

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In the Matter of)	
)	
Colorado Public Utilities Commission’s Petition)	CC Docket No. 96-98
for Delegation of Additional Authority to)	File No. NSD-L-00-16
Implement Number Resource Optimization)	
Methods)	

COMMENTS OF THE CITY AND COUNTY OF DENVER

Pursuant to Commissions Rules, the City and County of Denver (“Denver”), hereby files its comments related to the Colorado Public Utilities Commission (“COPUC”) request for additional delegated authority to implement number resource optimization measures.

BACKGROUND

Denver is concerned that COPUC makes no specific statements in its Petition related to the potential effects that numbering resource optimization efforts have had and continue to have upon the delivery of certain types of 9-1-1 calls, other than to say they will do their planning “...with ample industry participation...”¹. Denver applauds COPUC’s efforts to continue the effort to involve not only the local Incumbent Local Exchange Carrier, US West, but also a range of Competitive Local Exchange Carriers, Paging Providers, Cellular and PCS Providers and, within the past year, the various Colorado Public Safety Answering Points (PSAP’s). Denver hopes that COPUC will continue this effort at industry outreach and not implement thousand block pooling until

¹ COPUC Petition

it reaches a consensus with these parties, unlike certain instances which it has chosen to make decisions without allowing the full participation of its 9-1-1 Advisory Task Force. Additionally, COPUC does not state in its petition the results of the work its advisory subcommittees on 9-1-1 and Numbering have done analyzing the potential effects that local number portability, and by the same reasoning thousand block NPA pooling, can have on the existing 9-1-1 network in Colorado.² In this report, which was accepted by the COPUC Commissioners, there are several recommended, and in Denver's opinion required, upgrades which must be made to the Colorado 9-1-1 network before additional Numbering Resource Optimization methods are granted to COPUC. Nor does COPUC talk about a pending docket whereby the 9-1-1 service provider in Colorado will make several upgrades to the 9-1-1 network which will enable the 9-1-1 network to work more seamlessly within the issues of number portability, rate center consolidation and number pooling. It is with these 9-1-1 issues in mind that Denver asks the commission to grant COPUC the authority requested for thousand block pooling, but that this authority be delayed until such time these 9-1-1 network upgrades are completed.

NUMBERING OPTIMIZATION AND 9-1-1

In September 1997, COPUC's Numbering Task Force met and discussed the implications of rate center consolidations as they related to the delivery of 9-1-1 calls in the existing analog 9-1-1 environment in Colorado. The minutes of that meeting show considerable discussion related to the effects rate center consolidation would have upon CLEC's, and Wireless in the situation of a default routed 9-1-1 call. It appeared from those minutes that the proposed solution of line-class-code default routing of 9-1-1 calls

² *Report to the Commission on Recommended 911 Upgrades December 22, 1999*, COPUC Docket 99I-384T. A copy of the report is attached hereto.

would not work for CLEC's and Wireless. However, COPUC, in its rate center consolidation order relied upon a position taken by its staff, and ruled that CLEC's and Wireless would be required to implement line class code default routing of 9-1-1 calls.³ This decision was made by COPUC even though its 9-1-1 Advisory Task Force, made up of 9-1-1 PSAP representatives and industry 9-1-1 experts, had not had the opportunity to meet and come to closure on the implications of this order. COPUC stated "...the Commission finds that this Decision should not be delayed for further comment by the E911 Task Force."

When COPUC found that the line class code default solution would not work, as they had been advised by various CLEC's, its staff realized that it could not make its decisions related to Numbering Resource Optimization without the full and active participation of the 9-1-1 community in Colorado. In March 1999, members of the COPUC 9-1-1 Advisory Task Force were invited to a meeting of its Numbering Task Force to discuss the implications of future numbering issues, specifically the expansion to a fifth NPA in Colorado.

Current technology, a CAMA, analog-based architecture, is only capable of understanding 4 NPA's. Colorado currently has 4 NPA's active: 303, 719, 720 and 970. The addition of a fifth area code in this analog-based-4-NPA-capable statewide architecture necessitates a complete redesign of the Colorado's 9-1-1 network.

A joint subcommittee of the COPUC 9-1-1 Advisory Task Force and the COPUC Numbering Task Force authored a report⁴ describing the essentials of this redesign. The

³ COPUC Docket 97M-548T, Decision No. C98-439

⁴ *Report to the Commission on Recommended 911 Upgrades December 22, 1999*, COPUC Docket 99I-384T

COPUC is contemplating in a follow on docket⁵ to the redesign report, funding and building the 9-1-1 infrastructure required to enable the current 9-1-1 network to be upgraded to support a fifth NPA.

RECOMMENDATION

Denver believes that the FCC should not put the cart before the horse in this situation as the 9-1-1 network upgrades are not scheduled for completion until two years after the COPUC issues its order in the network upgrade docket⁶. Denver feels that the FCC should allow the COPUC the authority it asks to optimize the use of NPAs in Colorado but that thousand block pooling not be implemented by COPUC until such time that these proposed 9-1-1 network upgrades are completed.

Respectfully Submitted:

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⁵ COPUC Docket 00A-065T

⁶ COPUC Docket 00A-065T

99I-384T

**Report to the Commission on
Recommended 911 Upgrades**

December 22, 1999

Docket No. 99I-384T was opened on August 11, 1999 with the mailing of Decision C99-848. This Docket was established as a result of numbering resource optimization measures having already been implemented in Colorado, i.e., rate center consolidation, and the optimization measures that are evident in the near future. The Commission, by opening this Docket, intends to take steps to combat the potential degradation of the 911 network because of these optimization measures. C99-848 directed that a committee be formed under the direction of Commission Staff, to investigate these matters and file a report for consideration by the Commission.

Such a committee was formed with participation from the Colorado Numbering Task Force, the Colorado 911 Task Force, US West, in its role as Basic Emergency Service Provider (BESP), competitive local exchange carriers (CLECs), Public Safety Answering Point (PSAP) personnel, wireless providers, and other parties involved with the 911 system. This committee initially met on August 31, 1999. At this meeting, presentations were given by US West, Nortel, Lucent, Tim Dunn of the Denver PSAP and Becky Quintana, Chair of the Numbering Task Force. It was decided at this meeting to divide the large group into three subcommittees to explore the issues and potential problems facing the 911 network in Colorado. These three subcommittees dealt with the subjects of: 1) rate center consolidation and default routing; 2) 911 network design; and 3) legislative/funding. For the next several months, these subcommittees met and devised the attached report.

It is our suggestion that the Commission review this report, close the immediate docket, and open an adjudicatory docket in which this report and the recommendations contained within it, can be heard. Because of the short time frame contained within the recommendations, these hearings should take place as soon as possible so that an order can be issued and work can begin.

Rate Center Consolidation – Default Routing Subcommittee Report

The Rate Center Consolidation Work Group was charged with the identification of a short-term solution that would ensure proper delivery of default routed 911 failures. The task was to provide a workable solution within the parameters of the current network architecture and consolidated rate center environment. In order to achieve this objective, the work group evaluated the process by defining the various failure conditions that would result in a default routed 911 call. Two distinct types of failure conditions were identified. The first was the Automatic Number Identification (ANI) failure and the second was the Automatic Location Identification (ALI) failure, or “No Record Found” condition.

Three scenarios were identified that would result in an ANI failure. However, only the Emergency Service Central Office (ESCO) ANI failure results in the call being default routed to a Public Safety Answering Point (PSAP). An ESCO ANI failure condition exists when the ANI is garbled and/or not transmitted from the serving end office. This type of failure condition results in the call being routed based on the default Emergency Service Number (ESN) assigned to the incoming 911 trunk group. The ESCO code associated with that trunk group is used to provide the four remaining digits of a seven digit ANI with the NXX of 911. The call then routes to the designated default PSAP location and displays an ANI of 911-0XXX where the last three digits (X) are the corresponding numbers of the ESCO. The associated ALI display is either a “No Record Found,” or a pre-established ESCO ALI identifying the call as an ANI failure.

An ALI failure event occurs when a valid ANI is transmitted to the 911 tandem. However, the ALI record has not processed through the Automatic Location Identification/Data Management System (ALI/DMS). Thus, a corresponding ANI to Master Street Address Guide (MSAG) valid ESN relationship does not reside in the Selective Routing Database (SRDB) at the 911 tandem. The 911 call is default routed and displays the ANI of the calling party and an ALI of “Record Not Found.”

The method deployed in the 1A tandem for default routing an ALI failure is to utilize the default ESN assigned to the incoming 911 trunk group. The ESN assigned to the trunk group is initially built against the entire 10,000 block of the NXX(s) transmitted over that particular trunk group in the SRDB. All Telephone Numbers (TNs) retain this ESN until an MSAG valid TN/ESN is populated in the SRDB. Therefore, in this type of arrangement a 911 call from an ANI that has not been updated in the SRDB with an MSAG valid ESN will default to the same location as an ESCO ANI failure.

In theory this methodology increases the probability that the call will route to the PSAP that would have received the call had the record processed through the ALI/DMS onto the SRDB. However, the geographic extent of the Denver consolidated rate center incorporates multiple default PSAP locations. Prior to consolidation, a level of aggregation existed with respect to the correlation between default PSAP and rate center that ensured an ALI failure would route to the appropriate PSAP. In this consolidated rate center environment the probability of routing an ALI failure to the appropriate PSAP decreases significantly for the Competitive Local Exchange Carriers (CLECs).

Competitive Local Exchange Carriers (CLECs) are in the position of either using a limited number of NXXs or single NXX across the entire consolidated rate center. The end result is that a local dial tone provider may assign a subscriber a block of TNs with a particular NXX in a specific geographic sector of the consolidated rate center. An ALI failure condition will route the call to the PSAP associated with the default ESN of the trunk group. If the 911 trunk group was initially provisioned with a default ESN associated with a PSAP that was within close proximity to the physical location of this first subscriber, the ALI failure will route to the appropriate default location.

This same dial tone provider now has the ability to assign another block of TNs with the same NXX to a subscriber that is physically located in an entirely different geographic sector of the rate center. The physical location of this second subscriber would dictate that in the event of an ALI failure the call should route to one of the other default PSAP locations. If the TNs assigned are in the same 10,000 block of the same NXX, then an

ALI failure from this second subscriber will default to the same PSAP location as the initial subscriber.

Just prior to consolidation a decision was made to have the CLECs provision an appropriate number of trunk groups based on the number of default PSAPs within the consolidated rate center boundary. Line Class Code (LCC) Screen Indexing (SI) at the TN level within the originating end office was the mechanism to route a 911 dialed call over the appropriate trunk group. In essence, the originating CO would selectively route the call to the 911 tandem. In the event of an ALI failure, the default ESN assigned to the incoming 911 trunk group would be used as the routing mechanism to ensure that the call was delivered to the appropriate PSAP. However, this proved to be a non-workable solution as the default ESN assigned to the trunk group defines the initial ESN assigned to an NXX 10,000 block.

Additionally, the process of LCC screen indexing introduces an added layer of human intervention in the process. This added layer increases the probability of error by virtue of the fact that all line side provisioning would require an appropriate Rate Area (RAX) assignment. In a consolidated rate center environment, each of the default PSAP locations constitutes a specific or unique rate area. Each RAX is associated with a specific SI (screen index). The built in error arises when it becomes critical to ensure that the appropriate RAX is assigned during the customer or line side provisioning process.

One option identified as a means of routing ALI failures to a more appropriate default PSAP was to establish a predominant ESN at the 1,000 block level. In this scenario, a local service provider would initiate a process of geographic number assignment that would limit the spatial distribution of TNs to coincide with the default PSAP locations. This method of number administration would require the removal of an entire NXX 10,000 block from the SRDB. The 10,000 NXXs are restored with the appropriate ESN for each 1,000 block, as well as, any existing TNs that were previously loaded with an MSAG valid ESN. It was determined that this option was not a viable alternative due to the complexity and inherent risk of error entailed in the process.

A final option presented to the work group was the establishment of a single default PSAP location for both ESCO ANI and ALI failures for the consolidated rate center. At this time there is neither a consensus nor commitment among the local 911 Authority Boards to move in this direction.

It should be noted that ALI failures are database related as opposed to network related. However, the current architecture of the 911 system is not capable of ensuring that all failure conditions will default to the appropriate PSAP. As the 911 tandem is upgraded from a 1A switch to a DMS100 and SS7 signaling is deployed within the network, ESCO ANI failures will be either eliminated or reduced significantly. In addition, the DMS100 has the capability to establish predominant ESNs at the 1,000 block level.

From this analysis one can ascertain that provisioning 911 trunk groups for all default PSAP locations within the consolidated rate center only ensures accurate default routing in the event of an ESCO ANI failure. The number of default routed calls as a result of an ESCO ANI failure is minimal as evident by the data below (see Figure 1). However, ALI failures have a greater degree of frequency (see Figure 2).

PERCENT ESCO ANI FAILURES

PSAP	Nov-98	Dec-98	Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Jul-99
Arapahoe County SO	0.00	10.00	0.00	0.00	0.00	0.05	0.00	0.04	0.00
Aurora PD	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Denver PD	0.08	0.08	0.11	0.06	0.09	0.07	0.04	0.05	0.05
Douglas County SO	0.00	0.06	0.00	0.00	0.12	0.18	0.00	0.00	0.05
Jefferson County SO	0.00	0.05	0.00	0.00	3.41	0.00	0.00	0.12	10.00

Source: US West Communications

Figure 1

ALI SUMMARY for the CITY and COUNTY of DENVER

ALI Failures	Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Jul-99	Aug-99	Sep-99	Total
"No Record Found"	158	173	185	140	156	144	152	170	600	1878
Total Base Calls	21343	19055	21758	21032	24389	26888	36456	33650	29610	234181
Percent of Base	0.74	0.91	0.85	0.67	0.64	0.54	0.42	0.51	2.03	0.80
ANI Failures	Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Jul-99	Aug-99	Sep-99	Total
911-0XXX (ESCO)	30	15	24	19	13	15	24	26	26	192
Total Retrievals	27027	24085	27400	26237	30115	32840	43667	40954	35697	288022
Percent of Total	0.11	0.06	0.09	0.07	0.04	0.05	0.05	0.06	0.07	0.07

Source: US West Communications

Figure 2

Network Design Subcommittee Report

The task of the network subcommittee was to define the ongoing requirements of the 9-1-1 network encompassing business continuity, the expansion of area codes, local number portability (LNP), inter operability for all Public Safety Answering Points (PSAPs) within the State, and the migration to Signaling System 7 (SS7) technology. In addition, the subcommittee was required to recommend possible solutions, suggest an implementation timeline, and define the costs for the undertaking.

The subcommittee first looked at the driving forces which would require action:

Business Continuity

The concern of the subcommittee is that a single 9-1-1 selective routing switch serves a very large geographic area. A failure of any one switch due to software or environmental catastrophes could degrade or suspend the ability to process and deliver 9-1-1 calls for extended periods of time. The subcommittee explored the ability to "mate" two separate switches located in geographically separate locations to provide 9-1-1 service.

The subcommittee also discussed whether to split the existing service areas with multiple switches serving smaller geographic areas. The subcommittee agreed to the mated switches. This architecture has been successfully deployed in other states, and is a reasonable solution. Please refer to Appendix A for the proposed selective routing switch network diagram.

Subsequent discussions were made to address the survivability of inter office facilities (route diversity). There are central offices which have a single facility route to the 9-1-1 selective routing switch, when this facility is interrupted, the central office and its subscribers are isolated from 9-1-1 service. The subcommittee acknowledges the vulnerability of the existing infrastructure but did not have time to address possible relief or determine the magnitude of cost.

Area Code Expansion

The proliferation of area codes is the trigger which will require network / customer premise equipment (CPE) enhancements. Current deployed technology limits the number of area codes to four. While the current deployment of 9-1-1 selective routing switching offices (Denver, Pueblo, and Grand Junction) can operate for a period of time in the current mode, the requirement to upgrade the network and CPE to accept five or more area codes is closely tied to PSAP inter operability. The need of communicating between two PSAPs served from two different selective routing switches is exacerbated with the addition of wireless telephone service.

In order to meet the requirements, it will be necessary to upgrade the network / CPE to the new enhanced multifrequency specification (EMF) which will deliver the full ten digit telephone number of the calling party. This enhancement is currently available in Pueblo and Grand Junction selective routing switches. For the Denver 9-1-1 switch, the upgrade will be available concurrent with the replacement of the Cap Hill switch which is scheduled to cut on or before November, 2000. An audit of the CPE has been done and at this time twenty seven PSAPs are not ten digit capable. A listing of these PSAPs can be found in Appendix B.

Local Number Portability

The subcommittee brought up the issue of Local Number Portability and determined that call delivery and ALI are delivered correctly. The issue with surfaced was default routing. It was decided the issue really is one of rate center consolidation and the manner in which Competitive Local Exchange Carriers (CLECs) handle calls which the caller's telephone number can not be identified.

There are two main types of default calls. When a serving central or end office fails to identify the caller's telephone number, the call is advanced to a pre selected PSAP. The second type of default routed call is when the end office was able to forward the caller's telephone number, and the number is not listed in the selective routing database. This type of call is also advanced to a default PSAP.

The default routing issue was discussed in subcommittee and determined that steps have been taken to mitigate default call handling to several selected PSAPs. The number of default routed calls was quantified to be of low volume, and even though they are problematic, the subcommittee decided not to make any recommendations at this time.

PSAP Inter operability

The subcommittee determined that as the service areas of each selective routing switch areas meet, there is an increased need for PSAPs served from different 9-1-1 selective routing switches to transfer calls among each other. For example, a PSAP served from the Pueblo selective routing switch receives a call which requires dispatch to an adjoining PSAP, served from the Denver selective routing switch. Currently, the call can not be transferred and maintain the caller's telephone number and associated Automatic Location Identification (ALI) data. The need to transfer calls are on the increase.

In order to allow the transfer of calls with data between PSAPs served from different selective routing switches, a network upgrade must be performed. This enhancement will enable a call to be initially delivered and or transferred to any PSAP in the State. In order for this feature to be implemented, the Cap Hill selective routing switch in Denver will have to be replaced, the proper software loaded in all selective routing switches. The installation of inter selective routing switch trunks is also required. The replacement for the Cap Hill switch is scheduled for November, 2000.

Migration to Signaling System 7

The subcommittee determined there are two major reasons to migrate to SS7 technology. First is speed of call delivery. Completing calls using SS7 signaling can reduce call completion time by approximately three seconds. This will result in better service to the public and accelerate call origination to delivery of service.

In addition, the inter operability between selective routing switches relies on SS7 technology and can not be implemented in the existing analog environment.

It should be noted that the Federal Government Network Reliability Council has changed its position to fully support SS7 implementation for 9-1-1 networks.

Timelines

The subcommittee developed an implementation timeline to depict multiple triggers and changes to the network within the State of Colorado. Please refer to Appendix C for this information.

Tasks

The subcommittee has listed the tasks that must be performed by various parties for this recommended upgrade. Please refer to Appendix D for details.

Upgrade Costs

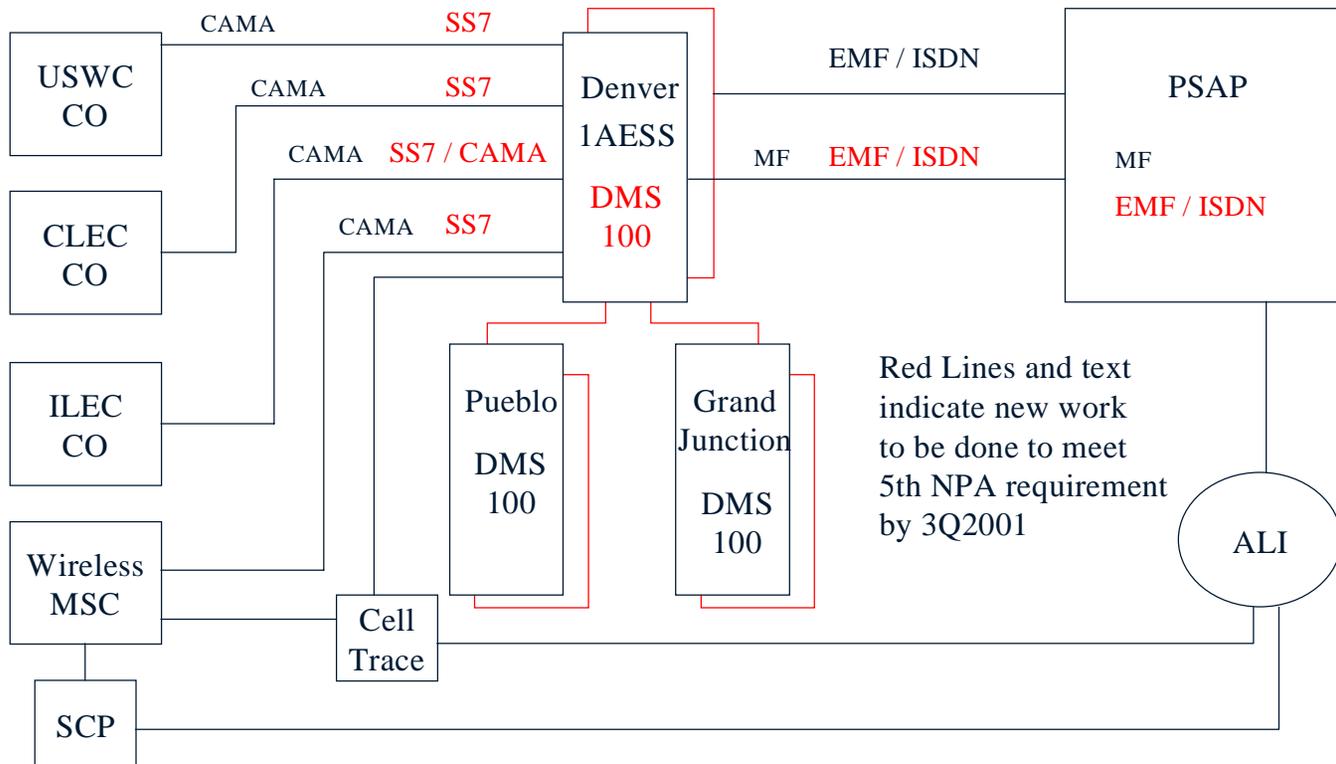
The subcommittee has assembled the costs for the recommended implementation. Please refer to Appendix D for details.

Recommendations

- The network subcommittee has agreed on the following recommendations:
- Migrate the exiting analog network to SS7
- Upgrade the PSAP CPE and network to the EMF (10 digit) specification

- Install the necessary software and trunks to enable statewide inter operability between PSAPs
- Install mated 9-1-1 selective routing switches at the Denver, Pueblo, and Grand Junction sites.

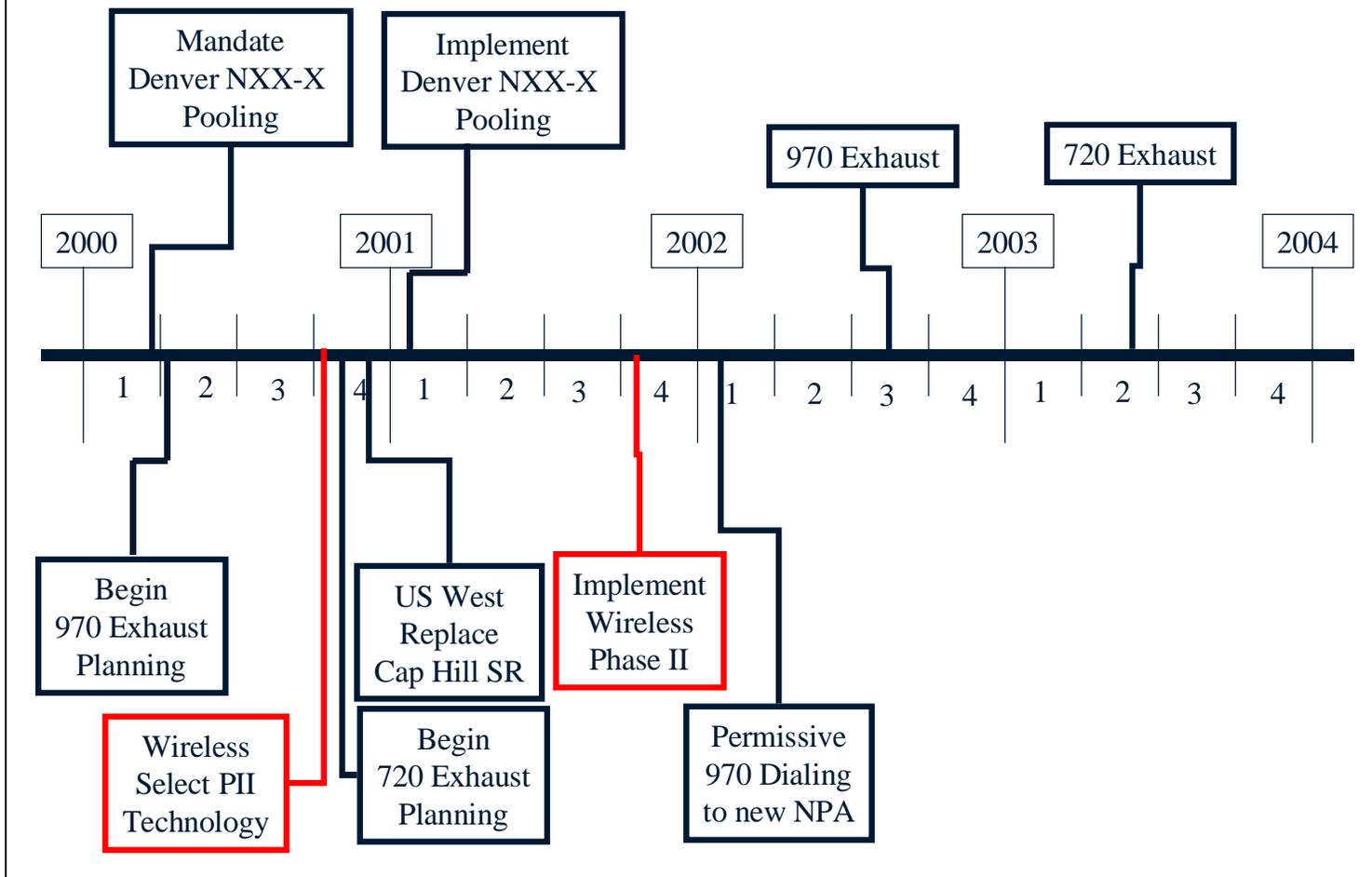
Colorado 911 Network Upgrades



Colorado PSAPs not 10-digit capable

County	PSAP
Chaffee	Salida
Crowley	Ordway
Delta	Delta
Douglas	Parker
Garfield	Glenwood Springs
Garfield	Rifle
Huerfano	Walsenburg
Jefferson	Arvada Fire
Jefferson	Evergreen
Jefferson	Golden
Jefferson	Wheat Ridge
Jefferson	Broomfield
Kit Carson	Burlington
Lake	Leadville
La Plata	Durango
Lincoln	Hugo
Montezuma	Cortez
Montrose	Montrose
Montrose	Nucla
Otero	La Junta
Otero	Rocky Ford
Prowers	Lamar
Pueblo	Pueblo County
Rio Blanco	Meeker
Routt	Steamboat Springs
San Miguel	Telluride
Weld	Greeley

Timeline as of 10/15/1999



Responsible	TASK	COMMENTS
PSAP	Upgrade of CPE for E-MF	27 PSAPs not capable. Complete by 12/31/2001
	Interface to NENA	Ongoing
	Request from BESP E-MF	Some requests made, however unavailable on Cap Hill SR until upgraded in 11/2000. Complete by 12/31/2001.
	Request NENA for Digital 911 from SR to PSAP.	Standards work in process at national level.
ILEC, CLEC, Independents, Wireless, PBX Operators	Upgrade switches to allow for SS7 from switch to Selective Router	May need to look at a PUC Mandate. Costs and scope unknown. Complete by 12/31/2001.
	Work cooperatively with PUC and BESP on any necessary modifications to interconnection agreement.	Complete by 12/31/2001
BESP	Install SS7 links from Selective Routers to all subtending switches.	Fund via tariff or by other means. Complete by 2/1/2002.
	Add redundant Selective Routers and re-home trunks.	Complete by 2/1/2002
	Replace Capitol Hill Selective Router	In process for completion by 11/30/2000. Should include SS7 upgrade as optional concurrent implementation.
	Add redundancy to networks	Ongoing. As needed.
	Research other methods of diversity.	<ul style="list-style-type: none"> - Lease from other carriers - Use PSAP Microwave - Work with other LECs to negotiate facilities cooperation
PUC	Review/Modify 4CCR723-29	<ul style="list-style-type: none"> - Need to incorporate new NENA standards - Support to meet 2/1/2002 needs - CLEC must notify PSAP when service is turned on.
	Support/review modifications to interconnection agreements	
	9-1-1 Task Force Statewide Informational Briefings on Numbering and 9-1-1	
Legislature and Funding	Possibility of restructuring legislation for cost recovery	Provide dual path funding <ul style="list-style-type: none"> - Local Controlled Funding - State Controlled Funding
	Limited Statewide 9-1-1 Authority	Would manage 9-1-1 network upgrade project through 2004
	Colorado Trust	Funding path to support upgrade of 27 PSAPs CPE for E-MF

Item	Cost	Payor
PSAP CPE Upgrades for E-MF	\$ 810,000.00	PSAP
Request from BESP for E-MF	\$ 19,000.00	PSAP
Upgrade CO/MSC SS7 Capability*	Unknown	Carriers
SS7 Links from SR to all switches	\$ 3,000,000.00	BESP
Replace Cap Hill Selective Router**	None	BESP
Add redundancy to SS7 Networks Statewide	\$ -	BESP
Add redundant SR's	\$ 1,100,000.00	BESP
Total	\$ 4,929,000.00	
<p>*Upgrade costs for CLECs and Independents to upgrade switches to SS7 capability is unknown. However, the upgrade path would be to allow for CAMA until the switch could be upgraded.</p>		
<p>**US West has said in meetings with the committee that this Selective Router would be replaced in 11/2000 but has not yet committed to this date in writing. Upgrade of this router was already planned and paid for by US West.</p>		

Legislative/Funding Subcommittee Report

The task of the legislative/funding subcommittee was to examine alternatives to fund the required upgrades necessary to address the problems identified by the overall 911/numbering task force. In addition, the subcommittee was charged with determining whether legislation will be required to address: the specific objectives of the task force, and the funding necessary to achieve these objectives.

The subcommittee first looked at what costs the 911 system faces in dealing with three major objectives of the overall task force:

- Upgrade US WEST and Independent telephone company 911 networks to SS7
- Upgrade PSAP facilities to handle 10 digits 911 calls
- Add redundant switching at all three tandem locations (Pueblo, Grand Junction, and Denver)

Other issues that remain outstanding include:

- Other upgrades to the US WEST network to reduce/eliminate 911 system outages
- The need for 911 authority boards to implement wireless ANI and ALI in the near term and the costs involved with doing this
- Other equipment upgrade and replacement costs that are pending at the PSAP level

The subcommittee was at somewhat of a disadvantage because of information that had not been collected at the time of our deliberations. The data on the number of PSAPs who are not 10 digit capable has been collected and is attached as Appendix B to the Network Design Subcommittee Report. However, it is strongly recommended that more complete data be collected on the current status of PSAPs, including costs to address: 10 digit dialing, ANI and ALI implementation, and other upgrade costs pending in the next two years. In addition, more data needs to be collected on what the cost will be to upgrade the independent telephone companies serving rural Colorado, and, what the mechanism is for this cost to be reimbursed. It is important to have a more complete picture of the cost picture in order to recommend an appropriate solution to upgrading the 911 network and the PSAPs.

Based on current information available the costs to upgrade the 27 PSAPs who are not 10 digit capable will be in the neighborhood of \$810,000. The cost to upgrade the US WEST 911 network to SS7 will be

approximately \$3,000,000. And, the cost to upgrade the competitive local exchange carriers and independent phone companies to SS7 is largely unknown, but could be approximately \$2,000,000. The cost to add redundant 911 selective routers in Denver, Grand Junction and Pueblo is estimated at \$1,100,000. The largest unknown at this point is the cost of adding redundancy to the 911 network statewide to minimize 911 outages; however, it is clear that this cost will be very significant.

The subcommittee discussed three different approaches to address the need for upgrades in the 911 system. The first approach is to utilize the existing 911 jurisdictional structure. The US WEST and Independent Company network pieces would be funded through the existing tariff structure. PSAP upgrades would be funded through increases in existing surcharges. This approach would avoid the complexity of approaching the state legislature for additional financial and jurisdictional authority. The downside is that many rural 911 authorities may have to exceed their current \$.70 limit on 911 surcharges, which requires a waiver from the PUC.

The second approach would be to request statutory authority from the state legislature to create a new statewide 911 authority and a new state collected surcharge to fund all of the upgrades. This would establish a mechanism to address jurisdictions that have financial needs beyond their present capacity to address them. It would also establish an entity with better resources to help coordinate statewide 911 issues. The downside is that the state legislature may not agree to additional state expenditures and the creation of a new bureaucracy. In addition, there does not appear to be much support for the creation of a statewide authority from local governments, and there may be objection from industry to the creation of a new surcharge.

The third approach would be a hybrid of the state authority concept. A non-profit statewide authority with a limited mission could be created and funded through an outside source. This entity could establish a low interest revolving fund for 911 Authorities to use in financing 911 system upgrades, or if funding was available, award grants for this purpose. This authority could also address other 911 coordination and implementations issues. This limited authority would most likely not have the funding available to address the statewide 911 network issues.

Based on the immediate need to address the 10 digit numbering issue, and the complexities involved in implementing the second and third approaches, the subcommittee recommended the first approach be followed at this time. However, given the broader issue of overall 911 network coordination and dependability, the subcommittee felt that the idea of a hybrid statewide authority should be given serious consideration at the appropriate time. The full task force concurred in both of these recommendations.

