Profiles of Wyoming Coal Mines

by Gary B. Glass[1]

Wyoming produced a record 10.9 million tons of coal in 1972 reaffirming the unparalleled growth predicted for the State's coal industry. Last year's record production exceeded the previous state record by more than a million tons. Today's power plant demands and synthetic fuel markets of the future suggest an 11-fold increase in annual production by the year 2000. Low mining costs and favorable mining conditions only accentuate this prognosis.

Wyoming coal is now marketed in 16 states and occasionally in British Columbia. Soon Texas, Oklahoma, and possibly Arkansas will be added to that group. In addition to power plants, which use approximately 97% of our coal, it is used by the beet sugar, cement and synthetic coke industries, railroads, government, domestic, and other miscellaneous users. Unit-trains streaming out of the State to power plants in Sioux City, Kansas City, and Chicago, indicate the demand. Announced unit-trains will soon be going to Wisconsin, Colorado, Nebraska, Oklahoma and Texas. The unit-train to Cason, Texas in 1976 is the longest proposed unit-train coal haul in the United States--1,483 miles.

The State's coal is used in power plants because it can (1) supply fuel demands, and (2) meet pollution standards. Power plant coal demands will continue to grow as electrical energy consumption increases 7 to 8 percent a year. Since coal is the only fuel in great enough supply to satisfy projected requirements, Wyoming's vast coal deposits will play an important role in supplying these national fuel needs. However, coal for power generation is viewed as a relatively short, 20 to 30 year boom, as nuclear power, char from conversion processes, and other more exotic energy sources are developed.

Conversion of coal to gaseous and liquid fuels promises to be the largest new outlet for Wyoming coal. Wyoming subbituminous coals are well suited for this use since they are more reactive than higher ranked coals. Additionally, many individual coal deposits in the State exceed the 500-800 million tons of reserves required to sustain a conversion facility. Before the next century, conversion of coal to synthetic fuels should be the prime use for Wyoming coal. The coal industry of Wyoming faces an optimistic but challenging future as it strives to meet

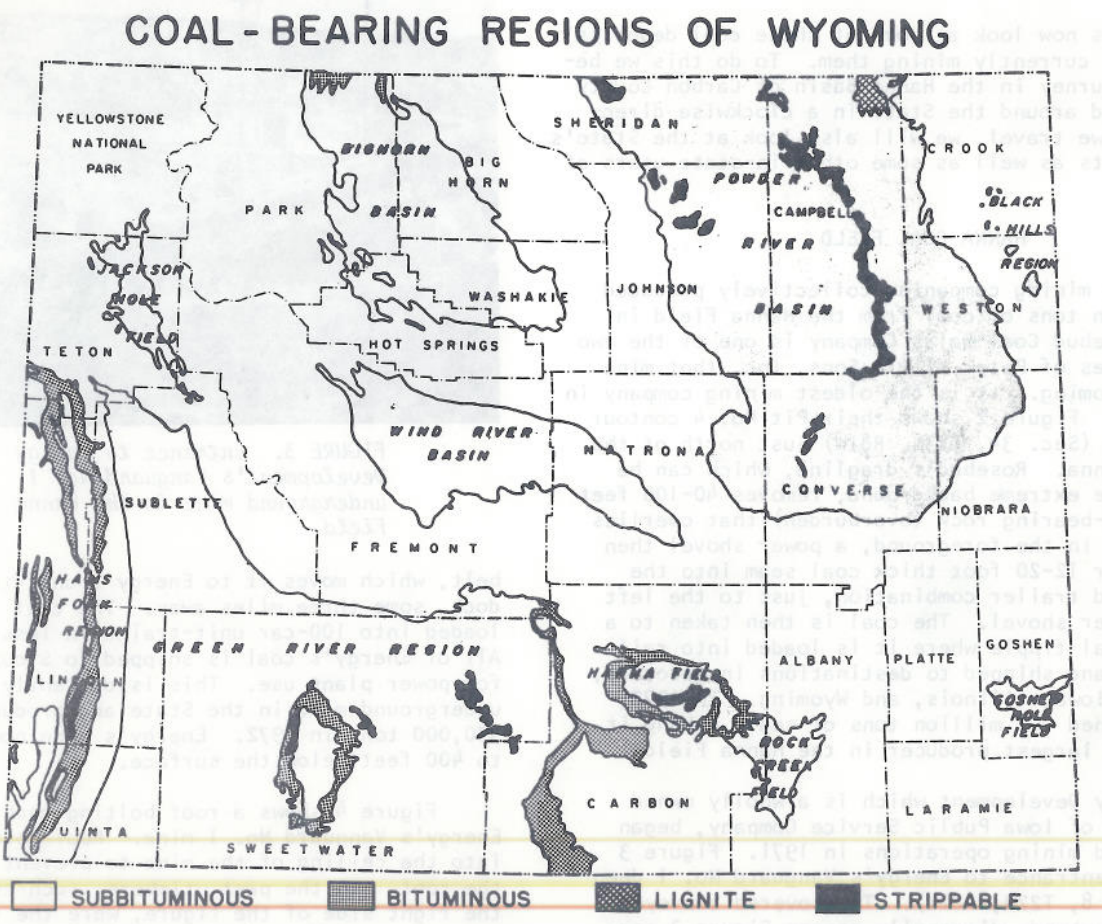

FIGURE 1. Coal-bearing regions of Wyoming

[1]Geological Survey of Wyoming, Laramie, Wyoming

demands of power plants today and a new burgeoning conversion industry tomorrow.

Figure 1 not only depicts the location of Wyoming's ten major coal-bearing regions but also shows the known strippable deposits as well as the rank of the coal. With the exceptions of the Black Hills Region in the northeast corner of the State and the Hams Fork Region along our western border, all these regions occupy basinal areas of low relief. Overall, these regions, which underlie approximately 41% of the State, contain 17% of the nation's coal resources. Wyoming's total coal resource within 6000 feet of the surface is 545 billion tons. A more meaningful figure, however, is the 25% or 136 billion tons that is mapped and within 3000 feet of the surface. Of that 136 billion, 2% is lignite, 10% is bituminous, and 88% is subbituminous in rank. One half or 68 billion tons of that mapped resource is considered recoverable by present mining methods -- underground and/or surface mining. Only 17% or 23.7 billion tons of the mapped resource is known to be strippable. Since 96% of Wyoming's production now comes from surface mines, our estimated 151,000 acres of strippable coals are by far our most important resource category.

Although coal mines are located in 6 of the coal-bearing regions, the Hanna Field, the Hams Fork Region and the Powder River Basin account for 96% of the State's annual production. The smaller producing regions are the Green River Region, the Wind River Basin and the Bighorn Basin.

Let us now look at some of these coal deposits and who is currently mining them. To do this we begin our journey in the Hanna Basin of Carbon County and proceed around the State in a clockwise direction. As we travel, we will also look at the State's power plants as well as some other in-state users of our coal.

HANNA COAL FIELD

Three mining companies collectively produced 4.2 million tons of coal from the Hanna Field in 1972. Rosebud Coal Sales Company is one of the two subsidiaries of Peter Kiewit Sons, Inc. that mine coal in Wyoming. It is the oldest mining company in the field. Figure 2 shows their Pit No. 4 contour strip mine (Sec. 34, T23N, R81W) just north of the town of Hanna. Rosebud's dragline, which can be seen in the extreme background, removes 40-100 feet of noncoal-bearing rock (overburden) that overlies the coal. In the foreground, a power shovel then loads their 12-20 foot thick coal seam into the tractor and trailer combination, just to the left of the power shovel. The coal is then taken to a conventional tipple where it is loaded into railroad cars and shipped to destinations in Colorado, Nebraska, Iowa, Illinois, and Wyoming. In 1972, Rosebud mined 1.1 million tons of coal, making it the second largest producer in the Hanna Field.

Energy Development which is a wholly owned subsidiary of Iowa Public Service Company, began underground mining operations in 1971. Figure 3 shows the entrance to Energy's Vanguard No. 1 deep mine (Sec. 8, T22N, R82W). The covered conveyor belt that extends diagonally across Figure 3 carries coal from the mine to another covered conveyor

FIGURE 2. Rosebud Coal Sales Company's strip mine near Hanna, Wyoming

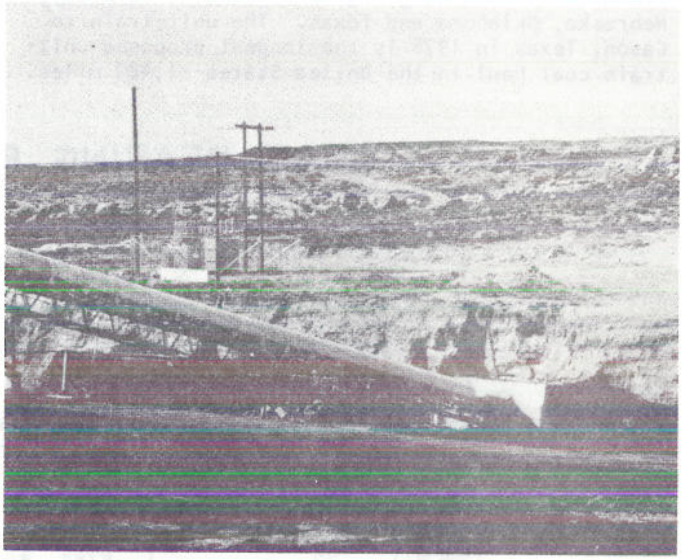

FIGURE 3. Entrance to Energy Development's Vanguard No. 1 underground mine in the Hanna Field.

belt, which moves it to Energy's unit-train loading dock, some three miles away. The coal is then loaded into 100-car unit-trains in less than 4 hours. All of Energy's coal is shipped to Sioux City, Iowa for power plant use. This is currently the largest underground mine in the State and produced about 330,000 tons in 1972. Energy's mine now penetrates to 400 feet below the surface.

Figure 4 shows a roof bolting machine inside Energy's Vanguard No. 1 mine. Roof bolts are driven into the ceiling of the mine to prevent collapse of the roof. In the past, timbers, such as those on the right side of the figure, were the typical roof supports used in underground mining. Research has shown that roof bolts actually provide more support

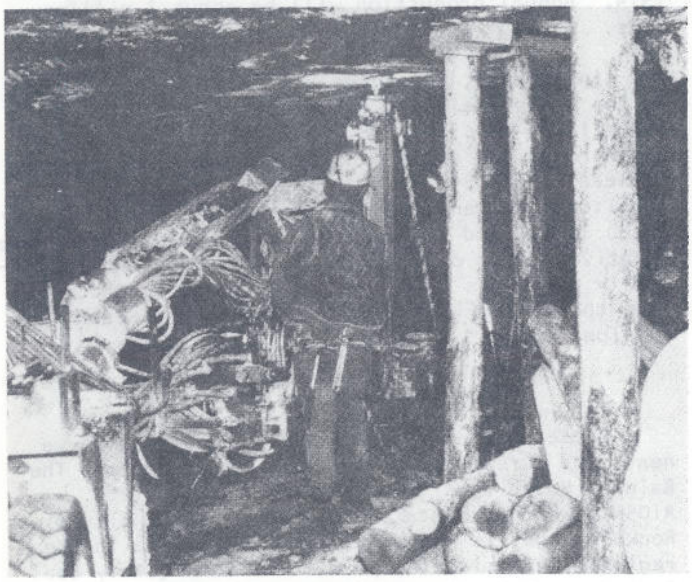

FIGURE 4. Roof bolting in the Vanguard No. 1 deep mine

than the old timbering methods. Roof bolts also allow more space in the mine so larger equipment can traverse the haulage ways. To install the roof bolts, the machine first drills a hole into the ceiling. Steel roof bolts are then inserted in that hole and driven upward with a hydraulic hammer, which is also mounted on the machine. For additional support, the roof bolts normally have a washer-like plate of wood or metal between the head of the bolt and the ceiling.

Energy's Vanguard No. 1 mine is the only underground mine in the State that uses continuous miners. Continuous miners are electric-powered machines equipped with a large rotating drum such as pictured in Figure 5. The drum is mounted on the front of the machine with numerous carbide-tipped teeth attached to it. In use, the drum spins on a horizontal plane and rips the coal from the walls of the mine. This drum can be raised and lowered in such a way that actually tears the coal loose. With these machines there is no undercutting of the coal, no drilling and no blasting necessary. While the machine is ripping coal, it is also moving the coal backward onto the machine, which then feeds the coal onto a shuttle car. The shuttle car carries the coal to the conveyor belt, which then moves it out of the mine. One major problem with mechanical miners is that they create considerable dust. To keep this dust down, water is generally sprayed on the cutting bits while the machine is in operation. This washes the coal dust to the floor of the mine and keeps airborne dust within tolerable limits.

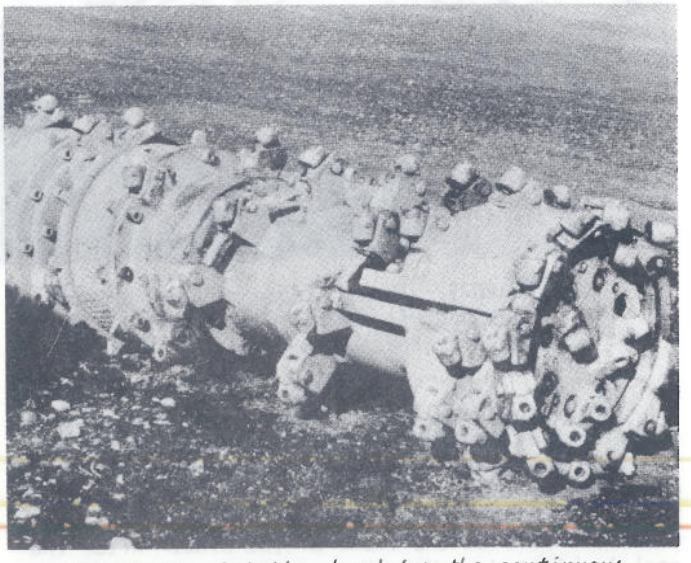

Figure 5. Rotating head for the continuous miners used in the Vanguard No. 1 deep mine

Energy Development is the one company in the State that operates an underground mine simultaneously with a strip mine. Figure 6 is one of Energy's strip mines (Sec.10, T22N, R82W). Energy uses scrapers rather than draglines to remove overburden. In Figure 6 the overburden has already been removed and the coal is being drilled so that it can be blasted for easier removal. This strip mine is on an 8-15 foot thick seam. Resources Exploration &

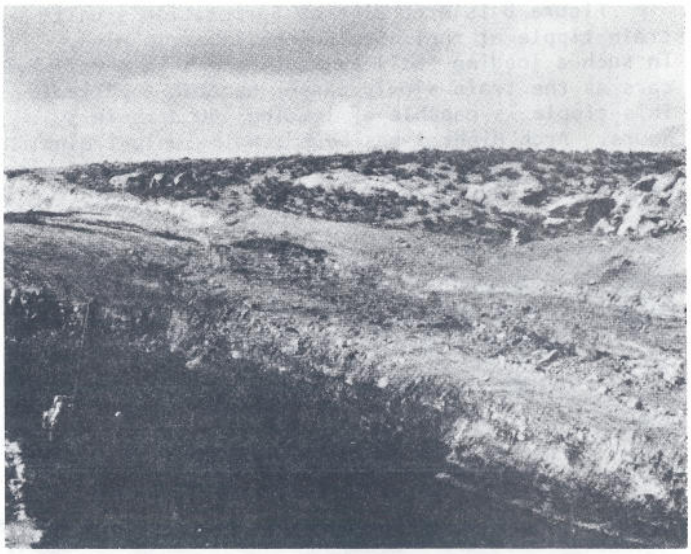

FIGURE 6. Energy Development's strip mine northwest of Hanna, Wyoming

Mining, Inc., which does the actual mining for Energy, produced an estimated 525,000 tons of coal in 1972. This coal also goes to Sioux City.

The largest and newest mining company in the Hanna Field is Arch Mineral Corporation, a jointly-owned company of Ashland Oil Company and Hunt Enterprises. Figure 7 shows the State's largest dragline as it removes overburden at Arch's Seminoe No. 1 strip mine. This machine is equipped with a 62 cubic yard bucket. Arch is currently operating two contour strip mines in the Hanna Field. Seminoe No. 1 (Sec. 16, T22N, R83W), which is the westernmost mine in the field, mines a 21 foot thick seam. Seminoe No. 2 (Sec. 8, T22N, R81W) is on a 30 foot seam. In 1972 Arch produced 2.2 million tons. They expect to double their production in 1973.

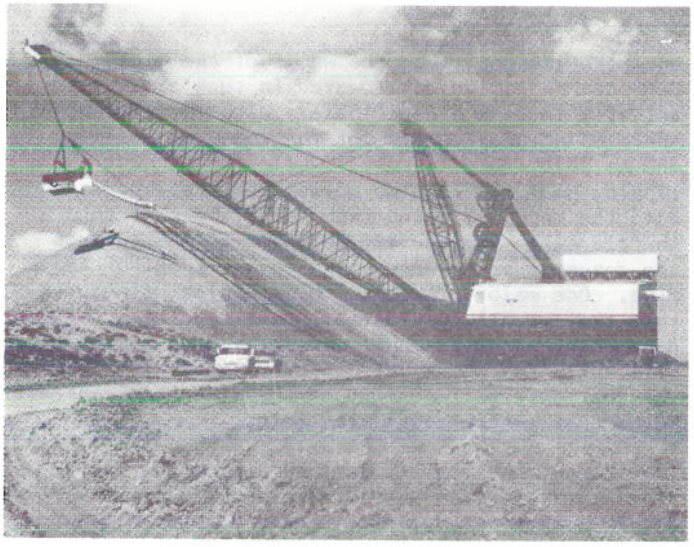

FIGURE 7. Wyoming's largest dragline removes overburden at Arch Mineral's Seminoe No. 1 strip mine west of Hanna, Wyoming

Figure 8 is Arch Mineral Corporation's unit-train tipple at their Seminoe No. 1 strip mine. In such a loading facility, coal drops into railway cars as the train slowly passes beneath the tipple. This tipple is capable of loading 100 cars in 3 hours. Arch Mineral has been sending unit-trains to Chicago and Kansas City. By now, one should also be going to Wisconsin as well.

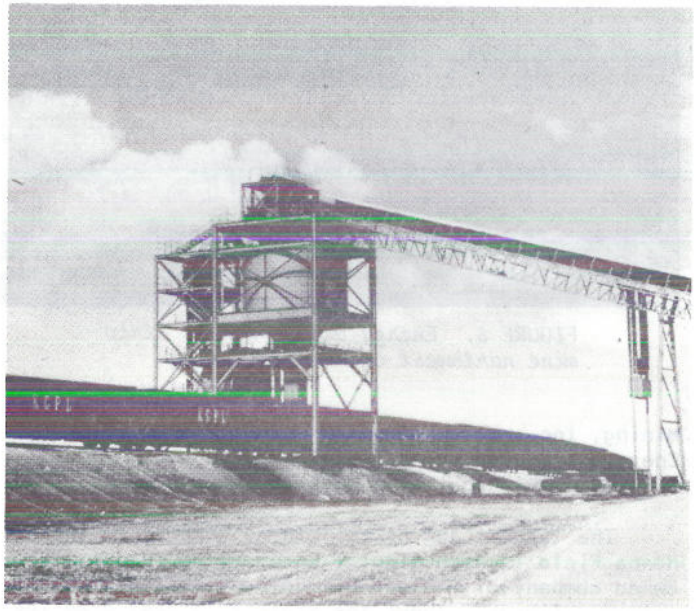

FIGURE 8. This unit-train tipple loads 100 rail cars in 3 hours at Arch Mineral's Seminoe No. 1 strip mine

Arch Mineral recently announced a joint venture with Union Pacific Corporation. They have formed the Medicine Bow Coal Company, which will begin strip mining in the Hanna Field in late 1973 or 1974. Annual production will be about 3 million tons.

In summary, the three active mining companies in the Hanna Field are expected to produce about 6.2 million tons in 1973. They mine a 7 foot seam underground and strip mine five seams that range between 11 and 30 feet. All the mined seams are of subbituminous rank. Their heat values range between 10,000 and 11,660 Btu/lb. Sulfur contents are relatively low, consistently below 0.8%, and occasionally as low as 0.2%. By 1974, annual production from the Hanna Field should approach or exceed 10 million tons.

GREEN RIVER REGION

Proceeding westward from the Hanna Field, we next find ourselves in the Green River Region. The Rainbow No. 8 underground mine (Sec. 23, T18N, R105W), which is located southeast of the city of Rock Springs, is the only active coal mine in the region. This mine is operated by Gunn-Quealy Coal Company, a subsidiary of Kemmerer Coal Company in Frontier, Wyoming. They mine a 4.5 foot seam, which is the only bituminous coal seam mined in Wyoming.

Coal is mined from the Rainbow Mine by conventional methods instead of by continuous miners such as used in the Vanguard mine in the Hanna Field. Figure 9 shows a face-cutting machine in front of the mine entrance. This machine completes the first step in conventional mining by cutting a groove beneath the face of the coal seam.

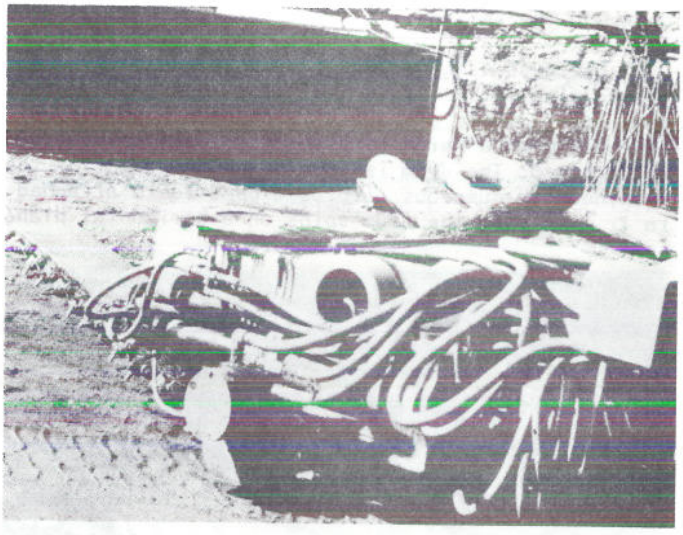

FIGURE 9. Face-cutting machine outside Gunn-Quealy's Rainbow No. 8 deep mine near Rock Springs, Wyoming

After the seam is undercut by the face-cutter, it is drilled so that explosives can be placed in it. The explosives are wired (Figure 10) and then detonated by electricity. The groove cut by the face-cutting machine allows the coal to break away clean and fall to the floor of the mine. After the coal is blasted or "shot", a loading machine is brought in to remove it (Figure 11). On the front

FIGURE 10. Coal face in the Rainbow No. 8 deep mine wired and ready for "shooting"

of the loader is a scoop-like device called a duckbill, which is driven under the freshly shot, loose coal. Arms on the duckbill then pull the coal backward onto a conveyor belt on the loader. The belt

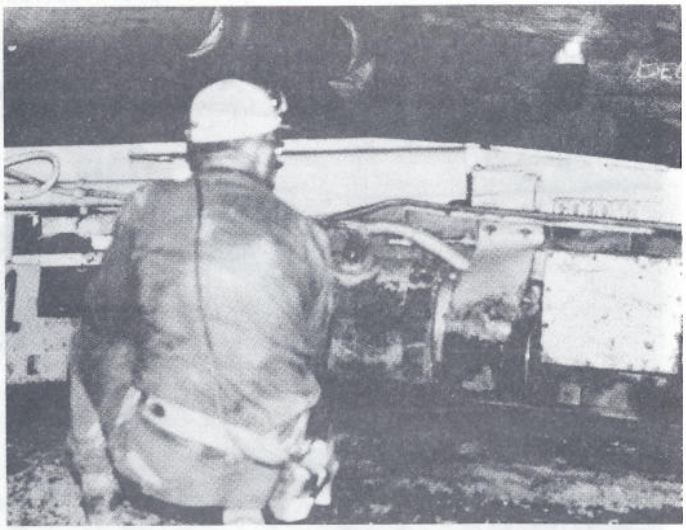

FIGURE 11. Loading machine inside the Rainbow No. 8 deep mine

moves the coal over the loader into a shuttle car, which carries it out to the tipple. While the loader is powered through trailing electric cables, the shuttle cars are battery powered for more maneuverability.

Production from the Rainbow No. 8 mine and another older mine, which is now closed, was 100,569 tons in 1972. The Rainbow No. 8 mine, alone, is expected to produce approximately 100,000 tons in 1973. Essentially all of Gunn-Quealy's coal is used in their nearby rotary-hearth coke plant (Figure 12). This plant converts their weakly-coking coal into a chemical grade coke suitable for reducing phosphate ore in electric furnaces. Gunn-Quealy is building another plant about three times this size. The new plant will have precipitators installed that should eliminate a high percentage of the plant's emissions.

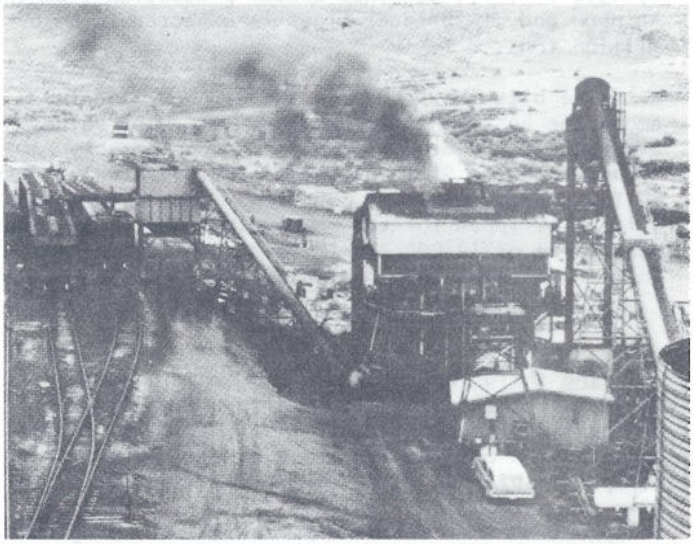

FIGURE 12. Gunn-Quealy Coal Company is now replacing this coke plant with a larger facility

One cannot leave the Green River Region without noting the construction of the State's largest coal-fired power plant (Sec. 3, T20N, R101W). The first unit of Pacific Power & Light and Idaho Power's Jim Bridger Plant will be completed in 1974. The plant, (Figure 13) which is located near Point-of-Rocks, will be fueled with nearby subbituminous coal. A 15 to 30 foot thick seam will be mined by surface methods. When all three units of the 1500- megawatt power plant are completed, the Jim Bridger strip mine (T20&21N, R100W) will have to produce approximately 5.5 million tons of coal per year.

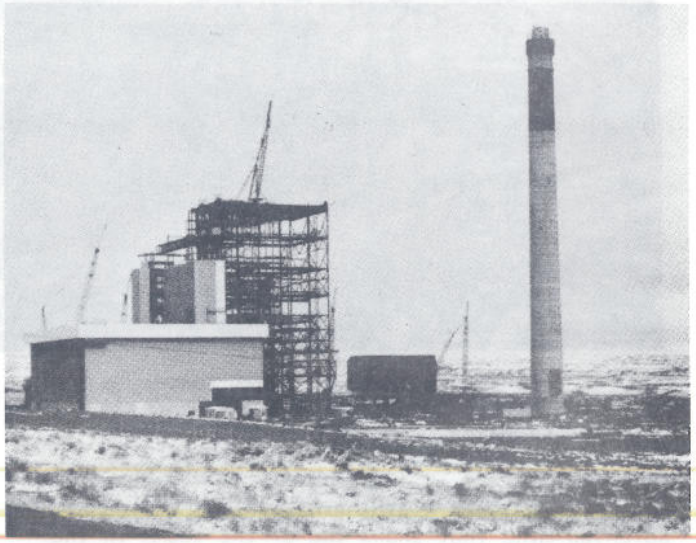

FIGURE 13. The Jim Bridger Power Plant near Point-of-Rocks, Wyoming

Summarizing, Gunn-Quealy's Rainbow No. 8 underground mine will remain the only active mine in this region for the next year or two. As their new coke plant goes into production, their annual tonnage will increase but will probably not exceed 400,000 tons per year. By 1974, some subbituminous coal will be strip mined for the Jim Bridger power plant. By 1976 or 1977, combined annual production from the Rainbow and Jim Bridger mines is expected to be 6 million tons.

The bituminous coal in the Rainbow mine is among the best mined in Wyoming. Its heat value averages 12,450 Btu/lb., which is considerably higher than the State average of 10,800 Btu/lb. Its sulfur content is 0.7%. The lower ranked coal that will be stripped for the power plant has an average heat value of 10,000 Btu/lb. and a sulfur content that ranges between 0.36% and 0.77%.

HAMS FORK REGION

The third largest producing area in Wyoming is the Hams Fork Region. It is also the westernmost of the six producing areas. Kemmerer Coal Company operates the only active mines in the region. They strip mine nine seams at this time, and have tentative plans to mine as many as 17 seams. The seams range between 6 feet and 115 feet thick. Draglines, scrapers, power shovels, and front-end loaders are all used in their operations. Their Sorensen mine (T21N, R116W), which is on the upper eight seams, supplies fuel to Utah Power & Light's nearby Naughton Power Plant. The lowermost seam, which averages 84 feet in thickness, is mined from the Elkol strip mine (T21N, R116W), and is retained as a commercial seam. The Elkol mine can be seen in the lower righthand corner of Figure 14. The other mining in that figure is part of the Sorensen mine.

FIGURE 14. Kemmerer Coal Company's Sorensen and Elkol strip mines near Kemmerer, Wyoming

Figure 15 is a closer view of a portion of the Sorensen mine that shows two of the seams in the mine. Coal seams in both of Kemmerer's mines dip 16 to 20 degrees to the west.

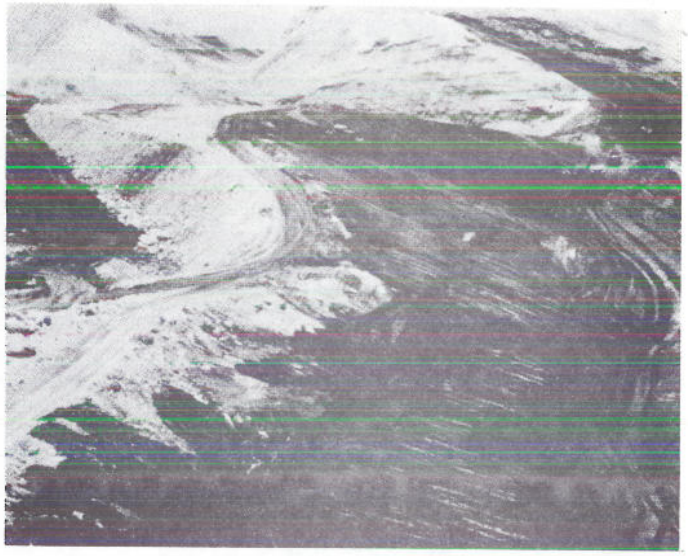

FIGURE 15. Coal seams dip relatively steeply in the Sorensen strip mine

Eighty-eight percent of Kemmerer's annual production goes to the Naughton Power Plant (Sec. 29, T21N, R116W). To supply that plant, coal from the Sorensen mine is first dumped into a mixing bin (Figure 16). This bin is designed to allow blending of different coal seams so that plant specifications

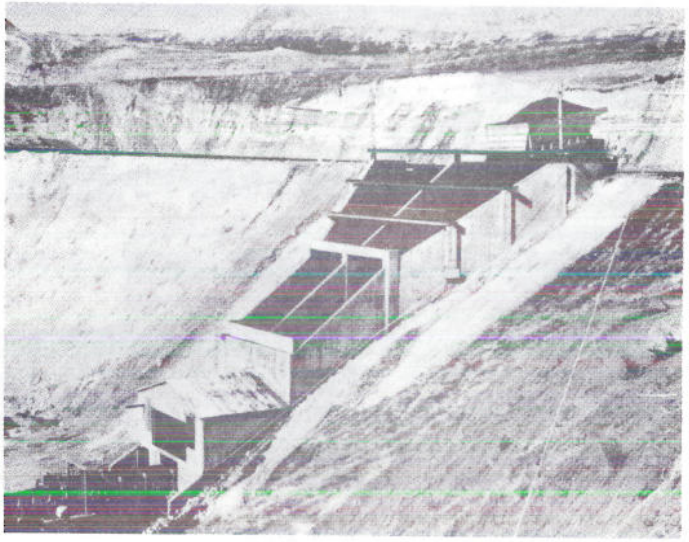

FIGURE 16. Coal is dumped into a mixing bin and then transported by conveyor belt to the Naughton Power Plant

can be maintained. The coal leaves the mixing bin via a conveyor belt, which carries it to a crusher and then on to the storage pile at the plant. The Naughton Power Plant is currently the second largest electric-generating facility in Wyoming with a capacity of 710-megawatts. As shown in Figure 17, huge wooden vats serve as the cooling towers for this conventional plant.

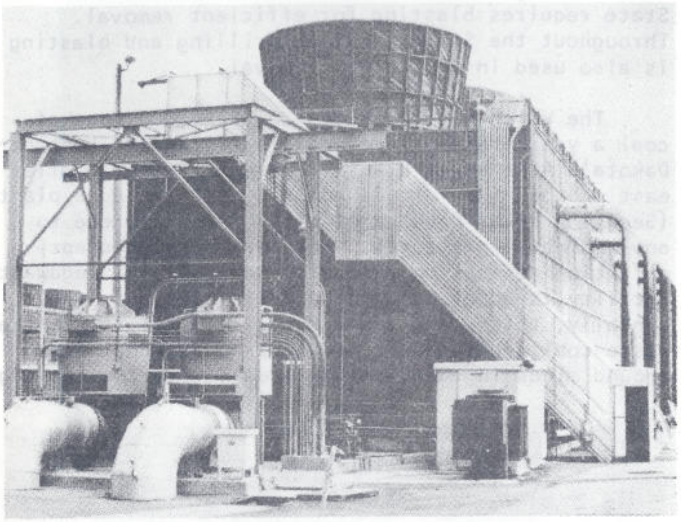

FIGURE 17. Cooling towers for the Naughton Power Plant near Kemmerer, Wyoming

Another small but unique purchaser of Kemmerer's coal is also located nearby. It's a pilot coke plant operated by FMC Corporation. This plant uses coal from the Elkol mine to make synthetic coke for phosphate ore reduction as well as higher grade metallurgical coke suitable for the blast furnaces of the steel industry. It is significant that all their synthetic coke is made from subbituminous coals, which are noncoking by more conventional processes.

In 1972, Kemmerer's production for the power plant was more than 1.8 million tons. Their additional production from the Elkol mine was almost 260,000 tons for a combined total of 2,102,919 tons. It is anticipated that Kemmerer's annual production will exceed 3 million tons by 1974. The mined coals in this region are subbituminous in rank. They average 9671 Btu/lb. and contain about 0.59% sulfur. Because of the great number of seams that are mined and their wide variation in thickness, it is difficult to establish an average seam thickness. At this time it is probably around 20 feet. Currently overburden in Kemmerer's mines ranges between 40 and 200 feet.

WIND RIVER BASIN

This fourth region is the Wind River Basin, which is located north and east of our last stop. There is only one active mine in the basin, and it is a small one at that. Muddy Creek Mines Corporation of Riverton opened a strip mine (Sec. 20, T6N, R1E) in 1973. The mine, which is a two-man operation, is extracting a 17 foot seam. Because this mine is so new, little more can be said about it. The coal is sold to domestic users in Fremont County and total production probably won't exceed 5000 tons annually.

BIGHORN BASIN

Proceeding north into the Bighorn Basin, we find two, small underground mining ventures, the Dusky Diamond and the Roncco mines. The Dusky Diamond mine (Sec. 26, T46N, R99W) is the smaller of the two and is located near the town of Grass Creek. This underground mine is on a 30 to 40 foot thick coal of which they mine the lower 20 feet (Figure 18). This is currently the thickest seam underground mined in the state. This seam is fairly flat-lying, and the mine is unique in that it has a self-supporting roof. There is no need for roof bolts or timbers. Dusky Diamond has a 50 year record of no roof falls. This mine, which is run by three men, produced 2,616 tons in 1972. The coal was sold to domestic consumers.

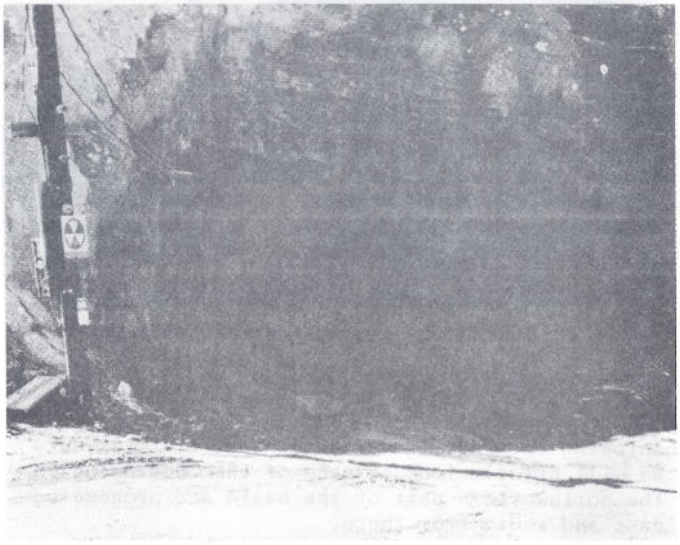

FIGURE 18. Entrance to the Dusky Diamond underground mine near Grass Creek, Wyoming

The larger mine is the Roncco mine (Sec. 17, T44N, R95W) near Gebo. This mine is an underground operation on a 6 to 9 foot seam that dips between 17 and 43 degrees. One can appreciate the steepness of this dip by examining Figure 19. The dark sloping ramp on the left side of Roncco's tipple approximates the average dip of the seam. This is a two-man operation and sells its coal to domestic users in Wyoming as well as some neighboring states. Production in 1972 was 3,063 tons.

Both seams mined in this basin are of subbituminous rank with heat values between 10,300 and 11,600 Btu/lb. Sulfur contents range from 0.4% to 1.1%. The combined annual production from the Bighorn Basin was 5,679 tons in 1972. All the coal was extracted by conventional mining methods rather than mechanical miners. If rumored expansion of the Dusky Diamond mine materializes, future production could exceed 200,000 tons per year. This expansion would involve conversion of the Dusky Diamond property to a surface mining operation.

POWDER RIVER BASIN

Our journey now draws to an end as we move eastward into the last of the six producing regions, the Powder River Basin. There are six mines in this region although one is not scheduled to begin

FIGURE 19. Tipple facility outside the Roncco underground mine near Gebo, Wyoming

shipping coal until the latter part of this year. We will briefly look at each of them beginning in the northwestern part of the basin and proceeding east and south from there.

Welch Coal Company runs the westernmost mine in the basin. This company, which is a subsidiary of Montana-Dakota Utilities, strip mines a 17 foot seam ten miles northwest of Sheridan. This two-man mine (Sec. 22, T57N, R85W) removes overlying non-coaly rock with a small tractor-towed scraper. In Figure 20, you are observing the uncovered coal seam being drilled for blasting. The drill, which is on the top surface of the coal, bores a vertical hole

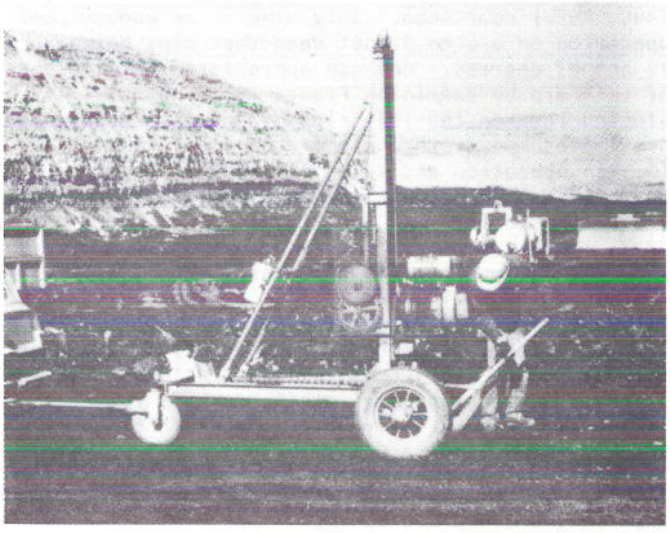

FIGURE 20. Drilling coal at the Welch strip mine near Sheridan, Wyoming

to the base of the seam. Explosives are then placed in the holes and detonated to fracture the coal and make loading easier. All surface mined coal in the State requires blasting for efficient removal. Throughout the State, similar drilling and blasting is also used in overburden removal.

The Welch mine produces about 20,000 tons of coal a year. All of the coal is trucked to Montana-Dakota's Acme Power Plant (Figure 21) some 10 miles east of the mine. It is rumored that the Acme plant (Sec. 15, T57N, R84W) will close this year due to environmental pressures. The cost of needed anti-pollution devices on this old and small (12 megawatt) facility is apparently forcing its closure. Incidentally, this plant was originally built to use the waste coal generated by numerous now defunct underground mines in the Sheridan area. With the closing

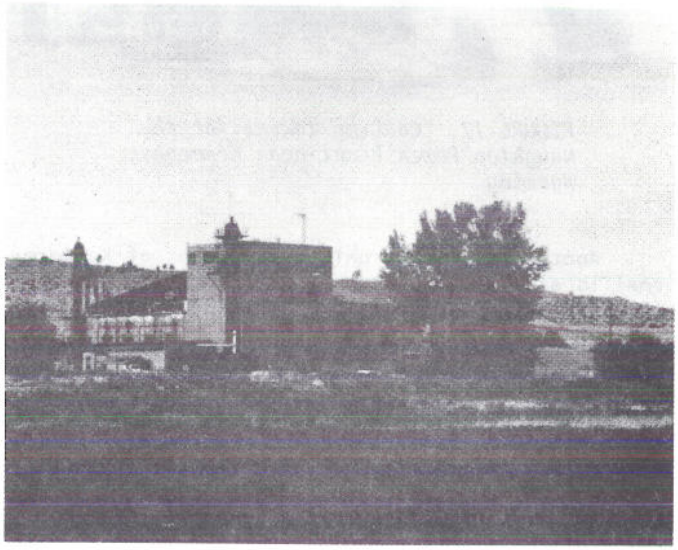

FIGURE 21. The Acme Power Plant at Acme, Wyoming

of those operations, the Welch mine was opened to supply the plant.

The next mine is Big Horn Coal Company's Big Horn No. 1 surface mine (Sec. 22, T57N, R84W) near the town of Acme. Big Horn is the second subsidiary of Peter Kiewit to mine coal in Wyoming. In this large open pit mine, the main seam averages 44 feet in thickness (Figure 22). A smaller seam, which can be seen near the top of Figure 22, is a rider coal and averages 12 feet. Both seams are mined. In Figure 22 the main coal is split into two benches with noncoaly rock separating them. This is unique to this portion of the pit as the seam is unsplit in the rest of the mine. Instead of using draglines, Big Horn uses scrapers to remove overburden, which averages 40 feet thick. Power shovels load the coal after it is blasted loose. The trailer that is being loaded in Figure 22 carries the coal to the conventional tipple. From there most of Big Horn's coal is shipped by rail to out-of-state power plants. Figure 23 is another view of the Big Horn mine to point out its size as well as the surrounding terrain and vegetation. Production from this mine in 1972 was just under 1 million tons.

We now head for Gillette and the oldest surface mine in the State, in fact, the first commercial

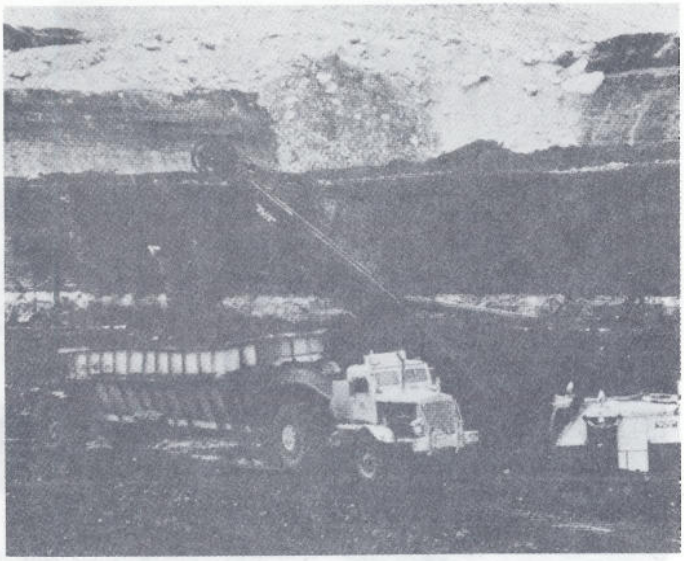

FIGURE 22. Big Horn Coal Company's Big Horn No. 1 surface mine near Sheridan, Wyoming

FIGURE 23. The Big Horn No. 1 surface mine is physically one of the largest in Wyoming

surface coal mine opened in Wyoming. The Wyodak mine (Sec. 28, T50N, R71W) was started in 1925 and has produced coal under various owners since then. Today it is owned by a subsidiary of Black Hills Power & Light Company, Wyodak Resources. The seam in this pit ranges from 50 feet to over 100 feet in thickness and averages 70 feet (Figure 24). At this time scrapers are used to remove overburden, however, draglines are occasionally used also. Wyodak's production in 1972 was almost 623,000 tons.

Coal from this mine is used by four Black Hills Power & Light Company power plants, two in Wyoming and two in South Dakota. The Neil Simpson Power

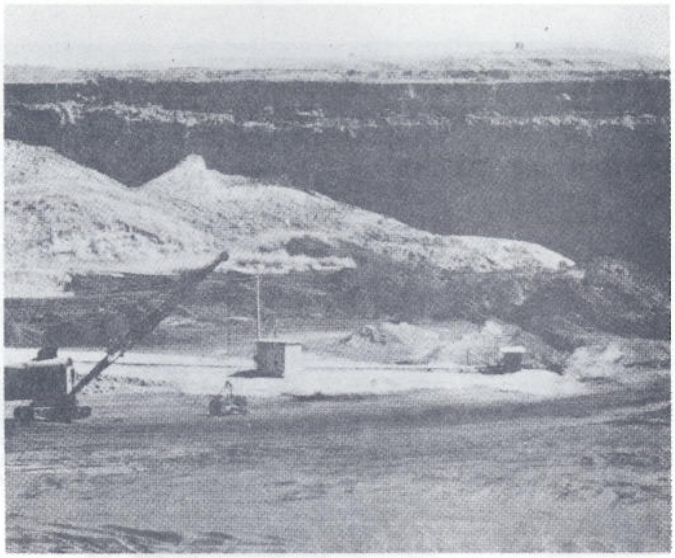

FIGURE 24. Wyodak Resources' Wyodak mine is not only the oldest surface mine in Wyoming, but it was also the first surface mine in the state.

Plant (Sec. 27, T50N, R71W) is located within one-half mile of the mine and coal is trucked to it. This plant is unique in that its newest unit is air-cooled rather than water-cooled (Figure 25).

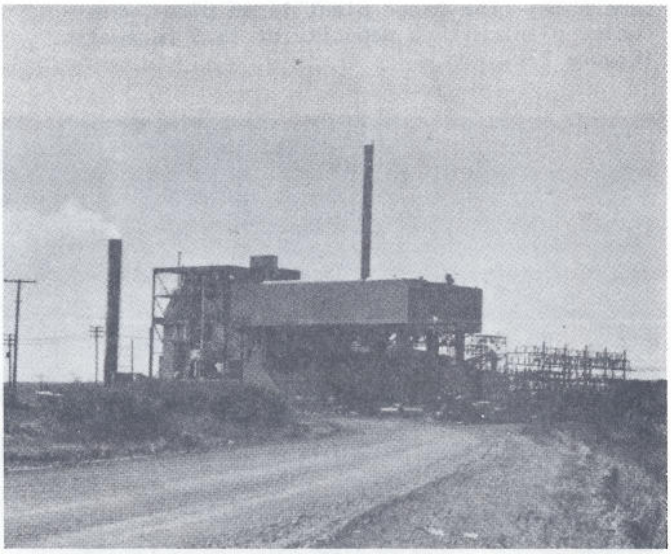

FIGURE 25. Wyoming's only air-cooled power plant is the Neil Simpson Plant near Gillette, Wyoming

It was also the first such air-cooled plant built in the United States. Conventional cooling towers for the older two units can be seen on the skyline on the right side of Figure 25. Figure 26 is a closeup of the housing over the huge fans that air-cool the newest unit. This plant has a rated capacity of 27.68 megawatts. Plans are being drawn up for a new 300 to 400 megawatt air-cooled plant in this vicinity. Air-cooled plants such as this one are particularly adaptable to semi-arid regions

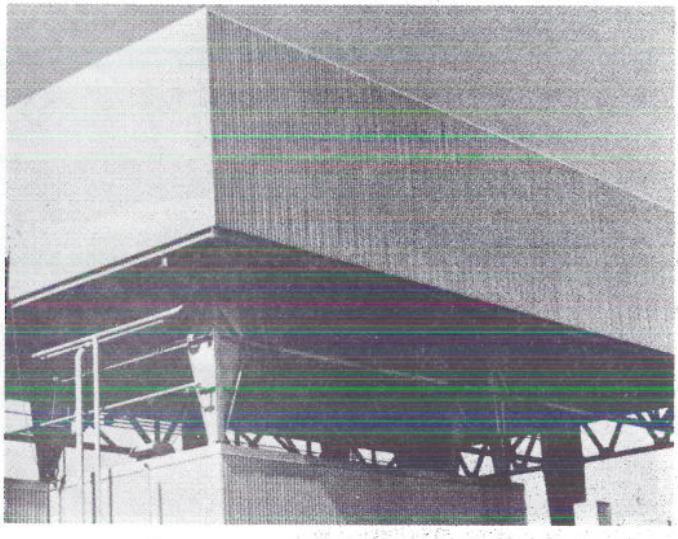

FIGURE 26. This is the housing over the three huge fans that cool the newest unit of the Neil Simpson Power Plant

since they require 1/10th the consumptive water of more conventional generating facilities.

Wyodak coal is shipped by railroad to the Osage Power Plant (Sec. 15, T46N, R63W) at the town of the same name. The Osage plant is an older water-cooled plant with a capacity of 35.5 megawatts (Figure 27).

FIGURE 27. The Osage Power Plant near Osage, Wyoming

Fifteen miles south of Gillette is Amax Coal Company's new Belle Ayr surface mine (Sec. 34, T48N, R71W). The loading shovel in Figure 28 is sitting on top of Amax's 70 foot coal seam. The overburden, which is only 20-30 feet thick, has already been removed with the same shovel. Amax intends to mine the entire open pit with power shovels, using 16-24 cubic yard buckets. This fall they will start

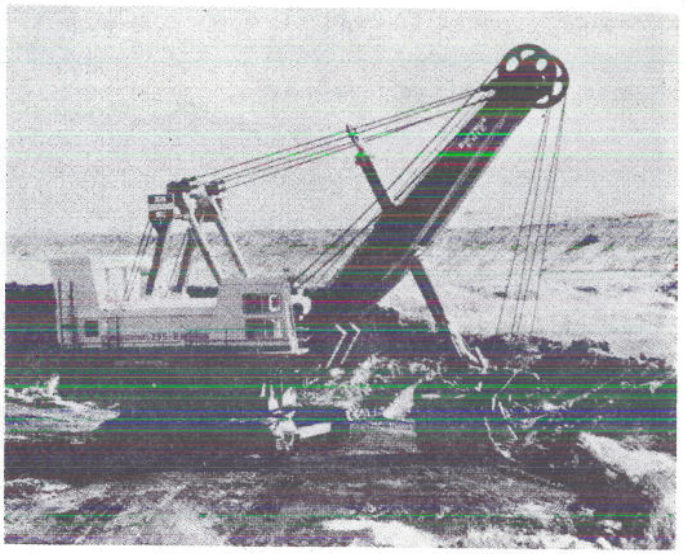

FIGURE 28. Amax Coal Company's new Belle Ayr surface mine south of Gillette, Wyoming

shipping coal to a Colorado power plant.

Amax's unit-train loading facility is the largest in the State. It is built around two silos of 13,000 ton capacity (Figure 29). The rectangular holes at the bases of these silos are big enough

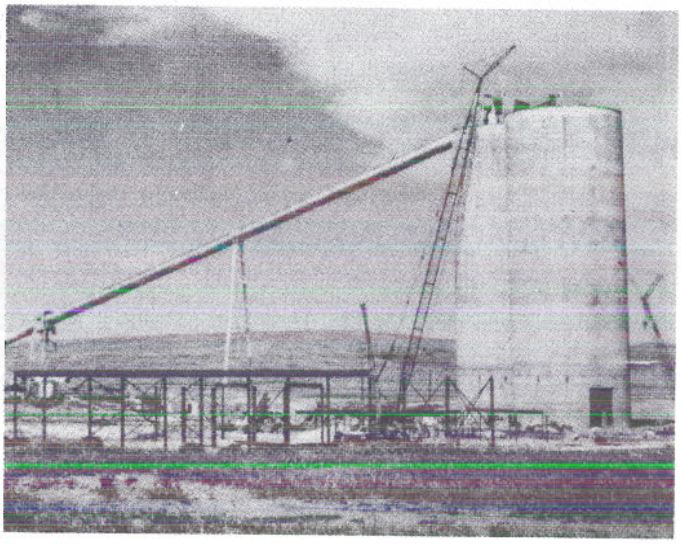

FIGURE 29. Construction of two concrete silos has been completed at the Belle Ayr mine

to move a train through them. As the railroad cars pass under the silos, coal will drop into them. The train, which never stops, will continue out the other side and on to its destination. Although anticipated 1973 production will not exceed 500,000 tons, production will exceed 3 million tons by 1976 and 6 million tons by 1978. By 1976 Amax will be shipping its coal to Cason, Texas, where it will

fuel the Lone Star state's first coal-fired power plant.

The next to the last mine is also the State's smallest mine. Best Coal Company's East Antelope strip mine (Sec. 35, T41N, R71W) is located on Antelope Creek about 20 miles north of Bill. This one man operation is only active during the winter months. During the inactive months, the mine fills with water (Figure 30), which must be pumped out before mining commences. The coal seam is 20 feet thick and is loaded with a front-end loader.

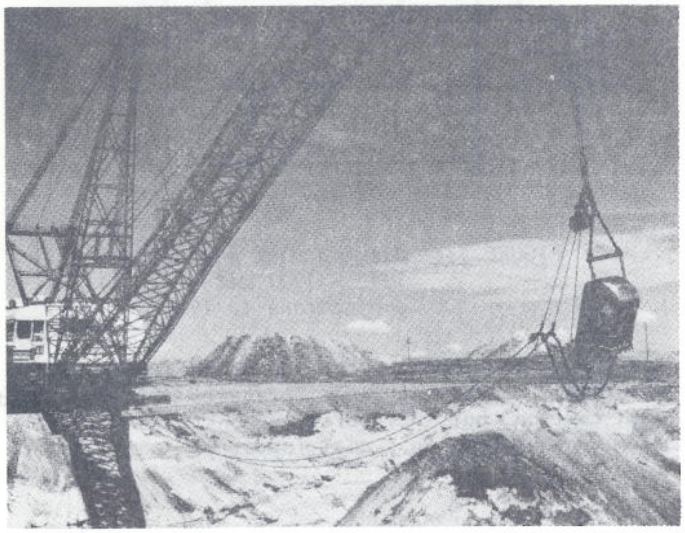

FIGURE 30. Pacific Power & Light Company's Dave Johnston Fuel Recovery Pit near Glenrock, Wyoming

Production from the East Antelope strip was 1800 tons in 1972. This coal is sold to domestic users for home heating.

It is perhaps fitting that the last mine we are visiting is also the largest in Wyoming. It is Pacific Power & Light Company's Dave Johnston Fuel Recovery Pit (Sec. 21, T36N, R75W) near Glenrock. As you can see in Figure 31, they employ a fairly large dragline for overburden removal. Pacific Power is mining two seams about 120 feet apart. The lower seam averages 35 feet thick while the upper ranges between 17 and 20 feet. In 1972, production was 2,622,150 tons.

Coal from this mine is moved via a private rail spur to the Dave Johnston Power Plant (Sec. 7, T33N, R74W) on the banks of the North Platte River (Figure 32). This is a distance of 15 miles. Pacific Power & Light's Dave Johnston plant with a capacity of 750 megawatts is currently the largest coal-fired generating plant in the State.

Before summarizing the activity in the Powder River Basin, it's worth mentioning that Atlantic Richfield intends to begin surface mining in a few years also. They have already announced signing a contract with a Nebraska power company.

The six active mining companies in the Powder River Basin collectively mined 4,251,605 tons of

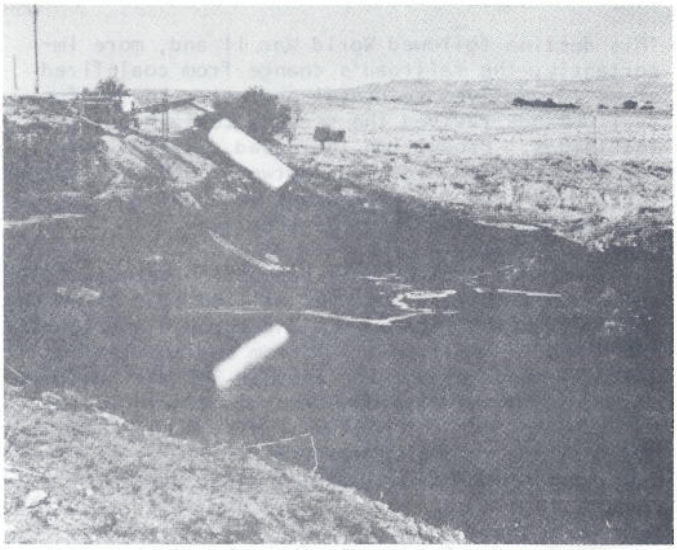

FIGURE 31. Best Coal Company's East Antelope strip mine north of Bill, Wyoming

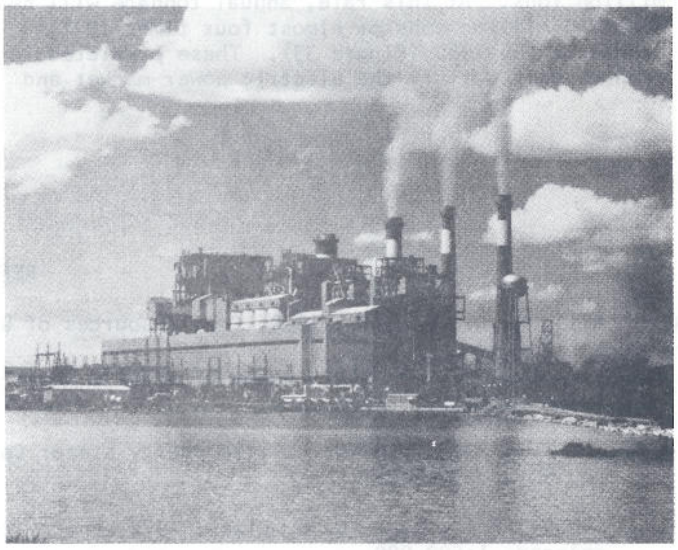

FIGURE 32. The Dave Johnston Power Plant on the bank of the North Platte River at Glenrock, Wyoming

coal in 1972. Their 1973 production is expected to be close to 5 million tons. They mine 5 different seams that vary from 12 to 70 feet thick. These subbituminous seams have heat values between 7500 and 9300 Btu/lb. Sulfur contents average 0.6%. All mining in this basin is by surface methods.

THE PAST AND THE FUTURE

How does 1972's record production compare with the past and where does it lead to in the future? Let us look at the past first. Except for an 11 year interval after World War I, Wyoming coal production for the years 1910 through 1945 remained above 6 million tons annually. After 1945, production fell to a record low of 1.6 million tons by 1958.

This decline followed World War II and, more importantly, the railroad's change from coal-fired steam locomotives to diesel engines. Low-sulfur fuel demands revived the state's coal industry in the 1960's. Production increased, first slowly, and then more than doubled between 1969 and 1972 to 10,920,468 tons. This tonnage is equal to 1.8% of the national production for that year.

Recorded Wyoming coal production between 1865 and Jan. 1, 1973 is over 462 million tons of which 383 million (83%) came from underground operations and almost 79 million (17%) from surface mining. Mining losses account for another 399 million tons and bring the total production and mining losses to a little over 861 million tons. Ninety-nine and four-tenths percent of Wyoming's original explored coal resources remains unmined after more than a century of mining.

As for the future, Wyoming already jumped from the 11th to the 9th largest coal producing state in 1972. In this decade, Wyoming's coal production is expected to increase 2 to 7 million tons per year. This is an average annual increase of almost 4 million tons. At this rate, annual tonnage will be about 40 million tons or almost four times 1972's production by 1980 (Figure 33). These predicted increases only satisfy the electric power market and do not include requirements of a predicted synthetic-fuels industry. If one adds tonnages to support this new industry, annual production could top 100 million tons by the end of this century. Naturally, these long-range forecasts must be viewed with caution, but they surely demonstrate the potential of Wyoming's coal industry.

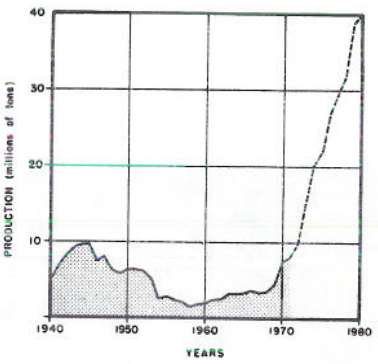

FIGURE 33. Wyoming coal production 1940 - 1971 with projections to 1980

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