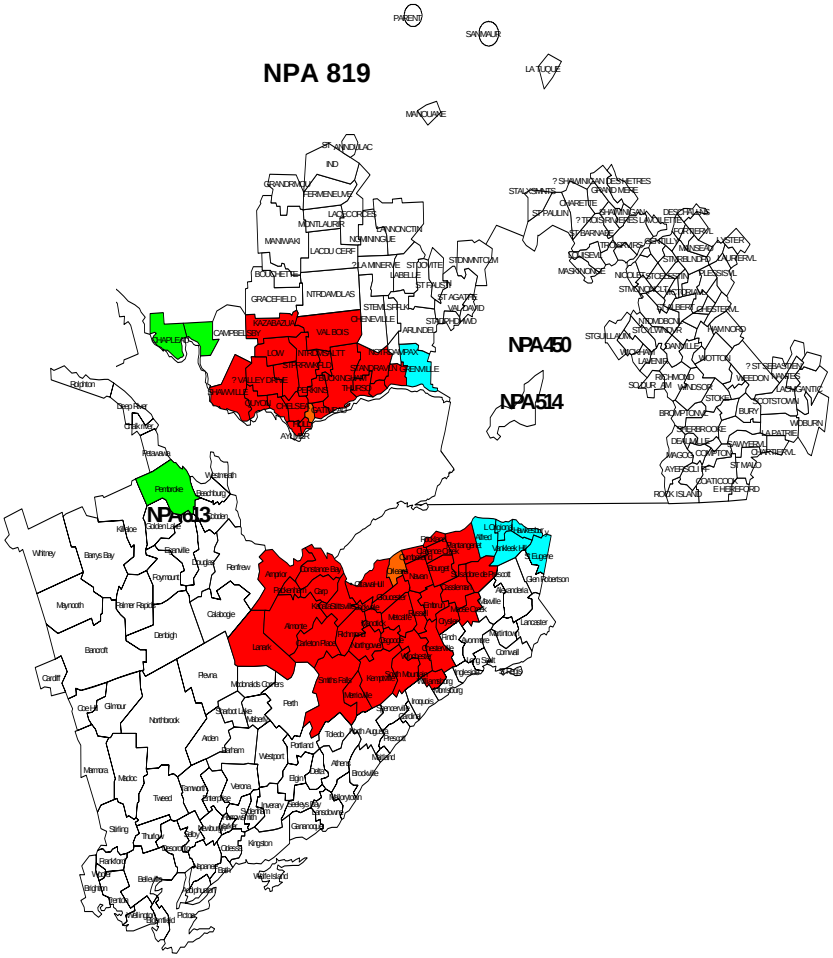
Planning Document
NPAs 819 & 613 Relief



Developed by the NPA 613 & 819 Relief Planning Committee

Version 5 Based on May 11, 2001 Relief Planning Conference Call

May 11, 2001

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Planning Document NPA 819 & 613 Numbering Relief

1. EXECUTIVE SUMMARY

NPA 819 consists of 213 Exchanges serving mainly Hull, Drummondville, Gatineau, Shawinigan, Sherbrooke, Trois Rivieres, Victoriaville and surrounding communities in the Canadian province of Quebec. NPA 613 consists of 131 Exchanges serving mainly Ottawa, Kingston, Belleville, Brockville, Cornwall and surrounding communities of the eastern part of Ontario in Canada.

Hull, located in NPA 819, and Ottawa, located in NPA 613, have the largest demand for Central Office (CO) Codes in NPA 819 and 613, respectively. Free local calling between Ottawa and Hull and certain other areas in NPA 819 and 613, is facilitated by using local 7-digit dialing between the two NPAs. In order to maintain the integrity of 7-digit dialing, the same CO Code cannot be assigned in both NPAs within the NPA 819 and 613 local free calling areas. This circumstance has resulted in a large number of CO Codes being protected from assignment within these local free calling areas and is prematurely causing the exhaust of both NPAs. This Planning Document (PD) combines relief planning alternatives and identifies possible solutions for providing relief for the NPA 819 and 613 geographic areas.

Based on the August 15, 2000 NPA 819 and 613 Relief Planning Central Office Code Utilization Survey (R-COCUS), the existing 800 Central Office CO Codes in NPA 819, of which 759 are assignable, are forecast to exhaust in January 2005. In addition, the existing 800 CO Codes in NPA 613, of which 758 are assignable, are forecast to exhaust in January 2006 if the protection of CO Codes to maintain 7-digit dialing between the local free calling areas of NPA 819 and 613 is retained. The exhausts of NPA 819 and 613 would be deferred to 2Q 2024 and 2Q 2008, respectively, if CO Code protection to maintain 7-digit dialing between the two NPAs were eliminated.

On April 4, 2001, the results of the 2001 General COCUS (G-COCUS) were made publicly available. These results provide more recent information regarding future CO Code usage in NPAs 819 and 613, although with less detail than the R-COCUS.

Based on the April 4, 2001 G-COCUS, the CO Codes in NPA 819 are forecast to exhaust in March 2007, if Protected CO Codes are retained. In addition, the CO Codes in NPA 613 are forecast to exhaust in August 2007 if Protected CO Codes are retained. The exhausts of NPA 819 and 613 become 2022 and July 2011 respectively if CO Code protection is eliminated.

Given the existing CO Code protection in NPA 819 and 613, relief planning of both NPAs is interdependent at this time; and, therefore, the date of relief must be determined based on the earliest exhaust date of either of the NPAs.

During the course of the Committee's deliberations, the Committee assessed the options identified by the CNA as well as a longer list of options identified by the Committee and reviewed the results of the 2001 G-COCUS. Based upon its assessment, the Committee makes the following recommendations:

1) The protection of CO Codes that are mirrored in NPAs 613 and 819 should cease in the 4th quarter of 2005 in order to provide relief to both NPAs 613 and 819 (about 16 months in advance of the currently Projected Exhaust Date for NPA 819 in March 2007 and about 21 months in advance of the currently Projected Exhaust Date for NPA 613 in August 2007). The removal of Protected CO Codes will require the introduction of 10-digit local dialing between NPAs 819 and 613 in the fourth quarter of 2005.

2) As the G-COCUS is performed annually, it is anticipated that subsequent G-COCUSes could result in the Projected Exhaust Date being altered in the future. Accordingly, the implementation of subsequent relief for NPA 613 should only be <u>tentatively</u> scheduled for the 4th quarter of 2009

(about 19 months in advance of the currently Projected Exhaust Date for NPA 613 without Protected CO Codes in July 2011).

3) The subsequent relief (i.e., following removal of CO Code protection) for NPA 613 be via the Distributed Overlay Option that is tentatively scheduled for the 4th quarter of 2009 (as per recommendation 2) above).

4) No subsequent relief activities (i.e., following removal of CO Code protection) be initiated at this time in NPA 819. Future relief activity would only commence for NPA 819 in accordance with the NPA Code Relief Planning & Notification Guidelines (i.e., six years prior to the Projected Exhaust Date).

More detailed recommendations are contained in section 8 of the document. This PD is being issued in accordance with Canadian Steering Committee on Numbering approved NPA Relief Planning and Notification Guidelines (INC 97-0404-016, dated January 27, 1999) to facilitate the selection of a consensus NPA 613 code relief method and a relief date.

Given the magnitude of this undertaking, inter-company commitment and co-operation are essential throughout the planning, provisioning and implementation stages of the introduction of the new NPA.

2. INTRODUCTION

NPA 819 consists of 213 Exchanges serving mainly Hull, Drummondville, Gatineau, Shawinigan, Sherbrooke, Trois Rivieres, Victoriaville and surrounding communities in the Canadian province of Quebec. NPA 613 consists of 131 Exchanges serving mainly Ottawa, Kingston, Belleville, Brockville, Cornwall and surrounding communities of the eastern part of Ontario in Canada. The Exchanges serving the Hull area in NPA 819 have cross-NPA local 7-digit free calling with some of the Exchanges serving the Ottawa-Carleton area in NPA 613. In addition, there are several other exchanges in NPA 819 and 613 where cross-NPA local 7-digit free calling exists. In order to retain 7-digit dialing for local calling between exchanges of these two NPAs, a large number of Central Office (CO) Codes continue to remain protected[1] and this situation is causing the premature exhaust of both NPAs. This Planning Document (PD) identifies possible solutions and makes recommendations for providing relief to the NPA 819 and 613 geographic areas.

Based on the August 15, 2000 NPA 819 and 613 Relief Planning Central Office Code Utilization Survey (R-COCUS), the existing 800 CO Codes in NPA 819, of which 759 are assignable, are forecast to exhaust in January 2005. In addition, the existing 800 CO Codes in NPA 613, of which 758 are assignable, are forecast to exhaust in January 2006 if the protection of CO Codes to maintain cross-NPA 7-digit dialing between the free calling areas of NPAs 819 and 613 is retained. The exhausts of NPA 819 and 613 would be deferred to 2Q 2024 and 2Q 2008 respectively if CO Code protection to maintain 7-digit dialing between these two NPAs were eliminated.

On April 4, 2001, the results of the 2001 General COCUS (G-COCUS) were made publicly available. These results provide more recent information regarding future CO Code usage in NPAs 613 and 819, although with less detail than the R-COCUS.

Based on the April 4, 2001 G-COCUS, the CO Codes in NPA 819 are forecast to exhaust in March 2007, if Protected CO Codes are retained. In addition, the CO Codes in NPA 613 are forecast to exhaust in August 2007 if Protected CO Codes are retained. The exhausts of NPA 819 and 613 become 2022 and July 2011 respectively if CO Code protection is eliminated.

Given the existing CO Code protection in NPA 819 and 613, relief planning of both NPAs is interdependent at this time; and, therefore, the date of relief must be determined based on the earliest exhaust date of either of the NPAs. The NPA 819 R-COCUS indicates that NPA 819 will exhaust in 1Q 2005 and NPA 613 will exhaust in 1Q 2006 if CO Code protection is retained. Consequently, NPA 613 Relief Planning must take the exhaust date of NPA 819 (i.e., 1Q 2005) into consideration.

[1] Code protection is an arrangement whereby a Central Office Code is designated as not available for assignment in an adjacent exchange or its EAS area in an adjacent NPA. This is done to allow 7-digit dialing across the boundary between the adjacent exchanges or EAS area in the adjacent NPAs. This means that it cannot be assigned in this area but it may be assigned elsewhere in the adjacent NPA.

The following 819 Exchanges have local 7-digit free calling within the Ottawa Exchange:

Aylmer
Buckingham
Chelsea
Gatineau
Kazabazua
Low
Luskville
Montebello
Notre-Dame-de-la-Salette
Papineauville
Perkins
Quyon
St-André-Avellin
St-Pierre-de-Wakefield
Shawville
Thurso
Val-des-Bois
Wakefield

The following 613 Exchanges have local 7-digit free calling within the Hull Exchange:

Almonte
Arnprior
Bourget
Carleton Place
Carp
Casselman
Chesterville
Clarence Creek
Constance Bay
Crysler
Cumberland
Embrun
Gloucester
Jockvale
Kanata-Stittsville
Kemptville
Lanark
Manotick
Merrickville
Metcalfe
Moose Creek
Navan
North Gower
Orleans
Osgoode
Pakenham
Papineauville
Plantagenet
Richmond
Rockland
Russell
St Isidore de Prescott
Smiths Falls
South Mountain
Williamsburg
Winchester

The following 613 Exchanges have local 7-digit free calling with the following 819 Exchanges:

- 613 Orleans - 819 Gatineau
- 613 Pembroke - 819 Chapeau
- 613 Pembroke - 819 Fort-Coulonge

The following 819 Exchanges have local 7-digit free calling with the following 613 Exchanges:

- 819 Grenville - 613 Alfred
- 819 Grenville - 613 Hawkesbury
- 819 Grenville - 613 L'Orignal
- 819 Grenville - 613 Vankleek Hill

The above local calling areas are shown in Figures 1 and 2 below.

It should be noted that there are currently some Protected CO Codes in both NPA 613 and 819 that are required to enable the provision of 7-digit local dialing across boundaries of other NPAs, although the majority of Protected CO Codes in NPAs 613 and 819 are used to enable 7-digit local dialing between NPAs 613 and 819.

It is very important to closely monitor the CO Code requirements of all existing and prospective CO Code Holders to ensure that relief is provided in sufficient time to ensure that CO Codes and telephone numbers are always available for service providers and customers, and to avoid a Jeopardy Condition.

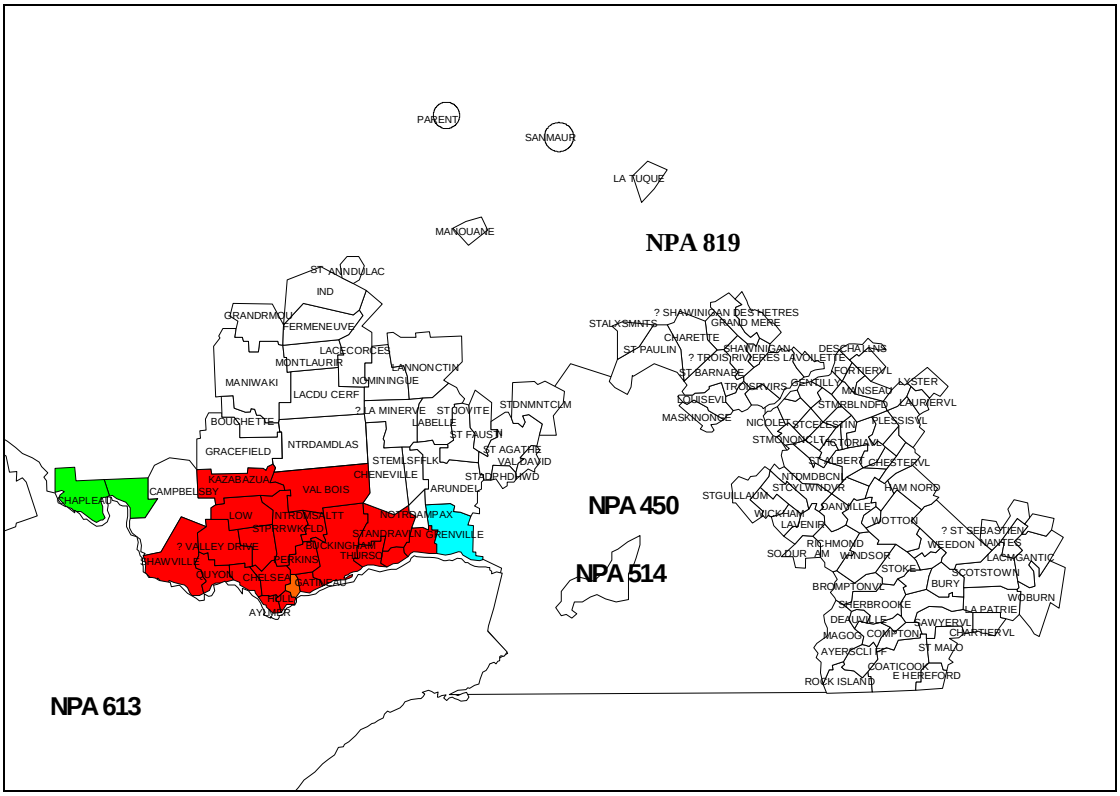


Figure 1 Existing NPA 819 Exchanges with Cross-NPA 613 7-digit Dialing

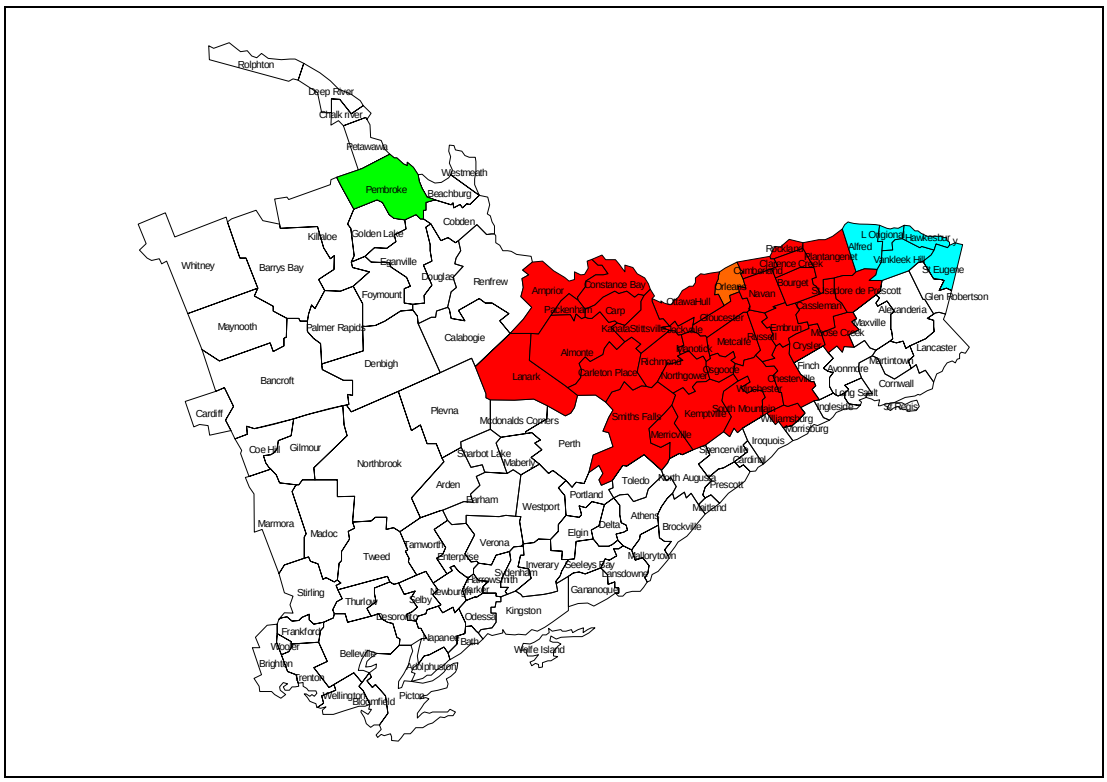


Figure 2 Existing NPA 613 Exchanges with Cross-NPA 819 7-digit Dialing

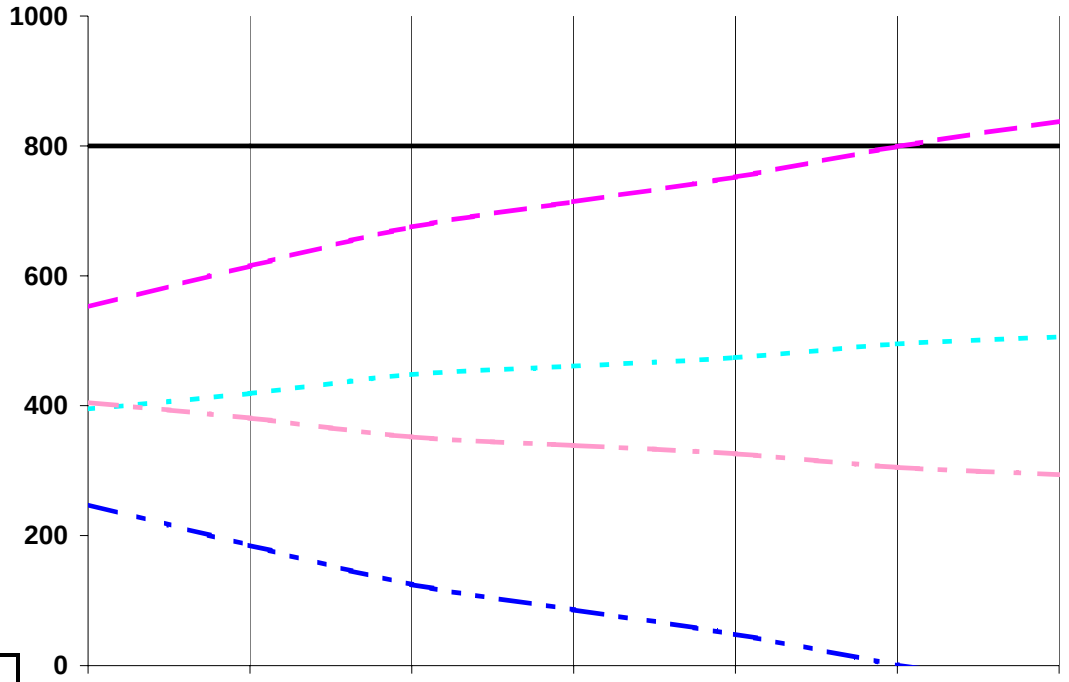
3. CENTRAL OFFICE CODE EXHAUST

The information in this section was developed by the Canadian Numbering Administrator and is related solely to the August 15, 2000 R-COCUS.

3.1. NPA 819 R-COCUS

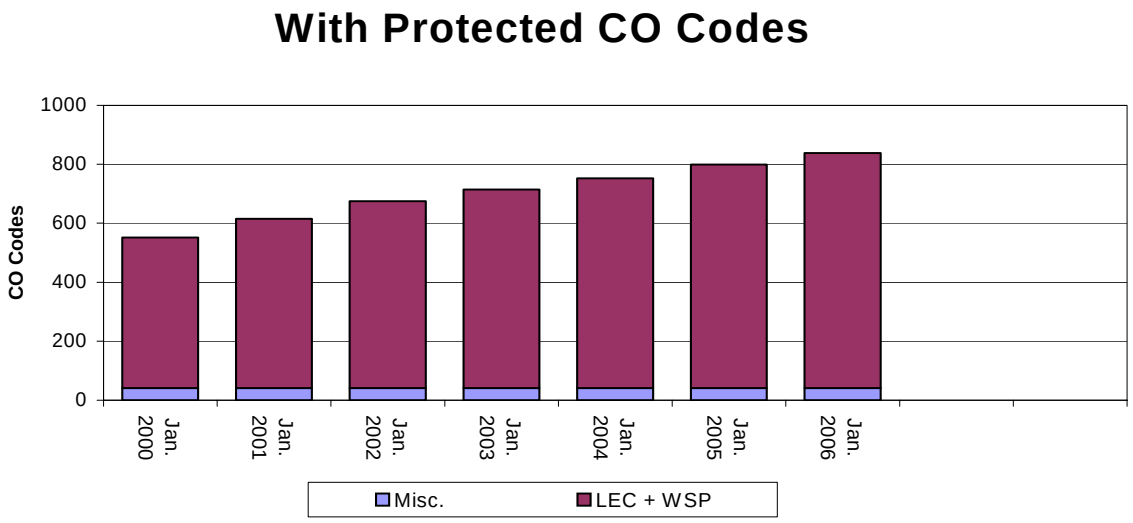
All CO Codes in NPA 819 are expected to exhaust in January 2005. This determination is based on the results of the August 15, 2000 R-COCUS.

The year-over-year change in the forecasts due to new business strategies, various Commission decisions, which allow for local competition, the granting of Personal Communications Services (PCS) licenses for the introduction of PCS service in 1996, and the requirement for CO Code protection, have all contributed to the earlier than expected requirement for relief of NPA 819. The following graph is based on results from the August 15, 2000 R-COCUS and represents the rate of CO Code utilization in NPA 819.



Year (January)	2000	2001	2002	2003	2004	2005	2006
NPA Capacity	800	800	800	800	800	800	800
COCUS with Protection	552	615	675	714	752	799	838
COCUS no Protection	395	419	448	461	474	495	506
NXX Availability no Protection	405	381	352	339	326	305	294
NXX Availability with Protection	248	185	125	86	48	1	-38

Figure 3 NPA 819 CO Code Exhaust August 15, 2000 R - COCUS



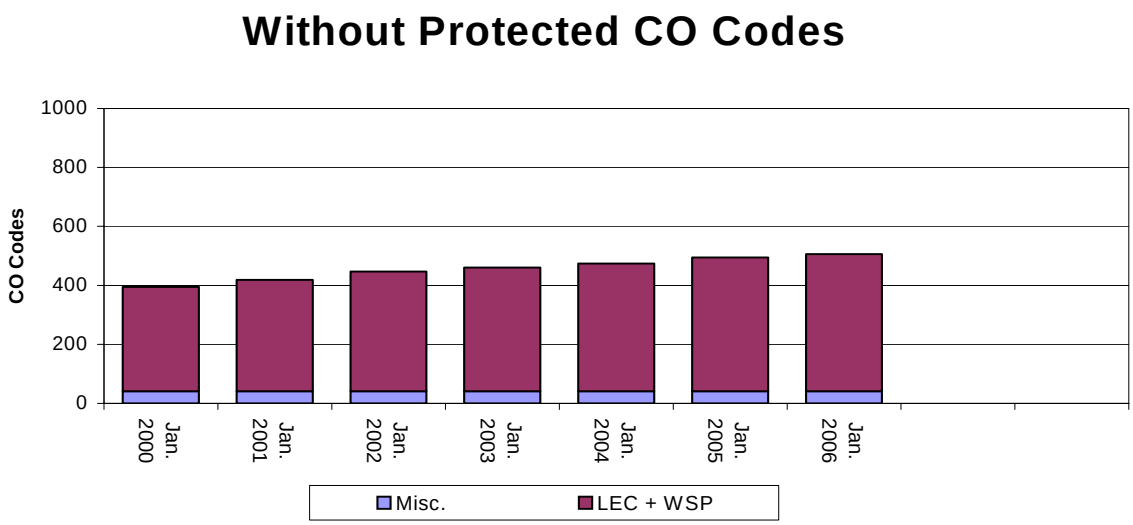
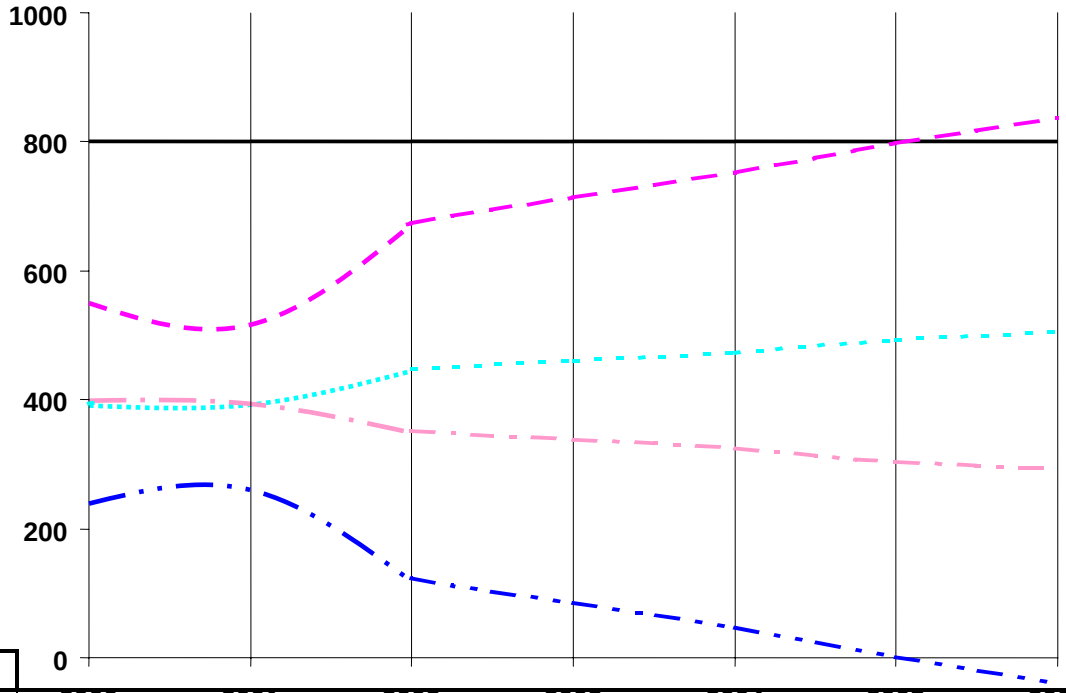


Figure 4 NPA 819 August 15, 2000 Relief COCUS

Figures 3 and 4 highlight the need to have mandatory 10-digit dialing in place and CO Code protection eliminated by October of the year 2004 in NPAs 819 and 613.

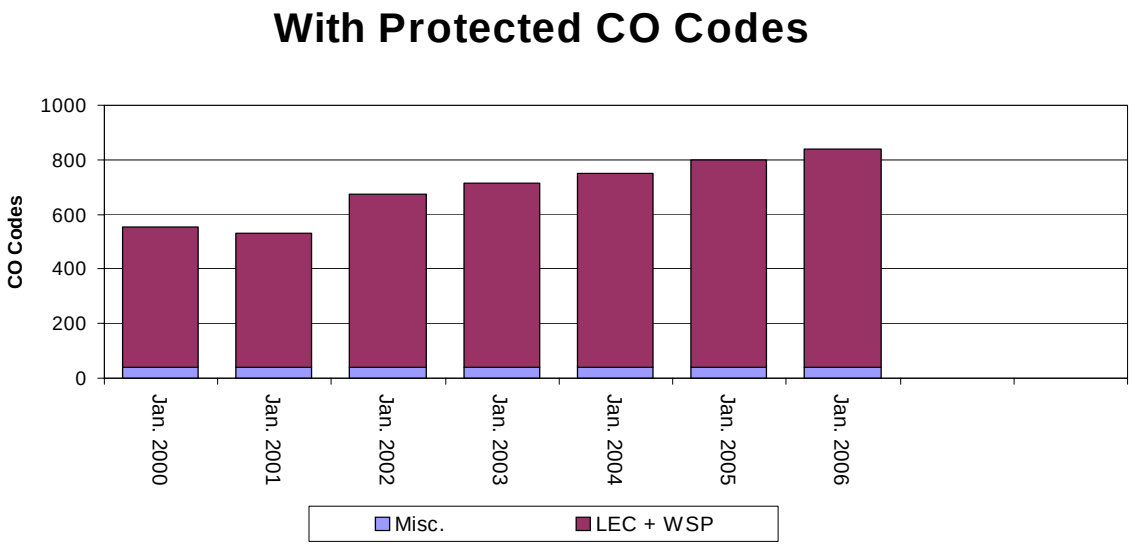
3.2. NPA 819 ACTUAL (2000-2001) and R-COCUS (2002-2006)

The following graph represents the rate of CO Code utilization in NPA 819. Actual January 1st CO Code assignments for the years 2000 and 2001 and results from the August 15, 2000 R-COCUS for the years 2002 to 2006 as of January 1 are represented.



Year (January)	2000	2001	2002	2003	2004	2005	2006
NPA Capacity	800	800	800	800	800	800	800
COCUS with Protection	552	531	675	714	752	799	838
COCUS no Protection	395	400	448	461	474	495	506
NXX Availability no Protection	405	400	352	339	326	305	294
NXX Availability with Protection	248	269	125	86	48	1	-38

Figure 5 NPA 819 CO Code Exhaust Actual (2000-2001) and R-COCUS (2002-2006)



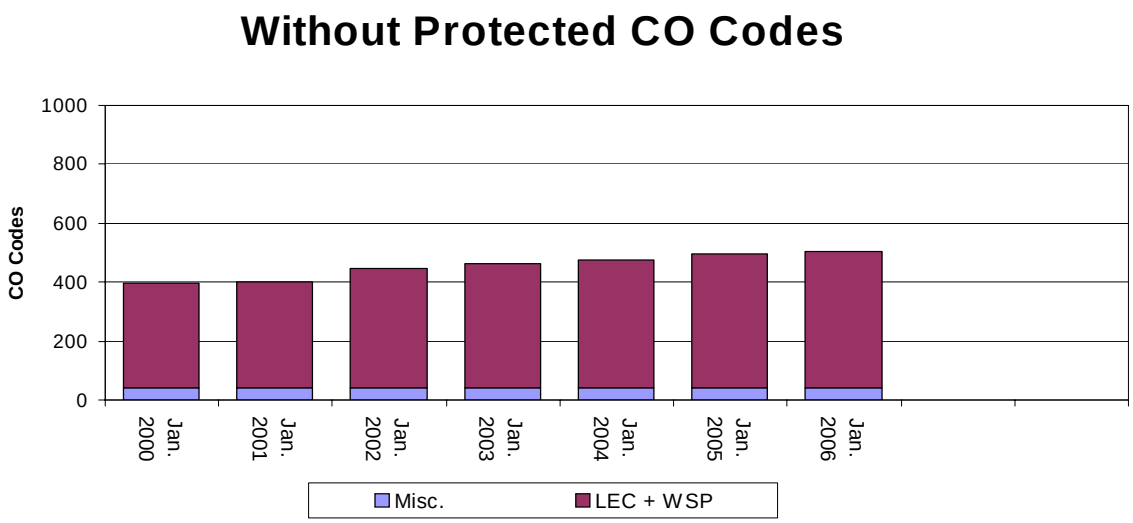


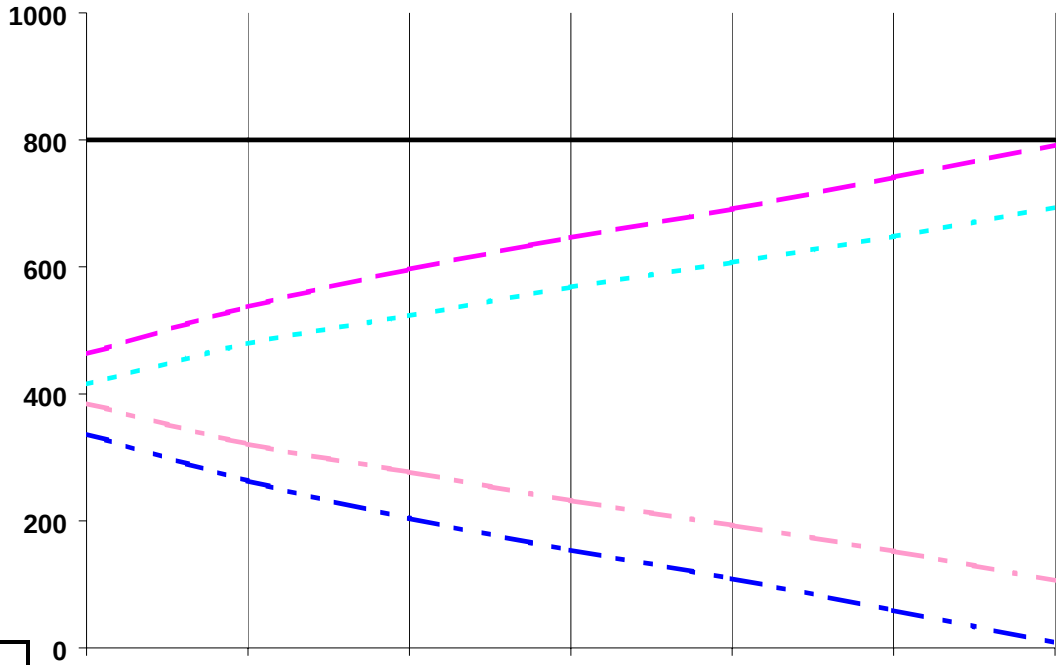
Figure 6 NPA 819 CO Code Exhaust Actual (2000-2001) and R-COCUS (2002-2006)

Figures 5 and 6 highlight the need to have mandatory 10-digit dialing in place and CO Code protection eliminated by October of the year 2004 in NPAs 819 and 613.

3.3. NPA 613 R-COCUS

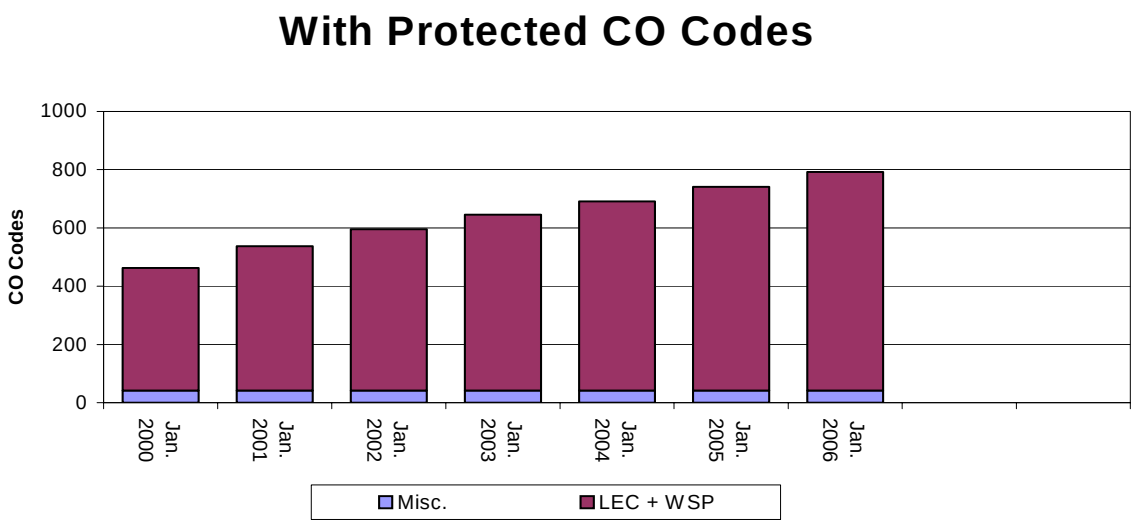
All CO Codes in NPA 613 are expected to exhaust in January 2006. This determination is based on the results of the August 15, 2000 R-COCUS.

The year-over-year change in the forecasts due to new business strategies, various Commission decisions, which allow for local competition, and the granting of PCS licenses for the introduction of PCS service in 1996 have all contributed to the earlier than expected requirement for relief of NPA 613. The following graph is based on results from the August 15, 2000 R-COCUS and represents the rate of CO Code utilization in NPA 613.



Year (January)	2000	2001	2002	2003	2004	2005	2006
NPA Capacity	800	800	800	800	800	800	800
COCUS with Protection	463	537	596	646	691	741	792
COCUS no Protection	415	479	523	568	607	648	694
NXX Availability no Protection	385	321	277	232	193	152	106
NXX Availability with Protection	337	263	204	154	109	59	8

Figure 7 NPA 613 CO Code Exhaust August 15, 2000 R - COCUS



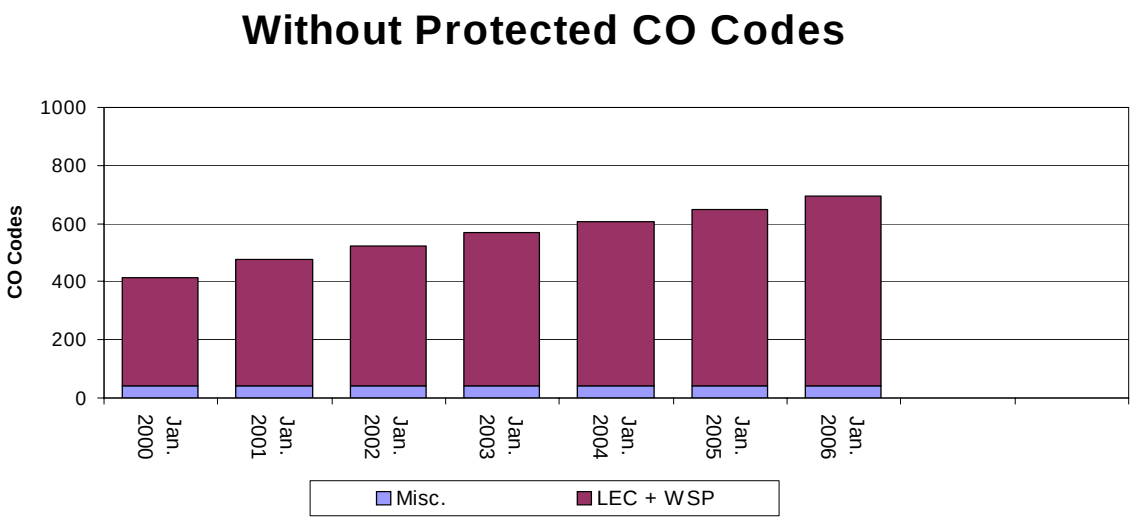


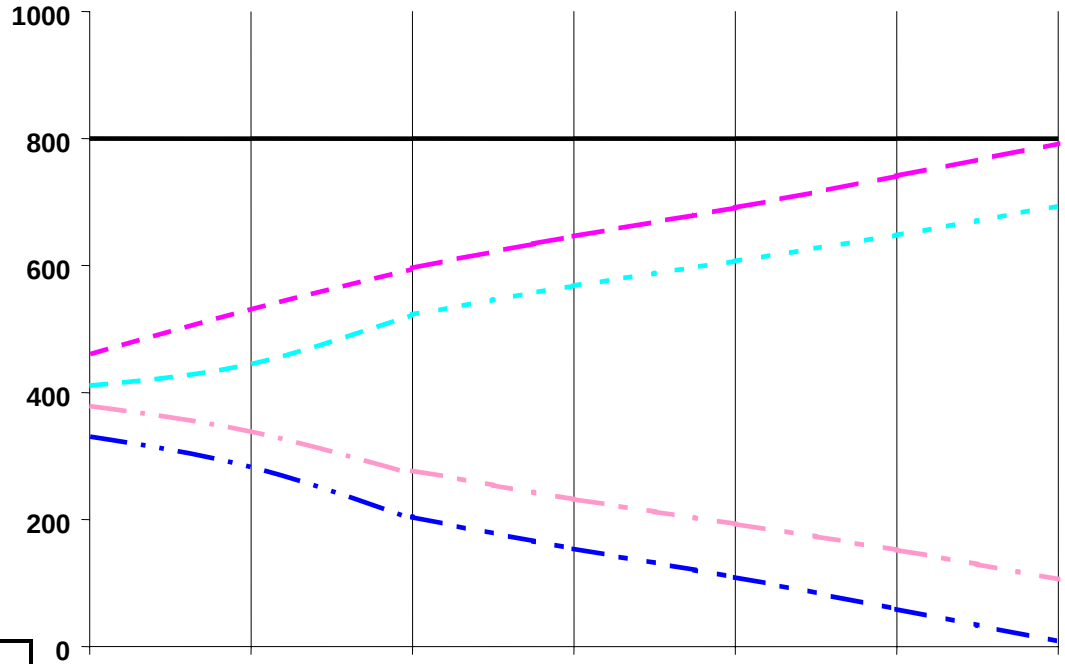
Figure 8 NPA 613 August 15, 2000 Relief COCUS

Figures 7 and 8 highlight the need to have mandatory 10-digit dialing in place and CO Code protection eliminated by October of the year 2004 in NPAs 613 and 819.

NPA 613 relief must be in place well in advance of reaching 758 assigned CO Codes, to allow for forecast volatility.

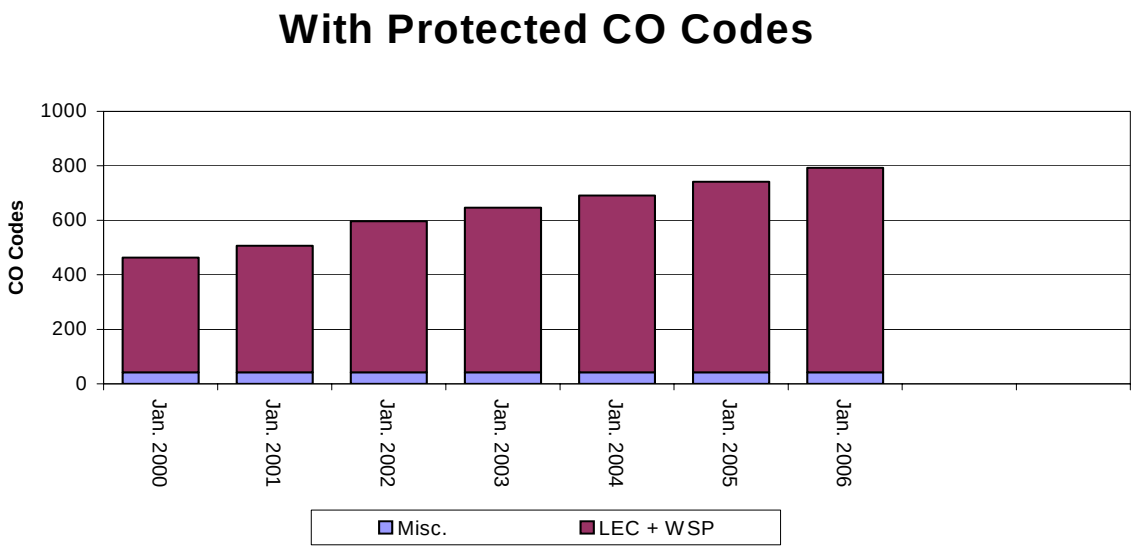
3.4. NPA 613 ACTUAL (2000-2001) and R-COCUS (2002-2006)

The following graph represents the rate of CO Code utilization in NPA 613. Actual January 1st CO Code assignments for the years 2000 and 2001 and results from the August 15, 2000 R-COCUS for the years 2002 to 2006 as of January 1 are represented.



Year (January)	2000	2001	2002	2003	2004	2005	2006
NPA Capacity	800	800	800	800	800	800	800
COCUS with Protection	463	507	596	646	691	741	792
COCUS no Protection	415	443	523	568	607	648	694
NXX Availability no Protection	385	357	277	232	193	152	106
NXX Availability with Protection	337	293	204	154	109	59	8

Figure 9 NPA 613 CO Code Exhaust Actual (2000-2001) and R-COCUS (2002-2006)



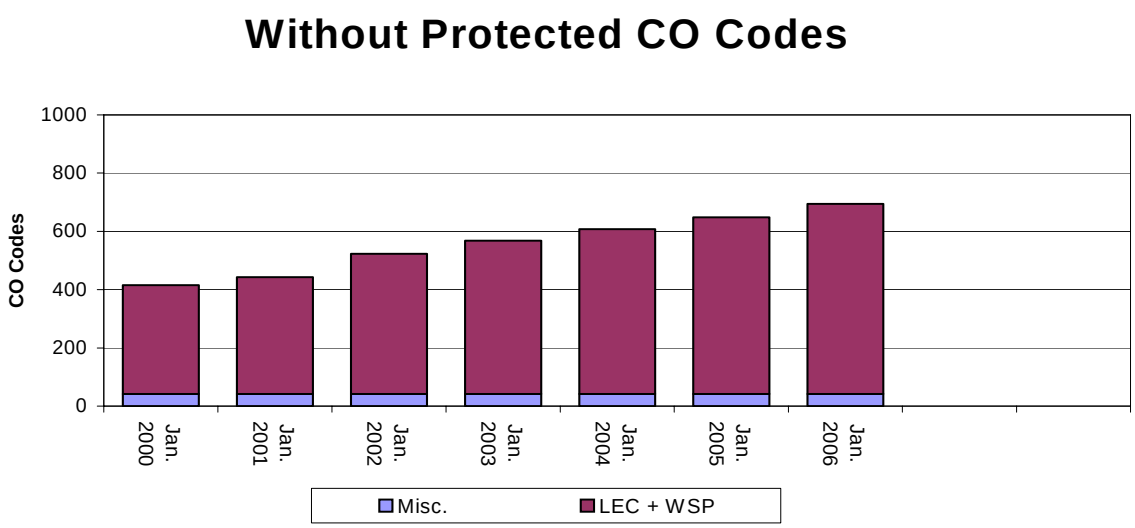


Figure 10 NPA 613 CO Code Exhaust Actual (2000-2001) and R-COCUS (2002-2006)

Figures 9 and 10 highlight the need to have mandatory 10-digit dialing in place and CO Code protection eliminated by October of the year 2004 in NPAs 613 and 819.

NPA 613 relief must be in place well in advance of reaching 758 assigned CO Codes, to allow for forecast volatility.

4. GENERIC CODE RELIEF METHODS

Once the necessity for NPA code relief was established, all code relief methods were considered, but only the following alternatives were examined in detail using the Geographic Split and Overlay methods.

A. Geographic Split (three options);

B. Concentrated Overlay within one NPA (two options);

C. Distributed Overlay; and,

D. Concentrated Overlay over parts of the two NPAs.

4.1. Geographic Split

4.1.1. Definition

By this method, the exhausting NPA is split into two or more geographic areas, leaving the existing NPA code to serve an area with the highest consumer density (to minimize number changes), and assigning a new NPA code(s) to the remaining area. This method traditionally divides areas by jurisdictional, natural or physical boundaries between the old and the new NPA.

NPA splits have occurred with enough frequency so that technical aspects have been addressed and established implementation procedures are generally understood. Public education and acceptance of the process has been made easier because of the numerous NPA splits that have occurred throughout North America. This method generally provides long-term relief for an area.

4.1.2. General Attributes

- Traditional method of NPA relief is familiar to the public and has well established implementation procedures.
- Ten-digit dialing required for local calls between different NPAs.
- Number changes required in new NPA boundaries.
- Reprogramming or replacement of equipment (switches, PBXs, cellular phones, etc.).
- Existing customers inconvenienced.
- More economic burden (businesses, public costs, stationery, etc.).
- Not as expensive to display in telephone directory.
- Requires a permissive dialing period.
- Possible boundary disputes.

4.2. Overlay

4.2.1. Definition

An NPA overlay occurs when more than one NPA code serves the same geographic area. Opening up a new NPA code provides code relief when the existing NPA is exhausted. Numbers from the new NPA are assigned for new growth on a carrier neutral basis, i.e., first come, first served. This method necessitates 10-digit dialing of local calls between the old and new NPAs coincident with NXX codes being implemented in the new NPA (universal 10-digit dialing for all local calls eliminates customer confusion).

The Distributed Overlay strategy is considered in situations when growth in telephone numbers is expected to be more or less evenly distributed throughout the existing NPA.

A Concentrated Overlay strategy is considered when growth in telephone numbers continuously occurs or is expected to occur in a specific area of the existing NPA(s). Given the unique nature of telephone calling patterns and the demand for CO Codes in the Ottawa-Hull area, the CNA has also considered introduction of the Concentrated Overlay strategy in part of the geographic area that is served by two contiguous NPAs.

4.2.2. General Attributes

- Relatively new method of NPA relief which has been implemented several times in the recent past and has well established implementation procedures.
- Requires universal 10-digit dialing within the NPA.
- No number changes are required for existing customers.
- Least disruptive to end-users.
- Less economic burden for existing business.
- Same location, two NPAs in residence/business.
- Increased directory costs.

5. RELIEF OPTIONS IDENTIFIED BY THE CNA IN THE INITIAL PLANNING DOCUMENT

The following assumptions were used by the CNA in the Initial Planning Document to develop various alternatives of providing CO Code relief in NPA 819 and 613. The analysis of these Relief Options was based on the August 15, 2000 R-COCUS results. Figures 13 to 19 contained in this document relate to the Relief Options identified by the CNA and described in this section. (The boundary of the New City of Ottawa is indicated by the bold black line on the maps.)

1) **7-digit dialing throughout NPA 613 and 819 will be replaced by 10-digit dialing:**
   - Begin 10-digit permissive dialing in NPA 613 and 819 effective **February 2004**;
   - Eliminate CO Code protection in NPA 613 and 819 and introduce mandatory 10-digit dialing throughout both NPAs by **October 2004**.

   (Note: Eliminating CO Code protection in NPAs 819 and 613 will defer exhausts of NPA 819 and 613 to years 2024 and 2008 respectively.)

   During the February 15-16, 2001 Relief Planning Meeting the Committee agreed to recommend that only local calls between NPAs 613 and 819 would require 10-digit dialing.

2) **For all three Concentrated Overlay Options (i.e., B-i, B-ii, D) the implementation date of the new NPA, will be 1Q 2005.**
   (Note: Introducing a Concentrated Overlay in 1Q 2005 will extend the life expectancy of NPA 613 up to the year 2012. Advancing the introduction of a Concentrated Overlay earlier than 1Q 2005 can further extend the life expectancy of NPA 613.)

As a result of assumption #1) above, the exhaust of NPA 819 defers to year 2024, therefore no Split or Distributed Overlay plans were evaluated for NPA 819.

The NPA 819 and 613 Concentrated Overlay alternative (D) was evaluated due to the unique nature of the community of interest and growth pattern between the Ottawa and Hull areas of NPA 819 and 613.

5.1. Geographic Split (A)

Although there are no municipal, physical or natural boundaries that can be used as reference points to split NPA 613, three geographic split options were assessed: namely, NPA 613 Ottawa Exchange Split, NPA 613 New City of Ottawa Exchange Split; and, NPA 613 Ottawa Extended Area Service (EAS) Split. Under ideal circumstances an NPA split should be implemented at least 18 months prior to NPA exhaust (i.e., 4Q 2006). A permissive dialing period will be required for all split options.

5.1.1. NPA 613 Ottawa Exchange Split (A-i):

The area served by the Ottawa Exchange Central Offices would retain NPA 613 and the area served by the remainder of the existing NPA 613 Exchanges would be grouped in the new NPA. This option would result in approximately 1.5 million number changes. Relief to NPA 613 and the new NPA is expected to last until year 2021 and 2030, respectively.

5.1.2. NPA 613 New City of Ottawa Exchange Split (A-ii):

The area served by the 14 Exchanges in the new City of Ottawa (formerly, the Regional Municipality of Ottawa-Carleton) would retain NPA 613 and the area served by the remaining existing Exchanges in NPA 613 would be grouped in the new NPA. This option would result in approximately 1.3 million number changes. Relief to NPA 613 and the new NPA is expected to last until year 2019 and 2032 respectively.

5.1.3. NPA 613 Ottawa Extended Area Service (EAS) Exchange Split (A-iii):

The area served by the Exchanges which have EAS (i.e., free calling) with the Ottawa Exchange would retain NPA 613 and the area served by the remainder of the existing NPA 613 Exchanges would be grouped in the new NPA. This option would result in approximately 1.1 million number changes. Relief to NPA 613 and the new NPA is expected to last until year 2016 and 2043 respectively.

5.1.4. Split of Existing NPA 819

During the Committee discussions a question was raised regarding why Split Options were not considered for NPA 819. The CNA evaluated options involving all relief methods in NPA 819. The CNA developed plans based on the assumption that cross-NPA 7-digit dialing will be eliminated. Consequently, the number of CO Codes that will become available for assignment in NPA 819 is sufficient to forestall exhaust in NPA 819 until 2024. Consequently, the CNA determined that no additional relief planning for NPA 819 was required at this time.

5.2. Concentrated Overlay (B)

Two Concentrated Overlay options for relief planning in NPA 613 were assessed; namely, NPA 613 Ottawa Exchange Concentrated Overlay and NPA 613 New City of Ottawa Exchange Concentrated Overlay.

The main advantage of these options is that number changes are not required, however they introduce the new NPA in a specific area within the existing NPA boundaries, eliminate local 7-digit dialing and introduce local 10-digit dialing. All these plans also require implementation of relief well in advance of the exhaust of NPA 613 to provide sufficient CO Codes for the future growth of the remainder of the NPA 613 area, which is not covered by the Concentrated Overlay.

5.2.1. NPA 613 Ottawa Exchange Concentrated Overlay (B-i):

Effective 1Q 2005, the future CO Code growth of the area served by the existing NPA 613 Ottawa Exchange would be provisioned by the new NPA and the area served by the remainder of the Exchanges would continue to utilize the remaining CO Codes available for assignment in NPA 613. This option would result in no number changes. Relief to NPA 613 and the new NPA is expected to last until year 2013 and 2031 respectively.

5.2.2. NPA 613 New City of Ottawa Exchange Concentrated Overlay (B-ii)

Effective 1Q 2005, the future CO Code growth of the area served by the 14 Exchanges of the new City of Ottawa in the existing NPA 613 would be provisioned by the new NPA and the area served by the remainder of the NPA 613 Exchanges would continue to utilize the remaining CO Codes available for assignment in NPA 613. This option would result in no number changes. Relief to NPA 613 and the new NPA is expected to last until year 2013 and 2031 respectively.

5.3. NPA 613 Distributed Overlay (C)

Introduce a new NPA using the Distributed Overlay method of relief planning where CO Codes from the new NPA will provision future CO Code demand in all Exchanges of the existing NPA 613 serving area. Under normal circumstances, an overlay should occur at least 18 months prior to NPA exhaust (i.e., 4Q 2006).

The main advantage of this option is that number changes are not required, however it eliminates local 7-digit dialing and introduces local 10-digit dialing.

The future CO Code growth in all Exchanges of the area served by the existing NPA 613 would be provisioned by the new NPA. This option would result in no number changes. Relief to NPA 613 and the new NPA is expected to last until year 2008 and 2025 respectively.

5.4. NPA 613 & 819 Ottawa-Hull Exchange Concentrated Overlay (D)

Effective Q1 2005, the future CO Code growth of the area served by the existing Ottawa and Hull Exchanges[2] in NPAs 613 and 819 would be served by the new NPA using the Concentrated Overlay Method. The area served by the remainder of the Exchanges in NPA 613 and 819 would continue to utilize the remaining CO Codes available for assignment in NPA 613 and 819. This option would result in no number changes. Relief to NPA 613, 819 and the new NPA is expected to last until year 2013, 2030 and 2028 respectively.

This Relief Method is unprecedented in Canada, since the concentrated overlay area encompasses two separate NPAs, however, given the uniqueness of the Ottawa-Hull area telephone-calling pattern, the CNA did consider this a viable option.

5.5. Summary of Relief Options Identified by the CNA

The following is a comparison of the alternatives evaluated:

Description	NPA 613 Ottawa Exchange Split (A-i)	NPA 613 New City of Ottawa Exchange Split (A-ii)	NPA 613 Ottawa EAS Exchange Split (A-iii)	NPA 613 Ottawa Exchange Conc. Overlay (B-i)	NPA 613 New City of Ottawa Exchange Conc. Overlay (B-ii)	NPA 613 Distributed Overlay (C)	NPA 613 & 819 Ottawa-Hull Exchange Conc. Overlay (D)
Exhaust – NPA 613	2021	2019	2016	2013	2013	2008	2013
Exhaust – NPA 819	2024*	2024*	2024*	2024*	2024*	2024*	2030
Exhaust –New NPA	2030	2032	2043	2031	2031	2025	2028
Approximate Number Changes Required	1.5 M	1.3 M	1.1 M	Nil	Nil	Nil	Nil
Dialing Impact	10D	10D	10D	10D	10D	10D	10D
Permissive Dialing	Required	Required	Required	Required	Required	Required	Required

* This date is based on the assumption that 7-digit dialing throughout NPA 613 and 819 will be replaced by 10-digit dialing and Code protection will be eliminated.
* This date will not be effected should all local calls between NPAs 613 and 819 require 10-digit dialing.

[2] This exchange appears in the LERG as OTTAWAHULL. To avoid confusion the CNA will refer to this exchange as the Hull Exchange in NPA 819 and the Ottawa Exchange in NPA 613.

6. RELIEF OPTIONS CONSIDERED BY THE RELIEF PLANNING COMMITTEE

The Relief Planning Committee considered the IPD developed by the CNA and, based upon discussion, identified 25 potential Relief Options for consideration. These options are listed as follows:

Joint NPA 819 & NPA 613 Relief Options	NPA 819 Relief Options	NPA 613 Relief Options
Ottawa-Hull Exchange Split	East-West Split	Distributed Overlay
Ottawa-Hull EAS Split	Eliminate 613/819 CO Code Protection only	Ottawa** Exchange Concentrated Overlay (Bi)
Ottawa-Hull Exchange Concentrated Overlay (Option D)	Distributed Overlay	New City of Ottawa Concentrated Overlay (Bii)
Ottawa-Hull EAS Concentrated Overlay	New City of Hull-Gatineau Overlay	Ottawa EAS Concentrated Overlay
Technology Specific Overlay (e.g., wireless, VOIP, LNP capable)	New City of Hull-Gatineau Split	Ottawa Exchange Split (Ai)
New City of Ottawa/New City of Hull-Gatineau Split	Boundary Realignment with NPA 418	New City of Ottawa Exchange Split (Aii)
New City of Ottawa/New City of Hull-Gatineau Overlay	Hull* Exchange Split (from 819 and 613)	Ottawa EAS Exchange Split (Aiii)
	New City of Hull-Gatineau Exchange Split	Phased Concentrated-Distributed Overlay
	Hull-Gatineau Exchange Concentrated Overlay	
	Hull Exchange Concentrated Overlay	

* The NPA 819 (Hull) part of the Ottawa-Hull exchange is split off and given a new NPA.
** The NPA 613 (Ottawa) part of the Ottawa-Hull exchange is split off and given a new NPA.

6.1. Protected CO Codes in NPAs 819 and 613

The Relief Planning Committee reviewed the Projected Exhaust Dates for NPAs 819 and 613. The Committee noted that the CNA has indicated that the release of the Protected CO Codes that are mirrored in NPAs 613 and 819 would extend the Projected Exhaust Dates beyond 2018 for NPA 819 and to 2Q 2008 for NPA 613.

The INC NPA Relief Planning & Industry Notification Guidelines state in item 5.0 g) that: “The use of protected codes (NXXs), which permit 7-digit dialing across NPA boundaries, should be eliminated or reduced to an absolute minimum as part of the NPA code relief planning process. Reduction or elimination of protected codes should be accomplished prior to a request for a relief NPA code.”

This is consistent with the new draft Canadian NPA Relief Planning Guidelines item 4.6 that states: "The RPC should attempt to ensure that the use of protected CO Codes, which permit 7-digit dialing across NPA boundaries, are eliminated or reduced to an absolute minimum as part of the NPA Relief Planning Process.”

The Committee agreed that the release of the mirrored protected CO Codes in NPA 819 would be sufficient to enable NPA 819 to last beyond 2018 and, accordingly, there is no need for any additional relief activities in NPA 819 at this time. Any Relief Option that would necessitate activities in NPA 819 would therefore impose premature burdens on customers and carriers in NPA 819. The Committee agreed to recommend the removal of mirrored CO Code protection in NPAs 819 and 613 in 2004.

Accordingly, the Relief Options pertaining to NPA 819 in the table shown above were eliminated from further consideration by the Committee.

6.2. Technology Specific Overlay

A Technology Specific Overlay would entail assigning a new NPA code overlaying an existing NPA, exclusively for providing services using a specific type of technology. For example, a new overlay NPA code could be assigned to be used by Voice Over Internet Protocol (VoIP) technology. Other examples would be assignments of NPA codes to wireless, wireline or LNP capable carriers only.

The Committee chose to reject this Option because it:

1) conflicts with current NPA Relief Planning & Notification Guidelines;
2) conflicts with new draft Canadian NPA Relief Planning Guidelines;
3) is inconsistent with Commission practice to render decisions that are technologically neutral;
4) is not competitively neutral;
5) is not likely to provide sufficient relief;
6) does not support LNP between different technologies;
7) has never before been implemented in Canada;
8) would cause customer confusion;
9) would cause disruption because of number changes.

6.3. NPA 613 Relief Options

The Committee reviewed the remaining options for NPA 613 and developed the following criteria to assess the options:

A. NPA Code Conservation – uses less NPAs
B. Number Change – existing customers will or will not be assigned a new area code
C. Total Carrier Costs – e.g., including implementation, customer awareness
D. Cost Deferral – would defer the incurrence of costs as long as possible
E. Longevity – the length of time before further relief activity would be required (e.g., a new area code)
F. Political Alignment – alignment with municipal and provincial boundaries
G. Geographic Identity – known areas or identifiable geographical features
H. Customer Confusion – complicated dialing plan or NPA border identification
I. Reprogram Mobile Phones – requirement to reprogram wireless devices to accommodate the number changes

The Committee used the above criteria and assessed the options in the NPA 613 Pro/Con Matrix below.

		Criteria								
	NPA 613 Relief Options	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
1	Eliminate 613/819 CO Code Protection prior to implementing one of the following Relief Options	P	P	P	P	P	P	P	P	P
2	Distributed Overlay	P	P	P	P	P	P	P	P	P
3	Ottawa[1] Exchange Concentrated Overlay (B1)	P	P	N	C	C	C	P	C	P
4	New City of Ottawa Concentrated Overlay (B2)	P	P	N	C	C	P	P	P	P
5	Ottawa EAS Concentrated Overlay	P	P	N	C	C	C	C	C	P
6	Ottawa* Exchange Split	P	C	C[2]	N	C	C	C	C	C
7	New City of Ottawa Exchanges Split	P	C	C[2]	N	C	P	P	P	C
8	Ottawa EAS Exchanges Split	P	C	C[2]	N	C	C	C	C	C
9	Phased Concentrated-Distributed Overlay	P	P	C[3]	P[4]	P	P	P	C	P

P = Pro
C = Con
N = Non-consensus

[1] The NPA 613 (Ottawa) part of the Ottawa-Hull exchange is split off and given a new NPA.
[2] Splits, by deferring costs are higher by the ratio of subscriber numbers.
[3] The C in column c) for the Phased Concentrated-Distributed Overlay is due to the fact that there would be a need for a second phase of consumer awareness program to communicate the introduction of the new overlay NPA in the area not covered by the Concentrated Overlay.
[4] The P in column d) under the Phase Concentrated-Distributed Overlay assumes it would be implemented at the same time as a distributed overlay (i.e., 12-18 months in advance of the exhaust date). However, if it is implemented sooner, then the P would become a C.

6.4. Analysis of the NPA 613 Relief Options

This section provides a summary of the Committee's analysis of the NPA 613 Relief Options in the above matrix. This analysis assumes that only the mirrored Protected CO Codes in both NPAs will be released and 10-digit local dialing only between NPAs 613 and 819 will be implemented. These assumptions differ from those of the CNA. In the Initial Planning Document, the CNA assumed that all protected CO Codes in NPAs 613 and 819 would be released and that 10-digit local dialing would be adopted for all local calls within and between NPAs 613 and 819 in 2004.

The following options were analysed by the Committee.

6.4.1. Exchange Splits

The following three Split Options have certain common elements:

- Ottawa Exchange Split
- New City of Ottawa Exchanges Split
- Ottawa EAS Exchanges Split

Of the above three Split Options, the Committee believes that the "New City of Ottawa Exchanges Split" would definitely be preferred over the other Split Options as a practical political boundary exists upon

which a split could be based (i.e., the new City of Ottawa). However, the existing exchange areas do not match perfectly with the New City of Ottawa municipal boundaries.

None of these options were recommended as all three splits require large up-front carrier costs, significant quantity of telephone number changes and subsequent mobile phone reprogramming and there may not be a recognizable boundary for the split. The relief that the splits provided had lower longevity than the other Relief Options. These factors were considered to outweigh the benefits of maintaining some 7-digit local dialing and unique geographic identity.

6.4.2. Concentrated Overlays

The following three Concentrated Overlay Options have certain common elements:

- Ottawa Exchange Concentrated Overlay
- New City of Ottawa Concentrated Overlay
- Ottawa EAS Concentrated Overlay

The Concentrated Overlay Options are more favourable than the Split Options because number changes are not required for the Concentrated Overlay Options.

None of these options were recommended, however, as they would advance the incurrence of costs of relief for both carriers and customers, have the potential to create a non-uniform dial plan and resultant customer confusion, and would not last as long as the Distributed Overlay and the Phased-Concentrated Distributed Overlay.

6.4.3. Distributed Overlay

According to the evaluation criteria, there were no cons associated with the Distributed Overlay Option. It was noted, however, by a participant of the Committee that, unlike the Split and Concentrated Overlay Options, the Distributed Overlay Option provides no additional geographic identity (i.e., distinguishing the New City of Ottawa from the surrounding area).

Adoption of a Distributed Overlay does not require any number changes for existing customers and, consequently, does not require mobile telephone reprogramming. Also it utilizes existing recognizable NPA boundaries. The longevity of this Relief Option is the greatest of all Relief Options considered. The Committee noted that this option would maximize the benefit of cost deferral for both customers and carriers. It was noted that this option would require 10-digit local dialing throughout NPA 613; however, this would be consistent with an eventual move towards the adoption of the 10-digit Uniform Dial Plan. This move to 10-digit local dialing will allow for the elimination of all Protected CO Codes in NPA 613, in accordance with NPA Code Relief Planning and Notification Guidelines. As a result of the benefits described above, this is the Committee's preferred Relief Option.

6.4.4. Phased Concentrated-Distributed Overlay

A Phased Concentrated-Distributed Overlay would entail the assignment of CO Codes from the new overlay NPA code in a concentrated area at the introduction of this option. CO Code assignment would be phased in to the area outside the concentrated area until it covers the entire original NPA. It was noted by Committee members, that there is no common understanding of the impacts, methods and procedures with respect to the implementation of a Phased Concentrated-Distributed Overlay.

Upon considering the Phased Concentrated-Distributed Overlay, it was determined that upon final implementation it results in a Distributed Overlay while possibly adding additional complexity, customer confusion and costs to the implementation. This Relief Option has never been done in Canada.

There are no perceived additional benefits from a Phased Concentrated-Distributed Overlay as compared to a Distributed Overlay, assuming that they are implemented at the same time. If the Phased Concentrated-Distributed Overlay were implemented sooner than the Distributed Overlay, then the costs would be incurred earlier by both consumers and carriers. Accordingly, the Committee rejected the Phased Concentrated-Distributed Overlay.

7. DIALING CHANGES FOR LOCAL CALLS

The following tables illustrate the local dialing plan in place today and the changes that would occur after CO Code Protection is removed for CO Codes that are mirrored in NPAs 613 and 819, as well as after a Split or Overlay is implemented as subsequent relief for NPA 613.

The Toll call dialing arrangement is not impacted due to the NPA relief.

NPA 613 – Geographic Split Local Dialing Plan			
For Local Calls from:	**Today**	**After CO Code Protection Removal**	**After Split**
Landline to Wireless within NPA	7-digits	7-digits	7/10-digits
Landline to Wireless between 613 & 819	7-digits	10-digits	10-digits
Landline to Wireless between 613 & other NPAs (e.g., 705, 905)	7-digits	7-digits	7/10-digits
Landline to Landline within NPA	7-digits	7-digits	7/10-digits
Landline to Landline between 613 & 819	7-digits	10-digits	10-digits
Landline to Landline between 613 & other NPAs (e.g., 705, 905)	7-digits	7-digits	7/10-digits
Wireless to Wireless within NPA	7-digits	7/10-digits	7/10-digits
Wireless to Wireless between NPAs	7/10-digits	10-digits	7/10-digits
Landline to Wireless between 613 & new NPA	N/A	N/A	10-digits
Landline to Landline between 613 & new NPA	N/A	N/A	10-digits
Wireless to Wireless between 613 & new NPA	N/A	N/A	10-digits

NPA 613 – Overlay Local Dialing Plan			
For Local Calls from:	**Today**	**After CO Code Protection Removal**	**After Overlay**
Landline to Wireless within NPA	7-digits	7-digits	10-digits
Landline to Wireless between 613 & 819	7-digits	10-digits	10-digits
Landline to Wireless between 613 & other NPAs (e.g., 705, 905)	7-digits	7-digits	10-digits
Landline to Landline within NPA	7-digits	7-digits	10-digits
Landline to Landline between 613 & 819	7-digits	10-digits	10-digits
Landline to Landline between 613 & other NPAs (e.g., 705, 905)	7-digits	7/10-digits	10-digits
Wireless to Wireless within NPA	7-digits	7/10-digits	10-digits
Wireless to Wireless between NPAs	7/10-digits	10-digits	10-digits
Landline to Wireless between 613 & new NPA	N/A	N/A	10-digits
Landline to Landline between 613 & new NPA	N/A	N/A	10-digits
Wireless to Wireless between 613 & new NPA	N/A	N/A	10-digits

NPA 819 Local Dialing Plan		
For Local Calls from:	**Today**	**After CO Code Protection Removal**
Landline to Wireless within NPA	7-digits	7-digits
Landline to Wireless between 613 & 819	7-digits	10-digits
Landline to Wireless between 819 & other NPAs (e.g., 450, 418)	7-digits	7-digits
Landline to Landline within NPA	7-digits	7-digits
Landline to Landline between 613 & 819	7-digits	10-digits
Landline to Landline between 819 & other NPAs (e.g., 450, 418)	7-digits	7/10-digits
Wireless to Wireless within NPA	7-digits	7/10-digits
Wireless to Wireless between NPAs	7/10-digits	10-digits

8. RELIEF PLANNING COMMITTEE RECOMMENDATIONS

The Relief Options described in Sections 5 and 6 of this Planning Document were developed using the R-COCUS results. The R-COCUS was conducted at the exchange level of detail, whereas the G-COCUS was performed at the NPA level of detail. In general, the purpose of the R-COCUS is to provide the CNA and Relief Planning Committee with forecast information in order to identify and assess alternative Relief Options. In general, the purpose of the G-COCUS is to provide an annual assessment of the future usage of CO Codes and to forecast the Projected Exhaust Date. The different methodologies for performing these two types of COCUS has the potential for producing different results and, in fact, the G-COCUS does indicate different results than the R-COCUS. The G-COCUS was conducted in February 2001, while the R-COCUS was performed in August 2000 and, therefore, the G-COCUS results are more recent.

On 4 April 2001, the CNA provided the results of the 2001 G-COCUS to the Canadian Steering Committee on Numbering (CSCN). The results of the 2001 G-COCUS indicate deferred Projected Exhaust Dates for NPAs 613 and 819 with Protected CO Codes, as well as a deferred Projected Exhaust Date for NPA 613 without Protected CO Codes.

Specifically, the 2001 G-COCUS results indicate that:

1) The NPA 613 Projected Exhaust Date (with Protected CO Codes still in place) has moved out from January 2006 to about August 2007 (a delay of 1.5 years).

2) The NPA 613 Projected Exhaust Date (with Protected CO Codes eliminated and 10-digit local dialing across 613-819 boundary) has moved out from April 2008 to about July 2011 (a delay of 3 years).

3) The NPA 819 Projected Exhaust Date (with Protected CO Codes still in place) has moved out from January 2005 (using the 2000 R-COCUS result) to about March 2007 (a delay of 2.2 years).

4) The NPA 819 Projected Exhaust Date (with Protected CO Codes eliminated and 10-digit local dialing across 613-819 boundary) has moved in from 2024 to 2022.

Accordingly, the Relief Planning Committee has assessed the analysis performed as a result of the August 2000 R-COCUS and concluded that any recommendations should take into account the 2001 G-COCUS results as well.

Recommendations

As the implementation of NPA relief is an expensive and time-consuming process for both customers and carriers, and any delay in the incidence of such costs would be of financial benefit to both customers and carriers, the Relief Planning Committee makes the following recommendations:

1) The protection of CO Codes that are mirrored in NPAs 613 and 819 should cease in the 4th quarter of 2005 in order to provide relief to both NPAs 613 and 819 (about 16 months in advance of the currently Projected Exhaust Date for NPA 819 in March 2007 and about 21 months in advance of the currently Projected Exhaust Date for NPA 613 in August 2007). The removal of Protected CO Codes will require the introduction of 10-digit local dialing between NPAs 819 and 613 in the fourth quarter of 2005. A 2 month network announcement period should be used to transition to the new dialing plan required by the elimination of protected CO Codes (i.e., during this period, educational announcements would be placed on local calls between NPAs 613 and 819 dialed using 7 digits). The network announcements would be phased in over a 1-week period. All affected 613 and 819 telecommunications directories published and issued during 2005 should indicate the NPA of telephone numbers in order to facilitate the change to 10-digit local dialing between NPAs 613 and 819 (e.g., the Ottawa-Hull directory). The CNA shall attempt

to assign Protected CO Codes in NPAs 613 and 819 to the maximum extent practicable between now and the fourth quarter of 2005, with due consideration to the preservation of 7-digit dial plans.

2) As the G-COCUS is performed annually, it is anticipated that subsequent G-COCUSes could result in the Projected Exhaust Date being altered in the future. Accordingly, the implementation of subsequent relief for NPA 613 should only be tentatively scheduled for the 4th quarter of 2009 (about 19 months in advance of the currently Projected Exhaust Date for NPA 613 without Protected CO Codes in July 2011). Request the CNA to monitor CO Code usage and assignment rates on a going forward basis, using the annual COCUS, in order to monitor the Projected Exhaust Date and to advise the Relief Planning Committee and CRTC, when appropriate, so that a final Relief Date and Relief Implementation Plan can be recommended to and approved by the Commission at least 3 years prior to the then Projected Exhaust Date.

3) The subsequent relief (i.e., following removal of CO Code protection) for NPA 613 be via the Distributed Overlay Option that is tentatively scheduled for the 4th quarter of 2009 (as per recommendation 2) above). A 2 month network announcement period should be used to transition to the new dialing plan required by the introduction of the Distributed Overlay (i.e., during this period, educational announcements would be placed on local calls dialed using 7 digits). The network announcements would be phased in over a 1-week period.

4) No subsequent relief activities (i.e., following removal of CO Code protection) be initiated at this time in NPA 819. Future relief activity would only commence for NPA 819 in accordance with the NPA Code Relief Planning and Notification Guidelines (i.e., six years prior to the Projected Exhaust Date).

9. PROPOSED SCHEDULE

As the recommendations of the Relief Planning Committee require the elimination of CO Code protection and adoption of 10-digit local dialing between NPAs 613 and 819 in order to provide relief to those NPAs in 4th quarter 2005, the Relief Planning Committee is recommending the following proposed schedule for this first relief activity. As subsequent relief activity for NPA 613 is required in 2009, the Relief Planning Committee has agreed not to develop a proposed schedule for the implementation of a the subsequent relief activity for NPA 613 at this time. The Relief Planning Committee would reconvene at the request of the CNA at an appropriate time in the future to recommend a Relief Date and develop a Relief Implementation Plan for the implementation of the approved Relief Option for NPA 613.

No.	NPAs 819 & 613 Relief Planning Proposed Time Line* (i.e., for Removal of CO Code Protection) Task or Event	Time (mths)	Cum. Time	Start date	End date (est.)	Depen-dency
1	CNA identifies NPA Exhaust		0		2-May-00	
2	CNA notifies CRTC, CSCN, & NANP-A of NPA exhaust	¼	0		9-May-00	**1**
3	CNA conducts NPA R-COCUS	3	3¼		15-Aug-00	**2**
4	CNA prepares and distributes IPD to Affected Parties.	2½	5¾		31-Oct-00	**3**
5	Affected parties review IPD and provide comments to the CNA	1¼	7		7-Dec-00	**4**
6	CNA modifies IPD per comments received and reissues	1	8		7-Jan-00	**5**
7	CNA arranges for NPA Relief Planning Meeting					
8	Affected Parties review revised IPD prior to meeting	1¼	9¼			**6**
9	CRTC issues Public Notice CRTC 2001-20 and solicits Interested Parties				5-Feb-01	
10	CNA Chairs NPA Relief Planning meeting to finalize IPD and to develop a TIF Report recommending that a CISC Ad Hoc NPA Relief Planning Working Group (RPWG) be formed	0	9¼	15-Feb-01	16-Feb-01	**7**
11	CNA merges NPA 613 & NPA 819 IPDs into one document	1¼	10½		14-Mar-01	
12	CNA Chairs 2nd NPA Relief Planning meeting to finalize IPD and to develop a TIF Report			22-Mar-01	23-Mar-01	
13	CNA Chairs 3rd NPA Relief Planning Meeting to finalize IPD and to develop a TIF Report (if necessary)			19-Apr-01	20-Apr-01	
14	CNA revises and forwards IPD and TIF Reports to the CISC/CRTC	½	11		11-May-01	**12**
15	CISC review of IPD and forwarding to CRTC for Approval*	½	11¾		25-May-01	**13**
16	CRTC issues Public Notice soliciting Comments	2	13¾		27-July-01	**15**
17	Interested Parties Comment & Reply	4½	18¼		12-Dec-01	**16**
18	CRTC issues Decision & directs Ad Hoc NPA RPWG to develop and execute NPA Relief Implementation Plan (RIP) and Consumer Awareness Plan (CAP)	4½	22¾		30-Apr-02	**17**
19	CNA announces Meeting of RPWG to Develop Consensus RIP and CAP	½	23¼		15-May-02	**18+19**
20	RPC Develops Consensus RIP and CAP (A Series of Meetings/Conference Calls Might Be Required)	4	27¼		16-Sep-02	**20**
21	CNA Forwards Consensus RIP and CAP	½	27¾		30-Sep-02	**21**
22	CISC reviews and forwards RIP and CAP to the CRTC for approval	1	28¾		31-Oct-02	**22**
23	CRTC Approves RIP and CAP (a public process may be initiated)	2	30¾		31-Dec-02	**23**

24	CNA Issues Media Release and informs LNP Consortium, Affected Parties and Interested Parties	1½	32¼		15-Feb-03	**24+25**
25	Task Forces, Service Providers and Users Execute the RIP and CAP	29	61¼			**24**
26	7- to 10- digit Dialing Transition Period	2	63¼		15-Sep-05	
27	Mandatory 10 digit Dialing & Code Protection Removed	¼	63½		15-Nov-05	
28	RPC Develops and CNA Submits Completion Reports to CISC one month after Relief	2	65½		15-Jan-06	

Notes:

In the event that a new COCUS or actual demand indicates that the exhaust date will change significantly, the CNA may convene a meeting of the NPA Relief Planning Working Group to review the issue and make a recommendation to the CISC and CRTC.

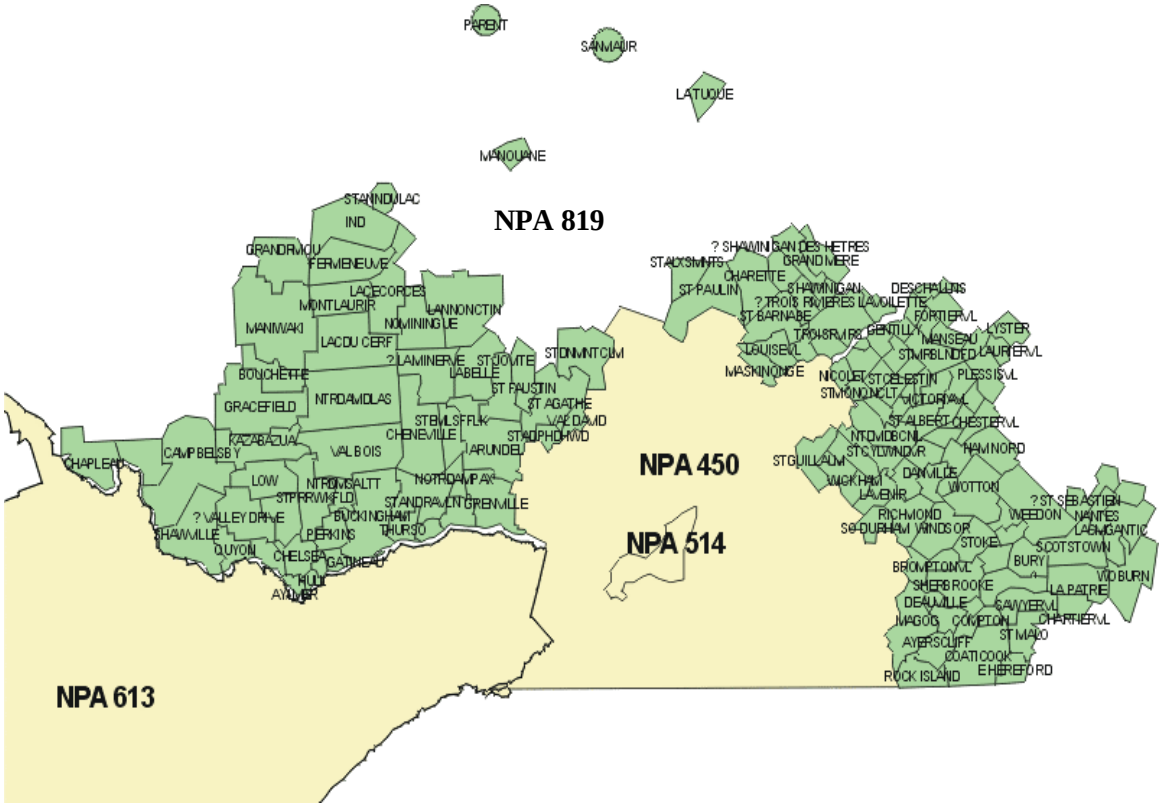


Figure 11 NPA 819 Boundaries

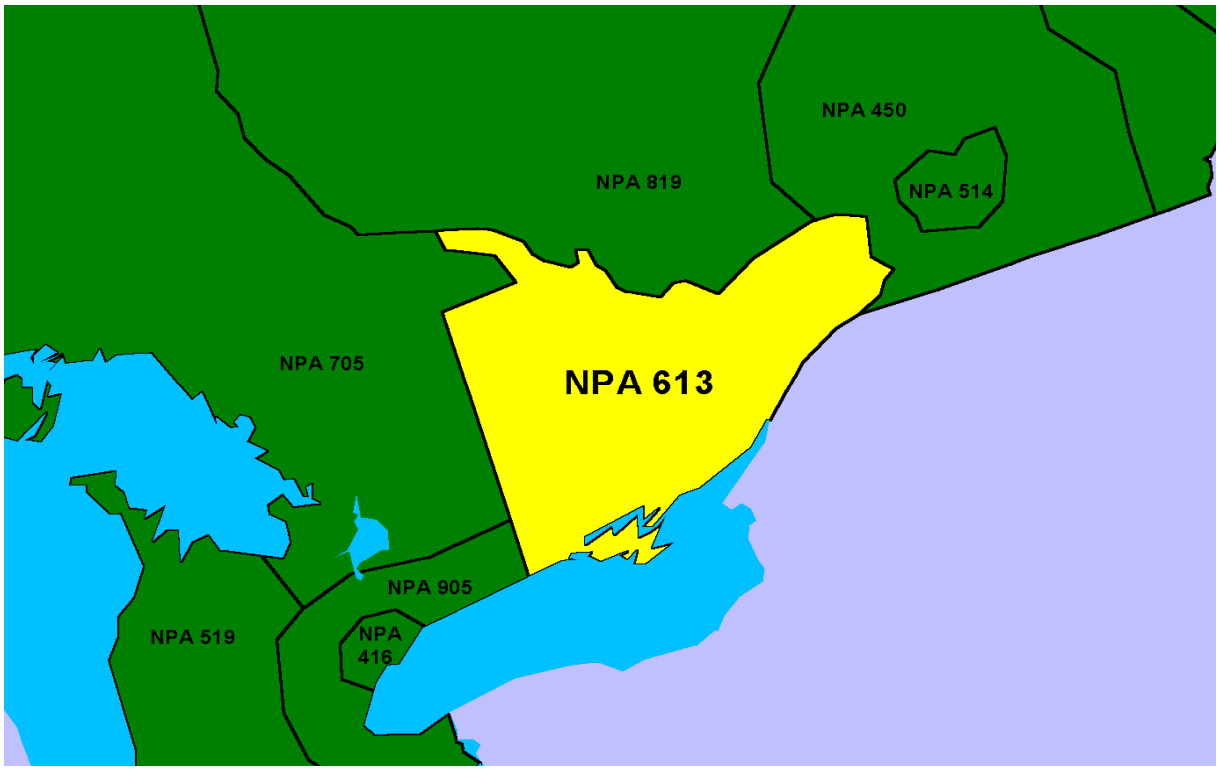


Figure 12 NPA 613 Boundaries

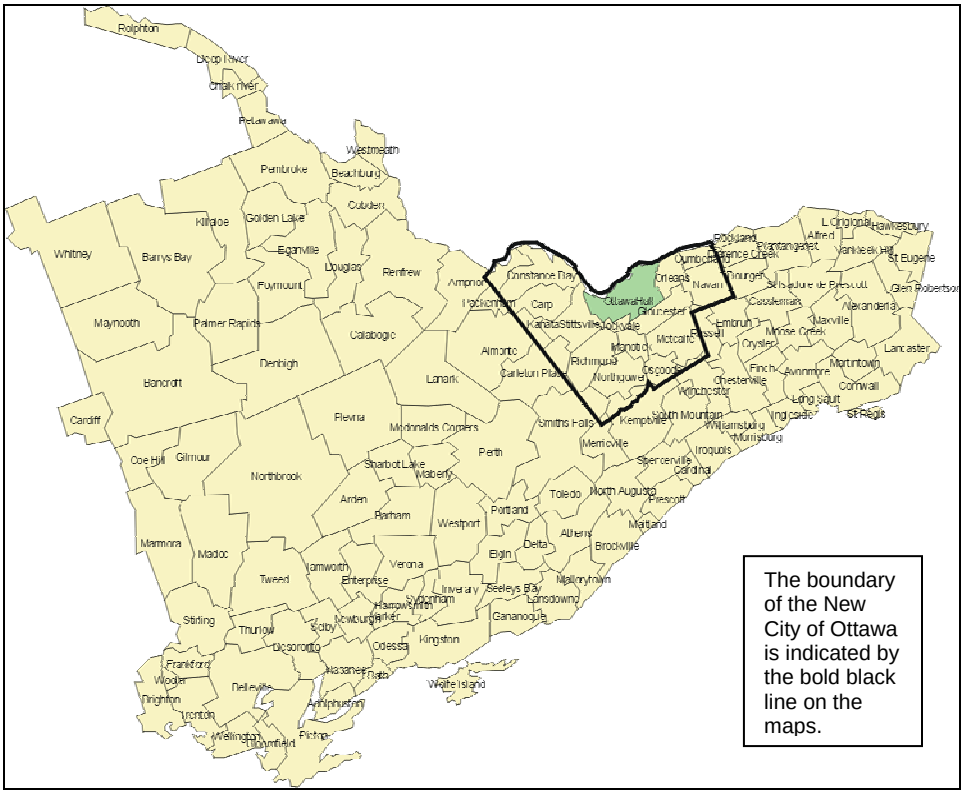


Figure 13 NPA 613 Ottawa Exchange Split (A-i)

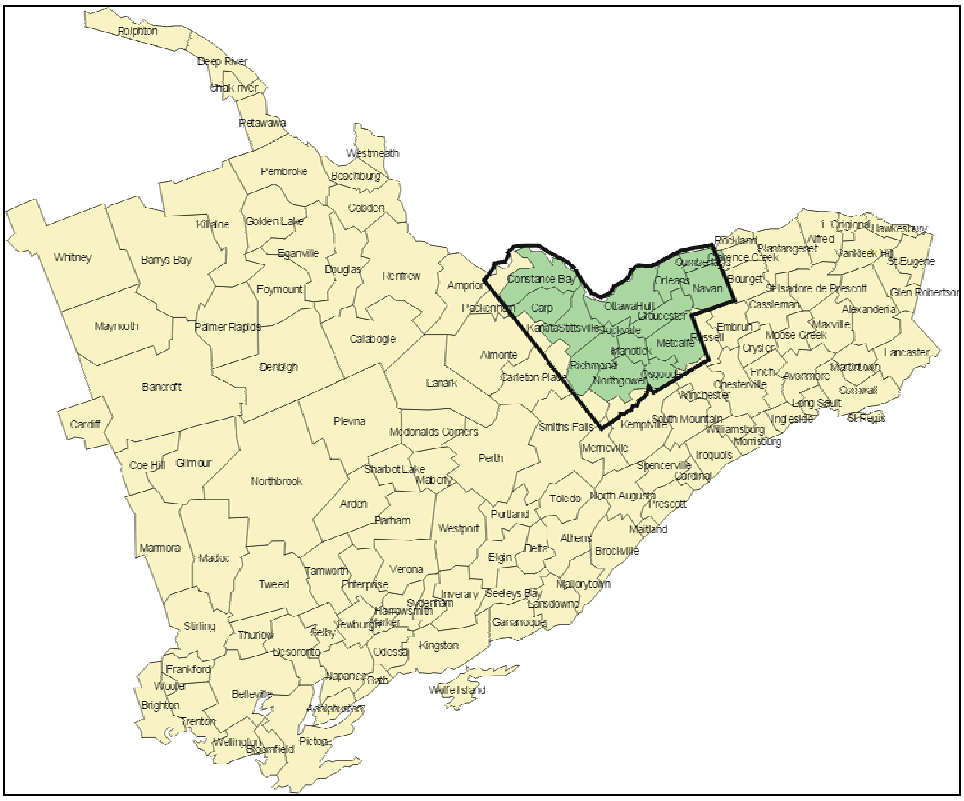


Figure 14 NPA 613 New City of Ottawa Exchange Split (A-ii)

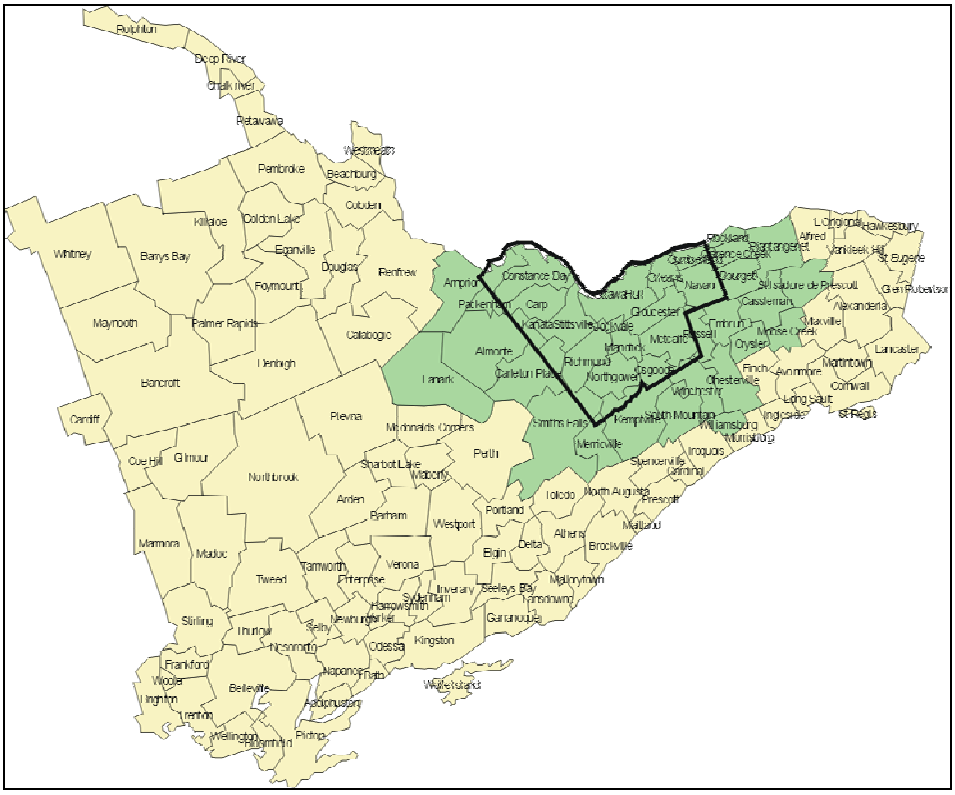


Figure 15 NPA 613 Ottawa EAS Exchange Split (A-iii)

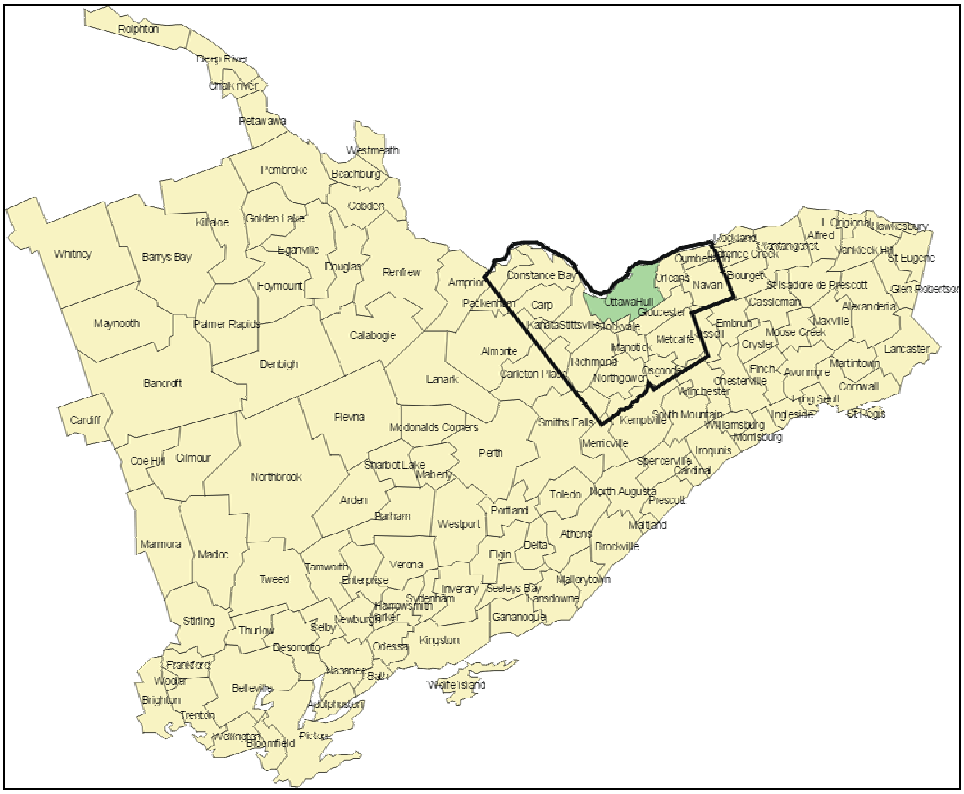


Figure 16 NPA 613 Ottawa Exchange Concentrated Overlay (B-i)

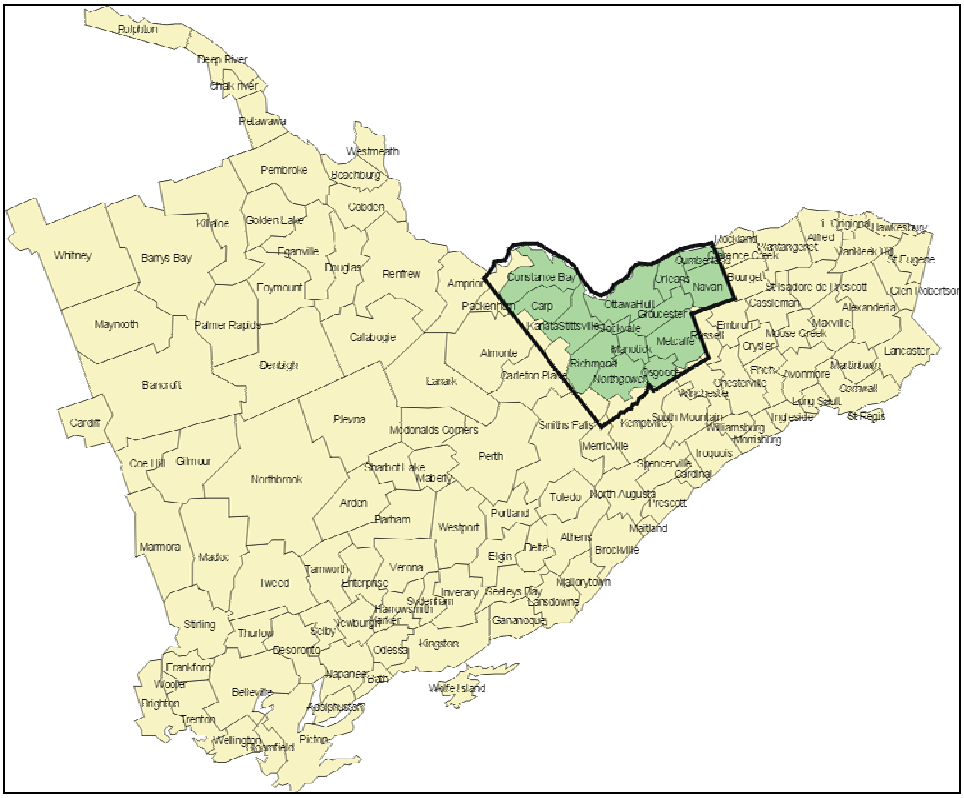


Figure 17 NPA 613 New City of Ottawa Exchange Concentrated Overlay (B-ii)

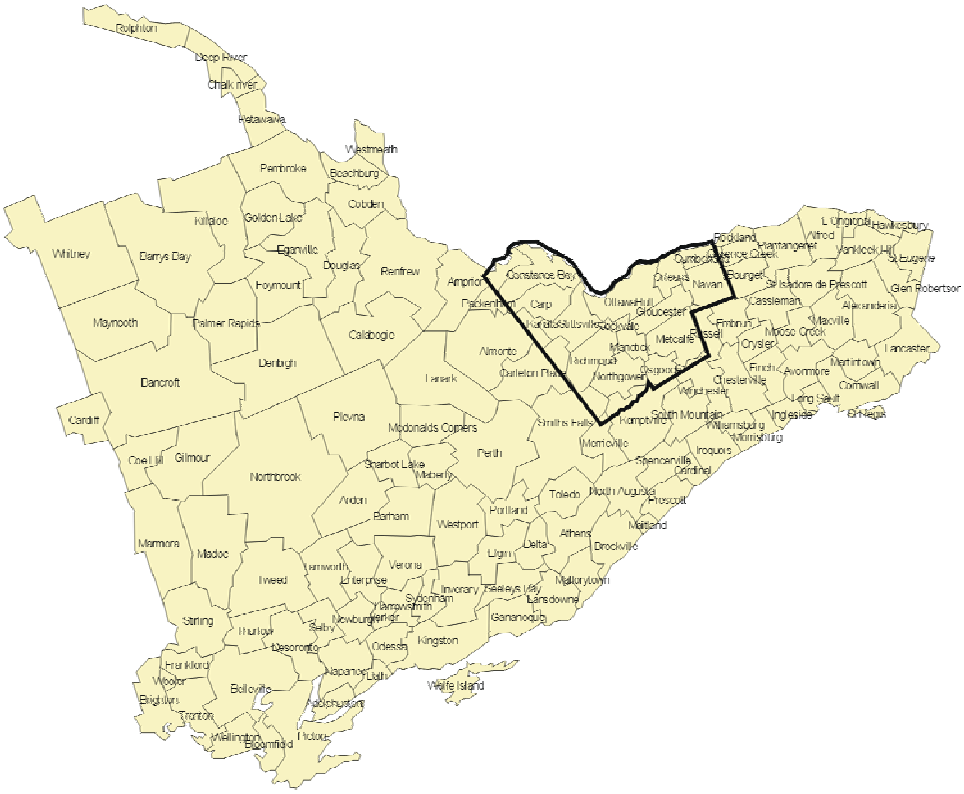


Figure 18 NPA 613 Distributed Overlay (C)

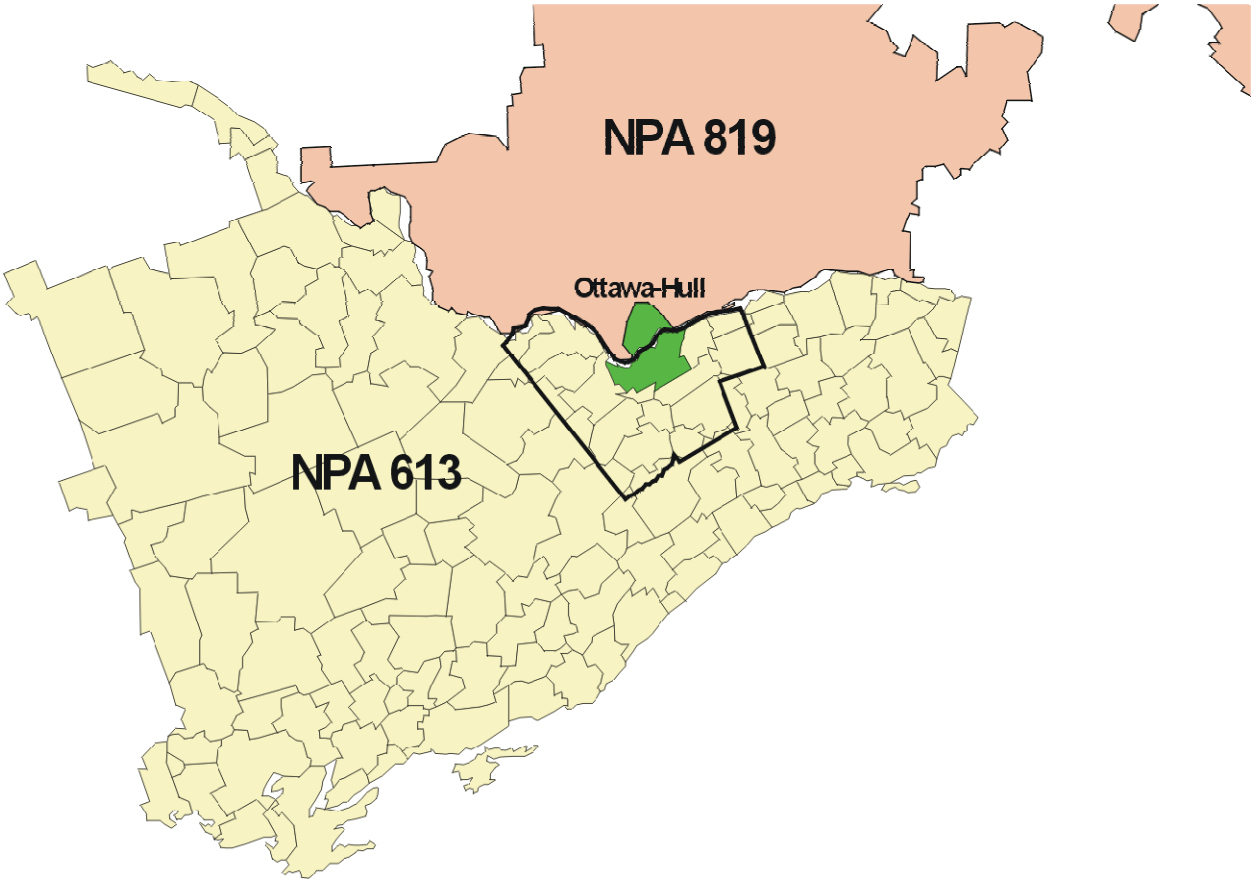
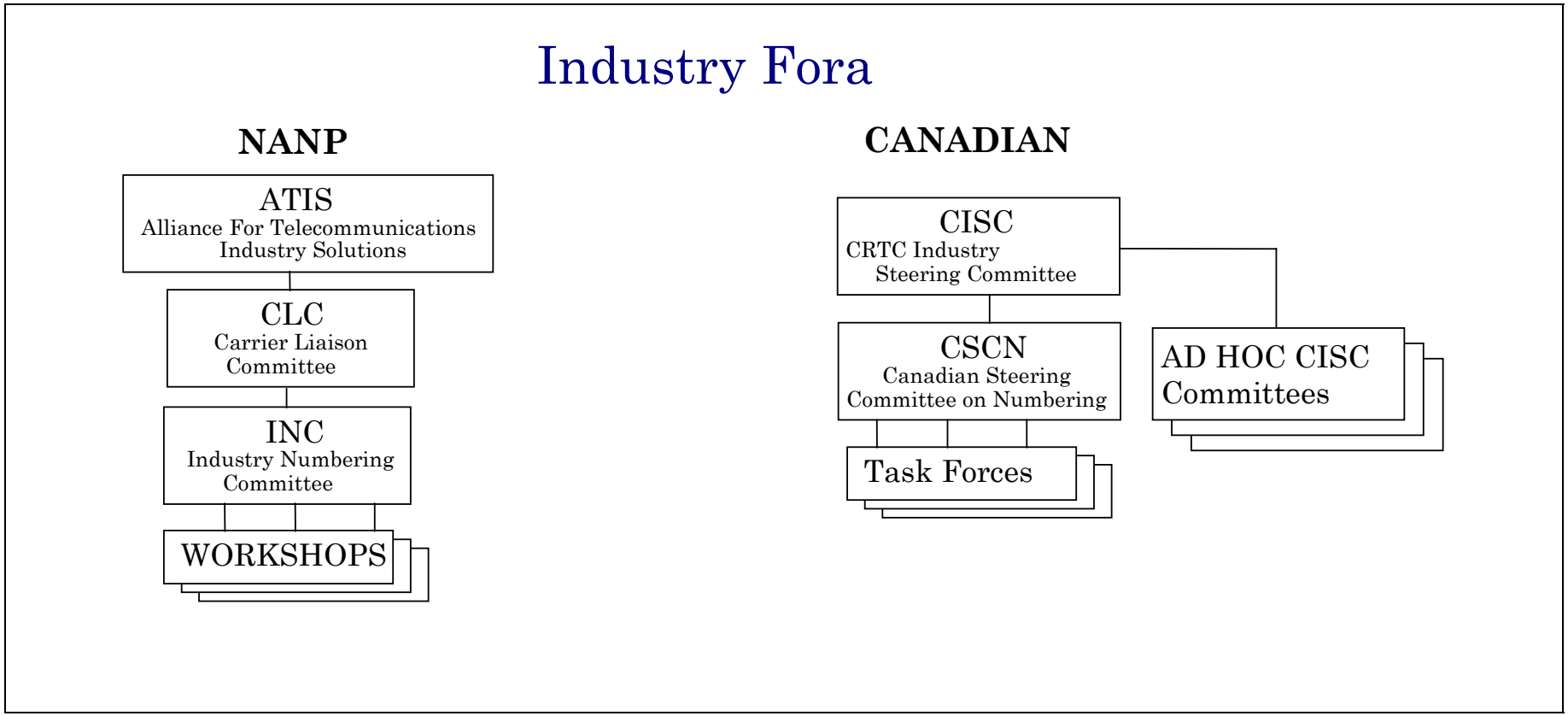
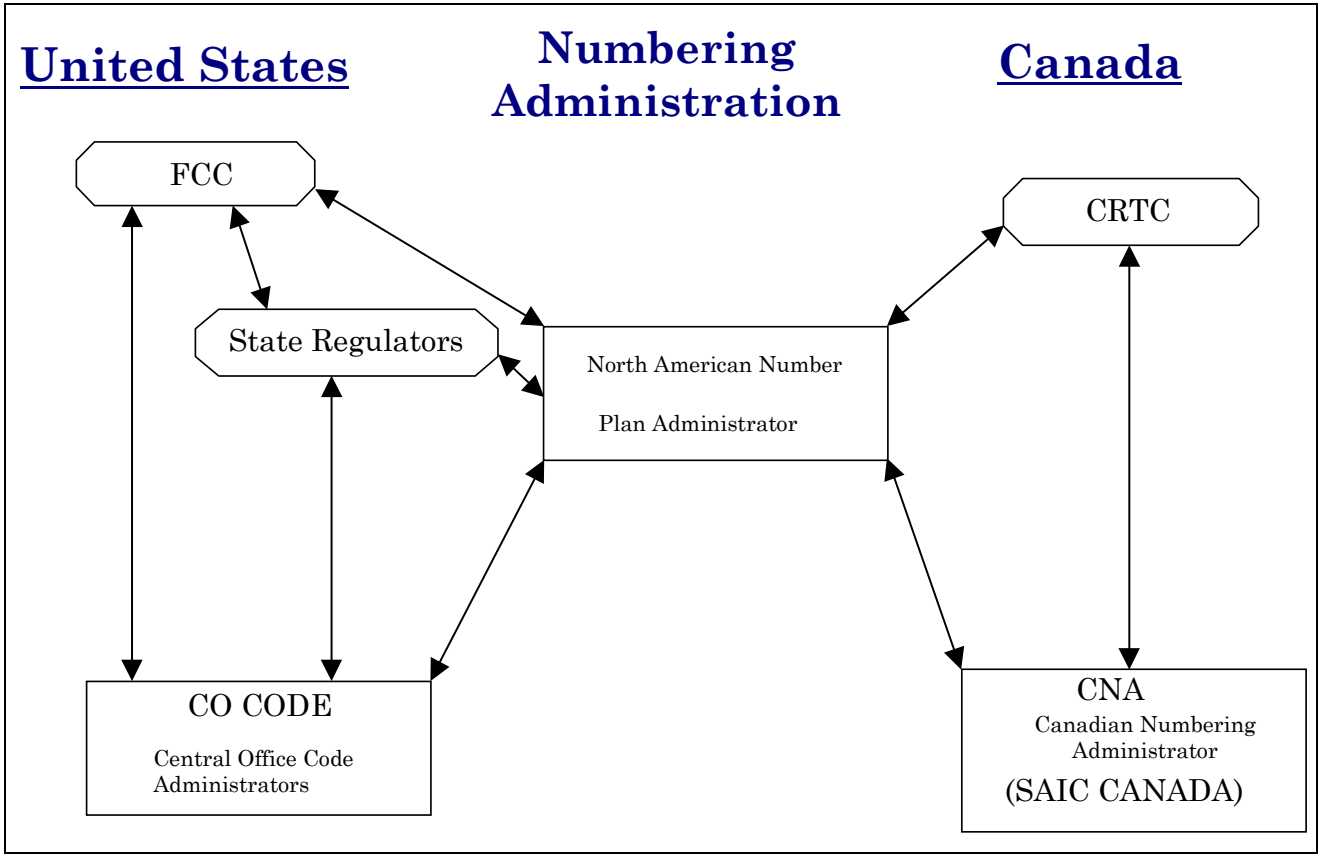


Figure 19 NPA 613/819 Ottawa-Hull Exchange Concentrated Overlay (D)

Appendix 1 Canadian Geographic NPAs



Appendix 2 Industry Fora



Appendix 3 Numbering Administration

The *NPA Code Relief Planning & Notification Guidelines* may be obtained from the CNA website at http://www.cnac.ca/numres/npa_relief/97040416.doc. **Double-click on the object below to open and view this document.**

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NPA CODE RELIEF PLANNING & NOTIFICATION GUIDELINES

These guidelines are reissued in connection with the resolution of INC Issue 105

Appendix 4 NPA Code Relief Planning & Notification Guidelines

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