

# ISSUES – Reliability and the Future of Transmission Costs

## Transmission Business Line Fiber-Optic Cable Plan

Bonneville Power Administration's Transmission Business Line provides safe, reliable, responsive, and environmentally sensitive, open, non-discriminatory access to transmission products and services at the most efficient cost possible.

### PURPOSE

- Bonneville Power Administration (Bonneville) needs to ensure the reliability of its transmission system with a high-speed, flexible, reliable system of communications composed of fiber-optic cable, with backup in some areas by digital radio. Fiber-optic installation increases Bonneville communication capacity and brings the agency up to date with contemporary technology.
- Bonneville installs fiber-optic cable where there is a demonstrated operational need. Bonneville anticipates exponential increases in data traffic in the future. It is therefore cost-effective to install cables with extra capacity.
- Fiber-optics installation and upgrade of Bonneville's existing microwave system is capital-intensive. To minimize costs to ratepayers, Bonneville leases to others those fibers in excess of its current operational need.
- Bonneville's Fiber-optic Program Strategy is to upgrade its system to meet operational needs without burdening ratepayers with the entire

cost. The Program therefore operates in recognition of the explosively growing fiber-optic market and dark-fiber leasing opportunities.

### MISSION

- To upgrade Bonneville's existing telecommunications technology, and thereby to enhance safety and reliability of the transmission system, and generate revenues by leasing surplus dark fibers to telecommunications service providers (TSPs), while providing public benefits through rate stabilization and potentially assisting Pacific Northwest (PNW) constituents' and customers' access to fiber-optic technology.

### OBJECTIVES

- Increase safety and reliability of the power system.
- Continue installing fiber to meet operational needs.
- Where possible, structure contractual arrangements to help Bonneville meet its financial, operational, and public benefit responsibilities, while minimizing the upgrade and operational costs.
- Emphasize public benefits to rural communities and customer services.
- Move toward a fundamental support of Regional Transmission Organization (RTO).

TBL will take written comments on "Reliability and the Future of Transmission Costs" from Nov. 15 to Dec. 20, 1999. Send comments to: P.O. Box 12999, Portland, OR 97212 or e-mail to [comments@BPA.gov](mailto:comments@BPA.gov). For questions on sending your comments, call: (503) 230-3478 (Portland) or 800-622-4519.



## STRATEGIES (HIGHLIGHTS)

- Prioritize each fiber-optic route according to level of importance for meeting internal Bonneville operational needs and requirements.
- Build routes necessary to upgrade the operation of Bonneville's transmission system.
- If the need to upgrade the telecommunication system is immediate, install fiber-optics even if costs must be recovered completely through rates.
- Establish contracts with 5-year paybacks from TSPs.
- Help rural communities, constituents, and public entities connect to the telecommunications network, while recovering cost from those constituents and public entities.

- Work with traditional transmission customers and other Federal agencies to help meet their operational needs.

## ACTIVITIES

- To date, about 2,000 miles of Bonneville fiber-optic cable have been installed or are being installed for nine projects, at a cost of about \$127M. These projects have expanded and improved Bonneville telecommunications capacity. Table 1 lists projects that have been completed as of December 1999.
- Bonneville administers all fiber-optic installation, and uses either its own construction crew (as available) or expert contract crews to install, depending on outage availability. If no outage is available, and the line must be worked hot, Bonneville crews always carry out the work.

**Table 1: Completed Installations (December 1999)**

<b>COMPLETED INSTALLATIONS (DECEMBER 1999)</b>				
<b>PROJECT</b>	<b>MILES</b>	<b>FIBERS</b>	<b>TOTAL COST (M)</b>	<b>FUNDING*: OTHER/BPA</b>
Hot Spring-Garrison (western Montana)	120	36	\$10.4	0% / 100%
Ross-Franklin-Bell (Vancouver, WA to Spokane)	558	36	\$33.9	0% / 100%
Bandon-Alvey (southwest Oregon)	123	36	\$ 4.5	100% / 0%
Keeler-Covington (Portland to Seattle)	197	72	\$14.6	0% / 100%
Alvey-Keeler (Eugene to Portland)	146	72	\$ 8.7	0% / 100%
Ross-Malin (Vancouver, WA to the California-Oregon border)	403	72	\$23.5	0% / 100%
Bell-Covington (Spokane to Seattle)	274	72	\$16.9	0% / 100%
Lane-Fairview (Eugene to Coos Bay)	108	144	\$11.4	100% / 0%
Olympia - Aberdeen	46	72	\$3.4	50% / 50%
<b>TOTAL</b>	<b>1975</b>	—	<b>\$127</b>	

- Funding: Initial costs funded upfront by others/costs funded by Bonneville.

- Bonneville has initiated a public interconnection/benefits program:
  - Bonneville has put in place an agreement with Northwest Open Access Network that allows for public benefit use for rural communities to interconnect with 1000 miles of Bonneville's fiber in the State of Washington.
  - Bonneville is working with CoastNet to provide some fibers for interconnection of rural communities in Oregon.

## BONNEVILLE'S INTERNAL NEEDS TECHNICAL AND OPERATIONAL

Bonneville requires each of its communication systems to have a reliability of 99.986%. Bonneville is moving from an analog microwave radio system to a digital system. The agency's digital options were fiber-optic cable, microwave radio, and satellite. Satellite was rejected due to long time delays, low bandwidth, and high cost. Therefore, Bonneville is installing a primarily fiber-optic system, supplemented by a digital microwave system. Reliability will remain Bonneville's paramount reason for ensuring high-quality communications.

Bonneville installs mostly All Dielectric Self-Supporting (ADSS) cables. ADSS cables are purchased in a variety of fiber counts, strengths, and glass types as needed to meet the unique needs of each project. To date, Bonneville has installed standard-sized cables containing 36, 72, or 144 strands of glass that run from 72 to 145 kilometers (45 to 90 miles), depending on the type of terminal equipment used. The range of sizes (fiber count) is related to the quickly evolving telecommunications industry and associated technology.

- Bonneville owns, operates and maintains the backbone components of its transmission grid in order to effectively implement the directive of the Transmission System Act to "maintain the electrical stability and electrical reliability of the Federal system." Reliable system operation depends upon Bonneville having full operational and maintenance control of the communications fibers which provide for

second-to-second control of the system's various components. Reliability would suffer if Bonneville had to depend upon third party operation or maintenance of these fibers.

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- Deregulation requires more capacity to handle a growing number of transactions. System operations require intensive real-time monitoring and controls, high-speed digital control and protection systems, data operation, database matching between control centers, and wide-area measurement systems to monitor power system equipment performance.
- The cost of fiber-optics is less expensive on a life-cycle and per-channel basis than analog or digital microwave radio.
- Fiber-optics has a much greater capacity: OC3 Digital radios have a capacity of 2016 voice circuits; fiber-optic OC12 has a capacity of 8064 such circuits. Fiber-optic system capacity can easily be expanded by a factor of 100 or more to meet future need. Fiber-optic cable is not terrain- and weather-dependent as microwave radios are. The cable is projected to last for 40 years.
- Fiber-optics allows the agency to reduce its dependence on Federal radio frequencies. Frequency diversity, which is the mainstay of Bonneville's analog system, is no longer acceptable for radio systems; acquiring new frequencies near metro areas and along the Canadian border is very difficult. Bonneville's options are becoming limited because the Federal Communications Commission (FCC), on behalf of the Federal Treasury, is continuing to auction off government frequencies.
- In locations where Bonneville has passive reflectors and long paths, digital radios cannot be used as a replacement.
- A state-of-the-art communications system increases the value of the region's investment in the existing transmission grid and allows Bonneville to meet future new capacity needs without the environmental impacts of construction (the towers on which the fiber is strung are already in place).

## CURRENT AND FUTURE OPERATIONAL NEEDS

### Estimating Future Need

After estimating numbers of fibers needed for reliable operation, Bonneville began installing 36-fiber cables (an industry standard)<sup>1</sup> in 1996. Based on what analysis can tell us today, it is expected that the upper future limit for Bonneville's operational needs will be above 100 fibers (see following discussion). Therefore, Bonneville is currently installing 72- to 144-fiber cable to meet estimated needs (see Table 2), depending on area of estimated demand.

Installing a larger (e.g., 144-fiber) cable than is currently required is highly cost-effective in planning for rapidly expanding future agency needs. Current thinking is to install more glass (fiber) at one time, rather than installing additional cables at a later time and dramatically increasing costs. The incremental cost for materials associated with a larger cable is nominal compared to the additional construction costs of repeated installations.

### Determining Fiber-optics Requirements

Bonneville must plan both for its near-term and long-term operational needs for fiber-optic cable.

- **Near-term (5 - 20 years):** Bonneville is currently reserving 12 fibers on all routes for internal operational needs.
- **Longer-term (beyond 20 years):** Bonneville is reserving 72 to 100+ fibers for operational needs.

This projected need is based on a cable life expectancy of approximately 40 years, anticipated expanding future bandwidth demand, and maximum system reliability achieved through redundant glass paths. The fiber number varies depending on high demand areas (such as the North-South Intertie) and lower demand areas in Bonneville's more remote feeds. Future bandwidth demand will be increased by the need for real time operational data, RTO traffic, administrative communications, and public benefits.

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<sup>1</sup>Current industry standard sizes are 36-, 72-, and 144-fiber cables.

Redundant glass strands are provided in order to accommodate the following major concerns:

- Direct control paths for transfer trip switching.
- Spare fiber to be used in case of partial cable damage within the cables own operating ring.
- Extra fiber that serves as a back-up path for short-term fiber damage in adjacent communication rings.
- Redundant fiber serving as back-up for long-term, catastrophic, adjacent ring damage.

**Ring Reliability:** Bonneville currently is installing major rings to provide redundant routes for reliability and back-up of the transmission system. These backbone rings are 400 to 800 miles long. The larger the ring, the greater the chance of a failure. To increase reliability, Bonneville will continue to subdivide the large loops into smaller (about 150-mile) routes to provide alternate paths for communications traffic in case a cable is damaged and traffic has to be rerouted in the other direction. This doubles the need for fiber in the backbone rings.

**Spare Glass:** All fiber-optic cable has experienced some glass breakage over time. Rather than go out and replace the cable each time some aging glass breaks, Bonneville has added extra fibers to the cable for backup. The agency has to date only about 15 years experience with fiber, so Bonneville wants to be conservative to ensure that the fiber can be used for 40 to 50 years. In addition, extra fibers are added for catastrophic events. If there is a mudslide in the Gorge or a flood in the Willamette Valley, the whole loop can be alternately routed.

**Public Benefit Fiber:** In addition, to meet its commitment to provide public benefits, Bonneville is providing at least four fibers for public use throughout its entire fiber-optics network.

## CRITERIA FOR INSTALLATION

Determining where and when to install fiber-optic cable is a multi-step process.

1. **Determine operational requirements and priorities.** Bonneville's first and foremost criterion for decisions on installing fiber-optic cable for communication is operational need. Operational requirements and priorities are typically defined by the following three factors:
  - What kind of control, protection and data acquisition information is needed to/from Bonneville facilities.
  - What level of availability for the communication system is required (main grid or sub-grid).
  - If main grid, what other reliability considerations are required (e.g., alternate routing, parallel fibers).
2. **Identify current commercial lease opportunities.**
3. **Select routes where operational requirements and commercial lease opportunities intersect.**
4. **Consider routes where operational requirements exist and public benefits are possible, even though lease opportunities are not strong.**
5. **Identify resource requirements and impacts (capital and staffing needs; workload impacts).**

## ACTIVITIES

The following projects are all justified under operational requirements.

**Table 2: Projects Committed for 2000**

Project	Fiber #	Miles	Cost (\$M)
Seattle - B.C. Border	144	166	\$13
Spokane - Noxon	72	96	\$ 4
Beaverton - Tillamook	72	100	\$ 6.5
Umatilla - LaGrande	72	86	\$ 5.3
Oregon City - Troutdale	72	66	\$ 4.5
Port Angeles - Olympia	72	107	\$ 6.5
Totals	—	621	\$39.8

**Table 3: Future Projects**

Project	Miles
Noxon - Hot Springs	165
Covington - Blaine #2	92
Keeler - Maple Valley	223
Alvey - Keeler #2	120
Fidalgo - Lopez Island	10
Alvey - Malin	225
Swan Valley - Teton	35
Bell - Boundary	100
Monroe - Chief Joseph (N Route)	120
Bandon - Gold Beach	50
Garrison -Anaconda	45
Franklin - Hatwai	130
Noxon - Hatwai	175
Hot Springs - Conkelley	75
Swan Valley - Goshen	50
Aberdeen - Allston	135

As operational requirements identified in the previous table intersect with commercial opportunities, those projects will be fit into the annual budget constraints shown on the following table.

**Table 4: Planned Capital Expenditures for Fiber-optics (FY01 - FY03)**

Fiber Budget	Loaded Costs (30%) (\$ Millions)
FY 01	\$ 36.9
FY 02	\$ 31.4
FY 03	\$ 18.1
Totals	\$86.4

**JUSTIFICATION OF ALL FIBER-OPTIC CABLE INSTALLATION ACTIVITIES**

**General Authority**

Bonneville is statutorily mandated under the Transmission Systems Act (16 U.S.C. § 838, et seq.) to own, operate and maintain the Federal transmission system in the Pacific Northwest. As a consequence, Bonneville may not rely on third parties to provide the operational communications for the transmission system.

Also, under the Bonneville Project Act of 1937, Bonneville is mandated to maintain the Federal transmission system in order to continuously provide a reliable source of electric power to its customers. Section 2(c) of that Act states the following:

*The administrator is authorized . . . to acquire . . . real and personal property . . . including . . . electric transmission lines, substations, and facilities and structures appurtenant thereto, as the administrator finds necessary or appropriate to carry out the purposes of this chapter*

Bonneville Project Act, § 2(c) 16 U.S.C. §832.

Consistent with that authority, Bonneville acquires communications facilities necessary to operate its transmission facilities reliably. Bonneville has maintained its own communications facilities under its existing authority, bolstered by waivers from Federal statutes requiring certain procurement procedures for communications facilities.

Generally, Bonneville is installing 36- or larger-fiber-optic cable system-wide to meet the communications needs of Bonneville’s larger transmission lines. This practice creates fiber-optic cable capacity in excess of Bonneville’s operational needs along certain transmission routes for the short term. Bonneville evaluated ways to best use that excess capacity. Bonneville determined that it had the authority, under sections 2(e) and 2(f) of the Bonneville Project Act, to contract to lease fiber-optic cable capacity in excess of its current operational needs. Section 2(e) of the Bonneville Project Act explicitly gives the Administrator the authority to:

*sell, lease, or otherwise dispose of such personal property as in his judgment is not required for the purposes of this chapter and such real property and interests in land acquired in connection with construction or operation of electric transmission lines or substations as in his judgment are not required for the purposes of this chapter . . .*

Bonneville Project Act, § 2(e) 16 U.S.C. §832.

Bonneville received explicit authority from the President to dispose of property in accordance with this provision on April 11, 1994. See Letter from William J. Clinton to the Secretary of Energy, RE: Disposal of Real Property of the Bonneville Power Administration (April 11, 1994). Therefore, Bonneville has explicit authority to lease incidental, excess fiber-optic capacity.

## **PUBLIC BENEFITS**

One important goal of Bonneville activities under the Commercial Plan is to make end user access in rural areas comparable with end user access in urban areas. (Many telecom companies have focused on urban areas because the return on investment is higher in dense population areas and will support a legitimate business case; this often leaves rural areas lagging behind.) So long as this objective — to enable rural access rates comparable to urban rates—is furthered, Bonneville will entertain the possibility of contracts with both non-profit and for-profit entities.

- Bonneville's goal is to provide interconnection to those rural communities with limited or no present telecommunications capacity.
- If some limited capacity is present, Bonneville's aim is to help ensure that the cost for telecommunications services is comparable to that in an urban area. Bonneville's support could bring about competition between existing local TSPs.
- Bonneville might also bring telecommunications capacity to an area with no present access.
- Bonneville assistance could allow an organization to provide services to rural communities for hospitals, schools, libraries, and so on.
- It could also bring economic development to rural communities; the stipulation is that the new business must originate or terminate in the rural community itself.
- Bonneville has provided at least four fibers for rural communities on all Bonneville fiber-optic cable routes (nine projects as of December 1999).
- TSPs who lease dark fibers are required to comply with state regulatory, registration, and certification requirements.

## **BONNEVILLE'S COMMERCIAL LEASE PLAN**

### **INTRODUCTION**

Bonneville's Commercial Plan is based on its commitment to upgrade its own communications system, thereby increasing reliability and safety, while minimizing costs to ratepayers. Therefore, it seeks to lease temporarily only those fibers presently excess to Bonneville need, with an eye to recovering the cost of original installation within five (5) years. Bonneville thus receives the value of the physical asset, as its operational fiber is paid for by lease arrangement of fibers currently not needed by the agency.

The Plan's success is based on five core ideas:

1. **Opportunity.** Bonneville can provide a willing alternative source of fiber-optic capacity for TSPs.
2. **Infrastructure.** Bonneville can provide a path via an infrastructure already in place, not only for traffic within the region, but through it.
3. **Reliability.** Bonneville offers experience, core competencies, transferability of skills, and a level of reliability of service that can make it an attractive source of dark fiber in the Pacific Northwest.
4. **Public Service.** Bonneville can take advantage of high-revenue city-pair markets, and thereby provide public service to rural or less-advantaged communities near its routes.
5. **Regional and National Value.**
  - An improved communications system helps keep the transmission network safe and reliable.
  - It improves customer satisfaction.
  - It increases the value of the business and supports the business viability of the agency.
  - It supports the financial viability of the agency at minimum cost to ratepayers. (In the 1996 Transmission Rate Case, Bonneville included a revenue projection from potential commercial leases as an offset to transmission rates.)

## JUSTIFICATION

Bonneville's Fiber-optic Strategy includes the temporary leasing of dark fibers surplus to Bonneville's current needs to TSPs, under a variety of contractual payback plans. The discussion below compares the provisions and impacts of a strategy that would not recover costs through leasing (A) with those of the strategy the agency is currently using, which includes cost-recovery through leasing (B).

- **Alternative A: Funded solely by Bonneville (ratepayers).** If Bonneville were to upgrade its communication system solely to meet current and projected operational needs, it would invest in a combination of fiber-optics and radio. To date, costs to install a 36-fiber cable for operational purposes only would have been \$80M to \$100M for the 2,000 miles already built. This entire amount would then be collected from transmission ratepayers, with the following financial implications:

1. The capital investments would all be funded using Borrowing Authority.
2. Payback would be 20 years, the average depreciation life used by Bonneville for communications equipment.
3. By definition, the net present value (NPV) of the investments would be zero, because rates are set to exactly recover costs, including a charge for risk.
4. Transmission ratepayers would pay for the entire cost of upgrading the communication system, because there would be no TSP revenues offsetting the costs of the fiber-optic investments.

- **Alternative B: Funded by Bonneville (ratepayers) and TSPs.** Bonneville has built to meet high future Bonneville fiber-optic needs (choosing 72-fiber or larger cable; leasing the temporary excess fibers). This means that installations to date have cost \$120M (rather than the \$80 - \$100M noted above). The extra \$20 - \$40M can provide the following financial benefits:

1. The TSPs provide part of the capital needed to upgrade Bonneville's communication system. This could increase the amount of Borrowing Authority available for Bonneville's other capital needs.
2. The goal for all projects that involve TSPs is to reduce payback time from 20 years to 5 years.
3. The NPV is greater than zero for all deals involving TSPs.
4. The transmission rate effect of upgrading communications capability is minimized, because TSP revenues lower the transmission revenue requirement. The 1996 Rate Case anticipated TSP revenues for communication services (PCS and fiber) averaging \$9 million per year, which offset transmission rates.

In addition, the transmission system infrastructure becomes more valuable. The revenues and up-front capital received from the TSPs will make it economically feasible for Bonneville to provide fiber-optics over a much greater portion of the transmission system.

## POLICY

- **Interconnection.** Bonneville policy for interconnecting with TSPs and other electric utilities is summarized by the following points:
  - **Use:** All uses of Bonneville's real property must be approved in advance.
  - **Access Rights:** TSPs and electric utilities must secure their own rights of access to Bonneville's rights-of-way from the underlying landowners.
  - **Connectivity Allowance:** Bonneville allows foreign-fiber<sup>2</sup> connectivity into Bonneville substations for the exclusive purpose of an electric utility's operational power system needs relating to communication, control, protection, and data acquisition.
  - **Fiber Limits:** The number of foreign-fibers with connectivity into a Bonneville substation

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<sup>2</sup> "Foreign," as used here, means non-Bonneville fiber or equipment.

is limited to the number of fibers, including spares, that the electric utility needs for power system operational purposes.

- **Ownership:** Bonneville owns all fiber attached to or entering Bonneville facilities.
  - **Foreign-owned Limits:** Bonneville does not allow foreign-owned commercial facilities, such as regeneration huts, or capabilities inside a Bonneville substation perimeter fence.
  - **Pole Attachments.** Attachment of foreign fiber to Bonneville-owned transmission structures is not normally allowed.
- **Federal Communications Commission Regulation**  
Bonneville is not a “common carrier” regulated by the Federal Communications Commission (FCC). Title II of the Federal Communications Act of 1934 is the law under which the FCC regulates “common carriers,” TSPs that offer telecommunications services on a universal, nondiscriminatory basis. Bonneville does not fit, and does not wish to fit this category. Bonneville only leases its temporarily excess fiber-optic cable capacity, and then only to selected TSPs that then transmit their own data as part of their business. Consequently, Bonneville is not competing with private sector providers of telecommunications services.

Because Bonneville does not fall within the “common carrier” category, Bonneville is a “private carrier” in terms of FCC jurisdiction. The FCC generally does not regulate “private carriers.” The FCC may try to assert its ancillary jurisdiction generally with particular regard to three issues: just and reasonable rates, protection of the public interest, and the possibility of an action that might be harmful to competition. The extent to which the FCC may assert its ancillary jurisdiction over Bonneville is unclear. Nevertheless, Bonneville does tailor its agreements to ensure that these do not become issues for concern.

- **Telecommunications Act of 1996**

The Telecommunications Act of 1996 allowed electric utilities to enter the telecommunications business, but did not address the issue of the participation of Federal power marketing authorities (such as Bonneville). Consequently, Bonneville is not venturing into the telecommunications business by offering telecommunications services as Tacoma City Light, PGE-Enron, and other utilities are currently doing. Bonneville has restricted its participation in the telecommunications industry solely to the lease of its temporarily excess unlit fiber-optic cable capacity.

Consistent with Bonneville’s limited participation, Bonneville is not pursuing the provision of lit services because of limitations on the agency’s authorities. Bonneville may respond to requests from other Federal agencies for lit fiber for Federal operational needs.

#### **Criteria for Leasing Agreement Decisions**

The following conditions determine where and when leasing agreements are made between Bonneville and parties interested in leasing excess Bonneville fibers:

- Bonneville’s operations determine the amount of fiber that can be characterized as “excess” and the terms of its availability.
- A market analysis (carried out at six-month intervals) determines the rate.
- Analysts check the TSP’s finances and carry out a risk assessment on the TSP’s ability to pay and the likelihood of Bonneville recovering its costs.
- To minimize risk or loss of investment, Bonneville is continuing to diversify contract types (revenue-sharing vs. fiber-per-mile [annual fee or one-time upfront]) and customer base.
- The expected life of a fiber-optic cable is about 40 years. Bonneville assesses its operational needs before determining length of term

(between 3 and 25 years) to lease fiber on any given contract. Given these facts and Bonneville's planning process before leasing, the agency has not taken back any leased fiber ahead of schedule and does not plan to do so. Bonneville has anticipated flexibility in operational needs by varying the contract terms.

### Key Conditions (Highlights)

The terms of any fiber-optic arrangement are subject to the following conditions:

- Bonneville owns all fiber-optic cable installed on its transmission-line towers and shall own all fiber attached to or entering Bonneville facilities.
- Only Bonneville crews or Bonneville-approved contractors may install fiber on Bonneville facilities.
- In all cases, Bonneville shall have exclusive rights to the number of fibers necessary to meet its operational needs, including fibers for redundancy and any other technical requirements.
- Bonneville needs take precedence over commercial opportunities. Lease arrangements are limited by Bonneville's operating needs; contracts are written for periods of anywhere from 3 to 25 years, depending on estimated Bonneville timeframe for fiber use.

### Land Rights Analysis

It is important to consider Bonneville's land rights when contemplating the leasing of fibers to commercial entities. The agency's transmission lines occupy easements that have been acquired over the last 60 years. The easement language can vary significantly from project to project. Most easements provide Bonneville with the right to use the land for "electric power and transmission line purposes." Some contain more specific language regarding the "attachment of appurtenances," or "permit the attachment of wires of others." A few allow for the "attachment of signal wires." Any new easements acquired now specifically

allow for "the attachment of appurtenances for communication facilities."

Bonneville believes that the attachment of fiber-optic cable systems used for the operation and maintenance of the power system (either by Bonneville by other utilities) is consistent with our land rights. However, when contemplating the leasing of fiber to outside commercial entities that will not use the fibers for activities that support the power system, it is important to conduct a more detailed analysis of the particular real property rights on the project. If the land rights are not deemed to be adequate, it may be necessary to improve the land rights or make the lessee responsible for any deficiencies with the land rights.

### LEASING ACTIVITIES

#### Current and Planned Leasing Summary

The following table shows TSP actual and forecast revenues for FYs 1997 - 2002 for existing and near-term projects.

**Table 5: Current and Projected Fiber-optics Revenues (\$M)**

1997	1998	1999	2000	2001	2002	2003	Total
<i>\$ millions</i>							
1.4	2.1	4.6*	10.5	13	15	19.8	66.4

• Estimated.

- In 1999, Bonneville received assets worth \$17M through various agreements with TSPs.

#### Lease Rate Justification

Based on operating needs, Bonneville will lease excess fibers for periods of 3 - 25 years. Bonneville is structuring the leasing of its excess fiber capacity to result in short (5-year) paybacks of the capital investments. Bonneville uses a single contract format (terms and conditions). However, the agency does not use a single pricing strategy because it believes that using varying pricing strategies maximizes payback.

Several different types of commercial lease arrangements may be negotiated. Each route has a

different market rate associated with it. The differences are based on the following:

- city-pair,
- distance between city-pair,
- numbers of fibers leased,
- availability of fibers,
- market price,
- market/route demand,
- presence or lack of available infrastructure,
- capital payback,
- Bonneville's operational need for the route, and
- the percentage of revenues negotiated.

Based on the demand for a particular route, pricing will vary for each route and the value of a route will change over time. Arrangements may be exclusive (which would restrict Bonneville from leasing additional fibers to other providers on the same route) or non-exclusive. Much of the risk can be mitigated through contractual conditions (see "Key Conditions"). However, it is important to remember that, as investment risk shifts to the TSP, so does revenue potential. Below are the types of commercial arrangements Bonneville currently uses for its fiber-optics leasing plan.

- 1) **Projects Funded in Advance.** The TSP finances part or all of the costs for materials and installation up-front, in exchange for temporary use of some of the fibers. Bonneville owns all the fiber-optic cable and retains several fibers for operational use.
- 2) **Fixed fee.** Bonneville finances the materials and installation of the fiber-optic route. The TSP pays an annual or one-time fixed fee for some of the fibers.
- 3) **Revenue percentage.** Bonneville finances the materials and installation for a fiber-optic route. Bonneville receives a certain percentage of the TSP's gross revenues derived from the specific Bonneville route. Revenue-sharing arrangements are shaped so as to recover construction costs within a 5-year period.

- 4) **Equipment/services Agreement.**<sup>3</sup> Bonneville or the customer may finance construction, depending on the amount of money Bonneville wants to invest in this option-the more equipment or services, the more Bonneville would receive from the customer. This type of arrangement may involve the exchange of equipment or services in lieu of cash payment.
- 5) **Hybrid.** Combinations of 1-4, above. The arrangements discussed in 1 - 4, above, may be combined in an agreement to make the best business decision, whether to consider operational, commercial, or public benefit aspects.

Any of these agreements may be tailored to needs in terms of exclusivity, maintenance costs, and restoration. In all cases Bonneville will own and maintain the entire cable, but will provide terminal equipment only for its own uses. Commercial lessees will be responsible for providing their own electronic terminal equipment.

## REVENUES AND REPAYMENT

### Financing Fiber-optic Investments

Bonneville has two options for financing fiber-optic investments: 1) Federal borrowing authority or 2) cash provided by TSPs. Bonneville uses borrowing authority to finance these projects under the following conditions:

1. when the fiber must be installed in order to meet transmission system requirements and no TSP is interested in leasing the fiber, or
2. when a commercial arrangement with a TSP provides for fixed fee or revenue-sharing agreement.

When no TSP is interested in leasing the fiber (condition 1), the cost of the fiber investment must be recovered from transmission revenues. When the fiber route has a revenue-sharing or fixed-fee agreement (condition 2), the cost of the fiber is recovered by a

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<sup>3</sup> This kind of agreement could stand alone, or could apply to any of the previous options (1 - 3).

combination of TSP revenues and transmission revenues. Bonneville does not issue a specific debt instrument for fiber investments; rather, it issues debt periodically for accumulated transmission capital spending without regard for specific projects.

When Bonneville uses cash provided by TSPs to finance the fiber-optic investment, Bonneville owns the fiber and retains the right to use the fiber for operational purposes. The TSP has a lease agreement to use some of the fibers.

### **Excess/Deficit Revenues and Subsidy**

In the 1996 Rate Case, Bonneville included a revenue projection from potential commercial leases as

an offset to transmission rates. With 3 years of the rate period complete, TSP revenues have slightly underrun the rate case projection. Nevertheless, Bonneville anticipates that TSP revenues will closely match the rate case projection in total over the 5-year rate period.

Deviations from the 1996 rate case projection are anticipated to be small and immaterial. However, after FY 2001 (the end of the rate period), Bonneville will assess revenue sufficiency against the rate case projection and determine whether revenues exceeded or underran expectations. Based on results, Bonneville will determine how to allocate excess or deficit revenues if the magnitude of the deviation is significant.

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DOE/BP-3224 November 1999 2M

