FLORIDA PUBLIC SERVICE COMMISSION
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# M E M O R A N D U M

April 30, 1998



TO: DIRECTOR, DIVISION OF RECORDS AND REPORTING (BAYO)

FROM: DIVISION OF COMMUNICATIONS (HAWKINS)
DIVISION OF AUDITING & FINANCIAL ANALYSIS (CATER)
DIVISION OF LEGAL SERVICES (CRUZ-BUSTILLO)

RE: DOCKET NO. 980550-TL - QUINCY TELEPHONE COMPANY d/b/a TDS TELECOM - REQUEST FOR APPROVAL OF TARIFF FILING TO INTRODUCE INTEGRATED SERVICES DIGITAL NETWORK - PRIMARY RATE INTERFACE (ISDN-PRI) (T-98-0434, FILED 04/01/98)

AGENDA: 05/12/98 - REGULAR AGENDA - TARIFF FILING - INTERESTED PERSONS MAY PARTICIPATE

CRITICAL DATES: DATE MAY 1, 1998 - COMPANY TARIFF REQUIREMENT

SPECIAL INSTRUCTIONS: \WP\980550TL.RCM

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## CASE BACKGROUND

On April 1, 1998, Quincy Telephone Company d/b/a TDS TELECOM (TDS or the Company) filed a tariff to introduce Integrated Services Digital Network - Primary Rate Interface (ISDN-PRI). ISDN can be thought of as an information pipeline that provides end-to-end digital connectivity for simultaneous data and voice transmission. Primary Rate Interface (PRI) is an optional service arrangement which can be used in conjunction with the customer's individual line business or residence service. The line uses the ISDN architecture to provide customers with the capabilities of simultaneous access, transmission, and switching of voice, data and video services via channelized transport. In addition, PRI provides the customer with access to Circuit-Switched Voice Services and Circuit Switched Data Services. PRI permits up to twenty three (23) Bearer (B) channels of data, voice, or voice and data and one Delta (D) data channel. The B channels are 64 kilobits (kbps), and the D channel is 64 kbps.

## DISCUSSION OF ISSUES

ISSUE 1: Should TDS's tariff filing to introduce Integrated Services Digital Network - Primary Rate Interface (ISDN-PRI) be approved?

RECOMMENDATION: Yes. TDS's tariff filing to introduce Integrated Service Digital Network - Primary Rate Interface (ISDN-PRI) should be approved to become effective May 12, 1998.

STAFF ANALYSIS: On April 1, 1998, TDS filed a tariff to introduce Integrated Services Digital Network - Primary Rate Interface (ISDN-PRI) into its General Exchange Tariff. The Company states that this offering is part of the overall upgrading of services and features that are now available in the central office as a result of its switch upgrade.

An ISDN-PRI arrangement connects an ISDN-capable telephone company central office switch to ISDN-capable customer premises equipment (CPE). Depending on the application, the CPE might be a PBX, a router, a multiplexer, etc. The ISDN-PRI arrangement provides a total of twenty four (24) digital communications channels within a single facility. Twenty-three (23) of these channels are Bearer (B) channels and they carry the actual voice or data. The B Channel is a bi-directional synchronous channel capable of supporting digital transmission speeds of 64 kilobits per second (kbps.) Each B Channel can carry Circuit-Switched Voice and Circuit-Switched Data. Clear channel capability is a characteristic of the transmission paths on the "B" channel that allows the full bandwidth on the "B" channel, 64 kbps, to be available to the customer. The B channels can be dedicated for calls to and from the public network: Incoming, Outgoing, 2-way, Direct Outward Dialing (DOD) or Direct Inward Dialing (DID).

One of the 24 channels is the Delta (D), which is used to transport signaling for the other 23 channels. The D Channel is a 64 kbps digital signaling channel that carries signaling and control for the B channels. The Company also states there might be situations where more than B 23 channels are needed at a particular premise. In those situations, multiple PRI facilities can be assigned to a PRI arrangement. When D channel backup is used in a multiple PRI arrangement, the D Channel in the first PRI facility is used to transport signaling for additional PRI facilities. The first PRI would be configured as 23B+D and the other PRIs would be configured 24B. This use of Non-Facility Associated Signaling (NFAS) allows the overhead of the D Channel to be distributed over multiple PRI facilities, thereby increasing channel efficiency. In multiple PRI arrangements, a second D Channel (D Channel Backup)

can be assigned (where available) as an automatic backup to the primary D Channel. This can be offered when more than one PRI is provided to the same customer in order to provide redundancy for the signaling channel.

The Company states that ISDN-PRI will be offered as a flat rated service which provides a customer high capacity digital link using a T1 facility. The PRI customers will be charged at the rate of $700 per month.

Staff has reviewed the cost data provided by the Company, and believes that the proposed rates for this service will more than adequately cover incremental cost and provide a reasonable contribution. TDS has projected that the annual revenue impact of this tariff filing will be a net increase of $25,200. This will raise TDS's achieved ROE to 5.15%, an increase of 0.26%, assuming there is no incremental expense. The Company's authorized midpoint return on equity is 11.65%.

Customers will also benefit from this service because it will allow them to get more from the public switched network. ISDN will provide a very cost effective solution to many customers' data needs. Customers, such as schools and Internet Service Providers, will be able to use this service to provide faster Internet access for their users.

ISDN-PRI service is beneficial to the Company as it allows the the Company to meet the high speed data needs of its customers. In addition, sales of this service will provide the Company with a positive revenue stream. This positive revenue stream will enable the Company to keep local rates, such as residence and business one-party rates at a minimum.

Staff recommends that TDS's tariff filing to introduce Integrated Services Digital Network - Primary Rate Interface (ISDN-PRI) be approved to become effective May 12, 1998.

ISSUE 2: Should Docket No. 980550-TL be closed?

RECOMMENDATION: Yes. If staff's recommendation for Issue 1 is approved, this tariff should become effective on May 12, 1998. If a protest is filed within 21 days from the issuance date of the order, the tariff should remain in effect with any increase held subject to refund pending resolution of the protest. If no timely protest is filed, this docket should be closed.

STAFF ANALYSIS: If staff's recommendation for Issue 1 is approved, this tariff should become effective May 12, 1998. If a protest is filed within 21 days from the issuance date of the order, the tariff should remain in effect with any increase held subject to refund pending resolution of the protest. If no timely protest is filed, this docket should be closed.

## SUBJECT INDEX

## INTEGRATED SERVICES DIGITAL NETWORK

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## INTEGRATED SERVICES DIGITAL NETWORK

### 2. PRIMARY RATE INTERFACE (PRI) (N)

#### A. GENERAL DESCRIPTION

1. Integrated Services Digital Network (ISDN) is a public network-based set of communications services that make it possible to send, receive, and modify information using regular telephone facilities. ISDN provides end-to-end digital communications and gives the ability to transmit data and voice over the same telephone line simultaneously. This functionality is provided via channelized transport facilities. The ISDN architecture provides for Primary Rate Interface (PRI) which is typically used when a customer wants to connect large quantities of digital lines to the network.

2. ISDN-PRI uses the ISDN architecture to provide the customer with the capability to transmit voice and data simultaneously over the same digital facility. Under various optional arrangements, PRI provides the customer with access to Circuit-Switched Voice Services and Circuit-Switched Data Services.

#### B. PRIMARY RATE INTERFACE (PRI) SERVICE ARRANGEMENT

1. An ISDN-PRI arrangement connects an ISDN-capable Telephone Company central office switch to ISDN-capable customer premise equipment (CPE). Depending on the application, that CPE might be a PBX, a router, a multiplexer, etc. The PRI ISDN arrangement provides a total of twenty-four digital communications channels within a single physical facility. Twenty-three of these channels are called Bearer, or B Channels and they carry the actual voice or data. Another channel, called the Delta or D Channel, is used to transport signaling for the other 23 channels. This configuration is known as 23B+D.

   a. **B Channel** - The B Channel is a bi-directional synchronous channel capable of supporting digital transmission speeds of 64 kilobits per second (kbps). Each B Channel of a PRI may carry:

      (1) Circuit-Switched Voice

      (2) Circuit-Switched Data

   b. **D Channel** - The D Channel is a 64 kbps digital signaling channel that carries signaling and control for the B Channels. (N)

## INTEGRATED SERVICES DIGITAL NETWORK

2. PRIMARY RATE INTERFACE (PRI) (Continued) (N)

B. PRIMARY RATE INTERFACE (PRI) SERVICE ARRANGEMENT (Continued)

2. **Primary Rate Access Facility** - The Primary Rate Access Facility provides a high capacity digital link over which the Primary Rate services are delivered. This facility is based on a 1.544 mbps DS1 carrier (T1 facility).

3 **Multiple PRI Arrangement** - There may be situations where more than 23 B Channels are needed at a particular customer premise. In those situations, multiple PRI facilities can be assigned to a PRI arrangement. With the multiple PRI arrangement, the D Channel in the first PRI facility is used to transport signaling for additional PRI facilities. The first PRI would be configured as 23B+D and the other PRIs would be configured as 24B. This use of Non-Facility Associated Signaling (NFAS) allows the overhead of the D Channel to be distributed over multiple PRI facilities, thereby increasing channel efficiency.

4. **D Channel Backup** - In Multiple PRI Arrangements, a second D Channel can be assigned (where available) as an automatic backup to the primary D Channel. This can be offered when more than one PRI is provided to the same customer in order to provide redundancy of the signaling channel.

C. CIRCUIT SWITCHED SERVICE DESCRIPTIONS

Circuit Switching is a switching arrangement in which an entire circuit or B Channel is dedicated to a given call. The circuit is connected on a per call basis and can carry circuit-switched voice or circuit-switched data. Circuit switched related services include:

1. **Clear Channel Capability** - A characteristic of the transmission paths on the "B" channel that allows the full bandwidth on the "B" channel, 64 kbps, to be available to the customer. However, ISDN interconnection to non-ISDN equipped central offices will be potentially subjected to analog transmission or sub-rated to 56 kbps.

2. **Dedicated Trunk Groups** - The B Channels of a PRI can be dedicated for calls to and from the public network: Incoming, Outgoing, 2-way, Direct Outward Dialing (DOD) or Direct Inward Dialing (DID). (N)

## INTEGRATED SERVICES DIGITAL NETWORK

2. PRIMARY RATE INTERFACE (PRI) (Continued) (N)

C. CIRCUIT SWITCHED SERVICE DESCRIPTIONS (Continued)

3. **Primary Rate Call-By-Call Service** - The Primary Rate Call-By-Call (CBC) feature offers access to additional services such as:

- Foreign Exchange,
- Tie Trunk,
- InWATS,
- and OutWATS

via the B Channels of an ISDN-PRI. With this feature, any B Channel on the PRI can be used to offer the above services on a per-call basis in addition to trunk calls to/from the public network (i.e., DOD/DID).

4. **Multiple Directory Numbers** - Each PRI includes an individual directory number. Additional directory numbers, a range of directory numbers, or several ranges of directory numbers can be optionally added.

5. **Advanced Calling Services** - ISDN-PRI can support access to the following Advanced Calling Services (also called CLASS services) from suitably equipped CPE:

a. **Caller ID - Basic-** This feature allows the central office and the customer's equipment to communicate the calling party's directory number on calls carried by the Primary Rate service. The number can then be made available to be displayed on a properly equipped telephone set or adjunct equipment. (N)

## INTEGRATED SERVICES DIGITAL NETWORK

### 2. PRIMARY RATE INTERFACE (PRI) (Continued)

(N)

### D. TECHNICAL SPECIFICATIONS

1. **Transmission Specifications** - The Primary Rate Access Facility provides a high capacity digital link over which the Primary Rate services are delivered. This facility is based on a 1.544 Mbps DS1 carrier (T1 facility) whose characteristics are as follows:

   - Line Code = Bipolar 8 Zero Substitution (B8ZS)
   - Framing Format = Extended Super Frame (ESF)
   - Signaling = Q.931 Signaling
   - Data Rate = 64 kbps clear or kbps restricted
   - D Channel = 24th channel on the T1 facility

2. **Customer Premise Equipment (CPE) and Facilities** - Compatible CPE is required to utilize ISDN-PRI. All equipment used to interface with these services is required to conform with ISDN guidelines as referenced in the following Bellcore specifications:

| Document Number | Description |
|---|---|
| TR-NWT-001268 | ISDN Primary Rate Interface Call Control Switching and Signaling Generic Requirements for Class II Equipment |
| SR-NWT-002343 | ISDN Primary Rate Interface Generic Guidelines for Customer Premises Equipment |

The Telephone Company shall not be responsible if changes in any of the equipment, operations, or procedures of the Company utilized in the provisioning of ISDN services render any facilities provided by the customer obsolete or require modification of such equipment or system, or otherwise affect its use or performance.

(N)

## INTEGRATED SERVICES DIGITAL NETWORK

2. PRIMARY RATE INTERFACE (PRI) (Continued) (N)

### E. REGULATIONS AND CONDITIONS

1. Unless specifically exempted, ISDN services shall be subject to all general regulations applicable to the provision of service by the Telephone Company as stated in the general tariff.

2. ISDN-PRI is provided at the option of the Company. These services are furnished subject to central office switching capacity, capability, and the availability of outside plant facilities.

   a. The availability, functionality, and capabilities of ISDN-PRI may vary, or may not be available, dependent upon type of serving central office switch, related software controlling that switch and associated outside plant.

      (1) Where facilities are not available, or unusual expenditures are involved in making them available, the customer may be required to pay additional charges to cover the unusual expenditure, or to contract for services beyond the normal service term, or both.

      (2) Mileage Charges: Provision of the underlying PRI Access facility (T1) is mileage sensitive. As such, additional mileage charges may apply.

3. Payment for Service:

   a. The minimum charge period for services provided under this tariff is one month.

   b. The customer may choose to pay for the service on a month-to-month basis.

   c. Suspension of service is not allowed.

4. Directory Listings: One directory listing is provided without charge for each ISDN-PRI customer. Additional listings may be provided as specified for Additional Listing Service in the Rates & Charges section of this ISDN-PRI tariff. (N)

## INTEGRATED SERVICES DIGITAL NETWORK

2. PRIMARY RATE INTERFACE (PRI) (Continued)

(N)

E. REGULATIONS AND CONDITIONS (Continued)

5. Billable Call Treatment: Normal toll charges (including InWATS and OutWATS charges) shall apply to calls that are made outside of the Local Service Area.

6. Customer Premise Equipment (CPE):

a. This tariff does not include terminal equipment on the customer's premises. Terminal equipment may be covered under a separate tariff, sold or leased separately by the Telephone Company (under a separate contract), or may be provided by the customer.

b. The customer is responsible for providing the power required for any and all CPE connected to an ISDN-PRI.

7. The Telephone Company shall not be liable for any loss or damages arising out of error, interruptions, defects, failure, or malfunctions of ISDN services or associated equipment. Damages arising out of such interruptions, defects, failures, or malfunctions of the services after the Telephone Company has been notified, and has reasonable time for repair, shall in no event exceed an amount equivalent to the charges made for the service affected for the period following notice from the customer until service is restored.

8. Service Establishment Charges do not apply for the establishment of the Communication Channels when the customer signs an agreement to subscribe to ISDN-PRI for a minimum of 3 years. If the customer discontinues service prior to the conclusion of the 3 year agreement, the customer will incur a disconnection charge equal to the Service Establishment Charges. The disconnection charge will not apply if the customer purchases other services from the Company which replace ISDN-PRI service.

(N)

## INTEGRATED SERVICES DIGITAL NETWORK

### 2. PRIMARY RATE INTERFACE (PRI) (Continued)

### F. RATES AND CHARGES

| INTEGRATED SERVICES DIGITAL NETWORK (ISDN) SERVICE<br>PRIMARY RATE INTERFACE (PRI)<br>ISDN-PRI RATE SCHEDULE | | |
|---|---|---|
| ISDN Service | Monthly Rate | Service Establishment (Nonrecurring Rates) |
| 1. ISDN-PRI ACCESS: | | |
| a. ISDN-PRI Access Facility (first mile) | Included in ISDN-PRI Rate (Communication Channels Mo. Rate) | Included in ISDN-PRI Service Establishment (Communications Channels Svc Establishment) |
| b. PRI Access Facility - Mileage Charges (each additional mile) | $20.00/each additional mile | Included in ISDN-PRI Service Establishment (Communication Channels Svc Establishment) |
| 2. COMMUNICATION CHANNELS: | | |
| a. B Channels plus D Channel, OR | $700.00 | $1,000.00 |
| B Channels (Multiple PRI Arrangement) | $700.00 | $1,000.00 |
| b. T1/PRI Rearrangement Charge (In Lieu of $1,000.00 Service Establishment Charge when the customer already has a T1 in place) | N/A | $200.00 |
| c. D Channel Backup | $100.00 | $150.00 |
| d. Directory Numbers: | | |
| Primary Directory Number (w/each ISDN-PRI) | No Charge | No Charge |
| Additional Directory Numbers | $2.00/Directory Number | $25.00/Initial Service Establishment Request |
| 3. CIRCUIT SWITCHED FEATURES: | | |
| a. Features: | | |
| 1. Clear Channel Capability | No Charge | No Charge |
| 2. Call-by-Call Capability for the following: | | |
| *a. Public Network Calls* (incoming, outgoing or 2-way trunk calls) | No Charge | No Charge |
| *b. DID* | No Charge | No Charge |
| *c. FX:* All existing tariff rates apply to FX facilities between CO's. | $10.00 | $50.00 |
| *d. Tie Facility:* All existing tariff rates apply to Tie facilities between CO's. | $10.00 | $50.00 |
| *e. InWATS:* All existing tariff rates apply to measured InWATS. | $10.00 | $50.00 |
| *f. OutWATS:* All existing tariff rates apply to measured OutWATS. | $10.00 | $50.00 |
| 3. Advanced Calling Services: | | |
| Caller ID - Basic (per PRI) | Included w/ISDN-PRI (Communication Channels Mo. Rate) | Included in ISDN-PRI Service Establishment (Communications Channels Svc Establishment) |
| b. Subsequent Feature Additions/Changes: | | |
| Feature Additions/Changes per PRI | N/A | $50.00 |
| c. Move Charge | | |
| To Move ISDN-PRI Service, per PRI | N/A | $25.00 |