Further Work

- Based on the analyses performed here, HM processes will be adjusted as follows:
  - PNR will report the aspect ratio of minimum bounding rectangle to the HM DM
  - the HM DM will adjust downwards its count of drops to match more closely the number of separate customer locations
- Based on further data to be provided by the ILECs concerning proper targets for DRD, the HM DM also may be adjusted to provide for this "twisting"

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Further Work

- These HM DM adjustments may, variously, include:
  - BB&B cable length adjustments by DZ to:
    - orient BB cable always along the major axis of rectangle
    - push BB&B cable more toward the edges of the cluster
    - ensure a minimum BB cable length
  - Normalize distribution cable lengths to an appropriate statistical measure of inter-customer distance
- Overall evaluation of the accuracy of the model should be consistent with the granularity of the universal service support program

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Chart 1

Revised Aspect Ratio Relative to Baseline:

Percent Change in Monthly Basic Local Service Cost

State	Company	0 - 5	5 - 100	100 - 200	200 - 650	650 - 850	850 - 2,550	2,550 - 5,000	5,000 - 10,000	10,000+	Weighted Average
FL	Central Tel Co Of Florida	-0.89%	-0.09%	-0.20%	0.98%	1.46%	0.52%	-0.08%	-0.01%	-0.12%	0.13%
FL	Gte Floridainc	-1.08%	-0.01%	-0.17%	0.26%	1.00%	-0.07%	0.13%	0.11%	0.08%	0.09%
FL	Southern Bell-Fl	-1.10%	0.32%	0.20%	-0.13%	0.53%	0.07%	0.04%	0.00%	-0.02%	0.07%
FL	United Tel Co Of Florida	-2.01%	0.10%	-0.73%	-0.05%	0.07%	0.13%	0.05%	0.12%	-0.01%	-0.13%
KS	Southwestern Bell-Kansas	-1.73%	-0.01%	1.36%	0.38%	0.05%	0.13%	-0.04%	-0.02%	-0.11%	-0.18%
MN	Contel Of Minnesota Inc Dba Gte Minnesota	-1.28%	0.09%	0.43%	-1.69%	-0.86%	-0.26%	-1.44%	0.05%		-0.61%
MN	Frontier Comm Of Minnesota Inc	-0.66%	-0.37%	-0.28%	0.04%	4.03%	0.07%	0.04%	-0.01%	-0.03%	-0.04%
MN	Northwestern Bell-Minnesota	-0.77%	0.19%	-0.52%	0.11%	0.30%	0.11%	0.13%	0.13%	0.00%	0.01%
MN	United Telephone Co Of Minn	-0.51%	0.07%	0.05%	-0.35%	1.05%	-0.65%	0.01%	0.01%		-0.11%
NV	Central Telephone Company - Nevada	1.96%	1.70%	1.06%	-0.89%	0.02%	-0.99%	-1.26%	-1.35%	-1.53%	-0.84%
NV	Nevada Bell	1.40%	0.65%	0.05%	0.57%	-0.98%	0.74%	-0.04%	0.05%	0.00%	0.57%
IN	Contel Of Indiana Inc Dba Gte - Indiana	-0.53%	0.15%	0.89%	-2.85%	0.16%	-1.23%	-0.29%	0.07%		-0.22%
IN	Gte Of Indiana	-0.09%	-0.49%	0.12%	0.39%	0.08%	0.26%	0.11%	0.42%	-0.02%	-0.02%
IN	Indiana Bell Tel Co	-0.17%	-0.20%	-0.87%	0.14%	-1.17%	-0.21%	-0.10%	-0.14%	-0.19%	-0.21%
IN	United Tel Co Of Indiana Inc	0.79%	-0.14%	0.35%	-0.11%	0.66%	0.19%	-0.07%	0.05%		-0.04%
TN	South Central Bell-Tn	-0.77%	0.18%	-0.57%	-0.19%	-0.02%	-0.29%	-0.32%	-0.31%	-0.53%	-0.18%
TN	United Inter-Mountain Tel Co-Tn		0.47%	-0.42%	-0.45%	3.79%	0.07%	-0.31%	0.30%	0.00%	0.17%
	Weighted Average	-0.90%	0.07%	-0.16%	-0.03%	0.29%	-0.02%	-0.04%	-0.13%	-0.22%	-0.07%

Chart 2

Effects of Using Surrogate Geocodes on Cluster Size and Cable Distances

Florida and Kansas Study Areas	Distribution Route Distance									
Geocode Scenario	0-5	5-100	100-200	200-650	650-850	850-2550	2550-5000	5000-10,000	10,000+	Weighted Average
A. Actual geocodes and CB boundary surrogates	53,824,007	161,338,079	48,533,791	98,119,208	23,741,532	124,915,586	71,782,388	22,412,618	3,187,173	607,854,382
B. Actual geocodes and "road" surrogates	51,615,104	151,568,046	46,110,529	90,888,595	22,176,030	120,024,791	70,213,555	21,845,927	3,263,839	577,706,416
Impact of substituting "road" surrogates for CB boundary surrogates	-4.1%	-6.1%	-5.0%	-7.4%	-6.6%	-3.9%	-2.2%	-2.5%	2.4%	-5.0%
C. Further replace actual geocode points with "road" surrogates	54,222,098	165,744,188	54,813,715	102,477,636	25,436,376	139,760,851	84,332,905	24,808,541	3,697,052	655,293,362
Additional impact of substituting "road" surrogates for actual geocodes	5.1%	9.4%	18.9%	12.8%	14.7%	16.4%	20.1%	13.6%	13.3%	13.4%
D. Further substitute all "road" surrogates with CB boundary surrogates	55,070,421	167,900,711	54,092,184	99,820,588	26,473,709	133,104,586	74,601,985	21,594,030	3,324,015	635,982,227
Additional impact of substituting all "road" surrogates with CB boundary surrogates	1.6%	1.3%	-1.3%	-2.6%	4.1%	-4.8%	-11.5%	-13.0%	-10.1%	-2.9%
Percent actual geocode	19.2%	59.0%	78.2%	83.6%	83.5%	78.1%	65.4%	48.7%	54.1%	69.1%
DRD excess due to CB surrogates	12.1%	6.9%	14.7%	2.1%	13.8%	8.4%	6.0%	-7.5%	7.9%	6.7%
DRD excess due to road surrogates	26.3%	15.8%	24.1%	15.3%	17.6%	21.1%	30.7%	27.8%	24.5%	19.4%

Chart 2

Effects of Using Surrogate Geocodes on Cluster Size and Cable Distances

Southwestern Bell-Kansas	Distribution Route Distance									
Geocode Scenario	0-5	5-100	100-200	200-650	650-850	850-2550	2550-5000	5000-10,000	10,000+	Weighted Average
A. Actual geocodes and CB boundary surrogates	31,894,807	31,942,107	6,818,324	10,616,492	1,996,620	14,162,853	9,112,614	1,967,180	356,126	108,867,122
B. Actual geocodes and "road" surrogates	30,883,886	29,790,110	6,353,516	10,088,641	1,694,310	14,391,591	8,986,679	2,024,181	325,723	104,538,636
Impact of substituting "road" surrogates for CB boundary surrogates	-3.2%	-6.7%	-6.8%	-5.0%	-15.1%	1.6%	-1.4%	2.9%	-8.5%	-4.0%
C. Further replace actual geocode points with "road" surrogates	31,459,001	33,046,375	9,167,466	11,981,911	2,347,775	18,164,416	10,857,769	1,941,406	502,207	119,468,326
Additional impact of substituting "road" surrogates for actual geocodes	1.9%	10.9%	44.3%	18.8%	38.6%	26.2%	20.8%	-4.1%	54.2%	14.3%
D. Further substitute all "road" surrogates with CB boundary surrogates	33,176,337	34,404,773	9,597,680	12,050,464	2,396,606	17,116,440	11,181,578	2,356,943	467,035	122,747,856
Additional impact of substituting all "road" surrogates with CB boundary surrogates	5.5%	4.1%	4.7%	0.6%	2.1%	-5.8%	3.0%	21.4%	-7.0%	2.7%
Percent actual geocode	9.0%	47.0%	67.0%	72.0%	78.0%	79.0%	75.0%	77.0%	87.0%	65.0%
DRD excess due to CB surrogates	44.6%	16.4%	60.8%	18.8%	25.7%	26.4%	30.3%	25.7%	35.8%	19.6%
DRD excess due to road surrogates	20.7%	23.3%	66.1%	26.1%	49.4%	33.2%	27.8%	-5.3%	62.3%	22.0%

Chart 3

Aggregate Results: Revised Aspect Ratio *

Distance Measure	0-5	5-100	100-200	200-400	650-850	850-2550	2550-5000	5000-10,000	10,000+	Total
Strand distance	157,676,946	430,928,496	69,503,235	124,111,287	32,638,403	179,539,859	107,027,161	38,816,635	9,254,090	1,149,496,112
Drop length included in Strand	580,101	24,560,846	17,578,026	52,796,690	18,944,409	126,833,000	95,245,452	37,122,078	12,212,795	385,873,398
DRD	95,791,350	362,354,599	73,080,387	130,420,835	33,260,673	166,922,132	91,761,708	33,031,273	7,205,946	993,828,904
DRD plus effective Drop	96,371,451	386,915,446	90,658,413	183,217,525	52,205,082	293,755,132	187,007,160	70,153,352	19,418,741	1,379,702,301
Pct increase due to Drop	0.6%	6.8%	24.1%	40.5%	57.0%	76.0%	103.8%	112.4%	169.5%	38.8%
DRD / Strand	61%	84%	105%	105%	102%	93%	86%	85%	78%	86%
Drop-adjusted DRD / Strand	61%	90%	130%	148%	160%	164%	175%	181%	210%	120%

* Reflects SB FL, Indiana Bell, SWB KS, NWB MN, NV Bell, Centel NV, and SB TN

Indiana Bell Revised Aspect Ratio

Distance Measure	0-5	5-100	100-200	200-400	650-850	850-2550	2550-5000	5000-10,000	10,000+	Total
Strand distance	2,202,977	67,344,042	10,771,429	19,540,948	4,246,403	27,845,921	16,434,442	4,540,773	1,352,388	154,279,322
Drop length included in Strand	9,392	2,460,610	2,159,498	7,005,860	1,893,479	18,215,030	13,791,332	3,855,608	1,260,380	50,651,189
DRD	1,370,187	55,250,882	11,724,994	21,644,283	4,152,109	26,519,283	14,348,361	3,693,533	992,986	139,696,619
DRD plus effective Drop	1,379,579	57,711,492	13,884,492	28,650,143	6,045,588	44,734,313	28,139,693	7,549,141	2,253,366	190,347,808
Pct increase due to Drop	0.7%	4.5%	18.4%	32.4%	45.6%	68.7%	96.1%	104.4%	126.9%	36.3%
DRD / Strand	62%	82%	109%	111%	98%	95%	87%	81%	73%	91%
Drop-adjusted DRD / Strand	63%	86%	129%	147%	142%	161%	171%	166%	167%	123%

Nevada Bell Revised Aspect Ratio

Distance Measure	0-5	5-100	100-200	200-400	650-850	850-2550	2550-5000	5000-10,000	10,000+	Total
Strand distance	21,143,317	6,391,246	2,000,411	1,307,176	835,030	3,821,905	1,902,111	1,272,286	516,296	39,189,778
Drop length included in Strand	122,755	659,432	504,708	529,006	538,777	1,513,294	1,518,674	970,244	399,021	6,755,910
DRD	18,566,159	6,045,816	2,003,050	1,337,652	804,408	3,808,815	1,526,797	933,446	374,624	35,400,767
DRD plus effective Drop	18,688,914	6,705,247	2,507,757	1,866,658	1,343,185	5,322,109	3,045,471	1,903,690	773,646	42,156,677
Pct increase due to Drop	0.7%	10.9%	25.2%	39.5%	67.0%	39.7%	99.5%	103.9%	106.5%	19.1%
DRD / Strand	88%	95%	100%	102%	96%	100%	80%	73%	73%	90%
Drop-adjusted DRD / Strand	88%	105%	125%	143%	161%	139%	160%	150%	150%	108%

Chart 3

Centel Nevada Revised Aspect ratio

Distance Measure	0-5	5-100	100-200	200-400	650-850	850-2550	2550-5000	5000-10,000	10,000+	Total
Strand distance	3,203,490	1,458,823	1,275,157	1,778,965	1,569,449	4,948,959	4,927,253	3,635,909	700,473	23,498,477
Drop length included in Strand	56,474	258,574	643,650	1,380,283	1,237,269	3,805,256	4,814,683	3,966,449	770,249	16,932,887
DRD	2,710,897	1,621,068	1,385,084	1,853,043	1,649,710	4,637,207	4,181,910	3,334,524	602,434	21,975,876
DRD plus effective Drop	2,767,370	1,879,643	2,028,733	3,233,326	2,886,979	8,442,463	8,996,594	7,300,974	1,372,682	38,908,763
Pct increase due to Drop	2.1%	16.0%	46.5%	74.5%	75.0%	82.1%	115.1%	119.0%	127.9%	77.1%
DRD / Strand	85%	111%	109%	104%	105%	94%	85%	92%	86%	94%
Drop-adjusted DRD / Strand	86%	129%	159%	182%	184%	171%	183%	201%	196%	166%

SWB KS Revised Aspect Ratio

Distance Measure	0-5	5-100	100-200	200-400	650-850	850-2550	2550-5000	5000-10,000	10,000+	Total
Strand distance	66,550,239	41,329,743	6,807,134	11,101,712	2,306,058	17,922,240	12,353,307	2,669,302	486,913	161,526,647
Drop length included in Strand	95,462	2,342,886	1,449,915	3,345,585	1,099,997	10,883,594	9,628,966	2,449,833	593,359	31,889,597
DRD	33,033,660	32,153,069	6,951,435	10,643,649	2,016,040	14,159,255	9,095,989	1,963,114	355,142	110,371,354
DRD plus effective Drop	33,129,121	34,495,955	8,401,350	13,989,234	3,116,037	25,042,849	18,724,956	4,412,947	948,500	142,260,951
Pct increase due to Drop	0.3%	7.3%	20.9%	31.4%	54.6%	76.9%	105.9%	124.8%	167.1%	28.9%
DRD / Strand	50%	78%	102%	96%	87%	79%	74%	74%	73%	68%
Drop-adjusted DRD / Strand	50%	83%	123%	126%	135%	140%	152%	165%	195%	88%

BS FL Revised Aspect Ratio

Distance Measure	0-5	5-100	100-200	200-400	650-850	850-2550	2550-5000	5000-10,000	10,000+	Total
Strand distance	10,318,585	65,799,300	19,350,623	39,652,738	11,919,517	66,912,382	44,323,526	18,346,056	2,893,515	279,516,240
Drop length included in Strand	166,645	7,316,253	6,097,520	19,895,856	7,382,628	48,584,427	37,325,871	15,065,427	3,368,173	145,202,799
DRD	7,266,610	57,056,680	18,669,617	40,320,470	12,317,860	60,815,187	38,515,458	15,791,945	2,122,295	252,876,123
DRD plus effective Drop	7,433,255	64,372,933	24,767,137	60,216,326	19,700,488	109,399,614	75,841,330	30,857,372	5,490,468	398,078,922
Pct increase due to Drop	2.3%	12.8%	32.7%	49.3%	59.9%	79.9%	96.9%	95.4%	158.7%	57.4%
DRD / Strand	70%	87%	96%	102%	103%	91%	87%	86%	73%	90%
Drop-adjusted DRD / Strand	72%	98%	128%	152%	165%	163%	171%	168%	190%	142%

Chart 3

NWB MN Revised Aspect Ratio

Distance Measure	0-5	5-100	100-200	200-400	650-850	850-2550	2550-5000	5000-10,000	10,000+	Total
Strand distance	46,714,352	74,070,515	9,589,177	17,075,041	3,434,202	24,323,785	14,781,865	5,582,567	2,391,562	197,963,066
Drop length included in Strand	95,428	2,942,807	2,502,894	7,061,954	2,099,682	19,221,961	16,194,473	7,370,850	4,548,235	62,038,284
DRD	28,214,404	60,054,247	10,730,186	18,910,578	3,676,684	24,179,503	13,378,726	4,873,962	2,042,056	166,060,346
DRD plus effective Drop	28,309,832	62,997,055	13,233,080	25,972,532	5,776,366	43,401,463	29,573,199	12,244,812	6,590,291	228,098,630
Pct increase due to Drop	0.3%	4.9%	23.3%	37.3%	57.1%	79.5%	121.0%	151.2%	222.7%	37.4%
DRD / Strand	60%	81%	112%	111%	107%	99%	91%	87%	85%	84%
Drop-adjusted DRD / Strand	61%	85%	138%	152%	168%	178%	200%	219%	276%	115%

BS TN Revised Aspect Ratio

Distance Measure	0-5	5-100	100-200	200-400	650-850	850-2550	2550-5000	5000-10,000	10,000+	Total
Strand distance	7,543,988	174,534,828	19,709,305	33,654,707	8,327,744	33,764,668	12,304,657	2,769,742	912,943	293,522,582
Drop length included in Strand	33,946	8,580,284	4,219,840	13,578,147	4,692,577	24,609,439	11,971,452	3,443,667	1,273,378	72,402,732
DRD	4,629,433	150,172,837	21,616,021	35,711,159	8,643,862	32,802,881	10,714,466	2,440,750	716,410	267,447,819
DRD plus effective Drop	4,663,379	158,753,121	25,835,862	49,289,306	13,336,439	57,412,321	22,685,918	5,884,417	1,989,788	339,850,551
Pct increase due to Drop	0.7%	5.7%	19.5%	38.0%	54.3%	75.0%	111.7%	141.1%	177.7%	27.1%
DRD / Strand	61%	86%	110%	106%	104%	97%	87%	88%	78%	91%
Drop-adjusted DRD / Strand	62%	91%	131%	146%	160%	170%	184%	212%	218%	116%

Chart 4

Effects of Using Surrogate Geocodes on Cluster Size and Cable Distances

Southwestern Bell-Kansas	Strand Distance									
Geocode Scenario	0-5	5-100	100-200	200-650	650-850	850-2550	2550-5000	5000-10,000	10,000+	Weighted Average
A. Actual geocodes and CB boundary surrogates	66,550,239	41,329,743	6,807,134	11,101,712	2,306,058	17,922,240	12,353,307	2,669,302	486,913	161,526,647
B. Actual geocodes and "road" surrogates	66,182,125	38,808,174	6,337,955	10,265,111	1,875,905	18,336,195	12,316,256	2,772,953	421,420	157,316,094
Impact of substituting "road" surrogates for CB boundary surrogates	-0.6%	-6.1%	-6.9%	-7.5%	-18.7%	2.3%	-0.3%	3.9%	-13.5%	-2.6%
C. Further replace actual geocode points with "road" surrogates	66,573,387	42,308,366	8,336,914	11,259,676	2,353,932	20,082,384	12,131,623	2,073,205	515,652	165,635,140
Additional impact of substituting "road" surrogates for actual geocodes	0.6%	9.0%	31.5%	9.7%	25.5%	9.5%	-1.5%	-25.2%	22.4%	5.3%
D. Further substitute all "road" surrogates with CB boundary surrogates	68,503,372	44,845,764	9,035,208	11,411,350	2,360,673	18,533,930	12,426,578	2,386,988	439,381	169,943,244
Additional impact of substituting all "road" surrogates with CB boundary surrogates	2.9%	6.0%	8.4%	1.3%	0.3%	-7.7%	2.4%	15.1%	-14.8%	2.6%
Percent actual geocode	9.0%	47.0%	67.0%	72.0%	78.0%	79.0%	75.0%	77.0%	87.0%	65.0%
Strand excess due to CB surrogates	32.6%	18.1%	48.9%	3.9%	3.0%	4.3%	0.8%	-13.7%	-11.2%	8.0%
Strand excess due to road surrogates	6.6%	19.2%	47.1%	13.5%	32.7%	12.1%	-2.0%	-32.8%	25.7%	8.1%

Chart 5

Strand Map Distance Will Commonly Exceed the Required Amount of Distribution Route Distance Because it Includes Some Portion of the Drop

Next-door house geocodes closer than across-street house geocodes

Number of lots:	20	
Lot width:	w	w < 100'
Lot depth:	2w	

Strand Map Distance

Vertical:	2w - 50'	Horizontal:	9w
	100'		9w
Subtotal:	2w + 50'	Subtotal:	18w
Total SMD:	20w + 50'		
Amount of drop distance implicitly included in SMD:	20 * 50'		
	1000'		

Distribution Route Distance Required

Backbone:	2w
Branch:	9w
Required DRD:	11w

Compare Strand Map Distance to Required Distribution Route Distance

SMD		**DRD**
20w + 50'	>	11w

Thus, SMD generally will **exceed** the DRD required to connect customer locations.
Note that if the 1000' of drop distance implicitly included in the SMD is also added to the DRD, this augmented DRD will exceed the SMD because w < 100'

SMD	<	**DRD + allocated drop**
20w + 50'		11w + 1000'

Chart 5

Strand Map Distance Will Commonly Exceed the Required Amount of Distribution Route Distance Because it Includes Some Portion of the Drop

Insert Data

Number of lots:	20
Lot width:	75
Lot depth:	150

Strand Map Distance to Connect Customer Locations

Vertical:	100	Horizontal:	675
	100		675
Subtotal:	200	Subtotal:	1350
Total SMD:	1550		
Amount of drop distance implicitly included in SMD:	1000		

Distribution Route Distance Required to Connect Customer Locations

Backbone:	150
Branch:	675
Required DRD:	825

Compare Strand Map Distance to Required Distribution Route Distance

SMD		**DRD**
1550	>	825

Thus, SMD generally will **exceed** the DRD required to connect customer locations.
This occurs because the raw DRD does not include the amount of drop distance that is used for it to reach the equivalent geocode locations as reached by the strand distance.

SMD		**DRD + allocated drop**
1550	<	1825

Chart 5

Strand Map Distance Will Commonly Exceed the Required Amount of Distribution Route Distance Because it Includes Some Portion of the Drop

Across-street house geocodes closer than next-door house geocodes

Number of lots:	20	
Lot width:	w	w > 100'
Lot depth:	2w	

Strand Map Distance

Vertical:	2w - 50'	Horizontal:	9w
	10 * 100'		
Subtotal:	2w + 950'	Subtotal:	9w
Total SMD:	11w + 950'		
Amount of drop distance implicitly included in SMD:	20 * 50'		
	1000'		

Distribution Route Distance Required

Backbone:	2w
Branch:	9w
Required DRD:	11w

Compare Strand Map Distance to Required Distribution Route Distance

SMD		**DRD**
11w + 950'	>	11w

Thus, SMD generally will **exceed** the DRD required to connect customer locations.
Note that if the 1000' of drop distance implicitly included in the SMD is also added to the DRD, this augmented DRD will exceed the SMD because w > 100'

SMD	<	**DRD + allocated drop**
11w + 950'		11w + 1000'

Chart 5

Strand Map Distance Will Commonly Exceed the Required Amount of Distribution Route Distance Because it Includes Some Portion of the Drop

Insert Data

Number of lots:	20
Lot width:	125
Lot depth:	250

Strand Map Distance to Connect Customer Locations

Vertical:	200	Horizontal:	1125
	1000		0
Subtotal:	1200	Subtotal:	1125
Total SMD:	2325		
Amount of drop distance implicitly included in SMD:	1000		

Distribution Route Distance Required to Connect Customer Locations

Backbone:	250
Branch:	1125
Required DRD:	1375

Compare Strand Map Distance to Required Distribution Route Distance

SMD		**DRD**
2325	>	1375

Thus, SMD generally will **exceed** the DRD required to connect customer locations.
This occurs because the raw DRD does not include the amount of drop distance that is used for it to reach the equivalent geocode locations as reached by the strand distance.

SMD		**DRD + allocated drop**
2325	<	2375

Chart 6

Re-creation of Prisbrey Dispersion Comparisons With Random 18x18 kft Clusters

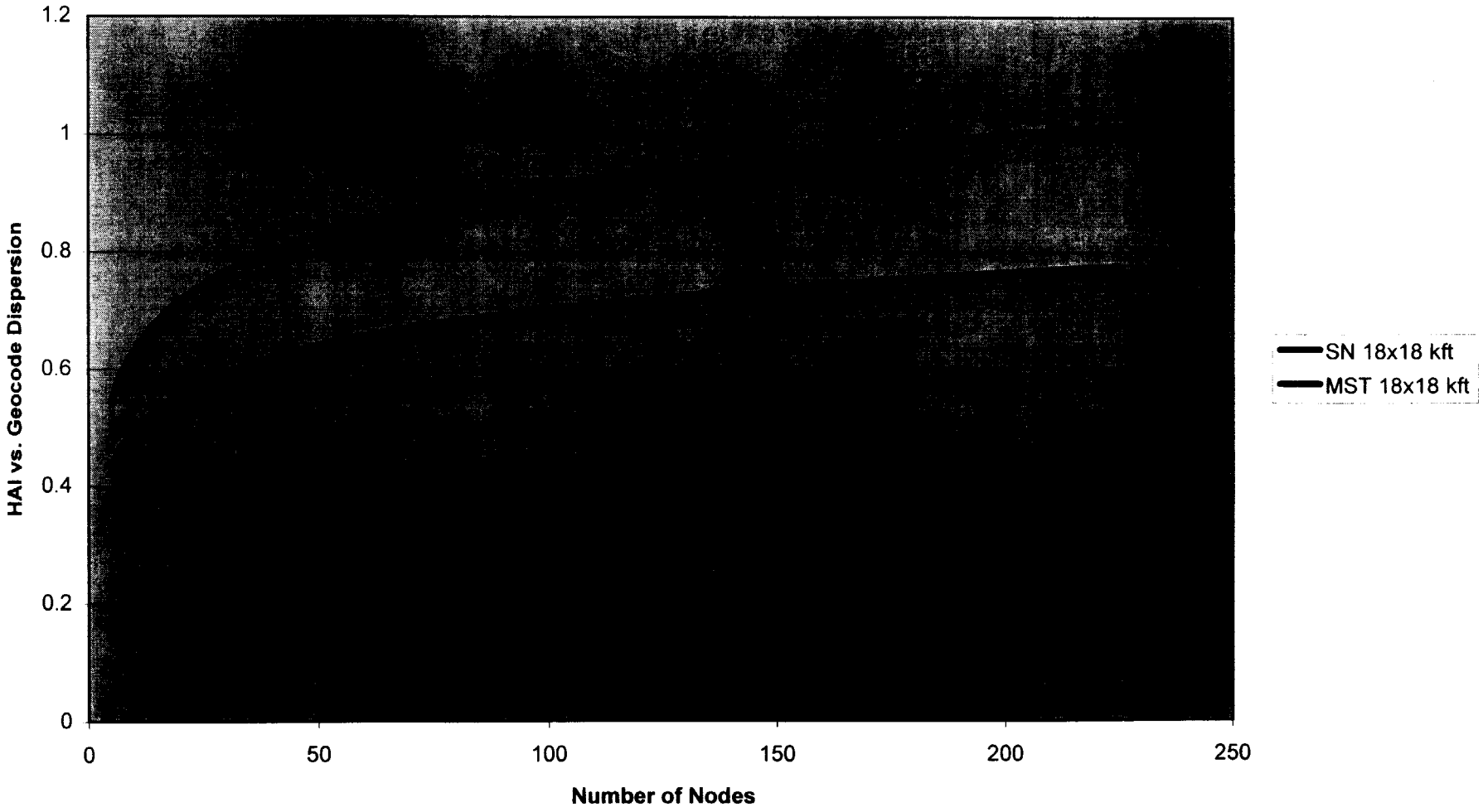


Chart 7

Star Dispersion Comparisons With More Realistic Random Clusters

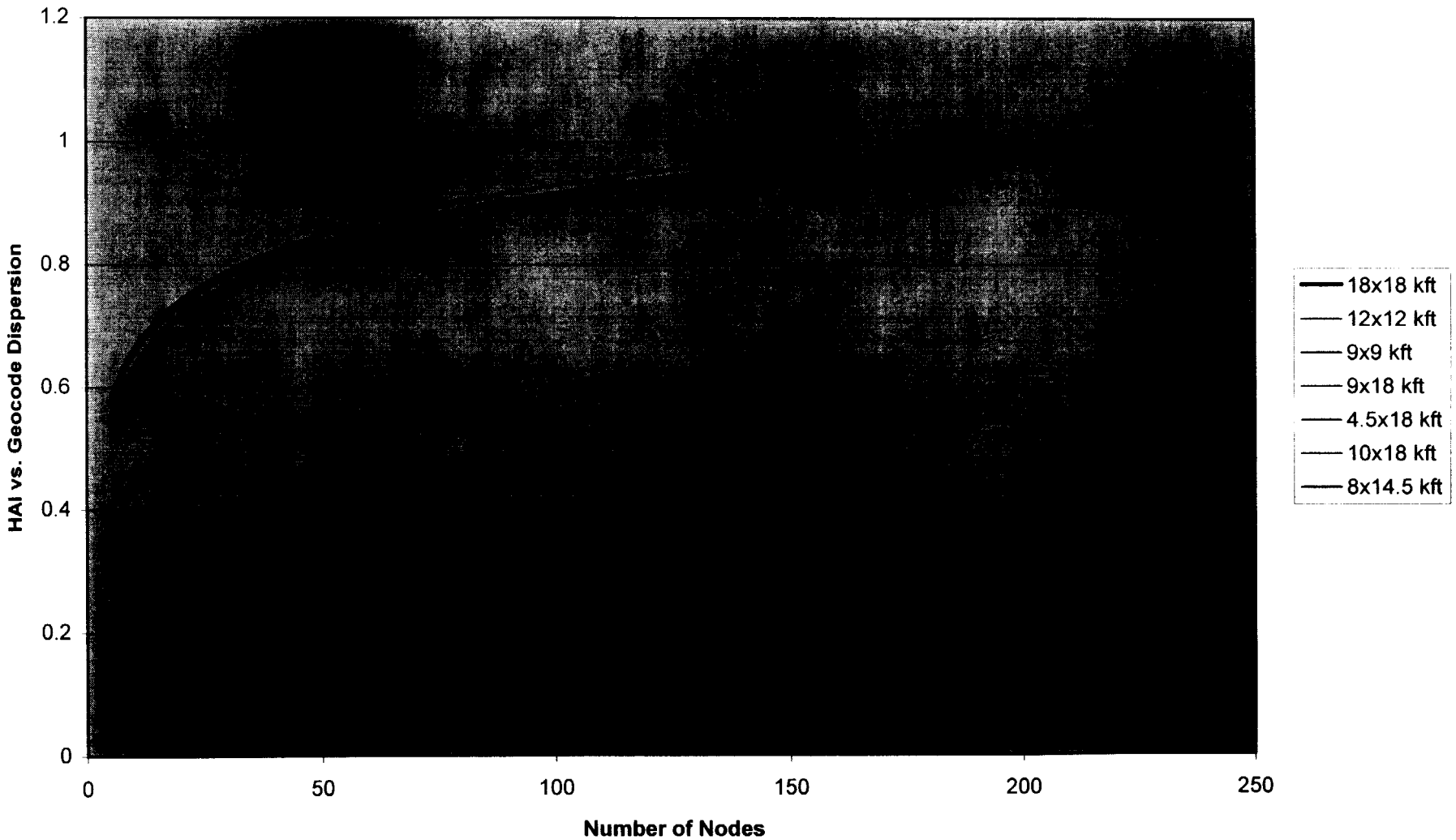


Chart 8

Tree Dispersion Comparisons With More Realistic Random Clusters

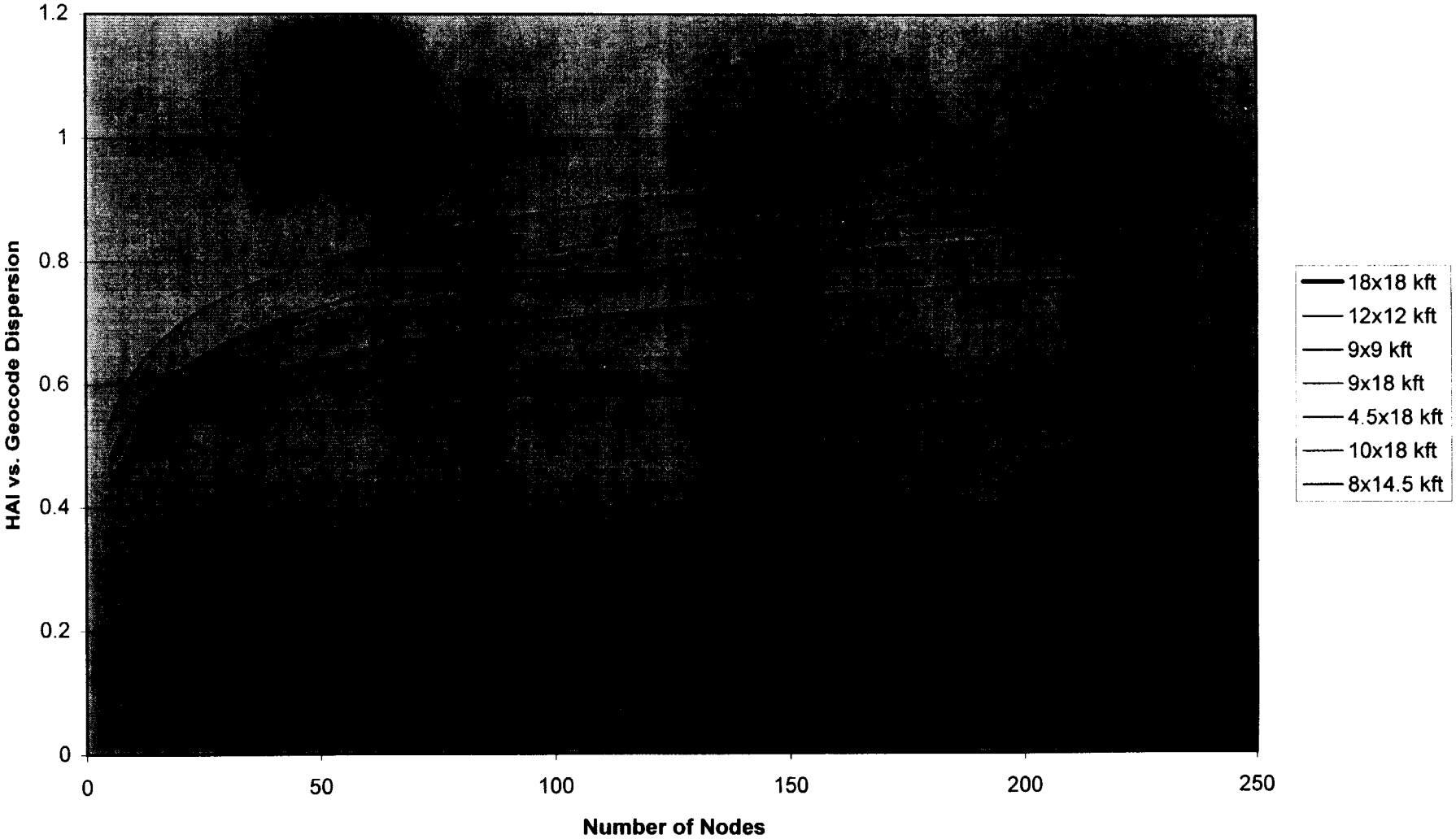


Chart 9

Star Dispersion Comparisons With Actual Clusters

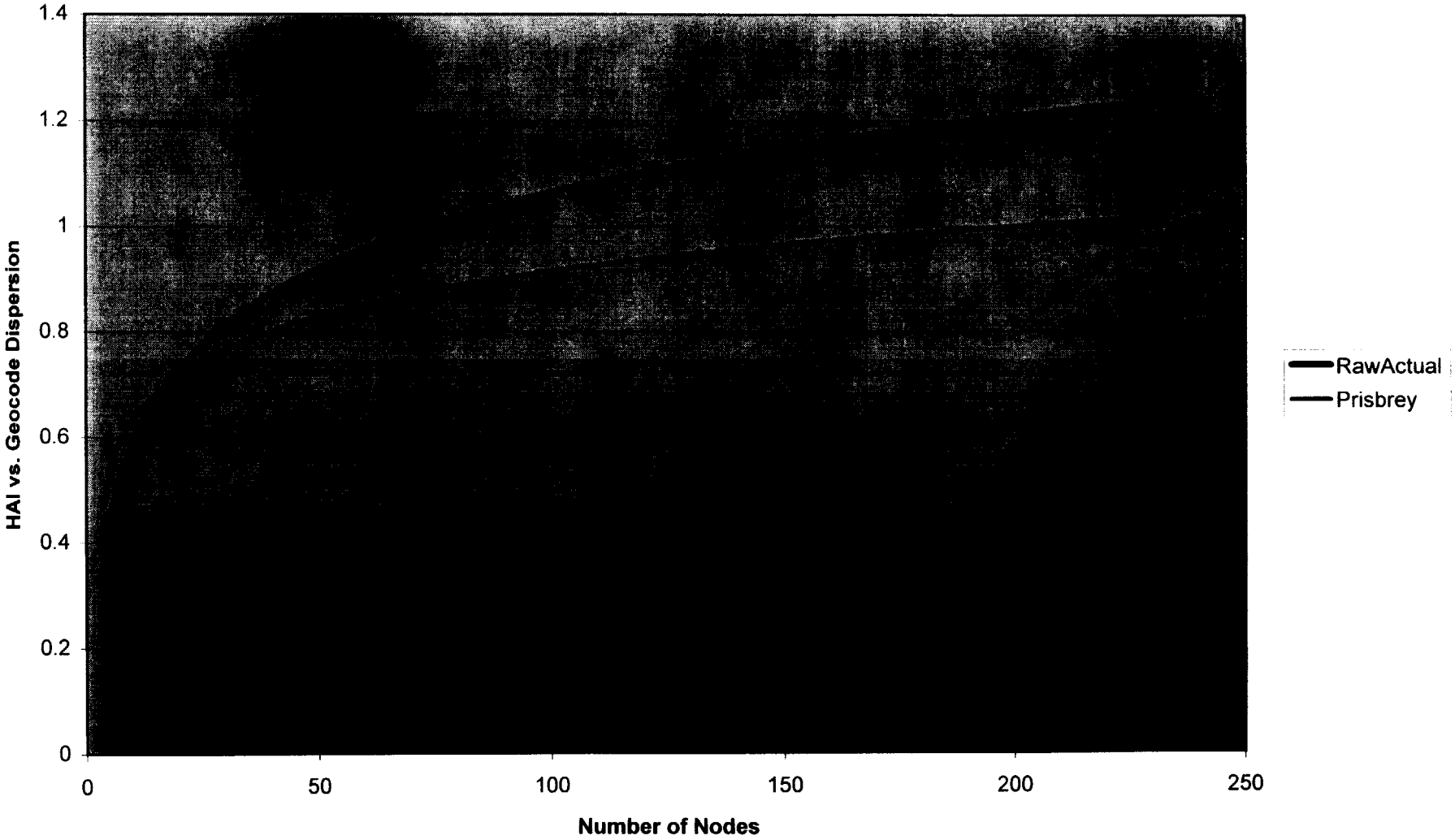


Chart 10

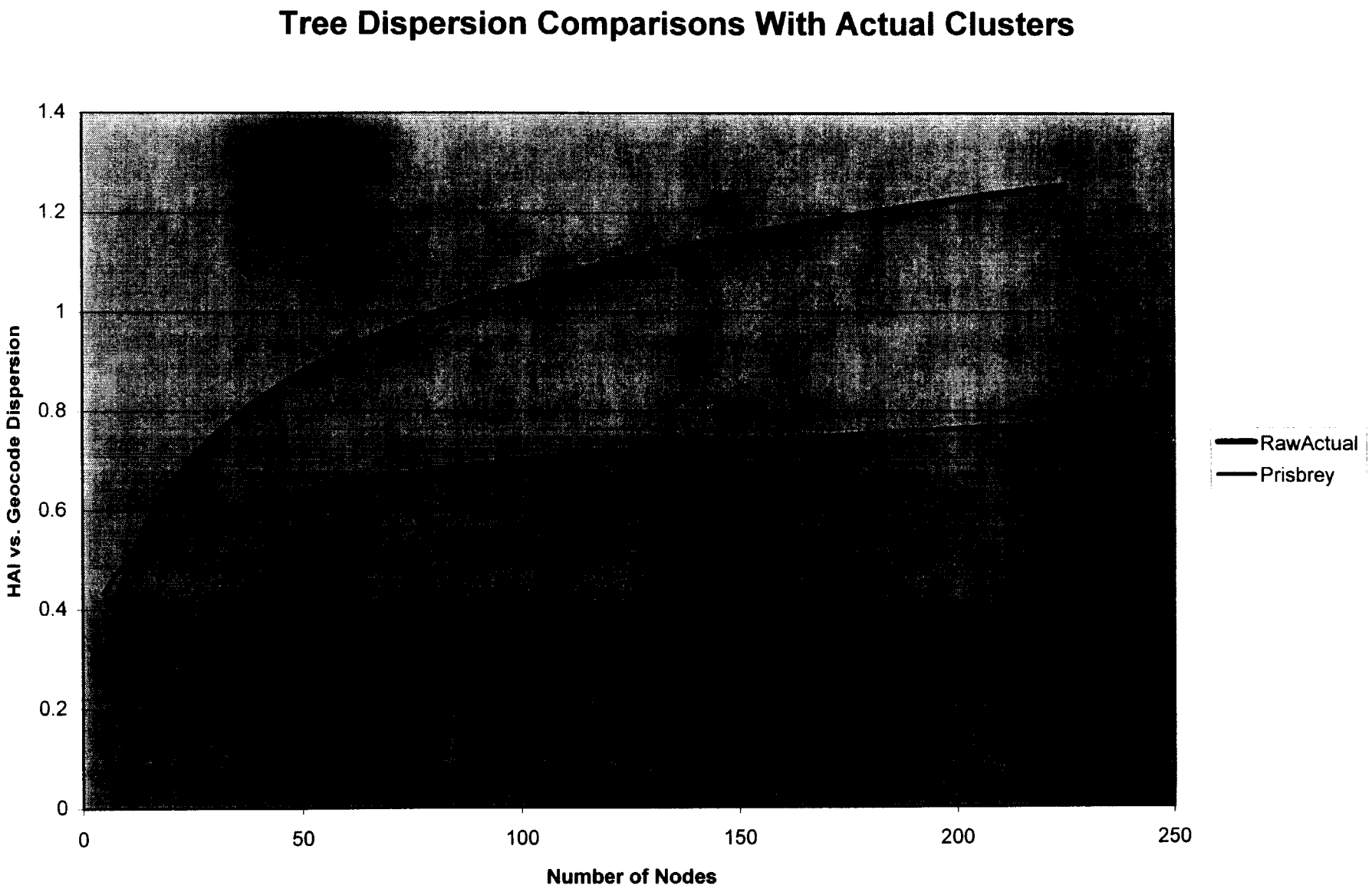

Tree Dispersion Comparisons With Actual Clusters
HAI vs. Geocode Dispersion
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
50
100
150
200
250
Number of Nodes
RawActual
Prisbrey

Chart 11

Star Dispersion Comparisons With Actual Clusters Including Surrogate Adjustment

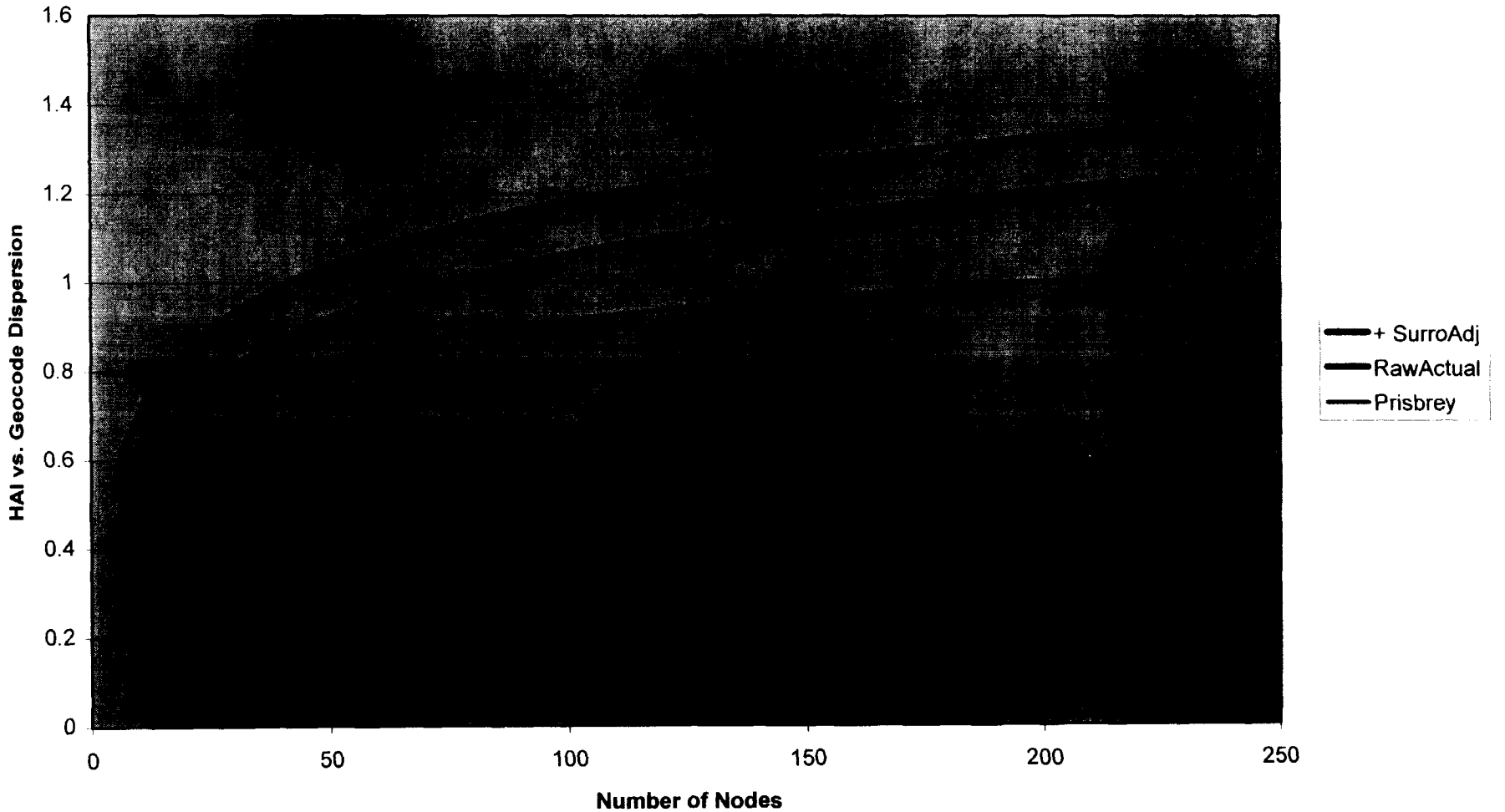


Chart 12

Tree Dispersion Comparisons With Actual Clusters Including Surrogate Adjustment

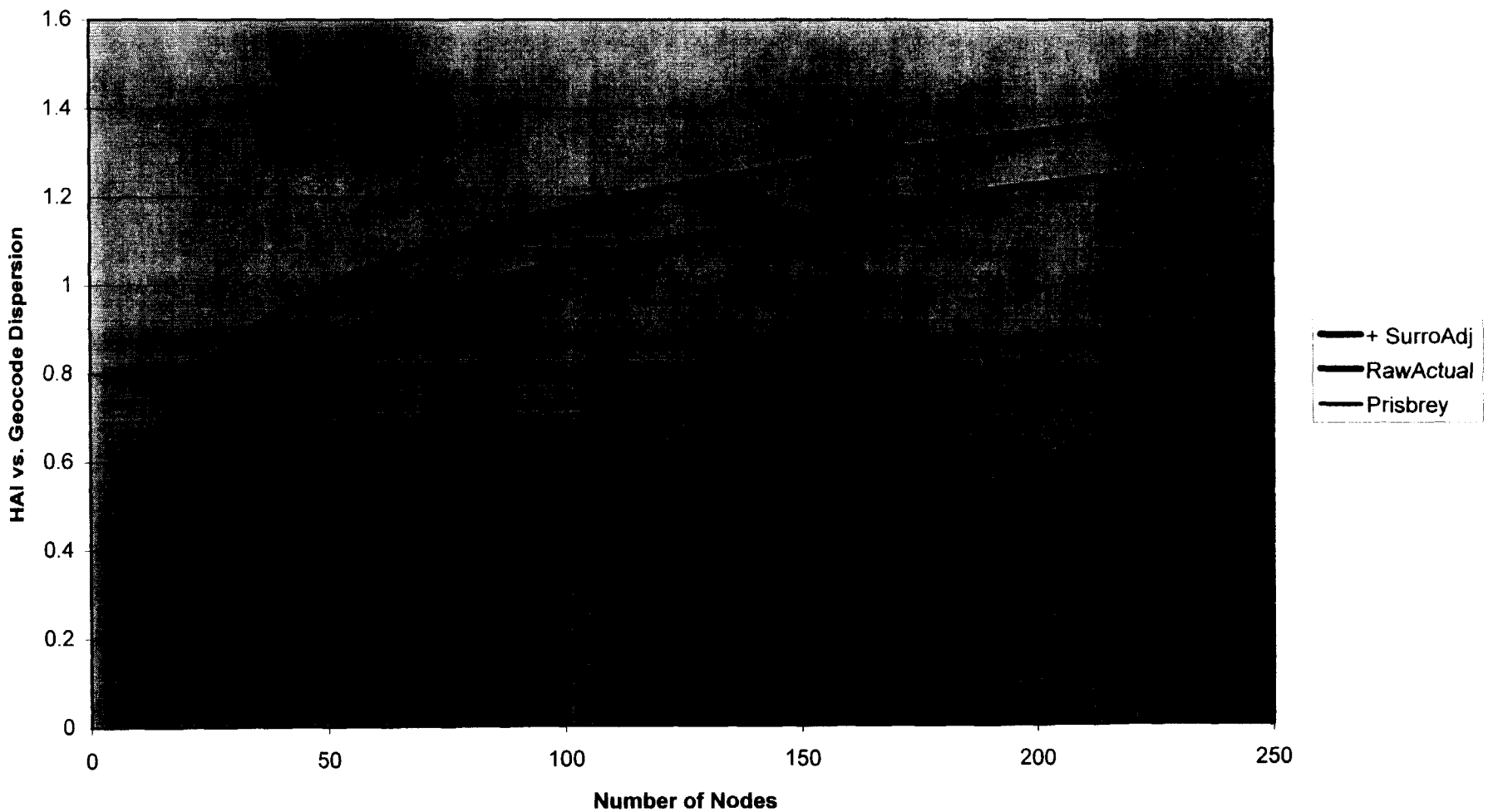
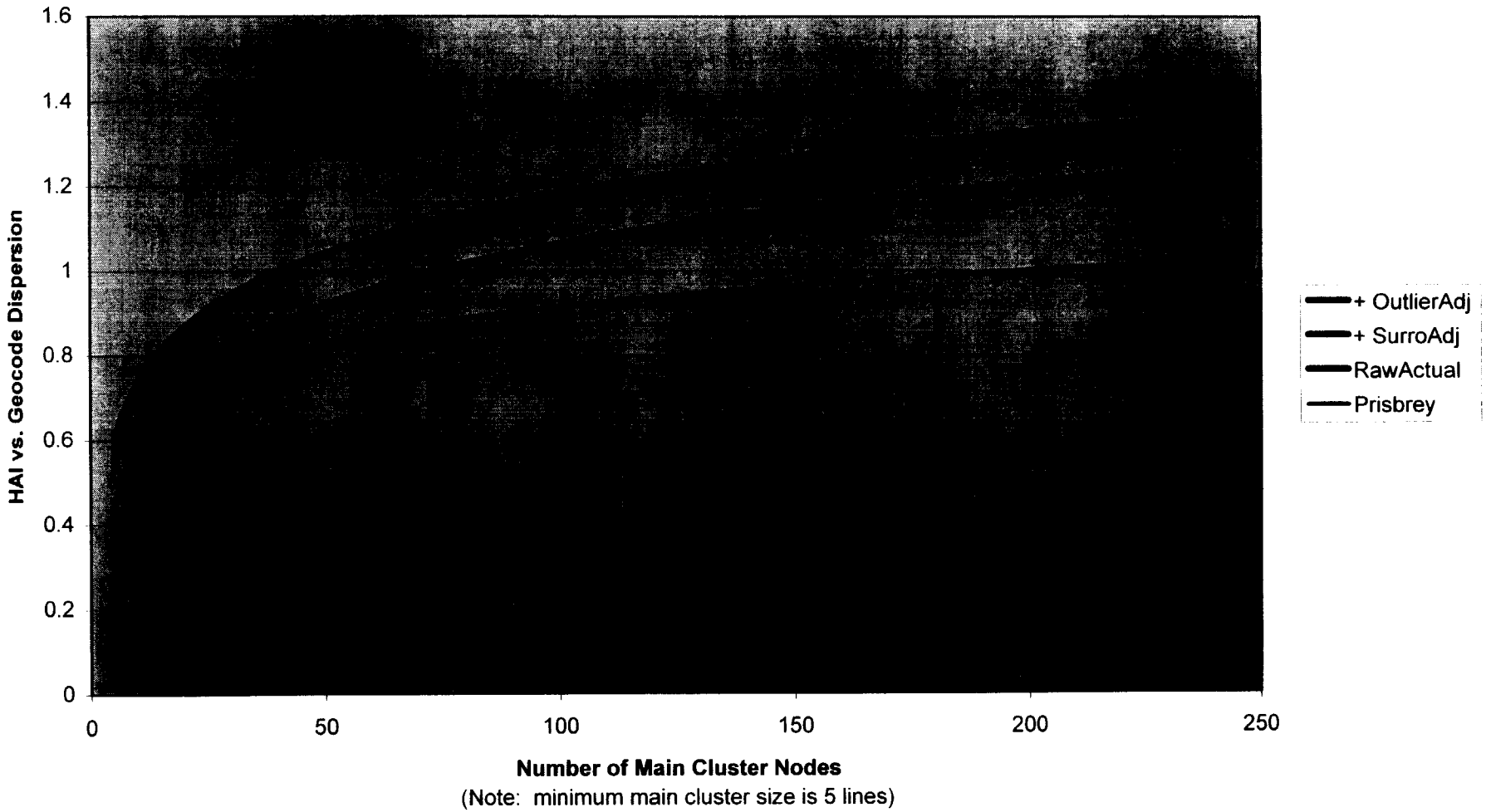


Chart 13

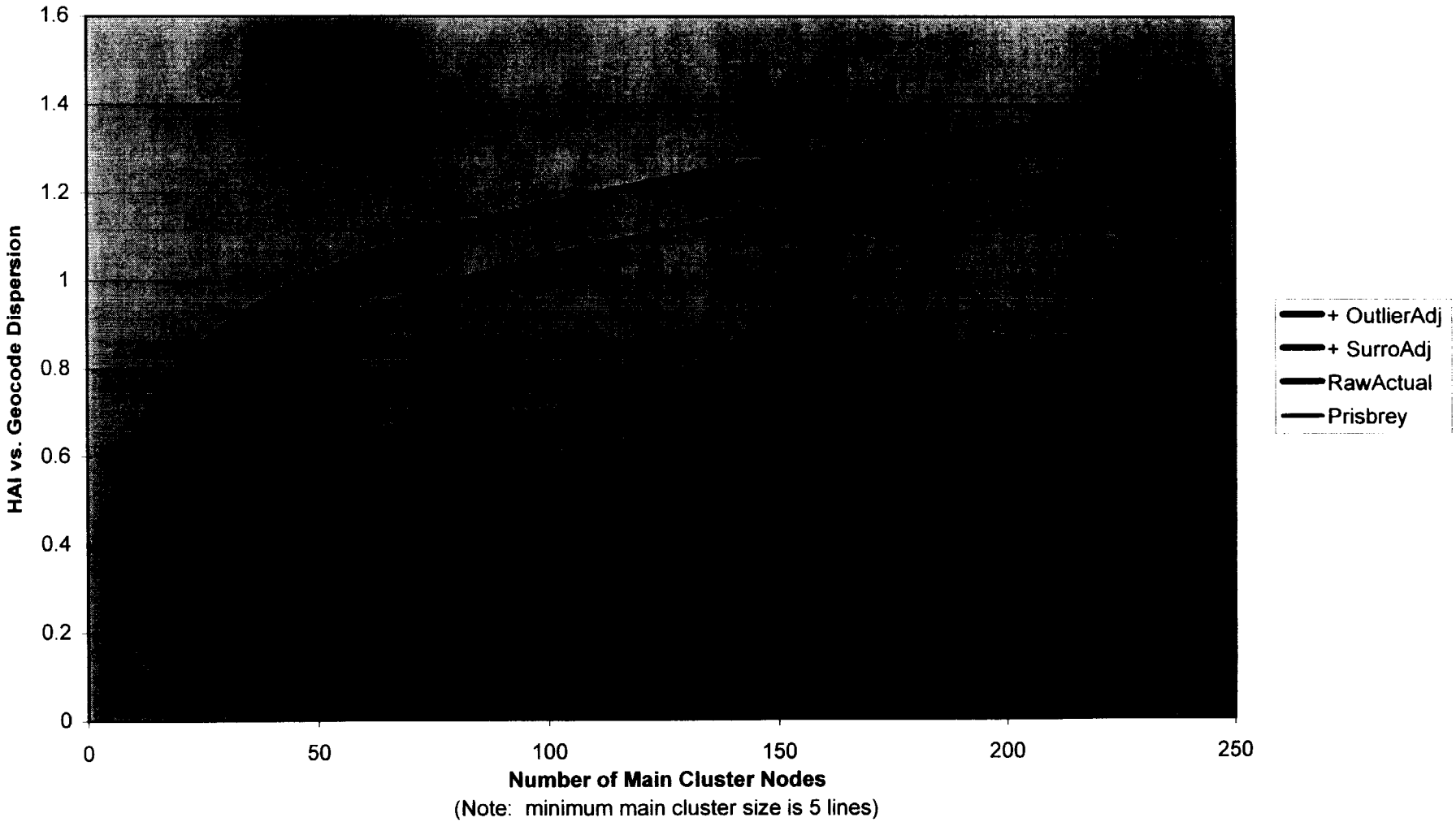
Star Dispersion Comparisons of Actual Clusters Including Outlier-Associated Cable



(Note: minimum main cluster size is 5 lines)

Chart 14

Tree Dispersion Comparisons of Actual Clusters Including Outlier-Associated Cable



(Note: minimum main cluster size is 5 lines)

Chart 15

Star Dispersion Comparisons of Actual Clusters Including Outlier-Associated Cable With Average Cluster Size

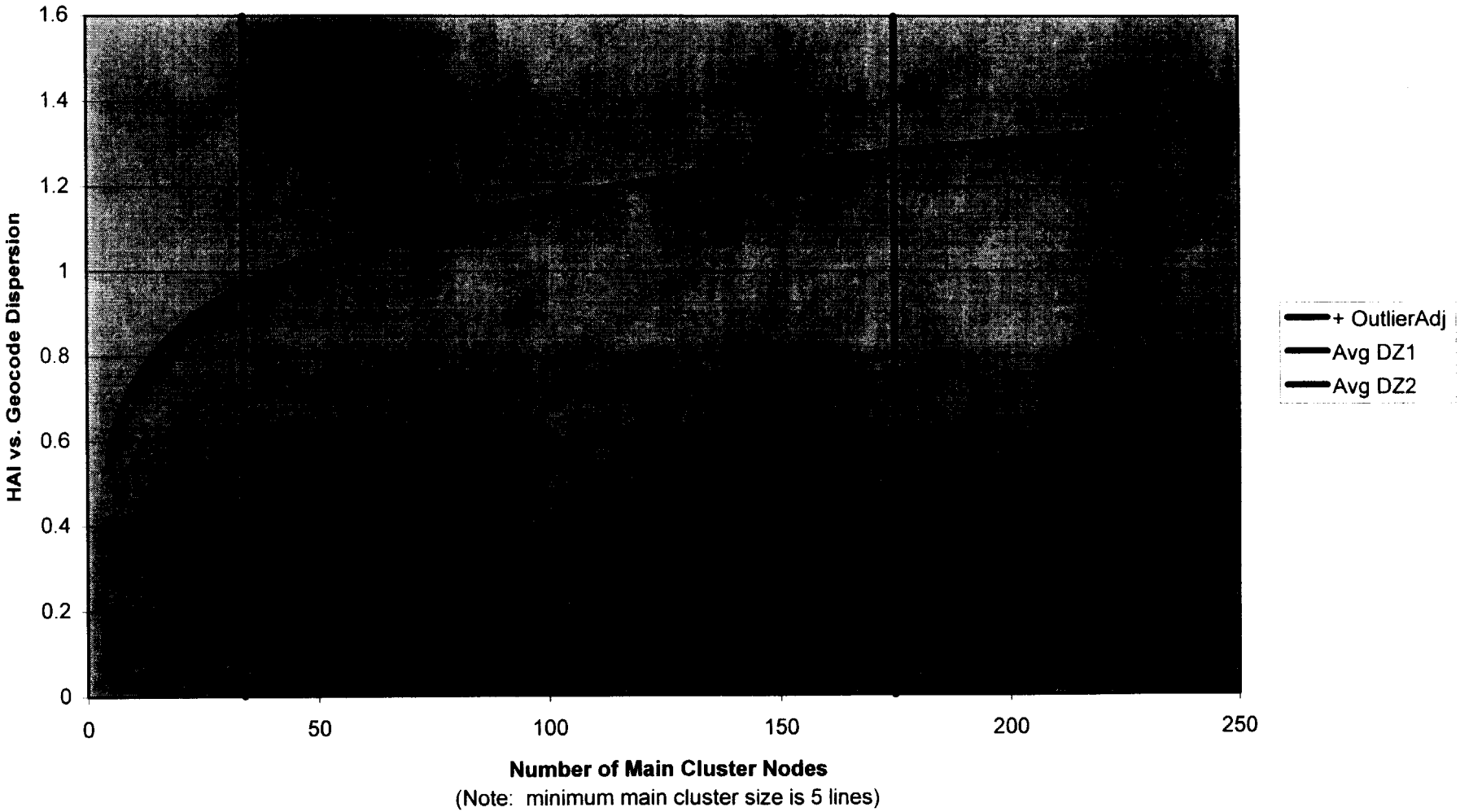
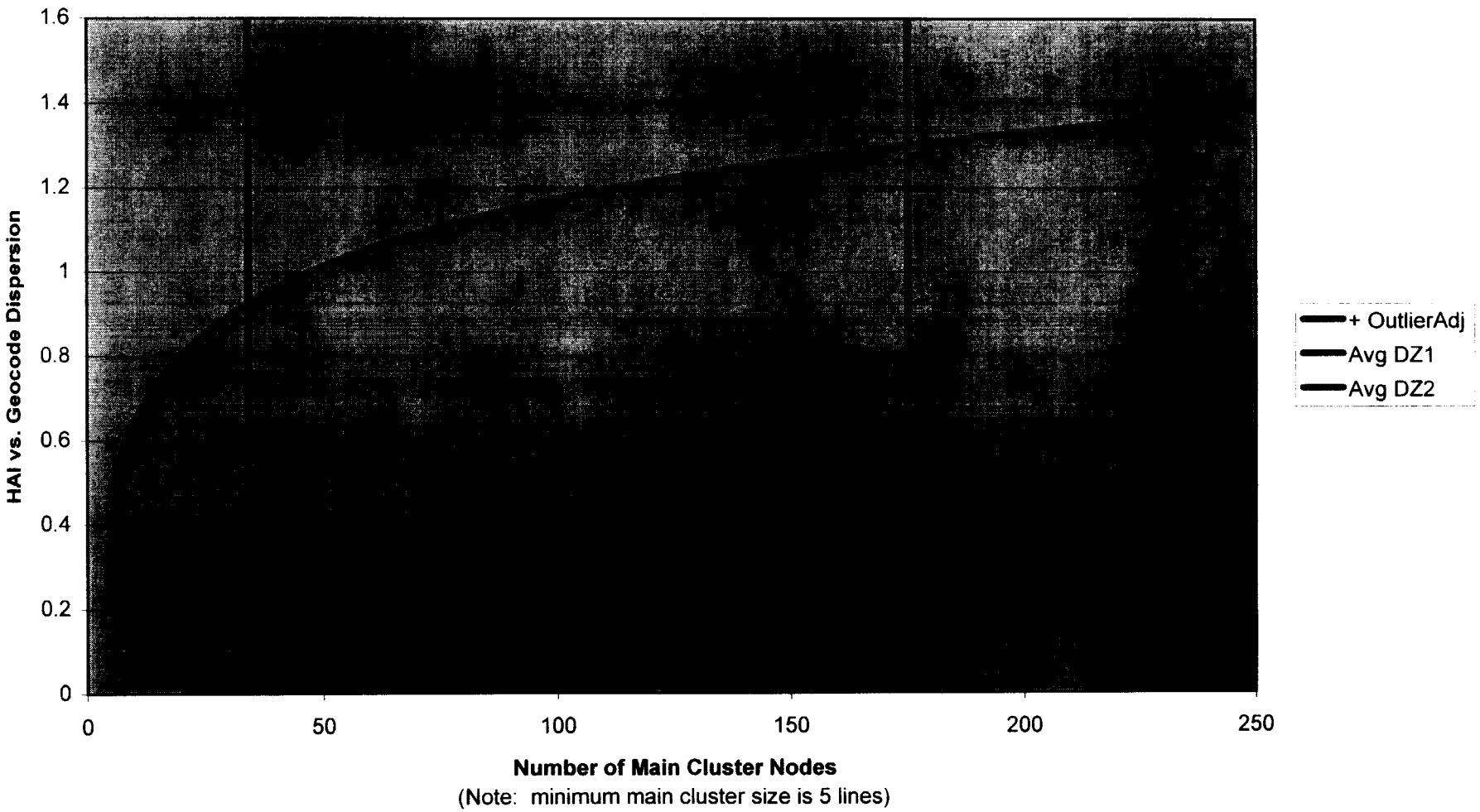


Chart 16

Tree Dispersion Comparisons of Actual Clusters Including Outlier-Associated Cable With Average Cluster Size



(Note: minimum main cluster size is 5 lines)

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To: Monica
Al
Candy

Bell Atlantic

June 3, 1998

Via Hand Delivery

RECEIVED

AT&T, L&GA
BASKING RIDGE, NJ

Michael P. Gallagher
Director
State of New Jersey
Board of Public Utilities
Two Gateway Center
Newark, NJ 07102

RE: FCC Analysis of Hatfield Model v 5.0a

Dear Mr. Gallagher:

In response to your questions regarding the FCC analysis of Hatfield (HAI) Model 5.0a, the specific algorithm studied by the Common Carrier Bureau is not the one used in HAI version 2.2.2. The Hatfield Model has undergone a number of revisions since version 2.2.2 was submitted in the Interconnection Phase of the Generic Proceeding. Version 4.0 was sponsored by AT&T in the Universal Service proceeding. (See, Exhibits to the Testimony of Robert A. Mercer on behalf of AT&T, 9/16/97.) Hatfield Model 5.0a is under consideration by the FCC for use in calculating the forward-looking economic cost of the network on which to base support for universal service in high cost areas.

The revisions to the Hatfield Model are largely an attempt to meet the FCC's cost model criteria and to respond to FCC and industry criticisms. The customer location methodology in 2.2.2 (where customer premises were spaced uniformly across a CBG) was earlier identified as flawed by the FCC. (See, Universal Service Report and Order, CC Docket 96045, FCC 97-157, released 5-8-97.) Now, several model versions later, the Hatfield team has taken great pains to develop a "new and improved" customer location methodology based on geocoded data. The analysis prepared by the Common Carrier Bureau reveals that the new methodology is also flawed and significantly underestimates loop lengths. The discovery of the flaw in version 5.0a reemphasizes doubts about the results produced by version 2.2.2.

Unfortunately, there is no way to quantify the degree of the error since the customer location methodology is just one of many changes made to the model. In addition, the 5.0a preprocessing step involving the use of geocoding is actually performed within a proprietary module from PNR and Associates, and is not available for inspection despite the Hatfield Model developer's claims that the model is public. As I noted in my May 21 letter, the same concerns regarding validation apply not just to the customer location algorithm, but to the rest of this "pig in a poke" family of models as well.

The most recent discovery of this flaw by the FCC also reaffirms Bell Atlantic's concerns more generally about the use of proxy models. To date, no proxy model submitted for consideration (including HAI version 5.0a) has met the performance standards established by the FCC. Analyses have revealed that the proxy models produce inaccurate customer locations and erroneous wire center line counts. It is difficult to envision using a proxy model with a long history of inaccuracy to establish loop rates. Even the latest generation of this model falls short.

Very truly yours,

BSA:ip
cc: Service list (via regular mail)