Recommendation of the North American Numbering Council

Concerning the Replacement of the Central Office Code Utilization Survey (COCUS)

Presented to the Federal Communications Commission

June 30, 1999

NANC Recommendation to the Federal Communications Commission Concerning the Replacement of the Central Office Code Utilization Survey (COCUS) Based Upon the Recommendation of the Numbering Resource Optimization Working Group (NRO WG)

On April 15, 1999, Yog Varma, Deputy Chief of the Common Carrier Bureau of the Federal Communications Commission, requested that the NANC provide the Commission, by June 30, 1999, with a final report and recommendation on a plan to replace the current COCUS reporting tool. The NANC subsequently requested that the NRO WG study the issue and provide a recommendation to the NANC.

On June 22, 1999, the NANC adopted the recommendation of the NRO WG with two amendments. Specifically, the NANC endorsed the use of the "Hybrid Model" developed by the NRO WG with an amendment to a requirement concerning the "granularity" of reporting utilization in some circumstances. In addition, the NANC adopted language to modify the discussion in the NRO WG Final Report concerning the timeframes for implementing the COCUS replacement. These two amendments are described below. A copy of the NRO WG Final Report, with the NANC amendments appearing in an italic font, is attached.

NANC Amendments to NRO WG Final Report:

1. "Granularity" of Reporting Utilization

Referring to Table 5, page 34 of the Final Report, NANC recommends that, in non-pooling areas that are within the "exhaust window," utilization reporting should be at the NPA-NXX level, instead of at the NPA level, as originally recommended by the NRO WG.[1] Conforming edits appear elsewhere in the NRO WG Final Report.

2. Implementation Timeframe

Referring to the discussion of the implementation timeframe in Section XI--Implementation, page 35 of the Final Report, NANC amends the NRO WG Final Report with the following statement that identifies a more definitive implementation interval:

"The time frame in which the recommended Hybrid alternative could be widely used is significantly affected by the extent the tasks listed in Section XI are worked in parallel as well as whether it is determined that a competitive bid process is appropriate for the development of any new software necessary to process data submitted. At the current

[1]On a related issue, the NANC discussed the NRO WG recommendation that utilization be reported on an aggregate basis of "telephone numbers unavailable." See Table 5, page 34. Although a majority of the membership favored a recommendation that utilization be reported in more disaggregated categories, the NANC did not reach consensus on this issue. There was the general recognition, however, that it may be appropriate in the future to require such further disaggregation.

level of understanding of the requirements, the time frame is estimated to be between 18 and 36 months."

NANC also states its intention to develop and convey to the Commission by August 30, 1999 a more detailed estimate of the timeframe for implementing the COCUS replacement.

Numbering Resource Optimization Working Group

Final (with NANC amendments)

Report on Central Office Code Utilization Survey

Analysis and Recommendation

June 30, 1999

Table of Contents

Executive Summary

The North American Numbering Council (NANC) directed the Numbering Resource Optimization Working Group (NRO WG) to review the current Central Office Code Utilization Survey (COCUS) and to suggest improvements and a possible alternative approach to gathering the information needed to more accurately determine the life span of numbering resources. In responding to this directive, the NRO WG developed a work plan which included ten specific tasks which it committed to completing by the end of 2Q99. Working from a set of assumptions adopted by the North American Numbering Council or within the Working Group itself, the NRO WG began by identifying a list of known deficiencies and concerns with the current COCUS. Each of the deficiencies and concerns identified were categorized into either an administrative issue common to any forecasting tool or a problem with the current COCUS itself. The NRO then defined the desired attributes or requirements that could eliminate each of those deficiencies and concerns.

Three alternative proposals were submitted as candidates for replacing the current COCUS tool. One proposal, the Minimalist Model, begins with the current COCUS, including utilization at the NPA level. The model also assumes more sophisticated modeling and forecasting techniques that use information that either can be derived from the carrier's submissions, such as TN growth rates, or is available to the NANPA as the Central Office (CO) Code administrator, such as the number of new entrants and the average number of CO codes requested by new carriers. The Minimalist Model solves such problems as the lack of forecasts from new entrants and inaccuracies of carriers' forecasts due to competitive uncertainties. The Minimalist model also can translate NPA level forecast and utilization to a consolidated rate center block demand in a pooling environment.

A second proposal, the U S WEST Model, involves a two-stage process. The first stage, referred to as the "Top-down Analysis", relies entirely on historical data and mathematical modeling to develop initial exhaust forecasts for each area code. The second stage involves "Bottom-up Analysis" and relies on user input similar to the existing COCUS system. For those NPAs which are forecasted to exhaust in less than five (or six) years based on Top-down Analysis, service providers would be required to input forecast data twice a year instead of once to allow closer monitoring of exhaust. NPAs that are not forecasted to exhaust within, for example, five, six or even seven years, would not require any service provider inputs for "Bottom-up" analysis.

The third proposal is the LINUS model, which proposes the collection of utilization and forecast data in the Top 100 MSAs on a quarterly basis. In MSAs beyond the Top 100, utilization and forecast data would be provided semi-annually. In near-jeopardy NPAs, utilization and forecast data would be provided

on at least a quarterly basis. In rural areas, utilization and forecast data would be provided annually. LINUS specifies the collection of this data at the thousand block level, by NXX, by rate center, and by NPA in both a pooling and non-pooling environment. All telephone numbers in each thousand block would be accounted for in one of six categories. These categories are explicitly defined to standardize their interpretation for consistency and uniformity. To collect LINUS survey data, the model proposes to standardize survey submission in electronic form to minimize costs.

A fourth proposal was subsequently developed which incorporates elements from the other three. This Hybrid Model proposes that, where pooling has not been implemented, or is not being planned, *and the NPA is not within the "exhaust window,"* service provider NPA level utilization and forecasting data would be required on at least an annual basis for all NPAs. For those NPAs expected to exhaust within five years, semi-annual data reporting would be required at standard intervals. *In an NPA expected to exhaust within five years where pooling has not been implemented, or is not being planned, utilization will be reported at the NPA-NXX level.* In an area where pooling has been or is planned to be implemented, utilization and forecasting data would be reported at the NPA-NXX-X level. Reporting would be semi-annual at standard intervals in a pooling environment. In all cases, this data would be combined with historical data and mathematical modeling to develop the forecasts for all NPAs. Utilization data would be reported as TNs "unavailable".

The four alternatives were analyzed to determine their level of compliance with the desired attributes previously identified. For the sixteen attributes associated with the tool itself, all of the proposals seem to at least partially meet most of those attributes, and both the LINUS and Hybrid models seem to be in full compliance with thirteen.

Individual service providers and the NANPA were invited to submit estimates on the relative costs they expect to incur to support each of the proposed alternatives. The NANPA was also invited to provide an assessment of the utility of each of the alternatives to assist them in the discharge of their responsibilities of providing accurate and timely forecasts. The NANPA ranked the Minimalist and U S WEST models as being the least costly, and the LINUS and the Hybrid models as having higher and similar costs. Responding service providers also ranked the Minimalist and U S WEST models as being less costly to them than the other two, but viewed the costs of LINUS as being higher than the Hybrid model. The NANPA indicated that the Minimalist and U S WEST models were of small utility gain over the current COCUS, that LINUS offered a significant gain in utility, and that the gain offered by the Hybrid model was moderate.

Based on the NRO WG analysis, the Hybrid approach appears to provide the optimum balance of keeping the data collection and reporting burden on service providers at a manageable level, while providing the NANPA with the additional

resources needed to provide more accurate exhaust projections. As such, it is the recommended alternative.

Consideration must also be given to the tasks and timeline necessary to implement a COCUS replacement. Some of the key tasks include approval by the FCC, incorporation into existing numbering guidelines, design and development of the software and interfaces needed to support the new tool, development of service provider tracking and reporting mechanisms, and testing.

The time frame in which the recommended Hybrid alternative could be widely used is significantly affected by the extent the tasks listed in Section XI are worked in parallel as well as whether it is determined that a competitive bid process is appropriate for the development of any new software necessary to process data submitted. At the current level of understanding of the requirements, the time frame is estimated to be between 18 and 36 months. It should be also acknowledged that this interval may coincide with the expiration of the current NANPA contract.

I Background

The Central Office Code Utilization Survey (COCUS) is an annual request for information by the North American Numbering Plan Administrator (NANPA). The NANPA asks telecommunications services providers using numbering resources to provide a forecast of demand for central office codes. From those forecasts, the NANPA projects the life span of the North American Numbering Plan (NANP) as well as individual numbering plan area codes (NPAs). This year, the NANPA, at the request of the Federal Communication Commission (FCC), requested information on numbering resource utilization from service providers. Both the COCUS and the utilization information were given to the NANPA by service providers on a voluntary basis. Not all service providers submitted a COCUS response, and of those that did, not all listed utilization information.[2] This lack of complete information has been widely assumed to contribute to the problem of inaccurate predictions of exhaust of NPAs.

The North American Numbering Council (NANC) directed the Numbering Resource Optimization Working Group (NRO WG) to review the current COCUS and to suggest improvements and a possible alternative approach to gathering the information needed to more accurately determine the life span of numbering resources. The NRO WG has been working since November 1998 to develop a plan and report to submit to the NANC by second quarter of 1999. (The details of the work plan approved by the NANC are included in Section III of this report.) The NANC specifically asked the NRO WG for a recommendation on a successor to COCUS, including how often data should be collected. The NANC further asked the NRO WG to identify specific policy elements that should be incorporated into NANPA guidelines. Examples of these policy elements are the level of granularity of COCUS data and the frequency of the reporting are presented in the report. In responding to the NANC directive, the NRO WG concentrated on the granularity of data and frequency of reporting as well as the conditions under which they apply. The NRO WG also discussed how the tool itself would process those inputs and the potential output reports generated by the tool. The NRO WG identified that the COCUS replacement must address forecast and utilization and must be mandatory for all code holders. In addition to the NANC directives, the NRO identified deficiencies and developed recommendations to improve the COCUS.

NANC Chairman Alan B. Hasselwander received a letter in April 1999 from Common Carrier Bureau Deputy Chief Yog Varma asking for a final report and recommendation on a plan to replace the current COCUS reporting tool and process to be submitted to the FCC by June 30, 1999.[3]

[2] See NANC meeting minutes, May 26, 1999.

[3] Reference Yog Varma, Deputy Chief, Common Carrier Bureau, Federal Communications Commission, letter dated April 15, 1999, found at web site www.frontiernet.net/~ahasselw/.

II Assumptions

The NRO WG prepared this report under the following assumptions which were either decided by the NANC and forwarded to the NRO WG or were reached as agreements within the NRO WG.

A. A COCUS replacement must address utilization and forecasting in one tool.

B. The core purpose of the forecasting/utilization tool is to forecast the exhaust of specific NPAs and the NANP, and, as a byproduct, the tool can assist in assessing the current utilization within existing NANP resources for potential application of number resource optimization measures and in performing audits.

C. The code holder/block holder is responsible to provide timely and accurate forecast and utilization data to the NANPA. The code holder is responsible for providing the same information for its resellers and Type 1 interconnecting carriers, subject to existing business arrangements between the entities.

D. The following conditions apply to the COCUS data that is collected by NANPA, including all forecast and utilization data.

1. State regulators may have access to aggregate data for a stated purpose.[4] State regulators can get carrier-specific data only in states where a legally enforceable confidentiality agreement is in place. Proposed sanction for violation: the state loses its prerogative to obtain future data. Carriers will be notified by the NANPA prior to provision of carrier-specific data to the states.

2. Audits should be conducted and should be controlled by industry guidelines. An audit can be conducted on code holders and/or resellers. (NANPA Oversight WG is working to develop an audit framework that contains frequency and conditions.)

E. The FCC will adopt rules that require NANP resource holders to provide timely and accurate information to the NANPA. Failure to do so would be a violation of an FCC rule, and the FCC would hold enforcement and jurisdiction for the violation. If the NANPA initiates enforcement action, carriers can appeal to the FCC, the agency that has jurisdiction over NANP resources in the United States. The FCC can delegate this authority to the states or some other entity. The sanction for

[4] See NANC Meeting minutes November 1998.

noncompliance is withholding by the NANPA of numbering resources until the service provider submits the required information.[5]

F. Where pooling has been implemented anywhere within an NPA, thousand block pooling participants will report forecast and utilization information at the NPA-NXX-X level.

G. In areas where thousand block pooling has been or is planned to be implemented, service providers that meet any one of the following criteria are not required to report CO Code utilization and forecast data at the thousands block level to the PA:

- Exempt from LNP and/or;
- Operating in a non-pooling area and/or;
- Operating in a thousand block pooling area but utilizes a switch technically incapable of pooling.

However, these service providers are expected to provide reports at the thousands block level to the CO Code Administrator in a reasonable amount of time (i.e., 6-9 months) prior to when they are required to implement LRN LNP[6].

H. The recommendation contained within this report, if adopted by the NANC and the FCC, will be formalized in detailed industry guidelines and requirements. (See timeline in Section XI.)

III COCUS Work Plan Activities

In the December 1998 work plan submitted to the NANC, the NRO WG committed to complete the following work items by the end of the second quarter of 1999.

1) Identify the core purpose of the reporting/forecasting utilization tool.

2) Identify any and all problems and shortcomings associated with current COCUS procedures.

3) Identify and list desired attributes and requirements of the reporting /forecasting utilization tool and related benefits.

4) Identify any and all proposals for a reporting/forecasting utilization tool (e.g., LINUS, State Issues Task Force (SITF) survey, etc.).

[5] See NANC Meeting minutes November 1998.
[6] See NANC Meeting minutes May 1999.

5) List characteristics of each proposal and compare with list of desired attributes.

6) Submit proposal(s) to NANPA and request information on associated NANPA costs.

7) Solicit input from service provider members of the NRO/NANC on associated service provider costs.

8) Review responses to items 6 and 7 and identify outstanding issues/concerns with proposal(s).

9) Develop an NRO recommendation for the NANC (including a future performance review of the new tool).

10) Incorporate policy elements previously decided at NANC into final report and submit to NANC.

IV Deficiencies with the Current COCUS and Desired Attributes of a Replacement

In order to satisfy the second and third items of the work plan, the NRO WG developed a list of known deficiencies and concerns with the current COCUS. Each of the deficiencies and concerns identified were categorized as either an administrative issue or a problem with the current COCUS tool.[7] The NRO then defined desired attributes or requirements that could eliminate each deficiency. The following table lists the attributes and requirements. The following items are not listed in order of importance. Priorities are assigned to the attributes in Section VI of this report.

Table 1.

Deficiency/Concern	Category	Desired Attributes/Requirements
1. Market entry timeframes for new entrants inconsistent w/ COCUS forecast period.	Tool & Administrative	Provisions to update forecast information periodically throughout the reporting period. Increase reliance on measurable data, e.g. utilization data.
2. New entrants are unaware of the rate areas.	Administrative	1. Need to have centralized resource of rate area information at the most granular local level. 2. New entrants need to be directed to that resource.
3. Carriers are reluctant to provide marketing data to a potential competitor.	Administrative	NANPA required to be a neutral 3rd party and must maintain confidentiality of the data.
4.No mechanism for Service Provider accountability for their forecast.	Administrative	Method for service provider explanation for forecast deviations; guidelines required.

[7] "Administrative issues" are those issues that are independent of any tool . The "problem with the current COCUS tool" refers to specific tool functionality.

Deficiency/Concern	**Category**	**Desired Attributes/Requirements**
5. Uncertainty due to changing market conditions and competitive environment.	Tool	See attribute for #1.
6. Forecast is performed only annually.	Tool & Administrative	See attribute for #1 and/or increased frequency of forecasts that may improve accuracy.
7. Not all carriers needing resources are required to provide data.	Administrative	Current code holders must provide data. Future code holders should be encouraged to provide data.
8. No method to determine or estimate the number or timeframe of new market entrants.	Administrative	Need to have a method of estimating the number of new entrants and their associated requirements for codes for each NPA area.
9. Assumptions made by Code Administrator are often based upon experience/empirical knowledge rather than statistical data and analysis.	Tool & Administrative	Models/Tools must have capability for the administrator to incorporate specific assumptions / parameters for each NPA to allow for anomalies when calculating the total NPA forecast. Examples: growth factors, special EAS calling arrangements, extended local calling plans, metro vs. rural areas, state regulatory requirements, etc.
10. Does not account for pent up demand during an NPA jeopardy condition.	Tool	Model must have some provision for gauging pent up demand during NPA jeopardy and what type of demand there will be when numbers become available.
11. COCUS is voluntary – some carriers refuse to participate.	Administrative	NANC addressed this issue in its November 1998 meeting (see meeting record, item G in the minutes). The NANC agreed that it should recommend that the FCC adopt rules, requiring carriers to provide information to the NANPA. Reference to the specific carriers required to participate is made in the same section of the NANC meeting record.
12. No method of identifying all current code holders– the code holders listed in the LERG are not necessarily accurate or complete.	Administrative	There needs to be reporting requirements for code holders to update NANPA of any code holder changes after a codes original assignment. Note: For forecasting and utilization purposes, the decision reached by NANC in November 1998, limits the reporting obligation to the code holder, i.e. LERG assignee. NANC should acknowledge that the code holder obligation is for the codes they have full administrative control over. NRO-WG recommends other users of telephone numbers in NXXs assigned to a code holder (e.g. resellers, type 1 service providers) should assume responsibility for reporting.
13. Code Administrator did not always solicit COCUS data from other carriers.	Administrative	The code administrator will solicit data from all code holders.
14. Does not look at utilization.	Tool	The new tool should have some utilization component.
15. No mechanism to perform reasonableness check of forecasts.	Tool	Historical aggregated utilization data should be used to do a reasonableness check of the forecast.
16. No consistency in definitions.	Administrative	When finalized, adopt the INC and NANC definitions.
17. Cannot accommodate unforecasted demand that surfaces between reporting intervals.	Tool	Provisions to update forecast information periodically throughout the reporting period. Increase reliance on measurable data, e.g. utilization data (This is the same attribute as per number 1.)
18. New carriers are unaware of the reporting process.	Administrative	A requirement needs to be developed that NANPA will inform new entrants that the new entrant must provide a forecast before receiving a code.
19. Not designed to work in a pooling environment.	Tool	The algorithm(s) should accommodate pooling where applicable. The granularity of the data reported may need to be changed to meet needs of a pooling environment.
20. Does not distinguish between new and growth codes.	Tool	Reporting requirements and the function of the COCUS replacement needs to distinguish between new and growth codes. See also #8.
21. Current COCUS linear trending model is insufficient to ensure accuracy.	Tool	A new analytical tool needs to be developed that encompasses those identified variables that impact code exhaust.

Deficiency/Concern	Category	Desired Attributes/Requirements
22. The COCUS process does not provide a reasonable prediction of code exhaust.	Tool & Administrative	The new process should incorporate attributes from other solution sets identified, algorithm(s) and specific data capable of providing a reasonable prediction of code exhaust.
23. COCUS replacement may be costly for both Service Providers and NANPA to administer.	Tool & Administrative	COCUS replacement must be affordable to all participants.
Other Desirable Attributes The NRO WG identified other desirable attributes for a COCUS replacement.		1. A "What if" analysis capability for modeling such things such as rate center consolidation, pooling, etc. 2. Interactive capability to provide data inputs. 3. Ability to accommodate mergers and acquisitions. 4. Ability to accommodate the FCC requirement for "set aside codes" for new entrants in an overlay situation when calculating NPA exhaust.

V Alternatives Considered

A summary of each of the proposed models as provided by the authors is as follows. The NRO WG takes no responsibility for these descriptions other than for the Hybrid Model.

A. AT&T Minimalist Model

The purpose of the minimalist model is to decompose the reasons for the inability of the Current COCUS to properly meet the needs of the industry. Potential causes of this inability that have been identified include: lack of compliance by carriers, lack of reporting of utilization, simplistic modeling and forecasting techniques used by NANPA, and insufficient granularity in the data being reported. The minimalist model assesses the ability to meet the need of the industry if all of these above causes, with the exception of granularity of data, are addressed. The minimalist model begins with the current COCUS, including utilization at the NPA level. The minimalist model then makes assumptions that all carriers are compliant with the COCUS request. The model also assumes more sophisticated modeling and forecasting techniques that use information that can be derived from the carriers submissions, such as TN growth rates, or is available to the NANPA as the CO Code administrator, such as number of new entrants and average number of CO codes requested by new carriers. The minimalist model solves such problems as the lack of forecast from new entrant, inaccuracies of carriers forecast due to competitive uncertainties, and can translate NPA level forecast and utilization to a consolidated rate center block demand in a pooling environment.

B. LINUS

The Line Number Utilization Survey ("LINUS") proposes the collection of utilization and forecast data in Top 100 MSAs on a quarterly basis. In MSAs beyond the Top 100, utilization and forecast data would be provided semi-annually. In near-jeopardy NPAs, utilization and forecast data would be provided on at least a quarterly basis. And, in rural areas utilization and forecast data would be provided annually.

LINUS specifies the collection of this data at the thousand block level, by NXX, by rate center, and by NPA in both a pooling and non-pooling environment. All 1000 telephone numbers in each thousand block be accounted for in one of the following categories: Assigned, Test, Reserved, Vacant, Aging, Ported-out and Administrative. These categories are explicitly defined to standardize their interpretation for consistency and uniformity. LINUS also mandates the need to have utilization and forecast data to account for resource that is allocated to resellers, either directly or indirectly, and forecast data to be categorized into separate groups by the anticipated reason for its consumption – growth codes and initial codes for new switches and expansion rate centers.

LINUS was developed on the concept that participation should be mandatory and not voluntary, and that some form of enforcement must be developed (e.g., denial of CO codes if no LINUS survey is on file). In addition, to enforce the accuracy of utilization data, some form of audit would need to be incorporated.

To collect LINUS survey data, NANPA proposes to standardize survey submission in electronic form to minimize costs. Due to amount of data, paper submission is very costly and impractical, but can be supported where justified on a case-by-case basis. Possible standardized file format(s) of survey data could be: MS Access, Excel, or flat ASCII. File submission would be electronic (preferably email, or ftp), or manual by exception (floppy disk).

C. U S WEST

The proposed U S WEST recommendation involves a two-stage process. The first stage, referred to as the "Top-down Analysis", relies entirely on historical data and mathematical modeling to develop initial exhaust forecasts for each area code. When any NPA is forecasted to exhaust within a selected period, for example five, six or even seven years, the second stage of this system would be applied. The second stage involves "Bottom-up Analysis", relies on user input similar to the existing COCUS

system. The industry may decide that for those NPAs which are forecasted to exhaust in less than five (or six) years based on Top-down Analysis, service providers would be required to input forecast data twice a year instead of once to allow closer monitoring of exhaust. NPAs which are not forecasted to exhaust within, for example five, six or even seven years, would not require any service provider inputs for "Bottom-up" analysis.

Input data for the Bottom-up Analysis could be in the form of future NXX needs, thousands blocks, or even individual TNs if desired.

D. Hybrid

The Hybrid approach contains elements of the AT&T Minimalist, the U S WEST and the LINUS alternatives. *Where pooling has not been implemented, or is not being planned, service provider NPA level utilization and forecasting data would be required on at least an annual basis if the NPA is not projected to exhaust within five years; if the NPA is expected to exhaust within five years, reporting would be at the NPA-NXX level of granularity.* For NPAs that are projected to exhaust within the next five years, semi-annual data reporting would be required at standard intervals.[8] In an area where pooling has been or is planned to be implemented, utilization and forecasting data would be reported at the NPA-NXX-X level reporting would be semi-annual at standard intervals in a pooling environment, by carriers not exempt per assumption G, section II. In all cases, this data would be combined with historical data and mathematical modeling to develop the forecasts for all NPAs. The administrator will have the ability to incorporate specific assumptions/parameters on an NPA specific basis. All utilization data would be reported as TNs (Telephone Number) "unavailable" with service providers retaining data by TN status category for audit purposes or if requested by the NANPA[9].

The table on the following two pages summarizes the four models.

[8] "If the NANPA notices a significant increase in code consumption between reporting periods, over and above what was projected, (e.g. 25%), the NANPA at their discretion may request semi-annual reporting for that NPA" from the May 26-27, 1999 NRO meeting minutes, agreement reached.

[9] The INC (Industry Numbering Committee) has defined the TN categories as 1) administrative number, 2) aging number, 3) assigned number, 4) reserved number, 5) wireless E 9-1-1 ESRD (Emergency Services Routing Digits) number.

Table 2

		AT&T Minimalist	US West Top Down/Bottom Up	LINUS	Hybrid
Utilization	**Frequency**	➢ Yearly	➢ Within exhaust window ➢ Semi-annually ➢ Outside exhaust window ➢ No collection	➢ Top 100 MSAs ➢ Quarterly ➢ > Beyond Top 100 MSAs ➢ Semi-annually ➢ Rural areas ➢ Annual	➢ Pooling Area ➢ Semi-annual ➢ Non-pooling within exhaust window ➢ Semi-annual ➢ Non-pooling outside exhaust window ➢ Annual
	Granularity	➢ NPA	➢ Within exhaust window ➢ NPA ➢ Outside exhaust window ➢ No collection	➢ Pooling area ➢ NPA-NXX-X ➢ Non-pooling area ➢ NPA-NXX	➢ Pooling area ➢ NPA-NXX-X[10] ➢ Non-pooling within exhaust window ➢ *NPA-NXX* ➢ Non-pooling outside exhaust window ➢ NPA[11]
	Reporting Category	➢ Working telephone numbers	➢ Aggregate utilization assumed	➢ 7 different utilization categories	➢ Aggregate utilization collected: TNs Unavailable
Forecast	**Frequency**	➢ For established carriers ➢ Yearly ➢ For new entrants ➢ Real-time update	➢ Within exhaust window ➢ Semi-annually ➢ Outside exhaust window ➢ No collection	➢ Top 100 MSAs ➢ Quarterly ➢ > Beyond Top 100 MSAs ➢ Semi-annually	➢ Pooling Area ➢ Semi-annual ➢ Non-pooling within exhaust window ➢ Semi-annual ➢ Non-pooling outside exhaust window ➢ Annual
	Granularity	➢ CO Code/NPA	➢ Within exhaust window ➢ CO Code/NPA ➢ Outside exhaust window ➢ No collection	➢ Pooling area ➢ Block/rate center ➢ Non-pooling area ➢ CO Code/rate area	➢ Pooling Area ➢ Block/rate center[12] ➢ Non-pooling within exhaust window ➢ CO Code/NPA ➢ Non-pooling outside exhaust window ➢ CO Code/NPA

[10] Subject to assumption G, Section II

[11] Service provider always has the option to report utilization at more granular levels, i.e., NPA-NXX or NPA-NXX-X.

[12] Subject to assumption G, Section II

		AT&T Minimalist	US West Top Down/Bottom Up	LINUS	Hybrid
	Reporting Category	➢ Initial and growth codes	➢ Within exhaust window ➢ Initial and growth codes assumed ➢ Outside exhaust window ➢ No collection	➢ Initial and growth codes/blocks	➢ Initial and growth codes/blocks
Data Collection Method	➢ Paper/web/on line/ interactive	➢ Web/online	➢ Electronic file transfer	➢ Electronic file transfer	➢ Electronic file transfer ➢ Fully interactive capability, as anticipated and designed by the NANPA for its LINUS proposal
Analysis		➢ TN growth rates ➢ New entrant profile ➢ New entrant trending	➢ Historical NXX assignment trends ➢ Expansion of rate area footprint	➢ Multivariate Probability Density	➢ Historical NXX/block assignment trends ➢ Expansion of rate area footprint
Other			➢ Window description ➢ NPA projected to exhaust within 7 years		➢ Window Description NPA projected to exhaust within 5 years
					➢ Allows mathematical modeling with NPA-specific assumptions to develop forecasts.[13] ➢ Fully interactive capability, as anticipated and designed by the NANPA for its LINUS proposal..

[13] The exact mathematical model is subject to further development. The NRO-WG recommends the model include the use of utilization data in a non-linear model.

VI Comparison of Desired Attributes with Alternatives

Under the "analysis" column shown below, proponents describe how their alternative accommodated each desired attribute. The priorities of each of the attributes are the product of the NRO WG; no priorities were established for the administrative deficiencies. The following numbered items correspond with table one in section IV.

Deficiency/Concern (1)
Market entry timeframes for new entrants inconsistent w/ COCUS forecast period.
Category
Tool & Administrative
Desired Attributes/Requirements
Provisions to update forecast information periodically throughout the reporting period. Increase reliance on measurable data, e.g. utilization data.
Preliminary Prioritization as a Desired Attribute
High – Where NPA exhaust is projected in the near term (near term to be defined) it will be necessary to have input more frequently. Volumes and frequency may impact cost.
Analysis

Minimalist Model
Includes utilization and forecast data at an NPA level. Allows for submission of carrier data throughout the reporting period. New entrant information is forecasted based upon historical trends.

LINUS
Forecast data requires break out of future consumption by reason, e.g. incremental growth in existing service, new service establishment. Participation requirement can be determined by industry and supported by regulation if desired.

U S WEST
For those NPAs hitting the threshold and therefore being subject to "bottoms up" analysis, utilization and forecast data would be provided as required. Those NPAs not hitting the threshold would not require carriers to provide utilization or forecast data.

Hybrid
Allows for submission via a mechanized interface of carrier data throughout the reporting period. This data would be combined with historical data and mathematical modeling to develop initial exhaust forecasts for all NPAs. Includes NPA, *NPA-NXX* and NPA NXX-X utilization and forecasting based on some criteria on a per NPA basis (e.g. pooling, or NPA within exhaust window).

Deficiency/Concern (2)

New entrants are unaware of the rate areas

Category

Administrative

Desired Attributes/Requirements

1. Need to have centralized resource of rate area information at the most granular local level.
2. New entrants need to be directed to that resource.

Preliminary Prioritization as a Desired Attribute

N/A at this time

Analysis

Minimalist Model

N/A

LINUS

N/A

U S WEST

This information is already available in the LERG but a table could be included in system. Probably not the ideal place, however.

Hybrid

N/A

Deficiency/Concern (3)

Carriers are reluctant to provide marketing data to a potential competitor.

Category

Administrative

Desired Attributes/Requirements

NANPA required to be a neutral 3rd party and must maintain confidentiality of the data.

Preliminary Prioritization as a Desired Attribute

N/A at this time

Analysis

Minimalist Model

N/A

LINUS

N/A

U S WEST

Standard security procedures would be included.

Hybrid

N/A

Deficiency/Concern (4)
No mechanism for Service Provider accountability for their forecast.
Category
Administrative
Desired Attributes/Requirements
Method for service provider explanation for forecast deviations; guidelines required.
Preliminary Prioritization as a Desired Attribute
N/A at this time
Analysis

Minimalist Model
Exhaust forecast is more reliant on historical data than carrier specific forecast so carrier forecast accuracy become less critical
LINUS
Feed back loop for carriers to true up carrier forecasts.
U S WEST
Could be provided online from within system.
Hybrid
N/A

Deficiency/Concern (5)
Uncertainty due to changing market conditions and competitive environment.
Category
Tool
Desired Attributes/Requirements
See solution for number 1 above.
Preliminary Prioritization as a Desired Attribute
High – See response for number 1 above.
Analysis

Minimalist Model
Includes utilization and forecast data at an NPA level. Allows for submission of carrier data throughout the reporting period. New entrant information is forecasted based upon historical trends. When a new entrant reports actual data, new entrant forecasts based upon historical trends would need to be re-adjusted. Forecasts are heavily dependent on measurable data such as utilization, TN growth and new entrant trending.
LINUS
Frequency of collection will mitigate the surprise element.
U S WEST
Hybrid
See solution to number 1 above.

Deficiency/Concern (6)
Forecast is only performed annually.
Category
Tool &
Administrative
Desired Attributes/Requirements
See solution for #1 and/or increased frequency of forecasts that may improve accuracy.
Preliminary Prioritization as a Desired Attribute
High – See response for number 1 above.
Analysis

Minimalist Model
This model does not specify the frequency of submission. There are mechanisms that allow updates throughout the year.
LINUS
Quarterly for top 100 MSAs; Semiannually for next 100; Annually for rural areas.
U S WEST
For those NPAs hitting the threshold and therefore being subject to "bottoms up" analysis, utilization and forecast data would be provided as required. Those NPAs not hitting the threshold would not require carriers to provide utilization or forecast data.
Hybrid
Semi-annual forecasting would be required for any NPA within the exhaust window or where pooling is planned or used.

Deficiency/Concern (7)
Not all carriers needing resources are required to provide data.
Category
Administrative
Desired Attributes/Requirements
Current code holders must provide data. Future code holders should be encouraged to provide data.
Preliminary Prioritization as a Desired Attribute
N/A at this time
Analysis

Minimalist Model
N/A
LINUS
N/A
U S WEST
This is an administrative and policy issue rather than a part of the system itself.
Hybrid
N/A

Deficiency/Concern (8)
No method to determine or estimate the number or timeframe of new market entrants.
Category
Administrative
Desired Attributes/Requirements
Need to have a method of estimating the number of new entrants and their associated requirements for codes for each NPA area.
Preliminary Prioritization as a Desired Attribute
N/A
Analysis

Minimalist Model
Model does trend new entrants and associated code requirements (new entrant profiles)
LINUS
Model trends the entrants and associated code requirements (new entrant profiles)
U S WEST
Historical data files would allow tracking of entry rates. Could be used to project future entrants.
Hybrid
Utilization and forecasting data would be combined with historical data and mathematical modeling to estimate the number and timeframe of new market entrants.

Deficiency/Concern (9)
Assumptions made by Code Administrator are often based upon experience/empirical knowledge rather than statistical data and analysis.
Category
Tool &
Administrative
Desired Attributes/Requirements
Models/Tools must have capability for the administrator to incorporate specific assumptions / parameters for each NPA to allow for anomalies when calculating the total NPA forecast. Examples: growth factors, special EAS calling arrangements, extended local calling plans, metro vs. rural areas, state regulatory requirements, etc.
Preliminary Prioritization as a Desired Attribute
Medium – Experience with the recent NANPA exhaust team showed that unique factors as identified do have an impact on any analysis.
Analysis

Minimalist Model
Model has ability to adjust for new switch entities and new services through adjustment of overall growth factors.

LINUS
LINUS uses baseline data that accommodates the empirical side of the tool. Does a period by period variance of forecast to observe growth and demand and that that data can be used to forecast. It looks at metro vs. rural, growth factors and state regulatory factors.
U S WEST
Historical growth is presented by the model. The planner using the forecasting tool will have the ability to override the values to accommodate anomalies or other factors that need to be addressed.
Hybrid
Utilization and forecasting data would be combined with historical data and mathematical modeling to develop initial exhaust forecasts for all NPAs.

Deficiency/Concern (10)
Does not account for pent up demand during an NPA jeopardy condition
Category
Tool
Desired Attributes/Requirements
Model must have some provision for gauging pent up demand during NPA jeopardy and what type of demand there will be when numbers become available
Preliminary Prioritization as a Desired Attribute
Low – It will come up only for the first 2 months after relief occurs and will be relatively rare and can be handled outside of the chosen solution.
Analysis Documentation Points
Minimalist Model
Because the model is based on TN growth and new entrant profiles, forecasted demand can be tracked independently which takes into account unfilled NXX demand during a jeopardy situation.
LINUS
Frequency of collection is based on need. Data collected more frequently in near jeopardy situations would account for pent up demand.
U S WEST
The model is based on historic NXX growth, forecasted demand can be tracked independently which takes into account unfilled NXX demand during a jeopardy situation. The totals should return to original projected levels following relief.
Hybrid
Historical and forecasted demand can be tracked independently which takes into account unfilled NXX demand during a jeopardy situation.

Deficiency/Concern (11)

COCUS is voluntary – some carriers refuse to participate.

Category

Administrative

Desired Attributes/Requirements

NANC addressed this issue in its November 1998 meeting (see meeting record, item G in the minutes). The NANC agreed that it should recommend that the FCC adopt rules, requiring carriers to provide information to the NANPA. Reference to the specific carriers required to participate is made in the same section of the NANC meeting record.

Preliminary Prioritization as a Desired Attribute

N/A at this time

Analysis

Minimalist Model

N/A

LINUS

Enforcement is requested.

U S WEST

This is an administrative and policy issue rather than a part of the system itself.

Hybrid

N/A

Deficiency/Concern (12)

No method of identifying all current code holders– the code holders listed in the LERG are not necessarily accurate or complete.

Category

Administrative

Desired Attributes/Requirements

There needs to be reporting requirements for code holders to update NANPA of any code holder changes after a codes original assignment. Note: For forecasting and utilization purposes, the decision reached by NANC in November 1998 limits the reporting obligation to the code holder, i.e. LERG assignee. NANC should acknowledge that the code holder obligation is for the codes they have full administrative control over. NRO-WG recommends other users of telephone numbers in NXXs assigned to a code holder (e.g. resellers, type 1 service providers) should assume responsibility for reporting.

Preliminary Prioritization as a Desired Attribute

N/A at this time

Analysis

Minimalist Model

N/A

LINUS

N/A

U S WEST
This is an administrative and policy issue rather than a part of the system itself.
Hybrid
N/A

Deficiency/Concern (13)
Code Administrator did not always solicit COCUS data from other carriers.
Category
Administrative
Desired Attributes/Requirements
The code administrator will solicit data from all code holders.
Preliminary Prioritization as a Desired Attribute
N/A at this time
Analysis
Minimalist Model
Model assumes carriers are obligated to provide utilization and forecast data
LINUS
Model assumes data from all carriers is required.
U S WEST
Requires interactive interface with CO Code assignment mechanized system, which is not yet developed.
Hybrid
N/A

Deficiency/Concern (14)
Does not look at utilization.
Category
Tool
Desired Attributes/Requirements
The new tool should have some utilization component.
Preliminary Prioritization as a Desired Attribute
High – It should improve accuracy of the forecast if utilization is included, this would also support the audit mechanism.
Analysis
Minimalist Model
Looks at utilization on an NPA basis. This utilization is used to generate a TN growth factor that is applied to the number of assigned NXXs within the NPA to project NXX growth.
LINUS
Utilization is reported in specific categories, assigned, reserved, aging ,administrative, test, vacant, and ported out. Utilization would be used to

check validity of forecasts as well as to assess TN growth to determine future demand on numbers.

U S WEST

For those NPAs hitting the threshold and therefore being subject to "bottoms up" analysis, utilization data would be provided as required (e.g., if no pooling, NPA level utilization, if pooling, NPA-NXX level). Those NPAs not hitting the threshold would not require carriers to provide utilization data.

Hybrid

Includes NPA, *NPA-NXX* and NPA NXX-X utilization and forecasting based on some criteria on a per NPA basis (e.g. pooling, or NPA within exhaust window). Utilization reported as unavailable TNs not individual TN status data.

Deficiency/Concern (15)

No mechanism to perform reasonableness check of forecasts.

Category

Tool

Desired Attributes/Requirements

Historical aggregated utilization data should be used to do a reasonableness check of the forecast.

Preliminary Prioritization as a Desired Attribute

Medium - Ancillary function that does not need to be inside the chosen option

Analysis

Minimalist Model

NXX growth projections as in (14) is used as a benchmark against aggregate carrier forecasts.

LINUS

Both historical and current forecasts and utilization will provide a reasonableness check. Frequency and granularity will provide feedback loop for self-correcting behavior.

U S WEST

Growth rates developed from utilization data would be used as a reasonableness check against the forecast data.

Hybrid

Submission of both forecasts and utilization provides the capability of a reasonableness check.

Deficiency/Concern (16)

No consistency in definitions.

Category

Administrative

Desired Attributes/Requirements

When finalized, adopt the INC and NANC definitions.

Preliminary Prioritization as a Desired Attribute

N/A at this time

Analysis

Minimalist Model

See Attributes/Requirements.

LINUS

Definitions sought in particular categories for TN reporting. See Attributes/Requirements.

U S WEST

To be included in system design and logic.

Hybrid

Utilization data reported for unavailable TNs. Unavailable is defined by INC. Detailed TN status' information must be maintained by service provider consistent with standard definitions.

Deficiency/Concern (17)

Cannot accommodate un-forecasted demand that surfaces between reporting intervals

Category

Tool

Desired Attributes/Requirements

Provisions to update forecast information periodically throughout the reporting period. Increase reliance on measurable data, e.g. utilization data (This is the same solution as per number 1.)

Preliminary Prioritization as a Desired Attribute

High – See No. 1

Analysis

Minimalist Model

Includes utilization and forecast data at an NPA level. Allows for submission of carrier data throughout the reporting period. New entrant information is forecasted based upon historical trends.

LINUS

Quarterly reporting should minimize impact of un-forecasted demand.

U S WEST

This proposal suggests an integrated system with automated links to the code assignment process which would trigger warning flags to the relief planner when code assignments vary significantly to forecasts.

Hybrid

Allows for submission of carrier data throughout the reporting period. This data would be combined with historical data and mathematical modeling to develop initial exhaust forecasts for all NPAs. Includes NPA, *NPA-NXX* and NPA NXX-X utilization and forecasting based on some criteria on a per NPA basis (e.g. pooling, or NPA within exhaust window).

Deficiency/Concern (18)

New carriers are unaware of the reporting process.

Category

Administrative

Desired Attributes/Requirements

A requirement needs to be developed that NANPA will inform new entrants that the new entrant must provide a forecast before receiving a code.

Preliminary Prioritization as a Desired Attribute

N/A

Analysis

Minimalist Model

N/A

LINUS

N/A

U S WEST

This would not be part of the system itself. Should be included in CO Code Assignment Guidelines and NANPA web page.

Hybrid

N/A

Deficiency/Concern (19)

Not designed to work in a pooling environment.

Category

Tool

Desired Attributes/Requirements

The algorithm(s) should accommodate pooling where applicable. The granularity of the data reported may need to be changed to meet needs of a pooling environment.

Preliminary Prioritization as a Desired Attribute

High – Expect that there will be pooling, some where, some time.

Analysis

Minimalist Model

Estimates 1k blocks needed for pooling at a rate center level. Does not ascertain the number of blocks available for donation to the initial pool at a rate center level.

LINUS

Utilization and forecast will be collected by Rate Center (RC), NXX by NXX block for pooling.

U S WEST

Forecast and utilization at the 1K block level was not anticipated as an integral component of this model.

Hybrid

Utilization and forecast will be collected by RC at the NPA NXX-X level block for pooling.

Deficiency/Concern (20)
Does not distinguish between initial codes and growth codes.
Category
Tool
Desired Attributes/Requirements
Reporting requirements and the function of the COCUS replacement needs to distinguish between initial and growth codes. See also #8
Preliminary Prioritization as a Desired Attribute
Medium – Recent debate about resources needed for new entrants indicates this is needed. Ability to model new entrant demand (i.e., different levels of new entrants and different levels of demand).
Analysis

Minimalist Model
Does distinguish.
LINUS
Distinguishes between initial and growth codes.
U S WEST
For those not meeting threshold, the top down analysis does not take into account the difference between a growth and an initial code. Bottom up analysis would take into account this difference.
Hybrid
Forecast will distinguish between initial and growth codes.

Deficiency/Concern (21)
Current COCUS linear trending model is insufficient to ensure accuracy.
Category
Tool
Desired Attributes/Requirements
A new analytical tool needs to be developed that encompasses those identified variables that impact code exhaust.
Preliminary Prioritization as a Desired Attribute
Medium – Not to impugn linear models as a whole, only its current function in COCUS. The tool needs to encompass those identified variables that impact code exhaust. Among the attributes that need to be used, the greatest attributes are TN growth rate and the impact of new entrants.
Analysis

Minimalist Model
Linear trending is the basis of the model but adjustments are made, e.g. demand from new entrants.
LINUS
Both linear and non-linear projections are applied in various model classes.

U S WEST
New model would provide capability for both linear and exponential forecasting allowing the user to choose the best fit in a given situation.
Hybrid
Both historical and mathematical modeling are used to forecast NPA exhaust.

Deficiency/Concern (22)
The COCUS process does not provide a reasonable prediction of code exhaust.
Category
Tool &
Administrative
Desired Attributes/Requirements
The new process should incorporate attributes from other solution sets identified, algorithm(s) and specific data capable of providing a reasonable prediction of code exhaust.
Preliminary Prioritization as a Desired Attribute
High – Primary purpose of COCUS is to provide a reasonable prediction of code exhaust.
Analysis
Minimalist Model
Use of historical data provides a check against reasonable/unreasonable forecasts.
LINUS
Regular collection and trending of line utilization will provide the data necessary for a more accurate and reliable forecast.
U S WEST
The 2-stage methodology (Top-down and Bottom-up) will improve forecasting accuracy and timeliness. The two stages will allow checks for reasonableness and validity.
Hybrid
Incorporates elements of all three proposals to help provide a reasonable prediction of code exhaust.

Deficiency/Concern (23)
COCUS replacement may be costly for both Service Providers and NANPA to administer.
Category
Tool and Administrative
Desired Attributes/Requirements
COCUS replacement must be affordable to all participants.

Preliminary Prioritization as a Desired Attribute

Medium – The greater overriding need is to have the model work.

Analysis

Minimalist Model

Requiring utilization and forecast data at the NPA level should minimize costs to industry; unknown costs to NANPA

LINUS

Will cost more than COCUS now, degree is unknown.

U S WEST

This System could be provided at reasonable cost.

Hybrid

Attempts to balance between the need for detailed utilization and forecasting data while keeping the administrative burden on both the NANPA and SPs to a manageable level.

Deficiency/Concern (Matrix Other Desirable Attributes)

The NRO WG identified other desirable attributes for a COCUS replacement

Desired Attributes/Requirements

1. A "What if" analysis capability for modeling such things such as rate center consolidation, pooling, etc.
2. Interactive capability to provide data inputs.
3. Ability to accommodate mergers and acquisitions.
4. Ability to accommodate the FCC requirement for "set aside codes" for new entrants in an overlay situation when calculating NPA exhaust.

Preliminary Prioritization as a Desired Attribute

1. Medium – not a direct function but would be useful.
2. High– the system interface and capability would improve data, time to complete analysis.

3. Low – Unsure how mergers and acquisitions will impact the analysis.4. Low – a "nice to have only"

Analysis

Minimalist Model

1. Specific modules have to be built, but potential exists.
2. Yes
3. Impact on numbering resource is not well known, so it is not modeled at this time
4. Does not explicitly deal with set aside codes in the exhaust year; does include new entrant needs in annual forecasts.

LINUS

1. Specific models could be built or data obtained via LINUS could be used as input into other NANPA tools used to model impact of pooling and rate center consolidation.

2. Yes
3. Collection of data using OCN should permit ability to accommodate mergers and acquisitions.
4. Quantity of set aside codes can be identified in the model.

U S WEST

1. Both “Top Down” and “Bottom Up” parts of the system will allow planner to override values calculated by the system itself.
2. Code holders would enter forecast Data via online screens.
3. Inventory and historical data would include SPID information, probably OCN to enable merging of Data.
4. User can establish exhaust threshold below standard “792” value when calculating exhaust.

Hybrid

1. Specific modules would have to be built but the potential exists.
2. Intended to support range of data input capabilities e.g. paper, electronic, file.
3. Utilization and forecast data would include OCN to enable merging of data.
4. User can establish exhaust threshold below standard “792” value when calculating exhaust.

VII Level of Compliance with Desired Attributes

Based on a review of the information in Section VI, the NRO WG developed the following compliance table of tool deficiency vs. desired attributes. Note that the common administrative issues are not included in this table.

Decode:

MIN = Minimalist Model
LINUS = LINUS
USW = U S WEST
HYB = Hybrid
ALL = All of the above

Notes on Table 3:

Unfilled cells pertain to deficiencies and attributes that are related to the administration of any replacement tool for reporting. The proposed alternatives dealt almost exclusively with the tool itself and thus the deficiencies and attributes that are mainly administrative in nature do not apply. In addition, none of the proposed alternatives was able to accommodate merger and acquisition activity per se because not enough has been learned about the impact of consolidation in the telecommunications industry on the demand for numbering resources.

Table 3

Deficiency	Desired Attributes	Fully Meets	Partially Meets	Does Not Meet
1. Market entry timeframes for new entrants inconsistent w/ COCUS forecast period	Provisions to update forecast information periodically throughout the reporting period. Increase reliance on measurable data, e.g. utilization data.	**LINUS, MIN, HYB**	**USW**	
5. Uncertainty due to changing market conditions and competitive environment	See solution for #1.	**LINUS, HYB**	**MIN, USW**	
6. Forecast is only performed annually.	See solution for #1 and/or increased frequency of forecasts that may improve accuracy.	**LINUS, HYB**	**MIN, USW**	
9. Assumptions made by Code Administrator are often based upon experience/empirical knowledge rather than statistical data and analysis.	Models/Tools must have capability for the administrator to incorporate specific assumptions / parameters for each NPA to allow for anomalies when calculating the total NPA forecast. Examples: growth factors, special EAS calling arrangements, extended local calling plans, metro vs. rural areas, state regulatory requirements, etc.	**LINUS, HYB**	**MIN,USW**	
10. Does not account for pent up demand during an NPA jeopardy condition	Model must have some provision for gauging pent up demand during NPA jeopardy and what type of demand there will be when numbers become available.	**ALL**		
14. Does not look at utilization.	The new tool should have some utilization component.	**LINUS, MIN, HYB**	**USW**	
15. No mechanism to perform reasonableness check of forecasts.	Historical aggregated utilization data should be used to do a reasonableness check of the forecast.	**LINUS, MIN, HYB**	**USW**	
17. Cannot accommodate un-forecasted demand that surfaces between reporting intervals.	Provisions to update forecast information periodically throughout the reporting period. Increase reliance on measurable data, e.g. utilization data (This is the same solution as per number 1.)		**MIN ,USW, LINUS, HYB**	
19. Not designed to work in a pooling environment.	The algorithm(s) should accommodate pooling where applicable. The granularity of the data reported may need to be changed to meet needs of a pooling environment.	**LINUS, HYB**	**MIN**	**USW**
20. Does not distinguish between new and growth codes.	Reporting requirements and the function of the COCUS replacement needs to distinguish between new and growth codes. See also #8.	**LINUS,MIN, HYB**	**USW**	

Deficiency	Desired Attributes	Fully Meets	Partially Meets	Does Not Meet
21. Current COCUS linear trending model is insufficient to ensure accuracy.	A new analytical tool needs to be developed that encompasses those identified variables that impact code exhaust.	**LINUS, HYB**	**MIN,USW**	
22. The COCUS process does not provide a reasonable prediction of code exhaust.	The new process should incorporate attributes from other solution sets identified, algorithm(s) and specific data capable of providing a reasonable prediction of code exhaust.	**LINUS, USW, HYB**	**MIN**	
Other Desirable Attributes: 1. A "What if" analysis capability for modeling such things such as rate center consolidation, pooling, etc. 2. Interactive capability to provide data inputs. 3. Ability to accommodate mergers and acquisitions. 4. Ability to accommodate the FCC requirement for "set aside codes" for new entrants in an overlay situation when calculating NPA exhaust.	1. A "What if" analysis capability for modeling such things such as rate center consolidation, pooling, etc. 2. Interactive capability to provide data inputs. 3. Ability to accommodate mergers and acquisitions. 4. Ability to accommodate the FCC requirement for "set aside codes" for new entrants in an overlay situation when calculating NPA exhaust.	**1.LINUS, HYB** **2.ALL** **4.USW, HYB, LINUS**	**1. MIN, USW** **4. MIN,**	**3. LINUS, USW, HYB, MIN**

VIII Assessment of Relative Costs and Utility

Individual service providers and the NANPA were invited to submit estimates on the relative costs they expect to incur to support each of the proposed alternatives. The NANPA was also invited to provide an assessment of the utility of each of the alternatives in assisting them to discharge their responsibilities of providing accurate and timely forecasts. The chart shown below summarizes the written response received from the NANPA on May 21st. All cost estimates were developed using the 1999 COCUS (referred to as Enhanced COCUS) as the baseline. Therefore, a value of 2.4X indicates that the estimated cost is 2.4 times the cost incurred in producing the 1999 COCUS report.

Table 4

	NANPA Utility Assessment	NANPA Relative Cost Assessment to 1999 COCUS
Minimalist	Small utility gain over enhanced COCUS due mostly to increased frequency in data reporting.	2.4X
US West	Small utility gain over enhanced COCUS due mostly to increased frequency in data reporting.	1.7X

	NANPA Utility Assessment	NANPA Relative Cost Assessment to 1999 COCUS
LINUS	Significant utility gain over enhanced COCUS due to increased frequency (quarterly) and granularity (NXX-X, TN categories) of data reporting as well as breakdown of code demand (initial, growth)	7.5X
Hybrid	Moderate utility gain over enhanced COCUS in pooling NPAs due to frequency (semi-annually) and granularity (NXX-X) of data reporting. Small utility gain in other areas due to frequency (semi-annually) of data reporting (NPAs within 5 years of exhaust). No utility gain in NPAs beyond 5 years of exhaust.	7X

The cost estimates submitted by service providers varied significantly from company to company. Some provided breakdowns into recurring and nonrecurring cost categories while others submitted a single cost estimate that included both. In addition, one company provided a single comparison of the costs of the 1999 COCUS with costs of LINUS, while another provided a single comparison of costs for the Hybrid versus costs for LINUS[14]. Given this diversity in costs reported, the only conclusion that may be drawn is that both NANPA and service providers seem to agree that the Minimalist and US WEST alternatives were similar in cost and the least expensive, while LINUS was estimated to be the most expensive[15]. The NANPA and service providers seem to agree that the Hybrid alternative fell somewhere in the middle. However, the NANPA estimated that its cost to implement the Hybrid would be similar to that of LINUS, while service providers indicated that their costs would be less[16].

IX Recommendation

Although all the proposed alternatives provide increased utility to the NANPA and a potential increase in accuracy for projections of NANP and NPA exhaust, the Hybrid proposal is the preferred alternative. Based on the NRO's analysis, the Hybrid approach attempts to keep the data collection and reporting burden on service providers at a manageable level especially in those NPAs with the least amount of resource use and projected demand. The Hybrid gives the NANPA the ability under certain circumstances to gather information at a more granular level than presently reported and at more frequent intervals when necessary. With the Hybrid, the NRO WG recommends a threshold for increased reporting forecasting and utilization data; if an NPA has less than five years to exhaust, then service providers in that NPA must report on a semi-annual basis. The NRO WG also recommends a provision for the NANPA to call for semi-annual reporting in NPAs in which a significant increase in code consumption is over and above what was projected, e.g., 25%, within the reporting interval.

[14] See ATIS website minutes from May 26-27 NRO-WG meeting for actual cost estimates
[15] Four to sixteen times more than the Minimalist or US West models
[16] One half to one third as costly as LINUS

Utilization data is an important component of the Hybrid, that can be used in the NANPA's modeling to determine growth in demand as well as to predict the impact of new entrants to a given NPA. With the set of assumptions discussed above, in particular the regulatory requirement to report utilization and forecast data, the Hybrid can replace COCUS and should improve future projections of exhaust.

Attributes of the Hybrid

Table 5

Hybrid		
Utilization	**Frequency**	➢ Pooling Area ➢ Semi-annual ➢ Non-pooling within exhaust window ➢ Semi-annual ➢ Non-pooling outside exhaust window ➢ Annual
	Granularity	➢ Pooling area ➢ NPA-NXX-X[17] ➢ Non-pooling within exhaust window ➢ NPA-NXX ➢ Non-pooling outside exhaust window ➢ NPA[18]
	Reporting Category	➢ Aggregate utilization collected: TNs Unavailable
Forecast	**Frequency**	➢ Pooling Area ➢ Semi-annual ➢ Non-pooling within exhaust window ➢ Semi-annual ➢ Non-pooling outside exhaust window ➢ Annual
	Granularity	➢ Pooling Area ➢ Block/rate center[19] ➢ Non-pooling within exhaust window ➢ CO Code/NPA ➢ Non-pooling outside exhaust window ➢ CO Code/NPA
	Reporting Category	➢ Initial and growth codes/blocks
Data Collection Method		➢ Electronic file transfer
Analysis		➢ Historical NXX/block assignment trends ➢ Expansion of rate area footprint
Other		➢ Window Description ➢ NPA projected to exhaust within 5 years
Other attributes:		➢ Allows mathematical modeling with NPA-specific assumptions to develop forecasts.[20] ➢ Fully interactive capability, as anticipated and designed by the NANPA for its LINUS proposal.. ➢

[17] Subject to assumption G, Section II

[18] Service provider always has the option to report utilization at more granular levels, i.e., NPA-NXX or NPA-NXX-X.

[19] Subject to assumption G, Section II

[20] The exact mathematical model is subject to further development. The NRO-WG recommends the model include the use of utilization data in a non-linear model.

X Implementation Considerations

The NANPA expressed a longstanding concern with COCUS and any replacement tool regarding compliance. For example, in the 1999 COCUS process, not all carriers responded to the request for COCUS information, and of those responding, not all supplied the utilization information that was requested for the first time. For the replacement tool to be more effective than the existing COCUS, the NANPA needs explicit authority to enforce its request and the ability to impose penalties upon carriers for noncompliance.[21]

XI Implementation

The tasks shown below are organized to incorporate the fairly comprehensive list of tasks that will be required to be completed before a new COCUS can be implemented and put into effect in the industry. This list is not intended to be all-inclusive.

	TASKS
1.	FCC approval of a new tool to replace the existing COCUS.[22]
2.	Develop high-level requirements Refine into functional requirements
3.	Submission of detailed cost data regarding said model as well as further definition of the mathematical model which will be utilized.
4.	Determination of whether development of all or part of the tool should be out-sourced.[23]
5.	Develop Detailed Administration guidelines
6.	Develop Detailed Requirements Document Including Interface Specifications
7.	Production of Software and Interfaces to support the new tool
8.	Conduct Quality Review
9.	Development of Service Provider Tracking and Reporting Mechanisms
10.	Conduct Live System Tests of Interfaces and Tool
11.	Service Turn Up

The time frame in which the recommended Hybrid alternative could be widely used is significantly affected by the extent the tasks listed in this table are worked

[21] See Section II, E.
[22] Includes a decision regarding cost recovery.
[23] May require the development of an RFP, which may add to the tasks needed, and the timeline for development.

in parallel as well as whether it is determined that a competitive bid process is appropriate for the development of any new software necessary to process data submitted. At the current level of understanding of the requirements, the time frame is estimated to be between 18 and 36 months.
Other tasks that could affect this process include: the need for an audit and verification process; development of data publication and circulation guidelines detailing what information can be disclosed, to whom and where.

It should be also acknowledged that this interval may coincide with the expiration of the current NANPA contract. Consideration should be given to the potential impacts that expiration of the NANPA contract may have on the development of the COCUS replacement.

XII Conclusions

The NRO WG recognized early on that a COCUS replacement that imposed too many reporting requirements on the industry would be cumbersome and difficult to administer both for the carriers and for NANPA. It was agreed by the NRO WG members that for the COCUS replacement, reporting must be of both forecasts and utilization and that the reporting must be mandatory for all carriers. There was some difference of opinion among the participants as to the required granularity of reporting. The NRO WG has attempted to strike a balance, giving enough data to enable the NANPA to accurately forecast NPA and NANP exhaust and understand how the NANP is being used while not overwhelming carriers with excessive reporting requirements.

NRO Working Group

TITLE: Hybrid Approach for COCUS Replacement

DATE: June 30, 1999

Hybrid Proposal

1. The hybrid approach contains elements of the other three proposals submitted to the NRO WG as possible replacement tools for COCUS.

Elements of the Hybrid Proposal

1. Where pooling has not been implemented, or is not being planned, SP NPA-level utilization and forecasting data would be required on at least an annual basis for all NPAs. The forecast would distinguish initial codes from growth codes. This data would be combined with historical data and mathematical modeling, which makes use of the utilization data in a non-linear manner, to develop initial exhaust forecasts for all NPAs. This approach would have capability for the administrator to incorporate specific assumptions/parameters for each NPA to allow for anomalies when calculating the total NPA forecast. Examples: growth factors, special EAS calling arrangements, extended local calling plans, metro vs. rural areas, set aside codes, state regulatory requirements, etc. For those NPAs that meet some set criteria, recommended to be that the NPA is projected to exhaust in next five years, semi-annual data reporting *at the NPA-NXX level* would be required at standard intervals NOTE: This would be a slight departure from the INC CO Code Assignment Guidelines (COCAG) which require semi-annual reporting for all NPAs. Reporting NPA-*NXX* level data only would also be a change to the CO Code Assignment Guidelines. Utilization data would be reported as TNs "unavailable" with the SPs retaining the detailed TN status level data for audit purposes or if requested by the NANPA. Data would be reported in a standard format consistent with the existing COCAG.

2. Consistent with the COCAG and the INC Pooling Guidelines and associated forms, where pooling has been or is planned to be implemented, utilization data would be reported at the NPA-NXX-X level. (NOTE: the standard forms developed by INC, if adopted for use in a new reporting tool/process, would allow carriers the option of always reporting utilization data at the the NPA-NXX or NPA-NXX-X level if necessary or desirable to minimize system development, etc.) Forecast data would be provided at the rate center-level. The forecast and utilization data would be combined with historical data and mathematical modeling to develop exhaust forecasts. Similar to NPAs where pooling has not been implemented, this approach would have capability for the administrator to incorporate specific assumptions/parameters for each NPA to allow for anomalies when calculating the total exhaust forecast. Examples: growth factors, special EAS calling arrangements, extended local calling plans, metro vs. rural areas, set aside codes, state regulatory requirements, etc. Reporting would be semi-annual at standard intervals. Utilization data would be reported as TNs "unavailable" with the SPs retaining the detailed TN status level data for audit purposes or if requested by the NANPA. Data would be reported in a standard format consistent with the existing INC Pooling Guidelines.

3. In all cases a standard format and schedule for reporting the data would be used. The recommended method of data collection would be electronic file transfer with fully interactive capabilities, as envisioned by the NANPA in its LINUS proposal. Any regulatory body needing these data could then obtain it via the NANPA. A mechanized interface would be made available to permit carriers to submit data both during the standard reporting period and any time between reporting periods.

4. The final forecast from the NANPA would include an adjustment to account for unforecasted demand from unidentified new entrants. The adjustment would be comprised of the estimated number of new entrants multiplied by the average number of codes new entrants have historically required.

5. This approach would include a system or process with links to the code assignment process which would trigger warning flags to the relief planner when code assignments vary significantly to forecasts. The NRO WG recommends that the NANPA would have the authority to ask for more frequent, e.g., semi-annual, reporting in any NPA in which there is a significant increase (25 percent) in code consumption above that which had been projected for the reporting interval.

6. All carrier specific input data would be kept secure during the input process, and while stored. All carrier specific analysis would be kept secure by NANPA.

Possible Outputs From New Tool/Process

The frequency and need for production of these reports would be dictated through industry guidelines, the NANPA requirements, or on an as needed basis.

1. Individual NPA forecast and exhaust projections
2. NANP Exhaust projection
3. NPA utilization reports
4. Utilization by industry segment
5. Rate center level forecasts
6. Comparison of actuals vs. forecast over defined number of cycles
7. Comparison of historical usage vs. forecast per SP per NPA/RC
8. Input for development of NANPA Initial Planning Documents (IPD)
9. Support for identification and declaration of NPA jeopardies
10. Identification of any assumptions or parameters that can be set by the NANPA
11. Impact of adjusting input variables in a given NPA
12. CO code consumption trends
13. NPA-NXX-X block consumption trends