

## UINTA BASIN

*John Barton*

The basin called Uinta in the northeastern part of Utah is a huge depression surrounded by mountains. It is approximately 125 miles long and varies between 40 and 60 miles in width. This unique region, with a variety of notable geographic features, includes Uintah and Duchesne Counties and spills over into western Colorado.<sup>1</sup> The Uinta Mountains and basin are part of the larger physiographic region known as the Colorado Plateau Province. The Uinta Mountains are the dominant feature of the region, and they form the basin's north rim. The Uintas, the highest range in Utah, are rugged mountains that angle east to west, unlike most mountain ranges in the world, which run north to south.<sup>2</sup> The Wasatch Mountains form the western rim of the basin; the Tavaputs Plateau, commonly called the Bookcliff Mountains, lies to the south, and the Rocky Mountains of Colorado to the east. The basin was once the lakebed of ancient Lake Uinta 150 million years ago. As the lake drained during the Mesozoic time periods, it created swampland, making it the home of the dinosaurs for which the region is famous. Eons later, some 50 to 36 million years ago, the Rocky Mountain (sometimes called the Laramide) orogeny (upthrust) created the Uinta Mountains.

The same geological upthrusts and glacial action that created the Uinta Mountains and carved them into their present form left deeply buried rich veins of precious ore. Most of the mining and mineral wealth of the Uinta Basin takes the form of oil and natural gas, exotic hydrocarbons, and phosphate. Of the total jobs in the basin, combined mining accounts for approximately 15 percent, and the larger portion of these positions earn the highest wages in the region, making mining a significant contributor to the overall economy.<sup>3</sup>

Significant amounts of precious metals have never been found in the Uinta Basin, in spite of folktales that claim the richest gold deposits in North America, if not the world, are located on the south slope of the Uinta Mountains. Wealth untold, according to Uinta Basin folklore, lies in the Uinta Mountains. These tales grow with retelling from generation to generation, and if they were true, the amount of

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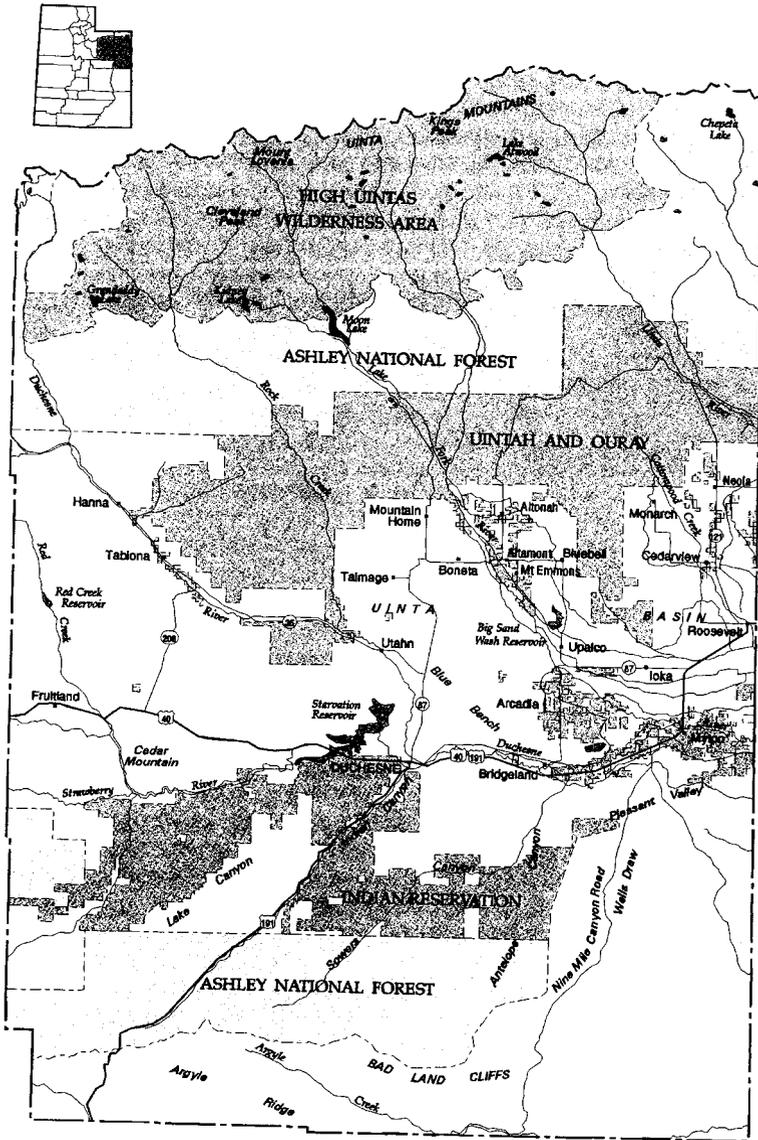
gold deep within the south slope of the Uintas would topple the world's economies and devalue the price of gold. The frequently repeated and often printed stories, although they lack historical documentation, include accounts of the Spanish discovering gold and forcing the Indians to work mines in the Uinta Basin. There is little doubt that the Spanish explored the basin for gold. Spanish bridle bits, cannonballs, ancient diggings, rock smelters, rusted helmets, swords and breastplates, and tree and rock inscriptions all confirm their presence but do not clearly establish when they were there nor their successes or failures at finding gold.<sup>4</sup>

The truth of these stories will possibly never be fully determined, but many believe them. Hundreds of people go each year to Rock Creek and other places throughout the Uinta Mountains to search for gold and the lost mines, including the legendary Rhoades Mine. To date no significant gold discoveries have been made, and, given the absence of corroborative physical evidence of Spanish mining in the Uinta Mountains, accounts of the lost mines must remain the stuff of folklore (see chapter four).<sup>5</sup>

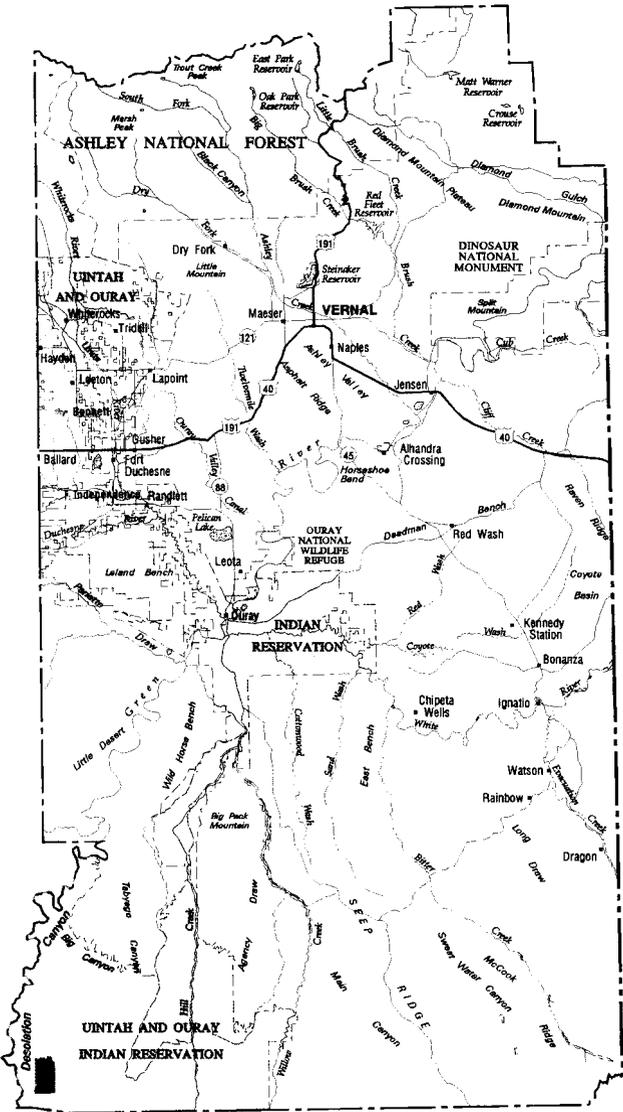
### METALS MINED IN THE UINTA BASIN

Throughout the Uinta Mountains and basin, individuals have done a great deal of prospecting for precious metals with little significant success. Deposits of commercial-grade ore are scarce in the region. There are trace amounts of many minerals, including gold, silver, copper, lead, iron, molybdenum, and uranium,<sup>6</sup> but presently their quantities are not sufficient to make them minable. Flake gold is visible in the Green River's oxbows and sandbars but, again, not in enough quantity to justify the time and energy necessary for placer and/or dredge mining. One of the many attempts to placer-mine the Green River occurred in 1908. The Uintah Placer Mining and Exploration Company opened an immense dredge and sold shares in the company to investors. The company planned on buying several additional dredges from its anticipated profits to garner further wealth from the Green River, but the expected profits failed to materialize. The dredge operated on the second bend below Split Mountain.<sup>7</sup> Later, in 1913, the Gold Placer Mining Company attempted a dredge operation several miles downstream near Horse Shoe Bend, but again costs exceeded the amount of gold recovered.<sup>8</sup>

Historically there have been only a few commercial mining operations in northeastern Utah for metals. The Dyer Mine, located about 26 miles north of Vernal at an elevation of 9,000 feet, was the most successful. In 1889 a smelter was constructed on Anderson Creek, and mining was undertaken for the next several years. The Dyer Mine produced an average of 50 percent copper, some lead, and trace amounts of silver—26 ounces per ton—and gold—0.255 ounces per ton.<sup>8</sup> Between 1887 and 1900, the mine produced more than \$3 million in copper. From 1891 to 1917, the Dyer churned out 4,377 tons of ore that yielded \$395,655 in copper, \$63,497 in silver, and \$18,857 in gold. By 1904 most of the pockets of high-yield ore had been exhausted, but intermittent mining continued until 1941.<sup>9</sup>



The Uinta Basin covers most of two Utah counties, Uintah (facing) and Duchesne (above), and extends into Wyoming and Colorado.



The Silver King Mine is located only about a mile and a quarter from the Dyer. Its peak production year was 1947 with 34 tons of lead-zinc ore shipped. Prior to 1947 only 12 tons of hand-sorted ore had been sent. The ore assayed at 25 percent lead, 17 percent zinc, 1.5 percent copper, 2 ounces of silver, and 0.02 ounces of gold per ton.<sup>10</sup>

Additional claims have been worked, including the Commonwealth Mine, also on Anderson Creek. A placer claim, this 1908 operation boasted flumes, a mill, a smelter, mining pits, and bunkhouses. No records detailing the successes or failures of the Commonwealth survive, but had it been successful, more information would surely exist. Copper was discovered in 1896 in the Split Mountain area near the Utah/Colorado line. Only 5 tons of hand-sorted ore were shipped to Park City for smelting. It yielded 56 percent copper and 69 ounces of silver to the ton, but no further ore was produced. Iron deposits were located in the Brush Creek drainage. The Pope deposit contains high-grade red hematite, but the quantities are too limited to justify mining.<sup>11</sup> There are hundreds of additional claims, many of which were worked to a small degree, others not at all, throughout the basin but none worthy of further study.

## OIL AND NATURAL GAS

### *The Boom*

As early as 1900, former straight-shooting sheriff of Uintah County John Pope drilled the first known well for natural gas or oil in the basin. Drilling to a depth of 1,000 feet showed no sign of gas or oil, and John Pope Number-One well was abandoned.<sup>12</sup> Additional wells were drilled on the west side of Asphalt Ridge in 1911, but again only dry holes resulted from the efforts. In 1917 the *Roosevelt Standard* reported that six different companies were planning on drilling for oil the next summer.<sup>13</sup> However, the excitement was short lived when the oil companies failed to make an appearance. During the next several years, the *Standard's* headlines made wild claims about oil possibilities: "Mountains of Oil in the West," "Riches in Oil Shale," "The Uintah Basin Is the Greatest Underdeveloped Oil Field in the West."<sup>14</sup> But no drilling occurred. During the 1920s Earl Douglass, the famed paleontologist who discovered a cache of dinosaur bones in what is now Dinosaur National Monument, spent considerable time and effort touting the oil potential of the Uinta Basin. With Douglass's urging, a well was drilled east of Vernal in 1925 and made an excellent strike of natural gas: 10 million cubic feet. This started the development of the Ashley field, which was the first natural-gas producer in eastern Utah.<sup>15</sup>

The first oil well drilled in Duchesne County occurred in 1928, but there was no follow-up for 21 years. There was some limited oil drilling in Uintah County in the early 1930s, but as the Depression deepened, it ground to a halt. Again in the 1940s, with the outbreak of the war, it was hoped oil drilling would add jobs and augment the

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agricultural economy of the region. Between 1945 and 1947, the Standard Oil Company of California, Continental Oil, Gulf Oil, Carter Oil, and Union Oil all showed interest in eastern Utah, but a small company out of Salt Lake City under the leadership of J. L. Dougan brought in the first well. The Equity Company's strike unleashed a small oil boom in Uintah County. By 1949 there were 26 wells in production, and the Gusher and Roosevelt fields were opened that same year. In 1955 limited drilling had begun in the Bluebell field, but there was little follow-up for another 15 years.<sup>16</sup>

Then, in 1970, Miles Number One, the first new well in the Altamont/Bluebell oil field, was drilled just outside the town of Altamont. As large quantities of oil were found, the Uinta Basin became excited about the possibilities of the oil industry and the potential wealth it would bring to the area.<sup>17</sup> No other industry has a history of such wide swings between boom and bust as the oil business. Nationally and internationally, the oil industry has gone from scarcity to glut, and the prices of oil have reflected those extremes. The factors that brought about the development of the Uinta Basin's oil were not mere happenstance. The oil companies had known for decades that oil was available, but the nation's needs were not sufficient to justify drilling small fields such as those in the Uinta Basin.

Halfway around the world in October 1973, the Organization of Petroleum Exporting Countries (OPEC) declared an embargo on shipping crude oil to those countries supporting Israel in its conflict with Egypt. The Arab oil embargo triggered renewed drilling in the United States. Oil exploration and production in the basin and elsewhere in the West increased significantly when the nation and most of western Europe felt the sting of the embargo.

Speculation and development in the basin reached unprecedented proportions during the next few years. The Uinta Basin soon experienced a rapid increase in population, matched only by the opening of the Uintah Reservation to homesteading in 1905. The decade of the 1970s saw boom times in most oil-producing states: Texas, Alaska, Oklahoma, Colorado, Wyoming, Montana, and, to a lesser degree, Utah.<sup>18</sup> As the rest of the nation was reeling with unexpected jumps in the price of gas, coupled with lines of customers blocks long to purchase a rationed amount, the Uinta Basin had its first period of prosperity. Seemingly overnight, hundreds of rigs were drilling around the clock, each with a several-man crew, support crews, and services. Motels and restaurants could barely meet customer needs; often they were crowded to capacity and beyond. Traffic reached new levels as hundreds and then thousands of new residents and oil-related businesses used the roads and highways. When the oil boom started, there was not a single stoplight in Duchesne County, and Uintah County only had two.

For the first time in the basin's history, jobs were plentiful, and wages were good. Entry-level workers could make double their former teachers' salary by going to work on oil rigs. Support businesses for the oil industry flourished, including roust-about crews, heavy construction, work-over services, trucking companies, hot-oil trucks, fishing-tool services, oil-hauling companies, finishing rigs, wax cutting, pumping,

pipelines and pump stations, and finally, a refinery in Roosevelt. The boom times brought sudden and new prosperity along with the growth. Real-estate prices soared. Local businesses—grocers, builders, auto dealers, clothing and furniture stores, movie theaters, and drugstores—all expanded and hired additional help. Many new, non-oil-related stores and businesses sprang up, such as mechanic shops, tire-sales stores, and additional gas stations and convenience stores.

As a result of the oil boom, the population of Duchesne County multiplied from 7,299 in 1970 to 12,537 in 1980, a 58 percent increase, and Uintah County experienced similar growth.<sup>19</sup> The sale of mobile homes did a booming business. Grocery stores and restaurants added new shifts, and many built additions to accommodate the growing needs of the county. More teachers were needed to meet the doubling of students in the local schools. The increased population brought new demands for professional services: doctors, lawyers, realtors, and insurance personnel.

The state's oil production, of which the combined Duchesne and Uintah Counties account for some 42 percent,<sup>20</sup> shows a marked increase in barrels (figured on a 42-gallon size) between 1948 and the high in 1985. In the last 35 years, the state's oil production peaked at 39.36 million barrels and had an estimated value of just over \$1 billion. The greater Altamont-Bluebell Duchesne field reached 12.266 million barrels in 1978. The cumulative production total through 1978 for the field was 115.14 million barrels, making it the second largest oil field in the state.<sup>21</sup>

### *The Bust*

As quickly as the oil boom struck, so did the bust. International oil prices and production significantly changed oil exploration in the county. Beginning in 1985, the price of crude oil fell from a record of near \$40 a barrel just a few years earlier to \$20 a barrel. Just as the international oil market brought about the conditions that resulted in the boom, so, too, did they contribute significantly to the bust. In 1985 several member nations of OPEC reshaped the oil market, their production causing a glut in the international market. The relatively high production costs of Uinta Basin oil severely reduced new drilling in the area.<sup>22</sup>

The total number of rigs drilling in the county plummeted as companies cut exploration back. Many workers lost their jobs, and a devastating ripple effect set in as oil and service companies, restaurants, retail stores of all types, banks, real-estate companies, city and county governments, schools, and social-service agencies were all impacted by the price drop.

Surcharges and fees imposed by the state and federal government, coupled with high drilling costs, made oil exploration and production less profitable in the basin when international prices dropped. The average cost per foot for drilling in Utah is \$87.68, while the national average is \$67.87.<sup>23</sup> Finally, most oil produced in the basin has a high wax content that necessitates heated pipelines to keep the oil flowing through the winter. This adds to the cost of production and makes the region's oil less desirable to produce.

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High production costs of Uinta Basin oil led large international oil companies such as Shell, Gulf, and Chevron to sell their oil fields to smaller companies, including Linmar and Keystone. New drilling was almost unknown between 1986 and 1992, but in 1992, 44 new wells were drilled in Duchesne County, while in Uintah County 238 wells shut down that year.<sup>24</sup> The sale of basin oil fields and the rapid decline in the number of new oil wells drilled created a severe economic downturn in the region. Many oil-field service companies filed for bankruptcy, leaving local businesses financially impaired. The downturn of the county's oil industry resulted in a basinwide economic recession.<sup>25</sup>

### HOUSE BILL 110 AND THE REVITALIZATION OF AN ECONOMY

The rapid decline in oil exploration and production left the basin economically challenged. After a political battle that many throughout the state thought futile, the gas and oil industry got a much-needed tax break for new and existing wells. As oil prices fell, it simply was not worth the oil companies' time and effort to keep local wells producing and pay the high taxes that the state demanded. Nor were the oil companies motivated to drill new wells. In 1990 Utah Representative David Adams, along with Representative Beverly Evans from Mt. Emmons (House District 54), Representative Dan Price from Vernal (House District 55), and State Senator Alarik Myrin from Altamont (Senate District 26), combined their legislative efforts to pass House Bill 110, providing a tax waiver and exemption for oil-production regions of the state, including Duchesne and Uintah Counties.<sup>26</sup> The tax waiver varies depending upon the international price of oil at the time but provides incentive to stimulate existing well production and did initiate some new drilling. The free fall of the region's economy halted with the slight but immediate difference House Bill 110 made. The 1990s and early 2000s have seen slight rises and dips in local oil production but have been for the most part stable.

### OIL SHALE AND TAR SANDS

In the Uinta Basin lies a wealth of yet untapped oil—shale oil and tar sands. Of all the world's oil reserves, a huge percentage is locked into sandstone and shale deposits. This oil, though as pure and refinable as any other, is far too costly to extract to be competitive on the open market at present prices. During the administration of George W. Bush, as conflict in the Middle East and the destruction from Hurricane Katrina helped push oil prices to all-time highs, research into the possibility of extracting oil from shale and tar sands increased greatly.<sup>27</sup> Commercial production of oil from bituminous sandstones or *tar sands* represents a considerable reserve for the future. *Oil shale*, similar to tar sands, is oil that has seeped into shale deposits. These "heavy oil" deposits have presented complex extraction problems for at least 17 companies that have conducted geological and engineering studies.

It is estimated that more than 2,000 square miles of basin lands have oil-shale deposits beneath their surface. A total of 21 impressive deposits of tar sands and oil-impregnated rock lie beneath the Uinta Basin, including the Asphalt Ridge deposit near Vernal, the P.R. Spring deposit near Hay Canyon in the Bookcliff Mountains, and the Sunnyside deposit. These three have been classified as “giants” and have an estimated reserve exceeding 500 million barrels of oil each. “Very-large” deposits of 100 to 500 million recoverable barrels include those at Raven Ridge and Dragon Wash. “Large” deposits indicate reserves with 10 to 100 million barrels and include Myton Bench, Whiterocks, Chipita Wells, Deep Creek, and Rim Rocks. “Medium” reserves range between half a million and 10 million barrels and include the Hill Creek and Yellowstone Lake Fork deposits.<sup>28</sup>

The oil-shale and tar-sand deposits will have a significant impact on the population and economy in the Uinta Basin when they are fully developed. Eastern Utah contains the highest grade of oil shale in the state, and it is estimated the Uinta Basin alone can produce some 100 billion barrels of oil once extractive processes have been perfected and their production costs become competitive with traditional drilling. Most of the present processes include some form of thermoextraction to separate the oil from the sand or shale. The energy costs of creating sufficient heat make them prohibitive at present. Various companies hold claims to these deposits and await a rise in the cost per barrel or new methods of extraction to lower production costs to the point where they can realize a profit.

## COAL

The millions of years of swamp vegetation in the Uinta Basin created expansive coal deposits. Although there are significant coal-mining operations in the Uinta Basin, they are across the border in Colorado. Ironically, much of the coal mined there is burned in Utah fueling Deseret Generation and Transmission’s power plant in Bonanza, about 35 miles south of Vernal.

Small deposits of coal exist in the northwest portion of Ashley Valley called Coal Mine Basin. At present there are no working mines there, but from the early days of settlement through the Depression, the mines operated on a small scale to supply coal for the local homes and businesses of Vernal.<sup>29</sup> The years from 1903 to 1905 saw the maximum productivity of Utah’s Uinta Basin coal production reaching 10,000 to 13,000 tons. Production fell off gradually until 1948, when oil became cheaply available. By 1961 all coal mining in Ashley Valley had ceased.<sup>30</sup>

The first coal mine in the area was the Pack-Allen. Its main shaft was 900 feet with additional drifts of 1,400 feet. It employed some 18 men in the winter months and produced an annual average of 4,500 tons of coal during its 33 years of operation. Coal sold for \$6.50 a ton, and miners were paid \$2.50 per ton. All the coal produced was sold and used in Ashley Valley. The Government Mine, owned by the federal

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government, operated for 15 years and employed only three to four men annually. It supplied coal to the military post at Fort Duchesne.<sup>31</sup>

Carl Gardner, a century old and a longtime resident of Vernal, says that during the Depression, he was unable to find employment; so, taking matters into his own hands, he determined to support his family with what tools and skills he had. During December he arose early in the morning, about 4:00 AM, harnessed his team of horses and hitched them to his wagon in the minus-30-degree temperature, and drove them the six miles to Coal Mine Basin. He hand-loaded coal into the wagon and drove to Vernal's Main Street, where he went to every business offering to sell a day's worth of coal and promising to return the next day with more. He farmed what few crops would grow in the summer with the drought of the 1930s and continued to deliver coal every day to stores and businesses in the winter throughout the Depression.<sup>32</sup>

### GILSONITE

Gilsonite, a rare hydrocarbon found in commercial quantities only in the Uinta Basin, is a unique solid petroleum substance and perhaps the area's most significant contribution to mining history.<sup>33</sup> It is shiny, hard, and black and resembles slick coal. Gilsonite is used to seal beer barrels and as a base for paints, inks, and perfumes. Additional uses are insulating pipelines, waterproofing and undercoating, paving, roofing, and other jobs utilizing crude asphalt; however, gilsonite's high quality makes it vastly more valuable than asphalt. It is also made into filler for rubber products, floor coverings, and tiles, among many other uses. Gilsonite appears in pure veins that vary from less than an inch to 17 feet wide, are 141 miles long, and total an estimated 30 million tons.<sup>34</sup> The larger veins are located some 20 miles both south and west of Vernal.

Several early travelers through the region found veins of gilsonite and were intrigued by them, but few had any notion of what to do with the mineral. Some tried burning it like coal, but the thick, dark smoke discouraged further fuel use. In 1885 Henry Gilson became interested in gilsonite and performed many home experiments to determine how to use it; to his wife's dismay, he ruined several of her pans and smoked up their home as he tried to melt it. His interest in the substance led to its being named after him.

The first boomtown for gilsonite mining was known as the Strip, later renamed Moffat. In 1888 a small section of land, about one mile east of newly constructed Fort Duchesne, was removed from Ute Reservation lands by an act of Congress. After the lobbying effort of brewer Adolphson Coors, who thought that gilsonite would be an excellent liner for his beer barrels, Congress agreed to remove the land if the Utes were willing. Plied with illegal liquor, the Utes were asked to sign an agreement allowing a 7,040-acre strip to be removed from the reservation to allow gilsonite mining by the Raven Mining Company. After the tribe looked the land over and found

nothing of value, it agreed. The tract of land was about one mile wide at the north by three miles to the south and about four miles long; after it was removed from the Ute Reservation, gilsonite mining began.

A wild, lawless boomtown soon sprang up, starting as a tent city of miners with saloons and a red-light district; in a short time, frame buildings replaced the tents. The Strip was outside the boundaries of the reservation; therefore, the army at nearby Fort Duchesne had no jurisdiction there. And because it lay at the far west end of Uintah County 20 miles from Vernal, county law officers rarely visited. Outlaws such as Butch Cassidy and Elzy Lay frequented the place. Gambling and prostitution flourished, providing diversion for miners from their hard work and long hours. At its height the Strip possessed four houses of ill repute and five saloons. As wild as any western mining town, the Strip had at least 17 deaths from gunfights during its short existence.<sup>35</sup>

In 1899 more than 2,000 tons of gilsonite were shipped from the Strip at an average price of 50 cents per ton from the railhead in Wellington. The cost of production and hauling by wagon from the Uinta Basin over the Nine-Mile Road to Wellington averaged \$21 per ton.<sup>36</sup> Hauling gilsonite from the Uinta Basin to Wellington was a flourishing business at the turn of the century. The gilsonite was placed in large canvas bags for shipping, and after loading their horse-drawn wagons with an average of 3,500 pounds, the men drove them from Vernal or Fort Duchesne to the bridge at Myton, south through Nine-Mile Canyon over Soldier Canyon, and then on to Wellington. The trip took an average of five days from Fort Duchesne or six days from Vernal. Freight costs were one dollar per hundred weight, and a good freighter made as much as \$80 a week, although he had several overhead costs to pay from that figure.<sup>37</sup>

At the turn of the century, gilsonite miners earned an average of four dollars a day, which was a good wage for the time.<sup>38</sup> Most of the work was done with pick and shovel. Work in the gilsonite mines was hard, and conditions were appalling. When struck with a pick, gilsonite easily fractures into small workable pieces, and a goodly amount can be produced in a short time. But the fractured gilsonite creates small, needle-sharp slivers that torment every crease in the miner's body. To try and combat this problem, many miners rubbed themselves with lard. This of course was not popular with the women who washed their clothes. Mining ground to a halt in Moffat by 1904 when the veins were exhausted. In 1921 the town name was changed to Gusher because the citizens hoped nearby oil exploration would bring in a "gusher" to make the town rich and revitalize its economy.

As the gilsonite veins played out at Moffat, additional discoveries were made in the basin. In January 1905 Raven Mining was given 60 days to locate and file on 100 mining claims of gilsonite and asphalt on federal lands. Likewise, the Florence Mining Company was given a preferential right to locate 640 acres of mineral lands. These mining claims were a sore spot for the thousands of waiting settlers who planned on entering the Uinta Basin in August when the lands were opened for homesteading. *The Daily Sentinel* of Grand Junction, Colorado, denounced the affair as a "land steal

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and a farce."<sup>39</sup> Nevertheless, these claims were filed upon, and Raven Mining became the largest gilsonite-producing company in the world for the next several years.

In 1904 the Barber Asphalt Corporation started mining and shipping gilsonite from the town of Dragon, Utah. In 1912 the Uintah Railway was completed, linking the tiny town with the Denver and Rio Grande Western Railroad. Its primary purpose was to haul gilsonite ore from the Uinta Basin. The Uintah Railway was a narrow-gauge line that operated as the only railroad in Utah's Uinta Basin until 1939.<sup>40</sup> In 1912 the mining camp at Dragon moved to Rainbow, where mining continued until 1938, when the new camp of Bonanza was established. Most of the buildings from Rainbow were disassembled and reconstructed at Bonanza. The small town flourished until the late 1970s, when the last residents moved into Vernal and surrounding towns. The newly completed Bonanza highway made travel in car pools from Vernal easy, so miners could drive and have their families live in larger communities with greater shopping, educational, and cultural opportunities.

In the 1950s a slurry line was laid from the Cowboy Mine, 40 miles south of Vernal, to Gilsonite (near Fruita), Colorado, some 72 miles away. Cost of the line and refinery was \$16 million. Ore was crushed to minus one-eighth inch, slurried into the six-inch pipeline in a concentrate of 60 percent water and 40 percent solids, and pumped at 350 gallons per minute.<sup>41</sup> By 1973 the slurry line was no longer used for gilsonite, and trucks carried the ore out of the basin.

Mining for gilsonite is still done in the Bonanza area by the American Gilsonite Company, Ziegler Chemicals, and Lexico Chemical and Mining Company. These are the only gilsonite-mining operations in the world. American Gilsonite is the largest. It began in 1942 when Chevron Oil Company purchased Barber Oil Company and formed American Gilsonite as a subsidiary. In 1991 Chevron divested itself of all non-oil-producing companies, and American Gilsonite became a private stock company. At present American Gilsonite ships 35,000 to 50,000 tons annually, and gilsonite sells for an average of \$350 per ton. It is trucked to Salt Lake, where it is loaded on trains to be shipped anywhere in the world. American Gilsonite employs around 60 people in full-time positions. Many of the miners are the sons and grandsons of gilsonite miners.<sup>42</sup>

Mining gilsonite is fraught with danger and hardship. The hard, slick substance defies most mechanical means of mining. Use of spark-ignited explosives is dangerous due to the volatile nature of gilsonite. Heat from friction causes it to melt and gum up jackhammers. It dissolves in lubrication oils and fouls the drives or motors of the equipment. Rippers and chain saws have been tried with limited success. If the vein is large enough, front-end loaders simply scoop yards of fractured gilsonite up, but this is rare. Commercial mining operations now use hand-held compressed-air slushers to break the brittle ore from its veins after electronically detonated explosives have loosened and fractured it. The highly compressed airstream further fractures the ore into near-powder fragments of one-sixteenth inch, and then the ore is vacuumed by pneumatic lifts out of the mines.

Gilsonite, when fractured, becomes highly unstable. Explosions in gilsonite mines during the years 1894 to 1908 killed six miners. In 1945 14 shafts exploded in a Bonanza mine, igniting the largest gilsonite vein in the United States. The blast threw debris from the shaft into the town a half mile away as timber and rocks rained down upon homes and mine buildings. Miraculously no lives were lost. The worst mining disaster in the region occurred in the mines at Big Bonanza on 4 November 1953, when an explosion killed eight miners.<sup>43</sup>

Of the estimated 30 million tons of gilsonite deposits in the Uinta Basin, there are some 10 million still thought to be available.<sup>44</sup> All gilsonite deposits on federal lands are considered nonlocatable minerals, and permits for mining must be obtained. All the major deposits are on federal lands.

### ELATERITE AND THE HOPE MINE

Perhaps the largest elaterite mine in the basin was the Hope Mine. Elaterite, another rare hydrocarbon similar to gilsonite, though pale in color, was prospected for and mined throughout the county in the early part of the twentieth century. The Hope Mine was just a mile south and slightly east of the Strawberry Pinnacles, about 15 miles west of Duchesne. It was the home and workplace of more than a dozen families and upward of 20 men. Complete with a pony-powered track line to get the ore out of the mine and down the mountain to the road, it was an engaging operation. The families lived in small log cabins, and there was a short-lived school to serve the children's educational needs.<sup>45</sup>

### PHOSPHATE

Some of the largest phosphate deposits in the world are found in the Park City formation some 15 miles north of Vernal. The deposits average 20 percent  $P_2O_5$  at a thickness averaging 20 feet and covering more than 20 square miles on Brush Creek. There are an estimated 700 million tons of reserves of phosphatic rock in the Big Brush Creek deposit. Its principal use is in agricultural fertilizer. There are additional significant phosphate deposits on Ashley Creek and Diamond Mountain, but they are not mined at present.

J. H. Ratliff discovered the Brush Creek deposits in 1915. He and a partner, A. E. Humphrey, filed a claim, but little mining was done for the next several decades. In 1958 the San Francisco Chemical Company purchased the operation and shipped 15,000 tons of ore that year. By 1960 the company was trucking ore to Wyoming, but lack of a railroad in the area for large-scale shipments hindered production. By 1965 more than 180,000 tons had been produced, and the operation employed more than 200 workers.<sup>46</sup> In 1969 Stauffer Chemical Company bought the mine and planned a huge expansion to 300,000 tons annually. In 1980 Chevron Resources Company purchased the mining and ore-processing facility on Brush Creek and

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increased production to 450,000 to 750,000 tons per year. A fleet of 24 trucks hauled phosphate from the mine around the clock. In 1986 a slurry line was completed to pump the pulverized phosphate, mixed with water, over the Uinta Mountains to Rock Springs, Wyoming. In 1991 Chevron sold the operation to J. R. Simplot Company and Farmlands Industries, Inc. A subsidiary company, S. F. Phosphate, was formed and owns the mine at present. The company slurries nearly 300,000 tons a year and employs around 125 people.<sup>47</sup>

### CONCLUSION

In spite of the unique, varied, and complex geological features of the Uinta Basin, the mining wealth and contributions to the economic well-being of the region come from oil and unusual minerals. Even without profitable metal mining, the mining industry is still a significant addition to the basin's economic well-being, however. Most mining jobs, whether they are at S. F. Phosphate, American Gilsonite, or in the oil industry, provide the highest wages in the area. Gilsonite and phosphate mining in the Uinta Basin is unique to Utah and western mining. The Uinta Basin is the only place in the world where gilsonite is mined commercially. Some of the largest phosphate deposits in the world are also located in the area. Oil and natural gas are a mainstay for the local economy also, and the Uinta Basin contains some of the largest shale-oil and tar-sands deposits in North America. Wealth in the form of precious metals on a significant scale has yet to be located.