APPENDIX A

SBC's Wholesale Support Processes

The Department has prepared this Appendix in order to provide the Commission with a detailed review of why SBC's wholesale support processes fail to make checklist items meaningfully available. In this Appendix, we examine SBC's wholesale support processes by reference to the two criteria outlined in Part III of the Department's comments: (A) functionality and (B) operability.

As noted in Part III, recent experience provides strong evidence that attempts at local market entry, even with the benefit of partially automated mechanisms, may flounder without automated processes to support rapid and large-scale entry. In Pacific Bell's region, for example, the ordering and provisioning of resale services by CLECs has been handled manually or is only partially automated by Pacific Bell. After an initial effort to attract customers, both AT&T and MCI were forced to suspend marketing programs because of the growing backlog of orders placed with Pacific Bell for resale services.[85] Reflecting this experience and others like it, both BOCs and CLECs have underscored the importance of automation, pointing out that it leads to cost-savings for BOCs in processing orders electronically and serves as an efficient entry vehicle

[85] See, e.g., Testimony of Stephen Huels, AT&T v. Pacific Bell, Cal. PUC Case No. 96-12-044, at 5. In addition, a study by the staff of the Public Service Commission of Wisconsin found that manually-processed orders were more likely to miss due dates than those Ameritech processed electronically. See Testimony of Anne Wiecki (OSS), Wis. PSC Docket No. 6270-TI-120 (Mar. 19, 1997).

for CLECs.[86]

Experience also suggests that automation is needed in two primary areas to provide access to OSS functions and facilitate the processing of transactions for resale services and unbundled elements. First, carriers must develop electronic transaction interfaces that will permit them to exchange information in agreed-upon formats. The BOC must build its part of an interface and provide CLECs with information and cooperation sufficient to allow the CLECs to construct their part of the interface to the BOC.[87] Automation in this regard will be needed where the volume of transactions expected for a particular function would, in the absence of such automation, cause significant barriers to competitive entry.[88] As an indication of which particular functions meet this criteria, the Department will examine market experiences to date, forecasts by CLECs and BOCs of future volumes, and industry standards for electronic transactions established by organizations such as the Alliance for Telecommunications Industry Solutions

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[86] Ameritech noted early on in the Commission's local competition docket that "[o]perational interfaces are essential to promote viable competitive entry." Local Competition Order at ¶ 516. "Our team recognized very early that it would be of enormous benefit to both SWBT and CLECs if we were able to transact business between us electronically, in order to save human resources." Affidavit of Elizabeth Ham ("Ham Aff."), ¶ 6, attached to SBC Brief.

[87] "For example, if an incumbent LEC adopted the Electronic Data Interchange (EDI) standard to provide access to some or all of its OSS functions, it would need to provide sufficiently detailed information regarding its use of this standard so that requesting carriers would be able to develop and maintain their own systems and procedures to make effective use of this standard." FCC 2nd Recon at ¶ 8 (footnote omitted). EDI is discussed more fully below.

[88] The expected volume would of course have to justify the incremental cost of creating such a capability or adding it to an existing electronic facility. Stated differently, the cost of automating a particular function, which may be passed on to CLECs, should not itself create a barrier to entry.

(ATIS), which is made up of both CLECs and BOCs.[89]

Second, the BOC must automate the interaction of many of its internal operations with the transactions flowing over such interfaces. In effect, the BOC must build systems to translate the agreed-upon format of the electronic interface into a format recognizable by its internal OSSs and in certain instances recognizable by human technicians.[90] Since the BOCs' internal electronic and manual processes were not originally designed to transact with competitors in a wholesale-like capacity, it may be necessary for a BOC to develop entirely new systems and methods for efficiently processing CLEC transactions for resale services and unbundled elements in order to make them practicably available.[91] Consistent with the Commission's Local

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[89] ATIS committees are close to finalizing standards for electronic ordering of resale services, unbundled loops, unbundled switch ports, and interim number portability, among others. ATIS promotes resolution of national and international telecommunications standards issues through eight open industry committees and forums which develop operational guidelines.

[90] While many permutations of resale services and unbundled elements could be *ordered* electronically, we do not mean to suggest that all such orders must be *processed* electronically (*e.g.,* provisioned without human intervention). For example, a CLEC could order an unbundled loop via an electronic interface. The electronic interface could then deliver the order to an OSS that scheduled manual processing of the unbundled loop. Even under this partially manual procedure, though, the CLEC would be able to automatically place the order directly from its own OSSs over a common interface without the need for manual ordering, and receive electronic status reports as scheduling information in the OSS was updated. Similar transaction-based interfaces between IXCs and BOCs were created because of the breakup of the original Bell System. As is discussed more fully below, the same must now happen for BOC-CLEC interactions, and national standards-setting bodies have begun to establish standards for such interfaces.

[91] As the Commission has pointed out, "nondiscriminatory access to operations support systems functions may require some modifications to existing systems necessary to accommodate such access by competing providers." FCC 2nd Recon at ¶ 6; Local Competition Order at ¶ 524. Under the Commission's rules BOCs are entitled to compensation for the costs of such

Competition Order,[92] at a minimum the Department expects BOC automation of processing steps in instances where a BOC electronically processes substantially analogous steps for its own retail operations. For example, the provisioning of an end-to-end combination of loop, switching, and transport elements is, in some cases, analogous to a BOC's retail POTS line. In such cases, the Department would normally expect a BOC to process an order in the same automated fashion that it processes retail POTS lines.

Automation in both of these areas—information exchanged between BOC and CLEC, and the translation and communication of this information to and from BOC OSSs—will minimize or eliminate human intervention in the transmission and processing of BOC-CLEC transactions. This electronic "flow-through" of information from CLEC OSSs[93] to the BOC's OSSs can dramatically improve transaction speeds and reduce errors and costs associated with wholesale support processes.

A. Functionality

The most critical wholesale support process SBC must put in place is the process for receiving CLEC orders for resale services and unbundled elements and provisioning such services and elements. It is this fundamental process that enables CLECs to enter the local

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development. See generally, Local Competition Order at Section VII.

[92] The Commission and the 1996 Act created nondiscrimination and other requirements, see supra Part III.

[93] A CLEC may also automate its interaction with the interface if the CLEC has its own OSSs.

market and serve new customers. For purposes of discussing the practicable availability of SBC's resale services and unbundled elements, the Department will focus on this process, but the Department believes the analysis below in most instances applies equally to the other functions SBC provides to CLECs.[94]

SBC claims to offer CLECs two automated interfaces to transact orders for resale services: (1) EASE, a terminal emulation interface offering direct access to some of SBC's OSSs; and (2) Electronic Data Interchange (EDI), an industry-standard ordering interface that requires SBC to translate transacted information into a form recognized by SBC's OSSs. For unbundled elements, SBC offers only EDI.[95]

SBC has begun to implement the industry-standard EDI ordering interface for resale services and unbundled elements even in advance of final standards from ATIS. To date, ATIS committees have defined guidelines for the information and forms required to order and provision resale local services (i.e. basic exchange service), unbundled loops, number portability, loops with number portability, switch ports, and directory services.[96] ATIS committees have also designated EDI as the preferred electronic format for computer-to-computer communication of

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[94] Other functions identified by the Commission include providing CLECs with customer and available facilities information prior to ordering services or elements (preordering), initiating tests or repairs of such services or elements (repair and maintenance), and providing CLECs with information sufficient for them to bill customers (billing).

[95] By its own admission, SBC has apparently not yet made its LEX ordering interface available. See Ham Aff. ¶ 32.

[96] ATIS OBF Local Service Ordering Guidelines Issue 2.

such forms.[97] ATIS committees are near finalizing their translation of these forms into EDI format, and the formal release of this translation, known as "Issue 7," is expected in June, with updates to follow.[98]

SBC has also committed to implement new industry standards within 120 days of their becoming final.[99] The Department views as critical a BOC's meaningful commitment to comply with emerging industry standards for BOC-CLEC interfaces and to begin development of interfaces in anticipation of such standards.[100] If all BOCs adhere to the same standard it will ultimately reduce the need for competitors to build completely separate interfaces for each BOC,

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[97] ATIS OBF O&P Issue 1122, Meeting Records, April 23, 1996.

[98] ATIS committees have previously performed translations or "mappings" of telecommunications ordering forms to be used between large business customers and their telecommunications carriers. These previous mappings, known as Issue 5 and Issue 6, were used by some carriers to implement partially standardized electronic transactions between BOCs and CLECs prior to the stabilization of the Issue 7 draft. Any changes made to Issue 7 before its final release will have to be implemented by carriers using prerelease drafts.

[99] Ham Aff. ¶¶ 31, 47 . Significant cooperation between carriers is required even when industry standards such as Issue 7 are in place.

[100] Of course adherence to industry standards is more a floor than a ceiling. As part of the Section 271 checklist, BOCs must make resale services and unbundled elements practicably available, and in many instances, as discussed above, automated processes are necessary to such practicable availability. Checklist compliance, however, cannot be conditioned upon the action of independent standards-setting bodies, and the Commission expressly rejected petitions requesting delay of the OSS access requirements until national standards have been fully developed. FCC 2nd Recon at ¶ 13. The Commission concluded, and the Department agrees, that "such a requirement would significantly and needlessly delay competitive entry," and that "it is apparent . . . that access to OSS functions can be provided without national standards." Id.

lowering competitor costs and facilitating faster development of such interfaces.[101]

SBC claims to offer multiple interfaces through which CLECs eventually will be able to perform most functions, including resale ordering functions. This approach, when operational, may fulfill the needs of both large and small competitors and comply with the Commission's complementary "nondiscrimination" and "meaningful opportunity" requirements, which may apply differently depending on the characteristics of the competitor in question. For example, SBC's EASE interface, which provides access via terminal emulation, may provide a small competitor, with no OSSs of its own, with appropriate access to SBC's own retail ordering functions, satisfying the nondiscrimination requirements for such small carriers with respect to certain resale services. That is, such a small competitor may be able to perform the identical service ordering functions as SBC's retail units and may be afforded a meaningful opportunity to compete with respect to these functions.

This same access, however, would place a larger competitor, with its own robust operations support systems, at a significant competitive disadvantage, denying the competitor a meaningful opportunity to compete and limiting the practicable availability of services or

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[101] As the Commission stated in its Local Competition Order, "[i]deally, each incumbent LEC would provide access to support systems through a nationally standardized gateway." Local Competition Order at ¶ 527. Standardized interfaces also reduce development costs for new entrants because third-party software developers can leverage the cost of building standards-based software solutions across multiple carriers. In addition, the industry-wide implementation of standards decreases the likelihood that any BOC could hold CLECs hostage to its ever-changing proprietary interface.

elements. SBC's EASE interface (or for that matter its Verigate and Toolbar interfaces) severely limits the ability of competing carriers to electronically transfer information transacted over these interfaces to the CLEC's OSSs, impeding the efficient flow-through of information from SBC OSSs to CLEC OSSs and the concomitant benefits of full automation, discussed above. Thus, unlike SBC's retail operations, a competing carrier with its own separate OSSs is forced to manually enter information twice—once into the SBC interface and a second time into its own OSSs. For high volumes of orders, such double entry would place a competitor at a significant disadvantage by introducing additional costs, delays, and significant human error.[102] Under Section 251(c) and the Commission's rules, such a functional difference may amount to unreasonable and discriminatory conditions for carriers possessing their own OSSs.

Current industry standards clearly recognize the shortcomings of such interfaces. ATIS committees, for example, have focused almost exclusively on "application-to-application" interfaces, such as EDI, which allow CLECs with their own OSSs to create flow-through automation to their own systems when transacting with BOCs via these interfaces, avoiding the need for re-keying.[103] ATIS committee guidelines suggest that such interfaces avoid the "input errors [which] are inevitable" with manual re-keying, and avoid the "result[ing] lost time and

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[102] See e.g., King Aff. ¶ 41 ("Such dual data entry not only creates delay while the customer waits on the line, it also inevitably results in order entry errors that impact customers' requested services."). In addition to the type of interface provided, its speed of operation also plays an important role in ensuring that competitors are provided with a nondiscriminatory, meaningful opportunity to compete.

[103] See, e.g., ECIC Mission Statement,<http://www.atis.com/atis/tcif/ecic/5tc40a00.htm>.

money in the effort to discover and correct them."[104] Application-to-application interfaces allow a competitor to design its own systems based on standardized sets of inter-carrier transactions. Leveraging these standard interfaces, a competitor may then present its customer service representatives with its own set of customized screens and information, and automatically populate its own databases with information at the same time it interacts with a BOC's systems. CLECs need only train their representatives to use this one customized system to interact with all BOCs, regardless of the interface provided, rather than having to incur the cost of training them on many different systems depending on the BOC.[105] Thus, as a practical matter, SBC's ability to receive orders for resale services and unbundled elements from carriers with their own OSSs rests exclusively on its EDI interface.[106] This is certainly true with regard to unbundled elements

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[104] ATIS TCIF Implementation Guideline for Electronic Data Interchange, Issue 6, § 2.1.4.

[105]SBC also recognizes the shortcomings of interfaces such as EASE and Verigate. SBC notes that both its EDI and DataGate application-to-application interfaces enable CLECs to use "their own user interface" or "graphical user interface." Ham Aff. ¶¶ 24, 29. SBC "has more than 12 representatives working on national standards development specifically related to . . . EDI data formats at the [ATIS] OBF/TCIF committees." Id. ¶ 47.

[106] As an indication of how even SBC's terminal emulation and GUI interfaces may operate, the Department has included as Attachment G a letter from a small carrier that recently attempted to obtain access to SBC's consumer and business EASE interfaces and the Toolbar interface.

> Southwestern Bell Operational Support Systems (OSS) have proven to be a major challenge to understand [and] implement. . . . [T]he screens and information we were accessing were not the same ones we had been trained on. . . . While some of the systems do function, it is obvious that we do not have the same access to information and systems that SWB provides to their own people. . . . Both systems are slow and go down several times a week . . . and require us to enter a disconnect order and a new service order to convert a customer. This causes

because SBC provides only the EDI interface to order such elements.

As a legal matter, however, SBC asserts that providing EASE satisfies its obligations under Sections 251 and 271. SBC argues that "[i]t is quite clear from the [Local Competition Order] that the concept of 'non-discriminatory' access was intended to mean simply that ILECs need only offer to CLECs the same type of OSS functionality that they themselves utilize today."[107] Further, by agreeing to develop "forms of access to its OSS functions that are not available today," SBC argues that it "has collectively exceeded its obligations."[108] Thus, under SBC's analysis, it *meets* its legal obligations under Section 251 by providing its EASE interface, which SBC claims will provide CLECs with identical access to SBC's OSS ordering functions. By developing an EDI interface, however, SBC believes it *exceeds* its obligations. This is particularly true, under SBC's analysis, with regard to unbundled elements, because "[p]rior to February 8, 1996, SWBT did not offer unbundled network elements on a retail basis," and therefore "no operations support systems functions for . . . unbundled network elements

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> several problems. . . . SWB has a form letter that is generated each time there is a disconnect. These letters are going out to our customers and the customer is confused as they are led to believe that they will lose their dialtone (of course in some cases they have!).

Letter from Valu-Line of Kansas President Rick Tidwell to the Department of Justice of 5/8/97, at 1-3.

[107] Ex Parte Letter from SBC to William F. Caton of 4/22/97, CC Docket No. 96-98, at 2 (emphasis in original).

[108] Ham Aff. ¶ 3.

existed."[109]

SBC's reading of the Commission's "nondiscrimination" requirement with regard to OSS access is incorrect. BOCs have access to many OSS functions, such as switch control functions and work force administration systems, that would facilitate the ordering and provisioning of unbundled elements. The Commission's nondiscrimination rules require parity of access to specific OSS "functions,"[110] recognize that providing such access "may require some modifications to existing systems,"[111] and are nowhere limited by the role such functions play with respect to the BOC's retail offerings. SBC's interpretation ignores the Commission's requirement that "[i]n all cases" incumbent LECs must provide "nondiscriminatory access to operations support systems functions for pre-ordering, ordering, provisioning, maintenance and repair, and billing of unbundled network elements under section 251(c)(3)."[112]

Even assuming SBC's analysis of this issue was correct—that it has met the Commission's OSS access requirements by providing the EASE ordering interface—SBC nevertheless has failed to make resale services and unbundled elements practicably available because of a lack of adequate automation. For example, SBC's argument amounts to the contention that SBC could satisfy Sections 251 and 271 by providing only manual ordering of

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[109] SBC Presentation to the Department of Justice, January 23, 1997, Attachment H to this Evaluation, at 3 (emphasis in original).

[110] Local Competition Order at ¶ 525.

[111] Id. at ¶ 524.

[112] Id. at ¶ 525

unbundled loops even in the face of substantial demand. As discussed above, such manual interfaces have been shown to be impractical for all but the lowest volumes of orders, and would preclude meaningful local competition via unbundled loops altogether.[113] SBC simply mistakes its interpretation of the Commission's OSS access rules as the *only* requirement for automating (*i.e.* meaningfully providing in many cases) the ordering and provisioning of resale services and unbundled elements. Such automation is not only critical to the practical availability of these services and elements, but because CLECs pay the cost of providing resale services and unbundled elements, the additional costs of inefficient manual processing are passed on to competitors.

Thus, as both a practical and legal matter, SBC's ability to receive orders for resale services and unbundled elements rests exclusively on its EDI interface. As discussed above, however, the interface between carriers is only the first of two areas of needed automation to render resale services and unbundled elements meaningfully available. SBC must also automate the interaction of this interface and its own OSSs to provide appropriate access, allowing the electronic processing of transactions received via the interface. While the Department finds, as an operational issue below, that SBC has failed to prove that any such automated interaction is

[113] Indeed, under this approach, SBC could conceivably meet the Commission's requirements and those of Section 251 by providing ordering and provisioning functionality sufficient to provision only one unbundled loop per month since this would indeed exceed SBC's own (nonexistent) access to unbundled elements as of the Commission's August 8, 1996, Local Competition Order. Note that ATIS committees in which SBC participates have identified the need for automated ordering interfaces for unbundled loops, among other elements.

operable, as a functional issue SBC has failed even to claim at least one important capability, that of supporting the electronic ordering and provisioning of an end-to-end combination of elements in compliance with the Commission's rules.

As previously discussed, the Department would expect SBC to automate processing steps at least in instances where a BOC electronically processes substantially analogous steps for its retail operations. Thus, the Department believes that the processing of an order for an end-to-end combination of loop, switching, and transport elements, the provisioning of which can, in many cases, be automated in a fashion analogous to that of a BOC retail POTS line, should be performed in those cases in the same automated fashion. As an example, Ameritech claims to process orders for such end-to-end combinations, or "platform"-based subscriber lines, without human intervention where existing facilities are in place to serve the customer.[114] SBC fails to provide any documentation supporting an order for such a combination or evidence that it could process it in an automated fashion.[115]

B. Operability

As SBC plainly states, "To date, no CLECs are using . . . any of the electronic interfaces

[114] See generally Supplemental Direct Testimony of Daniel J. Kocher on Behalf of Ameritech Illinois ("Kocher Testimony"), at 11-13; The Commission's rules preclude the separation of elements ordered in combination 47 C.F.R. § 51.315 (b) (1997).

[115] "SWBT thus far has not even reached the stage of offering any interface specifications that would make it feasible for AT&T to offer local service by means of . . . the combination of all network elements required to provide local service to customers." Dalton Aff. ¶ 7.

SWBT makes available."[116] This fact should place a heavy burden on SBC to prove the operation of its electronic interfaces and processes because industry experience demonstrates that, even after significant testing between BOCs and CLECs, wholesale support processes, both automated and human, rarely function as advertised and almost never practicably provide resale services and unbundled elements prior to enduring the rigors of commercial trials. SBC does not meet this burden, however, because it has failed to present sufficient evidence, in Oklahoma or elsewhere, that it has performed internal testing of its ability to receive and process orders for resale services and unbundled elements via its EDI interface. CLECs have expressed interest in joint testing this interface, but SBC has yet to initiate any such tests of its EDI ordering interface.[117] Further, with regard to all of SBC's wholesale support processes, including its EDI interface, SBC has failed to demonstrate that it could, if requested, comply with the Commission's Local Competition Order and provide resale services or unbundled elements in a nondiscriminatory manner, offering CLECs a meaningful opportunity to compete.

1. Internal Testing

SBC fails to present any evidence that it offers the real ability to provide resale services and unbundled elements via EDI, rather than a paper promise.[118] SBC plainly states that it has

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[116] Ham Aff. ¶ 45.

[117] There is evidence in the record that SBC has thwarted some CLEC attempts to use SBC's automated interfaces. See discussion in Part IV.

[118] SBC states that the EDI interface "is now available to CLECs for testing with SWBT the ordering and provisioning of unbundled network elements," Ham Aff. ¶ 29, and that "SWBT is ready to make its EDI Gateway for Unbundled Network Elements available to CLECs to begin

not completed internal testing of the interaction of its EDI interface and internal processes. "SWBT has performed successful integrated tests between SWBT's EDI Ordering Gateway and certain back office systems then from these back office systems to the SWBT EDI Ordering Gateway. Internal integrated testing continues today to include all involved systems and to test the multitude of ordering scenarios . . . ."[119] In addition, with regard to unbundled element ordering in particular, SBC reports that "SWBT internal testing [is] in progress" rather than "completed."[120] Thus, even if a CLEC could successfully transact with SBC's EDI interface today, SBC itself has not completed testing of its ability to process those transactions with its internal OSSs.

Even assuming SBC has completed internal testing of its wholesale support processes for offering resale services and unbundled elements, SBC fails to show that these wholesale support processes will offer nondiscriminatory access to such services and elements, provide competitors with a meaningful opportunity to compete, or operate at foreseeable levels of demand. SBC presents no internal functional or capacity test results, in Oklahoma or elsewhere, and no retail performance data with which to compare such test results. Indeed, Sprint, the one carrier with

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implementation and end-to-end testing efforts," Id. ¶ 31. Further, with regard to the capacity of the interface, SBC states that it "built" the interface to support "100,000 resale service requests per quarter" and "300,000 service requests" for elements during 1997. Id. ¶ 51.

[119] SBC Submission to the Department of Justice, April 29, 1997, included as Attachment I to this Evaluation.

[120] SWBT April 15, 1997 OSS Status Report to the Texas PUC, Docket Nos. 16189, 16196, 16226, 16285, and 16290. SBC does not indicate that its systems in Texas present technical difficulties different than those in Oklahoma.

which SBC claims to be testing an electronic interface (DataGate), alleges that SBC's EDI capabilities for receiving orders for unbundled elements do not exist.[121]

SBC points out that "the EDI ordering processes are a new development to support an extremely complex task. Implementation of this interface depends on the mutual efforts of CLECs and SWBT."[122] Yet, as discussed above, SBC has made no showing of *SBC's* efforts with regard to the interface itself or the automation that must take place between the interface and SBC's OSSs. SBC's lack of evidence lies in sharp contrast to Ameritech's efforts in its region, where it has submitted voluminous documentary and testimonial evidence of internal and third-party testing of its EDI interface and automated processes.[123] For example, Ameritech has hired at least two outside experts, Anderson Consulting and Telesphere Solutions, to test, exercise, and objectively evaluate its EDI interface and that interface's interaction with internal OSSs, providing valuable evidence of whether the interface is operational, performing in a nondiscriminatory manner with respect to Ameritech's internal OSSs, and providing competitors

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[121] "Sprint recently met with SWBT to discuss OSS interfaces and was provided current information on the status of SWBT's operations support systems and interfaces for CLECs. . . . For unbundled network element . . . orders, SWBT offers facsimile processes with manual intervention and plans to build automated EDI interfaces. . . . SWBT does not have any automated systems for OSS interface for unbundled network element services." Meyer Aff. ¶¶ 19, 21, 29.

[122] Ham Aff. ¶ 29.

[123] See, e.g., April 4, 1997 submissions to Illinois Commerce Commission, Docket No. 96-0404.

with a meaningful opportunity to compete.[124] In addition to these third-party efforts, Ameritech itself has provided a veritable barrage of detailed, ongoing internal testing evidence to demonstrate, sometimes successfully, sometimes not, that its interfaces and processes are operational and meaningfully available. These internal and third-party tests have revealed competitively-significant problems, allowing Ameritech to fix such problems now, before they substantially affect a competitor in the marketplace.[125]

This type of thorough internal testing is essential to ensuring that complex interfaces, such as EDI, and their interaction with internal processes are operational. Certainly in the absence of inter-carrier testing or commercial operation, without actual evidence of such thorough internal testing, SBC does not even approach its burden of proving the nondiscriminatory operation of its EDI interface (or any others) and its electronic processes for providing resale services and unbundled elements. The Georgia Public Service Commission's

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[124] It is instructive to note that Ameritech asked Telesphere Solutions (a developer of interfaces and gateways) to create a "dummy" CLEC interface to communicate with its EDI interface for purposes of testing. Ameritech used this opportunity to provide evidence of both a CLEC's ability to build its side of the interface based on Ameritech documentation and ultimately the operation of the interface after test transactions were performed. Obviously, none of these tests were dependent upon the plans or cooperation of Ameritech competitors. Third-party testing will, however, have to be examined carefully to verify the comprehensiveness and objectivity of the tester.

[125] One critical area Ameritech is improving in response to third-party evaluations is the documentation it provides to CLECs enabling them to build their side of the interface. There is substantial evidence that SBC's competitors are having significant problems in this regard. For example, "SWBT has not provided Sprint any process flow diagrams or documentation on operational interface processes and has provided very limited OSS interface specifications." Meyer Aff. ¶ 32.

reasoning, when it recently rejected a BellSouth SGAT, is equally applicable to SBC. The Georgia Commission held that "BellSouth has not yet shown that it can reliably provide unbundled loops and other unbundled elements in the controlled environment of pilot tests," and as a result "unbundled elements are not yet available as promised in the Statement and as required by Section 251."[126]

2. Inter-carrier Testing

Even if SBC had performed robust internal testing, industry experience, national standards with which SBC allegedly adheres, and experts in software engineering suggest that internal testing alone, without inter-carrier testing, often fails to expose competitively-significant faults in the new and complex software used to create electronic interfaces and their interaction with OSSs.[127] SBC has yet to initiate *any* inter-carrier testing of its EDI interface for ordering resale services and unbundled elements. Moreover, SBC alleges that it has only recently begun

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[126] GA PSC Order at 30-31. The Oklahoma Commission's factual finding that "it is logical to assume that SWBT has provided these companies . . . with the services and unbundled network elements necessary to provide local exchange service" falls somewhat short of this standard. Comments of the Oklahoma Corporation Commission on the Application of SBC Communications Inc., Southwestern Bell Telephone Co, and Southwestern Bell Long Distance for Provision of In-Region InterLATA Services in Oklahoma, CC Docket No. 97-121 ("OCC Comments"), at 8 (Apr. 30, 1997).

[127] The standard enunciated by the Illinois hearing examiner in his proposed order for the Illinois Commission is particularly illustrative:

> We are not convinced that the internal testing performed by Ameritech can solve all of the problems that will arise. Without actual testing with other carriers, this checklist item cannot be available. We agree with staff that we must be provided with empirical evidence that Ameritech's OSS are operational and functional.

ICC HEPO at 28.

testing its DataGate preordering interface with Sprint, and has not provided any test results from this test, or tests of any other of its interfaces.

To place SBC's state of readiness in perspective, Ameritech began inter-carrier testing of its EDI electronic ordering interfaces and processes in February 1996 with US Networks.[128] Notwithstanding Ameritech's early and intensive testing, its interfaces and processes were recently found deficient by the Wisconsin Public Service Commission and an Illinois hearing examiner.[129]

The Wisconsin Commission's decision, decided April 3, 1997, was made at a time when Ameritech had processed several thousand orders for resale services and unbundled loops region-wide. The Wisconsin Commission found, however, that Ameritech's systems still had "major problems" and that they did not meet the requirements of the checklist because they were not yet fully tested and operational.[130] Among other things, the record in the Wisconsin proceeding revealed significant problems with Ameritech's EDI resale ordering interface—an interface Ameritech had claimed was tested and commercially operated with U.S. Networks since February 1996, over a year prior to the Wisconsin Commission's decision. Ameritech has since taken steps to correct many of these problems. In comparison, as discussed above SBC has not

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[128] Id. at 26.

[129] Ameritech began testing its EDI resale interface and processes with AT&T in September 1996. Letter from AT&T to the Department of Justice of 4/23/97, Attachment J to this Evaluation, at 2.

[130] Wisconsin PSC Open Meeting, Utility Regulation Report, at 5 (Apr.3, 1997).

yet even begun such testing of its EDI interface,[131] much less identified and corrected the "bugs" that such testing inevitably will reveal.

These experiences underscore the near certainty of encountering problems in complex interfaces, and the need for extensive testing of such interfaces, which SBC has not demonstrated, before they can be considered operationally ready. In addition to experiences in the industry to date, the need for such testing is also clearly reflected in current ATIS committee guidelines for Issue 6—guidelines with which SBC purports to adhere.[132] That Issue includes a recommendation that, in addition to internal testing, carriers consider performing system testing "with trading partners using a test data file and/or testing with live data."[133] The guidelines conclude that "[o]nce these tests have been completed, you are ready for live processing to be run in parallel [with manual processes]."[134] This suggests that even after testing with a trading partner, problems may be encountered and testing must continue in parallel with manual

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[131] The Michigan Commission had earlier found that "[i]t appears that Ameritech Michigan is providing OSS functions that have enabled at least two competitors to provide local exchange telecommunications service in Michigan." In re Application of Ameritech Michigan, CC Docket No. 97-1, at 25 (Feb. 5, 1997). This determination, however, was couched in terms of the Michigan Commission's uncertainty as to whether "good faith effort [by Ameritech] will suffice for checklist compliance," Id., and the Michigan Commission did not appear to make any factual findings contrary to those of the Wisconsin Commission and Illinois examiner.

[132] SBC states that its EDI gateway conforms to the Ordering and Billing Forum/Telecommunications Industry Forum national standard guidelines. Issue 6 is the current TCIF national standard for EDI.

[133] ATIS TCIF EDI Guidelines, Customer Service, Issue 6, § 2.2.6.

[134] Id.

processes.

Industry participants also acknowledge the complexity of interfaces, the need for thorough inter-carrier testing, and the likelihood of competitively-significant problems arising even after commercial operation. For example, MCI's OSS affiant states:

> After each carrier's systems are developed and deployed, it is necessary to conduct "integration" testing -- full end-to-end trials designed to make sure that the systems can communicate properly with each other to accomplish the intended results in the designed manner. After integration testing has been successfully completed, it is time to put the systems into actual competitive use, supporting "live" customer transactions. Even once this stage of actual implementation is reached, however, testing is not completed. To the contrary, it is almost inevitable that the early stages of actual competitive use will reveal design and operating flaws that had escaped detection up through integration testing, thus requiring further trouble-shooting and system modification.[135]

Finally, software development experts widely agree that testing software typically consists of numerous different phases, including beta testing with live data in commercial operation. As highly-complex software applications, electronic communications interfaces and the OSSs they are interacting with must certainly undergo all of the generally agreed-upon tests for quality software development to be considered practically operational. Ian Sommerville, in his textbook Software Engineering, explains, "The most widely used [software] testing process consists of five stages," including "acceptance testing."[136] This last stage, acceptance testing, is "the final stage in the testing process before the system is accepted for operational use. The system is tested with data supplied by the system procurer rather than simulated test data.

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[135] King Aff. ¶28.

[136] Ian Sommerville, Software Engineering 448-449 (Addison-Wesley 5th ed. 1996).

Acceptance testing may reveal errors and omissions in the system requirements definition because the real data exercises the system in different ways from the test data."[137] Sommerville goes on to describe how system testing is commonly referred to as "beta testing," and claims that beta testing is the norm when rolling out complex systems.

Substantial research has also demonstrated that fixing defects becomes vastly more expensive and time consuming as bugs are diagnosed progressively later in the development and roll-out process. As one expert has found, "[a]ssume that an error uncovered during design will cost 1.0 monetary unit to correct. Relative to this cost, the same error uncovered just before testing commences will cost 6.5 units; during testing 15 units; and after release, between 60 and 100 units."[138] These statistics suggest that defects not identified and corrected in the testing of electronic interfaces and processes (*e.g.*, prior to BOC entry into the in-region long distance market) will cost several times the amount to correct in the commercial environment, causing increased costs and delays when CLECs are trying to compete with BOCs.[139]

Accordingly, SBC has failed not only to offer adequate functionality, it has fallen far short of carrying its burden to show that its wholesale support processes are operational to even a limited extent.

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[137] Id. at 449.

[138] Roger S. Pressman, Software Engineering: A Practioner's Approach 189 (McGraw-Hill 4th ed. 1997).

[139] According to Pressman, "[s]oftware testing accounts for the largest percentage of technical effort in the software process," and "[i]t is not unusual for a software development organization to expend between 30 and 40 percent of total project effort on testing." Id. at 448.

APPENDIX B

Local Competitors and Potential Competitors in Oklahoma

Potential Competitors with Approved Interconnection Agreements with SWBT

Brooks Fiber. Brooks, with an approved negotiated interconnection agreement, is the only operational local exchange competitor in Oklahoma, and Brooks is one of only a handful of providers in Oklahoma that already has substantial local facilities of its own in place. Brooks has one switch each in Tulsa and Oklahoma City, along with CAP-style SONET rings containing 221 miles of fiber in Tulsa and 44 miles of fiber in Oklahoma City, enabling it to act as a facilities-based provider. However, the number of customers now served by Brooks is minuscule. Brooks has a total of 20 business customers in Tulsa and Oklahoma City according to its own evidence in the Oklahoma Section 271 proceeding. Of these 20 customers, Brooks serves 8 entirely over Brooks' own facilities, 11 with a combination of leased dedicated T-1 facilities and Brooks' own facilities, and 1 through the resale of SWBT ISDN service. Brooks OCC Comments at 2. Brooks also has four of its own employees using residential service in Tulsa and Oklahoma City on a trial basis through total service resale of SWBT's local services. While Brooks has a residential tariff according to SBC, as Brooks witness Ed Cadieux explained to SWBT during the OCC Section 271 hearings, it is not actually taking on any outside residential customers.[140]

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[140] Q (by SWBT atty. Toppins) You may then reject a customer's request for local service?

A (by Brook's Cadieux) We will not process applications for residential service at

Brooks has testified in the Oklahoma Section 271 hearings that it is only evaluating SBC's resold service and has not yet reached any conclusions on whether to use it. OCC Transcript, Apr, 14, 1997 at 63-64. Brooks plans to serve its customers primarily through the use of unbundled SWBT loops and the use of its own switching and transport facilities. Brooks OCC Comments at 2. Brooks' use of SWBT loops, however, is premised on its ability to gain physical collocation in SWBT central offices (COs), 6 in Oklahoma City and 5 COs in Tulsa. Id. at 3. As of SBC's filing date, none of these collocations had been completed, even though the initial applications were filed in June of 1996. Id. at 4. Brooks has experienced problems both with SBC's substantial delays in providing collocation and SBC's prices for collocation. Transcript of Proceedings, OCC Cause No. PUD 97-64 ("OCC Transcript, Apr. 23, 1997") at 111-115 (April 23, 1997). Because of these problems in getting essential collocation, and because Brooks has so few customers, Brooks has not begun to seriously discuss OSS and unbundled loop provisioning issues with SBC.

U.S. Long Distance ("USLD"). Though USLD has an approved negotiated interconnection agreement with SWBT it is not yet operational. USLD has no facilities installed in Oklahoma and plans to enter Oklahoma initially as a reseller, transitioning to a partial facilities basis over time (its agreement provides for interconnection using a switch in Oklahoma City).

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this point.

Q Even on a resale basis?

A Even on a resale basis; that is correct.

OCC Transcript, Apr. 14, 1997, at 70.

One of the reasons that USLD has not yet entered Oklahoma is that USLD is still in dispute with SBC over the interpretation of provisions of its agreement regarding its operations in Texas, including what prices and terms USLD will actually have for various services including resale, customer conversion, trunk provisioning intervals, OSS, and order processing, so that the Oklahoma agreement is inactive until the parties can reach a meeting of the minds in their negotiations. Affidavit of Richard Burk ("Burk Aff."), ¶¶ 4-6, 9-10, attached to Opposition of USLD, CC Docket No. 97-121 (May 1, 1997). USLD is also concerned about whether SWBT has adequate OSS to handle orders electronically. So far, USLD has not been allowed access to SWBT's OSS due to the unavailability of OSS training courses. Id. ¶7.

Intelcom Group. ICG has an approved negotiated interconnection agreement with SWBT but it is not yet operational and is not ready to enter, as the agreement was only approved on April 3. ICG would likely enter on a facilities basis, but it is unclear how much network construction will be necessary before ICG is ready to begin offering service in Oklahoma.

Sprint. Sprint has an interconnection agreement with SWBT which incorporates many of the terms from the AT&T arbitration award. This agreement is incomplete because it is contingent on the results of certain negotiations between AT&T and SWBT. Sprint did not seek arbitration separately but stipulated with SWBT to take the terms of the AT&T arbitration award. It is not yet ready to begin operations and does not plan to enter Oklahoma until 1998. OCC Transcript, Apr. 23, 1997, at 91. Sprint has experienced problems with SWBT trying to reach an agreement on OSS interfaces. Sprint would likely enter initially as a reseller though it also has