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STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

Ameritech Michigan's submission on performance measurements, benchmarks, and reporting in compliance with the October 2, 1998 Order in MPSC Case No. U-11654	))))	Case No. U-11830

AFFIDAVIT OF DANIEL S. LEVY

STATE OF ILLINOIS)
)
COUNTY OF COOK)

I, **DANIEL S. LEVY**, being duly sworn, state:

1. I have personal knowledge of the facts set forth herein, and I am competent to testify thereto as a witness.

I. Qualifications

2. My name is Daniel S. Levy. I have a Ph.D. in Economics from The University of Chicago. I serve as the National Leader of Economic Matters for Arthur Andersen's Strategy, Finance, and Economics Group. A copy of my resume may be found in Appendix B.

II. Purpose and Organization of the Affidavit

3. The purpose of this affidavit is to respond to the Commission's request for a simple yet rigorous methodology for analysis of Ameritech Michigan's performance measurements. The discussion below describes a methodology that will allow Ameritech Michigan, its competitors, and the Commission to determine whether Ameritech Michigan is meeting its contractual obligations. In order to make such a determination, Ameritech Michigan's performance in support of competitive local exchange carrier (CLEC) operations and end-users is either compared to performance standards or to Ameritech Michigan's performance in service of its retail customers. The results of these comparisons are used to determine whether or not Ameritech Michigan discriminates against CLECs in providing services to either the CLEC itself or its end-users.

4. Section III below details the proposed methodology. This methodology is based on statistical techniques that are well-known and accepted by courts, telecommunications companies, and academic experts. Section IV discusses the value of statistical techniques in assessing the quality of service that telecommunications companies provide in support of various groups of end-users. Section V develops the statistical measures that are used in the proposed methodology. Section VI details the proposed methodology for identifying when remedies will be employed. Section VII discusses the support that many

telecommunication companies have expressed for the use of statistical techniques similar to those proposed here. Section VIII provides conclusions.

III. Proposed Testing Method

5. This affidavit discusses two well-known statistical tests that can be used to determine whether Ameritech Michigan is providing non-discriminatory service. The testing protocol discussed is based on the z-test, which has been endorsed by a range of telecommunication companies and has been selected because it can be implemented through standard commercially available software. The test proposed employs a 95 percent, one-tailed, confidence interval. It calls for quarterly testing, which provides larger sample sizes that will increase the chance of identifying true disparity.

6. The method discussed here employs components of Ameritech's previous parity testing proposal to the FCC. At the request of the Michigan Commission Staff, Ameritech Michigan has simplified its previous proposal for parity testing. The parity testing methods proposed by Ameritech to the FCC do provide additional benefits that the Commission may want to consider. However, in order to comply with the wishes of the Commission Staff, Ameritech has proposed a simplified methodology.

7. An additional test, Fisher's exact test, is proposed for situations where the z-test is generally considered inappropriate due to specific characteristics of the measure being tested and comparatively small sample sizes. Again, the proposed test employs a 95 percent, one-tailed, confidence interval. Like the z-test, this test is well-known and generally accepted.

8. The proposed tests are based on quarterly data, which will increase sample sizes, and thus increase the ability to detect disparity of performance during the test period. In addition, as mentioned above, larger sample sizes yielded by quarterly testing will reduce the impact of random fluctuations in performance that are likely to result from random chance.

IV. Benefit of Statistical Methodology

9. Obviously, the level of performance experienced by Ameritech Michigan's own end-users will vary from quarter to quarter, month to month, and even from day to day. For each performance measure, a given result in a quarter contains a random component.[1] The observed performance of Ameritech Michigan on any given performance measure will change from one period to the next even if the underlying performance of Ameritech Michigan is consistent over time.

[1] See AT&T *ex parte* communication to the FCC dated February 3, 1998

Therefore, the observed performance of Ameritech Michigan in a given quarter is viewed as a "sample", in statistical terms, of the underlying level of performance provided to end-users by Ameritech Michigan.

10. Similarly, even though Ameritech Michigan may be providing equal levels of service to both its own and CLEC end-users, random variation and chance will result in differences in measured performance for CLEC and Ameritech Michigan transactions during any given measurement period. The statistical methods discussed here can be used to distinguish between differentials in performance generated by random chance and those attributable to Ameritech Michigan.

11. Because of the complexity of factors that affect Ameritech Michigan's performance, it is likely that on occasion these standard tests will indicate discrimination when in fact there is no discrimination. It is possible that more detailed analysis of the source of disparity may demonstrate that the appearance of disparity is erroneous. This additional analysis may require further levels of disaggregation or alternative statistical methods. In some cases, the apparent disparity will not reflect true disparate service, but rather will be attributable to some acceptable market factor that was not reflected in the first-stage analysis.

12. For example, consider the situation of a CLEC, which submitted, in March 1998, a disproportionate number of its 911 customer record updates on March 25th.

Because the computer systems were malfunctioning on that date, the customer record update processes were delayed for both CLEC and Ameritech Michigan retail customers. The data indicate that this CLEC received disparate treatment in March. However, the apparent disparity was not due to discriminatory service. If the CLEC had not submitted a disproportionate number of files on March 25th, its performance data would indicate parity for that month.

13. The statistical analyses and testing protocols that are outlined in this affidavit are based on the assumption that if parity is not observed, the first course of action should be to investigate whether there is an explanation for the apparent disparity.

14. The statistical methods outlined have the following goals.

- Provide a high likelihood of correctly assessing remedies for disparity when disparity exists.
- Provide a low likelihood of incorrectly assessing remedies when parity exists.
- Provide a comparison of performance that reduces the impact of random variation.
- Provide a testing protocol that is easy to implement and verify.

15. Statistical tests provide the ability to achieve these goals. In addition, statistical tests such as these have been recognized by regulators, courts, and the scientific

community. For these reasons among others, many telecommunications companies have agreed that statistical tests should be employed for performance testing.[2] The tests have been chosen because of their ease of implementation, which the Staff has requested. In some situations, it may be appropriate to employ alternative tests. However, the z-test and Fisher's exact test are a pair of well-known and accepted tests that can be employed in a broad range of relevant settings.

A. Why a Statistical Methodology is Necessary

16. Statistical tests are designed to measure whether observed differences in performance are unlikely to result from anything other than the typical random variation that would be expected in this type of data. Consider the situation in which Ameritech Michigan provides exactly identical repair service to both CLEC and retail customers. In any quarter, the observed service to CLEC and retail customers will be slightly different due to random variations in the types of problems that occur. To the extent that these differences are small, they may not reflect a meaningful difference between Ameritech Michigan's measured performance for CLEC and retail end-users.

[2] See Section VI below.

17. For example, in March 1998, the average time required to provide a repair — Mean-Time-to-Repair — for Ameritech Michigan retail customers was 39.32 hours. Even if Ameritech Michigan were providing non-discriminatory service, it is unlikely that the Mean-Time-to-Repair for a CLEC's resale customers would be exactly 39.32 hours. Instead, because of random variation in performance for all customers, service to CLEC customers will be worse than service to retail customers about half of the time. Of course, the other half of the time performance to retail customers will be worse than that provided to CLEC customers. It will almost never be the case that performance to any two groups of end-users will be exactly the same.

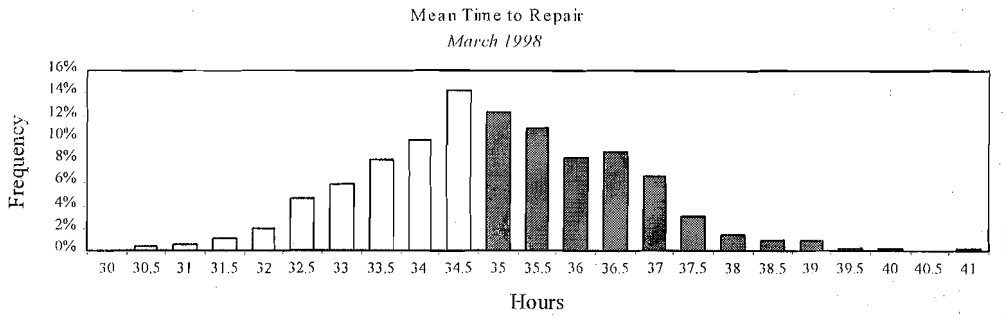
18. The effect of this type of random variation on observed performance is not unique to the telecommunications industry. It also affects many aspects of our everyday lives, from the complex to the mundane. Consider, for example, a perfectly fair coin that is tossed 500 times. One expects to see the coin come up heads 250 times and tails 250 times. But in fact this does not always happen. There is more than a 16-percent chance that the 500 tosses will result in more than 261 heads. There is an equal probability that the 500 tosses will result in less than 239 heads. These results follow from the laws of probability. If one concludes that the coin is biased based on a criterion of observing at least 261 heads, a fair coin would be erroneously judged as being biased 16 percent of the time.

19. To make the coin toss example more directly comparable to Ameritech Michigan's situation, consider the following scenario. Two fair coins are tossed 500 times each. We know that both coins will tend to produce 250 heads. A non-statistical methodology might conclude that there was disparity whenever the "CLEC" coin produced fewer heads than the "Ameritech Michigan retail" coin. However, even though both coins are fair, due to random variation there is a low probability that both coins will produce the exact same number of heads in a set of 500 tosses. A non-statistical methodology that judged the "parity of performance" of the two coins based simply on whether one coin produced more heads than the other would indicate an apparent disparity nearly 50 percent of the time, even though the two coins were both perfectly fair. Clearly, two fair coins are in exact parity all of the time. It is simply random variation that leads to apparent disparity half of the time.

20. This same type of random variation affects Ameritech Michigan's observed performance in its service to any two randomly selected groups of end-users in a given month or quarter. Consider a specific example drawn entirely from Ameritech's own retail customers' experience with Mean-Time-to-Repair. To demonstrate the effects of random chance on measured performance, I randomly selected 1,000 groups, each containing 1,000 end-users, from Ameritech's retail customer base. Because these selected end-users are actual Ameritech customers, they are receiving an underlying level of service that is, by definition,

nondiscriminatory compared to

Figure 1
Apparent Discrimination Caused by Random Chance



the broader pool of Ameritech customers, which experienced a Mean-Time-To-Repair of 34.7 hours.[3] The graph above illustrates the variation in Mean-Time-to-Repair for these groups.

21. As Figure 1 shows, about 48 percent of the 1,000 groups sampled had a Mean-Time-to-Repair above the average of 34.7 hours. If one were to judge performance and award remedies on a non-statistical basis, Ameritech Michigan would make remedy payments to approximately 483 out of 1,000 groups *of its own retail customers.*

22. Statistical methodologies recognize the inherent variability in the type of performance data at issue here. The steps needed to conduct these statistical tests

[3] Note that this calculation includes trouble reports that came clear, and trouble reports with no trouble found. Also, the calculation reflects the average across all of Ameritech's retail customers, not just Michigan.

are described in greater detail below.

V. Basic Statistical Concepts and Terms

A. Binary Data versus Continuous Data

23. There are two broad categories of data reflected in Ameritech Michigan's performance measurements: binary data and continuous data. Binary measures have only two possible outcomes for a given event. For instance, the Trouble-Report-Rate is a binary measure, since there are only two possibilities for a given phone line: either it had a trouble, or it didn't. Similarly, Confirmed-Due-Dates-Not-Met is a binary measure since for any particular due date there are only two options: either the due date was met, or it was not met.

24. In contrast, continuous data can take on any value along a continuum. For instance, Mean-Time-To-Repair is a continuous measure because the amount of time could be one minute, two days, or any other amount of time. Similarly, the Average-Installation-Interval is a continuous measure, exhibiting a wide range of possible values for the measured amount of time to install.

B. The Mean

25. A primary question in performance measurement is whether Ameritech Michigan's "typical" service for CLEC end-users is different from the "typical" performance provided to Ameritech Michigan's own retail customers. The "mean," or "average," is a widely used measure of typical performance, representing the "center" of a group of values. The mean can be interpreted as the "expected value" of the data. Clearly, some customers will experience a longer repair time than the mean, and some will experience a shorter repair time, but the mean repair time provides an "expected" length of time that a customer will tend to wait for a repair.

26. The mean of a group of values, or the sample mean, is simply the sum of all of the observed data divided by the number of observations. It is important that each observed value be included in the calculation. For instance, if a certain CLEC had 10 trouble reports in a given quarter, and 7 took 1 hour to repair, and 3 took 3 hours to repair, the Mean-Time-to-Repair would be 1.6 hours. The mean reflects both the values of the data *and* the frequency with which those values are observed.

$$\text{Mean} = \bar{x} = \frac{\Sigma x_i}{n}, \text{ where}$$

x_i indicates the observed values of the data, where x_1 is the first observed value, x_2 is the second value, etc.
Σ indicates the summation. In this case, all of the observed values are summed.
n is the total number of observed values.

27. The same calculation can be used for both continuous and binary measures. The only distinction that arises with binary measures is that each outcome is assigned a value of either zero or one. For instance, with Confirmed-Due-Dates-Not-Met, each due date is assigned the value zero if the due date was met, or assigned the value one if the due date was not met. If there were 100 installations in a given quarter, and 95 of the confirmed due dates were met and 5 were missed, then the mean of this measure would be equal to 0.05, or 5 percent, which is equal to the sum of the values of the due date data (5) divided by the total number of observations (100).

28. Ameritech Michigan's mean observed performance supplied to any group of end-users can be calculated and compared to the observed performance supplied to any other group. As discussed above, due to random variations, it will be rare that Ameritech Michigan's observed performance will be identical for CLEC and Ameritech Michigan end-users. However, with parity of service, it will also be rare to observe large differences in performance between CLEC and Ameritech Michigan end-users.

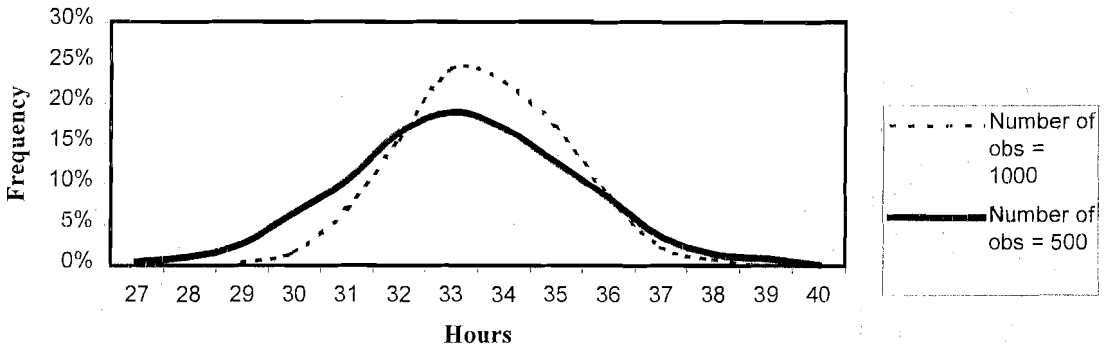
C. Variance and Standard Deviation

29. The larger the sample size used to determine the mean, the less variation there will be in the observed mean. When a mean is based on very few observations, there is a risk that a single extreme value will have a large impact on the estimated mean. A mean calculated with many observations will be less susceptible to the influence of a single or small number of extreme values.

30. The effect of sample size on the variability of the means can be seen in Figure 2. The dotted line reflects the distribution of the means from groups with 1,000 end-users, while the solid line reflects the distribution of the mean when the sample includes 500 end-users. Again, the information for this graph has been drawn from the actual experience of Ameritech's retail customers. The dotted line reflects the greater precision of the estimate of the mean that is achieved with larger sample sizes. Notice that proportionally fewer of the groups of 1,000 observations are at the more extreme values, above approximately 36 and below 32. More of the groups of 1,000 observations are found close to 34.7, the mean for Ameritech's retail customers for March 1998. With more observations, we are more likely to obtain a group that has a mean closer to the true mean of the underlying population.

Figure 2: The Effects of Number of Observations on the Distribution of the Monthly Mean

Mean-Time-to-Repair - *March 1998*



31. Since, as Figure 2 demonstrates, the estimate of the mean is more precise when the group is larger, it is possible to identify smaller differences in means between two groups, when the groups are larger. The statistical tests described below specifically account for the fact that larger groups provide a more precise estimate, increasing the probability of detecting disparity when it exists.

32. Of course, the precision of the estimated mean is not only influenced by the sample size, it is also affected by the amount of variation in the underlying measure. If there is little or no variation in a measure, its mean may be estimated very precisely with relatively little data. Measures that exhibit large variation in the performance experienced by individual end-users will require larger sample

sizes to achieve the same level of precision.

33. In order to determine whether the observed differences in performance are likely to result merely from random chance, we need a measure of the variability of the performance measure across CLEC and Ameritech Michigan end-users that reflects two things: a) the variation in the underlying performance data, and b) the number of observations. The variance of the mean and the standard deviation of the mean are common statistical measures of variability in data. With these measures of variability, it is possible to determine whether observed differences in mean performance levels between groups are likely to result solely from random chance.

34. The variance of the data is calculated as follows. The first step is to subtract the mean of the data set, $\bar{x}$, from each observation in the data set, x_i. These individual differences from the mean are squared and summed. This total squared difference is divided by the number of observations minus one to create a measure of the dispersion in the data.[4]

$$\text{Variance of the sample} = \frac{\Sigma[x_i - \bar{x}]^2}{(n-1)} = \sigma^2 \text{, where } \sigma \text{ is pronounced "sigma"}$$

[4] A variance based on data samples is a sample or estimated variance and is more correctly referred to as s^2. The population variance is referred to as σ^2. However, most documentation of parity testing in the telecommunications context has referred to sample variances as σ^2, and we will use this convention as well unless otherwise noted. The notational difference is not important, but the conceptual difference is.

Standard deviation of the sample = $\sqrt{\sigma^2}$ = square root of the variance = σ

35. These fundamental statistical concepts are the basis of a well-known statistical test known as the z-test. In the next section, I describe the use of the z-test in implementing the proposed parity test.

V. Proposed Statistical Tests

A. The z-test

36. Ameritech has proposed the use of the z-test to determine whether there is a statistically significant difference between the mean level of performance provided to two groups. As discussed above, the goal of statistical testing is to achieve a high probability of awarding remedies when there is true disparity, while reducing the probability that remedies will be awarded when performance is not in parity. Achieving these two outcomes will depend on the dispersion of the underlying data for the measure in question for both the CLEC and Ameritech Michigan, as well as the number of observations in the quarter.

37. The z-test is based on an index for comparing measurement results from different sources of data. The index is based on the difference between two means. In this

case, the index is based on the difference between the mean performance for CLEC customers and the mean performance for Ameritech Michigan retail customers. The difference between the two measures is simple to compute.

$$DIFF = \bar{x}_{AIT} - \bar{x}_{CLEC}$$

38. The z-test index adjusts the difference between the two means based on the standard deviation of that difference. As discussed above, the standard deviation measures the dispersion of the data and provides a threshold for the typical variation in the data. The standard deviation of the difference between the means depends on the variance of the performance for CLEC customers, the variance of the performance for retail customers, and the number of observations of CLEC and retail performance data.[5]

$$Variance_{DIFF} = \sigma^2_{DIFF} = \frac{\sigma^2_{CLEC}}{n_{CLEC}} + \frac{\sigma^2_{AIT}}{n_{AIT}} = \text{variance of difference between the means}$$

$$\text{Standard deviation}_{DIFF} = \text{sqrt}(\sigma^2_{DIFF}) = \sigma_{DIFF} = \text{standard deviation of difference between the means}$$

39. The z-test can be one-tailed or two-tailed. The one-tailed version of the z-test identifies cases of disparity in one direction, in this case when the service to the

[5] See Appendix A to this affidavit for a more detailed discussion.

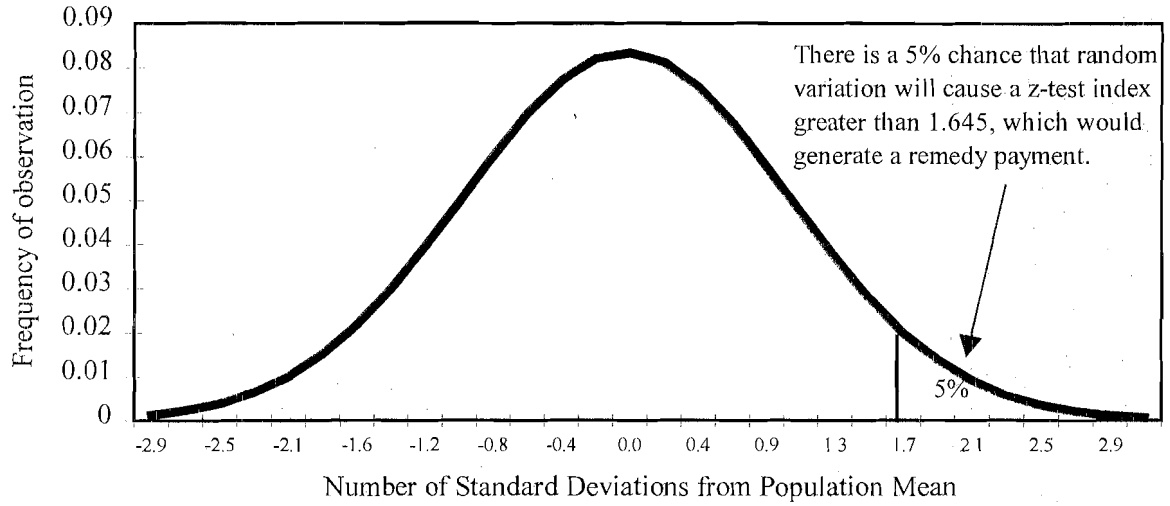
CLEC end-users is worse than that provided to Ameritech end-users. The two-tailed version identifies disparity in either direction. Since the object of this statistical analysis is to test whether Ameritech Michigan's service provision in its resale market is worse than it is for its retail customers, the one-tailed z-test is more appropriate than the two-tailed version.

40. The z-test that Ameritech Michigan has proposed will tend to produce a finding of disparity 5 percent of the time even when parity exists. This means that in situations where Ameritech Michigan is in parity, it will tend to pay a penalty 5 percent of the time, even though it provides the same level of service to both CLEC and Ameritech Michigan end-users. This finding of disparity will occur simply due to the random variations in the data. This is depicted in Figure 3, which shows the probability of observing sample means that are at increasing distances from the population mean. The z-test is designed so that there is only a 5 percent chance that the sample mean will be more than 1.645 standard deviations above the population mean.

41. At the same time, the z-tests proposed here will detect significant levels of disparity when they exist. For example, based on data from March 1998, a difference of as little as 2.4 hours in Average-Installation-Interval between Ameritech Michigan and AT&T end-users would be detected by the proposed test 98 percent of the time and would be defined as disparity. This means that the z-

test we have proposed has a high likelihood of detecting differences in the level of performance when they exist.

Figure 3
Distribution of Sample Means from Population Mean



42. As is typical with statistical tests, the ability to detect differences in performance will depend on how many observations are available for the test. Therefore, for measures that do not occur as frequently as installations, larger differences would have to occur before they would become statistically significant. Similarly, differences in performance between CLECs and Ameritech Michigan will become more likely to be detected as the size of CLECs increases. This means that if CLECs increase in size over time, the statistical tests proposed here will become increasingly strict, requiring more similar levels of performance between the CLECs and Ameritech Michigan before service would be considered in parity.

43. Typically, the conditions for employing a z-test for the comparisons of the mean of two continuous measures requires at least 30 observations.[6] Therefore, Ameritech Michigan has proposed that tests of parity be employed only in those situations where both CLEC and Ameritech Michigan end-users have more than 30 observations for a given performance measure being tested.

44. Ameritech has proposed that whenever the z-test index is less than 1.645 performance would be considered "in parity." For parity tests where the z-test index is greater than 1.645, the measure would be considered out of parity, unless Ameritech could demonstrate that more appropriate disaggregation levels or alternative statistical tests were more appropriate for the specific circumstances of that measure in the given quarter. As stated above, Ameritech has proposed quarterly testing, which will increase sample sizes, facilitating the identification of true disparity.

45. Although the z-test is a valid and acceptable test for parity for measures that are calculated as proportions, the underlying assumptions of the z-test are not valid when data sets are small and the proportions tend to be extreme (close to one or zero). The required minimum sample size for the z-test depends on the observed

[6] See Appendix A for additional discussion on required sample sizes.

proportion in the data (see Table 1 below).[7] Because some of the measures of interest in this setting (for instance, Confirmed-Due-Dates-Not-Met, or Trouble-Report-Rate) exhibit small proportions (sometimes less than one percent) and some of the carriers have small sample sizes, in some cases it may be more appropriate to use the Fisher's exact test. In addition to its merits when data sets are small and observed probabilities are low, the Fisher's exact test is also valid when the sample sizes are larger and the observed probability is closer to 50 percent. However, we are recommending the z-test, when it is appropriate, because of its additional power. The calculations for Fisher's exact test are described in detail in the Appendix A. They can be implemented on standard, commercially available computer software.

Table 1
Implementation of the z-test
Required Minimum Sample Sizes at
Different Levels of Observed Probabilities[8]

Sample Proportion	Sample Size
0.5	≥ 30
0.4 or 0.6	≥ 50
0.3 or 0.7	≥ 80
0.2 or 0.8	≥ 200
0.1 or 0.9	≥ 600
0.05 or 0.95	≥ 1400

[7] See further discussion in the Appendix A.
[8] Zar (1984), pp. 385–386.

VII. CLECs have endorsed the use of a statistical methodology

46. There is wide recognition in the telecommunications industry that statistical methods are essential for measuring parity of service. The use of statistical methodology has been endorsed by many of Ameritech Michigan's competitors in the local exchange markets.

A. Endorsements of the use of a statistical methodology

- The following statement has been excerpted from a document created by the Local Competition Users Group (LCUG), a cooperative effort of AT&T, MCI, Sprint, LCI and WorldCom, dated February 6, 1998 (version 1.0), page 4.

  > When making the comparison of ILEC results to CLEC results, it is necessary to employ comparative procedures that are based upon generally accepted statistical procedures. It is important to use statistical procedures because all of the ILEC-CLEC processes that will be measured are processes that contain some degree of randomness. Statistical procedures recognize that there is measurement variability, and assist in translating results data into useful decision-making information.

- "Allegiance [Allegiance Telecom, Inc.] agrees that statistical analysis is an essential tool in determining whether or not an ILEC is meeting its obligation to provide competing carriers with nondiscriminatory interconnection and access to OSS, operator services and directory

assistance." Source: Comments of Allegiance Telecom, Inc., dated June 1, 1998. CC Docket No. 98-56, RM-9101, p. 7.

- "A statistically valid method to evaluate parity is critical to the overall performance requirement process. Parity cannot be fairly determined without an appropriate statistical methodology." Source: Comments of MCI Telecommunications Corporation, dated June 1, 1998. CC Docket No. 98-56, RM-9101, p. iii.

- "Sprint agrees with the Commission that reporting averages of performance measurements alone may not suffice in uncovering underlying differences in performance. Thus, Sprint supports the use of statistical techniques for determining whether there are statistically significant differences between the ILEC's performance when provisioning service to its own retail customers and its performance toward competing carriers." Source: Comments of Sprint Corporation, dated June 1, 1998. CC Docket No. 98-56, RM-9101, p. 6.

B. Endorsements of the z-test

47. The z-test methodology is consistent with standard methods of statistical testing and has been endorsed by many telecommunications companies.[9] The following statements indicate their support for this methodology:

- "MCI and the Local Users Group have recommended a statistical methodology called 'the z test'. After examining various statistical tests, LCUG members determined that the 'z test' methodology best adjusts for the probability of errors (1) pointing to parity violations where none exists and (2) missing parity violations where they do exist." MCI, Pennsylvania CLEC/ILEC facilitation, p. 10, III.
- "With respect to the statistical test, the PUCT [Public Utilities Commission of Texas] has approved the Z-test to determine the parity of a performance measurement in SWBT's interconnection agreements with AT&T and MCI." Public Utility Commission of Texas, NPRM Comments, p. 8.

VII. Conclusions

50. Ameritech has recommended a statistical methodology as a test for parity of service. The statistical methodology provides Ameritech Michigan with strong

incentives to maintain nondiscriminatory performance to its CLEC customers by prescribing a substantial level of remedies wherever there is apparent discrimination. Statistical methods adjust for the day-to-day random variation in the data, distinguishing between performance differences that may be evidence of discrimination and performance differences that could arise due to random chance. They provide a standard, generally accepted methodology for identifying apparent discrimination.

51. While the statistical methods described above can be used to compare performance between Ameritech Michigan's resale and retail markets, they do not test for discriminatory behavior. Rather, they indicate how likely it is that differences in the service provided to each market are or are not due to random chance. Findings of apparent disparity would not necessarily indicate discriminatory intent or behavior on the part of Ameritech Michigan. Further analysis based on statistical tests that are more appropriate for a specific situation may reject the existence of disparity. Moreover, additional investigation of particular circumstances for a particular measure for a given quarter may demonstrate the disparity was not the result of Ameritech Michigan's actions, but rather was caused by conditions beyond Ameritech Michigan's control.

[9] See, for example, the LCUG response to the NPRM for the 271 rulemaking.

52. It should also be noted that even instances of correctly identified disparity may not justify a legal conclusion of discrimination, either because the cause of the disparity is beyond the control of Ameritech Michigan or because the magnitude of the disparity does not warrant such a conclusion. As noted by the FCC, "...even if statistically significant differences appear between results for the incumbent LEC and the competing carrier, these differences may be too small to have any practical competitive consequence and may not justify a legal conclusion that the incumbent LEC has discriminated against the competing carrier."[10]

[10] Notice of Proposed Rulemaking; Appendix B — Statistical Methods, p. B4.

This concludes my affidavit.

Further affiant saith not.

Daniel S. Levy

Subscribed and sworn

before me this 31 day of

October, 1998.

Notary Public
County, Michigan
My Commission Expires 01/11/2001

APPENDIX A

I. Appropriate Statistical Methods for Testing Parity: Form of Data and Distributional Assumptions

The statistical analysis proposed by Ameritech Michigan compares Ameritech Michigan's performance in providing service to its own retail customers with its performance in providing service to customers of its competing carriers. Findings of inferior service provision to its competing carrier customers would indicate "disparity" between Ameritech's retail and resale markets. Otherwise, Ameritech Michigan's performance in both markets would be considered "in parity." The statistical methods used to test for parity often depend on the form of the data — binary or continuous — describing each of the performance measures being examined.

Binary data are classified into two discrete categories. For example, whether a line was or was not installed in time is a binary outcome. For binary data, we compare the frequency of such occurrences for retail customers versus competing carrier customers. For example, if the proportion of lines needing repairs is 2 percent of all retail lines but 1 percent of all a competing carrier's lines, a statistical test could determine how likely it is that this difference is due to random chance.

Continuous data measure a quantity or a length (e.g., *how long* it took to repair a line, rather than whether a line did or did not need a repair). A comparison of means is often appropriate for performance measures based on continuous data. For example, if the average time needed to repair a line is two days for the retail market but three days for the competing carrier or resale market, a statistical test could determine how likely it is that this hypothetical difference is due to random chance.

Calculation of the probability that an observed difference is due solely to random chance depends on the assumptions made regarding the distribution of the data. Choice of the appropriate test, therefore, depends on making the appropriate distributional assumptions given the data to be analyzed. Whether the data are binary or continuous often is important, if not determinative, in making these assumptions. I discuss these issues below as they apply to parity testing.

I.A. Statistical Tests for Performance Measures Based on Continuous Data

i) Pooled vs. Separate Variance Tests

When comparing means of continuous performance measures, the z-test is employed.[1] Two different versions of the test may be used depending on the assumptions made about the variance, or spread, of the populations from which the means were sampled. If the variance of the populations from which both the retail and the resale data were sampled are assumed to be equal, a z-test using a combined or pooled variance estimate may be used.[2] Otherwise, separate variance estimates from the retail and resale sample data are used.[3] I currently use the separate variance version of the z-test in the comparisons of means since this test makes the fewest assumptions about the underlying populations. Statistical comparisons of variances should not be considered part of a z-test but rather, require a different statistical test altogether.[4] Should such tests reveal systematic equality in the variances of the retail and resale markets, the pooled version of the z-test can be used if and where appropriate.

ii) One-tailed v. Two-tailed Tests

The z-test can be one-tailed or two-tailed. The one-tailed version of the test only identifies cases of disparity in one direction — either resale performance being worse than retail, or vice versa. The two-tailed version identifies disparity in either direction. Since the object of this statistical analysis is to test whether Ameritech's service provision in its resale market is worse than in its retail market, the one-tailed z-test is more appropriate than the two-tailed version.

iii) Sample Size

To obtain accurate results when comparing means using a z-test, the means must be distributed according to a normal distribution. According to the central limit theorem, as sample size increases, the distribution of sample means becomes increasingly normal. This result holds for virtually all distributions of data. As one increases sample size, the speed with which the distribution of sample means approaches normality depends on how closely the underlying population from which the data were sampled follows a normal distribution. Sample sizes of 30 observations are commonly viewed as a minimum threshold for the distribution of sample means to approach normality.[5] Currently, a sample of 30 observations is used as a minimum sample size in the parity tests proposed by Ameritech Michigan, for both samples of CLEC and Ameritech Michigan end-users, when comparing means using a z-test. This threshold can be increased if warranted by indications of significant departures from normality in the data.

I.B. Statistical Tests for Performance Measures Based on Binary Data

i) Limitations of the z-test comparing proportions

Binary data follow a binomial distribution.[6] For large sample sizes with sample proportions close to 0.5, the binomial distribution converges to a normal distribution. Under such circumstances, a z-test can be used to compare differences in proportions.[7] However, the smaller the sample size or the more the sample proportions deviate from 0.5, the less appropriate the assumption of normality. Many of the performance measures based on binary data in the present case involve comparisons of proportions of less than 5 percent, and sometimes less than 1 percent. In addition, the sample sizes are often well under recommended levels for using the normal approximation.[8] Due to these data limitations, there may be situations where Fisher's exact test is more appropriate.

ii) Fisher's exact test

Fisher's exact test is a widely understood and generally accepted statistical test for comparing proportions that can be used when sample sizes are small or sample proportions are close to zero or one. This test does not require a minimum sample size or restrict its application to a limited range of sample proportions because it is an exact statistical test. It does not rely on an approximated distribution, but rather calculates the exact probability of obtaining specific frequencies of observations. The simple example below is illustrative.

For the performance measure comparing the percentage of lines needing repairs, the observed frequencies of retail and resale lines can be arranged in a 2x2 ("two-by-two") table (see Table 1). The two columns identify retail or resale observations, and the two rows identify lines needing or not needing repairs. When testing for parity, the null hypothesis is that the percentage of resale lines needing repairs is equal to or less than the percentage of retail lines needing repairs. In this example, if Fisher's exact test indicates a statistically significant difference between 25.0 percent (the resale repair rate) and 23.1 percent (the retail repair rate), we would reject the null hypothesis in favor of the alternative hypothesis — that the percentage of resale lines needing repairs is greater than the percentage of retail lines needing repairs.

First, the probability of obtaining the observed frequencies is calculated.[9] Then, for fixed row and column totals, the corresponding probabilities of every other 2x2 table which is "more extreme" than the observed 2x2 table are calculated and summed. For the two-tailed version of the test, more extreme tables are those which are less likely than the observed table. For the one-tailed version of the test, which is more appropriate for this analysis, more extreme tables are those indicating worse resale performance than the observed table (Tables 2-4 below).[10]

This sum of probabilities is added to the probability of obtaining the observed table, yielding a p-value, which is the result of the test. A large p-value (close to one) would indicate a high probability of obtaining the observed difference under the null hypothesis, and a low p-value (close to zero) would indicate a low probability of obtaining the observed difference under the null hypothesis. Comparing the p-value to a pre-determined level of statistical significance, typically set at α=0.05, determines whether or not the p-value is small enough to indicate disparity.

Table 1 – Observed Frequencies
Probability = 0.431

	Resale	Retail	Total
No Repair	3	60	63
Repair	1	18	19
Total	4	78	82
% Repair	25.0%	23.1%	

Table 2 – More Extreme Table
Probability = 0.191

	Resale	Retail	Total
No Repair	2	61	63
Repair	2	17	19
Total	4	78	82
% Repair	50.0%	21.8%	

Table 3 – More Extreme Table
Probability = 0.035

	Resale	Retail	Total
No Repair	1	62	63
Repair	3	16	19
Total	4	78	82
% Repair	75.0%	20.5%	

Table 4 – More Extreme Table
Probability = 0.002

	Resale	Retail	Total
No Repair	0	63	63
Repair	4	15	19
Total	4	78	82
% Repair	100.0%	19.2%	

The one-tailed Fisher's exact test above yields the p-value:
$p = 0.431 + 0.191 + 0.035 + 0.002 = 0.659$. If the pre-determined level of statistical significance were set at α=0.05, we would clearly fail to reject the null hypothesis that the proportion of resale lines needing repairs was the same as the proportion of retail lines needing repairs because the p-value is much greater than α. In other words, this comparison of proportions indicates parity between the retail and resale markets for this performance measure.[11]

The example above, together with Table 5 below, demonstrate how random chance and sample size affect determinations of parity. A more superficial treatment of the data which, for example, compared absolute percentage differences to test for parity might make a determination of disparity in the case above. However, given the relatively small sample size, Fisher's exact test indicates that it is highly likely that the observed difference is just due to chance. If the same proportions were observed but with much larger sample sizes, the likelihood that a resale repair rate 1.9 percentage points greater than the retail repair rate was due solely to chance would be greatly reduced. We observe this situation in table 5 below.

Table 5 – Alternate Observed Frequencies
Probability = 0.000093

	Resale	Retail	Total
No Repair	3,750	461,400	465,150
Repair	1,250	138,600	139,850
Total	5,000	600,000	605,000
% Repair	25.0%	23.1%	

The p-value for a Fisher's exact test on the alternate frequencies observed in Table 5 is p=0.00087, indicating that, with a larger sample size, it is very unlikely that a difference as large as 1.9 percentage points would be observed if the null hypothesis of equal population proportions was true. Since this p-value is less than the pre-determined level of statistical significance of α=0.05, we would reject the null hypothesis of parity.

These examples indicate the necessity of using a statistical approach in parity analyses. The choice of the appropriate test and recognition of the influence of sample size are required to correctly account for randomness in data. Use of non-statistical approaches when comparing means and proportions would often lead to errors of interpretation due to the statistical uncertainty in sampled data.

II. Other Statistical Tests

The statistical methods described above are appropriate to apply when testing for parity given: a) the data and performance measures being examined to date, and b) the Staff's request for a simple method of implementing a test for parity. If additional performance measures require examination, additional data become available, or further analysis reveals the need to reexamine the methods that have been applied to date, the appropriate application of other statistical methods may prove useful. Some of these methods include Bayesian tests, which allow for the incorporation of prior beliefs about the data. Others include nonparametric tests, bootstrapping, and permutation tests, which are subject to limited, if any, constraints regarding distributional assumptions.

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[1] The score of a z-test is the difference in the sample means relative to the standard deviation of this difference. The standard error is a measure of the spread of the data that provides an estimate of the typical deviation of a difference in sample means from zero. The null hypothesis for these parity tests — that the population means are equal — is expressed mathematically by assuming the difference in population means is zero. The larger the observed difference in means for a fixed standard error, the larger the score of the z-test and the more likely it is that the sample means are indeed "different," or obtained from two different populations rather than from the same underlying population.

In this analysis our z-test calculations use estimated variances from the sample data. When estimated variances are used, the results of the test follow a student's t distribution (Wonnacott and Wonnacott, 1984, p. 264). If sample sizes are large, however, and the estimated variances can be assumed to be the population variances, the student's t distribution will approximate the normal distribution (Wonnacott and Wonnacott, 1984, p. 264). In this analysis, we base statistical inferences made from the scores of the z-test on the normal distribution. From Ameritech's perspective, this is a conservative approach to testing for parity, because the kurtosis of the normal distribution is smaller than that of the student's t distribution (Zar, 1996, p. 95). This makes findings of disparity more likely than if we relied on the student's t distribution. The probability density functions of both the normal and student's t distributions are listed below (Larsen and Marx, 1986):

$$if\ X \sim N(\mu,\sigma),\ then\ f_X(x) = \frac{1}{\sqrt{2\pi}\sigma} \times e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2} \qquad \text{(p. 210)}$$

where μ = population mean
σ = population standard deviation
π = mathematically defined constant $\approx$ 3.14159
e = mathematically defined constant $\approx$ 2.71828

$$if\ X \sim t(n),\ then\ f_X(x) = \frac{\Gamma\left(\frac{n+1}{2}\right)}{\sqrt{n\pi} \times \Gamma\left(\frac{n}{2}\right) \times \left(1+\frac{x^2}{n}\right)^{\left(\frac{n+1}{2}\right)}} \qquad \text{(p. 341)}$$

where n = degrees of freedom

Γ = gamma function where $\Gamma(r) = \int_0^\infty x^{(r-1)} e^{-x} dx$ (p. 227).

[2] The formula for the pooled-variance z-test is (Zar, 1996, p. 125):

$$Z = \frac{\overline{X_1} - \overline{X_2} - (\mu_1 - \mu_2)}{\sqrt{\frac{s_p^{\ 2}}{n_1} + \frac{s_p^{\ 2}}{n_2}}}$$

where $\overline{X_1}$ = incumbent LEC sample mean
$\overline{X_2}$ = CLEC sample mean

μ_1 = incumbent LEC population mean

μ_2 = CLEC population mean

$(\mu_1 - \mu_2)$ = 0 under null hypothesis of parity, or equality of means

s_p^2 = pooled sample variance = $\dfrac{\sum_{i=1}^{n_1}\left(X_{1i} - \overline{X_1}\right)^2 + \sum_{i=1}^{n_2}\left(X_{2i} - \overline{X_2}\right)^2}{(n_1 - 1) + (n_2 - 1)}$,

(Wonnacott and Wonnacott, 1984, p. 232)

where X_{1i} = each incumbent LEC observation $(i = 1,2,3...)$ and X_{2i} = each CLEC observation $(i = 1,2,3...)$

n_1 = incumbent LEC sample size

n_2 = CLEC sample size

If statistical inferences based on the result of the test assume a student's t distribution rather than the normal distribution (a t-test instead of a z-test), the degrees of freedom for this test is:
$df = (n_1 - 1) + (n_2 - 1)$ (Wonnacott and Wonnacott, 1984, p. 232).

[3] The formula for the z-test which does not assume equal variances is (Kmenta, 1986, p. 137 and p. 145):

$$Z = \frac{\overline{X_1} - \overline{X_2} - (\mu_1 - \mu_2)}{\sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}}$$

where $s_1^2 = \dfrac{\sum_{i=1}^{n_1}\left(X_{1i} - \overline{X_1}\right)^2}{n_1 - 1}$ = incumbent LEC sample variance (Matlack, 1980, p.47)

$s_2^2 = \dfrac{\sum_{i=1}^{n_2}\left(X_{2i} - \overline{X_2}\right)^2}{n_2 - 1}$ = CLEC sample variance (Matlack, 1980, p.47).

This version of the z-test is an approximate solution. This problem, know as the Behrens-Fisher problem, has remained unsolved for over 50 years (Larson and Marx, p.362).
If statistical inferences based on the result of the test assume a student's t distribution rather than the normal distribution (a t-test instead of a z-test), the approximation for the degrees of freedom for this test is (Zar, 1996, p. 129):

$$df = \frac{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)^2}{\frac{\left(\frac{s_1^2}{n_1}\right)^2}{(n_1 - 1)} + \frac{\left(\frac{s_2^2}{n_2}\right)^2}{(n_2 - 1)}}.$$

[4] One test of equality of variances of two assumed normal populations is given by the formula below (Kmenta, 1986, pp. 147-148):

$$\frac{s_1^2}{s_2^2} \sim F_{n_1-1, n_2-1}$$

where F_{n_1-1,n_2-1} is the F distribution with $n_1 - 1, n_2 - 1$ degrees of freedom. This tests the null hypothesis that $\sigma_1^2 \leq \sigma_2^2$ against the alternative hypothesis that $\sigma_1^2 > \sigma_2^2$ where σ_1^2 and σ_2^2 are the two population variances.

[5] If the populations from which the two means are sampled are normal *and* the variances of these populations are identical, the z-test is an exact test. Consequently, it is not subject to the sample size constraints imposed by reliance on approximations to the normal distribution based on the central limit theorem.

[6] The formula for the probability function of the binomial distribution is (Zar, 1996, p. 515):

$$if\ W \sim B(n, p), then\ p_W(x) = \frac{n!}{x!(n-x)!} p^x q^{(n-x)}$$

where n = sample size
p = probability of event occurring
k = number of events occurring.

[7] The formula for the test statistic comparing differences in proportions from large sample sizes is (Martín Andrés, Herranz Tejedor, and Silva Mato, 1995, p.444):

$$Z = \frac{p_1 - p_2 - (\pi_1 - \pi_2)}{\sqrt{p_{both}(1 - p_{both})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

where p_1 = sample incumbent LEC proportion = $\frac{k_1}{n_1}$ = events in sample / sample size

p_2 = sample CLEC proportion = $\frac{k_2}{n_2}$ = events in sample / sample size

$$p_{both} = \frac{k_1 + k_2}{n_1 + n_2}$$

π_1 = population LEC probability

π_2 = population CLEC probability

$(\pi_1 - \pi_2) = 0$ under null hypothesis of parity, or equality of proportions

n_1 = incumbent LEC sample size

n_2 = CLEC sample size

Like the z-test on means, the z-test above compares the difference between two proportions relative to the standard error of the difference of these sample proportions. It, too, is based on the assumption of normally distributed means, because proportions are means for binary data. This assumption again allows us to determine the statistical confidence with which we can say the sample proportions are the "same," or drawn from the same underlying binary distribution.

[8] Zar (1984, pp. 385–386) provides the following table from Cochran (1977, p.58) with sample size recommendations for different magnitudes of sample proportions:

Sample proportion	Sample Size
0.5	≥ 30
0.4 or 0.6	≥ 50
0.3 or 0.7	≥ 80
0.2 or 0.8	≥ 200
0.1 or 0.9	≥ 600
0.05 or 0.95	≥ 1,400

[9] The formula for obtaining the probability of any specific 2x2 table is (Zar, 1996, p. 541):

$$P = \left(\frac{R_1!R_2!C_1!C_2!}{n!}\right)\left(\frac{1}{f_{11}!f_{12}!f_{21}!f_{22}!}\right)$$

where R_1 and R_2 = row 1 total and row 2 total, respectively

C_1 and C_2 = column 1 total and column 2 total, respectively

f_{11} = count in cell: row 1, column 1

f_{12} = count in cell: row 1, column 2

f_{21} = count in cell: row 2, column 1

f_{22} = count in cell: row 2, column 2

$n = f_{11} + f_{12} + f_{21} + f_{22}$ = total number of observations

Fisher's exact test is based on combinatorics. Since the row and column totals are fixed, as one of the four cell counts varies, the other three are adjusted accordingly and the probability of observing each resulting 2x2 table follows the hypergeometric distribution given by the formula (Evans, Hastings, and Peacock, 1993, p. 85):

$$if\ V \sim H(N,X,n),\ then\ p_V(x) = \frac{\binom{X}{x}\binom{N-X}{n-x}}{\binom{N}{n}}$$

where N = total sample size (total number of lines in the example in the body of the Appendix A)
X = number of events in total sample (total number of lines needing repair)
n = sample size of comparison category (total number of retail lines)
x = number of events in comparison category (number of retail lines needing repair)
where the minimum value of x is $\max(0, n-N+X)$ and the maximum value of x is $\min(X,n)$.

[10] As with the z-test comparing means, since the object of this statistical analysis is to test whether Ameritech's service provision in its resale market is worse than it is for its retail customers, the one-tailed version of Fisher's exact test is more appropriate than the two-tailed version.

[11] An arguable limitation of Fisher's exact test is that it conditions on both the row and column marginal totals, meaning that both the row and column totals must be fixed during the calculation. Although fixing the row totals (repair / no repair) is an unnecessary restriction for testing the resale and retail proportions being compared, many statisticians have argued that this does not significantly detract from the accuracy of the test, and they do not hesitate to advocate its use.

"Fisher's exact test is the most widely known and accepted method for analyzing a 2x2 table ..." (Andrés Martín and Herranz Tejedor, 1995, p.590).

"It is the probabilities of occurrence in the relevant subset that provide the correct basis for tests of significance. In other words, we must condition on the margins, whatever the origin of the table. Whether no, one, or two margins are 'fixed' in advance is irrelevant." (Yates, 1984, p. 433)

Fisher (1935) and later Yates (1984, together with many other discussants (including Barnard and Cox), argue that knowledge of the joint distribution of the row totals provides little inference on the magnitude of association evident in a 2x2 table. Little (1989, p.286) describes the row marginal sums as "approximately ancillary" because little information is lost by conditioning on both marginals.

"The Fisher exact test is applicable to contingency tables where both the row totals and column totals are set in advance of data collection (an uncommon situation). Fortunately, the testing procedure appears to work with other contingency tables as well" (Zar, 1984, p. 392).

One should note, especially when working with small samples, that Fisher's exact test is conservative. This decreases the power of the test and increases the likelihood of making Type II errors — accepting the null hypothesis of parity when parity does not exist. However, it also reduces the probability of making Type I errors — rejecting the null hypothesis of parity when parity does, in fact, exist. Statisticians have argued that the benefits of Fisher's exact test outweigh any reduction in power resulting from its use over other methods "... the loss of power produced by using Fisher's test is very slight in the majority of situations, and this is acceptable in return for the greater ease of computation and a more generic validity (for all types of sample)." (Andrés Martín and Herranz Tejedor, 1995, p.579).

Some statisticians have proposed adjustments to Fisher's exact test to compensate for its conservatism. Agresti (1990) cites Lancaster's (1961) and Plackett's (discussion of Yates, 1984) advocacy of the mid-P value method — using half the P value of the observed table plus the probability of the more extreme tables — "as a good compromise between having a conservative test and using randomization on the boundary to eliminate problems from discreteness" (Agresti, 1990, p.66).

Appendix B

DANIEL S. LEVY ECONOMIST

EDUCATION

Ph.D., Economics, University of Chicago
A.B., Economics, University of Chicago (With Special Honors in Economics)

Daniel S. Levy specializes in applications of economics and statistics in the study of corporate structures related to industrial organization/antitrust and transfer-pricing issues. His work includes detailed analyses and valuations of corporate functions, risks, and assets for international corporations in a wide range of industries. Dr. Levy's work also includes the study of environmental issues, including comment before the EPA on contingent valuations of power plant emissions damages. In the area of labor economics, he has studied the effects of variations in employment incentives on the productivity and retention of employees, and has investigated the social and economic determinants of investments in human capital. He is expert in numerous statistical and modeling applications, and has modeled complex economic and social factors affecting demographic and market behavior.

Prior to joining Arthur Andersen, Dr. Levy held research and consulting positions at Charles River Associates, The RAND Corporation, Needham-Harper Worldwide Advertising, SPSS Inc. and the University of Chicago Computation Center.

EXPERT TESTIMONY/AFFIDAVITS

- Before the FCC, 1998, Expert Affidavit, *Statistical Analysis.*
- Graber, A. et al. v. Giuliani, United States District Court Southern District of New York, 1998, Expert Affidavit and Deposition, *Statistical Sampling and Survey Research.*
- Marisol, A. et al. v. Giuliani, United States District Court Southern District of New York, 1998, Expert Affidavit and Deposition, *Statistical Sampling and Survey Research.*
- DFW v. Continental Air Lines, Texas, 1998, Expert Deposition and Testimony.
- Randall's Food Markets, Inc., v. Fleming Companies, Inc., The American Arbitration Association Dallas, Texas, June, 1998, Expert Affidavit, *Statistical Sampling.*
- Randall's Food Markets, Inc., v. Fleming Companies, Inc., The American Arbitration Association Dallas, Texas, February 1998, Expert Report, *Statistical Sampling.*

- Donald E. Haney v. Timesavers Inc., et al. United States District Court, District of Oregon, January 1998, Expert Testimony, *Patent Infringement.*
- Merck-Medco Managed Care Inc. v. Rite Aid Corporation et al. Northern District of Maryland, May 1997, Expert Deposition, *Antitrust.*
- Donald E. Haney v. Timesavers Inc., et al. United States District Court, District of Oregon, July 1997, Expert Report, *Patent Infringement.*
- Kenneth Heubert Williams v. Honri Vashon Hunt et al., State of Michigan in the Circuit Court for the County of Oakland, May 1997, Expert Deposition, *Value of Life.*
- Merck-Medco Managed Care Inc. v. Rite Aid Corporation et al. Northern District of Maryland, April 1997, Expert Report, *Antitrust.*
- Robinson Rubber et al. V. Hennepin County, Minnesota, United States District Court, District of Minnesota, Fourth Division, April 1997, Expert Deposition, *Antitrust.*
- Robinson Rubber et al v. Hennepin County, Minnesota, United States District Court, District of Minnesota, Fourth Division, April 1997, Expert Report, *Antitrust.*
- Massachusetts Wholesalers of Malt Beverages, Inc., v. Commonwealth of Massachusetts et al, Suffolk Superior Court, 1996, Expert Testimony, *Financial Damages.*
- Luke Brothers v. S. P. Krusell, US District Court, District of Massachusetts, July 1996, Expert Affidavit, *Antitrust.*
- Luke Brothers v. S. P. Krusell, US District Court, District of Massachusetts, August 1996, Expert Affidavit, *Antitrust.*
- Daras v. Texaco Inc, 1993, Affidavit.
- Environmental Protection Agency: Navajo Generating Station, 1991, Public Comment, *Valuation of Environmental Damages.*

PROFESSIONAL EXPERIENCE

1996 – Present	Director of Economics, Arthur Andersen L.L.P.:CRCO
1995 - 1996	Economist, Arthur Andersen L.L.P.
1991 - 1995	Senior Associate, Charles River Associates

1988 - 1991	Associate Economist, The RAND Corporation
1985 - 1988	Computer Advisor, University of Chicago Computation Center
1982 - 1985	Research and Teaching Consultant, SPSS Inc.
1981 - 1982	Research Consultant, Needham, Harper Worldwide Advertising

PROFESSIONAL HONORS AND ACTIVITIES

- Earhart Fellowship for graduate research in economics, 1981 - 1982
- Hewlett Grant for research in developing countries, 1985 - 1986; renewed, 1986 - 1987
- CBS Bicentennial Scholarship for research on events leading to the American Revolution, 1986 - 1987
- Homer and Alice Jones Fellowship, University of Chicago, 1987 - 1988
- American Economics Association, 1988- Present
- Population Association of America, 1988-1991

PAPERS, PRESENTATIONS, AND PUBLICATIONS

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STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

Ameritech Michigan's submission on performance measurements, benchmarks, and reporting in compliance with the October 2, 1998 Order in MPSC Case No. U-11654.	)	Case No. U-11830

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STATE OF MICHIGAN

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AFFIDAVIT OF SUSAN L. WEST

STATE OF ILLINOIS)
)
COUNTY OF)

I, **SUSAN L. WEST**, being duly sworn, state:

I have personal knowledge of the facts set forth herein, and I am competent to testify thereto as a witness.

I. Qualifications

My name is Susan L. West. I am the General Manager of Service and Network Performance at Ameritech Information Industry Services ("AIIS"), a division of Ameritech Services, Inc. AIIS is an Ameritech business unit that provides communications products and services to other telecommunications providers, including providers that compete with Ameritech Michigan in the local exchange market.

As General Manager of Service and Network Performance at AIIS, my principal responsibility is to ensure that the quality of the products and services that AIIS provides to its customers meets all applicable marketplace and regulatory standards, as well as the needs of AIIS customers. I oversee AIIS' implementation of interconnection agreements

between Ameritech operating companies and competing local exchange carriers ("CLECs"). I am responsible for the development and implementation of measurements of operational performance for the products and services covered by those agreements, and for the issuance of monthly performance reports.

I am also responsible for service management, interconnection management and operations support. The Service and Network Performance unit focuses on developing and managing the ongoing service relationship with all AIIS customers. My specific responsibilities include, but are not limited to:

> Managing the overall design, planning and implementation of interconnection agreements, including end office integration, collocation implementation and trunk group administration.
>
> Providing Service Management support to all AIIS customers. Service Managers act as the first point of contact for internal and external customers for servicing issues, including provisioning, maintenance, billing and overall network performance. Service Managers are a point of escalation for expedition and for provisioning and maintenance issues. Service Managers are also responsible for reviewing network performance and addressing issues that arise with customers.

In addition, I oversee the Customer Response Unit, which coordinates repair and maintenance functions for Ameritech Michigan's resale operations. The Customer Response Unit (CRU) is part of the Service and Network Performance organization. The CRU is responsible for repair administration for AIIS customers. The CRU receives

customer trouble reports, screens them and refers them to the appropriate group for resolution.

I have served in my present position since April of 1997. I have worked for AIIS or affiliated companies since 1978, serving in various sales, marketing, and network positions within those companies.

I received a masters of science degree in industrial administration from Purdue University in 1978. I also hold a masters of science degree in bionucleonics, and a bachelor of science degree, from that university.

II. Purpose of Affidavit

The purpose of this affidavit is to describe Ameritech Michigan's comprehensive plan for performance measurement, reporting, benchmarks, and remedies. In its October 2, 1998 order in Case No. U-11654 (the "*Phone Michigan Order*"), the Commission has asked Ameritech Michigan to file a proposal containing:

> the appropriate performance measures to be reported,
> the form and method for reporting performance,
> the standards or benchmarks for performance that should be adopted by the Commission for use in determining whether Ameritech Michigan is providing interconnection in conformity with federal and state law, along with
> appropriate enforcement mechanisms.

In the remainder of this affidavit, I discuss first the performance measures that Ameritech Michigan proposes to report — what they will measure and how they are calculated. As a frame of reference, I will compare these measures against certain contractual measures addressed in the Commission's findings in the *Phone Michigan Order*, against the model rules proposed by the FCC in its recent Notice of Proposed Rulemaking, and against those measures advanced or discussed by this Commission and the FCC in previous orders on long-distance applications. I then discuss the reasons why Ameritech Michigan has defined or developed certain measures in the way it proposes.

After discussing the various operating characteristics and objectives addressed by Ameritech Michigan's performance measures, I will discuss the proposed form and method for reporting performance. These include considerations of the geographic scope of reporting, the frequency of reporting, and the availability of reported data and underlying documentation for examination by CLECs and by the Commission.

Next, I will address Ameritech Michigan's proposed "benchmarks" against which key performance measures would be compared on an ongoing basis. These benchmarks address, directly, the outcomes of the wholesale services (interconnection, access to unbundled network elements, and access to resale services) that Ameritech Michigan is required to provide to CLECs by contracts established pursuant to the Telecommunications Act of 1996 (the "1996 Act"). As will be detailed below, where Ameritech Michigan provides an analogous service to itself, the benchmark for wholesale performance is "parity," *i.e.* a comparison between wholesale services and their retail analogs. "Parity" does not require identical results, only substantially equivalent

treatment in comparable situations. Where no satisfactory retail analog exists, Ameritech Michigan proposes numerical targets or standards (*e.g.*, a certain success rate for meeting confirmed due dates for installation of unbundled loops) that provide CLECs with a meaningful opportunity to compete.

Finally, I will discuss Ameritech Michigan's proposed system of enforcement, including self-executing remedies to be computed and assessed on a quarterly basis should Ameritech Michigan fail to meet certain performance benchmarks. These remedies would be in the form of damages, designed to compensate the affected party.

Simply stated, Ameritech Michigan's performance proposal puts rigor into efficiently implementing and maintaining the terms surrounding the provision of services under its interconnection agreements. Ameritech Michigan's wholesale business is committed to the obligations made between the parties in those agreements and to the overall intent of the 1996 Act. Above and beyond the obligations in those agreements, my organization has worked with CLECs to continually monitor and improve performance measurements and results.

A sound performance plan should

- Enhance the relationship between parties and consequently their operations;
- Balance the benefits of performance reporting against the associated costs, and recognize the limitations of existing systems;
- Be equally applied to all local wholesale service providers in the state;

- Be symmetrical in its application to the CLECs where reciprocal services are provided, such as interconnection and collocation;
- Identify and measure processes that impact outcomes for the CLEC and that thus have meaningful business implications;
- Be understood by the parties with measurements defined and described in operational manuals or user guides;
- Utilize a reasonable, objective benchmark that mimics the retail operation or is developed based upon existing approved contracts or operational expertise;
- Allow the parties to identify and resolve minor glitches before they erupt into serious service problems;
- Be structured to address performance problems efficiently without delay or undo loss to a party;
- Be self-enforcing: triggered and applied based upon supportable facts and data and not baseless accusations or gaming of the process;
- Have remedies that correlate in "price" and terms with the service loss or impairment;
- Be the sole performance plan applied to CLECs (in other words, where remedial mechanisms overlap, a CLEC should not receive double remedies by choosing both mechanisms);
- Be relied upon by this Commission in its oversight and enforcement role under the 1996 Act.

As I will describe below, Ameritech Michigan's plan meets all of these objectives.

III. Performance Measures Proposed by Ameritech Michigan

A. In General

I. Under the 1996 Act, CLECs may enter into the local telephone market place by any or all of the following three methods: by reselling Ameritech Michigan's services ("resale"); by using unbundled elements of Ameritech Michigan's network ("unbundled network elements" or "UNEs"); and by constructing new local networks and interconnecting them with Ameritech Michigan's network ("interconnection," "end office integration" or "EOI"). Pursuant to the 1996 Act, Ameritech Michigan has entered into "interconnection agreements" with various CLECs that govern the terms of their interconnection with Ameritech Michigan, their use of Ameritech Michigan's unbundled network elements, and their resale of Ameritech Michigan services.

Performance measures are designed to assist CLECs and regulatory bodies in monitoring and enforcing the contractual obligations set forth in these interconnection agreements. For example, Ameritech Michigan's interconnection agreement with MFS requires Ameritech Michigan to provision 80 percent of certain unbundled loops within 5 days of an MFS order for such loops.

In addition, performance measures assist CLECs and regulatory bodies in evaluating the level of service provided by Ameritech Michigan to CLECs. In particular, this Commission (as well as the FCC) evaluates the quality of Ameritech Michigan services in assessing Ameritech Michigan's compliance with the "competitive checklist" that the 1996 Act requires as a condition for entry into the long-distance market.

While performance data may be useful, they are also costly to produce. Ameritech's costs of compiling and reporting performance measures for the wholesale unit are already very substantial. Ameritech's annual cost of performance measurements, regionwide, is approximately $20 million. The incremental cost of Ameritech's existing wholesale performance measurements (compiled monthly for over 100 categories of performance for over 50 CLECs in five states) is approximately $1.25 million annually, plus $2 million for initial development and implementation (including the design of systems and procedures, both electronic and manual). These costs include the deployment of a full-time staff of 5 persons, plus the assignment of computer programmers and network personnel, plus the engagement of expert consultants. The proposals set forth herein will more than double those costs, to approximately $3 million per year.

Thus, it is important to ensure that before a given performance measurement or category of measurement is adopted, it must be both meaningful and cost-effective. In other words, it should provide information that is useful to the business operations of the CLEC and of Ameritech Michigan, and the benefits of performing the measurement should outweigh the costs. After all, end users will ultimately receive the benefits and bear the costs of any performance measurement program.

Ameritech Michigan has been working with numerous CLECs over the past two years to examine the performance measures that follow the terms of their agreements. In many instances, these discussions have resulted in the addition, elimination, modification,

or further definition of performance measures, consistent with the basic principle of cost-benefit analysis.

Drawing on these working relationships, on guidance from this Commission and the FCC, and on the basic test of meaning and cost effectiveness, Ameritech Michigan proposes that it measure and report its performance in 31 categories of service, comprising 134 categories of performance measures (*e.g.* different product or service types), for over 20 separate active CLECs, and for all CLECs as a whole. These categories and measures are described in greater detail below, and are also summarized in West Schedule 1. The first column of West Schedule 1 describes each measurement proposed. The next column describes the number and type of categories into which the measure would be further broken down or disaggregated so as to facilitate and enhance analysis. Next, West Schedule 1 shows which measures apply to "wholesale" operations (those functions performed by Ameritech Michigan on behalf of CLECs, which are marked under the column "W" on West Schedule 1), and which apply to Ameritech Michigan's own "retail" operations (identified with a mark under the column "R"). The remaining columns are relevant to the discussion of performance benchmarks and enforcement, and are addressed in later sections of this affidavit.

West Schedule 2 is the "User Guide" that accompanies Ameritech Michigan's proposal. It describes the formulas by which Ameritech Michigan plans to calculate the performance measures summarized in West Schedule 1. Like the overall proposal, it represents the result of extensive discussions with CLEC representatives, in which we have developed, further defined and clarified the performance measurements that stem

from our interconnection agreements. It also incorporates existing glossaries provided with Ameritech Michigan's performance reports. Each page of West Schedule 2 corresponds to a single performance measure. It provides a mathematical formula for computation, and defines the terms used in the calculation formula, along with any business rules used in the calculation (*e.g.*, a resale order received after 7 p.m. is considered to have been received on the next business day). Finally, West Schedule 2 lists any transactions that should be excluded from the measurement to make the data more comparable and meaningful. This User Guide is intended not only to provide detailed information for purposes of this proceeding; as these measurements are incorporated into the business agreements between Ameritech Michigan and CLECs, the User Guide will give all parties a common frame of reference that clearly defines the various performance measures.

As shown by the levels of disaggregation on West Schedules 1 and 2, Ameritech Michigan's proposed measures cover its performance with respect to each of the three methods of competitive entry described above: resale, UNEs, and interconnection.

In addition, the reports encompass the performance of the Ameritech Michigan operations support systems ("OSS") that generally serve all three entry methods. The major OSS functions, as listed by the FCC at 47 CFR § 51.319(f)(1), are as follows:

Pre-ordering;

Ordering;

Provisioning;

Repair and Maintenance; and

Billing.

Ameritech Michigan provides CLECs with access to its OSS via electronic "interfaces" that allow CLEC representatives or their electronic systems to interact with the existing electronic or "Legacy" systems that help Ameritech Michigan perform the OSS functions. As shown by West Schedules 1 and 2, Ameritech Michigan would report on performance measures for all five of the above OSS functions. Further, in accordance with this Commission's June 9, 1997, comments ("*Ameritech Michigan Comments*") on Ameritech Michigan's 1997 long-distance application (p. 31), Ameritech Michigan's proposed measures assess the performance of its OSS interfaces (*e.g.*, by measuring the time required for the interfaces to return order status reports to the CLEC, and the percentage of time that interfaces are unavailable) and of the OSS functions as a whole (*e.g.* by measuring the overall time for installation of service or repair).

In addition to the three main entry methods, and the various OSS functions, Ameritech Michigan's proposal addresses its performance with respect to certain other obligations, such as its provision of access to "911" services to CLECs.

B. The 1998 Notice Of Proposed Rulemaking On Performance Measures

On April 17, 1998, the FCC released a Notice of Proposed Rulemaking in CC Docket No. 98-56 (the "NPRM" or "Notice"), in which it proposed to adopt model performance measurements "by which to analyze whether new providers of local telephone service are able to access, among other things, the support functions . . . of

incumbent local telephone companies in a nondiscriminatory and just and reasonable manner." The FCC proposed 30 "model" measurements.

Pursuant to the Notice, various entities, including Ameritech Michigan, filed comments and reply comments on the FCC's proposed model rules on June 1 and July 6, 1998, respectively. In its comments, Ameritech Michigan raised concerns regarding jurisdiction and the FCC's proposed procedure for addressing performance measures, as well as the interplay between the FCC's proposed model rules and the process of negotiation, arbitration, and judicial review in the 1996 Act. While similar legal issues exist in this case, those legal issues do not fall within the scope of this affidavit.

It is notable, however, that Ameritech Michigan proposes to report 26 of the 30 measurements advanced in the Notice (with certain modifications, the most significant of which are described below). And the cost-benefit principles in this proposal are consistent with the FCC's overall approach to "balance our goal of detecting possible instances of discrimination with our goal of minimizing, to the extent possible, burdens imposed on incumbent LECs." NPRM, ¶ 46.

C. Specific Performance Measurements

I. The following section details the performance measurements and categories proposed by Ameritech Michigan.

1. Pre-Ordering: Average Response Time

I. The first Ameritech Michigan performance measure covers *pre-ordering*, the process by which CLEC and Ameritech Michigan retail customer representatives alike obtain information prior to placing an order. Measure number 1 in West Schedule 1

addresses the average speed at which Ameritech Michigan's OSS (the interface and Legacy systems acting together) respond to CLEC requests.

Within the general measurement of average response time, Ameritech Michigan first proposes to report on the average time for a service representative to obtain access to the electronic customer service record ("CSR") that describes the customer's existing telephone service. Because a representative retrieves the CSR in its entirety, the cycle time for retrieval and display increases with the size of the CSR. Thus, Ameritech Michigan proposes that it report cycle time for CSRs under 10,000 characters, which represent the vast majority of CSRs requested. Should any CLEC request CSRs over 10,000 characters at least 10 percent of the time, Ameritech Michigan will work with that CLEC individually to establish an appropriate benchmark and remedy.

Similarly, Ameritech Michigan proposes to report separately the average cycle time for a representative to validate the customer's address, select a new telephone number if necessary, and select a "due date" by which the customer's order is to be completed.

As noted in West Schedule 1, there is no retail analog for the above functions, because retail transactions do not pass through (and therefore cannot be measured by) an interface.

2. Ordering and Provisioning Measurements

a. Order Completion Measurements

I. Measures 2 and 3 on West Schedule 1 address the overall speed of ordering and provisioning activities. Although some CLECs place certain orders by

facsimile, CLECs primarily place customer orders for resold services via Electronic Data Interchange ("EDI"), a standard format for the transfer of data between electronic systems. EDI is also available for ordering unbundled local loops. Ameritech Michigan's retail representatives input transactions electronically, and Ameritech Michigan offers CLECs electronic access for orders. If a CLEC still chooses to submit orders manually, Ameritech Michigan cannot be held responsible for any resulting delays associated with the additional work required for Ameritech Michigan to do the electronic input for the CLEC. Manual order submission was intended only as a transitional measure, to be phased out as CLECs implemented the electronic interface. Processing manual submissions requires Ameritech Michigan to do the CLEC's job of preparing and entering electronic orders, so manual and electronic orders are inherently incomparable.

Similarly, the FCC has stated that "[b]ecause incumbent LECs access their systems electronically for retail purposes, . . . incumbent LECs need measure only the access they provide electronically to competing carriers." NPRM, ¶ 40. Thus, all of the measures herein apply only to electronically submitted orders, unless specifically defined to include or address manual submissions. The same applies to the performance measures in areas other than ordering, for the same reasons.

Ameritech Michigan proposes that it report on two separate measurements for the speed of order completion: the "average installation interval," and the percentage of confirmed due dates not met.

Average Installation Interval. This measurement compares the average length of time it takes Ameritech Michigan to complete electronically submitted CLEC orders

(measured from the date of order receipt to the date of installation) with the average length of time it takes to complete comparable retail orders. The following order types would be measured separately: resale and retail residence (typically the least complex orders), business, and Centrex (typically the most complex service, which takes the most time to install); and unbundled loops. (Although Ameritech Michigan makes unbundled switching and transport available to requesting carriers, the volumes requested at present are not sufficient to develop or warrant performance standards. If and when CLECs choose to order these items in sufficient quantities, the question of performance can be addressed in contract negotiations.) This is consistent with the FCC's order on Ameritech Michigan's 1997 long-distance application ("*Ameritech Michigan Order*"), which acknowledged that "Ameritech can and should disaggregate its data to account for the impact different types of services may have on the average installation interval" (¶ 170). Similarly, this Commission's *Ameritech Michigan Comments* state (pp. 31-32) that "if business orders are more complex and handled differently by Ameritech's retail operations than are residential orders, performance measures should distinguish these operations."

Ameritech Michigan further segregates retail and resale orders between those requiring a "field visit" and those that do not. The need for a field visit to install or modify equipment naturally affects the time required to complete an order.

Orders that are canceled, orders for which the customer does not accept the earliest Ameritech-offered due date, orders for which the interval is negotiated (e.g., projects), and orders associated with Ameritech Michigan's internal or administrative use

of local services are excluded from the above calculation. This is in accordance with the Commission's *Ameritech Michigan Comments*, in which the Commission stated (p. 31) that "[i]f an order completion date can be determined either by Ameritech or by the desires of the customer, the latter should not be included in Ameritech's performance measure." Likewise, this is consistent with the FCC's *Ameritech Michigan Order*, which provides that "Ameritech can and should exclude from its data those customers who requested due dates beyond the first available due date," (¶ 170) because the time required for installation in those cases reflects the customer's own preference for an extended due date, and not necessarily the speed of Ameritech Michigan's provisioning.

Ameritech Michigan's measurement and calculation are pursuant to, and consistent with, the "Average Installation Interval" defined by the FCC in its *Ameritech Michigan Order*, and in its *BellSouth South Carolina* and *BellSouth Louisiana* orders. In the *Ameritech Michigan Order*, the FCC explained that "submission of data showing average installation intervals is fundamental to demonstrating that Ameritech is providing nondiscriminatory access to OSS functions" (¶ 171) because "[i]f Ameritech is, to a significant extent, processing retail orders for itself more quickly than it is processing resale orders for competitive carriers, Ameritech would not be meeting its obligation to provide equivalent access to those OSS functions" (¶ 167). The FCC subsequently reiterated this requirement when it denied BellSouth's applications to provide long-distance service in South Carolina and Louisiana, and it also provided guidance as to the calculation of installation intervals.

In accordance with the FCC's rulings, Ameritech Michigan calculates the installation interval as the interval, in business days, between the actual receipt of the order by Ameritech Michigan's electronic interface, and the day that the order is actually completed. Thus, this measurement encompasses both the time required for the order to be accepted and processed by Ameritech Michigan's electronic systems, and for the actual tasks needed to execute the customer's request.

The measure proposed here measures only the length of time it takes Ameritech Michigan to complete orders for requesting carriers; that is the time perceived by the end user. The Commission determined in the *Phone Michigan Order* (p. 4), however, that "orders should be considered completed only after Ameritech Michigan has notified [BRE] of completion." Adding the completion notice interval to CLEC orders, in the manner the *Phone Michigan Order* suggests, does not provide a valid comparison to retail operations (which do not have a notification interval). Rather, it would skew results, create a false appearance of disparity where none exists, and reduce the comparability and thus the utility of the measure. Further, the average interval for completion notification is already captured in a separate measurement below. Including the same interval in this measure would be redundant.

Current systems capabilities and limitations require that Ameritech Michigan measure this interval in days, not to the hour and minute. Ameritech Michigan's wholesale interfaces record the time of order receipt, but record only the date, not the time, of completion. Further, most of Ameritech Michigan's retail systems record only

the day of an order's receipt and the day of its completion — in other words, they do not contain a "time" stamp for the hour and minute. Recording and tracking the hour and minute of retail order entry and completion would require a complete redesign of Ameritech Michigan's ordering and provisioning systems. For example, most of Ameritech Michigan's provisioning systems today do not take into account the time the order is due, just the date.

Likewise, Ameritech Michigan's reporting processes and systems for provisioning record by date, not time. The Work Force Administration (WFA) system, which is used to assign technicians for field work on retail and wholesale orders alike, does not have a capability for entering the actual time an order was completed. Similarly, the downstream provisioning systems would need to be redesigned to register the exact time an order is due if time of day were to be a performance requirement for reporting purposes. Because the same limitations apply to wholesale and retail systems, and to the resulting measurements, they do not affect comparability.

Ameritech Michigan's estimate of the costs to modify the provisioning systems and data storage for reporting on a time-of-day (hour and minute) basis would be about $16 million regionwide. (This does not take into account any modifications required for the ordering system.) The time required to implement these measures could run from one to two years. Meanwhile, comparing the processing of orders to the minute or hour is not a significant differentiation when measuring orders that take several days to process. Historically, the industry has measured such orders in terms of days. On balance, then,

the minimal benefit of refining data to the hour and minute is outweighed by the associated costs.

Ameritech Michigan plans to exclude orders that experience "delaying events" and "force majeure" events (as defined by the applicable interconnection agreements). Delaying events include situations where the customer is not ready or cannot provide premises access, or where the customer chooses its own due date and does not accept the earlier company-offered installation appointment. (See West Schedule 2.) The FCC endorsed such an exclusion in its *Ameritech Michigan Order* (¶ 170), because Ameritech Michigan should not be penalized for fulfilling the customer's requests.

In the *Phone Michigan Order*, however, the Commission stated that such delaying events should not result in an order being excluded from the performance measurements. Instead, it stated that Ameritech should compute an hour-for-hour, day-for-day extension based on the length of the delay, and then adjust its measurements. This approach, however, is not feasible given the current system constraints (which were never addressed in the *Phone Michigan Order* or in that proceeding) and is not cost-effective. As I stated above, Ameritech Michigan's systems do not measure order intervals by the hour and minute. More importantly, they do not have the "stopwatch" function the order's approach would require. Instead, Ameritech Michigan's service representatives would have to manually figure out the length of any delays on an order, record it in journals, and then adjust the mechanized performance calculation by hand. This process would not only increase the costs of the process, but also add delay as well as an element of

judgment that would make the performance information less meaningful and verifiable, while distracting operating personnel from their real job of processing orders.

Next, while the *Phone Michigan Order* provides for separate reporting of Interim Number Portability ("INP"), Ameritech Michigan does not propose that INP be measured here. Ameritech Michigan's current schedule is to have all existing INP converted to long-term number portability ("LNP") by year-end. Pursuant to this implementation schedule, no new INP can be ordered in Michigan. Based on this schedule, Ameritech Michigan does not propose disaggregation for INP, as it is not appropriate in an LNP environment and is not cost justified given that no further orders for INP will be submitted.

Reporting of LNP would be impractical, because Ameritech Michigan does not have the information to make the measurement calculation. One of the advantages of unbundled elements available to CLECs is that CLECs may order unbundled elements individually and connect them to their own or someone else's equipment or facilities. This allows the carrier to take an unbundled loop from Ameritech Michigan and connect it to a long-term number portability ("LNP") telephone number. In this case, Ameritech Michigan provisions the unbundled loop, but the carrier controls the sending of the activate message to the third party database administrator, Lockheed Martin, which runs the Number Portability Administration Center that releases the messages to transfer the number from one carrier to another. Ameritech Michigan has no control over the LNP activation and should not be responsible for measuring LNP orders with unbundled loops, because it is not directly involved and does not receive the LNP order.

Finally, since the installation interval for interconnection trunks is, for new networks, a negotiated interval resulting from joint planning sessions, Ameritech Michigan does not propose that it report the average installation interval for such trunks. Indeed, telecommunications carriers who engage in careful planning can appear to have longer intervals, which could be falsely interpreted as a performance problem. The "confirmed due dates not met" measure, which I discuss below, is thus the better measure of timely provisioning for interconnection trunks. And for established networks, this measure is subsumed by the Call Attempts Blocked metric discussed in detail below.

Confirmed Due Dates Not Met. For orders installed during the reporting period, this metric measures the percentage of orders completed after the due date, where the reason for delay is attributable to Ameritech Michigan. The NPRM proposes an analogous measure titled "Percentage of Due Dates Missed." (NPRM, ¶ 54 & App. A, § II.A.2).

In calculating the percentage of confirmed due dates not met, Ameritech Michigan would exclude due date "misses" caused by the customer or the end user not being ready (as happens, for example, when customer-ordered premises equipment does not arrive in time) or when the end user is not available to provide access to the premises in those cases where access is required. Ameritech Michigan also plans to employ additional exclusions and clarifications as detailed in West Schedule 2.

Ameritech Michigan's disaggregation categories are the same as those proposed for average installation interval, with the addition of interconnection trunks to this measure.

b. Order Status Measurements

I. The ordering and provisioning process addressed above as a whole can be broken down into several discrete stages. First, upon receipt of a CLEC order, Ameritech Michigan's systems and personnel check the order for completeness and proper formatting. If the order passes that initial check, and is accepted by Ameritech Michigan's systems, Ameritech Michigan provides the CLEC with a confirmation. Next, Ameritech Michigan personnel and systems do the actual work needed to complete the order. Finally, upon completion of the order, Ameritech Michigan provides the CLEC with a completion notice. Ameritech Michigan measures and reports the time for each of these separate steps (measures 4 through 6 on West Schedule 1) in the following manner.

Average Reject Notice Interval. Ameritech Michigan's electronic systems and personnel screen for, and reject, CLEC orders that contain incomplete, improper, or improperly formatted data. Ameritech Michigan then notifies the CLEC that its order was rejected. The notice also explains the reasons for rejection so that the CLEC may correct and resubmit the order. Under this proposal, Ameritech Michigan would report the average time it takes to inform CLECs that an order has been rejected. (The rate of order rejection, as opposed to the speed of rejection notices, is addressed by a separate measure below.) Ameritech Michigan offers to report on the rejection notice interval for orders submitted over its EDI interface, with separate categories for resale and unbundled network elements.

Average FOC Notice Interval. For orders that have been accepted for processing and provisioning by Ameritech Michigan's Legacy systems, Ameritech Michigan proposes to measure the time between its receipt of the CLEC order and its issuance of a Firm Order Confirmation ("FOC"). Ameritech Michigan employs the same categories of disaggregation as described with respect to rejection notices.

Average Completion Notice Interval. Finally, Ameritech Michigan proposes that it measure the average time in which it notifies a CLEC that it has completed the CLEC's order — in other words, the time between the actual installation as reported by a technician and the time the CLEC receives notification (a form "865") so that it may bill the customer. The interval for each order is measured in hours and minutes. Ameritech Michigan records the hour and minute of the completion *notice*. However, due to the system limitations discussed under average installation interval above, Ameritech Michigan does not record the hour and minute of order completion, only the day. Thus, it cannot use the actual hour and minute of completion for this calculation. Instead, the time of order completion is assumed to be just after midnight — in other words, the interval begins at the earliest possible time of the day the order is completed. Because the completion notice clock starts to run from that time, this assumption makes the interval appear longer than it really is.

In contrast to the order completion measures discussed above, Ameritech does not propose that it disaggregate these order status measures based on whether a field visit is required. The field visit/non-field visit distinction is not a meaningful one for rejection notices, FOCs, or completion notices, because it does not affect the speed of their

issuance. Whatever effect the dispatch of personnel may have on the time to complete an order, the fact of dispatch, in and of itself, does not affect the initial review of an order for syntax and format, or the time required to notify the CLEC of the order's rejection or confirmation. The determination of whether dispatch is required to complete an order is not made until after the order is accepted. Likewise, the dispatch of personnel to install an order does not affect the interval for the ensuing completion notice, which occurs after dispatch is complete. Thus, Ameritech Michigan does not propose this type of categorization.

Ameritech Michigan does not propose to measure order status intervals for Interim Number Portability for the same reasons described in the previous discussion of Average Installation Intervals.

c. Held Order Measurement

I. As an adjunct to the order completion measures described above, Ameritech Michigan proposes to measure the Average Interval for Past Due Orders (measure 7 on West Schedule 1). This measure addresses the average number of days to complete orders not completed on their original due date. It thus assists a requesting carrier in investigating and further refining the order completion measurements, by determining if the average period that its orders are pending after the committed due date is any longer than the average period for similar Ameritech orders.

As shown in West Schedule 2, the Average Interval for Past Due Orders would be calculated using the total number of calendar days between original due date and

completion date on past due orders, divided by the total number of orders past due. This calculation is based on all past-due orders completed in the month. The proposed calculation excludes all canceled orders, all past due orders attributable to customer delays, all order activities that are associated with Ameritech Michigan's internal or administrative use of local services, and other exclusions as listed in West Schedule 2.

The "Average Interval for Past Due Orders" would serve the same objective as the NPRM's proposed measure for "Average Interval for Held Orders." (NPRM, ¶¶ 65-67 & App. A, § II.D.) The NPRM's analog addresses the time required to complete held orders, which are defined as all past-due orders pending at the end of a reporting period. Ameritech Michigan's measure, however, more directly serves the NPRM's stated objective. The NPRM's proposed measure is a snapshot in time reflecting the number of held orders at one point in time and how long they have been held thus far, not the time required to complete the order. This does not help the carrier in determining if the average period that its orders are pending after the committed due date is any longer than the average period for similar Ameritech Michigan orders (NPRM, ¶ 65).

d. Installation Troubles Measurement

As the FCC has observed, "[t]rouble reports often indicate that a customer has not received the exact service ordered, either because the carrier provided the wrong type of service or a lower quality of service than expected." NPRM, ¶ 68. Thus, to help assess the accuracy and quality of order provisioning, Ameritech Michigan proposes that it measure the rate of new installations reporting "trouble" within 7 calendar days of

installation (measure 8 on West Schedule 1). This measure is known as "installation trouble reports" or "new service failures." It is calculated by taking the number of service orders that received trouble reports within 7 days after completion (and referencing "found network trouble" codes) and dividing by the total number of orders completed during the reporting period. The results would be segregated based on product codes, *i.e.*, Residential POTS, Business POTS, and Centrex, each with separate categories for field visit and non-field visit, and unbundled loops. Troubles for interconnection trunks are addressed by the Call Attempts Blocked metric described below.

Certain trouble reports would be excluded from the measurement, such as those where investigation reveals that there is no real problem. These categories are detailed in West Schedule 2.

Ameritech Michigan's proposed measurement is generally consistent with the NPRM's proposed measure (¶¶ 68-70) of "Percentage of Troubles in 30 days for New Orders." However, Ameritech Michigan proposes a 7-day period, in which trouble reports are more directly related to the quality of the installation, as opposed to the 30 days from installation advocated by the NPRM, where trouble reports are more likely to reflect other trouble conditions that occur purely by random chance. The 7-day period has been adopted by the Public Utilities Commission of Ohio for Ameritech Ohio's regulatory reports, based on data showing that most troubles after the 7-day period are not related to any problems in installation.

e. **Order Quality Measurements**

I. **Percentage of Order Flow Through.** As an additional reference in assessing processing speed and reliability, Ameritech Michigan proposes to measure and report on the rate of electronic processing or "flow-through" — the percentage of CLEC orders that pass through Ameritech Michigan's EDI ordering interface, and into Ameritech Michigan's "back office" or "Legacy" provisioning systems, without need for manual intervention (measure 9 on West Schedule 1). Certain orders (for example, complex orders that require engineering work or coordination between carriers) require manual intervention, because not all of the steps involved in processing them can be cost-effectively programmed for fully electronic processing. Flow through does not measure the provisioning or completion of the order, only its transmission to the back office system.

No direct retail equivalent is available since there is not a comparable retail interface. (Ameritech Michigan representatives type retail orders into the Legacy systems themselves; the same input occurs for CLEC orders that do not flow through and require manual intervention.)

Percent of Rejected Orders (Service Order Accuracy, or Electronically Received Order Quality). Ameritech Michigan plans to report the quality of CLEC orders submitted, by measuring the rate of orders that are rejected because of their improper or incomplete formatting or information (measure 10 on West Schedule 1).

It is important to make clear, however, that the rate of rejection does not reflect on the quality of access that Ameritech Michigan provides to its OSS, but primarily relates

to the quality of CLEC performance and Ameritech Michigan's ability to detect CLEC errors. Rejections are most often driven by the CLECs themselves, when they submit improper or incomplete orders.

Ameritech Michigan's measurement definition and calculation are consistent with those proposed in the NPRM (¶ 75 & App. A, § II.F.2). Ameritech Michigan, however, excludes orders submitted by Access Service Request ("ASR"), which some CLECs use to order unbundled loops. Ameritech Michigan now offers a standard EDI interface for unbundled loops. The industry pushed for loop ordering via EDI, the industry standard-setting body TCIF approved it, and that is the standard for which performance should be measured.

f. 911 Database Update and Accuracy

I. Section 271(c)(2)(B)(vii)(I) requires a long-distance applicant to provide "nondiscriminatory access to . . . 911 and E911 services." As part of its 911 and E911 services, Ameritech Michigan maintains an Automatic Location Identifier ("ALI") database that allows emergency services personnel to identify the location of a 911 or E911 caller, whether that caller is served by Ameritech Michigan or by a competing carrier. Ameritech Michigan updates the database to reflect customer information submitted by CLECs, and also serves to coordinate the resolution of any errors identified in CLEC data. In its *Ameritech Michigan Order* (¶ 256), the FCC stated that "Ameritech

Michigan must maintain the 911 database entries for competing LECs with the same accuracy and reliability that it maintains the database entries for its own customers."[1]

Ameritech Michigan processes its own 911 database updates electronically, and it currently offers several electronic options so that CLECs can do the same: CONNECT-DIRECT with Network Data Mover via an SNA interface; CONNECT-DIRECT with Network Data Mover via TCP/IP via the Electronic Commerce Network; Information Xchange Facility, a PC-based system via dial-up modem; UNIX UUCP using dial-up modem; maghetic tape; and Remote Job Entry (RJE). Ameritech Michigan currently accepts numerous standard formats for such updates: AT&T232, NENA 1 (240 bytes) and NENA 2 (512 bytes). Some of these electronic options go above and beyond the options available to Ameritech Michigan's own personnel. Ameritech Michigan provides carriers with a monthly CD-ROM containing the Address and Routing Files (ARF) for the region. The ARF is a subset of the MSAG. In addition, Ameritech Michigan offers requesting carriers "View-Only" access to the 911 database, to allow them to conduct their own quality checks, query current 911 record data, and consult the Master Street Address Guide. These "view-only" features were added to address the Commission's concerns with respect to 911 services in its *Ameritech Michigan Comments* (pp. 42-44) and in Case No. U-11229.

To demonstrate the timeliness, accuracy, and reliability of its 911/E911 database services, Ameritech Michigan proposes that it measure numerous service attributes. First, Ameritech Michigan would report the timeliness of database updates, measuring the

[1] The FCC emphasized, however (p. 260, n. 672), "that it is not our intention to hold Ameritech responsible

percentage of update files not processed by the next business day after Ameritech Michigan receives them from the CLEC (measures 11 and 12 on West Schedule 1).

An update file is basically a batch of updates that a CLEC or Ameritech Michigan's own systems submit at one time. A file may contain many updates. For example, although Ameritech processes around 1 million updates each month regionally, they are contained in around 600 files. Ameritech Michigan has chosen to focus on reporting on files rather than the updates that make up those files, because that is how 911 updates are processed.

Ameritech Michigan would next measure the rate of erred record updates identified in such updates, as a test of the accuracy of database updates, for electronically submitted and manually submitted updates (measures 13 and 14, respectively, on West Schedule 1). (While this data is reported to the CLEC for each file, Ameritech Michigan will summarize it monthly as well.) An error is identified when a record is submitted but fails to pass Ameritech Michigan's edit checks and is thus not used to update the 911 databases. The accuracy of CLEC 911 submissions is, however, a function of the CLECs themselves, and that Ameritech Michigan should not be held responsible for CLEC errors.

Ameritech Michigan next proposes that it report the timeliness of error notifications, which it sends to CLECs so that they may resolve any errors identified in their database entries. Ameritech Michigan would measure the percentage of error record files not provided by the next business day, with separate measures for electronically

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for errors made by its competitors."

received (measure 15 on West Schedule 1) and manually received entries (measure 16 on West Schedule 1).

3. Repair and Maintenance

Mean Time to Repair. To help evaluate the speed of its repair and maintenance functions, Ameritech Michigan proposes that it report the mean time to repair resale and retail residence, business, and Centrex lines, and unbundled loops (measure 17 on West Schedule 1)., This measure would be calculated as the average difference between the date and time of service restoral versus the date and time the applicable trouble report was logged with Ameritech Michigan, on customer-reported trouble reports resolved during the reporting period.

Unlike the ordering and provisioning systems discussed above, Ameritech Michigan's repair and maintenance systems do have the capability to record and thus measure time to the hour and minute. Thus, consistent with the *Phone Michigan Order*, unbundled loop repairs that experience delaying events will not be excluded; rather, the measurement clock is simply stopped for the period of delay.

Certain categories of troubles would be excluded where feasible, such as reported troubles where investigation revealed no problems with Ameritech Michigan's facilities. These are described in West Schedule 2.

Ameritech Michigan's proposed measurement categories are based on disposition codes. These codes identify actual troubles that have been repaired by Ameritech Michigan. For maintenance and repair purposes, this is more logical and less costly than

the use of dispatch versus non-dispatch. One of the problems with dispatch versus non-dispatch in the maintenance and repair environment is the handling of cable troubles. The first ticket reported on a cable damage is the only ticket marked as requiring dispatch, even though there could be 300 cases of reported troubles on that particular cable damage. A 300-line cable damage would take much longer to clear than a single line trouble and yet each would only count as 1 dispatch. Therefore, a dispatch vs. non-dispatch breakdown would not allow the carrier to gauge whether its customers' services are repaired in the same time frame as Ameritech Michigan's customers.

In addition, Ameritech Michigan proposes not to measure the repair interval for interconnection trunks, because the measure would be redundant with the comprehensive Call Attempts Blocked measure described in the Interconnection Measurements section below.

Trouble Report Rate. Ameritech Michigan next proposes to measure the trouble report rate on resale, and unbundled loops, and to further report the trouble rates on Ameritech Michigan retail facilities for comparison (measure 18 on West Schedule 1). As shown in West Schedule 2, the numerator for this measurement would be the number of initial trouble reports closed during the reporting period. Thus, for example, trouble reports received on the 31st of one month, and closed on the 1st of the subsequent month, would be reported in that subsequent month. The denominator would be the number of service access lines (by category) in service at the end of the reporting period. This methodology is consistent with Ameritech Michigan's current processing capabilities.

Separate reporting would be offered for resale and retail residential POTS, business POTS, and Centrex, and for unbundled loops. To ensure apples-to-apples comparisons for all categories, the number of trouble reports for a given category or service would be compared to the applicable total of lines corresponding to that particular category or service. For instance, unbundled loop troubles would be divided by the total number of loops reported in service, in order to derive the trouble report rate.

As described in West Schedule 2, this measurement would exclude trouble reports where investigation reveals no real trouble in the Ameritech network. Further, trouble reports on new service (*i.e.* , within 7 days of installation) would be excluded from this measure, because they are already captured in the measure for Installation Trouble Reports above.

This measurement is analogous to the NPRM's proposed measurement of Frequency of Troubles in 30-Day Period (NPRM, ¶ 83 & App. A, § III.2).

Percent Repeats — Maintenance. Ameritech Michigan next proposes that it report the incidence of "repeat" troubles, also known as "Percent Repeats — Maintenance," occurring within 30 days of the date the initial trouble is cleared (measure 19 on West Schedule 1). The measurement's objective is to help assess the quality and reliability of Ameritech Michigan's repair and maintenance activities. It is calculated by taking the number of repeat trouble reports closed in a 30 day period, and dividing by the total number of closed trouble reports in the same 30 day period. The NPRM proposes a similar measurement titled "Frequency of Repeat Troubles in 30-Day Period." (NPRM, ¶ 84 & App. A, § III.3).

Percentage of Customer Troubles Not Resolved Within Estimated Time. As an additional means of evaluating the timeliness of repair and maintenance activities, Ameritech Michigan proposes that it report the percentage of troubles not resolved within the estimated time (measure 20 on West Schedule 1), which has sometimes been described as the percentage of missed appointments. This measure would be calculated by dividing the number of customer-reported initial trouble tickets not resolved by the estimated date and time by the total number of initial trouble tickets resolved within the reporting period.

Separate reporting is proposed for resale and retail residential POTS, business POTS, and Centrex, and for unbundled loops.

As with the other trouble reporting measures, categories of troubles that do not relate to Ameritech Michigan's facilities are to be excluded. These categories are detailed in West Schedule 2 and relate only to resale.

4. Billing

Each Monday through Saturday, Ameritech Michigan provides each CLEC that resells its services with a "daily usage file" (also known as a "daily usage feed") that contains calling and usage data for that CLEC's customers. In addition, Ameritech Michigan's Electronic Billing System ("AEBS") generates monthly wholesale bills for each CLEC customer. Ameritech Michigan provides the daily files and monthly bills to CLECs. For those CLECs that provide service by use of unbundled network elements,

Ameritech Michigan provides monthly bills via the Carrier Access Billing System ("CABS"). The following measures address the timeliness of these billing functions.

Daily Usage Timeliness. Ameritech Michigan proposes to measure the percentage of resale usage records transmitted within 5 business days of their origination date (the date that the underlying calls and messages were recorded by the automated message accounting system in Ameritech Michigan's central offices) (measure 21 on West Schedule 1). The 5 day standard is also used by AT&T in its own established process for measuring Ameritech Michigan performance.

No meaningful retail analog exists for this process. Ameritech Michigan sends usage data for retail customers directly to the customer's billing file, where it is held until bills are released. The usage is formatted at the end of the billing cycle. By contrast, preparing a usage file for CLECs requires Ameritech Michigan to accumulate data by CLEC from each revenue accounting office (there are five in Michigan) to make up a statewide file for that CLEC; the five state files for the Ameritech region are then consolidated into a regional file, which is sent to the CLEC. Ameritech Michigan performs this summarization for the convenience, and at the request, of the CLECs. The extra steps involved in summarization do not occur in the retail environment.

AEBS Bills Delivered Late/ CABS Bills Delivered Late. Similarly, Ameritech Michigan offers to measure the percentage of monthly bills not delivered within a specified time period. For resale, Ameritech Michigan would report the percentage of monthly Ameritech Michigan Electronic Billing System ("AEBS") bills not delivered within 12 days of the scheduled billing date (measure 22 on West Schedule 1). For

monthly unbundled network element bills, processed by the Carrier Access Billing System ("CABS"), Ameritech Michigan would measure the percentage of bills transmitted over six calendar days after the scheduled billing date (measure 23 on West Schedule 1).

No real retail analog exists for this process. The resale billing process, by its very nature, requires additional processing time. Retail bills are issued directly to the end user. By contrast, in the resale environment, retail rates must first be applied; then, carrier end-user billing must be accumulated, discounted, formatted and summarized before a resale bill can be rendered.

Likewise, because resale and network element billing is at the company-to-company level (that is, Ameritech Michigan sends a bill to each CLEC), the current monthly volume for such bills runs only in the hundreds for the Ameritech region. Retail bills, however, go from Ameritech Michigan to each individual Ameritech Michigan end user. The current monthly retail volume is thus in the millions. Given the inherent disparity in monthly volumes, any attempted comparison of billing speed would not be meaningful.

5. General Measurements

a. Systems Availability

For the pre-ordering, ordering, provisioning, and repair functions, Ameritech Michigan would report *availability* (the percentage of time, other than regularly scheduled downtime for system maintenance, that OSS are up and running for CLECs to

access them). For example, Ameritech Michigan would measure the availability of its pre-ordering systems by computing the time in which the EDI pre-ordering interface is unavailable, as a percentage of the total time for which EDI is scheduled to be available during the month. Measure 24 on West Schedule 1 would present the Percentage of Time Interface is Unavailable for the EDI pre-ordering, ASR ordering/ provisioning, EDI ordering/ provisioning interfaces, and EB/TA repair and maintenance interfaces, respectively.

b. Speed of Answer

Ameritech Michigan maintains and staffs service centers to assist CLECs in placing orders or making trouble reports (and in some cases to place the order or trouble report on the CLEC's behalf), and to answer other CLEC questions. The Customer Response Unit, which receives and screens calls on trouble reports for resold services, reports to me. The Network Element Control Center, which receives and screens trouble reports called in for unbundled network elements, is budgeted by my organization and has a matrix-reporting relationship with me.

Ameritech Michigan proposes to measure the average speed at which its service representatives answer CLEC telephone calls in the ordering and repair areas (measures 25 and 26 on West Schedule 1). The applicable service center answer times are presented separately for resale and unbundled network elements. This measure corresponds to the NPRM's proposed measure of Service Center Responsiveness. (NPRM, ¶ 92 & App. A, § V.B.)

c. Operator Services And Directory Assistance ("OS/ DA")

Ameritech Michigan operator services and directory assistance ("OS/DA") personnel provide services to Ameritech Michigan and CLEC customers alike. Ameritech Michigan's OS and DA systems do not uniquely identify the calling customer's carrier during the call set-up, but treat each request on a first-come-first-served basis. Even where Ameritech Michigan's OS or DA systems receive the traffic on separate trunk groups dedicated to the CLEC, so the equipment can identify the source of the traffic, that identification is performed mechanically, at the front end of the process, and not by Ameritech Michigan's operators. Once the call is identified or "branded," it is then submitted to Ameritech Michigan's automatic call distribution ("ACD"), which automatically submits calls to the next available operator on a first come, first served basis. From that point on, the system is unaware of the source of the call, and processes all calls on the same nondiscriminatory basis.

Ameritech Michigan proposes to measure the average speed of answer for all OS/DA calls, regardless of the customer's serving carrier, with OS calls presented separately from DA calls (measure 27 on West Schedule 1).

The NPRM similarly proposes a measurement of OS/DA speed of answer, (¶¶ 93-94 & App. A, § V.C) but proposes that incumbent LECs combine OS and DA, while segregating calls by serving carrier. Ameritech Michigan provides separate measures for OS and DA because they involve separate processes that can produce significantly different results. Ameritech Michigan does not segregate calls by carrier, because, as

described above, its OS/DA systems are incapable of distinguishing between serving carriers — either for purposes of measurement, or for the purpose of discrimination. It would cost approximately $350,000 per switch, or $9.4 million, for Ameritech Michigan as a whole, to deploy the software and facilities necessary to differentiate between CLEC and retail traffic. In addition, Ameritech Michigan would spend about $700,000 to create the capability to generate an appropriate report. Further, it would take approximately 12 to 24 months to deploy the necessary hardware and software. It would not be cost-effective to incur such expenses — and thereby create the potential for discrimination where none currently exists — simply to produce a report.

6. Interconnection Measurements

A CLEC may choose to compete with Ameritech Michigan by building its own facilities and then interconnecting them with Ameritech Michigan's network. Section 271(c)(2)(B)(i) of the 1996 Act requires a long-distance applicant to provide "[i]nterconnection in accordance with the requirements of sections 251(c)(2) and 252(d)(1)." In turn, section 251(c)(2) requires, among other things, that interconnection be "at least equal in quality to that provided by the local exchange carrier to itself or . . . [to] any other party to which the carrier provides interconnection," and that it be provided on rates, terms, and conditions that are "just, reasonable, and nondiscriminatory, in accordance with the terms and conditions of the [interconnection] agreement."

Ameritech Michigan provides several performance measures designed to confirm that its interconnection with CLECs is at least equal in quality to its interconnection with itself and other parties, in terms of both speed and reliability. The measurement of timely

provisioning of interconnection trunks (confirmed due dates not met, which appears as measure 3 on West Schedule 1), is common to the resale and unbundled network elements contexts as well, and has been described above. Additional measures, specific to the interconnection area, are described in this section.

a. Call Attempts Blocked

Ameritech Michigan's principal measurement for interconnection performance is the rate of blockages on call attempts from Ameritech Michigan customers that are to be routed to and terminated on CLEC networks, via end office integration, as compared to the call completion rate for traffic traveling solely on Ameritech Michigan facilities.

A call attempt is "blocked" when a customer is unable to complete a call on that attempt due to network congestion. The FCC has stated that an incumbent carrier must design "interconnection facilities to meet the same technical criteria and service standards, such as probability of blocking in peak hours," that it uses within its own network. *First Report and Order*, 11 F.C.C. Rcd. 15614-15. This measure also complies with the *Ameritech Michigan Order* (¶ 255), which provides that "data regarding call completion rates for calls originating on Ameritech Michigan's network and terminating with Ameritech customers and CLECs' customers, respectively, [would] be useful for measuring parity."

The rate of "call attempts blocked" is thus defined as the number of blocked call attempts, minus the number of blocked call attempts that are successfully re-routed, divided by the number of total call attempts and expressed as a percentage. Blockage that results from actions or failures to act on the part of the CLEC is excluded from the

on the busy hour. However, the busy hour of any individual common trunk group may not coincide with the busy hour of each carrier whose traffic is commingled on that trunk group. Therefore, calls being blocked in hours outside of the trunk group busy hour may not be reflected in the blockage report, and a carrier that sends its traffic during hours other than the busy hour may not be experiencing blockage even though the facility blocks during the busy hour.

The FCC has recognized, in the *Ameritech Michigan Order* (¶ 255) and the NPRM (¶ 101), that call completion (and thus, call attempts blocked) may serve as an alternative (or even as an improvement) over trunk blockage reports, and Ameritech Michigan has found that it does.

b. Collocation

With respect to collocation, Ameritech Michigan proposes to measure the "Average Time to Respond to a Physical Collocation Request" (measure 29 on West Schedule 1) based upon the date Ameritech Michigan responds to each complete and accurate order (*e.g.*, by providing information on space availability and costs) compared to the date it was submitted (that is, the date that a complete and accurate order was received by Ameritech Michigan). Ameritech Michigan will further offer to report the "Average Time to Provide a Collocation Arrangement" (measure 30 on West Schedule 1) based upon the date each firm collocation order is completed (that is, the date that Ameritech Michigan completes the collocation work) less the date and time it was submitted and when the CLEC agreed to start work for a physical collocation, or when a complete and accurate order was received for virtual collocation. Third, Ameritech

Michigan will offer to report the "Percent of Due Dates Missed with Respect to the Provision of Collocation Arrangements" (measure 31 on West Schedule 1) based upon the percentage of orders not "completed" within the committed due date, if the delay was attributable to Ameritech Michigan.

For all of these measures, the clock would stop when Ameritech Michigan sent to the CLEC a response providing space availability and cost information, and would not re-start until it received a "firm order." All three measures would exclude orders canceled by the competing carrier and would be disaggregated between physical and virtual collocation arrangements as applicable. CLEC delays in arranging final walk-through or accepting collocation space would likewise be excluded.

D. Overall Comparison Of Proposed Measures To FCC Orders

In the course of the preceding discussion, I have noted the numerous areas where Ameritech Michigan's proposed measurements address the FCC's order with respect to Ameritech Michigan's 1997 long-distance application (the "*Ameritech Michigan Order*"), and the FCC's 1998 Notice of Proposed Rulemaking on performance measures ("NPRM"). Here, I will provide an overview analysis showing how Ameritech Michigan's proposal meets the objectives and issues identified by the FCC.

1. The FCC's *Ameritech Michigan Order*

As I mentioned earlier, performance measurements help this Commission and the FCC evaluate Ameritech Michigan's compliance with the competitive checklist required for entry into the long-distance market within its region. Paragraph 212 of the *Ameritech*

Michigan Order specified seven areas of new performance measurements that the FCC expected to see in future long-distance applications: (1) average installation intervals for resale; (2) average installation intervals for loops; (3) comparative performance information for unbundled network elements; (4) service order accuracy and percent flow through; (5) held orders and provisioning accuracy; (6) bill quality and accuracy; and (7) repeat trouble reports for unbundled network elements.

As discussed above, Ameritech Michigan's proposal here includes a measurement of the Average Installation Interval, with separate calculations for resale and for unbundled loops. It is included as measure 2 on West Schedule 1.

Next, the FCC's *Ameritech Michigan Order* (¶ 141) properly recognized that the ordering and provisioning of unbundled network elements does not have a retail analog. It stated, however, that Ameritech Michigan should present information comparing repair and maintenance functions between unbundled network elements and retail services. *Id.* ¶ 212 n.544. And in my discussion of performance benchmarks below, I show how Ameritech Michigan developed standards for the repair and maintenance of unbundled loops by using retail service quality standards as a starting point. But a direct comparison between performance for unbundled loops and for bundled retail services would not be feasible. Retail troubles include problems with central office based services, such as call waiting or three way calling. These issues are not applicable to unbundled loops. The repair process is also different: for unbundled loops, the CLEC, not Ameritech, is responsible for isolating the trouble. Further, testing for bundled retail service is done automatically, through the central office switch (provided the end user is not calling in on

the line in trouble), while testing for unbundled loops requires a manual "shoe test" coordinated by the Network Element Control Center technician and the central office technician. Repairs for bundled retail service are not reasonable analogs for unbundled loop repairs.

Next, Ameritech Michigan's proposal includes measures for service order accuracy (titled "Percentage of Rejected Orders," at measure 10 on West Schedule 1) and for flow-through ("Percentage of Order Flow Through" appearing at measure 9 on West Schedule 1).

Ameritech Michigan's measurement for "held orders" is the Average Interval for Past Due Orders, which appears as measure 7 on West Schedule 1. Meanwhile, Ameritech Michigan proposes to measure provisioning accuracy by using the rate of Installation Trouble Reports (measure 8 on West Schedule 1). The FCC endorsed this approach in the NPRM, noting that the rate of installation troubles "will provide information about whether the incumbent LEC processed the order accurately," while at the same time serving as "a less burdensome measurement than measuring order accuracy, which requires an incumbent LEC to compare the original account profile and order sent by the competing carrier to the account profile following completion of the order." NPRM, ¶ 68.

With regard to billing accuracy, Ameritech Michigan currently performs a variety of statistical reviews and quality initiatives designed to audit and evaluate the accuracy and integrity of CLEC and retail bills alike. These programs include the analysis of bills, rate tables, contracts, tariffs and usage records to reduce the risk of errors. All of these

analyses are an ongoing part of Ameritech Michigan's retail and wholesale operations. These reviews do not, however, translate into ongoing performance measures. And, after having further time to reflect on its request for a billing accuracy measure in the *Ameritech Michigan Order*, the FCC has also recognized the infeasibility of such a measure, and has withdrawn its request: The NPRM does not contain a measure for billing accuracy.

Finally, Ameritech Michigan's proposed measurement of repeat trouble reports ("Percentage Repeats — Maintenance; measure 19 on West Schedule 1) includes a separate category for unbundled loops, and thus addresses the FCC's request for such information.

2. The 1998 NPRM

As I noted earlier, the NPRM on performance measurements tentatively proposed for 30 "model" measurements, that (if and when they are adopted) would serve as guidelines for state commissions. Ameritech Michigan's proposal includes 26 of those 30 measures, with some modifications. The four models proposed by the NPRM that are not also reflected in Ameritech Michigan's measurement plan are: average coordinated conversion, average jeopardy notice, percent of orders with jeopardy, and average submissions per order. I discuss these measures in the following paragraphs.

Average Time for Coordinated Customer Conversions. The stated purpose of this tentative measure (NPRM, ¶ 57 & App. A, § II.B) is to determine how long an end user is without local exchange service when service is converted to a CLEC that uses the

incumbent's unbundled loop to provide such service — or, more specifically, the time between removal of the jumper wire from central office equipment on the Main Distribution Frame ("MDF"), and its connection to the Connecting Facility Assignment ("CFA") that runs to the CLEC's collocation space equipment.

Ameritech Michigan's existing electronic systems do not and cannot record the information necessary for the proposed calculation. Instead, a central office technician would have to manually note the exact time he or she pulled the old jumper, as well as the time he or she terminated the CLEC's jumper to the CLEC's frame. The manual recording involved would be time-consuming, imprecise, and would distract Ameritech Michigan field personnel from their primary task of installing and maintaining service.

Further, the proposed interval would include time associated with factors that are beyond Ameritech Michigan's control. First, if the end user is on the line at the time conversion is scheduled, the conversion cannot go forward. Second, under Long-Term Number Portability ("LNP"), the CLEC — not Ameritech Michigan — sends the activating message to a third-party number portability database administrator; Ameritech Michigan has no control over this process, and no knowledge of when it is complete. Third, many conversions require the presence of a CLEC's third party vendor, who may cause delays.

Because electronic recording and tracking is not feasible, this measure would require manual recording that entailed a series of "judgment calls" in which the persons responsible for recording data would have to manually assess and try to eliminate the impact of non-Ameritech factors on the measure. All of these factors would lead to a

highly imprecise measure, and would distract technicians from the real work of performing the conversion in a timely fashion.

Finally, the NPRM's proposed measure is fraught with practical difficulties. Although it may be possible to manually track Ameritech Michigan's work on single-line conversions, the NPRM does not define the calculation method for multiple-line conversions. Such conversions would also distort results, because the fixed time involved for setting up a conversion would presumably be allocated among numerous lines. Attempting to disaggregate or otherwise account for this phenomenon would result in another substantial drag on technician time.

On balance, then, Ameritech Michigan maintains (just as it did in its comments on the NPRM) that any benefit of this measure is far outweighed by its costs, its imprecision, and the distraction it would cause from providing timely service.

Average Jeopardy Notice Interval (NPRM, ¶ 62 & App. A, § II. C.3). A jeopardy notice is issued when a customer's order is in danger of not being completed as scheduled. Ameritech Michigan's network personnel use "jeopardies" to internally monitor order status through the network, to identify and resolve roadblocks and resource issues, and to improve due date performance. The lion's share of such notices are minor enough to allow resolution well in advance of the due date, with no impact on customer service. In the event that network personnel are nonetheless unable to resolve a jeopardy on a CLEC order before 24 hours in advance of the order due date, Ameritech Michigan informs the CLEC. By contrast, Ameritech Michigan retail representatives do not use jeopardy information in the ordinary course.

The NPRM, however, envisions a very different role for jeopardy notices; namely, "to inform [CLEC] customers of the potential need to reschedule the time for service installation." NPRM, ¶ 62. Thus, it proposes an "average jeopardy notice interval" that would "determine how far in advance a competing carrier receives [the jeopardy] notice, compared to how far in advance an incumbent LEC's service representative receives such notice." Ameritech Michigan does not propose that this NPRM measure be adopted here, because the NPRM's view does not reflect real-world operations.

It bears repeating, at the outset, that jeopardy notices are but a means to an end — namely, the improvement of due date performance. So long as due dates are met, the jeopardy notice has served its purpose. There is no impact on customer service and no need to create a separate performance measure. At most, the provision of jeopardy notices is a secondary measure that has meaning only if the primary measure (due dates not met) indicates some concern that bears further investigation.

Moreover, the proposed measure would not provide useful information, because it does not reflect current operations. As described above, Ameritech Michigan attempts to resolve jeopardies within its own network until 24 hours before the due date. As a result, Ameritech Michigan does not provide CLECs with a jeopardy notice unless the issue is not resolved by that time; thus, the "average jeopardy notice interval" would never be more than 24 hours. Earlier notification would likely raise numerous "false alarms" and unnecessary escalations, and would thus be counterproductive for both CLECs and Ameritech Michigan. Meanwhile, Ameritech Michigan's retail representatives do not use

jeopardy notices in the normal course — thus, the retail analog envisioned by the NPRM simply does not exist. Nor can there be any parity issue in this area.

Percentage of Orders Given Jeopardy Notices (NPRM, ¶ 63 & App. A, § II.C.4). Ameritech Michigan objects to this measure for the same reasons it objects to the NPRM's proposed measure of jeopardy notice intervals described in the preceding paragraphs. Again, the primary measures of order timeliness should be "Average Installation Interval" and "Confirmed Due Dates Not Met." Those measures already address the FCC's concern that incumbents might improperly complete retail orders first, and are sufficient to detect any material level of such discrimination. Indeed, the measure for jeopardy notices would be counterproductive, because it would penalize Ameritech Michigan for issuing jeopardy notices, which are an important internal method for improving due date performance.

Average Submissions per Order (NPRM, ¶ 76 & App. A, § II.C.3). This measure is intended to compute the average number of times an order must be resubmitted before it is finally accepted as a valid order, by using the rate of order rejection. Ameritech Michigan does not believe that the measure proposed by the NPRM is meaningful. Resubmissions are usually driven by incomplete or inaccurate orders submitted by competing carriers themselves, not by problems in obtaining access to Ameritech Michigan's ordering system. Further, because the proposed formula uses the number of order rejections in the numerator of the calculation, just like the Percentage of Rejected Orders (measure 10 on West Schedule 1), this measure is redundant.

IV. Proposed Reporting Methods

The Commission also requests that Ameritech Michigan's proposal cover the proposed methods and formats for reporting performance data. In this section, I address the following issues that relate to reporting methods: the geographic level for reporting; the scope of reporting (how many CLECs are covered); separate reporting for distinct electronic interfaces; reciprocal reporting requirements for CLECs; who may receive performance reports; how often such reports will be distributed; and the process for audits, along with direct availability of underlying data.

A. Geographic Level for Reporting

Ameritech Michigan proposes the use of state-level reporting, which best corresponds with the scope of its operations and of its corresponding interconnection agreements with competing carriers. Ameritech further proposes to report the same data for the Ameritech region as a whole. Many operations support systems are uniform throughout the Ameritech region. Analysis at the regional level can highlight and facilitate the analysis of state-specific trends. Specifically, regional summarization can allow Ameritech Michigan, CLECs and this Commission to determine whether apparent disparities at the state level reflect systemic problems, idiosyncrasies, or random chance.

Ameritech Michigan specifically disagrees with the suggestion of some CLECs, noted at ¶ 38 of the NPRM, who advocate reporting on more granular levels, such as LATAs or MSAs. Compliance with all of the possible variations in reporting detail would be infeasible and very expensive. And reporting results in such detail for all

measures, for all CLECs, would strangle Ameritech in paperwork and leave it at the mercy of its competitors' business plans. Further, by reducing the scope of the various data samples, small-area reporting would reduce the statistical reliability of the various measures, and increase the number of false positives.

To the extent that a specific CLEC has a legitimate business need for a more detailed presentation, that need can be addressed in the process of negotiation and arbitration provided in the 1996 Act, or in the procedures for supplemental requests provided in most interconnection agreements. And to the extent that more detailed presentation may be helpful in analyzing specific performance measures in a given period, that analysis should be performed only after the basic, state-level reporting indicates that discrimination may be present in discrete geographic areas that warrants further investigation.

B. Scope of Reporting

Under this proposal, Ameritech Michigan plans to report separately on performance as provided to its own retail customers (where a retail analog is available); competing carriers in the aggregate; and individual competing carriers. A given CLEC should have at least 1,000 lines or loops in service before it warrants its own report.

C. Reciprocal Reporting Requirements

Performance measures are not a one-way street. CLECs should provide reciprocal reporting of performance in areas where they provide services, comparable to those described herein, to Ameritech Michigan or to other carriers. This reciprocity should

apply both to CLEC retailers, when they provide services to Ameritech Michigan, and to the CLECs who are now entering the wholesale market.

CLEC Retailers. First, CLECs are responsible for engineering, installing, and monitoring all interconnection trunks to transport traffic from their end users to Ameritech end users. In these situations, the CLEC should provide call-attempts-blocked reports, or at least trunk blockage reports, along with such measurements as Confirmed Due Dates Not Met.

CLECs' are also required, by their interconnection agreements, to provide reciprocal collocation arrangements to Ameritech Michigan. Therefore, it is only reasonable for CLECs to provide such collocation measurements as Average Time to Respond to a Physical Collocation Request, Average Time to Provide a Collocation Arrangement, and Percentage of Confirmed Due Dates Missed.

Next, Ameritech Michigan has every right to try to win back customers that have transferred their service to CLECs. Thus, just as Ameritech Michigan provides CLECs with access to Customer Service Records ("CSRs") upon request, so should the CLECs be required to provide their own CSRs. Therefore, CLECs should also report the average time to respond to requests for CSRs.

Thus far, Ameritech Michigan has encountered difficulties obtaining CSRs. CSR requests by "win-back" service representatives, when they are even responded to by a CLEC, are not returned for an average of two to three days and are often not even responded to at all. Thus, Ameritech Michigan can only assume the account "as is":

unless and until that happens, the service representative does not have the account information available to work with the customer on the phone to improve service.

While it is impossible at this time to forecast all future services that CLECs may agree to provide Ameritech Michigan, CLECs should provide reciprocal reporting in all areas where they provide Ameritech Michigan with services comparable to those received by the CLECs.

CLEC Wholesalers. As competition in the retail local exchange market continues to grow, CLECs are now beginning to enter the wholesale market, in competition with Ameritech Michigan. For example, this past July, WorldCom gave an extensive marketing presentation in which it announced that it will provide wholesale local service, beginning with offerings in seven cities, including Detroit. And at a recent industry trade forum, TCG and Frontier announced similar plans.

Ameritech Michigan has worked to bring about competition in the local retail market, and it supports the development of competition in the wholesale market as well. But competition must be fair, and more importantly, retailers should have access to performance information for all their suppliers. That is how they make the best choice for themselves, and thus the best choice for their end users. Performance measurement, reporting, benchmarks, and remedies should be consistent across suppliers. Thus, the Commission should make clear that any performance guidelines adopted herein apply across the board to all wholesale providers.

D. Receipt of Reports

Ameritech Michigan proposes that it continue its current procedure for report distribution. Ameritech Michigan will provide reports to CLECs with at least 1,000 lines or loops in service who are receiving service from Ameritech Michigan and who request a report. The report will include data for that CLEC, data for CLECs as a whole, and any comparable retail figures as appropriate. Ameritech Michigan will also provide this Commission with copies of all reports for CLECs operating in Michigan. These reports would be filed on a confidential basis.

CLEC wholesalers should provide similar reports, and CLEC retailers should provide reciprocal reports on measures where they provide comparable services to Ameritech Michigan.

E. Frequency of Reports

Ameritech Michigan proposes that it continue its current practice of preparing and issuing reports on a monthly basis. Ameritech Michigan further proposes that it have forty-five days notice prior to the beginning of the reporting period (e.g.: March 15th notice for a May report) to generate reports for a new CLEC. This notice period allows sufficient time for Ameritech Michigan to update its systems and tables with the new CLEC's system identifier.

F. Audits and Availability of Underlying Performance Data

There is a significant risk that audits may become unduly burdensome and disruptive to Ameritech Michigan's operations. A simple way to reduce the burden of

audits, without reducing their effectiveness, would be to consolidate them and thus eliminate the time required to accommodate and coordinate separate audits for every single CLEC. Thus, Ameritech Michigan proposes a consolidated annual audit, covering performance data for all CLECs for the year. The audit would be performed by an independent, duly qualified third-party auditor. The independent auditor would determine the type and extent of testing procedures, such as testing a sample of raw data.

Any further audits should be conducted only in cases where there is probable cause to believe that Ameritech Michigan's data contains material errors that have not been corrected even after they have been brought to its attention. Further, potential discrepancies that give rise to an audit should be observed over several months and not merely represent an isolated problem.

CLEC requests for such special audits should be made and resolved under the dispute resolution process set forth in the applicable interconnection agreements. Generally, the CLEC and Ameritech Michigan would first seek a negotiated resolution. If voluntary negotiations are unsuccessful, the parties would proceed to alternative dispute resolution procedures. If those procedures are similarly unsuccessful, the parties would proceed to this Commission.

As with the annual audit, special audits should be conducted by an independent duly qualified third-party auditor under a nondisclosure agreement because it will entail access to confidential information of Ameritech Michigan and perhaps other CLECs. Selection of the auditor should be jointly agreed to by the CLEC and Ameritech Michigan. Further, the CLEC should pay for the costs of the special audit.

Ameritech Michigan will of course provide the independent auditor with the raw CLEC data that supports the calculations of performance measurements, upon the auditor's request. Ameritech Michigan is also willing to provide CLECs with information about their own raw data during the process of discussion and reconciliation of performance results. Providing such data every month for every one of the over 20 CLECs operating in Michigan would not be cost-effective, however, and it would not be necessary given an annual independent audit. It would require Ameritech Michigan to construct a "data warehouse" with appropriate safeguards to prevent CLECs from gaining access to the confidential information of their competitors. The estimated cost of such a facility would be $8 million for the Ameritech region as a whole.

Ameritech Michigan is committed to keeping the confidential business information of itself, and of requesting carriers, confidential. Under no circumstances should CLECs be given access to the raw data describing the transactions of their competitors, including Ameritech Michigan.

V. Evaluation of Performance Measurements

A. Performance Outcomes vs. Performance Indicators

Some of the performance measurements proposed above address *outcomes*: the real-world quality of the end products and services that Ameritech Michigan offers to requesting carriers. These correspond to the level of CLEC service as perceived by the end user. In fact, many also tie directly to the obligations owed by Ameritech Michigan under its interconnection agreements. For example, Ameritech Michigan provides requesting carriers with access to unbundled network elements: the "average installation

interval" measures the speed at which those elements are provided, while "installation trouble reports" indicate the quality of the elements provided.

The performance measurement summary in West Schedule 1 identifies such measurements as "outcome" measurements in the column labeled "measurement type." As West Schedule 1 shows, the following proposed measurements are "outcome" measurements:

Pre-ordering Average Response Time (measure 1);

Average Installation Interval (measure 2);

Confirmed Due Dates Not Met (measure 3);

Average Reject Notice Interval (measure 4);

Average Completion Notice Interval (measure 6);

Installation Trouble Reports (New Service Failures) (measure 8);

911 Customer Record Update Files Not Processed By the Next Business Day (Received Electronically) (measure 11);

911 Erred Customer Record Update Files Not Returned By Next Business Day (Received Electronically) (measure 15);

Mean Time to Repair (measure 17);

Trouble Report Rate (measure 18);

Percent Repeats — Maintenance (measure 19);

Percentage of Customer Troubles Not Resolved within the Estimated Time (measure 20);

Daily Usage Timeliness (measure 21);

Percentage of Time Interface is Unavailable (measure 24);

Average Speed of Answer (OS/DA) (measure 27);

Call Attempts Blocked (measure 28);

Average Time to Respond to a Physical Collocation Request (measure 29);

Percent of Due Dates Missed in Provision of Collocation Arrangements (measure 31).

While OS/DA is an "outcome," nondiscriminatory performance is already ensured by the way that Ameritech Michigan's systems process calls on a first-come-first-served basis, without knowing which carrier serves the customer making the call. The system cannot measure comparative performance, so there is no way to set a real benchmark; but the system cannot discriminate, so there is no need to set a benchmark either.

Certain other performance measurements do not address separate outcomes by themselves, but are merely *indicators*: that is, they may provide additional information about a particular stage in the process that leads to an outcome, or about factors outside Ameritech Michigan's control. The indicators serve as a performance management tool for both Ameritech Michigan and the CLEC. While this information may be helpful in investigating outcome data, there should not be a separate performance benchmark for these measures. A business manager serious about competing in the market is only interested in and committed to the measurements that affect its outcomes or service to the end user. A performance plan should focus on outcomes: The parties should manage indicators to minimize any outcome impact. The various indicator measures are detailed as follows.

The Average FOC Notice Interval (measure 5 on West Schedule 1) simply highlights the first phase of the Average Installation Interval discussed above. Any service-affecting delay associated with order confirmation is thus already captured in the outcome measurement, and there is no need to create a redundant benchmark.

The Average Interval for Past Due Orders (measure 7 on West Schedule 1) is also an indicator rather than an outcome. It focuses on the piece of the Average Installation Interval that comes after the order's due date, for the subset of orders that are past due. All of the orders in this measure are, by definition, covered by the outcome measure for Confirmed Due Dates Not Met. And any delay in processing those orders would be reflected in the Average Installation Interval. A second benchmark would be improper.

Similarly, the successful electronic flow-through of an order from the EDI interface into the Legacy systems (measure 9 on West Schedule 1) may affect the time between the submission of the order and the time provisioning begins; however, there are still additional steps involved later on (such as the physical installation). Thus, in the end, flow-through may not affect the time required for the order to be processed, as a whole. If it does not, the lack of flow-through does not affect service or the CLEC, and Ameritech Michigan should not be penalized. On the other hand, if the lack of flow-through does cause a net delay in installation, that delay would already be captured in the related outcome measure (*e.g.* Average Installation Interval, or Confirmed Due Dates Not Met). It would be unnecessary, and unfair, to punish Ameritech Michigan twice.

Next, certain indicator measures address events that are outside Ameritech Michigan's control. For instance, the rate of order rejection is primarily a function of

CLEC errors in submitting data. Ameritech Michigan should not be held responsible for errors caused by CLEC personnel, or for successfully identifying those errors and bringing them to the CLEC's attention. Thus, it would be inappropriate to measure performance against a benchmark. The following measures address events outside Ameritech Michigan's control, and are also denoted as indicators in West Schedule 1:

Percentage of Rejected Orders (measure 10);

Errors in Customer Record Update Files (measures 13 and 14).

Similarly, certain measures provide information about transactions that CLECs choose to submit manually even though Ameritech Michigan makes electronic methods available. For 911 database updates, Ameritech Michigan offers several electronic options, described above. Despite these electronic options, some CLECs still submit updates manually. While Ameritech Michigan accepts such updates, benchmarking its performance would be unfair. Manual entries require manual processing and are not comparable to retail updates, which are submitted electronically. Further, Ameritech Michigan offers CLECs several interfaces and formats for electronic submission; it should not be held responsible to those CLECs that still choose to use other methods. Instead, CLECs should be encouraged to use the superior electronic methods and features available to them. Many of these features were added to address this Commission's concerns with respect to the speed and accuracy of 911 database updates. As a result, the following measures related to manual 911 updates are reported as indicators, for information purposes only, without a benchmark:

911 Customer Record Update Files Not Processed By the Next Business Day (Received Manually) (measure 12 on West Schedule 1);

911 Erred Customer Record Update Files Not Returned By Next Business Day (Received Manually) (measure 16 on West Schedule 1).

Similarly, no benchmark is proposed for the indicator measurement that computes the average speed of answer for telephone calls to the ordering and repair service centers (measures 25 and 26 on Schedule 1). Ameritech Michigan processes its own orders and repairs electronically, and it offers CLECs electronic interfaces so that they can do the same. Ameritech Michigan should not be held responsible for CLECs that choose not to use the interfaces, and CLECs should not be encouraged to tie up the service center lines with transactions when an electronic alternative is available.

Next, unlike the outcome measure for billing information used by CLECs to bill their own end users, the measures for Ameritech Michigan's bills to CLECs — AEBS Billing Interval Cycle Time (measure 22 on West Schedule 1), and CABS Bills Delivered Late (measure 23 on West Schedule 1) — are denoted as "indicators," because they are not service-affecting and because late bills do not have adverse economic consequences for the CLECs that receive them. CLECs can continue billing their own end users (from the daily usage file for resale or from their own usage records in the case of an unbundled loop), and for cash planning purposes, the amount they bill gives them a good idea of the size wholesale bill to expect. Further, Ameritech Michigan's standard policy is to waive

late-payment charges on CABS bills if they are delivered late, and Ameritech Michigan does not assess late-payment charges on AEBS bills at all. If anything, a delay in the payment date, without any corresponding finance charge, is beneficial to the CLECs.

The Average Time to Provide a Collocation Arrangement (measure 30 on West Schedule 1) is also an indicator rather than outcome measurement. Collocation activities require coordination between Ameritech Michigan and the requesting carrier, and the time to provide each collocation arrangement is a negotiated interval that reflects the complexity of the order and the time the CLEC needs completion. CLECs that are properly planning their networks will request collocation well in advance of the time they need it, and the time between request and provision will be larger. Proper planning should be encouraged, but Ameritech Michigan should not be penalized for the resulting increase in the time to provide collocation. Instead, the proper outcome measure is the Percent of Due Dates Missed (measure 31 on West Schedule 1), which better captures the timeliness of provisioning against the negotiated interval.

B. Benchmarks: Retail Analogs vs. Standards

Benchmarks are used to evaluate the actual level of performance provided to the CLEC compared to that furnished to the retail operations of Ameritech Michigan. Some performance outcomes for wholesale operations are comparable to outcomes in the retail environment. Where such a retail analog exists, statistical analysis should be used to evaluate the parity of performance between wholesale and retail operations. These measures are identified in West Schedule 1, by a notation of "parity" in the "benchmark" column.

As is more thoroughly explained in the affidavit of Dr. Levy, statistical analysis should be employed to determine if discrimination exists in instances where the wholesale service provided to the CLEC may be directly compared to a retail analog. The purpose of statistical analysis is to better detect disparity where it exists, while at the same reducing the chance of "false positives", i.e., that disparity will be found where none in fact exists. Note, however, that even statistical analysis cannot eliminate that risk entirely.

The following measures on West Schedule 1 have retail analogs, and would be benchmarked against those analogs using statistical analyses of parity:

Average Installation Interval (for resale orders) (measure 2);
Confirmed Due Dates Not Met (resale) (measure 3)
Installation Trouble Reports (resale) (measure 8);
Customer Record Update Files Not Processed by Next Business Day (Received Electronically) (measure 11);
Erred Customer Record Update Files Not Returned by Next Business Day (Received Electronically) (measure 15);
Mean Time to Repair (Resale) (measure 17);
Trouble Report Rate (Resale) (measure 18);
Percent Repeats-Maintenance (Resale) (measure 14); and
Call Attempts Blocked (measure 28).
Percentage of Customer Troubles Not Resolved Within Estimated Time (Resale) (measure 20)

In circumstances where no comparable retail analog exists, performance should be measured against a standard benchmark to determine whether wholesale performance provides requesting carriers a reasonable opportunity to compete. This is the same standard used by the FCC in evaluating checklist compliance. *Ameritech Michigan Order*, ¶ 141. The applicable standard for each measure that employs a standard benchmark is shown in the "benchmark" column of West Schedule 1.

The most notable measures for which no retail analog exists are those for unbundled loops. Ameritech Michigan does not unbundle loops for itself. And providing an unbundled loop to a CLEC is not the same as installing retail service for an end user. It requires manual activities and coordination between carriers in order to provide the requesting carrier with access to the loop. For instance, unbundled loop requests are automatically routed to the facility assignment systems, which will select appropriate loop facilities to match the unbundling service request. The service order is also routed to a special services center to complete the unbundled loop design, and to inventory the entire circuit from the network interface (at the end user's premises) to the final connection to CLEC's collocated equipment in the Ameritech central office. This center will either mechanically or manually assign CLEC's designed tie cable as well as any other tie cables required within the central office. These tie cables connect the unbundled loop, which terminates on Ameritech's main distributing frame (MDF), to the CLEC's established point of collocation in the central office. After the facility assignment and design for the unbundled loop are completed, the unbundling service order is distributed

to the required work groups. Ameritech's Network Element Control Center then contacts the carrier to establish a coordinated cut-over schedule.

The various standards are detailed in West Schedule 1. Ameritech used three principal references to develop them: First, Ameritech Michigan proposes standards taken from existing interconnection agreements wherever applicable. These benchmarks have already been the subject of the 1996 Act's process of negotiation and arbitration, and they have already been approved by this Commission as consistent with the Act. They also preserve Ameritech Michigan's existing business relationships. Standards for the following performance outcomes on West Schedule 1 come from Ameritech Michigan's current interconnection agreements:

> Average Installation Interval (for unbundled loops) (measure 2);
> Confirmed Due Dates Not Met (loops) (measure 3);
> Average Time to Respond to a Physical Collocation Request (measure 29).

The measurement of missed repair appointments (Percentage of Customer Troubles Not Resolved within the Estimated Time; measure 20 on West Schedule 1) for unbundled loops, is similar to the measurement of missed service appointments (Confirmed Due Dates Not Met), for which Ameritech Michigan's existing contracts provide a standard of 20 percent. Thus, Ameritech Michigan adopted the same standard for the repair measurement. By the same reasoning, the standard for Percent of Due Dates Missed in Provision of Collocation Arrangements (measure 31) is also set at 20 percent.

The Average Installation Interval for loops is expressed in business days. In the *Phone Michigan* proceeding, the ALJ found that Ameritech Michigan's contract with Phone Michigan, which defined the interval in days, without saying whether they were calendar or business days, was intended to mean calendar days. *Phone Michigan Order*, p. 4. The ALJ also found that if the last day of the interval fell on a weekend or holiday, the final day for completion would be the next business day. *Id.* The use of business days here is a better match for industry practice and Ameritech Michigan's operations. For the most part, Ameritech Michigan's field personnel are dispatched on weekends and holidays only for emergencies or occasional "catch up" work. It would not be fair to establish a benchmark that did not recognize this long-standing policy. For example, if Ameritech Michigan received a loop order on Monday morning, the day for completion under the ALJ's approach would be the next Monday, and Ameritech Michigan would have five working days to fill the order. But if Ameritech Michigan received the same order on Wednesday morning, the day for completion would still be the next Monday, giving Ameritech Michigan only three working days to complete the same order. Thus, an order would be due the same day even though it was received two days later. Orders for the same service should be treated the same way, and the day of the week that they happen to come in should not affect the benchmark.

Next, Ameritech Michigan used service quality standards that were close enough to the wholesale performance outcome to be used as a benchmark. The measure of overall Trouble Reports on unbundled loops (measure 9 on West Schedule 1), which measures the percentage of loops reporting trouble within the month, is similar to the

Monthly Trouble Reports per 100 Lines measure currently in effect in Michigan. That measure is benchmarked at 6 troubles or less per hundred lines per month. As I mentioned above, retail services are subject to a wider variety of troubles (such as those associated with central office-based services) than unbundled loops. Thus, Ameritech Michigan adjusted the 6 percent threshold downward, to 4 percent, to arrive at the standard for this performance measure.

The Mean Time to Repair for unbundled loops (measure 18 on West Schedule 1) measures the average service outage time for trouble reports closed in the reporting period. This measure is similar to the retail service quality standard for clearing troubles in Michigan, which is 36 hours (1.5 days), so the same benchmark was adopted for unbundled loops.

For those performance outcomes without a benchmark either in interconnection agreements or service quality standards, Ameritech Michigan relied on studies of the process leading to those outcomes.

First, for the Average Response Time for pre-ordering, Ameritech reviewed the electronic processes involved in obtaining pre-order information in response to CLEC inquiries. The electronic processes for telephone number selection and retrieval of customer service records of less than 10,000 characters, if they operate efficiently, should take about 6 seconds or less. The process for address validation takes slightly more time: If the address provided by the CLEC is not included in the database, the system looks for addresses that are similar to the one provided and furnishes the results to the CLEC to assist them in determining the correct address. Therefore, the proposed standard is 9

seconds or less. The process for due date selection, meanwhile, requires more steps. Due dates are selected differently depending upon whether a premises visit is required. If, after reviewing all of the order information, the system determines that no premises visit is required, it uses set methods and procedures to determine the appropriate due date to be offered. On the other hand, if a premises visit is required, the system must identify dates that technicians are available for dispatch. In the second case, the process is more involved and, therefore, takes more time to complete. As a result, the proposed standard is 16 seconds or less. Note that all of the standard pre-order response times allow CLEC representatives to obtain pre-order information while talking with the customer on the phone, and thus give them a meaningful opportunity to compete.

Next, in arriving at a standard for the measure of Average Reject Notice Interval (measure 4 on West Schedule 1) Ameritech Michigan reviewed the steps involved in processing the CLEC order, determining that the order must be rejected, and providing a notice of rejection back to the CLEC. (In some cases, rejection is done automatically; however, for certain orders, such as complex orders that require manual intervention, review and rejection of orders must be done manually.) Review of these procedures, and of past operating statistics, showed that rejection notices should be returned within 24 hours, 80 percent of the time, if the steps involved are performed efficiently.

The same approach was used for the Average Completion Notice Interval to arrive at a standard of 80 percent returned within 48 hours. The period for completion notices is longer than for rejection notices, to compensate for the fact that Ameritech Michigan's systems (due to inherent limitations) overstate the completion notice interval. As I stated

earlier, those systems do not record the hour and minute of order completion, only the day. The completion notice interval is calculated by assuming that all orders were completed just after midnight on the day of completion. This is almost always earlier than the real completion time. Thus, the calculated completion notice interval is typically several hours longer than the real completion interval; this extra time should also be included in the benchmark, so that Ameritech Michigan is evaluated based on the real-world performance experienced by the CLEC, not that perceived by Ameritech Michigan's electronic systems.

Similarly, the standard of 17 percent for Percent Repeats - Maintenance (Unbundled Loops) was derived from analyses that revealed that Ameritech Michigan was experiencing a comparable number of repeat troubles with its retail business. Furthermore, the Wisconsin Commission utilizes a similar standard of approximately 15.6 percent.

The same approach was used to develop the 5-business day standard for delivery of daily usage information. Ameritech Michigan performed a process review and determined that 98 percent of CLEC usage records should be formatted and rated, then segregated and accumulated by CLEC, within 5 business days in an efficient operation. Also, this is the way AT&T measures our performance.

The 1 percent benchmark for Percentage of Time Interface is Unavailable is based on a review of current systems performance, which showed that the various interfaces should be available at least 99 percent of the scheduled time when they are working efficiently.

VI. Proposed Enforcement Mechanisms

A. General Principles

I. Finally, the Commission has asked Ameritech Michigan to propose enforcement mechanisms to address instances where performance fails to meet the appropriate benchmarks. Ameritech Michigan has proposed detailed remedy formulas for failure to meet benchmarks as noted in West Schedule 1, under the "Remedy" column, for each outcome measure. There are some guiding principles, however, that apply to each formula.[1]

First, the purpose of any remedial system should be just that: remedial. The overall intent should be to compensate CLECs for actual harm sustained as a result of below-standard or discriminatory performance, not to penalties or arbitrary punishment on Ameritech Michigan. Thus, the remedy amount is based on the affected volume of transactions for the affected CLEC. A straight dollar penalty, by contrast, would likely overcompensate CLECs with only minimal transaction volume while possibly under-compensating those CLECs that are most affected.

Second, the focus should be on overall performance. The performance in a single month may fail to meet the applicable benchmark due to isolated, one-time occurrences that have no lasting impact. Further, the parties should focus on using monthly reports to quickly identify and resolve problems, and such improvements should be encouraged. Thus, Ameritech Michigan proposes that remedies be computed and assessed on a quarterly basis, using data for the quarter as a whole. This keeps the parties focused on long-run service trends (which is the course that most benefits customers), as opposed to

nonrecurring short-term events. It also creates an incentive to correct minor issues before they become serious, again to the benefit of the end user. In addition, the increased number of transactions included in the calculation increases the statistical reliability of the measure and reduces the risk that any one transaction will have a disproportionate impact on the measurement. Any claims by CLECs relating to remedies would be required to be asserted no later than the end of the quarter following the quarter to which the claim relates.

Even with quarterly calculation of remedies, the performance on some individual transactions may fail to meet the applicable benchmark due simply to random chance, or to normal market or environmental fluctuations outside of Ameritech's control, that cannot be completely eliminated by the use of the disaggregation categories or exclusions identified above and in West Schedule 2.

Where performance is measured against retail analogs, statistical analysis performs the function of addressing (but not eliminating) random fluctuations that do not reflect on Ameritech Michigan's performance. Ameritech Michigan proposes to apply the standard "z-test" to performance data. The z-test will compute a range of performance at a 95 percent confidence level. That range would be a "safe harbor": if wholesale performance falls within the range, no remedies would be imposed. (Because the test focuses on wholesale results that are less favorable than retail, the range of performance subject to consideration would have only one "tail" and the test would be a "one-tailed" test.)

Where performance is measured against a standard, a remedy should be applied only when a threshold percentage of transactions fails to meet standard. These percentages are identified in the benchmark column of West Schedule 1 for each measure, and they are also used in the formula for calculating the remedy.

Further, under either approach, a CLEC would have to have at least 30 transactions for a given measure before remedies are calculated. This is the generally accepted minimum for statistically valid analysis (in some cases, the minimum may be higher).

B. Calculation of Remedies

1. Degree of Apparent Disparity

The remedy formulas are based upon the following basic components. The first piece compares the actual average level of performance provided to the CLEC by Ameritech Michigan to the applicable standard or retail analog. The resulting difference reflects the overall degree of potential disparity. As a result, the remedy calculation incorporates the relative level of apparent disparity for each measure and for each CLEC. The more actual performance falls below the benchmark, the more compensation the CLEC receives.

2. Monetary Impact of Disparity

The next component of the remedy formula captures the monetary effect of the disparity. Some performance measures correspond to products or services for which Ameritech Michigan charges the CLEC; for these measures, the compensation for below-

standard performance is based upon the average monthly recurring charge for either the service or the unbundled element being provided by Ameritech Michigan to the CLEC. This way, the CLEC receives a rebate on its monthly charge for late or lower-quality work. The following measures use a monetary component tied to the charge for the underlying product or service:

Average Installation Interval

Confirmed Due Dates Not Met

Average Reject Notice Interval

Average Completion Notice Interval

Installation Trouble Reports

Customer Record Update Files Not Processed by Next Business Day (Received Electronically)

Erred Customer Record Update Files Not Returned by Next Business Day (Received Electronically)

Mean Time to Repair

Trouble Report Rate

Percent Repeats - Maintenance

Percentage of Customer Troubles Not Resolved Within the Estimated Time

Average Time to Respond to Collocation Request (monetary amount is based on monthly charge for floor space)

Percent of Due Dates Missed with respect to Collocation Requests (monetary amount is based on the collocation build out fee).

Pre-ordering Average Response Time corresponds to functions that CLEC representatives use in doing their work. Thus, the monetary component is based upon the average increased cost to the CLEC to perform the function related to the measure. This cost is estimated as the average length of time it would take a CLEC representative to perform the specific transaction manually, multiplied by the average salary per representative (estimated at an average $10 per hour.) In other words, the CLEC is compensated for the extra time (and salary) incurred by its representatives due to Ameritech Michigan delays. Ameritech Michigan's process analysis indicates that each transaction will take on average approximately 12 minutes to complete (1/5 of an hour). At an average $10 per hour, the monetary component for a transaction consisting of all four pre-order activities (CSR retrieval, address verification, telephone number selection, and due date selection) and is estimated at $2. Each of the four pre-order activities is assigned an equal portion of this cost, or 50 cents.

In this instance, there is also a limiting factor included in the formula to ensure that the CLEC is not encouraged to submit duplicate transactions in order to increase the level of the remedy. The number of associated transactions for each order is limited to 1 customer service record retrieval, 2 telephone number selections, and 2 address validations per order. In the case of Due Date Selection, the limit is set at three since due date selection is normally more of an iterative process.

The same approach was used to develop the monetary component for Percentage of Time Interface is Unavailable. Ameritech Michigan based this component on the

estimated cost to a CLEC of manually inputting information when the interface is unavailable.

For daily usage records, the monetary component is designed to compensate for the cost of money associated with the usage contained on the files not provided on time, based on an estimated revenue per daily usage record of 50 cents.

For confirmed due dates not met with respect to interconnection trunks, the monetary component would be based on the rate for reciprocal compensation, multiplied by the estimated daily traffic subject to reciprocal compensation that would have otherwise traveled over those trunks, multiplied by the average delay, in days, for provisioning past due trunks.

3. Weighting Factor

The third component of the remedy formula is a weighting factor that represents the relative importance of disparity for the measure in question. For some measures, the benchmark is a percentage of transactions that meet standard: Failure to achieve that percentage means that some percentage of transactions do not meet standard, but not all transactions are affected. Thus, the weighting factor for these transactions is comparatively low, usually set at 3 percent.

For other measures, the benchmark is an overall average interval of time (e.g. days or hours) for all transactions during the month: An apparent disparity in the average interval for all transactions as a whole indicates that the potential problem is more widespread. These measurements receive a higher weight. Thus, the remedy for Average Installation Interval (measure 3), includes a factor (25%) that attaches a relatively high

level of importance to this measure. The actual effect is to compensate the CLEC approximately 25 percent of its average monthly recurring line or unbundled loop rate for each day on average that installation is potentially out of parity. In other words, if the level of apparent disparity amounts to 4 days, the CLEC would be credited the full average monthly recurring charge. The same weighting factor applies to the measurement of Mean Time to Repair.

Finally, the measures for 911 outcomes (Customer Record Files Not Processed by Next Business Day (Received Electronically) and Erred Customer Record Update Files Not Returned by Next Business Day (Received Electronically) also receive a heavy weight, to reflect the importance of 911 services to the public. The weighting factor is based on the recurring monthly rate for three months of 911 administration.

4. Volume of Transactions

The final general component represents the actual number of occurrences associated with the measure. Using Average Installation Interval (measure 3 on West Schedule 1) as an example, the total number of order installations completed is considered in calculating the remedy. This provides the base, which is multiplied by the percentage of affected transactions and the degree of disparity (the first component of the remedy calculation) to come up with the number of affected transactions.

5. Minimum Remedy Amount

Ameritech Michigan proposes that, wherever quarterly remedies are to be assessed on a particular outcome measure for a particular CLEC, a minimum remedy should be provided. For the four highest-weight measures (Average Installation Interval, 911 Customer Record Update Files Not Processed by the Next Business Day (Received Electronically), 911 Erred Customer Record Update Files Not Returned by Next Business Day (Received Electronically), and Mean Time to Repair), Ameritech Michigan proposes a minimum remedy of $1,000. For all other outcome measures, Ameritech Michigan proposes a minimum remedy amount of $100. Thus, where a CLEC has the minimum 30 transactions in the quarter required for statistical analysis and for the calculation of remedies, but the calculated remedy falls below the minimum amount, the CLEC would be entitled to the minimum amount.

For example, assume Ameritech Michigan fails to meet the benchmarks under Average Installation Interval for one or more measurement categories. If the calculated quarterly remedy for all categories using the above formula is less than $1,000, the CLEC would receive the $1,000 minimum remedy.

6. Avoiding Double Remedies

Ameritech Michigan's existing interconnection agreements already contain remedy amounts for failure to meet certain performance benchmarks. As I noted in discussing the formulation of proposed benchmarks, some of the contractual performance benchmarks correspond to benchmarks in this proposal. Thus, in some cases, contractual remedies will overlap with the remedies proposed here. As Ameritech Michigan's

current agreements expire or are amended, the market will naturally move to the remedial system advanced in this proposal. In the meantime, Ameritech Michigan proposes that a CLEC may elect between their current contractual remedy amount and the remedy calculated under this proposal. Of course, no CLEC would be allowed to choose both remedies, and Ameritech Michigan should not have to pay remedies based upon both the contract and this proposal. Such double payments would not serve the overall goal of fair compensation.

C. Call Attempts Blocked

This outcome does not require a remedy formula. When call attempts from Ameritech Michigan customers to CLEC end users are blocked, Ameritech Michigan suffers a negative impact, by losing the revenue from that originating call attempt. As a result, no additional remedy should be paid on this measure.

D. Procedure for Further Investigation of Apparent Disparity

The proposed system of remedies is self-executing, and Ameritech Michigan would pay remedies in the form of appropriate credits on CLEC bills automatically, in accordance with the calculation formula, when its performance on an outcome measurement does not meet standard.

The self-executing system is a simple and straightforward one to administer. But when performance appears to fall below standard, it is still important to determine the causes, and resolve them if possible. Understanding and improving performance outcomes should be the long-term goal.

Further, because of the complexity of service that Ameritech Michigan provides, our experience to date has shown that on occasion statistical tests (or percentage-threshold tests) will indicate a possible shortfall in performance that does not really exist. Statistical tests and threshold tests reduce the possibility of random error, but cannot eliminate it. Thus, when possible disparity is found in the above analysis, a second level of analysis should be performed to determine the source of the apparent disparity. In some cases, the apparent disparity will be attributable to some factor that does not reflect disparate service, but rather from some acceptable market or service-based factor that was not reflected in the first stage analysis. If real disparity does in fact exist, the second stage analysis will help pinpoint the cause of such disparity, allowing for efficient correction.

Thus, Ameritech Michigan proposes a multiple stage protocol to check for discrimination. In the first stage, the statistical techniques and percentage thresholds described above, and summarized in West Schedule 1, are used to assess performance. If this analysis demonstrates satisfactory performance, no further analysis will be required. If Ameritech Michigan does not meet the first-stage test, it would calculate and pay the appropriate remedy automatically. Then, Ameritech Michigan and the applicable CLEC would begin a cooperative second-stage investigation to determine the source of the apparent disparity. If the second-stage analysis reveals that there was no real shortfall in Ameritech Michigan's performance, the CLEC should refund part or all of the associated remedy. The procedure for this is already established: The parties could simply use the process of dispute resolution set forth in their contract.

VII. Conclusion

This concludes my affidavit.

Further affiant saith not.

Susan West

Susan West

Subscribed and sworn
before me this 30th day of
October, 1998.

Christine L. Voutiritsas

"OFFICIAL SEAL"
CHRISTINE L. VOUTIRITSAS
Notary Public, State of Illinois
My Commission Expires 4-30-2000

WEST SCHEDULE 1: MICHIGAN PERFORMANCE MEASUREMENT SUMMARY

#	MEASUREMENT	CATEGORIES	W	R	MEASUREMENT TYPE	BENCHMARK	REMEDY
PRE-ORDERING							
1	Average Response Time	▪ Customer Service Record ▪ ≤ 10,000 characters ▪ > 10,000 characters	 X X		▪ Outcome	80% ≤ 6 secs.* *CSRs ≤10,000 characters	(80%-X)($.50)(# of Transactions),where the # of transactions is ≤ the # of orders
		▪ Address Validation	X			80% ≤ 9 secs.	(80%-X)($.50)(# of Transactions), where # of Transactions ≤ 2(# of Orders)
		▪ Telephone Number Selection	X			80% ≤ 6 secs.	(80%-X)($.50)(# of Transactions), where # of Transactions ≤ 2(# or Orders)
		▪ Due Date Selection	X			80% ≤ 16 secs.	(80%-X)($.50)(# of Transactions), where # of Transactions ≤ 3(# of Orders)
ORDERING/PROVISIONING							
	Order Completion Measurements						
2	Average Installation Interval	Resale Residence POTS ▪ Field Visit ▪ Non-Field Visit	 X X	 X X	▪ Outcome	Parity	(X-A)(25%)(RC)(Total # of Order Installations Completed)
		Resale Business POTS ▪ Field Visit ▪ Non-Field Visit	 X X	 X X		Parity	(X-A)(25%)(RC)(Total # of Order Installations Completed)
		Resale Centrex ▪ Field Visit ▪ Non-Field Visit	 X X	 X X		Parity	(X-A)(25%)(RC)(Total # of Order Installations Completed)
		Unbundled Loops	X			80% within 5 Days	(80%-X)(25%)(RC)(Total # of Order Installations Completed)
3	Confirmed Due Dates Not Met	Resale Residence POTS ▪ Field Visit ▪ Non-Field Visit	 X X	 X X	▪ Outcome	Parity	(X-A)(3%)(RC)(Total # of Order Installations Completed)
		Resale Business POTS ▪ Field Visit ▪ Non-Field Visit	 X X	 X X		Parity	(X-A)(3%)(RC)(Total # of Order Installations Completed)
		Resale Centrex ▪ Field Visit ▪ Non-Field Visit	 X X	 X X		Parity	(X-A)(3%)(RC)(Total # of Order Installations Completed)
		Unbundled Loops	X			≤ 20%	(X-20%)(3%)(RC)(Total # of Loop Installations Completed)
		Interconnection Trunks	X			≤ 20%	(X-20%)(278 Minutes of Use/Trunk/Day)(Reciprocal Compensation Rate)(Average # of Days Late for All Missed Trunks)(Total # of Trunk Installations)

Legend: X = TC Performance
A = Ameritech Performance
RC = Recurring Charge
($25 Resale, $9.43 Loops)

NOTE: Measures expressed as percentages are expressed as their decimal equivalents for purposes of remedy calculations.

WEST SCHEDULE 1: MICHIGAN PERFORMANCE MEASUREMENT SUMMARY

#	MEASUREMENT	CATEGORIES	W	R	MEASUREMENT TYPE	BENCHMARK	REMEDY
	Order Status Measurements						
4	Average Reject Notice Interval	Resale	X		▪ Outcome	80% ≤ 24 hours	(80%-X)(3%)(RC)(Total # of Rejected 855s for Electronically Received Orders)
		Unbundled Loops	X				
5	Average FOC Notice Interval	Resale	X		▪ Indicator		
		Unbundled Loops	X				
6	Average Completion Notice Interval	Resale	X		▪ Outcome	80% ≤ 48 hours	(80%-X)(3%)(RC)(Total # of Completion Notices for Electronically Received Orders)
		Unbundled Loops	X				
	Held Order Measurement						
7	Average Interval for Past Due Orders/Loops	Resale Residence POTS	X	X	▪ Indicator		
		Resale Business POTS	X	X			
		Resale Centrex	X	X			
		Unbundled Loops	X				
	Installation Trouble Measurement						
8	Installation Trouble Reports (New Service Failures)	Resale Residence POTS [Found Network Troubles (Codes 3,4, 5)]			▪ Outcome	Parity	(X-A)(3%)(RC)(Total # of Order Installations Completed)
		▪ Field Visit	X	X			
		▪ Non-Field Visit	X	X			
		Resale Business POTS [Found Network Troubles (Codes 3,4, 5)]				Parity	(X-A)(3%)(RC)(Total # of Order Installations Completed)
		▪ Field Visit	X	X			
		▪ Non-Field Visit	X	X			
		Resale Centrex [Found Network Troubles (Codes 3,4, 5)]				Parity	(X-A)(3%)(RC)(Total # of Order Installations Completed)
		▪ Field Visit	X	X			
		▪ Non-Field Visit	X	X			
		Unbundled Loops	X			≤ 6%	(X-6%)(3%)(RC)(Total # of Loops Installations Completed)
	Order Quality Measurements						
9	Percentage of Order Flow Through	Resale	X		▪ Indicator		
		Unbundled Loops	X				

Legend: X = TC Performance
A = Ameritech Performance
RC = Recurring Charge
($25 Resale, $9.43 Loops)

NOTE: Measures expressed as percentages are expressed as their decimal equivalents for purposes of remedy calculations.

WEST SCHEDULE 1: MICHIGAN PERFORMANCE MEASUREMENT SUMMARY

#	MEASUREMENT	CATEGORIES	W	R	MEASUREMENT TYPE	BENCHMARK	REMEDY
10	Percentage of Rejected Orders (Service Order Accuracy - Electronically Received Order Quality)	Resale	X		▪ Indicator		
		Unbundled Loops	X				
	911 Database Update and Accuracy						
11	Customer Record Update Files Not Processed by the Next Business Day (Received Electronically)	Note: Wholesale includes facility-based carriers only. Retail includes Ameritech and non-facilities based carriers (i.e. resale).	X	X	▪ Outcome	Parity	(X-A)($88.08*)(Total # of Electronically Received CRU Files) *3 months of the tariffed monthly rate for 911 administration
12	Customer Record Update Files Not Processed by the Next Business Day (Received Manually)	Note: Wholesale includes facility-based carriers only.	X		▪ Indicator		
13	Errors in Customer Record Update Files (Received Electronically)	Note: Wholesale includes facility-based carriers only. Retail includes Ameritech and non-facilities based carriers (i.e. resale).	X		▪ Indicator		
14	Errors in Customer Record Update Files (Received Manually)	Note: Wholesale includes facility-based carriers only.	X		▪ Indicator		
15	Erred Customer Record Update Files Not Returned by Next Business Day (Received Electronically)	Note: Wholesale includes facility-based carriers only. Retail includes Ameritech and non-facilities based carriers (i.e. resale).	X	X	▪ Outcome	Parity	(X-A)($88.08)(Total # of Erred CRU Files Received Electronically)
16	Erred Customer Record Update Files Not Returned by Next Business Day (Received Manually)	Note: Wholesale includes facility-based carriers only.	X		▪ Indicator		

Legend: X = TC Performance
A = Ameritech Performance
RC = Recurring Charge
($25 Resale, $9.43 Loops)

NOTE: Measures expressed as percentages are expressed as their decimal equivalents for purposes of remedy calculations.

WEST SCHEDULE 1: MICHIGAN PERFORMANCE MEASUREMENT SUMMARY

#	MEASUREMENT	CATEGORIES	W	R	MEASUREMENT TYPE	BENCHMARK	REMEDY
REPAIR & MAINTENANCE							
17	Mean Time to Repair	Resale Residence POTS			▪ Outcome	Parity	(X-A Days)(25%)(RC)(Total # of Initial Trouble Reports Closed)
		▪ Regulated Wire & Equipment (Code 03)	X	X			
		▪ Outside Plant (Code 04)	X	X			
		▪ Central Office (Code 05)	X	X			
		Resale Business POTS				Parity	(X-A Days)(25%)(RC)(Total # of Initial Trouble Reports Closed)
		▪ Regulated Wire & Equipment (Code 03)	X	X			
		▪ Outside Plant (Code 04)	X	X			
		▪ Central Office (Code 05)	X	X			
		Resale Centrex				Parity	(X-A Days)(25%)(RC)(Total # of Initial Trouble Reports Closed)
		▪ Regulated Wire & Equipment (Code 03)	X	X			
		▪ Outside Plant (Code 04)	X	X			
		▪ Central Office (Code 05)	X	X			
		Unbundled Loops	X			≤ 36 hours (1.5 days)	(X-1.5 Days)(25%)(RC)(Total # of Measured Trouble Reports Closed)
18	Trouble Report Rate	Resale Residence POTS	X	X	▪ Outcome	Parity	(X-A)(3%)(RC)(# of Access Lines in Service)
		• Found Network Troubles (Codes 3,4, 5)					
		Resale Business POTS	X	X		Parity	(X-A)(3%)(RC)(# of Access Lines in Service)
		• Found Network Troubles (Codes 3,4, 5)					
		Resale Centrex	X	X		Parity	(X-A)(3%)(RC)(# of Access Lines in Service)
		• Found Network Troubles (Codes 3,4, 5)					
		Unbundled Loops	X			≤ 4%	(X-4%)(3%)(RC)(# of Loops in Service)
19	Percent Repeats – Maintenance	Resale Residence POTS	X	X	▪ Outcome	Parity	(X-A)(6%)(RC)(Total # of Initial Trouble Reports Closed)
		▪ Found Network Troubles (Codes 3,4, 5) on the Repeat Trouble					
		Resale Business POTS	X	X		Parity	(X-A)(6%)(RC)(Total # of Initial Trouble Reports Closed)
		▪ Found Network Troubles (Codes 3,4, 5) on the Repeat Trouble					
		Resale Centrex	X	X		Parity	(X-A)(6%)(RC)(Total # of Initial Trouble Reports Closed)
		▪ Found Network Troubles (Codes 3,4, 5) on the Repeat Trouble					
		Unbundled Loops	X			≤ 17%	(X-17%)(6%)(RC)(Total # of Measured Trouble Reports Closed)

Legend: X = TC Performance
A = Ameritech Performance
RC = Recurring Charge
($25 Resale, $9.43 Loops)

NOTE: Measures expressed as percentages are expressed as their decimal equivalents for purposes of remedy calculations.

WEST SCHEDULE 1: MICHIGAN PERFORMANCE MEASUREMENT SUMMARY

#	MEASUREMENT	CATEGORIES	W	R	MEASUREMENT TYPE	BENCHMARK	REMEDY
20	Percentage of Customer Troubles Not Resolved within the Estimated Time (Missed Repair Appointments)	Resale Residence POTS	X	X	• Outcome	Parity	(X-A)(3%)(RC)(Total # of Initial Trouble Reports Closed)
		Resale Business POTS	X	X		Parity	(X-A)(3%)(RC)(Total # of Initial Trouble Reports Closed)
		Resale Centrex	X	X		Parity	(X-A)(3%)(RC)(Total # of Initial Trouble Reports Closed)
		Unbundled Loops	X			≤ 20 %	(X-20%)(3%)(RC)(Total # of Measured Trouble Reports Closed)
BILLING							
21	Daily Usage Timeliness (Not Provided on Time)	Resale	X		▪ Outcome	≤ 2% not provided within 5 days	(98%-X) (.000104*)($.50**)(# of Daily Usage Records) *Daily interest rate **Estimated value of a Daily usage record
22	AEBS Bills Delivered Late	Resale	X		▪ Indicator		
23	CABS- Bills Delivered Late	UNE	X		▪ Indicator		
GENERAL							
	Systems Availability Measurement						
24	Percentage of Time Interface is Unavailable	Pre-Ordering	X		▪ Outcome	≤1% unavailable	(A-1%)($.50)(# of transactions), where the # of transactions have the same maximums as listed in Pre-Ordering "Average Response Time" measure
		EDI	X				(A-1%)($.50)(# of transactions), where the # of transactions equals the # of orders
		Access Service Request	X				(A-1%)($.50)(# of transactions), where the # of transactions equals the # of orders
		EB/TA Trouble Entry	X				(A-1%)($.50)(# of transactions), where the # of transactions equals the # of troubles
	Center Responsiveness						
25	Average Speed of Answer – Ordering	Resale	X		▪ Informational		
		Unbundled Loop	X				
26	Average Speed of Answer – Repair	Resale	X		▪ Informational		
		Unbundled Loop	X				
	OS/DA						
27	Average Speed of Answer – OS/DA	Operator Services	X	X	▪ Outcome	Wholesale and retail performance is combined in a single measure	Process ensures parity, thus a remedy is not applicable
		Directory Assistance	X	X			

Legend: X = TC Performance
A = Ameritech Performance
RC = Recurring Charge
($25 Resale, $9.43 Loops)

NOTE: Measures expressed as percentages are expressed as their decimal equivalents for purposes of remedy calculations.

WEST SCHEDULE 1: MICHIGAN PERFORMANCE MEASUREMENT SUMMARY

#	MEASUREMENT	CATEGORIES	W	R	MEASUREMENT TYPE	BENCHMARK	REMEDY
INTERCONNECTION							
	Trunk Blockage Measurements						
28	Call Attempts Blocked	Interlata	X	X	▪ Outcome	Parity	Disparity negatively impacts Ameritech, thus a remedy is not applied to the CLEC
		Intralata	X	X			
COLLOCATION							
29	Average Time to Respond to a Physical Collocation Request	Physical	X		▪ Outcome	80% within 10 Days	(80%-X)(3%)($703.69*) (# of Physical Collocation Requests) * Monthly floor space charge for 100 sq. ft.
30	Average Time to Provide a Collocation Arrangement	Virtual	X		▪ Indicator		
		Physical	X				
31	Percent of Due Dates Missed in Provision of Collocation Arrangements	Virtual	X		▪ Outcome	≤ 20 %	(X-20%)($61*)(Average No. of Days Late for all Missed Virtual Collocations)(Total # of Virtual Collocations) *Daily project management fee equals (sum of an initial bay and one additional bay)/30
		Physical	X				(X-20%)(1/120)(COBO Payment)(Average # of Days Late for All Missed Physical Collocations)(Total # of Physical Collocations)

Legend: X = TC Performance
A = Ameritech Performance
RC = Recurring Charge
($25 Resale, $9.43 Loops)

NOTE: Measures expressed as percentages are expressed as their decimal equivalents for purposes of remedy calculations.

WEST SCHEDULE 2: MICHIGAN PERFORMANCE MEASUREMENT USER GUIDE

Measurement Type: Outcome

REFERENCE:	PRE-ORDERING	DISAGGREGATION CATEGORIES:	W	R
		✓ *Pre-Ordering Customer Service Record (CSR)*	X	
MEASUREMENT:	**Average Response Time**			
		✓ *Address Validation(AV)*	X	
		✓ *Telephone Number Selection (TNS)*	X	
		✓ *Due Date Selection (DDS)*	X	
S.M. Expert(s):	For Internal Use Only			
AIIS Contact(s):	For Internal Use Only			
Reporting Period:	One Calendar Month			
Calculation:	{Σ[(Query Response Date and Time) – (Query Submission Date and Time)]} / Total Number of Accepted Queries Submitted Benchmark Percentage: [Number of Query Responses Returned Within a Specified Interval ("X" seconds)]/ Total Number of Queries Submitted X 100			
Description(s) / Definition (s):	"Average Response Time" measures the average response time (in seconds) per [pre-ordering CSR, AV, TNS, or DDS] query between the query submission time to the query response time, for all [pre-ordering CSR, AV, TNS, or DDS] queries submitted in the reporting period. ▪ A query is an individual request for data. ▪ Query response is the time the interface provides a response. ▪ Query submission is the time of interface entry. Benchmark Percentage: "Percent within a Specified Interval" measures the number of [pre-ordering CSR, AV, TNS, or DDS] query responses returned within a specified interval ("X" seconds) as a percentage of the total number of [pre-ordering CSR, AV, TNS, or DDS] queries submitted in the reporting period.			
Business Rules:				
Exclusions:				
Inclusions:	▪ Both interface and back-end systems ▪ Real time functions only			
Market:	*WHOLESALE*	*RETAIL*		
Disaggregation:	▪ Pre-Ordering Customer Service Record ▪ ≤ 10,000 characters ▪ > 10,000 characters ▪ Address Validation ▪ Telephone Number Selection ▪ Due Date Selection			
System Source:	For Internal Use Only			
Data Source:	For Internal Use Only			

Final Form
Exh. #2 to Ms. West

Measurement Type: Outcome

REFERENCE:	ORDERING & PROVISIONING – Order Completion Measurements	DISAGGREGATION CATEGORIES:	W	R
MEASUREMENT:	Average Installation Interval	✓ *Resale POTS*	X	X
		Unbundled Loops	X	
S.M. Expert(s):	For Internal Use Only			
AIIS Contact(s):	For Internal Use Only			
Reporting Period:	One Calendar Month			
Calculation:	{Σ[(Completion Date) – (Receive Date)]} / Total Number of Order Installations Completed			
Description(s) / Definition (s):	"Average Installation Interval" measures the average elapsed number of days per order installation between the receive date and completion date for the total number of order installations completed in the reporting period. ▪ A valid order contains all relevant and correct information required to fully process the order. ▪ The receive date is the date the service order is received by Ameritech's gateway. For retail, the receive date is the date when the customer contacts the service center and the service representative keys the order into ASON. ▪ A completion date is the date the requested work has been completed (The installation date equals the completion date.) ▪ A service order is considered "installed" when service is activated on the line.			
Business Rules:	▪ The measure is calculated using business days only (i.e., Monday – Friday). ▪ The order is counted in the period that it is closed (e.g. paperwork is completed). ▪ Requests for same-day installation of a feature must be received 3:00 p.m. ▪ Requests received after 7:00 p.m. are considered as received on the next business day.			
Exclusions:	▪ Orders for which the customer requested an installation due date beyond the due date offered by Ameritech. ▪ Change orders generated as a result of a repair visit ▪ Cancelled orders ▪ Incumbent LEC orders associated with internal use of local services (Applies to Retail only) ▪ Force majeure (as defined in the interconnection agreements) ▪ Delaying events as defined in the interconnection agreements (e.g., customer-caused missed appointments – customer not ready, no access)			
Inclusions:	▪ All change (C), new (N), and to (T) type orders and related supplement orders ▪ Valid orders only			
Market:	*WHOLESALE*	*RETAIL*		
Disaggregation:	▪ Resale Residence POTS ▪ Field Visit ▪ Non-Field Visit ▪ Resale Business POTS ▪ Field Visit ▪ Non-Field Visit ▪ Resale Centrex ▪ Field Visit ▪ Non-Field Visit	▪ Retail Residence POTS ▪ Field Visit ▪ Non-Field Visit ▪ Retail Business POTS ▪ Field Visit ▪ Non-Field Visit ▪ Retail Centrex ▪ Field Visit ▪ Non-Field Visit		
System Source:	For Internal Use Only	For Internal Use Only		
Data Source:	For Internal Use Only	For Internal Use Only		

Measurement Type: Outcome

REFERENCE:	ORDERING & PROVISIONING – Order Completion Measurements	DISAGGREGATION CATEGORIES:	W	R
MEASUREMENT:	Average Installation Interval	Resale POTS	X	X
		✓ *Unbundled Loops*	X	
S.M. Expert(s):	For Internal Use Only			
AIIS Contact(s):	For Internal Use Only			
Reporting Period:	One Calendar Month			
Calculation:	{Σ[(Completion Date) – (Receive Date)]} / Total Number of Order Installations Completed Benchmark Percentage: [Number of Order Installations Completed within a Specified Interval ("X" days)/Total Number of Order Installations Completed] X 100			
Description(s) / Definition (s):	"Average Installation Interval" measures the average elapsed number of days per order installation between the receive date and completion date for the total number of order installations completed in the reporting period* ▪ A valid order contains all relevant and correct information required to fully process the order. ▪ The receive date is the date Ameritech receives a valid order from the CLEC to provide, correct, or change service or service elements and is automatically date stamped in the unbundled loop ordering system, EXACT. ▪ A completion date is the date the requested work has been completed. (The installation date equals the completion date) ▪ A service order is considered "installed" when the unbundled loop is in place by Ameritech. Benchmark Percentage: "Percent within a Specified Interval" measures the number of order installations completed within a specified interval ("X" days) as a percentage of total number of order installations completed in the reporting period.* *Ameritech is migrating this measure from "orders" to "loops".			
Business Rules:	▪ The measure is calculated using business days only (i.e., Monday - Friday, excluding holidays). ▪ The order is counted in the period that it is closed (e.g. paperwork is completed). ▪ The end-of-day cut-off for received orders is 3:00 p.m. or defined by contractual agreements.			
Exclusions:	▪ Orders for which the customer requested an installation due date beyond the contractual due date interval ▪ Orders that require field dispatch where facilities are not in place ▪ Cancelled orders ▪ Disconnect "D" orders ▪ Force majeure (as defined in the interconnection agreements) ▪ Delaying events as defined in the interconnection agreements (e.g., customer-caused missed appointments - customer not ready, no access) (effective once the measure is migrated to "loops")			
Inclusions:	▪ All new (N) and related supplement orders ▪ Unbundled loops include Analog 2W loops only ▪ Valid orders only			
Market:	*WHOLESALE*	*RETAIL*		
Disaggregation:	▪ Unbundled Loops			
System Source:	For Internal Use Only			
Data Source:	For Internal Use Only			

Measurement Type: Outcome

REFERENCE:	ORDERING & PROVISIONING – Order Completion Measurements	DISAGGREGATION CATEGORIES:	W	R
MEASUREMENT:	Confirmed Due Dates Not Met	✓ *Resale POTS*	X	X
		Unbundled Loops	X	
		Interconnection Trunks	X	
S.M. Expert(s):	For Internal Use Only			
AIIS Contact(s):	For Internal Use Only			
Reporting Period:	One Calendar Month			
Calculation:	(Number of Order Installations Completed After the FOC Due Date / Total Number of Order Installations Completed) X 100			
Description(s) / Definition (s):	"Confirmed Due Dates Not Met" measures the number of order installations not completed by the firm order confirmation (FOC) due date, as a percentage of the total number of order installations completed in the reporting period. ▪ A valid order contains all relevant and correct information required to fully process the order. ▪ The confirmed due date is defined as the date assigned by Ameritech and communicated to the CLEC via a FOC (Firm Order Confirmation) representing the date that Ameritech has committed to complete the service order by activating service on the line. ▪ FOC (Firm Order Confirmation) is defined as an acknowledgement to the customer that provides among other items: circuit number, order number, and a confirmed due date. The confirmation is sent from Ameritech to the CLEC stating that the order will be worked as submitted or worked with the modifications specified on the confirmation. ▪ A service order is considered "installed" when service is activated on the line.			
Business Rules:	▪ The order is counted in the period that it is closed (e.g. paperwork is completed). ▪ Subsequent due date changes by and for Ameritech do not change the original due date by which this measure is calculated. ▪ Supplemental orders by the customer may change the due date by which this measure is calculated.			
Exclusions:	▪ Change orders generated as a result of a repair visit ▪ Cancelled orders ▪ Force majeure (as defined in the interconnection agreements) ▪ Delaying events as defined in the interconnection agreements (e.g., customer-caused missed appointments - customer not ready, no access) ▪ Incumbent LEC orders associated with internal use of local services (Applies to Retail only)			
Inclusions:	▪ All change (C), new (N), and to (T) type orders and related supplement orders ▪ Valid orders only			
Market:	*WHOLESALE*	*RETAIL*		
Disaggregation:	▪ Resale Residence POTS ▪ Field Visit ▪ Non-Field Visit ▪ Resale Business POTS ▪ Field Visit ▪ Non-Field Visit ▪ Resale Centrex ▪ Field Visit ▪ Non-Field Visit	▪ Retail Residence POTS ▪ Field Visit ▪ Non-Field Visit ▪ Retail Business POTS ▪ Field Visit ▪ Non-Field Visit ▪ Retail Centrex ▪ Field Visit ▪ Non-Field Visit		
System Source:	For Internal Use Only	For Internal Use Only		
Data Source:	For Internal Use Only	For Internal Use Only		

Measurement Type: Outcome

REFERENCE:	ORDERING & PROVISIONING – Order Completion Measurements	DISAGGREGATION CATEGORIES:	W	R
MEASUREMENT:	Confirmed Due Dates Not Met	Resale POTS	X	X
		✓ *Unbundled Loops*	X	
		Interconnection Trunks	X	
S.M. Expert(s):	For Internal Use Only			
AIIS Contact(s):	For Internal Use Only			
Reporting Period:	One Calendar Month			
Calculation:	(Number of Loop Installations Completed After the FOC Due Date/Total Number of Loop Installations Completed) X 100			
Description(s) / Definition (s):	"Confirmed Due Dates Not Met" measures the number of loop installations not completed by the firm order confirmation (FOC) due date, as a percentage of the total number of loop installations completed in the reporting period. ▪ A valid order contains all relevant and correct information required to fully process the order. ▪ The confirmed due date is defined as the date assigned by Ameritech and communicated to the CLEC via a FOC (Firm Order Confirmation) representing the date that Ameritech has committed to complete the installation of the unbundled loop if facilities are available. ▪ FOC (Firm Order Confirmation) is defined as an acknowledgement to the customer that provides among other items: circuit number, order number, and a confirmed due date. The confirmation is sent from Ameritech to the CLEC stating that the order will be worked as submitted or worked with the modifications specified on the confirmation. ▪ A loop is considered "installed" when the unbundled loop is in place by Ameritech.			
Business Rules:	▪ The order is counted in the period that it is closed (e.g. paperwork is completed). ▪ Subsequent due date changes by and for Ameritech (except in situations involving special construction) do not change the original order date by which the measure is calculated. ▪ Supplemental orders by the customer may change the due date by which this measure is calculated.			
Exclusions:	▪ Cancelled orders ▪ Disconnect "D" orders ▪ Force majeure (as defined in the interconnection agreements) ▪ Delaying events as defined in the interconnection agreements (e.g., customer-caused missed appointments - customer not ready, no access)			
Inclusions:	• Unbundled loops include Analog 2W loops only • Valid orders only			
Market:	*WHOLESALE*	*RETAIL*		
Disaggregation:	▪ Unbundled Loops			
System Source:	For Internal Use Only			
Data Source:	For Internal Use Only			

Measurement Type: Outcome

REFERENCE:	ORDERING & PROVISIONING – Order Completion Measurements	DISAGGREGATION CATEGORIES:	W	R
MEASUREMENT:	**Confirmed Due Dates Not Met**	Resale POTS	X	X
		Unbundled Loops	X	
		✓ *Interconnection Trunks*	X	
S.M. Expert(s):	For Internal Use Only			
AIIS Contact(s):	For Internal Use Only			
Reporting Period:	One Calendar Month			
Calculation:	(Number of Trunk Installations Completed After the FOC Due Date / Total Number of Trunk Installations) X 100			
Description(s) / Definition (s):	"Confirmed Due Dates Not Met" measures the number of trunk installations not completed by a valid firm order confirmation (FOC) due date, as a percentage of the total number of trunk installations in the reporting period. ▪ A valid order contains all relevant and correct information required to fully process the order. ▪ FOC (Firm Order Confirmation) is defined as an acknowledgement to the customer that provides among other items: circuit number, order number, and a confirmed due date. The confirmation is sent from Ameritech to the CLEC stating that the order will be worked as submitted or worked with the modifications specified on the confirmation. ▪ The trunk is considered "installed" when the trunk is in place by Ameritech.			
Business Rules:	▪ The trunk is counted in the period it is reported "complete". (e.g. paperwork is completed) ▪ Subsequent due date changes by and for Ameritech do not change the original order date by which the measure is calculated. ▪ Supplemental orders by the customer may change the due date by which this measure is calculated.			
Exclusions:	▪ Cancelled orders ▪ Disconnect "D" orders ▪ Force majeure (as defined in the interconnection agreements) ▪ Delaying events as defined in the interconnection agreements (e.g., customer-caused missed appointments - customer not ready, no access)			
Inclusions:	▪ Valid orders only			
Market:	*WHOLESALE*	*RETAIL*		
Disaggregation:	▪ Interconnection Trunks			
System Source:	For Internal Use Only			
Data Source:	For Internal Use Only			

Measurement Type: Outcome

REFERENCE:	ORDERING & PROVISIONING – Order Status Measurements	DISAGGREGATION CATEGORIES:	W	R
MEASUREMENT:	Average Reject Notice Interval	✓ *Resale*	X	
		✓ *Unbundled Loops*	X	
S.M. Expert(s):	For Internal Use Only			
AIIS Contact(s):	For Internal Use Only			
Reporting Period:	One Calendar Month			
Calculation:	{Σ[(Date and Time Rejected 855 Made Available to the CLEC) – (Receive Date and Time)]} / Total Number of Rejected 855s for Electronically Received Processed Orders Benchmark Percentage: [Number of Rejected 855s Made Available to the CLEC Within a Specified Interval (24 Hours) / Total Number of Rejected 855s for Electronically Received Processed Orders] X 100			
Description(s) / Definition (s):	"Average Reject Notice Interval" measures the average rejected 855 response time (in hours), for the total number of rejected 855s for electronically received orders processed within the reporting period. ▪ An 855 is a notification to the CLEC whether the submitted order is valid and can be processed and worked by Ameritech. When used to provide a "reject", it provides notification that the order cannot be worked as submitted. ▪ The receive date and time is the date and time the service order is received by Ameritech. ▪ Rejected 855 response time is defined as the hours elapsed between the time Ameritech receives the service order from the CLEC and the time that the rejected 855 is made available to the CLEC. Benchmark Percentage: "Percent within a Specified Interval" measures the number of rejected 855s for electronically received orders returned to the CLEC within a specified interval (24 hours), as a percentage of the total number of rejected 855s for electronically received orders processed within the reporting period.			
Business Rules:	▪ The measure is calculated using business days only (i.e., Monday - Friday, excluding holidays). ▪ Requests received after 7:00 p.m. are considered as received on next business day.			
Exclusions:				
Inclusions:	▪ Electronically received orders only ▪ EDI-based orders only			
Market:	*WHOLESALE*	*RETAIL*		
Disaggregation:	▪ Resale ▪ Unbundled Loops			
System Source:	For Internal Use Only			
Data Source:	For Internal Use Only			

Measurement Type: Indicator

REFERENCE:	ORDERING & PROVISIONING – Order Status Measurements	DISAGGREGATION CATEGORIES:	W	R
MEASUREMENT:	Average FOC Notice Interval	✓ *Resale*	X	
		✓ *Unbundled Loops*	X	
S.M. Expert(s):	For Internal Use Only			
AIIS Contact(s):	For Internal Use Only			
Reporting Period:	One Calendar Month			
Calculation:	{Σ[(Date and Time 855 FOCs Made Available to the CLEC) – (Receive Date and Time)]} / Total Number of 855 FOCs for Electronically Received Processed Orders Benchmark Percentage: [Number of 855 FOCs Made Available to the CLEC Within a Specified Interval (24 Hours) / Total Number of 855 FOCs for Electronically Received Processed Orders] X 100			
Description(s) / Definition (s):	"Average FOC Notice Interval" measures the average 855 FOC response time (in hours), for the total number of 855 FOCs for electronically received orders processed within the reporting period. ▪ An 855 is a notification to the CLEC whether the submitted order is valid and can be processed and worked by Ameritech. ▪ FOC (Firm Order Confirmation) is defined as an acknowledgement to the customer that provides among other items: circuit number, order number, and a confirmed due date. The confirmation is sent from Ameritech to the CLEC stating that the order will be worked as submitted or worked with the modifications specified on the confirmation. ▪ The receive date and time is the date and time the service order is received by Ameritech's gateway. ▪ FOC response time is the hours elapsed between the time Ameritech receives the service order from the CLEC and the time that the FOC is made available to the CLEC. Benchmark Percentage: "Percent within a Specified Interval" measures the number of 855 FOCs for electronically received orders returned to the CLEC within a specified interval (24 hours), as a percentage of the total number of 855 FOCs for electronically received orders processed within the reporting period.			
Business Rules:	▪ The measure is calculated using business days only (i.e., Monday - Friday, excluding holidays). ▪ Requests received after 7:00 p.m. are considered as received on next business day.			
Exclusions:	▪ Rejected orders			
Inclusions:	▪ Electronically received orders only ▪ EDI-based orders only			
Market:	*WHOLESALE*	*RETAIL*		
Disaggregation:	▪ Resale ▪ Unbundled Loops			
System Source:	For Internal Use Only			
Data Source:	For Internal Use Only			

Measurement Type: Outcome

REFERENCE:	ORDERING & PROVISIONING – Order Status Measurements	DISAGGREGATION CATEGORIES:	W	R
MEASUREMENT:	Average Completion Notice Interval	✓ *Resale*	X	
		✓ *Unbundled Loops*	X	
S.M. Expert(s):	For Internal Use Only			
AIIS Contact(s):	For Internal Use Only			
Reporting Period:	One Calendar Month			
Calculation:	{Σ[(Date and Time Completion Notification Made Available to the CLEC) – (Completion Date)]} / Total Number of Completion Notifications for Electronically Received Processed Orders Benchmark Percentage: Number of Completion Notifications Made Available to the CLEC Within a Specified Interval (48 Hours) / Total Number of Completion Notifications for Electronically Received Processed Orders) X 100			
Description(s) / Definition (s):	"Average Completion Notice Interval" measures the average completion notification response time (in hours), for the total number of completion notifications for electronically received orders processed within the reporting period. ▪ Completion notification is communication to the CLEC that all work requested on the CLEC order (and any supplemental orders) has been completed. ▪ Completion date is the date the requested work has been completed (the installation date equals the completion date). The system assumes that all completions for the day are completed at 12:00am (00:00:00) of that day. Benchmark Percentage: "Percent within a Specified Interval" measures the number of completion notifications made available to the CLEC within a specified interval (48 hours), as a percentage of the total number of completion notifications transmitted for orders originally received electronically within the reporting period.			
Business Rules:	▪ The measure is calculated using business days only (i.e., Monday - Friday, excluding holidays).			
Exclusions:	▪ Rejected orders			
Inclusions:	▪ Electronically received orders only ▪ EDI-based orders only			
Market:	*WHOLESALE*	*RETAIL*		
Disaggregation:	▪ Resale ▪ Unbundled Loops			
System Source:	For Internal Use Only			
Data Source:	For Internal Use Only			

Measurement Type: Indicator

REFERENCE:	ORDERING & PROVISIONING – Held Order Measurements	DISAGGREGATION CATEGORIES:	W	R
MEASUREMENT:	Average Interval for Past Due Orders	✓ *Resale POTS*	X	X
		Unbundled Loops	X	
S.M. Expert(s):	For Internal Use Only			
AIIS Contact(s):	For Internal Use Only			
Reporting Period:	One Calendar Month			
Calculation:	{Σ[(Completion Date) – (Due Date)]} / Total Number of Past Due Orders			
Description(s) / Definition (s):	"Average Interval for Past Due Orders" measures the average elapsed number of days from the confirmed order due date to completion date, for all past due orders completed within the reporting period. ▪ A valid order contains all relevant and correct information required to fully process the order. ▪ A past due order is defined as an order that is completed on a date after its confirmed order due date. ▪ The confirmed due date is defined as the date assigned by Ameritech and communicated to the CLEC via a FOC (Firm Order Confirmation) representing the date that Ameritech has committed to complete the service order by activating service on the line. ▪ FOC (Firm Order Confirmation) is defined as an acknowledgement to the customer that provides among other items: circuit number, order number, and a confirmed due date. The confirmation is sent from Ameritech to the CLEC stating that the order will be worked as submitted or worked with the modifications specified on the confirmation. ▪ A completion date is the date the requested work has been completed. (The completion date equals the installation date) ▪ A service order is considered "installed" when service is activated on the line.			
Business Rules:	▪ The measure is calculated using calendar days. ▪ The order is counted in the period that it is closed (e.g. paperwork is completed). ▪ Subsequent due date changes by and for Ameritech do not change the original due date by which this measure is calculated. ▪ Supplemental orders by the customer may change the due date by which this measure is calculated.			
Exclusions:	▪ Cancelled orders ▪ Force majeure (as defined in the interconnection agreements) ▪ Delaying events as defined in the interconnection agreements (e.g., customer-caused missed appointments - customer not ready, no access) ▪ Incumbent LEC orders associated with internal use of local services (Applies to Retail only)			
Inclusions:	• Valid Orders Only • All change (C), new (N), and to (T) type orders and related supplement orders			
Market:	*WHOLESALE*	*RETAIL*		
Disaggregation:	▪ Resale Residence POTS ▪ Resale Business POTS ▪ Resale Centrex	▪ Retail Residence POTS ▪ Retail Business POTS ▪ Retail Centrex		
System Source:	For Internal Use Only	For Internal Use Only		
Data Source:	For Internal Use Only	For Internal Use Only		

Measurement Type: Indicator

REFERENCE:	ORDERING & PROVISIONING – Held Order Measurements	DISAGGREGATION CATEGORIES:	W	R
MEASUREMENT:	Average Interval for Past Due Loops	Resale POTS	X	X
		✓ *Unbundled Loops*	X	
S.M. Expert(s):	For Internal Use Only			
AIIS Contact(s):	For Internal Use Only			
Reporting Period:	One Calendar Month			
Calculation:	{Σ[(Completion Date) – (Due Date)]} / Total Number of Past Due Loops			
Description(s) / Definition (s):	"Average Interval for Past Due Loops" measures the average elapsed number of days from the confirmed loop due date to completion date, for all past due loops completed within the reporting period. ▪ A valid order contains all relevant and correct information required to fully process the order. ▪ A past due loop is defined as a loop that is completed on a date after its confirmed order due date. ▪ The confirmed due date is defined as the due date assigned by Ameritech and communicated to the CLEC via a FOC (Firm Order Confirmation) representing the date that Ameritech has committed to complete the installation of the unbundled loop. ▪ FOC (Firm Order Confirmation) is defined as an acknowledgement to the customer that provides among other items: circuit number, order number, and a confirmed due date. The confirmation is sent from Ameritech to the CLEC stating that the order will be worked as submitted or worked with the modifications specified on the confirmation. ▪ A completion date is the date the requested work has been completed. The work has been completed when the loop on a service order is closed out with the completion date. ▪ A loop is considered "installed" when the unbundled loop is in place by Ameritech.			
Business Rules:	▪ The measure is calculated using calendar days. ▪ A loop is counted in the period that it is closed (e.g. paperwork is completed). ▪ Subsequent due date changes by and for Ameritech (except in situations involving special construction) do not change the original order date by which the measure is calculated. ▪ Supplemental orders by the customer may change the due date by which this measure is calculated.			
Exclusions:	▪ Cancelled orders ▪ Disconnect "D" orders ▪ Force majeure (as defined in the interconnection agreements) ▪ Delaying events (e.g., customer-caused missed appointments - customer not ready, no access)			
Inclusions:	• Valid Orders Only • Unbundled loops include Analog 2W loops only			
Market:	*WHOLESALE*	*RETAIL*		
Disaggregation:	▪ Unbundled Loops			
System Source:	For Internal Use Only			
Data Source:	For Internal Use Only			

Measurement Type: Outcome

REFERENCE:	ORDERING & PROVISIONING – Installation Troubles Measurement	DISAGGREGATION CATEGORIES:	W	R
MEASUREMENT:	Installation Trouble Reports (New Service Failures)	✓ *Resale POTS*	X	X
		Unbundled Loops	X	
S.M. Expert(s):	For Internal Use Only			
AIIS Contact(s):	For Internal Use Only			
Reporting Period:	One Calendar Month			
Calculation:	(Number of Trouble Reports Received on Service Orders Within 7 Days After Completion / Total Number of Order Installations Completed) X 100			
Description(s) / Definition (s):	"Installation Trouble Reports (New Service Failures)" measures the number of service orders that receive a trouble report within the first seven days after the service order has been completed, as a percentage of total number of order installations completed in the reporting period. ▪ A trouble report is generated in Ameritech's systems when a customer (end-user or CLEC) contacts Ameritech to report trouble with their Resale/Retail Service. ▪ An order installation has been completed when the requested work has been completed. (The installation date equals the completion date) ▪ A service order is considered installed when service is activated on the line.			
Business Rules:	• The measure is calculated using calendar days.			
Exclusions:	▪ Change orders generated as a result of a repair visit ▪ Subsequent trouble reports - an additional call on a previously reported trouble that has not yet been reported as resolved or closed. ▪ Force majeure (as defined in the interconnection agreements) ▪ Employee reports ▪ Trouble reports not associated with a specific phone line (e.g., a report of a drop wire down)			
Inclusions:	▪ Found network troubles only. These include disposition codes 3 (regulated wire & equipment), 4 (outside plant), and 5 (central office) ▪ New (N), change (C), and to (T) type orders and related supplement orders			
Market:	*WHOLESALE*	*RETAIL*		
Disaggregation:	▪ Resale Residence POTS ▪ Field Visit ▪ Non-Field Visit ▪ Resale Business POTS ▪ Field Visit ▪ Non-Field Visit ▪ Resale Centrex ▪ Field Visit ▪ Non-Field Visit	▪ Retail Residence POTS ▪ Field Visit ▪ Non-Field Visit ▪ Retail Business POTS ▪ Field Visit ▪ Non-Field Visit ▪ Retail Centrex ▪ Field Visit ▪ Non-Field Visit		
System Source:	For Internal Use Only	For Internal Use Only		
Data Source:	For Internal Use Only	For Internal Use Only		

Measurement Type: Outcome

REFERENCE:	ORDERING & PROVISIONING – Installation Troubles Measurement	DISAGGREGATION CATEGORIES:	W	R
MEASUREMENT:	Installation Trouble Reports (New Service Failures)	Resale POTS	X	X
		✓ *Unbundled Loops*	X	
S.M. Expert(s):	For Internal Use Only			
AIIS Contact(s):	For Internal Use Only			
Reporting Period:	One Calendar Month			
Calculation:	(Number of Trouble Reports Received on Loops Within 7 Days After Completion / Total Number of Loop Installations Completed) X 100			
Description(s) / Definition (s):	"Installation Trouble Reports (New Service Failures)" measures the number of loops that receive a trouble report within the first 7 days after the loop has been installed, as a percentage of total number of loop installations completed in the reporting period. ▪ A trouble report is generated in Ameritech's systems when a customer contacts Ameritech to report trouble with their service. ▪ A loop installation has been completed when the requested work has been completed (the installation date equals the completion date.) ▪ A loop is considered "installed" when the unbundled loop is in place by Ameritech.			
Business Rules:	• The measure is calculated using calendar days.			
Exclusions:	▪ Trouble tickets involving interexchange carriers, request for information, interconnection trunks (including IXC trunks), and CPE ▪ Disconnect "D" orders ▪ Force majeure (as defined in the interconnection agreements)			
Inclusions:	• Unbundled loops include Analog 2W loops only			
Market:	*WHOLESALE*	*RETAIL*		
Disaggregation:	▪ Unbundled Loops			
System Source:	For Internal Use Only			
Data Source:	For Internal Use Only			

Measurement Type: Indicator

REFERENCE:	ORDERING & PROVISIONING – Order Quality Measurements	DISAGGREGATION CATEGORIES:	W	R
MEASUREMENT:	Percentage of Order Flow Through	✓ *Resale*	X	
		✓ *Unbundled Loops*	X	
S.M. Expert(s):	For Internal Use Only			
AIIS Contact(s):	For Internal Use Only			
Reporting Period:	One Calendar Month			
Calculation:	(Number of Electronically Received Orders that Are Electronically Processed / Total Number of Valid Orders Received Electronically) X 100			
Description(s) / Definition (s):	"Percentage of Order Flow Through" measures the number of electronically received and electronically processed orders, as a percentage of the total number of valid orders received electronically in the reporting period. • A valid order contains all relevant and correct information required to fully process the order. • An electronically received order is an order that is transmitted to Ameritech via the EDI ordering interface. • An electronically processed order is an order that has passed system checks, been accepted by the EDI ordering interface, and flows to downstream systems without manual intervention • A rejected order is an order that does not pass system checks and is electronically returned to the CLEC prior to being accepted by the EDI ordering interface.			
Business Rules:	• Orders are counted in the reporting period that they are received.			
Exclusions:	▪ Rejected orders			
Inclusions:	▪ Valid orders only ▪ EDI-based orders only			
Market:	*WHOLESALE*	*RETAIL*		
Disaggregation:	▪ Resale ▪ Unbundled Loops			
System Source:	For Internal Use Only			
Data Source:	For Internal Use Only			

Cathy

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