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DAVID L. SIERADZKI
COUNSEL
DIRECT DIAL (202) 637-6462
INTERNET DS0@DC2.HHLAW.COM

COLUMBIA SQUARE
555 THIRTEENTH STREET, NW
WASHINGTON, DC 20004-1109
TEL (202) 637-5600
FAX (202) 637-5910

August 26, 1998

Magalie Roman Salas
Secretary
Federal Communications Commission
1919 M St., N.W.
Washington, D.C. 20554

Re: Federal-State Joint Board on Universal Service, CC Docket No. 96-45

Dear Ms. Salas:

On behalf of Western Wireless Corp. ("Western Wireless"), I am writing to notify you of three *ex parte* presentations made today regarding the above-captioned proceeding.

First, Gene DeJordy, Executive Director of Regulatory Affairs, Western Wireless; Brian Fontes, Senior Vice President for Policy & Administration, Cellular Telecommunications Industry Association; and Michele Farquhar and I of Hogan & Hartson, L.L.P., counsel to Western Wireless, met with Kathryn Brown, Chief, Common Carrier Bureau ("CCB"); Lisa Gelb, Chief, Accounting Policy Division ("APD"), CCB; and Lisa Sockett and Richard Cameron of the CCB staff.

Second, Richard Chandler and Alan J. (Joe) Boyer of HAI Consulting, Inc; Mr. DeJordy; Ms. Farquhar, Ronnie London of Hogan & Hartson, L.L.P., and I met with Chuck Keller, William Sharkey, C. Anthony Bush, and Richard Smith of the APD/CCB staff.

Third, Mr. DeJordy, Ms. Farquhar and I met with James Bradford Ramsay, Assistant General Counsel, National Association of Regulatory Utility Commissioners, a member of the Joint Board staff.

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We used the attached materials in connection with these presentations. Please contact me if you have any questions.

Respectfully submitted,

David Sieradzki

David L. Sieradzki
Counsel for Western Wireless Corp.

Enclosures

cc: Kathryn Brown
Lisa Gelb
Lisa Sockett
Richard Cameron
James Bradford Ramsay
Chuck Keller
William Sharkey
C. Anthony Bush
Richard Smith

HWM

HAI Consulting, Inc. Wireless Model

Washington D.C.

August 26, 1998

HWM Overview

- Development sponsored by Western Wireless Corporation
- Engineering and cost model that calculates the cost of providing wireless local access
- Examines AMPS technology (cost effective in low density areas)
- Uses inputs from HM 5.0a wireline model results

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HWM Features

- Incorporates cluster, cost and investment data from HM5.0a
- Provides results by state and wire center
- Estimates wireline and wireless investment, monthly costs and USF subsidy levels
- Provides data suitable for mapping

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HWM Approach and Modeling Environment

- "Bottom Up" modeling process
- Uses Cluster data and current wireline access traffic loads to determine cell site, radio equipment and backhaul requirements
- Integrates transport, switching, signaling and other cost data from HM5.0a
- Model developed using Microsoft Excel and Access

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Data Pre-processing

- Before creating a specific state model, data "pre-processing" is required
- Cluster Pre-processing (MS Access)
  - Pulls data for a state from HM 5.0a Cluster database
  - Based technology specific engineering parameters, clusters are analyzed and divided by line count
  - Cell site coverage and capacity requirements are determined
  - Data written to an Excel spreadsheet and copied into HWM template

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Cluster Analysis

- Clusters over a certain line size are considered "Target Clusters"
  - Target Cluster area and line data are averaged
  - Target Clusters have cell sites built specifically to serve them with adequate height and channels to meet calculated coverage and traffic load
- "Non Target Clusters"
  - Area and line data are aggregated for clusters that do not meet requirements to be Target Clusters
  - Cell sites are specified to meet total coverage and traffic load for Non Target Cluster area

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Data Pre-processing (Cont'd)

- HM 5.0a Pre-processing
  - HM 5.0a is run for all companies in a state. Default values are used.
  - Data from "Investment Input" output sheet aggregated by wire center into a single Excel worksheet
  - Aggregated data put into a HWM pre-processing workbook, resulting new worksheet copied into HWM template

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Wireless Model Cost Factors

- Two cost factors derived from HM 5.0a results are used in HWM
  - Radio equipment monthly cost factor
    - The ratio of annual cost and overhead factors to total investment
    - Applied to wireless investment to determine a monthly cost
  - Retail uncollectible factor
    - The cost of uncollectible billings as a % of monthly cost

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HWM State Model Template

- MS excel 97 workbook with integrated worksheets
  - "Model Assumptions"
  - "Lookup Tables"
  - "Cluster and Cell Analysis"
    - Cluster pre-processing data
  - "HM Costs"
    - HM 5.0a pre-processing data and factors
  - "WC Data"
  - "Summary Model Results"

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HWM Variable Inputs

- Model Assumptions Worksheet
  - User interface for costs and inputs to the model
    - Capacity Variables
    - Backhaul Facilities Expense Variables
    - Recurring Subscriber Expense Variables
    - Subscriber and Subscriber Premises Investment, Acquisition and Operating Variables
    - USF Subsidy Thresholds
  - Also generates inputs for Cluster pre-processing

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HWM Variable Inputs (Cont'd)

- Lookup Tables Worksheet
  - **Site Investment**
    - Varying height towers based on coverage requirement
    - Provides tower and structure investment detail
  - **Traffic Analysis and Radio Channel Investment**
    - Based on offered load from cluster lines in cell
  - **Microwave System Costs**
    - Based on backhaul requirements

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The WC Data Worksheet

- The "Engine" of HWM
  - Performs all wireless cost and investment calculations by wire center
  - Integrates inputs, data and factors from HM 5.0a and Model Assumptions to produce results
  - Contrasts wireless vs. wireline results
  - Identifies wireless or wireline advantages by wire center
  - Performs certain results checking tests

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Summary Model Results Worksheet

- State Geographic and Demand Data
  - General information in, and results from, the model
- Investment Summary for The Entire State
- USF Subsidy Summary Results
- USF Subsidy Analysis
  - Wireline vs. Wireless

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Summary Model Results (Cont'd)

- Estimated "Tapered" Subsidy
  - Analysis of the subsidy requirements if the most cost-effective technology is selected for each wire center
- Wireless vs. Wireline Costs - All Wire Centers
  - CLLIs With A Wireline Cost Advantage
  - CLLIs With A Wireless Cost Advantage
- Cell Site Coverage Tests
  - Engineering validation to be sure no CLLIs with a wireless cost advantage have had more cell sites calculated than can realistically be built

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Other Model Features

- ILEC Summary Worksheet
  - Predefined Pivot Table for additional analysis
- Mapping Data Worksheet
  - Highlights certain results for export to MapInfo and similar mapping programs

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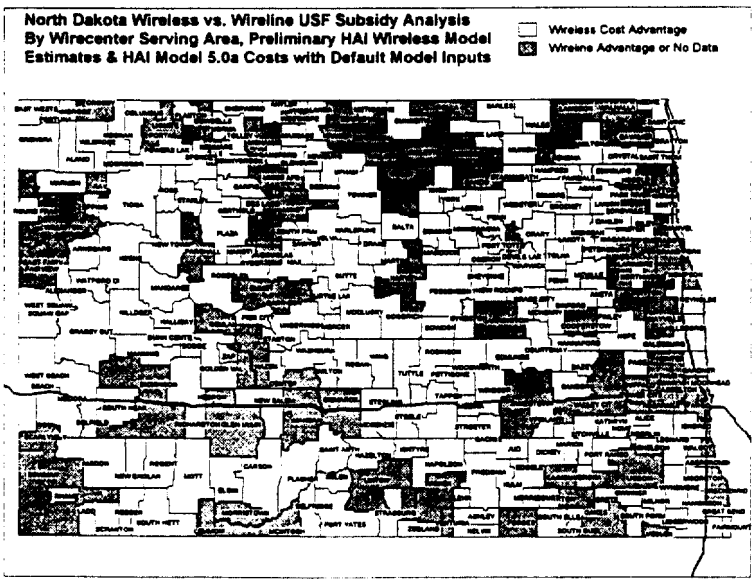

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State: **North Dakota**

Enter alternate values only in the blue fields below

		Description and default values
Capacity Variables		
Technology Basis:		e.g. AMPS
Max Radio Channels/Cell:		
Min Radio Channels/Cell:		
Voice Paths Per Channel:		
Peak Traffic Offered Per WLL Sub:		Busy Hour CCS per line
Max Subscriber Lines Per Cell:		*From P=.01 Traffic Table*
Min Subscriber Lines Per Cell:		*Based on Min Channels/Cell*
Minimum Entry Expectation (Penetration)		
Minimum Cluster Lines For Cell Site		*Based on Reaching Minimum Entry Penetration*
Monthly Cell Site Rent		Based on WW & HAI Estimates
Minimum Cell Coverage Area		Based on .5 mile minimum coverage radius
Backhaul Facilities Expense Variables		
Backhaul Vocoder Rate (Kbps)		kbps
Vocoder Backhaul Factor		Adds overhead for control channels & error control in T1 backhaul facilities
Voice Paths Per T1:		*Voice Paths backhauled per T1*
Cost Per Leased T1:		Per month, estimate for LEC service
Transcoder Cost Per T1:		"0" if 64 kpbs
Cost per T1 Switch Port:		

Recurring Subscriber Expense Variables	**Enter Number Here To Overide Data in HM Costs Sheet**	**Averaged Data In HM Cost Sheet**	
End office usage:			(Per line, per month; from HM Costs sheet)
Billing/Bill Inquiries			(Per line, per month; from HM Costs sheet)
Directory Listing			(Per line, per month; from HM Costs sheet)
LNP (when available)			(Per line, per month; from HM Costs sheet)

Subscriber and Subscriber Premises Investment, Acquistion and Operating Variables			
Customer Interface Unit (CIU) Cost:			(The CIU interfaces the radio link to premises wiring)
Annual Reduction In CIU Cost (due to increased production):			
CIU Installation Cost:			
CIU Annual Maintenance Cost			
Marketing Cost per Gross Sub Added			(Agents' Commissions, Credit Checks, Advertising, etc.)
Uncollectibles as a % all other monthly costs			(Per line, per month; from HM Costs sheet)
Cost of Spectrum Per POP			Based on PCS D,E & F auction results for rural BTAs
POPs Per Household			From 1997 Statistical Abstract, p. 59

USF Subsidy Thresholds (From HM 5.0a)	
Residential	
Business	

North Dakota
Sample WC Data

State	CLLI	Company	LOCALITY	CLLI Clusters	CLLI ResBisPub Lines	Households					
ND	ABRCNDXA	RED RIVER RURAL TEL. ASSN.	ABERCROMBI	9	252	231.494	$ 97.31	$ 143.24	$ (45.93)	YES	32%
ND	ABSRNDXA	ABSARAKA COOP TELEPHONE CO.	ABSARAKA	1	32	26.936	$ 414.37	$ 237.10	$ 177.27	no	-75%
ND	ADMSNDXA	POLAR COMMUNICATIONS, INC.	ADAMS	9	174	164.180	$ 176.90	$ 224.49	$ (47.59)	YES	21%
ND	ALAMNDXA	NORTHWEST COMMUNICATIONS COOPE	ALAMO	21	174	157.000	$ 119.25	$ 312.16	$ (192.91)	YES	62%
ND	ALICNDXA	INTER-COMMUNITY TELEPHONE COMPA	ALICE	6	92	85.870	$ 176.48	$ 179.55	$ (3.07)	YES	2%
ND	ALXNNDBC	NORTHWESTERN BELL-NORTH DAKOTA	ALEXANDER	38	513	466.834	$ 96.82	$ 253.16	$ (156.34)	YES	62%
ND	AMBRNDXA	NEMONT TELEPHONE COOPERATIVE - N	AMBROSE	17	112	108.000	$ 291.76	$ 455.99	$ (164.23)	YES	36%
ND	AMDNNDXA	CONSOLIDATED TELEPHONE COOPERAT	AMIDON	31	187	136.000	$ 158.09	$ 390.18	$ (232.09)	YES	59%
ND	ANTANDXA	POLAR COMMUNICATIONS MUTUAL AID	ANETA	14	262	240.860	$ 124.25	$ 221.65	$ (97.40)	YES	44%
ND	ANTLNDXA	SOURIS RIVER TELECOMMUNICATIONS	ANTLER	14	153	136.965	$ 114.14	$ 240.95	$ (126.80)	YES	53%
ND	ARNGNDXA	RESERVATION TELEPHONE COOPERATI	ARNEGARD	20	192	167.795	$ 128.82	$ 246.80	$ (117.98)	YES	48%
ND	ARTHNDXA	POLAR COMMUNICATIONS MUTUAL AID	ARTHUR	9	316	240.820	$ 64.02	$ 51.92	$ 12.09	no	-23%
ND	ASHYNDXA	DICKEY RURAL TEL COOP.	ASHLEY	3	21	14.603	$ 1,993.53	$ 2,076.43	$ (82.89)	YES	4%
ND	BALTNDXA	NORTH DAKOTA TELEPHONE COMPANY	BALTA	27	215	211.000	$ 113.67	$ 367.20	$ (253.53)	YES	69%
ND	BECHNDXA	YORK TELEPHONE COMPANY	BEACH	37	754	696.809	$ 73.70	$ 115.17	$ (41.47)	YES	36%
ND	BELHNDXA	WEST RIVER TELECOMMUNICATIONS CO	BEULAH	12	1384	1,187.777	$ 59.02	$ 25.32	$ 33.71	no	-133%
ND	BFLONDXA	INTER-COMMUNITY TELEPHONE COMPA	BUFFALO	13	178	146.940	$ 88.89	$ 90.27	$ (1.38)	YES	2%
ND	BLFDNDBC	NORTHWESTERN BELL-NORTH DAKOTA	BELFIELD	12	507	466.078	$ 94.05	$ 119.70	$ (25.65)	YES	21%
ND	BNFRNDXA	GRIGGS COUNTY TELEPHONE COMPAN	BINFORD	16	273	260.669	$ 138.51	$ 251.88	$ (113.36)	YES	45%
ND	BRCKNDXA	POLAR COMMUNICATIONS MUTUAL AID	BROCKET	7	113	105.521	$ 155.78	$ 227.49	$ (71.71)	YES	32%
ND	BRTHNDXA	SOURIS RIVER TELECOMMUNICATIONS	BERTHOLD	27	375	339.734	$ 66.07	$ 156.00	$ (89.93)	YES	58%
ND	BSMRNDBC	NORTHWESTERN BELL-NORTH DAKOTA	BISMARCK	58	31801	26,120.918	$ 51.05	$ 12.24	$ 38.80	no	-317%
ND	BUTTNDXA	SOURIS RIVER TELECOMMUNICATIONS	BUTTE	38	409	372.781	$ 69.28	$ 245.51	$ (176.23)	YES	72%
ND	BWBLNDXA	NORTHWEST COMMUNICATIONS COOPE	BOWBELLS	6	286	258.062	$ 101.15	$ 81.48	$ 19.67	no	-24%
ND	BWDNNDXA	DAKOTA CENTRAL TELECOMMUNICATIO	BOWDON	18	341	317.830	$ 152.92	$ 257.04	$ (104.12)	YES	41%
ND	BWMNNDXA	CONSOLIDATED TELEPHONE COOPERAT	BOWMAN	17	1344	928.863	$ 60.63	$ 53.14	$ 7.49	no	-14%
ND	CANDNDXA	NORTH DAKOTA TELEPHONE COMPANY	CANDO	20	648	554.495	$ 71.27	$ 70.80	$ 0.47	no	1%
ND	CGTNNDXA	DAKOTA CENTRAL TELECOMMUNICATIO	CARRINGTON	12	1300	1,137.176	$ 62.40	$ 47.63	$ 14.77	no	-31%
ND	CLFXNDXA	RED RIVER RURAL TEL. ASSN.	COLFAX	14	311	284.284	$ 84.27	$ 168.38	$ (84.12)	YES	50%
ND	CLMBNDXA	NORTHWEST COMMUNICATIONS COOPE	COLUMBUS	14	218	197.363	$ 92.81	$ 193.79	$ (100.98)	YES	52%
ND	CNTRNDXA	WEST RIVER TELECOMMUNICATIONS CO	CENTER	38	613	577.106	$ 66.91	$ 175.52	$ (108.61)	YES	62%
ND	CPTWNDXA	GRIGGS COUNTY TELEPHONE COMPAN	COOPERSTOW	12	668	587.077	$ 75.29	$ 63.42	$ 11.87	no	-19%
ND	CRETNDXA	DICKEY RURAL TEL COOP.	CRETE	7	113	80.000	$ 177.21	$ 213.47	$ (36.26)	YES	17%
ND	CRPONDXA	SOURIS RIVER TELECOMMUNICATIONS	CARPIO	7	135	122.472	$ 120.33	$ 141.70	$ (21.36)	YES	15%
ND	CRRYNDXA	NORTH DAKOTA TELEPHONE COMPANY	CRARY	12	151	145.430	$ 119.52	$ 229.71	$ (110.19)	YES	48%
ND	CRSBNDXA	NORTHWEST COMMUNICATIONS COOPE	CROSBY	18	789	663.862	$ 64.46	$ 51.11	$ 13.35	no	-26%
ND	CRSNNDXA	WEST RIVER TELECOMMUNICATIONS CO	CARSON	54	481	441.960	$ 74.08	$ 243.63	$ (169.55)	YES	70%
ND	CRTYNDXA	DAKOTA CENTRAL TELECOMMUNICATIO	COURTENAY	38	673	619.085	$ 74.42	$ 192.97	$ (118.54)	YES	61%
ND	CRYSNDXA	POLAR COMMUNICATIONS MUTUAL AID	CRYSTAL	22	512	467.004	$ 72.32	$ 140.37	$ (68.04)	YES	48%
ND	CSLTNDBC	NORTHWESTERN BELL-NORTH DAKOTA	CASSELTON	20	1184	986.367	$ 58.76	$ 55.26	$ 3.50	no	-6%
ND	CVLRNDXA	POLAR COMMUNICATIONS MUTUAL AID	CAVALIER	17	1345	1,134.622	$ 55.51	$ 40.47	$ 15.04	no	-37%
ND	DAZYNDXA	INTER-COMMUNITY TELEPHONE COMPA	DAZEY	9	125	124.490	$ 206.81	$ 307.34	$ (100.53)	YES	33%
ND	DCKYNDXA	DICKEY RURAL TEL COOP.	DICKEY	11	136	96.615	$ 216.43	$ 339.63	$ (123.19)	YES	36%
ND	DCSNNDBC	NORTHWESTERN BELL-NORTH DAKOTA	DICKINSON	65	9877	8,291.276	$ 52.51	$ 25.26	$ 27.25	no	-108%
ND	DELCNDXA	SOURIS RIVER TELECOMMUNICATIONS	DES LACS	17	295	265.952	$ 72.23	$ 164.65	$ (92.43)	YES	56%
ND	DGLSNDXA	RESERVATION TELEPHONE COOPERATI	DOUGLAS	3	66	58.254	$ 206.30	$ 147.45	$ 58.85	no	-40%
ND	DHLNNDXA	POLAR COMMUNICATIONS MUTUAL AID	DAHLEN	10	132	120.762	$ 127.40	$ 256.93	$ (129.52)	YES	50%
ND	DNCTNDXA	CONSOLIDATED TELEPHONE COOPERAT	DUNN CENTE	11	199	143.923	$ 92.07	$ 197.12	$ (105.05)	YES	53%
ND	DNSTNDBC	NORTHWESTERN BELL-NORTH DAKOTA	DUNSEITH	14	1176	1,096.669	$ 72.57	$ 94.71	$ (22.14)	YES	23%
ND	DNYBNDXA	SOURIS RIVER TELECOMMUNICATIONS	DONNYBROOK	7	99	90.264	$ 160.30	$ 209.84	$ (49.54)	YES	24%
ND	DODGNDXA	CONSOLIDATED TELEPHONE COOPERAT	DODGE	25	308	225.798	$ 100.52	$ 245.21	$ (144.68)	YES	59%
ND	DRAKNDXA	NORTH DAKOTA TELEPHONE COMPANY	DRAKE	19	412	406.942	$ 69.47	$ 145.81	$ (76.34)	YES	52%
ND	DRNGNDXA	SOURIS RIVER TELECOMMUNICATIONS	DEERING	43	605	553.296	$ 68.85	$ 257.52	$ (188.67)	YES	73%
ND	DVLKNDXA	NORTH DAKOTA TELEPHONE COMPANY	DEVILS LAK	20	3903	3,486.801	$ 56.21	$ 22.52	$ 33.69	no	-150%
ND	DYTNNDXA	POLAR COMMUNICATIONS MUTUAL AID	DRAYTON	13	562	508.533	$ 84.62	$ 93.55	$ (8.92)	YES	10%
ND	EDBGNDXA	POLAR COMMUNICATIONS MUTUAL AID	EDINBURG	15	384	353.053	$ 68.87	$ 134.42	$ (65.55)	YES	49%

Universal Service

The Wireless Solution

July, 1998

western® wireless

Universal Service

The Wireless Solution

- Overview
- Universal Service Goals
- Wireless Universal Services
- Lower USF Costs
- Public Interest Benefits of Wireless Solution
- Challenges and Obstacles

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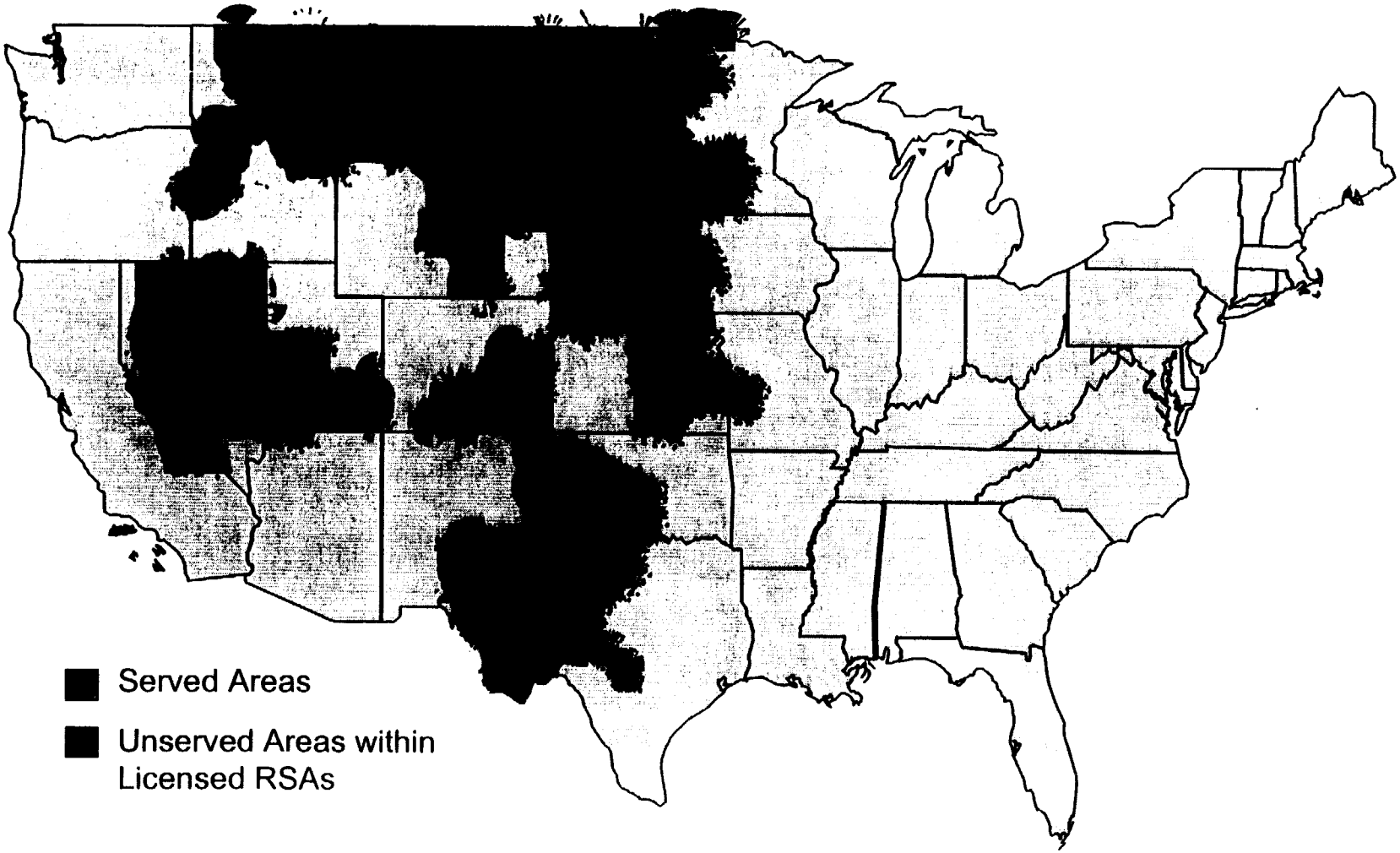
Overview

Wireless Meets Universal Service Goal

- Ability to Serve Consumers in Rural and Urban Areas
- Public Interest Benefits of a Competitively-Neutral Universal System (Federal and State)
- Ability to Provide Required Universal Services Plus Additional Services
- Lower Costs and Lower Subsidies

Overview

Western Wireless Perspective



Overview

Wireless Advantages Over Wireline Systems in Providing Service to Rural Areas

- More Extensive Service Availability
- More Service Options
- Mobility which is Vital
- Lower Costs

Overview

Wireless Provides Public Interest Benefits

- Greater Competition, Particularly in Rural Areas
- Rapid Delivery of Additional Service Options to the Public
- Bring Service to Unserved Areas
- Lower Subsidies at Federal and State Level

Overview

Remaining Challenges/Obstacles

- Establishing and Maintaining Competitive-Neutrality Nationally
- Establishing Competitive Universal Service System in Territories Served by Rural (Independent) Telcos
- Establishing State Universal Service Rules that do not Disadvantage Wireless Carriers

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Universal Service Goals

Requirement	How Wireless Carriers can Meet this Goal
Competitively-Neutral	• Provide Services in Competition with Wireline Carriers - 8 Licenses per Market • Contribute to Fund Universal Service
All Americans	• Serve Consumers in Areas that are Not Served, Not Adequately Served, or Not Cost-Effectively Served by Wireline Carriers
Affordable	• Provide More Services at Lower Cost and/or Lower Subsidy
Telecommunication Services	• Provide the Supported Telecommunications Services Plus Additional Services

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Wireless Universal Services

Prerequisites for Universal Service Provider	**Wireless Carriers?**
Common Carrier	Yes
Offer Supported Services throughout the Designated Service Area	Yes
Advertise the Availability of Supported Services	Yes
Designation as an Eligible Telecommunications Carrier by State	Yes

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Wireless Universal Services

Landline vs. Wireless

Services and Features	Landline	Wireless
Voice Grade Service	yes	yes
DTMF Signaling or Equivalent	yes	yes
Single Party Service	some, not all	yes
Access to Emergency Services	yes	yes
Access to Operator Services	yes	yes
Access to Interexchange Services	yes	yes
Access to Directory Assistance	yes	yes
Lifeline/Link-Up Toll Limiting Services	yes	yes
Data/Internet Capability	yes	yes

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Wireless Universal Services

Capabilities that Distinguish Wireless Carriers

- More Extensive Service Availability
- More Service Options
- Expanded Local Calling Areas
- Mobility
- High Quality and Reliability

Wireless Universal Services

More Extensive Service Availability

- Service Availability Depends on Built Facilities in Wireless or Wired Service
- Wireless: 97% of population have access to wireless services
- Landline: 93.8% of households subscribe to landline telephone service with many households unable to receive service; e.g., Reese and Antelope Valley, Nevada

Source: Preliminary Statistics of Communications Common Carriers, FCC (1997 Edition); Cellular CGSA FCC Filings.

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Wireless Universal Services

Examples of Wireless' Extensive Coverage in Rural States

	Population Density (Pop/Sq. Mile)	Wired Penetration	Served by Wireless
Texas	64.9	91.3%	99.6%
Nevada	10.9	94.1%	98.0%
North Dakota	9.3	95.8%	98.0%
Montana	5.5	93.7%	98.0%
Wyoming	4.7	93.4%	99.0%

Source: Preliminary Statistics of Communications Common Carriers, FCC (1997 Edition); Cellular CGSA FCC Filings.

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