

COAL SLURRY PIPELINES: THE ETSI PROJECT

by George R. Coffey & Virginia A. Partridge



Black Mesa Slurry Line during construction.

In the May, 1977 issue of **RIGHT OF WAY**, an article appeared on the coal slurry pipeline saga entitled, "History Repeats Itself as Railroads Block Coal Slurry Pipelines," by Ginny Partridge, Public Relations Representative of the ETSI Pipeline Project. This is a report of progress on the ETSI Pipeline Project system, the biggest single pipeline project ever undertaken in the lower 48 states. ETSI is a joint venture of Atlantic Richfield, Bechtel, Kansas-Nebraska Natural Gas, Lehman Brothers Kuhn Loeb, and Texas Eastern.

BACKGROUND

Slurry pipeline technology is established and proven. With the increasing demand for long distance transport of minerals and coal, this highly efficient and environmentally benign transport mode is sure to be used

more and more. Original patents for the slurry pipeline concept were issued in 1891 and the first coal slurry pilot plant was built in a vacant lot at 58th Street and Madison Avenue in New York City.

The first operational coal slurry pipeline was built in 1914 in England, and used to transport coal from the Thames River docks into London.

America had to wait until 1957 for its first commercial coal slurry line. That's when the Consolidation coal slurry line was built in Ohio, connecting coal mines near Cadiz in the southern part of that state with a power generating station outside of Cleveland. This line, also known as the East Lake slurry line, successfully operated for six years before it was shut down after unit trains forced tariffs below the pipeline's rate. The pipeline could still operate if rail rates increased.

The Ohio pipeline was the precursor of over 15 long distance slurry pipelines built around the world in the 20-plus years since its startup. The 273-mile Black Mesa pipeline, which has been operating successfully since 1970, located in Kayenta, Arizona, was another major milestone in the development of slurry pipelines. This pipeline moved 5 million tons of coal per year across Arizona to the 1500 MW Mohave power station in Nevada. The Black Mesa Pipeline, a subsidiary of Southern Pacific railroad, has demonstrated the reliability required by Electric utilities; and it has been able to deliver coal better than 90 percent of the time. Moreover, it has operated without any adverse effect on the environment.

George R. Coffey is Vice-President of Public Relations for ETSI and Virginia A. Partridge is a Public Representative for ETSI.

The entire length of the pipeline remains buried and the land above has been completely restored. Although it has been stopped for as long as six days, it has been restarted without removing the slurry.

The energy climate of the United States changed radically shortly after the Black Mesa line began operating. The 1973 OPEC oil embargo caused crude oil and petroleum product prices to quadruple. Although the embargo was lifted within two years, it drove home the point that we could no longer rely on foreign sources for a major part of our energy requirements. We turned to the vast reserves of American coal—reserves expected to last from 200 to 400 years and established a national policy designating coal as our country's primary energy source for the balance of this century and on into the next.

Because of this policy change, new coal-fired power stations have been completed or are under construction or planned at many locations around the country. Coal traffic on our railroads is increasing as we struggle to keep up with the rising demand for domestic steam coal and as we haul coal from our mines to our harbors for export.

It has become abundantly clear that there has never been a greater need for a coal slurry pipeline industry in this country. Coal slurry lines can supplement existing transportation systems, principally railroad and barges in domestic service and in transporting coal to harbors for export as well.

The ETSI coal slurry pipeline project is the pioneer coal slurry project being developed today. The main ETSI slurry pipeline will be about 1400 miles long and will move a half water, half coal slurry from mines in Wyoming's Powder River Basin to power stations in Oklahoma and Arkansas on the Mississippi River. From Cypress Bend, barges will be able to carry the dewatered ETSI pipeline coal down river to power stations in Louisiana. The pipeline is expected to cost about \$3 billion transporting \$30 million tons of coal per year. The pipeline's diameter will probably be 40 inches.

The ETSI system includes three coal slurry preparation plants at mine sites near Gillette, Wyoming. At these plants coal will be ground to the consistency of sugar and then mixed with water before

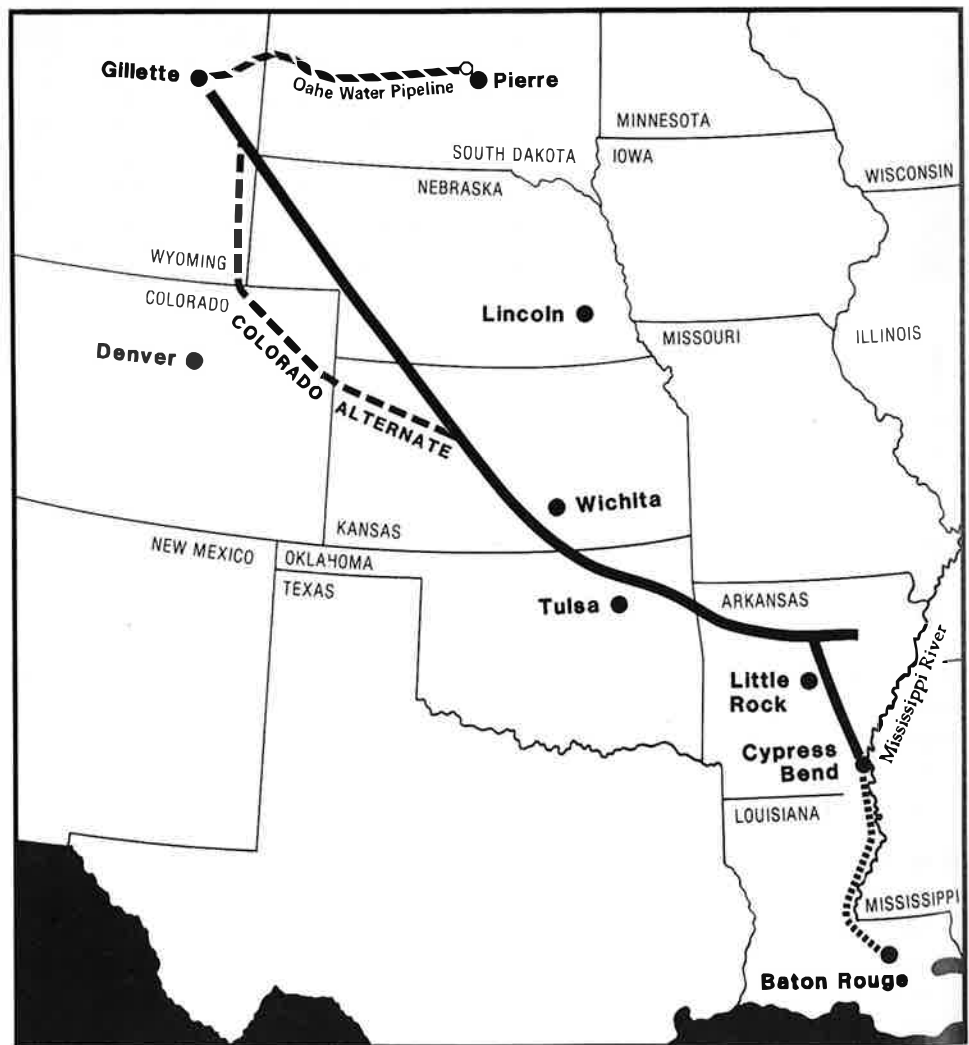
entering the pipeline.

The water for the slurry will come from South Dakota's Lake Oahe, the largest reservoir on the Missouri River, and will be transported to the plant sites through the nearly 300 mile-long West River Aqueduct.

The main coal slurry line will have pumping stations every 80 to 100 miles and will cross Wyoming, the northeast corner of Colorado, and Kansas before reaching power stations in Oklahoma. The line will then cross into Arkansas serving power plants in that state plus the Cypress Bend barge terminal. At all delivery points, dewatering terminals will heat and spin the slurry dry and deliver powdered coal to the power stations and the barge terminal. The used slurry water will be clarified and be used for power station cooling and other industrial purposes.



THE ETSI PIPELINE ROUTE



ETSI COMPONENTS

There are four distinct elements comprising the ETSI slurry system. They are: 1) water supply system, 2) coal preparation plants, 3) coal slurry pipelines and pumping stations, and 4) coal dewatering plants.

1. Water Supply System

ETSI has negotiated rights to water from both the Oahe Reservoir in South Dakota and to Madison Formation in Wyoming. The Oahe Reservoir will be ETSI's primary source, and the Madison represents a backup source in the event Oahe water is not available. The total pipeline system requires up to 20,000 acre feet of water annually to transport a maximum of 37.4 million tons of coal.

Oahe Reservoir. Lake Oahe is one of six federal main stem reservoirs on the