

KING COAL

HISTORIC MINE BYWAY

Interpretive Plan



"Wyodak coal mine near Gillette, WY, Val Kuska July – Aug 1930" (Wyoming State Archives, Kuska Collection, File 661-680)



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**“COAL? WYOMING HAS ENOUGH WITH WHICH TO RUN
THE FORGES OF VULCAN, WELD EVERY TIE THAT BINDS,
DRIVE EVERY WHEEL, CHANGE THE NORTH POLE INTO
A TROPICAL REGION OR SMELT ALL HELL.”**

—Fenimore Chatterton, Wyoming Secretary of State, 1902

This interpretive plan was developed by Toxey/McMillan Design Associates between 2014 and 2017 under contract from the Wyoming State Historic Preservation Office. The project scope was revised in 2016 at the request of the Wyoming SHPO and local project participants. This document reflects a historical perspective on the Campbell County Coal Industry rather than current events and economic conditions.

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Eagle Butte mine silos, north of Gillette (Toxey/McMillan Design Associates)

INTRODUCTION TO THE PROJECT

The *King Coal Historic Mine Byway* is a product of the Historic Mine Trail and Byway Program, part of the Wyoming State Historic Preservation Office (SHPO)'s Monuments and Markers Program. In an effort to bring light and appreciation to Wyoming's extremely rich and diverse mining history and mineral reserves, the program's mission, as defined by the state legislature, is to identify and designate historic mine locations and trails within the state. *King Coal Historic Mine Byway* is the fifth trail to be created since the program was established by the Wyoming Legislature in 2005. Others include: *Gold Flakes to Yellowcake Historic Mine Trail*, which interprets the gold mines and uranium mines in the Sweetwater Mining District and the Gas Hills Uranium Mining District; *Black Gold Byway*, which interprets the Salt Creek Oilfield north of Casper; *Black Diamond Trail*, which interprets the underground coal-mining district north of Sheridan; and *Trona Trail*, which interprets the historic and contemporary trona-mining area west of Green River.

The new byway supports the Historic Mine Trail and Byway Program objectives:

- 1) to provide a precise history of mineral development in Wyoming;
- 2) to interpret the role of mining and minerals in the development of Wyoming's economy;
- 3) to identify and describe Wyoming's mining and mineral-development heritage.



Wyodak mine (Campbell County Rockpile Museum)

INTERPRETIVE SIGNIFICANCE

Campbell County lies at the heart of the Powder River Basin coal production region, the largest in the United States. While mining for coal has been an occupation in this area since the late 19th century and belongs to Wyoming's classic tales of settlement and mineral wealth, the most significant chapter of this story is the modern era, beginning in the early 1970s.

This is a story of scale. [In 2015](#), the Powder River Basin [was](#) the largest coal-producing region in the world (generating 400 million tons annually) [and provided](#) over 35% of the nation's coal production. While the magnitude of its reserves continues to be discovered, Wyoming Secretary of State Fenimore Chatterton had a good idea of their size when he stated in 1902, "Coal? Wyoming has enough with which to run the forges of Vulcan, weld every tie that binds, drive every wheel, change the North Pole into a tropical region or smelt all Hell."

At one trillion tons, this may be the largest reserve in the world. In addition to the immensity of its volume—a 100-foot-deep coal seam spanning 120 miles east to west and 200 miles north to south—the coal is close to the surface in the Gillette area, making surface mining possible and the cost of production relatively low. Two of the largest open-pit mines in the United States are located here, and some of the largest equipment in the world has been built to mine it, such as "Ursa Major," the largest dragline excavator in North America. Also supersized are the mile-long trains that transport the coal directly from the mines to power plants across the U.S.

This sleeping giant did not awaken until the OPEC oil embargo in the early 1970s created an energy crisis in the United States and a shift of dependence from imported oil to domestic energy sources, namely home-grown coal, which is plentiful in Wyoming. Although born as a domestic industry and energy source, Powder River coal has been expanding its market which now extends into Asia. The importance of this development to the regional economy can be seen in Gillette schools where Chinese is now taught, preparing the next generation to continue Powder River coal's expansion and influence in Asia.



Loaded unit train leaving Eagle Butte mine (Toxey/McMillan Design Associates)



CCC "boys" putting out coal seam fire in the Gillette area, 1933–1942 (Campbell County Rockpile Museum)

Campbell County is also associated with several mining events and recovery methods that are historically and environmentally significant. These include a Civilian Conservation Corps (CCC) camp dedicated to putting out coal fires and strides toward responsible reclamation taken by Gillette-area mining companies.

In addition to leading the nation in research into best practices for reclamation, the mining companies in this area have conducted research in cutting-edge energy technologies such as methane farming and K-fuels. Except for the coalbed methane boom and bust of the early 2000s, new products and industries have not found fertile ground from these explorations. However, the age-old, earthy work of mining coal and providing mine-related services have completely transformed Gillette's and northeastern Wyoming's economic and physical landscape since the 1970s. Though initially the community was hesitant to open its doors to large commercial mining, most locals benefit directly or indirectly from these operations, making it a family affair and defining the region's identity.

PROJECT GOAL

The goal of this project is to develop a byway that places in value the history and heritage of the Campbell County coal-mining area through a variety of media, including a driving trail with a narrated audio tour or mobile app, possibly augmented by roadside interpretive panels in the future. These media are intended to engender public understanding, appreciation, and stewardship of this cultural legacy.



Wyodak mine (Black Hills Corporation)

INTENT OF THE INTERPRETIVE PLAN

The goal of this Interpretive Plan is to guide the development of a driving tour, roadside signs, exhibits, and other media. To accomplish this, the plan:

- Synthesizes available visitor information to understand the project's audience
- Defines learning, behavioral, and emotional objectives for the media and exhibit components based on public input
- Establishes an interpretive theme for the project
- Develops storylines
- Defines a driving route and accompanying interpretation that tie together these features in a cohesive experience
- Outlines other media for further development and interpretation of the byway.

METHODOLOGY AND DEVELOPMENT PROCESS

The content of this interpretive plan was derived through field research, bibliographic research, archival research, public meetings, and interviews. A public meeting was held in Gillette on January 21, 2015, and included the participation of local residents, representatives of local cultural organizations, and representatives of several state and federal agencies, including the State Historic Preservation Office (SHPO), Wyoming Department of Transportation (WYDOT), and the Bureau of Land Management (BLM). The interpretive consultants, Toxey/McMillan Design Associates, also spent three days in the field in January 2015 touring the region, visiting mines, meeting with area museums, and interviewing stakeholders. A list of bibliographic sources consulted can be found at the end of this document.



One of the smaller, decommissioned haul trucks, Wright Centennial Museum (Toxey/McMillan Design Associates)

AUDIENCE PROFILE

To identify and understand potential visitors to the *King Coal Historic Mine Byway*, this study takes a multi-pronged approach. Beginning with a broad look at (1) visitors to the state of Wyoming in general, the analysis narrows in scope to (2) visitors to northeastern Wyoming, followed by (3) visitors to visitor centers near Gillette, and finally (4) visitors centers within Gillette.

A 2014 visitor profile study carried out for the State of Wyoming contains several results relevant to the Campbell County byway project. It shows that the majority (78%) of visitors arrive by car and that there is a growing trend toward visitors going to more places in Wyoming. In fact, the average trip involves stops at four destinations in the state. Topping the list of preferred activities/destinations are: visiting national parks, taking scenic drives, and having natural experiences.¹

A similar study conducted for northeastern Wyoming, also in 2014, echoes the results of the statewide study. The majority (70.1%) of travelers studied were adults traveling without children and were of an older generation (average age 52.3 years). The overwhelming majority (92.3%) sought visitor information upon arrival to the area, namely the state's welcome centers. Approximately two-thirds used social media during their visits with most posting on Facebook.²

Gillette, conveniently positioned at the crossroads of two highways (the east-west transcontinental Interstate 90 and the north-south state highway 59), receives a lot of cross traffic. Out-of-state visitors especially arrive via the much used interstate corridor, which is one of the main conduits into the state. Since the majority of visitors to Wyoming travels by car and visits multiple destinations, the *King Coal Historic Mine Byway* has the potential of attracting I-90 travelers and enticing them to make an unscheduled scenic drive along the mine byway, especially if directed to this amenity in the nearby state welcome centers. The Sheridan Welcome Center (100 miles northwest of Gillette) receives an average of 100,000 visitors a year. The Northeast Wyoming Welcome Center (75 miles east of Gillette) receives an average of 72,000 visitors a year. If even a small percentage of these travelers stopped in Gillette, the number would be significant.

| [Visitors to Gillette's Campbell County Rockpile Museum](#) (an average of 10,000 per year) and the Wright Centennial Museum on Highway 59

¹ 2014 Overnight Visitor Profile Research (January 2015) funded by the Wyoming Tourism Board and conducted by Strategic Marketing & Research Insights.

² Crook County Tourism Promotion Board: 2014 Visitor Intercept Survey.

south of Gillette (averaging 1,000 visitors per year) [are a ready audience for the historic mine byway](#).

Another tourist draw to Gillette that could [funnel](#) visitors to the historic mine byway is CAM-PLEX. This event center hosts a broad range of events that have regional draw. Visitors to these concerts, rodeos, conventions, and other attractions may also be interested in driving the historic mine byway, especially given CAM-PLEX's free, permanent, outdoor display of large mining equipment in its parking lot. In 2015 alone, the center's 547 events drew 327,551 attendees, 36,000 of whom were non-local (i.e., coming from outside Campbell County).

The considerable amount of business [conducted](#) in and near Gillette in energy and support industries in itself brings a lot of traffic here, all of which provides potential visitors who are interested in the topic of coal.

Finally, potential visitors to the area could come during the annual Sturgis Motorcycle Rally, which boasts over 400,000 tourists a year. For one official week in August, but spilling into the weeks before and after this, motorcycle enthusiasts from around the world descend on Sturgis, South Dakota. These participants actively seek scenic and historic drives for their journey and for entertainment during their stay. The *King Coal Historic Mine Byway* will be an added tourist attraction in this part of the state.

The data, below, provide support for the summary of potential visitors described above

DEMOGRAPHICAL DATA

The *2014 Overnight Visitor Profile Research* (January 2015) funded by the Wyoming Tourism Board and conducted by Strategic Marketing & Research Insights provides a general overview of visitors to the state. Below are relevant statistics from this study:

- Outpacing the national average, overnight tourism in Wyoming saw an 11% increase in leisure visitors in 2014. These 10.1 million visitors come from the surrounding states and also from several more distant states, California and Texas being most noteworthy. "The 'cowboy' theme may have resonated strongly with this audience and helped drive visitation" (pp. 3–6).
- From 2007 to 2014, "the majority [78%] of Wyoming visitors drive a car, van, truck or SUV to the state" (p. 11). Trip length was in the 2- to 3-night range.

- The majority (77%) of visitors travel with a spouse or significant other. The presence of young children (0–12 years old) was at 21% (p. 12).
- There is a growing and continuous general trend toward visitors going to more places in Wyoming year-over-year, with *most visiting an average of 4 destinations* in 2014 (p. 13).
- The top tourist activities are: state and national park (53%), scenic drives (54%), and natural experiences (41%). Natural experiences include hiking/backpacking, wildlife watching, and camping. While not on the top of the list, visiting historical sites (38%), visiting museums (32%), and sightseeing tours (28%) are significant tourist activities (p. 15).
- “The demographic profile indicates that visitors this year [2014] were as affluent as in 2013, somewhat younger (although not as young as in 2012), and with a wider range of educational attainment. In terms of ethnicity, the vast majority of Wyoming visitors [84%] identify themselves as Caucasian” (p. 20).

VISITOR DEMOGRAPHICAL STATISTICS FOR NORTHEASTERN WYOMING³

Randall Travel Marketing (RTM) was retained by the Campbell County Convention & Visitors Bureau (CCCVB) to conduct a Visitor Profile and Inquiry Conversion Study in 2012 for Campbell County. A total of 112 visitors participated in and completed the survey. To augment the study data, the same survey was conducted as an intercept questionnaire with existing visitors in Campbell County. This data represent an additional 63 respondents. Therefore, N=175 for the total response in this report unless otherwise noted. The visitor demographics from this study provide useful insight about current and potential visitors to Northeastern Wyoming. Below are the relevant highlights from this study.

CAMPBELL COUNTY BASIC VISITOR DEMOGRAPHICS

CATEGORY	STATISTICS
Age	52.2 years <u>Millennium Generation: 1.2%</u> <u>Generation X: 33.9%</u> <u>Baby Boomer: 54.0%</u> <u>Silent Generation: 10.9%</u>
Gender	<u>Male 57.6%; Female 42.4%</u>
Adults traveling <u>without</u> children	<u>82.4%</u>
Education	<u>High School or Some College: 34.3%</u>

³ This section, entitled “Visitor Demographical Statistics for Northeastern Wyoming,” was developed by the State of Wyoming’s Economic Analysis division in November 2016, based on data supplied by the Campbell County Convention and Visitors Bureau in July 2016.

	<u>College Degree only: 45.1%</u> <u>Graduate School: 19.4%</u> <u>All other: 1.2%</u>
<u>Employment</u>	<u>Retired 24.6%; Employed 75.4%</u>
<u>Household Income</u>	<u>Median = \$85,250</u> <u>Less than \$40,000: 13.5%</u> <u>\$40,000–\$59,999: 16.7%</u> <u>\$60,000–\$79,999: 14.6%</u> <u>\$80,000–\$99,999: 19.8%</u> <u>\$100,000–\$119,999: 14.6%</u> <u>\$120,000–\$139,999: 20.8%</u>

PRIMARY POINT OF ORIGIN:

- Visitors were from 40 different states across the country, including Wyoming, Minnesota, Texas, Montana, Colorado, and Missouri. There was also a significant cluster from the east.
- Approximately 82.5% of visitors stayed overnight in Campbell County. The average number of nights spent was 2.59 in 2012, and 25.2% of respondents spending four or more nights in the county.

TRAVEL:

- 74.1% traveled by automobile only.

MAJOR PURPOSE OF TRIP:

- Nearly half (48.7%) visited the county for leisure or vacation.
- A solid 28.3% of visitors came for business purposes.
- About 23.0% traveled through Gillette and Wright on their way to another destination such as Yellowstone, Mount Rushmore, and/or Rapid City in South Dakota.

VISITOR INFORMATION:

- A healthy quarter (25.4%) mentioned using a Wyoming tourism website to help plan their trips.
- 22.8% directly mentioned the Campbell County website (www.visitgillette-wrightwyo.org) among their trip-planning tools.
- Approximately one half mentioned using information from state or local visitor centers, the Wyoming State Travel Guide, and/or other travel related websites in planning their trip to Gillette-Wright.

ACCOMMODATION:

- Hotels and motels were the predominant lodging preference for tourists. Almost nine out of ten visitors (88%) spent the night at a hotel or motel, while 6.5% stayed with a friend or family member.
- Slightly more than 3% stayed at an area campground.

ACTIVITIES CONDUCTED WHILE VISITING CAMPBELL COUNTY:

- Dining out
- Driving/Sightseeing
- Shopping
- Visiting a state or national park
- Visiting an attraction/museum/historic site
- Business
- Outdoor recreation
- Visiting a coal mine
- Attending event at CAM-PLEX

OTHER SIGNIFICANT VISITOR INFORMATION:

- Thirty-four percent (34.0%) of the responding public made its travel plans one to four weeks in advance of making the trip to Campbell County. Slightly over one-fifth (21.9%) said it took one to three months to make their travel arrangements. Fourteen percent mentioned it was a “spur of the moment” trip, while 15.8% listed taking more than six months to plan its Campbell County excursion.
- Satisfaction Ratings: respondents were highly satisfied (rated as “A”) with the “quality of lodging rooms” and “lodging value.” The “level of service/employee training” and “Overall quality of attractions” were rated a solid “B.”
- Likes: Beautiful country/Scenery, Friendly people, Hunting, Open space/West, Coal mine.
- Desired New Products: Scenic driving trails, ranch tours, walking/biking trails, more local flavor restaurants.

ATTENDANCE DATA FOR VISITOR CENTERS, MUSEUMS, AND MINE TOURS

Visitor demographics specific to Campbell County can be found by examining visitor statistics for area **and state** visitor centers, museums, and sightseeing tours. The data below examine visitor statistics for:

1) GILLETTE AND WRIGHT VISITOR CENTERS

According to a CCCVB survey, 14.9% of visitors stopped at the Gillette and/or Wright visitor centers. This is important because national data indicate that only about 10% of travelers stop at visitor centers. Approximately one-third of those that do stop at a visitor center will stay in the area longer, spend more money, or otherwise change their behavior based on information they find at the visitor center. Since a

relatively higher percentage of Campbell County visitors stop at the county's visitor centers, the CCCVB has a strong opportunity to influence the behavior of a significant portion of visitors and encourage them to stay longer, spend more money, etc. The tables below illustrate the number of annual visitors from 2010 to 2015 and the number of visitors in 2015 by month for the Gillette and Wright visitor centers.

<u>YEAR</u>	<u>GILLETTE VISITOR CENTER</u>	<u>WRIGHT VISITOR CENTER</u>	<u>TOTAL</u>
<u>2010</u>	<u>10,196</u>	<u>785</u>	<u>10,981</u>
<u>2011</u>	<u>8,921</u>	<u>1,188</u>	<u>10,109</u>
<u>2012</u>	<u>8,676</u>	<u>1,188</u>	<u>9,864</u>
<u>2013</u>	<u>9,167</u>	<u>4,234</u>	<u>13,401</u>
<u>2014</u>	<u>9,028</u>	<u>3,123</u>	<u>12,151</u>
<u>2015</u>	<u>8,638</u>	<u>3,915</u>	<u>12,553</u>

<u>2015 MONTH</u>	<u>GILLETTE VISITOR CENTER</u>	<u>WRIGHT VISITOR CENTER</u>	<u>TOTAL</u>
<u>January</u>	<u>85</u>	<u>0</u>	<u>85</u>
<u>February</u>	<u>82</u>	<u>0</u>	<u>82</u>
<u>March</u>	<u>148</u>	<u>0</u>	<u>148</u>
<u>April</u>	<u>153</u>	<u>0</u>	<u>153</u>
<u>May</u>	<u>494</u>	<u>242</u>	<u>736</u>
<u>June</u>	<u>1,610</u>	<u>1,249</u>	<u>2,859</u>
<u>July</u>	<u>2,687</u>	<u>1,144</u>	<u>3,831</u>
<u>August</u>	<u>1,800</u>	<u>1,075</u>	<u>2,875</u>
<u>September</u>	<u>833</u>	<u>167</u>	<u>1,000</u>
<u>October</u>	<u>526</u>	<u>38</u>	<u>564</u>
<u>November</u>	<u>125</u>	<u>0</u>	<u>125</u>
<u>December</u>	<u>95</u>	<u>0</u>	<u>95</u>
<u>Total</u>	<u>8,638</u>	<u>3,915</u>	<u>12,553</u>

CCCVB data show that summer months are the most popular time to visit. July held supreme, followed by August and June. Over three fourths of annual visitation occurred in those three summer months. There was little visitation the cold, winter months of December through February. The Gillette Visitor Center is open year-round, while the Wright Visitor Center is only open from May through October.

2) STATE VISITOR CENTERS: SHERIDAN INFORMATION CENTER AND NORTHEAST WYOMING WELCOME CENTER

<u>YEAR</u>	<u>SHERIDAN INFORMATION</u>	<u>NORTHEAST WY WELCOME</u>	<u>TOTAL FOR ALL 7 STATE WELCOME</u>
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	CENTER	CENTER	CENTERS
2012	103,489	72,361	773,670
2013	97,025	72,679	864,403
2014	106,243	72,578	864,432

3) PUBLIC TOURS OF EAGLE BUTTE MINE

Mining is critical not only to the economy of Campbell County, but also to that of the state. It is therefore understandable that sightseeing tours of the local coal mines draw tourists from all over the [world](#). As highlighted in the numbers for the Gillette Visitor Center (see #1, [above](#)), information on coal mines and open pit tours was the top requested item.

[The](#) Eagle Butte mine north of Gillette [has](#) [allowed](#) the Gillette Convention and Visitors Bureau to conduct public tours. Tours [have been](#) conducted Monday through Friday during the summer months (June–August). There are two tours each day, and each limited to the seating provided on a 24-passenger bus. The table below shows the summarized data for 2009–2015.

YEAR	TOTAL	WYO TOTALS	US TOTALS (ALL BUT WYOMING)	INT'L TOTALS	ADDITIONAL REQUESTS NOT MET
2009	1,196	132 (11.0%)	1,038 (86.8%)	26 (2.2%)	No Data Available
2010	1,647	276 (16.8%)	1,336 (81.1%)	35 (2.1%)	435
2011	1,615	205 (12.7%)	1,555 (96.3%)	60 (3.7%)	1,233
2012	1,970	267 (13.6%)	1,601 (81.3%)	102 (5.2%)	No Data Available
2013	2,255	219 (9.7%)	1,983 (87.9%)	53 (2.4%)	No Data Available
2014	2,047	194 (9.5%)	1,889 (92.3%)	69 (3.4%)	No Data Available
2015	2,279	391 (17.2%)	1,785 (78.3%)	103 (4.5)	No Data Available

As the table above shows, attendance for mine tours [has](#) steadily increased (with a slight dip in the numbers between 2013 and 2014). While the vast majority (averaging 87%) of tourists [have been](#) from the U.S. (not including Wyoming), Wyoming residents [have maintained](#) a significant presence [with an](#) average [of](#) around 15% of visitors.

Eagle Butte mine and other mines also provide or allow tours throughout the year to visiting dignitaries, government officials, and special interest groups. These tours are not recorded or tracked.

In addition, Eagle Butte mine provides and maintains a popular public overlook of the mine, which also contains interpretive panels and surplus equipment. The overlook is moved along highway 59 as the area being mined moves. There is no data collected on numbers of visitors to this exhibit.

4) CAMPBELL COUNTY ROCKPILE MUSEUM

Within Gillette is the Campbell County Rockpile Museum. Former museum director, Terry Girouard, provided the museum's 2013 visitor data. As with the majority of attractions in Wyoming, the summer months (June–August) produce the highest number of visitors. Below is a graph and analysis of visitation to the museum.

- From November through April the majority of walk-in visitors are from Campbell County.
- From May through October walk-in visitors from outside Campbell County greatly outnumber resident walk-in visitors. For the full year only 36% of the walk-in visitors are from Campbell County. When considering all visitors for the year (walk-ins plus school groups, tours, and events), the number of locals increases to 55% of visitors.

DATE	VISITORS	SCHOOL TOURS	TOURS	PROGRAMS	TOTAL
Jan. 1–Dec. 31, 2012	7846	1884	720	981	11,431
Jan. 1–Dec. 31, 2013	7247	1723	260	1336	10,566
Jan. 1–Dec. 31, 2014	6871	1828	304	1438	10,441

5) WRIGHT CENTENNIAL MUSEUM

In addition to a visitor center, Wright also boasts a small historic museum. Open from mid-May through September, the Wright Centennial Museum attracts a fair number of visitors.

It is interesting to note that the museum collects specific data on tourists who stop to look at the haul truck from a nearby coal mine displayed on the lawn. The attraction of visitors to the haul truck underscores the

draw and fascination with the mining industry in the area and indicates potential public interest in the *King Coal Historic Mine Byway*.

YEAR	SUBTOTAL	TRUCK LOOKERS	TOTAL
2010	906	144	1050
2011	867	195	1062
2012*	147	33	180
2013	815	238	1053
2014	630	135	765
* Construction Year			

6) STURGIS – AN ANNUAL SUMMER EVENT

This internationally acclaimed event occurs every August and draws hundreds of thousands of road-trippers. One of the largest motorcycle rallies in the world, the Sturgis Motorcycle Rally is centered in Sturgis, South Dakota, but spreads throughout northeastern Wyoming. It began in 1938 and was originally held for stunts and races but has evolved into being a general meeting of motorcycle enthusiasts.

The estimated attendance in 2014 was 442,200 during the seven Official Rally Dates (August 4–10, 2014); however, the event has grown to be a season that lasts for several weeks, bringing significant income to the entire region.

The rally brings road-trippers through Campbell County, and the people it brings are the type that actively seek out scenic and historical drives. For them, it is not only the destination but also the journey to get there that matters. Many Sturgis participants avoid the heavily traveled I-90 corridor, taking more scenic routes and byways and are a likely audience for the Campbell County historic mine byway.

VISITOR NEEDS

To address a variety of learning types, proposed interpretation includes graphics, text, sound, and tactile as well as interactive components.

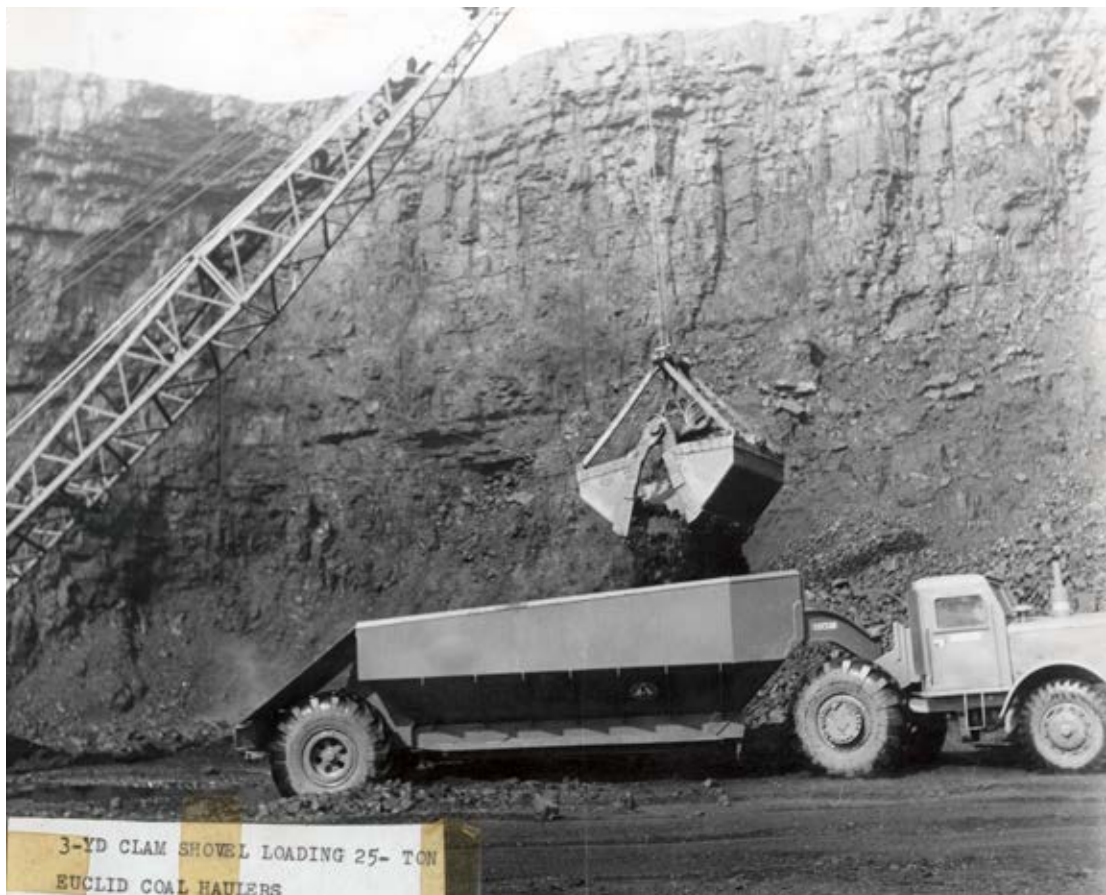
PROJECT OBJECTIVES

The objectives listed below were identified by community members at a Public Meeting in Gillette on January 21, 2015.

LEARNING OBJECTIVES:

After experiencing the *King Coal Historic Mine Byway*, visitors will:

- recognize that [at one time](#) Powder River Basin coal [produced](#) 35% of the nation's energy needs
- understand the history of the region
- recognize that the modern mining methods followed here do not lead to the perceived dirty mine towns of the 19th and early 20th centuries
- understand how important it is for communities and industries to develop transportation routes
- recognize the boom and bust nature of natural resource [development](#)
- understand that Wyoming benefits from coal [development](#), particularly in the area of public school spending
- understand the efforts made by coal companies to reclaim the landscape
- understand how coal mining has helped ranchers to hold onto their land and heritage farming efforts.



Wyodak mine (Black Hills Corporation)

BEHAVIORAL OBJECTIVES:

After experiencing the *King Coal Historic Mine Byway*, visitors will:

- explore more of the mining district
- visit the Campbell County Rockpile Museum and Wright Centennial Museum
- patronize [a full range of commercial services in the region](#)
- recognize the importance of conservation of natural resources
- get involved in stewardship and conservation of the landscape
- visit the town of Wright and understand its history as a company mine town
- look for coal seams and scoria (clinker) in the road cuts and landscape as they continue on their travels.

EMOTIONAL OBJECTIVES:

After experiencing the *King Coal Historic Mine Byway*, visitors will:

- feel a sense of awe at the magnitude of the Powder River Basin coal seam, equipment, mining operation, and energy produced
- feel a sense of awe at the volume of ancient plant life and natural forces that created this mammoth coal seam
- feel a connection with the history and the people who have come before them
- feel respect for the land as a resource
- appreciate Wyoming's diversity of landscapes, industries, and peoples.

UNDERLYING THEME:

An interpretive project has a central theme that ties together the information presented. It defines what the content covers and does not cover. It establishes the main idea, like the moral of a story.

KING COAL HISTORIC MINE BYWAY THEME:

The magnitude of Campbell County's coal operations extends from the unparalleled volume of the Powder River Basin coal seam and its accessibility in Campbell County to the immensity of mining equipment in use here, to the expanse of mining operations, to the quantity of energy produced by this product throughout the U.S. and abroad.



Wyodak mine (Black Hills Corporation)

NAME CONSIDERATIONS:

King Coal Historic Mine Byway is a provisional name for this project. Alternates are listed here, and other suggestions are welcome.

- Energy Highway Historic Mine Byway
- Coal Country Historic Mine Byway
- Campbell Coal Country Historic Mine Byway
- Coal Capital Historic Mine Byway
- Campbell County Coal Historic Mine Byway
- Energy Capital Coal Historic Mine Byway

INTERPRETATION TOPICS AND SUBTOPICS:

TOPIC 1: GEOLOGIC HISTORY

- How and when Powder River Basin coal formed
- Why Powder River Basin coal is low in sulfur
- Types of coal
- Location of Powder River Basin coal and Campbell County coalbed
- Locations of Campbell County coal mines
- BTUs and ash content of Campbell County coal

TOPIC 2: CAMPBELL COUNTY EARLY MINING HISTORY

- Campbell County settlement history
- Regional truck mine heritage
- Relationship of transportation to mining development in Campbell County
 - Mine-mouth operations vs. shipping coal
 - Wyodak case study
- Early Commercial mines in Campbell County
 - Peerless mine
 - Homestake/Wyodak mine
- Coal seam fires
 - CCC camp
 - BLM archives
 - Subsidence

TOPIC 3: LARGE-SCALE COMMERCIAL COAL MINING

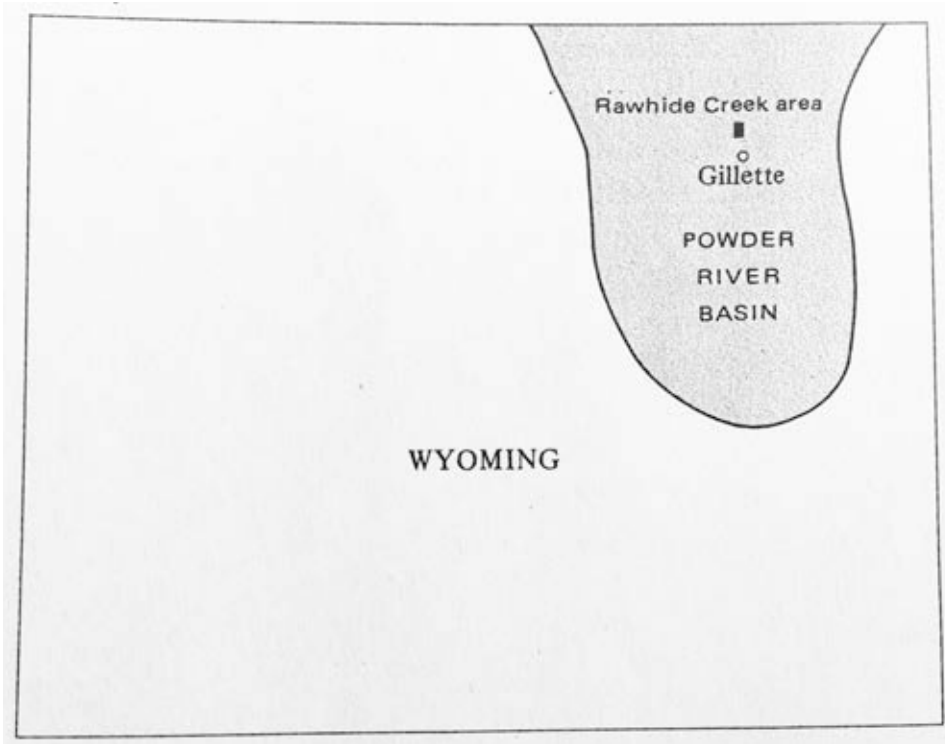
- 1970s energy crisis and birth of huge commercial mining in Campbell County
- Open pit mining methods and technologies developed here
- Size and types of mining equipment
- Volume of output
- Land and mineral leasing
 - BLM mineral rights ownership
 - Collaboration with WYDOT
 - Private surface ownership
 - Collaboration with ranchers and impact of mining on ranching industry
- Related Industries
 - Product research and experimentation
 - Coalbed methane
 - Oil and natural gas
 - Uranium
 - Competition for resources and customers

TOPIC 4: MINE SAFETY AND IMPACTS OF THE INDUSTRY

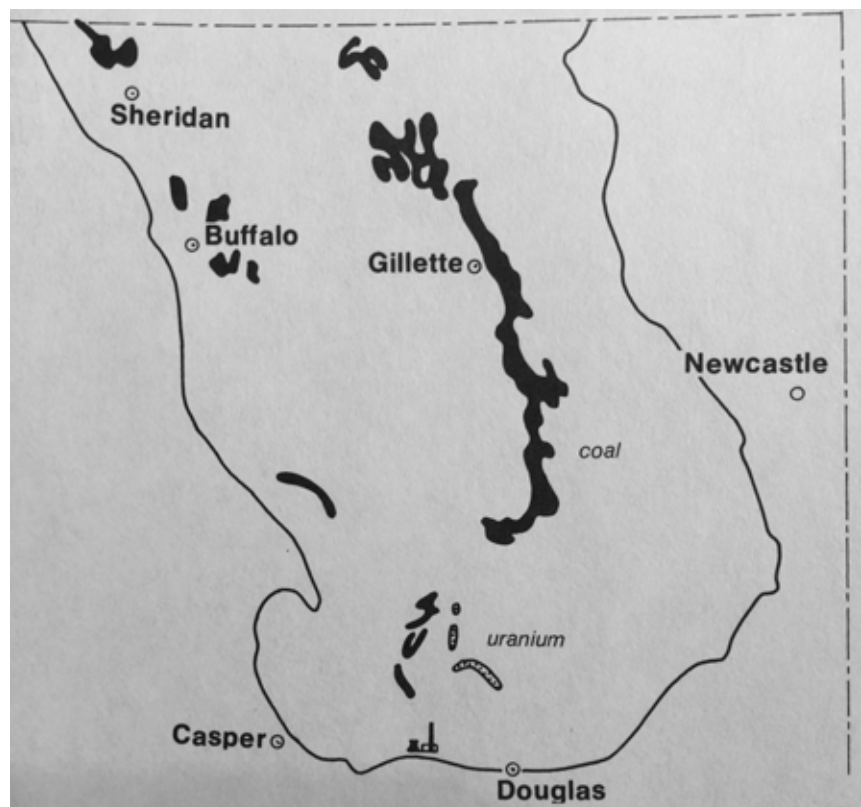
- Mine Safety and Rescue
- Physical impacts of commercial coal mining on the region
 - Urban development
 - Mining company town of Wright
 - Road development and rerouting
 - Railroad development
 - Reclamation
- Social impacts:
 - Influx of people
 - House values
 - School funding
 - Women in mining
 - Jobs/layoffs
 - Boom/bust economy
 - Tourism
- Reclamation method developed by Campbell County coal mines
- Concerns over fast growth of industry



Apparently, you can tip one of these over (Campbell County Rockpile Museum)



Map of Wyoming showing location of Powder River Basin and Gillette (B.E. Law, "Large-scale Compaction Structures in the Coal-Bearing Fort Union and Wasatch Formations, Northeast Powder River Basin, Wyoming," *Wyoming Geological Association 28th Annual Field Conference Guidebook*, Casper, 1976)



Coal deposits in the Powder River Basin (David R. Lageson and Darwin R. Spearing, *Roadside Geology of Wyoming*, Missoula: Mountain Press Publishing Company, 1988)

STORYLINE DEVELOPMENT

The storyline development is organized according to three proposed driving routes of the byway (Routes A–C). They all begin or end at the Campbell County Rockpile Museum: one traveling north from here (Route A), one traveling east from here (Route B), and one traveling south from here (Route C). The three routes are detailed on pp. 118–129.

There is an allowance in the descriptions below for the overlap of material. This is because the subjects overlap and reinforce each other and also because we do not expect all visitors to experience all three routes in the same day.

ROUTE A

- GEOLOGIC HISTORY OF THE GILLETTE COALFIELDS
- LOCATION OF CAMPBELL COUNTY COAL MINES: NORTH OF GILLETTE
- OPEN PIT MINING METHODS AND TECHNOLOGIES DEVELOPED HERE
- MINE-MOUTH OPERATIONS

GEOLOGIC HISTORY OF THE GILLETTE COALFIELDS

Gillette is the county seat of Campbell County and lies in the heart of the Powder River Basin, home to the most abundant deposit of mineable low-ash, low-sulfur, subbituminous coal in the U.S. and perhaps the world. The total Powder River Basin deposit has been estimated at one trillion tons, though much of it lies beyond the reach of today's mining technology or extraction economy. A government surveyor working near Gillette for the U.S. Department of the Interior in the 1860s described it as "the best I have ever seen in the West; from the amount seen cropping out, I should think it almost inexhaustible."⁴ Although scientists have learned that such fossil fuels are far from inexhaustible, the coal resources in this area of Wyoming are so plentiful and desirable that [in 2015](#) they accounted [for over 35%](#) of the U.S. national coal production, the vast majority of which [left](#) the state for use in various other states and even other countries.⁵

Formation of the Powder River Basin began with active plate tectonic movement during the mountain-building event known as the Laramide

⁴ James A. Sawyers in William S. Bryans, "A History of Transcontinental Railroads and Coal Mining on the Northern Plains to 1920," (Ph.D. dissertation, University of Wyoming, 1987), p. 46, quoted in A. Dudley Gardner and Verla R. Flores, *Forgotten Frontier: A History of Wyoming Coal Mining* (Boulder, CO: Westview Press, 1989), p. 9.

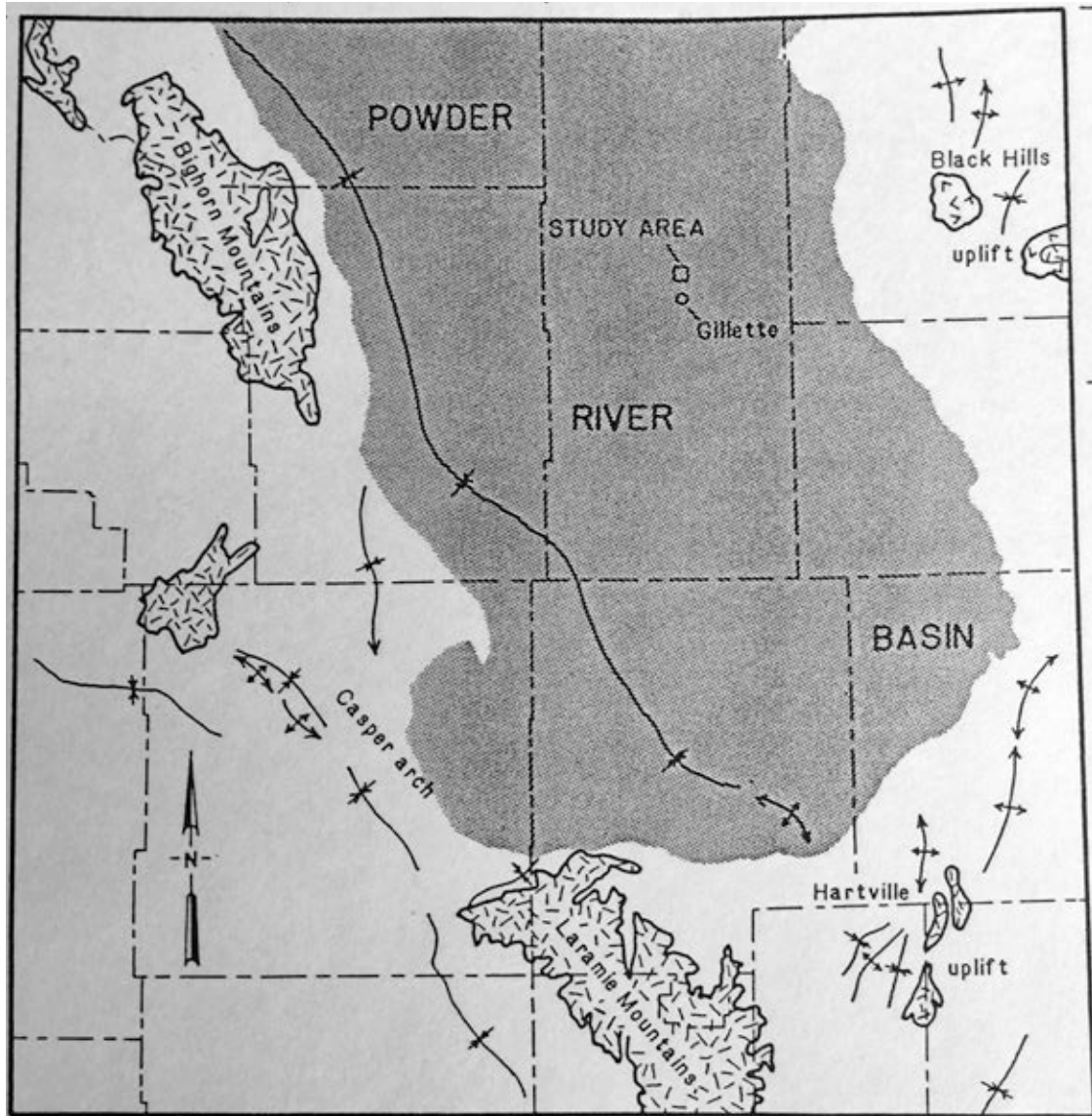
⁵ [As of 2015](#), Wyoming [consumed](#) 30 million tons of coal per year. The remaining production [was](#) transported by rail to the rest of the U.S., Texas [having been](#) the largest consumer at around 40 million tons annually. (Nick Jones, Wyoming State Geologic Survey, Personal Communication, June 1, 2015)

Orogeny (approximately 75 million years ago in the Cretaceous Period), which divided the Western Interior Seaway. This warm, shallow saltwater sea, approximately 1,000 kilometers wide, connected the Arctic Ocean to the Gulf of Mexico. As the sea retreated, the land left in its wake compartmentalized into eight sedimentary basins, one of which became the Powder River Basin.⁶ Uplifting during this period caused the faults and folds that form the basin's topographical boundaries: the Bighorn Mountains to the West, the Grass Creek Anticline and Miles City Arch to the north in Montana, the Black Hills to the east, and the Hartville Uplift, Laramie Mountains, and Casper Arch to the south.⁷ In Wyoming and Montana, freshwater runoff flowed down from the basin's surrounding mountains. A warm moist climate allowed expansive wetlands to develop. Over millions of years, the swamps that were so conducive to coal formation either flooded and were consumed by large shallow lakes or, as the climate became more arid, yielded the grasslands that cover the land today. Mostly hidden underneath this surface lies the coal-rich Tongue River Member of the Fort Union geological formation, which dates to the Paleocene Epoch, 65–55 million years ago.

Geological events in the Cretaceous Period deposited thick layers of sedimentary rocks such as sandstone (formed from the settled rock debris of erosion) or, in other areas, limestone (formed from seashells and coral or the calcium carbonate that seawater dissolves as these shells break down). Following the Cretaceous Period, in the Paleocene and Eocene epochs, a different kind of sedimentary rock—coal—was formed from plant debris. As the basin floor sank lower, large quantities of dead vegetation from the swamps accumulated under the surface of the water. Once such vegetation begins decomposing, it is called *peat*. Just as a large pile of leaves will compost into a small fraction of its original volume, the huge quantities of dead swamp vegetation were reduced by enzymes into dense peat through bacterial and fungal decay. Further alteration of the peat through this natural decomposition process resulted in an amorphous jelly-like material called *gytta*.

⁶ Nick R. Jones, "Genesis of Thick Coal Deposits and Their Unique Angular Relationships: Powder River Basin, Wyoming." *Report of Investigations*, No. 60 (Laramie, WY: Wyoming State Geological Survey, 2010), pp. 4–5.

⁷ Nick Jones (2010), p. 4.



Geology of the Powder River Basin in Wyoming, showing Bighorn Mountains to the west, Black Hills uplift to the east, and Casper arch, Laramie Mountains, and Hartville uplift to the south (Richard Jones, "Coal Geology, Geophysical Logs, and the Lithologic Description from a Drilling Program at the Rawhide Village, 1989," *Geologic Survey of Wyoming* 1.5/2:89-2, p. 5)

How exactly does swamp detritus become energy-packed coal? The transformation of carbon-rich plant remains into coal—called *coalification*—initially takes place underwater. Coal may form in swamps (such as those of the ancient Powder River Basin), seawater environments, coastal marshes, and back beach wetlands. The millions of years over which coalification occurs may be understood in two phases: first *biogenesis*, then *thermogenesis*.⁸

⁸ Nick Jones (2010), pp. 34–35. Deposition of the entire Fort Union formation occurred over a 10 million-year period from 65 to 55 million years ago. Deposition of the Tongue River Member likely occurred over a 2–3 million-year period from 58–55 million years ago (Nick Jones (2015)).

Layers of dead plant material settle and begin to decompose at the bottom of a swamp, forming peat. The top layer has access to water-borne oxygen, which facilitates rapid bacterial and fungal decay (biogenesis). Material at the bottom of the swamp decays much more slowly than material above it, due to the lack of oxygen at the bottom. If the whole swamp were oxygenated, then all of the organic material would become fully decomposed, and there would be nothing left to produce a watery, black, carbon-rich gel called gyttja, the precursor to coal.⁹ As the floor of the swamp basin gradually sinks lower from tectonic activity, this space accommodates more and more organic material. Within the peat accumulation underwater, the rate of decomposition decreases with depth. Two products of biogenic decay are tannic and hummic acid, which lower oxygen levels and further slow decomposition. Due to the slowing of decomposition, carbon—which was produced in the vegetation during photosynthesis thanks to sunlight¹⁰—is preserved in the middle and lower layers of peat. Without this slowing of decomposition, the carbon would be converted into other substances. This is important, because carbon is the prized energy-rich element in coal. At the end of biogenesis, what remains is gyttja.¹¹

Heat then drives the conversion of gyttja into coal. This phase, called thermogenesis, requires that the temperature of the surrounding earth reach a point whereby the bonded water in the gyttja can be driven off. The heat comes from the depths of the earth and is preserved by the insulating layers of sediment above the peat. (As the swamp environment is flooded or dries up, peat and gyttja become buried by other kinds of rock.) Fires in adjacent coal beds and intrusion of igneous rock may also contribute heat.¹² Heat combined with pressure (from layers of peat and rock above) reduce the water content of the gyttja which releases volatile vapors, solidifying gyttja into coal of various densities and compositions. As moisture content decreases, coalification increases the carbon ratio and corresponding energy value (i.e., British thermal unit, known as Btu) through the progressively denser coal stages of lignite, sub-bituminous, bituminous, and the most carbon-dense coal, anthracite, each of which are further divided into sub-categories.

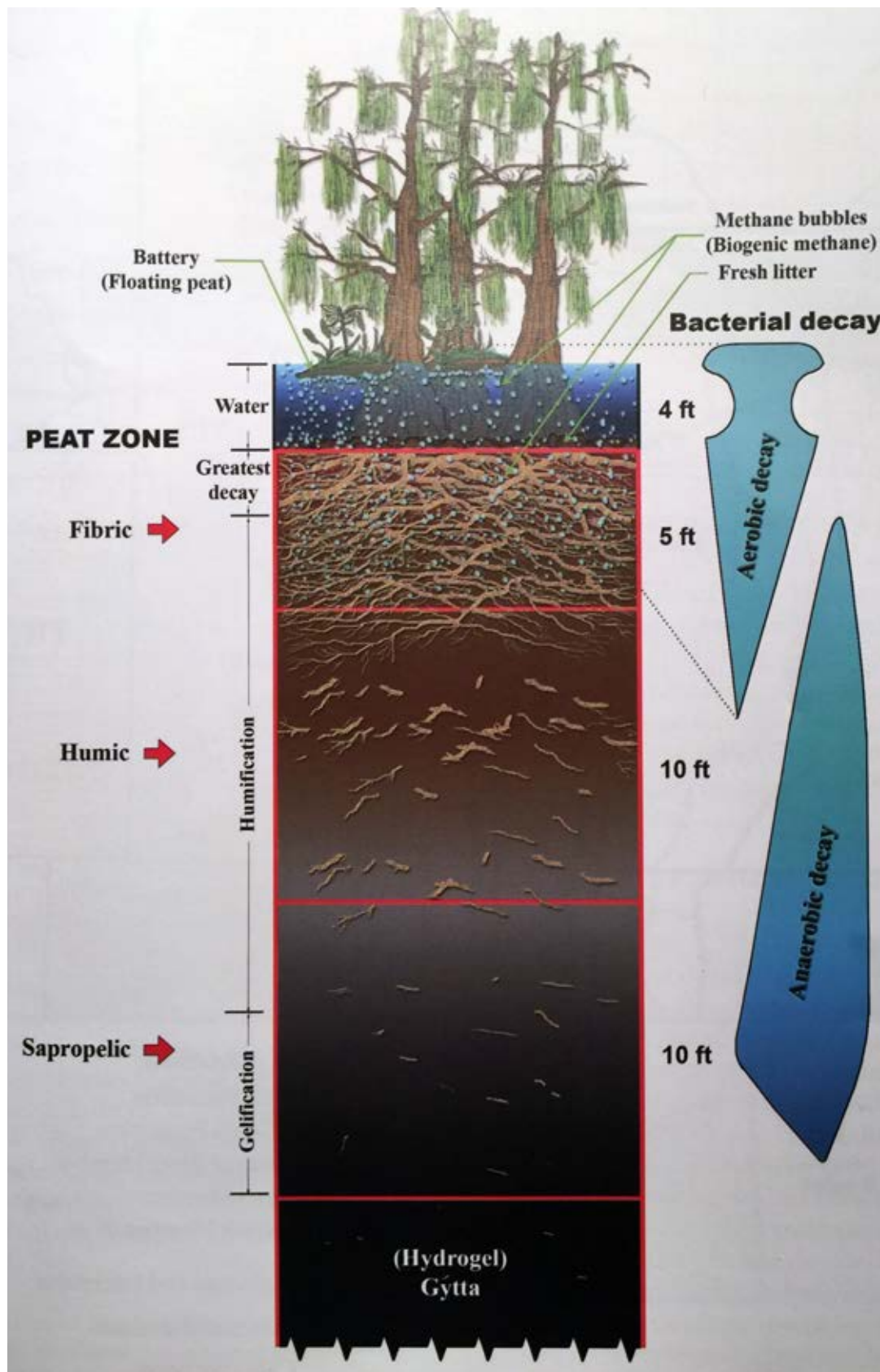
What makes Powder River Basin coal desirable is the overall thickness of the strata and relative purity (low sulfur and ash content) of the coal. In the more ancient marine environment (Pennsylvanian Epoch, circa 300 million years ago) where bituminous coal formed in the Appalachian

⁹ Nick Jones (2015).

¹⁰ Through the study of petrography, plant fragments can be seen microscopically in coal. “In fact many recognizable plant remains, though coalified, do exist. These are called macerals and are much like the minerals we find in rocks” (Nick Jones (2015)).

¹¹ Nick Jones (2010), p. 36.

¹² Nick Jones (2010), p. 36.



A peat column illustrating the process of coalification (Nick Jones (2010), p. 37)

regions of Pennsylvania, West Virginia, and Kentucky, high concentrations of sulfate ions in saltwater led to a higher concentration of sulfur in the coal. The water that surrounded the younger subbituminous coal from bogs in Wyoming and Montana was much less saline and yielded a much lower sulfur coal than the eastern bituminous varieties. However, the lower carbon content of this higher moisture subbituminous coal (as opposed to less moist bituminous and anthracitic coal) means less concentrated (or embodied) solar energy from ancient plant material. In other words, more of it must be burned to obtain the same amount of heat. Even so, the lower sulfur content of the Powder River Basin subbituminous coal makes it more desirable for modern electricity generation.



Eagle Butte mine's upper 40-foot deep coal seam (the Roland / Anderson) and lower 60-foot seam (the Smith / Canyon) below four benches of overburden (Toxey/McMillan Design Associates)



Closely situated coal seams, Wyodak mine, 1936 (Wyoming State Archives)

Prior to World War II, coal was mined primarily for use as a fuel for steam-powered locomotives. These were gradually phased out by more efficient diesel engines. However, as the post-World War II nation's energy needs grew and as environmental regulations grew, new power plants increased demand for the lower sulfur, subbituminous coal from the Powder River Basin.¹³ By the 1990s, power plants were increasingly sourcing natural gas, but advances in the coal industry's strip mining operations kept it economically competitive, especially in the political context of oil price manipulation in the post-1970s world market.

The low ash content of Gillette-area coal further enhances its desirability. Ash is more evident in coalbeds from the western Powder River Basin than in the Gillette area. On the western side of the basin, the more tectonically active uplifting of the Bighorns produced more faults, a higher rate of sediment deposition by frequently shifting streams, and greater subsidence of the adjacent basin floor. The result was thinner, more deeply buried (thousands of feet below the earth's surface) coal layers interbedded with and pinched out by non-organic, ash-producing layers such as mudstone, siltstone, and sandstone.

¹³ R. M. Flores and L. R. Bader, "Fort Union Coal in the Powder River Basin, Wyoming and Montana: A Synthesis," p. 7 in ["1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region," by Fort Union Assessment Team](#), U.S. Geological Survey Professional Paper 1625-A.

In contrast, the more stable eastern Powder River Basin, home of the Campbell County coalfield, has lower ash and lower sulfur content. Current geologic theory attributes this difference to the fact that eastern Powder River Basin swamps were fresh water and therefore never infused with sulfates. Additionally they were deposited in a period that did not have much volcanism, and they were not affected by hurricanes, as were coastal wetlands, which are associated with coal having higher sulfur content.¹⁴

The uplifting of the Black Hills to the east influenced the depth and slope of the Campbell County coalfield. Imagine that as the Black Hills were uplifted, a bull's eye hill (anticline) appeared with the oldest Precambrian granitic core revealed at its high point in the center, surrounded by metamorphic rocks and progressively younger layers of other formations as one moves away in any direction. Moving west from the center of the Black Hills toward the eastern Powder River Basin, the strata slope downward with outcrops visible where layers transition from one rock type to another. Just east of Gillette, the outcropping of coal meets the surface and slopes gently down toward the center of the basin to the west at an angle ranging between 0.5°– 3°. In other words, the coal seam is close to the surface on the east side of the basin and deep underground in the center and west side. Less overburden (the layers of rock and dirt located above the coal) requires less input of energy (and therefore less cost) to move earth and extract the coal.

Exposure of the coal seam to the air at the earth's surface on the east side of the basin has also led to the formation of an additional resource: *clinker*. This is a reddish-orange rock (locally referred to as *scoria*), which occurs over a 250-square-mile area that delineates the eastern border of the Gillette coalfield.¹⁵ This hard yet porous rock is valued as a base material for roads and is quarried in its own right.

Clinker is formed by the burning of coal underground. When coal meets air, lightning, or wildfires, spontaneous combustion can occur. This ignites the coal and begins a long, slow burning of the outcrop. As these fires migrate underground, following coal seams, they bake the overlying sandstone, siltstone, mudstone, and shale, making it harder, much like clay hardens in a kiln. As the coal is consumed by fire, the void it leaves is filled by collapsing, baked strata above it, which mix and fuse in the

¹⁴ Nick Jones (2015).

¹⁵ M.S. Ellis et al., "Gillette Coalfield, Powder River Basin: Geology, Coal Quality, and Coal Resources." Chapter PG in ["1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region,"](#) by Fort Union Assessment Team, U.S. Geological Survey Professional Paper 1625-A, 2, and Heffern, Ed., U.S. Bureau of Land Management web site: http://www.blm.gov/wy/st/en/resources/public_room/gis/metadata/clinker-wy.html, April 29, 2015.

intense heat. Different rock types merge into *breccia* (rock composed of fragments of other rocks and minerals cemented together). Baked sandstone hardens to brick, while heat transforms shale into a ceramic mineral known as *porcellanite*. *Paralava* (another variety of clinker) forms where rocks have been heated enough to melt. Glassy ash marks the lower boundary of the clinker.¹⁶



Clinker mine north of Gillette and east of Rawhide coal mine (Toxey/McMillan Design Associates)

Because of the fire that produces clinker, the outcropped burned coal adjacent to the clinker is often referred to as the *burn line*. In Campbell County, the burn line runs roughly north-south the length of the county and approximately 10 miles to the east of Gillette. It demarcates the edge of the bed where the quality of coal typically diminishes. The fires maintained heat over hundreds and thousands of years in this area of the basin, with clinker beds up to 180 feet thick, some of which are dated at over a million years old.¹⁷

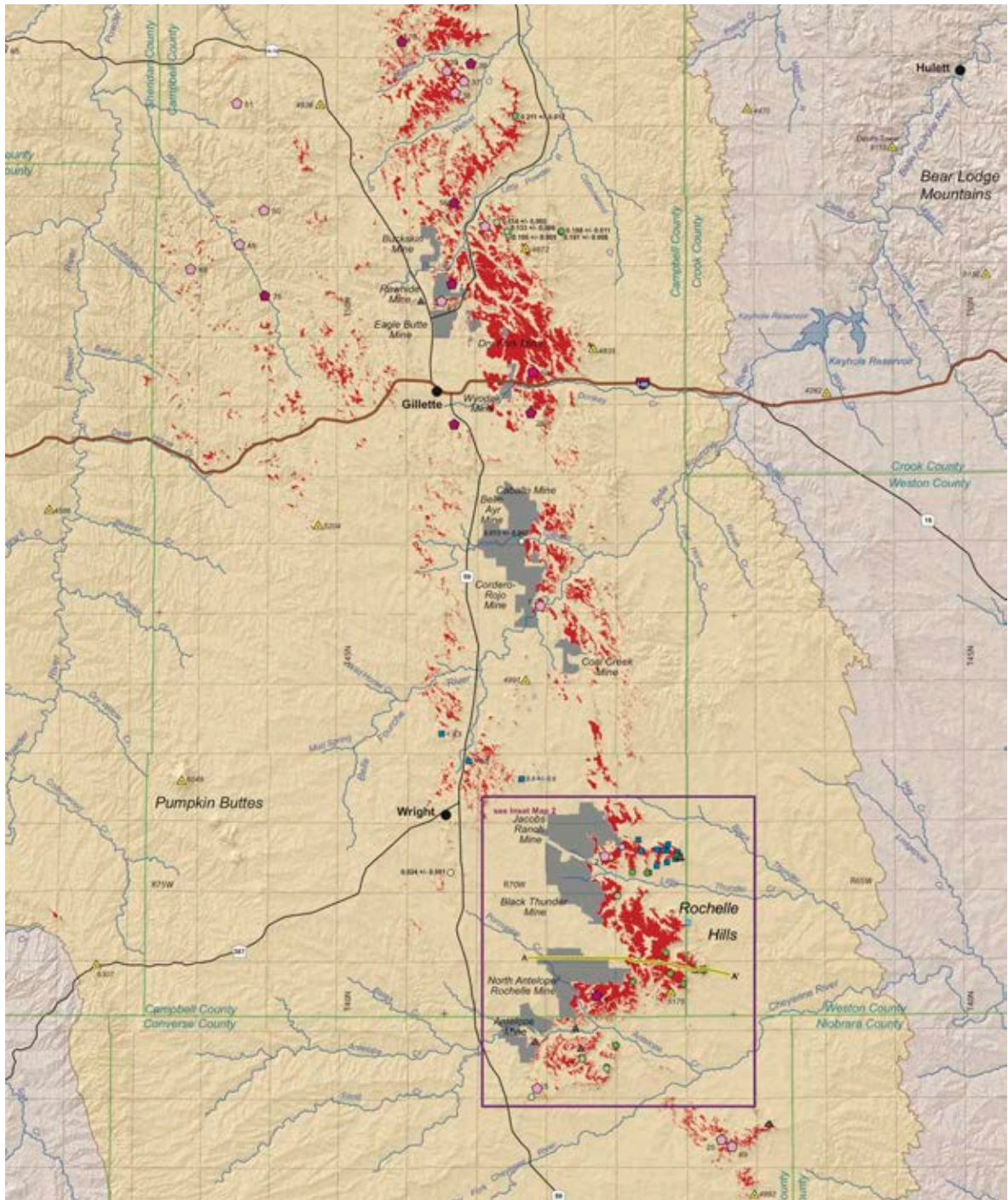
Clinker resists erosion, and its *haystack* formations (also called *caprocks*) are abundant in the region. Clinker is part of the overburden that is removed and stored during the coal mining process, but it also occurs at the same level of the coal seam, since it collapses into the void left by burned coal. Near the burn line, unburned coal and clinker often merge to form an aquifer carrying ground water and supplying many water wells in the region.

¹⁶ Ed Heffern, U.S. Bureau of Land Management web site:

http://www.blm.gov/wy/st/en/resources/public_room/gis/metadata/clinker-wy.html, April 29, 2015.

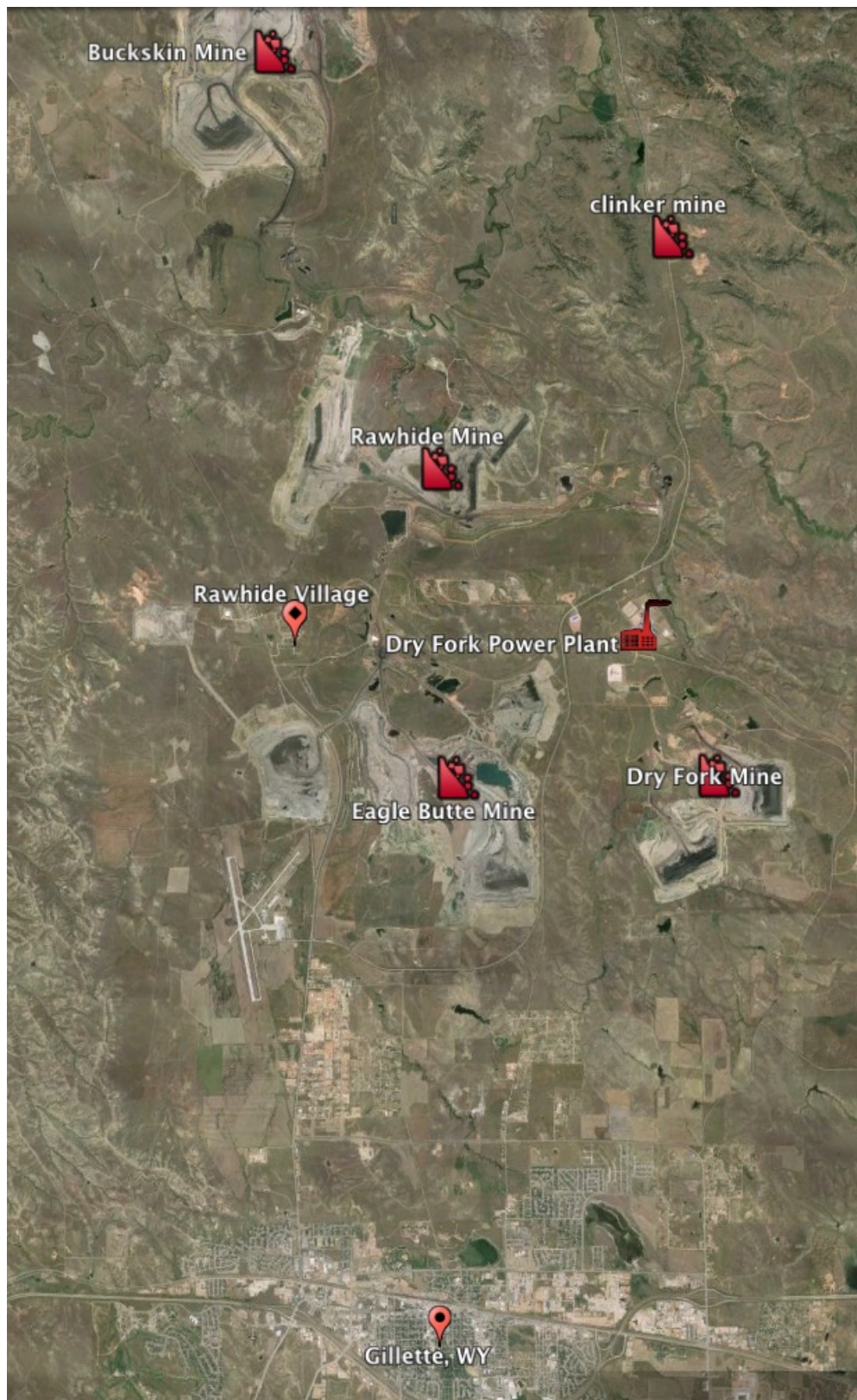
¹⁷ Wyoming State Geological Survey web site:

<http://www.wsgs.wyo.gov/research/energy/coal/PRB.aspx>, April 23, 2015.



Clinker distribution and age in the Powder River Structural Basin; detail of Campbell County mining area (Montana Bureau of Mines and Geology)

LOCATION OF CAMPBELL COUNTY COAL MINES: NORTH OF GILLETTE



Campbell County coal mines located north of Gillette (Google Earth Pro)

OPEN-PIT MINING METHODS AND TECHNOLOGIES

Surface mining (also known as “strip mining” and “open-pit mining”) may be the oldest form of mining; however, large-scale surface mining, such as the coal mining taking place in Campbell County today, depends upon the mid-to-late 20th century ability to build massive earth-moving machinery. The concept and methods used globally to mine coal on this scale are a product of Campbell County’s industrial mining operations. It is no surprise, therefore, that some of the largest mines and largest mining equipment in North America are located here.

The open-pit coal-mining process that developed in Campbell County beginning in the late 1970s (with roots back to the opening of the Wyodak mine in 1923) follows a prescribed series of steps. Being a product of the late 20th century and this society’s growing concerns for environmental protection, these steps are defined by environmental regulations as well as by mining efficiencies.

In opening a new mine, first a thorough study of the land is conducted, identifying existing plants, landforms, water features, wildlife habitats, wildlife counts, and livestock capacity. A subsurface study is also made by drilling core samples (at least one hole per 40 acres) to analyze the depth and physical and chemical composition of overburden so that its removal and storage (during mining) and its replacement (during the post-mining reclamation process) can be planned. Some overburden has toxic properties and is considered to be “unsuitable” for placement back in the ground except in isolated pits, where it cannot contaminate ground water or hinder plant growth.

Drill holes also provide samples of the coal that lies below. This is analyzed for depth of seam, Btu content, and chemical content, specifically: ash, sulfur, sodium, and moisture. The data collected is used by geologists to model and study the underground structure of the earth at the mine. They use computer models to plan the mine’s progress five years in advance.

The next step is the removal of large shrubs and trees. This is followed by the removal of topsoil. Ranging in depth from 0.7 to 5.0 feet, it is scraped from the surface by truck shovel. Being the most important ingredient in the reclamation process, the topsoil is carefully stockpiled for later use. Next, the overburden is removed to expose the coal seam. Like topsoil, the overburden is stored for later use as backfill, or it may be used immediately to backfill the pit as the actively mined *leading edge* of the pit advances.

Although the coal seam in Campbell County is relatively close to the earth’s surface, making it economical to mine with surface techniques,

the removal of overburden is nevertheless the largest expense and largest



Eagle Butte surface coal mine, north of Gillette (Toxey/McMillan Design Associates)

effort in the coal mining process here. The overburden itself ranges from a depth of 100 feet in the mines north of Gillette up to 400 feet in the mines south of Gillette. The deeper coal of the southern mines is costlier to retrieve; however, its greater depth has also produced a drier, denser, higher Btu coal that is more valued and sells for a higher price than the more accessible coal in the mines north of Gillette, making it worth the effort.¹⁸

The significant depth and density of the overburden often require explosives (cast blasts) to loosen it before it can be removed. The three methods of removing overburden in the Campbell County coal mines are: (1) *truck and shovel* (for smaller mines and shallow overburden, for example at Eagle Butte), (2) *cast blast + dozer push*, and (3) *cast blast + dragline excavation* (used in the largest mines south of Gillette, such as at Black Thunder).

In the *truck and shovel* method of mining, a huge electrical shovel digs directly into the overburden, removing several cubic yards per bite. The

¹⁸ Increased overburden increases the weight and compaction of the coal, pressing out water and rendering a more compact, higher Btu, higher quality product.

excavated rock is then loaded into massive dump trucks, called *haul*



Dozer-push pit with shovel used for cleanup, Eagle Butte mine (Toxey/McMillan Design Associates)

trucks, and hauled to the surface for backfilling or stockpiling (for use later in backfilling). Haul trucks are also used for hauling coal to the surface for processing and use.

In *cast blast + dozer push*, explosives are set in the ground at an angle to the pit such that when they detonate, they push the overburden into the pit, replacing coal that has been mined and exposing more coal to mine. Bulldozers push into the pit any overburden that did not fall directly into the pit from the blast.

In *cast blast + dragline excavation*, explosives are used in the same way as with dozer push, except that many more explosives are used in a single dragline blast, because the dragline excavator is capable of removing much more overburden. This system, which was introduced to the largest Campbell County mines in the mid-1990s, is composed of a large bucket (large enough to hold a bus) suspended with cables from a boom (a truss structure, similar to a crane). The bucket is powered by an electric motor (connected directly to a high-voltage grid) and maneuvered with wire ropes and chains to be drawn horizontally, picking up blasted overburden as it goes. The bucket is then hoisted out of the pit to dump its load on

the surface next to the pit.

Draglines such as this are built on site at the mines and are among the largest mobile land machines the world has ever known. Campbell County boasts the largest dragline excavator in North America: Ursa Major. In use at Black Thunder mine—not surprisingly the largest and most productive coal mine in the U.S. [in 2015](#)—Ursa Major weighs almost 15 million pounds (7,500 tons; without a load), has a 360-foot boom, and carries 160 cubic yards of rock in its bucket.

Another piece of super-sized equipment in use at the Campbell County mines is the *haul truck*. Like the draglines, these monsters are assembled on site. Although they look like oversized Tonka trucks, they are serious equipment and do the important job of hauling coal, as well as overburden, out of the pit. Diesel fuel for these vehicles is one of the largest expenses in the mining operation. Haul trucks have been

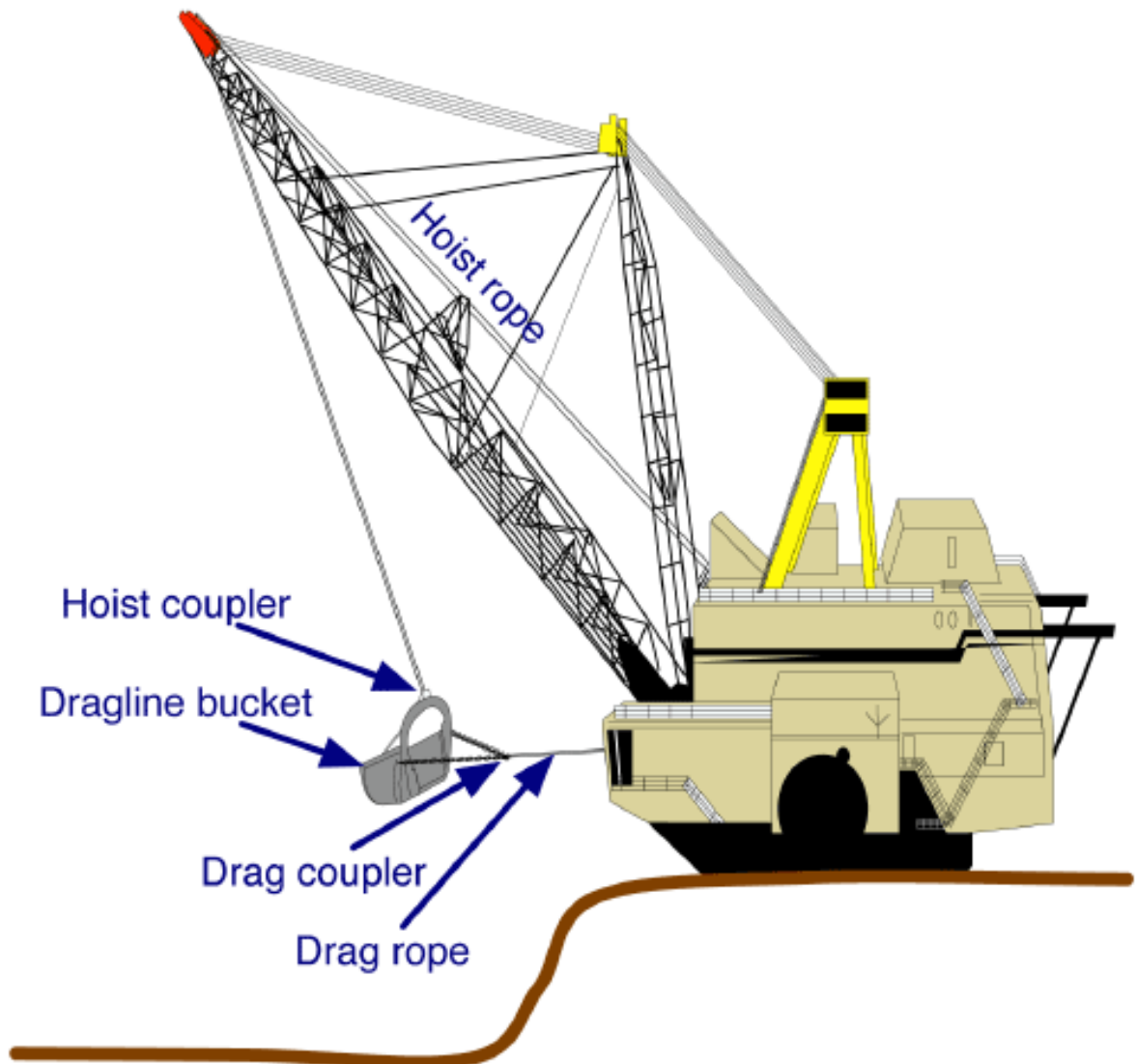


Diagram of a dragline excavator (Wikimedia Commons)



Coal Creek mine brochure showing equipment in use in the mid-late 1980s in this mine located south of Gillette, near Wright (American Heritage Center, University of Wyoming)





Ursa Major dragline excavator peeking out of the Black Thunder mine pit, south of Gillette (Kimon Berlin)

increasing in size and capacity over the past several decades. Small versions can be seen at the Wright Centennial Museum and the CAM-PLEX mining equipment display; however, current haul trucks weigh up to 600,000 pounds (300 tons)—empty—and can haul up to 500,000 pounds (240 tons) of coal. One of their most impressive features is the six gigantic tires that support them. On current haul trucks, these measure 13 feet in diameter and cost some \$50–70,000 apiece (and last one year). The truck itself costs \$5 million, without the tires.

To reach the level of the coal, overburden is removed in a series of *benches* that step downward. Having a stepped pit makes removal of overburden and ore easier, plus its walls are less prone to failure. The depth of a bench is determined by the height of a shovel boom. Local resident Mary Kelley explains that the depth of a bench also has to do with line of sight: “It is important that workers are able to see the boom and where it is at all time, for safety reasons.”¹⁹ At the Eagle Butte mine (located north of Gillette), for example, benches are 65–70 feet high. Here, the overburden ranges from 150–350 feet deep, meaning that there are up to five benches of overburden. Once the level of the coal seam is reached, it is removed in a similar way to the overburden: drilling, blasting, loading by shovel into haul trucks, and transporting out of the pit via haul truck

¹⁹ Mary Kelley, personal communication, September 2016.

to the crushing facility.

As with the varying depth of overburden among the Campbell County coal mines, depth of the coal seam varies with location. The coal seam at Eagle Butte mine is divided into an upper 40-foot deep seam (the Roland or



Haul truck, Eagle Butte mine (Toxey/McMillan Design Associates)

Anderson seam) and a lower 60-foot seam (the Smith or Canyon seam). Two feet of silty claystone (called a *splay deposit*) separate them. In most cases, the Roland is mined as one bench, and the Smith is mined as one bench. By comparison, the Belle Ayr mine south of Gillette has up to 300 feet of overburden above a single 75-foot coal seam (here only the Smith/Canyon seam), which is mined in one bench.

Upon leaving the pit, haul trucks bring the coal to the *truck dump* (hopper). From here, the ore goes through several steps of *preparation* (processing) in which it is crushed to 2–3 inch chunks, and graded by size. It is then taken by conveyor belt into silos and stored. Many of the chunks are initially too large to be processed (some up to six feet in diameter). These are pre-crushed by a loader before entering the truck dump.

Each silo holds about 10,000 tons of coal. Coal trains are filled directly

from the silos in a process called *batch load out*. The trains move slowly below the silos, filling continuously from chutes. The process is controlled by an electronic eye. Different coal qualities are blended from the silos to fill a customer's order. Each train car's *tare weight* (empty weight) is taken before it is filled with the specified weight of product (about 136 tons of



Truck Dump, Eagle Butte mine (Toxey/McMillan Design Associates)

coal per car). Once filled, the cars are weighed again to determine their *gross weight*. Their tare weight is then subtracted from the gross weight to compute the actual load being shipped and delivered (*net weight*). With 110 cars per train, a coal train carries 15,000 tons of coal and is about a mile in length. It takes about 2–3 hours to load a 110-car train (i.e., at a rate of about 1.5 minutes per car). The load may then be sprayed with *car topper*, which is a starch used to keep coal dust from flying off.²⁰

The special hopper cars that compose the coal trains have rotary couplings that allow them to be turned over and dumped by special equipment at the destination power plants. These dedicated coal trains

²⁰ Water cannot be used for dust control because it dries quickly and because it causes coal fires. The latter occurs when dry coal absorbs water. Heat that results from the process of absorption can ignite the coal.

(called *unit trains* in the industry)²¹ go back and forth between mines and their customers' power plants. In addition to the cars, a unit train usually has seven engines and one radio car. Four of the engines lead the train and are operated manually. The three engines at the end of the train are radio operated.



Conveyor belts and silos, Eagle Butte mine (Toxey/McMillan Design Associates)

Outside of loading, coal freight trains average about 30 miles per hour. [In 2015](#), approximately 60 trains of coal [left](#) Campbell County every day, 24 hours per day. (The mines never shut down.)

As the *leading edge* (actively mined wall) of a pit advances, the back side of the mined pit is backfilled with removed overburden. In this way, the whole pit appears to be moving forward. Due to the threat of seam fires, which occur when coal is exposed to oxygen in the air, mines want to backfill as quickly as possible. This also reduces the need (and space needed) to stockpile backfill and accelerates the reclamation process.²²

²¹ The term “unit” comes from the 1970s concept for these trains to be composed of 100 cars, each carrying 100 tons. As the industry has expanded, so has the carrying capacity of the unit trains.

²² Much of the information presented in this description of the Campbell County surface-mining process derives from a tour of the Eagle Butte mine provided on January 21, 2015, by David Olson, Geology/Coal Quality Specialist for Alpha Coal West.

The basic idea of reclamation is backfilling and grading with overburden, covering this with a uniform level of contoured topsoil (approximately two-feet thick), and replanting. Depending upon the original landscape features, however, the process may be more complicated. Before mining can begin, a reclamation plan has to be established to define depth of backfill and topsoil, treatment and replacement of water features,

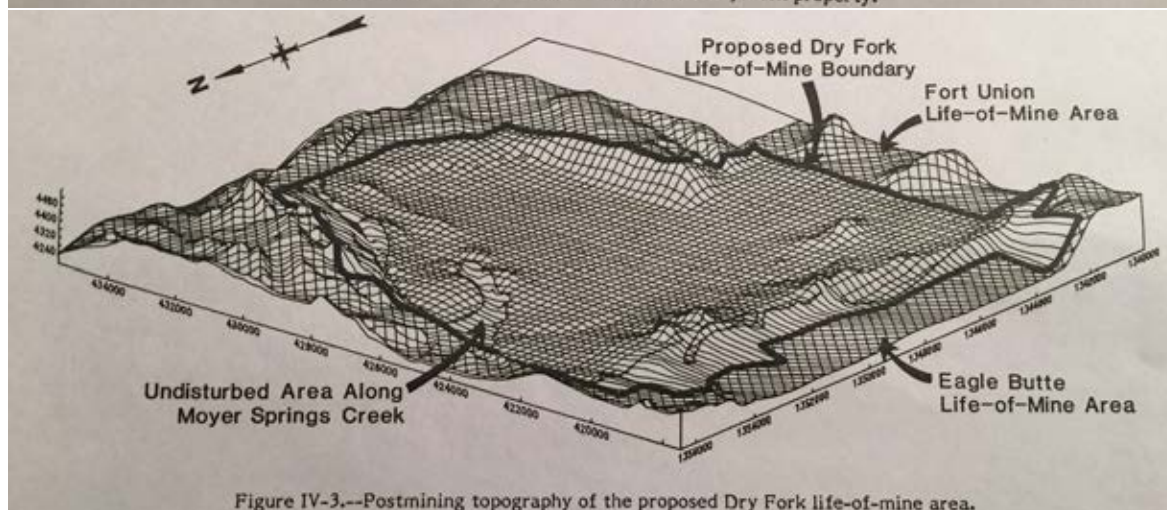
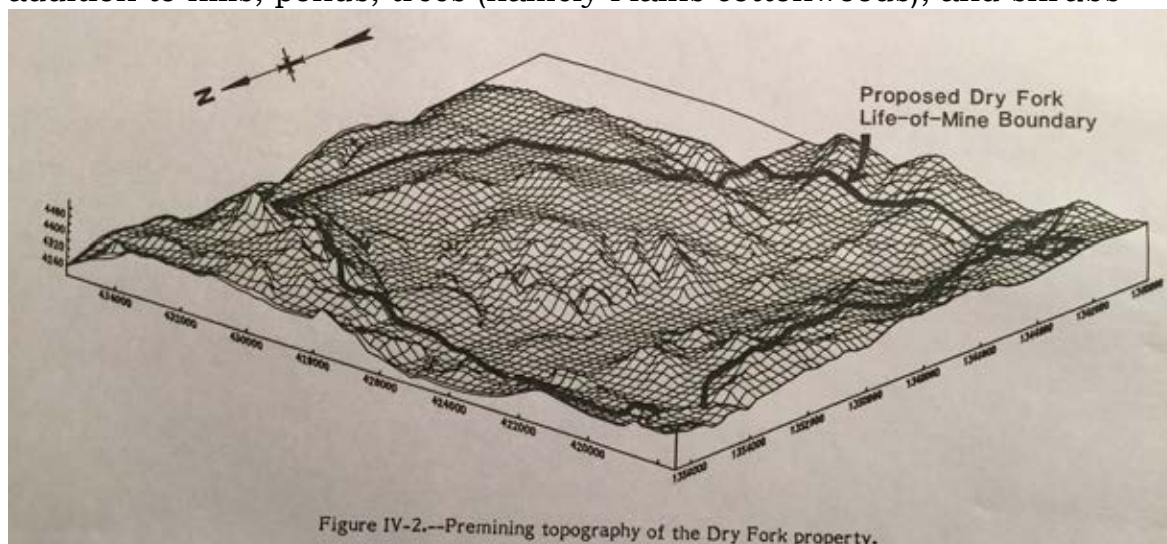


Unit trains being filled, Rawhide mine (Toxey/McMillan Design Associates)

replacement of wildlife habitats, **and** locations and types of native grasses, shrubs, and trees to be replanted. If the original landscape included a spring, this must be protected during the mining process, but if the landscape included streams, ponds, riparian zones, wetlands, and drainage channels, these will be re-constructed during reclamation. The intent of the revegetation plan is to reestablish the diverse, productive, self-renewing, pre-mining flora, be it grassland, shrub-grassland, or bottomland vegetation. While fertilization is allowed, the mine is not allowed to irrigate plantings, which must take root and survive with the local conditions. One problem that mines face is the difficulty in reestablishing sagebrush on reclaimed land.

Even though 100 feet of coal is removed from the ground during mining, the reclaimed ground level is only about 30 feet lower than the original

surface. This is because backfilled rock is less dense than what was removed. To provide habitat diversity, small hills are introduced into the post-mining topography; however, the reclaimed land is nevertheless a lot flatter and less topographically varied than the original landscape. In addition to hills, ponds, trees (namely Plains cottonwoods), and shrubs



Terrain models showing natural topography of Dry Fork area before mining (above) and projected topography after coal mining and reclamation (below) (United States Department of the Interior, "Proposed Mining Plan, Dry Fork Mine, Campbell County, Wyoming, Final Environmental Impact Statement, OSMRE-EIS-24," (March 1989), pp. IV-11 and IV-12)

reintroduced to provide habitat, forage, and roosts for wildlife, boulders removed during excavation are used to form rock piles (locally called "rabbitats") throughout the reclaimed landscape. Their intent is to mitigate the loss of scoria outcrops that are used as raptor perches and mammal dens.

A mine has to prove the viability of reclaimed land with successful plant growth, successful livestock production (namely cattle) in pre-mining numbers (measured in *animal units*), and the return of wildlife in pre-

mining numbers before reclamation bonds are released. Wildlife management protocol is established by the Wyoming Game and Fish Department. Examples of wildlife associated with Campbell County that are monitored for return to reclaimed land include: several endangered species (black-footed ferret, southern bald eagle, and peregrine falcon) as well as golden eagle, ferruginous hawk, great horned owl, prairie falcon, kestrel, red-tailed hawk, Swainson's hawk, burrowing owl, rough-legged hawk, marsh hawk, mountain plover, sage grouse, brook trout, cotton-tailed rabbit, jackrabbit, prairie dog, ground squirrel, pronghorn, mule deer, and many other birds, mammals, and reptiles.²³ Being part of an ecosystem, the return of many of these species depends upon the return of their prey, which in turn depends upon mature forage.²⁴



Eagle Butte mine land that has been reclaimed after removal of coal (Campbell County Rockpile Museum)

Where post-coal-mining reclamation has taken place, groundwater levels vary. Some monitor wells show water levels rising *above* pre-mining levels, while others show a decline in water levels. Likewise, post-mining water quality also varies and can increase or decrease due to numerous reasons such as the “the physiographic location, availability of recharge sources, and the physical nature of the backfill material.”²⁵ These issues are followed closely by the Gillette Area Groundwater Monitoring Organization (GAGMO), which has been collecting and publishing

²³ A long list of species found in the Campbell County mining district is located on pp. II-23 through II-25 of “Final Environmental Statement: Proposed Mining and Reclamation Plan: Caballo Mine, Campbell County, Wyoming, on Federal Coal Leases W-3397 and W-49644,” (United States Department of the Interior, 1979).

²⁴ United States Department of the Interior (1989), p. IV-16.

²⁵ Stearns (2003), pp. 1233 and 1235.

groundwater data from area mines since 1980.²⁶

MINE-MOUTH OPERATIONS

While most of the Campbell County mines ship their coal to out-of-state industrial customers, two of them are tied to mine-mouth operations providing power to regional users. A mine-mouth operation is a power plant that is located at the mouth of a mine. It burns coal mined on site or nearby and ships out ready-to-use power instead of raw ore. Due to [limitations](#) in transmitting electricity, power plants supply electricity to a limited radius. The power generated at the Dry Fork mine-mouth operation north of Gillette and at the Wyodak mine-mouth operation east of Gillette supply power to northeast Wyoming and its industrial operations.

Built in 2011, Dry Fork Station is a state-of-the-art, coal-fed power plant that uses coal mined next door at the Dry Fork mine. Power from this plant serves members of the Basin Electric Power Cooperative and Wyoming Municipal Power Agency.



Dry Fork mine-mouth operation (power plant on left, mine on right) (Toxey/McMillan Design Associates)

ROUTE B

- **CAMPBELL COUNTY’S RAILROAD AND COAL-MINING HISTORY**
- **UNDERGROUND COAL MINING**
- **EARLY COMMERCIAL STRIP MINING IN WYOMING**
- **PEERLESS MINE**
- **HOMESTAKE / WYODAK MINE**
- **LOCATION OF CAMPBELL COUNTY COAL MINES: EAST OF GILLETTE**
- **COAL BED FIRES AND THE CCC**
- **SUBSIDENCE**

²⁶ [The ongoing groundwater monitoring work of GAGMO is discussed here at the request of geologist Dave Olson and the Environmental Department of Alpha Coal West, former owner of the Belle Ayr and Eagle Butte mines and a resource and reviewer of the content and accuracy of this interpretive plan. It was added as a result of an early review of the plan.](#)

CAMPBELL COUNTY'S RAILROAD AND COAL-MINING HISTORY

As of 2015, Wyoming's Powder River Basin and the Gillette coalfield in particular produced more coal than any other area in the United States and supplied electrical power plants across the nation. The origins of this economic and energy powerhouse stretch back to the nineteenth century and the Euro-American project of westward expansion. Both the Euro-American settlement of the West and the exploitation of its natural resources owe much to the nation's railroad history.

This desire to settle and protect newly formed territories and transport their goods to market drove the federal legislative process behind the Pacific Railway acts of 1862 and 1864, which led to the development of a railway system stretching from the Eastern states across the West (before many of these territories had become states). In addition to providing right-of-way through public land, federal land grants for every mile of track built, and federal financing, these laws granted railroad companies coal deposits beneath the surface of *adjacent* lands.²⁷ Since steam locomotives were used to haul trains, and these were coal-fired, this added benefit was essential to fueling the rail system.

By the late 1880s, Wyoming had ushered in a network of new railway lines that consequently grew hand-in-hand with coal prospecting in order to power the locomotives as well as the communities that the railroads spawned, such as Gillette. In northeast Wyoming, the earliest mines developed for serving railroads appeared first with the Cambria mine in Weston County (1887), then in Converse County (1888), then in Sheridan County (1892).

After decades of expansion in the East and Midwest, competing railroad companies vied to establish routes westward through the Great Plains and Rockies to reach the Pacific coast. Wyoming's pivotal location along the Continental Divide and at the crossroads between the Missouri River and Puget Sound led to particularly fierce competition.²⁸ In the late 1880s, the Chicago, Burlington, and Quincy (CB&Q) railroad president, Charles Perkins, looked to the Northwest and determined that he could find markets for coal, iron, and timber in Puget Sound. He announced plans to extend a line from Nebraska to the Black Hills and beyond. The Union Pacific already occupied southern Wyoming, and the Wyoming Central Railway paralleled it about 100 miles to the north. The Northern

²⁷ David A. Wolff, *Industrializing the Rockies: Growth, Competition, and Turmoil in the Coalfields of Colorado and Wyoming* (Boulder (CO): University Press of Colorado, 2003), p. 5.

²⁸ Gregory Nickerson, "The Burlington Route," WyoHistory.org.
<http://www.wyohistory.org/essays/burlington-route-wyomings-second-transcontinental-railroad>, accessed October 6, 2015.

Pacific railway occupied much of southern Montana, but its owners were willing to negotiate a sharing of tracks west from there. Surveyors working for the CB&Q (known in Wyoming more commonly as the B&M, or “the Burlington,” in reference to its subsidiary: the Burlington and Missouri River Railroad) set their sights on Billings, Montana, and found plenty of coal along the way in the northeastern Wyoming.



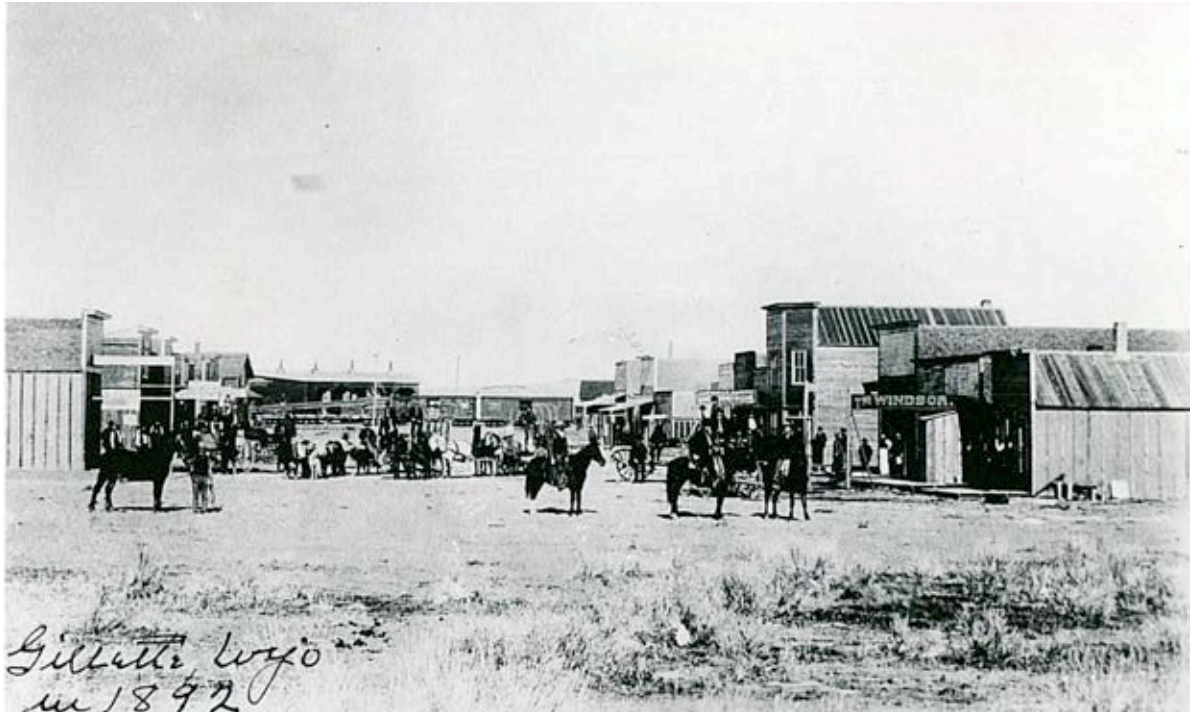
Edward Gillette (Stimson Collection, Wyoming State Archives)

An important person in the founding and history of Gillette is its namesake, Edward Gillette. He was an engineer and railroad surveyor who worked on the Denver and Rio Grande line in Colorado before joining the Burlington and Missouri River Railroad survey corps in December 1884. His crew began in Nebraska, working with haste due to rumors that the Union Pacific was moving to secure the route northwest.²⁹ By 1891 the team had advanced into northeastern Wyoming and was heading to “Stone Pile draw”³⁰ at the mouth of Hay Creek, bypassing the railroad-workers’ tent camp of Donkey Town. Edward Gillette, however, identified a shorter route northeast of this site that not only saved the railroad five miles of track but also avoided the costly construction of 30 bridges and some grading. Having saved his employer significant time and money, he hoped for a monetary reward, such as a pay raise, bonus, or, better yet, a percentage of royalties. Instead, he was remunerated by the naming of a

²⁹ Edward Gillette, *Locating the Iron Trail* (Boston: The Christopher Publishing House, 1925), p. 43.

³⁰ This was Edward Gillette’s term for what may have been a draw near the Rockpile. Edward Gillette (1925), p. 75.

town in his honor: Gillette. The town of Gillette was established in 1891 and incorporated in January 1892.



Gillette, 1892 (Wyoming State Archives)

In 1925 Edward Gillette wrote with foresight,

Gillette was a live town from the start. The cowboys and followers of the railroad saw to that, like many a frontier town in the West, until finally it settled down to an orderly development, and is now one of the best county seats on the railroad, in which the state takes much pride. It commands the trade of a large section of country. Its stock raising, farming and coal resources, with the probability of oil fields adjacent, will, no doubt, cause the town to have a considerable growth in the future.³¹

³¹ Edward Gillette (1925), pp. 75–76.



Building the railroad into Gillette (Heald Collection, Wyoming State Archives)

The railroad arrived in Gillette in August 1891, just in time to ship cattle to Midwestern markets from the vast grazing areas in this region and extending north and west from here. Ranching in the region dated to 1866 with the earliest documented cattle drives from Texas to Montana. Finding good grazing here, Euro-American settlers slowly moved into the region when the Indian Wars abated in the late 1870s. Some managed large open-range cattle businesses on behalf of eastern U.S. and European owners, while others staked out small, personal claims. Having a railroad shipping point at Gillette saved cowboys weeks of time trailing their cattle to market over hundreds of miles. To support this industry, corrals, liverys, and blacksmith shops sprang into existence, accompanied by hotels, cafés, saloons, and brothels, which quickly transformed the former sleepy Donkey Town into booming Gillette.

The influx of newcomers to Gillette slowed when the Burlington extended its line to Sheridan in 1892 and later to the Northern Pacific tracks in Huntley, Montana, in 1894. Over this short period of time, the number of saloons in Gillette dropped from six to two, and by 1900 its population was only 151. Taxes paid by the railroad were of great assistance to the struggling town.

It would be a long time before Gillette would regain its role as a central railroad shipping point. This finally took place in the 1970s when the merged Burlington Northern railroad built a line—known as the Orin Cutoff—from Gillette southward through Bill to Orin Junction on the North Platte River.



Stockyards at Gillette, ca. 1905, with railroad in mid-ground (Heald Collection, Wyoming State Archives)

While the initial growth of Gillette and the development of nearby mines may be traced back to its location on a major rail line, the city's story is more than a simple boom-and-bust arc. Coal mining contributed substantially to the region's sustainability before this momentous occasion and has been the foundation of its economy since the 1970s.



"Fiesta Theatre on right. Gillette WY Street Scene" (Wyoming State Archives)

UNDERGROUND COAL MINING

The abundance of near-surface coal in northeastern Wyoming contributed to the autonomy of homesteaders,³² making homesteading in this region viable. Coal outcrops in Campbell County gave rise to dozens of “mom-and-pop” wagon mines in which coal was dug from exposed seams in canyon cliffs or creek banks with pickaxes or whatever tools were handy (in one case, a potato fork did the job!) and loaded into wagons for home use or local distribution.

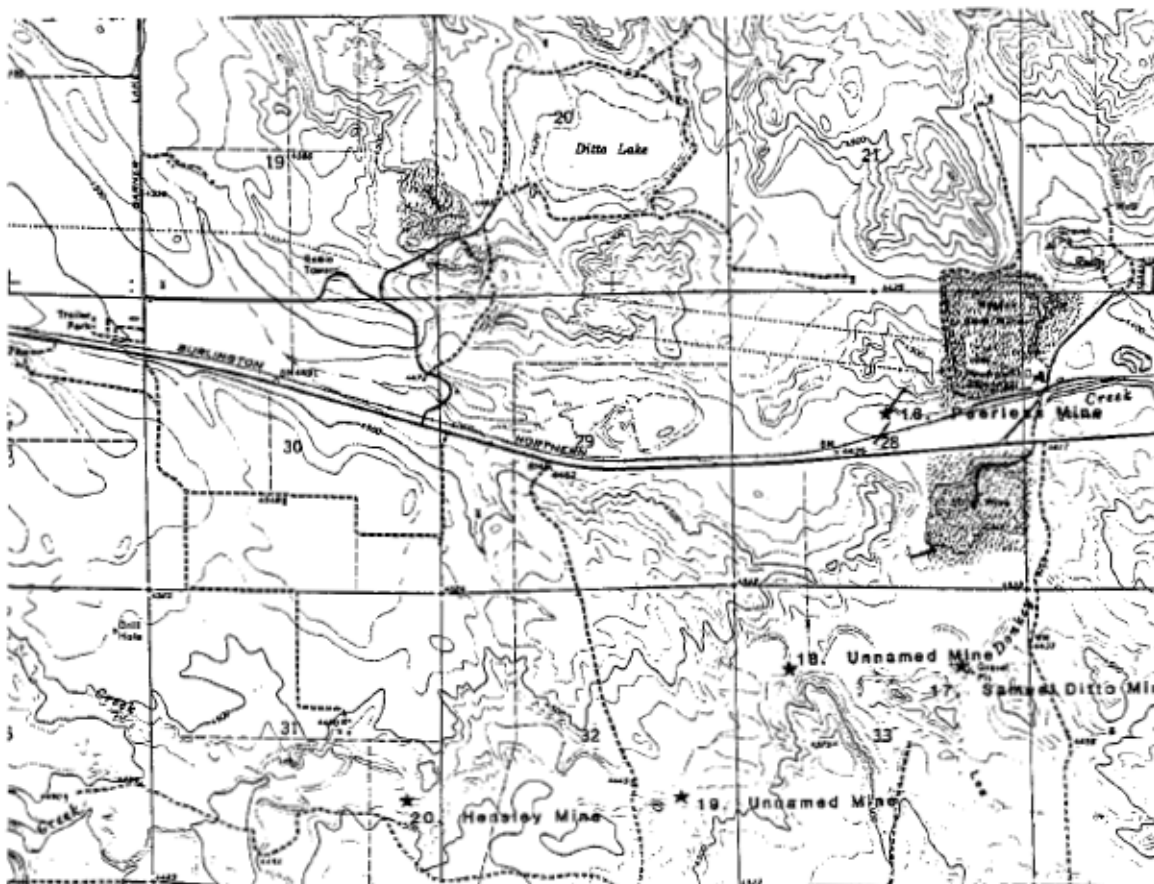
Campbell County settlers who persisted through blizzards and droughts typically implemented dry-land farming techniques and diversified their operations with livestock raising. Many increased their land holdings through the Enlarged Homestead and Stock-Raising Homestead acts (1909



“John Henry and Louisa Keck made Gillette their home in 1919. John and his brothers, Matt and Jim, operated a coal mine in which the coal was hauled from the shaft by donkey-drawn cars, then dumped in wagons to be transported away. ... Jim Keck also at Peerless...” (quoted from Mary Kelley, *Coal in Campbell*

³² Michael Cassity, *Wyoming Will Be Your New Home... Ranching, Farming, and Homesteading in Wyoming, 1860–1960* (Cheyenne: Wyoming State Historic Preservation Office, Wyoming State Parks and Cultural Resources, 2011), pp. 132–134.

County (Charleston (SC): Arcadia Publishing, 2013), p. 18; photo: Campbell County Rockpile Museum)



Locations of known underground coal mines east of Gillette in the Wyodak seam (MidWest Mining Company, "Final Report to the Wyoming Department of Environmental Quality on Land Use Recommendations to Minimize Subsidence Risk in Gillette, Wyoming" (1986), p. 15)

and 1916, respectively). Faced with poor soil, vast treeless swaths of land, and long harsh winters, these resilient farmers depended on coal for fuel for cooking and heating (which is required much of the year in this climate). Coal was also used in some small electrical generators. Some enterprising settlers established or leased coal claims in order to sell coal to neighbors or barter with it for goods they did not produce on their own land. Many of these small commercial mines accessed the Felix coal seam west of Gillette.

Larger commercial endeavors took place east of Gillette, specifically in the Minturn district. Here, in the early 1900s, numerous small underground room-and-pillar mines were established within the thick coal seam. The Hensley, Andrew Ditto, Eveland, and Samuel Ditto mines recorded the largest outputs.³³ These mines mostly served local needs.

³³ Dobbin, Carroll Edward, V.H. Barnett, and William Taylor Thom Jr. "Contributions to Economic Geology (short papers and preliminary reports), 1927, Part II, Mineral fuels. The Gillette coal field,

Whether providing for their families' needs or working full shifts underground, miners found this a dangerous enterprise, especially underground mining. Deaths and injuries from the collapse of undercut banks or under-supported roofs were commonplace, as were burns from explosions of deadly gas or mishandled explosive powder. To address these and other hazards, such as black lung disease, the Wyoming Territorial government passed mine safety laws and created the new office of State Mine Inspector in 1886.



Slope shaft leading to the Peerless underground coal mine (Campbell County Rockpile Museum)

northeastern Wyoming. The Minturn District and the northwestern part of the Gillette Field, Wyoming." U.S. Geological Survey Bulletin 796-A, pp. 62–64.

EARLY COMMERCIAL STRIP MINING IN WYOMING

The origin of surface or strip mining in Wyoming may be traced to this area just a few miles east of Gillette. While considered safer and more efficient than underground mining, strip mining involves dangerous, heavy equipment, explosives, and other risks and challenges. However, as the scale of strip mining grew, miners developed more efficient and safer methods of extraction.

Two adjacent commercial mines turned to this method in 1923 and 1924, respectively: Wyodak (established by Homestake Mining Company) and Peerless (operated at that time by Kirby Mutual Coal Company), which had begun as an underground mine. Instead of drilling tunnels and rooms into the coal seam, they used scrapers and steam shovels to remove overburden and expose large sections of the coal seam for easier access. In this area, 3–6 miles east of Gillette, the massive coal beds lie only 15–25 feet beneath the earth's surface. These are the uppermost Roland and Smith beds of the thick Tongue River Member, which is part of the larger Fort Union Formation of Paleocene coal. The region's larger contribution to surface mining methods and equipment followed later in the century.



Wyodak surface mine: shallow overburden is visible in the upper right (Black Hills Corporation)

PEERLESS MINE

The Peerless mine—originally known as the Shields mine—opened in 1922 as an underground, commercial coal mine. In this year banker Mark H. Shields acquired over 1,000 acres of known coal land a few miles east of Gillette and developed the first mine in the area outfitted with a railroad switch to facilitate the shipment of coal to other regions. He also built a company town to house mine workers. It boasted two boilers, housing, a hotel, an office, a store, and a tippie. Shields envisioned profit sharing and cooperative ownership for long-term employees, but a union soon prevailed.

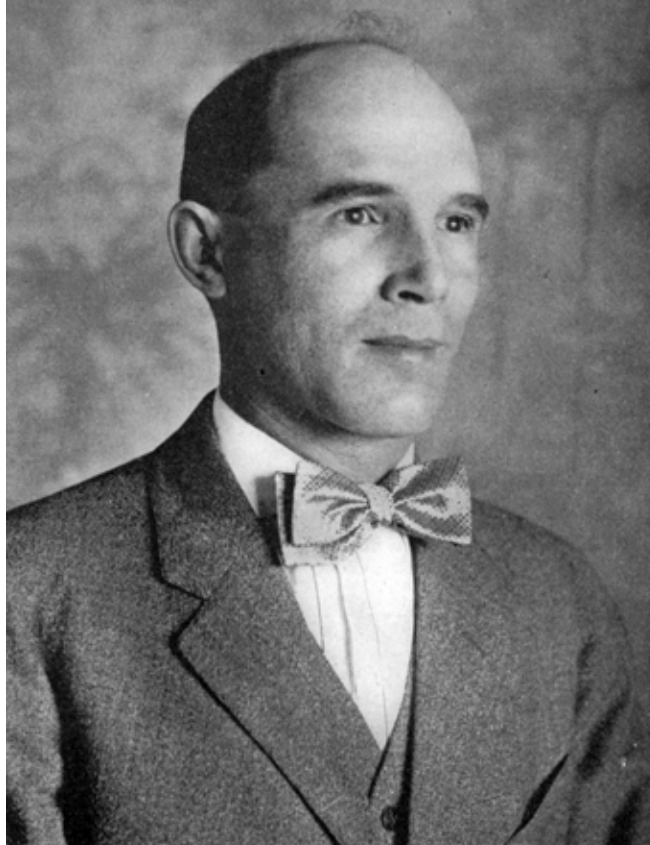


Peerless mine, tippie, and town, 1922–1923 (Campbell County Rockpile Museum)

In 1923 Shields renamed the company from the M. H. Shields Coal Company to Peerless Coal Company after the mine and town, but in March of that year, the business shut down when he suddenly ended his life. His suicide appears to have been at least in part spurred by guilt or shame following discovery that he fraudulently invested Bank of Gillette funds in the mining business.³⁴ A few months later, the bank sold the mine to Judge E. C. Raymond of Newcastle and other owners of the Kirby Mutual Coal Company based in Basin, Wyoming, who resumed the mine's operation.


The first challenge the new owners faced was to pump out the large quantity of water that had accumulated in the Peerless mine shaft while closed. The company then improved the mine with a double-entry panel system, sinking a second shaft opening to intersect with the first, and spent \$35,000 to improve the railroad tracks, scale, and tippie. In 1924, with a steady workforce of 20–30 men, the Peerless coal shipments resumed, and Kirby Mutual Coal Company made plans to build more housing.

³⁴ Mary Kelley, *Coal in Campbell County* (Charleston: Arcadia Publishing: 2013), p. 15.




Mark Shields (Campbell County Rockpile Museum)


The Home Of Peerless Coal



From the Thickest Vein
in the United States



A Small Portion of Our 80 Foot Vein




PEERLESS, WYOMING


Mined and Sold Exclusively by

KIRBY MUTUAL COAL Co.

PEERLESS MINE GILLETTE, WYOMING



Our Reputation is Back
of Every Lump



Why You Get a Better Service

Peerless coal / Kirby Mutual Coal Co. advertisement (Campbell County Rockpile Museum)

Peerless mine's accounting logs from 1924 list many Polish names among the miners, which is unusual for the Gillette area at this time. Most regional mines hired local ranchers and farmers as miners, whose names were predominantly British. The presence of Polish names in the Peerless logs indicate that managers brought Polish miners from the Kirby company's mining operations in Basin, Wyoming, where Polish miners prevailed, to fill the jobs at Peerless. The logs also record a wage range of \$0.94–0.99/hour.³⁵

Plagued by continual seepage of groundwater into the shafts, the company ordered a combined electric steam shovel/drag line scraping machine and began surface stripping operations in the summer of 1924, following the example of the new neighboring mine at Wyodak. Additional contracts to

DAILY TIME SHEET
Kirby Mutual Coal Company
Basin, Wyoming

PEERLESS MINE March 18 24 DATE

CHECK NO.	NAME	RATE	HOURS	DISTRIBUTION	ACCT. NO.	DETAIL
1	John G. Galy	71/2	7	Transport & Dump	5422	3 70
2	John G. Galy	99 1/4	8	Transporting	2222	7 78
3	John G. Galy	77	3 1/2	Transporting	2222	3 46
4	John G. Galy	71/2	8	Transport & Dump	5422	3 70
5	John G. Galy	77	8	Transporting	1222	7 78
6	John G. Galy	99 1/4	8	Transporting	2222	7 78
7	John G. Galy	94	8	Transport & Dump	2222	7 78
10	John G. Galy	98 1/4	8	New Dump	2222	7 78
13	John G. Galy	91 1/4	8	"	2222	7 36
16	John G. Galy	90 3/4	7	Strip Pit	2122	7 36
21	John G. Galy	103 3/4	8	Strip Pit	1222	7 36
32	John G. Galy	99	8	Strip Pit	1222	7 36
37	John G. Galy	97 1/4	16	Transporting	2222	7 36
38	John G. Galy	99	8	Strip Pit	1222	7 36
31	John G. Galy	99	7	"	1222	7 36
32	John G. Galy	88	3	Strip Pit	2122	7 36
34	John G. Galy	47			40	47
35	John G. Galy	100	7	Transporting	2122	7 36
37	John G. Galy	90 3/4	7	Transporting	2122	7 36

³⁵ Peerless Mine Log, 1924 (Campbell County Rockpile Museum).

Kirby Mutual Coal Company time sheet for Peerless mine, showing Polish miners' names (Campbell County Rockpile Museum)

ship coal to Nebraska were negotiated that year but were never fulfilled. Reasons for the cessation of mining activities at Peerless are unclear. State mining reports show that the mine remained idle from 1925 to 1927, when it officially closed. The land was later absorbed into the Wyodak mining operation.

HOMESTAKE/WYODAK MINE

Established as a strip mine in 1923, the Wyodak mine had become the largest open coal pit in the world by 1935. It measured 115 feet deep (a 90-foot deep coal seam underneath 25 feet of overburden) and utilized conveyor belts to transport coal to the surface. Its product fueled the Burlington Railroad, the Homestake gold mine in South Dakota, and the city of Gillette. Additional land acquisitions and federal leases, along with technological advances in mining, allowed the Wyodak mine's annual production to increase to a peak of approximately 6 million tons in 2008.³⁶ Today, Wyodak may be the longest continually operated coal mine in the United States. Although the basic concept of strip mining has not changed in the past century, the mining landscape has changed from one dominated by the hard physical labor of men and horses to one of massive modern machinery.

In 1921 surveyors working for the Homestake Mining Company of Deadwood, South Dakota, had their eyes on land six miles east of Gillette, adjacent to U.S. Highway 14 and the Burlington Railroad (CB&Q) main line. Exploratory sample holes were drilled and revealed that their hunch was correct: this was the place to invest in the new coal mine that was needed to fuel operations at their gold mine in Lead, South Dakota.

³⁶ United States Department of the Interior, Bureau of Land Management, "Powder River Basin (PRB) Coal Production," http://www.blm.gov/wy/st/en/programs/energy/Coal_Resources/PRB_Coal/production.html, accessed August 28, 2015.



"Wyodak Coal Co. Largest Coal Vein In U.S." (Campbell County Rockpile Museum)



Horse-drawn teams removing overburden at Wyodak mine (Campbell County Rockpile Museum)

Workers had previously started an underground coal mining shaft on the former Levinson Ranch; however, infiltrating water caused them to reconsider the site. Surface mining presented an attractive alternative. The goal was to minimize labor input and maximize coal output. In 1922 it became clear that the company was planning for the long term when, under Superintendent Ed G. Ross, work began on Wyodak Village, a company town for mine workers, before the mine was even established. Water and sewer lines were laid, and carpenters began constructing buildings. Representatives of the Homestake Mining Company continued to buy land from surrounding homesteaders in 1922 and 1923.

In 1923 Homestake formed a subsidiary, Wyodak Coal and Manufacturing Company, coining a name that captured the spirit of the company's bi-state enterprise and the nearby boundary between Wyoming and South Dakota. In April 1923 Mr. Wells was hired to begin stripping

overburden with multiple horse teams. One man using a 4-horse team pulling a half-yard scraper called a *fresno* was paid \$4.50/day (without breaks!). By September he had reached the watertable and was ready for a steam shovel to take over. By the end of the year coal was being mined. In 1924, while still removing and loading coal by clamshell steam shovel, the company switched to hydraulic stripping, using water pumped at high

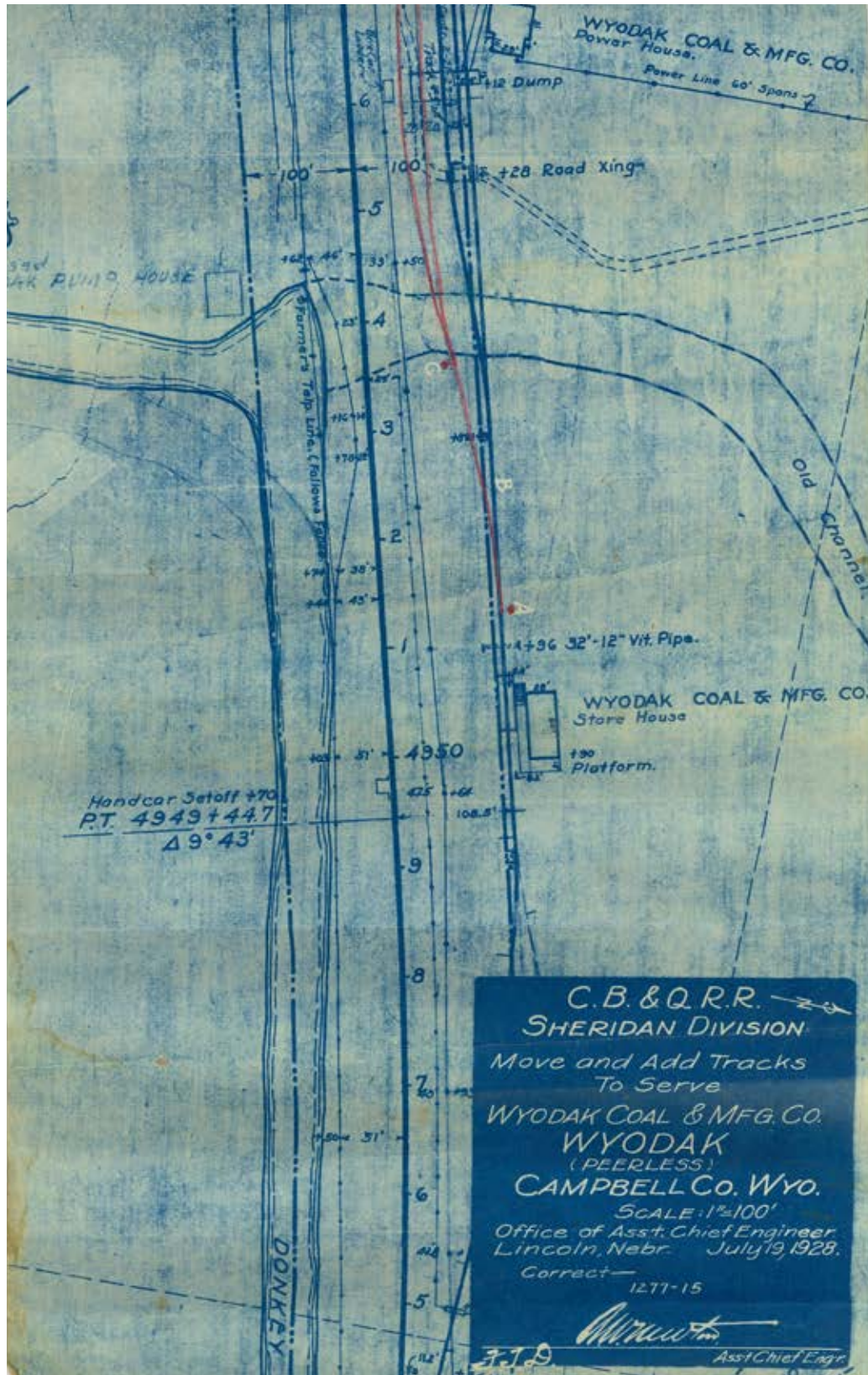


1927 photograph of Wyodak mine with conveyor belt and railroad visible (Campbell County Rockpile Museum)

pressure to wash away the overburden, though a high clay content and cold weather impeded progress. Also that year, an electric plant, tippie, and more employee houses were built at Wyodak. Finally in 1925, Homestake's coal-fed, steam-powered electric plant in Lead received its first rail shipment of Wyodak coal. Additional steam shovels (both clamshell and bucket) took over the stripping in 1932.

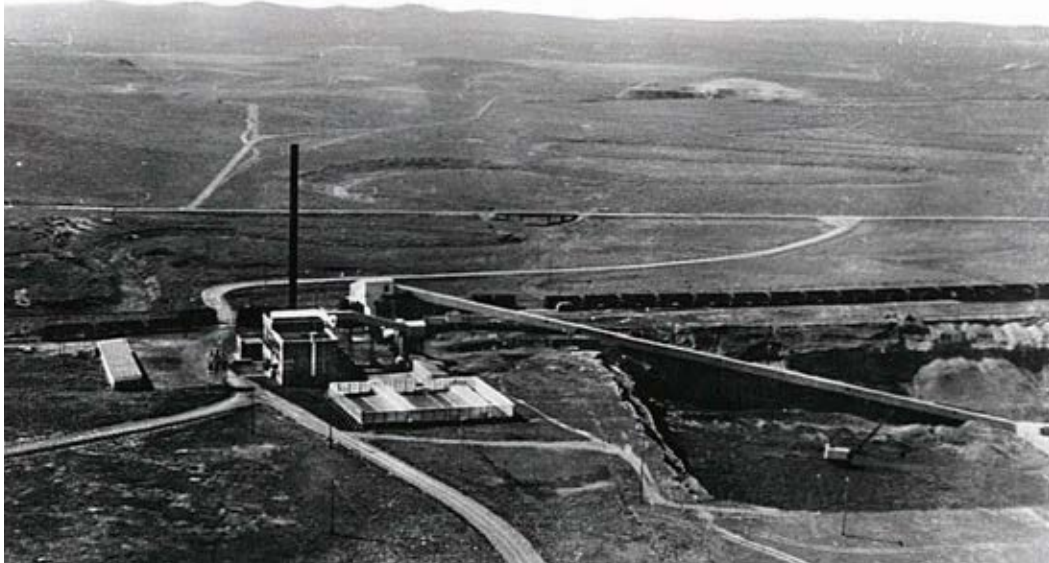


"Sluicing, Wyodak Coal Co., 6-26-28." The shallow overburden at the Wyodak mine is being washed away with hydraulic stripping. Visible on the right is the deep coal pit. (Black Hills Corporation)



Chicago, Burlington & Quincy Railroad (CB&Q RR) plans dated July 19, 1928, to move and add tracks to serve Wyodak's Peerless mine (Campbell County Rockpile Museum)

Even though the Wyodak site was in part selected for its location next to the Burlington railroad for rail transportation of coal to Lead, it was soon determined that it would be cheaper to transport power the short distance than heavy coal. A mine-mouth power plant was built at Wyodak, and transmission lines were constructed to carry power generated at the coal mine to South Dakota.



Mine-mouth operation at Wyodak: power plant (left) and mine (right) (Wyoming State Archives)



Power plant at Wyodak, 1928 (building still standing in 2015) (Wyoming State Archives)

In addition to Wyodak's constantly moving coal mine, the company's history is punctuated with improvements and expansions of the mine and power plants. For example, in 1929 a new and enlarged Wyodak power plant began providing electricity to the city of Gillette. Conveyor belts sped up the removal of coal in the 1930s. The tippie was soon enlarged to four tracks with upper and lower decks, dump chute, bucket elevator, and

shaking screens. Throughout this decade new buildings continued to be added, many of which were contracted to local builder John Husby.

Although the town's economy was not exempt from the Great Depression, a market for coal—including Homestake's operations, railroad, sugar beet factories, cement plants, production of agricultural machinery, etc.—helped employ a local workforce and to some degree moderated the effects of price fluctuations among volatile goods such as beef, wool, and food crops. Wyodak proudly kept its coal prices low for local customers who bought coal by the truckload for their winter heat. In 1940 the cost of a ton of lump coal was \$2.00, rising to \$2.95 in 1955.

In the 1940s, slack coal, which was previously sent to Lead for the gold mine operations, was diverted to war production plants and to the Atomic Energy Commission in the Pacific Northwest. Another new development at this time was the replacement of conveyor belts with trucks for hauling coal out of the pit. The 1950s were marked by the introduction of diesel tractors with scrapers and bulldozers to push overburden out of the pit and by use of explosives to loosen the coal.

The neighboring power plants grew alongside the mine, fueling daily operations as well as filling domestic, agricultural, and commercial demands. With the exception of the initial power plant, which was water-cooled, subsequent power plants increased generating capacity while utilizing the latest air-cooling technologies. In 1954 Wyodak's power production facilities were sold to the Black Hills Corporation with a two year option to buy the mine, which it did under the subsidiary Wyodak Resources Development Corporation.

The mine community gradually evacuated Wyodak Village, which was sold to Black Hills Power and Light Company for use by its employees. The final remaining houses were jacked up and moved away in the 1990s, and the land was put to industrial use. The last resident, engineer Ken Wrede, reminisced that in its heyday, Wyodak village had the only trees in Gillette, with hedgerows carefully tended and doors left unlocked.³⁷ The mine and mine-mouth power plant continue operations to this day and provide a spectacle to I-90 travelers.



"Employee Homes. Wyodak Coal Co. Gillette, Wyo." (Black Hills Corporation)

³⁷ Valerie Kiger, "Ghost Town," *The (Gillette) News-Record* (n.d., 1996 or later).

LOCATION OF CAMPBELL COUNTY COAL MINES: EAST OF GILLETTE



Campbell County coal mine located east of Gillette (Google Earth Pro)

COAL BED FIRES AND THE CCC

Coal was first discovered in the Powder River Basin in 1859 by geologist Ferdinand V. Hayden of the U.S. Army's Reynolds Expedition. The importance of this discovery was not overlooked by the federal government. Despite the government's generous land giveaways in this region and across the West, various legislative acts (such as the Stock Raising Homestead Act of 1916 and the Mineral Leasing Act of 1920) protected the government's subsurface rights to minerals—coal in particular—with provisions for leases and royalties on both private and public land. In short, coal is a major public asset. However, its integrity is threatened by extensive, long-lived coal bed fires. These burn up the resource rendering it lost to the public good: it generates neither useful power nor money for the public treasury.

Coal bed fires occur naturally—from lightning strikes, spontaneous combustion, and forest and grass fires that spread through roots—as well as from human causes, such as an untended campfire. Once fire begins to spread underground, its boundaries prove difficult to evaluate and the fire itself even more difficult to contain.

Coal seam fires have not always been viewed as a nuisance or threat. In the past, consistently glowing outcrops may have served as landmarks to night travelers. A long burning seam west of Gillette was previously used as a gathering spot for social outings during which coffee, steaks, and hot dogs were roasted directly over the ground. Ranchers have observed the

stench of sulfur around areas of ground that never had any snow accumulation. Livestock gravitate to them for warmth.

While some slower burning fires do not pose an obvious threat through their steady release of small amounts of heat and smoke (which is nevertheless toxic), larger fires can open dangerous crevices eight or more feet deep and filled with intense heat and molten rock glowing red and white. These are very dangerous for livestock and humans. Still others spread quickly, consuming many acres and tons of coal deposits. In 1924, about a mile south of the Peerless mine, flames 20 feet high with sparks like fireworks were visible from miles away. One of the earliest recorded fires in the area, the T-7 fire southeast of Gillette, was mentioned in the 1865 diary of the Sawyers' expedition.



Coal seam fire in the Gillette area put out by the CCC "boys," 1933–1942 (Campbell County Rockpile Museum)

In 1929 U.S. Department of the Interior engineer C. W. Wells declared that coal fires ought to be extinguished. Sixty coal fires had been identified in Campbell County alone, 25 to 30 of which were believed to be active at that time. The historical number has since been adjusted to 80 or more. A subsequent letter from the U.S. Department of the Interior (dated soon after President Roosevelt's New Deal Civilian Conservation Corps (CCC) program was authorized) estimated that in all of Wyoming, the value of the endangered coal was in excess of \$63 million, and the cost to control it might be around \$500,000. It was also noted that filling in abandoned mines as a method for controlling fires would have the added benefit of public safety. A CCC camp was established at Gillette in

1933 to put out coal bed fires. It grew to two camps over the coming years until they were disbanded in 1942. These were the only CCC camps that were administered by the Government Land Office and the only ones focused on extinguishing coal fires.

Nationwide, over two thousand CCC camps were created with the goal of putting young unemployed men to work, mostly on natural resource conservation projects (building dams, fire roads, bridges, fire towers, and fish ponds; planting trees and managing forests; fighting forest fires, etc.). The vision behind the program aimed to heal the wounds of a country emerging from the shadow of the Great Depression by restoring hope and self-confidence to America's young men. In addition to providing vocational training, the CCC offered academic courses and encouraged sports and hobbies.



CCC Camp Miller, Gillette, 1930s (Campbell County Rockpile Museum)

The CCC “boys” (as they were fondly referred to by local journalists of the day) who arrived in Gillette the first year were mostly from Texas, and they were well received. Over the years, the population ranged from 100 to 300. A quota for local employment kept 21–26 spots reserved for Wyoming participants. In that first season of 1933, the army officers directing the camp turned to Wyoming men who had experience in the coal mines to be their foremen. A press release stated that the camp members caught the true spirit of emergency conservation work and showed a “remarkable willingness to meet any emergency day or night. Consequently the most cordial relations exist among the workmen and with the camp officers, superintendent, and foremen as well as with the ranchers and residents in the community.”³⁸ In October at the close of the camp’s first season, U.S. Geological Survey District Mining Supervisor R. H. Allport stated, “We consider that the work of you boys in putting fires under control has an ultimate value which cannot be measured in money value at the present time.”³⁹

³⁸ United States Department of the Interior, General Land Office, “Gillette Emergency Conservation Camp” (Press release, August 16, 1933).

³⁹“Imagination staggered by vast Gillette coal fields,” *Rock Springs Rocket*, October 12, 1933.

The U.S. Geological Survey (USGS) selected a site for the camp located just east of downtown Gillette (at Sixth Street and 4J Road) on land that was generously loaned by Underwood Lumber Company. The outpost was christened Camp Miller in honor of the Wyoming Governor. After operating on a seasonal basis from 1933 to 1936, permanent barracks and buildings were constructed, and in 1937 the camp became a year-round operation.



Aerial view of Gillette from the 1930s with the CCC Camp Miller in the upper right, the Rockpile in the far right, and the county fairgrounds in the foreground (Campbell County Rockpile Museum)

Men, both unmarried and married, typically served between six and 13 months. The camp community became integrated into the life of the city. Over time the city welcomed African-Americans and Mexican-Americans who arrived at the camp from Arizona, Texas, Oklahoma, and elsewhere. In 1935, Allport remarked to the local Lions Club that he knew of no community that had thus far extended so much cooperation to the CCC camps as had Gillette.⁴⁰ It must have helped that during its tenure, the CCC contracts put thousands of dollars into local businesses.

Standard pay was \$30 monthly, \$25 of which was automatically sent home to the men's families. Described as a cross between army and college, the camps maintained a well-rounded and busy schedule. Recreation included swimming, tennis, movies, softball, and even a homegrown orchestra that hosted dances for the public. The public was

⁴⁰ "Outlines work of field camps," in *The (Gillette) News-Record*, October 17, 1935.

also invited to sporting events including baseball, boxing, wrestling, and, on occasion, an open house where the public could view work in progress



CCC “boys” wearing gas masks as they put out a coal seam fire in the Gillette area, 1933–1942 (Campbell County Rockpile Museum)

at a field camp and enjoy a picnic. While some courses were free and open to the public, such as carpentry, other courses focused on high school completion and vocational subjects (for example, first aid, public speaking, auto mechanics, truck driving, heavy machinery operation, typing, and citizenship).

Water is not an effective means of putting out coal fires (because the heat generated by dry coal’s absorption of water can ignite the coal), and the soil erosion water causes can expose more coal to oxygen in the air, fueling and worsening the blaze. The teams of CCC workers therefore aimed mostly to smother coal fires by moving dirt over them, filling in shafts, and plugging other holes providing air to the fire. Where this was not possible, burning areas were dug up and loaded on flatbed trucks (lined with steel plates) to be scattered and cooled. The teams used hard labor and wheelbarrows, road rippers and scrapers, bulldozers, dump trucks, metal chutes, and explosives when needed to move boulders and break up areas of porous clinker that allowed for downward air combustion.

While some fires were extinguished in a couple of days, others took months and tens of thousands of man hours. On occasion, fires could not be extinguished, or they reignited a year or two later, in which case the

men dug trenches to contain the spread and built features such as terraces to stabilize the earth. When fire work was slow, other projects received attention, such as bridge repairs and grasshopper control.



CCC team putting out a coal seam fire in the Gillette area, 1933–1942 (Campbell County Rockpile Museum)

Few signs of Camp Miller remain, though some wood from disassembled buildings was reclaimed for house building in town. Most of the barracks were shipped to Clearmont in Sheridan County to be used in a German prisoner of war camp, where inmates were put to work in the beet fields. Additional large-scale efforts were made to address coal fires in the 1950s, 1960s, and early 2000s, especially when federal Abandoned Mine Lands funds could be applied (mostly in cases of small, 19th-century, room-and-pillar, underground mines). Funding for this program came in part from a federal tax placed on coal to cover the cost of reclaiming abandoned mines.

SUBSIDENCE

Since fires burn away large subsurface coal beds, the weakened overlying layers sometimes cave in, or *subside*. Subsidence refers to an area where the earth's surface has noticeably sunk. Numerous incidents of subsidence have occurred in Campbell County. For example, following the 1921 fire at Hurtt's coal mine in the Recluse precinct, a quarter of an acre subsided to a depth of four feet, and 60 miles south of Gillette, 15 feet of subsidence occurred in parts of a 50-acre coal bed fire in 1925.

Subsidence can also occur in aging or abandoned coal mines, with or without fire, when rotting or eroding support systems fail. One of the more alarming sinkholes occurred near Gillette's Sage Valley Junior High in 1986.

In 1984, an earth-moving scraper that was clearing a lot at the Campbell County landfill fell into a subsided chamber of an abandoned mine. As a result, a state governmental abandoned mine program developed a study on the risks of subsidence. The results of this study pointed to only moderate risk west of the city where the Felix coal seam—located close to surface of the earth in this area—was accessed through relatively small underground mining operations in the late 1800s and early 1900s. While the CCC workers filled in approximately 30 vacated mines, this study identified 15 additional sites and indicated the possibility of more. It concluded with the recommendation that any future building projects in the area explore this danger and make any needed mitigations.

| Later, the staggering scale of Campbell County coal production would eclipse the small-scale production of the region's early settlers and miners; however, it is upon their grit, courage, and perseverance in the face of great challenges that this mighty industry was built.



Image of subsidence from former underground mine or coal seam fire near Gillette (MidWest Mining Company (1986), p. 24)



Unstable ground in the vicinity of coal seam fires provides additional challenges for heavy equipment, as experienced here by the CCC fire fighting teams, 1933–1942 (Campbell County Rockpile Museum)

ROUTE B TIMELINE

- 1886** Wyoming territorial legislature passed mine safety laws and established new Office of State Mine Inspector.
- 1891** Burlington Railroad established Gillette.
- 1921** Donkey Creek mine southeast of Gillette mined a 75-foot deep underground shaft. First carload of coal was sent to Alliance, Nebraska. Operated by H. P. Hensley and Son, it produced 40 tons/day. Previously controlled by Sam Ditto, it was subsequently operated by W. Tyrrell, R. J. Campbell, and then redeveloped under Donkey Creek Coal Association with plans to secure year-round contracts for railroad shipments in 1922.
- 1921** Homestake Mining Co. of Deadwood, South Dakota, arranged 90-day option on Sam Ditto's acreage east of town with an option permanently to lease coal (June), purchased 320 acres from Ben Doud, and drilled exploratory holes into the Ditto field. Coal was found near the surface, strip mining was declared possible, and plans were announced for a \$1.5 million power plant at Gillette to transmit power to Lead, South Dakota (July–August). Having also acquired the 160-acre Levinson Ranch, Homestake found a 53-foot thick vein found here and dug a shaft to begin underground mining but soon abandoned this plan due to high influx of water and new shaft begun a quarter mile to the west. Homestake purchased the Ditto tract for \$8000 (September–October) and drilled more survey holes throughout the fall. Coal was found at levels as shallow as 14 feet deep. Influx of water threatened some shafts, so pumps were installed.
- 1922** Homestake superintendent Ed G. Ross assessed the land for steam-shovel removal of up to 100 feet of overburden. The coal camp town opened with sewer and water mains. Six buildings were completed (October).
- 1922** The M. H. Shields Coal Company incorporated to begin developing a commercial-scale underground mine on 1000 acres near the Homestake Mining Co. lands east of Gillette. A 60-foot thick vein was found near the Burlington tracks. Water was encountered as the shaft was dug, necessitating the installation of pumps. Twenty-five men were put to work building six houses and a commissary at the mine. Plans were made for a railroad switch to connect the mine to the Burlington (August). A 107-foot deep shaft was dug and tunneling began, and 10 buildings were erected with more in progress. The new town was to be called Peerless. Dick Hotchkiss served as superintendent. Mining cars and tipples arrived, allowing 3–5 carloads of coal to be shipped out daily.

Hotel, office, and store were in operation (September–November).

1923 Homestake operated local mining under the subsidiary name of Wyodak Coal and Manufacturing Co., acquiring properties east of the Peerless mine and beginning construction of a railroad to its gold mine in South Dakota. Stripping of overburden began with 7–8 men working in horse-drawn fresno (scraper) teams overseen by Mr. Wells (April). Superintendent Ross predicted coal would be removed next season. The stripped area became ready for steam-shovel removal of coal (September).

1923 Mark H. Shields renamed his company Peerless Coal Company and served as both President and Treasurer. Contracts were secured for machinery and the construction of railroad tracks and more houses. Peerless miners went on strike and organized a union around a statewide agreement on wages. Mark H. Shields committed suicide (March). Peerless mine was sold for \$25,000 to Judge E. C. Raymond of Newcastle and other interests. Kirby Mutual Coal Company formed to oversee operations of the Peerless mine. Engineer Mr. Magee was put in charge of preparing for reopening. Millions of gallons of water that had accumulated in the shaft were pumped out (September–December).

1924 Wyodak introduced a clamshell steam shovel to continue work on area stripped by horse teams the previous summer (May). The steam shovel prepared to start digging coal, and three houses were built (July–August). Stripping reached the level of the coal, which was used at the local plant. Construction began on the office, warehouse, changing room, and tippie (December).

1924 Kirby Mutual Coal Company operated the Peerless mine using an underground shaft and pumping out water pumped through the shaft. An average of 20–30 men was employed at the mine. Coal was shipped by train carload and sold to local consumers (January). Tests showed that the Peerless coal was free from impurities. A general store opened. Plans were made to build more houses and secure contracts in South Dakota and Nebraska. The Peerless coal miners' union reorganized with United Mine Workers of America (UMWA). A coal bank fire one mile south of Peerless erupted into 20-foot flames (April). A steam shovel/drag line combination machine arrived and stripping operations began at Peerless (June). The mine passed state inspection, and contracts were secured in Nebraska (September).

1925 Wyodak operated a power plant with boiler and two generators in an engine house.

- 1925** Peerless (operated by Kirby Mutual Coal Co.) shut down and remained idle. Pumps and other equipment were pulled out to be leased (February).
- 1925** Smaller mines came under the jurisdiction of state mine inspector who paid a visit to local mines (March).
- 1927** A fire at Wyodak almost completely destroyed the power plant. Plans were made immediately to rebuild it (June). Work progressed rapidly (July).
- 1928** Another fire (begun by spontaneous combustion) at Wyodak—this one at the mine—damaged the engine room, chute, tipple, and tracks. Coal shipments were interrupted (February). Gillette City Council passed a resolution to move forward with the Lions Club committee's recommendation to accept Wyodak's proposal to enlarge the power plant in order to provide electricity to the city. The city's power plant was inadequate for projected growth (December).
- 1929** Gillette signed a 10-year contract for electrical power from Wyodak (June). Wyodak brought two turbines and generators (500 & 1000 kw) online to connect power to the city distribution lines (November). The state coal mine inspector visited Campbell County following six fatal accidents (four at small local mines and two at large ones).
- 1931** CB&Q Railroad began testing local coal to replace Sheridan coal on this division of its line. Homestake began surveying for high power lines to transmit Wyodak power to its Lead gold mine and other industries. Plans were made for construction of the power lines the following spring (October).
- 1932** CB&Q signed its first contract for Wyodak coal, to be used by locomotives (five carloads/week). Wyodak acquired two new Marion electric steam shovels (one clamshell for loading and one bucket for stripping), allowing them to cease hydraulic washing to remove surface dirt, which required subsequent pumping of the pit. Joseph F. Peters succeeded Ed Ross as Wyodak Superintendent.
- 1933** USGS district mining supervisor R.H. Allport inspected the Gillette area as possible site for a Civilian Conservation Corps (CCC) camp. Records showed two coal fires in the county that had been burning since 1884 and 1891 (April). Underwood Lumber Company offered its land to be used by the federal government for the camp at no charge (May). Gillette's CCC camp (designated GLO-1-W) opened with arrival of 179 Texans, 21 Wyoming men, and three army officers in charge. It was named Camp Miller after Wyoming Governor Leslie A. Miller.

Floored tents, mess hall, kitchen, bathhouse, and recreation hall were constructed. Field work on the Donkey Creek mine fire began (June). CCC men extinguished the Black Diamond fire, worked on the Baker Canyon fires and Ditto fire, and filled in the abandoned Peerless shaft (July).

- 1933** Wyodak made improvements with on its electric breaker to crush large coal lumps for loading onto conveyor belts (May) and constructed new garage and locker room buildings for employees (November). A group representing Black Hills communities (of northeast Wyoming and northwest South Dakota) formed under the name “Big Horn-Black Hills Power Association” and discussed plans for a large power plant to be built with loans from the federal Public Works administration. Public meetings were held (July–November). The USGS oversaw the covering over of the old Peerless strip mine with dirt (October).
- 1934** State geologist C. S. Dietz offered a free three-week mining class at Campbell County High School; 25 attended (November).
- 1935** The fate of the Black Hills Power project depended on legislation which passed in Wyoming but was stalled in South Dakota (March) but later passed (September). The CCC built wooden barracks, a new mess hall/cook’s quarters, and recreation hall at Camp Miller. The CCC stationed two camps here (GLO-1-W and GLO-2-W) (summer only). Two men from GLO-2-W died from spinal meningitis. Quarantine went in effect (October).
- 1936** Wyodak built a new 20-ton scale building.
- 1937** CCC Camp Miller became a year-round camp (fall). CB&Q railroad pioneered internal-combustion diesel-electric engines, reducing dependence on coal.
- 1941** Wyodak expanded its power plant to meet increased demands from the city of Gillette and daily mine operations. A new \$80,000 boiler (500hp) was installed and a two-story brick engine building with basement built. Russell Reilly succeeded Joseph F. Peters as manager of Wyodak Coal and Manufacturing Company. The CCC assessed its accomplishments after eight years: 16 mine fires extinguished in addition to forest and grass fires.
- 1942** The CCC disbanded Camp Miller (May 31).
- 1943** U.S. Bureau of Mines inspected and commended Wyodak for its safety consciousness (February). Wyodak began shipping 350 tons/day of slack coal—soon to be increased to 800 tons with double shifts—to the West Coast for war production plants. This market for slack (left over after pea/nut/stove/lump coal are

removed) allowed for increased production since the previous market for slack, the gold mine in Lead, was forced to shut down by federal war time rules. Coal continued to be shipped to Nebraska, Iowa, and other points east, and to be sold for local use (October–December).

- 1949** U.S. Congress appropriated funds to control fires in inactive coal deposits. U.S. Bureau of Mines selected the Moyer Gulch fire, burning since 1914, as the first Wyoming project.
- 1986** A study on subsidence risk in Gillette was commissioned from MidWest Mining Company of Littleton, Colorado, funded by the Wyoming Department of Environmental Quality, Land Quality Division, Abandoned Mine Lands Program, and the U.S. Department of the Interior, Office of Surface Mining Reclamation and Enforcement.



Figure 1. Fire in the Roland Coal Bed at Moyer Gulch
(prior to control work)

Moyer Gulch fire prior to control work that began November 3, 1949 (Bureau of Land Management, "Final Report Control of Coal-Crop Fire at Moyer Gulch, Gillette, Campbell County, Wyoming," (January 8, 1951), p.

2)

ROUTE C

- CAMPBELL COUNTY: COAL “BREADBASKET”
- LOCATION OF CAMPBELL COUNTY COAL MINES: SOUTH OF GILLETTE
- TRANSPORTATION OF COAL BY RAIL
- TECHNOLOGICAL INNOVATION AND RESEARCH
- COAL LEASING & RELATIONS WITH OTHER EXTRACTIVE INDUSTRIES
- SOCIAL IMPACTS OF COAL INDUSTRY
- BIRTH AND GROWTH OF WRIGHT: “NOT A BOOM & BUST COMPANY TOWN”
- WOMEN MINERS
- MINE SAFETY & HEALTH

CAMPBELL COUNTY: COAL “BREADBASKET”

In 1979 a *Sheridan Press* journalist quoted a U.S. Department of Energy official who remarked, “Wyoming is shaping up as the energy breadbasket of the nation.... The geologist has replaced the cowboy in the state’s economy.” While the cowboy still looms large in Wyoming culture, and in fact ranchers have been partners in many coal, gas, and oil enterprises, the coal reserves in the Powder River Basin (PRB)—the largest in the country and possibly the world—do entitle it to “breadbasket” status. Another apt moniker for the region is the “Saudi Arabia of Coal.”

Campbell County forms the heart of the Powder River Basin, which stretches from northeast Wyoming into southern Montana. Furthermore, a unique area within Campbell County, located south of Gillette on either side of Highway 59, represents the heart of modern industrialized surface (strip) mining. The world’s most productive coal mines began digging here several decades ago.

A few statistics lend some perspective to the vast output. As of 2015:

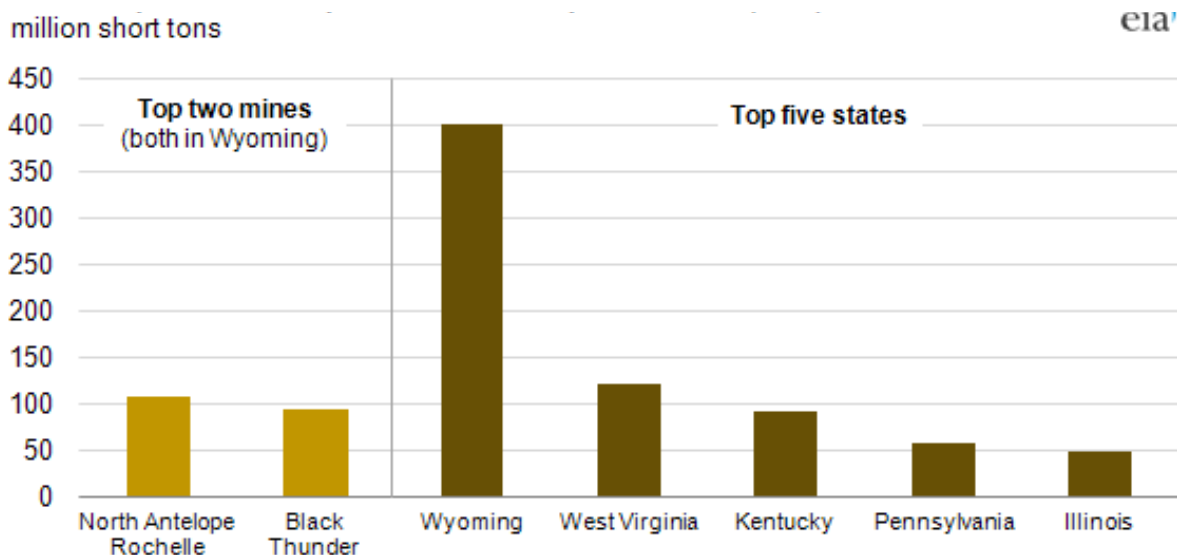
- Wyoming coal traveled by train to over 30 states (primarily for generation of electricity), and constituted 4% of total U.S. exports of coal to over 40 countries.
- Wyoming produced approximately 39% of the total U.S. coal output.
- Campbell County represented approximately 80% of Wyoming’s coal output.
- Active mines in Campbell County accounted for eight of the most recently ranked top ten coal-producing mines in the United States.
- Five of the nationally ranked top ten coal mines were situated within the coal-mining area south of Gillette flanking Highway 59.⁴¹

⁴¹ U.S. Energy Information Administration, U. S. Department of Energy, “Annual Coal Report 2013” (April 2015), <http://www.eia.gov/coal/annual/pdf/acr.pdf>, p. 15, accessed December 18, 2015.

Additionally:

- In the peak production year of 2008, Campbell County mines produced about the same amount of coal that was produced in the entire century of 1870–1970.⁴²
- In 2015 the nationally ranked top two mines were located in the area south of Gillette and maintained the additional distinction of *world's* top producing coal mines. These were: Black Thunder (owned by Arch Coal) in second place, and in first place, North Antelope Rochelle (owned by Peabody Energy), which produced nearly double the quantity of the third ranked mine in the world (located in Indonesia).⁴³

While not an accurate comparison of units of energy produced, the following chart illustrates current and recent volumetric production trends.



2012 U.S. coal production: Top two mines vs. top five states (U.S. Department of Labor, Mine Safety and Health Administration)

Although the sub-bituminous coal from the Powder River Basin embodies more moisture and less thermal energy than bituminous coal from other regions, its lower sulfur content meets clean air guidelines more readily. The extraction of this coal from thick beds located relatively close to the surface of the earth in the Campbell County area grew in efficiency as surface mining machinery advanced in size, power, and technology

⁴² Larson, T. A., *History of Wyoming*, Second Edition, Revised (Lincoln: University of Nebraska Press, 1978), p. 518.

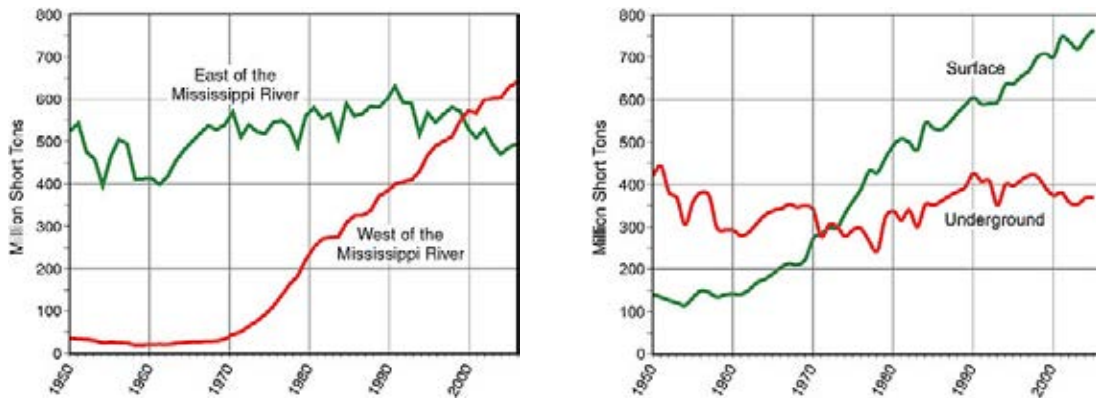
⁴³ Sourcewatch.org, "Top ten largest coal mines in the world," (ranked by output), http://www.sourcewatch.org/index.php/Top_ten_largest_coal_mines_in_the_world, accessed December 18, 2015.

throughout the 20th century. Expanding technological access to this coal and rising clean air standards combined to create increased demand for Campbell County coal through the late 20th and early 21st centuries.

Wyoming was not among the top ten coal producers in 1970. During the 1980s, however, the state surpassed West Virginia and Kentucky to take the lead in coal production. The Clean Air Act and its subsequent amendments were the most momentous forces behind the shift in demand from eastern to western coal, but other factors also came into play, many of which continue to influence market fluctuations:

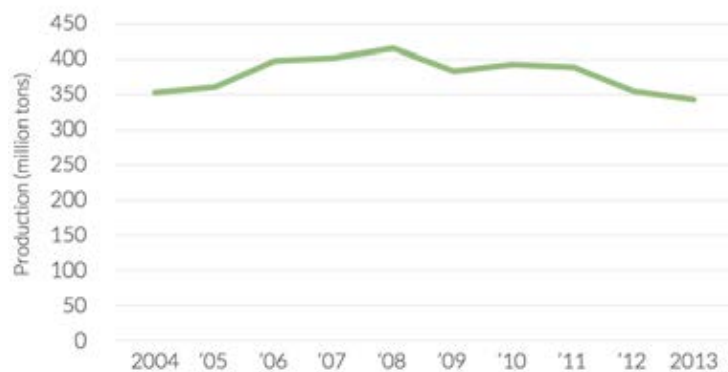
- Availability of hydroelectric power in the Northwest (dependent on the number of dams in operation)
- Prices of other fossil fuels (oil and natural gas), nuclear energy, and renewable energy sources (primarily wind and solar)
- Severity of weather (affecting both heating/cooling power demands as well as daily mine operations where pits are easily flooded and machinery parts can freeze up in cold weather)
- Stockpiles at power plants and short term pricing (spot sales)
- Length of contracts (10–30 years in the 1970s vs. 1–2 years in the 2000s)
- Tax rates and stability of state tax structures
- Federal leasing and state permitting processes
- Railroad transportation capacity and costs
- Strikes at unionized eastern mines
- Environmental lawsuits
- Deregulation of electrical utilities and changes in mine ownership
- The number of coal-fired power plants in operation at any given time.

In the wake of research conducted as a result of the 1963 Clean Air Act and 1967 Air Quality Act, amendments to the Clean Air Act in the 1970s and again in 1990 regulated gases associated with coal combustion, such as sulfur dioxide (SO₂, which forms acid rain). The establishment of the Environmental Protection Agency (EPA) enabled the enforcement of power plant emissions monitoring and compliance with standards for air pollutants. The focus has been on pollutants originating from multiple sources that were threatening public and environmental health. In addition to sulfur dioxide, these included particulate matter, nitrogen dioxide (NO₂), carbon monoxide (CO), ozone, and lead. Rolled out in long phases, a market-based system for the banking and trading of pollutant allowances initially permitted some flexibility in retrofitting older plants with scrubbers. Meanwhile, sub-bituminous Powder River Basin coal, with its lower sulfur and ash content (when compared to the bituminous coal of eastern regions), quickly became an attractive product that enabled many coal-fired power plants to stay in business.



Domestic coal production and methods: 1950–2005 (U.S. Department of Energy, Energy Information Administration (2006))

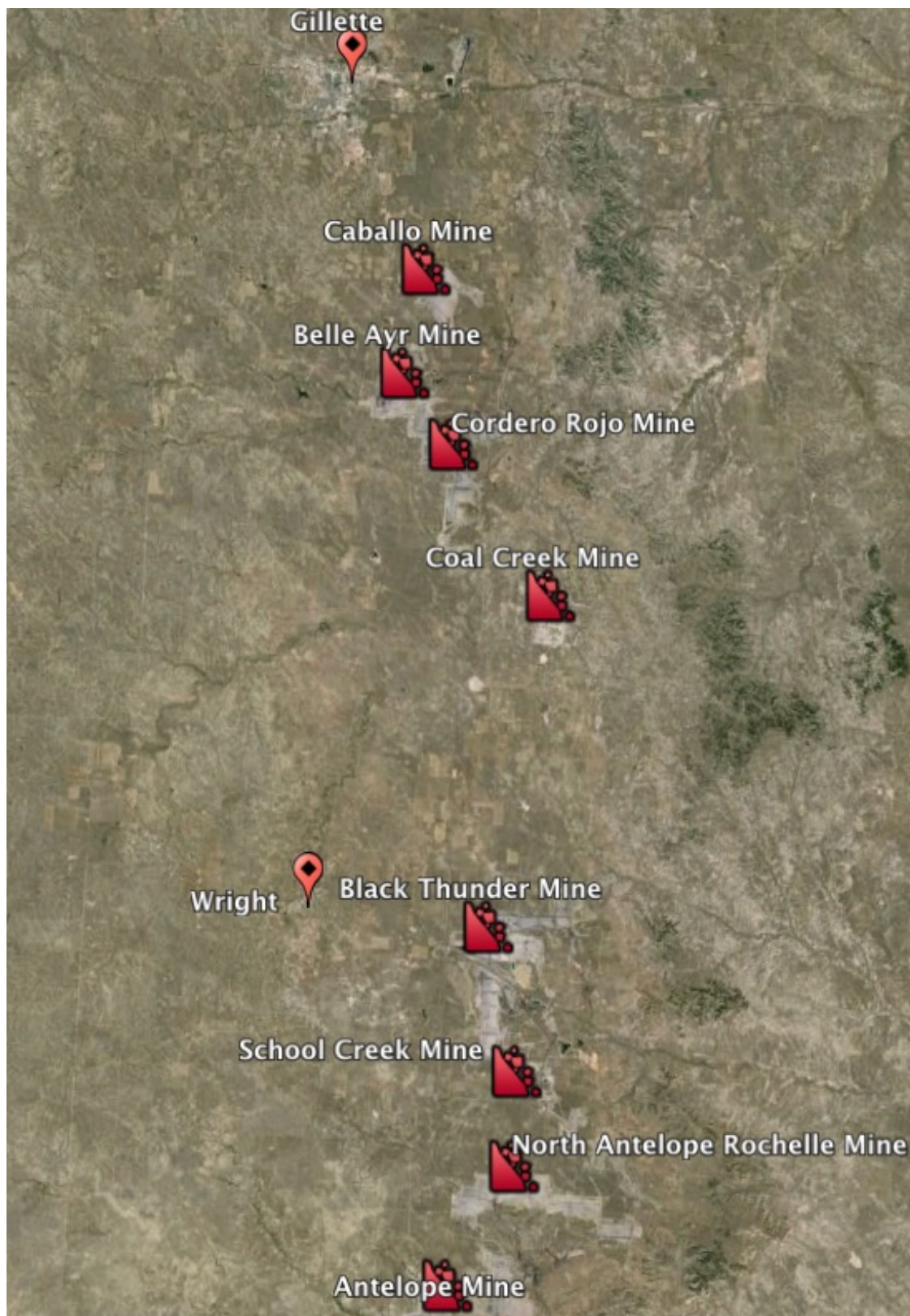
When President Carter took office in 1977, he challenged the domestic coal industry to double production by 1985 as part of his energy plan. Still reeling from the dramatic increase of the price of crude oil in the aftermath of the 1973 OPEC oil embargo (during which the price of a barrel quadrupled in the U.S.), the Carter Administration sought economic stability in greater energy independence. The goal to increase coal succeeded in large part due to the emphasis on western coal, not so much as a replacement for eastern coal (which adequately served eastern customers), but rather for distribution to energy producers in the West, South, and Midwest, as these regions' power plants shifted away from oil. Carter's plan also included money for coal research and development, as well as research into the long-term effects of carbon dioxide and hydrocarbons on the atmosphere.



Coal production for Campbell County (U.S. Department of the Interior, Extractive Industries Transparency Initiative)

Wyoming was in fact already doing its part to supply energy to the nation. As early as 1974, 64% of its coal production was sent to other states. Over the coming years that figure steadily increased and stood at 89% in 2013. Year after year, the surface mines in Campbell County (ranging from 18 to 11 over these recent decades) have claimed a large majority of that as their own.

LOCATION OF CAMPBELL COUNTY COAL MINES: SOUTH OF GILLETTE

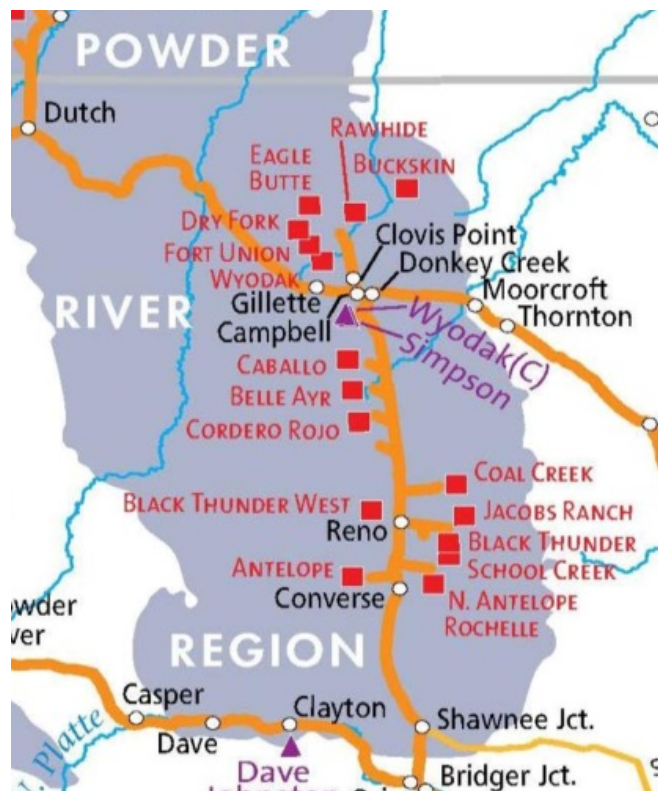


Campbell County coal mines located south of Gillette (Google Earth Pro)

TRANSPORTATION OF COAL BY RAIL

One of the biggest obstacles to marketing coal from the Powder River Basin has been the high cost of transportation, which, in the early 1970s, ran two to three times the cost of the coal itself (at its source). Lack of convenient routes, high-traffic on existing routes, mergers and consequent incompatibility of computer systems, union negotiations, poor weather, and demand for agricultural shipments all contributed to elevated shipping costs, thereby limiting the development of the coal industry around Gillette.

Railroad transportation has always been important to Gillette. In fact, Gillette owes its name and existence to the railroad. The railroad that created Gillette, now known as BNSF (Burlington Northern Santa Fe), once again came to the city's aid in the 1970s to resolve the Powder River Basin shipping obstacles and open the way for coal development south of Gillette. In 1972 BNSF (at the time known as BN) established an 18.2-mile branch to connect the new Belle Ayr mine with Gillette. Regular shipments began the following year with a dedicated train and crew. They departed every 70 hours to transport 11,000 tons of coal (spread out over 110 cars) to a Colorado power plant.



Mines served by the Burlington Northern Santa Fe railroad (BNSF Railway, "Guide to Coal Mines," Fort Worth, TX: 2013)

In 1972, with more mines projected for the region, the BN started plans for a new north-south line through the eastern Powder River Basin. In 1974 the company applied jointly with the Chicago & North Western railway (the C&NW later withdrew) to link the Campbell County coalfields more directly with the railroad's east-west corridors. The 113-mile route that resulted from this was the longest new line to be built in the U.S. since 1931. A legal challenge to the Interstate Commerce Commission's hasty approval of the line caused an extended delay, but construction eventually moved forward from its terminal points in Gillette and Orin, located near the city of Douglas in Converse County, Wyoming. The two work crews met in the middle in 1979. At a cost of approximately \$1 million per mile, the route became known as the Orin Cutoff. In fact, it did cut off 155 miles of travel for trains heading to Colorado and the Southwest following older routes. It is also known as the "Joint Line" as it is served by both BNSF and Union Pacific (UP). At the behest of local landowners' petitions, the new grade was accompanied by over 200 miles of fencing, underpasses for pronghorn and cattle, and grade crossings.



Unit train leaving Jacobs Ranch mine south of Gillette (Campbell County Rockpile Museum)

In addition to building the whole new line through Campbell County, the railroad has upgraded lines, added passing tracks in towns, built more locomotives, and built spurs to mines—totaling billions of dollars since 1970—to accommodate the staggering amounts of coal mined in Campbell County. As transportation capacity increased, so [did](#) production, and vice versa in a long cycle of growth. Investment in railroad infrastructure continued in the 1980s through the 2000s as the major railroad companies expanded and upgraded both infrastructure and locomotives. Transportation competition for coal shipment out of the PRB nearly arose in the 1980s with a proposed coal-slurry pipeline, but after strong opposition from the railroads and predictions that water withdrawal would significantly lower the Madison Aquifer, the project was soundly rejected on both state and federal fronts.



Orin Cutoff and railroad spur leading to Coal Creek mine visible mid-ground right to upper left of the image
(Campbell County Rockpile Museum)

TECHNOLOGICAL INNOVATION AND RESEARCH

Wyodak and smaller mines in the Gillette area had been serving the local market for decades by selling lump coal to homes, schools, and businesses when Amax Coal Company took the industry to a new level of commerce. Development of its Belle Ayr surface coal mine began in 1970, opening in 1973. This event inaugurated the regional coal boom south of Gillette, home to some of the largest coal mines in the world and the epicenter of the Powder River Basin coal industry. Belle Ayr soon went into full-scale production, quickly becoming and remaining the top producer of coal in the United States until 1982, when it was outpaced by nearby Black Thunder mine (opened by Atlantic Richfield Company, known as ARCO, in 1978 and subsequently sold to Arch Coal, Inc., in 1998). On December 17, 2004, Black Thunder became “the first coal mine in the world to ship one billion tons of coal.”⁴⁴ It maintained the crown of top-producer until 2007 and held the position as second largest producer [as of 2015](#). In 2007 the North Antelope and Rochelle mines (located just south of Black Thunder and opened by Peabody Energy Corporation in 1983 and 1985, respectively) merged to become not only the largest mine in the US but also the world leader in coal production. This mammoth mine reached a production of 117,965,515 tons in 2014 and in January 2016 shipped its two-billionth ton of coal.⁴⁵



Haul truck in use at Cordero mine south of Gillette (Campbell County Rockpile Museum)

⁴⁴ ArchCoal website: <http://www.archcoal.com/aboutus/blackthunder.aspx> (consulted December 12, 2015).

⁴⁵ Benjamin Storrow, “North Antelope Rochelle ships its 2 billionth ton of coal,” *Casper Star Tribune* (January 23, 2016).

Although the basic concept of surface mining remains simple and constant, the Campbell County mines have contributed significantly to technological developments now used worldwide that have increased production while keeping costs low. Active mining areas are constantly moving as coal is removed. But train tracks and loading facilities are stationary, meaning that transportation of the coal to these services is a constantly changing condition that inspires new technological solutions. Technological innovations have also abounded at the many Gillette surface coal mines as they continually seek to increase both production volume and efficiency. And as technological efficiencies develop larger machinery, surface mines are able to remove more overburden and access more coal.



Black Thunder mine south of Gillette (Campbell County Rockpile Museum)

Sun Company Incorporated (SUNOCO) opened Cordero mine in 1976 and was the first to use the 24-foot tall Haulpak truck manufactured by Dresser Construction and Mining Equipment to carry a 240-ton load atop tires standing nine feet tall. In 1983 Black Thunder introduced an underground slot system as an alternative to tall silos for coal sorting and storage. In 1984 North Antelope mine developed the largest dragline and introduced a computerized batch-weighting system for train loading. This was also the first mine to employ foreign-made hauling trucks (imported from Japan). Antelope mine (opened by NERCO, Incorporated, in 1985) was the first in this region to haul coal from the pit to the processor by means of a conveyor belt system (following the example set by Wyodak in the early 20th century). At Caballo mine shovels and trucks were replaced by a bucket-and-wheel system in which twelve 1,350-ton buckets

standing 66 feet high scoop and transfer coal to conveyors. In 1997 Triton Coal built at its North Rochelle mine an \$84 million 100-yard dragline to remove the deep overburden, and a year later implemented a two-mile conveyor system to reach the railroad spur. In 2001 Kennecott Energy Company (then owner of Jacobs Ranch and Antelope mines) introduced the largest hydraulic shovel in the industry, featuring an 85-ton bucket with a volume capacity of 56 cubic yards—a significant leap from the 40-cubic-yard model used twenty years earlier.



Large shovel removing overburden at the Amax (Belle Ayr) mine, 1975 (Wyoming State Archives)



Caballo mine south of Gillette (Campbell County Rockpile Museum)

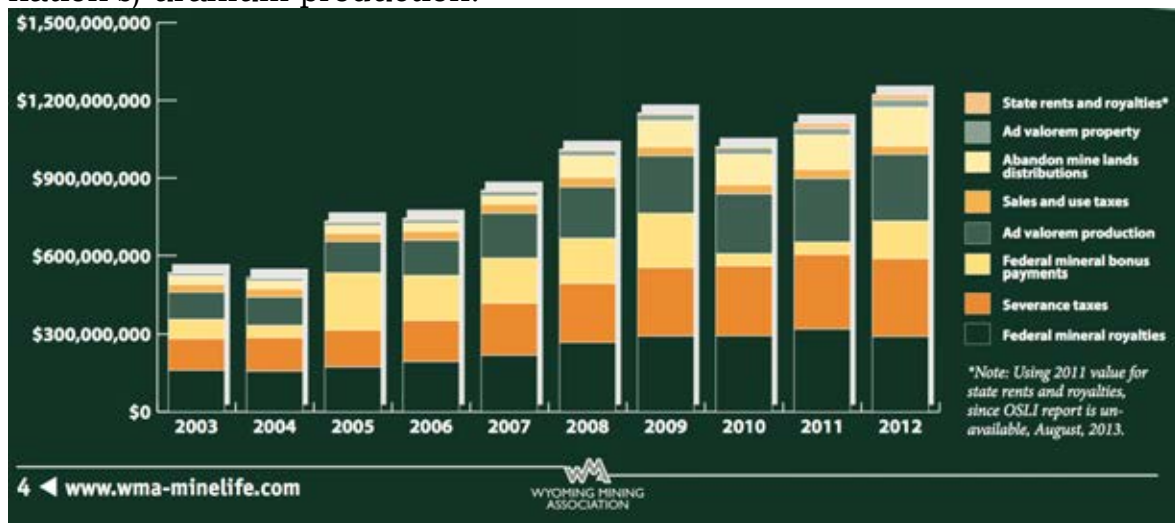
In addition to developing mining technologies, the Campbell County coal mines have also hosted research in technologies for coal transportation and transformation into other forms of fuel. These include, for example, coal gasification, coal liquefaction (which transforms low-energy coal into a higher energy synthetic fuel, or *synfuel*), and transportation of coal slurry via pipeline. The U.S. Department of Energy became involved with a private company in Campbell County in the 1970s and 1980s to test controlled underground ignition of coal in order to force gas to the surface. The program and plans were abandoned, however, after the high pressure of the gas was found to contaminate groundwater with byproducts. The most promising technological coal enhancement experimentation in this region has been K-fuel, based on a process invented in California by Ed Koppelman. This process imitates nature's production of coal by using heat and pressure to restructure, dry, and condense 8,000 Btu coal into purified 11,000 Btu pellets or briquettes. While testing and demonstration plants have been in operation off and on since the 1980s at the Fort Union and Buckskin mines north of Gillette and at the Wyodak mine east of Gillette, none have proven economically viable. This research, however, may have inspired the state to create the School of Energy Resources at the University of Wyoming in 2012, whose mission is:

- To provide ... instruction in energy-related disciplines, particularly those of importance to develop Wyoming's energy resources;
- To advance state-of-the-art, Wyoming energy-related science, technology and economics research.⁴⁶

⁴⁶ Wyoming Statute W.S. 21-17-117; See also University of Wyoming School of Energy Resources website: <http://www.uwyo.edu/ser/about-us/>.

COAL LEASING & RELATIONS WITH OTHER EXTRACTIVE INDUSTRIES

Between 2008 and 2015, coal contributed over a billion dollars of annual revenue to Wyoming (see graph, below).⁴⁷ In Campbell County during this time, coal paid for the majority of education costs, emergency services, and other public benefits. The mineral-rich state drew even more income from oil and gas, which also supported education, low taxes, and other public benefits. Combined, oil and gas led the state's list of recorded valuation of taxable minerals, followed in descending order by coal, trona (a source of chemical soda ash), bentonite, uranium, sand and gravel, and other materials.⁴⁸ Campbell County is particularly well endowed with mineral resources, including coal, gas, oil, and most of the state's (and nation's) uranium production.⁴⁹



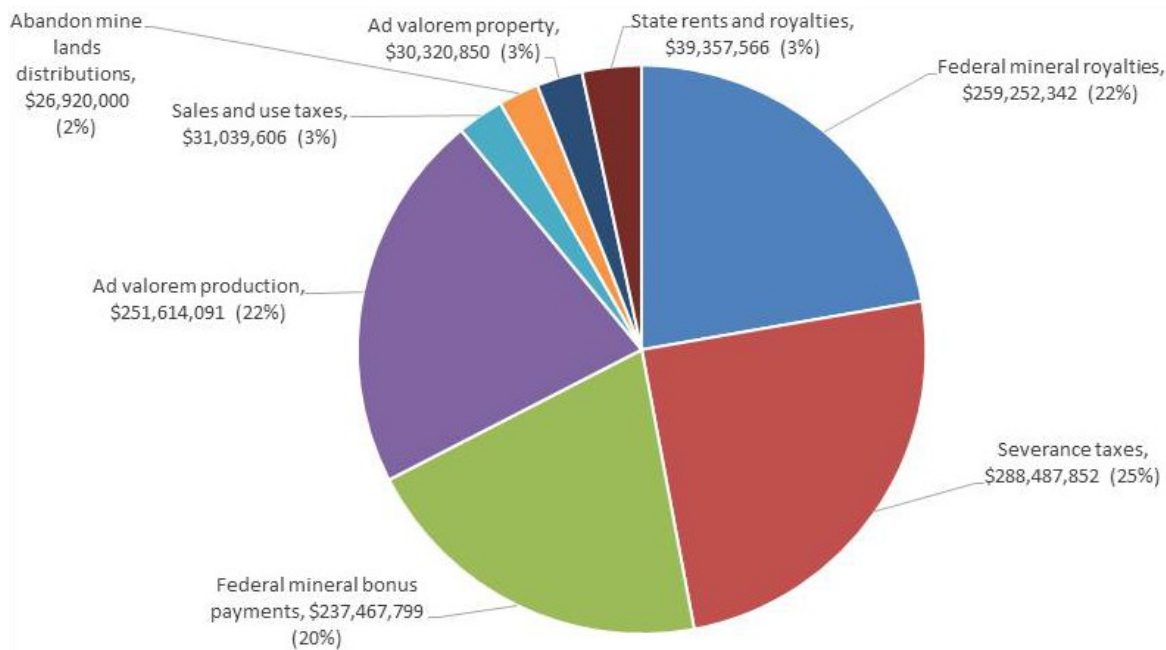
Trend in Wyoming state and local government revenue from coal ("The 2013–14 Concise Guide to Wyoming Coal," Wyoming Mining Association)

While leases for such resources ideally do not overlap, there have been conflicts between gas (including coalbed methane) developers and coal developers. In the best scenario, gas wells are tapped and then capped in advance of coal mining so that the gas resource is drained before construction of the mine interferes with its extraction. In other instances, gas wells have impeded plans for coal development, and courts have become involved. Most of the state's natural gas comes from levels much deeper than the Powder River Basin coal beds, so extraction can potentially

⁴⁷ Wyoming Mining Association: <http://www.wyomingmining.org/economics/> (consulted March 13, 2016).

⁴⁸ Wyoming Department of Revenue, Mineral Tax Division, "Fact Sheet, Fiscal Year 2014."

⁴⁹ United States Nuclear Regulatory Commission: <http://www.nrc.gov/info-finder/materials/uranium/> (consulted January 29, 2016).

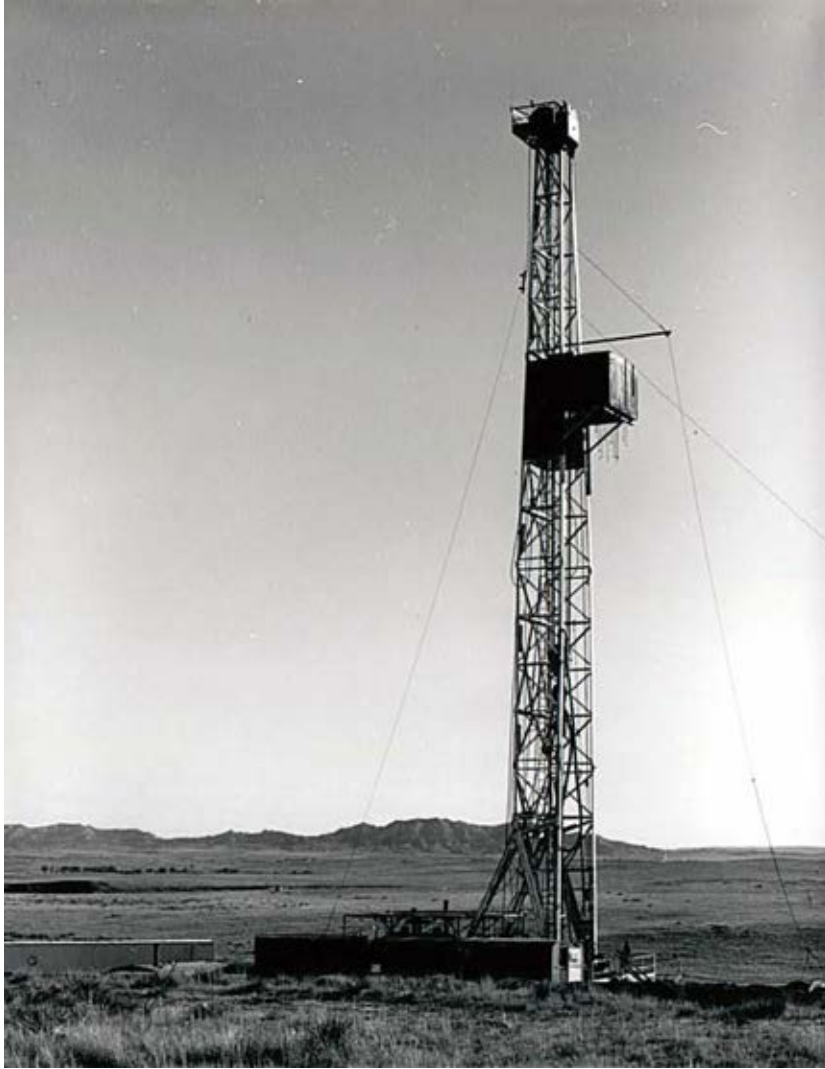


(Wyoming Mining Association, [2015](#))

resume after a coal mine has departed the area. But coalbed methane derives from coal seams, and its extraction must precede that of coal.⁵⁰

The tensions among energy industries, however, are not only logistical: these companies compete for some of the same clients and government subsidies.

⁵⁰ Campbell County was the locus of a brightly burning but short-lived coalbed methane boom and bust in the late 1990s and early 2000s. Developed during coalification and therefore located within coal seams, methane is released as a byproduct during the mining of coal. This hydrocarbon and very powerful greenhouse gas is the main ingredient of natural gas—which is burned by gas-fired power plants. In a few years' time, 24,000 wells were dug in the Powder River Basin, but the industry was eclipsed by new technologies (hydraulic fracking and directional drilling) introduced in other regions of the state. Compounded by the 2008 economic downturn, the drying up of many wells, and a fall in natural gas prices, the boom ended abruptly and painfully, causing many gas companies to abandon wells, go bankrupt, and leave the problem of capping wells and reclamation on the shoulders of the state. See Irina Zhorov, "Coalbed methane bust leaves thousands of orphaned gas wells in Wyoming," *High Country News* (January 1, 2014). See also Bleizeffer (2013).



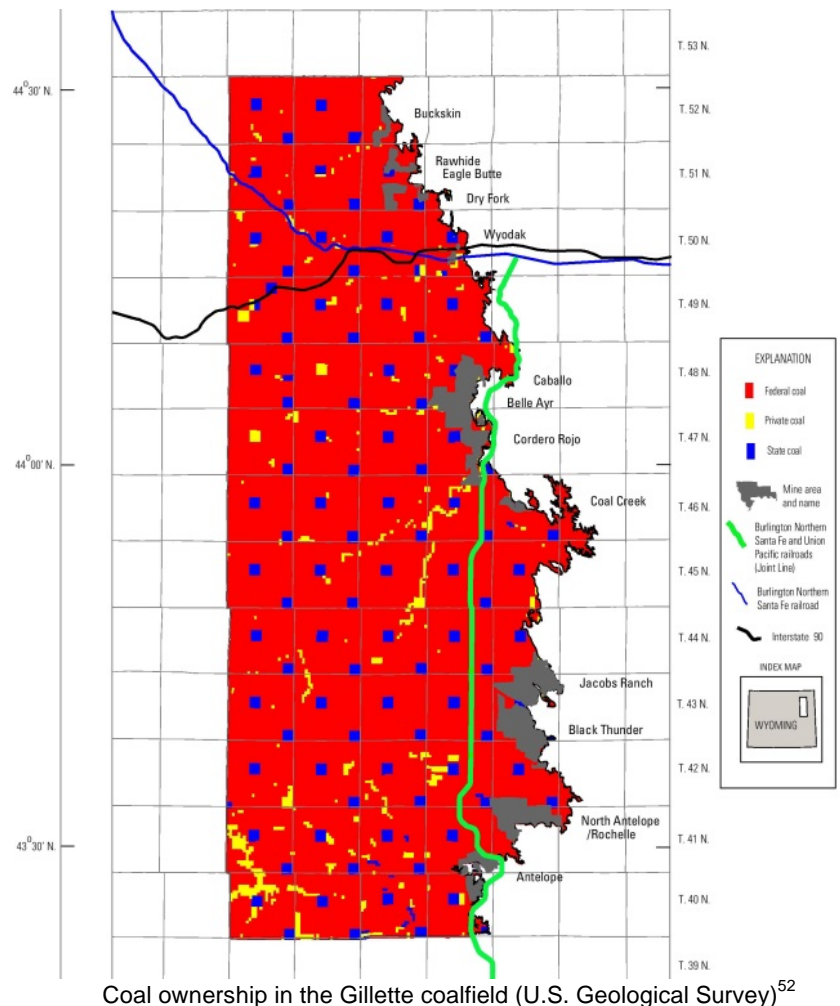
Campbell County oil well (by Richard Collier; Wyoming State Archives)

Part of the strain derives from the history of U.S. land rights. The split between surface and subsurface ownership forms the fulcrum upon which the leasing system rests. In the Euro-American settlement of the West, minerals were up for grabs. Railroad companies became some of the first beneficiaries of this bounty when the Pacific Railway Act of 1864 included not only land grants but also mineral rights to entice railroad companies in the expansion of tracks. To this day, the Burlington Northern Santa Fe and Union Pacific railroad companies remain the largest private holders of coal reserves. The General Mining Act of 1872 essentially legalized a “finders keepers” approach to minerals whereby all citizens were free to stake claims to both minerals and surrounding lands for development of their finds. After realizing that coal-rich lands were effectively being given away, lawmakers used the 1873 Coal Lands Act to set minimum prices per acre for coal land depending on its distance from the railroad.

Loopholes allowed the continued amassing of coal lands at below-market value into the early 20th century. President Theodore Roosevelt responded by removing 66 million acres of Western coal lands from public homesteading lands. Not all of this land ended up having coal, and the government soon wished to open up more land for settlement. Thus, in order to retain federal rights to the coal, the Enlarged Homestead Act of 1909 and additional legislation in 1910 separated surface ownership from sub-surface mineral rights to coal. A major oil grab in the West prompted President Taft to act similarly on behalf of oil reserves, and the Pickett Act of 1910 ratified (as did the Supreme Court) the presidential power to repossess federal lands and resources for federal ownership. The Stock-Raising Homestead Act of 1916 further expanded federal rights to all sub-surface minerals under land obtained through that Act. Consequently, in the Powder River Basin, the federal government owns the vast majority of sub-surface coal but only one quarter of the surface land corresponding with the coal.⁵¹ Unintentionally, this split in ownership hindered competition for coal development since consent from [the](#) surface owner was required for development. A landowner might privately give consent in advance to one developer, who became de facto the only legitimate bidder for a coal lease. This loophole was eliminated and such bids were exempted from consideration. Many of the large surface mines in the PRB now opt to obtain surface rights whenever possible in order to avoid complicated negotiations and conflicts with private landowners.

The Mineral Leasing Act of 1920 established the basics of the leasing system. Developers seeking to mine public minerals were required to gain permission from the Bureau of Land Management (under the U.S. Department of the Interior) to explore for resources on public land, apply to lease the minerals, and compensate the government accordingly

⁵¹ Robert H. Nelson, *The Making of Federal Coal Policy* (Durham: Duke University Press, 1983), pp. 14–15.



Coal ownership in the Gillette coalfield (U.S. Geological Survey)⁵²

(through yearly rent, taxes, and royalties that are divided among the state, a reclamation fund, and the federal treasury). The law as it was written became outdated as low coal prices, high transportation costs, and lack of demand for Western coal prior to the 1970s led to speculation. Large tracts were leased and then sat on for decades without any development or payment of public revenue. The Coal Leasing Amendments Act of 1976 and further amendments remedied this with a use-or-lose period, which for coal means that substantial commercial quantities of coal must be produced within 10 years or the lease is revoked. Some companies in the PRB get around this limit by applying to lease adjoining properties many years into an existing lease and thus begin a new 10-year period for the entire enlarged lease. In this manner they extend the development phase and simultaneously extend the life of the mine (typically estimated between 15 and 50 years).

⁵² James A. Luppens et al. "Assessment of Coal Geology, Resources, and Reserves in the Gillette Coalfield, Powder River Basin, Wyoming," U. S. Geological Survey, Open-File Report 2008-1202, Fig. 63.

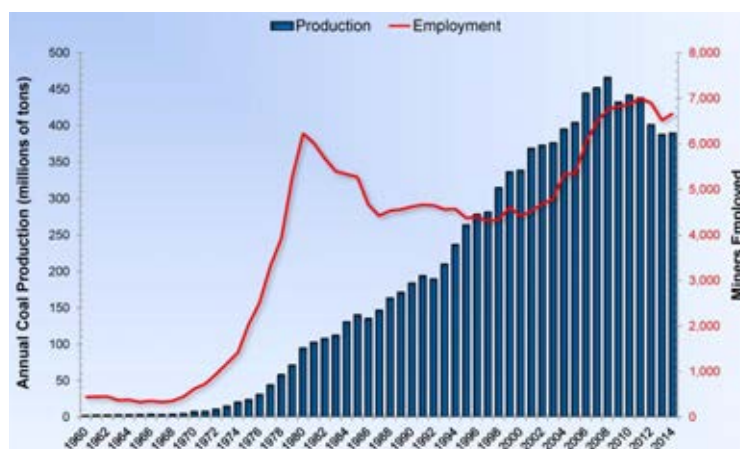
The 1970 National Environmental Policy Act (NEPA) aimed to assess unforeseen environmental damage in projects involving federal agencies. It stipulated that a lease application be accompanied by an environmental assessment (EA) and/or environmental impact statement (EIS) as well as a public comment period. This process slowed down hasty development, but some vagueness made it difficult to enforce. Disputes over development impact claims led to a lengthy, federal, coal-leasing freeze in 1971. After the law was clarified and development resumed, the playing field among coal developers was further leveled. The “lease by application” process now consists of competitive bids based on the determination of a minimum fair market value bid that is reached through public input.

SOCIAL IMPACTS OF COAL INDUSTRY

The detrimental results of expanding a city’s population too quickly without adequate planning acquired the term *Gillette Syndrome* from psychologist Eldean (or ElDean) Kohrs who wrote a paper in 1974 entitled, “Social Consequences of Boom Growth in Wyoming.” He extrapolated the social distress he observed in the late 1960s through 1971 in Gillette—resulting from an oil boom and bust—into a wider pattern that was relevant to boom-town growth in general. Gillette’s population doubled in the 1960s due to the oil boom and more than quadrupled [between](#) the mid-1970s [and 2015](#) due to the coal boom. Rock Springs, Wyoming, encountered similar challenges when the construction of a power plant and increased trona mining doubled its population in three years. And other examples can be seen in mineral-rich communities across the West.

By making the interests of the community those of the mines as well, the mines have made themselves desirable neighbors, who have publicly committed to the social, economic, and environmental wellbeing of the region. For example, from the beginning of the coal boom, these mines provided impact assistance money, which [was](#) distributed among city and county governments. These substantial funds [went](#) toward expanding services and developing housing needed to host the temporary construction workforce that a new mine [required](#), and then to sustain an ongoing, though usually smaller, permanent employee base. Coal mining money not only eased urban growing pains, however; it also increased civic amenities and supported countless civic events and non-profit causes, making Gillette a great place to live. In the words of Debra McCown, coal companies “came with a long-term focus that changed the feel of the town.... Even as they sparked a new and larger trend of growth,

the mines helped to settle Gillette down”⁵³ from the wildcatter scene of bars and muddy trailer homes left by the oil boom.



Wyoming coal production and employment 1960–2014 (Wyoming State Geological Survey)

In the mid 1970s, word spread throughout the U.S. of Gillette’s job surfeit. Billboards around the country advertised the need of miners, and local economic development offices attended job fairs in labor-intensive regions of the U.S., such as Michigan and Illinois, to recruit labor and other tradesmen, including police. Even *National Geographic* magazine reported the event, making famous a photograph of a miner from the southeast U.S. wearing a tee-shirt emblazoned with the question: “Where the Hell’s Gillette, Wyoming?” The *Chicago Tribune* reported in 1974 that there were no rooms available for rent in town and 3,000 trailer homes crowded outside of town. “Thirty bank accounts are being opened in town each day. More than 150 applications for license plates are being made weekly.... There is no unemployment. And the median age of the town once filled with old timers and their offspring is now 24.8 years.”⁵⁴

The coal boom in Campbell County settled down as the price of oil stabilized, but cycles of layoffs and rehiring in the coal industry created some instability in the Gillette area throughout the 1980s (in 1988 over 400 people applied for 6 entry level jobs with Triton Coal Company) and again in the late 1990s due to utility deregulation and changes in corporate ownership. Of 25 Wyoming coal mines, Wyodak was one of only three not involved in the turmoil of mergers, buyouts, and closures during this period. Numbers of projected future employees in the local coal industry have been repeatedly revised downward.

⁵³ Debra McCown, “In Gillette, Coal Has Paved a Path to the Future,” *Coal People Magazine* (January 2014).

⁵⁴ *Chicago Tribune* (1974).

The state also stepped in to help host communities by imposing a severance tax on coal. Part of its



Employees at Belle Ayr mine (Campbell County Rockpile Museum)

purpose [was](#) to mitigate the impact of mining on local communities. State legislators also established a permanent mineral trust fund to ease the loss of income to a community as mineral reserves become exhausted.

[Coal](#) companies have stood by their workforce even during market retraction. ARCO, for example, offered severance packages, mental health support, and job search assistance during the 1980s layoffs. And prior to constructing the North Antelope mine, its owners identified sources for home loans, contributed closing costs to employees, pre-leased RV spaces for employees, helped the county with mass transit and road upgrades, and donated funds to Gillette to help design a new sewage treatment plant. These efforts belong to a larger trend of state and local communities' expectations that mineral extraction companies should engage in a joint planning and financing process for new community facilities such as housing, schools, and recreation.

[Coal](#) jobs and the spending power that comes with them impact the local and state economy with a ripple effect when they are gained or lost. Restructured taxes and new financial expectations of mine owners, along with strong leadership and lessons learned, turned things around for Gillette as it weathered the ups and downs of the coal economy. The development of parks, recreation centers, education facilities, and a stronger infrastructure announced its recovery. Not only do the mines largely pay for these amenities, but they have also reversed the city's poor reputation and brought Gillette many coveted titles over the years, such as Wyoming's city of lowest unemployment (1979), highest wages (1997), and lowest per capita tax levels (1980), as well as a few dubious distinctions, such as most expensive place to live in Wyoming (1976).⁵⁵ The larger community was watching: Gillette's problems and

⁵⁵ Various articles published in *The (Gillette) News-Record*, 1976–1997, located in clipping files at the Campbell County Rockpile Museum.

improvements alike informed the planning of a new town 40 miles to the south, Wright.

BIRTH & GROWTH OF WRIGHT: "NOT A BOOM & BUST COMPANY TOWN"

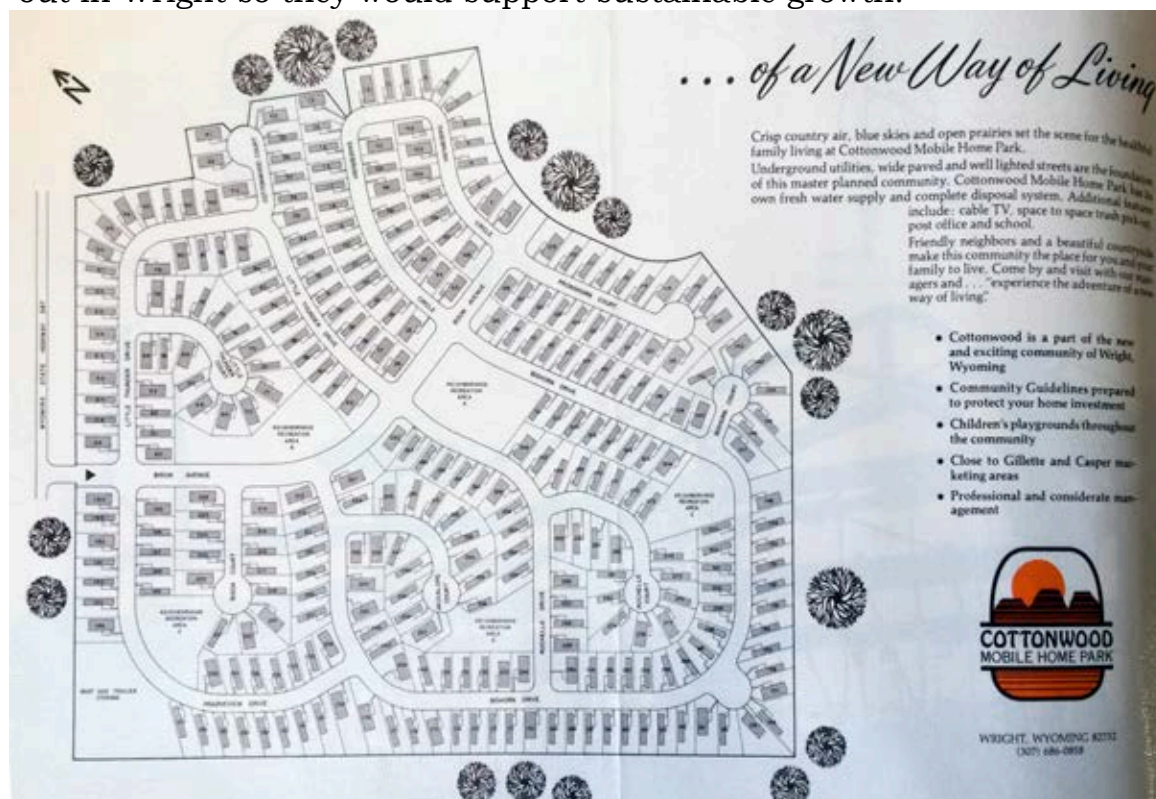
The Atlantic Richfield Company (ARCO), owner of the leases for the Black Thunder mine, planned a new town for employees who would otherwise face a long commute to Gillette. ARCO purchased land adjacent to a site known as Reno Junction (previously home to a store, bar, and later a gas station), which was owned by the Wright family. This pioneer family had homesteaded the land and established the first post office in the area in 1906 to serve local ranchers. Although ARCO was prepared to spend \$15 million on developing a town, the company made it clear that the town of Wright would not be a company town. ARCO intended to be in the mining business for the long haul and wanted a city that would help attract new employees and their families, and more importantly, retain them after a lengthy training period.



The new concept for Wright garnered lots of media attention, such as this article entitled: "New breed of 'company town,'" by Judy Donovan of *The Arizona Daily Star*, republished in the *Rocky Mountain News*, October 22, 1978. (Wright Centennial Museum).

The services of a professional planner for the town of Wright proved to be a good investment. Robert E. Huff, with successes such as Columbia, Maryland, and Reston, Virginia, under his belt, foresaw the need for electric utilities, sewage/solid waste facilities, a town hall, recreation and sports centers, schools, fire/police/medical services, churches, parks,

telephone and postal services, and a shopping center, and he laid them out in Wright so they would support sustainable growth.



Plan for mobile home park in the planned company town of Wright, Cottonwood Mobile Home Park brochure, n.d. (presumed ca. 1976) (Wright Centennial Museum)

With professional management overseen by ARCO, the designs, zoning, and construction proceeded according to plan, and the suburban oasis in a vast windy grassland attracted the attention of other mines in the region. The town's first homes were mobile homes, which were occupied in 1976, and new home sites were soon sold to builders and homeowners. ARCO eventually handed over management of community properties to Campbell County. Although its population never swelled to the number predicted at its inception (6,500), the town drew residents from a variety of employers and incorporated itself in 1985.

Wright slowly gained independence as leaders came together to address the growing pains, tensions with the county over funding and social services, and tensions with the company over management decision-making. In 1981, city residents established a representative town council to function as an advisory board to ARCO, and they elected members to a water and sewer district board. At one point they even made a motion to form their own county (to be named "Antelope") to capture more revenue from the surrounding mines, but the projected population was too low.



Aerial view of Wright at the time of its dedication, *The (Gillette) News-Record*, October 13, 1978 (Wright Centennial Museum)

WOMEN MINERS

One very progressive impact that the Campbell County coal mines have had on the region and an example they set for the nation is the acceptance of women into the previously male-dominated world of coal mining. Not only was coal mining men's domain by tradition, but also by law. The Wyoming territorial legislature passed the paternalistic Coal Mine Safety Act in 1886, which banned boys under 14 years of age and "women and girls of any age," and from employment "in or about any coal mine."⁵⁶ Small, family-owned and operated mines, such as the hundreds of small wagon mines that proliferated in the Gillette area in the 19th and early 20th centuries, would have had all family members assisting with the work, law or no law, but these disappeared as larger, professional mines grew. Finally in the late 20th century, women entered mines with equal status, if

⁵⁶ Gardner and Flores (1989), pp. 39 and 54



Brenda Eastling, female coal miner in Campbell County, 1982 (Wyoming State Archives)

not equal number, to their male peers. In older mining areas, such as Appalachia, equality was hard-won and slow to arrive, requiring court assistance.⁵⁷ However, after Belle Ayr mine opened in the early 1970s (the first of the huge industrial mines to open in this region) offering women only clerical and administrative positions, the door widened for female miners. By the time that other large Campbell County coal mines broke ground in the late 1970s and early 1980s, women comprised about 20% of the workforce and have maintained that presence ever since.⁵⁸ This was largely due to a shortage of men to meet the workforce demand (despite the massive influx of newcomers). It also had to do with the mines' perception that "the presence of women would shore up a more positive image of the industry since popular wisdom holds that women in general are safe, caring, and environmentally responsible."⁵⁹

Female miners in Campbell County work the same shifts (12-hour rotating shifts, 24/7) and do the same jobs as their male counterparts: driving trucks, operating heavy equipment, including shovels, supervising crews, and holding white-collar positions in engineering and management. While in some mining cultures, such as Appalachia, rank is

⁵⁷ Rolston (2014), p. 17.

⁵⁸ Robert Henning, "Women Coal Miners of the Powder River Basin" (exhibition text), Campbell County Rockpile Museum (2013); Kathy Brown, "Women in Coal," *Gillette News-Record.com* (July 7, 2013); and Rolston (2014), p. 4.

⁵⁹ Rolston (2014), p. 18.

established among miners by seniority, in the Campbell County mines, “rank in the pit correlates with the hierarchy of machines used to expose and extract the coal, and women operate the most prestigious loading machines, alongside men.”⁶⁰ Despite the fact that mining work has been mechanized, the hours are long, and the work is hard, both physically and emotionally. Miner Rhonda Brewer explains, “It will make you and break you. You have to be thick skinned. You have to be really tough.”⁶¹

So, what’s in it for women? High wages are a big draw. Another attraction is one of kinship. Many women miners come from multi-generational mining families. The family structure also extends to work crews. Miners develop very close bonds within their work crews, with whom they may spend their entire careers. Their lives and safety depend upon each other. One way that camaraderie and trust are established and maintained is through practical jokes. Through crew families, miners develop mutual respect and find dignity and meaning in otherwise monotonous tasks.⁶² Female miners find these relationships as rewarding as do male miners.



Ellen Rowell, female coal miner in Campbell County, 1982 (Wyoming State Archives)

⁶⁰ Rolston (2014), pp. 4–5.

⁶¹ Brown (2013).

⁶² Rolston (2014), pp. 7–8.



Daily reminders at the Buckskin mine of the necessity for safety (Campbell County Fire Department)

MINE SAFETY & HEALTH

The 1886 Coal Mine Safety Act was the first of many pieces of legislation that have shaped Wyoming's stringent mine safety policies and practices. In addition, surface mining is generally safer than underground mining due to the venting of toxic fumes to the atmosphere and the removed risk of overhead collapse. Campbell County surface coal mines have contributed significantly to these policies and to the state's strong track record of mine safety. The mines provide safe, well-paying work for men and women throughout all levels and departments.

All mines require extensive safety training of employees, and most mines have their own firefighting equipment and personnel, some including water trucks, ambulance, and emergency medical technicians. The local mines of Rawhide and Caballo held their own rescue competitions as early as 1979. The competition included other mines in 1981 and over the years has grown into a renowned, annual, international mine rescue competition featuring teams from as far away as Australia. The competition is based in Gillette, and local mines often come out on top. In 1997 Jacobs Ranch mine was the first Campbell County mine to win the prestigious Sentinels of Safety Award from the U.S. Mine Safety and Health Administration and American Mining Congress (now the National Mining Association), though Rochelle and Buckskin mines had received other honors previously. Area mines have also received safety awards from the state Mine Inspector and Wyoming Mining Association. In addition, miners who experience on-the-job injuries are well cared for. Wyoming established the Miners Hospital Board in 2001 to distribute

funds to care for miners' health statewide, with a focus on pulmonary/respiratory, hearing, cardiac, and musculoskeletal conditions.



Rescue personnel from Rawhide mine (Campbell County Rockpile Museum)



Competition belt buckle from the Gillette coal mines' 11th International Surface Mine Rescue Competition, 1991 (Campbell County Rockpile Museum)

OVERALL ROUTE MAP



(Google Earth Pro)

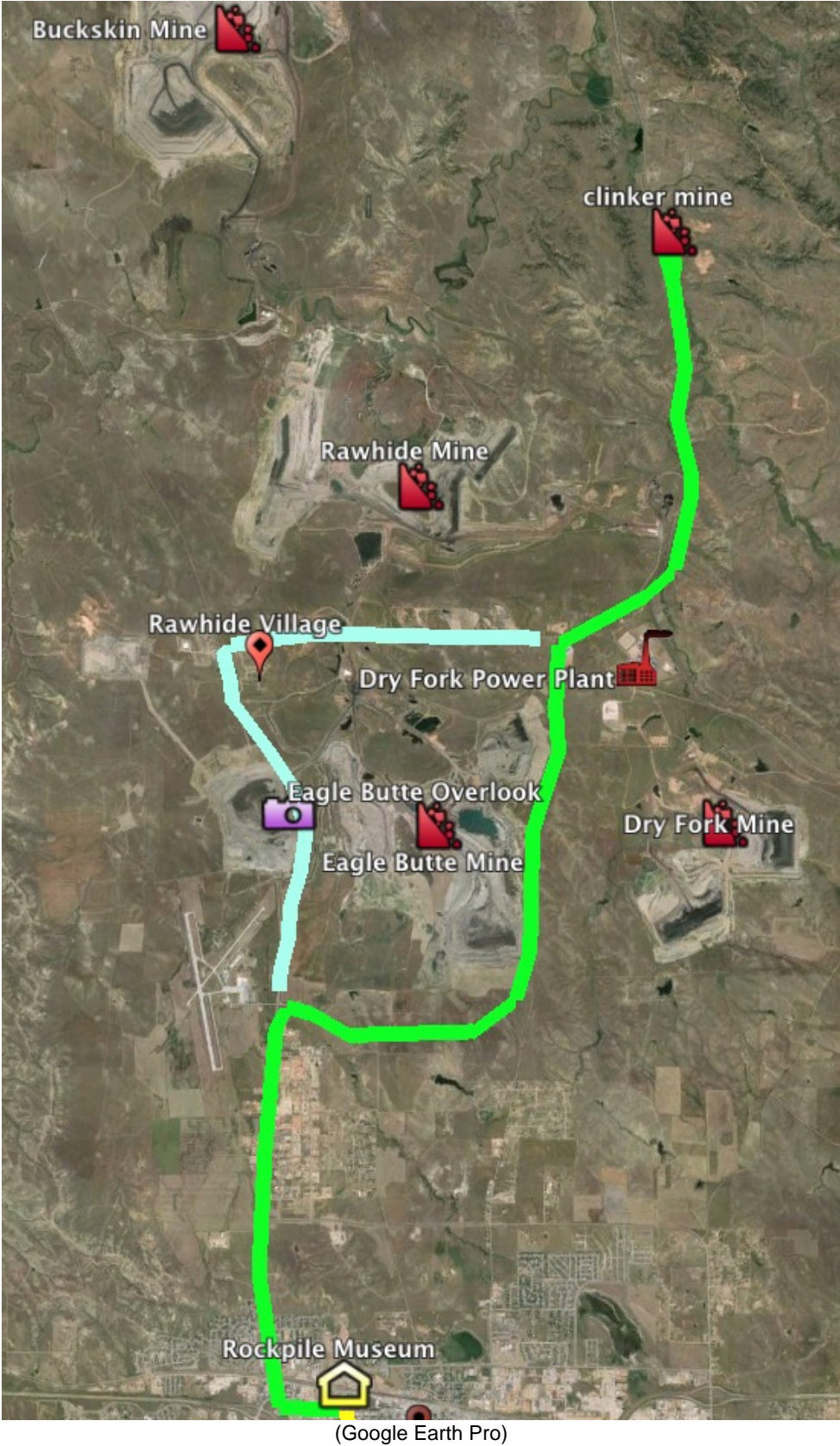
ROUTE RECOMMENDATION

The maps and directions below define the proposed byway route for the *King Coal Historic Mine Byway*.

Because visitors to the byway may be arriving from one of four directions (eastbound and westbound I-90 and northbound and southbound highway 59), or beginning from central Gillette, the trail is conceived as a series of three spokes or lobes that start from the Campbell County Rockpile Museum in Gillette (900 West 2nd Street, Gillette, WY 82716) and can be experienced either separately or sequentially, in any order. Beginning and/or ending the circuits at the Rockpile Museum orients the byway tour at a fixed interpretive site and can drive visitors to this museum, which also has an exhibit on the county's mining history. This use of the Rockpile also provides continuity with the site's historic role as a regional landmark and orientation point.

The route also includes excursions through Gillette and Wright (a former mine company town), recommended visits to the Campbell County Rockpile Museum and Wright Centennial Museum, the outdoor mining equipment display at CAM-PLEX, and the outdoor equipment display and overlook at Eagle Butte mine. For those viewers wanting to extend the driving experience, points of interest beyond the driving route are indicated on the map and recommended for inclusion on official map materials developed for the byway tour.

ROUTE A MAP



ROUTE A (CURRENT)—NORTH
ROUNDRIP DISTANCE: CA. 28 MILES

- 1.** Begin at the Campbell County Rockpile Museum: 900 West 2nd Street, Gillette, WY 82716.
- 2.** Head west on W 2nd Street/Highway 59N/Highway 14W-16W/Business-90 and remain on it as the road turns northward.
- 3.** In 4.1 miles, turn right (east), to follow Highway 59 N (the entrance to the Gillette-Campbell County Airport is on your left). You will continue on Highway 59N for 9.6 miles.
- 4.** Look left to see a large, undeveloped, grassy field. This is a former pit of the Eagle Butte coal mine that has been reclaimed and put back to use as pastureland. Notice also the “rabbitats.”
- 5.** Continue on Highway 59 as it turns northward. On your left is Eagle Butte mine, and on your right is Dry Fork mine and mine-mouth power plant.
- 6.** About 1.5 miles further north on your left is Rawhide mine. There is also a good view of the unit trains being filled and leaving the mine.
- 7.** Continue north ca. 2.2 miles to see a clinker mine on the right.
- 8.** Make a U-turn and retrace route to the Campbell County Rockpile Museum (13.7 miles) or take the following detour.

OPTIONAL DETOURS:

- 9.** On your return trip when Highway 59 joins Highway 14-16 (9.6 miles after U-turn), turn right (north) onto Highway 14W-16W instead of turning left (south) to return directly to the museum.
- 10.** In 2 miles, take the pullout to the left (west) to see Eagle Butte’s overlook into the mine’s North Pit. Not only is the active mine visible (24 hours/day), but the company also provides some scrap equipment for up-close viewing. (Be aware that the location of the overlook moves as does the active mine.)
- 11.** Continue northward on Highway 14W-16W. In about 0.9 miles, notice the main entrance to Eagle Butte mine on your right.
- 12.** Continue northward on Highway 14W-16W 0.1 miles to reach the community known as Rawhide Village.
- 13.** Turn around in Rawhide Village and return south to Gillette or continue north 1.5 miles to see Rawhide and Buckskin mines on your right.
- 14.** If desired, you can continue following Highway 14W-16W, which is one route of the historic Black-and-Yellow Highway, on a scenic drive to Sheridan (ca. 92 miles). Here, you can experience the Black Diamond Trail, an interpreted byway through Sheridan County’s historic underground mining district.

ROUTE A (FUTURE)—NORTH ROUNDRIP DISTANCE: CA. 28 MILES

This route is expected to change when Highway 59 is moved. Currently the highway wraps around the southern end of Eagle Butte mine, then turns north and passes between Eagle Butte and the Dry Fork mine and power plant. After the move—as noted in a lighter green route line on the map above—Highway 59 will continue north with Highway 14/16 past Eagle Butte mine, then turn east on the north side of Eagle Butte mine, intersecting with and resuming its current trajectory north of Dry Fork. The new route will no longer pass the Dry Fork mine-mouth operation but will provide new views of both Eagle Butte and Rawhide mines, Rawhide Village, and the Eagle Butte mine overlook.

- 1.** Begin at the Campbell County Rockpile Museum: 900 West 2nd Street, Gillette, WY 82716.
- 2.** Head west on W 2nd Street/Highway 59N/Highway 14W-16W/Business-90 and remain on it as the road turns northward.
- 3.** In about 4 miles when passing the Gillette-Campbell County Airport on your left, look right to see a large, undeveloped, grassy field. This is a former pit of the Eagle Butte mine that has been reclaimed and put back to use as pastureland. Notice also the “rabbitats.”
- 4.** Two miles past the airport, take the pullout to the left (west) to see Eagle Butte’s overlook into the mine’s North Pit. Not only is the active mine visible (24 hours/day), but the company also provides some scrap equipment for up-close viewing. (The location of the overlook moves as does the active mine.)
- 5.** Continue northward on Highway 59N/Highway 14W-16W. In 0.9 miles notice the main entrance to Eagle Butte mine on your right.
- 6.** Continue northward ca. 0.1 miles (actual location TBD), and turn right (east) to follow Highway 59N (ca. 7 miles from beginning point at Campbell County Rockpile Museum). On your left is the community known as Rawhide Village, and on your right are views of Eagle Butte mine.
- 7.** Continue on Highway 59N as it turns northward. On your left is Rawhide mine. There is also a good view of the unit trains being filled and leaving the mine.
- 8.** Continue north to see a clinker mine on your right (ca. 7 miles after turning onto Highway 59N).
- 9.** Make a U-turn and retrace route to the Campbell County Rockpile Museum (ca. 14 miles).

OPTIONAL DETOUR:

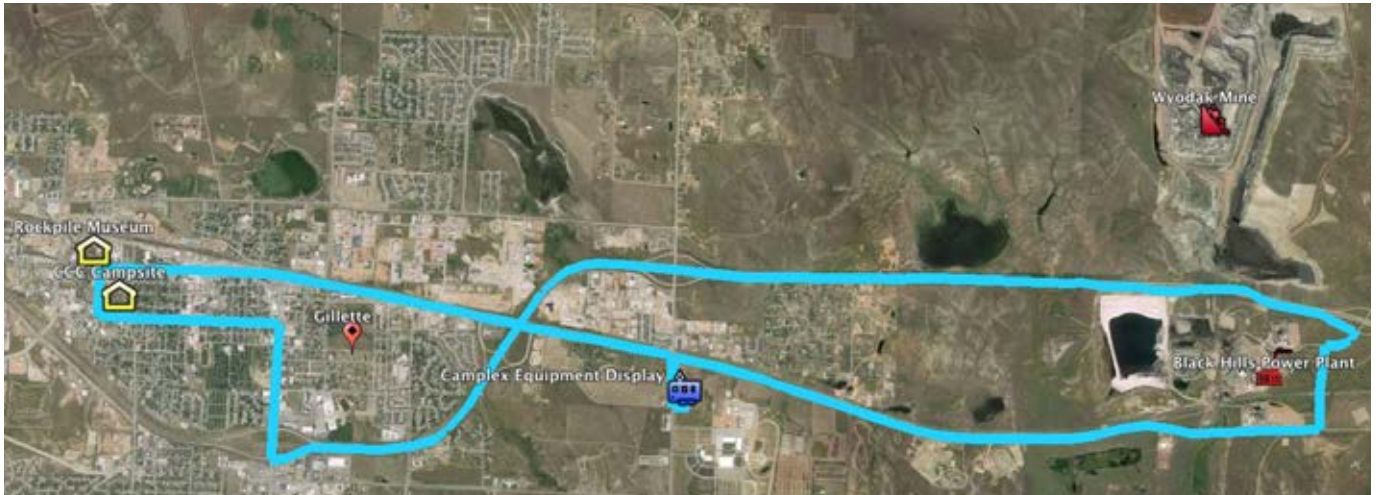
- 10.** If desired, you can follow Highway 14W-16W north from the intersection with Highway 59 near Rawhide Village on a scenic drive to Sheridan (ca. 92 miles). This is one route of the historic Black-and-

Yellow Highway. In Sheridan you can experience the Black Diamond Trail, an interpreted byway through Sheridan County's historic underground mining district.



Mary Kelley and Beth King at the Eagle Butte mine overlook (Toxey/McMillan Design Associates)

ROUTE B MAP

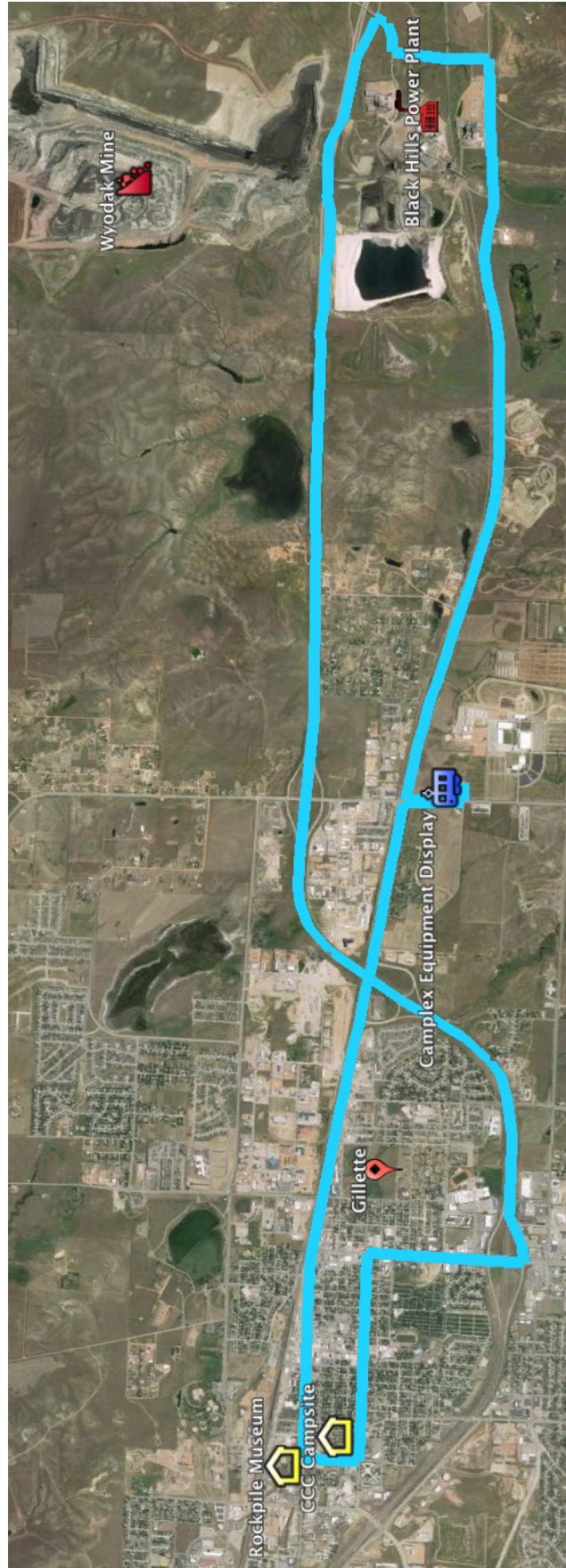


See larger map on following page (Google Earth Pro)

ROUTE B—EAST

ROUNDTrip DISTANCE: CA. 25 MILES

1. Begin at the Campbell County Rockpile Museum: 900 West 2nd Street, Gillette, WY 82716.
2. Head east on W 2nd Street.
3. In 200 feet turn right (south) onto Stocktrail Avenue.
4. In 0.25 miles turn left (east) onto W 6th Street.
5. In 1.5 miles look left and right at the intersection of 6th Street and S 4-J Road to see location of the former Civilian Conservation Corps Camp Miller. 7th Street is probably the southern limit to this campground.
6. For another 8.5 miles continue east on 6th Street to Highway 59/S Douglas Highway.
7. Turn right (south) onto Highway 59/S Douglas Highway.
8. In 0.75 miles turn left (east) onto I-90 E toward Moorcroft.
9. In ca. 5 miles look at the Wyodak coal mining operation on the north and south sides of the highway and the mine-mouth power generation on the south side of the highway.
10. Take the following exit #132 for American Road (6.4 miles after entering I-90) and turn right (south) onto American Road.
11. In 0.2 miles turn left to stay on American Road (at Wyodak entrance).
12. In another 0.5 miles when American Road dead-ends at Highway 51, turn right (west).
13. On your right you are passing the mine-mouth power plant owned by Black Hills Power that burns coal from the Wyodak mine.
14. Continue 4 miles on Highway 51 to S Garner Lake Road.
15. Turn left (south) onto S Garner Lake Road, and take the first left into the Mining Equipment Display at the CAM-PLEX event center.
16. Return to Highway 51 and continue west on it three miles to return to the Campbell County Rockpile Museum.



ROUTE C MAP



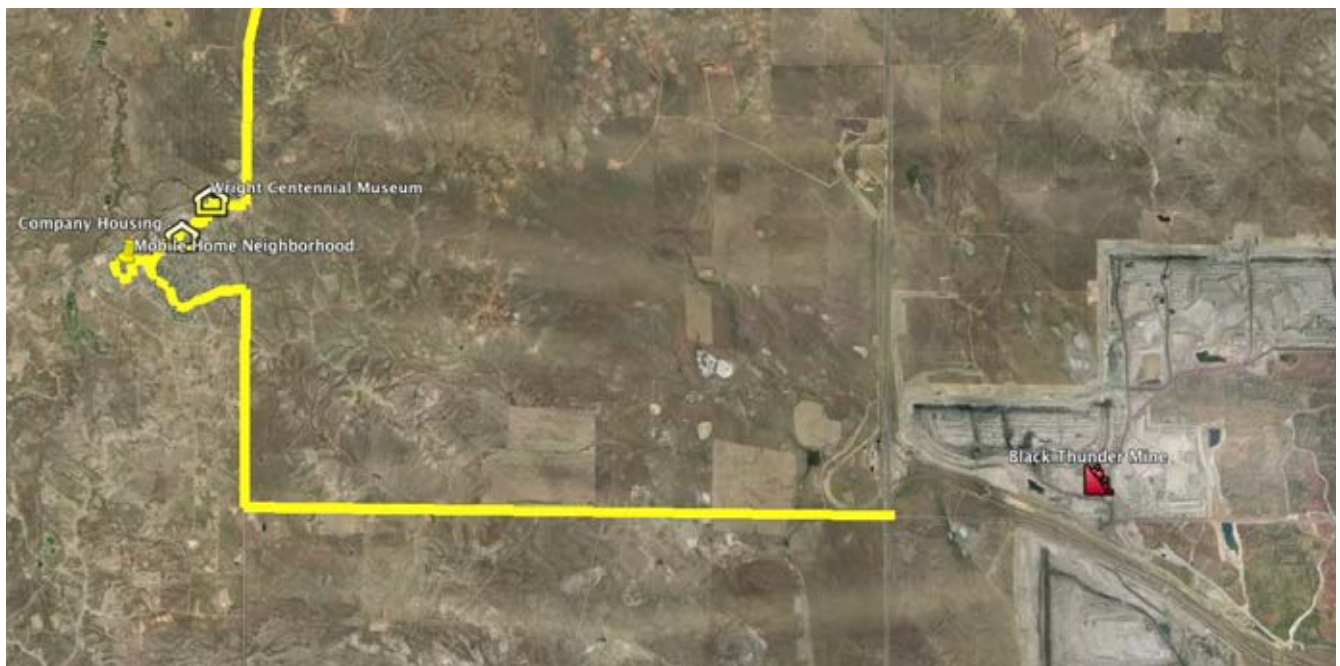
(Google Earth Pro)

ROUTE C MAP: DETAIL THROUGH WRIGHT



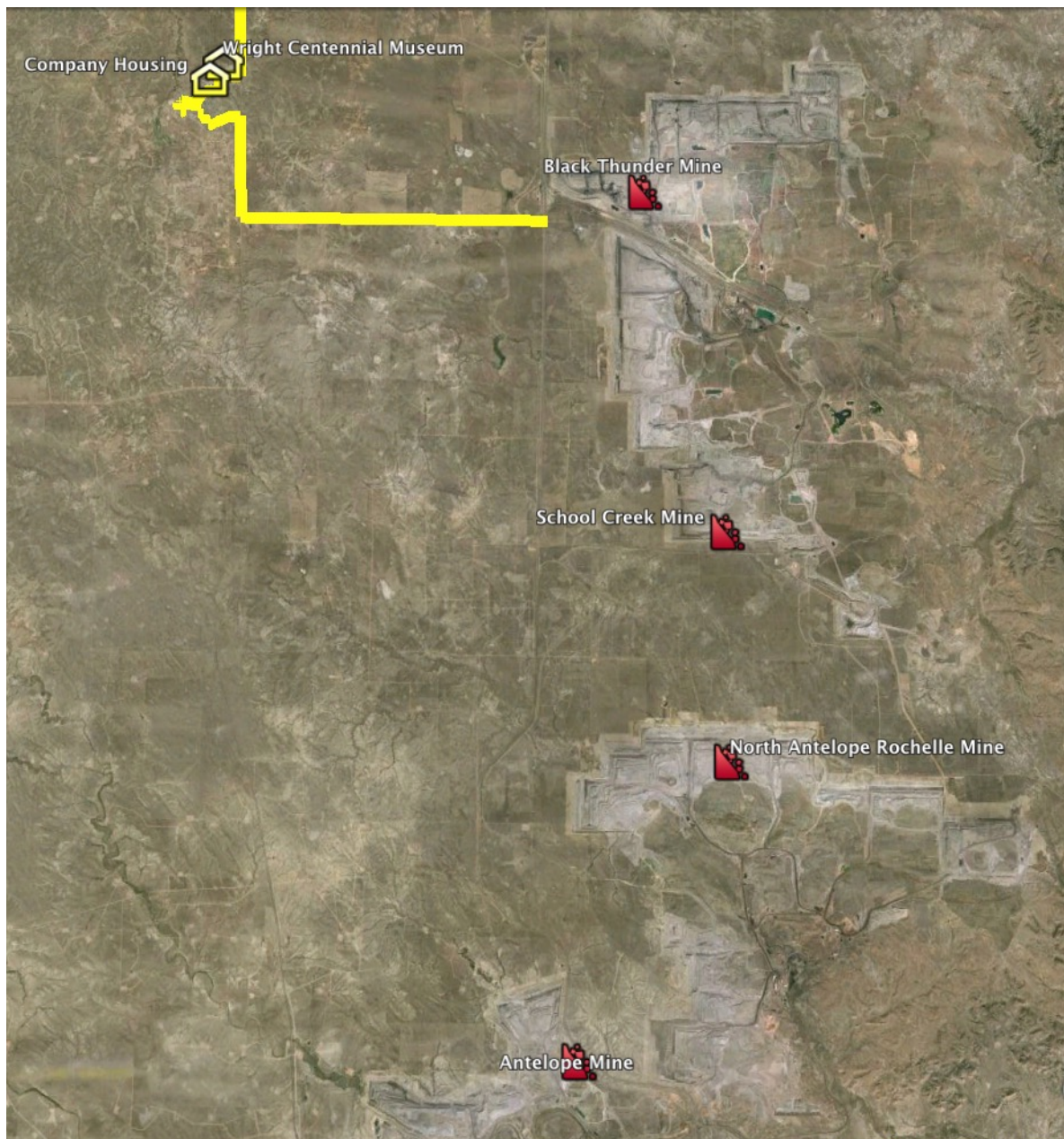
(Google Earth Pro)

ROUTE C MAP: DETAIL FROM WRIGHT TO BLACK THUNDER MINE



(Google Earth Pro)

ROUTE C MAP: DETAIL MINES SOUTH OF WRIGHT



(Google Earth Pro)

ROUTE C—SOUTH

ROUNDTrip DISTANCE: CA. 107 MILES

1. Begin at the Campbell County Rockpile Museum: 900 West 2nd Street, Gillette, WY 82716.
2. Head east on W 2nd Street.
3. In one mile turn right (south) on Highway 59.
4. Continue south on Highway 59 for 11 miles. One-half mile south of Bishop Road between mile markers 103 and 102 on the east side of

- the road you see the mine manager's house from Wyodak Village that was moved here. Behind this house is the huge Caballo mine.
- 5.** Continue south on Highway 59 for 4 more miles. On the east side of the road is a very good view of the Belle Ayr mine, and a few miles south of it is the Cordero Rojo mine, followed by the Coal Creek mine.
 - 6.** Continue south on Highway 59 to the town of Wright (38 miles south of Gillette).
 - 7.** Turn right (west) onto Highway 387 W.
 - 8.** In 0.3 miles turn left (south) onto Ranch Drive.
 - 9.** On your left in 800 feet at the intersection with Reno Drive is the Wright Centennial Museum (104 Rd, Ranch Drive, Wright, WY 82732). A huge white haul truck announces the museum, which houses regional history exhibits.
 - 10.** Turn right onto Reno Drive.
 - 11.** Turn left in 0.4 miles when Reno Drive ends at Wright Boulevard.
 - 12.** In 0.3 miles turn right onto Bison Avenue to tour the first neighborhood of this planned town, formerly owned by ARCO (Atlantic Richfield Company) to house employees at its Black Thunder mine.
 - 13.** In 0.2 miles take the second left onto Bighorn Drive, which loops back to Bison Avenue in 0.5 miles.
 - 14.** Turn right on Bison Avenue and in 0.3 miles turn right again onto Wright Boulevard.
 - 15.** In 1.1 miles, Wright Boulevard ends at Highway 59. Turn right (south) onto Highway 59.
 - 16.** In 7.6 miles turn left (east) onto Highway 450/Little Thunder Road.
 - 17.** In 5.7 miles will be at the entrance to Black Thunder mine, currently the second largest coal mine in the world (recently surpassed as the largest by its neighbor to the south, North Antelope Rochelle mine). This is also a good place to view the BNSF railroad's Orin Cutoff line that is integral and essential to this massive mining effort.
 - 18.** Make a U-turn, and take Highway 450/Little Thunder Road 5.7 miles back to Highway 59.
 - 19.** Turn right (north) on Highway 59 and continue 44 miles back to the Campbell County Rockpile Museum.

OPTIONAL DETOUR:

- 20.** Instead of turning right (north) on Highway 59, turn left and continue southward 38 miles to the town of Bill.
- 21.** Over the first 17 miles (south of Highway 450, on the way to Bill) you pass School Creek mine, North Antelope Rochelle mine (the largest coal mine in the world), and Antelope mine, all east side of Highway 59.
- 22.** Five miles north of Bill, Highway 59 crosses under the Orin Cutoff providing excellent views of unit trains carrying coal.

23. In Bill see the Union Pacific rail yard. Here UP and BNSF hand off the unit trains.

MEDIA PLAN AND RECOMMENDATIONS

This interpretive plan will be used to guide the development and design of the media suggested below.

1. AUDIO TOUR

The term Audio Tour used here is broadly defined as a mobile app (which also has image and video capabilities), podcast or other downloadable digital file (which also has image capabilities), CD sound recording, or radio emission.

The mine companies, working with WYDOT, are planning or negotiating some changes in the placement of Highway 59, both north and south of Gillette in the next few years in order to access coal deposits located beneath the current roadbed. This means that interpretive panels placed in the ground would need to be moved after a year or two and that the driving tour routes themselves (routes A and C) may change. For this reason, compounded by the current lack of pullouts along Highway 59, it is recommended that the first interpretive campaign for establishing the *King Coal Historic Mine Byway* be the development of an Audio Tour. Being the most fluid form of interpretation, an Audio Tour can adapt to minor route changes without the cost of moving panels or changing printed materials.

Due to the long drives involved in the three routes, the three Audio Tours will probably take the form of short chapters, since long narrative pieces would be costly to produce and might lose listeners' attention. The soundtracks can include sound effects (blasting, machinery) and music, as well as oral histories if available. If a medium is chosen that has image capabilities, then video clips, historic photos, and other visual materials can complement the Audio Tour.

A suggestion for the order and organization of interpretive topics for the three routes follows.

ROUTE A

- Geologic History of the Gillette Coalfields: Why Coal Is Located Here
- Reclamation Methods Developed in Campbell County Coal Mines
- Size and Scale of Mining Equipment and Production
- Open-Pit Mining Methods and Technologies Developed Here
- Mine-Mouth Operations: Dry Fork
- Geology and Mining of Clinker (Scoria)

ROUTE B

- Coal Bed Fires and the CCC Camp Miller
- Campbell County's Railroad and Coal-Mining History
- Underground Coal Mining
- Early Commercial Strip Mining in Wyoming
- Peerless Mine
- Homestake / Wyodak Mine
- Subsidence

ROUTE C

- Campbell County: Coal "Breadbasket"
- Factors Influencing the Market for Powder River Basin Coal
- Coal and Agriculture: Harnessing the Boom and Seeking Balance
- Coal Leasing and Relations with Other Extractive Industries
- Economic Contribution of Coal Mining to Wyoming by 2013
- Birth and Growth of Wright: "Not a Boom-and-Bust Company Town"
- Social Impacts and Challenges
- Women Miners
- Mine Safety and Health
- Transportation of Coal by Rail

2. ORIENTATION MAPS

In order to alert drivers to the *King Coal Historic Mine Byway*, we recommend locating two or three large maps along the byway, diagramming the three routes, noting significant sites along the routes, and identifying ways to find more information about the byway, such as websites, mobile apps, local exhibits, and other interpretive sources.

Sites for consideration for map placement include:⁶³

- CAM-PLEX Mining Equipment Display, Gillette
- Campbell County Rockpile Museum, Gillette
- Wright Centennial Museum, Wright
- Wright Visitors Center, Wright (which would need to be included on Route C)

⁶³ Wyoming SHPO requires a signed Memorandum of Agreement with the landowner prior to placing any state-owned signage outside of the state right-of-way or off state-owned land.

- Gillette Visitors Center, Gillette (which would need to be included on Route C)
- Campbell County Public Library (which would need to be included on Route C)
- [Eagle Butte Mine Overlook on Highway 59N/Highway 14W-16W⁶⁴](#)

3. VIRTUAL REALITY EXPERIENCE

Leveraging the burgeoning technology of Virtual Reality can allow for some exciting tourism opportunities along the *King Coal Historic Mine Byway*. This is especially valuable here, because the mines are mostly inaccessible to the public. Using a smartphone or tablet to simulate reality, a visitor would be able to stand in the midst of a mining operation and experience its magnitude and wonder, see how a dragline works up close, witness gigantic front loaders scooping coal from a cliff, and even perceive the enormous size of haul trucks as they roll past (or over!) the viewer.

This technology could also be used to show how the same spot of land is transformed from a quiet ranch to a bustling mining operation back to a pastoral scene after reclamation.

Once the visual file is developed, it can be downloaded the same way a brochure or Audio Tour can be downloaded from a website. The tour can be played on iOS (Apple) or Android devices or on a computer (Youtube supports 360° viewing). Or the visual file could be played in an inexpensive Virtual Reality viewer (like “Google Cardboard”). The VR experience could also be developed into an exhibit hosted by the Campbell County Rockpile Museum, the Wright Centennial Museum, or the visitor centers in Gillette or Wright.

4. EXTERIOR INTERPRETIVE SIGN SERIES

We recommend approximately four exterior interpretive roadside panels be developed and located along each of the three routes, A through C. Their content will follow the same outline of topics identified for the Audio Tour described above. The panels will include text, photographs, diagrams, and maps.

We further recommend that the panels be designed in a distinctive way that identifies them as part of the byway and that interprets the byway theme. By presenting the byway in a captivating and engaging way, the

⁶⁴ [This site is challenged by the fact that it moves as the active mine itself moves and by the fact that it is maintained by a private company.](#)

panels will brand it and elicit respect for it, which may serve to minimize vandalism.

With previous historic mine byways, roadside panels have been placed at existing pullouts or appropriate places where cars can safely stop. The current situation in Campbell County of shifting roads as well as a dearth of pullouts poses immediate and significant challenges to panel placement.

One possible solution that may solve the issue of moving roads and ephemeral pullouts as well as providing a distinctive design approach is to mount the panels to pieces of defunct mining equipment, such as tires from haul trucks. These large pieces are artifacts in themselves, they may be donated by the mines, and they are moveable (for when the road moves) but at the same time too large and heavy to be moved without heavy equipment. In this way, the mining theme is incorporated into the structural supports for the panels, expanding the interpretation and providing an eye-popping, clearly identifiable look for the byway signs.

Another solution is to wait until rerouting has been completed—with pullouts requested from WYDOT—to carry out a sign series.

5. BROCHURE

As a service to travelers following the *King Coal Historic Mine Byway* and in order to provide interpretive materials consistent with other mine byways, we recommend developing a brochure (printed and digital). It should include maps of the three routes annotated with points of interest along the way. It can also include short descriptions and photographs that bring the byway to life and guide people's experiences.

The digital brochure should be available online at numerous websites (Wyoming SHPO, Wyoming Office of Tourism, Campbell County, etc.). The print brochure can be distributed through state, regional, and local tourism channels in order to make travelers aware of the byway and to accompany them along it.

6. WEBSITE

Visibility for the byway can be greatly augmented with a website. Most travelers carry out preplanning using the Internet. The byway website could expand upon the interpretation developed in the Audio Tour, Interpretive Signs, and Brochure with more detailed information, histories, statistics, and links to related studies as well as to collections of

historic photographs. It is a venue for unlimited additional information about the byway and the history of the region.

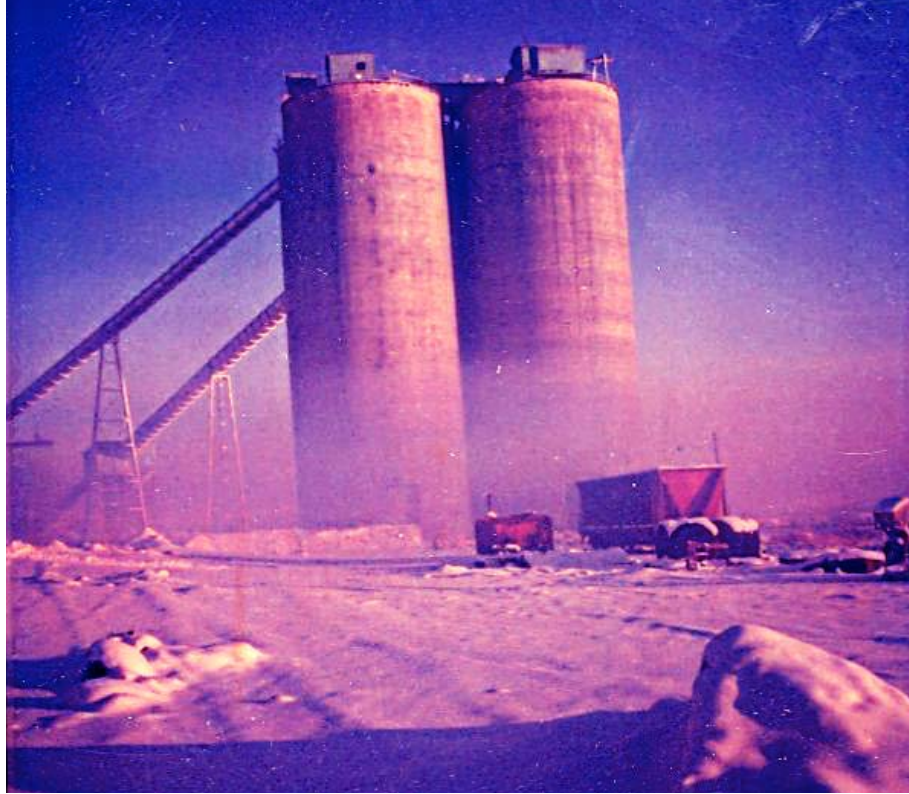
In addition, the website can host the Audio Tour, Virtual Reality experience, and byway brochure, making them accessible for download. It could also have links to museums, visitor centers, and the other historic mine byways.

7. HIGHWAY APPROACH SIGNS

We recommend that the Wyoming Department of Transportation (WYDOT) provide small signs indicating the path of the trail, at least at turn-off points along I-90 and along Highway 59.

8. OFFICIAL STATE HIGHWAY MAP OF WYOMING

We recommend that WYDOT include the *King Coal Historic Mine Byway* on the state highway map.



Belle Ayr mine (Campbell County Rockpile Museum)

COST ESTIMATES

Please note that cost estimates provided below are not based on defined scope and design and therefore are hypothetical. Depending upon scope, design, and available budget, these could change.

1. AUDIO TOUR (WITH VIDEO AUGMENTATION)

Approximately \$600–800/minute of finished audio. This includes development of storylines, scripting, narration, editing of oral histories, sound effects, and background music. This assumes a volunteer professional voice talent from the community. If such a person is not available, the cost will increase by the expense of the voice talent.

If still or video images are developed to accompany the Audio Tour, the cost will be higher. Production costs of visuals range considerably, depending upon whether existing historical images are used or 3D modeling is developed. Illustrating an audio tour using historic imagery provided by the community would be additionally ca. \$400–500 per minute of finished product.

2. ORIENTATION MAPS

Approximately \$5,000–6,000 for a 42”x48” map panel (graphic development and fabrication), not including the mount. Depending upon its design, the mount (simple aluminum pedestal, wooden state park-type posts, masonry, etc.) could range from \$500–15,000 apiece. Packaging, shipping, and installation not included.

3. VIRTUAL REALITY EXPERIENCE

Virtual Reality tour: Production costs of these ideas range considerably, depending upon the scope of the tour. The production will require a sunny day at the mine and staged assistance from the mine operators, including haul truck drivers and machinery operators. VR production is like video production but requires much more data processing and editing. Basic production costs start at ca. \$900–1200 per minute of finished product. Travel costs and mine assistance costs not included.

4. EXTERIOR INTERPRETIVE SIGN SERIES

Approximately \$6,000 per panel (approximately 24”x42”), not including the mount. Cost includes research, writing, graphic design, layout, image collection and licensing, review and correction process, and fabrication in high-pressure plastic laminate (1/2” thick). Depending upon its design, the mount (simple aluminum pedestal, wooden state park-type posts, masonry, etc.) could range from \$300–15,000 apiece. If the concept of

using retired mining equipment as mounts is accepted and if the equipment is donated, then the only mounting cost would be fashioning hardware to attach the panels to the equipment. Packaging, shipping, and installation not included.

5. BROCHURE

Approximately \$15,000 to \$20,000 for research, writing, graphic design, layout, development of maps, development of illustrations, image collection, image licensing, photographic enhancement, mockups, review process, and proofs. Printing and shipping cannot be estimated without parameters.

6. WEBSITE

Approximately \$8,000 to \$18,000, depending upon website complexity.

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FOR MORE INFORMATION

For more information on the *King Coal Historic Mine Byway*, please contact the following:

State Historic Preservation Office
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