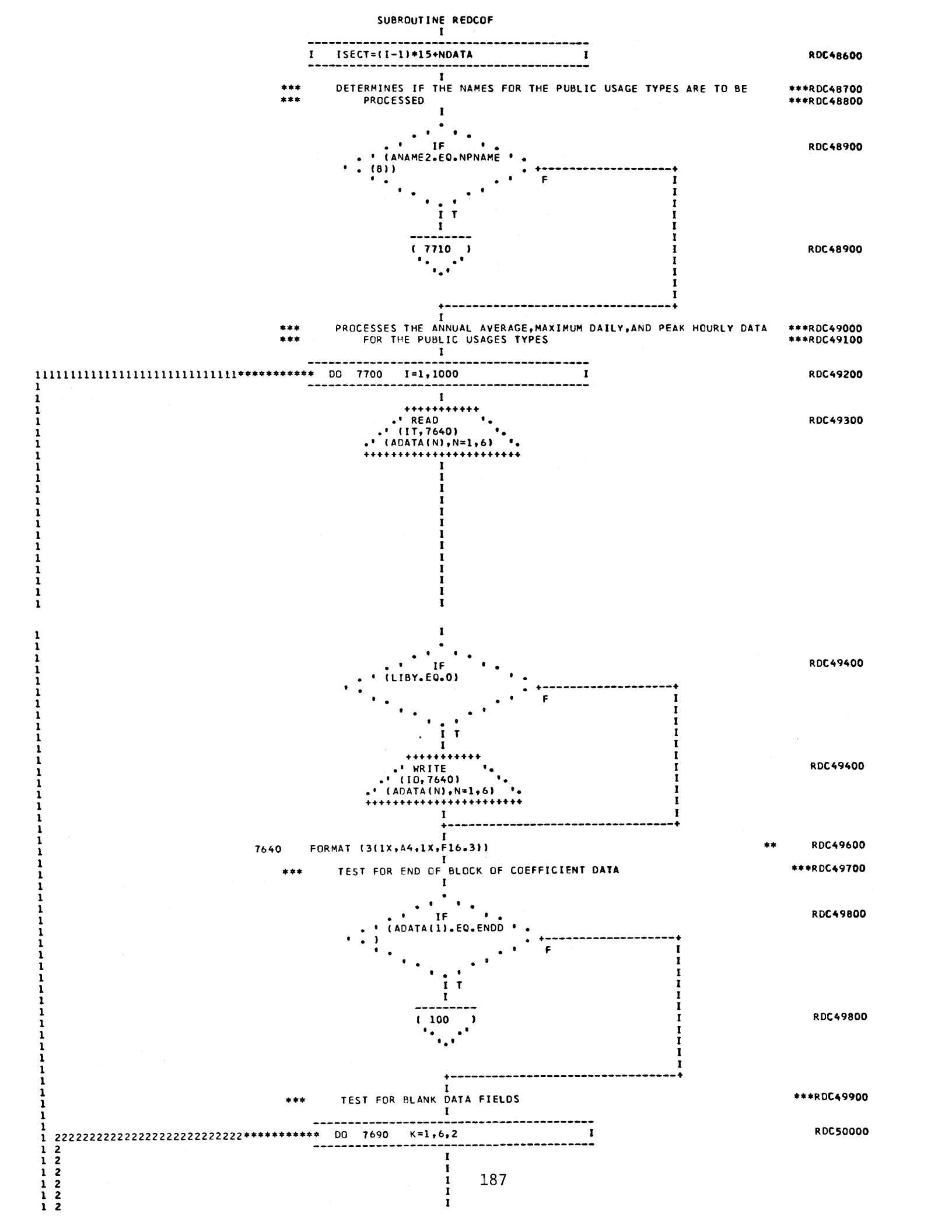
```
      SUBROUTINE REDCOF
                  I
   ----------------------------------------
   I   LAT1=LAT+1                        I                                  RDC34300
   ----------------------------------------
                  I
***     DETERMINES THE LONGITUDE FOR POINTS 1 AND 2                         ***RDC34400
***     VALUES FOR LONGI RANGE FROM 1 TO 59                                 ***RDC34500
                  I
   ----------------------------------------
   I   LONGI=LONG-65.0                    I                                  RDC34600
   ----------------------------------------
                  I
***     DETERMINES THELONGITUDE FOR POINTS  4 AND 3                         ***RDC34700
***     VALUES FOR LONGI1 RANGE FROM 2 TO 60                                ***RDC34800
                  I
   ----------------------------------------
   I   LONGI1=LONGI+1                     I                                  RDC34900
   ----------------------------------------
                  I
***     R1, R2, R3 AND R4 ARE THE RAINFALL DATA FOR POINTS 1, 2, 3 AND 4,   ***RDC35000
***         RESPECTIVELY---RAINFALL DATA ARE OBTAINED FROM THE LIBRARY      ***RDC35100
                  I
   ----------------------------------------
   I   R1=RAINFL(LONGI,LAT)              I                                  RDC35300
   I   R2=RAINFL(LONGI,LAT1)             I                                  RDC35400
   I   R3=RAINFL(LONGI1,LAT1)            I                                  RDC35500
   I   R4=RAINFL(LONGI1,LAT)             I                                  RDC35600
   ----------------------------------------
                  I
***     V1, V2, V3 AND V4 ARE THE EVAPOTRANSPIRATION DATA FOR POINTS 1, 2,  ***RDC35700
***         3 AND 4, RESPECTIVELY---EVAPOTRANSPIRATION DATA ARE OBTAINED    ***RDC35800
***         FROM THE LIBRARY FILE.                                          ***RDC35900
                  I
   ----------------------------------------
   I   V1=EVAPO(LONGI,LAT)               I                                  RDC36000
   I   V2=EVAPO(LONGI,LAT1)              I                                  RDC36100
   I   V3=EVAPO(LONGI1,LAT1)             I                                  RDC36200
   I   V4=EVAPO(LONGI1,LAT)              I                                  RDC36300
   ----------------------------------------
                  I
***     DLAT IS THE FRACTIONAL DEGREE OF LATITUDE REPRESENTING THE          ***RDC36400
***         DISTANCE BETWEEN THE CITY AND THE ADJACENT INTEGRAL DEGREE OF   ***RDC36500
***         LATITUDE SOUTH OF THE CITY.                                     ***RDC36600
***     DLAT=LATD-25.0-FLOAT(LAT)                                           ***RDC36700
***     DLONG IS THE FRACTIONAL DEGREE OF LONGITUDE REPRESENTING THE        ***RDC36800
***         DISTANCE BETWEEN THE CITY AND THE ADJACENT INTEGRAL DEGREE OF   ***RDC36900
***         LONGITUDE EAST OF THE CITY.                                     ***RDC37000
***     DLONG=LONG-65.0 -FLOAT(LONGI)                                       ***RDC37100
***     CALCULATES THE RAINFALL FOR THE POINT AT LATITUDE LAT AND           ***RDC37200
                  I
                  I

***         LONGITUDE OF THE CITY VIA INTERPOLATING RAINFALL DATA FOR       ***RDC37300
***         POINTS 1 AND 4.                                                 ***RDC37400
***      R5=R1+(R4-R1)*DLONG                                                ***RDC37500
***      CALCULATES THE RAINFALL FOR THE POINT AT LATITUDE LAT1 AND         ***RDC37600
***         LONGITUDE OF THE CITY VIA INTERPOLATING RAINFALL DATA FOR       ***RDC37700
***         POINTS 2 AND 3                                                  ***RDC37800
***      R6=R2+(R3-R2)*DLONG                                                ***RDC37900
***      CALCULATES THE SUMMER PRECIPITATION FOR THE CITY VIA INTERPOLATING ***RDC38000
***         BETWEEN THE CALCULATED VALUES OF RAINFALL FOR POINTS 5 AND 6.   ***RDC38100
                  I
    ----------------------------------------
    I   RAINSM=(R1+R2+R3+R4)/4.0          I                                 RDC38200
    ----------------------------------------
                  I
***     CALCULATES THE EVAPOTRANSPIRATION FOR THE POINT AT LATITUDE LAT     ***RDC38300
***         AND LONGITUDE OF THE CITY VIA INTERPOLATING EVAPOTRANSPIRATION  ***RDC38400
***         DATA FOR POINTS 1 AND 4                                         ***RDC38500
***      V5=V1+(V4-V1)*DLONG                                                ***RDC38600
***      CALCULATES THE EVAPOTRANSPIRATION FOR THE POINT AT LATITUDE LATI   ***RDC38700
***         AND LONGITUDE OF THE CITY VIA INTERPOLATING EVAPOTRANSPIRATION  ***RDC38800
***         DATA FOR POINTS 2 AND 3                                         ***RDC38900
***      V6=V2+(V3-V3)*DLONG                                                ***RDC39000
***      CALCULATES AND STORES THE SUMMER EVAPOTRANSPIRATION FOR THE CITY   ***RDC39100
***         VIA OF INTERPOLAITNG BETWEEN THE CALCULATED VALUES OF           ***RDC39200
***         EVAPOTRANSPIRATION FOR POINTS 5 AND 6.                          ***RDC39300
                  I
    ----------------------------------------
    I   EVAPSM=(V1+V2+V3+V4)/4.0          I                                 RDC39400
    ----------------------------------------
                  I
***     STORES THE MAXIMUM DAILY EVAPOTRANSPIRATION FOR THE CITY            ***RDC39500
                  I
    ----------------------------------------
    I   EVAPMX=0.29                       I                                 RDC39600
    I   ELONG=100.                        I
    ----------------------------------------
                  I
***     DETERMINES IF THE CITY IS LOCATED WEST OF THE ROCKY MOUNTAINS--IF   ***RDC39800
***         SO, THE MAXIMUM DAILY EVAPOTRANSPIRATION FOR THE CITY CHANGES   ***RDC39900
                  I
    ----------------------------------------
    I   IF(LONG.GE.ELONG)EVAPMX=0.25      I                                 RDC40000
    ----------------------------------------
                  I
***     EVAPNT IS THE NET EVAPOTRANSPIRATION---USED IN SPRINKLING EQUATION  ***RDC40100
                  I
                  I
                  I
                  I
                  I
                  I
```

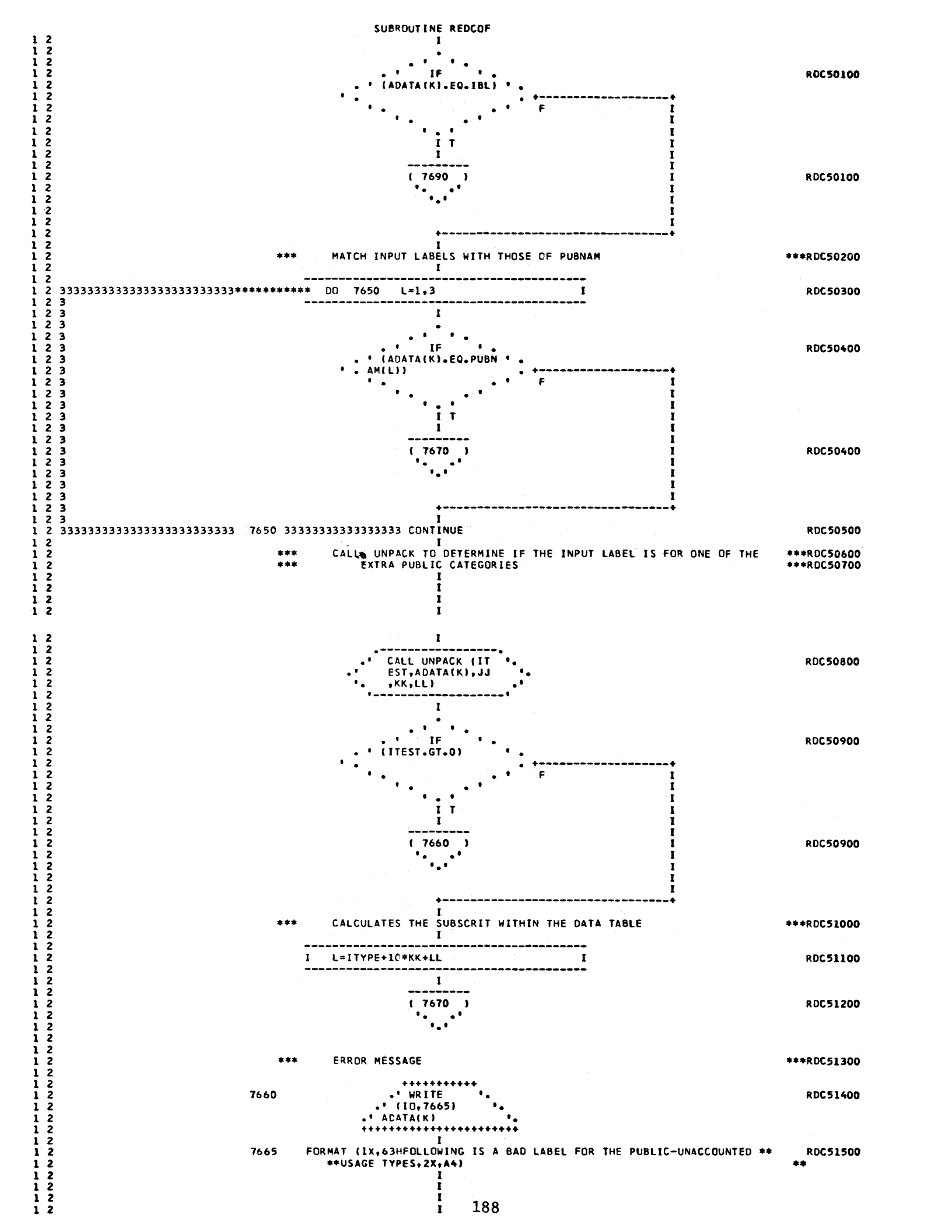
```
                    SUBROUTINE REDCOF
                          I
           ---------------------------------------
           I   EVAPNT=EVAPSM-0.6*RAINSM          I              RDC40200
           ---------------------------------------
                          I
     ***                                                         ***RDC40300
     ***                                                         ***RDC40400
                          I
                      ---------
                      ( 100   )                                    RDC40500
                       '.   .'
                         '.'


     ***.....                                                    ***RDC40600
     ***.....                                                    ***RDC40700
     ***.....THE FOLLOWING READS IN INDUSTRIAL COEFFICIENTS      ***RDC40800
     ***.....                                                    ***RDC40900
     ***.....                                                    ***RDC41000
     ***                                                         ***RDC41100
     ***     TEST FOR END OF INPUT TO SUBROUTINE                 ***RDC41200
     ***                                                         ***RDC41300

                          .
                      . '   ' .
 2010              . '   IF    ' .                                 RDC41400
               . '  (II.EQ.10)    ' .
             .                        .+-----------------+
               ' .                 . '  F                I
                   ' .         . '                       I
                       ' . . '                           I
                        I T                              I
                        I                                I
                      ---------                          I
                      ( 100   )                          I         RDC41400
                       '.   .'                           I
                         '.'                             I
                                                         I
                                                         I
                        +--------------------------------+
                        I
     ***                                                         ***RDC41500
     ***     TEST FOR CATEGORY LABELS INPUT                      ***RDC41600
     ***                                                         ***RDC41700
                        I
                        I
                        I
                        I
                        I
                        I
                        I

                        I
                        .
                    . '   ' .
                 . '   IF    ' .                                   RDC41800
              . '  (II.EQ.2)    ' .
            .                       .+-------------------+
              ' .               . '  F                   I
                  ' .       . '                          I
                      ' . . '                            I
                       I T                               I
                       I                                 I
                     ---------                           I
                     ( 2400  )                           I         RDC41800
                      '.   .'                            I
                        '.'                              I
                                                         I
                                                         I
                       +---------------------------------+
                       I
     ***                                                         ***RDC41900
     ***     OTHERWISE IT WILL BE INDUSTRY USAGE COEFFICIENTS    ***RDC42000
     ***                                                         ***RDC42100
                       I
           ---------------------------------------
           I   II=100*(II-4)+804                 I              RDC42200
           ---------------------------------------
                       I
                  +++++++++++
 2100            .' READ       '.                                  RDC42300
               .'  (IT,2101)     '.
             .'  (DATA(I),I=1,6)   '.
             +++++++++++++++++++++++
                       I
                       .
                   . '   ' .
                . '   IF    ' .                                    RDC42400
             . '  (LIBY.EQ.0)   ' .
           .                        .+-------------------+
             ' .                . '  F                   I
                 ' .        . '                          I
                     ' . . '                             I
                       I T                               I
                       I                                 I
                       I                                 I
                       I                                 I
                       I                                 I
                       I                                 I
                       I                                 I
                       I                                 I
                       I                                 I
```


SUBROUTINE REDCOF
WRITE (IO,2101) (DATA(I),I=1,6)
RDC42400
2101 FORMAT (3(1X,A4,1X,F16.3)) ** RDC42600
DO 2300 I=1,6,2
RDC42700
***RDC42800
*** TEST FOR END OF DATA CARD ***RDC42900
***RDC43000
IF (DATA(I).EQ.EOD)
RDC43100
F
T
100
RDC43100
IF (DATA(I).EQ.BLANK)
RDC43200
F
T
2300
RDC43200
***RDC43300
*** DECODE IDENTITY AND STORE COEFFICIENTS ***RDC43400
***RDC43500
CALL UNPACK (ITEST,DATA(I),J,K,L)
RDC43600
IF (ITEST.GT.0)
RDC43700
F
T
2200
RDC43700

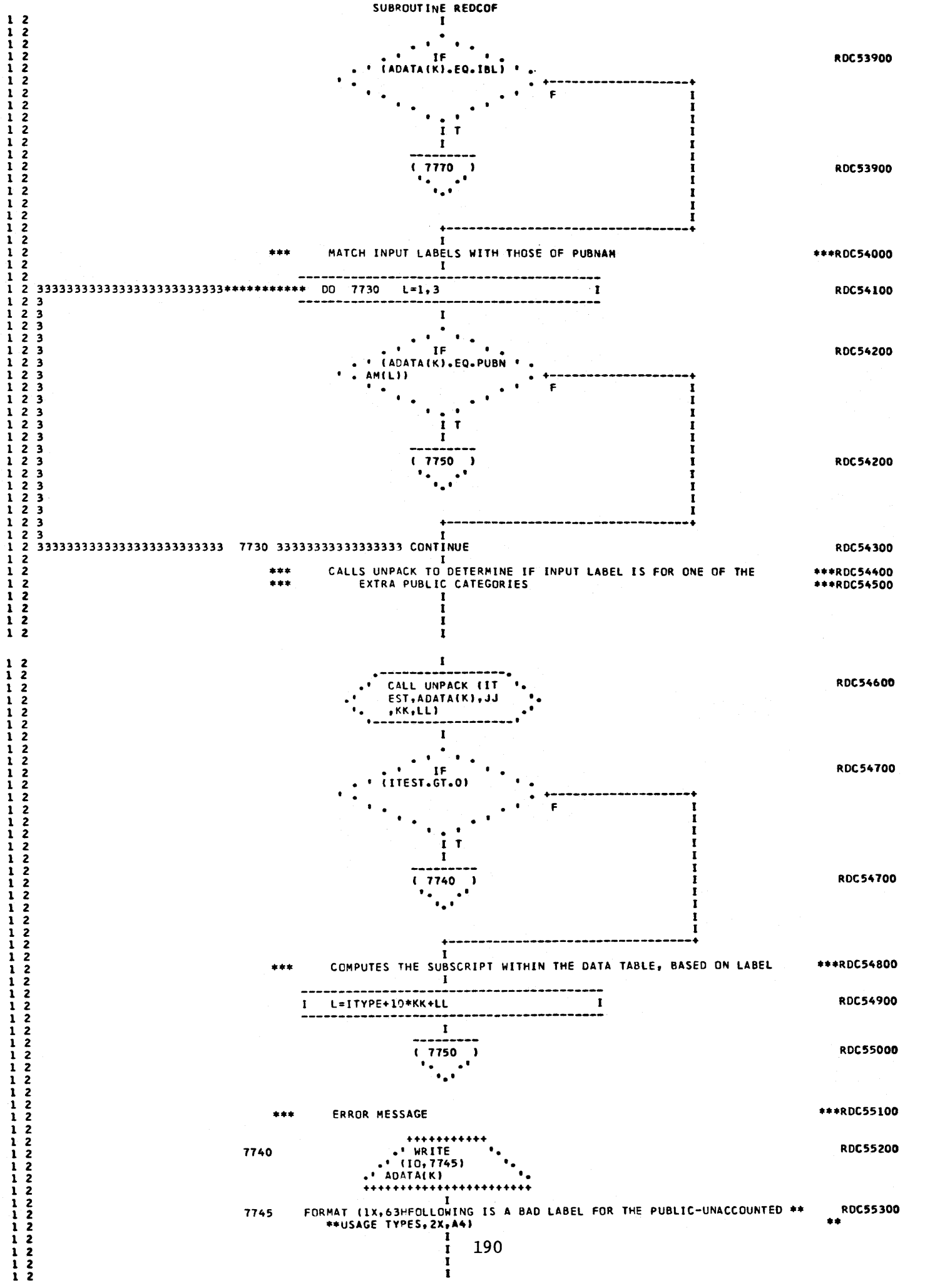

SUBROUTINE REDCOF
INDX=100*(J-2)+10*K+L+II
DDATA(INDX)=DATA(I+1)
2300
2200
WRITE
(IO,2201)
DATA(I)
2201 FORMAT(1HO,A4,37H IS NOT A VALID COEFFICIENT IDENTITY.)
LERR=LERR+1
2300 CONTINUE
2100
DECODE IDENTITY AND STORE LABELS
2400 CONTINUE
2500
READ
(IT,2501)
(DATA(I),I=1,15)
IF
(LIBY.EQ.0)
F
T
WRITE
(IO,2501)
(DATA(I),I=1,15)
2501 FORMAT (3(1X,A4,1X,4A4))
DO 2800 I=1,15,5
TEST FOR END OF DATA CARD
IF
(DATA(I).EQ.EOD)
F
T
100


SUBROUTINE REDCOF
IF (DATA(I).EQ.BLANK)
F
T
(2800)
RDC45900
RDC45900
***RDC46000
***DECODE AND STORE LABELS ***RDC46100
***RDC46200
CALL UNPACK (ITEST,DATA(I),J,K,L)
RDC46300
IF (ITEST.GT.0)
RDC46400
F
T
(2700)
RDC46400
INDX=4*(100*(J-2)+10*K+L)+4
DDATA(INDX)=DATA(I+1)
DDATA(INDX+1)=DATA(I+2)
DDATA(INDX+2)=DATA(I+3)
DDATA(INDX+3)=DATA(I+4)
RDC46500
RDC46600
RDC46700
RDC46800
RDC46900
(2800)
RDC47000
2700 WRITE (IO,2701) DATA(I)
RDC47100
2701 FORMAT (1HO,A4,31H IS NOT A VALID INDUSTRY LABEL.) **
RDC47200
LERR=LERR+1
RDC47300
2800 CONTINUE
RDC47400
(2500)
RDC47500
***.....
***.....
***.....THE FOLLOWING READS IN PUBLIC AND UNACCOUNTED COEFFICIENTS
***.....
***.....
***RDC47600
***RDC47700
***RDC47800
***RDC47900
***RDC48000
7610 CONTINUE
RDC48100
***NDATA EQUALS THE NUMBER OF VARIABLES IN THE PDATA MASTER TABLE UP TO PCOFAA TABLE
***RDC48200
***RDC48300
NDATA=5*30
RDC48400
***CALCULATES THE SUBSCRIPT OF THE DATA TABLES
***RDC48500


SUBROUTINE REDCOF
ISECT=(I-1)*15+NDATA
RDC48600
*** DETERMINES IF THE NAMES FOR THE PUBLIC USAGE TYPES ARE TO BE PROCESSED ***RDC48700 ***RDC48800
IF (ANAME2.EQ.NPNAME (8))
RDC48900
T
F
7710
RDC48900
*** PROCESSES THE ANNUAL AVERAGE,MAXIMUM DAILY,AND PEAK HOURLY DATA FOR THE PUBLIC USAGES TYPES ***RDC49000 ***RDC49100
DO 7700 I=1,1000
RDC49200
READ (IT,7640) (ADATA(N),N=1,6)
RDC49300
IF (LIBY.EQ.0)
RDC49400
WRITE (IO,7640) (ADATA(N),N=1,6)
RDC49400
7640 FORMAT (3(1X,A4,1X,F16.3)) ** RDC49600
*** TEST FOR END OF BLOCK OF COEFFICIENT DATA ***RDC49700
IF (ADATA(1).EQ.ENDD)
RDC49800
100
RDC49800
*** TEST FOR BLANK DATA FIELDS ***RDC49900
DO 7690 K=1,6,2
RDC50000


SUBROUTINE REDCOF
IF
(ADATA(K).EQ.IBL)
F
T
7690
RDC50100
*** MATCH INPUT LABELS WITH THOSE OF PUBNAM ***RDC50200
DO 7650 L=1,3
RDC50300
IF
(ADATA(K).EQ.PUBN
AM(L))
F
T
7670
RDC50400
7650 33333333333333333 CONTINUE
RDC50500
*** CALL UNPACK TO DETERMINE IF THE INPUT LABEL IS FOR ONE OF THE ***RDC50600
*** EXTRA PUBLIC CATEGORIES ***RDC50700
CALL UNPACK (IT
EST,ADATA(K),JJ
,KK,LL)
RDC50800
IF
(ITEST.GT.0)
F
T
7660
RDC50900
*** CALCULATES THE SUBSCRIT WITHIN THE DATA TABLE ***RDC51000
L=ITYPE+10*KK+LL
RDC51100
7670
RDC51200
*** ERROR MESSAGE ***RDC51300
7660
WRITE
(IO,7665)
ADATA(K)
RDC51400
7665 FORMAT (1X,63HFOLLOWING IS A BAD LABEL FOR THE PUBLIC-UNACCOUNTED **
**USAGE TYPES,2X,A4)
RDC51500
**

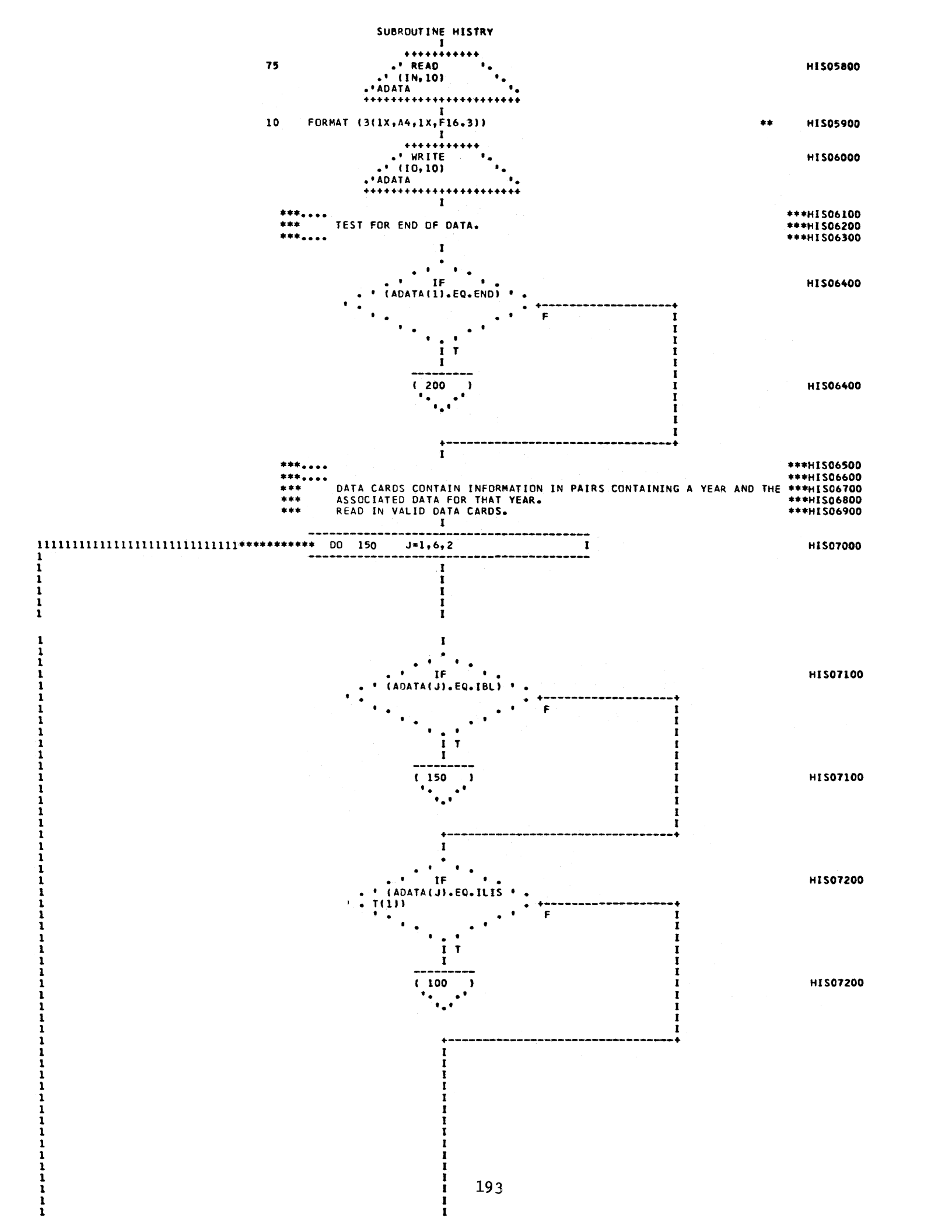
```
                                                    SUBROUTINE REDCOF
1 2                                                       I
1 2                                         ------------------------------------------
1 2                                         I   LERR=LERR+1                          I          RDC51700
1 2                                         ------------------------------------------
1 2                                                       I
1 2                                                   ---------
1 2                                                   ( 7690  )                                 RDC51800
1 2                                                    '.   .'
1 2                                                      '.'
1 2
1 2
1 2                                   ***     SETS JSECT EQUAL TO THE VALUE OF SUBSCRIPT WITHIN THE DATA TABLE  ***RDC51900
1 2                              7670                CONTINUE                                       RDC52000
1 2                                                       I
1 2                                         ------------------------------------------
1 2                                         I   JSECT=L                              I          RDC52100
1 2                                         ------------------------------------------
1 2                                                       I
1 2                                   ***     COMPLETE INDEX FOR INPUT DATA IN THE DATA TABLE                   ***RDC52200
1 2                                                       I
1 2                                         ------------------------------------------
1 2                                         I   IJ=ISECT+JSECT                       I          RDC52300
1 2                                         ------------------------------------------
1 2                                                       I
1 2                                   ***     PUTS THE INPUT DATA IN THE PROPER PLACE IN THE PROPER TABLE       ***RDC52400
1 2                                                       I
1 2                                         ------------------------------------------
1 2                                         I   PDATA(IJ)=ADATA(K+1)                 I          RDC52500
1 2                                         ------------------------------------------
1 2                                                       I
1 2222222222222222222222222222  7690 2222222222222222 CONTINUE                                      RDC52600
1                                                         I
11111111111111111111111111111   7700 1111111111111111 CONTINUE                                      RDC52700
                                                          I
                                      ***     READS AND SETS UP TABLES OF UNITS AND LABELS FOR PUBLIC USAGE TYPE***RDC52800
                                                          I
                                 7710                CONTINUE                                       RDC52900
                                                          I
                                            ------------------------------------------
11111111111111111111111111111***********    DO  7780   I=1,1000                   I          RDC53000
1                                           ------------------------------------------
1                                                         I
1                                                    +++++++++++
1                                                  .' READ      '.                                  RDC53100
1                                                .'  (IT,7720)    '.
1                                              .' (ADATA(N),N=1,15) '.
1                                              ++++++++++++++++++++++
1                                                         I
1                                                         I
1                                                         I
1                                                         I

1                                                         I
1                                                         .
1                                                     .  '  '  .
1                                                 .  '    IF     '  .                               RDC53200
1                                             .  '   (LIBY.EQ.0)     '  .
1                                           '.                          .  +---------------------+
1                                             '  .                   .  '    F                   I
1                                                 '  .           .  '                            I
1                                                     '  .   .  '                                I
1                                                         I T                                    I
1                                                         I                                      I
1                                                    +++++++++++                                 I
1                                                  .' WRITE     '.                               I  RDC53200
1                                                .'  (IO,7720)    '.                             I
1                                              .' (ADATA(N),N=1,15) '.                           I
1                                              ++++++++++++++++++++++                            I
1                                                         I                                      I
1                                                         +--------------------------------------+
1                                                         I
1                                7720    FORMAT (3(1X,A4,1X,4A4))                          **       RDC53400
1                                                         I
1                                     ***     TEST FOR END OF BLOCK OF INPUT DATA                   ***RDC53500
1                                                         I
1                                                         .
1                                                     .  '  '  .
1                                                 .  '    IF     '  .                               RDC53600
1                                             .  '  (ADATA(1).EQ.ENDD '  .
1                                           '. )                        .  +---------------------+
1                                             '  .                   .  '    F                   I
1                                                 '  .           .  '                            I
1                                                     '  .   .  '                                I
1                                                         I T                                    I
1                                                         I                                      I
1                                                    ---------                                   I
1                                                    ( 100   )                                   I  RDC53600
1                                                     '.   .'                                    I
1                                                       '.'                                      I
1                                                                                                I
1                                                                                                I
1                                                         +--------------------------------------+
1                                                         I
1                                     ***     TEST FOR BLANK DATA FIELDS                            ***RDC53700
1                                                         I
1                                           ------------------------------------------
1 222222222222222222222222222***********    DO  7770   K=1,15,5                   I          RDC53800
1 2                                         ------------------------------------------
1 2                                                       I
1 2                                                       I
1 2                                                       I
1 2                                                       I
1 2                                                       I
```


SUBROUTINE REDCOF
IF (ADATA(K).EQ.IBL)
F
T
(7770)
*** MATCH INPUT LABELS WITH THOSE OF PUBNAM
DO 7730 L=1,3
IF (ADATA(K).EQ.PUBN AM(L))
F
T
(7750)
7730 33333333333333333 CONTINUE
*** CALLS UNPACK TO DETERMINE IF INPUT LABEL IS FOR ONE OF THE
*** EXTRA PUBLIC CATEGORIES
CALL UNPACK (IT EST,ADATA(K),JJ ,KK,LL)
IF (ITEST.GT.0)
F
T
(7740)
*** COMPUTES THE SUBSCRIPT WITHIN THE DATA TABLE, BASED ON LABEL
L=ITYPE+10*KK+LL
(7750)
*** ERROR MESSAGE
7740 WRITE (IO,7745) ADATA(K)
7745 FORMAT (1X,63HFOLLOWING IS A BAD LABEL FOR THE PUBLIC-UNACCOUNTED ** **USAGE TYPES,2X,A4)

```
                                          SUBROUTINE REDCOF
1 2                                               I
1 2                                ----------------------------------------
1 2                                I   LERR=LERR+1                        I          RDC55500
1 2                                ----------------------------------------
1 2                                               I
1 2                                           ---------
1 2                                           ( 7770  )                              RDC55600
1 2                                            '.   .'
1 2                                              '.'
1 2
1 2                        7750                CONTINUE                              RDC55700
1 2                                               I
1 2                           ***     MAKES CORRECTION FOR SUBSCRIPT WITHIN THE UNITS AND LABEL TABLES  ***RDC55800
1 2                                               I
1 2                                ----------------------------------------
1 2                                I   JSECT=(L-1)*4+1                    I          RDC55900
1 2                                ----------------------------------------
1 2                                               I
1 2                           ***     COMPLETES INDEX INPUT DATA IN DATA TABLE                   ***RDC56000
1 2                                               I
1 2                                ----------------------------------------
1 2                                I   IJ=ISECT+JSECT                     I          RDC56100
1 2                                ----------------------------------------
1 2                                               I
1 2                           ***     PUTS THE INPUT DATA IN THE PROPER PLACE IN THE PROPER TABLE   ***RDC56200
1 2                                               I
1 2                                ----------------------------------------
1 2                                I   PDATA(IJ)=ADATA(K+1)               I          RDC56300
1 2                                I   PDATA(IJ+1)=ADATA(K+2)             I          RDC56400
1 2                                I   PDATA(IJ+2)=ADATA(K+3)             I          RDC56500
1 2                                I   PDATA(IJ+3)=ADATA(K+4)             I          RDC56600
1 2                                ----------------------------------------
1 2                                               I
1 22222222222222222222222222222  7770 22222222222222222 CONTINUE                     RDC56700
1                                                 I
111111111111111111111111111111  7780 11111111111111111 CONTINUE                      RDC56800
                                                  I
                                              ---------
                           7790               ( 100    )                             RDC56900
                                               '.    .'
                                                 '.'

                           9000                CONTINUE                              RDC57000
                                                  I
                                                  I
                                                  I
                                                  I
                                                  I
                                                  I
                                                  I
                                                  I

                                                  .
                                              . '   ' .
                                          . '    IF     ' .                          RDC57100
                                      . '   (IT.NE.IN)      ' .
                                    .                         . +--------------------+
                                      ' .                 . '    F                   I
                                          ' .         . '                            I
                                              ' . . '                                I
                                                I T                                  I
                                                I                                    I
                                           +++++++++++                               I
                                         .' REWIND    '.                             I   RDC57100
                                       .' IT            '.                           I
                                       ++++++++++++++++++++                          I
                                                I                                    I
                                                +------------------------------------+
                                                I
                                       .-------------------.
                                       I RETURN             '.                           RDC57200
                                       I                      .
                                       I                    .'
                                       --------------------'

***END*******END*******END*******END*******END*******END*******END*******END*******ENC*******END*******END*******END***    RDC57300
```

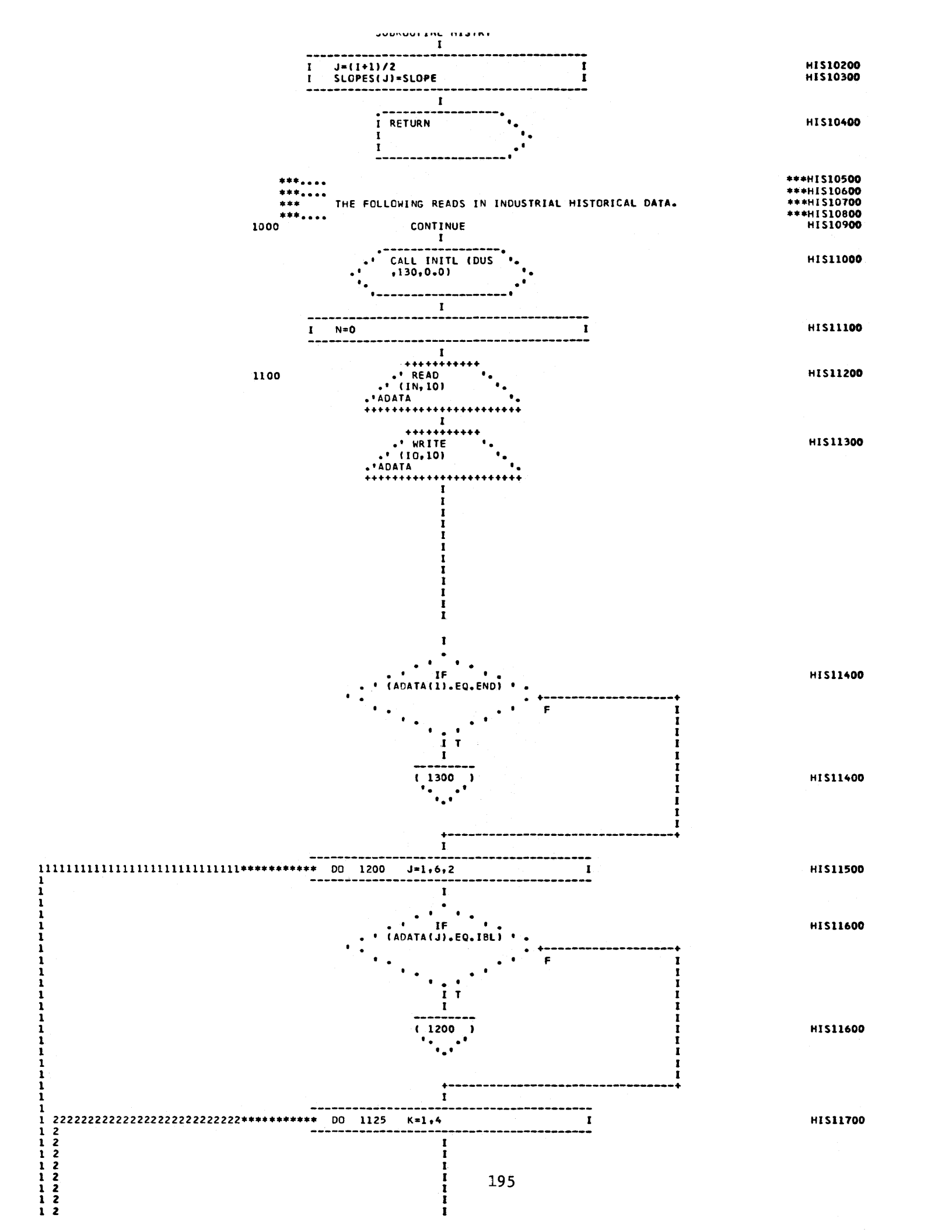
SUBROUTINE HISTRY

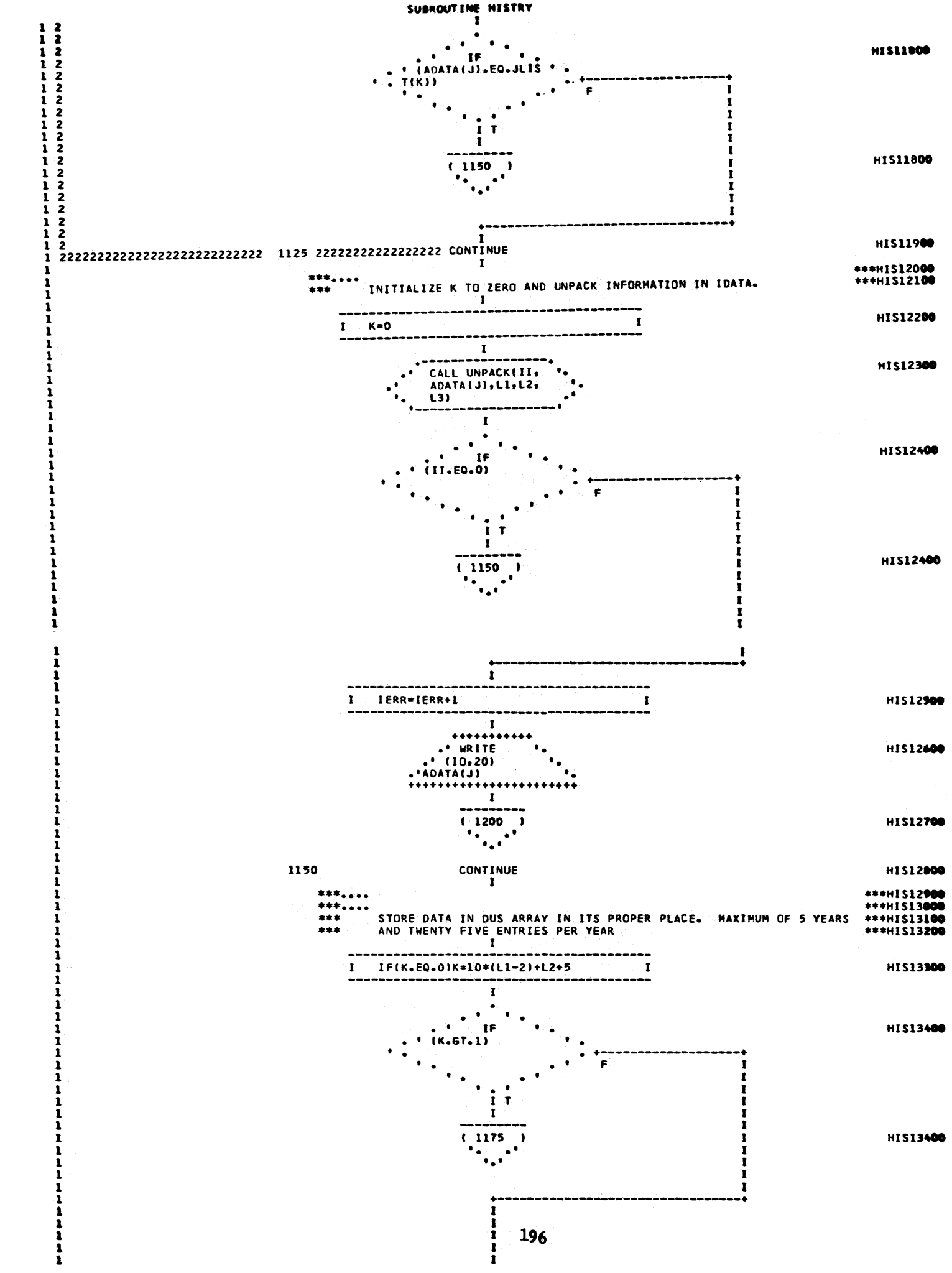
```
        *************************
        **                     **
        ** SUBROUTINE HISTRY   **
        ** (I)                 **
        **                     **
        *************************
                    I
***....
***     THE FOLLOWING READS IN THE HISTORICAL INPUT DATA USING HISTRY.
***....
***....
    REAL IBL
    DIMENSION         ADATA(6),D(5),YR(5),DUS(5,26)
    REAL ILIST(2),JLIST(4)
    DIMENSION MIN(15),MAX(15)
    COMMON/IFILE/IN,IO
    COMMON/HISDAT/SLOPES(25)
                    I
***....
***     THE ARRAY SLOPES CONTAINS HISTORICAL RATES OF CHANGE OF THE
***         FOLLOWINGI
***
***      SLOPES                         DESCRIPTION
***     LOCATION
***
***        1            TOTAL CITY POPULATION
***        2            FRACTION OF CITY POPULATION THAT IS NON-WHITE
***        3            TOTAL NUMBER OF OCCUPIED HOMES IN THE CITY
***        4            FRACTION OF OCCUPIED HOMES IN MEDIUM VALUE RANGE
***        5            FRACTION OF OCCUPIED HOMES IN HIGH VALUE RANGE
***        6            MEDIAN SCHOOL YEARS COMPLETED
***        7            ELEMENTARY SCHOOL ENROLLMENT IN THE CITY
***        8            HIGH SCHOOL ENROLLMENT IN THE CITY
***        9            TOTAL SERVICES EMPLOYMENT IN THE CITY
***       10            MEDICAL SERVICES EMPLOYMENT IN THE CITY
***       12            TOTAL EMPLOYMENT TO TOTAL POPULATION
***       11            PER CAPITA INCOME
***       13
***      THRU           INDUSTRY GROUPS 1 TO 11 TO TOTAL POPULATION
***       23
***       24            TOTAL EMP IN TRANS, COMM, AND PU TO CITY EMPLOYMENT
***       25            TOTAL MFG EMPLOYMENT TO TOTAL CITY EMPLOYMENT
***....
***....
    DATA ILIST /4HYEAR,4HDATA/
    DATA JLIST/4HYEAR,4HPOPU,4HICOM,4HEMPL/
    DATA MIN  /3,4,5,7,9,13,15,16,17,18,20,22,23,25,26/
    DATA MAX  /3,4,6,8,12,14,15,16,17,19,21,22,24,25,26/
    DATA  END /4HENDD/
    DATA IBL /4H    /
                    I

                    I
***....
***....
***     INITIALIZE YR TO ZERO.
***....
                    I
          .'-----------------.
        .'  CALL INITL (YR,   '.
       .'   5,0.0)             '.
        '.                    .'
          '------------------'
                    I
***....
***     IF IT IS INDUSTRIAL HISTORY DATA PERFORM INDUSTRIAL HISTORY CALCS.
                    I
                    .
                .  '  '  .
             . '    IF      ' .
          . '  (I.EQ.21)       ' .
        .  .                      .  +--------------------+
             .  .            .  '  F                      I
                  .  .  .  .                              I
                    .                                     I
                    I T                                   I
                    I                                     I
                ---------                                 I
               ( 1000   )                                 I
                 '.  .'                                   I
                   '.'                                    I
                                                          I
                                                          I
                    +-------------------------------------+
                    I
***....
***....
***     INITIALIZE A COUNTER (N).
                    I
    -----------------------------------------
    I   N=0                                 I
    -----------------------------------------
                    I
***....
***     THE FOLLOWING READS IN ALL HISTORICAL DATA EXCEPT INDUSTRIAL DATA.
***....
                    I
                    I
                    I
                    I
                    I
                    I
                    I
```


SUBROUTINE HISTRY
75 READ (IN,10) ADATA
HIS05800
10 FORMAT (3(1X,A4,1X,F16.3)) **
HIS05900
WRITE (IO,10) ADATA
HIS06000
***.... ***HIS06100
*** TEST FOR END OF DATA. ***HIS06200
***.... ***HIS06300
IF (ADATA(1).EQ.END)
HIS06400
F
T
(200)
HIS06400
***.... ***HIS06500
***.... ***HIS06600
*** DATA CARDS CONTAIN INFORMATION IN PAIRS CONTAINING A YEAR AND THE ***HIS06700
*** ASSOCIATED DATA FOR THAT YEAR. ***HIS06800
*** READ IN VALID DATA CARDS. ***HIS06900
DO 150 J=1,6,2
HIS07000
IF (ADATA(J).EQ.IBL)
HIS07100
F
T
(150)
HIS07100
IF (ADATA(J).EQ.ILIS T(1))
HIS07200
F
T
(100)
HIS07200

SUBROUTINE HISTRY

```
          IF (ADATA(J).EQ.ILIST(2))                                  HIS07300
          T
          ( 125 )                                                    HIS07300
          F

      I  IERR=IERR+1                                     I           HIS07400

          WRITE (IO,20) ADATA(J)                                     HIS07500

 20   FORMAT (1H0,A4,37H IS NOT A VALID HISTORICAL DATA CARD.)  **   HIS07600

          ( 150 )                                                    HIS07700

   ***....                                                        ***HIS07800
   ***....                                                        ***HIS07900

 100  I  N=N+1                                           I           HIS08000
      I  YR(N)=ADATA(J+1)                                I           HIS08100

          ( 150 )                                                    HIS08200

 125  I  D(N)=ADATA(J+1)                                 I           HIS08300

 150  1111111111111111 CONTINUE                                      HIS08400

          ( 75 )                                                     HIS08500

 200                   CONTINUE                                      HIS08600

   ***....                                                        ***HIS08700
   ***     ALL DATA IS IN --- DETERMINE THE SLOPE.                ***HIS08800
   ***....                                                        ***HIS08900
   ***....                                                        ***HIS09000
   ***     NORMALIZE YEARS TO ONE DIGIT.                          ***HIS09100

      I  A=YR(1)-1.0                                     I           HIS09200

      DO  300     J=1,N                                  I           HIS09300

      I  YR(J)=YR(J)-A                                   I           HIS09400

 300  1111111111111111 CONTINUE                                      HIS09500

   ***....                                                        ***HIS09600
   ***....                                                        ***HIS09700
   ***     CALL A LINEAR REGRESSION SUBROUTINE TO DEVELOPE THE HISTORICAL ***HIS09800
   ***     RATE OF CHANGE IN THE DATA.                            ***HIS09900

          CALL LREGRS (N,
           YR,D,SLOPE,C)                                             HIS10000

   ***     SAVE THE SLOPES IN AN ARRAY FOR FUTURE USE.            ***HIS10100
```

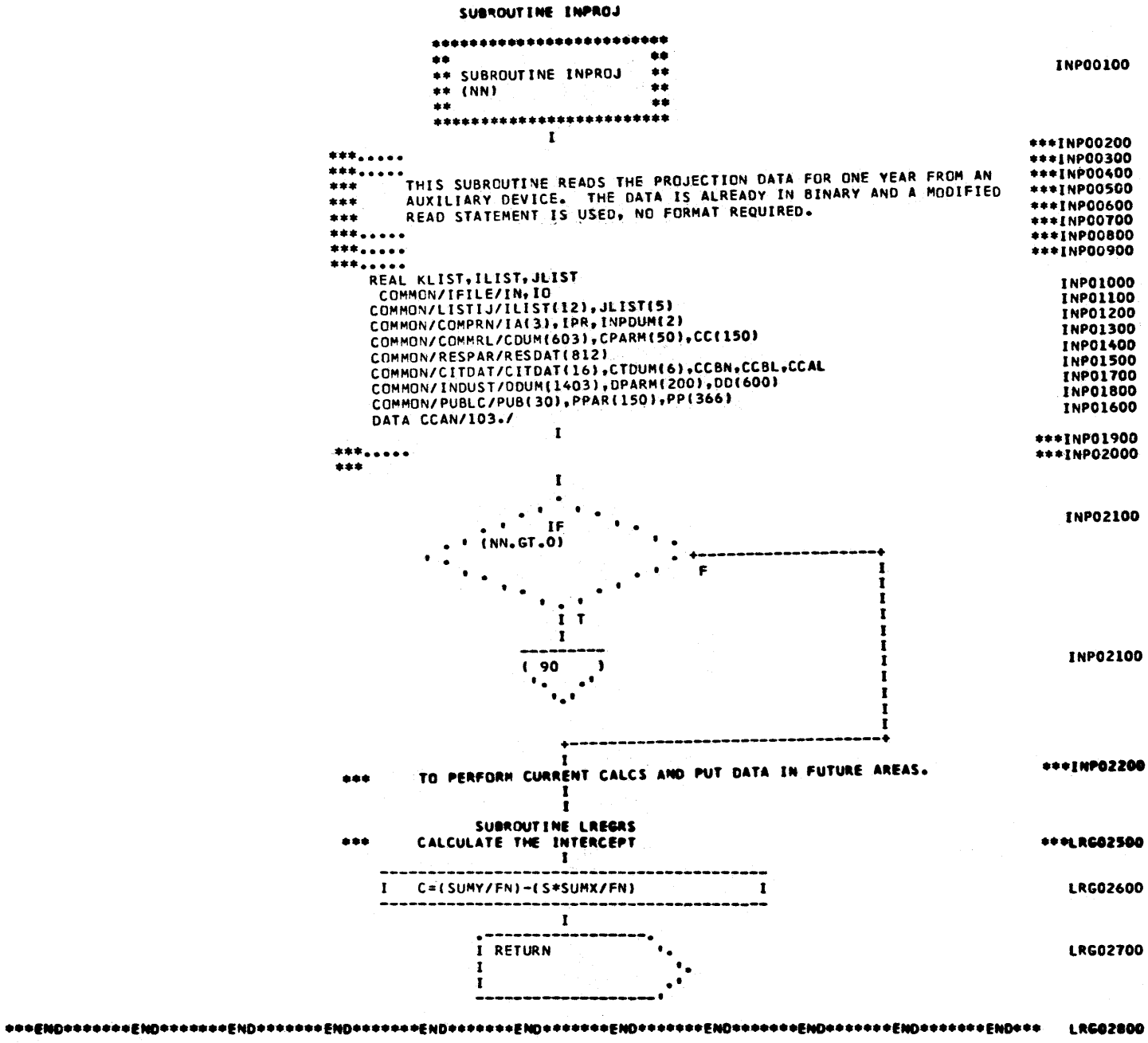

SUBROUTINE HISTRY
J=(I+1)/2
SLOPES(J)=SLOPE
RETURN
HIS10200
HIS10300
HIS10400
***HIS10500
***HIS10600
***HIS10700
***HIS10800
THE FOLLOWING READS IN INDUSTRIAL HISTORICAL DATA.
1000 CONTINUE
HIS10900
CALL INITL (DUS ,130,0.0)
HIS11000
N=0
HIS11100
1100 READ (IN,10) ADATA
HIS11200
WRITE (IO,10) ADATA
HIS11300
IF (ADATA(1).EQ.END)
HIS11400
F
T
1300
HIS11400
DO 1200 J=1,6,2
HIS11500
IF (ADATA(J).EQ.IBL)
HIS11600
F
T
1200
HIS11600
DO 1125 K=1,4
HIS11700


SUBROUTINE HISTRY
IF (ADATA(J).EQ.JLIS T(K))
F
T
(1150)
HIS11800
HIS11900
2222222222222222222222222222 1125 22222222222222222 CONTINUE
***HIS12000
*** INITIALIZE K TO ZERO AND UNPACK INFORMATION IN IDATA. ***HIS12100
K=0
HIS12200
CALL UNPACK(II, ADATA(J),L1,L2, L3)
HIS12300
IF (II.EQ.0)
F
T
(1150)
HIS12400
IERR=IERR+1
HIS12500
WRITE (IO,20) ADATA(J)
HIS12600
(1200)
HIS12700
1150 CONTINUE
HIS12800
***HIS12900
***HIS13000
*** STORE DATA IN DUS ARRAY IN ITS PROPER PLACE. MAXIMUM OF 5 YEARS ***HIS13100
*** AND TWENTY FIVE ENTRIES PER YEAR ***HIS13200
IF(K.EQ.0)K=10*(L1-2)+L2+5
HIS13300
IF (K.GT.1)
F
T
(1175)
HIS13400

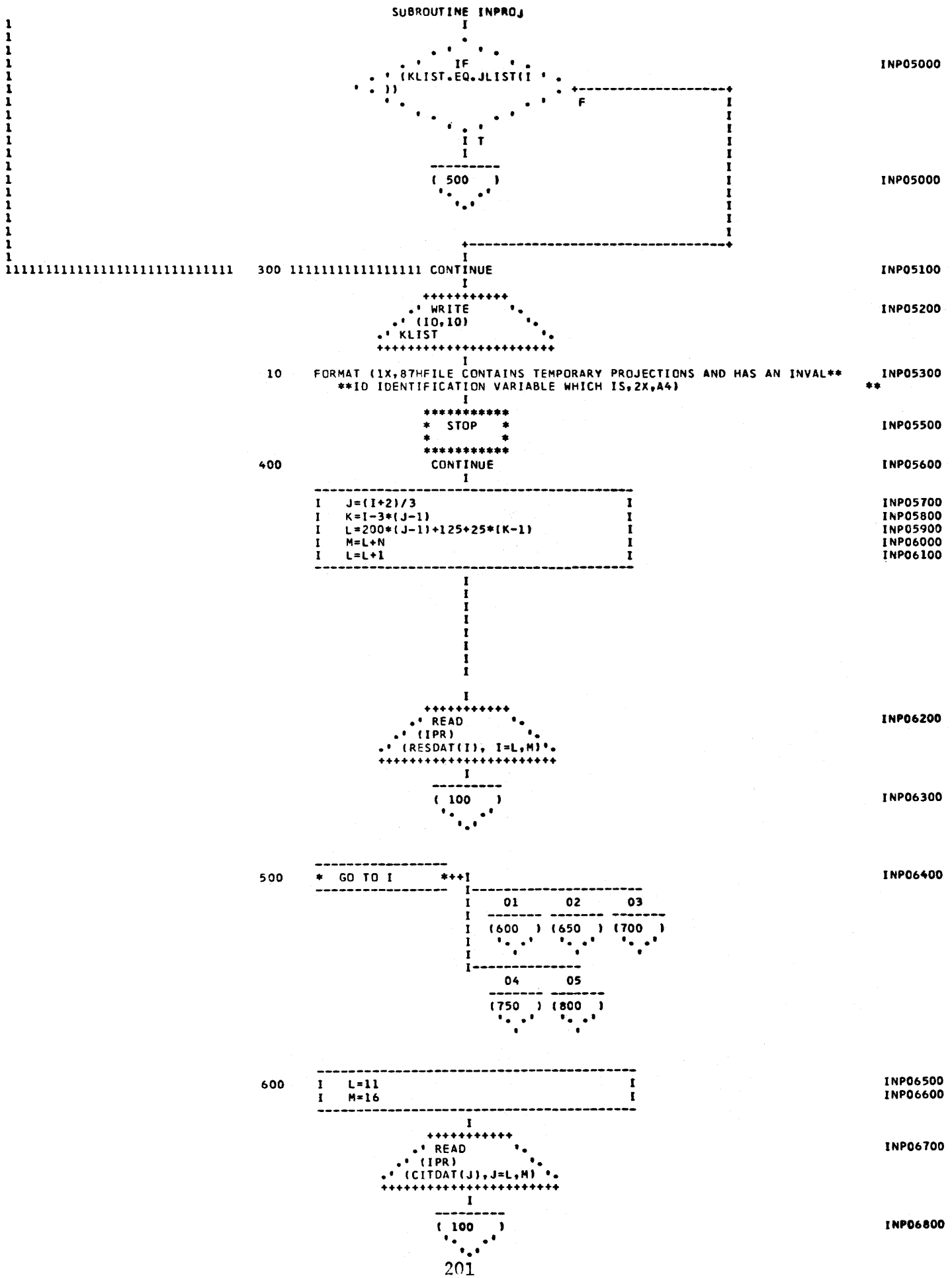
SUBROUTINE HISTRY

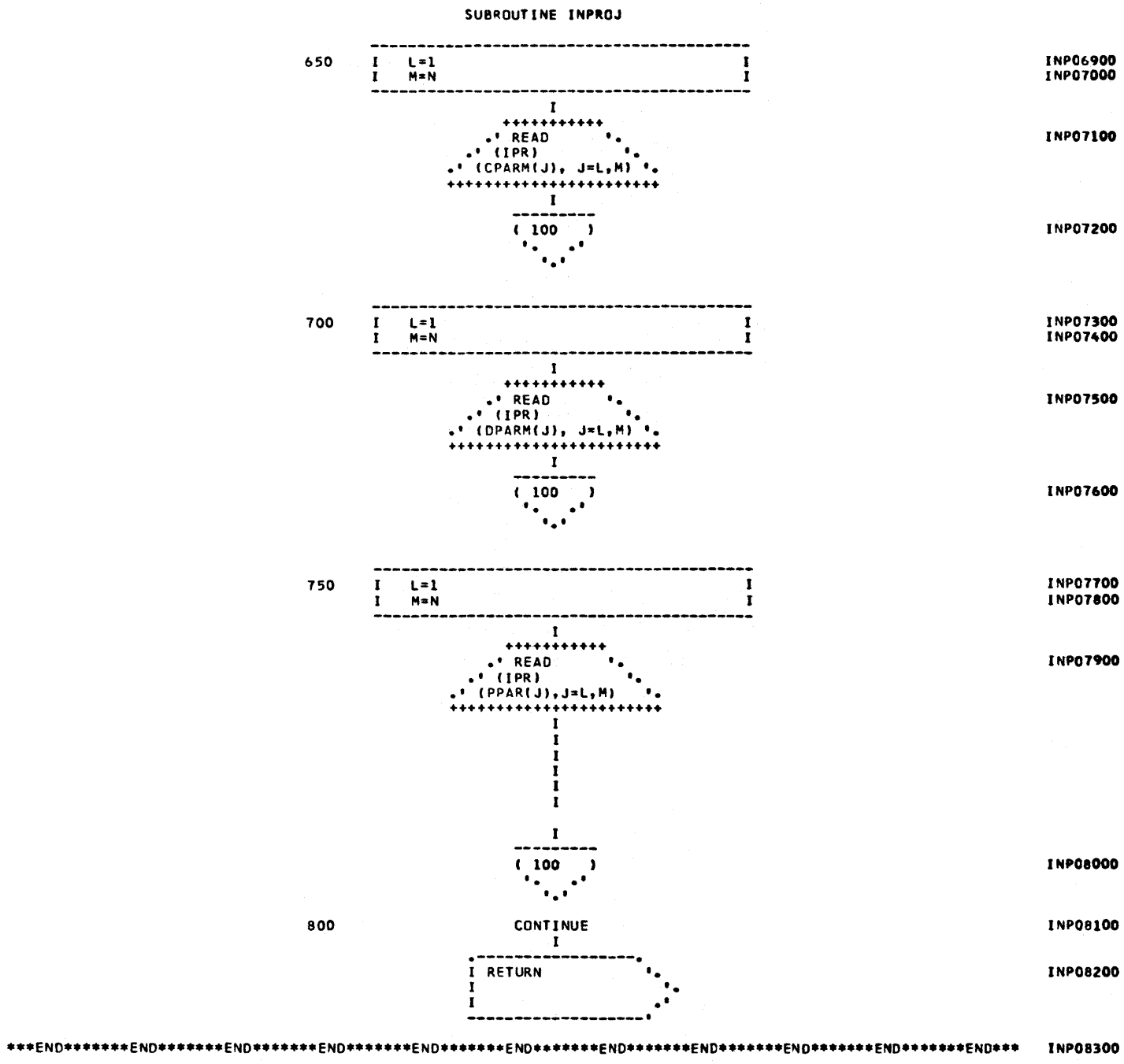
```
1                                                  I
1                                    ----------------------------------------
1                                    I  N=N+1                               I                  HIS13500
1                                    I  DUS(N,26)=N                         I                  HIS13600
1                                    ----------------------------------------
1                                                  I
1                                    ----------------------------------------
1                          1175      I  DUS(N,K)=ADATA(J+1)                 I                  HIS13700
1                                    ----------------------------------------
1                                                  I
11111111111111111111111111111  1200 1111111111111111 CONTINUE                                  HIS13800
                                                   I
                                               ---------
                                               ( 1100  )                                       HIS13900
                                                 .   .
                                                   .

                           1300                CONTINUE                                        HIS14000
                                                   I
                                 ***....                                                    ***HIS14100
                                 ***     ALL DATA CARDS HAVE BEEN INPUT AND PROCESSED       ***HIS14200
                                 ***....                                                    ***HIS14300
                                 ***....                                                    ***HIS14400
                                 ***     NORMALIZE YEARS TO ONE DIGIT AND FOLLOW WITH PROPER DATA.  ***HIS14500
                                                   I
                                    ----------------------------------------
                                    I  A=DUS(1,1)-1.0                      I                   HIS14600
                                    ----------------------------------------
                                                   I
                                    ----------------------------------------
11111111111111111111111111111*********** DO  1400   J=1,N                  I                   HIS14700
1                                   ----------------------------------------
1                                                  I
1                                   ----------------------------------------
1                                   I  DUS(J,1)=DUS(J,1)-A                 I                   HIS14800
1                                   I  YR(J)=DUS(J,1)                      I                   HIS14900
1                                   I  SUM=0.0                             I                   HIS15000
1                                   ----------------------------------------
1                                                  I
1                                   ----------------------------------------
1 222222222222222222222222222*********** DO  1350   L=5,24                 I                   HIS15100
1 2                                 ----------------------------------------
1 2                                                I
1 2                               ***.....                                                  ***HIS15200
1 2                               ***     SUMS SIC CATEGORIES EXCEPT 400 SERIES             ***HIS15300
1 2                               ***.....                                                  ***HIS15400
1 2                                                I
1 2                                                I
1 2                                                I
1 2                                                I
1 2                                                I

1 2                                                I
1 2                                 ----------------------------------------
1 2                                 I  SUM=SUM+DUS(J,L)                    I                   HIS15500
1 2                                 ----------------------------------------
1 2                                                I
1 2                               ***.....                                                  ***HIS15600
1 2                               ***     DIVIDE BY TOTAL POPULATION TO GET FRACTION IN EACH SIC CATEGORY  ***HIS15700
1 2                               ***.....                                                  ***HIS15800
1 2                                                I
1 2                                 ----------------------------------------
1 2                                 I  DUS(J,L)=DUS(J,L)/DUS(J,2)          I                   HIS15900
1 2                                 ----------------------------------------
1 2                                                I
1 222222222222222222222222222  1350 2222222222222222 CONTINUE                                  HIS16000
1                                                  I
1                                 ***.....                                                  ***HIS16100
1                                 ***     CALCULATE FRACTION OF EMPLOYED IN SIC CATEGORY 400  ***HIS16200
1                                 ***.....                                                  ***HIS16300
1                                                  I
1                                   ----------------------------------------
1                                   I  DUS(J,25)=DUS(J,25)/DUS(J,4)        I                   HIS16400
1                                   ----------------------------------------
1                                                  I
1                                 ***.....                                                  ***HIS16500
1                                 ***     CALCULATE FRACTION OF EMPLOYED IN MANUFACTURING EXCEPT SIC 400  ***HIS16600
1                                 ***.....                                                  ***HIS16700
1                                                  I
1                                   ----------------------------------------
1                                   I  DUS(J,26)=SUM/DUS(J,4)              I                   HIS16800
1                                   ----------------------------------------
1                                                  I
1                                 ***.....                                                  ***HIS16900
1                                 ***     CALCULATE FRACTION OF POPULATION EMPLOYED         ***HIS17000
1                                 ***.....                                                  ***HIS17100
1                                                  I
1                                   ----------------------------------------
1                                   I  DUS(J,4)=DUS(J,4)/DUS(J,2)          I                   HIS17200
1                                   ----------------------------------------
1                                                  I
11111111111111111111111111111  1400 1111111111111111 CONTINUE                                  HIS17300
                                                   I
                                    ----------------------------------------
11111111111111111111111111111*********** DO  1500   J=1,15                 I                   HIS17400
1                                   ----------------------------------------
1                                                  I
1                                   ----------------------------------------
1                                   I  L1=MIN(J)                           I                   HIS17500
1                                   I  L2=MAX(J)                           I                   HIS17600
1                                   ----------------------------------------
1                                                  I
1                                                  I
```

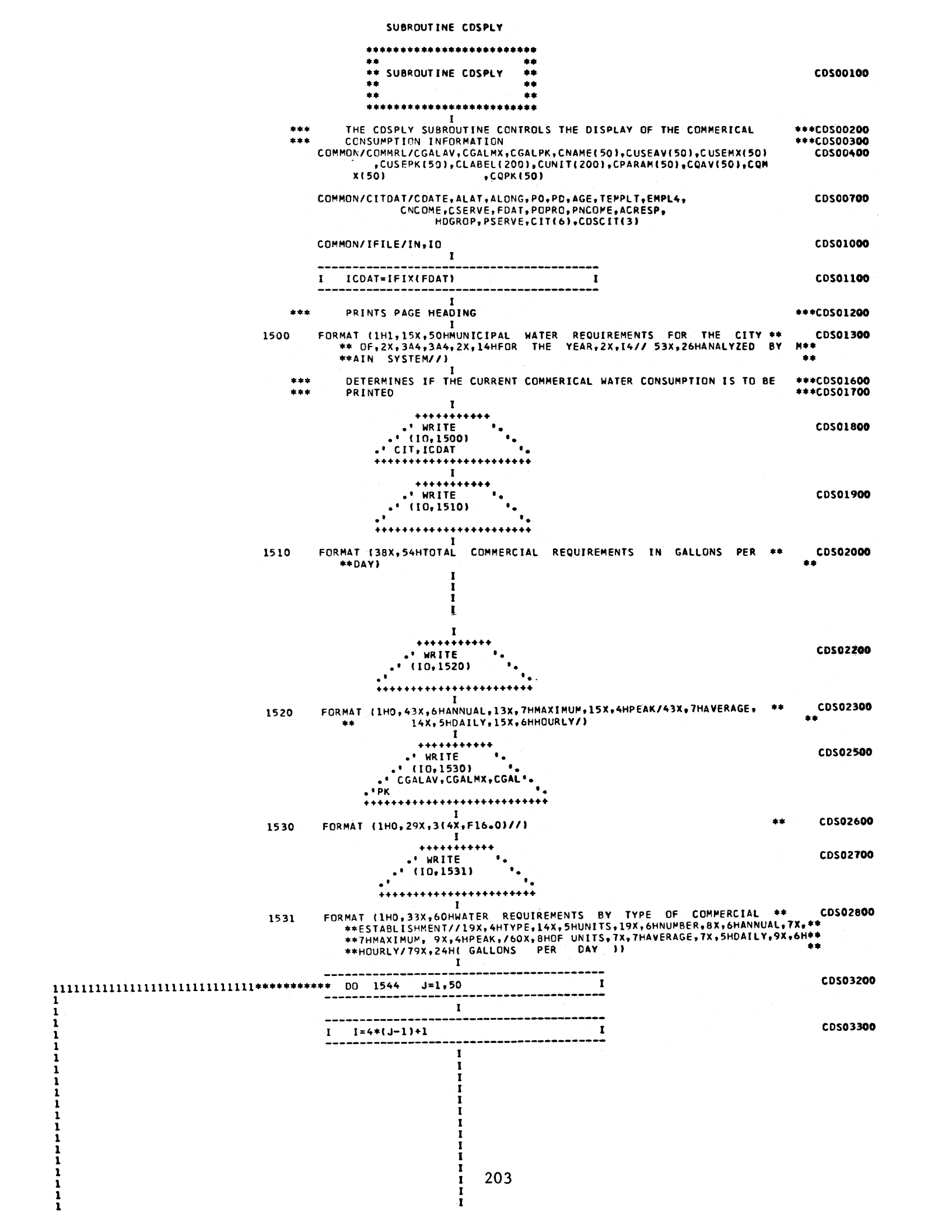
```
                                              SUBROUTINE HISTRY
1                                                   I
1                                   ***....                                                                     ***HIS17700
1                                   ***      INITIALIZE DATA TO ZEROS.                                          ***HIS17800
1                                                   I
1                                         .-----------------.
1                                       .'  CALL INITL(D,5,  '.                                                  HIS17900
1                                     .'    0.0)               '.
1                                      '.                    .'
1                                        '.-----------------.'
1                                                   I
1                                   ***....                                                                     ***HIS18000
1                                   ***      SUM THE PROPER COMBINATIONS OF S.I.C. EMPLOYEES.                   ***HIS18100
1                                                   I
1                                        --------------------------------------
1 22222222222222222222222222*********** DO  1450   L=L1,L2                  I                                    HIS18200
1 2                                      --------------------------------------
1 2                                                 I
1 2                                      --------------------------------------
1 2 333333333333333333333333*********** DO  1425   M=1,N                    I                                    HIS18300
1 2 3                                    --------------------------------------
1 2 3                                               I
1 2 3                                    --------------------------------------
1 2 3                                    I  D(M)=D(M)+DUS(M,L)              I                                    HIS18400
1 2 3                                    --------------------------------------
1 2 3                                               I
1 2 333333333333333333333333  1425 3333333333333333 CONTINUE                                                     HIS18500
1 2                                                 I
1 22222222222222222222222222  1450 2222222222222222 CONTINUE                                                     HIS18600
1                                                   I
1                                   ***....                                                                     ***HIS18700
1                                   ***      DEVELOPE THE SLOPES FOR THE INDUSTRIAL HISTORICAL DATA.            ***HIS18800
1                                                   I
1                                         .-----------------.
1                                       .'  CALL LREGRS (N,  '.                                                  HIS18900
1                                     .'    YR,D,SLOPE,C)      '.
1                                      '.                    .'
1                                        '.-----------------.'
1                                                   I
1                                        --------------------------------------
1                                        I  K=J+10                          I                                    HIS19000
1                                        I  SLOPES(K)=SLOPE                 I                                    HIS19100
1                                        --------------------------------------
1                                                   I
1111111111111111111111111111  1500 1111111111111111 CONTINUE                                                     HIS19200
                                                    I
                                             .-----------------.
                                             I RETURN            '.                                              HIS19300
                                             I                     '.
                                             I                    .'
                                             -------------------.'

***END*******END*******END*******END*******END*******END*******END*******END*******END*******END*******END***    HIS19400


                                         ************************
                                         **                    **
                                         ** SUBROUTINE LREGRS  **                                                LRG00100
                                         ** (N,X,Y,S,C)        **
                                         **                    **
                                         ************************
                                                    I
                                    ***....                                                                     ***LRG00200
                                    ***....                                                                     ***LRG00300
                                    ***      THIS IS THE SUBROUTINE THAT CALCULATES THE LINEAR REGRESSIONS.     ***LRG00400
                                    ***....                                                                     ***LRG00500
                                    ***....                                                                     ***LRG00600
                                         DIMENSION X(1),Y(1)                                                     LRG00700
                                                    I
                                         --------------------------------------
                                         I  SUMX=0.0                        I                                    LRG00800
                                         I  SUMXSQ=0.0                      I                                    LRG00900
                                         I  SUMY=0.0                        I                                    LRG01000
                                         I  SUMXY=0.0                       I                                    LRG01100
                                         --------------------------------------
                                                    I
                                    ***....                                                                     ***LRG01200
                                                    I
                                         --------------------------------------
1111111111111111111111111111*********** DO  100    I=1,N                    I                                    LRG01300
1                                        --------------------------------------
1                                                   I
1                                   ***....                                                                     ***LRG01400
1                                                   I
1                                        --------------------------------------
1                                        I  SUMX=SUMX+X(I)                  I                                    LRG01500
1                                        I  SUMXSQ=SUMXSQ+X(I)**2           I                                    LRG01600
1                                        I  SUMY=SUMY+Y(I)                  I                                    LRG01700
1                                        I  SUMXY=SUMXY+X(I)*Y(I)           I                                    LRG01800
1                                        --------------------------------------
1                                                   I
1111111111111111111111111111   100 1111111111111111 CONTINUE                                                     LRG01900
                                                    I
                                    ***....                                                                     ***LRG02000
                                    ***      CALCULATE THE SLOPE                                                ***LRG02100
                                                    I
                                         --------------------------------------
                                         I  FN=N                            I                                    LRG02200
                                         I  S=(FN*SUMXY-SUMX*SUMY)/(FN*SUMXSQ- I                                 LRG02300
                                         I      SUMX**2)                    I
                                         --------------------------------------
                                                    I
                                    ***....                                                                     ***LRG02400
                                                    I
                                                    I
```


SUBROUTINE INPROJ
** SUBROUTINE INPROJ **
** (NN) **
INP00100
***INP00200
***INP00300
*** THIS SUBROUTINE READS THE PROJECTION DATA FOR ONE YEAR FROM AN ***INP00400
*** AUXILIARY DEVICE. THE DATA IS ALREADY IN BINARY AND A MODIFIED ***INP00500
*** READ STATEMENT IS USED, NO FORMAT REQUIRED. ***INP00600
***INP00700
***INP00800
***INP00900
REAL KLIST,ILIST,JLIST INP01000
COMMON/IFILE/IN,IO INP01100
COMMON/LISTIJ/ILIST(12),JLIST(5) INP01200
COMMON/COMPRN/IA(3),IPR,INPDUM(2) INP01300
COMMON/COMMRL/CDUM(603),CPARM(50),CC(150) INP01400
COMMON/RESPAR/RESDAT(812) INP01500
COMMON/CITDAT/CITDAT(16),CTDUM(6),CCBN,CCBL,CCAL INP01700
COMMON/INDUST/ODUM(1403),OPARM(200),DD(600) INP01800
COMMON/PUBLC/PUB(30),PPAR(150),PP(366) INP01600
DATA CCAN/103./
***INP01900
***INP02000
IF
(NN.GT.0)
F
T
INP02100
(90)
INP02100
*** TO PERFORM CURRENT CALCS AND PUT DATA IN FUTURE AREAS. ***INP02200
SUBROUTINE LREGRS
*** CALCULATE THE INTERCEPT ***LRG02500
C=(SUMY/FN)-(S*SUMX/FN) LRG02600
RETURN LRG02700
END****END*******END*******END*******END*******END*******END*******END*******END*******END*******END*** LRG02800

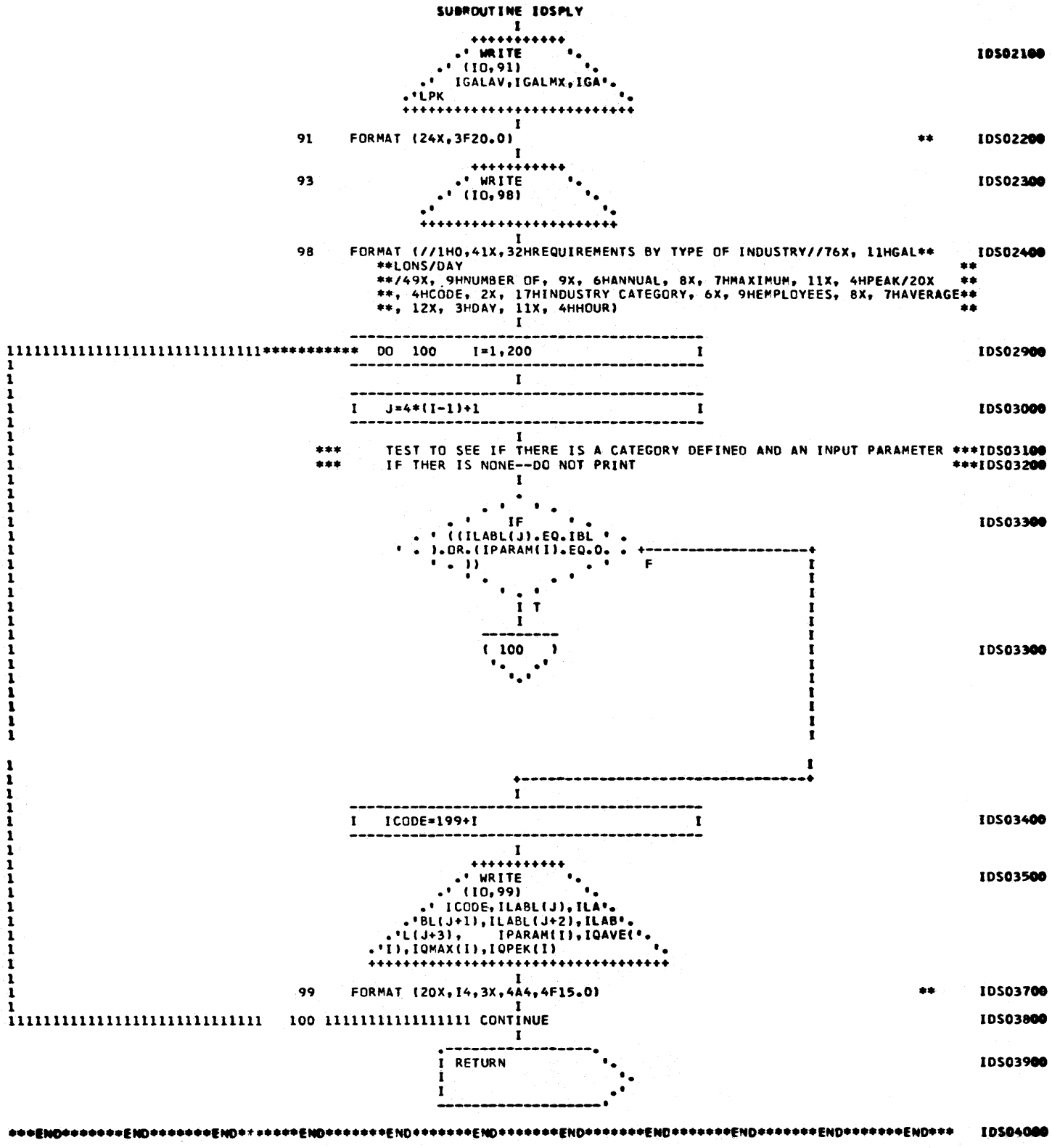
```
                                        SUBROUTINE INPROJ
                                                I
                            ---------------------------------------------
                            I   CITDAT(11)=CITDAT(1)                    I                    INP02300
                            I   CITDAT(12)=CITDAT(4)                    I                    INP02400
                            I   CITDAT(13)=CITDAT(9)                    I                    INP02500
                            I   CITDAT(16)=CITDAT(10)                   I                    INP02600
                            ---------------------------------------------
                                                I
                        ***....                                                            ***INP02700
                        ***     ADJUST ASSESSMENT FACTORS FOR BASE YEAR CONSTRUCTION COST INDEX ***INP02800
                        ***....                                                            ***INP02900
                                                I
                            ---------------------------------------------
                            I   CI=1.                                   I                    INP03000
                            I   IF(CCBN.GT.0.)CI=CCBN/CCAN              I                    INP03100
                            I   IF(CCBL.GT.0..AND.CCAL.GT.0.)CI=CC      I                    INP03200
                            I        BL/CCAL                            I
                            I   N=-150                                  I                    INP03300
                            ---------------------------------------------
                                                I
                            ---------------------------------------------
111111111111111111111111111111***********  DO  50      I=1,4            I                    INP03400
1                           ---------------------------------------------
1                                               I
1                           ---------------------------------------------
1                           I   N=N+200                                 I                    INP03500
1                           ---------------------------------------------
1                                               I
1                           ---------------------------------------------
1 2222222222222222222222222222***********  DO  40      J=1,25           I                    INP03600
1 2                         ---------------------------------------------
1 2                                             I
1 2                         ---------------------------------------------
1 2                         I   II=N+J                                  I                    INP03700
1 2                         I   RESDAT(II)=CI*RESDAT(II)                I                    INP03800
1 2                         ---------------------------------------------
1 2                                             I
1 2222222222222222222222222222    40 2222222222222222 CONTINUE                               INP03900
1                                               I
111111111111111111111111111111    50 1111111111111111 CONTINUE                               INP04000
                                                I
                                    .-------------------.
                                    I RETURN             '.                                  INP04100
                                    I                      .
                                    I                     .'
                                    ---------------------'

                        ***.....                                                           ***INP04200
                      90                     CONTINUE                                        INP04300
                                                I
                                                I

                                                I
                                    .-------------------.
                                  .'  CALL INITL (PPA    '.                                  INP04400
                                 .    R,150,0,0)           .
                                  '.                     .'
                                    '-------------------'
                                                I
                                           +++++++++++
                     100                .' READ        '.                                    INP04500
                                      .'  (IPR)          '.
                                    .'  KLIST,N            '.
                                    +++++++++++++++++++++++++
                                                I
                            ---------------------------------------------
111111111111111111111111111111***********  DO  200     I=1,12           I                    INP04600
1                           ---------------------------------------------
1                                               I
1                                               .
1                                          . '     ' .
1                                      . '     IF      ' .                                   INP04700
1                                   . ' (KLIST.EQ.ILIST(I ' .
1                                  ' . ))                    . +--------------------+
1                                      ' .               . '   F                   I
1                                          ' .       . '                           I
1                                              ' . '                               I
1                                               I T                                I
1                                               I                                  I
1                                          ----------                              I
1                                          ( 400    )                                INP04700
1                                           '.    .'                               I
1                                             '..'                                 I
1                                                                                  I
1                                               +----------------------------------+
1                                               I
111111111111111111111111111111   200 1111111111111111 CONTINUE                               INP04800
                                                I
                            ---------------------------------------------
111111111111111111111111111111***********  DO  300     I=1,5            I                    INP04900
1                           ---------------------------------------------
1                                               I
1                                               I
1                                               I
1                                               I
1                                               I
1                                               I
1                                               I
1                                               I
1                                               I
1                                               I
1                                               I
```


SUBROUTINE INPROJ
IF (KLIST.EQ.JLIST(I))
T
F
500
300 CONTINUE
WRITE (IO,10) KLIST
10 FORMAT (1X,87HFILE CONTAINS TEMPORARY PROJECTIONS AND HAS AN INVAL** **ID IDENTIFICATION VARIABLE WHICH IS,2X,A4)
STOP
400 CONTINUE
J=(I+2)/3
K=I-3*(J-1)
L=200*(J-1)+125+25*(K-1)
M=L+N
L=L+1
READ (IPR) (RESDAT(I), I=L,M)
100
500 GO TO I
01
02
03
04
05
600
600 L=11
M=16
READ (IPR) (CITDAT(J),J=L,M)
100

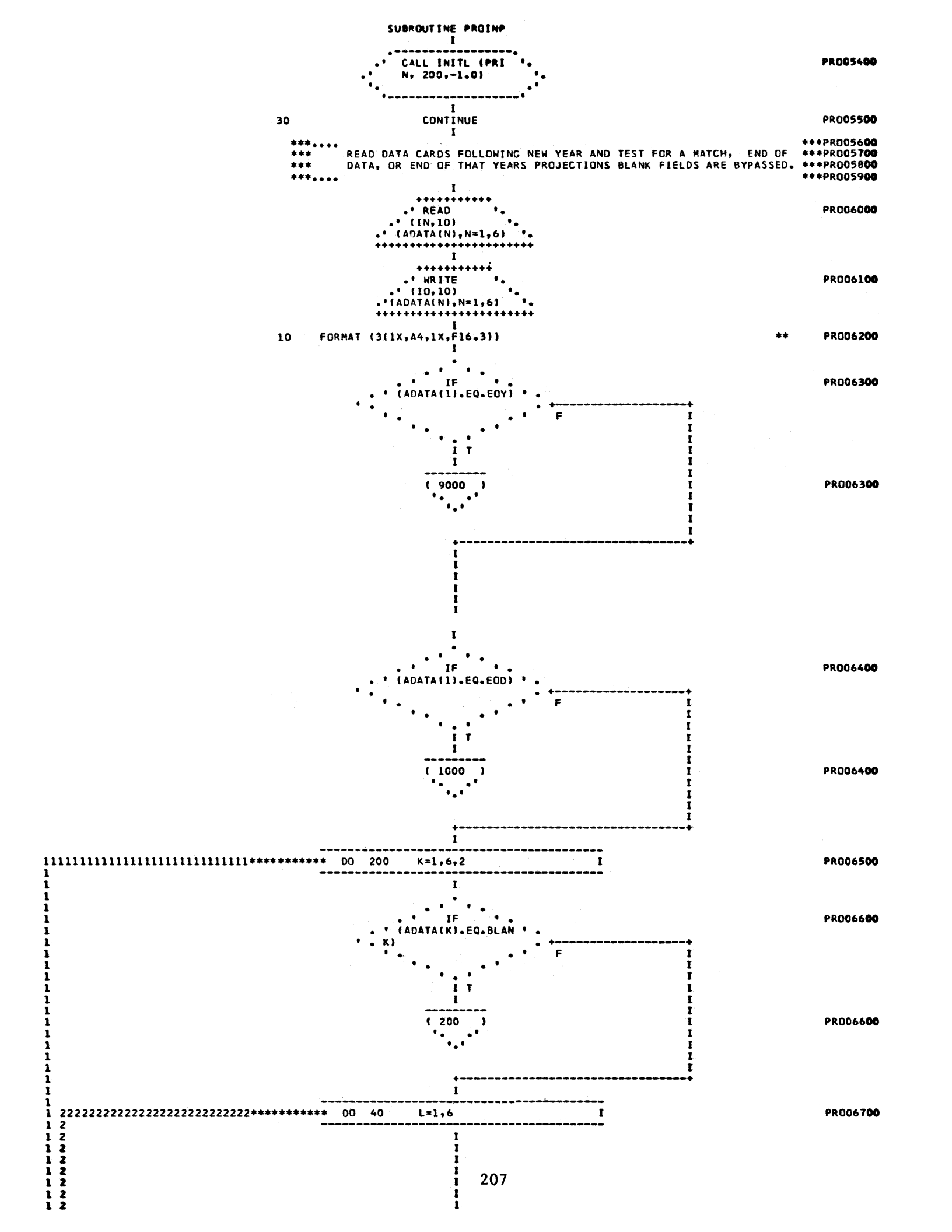

SUBROUTINE INPROJ
650
L=1
M=N
READ
(IPR)
(CPARM(J), J=L,M)
100
700
L=1
M=N
READ
(IPR)
(DPARM(J), J=L,M)
100
750
L=1
M=N
READ
(IPR)
(PPAR(J),J=L,M)
100
800
CONTINUE
RETURN
INP06900
INP07000
INP07100
INP07200
INP07300
INP07400
INP07500
INP07600
INP07700
INP07800
INP07900
INP08000
INP08100
INP08200
END****END*******END*******END*******END*******END*******END*******END*******END*******END*******END*******END***
INP08300

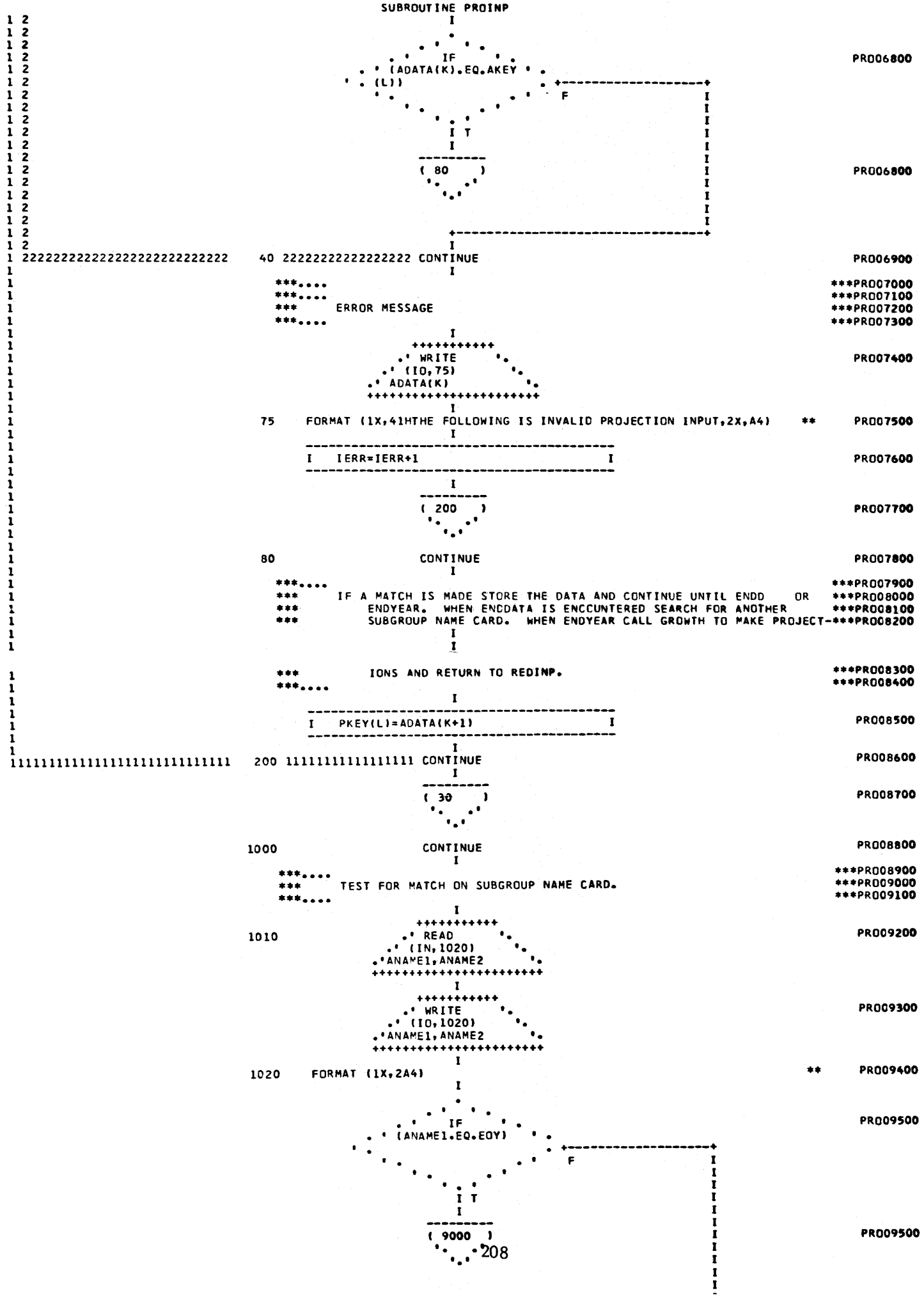

SUBROUTINE CDSPLY
** SUBROUTINE CDSPLY **
CDS00100
*** THE CDSPLY SUBROUTINE CONTROLS THE DISPLAY OF THE COMMERICAL ***CDS00200
*** CONSUMPTION INFORMATION ***CDS00300
COMMON/COMMRL/CGALAV,CGALMX,CGALPK,CNAME(50),CUSEAV(50),CUSEMX(50) CDS00400
,CUSEPK(50),CLABEL(200),CUNIT(200),CPARAM(50),CQAV(50),CQM
X(50) ,CQPK(50)
COMMON/CITDAT/CDATE,ALAT,ALONG,PO,PD,AGE,TEMPLT,EMPL4, CDS00700
CNCOME,CSERVE,FDAT,POPRO,PNCOME,ACRESP,
HDGROP,PSERVE,CIT(6),CDSCIT(3)
COMMON/IFILE/IN,IO CDS01000
I CDAT=IFIX(FDAT) I CDS01100
*** PRINTS PAGE HEADING ***CDS01200
1500 FORMAT (1H1,15X,50HMUNICIPAL WATER REQUIREMENTS FOR THE CITY ** CDS01300
** OF,2X,3A4,3A4,2X,14HFOR THE YEAR,2X,I4// 53X,26HANALYZED BY M**
**AIN SYSTEM//) **
*** DETERMINES IF THE CURRENT COMMERICAL WATER CONSUMPTION IS TO BE ***CDS01600
*** PRINTED ***CDS01700
WRITE CDS01800
(IO,1500)
CIT,ICDAT
WRITE CDS01900
(IO,1510)
1510 FORMAT (38X,54HTOTAL COMMERCIAL REQUIREMENTS IN GALLONS PER ** CDS02000
**DAY) **
WRITE CDS02200
(IO,1520)
1520 FORMAT (1HO,43X,6HANNUAL,13X,7HMAXIMUM,15X,4HPEAK/43X,7HAVERAGE, ** CDS02300
** 14X,5HDAILY,15X,6HHOURLY/) **
WRITE CDS02500
(IO,1530)
CGALAV,CGALMX,CGAL
PK
1530 FORMAT (1HO,29X,3(4X,F16.0)//) ** CDS02600
WRITE CDS02700
(IO,1531)
1531 FORMAT (1HO,33X,60HWATER REQUIREMENTS BY TYPE OF COMMERCIAL ** CDS02800
ESTABLISHMENT//19X,4HTYPE,14X,5HUNITS,19X,6HNUMBER,8X,6HANNUAL,7X,
7HMAXIMUM, 9X,4HPEAK,/60X,8HOF UNITS,7X,7HAVERAGE,7X,5HDAILY,9X,6H
**HOURLY/79X,24H(GALLONS PER DAY)) **
DO 1544 J=1,50 CDS03200
I=4*(J-1)+1 CDS03300

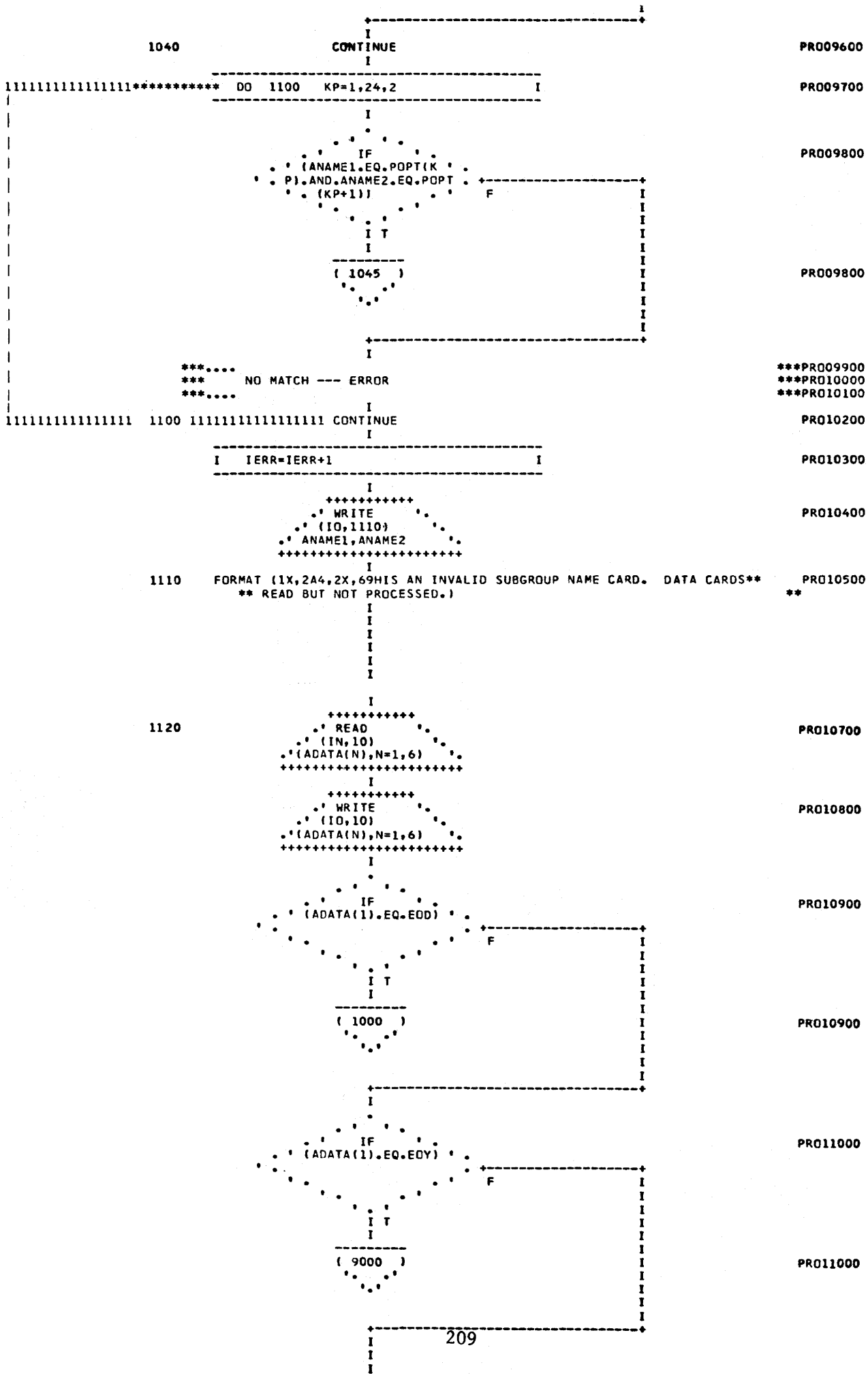
```
                                      SUBROUTINE CDSPLY
1                                           I
1                                           .
1                                         . ' .
1                                       . '   IF    ' .                                                    CDS03400
1                                     . ' (CPARAM(J).LE.0.) ' .
1                                   . '                     ' . +-------------------+
1                                     '.                    .'    F                  I
1                                       '.                .'                       I
1                                         '.            .'                         I
1                                           ' .       .'                           I
1                                             I T                                  I
1                                             I                                    I
1                                           ---------                              I
1                                           ( 1544  )                              I                    CDS03400
1                                             '.  .'                               I
1                                               '.'                                I
1                                                                                  I
1                                                                                  I
1                                             +--------------------------------+
1                                             I
1                                          +++++++++++
1                                        .' WRITE     '.                                                  CDS03500
1                                      .' (IO,1532)     '.
1                                    .' CLABEL(I),CLABEL(I'.
1                                  .'+1),CLABEL(I+2),CLABEL('.
1                                .'I+3),                    CU'.
1                              .'NIT(I),CUNIT(I+1),CUNIT(I+2),CU'.
1                            .'NIT(I+3),                      CP'.
1                           .'ARAM(J),CQAV(J),CQMX(J),CQPK(J)      '.
1                           ++++++++++++++++++++++++++++++++++++++++++
1                                             I
1                          1532    FORMAT (19X,4A4,2X,4A4,4F14.0)                          **              CDS03800
1                                             I
111111111111111111111111111111  1544 1111111111111111 CONTINUE                                           CDS03900
                                              I
                                        .-----------------.
                                   1700 I RETURN          '.                                             CDS04000
                                        I                   '.
                                        I                  .'
                                        -------------------'

***END*******END*******END*******END*******END*******END*******END*******END*******END*******END*******END***  CDS04100
                                      SUBROUTINE IDSPLY

                                     *************************
                                     **                     **
                                     ** SUBROUTINE IDSPLY    **                                           IDS00100
                                     **                     **
                                     **                     **
                                     *************************
                                              I
                                 ***     SUBROUTINE TO PRINT OUT INDUSTRIAL CALCULATIONS                 ***IDS00200
                                     REAL IBL
                                     REAL IGALAV,IGALMX,IGALPK,ILABL,IUSEAV,IUSEMX,IUSEPK,IPARAM,
                                          IQAVE,IQMAX,IQPEK

                                     COMMON/IFILE/IN,IO                                                   IDS00300
                                     COMMON/CITDAT/CDATE,ALAT,ALONG,PO,PD,AGE,TEMPLT,EMPL4,               IDS00400
                                                CNCOME,CSERVE,FDAT,POPRO,PNCOME,ACRESP,
                                                     HDGROP,PSERVE,CIT(6),IDSCIT(3)

                                     COMMON/INDUST/IGALAV,IGALMX,IGALPK,ILABL(800),IUSEAV(200),           IDS00700
                                                   IUSEMX(200),IUSEPK(200),IPARAM(200),
                                                        IQAVE(200),IQMAX(200),IQPEK(200)

                                     DATA IBL/4H    /                                                     IDS01000
                                              I
                                     ----------------------------------------
                                     I   IFDAT=IFIX(FDAT)                   I                           IDS01100
                                     ----------------------------------------
                                              I
                                 ***     PRINTS PAGE HEADING                                             ***IDS01200
                                              I
                                           +++++++++++
                                         .' WRITE     '.                                                  IDS01300
                                       .' (IO,80)       '.
                                     .' CIT,IFDAT         '.
                                     ++++++++++++++++++++++++
                                              I
                                80   FORMAT (1H1,12X,50HMUNICIPAL  WATER  REQUIREMENTS  FOR  THE  CITY **     IDS01400
                                        ** OF,2X,3A4,3A4,2X,14HFOR  THE  YEAR,2X,I4//49X,26HANALYZED  BY  MA**
                                        **IN  SYSTEM//)                                                  **
                                              I
                                           +++++++++++
                                         .' WRITE     '.                                                  IDS01700
                                       .' (IO,90)       '.
                                     .'                   '.
                                     ++++++++++++++++++++++++
                                              I
                                90   FORMAT (35X,54HTOTAL INDUSTRIAL WATER REQUIREMENTS IN GALLONS PER **     IDS01800
                                        **DAY/1HO,29X,14HANNUAL AVERAGE,7X,13HMAXIMUM DAILY,9X,           **
                                        ** 11HPEAK HOURLY)                                                **
                                              I
                                              I
```


SUBROUTINE IDSPLY
WRITE (IO,91) IGALAV,IGALMX,IGA LPK
91 FORMAT (24X,3F20.0)
93 WRITE (IO,98)
98 FORMAT (//1HO,41X,32HREQUIREMENTS BY TYPE OF INDUSTRY//76X, 11HGAL** **LONS/DAY **/49X, 9HNUMBER OF, 9X, 6HANNUAL, 8X, 7HMAXIMUM, 11X, 4HPEAK/20X **, 4HCODE, 2X, 17HINDUSTRY CATEGORY, 6X, 9HEMPLOYEES, 8X, 7HAVERAGE** **, 12X, 3HDAY, 11X, 4HHOUR)
DO 100 I=1,200
J=4*(I-1)+1
*** TEST TO SEE IF THERE IS A CATEGORY DEFINED AND AN INPUT PARAMETER ***
*** IF THER IS NONE--DO NOT PRINT
IF ((ILABL(J).EQ.IBL .OR.(IPARAM(I).EQ.0.))
F
T
(100)
ICODE=199+I
WRITE (IO,99) ICODE,ILABL(J),ILABL(J+1),ILABL(J+2),ILABL(J+3), IPARAM(I),IQAVE(I),IQMAX(I),IQPEK(I)
99 FORMAT (20X,I4,3X,4A4,4F15.0)
100 CONTINUE
RETURN
END****END*******END*******END*******END*******END*******END*******END*******END*******END*******END*******END***

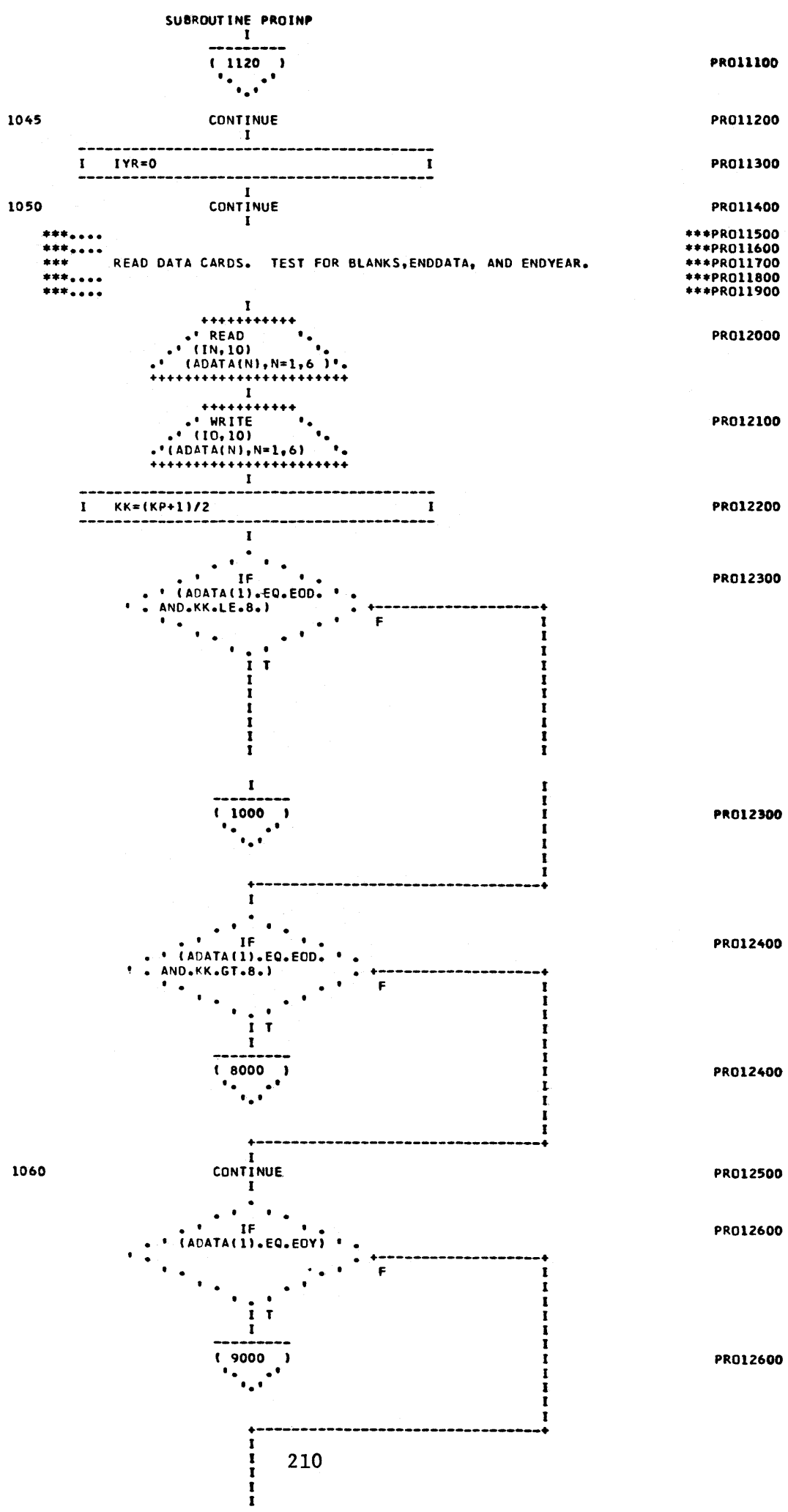
```
                SUBROUTINE PROINP

               ************************
               **                    **
               ** SUBROUTINE PROINP  **                                    PR000100
               ** (IERR,IRES,ICOM,IND **
               ** S,IPUB)            **
               **                    **
               ************************
                          I
***....                                                                    ***PR000200
***....                                                                    ***PR000300
***     THIS SUBROUTINE READS IN THE KEY AND OPTIONAL PROJECTIONS MADE BY  ***PR000400
***     THE MAIN II USER                                                   ***PR000500
***....                                                                    ***PR000600
***....                                                                    ***PR000700
***     POPT IS THE ARRAY CONTAINING THE SUBGROUP NAMES FOR THE OPTIONAL   ***PR000800
***          PROJECTIONS.                                                  ***PR000900
***     AKEY CONTAINS THE DATA NAMES OF THE THREE KEY PROJECTIONS (YEAR    ***PR001000
***          POPULATION, AND INCOME) AS WELL AS ACREAGE, HOUSING DENS-     ***PR001100
***          ITY AND TOTAL SERVICES.                                       ***PR001200
***     HOMN CONTAINS THE DATA NAMES FOR THE TOTAL NUMBER OF HOMES IN EACH ***PR001300
***          CLASS FOR THE FOUR CATEGORIES MS, MT, FS, FT AND TOTALS       ***PR001400
***          FOR EACH CATEGORY.                                            ***PR001500
***....                                                                    ***PR001600
      REAL MAN
      DIMENSION POPT(24),AKEY(6),HOMN(16)                                    PR002600
      DIMENSION          ADATA(6),TSTORE(200,7),YEAR(7),X(7),Y(7)            PR002700
      COMMON/PUBLC /PUBNM(30),PPD(150),PROPUB(216),PPAR(150)                 PR001700
      COMMON/INDUST/DDATA(1603),PRIN(201),PROIND(399)                        PR001800
      COMMON/IFILE/IN,IO                                                     PR001900
      COMMON/CITDAT/CITDUM(10),PKEY(6),BDUM(6),PROCIT(3)                     PR002000
      COMMON/RESIDL/RDUM(300),HNUM(16),PRORSD(210)                           PR002100
      COMMON/NUMBER/NOS                                                      PR002200
      COMMON/COMMRL/CDUM(3),CNAME(50),CD(450),CCEMP(50),                     PR002300
                    CEMP(50),P(50),CPAR(50),PROCOM(100)

                          I
***....                                                                    ***PR002500
      EQUIVALENCE (DDATA(1),TSTORE(1,1))                                     PR004300
                          I
***....                                                                    ***PR002800
      DATA  EOD/4HENDD/                                                      PR002900
      DATA  EOY/4HENDY/                                                      PR003000
      DATA POPT/4HNUMH,4HOMES,4HCOMF,4HEMPL,4HCOMF,4HPARM,4HINDP,4HROJT,     PR003100
                4HPUBP,4HARAM,4HPUBA,4HNAVE,4HPUBM,4HAXDY,4HPUBP,4H
     EKHR,          4HHNUM,4HHOMS,4HHCOM,4HPARM,4HHIND,4HPARM,4HHP
     UB,4HPARM/
      DATA AKEY/4HYEAR,4HPOPU,4HICOM,4HACRE,4HDENS,4HTSER/                   PR003400
      DATA  BLANK/4H    /                                                    PR003500
                          I
                          I
      DATA HOMN/4HMWLO,4HMWMD,4HMWHI,4HMWTL,4HMPLO,4HMPMD,4HMPHI,4HMPTL,     PR003600
                4HFWLO,4HFWMD,4HFWHI,4HFWTL,4HFPLO,4HFPMD,4HFPHI,4HF
     PTL/
      DATA  MAN/4HEMPM/                                                      PR003800
                          I
***....                                                                    ***PR003900
***....                                                                    ***PR004100
***....                                                                    ***PR004400
                          I
      ----------------------------------------
      I   ITYPE=3                            I                             PR004500
      ----------------------------------------
                          I
***....                                                                    ***PR004600
***     INITIALIZE ALL DATA FIELDS TO MINUS ONE.                           ***PR004700
***....                                                                    ***PR004800
                          I
                    .----------------.
                  .'  CALL INITL (PPA  '.                                   PR004900
                .'    R ,150,-1.0)     '.
                '.                   .'
                  '.----------------.'
                          I
                    .----------------.
                  .'  CALL INITL (HNU  '.                                   PR005000
                .'    M , 16,-1.0)     '.
                '.                   .'
                  '.----------------.'
                          I
                    .----------------.
                  .'  CALL INITL (PKE  '.                                   PR005100
                .'    Y ,  6,-1.0)     '.
                '.                   .'
                  '.----------------.'
                          I
                    .----------------.
                  .'  CALL INITL (CEM  '.                                   PR005200
                .'    P , 50,-1.0)     '.
                '.                   .'
                  '.----------------.'
                          I
                    .----------------.
                  .'  CALL INITL (CPA  '.                                   PR005300
                .'    R , 50,-1.0)     '.
                '.                   .'
                  '.----------------.'
                          I
                          I
                          I
                          I
                          I
```

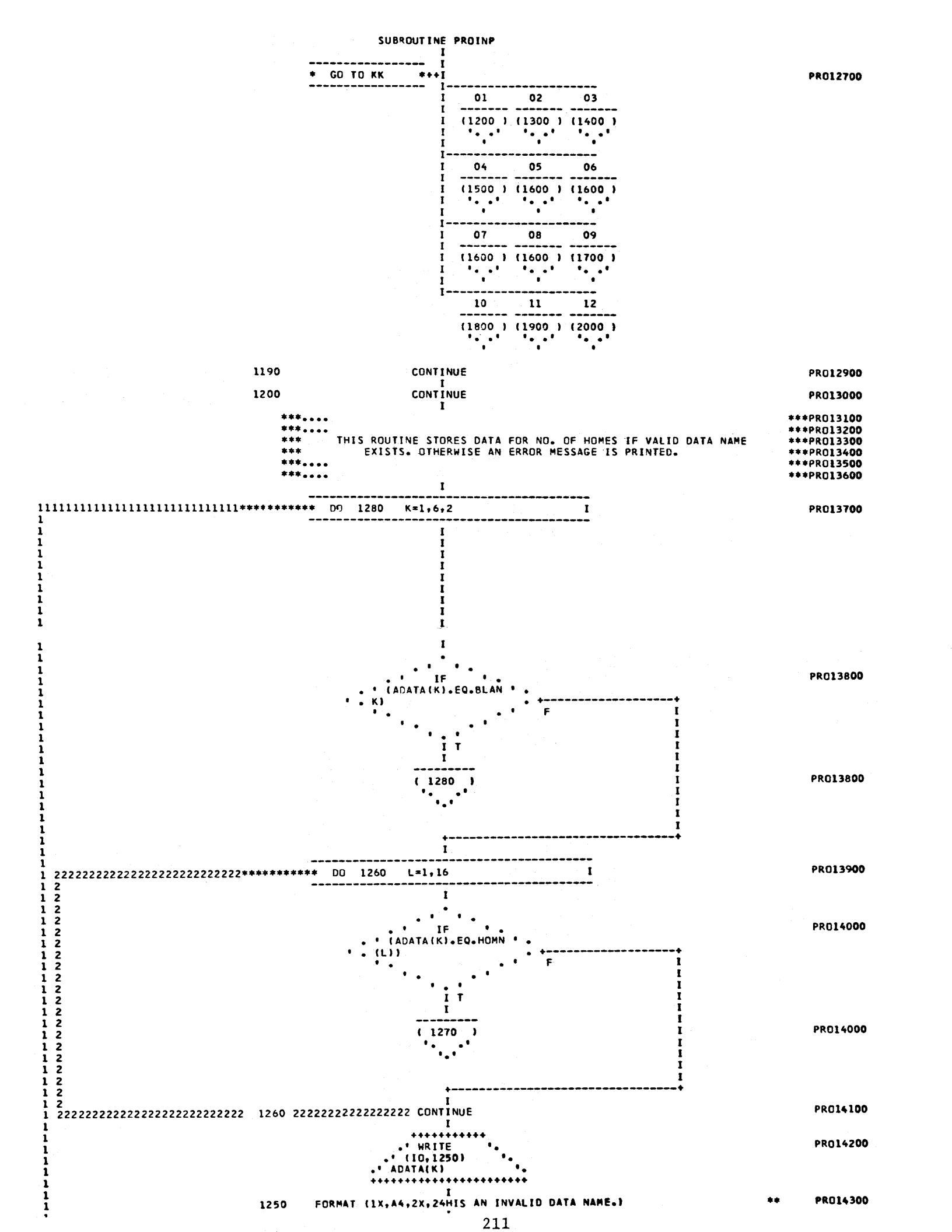

SUBROUTINE PROINP
CALL INITL (PRIN, 200,-1.0)
30 CONTINUE
.... READ DATA CARDS FOLLOWING NEW YEAR AND TEST FOR A MATCH, END OF DATA, OR END OF THAT YEARS PROJECTIONS BLANK FIELDS ARE BYPASSED. ....
READ (IN,10) (ADATA(N),N=1,6)
WRITE (IO,10) (ADATA(N),N=1,6)
10 FORMAT (3(1X,A4,1X,F16.3))
IF (ADATA(1).EQ.EOY)
T
9000
F
IF (ADATA(1).EQ.EOD)
T
1000
F
DO 200 K=1,6,2
IF (ADATA(K).EQ.BLAN K)
T
200
F
DO 40 L=1,6
PRO05400
PRO05500
***PRO05600
***PRO05700
***PRO05800
***PRO05900
PRO06000
PRO06100
PRO06200
PRO06300
PRO06300
PRO06400
PRO06400
PRO06500
PRO06600
PRO06600
PRO06700

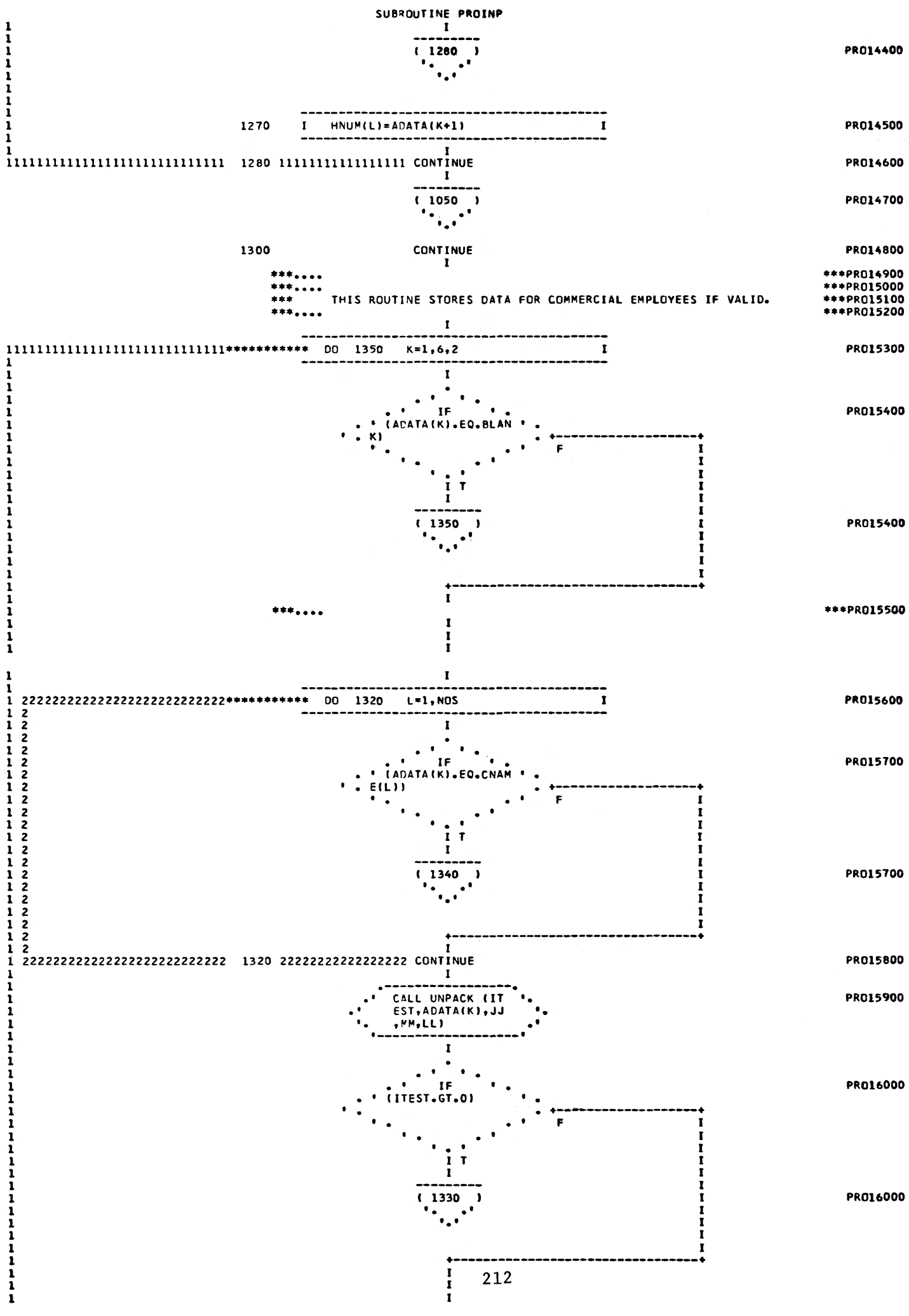

SUBROUTINE PROINP
IF (ADATA(K).EQ.AKEY (L))
F
T
80
40 22222222222222222 CONTINUE
***.... ***PR007000
*** ERROR MESSAGE ***PR007200
***.... ***PR007300
WRITE (IO,75) ADATA(K)
75 FORMAT (1X,41HTHE FOLLOWING IS INVALID PROJECTION INPUT,2X,A4) **
IERR=IERR+1
200
80 CONTINUE
***.... ***PR007900
*** IF A MATCH IS MADE STORE THE DATA AND CONTINUE UNTIL ENDD OR ***PR008000
*** ENDYEAR. WHEN ENCDATA IS ENCCUNTERED SEARCH FOR ANOTHER ***PR008100
*** SUBGROUP NAME CARD. WHEN ENDYEAR CALL GROWTH TO MAKE PROJECT-***PR008200
*** IONS AND RETURN TO REDINP. ***PR008300
***.... ***PR008400
PKEY(L)=ADATA(K+1)
200 1111111111111111 CONTINUE
30
1000 CONTINUE
***.... ***PR008900
*** TEST FOR MATCH ON SUBGROUP NAME CARD. ***PR009000
***.... ***PR009100
READ (IN,1020) ANAME1,ANAME2
1010
WRITE (IO,1020) ANAME1,ANAME2
1020 FORMAT (1X,2A4) **
IF (ANAME1.EQ.EOY)
F
T
9000

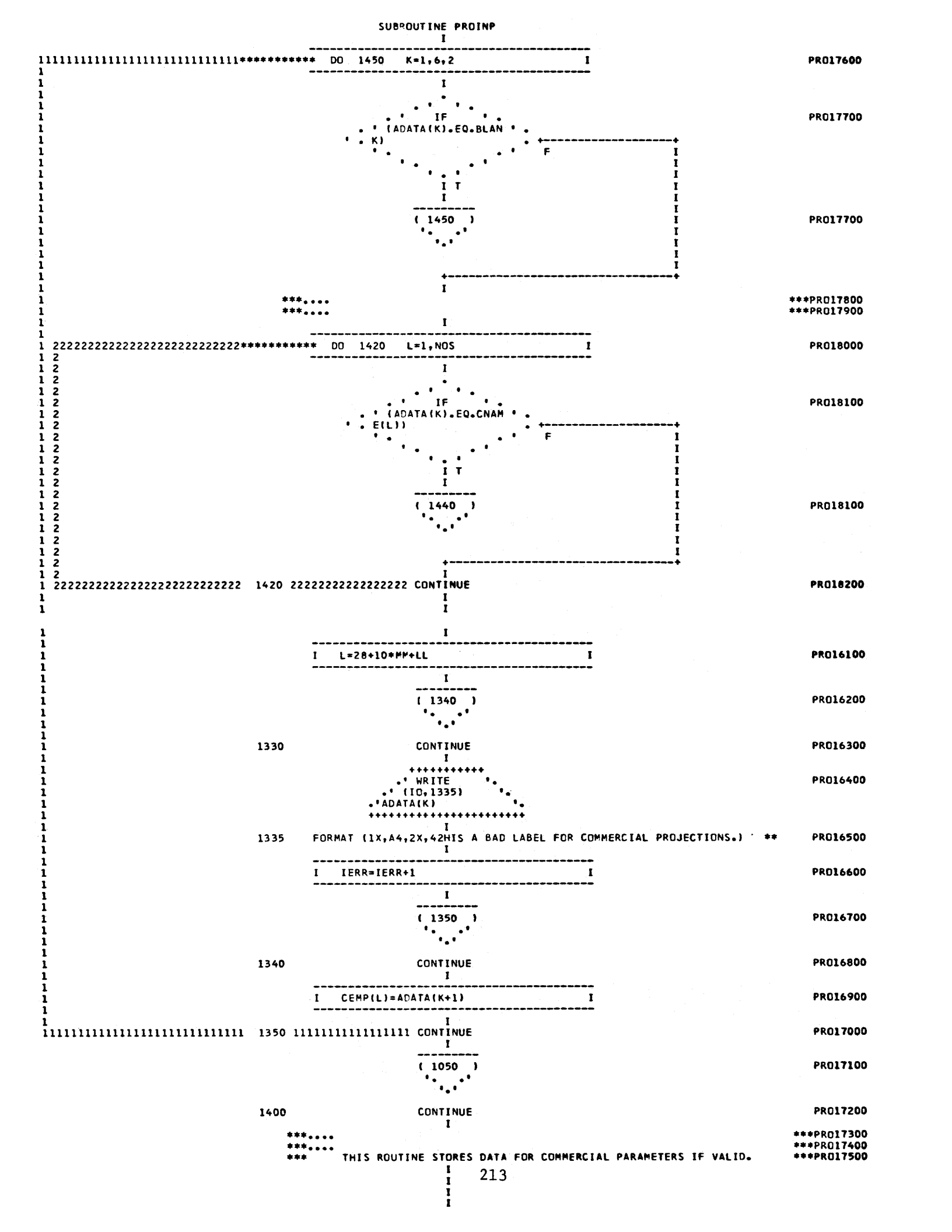


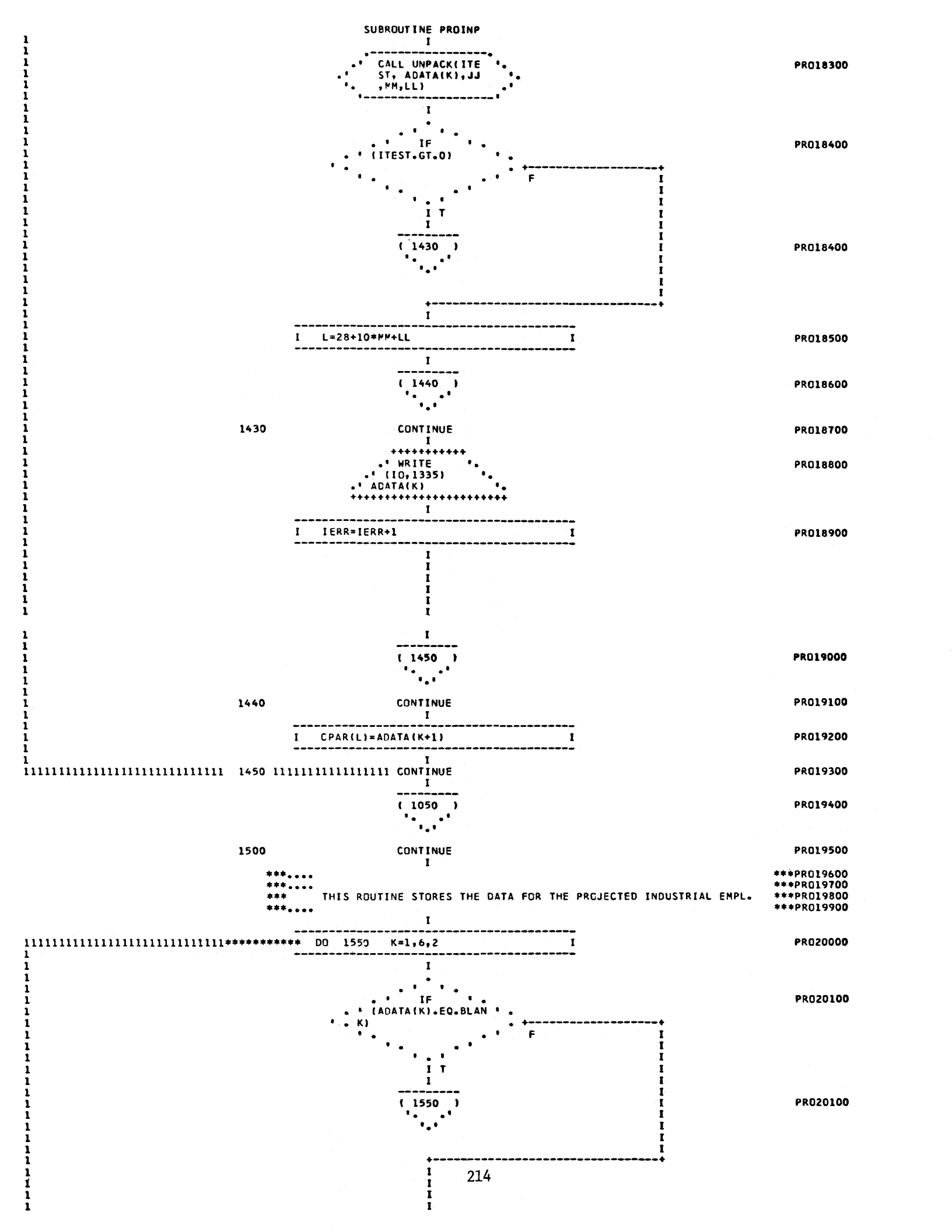
PR009600
PR009700
PR009800
PR009800
PR009900
PR010000
PR010100
PR010200
PR010300
PR010400
PR010500
PR010700
PR010800
PR010900
PR010900
PR011000
PR011000

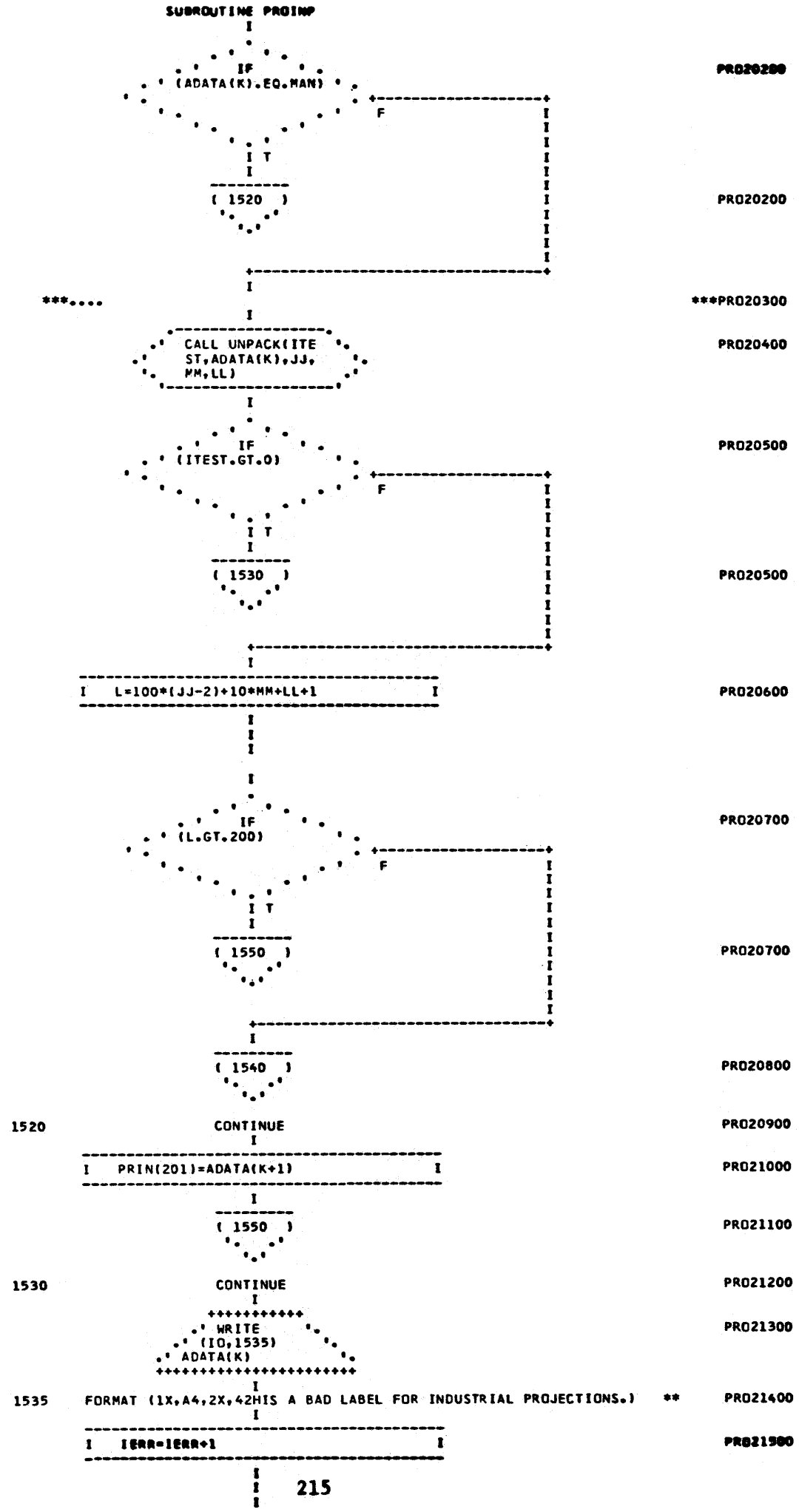

SUBROUTINE PROINP
(1120)
PRO11100
1045 CONTINUE
PRO11200
I IYR=0 I
PRO11300
1050 CONTINUE
PRO11400
***.... ***PRO11500
***.... ***PRO11600
*** READ DATA CARDS. TEST FOR BLANKS,ENDDATA, AND ENDYEAR. ***PRO11700
***.... ***PRO11800
***.... ***PRO11900
READ
(IN,10)
(ADATA(N),N=1,6)
PRO12000
WRITE
(IO,10)
(ADATA(N),N=1,6)
PRO12100
I KK=(KP+1)/2 I
PRO12200
IF
(ADATA(1).EQ.EOD.
AND.KK.LE.8.)
PRO12300
T
F
(1000)
PRO12300
IF
(ADATA(1).EQ.EOD.
AND.KK.GT.8.)
PRO12400
T
F
(8000)
PRO12400
1060 CONTINUE
PRO12500
IF
(ADATA(1).EQ.EOY)
PRO12600
T
F
(9000)
PRO12600

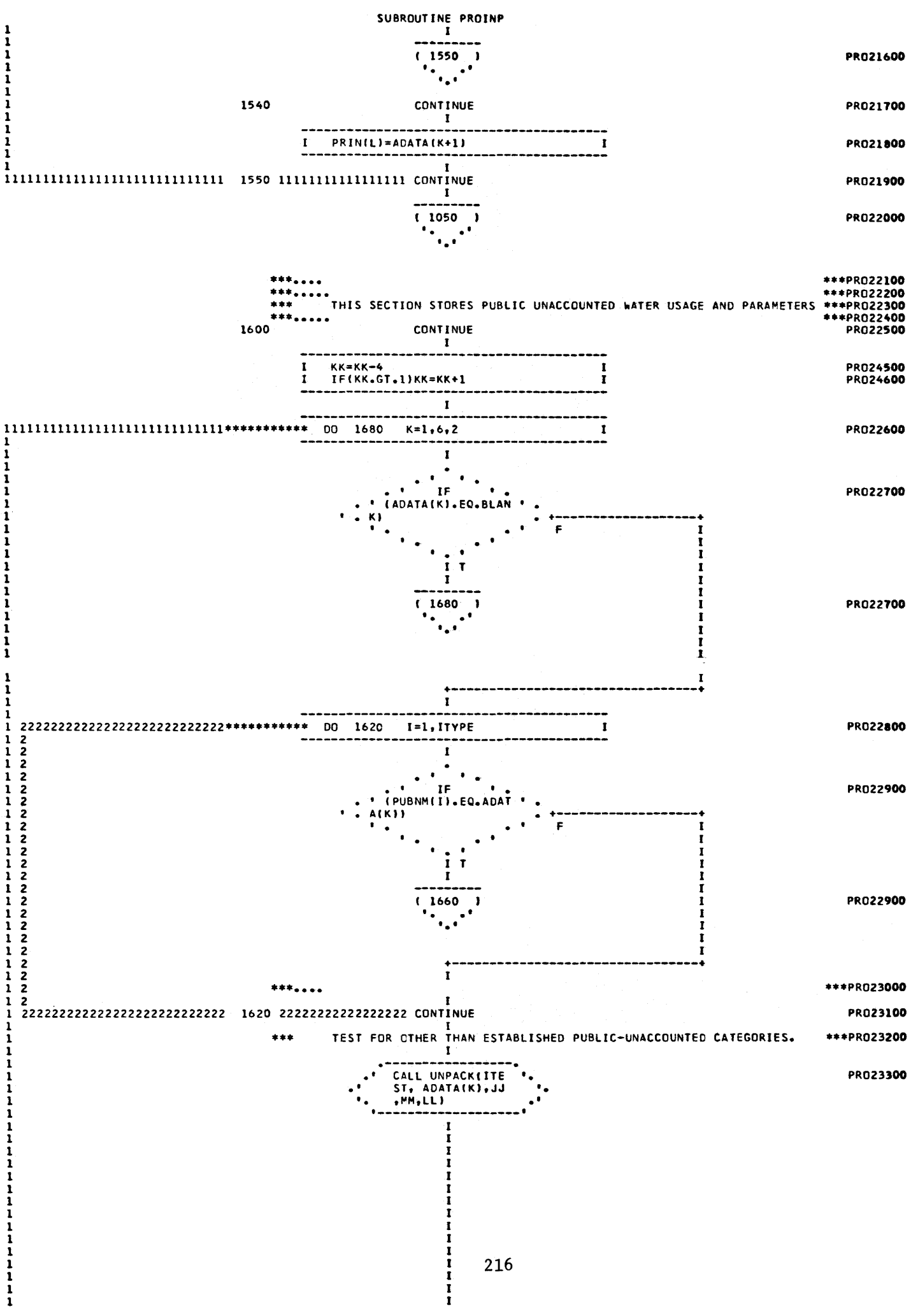

SUBROUTINE PROINP
* GO TO KK ***
01 02 03
(1200) (1300) (1400)
04 05 06
(1500) (1600) (1600)
07 08 09
(1600) (1600) (1700)
10 11 12
(1800) (1900) (2000)
1190 CONTINUE
1200 CONTINUE
***.... ***PRO13100
***.... ***PRO13200
*** THIS ROUTINE STORES DATA FOR NO. OF HOMES IF VALID DATA NAME ***PRO13300
*** EXISTS. OTHERWISE AN ERROR MESSAGE IS PRINTED. ***PRO13400
***.... ***PRO13500
***.... ***PRO13600
DO 1280 K=1,6,2 PRO13700
IF (ADATA(K).EQ.BLAN K) PRO13800
F
T
(1280) PRO13800
DO 1260 L=1,16 PRO13900
IF (ADATA(K).EQ.HOMN (L)) PRO14000
F
T
(1270) PRO14000
1260 CONTINUE PRO14100
WRITE (IO,1250) ADATA(K) PRO14200
1250 FORMAT (1X,A4,2X,24HIS AN INVALID DATA NAME.) ** PRO14300

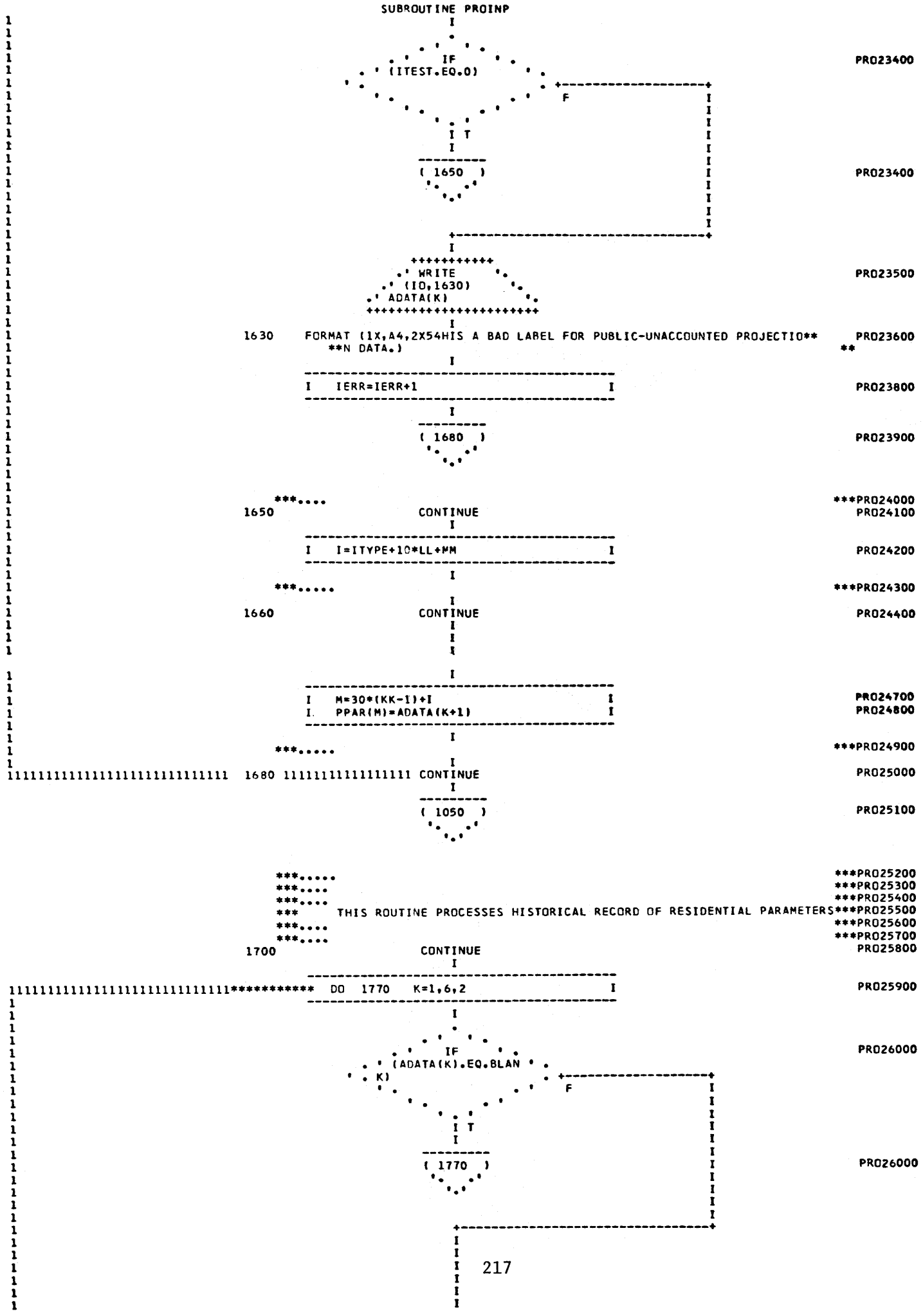

SUBROUTINE PROINP
(1200)
PRO14400
1270 HNUM(L)=ADATA(K+1)
PRO14500
1280 CONTINUE
PRO14600
(1050)
PRO14700
1300 CONTINUE
PRO14800
***PRO14900
***PRO15000
*** THIS ROUTINE STORES DATA FOR COMMERCIAL EMPLOYEES IF VALID.
***PRO15100
***PRO15200
DO 1350 K=1,6,2
PRO15300
IF (ADATA(K).EQ.BLAN K)
PRO15400
F
T
(1350)
PRO15400
***PRO15500
DO 1320 L=1,NOS
PRO15600
IF (ADATA(K).EQ.CNAM E(L))
PRO15700
F
T
(1340)
PRO15700
1320 CONTINUE
PRO15800
CALL UNPACK (IT EST,ADATA(K),JJ ,MM,LL)
PRO15900
IF (ITEST.GT.0)
PRO16000
F
T
(1330)
PRO16000

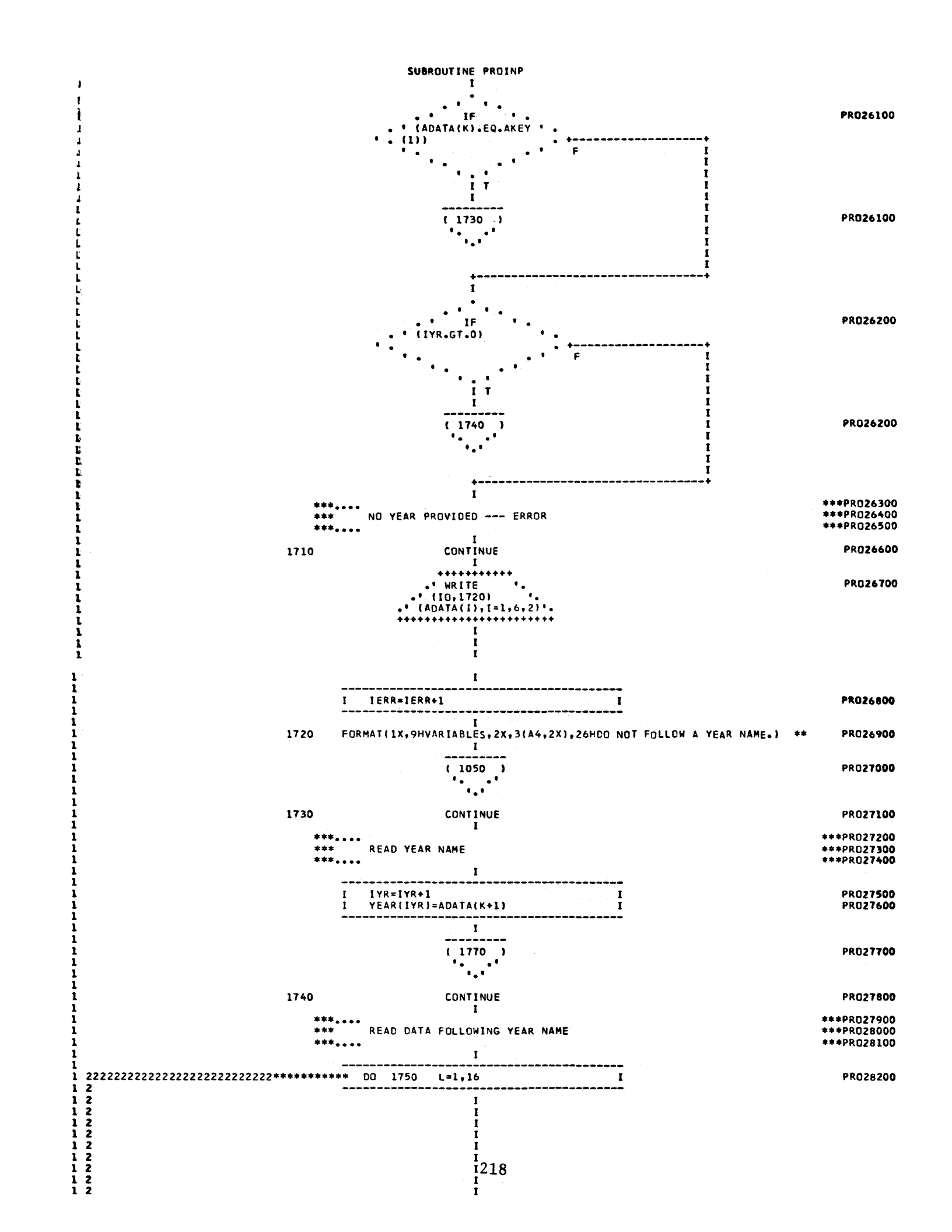

SUBROUTINE PROINP
DO 1450 K=1,6,2
IF (ADATA(K).EQ.BLAN K)
F
T
1450
***....
***....
DO 1420 L=1,NOS
IF (ADATA(K).EQ.CNAM E(L))
F
T
1440
1420 CONTINUE
L=28+10*MM+LL
1340
1330 CONTINUE
WRITE (IO,1335) ADATA(K)
1335 FORMAT (1X,A4,2X,42HIS A BAD LABEL FOR COMMERCIAL PROJECTIONS.) **
IERR=IERR+1
1350
1340 CONTINUE
CEMP(L)=ADATA(K+1)
1350 CONTINUE
1050
1400 CONTINUE
***....
***....
*** THIS ROUTINE STORES DATA FOR COMMERCIAL PARAMETERS IF VALID.
PRO17600
PRO17700
PRO17700
***PRO17800
***PRO17900
PRO18000
PRO18100
PRO18100
PRO18200
PRO16100
PRO16200
PRO16300
PRO16400
PRO16500
PRO16600
PRO16700
PRO16800
PRO16900
PRO17000
PRO17100
PRO17200
***PRO17300
***PRO17400
***PRO17500


SUBROUTINE PROINP
CALL UNPACK(ITEST, ADATA(K),JJ,MM,LL)
PRO18300
IF (ITEST.GT.0)
PRO18400
F
T
1430
PRO18400
L=28+10*MM+LL
PRO18500
1440
PRO18600
1430 CONTINUE
PRO18700
WRITE (IO,1335) ADATA(K)
PRO18800
IERR=IERR+1
PRO18900
1450
PRO19000
1440 CONTINUE
PRO19100
CPAR(L)=ADATA(K+1)
PRO19200
1450 CONTINUE
PRO19300
1050
PRO19400
1500 CONTINUE
PRO19500
***PRO19600
***PRO19700
*** THIS ROUTINE STORES THE DATA FOR THE PROJECTED INDUSTRIAL EMPL. ***PRO19800
***PRO19900
DO 1550 K=1,6,2
PRO020000
IF (ADATA(K).EQ.BLANK)
PRO020100
F
T
1550
PRO020100

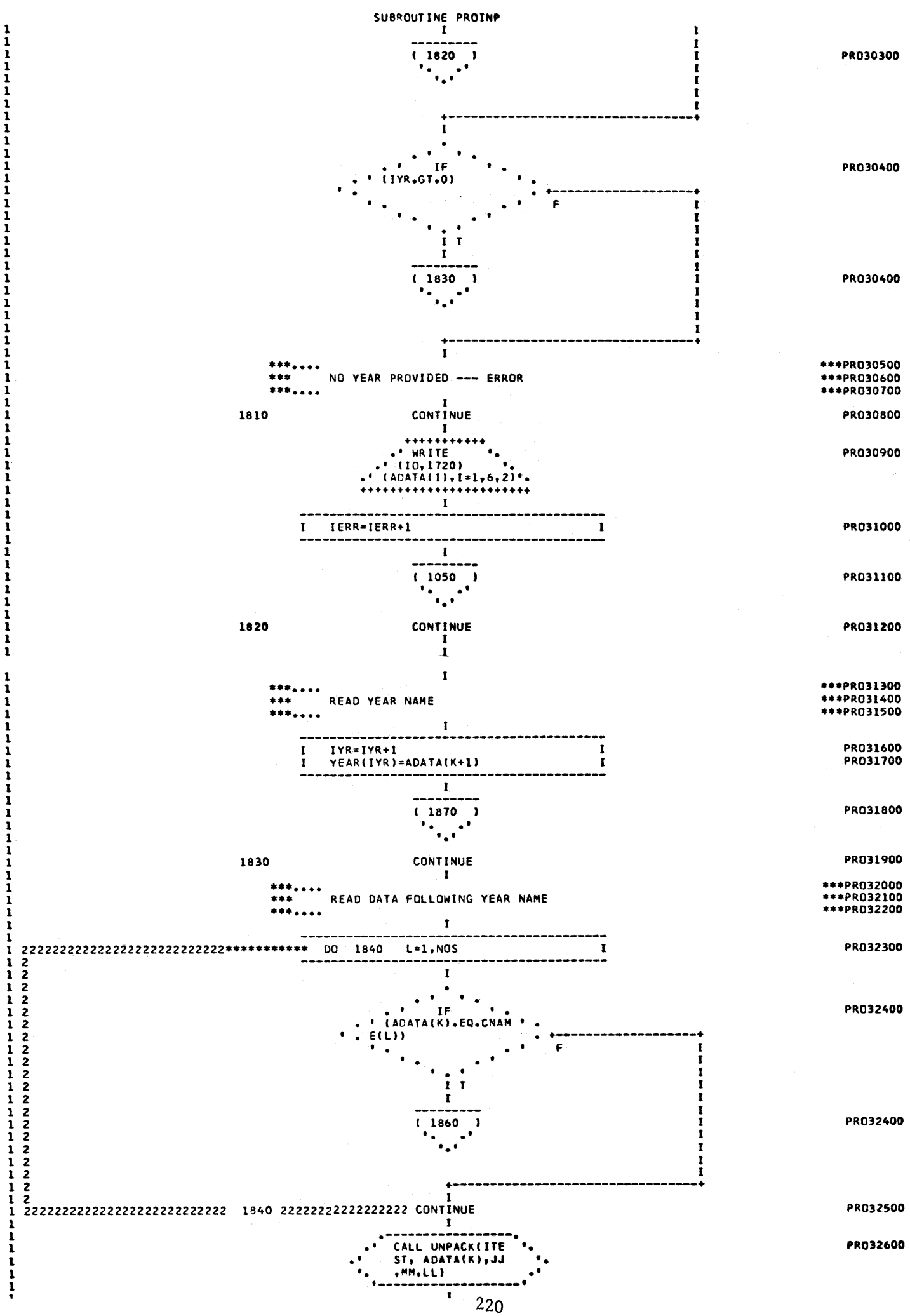

SUBROUTINE PROINP
IF (ADATA(K).EQ.MAN)
F
T
1520
PRO20200
***....
***PRO20300
CALL UNPACK(ITEST,ADATA(K),JJ,MM,LL)
PRO20400
IF (ITEST.GT.0)
PRO20500
1530
L=100*(JJ-2)+10*MM+LL+1
PRO20600
IF (L.GT.200)
PRO20700
1550
1540
PRO20800
1520 CONTINUE
PRO20900
PRIN(201)=ADATA(K+1)
PRO21000
1550
PRO21100
1530 CONTINUE
PRO21200
WRITE (IO,1535) ADATA(K)
PRO21300
1535 FORMAT (1X,A4,2X,42HIS A BAD LABEL FOR INDUSTRIAL PROJECTIONS.) **
PRO21400
IERR=IERR+1
PRO21500

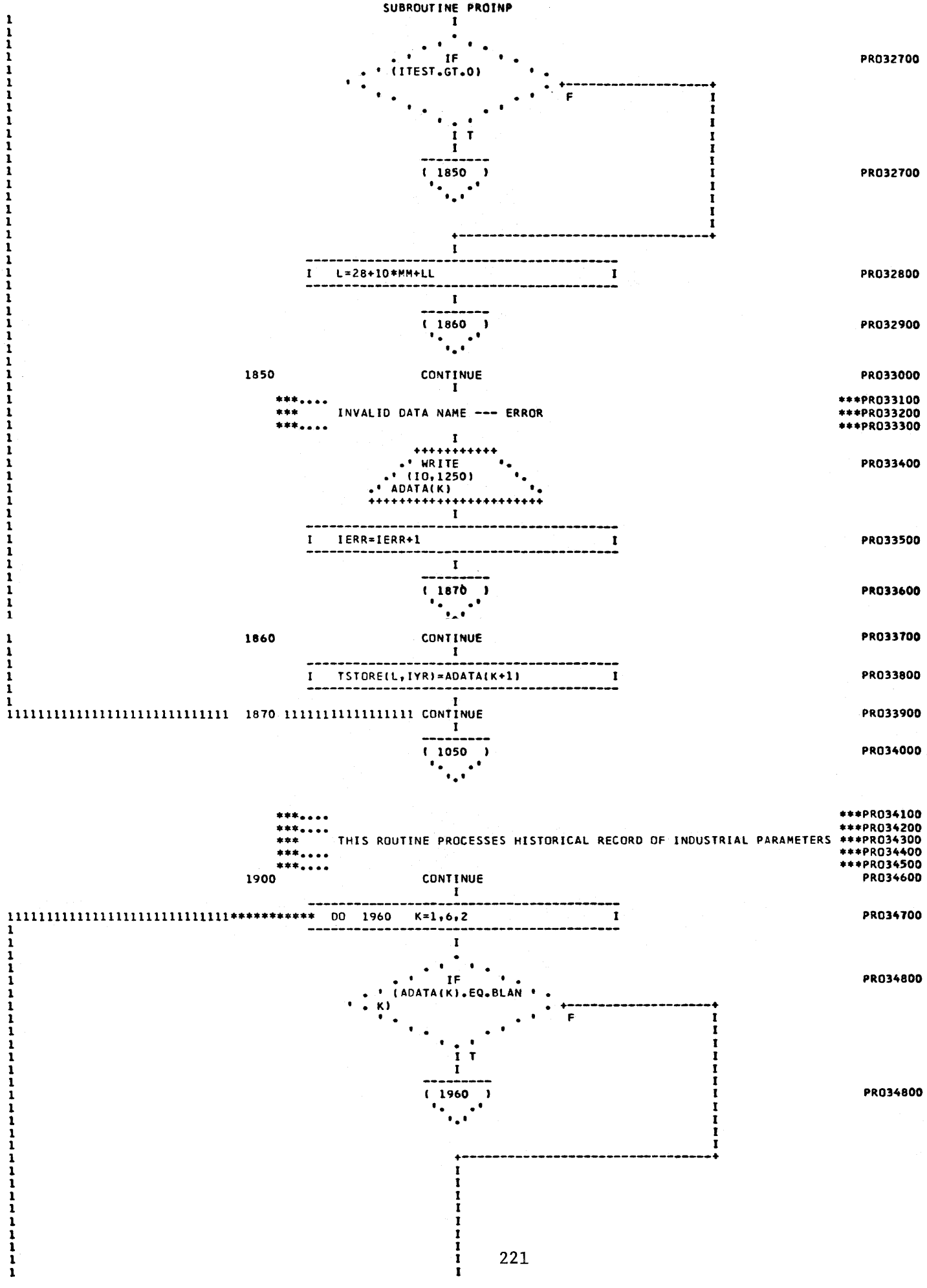

SUBROUTINE PROINP
(1550)
1540 CONTINUE
PRIN(L)=ADATA(K+1)
1550 CONTINUE
(1050)
***.... THIS SECTION STORES PUBLIC UNACCOUNTED WATER USAGE AND PARAMETERS
1600 CONTINUE
KK=KK-4
IF(KK.GT.1)KK=KK+1
DO 1680 K=1,6,2
IF (ADATA(K).EQ.BLAN K)
T
F
(1680)
DO 1620 I=1,ITYPE
IF (PUBNM(I).EQ.ADAT A(K))
T
F
(1660)
***....
1620 CONTINUE
*** TEST FOR OTHER THAN ESTABLISHED PUBLIC-UNACCOUNTED CATEGORIES.
CALL UNPACK(ITE ST, ADATA(K),JJ ,MM,LL)


SUBROUTINE PROINP
IF (ITEST.EQ.0)
F
T
(1650)
WRITE (IO,1630) ADATA(K)
1630 FORMAT (1X,A4,2X54HIS A BAD LABEL FOR PUBLIC-UNACCOUNTED PROJECTIO** **N DATA.)
IERR=IERR+1
(1680)
***....
1650 CONTINUE
I=ITYPE+10*LL+MM
***.....
1660 CONTINUE
M=30*(KK-1)+I
PPAR(M)=ADATA(K+1)
***.....
1680 CONTINUE
(1050)
***.....
***.....
***.....
*** THIS ROUTINE PROCESSES HISTORICAL RECORD OF RESIDENTIAL PARAMETERS
***.....
***.....
1700 CONTINUE
********** DO 1770 K=1,6,2
IF (ADATA(K).EQ.BLAN K)
F
T
(1770)

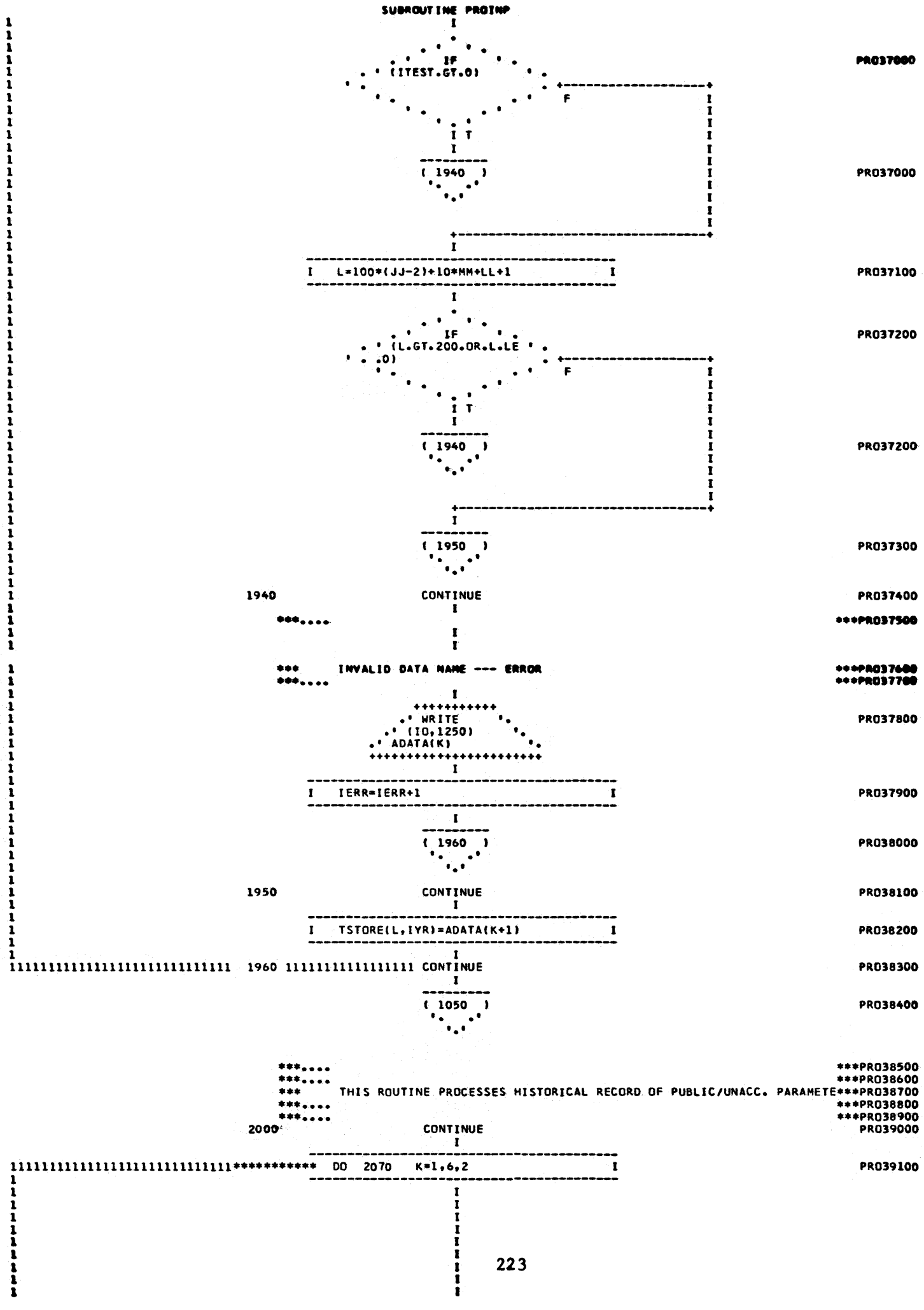

SUBROUTINE PROINP
IF (ADATA(K).EQ.AKEY (1))
F
T
(1730)
IF (IYR.GT.0)
F
T
(1740)
NO YEAR PROVIDED --- ERROR
1710 CONTINUE
WRITE (IO,1720) (ADATA(I),I=1,6,2)
IERR=IERR+1
1720 FORMAT(1X,9HVARIABLES,2X,3(A4,2X),26HDO NOT FOLLOW A YEAR NAME.) **
(1050)
1730 CONTINUE
READ YEAR NAME
IYR=IYR+1
YEAR(IYR)=ADATA(K+1)
(1770)
1740 CONTINUE
READ DATA FOLLOWING YEAR NAME
DO 1750 L=1,16

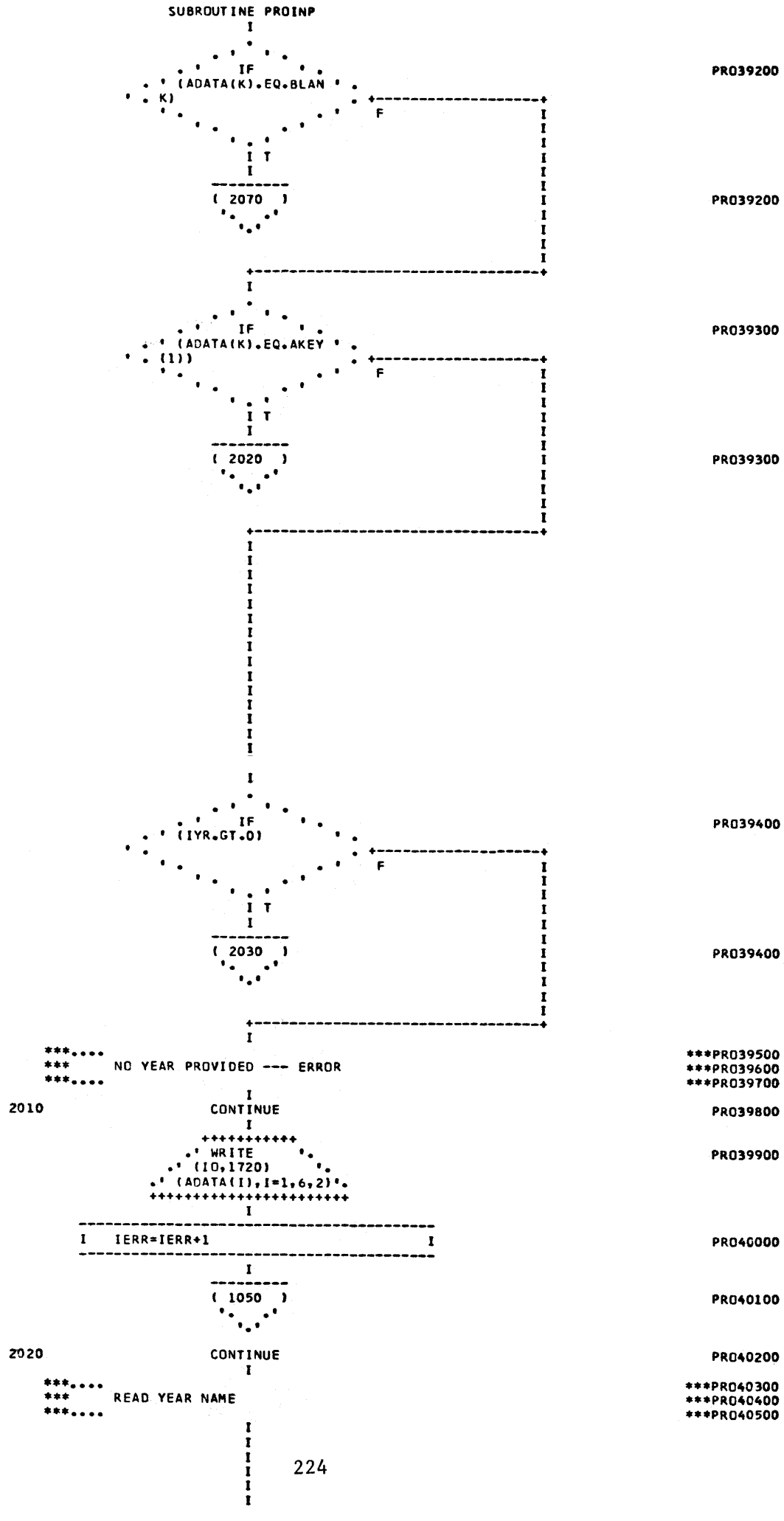
```
                                         SUBROUTINE PROINP
1 2                                              I
1 2                                              .
1 2                                          . '   ' .
1 2                                       . '    IF     ' .                                    PRO28300
1 2                                    . ' (ADATA(K).EQ.HOMN ' .
1 2                                 ' . (L))                    . +------------------------+
1 2                                    ' .                   . '    F                      I
1 2                                       ' .             . '                              I
1 2                                           ' .     . '                                  I
1 2                                              I T                                       I
1 2                                              I                                         I
1 2                                          ---------                                     I
1 2                                          ( 1760  )                                     I   PRO28300
1 2                                           '.   .'                                      I
1 2                                             '.'                                        I
1 2                                                                                        I
1 2                                                                                        I
1 2                                              +-----------------------------------------+
1 2                                              I
1 22222222222222222222222222  1750 2222222222222222 CONTINUE                                   PRO28400
1                                                I
1                               ***....                                                     ***PRO28500
1                               ***     INVALID DATA NAME --- ERROR                         ***PRO28600
1                               ***....                                                     ***PRO28700
1                                                I
1                                          +++++++++++
1                                        .' WRITE      '.                                      PRO28800
1                                      .' (IO,1250)      '.
1                                    .' ADATA(K)           '.
1                                    +++++++++++++++++++++++
1                                                I
1                                 -----------------------------------------
1                                 I   IERR=IERR+1                          I                   PRO28900
1                                 -----------------------------------------
1                                                I
1                                            ---------
1                                            ( 1770  )                                         PRO29000
1                                             '.   .'
1                                               '.'
1
1                         1760                 CONTINUE                                        PRO29100
1                                                I
1                                 -----------------------------------------
1                                 I   TSTORE(L,IYR)=ADATA(K+1)             I                   PRO29200
1                                 -----------------------------------------
1                                                I
11111111111111111111111111111  1770 1111111111111111 CONTINUE                                  PRO29300
                                                 I
                                                 I
                                                 I
                                                 I

                                                 I
                                             ---------
                                             ( 1050  )                                         PRO29400
                                              '.   .'
                                                '.'


                                ***....                                                     ***PRO29500
                                ***....                                                     ***PRO29600
                                ***     THIS ROUTINE PROCESSES HISTORICAL RECORD OF COMMERCIAL PARAMETERS ***PRO29700
                                ***....                                                     ***PRO29800
                                ***....                                                     ***PRO29900
                          1800                 CONTINUE                                        PRO30000
                                                 I
                                  -----------------------------------------
11111111111111111111111111111***********   DO  1870   K=1,6,2             I                   PRO30100
1                                 -----------------------------------------
1                                                I
1                                                .
1                                            . '   ' .
1                                         . '    IF     ' .                                    PRO30200
1                                      . ' (ADATA(K).EQ.BLAN ' .
1                                   ' . K)                      . +------------------------+
1                                      ' .                   . '    F                      I
1                                         ' .             . '                              I
1                                             ' .     . '                                  I
1                                                I T                                       I
1                                                I                                         I
1                                            ---------                                     I
1                                            ( 1870  )                                     I   PRO30200
1                                             '.   .'                                      I
1                                               '.'                                        I
1                                                                                          I
1                                                                                          I
1                                                +-----------------------------------------+
1                                                I
1                                                .
1                                            . '   ' .
1                                         . '    IF     ' .                                    PRO30300
1                                      . ' (ADATA(K).EQ.AKEY ' .
1                                   ' . (1))                    . +------------------------+
1                                      ' .                   . '    F                      I
1                                         ' .             . '                              I
1                                             ' .     . '                                  I
1                                                I T                                       I
1                                                I                                         I
1                                                I                                         I
1                                                I                                         I
1                                                I                                         I
1                                                I                                         I
1                                                I                                         I
```

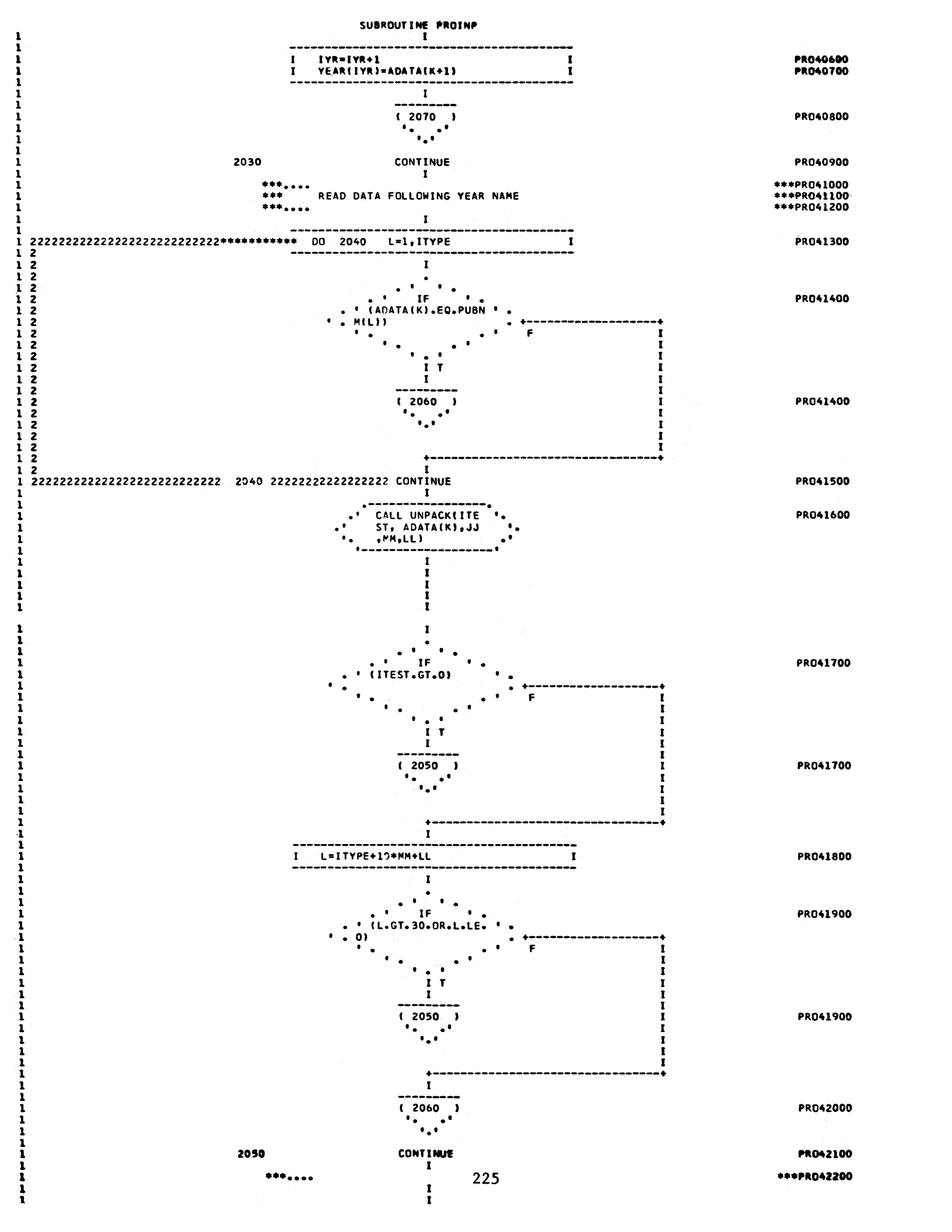

SUBROUTINE PROINP
(1820)
IF (IYR.GT.0)
F
I T
(1830)
***.... NO YEAR PROVIDED --- ERROR
1810 CONTINUE
WRITE (IO,1720) (ADATA(I),I=1,6,2)
IERR=IERR+1
(1050)
1820 CONTINUE
***.... READ YEAR NAME
IYR=IYR+1
YEAR(IYR)=ADATA(K+1)
(1870)
1830 CONTINUE
***.... READ DATA FOLLOWING YEAR NAME
DO 1840 L=1,NOS
IF (ADATA(K).EQ.CNAM E(L))
F
I T
(1860)
1840 CONTINUE
CALL UNPACK(ITE ST, ADATA(K),JJ ,MM,LL)
PRO30300
PRO30400
PRO30400
***PRO30500
***PRO30600
***PRO30700
PRO30800
PRO30900
PRO31000
PRO31100
PRO31200
***PRO31300
***PRO31400
***PRO31500
PRO31600
PRO31700
PRO31800
PRO31900
***PRO32000
***PRO32100
***PRO32200
PRO32300
PRO32400
PRO32400
PRO32500
PRO32600


SUBROUTINE PROINP
IF (ITEST.GT.0)
F
T
1850
L=28+10*MM+LL
1860
1850 CONTINUE
INVALID DATA NAME --- ERROR
WRITE (IO,1250) ADATA(K)
IERR=IERR+1
1870
1860 CONTINUE
TSTORE(L,IYR)=ADATA(K+1)
1870 CONTINUE
1050
THIS ROUTINE PROCESSES HISTORICAL RECORD OF INDUSTRIAL PARAMETERS
1900 CONTINUE
DO 1960 K=1,6,2
IF (ADATA(K).EQ.BLAN K)
F
T
1960

```
                                                                      PR034900
                                                                      PR034900
                                                                      PR035000
                                                                      PR035000
    ***....                                                           ***PR035100
    ***     NO YEAR PROVIDED --- ERROR                                ***PR035200
    ***....                                                           ***PR035300
1910                CONTINUE                                          PR035400
                                                                      PR035500
                  +++++++++++
                .' WRITE     '.
              .' (IO,1720)     '.
            .' (ADATA(I),I=1,6,2)'.
            +++++++++++++++++++++++
                                                                      PR035600
                                                                      PR035700
1920                CONTINUE                                          PR035800
    ***....                                                           ***PR035900
    ***     READ YEAR NAME                                            ***PR036000
    ***....                                                           ***PR036100
    ---------------------------------------
    I   IYR=IYR+1                           I                         PR036200
    I   YEAR(IYR)=ADATA(K+1)                I                         PR036300
    ---------------------------------------
                                                                      PR036400
1930                CONTINUE                                          PR036500
    ***....                                                           ***PR036600
    ***     READ DATA FOLLOWING YEAR NAME                             ***PR036700
    ***....                                                           ***PR036800
                  .-----------------.
                .' CALL UNPACK(ITE  '.                                PR036900
              .'    ST, ADATA(K),JJ    '.
              '.    ,MM,LL)          .'
                '-----------------'
```


SUBROUTINE PRDINP
IF (ITEST.GT.0)
F
T
1940
L=100*(JJ-2)+10*MM+LL+1
IF (L.GT.200.OR.L.LE.0)
F
T
1940
1950
1940 CONTINUE
*** INVALID DATA NAME --- ERROR
WRITE (IO,1250) ADATA(K)
IERR=IERR+1
1960
1960 CONTINUE
1950 CONTINUE
TSTORE(L,IYR)=ADATA(K+1)
1050
2000 CONTINUE
THIS ROUTINE PROCESSES HISTORICAL RECORD OF PUBLIC/UNACC. PARAMETE
DO 2070 K=1,6,2
PR037000
PR037100
PR037200
PR037300
PR037400
PR037500
PR037600
PR037700
PR037800
PR037900
PR038000
PR038100
PR038200
PR038300
PR038400
PR038500
PR038600
PR038700
PR038800
PR038900
PR039000
PR039100


SUBROUTINE PROINP
IF (ADATA(K).EQ.BLAN K)
F
T
2070
IF (ADATA(K).EQ.AKEY (1))
F
T
2020
IF (IYR.GT.0)
F
T
2030
***.... NO YEAR PROVIDED --- ERROR
2010 CONTINUE
WRITE (IO,1720) (ADATA(I),I=1,6,2)
IERR=IERR+1
1050
2020 CONTINUE
***.... READ YEAR NAME
PRO39200
PRO39200
PRO39300
PRO39300
PRO39400
PRO39400
***PRO39500
***PRO39600
***PRO39700
PRO39800
PRO39900
PRO40000
PRO40100
PRO40200
***PRO40300
***PRO40400
***PRO40500


SUBROUTINE PROINP
IYR=IYR+1
YEAR(IYR)=ADATA(K+1)
PRO40600
PRO40700
(2070)
PRO40800
2030 CONTINUE
PRO40900
***.... ***PRO41000
*** READ DATA FOLLOWING YEAR NAME ***PRO41100
***.... ***PRO41200
DO 2040 L=1,ITYPE
PRO41300
IF (ADATA(K).EQ.PUBN M(L))
PRO41400
F
I T
(2060)
PRO41400
2040 2222222222222222 CONTINUE
PRO41500
CALL UNPACK(ITE ST, ADATA(K),JJ ,MM,LL)
PRO41600
IF (ITEST.GT.0)
PRO41700
F
I T
(2050)
PRO41700
L=ITYPE+19*MM+LL
PRO41800
IF (L.GT.30.OR.L.LE. 0)
PRO41900
F
I T
(2050)
PRO41900
(2060)
PRO42000
2050 CONTINUE
PRO42100
***.... ***PRO42200

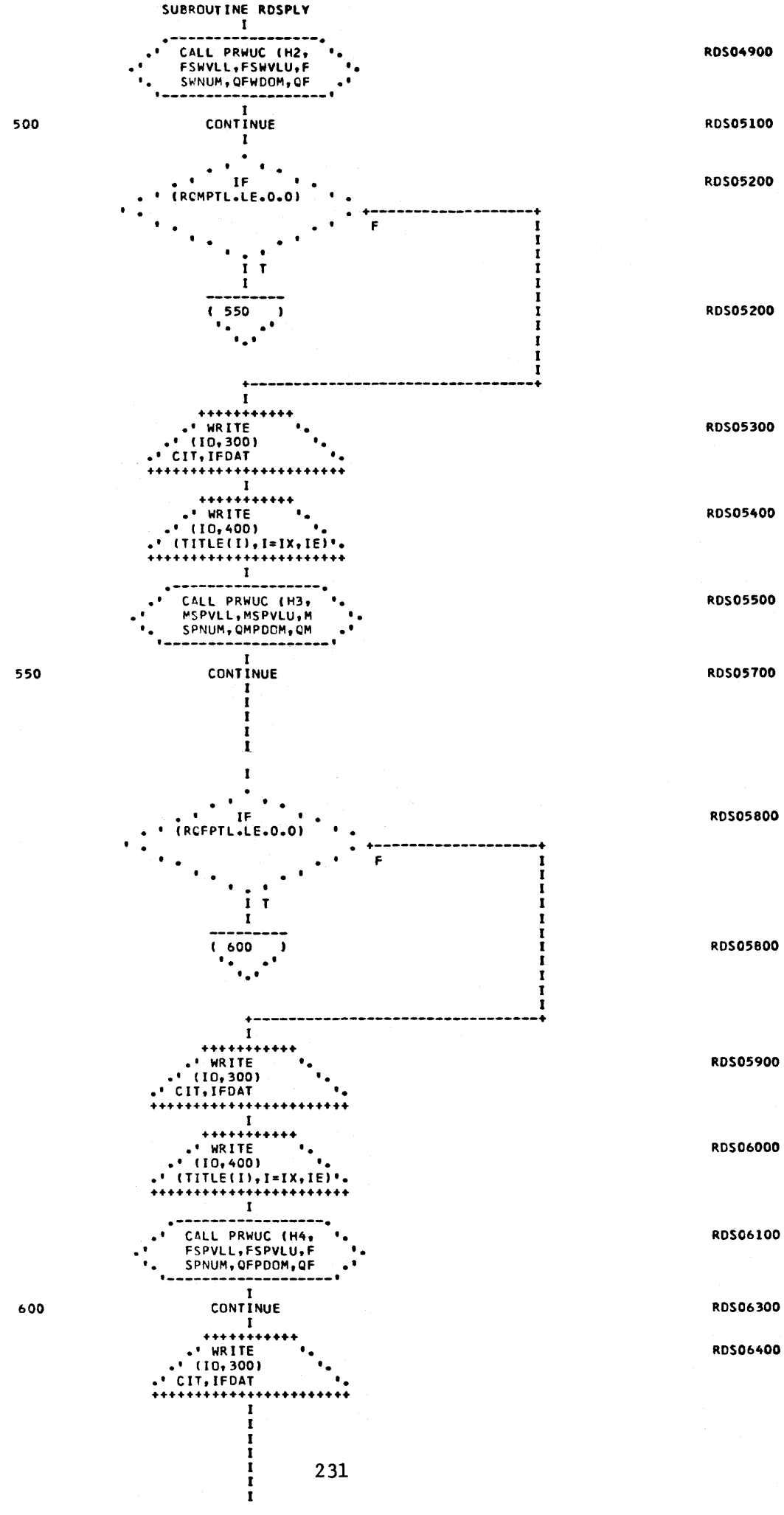
```
                                                SUBROUTINE PROINP
1                                     ***     INVALID DATA NAME --- ERROR                                          ***PRO42300
1                                     ***....                                                                      ***PRO42400
1                                                      I
1                                                 +++++++++++
1                                               .' WRITE      '.                                                   PRO42500
1                                             .' (IO,1250)      '.
1                                           .' ADATA(K)           '.
1                                           +++++++++++++++++++++++
1                                                      I
1                                        ---------------------------------------
1                                        I   IERR=IERR+1                       I                                   PRO42600
1                                        ---------------------------------------
1                                                      I
1                                                  ---------
1                                                  ( 2070  )                                                       PRO42700
1                                                   '.   .'
1                                                     '.'
1
1                               2060                CONTINUE                                                       PRO42800
1                                                      I
1                                        ---------------------------------------
1                                        I   TSTORE(L,IYR)=ADATA(K+1)          I                                   PRO42900
1                                        ---------------------------------------
1                                                      I
11111111111111111111111111111  2070 1111111111111111 CONTINUE                                                      PRO43000
                                                       I
                                                   ---------
                                                   ( 1050  )                                                       PRO43100
                                                    '.   .'
                                                      '.'


                                      ***....                                                                      ***PRO43200
                                      ***....                                                                      ***PRO43300
                                      ***     EXTRAPOLATE PROJECTED VALUES OF PARAMETERS FROM HISTORICAL RECORD    ***PRO43400
                                      ***....                                                                      ***PRO43500
                                      ***....                                                                      ***PRO43600
                                8000                CONTINUE                                                       PRO43700
                                                       I
                                         ---------------------------------------
                                         I   KKK=KK-8                          I                                   PRO43800
                                         ---------------------------------------
                                                       I
                                         ---------------------------------------
11111111111111111111111111111*********** DO  8500   I=1,200                  I                                   PRO43900
1                                        ---------------------------------------
1                                                      I
1                                                      I
1                                                      I

1                                                      I
1                                        ---------------------------------------
1                                        I   NNN=0                             I                                   PRO44000
1                                        ---------------------------------------
1                                                      I
1                                        ---------------------------------------
1 222222222222222222222222222*********** DO  8010   J=1,7                    I                                   PRO44100
1 2                                      ---------------------------------------
1 2                                                    I
1 2                                                    .
1 2                                                .  '  '  .
1 2                                            .  '    IF      '  .                                                PRO44200
1 2                                         . ' (TSTORE(I,J).LE.0 ' .
1 2                                       ' . .0)                   . +-------------------+
1 2                                          ' .                 . '    F                 I
1 2                                              ' .         . '                          I
1 2                                                  ' . . '                              I
1 2                                                    I T                                I
1 2                                                    I                                  I
1 2                                                ---------                              I
1 2                                                ( 8010  )                              I                        PRO44200
1 2                                                 '.   .'                               I
1 2                                                   '.'                                 I
1 2                                                                                       I
1 2                                                    +----------------------------------+
1 2                                                    I
1 2                                      ---------------------------------------
1 2                                      I   NNN=NNN+1                         I                                   PRO44300
1 2                                      I   X(NNN)=YEAR(J)                    I                                   PRO44400
1 2                                      I   Y(NNN)=TSTORE(I,J)                I                                   PRO44500
1 2                                      ---------------------------------------
1 2                                                    I
1 222222222222222222222222222  8010 2222222222222222 CONTINUE                                                      PRO44600
1                                                      I
1                                     ***....                                                                      ***PRO44700
1                                     ***     PERFORM LINEAR REGRESSION ON TWO OR MORE DATA POINTS                 ***PRO44800
1                                     ***....                                                                      ***PRO44900
1                                                      I
1                                                      I
1                                                      I
1                                                      I
1                                                      I
1                                                      I
1                                                      I
1                                                      I
1                                                      I
1                                                      I
1                                                      I
1                                                      I
1                                                      I
```

```
                         SUBROUTINE PROINP
                                 I
                                 .
                             .  '  '  .
                        .  '     IF       '  .                         PRO45000
                    . '  (NNN-1)              ' .
                 +-' .                          . '-+
                 I      .                    .      I
                 I         .              .         I
                 I            .   .   .             I
                 I -              I 0               I +
              ---+---             I              ---+---
              (8500 )             I              (8090 )
               '. .'              I               '. .'
                 .                I                 .
                                  I
                                  I
                                  I
         8050                 CONTINUE                                 PRO45100
                                  I
           ***....                                                  ***PRO45200
           ***      ONE DATA POINT --- ERROR                        ***PRO45300
           ***....                                                  ***PRO45400
                                  I
                             +++++++++++
                           .' WRITE      '.                            PRO45500
                         .' (IO,8060)      '.
                       .'                    '.
                      ++++++++++++++++++++++++
                                  I
         8060    FORMAT(1X,56HWARNING --- ABOVE DATA INPUT FOR A SINGLE YEAR, IGNOR**   PRO45600
                    **ED.)                                          **
                                  I
                              ---------
                              ( 8500  )                                PRO45800
                               '.   .'
                                 '.'
         8090                 CONTINUE                                 PRO45900
                                  I
                       .-------------------.
                     .'  CALL LREGRS (NN    '.                         PRO46000
                   .'    N,X,Y,S,C)           '.
                    '.                        .'
                      '--------------------'
                                  I
           ***....                                                  ***PRO46100
           ***      COMPUTE PROJECTED VALUE                         ***PRO46200
           ***....                                                  ***PRO46300
                                  I
                                  I
                                  I

                                  I
              ----------------------------------------------
              I   TEMP=C+(S*PKEY(1))                       I           PRO46400
              I   IF(TEMP.LE.0.0)TEMP=0.0                  I           PRO46500
              ----------------------------------------------
                                  I
           ***....                                                  ***PRO46600
           ***      STORE PROJECTED VALUE                           ***PRO46700
           ***....                                                  ***PRO46800
                                  I
              ------------------  I
              *  GO TO KKK     ***I                                    PRO46900
              ------------------  I---------------------------
                                  I    01        02        03
                                  I  -------   -------   -------
                                  I  (8100 )   (8200 )   (8300 )
                                  I   '. .'     '. .'     '. .'
                                  I     .         .         .
                                  I-------
                                       04
                                     -------
                                     (8400 )
                                      '. .'
                                        .
         8100                 CONTINUE                                 PRO47000
                                  I
              ----------------------------------------------
              I   IF(HNUM(I).LT.0.0)HNUM(I)=TEMP           I           PRO47100
              ----------------------------------------------
                                  I
                              ---------
                              ( 8500  )                                PRO47200
                               '.   .'
                                 '.'
         8200                 CONTINUE                                 PRO47300
                                  I
              ----------------------------------------------
              I   IF(CPAR(I).LT.0.0)CPAR(I)=TEMP           I           PRO47400
              ----------------------------------------------
                                  I
                              ---------
                              ( 8500  )                                PRO47500
                               '.   .'
                                 '.'
         8300                 CONTINUE                                 PRO47600
                                  I
                                  I
                                  I
```

```
                                          SUBROUTINE PROINP
1                                                I
1                             -----------------------------------------
1                             I   IF(PRIN(I).LT.0.0)PRIN(I)=TEMP      I              PR047700
1                             -----------------------------------------
1                                                I
1                                            ---------
1                                            ( 8500  )                              PR047800
1                                             '.   .'
1                                               '.'
1
1                       8400                 CONTINUE                               PR047900
1                                                I
1                             -----------------------------------------
1                             I   IF(PPAR(I).LT.0.0)PPAR(I)=TEMP      I              PR048000
1                             -----------------------------------------
1                                                I
1                                            ---------
1                                            ( 8500  )                              PR048100
1                                             '.   .'
1                                               '.'
1
11111111111111111111111111111  8500 1111111111111111 CONTINUE                       PR048200
                                                 I
                                        .----------------.
                                      .'  CALL INITL (TST '.                        PR048300
                                     .'   ORE,1400,0.0)     '.
                                      '.                   .'
                                        '-----------------'
                                                 I
                                        .----------------.
                                      .'  CALL INITL (TST '.                        PR048400
                                     .'   ORE,1400,0.0)     '.
                                      '.                   .'
                                        '-----------------'
                                                 I
                                            ---------
                                            ( 1000  )                               PR048500
                                             '.   .'
                                               '.'


                         ***....                                                 ***PR048600
                         ***....                                                 ***PR048700
                         ***     TEST FOR KEY PROJECTIONS                        ***PR048800
                         ***....                                                 ***PR048900
                         ***....                                                 ***PR049000
                         ***....                                                 ***PR049100
                        9300                 CONTINUE                               PR049200
                                                 I
                                                 I
                                                 I

                                                 I
                                                 .
                                            . '     ' .
                                        . '     IF      ' .                         PR049300
                                     . ' (IERR.GT.0)        ' .
                                   .                            . +---------------------+
                                     ' .                    . '   F                     I
                                         ' .            . '                             I
                                             ' .    . '                                 I
                                                 I T                                    I
                                                 I                                      I
                                       .-----------------.                              I
                                       I RETURN           '.                            I   PR049300
                                       I                    '.                          I
                                       I                   .'                           I
                                       ------------------'                              I
                                                                                        I
                                                 +--------------------------------------+
                                                 I
                               -----------------------------------------
1111111111111111111111111111**********  DO  9100   K=1,3                    I           PR049400
1                              -----------------------------------------
1                                                I
1                                                .
1                                           . '     ' .
1                                       . *     IF      ' .                         PR049500
1                                    . ' (PKEY(K).GT.0.0)   ' .
1                                  .                            . +---------------------+
1                                    ' .                    . '   F                     I
1                                        ' .            . '                             I
1                                            ' .    . '                                 I
1                                                I T                                    I
1                                                I                                      I
1                                           ---------                                   I
1                                           ( 9100  )                                   I   PR049500
1                                            '.   .'                                    I
1                                              '.'                                      I
1                                                                                       I
1                                                                                       I
1                                                +--------------------------------------+
1                                                I
1                                           +++++++++++
1                                        .' WRITE       '.                          PR049600
1                                      .' (IO,9050)       '.
1                                    .' AKEY(K)             '.
1                                    +++++++++++++++++++++++++
1                                                I
1                          9050     FORMAT (/18HTHE KEY PROJECTION,2X,A4,2X,48HHAS NOT BEEN INPUT.  PR**    PR049700
1                                      **OJECTION IS NOT POSSIBLE.)                                        **
1                                                I
1                                                I
```

```
                                SUBROUTINE PROINP
1                                      I
1                          ------------------------------------
1                          I   IERR=IERR+1                    I                                    PR049900
1                          ------------------------------------
1                                      I
1                                .-----------------.
1                                I RETURN          '.                                             PR050000
1                                I                   '.
1                                I                   .'
1                                -------------------'
1111111111111111111111111111111  9100 1111111111111111 CONTINUE                                   PR050100
                                       I
                             ***....                                                              ***PR050200
                             ***     ALL PROJECTION DATA HAS BEEN STORED                          ***PR050300
                             ***....                                                              ***PR050400
                                       I
                                  .-----------------.
                                .'  CALL GROWTH (IR   '.                                          PR050500
                              .'    ES,ICOM,INDS,IP     '.
                              '.    UB)                 .'
                                '.-------------------.'
                                       I
                                  .-----------------.
                                  I RETURN          '.                                           PR050600
                                  I                   '.
                                  I                   .'
                                  -------------------'

***END*******END*******END*******END*******END*******END*******END*******END*******END*******END***  PR050700
                                  SUBROUTINE RDSPLY

                                 ************************
                                 **                    **
                                 ** SUBROUTINE RDSPLY   **                                        RDS00100
                                 ** (IF)                **
                                 **                    **
                                 ************************
                                          I
                             ***                                                                  ***RDS00200
                             *** PRINT RESIDENTIAL WATER USAGE CALCULATIONS                        ***RDS00300
                             ***                                                                  ***RDS00400
                             ***                                                                  ***RDS00500
                             *** IF=0, CURRENT DATA.    IF=1, PREDICTED DATA                      ***RDS00600
                             ***                                                                  ***RDS00700
                                  REAL MSPVLL,MSPVLU,MSPASM,MSPAPR,MSPSPR,MSPDEN,MSPPEP,MSPNUM,
                                       MSWVLL,MSWVLU,MSWASM,MSWAPR,MSWSPR,MSWDEN,MSWPEP,MSWNUM

                                  DIMENSION TITLE(6), H1(8), H2(8), H3(8), H4(8),H5(8)            RDS02500
                                  COMMON/CITDAT/CDATE,ALAT,ALONG,PO,PD,AGE,TEMPLT,EMPL4,          RDS00800
                                              CNCOME,CSERVE,FDAT,POPRO,PNCOME,ACRESP,
                                                   HDGROP,PSERVE,CIT(6),RDSCIT(3)

                                  COMMON/IFILE/IN,IO                                              RDS01100
                                  COMMON /RESPAR/ FSPVLL(25),FSPVLU(25),FSPASM(25),FSPAPR(25),    RDS01200
                                       FSPSPR(25),FSPDEN(25),FSPPEP(25),FSPNUM(25),FSWVLL(25),FSWVLU
                                       (25),FSWASM(25),FSWAPR(25),FSWSPR(25),FSWDEN(25),FSWPEP(25),F
                                       SWNUM(25),MSPVLL(25),MSPVLU(25),MSPASM(25),MSPAPR(25),MSPSPR(
                                       25),MSPDEN(25),MSPPEP(25),MSPNUM(25),MSWVLL(25),MSWVLU(25),MS
                                       WASM(25),MSWAPR(25),MSWSPR(25),MSWDEN(25),MSWPEP(25),MSWNUM(2
                                       5),RDSRSP(12)
```

```
              SUBROUTINE RDSPLY
       QMWTOT(25),QMWMAX(25),QMWPEK(25),RDSRSD(3)                                   RDS02400
       DATA TITLE/4H    ,4HCURR,4HENT ,4H  PR,4HEDIC,4HTED /                        RDS02600
       DATA H1/4H    ,4HMETE,4HRED ,4HAND ,4HSEWE,4HRED ,4HAREA,4HS   /             RDS02700
       DATA H2/4H   F,4HLAT ,4HRATE,4H AND,4H SEW,4HERED,4H ARE,4HAS  /             RDS02800
       DATA H3/4H  MF,4HTERE,4HD AN,4HD SE,4HPTIC,4H TAN,4HK AR,4HEAS /             RDS02900
       DATA H4/4H FLA,4HT RA,4HTE A,4HND S,4HEPTI,4HC TA,4HNK A,4HREAS/             RDS03000
       DATA H5/4H    ,4H    ,4H    ,4H  TO,4HTAL ,4H    ,4H    ,4H    /             RDS03100

       ----------------------------------------
       I   IFDAT=IFIX(FDAT)                   I                                     RDS03200
       I   IX=IF*3+1                          I                                     RDS03300
       I   IE=IX+2                            I                                     RDS03400
       ----------------------------------------
                       I
                       .
                   . '   ' .
               . '    IF     ' .                                                    RDS03500
           . '  (RQMWTL.LE.0.0)  ' .
         .                         . +--------------------+
           ' .                   . '   F                  I
               ' .           . '                          I
                   ' .   . '                              I
                       I T                                I
                       I                                  I
                   ---------                              I
                   ( 450   )                              I                         RDS03500
                    '.   .'                               I
                      '.'                                 I
                                                          I
                       +----------------------------------+
                       I
 ***      PRINTS PAGE HEADING                                                    ***RDS03600
                       I
                  +++++++++++
                .' WRITE     '.                                                     RDS03700
              .' (IO,300)      '.
            .' CIT,IFDAT         '.
            ++++++++++++++++++++++
                       I
 300   FORMAT (1H1,10X,50HMUNICIPAL  WATER  REQUIREMENTS  FOR  THE  CITY **         RDS03800
          ** OF,2X,3A4,3A4,2X,14HFOR  THE  YEAR,2X,I4//48X,26HANALYZED  BY  MA**
          **IN  SYSTEM//)                                                    **
                       I
                       I
                       I
                       I
                       I
                       I
                       I
                       I

                       I
                  +++++++++++
                .' WRITE     '.                                                     RDS04100
              .' (IO,400)      '.
            .' (TITLE(I),I=IX,IE)'.
            ++++++++++++++++++++++
                       I
 400   FORMAT (32X,3A4,42HRESIDENTIAL WATER REQUIREMENTS BY CATEGORY)    **         RDS04200
                       I
             .-----------------.
           .' CALL PRWUC (H1,   '.                                                  RDS04300
         .'  MSWVLL,MSWVLU,M     '.
           '. SWNUM,QMWDOM,QM   .'
             '-----------------'
                       I
 450                CONTINUE                                                        RDS04500
                       I
                       .
                   . '   ' .
               . '    IF     ' .                                                    RDS04600
           . '  (RQFWTL.LE.0.0)  ' .
         .                         . +--------------------+
           ' .                   . '   F                  I
               ' .           . '                          I
                   ' .   . '                              I
                       I T                                I
                       I                                  I
                   ---------                              I
                   ( 500   )                              I                         RDS04600
                    '.   .'                               I
                      '.'                                 I
                                                          I
                       +----------------------------------+
                       I
                  +++++++++++
                .' WRITE     '.                                                     RDS04700
              .' (IO,300)      '.
            .' CIT,IFDAT         '.
            ++++++++++++++++++++++
                       I
                  +++++++++++
                .' WRITE     '.                                                     RDS04800
              .' (IO,400)      '.
            .' (TITLE(I),I=IX,IE)'.
            ++++++++++++++++++++++
                       I
                       I
                       I
                       I
                       I
```


SUBROUTINE RDSPLY
CALL PRWUC (H2, FSWVLL,FSWVLU,F SWNUM,QFWDOM,QF
RDS04900
500 CONTINUE
RDS05100
IF (RCMPTL.LE.0.0)
RDS05200
F
T
(550)
RDS05200
WRITE (IO,300) CIT,IFDAT
RDS05300
WRITE (IO,400) (TITLE(I),I=IX,IE)
RDS05400
CALL PRWUC (H3, MSPVLL,MSPVLU,M SPNUM,QMPDOM,QM
RDS05500
550 CONTINUE
RDS05700
IF (RCFPTL.LE.0.0)
RDS05800
F
T
(600)
RDS05800
WRITE (IO,300) CIT,IFDAT
RDS05900
WRITE (IO,400) (TITLE(I),I=IX,IE)
RDS06000
CALL PRWUC (H4, FSPVLL,FSPVLU,F SPNUM,QFPDOM,QF
RDS06100
600 CONTINUE
RDS06300
WRITE (IO,300) CIT,IFDAT
RDS06400

```
      SUBROUTINE RDSPLY                                                    RDS06500
```



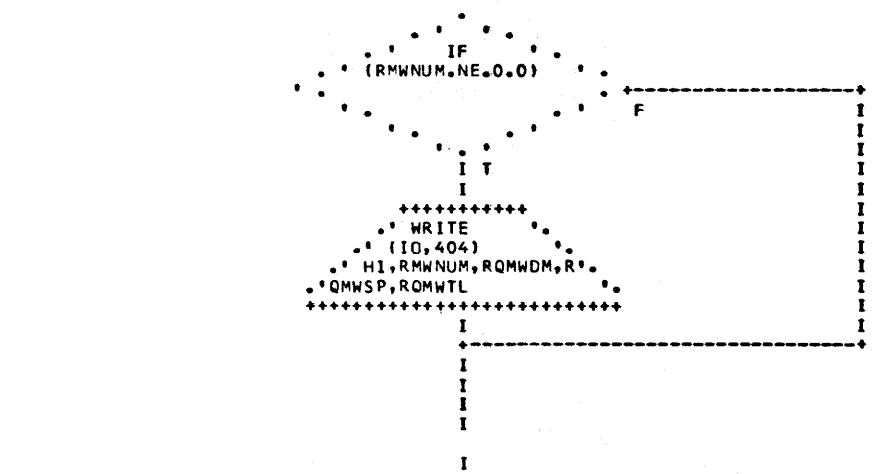
```
401   FORMAT (31X,3A4,49HRESIDENTIAL WATER REQUIREMENTS IN GALLONS PER D**  RDS06600
     **AY///1HO,43X,6HANNUAL,8X,7HMAXIMUM,10X,4HPEAK/                    **
     **  43X,7HAVERAGE,9X,5HDAILY,10X,6HHOURLY)                          **
```



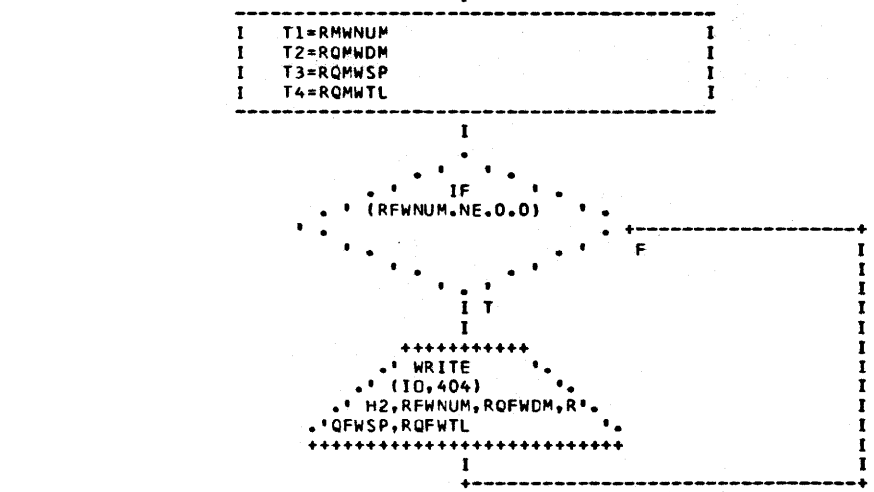
```
402   FORMAT (F50.0,F15.0,F15.0)                                    **     RDS07000
```



```
403   FORMAT (1HO//43X,37HREQUIREMENTS BY TYPE - ANNUAL AVERAGE/       **  RDS07200
     ** 1HO,34X,4HTYPE,20X,6HNO. OF,12X,15HGALLONS PER DAY/            **
     **      60X,5HUNITS,4X,8HDOMESTIC,2X,10HSPRINKLING,7X,5HTOTAL)     **
```




```
                                                                        RDS07500
```



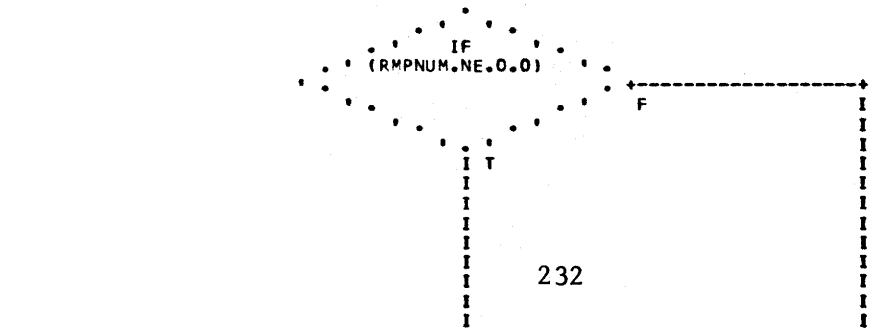

```
                                                                        RDS07600
                                                                        RDS07700
                                                                        RDS07800
                                                                        RDS07900
```



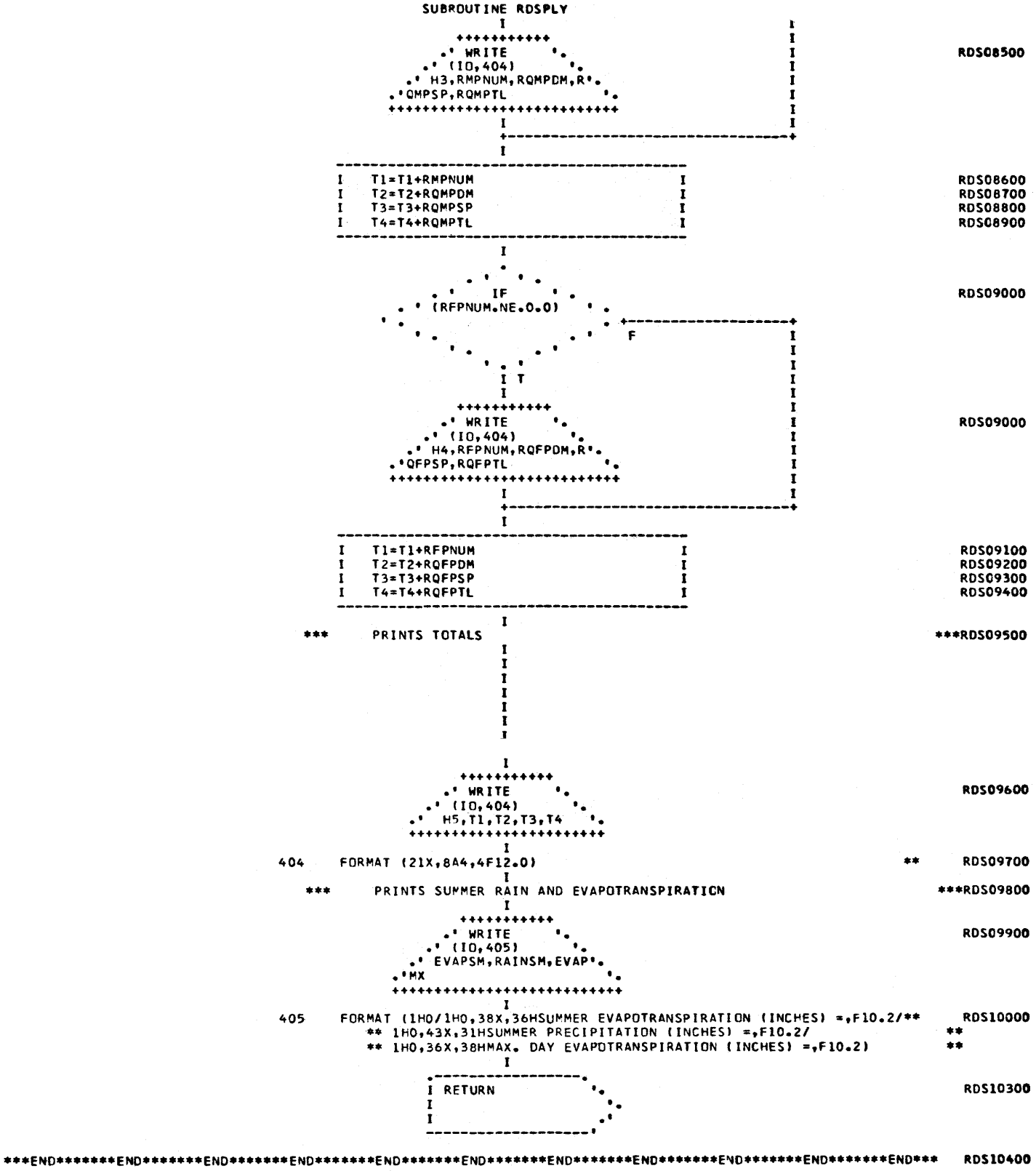
```
                                                                        RDS08000
                                                                        RDS08000
```



```
                                                                        RDS08100
                                                                        RDS08200
                                                                        RDS08300
                                                                        RDS08400
```




```
                                                                        RDS08500
```

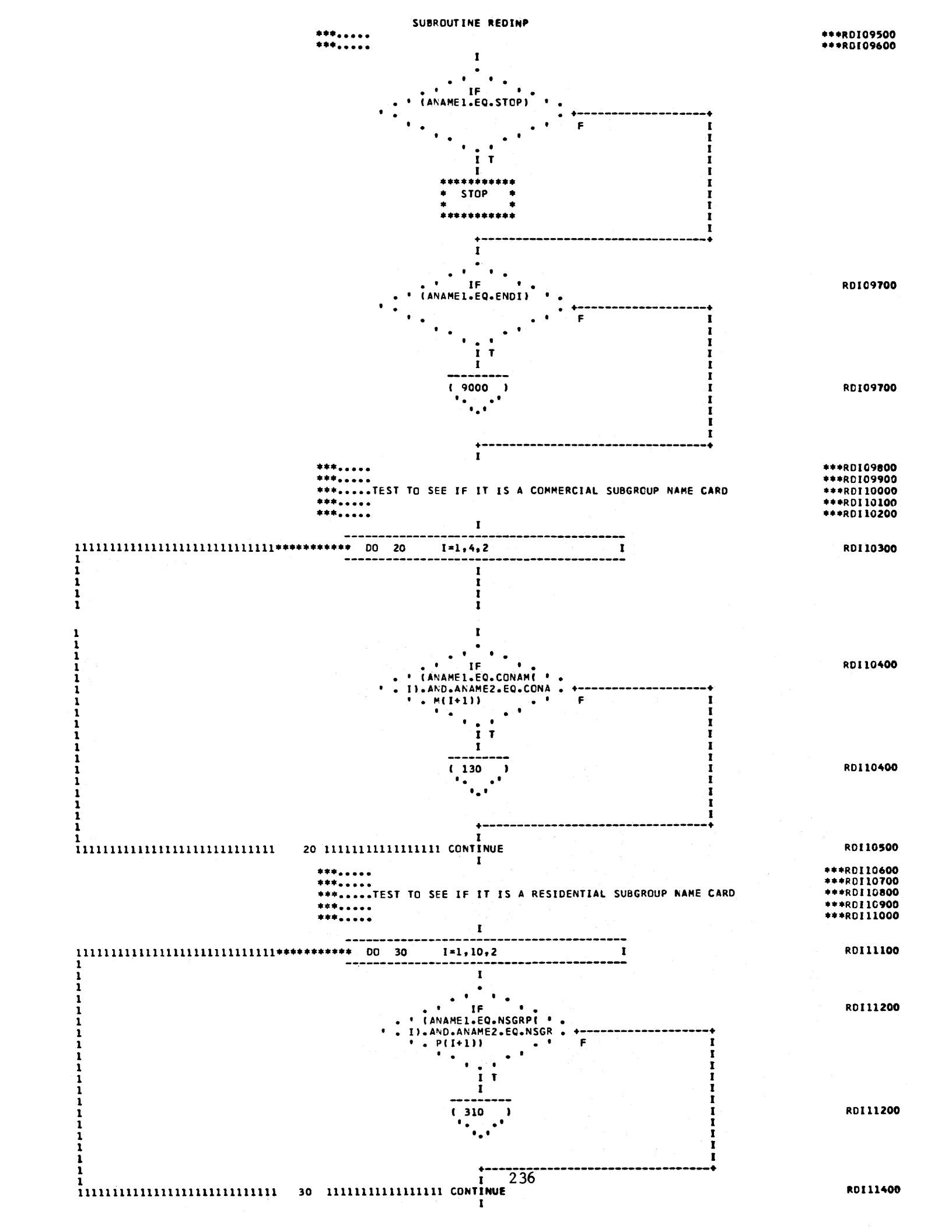


RDS08500 RDS08600 RDS08700 RDS08800 RDS08900 RDS09000 RDS09000 RDS09100 RDS09200 RDS09300 RDS09400 ***RDS09500 RDS09600 RDS09700 ***RDS09800 RDS09900 RDS10000 RDS10300

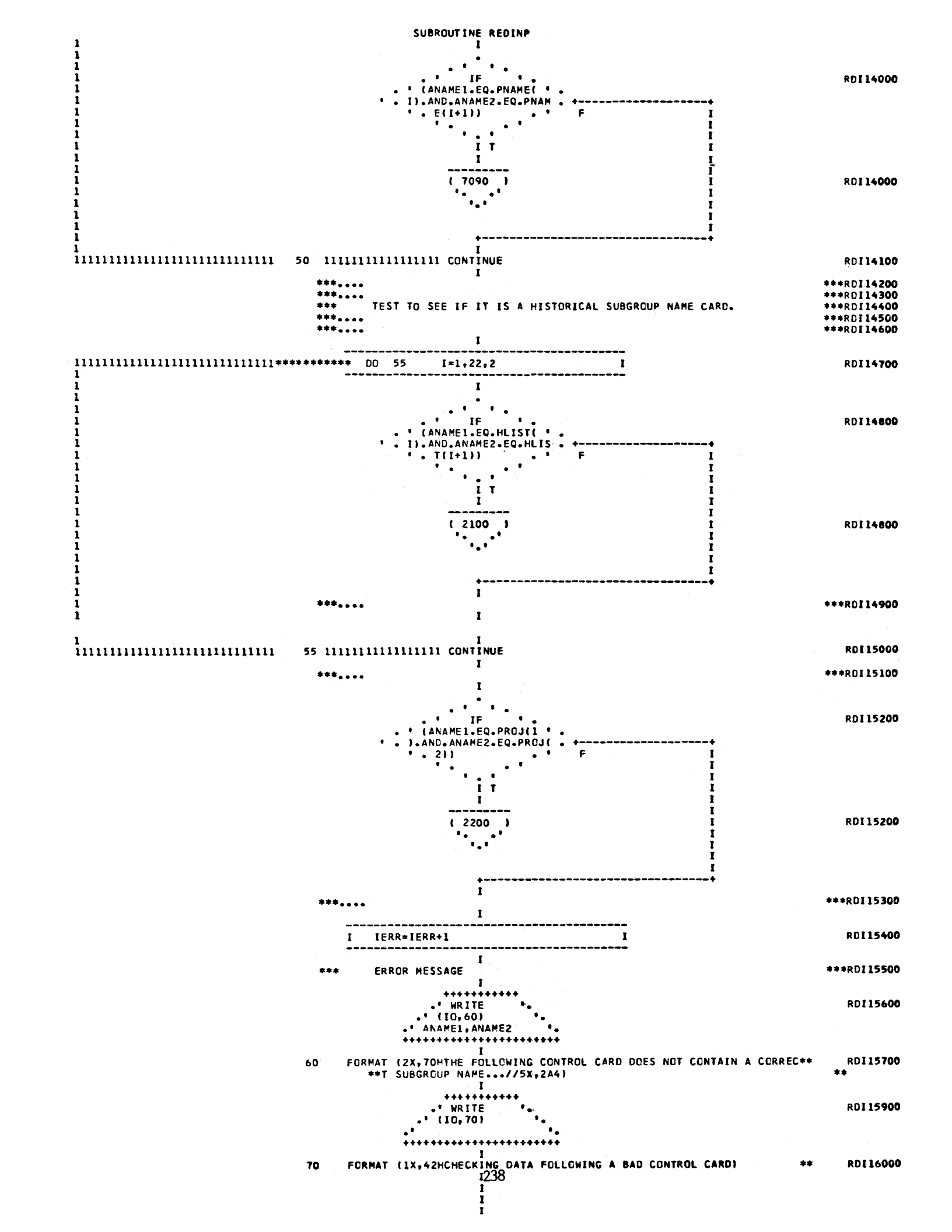
END****END*******END*******END*******END*******END*******END*******END*******END*******END*******END*** RDS10400

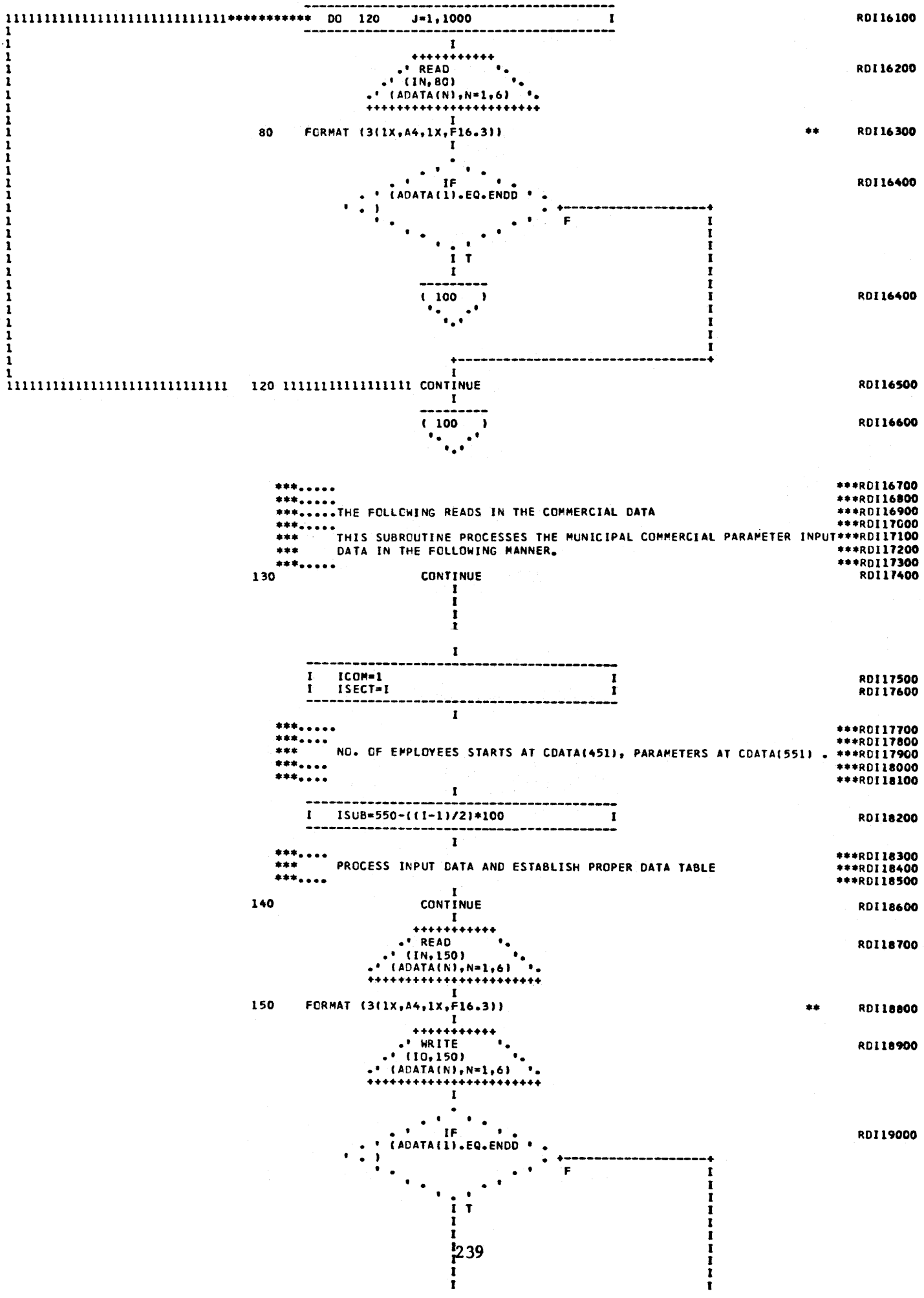
```
      SUBROUTINE REDINP

     ************************
     **                    **
     ** SUBROUTINE REDINP  **                                        RDI00100
     ** (IERR,IRES,ICOM,IND**
     ** S,IPUB,JPR)        **
     **                    **
     ************************
                I
***.....                                                             ***RDI00200
***     SUBROUTINE TO READ IN MUNICIPAL DATA FOR MAIN II SYSTEM       ***RDI00300
***     VARIOUS NAMES AND ARRAYS ARE DEFINED AS FOLLOWS               ***RDI00400
***        LLIST = ARRAY CONTAINING INDUSTRIAL SUBGROUP NAMES         ***RDI00500
***        ICONAM= ARRAY CONTAINING COMMERCIAL SUBGROUP NAMES         ***RDI00600
***        NSGRP = ARRAY CONTAINING RESIDENTIAL SUBGROUP NAMES        ***RDI00700
***        IPNAME= ARRAY CONTAINING PUBLIC AND UNACCOUNTED SUBGROUP NAMES***RDI00800
***        ICITY = ARRAY CONTAINING WORD CITY DATA                    ***RDI00900
***        CIT   = ARRAY CONTAINING CITY NAME                         ***RDI01000
***.....                                                             ***RDI01100
    REAL IBL
    INTEGER COMPRN                                                     RDI01200
    REAL NSGRP(10),PARNM(12)
    REAL IGALAV,IGALMX,ILABL,IUSEAV,IUSEMX,IUSEPK,IPARAM,IQAVE,IQMAX,
        IQPEK

    INTEGER OPTC
    REAL PRTOPT(6),NDC(3)
    DIMENSION ALIST(4)                                                 RDI02900
    DIMENSION HLIST(22),PROJ(2)
     DIMENSION  CONAM(4),ADATA(6)                                      RDI03000
    DIMENSION  OPT(2)                                                  RDI03100
    DIMENSION DATA(6)                                                  RDI03200
    DIMENSION  PNAME(8)                                                RDI03400
    DIMENSION  CITY(2),CIT1(3),CIT2(3)                                 RDI03500
    DIMENSION CITNAM(10)
    DIMENSION CDATA(750),DDATA(2203),CDUM(3)                           RDI03700
    COMMON/COMMRL/CGALAV,CGALMX,CGALPK,CNAME(50),CUSEAV(50),CUSEMX(50) RDI01300
          ,CUSEPK(50) ,CLABEL(200),CUNIT(200),CPARAM(50),CQAV(50),CQMX
        (50),              CQPK(50)

    COMMON/NUMBER/NOS                                                  RDI01600
    COMMON/ITEST/IBL                                                   RDI01700
    COMMON/RESPAR/PAR(800),APAR(12)                                    RDI01800
    COMMON/INDUST/IGALAV,IGALMX,IGALPK,ILABL(800),IUSEAV(200),         RDI01900
                  IUSEMX(200),IUSEPK(200),IPARAM(200),
                       IQAVE(200),IQMAX(200),IQPEK(200)

    COMMON/PUBLC/PUBNAM(30),PDATA(516)                                 RDI02200
    COMMON/IFILE/IN,IO                                                 RDI02300
    COMMON/CITDAT/CITDAT(16),CIT1,CIT2,CIND(3)                         RDI02400
    COMMON/COMPRN/COMPRN(6)                                            RDI02500
                I

    COMMON/RESIDL/RVAL(526)                                            RDI02600
                I
***.....                                                             ***RDI02700
***.....                                                             ***RDI02800
    EQUIVALENCE (NOS,NTYPE),(CDATA,CUSEAV),
                (DDATA,IGALAV),(CDUM,CGALAV)

    EQUIVALENCE (IPRJT,COMPRN(4))                                      RDI06800
                I
***....                                                              ***RDI03900
***....                                                              ***RDI04000
    DATA  CONAM/4HCOMM,4HPARM,4HCOMM,4HEMPL/                           RDI04100
    DATA EOD/4HENDD/                                                   RDI04200
    DATA  ENDI/4HENDI/                                                 RDI04300
    DATA  ENDD/4HENDD/                                                 RDI04400
    DATA  OPT/4HOPTI,4HONS /                                           RDI04500
    DATA NSGRP/4HFLAT,4HSEPT,4HFLAT,4HSEWR,4HMETR,4HSEPT,4HMETR,       RDI04700
              4HSEWR,4HENDI,4HNPUT/

    DATA BLANK/4H    /                                                 RDI04900
    DATA PARNM/4HVALN,4HVALX,4HASMT,4HANPR,4HSMPR,4HDENS,4HPEPL,       RDI05000
              4HNUMB,4HLOWV,4HMEDV,4HHIGH,4HENDD/

    DATA ALIST/4HINDP,4HARAM,4HENDI,4HNPUT/                            RDI05200
    DATA  PNAME/4HPUBP,4HARAM,4HPUBA,4HNAVE,4HPUBM,                    RDI05300
               4HAXDY,4HPUBP,4HEKHR/

    DATA  TYPE/3/                                                      RDI05500
    DATA  CITY /4HCITY,4HDATA/                                         RDI05600
    DATA HLIST/4HPOPU,4HLATN,4HNONW,4HHITE,4HALLH,4HOMES,4HMEDH,4HOMES RDI05700
             ,4HHIGH,4HOMES,4HSKOL,4HYEAR,4HELEM,4HSKOL,4HHIGH,4
        HSKOL          ,4HTSER,4HVICE,4HMEDI,4HCALS,4HINDH,4HISTY/

    DATA PROJ/4HNEWY,4HEAR /                                           RDI06000
    DATA CITNAM /4HCDAT,4HLATC,4HLONG,4HPCPU,4HPDEN,                   RDI06100
                 4HPOPP,4HEMPL,4HEMTC,4HICCM,4HTSER/

    DATA PRTOPT/4HMACH,4HLBIN,4HLIBY,4HPROJ,4HPNCH,4HOPTD/             RDI06300
    DATA  NDC/4HCCBN,4HCCBL,4HCCAL/                                    RDI06400
    DATA STOP/4HSTOP/
                I
***....                                                              ***RDI06500
***....                                                              ***RDI06900
                I
    ----------------------------------------
    I   OPTC=6                           I                             RDI07000
    I   NUM=10                           I                             RDI07100
    I   ITYPE=3                          I
    ----------------------------------------
                I
                I
```

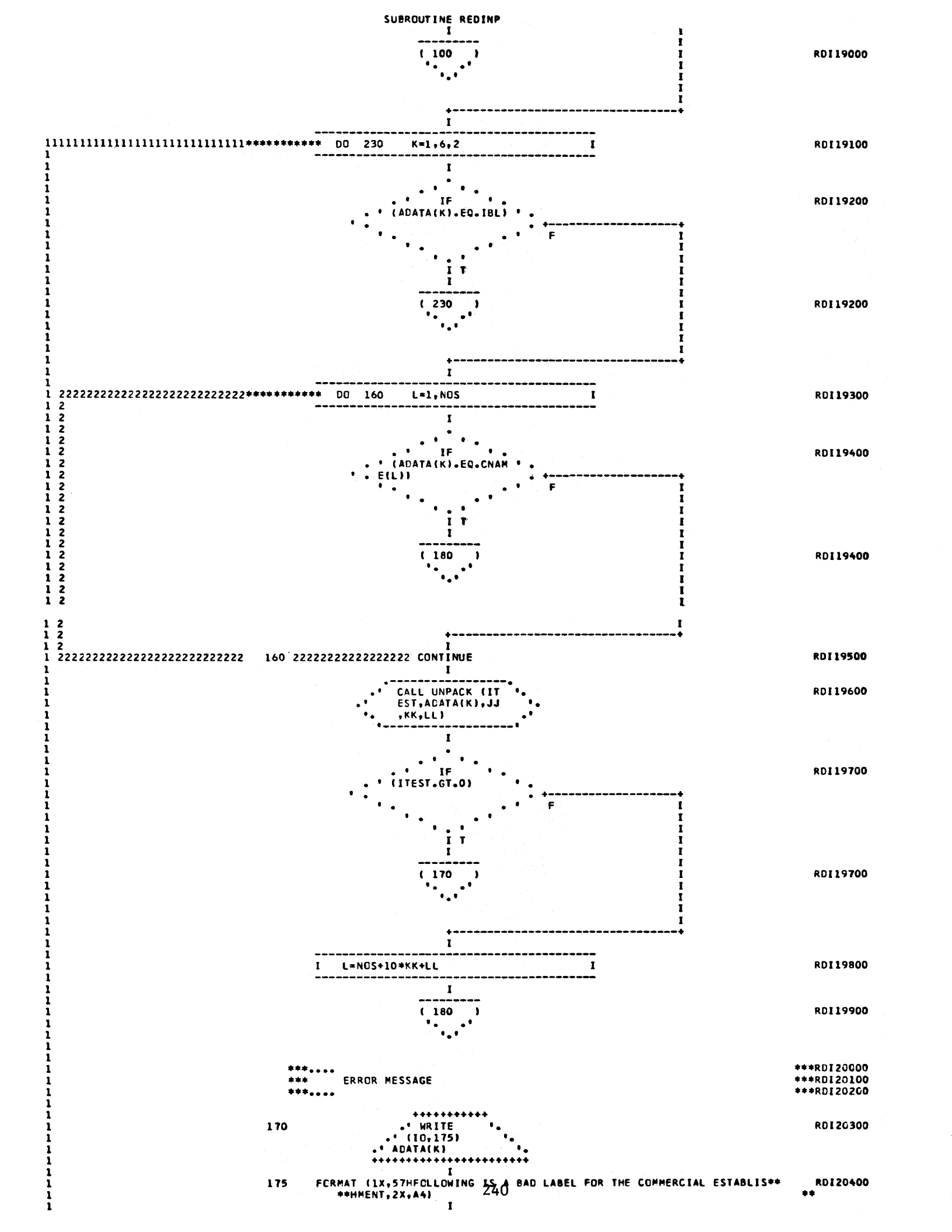
```
                SUBROUTINE REDINP
                      I
***....                                                    ***RDIC7200
                      I
                  .-----------------.
                .'  CALL INITL (CDU  '.                    RDI07300
              .'    M       ,  3,0    '.
              '.    .0)               .'
                '-------------------'
                      I
                  .-----------------.
                .'  CALL INITL (CDA  '.                    RDI07400
              .'    TA      , 750,0   '.
              '.    .0)               .'
                '-------------------'
                      I
                  .-----------------.
                .'  CALL INITL (PAR  '.                    RDI07500
              .'          , 812,0     '.
              '.    .0)               .'
                '-------------------'
                      I
                  .-----------------.
                .'  CALL INITL (PAR  '.                    RDI07600
              .'    ( 51),25,1.0)     '.
              '.                      .'
                '-------------------'
                      I
                  .-----------------.
                .'  CALL INITL (PAR  '.                    RDI07700
              .'    (251),25,1.0)     '.
              '.                      .'
                '-------------------'
                      I
                  .-----------------.
                .'  CALL INITL (PAR  '.                    RDI07800
              .'    (451),25,1.0)     '.
              '.                      .'
                '-------------------'
                      I
                  .-----------------.
                .'  CALL INITL (PAR  '.                    RDI07900
              .'    (651),25,1.0)     '.
              '.                      .'
                '-------------------'
                      I
                  .-----------------.
                .'  CALL INITL (DDA  '.                    RDI08000
              .'    TA      ,2203,0   '.
              '.    .0)               .'
                '-------------------'
                      I

                      I
                  .-----------------.
                .'  CALL INITL (PDA  '.                    RDI08100
              .'    TA      , 366,0   '.
              '.    .0)               .'
                '-------------------'
                      I
                  .-----------------.
                .'  CALL INITL (RVA  '.                    RDI08200
              .'    L       , 526,0   '.
              '.    .0)               .'
                '-------------------'
                      I
                  .-----------------.
                .'  CALL INITL (CIT  '.                    RDI08300
              .'    DAT,25,0.0)       '.
              '.                      .'
                '-------------------'
                      I
                   ++++++++++++
                 .' WRITE      '.                          RDI08400
               .' (IO,1)         '.
             .'                    '.
             ++++++++++++++++++++++++
                      I
 1    FORMAT (1H1)                                    **    RDI08500
                      I
 ***     DETERMINES THE BLOCK OF INPUT DATA TO BE PROCESSED ***RDI08600
 ***....                                                   ***RDI08700
                      I
                   ++++++++++++
                 .' READ       '.
100            .' (IN,10)        '.                        RDI08800
             .' ANAME1,ANAME2      '.
             ++++++++++++++++++++++++
                      I
 10   FORMAT (1X,2A4)                                 **    RDI08900
                      I
                   ++++++++++++
                 .' WRITE      '.                          RDI09000
               .' (IO,11)        '.
             .' ANAME1,ANAME2      '.
             ++++++++++++++++++++++++
                      I
 11   FORMAT (1X,6HREDINP,2X,2A4///)                  **    RDI09100
                      I
 ***.....                                                  ***RDI09200
 ***.....                                                  ***RDI09300
 ***.....TEST FOR END OF INPUT                             ***RDIC9400
                      I
                      I
```

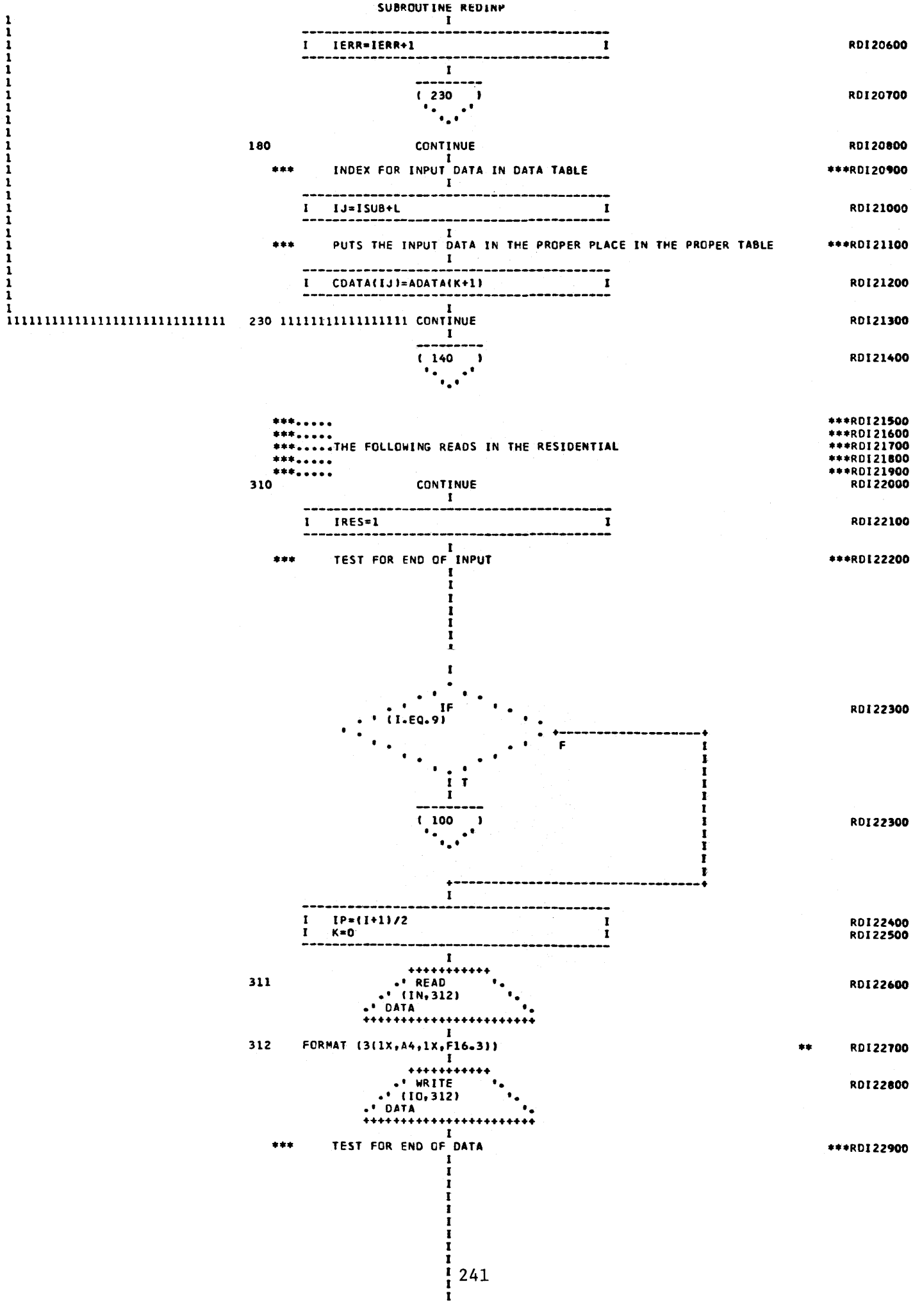

SUBROUTINE REDINP
***.....
***.....
IF
(ANAME1.EQ.STOP)
F
T
STOP
IF
(ANAME1.EQ.ENDI)
F
T
9000
***.....TEST TO SEE IF IT IS A COMMERCIAL SUBGROUP NAME CARD
DO 20 I=1,4,2
IF
(ANAME1.EQ.CONAM(I).AND.ANAME2.EQ.CONA M(I+1))
F
T
130
20 CONTINUE
***.....TEST TO SEE IF IT IS A RESIDENTIAL SUBGROUP NAME CARD
DO 30 I=1,10,2
IF
(ANAME1.EQ.NSGRP(I).AND.ANAME2.EQ.NSGR P(I+1))
F
T
310
30 CONTINUE

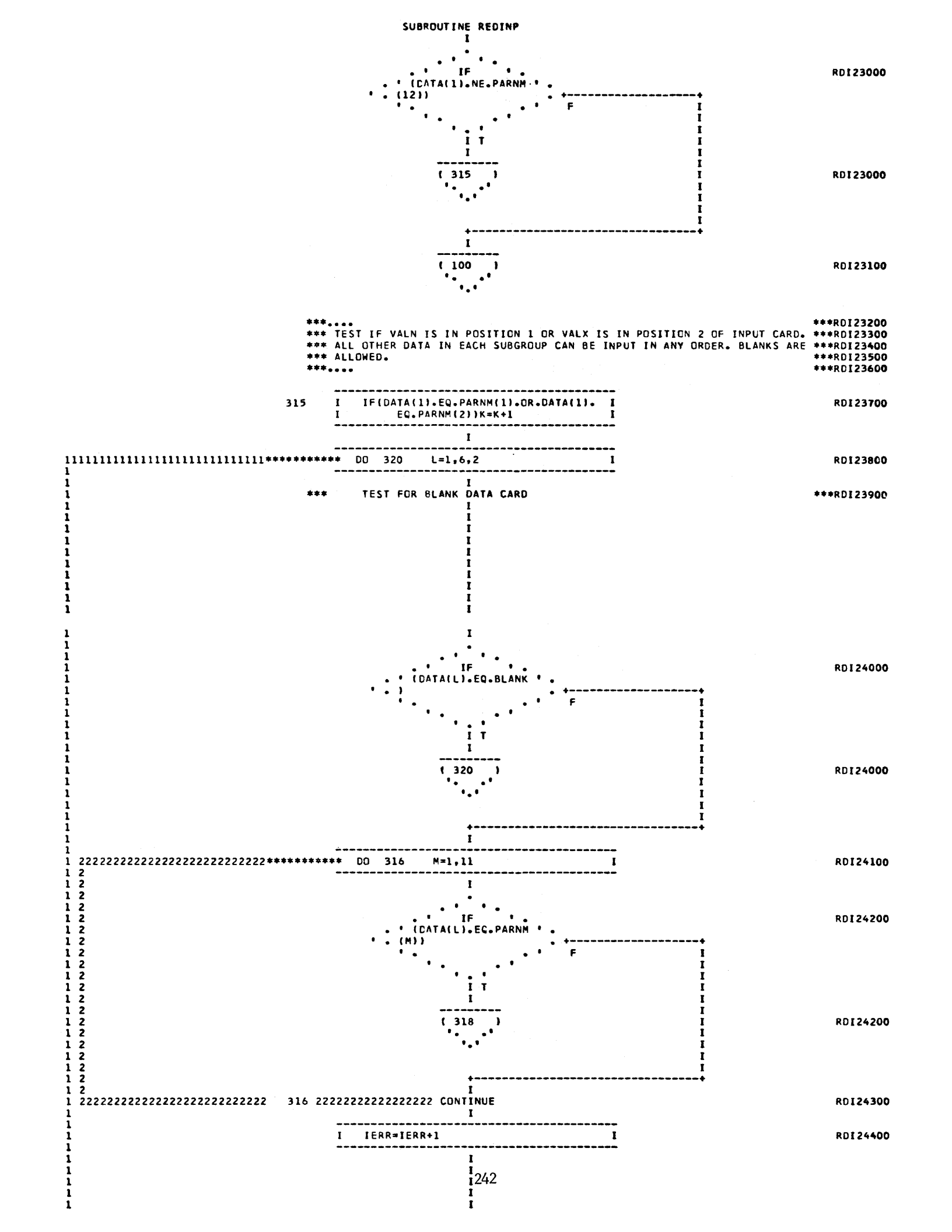
```
                      SUBROUTINE REDINP                                          
                            I                                                    
***                                                                              ***RDI11500
***                                                                              ***RDI11600
***     TEST TO SEE IF IT IS A CITY OPTIONS SUBGROUP NAME CARD                   ***RDI11700
***                                                                              ***RDI11800
***                                                                              ***RDI11900
                            I                                                    
                            .                                                    
                          . ' .                                                  
                        .     IF    .                                            RDI12000
                      . ' (ANAME1.EQ.OPT(1) ' .                                  
                    ' . .AND.ANAME2.EQ.OPT(2) . +-------------------+          
                      ' . )                 . '   F                 I          
                        ' .               . '                       I          
                          . ' .         . '                         I          
                            I T         I                           I          
                            I           I                           I          
                          ---------     I                           I          
                          ( 1978  )     I                           I          RDI12000
                            '.  .'      I                           I          
                              '.'       I                           I          
                                        I                           I          
                                        I                           I          
                            +-----------------------------------+   I          
                            I                                   I   I          
                            I                                   I   I          
35                        CONTINUE                              I   I          RDI12100
                            I                                   I   I          
***.....                                                        I   I          ***RDI12200
***.....                                                        I   I          ***RDI12300
***.....TEST TO SEE IF IT IS A INDUSTRIAL SUBGROUP NAME CARD    I   I          ***RDI12400
***.....                                                        I   I          ***RDI12500
                            I                                   I   I          
                            .                                   I   I          
                          . ' .                                 I   I          
                        .     IF    .                           I   I          RDI12600
                      . ' (ANAME1.EQ.ALIST( ' .                 I   I          
                    ' . 1).AND.ANAME2.EQ.ALIS . +-------------------+          
                      ' . T(2))             . '   F             I   I          
                        ' .               . '                   I   I          
                          . ' .         . '                     I   I          
                            I T         I                       I   I          
                            I           I                       I   I          
                          ---------     I                       I   I          
                          ( 1010  )     I                       I   I          RDI12600
                            '.  .'      I                       I   I          
                              '.'       I                       I   I          
                                        I                       I   I          
                                        I                       I   I          
                            +-----------------------------------+   I          
                            I                                   I   I          
                            I                                   I   I          
                                                                I   I          
                            I                                   I   I          
***                                                             I   I          ***RDI12700
***                                                             I   I          ***RDI12800
***     TEST TO SEE IF IT IS A CITY SUBGRCUP NAME CARD          I   I          ***RDI12900
***                                                             I   I          ***RDI13000
***                                                             I   I          ***RDI13100
                            I                                   I   I          
                            .                                   I   I          
                          . ' .                                 I   I          
                        .     IF    .                           I   I          RDI13200
                      . ' (ANAME1.EQ.CITY(1 ' .                 I   I          
                    ' . ).AND.ANAME2.EQ.CITY( . +-------------------+          
                      ' . 2))               . '   F             I   I          
                        ' .               . '                   I   I          
                          . ' .         . '                     I   I          
                            I T         I                       I   I          
                            I           I                       I   I          
                          ---------     I                       I   I          
                          ( 1860  )     I                       I   I          RDI13200
                            '.  .'      I                       I   I          
                              '.'       I                       I   I          
                                        I                       I   I          
                                        I                       I   I          
                            +-----------------------------------+   I          
                            I                                   I   I          
                            I                                   I   I          
45                        CONTINUE                              I   I          RDI13300
                            I                                   I   I          
***.....                                                        I   I          ***RDI13400
***.....                                                        I   I          ***RDI13500
***.....TEST TO SEE IF IT IS A PUBLIC AND UNACCOUNTED SUBGROUP NAME CARD  I   I  ***RDI13600
***.....                                                        I   I          ***RDI13700
***.....                                                        I   I          ***RDI13800
                            I                                   I   I          
                          ------------------------------------  I   I          
1111111111111111111111111111111**********  DO  50     I=1,8,2  I   I          RDI13900
1                         ------------------------------------  I   I          
1                                       I                       I   I          
1                                       I                       I   I          
1                                       I                       I   I          
1                                       I                       I   I          
1                                       I                       I   I          
1                                       I                       I   I          
1                                       I                       I   I          
1                                       I                       I   I          
1                                       I                       I   I          
1                                       I                       I   I          
1                                       I                       I   I          
1                                       I                       I   I          
1                                       I                       I   I          
1                                       I                       I   I          
1                                       I                       I   I          
1                                       I                       I   I          
1                                       I                       I   I          
1                                       I                       I   I          
```


SUBROUTINE REDINP
IF (ANAME1.EQ.PNAME(I).AND.ANAME2.EQ.PNAME(I+1))
T
F
7090
50 CONTINUE
TEST TO SEE IF IT IS A HISTORICAL SUBGROUP NAME CARD.
DO 55 I=1,22,2
IF (ANAME1.EQ.HLIST(I).AND.ANAME2.EQ.HLIST(I+1))
T
F
2100
55 CONTINUE
IF (ANAME1.EQ.PROJ(1).AND.ANAME2.EQ.PROJ(2))
T
F
2200
IERR=IERR+1
ERROR MESSAGE
WRITE (IO,60) ANAME1,ANAME2
60 FORMAT (2X,70HTHE FOLLOWING CONTROL CARD DOES NOT CONTAIN A CORREC** **T SUBGROUP NAME...//5X,2A4)
WRITE (IO,70)
70 FORMAT (1X,42HCHECKING DATA FOLLOWING A BAD CONTROL CARD) **
RDI14000
RDI14000
RDI14100
***RDI14200
***RDI14300
***RDI14400
***RDI14500
***RDI14600
RDI14700
RDI14800
RDI14800
***RDI14900
RDI15000
***RDI15100
RDI15200
RDI15200
***RDI15300
RDI15400
***RDI15500
RDI15600
RDI15700
RDI15900
RDI16000

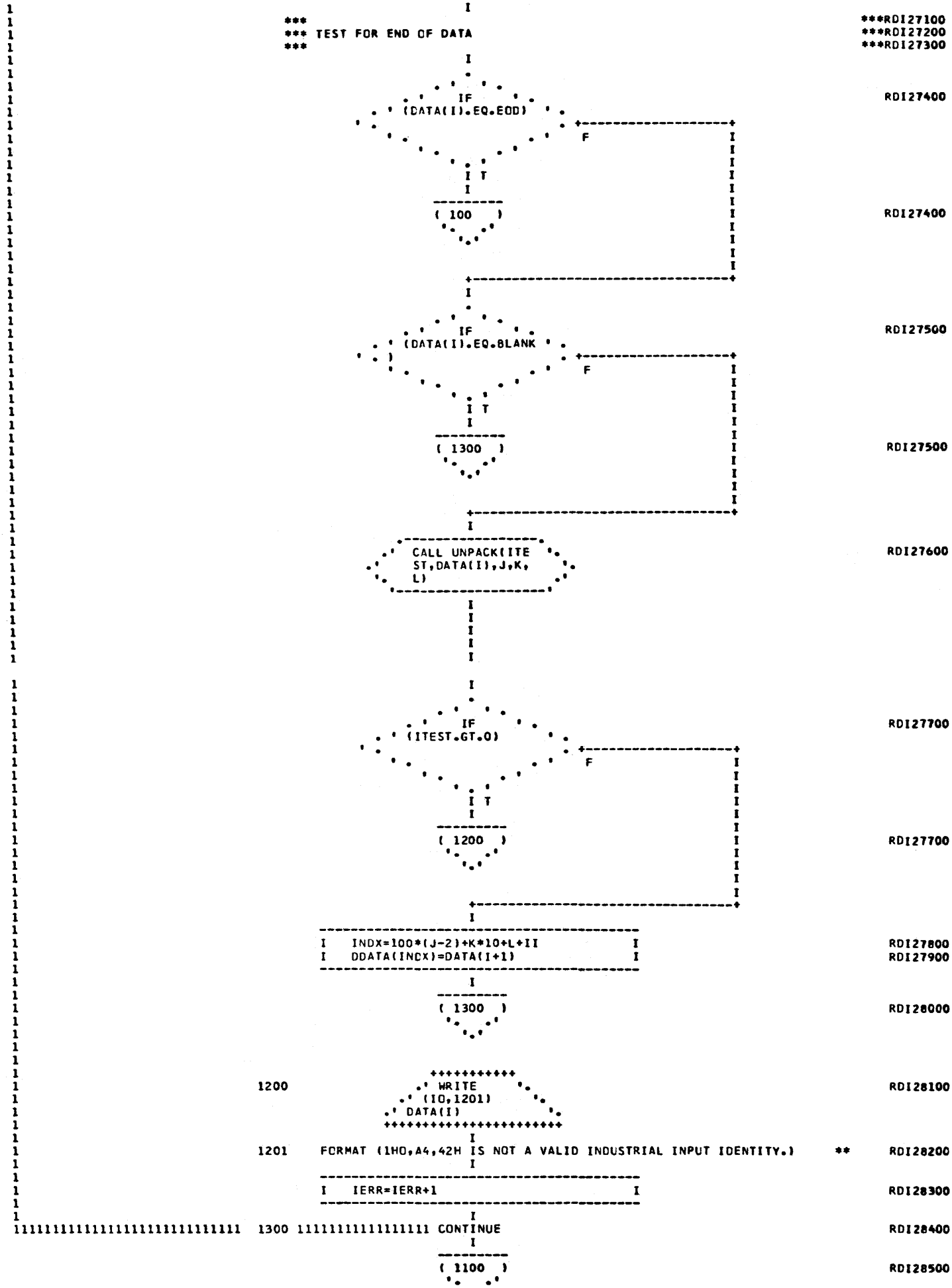

SUBROUTINE REDINP
DO 120 J=1,1000
READ (IN,80) (ADATA(N),N=1,6)
80 FORMAT (3(1X,A4,1X,F16.3))
IF (ADATA(1).EQ.ENDD
F
T
(100)
120 CONTINUE
(100)
***THE FOLLOWING READS IN THE COMMERCIAL DATA
*** THIS SUBROUTINE PROCESSES THE MUNICIPAL COMMERCIAL PARAMETER INPUT
*** DATA IN THE FOLLOWING MANNER.
130 CONTINUE
ICOM=1
ISECT=I
*** NO. OF EMPLOYEES STARTS AT CDATA(451), PARAMETERS AT CDATA(551) .
ISUB=550-((I-1)/2)*100
*** PROCESS INPUT DATA AND ESTABLISH PROPER DATA TABLE
140 CONTINUE
READ (IN,150) (ADATA(N),N=1,6)
150 FORMAT (3(1X,A4,1X,F16.3))
WRITE (IO,150) (ADATA(N),N=1,6)
IF (ADATA(1).EQ.ENDD
F
T

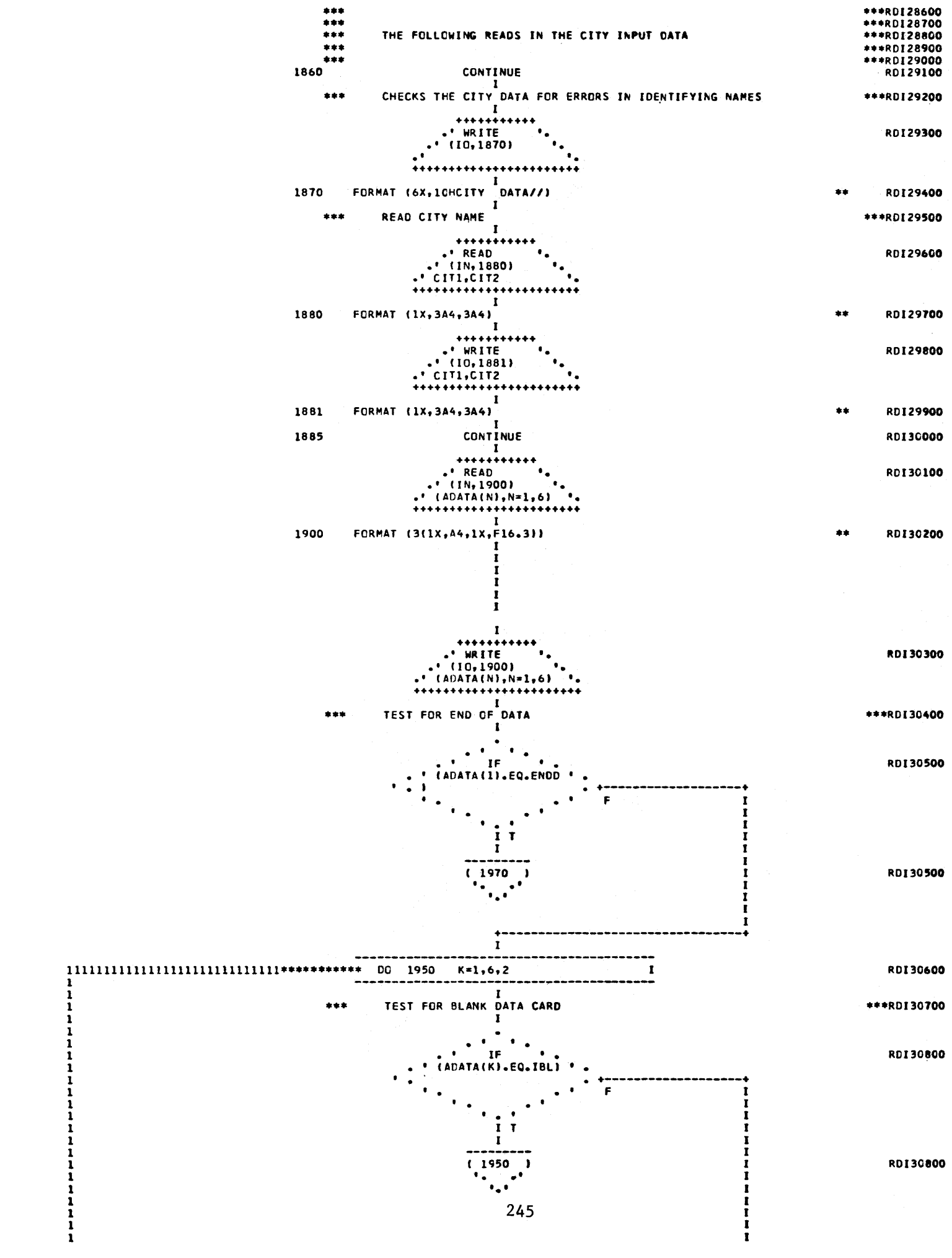

SUBROUTINE REDINP
100
RDI19000
DO 230 K=1,6,2
RDI19100
IF (ADATA(K).EQ.IBL)
F
T
230
RDI19200
DO 160 L=1,NOS
RDI19300
IF (ADATA(K).EQ.CNAM E(L))
F
T
180
RDI19400
160 CONTINUE
RDI19500
CALL UNPACK (IT EST,ADATA(K),JJ ,KK,LL)
RDI19600
IF (ITEST.GT.0)
F
T
170
RDI19700
L=NOS+10*KK+LL
RDI19800
180
RDI19900
***.... ***RDI20000
*** ERROR MESSAGE ***RDI20100
***.... ***RDI20200
170 WRITE (10,175) ADATA(K)
RDI20300
175 FORMAT (1X,57HFOLLOWING IS A BAD LABEL FOR THE COMMERCIAL ESTABLIS** **HMENT,2X,A4)
RDI20400

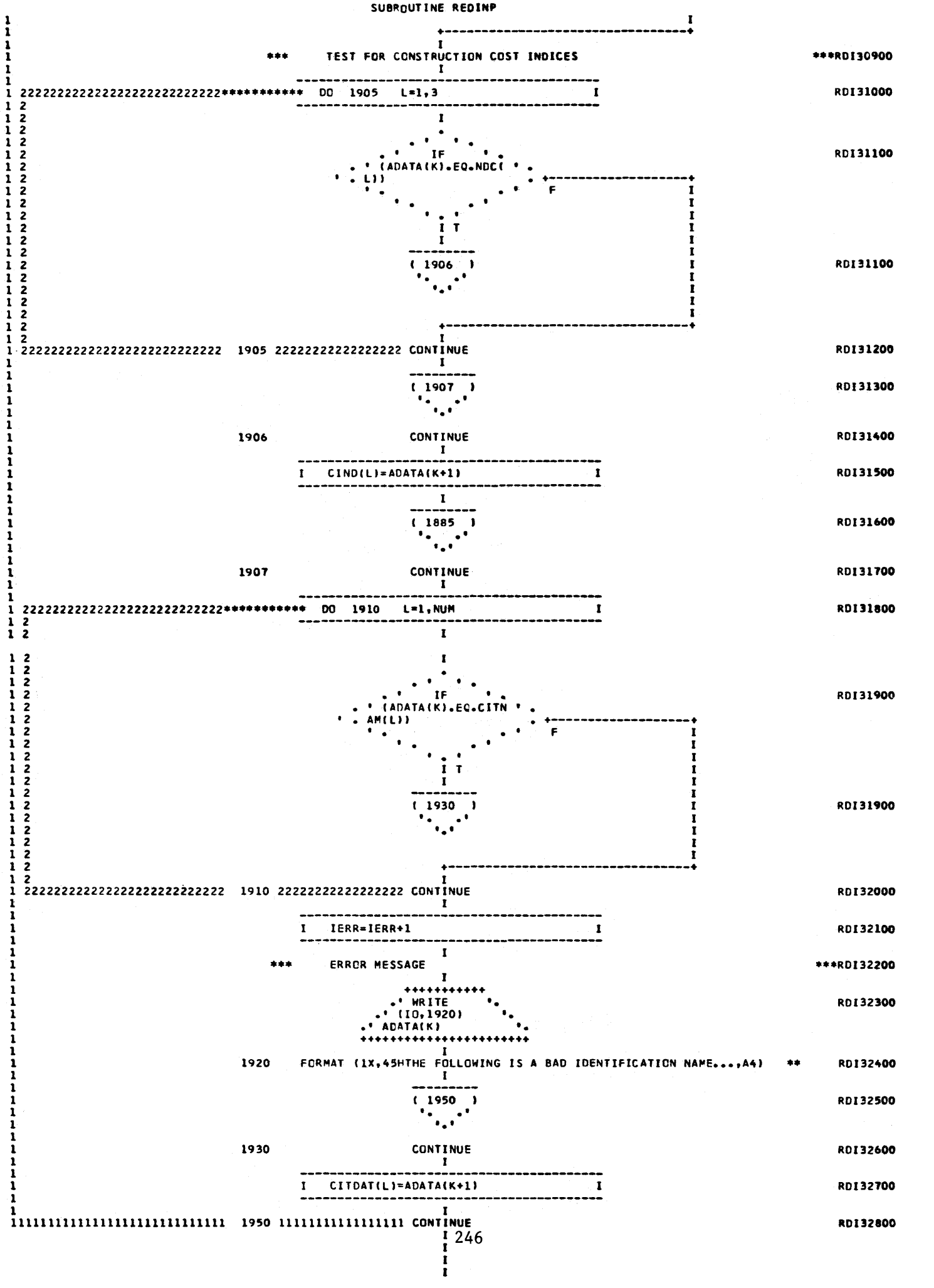

SUBROUTINE REDINP
IERR=IERR+1
230
180 CONTINUE
*** INDEX FOR INPUT DATA IN DATA TABLE
IJ=ISUB+L
*** PUTS THE INPUT DATA IN THE PROPER PLACE IN THE PROPER TABLE
CDATA(IJ)=ADATA(K+1)
230 CONTINUE
140
*** .....
*** .....
*** .....THE FOLLOWING READS IN THE RESIDENTIAL
*** .....
*** .....
310 CONTINUE
IRES=1
*** TEST FOR END OF INPUT
IF (I.EQ.9)
T
F
100
IP=(I+1)/2
K=0
311 READ (IN,312) DATA
312 FORMAT (3(1X,A4,1X,F16.3))
WRITE (IO,312) DATA
*** TEST FOR END OF DATA


SUBROUTINE REDINP
IF (DATA(1).NE.PARNM (12))
F
T
315
100
RDI23000
RDI23000
RDI23100
***.... ***RDI23200
*** TEST IF VALN IS IN POSITION 1 OR VALX IS IN POSITION 2 OF INPUT CARD. ***RDI23300
*** ALL OTHER DATA IN EACH SUBGROUP CAN BE INPUT IN ANY ORDER. BLANKS ARE ***RDI23400
*** ALLOWED. ***RDI23500
***.... ***RDI23600
315 IF(DATA(1).EQ.PARNM(1).OR.DATA(1). EQ.PARNM(2))K=K+1
RDI23700
DO 320 L=1,6,2
RDI23800
*** TEST FOR BLANK DATA CARD ***RDI23900
IF (DATA(L).EQ.BLANK)
F
T
320
RDI24000
RDI24000
DO 316 M=1,11
RDI24100
IF (DATA(L).EQ.PARNM (M))
F
T
318
RDI24200
RDI24200
316 CONTINUE
RDI24300
IERR=IERR+1
RDI24400

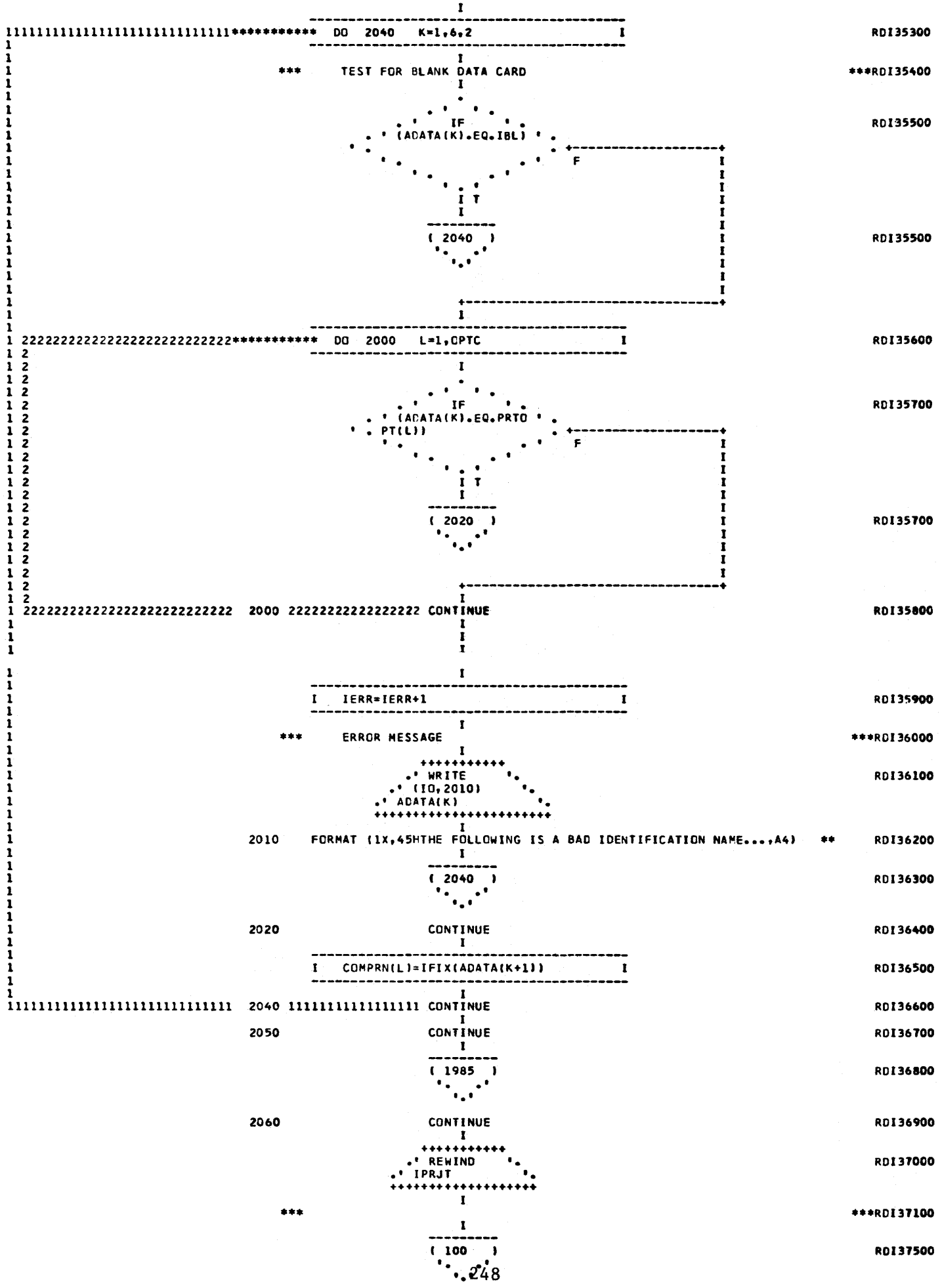
```
                                                 SUBROUTINE REDINP
1                                                        I
1                                                  +++++++++++
1                                                .' WRITE      '.                                          RDI24500
1                                              .' (IO,317)       '.
1                                            .' DATA(L)            '.
1                                            ++++++++++++++++++++++++
1                                                        I
1                              317     FORMAT (1H0,A4,31H IS NOT A VALID PARAMETER NAME.)            **    RDI24600
1                                                        I
1                                                    ----------
1                                                    ( 320    )                                            RDI24700
1                                                     '.    .'
1                                                       '.'
1
1
1                                      ----------------------------------------
1                              318     I   I=200*(IP-1)+25*(M-1)+K             I                           RDI24800
1                                      ----------------------------------------
1                                                        I
1                                                        .
1                                                   . '     ' .
1                                               . '    IF       ' .                                        RDI24900
1                                           . '  (M.GT.8)           ' .
1                                         '.                            .+---------------------+
1                                             '.                     .'    F                    I
1                                                 '.             .'                             I
1                                                     '.     .'                                 I
1                                                        I T                                    I
1                                                        I                                      I
1                                                    ----------                                 I
1                                                    ( 319    )                                 I          RDI24900
1                                                     '.    .'                                  I
1                                                       '.'                                     I
1                                                                                               I
1                                                        +--------------------------------------+
1                                                        I
1                                      ----------------------------------------
1                                      I   PAR(I)=DATA(L+1)                    I                           RDI25000
1                                      ----------------------------------------
1                                                        I
1                                                    ----------
1                                                    ( 320    )                                            RDI25100
1                                                     '.    .'
1                                                       '.'

1
1                                      ----------------------------------------
1                              319     I   I=3*(IP-1)+M-8                      I                           RDI25200
1                                      I   APAR(I)=DATA(L+1)                   I                           RDI25300
1                                      ----------------------------------------
1                                                        I
1111111111111111111111111111111   320 1111111111111111111 CONTINUE                                         RDI25400
                                                         I
                                                     ----------
                                                     ( 311    )                                            RDI25500
                                                      '.    .'
                                                        '.'


                                  ***.....                                                              ***RDI25600
                                  ***.....                                                              ***RDI25700
                                  ***.....THE FOLLOWING READS IN THE INDUSTRIAL DATA                    ***RDI25800
                                  ***.....                                                              ***RDI25900
                               1010                   CONTINUE                                             RDI26000
                                                         I
                                       ----------------------------------------
                                       I   INDS=1                              I                           RDI26100
                                       ----------------------------------------
                                                         I
                                  ***                                                                   ***RDI26200
                                  ***                                                                   ***RDI26300
                                  *** READ AND STORE MUNICIPAL INDUSTRIAL INPUT                         ***RDI26400
                                  ***                                                                   ***RDI26500
                                                         I
                                       ----------------------------------------
                                       I   II=1404                             I                           RDI26600
                                       ----------------------------------------
                                                         I
                                                   +++++++++++
                               1100              .' READ        '.                                         RDI26700
                                               .' (IN,1101)       '.
                                             .' (DATA(I),I=1,6)     '.
                                             ++++++++++++++++++++++++
                                                         I
                               1101     FORMAT (3(1X,A4,1X,F16.3))                                   **    RDI26800
                                                         I
                                                   +++++++++++
                                                 .' WRITE       '.                                         RDI26900
                                               .' (IO,1101)       '.
                                             .' (DATA(I),I=1,6)     '.
                                             ++++++++++++++++++++++++
                                                         I
                                       ----------------------------------------
1111111111111111111111111111111*********** DO  1300   I=1,6,2                  I                           RDI27000
1                                      ----------------------------------------
1                                                        I
```

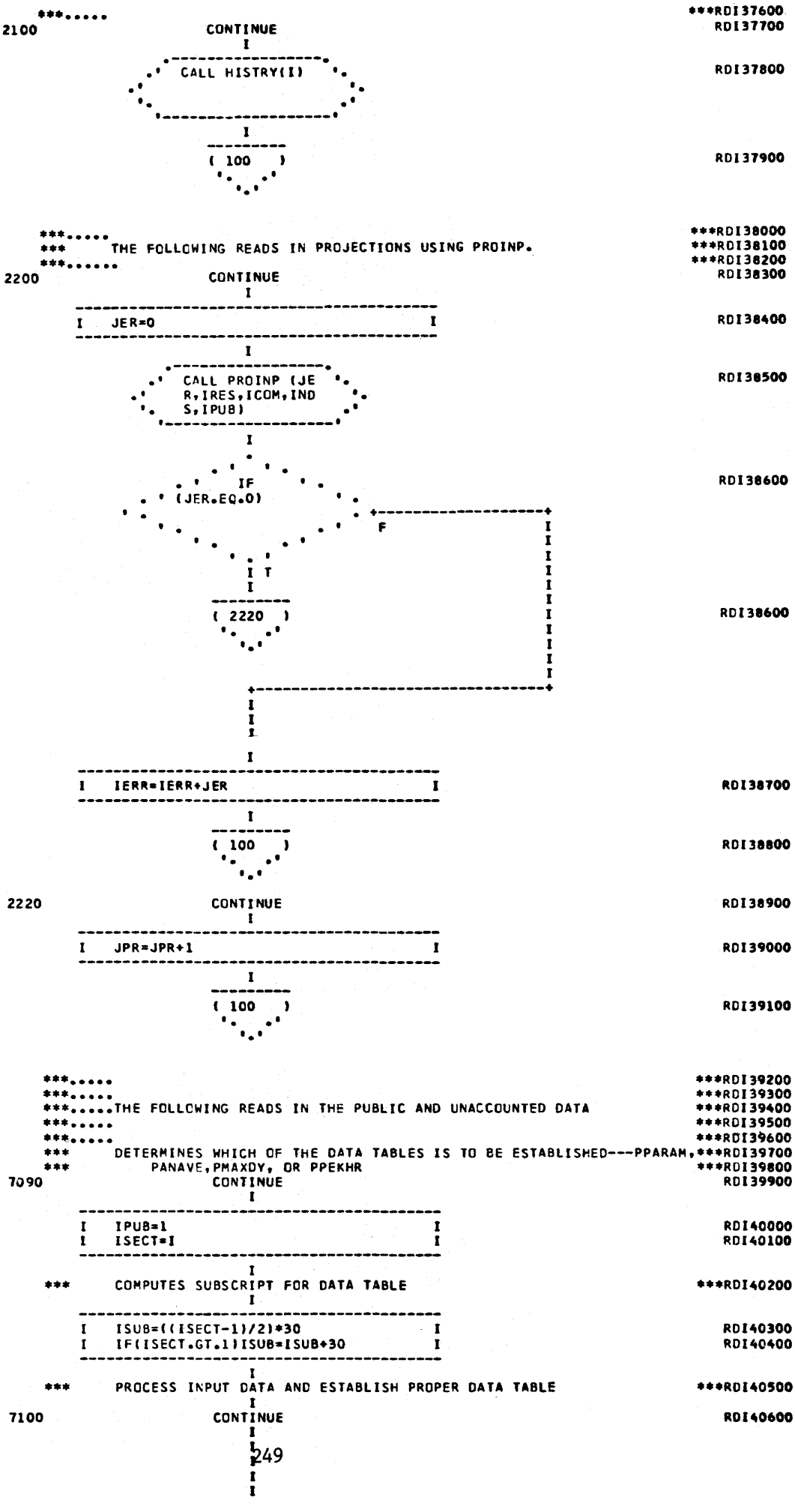

SUBROUTINE REDINP
***
*** TEST FOR END OF DATA
***
IF (DATA(I).EQ.EOD)
F
T
100
IF (DATA(I).EQ.BLANK)
F
T
1300
CALL UNPACK(ITEST,DATA(I),J,K,L)
IF (ITEST.GT.0)
F
T
1200
INDX=100*(J-2)+K*10+L+II
DDATA(INDX)=DATA(I+1)
1300
1200
WRITE (IO,1201) DATA(I)
1201 FORMAT (1HO,A4,42H IS NOT A VALID INDUSTRIAL INPUT IDENTITY.) **
IERR=IERR+1
1300 CONTINUE
1100
RDI27100
RDI27200
RDI27300
RDI27400
RDI27400
RDI27500
RDI27500
RDI27600
RDI27700
RDI27700
RDI27800
RDI27900
RDI28000
RDI28100
RDI28200
RDI28300
RDI28400
RDI28500


*** ***RDI28600
*** ***RDI28700
*** THE FOLLOWING READS IN THE CITY INPUT DATA ***RDI28800
*** ***RDI28900
*** ***RDI29000
1860 CONTINUE RDI29100
*** CHECKS THE CITY DATA FOR ERRORS IN IDENTIFYING NAMES ***RDI29200
WRITE RDI29300
(IO,1870)
1870 FORMAT (6X,10HCITY DATA//) ** RDI29400
*** READ CITY NAME ***RDI29500
READ RDI29600
(IN,1880)
CIT1,CIT2
1880 FORMAT (1X,3A4,3A4) ** RDI29700
WRITE RDI29800
(IO,1881)
CIT1,CIT2
1881 FORMAT (1X,3A4,3A4) ** RDI29900
1885 CONTINUE RDI30000
READ RDI30100
(IN,1900)
(ADATA(N),N=1,6)
1900 FORMAT (3(1X,A4,1X,F16.3)) ** RDI30200
WRITE RDI30300
(IO,1900)
(ADATA(N),N=1,6)
*** TEST FOR END OF DATA ***RDI30400
IF RDI30500
(ADATA(1).EQ.ENDD
F
I T
(1970) RDI30500
DO 1950 K=1,6,2 RDI30600
*** TEST FOR BLANK DATA CARD ***RDI30700
IF RDI30800
(ADATA(K).EQ.IBL)
F
I T
(1950) RDI30800

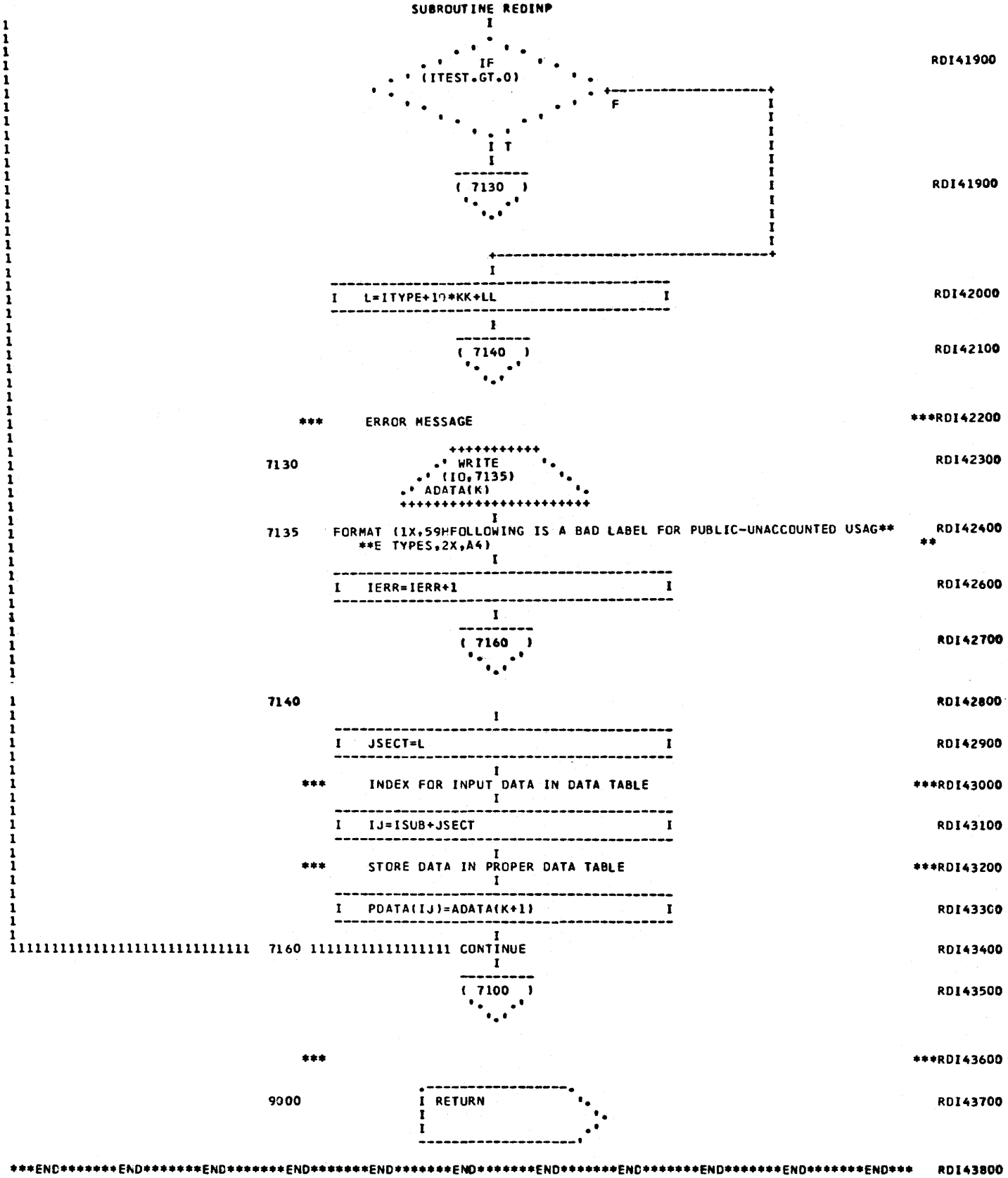

*** TEST FOR CONSTRUCTION COST INDICES ***RDI30900
2222222222222222222222222********** DO 1905 L=1,3 RDI31000
IF (ADATA(K).EQ.NDC(L)) F RDI31100
(1906) RDI31100
2222222222222222222222222 1905 22222222222222222 CONTINUE RDI31200
(1907) RDI31300
1906 CONTINUE RDI31400
CIND(L)=ADATA(K+1) RDI31500
(1885) RDI31600
1907 CONTINUE RDI31700
2222222222222222222222222********** DO 1910 L=1,NUM RDI31800
IF (ADATA(K).EQ.CITN AM(L)) F RDI31900
(1930) RDI31900
2222222222222222222222222 1910 22222222222222222 CONTINUE RDI32000
IERR=IERR+1 RDI32100
*** ERROR MESSAGE ***RDI32200
WRITE (IO,1920) ADATA(K) RDI32300
1920 FORMAT (1X,45HTHE FOLLOWING IS A BAD IDENTIFICATION NAME...,A4) ** RDI32400
(1950) RDI32500
1930 CONTINUE RDI32600
CITDAT(L)=ADATA(K+1) RDI32700
1111111111111111111111111111 1950 11111111111111111 CONTINUE RDI32800

```
      SUBROUTINE REDINP                                                  RDI32900
      ( 1885  )
1970  CONTINUE                                                           RDI33000
      IF (CIND(1).GT.0..OR.(CIND(2).GT.0..AND.CIND(3).GT.0.)) T / F      RDI33100
      ( 100   )                                                          RDI33100
***   ERROR MESSAGE                                                      ***RDI33200
      IERR=IERR+1                                                        RDI33300
      WRITE (IO,1975)                                                    RDI33400
1975  FORMAT(1X,60HCONSTRUCTION COST INDEX HAS NOT BEEN PROVIDED IN PROP**RDI33500
     **ER FORM)                                                          **
1976  CONTINUE                                                           RDI33700
      ( 100   )                                                          RDI33800

***                                                                      ***RDI33900
***                                                                      ***RDI34000
***   THE FOLLOWING READS IN THE OPTIONS DATA                            ***RDI34100
***                                                                      ***RDI34200
***                                                                      ***RDI34300
***   CHECKS THE COMMERCIAL DISPLAY OPTIONS                              ***RDI34400
      WRITE (IO,1980)                                                    RDI34500
1980  FORMAT (//6X,15HDISPLAY OPTIONS//)                            **    RDI34600
1985  CONTINUE                                                           RDI34700
      READ (IN,1990) (ADATA(N),N=1,6)                                    RDI34800
1990  FORMAT (3(1X,A4,1X,F16.3))                                    **   RDI34900
      WRITE (IO,1990) (ADATA(N),N=1,6)                                   RDI35000
***   TEST FOR END OF DATA                                               ***RDI35100
      IF (ADATA(1).EQ.ENDD) T / F                                        RDI35200
      ( 2060  )                                                          RDI35200
```


SUBROUTINE REDINP
DO 2040 K=1,6,2
TEST FOR BLANK DATA CARD
IF (ADATA(K).EQ.IBL)
F
T
2040
DO 2000 L=1,CPTC
IF (ADATA(K).EQ.PRTO PT(L))
F
T
2020
2000 CONTINUE
IERR=IERR+1
ERROR MESSAGE
WRITE (IO,2010) ADATA(K)
2010 FORMAT (1X,45HTHE FOLLOWING IS A BAD IDENTIFICATION NAME...,A4)
2040
2020 CONTINUE
COMPRN(L)=IFIX(ADATA(K+1))
2040 CONTINUE
2050 CONTINUE
1985
2060 CONTINUE
REWIND IPRJT
100
RDI35300
RDI35400
RDI35500
RDI35500
RDI35600
RDI35700
RDI35700
RDI35800
RDI35900
RDI36000
RDI36100
RDI36200
RDI36300
RDI36400
RDI36500
RDI36600
RDI36700
RDI36800
RDI36900
RDI37000
RDI37100
RDI37500


***.....
2100 CONTINUE
CALL HISTRY(I)
(100)
***.....
*** THE FOLLOWING READS IN PROJECTIONS USING PROINP.
***.....
2200 CONTINUE
JER=0
CALL PROINP (JER,IRES,ICOM,INDS,IPUB)
IF (JER.EQ.0)
T
F
(2220)
IERR=IERR+JER
(100)
2220 CONTINUE
JPR=JPR+1
(100)
***.....
***.....
***.....THE FOLLOWING READS IN THE PUBLIC AND UNACCOUNTED DATA
***.....
***.....
*** DETERMINES WHICH OF THE DATA TABLES IS TO BE ESTABLISHED---PPARAM,
*** PANAVE,PMAXDY, OR PPEKHR
7090 CONTINUE
IPUB=1
ISECT=I
*** COMPUTES SUBSCRIPT FOR DATA TABLE
ISUB=((ISECT-1)/2)*30
IF(ISECT.GT.1)ISUB=ISUB+30
*** PROCESS INPUT DATA AND ESTABLISH PROPER DATA TABLE
7100 CONTINUE

```
                                    SUBROUTINE REDINP
                                          I
                                     +++++++++++
                                   .' REAC       '.                              RDI40700
                                 .' (IN,7110)      '.
                               .' (ADATA(N),N=1,6)  '.
                               +++++++++++++++++++++++
                                          I
              7110    FORMAT (3(1X,A4,1X,F16.3))                          **     RDI40800
                                          I
                                     +++++++++++
                                   .' WRITE      '.                              RDI40900
                                 .' (IO,7110)      '.
                               .' (ADATA(N),N=1,6)  '.
                               +++++++++++++++++++++++
                                          I
            ***     TEST FOR END OF DATA                                      ***RDI41000
                                          I
                                          .
                                      . '   ' .
                                  . '    IF     ' .                              RDI41100
                               . ' (ADATA(1).EQ.ENDD ' .
                              ' . )                    . +--------------------+
                                 ' .               . '    F                   I
                                     ' .       . '                            I
                                         ' . '                                I
                                          I T                                 I
                                          I                                   I
                                      ---------                               I
                                      ( 100   )                               I  RDI41100
                                       '.   .'                                I
                                         '.'                                  I
                                                                              I
                                                                              I
                                          +-----------------------------------+
                                          I
                         -----------------------------------------
1111111111111111111111111111*********** DO  7160   K=1,6,2        I              RDI41200
1                        -----------------------------------------
1                                         I
1           ***     TEST FOR BLANK DATA CARD                                  ***RDI41300
1                                         I
1                                         I
1                                         I
1                                         I
1                                         I
1                                         I
1                                         I
1                                         I
1                                         I
1                                         I
1                                         I

1                                         I
1                                         .
1                                     . '   ' .
1                                 . '    IF     ' .                              RDI41400
1                              . ' (ADATA(K).EQ.IBL) ' .
1                             ' .                      . +--------------------+
1                                ' .               . '    F                   I
1                                    ' .       . '                            I
1                                        ' . '                                I
1                                         I T                                 I
1                                         I                                   I
1                                     ---------                               I
1                                     ( 7160  )                               I  RDI41400
1                                      '.   .'                                I
1                                        '.'                                  I
1                                                                             I
1                                                                             I
1                                         +-----------------------------------+
1                                         I
1                        -----------------------------------------
1 2222222222222222222222222*********** DO  7120   L=1,ITYPE       I              RDI41500
1 2                      -----------------------------------------
1 2                                       I
1 2                                       .
1 2                                   . '   ' .
1 2                               . '    IF     ' .                              RDI41600
1 2                            . ' (ADATA(K).EQ.PUBN ' .
1 2                           ' . AM(L))               . +--------------------+
1 2                              ' .               . '    F                   I
1 2                                  ' .       . '                            I
1 2                                      ' . '                                I
1 2                                       I T                                 I
1 2                                       I                                   I
1 2                                   ---------                               I
1 2                                   ( 7140  )                               I  RDI41600
1 2                                    '.   .'                                I
1 2                                      '.'                                  I
1 2                                                                           I
1 2                                                                           I
1 2                                       +-----------------------------------+
1 2                                       I
1 2222222222222222222222222  7120 2222222222222222 CONTINUE                      RDI41700
1                                         I
1                                 .'------------------'.
1                               .'  CALL UNPACK (IT     '.                       RDI41800
1                             .'    EST,ADATA(K),JJ      '.
1                              '.   ,KK,LL)             .'
1                                '.------------------.'
1                                         I
1                                         I
1                                         I
```


SUBROUTINE REDINP
IF (ITEST.GT.0)
F
T
7130
L=ITYPE+10*KK+LL
7140
*** ERROR MESSAGE
7130 WRITE (IO,7135) ADATA(K)
7135 FORMAT (1X,59HFOLLOWING IS A BAD LABEL FOR PUBLIC-UNACCOUNTED USAG** **E TYPES,2X,A4)
IERR=IERR+1
7160
7140
JSECT=L
*** INDEX FOR INPUT DATA IN DATA TABLE
IJ=ISUB+JSECT
*** STORE DATA IN PROPER DATA TABLE
PDATA(IJ)=ADATA(K+1)
7160 CONTINUE
7100
***
9000 RETURN