public switched telephone network?

Q. Yeah.

A. Yeah, I would say every subscriber to the public switched telephone network would have access to voice telephony.

Q. So you're saying it's conceivable that people would want ubiquitous -- everybody in an exchange would want to interconnect to the public switched telephone network to subscribe to voice services, but it's inconceivable that everyone in an exchange would want to subscribe to a frame relay type service?

A. Well, you say interconnect and, again, I'm not sure of the intended semantics there. The thing you have to understand with frame relay, it is a digital service, as you know. Probably 95 to 99 percent of the access facilities in the ground today are analog, so it's inconceivable that that would be the case.

Q. Did you say of access services?

A. Yeah, the services used to access, no regulatory connotation intended.

Q. Do you know what percentage of Ameritech Indiana's network is digital?

A. No.

1 Q. Do you know, is there a significant difference
2 between the amount of digital technology
3 deployed in Ameritech Indiana's interoffice
4 network as opposed to its local loops?
5 A. I'm not sure.
6 Q. As a general proposition, would you agree with
7 the statement that all telephone networks are
8 moving into digital technology?
9 A. Not as a general proposition. I would say the
10 carriers have recognized the benefits to
11 digital telephony on a backbone. It's
12 extremely unlikely that the -- the current base
13 of analog circuits could ever be replaced.
14 Again, that's my perspective on your general
15 proposition.
16 Q. Are you familiar with subscriber loop
17 technology?
18 A. What do you mean, subscriber loop technology?
19 Q. Digital loop carrier technology.
20 A. Digital subscriber, DSL?
21 Q. Yeah, DSL.
22 A. Yes.
23 Q. Subscriber line?
24 A. Sure.
25 Q. That's digital technology, right?

1 A. Yes.
2 Q. It's in the loop, isn't it?
3 A. Yes.
4 Q. Do you know how -- do you know the rate at
5 which DLC technology is being deployed by
6 Ameritech?
7 A. I'm not familiar with DLC technology.
8 Q. I'm sorry, subscriber loop transport
9 technology.
10 A. No.
11 Q. As a general proposition, do new technologies
12 get deployed ubiquitously throughout a network?
13 A. Again, I would have to answer yes and no to
14 that question.
15 MR. FRUEHWALD: Your Honor, I
16 think, you know, that's a question far beyond
17 the scope of anything we're talking about here.
18 JUDGE MILLER: I think you can
19 move on.
20 MR. CANIS: I'll withdraw that
21 question. Thank you.
22 Q. You are familiar with Ameritech's ATM network,
23 are you not?
24 A. Yes, I'm somewhat familiar.
25 Q. When that was rolled out -- can you tell me

1 when that was rolled out?
2 A. No.
3 Q. Can you tell me if everyone has ubiquitous
4 access to that ATM network now?
5 MR. FRUEHWALD: Your Honor, I
6 think this is still the same problem of the
7 details of some other technologies and other
8 systems that are not at issue before us. The
9 prior justification for even getting into this
10 change was some comparable that has nothing to
11 do with the roll-outs and the technology and
12 the plans for utilization of some other
13 technology. I think this is far beyond the
14 scope of any conceivable relevance.
15 JUDGE MILLER: I think you've --
16 you have made clear the direction you're
17 wishing to go with this point. Now, the
18 witness is free to answer the question whether
19 or not he's familiar with how that has
20 developed as a different type of technology,
21 but I don't know that that point needs to be
22 reemphasized.
23 MR. CANIS: Fair enough, your
24 Honor.
25 Q. On page 6 of your verified statement, line 2,

1 you state that, "If the frame is to be
2 transmitted interLATA, it is routed through an
3 intraLATA frame relay network to a
4 network-to-network interface."
5 Can you clarify whether NNIs are used only
6 for interLATA transmission of frame relay
7 traffic?
8 A. Well, again, as a general concept, the
9 network-to-network interface truly is a
10 standards based protocol which enables two
11 primary switches to communicate. It's usually
12 used to enable two different frame relay
13 carriers' switches to communicate. Again, this
14 example in particular was to sort of track the
15 path of the particular network that ICI had
16 presented or was interested in, but no, an NNI
17 can be used for interLATA, intraLATA or
18 interstate frame relay traffic.
19 Q. To your knowledge does Ameritech have more than
20 one frame relay switch in any LATA in Indiana?
21 A. Yes.
22 Q. And in order to communicate between those
23 switches, does it employ an NNI?
24 A. Yes.
25 Q. Does Ameritech provide voice telephony or voice

1 service over frame relay?
2 A. We have an offering in the marketplace. To
3 date only one customer I know of is testing it.
4 Q. And is that interstate or intrastate?
5 A. I believe it's intrastate.
6 Q. Intra?
7 A. Yes.
8 Q. Is that a tariffed service?
9 A. It's a tariffed service in combination with
10 customer premises equipment.
11 Q. I'm sorry, could you explain that?
12 A. Sure. Frame relay is offered as a data
13 service. Certain customer premises equipment
14 enables you to combine voice also on to your
15 data network.
16 Q. Do you know whether Ameritech uses compressed
17 or noncompressed voice technology in the
18 provision of that voice over frame relay
19 service?
20 A. Oh, Ameritech doesn't really offer the service.
21 The equipment vendors that we partner with will
22 compress the voice.
23 Q. So to the extent that Ameritech provides voice
24 over frame relay, it is a compressed signal?
25 A. Yes.

1 Q. Does Ameritech offer voice over frame relay
2 using noncompressed technology?
3 A. No.
4 Q. Do you know, is there a quality difference
5 between voice telephony or voice services
6 routed over frame relay using compressed or
7 noncompressed technologies?
8 A. To the extent I have evaluated the technology,
9 yes, there is a difference on both.
10 Q. Could you explain what that difference is?
11 A. There was some -- hard to categorize it --
12 echoing on the call, some stuttering of the
13 transmission.
14 JUDGE MILLER: For which type,
15 I'm sorry, compressed or noncompressed?
16 THE WITNESS: For both. For
17 both. I guess stuttering is probably a good
18 word to use. Phrases had to be repeated when
19 the transmission wasn't clear.
20 Q. Is voice over frame relay using noncompressed
21 technology superior to that using compressed
22 technology?
23 A. I don't think I have an answer to that.
24 MR. CANIS: I have no further
25 questions. Thank you.

ATTACHMENT 4

TRANSCRIPT: CROSS EXAMINATION OF W. KARL WARDIN AT INDIANA ARBITRATION HEARING ("Wardin Indiana Testimony")

1 information.

2 JUDGE MILLER: Any objection?

3 MR. CANIS: No.

4 JUDGE MILLER: Exhibits 4 and 5

5 are accepted into the record without objection,

6 noting that Exhibit 5 includes information for

7 which Ameritech has requested confidential

8 treatment pursuant to a motion for a protective

9 order.

10 MR. FRUEHWALD: I would make the

11 witness available for cross-examination.

12 MR. CANIS: Thank you, your

13 Honor.

14 **CROSS-EXAMINATION,**

15 **QUESTIONS BY MR. JONATHAN E. CANIS:**

16 Q. Mr. Wardin, throughout these questions I will

17 be referring to the nonpublic version of your

18 testimony, although I do not anticipate that we

19 will be using proprietary data and citing them

20 on the record, so I think we can talk around

21 the data without having to go in a proprietary

22 record.

23 A. Okay.

24 Q. On page 4, line 10, you state that -- or lines

25 9 and 10, you state that, "The cost studies

submitted with my testimony are consistent with the TELRIC-based methodology set forth by the FCC."

Could you explain what you mean by consistent?

A. What I mean by consistent in this statement is that if -- if the Eighth Circuit Court were to maintain that the TELRIC methodology be used for pricing interconnection and unbundled network elements, that the studies that I have done would comport with that methodology and be acceptable to this Commission.

Q. Is it your contention, then, that the process you used in your proposed rate computations is fully consistent with the TELRIC rules established by the FCC that are currently under stay in the Eighth Circuit?

A. Yes, they are. I mean, there was one difference that had to do with utilization. The rules allow us to use a utilization factor in determining the investment for multiplexors. We did not use -- we used the utilization factor of one, so we basically used the engineering capacity to determine the costs of the multiplexor being used, so had we done

that, the costs would have been slightly higher than those shown in the exhibit.

Q. When you say multiplexor, what do you mean?

A. The multiplexors that I'm referring to is to bring -- if interconnection was at 56 or 64 kilobyte service from a electrical DS0 type interface up to an optical DS3 interface or from an electrical DS1 interface to an optical DS3 depending upon the type of interconnection.

Q. Where does this multiplexing function take place?

A. The multiplexing function takes place in the serving wire center that the AADS switch is located off of.

Q. Is the AA -- well, when you said in the wire center, is that an Ameritech wire center?

A. I'm sorry, yes. The multiplexors reside, I call it a central office, but it's in that building but it's also called a wire center under other circumstances, but it's an Ameritech Indiana building is where the multiplexors are.

Q. Has this Commission approved the TELRIC rates you're proposing in your testimony?

A. I guess that's part of the proceeding here is

to determine the appropriate rates for interconnection should the Commission view that interconnection as appropriate for this instance.

Q. Has this Commission approved the TELRIC methodology that you have used in computing your proposed rates?

A. The methodology is the same that we used in establishing the unbundled network elements in the generic SGAT proceeding. That is still under review by the Commission.

Q. Are you proposing that the rates you have included in your testimony would be subject to change if the Commission establishes different -- a different methodology for computing TELRIC?

A. Just so that we're on the same basis, I believe what you're referring to is the cost of money used, the depreciation rate or life and the utilization factors, if they differ from what I used in these computations for interconnection, and if the Commission felt that it was deemed necessary to change or redo these costs, we would do that, but I would say that from my position, that these would be reflective of the

1 TELRIC rates for this service.
2 Q. But the methodology and the different cost
3 factors that you just discussed have not been
4 specifically approved by this Commission in a
5 final order to date; is that correct?
6 A. That's correct.
7 Q. On page 6 of your testimony, top line, line 1,
8 you talk about reference to the consumption of
9 total network capacity. Have you considered
10 excess capacity in the computation of these
11 rates?
12 A. In developing the TELRICs for this particular
13 service, we did not look at any excess network
14 capacity in developing the modem cost. Like I
15 said, it was based on engineering capacity.
16 Q. Now, you just mentioned I think modem costs?
17 A. Right.
18 Q. Are these different from MUX costs?
19 A. I'm sorry, that's me because I'm not as
20 technically proficient as Dr. Viren. I'll
21 probably interchange modems and multiplexors,
22 but what I meant was multiplexors. I'm sorry.
23 Q. Now, we talked about the excess capacity in the
24 multiplexor. There are other cost elements
25 besides the multiplexor involved in the rates

that you have proposed, is that not the case?

A. That's correct.

Q. What are those other elements?

A. The other element probably -- the major element is the -- the switching cost itself that we're purchasing from AADS of Indiana, Inc.

Q. Is transport a relevant cost issue as well?

A. I have not -- transport is not part of the costs that I have developed. The transport functionality that I think you're referring to from the Ameritech central office or the Ameritech wire center out to the AADS switch, that is part of the rate for the switching functionality that Ameritech Indiana is purchasing.

Q. You mentioned that excess capacity was not considered in pricing the multiplexing function. Was it considered in pricing the switching function or the bundled switching/transport function?

A. No, it wasn't. We purchase -- that's a direct input into the pricing is we have either a DS1, a 56 or 64 kilobyte interface. That's a cost input to Ameritech Indiana.

Q. You said a -- did you say there are three

different interfaces, DS1, 56 and 64 kilobyte?

A. Yes, there are.

Q. So when you say excess capacity was not considered, is that excess capacity was not measured or the issue of capacity did not arise?

A. Well, I mean we considered excess capacity. Ameritech Indiana's investment, all the investment that Ameritech Indiana experienced in provisioning this service, we looked at engineering capacity, the expenses, the recurring expenses that Ameritech Indiana received or was assessed for the frame relay switch functionality, that is a line item into the cost. And that line item's under the other recurring expenses.

Q. So when you talk about the DS1, 56 or 64 kilobyte interfaces, you're talking about dedicated interfaces then and you priced those as dedicated interfaces?

A. I priced those as if it would be dedicated to a specific customer, that's correct.

Q. That's only the interface for the transport; is that not correct?

A. A price for the interface -- if somebody wanted

1 to have a frame relay switching functionality
2 and the interface for the transport, that's
3 what I tried to cost out.
4 Q. So is this DS1, 56 and 64 kilobyte a measure of
5 the switching capacity of the frame relay
6 switch?
7 A. That is a measure of what Ameritech Indiana
8 experiences as costs for providing that
9 service.
10 Q. Could you elaborate on that, please?
11 A. Well, if a -- if an entity wanted to -- maybe
12 I'll answer the question a different way
13 because -- I might not answer your question
14 directly, but I think I'll get to what you're
15 looking for.
16 Ameritech Indiana does not own any frame
17 relay switches, so the only way Ameritech
18 Indiana could offer some connection to its
19 frame relay service is reselling somebody
20 else's switching capacity, so when ICI asked
21 for interconnection to Ameritech Indiana's
22 frame relay switch, we don't own a frame relay
23 switch, so what we're doing is we're passing
24 along the same costs that Ameritech Indiana
25 experiences for the frame relay switching and

then adding the multiplexing costs that we incur to interface the underlying vendor at the appropriate speed. So the hand-off to the AADS who owns the switch is at a -- they want a DS3 interface, so I made connections or interfaces for 56, 64 and 1.5 megabyte service, so that's what the multiplexing is for, and then it just was a direct pass-through of the other expenses for the switching functionality.

Q. Could you explain in a little more detail what the relationship is between AADS and Ameritech? Let's start out by asking what is AADS?

A. To the best of my knowledge, I'll try to answer these questions, but AADS is a separate subsidiary of Ameritech and received a license I think in Cause 39718 in September of 1993 from the Indiana Utility -- IURC to provide data services and they have been -- they are regulated like any other frame relay provider in the state of Indiana. So Ameritech Illinois -- excuse me, Ameritech Indiana purchases frame relay switching functionality from AADS and offers it as a tariff service in its FCC No. 2 access tariff in the intrastate Indiana access tariffs.

1 Q. Is to your knowledge AADS a wholly-owned
2 subsidiary of Ameritech?
3 A. To my -- best of my knowledge, Ameritech owns
4 AADS of Indiana, Inc. entirely.
5 Q. When you mentioned that in September '93 AADS
6 received -- was approved by this Commission, do
7 you know, does AADS hold a certificate of
8 public convenience and necessity?
9 A. I don't necessarily know what those terms mean
10 in relation to it, but I know that they were
11 given authority to provide service at that date
12 by this Commission.
13 Q. Do you know -- I'm sorry, are you finished?
14 A. Yes.
15 Q. Do you know on what basis were they authorized,
16 as, for instance, an interexchange carrier, a
17 local services carrier, a reseller?
18 A. They were I believe authorized -- the only --
19 as long as Ameritech was unable to offer the
20 service, they could not either, so they were
21 authorized as an intraLATA data provider,
22 nonfacilities based, and could resell private
23 line services.
24 Q. Now, AADS owns all of the frame relay switches
25 that are used in the provision of interstate

and intrastate frame relay service by Ameritech?

A. AADS owns the frame relay switches that Ameritech Indiana -- of the basic frame relay service that Ameritech Indiana offers, that's correct.

Q. Does Ameritech own any frame relay switches of its own?

A. Ameritech Indiana does not own any frame relay switches of its own.

Q. Do you know if Ameritech, the parent company of Ameritech Indiana, owns any switches, frame relay switches?

A. The reason why I'm pausing to think about that, we maybe own a frame relay switch for internal uses, but I don't know who would own -- I don't know if Ameritech owns any frame relay switches. None that it would be offering for public service or for sale for revenues.

Q. Does AADS own any other data switches that are used in the provision of services by Ameritech Indiana?

A. The only switches that I know for sure that AADS owns are the frame relay switches that are part of this. I don't know of other data

1 switches that are -- that are out there like
2 the ATMs or whatever. I don't know if we own
3 any or, you know, who owns those.
4 Q. Did you prepare the response to ICI data
5 requests -- ICI Data Request No. 7?
6 A. No. But I can look at it.
7 MR. FRUEHWALD: Is that one
8 attached to Mr. -- Dr. Viren's rebuttal?
9 MR. CANIS: Yes.
10 JUDGE MILLER: Are we talking
11 about the document which was filed on May 6th?
12 MR. FRUEHWALD: Yes, sir, I
13 think. I think so.
14 MR. CANIS: Yes, your Honor.
15 JUDGE MILLER: Thank you. You're
16 asking generally first of all?
17 MR. CANIS: Generally, yes, and
18 we'll get specific at this point.
19 Q. May I direct your attention to page 9 and the
20 response to ICI Data Request No. 7.
21 A. Okay.
22 Q. It states, "AADS purchases local loops from
23 Ameritech pursuant to tariff."
24 Do you know, what is the reference to
25 local loops?

A. I will give you what I think they mean by local loops, but I would think that's the local transport going from the Ameritech wire center or central office to either their customers' premises or the premises of AADS. These are probably more like private lines.

Q. Are they digital as opposed to analog, do you know?

A. I would guess that they would most likely -- in the context when we're looking at this thing for local loops, I would say that they're not used for what we would call normal voice communications, but would be used in the extent of a private line, so in that case most likely would be a digital service of some type.

Q. Now, when you say local loops and pursuant to tariff, we are not talking now about unbundled loops?

A. Once again, because I didn't prepare this, but this is what my reading of it would be, no, it's not about unbundled network elements or unbundled loops; however, purchasing tariffed services from the special access section of Ameritech Indiana's access tariff, so that would be like base rate, DS0, DS1 type service.

1 Q. Now, in Subsection C to that response, you
2 state that, "As noted above, Ameritech
3 purchases switching services from AADS pursuant
4 to agreement."
5 Can you explain that?
6 A. I think they -- a copy of the agreement was
7 provided. I haven't read that agreement. I
8 know that AADS, when they sell enhanced frame
9 relay service, has to purchase out of Ameritech
10 Indiana's tariff the basic functionality, so
11 they take the basic functionality, add the
12 enhancements which might be like the CPE to
13 offer enhanced frame relay service.
14 Q. Do you know, does AADS provide service pursuant
15 to tariff?
16 A. There is a tariff that Ameritech Indiana has --
17 excuse me, AADS has a tariff with the IURC that
18 was filed back in 1993.
19 Q. Does Ameritech purchase service from AADS
20 pursuant to that tariff?
21 A. Ameritech Indiana purchases frame relay
22 services from AADS. I think they have
23 established a separate and distinct arrangement
24 for that or negotiated a contract for that,
25 like an ICB.

1 Q. So an ICB being an individual case basis
2 service arrangement?
3 A. Uh-huh.
4 Q. That is an individually negotiated arrangement
5 that is unique between the parties?
6 A. Yes. I'm sure that AADS would sell the same
7 functionality to somebody else with the same
8 volumes.
9 Q. Do you know if it does?
10 A. I do not know that for a fact.
11 Q. Do you know if AADS does in fact have contracts
12 with any other party except Ameritech?
13 A. AADS has contracts with other parties, yes,
14 they do.
15 Q. For the provision of frame relay switching?
16 A. Well, I mean depends if you want to call
17 switching a service. They sell enhanced
18 services. They have lots of customers that
19 they've sold frame relay -- enhanced frame
20 relay service to.
21 Q. I thought AADS provided service pursuant to
22 tariff for its resold frame relay service?
23 A. AADS sells -- AADS sells frame relay, basic
24 frame relay service to Ameritech Indiana and
25 they, Ameritech Indiana, has -- anybody can

1 purchase out of that tariff. When AADS sells
2 enhanced frame relay service, they purchase it
3 out of the Ameritech Indiana access tariff and
4 then combine it with the enhancements to offer
5 the enhanced service.
6 Q. But AADS provides -- I'm sorry, were you
7 finished responding?
8 A. Yeah.
9 Q. AADS sells frame relay switching to Ameritech,
10 is that not the case?
11 A. AADS sells frame relay switching to Ameritech
12 Indiana, that's correct.
13 Q. Is frame relay switching an enhanced service?
14 A. Well, frame relay -- I mean, like enhanced
15 service from whose definition?
16 Q. How about the FCC's definition.
17 A. AADS sells enhanced frame relay service.
18 Ameritech Indiana does not sell enhanced frame
19 relay service, just basic.
20 Q. My question was is the switching functionality
21 provided by AADS to Ameritech a basic frame
22 relay service?
23 A. Well, I mean, I'm not a lawyer or anything, but
24 I think it seems that it would by definition be
25 basic.