NATIONWIDE NUMBERING PLAN AND DIALING PROCEDURES

EFFICIENT CODE UTILIZATION AND CONSERVATION PROGRAM

(Ref. E.L. 2821/GL74-03-160)

CONTENTS PAGE

1. OBJECTIVE

1.01 With the exhaust date of all NPA codes estimated to be only about 25 years ahead, conservation and efficient use of all codes is, more than ever before, a matter of vital importance. Wise code administration is essential in all NPAs, and the need for code relief measures should be deferred as long as practically and economically feasible.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 Analysis of the 1971 COCUS data indicates that the North American Dial Network will deplete its supply of the remaining 25* unassigned NPA type codes in the 1995 to 2000 time frame. It will then become necessary to utilize the current universe of 640 central office codes as NPA codes, beginning with specific NNO codes as outlined in GL73-06-108, and the entire Dial Network must be arranged to accept "interchangeable codes."

In addition to the 21 currently unassigned NPA type codes, it is anticipated that four NPA type TWX codes will be released by Western Union in the 1985 to 1990 time frame.

1.04 The modification required to convert all switching systems for interchangeable codes, on an industry-wide basis, will incur a multimillion dollar expenditure. However, this cost can be minimized by deferring these modifications to a point in time of maximum ESS, since the expenditures are largely controlled by the quantity of electromechanical common control switching equipment remaining in service at the time of conversion. Therefore, every practical measure must be taken

to conserve the assignment of new NPA codes and delay as long as possible the multimillion dollar expenditure of the ultimate arrangement.

2. HISTORICAL BACKGROUND

2.01 When the DDD plan was envisioned in the 1940s, a Nationwide Numbering Plan was designed whereby any telephone in the United States and Canada would be identified by a 10-digit unique address: namely, a 3-digit area code and a 7-digit (two letter - five numeral) telephone number. The two letters used were the first two of the exchange or building name. It was thought at that time that the distinct numbering scheme, which provided 152 NPA codes of the N0/1X* format, would last into the distant future. While there were 160 possible codes of the N0/1X format, the eight codes ending in "11" were reserved for System Service Codes.

*Where: N = the eight digits 2 through 9
0/1 = the two digits 0 and 1
X = the ten digits 0 through 9

2.02 Initially, when the basic numbering plan was introduced in 1947, 86 of the available 152 NPA codes were assigned. Today, 131 NPA codes are in use or reserved. As early as the 1950s, it was recognized that the original plan would not be able to accommodate truly long-term code requirements. Many extensive studies were made to determine what changes, if any, would be appropriate. The studies considered a multitude of alternatives, but there still seemed to be overriding merit in retaining the basic structure of the 10-digit concept for the North American Dial Network. However, this method limited the quantity of usable exchange names because of word structure. Although letters appear in eight dial locations, and 64 (8 × 8) combinations are possible for the first two dial pulls, four of these combinations, the letter equivalents of 55 (JKL, JKL), 57 (JKL, PRS), 95 (WXY, JKL), and 97 (WXY, PRS), were not considered suitable for exchange names. This left only 60 combinations for the first two dial pulls. For the third pull, there were nine possibilities, 1 through 9. The zero (0) was not considered suitable for the third dial pull because of the possible confusion with the letter "O." The 60 combinations for the first two dial pulls multiplied by the nine combinations of the third dial pull (60 × 9) made it possible to use only 540 codes for central office code assignments. Once the 540 codes were assigned in the faster growing NPAs, it was recognized that additional NPAs would be required. It became obvious that the original numbering system would be inadequate to meet the long-term requirements for telephones in the North American Dial Network, as implied by more recent estimates.

2.03 A partial solution was found in adopting "All Number Calling" (ANC), which expanded the central office code universe from 540 to 640. This was accomplished by recapturing the four combinations of the first two dial pulls mentioned above and by dropping the aversion to the digit "0" for the third dial pull. With ANC, there are eight combinations for the first and second dial pull [one (1) and zero (0) are not used] and ten combinations for the third dial pull. This gives a total of 640 NNX* combinations (8 × 8 × 10) available for assignment as central office codes.

*Where: N = the eight digits 2 through 9

X = the ten digits 0 through 9

2.04 Basic economic considerations in initial switching equipment design made it possible for NPA codes and central office codes to be recognizably different. A zero (0) or a one (1) had to be present in the "B" or second digit position and absent in the "E" or fifth digit position for a valid 10-digit call. On a valid 7-digit call the absence of a zero (0) or a one (1) in the "B" or second position was required. Thus, the switching equipment was always able to distinguish a 7-digit and a 10-digit call merely by examining the second and fifth digit received. However, with the introduction of "interchangeable codes," these simple examinations of digits are no longer valid, since interchangeability expands the universe of 640 central office codes to 792 by adding the 152 N0/1X codes currently reserved for use as NPA designations only. As a long-term code relief arrangement, around the year 1995, it will become necessary to expand the principle of code interchangeability through assigning the current 640 central office (NNX) codes as NPA codes. The equipment modifications for code interchangeability are identical for the expansion of either the central office or NPA code universe.

2.05 When it becomes necessary for an NPA to introduce interchangeable codes and the equipment must resolve NPA-CO code ambiguity,

the following alternatives are available as described in E.L. 3086 (GL74-07-004) or Section 781-610-100:

(a) A 3- to 5-second timing interval may be introduced after the seventh digit. If additional digits are received within this interval, the call will be processed as a 10-digit call. If no additional digits are received, interdigital time-out will occur and the call will be processed as a 7-digit call.

or

(b) Introduce the prefix code "1" to distinguish between the 7- and 10-digit formats. With this modification, the prefix code "1" always means that ten digits will follow, including those toll calls placed within the Home NPA that require the prefix "1" for toll access. With the "0+" dialing procedure, either timing is employed to differentiate the 7- and 10-digit traffic, or all "0+" calls must be placed on a 10-digit basis, including the Home NPA calls.

2.06 Bell Laboratories has conducted several human factors experiments to evaluate customer annoyance considerations associated with various dialing procedures proposed for the North American Dial Network, including the alternatives cited above. The preliminary results from the experimental data to date suggest that timing is slightly ***less*** desirable, from a customer point of view, than additional digits. In addition, timing is not only substantially more expensive to implement but slows the completion of many of the predominant 7-digit calls. However, some corroborative data are still required to assure reliability of the previously obtained study data. Once the planned additional human factors data are obtained, and if the results support the preliminary conclusions reached from the data previously gathered, it is likely that the "1+" (or "prefix") method to resolving NPA-CO code ambiguity will be adopted for universal use throughout the entire Dial Network. But, should the results be other than correlative, a decision will be more difficult and perhaps require more extensive studies.

2.07 Until a definite decision has been announced and recommended to the system, it is suggested that the "1+" (or "prefix") method be used, rather than timing, for study purposes. Additional guidelines and information are outlined in GL74-01-102.

3. GUIDELINES FOR CODE RELIEF DEFERRAL

3.01 It is recognized that every code utilization situation is unique and must be evaluated on a local level with both service and economics in mind. The following guidelines should be considered as fundamental to every Telephone Company's code conservation program.

CODE PROTECTION

3.02 Code protection for adjacent NPAs, so that customers may dial local calls across NPA boundaries on a 7-digit basis, appears to have desirable service aspects as long as it may be accomplished without exhausting the CO code capacity of the Home or the Adjacent NPA(s) in the near future. However, central office code protection should be eliminated when either NPA involved approaches exhaust. This will release these codes for regular central office assignment and defer relief. The discontinuance of 7-digit local dialing across NPA boundaries, with the consequent substitution of ten digits, is far less disruptive to customers and more economically attractive than having to introduce interchangeable codes, split the NPA, or realign the NPA boundary to provide code relief.

DEDICATED CENTREX CODES

3.03 Dedicated Centrex codes should be eliminated unless a Centrex customer requires, or is expected to reach, the administrative maximum code fill within the life of the existing code universe. Otherwise, good planning suggests that the Centrex customer share a code with other Centrex and/or POTS customers.

3.04 The following additional guidelines are recommended to be observed in the assignment of Centrex numbers and codes:

(a) To fully utilize a central office Centrex code, individual Centrex installations expected to exceed 7000 numbers should be established on a 5-digit dialing arrangement within the Centrex code, or 2-digit access codes should be assigned for tie lines, dial dictation and paging services, Centrex attendant, etc.

(b) If a Centrex customer requests a specific code or number, it should be explained that it is usually impractical to meet such requests

without impairing the Company's ability to meet its total service obligations.

(c) Centrex customers should be advised that other customers may share the same central office code, except those customers that have actual and forecasted requirements of administrative capacity within the life of the existing code universe.

MULTILINE HUNTING

3.05 Multiline hunting feature available in X-Bar offices and ESS machines offers an excellent opportunity to conserve number assignments and reservations. Unless a customer's functions are identified by individual line number, a 7-digit number is not required for each line of a multihunting group. This feature becomes especially important whenever Panel or step-by-step is replaced with ESS, because it may permit the release of 7-digit numbers for other subscriber assignments and thus increase code efficiency.

MULTICODE ASSIGNMENTS

3.06 Multicode assignments in small Community Dial Offices, both Bell and Independent, are discouraged based on the resulting poor code utilization. All requests for central office codes in these situations should be carefully evaluated economically and in terms of convenience versus actual need for a multiple code office.

FOREIGN EXCHANGE

3.07 Foreign Exchange (FX) service is normally provided by cable or carrier to the foreign exchange. However, for economic and other reasons, in some cases this type of service has been established with special central office codes in the subscriber's regular central office. Every effort should be made in exhausting NPAs to recapture special FX codes with number fills significantly below the average of the NPA and release them for regular central office code assignment. If proper plans to recapture these codes are prepared well in advance, the number changes required will be minimal.

RESERVED CODES

3.08 Reserved codes to care for growth in individual offices, based on forecasts made which reserved specific central office codes for activation at some future date as required, should be reviewed frequently. These reviews may indicate that some code reservations may be released because of rate and/or growth pattern changes. This type of review is especially important where central office codes are critical and at a premium.

SPECIAL CODES

3.09 Special codes that are dedicated and required for miscellaneous purposes, such as DDD customer instruction, special billing, mass calling, announcement service, etc, should be avoided. In addition, every effort should be made to recapture those dedicated codes which differ from the standard System codes dedicated exclusively for such services as: Time (844), Weather (936), Test Codes (958 and 959), and Emergency Service (911).

RATE CHANGES

3.10 Rate changes that offer code relief should be made as opportunities present themselves. With the growing offering of optional telephone services to meet customer requirements, careful coordination is needed among the appropriate departments to review in detail the central office and NPA code situation before proceeding with rate-making plans and decisions.

3.11 In NPAs where a single wire center serves several groups of subscribers with differing toll rate structures, code efficiency may have been affected. The originating rate differences may be handled in Step-by-Step offices by number segregation and in common control offices by class of service segregation. However, rate discrimination on a terminating basis in the same equipment entity requires the use of additional central office codes. The consolidation of rate centers should be done as opportunities exist or arise, without incurring noticeable adverse customer reaction and/or loss of revenue. In addition, the 2-way optional service plans that require dedicated central office codes with low code fill should be avoided and existing arrangements considered for elimination as opportunities arise.

NEW WIRE CENTER

3.12 New wire center planning should be studied with the latest, most reliable wire centering techniques. While new wire centers are often justified by outside plant savings, the additional

code(s) required have a partially offsetting value. Investigate the feasibility of utilizing unigauge cable and subscriber loop carrier (SLM) facilities for economically extending the serving range of the existing wire centers instead of assigning a new central office code.

MOBILE AND PAGING

3.13 Mobile and Paging service rate situations that involve a charge for land-to-air Mobile and/or Paging, which is different from the rate to the terminating office location, should be avoided since these types of services create a requirement for dedicated central office codes. Further guidelines may be found in GL73-10-006 or GL73-11-124.

DENSITY PATTERN

3.14 Density pattern analysis of code fills as outlined in GL72-06-063, and as illustrated in the 1971 COCUS results and Section 27 of the 1971 PIR, is a good tool for evaluating the efficiency of central office code utilization. The traditional measurement of code utilization is to calculate the number of telephone numbers working per assigned central office code within an NPA. However, this type of measurement by itself does not give a true indication of the relative efficiency of central office code usage. Any measurement of code efficiency must include the influence that geographic telephone number density has on wire center planning and that rate planning has on exchange boundary selection. Density pattern analysis quantifies the influence of telephone number dispersion on central office code fill by taking into account the telephone numbers served per square mile of land area and is recommended as a code utilization yardstick. An ***average*** code fill of about 7000 telephone numbers per assigned central office code, excluding protected, special, and test codes, is considered to be excellent in a metropolitan NPA environment. Many nonmetropolitan NPAs should be able to achieve an average code fill in the vicinity of 5000 telephone numbers per code by the time relief becomes imminent.

VALUE OF A CODE

3.15 The value of a code should be included in all economic studies involving the discretionary use of additional codes or the retrieval of codes already in use. Since the effect of using or retrieving an incremental code is a very small shift in the timing of the large future expenditures required for code relief, the most practical way of quantifying code value is to determine the present worth effect of the shift in timing. This approach tends to yield very low code values when code relief expenditures are in the distant future and rather high code values as code relief expenditures become imminent. It is, in fact, likely that economic analysis would suggest the discretionary use of codes to achieve other minor savings 15 or 20 years in advance of relief, but would also justify substantial expenditures to recover the same codes a few years in advance of relief. Thus, present worth studies of this type cannot be used as the sole criteria for decision making, because they fail to reflect any constraints in the availability of future funds and may suggest the desirability of avoidable future expenditures. In addition, the cumulative effect of many decisions to use codes to achieve minor savings can result in a major advance in the timing of code relief and a major escalation in future relief costs.

3.16 The following procedure is recommended for use in estimating the value of a code for use in a comparison of alternative plans on a Present Worth of Annual Costs (PWAC) basis:

(a) For the NPA(s) being studied, identify the timing of future relief measures; such as, code retrieval, code interchangeability, NPA boundary realignment, and NPA split(s). All these items affect the expenditures related to code usage, since the value of a code will largely depend on "***where***" the NPA is today in relation to "***when***" code relief is required.

(b) Calculate the one-time expenses associated with each of the future events mentioned in (a) above.

(c) Calculate the capital expenditures associated with each of the future events mentioned in (a) above and all related AC (Annual Costs).

(d) Calculate the shift in timing of each of the future events mentioned in (a) that would result from the code assignment or retrieval under consideration.

(e) Based on the timing shift determined in (d), calculate the difference in PW (Present Worth) of the one-time expenses in (b) and the PW of the increments in AC determined in (c). The sum of all these is the current value of

the code(s) under consideration and should be included in a PWAC (Present Worth of Annual Costs) analysis of the plans under study.

3.17 It must be recognized that all PWAC studies share intangibles which are unpredictable when dealing with future events. Furthermore, factors other than economic considerations may influence the decision-making process of choosing the best and most practical alternative. However, the results from such an analysis will help emphasize the critical significance of efficient code utilization and conservation.

3-ROW TWX

3.18 In most cases, 3-row TWX stations are assigned to the central office code in the office where they are terminated. In some cases, however, 3-row stations are assigned to theoretical codes for rating purposes. The assignment to theoretical codes results in very inefficient code utilization and should be discontinued by using the "basket-code" concept, that is, a small reserved number series within a POTS code already working in the office where the 3-row customer is terminated may be used as a "basket-code." If there is only one code for that office, arrangements should be made with Accounting for that code to be used as a "basket-code" for rating purposes. With the continuing decline of 3-row stations, as service is converted to 4-row, a constant review of those central office codes used exclusively for 3-row TWX service is highly recommended. For additional guidelines and administrative procedures, refer to GL72-12-133 and GL73-06-098.

CENTRAL OFFICE CODE SHARING

3.19 Central office code sharing merits consideration whenever plans are being prepared to assign another central office code to an entity that is located within the same rate center. Code sharing is the concept of assigning a central office code to two or more entities in order to gain increased code utilization in low fill offices, provided the current number fill and projected growth in the entities involved make it feasible to do so. Since the numbers in the code would be allocated to individual offices by thousands (1000s) groups, central office code sharing requires the effective expansion of a central office code from three to four digits, ie, the central office code plus the first digit of the line number. While switching equipment now translates up to three digits to determine the proper routing of a call within the Home NPA, this type of code sharing would require that those offices sharing the code and all offices with direct trunk groups to the sharing offices be equipped for four or "D" digit translation.

3.20 Some code-sharing opportunities currently exist. One example is code sharing with ESS. For a nominal cost, codes may be shared by two end office switching entities within the same rate center and building, provided one entity is an ESS unit. This type of code sharing has application when one entity serving the exchange area has reached switching capacity but can utilize only part of one of its central office codes. By assigning the lower half of the line numbers (0000 through 4999) to the existing unit and the upper half (5000 through 9999) to the relief unit (or vice versa), only one code is required thus maximizing both code efficiency and utilization. Recognizing that transmission, trunking, and switching penalty costs are associated with current code-sharing methods, both feasibility and economics should be evaluated in each candidate situation. The current possibilities for central office code sharing merit consideration whenever plans are being prepared to assign central office codes to existing or potential locations within the same rate center.

3.21 Bell Laboratories has been conducting extensive study work in the area of code sharing among offices serving more than one exchange. Preliminary results of a recent study suggest that code sharing may be a viable solution to help prolong the life of the North American Numbering Plan. This study investigated several alternatives to determine the cost of code sharing between a new office and existing offices. The principles examined are the same as for the case of sharing codes among existing offices in order to recover codes already assigned. The costs, which consisted of equipment modifications for "D" digit translation and trunking penalties incurred for providing proper call routing, appear to be reasonable for some situations. The costs for number changes were considered but not estimated.

3.22 In addition to the number changes and the call routing modifications necessary in all switching entities involved, the matter of rating a call for billing purposes plays a major economic role. If a central office code were shared among several entities and multiple exchange areas are

involved, the AMA processing equipment, Rate Quote Systems (RQS), TSP(S) coin raters, V and H coordinate rate tables, and independent industry equipment would be affected and would have to be modified throughout the North American Dial Network. Since cost estimates for these modifications appear relatively high, further study work is underway to investigate the future possibility of code sharing between exchange areas and the impact it would have on the entire Network.

3.23 A study model is currently being developed by Bell Laboratories to determine the increased life expectancy of an NPA and the Dial Network through the use of code sharing. This model will provide a means of determining potential code relief deferral resulting from varying quantities of central office code sharing within individual NPAs. By combining the results of the model for all the individual NPAs, the expected life gain of the North American Numbering Plan due to code sharing may be determined.

3.24 Until these study model results are available, no recommendations can be offered regarding code sharing between end offices ***serving different rate centers.*** However, code sharing between or among switching entities ***within the same rate center*** should be fully investigated and, to the extent practical, implemented as opportunities arise.

PLANT TEST CODES

3.25 Plant test codes of the 3-digit NNX/NXX* configuration should be reviewed frequently to determine if these codes are being utilized to maximum efficiency. In a recent survey conducted by AT&T, it was found that wide variation still exists in the number of NNX/NXX type test codes that have been set aside for maintenance in individual NPAs. It appears, however, that with meticulous usage of test codes a ***maximum of 21 codes***, including 958 and 959, are generally sufficient to perform the necessary maintenance functions if these codes are shared among the different types of offices. This number is based on the existence of ***all*** currently used types of central office switching equipment. See Table A for a typical example of efficient test code utilization.

Where: This NNX/NXX type format denotes ***before*** (NNX) and ***after*** (NXX) code interchangeability.

3.26 Bell Laboratories is currently investigating arrangements for test code conservation. With the testing and maintenance arrangements under consideration, it would be possible to reduce the total requirements for NNX/NXX type test codes to five and in certain cases less than five. These arrangements, if implemented, will create ample spare test code arrangements to handle future testing needs without causing the Operating Companies further inconvenience and the possible hardship of having to set aside additional NNX/NXX codes for maintenance. Furthermore, with these arrangements, the use of the existing dedicated toll plant test codes 958 and 959, which have been set aside by AT&T, will be maximized to the extent feasible in both local and toll facilities. Two or possibly three additional NNX/NXX type test codes will probably be required as long as #1X-Bar equipment is in service. There are ***no*** plans, however, to make changes in Panel equipment to reduce its test code requirements. Therefore, in NPAs with Panel offices, only limited reduction in NNX/NXX type test codes may be realized through these new maintenance arrangements before all Panel offices are retired.

3.27 The ***present*** test circuit equipment arrangement requires a ***maximum of 21 codes.*** As long as #1X-Bar equipment is in service, it will be impossible to reduce the quantity of 20 codes without major test circuit modifications which are not yet available as System standards.

3.28 The contemplated arrangement for test codes would be very effective in reducing test code requirements, especially in #1X-Bar and ESS. However, since ***no new*** test arrangement is proposed for Panel equipment, only a limited overall code reduction (to 16 codes) may be realized. In NPAs without Panel equipment in service, test codes may be reduced to a ***maximum of five*** with the ***proposed*** test access arrangements cited above.

3.29 The reduction of the presently assigned Plant test codes will be accomplished through the installation of certain new test distributors, selectors, and other equipment that is still under consideration by Bell Laboratories. Installation of this equipment, when it becomes available, should be scheduled on the basis of economic justification and convenience only. See Table B for the anticipated test code requirements.

TABLE A

TYPICAL TEST CODE ASSIGNMENTS WITH PRESENT TECHNOLOGY

TEST CODE REQ'D		TYPE OF OFFICE						
NO.	TYPE (NNX/NXX)	PANEL	SXS	#1X–BAR	#5X–BAR	ESS	TOLL TANDEM	#4 TOLL
1	@ 550	A	A	A	A	A	G	J
2	551			F	A	A	H	J
3	552			F	A	A	H	K
4	553	S		F		A	I	
5	554	S		F		A	E	
6	556	S		F		A		
7	557	S		F		A		
8	558	S		F		A		
9	559	S		F		A		T
10	571	B	B	B	B	B		L
11	579	C	C	C	C	C		L
12	* 958	M		M	N		N	
13	* 959						E	E
14	Ø 970			Q			O	O
15	971	P		Q				
16	972	P		Q				
17	973	P		Q				
18	975			R			U	
19	977	P		R				
20	978	P		R				
21	979	D	D	D	D	D		

@ 3-digit codes may differ in configuration and assignment throughout the Dial Network
* Dedicated Code set aside by AT&T for maintenance
Ø Temporary Code set aside by AT&T for maintenance

Note: Example with all possible types of equipment in a single NPA

LEGEND FOR TABLE A

A — Station ringer test circuit
B — Test trunk to local test desk-repair in all local offices
C — Test trunk to local test desk-installation in all local offices
D — Installation desk communication circuit in all local offices
E — Milliwatt test termination
F — Line verification test circuit
G — Tandem test incoming frame
H — CAMA-PCI test
I — Test wagon test
J — AOTC test
K — Intertoll return test termination
L — AIOT test
M — Message register test
N — Maintenance center communication circuit
O — Office balance test
P — Multiple zone registration test
Q — District junctor test frame 1
R — District junctor test frame 0
S — District selector test frame
T — Synchronous test line termination
U — Loop around test line termination

TABLE B

ANTICIPATED TEST CODE REQUIREMENTS

TYPE OF OFFICE	PLANT TEST CIRCUIT EQUIPMENT ARRANGEMENT							
	"PRESENT TECHNOLOGY" CODE REQUIREMENT				"PROPOSED TECHNOLOGY" CODE REQUIREMENT			
	958	959	REGULAR NNX/NXX	TOTAL	958	959	REGULAR NNX/NXX	TOTAL
Panel	X		15	16	X	X	14	16
Step-by-Step			4	4	X	X	2	4
=1X-Bar	X		19	20	X	X	2 or 3	4 or 5
=5X-Bar	X		6	7	X		1	2
ESS			12	12	X or X		1	2
Toll Tandem	X	X	7	9	X	X	1	3
=4 Toll		X	7	8		X	1	2
All Types	X	X	19	21	X	X	14	16

3.30 As indicated in Tables A and B, Step-by-Step offices present no problem to the test code situation and would require no extensive test circuit modifications. Some Operating Companies with ***predominantly*** noncommon control Step-by-Step areas, where fourth level service code selectors exist or are being added for Code "411" (Directory Assistance), are using the 410X code series for local Plant test and for providing customer access to local Repair Service Centers. Generally, Code 4102 is used for reaching Repair Service, and the remaining 410X codes are assigned as Plant test codes; such as, Code 4104 for Ringer Test, Code 4106 for =14 LTD (Local Test Desk), Code 4109 for Verification Test, etc. Since this arrangement is confined to the local switching network, and since all station toll calls require the prefix "1" for DDD access, the only potential code conflict would arise from the assignment of "410" as a central office code.

3.31 Use of the 410X series for local service and test codes must be discontinued when all Step-by-Step equipment is replaced with ESS.

CODE ASSIGNMENT

3.32 Code assignment and efficient utilization of ***"ALL"*** codes is ***"EVERYONE'S"*** responsibility. Every effort should be made to maintain a continuing awareness of the importance of code conservation and efficient code utilization throughout the organization. The activities involved in effective code administration include:

(a) Assignment of codes (refer to GL73-06-108 for guidelines).

(b) Keeping accurate records of codes assigned and reserved.

(c) Constantly monitoring the code situation.

(d) Reviewing plans requiring codes.

(e) Recommending code conservation techniques.

(f) Retrieval of codes whenever feasible.

(g) Coordinating code problems among departments.

(h) Stressing efficient code utilization.

(i) Developing fundamental plans for future code relief.

3.33 This type of diligent code monitoring is extremely important within an NPA, particularly one that is approaching exhaustion in the near future, in order to defer code relief expenditures as long as practical and economical.

4. GUIDELINES FOR MAJOR CODE RELIEF PLANNING

4.01 Prior to the time that an NPA reaches the 640 code level, it will become necessary to evaluate in detail the following three alternatives for future major code relief:

(a) ***NPA boundary realignment*** is a very desirable alternative to splitting or adopting interchangeable codes. This alternative will ***apply only*** to multi-NPA states and where such an intrastate NPA realignment provides relief for at least ten years extending through 1995.

(b) ***Introduce interchangeable codes*** in NPAs that exhaust their supply of 640 central office codes and when forecasted code requirements do not exceed the 792 code level by 1995. In situations where an NPA ***will*** exhaust 792 codes before 1995, consideration should be given to splitting the NPA at the 640 code level.

(c) ***NPA splitting*** is the last resort for code relief and such a recommendation ***will not*** be approved where other reasonable measures provide relief through 1995.

4.02 The year "***1995***" is critical in code relief planning. This date has been determined through the analysis of the 1971 COCUS data submitted and alteration of these data to reduce the more ambitious central office code fill projections. The 1995 date is considered the earliest future date when the 153rd code will be required as an NPA code in the North American Numbering Plan.

4.03 A fundamental plan for "NPA Code Relief," prepared well in advance of the anticipated exhaust date, will alleviate major problems and avoid short-notice construction dollar requirements. In addition, depending on which alternative is chosen, careful planning can minimize the large expenditures required at the time code relief is necessary.

5. GENERAL LETTER (GL) REFERENCE LIST

5.01 A reference list of general letters follow.

GL NUMBER	SUBJECT	DATE
72-06-063	1971 Central Office Code Utilization Survey (COCUS)	June 12, 1972
72-12-133 and 73-06-098	Recapturing Central Office Codes Used Exclusively for 3-Row TWX	December 15, 1972 and June 18, 1973
73-06-108	Nationwide Numbering Plan and Dialing Procedures — Code Assignment Responsibilities	June 19, 1973
73-10-006 and 73-11-124	Radio Common Carrier (RCC) Interconnection — Reviews Guidelines and Procedures	October 3, 1973 and November 27, 1973
74-01-102	Use of an Alternative Strategy to Timing when Interchangeable Codes are Introduced	January 16, 1974
74-07-004 (E.L. 3086) (Section 781-610-100)	Nationwide Numbering Plan and Dialing Procedures — General Guidelines	July 5, 1974 and January 1975

R. H. Kaschner
March 1974