

North American Numbering Plan Exhaust Study

Submitted by:

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Table of Contents

1.0 Introduction.....	1-1
2.0 NPA Demand Model Overview.....	2-1
3.0 CO Code Demand Model.....	3-1
4.0 Pooling Model.....	4-1
Appendix A Sensitivity Analysis	
Appendix B CO Code Module	
Appendix C NANP Exhaust Module	
Appendix D Pooling Impacts Summary	
Glossary	G-1

1.0 INTRODUCTION

Report Overview

This report provides a detailed analysis of the North American Numbering Plan (NANP) Exhaust Study performed by Lockheed Martin CIS as the North American Numbering Plan Administrator (NANPA). There are three main elements of this study:

1. NPA Demand Estimate
2. CO Code Demand Estimate
3. Pooling Impacts

Background

Each year, it is NANPA's responsibility to estimate the exhaust of each active US Geographic NPA as well as the exhaust of the entire NANP. NANP exhaust is estimated by projecting the exhaust of the remaining NPAs. These estimates are the result of a process known as COCUS (Central Office Code Utilization Survey). COCUS incorporates analysis of historical trends as well as survey data.

Lockheed Martin CIS started transition of NANPA in early 1998. The transition did not include the 1998 COCUS. The 1999 COCUS is Lockheed Martin CIS' first COCUS as the new NANPA. In January 1999, as part of establishing the baseline for COCUS, NANPA came to a preliminary conclusion that the NANP could exhaust as early as 2007. This conclusion was based on the preliminary results of the NPA Demand Model and the newly developed CO Code Demand Model. These tools were developed to assist in predicting NPA and NANP exhaust associated with processing annual COCUS.

NANPA presented these preliminary conclusions at a meeting with FCC staff members on January 20, 1999. Such meetings are periodically scheduled for the purposes of providing updates on numbering issues. The FCC staff asked NANPA to provide their preliminary findings to a larger group of FCC

staff members. This meeting was held January 29. On February 18, NANPA provided a presentation of the preliminary NANP Exhaust Study to the entire North American Numbering Council (NANC).

The NANC decided that the Exhaust Study should be reviewed by a team of subject matter experts made up members of NANC and NANPA customers. For this purpose, the NANP Exhaust Review Team (Review Team) was created. The goal of the team was to review the NANPA study and achieve as much consensus as possible on the assumptions and conclusions. The review was scheduled to complete by the April NANC at which time, NANPA would provide a final review of the NANP Exhaust Study.

Overview of Models

There are three separate models within the NANP Exhaust Study:

1. NPA Demand Model
2. CO Code Demand Model
3. Pooling Model

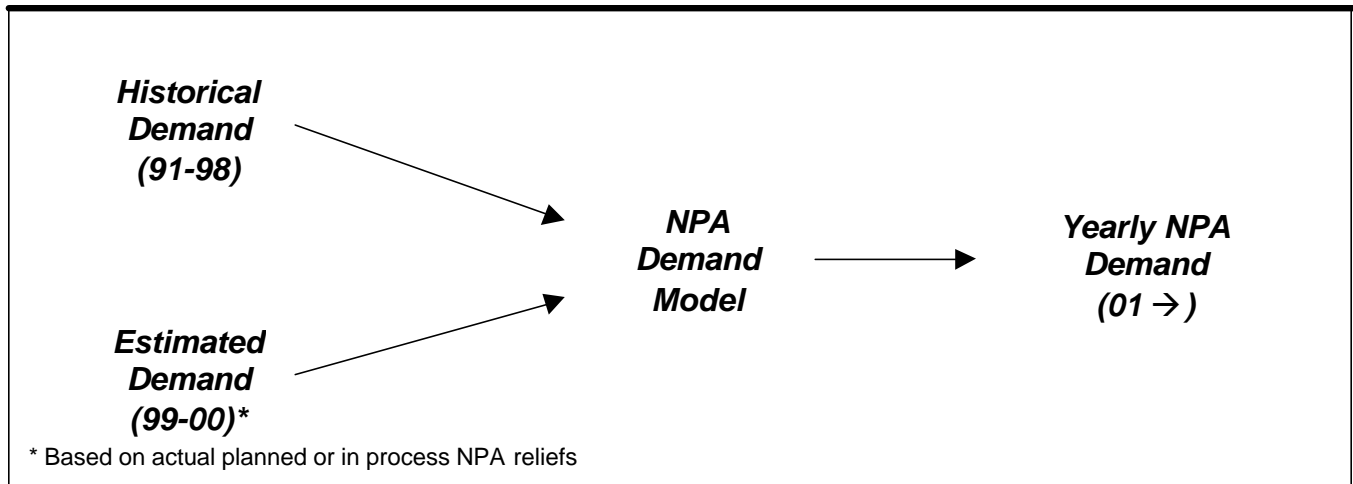
The baseline for all of the models is year-end 1998 (YE98). The models do not yet incorporate the 1999 COCUS. To estimate the year of NANP exhaust, the models estimate yearly NPA demand. The NANP exhausts in the year when the last remaining spare NPA is placed in service.

The three models use two methods for estimating NANP exhaust. The NPA Demand Model can be considered a top-down method. It estimates NANP exhaust based on an estimate of NPA demand. The CO Code Demand Model takes a bottom-up approach for estimating NANP exhaust. It estimates NANP exhaust based on CO Code demand, which is the underlying driver for NPA demand. The Pooling Model uses the same methodology as the CO Code Demand Model, however it uses different assumptions about how blocks of numbers are distributed to service providers.

The NPA Demand Model uses historical NPA demand and estimated 1999 and 2000 NPA demand to project yearly NPA demand beyond 2000, as shown in Exhibit 1-1. The NPA Demand Model also

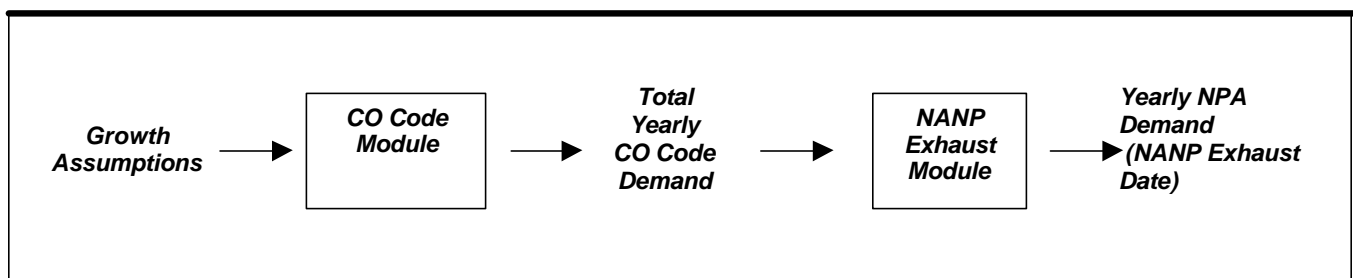
contains the information that determines the YE98 active and spare NPAs. This baseline data is used to determine NANP exhaust in all of the Models.

NPA Demand Model (Exhibit 1-1)



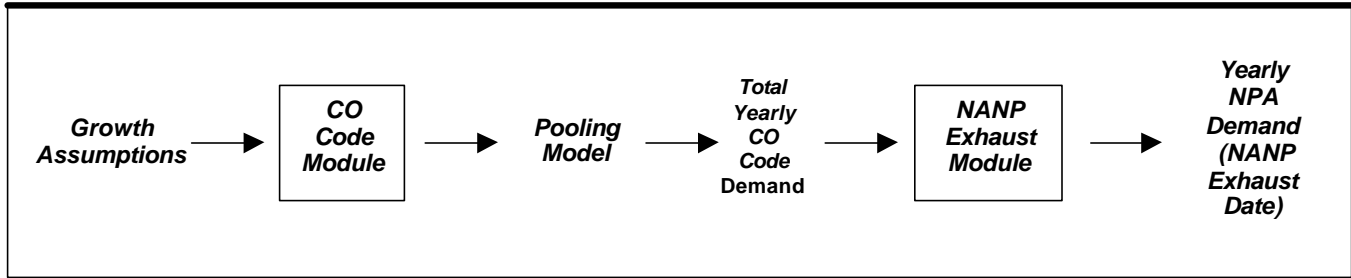
The CO Code Demand Model has two steps, or modules. First, it estimates Total Yearly CO Code Demand. Then, the Total Yearly CO Code Demand is used to estimate yearly NPA demand and subsequently the NANP exhaust date. A sensitivity analysis is also conducted to determine the range of results arising from this model given different assumptions. The CO Code Demand Model contains all of the assumptions that drive NANP exhaust for the bottom-up approach, as shown in Exhibit 1-2.

CO Code Demand Model (Exhibit 1-2)



The Pooling Model applies some alternative assumptions to the CO Code Demand Model and uses the same two-step methodology. These assumptions result in demand for fewer CO Codes per year. When the Pooling Model is applied to the CO Code Demand Model, the result is still Total Yearly CO Code Demand. Total Yearly CO Code Demand is then used to estimate yearly NPA demand and the NANP exhaust date as shown in Exhibit 1-3.

Pooling Model (Exhibit 1-3)



Each of the three models is discussed in detail in the following sections.

2.0 NPA DEMAND MODEL OVERVIEW

2.1 Introduction

For the purposes of this study, the year of NANP exhaust will be defined as the year that the last spare NPA is put in service. This definition applies to both the NPA Demand Model and the CO Code Demand Model.

The first attempt NANPA made to estimate NANP exhaust was the top-down method, using the NPA Demand Model. The NPA Demand Model relies on two inputs to project future yearly NPA demand: recent historical NPA growth rates and estimated near term NPA demand (1999 and 2000).

2.2 Findings

The NPA Demand Model predicts a NANP exhaust date of 2007 with a likely range between 2006 and 2012.

2.3 Methodology

The initial step in running the model is to determine a baseline. The baseline consists of three elements:

1. YE98 NPA Status
2. Recent Growth Rates
3. Estimated 1999 and 2000 NPA demand

From this data we can determine a range of future yearly growth rates to determine NANP exhaust.

2.3.1 Baseline Data - YE98 NPA Status

The YE98 NPA status looks at both active US Geographic NPAs and the NPAs available for assignment as US Geographic NPAs. Table 1-1 provides a YE98 status of all 800 NANP NPAs.

As of YE98 there were 206 US Geographic NPAs in service. NANPA excluded all NPAs currently designated as Reserved or Unassignable from the pool of NPAs available for assignment as US Geographic NPAs. Although some of these may change their status and become available for assignment, NANPA could not make that determination at this time.

NANPA determined that as of YE98 there are 410 NPAs available for assignment as US Geographic codes. This includes those NPAs designated as General Purpose Codes (GPCs), Geographic Relief Codes (GRCs), and Easily Recognizable Codes (ERCs). In reality this is a conservative figure because NANPA does not have the authority to assign ERCs. The assignment of an ERC requires industry approval.

Table 1-1

NPA CLASSIFICATION	Subtotal	Total NPAs
Active NPAs		
US Geographic	206	
International Geographic	41	
Service Codes	12	
Total		256
Reserved NPAs		
NANP Expansion	80	
Future NANP Use	20	
Service Code Growth	11	
Total		111
Unassignable NPAs		20
Spare NPAs		
ERCs	43	
GRCs and GPCs	367	
Total		410
GRAND TOTAL		800

Baseline Data - Recent US Geographic NPA Growth Rates

Table 1-2 provides US Geographic NPA growth from 1991 to 1998. The table provides: how many new NPAs went into service in each year; what the cumulative total is at year end; the yearly percent increase; the average growth rate of the previous five years; and how many NPAs were in jeopardy at year end.

For the purposes of this study, the year an NPA goes in service is defined as the year permissive dialing begins. If the relief NPA is an overlay NPA with no permissive dialing requirements, then it is the year that the NPA was dialable.

The yearly percent increase is calculated by dividing the new NPAs in the year by the previous year's cumulative total. The average growth rate of the previous five years is calculated by adding the previous five years' growth rates and dividing by five. This provides a growth rate that smooths out the yearly fluctuations. The number of Jeopardy NPAs is provided as a reference point.

Table 1-2

Year	New NPAs	Total Active US Geo. NPAs	Yearly Increase	5 Yr Average Increase	YE Jeopardies
1990		115			
1991	4	119	3%		
1992	4	123	3%		
1993	2	125	2%		
1994	1	126	1%		11
1995	13	139	10%	4%	17
1996	11	150	8%	5%	21
1997	32	182	21%	8%	43
1998	24	206	13%	11%	54

It is clear from the historical data that NPA demand increased dramatically starting in 1995. It is likely that this is a result of new telecommunications service providers (SPs) and new services (e.g. second lines, internet applications, etc.) entering the market as a result of wireless spectrum auctions and local competition facilitated by the Telecom Act of 1996.

It is also clear from the increasing number of Jeopardies that the historical method for forecasting NPA exhaust based on the COCUS survey is inadequate. This is likely a function of the fact that historical methods did not sufficiently account for the entrance of new SPs, as well as shortcomings of COCUS as identified by the NANC Number Resource Optimization Committee (NRO).

Furthermore, one could postulate that the number of Jeopardies and associated rationing is artificially suppressing demand for new NPAs. Therefore, the historical NPA growth rate is lower than it would be if the industry could provide NPA relief to meet the actual CO Code demand. This model however uses the actual yearly growth rates and does not apply a “Jeopardy factor” to try and represent what may be the true demand for NPAs.

Baseline Data – Estimated 1999 & 2000 Demand

Table 1-3 provides a list of NPAs that NANPA estimates will go into service in 1999 and 2000 based on actual NPAs for which relief projects have or will be started. The number (2) in parenthesis after the NPA notes that it is a three-way split that will require two NPAs.

Table 1-3

1999			2000		
212	602(2)	914	201	619 (Phase 2)	916
281/713	609	941	203	650	954
314	612 (2)	978	207	704	973
407	616		312/773	707	
408	617		318	714	
414	619 (Phase 1)		360	716	
423	630		409	724	
502	678		412	760	
503	703		415	804	
508	718		510	817	
512	781		561	860	
516	805		603	908	
601	847	TOTAL 31	606	909 (Phase 1)	TOTAL 29

In addition to the NPAs noted above, there are another 8 NPAs in 2000 that NANPA is not at liberty to disclose at this time to the general public until the 1999 COCUS is released. This brings the total estimated new NPAs in 1999 to 31 and in 2000 to 37.

Table 1-4 below shows yearly NPA growth from 1991 to 2000 using NANPA estimates for 1999 and 2000.

Table 1-4

Year	New NPAs	Active US NPAs	Yearly Increase	5 Yr Average Increase	YE Jeopardies
1990		115			
1991	4	119	3%		
1992	4	123	3%		
1993	2	125	2%		
1994	1	126	1%		11
1995	13	139	10%	4%	17
1996	11	150	8%	5%	21
1997	32	182	21%	8%	43
1998	24	206	13%	11%	54
1999E	31	237	15%	14%	NA
2000E	37	274	16%	15%	NA

Both the NPA Demand Model and the CO Code Demand Model focus on US Geographic NPAs. Growth assumptions are derived and applied to US Geographic NPAs. However, in addition to estimating the demand for US Geographic Codes, the models make an allowance for demand for other NANP countries and for Service Codes. It is assumed that there will be two additional NPAs either put in service or reserved for a specific service purpose. These two NPAs do not include the existing NPAs reserved for service code growth.

The two additional NPAs include geographic relief codes outside of the US (e.g., Canada, Caribbean), new NPAs for a country (existing NANP country or new member of the NANP), new service codes, or codes reserved for a specific service.

NPA Demand Model NANP Exhaust Estimate

The year that NANP Exhaust will occur depends on the growth rate assumed.

Based upon input from the team, NANPA revised its February 18 analysis to use 1999 and 2000 Estimated NPA demand to generate the NPA Exhaust Projection based on NPA Growth Rate.

At the February 18 NANC Presentation the original chart started with year 1998 not YE 2000 as shown in Exhibit 2-1 below.

Exhibit 2-1 and Table 1-5 show the year that the 410th spare NPA would be put in service for a given growth rate. The growth rate is constant and applied only to US Geographic codes.

NPA Exhaust Projection Based on NPA Growth Rate (Exhibit 2-1)

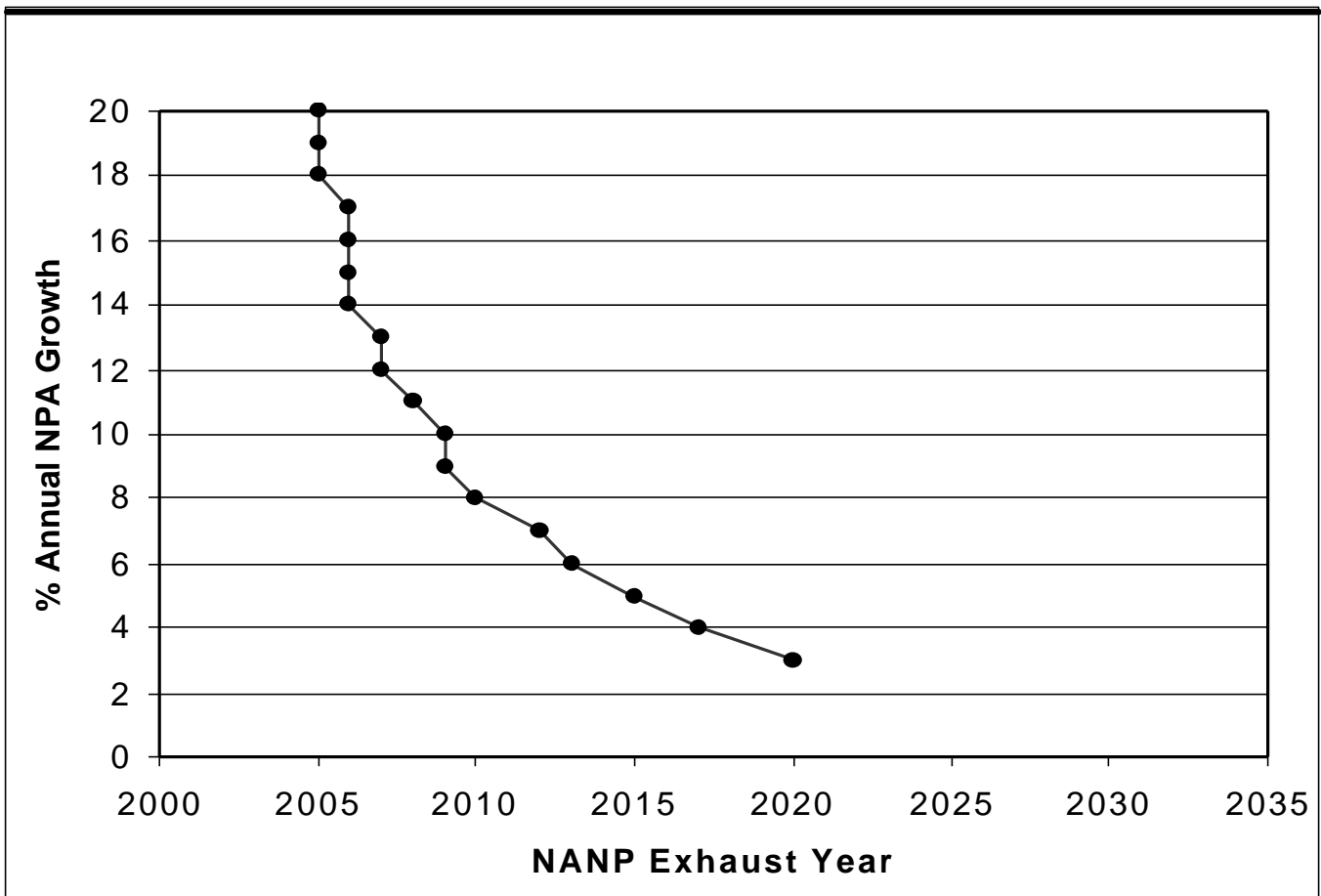


Table 1-5

Growth Rate for 2001 and Beyond	Year NANP Exhaust
3%	2020
4%	2017
5%	2015
6%	2013
7%	2012
8%	2010
9%	2009
10%	2009
11%	2008
12%	2007
13%	2007
14%	2006
15%	2006
16%	2006
17%	2006
18%	2005
19%	2005
20%	2005

Given recent historical NPA growth and the increasing trend of NPAs in jeopardy, a growth rate that is on par with the current growth rate seems likely.

Plotting Three Options for Future Trend of NPA Demand

Over the six-year period between 1995 and 2000, yearly NPA growth rates remain high as shown in Table 1-6.

Table 1-6

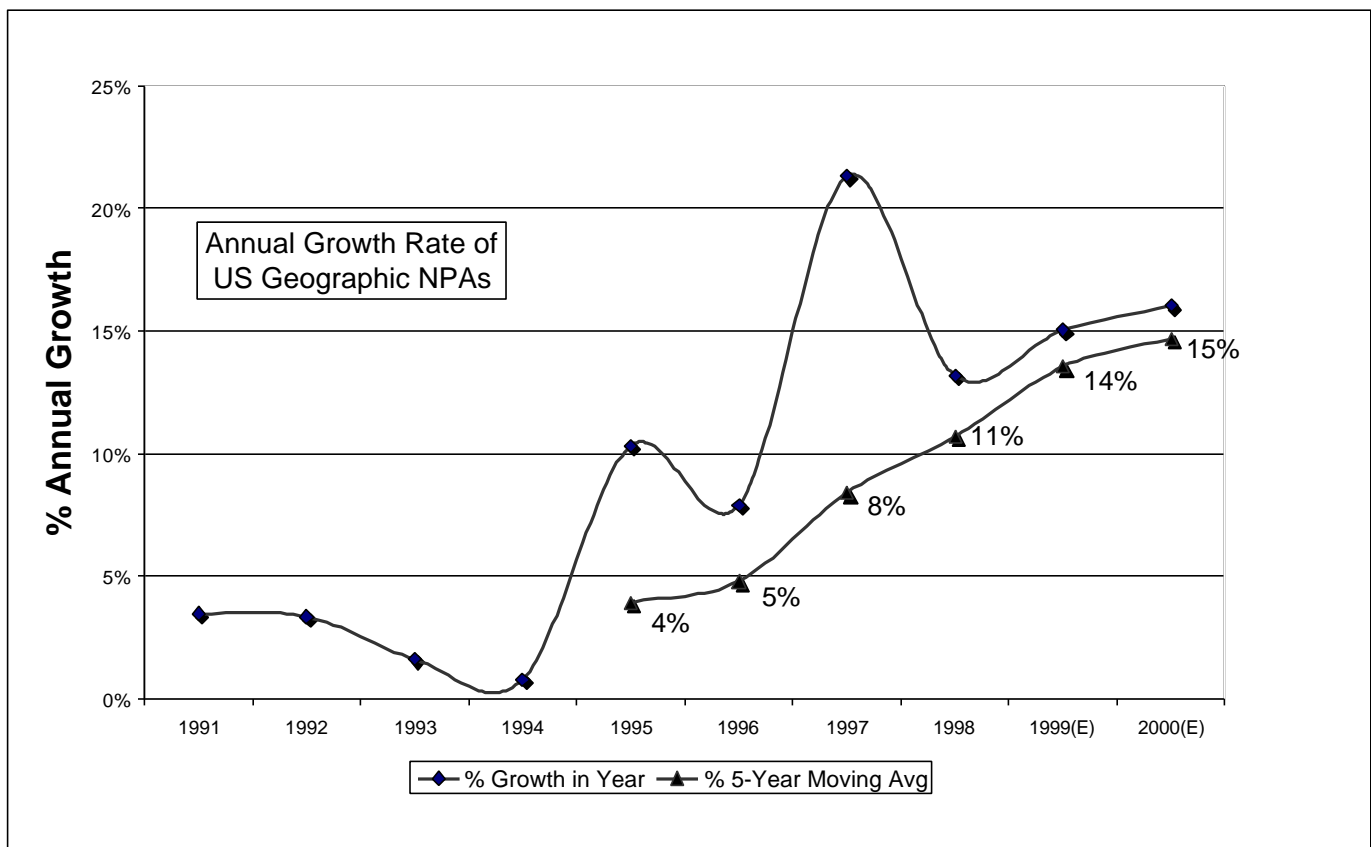
Year	Yearly Increase	5-Year Average Increase
1995	10%	4%
1996	8%	5%
1997	21%	8%
1998	13%	11%
1999	15%	14%
2000	16%	15%

The 5-Year Average Growth Rate has increased from 4% in 1995 to 15% in 2000 as shown in Exhibit 2-2. The future NPA growth rate (2001 and beyond) can be summarized as one of the following scenarios:

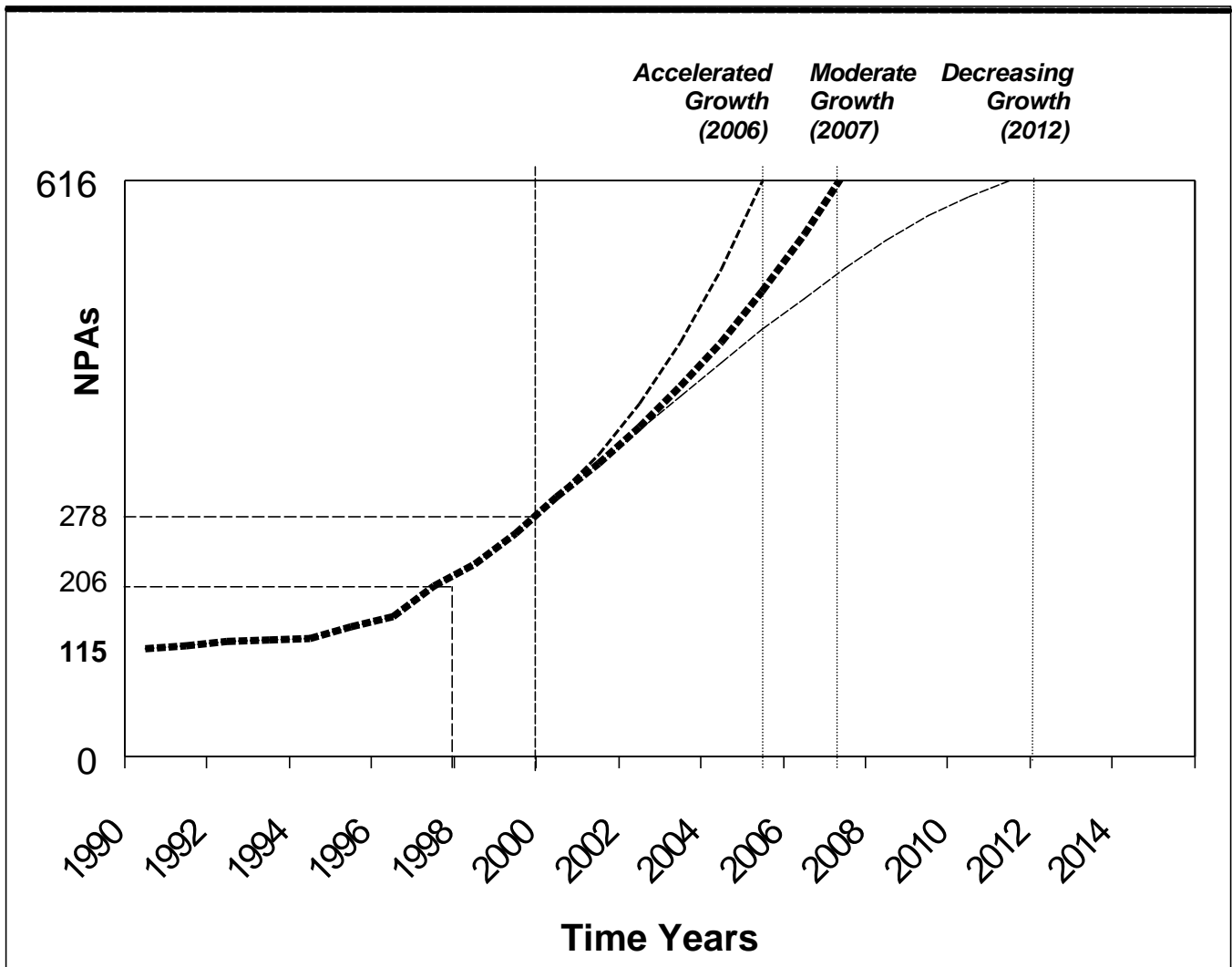
1. **Accelerated Growth** – The rate of growth continues to increase and yearly growth rates exceed 15%.
2. **Moderate Growth** – The rate of growth levels off somewhere between the low of 8% and the high of 21%. NANPA assumed a moderate growth rate to be 12%. NANPA believes that a continued growth rate of 12% to be a moderate growth assumption.
3. **Decreasing Growth** – The rate of growth decreases every year from 12% in 2001.

NANPA has plotted these three scenarios in Exhibit 2-3. The growth rates are captured in Table 1-7, 1-8 and 1-9. The growth rate is applied to the previous year’s total US Geographic NPAs. International and service NPAs are estimated at two per year.

Annual US Geographic NPA Growth Rate (Exhibit 2-2)



NPA Demand (Exhibit 2-3)



If growth accelerates the NANP could exhaust as early as 2006. If growth decreases the NANP may exhaust as late as 2012. As previously stated NANPA believes the more likely scenario is represented by the moderate growth estimate, using a 12% yearly growth rate. In this scenario the NANP would exhaust in 2007.

Accelerated Growth Rate (Table 1-7)

Year	2001	2002	2003	2004	2005	2006
Growth Rate	15.8%	16.4%	17%	17.6%	18.2%	18.8%

Moderate Growth Rate (Table 1-8)

Year	2001	2002	2003	2004	2005	2006	2007
Growth Rate	12%	12%	12%	12%	12%	12%	12%

Decreasing Growth Rate (Table 1-9)

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Rate	12%	11%	10%	9%	8%	7%	6.5%	5.5%	4.5%	3.5%	2.5%	1.5%

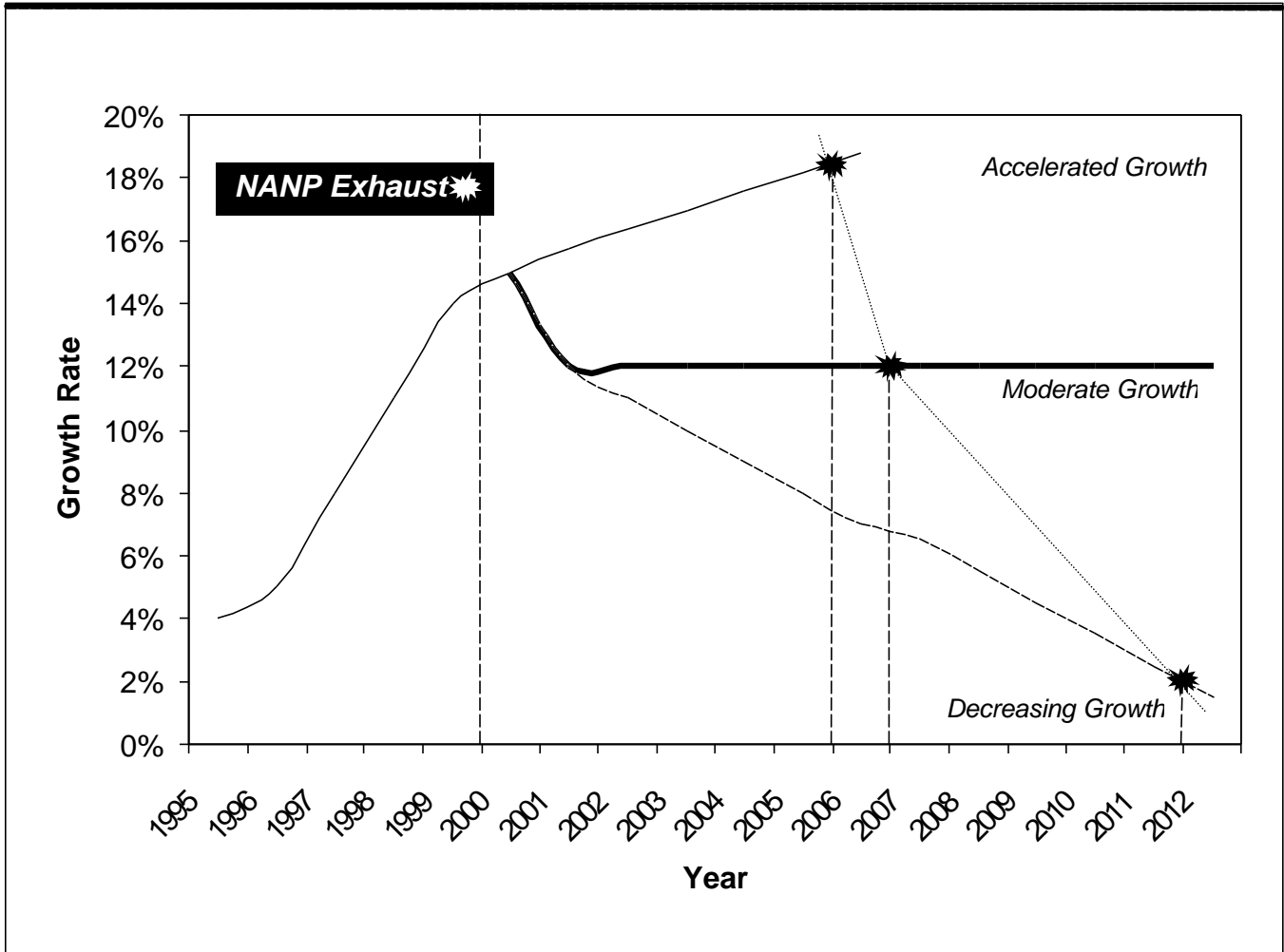
Conclusions

To estimate future NPA demand one must first answer the question, “Will NPA demand remain at its current high rate, will it increase, or will it decrease?” NANPA sees no indication that the demand is decreasing. As a matter of fact, the number of relief projects, jeopardies, and recent growth rates would indicate that demand is increasing.

It is NANPA’s opinion that a 12% yearly growth rate is a reasonable, if somewhat conservative, estimate. Using a 12% growth rate, the NPA Demand Model estimates NANP Exhaust to be in 2007. NANPA has a high level of confidence that the growth rate will be between the Decreasing Growth Rate Scenario and the Accelerated Growth Rate Scenario resulting in a range of exhaust dates between 2006 and 2012.

Exhibit 2-4 summarizes the range of NPA growth rates and their respective NANP exhaust dates used in the NPA Demand Model.

NANP Exhaust (Exhibit 2-4)



3.0 CO CODE DEMAND MODEL

3.1 Introduction

After estimating NANP exhaust using NPA demand, NANPA wanted to gain a better understanding of the underlying driver behind NPA demand - CO Code demand. To that end, a model was developed to estimate CO Code demand and its impact on NPA demand. The CO Code Demand Model (Model) has two modules, a CO Code Demand Module and a NANP Exhaust Module. The CO Code Demand Module estimates total yearly CO Code Demand. Total yearly CO Code Demand is then input into the NANP Exhaust Module to estimate yearly NPA demand and subsequently, NANP exhaust.

3.2 Findings

The result of the CO Demand Module projects the following CO Code Demand Rate for 1999-2008. (CO Code demand for 1998 is included for comparison purposes.)

CO Code Growth Rate

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Growth Rate	15.4%	15.5%	16.3%	14.6%	12.6%	12.1%	9.7%	9.5%	8.7%	7.5%	7.1%

NANP Exhaust

The result of the NANP Exhaust Module projects NANP Exhaust in 2008.

Sensitivity Analysis

A sensitivity analysis was performed on the assumptions in the Model. The analysis applies a range to the assumptions (low and high) used to generate the 2008 exhaust date. A statistical analysis was then performed on the assumptions to generate a probability of results. This sensitivity analysis projects with an 80% confidence that exhaust will occur between 2005 and 2012. The description of the sensitivity analysis, the assumptions, and the ranges are in Appendix A.

In the Model the major drivers for CO Code demand, and in turn NANP Exhaust, are the assumptions involving the entrance of new service providers. These assumptions are referred to as CO Codes for Footprint and are described later in this section. If the numbers in the footprint assumptions are lower, demand decreases and the exhaust date moves out. If the numbers are higher, demand increases and the exhaust date moves in.

3.3 Methodology

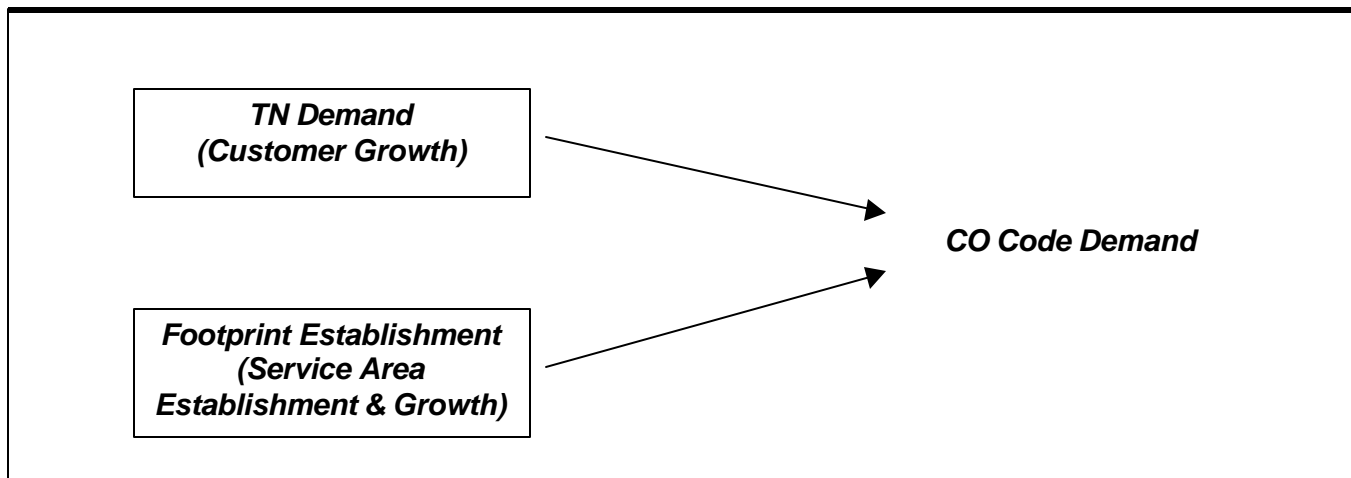
MODULE ONE: CO CODE DEMAND MODULE

Two Drivers of CO Code Demand

CO Codes serve two purposes. First, CO Codes provide working telephone numbers (WTNs). WTNs are defined in this study as TNs that are either, assigned to end users or assigned for administrative purposes within telecommunications networks. The second use of CO Codes is as a network address for billing and routing purposes. For the purposes of this document we will refer to those as “CO Codes for Footprint.”

The CO Code Demand Model divides the two drivers: 1) CO Codes required to meet demand for WTNs; and 2) CO Codes required for Footprint to estimate total yearly CO Code demand, as shown in Exhibit 3-1.

CO Code Demand (Exhibit 3-1)



CO Code Users as Four Segments

Telecommunications service providers (SP) can be divided into two categories: wireline and wireless. These categories can be divided into two segments. Wireline SPs are either Incumbent Local Exchange Carriers (ILECs) or Competitive Local Exchange Carriers (CLECs). Wireless SPs are either Commercial Mobile Radio Service providers (CMRS) or Paging SPs. For the purposes of this report CLECs include all CO Code users that are not included as ILECs, CMRS SPs, or Paging SPs. CLECs include SPs that compete with ILECs for traditional voice service as well as SPs that offer non-traditional voice service (e.g., voice over IP) but nonetheless are NANP users.

The four segments each have a different profile with regard to their demand for Equivalent CO Codes for TNs and Equivalent CO Codes for Footprint. The Model provides a baseline profile of each industry segment, then applies demand assumptions to Equivalent CO Codes for TNs and Equivalent CO Codes for Footprint.

YE 98 Baseline Data

The following YE98 data is used in the Model:

- Rate Centers By Segment
- CLEC and ILEC Access Lines
- CMRS and Paging Subscribers.

This section provides the baseline data and its source. The use of this data will be described within this section of the report.

YE98 Rate Centers By Segment

NANPA CO Code Assignment Data, the LERG, and NANPA staff review were used to estimate the number of rate centers where at least one member of the industry segment holds a CO Code. This

provides a point of reference with regard to each industry segments' geographic coverage, as shown in Table 3-1. The number of ILEC rate centers is used as the baseline for estimating percent coverage.

Table 3-1

Segment	YE 98 Rate Centers	% of ILEC RCs
ILEC	19,240	100%
CLEC	4,386	23%
CMRS	2,789	14%
Paging	1,806	9%

CLEC and ILEC Access Lines

The CO Code Demand Module requires an estimate of the number of WTNs. WTNs are derived using industry sources to estimate the number of subscribers for the wireless industry (CMRS and Paging) and the number of access lines for the wireline industry (ILECs and CLECs). Access lines are defined as DS0 equivalents. A factor is then applied to subscribers and access lines to derive WTNs.

“Within the telephone industry there are several alternative, but closely related, definitions of telephone lines or loops. While these differences often make it difficult to reconcile data from different statistical series, they are not usually large enough to affect comparisons among companies or trends over time.”¹

Two FCC reports quote YE97 ILEC access lines to be 162,864,239² and 172,500,000³. NANPA decided to use a conservative estimate of 165,500,000 for YE98 ILEC access lines.

A report from Merrill Lynch titled 3Q98 Review In-Depth Report Telecom Services – Local quotes 3Q98 CLEC access lines at 4,237,867. NANPA uses a conservative estimate of 4,000,000 CLEC access lines for YE98.

¹ FCC – Trends in Telephone Service – February 1999

² FCC – Statistics of Communications Common Carriers 1997/1998

³ FCC – Trends in Telephone Service 1999

CMRS and Paging Subscribers

NANPA used a wireless industry report distributed regularly by Donaldson, Lufkin, & Jenrette (DLJ) to estimate YE98 CMRS and Paging subscribers. Specifically, the DLJ Winter 98/99 Wireless Communications Industry Report was used. (This report is commonly referred to as the “Dick Tracy Report.”)

This report estimates YE98 CMRS subscribers at 69,000,000 and paging subscribers at 54,500,000.

Baseline Summary

Segment	% of ILEC RC	AL/Subs
ILEC	100%	165,500,000
CLEC	23%	4,000,000
CMRS	14%	69,000,000
Paging	9%	54,500,000

Demand Assumptions

As already stated, the Model divides the demand for CO Codes into two categories; codes required to meet demand for WTNs and codes required for footprint. For the purposes of this study we will refer to these categories as Equivalent CO Codes for TNs and Equivalent CO Codes for Footprint. The term *equivalent* is used because in real world conditions SPs acquire a CO Code to serve both of these purposes. The model divides these two drivers and projects demand for Equivalent CO Codes for TNs separately from the demand for Equivalent CO Codes for Footprint.

Equivalent CO Codes for TNs

Equivalent CO Codes for TNs - Yearly demand for Equivalent CO Codes for TNs is generated by multiplying WTNs by a growth rate, then applying an inventory factor to the result.

WTNs x Growth Rate x Inventory Factor = Yearly Equivalent CO Codes for TNs

WTN Factor

YE98 subscribers and access lines are used to estimate YE98 WTNs, which is the WTN baseline for the Model. YE98 WTNs is multiplied by the 1999 growth rate to generate YE99 WTNs. YE99 WTNs is multiplied by the 2000 growth rate to generate YE00 WTNs.

Since subscribers and access lines are not a true indication of the amount of WTNs, the Model applies a factor to those numbers to estimate WTNs. The number of WTNs will be greater than the number of access lines. A certain quantity of TNs is required for administrative purposes, billing, voice mail, etc. In addition, one access line that serves a business will likely support multiple TNs.

The CLEC WTN Factor is 2.0:1. The number of CLEC access lines at YE98 is multiplied by 2 to generate the number of YE98 CLEC WTNs.

A New York Public Service Commission docket quotes the ratio of TNs to access lines in the 212 NPA as 2.0624. The 212 NPA has a high concentration of business customers. Currently CLECs are predominantly serving business customers. Therefore, NANPA believes it is reasonable to use a 2:1 ratio for the CLEC WTN ratio.⁴

The ILEC WTN Factor is 1.2:1. The number of ILEC access lines at YE98 is multiplied by 1.2 to generate the number of YE98 ILEC WTNs.

Since the 212 NPA has a 2:1 WTN ratio, NANPA estimates that a 1.2:1 ratio would be a reasonable yet conservative estimate of the overall ILEC WTN ratio. Using FCC data, a 1.2:1 ratio works out to a 1:1 ratio for residential lines and business lines and a 5:1 ratio for business trunks.⁵

⁴ State of New York Department of Public Service Docket No. 96-98, March 19, 1998

⁵ FCC – Statistics of Communications Common Carriers 1997/1998 (YE 1997 – 162,864,239)

The CMRS WTN Factor is 1.01:1. The number of CMRS subscribers at YE98 is multiplied by 1.01 to generate the number of CMRS YE98 WTNs.

It is assumed that each CMRS subscriber has a TN, each of these TNs is considered a WTN. In addition, a number of TNs equal to 1% of total subscribers is used by CMRS providers as WTNs. This 1% includes TNs used for TLDNs, roamer ports, voice mail, E911 TNs for cell sites, and other administrative purposes.

The Paging WTN Factor is .90:1. The number of paging subscribers at YE98 is multiplied by .90 to generate the number of YE98 paging WTNs.

It is estimated that 10% of subscribers are served by non-US Geographic NANP resources, such as toll free numbers and PIN codes.

YE98 WTN Summary

Segment	Subs/AL	WTN Factor	WTNs
ILEC	165,500,000	1.2 to 1	198,600,000
CLEC	4,000,000	2 to 1	8,000,000
CMRS	69,000,000	1.1 to 1	69,690,000
Paging	54,500,000	.9 to 1	49,050,000
		TOTAL	325,340,000

Yearly Growth Rate

NANPA relied on various industry sources to estimate the near term yearly growth rate of WTNs. In later years, NANPA used a statistical technique to estimate yearly growth rates. A different growth rate is applied to each segment. Each growth rate is for incremental TNs.

Wireline Growth Rate

Two sources were used to estimate wireline growth rates; FCC – Trends in Telephone Service, February 1999; and SBC Warburg Dillon Read Inc. – Industry Report Telecom Services September 1997.

The FCC Report shows that historical growth in local loops as reported by NECA has been:

Year	1991	1992	1993	1994	1995	1996	1997
Growth	2.4%	2.8%	3.3%	3.6%	4.1%	4.1%	4.5%

The same report provides the following history for Percentage of Additional Lines for Households with Telephones, that is households with additional lines / households with telephones:

Year	1991	1992	1993	1994	1995	1996	1997
Growth	7.3%	9.1%	9.4%	12.2%	14.8%	16.5%	18.6%

This second chart provides some insight into why demand seems to be increasing. It’s worthy to note that 1997 was very early in the trend of individuals getting additional phone lines for internet access.

The SBC Warburg Dillon Read Inc. Report is used to project CLEC Growth:

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007
Growth	45%	36%	28%	24%	20%	17%	15%	14%	13%

When a straight line 3% growth rate is applied to ILECs and the SBC Warburg Dillon Read growth rate is applied to CLECs the resulting overall wireline growth rate is:

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007
Growth	4.6%	4.8%	4.7%	4.8%	4.7%	4.6%	4.5%	4.6%	4.5%

This growth rate is consistent with the trend represented in the FCC Report. Validating the overall wireline growth rate ensures that only incremental TN growth was accounted for and did not include subscribers gained via local number portability.

Wireless Growth Rate

The Dick Tracy Report provides yearly growth projections through 2008 for CMRS and 2003 for Paging.

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CMRS	20.3%	17.5%	13.8%	11.3%	9.3%	7.8%	6.9%	6.1%	5.5%	5.2%
Paging	5.9%	6.5%	7.0%	5.7%	4.7%					

Outer Year Growth Rates

NANPA needed to generate a method for estimating demand in the outer years (2008 and beyond). To this end NANPA developed a demand rate based on an “S-curve.” The S-curve demand rate has TN demand reaching a plateau and leveling off to follow maximum population penetration.

Inventory TN Factor

To this point the model has calculated total WTNs based on the estimated growth rate. The final step in this part of the Model is to estimate the total demand of CO Codes for TNs. This is accomplished by applying the Inventory TN Factor to total WTNs.

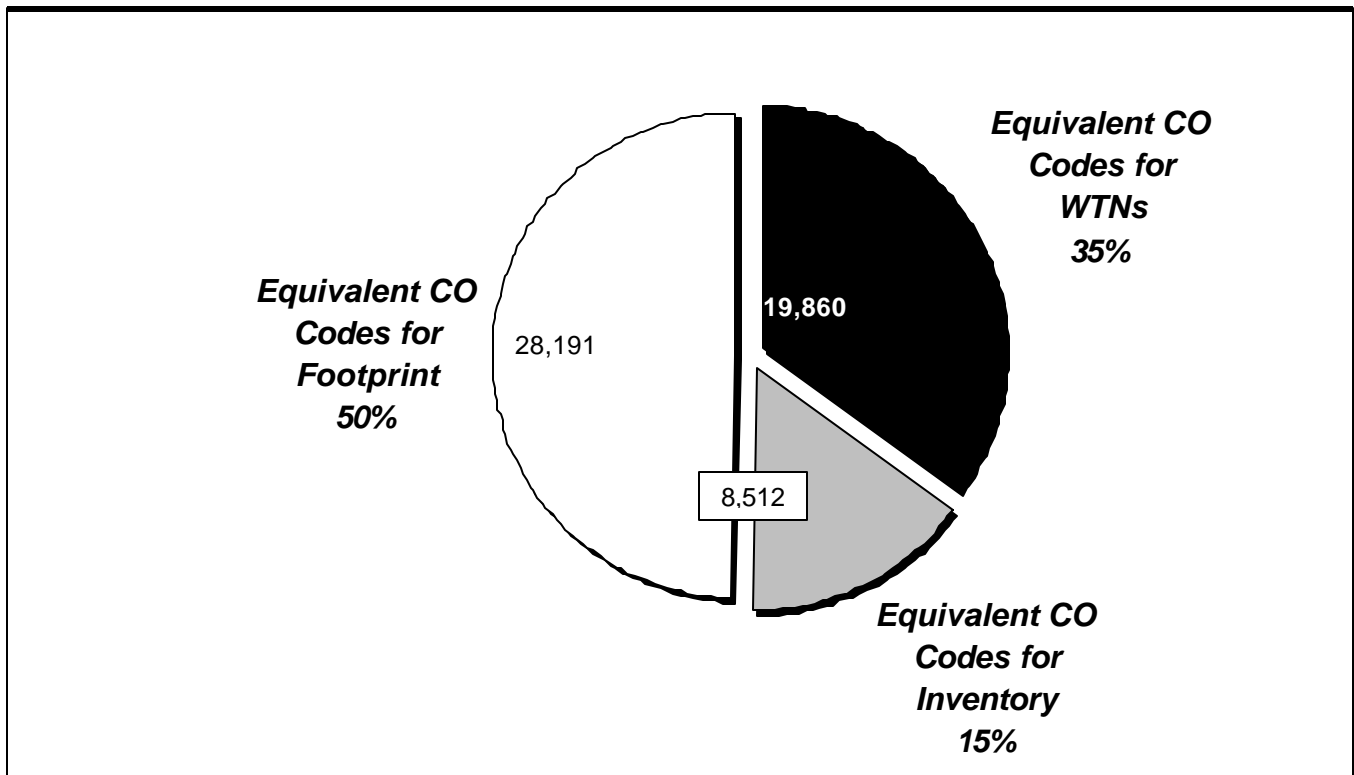
SPs require an inventory of spare TNs. This inventory is required for meeting the real-time demand for WTNs and for aging canceled TNs. In general, it represents the number of spare TNs required for aging and to allow for the time it takes to replenish the TN inventory.

The Inventory TN Factor is analogous to a fill rate. For example, the wireless segments’ Inventory TN factor is 80%. This means that, for the Model’s purposes, 80% of the segments’ TNs are WTNs and 20% are inventory TNs. Dividing this number by 10,000 would provide total CO Codes for TNs. For every 8,000 WTNs the segment requires one CO Code.

It's important to note that an 80%-20% split of WTNs and inventory TNs represents a 100% TN efficiency rate. The inherent inefficiencies associated with the fact that there are multiple SPs across multiple segments is addressed in the Equivalent CO Codes for Footprint portion of the CO Code Demand Module.

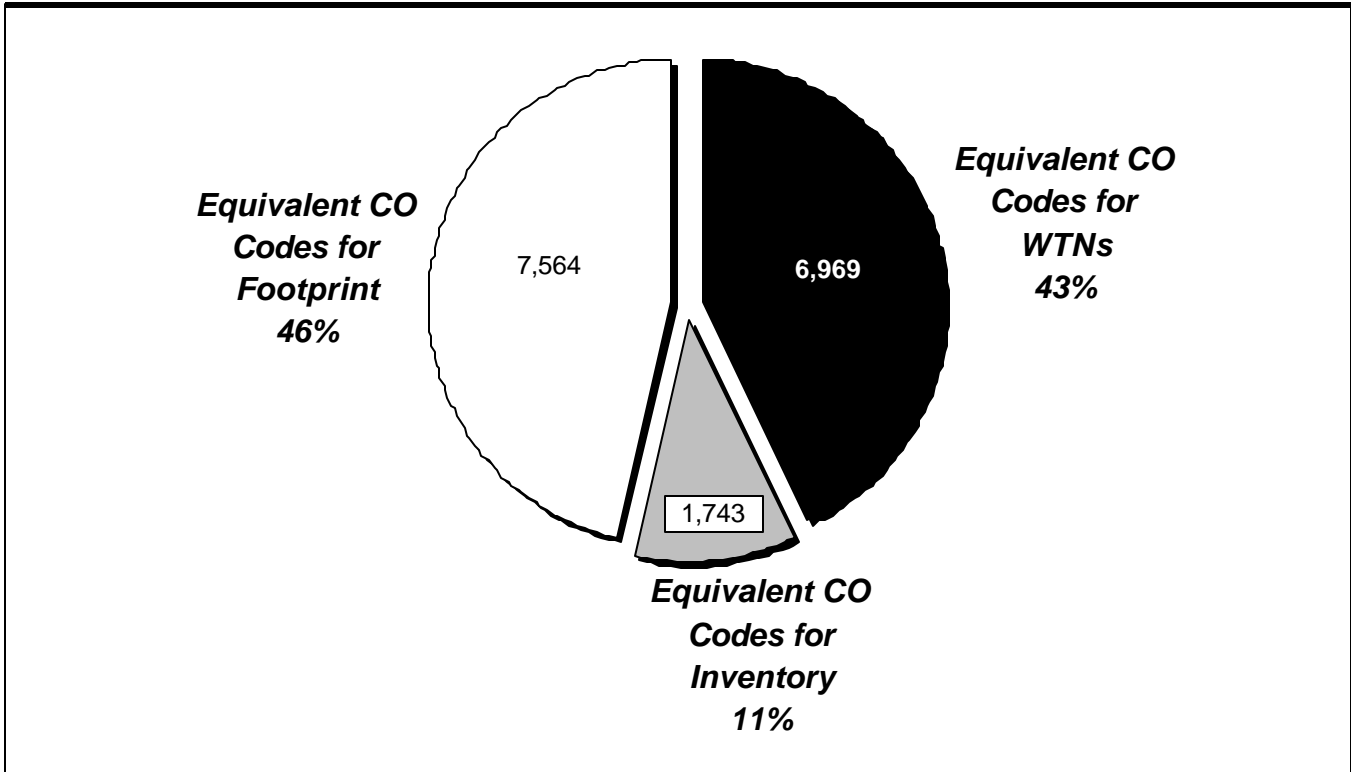
The ILEC segment's Inventory Factor is 70%. For every 7,000 WTNs the segment requires one Equivalent CO Code for TNs. The YE98 estimate of ILEC Equivalent CO Codes for WTNs, Equivalent CO Codes for Inventory and Equivalent CO Codes for Footprint is illustrated in Exhibit 3-2.

CO Codes for ILEC Segment - 56,563 Total (Exhibit 3-2)



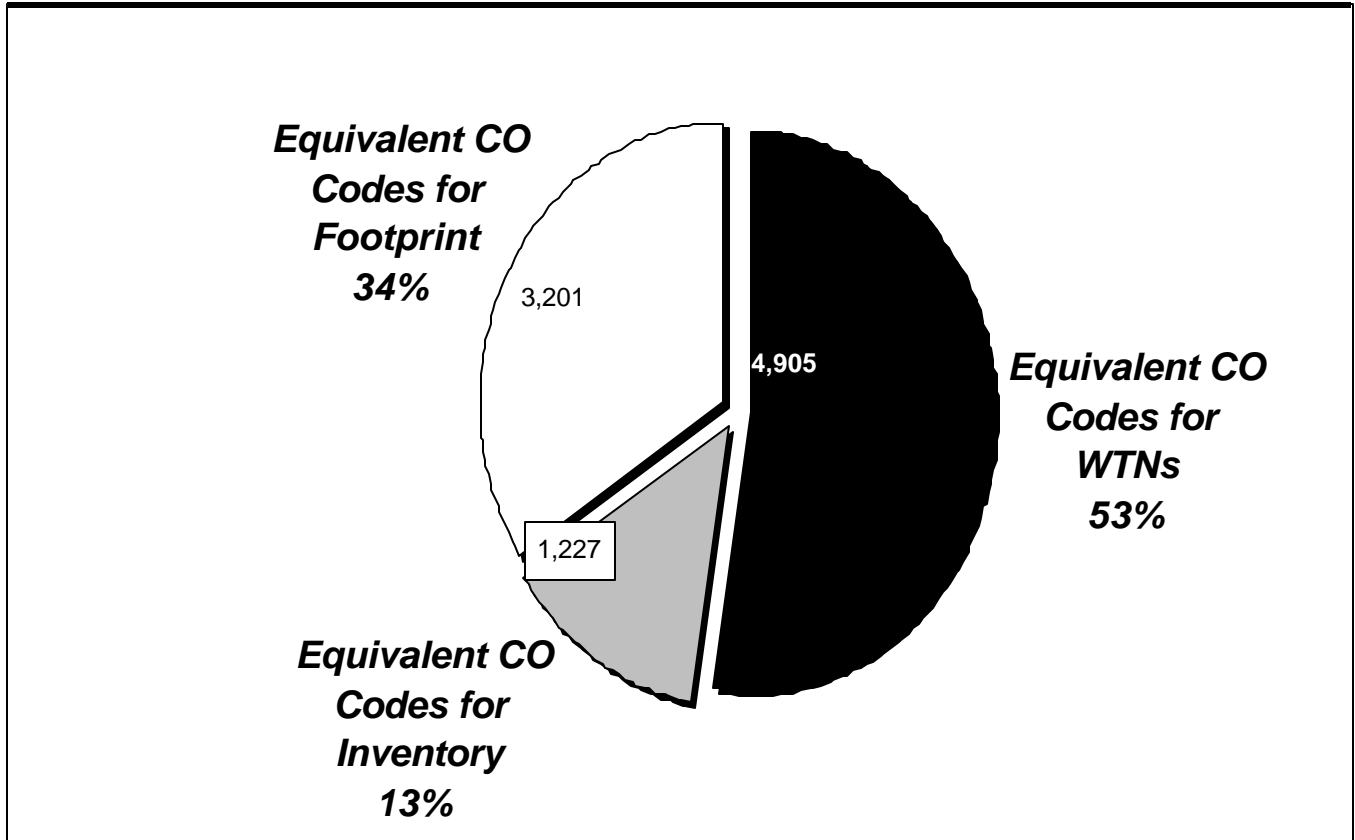
The CMRS segment's Inventory Factor is 80%. For every 8,000 TNs the segment requires one Equivalent CO Code for TNs. The YE98 estimate of CMRS Equivalent CO Codes for WTNs, Equivalent CO Codes for Inventory and Equivalent CO Codes for Footprint is illustrated in Exhibit 3-3.

CO Codes for CMRS Segment - 16,276 Total (Exhibit 3-3)



The Paging segment’s Inventory Factor is 80%. For every 8,000 TNs the segment requires one Equivalent CO Code for TNs. The YE98 estimate of Paging Equivalent CO Codes for WTNs, Equivalent CO Codes for Inventory and Equivalent CO Codes for Footprint is illustrated in Exhibit 3-4.

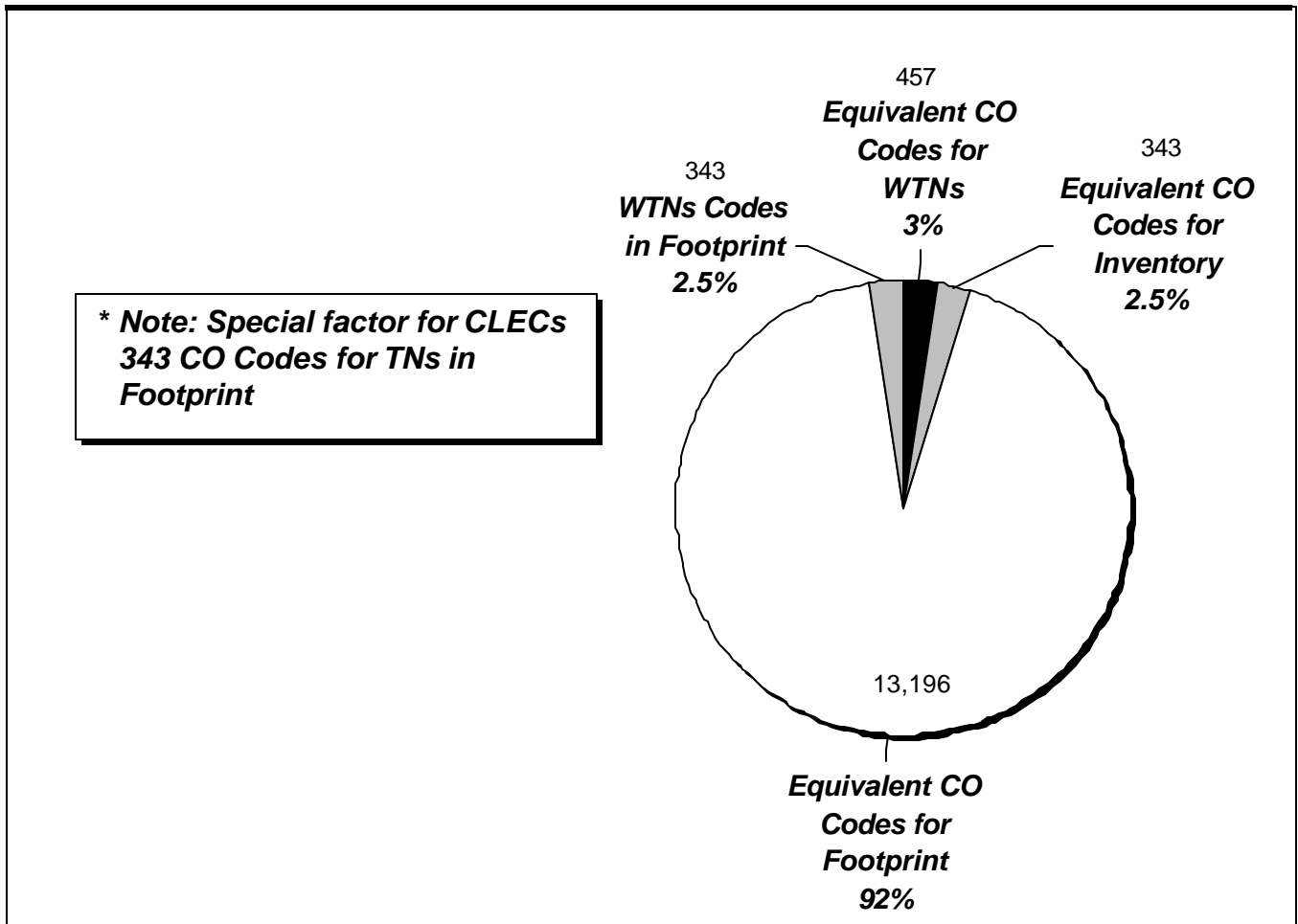
CO Codes for Paging Segment - 9,333 Total (Exhibit 3-4)



The CLEC segment’s Inventory Factor was adapted to account for the fact that the segment has such a large number of CO Codes with low utilization. Since the segment is relatively new, it still is in the process of building out its footprint. The Model assumes that, over time, those footprint codes will take up a percentage of the new TNs.

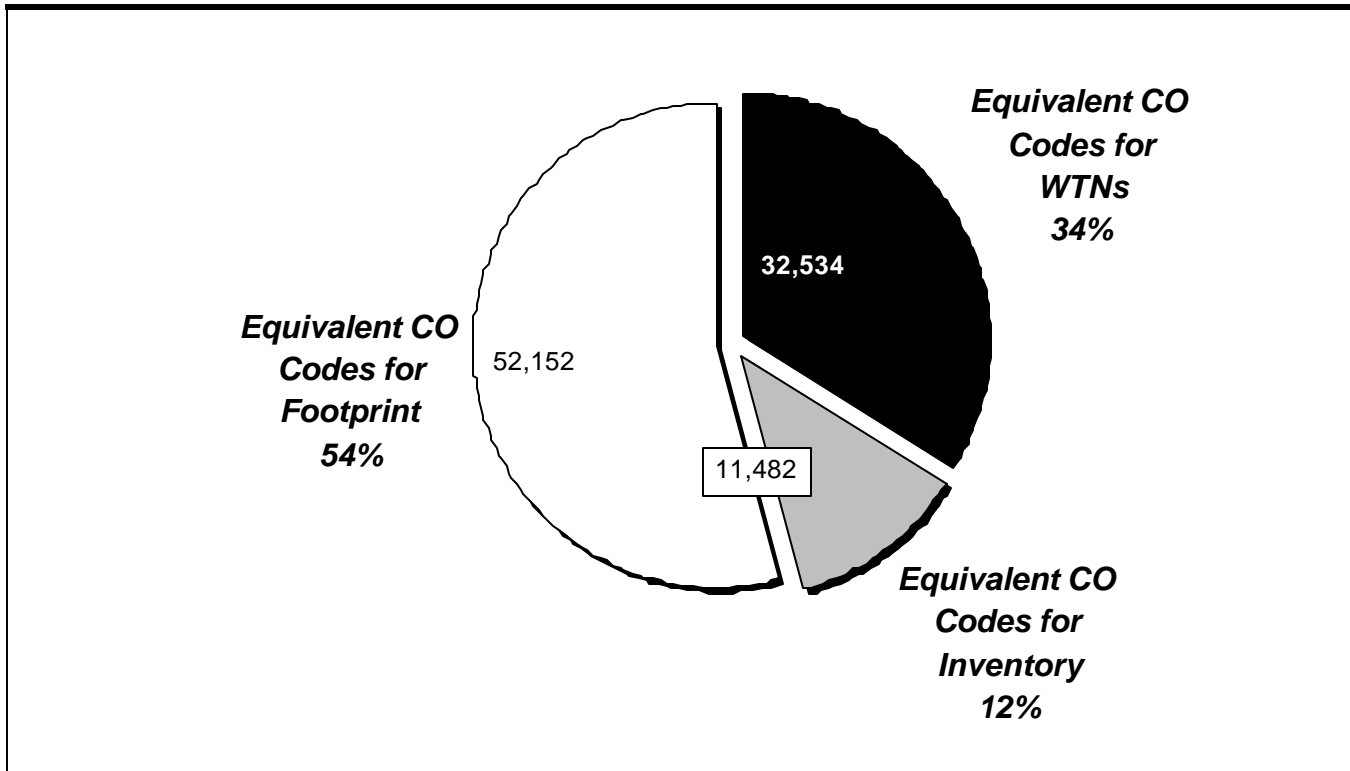
For this reason the CLEC segment's Inventory Factor is 100%. This has the effect of moving growth TNs to Equivalent CO Codes for Footprint. The model has been adapted so that the CLEC segment requires one CO Code for every 14,200 WTNs. The estimate of YE98 CLEC Equivalent CO Codes for WTNs, Equivalent CO Codes for Inventory and Equivalent CO Codes for footprint is illustrated in Exhibit 3-5.

Adjusted CO Codes for CLEC Segment - 13,996 Total (Exhibit 3-5)



The total industry estimate of YE98 Equivalent CO Codes for WTNs, Equivalent CO Codes for Inventory and remaining equivalent CO Codes is illustrated in Exhibit 3-6.

CO Codes for all segments - 96,168 Total (Exhibit 3-6)



Equivalent CO Codes for TNs is an estimate of the total TNs required for the industry to meet TN demand represented as CO Codes.

Equivalent CO Codes for Footprint

In the model the primary driver of demand for CO Codes for Footprint is generated by estimating the entrance of new SPs

To this end, NANPA created a definition of an Equivalent SP for each segment. An Equivalent SP holds one CO Code for Footprint in a certain number of rate centers. In general, an Equivalent SP is

considered a mature SP with regard to Equivalent CO Codes for Footprint. That is, an Equivalent SP is an SP that has acquired the majority of CO Codes for Footprint it will ever need.

The Model assumes that a new entrant builds out its coverage over a five year period. After five years the new entrant is considered a mature SP (an Equivalent SP). A mature SP in the CLEC, CMRS, and Paging segments will continue to expand into new rate centers, but at a much slower rate.

Definition of an Equivalent SPs

Each industry segment has different profiles with regard to their rate center coverage. For this reason it was necessary to develop a definition of an Equivalent SP for each industry segment.

One Equivalent ILEC holds one Equivalent CO Code for Footprint in 100% of the rate centers. The Model assumes there is only one Equivalent ILEC and the ILEC never expands its coverage. The ILEC does not demand any CO Codes for Footprint for the purposes of establishing footprint or expanding into new rate centers.

For the definition of an Equivalent CLEC, CMRS, and Paging SP, NANPA referred to the YE98 data on rate center coverage. Recall that the definition of the rate center coverage was “at least one member of the segment held a code in the rate center.” The baseline to determine rate center coverage was the number of rate centers at least one ILEC held a code.

Using this definition the CLEC segment had a 23% coverage, the CMRS segment had a 14% coverage and the Paging segment had a 9% coverage. NANPA used these percentages to estimate an Equivalent SP. This definition is a convention used for the Model. It would be incorrect, for example, to interpret this to mean that NANPA believes that each CLEC has a CO Code in 23% of the rate centers. NANPA understands that for each segment there are hundreds of SPs. Some SPs serve a small number of rate centers, some SPs serve a moderate number of rate centers, and some SPs serve a large number of rate centers. Furthermore, some SPs serve a small portion of the US, some SPs serve a moderate portion of the US, and some SPs serve a large portion of the US.

The definition of an Equivalent SP attempts to come up with a definition that accounts for these differences. One needs to view the definition of an Equivalent SP in light of what is called the New Entrant Pipeline. The new entrant pipeline defines the rate of entry of new SPs.

Because the Model was designed to take into account the entrance of new SPs, the definition of an Equivalent SP and the new entrant pipeline are major drivers of CO Code demand. If either of these numbers is decreased the NANP exhaust date will move out. If either of these numbers is increased the NANP exhaust date will move in.

Definition of an the Equivalent SPs:

One Equivalent CLEC holds one Equivalent CO Code for Footprint in 23% of the rate centers (4,386).

One Equivalent CMRS holds one Equivalent CO Code for Footprint in 14% of the rate centers (2,789).

One Equivalent Paging SP holds one Equivalent CO Code for Footprint in 9% of the rate centers (1,806).

Demand Assumptions

There are three drivers in the Model for demand for Equivalent CO Codes for Footprint;

- 1) The new entrant pipeline
- 2) The expansion of an Equivalent SP into new rate centers
- 3) The deployment of new nodes on the network (e.g., switches, interconnection points, LRNs, etc.).

The demand for Equivalent CO Codes for Footprint is intended to capture only those CO Codes that are required for an Equivalent SP to establish service for billing and routing purposes. In the real world an SP would acquire a CO code to establish service and would then assign TNs within that CO Code to users and administrative functions. 100% of the TNs required for WTNs and inventory, as defined, are captured in the Equivalent CO Codes for TNs calculation (with the exception of CLECs).

New Entrant Pipeline

The Model assumes that a number of Equivalent SPs within the CLEC, CMRS, and Paging segments are either mature or are in the process of building out their network to become a mature SP. There are a number of new entrants each year. The new entrant acquires Equivalent CO Codes for Footprint based on a five-year buildout curve. At the end of the five years the new entrant is a mature SP (Equivalent SP). After five years the new entrant has acquired all of the Equivalent CO Codes for Footprint required to become a mature SP.

New Entrant Buildout Curves

CLEC Buildout Curve (100% = 4,386)

Year 1	Year 2	Year 3	Year 4	Year5
20%	20%	20%	20%	20%

CMRS Buildout Curve (100% = 2,749)

Year 1	Year 2	Year 3	Year 4	Year5
40%	15%	15%	15%	15%

Paging Buildout Curve (100% = 1,806)

Year 1	Year 2	Year 3	Year 4	Year5
40%	15%	15%	15%	15%

New Entrant Pipeline - CLEC

The Equivalent CLEC category captures the new telecommunications SPs that are not included in the CMRS or Paging categories. There is evidence that shows local telecommunications competition is a relatively new industry that will continue to evolve and grow over time. The evidence can be divided into five categories; recent historical trends of new CLEC entrants, regulatory initiatives, decreasing cost of entry, introduction of new services, and a comparison with the long distance industry.

Trends of New CLEC Entrants

The table below provides a summary of a chart in the FCC Competition Report 3Q98. The chart depicts by quarter the first date a specific local service competitor received a numbering code. The first row is the quarter, the second row is the cumulative number of CLECs receiving their first code, and the third row is the yearly incremental number of CLECs receiving their first numbering code.

This chart shows the rate of entry of new CLEC code-holders. Clearly one can see that the rate of entry has increased in 1997 and seems to be increasing in 1998. The third quarter of 1998, the last quarter where data is provided, has the greatest increase of any quarter so far, 30.

New CLEC Code Holders

1994				1995				1996				1997				1998		
1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
0	2	5	8	10	10	12	13	15	20	27	31	41	54	74	92	99	116	146
			8				5				18				61			54*

** The sum of three quarters not one year.*

Another indication that the number of CLEC code holders will continue to grow is represented by the number of certified CLECs as compared to the number of CLEC code holders. NANPA used a sample of four states to compare this information. The number of YE98 certified CLECs was obtained through state PUC websites. There are two sources of CLEC code holders in the state. One is the FCC Competition Report 3Q98 and the other is the NANPA estimate of YE98. The NANPA estimate was obtained through a combination of NANPA CO Code assignment data, LERG data, and staff review.

In all cases there is a very low number of CLEC Code holders compared to the number of certified CLECs. One can assume that not all certified CLECs will become code holders. However, one can also assume that some number of them will become code holders.

State	Certified CLECs	3Q98 Code Holders	YE98 Code Holders
California	118	28	30
Colorado	52	11	11
Illinois	120	16	17
New York	76	27	35

Another point of reference is the increasing number of interconnection agreements with RBOCs. The table below provides a comparison of 1997 interconnection agreements and 1998 interconnection agreements for Ameritech, Bell Atlantic, Bell South, and US WEST.

One can see that the number of interconnection agreements for three of the four RBOCs shown more than doubled from 1997 to 1998.

CLEC Interconnection Agreements

RBOC	1997	1998
Ameritech	87	119
Bell Atlantic	180	534
Bell South	250	511
US WEST	180	473

(Source: tele.com Magazine December 1998, p.18, *“Hard to Keep the Players Straight”*)

Regulatory Factors

There are at least three regulatory initiatives that will spur entry of new local service providers. They are the LMDS auction, the co-location decision, and the entry of RBOCs into the long-distance market.

A letter from Daniel Phythyon, former Chief of the Wireless Telecommunications Bureau, to the editors of Wireless Review magazine (July 15, 1998, p. 6) contains the following quote, “In five weeks, the LMDS auction added 104 new players – who won nearly 90% of the 986 available licenses – to the marketplace.” He goes on to say, “We also achieved Congress’s objective of promoting diversity – 93 small-business bidders won 664 licenses; of those, 142 were won by rural telephone companies, 30 by

women-owned companies and nine by minority-owned companies.” These two quotes illustrate the following facts: there will be new SPs entering the market; they will be entering the market in rural as well as urban markets; there will be different types of SPs (not just large phone companies); and it is Congress’s objective to encourage the entrance of new SPs.

In March 1999 the FCC issued a decision regarding the co-location of CLECs in ILEC central offices. An article in the April 5, 1999 issue of tele.com Magazine addresses this decision as follows: “With what appears to be a regulatory green light, competitive local exchange carriers (CLECs) are establishing a foothold into the facilities-based local market as incumbent players are required to open their central office (CO) switch equipment to their competitor.” It goes on to say, “Details are fuzzy in terms of assessing the benefits to competitive providers, but some believe the new rules could cut costs for the new market entrants drastically, from \$70,000 to about \$10,000 per CO. The time it takes to provide service could also be slashed, from six months to 45 days...”

The fact that the co-location decision is making it easier and less expensive to deploy service as a CLEC is likely to have the effect of increasing the number of new entrants.

Finally there have been articles recently suggesting that Bell Atlantic may be the first RBOC that will be allowed to offer long distance service. This insight is based on a series of tests performed by KPMG Peat Marwick under the guidance of the NY State PSC. An article in the USA Today has the following quote; “Once the Bells enter the \$80 billion dollar long-distance market, long-distance companies are expected to jump into the \$100 billion local market. That means consumers would have a choice of local carriers, just as they have a choice of long-distance carriers.”

One can draw two conclusions from this quote. First, the entry of an RBOC into the long-distance market is very likely going to be a catalyst for increased local competition. Second, the fact that a periodical like USA Today does not realize that local competition currently exists indicates that the current level of competition is only a fraction of what it will eventually evolve.

Decreasing Cost of Entry

As time goes on the cost to become a CLEC has and will continue to decrease. This is illustrated in an article in the January 25, 1999 issue of tele.com Magazine, p. 58. “The early CLECs often relied on telco-class equipment like Class 5 switches that cost \$7 million says Viren, a former executive at CLEC pioneer Intermedia Communications Inc. (Tampa, Fla.). As a result, he says, they would have to spend some \$3 billion to build a 50-city network. Second-generation CLECs are developing much cheaper models. 2nd Century will invest in telephony gateways based on the internet protocol (IP), at a cost of about \$700,000.... When all is said and done, Viren says, it can build that same 50-city network for as little as \$150 million.”

This quote is notable for two reasons. First, it illustrates a dramatic difference in cost over a short period of time. Although there is no timeframe mentioned one can assume that it is no more than four years, 1995 to 1999. The lower cost of entry will likely result in more new entrants. The quote is also notable because it already begins to talk about two generations of CLECs. If the industry has progressed through two generations in approximately four years, it is likely that the industry will continue to adapt and grow.

Introduction of New Services

Most individuals believe that there will be very few CLECs because providing local service is very capital intensive. Indeed, this is not entirely correct for two reasons: cost is decreasing and not all CLECs will focus on taking customers away from the ILECs. Indeed, some CLECs will be offering new services that are incremental to current local phone service. Local competition has opened the door for new and innovative services.

A service offered by a company called eFax.com provides a good example⁶. Users register by sending their email address. The user receives a fax number (10-digit NANP number). Faxes sent to the fax number will be converted to an image file and forwarded to the user as an attachment to an email. The

⁶ Newsweek 2-8-99, p.9

service is free. It took NANPA personnel less than 10 minutes to register with the company, receive the number, and begin receiving faxes.

Comparison to the Long Distance Industry

Recently the NANP has experienced the exhaust of another of its resources, Carrier Identification Codes (CICs). The solution was to expand the format of a CIC from three to four digits. (10-XXX to 101-XXXX)

One wonders how it is that a resource with 1,000 numbers was not sufficient to serve an industry with a handful of service providers, such as AT&T, MCI, Sprint, Worldcom and a few others, that require one number each. In addition, long distance is an industry undergoing considerable consolidation meaning there should be fewer service providers. Furthermore, the industry is 15 years old, one would think that it has reached maturity and demand for CICs have decrease to a minimal level.

The fact is that there is not a handful of service providers – there are hundreds. The FCC estimates 616 long distance SPs at YE96, when counting at the state level. As of 1Q98 there were 1,596 FG-D CICs assigned.⁷

Although technically a long distance company could operate with one CIC, there are allowances in the Industry Numbering Committee (INC) Guidelines for a company to obtain additional CICs.

There were 201 FG-D CICs assigned between 1Q97 and 1Q98, an increase of 14%. It seems that this is still a vibrant and growing segment of the industry despite consolidation and the age of the industry.

At YE98, two years after local competition was legislated, there were 206 SPs. At YE86, two years after long distance competition was legislated, there were 413 CICs assigned. In 1Q98 there were 1,596 CICs assigned.

⁷ FCC – Trends in Telephone Service July 1998

The following conclusions can be drawn regarding the long distance industry:

- While it would appear that there are very few long distance SPs the fact is there are hundreds.
- Although one may think that the industry has matured and should be experiencing low demand for NANP resources, the fact is it is still experiencing a high rate of demand for NANP resources despite the age of the industry.
- Although one may think that consolidation within the industry would decrease demand for NANP resources, the fact is it is still experiencing a high rate of demand for NANP resources.

Conclusions

These examples are not offered as quantitative data to support a specific estimate for a quantity of new entrants, but as qualitative data to support NANPA's opinion that local service competition is in its early stages and will continue to grow in the near future. A natural by-product of this growth is demand for NANP resources (i.e., CO Codes). TNs are the fuel local service providers need to offer service. Since TNs are currently tied to CO Codes, demand for TNs results in demand for CO Codes.

Impact of Consolidation

There is a theory that the current trend towards consolidation of service providers in the industry will result in a decreased demand for CO Codes. Equivalent CO Codes for Footprint is projected by estimating the number of new SPs and their rate center coverage. For consolidation to impact demand for Equivalent CO Codes for Footprint in the Model it would have to impact the number of new entrants. If there is any impact on new entrants it would be to increase the number. It is clear that many SPs enter the business with the goal of being purchased by a larger SP. The current demand history already includes consolidation. Further, consolidation happens after a SP reaches a certain level of buildout. Indeed, consolidation is a method of network buildout for the acquirer. To date, NANPA has seen few returned codes due to consolidation.

Summary of CLEC Pipeline

The following table shows the results of the CLEC Pipeline assumptions. It displays the incremental number of CO Codes and Incremental Equivalent CLECs each year. This number is derived as follows:

Yearly CO Codes for Footprint / Definition of a CLEC (or 4,386)

Year	1999	2000	2001	2002	2003	2004	2005	2006
Codes	8,444	9,018	9,055	9,093	10,007	8,292	8,325	7,482
Incr Eq CLECs	1.9	2.1	2.1	2.1	2.3	1.9	1.9	1.7

New Entrant Pipeline – CMRS

Since CMRS providers are licensed by the FCC, there potentially will not be as many new entrants in the CMRS segment as there will be in the CLEC segment. NANPA does assume that demand for footprint codes for CMRS SPs will be supplemented by demand for codes from unlicensed providers, satellite providers, NXX based services, and/or currently unknown providers created by new licenses.

The following excerpt is offered as an example of a wireless service that does not require spectrum allocation. It is not being offered to support a specific quantity of CMRS equivalents or their buildout but merely as supporting data to show that such a service will likely exist in the future.

“At the Venture Market South conference on Tuesday, I sat in on Time Domain’s presentation by CEO Mark Petroff. He had a video that pitched the “new dimension” in wireless data. ... It uses what’s considered the “noise” of ordinary frequency bands, so it doesn’t even need traditional spectrum allocation.” (Source: Red Herring Online)

The following excerpt from the INC CO Code Assignment Guidelines shows that carriers can request codes for an NXX-based service such as Calling Party Pays.

“4.2 Assignment of additional code(s) will be made for an established point of interconnection or switching entity by satisfying one of the criteria in Sections 4.2.1 to 4.2.3. ...

4.2.2 *An additional code(s) is necessary for distinct routing, rating, or billing purposes (e.g. Calling Party Pays)."*

Summary of CMRS Pipeline

The following table shows the results of the CMRS Pipeline assumptions. It displays the incremental number of CO Codes and Incremental Equivalent CMRS each year. This number is derived as follows:

Yearly CO Codes for Footprint / Definition of a CMRS (or 2,749)

Year	1999	2000	2001	2002	2003	2004	2005	2006
Codes	1,855	2,583	3,307	3,070	3,107	2,459	3,179	2,801
Incr Eq CMRS	0.7	0.9	1.2	1.1	1.1	0.9	1.2	1.0

New Entrant Pipeline – Paging

Paging service providers have the lowest demand for footprint codes due to new SP entrants.

Summary of Paging Pipeline

The following table shows the results of the Paging Pipeline assumptions. It displays the incremental number of CO Codes and Incremental Equivalent Paging each year. This number is derived as follows:

Yearly CO Codes for Footprint / Definition of a Paging SP (or 1,806)

Year	1999	2000	2001	2002	2003	2004	2005	2006
Codes	748	1,510	825	592	629	668	430	1,186
Incr Eq Paging	0.4	0.8	0.5	0.3	0.3	0.4	0.2	0.7

Expansion of an Equivalent SP into New Rate Centers

The model assumes that each mature Equivalent SP will require additional Footprint codes for expansion into new rate centers. Each year the definition of an Equivalent SP increases by 2%. Each

mature Equivalent SP will acquire a number of Footprint CO Codes equal to 2% of the baseline number. For example in 1999 each mature Equivalent CLEC will expand into 88 new rate centers ($4,386 \times 2\% = 88$). This growth rate is applied to the CLEC, CMRS, and Paging Equivalent SP.

Deployment of New Nodes on the Network

As SPs grow they add new nodes to their networks. New nodes can either be a new switch or gateway device, or a new point of interconnection (POI) with the PSTN. In most cases, SPs will request a CO Code to establish the new node. The INC CO Code Assignment Guidelines specifically allows for the assignment of a CO Code to establish a node. The following excerpt was taken from the INC Central Office Code (NXX) Guidelines (INC 95-0407-008).

“4.1. CO Codes are assigned to entities for use at a Switching Entity or Point of Interconnection they own or control. Assignment of the initial code(s) will be to the extent required to terminate PSTN traffic as authorized.... Utilization criteria or projection will not be used to justify an initial NXX assignment.”

The Model estimates that each of the four segments will require one additional CO Code for a new node in each US Geographic NPA every year.

MODULE TWO: NANP EXHAUST PROJECTION FROM CO CODE DEMAND

Introduction

The output of the CO Code Demand module (yearly CO Code demand) is input into the NANP Exhaust module to estimate yearly US Geographic NPA demand. In addition two international and/or service NPAs are assumed to be assigned per year. The total yearly NPA demand is then used to estimate the year of NANP exhaust. A sensitivity analysis is performed on the CO Code Demand module assumptions to estimate a range of possible exhaust dates.

Findings

The Model projects NANP exhaust in 2008.

Sensitivities to the NANP exhaust date were run using a range of CO Code Demand assumptions using the analysis methods discussed in the Sensitivity Analysis Appendix. The probability analysis projects, with 80% confidence, that the NANP will exhaust between 2005 and 2012 with an expected exhaust date of 2008.

The Model designates 17 NPA areas that will become overlays because of high CO Code assignment rate. The Model automatically calculates an overlay relief for NPAs with very high CO Code Assignment rates (three additional NPAs required by YE2005). The Model designates another 50 NPA areas that could be either split or overlay (at most one additional NPA required prior to NANP exhaust). The Model assumes that the remaining 139 NPA areas use a split relief method when required. Sensitivities were run to understand the effects of various relief methods on overall NANP exhaust with no appreciable shortening or lengthening of expected NANP life.

3.3 Methodology

NANP Exhaust Baseline Data

The Model profiles each of the 206 NPAs in service at YE98 to establish 206 surrogate NPAs. The surrogate NPAs are intended to be actual representations of actual NPA areas. However, because of the simplifying assumptions of the Model, it would not be appropriate to use this Model to estimate exhaust of a specific NPA.

A regression analysis using data points from NANPA CO Code assignment data from April 1, 1998 to December 31, 1998, provides a raw monthly CO Code assignment rate for each surrogate NPA. If the actual NPA was in relief or rationing during the regression period, the CO Code demand rate would have been impacted. To compensate for this effect the Model uses the average CO Code assignment rate for that specific NPA. The Model also determines if an area has a very high monthly CO Code

assignment rate. If so, the Model limits that growth to three times the average CO Code growth rate for an area to ensure that potentially abnormally high growth rates do not skew the results.

Specific NPA CO Code Consumption Calculations

The Model uses a proportion of the normalized assignment rate per NPA divided by the total CO Codes assigned to ensure that the total of all 206 equals the 1999 CO Code consumption projection from the CO Code Demand Model. The derived proportional ratio of the CO Code demand represents the specific area's share of annual CO Code assignment.

The Model applies the CO Code demand share by NPA to each year's CO Code Projection from the first module of the CO Code Demand Model to give new CO Codes per year by specific NPA.

NPA Relief Calculation

The Model then predicts expected relief by using the cumulative CO Codes assigned by specific NPA and dividing by the maximum CO Codes in use before the relief. Relief is implemented 18 months prior to exhaust. For the purposes of the Model NPA, exhaust is defined as the date that 713 CO Codes are assigned. The 79 remaining codes represent codes that are unassignable and codes available for demand spikes during the relief period. The Model assumes that, on average, NPA relief activities will require a relief period of 18 months to account for variable exhaust windows, implementation activities, and permissive dialing periods.⁸ The relief period ramps from a negative timeframe in 1999 (relief six months after exhaust) and 2000 (relief three months after exhaust) to account for the high rate of Jeopardies and rationing expected in 1999 and 2000. The planning period continues to ramp to a moderate period in 2001 (relief six months prior to exhaust) to the normal period in 2002. The relief period is defined as the amount of time required to minimize Jeopardies given the variability and the

⁸ INC NPA Code Relief Planning & Notification Guidelines (INC 97-0404-016, Reissued January 27, 1999) specify that an "exhaust window" and relief plan be developed for each NPA. Using the earliest possible exhaust date in the exhaust window, the date of mandatory dialing should be 6 to 12 months prior to that date. Also, a 90 day period should be set aside for intercept once permissive dialing has ended to ensure accurate billing and messaging. Permissive dialing periods have been as short as 4 months to as long as 2 years. An NPA test number should be activated 4 to 6 weeks prior to relief date.

magnitude of the CO Code assignment rate. The resulting calculation indicates expected relief activity by year.

The Model assumes that the descendents of an NPA grow at the same rate as the parent NPA. Under the split scenario the demand rate is divided evenly between both NPAs. The Model does not explicitly account for the probable event that descendants will grow at different rates. The model also assumes that four split NPAs have the same life expectancy as four overlay NPAs. The only difference between splits and overlays in the Model is the third and fourth NPAs get assigned when the first two peer NPAs exhaust.

4.0 1KB POOLING MODEL

4.1 Introduction

The 1KB Pooling Model (Pooling Model) projects the impact of Thousands Block Pooling (1KB Pooling) on NANP resources. 1KB Pooling provides TN resources to participating SPs in blocks of 1,000 rather than in CO Code blocks of 10,000. The Pooling Model captures this fundamental change in how NANP resources are doled out to SPs. CO Codes are only issued to SPs as required to replenish the 1KB Pool in a rate center or for Local Routing Number (LRN) assignments. Pooling Model illustrates the impact of 1KB Pooling on CO Code demand, NPA life extension, and NANP exhaust.

The new 1 KB Pooling Model applies the 1KB Pooling factors to the specific 206 NPA areas using the same assumptions as the CO Code Demand Model. The pooling impacts presented at the February 18 NANC meeting used the old “Model NPA” pooling model that was not directly integrated into the CO Code Demand Model. The new Pooling Model ties directly into the CO Code Demand Module and NANP Exhaust Module. It changes the CO Code demand that is generated in the CO Code Demand Module due to the assignment of 1KBs. It then determines NPA life and NANP exhaust in the same manner as the non-pooling scenarios in the NANP Exhaust Module. A pooling scenario summary reports key pooling indicators for each scenario.

The Pooling Model accommodates various 1KB initiation dates, donation rates, WTN inventory factors, and 1KB Pool inventory factors. The Pooling Model assumes that all NPAs begin pooling at the same time.

4.2 Findings

With all industry segments participating in 1KB Pooling, the expected date for NANP Exhaust is in the 2094 timeframe versus the 2008 timeframe without 1KB Pooling. Table 4-1 summarizes the pooling scenarios using the new Pooling Model.

Summary of 1KB Pooling Impacts (Table 4-1)

1KB Pooling Scenario	NANP Exhaust Timeframe
No Pooling – NANPA base scenario	2008
All segments participate (ILEC, CLEC, CMRS, and Paging) in 2000 with donation	2094
All segments participate in 2000 without donation	2058
CLEC, ILEC, and CMRS participate in 2000 (no Paging) with donation ¹	2048

NANPA’s base pooling scenario assumes that all users of NANP resources initiate 1KB pooling in 2000.² NANPA assumes that SPs donate seven 1KBs out of the Equivalent CO Codes for Footprint to the 1KB Pool. This represents approximately 50% of the unused 1KB resource in SP inventories.

Since NANPA does not have reliable utilization data, donation rates are somewhat speculative. A case was run to show the impact of 1KB pooling in a scenario in which no 1KBs are donated by SPs nor are any 1KBs reclaimed by the Pooling Administrator. NANP exhaust with all industry segments participating in 1KB Pooling in 2000 but no 1KB donation is in the 2058 timeframe.

Industry Participation In Pooling

An important finding regarding pooling participation was first analyzed for the 847 1KB Pooling implementation in Illinois and is validated here. SPs who do not pool must use whole CO Codes for TN growth and Footprint expansion rather than using 1KBs from the 1KB Pool. CO Codes become shareable by pooling participants but not by non-participants. Full participation in pooling reduces CO Code consumption to less than 25% of the original CO Code demand rate without pooling. An industry

¹ It was felt by various industry members of the Review Team that Paging would not participate in NXX-X assignments because Paging is not currently “LNP-capable.” Paging would require modifications to network equipment to receive LRN dipped calls or special interconnection arrangements in order to accommodate NXX-X assignments.

² An alternative pooling scenario was discussed by industry members on the Review Team. The alternate pooling scenario included CLEC and ILEC participation in 2001 and CMRS in 2003 and no Paging participation with donation. It projected NANP exhaust in 2042 but used different assumptions for CO Code demand and donation than NANPA’s case. Therefore, 2042 can not be directly compared to the dates in Table 4-1.

segment (e.g., ILEC or Paging) that uses only 10% of the CO Code demand rate can have a significant impact if every other industry segment combined only uses 20% of the original CO Code demand rate.

For illustration: In a pooling scenario without Paging participation and without donation, Paging is projected to demand 1,723 CO Codes in 2001. The rest of the industry combined demands only 4,491 CO Codes (for 1KB Pool replenishment and LRN assignments.) Paging alone demands 30% of the CO Codes assigned in 2001. The Paging segment demanded 9% of the CO Codes assigned in 1998.

NANP TN Utilization at Exhaust in the Pooling Model

NANPA analyzed the TN utilization of the NANP at exhaust in 2094 to determine how aggressively the Pooling Model applied 1KB Pooling parameters. TN utilization at exhaust should illustrate the potential for stranding NANP resources in slow growth rate centers or NPAs. The analysis shows that the Pooling Model projects very *conservative* 1KB Pooling assumptions. At NANP exhaust in 2094, 1.6B TNs are in service out of 3.3B TNs available in assigned CO Codes and 1KBs. This indicates that 1.7B TNs or 52% could be stranded in 1KBs in slow growth rate centers in NPAs with pooling and in CO Codes in (NPAs) without pooling.

4.3 Methodology

Baseline Data

Baseline data is input directly from the CO Code Demand Model. Additional inputs are required for the Year of 1KB Pooling initiation by industry segment, 1KB donation rate by industry segment, and TN Inventory Factor.

The Pooling Module relies on the following data from the CO Code Demand Model:

To determine...	Use...
Potential 1KBs available for donation	<ul style="list-style-type: none"> • Total CO Codes for Footprint by industry segment
1KBs for TN Growth	<ul style="list-style-type: none"> • TN Inventory Factor • Incremental TNs by industry segment
1KBs for Footprint	<ul style="list-style-type: none"> • Incremental CO Codes for Footprint
CO Codes for LRNs	<ul style="list-style-type: none"> • CO Codes for Nodes/LRNs • Incremental New Entrants by Industry Segment
CO Codes required in non-pooling scenarios or years	<ul style="list-style-type: none"> • Incremental CO Codes by Industry Segment

Pooling Model Description

The Pooling Module has the capability to run the following scenarios:

Initiation

1. The Pooling Model can vary the Year of 1KB Pooling initiation by industry segment. The valid years to initiate 1KB pooling are 2000, 2001, 2002, 2003 or not applicable (“NA”). NA indicates that an industry segment does not participate in 1KB Pooling.

1KB Donation

2. The number of donated 1KBs blocks per industry segment from footprint CO Codes can be modified from zero to 10 1KBs. The NANPA default value is seven 1KBs donated for each Footprint CO Code assigned to an industry segment in the year prior to 1KB Pooling initiation.³

TN Inventory

³ Seven 1KBs out of the 10 1KBs unused in the Equivalent CO Codes for Footprint was selected by NANPA to be a conservative assumption. Seven 1KBs represents approximately 50% of the unused resource (Equivalent CO Codes for Footprint plus Equivalent CO Codes for Inventory) in a typical SP inventory.

3. Similar to the CO Code Demand Model, the Pooling Model assumes some allowance for TN inventory beyond the amount for working TNs. For example: a 80% TN inventory factor (i.e., 80% WTNs and 20% in inventory/aging uses 10 1KBs to serve 8,000 working telephone numbers (“WTNs”) and 2,000 in aging or inventory. The NANPA default assumes that the normal situation has the same TN Inventory factor for 1KBs as the CO Code Demand Model assumes for CO Codes.

Equivalent SP Demand

4. The Pooling Model assumes that an Equivalent new entrant SP or expanding SP requires one 1KB per rate center entered in any given year for Footprint.

LRN Assignment

5. The Pooling Model assumes that a new entrant, new switch, or point of interconnection (POI) in an NPA requires one new CO Code assignment for a Local Routing Number (LRN). If the new entrant SP, switch, or POI is in an industry segment that participates in pooling, then that SP contributes nine 1KBs from the new CO Code to the 1KB pool.

1 KB Pooling Administration

6. The Pooling Model administers 1KBs separately from CO Codes. It administers an ongoing 1KB pool that can be shared by all 1KB Pooling SPs. The Pooling Model calculates demand for 1KBs for TN growth and 1KBs for footprint.
7. The Pooling Model calculates whether there is adequate 1KB inventory to serve the current demand for 1KBs. The 1KB Pooling administrator uses 1KB pool carryover from the prior year and the current 1KBs made available by new CO Code assignments to 1KB Pooling participant SPs to calculate additional 1KB requirements. The Pooling Model obtains new 1KB resources by obtaining new CO Codes and adding those resources to the pool.⁴

⁴ 1KB Pooling issues the CO Code to an SP to act as a code holder. The 1KB Pooling administrator issues the new CO Code to SPs in a given rate center. Nine 1KBs are returned to the 1KB Pool to be issued to other SPs participating in the pool.

CO Code Consumption

8. The Pooling Model calculates the CO Code Demand by industry segment based on whether that industry segment is participating in 1KB Pooling or needs a new CO Code for a new switch, POI or new entrant
9. The Pooling Model tracks the new CO Codes opened for 1KB Pool administration.
10. The Total CO Code Demand is input into the NANP Exhaust Module to determine the impact of 1KB Pooling on the CO Code assignment rate, NPA relief, and NANP exhaust.

Sensitivity Analysis Appendix

Introduction

A sensitivity analysis was conducted on the CO Code Demand Model to determine the impact of various assumptions on the cumulative CO Codes required by year and the projected date for NANP exhaust. The range of findings in the CO Code Model's first module was input into the second module to determine the probability distribution for likely NANP exhaust outcomes.

The sensitivity analysis produces a ranking of assumptions that have the most impact on CO Code demand and NANP exhaust. The assumptions that most influence the outcome were varied given reasonable ranges of expected values.

The CO Code Demand Model has over 475 independent variables that drive the outcome. Due to the nature of sensitivity analysis, it is only practical to focus on the key drivers for CO Code consumption and NANP exhaust. The sensitivity analysis focuses on the top 20 drivers to determine the probability of the predicted outcomes.

The sensitivity analysis focused on the key driving assumptions for TN demand and Footprint demand in order to produce the broadest potential range. For example, a large variation in one independent variable, the definition of an Equivalent CLEC SP, has broad impact on many of the assumptions for Equivalent CLEC CO Codes for the Footprint through the study period. A smaller variation in each of the 100+ independent variables dealing with CLEC Footprint demand has less overall impact.

Findings

The sensitivity and probability analyses provided likely ranges of outcomes for CO Code Consumption and NANP exhaust as depicted in Exhibits A-1, A-2, and A-3.

CO Code Demand Scenarios (Exhibit A-1)

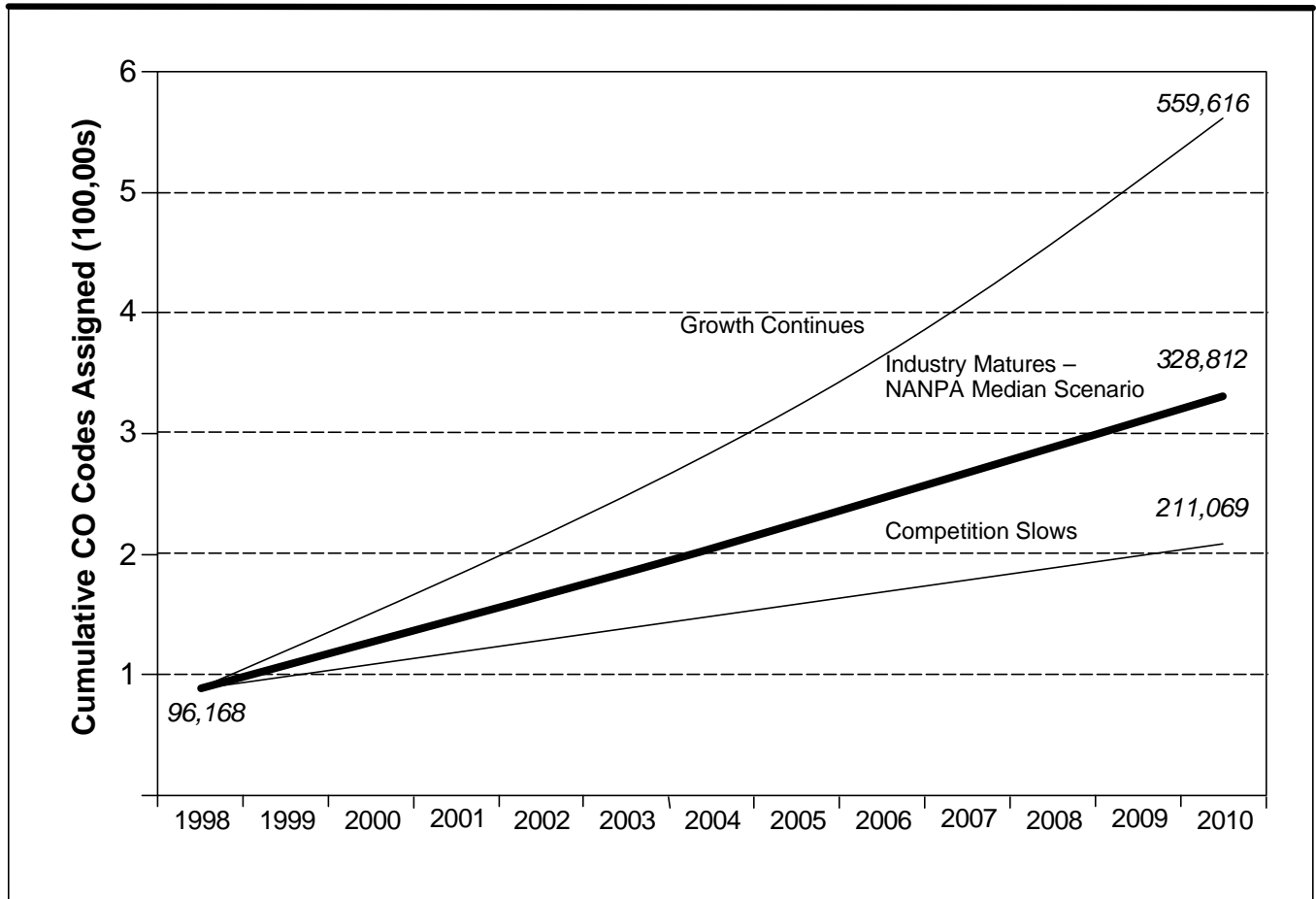
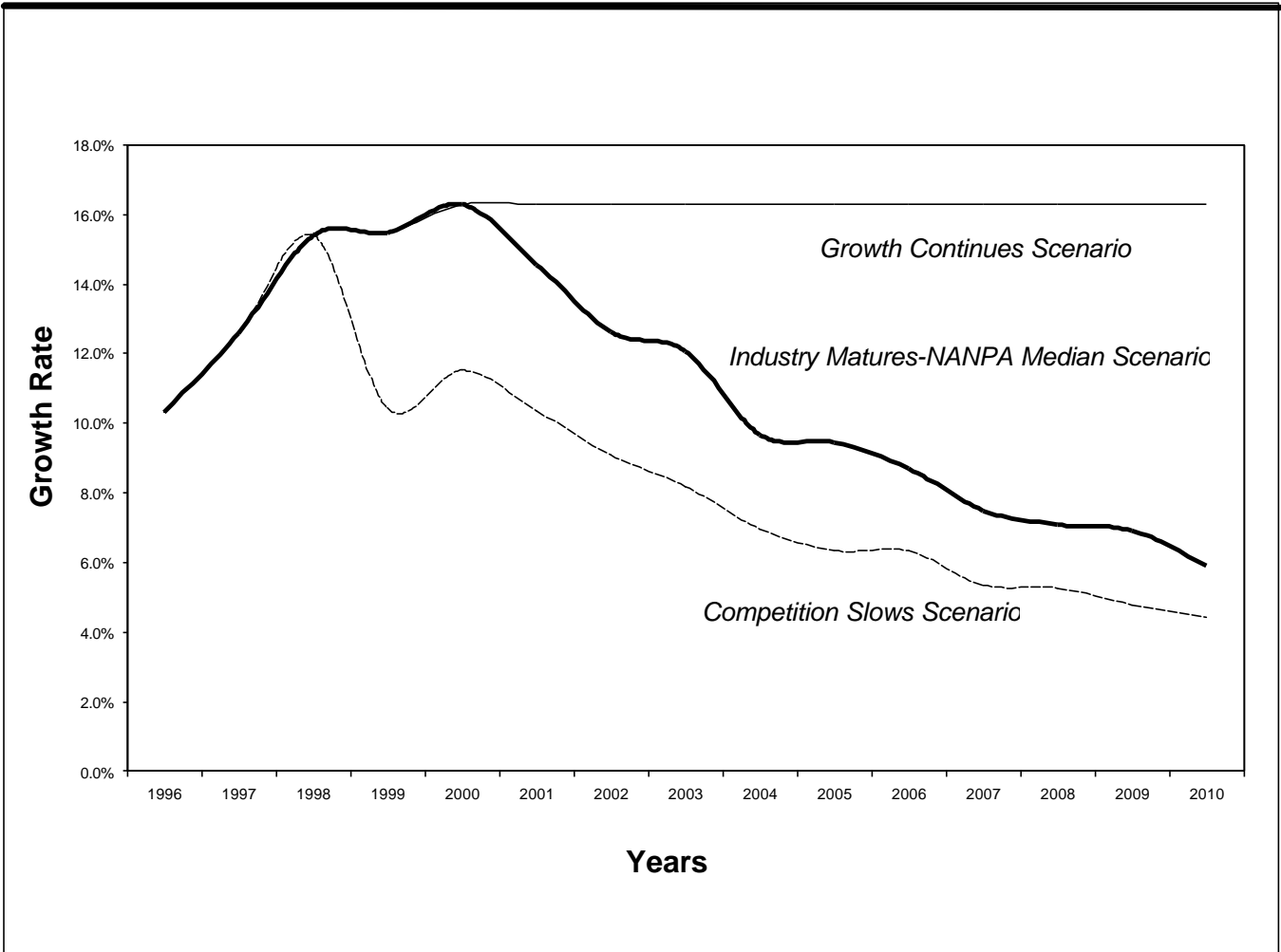


Exhibit A-1 shows the CO Code demand for three scenarios that were produced by the sensitivity analysis. The CO Code demand resulting in 328,812 CO Code assignments by 2010 was used by NANPA as the median scenario. The Growth Continues Scenario assumes that code demand continues at its current rate. The Competition Slows Scenario assumes a rapid reduction in CO Code demand. The CO Code Demand growth rates are shown in Exhibit A-2.

Annual CO Code Assignment Growth Rate Scenarios (Exhibit A-2)



NANP Exhaust Projection (Exhibit A-3)

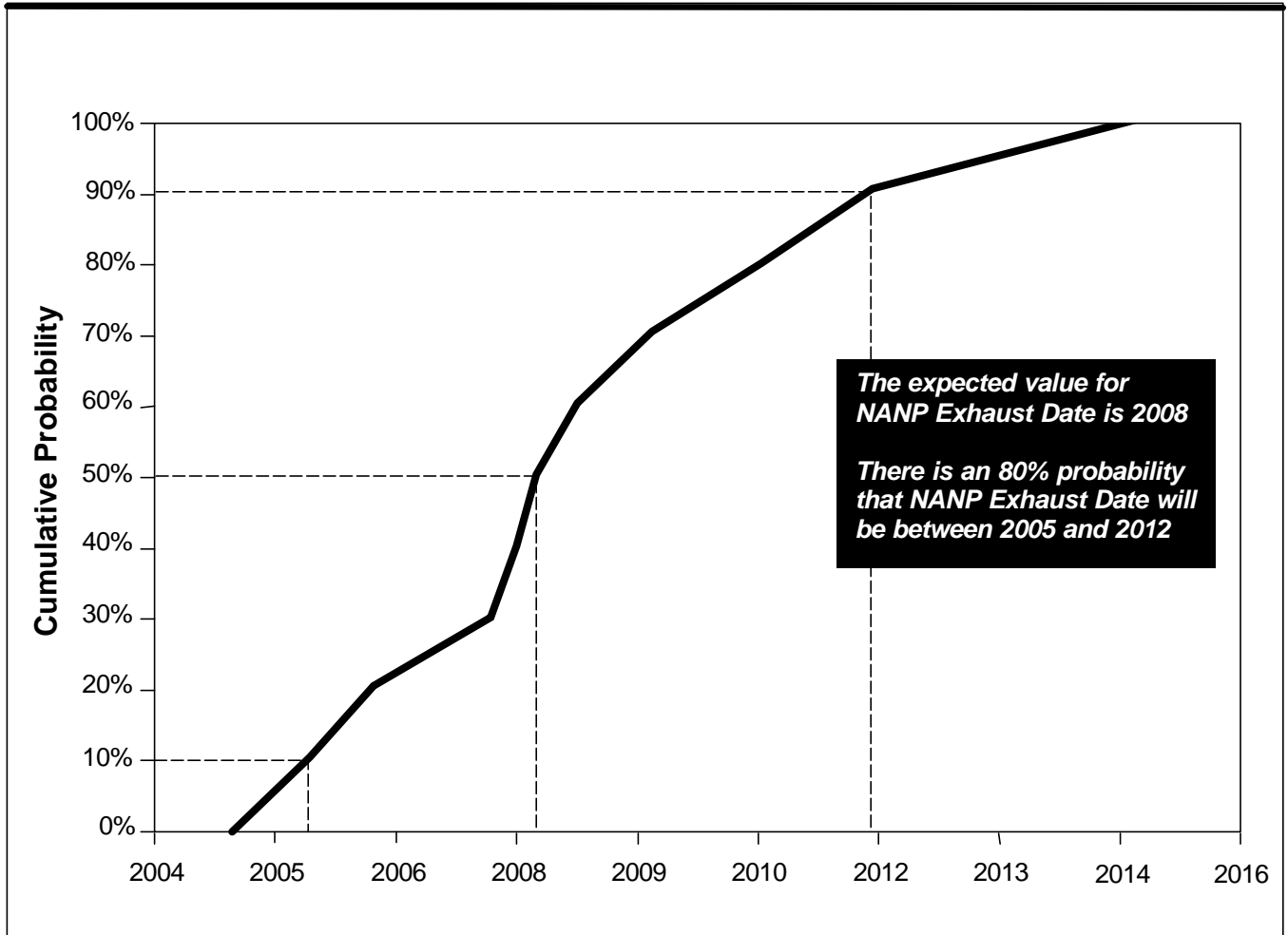


Exhibit A-3 shows the probability of NANP exhaust given various ranges in the sensitivity analysis.

Sensitivity Analysis Methodology

An arbitrary variation range is applied to each of the 475 input variables to see which variables drive CO Code consumption. The impact on CO Code demand or NANP exhaust is determined for the spread of the results of the top 20 variables, which are used to determine the categories that truly drive demand.

The top 20 variables are given a reasonable range that is plus or minus the median assumption that NANPA used for the NANP Exhaust Study.

The sensitivity analysis tool runs an analysis on the top 20 variables to determine the impact of each assumption on CO Code consumption and NANP exhaust. A tornado diagram is used to visualize the impact of each of the top 10 or 20 assumptions. The top 20 variables can be modified to capture either better assumptions or a stronger feeling of uncertainty or discomfort.

Probability Analysis Methodology

Once the top-ranking variables and their likely ranges are determined, the sensitivity analysis tool runs a Modified Monte Carlo Simulation to determine the probability of various outcomes. The Modified Monte Carlo Simulation runs every combination of high case, median case, and low case against each of the top variables in the sensitivity analysis. The probability analysis assumes that the median case has a 50% probability of occurring and the high and low case each have a 25% probability of occurring.

The probability analysis tool creates a list of possible combinations. The resulting probability of each result case equals the product of the probabilities of each assumption case (high, median, or low).

- The cases are sorted based on the likely NANP exhaust date from the earliest date to the latest date. The cumulative probability of each probability case is plotted on the probability distribution curve.
- The probability distribution curve shows the 10% likelihood on the low end and the high end as well as the 50% median likelihood.

- The 80% “confidence interval” is the range between the 10% cumulative probability and the 90% cumulative probability.

The projected CO Code consumption ranges for the 10% likelihood “high-end” probability cases and the 10% likelihood “low end” cases are plotted with the 50% likely median case to show the range of values.

Sensitivity Analysis Outcomes

The most sensitive assumptions directly drive CO Code consumption and NANP exhaust. The 23 key assumptions that have the biggest impact are broken down in three categories: CO Codes for Footprint, TNs in Service, and Remaining NPAs for US Geographic Assignments.

CO Codes for Footprint (Rank of assumption with greatest impact)

Assumption	CLEC	CMRS	Paging	ILEC
Equivalent SP definition	1	2	4	NA
Rate Center Growth per Year	3	5	9	NA
New node assumption	16	14	15	17

TNs in Service (Rank of assumption with greatest impact)

Assumption	CLEC	CMRS	Paging	ILEC
Working TNs ratio	12	20	23	6
Inventory TN Factor	13	10	19	11
Subscriber/Access Line Starting Point	7	21	22	18

NPA's for US Geographic Assignment (Rank of assumption with greatest impact)

Assumption	Rank
Average International and Service NPAs Assigned per year	8

Range of Assumptions Detail

Rank	Assumption	Low (25%)	Median (50%)	High (25%)
1	Equivalent CLEC SP	2,000	4,386	8,000
2	Equivalent CMRS SP	1,000	2,749	5,000
3	Rate Center Growth/Year CLEC	0%	2%	3%
4	Equivalent Paging SP	1,000	1,806	4,000
5	Rate Center Growth/Year CMRS	0%	2%	3%
6	Ratio of Working TNs to Subs/Access Lines ILEC	1.10	1.20	2.00
7	Subscriber/Access Line Starting Point CLEC	3,000,000	4,000,000	8,000,000
8	Average Intl. NPAs Assigned per Year	1	2	3
9	Rate Center Growth/Year Paging	0%	2%	3%
10	Working TNs to CO Codes for TN Growth CMRS	60%	80%	90%
11	Working TNs to CO Codes for TN Growth ILEC	50%	70%	80%
12	Ratio of Working TNs to Subs/Access Lines CLEC	1.50	2.00	3.00
13	Working TNs to CO Codes for TN Growth CLEC	50%	70%	80%
14	New Node Assumption for CMRS	0	1	1
15	New Node Assumption for Paging	0	1	1
16	New Node Assumption for CLEC	0	1	1
17	New Node Assumption for ILEC	0	1	1
18	Subscriber/Access Line Starting Point ILEC	160,000,000	165,500,000	185,000,000
19	Working TNs to CO Codes for TN Growth Paging	60%	80%	90%

Rank	Assumption	Low (25%)	Median (50%)	High (25%)
20	Ratio of Working TNs to Subs/Access Lines CMRS	1.01	1.01	1.10
21	Subscriber/Access Line Starting Point CMRS	67,000,000	69,000,000	71,000,000
22	Subscriber/Access Line Starting Point Paging	50,000,000	54,500,000	56,000,000
23	Ratio of Working TNs to Subs/Access Lines Paging	0.85	0.90	0.95

CO Code Demand Model

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TN Assumptions

Subscribers/ Access Lines	
CMRS	69,000,000
Paging	54,500,000
CLEC	4,000,000
ILEC	165,500,000

Subscriber/Access Line Starting Point

Subscriber/Access Line Starting Point	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CMRS	24.7%	20.3%	17.5%	13.8%	11.3%	9.3%	7.8%	6.8%	6.1%	5.5%	5.2%
Paging	4.8%	5.9%	6.5%	7.0%	5.7%	4.7%	4.5%	4.5%	4.5%	4.2%	4.0%
CLEC	69.0%	45.0%	36.0%	28.0%	24.0%	20.0%	17.0%	15.0%	14.0%	13.0%	13.0%
ILEC	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%

Industry Growth Rate Assumption

Industry Growth Rate Assumption	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CMRS	24.7%	20.3%	17.5%	13.8%	11.3%	9.3%	7.8%	6.8%	6.1%	5.5%	5.2%
Paging	4.8%	5.9%	6.5%	7.0%	5.7%	4.7%	4.5%	4.5%	4.5%	4.2%	4.0%
CLEC	69.0%	45.0%	36.0%	28.0%	24.0%	20.0%	17.0%	15.0%	14.0%	13.0%	13.0%
ILEC	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%

TN Ratio

CMRS	1.01
Paging	0.90
CLEC	2.00
ILEC	1.20

Rate of Working TNs to Subs/Access Lines

CMRS	1.01
Paging	0.90
CLEC	2.00
ILEC	1.20

New Services Assumptions

New Service Introduction
 CMRS (e.g., CPP, 3C, Satellite, etc.)
 Paging
 CLEC (e.g., ISP, Data, etc.)
 ILEC

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CMRS (e.g., CPP, 3C, Satellite, etc.)	-	-	-	-	-	-	-	-	-	-
Paging	-	-	-	-	-	-	-	-	-	-
CLEC (e.g., ISP, Data, etc.)	-	-	-	-	-	-	-	-	-	-
ILEC	-	-	-	-	-	-	-	-	-	-

Year 1 Penetration

CMRS	0%
Paging	0%
CLEC	0%
ILEC	0%

Year 2 Growth

CMRS	0%
Paging	0%
CLEC	0%
ILEC	0%

Year 3 Growth

CMRS	0%
Paging	0%
CLEC	0%
ILEC	0%

Year 4 Growth

CMRS	0%
Paging	0%
CLEC	0%
ILEC	0%

Year 5 Growth

CMRS	0%
Paging	0%
CLEC	0%
ILEC	0%

Out Year Growth Rate

CMRS	0%
Paging	0%
CLEC	0%
ILEC	0%

New Services Adoption Curve

CMRS	0%
Paging	0%
CLEC	0%
ILEC	0%

Working TNs to CO Codes for TN Growth Assumption

Fill Rate	
CMRS	80%
Paging	80%
CLEC	100%
ILEC	70%

Working TNs to CO Codes for TN Growth

CMRS	80%
Paging	80%
CLEC	100%
ILEC	70%

CO Code Demand Model

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Footprint Baseline Assumptions

YE1998	
CO Codes	
CMRS	16,276
Paging	9,333
CLEC	13,996
ILEC	56,563

1998	
Rate Centers	
CMRS	2,749
Paging	1,806
CLEC	4,386
ILEC	19,240

Service Provider and New Entrant Pipeline

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Service Providers														
Cellular		2	2	2	2	2	2	2	2	2	2	2	2	2
ESMR/Satellite, etc	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CMRS	3	5	5	6	6	7	9	10	11	11	12	13	13	13
Paging	9	10	11	11	11	12	12	12	12	12	12	12	13	13
National CLEC	1	2	2	2	2	3	3	4	4	4	4	6	6	6
LMDS CLEC	-	1	1	1	2	3	3	4	4	4	4	4	4	4
CATV CLEC	-	-	-	-	1	1	1	1	1	1	1	1	1	2
ISP	-	-	-	-	-	2	3	3	3	4	4	5	5	6
Local CLEC	2	4	5	6	9	12	14	15	17	18	21	22	23	25
ILEC	1	1	1	1	1	1	1	1	1	1	1	1	1	1

New Entrant Buildout Curve Assumption

	Year 1	Year 2	Year 3	Year 4	Year 5
CMRS	40%	55%	70%	85%	100%
Paging	40%	55%	70%	85%	100%
CLEC	20%	40%	60%	80%	100%
ILEC	5%	10%	15%	20%	25%

Rate Center Coverage Assumptions

Rate Ctr. Growth/Year	
CMRS	2%
Paging	2%
CLEC	2%
ILEC	0%

New Switch/Point of Interconnection Assumption

	Every	Years) per NPA
CMRS	1	1
Paging	1	1
CLEC	1	1
ILEC	1	1

CO Codes for TNs

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TN Projection

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
TN Growth Rate Assumption											
CMRS (DL)	24.7%	20.3%	17.5%	13.8%	11.3%	9.3%	7.8%	6.9%	6.1%	5.5%	5.2%
Paging (DLJ)	4.8%	5.9%	6.5%	7.0%	5.7%	4.7%	4.8%	4.5%	4.5%	4.2%	4.0%
CLEC (FCC)	69.0%	45.0%	36.0%	28.0%	24.0%	20.0%	17.0%	15.0%	14.0%	13.0%	13.0%
ILEC (FCC)	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%

TN Projection (Existing Services)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CMRS	69,690,000	83,830,000	98,475,000	112,110,000	124,735,000	136,350,000	146,955,000	157,055,000	166,650,000	175,740,000	184,830,000
Paging	49,050,000	51,943,950	55,320,307	59,192,728	62,566,714	66,507,349	69,540,339	71,651,453	74,847,552	76,023,104	81,171,711
CLEC	8,000,000	11,600,000	15,776,000	20,193,280	25,039,667	30,047,601	35,155,693	40,429,047	46,089,113	52,090,688	58,851,189
ILEC	198,600,000	204,556,000	210,694,740	217,016,582	223,526,050	230,231,831	237,138,786	244,252,950	251,560,538	259,127,954	266,901,793
Total TNs (Existing Services)	325,340,000	351,931,950	380,266,047	408,511,590	435,867,431	462,136,781	487,789,818	513,386,448	539,167,203	564,971,756	591,754,692

New Services Introduction

[A new service introduced by only one of the current SPs]

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
New Service Introduction										
CMRS (e.g., CPP, 3G, Satellite, etc.)	-	-	-	-	-	-	-	-	-	-
Paging	-	-	-	-	-	-	-	-	-	-
CLEC (e.g., ISP, Data, etc.)	-	-	-	-	-	-	-	-	-	-
ILEC	-	-	-	-	-	-	-	-	-	-

Total New Service Introduction

	Year 1 Penetration	Year 2 Growth	Year 3 Growth	Year 4 Growth	Year 5 Growth	Out Year Growth Rate
CMRS	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Paging	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
CLEC	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
ILEC	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%

TN Projection (New Services)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CMRS	-	-	-	-	-	-	-	-	-	-	-
Paging	-	-	-	-	-	-	-	-	-	-	-
CLEC	-	-	-	-	-	-	-	-	-	-	-
ILEC	-	-	-	-	-	-	-	-	-	-	-

Total TNs (New Services)

Total TNs Projected

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total TNs Projected											
CMRS	69,690,000	83,830,000	98,475,000	112,110,000	124,735,000	136,350,000	146,955,000	157,055,000	166,650,000	175,740,000	184,830,000
Paging	49,050,000	51,943,950	55,320,307	59,192,728	62,566,714	66,507,349	69,540,339	71,651,453	74,847,552	76,023,104	81,171,711
CLEC	8,000,000	11,600,000	15,776,000	20,193,280	25,039,667	30,047,601	35,155,693	40,429,047	46,089,113	52,090,688	58,851,189
ILEC	198,600,000	204,556,000	210,694,740	217,016,582	223,526,050	230,231,831	237,138,786	244,252,950	251,560,538	259,127,954	266,901,793
Total TNs Projected	325,340,000	351,931,950	380,266,047	408,511,590	435,867,431	462,136,781	487,789,818	513,386,448	539,167,203	564,971,756	591,754,692

CO Codes for TNs

CO Codes For TNs

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CO Codes for Existing Services TNs											
CMRS	8,712	10,480	12,311	14,016	15,595	17,047	18,373	19,636	20,836	21,973	23,110
Paging	6,132	6,484	6,917	7,402	7,824	8,192	8,572	8,961	9,361	9,758	10,152
CLEC	800	1,160	1,578	2,020	2,505	3,006	3,517	4,045	4,612	5,212	5,880
ILEC	28,372	29,224	30,101	31,004	31,935	32,893	33,880	34,897	35,944	37,023	38,134
Total CO Codes Existing Svc TNs	44,016	47,358	50,907	54,442	57,859	61,138	64,342	67,539	70,753	73,966	77,286

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CO Codes for New Services TNs											
CMRS	-	-	-	-	-	-	-	-	-	-	-
Paging	-	-	-	-	-	-	-	-	-	-	-
CLEC	-	-	-	-	-	-	-	-	-	-	-
ILEC	-	-	-	-	-	-	-	-	-	-	-
Total CO Codes for New Svc. TNs	-	-	-	-	-	-	-	-	-	-	-

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CO Codes for TNs											
CMRS	8,712	10,480	12,311	14,016	15,595	17,047	18,373	19,636	20,836	21,973	23,110
Paging	6,132	6,484	6,917	7,402	7,824	8,192	8,572	8,961	9,361	9,758	10,152
CLEC	800	1,160	1,578	2,020	2,505	3,006	3,517	4,045	4,612	5,212	5,880
ILEC	28,372	29,224	30,101	31,004	31,935	32,893	33,880	34,897	35,944	37,023	38,134
Total CO Codes for TNs	44,016	47,358	50,907	54,442	57,859	61,138	64,342	67,539	70,753	73,966	77,286

CO Codes for Footprint

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Service Provider and New Entrant Footprint Assumptions

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Service Provider Summary														
CMRS	3	5	5	6	6	7	9	10	11	11	12	13	13	13
Paging	9	10	11	11	11	12	12	12	12	12	12	13	13	13
CLEC	2	4	5	6	9	12	14	15	17	18	21	22	23	25
ILEC	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Service Provider Footprint	15	20	22	24	27	32	36	38	41	42	46	49	50	52

Rate Ctr. Growth

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CMRS	2%	2,749	2,804	2,860	2,917	2,976	3,035	3,096	3,156	3,221	3,285
Paging	2%	1,806	1,842	1,879	1,917	1,955	1,994	2,034	2,075	2,116	2,158
CLEC	2%	4,366	4,474	4,563	4,654	4,748	4,842	4,939	5,038	5,139	5,242
ILEC	0%	19,240	19,240	19,240	19,240	19,240	19,240	19,240	19,240	19,240	19,240

Additional Nodes/LRNs Installed by Segment

Incremental Nodes/LRNs in U.S.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CMRS				247	287	329	371	415	456	499	542
Paging		206	247	247	287	329	371	415	456	499	542
CLEC		206	247	247	287	329	371	415	456	499	542
ILEC		206	247	247	287	329	371	415	456	499	542

CO Codes for Footprint

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CO Codes for Footprint											
CMRS	7,564	9,562	12,409	16,191	19,787	23,550	26,651	30,688	34,504	37,168	39,478
Paging	3,201	4,285	6,179	7,416	8,460	9,560	10,719	11,663	13,507	14,880	16,310
CLEC	13,196	21,455	31,007	40,968	51,258	62,852	73,029	83,739	93,871	104,342	115,260
ILEC	28,191	28,397	28,644	28,931	29,260	29,631	30,046	30,502	31,001	31,543	32,125
Total CO Codes for Footprint	52,152	63,699	76,238	93,506	108,765	125,693	140,446	156,603	172,682	187,933	203,174

Total CO Code Growth

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Total CO Codes	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CO Codes Consumed											
CMPS	16,276	20,042	24,720	30,207	35,982	40,597	45,024	50,334	55,340	59,141	62,598
Prallg	9,333	10,779	13,096	14,818	16,284	17,752	19,231	20,624	22,068	24,638	26,462
CIEC	13,966	22,615	32,585	42,988	53,763	65,858	76,546	87,784	98,483	109,554	121,150
ILEC	56,563	57,621	58,745	59,935	61,195	62,524	63,926	65,399	66,945	68,566	70,259
Total CO Codes	96,168	111,057	128,145	147,948	166,024	186,731	204,788	224,142	243,035	261,899	280,460
Incremental CO Codes Assigned											
Annual CO Code Assignment Rate	15.4%	15.5%	16.3%	14.6%	12.6%	12.1%	9.7%	9.5%	8.7%	7.5%	7.1%

NANP Exhaust Module (Sample Data)

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No Pooling

NANP Exhaust Baseline Data

Annual CO Code Assignments	National																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
NPA Profile	547	446	568	428	433	542	460	698	480	98	742	531	740	380	478	358	562
YE 1998 CO Code Assignments	7.4	4.1	5.7	5.7	7.6	4.9	2.2	7.6	5.7	5.7	6.2	6.8	5.7	5.7	1.2	1.9	3.0
YE 1998 Adjusted CO Code Assignment Rate	0.53%	0.29%	0.41%	0.41%	0.54%	0.35%	0.16%	0.54%	0.41%	0.41%	0.44%	0.48%	0.41%	0.41%	0.09%	0.13%	0.21%
NPT CO Code Assignment Share																	
Annual CO Code Assignments	14,889	78	43	61	61	81	51	23	81	61	61	65	71	61	13	20	32
1999	18,089	95	53	74	74	98	63	28	89	74	80	87	74	74	16	24	38
2000	18,803	99	55	76	76	102	65	30	102	76	83	90	76	76	16	25	40
2001	18,676	98	54	76	101	65	29	101	76	76	82	90	76	76	16	25	40
2002	20,108	106	58	82	109	70	32	109	82	82	88	96	82	82	17	27	43
2003	18,056	95	53	73	88	62	28	89	73	73	79	87	73	73	16	24	38
2004	19,354	102	56	79	79	105	67	30	105	79	85	93	79	79	17	26	41
2005	19,493	103	57	79	79	106	67	31	106	79	86	93	79	79	17	26	41
2006	18,264	96	53	74	74	99	63	29	99	74	80	88	74	74	16	24	38
2007	18,118	95	53	74	74	99	63	29	99	74	80	88	74	74	16	24	38
2008	18,300	102	56	79	79	105	67	30	105	79	85	93	79	79	17	26	41
2009	17,756	93	52	72	86	61	28	86	72	72	78	85	72	72	15	24	38
2010	18,598	98	54	76	76	101	64	29	101	76	82	89	76	76	16	25	39
2011	16,379	86	48	67	67	89	57	26	89	67	72	79	67	67	14	22	35
2012	17,155	90	50	70	70	93	59	27	93	70	75	82	70	70	15	23	36
2013	17,179	90	50	70	70	93	59	27	93	70	75	82	70	70	15	23	36
2014	17,981	95	52	73	73	98	62	28	98	73	73	79	62	73	16	24	38
2015	17,981	95	52	73	73	98	62	28	98	73	73	79	62	73	16	24	38
2016	16,422	86	48	67	67	89	57	26	89	67	72	79	67	67	14	22	35
2017	17,924	94	52	73	73	97	62	28	97	73	73	79	62	73	15	24	38
2018	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2019	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2020	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2021	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2022	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2023	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2024	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2025	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2026	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2027	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2028	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2029	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2030	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2031	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2032	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2033	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2034	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2035	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2036	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2037	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2038	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2039	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2040	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2041	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2042	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2043	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2044	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2045	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2046	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2047	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2048	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2049	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2050	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2051	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2052	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2053	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2054	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2055	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2056	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2057	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2058	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2059	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2060	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2061	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2062	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2063	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2064	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2065	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2066	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2067	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38
2068	18,118	95	53	74	74	98	63	29	98	74	80	87	74	74	16	24	38

NANP Exhaust Module (Sample Data)

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No Pooling

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2069	625	489	629	489	514	583	511	483	779	541	159	808	602	801	441	491	378	594
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2070	720	542	703	563	612	656	511	483	779	541	233	888	689	801	515	491	402	632
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2071	819	597	779	639	688	721	597	561	849	615	309	971	779	951	581	491	378	594
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2072	1,023	703	937	739	824	856	602	1,189	849	615	463	1,141	985	1,109	749	558	475	755
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2073	1,118	762	1,010	870	1,022	918	807	1,287	922	640	540	1,220	1,052	1,182	822	572	503	783
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2074	1,220	818	1,069	949	1,127	995	860	1,392	1,001	619	519	1,305	1,145	1,281	901	599	529	834
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2075	1,323	875	1,168	1,028	1,233	1,052	921	1,488	1,080	698	1,391	1,238	1,340	1,480	606	555	475	875
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2076	1,419	928	1,242	1,102	1,332	1,115	720	1,587	1,154	774	1,471	1,326	1,414	1,564	622	579	491	914
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2077	1,517	982	1,317	1,177	1,433	1,179	749	1,688	1,229	847	1,638	1,508	1,588	1,729	638	604	563	904
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2078	1,619	1,038	1,396	1,256	1,538	1,246	749	1,803	1,308	926	1,638	1,508	1,588	1,729	638	604	563	904
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2079	1,712	1,090	1,468	1,328	1,634	1,307	807	1,889	1,380	998	1,796	1,652	1,716	1,856	670	654	1,032	994
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2080	1,810	1,144	1,544	1,404	1,735	1,371	836	2,000	1,456	1,074	1,790	1,652	1,716	1,856	670	654	1,032	994
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2081	1,886	1,242	1,681	1,541	1,917	1,487	889	2,182	1,553	1,211	1,945	1,843	1,923	2,063	716	724	1,142	1,071
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2082	1,986	1,292	1,751	1,611	2,010	1,546	916	2,373	1,663	1,281	2,021	1,925	1,923	2,063	716	724	1,142	1,071
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2083	2,076	1,344	1,824	1,684	2,108	1,608	944	2,573	1,736	1,354	2,100	2,011	1,996	2,136	746	771	1,178	1,107
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2084	2,171	1,392	1,891	1,751	2,197	1,665	970	2,762	1,803	1,421	2,172	2,090	2,063	2,203	760	793	1,216	1,145
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2085	2,257	1,444	1,964	1,824	2,284	1,727	998	2,959	1,876	1,494	2,251	2,176	2,176	2,316	775	811	1,289	1,216
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2086	2,351	1,497	2,038	1,898	2,382	1,790	1,026	3,157	1,950	1,568	2,331	2,263	2,210	2,350	791	841	1,327	1,254
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2087	2,446	1,550	2,112	1,972	2,490	1,853	1,054	3,357	2,054	1,642	2,411	2,350	2,298	2,438	807	865	1,385	1,312
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2088	2,541	1,603	2,186	2,046	2,588	1,916	1,082	3,557	2,158	1,716	2,491	2,437	2,385	2,525	823	889	1,433	1,360
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2089	2,636	1,656	2,260	2,120	2,668	1,979	1,110	3,762	2,262	1,790	2,571	2,524	2,432	2,572	839	913	1,481	1,408
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2090	2,731	1,709	2,354	2,214	2,764	2,064	1,138	3,977	2,376	1,864	2,656	2,608	2,506	2,646	856	941	1,531	1,458
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2091	2,826	1,762	2,408	2,268	2,882	2,105	1,168	4,197	2,490	1,938	2,731	2,698	2,596	2,736	881	976	1,581	1,508
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2092	2,921	1,815	2,462	2,322	2,946	2,158	1,194	4,425	2,604	2,012	2,811	2,785	2,684	2,824	907	1,002	1,631	1,558
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2093	3,016	1,868	2,516	2,376	3,000	2,222	1,222	4,659	2,716	2,086	2,886	2,861	2,759	2,909	933	1,028	1,681	1,608
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2094	3,111	1,921	2,570	2,430	3,116	2,294	1,250	4,894	2,826	2,160	2,971	2,959	2,802	2,942	959	1,056	1,731	1,658
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2095	3,206	1,974	2,624	2,484	3,274	2,352	1,278	5,139	2,936	2,234	3,051	3,046	2,889	3,029	985	1,081	1,779	1,706
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2096	3,301	2,027	2,678	2,538	3,324	2,430	1,306	5,387	3,050	2,306	3,131	3,133	2,976	3,116	1,011	1,107	1,821	1,748
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2097	3,396	2,080	2,732	2,592	3,372	2,478	1,334	5,637	3,164	2,382	3,211	3,211	3,054	3,194	1,031	1,127	1,871	1,798
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2098	3,491	2,133	2,786	2,646	3,416	2,526	1,362	5,891	3,276	2,456	3,282	3,282	3,125	3,265	1,051	1,147	1,921	1,848
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2099	3,586	2,186	2,840	2,700	3,496	2,576	1,390	6,145	3,390	2,526	3,351	3,351	3,194	3,334	1,071	1,167	1,971	1,898
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2100	3,681	2,239	2,894	2,754	3,550	2,630	1,418	6,400	3,504	2,596	3,426	3,426	3,269	3,409	1,091	1,187	2,021	1,948
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2101	3,776	2,292	2,948	2,808	3,604	2,684	1,446	6,654	3,618	2,666	3,491	3,491	3,334	3,474	1,111	1,207	2,071	1,998
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2102	3,871	2,345	3,002	2,852	3,658	2,738	1,474	6,908	3,732	2,736	3,556	3,556	3,399	3,539	1,131	1,227	2,121	2,048
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2103	3,966	2,398	3,056	2,906	3,712	2,792	1,502	7,162	3,846	2,806	3,621	3,621	3,464	3,604	1,151	1,247	2,171	2,098
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2104	4,061	2,451	3,110	2,960	3,766	2,846	1,530	7,416	3,960	2,876	3,686	3,686	3,529	3,669	1,171	1,267	2,221	2,148
18,118	95	53	74	74	74	98	63	28	98	74	74	80	87	74	74	16	24	38
2105	4,156	2,504	3,164	3,014	3,820	2,900	1,558	7,670	4,074	2,946	3,756	3,756						

NANP Exhaust Module (Sample Data)

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No Pooling

2045	5,011	2,928	4,036	5,038	3,491	1,782	5,303	3,948	3,660	4,481	4,612	4,208	3,848	1,223	1,489	2,353
2046	5,106	2,981	4,110	5,136	3,554	1,810	5,401	4,022	3,644	4,571	4,699	4,282	3,922	1,239	1,513	2,391
2047	5,201	3,034	4,184	5,234	3,617	1,838	5,499	4,096	3,714	4,651	4,786	4,356	3,996	1,255	1,537	2,429
2048	5,296	3,087	4,258	5,332	3,680	1,866	5,597	4,170	3,788	4,731	4,873	4,430	4,070	1,271	1,561	2,467
2049	5,391	3,140	4,332	5,430	3,743	1,894	5,695	4,244	3,862	4,811	4,960	4,504	4,144	1,287	1,585	2,505
2050	5,486	3,193	4,406	5,528	3,806	1,922	5,793	4,318	3,936	4,891	5,047	4,578	4,218	1,303	1,609	2,543
2051	5,581	3,246	4,480	5,626	3,869	1,950	5,891	4,392	4,010	4,971	5,134	4,652	4,292	1,319	1,633	2,581
2052	5,676	3,299	4,554	5,724	3,932	1,978	5,989	4,466	4,084	5,051	5,221	4,726	4,366	1,335	1,657	2,619
2053	5,771	3,352	4,628	5,822	4,005	2,006	6,087	4,540	4,172	5,130	5,303	4,800	4,449	1,351	1,681	2,657
2054	5,866	3,405	4,702	5,920	4,068	2,034	6,185	4,614	4,233	5,209	5,395	4,874	4,514	1,367	1,705	2,695
2055	5,961	3,458	4,776	6,018	4,121	2,062	6,283	4,688	4,306	5,291	5,482	4,948	4,588	1,383	1,729	2,733
2056	6,056	3,511	4,850	6,116	4,184	2,090	6,381	4,762	4,380	5,371	5,569	5,022	4,662	1,399	1,753	2,771
2057	6,151	3,564	4,924	6,214	4,247	2,118	6,479	4,836	4,454	5,451	5,656	5,096	4,736	1,415	1,777	2,809
2058	6,246	3,617	4,998	6,312	4,310	2,146	6,577	4,910	4,528	5,531	5,743	5,170	4,810	1,431	1,801	2,847
2059	6,341	3,670	5,072	6,410	4,373	2,174	6,675	4,984	4,602	5,611	5,830	5,244	4,884	1,447	1,825	2,885
2060	6,436	3,723	5,146	6,508	4,436	2,202	6,773	5,058	4,676	5,691	5,917	5,318	4,958	1,463	1,849	2,923
2061	6,531	3,776	5,220	6,606	4,499	2,230	6,871	5,132	4,750	5,771	6,004	5,392	5,032	1,479	1,873	2,961
2062	6,626	3,829	5,294	6,704	4,562	2,258	6,969	5,206	4,824	5,851	6,091	5,466	5,106	1,495	1,897	2,999
2063	6,721	3,882	5,368	6,802	4,625	2,286	7,067	5,280	4,898	5,931	6,180	5,540	5,180	1,511	1,921	3,037
2064	6,816	3,935	5,442	6,900	4,688	2,314	7,165	5,354	4,972	6,011	6,265	5,614	5,254	1,527	1,945	3,075
2065	6,911	3,988	5,516	7,000	4,751	2,342	7,263	5,428	5,046	6,091	6,352	5,688	5,328	1,543	1,969	3,113
2066	7,006	4,041	5,590	7,098	4,814	2,370	7,361	5,502	5,120	6,171	6,439	5,762	5,402	1,559	1,993	3,151
2067	7,101	4,094	5,664	7,194	4,877	2,398	7,459	5,576	5,194	6,251	6,526	5,836	5,476	1,575	2,017	3,189
2068	7,196	4,147	5,738	7,292	4,940	2,426	7,557	5,650	5,268	6,331	6,613	5,910	5,550	1,591	2,041	3,227
2069	7,291	4,200	5,812	7,390	5,003	2,454	7,655	5,724	5,342	6,411	6,700	5,984	5,624	1,607	2,065	3,265
2070	7,386	4,253	5,886	7,488	5,066	2,482	7,753	5,798	5,416	6,491	6,787	6,058	5,698	1,623	2,089	3,303
2071	7,481	4,306	5,960	7,586	5,129	2,510	7,851	5,872	5,490	6,571	6,874	6,132	5,772	1,639	2,113	3,341
2072	7,576	4,359	6,034	7,684	5,192	2,538	7,949	5,946	5,564	6,651	6,961	6,206	5,846	1,655	2,137	3,379
2073	7,671	4,412	6,108	7,782	5,255	2,566	8,047	6,020	5,648	6,731	7,049	6,280	5,920	1,671	2,161	3,417
2074	7,766	4,465	6,182	7,880	5,318	2,594	8,145	6,094	5,732	6,811	7,135	6,354	6,004	1,687	2,185	3,455
2075	7,861	4,518	6,256	7,978	5,381	2,622	8,243	6,168	5,796	6,891	7,222	6,428	6,068	1,703	2,209	3,493
2076	7,956	4,571	6,330	8,076	5,444	2,650	8,341	6,242	5,860	6,971	7,309	6,502	6,142	1,719	2,233	3,531
2077	8,051	4,624	6,404	8,174	5,507	2,678	8,439	6,316	5,934	7,051	7,396	6,576	6,216	1,735	2,257	3,569
2078	8,146	4,677	6,478	8,272	5,570	2,706	8,537	6,390	6,008	7,131	7,483	6,650	6,290	1,751	2,281	3,607
2079	8,241	4,730	6,552	8,370	5,633	2,734	8,635	6,464	6,082	7,211	7,570	6,724	6,364	1,767	2,305	3,645
2080	8,336	4,783	6,626	8,468	5,696	2,762	8,733	6,538	6,156	7,291	7,657	6,798	6,438	1,783	2,329	3,683
2081	8,431	4,836	6,700	8,566	5,759	2,790	8,831	6,612	6,230	7,371	7,744	6,872	6,512	1,799	2,353	3,721
2082	8,526	4,889	6,774	8,664	5,822	2,818	8,929	6,686	6,304	7,451	7,831	6,946	6,586	1,815	2,377	3,759
2083	8,621	4,942	6,848	8,762	5,885	2,846	9,027	6,760	6,378	7,531	7,921	7,020	6,660	1,831	2,401	3,797
2084	8,716	4,995	6,922	8,860	5,948	2,874	9,125	6,834	6,452	7,611	8,005	7,094	6,734	1,847	2,425	3,835
2085	8,811	5,048	6,996	8,958	6,011	2,902	9,223	6,908	6,526	7,691	8,092	7,168	6,808	1,863	2,449	3,873
2086	8,906	5,101	7,070	9,056	6,074	2,930	9,321	6,982	6,600	7,771	8,179	7,242	6,882	1,879	2,473	3,911
2087	9,001	5,154	7,144	9,154	6,137	2,958	9,419	7,056	6,674	7,851	8,266	7,316	6,956	1,895	2,497	3,949
2088	9,096	5,207	7,218	9,252	6,200	2,986	9,517	7,130	6,748	7,931	8,353	7,390	7,030	1,911	2,521	3,987
2089	9,191	5,260	7,292	9,350	6,263	3,014	9,615	7,204	6,822	8,011	8,440	7,464	7,104	1,927	2,545	4,025
2090	9,286	5,313	7,366	9,448	6,326	3,042	9,713	7,278	6,896	8,091	8,527	7,538	7,178	1,943	2,569	4,063
2091	9,381	5,366	7,440	9,546	6,389	3,070	9,811	7,352	6,970	8,171	8,614	7,612	7,252	1,959	2,593	4,101
2092	9,476	5,419	7,514	9,644	6,452	3,098	9,909	7,426	7,044	8,251	8,701	7,686	7,326	1,975	2,617	4,139
2093	9,571	5,472	7,588	9,742	6,515	3,126	10,007	7,500	7,118	8,331	8,791	7,760	7,400	1,991	2,641	4,177
2094	9,666	5,525	7,662	9,840	6,578	3,154	10,105	7,574	7,192	8,411	8,875	7,834	7,474	2,007	2,665	4,215
2095	9,761	5,578	7,736	9,938	6,641	3,182	10,203	7,648	7,266	8,491	8,962	7,908	7,548	2,023	2,689	4,253
2096	9,856	5,631	7,810	10,036	6,704	3,210	10,301	7,722	7,340	8,571	9,049	7,982	7,622	2,039	2,713	4,291
2097	9,951	5,684	7,884	10,134	6,767	3,238	10,399	7,796	7,414	8,651	9,136	8,056	7,696	2,055	2,737	4,329
2098	10,046	5,737	7,958	10,232	6,830	3,266	10,497	7,870	7,488	8,731	9,223	8,130	7,770	2,071	2,761	4,367
2099	10,141	5,790	8,032	10,330	6,893	3,294	10,595	7,944	7,562	8,811	9,310	8,204	7,844	2,087	2,785	4,405

NPA Relief Calculator

Geographic Relief Indicator (Use Starting Point)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1989	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1990	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2002	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2003	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2004	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2005	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2006	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2007	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2008	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
2009	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
2010	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
2011	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
2012	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
2013	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
2014	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
2015	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
2016	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
2017	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

NANP Exhaust Module (Sample Data)

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No Pooling

Area Code	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
2066	8	8	8	8	8	4	8	8	8	8	8	8	8	3	3
2067	8	8	8	8	8	8	8	8	8	8	8	8	8	3	3
2068	8	8	8	8	8	4	8	8	8	8	8	8	8	3	3
2069	8	8	8	8	8	4	8	8	8	8	8	8	8	3	3
2070	8	8	8	8	8	4	8	8	8	8	8	8	8	3	3
2071	8	8	8	8	8	4	8	8	8	8	8	8	8	3	3
2072	8	8	8	8	8	4	8	8	8	8	8	8	8	3	3
2073	8	8	8	8	8	4	8	8	8	8	8	8	8	3	3
2074	8	8	8	8	8	4	8	8	8	8	8	8	8	3	3
2075	8	8	8	8	8	4	8	8	8	8	8	8	8	3	3
2076	8	8	8	8	8	4	8	8	8	8	8	8	8	3	3
2077	8	8	8	8	8	4	8	8	8	8	8	8	8	3	3
2078	8	8	8	8	8	4	8	8	8	8	8	8	8	3	3
2079	8	8	8	8	8	4	8	8	8	8	8	8	8	3	3
2080	8	8	8	8	8	4	8	8	8	8	8	8	8	3	3
2081	8	8	8	8	8	4	8	8	8	8	8	8	8	3	3
2082	8	8	8	8	8	4	8	8	8	8	8	8	8	3	3
2083	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3
2084	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3
2085	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3
2086	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3
2087	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3
2088	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3
2089	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3
2090	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3
2091	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3
2092	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3
2093	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3
2094	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3
2095	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3
2096	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3
2097	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3
2098	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3
2099	8	8	8	8	8	5	8	8	8	8	8	8	8	3	3

NANP Exhaust

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Area Codes Required	206	231	269	322	381	414	457	503	549	574	602	637	653	704	737
Area Codes Released		25	38	53	59	33	43	46	46	25	26	35	16	51	33
Incremental U.S. Area Codes	616	614	612	610	608	606	604	602	600	598	596	594	592	590	588
Total Area Codes for US Geographic	410	383	343	288	227	192	147	99	51	24	(6)	(43)	(61)	(114)	(149)
Remaining Area Codes															

Oct2008

NANP Exhaust by CO Codes

NANP Resource Report and 1KB Pooling Model Summary

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No Pooling

PRESS F9 to Calculate

1KB Pooling Scenario

1KB Pool Scenario

No Pooling

1KB Pooling Initiation

Year Pooling Initiated	1KB Footprint Donation Rate
NA	0
NA	0
NA	0
NA	0

1KB Pool Assumptions

CMRS
Paging
CLEC
ILEC

Note: Year pooling initiated can be 2000, 2001, 2002, 2003 or NA (not pooling)
Note: Number of 1K Blocks donated from Equivalent CO Codes for Footprint that were assigned to an industry segment in the year prior to pooling (7 KBs donated is default; 0 indicates no donation)

1KB Pooling Reclamation

	Donated 1K Blocks	2000	2001	2002	2003
1KB Pool Creation					
CMRS	-	0	0	0	0
Paging	-	0	0	0	0
CLEC	-	0	0	0	0
ILEC	-	0	0	0	0
Total 1KB Pool Available					

1KB Pooling Utilization Efficiency Assumption

CO Code	Inventory Rate by TN Growth	1KB Assignment Rate	1KBs Consumed per Equivalent CO Codes for TNs
80%	80%	80%	10
80%	80%	80%	10
100%	100%	100%	10
70%	70%	70%	10

1KB Inventory Factor

1KB Inventory Calculator

Rate Centers in Study Area
Minimum 1KBs in Reserve per Rate Center
Total 1KBs in Inventory

19240
5
96,200

NPA Demand Indicators

International/Service Growth NPAs
International NPAs Required per Year

2

Key NPA Demand Indicators

New NPAs Required 1999 to 2005
NANP Exhaust
Average CO Code Assignment Rate to 2010

297
Oct-2008
10.9%

NANP Resource Report and 1KB Pooling Model Summary

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All Segments Pooling w/ Donation

PRESS F9 to Calculate

1KB Pooling Scenario

1KB Pool Scenario

All Segments Pooling w/ Donation

1KB Pooling Initiation

Year Pooling Initiated

1KB Footprint Donation Rate

2000	7
2000	7
2000	7
2000	7

1KB Pool Assumptions

CMRS
Paging
CLEC
ILEC

Note: Year pooling initiated can be 2000, 2001, 2002, 2003 or NA (not pooling)
Note: Number of 1K Blocks donated from Equivalent CO Codes for Footprint that were assigned to an industry segment in the year prior to pooling (7 KBs donated is default; 0 indicates no donation)

1KB Pooling Reclamation

	Donated 1K Blocks	2000	2001	2002	2003
1KB Pool Creation					
CMRS	86,860	86,860	0	0	0
Paging	43,249	43,249	0	0	0
CLEC	217,049	217,049	0	0	0
ILEC	200,508	200,508	0	0	0
Total 1KB Pool Available	547,666	547,666			

1KB Pooling Utilization Efficiency Assumption

CO Code	Inventory Rate by TN Growth	1KB Assignment Rate	1KBs Consumed per Equivalent CO Codes for TNs
80%	80%	80%	10
80%	80%	80%	10
100%	100%	100%	10
70%	70%	70%	10

1KB Inventory Factor

1KB Inventory Calculator

Rate Centers in Study Area
Minimum 1KBs in Reserve per Rate Center
Total 1KBs in Inventory

19240
5
96,200

NPA Demand Indicators

International/Service Growth NPAs
International NPAs Required per Year

0.5

Key NPA Demand Indicators

New NPAs Required 1999 to 2005
NANP Exhaust
Average CO Code Assignment Rate to 2010

47
Dec-2094
3.0%

NANP Resource Report and 1KB Pooling Model Summary

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All Segments Pooling without Donation

PRESS F9 to Calculate

1KB Pooling Scenario

1KB Pool Scenario

All Segments Pooling without Donation

1KB Pooling Initiation

Year Pooling Initiated	1KB Footprint Donation Rate
2000	0
2000	0
2000	0
2000	0

1KB Pool Assumptions

CMRS
Paging
CLEC
ILEC

Note: Year pooling initiated can be 2000, 2001, 2002, 2003 or NA (not pooling)
Note: Number of 1K Blocks donated from Equivalent CO Codes for Footprint that were assigned to an industry segment in the year prior to pooling (7 KBs donated is default, 0 indicates no donation)

1KB Pooling Donation

Donated 1K Blocks	2000	2001	2002	2003
CMRS	-	0	0	0
Paging	-	0	0	0
CLEC	-	0	0	0
ILEC	-	0	0	0
Total 1KB Pool Available	-	0	0	0

1KB Pooling Utilization Efficiency Assumption

CO Code	Inventory Rate by TN Growth	1KB Assignment Rate	1KBs Consumed per Equivalent CO Codes for TNs
CMRS	80%	80%	10
Paging	80%	80%	10
CLEC	100%	100%	10
ILEC	70%	70%	10

1KB Inventory Factor

1KB Inventory Calculator

Rate Centers in Study Area
Minimum 1KBs in Reserve per Rate Center
Total 1KBs in Inventory

19240
5
96,200

NPA Demand Indicators

International/Service Growth NPAs
International NPAs Required per Year

0.5

Key NPA Demand Indicators

New NPAs Required 1999 to 2005
NANP Exhaust
Average CO Code Assignment Rate to 2010

116
Sep-2058
5.9%

NANP Resource Report and 1KB Pooling Model Summary

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CLEC, ILEC, CMRS (No Paging), Pooling with Donation

PRESS F9 to Calculate

1KB Pooling Scenario

1KB Pool Scenario

CLEC, ILEC, CMRS (No Paging), Pooling with Donation

1KB Pooling Initiation

Year Pooling Initiated	1KB Footprint Donation Rate
2000	7
NA	0
2000	7
2000	7

1KB Pool Assumptions

CMRS
Paging
CLEC
ILEC

Note: Year pooling initiated can be 2000, 2001, 2002, 2003 or NA (not pooling)
Note: Number of 1K Blocks donated from Equivalent CO Codes for Footprint that were assigned to an industry segment in the year prior to pooling (7 KBs donated is default, 0 indicates no donation)

1KB Pooling Donation

	Donated 1K Blocks	2000	2001	2002	2003
1KB Pool Creation					
CMRS	86,860	86,860	0	0	0
Paging	0	0	0	0	0
CLEC	217,049	217,049	0	0	0
ILEC	200,508	200,508	0	0	0
Total 1KB Pool Available	504,417	504,417			

1KB Pooling Utilization Efficiency Assumption

CO Code	Inventory Rate by TN Growth	1KB Assignment Rate	1KBs Consumed per Equivalent CO Codes for TNs
80%	80%	80%	10
80%	80%	80%	10
100%	100%	100%	10
70%	70%	70%	10

1KB Inventory Factor

1KB Inventory Calculator

Rate Centers in Study Area
Minimum 1KBs in Reserve per Rate Center
Total 1KBs in Inventory

19240
5
96,200

NPA Demand Indicators

International/Service Growth NPAs
International NPAs Required per Year

0.5

Key NPA Demand Indicators

New NPAs Required 1999 to 2005
NANP Exhaust
Average CO Code Assignment Rate to 2010

71
Aug-2048
4.0%

GLOSSARY

CIC – Carrier Identification Code

CLEC – Competitive Local Exchange Carriers

CMRS – Competitive Mobile Radio Service Providers

CO Code – Serves two purposes; provide working telephone numbers (WTNs), or as a network address for billing and routing purposes

COCUS – Central Office Code Utilization Survey (COCUS) is conducted annually by NANPA from direct input received from Central Office Code Administrator(s) in order to monitor central office code utilization, projected exhaust of NPAs and demand for new NPAs to provide code relief. The purpose of COCUS is to provide an annual overall view of both present and projected CO code (NXX) utilization for each NPA in the NANP.

Code Administrator – Entity(ies) responsible for the administration of the NXXs within an NPA.

Conservation – Consideration given to the efficient and effective use of a finite numbering resource in order to minimize the cost and need to expand its availability, while at the same time allowing the maximum flexibility in the introduction of new services, capabilities and features.

ERC – Easily recognizable codes

Footprint – For the purpose of this study, “footprint” serves as a term for CO codes used as a network address for billing and routing purposes

GRC – Geographic Relief Codes

GPC – General Purpose Codes

ILEC – Incumbent Local Exchange Carriers

Jeopardy NPA – A jeopardy condition exists when the forecasted and/or actual demand for NXX resources will exceed the known supply during the planning/implementation interval for relief. Accordingly, pending exhaust of NXX resources within an NPA does not represent a jeopardy condition if NPA relief has been or can be planned and the additional NXXs associated with the NPA will satisfy the need for new NXX codes.

LERG – Local Exchange Routing Guide

Mandatory Dialing Date – The date where permissive dialing ends and the new NPA must be dialed to complete the call.

NANC – North American Numbering Council

NANP – The North American Numbering Plan is a numbering architecture in which every station in the areas served by the NANP is identified by a unique ten-digit address consisting of a three digit NPA code, a three digit central office code of the form NXX, and a four digit line number or the form XXXX, where N represents the digits 2-9 and X represents any digit 0-9.

NANPA – North American Numbering Plan Administration. Key responsibilities for coordination and administration of the North American Numbering/Dialing Plans were assigned to NANPA. These central administration functions are exercised in an impartial manner toward all industry segments while balancing the utilization of a limited resource.

NECA – National Exchange Carrier Association

New Entrant Pipeline – Defines the rate of entry of new service providers

NPA – Numbering Plan Area, also called an area code. An NPA is the three digit code that occupies the A, B and C positions in the ten digit NANP format that applies throughout the areas served by the NANP. NPAs are of the form NXX, where N represents the digits 2-9 and X represents any digit 0-9. In the NANP, NPAs are classified as either geographic or non-geographic.

- A. **Geographic NPAs** are NPAs which correspond to discrete geographic areas served by the NANP.
- B. **Non-geographic NPAs** are NPAs that do not correspond to discrete geographic areas, but which are instead assigned for services with attributes, functionalities or requirements that transcend specific boundaries. The common examples are NPAs in the N00 format, e.g. 800.

NPA Code Relief – NPA code relief refers to an activity that must be performed when an NPA nears exhaust of its 792 NXX capacity. Relief is typically provided to an NPA about a year before its capacity is reached. Providing code relief to such an NPA normally takes the form of assigning a new NPA for an NPA split or overlay. Another option is changing the boundary of the existing NPA.

NPA Relief Coordinator – The organization responsible for the overall coordination of the NPA relief activity.

NPA Relief Date – The date by which the NPA is introduced and routing of normal commercial traffic begins.

Permissive Dialing Period – The time frame beginning with the introduction of the new NPA whereby both the old and new NPA can be dialed. The beginning of permissive dialing is coincident with the relief date and ends with the mandatory dialing date. The year an NPA goes into service.

Rate Center Coverage – Defined in this study as at least one member of an industry segment held a code in the rate center.

Relief Plan – The relief plan will evolve from the relief options shall be prepared in accordance with the appropriate industry guidelines, i.e., NPA Allocation Plan and Assignment Guidelines, NPA Code Relief Planning Guidelines, etc.

Service Providers (SPs) – Any entity that is authorized, as appropriate, by local governmental, state, federal or governmental authorities covering areas served by the NANP to provide communications services to the public.

(WTNs) –The quantity of telephone numbers within existing CO codes. WTNs are defined for this study as telephone numbers that are either, assigned to end users or assigned for administrative purposes within telecommunications networks

Telephone Numbers (TNs) – (NXX-XXXX) which are assigned to working subscriber access lines or their equivalents, e.g., direct inward dialing trunks, paging numbers, special services, temporary local directory numbers (TLDNs), etc., within a switching entity/POI