Regional Background Paper

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Background Papers are compilations of information intended for use as tools by decision-makers in the member state governments, private business enterprises and in educational institutions.

A Comparison of Unit Train and Slurry Pipeline Transportation of Coal

This is a Regional Background Paper from the Federation of Rocky Mountain States directed by the governors of Colorado, Montana, New Mexico, Utah, and Wyoming.

This Regional Background Paper is an attempt to provide an objective comparison of unit train and slurry pipeline transportation of coal. This Paper was prepared under a directive of the Energy Resources Committee of the Federation's Natural Resources Council.

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and Slurry Pipeline
Transportation of Coal

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OVERVIEW

Coal production in the Rocky Mountain region has grown sharply in recent years and is projected to continue substantial growth for at least the remainder of this century. Although some of the coal produced will be consumed or converted near the mine site, much of it will be transported significant distances to markets both within and outside the region.

The most practical means of transporting large amounts of coal long distances, in the absence of suitable waterways, is by railroad or slurry pipeline. Both means of transportation have environmental and other impacts associated with their use, and both have proponents who argue that each has significant advantages over the other. Since the manner by which coal will be transported has important implications for the region, the Federation of Rocky Mountain States undertook a study of coal slurry pipeline and unit train transport order to provide a comparison of the advantages and impacts of each. This report is a description of that effort.

Statements prepared by Burlington Northern and the Slurry Transport Association are presented in the appendices. The statements address issues dealt with in the report and provide further insight into the opposing viewpoints.

I. DESCRIPTION OF EACH SYSTEM

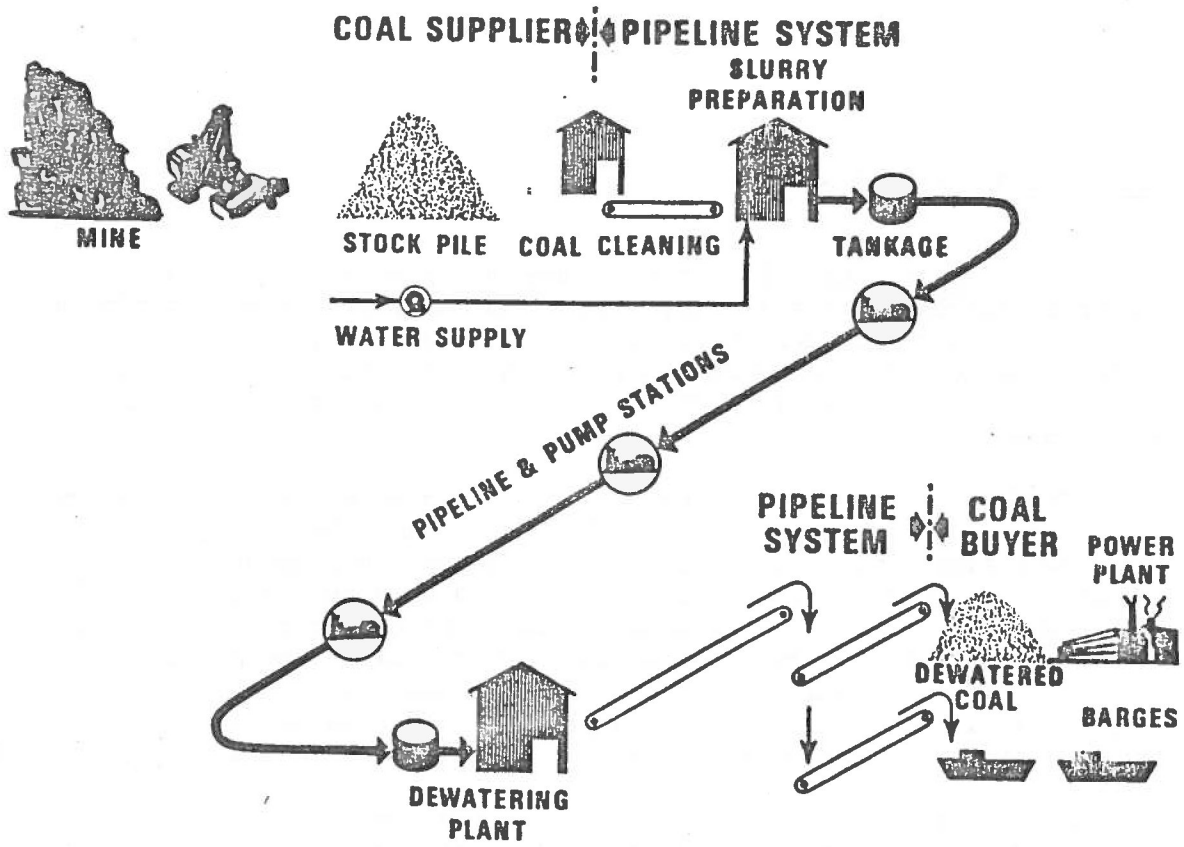
Slurry Pipelines. Slurry pipelines are pipelines that carry solid material suspended in a liquid. The solid material can be any mineral, such as coal, copper concentrate, oil shale tailings, etc., and the liquid can be water, hydrocarbons, or other fluids. This paper deals with slurry pipelines transporting coal and using water as a means of conveyance.

The slurry pipeline system consists of three principal operations. These are shown in Figure 1.1. Coal is crushed by impactors and ground to a very fine size so that it attains a consistency about like that of sugar. The finely ground coal is then mixed with an equal amount of water and stored in agitated tanks to keep the coal particles in suspension. When introduced to the pipeline, the slurry moves at a low velocity (about 3½ miles per hour) under pressure created by a pumping station. In order to maintain pressure and constant flow, additional pumping stations must be placed at 50-100 mile intervals along the pipeline.

At the termination of the line, the pipeline delivers its product into large tanks where it is held until dewatering. Separating the coal from the agitated water is usually accomplished by using vacuum filtration or centrifuging. Once separated from the water and sufficiently dried, the coal is ready for use. (Disposition of the slurry water is discussed in a later section.)

Figure 1.1

Explanation of Coal Slurry Pipeline System



Source: Statement of John M. Huneke, Vice President, ETSI, before the U.S. House Committee on Interior and Insular Affairs, September 12, 1975.

Although the use of slurry pipelines has only recently become an issue of major public interest, the concept is not new. Slurry pipeline use in the U.S. dates back to the 1850's when a line was constructed in California to transport gold-bearing sands. The first long-distance slurry pipeline in the U.S. was constructed in 1957 to transport Gilsonite from Utah to a refinery near Grand Junction, Colorado. The same year Consolidation Coal Company constructed a 10-inch, 108-mile long coal slurry pipeline from Cadiz, Ohio, to a power plant in Cleveland. The line operated for six years, transporting about 1.3 million tons of coal per year, but was shut down when reduced railroad freight rates made continued operation uneconomical. Competition created by operation of the slurry pipeline was a significant factor in effecting a reduction in rail freight rates from $3.47 per ton to $1.88 per ton.[1]

The most recent development in the U.S. was the construction in 1970 of the longest and largest coal slurry pipeline ever built -- the Black Mesa line. This pipeline is owned by the Southern Pacific Transportation Company, which also owns the Southern Pacific Railroad. Some 273 miles long and 18 inches in diameter, this pipeline transports about 4.8 million tons of coal per year between Kayenta, Arizona, and the Mohave Power Plant in Nevada. A much longer and larger line has been proposed by a company called Energy Transportation Systems, Inc. (ETSI), to run between Wyoming and Arkansas. This line is in the advanced stages of planning and would transport 25 million tons of coal per year over a 1,036-mile distance. Figure 1.2 shows existing and proposed coal slurry pipelines in the U.S.

Construction of the proposed long-distance slurry pipelines shown in Figure 1.2 cannot proceed, however, unless rights-of-way can be acquired. Virtually any long-distance slurry pipeline constructed in the U.S. would have to cross railroad rights-of-way along its route. The railroads have been unwilling, however, to grant permission for such crossings and strongly oppose legislation that would provide slurry pipeline sponsors with the power of eminent domain.

Legislation authorizing the power of eminent domain to slurry pipeline sponsors passed the Senate in 1974. The House did not take action on similar legislation and the Senate bill (S. 3879) died at the end of the 93rd Congress. Efforts to enact eminent domain legislation did not die with the 93rd Congress, however, and several additional bills were introduced at the beginning of the 94th Congress. The House Committee on Interior and Insular Affairs held eleven days of hearings in 1975 on slurry pipeline

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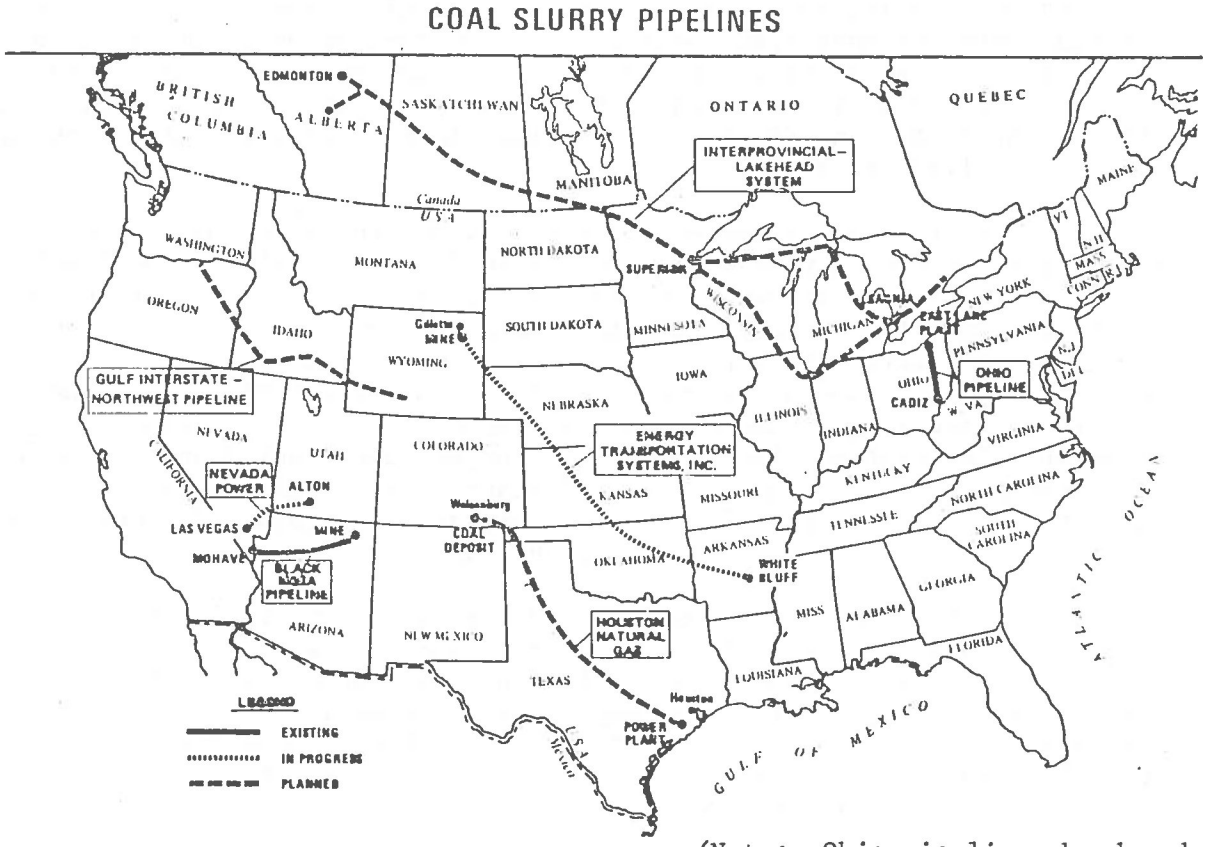
[1] Hudson Institute, Research Analysis of Factors Affecting Transportation of Coal by Rail and Slurry Pipelines, p.11.

Figure 1.2

Coal Slurry Pipeline Network



(Note: Ohio pipeline abandoned in 1963)

Source: Statement of John M. Huneke, Vice President, ETSI, Inc., before the U.S. Senate Committee on Interior and Insular Affairs, June 11, 1974.

legislation (H.R. 1863, H.R. 2220, H.R. 2553 and H.R. 2896), but the legislation did not come up for a committee vote during 1975. In June of 1976, Representative Bob Eckhardt introduced a new bill (H.R. 14385) that addressed some specific concerns identified during the 1975 hearings. The bill came up for a committee vote on June 30 and was tabled by a 21-19 margin.

Shortly after the defeat of Eckhardt's bill, the board of the Office of Technology Assessment, a research arm of Congress, voted to conduct a study of the issues associated with slurry pipeline use. The study is scheduled to be completed in the spring of 1977, and sponsors of slurry pipeline legislation expect it to be a trigger for Congressional action early in the first session of the 95th Congress.[2]

Another approach available to slurry pipeline sponsors is to obtain the power of eminent domain from the individual state legislatures along the pipeline route. For pipelines that cross several states, this can be a difficult and time-consuming process. Measures to authorize the power of eminent domain to slurry pipeline sponsors have been unsuccessful in recent sessions of the Nebraska, Kansas, and Oklahoma legislatures.

A third approach to removing the obstacle posed by railroad opposition to slurry pipeline crossings is through the courts. ETSI has filed three identical suits in Wyoming against three individual railroads. According to Frank Odasz, ETSI's Rocky Mountain area manager, the suits seek a declarative judgment stating that the railroads do not have the right to deny pipeline crossings at locations where the right-of-way is not owned in fee simple but is an acquired easement from a private landowner. In a number of places, railroad rights-of-way do not follow the original land grants but have been constructed across private lands through the purchase of easements. At these locations, the ETSI suits contend, the railroads do not have the right to deny crossings. If the suits are successful, thus allowing rights-of-way to be purchased from the individual landowners, the ETSI pipeline could proceed without eminent domain authorization. ETSI and the slurry pipeline industry, however, continue to seek federal legislation authorizing the power of eminent domain.

Unit Train Transport. Two-thirds of U.S. coal traffic is moved by rail. Until recently, most of this traffic was limited to relatively short hauls. Long-distance transportation was uneconomical in most cases because of the availability of competing fuels and because the value of coal relative to its weight is low. The economics of coal transportation have changed substantially in recent years, however, due to several significant developments. First, the demand for low-sulfur coal has grown dramatically. Second, low-sulfur Western coal that commonly occurs in shallow seams of great thickness can be surface mined at a much lower cost than most Eastern low-sulfur coals. This fact has allowed Western coal to compete in Eastern markets even with substantial transportation costs

[2]Ted Vaden, "Pipelines, Railroads Contend for Coal Transport Business," Congressional Quarterly, Vol. XXXIV, No. 3, July 24, 1976, p.1965.

added to the price. Third, the railroads have developed a system of unit train transport that has greatly reduced freight rates for long-distance hauls.

A unit train, for the purposes of this report, is a complete train of dedicated cars loaded at the origin, unloaded at one destination each trip, and moving in both directions on a predetermined schedule.[3]

Figure 1.3 is an illustration of a coal unit train system. A typical unit train consists of 100 cars, each carrying 100 tons, with a total delivery of 10,000 tons. Improvements in technology allow rapid loading and unloading (see Figure 1.3) and minimize idle time and inefficiencies. For example, one railroad that formerly used 2,400 hopper cars to transport 3½ million tons of coal now uses only 892 cars in unit train service to deliver the same volume to the same destination.[4] Burlington Northern estimates that such increased efficiencies and other improvements inherent in unit train operation have reduced the cost of coal to the utility by more than 50 percent.[5]

In sum, unit train operation allows low-cost transportation of large volumes for long distances. Coal is currently being hauled by unit trains on a regularly scheduled basis from Montana, Wyoming, and other Western states to destinations up to 1,200 miles away. Although it might be argued that the use of slurry pipelines doesn't preclude use of unit trains and vice versa, a variety of policy questions surrounds any decision about which means is more desirable or which combination of means should be utilized. Further, several railroads argue that construction of a single major slurry pipeline would seriously threaten their ability to raise the capital necessary for needed improvements and expansion -- which would affect transportation of not only coal and energy fuels, but thousands of other products as well.

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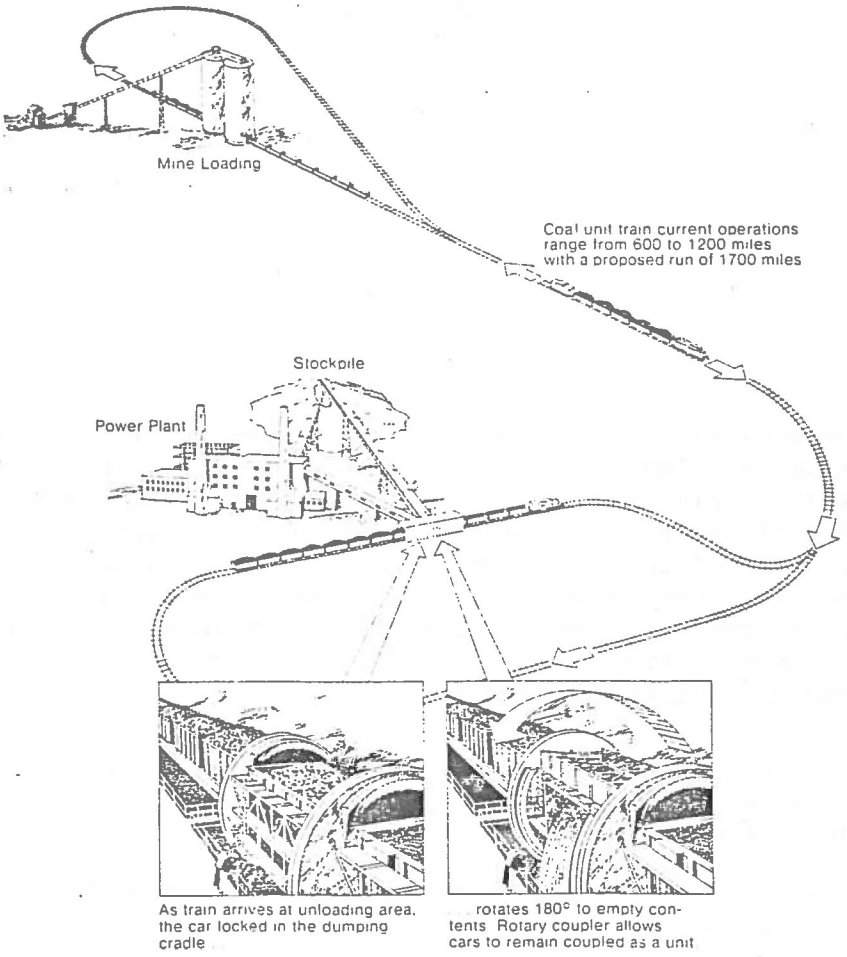
[3]U.S. Department of Interior, Comparison of Economics of Several Systems for Providing Coal-Based Energy to Users 1,000 Miles Southeasterly from Eastern Wyoming Coal Fields: Form Modes of Energy Transportation and Electricity versus Gas as the End Use Energy Forms, as cited in Coal Slurry Pipelines Legislation Hearings before the Committee on Interior and Insular Affairs, U.S. House of Representatives, 94th Congress (Washington, D.C.: U.S. Government Printing Office, 1975, p. 350. Hereafter cited as CSPL.

[4]Testimony of Stephen Ailes, President, Association of American Railroads, CSPL, p.914.

[5]Burlington Northern, "Unit Trains Bring Economies in Rail Service." No. 71271.S, p.2.

Figure 1.3

Coal Unit Train Transportation System



Source: Statement of Louis W. Menk, Chairman and Chief Executive officer, Burlington Northern, Inc. CSPL, p.93

II. WATER USE

A discussion of water use in coal transportation must necessarily focus on slurry pipelines since water use in unit train transport is minimal. As in nearly all matters involving water use in the West, the desirability of water use in slurry pipelines is a major point of contention. Transport of coal in slurry pipelines requires a quantity of water approximately equal to the quantity of coal being transported. For a large pipeline such as that proposed by ETSI, this translates to about 15,000 acre-feet per year. Construction of several major pipelines within the region would thus constitute a significant water use.

From a regional perspective, export of coal by means of slurry pipelines would require far less water than would conversion to electricity or synthetic fuels within the region. About one ton of water is required to move a ton of coal by slurry pipeline, while coal gasification plants use two tons of water and a steam-electric plant requires approximately seven tons to convert a ton of coal.[6]

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[6]Testimony of Jack O. Horton, Assistant Secretary for Land and Water Resources, DOI, CSPL, p.129.

In making such comparisons, it must be emphasized that water use in a slurry pipeline represents the amount required to transport coal in a raw state and not the amount required to convert the coal to a usable form of energy such as electricity. Depending on its quality or the level of treatment provided, water used in a slurry can be reused at the pipeline terminus to provide a portion of the process or cooling water requirements of an energy facility. More water is required to convert the coal than was required to transport it in the pipeline, however, and it is misleading to make comparisons of water usage unless the comparison is made to illustrate the difference between a policy of export versus one of conversion. On a national level, water consumption inherent in conversion of coal transported by slurry pipeline or by unit train will be very similar. The policy consideration is whether or not exporting water from a water-short region to a region where water is of relative abundance is prudent. Decisions regarding water use must be made in accordance with the legal, resource, and economic conditions that exist in a specific state at a specific location and at a particular time.

It is important to note that federal legislation authorizing the use of eminent domain by slurry pipeline sponsors may not preserve state jurisdiction in the allocation of water for use in a slurry pipeline. Section 10 of H.R. 1863 contained language that would seem to guarantee protection of states' rights in water use:

"Sec. 10. Nothing in this Act shall be construed

(1) as affecting in any way any existing law governing appropriation, use or diversion of water, or any Federal, State, or private right to water;

(2) as expanding or diminishing Federal or State jurisdiction, responsibility, or interests in water resources development or control;

(3) as displacing, superseding, limiting, or modifying any interstate compact or the jurisdiction or responsibility of any legally established joint or common agency of two or more states or of two or more States and the Federal Government; or

(4) as superseding, modifying, or repealing, except as specifically set forth in this Act, existing laws applicable to the various Federal agencies which are authorized to develop or participate in the development of water resources or to exercise licensing or regulatory functions in relation thereto."

Companion bills in the House and Senate contained similar language. More than one attorney, however, has stated that these provisions would not provide adequate protection of state jurisdiction. Frank Morison, an attorney with the Denver firm of Holland and Hart, states:

> "While the language of Section 10 would appear to adequately protect states' rights and states' jurisdiction over water, nevertheless, a series of decisions of the United States Supreme Court with respect to similar language have so narrowly interpreted such provisions that, in fact, protection of the states' rights and states' jurisdiction has not been effective."

As an example of such narrow interpretation, Morison cites a 1948 case wherein the Federal Power Commission had rejected an application for a license needed to construct a hydroelectric project because the petitioner had not secured approval for water use from the state in which the project was to be located, as required under the provisions of the Federal Power Act. The petitioner appealed the ruling and the case eventually reached the Supreme Court. The Supreme Court ruled in favor of the petitioner, stating that to require state approval as a condition of federal approval ". . . would vest in the Executive Council of Iowa a veto power over the Federal project. Such a veto power could easily destroy the effectiveness of the Federal act."

In a memorandum to the Federation of Rocky Mountain States (Appendix F), Morison elaborates on this decision and cites several others that cast doubt upon the effectiveness of language protecting states' rights. Thus, if Morison's interpretation of proposed federal legislation is correct, allocation of water for use in a slurry pipeline would not be a matter of state jurisdiction. Along these lines, provisions such as the Colorado statute prohibiting export of water from the state would be invalid when applied to slurry pipelines. A statute enacted by the Montana legislature, declaring water use in a coal slurry pipeline a nonbeneficial use, could also be in jeopardy.

Slurry water can be used after it is separated from the coal to provide a portion of the cooling or process water requirements. If low-quality water is used, it must be treated before reuse or disposal. Even if high-quality water is used, some treatment may be required before reuse. Contaminants picked up during the slurry process can be removed without prohibitive costs.[7]

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[7]Testimony of John A. Green, Administrator, Region VIII, EPA, CSPL, p.124.

III. ENVIRONMENTAL IMPACTS

Land Use. Slurry pipelines require much less land than unit trains transporting the same amount of coal over a similar distance. Slurry pipelines are buried two-and-one-half feet underground and the surfaces above them can be reclaimed and returned to their former uses. The only permanent land use involved is for processing facilities at each end of the pipeline and pumping stations at widely spaced intervals along the route. A 1,000-mile, 38-inch diameter slurry pipeline would disturb 12,550 acres along its route, but only 840 surface acres would be precluded from other uses by surface structures such as pumping stations, coal preparation, and dewatering plants. Some additional, but relatively small, land requirements are associated with development of a water supply for the pipeline. Figure 3.1 is a summary of land utilization for a typical coal slurry pipeline system.

Land requirements will vary depending on the topography along the route. Crossing areas of high relief will require additional pumping stations to maintain pressure in the line. Furthermore, a slurry pipeline cannot take a straight-line route across rugged country, but must be angled up a contour when slopes in excess of 15 percent are encountered.[8] Since a pumping station occupies only 50 acres, the addition of one or two stations would not greatly increase land utilization over the amount shown for the typical pipeline in Figure 3.1.

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[8]Ray Davidson, The Coal Slurry Pipeline Alternative, (Denver: Western Governors' Regional Energy Policy Office, November, 1975), p.12.

Figure 3.1

Pipeline Land Utilization Summary

TYPICAL 1000-MILE 38" DIAMETER
COAL SLURRY PIPELINE SYSTEM

Description of Use	Acres
Slurry Pipeline Right-of-Way	12,550
Coal Preparation Plant	100
Dewatering Plant	200
Slurry Pipeline Pump Stations (10 Stations)	470
Water Supply Gathering Pipeline Right-of-Way	610
Water Supply Pump Station	60
Water Supply Wellhead Facilities	10
TOTAL	14,000

NOTES:
1. Right-of-way acreage restored after completion of construction.
2. Acreage used for construction phase (spreads, warehousing, etc.) is not included since it will be returned to its former condition.

Source: Statement of John M. Huneke, Vice President, ETSI, before the Senate Committee on Interior and Insular Affairs, June 11, 1974.

Railroads generally do not run underground and construction of track precludes other uses of the area occupied by the right-of-way during the life of the line. Construction of a 113-mile line in the Powder River Basin of Wyoming, for example, will require a right-of-way occupying 2,400 acres. Additional land utilization is associated with construction of spur lines to service individual lines in the region. Thirty-seven miles of spur lines will be constructed, bringing total mileage to 150 miles.[9] Using an average of 18 acres per mile of track, an additional

[9]U.S. Department of Interior et al, Draft Environmental Impact Statement on Development of Coal Resources in the Eastern Powder River Coal Basin of Wyoming, Vol. III (1974), p. II-3. Hereafter cited as Draft EIS.

666 acres will be utilized by spur line construction. If all new track and rights-of-way were required for long-distance hauls, a very large amount of land would be utilized. Tracks are in existence, however, to serve most markets where there is a demand for Western coal. Thus, it is difficult to project the overall amount of land required for new rights-of-way if most coal production is transported by unit train.

One comparison that can be made is between the proposed Powder River Basin rail line and a hypothetical slurry pipeline similar to that proposed by ETSI. The rail right-of-way, not counting spur lines, will occupy 2,400 acres and is projected to result in a loss of 75 antelope through habitat destruction.[10]

A slurry pipeline originating in the same area would require about 70 acres for water development facilities, 100 acres for a coal preparation plant and about 100 acres for pumping stations over the 113-mile segment. If no additional track is needed beyond the 113-mile line, there would not be a significant additional line requirement for the rail system, whereas the slurry pipeline would require about 50 acres for a pumping station each 100 miles and about 200 acres for a dewatering plant. Even so, total land utilization for a 1,000-mile slurry line would be less than that of the proposed 113-mile rail line in the Powder River Basin.

Energy Efficiency. It is difficult to draw a conclusion about which means of transportation is more energy efficient. Railroads concede that single-car shipment of coal is less energy-efficient than slurry pipelines, but argue that unit train transport is somewhat more energy-efficient than slurry pipeline transport. Slurry pipeline sponsors state that slurry pipelines are more efficient than rail transport. Independent studies have reached mixed conclusions. Figure 3.2 presents various estimates of energy consumption for each mode of transportation.

Adding to the difficulty of making comparisons is the fact that energy consumption varies for both modes of transportation, depending upon terrain and other factors. For example, comparing energy consumption of a unit train hauling coal from eastern Montana to Spokane, Washington, with slurry transport from eastern Wyoming to Houston, Texas, is not a valid comparison due to the great difference in topography over the two routes. It is perhaps significant to note, however, that estimated energy consumption on a ton-mile basis for the proposed ETSI line is similar to that estimated by Burlington Northern for transportation over relatively similar routes.

Another factor to consider is the potential for slurry pipelines to be constructed over a more direct route than a railroad utilizing existing track. Frank Odasz, ETSI Rocky Mountain Area Manager, states that the proposed ETSI pipeline route is 34 percent shorter than the route that would be used to provide unit train service to the same destination.

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[10] Draft EIS, p. II-107.

Figure 3.2

Comparison of Estimated Energy Consumption (BTU Per Ton-Mile)
Between Unit Train and Slurry Pipeline

Source of Estimate	Unit Train	Slurry Pipeline
Representative of Burlington Northern Railroad. (Estimate based on trip between Colstrip, Montana, and Havana, Illinois.)	250	---
T.C. Aude, T.R. Thompson, and E.J. Wasp, Economics of Slurry Pipeline Systems, Figure 3. (Estimate assumes throughput of five million tons per year.)	680	270
Theodore D. Browne and Edward F. Harvey, Wyoming Energy Consumption, p.28. (Estimate does not account for energy consumed in returning empty train to mine.)	300	750
Letter of George M. Stafford, ICC Chairman, as reproduced in Coal Slurry Pipeline Legislation Hearings, p.641. (Estimate is based on energy consumption for operating Black Mesa Line, 273-mile pipeline running from Kayenta, Arizona, to Davis Dam, Nevada.)	---	295
Dana Martin, Thomas Frizzell, and Richard Bourke, Montana Energy Policy Study, p.145. (Adapted from an estimate for unit train service between Colstrip, Montana, and Spokane, Washington.)	1080	
U.S. Department of Interior, Comparison of Economics of Several Systems for Providing Coal-Based Energy to Users 1,000 Miles Southeasterly from Eastern Wyoming Coal Fields -- Four Modes of Energy Transportation and Electricity Versus Gas as the End Use Energy Forms as reproduced in Coal Slurry Pipeline Legislation Hearings, p.344.	250	600

Air Quality. Neither mode of transportation has major air quality impacts associated with its use. Slurry pipelines have no air emissions directly associated with their use except for those generated in producing the electric power needed for their operation and some potential low-level losses of coal dust at the crushing and dewatering plants. Coal dust may also be released if a technical problem requires that the line be cleared and the slurry mixture emptied into holding ponds adjacent to the pumping stations. This potential problem could be eliminated through implementation of regulations requiring that the holding ponds be covered.

Unit trains, primarily through their consumption of diesel fuel, do release a continuous, although not major, amount of combustion by-products into the air. Figure 3.3 shows estimated average locomotive emissions per unit train trip over the Gillette-Douglas route. Unit train operation generates additional particulates by stirring up dust along the right-of-way.

Water Quality. Unit train transport has a minor impact upon water quality. Slurry pipeline impacts upon water can vary substantially depending primarily on the location of the water supply and the amount of water required. Potential water quality impacts are also associated with accidental discharge caused by rupture of the pipeline and discharge into holding ponds caused by a technical failure.

Figure 3.3

Average Locomotive Emissions Per Unit Train

	Average Locomotive* Emission Factors	Average Locomotive Emissions** Per Unit Train/Per Round Trip
	Lb/10^3 gal.	Lb/Per Trip
Particulates	25	121
Sulfur Oxides (SO_x as SO_2)	57	277
Carbon Monoxide	130	633
Hydrocarbons	94	457
Nitrogen Oxides (NO_x as NO_2)	370	1801
Alclehydes (as HC HO)	5.5	27
Organic Acid	7	34

*Assumes train of 110 cars and 5 locomotives at 3,000 HP.
**Assumes round trip of 4.3 hours with one-half the distance empty and one-half loaded.

Source: U.S. Environmental Protection Agency, Office of Air and Water Programs, Office of Air Quality Planning and Standards Research; Compilation of Air Pollutant Emission Factors, EPA Bulletin No.42, as cited in Draft EIS, p. II-40.

Diversion or extraction of water from a natural water supply can have substantial impacts upon water quality. The severity of the impact depends upon the amount withdrawn in relation to the quality and quantity of the water source. Diversion of 15,000 acre-feet from the main stem of the Missouri River may not have a major impact whereas the same diversion from a smaller river or drainage system could have a major impact. By the same token, extraction of a large quantity of water from one aquifer may have no significant impact on water quality while withdrawal of the same amount from another can cause an increase in salinity to a degree where it is no longer suitable for domestic or agricultural use. With so many variables, it is impossible to generalize about the water quality impacts of water usage in slurry pipelines. The impacts vary with the individual conditions of a specific project and any assessment of these impacts must be made in view of these specific conditions.

From a water quality and water availability perspective alone, however, unit train transport is preferable to slurry pipeline transport since it does not require water to be exported from the region, thus leaving the water available for other uses. Slurry pipelines do not affect water availability when water otherwise unavailable for use is drawn from an aquifer in an amount that does not affect water quality or other water users in the region. ETSI makes such an argument in its proposal to extract 15,000 acre-feet per year from the Madison formation in Wyoming. Sharply conflicting claims have been made about the effect of this withdrawal, however, and the controversy surrounding it underscores a vital concern -- the impacts of slurry pipeline withdrawals on water quality and availability must be thoroughly understood before informed decisions can be made on applications for such appropriations.

A rupture in the line could cause discharge of coal slurry into a water body, which would have an impact on water quality. The likelihood of such discharges are relatively low, however, and coal slurry would not have as significant an impact as petroleum products. Another potential water quality impact could occur through a forced discharge of the slurry into holding ponds. This problem could be largely eliminated, however, by lining the ponds with an impervious coating.

Socioeconomic Impacts. More employees are required to operate a rail system than would be required to operate a slurry pipeline transporting the same amount of coal an equal distance. ETSI states that only 335 employees would be required to operate its proposed slurry pipeline and estimates that approximately 2,500 workers would be needed on a rail system hauling the same quantity an equal distance.[11] All the employees required for each system, however, would not be located in the same area. For example, it is estimated that 75 ETSI employees would be located in Wyoming (for a system moving 25 million tons per year) while 258 railroad employees associated with the Gillette to Douglas line (for a system moving 38 million tons per year by 1980) would reside in the state. The population impact of both systems is not major and is much less than that associated with large conversion facilities.

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[11] Energy Transportation Systems, Inc., Slurry Pipelines: Innovation in Energy Transportation (May 1975), p.14.

Although less labor-intensive than rail systems, slurry pipelines are much more capital-intensive. Since the investment required to construct a slurry pipeline is greater than that required for a comparable rail system, a slurry pipeline would generate a greater amount of tax revenue per employee than a unit train system. Figures 3.4 and 3.5 present employment, population, and fiscal impact implications of slurry pipelines and unit train systems. These comparisons are based on the Wyoming portion of the ETSI slurry pipeline and the Gillette to Douglas rail line. The values presented are thus project-specific and would not remain constant in all cases. The pattern shown in Figures 3.4 and 3.5, however, would be similar in other comparisons between unit train systems and slurry pipelines transporting large volumes of coal over similar routes.

Noise and Disturbance. Unit train transport is more disruptive in terms of noise and visual impacts than slurry pipelines. Slurry pipelines are silent and after reclamation their rights-of-way are not readily apparent. Visible facilities and sources of noise include only the coal preparation and dewatering plants and pumping stations placed at wide intervals along the line.

A unit train consisting of 110 cars and 5 diesel units is about 1.2 miles long. Traveling at 25 miles per hour, such a train would pass a given point in approximately three minutes.[12] Moving 25 million tons of coal from Wyoming to Arkansas by 100-car unit trains would mean that separate trains would pass a given point every hour and three-quarters throughout the day (24 hours).[13] Unit train traffic, besides being highly visible, would be a source of a substantial amount of noise at frequent intervals. Figure 3.6 presents noise levels for various rail vehicles and trucks. The impacts of this noise would depend primarily upon the location of the line and its proximity to residences and communities. In some communities -- where heavy unit train traffic is projected -- noise could be a significant and disruptive problem.

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[12] Draft EIS, P. II-35.

[13] U.S. Department of Interior, CSPL, p.341.

Figure 3.4

Employment, Population, and Fiscal Impact Implications of Slurry Pipelines

YEAR / IMPACT	Column 1: Direct Employment – Construction	Column 1: Direct Employment – Permanent	Column 1: Direct Employment – Total	Column 2: Direct and* Indirect Related Population	Column 3: Construction Expenditures (millions)	Column 4: Assessed Valuation of New Construction (millions)	Column 5: Assessed Valuation Per Direct Plus Indirect Related Population (Column 4/Column 2)
1	1150	0	1150	3019	70	0	--[a]
2	600[b]	0	600	1575	204[c]	14.2[c]	9,016
3	0	75	75	469	0	38.9[c]	82,942
4	0	75	75	469	0	38.8[c]	82,729
5	0	75	75	469	0	38.7[c]	82,516
10	0	75[b]	75	469	0	38.0[c]	81,023

* Indirect related population includes the service workers and their families that are associated with the direct employees and their families.

[a] The ratio of assessed value is computed on the basis of 25% of total expenditures in the preceding year. The assessed value for year one is therefore zero.

[b] Telephone interview with Mr. Hal Ragsdale, Energy Transmission Systems, Inc.

[c] Based on non-pipeline expenditures of $49.3 million assessed at 25% and 50 miles of 35" slurry pipeline and 35 miles of 16" pipeline laid in year one; $141 million of non-pipeline expenditures assessed at 25% in year two. Pipelines are depreciated at 2.5% per year. The expenditure schedule is based on an interview with Hal Ragsdale, op. cit. The assessment procedures are based on an interview with Mr. Merrill Ainsworth, Wyoming Dept. of Revenue.

Source: David D. Freudenthal, Peter Ricciardelli, and Michael N. York, Coal Development Alternatives: An Assessment of Water Use and Economic Implications (Wyoming Department of Planning and Economic Development, Dec. 1974), p.A-4.

Figure 3.5

Employment, Population, and Fiscal Impact Implications of Unit Trains

YEAR	IMPACT	Column 1: Direct Employment – Construction	Column 1: Direct Employment – Permanent	Column 1: Direct Employment – Total	Column 2: Direct and* Indirect Related Population	Column 3: Construction Expenditures (millions)	Column 4: Assessed Valuation of New Construction (millions)	Column 5: Assessed Valuation Per Direct Plus Indirect Related Population (Column 4/Column 2)
1		300	0	300	788	20	0[a]	--[b]
2		300	0	300	788	45	5	6345
3		300[c]	112[d]	412	1544	50[e]	11.25	7286
4		0	258	258	1613	0	12.5	7750
5		0	258[f]	258	1613	0	12.5	7750
10		0	293[g]	293	1832	0	12.5[h]	6823

* Indirect related population includes the service workers and their families that are associated with the direct employees and their families.

[a] Based on average of "18th Steam Stations Cost Survey" Electrical World, Nov. 1, 1973 and unpublished information furnished by Mr. John Goodier, Chief of Mineral Division, Wyoming DEPAD.

[b] Expenditure patterns based on unpublished information furnished by Mr. Bob Lindaur, EXXON Corp. Total cost based on Steve Miller's data.

[c] Powder River Basin Environmental Impact Statement.

[d] Based on ratio of export tonnage to employment and the export tonnages projected in Powder River Basin Environmental Impact Statement, P. II-36.

[e] Based on interviews with Mr. Maury Wauxland, Burlington Northern Railroad. These are expenditures only for the Gillette-Douglas line. It is reasonable to assume that this will be the biggest single capital outlay undertaken by the railroads in Wyoming.

[f] Powder River Basin EIS, p. II-123.

[g] Estimate based on expert tonnage projections from Wyoming Geological Survey and employment ratios used in the Powder River Basin Environmental Impact Statement.

[h] Based on estimate by Mr. Harold Debolt, Wyoming Department of Revenue. Assessed evaluation of railroads is complicated by a number of factors about which insufficient information is available at the present time to make more precise estimates possible. These figures should, therefore, be treated with considerable caution.

Source: David D. Freudenthal, Peter Ricciardelli, and Michael N. York, Coal Development Alternatives: An Assessment of Water Use and Economic Implications (Wyoming Department of Planning and Economic Development, December 1974), p.A-2.

Figure 3.6

Comparison of Noise Levels for Rail Vehicles and Trucks

Vehicle	Noise Level (Decibels - 50 ft. from Vehicle)
Railroads	
a. Diesel, Electric, Locomotives	88 - 98
b. Freight Cars	80 - 94
c. Passenger Cars	80 - 90
Trucks	
a. Light	70 - 85
b. Medium	80 - 89
c. Heavy Duty	85 - 95

Source: Kerber, Matthew J., Your Government and the Environment - A Supplemental Environmental Reference, Vol. 2 S. (Output Systems Corporation, 1973/74).

IV. IMPACT OF SLURRY PIPELINE USE ON THE RAILROADS

An important public policy issue associated with the use of slurry pipelines is the effect their usage would have upon the stability and economic health of the railroads. Slurry pipeline sponsors, some utilities, and the National Coal Association have argued that future coal traffic will be so great that there will be enough business for all modes of transportation without crippling competition. Railroad spokesmen sharply disagree with these assertions and have stated that the existence of a single major slurry pipeline would jeopardize the ability of the railroads to raise capital needed for improvements and growth.

About two-thirds of the coal produced in the U.S. is currently transported by rail. Coal traffic accounts for 25 percent of the railroad industry's volume, 13 percent of its ton-miles, and 11 percent of its revenue.[14] Plans for expansion and upgrading of facilities on several major roads are also heavily dependent on projected revenue derived from coal traffic. Obviously, coal traffic is of vital importance to the industry. The effect that competition with slurry pipelines for a share of this traffic would have upon the railroad industry is not so obvious.

Coal production in the nation, and in the Rocky Mountain region in particular, is projected to grow dramatically in the next decade. A National Academy of Engineering study, for example, projected a doubling of coal production by 1985. Many other studies have projected production increases of a comparable magnitude. The railroad industry expects to maintain a dominant position in transporting much of this increased production. In 1974, the Burlington Northern Railroad hauled 16 million tons of Western coal but expects to haul between 140 and 150 million tons by 1980.[15] Gearing up to handle an increase of this magnitude requires major investments for equipment purchases and rail line construction and upgrading. Louis Menk, chairman and chief executive officer of Burlington Northern, has testified before Congress that his company expects to invest nearly one billion dollars over the next five years to accommodate projected coal traffic.[16]

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[14] Testimony of Stephen Ailes, President, Association of American Railroads, CSPL, p.915.

[15] Testimony of Louis W. Menk, Chairman and Chief Executive Officer, Burlington Northern, Inc., CSPL, p.933.

[16] Ibid., p.939.

The existence of a single major slurry pipeline competing for this traffic, Menk said, could have a major and possibly fatal effect on the company's ability to finance these needed improvements. Other railroad officials have expressed similar concerns.

Sponsors of slurry pipelines and other pipeline proponents reject such arguments of railroad vulnerability. Referring to Menk's testimony, ETSI has countered that projected coal traffic will be sufficient to allow Burlington Northern a healthy rate of growth, even if the ETSI line captures 25 million tons per year:

> " . . . Can his (Menk's) railroad not share a minor portion of that enormous increase in the national interest and still be more successful than it has been? If the ETSI pipeline should divert 25 million tons of the anticipated increase, would not an increase from 16 million tons to 200 million tons in a decade still be considered a comfortable growth trend for the railroad?"[17]

If Burlington Northern's coal traffic projections are correct and if only one slurry pipeline encroaches on this traffic, it appears unlikely that Burlington Northern would suffer substantial economic harm. The company should still, in fact, experience substantial growth. But, if one slurry pipeline is constructed and operated successfully, more are likely to follow if they can obtain a water supply and the necessary government approvals. This would seem to be Menk's and the railroads' concern. Slurry pipelines could then capture a much larger percentage of projected coal traffic.

Not only would the loss of large volumes of coal traffic be a severe blow, the railroad industry argues, but also slurry pipelines would capture the most profitable traffic. In the words of several railroad industry representatives, slurry pipelines would "skim off the cream" of the coal traffic.[18] Such skimming refers to a belief that the slurry pipelines would transport only the profitable large volume, long-term movements and would leave the less lucrative traffic to the railroads. Under Interstate Commerce Commission (ICC) regulations, the railroads have the obligation as common cariers to serve the needs of all users without showing prejudice in car supply. They must make their services available to anyone willing to pay the tariff. Furthermore, ICC regulations prevent a railroad from signing a long-term contract, or any contract, to carry goods. Freight rates are determined on a year-to-year basis.[19]

Slurry pipelines are also regulated by the ICC once they begin operations. The ICC takes full jurisdiction over slurry pipeline rates, valuations, and reports and regulates them to assure that no shippers will be discriminated against.[20]

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[17]Statement and comments of Energy Transportation Systems, Inc. (Washington, D.C.: U.S. Government Printing Office, 1975), p.1962.

[18]Testimony of Jerry E. Gobrecht, Vice President, Louisville and Nashville Railroad Co., CSPL, p.835.

[19]Ibid., p.840.

[20]Testimony of George M. Stafford, Chairman, ICC, CSPL, p.631.

It isn't clear, however, how slurry pipelines will be prevented from discriminating against shippers in terms of providing access to the pipeline. In other words, once a slurry pipeline capacity has been contracted for, additional shippers cannot be accommodated unless another line is built or additional capacity becomes available. Floyd Lewis, President of Middle South Utilities, testified before Congress that:

> "Common carrier status does not require you to vitiate contracts freely negotiated and entered into. And once you have contracted up 100 percent of capacity, you don't have to say someone else comes in and wants a service, so I have to vitiate a contract I have already signed."[21]

Since the slurry pipelines cannot serve all comers and do have the ability to enter into long-term contracts, a situation of unfair competition is created, the railroad industry argues, that would enable the slurry pipelines to dominate large-volume, long-distance hauls. It is difficult to speculate on how great this domination could become and how severe an impact on the railroads would result. In some cases, competition between a railroad system and a slurry pipeline may be beneficial and completely within the railroad's ability to absorb. In other cases, considering the precarious financial position of some railroads, loss of current or projected coal traffic may be a fatal blow. George Stafford, Chairman of the ICC, expressed such concern in his statement that ". . . each proposal for a coal pipeline must be examined on the basis of total national need rather than simply on its own commercial viability."[22]

The railroad industry serves a variety of transportation needs more economically than other modes of transportation. Loss of a railroad can have major impacts on the area it formerly served, and the federal government has spent large sums of money to reduce such railroad failures. Thus, it is important that slurry pipeline proposals be evaluated on the basis of their impact on the overall transportation system, particularly the railroads. An important element of a study authorized by Congress and expected to be completed by the spring of 1977 is an analysis of slurry pipeline competition on the railroads.

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[21] Testimony of Floyd W. Lewis, President, Middle South Utilities, Inc., CSPL, p.778.

[22] Testimony of George M. Stafford, Chairman, ICC, CSPL, p.623.

V. ECONOMICS

The cost of shipping a unit of coal through a slurry pipeline varies considerably in relation to several factors, but is primarily a function of volume and distance. Figure 5.1 presents transportation costs per ton-mile for coal shipment via unit train, slurry pipeline, and extra high-voltage transmission over a 1,000-mile distance. As shown in Figure 5.1, unit train transportation costs are constant while slurry pipeline costs (per ton-mile) decline as throughput increases. Although there is some variation in unit train transportation costs, the variation is not an exclusive function of volume and distance shipped. Figure 5.2 presents slurry pipeline transportation costs as a function of both throughput and distance. Savings on a ton-mile basis are realized as distance increases.

The data in Figures 5.1 and 5.2 were developed by ETSI and have been challenged by the railroad industry. Louis Menk of Burlington Northern argues that the savings projected by ETSI in transporting large volumes cannot be realized because such large volumes cannot be consumed by a single user but must be redistributed by feeder lines or transferred to another mode of transportation. Such a redistribution, Menk argues, eliminates projected savings and, in fact, makes slurry pipeline transportation more expensive than unit train transportation.

The original ETSI proposal envisioned shipping 25 million tons to a power complex 30 miles south of Little Rock, Arkansas. The proposed power complex would have been the largest in the world, consisting of four 800-megawatt units. A ruling by the Arkansas Public Service Commission (PSC), however, has denied approval of two of the proposed units. The denial was based on several considerations, including a finding that no more than two of the units could be constructed at the proposed site without creating an unacceptable adverse impact on the environment.[23]

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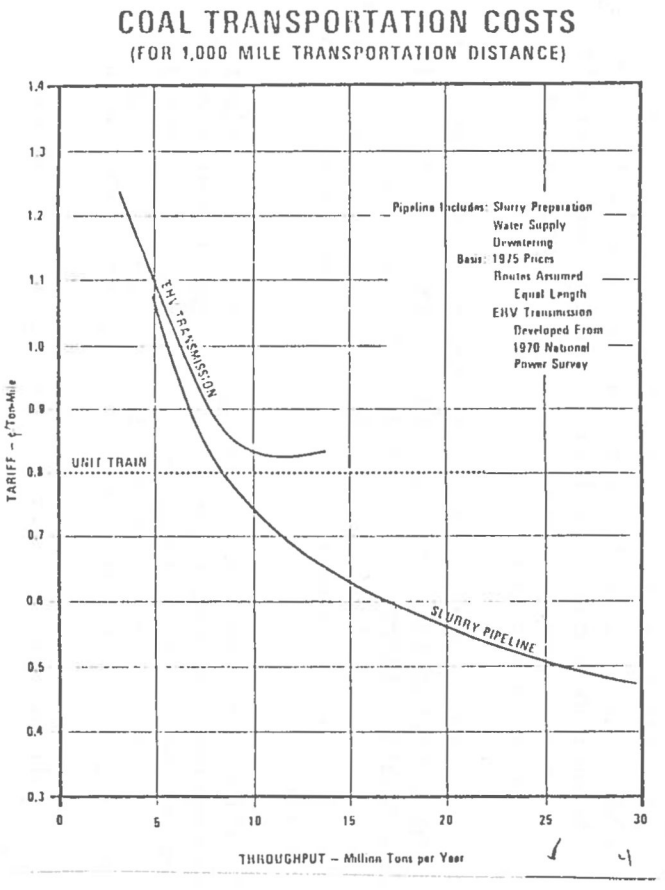
[23]Arkansas Public Service Commission, CSPL, p.945.

Figure 5.1

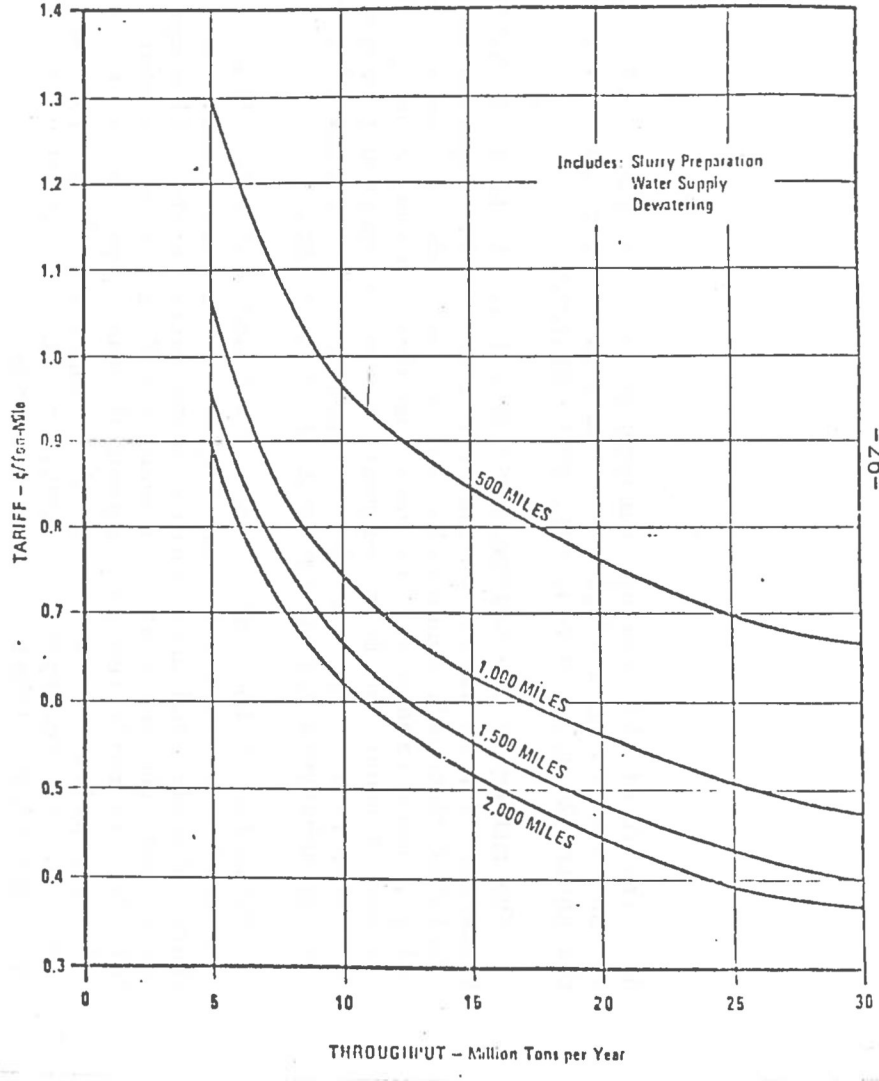
Comparison of Coal Transportation Costs Over One Thousand Mile Distance for Unit Train and Slurry Pipeline



Source: ETSI, Slurry Pipelines, Innovation in Energy Transportation, (May 1975), p.8.

Figure 5.2

Coal Slurry Pipeline
Transportation Costs



Source: ETSI, as reproduced in CSPL, p.951.

As a result of this ruling, throughput of the proposed ETSI line could not be consumed at a single site but would have to be redistributed if the entire 25 million tons were to be shipped.

The ruling of the Arkansas PSC is not likely to be an isolated instance. Concentration of coal-fired generating capacity in the magnitude proposed, considering current air emission control technology, would create environmental problems in many areas of the nation. A reduction in throughput, a need to construct feeder lines, or a need to transfer the slurried coal to another mode of transportation can add substantially to the cost of transportation.

Estimates of the cost of unit train and slurry pipeline transportation are by no means uniform. Figure 5.3 presents various estimates of slurry pipeline and unit train transportation costs. Although there are variations, the costs of both modes are fairly close in most estimates. This fact is reflected in a Bureau of Mines report that states: "Neither (slurry pipelines or unit trains) is superior to the other in any broad spectrum. Yet for specific cases, one will undoubtedly be preferable to the other though likely to narrow margins."[24]

Figures 5.4 and 5.5 present estimates of the investment and operating costs of a slurry pipeline and unit train system transporting 25 million tons a year over a 1,000-mile distance. As illustrated by the figures, the capital requirements of a slurry pipeline system are greater than those of a comparable unit train system. The operating costs of a slurry pipeline, however, are lower than those of a unit train system. The lower operating costs result primarily because fewer employees are required to run a slurry pipeline than a comparable unit train system. Slurry pipeline sponsors argue that lower operating costs will result in substantial, long-term savings because capital-intensive slurry pipelines are better insulated from inflation, and thus from rate increases, than the more labor-intensive railroads.

The railroads counter that both systems are affected by inflation since the interest rate on borrowed capital needed to finance a slurry pipeline would reflect a projected inflation rate over the period of investment. Having this factor built into capital costs would eliminate the presumed insulation from inflation. (This argument is developed further in Appendix A.)

If allowed to compete freely, coal users will select the means of transportation that can deliver coal at the lowest overall cost. But the lowest cost to individual companies may not be the lowest cost to society. There are cost externalities, such as the impact of slurry pipeline water use, or the disturbance created by 100-car unit trains rumbling through communities at frequent intervals, that may not be reflected in the cost per unit of coal delivered. Public policy is most likely to evolve from these issues.

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[24] U.S. Bureau of Mines, Long-Distance Coal Transport: Unit Trains or Slurry Pipelines, IC 8690, p.24.

Figure 5.3

Comparison of Estimated Cost (Dollars Per Ton-Mile) Between Unit Train and Slurry Pipeline

Source of Estimate	Unit Train	Slurry Pipeline
Dana Martin, Thomas Frizzel and Richard Bourke, Montana Energy Policy Study.	.58 - .77	.32 - .60
Energy Transportation Systems, Inc., Slurry Pipelines: Innovation in Energy Transportation (Assumes throughput of 15 million tons per year for 1,000-mile distance).	.8	.64
U.S. Department of Interior, Comparison of Economics of Several Systems for Providing Coal-Based Energy to Users 1,000 Miles Southeasterly from Eastern Wyoming Coal Fields -- Four Modes of Energy Transportation and Electricity Versus Gas as the End Use Energy Forms as reproduced in Coal Slurry Pipeline Legislation Hearings, p.344.	.72	.59
Michael Rieber, Shao Soo, and James Stackel, The Coal Future: Economic and Technological Analysis of Initiatives and Innovations to Secure Fuel Supply Independence (Estimate found in Wyoming to Arkansas route).	---	.62
Representative of Burlington Northern (Actual rate, Wyoming to Amarillo, Texas, hauling about one million tons per year).	.71	---

Figure 5.4

Cost of Slurry Pipeline Transportation of Coal (1975)

[Dollars in million]

Item	No debt [1] (1975)	75 percent debt [2] (1975)
Total investment	$746.0	$746.0
Required net cash flow per year	92.6	85.8
Annual depreciation (on construction)	(22.0)	(22.0)
Required after-tax profit plus interest	70.6	63.8
Interest		(42.1)
Profit	70.6	21.7
Federal income tax at 50 percent	70.6	21.7
Required gross profit per year	141.2	43.4
Interest		42.1
Estimated annual operation costs:		
Direct costs	23.8	
Indirect costs	2.5	
Taxes and insurance	13.2	
Depreciation	22.0	
Total	61.5	
Required total annual income	202.7	147.0
Estimated required per ton-mile	$0.0081	$0.0059
Mills	(8.1)	(5.9)

[1] 12 percent return, 30 yr.
[2] At 9½ percent interest and 15 percent return on equity; 11 percent return on total investment.

Source: Comparison of Economics of Several Systems for Providing Coal-Based Energy to Users 1,000 Miles Southeasterly From Eastern Wyoming Coal Fields: Form Modes of Energy Transportation and Electricity Versus Gas as the End Use Energy Forms, as cited in CSPL, p. 353.

Figure 5.5

Cost of Rail Transportation of Coal (1975)

[Dollars in millions]

Items	No debt [1] (1975)	75 percent debt [2] (1975)
Total investment	$478.0	$478.0
Required net cash flow per year	59.3	55.0
Annual depreciation (on investment excluding roadway)	(9.3)	(9.3)
Required after-tax profit plus interest	50.0	45.7
Interest		(30.1)
Profit	50.0	15.6
Federal tax at 50 percent	50.0	15.6
Required gross profit per year	100.0	31.2
Depreciation	9.3	9.3
Interest		30.1
Estimated annual operating costs:		
Loading at $0.50 per ton	12.5	
Unloading and stockpiling at $1.50 per ton	37.5	
Roadway repairs (10 percent)	20.0	
Crew labor (260 man-hours per million ton-mile per year at $6.00 per hour)[3]	40.0	
Total	110.0	110.0
Required total income per year	219.3	180.6
Estimated required total income, per ton mile	$0.0088	$0.0072
Mills	(8.8)	(7.2)
Estimated required total income, per ton mile, excluding loading and unloading	$.0068	$.0052
Mills	(6.8)	(5.2)

[1] 12 percent return, 30 yr.
[2] At 9¾ percent interest on 15 percent on equity, 11 percent return on total investment.
[3] This ratio of man-hour requirements appears in the results of a TRW-Battelle study, "A Report to the Interagency Coal Task Force, Project Independence Blueprint, On the Manpower Requirements of Coal Transportation," June 26, 1974.

Source: Comparison of Economics of Several Systems for Providing Coal-Based Energy to Users 1,000 Miles Southeasterly from Eastern Wyoming Coal Fields: Form Modes of Energy Transportation and Electricity versus Gas as the End Use Energy Forms as cited in CSPL, p.352.

APPENDIX A

STATEMENT OF BURLINGTON NORTHERN RAILROAD

LAND USE

It is not meaningful to compare slurry pipelines with railroads in terms of land use. Railroads are already in place and thus require virtually no additional land. The land required for slurry pipelines, on the other hand, would take out of productive use a significant amount of land that would not have to be disturbed if the coal moved by unit train. Comparison is made between a hypothetical slurry line and the new line under construction from Orin to Gillette, Wyoming. This is again an invalid comparison because it implies that the slurry line would be an alternative to the rail line. In reality, however, the rail line must be constructed regardless of whether a slurry line is built or not. In this case, a slurry line would be a duplicate system, needlessly using additional land. Further, it would take at least three slurry lines with a capacity of 20 million tons each to match the capacity of the rail line.

Also, it is not correct to assume that land that has been disturbed in order to install a 38" pipeline will ever return to its original productivity. Topsoil may be replaced by subsoil that will not support growth. Compaction of equipment along the right-of-way can have an adverse effect on the original soil; trenching and refilling can set up severe erosion conditions.

In addition, much of the pipeline route is through the semi-arid Western area which has a fragile ecology. Digging through this land can leave scars that never go away. Because coal slurry has a natural tendency to settle, slopes must be kept gradual. This requires considerable earth filling which in turn creates additional land-use impacts, and, of course, loss of ground cover could result in severe erosion problems.

ENERGY

Generally speaking, both systems -- in the transportation aspects -- would use about the same amount of energy to move coal from Wyoming to Arkansas. The Hudson Institute study[1] estimates each would use about 300 btu per ton-mile of coal delivered. The big energy drain in a coal slurry system comes about due to the slurry preparation at the mine and the drying at the using end. Wyoming Energy Consumption, a study prepared for the Wyoming Department of Planning and Economic Development, estimated the total energy usage of a coal slurry system (including slurry preparation, transportation, and dewatering) at 750 btu per ton-mile compared to 300 btu per ton-mile for unit trains.

SOCIOECONOMIC IMPACTS

Employment. There would be a major negative impact on employment if slurry lines divert coal being hauled by unit train. Railroads, as common carriers, would be required to handle the coal while the slurry lines were being constructed, and as soon as the slurry lines were operational and replaced the unit trains, the unit-train workers would be thrown out of work. According to figures from ETSI cited in this report, each pipeline would displace about 2200 rail workers. Generally, these displaced workers would be highly paid, and the economic impacts of loss of buying power plus welfare costs would be severely felt by local communities. In times of chronic unemployment, the use of scarce capital resources to make savings in labor costs is not sound public policy.

IMPACT OF SLURRY PIPELINES ON RAILROADS

Development of coal slurry pipelines would have a devastating effect on an already faltering railroad industry. In testimony before the House Interior and Insular Affairs Committee, George Stafford, chairman of the Interstate Commerce Commission warned:

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[1]Hudson Institute, Research Analysis of Factors Affecting Transportation of Coal by Rail and Slurry Pipeline, April 1976.

> "Substantial diversion of the railroads' coal traffic through destructive competition would plainly have a devastating effect on an already crippled industry. At a time when Congress has committed billions of dollars in an attempt to maintain a workable railroad system in this country, it is important to note that railroads derive more revenue from coal than from any other commodity -- over $1.4 billion annually, or about 10.5 percent of their total revenue. Diversion of coal traffic could result in railroads having to reduce their service to coal-producing areas, further depriving them of revenue and perhaps forcing them to increase their rates on other commodities to cover operating costs. In some cases, such diversion could pose a threat to a railroad's very existence."

The damage by pipelines to the rail industry comes about because of two basic differences between the systems. Railroads are common carriers obliged to handle any business offered them and are not permitted to make long-term contracts that would guarantee volumes over a long period of time. Slurry pipelines, on the other hand, are single-purpose carriers which use a device known as the "take-or-pay contract" whereby a receiver of coal is tied to receiving and paying for a fixed volume every year over 20 or 30 years. This sets up a monopoly for the pipeline and effectively insulates this traffic from any other mode no matter what price changes or innovations are offered.

As common carriers, the railroads are required to haul most of the coal that will be produced in 1980 -- whether slurry pipelines are developed or not. And they are already investing billions of dollars in plant and equipment in order to be able to handle the volumes they have been told are to be forthcoming. Having made this long-term investment and assumed the attendant debt-service obligations, the railroads are critically vulnerable to having huge volumes of coal diverted to slurry pipelines after a few years. If this happens, the railroads would still have the long-term debt obligations, but much of their revenue-producing coal traffic would have been lost. The result, in the cases of many marginal railroads, would be financial ruin. Without huge government subsidies, the only possible way to make up the shortfall would be by raising rates on other commodities which would, in many cases, only drive business away.

Even the threat of slurry pipeline development is harmful. Burlington Northern is currently undertaking to secure debt financing for a large part of the nearly one billion dollars we need in order to be able to handle 1980 coal volumes. The spectre of slurry pipelines later "skimming the cream" from the coal business is unsettling to the financial community and seriously impairs our ability to raise funds. At a time when Congress is spending over six billion dollars to revitalize a faltering railroad industry, it does not make good sense to encourage development of an unnecessary and duplicate system of transportation that would take away the very means of railroad survival.

ECONOMICS

Cost Comparisons -- The only way general cost comparisons can be made between unit trains and large-volume pipelines is hypothetically. Unit train coal rates are public record. Slurry costs for large-volume lines, however, are unknown because no coal slurry line larger than five million tons has been built in the world. Construction costs are crucial and difficult to estimate, and factors such as cost of right-of-way, cost of environmental protection compliance, materials used, etc. are major determinates of construction costs. (Alaska pipeline cost estimate is now eight times what Bechtel originally estimated.) The ETSI cost figures are based on delivery of 25 million tons to one point, but environmental standards presently restrict volume to about five to seven million tons at any one location. This, using ETSI figures, raises pipeline costs well above cost of rail delivery.

Further, pipeline flexibility disadvantages -- in rerouting, changing points of origin and delivery, changing rate of delivery -- are very difficult to quantify in a general sense. No reliable source of water seems to be available and water-supply proposals, such as Oahe Dam, are difficult to determine costs for. In addition, other operational problems such as dewatering, slurry storage, water disposal, and underflow burning are not defined sufficiently for cost determination. Given these uncertainties, then, it is hardly surprising that the Bureau of Mines study done by Campbell and Katell concluded that "no single comprehensive theory is available now to deal with the relative cost differences associated with the capacity of (slurry) lines."[2]

Inflation Effect -- Slurry proponents claim that pipelines, which are capital-intensive, are less affected by inflation than railroads which are more labor-intensive. In point of fact, however, both systems are affected by the same real or anticipated inflation rates.

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[2]U.S. Department of the Interior, Bureau of Mines, Campbell, T.C. and Katell, Signey, Economies of Scale for Coal Slurry Pipelines, Jan. 1975.

Pipelines have anticipated inflation rates built into the debt portions of capital charges (i.e., "front-end loaded") and equity portions have to be escalated just like other variable costs. Unit trains reflect current inflation levels by means of tariff escalations.

Pipelines would be built with mostly borrowed money. The interest rate on that borrowed money will reflect the lenders' (or investors') best estimate of the levels of inflation over the period of investment. If a lender anticipates no inflation, he might lend money for a four percent rate (to cover risks, costs, return, etc). If, however, he anticipates a five percent average annual inflation rate over the period, he would tack the five percent on to the four percent to arrive at a nine percent rate. In this case, if a pipeline cost were one billion dollars and the payback period were 30 years, the cost of interest plus principal would be about three billion dollars. Approximately one billion dollars of this would be the "load" for anticipated inflation. (The explanation above assumes all capital costs are related to borrowed funds. If equity financing is used, some escalation would have to be used in order to adjust returns to current levels of inflation.)

In general, two factors[3] will determine which is the lower cost system: (1) the initial cost spread between the two systems, and (2) the steepness of the actual inflation lines. Obviously, if both systems start out even, and there is any amount of inflation, the unit train will lose out. Conversely, if the unit train cost starts out well below the pipeline cost, and there is a low inflation rate, the pipeline will be at a cost disadvantage. Examples used in the Hudson Institute study indicate that where the lines crossed after the 17th year, the unit train had the cost advantage; where the lines crossed before the eighth year, it was the pipeline which had the cost advantage. In between, sophisticated analysis is required to determine which system has the edge. (For example, if the lines crossed at the 12th year, the trade-offs of paying 12 years of "premium" for later savings would have to be carefully examined). The Hudson data also has determined that at a three percent future inflation rate, the unit train system needed to be only one dollar per ton below the pipelines initially in order to be clearly the low-cost mode; at five percent inflation, the unit train needed a two dollar per ton spread.

[3]Another very important factor in judging between the systems is flexibility. Although unit trains obviously have the advantage in this regard, the cost savings are very difficult to quantify for general comparison.

It is also important to remember that the pipeline escalation component is relatively fixed over time, but the rail system can use productivity improvements to offset inflation. Among these are: longer trains, lighter cars, improved track system, electrification, more output per labor hours, and coal benefication by water removal.

It is precisely because of productivity improvement possibilities that monotonic projections of high future inflation rates are not generally a reliable method of analysis. Inflation tends to vary considerably from year to year; in fact, the average inflation rate from 1900 to present was just over three percent. Many experts (Hudson Institute, Secretary Simon) are predicting much lower inflation for the near future and even this year. So far, inflation has been less than one-half of the rate in 1974-75, according to The Wall Street Journal of September 1, 1976.

APPENDIX B

STATEMENT OF COAL SLURRY TRANSPORT ASSOCIATION

If coal production in the Rocky Mountain region is to increase substantially during the remainder of this century, as the report of the Federation of Rocky Mountain States suggests, coal transportation certainly is one of the many complex issues those states must consider in working out their energy development policies. The Federation's report reflects many of the benefits of the slurry pipeline concept, however, which deserve greater emphasis, and they are discussed briefly in this supplementary statement.

Coal slurry pipelines are simply a form of transportation. They are not involved in the basic issues of energy development. Once the Western states have decided how their energy resources will be developed, however, the pipeline concept offers an attractive option either for exporting coal to be processed elsewhere or for moving coal from mines to areas of need within the Rocky Mountain states.

Ultimately, the benefits of each pipeline must be judged on the basis of all the factors involved. We agree with the report when it states that: "The impacts vary with the individual conditions of a specific project and any assessment of these impacts must be made in view of these specific conditions." (Page 17)

This point is made in the report with particular reference to the sources of water for slurry pipelines. The slurry transport industry supports this approach. Each state must judge the merits of each proposal to use its water resources. We assume this will be the case with coal conversion plans. It certainly was the case in Wyoming, where the coal pipeline plans of Energy Transportation Systems, Inc., were reviewed and approved by the legislature and by the State Engineer, who required an extensive well testing program before issuing permits. The sponsors of other proposed pipelines fully expect their plans to be examined on their individual merits.

The report raises a question as to whether the rights of the states can be protected adequately in proposed federal legislation granting eminent domain for coal slurry pipelines. The language of the pending bills (cited in the report) could scarcely be clearer. In declaring that the states are to be protected we would welcome any suggestions for language which might express that idea better.

Water is a matter of legitimate concern for the Western states and we believe it can be resolved on a case-by-case basis to the satisfaction of the states involved. Unfortunately, this legitimate concern over water too often has been manipulated by the Western railroads to obscure another fundamental issue -- the Western coal transportation monopoly.

There is no way now that coal can move in the West except by rail. This is a monopoly which became significant only when Western coal production began to increase in recent years. On a national basis, railroads and barge lines share the traffic, with rails traditionally carrying two-thirds of the tonnage. Not satisfied with their traditional share, the railroads are fighting to keep all the Western coal traffic to themselves by blocking the development of coal slurry pipelines.

This monopoly raises serious public policy issues involving competition, and the reliability of energy supplies. We believe all of these issues must be considered in deciding whether to encourage the development of slurry lines.

One basic question is whether the Western states should be the only part of the nation without the benefits of rate competition in coal shipping. Competition is important to the electric utilities which must seek the lowest possible coal tariffs, and it is equally important to consumers, whose electric bills are governed in part by the cost of transporting fuel. Those utilities and consumers increasingly will include citizens of the Western states. Competition will be important to them not only in the initial choice but over the entire life of the power plant to be supplied. Capital-intensive coal slurry pipelines are much better insulated from inflation, and thus from rate increases, than the labor-intensive railroads. Unit train rates in the West were just increased 16 percent on July 1, 1976.

The second basic question is whether the West and the nation should rely on a few Western railroads as the only link between the mines and the power plants. A close examination of the forecasts of coal production and coal traffic reveals that the Western coal transportation system is comprised largely of a single railroad -- the Burlington Northern (BN). The Burlington is the only way to move coal out of a very large portion of the Northern Great Plains. The BN has forecast that it will haul from 225 million to 300 million tons annually by 1985. That 300 million tons would be 25 percent of the total national coal production forecast for that year. Should the nation rely on a single railroad for that large a share of a precious energy asset?

A look at the financial facts also dispels the railroads' complaints about slurry pipelines as a threat to their survival. Westerners know that the Burlington and the other major Western railroads have been solidly prosperous railroads for years without the benefit of coal traffic. The new coal business will mean added prosperity and jobs whether slurry lines are built or not. BN coal revenues have mounted steadily from $42 million in 1970 to $300 million forecast for this year and $900 million predicted by 1980. Profits for four of the major Western railroads increased at a compound annual average of 23 percent over the past five years. In addition to their railroad earnings, of course, these companies own substantial natural resources. The Burlington and Union Pacific each hold coal reserves in excess of 10 billion tons.

These factors deserve full analysis in judging the impact on railroads of a competitive, integrated system of coal transportation. With the financial strength they already possess, and with the prospect of rich new coal traffic, the ability of the Western railroads to finance expansion is not likely to be affected significantly if slurry pipelines capture a minority share of the coal traffic. Virtually all of the new traffic will be unit train business. There is no cream to skim. It's all uniformly profitable, although it obviously will be much more profitable if there is no rate competition from pipelines.

Concern over the welfare of the railroads is natural, since they are vitally important to the Rocky Mountain states and to the nation. We believe the railroads always will be the basic system for moving coal. But we also contend that their arguments for protection against competition in the West deserve close examination, just as slurry pipelines are being closely studied. The facts do not support railroads' assertions of potential damage.

As the report concludes, all factors must be considered in deciding whether coal pipelines should be permitted to compete for a share of Western traffic. We are confident that a thorough and fair examination of those factors will result in acceptance and encouragement of the coal slurry pipeline concept.

APPENDIX C

WESTERN GOVERNORS' REGIONAL ENERGY POLICY OFFICE

PUBLIC POLICY RESOLUTION OPPOSING PASSAGE OF H.R. 1863

Public Policy Resolution 75-13
Santa Fe, July 29, 1975

OPPOSING PASSAGE OF H.R. 1863 URGING
CAUTION IN WITHDRAWAL OF WESTERN WATER

WHEREAS, Congress is being asked to consider numerous measures intended to increase the development of domestic energy resources, and

WHEREAS, the vast amount of energy reserves in the Western states insure that this region will experience the negative impact of this development, obligating the Western Governors' Regional Energy Policy Office to closely examine all development proposals to access their compatibility with the desires of our people and the capabilities of our natural resources, and

WHEREAS, one of these proposals, H.R. 1863, is an amendment to the Mineral Leasing Act, 1920, which would give eminent domain power to carriers of coal by slurry pipeline, and

WHEREAS, the removal of large quantities of surplus and/or ground water when the effects are inadequately understood may seriously impact existing uses, preclude expansion of other beneficial uses, degrade the quality of remaining supply, and create other direct and indirect social, economic, and other environmental impacts, and

WHEREAS, giving pipeline carriers eminent domain for coal slurry pipelines could greatly accelerate the implementation of pipeline construction, and

WHEREAS, an evaluation of the region's present and potential rail capacity indicates no urgency for alternative means of transporting coal,

NOW, THEREFORE, BE IT RESOLVED: that a comprehensive analysis of all long-term impacts of large scale water withdrawals should be completed prior to irreversibly committing a resource of such importance to this region.

BE IT FURTHER RESOLVED: that, although completion of such studies may indicate that slurry pipelines are an acceptable form of coal transportation, Congressional endorsement of such projects through the granting of eminent domain privileges would be inappropriate at this time.

BE IT FURTHER RESOLVED: that the Western Governors' Regional Energy Policy Office therefore opposes passage of H.R. 1863 until the appropriate studies are completed.

Proposed by the State of Montana
Adopted unanimously.

WESTERN GOVERNORS' REGIONAL ENERGY POLICY OFFICE, INC.

(signed by Jerry Apodaca)
Jerry Apodaca, Governor of New Mexico
Chairperson of the Board

APPENDIX D

STATEMENT IN OPPOSITION TO H.R. 1863

by the

GOVERNORS OF THE OLD WEST REGIONAL COMMISSION

STATEMENT BY THE GOVERNORS OF THE OLD WEST REGIONAL COMMISSION IN OPPOSITION TO H.R. 1863, A BILL TO AMEND THE MINERAL LEASING ACT OF 1920 BY GRANTING EMINENT DOMAIN TO CARRIERS OF COAL BY SLURRY PIPELINES.

With energy shortages unending in the foreseeable future, Congress will be faced with legislative proposals aimed toward overcoming immediate supply problems by increasing the development of domestic energy sources. Because energy-producing areas of our nation, such as the Northern Great Plains, will bear the full brunt of this type of legislation, the Governors of the Old West Regional Commission, consisting of North and South Dakota, Montana, Wyoming, and Nebraska, have an obligation to examine closely each specific proposal before Congress to assure that it is compatible with the desires of our people and within the capabilities of our natural resources.

One such bill, H.R. 1863, a proposed amendment to the Mineral Leasing Act of 1920, would give eminent domain power to the carriers of coal by slurry pipeline. Though coal slurry pipelines may in the future become an acceptable means of transporting coal long distances, Congressional endorsement of such projects is premature at this time for the following reasons.

1. There is not sufficient data to adequately assess the potential impacts of removing large amounts of water from local aquifers and then exporting this water from water-short regions. Because of this concern, the Montana legislature prohibited the use of the state's water for slurry to export coal.

This lack of knowledge is exemplified in the coal slurry pipeline planned from Wyoming to Arkansas which will use deep wells to take 15,000 acre-feet of water from the Madison limestone formation, a region-wide carbonate aquifer system. Yet the hydrology and geology of the Madison formation, which underlies much of the Powder River Basin, are virtually unknown. It is thought that Madison groundwater supplies shallower aquifers in Wyoming, Montana, the Dakotas and Nebraska; that major groundwater development of the Madison may exceed recharge and thereby lower the water level; and also that the increased mineralization can be expected in areas of major water withdrawal. If these conditions, either singly or in combination, were to occur, then our local areas and states would seriously suffer.

A Northern Great Plains Resources Program report by Frank A. Swenson entitled Possible Development of Water from Madison Group and Associated Rock in Powder River Basin, Montana-Wyoming recommends:

> Much more additional data regarding the Madison are needed before location and spacing of major developments and their effects are known. At present there are no water wells in the central part of the Powder River Basin. Exploratory drilling and aquifer-performance tests in the parts of the basin where major strippable coal is found are required to determine if the hydrologic conditions are favorable for major water supplies before construction of facilities for energy development. Arrangements should be made whereby needed hydrologic data can be gained by close coordination between the planning, exploratory and development programs.

2. The Western States Water Council predicts that giving pipeline carriers eminent domain for coal slurry pipelines would "greatly accelerate the implementation of pipeline construction." A thorough environmental analysis of the long-term impact of this probability should be accomplished before irreversibly committing a resource of such great importance to the region.

3. It does not appear that intensified construction of coal slurry pipelines is necessary. In a February 1975 report for the Montana Bureau of Mines and Geology prepared by Cameron Engineers, Inc., and entitled Market Prospects for Montana Coal, the following observation was made concerning the ability of railroads to increase their capacity of coal shipments from Montana:

> Rail transportation capacity should not be a factor limiting Montana's ultimate coal production. Several times the present amount of Montana coal shipments could be hauled on existing lines by increasing the number of cars and traction units. With additional centralized traffic control, more than ten times present production could be hauled. Beyond this, the railroads will simply install the additional equipment and roadway necessary to move whatever quantity of coal they can be assured will continue to be required.

Since the railroads operating in Montana service the entire region, there would appear to be no urgency for alternative means of transporting coal.

In conclusion, H.R. 1863 and the resultant acceleration of construction of coal slurry pipelines in the Northern Great Plains could have a serious impact on the groundwater resource. More information and time is needed to fully understand the impacts of large water withdrawals. In the meantime, the railroads appear to be capable of transporting increased coal production. Therefore, we oppose passage of H.R. 1863.

(signed by Ed Herschler)
Governor of Wyoming

APPENDIX E

STATEMENT OF CONCERN PREPARED BY TEN WESTERN GOVERNORS

ATTENDING THE NATIONAL GOVERNORS' CONFERENCE, WASHINGTON, D. C.

February 20, 1975

STATEMENT OF CONCERN

February 20, 1975

FEDERAL COAL LEASING POLICY

There should be a prohibition against the issuance of additional federal coal leases until a federal strip mining act is passed by the Congress and signed into law by the President.

As federal coal leasing policies are developed, continued dialogue with the individual states is vitally needed.

IMPACT ASSISTANCE FUNDS

Since the demand for development of federal coal in the West is a result of national needs, then there is a corresponding national responsibility to insure adequate relief for environmental and socioeconomic impacts.

This additional relief should be in the form of discretionary, fronted federal funds which will enable impacted communities to develop the necessary facilities prior to extensive population influxes.

ENERGY CONSERVATION

Energy conservation must not be examined as only an alternative in gaining energy self-sufficiency, but rather as the cornerstone of each alternative examined.

Consequently, it is essential that the federal government establish long-range, uniform guidelines and that under these guidelines each state be encouraged to develop its own rationale for a conservation ethic, so that it is tuned to the specific needs of the individual states.

FEDERAL PREEMPTION OF STATES' LAWS

It must be the position of the states that they will not allow federal preemption of any laws which the states have the express right to develop and administer.

The governors of these ten Western states are concerned about present federal proposals to preempt the states' authority to exercise control over the location of energy facilities and the authority to adopt and administer clean air and water standards.

RESEARCH FUNDS

Under the present federal policy we feel that adequate commitment and funding has not been provided for development of alternative sources of energy, demonstration projects, and energy conservation research.

Along with this federal commitment and funding, it is also mandatory that the states have significant input to where and how these funds will be expended.

STRIP MINING REGULATIONS

The vast expansion of coal extraction and conversion is seen by the federal government as a keystone to eliminating the energy crisis. Because of this it is necessary to establish broad federal guidelines related to strip mine regulations. However, these guidelines must not preempt the individual needs of the states for site-specific legislation.

APPENDIX F

MEMORANDUM CONCERNING

PROPOSED FEDERAL COAL SLURRY PIPELINE LEGISLATION

MEMORANDUM

July 11, 1975

To: Federation of Rocky Mountain States

From: Frank H. Morison

Re: Protection of States' Water Rights and Jurisdiction Under Proposed Federal Legislation Concerning Coal Slurry Pipelines

H.R. 1863 (and companion bills H.R. 2220, H.R. 2553 and H.R. 2896) have been introduced in the 94th Congress and have been assigned to the Committee on Interior and Insular Affairs. Hearings are now being conducted with respect to such bills. H.R. 1863 is entitled the "Coal Slurry Pipeline Act of 1975". This bill essentially establishes a procedure whereby a carrier of coal by pipeline may obtain a certificate of public convenience and necessity from the Department of Interior and the carrier holding such a certificate is granted the right of eminent domain to acquire rights of way necessary to construct, operate and maintain the proposed coal pipeline. It is my understanding that the Federation of Rocky Mountain States, its staff and its committees are now studying the propriety of the basic factors of utilizing coal slurry pipelines as a method of transportation of the coal reserves from the Rocky Mountain region to other parts of the nation where such coal is needed. This Memorandum and the Resolution it introduces does not relate to the basic question of whether or not coal slurry pipelines should be utilized as such a method of transportation.

This Memorandum is directed solely to the question as to whether or not the individual states are protected under the proposed legislation with respect to the states' jurisdiction governing the appropriation, use and diversion of water within such state. In H.R. 1863 an attempt is made in Section 10 thereof to protect such state rights, Section 10 being as follows:

"

CONSTRUCTION OF LAW

Sec. 10. Nothing in this Act shall be construed —

(1) as affecting in any way any existing law governing appropriation, use or diversion of water, or any Federal, State, or private right to water;

(2) as expanding or diminishing Federal or State jurisdiction, responsibility, or interests in water resources development or control;

(3) as displacing, superseding, limiting, or modifying any interstate compact or the jurisdiction or responsibility of any legally established joint or common agency of two or more States or of two or more States and the Federal Government; or

(4) as superseding, modifying, or repealing, except as specifically set forth in this Act, existing laws applicable to the various Federal agencies which are authorized to develop or participate in the development of water resources or to exercise licensing or regulatory functions in relation thereto.

"

While the language in Section 10 would appear to adequately protect states' rights and states' jurisdiction over water, nevertheless a series of decisions of the United States Supreme Court with respect to similar language have so narrowly interpreted such provisions, that in fact protection of the states' rights and states' jurisdiction has not been effective.

For example, in First Iowa Hydro-Electric Coop. v. F.P.C., 328 U.S. 152 (1946), an applicant for a license for a hydroelectric project from the Federal Power Commission under the provisions of the Federal Power Act was unable to comply with section 9(b) of the Act requiring that it submit "satisfactory evidence that the applicant has complied with the laws of the State or States within which the proposed project is to be located with respect to bed and banks and to the appropriation, diversion, and use of water for power purposes ...." 16 U.S.C. §802(b). The reason was that the State of Iowa, where the project was located, had refused to grant the applicant a permit for the same project. The Federal Power Commission rejected the license application for that reason and was affirmed by the Court of Appeals. The Supreme Court reversed, holding that "to require the petitioner to secure the actual grant to it of a State permit under #7767 as a condition precedent to securing a federal license for the same project under the Federal Power Act would vest in the Executive Council of Iowa a veto power over the Federal project. Such a veto power easily could destroy the effectiveness of the Federal Act." 382 U.S. at 164. The Court found particularly troublesome an Iowa statute which required that "any water taken from the stream in connection with the project is returned thereto at the nearest practicable place without being materially diminished in quality or polluted or rendered deleterious to fish....", a provision which the Court felt "strikes at the heart of the present project" since "the feature of the project which especially commended it to the Federal Power Commission was its diversion of substantially all of the waters of the Cedar River near Moscow, to the Mississippi River near Muscaline." Id. at 165 (emphasis in original). In short, the Court found that the Federal Power Act had superseded state law with respect to the matters entrusted to the Commission, notwithstanding the language of Section 9(b) and section 27, a "savings" clause which provides that "nothing herein shall be construed as affecting or intending to affect or in any way to interfere with the laws of the respective States relating to the control, appropriation, use or distribution of water used in irrigation or for municipal or other uses, or any vested right acquired therein."

A similar result was reached by the Supreme Court in Ivanhoe Irr. Dist. v. McCracken, 357 U.S. 275 (1958). There the California Supreme Court refused to confirm the validity of certain water delivery contracts executed under the Federal reclamation laws on the ground that the contracts were contrary to California law, which it found controlling by virtue of section 8 of the Reclamation Act of 1902, which provides as follows:

> Section 8: "That nothing in this Act shall be construed as affecting or intended to affect or to in any way interfere with the laws of any State or Territory relating to the control, appropriation, use, or distribution of water used in irrigation, or any vested right acquired thereunder, and the Secretary of the Interior, in carrying out the provisions of this Act, shall proceed in conformity with such laws, and nothing herein shall in any way affect

> any right of any State or of the Federal Government or any landowner, appropriator, or user of water in, to, or from any interstate stream or the waters thereof: Provided, That the right to the use of water acquired under the provisions of this Act shall be appurtenant to the land irrigated, and beneficial use shall be the basis, the measure, and the limit of the right." 32 Stat. 390, 43 U.S.C. §§372, 383.

The Supreme Court reversed. In finding section 8 not dispositive of the contract issue, it concluded that "as we read §8, it merely requires the United States to comply with State law when, in the construction and operation of a reclamation project, it becomes necessary for it to acquire water rights or vested interests therein." Id. at 291. Further, it stated that "without passing generally on the coverage of §8 in the delicate area of federal-state relations in the irrigation field, we do not believe that Congress intended §8 to override the repeatedly reaffirmed national policy of §5 [imposing excess acreage restrictions on water deliveries]."

In City of Fresno v. California, 372 U.S. 627 (1963), the Court amplified its view of the limited scope of the savings provision of Section 8. In that case the construction and operation of a federal project had allegedly interfered with Fresno's water rights under California law, and the City relied on section 8 in its argument that the Federal Government should be restrained from such interference. The Court rejected that argument:

> [Section] 8 does not mean that state law may operate to prevent the United States from exercising the power of eminent domain to acquire the water rights of others. This was settled in Ivanhoe Irrigation District v. McCracken, ... Rather, the effect of §8 in such a case is to leave to state law the definition of the property interests, if any, for which compensation must be made.

Thus the Court appears to have relegated section 8 merely to the status of a compensation statute.

Similarly, in Arizona v. California, 373 U.S. 546 (1963), the Court brushed aside a comparable savings clause as inconsistent with the Secretary of the Interior's authority under the Boulder Canyon Project Act to allocate waters from the mainstream of the Colorado River by contract (Id. at 569, footnotes omitted):

> Notwithstanding the Government's construction, ownership, operation, and maintenance of the vast Colorado River works that conserve and store the river's waters and the broad power given by Congress to the Secretary of the Interior to make contracts for the distribution of the water, it is argued that Congress in §§14 and 18 of the Act took away practically all the Secretary's power by permitting the States to determine with whom and on what terms the Secretary would make water contracts. Section 18 states:

> "Nothing herein shall be construed as interfering with such rights as the States now have either to the waters within their borders or to adopt such policies and enact such laws as they may deem necessary with respect to the appropriation, control, and use of waters within their borders...."

A court would probably treat the "savings" clauses presently found in section 10 of H.R. 1863 in the same fashion evidenced above. Once a federal agency, whether it is the Secretary of the Interior, the FPC, or the ICC, grants a certificate of convenience and necessity to a coal pipeline, after extensive hearings and findings that such a project would be in the public interest, a court might find the savings clauses do not empower a state to "veto" such project by denying it a water right or other requisite authority under state law.

Finally, even if the states' present jurisdiction over the acquisition of water rights is fully preserved, there remains a significant loophole which might be seized upon to provide a water supply for a coal pipeline project wholly without regard to a state's views on the matter. In this regard, reference is made to the so-called "federal reserved water rights doctrine", which is applicable throughout the West where the United States has extensive land holdings. That doctrine, expounded most authoritatively in Arizona v. California, 373 U.S. 546 (1963) and affirmed in United States v. Dist. Ct., County of Eagle, Colorado, 401 U.S. 520 (1971), holds that by the reservation of federal lands for certain purposes, such as Indian reservations, national forests, wildlife refuges, and other federal purposes, the Executive has impliedly "reserved" sufficient unappropriated water to meet the needs of the reservation. The magnitude and attributes of such federally reserved rights, which are extensive, currently remain unknown. It is quite conceivable that, in certain circumstances, a coal pipeline project might be able to acquire its water supply from a federal reserved right. Such acquisition would be contrary to the apparent intent of the proposed legislation.

The water rights issue appears to be of paramount concern to the House committee. It is also a matter of critical concern to the Rocky Mountain States. Therefore, a proposed resolution has been drafted (attached hereto) and hopefully can be adopted by the Federation whereby the rights and jurisdiction of the respective states over their water rights can be adequately and effectively protected. Moreover, if any reserved right is to be utilized contrary to the apparent intent of the proposed legislation, such utilization must be specifically authorized by Congress.

Hearings are now being completed on the subject bills, and consequently time is of the essence if the Federation is to have any effective input with respect to such legislation as it pertains to water rights in the Rocky Mountain States.

RESOLUTION

Whereas there are now pending in the 94th Congress, before the House Committee on Interior and Insular Affairs, bills to authorize the Secretary of the Interior to grant certificates of convenience and necessity for the operation of coal slurry pipelines (H.R. 1863, H.R. 2220, H.R. 2553, and H.R. 2896); and

Whereas most of the currently proposed coal slurry pipelines would originate in the Rocky Mountain States and would require substantial quantities of water to transport the coal to distant destinations outside the state of origin; and

Whereas the proponents of such legislation have asserted that it is their intent to guarantee State jurisdiction and control over the allocation of water for the operation of such pipelines and to that end have included certain savings clauses in section 10 of the referenced bills; and

Whereas the Federation of Rocky Mountain States, while it has under study but has not yet adopted a position on the merits of the proposed legislation, nevertheless deems it imperative to assure State jurisdiction and control over the allocation of water to coal slurry pipelines should the pending proposals or similar legislation be enacted; and

Whereas the savings clauses with respect to water rights administration in the pending bills do not adequately protect the States' interests in that similar clauses have been so narrowly interpreted by the Supreme Court as to defeat their purpose (First Iowa Hydro-Electric Coop. v. F.P.C., 328 U.S. 152 (1946); Ivanhoe Irr. Dist. v. McCracken. 357 U.S. 275 (1958); City of Fresno v. California, 372 U.S. 627 (1963); and Arizona v. California, 373 U.S. 546 (1963);

Therefore, the Natural Resources Council of the Federation of Rocky Mountain States hereby records its opposition to the pending coal slurry pipeline authorization bills unless section 10 thereof is amended to clarify and strengthen its purpose by adding the following new subsection (5):

> " (5) as granting a right to the use of water to a carrier holding a certification of convenience and necessity issued pursuant to section 5(b) of this Act, or as superseding state laws or regulations governing the acquisition and administration of water rights so as to excuse the holder of such a certificate from complying with state law in acquiring a right to any water right derived from federal law, including but not limited to a 'reserved water right' as defined in Arizona v. California, 373 U.S. 546, be utilized as a source of water for a coal pipeline project without the consent of Congress."

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  President, Communications Investment Corporation, Utah
- Theodore D. Brown, Voluntary Treasurer
  Executive Vice President, First National Bank of Denver, Colorado
- John Fleming Kelly, Assistant Secretary and Legal Counsel
  Partner, Holland & Hart, Colorado
- Philip M. Burgess, Vice President and Executive Director
- James M. Klump, Director of Finance
- James A. Pulver, Director of Information
- Douglas L. Mutter, Director of Council Operations