Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Connect America Fund	)	WC Docket No. 10-90
	)	
High-Cost Universal Service Support	)	WC Docket No. 05-337
	)	

PETITION FOR RECONSIDERATION

of the

WESTERN TELECOMMUNICATIONS ALLIANCE,
THE EASTERN RURAL TELECOM ASSOCIATION, and the
NATIONAL EXCHANGE CARRIER ASSOCIATION, Inc.

April 18, 2013

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Attachment: Statistical Tests of Benchmarks of "Similarly Situated" Companies

Summary

The Rural Associations request the Commission reconsider those portions of its *Sixth Order on Reconsideration and Memorandum Opinion and Order* in this proceeding ("*Sixth Order*") concluding that the Quantile Regression Analysis (QRA) methodology for limiting High-Cost Loop Support ("HCLS"), as implemented by the Wireline Competition Bureau (the "Bureau") in its April 25, 2012 *HCLS Benchmarks Order,* results in the "predictable" universal service support mandated by section 254 of the Communications Act of 1934, as amended (the "Act"). Despite some positive revisions in the *Sixth Order*, the benchmarking approach in its current form continues to make both the *rules* governing universal service support and *support amounts* fundamentally unpredictable.

The Rural Associations also request that the Commission reconsider its conclusion that the Bureau reasonably based its benchmarks on analyses of "similarly situated" companies, as required under the Commission's November 2011 *USF/ICC Order*. As demonstrated herein, however, the Bureau's approach does not apply similar benchmarks to similar companies. This defect requires reconsideration, as it entirely undercuts the Commission's rationale for imposing the benchmarks in the first place. Formulas that do not treat similarly-situated companies alike are, by definition, irrational; with such a flaw they cannot constitute effective "benchmarks" that provide reasonable and transparent guidance as to how companies should conduct business going forward, and thus should not be utilized to determine support amounts.

Finally, the Rural Associations request reconsideration of the Commission's rejection of proposals that the QRA model and benchmarks be used only to "trigger" a harder look to determine whether a carrier's costs are truly inefficient. As shown herein, the trigger approach constitutes the most straightforward and practicable way to address the predictability and

technical concerns regarding the regression model and benchmarks that have been identified on

the record.

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Pursuant to section 1.429 of the Commission's rules, 47 C.F.R. § 1.429, the Western

Telecommunications Alliance ("WTA"); the Eastern Rural Telecom Association ("ERTA") and

the National Exchange Carrier Association, Inc. ("NECA") (the "Rural Associations")[1] request

partial reconsideration of the Commission's *Sixth Order on Reconsideration and Memorandum*

Opinion and Order in the captioned proceeding.[2]

Specifically, the Rural Associations first request the Commission reconsider its

determination that the Quantile Regression Analysis (QRA) methodology for limiting High-Cost

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[1] WTA is a trade association that represents over 250 small rural telecommunications companies operating in the 24 states west of the Mississippi River. ERTA is a trade association representing rural community based telecommunications service companies operating in states east of the Mississippi River. NECA is responsible for preparation of interstate access tariffs and administration of related revenue pools, and collection of certain high-cost loop data. *See generally,* 47 C.F.R. §§ 69.600 *et seq.*; *MTS and WATS Market Structure*, CC Docket No.78-72, Phase I, Third Report and Order, 93 FCC 2d 241 (1983).

[2] *Connect America Fund*, WC Docket No. 10-90, *High-Cost Universal Service Support*, WC Docket No. 05-337, Sixth Order on Reconsideration and Memorandum Opinion and Order, FCC 13-16 (rel. Feb. 27, 2013) (*Sixth Order*).

Loop Support ("HCLS"), adopted in principle by the Commission in its 2011 *USF/ICC Order*[3]

and implemented by the Wireline Competition Bureau (the "Bureau") in its April 25, 2012 *HCLS*

Benchmarks Order,[4] results in the "predictable" universal service support mandated by section

254 of the Communications Act of 1934, as amended (the "Act"). Despite some positive

revisions in the *Sixth Order* (such as combining the separate CapEx and OpEx formulas into one

and modifying the caps' phase-in schedule), the benchmarking approach in its current form

continues to make both the *rules* governing universal service support and *support amounts*

fundamentally unpredictable – a result not permitted under the Act even under the most generous

reading of the Fifth Circuit's *Alenco* decision.[5]

The Rural Associations also request that the Commission reconsider its determination

that the Bureau reasonably based its benchmarks on analyses of "similarly situated" companies,

as required under the *USF/ICC Order*. Contrary to the Commission's findings in the *Sixth*

Order,[6] the Bureau's benchmarks do not apply similar benchmarks to similar companies. This

defect requires reconsideration, as it entirely undercuts the Commission's rationale for imposing

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[3] *Connect America Fund*, WC Docket No. 10-90, A *National Broadband Plan for Our Future*, GN Docket No. 09-51, *Establishing Just and Reasonable Rates for Local Exchange Carriers*, WC Docket No. 07-135, H*igh-Cost Universal Service Support*, WC Docket No. 05-337, *Developing an Unified Intercarrier Compensation Regime*, CC Docket No. 01-92, F*ederal-State Joint Board on Universal Service*, CC Docket No. 96- 45, *Lifeline and Link-Up*, WC Docket No. 03-109, *Universal Service – Mobility Fund*, WT Docket No. 10-208, Report and Order and FNPRM, 26 FCC Rcd. 17663 (2011), *pets. for review pending, Direct Commc'ns Cedar Valley, LLC v. FCC*, No. 11-9581 (10th Cir. filed Dec. 18, 2011) (*USF/ICC Order*).

[4] *Connect America Fund*, WC Docket No. 10-90, *High-Cost Universal Service Support*, WC Docket No. 05-337, Order, 27 FCC Rcd. 4235 (2012) (*HCLS Benchmarks Order*).

[5] *Sixth Order* ¶ 33, citing *Alenco Communications, Inc. v. FCC*, 201 F.3d 608, 623 (5th Cir. 2000).

[6] *E.g., Sixth Order* ¶ 21 (dismissing Accipiter's concerns regarding unpredictability of benchmarks on grounds that the Commission's approach "is designed precisely to compare each individual carriers' costs to those of similarly situated carriers, accounting for the most significant drivers of cost such as 'density, terrain and operating environment.")

the benchmarks in the first place – formulas that do not treat similarly-situated companies alike are, by definition, irrational; thus in their current form they cannot constitute effective "benchmarks," and should not be utilized to determine support amounts. The Commission should accordingly reconsider the *Sixth Order* in this respect as well.

Finally, the Rural Associations request reconsideration of the *Sixth Order's* rejection of proposals that the QRA model and benchmarks be used only to trigger a harder look to determine whether a carrier's costs are truly inefficient. As shown herein, a "trigger" approach constitutes the most straightforward and practicable way to address the predictability and technical concerns regarding the regression model and benchmarks that have been identified on the record.

I. STANDARD OF REVIEW

The *Sixth Order* partially addressed petitions for reconsideration of the Commission's November 2011 *USF/ICC Order* filed by the Rural Associations as well as other parties, and also partially addressed applications for review of the Bureau's *HCLS Benchmarks Order*.[7]

While reconsideration of such orders is not common, under the particular facts of this proceeding the Commission should consider and grant the Rural Associations' petition insofar as it seeks reconsideration specifically of those portions of the *Sixth Order* denying Applications for Review of the Bureau's *HCLS Benchmarks Order*. The patent complexity of the *HCLS Benchmarks Order* required examination and analysis that took more time than the month in which an Application for Review of that order needed to be filed. Indeed, substantial evidence

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[7] Petition for Reconsideration and Clarification of NECA, OPASTCO, and WTA, CC Docket No. 01-92, *et al.* (filed Dec. 29, 2011); NECA, OPASTCO, and WTA Application for Review, WC Docket Nos. 10-90, 05-337 (filed May 25, 2012) (*Rural Associations' AFR*). *See also, e.g.*, East Ascension Telephone Application for Review, WC Docket Nos. 10-90, 05-337 (filed May 25, 2012); Accipiter Communications Inc., Petition for Reconsideration and Clarification, CC Docket No. 01-92, *et al.* (filed Dec. 29, 2011); Central Texas Telephone Cooperative, Inc., Application for Review, WC Docket Nos. 10-90, 05-337 (filed May 25, 2012).

has become available in the past eleven months demonstrating the extent to which the formulas have caused universal service support to become unpredictable, contrary to section 254's requirements.

One notable example of additional evidence that was not available when the Rural Associations filed their Application for Review is a detailed study submitted by Alexicon Telecommunications Consulting (developed in cooperation with Balhoff & Williams) entitled "Lessons from Rebuilding the FCC's Quantile Regression Analysis."[8] The *Alexicon/Balhoff Study* extensively documents attempts to reconstruct the Bureau's regression formulas, including data inputs, development of variables, and associated statistical analyses. Among the issues and flaws found were inclusion of what appeared to be arbitrary amounts and differing allocation schemes in the variables, numerous problems with independent variables used in the models, omission of factors needed to explain carrier costs in any given year, and the Bureau's failure to deal with outliers in crafting the formulas.[9]

Significantly, the *Alexicon/Balhoff Study* also highlighted the fact that the Bureau's analysis does not really rely on comparisons of "similarly situated" companies but instead simply lumps all rate-of-return carriers together. According to the *Alexicon/Balhoff Study*, this "loose application of the principle related to comparisons with 'similarly-situated peers' appears contrary to both the FCC's stated objectives with respect to the model and the FCC's explicit delegation/ instruction to the Bureau."

There are many other examples of such evidence having been placed into the record as greater opportunity for examination and analysis of the highly complex regression analysis

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[8] Letter from Vincent H. Wiemer, Alexicon Telecommunications Consulting, to Marlene H. Dortch, FCC, WC Docket No. 10-90, Attach. (filed Feb. 21, 2013) (*Alexicon/Balhoff Study*).

[9] *See id.* at 14-25.

formulas and caps became available. Since release of the Bureau's *HCLS Benchmarks Order*

and in the wake of the Application for Review that was filed just a month later, numerous

affected companies have attempted to replicate or reconstruct how the benchmarks were applied

to them, so as to predict whether and to what extent their individual investments and

expenditures might be subject to new caps. Most were unable to do so.[10] In some of these cases,

difficulties were caused by the use of significantly erroneous individual company data in the

QRA models. A recent filing by Vantage Point Solutions, submitted on behalf of South Slope

Cooperative Communications (South Slope), is typical; it explained the data used to determine

South Slope's housing units per square mile appeared to be too high by a factor of ten (*i.e.,*

whereas actual housing density in South Slope's area is approximately 42 housing units per

square mile, the data used by the Bureau in computing benchmarks was over 400 housing units

per square mile).[11]

Other entities report problems of currently unknown nature that have prevented them

from checking the accuracy of their benchmarks. For example, even though their underlying data

appear correct, Wauneta Telephone and Rural Telephone Service Company were unable to

reproduce the capital and operating expense limits the Bureau had computed for them using the

Bureau's formulas.[12] US Telecom has reported anomalous results for Silver Star involving road

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[10] *See, e.g.,* Letter from Vincent J. Wiemer, Alexicon, to Marlene H. Dortch, FCC, WC Docket Nos. 10-90, 05-337 (filed Feb. 6, 2013); *see also* Letter from Stacey Brigham, TCA, to Marlene H. Dortch, FCC, WC Docket No. 10-90 (filed Oct. 18, 2012); Letter from Mark R. Martell, RTI, to FCC, WC Docket No. 10-90 (filed June 26, 2012); Letter from Larry B. Mason, Southern Montana Telephone, to Sharon Gillett, Wireline Competition Bureau, WC Docket No. 10-90 (filed June 1, 2012).

[11] Letter from Larry D. Thompson, Vantage Point Solutions, to Marlene H. Dortch, FCC, WC Docket No. 10-90 (filed Mar. 13, 2013).

[12] Letter from Loretta M. Raile and Randell J. Raile, Wauneta Telephone, to Sharon Gillett, Wireline Competition Bureau, WC Docket Nos. 10-90, 05-337 (filed June 26, 2012); Letter from

miles, frost-free days and lower costs.[13] Ritter Communications and JSI likewise demonstrated

how companies with similar numbers of access lines per square mile could have significant

differences in costs.[14] Recently, WTA and NTCA filed an extensive list of "Technical

Concerns" with the model, which point out further problems that contribute to unpredictability.[15]

The unpredictability associated with the benchmark approach has brought RLEC

investment in telecommunications and broadband infrastructure to a virtual halt for many

companies. A survey earlier this year by NTCA found that 69 percent of its responding RLEC

members were postponing or cancelling fixed network upgrades as a result of the uncertainty

surrounding the regression model and other elements of the *USF/ICC Order*.[16] The recent

Alexicon/Balhoff Study observed that two major lenders to RLECs -- CoBank and the Rural

Utilities Service ("RUS") -- have reported sharply lower lending to RLECs for rural network

infrastructure during the past year.[17] CoBank has indicated that it is making no new

infrastructure loans in light of the regression uncertainty, while RUS was able to lend only 11.6

Rhonda S. Goddard, Rural Telephone Service, to Sharon Gillett, Wireline Competition Bureau, WC Docket Nos. 10-90, 05-337 (filed May 8, 2012).

[13] Letter from David Cohen, US Telecom, to Marlene H. Dortch, FCC, WC Docket Nos. 10-90, 05-337 (filed May 30, 2012) (*US Telecom May 30th Letter*). Specifically, Silver Star discussed how it was counter-intuitive to have a positive correlation between lower cost and fewer frost-free days.

[14] Letter from John Kuykendall, JSI, to Marlene H. Dortch, FCC, WC Docket Nos. 10-90, 05-337, *et al.* (filed Mar. 20, 2012). JSI noted differences in terrain and elevations for companies having 5.81 and 5.64 access lines per square mile revealed vastly different costs in the provision of services and facilities.

[15] *See* Letter from Michael R. Romano, NTCA and Derrick Owens, WTA, to Marlene H. Dortch, FCC, WC Docket No. 10-90, Attach. (filed Mar. 6, 2013) (*NTCA/WTA Technical Concerns List*).

[16] *See* NTCA, "Survey: FCC USF/ICC Impacts: Summary of Results" (Feb. 19, 2013), available at http://www.ntca.org/2013-press-releases/survey-shows-rural-telecommunications-carriers-postponing-delaying-network-upgrades-because-of-regulatory-uncertainty.html (*NTCA Survey Results*).

[17] *Alexicon/Balhoff Study* at 29.

percent of the $690 million in rural telecommunications infrastructure loan funds that it had available for 2012 (a major change from recent years, when RUS has typically lent 80-to-100 percent of such available funds).[18] The third major lender to RLECs, the Rural Telephone Finance Cooperative ("RTFC"), has warned the Commission that the changes and uncertainties regarding high-cost support increase the likelihood of loan covenant breaches and payment defaults, and that RLEC access to financing is becoming difficult due to inability to satisfy established metrics of creditworthiness.[19]

In sum, the record amassed in this proceeding, based upon analyses and examinations undertaken since the Rural Associations' Application for Review was filed, dramatically demonstrates serious flaws in the regression formulas as implemented and in their current form. This evidence, which does not appear to have been given due consideration by the Commission, warrants reconsideration of those specific aspects of the *Sixth Order* as discussed herein.

II.   DESPITE IMPROVEMENTS, THE BUREAU'S REGRESSION FORMULAS REMAIN FUNDAMENTALLY UNSTABLE AND UNPREDICTABLE.

In a recent brief filed in the Tenth Circuit, the Commission, citing *Qwest Corp. v. FCC*, 283 F.3d 1191, 1200 (10th Cir. 2001), asserted that it "has a 'mandatory duty' to 'base its universal [service] policies on the principles listed in §254(b)' of the Act."[20] Whereas the Commission's argument focused upon the provision of reasonably comparable access to advanced communications and information services, section 254(b)'s mandates also include

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[18] *Id. See also*, Letter from Robert F. West, Senior Vice President, Communications Banking Group, CoBank, to Marlene H. Dortch, Secretary, WC Docket No. 10-90 (filed May 8, 2012).

[19] Letter from Lawrence Zawalick, Senior Vice President, RTFC, to Honorable Julius Genachowski, WC Docket No. 10-90 (filed June 4, 2012).

[20] Federal Respondents Uncited Response to the Joint Universal Service Fund Principal Brief of Petitioners at 2, In Re: FCC 11-161, No. 11-9900 (10th Cir. Mar. 6, 2013) (*FCC Response to Petitioners' Principal USF Brief*).

"specific, predictable and sufficient Federal and State mechanisms to preserve and advance universal service."[21]

While taking a number of steps to revise the QRA caps in the near-term,[22] and even as it acknowledges that more remains to be done to address the predictability and volatility problems caused by the caps and underlying models,[23] the Commission's *Sixth Order* largely denies Applications for Review filed by the Rural Associations and other parties, and continues to assert that the caps are predictable and stable.[24] Unfortunately, the record – and some of the Commission's own steps in the *Sixth Order* – indicates otherwise. Indeed, the QRA caps cannot be considered predictable on the face of the current record.

First, the Rural Associations and other stakeholders have demonstrated repeatedly over the past year that the formulas in their current form do not result in predictable support or encourage infrastructure investment, but rather produce random decreases and redistributions of support that no rational company manager can plan for or anticipate over time.[25] Any potential for predictability in the current caps mechanisms is further undermined by the fact that the actions of *all* other RLEC high-cost support affect on the QRA caps as they are recalculated. As a result, even if an RLEC could somehow solve the randomness within the model and then estimate, with a minimum level of certainty the investments that it might be deemed "efficient"

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[21] 47 U.S.C §254(b)(5).

[22] *Sixth Order* ¶¶ 16 (directing the Bureau to examine how the caps might be held more constant rather than fluctuating from year-to-year), 28-29 (directing the Bureau to consider ways of implementing a single regression formula while summing the existing separate caps for 2013), and 30 (modifying the phase-in of the caps in 2013).

[23] *Id.* ¶¶ 15-16.

[24] *Id.* ¶¶ 32-33.

[25] *See, e.g., Rural Associations' AFR*, Exh. 1; *Alexicon/Balhoff Study* at 28-32; *NTCA/WTA Technical Concerns List*, points 8, 9.

enough to make and yet remain under the caps, the success or failure of any efforts at "prudence" under the current cap regime are ultimately contingent upon an unobtainable snapshot of the actions (or inaction) of other RLECs.[26]

This situation is complicated further by the two-year lag under which the HCLS program operates; that is, 2013 support distributions are based on 2011 investments. Commissioner Pai accurately sums up the task facing a typical RLEC, stating that "a rural carrier seeking to adjust its operating expenses *today* needs to know what the QRA benchmarks will be two years from now—in 2015—because those are the benchmarks that will apply to *today's* spending."[27] Yet, an RLEC cannot predict this 2015 benchmark because it will be based on a significantly revised model and new data.[28] Thus, a carrier seeking to develop, *today*, a reasonable operating and investment plan must do so without any ability to determine which potential investments will be fortunate enough to be deemed "efficient" enough to fall within the 2015 QRA cap.

To be absolutely clear to the extent that this has somehow been lost in prior advocacy – small rural carriers are not looking for *guaranteed* outcomes from the model or the caps. But as providers of last resort they are entitled by law and good public policy to some reasonable level of visibility into what the outcomes will be over time, in order to plan accordingly. As the record shows, the current caps fall far short in this respect.

Second, assuming *arguendo* the QRA framework were more stable and provided some reasonable level of visibility into how the caps might shift in subsequent years, such visibility is confounded by the acknowledged existence of material errors, such as study area boundary flaws

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[26] *See Sixth Order*, Statement of Commissioner Pai, at 30. (stating that, "the whole point of the QRA benchmarks is to induce rural carriers to reduce their spending, which *will* necessarily feedback into QRA benchmarks for future years") (emphasis in the original).

[27] *Id*. at 31. (emphasis added).

[28] *See id*.

in the current model that will directly impact many of the variables used. While the Bureau is working diligently to remedy some of these shortcomings (*e.g.,* correcting study area boundaries), other data errors (such as costs in Alaska[29] and road data across the country[30]) remain outstanding with no resolution in sight.

The *Alexicon/Balhoff Study* and the Technical Concerns list submitted by NTCA and WTA deconstruct the QRA and identify numerous deficiencies in its design. The *Alexicon/Balhoff Study*, for example, provides a detailed inspection of the 16 variables used in the model and identifies no fewer than six general categories of flaws that afflict them. Some of these flaws may be mitigated when the Commission corrects the data errors noted above.[31] But merely correcting input data would not eliminate all the problems with the independent variables.

Third, even the process for undertaking corrections of these data errors itself introduces significant unpredictability. Whereas corrections are needed, the fact remains that in making them the Bureau will effectively be pressing a giant "reset button" with respect to the entire model and the resulting caps for 2014 as it incorporates new data and corrected study area boundaries, and creates new variables and calculates new coefficients.[32] Existing QRA

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[29] *E.g.,* Letter from Stephen Merriam, Arctic Slope Telephone Association Cooperative, Inc., to Marlene H. Dortch, FCC, WC Docket No. 10-90 (filed Feb. 27, 2013); Letter from Thomas J. Navin, Matanuska Telephone Association, to Marlene H. Dortch, FCC, WC Docket No. 10-90 (filed Aug. 3, 2012).

[30] *E.g.,* Letter from Jeffry H. Smith, GVNW, to Marlene H. Dortch, WC Docket No. 10-90 (filed Dec. 4, 2012); Letter from Mary J. Sisak, Silver Star Telephone Company, to Marlene H. Dortch, FCC, WC Docket No. 10-90 (filed Nov. 12, 2012).

[31] *Alexicon/Balhoff Study* at 17.

[32] *See NTCA/WTA Technical Concerns List,* point1 (stating that "the correction of geographic boundary data is likely to produce significant swings in coefficients. This confirms that the model may be subject to wide swings based on correction of only a single study area boundary, and that predictability or certainty will be unobtainable until, at a minimum, this process is complete and coefficients are reset."); Letter from Michael R. Romano, Sr. Vice President – Policy, NTCA, to Marlene H. Dortch, Secretary, WC Docket No. 10-90, *et al.* (filed Jul. 12,

benchmarks are having real impacts now on some companies in terms of reduced cash flows, and they are having adverse impacts now on planning by *many more* companies in that they are creating a fear of being "the next to fall" in the absence of greater transparency and predictability. Just as it has reconsidered the extent to which the caps should be modified to ensure greater predictability from year-to-year,[33] the Commission should reconsider how and to what extent the caps will apply in the face of such significant impending changes at the end of this year.

Fourth, in addition to data errors, a number of technical flaws still resident within the QRA caps and underlying model undermine any sense of predictability or reliability in the current framework. The Rural Associations highlighted several such concerns in a recent filing, including: (1) the fact that the formulas do not capture accurately census blocks within study areas (including the mis-attribution of certain rural census blocks as urban based upon their inclusion within a group that contains some urban census blocks);[34] (2) the need to use a more reliable dependent variable;[35] (3) the need for restructuring and more deliberate selection of statistically significant independent variables within the model through robust – and publicly available -- testing;[36] (4) the need to perform further analysis of those independent variables to

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2012) (filed with an attached exhibit showing "the significant 'ripple effects' on support payments across 113 different study areas arising out of just the correction of a single variable for two other study areas for boundary data").

[33] *Sixth Order* ¶ 16; Statement of Commissioner Rosenworcel, at 28.

[34] *NTCA/WTA Technical Concerns List*, point 2.

[35] *Id.*, point 3.

[36] *Id.*, points 4 and 5; *See also* Letter from Thomas Moorman, Counsel to Nebraska Rural Independent Companies, to Marlene H. Dortch, FCC, WC Docket Nos. 10-90, *et al.*, Attach. (Nebraska Rural Independent Companies' Capital Expenditure Study: Predicting the Cost of Fiber to the Premise) (filed Jan. 7, 2011) (documenting a need to screen out 50% of roadway data to achieve reasonable reliability). The need for such screening would preclude use of accurate data for most rural study areas.

isolate the outstanding reasons for any lingering counterintuitive results and to establish an appropriate time for updates to them;[37] and (5) the need for public testing once this other work is done to ensure reasonable predictability (and a lack of volatility) in the model and the resulting caps.[38]

This last point – the need for testing that is publicly available for review and comment by affected parties and other stakeholders – is particularly critical. The Rural Associations therefore renew their prior requests that the Commission or the Bureau release for public review the results of any testing conducted with respect to the model and the resulting caps.[39] The Commission and Bureau could perhaps go a long way toward resolving or dispelling concerns with respect to the predictability of the caps, or at least furthering the conversation about how to improve the caps to achieve sound public policy objectives, by releasing the results of any such tests into the record of the relevant proceedings.

Despite this growing evidence accumulated over the last eleven months, the Commission rejects claims that fundamental errors that fissure the foundation of the QRA violate section

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[37] *NTCA/WTA Technical Concerns List*, points 7 and 8.

[38] *Id.*, point 9.

[39] *See, e.g.,* Letter from Michael R. Romano, Sr. Vice President – Policy, NTCA, to Marlene H. Dortch, Secretary, WC Docket No. 10-90, *et al.* (filed July 19, 2012); Letter from Michael R. Romano, Sr. Vice President – Policy, NTCA, to Marlene H. Dortch, Secretary, WC Docket No. 10-90, *et al.* (filed Jul. 16, 2012); Letter from Michael R. Romano, Sr. Vice President – Policy, NTCA, to Marlene H. Dortch, Secretary, WC Docket No. 10-90, *et al.* (filed July 13, 2012) ("[NTCA] also highlighted the troubling fact that the caps appear to have been implemented without any testing – at least any that has been publicly disclosed – to confirm or deny their volatility or even their validity in the first instance. [NTCA] explained that the raw data made available thus far with respect to the caps does not enable such testing or constitute such verification. NTCA therefore urged the [Commission] to produce the results of such testing (if it has been conducted), to suspend the caps and conduct such testing (if it has not been performed), and ultimately to provide clearer and more transparent 'business rules' that provide sufficient support and enable company managers to understand with a reasonable degree of certainty what investments.")

254's "predictability" requirement.[40] Instead, the *Sixth Order* cites the Fifth Circuit's *Alenco* decision and asserts that the Commission can satisfy the statute by adopting predictable *rules* that govern distribution of subsidies.[41]

Unfortunately, the regression-related distribution rules are *not* predictable. Rules that rely on inaccurate or outdated data; that fail to obtain meaningful statistically relevant outcomes; and that produce unpredictable outcomes on an annually changing basis cannot reasonably be deemed "predictable."[42] The process offered by the Commission affords no avenue to obtain foresight on the basis of past experience and observation since the governing thresholds change annually in non-transparent ways.

Contrary to claims, petitioners and the rural carriers they represent do not seek "predictable market outcomes"[43] but simply rules that establish a transparent, predictable process where one can have reasonable expectations, not necessarily exact certainty, as to what might cause funding amounts to change from year to year. Although pre-reform HCLS mechanisms tied to the NACPL injected some annual variability in support, the Rural Associations have previously demonstrated that those changes were in fact highly predictable.[44] By contrast, the

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[40] *Sixth Order* ¶ 33.

[41] *Id.*

[42] "Predictable rules" as used by the *Alenco* court cannot mean simply predictable procedures. After all, state lottery agencies operate according to very predictable rules that generate extremely unpredictable results, but the Communications Act surely would not allow this Commission to use those agencies' procedures to distribute high-cost support funds. Rather, the rules must be such as to allow a reasonable opportunity for companies to predict their effect on future support.

[43] *FCC Response to Petitioners' Principal USF Brief* at 44-45 ("Petitioners have made clear that what they seek 'is not merely predictable funding mechanisms, but predictable market outcomes' – something to which the Act does not entitle USF recipients.")

[44] *See Rural Associations' AFR* at 18 and Exh. 8. The *Sixth Order* does not address this contrary evidence. In pleadings before the 10th Circuit, the Commission continues to assert that existing

QRA is a multi-variable statistical model whose components are recalculated annually (at least

for now) based upon the actions two years earlier of a pool of carriers, offering no discernible

basis for future outcomes that serve to inform a carrier considering whether to undertake

investments or incur additional operating expenditures.

The impacts of this regulatory uncertainty are having real impacts now on rural

investment, to the detriment of rural consumers.[45] The Commission should therefore reconsider

its conclusion in response to the Applications for Review that the caps are "predictable," and

should instead ensure that its staff undertakes the review, analysis, modifications, and testing –

all in public forums – to develop a system that in fact provides reasonable predictability for

carriers seeking to justify long-term investments in hard-to-serve rural areas.

III.   THE BUREAU'S METHODOLOGY DOES NOT RELY ON STATISTICAL ANALYSIS OF "SIMILARLY SITUATED" COMPANIES, AS THE *USF/ICC ORDER* DIRECTED.

The Rural Associations' AFR pointed out that a key flaw in the methodology was its

failure to rely on statistical analysis of "similarly situated" companies, as the *USF/ICC Order*

directed. Rather, as the Rural Associations explained, instead of evaluating the 90th percentile of

"look alike" companies, the current form of the model

> merely estimates a trendline . . . . In fact, there are no specific 'similarly situated'
> companies involved in this comparison. Not only do capped carriers not have
> clear 'peers' to look to in determining how their operations might become 'more
> efficient' or 'more prudent,' the caps are inconsistent with Commission
> expectations.[46]

HCLS mechanisms are unpredictable as well, despite this record evidence to the contrary. *FCC Response to Petitioners' Principal USF Brief* at 45.

[45] *Supra* at 6.

[46] *Rural Associations' AFR* at 13.

Recently, the *Alexicon/Balhoff Study* addressed the same fundamental issue in more

detail:

> It is important to understand from the outset that the FCC's commentary that the
> QRA provided a comparison of costs with "similarly-situated companies" does
> not mean that carriers of certain sizes are compared nor does it mean that
> companies in Alaska are compared with each other. It means that the carrier is
> compared with all the other 725 rate-of-return carriers. This loose application of
> the principle related to comparisons with "similarly-situated peers" appears
> contrary to both the FCC's stated objectives with respect to the model and the
> FCC's explicit delegation/instruction to the Bureau. Comparability of data is a
> serious issue in assessing the costs of rural telecommunications carriers. The 726
> study areas involved in the QRA range from single-exchange carriers with less
> than 200 access lines to carriers that are over 100 times that size situated in vastly
> differing geographic areas. There are two main ways to ensure comparability of
> data. The first is to capture all or the vast majority of the causes of differences
> between costs in the study areas. The second is to segregate the data into more
> comparable subsets (i.e., compare study areas of similar size, geography,
> broadband deployment, etc.). The QRA does not attempt to do either.[47]

This is not a minor "technical" problem. The Commission's fundamental instructions to

the Bureau were to develop benchmarks that could identify instances of wasteful investment or

inefficient spending. In so doing, the Commission indicated that comparison to similarly

situated companies was indeed its only basis for judging a company's costs to be excessive.

Thus, if the QRA models do not achieve comparisons to similarly situated peers, the

Commission has no basis for capping expenses of companies whose costs exceed the model

benchmarks.[48]   Further, the Commission itself has made plain a key reason why support

provided subject to the benchmarking process remains "predictable" within the meaning of

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[47] *Alexicon/Balhoff Study* at 23.

[48] Without comparisons to "similarly situated" companies, the Bureau's QRA formulas can only
reveal companies with high relative costs, without any basis for asserting that costs in a
particular instance are excessive or inefficient. *Id. See also, e.g., Rural Associations' AFR* at 13;
NTCA/WTA Technical Concerns List at 1; *US Telecom May 30th Letter* at 1; Letter from David
Cosson, Counsel to Rural Telephone Service Company, to Marlene H. Dortch, FCC, WC Docket
No. 10-90, Attach., at 23 (filed Apr. 16, 2012).

section 254 is because the formulas are based on analyses of "similarly situated" peers.[49] If this

is not the case, claims the models produce "predictable" results ring hollow as well.

Despite the obvious importance of these issues, however, the *Sixth Order* appears to

reflect no serious consideration as to whether the Bureau in fact used similarly situated

companies to develop its benchmarks. Instead, the *Sixth Order* dismisses such concerns by

concluding in summary fashion that the Bureau "took a reasonable approach" by considering "all

the significant variables in determining the caps, in effect comparing each company to all other

companies to the degree to which the companies are similar in regard to the variables found to be

significant (*i.e.*, the degree to which they are similarly situated)."[50]

It thus appears that the Commission recognizes the Bureau's process merely compared

individual companies to all other companies based on analysis of a number of individual

variables (variables which, as discussed above, have been shown to have serious flaws).

Benchmarks assigned to particular study areas in this manner could perhaps be justified _if_ they

accurately reflected relationships between costs and other variables. But the record before the

Commission prior to issuance of the *Sixth Order* showed this was not so. The Rural

Associations' AFR highlighted, for example, the ineffectiveness of the benchmarks in

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[49] *See supra,* n.6 (discussing Commission's rejection of Accipiter's claims of "unpredictability" on grounds the formulas are designed precisely to compare individual costs to similarly situated peers based on analysis of significant cost drivers such as density, terrain and operating environment.)

[50] *Sixth Order* ¶ 34. The Commission also referenced a footnote in Appendix H of the *USF/ICC Order,* which stated the term "similarly-situated peers" was only intended to mean that "based on data from all the carriers in the analysis, if there were (hypothetically) 100 study areas with independent variable values that were nearly the same as those with the study area in question, 90 of them would be expected to have values equal to or less than the 90th percentile prediction. It does not mean the carriers with the most similar number of loops (or values of the other variables)." *Id.* at n.90, citing *USF/ICC Order*, Appendix H, n. 1.

identifying companies with the highest cost per loop,[51] citing in particular cases of companies with severe benchmark caps whose cost per loop is not anywhere near the highest among the rural companies. Other examples of such anomalous results were provided to the Commission following the Bureau's *HCLS Benchmarks Order* and the Commission failed to address them.[52]

It would have been easy to test the reasonableness of the Bureau's benchmarking approach by comparing whether groups of "peer" study areas based on the sixteen variables actually have similar benchmarks.[53] As discussed in the attached paper ("Statistical Tests of Benchmarks of Similarly Situated Companies") actual benchmarks produced by the formulas do not in fact treat similarly situated companies in a similar fashion. Regardless of how one defines an analysis of similarly situated companies, benchmarks that fail to accomplish this basic goal appear inherently arbitrary and capricious.

As a result of these concerns, neither the Bureau nor the Commission can state with any certainty whether the formulas in their current form actually identify instances of excessive or wasteful spending. The Commission should accordingly reconsider and reverse its determination in the *Sixth Order* that the benchmarks in their current form successfully identify "similarly situated" companies and find instead that the formulas do not comport with the delegation of authority made in the Commission's *USF/ICC Order*.

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[51] *Rural Associations' AFR* at 6-7.

[52] For example, Ritter Communications and JSI demonstrated how the use of access lines per square mile of service territory gives the illusion of cost similarities between companies when a more comprehensive examination revealed significant differences. Letter from John Kuykendall, JSI, to Marlene H. Dortch, FCC, WC Docket Nos. 10-90, 05-337, *et al.* (filed Mar. 20, 2012). JSI noted differences in terrain and elevations for companies having 5.81 and 5.64 access lines per square mile revealed vastly different costs in the provision of services and facilities. *Id.*

[53] In the case of study areas without matching peer groups, resulting benchmarks should at least be close to companies that might be considered "near matches."

IV. THE COMMISSION SHOULD DIRECT THE BUREAU TO USE THE BENCHMARKS SOLELY AS TRIGGERS FOR FURTHER REVIEW.

Based on the above points, it is clear the Commission cannot rationally continue to utilize QRA-based benchmarks to automatically reduce HCLS support payments to RLECs. The Rural Associations accordingly request reconsideration of the Commission's rejection of the reasonable alternative advanced in several applications for review that the QRA models and benchmarks be used "only to trigger a harder look to determine whether a carrier's costs were truly 'inefficient'."[54]

Regression benchmarks used solely as triggers would permit evaluation of costs and circumstances in a reasoned manner calculated to encourage prudent investment and operation. In contrast, rigid benchmarks that arbitrarily and automatically disallow certain investments and expenses have had the opposite impact, particularly because the underlying regression model remains subject to the significant flaws and fluctuations detailed above. As noted by the *Alexicon/Balhoff Study*, "use of the model as an automatic disallowance . . . create[s] a much higher level of unpredictability . . . ."[55] As evidenced by the NTCA study and CoBank, RUS and RTFC experiences described above, this unpredictability leads to industry-wide disincentives to invest and propagates precisely (if not perversely) the opposite result of what the Commission has pledged to be the goal of reform, specifically, increased broadband deployment.

Notably, the HCLS mechanism to which the regression model currently applies is a capped fund, and existing benchmarks primarily redistribute HCLS dollars among certain

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[54] Application for Review of the Blooston Rural Broadband Carriers, WC Docket Nos. 10-90 and 05-337, at 10 (filed May 22, 2012); Application for Review of Blue Valley Tele-Communications, Inc., WC Docket Nos. 10-90 and 05-337, at 10 (filed June 22, 2012); Supplement to the Application for Review of Silver Star Telephone Company, Inc., WC Docket Nos. 10-90 and 05-337, at 3 (filed June 22, 2012).

[55] *Alexicon/Balhoff Study* at 28.

recipients without significantly impacting the targeted budget for the Commission's High-Cost

Support programs. The primary effect of the regression model has thus been to render HCLS

receipts of individual RLECs unpredictable. By creating concerns among RLECs and their

lenders that increased capital and/or operating expenditures will cause them to lose support under

future benchmarks, the QRA models have discouraged many RLECs from making the significant

investments necessary to improve voice and broadband services, even if they might appear to be

"winners" under the caps in the short-run. This suppression of private investment to advance

broadband in rural America is in serious conflict with the goals of the National Broadband Plan

and good public policy.

  While the Rural Associations continue to work with the Bureau to improve the data and

variables used in the regression model, the most practicable way to achieve the Commission's

stated "expectation" that the regression model will be modified to "provide rural carriers

sufficient certainty … to encourage efficient investment while maintaining the balance struck in

the Commission's reforms to encourage efficient spending by HCLS recipients"[56] is to use the

model's benchmarks solely as triggers for reviews rather than as automatic disallowance devices.

  The initial justification advanced by the Commission for rejecting the trigger alternative –

namely, that it did not provide the Bureau with the discretion to use the regression model in that

manner[57] – is very curious and, in the end, inapposite. In implementing the Commission's

Order, the Bureau in fact modified the Commission's original framework in several key

respects.[58] The Commission, on review, further modified several basic aspects of the Bureau's

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[56] *Sixth Order* ¶ 33.

[57] *Id.* ¶ 35

[58] For example, in response to concerns voiced by commenters and "peer reviewers" on the
Commission's staff, the Bureau decided to reduce the overall number of regressions from 11 to

initial regression model (including reducing the two regression equations to one and summing

the current benchmarks[59]) and directed the Bureau to address predictability, certainty and

investment incentive issues in the future.[60]   Thus, even accepting arguendo that the Bureau did

not have authority to modify the formulas in this manner, the Commission certainly had full

authority on review, and continues to have full authority on reconsideration, to re-examine and

modify the manner in which the regression model and benchmarks are applied. [61]

The Commission's other justification – that it was reasonable for it to adopt a general rule

to identify carriers with costs that are significantly higher than their peers instead of relying on

more costly and burdensome approaches like audits[62] -- is fraught with unwarranted and

erroneous assumptions and disregards applicable legal mandates.

Assuming *arguendo* that the transparency, accuracy and predictability of the regression

model could be improved as recommended above, it would still be a model that can only abstract

some elements of the actual operating conditions faced by more than 700 RLECs.   However, if

the Commission's determination is that the model must be used to develop benchmarks even as

fixes are being made, it would seem more reasonable to use the benchmarks developed by such a

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2, and modified the Commission's initial methodology to include additional independent variables. *See Bureau HCLS Benchmarks Order* at ¶¶ 17-19.

[59] *Sixth Order* ¶¶ 24-29.

[60] *Id.* ¶ 33.

[61] The Rural Associations' Application for Review pointed out that the authority delegated to the Bureau to implement the regression formulas was, if anything, *too* broad, and that the unprecedented scope of this authority raised significant legal concerns about unpredictability in future formula iterations. *Rural Associations' AFR* at 20-21. Indeed, the rule directing the Bureau to issue annual updates to the formulas contains no substantive standard whatsoever – it merely directs the Bureau to issue annual schedules adjusting support. 47 C.F.R. § 36.621(a)(5) ("Study area unseparated loop cost may be limited annually pursuant to a schedule announced by the Wireline Competition Bureau.") The Commission has yet to address this aspect of the Rural Associations' AFR.

[62] *Sixth Order* ¶ 35.

model solely to *identify* carriers with costs that are significantly higher than those of a benchmark or comparison group. The point is that a regression model could be more appropriately used to identify HCLS recipients with above-benchmark costs that should be reviewed more closely, but is not competent to disallow certain costs automatically without any consideration of their reasons and circumstances under which they were incurred.

Moreover, the review following identification of a carrier with above-benchmark costs does not need to be a full-fledged audit, or an otherwise costly and burdensome approach. First, the number of such reviews will be limited and manageable. For example, the Commission's recent Public Notice[63] identifies only 71 carriers as exceeding the newly summed CapEx-OpEx benchmark during the remainder of 2013. Where a carrier's costs have exceeded a benchmark, it should be relatively simple to determine the handful of particular investments and/or operating expenses that have contributed significantly to such overage and to determine whether such expenditures were likely reasonable and prudent. Where a substantial recent capital investment has been made (for example, a fiber upgrade), the associated sudden increase in CapEx causing the company to exceed the trigger level can be readily explained. Similarly, substantial maintenance costs are readily ascertainable, and can be evaluated in terms of both normal operating conditions and unusually destructive or disruptive events. In the few instances where such explanations are missing or unclear, closer inspection would be warranted.

Finally, state commissions are very familiar with the service needs and operating conditions and costs within their jurisdictions, and can readily and efficiently conduct reviews of substantial capital expenditures and/or operating expenses in connection with their section 214(e) jurisdiction over the designation of eligible telecommunications carriers ("ETCs") or in

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[63] *Wireline Competition Bureau Releases New High-Cost Support Benchmarks for 2013,* Public Notice, WC Docket Nos. 10-90 and 05-337, DA 13-551 (rel. Mar. 26, 2013).

connection with their certification obligations under section 54.314 of the Commission's rules. Such state commission reviews could be required to be conducted within specific time periods (*e.g.*, within 120 days of Commission request) or by specific annual deadlines (e.g., the October 1 certification date specified in section 54.314). Such reviews would not constitute an unreasonable burden for state commissions; rather, given the relatively small number of RLECs likely to exceed a 90% benchmark, there are likely to be only a handful of reviews for each state commission. In fact, by focusing on a few above-benchmark companies, such reviews could make the annual state certifications under section 54.314 much more efficient and effective.

The major advantage of the trigger approach is that it improves the predictability of high-cost support and thereby encourages RLECs and their lenders to make the additional infrastructure investments necessary to provide quality, affordable and reasonably comparable voice and broadband services in their rural service areas. Such investments will be made if RLECs and their lenders believe that reasonable and prudent expenditures will be supported; but will not be made if such RLECs and lenders fear that costs may be disallowed automatically at sometime in the future because they exceed arbitrary benchmarks.

The Rural Associations and other parties have described numerous ways that the data and variables of the regression model can be improved. Nevertheless, a revised regression model will still be a model that lacks the experience, flexibility and discretion to determine whether specific expenditures were reasonable and prudent and to encourage the infrastructure investment that is essential to the Nation's broadband future. Use of the regression model and benchmarks as triggers for further review of expenditures is the most straightforward and practicable way to improve at least to some degree the predictability of federal high cost support and to revive rural infrastructure investment.

V. CONCLUSION

For all the above reasons the Rural Associations request the Commission reconsider its determinations that the QRA methodology for limiting HCLS results in predictable universal service support as mandated by section 254 of the Act. The Rural Associations also request the Commission reconsider its determination that the Bureau reasonably based its benchmarks on analyses of "similarly situated" companies. As shown herein, this defect entirely undercuts the Commission's rationale for imposing the benchmarks in the first place.

In light of these errors, the Commission should also reconsider its rejection of proposals that the QRA model and benchmarks be used only to trigger a harder look to determine whether a carrier's costs are truly inefficient. This approach constitutes the most straightforward and practical way to address the serious concerns regarding the regression model and associated benchmarks identified in prior filings and in this petition for reconsideration.

Respectfully submitted,

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April 18, 2013

Attachment

Statistical Tests of Benchmarks of "Similarly Situated" Companies

Statistical Tests of Benchmarks of "Similarly Situated" Companies

      The Commission has adopted statistical models for use in establishing benchmarks, above which costs reported by rural exchange carriers will not be eligible for universal service support. These benchmarks are said to be based on costs of "similarly situated" study areas. If a company's costs significantly exceed those of its peers, as imputed by the Commission's models, the company is deemed to have incurred unduly high costs.

      A peer group of similarly situated study areas would ordinarily be understood to be a set of study areas who share relevant attributes. In this case the attributes would be those needed to determine the cost of providing broadband telephone service. If most study areas in the group reported similar costs, it might be fair to suspect an outlier with much higher costs had incurred unnecessary expenses or investment.

      The Commission's models establish benchmarks by calculations using values of sixteen independent variables; *i.e.*, the Commission's analyses determine that these variables are the factors needed to determine the cost of providing service. It follows that a peer group, for the purpose of establishing benchmarks, must be a group that shares similar values of each of the sixteen variables.[1]

      The Commission appears to take the position that it is not necessary that there be an actual peer group of study areas for each company. Rather, the models appear designed to simulate the costs that would have been incurred by the peer group if it actually existed.[2] While this premise is debatable in the abstract, it is readily testable in regards to any particular model. The following test shows, however, that the Commission's models do not establish similar situations.

      Regardless of whether a model relies on data from actual peer groups, for any model to pass the "similar situations" requirement, two principles must be satisfied: a *similarity principle*, and a *dissimilarity principle*.[3] Under the similarity principal, companies who are otherwise similar based on relevant independent variables must mostly be similar in values of cost per loop, and the model must assign similar benchmarks to similar companies. To satisfy the dissimilarity principal, the model must assign *dissimilar* benchmarks to dissimilar companies. If not, then similarity and benchmarks cannot be considered linked.

      The following examples help illustrate these principles. First consider ten companies in Group A whose data are all similar; i.e., each company's value of each of the sixteen variables used in the model is similar to the values reported by each of the

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[1] Finding study areas with similar values of all sixteen variables is extremely difficult. If each of the sixteen variables had only two possible values, there would be 65,536 (2^{16}) possible combinations of values, and only 726 study areas to populate all combinations. Indeed, creating groups by dividing each variable into only two ranges of values (yes/no or above median/below median), produced 408 look-alike groups of study areas, with nearly half of study areas being the sole members of their groups.

[2] *Connect America Fund*, WC Docket No. 10-90, *High-Cost Universal Service Support*, WC Docket No. 05-337, Sixth Order on Reconsideration and Memorandum Opinion and Order, FCC 13-16, n. 90 (rel. Feb. 27, 2013).

[3] In statistical terms, these combined principles are called "statistical significance".

other nine companies. For simplicity, we illustrate just one of the variables in Exhibit 1, count of loops. All study areas listed in Column A1 have counts of loops between 100 and 200, a narrow range considering that the full range of loops counts extends to over 200,000. Column A2 illustrates costs of these ten hypothetical study areas, also similar to each other, with values between $50,000 and $100,000.

Now compare this set of data to hypothetical Group B, a second set of similar companies, but who are dissimilar from Group A. Column B1 shows loop counts of these companies one hundred times as large as those illustrated in Column A1. Likewise, Column B2 shows costs one hundred times larger than column A2. Because the numbers in Column B2 are similar, these costs satisfy the similarity principle. Furthermore, these costs are quite dissimilar to the costs of the smaller companies. This would be an example of similar situations successfully satisfying the dissimilarity principle.

Finally, suppose instead that the companies in Group B had the costs in Column B3. This grouping would be nonsensical. Notwithstanding that the Group B companies are one hundred times larger than the Group A companies, measured by variables reportedly predictive of costs, their costs are identical. The dissimilarity principle is not satisfied.
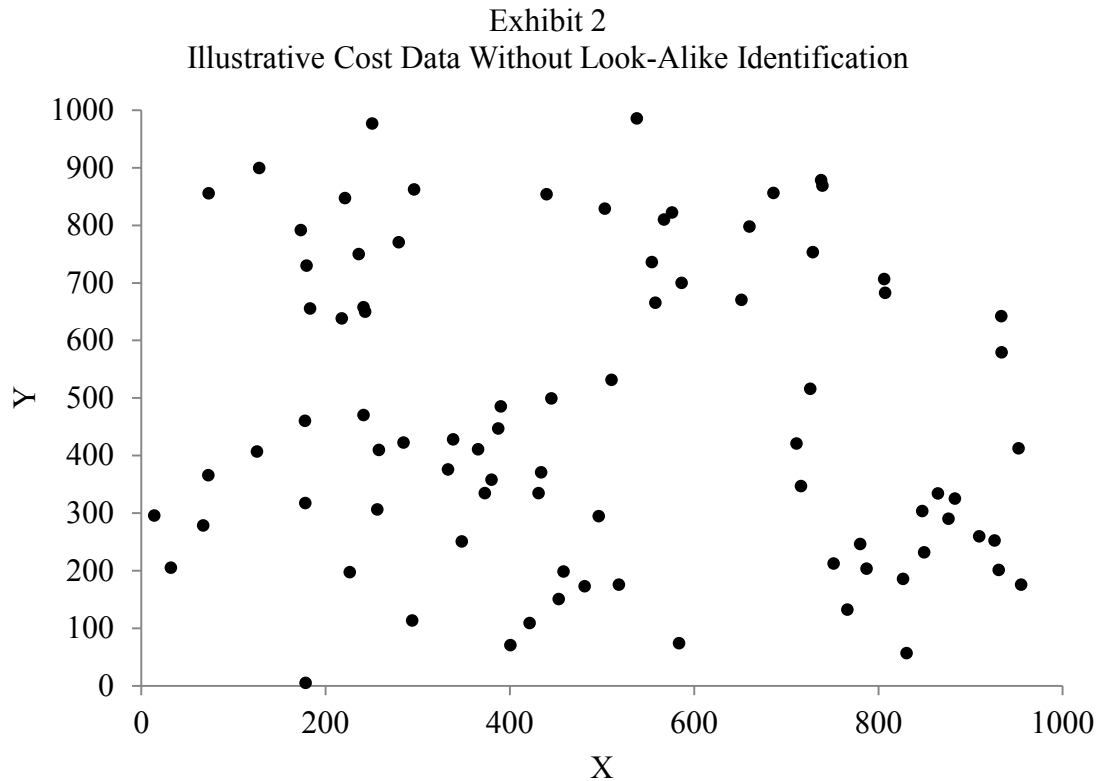
Exhibit 1
Similarity and Dissimilarity Principles

Look-Alike Group A		Look-Alike Group B		
A1	A2	B1	B2	B3
Loops	Costs	Loops	Costs	Alternative Costs
100	$50,000	10,000	$5,000,000	$50,000
110	$55,000	11,000	$5,500,000	$55,000
120	$60,000	12,000	$6,000,000	$60,000
130	$65,000	13,000	$6,500,000	$65,000
140	$70,000	14,000	$7,000,000	$70,000
150	$75,000	15,000	$7,500,000	$75,000
160	$80,000	16,000	$8,000,000	$80,000
170	$85,000	17,000	$8,500,000	$85,000
180	$90,000	18,000	$9,000,000	$90,000
190	$95,000	19,000	$9,500,000	$95,000

Guided by this example, we look at similar and dissimilar groups actually constructed based on the variables in the Bureau's models.

First we consider how a regression model might use variables to target similar situations. This analysis shows that one or more well-chosen variables, when included in a statistical model, could effectively associate data of one observation with others that are similarly situated. The example is constructed from two variables made up of random numbers.

Exhibit 2 shows this data before any effort is made to find variables defining similar situations. Because both the X and Y axis variables are random numbers, the Exhibit shows a general scatter of points across the page, with no apparent correlation. This is characteristic of the relationships between the cost variables in the Commission's

quantile regression models and many of the independent variables, which have previously been shown to be quite weakly correlated.[4]

Exhibit 2
Illustrative Cost Data Without Look-Alike Identification

To illustrate successful identification of similar situations by a model, this test constructed a third variable, which approximately divided points shown in Exhibit 2 into four groups, as shown in Exhibit 3. This demonstrates the kind of correlation one would hope to find studying potential variables for inclusion in a regression model. For example, if the Road Crossings variable used in the Bureau's benchmark models had a strong enough correlation with the cost variable, including it in the model might have had the effect shown.

Like some of the variables used in the Bureau's models, the new variable, X_2, constructed for Exhibit 3 has a predefined list of possible values (in this case, four of them). This variable assumes a value of one generally for data points below the medians of X and Y. Similarly, it assumes values 2, 3 or 4 for other combinations of the two variables above or below their medians. Each value of X_2 is marked by its own shaped marker, allowing the viewer to see the correlation effect of adding this variable to the model. Also, to illustrate that the situations may be similar but not perfect, a few of the data points "bleed" into areas of the graph primarily occupied by other markers.

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[4] NECA, OPASTCO, and WTA Application for Review, WC Docket Nos. 10-90, 05-337, at 13 (filed May 25, 2012).

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Exhibit 3
Illustrative Cost Data With Successful Look-Alike Identification
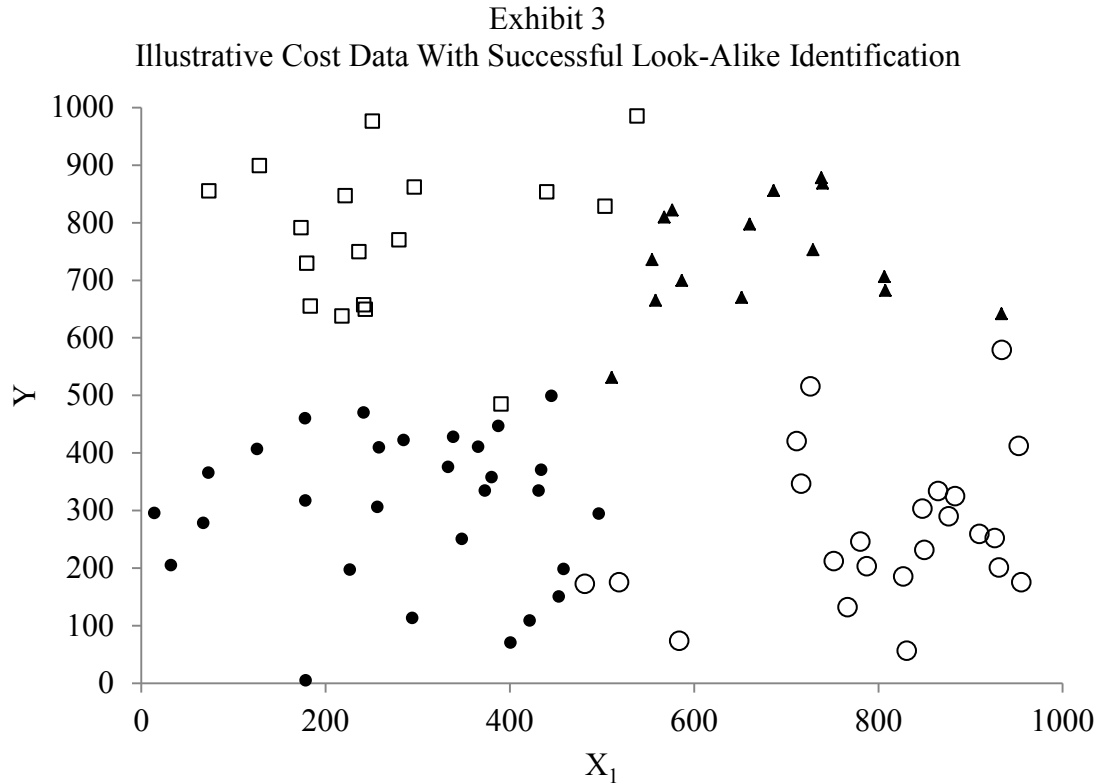
For example, the solid round dots in Exhibit 3 represent data points with variable X_2 equal to 1. Points in this group associate lower than median values of X with lower than median values of Y. This artificial construction of variable X_2 clearly separates data into four distinct groups. Had the Bureau demonstrated that a variable in its model was so effective in explaining variations in cost trends, it would have gone a long way to establishing similarly situated groups of study areas for benchmark analysis.

A simple statistical t-test shows when a subset of the data has values materially different from the remainder of the population. In particular, the t-test of the difference between two means shows whether one group of data, considering its mean and standard deviation, is significantly different than the remainder of the data. This t-test concluded that each of the four groups in Exhibit 3 differs significantly from the remainder of the data not in the group. T- test statistics calculated for each of the four groups are 14.1, 17.5, 17.3 and 24.0 respectively, much higher than the critical test value of 1.97. Such are the values of test statistics that are associated with data patterns like those in Exhibit 3.

While Exhibit 3 shows successful progress toward constructing look-alike groups of X-Y data combinations, it should not be supposed that just any variable would be as useful as X_2 for this purpose. Exhibit 4 shows the effect of a different variable, X_3, in the same model. In this exhibit, the four values of X_3 are similarly designated by different shaped markers. Unlike Exhibit 3, this exhibit shows no clear pattern of data markers associated with values of X_3. This variable does not add materially to success in identifying similar situations.

Nor does a t-test of the difference between means associated with levels of X_3 show significant differences. T-test statistics calculated for each of the four groups are 0.3, 0.1, 0.003 and 0.5 respectively, way below the critical test value of 1.97. Such are the

values of test statistics that are associated with data patterns like those in Exhibit 4, which do not distinguish similar groups, but instead appear to be confetti of shapes apparently scattered at random.

The addition of X_3 to the model does not help find similarity within groups, and does not help show dissimilarity between groups.

Exhibit 4
Illustrative Cost Data With Unsuccessful Look-Alike Identification
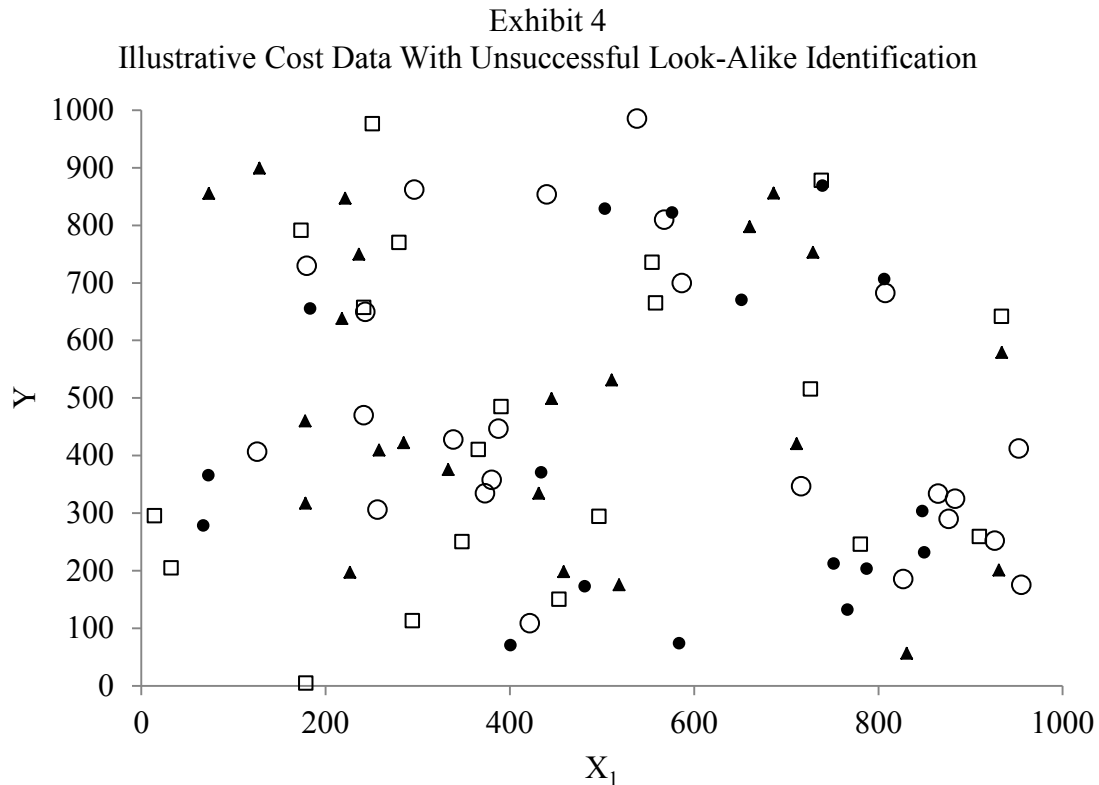
So how well do the variables in the Commission's quantile models contribute to construction of similar situations? To test these variables, Exhibit 5 shows the same type of display as Exhibits 3 and 4, but using cost data from the quantile regression models. The vertical axis represents CAPEX cost per loop of each study area. The horizontal axis represents loop counts, the variable in the models most highly correlated with costs.[5]

The third variable (playing the role of X_2 in the preceding exhibits), was constructed from the Road Crossings variable, the one next most highly correlated with costs.[6] Data points are assigned to groups by dividing into four ranges of Road Crossings.[7]

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[5] *Connect America Fund*, WC Docket No. 10-90, *High-Cost Universal Service Support*, WC Docket No. 05-337, Order, 27 FCC Rcd. 4235 (2012), Table 3, at 43.

[6] *Id.*

[7] Exhibit 5 allows the patterns of data to be evident by suppressing display of the extreme tails of data at the far ends of the horizontal and vertical axes.

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Exhibit 5
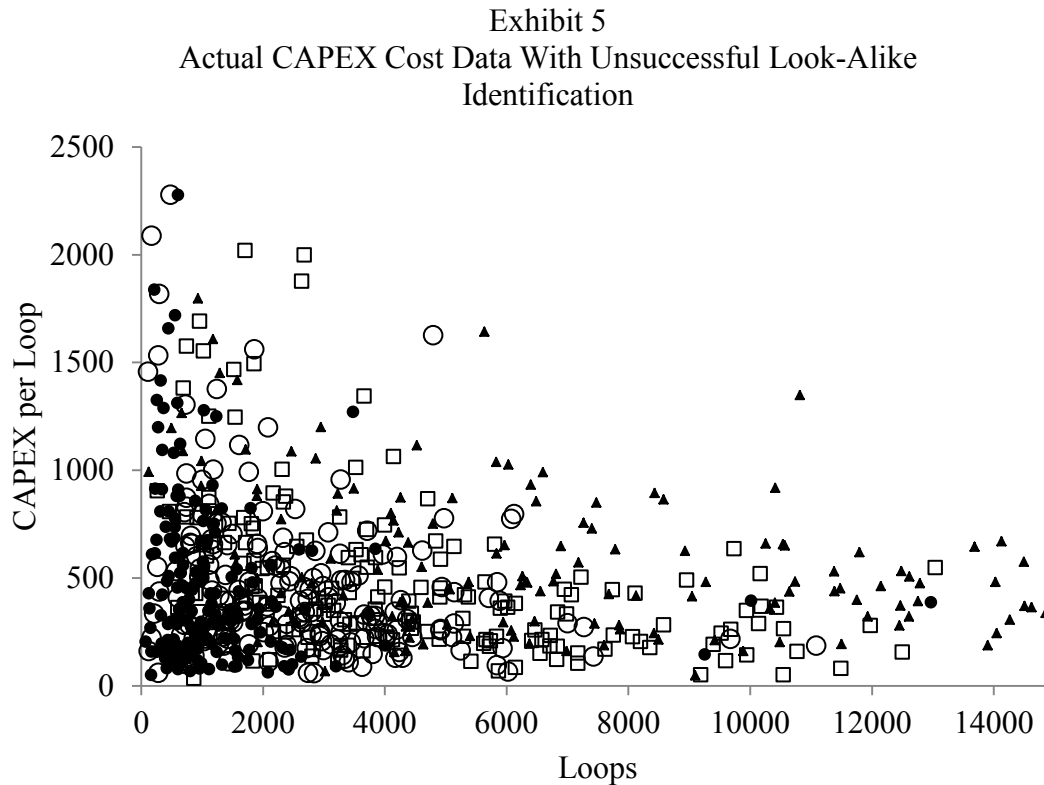Actual CAPEX Cost Data With Unsuccessful Look-Alike
Identification

Exhibit 5 shows that count of loops does relate somewhat to the pattern of CAPEX cost per loop data. Higher values of cost per loop tend to associate more with lower values of loops, and study areas with larger loop counts have a narrower range of variation in cost per loop.

Furthermore, companies with higher loop counts but in the lowest quarter of Road Crossings (the solid round dots) tend to have lower cost per loop than other companies. But for smaller loops sizes, the solid round dots can also be seen at relatively high values of cost per loop. To a limited degree only, these variables do help construct similarly situated groups.

Unlike Exhibit 3, however, clearly distinct groupings of data points are not apparent. Rather, the display is one of intermixed multi-shaped confetti, as in Exhibit 4. Indeed, these variables alone are not sufficient to establish significant t-tests for differences between means. Much more progress in look-alike construction is needed for the models to achieve similar situations. Unfortunately, the correlations with cost data of the remaining fourteen independent variables are not sufficient to successfully find look-alike groups for most study areas.

By these observations, it is seen that Loops and Road Crossings variables do help a little in the objective of finding similar comparators for study areas. They do not succeed, however, in establishing effective groups of look-alike peers. T-statistics comparing each group to the full population are 1.48, 0.23, 1.34, and 0.10 respectively. Two of these are as low as the statistics for the purely random number data used in

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Exhibit 4, and all of them are substantially lower than the significance level of 1.97. Exhibit 5 resembles much more Exhibit 4, the unsuccessful look-alike construction, than it does Exhibit 3, the successful construction.

Indeed, of the 408 look-alike groups of study areas (with regards to independent variable values only) only four groups that are statistically significant contain study areas benchmarked for CAPEX, and only five such groups contain study areas benchmarked for OPEX. Exhibit 6 summarizes this data.

Exhibit 6
Study Areas in Look Alike Groups For 2012 Benchmarks

	CAPEX		OPEX	
	Total	Capped	Total	Capped
Singularly Situated	281	37	281	35
Not Significant and Not Affected	254	0	275	0
Not Significant but Some Affected	113	31	97	32
Significant	78	6	73	7

This exhibit shows that nearly all study areas affected by the caps either have no look-alike peers or belong to groups without statistically significant benchmarks. Only six of those whose CAPEX is affected, and seven of those whose OPEX is affected, have significant benchmarks. Nearly half of all study areas belong to groups with no peers, as do nearly half of those affected by the caps. Compared to the number of capped study areas belonging to statistically significant groups, eleven times as many belong to other groups. Even with sixteen independent variables, the benchmark models do not achieve statistical significance of similar situations. The benchmarks show the "confetti pattern" of unsuccessful look-alikes, not the successful similar situation pattern.

As shown, benchmarks that supposedly rely on analysis of "similar situations" can readily be tested to determine their validity using the methods described above. These analyses make it quite clear that this property is not inherent in every model, and is missing from the current benchmark models. Lacking confirmation by such tests, the Commission's statement that benchmark models compare each company to similarly situated peers does not appear to be based on reasoned findings of fact.