William Hall

NATIONAL BUREAU OF STANDARDS REPORT

7826

Description of Computer Program for National Fallout Shelter Survey

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

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NATIONAL BUREAU OF STANDARDS REPORT

NBS PROJECT		NBS REPORT
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Description of Computer Program for National Fallout Shelter Survey*

Computation Laboratory Section
Applied Mathematics Division

*Work supported by the Office of Civil Defense (DOD), the Defense Atomic Support Agency (DOD), and the Bureau of Yards and Docks (Department of the Navy).

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

PREFACE

Phase I of the National Fallout Shelter Survey consisted of a number of parts which had to be carefully integrated. The physical theory which underlies the entire undertaking is attributable to Dr. L. V. Spencer and Mr. Charles Eisenhauer of the Radiation Physics Division, National Bureau of Standards. The collection of the data for each building that was surveyed was the joint responsibility of the Corps of Engineers, U. S. Army, and the Bureau of Yards and Docks, U. S. Navy. These pertinent data were collected all over the United States and sent to the Bureau of Census, Department of Commerce, where they were transformed into a form which made them suitable for handling on an electronic digital computer.

The Computation Laboratory, National Bureau of Standards, played the following role. After receipt of the data on the existing structures, they were edited on the electronic computer and separated into three classes. The first consisted of data for those structures which passed all of the edit checks and which therefore could be further processed; the second consisted of data for those structures for which minor inconsistencies were detected; the third consisted of those data for which inconsistencies were so gross as to preclude further processing. For data in the second class, minor changes were made and the data were incorporated with the processable data. Data in the third class were returned to the Bureau of Census with an indication of the nature of the errors detected.

The usable data were processed to calculate the protection factors to be expected in existing facilities, and the results of these calculations were returned to the field offices of the Army Corps of Engineers for further distribution. In addition, consolidated files, referred to generally in the text as M files, were prepared, as well as were summaries for various levels.

The entire logic of organizing the problem from the receipt of the basic information on magnetic tape from the Bureau of Census to preparation of all reports, master files, summaries, etc. was the responsibility of the Computation Laboratory. The preparation of each of the numerous codes which are described in detail in the body of this report was done completely by the staff. While an understanding of any one facet of the problem may be had by studying the appropriate section of this report, the overall interwoven intricacy of the entire process can be appreciated only by wading through all of the details associated with each aspect of the problem. That the staff was able to formulate in such detail such an intricate process may be attributed to the many weeks of conferences and discussions which preceded the coding effort. The familiarity by each member of the group with the role that every other member was to play greatly furthered the success of the operation.

The contributions of each of the following individuals to this important task could be separated only insofar as responsibility is concerned for major sections of the coding; significant suggestions by each and every one are to be found scattered throughout the entire effort. Therefore, no effort is made to try to indicate individual responsibility or assign individual credit, but rather attribute the success of the over-all accomplishment to the following individuals: Mrs. Jeanne Beiman, Mr. William Hall, Mr. Louis Joseph, Mr. Peter O'Hara, Miss Maxine Paulsen, Miss Irene Stegun, and Mrs. Ruth Varner.

Don Mittleman
Chief, Computation Laboratory

Edward Cannon
Chief, Applied Mathematics Division

CONTENTS

ABSTRACT

This report describes in detail the procedures and programs devised by the Computation Laboratory staff for processing data gathered for the National Fallout Shelter Survey.

1. GOAL

The basic goal of the Computation Laboratory was twofold; the first objective was the calculation of all shelter data and their transmission to the submitting field offices; the second, the creation of three tape files from which any desired subsets of input data and/or calculated results were to be readily available. These three files were:

(1) Standard Location-Population File (MWO). (See Appendix III page 49.)

(2) Edited Input File (M1). (See Appendix III, page 48.)

(3) Shelter File (M2). (See Appendix III, page 48.)

These three files were created and maintained using procedures devised to assure that all of the following conditions were met:

(1) All files were compatible.

(a) There existed a one-one or many-one correspondence from M2 to M1.

(b) There existed a one-zero, one-one, or one-many correspondence from each level of MWO and M1.

(c) There existed a one-one or many-one correspondence from each item of MWO to each of the higher levels of MWO.

(2) Each file was in ascending order of identification field.[1]

(3) There were no duplicates in any file. (Duplicate here and elsewhere means duplicate identification fields.)

(4) It was possible to add an item, remove an item, or replace an item for each file.

(5) Each item was permissable.

(a) Each field of each item was a possible legitimate value.

(b) There were no paradoxical relations between fields within an item.

(c) There were no paradoxical relations between items.

All other files or cards decks mentioned were temporary and have been used for intermediate results only. Each of the major programs or procedures used is described definitively in relation to the three basic files and for input or output not strictly for internal NBS use. Other files and one run programs may not be defined.

2. FILE NUMBERING SYSTEM

I. First character was C; these were data received from Census Bureau. These may be cards, magnetic tapes or printed copy.

(A) C1 consisted of Standard Location, County, Area, and State name cards. (See Appendix III, page 45.)

(B) C2 consisted of population cards for each standard location. (See Appendix III, page 45.)

(C) C3 was a magnetic tape for each PCU[2] containing all numeric information from Fosdic schedules. (See Appendix III, page 46.)

(D) C4 was a card deck of all address cards corresponding to the Fosdic schedules. (See Appendix III, page 46.)

(E) C5 was a printed memorandum containing identification fields of items of M1 found, outside the NBS system, to be in error and to be removed. (See Appendix III, page 47.)

(F) →

II. First character was F; these were data originating in field. All transmission was to Census Bureau at Jeffersonville. (See Appendix III, pages 40-44.)

III. First character was M; these were the three master files created and maintained on magnetic tape by NBS. If primed, the file was either a subset of or an input to the indicated M file and had the same format.

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1. For MWO the identification field was the eight character Standard Location code. For M1 the identification was twenty characters, the first eight of which were standard location code; the next two, field office code; the next two, contract code; the next five, facility number; the next two, part number; and the last, revision number. For M2 the identification contained the same twenty characters as for M1 plus eight binary bits as a minor key to indicate story number.

2. Abbreviation used for Processing Unit--a group of generally about 4000 entries each of C3 and C4 as received from the Census Bureau.

(A) MW0 is the Standard Location-Population File

(B) M1 is the Edited Input File

(C) M2 is the Shelter File

IV. First character is P; these are both magnetic tapes and printed copies which leave NBS.

(A) P1 contains all rejected and questioned items from Input Edit Program. (See Appendix III, page 50)

(B) P1A contains all items from P1 which have a non-zero revision number. (See Appendix III, page 51)

(C) P2 contains one line of identification for each M1 entry processed plus one line for each shelter with a PF of at least 20; or if no shelter existed for an entire facility part, a line to indicate the "no shelter" case. In addition there is a title page for each Standard Location. (See Appendix III, pages 52-54.)

(D) P3 contains one line for each M2' item rejected by the M2" creation program. An entry is caused by either a duplicate or a superseded revision on one or more of the M2' inputs. Three or more duplicates (or two or more superseded revisions) are considered to be pairs (1 and 2, 2 and 3, etc.). (See Appendix III, page 55.)

(E) P4 is similar to P3 except that it is produced by the M2 creation program and contains, in addition to the duplicate and superseded revision rejections, rejections caused by the C5 input, and entries from the C5 input for which matching entries could not be found on M2 or M2". (See Appendix III, page 55.)

(F) P5 is produced by the M1 creation program. An item is entered if any discrepancy occurs between M1" and M2. (See Appendix III, page 55.)

(G) P6, P7, P8, and P9 are outputs from the summary programs. All of these are quite similar logically as well as in format. The logical differences are that the levels of summation vary and that a breakdown of shelters by capacity may or may not be included. The format difference is merely that summaries appear either one to a page or four to a page. (See Appendix III, pages 56-61)

(1) P6 is output from Summary A and contains summaries for Standard Locations and Counties without the shelter capacity breakdown.

(2) P7 is output from Summary B and contains summaries for Counties, Areas, and States without the shelter capacity breakdown.

(3) P8 is output from Summary C and is like P7 except that the shelter capacity breakdown is included.

(4) P9 is output from Summary D and contains State, Regional, and National summaries with the shelter capacity breakdown.

3. FILE DESCRIPTIONS

3.1 F1 Item

The F1 item was the "Breaker Sheet" which appeared as the first page of each book of Fosdic Schedules. This item was duplicated (front and back of page) for each book and contained information used in the Bureau of Census processing. The data were used for system control by the Bureau of Census and certain fields were appended to each F2 item from the book. (See Appendix III, page 40.)

3.2 F2 Item

The F2 item was a Fosdic Schedule; both sides of a page constituted a single item. The F2 item, augmented by Census Serial Number and Work Unit number from F1, was used by the Bureau of Census to produce both the C3 and C4 as received by NBS. (See Appendix III, pages 41-42.)

3.3 MW0 File

The MW0 file was completely BCD, and there were no label or trailer records; instead there were arbitrary numbers of label and trailer items within the leading and trailing records. MW0 was essentially a consolidation of C1 and C2. The MW0 record was made up of ten eighty-four character items; each normal item was constructed by a transposition of data from a single C1 item except that the appropriate populations from C2 were inserted into the items representing fourth level (census tract) entries.

For operational convenience, and justified by the fact that the first two characters of the C1 identification could be only numeric and non-zero, each updating of MW0 resulted in the addition of an extra label item to the beginning of the file. The label items had an identification key in which the first two characters were zero, hence were recognizable by all programs as artificial entries.

Similarly any number of padding items (key ZZZZZZZZ) were recognizable by all programs as being artificial, and the first encountered was a signal that the end of the file had been reached.

Each MW0 item contains:

(1) An eight character identification field,

(2) zeroes,

(3) A zero for a fourth level item or a "-" for a first, second, or third level item.

(4) The remainder of the item was alphabetic identifying information (name and level) except in the case of the fourth level item in which words 9, 11, and 13 (or characters 54-58, 66-70, and 78-82) were respectively resident, day, and night populations.

3.4 M1 Files

The normal items of M1, M1', and M1" were binary and identical in format. Each file also has the same tape format since each has a 72 character BCD label record and each tape has a two word trailer record which contains a normal item count and a count of the number of binary records.

For the M1' and M1 tapes the first word of the label record is 000001; for the M1", 000006. For M1' and M1" the remaining characters are:

ΔFALLOUTΔMASTERΔFILEΔTHISΔTAPEΔISΔFROMΔPRU=ααααααΔREEL=ββββββ where αααααα is the PCU number and ββββββ is the census reel number from the C4 input. For M1" the PCU number and census reel number are simply from among those appearing in the subfile since there is no one-to-one correspondence between PCU and M1" subfile.

For the M1 file the remaining characters are:

ΔFALLOUTΔEDITΔTAPES.ΔΔ*UPDATEDΔAGAINSTΔSUMMARYΔTAPES.*

The trailer labels on M1', M1", and M1 are identical; each follows a file mark and has only two words which contain item and record tallies. For M1' the tallies are for the entire file; for M1" and M1, the tallies are for the tape which is a subfile only.

The normal record on each file has 2700 words or sixty 45-word items. The item contains all information from the original Fosdic schedule plus a binary representation of the error indicator and the PCU number. For each file there is a complete tape record of padding (all words ZZZZZZ); for each file if the number of schedules was not divisible by sixty, the record immediately preceding the padding record has been completed by the addition of padding items to preserve uniform record length.

3.5 M2 Files

The normal items of M2', M2" and M2 are identical in format. The tape formats are similar since each tape has a 48 character BCD label record and a four word trailer record following the normal items.

For M2' the first word of the label is 000003 and the remaining characters are:

ΔTHISΔTAPEΔISΔPCUΔααααααΔFORΔMASTERΔFILEΔ2 where αααααα is the PCU number.

For M2" the first word of the label is 00α003 where α is the index of the tape within the file and the remaining characters are:

MP-UPDATINGΔTAPEΔNBSΔFALLOUTΔSURVEYΔNOΔ1.

For M2 the first label word is as that of M2" but the remaining characters are:

ΔMASTERΔ2ΔNATΔFALLOUTΔSURVEY.

The trailer labels are identical in format. Each follows a file mark and consists of four words. Word one is one greater than the number of preceding binary records; word two is the hash sum of all non-padding items in the preceding records; word three is all binary ones if this is the last tape of the file or zeroes otherwise; and word four is the hash sum of words one, two, and three.

The normal records are 2402 words long and contain 300 eight word shelter items plus a leading word containing the index of this record within tape and a trailing word which is the 1's complement of the hash sum of the items within the record. This means that the hash sum of the entire record is equal to the record index. The last normal record of each tape may contain entire items of padding which in this case consist of eight binary words, each of which is all binary 1's.

3.6 C1 File

The C1 file was received as a card deck. Although it was subject to corrections or modifications, it was considered a total file rather than a subfile.

The items within C1 were of two distinct types, the great majority being Standard Location items, the remainder, higher level identifications. Both types had the same identification key, the eight character Standard Location code containing no leading zeroes. The item key for both consisted of a single numeric character to identify region, a single BCD character to identify state within region, a

single BCD character to identify area within state, a single BCD character to identify county within area and a four character numeric code to identify census tract within county.

For Standard Location items, each of the first four characters of the identification key was non-zero and the census tract field was non-zero; this key was followed by a four character field of zeroes. The remainder of the item contained alphabetic information to identify the census tract and a resident population field. This type C1 item became the fourth level type item in the MWO file.

The second type of item in C1 identified a less specific location than the Standard Location items. First, second, and third level items identified state, area, and county respectively. Each level had zeroes for the census tract code followed by three zeroes and a "-". All characters following the "-" identified the particular level specified by the item.

The level of identification except for the fourth level was the number of non-zero characters appearing within characters two, three, and four of the Standard Location code. Because of the "nesting" properties of the identification, no non-zero character could legitimately occur after a zero within the four characters.

To completely describe a Standard Location it was necessary to have one item from each level. As this file was sorted in ascending order on the Standard Location key, complete identification for a single Standard Location was available by simply reading through the file and retaining the last encountered item from each level.

3.7 C2 File

A C2 card was received at NBS for each book of Fosdic schedules received at Jeffersonville Census. The subfile unit when received was the work unit. These subfiles were used to update the MWO file in the normal updating cycle. (See Section 5 for detailed procedure.)

Each C2 item contained Standard Location code as a key and day and night populations. There was a single column having either a blank or an R to indicate whether the item was an "original" or a "revision". This field was not utilized by the procedure except in case of duplicate items within a single updating cycle. In addition there were fields containing Census Serial Number, Field Office, Contract Number, and Work Unit; the latter group of fields was not used in the NBS system.

3.8 C3 Files

The C3 files were received as magnetic tapes. Each file (a PCU or Census Processing Unit) contained approximately four thousand items. Each PCU had been converted from Remington Rand tape to IBM tape. Some editing had been done by Census incidental to the conversions (schedule to microfilm to magnetic tape) of the data.

The items of C3 were on tape with two items per tape record; each item consisted of 360 BCD characters and contained all information on the Fosdic Schedule except the name and address field. In addition each PCU contained a label item and two or more trailer items; these were desirable to allow machine checking of inputs both as to identification and number of items.

The label item was double length and consisted of a twelve character field of zeroes, six characters PCUΔNO followed by a six character field containing the PCU number, and twelve characters CENSUSΔREELΔ followed by a six character field containing the reel number on which the PCU had originally been recorded. The remainder of the label item contained all words of Z's except for the last six characters which were ABCDEF.

The normal items were representations of the Fosdic schedule and were as shown in format layout and the examples. If there were an odd number of schedules in a PCU a "padding" item consisting of 360 characters of Z's was added to fill the last normal tape record.

The trailer items, also double length, contained 6 characters of Z's, twelve characters ΔDATAΔBLOCKS followed by a six character field containing the number of tape records, and twelve characters ΔBUILDINGSΔΔ followed by a six character tally of the number of facilities in the PCU. The remainder of the item contained all words of Z's except the last six characters which were ABCDEF.

The C3 file was sorted in ascending order on the first twenty characters of each item; the leading characters of the non-normal items had been selected so as to insure that the label item and trailer items remained in proper order with relation to the normal items. As the sorts were made before any other processing of the data, reference to C3 is to the sorted C3 file.

3.9 C4 File

The C4 card subfile was received from Jeffersonville Census. A C4 subfile existed for each PCU. Each item within the file contained, in addition to the twenty character identification, the Census

Serial Number, Page Number and the fifty character name and address of the facility. These fields were Items 1 through 8 from the original Fosdic schedule plus the Census Serial Number.

The C4 subfile was augmented at NBS by a label item, a trailer item and padding items. The augmented file was then sorted on the identification key and used as input to the Input Edit Program.

Since the file was blocked on tape with ten items per tape record, enough padding items were added to assure that the total number of items in the file was a multiple of ten. Hereafter reference to C4 is to the augmented sorted C4 file unless otherwise specified. The label item consisted of twelve characters of zeroes, a seven character field of PCUΔNOΔ, a five character PCU number, and blanks. The trailer item consisted of twelve characters of Z's, a six character field containing the number of items in the original file, and a six character field containing the number of tape records, followed by all Z's.

3.10 C5 File

Each C5 item was received at NBS as a printed memorandum. Each item contained simply the twenty character identification key and represented a facility to be removed from the system. Upon receipt, each item was transcribed to a punch card which was then stored in a C5 card subfile to await the next scheduled M2 update. The C5 card subfile was sorted on the entire twenty character item and the sorted subfile used as input to the M2 updating program.

C6 description

3.11 P Files

The P1 file is completely described in "Input Edit Program"; the P2 file, in "PF Calculation and Print". The remaining P file formats were designed to be self-explanatory; hence the examples shown suffice to assure their intelligibility.

A P1A item was an image of the original Fosdic schedule augmented by the error indicator constructed from an item in P1 ~~having a non-zero revision number~~. P3, P4, and P5 were files of rejected items arising from the construction of M1 or M2. Each P3, P4, and P5 item contained a message within itself to indicate the reason for its rejection.

P6, P7, P8, and P9 were the summary outputs and contained essentially the same information as that in M2. These data had been consolidated at the appropriate identification and the proper alphabetic identifications for each level had been obtained from the MWO file.

4. SORTS

All sorts were made using the SORT 709 Routine prepared by IBM for the IBM 7090. (See IBM SORT 709 C28-6036.) Both the C3 and C4 files prior to the Input Edit Routine were sorted in ascending order on a key consisting of Standard Location Code, Field Office, Contract Number, Facility Number, Part Number, and Revision Number. The C5 subfile was sorted on the same key for input to the M2 creation program. C6

C1 and C2 were each sorted on the eight character Standard Location Code prior to the construction of or an updating of MWO.

The P1 File was sorted in ascending order on a key of Revision Number (where all non-zero revisions were considered equal), PCU Number, Work Unit, Census Serial Number, and Page Number.

→ M1 chg file

5. MWO CONSTRUCTION

The original MWO file was composed of the C1 file which had been sorted on the identification key and checked for duplicates. This file was complete (subject to updating) except that each fourth level (census tract) item was missing the day and night population fields. This file was on magnetic tape.

The populations for each item appeared on a C2 item and had to be consolidated into MWO for each item for which there was an item in M2 before the summary program could be used.

Since a C2 item had been created with each book of Fosdic schedules, there was a duplicate item for each Standard Location having more than one book of facilities. There was no convenient way to determine which of a pair of duplicates had the better population estimates; neither was there an identification key within the item itself to determine the chronological ordering of duplicates.

The procedures devised for updating used the difference in lead time for C2 and the PCU files for chronological ordering. The C2 files were punched at the same time as the C3 and C4 files were prepared and came to NBS directly from Jeffersonville Census. Since the C3 file, after microfilming, had to be processed on FOSDIC, Univac, and the tape to tape converter, the PCU files were received at NBS a week or more after the C2 file which had been created from the same books of Fosdic schedules.

This justified a periodic updating of MWO. The procedure adopted was to accumulate all C2 files received within a specified period into a C2', then sort C2' on the Standard Location key and check for duplicates. If duplicates occurred and the population fields were identical one item was retained; if the population fields were not identical, one was discarded; if the difference was significant, both were discarded; and OCE notified of the discrepancy. A "revision"item was retained rather than an "original" item if the choice existed between these types regardless of population discrepancies. This operation was done on EAM equipment and the IBM 1401.

The C2' file was then consolidated into the MWO file using the rule that the population fields from C2' replaced the population fields on MWO without any checking on equality. The only exception was that a blank field of C2' did not replace a numeric field of MWO. Use of this procedure tacitly assumed that the last data received were the most nearly correct data available.

6. INPUT EDIT PROGRAM

6.1 Function

The function of this program was to add the name card (C4) to the corresponding Fosdic schedule (C3), and to check for duplicate facilities or excess unmatched items from each input. It was also required to edit the items and reject those which defined buildings for which the computations were either impossible or meaningless. A third goal was to mark items as questionable if they were either inconsistent in fields which invalidated neither the computations nor the identification key or if certain low order (minor) corrections were made to assure consistency.

Inputs were C3 and C4, and outputs were P1 and M1'. M1' was essentially a subset of M1 which was used as input to the shelter calculation, and P1 was the file of rejected and questionable items. The program was used with input data of a single PCU. The program combined corresponding items from C3 and C4 to construct an M1' entry. The edit checks made on these items fell into two broad groupings. First were the internal checks which found inconsistencies within a C3, C4, or M1' item. These checks resulted in classification of each item as acceptable, meaning that the item was internally consistent; questionable, meaning either that the item was inconsistent but processable or that it was inconsistent but "correctable" by application of certain low order correction rules[3] included in the program; or rejected, meaning that the item was unprocessable. If an item was both questionable and rejected it was considered rejected.

The second group of checks was that which checked an item for consistency both with adjacent entries from the same file and corresponding entries from one or more of the other files involved. An item which failed to pass this group of checks only was in itself processable, but acceptance of such an item would have resulted in violation of the master file rules.

The program first checked a C4 item with its successor to determine if it was a duplicate, superseded revision, or acceptable item. If there were two or more items having identical keys, all except the last were considered duplicates. If there were two or more having duplicate keys except for revision number, only that which had the highest revision number was accepted; all others were superseded revisions. Rejection for duplication or superseded revision occurred before the next step of the editing procedure, without internal checking of the C4 item.

The program next attempted to combine a C3 entry and a C4 entry into an M1' item. If there was a mismatch resulting in an excess C4 item, the excess item was immediately checked for internal consistency and entered in the P1 file.

If the C4 entry matched a C3 entry the M1' item was constructed in the memory and marked "matched". If the attempted matching resulted in an excess C3 item, an M1' item was constructed using an artificial C4 item[4] and marked "unmatched". The internal checks on the M1' item were then made.

If internal checks were begun, all checks were made on each item even if failure to pass the first test had been sufficient to cause rejection. The checks made were of two distinct types. First were those to assure that each field in itself did not contain an impossible value; these are described definitively in P1 interpretation sections. Second were those which checked relations between fields to assure that the item described neither an impossible nor an improbable building; these rules are described in detail in "Higher Order Checks" but are mentioned by name in the P1 interpretation sections. As each check was made a "pass" or "no pass" indicator for that check was set up within the item. If a check was not passed an "error" or "question" indicator was set up within the item. For both the C4 and

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3. See Existence Check, Story-Height Check, Dimension Check, Setback Check, Contaminated Planes Check, and P1 interpretation.

4. The artificial C4 item consists of that data from C3 which is common to C3 and C4 and an address of PCU number and Work Unit Number.

M1' entries on P1 the item was made up of the original item and a sequence of "·"'s and alphanumeric mnemonic characters. In both cases, a position represented a type of check; a "·" indicated that the check had passed; any other character indicated that the check had not passed or did not pass until a correction had been made.

For the C4 items, the relations between successive entries were determined before the internal checks were made and under some conditions no internal checks were necessary. For the M1' (or C3) items all internal checks were made before relations between different items were investigated. Each of a group of M1' items having identical keys was considered a duplicate whereas the superseded revision criteria were exactly those of the C4 item checks.

For both types of P1 entry the first thirteen positions (excluding blanks) represented the same checks on the indicated item.

6.2 Interpretation of C4 Items in P1

The entries from C4 in P1 are called A type rejections (the second character of the error indicator code is always A). The item consists of a thirteen character error indicator grouped in two blocks of five and a block of three separated by blanks; two blanks; and the data from C4 as follows:

8 characters	Standard Location	(Item 3)
2 characters	Field Office	(Item 4) (See Appendix I, page 27.)
2 characters	Contract Number	(Item 5)
5 characters	Facility Number	(Item 6)
2 characters	Part Number	(Item 7)
1 character	Revision Number	(Item 8)
1 character	Zero	------
50 characters	Name and Address	(Item 2)
1 character	Blank	------
5 characters	Census Serial Number	------
1 character	Blank	------
2 characters	Page Number	(Item 1)

No A type entry ever had a corresponding entry on the M1' output since there was no C3 information for the facility represented. The character by character interpretation of the error indicator follows:

Character 1 is always "X".

Character 2 is always "A".

Character 3 is:

"1" if item is a duplicate.

"2" if item is internally consistent but a mismatch.

"3" if item is internally inconsistent and a mismatch.

"4" if item is a superseded revision.

Character 4 is "C" if the Census Serial Number was not a non-zero numeric field.

Character 5 is "P" if the Page Number (Item 1) was not a non-zero numeric field.

Character 6 is "S" if the Standard Location (Item 3) was illegal. As this check was made by checks of individual characters within the eight character field rather than by a direct comparison with existing Standard Locations, passage of the tests insured only that the field was legitimate with respect to the coding structure rules. Many Standard Location codes are legitimate but represent no real standard locations.

Character 7 is "O" if the Field Office (Item 4) was one not appearing on the list supplied by the Corps of Engineers.

Character 8 is "R" if the Revision Number (Item 8) was non-numeric.

Character 9 and 10 are always "·" for A type errors.

Character 11 is "C" if the Contract Number (Item 5) was non-numeric.

Character 12 is "F" if the Facility Number (Item 6) was non-numeric.

Character 13 is "P" if the Part Number (Item 7) was non-numeric or zero.

6.3 Interpretation of M1' Items in P1

Since each M1' item had been checked against adjacent M1' items and against a C3 item as well as internally, there were a number of combinations of inconsistencies which were coded on the P1 item. At the conclusion of all checking for each item, the internal indicators and the relation between the identification key of the item and that of its successor were used to determine whether the entry was to be made in the M1' file, the P1 file, or both. If entry was made on P1, the same criteria were used to determine which of fifteen error classes was proper for the entry. A further breakdown was the separation of B through D entries (representing those items with zero revision numbers) and E through G entries (representing those items with non-zero revision numbers and eventually appearing on P1A). The M1' entry on P1 was made up of one line consisting of a 34 character error indicator code which actually occupied 40 positions including blanks and edited information from M1' as indicated below and three lines, each of which was 120 characters of C3 preceded by a two digit index.

The first three characters of the error indicator, the first characters of line 1, were analogous to those of the C4 entry; if the first character was "X" no entry appeared on M1' (rejected item); if a ".", an entry also appeared on M1' (questionable item). The second character again identified the general type of inconsistency; and the second and third characters combined, the specific type. In the following table enumerating the error types a "?" means an item questioned, "X" means an item rejected, and "OK" means an item was internally consistent:

Successive M1' Relation	Corresponding C4	Internal Error	On M1'	1st Three Characters of Code Zero Rev.	Non-Zero Rev.
Duplicate	Yes	OK	No	XB5	XE5
Duplicate	Yes	?	No	XB6	XE6
Duplicate	Yes	X	No	XC3	XF3
Duplicate	No	OK	No	XB1	XE1
Duplicate	No	?	No	XB3	XE3
Duplicate	No	X	No	XC1	XF1
Superseded Rev.	Yes	OK	No	XC5	XF5
Superseded Rev.	Yes	?	No	XC5	XF5
Superseded Rev.	Yes	X	No	XC5	XF5
Superseded Rev.	No	OK	No	XC5	XF5
Superseded Rev.	No	?	No	XC5	XF5
Superseded Rev.	No	X	No	XC5	XF5
Consistent	Yes	?	Yes	.D.	.G.
Consistent	Yes	X	No	XC4	XF4
Consistent	No	OK	No	XB2	XE2
Consistent	No	?	No	XB4	XE4
Consistent	No	X	No	XC2	XF2

The remainder of the error indicator code was quite similar to that for the C3 item. It did differ in one important respect, however. In the C3 code, any inconsistency was cause for rejection; in the M1' code a position could represent a cause for rejection, for questioning, or for either. The action taken is shown by "X" and/or "?" enclosed in parentheses in the character by character description.

Characters 4 through 8 and 11 through 13 were identical to the same characters in the C3 indicator, both as to interpretation of the check indicated and the character itself. Appearance of an alphabetic character in one of these positions was cause for rejection. Although none of the fields to which these positions refer were involved directly in the shelter calculations, an error in any one of them could result eventually in an inaccessible item on M1 or M2 had the item been allowed to remain in the system.

Character 9 is "U" (?) if the Use Class (Item 13) was not one of the values on the list supplied by Office, Chief of Engineers. Zero was substituted into M1' for an illegal value. (See Appendix I, page 28.)

Character 10 is "W" (?) if the Owner Code (Item 14) was other than one of those supplied by Office, Chief of Engineers. Zero was substituted into M1' for any illegal values. (See Appendix I, page 28.)

Character 14 is "N" (?) if the Number of Building Parts (Item 9) was not less than 100 or was less than Part Number (Item 7).

Character 15 is "S" (?) if the Number of Stories (Item 10) was not numeric.

Character 16 is "Y" (?) if Year Built (Item 11) did not satisfy one of the following conditions:

(1) All zeroes.

(2) All blanks.

(3) A blank, zero or 1 in the thousands position and 6, 7, 8, or 9 in the hundreds position.

Character 17 is "V" (?) if the Physical Vulnerability (Item 12) was not one of those values from the table furnished by the Office, Chief of Engineers. (See Appendix I, page 29.)

Character 18 is "N" (?) if the Number of Subbasements (Item 15) was non-numeric.

Character 19 is "S" (?) if the Number of Setbacks (Item 16) was non-numeric.

Character 20 is "E" (? or X) if "Existence" conditions were not passed.

Character 21 is "H" (? or X) if the "Story-Height" conditions were not passed.

Character 22 is "S" (X) if "Setback" relations were not satisfied.

Character 23 is "D" (? or X) if "Dimension" tests were not passed.

Character 24 is "C" (? or X) if "Contaminated Planes" fields caused an unprocessable or questionable item.

Characters 25 through 34 represent the same type of check made on different groupings of fields from the M1' item. All fields from the M1' item from Items 17 through 23 and Signature item were checked to verify that each was numeric. In addition to the obvious case in which each character of each field was a numeric character, the case in which each character of a field was blank was considered numeric and set equal to a negative zero. A field which was not all blank or all numeric was illegal. When an illegal field was encountered the program substituted a negative zero for the illegal value and made the proper entry into the error indicator. Illegal fields were not sufficient to cause rejection but frequently the substituted zeroes resulted in inconsistencies in higher order checks as indicated by characters 20 through 24.

Character	Symbol	Fosdic Item
25	7	Item 17
26	8	Item 18
27	9	Item 19
28	0	Item 20
29	1	Item 21
30	2	Item 22
31	B	Item 23-Basement
32	F	Item 23-First Floor
33	U	Item 23-Upper Floor
34	S	Signature

6.4 Higher Order Checks

The higher order checks were each made by a subprogram which checked relations between (or among) fields within a single item. These relations determined whether an item was accepted, rejected, or questioned. These subprograms were Existence Check, Story-Height Check, Setback Check, Dimension Check, and Contaminated Planes Check.

In the description of the function of each subprogram, use of the terms accepted, rejected, and questioned refer to all testing within the subprogram unless otherwise specified. Reject and question both imply that the appropriate indicators were constructed within the M1' item, whereas accept means that the specific indicator was set to "·" and the error type indicator was left unchanged. Fields are referenced as the C3 (Fosdic Schedule) input (See Appendix III, pages 43-44.) or as follows:

S = Item 10 (Number of Stories)

H_T = Item 18a (Total Height)

H_B = Item 18b (Basement Height)

H_U = Item 18d (Upper Story Height)

B = Item 15 (Number of Subbasements)

SB = Item 16 (Number of Setbacks)

Quantities constructed by the subprograms for use within themselves only were SC, the highest story at which a construction change occurred and the existence parameters (subscripted E's) which were either 1 or 0. A 1 indicated the legitimate presence of the specified characteristic and a zero its absence.

E_B refers to basement.

E_F refers to first story.

E_U refers to upper story.

E_C refers to upper story after change.

E_{S1} refers to setback number 1.

E_{S2} refers to setback number 2.

E_{S3} refers to setback number 3.

E_R refers to roof.

σ is a function of E_F, E_U, and E_C defined in Existence Check.

6.5 Existence Check

The first step was the setting to zero of SC and all existence parameters. The remaining checks are described in the sequence in which they were made. For certain conditions the ordering of the tests is essential to proper interpretation of the error code.

If none of the fields describing basement exterior walls and height above grade (23a through 23l) were blank or non-numeric, E_B was set equal to 1 which indicated that the basement was properly defined. If one or more of the specified fields was blank or non-numeric, E_B remained zero.

In an identical manner E_F was set equal to 1 if none of the fields referring to the first story exterior walls (23q through 23x) were blank or non-numeric.

For E_U the applicable fields were those describing the upper stories (actually the second story) or 23c through 23j. To correct a number of schedules which had been filed out not according to instructions it was necessary to make a preliminary check before the construction of E_U. If all of the specified fields were zero and H_U was zero, all of the fields were changed to blank fields. Then E_U was constructed in a manner analogous to that used for E_B and E_F.

E_C was constructed somewhat differently since each construction change referred to a single side of the building or building part. For E_B, E_F, and E_U it was sufficient to consider all four sides as an entity (a story) whereas for E_U it was necessary to consider each side separately.

Side A was the first considered. If 23$\bar{o}$, 23$\bar{s}$, and 23$\bar{w}$ were all zero they were changed to blank fields. Then if no field from among 23$\bar{o}$, 23$\bar{s}$, and 23$\bar{w}$ was blank or non-numeric and 23$\bar{o}$ was greater than 2, SC was set equal to 23$\bar{o}$ and E_C was set to 1. If the same conditions existed except that 23$\bar{o}$ equaled 2; 23$\bar{o}$, 23$\bar{s}$, and 23$\bar{w}$ were set to zero, E_C left unchanged, the "question" and "Existence" indicators marked and the existence check continued. If the same conditions existed except that 23$\bar{o}$ was less than 2, the item was rejected. If 23$\bar{o}$ was less than or equal to 2, the walls described had been considered previously in either the E_F or E_U construction and the data were either redundant or ambiguous.

Sides B, C, and D were examined by a procedure exactly analogous to that used for side A except that SC was changed only if the potential value of SC arising from a side was greater than the existing value. Hence the final SC was the story number of the highest story at which a construction change

occurred.

The parameter σ was then constructed as follows:

$\sigma = 0$ if $E_F + E_U + E_C = 0$ (at most a basement existed)

$\sigma = 1$ if $E_F = 1$; $E_U + E_C = 0$ (at most basement and first story existed)

$\sigma = 2$ if $E_F = E_U = 1$; $E_C = 0$ (no construction changes--at least two stories)

$\sigma = 3$ if $E_F = E_U = E_C = 1$ (construction change(s) and at least three stories)

$\sigma = 4$ and the item rejected for any other combination of 1's and 0's for E_F, E_U, and E_C.

The remaining tests in the Existence Check subprogram are best explained by means of the following table in which all checked for combinations of data are indicated along with the corrections made and final status of the item:

Data				Correction	Status
E_B	H_B	S	B		
1	0	-	-	$0 \rightarrow E_B$	Reject
1	1,2,3	-	-	$4 \rightarrow H_B$	Question
1	> 3	-	-	-	Accept
0	-	0	-	-	Reject
0	$\neq 0$	$\neq 0$	-	$0 \rightarrow H_B$	Question
0	0	$\neq 0$	0	-	Accept
0	0	$\neq 0$	$\neq 0$	$0 \rightarrow B$	Question

6.6 Story-Height Check

This subprogram used the redundancy implicit in the M1' item and the subprogram parameters to verify that the building or building part described was a legitimate building with respect to the heights, stories, and existence parameters.

There were three distinct branches within the subprogram, the one used being dependent upon the value of S. For each of the three branches a table is shown which shows all conditions that were checked, the correction made and final status. An asterisk in the Status column indicates that checks in Other Conditions column for succeeding lines must be made before status can be determined.

For S = 0

H_T	H_U	H_F	E_B	σ	Other Conditions	Correction	Status
0	0	$\neq 0$	1	0		$0 \rightarrow H_F$	question
0	0	$\neq 0$	-	$\neq 0$		$0 \rightarrow H_F$	reject
0	0	$\neq 0$	0	0		$0 \rightarrow H_F$	reject
0	0	0	-	$\neq 0$			reject
0	0	0	1	0			accept
0	0	0	0	0			reject
0	$\neq 0$	$\neq 0$	-	-			reject
0	$\neq 0$	0	-	$\neq 0$		$0 \rightarrow H_U$	reject
0	$\neq 0$	0	1	0		$0 \rightarrow H_U$	question
0	$\neq 0$	0	0	0		$0 \rightarrow H_U$	reject
$\neq 0$	0	0	-	$\neq 0$		$0 \rightarrow H_T$	reject
$\neq 0$	0	0	1	0		$0 \rightarrow H_T$	question
$\neq 0$	0	0	0	0		$0 \rightarrow H_T$	reject
$\neq 0$	0	$\neq 0$	-	$\neq 1$		-	reject
$\neq 0$	0	$\neq 0$	-	1	$H_T - H_F < 0$	-	reject
					$H_T - H_F > \frac{H_F}{2}$	-	reject
					$H_T - H_F \leq \frac{H_F}{2}$	$1 \rightarrow S$	question
$\neq 0$	$\neq 0$	0	-	-			reject
$\neq 0$	$\neq 0$	$\neq 0$	-	0,1			reject
$\neq 0$	$\neq 0$	$\neq 0$	-	2,3		$\frac{3H_U/2 - H_F + H_T}{H_U} \rightarrow S$	*
					$2 \geq S$		reject
					$2 < S$		*
					$SC < S$		question
					$SC \geq S$		reject

For S = 1

H_T	H_U	H_F	E_B	σ	Other Conditions	Correction	Status
0	0	0	-	$\neq 0$			reject
0	0	0	0	0			reject
0	0	0	1	0		$0 \rightarrow S$	question
0	0	$\neq 0$	-	1		$H_F \rightarrow H_T$	question
0	0	$\neq 0$	-	$\neq 1$			reject
0	$\neq 0$	-	-	-			reject
$\neq 0$	0	0	-	1		$H_T \rightarrow H_F$	question
$\neq 0$	0	-	-	$\neq 1$			reject
$\neq 0$	0	$\neq 0$	-	1	$H_T - H_F < 0$		reject
					$H_T - H_F \geq 0$ and $\frac{H_F}{2} + 5 < H_T - H_F$		reject
					$H_T - H_F \geq 0$ and $\frac{H_F}{2} + 5 \geq H_T - H_F$		accept
$\neq 0$	$\neq 0$	0	-	$\neq 1$			reject
$\neq 0$	$\neq 0$	0	-	1		$H_U \rightarrow H_F$; $0 \rightarrow H_U$	*
					$H_T - H_F < 0$		reject
					$H_T - H_F \geq 0$ and $\frac{H_F}{2} + 5 < H_T - H_F$		reject
					$H_T - H_F \geq 0$ and $\frac{H_F}{2} + 5 \geq H_T - H_F$		question
$\neq 0$	$\neq 0$	$\neq 0$	-	0			reject
$\neq 0$	$\neq 0$	$\neq 0$	-	1		$0 \rightarrow H_U$	*
					$H_T - H_F < 0$		reject
					$H_T - H_F \geq 0$ and $\frac{H_F}{2} + 5 < H_T - H_F$		reject
					$H_T - H_F \geq 0$ and $\frac{H_F}{2} + 5 \geq H_T - H_F$		question
$\neq 0$	$\neq 0$	$\neq 0$	-	2,3		$\frac{3H_{U/2} - H_F + H_T}{H_U} \rightarrow S$	*
					$S \geq 2$		reject
					$S < 2$		*
					$SC < S$		question
					$SC \geq S$		reject

For S > 1

H_T	H_U	H_F	E_B	σ	Other Conditions	Correction	Status
0	0	0	-	$\neq 0$			reject
0	0	0	0	0			reject
0	0	0	1	0		$0 \rightarrow S$	question
0	0	$\neq 0$	-	-			reject
0	$\neq 0$	0	-	-			reject
0	$\neq 0$	$\neq 0$	-	0,1			reject
0	$\neq 0$	$\neq 0$	-	2,3		$H_F+(S-1)H_U \rightarrow H_T$	question
$\neq 0$	0	0	-	-			reject
$\neq 0$	0	$\neq 0$	-	0			reject
$\neq 0$	0	$\neq 0$	-	1		$1 \rightarrow S$	*
					$H_T-H_F < 0$		reject
					$H_T-H_F \geq 0$; $\frac{H_F}{2} + 5 < H_T-H_F$		reject
					$H_T-H_F \geq 0$; $\frac{H_F}{2} + 5 \geq H_T-H_F$		question
$\neq 0$	0	$\neq 0$	-	2,3		$\frac{H_T-H_F}{S-1} \rightarrow H_U$	*
					$H_U < 7$		reject
					$7 \leq H_U \leq 12$		question
					$H_U > 12$		reject
$\neq 0$	$\neq 0$	0	-	0,1			reject
$\neq 0$	$\neq 0$	0	-	2,3		$H_T-(S-1)H_U \rightarrow H_F$	*
					$H_F < 7$		reject
					$H_F > 12$		reject
					$7 \leq H_F \leq 12$		question
$\neq 0$	$\neq 0$	$\neq 0$	-	0,1			reject
$\neq 0$	$\neq 0$	$\neq 0$	-	2,3	$H_T-H_F-(S-1)H_U \leq S+5$		accept
					$H_T-H_F-(S-1)H_U > S+5$		*
					$\lvert H_T-H_F-H_U \rvert \geq S+5$		reject
					$H_T-H_F-(S-1)H_U > S+5$		*
					$\lvert H_T-H_F-H_U \rvert < S+5$	$\frac{H_T-H_F}{S-1} \rightarrow H_U$	*
					$7 \leq H_U \leq 12$		question

6.7 Setback Check

The first steps in the setback check were the calculation of E_R, E_{S1}, E_{S2}, and E_{S3}; each was set to zero initially. If 19a, 19b, 19c, and 19d contained either all blanks or a mixture of fields each of which was all blanks or all zeroes, E_R remained unchanged. If there was a mixture of blanks and numerics at least one of which was non-zero, the item was rejected; if all contained numerics and at least one field was non-zero, E_R was set equal to 1.

Fields 19e, 19f, 19g, 19h, and 19i were then used to construct E_{S1}. If each of these fields was either all blanks or all zeroes with at least one being all blanks, E_{S1} was left unchanged. If each of

the fields was numeric and at least one was non-zero, E_{S1} was set equal to 1. Any other combination caused immediate rejection.

E_{S2} and E_{S3} were constructed using the same procedure as that for E_{S1} except, of course, the data referring to setbacks number 2 and number 3 were used. The item was questioned if SB did not agree with the number of existing setbacks as determined by examination of E_R, E_{S1}, E_{S2}, and E_{S3}. SB in this case was set equal to the existing number of setbacks.

Failure to pass all of the following tests resulted in rejection of the item:

(1) Setback number 1 if it existed had to occur at a height greater than that of the first story.

(2) A setback existed only if all lower numbered setbacks existed.

(3) For the highest setback, the distance to the face for each of the four sides had to be equal to the distance to the edge of roof for the corresponding side.[5]

(4) For the roof distances:
Side A (19a) + Side C (19c) < Bldg. length B (17b)
Side B (19b) + Side D (19d) < Bldg. length A (17a)

(5) Each setback height had to be greater than that of the next lower setback but less than the building height.

(6) No setback distance could be less than that of the next lower setback and for each setback at least one of the distances had to be greater than the corresponding distance for the next lower setback.

6.8 Dimension Check

The first tests made within this subprogram were on the area of the building or building part. If the total area was less than 100 square feet the item was rejected.

The second group of tests was to verify consistency of core information. The upper (second) story core was checked first. If the data fields defining a core (23$\bar{k}$, 23$\bar{l}$, 23$\bar{m}$, 23$\bar{n}$, 17e, and 17f) were each either all zeroes or all blanks the second story core did not exist and checking continued with the first story core. If the applicable fields contained a mixture of blanks, zeroes, and non-zero numeric characters with at least one field of blanks and one non-zero field the item was rejected. If all of the fields were numeric and at least one non-zero, a core was assumed to exist pending the following checks:

σ	17a-17e	17b-17f	Correction	Status
0,1	-	-	-	reject
2,3	+	+	-	accept*
2,3	+	-	0 → 17f;23$\bar{l}$;23$\bar{n}$	question*
2,3	-	+	0 → 17e;23$\bar{k}$;23$\bar{m}$	question*
2,3	-	-	0 → 17f;17e;23$\bar{k}$;23$\bar{l}$;23$\bar{m}$;23$\bar{n}$	question*

The first story core existence was ascertained using precisely the same criteria as for the upper (second) story except that the data fields used were 23y, 23z, 23$\bar{a}$, 23$\bar{b}$, 17c, and 17d. Core consistency was checked by:

σ	17a-17c	17b-17d	Correction	Status
0	-	-	-	reject
≠0	+	+	-	accept*
≠0	+	-	0 → 17d;23z;23$\bar{b}$	question*
≠0	-	+	0 → 17c;23y;23$\bar{a}$	question*
≠0	-	-	0 → 17c;17d;23y;23z;23$\bar{a}$;23$\bar{b}$	question*

*Processing continued within the subprogram in the cases indicated.

If E_B was zero; and 17g zero the item was accepted but if 17g was not zero, it was set to zero and the item questioned.

5. If this check was not satisfied, the roof distance replaced the corresponding setback distance; the item was questioned and checking continued.

6.9 Contaminated Planes Check

For the contaminated planes data each of the four sides was checked independently using exactly the same tests for each. For acceptance each side had to pass all tests; for questioned items, at least one side was questioned and no side was rejected. Using H and W to represent height and width respectively and subscripts to denote plane index the following existence parameters were constructed:

$E_1 = 1$ if $W_1 > 0$ and $H_1 \neq 0$,

$E_1 = 0$ otherwise;

$E_2 = 1$ if $W_2 > 0$ and $H_2 \neq 0$,

$E_2 = 0$ otherwise;

$E_3 = 1$ if $W_3 > 0$ and $H_3 \neq 0$,

$E_3 = 0$ otherwise.

Then-------

E_1	E_2	E_3	Other	Action	Status
0	-	-			reject
1	0	0	$W_1 \geq 200$		accept
			$W_1 < 200$		reject
1	0	1	$W_1 \geq 200$	$0 \rightarrow H_3; W_3$	question
			$W_1 < 200$	$0 \rightarrow H_3; W_3$	reject
1	1	0	$W_1+W_2 \geq 200$		accept
			$W_1+W_2 < 200$		reject
1	1	1	$W_1+W_2+W_3 \geq 200$		accept
			$W_1+W_2+W_3 < 200$		reject

7. PF CALCULATION AND PRINT

The basic function of this program was to prepare from an M1' file and an MWO file a P2 file and an M2' file. Both P2 and M2' contained essentially the same data per shelter item; this consisted of several descriptive fields from the M1' item plus the calculated reduction factors and the protection factor.

The reduction factor calculations, although quite lengthy, were actually contained within a two entrance-two exit subroutine. The entry points were for a new M1' item (new facility) and for a different shelter (story) of the same facility as the preceding shelter; the exits were made when the calculated protection factor (PF) was greater than or equal to 20 (this defined a shelter) or when the last potential shelter of the facility had been calculated. The program is described in terms of the input-output files and the reduction factor calculation just as if they were completely separate programs.

7.1 Input-Output Program

Since each of the input files MWO and M1' was in ascending order on at least the entire Standard Location code and a single M1' file satisfied all conditions required of an M1 file, no legitimacy tests were required on the input. The input files were read so as to insure that an item from each level of MWO applicable to the M1' item being processed was available in the computer memory. If no such MWO item existed, it was constructed by using the Standard Location code from the M1' item as the identification for the lowest level and blanks for the remainder of that item and for each of the higher level items missing.

The program proceeded by transferring data from a single M1' item to the reduction factor subroutine. There the reduction factors were calculated for the potential shelter with the lowest story

number.[6] If the computations indicated a PF ≥ 20 or if the potential shelter was the highest numbered of the facility, control was returned to the Input-Output program for construction of the outputs. If the PF was less than 20, and there was a higher story in the facility, the subroutine merely began the computation for the next potential shelter. If a shelter was found, after the outputs were constructed, control was transferred to the subroutine for calculation of PF for the next higher potential shelter.

7.2 PF Subroutine

The purpose of the PF subroutine is to determine which stories of a building part are shelters (that is, have a protection factor of at least 20) and for each of these stories to compute the reduction factor (the reciprocal of the protection factor). The method of calculation was devised by Charles Eisenhauer. The results obtained are generally valid to within a factor of two.

The subroutine was written with the knowledge that there would be an edit routine preceding its use. Therefore, the Fosdic Form information was assumed to be consistent and conform to the instructions for filling it in. For example, the subroutine will give erroneous results for a building with a basement and no higher stories if the PSF for the first floor as given in Item 22 is not zero.

Externally, this subroutine is used in the following manner. First, the pertinent information from a Fosdic Form is placed in a certain part of the memory. Then the subroutine is entered successively to obtain results for one story at a time. The stories are returned in order of increasing story number starting with the lowest subbasement and proceeding upward. After each entry the subroutine produces the following information, placing it in the memory immediately following the Fosdic Form information: (a) the current story number, (b) the contributions to the reduction factor through each of the four sides and through the ceiling, (c) the total reduction factor for this story, (d) floor area, (e) the number of stories at or below the current story which have a protection factor less than 20, (f) an indicator which is zero if this is the highest story of the building part and is not zero otherwise. Stories for which the protection factor is less than 20 are skipped except for the top story, which is always returned. When the highest story is not a shelter, it is returned with the total reduction factor set equal to a very large number (about 10^{38}). In this case the other reduction factor information has no significance.

Internally, the order of calculation is different from that which appears externally. The subroutine first calculates results for the basement (if present). These results are saved and used to calculate results for the subbasements (if present). Then the other stories are processed in order.

7.3 Geometric Model for a Building Part

For purposes of the calculations, a building part is assumed to consist of a number of rectangular parallelepipeds, called stories, one on top of another with corresponding vertical faces parallel. The basement (if present) and the first story (if present) have dimensions Length "A" by Length "B" with heights as given in Item 18 of the Fosdic Form. Each upper story present has the height given in Item 18; but its length and width and its position over the lower stories are determined by the information in Item 19 (Roof and Setback Location).

It should be noted, however, that the model makes no provision for a setback to begin anywhere except between stories. Accordingly, the information obtained from the Fosdic Form is changed using the following procedure. If the height at which a setback begins should be less than the height of the first story, it is set equal to this height. If a setback would otherwise begin between two floors, the height is shifted to that of the nearer floor. If the height should be equidistant from two floors, it is changed to that of the lower one. If, as a result of the shifting, two or more setbacks occur at the same height, they are combined into one setback using the distances for the originally highest of these setbacks.

The total building height given in Item 18 is used only in calculating the roof contribution to the reduction factor. If this height is less than the height of the top of the highest story, it is increased to this latter height; otherwise it is left unchanged.

7.4 Grade Height and the Nature of the First Contaminated Plane

The height of ground grade on each of the four sides of the building is a necessary piece of information for the calculation. Grade height is taken to be either the negative of the "ceiling height above grade" as given in Item 23 or equal to the height of the first contaminated plane as given in Item 20. The latter alternative is selected if and only if the first contaminated plane is determined to be grade.

For purposes of the calculation, the first contaminated plane is taken to be either ground grade or a neighboring roof. Since the Fosdic Form does not provide this information, the subroutine makes a

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6. Basement is the 0^{th} story and subbasements have negative story numbers.

determination using the following procedure. (Note that a separate determination is made for each of the four sides.) If the height of Plane 1 is less than or equal to ten feet, the plane is grade. Otherwise, the basement "ceiling height above grade" is compared with zero. If it is greater than zero, the plane is a neighboring roof. If not, the height of Plane 1 is compared with 30 feet. If it is greater than or equal to 30 feet, then the plane is a neighboring roof. Otherwise, further comparisons must be made. If the plane is above the top of the building part, or if the mass thickness of the outer wall of the story which has its floor below and its ceiling at or above the plane height is less than or equal to 100 PSF (Pounds per square foot), then the plane is a neighboring roof. In the remaining case, that is, when the mass thickness is above 100 PSF, the plane is taken to be grade.

7.5 General Discussion of the Method of Calculation

The reduction factor for a story is defined to be the dose rate of radiation that strikes a detector located three feet above the center of the floor of the story divided by the dose rate for a detector three feet above an infinite plane. The total reduction factor is obtained as a sum of contributions due to the various sources which include the roof, the setbacks, and the contaminated planes.

For the basement and higher stories use is made of four subroutines, ROFDOS, WALDOS, CONTAM, and EXTRAP. These subroutines in turn make use of table lookup and interpolation subroutines. The basement is treated no differently from the higher stories as far as the calculation is concerned. The information as to mass thicknesses, apertures, etc. is, of course, obtained from different parts of the Fosdic Form.

Subbasements are treated differently from the rest of the stories and so will be discussed first.

7.6 Subbasements

The reduction factor for a subbasement is the total reduction factor for the basement multiplied by an attenuation factor. This factor is determined by looking it up in Table 1 for a mass thickness X_0, equal to k times the mass thickness of the basement floor, where k is the number of floor slabs between the subbasement detector and the basement detector. (For the first subbasement k = 1; for the second subbasement k = 2, etc.) The entire contribution to the reduction factor is assumed to come through the ceiling. The area for a subbasement is assumed to be equal to that of the basement.

7.7 Basement and Higher Stories

First the four major subroutines ROFDOS, WALDOS, CONTAM, and EXTRAP will be described. Then it will be shown how, for each story, these are used to get the total reduction factor and the contributions through the four sides and the ceiling.

ROFDOS

ROFDOS gives the contribution from either a central or a peripheral type roof. In Figure 1 (See Appendix V, page 82.) the unshaded portion represents a central type roof. The shaded areas together form a peripheral type roof. Partitions of equal mass thicknesses which shield the detector are assumed to lie below the boundaries between the shaded areas and the unshaded area. For the peripheral roof consisting of only one of the two shaded areas, the result given by ROFDOS must be multiplied by one half.

ROFDOS is entered with the following six arguments:

(1) INDCT (an indicator which is zero for a central type roof and which is not zero for a peripher-type roof)
(2) TAREA (total roof area; i.e. core plus periphery)
(3) CAREA (area of core)
(4) Z (vertical distance between the detector and the roof)
(5) XOH (total mass thickness of all horizontal barriers between the detector and the roof, inclusive)
(6) XP (mass thickness of interior partions)

For a central type roof arguments TAREA and XP are not used in the computation.

The subroutine proceeds as follows:

(1) Looks up Table 7 for X_0 = XOH to get SVAL (skyshine correction).
(2) If INDCT = 0, looks up Table 2 for X_0 = XOH · $(10/Z)^2$, A = CAREA. Result is C3. Routine returns C3·SVAL as result.
(3) If INDCT ≠ 0, performs steps 4 through 6.
(4) Looks up Table 2 for X_0 = (XOH + XP)·$(10/Z)^2$, A = CAREA. Result is C1.
(5) Looks up Table 2 for X_0 = (XOH + XP)·$(10/Z)^2$, A = TAREA. Result is C2.
(6) Routine returns (C2 - C1)·SVAL as result.

If result turns out negative, it is set equal to zero.

WALDOS

WALDOS is used once for each side of each story. It gives two results, WALC and WALS. WALC is the uncorrected contribution to the reduction factor through the ceiling from sources on the current side. WALS is the uncorrected contribution to the reduction factor through the current side.

WALDOS is entered with the following argument list:

(1) HDAG (the height of the detector above grade)

(2) AR (area of building at the current story)

(3) XWALL (mass thickness of outer wall at current story)

(4) XI (interior wall mass thickness at current story)

(5) FRAP (fraction of exterior wall of the current story which is occupied by apertures)

(6) PR (ratio of length of current side to perimeter of current story)

(7) INSA (an indicator which is zero if the current story is the top story. It is not zero if there is a story above)

(8) XOALAT (XWALL·⟨1-FRAP⟩ for the story above)

(9) XCEIL (mass thickness of the ceiling)

(10) HTS (height of the current story)

(11) NFLOOR (number of stories above the highest contaminated plane on the current side or number of stories above the highest setback on the current side below the detector, whichever is smaller. NFLOOR is initially set equal to zero. Then as one proceeds from the basement up, NFLOOR remains zero until the detector is at or above the highest contaminated plane on the current side. NFLOOR is set back to zero just above a setback. NFLOOR is increased by one on the current side before computing a story which has its detector at or above the highest contaminated plane.)

(12) XFLOOR (mass thickness of the floor)

The subroutine proceeds as follows:

(1) If HDAG < 0, goes to step 2; otherwise to step 10.

(2) If 3-HDAG ≦ HTS, sets the fraction exposure, EXPOS, equal to zero and goes to step 3; otherwise sets EXPOS = (HTS-3+HDAG)/HTS and goes to step 4.

(3) If HDAG ≦ -20, sets WALC = WALS =0) and returns; otherwise proceeds to step 4.

(4) If INSA = 0, sets WALC = 0 and goes to step 7; otherwise proceeds to step 5.

(5) Looks up Table 1 for X_0' = XCEIL to get FLSLAB.

(6) Looks up table 4 for X_e = XOALAT, A = AR to get C3. Sets WALC = C3·FLSLAB·PR.

(7) Looks up Table 3 for X_e =XWALL + XI, A = AR; result: C4.

(8) Looks up Table 3 for X_e = XI, A = AR; result: C5.

(9) Sets WALS = PR·EXPOS·[C4·(1-FRAP) + C5·FRAP] and returns.

(10) Looks up Table 3 for X_e = XWALL + XI, A = AR; result: C1.

(11) Looks up Table 3 for X_e = XI, A = AR; result: C2.

(12) Computes APCOR (aperture correction)

(a) If NFLOOR = 0, sets APCOR = 1.

(b) If XFLOOR ≦ 40 PSF, sets APCOR = 1.

(c) If XFLOOR > 40 PSF and XI > 60 PSF, sets APCOR = 1.

(d) If XFLOOR > 40 PSF and XI ≦ 60 PSF, looks up Table 8 for XI = XI and NFLOOR equal to the smaller of NFLOOR and six; result: APCOR.

(13) Sets WALS = PR·[C1·(1-FRAP) + C2·FRAP·APCOR] , WALC = 0 and returns.

CONTAM

For a contaminated strip, CONTAM gives a correction due to detector height and finiteness of the strip. CONTAM is entered with the following argument list:

(1) HT (height of the detector above the contaminated strip)

(2) D1 (horizontal distance from exterior wall to inner boundary of the strip)

(3) D2 (horizontal distance from exterior wall to outer boundary of the strip)

(4) XOALL (XWALL·⟨1-FRAP⟩ for the current story)

(5) XOALAT (XWALL·⟨1-FRAP⟩ for the story above)

(6) HTS (height of the current story)

(7) INSA (an indicator which is zero if the current story is the top story. It is not zero if there is a story above.)

The subroutine proceeds as follows:

(1) If HT $\leqq$ 0, sets H=5 and proceeds to step 2. Otherwise sets H=HTS, XEF=XOALL and goes to step 3.

(2) If INSA = 0, sets XEF=XOALL. If INSA $\neq$ 0 and 8-HT > HTS (which means that raising the detector to five feet above the strip puts the detector above the current story), sets XEF=XOALAT. If INSA $\neq$ 0 and 8-HT $\leqq$ HTS, sets XEF=XOALL.

(3) If D2/H $\leqq$ 2 or if 2 < D2/H $\leqq$ 10 and D2 $\leqq$ 300 feet, goes to step 4. In all other cases goes to step 7.

(4) Looks up Table 6 for W_c/H = D1/H, X=XEF; result: FCOR1.

(5) Looks up Table 6 for W_c/H = D2/H, X=XEF; result: FCOR2.

(6) Returns FCOR2 - FCOR1 as result.

(7) Looks up Table 5 for X = XEF, H=H, result: FCOR1.

(8) Calculates correction to FCOR1 due to finiteness of the strip.

(a) HYP1 = $\sqrt{H^2 + (D1)^2}$

(b) HYP2 = $\sqrt{H^2 + (D2)^2}$

(c) Looks up Table 5 for X = 0, H = HYP1; result: HCOR1.

(d) Looks up Table 5 for X = 0, H = HYP2; result: HCOR2.

(e) Looks up Table 5 for X = 0, H = H; result: HCOR3.

(f) HCOR = (HCOR1-HCOR2)/HCOR3.

(9) Returns FCOR1·HCOR as result.

If the result of CONTAM would otherwise be negative, it is set equal to zero.

EXTRAP

EXTRAP calculates a correction for sources beyond the last contaminated strip. It is not always used. The argument list for EXTRAP is as follows:

(1) HDAG (height of detector above grade)

(2) D (distance to the outer edge of the outermost contaminated strip which contributes a CONTAM correction)

(3) XOALL (XWALL·⟨1-FRAP⟩ for the current story)

(4) XOALAT (XWALL·⟨1-FRAP⟩ for the story above)

(5) HTS (height of the current story)

(6) INSA (an indicator which is zero if the current story is the top story. It is not zero if there is a story above.)

The subroutine proceeds as follows:

(1) If HDAG $\leqq$ 0, sets H = 5 and proceeds to step 2. Otherwise sets H = HDAG, XEF = XOALL and proceeds to step 3.

(2) If INSA = 0, sets XEF = XOALL. If INSA $\neq$ 0 and 8-HDAG > HTS (which means that raising the detector to five feet above grade puts the detector above the current story), sets XEF = XOALAT. If INSA $\neq$ 0 and 8-HDAG $\leqq$ HTS, sets XEF = XOALL.

(3) R = $\sqrt{H^2 + D^2}$

(4) Looks up Table 5 for X = XEF, H = H; result: FCOR1.

(5) Looks up Table 5 for X = 0, H = H; result: HCOR3.

(6) Looks up Table 5 for X = 0, H = R; result: HCOR1.

(7) Returns FCOR1·(HCOR1/HCOR3) as result.

7.8 Contributions from Roofs

There are three types of "roofs" that contribute to the reduction factor, the actual roof, setbacks above the detector, and neighboring roofs above the detector.

7.9 The Actual Roof

The contribution from the roof of the building part is calculated using ROFDOS with INDCT = 0. The height given in Item 18 of the Fosdic Form (possibly altered) is used in determining Z. The contribution is assumed to come through the ceiling of the story.

7.10 Setbacks Above the Detector

Setbacks above the detector contribute to the reduction factor through the ceiling of the story. A setback is first divided up into parts and the contributions from the parts are added to get the total setback contribution. The method of division will now be explained.

Consider Setback 2 of the building shown in side view in Figure 2. (See Appendix V, page 82.) A section view looking downward is shown in Figure 3. (See Appendix V, page 82.) The setback is the shaded area between the two rectangles. The area is divided into four rectangles by extending the sides of the inner rectangle which are parallel to the shorter of the sides of the outer rectangle. If the outer rectangle is a square, the sides parallel to side B of the building are the ones which are extended. Each of the four subrectangles is associated with a different side of the building part. If the setback has zero offset on a given side, the rectangle associated with that side will have zero area and will not contribute to the reduction factor.

Figure 4 (See Appendix V, page 82.) shows the rectangle associated with side A. The detector has horizontal distance d from side A. The contribution from this rectangle is determined using ROFDOS according to the following scheme:

(1) $d_2 < d$. Use INDCT $\neq$ 0, TAREA = $2W\cdot(d-d_1)$, CAREA = $2W\cdot(d-d_2)$, XP = interior wall PSF for the current side. Multiply result by one-half.

(2) $d_2 = d$. Use INDCT = 0, CAREA = $2W\cdot(d-d_1)$. Multiply result by one-half.

(3) $(d_1 + d_2)/2 < d < d_2$. Add results of using ROFDOS as in a and b.

(a) INDCT $\neq$ 0, TAREA = $2W\cdot(d-d_1)$, CAREA = $2W\cdot(d_2-d)$, XP = interior wall PSF for current side. Multiply result by one-half.

(b) INDCT = 0, CAREA = $2W\cdot(d_2-d_1)$.

(4) $(d_1 + d_2)/2 = d$. Use INDCT = 0, CAREA = $W\cdot(d_2- d_1)$.

(5) $d_1 < d < (d_1 + d_2)/2$. Add results of using ROFDOS as in a and b.

(a) INDCT $\neq$ 0, TAREA = $2W\cdot(d_2-d_1)$, CAREA = $2W\cdot(d-d_1)$, XP = interior wall PSF for side opposite to the current side. Multiply result by one-half.

(b) INDCT = 0, CAREA $2W\cdot(d-d_1)$.

(6) $d_1 = d$. Use INDCT = 0, CAREA = $2W\cdot(d_2-d_1)$. Multiply result by one-half.

(7) $d < d_1$. Use INDCT $\neq$ 0, TAREA = $2W\cdot(d_2-d)$, CAREA = $2W\cdot(d_1-d)$, XP = interior wall PSF for the side opposite to the current side. Multiply result by one-half.

7.11 Neighboring Roofs Above the Detector

A neighboring roof above the detector is assumed to contribute to the reduction factor through the side of the current story. The contribution is calculated using ROFDOS in the following manner: (It should be recalled that on each side a decision is made as to whether Plane 1 is a neighboring roof or not.)

(1) INDCT $\neq$ 0.

(2) CAREA = (Length of side A)·(Length of side B).

(3) Let W = length of side A if the current side is parallel to side A, = length of side B if the current side is parallel to side B. Then TAREA = CAREA + 2W·(width of Plane 1 on the current side).

(4) XOH = sum of mass thicknesses of horizontal barriers at the height of the neighboring roof and

between this height and the height of the detector.

(5) XP = interior wall mass thickness added to the product of one minus the fraction apertures and the exterior wall mass thickness.

(6) The result of using ROFDOS is multiplied by one-half.

7.12 Contributions from Contaminated Strips

For a given story of a building part, each side has contaminated strips that may contribute to the reduction factor. These consist of setbacks below the detector and of contaminated planes. Contributions to the reduction factor are determined as follows. First, WALDOS is used to get the uncorrected contributions WALC and WALS. Then corrections due to contributing contaminated strips are determined using CONTAM. These corrections are added together. To this sum an extrapolation correction (determined by using EXTRAP) may or may not be used depending on the configuration. The resulting sum, CORR. is used to form the products WALC·CORR and WALS·CORR which are the contributions to the reduction factor through the ceiling and through the current side respectively due to contaminated strips on that side. The quantity CORR is not allowed to exceed one. It will be zero if no contaminated strip contributes.

The contributions to CORR are determined according to the following rules:

(1) Only the unshielded portion of a contaminated strip contributes. (Shielding will be discussed in the next section.)

(2) Setbacks below the detector contribute.

(3) Plane 1 contributes if it is at or below the detector or if it is grade. If Plane 1 is a neighboring roof and above the detector, it does not contribute to CORR.

(4) Plane 2 contributes only if it is at or below the detector.

(5) Plane 3 contributes only if it and Plane 2 both are at or below the detector.

(6) An extrapolation correction is used if and only if one or more of the following conditions obtain.

(a) The detector is at or above all of the contaminated planes on the current side.

(b) The detector is at the same height as Plane 1; but a point five feet above Plane 1 is at or above the height of all of the contaminated planes on the current side.

(c) The detector is below Plane 1; Plane 1 is grade; and a point five feet above Plane 1 is at or above the height of all of the contaminated planes on the current side.

7.13 Shielding

Part of a contaminated strip may not contribute to the reduction factor because of shielding. Figure 5 (See Appendix V, page 83) shows two contaminated strips and a test point used in determining the extent of shielding. If $w_2/h_1 \geq d_2/h_2$ the lower strip is totally shielded and hence does not contribute. If $w_2/h_1 < d_2/h_2$, the lower strip may be shielded. The effective inner distance becomes the larger of d_1 and $(w_2/h_1)\cdot h_2$. Note that the inner edge of the upper strip is not used in determining the extent of shielding of the lower strip.

In determining shielding by a setback the test point is put at detector height at the outer wall of the current story.

For shielding by Plane 1 the following rules are used:

(1) If the detector is above Plane 1, use a test point at detector height at the outer wall of the current story.

(2) If the detector is at the same height as Plane 1 or if the detector is below Plane 1 and Plane 1 is grade, use a test point five feet above Plane 1 at the outer wall of the current story (or on a vertical extension thereof).

(3) If the detector is below Plane 1 and Plane 1 is a neighboring roof, there is no shielding.

For shielding by Plane 2, the test point is determined as follows:

(1) If the detector is above Plane 2, use a test point at detector height at the outer wall of the current story.

(2) If the detector is at the same height as Plane 2, use a test point five feet above Plane 2 at the outer wall of the current story (or on a vertical extension thereof).

(3) If the detector is below Plane 2, there is no shielding.

Tables 1 through 8 are presented together with the methods of interpolation and extrapolation used. Note that in Tables 1 through 5 the natural logarithms of the values are tabulated. (See Appendix II, pages 30-39.)

7.14 Output Construction

Data transferred from the PF calculation to the Input-Output program were a highest numbered story indicator (simply yes or no), story number and reduction factors for each of the four sides, the ceiling and total. The true PF was then calculated as the reciprocal of the reduction factor sum rounded to the nearest integer. For P2 output the protection factors were categorized as follows:

Category	1	if $20 \leq PF \leq 39$	Category	5	if $150 \leq PF \leq 249$
	2	$40 \leq PF \leq 69$		6	$250 \leq PF \leq 499$
	3	$70 \leq PF \leq 99$		7	$500 \leq PF \leq 999$
	4	$100 \leq PF \leq 149$		8	$1000 \leq PF$

The shielded area was then computed by multiplying the floor area of the shelter by a factor corresponding to the PF category as follows:

Categories 1, 2, 3	the factor was .5
Category 4	the factor was .3
Category 5	the factor was .7
Categories 6, 7, 8	the factor was 1.0

Core areas could only be calculated for first and second stories since there was no provision on the C3 input for describing the dimensions of core areas on other stories. Volumes were calculated for first and second stories using the smaller of core area or shielded area as shelter area if the core area existed. If core area did not exist, for basements, subbasements and all stories higher than the second, volume was computed by multiplying the height of the story by the shielded area.

After these calculations were completed, an M2' item was constructed and stored into a block of memory set aside for accumulation of M2' items. If this facility could more than fill the remainder of the block (300 items) assuming that each potantial shelter became a shelter the item just stored was erased, and the block printed. The last item was then stored as the first item of the store block. If this was not the last possible facility within the block, the storage index was advanced by one unit.

The shelter line for P2 was then constructed and a test made to determine if this was the first shelter[7] encountered for its Standard Location. If so, a heading page was constructed from the MW0 items within the memory and the MW0 item advanced and the page heading printed before printing the P2 line. Otherwise, after checking for necessity for a new (continued Standard Location) page heading, and printing it if required, the P2 line was printed. The PF subroutine was then entered for computations for the next potential shelter.

8. M2" CONSTRUCTION and MAINTENANCE

An updated M2 file was created before each summary run. The first step was the merging of all M2' files which had not previously been consolidated into M2 into an M2" file. The M2" file satisfied all conditions required of an M2 file. If duplicates occurred from among the M2' inputs, then the entry appearing from the higher or highest numbered PCU was retained and each of the other duplicates printed on P3. As the M2 item does not contain the PCU number, the selection was made by operational procedure rather than by the program. The program assumed that the PCU numbers of the respective M2' files were in the same numeric order as the indices of the tape units from which the M2' files were read.

8.1 Update-Summary Program

The basic function of this program was to produce from input files M2'', M2''', MW0, and C5, output files P4, P6, P7, P8, P9, and M2. The initial M2''' file was an M2'' file of PCU's $1 \rightarrow N$ and the initial M2'' file was an M2'' file of PCU's $N+1 \rightarrow M$ producing the first M2 file of PCU's $1 \rightarrow M$; thereafter the M2 file became the next M2''' input file.

The P4 file or reject file included:

(1) All items from the C5 file (delete file)

(a) matching items found on M2'''

(b) matching items found on M2''

(c) not found (these items were saved and included in next C5 file)

(2) All items from M2''' file not on M2 file

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7. "Shelter" here includes the no shelter per facility case.

(a) see (1)a above

(b) items having a higher revision on M2'' file

(c) items having a duplicate on M2'' file

(3) All items from M2'' file not on M2 file

(a) see (1)b above

(b) items having a higher revision on M2''' file

(c) items not having at least a four character match (i.e. a county) on MWO

The M2 file or shelter file:

A consolidation of all items found on the M2'' and M2''' files not found on the P4 file.

The Summaries:

Information on the M2 file was per shelter and calculations to determine PF category and capacity spaces were made by using the same rules as the "PF calculation" program. A few additional calculations were made on the shelter level, a few on the building level, and one (the peak unsheltered) on the SL (Standard Location) level. Values from the shelter level calculations were added to the SL totals; these totals plus the population information found on MWO were the basic units used in creating the six summaries described below. (Any or all of the 3 population values not found on MWO were considered to be zero for adding purposes thus introducing an error; all summaries influenced by this error were marked by a double asterisk just before the words PEAK UNSHELTERED. If the SL was on MWO but not on M2 only the population sums were used.

(1) Standard Location Summary (8 character ID or identification key)

(a) There was one for each SL found on the MWO and/or M2 file.

(b) The number of SL summaries printed each time varied as follows:

1. All the SL's on M2.

2. Only the SL's on M2 that came from M2'' (that is all SL's that had any change since the last Update-Summary run).

3. All the SL's on MWO and/or the M2.

(c) There was a special print when the SL (name) was not found on MWO and a special print when no shelters were reported for an SL found on MWO.

(d) The information from this summary was added to the county totals before it was printed (if it was).

(e) If this was the last SL in the county, a county summary was produced. If not, calculations on the next SL were started.

(2) County Summary (4 character ID)

(a) There was one for each county on MWO.

(b) All county summaries were printed every time.

(c) There was a special print when no shelters were reported in that county.

(d) The information from this summary was added to the area totals before it was printed.

(e) If this was the last county in the area, an Area Summary was produced. If not, calculations on the next SL were started.

(3) Area Summary (3 character ID)

(a) There was one for each area on MWO.

(b) All area summaries were printed every time.

(c) There was a special print when no shelters were reported in that area.

(d) The information from this summary was added to the state totals before it was printed.

(e) If this was the last area in the state, a State Summary was produced. If not calculations on the next SL were started.

(4) State Summary (2 character ID)

(a) There was one for each state on MWO.

(b) All state summaries were printed every time.

(c) There was a special print when no shelters were reported in that state.

(d) The information from this summary was added to the region totals before it was printed.

(e) If this was the last state in the region, a Region Summary was produced. If not, calculations

on the next SL were started.

(5) Region Summary (1 character ID)

(a) There was one for each of the eight regions in the survey.

(b) All region summaries were printed each time.

(c) There was a special print when no shelters were reported in that region.

(d) The information from this summary was added to the national totals.

(e) If this was the eighth region, the National Summary was produced. If not, calculations on the next SL were started.

(6) National Summary

(a) There was one.

(b) The National Summary printed each time.

(c) Once this summary was printed the run was completed.

9. THE REPORT FILES P6, P7, P8, and P9

The report files were produced by making use of the summary information as described above in addition to the calculations of percentages of resident, day and night populations sheltered by category 1, categories 2-3, categories 4-8, and categories 1-8. As soon as the necessary information was available for printing one of the summaries, the report part of the program was put into operation. The data were set up according to a specified format and were written in BCD on one or more of the four report files depending upon the type of summary being written. For a description of P6, P7, P8, and P9 see Section 2., page 1.

10. M1 CREATION

10.1 M1" Creation

All of the M1' files were combined into a single M1" file. This consolidation was accomplished by use of a simple merge program in which the individual items were ordered on a key consisting of the M1 identification fields as a major field and the PCU as a minor field. No items were removed in this phase; hence duplicate items or superseded revisions could appear in the M1" File. Because of the minor field, however, when duplicates (on the twenty character key) occurred, the item with the highest PCU number followed all other duplicates of the same item. No item could appear on M1" which had an identification key and PCU number identical to those of any other item since each M1' file itself satisfied all requirements for an M1 file.

10.2 M1"-M2 Match-Select

The final phase of the M1 construction was to remove duplicate items and superseded revisions from the M1" file to convert it into the M1 file.

The program to create M1 used M2 and M1" as inputs. Essentially the procedure was to read M1" and M2 and copy onto the M1 file only those entries from M1" which were either unduplicated on the twenty character key or the last appearing of a number of duplicates and for which one or more items having the same twenty character identification key appeared on M2. All items of M1" which did not appear on M1 appeared on P5 and were used for reconciliation.

11. FINAL PF CALCULATION

This calculation was performed to obtain a single hard copy of the P2 file in which all facilities within a Standard Location appeared in a single book and in proper order. Since P2 consists of essentially the same information as that in M2 this provided for posterity a readable version of the shelter file as well as facilitating reconciliation of the subsets of P2 previously sent to the field offices.

The Final PF program was merely a variation of the normal PF program. The only essential difference in the programs was that in the final version no M2' file was created.

There was also a variation in procedure in that for the original version a Processing Unit (a single M1' tape) was the input data unit whereas for the final program the input data units were the tapes of the M1 file taken singly. This was done purely as a matter of operational convenience.

12. SPECIAL OUTPUT FILES

The programs and procedures which have been described in detail were components of the system essential to the accomplishment of the original goals. After these goals had been attained, several other output files were required by OCE.

The Fosdic Schedule Count file was a count of items in M1 by revision number and by state and region.

A standard location file was prepared which contained those Standard Locations on MWO for which no items from M1 existed and those Standard Locations not appearing on MWO for which items from M1 did exist.

A number of special output files were desired which were merely normal outputs from the previously described programs, except that the items for inclusion were some subset of the entire file. To facilitate this type of output a generalized selective copy program was written by use of which almost any specified subset from M1 or M2 could be copied into an intermediate file. This was then used as an M1 or M2 input file for the appropriate program to produce the desired output file. Special files prepared by use of this technique included:

(1) Army Facilities - P9

(2) Navy Facilities - P9

(3) Air Force Facilities - P9

(4) HEW Facilities - P9 (the items were included on a basis of certain combinations of Use Code and Owner Code)

(5) Non-Military Federal Facilities - P9

(6) State or Local Government Facilities - P9

(7) Facilities having a PV (Physical Vulnerability) of 21 or 22 - P9

(8) Basement or Subbasement Shelters - P9

(9) Army Facilities - P2

(10) Navy Facilities - P2

(11) Government Sensitive Facilities - P2

(12) Special Virginia and Maryland Counties - P2

(13) Arizona and California Facilities with Use Code of 44 - P2

13. Charge Procedure

APPENDIX I

Field Office Codes

New England Division
- A1 New England Div
- AA DPWO-1
- AB APWO-NY (1)

North Atlantic Division
- B1 Baltimore Dist
- B2 Buffalo Dist (2)
- B3 Eastern Ocean Dist
- B4 New York Dist
- B5 Norfolk Dist
- B6 Philadelphia Dist
- B7 Pittsburgh Dist
- BA DPWO-4
- BB DPWO-5 (3)
- BC APWO-Chesapeake
- BD APWO-NY (1)

South Atlantic Division
- C1 Charleston Dist
- C2 Jacksonville Dist
- C3 Mobile Dist
- C4 Savannah Dist
- C5 Wilmington Dist
- CA DPWO-5 (3)
- CB SE Div - BuDocks
- CC APWO - Caribbean

Ohio River Division
- D1 Buffalo Dist (2)
- D2 Huntington Dist
- D3 Louisville Dist
- D4 Memphis Dist
- D5 Nashville Dist

North Central Division
- E1 Chicago Dist
- E2 Detroit Dist
- E3 Rock Island Dist
- E4 St Paul Dist
- EA DPWO-9

Missouri River Division
- F1 Kansas City Dist (4)
- F2 Omaha Dist

Southwestern Division
- G1 Alburquerque Dist
- G2 Fort Worth Dist
- G3 Galveston Dist
- G4 Little Rock Dist
- G5 Tulsa Dist
- GA DPWO-8 (5)

North Pacific Division
- H1 Alaska Dist
- H2 Portland Dist
- H3 Seattle Dist
- H4 Walla Walla Dist
- HA NW&A Div - BuDocks

South Pacific Division
- J1 Los Angeles Dist
- J2 Sacramento Dist
- J3 San Francisco Dist
- JA DPWO-12
- JB SW Div - BuDocks

Lower Miss Valley Division
- K1 Kansas City Dist (4)
- K2 New Orleans Dist
- K3 St. Louis Dist
- K4 Vicksburg Dist
- KA DPWO-8 (5)

Pacific Ocean Division
- L1 Pacific Ocean Div
- L2 Honolulu Dist
- LA DPWO-14
- LB Pac Div - BuDocks

APPENDIX I

Use Class Codes

RESIDENTIAL:
- 11 Apartment/Hotel
- 12 Dormitory/Barracks
- 19 Other

EDUCATIONAL:
- 21 Kindergarten/elementary school
- 22 Jr. High/High/Preparatory school
- 23 College/University
- 24 Business/Professional/Industrial school
- 25 Correctional schools
- 26 Library-Museum
- 29 Other

RELIGIOUS:
- 31 Church/Synagogue
- 32 Retreat/Monastery/Convent
- 39 Other

GOV'T and PUBLIC SERVICE:
- 41 Hospital
- 42 Clinic
- 43 Utilities
- 44 Communication facilities
- 45 Offices
- 46 Jails/Prisons/Correctional Institutions
- 47 Armories/monuments/memorials
- 49 Other

COMMERCIAL:
- 51 Offices
- 52 Food Stores
- 53 Stores other than Food Stores
- 54 Warehouses
- 55 Banks/Financial Institutions
- 59 Other

INDUSTRIAL:
- 61 Factory/plant/manufacturing center
- 62 Food processing plants
- 69 Other

AMUSEMENT/MEETINGS:
- 71 Theatre/Auditorium
- 72 Community Center
- 79 Other

TRANSPORTATION:
- 81 Railroad Station/terminal
- 82 Bus Station/terminal
- 83 Airport terminal
- 84 Airport hangars
- 85 Marine Terminal
- 86 Automotive Repair and Storage
- 89 Other

MISCELLANEOUS:
- 99 Categories not covered above

Owner Codes

1 - Federal government
2 - State government
3 - Local government
4 - Private
5 - Other

APPENDIX I

Physical Vulnerability Codes

TYPE OF FACILITY	PV CODES
Quonset type, single-story building	11
Wood-framed buildings	
Single-story or multi-story dwelling	21
Single-story or multi-story commercial or industrial building	22
Wall-bearing buildings	
Single-story dwelling	31
Single-story commercial or industrial	32
Two-story dwelling	34
Two-story commercial or industrial	35
3-5 story buildings	36
6-8 story buildings	37
Multi-story monumental type buildings	38
Steel-framed buildings	
Single-story very light steel frame, industrial or commercial	41
Single-story light steel frame, no cranes or cranes of less than 10 tons, industrial	42
Multi-story, conventional design, commercial	43
Multi-story, light industrial	44
Single-story, industrial with 10-25 ton cranes	45
30-50 ton cranes	46
60-100 ton cranes	47
Over 100 ton cranes	48
Steel-framed multi-story, earthquake resistant	49
Reinforced concrete frame buildings	
Single-story, very light frame, industrial or commercial	51
Single-story, light frame, no cranes or cranes of less than 10 tons, industrial	52
Single-story industrial 10-25 ton cranes	53
30-50 ton cranes	54
60-100 ton cranes	55
Over 100 ton cranes	56
Multi-story, conventional commercial	57
Multi-story, industrial	58
Multi-story, earthquake resistant	59
Multi-story, windowless blast-resistant design	91
Composite framed buildings (structural steel and concrete)	
Single-story, no cranes or cranes of less than 10 tons	61
Single-story, 10-50 ton cranes	62
Tunnels and earth-covered structures	71
Mines and deep underground facilities	81

APPENDIX II

TABLE 1

(Natural logarithms of values are given.)

X_o'	
0	0.
10	-0.844
20	-1.386
30	-1.864
40	-2.303
50	-2.733
60	-3.147
70	-3.576
80	-3.990
90	-4.423
100	-4.804
110	-5.221
120	-5.627
130	-6.032
140	-6.438
150	-6.831
160	-7.236
170	-7.642
180	-8.047
190	-8.422
200	-8.839
210	-9.210

1. For $X_o' > 210$, value = 0.
2. Linear interpolation in X_o' for natural logarithm of value.
3. $\Delta X_o' = 10$.

TABLE 2 (Part 1)

(Natural logarithms of values are given.)

ln A	X_o 0	10	20	30	40	50	60	80	100	120
2.50211	-6.694	-5.735	-6.513	-6.924	-6.452	-6.999	-7.666	-8.007	-8.515	-8.508
2.84867	-6.041	-5.389	-5.994	-6.307	-5.977	-6.386	-6.893	-7.219	-7.676	-7.757
3.19525	-5.459	-5.044	-5.508	-5.744	-5.532	-5.835	-6.219	-6.539	-6.960	-7.116
3.54181	-4.943	-4.703	-5.053	-5.232	-5.116	-5.341	-5.635	-5.956	-6.355	-6.573
3.88839	-4.483	-4.371	-4.631	-4.770	-4.730	-4.900	-5.133	-5.460	-5.848	-6.120
4.23495	-4.075	-4.048	-4.241	-4.354	-4.375	-4.510	-4.703	-5.043	-5.428	-5.744
4.58153	-3.710	-3.739	-3.882	-3.981	-4.050	-4.166	-4.339	-4.694	-5.083	-5.436
4.92809	-3.385	-3.444	-3.554	-3.650	-3.756	-3.866	-4.033	-4.406	-4.805	-5.188
5.27466	-3.092	-3.165	-3.256	-3.356	-3.491	-3.606	-3.779	-4.171	-4.583	-4.991
5.62123	-2.829	-2.904	-2.987	-3.099	-3.256	-3.384	-3.570	-3.982	-4.409	-4.838
5.96780	-2.590	-2.663	-2.748	-2.875	-3.050	-3.195	-3.399	-3.832	-4.275	-4.721
6.31437	-2.372	-2.441	-2.535	-2.682	-2.871	-3.037	-3.263	-3.715	-4.174	-4.634
6.66094	-2.172	-2.240	-2.350	-2.517	-2.719	-2.907	-3.155	-3.626	-4.100	-4.570
7.00751	-1.987	-2.059	-2.189	-2.378	-2.592	-2.802	-3.071	-3.558	-4.046	-4.526
7.35408	-1.815	-1.899	-2.052	-2.263	-2.488	-2.720	-3.007	-3.508	-4.008	-4.496
8.04722	-1.505	-1.639	-1.842	-2.095	-2.345	-2.610	-2.923	-3.446	-3.963	-4.464
8.74036	-1.234	-1.451	-1.708	-1.995	-2.272	-2.557	-2.879	-3.414	-3.937	-4.448
9.43350	-1.005	-1.325	-1.632	-1.945	-2.254	-2.538	-2.848	-3.382	-3.897	-4.423
10.12665	-0.828	-1.243	-1.598	-1.931	-2.254	-2.538	-2.848	-3.382	-3.897	-4.423
10.81979	-0.755	-1.204	-1.575	-1.931	-2.254	-2.538	-2.848	-3.382	-3.897	-4.423
11.51293	-0.693	-1.109	-1.575	-1.931	-2.254	-2.538	-2.848	-3.382	-3.897	-4.423

1. If $X_o > 300$, value = 0.
2. If ln A > 11.51293, use ln A = 11.51293.
3. If ln A < 2.50211, value = 0.
4. Linear interpolation in ln A and X_o for natural logarithm of value.
5. For $0 \leqq X_o \leqq 60$, $\Delta X_o = 10$.
6. For $60 \leqq X_o \leqq 300$, $\Delta X_o = 20$.
7. For $2.50211 \leq \ln A \leqq 7.35408$, $\Delta \ln A = .34657$.
8. For $7.35408 \leqq \ln A \leqq 11.51293$, $\Delta \ln A = .69314$.

TABLE 2 (Part 2)

(Natural logarithms of values are given.)

ln A	X_o 140	160	180	200	220	240	260	280	300
2.50211	-8.895	-9.011	-9.103	-9.932	-9.419	-9.594	-9.936	-10.033	-11.397
2.84867	-8.140	-8.316	-8.499	-9.232	-8.941	-9.177	-9.543	-9.733	-10.813
3.19525	-7.497	-7.727	-7.983	-8.640	-8.530	-8.818	-9.203	-9.468	-10.325
3.54181	-6.957	-7.232	-7.546	-8.142	-8.181	-8.510	-8.911	-9.235	-9.920
3.88839	-6.507	-6.822	-7.179	-7.730	-7.886	-8.249	-8.662	-9.032	-9.591
4.23495	-6.137	-6.485	-6.875	-7.393	-7.641	-8.029	-8.453	-8.857	-9.326
4.58153	-5.836	-6.213	-6.626	-7.120	-7.438	-7.847	-8.279	-8.708	-9.117
4.92809	-5.596	-5.997	-6.425	-6.905	-7.274	-7.698	-8.135	-8.581	-8.957
5.27466	-5.408	-5.828	-6.266	-6.737	-7.144	-7.578	-8.020	-8.476	-8.837
5.62123	-5.264	-5.700	-6.143	-6.610	-7.042	-7.483	-7.928	-8.390	-8.750
5.96780	-5.156	-5.605	-6.051	-6.517	-6.964	-7.410	-7.858	-8.321	-8.691
6.31437	-5.078	-5.536	-5.983	-6.451	-6.907	-7.356	-7.805	-8.267	-8.652
6.66094	-5.023	-5.490	-5.936	-6.407	-6.867	-7.317	-7.766	-8.226	-8.630
7.00751	-4.987	-5.459	-5.904	-6.379	-6.840	-7.291	-7.741	-8.197	-8.623
7.35408	-4.964	-5.441	-5.886	-6.364	-6.823	-7.279	-7.729	-8.181	-8.623
8.04722	-4.944	-5.425	-5.878	-6.354	-6.822	-7.279	-7.729	-8.181	-8.623
8.74036	-4.938	-5.420	-5.878	-6.348	-6.822	-7.279	-7.729	-8.181	-8.623
9.43350	-4.920	-5.404	-5.878	-6.348	-6.822	-7.279	-7.729	-8.181	-8.623
10.12665	-4.920	-5.404	-5.878	-6.348	-6.822	-7.279	-7.729	-8.181	-8.623
10.81979	-4.920	-5.404	-5.878	-6.348	-6.822	-7.279	-7.729	-8.181	-8.623
11.51293	-4.920	-5.404	-5.878	-6.348	-6.822	-7.279	-7.729	-8.181	-8.623

TABLE 3

(Natural logarithms of values are given.)

ln A \ X_e	0	20	40	60	80	100	120	160	200	240	280	320
2.50210	1.511	0.621	-0.106	-0.503	-1.130	-1.638	-2.098	-2.984	-3.877	-4.578	-5.837	-7.234
3.19524	0.631	0.012	-0.556	-0.939	-1.469	-1.939	-2.395	-3.247	-4.117	-4.894	-5.932	-7.037
3.88838	0.113	-0.355	-0.835	-1.210	-1.685	-2.135	-2.589	-3.420	-4.279	-5.103	-6.010	-6.944
4.58152	-0.161	-0.566	-1.008	-1.380	-1.830	-2.271	-2.724	-3.546	-4.399	-5.251	-6.093	-6.942
5.27466	-0.293	-0.691	-1.128	-1.501	-1.945	-2.385	-2.838	-3.659	-4.511	-5.375	-6.197	-7.017
5.96780	-0.364	-0.788	-1.236	-1.614	-2.063	-2.505	-2.960	-3.783	-4.637	-5.506	-6.331	-7.158
6.66094	-0.435	-0.897	-1.363	-1.749	-2.207	-2.654	-3.110	-3.938	-4.795	-5.664	-6.505	-7.351
7.35408	-0.548	-1.048	-1.531	-1.926	-2.392	-2.843	-3.301	-4.134	-4.993	-5.862	-6.720	-7.586
8.04722	-0.725	-1.253	-1.747	-2.152	-2.622	-3.077	-3.537	-4.374	-5.235	-6.104	-6.972	-7.853
8.74036	-0.970	-1.512	-2.011	-2.424	-2.894	-3.351	-3.813	-4.652	-5.514	-6.386	-7.257	-8.140
9.43350	-1.265	-1.811	-2.308	-2.729	-3.197	-3.654	-4.116	-4.957	-5.819	-6.696	-7.562	-8.437
10.12665	-1.576	-2.121	-2.617	-3.039	-3.506	-3.964	-4.427	-5.268	-6.130	-7.013	-7.872	-8.737
10.81979	-1.846	-2.399	-2.902	-3.320	-3.793	-4.252	-4.714	-5.556	-6.419	-7.309	-8.166	-9.029
11.51293	-2.001	-2.587	-3.117	-3.522	-4.017	-4.482	-4.941	-5.786	-6.654	-7.543	-8.420	-9.306
12.20607	-1.945	-2.615	-3.207	-3.588	-4.129	-4.607	-5.062	-5.913	-6.791	-7.673	-8.603	-9.560

1. For $X_e > 320$, value = 0.
2. If ln A < 2.50210, use ln A = 2.50210.
3. If ln A > 12.20607, use ln A = 12.20607.
4. Linear interpolation in X_e and ln A for natural logarithm of value.
5. Δ ln A = .69314.
6. For $0 \leq X_e \leq 120$, $\Delta X_e = 20$.
7. For $120 \leq X_e \leq 320$, $\Delta X_e = 40$.

TABLE 4 (Part 1)

(Natural logarithms of values are given.)

ln A \ X_e	0	10	20	30	40	50	60	80	100	120
2.50210	-6.193	-5.816	-5.660	-5.809	-6.034	-6.404	-6.667	-6.882	-7.208	-9.103
3.19524	-5.736	-5.224	-4.972	-5.092	-5.258	-5.500	-5.702	-5.994	-6.356	-7.684
3.88838	-5.281	-4.694	-4.385	-4.484	-4.609	-4.769	-4.932	-5.274	-5.657	-6.586
4.58152	-4.844	-4.229	-3.896	-3.979	-4.080	-4.195	-4.336	-4.705	-5.100	-5.767
5.27466	-4.436	-3.831	-3.500	-3.572	-3.661	-3.759	-3.893	-4.274	-4.671	-5.186
5.96780	-4.072	-3.502	-3.192	-3.260	-3.347	-3.446	-3.582	-3.963	-4.359	-4.804
6.66094	-3.763	-3.245	-2.967	-3.037	-3.129	-3.239	-3.381	-3.759	-4.152	-4.578
7.35408	-3.524	-3.063	-2.822	-2.898	-2.998	-3.121	-3.269	-3.644	-4.036	-4.469
8.04722	-3.367	-2.957	-2.751	-2.840	-2.949	-3.074	-3.225	-3.604	-3.999	-4.435
8.74036	-3.296	-2.930	-2.754	-2.855	-2.970	-3.094	-3.245	-3.633	-4.028	-4.458
9.43350	-3.263	-2.970	-2.841	-2.949	-3.070	-3.197	-3.351	-3.735	-4.134	-4.621
10.12665	-3.331	-3.103	-3.014	-3.129	-3.254	-3.384	-3.538	-3.919	-4.322	-4.867
10.81979	-3.561	-3.354	-3.280	-3.400	-3.529	-3.656	-3.809	-4.194	-4.596	-5.146
11.51293	-4.014	-3.752	-3.644	-3.769	-3.897	-4.015	-4.167	-4.572	-4.959	-5.410
12.20607	-4.748	-4.321	-4.115	-4.241	-4.365	-4.464	-4.613	-5.064	-5.415	-5.611

1. For $X_e > 300$, value = 0.
2. For ln A < 2.50210, value = 0.
3. For ln A > 12.20607, value = 0.
4. Linear interpolation in X_e and ln A for natural logarithm of value.
5. Δ ln A = .69314.
6. For $0 \leq X_e \leq 60$, $\Delta X_e = 10$.
7. For $60 \leq X_e \leq 300$, $\Delta X_e = 20$.

TABLE 4 (Part 2)

(Natural logarithms of values are given.)

ln A	X_e 140	160	180	200	220	240	260	280	300
2.50210	-9.429	-9.585	-9.256	-9.413	-10.437	-11.274	-12.261	-12.319	-12.690
3.19524	-8.072	-8.348	-8.322	-8.578	-9.322	-9.980	-10.749	-10.998	-11.731
3.88838	-7.006	-7.359	-7.543	-7.869	-8.431	-8.967	-9.577	-9.946	-10.880
4.58152	-6.196	-6.591	-6.909	-7.282	-7.739	-8.201	-8.703	-9.137	-10.145
5.27466	-5.609	-6.021	-6.411	-6.812	-7.223	-7.648	-8.084	-8.539	-9.532
5.96780	-5.211	-5.622	-6.040	-6.455	-6.860	-7.274	-7.675	-8.126	-9.049
6.66094	-4.967	-5.369	-5.788	-6.206	-6.627	-7.044	-7.435	-7.867	-8.701
7.35408	-4.845	-5.236	-5.644	-6.061	-6.500	-6.925	-7.320	-7.736	-8.495
8.04722	-4.810	-5.199	-5.601	-6.016	-6.455	-6.883	-7.287	-7.702	-8.439
8.74036	-4.854	-5.251	-5.645	-6.051	-6.479	-6.906	-7.319	-7.754	-8.522
9.43350	-4.982	-5.360	-5.749	-6.165	-6.637	-7.079	-7.424	-7.875	-8.649
10.12665	-5.191	-5.549	-5.938	-6.367	-6.884	-7.340	-7.613	-8.067	-8.793
10.81979	-5.490	-5.855	-6.228	-6.650	-7.180	-7.640	-7.902	-8.335	-8.948
11.51293	-5.890	-6.317	-6.637	-7.012	-7.485	-7.930	-8.335	-8.740	-9.210
12.20607	-6.401	-6.970	-7.179	-7.446	-7.756	-8.161	-8.908	-9.251	-9.510

TABLE 5

(Natural logarithms of values are given.)

X ln H	0	50	100	150	200	250	300
1.09864	0.	0.	0.	0.	0.	0.	0.
1.90336	-0.193	-0.164	-0.184	-0.170	-0.208	-0.218	-0.240
2.70808	-0.364	-0.354	-0.388	-0.395	-0.431	-0.454	-0.481
3.51280	-0.566	-0.611	-0.657	-0.701	-0.722	-0.756	-0.780
4.31752	-0.855	-0.977	-1.038	-1.111	-1.131	-1.178	-1.195
4.66409	-1.019	-1.179	-1.247	-1.325	-1.356	-1.408	-1.425
5.01066	-1.215	-1.418	-1.487	-1.568	-1.615	-1.655	-1.675
5.35723	-1.426	-1.682	-1.763	-1.833	-1.914	-1.973	-1.999
5.70380	-1.695	-1.995	-2.094	-2.148	-2.269	-2.350	-2.383
6.05037	-2.043	-2.375	-2.491	-2.531	-2.690	-2.794	-2.834
6.39694	-2.490	-2.836	-2.971	-3.002	-3.189	-3.311	-3.360
6.74351	-3.058	-3.394	-3.545	-3.578	-3.777	-3.907	-3.967
7.09008	-3.768	-4.065	-4.228	-4.279	-4.466	-4.588	-4.661
7.43665	-4.641	-4.864	-5.033	-5.123	-5.266	-5.360	-5.448
7.78322	-5.699	-5.808	-5.974	-6.128	-6.190	-6.230	-6.337

1. If $X > 300$, use $X = 300$.
2. For $\ln H > 7.78322$, value = 0.
3. Linear interpolation in X and ln H for natural logarithm of value.
4. $\Delta X = 50$.
5. For $1.09864 \leq \ln H \leq 4.31752$, $\Delta \ln H = .80472$.
6. For $4.31752 \leqq \ln H \leqq 7.78322$, $\Delta \ln H = .34657$.

TABLE 6

X	W_c/H 0.	0.2	0.4	0.6	0.8	1.0	1.5	2.0	2.5	5.0	7.5	10.0
0	0.	0.00310	0.01430	0.03130	0.0521	0.0720	0.128	0.172	0.195	0.290	0.339	0.415
6	0.	0.00150	0.00870	0.02110	0.0375	0.0540	0.108	0.150	0.165	0.258	0.314	0.395
12	0.	0.00042	0.00460	0.01410	0.0274	0.0430	0.089	0.126	0.140	0.230	0.295	0.375
18	0.	0.00019	0.00300	0.01050	0.0224	0.0380	0.084	0.120	0.131	0.225	0.292	0.363
24	0.	0.00017	0.00270	0.00990	0.0214	0.0360	0.080	0.116	0.125	0.220	0.289	0.355
48	0.	0.00009	0.00130	0.00550	0.0137	0.0240	0.063	0.097	0.110	0.205	0.286	0.340
72	0.	0.00006	0.00087	0.00430	0.0105	0.0200	0.051	0.085	0.099	0.198	0.286	0.331
96	0.	0.00004	0.00055	0.00270	0.0076	0.0156	0.046	0.077	0.094	0.195	0.285	0.325
120	0.	0.00003	0.00036	0.00220	0.0057	0.0124	0.036	0.071	0.092	0.190	0.280	0.320
144	0.	0.00002	0.00028	0.00140	0.0045	0.0100	0.033	0.061	0.084	0.180	0.273	0.310
168	0.	0.	0.00018	0.00120	0.0036	0.0085	0.029	0.055	0.078	0.167	0.262	0.301
192	0.	0.	0.00012	0.00090	0.0030	0.0072	0.026	0.051	0.074	0.160	0.253	0.295
216	0.	0.	0.	0.00070	0.0025	0.0058	0.024	0.047	0.068	0.158	0.249	0.285
240	0.	0.	0.	0.00053	0.0020	0.0049	0.022	0.043	0.063	0.155	0.246	0.280
264	0.	0.	0.	0.00023	0.0016	0.0039	0.020	0.040	0.060	0.150	0.240	0.273
288	0.	0.	0.	0.	0.0011	0.0034	0.018	0.037	0.053	0.145	0.236	0.265
312	0.	0.	0.	0.	0.0008	0.0025	0.012	0.032	0.046	0.138	0.231	0.257

1. If $X > 312$, use $X = 312$.
2. Linear interpolation in X and W_c/H for value.
3. For $0 \leqq X \leqq 24$, $\Delta X = 6$.
4. For $24 \leqq X \leqq 312$, $\Delta X = 24$.
5. For $0 \leqq W_c/H \leqq 1$, $\Delta W_c/H = .2$.
6. For $1 \leqq W_c/H \leqq 2.5$, $\Delta W_c/H = .5$.
7. For $2.5 \leqq W_c/H \leqq 10$, $\Delta W_c/H = 2.5$.

APPENDIX II

TABLE 7

X_0	Skyshine Correction
0	1.15
50	1.08
100	1.04
200	1.01
400	1.00

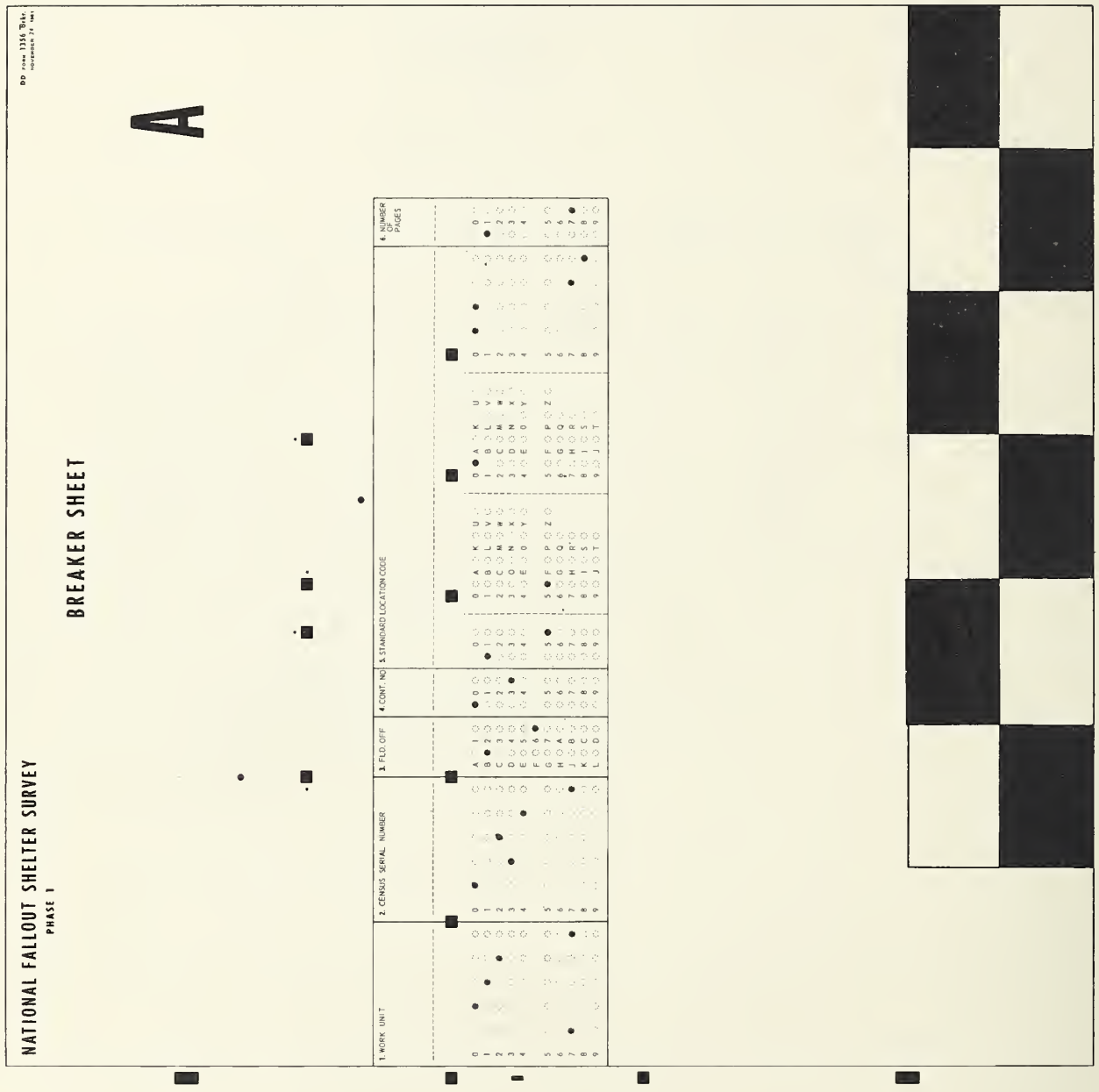
1. If $X_0 > 400$, use $X_0 = 400$.
2. Linear interpolation.

TABLE 8

XI	0	10	20	30	40	50	60
NFLOOR							
1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2	.7	.8	.8	.9	.9	.9	.9
3	.6	.7	.8	.8	.8	.9	.9
4	.5	.6	.7	.8	.8	.8	.9
5	.4	.6	.7	.7	.8	.8	.8
6	.3	.4	.5	.6	.7	.7	.8

1. No interpolation or extrapolation is used.

F1 BREAKER SHEET FROM BOOK OF FOSDIC SCHEDULES



F2 FRONT SIDE OF FOSDIC SCHEDULE

DD Form 1356
1 NOVEMBER 1961
23.3-1

NATIONAL FALLOUT SHELTER SURVEY
PHASE 1

1. PAGE NO. 02

2. NAME AND ADDRESS OF BUILDING (Abbreviate to fit in 50 spaces. Please print.)
40 PASSAIC ST HACKENSACK

3. STANDARD LOCATION CODE 1551 0078

(Print and mark data for items 4 through 8)

4. FLO. OFF.	5. CONT. NO.	6. FACILITY NO.	7. PART NO.	8. REV. NO.	9. NUMBER BUILDING PARTS	10. STORIES (IN THIS PART)	11. YEAR BUILT	12. PHYS. VULN.	13. USE CLASS	14. OWN. CODE	15. SUB-BASEMENTS (In this part)	16. NUMBER SETBACKS (In this part)
A 1												
B ● 2												
C 3												
D 4												
E 5												
F 6 ●												
G 7												
H A												
J B												
K C												
L D												

Make no mark in this margin

17. AREA DIMENSIONS (In feet)

ITEM		LENGTH "A"	LENGTH "B"
EXTERIOR WALLS	"A"	Hun. Tens Units	Hun. Tens Units
	"B"		
CORE	FIRST STORY	Hun. Tens Units	Hun. Tens Units
	UPPER STORIES	Hun. Tens Units	Hun. Tens Units
BASEMENT (Percent usable)		Per cent	

18. HEIGHTS (In feet)

ITEM	HEIGHT
TOTAL BUILDING	Hun. Tens Units
BASEMENT	Hun. Tens Units
FIRST STORY	Hun. Tens Units
UPPER STORIES	Hun. Tens Units

19. ROOF AND SETBACK LOCATION

ITEM		DISTANCE TO EDGE OF ROOF FROM SIDE "A" (Mark in tens of feet)	DISTANCE TO EDGE OF ROOF FROM SIDE "B" (Mark in tens of feet)	DISTANCE TO EDGE OF ROOF FROM SIDE "C" (Mark in tens of feet)	DISTANCE TO EDGE OF ROOF FROM SIDE "D" (Mark in tens of feet)
ROOF		Hun. Tens	Hun. Tens	Hun. Tens	Hun. Tens
	HEIGHT AT WHICH SETBACK BEGINS	DISTANCE TO FACE FROM SIDE "A" (Mark in tens of feet)	DISTANCE TO FACE FROM SIDE "B" (Mark in tens of feet)	DISTANCE TO FACE FROM SIDE "C" (Mark in tens of feet)	DISTANCE TO FACE FROM SIDE "D" (Mark in tens of feet)
SETBACK NO. 1	Hun. Tens Units	Hun. Tens	Hun. Tens	Hun. Tens	Hun. Tens
SETBACK NO. 2	Hun. Tens Units	Hun. Tens	Hun. Tens	Hun. Tens	Hun. Tens
SETBACK NO 3	Hun. Tens Units	Hun. Tens	Hun. Tens	Hun. Tens	Hun. Tens

Make no mark in this margin

20. CONTAMINATED PLANES

ITEM		SIDE "A"	SIDE "B"	SIDE "C"	SIDE "D"
PLANE 1	EFFECTIVE HEIGHT (In feet)	Above / Below; Hun. Tens Units	Above / Below; Hun. Tens Units	Above / Below; Hun. Tens Units	Above / Below; Hun. Tens Units
	WIDTH OF PLANE (Tens of feet)	Hun. Tens	Hun. Tens	Hun. Tens	Hun. Tens
PLANE 2	EFFECTIVE HEIGHT (In feet)	Above / Below; Hun. Tens Units	Above / Below; Hun. Tens Units	Above / Below; Hun. Tens Units	Above / Below; Hun. Tens Units
	WIDTH OF PLANE (Tens of feet)	Hun. Tens	Hun. Tens	Hun. Tens	Hun. Tens
PLANE 3	EFFECTIVE HEIGHT (In feet)	Above / Below; Hun. Tens Units	Above / Below; Hun. Tens Units	Above / Below; Hun. Tens Units	Above / Below; Hun. Tens Units
	WIDTH OF PLANE (Tens of feet)	Hun. Tens	Hun. Tens	Hun. Tens	Hun. Tens

F2 BACK SIDE OF FOSDIC SCHEDULE

NOTES

SIGNATURE	DATE	
		A
		B
		C
		D
		E
		F
		G
		H

Make no mark in this margin

21. SURVEY METHOD CODE .....

22. FLOOR AND ROOF DESCRIPTION PSF	BASEMENT FLOOR	FIRST FLOOR	UPPER FLOORS	ROOF
	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens

23. STRUCTURE DETAIL

	ITEM	SIDE "A"	SIDE "B"	SIDE "C"	SIDE "D"
BASEMENT	EXTERIOR WALLS PSF	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens
	CEILING HEIGHT ABOVE GRADE (Feet)				
	APERTURES (In exterior walls) *(Estimate percentage of open area and mark both numerals at nearest 10%)*	Per-cent	Per-cent	Per-cent	Per-cent
	INTERIOR WALLS PSF	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens
FIRST STORY	EXTERIOR WALLS PSF	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens
	APERTURES (In exterior walls) *(Estimate percentage of open area and mark both numerals at nearest 10%)*	Per-cent	Per-cent	Per-cent	Per-cent
	INTERIOR WALLS PSF	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens
UPPER STORIES	EXTERIOR WALLS PSF	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens
	APERTURES (In exterior walls) *(Estimate percentage of open area and mark both numerals at nearest 10%)*	Per-cent	Per-cent	Per-cent	Per-cent
	INTERIOR WALLS PSF	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens
	IF THE WALL CONSTRUCTION CHANGES IN THE UPPER STORIES *(Mark story at which change begins)* *(DESCRIBE SECOND TYPE OF CONSTRUCTION BELOW)*	*IF NO CHANGE, MARK HERE* ..... STORY NUMBER Tens Units	*IF NO CHANGE, MARK HERE* ..... STORY NUMBER Tens Units	*IF NO CHANGE, MARK HERE* ..... STORY NUMBER Tens Units	*IF NO CHANGE, MARK HERE* ..... STORY NUMBER Tens Units
	EXTERIOR WALLS PSF	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens
	APERTURES (In exterior walls) *(Estimate percentage of open area and mark both numerals at nearest 10%)*	Per-cent	Per-cent	Per-cent	Per-cent
	INTERIOR WALLS PSF	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens	PSF Hun. Tens

Make no mark in this margin

FOSDIC SCHEDULE ITEM REFERENCE (FRONT)

DD FORM 1356, 1 NOVEMBER, 1961

23.3:1

NATIONAL FALLOUT SHELTER SURVEY

PHASE 1

1. PAGE NO.: T T

2. NAME AND ADDRESS OF BUILDING (Abbreviate to fit in 50 spaces. Please print.)

s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s s

3. STANDARD LOCATION CODE: a a a a b b b b

(Print and mark data for items 4 through 8)

4. FLD. OFF	5. CONT. NO.	6. FACILITY NO.	7. PART NO.	8. REV. NO.	9. NUMBER BUILDING PARTS	10. STORIES (IN THIS PART)	11. YEAR BUILT	12. PHYS. VULN.	13. USE CLASS	14. OWN CODE	15. SUB-BASEMENTS (In this part)	16. NUMBER SETBACKS (In this part)
c c	d d	e e e e e	f f	g	i i	j j	k k k k	l l	m m	n	o	p

A 1, B 2, C 3, D 4, E 5, F 6, G 7, H A, J B, K C, L D

Make no mark in this margin

17. AREA DIMENSIONS (In feet)

ITEM			LENGTH "A"	LENGTH "B"
EXTERIOR WALLS	"A"	"B"	Hun. Tens Units 17a	Hun. Tens Units 17b
CORE	FIRST STORY		Hun. Tens Units 17c	Hun. Tens Units 17d
CORE	UPPER STORIES		Hun. Tens Units 17e	Hun. Tens Units 17f
BASEMENT (Percent usable)			Per-cent 17g	

18. HEIGHTS (In feet)

ITEM	HEIGHT
TOTAL BUILDING	Hun. Tens Units 18a
BASEMENT	Hun. Tens Units 18b
FIRST STORY	Hun. Tens Units 18c
UPPER STORIES	Hun. Tens Units 18d

19. ROOF AND SETBACK LOCATION

ITEM		DISTANCE TO EDGE OF ROOF FROM SIDE "A" (Mark in tens of feet)	DISTANCE TO EDGE OF ROOF FROM SIDE "B" (Mark in tens of feet)	DISTANCE TO EDGE OF ROOF FROM SIDE "C" (Mark in tens of feet)	DISTANCE TO EDGE OF ROOF FROM SIDE "D" (Mark in tens of feet)
ROOF		Hun. Tens 19a	Hun. Tens 19b	Hun. Tens 19c	Hun. Tens 19d
	HEIGHT AT WHICH SETBACK BEGINS	DISTANCE TO FACE FROM SIDE "A" (Mark in tens of feet)	DISTANCE TO FACE FROM SIDE "B" (Mark in tens of feet)	DISTANCE TO FACE FROM SIDE "C" (Mark in tens of feet)	DISTANCE TO FACE FROM SIDE "D" (Mark in tens of feet)
SETBACK NO. 1	Hun. Tens Units 19e	Hun. Tens 19f	Hun. Tens 19g	Hun. Tens 19h	Hun. Tens 19i
SETBACK NO. 2	Hun. Tens Units 19j	Hun. Tens 19k	Hun. Tens 19l	Hun. Tens 19m	Hun. Tens 19n
SETBACK NO. 3	Hun. Tens Units 19o	Hun. Tens 19p	Hun. Tens 19q	Hun. Tens 19r	Hun. Tens 19s

20. CONTAMINATED PLANES

ITEM		SIDE "A"	SIDE "B"	SIDE "C"	SIDE "D"
PLANE 1	EFFECTIVE HEIGHT (In feet)	Above / Below; Hun. Tens Units 20a	Above / Below; Hun. Tens Units 20b	Above / Below; Hun. Tens Units 20c	Above / Below; Hun. Tens Units 20d
PLANE 1	WIDTH OF PLANE (Tens of feet)	Hun. Tens 20e	Hun. Tens 20f	Hun. Tens 20g	Hun. Tens 20h
PLANE 2	EFFECTIVE HEIGHT (In feet)	Above / Below; Hun. Tens Units 20i	Above / Below; Hun. Tens Units 20j	Above / Below; Hun. Tens Units 20k	Above / Below; Hun. Tens Units 20l
PLANE 2	WIDTH OF PLANE (Tens of feet)	Hun. Tens 20m	Hun. Tens 20n	Hun. Tens 20o	Hun. Tens 20p
PLANE 3	EFFECTIVE HEIGHT (In feet)	Above / Below; Hun. Tens Units 20q	Above / Below; Hun. Tens Units 20r	Above / Below; Hun. Tens Units 20s	Above / Below; Hun. Tens Units 20t
PLANE 3	WIDTH OF PLANE (Tens of feet)	Hun. Tens 20u	Hun. Tens 20v	Hun. Tens 20w	Hun. Tens 20x

Make no mark in this margin

NOTES

24.

SIGNATURE	DATE	
		A
		B
		C
		D
		E
		F
		G
		H

Make no mark in this margin

21. SURVEY METHOD CODE .....

22. FLOOR AND ROOF DESCRIPTION

	BASEMENT FLOOR	FIRST FLOOR	UPPER FLOORS	ROOF
PSF Hun. Tens	22a	22b	22c	22d

23. STRUCTURE DETAIL

	ITEM	SIDE "A"	SIDE "B"	SIDE "C"	SIDE "D"
BASEMENT	EXTERIOR WALLS PSF	PSF Hun. Tens 23a	PSF Hun. Tens 23b	PSF Hun. Tens 23c	PSF Hun. Tens 23d
	CEILING HEIGHT ABOVE GRADE (Feet)	23e	23f	23g	23h
	APERTURES (In exterior walls) *(Estimate percentage of open area and mark both numerals at nearest 10%)*	Percent 23i	Percent 23j	Percent 23k	Percent 23l
	INTERIOR WALLS PSF	PSF Hun. Tens 23m	PSF Hun. Tens 23n	PSF Hun. Tens 23o	PSF Hun. Tens 23p
FIRST STORY	EXTERIOR WALLS PSF	PSF Hun. Tens 23q	PSF Hun. Tens 23r	PSF Hun. Tens 23s	PSF Hun. Tens 23t
	APERTURES (In exterior walls) *(Estimate percentage of open area and mark both numerals at nearest 10%)*	Percent 23u	Percent 23v	Percent 23w	Percent 23x
	INTERIOR WALLS PSF	PSF Hun. Tens 23y	PSF Hun. Tens 23z	PSF Hun. Tens 23ā	PSF Hun. Tens 23b̄
UPPER STORIES	EXTERIOR WALLS PSF	PSF Hun. Tens 23c̄	PSF Hun. Tens 23d̄	PSF Hun. Tens 23ē	PSF Hun. Tens 23f̄
	APERTURES (In exterior walls) *(Estimate percentage of open area and mark both numerals at nearest 10%)*	Percent 23ḡ	Percent 23h̄	Percent 23ī	Percent 23j̄
	INTERIOR WALLS PSF	PSF Hun. Tens 23k̄	PSF Hun. Tens 23l̄	PSF Hun. Tens 23m̄	PSF Hun. Tens 23n̄
	IF THE WALL CONSTRUCTION CHANGES IN THE UPPER STORIES *(Mark story at which change begins)* *(DESCRIBE SECOND TYPE OF CONSTRUCTION BELOW)*	*IF NO CHANGE, MARK HERE* ..... STORY NUMBER Tens Units 23ō	*IF NO CHANGE, MARK HERE* ..... STORY NUMBER Tens Units 23p̄	*IF NO CHANGE, MARK HERE* ..... STORY NUMBER Tens Units 23q̄	*IF NO CHANGE, MARK HERE* ..... STORY NUMBER Tens Units 23r̄
	EXTERIOR WALLS PSF	PSF Hun. Tens 23s̄	PSF Hun. Tens 23t̄	PSF Hun. Tens 23ū	PSF Hun. Tens 23v̄
	APERTURES (In exterior walls) *(Estimate percentage of open area and mark both numerals at nearest 10%)*	Percent 23w̄	Percent 23x̄	Percent 23ȳ	Percent 23z̄
	INTERIOR WALLS PSF	PSF Hun. Tens 23ā	PSF Hun. Tens 23b̄	PSF Hun. Tens 23c̄	PSF Hun. Tens 23d̄

Make no mark in this margin

C1 SAMPLE FILE

```
150C0C0C000-   NEW JERSEY                    NJ
151C0C0C000-  *ALLENTCWN-BETHLEHEM-EASTON == NEW JERSEY PART
151100C0000-    WARREN COUNTY, N.J.
151100010000    ALLAMUCHY TWP                        R= 4075
151100C20000    ALPHA BCROUCH                        R= 2406
151100030000    BELVICERE TOWN                       R= 4468
151100040000    BLAIRSTOWN TWP                       R= 4517
151100050000    FRANKLIN TWP                         R= 4784
152C0C0C000-  *ATLANTIC CITY, N.J.
152100C0000-    ATLANTIC COUNTY, N.J.
152100010000    TRACT 1  ATLANTIC CITY CITY          R= 2061
152100020000    TRACT 2  ATLANTIC CITY CITY          R= 2559
152100030000    TRACT 3  ATLANTIC CITY CITY          R= 3128
152100040000    TRACT 4  ATLANTIC CITY CITY          R= 2881
152100050000    TRACT 5  ATLANTIC CITY CITY          R= 2833
152100060000    TRACT 6  ATLANTIC CITY CITY          R= 3166
152100070000    TRACT 7  ATLANTIC CITY CITY          R= 2200
155000000000-  *PATERSON-CLIFTON-PASSAIC, N.J.
155100C0000-    BERGEN COUNTY, N.J.
155100010000    TRACT AN-1 ALPINE BORC               R= 7095
155100020000    TR RO-2 HARRINGTON PARK BORO         R= 5911
155100030000    TRACT RV-3 RIVER VALE TWP            R= 5616
155100770000    TRACT BO-77 BOGOTA BORO              R= 7965
155100780000    TRACT HA-78 HACKENSACK CITY          R= 2546
155100790000    TRACT HA-79 HACKENSACK CITY          R= 4652
155100800000    TRACT HA-80 HACKENSACK CITY          R= 4955
155100810000    TRACT HA-81 HACKENSACK CITY          R= 5664
155100820000    TRACT HA-82 HACKENSACK CITY          R= 5749
155100830000    TRACT HA-83 HACKENSACK CITY          R= 6955
155200C0000-    PASSAIC COUNTY, N.J.
155200010000    TRACT CL 42 CLIFTON CITY             R= 8332
155200020000    TRACT CL 43-A CLIFTON CITY           R= 8894
155200030000    TRACT CL 43-B CLIFTON CITY           R=14074
155200040000    TRACT CL 44-A CLIFTON CITY           R= 7400
155200050000    TRACT CL 44-B CLIFTON CITY           R= 4296
155200060000    TRACT CL 45 CLIFTON CITY             R= 5137
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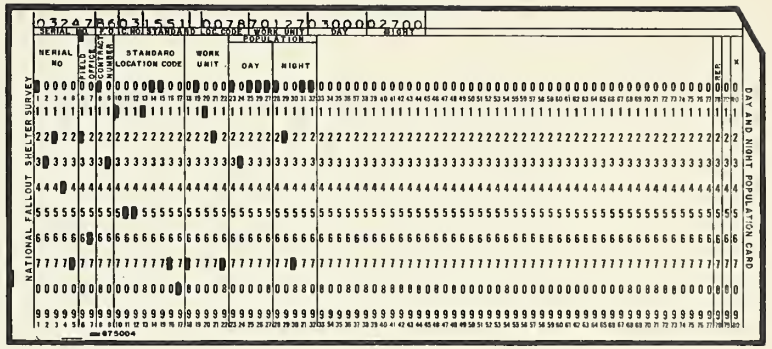
C2 SAMPLE CARD

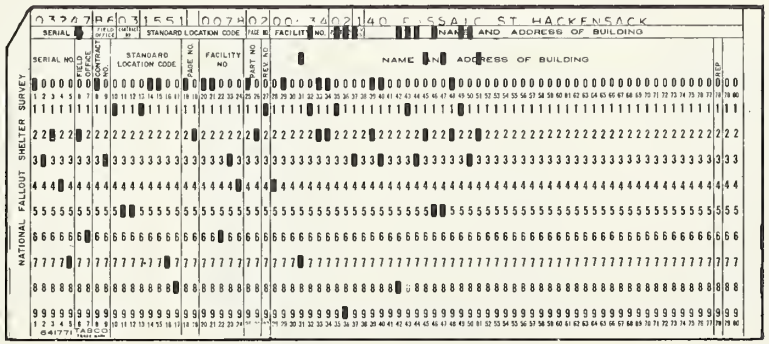


LEGEND FOR SCHEOULE
ITEMS OTHER THAN
17 THROUTH 23

a	OCDM Code
b	Census Code
c	Field Office
d	Contract Code
e	Facility Number
f	Part Number
g	Revision Number
i	Number of Parts
j	Number of Stories
k	Year Built
l	Physical Vulnerability
m	Use Code
n	Owner Code
o	Number of Subbasements
p	Number of Setbacks
q	Serial Number
r	Page Number
s	Facility Name
t	Census Processing Unit
u	Rep (Census Use Only

C4 FORMAT AND EXAMPLE CARO

0	1	2	3	4	5	6	7	8	9	10	11	12	13
123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456
qqqqq	ccddaaaabbbbrreeeeeffg	sssssssssssssssssssssssssssssssssssssssssssssssssssu											



C3 FORMAT AND EXAMPLE LISTING

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456
aaaabbbb0000	ccddeeeeeffgiiijjkkkkll	17a	17c	17e	17g	17b	17d	17f	18a	18b	18c	18d	19e	19j	19o	19k	19p	19l	19q

20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456
20i	20w	20q	20w	20b	20f	20j	20w	20r	20w	20c	20y	20k	20w	20s	20w	20d	20h	20l	20p

40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456
23q	23y	23r	23z	23a	23k	23i	23b	23m	23x	23t	23g	23c	23f	23v	99999	TT	Work Unit		ABCDEF

```
1551007800000B6030063402103040912360045000000000900000000005000001401 2---------00----------------------------------000004
0036090022100000060060040022100000020034140015120050040000030022191140000--------7----0504----0-------0------0------0--00
1210001210001220001220001210001210001210001210000-----0--0-----0--0-----0--0-----0--003247     02 701272001770000000ABCDEF
```

APPENDIX III

AS RECEIVED AT NBS

FORM CD-121 (9-22-59)

UNITED STATES GOVERNMENT

Memorandum

TO Mr. Peter O'Hara
National Bureau of Standards

DATE: Feb. 6, 1962

FROM Decennial Operations Branch
Jeffersonville, Indiana

SUBJECT: NFSS - PHASE I

Delete from your records the following schedule(s).

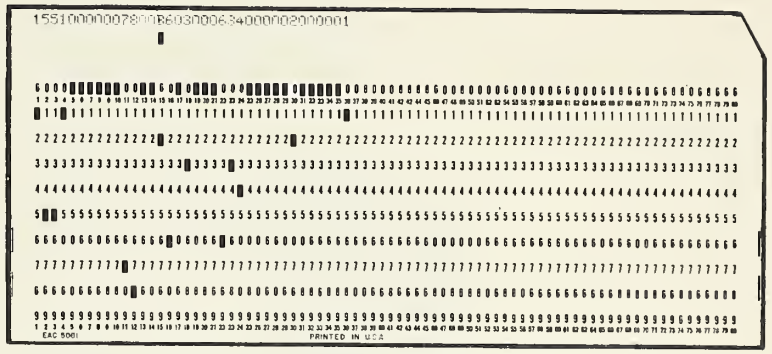
Field Office B6 Work Unit 70127 Census Book No. 03247

Contract Code 03 Standard Location 15510078

Facility No. 00634 Part No. 02 Rev. No. 1

This is as a result of a notification from the Field Office that the above submission(s) had an identification error. This notice to delete will remove the incorrectly identified schedule from the system. Jeffersonville will correct the error(s) and re-enter the schedule into the system.

CARD AS PREPARED FOR PROCESSING



Col 32 "0" if normal
"C" if correction

APPENDIX III

M1 FORMAT

WORD		
	0	aaaabb
	1	bbccdd
	2	eeeeef
	3	fgOOii
	4	jjkkkk
	5	llmmno
	6	p qqqq
	7	q rrss
	8	ssssss
	9	ssssss
	10	ssssss
	11	ssssss
	12	ssssss
	13	ssssss
	14	ssssss
	15	ssssss
	16	tttttt

Bit		1111111111222222222233333
Pos		S12345678901234567890123456789012345
17		17a | 17b | 17c
18		17d | 17e | 17f
19		18a | 18b | 18c
20		18d | 19e | 19j
21		19o | ± 20a | ± 20b
22		± 20c | ± 20d | ± 20i
23		± 20j | ± 20k | ± 20l
24		± 20q | ± 20r | ± 20s
25		± 20t | Not Used | mm (BCD)
26	+	19a | 19b | 19c | 19d | 19f
27	+	19g | 19h | 19i | 19k | 19l
28	+	19m | 19n | 19p | 19q | 19r
29	+	19s | 20e | 20f | 20g | 20h
30	+	20m | 20n | 20o | 20p | 20u
31	+	20v | 20w | 20x | 22a | 22b
32	+	22c | 22d | 23a | 23b | 23c
33	+	23d | 23m | 23n | 23o | 23p
34	+	23q | 23r | 23s | 23t | 23y
35	+	23z | 23ā | 23b̄ | 23c̄ | 23d̄
36	+	23ē | 23f̄ | 23k̄ | 23l̄ | 23m̄
37	+	23n̄ | 23ō | 23p̄ | 23q̄ | 23r̄
38	+	23s̄ | 23t̄ | 23ū | 23v̄ | 23w̄
39	+	23b̄ | 23c̄ | 23d̄ | jjjjjj | mmmmmm
40		17g | 24a | 24b | 24c | 24d | 24e | 24f | 24g | 24h
41		21 | 23e | 23f | 23g | 23h | 23i | 23j | 23k | 23l
42		23u | 23v | 23w | 23x | 23ḡ | 23h̄ | 23ī | 23j̄ | 23w̄
43		23x̄ | 23ȳ | 23z̄ | nnnn | oooo | pppp | Not Used
44		CPSORUWCFPNSYVNSEHSDC789012BFUS

LEGEND FOR FIELDS COMPUTED BY PF CALCULATION

π	Height of Story
α	Story Number
β	Side A contribution
γ	Side B contribution
δ	Side C contribution
ϵ	Side D contribution
η	Ceiling contribution
θ	Protection Factor
λ	Core Area
μ	.1 × Floor Area

M2 FORMAT

WORD		
	0	aaaabb
	1	bbccdd
	2	eeeeef

Bit		1111111111222222222233333
Pos		S12345678901234567890123456789012345
3		f_2(BCD) | g | π | m | ± α
4		β | γ
5		δ | ϵ
6		η | θ
7		λ | n | μ

SINCE THESE FILES ARE BINARY NO EXAMPLES ARE SHOWN

11 yrs owned

```
000002000000   TITLE CAROS FOR W OLIVER TAPE. TYPE 1.  JAN 30,62
000002000000  OETAIL CAROS FOR W. OLIVER TAPE  TYPE 2
15CC0C0C000-   NEW JERSEY              NJ
151C000C000-  *ALLENTOWN-8ETHLEHEM-EASTON == NEW JERSEY PART
151I0C0C000-    WARREN COUNTY, N.J.
15110C010000    ALLAMUCHY TWP                    R= 4075   0AY= 5050 NIGHT= 4970
15110C020000    ALPHA 80ROUGH                    R= 2406   0AY= 2750 NIGHT= 2530
15110C030000    8ELVIDERE TOWN                   R= 4468   0AY= 5510 NIGHT= 5410
15110C040000    8LAIRSTOWN TWP                   R= 4517   0AY= 8430 NIGHT= 8180
15110C050000    FRANKLIN TWP                     R= 4784   0AY= 5790 NIGHT= 5420

152C0C0C000-  *ATLANTIC CITY, N.J.
15210C0C000-    ATLANTIC COUNTY, N.J.
152100010000    TRACT 1  ATLANTIC CITY CITY      R= 2061   0AY=16000 NIGHT= 2061
152100020000    TRACT 2  ATLANTIC CITY CITY      R= 2559   0AY=20000 NIGHT= 2559
15210C030000    TRACT 3  ATLANTIC CITY CITY      R= 3128   0AY=25000 NIGHT= 3128
152100040000    TRACT 4  ATLANTIC CITY CITY      R= 2881   0AY=24000 NIGHT= 2881
152100050000    TRACT 5  ATLANTIC CITY CITY      R= 2833   0AY=24000 NIGHT= 2833
152100060000    TRACT 6  ATLANTIC CITY CITY      R= 3166   0AY=25000 NIGHT= 3166
15210C070000    TRACT 7  ATLANTIC CITY CITY      R= 2200   0AY=17000 NIGHT= 2200
1550000C000-  *PATERSCN-CLIFTON-PASSAIC, N.J.

1551C0C0C0C-    8ERGEN COUNTY, N.J.
155100010000    TRACT AN-1 ALPINE 8CRO           R= 7095   0AY= 8100 NIGHT= 8100
155100020000    TR H0-2 HARRINGTON PARK 80RO     R= 5911   0AY= 5100 NIGHT= 6400
155100030000    TRACT RV-3 RIVER VALE TWP        R= 5616   0AY= 5800 NIGHT= 6500
1551C0770000    TRACT 80-77 80GOTA 80RO          R= 7965   0AY= 9000 NIGHT= 9000
155100780000    TRACT HA-78 HACKENSACK CITY      R= 2546   0AY= 3000 NIGHT= 2700
155100790000    TRACT HA-79 HACKENSACK CITY      R= 4652   0AY= 5600 NIGHT= 5600
155100800000    TRACT HA-80 HACKENSACK CITY      R= 4955   0AY= 5700 NIGHT= 5700
15510C810000    TRACT HA-81 HACKENSACK CITY      R= 5664   0AY= 6600 NIGHT= 6600
1551CC820000    TRACT HA-82 HACKENSACK CITY      R= 5749   0AY= 6700 NIGHT= 6700

155100830000    TRACT HA-83 HACKENSACK CITY      R= 6955   0AY= 7800 NIGHT= 7700
15520C0C000-    PASSAIC COUNTY, N.J.
155200010000    TRACT CL 42 CLIFTCN CITY         R= 8332   0AY= 8340 NIGHT= 8870
15520C020000    TRACT CL 43-A CLIFTON CITY       R= 8894   0AY= 8900 NIGHT= 9800
155200030000    TRACT CL 43-8 CLIFTON CITY       R=14074   0AY=14080 NIGHT=15490
15520C040000    TRACT CL 44-A CLIFTCN CITY       R= 7400   0AY= 8870 NIGHT= 8140
155200050000    TRACT CL 44-8 CLIFTON CITY       R= 4296   0AY= 7450 NIGHT= 4730
155200060000    TRACT CL 45 CLIFTCN CITY         R= 5137   0AY= 8940 NIGHT= 5700
ZZZZZZZZZZZZ 42530  4254ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ
ZZZZZZZZZZZZ 42530  4254ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ
```

P1 REJECTIONS

EXAMPLES OF TYPE A ENTRIES

```
XA4.. ..... ...  15510078B60300634020040 PASSAIC ST HACKENSACK            03247 02
XA1.. ..... ...  15510078B60300634021040 PASSAIC ST HACKENSACK            03247 02
XA2.. ..... ...  15510078B60300634060040 PASSAIC ST HACKENSACK            03247 06
XA3.P ..R.. ...  15510078B603006340W0040 PASSAIC ST HACKENSACK            03247 32
```

EXAMPLE OF TYPE B-G ENTRIES

```
.G .. ..... ..... ..... ..... .9... .... 1551007886030063402103040912365751400003247 0240 PASSAIC ST HACKENSACK
00   155100780000B6030063402103040912360045000000000009000000000005000001401 2----------00------------------------------000004
20   00360900221000000600600400221000000200341400151200500400000300221911 40000---------7----0504----0------0------0------0--00
40   121000121000122000122000121000121000121000121 0000-----0--0-----0--0-----0--0-----0--003247     02 70127Z0017700000ABCOEF
```

FOSDIC DATA AS RECEIVED FOR PROCESSING BY NBS
(COMPARE WITH FOSDIC FORM)

```
SERIAL  PAGE   WU   PCU   ERROR INDICATOR
03247    02 70127 00177 .G .. ..... ..... ..... ..... .9... ....

                                                          (1) PAGE NO. 02
(2) 40 PASSAIC ST HACKENSACK                              (3)    155100780000

  (4)   (5)   (6)   (7)   (8)   (9)  (10)  (11)  (12)  (13)  (14)  (15)  (16)
   B6    03 00634    02     1    03    04  0912    36    11     4     0     0

(17) AREA DIMENSIONS   SIDE A      SIDE B      (18) HEIGHTS
     EXTERIOR WALLS      045         090           TOTAL          050
     CORE 1ST STORY      000         000           BASEMENT       000
     CORE UPPER STORY    000         000           1ST STORY      014
     BASEMENT PERCENT     00         ***           UPPER STORY    012

(19) ROOF AND SETBACK  HEIGHT      SIDE A      SIDE B      SIDE C      SIDE D
     ROOF                ***          0-          --          --          --
     SETBACK NO. 1       ---          --          --          --          --
     SETBACK NO. 2       ---          --          --          --          --
     SETBACK NO. 3       ---          --          --          --          --

(20) CONTAMINATED PLANES           SIDE A      SIDE B      SIDE C      SIDE D
     PLANE 1    EFFECTIVE HEIGHT  A 000       A 000       A 000       A 050
                WIDTH OF  PLANE      04          06          02          04
     PLANE 2    EFFECTIVE HEIGHT  A 036       A 060       A 034       A 000
                WIDTH OF PLANE       09          04          14          03
     PLANE 3    EFFECTIVE HEIGHT  A 022       A 022       A 015       A 022
                WIDTH OF PLANE       10          10          12          19

 SIGNATURE      A -   B -   C -   D -   E -   F -   G -   H -

(21) SURVEY METHOD CODE     2

(22) FLOOR AND ROOF DESCRIPTION  BASEMENT   1ST FLOOR   UPPER FLOORS     ROOF
                                     --          --          05          04

(23) STRUCTURE DETAIL
                                   SIDE A      SIDE B      SIDE C      SIDE D
     BASEMENT  EXTERIOR WALLS         --          --          --          --
               HGT ABOVE GRADE         -           -           -           -
               APERTURES              --          --          --          --
               INTERIOR WALLS         --          --          --          --

     1ST STORY EXTERIOR WALLS         12          12          12          12
               APERTURES              10          10          20          20
               INTERIOR WALLS         00          00          00          00

     UPPER     EXTERIOR WALLS         12          12          12          12
               APERTURES              10          10          10          10
               INTERIOR WALLS         00          00          00          00

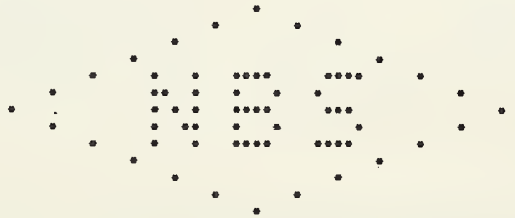
     UPPER AFTER CONSTRUCTION CHANGE
               NO CHANGE               X           X           X           X
               STORY NUMBER           --          --          --          --
               EXTERIOR WALLS         --          --          --          --
               APERTURES              --          --          --          --
               INTERIOR WALLS         --          --          --          --
```

NATIONAL BUREAU OF STANDARDS

NATIONAL FALLOUT SHELTER SURVEY-PHASE 1

SL=1551-0078 FO=86 C=03 PCU= 00177 OCT 23 62

```
15000000      NEW JERSEY              NJ
15500000     *PATERSON-CLIFTON-PASSAIC, N.J.
15510000      BERGEN COUNTY, N.J.
155100780000  TRACT HA-78 HACKENSACK CITY    R= 2546   DAY= 3000 NIGHT= 2700
```



```
                SL=1551-0078  FO=B6  C=03      PCU= 00177                                  OCT 23 62            1

FAC=00571 PT=01 OF 01  REV=2 ST=03 173 MAIN ST HACKENSACK                                  USE=51 OWN=4 PV=36 YEAR=0930 SM=7
                                    STORY  A   B   C   O   CL  TOT  PF  FLOOR   S-AREA   CORE   VOLUME   PEOPLE
                                 ** PROTECTION FACTOR IS LESS THAN 20 FOR EACH STORY **

FAC=00592 PT=01 OF 01  REV=1 ST=C2 294 MAIN STREET HACKENSACK                              USE=53 OWN=4 PV=35 YEAR=1925 SM=7
                                    STORY  A   B   C   O   CL  TOT  PF  FLOOR   S-AREA   CORE   VOLUME   PEOPLE
                                       0  00  00  00  00  25   25   1   1349     674             4724      9*

FAC=00598 PT=02 OF 02  REV=1 ST=C2 314 MAIN ST HACKENSACK                                  USE=53 OWN=4 PV=35 YEAR=1940 SM=7
                                    STORY  A   B   C   O   CL  TOT  PF  FLOOR   S-AREA   CORE   VOLUME   PEOPLE
                                       0  00  00  02  00  25   27   1   2429    1214            12149     24*

FAC=00599 PT=01 OF 04  REV=1 ST=C4 Y M C A 360 MAIN ST HACKENSACK                          USE=72 OWN=5 PV=38 YEAR=1927 SM=7
                                    STORY  A   B   C   O   CL  TOT  PF  FLOOR   S-AREA   CORE   VOLUME   PEOPLE
                                       1  00  05  00  05  00  09   4   2088     626             6263      62
                                       2  12  16  00  15  01  43   1   2088    1044            10440     104*
                                       3  13  08  02  07  11  41   1   2088    1044                      104*

FAC=00600 PT=01 OF 01  REV=1 ST=C2 408 MAIN ST HACKENSACK                                  USE=11 OWN=4 PV=34 YEAR=0918 SM=7
                                    STORY  A   B   C   O   CL  TOT  PF  FLOOR   S-AREA   CORE   VOLUME   PEOPLE
                                       0  02  01  03  01  41   47   1   1919     959             6719      13*

FAC=00604 PT=01 OF 01  REV=1 ST=C2 419 MAIN ST HACKENSACK                                  USE=53 OWN=4 PV=35 YEAR=1930 SM=7
                                    STORY  A   B   C   O   CL  TOT  PF  FLOOR   S-AREA   CORE   VOLUME   PEOPLE
                                       0  00  00  00  00  24   24   2   1113     556             3897       7*

FAC=00606 PT=01 OF 01  REV=1 ST=C5 435 MAIN ST HACKENSACK                                  USE=54 OWN=4 PV=43 YEAR=1923 SM=7
                                    STORY  A   B   C   O   CL  TOT  PF  FLOOR   S-AREA   CORE   VOLUME   PEOPLE
                                       0  00  00  00  00  00   00   8   4499    4499            44999      89
                                       2  01  03  02  11  00   17   2   5000    2500            25000     250*
                                       3  01  02  05  10  01   19   2   5000    2500                      250*
                                       4  05  01  05  09  07   27   1   5000    2500                      250*

FAC=00628 PT=01 OF 01  REV=1 ST=C1 HACK MUT SAV AND LOAN ASSN 242 STATE ST HACKENSACK USE=55 OWN=4 PV=32 YEAR=1928 SM=7
                                    STURY  A   B   C   O   CL  TOT  PF  FLOOR   S-AREA   CORE   VOLUME   PEOPLE
                                       0  00  01  01  00  04   06   5   1774    1242             9938      19

FAC=00634 PT=02 OF 03  REV=1 ST=C4 40 PASSAIC ST HACKENSACK                                USE=11 OWN=4 PV=36 YEAR=0912 SM=7
                                    STORY  A   B   C   O   CL  TOT  PF  FLOOR   S-AREA   CORE   VOLUME   PEOPLE
   .. ..... ..... ..... .9... ....    1  05  12  05  04  02   27   1   4050    2025            28350     202*
                                       2  01  03  00  02  06   12   3   4050    2025            24300     202*
                                       3  00  02  00  07  23   31   1   4050    2025                      202*
```

SL=1551-0078 FO=86 C=03 PCU= 00177 OCT 23 62 2

FAC=00634 PT=03 OF 03 REV=1 ST=C4 40 PASSAIC ST HACKENSACK USE=11 OWN=4 PV=36 YEAR=0912 SM=7

STORY	A	B	C	O	CL	TOT	PF	FLOOR	S-AREA	CORE	VOLUME	PEOPLE
0	00	00	11	01	08	20	2	1616	808		6467	12*
1	01	00	22	01	17	41	1	2310	1155		10395	115*

FAC=00635 PT=01 OF 02 REV=1 ST=C2 FIRST PRESBYTERIAN CH 64 PASSAIC ST HACKENSACK USE=31 OWN=5 PV=35 YEAR=0930 SM=7

STORY	A	B	C	O	CL	TOT	PF	FLOOR	S-AREA	CORE	VOLUME	PEOPLE
0	00	00	01	01	20	22	2	2303	1151		20735	41*

FAC=00636 PT=01 OF 04 REV=1 ST=C7 430 UNION ST HACKENSACK USE=11 OWN=4 PV=43 YEAR=1928 SM=6

STORY	A	B	C	O	CL	TOT	PF	FLOOR	S-AREA	CORE	VOLUME	PEOPLE
1	00	01	00	00	01	02	6	3330	3330	240	2400	24
2	02	02	01	00	01	06	5	3330	2330	240	2160	24
3	02	01	01	01	02	06	5	3330	2330			233
4	01	01	01	03	03	10	4	3330	998			99
5	01	03	01	02	10	18	2	3330	1665			166*
6	01	03	01	02	31	38	1	3330	1665			166*

FAC=00647 PT=01 OF 01 REV=1 ST=C2 HOLY TRINITY CHURCH CONVENT PANGBORN PL HACKENSACK USE=32 OWN=5 PV=34 YEAR=1956 SM=7

STORY	A	B	C	O	CL	TOT	PF	FLOOR	S-AREA	CORE	VOLUME	PEOPLE
0	00	00	00	00	03	04	6	3149	3149		22049	44
1	04	01	05	01	17	28	1	3500	1750		21000	175*

FAC=00648 PT=03 OF 03 REV=1 ST=C1 HOLY TRINITY SCHOOL PANGBORN PL HACKENSACK USE=21 OWN=5 PV=38 YEAR=1956 SM=7

STORY	A	B	C	O	CL	TOT	PF	FLOOR	S-AREA	CORE	VOLUME	PEOPLE
0	00	00	05	00	17	23	2	7019	3509		42119	84*

SL=1551-0078 FO=86 C=03 PCU= 00177 OCT 23 62 2

END OF THIS STANDARD LOCATION. NUMBER OF FORMS PROCESSED IS 14

```
LOW REVISION ON MASTER
151100000010000E1130001710000001000000 16  1  69915
151100000010000E1130001710000001000000 27  2  69910
151100000010000E1130001710000001000000 27  3  70916

LOW REVISION ON MP-UPDATING TAPE
151100000050000F1130011620000001000001 10  0  69912
151100000050000E1130011620000001000001 11  0  68914

THIS IS A DELETE NOT A
LOW REVISION ON MASTER
152100000020000E1120063790000001000000  8  0  70444
152100000020000E1120063790000001000000 10  1  69398

THIS IS A DELETE NOT A
LOW REVISION ON MP-UPDATING TAPE
152100000030000E1090012260000001000000 14  0  71663

                          THIS DELETE NOT FOUND    152100000030000E1010038080000001000000

                          THIS DELETE NOT FOUND    152100000030000E1010038100000001000000

COUNTY NOT ON WO 154900 SO IT WAS DELETED FROM MASTER 2
154900013300000D3240009540000010000001 10  0  72691
154900013300000D3240009540000010000001110  1  68578
154900013300000D3240009540000010000001126  2  68996
154900013300000D3240009540000010000001126  3  69043

DUPLICATES**SAVE ITEMS FROM UPDATE TAPE**
155200000600000E1130001710000001000000 16  1  69915
155200000600000E1130001710000001000000 27  2  69915
155200000600000E1130001710000001000000 27  3  70916
152000000600000E1130001710000001000000 27  4  68477
152000000600000E1130001710000001000000 27  8  68510
152000000600000E1130001710000001000000 27 10  68517
```

PHASE 1 STANDARD LOCATION SUMMARY AUG 20 1962 PAGE 157

NEW JERSEY NJ
*PATERSON-CLIFTON-PASSAIC, N.J.
BERGEN COUNTY, N.J.

155100030000 TRACT RV-3 RIVER VALE TWP

FO=B6 C=03	R= 5616	DAY= 5800	NIGHT= 6500			PEAK UNSHELTERED POPULATION=			5442
PF CATEGORY	1	2	3	4	5	6	7	8	4-8
CAPACITY-SPACES	2703	576	467	398	601	139	16	4	1158
SHELTERS ACCOMODATING ANY NUMBER	39	7	5	4	8	1	0	0	13

TOTAL BLOGS= 25 BLDGS REJECTED= 3 BLDGS WITH A PF CAT 4-8 1 BALANCE= 21

1551007-0000 TRACT BO-77 BOGOTA BORO

FO=B6 C=03	R= 7965	DAY= 9000	NIGHT= 9000			PEAK UNSHELTERED POPULATION=			7465
PF CATEGORY	1	2	3	4	5	6	7	8	4-8
CAPACITY-SPACES	3826	943	768	83	1060	208	113	71	1535
SHELTERS ACCOMODATING ANY NUMBER	43	11	6	1	17	4	2	6	30

TOTAL BLDGS= 28 BLDGS REJECTED= 5 BLDGS WITH A PF CAT 4-8 3 BALANCE= 20

155100780000 TRACT HA-78 HACKENSACK CITY

FO=B6 C=03	R= 2546	DAY= 3000	NIGHT= 2700			PEAK UNSHELTERED POPULATION=			2396
PF CATEGORY	1	2	3	4	5	6	7	8	4-8
CAPACITY-SPACES	1364	810	202	161	276	78	0	89	604
SHELTERS ACCOMODATING ANY NUMBER	11	7	1	2	3	2	0	1	8

TOTAL BLDGS= 14 BLDGS REJECTED= 1 BLDGS WITH A PF CAT 4-8 5 BALANCE= 8

155100790000 TRACT HA-79 HACKENSACK CITY

FO=B6 C=03	R= 4652	DAY= 5600	NIGHT= 5600			PEAK UNSHELTERED POPULATION=			4534
PF CATEGORY	1	2	3	4	5	6	7	8	4-8
CAPACITY-SPACES	1863	2028	196	146	682	163	28	47	1066
SHELTERS ACCOMODATING ANY NUMBER	14	6	3	2	6	3	0	1	12

TOTAL BLDGS= 36 BLDGS REJECTED= 2 BLDGS WITH A PF CAT 4-8 1 BALANCE= 33

PHASE 1 COUNTY SUMMARY AUG 20 1962 PAGE 5

NEW JERSEY NJ
*PATERSON-CLIFTON-PASSAIC, N.J.

155100 BERGEN COUNTY, N.J.

FO=B6 C=03 R= 48133 DAY= 56580 NIGHT= 52730 PEAK UNSHELTERED= 43619

PF CATEGORY	1	2	3	4	5	6	7	8	4-8
CAPACITY-SPACES	17858	6811	3369	903	2980	1101	358	355	5697
SHELTERS ACCOMODATING									
ANY NUMBER	111	55	29	16	15	8	3	3	45
50-99	16	16	10	2	2	3	2	1	10
100-299	53	10	5	1	5	1	1	1	9
300 OR MORE	14	8	4	1	2	1	0	0	4

TOTAL BLDGS= 177 BLDGS REJECTED= 61 BLDGS WITH A PF CAT 4-8= 33 BALANCE= 83

PHASE 1 AREA SUMMARY AUG 20 1962 PAGE 6

NEW JERSEY NJ

155000 *PATERSON-CLIFTON-PASSAIC, N.J.

R=105241 DAY=119180 NIGHT=117730 PEAK UNSHELTERED=126732

PF CATEGORY	1	2	3	4	5	6	7	8	4-8
CAPACITY-SPACES	18378	7076	3549	1019	3064	1221	438	455	6197
SHELTERS ACCOMODATING									
ANY NUMBER	122	61	32	19	16	10	5	6	56
50-99	18	17	12	3	4	3	5	3	18
100-299	59	11	6	1	6	2	2	1	12
300 OR MORE	15	9	5	1	2	1	0	0	4

TOTAL BLDGS= 190 BLDGS REJECTED= 63 BLDGS WITH A PF CAT 4-8= 41 BALANCE= 86

PHASE 1 STATE SUMMARY AUG 14 1962 PAGE 5

150000 NEW JERSEY NJ

R= 6066782 DAY= 9022045 NIGHT= 6628553 PEAK UNSHELTERED POPULATION= 8085305

PERCENTAGE SHELTERED BY CATEGORY 1 R= 61.5 DAY= 41.3 NIGHT= 56.3
PERCENTAGE SHELTERED BY CATEGORIES 2-3 R= 39.5 DAY= 26.6 NIGHT= 36.2
PERCENTAGE SHELTERED BY CATEGORIES 4-8 R= 23.6 DAY= 15.8 NIGHT= 21.6
PERCENTAGE SHELTERED BY CATEGORIES 1-8 R= 124.7 DAY= 83.8 NIGHT= 114.1

PF CATEGORY	1	2	3	4	5	6	7	8	4-8
CAPACITY-SPACES	3732064	1698820	703172	276235	472748	340032	101131	242210	1432356
SHELTERS ACCOMODATING									
ANY NUMBER	25125	11886	4333	3032	2036	1495	702	1543	8808
50-99	4676	1277	341	434	296	274	158	358	1520
100-299	6218	2505	866	502	371	400	146	355	1774
300 OR MORE	3183	1623	730	240	437	250	87	185	1199

TOTAL BLDGS= 25694 BLDGS REJECTED= 4378 BLDGS WITH A PF CAT 4-8= 4735 BALANCE= 16581

SAMPLE PAGE OF REGIONAL SUMMARY

PHASE 1 REGIONAL SUMMARY AUG 14 1962 PAGE 11

REGION 1

R= 35740939 DAY= 47880614 NIGHT= 40699778 **PEAK UNSHELTERED POPULATION= 41720706

PERCENTAGE SHELTERED BY CATEGORY 1	R= 102.7	DAY= 76.6	NIGHT= 90.1
PERCENTAGE SHELTERED BY CATEGORIES 2-3	R= 79.3	DAY= 59.2	NIGHT= 69.6
PERCENTAGE SHELTERED BY CATEGORIES 4-8	R= 62.5	DAY= 46.6	NIGHT= 54.8
PERCENTAGE SHELTERED BY CATEGORIES 1-8	R= 244.5	DAY= 182.5	NIGHT= 214.7

PF CATEGORY	1	2	3	4	5	6	7	8	4-8
CAPACITY-SPACES	36710380	19833807	8527279	3901317	6580408	6119471	2557790	3179801	22338787
SHELTERS ACCOMODATING									
ANY NUMBER	215840	109997	45079	34959	27032	17781	8533	17019	105324
50-99	48797	15094	4475	4818	2349	2220	1524	4177	15088
100-299	91043	40987	13984	9005	5174	2981	1534	4156	22850
300 OR MORE	29161	18130	8652	3198	7132	5654	2206	2348	20538

TOTAL BLDGS=156506 BLDGS REJECTED= 20938 BLDGS WITH A PF CAT 4-8= 48341 BALANCE= 87227

PHASE 1 NATIONAL SUMMARY AUG 14 1962 PAGE 65

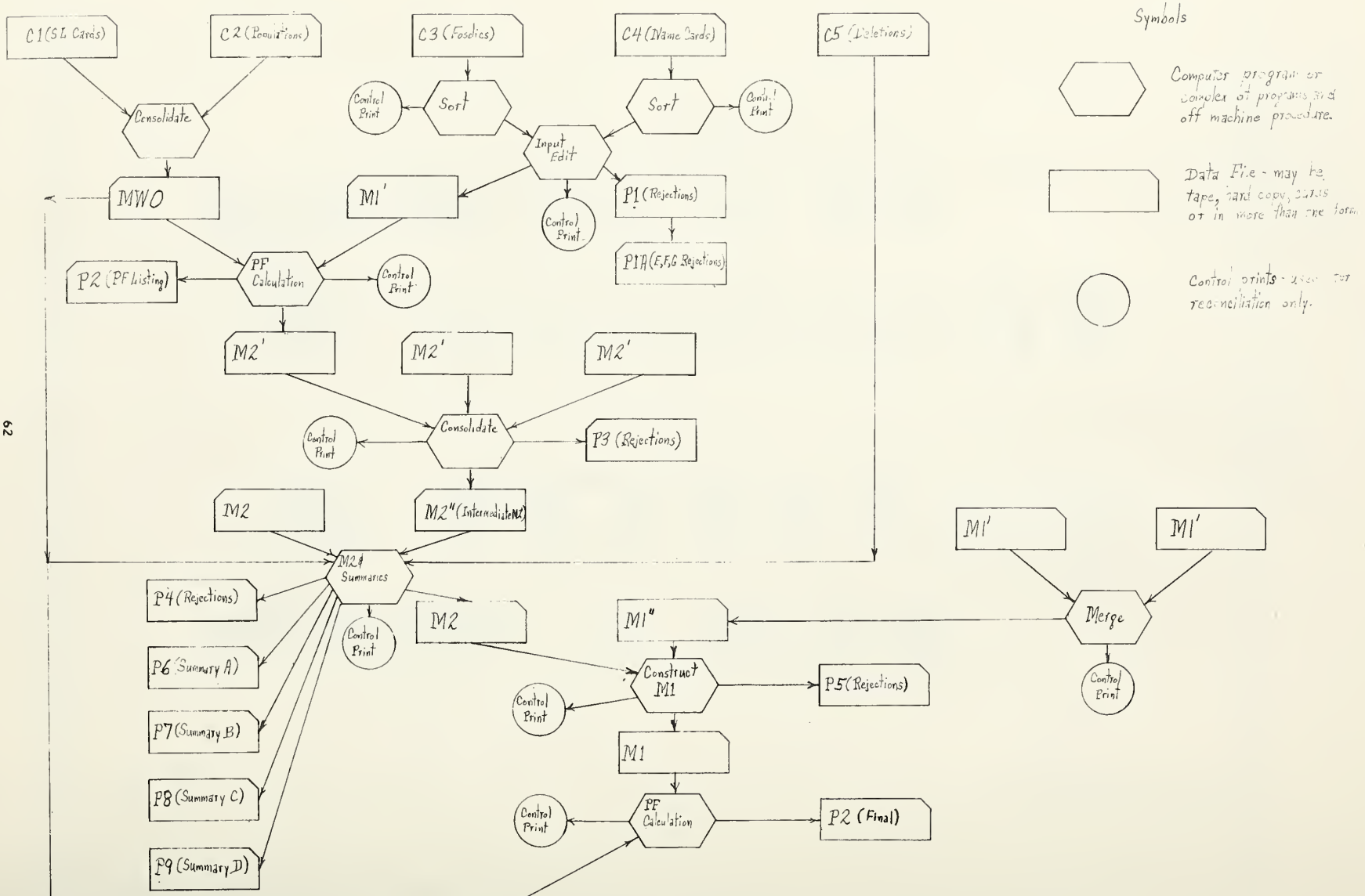
R= 181913370 DAY= 206775254 NIGHT= 191918572 **PEAK UNSHELTERED POPULATION= 203226823

PERCENTAGE SHELTERED BY CATEGORY 1 R= 47.6 DAY= 41.9 NIGHT= 45.1
PERCENTAGE SHELTERED BY CATEGORIES 2-3 R= 37.3 DAY= 32.8 NIGHT= 35.4
PERCENTAGE SHELTERED BY CATEGORIES 4-8 R= 30.5 DAY= 26.8 NIGHT= 28.9
PERCENTAGE SHELTERED BY CATEGORIES 1-8 R= 115.6 DAY= 101.7 NIGHT= 109.5

PF CATEGORY	1	2	3	4	5	6	7	8	4-8
CAPACITY-SPACES	86728754	47630560	20381901	9329735	15254456	14551530	6341414	10091678	55568813
SHELTERS ACCOMODATING									
ANY NUMBER	411493	215004	87840	67412	52947	38717	20811	48364	228251
50-99	71034	26238	9327	8437	6171	5889	4099	11594	36190
100-299	149886	68770	24120	17456	10025	7925	4590	13334	53330
300 OR MORE	84152	48110	21115	8445	14992	11628	4858	7144	47067

TOTAL BLDGS=381627 BLDGS REJECTED= 66949 BLDGS WITH A PF CAT 4-8=112830 BALANCE=201848

OVERALL DATA ROUTING WITHIN NBS SYSTEM



APPENDIX IV

Input Edit Flow Chart Contents

Page	Section	Description
1		Overall block diagram
2	START	Initialization
	TAPEC	C3 input
	TAPEF	C4 input
	ALTER	C3 or C4 format modification
	CKLB	C3 or C4 identification check
3	CKLB (cont.)	C4 identification check
	PVCK	Pre conversion check
	SCAT	Isolation of data fields
	PCVED	Pre conversion edit
	A23	A2 or A3 determination
	CDRR	"A" output set up
	ERDC	Hollerith P1 indicator construction
4	CDRP	"A" construction and print
	DPCK	Duplicate C4 check
	MERG	Consolidation of C3 and C4 to M1
	MISM	Excess C4 gating set up
	XFSDC	Excess C3 gating set up
	FTR	C3 index advance

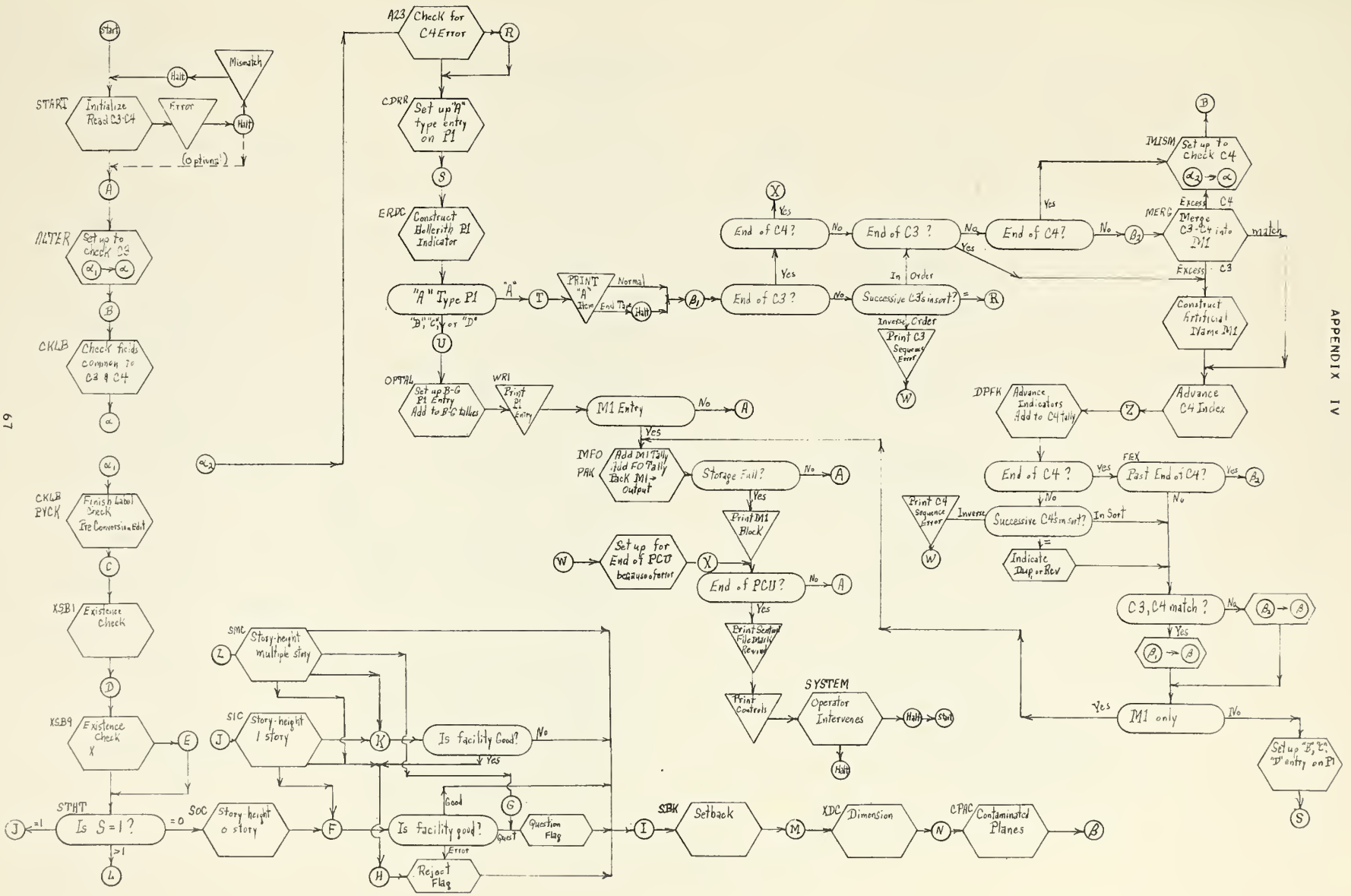
5	DPFK	Duplicate C3 check
	FEX	Abnormal end of run set up
	END	End of run
	ENDR	Error end of run set up
	OPTAL, WG1, WR1	"B", "C", or "D" construction and print
	MFO, PAK	M1 construction and storage
	FOX	M1 print
6	XSB	Existence check
7	XSB (cont.)	Existence check
	SOC	Story-height check (0 stories)
8	S1C	Story-height check (1 story)
9	SMC	Story-height check (multiple stories)
10	SBK	Setback check
11	XDC	Dimension check
12	CPAC	Contaminated planes check

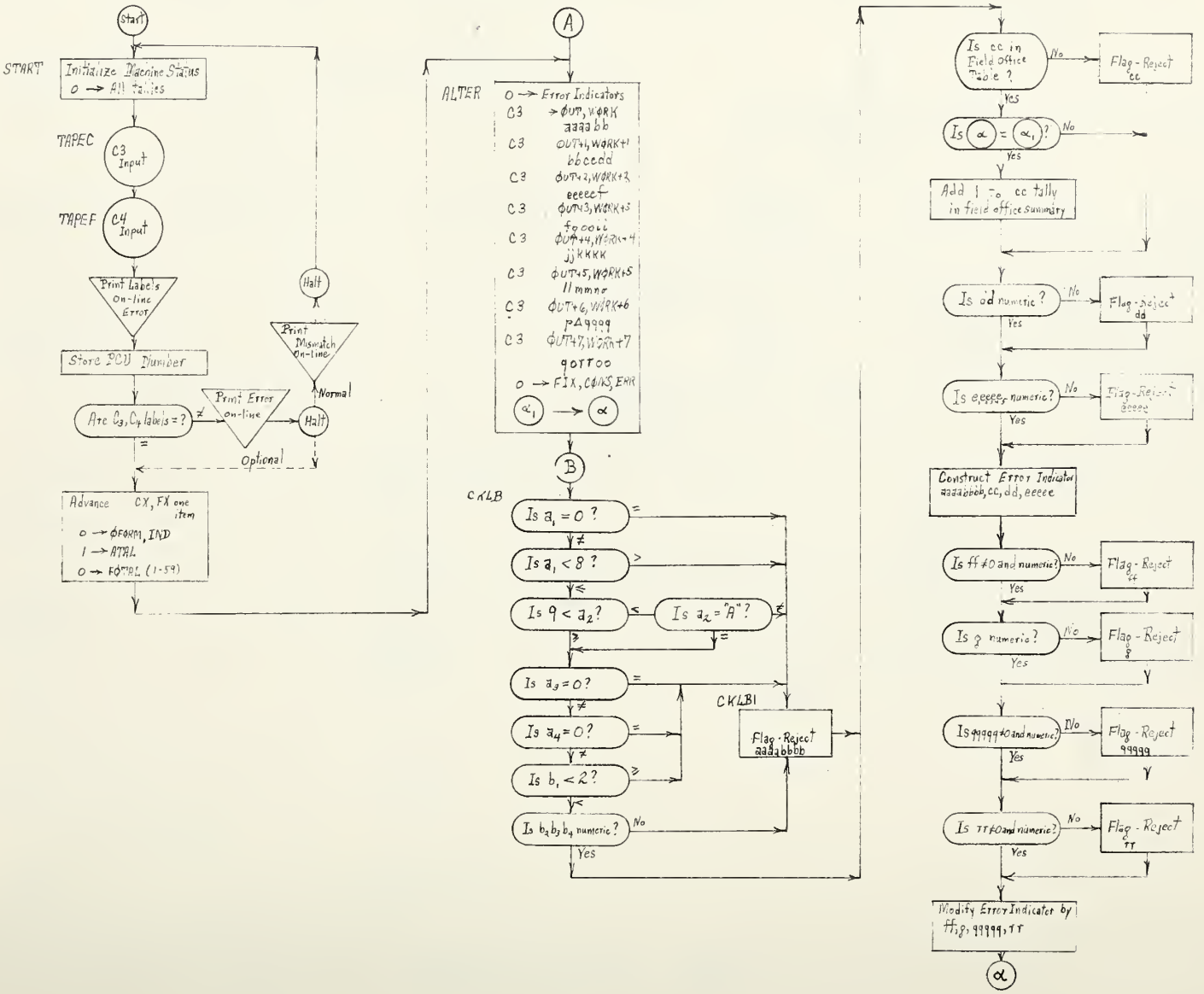
Input Edit - Connector Index

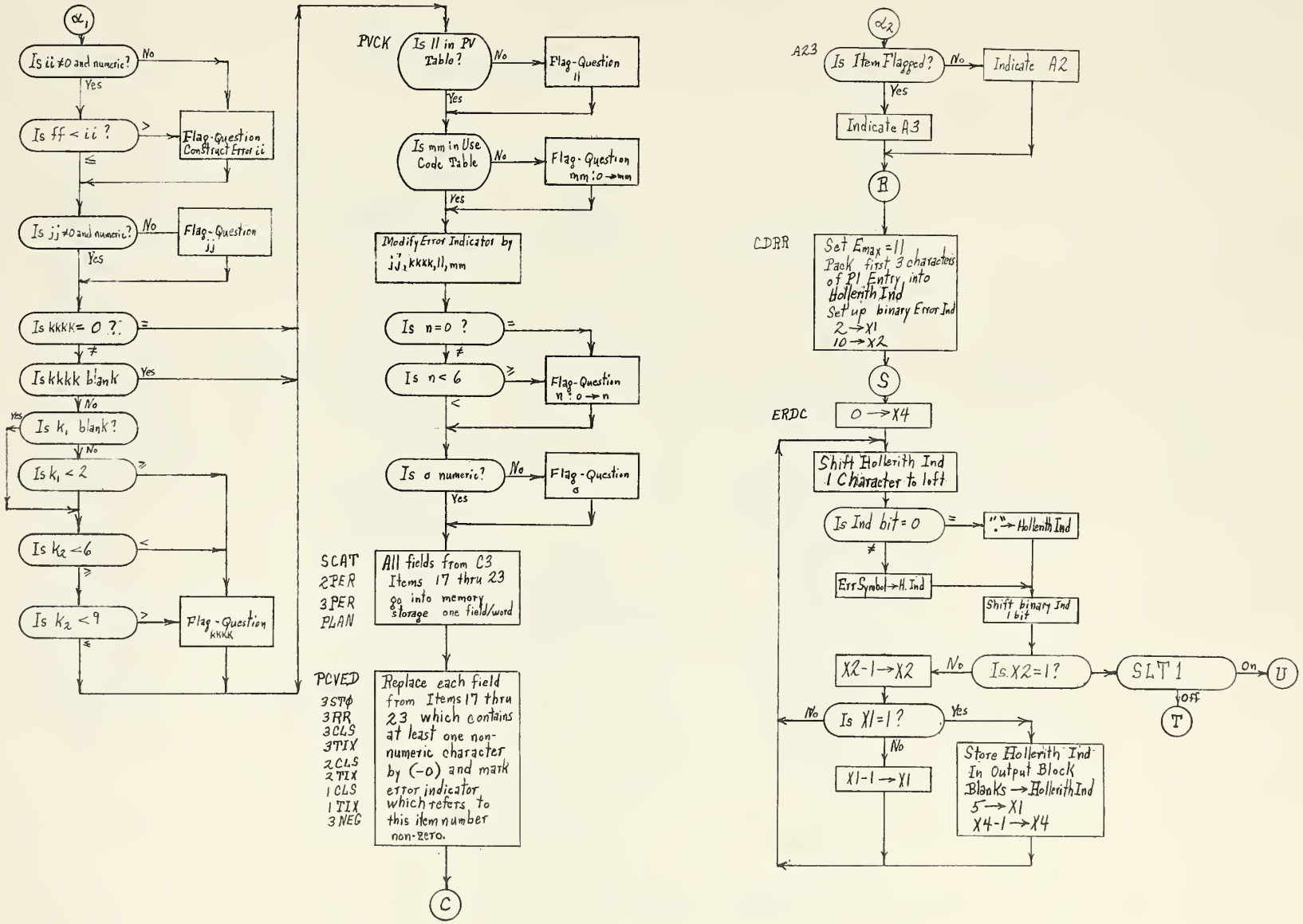
APPENDIX IV

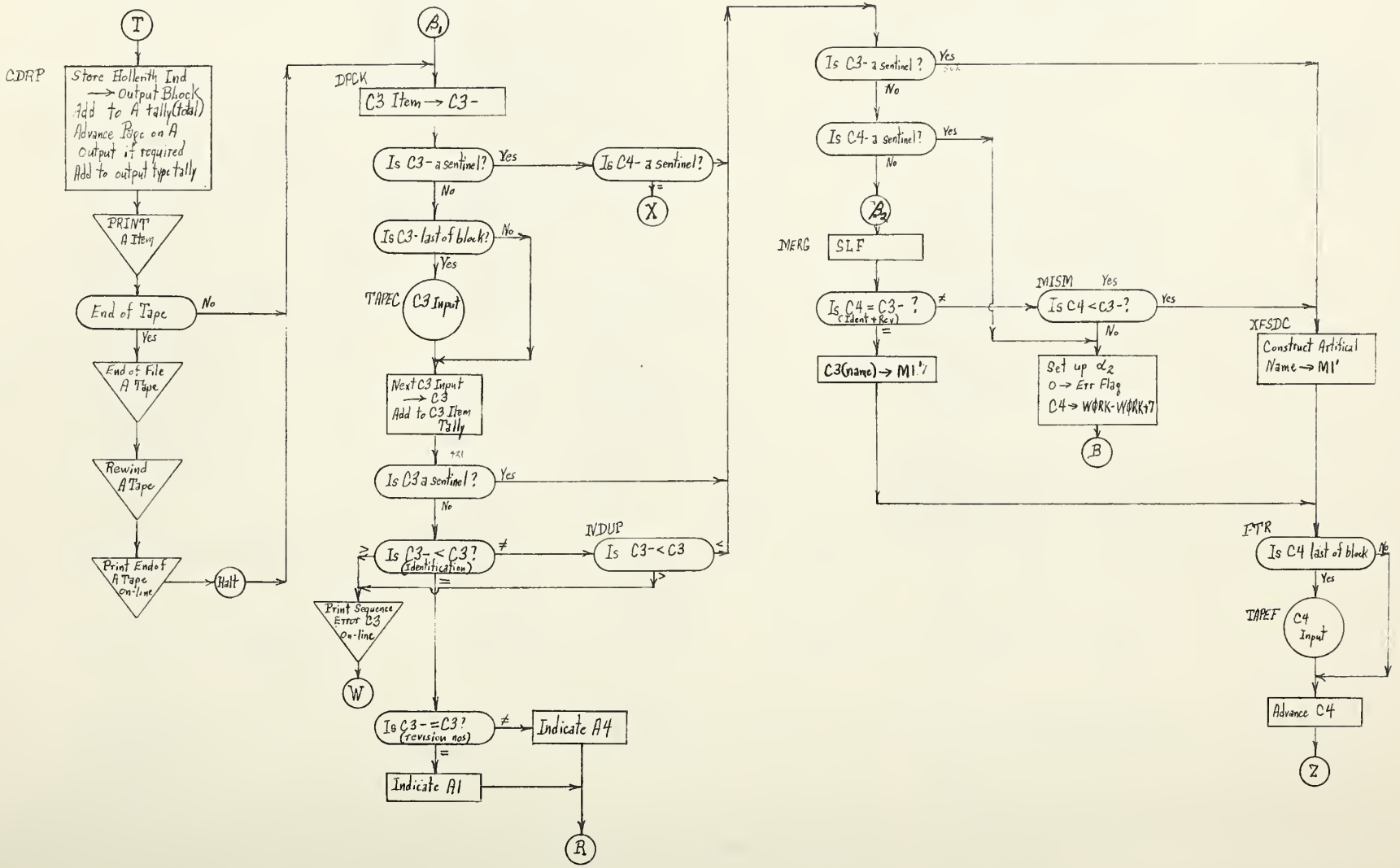
Input Edit - Connector Index (Cont.)

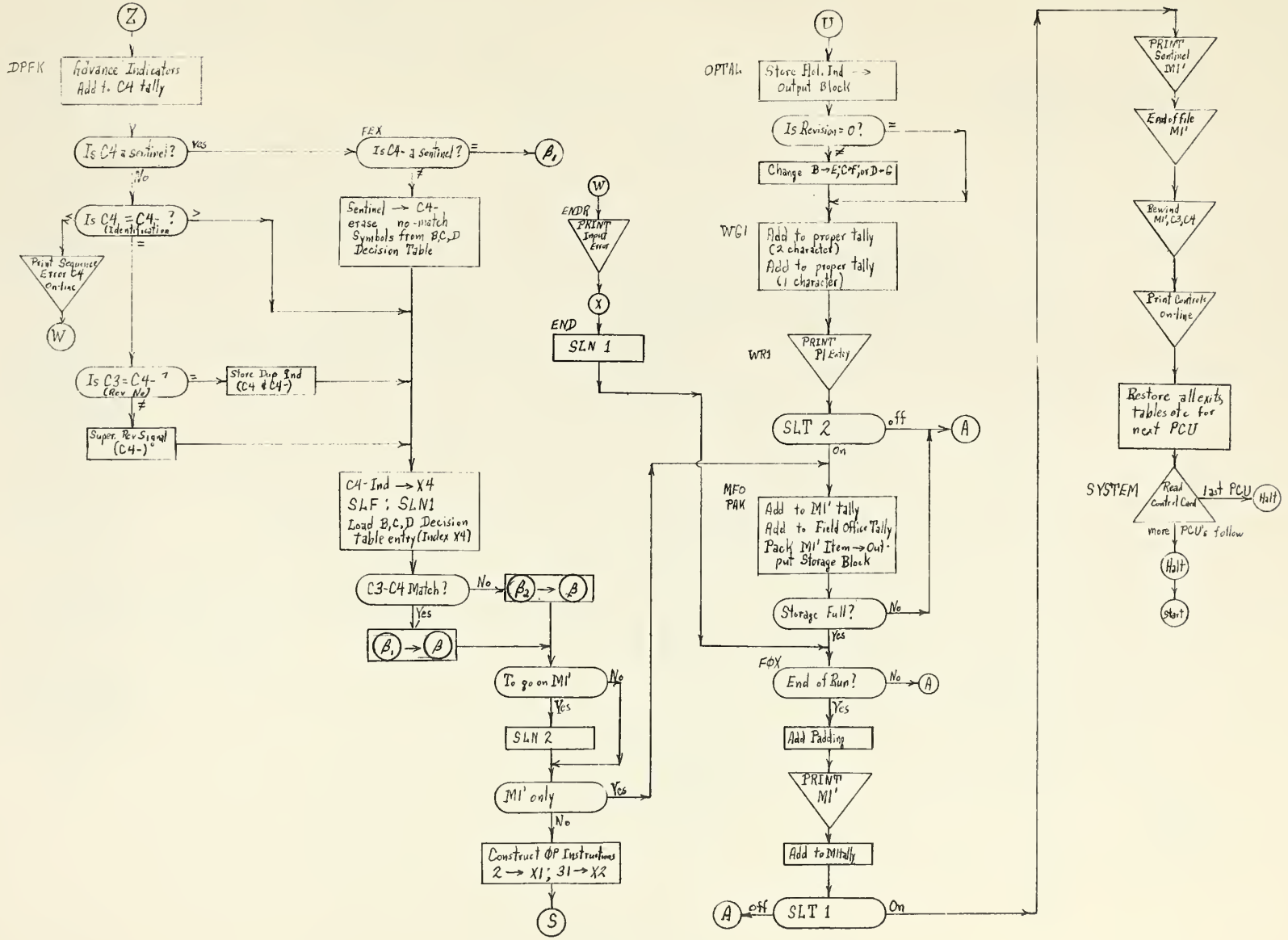
INPUT EDIT FLOW CHART PAGE 1

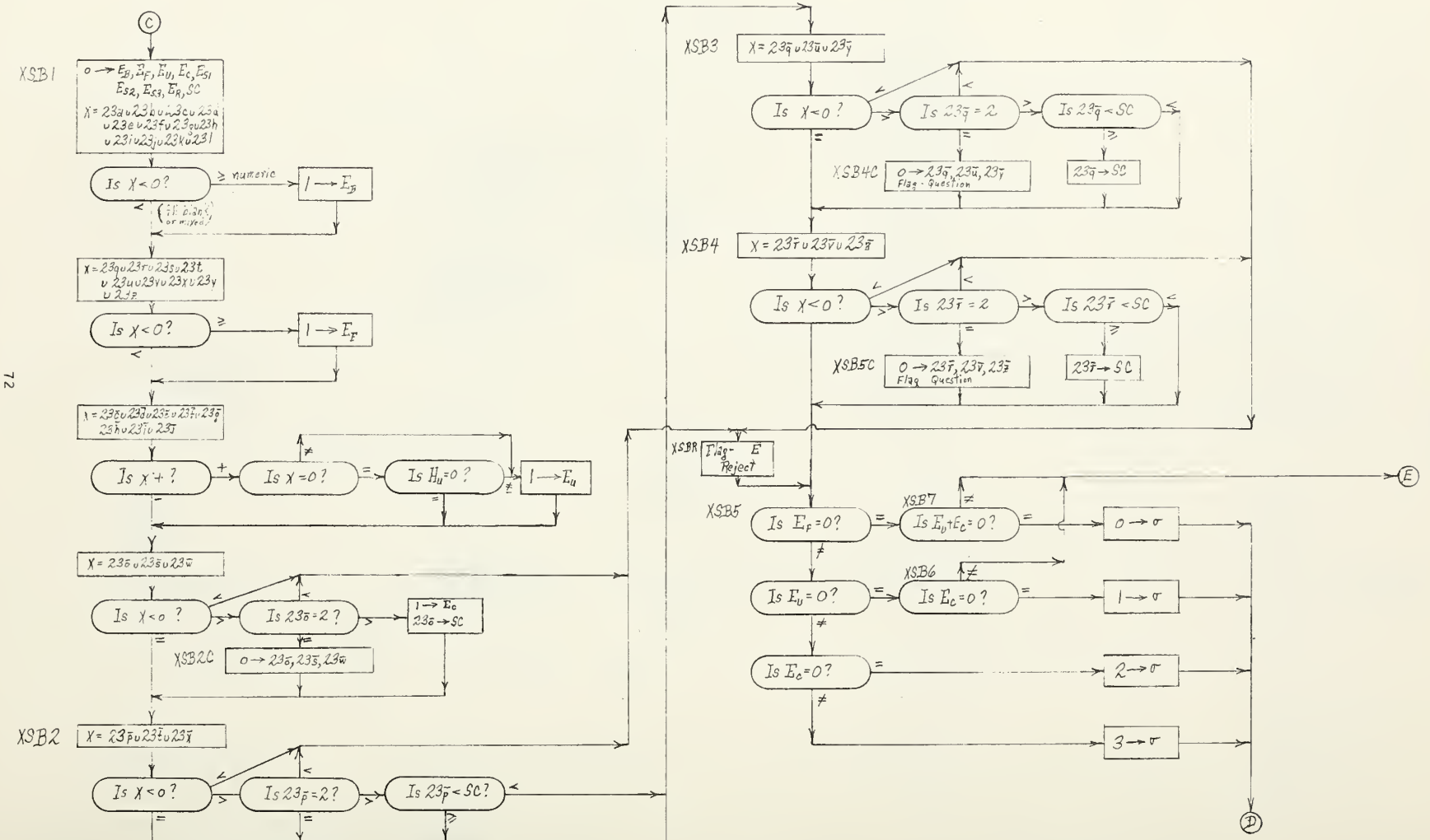


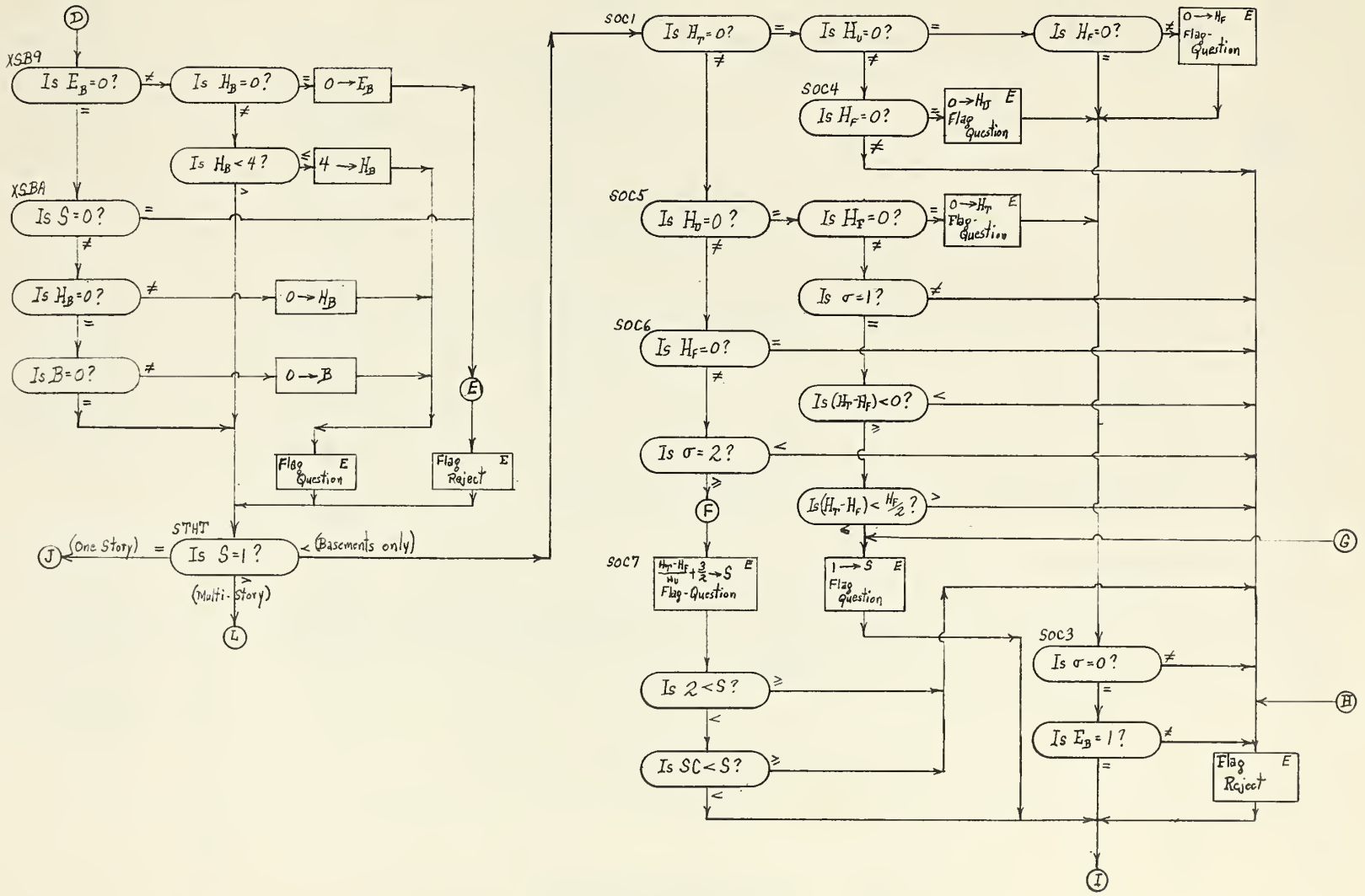

Start
START
Initialize Machine Status
0 → All tables
TAPEC
C3 Input
TAPEF
C4 Input
Print Labels On-line Error
Store POU Number
Are C3, C4 labels = ?
Print Error on-line
Halt
Print Mismatch On-line
Normal
Optional
Advance CX, FX one item
0 → FORM1, IND
1 → ATAL
0 → FORM2 (1-59)
A
ALTER
0 → Error Indicators
C3 → OUT, WORK aaaabb
C3 OUT+1, WORK+1 bbccdd
C3 OUT+2, WORK+2 eeeeef
C3 OUT+3, WORK+3 fgcchh
C3 OUT+4, WORK+4 jjkkkk
C3 OUT+5, WORK+5 llmmno
C3 OUT+6, WORK+6 pqqqqq
C3 OUT+7, WORK+7 qorroo
0 → FIX, CHKS, ERR
B
CKLB
Is a1 = 0 ?
Is a1 < 8 ?
Is 9 < a2 ?
Is a2 = "A" ?
Is a3 = 0 ?
Is a4 = 0 ?
Is b1 < 2 ?
Is b2 b3 b4 numeric ?
No
Yes
CKLB1
Flag - Reject aaaabbbb
Is cc in Field office Table ?
Flag - Reject cc
Is α = α1 ?
Add 1 to cc tally in field office summary
Is dd numeric ?
Flag - Reject dd
Is eeeeef numeric ?
Flag - Reject eeeeef
Construct Error Indicator aaaabbbb, cc, dd, eeeee
Is ff ≠ 0 and numeric ?
Flag - Reject ff
Is g numeric ?
Flag - Reject g
Is qqqqq ≠ 0 and numeric ?
Flag - Reject qqqqq
Is rr ≠ 0 and numeric ?
Flag - Reject rr
Modify Error Indicator by ffg, qqqqq, rr
α


α1
Is ii ≠0 and numeric?
No
Yes
Is ff < ii ?
>
Flag-Question Construct Error ii
≤
Is jj ≠0 and numeric?
No
Flag-Question jj
Yes
Is kkkk= 0 ?
=
≠
Is kkkk blank
Yes
No
Is k1 blank?
Yes
No
Is k1 < 2
≥
Is k2 <6
<
≥
Is k2 <9
>
Flag-Question kkkk
≤
PVCK
Is ll in PV Table?
No
Flag-Question ll
Yes
Is mm in Use Code Table
No
Flag-Question mm: 0→mm
Yes
Modify Error Indicator by jj, kkkk, ll, mm
Is n=0 ?
=
≠
Is n< 6
≥
Flag-Question n: 0→n
<
Is a numeric?
No
Flag-Question a
Yes
SCAT
2PER
3PER
PLAN
All fields from C3 Items 17 thru 23 go into memory storage one field/word
PCVED
3STΦ
3RR
3CLS
3TIX
2CLS
2TIX
1CLS
1TIX
3NEG
Replace each field from Items 17 thru 23 which contains at least one non-numeric character by (-0) and mark error indicator which refers to this item number non-zero.
C
α2
A23
Is Item Flagged?
No
Indicate A2
Yes
Indicate A3
R
CDRR
Set Emax = 11
Pack first 3 characters of P1 Entry into Hollerith Ind
Set up binary Error Ind
2→X1
10→X2
S
ERDC
0→X4
Shift Hollerith Ind 1 Character to left
Is Ind bit = 0
=
" "→Holleith Ind
≠
Err Symbol→H. Ind
Shift binary Ind 1 bit
X2-1→X2
No
Is X2=1?
SLT 1
On
U
Off
T
No
Is X1=1?
Yes
No
X1-1→X1
Store Hollerith Ind In Output Block
Blanks→Hollerith Ind
5→X1
X4-1→X4

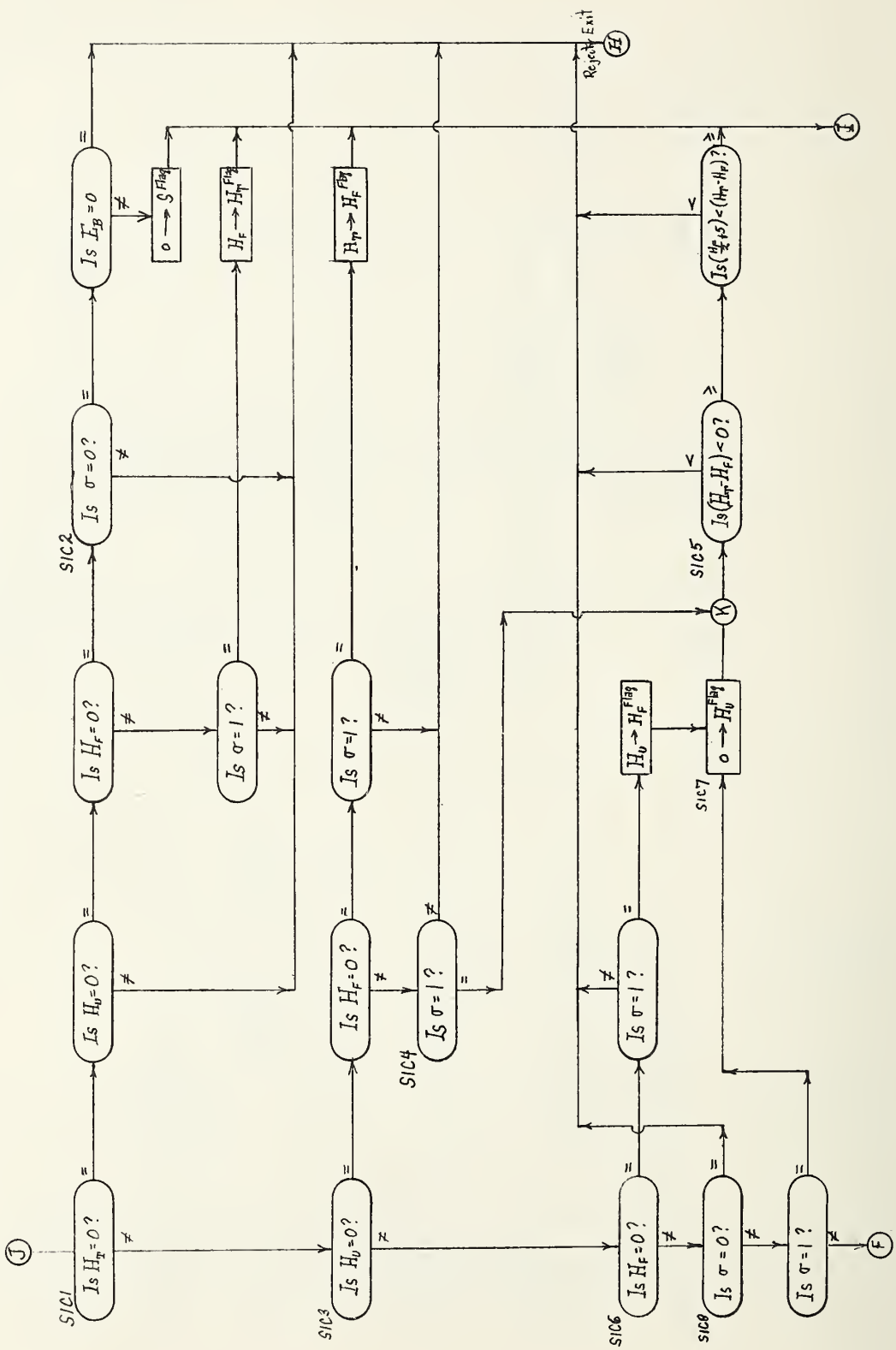

T
CDRP
Store Hollerith Ind → Output Block
Add to A tally (total)
Advance Page on A
Output if required
Add to output type tally
PRINT A Item
End of Tape
No
Yes
End of File A Tape
Rewind A Tape
Print End of A Tape on-line
Halt
β1
DPCK
C3 Item → C3-
Is C3- a sentinel?
Yes
Is C4- a sentinel?
No
X
Is C3- last of block?
No
Yes
TAPEC
C3 Input
Next C3 Input → C3
Add to C3 Item Tally
Is C3 a sentinel?
Yes
No
NDUP
Is C3- < C3? (Identification)
≠
Is C3- < C3
Print Sequence Error C3 on-line
W
Is C3- = C3? (revision nos)
≠
Indicate A4
Indicate A1
R
Is C3- a sentinel?
Yes
No
Is C4- a sentinel?
Yes
No
β2
MERG
SLF
Is C4 = C3-? (Ident + Rev)
≠
=
C3(name) → M1'
MISM
Yes
Is C4 < C3-?
Yes
No
Set up α2
0 → Err Flag
C4 → WORK-WORK+7
B
XFSDC
Construct Artificial Name → M1'
I-TR
Is C4 last of block
No
Yes
TAPEF
C4 Input
Advance C4
Z

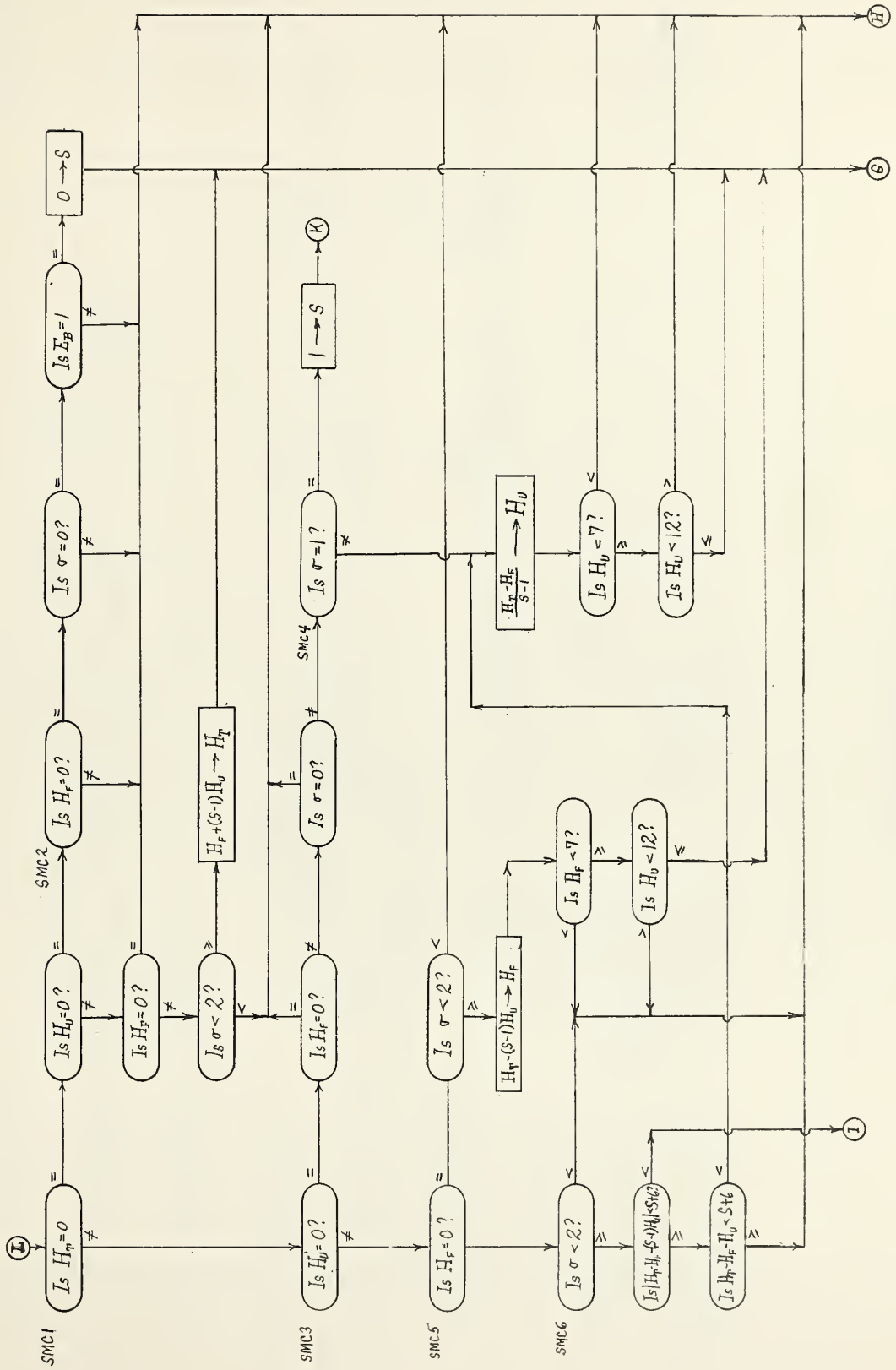

Z
DPFK
Advance Indicators
Add 1. C4 tally
Is C4 a sentinel?
Yes
No
FEX
Is C4- a sentinel?
=
≠
Sentinel → C4-
erase no-match
Symbols from B,C,D
Decision Table
Is C4 = C4- ?
(Identification)
<
=
>
Print Sequence
Error C4
on-line
W
Is C3 = C4- ?
(Rev No)
=
≠
Store Dup Ind
(C4 & C4-)
Super. Rev Signal
(C4-)'
C4-Ind → X4
SLF ; SLN1
Load B,C,D Decision
table entry (Index X4)
C3-C4 Match?
No
Yes
β2 → β
β1 → β
To go on M1'
No
Yes
SLN 2
M1' only
Yes
No
Construct ΦP Instructions
2 → X1 ; 31 → X2
S
W
ENDR
PRINT
Input
Error
X
END
SLN 1
U
OPTAL
Store Hol. Ind → Output Block
Is Revision = 0?
=
≠
Change B→E; C→F for D→G
WG1
Add to proper tally
(2 character)
Add to proper tally
(1 character)
WR1
PRINT
P/Entry
SLT 2
off
on
A
MFO
PAK
Add to M1' tally
Add to Field Office Tally
Pack M1' Item → Output Storage Block
Storage Full?
No
Yes
FΦX
End of Run?
No
A
Yes
Add Padding
PRINT
M1'
Add to M1 tally
A
off
SLT 1
On
PRINT
Sentinel
M1'
End of file
M1'
Rewind
M1', C3, C4
Print Controls
on-line
Restore all exits,
tables etc for
next PCU
SYSTEM
Read
Control Card
last PCU
Halt
more PCU's follow
Halt
Start

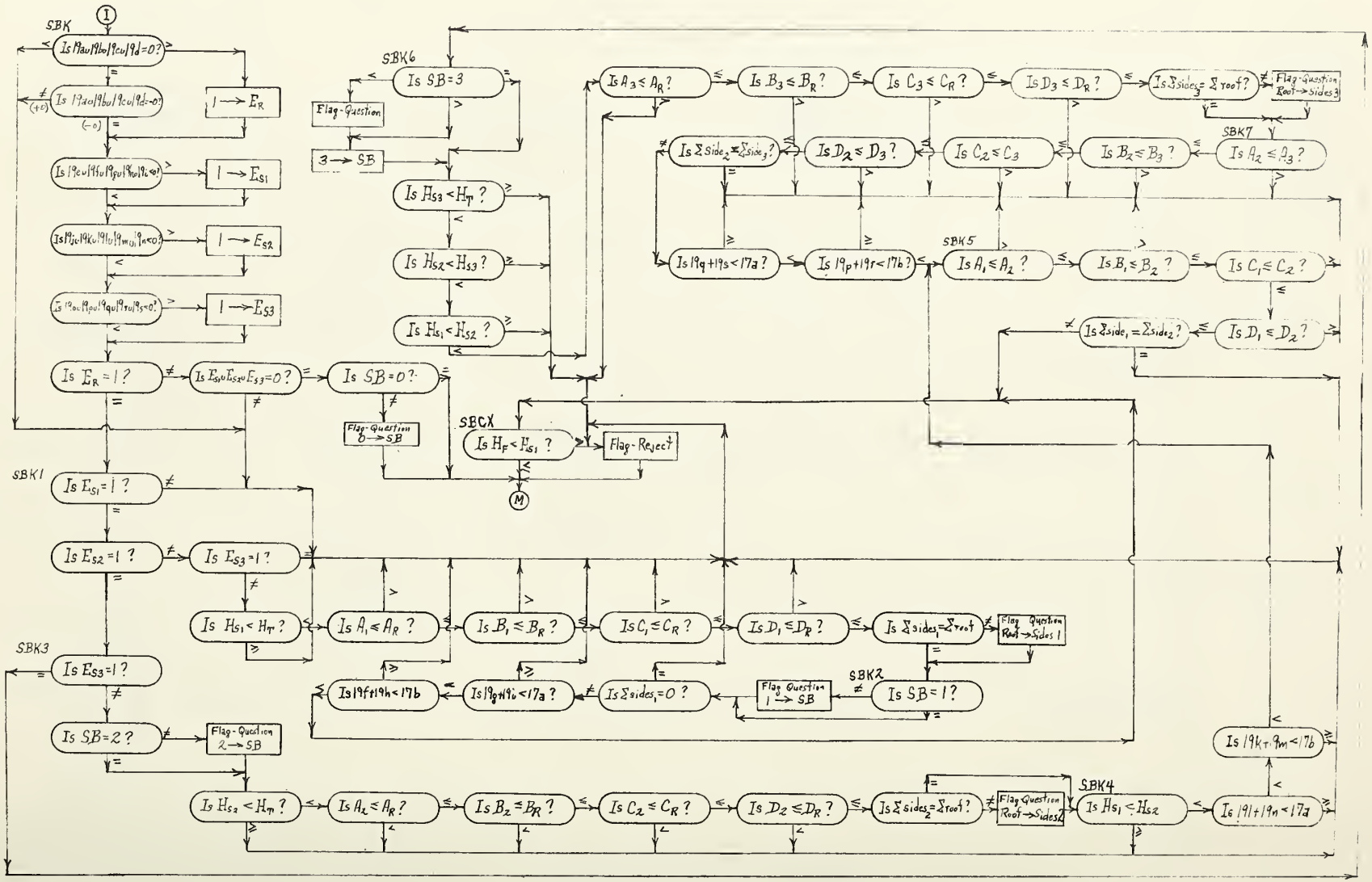

C
XSB1
0 → E_B, E_F, E_U, E_C, E_S1, E_S2, E_S3, E_R, SC
X = 23a ∪ 23b ∪ 23c ∪ 23d ∪ 23e ∪ 23f ∪ 23g ∪ 23h ∪ 23i ∪ 23j ∪ 23k ∪ 23l
Is X < 0?
≥ numeric
1 → E_B
(all blanks or mixed)
X = 23q ∪ 23r ∪ 23s ∪ 23t ∪ 23u ∪ 23v ∪ 23x ∪ 23y ∪ 23z
Is X < 0?
1 → E_F
X = 23c ∪ 23d ∪ 23e ∪ 23f ∪ 23g ∪ 23h ∪ 23i ∪ 23j
Is X + ?
Is X = 0?
Is H_U = 0?
1 → E_U
X = 23c ∪ 23d ∪ 23w
Is X < 0?
Is 23c = 2?
1 → E_C
23c → SC
XSB2C
0 → 23c, 23d, 23w
XSB2
X = 23p ∪ 23t ∪ 23x
Is X < 0?
Is 23p = 2?
Is 23p < SC?
XSB3C
0 → 23p, 23t, 23x
Flag Question
23p → SC
XSB3
X = 23q ∪ 23u ∪ 23y
Is X < 0?
Is 23q = 2
Is 23q < SC
XSB4C
0 → 23q, 23u, 23y
Flag Question
23q → SC
XSB4
X = 23r ∪ 23v ∪ 23z
Is X < 0?
Is 23r = 2
Is 23r < SC
XSB5C
0 → 23r, 23v, 23z
Flag Question
23r → SC
XSBR
Flag E Reject
XSB5
Is E_F = 0?
XSB7
Is E_U + E_C = 0?
0 → σ
XSB6
Is E_U = 0?
Is E_C = 0?
1 → σ
Is E_C = 0?
2 → σ
3 → σ
E
D

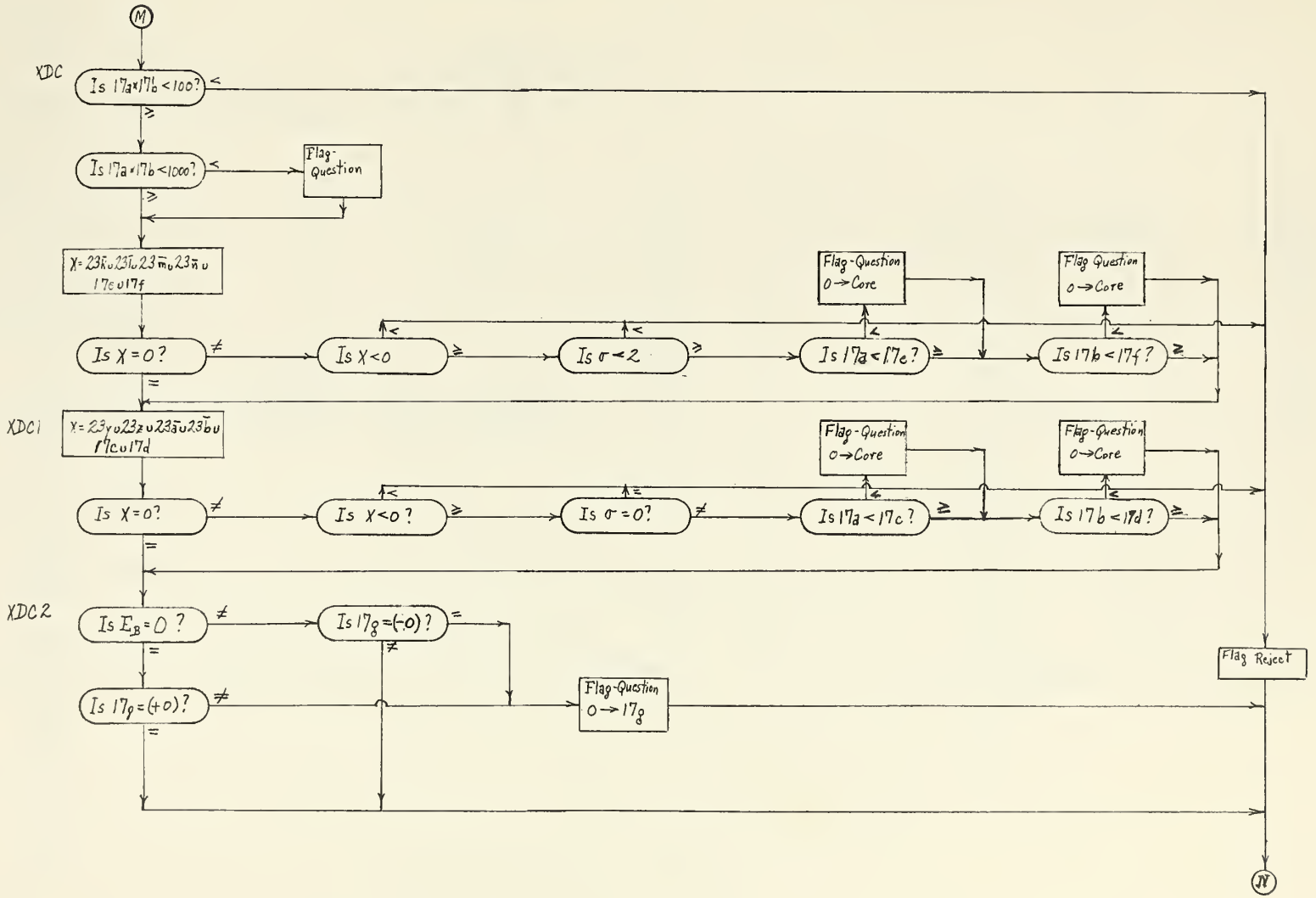

D
XSB9
Is E_B=0?
Is H_B=0?
0→E_B
Is H_B<4?
4→H_B
XSBA
Is S=0?
Is H_B=0?
0→H_B
Is B=0?
0→B
E
Flag Question E
Flag Reject E
STHT
Is S=1?
(One Story)
(Basements only)
(Multi-Story)
J
L
SOC1
Is H_T=0?
Is H_U=0?
Is H_F=0?
0→H_F E Flag-Question
SOC4
Is H_F=0?
0→H_U E Flag Question
SOC5
Is H_U=0?
Is H_T=0?
0→H_T E Flag-Question
Is σ=1?
SOC6
Is H_F=0?
Is (H_T-H_F)<0?
Is σ=2?
F
Is (H_T-H_F)<H_F/2?
G
SOC7
$\frac{H_T-H_F}{H_U}+\frac{3}{2}$→S E Flag-Question
1→S E Flag Question
SOC3
Is σ=0?
H
Is E_B=1?
Flag Reject E
Is 2<S?
Is SC<S?
I

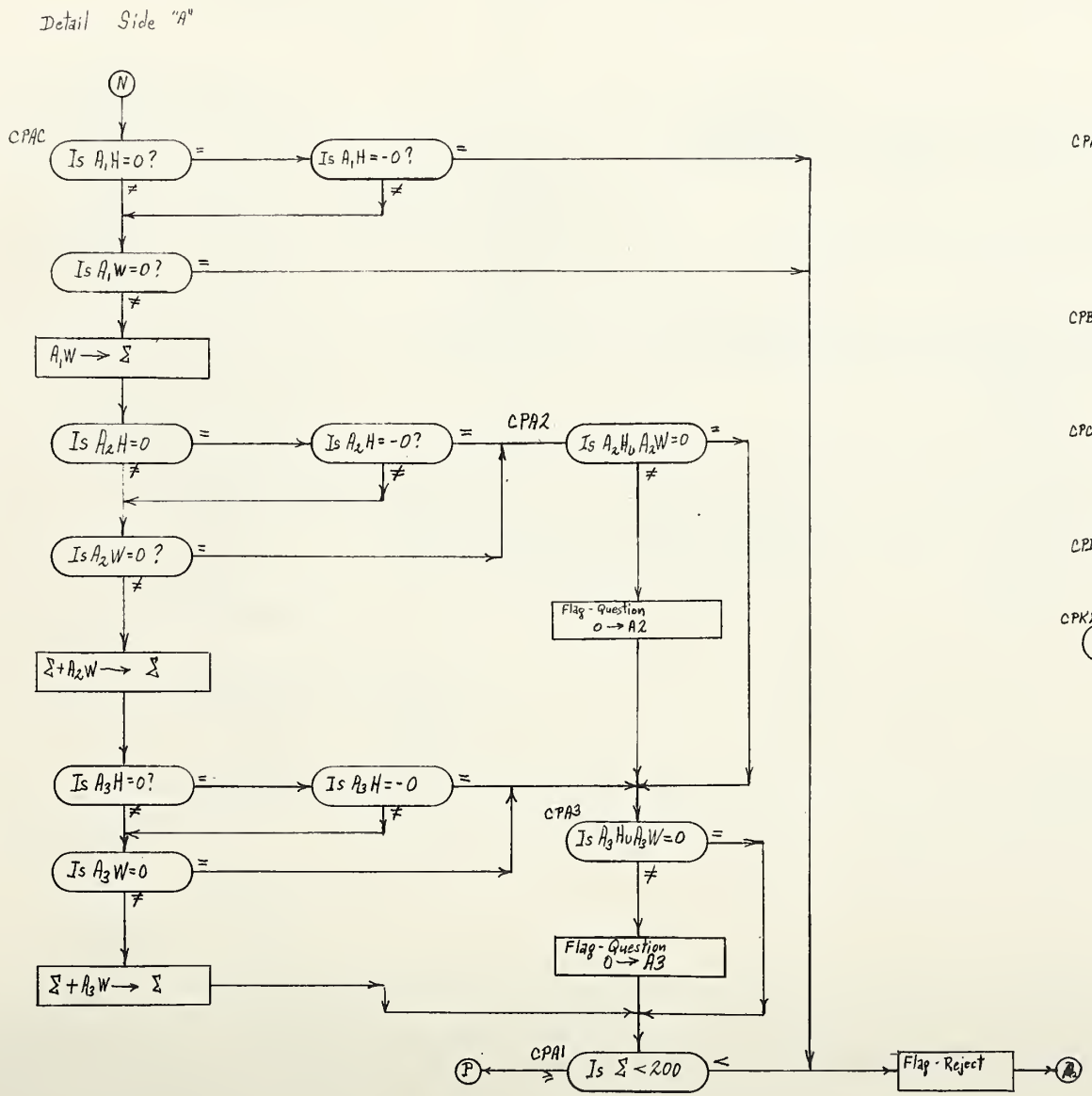
INPUT EDIT FLOW CHART PAGE 8

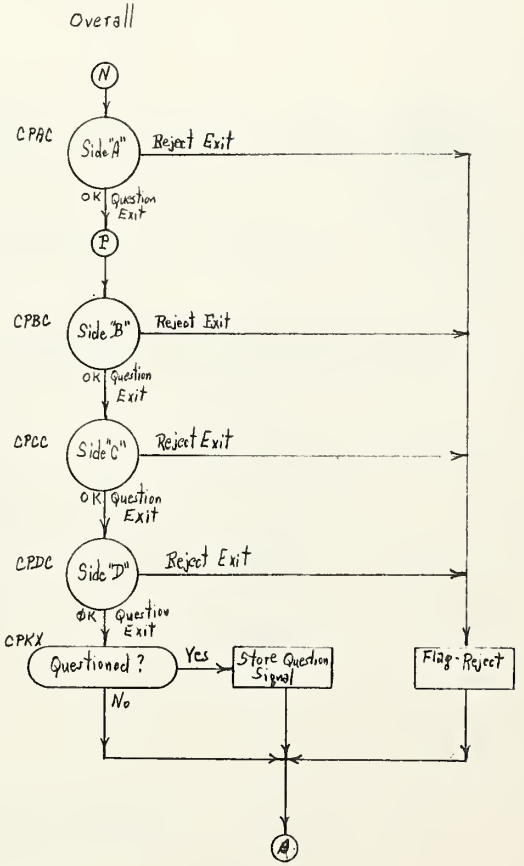



SMC1
SMC2
SMC3
SMC4
SMC5
SMC6
Is $H_n=0$
Is $H_v=0$?
Is $H_F=0$?
Is $\sigma<2$?
$H_p+(S-1)H_v \rightarrow H_T$
Is $H_F=0$?
Is $H_v=0$?
Is $\sigma=0$?
Is $\sigma=1$?
$1 \rightarrow S$
$0 \rightarrow S$
Is $E_B=1$
Is $\sigma=0$?
Is $H_F=0$?
Is $H_v=0$?
$H_n-(S-1)H_v \rightarrow H_F$
$\frac{H_n-H_F}{S-1} \rightarrow H_v$
Is $\sigma<2$?
Is $H_F<7$?
Is $H_v<7$?
Is $H_v<12$?
Is $|H_n-H_v-(S-1)H_v|<S+6$?
Is $H_n-H_F-H_v<S+6$
A
B
H
I
K


SBK
SBK1
SBK2
SBK3
SBK4
SBK5
SBK6
SBK7
SBCX
Flag-Question
Flag-Reject
Flag Question Roof→Sides 1
Flag Question Roof→Sides 2
Flag Question Roof→Sides 3
1 → E_R
1 → E_S1
1 → E_S2
1 → E_S3
3 → SB
2 → SB
1 → SB
0 → SB


M
XDC
Is 17a×17b<100?
<
≥
Is 17a×17b<1000?
Flag-Question
X=23k̄∪23l̄∪23m̄∪23n̄∪17e∪17f
Is X=0?
≠
=
Is X<0
Is σ<2
Is 17a<17e?
Flag-Question 0→Core
Is 17b<17f?
Flag Question 0→Core
XDC1
X=23x∪23z∪23ȳ∪23b̄∪17c∪17d
Is X=0?
Is X<0?
Is σ=0?
Is 17a<17c?
Is 17b<17d?
Flag-Question 0→Core
XDC2
Is E_B=0?
Is 17g=(-0)?
Is 17g=(+0)?
Flag-Question 0→17g
Flag Reject
N


Detail Side "A"
N
CPAC
Is A1H=0?
Is A1H=-0?
Is A1W=0?
A1W → Σ
Is A2H=0
Is A2H=-0?
CPA2
Is A2Hb A2W=0
Is A2W=0?
Flag - Question 0 → A2
Σ+A2W → Σ
Is A3H=0?
Is A3H=-0
CPA3
Is A3Hb A3W=0
Is A3W=0
Flag - Question 0 → A3
Σ+A3W → Σ
CPA1
Is Σ<200
Flag - Reject
P
A


Overall
N
CPAC
Side "A"
Reject Exit
OK Question Exit
P
CPBC
Side "B"
Reject Exit
OK Question Exit
CPCC
Side "C"
Reject Exit
OK Question Exit
CPDC
Side "D"
Reject Exit
OK Question Exit
CPKX
Questioned?
Yes
Store Question Signal
No
Flag - Reject
A

APPENDIX IV

PF PRINT

FLOW CHART MNEMONICS

FF = Fosdic Form

ITC = Index of current FF being processed within this record

RECNO = Record index of current input record being processed

LSTOR = Storage for unpacked FF

LSTOR + 134 = 0 only if current FF has been completely processed

MS1 or MS2 = Master File 1 or 2

PF = Protection Factor

SL = Standard Location

12AB = The OCDM code of the SL

Floor = 0 only if there are no shelters ≥ 20PF in FF to date

TAPE ASSIGNMENTS

Input:	M1	B5
	MW0	B6
Output:	M2	A7, B7
	P2	A9

INPUT CARD: Example

Words 1-4 = ΔΔDECΔ20Δ1961Δ...Δ

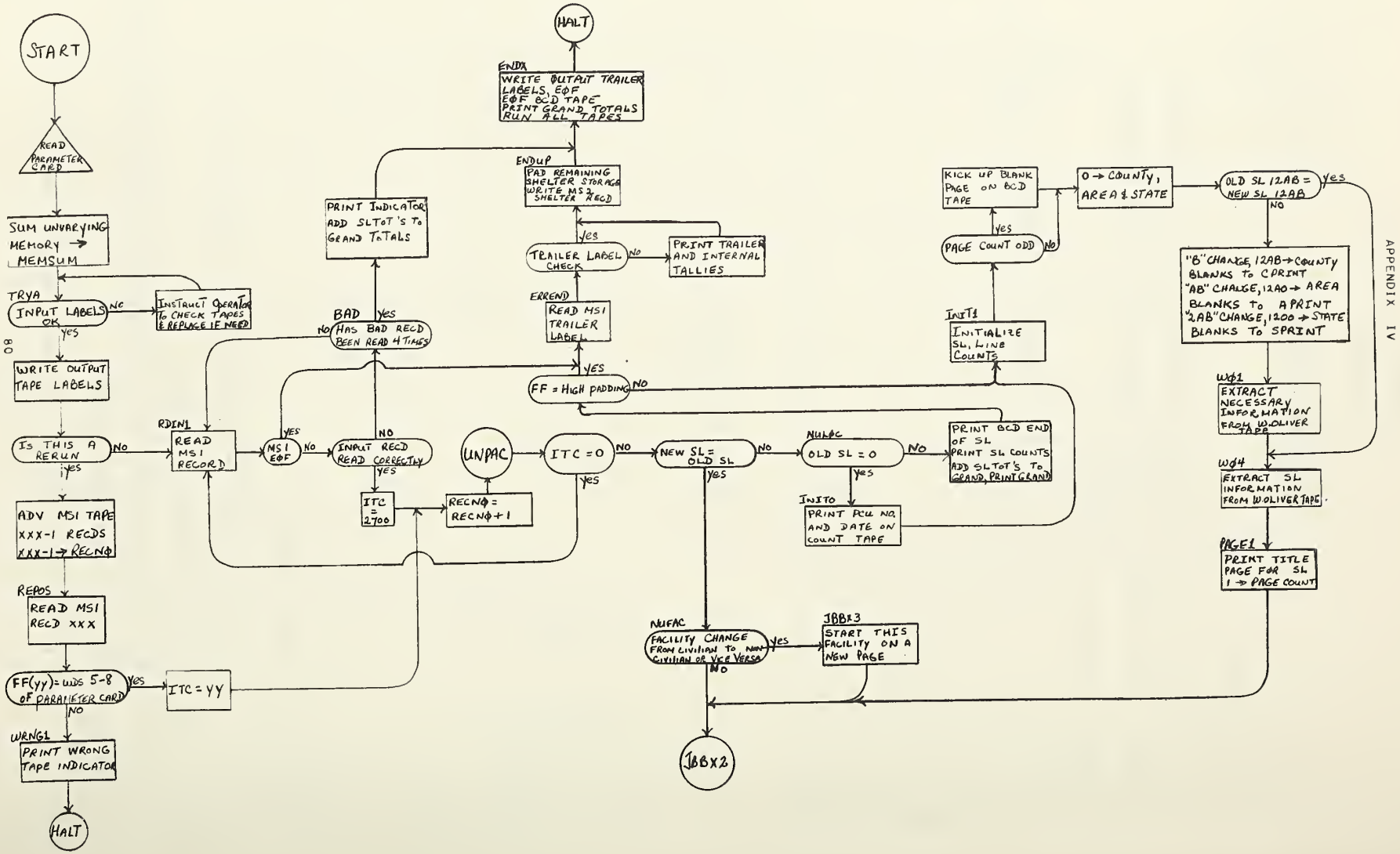
5-8 = 12AB5678FOCC12345PNROONP which is words 1-4 of FF

9_L = 000 for beginning of PCU

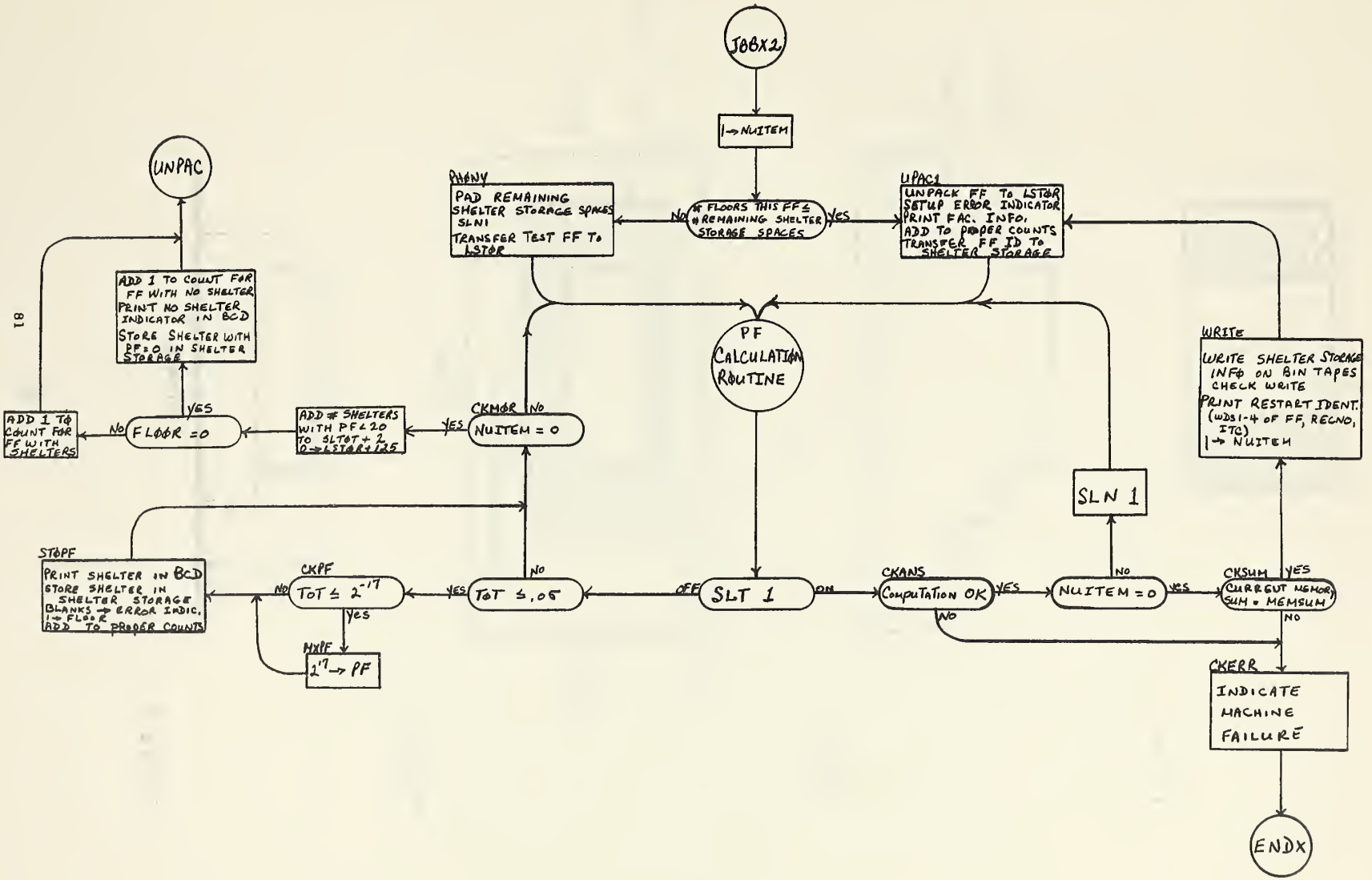
= XXX for rerun where XXX = record No. in which 1st usable FF occurs

9_R = 0000 for beginning of PCU

= yyyy for rerun where yy = index of 1st usable FF.


START
READ PARAMETER CARD
SUM UNVARYING MEMORY → MEMSUM
TRYA
INPUT LABELS OK
NO
INSTRUCT OPERATOR TO CHECK TAPES & REPLACE IF NEED
YES
80
WRITE OUTPUT TAPE LABELS
IS THIS A RERUN
NO
YES
ADV MSI TAPE XXX-1 RECDS XXX-1 → RECN∅
REPOS
READ MSI RECD XXX
FF(yy) = WDS 5-8 OF PARAMETER CARD
YES
ITC = YY
NO
WRNG1
PRINT WRONG TAPE INDICATOR
HALT
RDIN1
READ MSI RECORD
MSI EOF
YES
NO
INPUT RECD READ CORRECTLY
NO
YES
ITC = 2700
RECN∅ = RECN∅+1
UNPAC
ITC = 0
NO
YES
NEW SL = OLD SL
NO
YES
NULOC
OLD SL = 0
NO
YES
INITO
PRINT PCH NO AND DATE ON COUNT TAPE
PRINT BCD END OF SL PRINT SL COUNTS ADD SLTOT'S TO GRAND, PRINTGRAND
NUFAC
FACILITY CHANGE FROM CIVILIAN TO NON CIVILIAN OR VICE VERSA
YES
NO
JBBx3
START THIS FACILITY ON A NEW PAGE
JBBx2
BAD
HAS BAD RECD BEEN READ 4 TIMES
NO
YES
PRINT INDICATOR ADD SLTOT'S TO GRAND TOTALS
ENDP
PAD REMAINING SHELTER STORAGE WRITE MS2 SHELTER RECD
ERREND
READ MSI TRAILER LABEL
TRAILER LABEL CHECK
YES
NO
PRINT TRAILER AND INTERNAL TALLIES
ENDX
WRITE OUTPUT TRAILER LABELS, EOF EOF BCD TAPE PRINT GRAND TOTALS RUN ALL TAPES
HALT
FF = HIGH PADDING
NO
YES
INIT1
INITIALIZE SL, LINE COUNTS
PAGE COUNT ODD
NO
YES
KICK UP BLANK PAGE ON BCD TAPE
0 → COUNTY, AREA & STATE
OLD SL 12AB = NEW SL 12AB
YES
NO
"B" CHANGE, 12AB → COUNTY BLANKS TO CPRINT
"AB" CHANGE, 12A0 → AREA BLANKS TO APRINT
"2AB" CHANGE, 1200 → STATE BLANKS TO SPRINT
WØ1
EXTRACT NECESSARY INFORMATION FROM WOLIVER TAPE
WØ4
EXTRACT SL INFORMATION FROM WOLIVER TAPE
PAGE1
PRINT TITLE PAGE FOR SL 1 → PAGE COUNT

APPENDIX IV


JOBX2
1→NUITEM
UNPAC
PHONY
PAD REMAINING SHELTER STORAGE SPACES SLN1
TRANSFER TEST FF TO LSTOR
FLOORS THIS FF ≤ # REMAINING SHELTER STORAGE SPACES
NO
YES
UPAC1
UNPACK FF TO LSTOR
SETUP ERROR INDICATOR
PRINT FAC. INFO.
ADD TO PROPER COUNTS
TRANSFER FF ID TO SHELTER STORAGE
ADD 1 TO COUNT FOR FF WITH NO SHELTER
PRINT NO SHELTER INDICATOR IN BCD
STORE SHELTER WITH PF=0 IN SHELTER STORAGE
PF CALCULATION ROUTINE
WRITE
WRITE SHELTER STORAGE INFO ON BIN TAPES
CHECK WRITE
PRINT RESTART IDENT. (WDS 1-4 OF FF, RECNO, ITC)
1→NUITEM
ADD 1 TO COUNT FOR FF WITH SHELTERS
FLOOR =0
YES
NO
ADD # SHELTERS WITH PF≠20 TO SLTOT+2
0→LSTOR+125
CKMOR
NUITEM = 0
SLN 1
STOPF
PRINT SHELTER IN BCD
STORE SHELTER IN SHELTER STORAGE
BLANKS → ERROR INDIC.
1→FLOOR
ADD TO PROPER COUNTS
CKPF
TOT ≤ 2^-17
MXPF
2^17 → PF
TOT ≤ .05
SLT 1
OFF
ON
CKANS
COMPUTATION OK
NUITEM = 0
CKSUM
CURRENT MEMORY SUM = MEMSUM
CKERR
INDICATE MACHINE FAILURE
ENDX

APPENDIX V

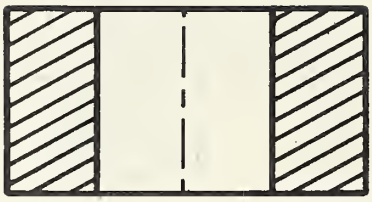


Figure 1

Figure 2

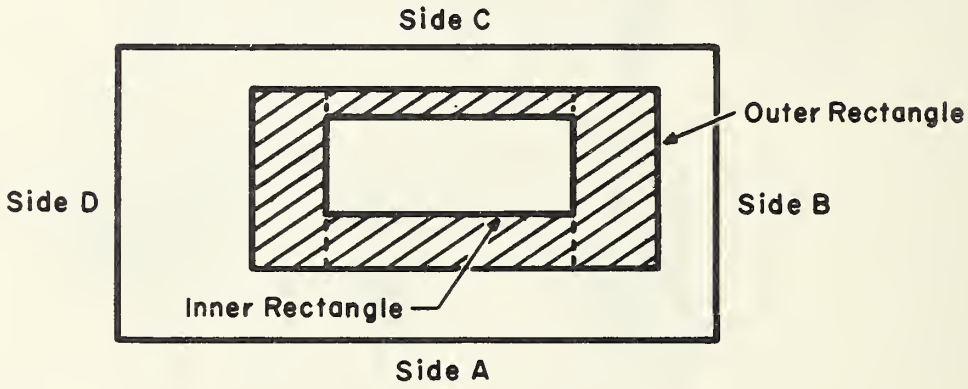


Figure 3

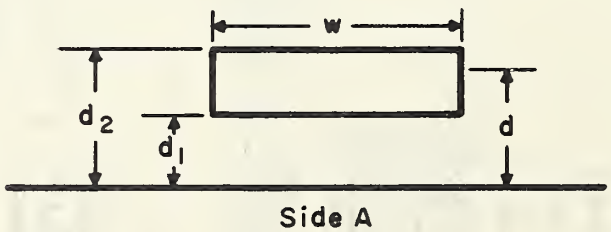


Figure 4

APPENDIX V

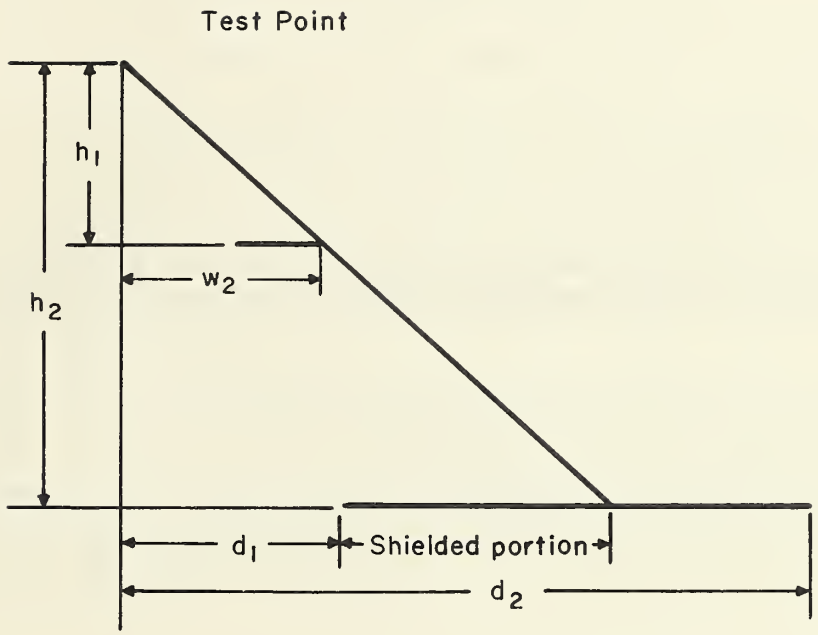


Figure 5

'63 Differences

There was only one conceptual difference between the procedures used for processing the '62 Fallout Shelter Survey and those used for '63 data. This change was introduced to permit changes in identification keys and/or certain fields in the M1 and M2 files. The procedure is described in 13.0 and by data routing diagram on page 62A.

However, all of the other computer programs had to be modified to some extent. In some programs, the only changes involved were those to permit a two character revision number; in others, extensive reprogramming was required.

The changes within each program were necessary to allow for two definitions of "shelter" (PF ≥ 40 and PF ≥ 100), representation on P2 and M2 of all shelter with PF ≥ 10 rather than 20, new definitions for capacity for low PF categories, or to provide ability to distinguish between '62 and '63 data in M1 and M2 files.

The effect of these modifications on the print files P2, P6, P7, P8, and P9 and the new file P 10 is explained by the new formats for these files.

In general the descriptions of programs in NBS Report 7826 remain valid except where superseded by addition, deletion or replacements as indicated by the following notes.

1. Goal OK

2. File Numbering

I. C6 addition

II. OK

III. OK

IV. P1 and P1A change
add extra summary P's

3.10 A add
C6

3.11 new P file and I1 and P1A changes

4. Sorts
C6
M1 change

5. MWO OK except MW not updated for 63

6. Input Edit
Add after 2nd paragraph 2 character rev. const. rules.

7.1 PF 10

7.2 PF 10

7.14 Categories -- dual definition of shelter

9. Report files (additional?)

13. Addition

Appendices

Page	47A	Change memo and example
	48	format for 2 clear revision
	53	Replace
	54	Replace
	56-61	Replace
	62A	Add change information flow

2. FILE NUMBERING SYSTEM

Add (F) C6 was a printed memorandum containing identification fields of an item in the system to be changed and the new identification fields for that item. ~~A new name field could appear on C6, but change of name was optional.~~ Fields which were allowed but not required to change were name, Physical Vulnerability, Owner code, and Use Code. If any of the latter fields appeared as blanks, the old value for that field was left unchanged.

~~Fields which could be affected by C6 item were, Name,~~ Physical

Change IV (B) ~~PIA~~ contains all B, C, and D items from ~~PI~~. E, F, and G items do not exist for '63.

After 3.10 C5 File
Add 3.10A C6 File

Each C6 item was received at NBS as a printed memorandum. Each item represented an item within the system for which the identification fields and/or the ~~name field~~ had to be changed. Each item was transcribed to ~~a~~ two punch cards ~~which was~~ were stored in a C6 card subfile until an updating cycle was begun.

Each card contained the old identification key of twenty characters. The remaining forty columns of the card were either left blank or contained a new name field; if these columns contained only blanks, the name field of the item in the system remained unchanged; if these columns had at least one non-blank character, the forty columns plus ten blanks replaced the fifty character name within the item.

name, Physical Vulnerability, Owner code or Use code

Each card of the item contained the old identification key of twenty characters plus one character to indicate card within item. In addition card one contained a new identification key and could have new values for any fields from among Physical Vulnerability Use Code, and Owner code. Card two had only the old identification key, a card number, and possibly a new name of forty characters. Updating procedure unconditionally replaced the identification key

of the M1 item, corresponding to the old identification Key of C6 by the new identification key. The remaining fields of M1 subject to change were replaced ~~only~~ by corresponding fields from C6 if & only if the C6 field ~~was~~ did not contain all blanks. These fields were changed independently of each other.

3.11 P Files

In paragraph 2, line 2, omit "having a non-zero revision number".

4. SORTS

Replace last sentence of paragraph 1 by:

The C5 and C6 subfiles were sorted on the same key for input to the M2 creation program and the M1 change program respectively.

4. SORTS

Replace paragraph 3 by:

The M1' change file created by the match-merge of C6 and M1 was sorted using the same key as that used for sorting C3 and C4. Thereafter, the M1' was treated exactly as a normal M1' file.

5- MWC Construction

The MWC file was not altered in the '63 production.

6. INPUT EDIT PROGRAM

After paragraph 3 add:

For '63 data the revision numbers were changed in M1' by the program from those appearing on C3 and C4 so that:

0	became	20
1	"	21
2	"	22
3	"	23
4	"	24
5	"	25
6	"	26
7	"	17
8	"	18
9	"	19

This was done to insure that updating of the file would follow rules for schedule submission for '63 data and to provide a method of distinguishing between '62 and '63 data.

Page 8

In 6.3

In the table showing error types, ignore the last column. The next-to-last column now indicates error type regardless of revision number.

Page 15

6.8

add to 1st paragraph

If total area > 100 but < 1000 item was questioned.

Page 23 7.14

see next page

Category 1 if $10 \leq PF \leq 39$

~~Category~~

The shielded areas were computed by multiplying the floor area by factors corresponding to the PF category as follows:

	For PF ≥ 100 criteria:	For PF ≥ 40
Category 1	the factor was 0	0
2	" " " 0	.4
3	" " " 0	.7
4	" " " .3	.8
5	" " " .7	.9
6,7,8	" " " 1.0	1.0

Page 16 7.0- PF ~~Calculation~~ Calculate and Print
Substitute "10" for "20" throughout for minimum value of PF.

Add

13. Change Procedure

From each C6 item, a C5 item was constructed; the C5 item was used in the Update-Summary Program (See 8.1) exactly as a normal C5 item in updating the M2 file.

The sorted C6 file was then used to match-merge against the M1, M1' or M1" file. Inputs to the program were M1* and C6; outputs were M1*new (those items from M1 which were not found on C6), M1' change (those items on both M1 and C6 with appropriate changes made -- this file had to be sorted before any further use) and C6 new (those items from C6 for which no matching item was found on M1).

The C6 new tape then had to be used to match-merge against the other M1 file.

*This was M1 only when changes were made on '62 data; for '63 changes this file was M1' or M1", but the procedures were identical.

Page 47 add 47A C6 Change Sample
Page 48 M2 format
Page 51 Sample (replace)
" 53 " "
" 54 " "
" 55 " " add 55A Change Sample
Pages 56-61 " "
add 62A Change cycle

U. S. DEPARTMENT OF COMMERCE
Luther H. Hodges, *Secretary*

NATIONAL BUREAU OF STANDARDS
A. V. Astin, *Director*

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