

by

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INTRODUCTION

The 1960 Wyoming mineral production (including fuels) was valued at a record \$432 million according to preliminary figures compiled by the U. S. Bureau of Mines. This was a 10 percent increase over the 1959 production.

Significant increases were noted in the production of uranium and sodium carbonate; however, declines were recorded in coal, iron ore, phosphate rock, and sodium sulfate production. Uranium continues as the largest mining industry in the State and is followed by sodium carbonate, bentonite, and coal, in that order. The production of nonmetals was 2 percent higher than in 1959.

METALS

Uranium. Uranium continued to hold the spotlight with the disclosure that Wyoming's production increased 65 percent over that of 1959. In the next six years, over one-fifth of the total U. S. production of uranium will be mined in Wyoming. This will be valued at more than \$330 million.

Most of the uranium continues to be produced in the Gas Hills area of Fremont and Natrona counties. Active companies in the area include Fairfield-Anderson and Beach, Federal-Gas Hills Partners, Globe Mining, Hidden Splendor, Dale B. Levi, Union Carbide Nuclear, Utah Construction and Mining, Vitro Minerals, Western Mining, and Western Nuclear. These operations have moved between 20 to 30 million

cubic yards of rock and have produced more than a million tons of uranium ore.

The fifth Wyoming uranium mill, operated by Globe Mining Company (subsidiary of Union Carbide Nuclear Corp.) at capacity of 492 tons-per-day, went on stream early in 1960. Federal-Gas Hills Partners incorporated an \$180,000 modification program to boost the capacity of their mill from 529 to 800 tons-per-day, and Susquehanna-Western's contract for their 500 ton-per-day mill was extended to December 31, 1966, to allow for the purchase of 450,000 pounds of uranium concentrates from the Petrotomics mine in the Shirley Basin.

In the Shirley Basin, Utah Construction and Mining shipped the first ore from its underground mine early in 1960. Other companies contributing to the development of the multi-million ton reserves in the Shirley Basin have been Petrotomics (a corporate combine of Kerr-McGee Oil Industries, Inc., Tidewater Oil Co., Skelly Oil Co., and Getty Oil Co.) and Federal-Gas Hills Partners. Petrotomics has received permission from the AEC to build a mill there or to make arrangements to have their ore processed at existing mills. The AEC contract with Petrotomics provides for the purchase of 1,024,000 pounds of uranium oxide concentrates before March 31, 1962, and 3,158,800 pounds of concentrates between that date and December 31, 1966.

Elsewhere in the State, uranium was produced from Homestake's underground Hauber mine and Western Uranium Corporation's new, open-pit mine, both in Crook County. In the Crooks Gap area, Continental Materials commenced sinking a second shaft to develop a deep ore body near a depth of 600 feet, and Green Mountain Uranium Corporation shipped ore from its underground mine to the Western Nuclear Mill at Jeffery City. Underground operations were initiated on Little Mo's mine on Copper

Mountain, and large-scale development work was initiated on a similar deposit about one mile north of their present property. In addition, a small ore body was blocked out in the same area by Utah Construction and Mining Corporation. The leading uranium producers in Converse County have been B and H Mines and Vern Mrak.

Iron. Early in the summer of 1960, Columbia-Geneva Steel Division of U. S. Steel Corporation initiated development work on the \$73 million taconite-iron mining project north of Atlantic City in Fremont County. It is reported that exploratory work indicates 300 million tons of ore containing 21.8 to 35.2 percent iron. Initial production is scheduled for 1962. The operation, located 8,300 feet above sea level, will be the highest, large-scale open pit iron mine in the U.S.

Although high-grade iron ore continued to be produced from Colorado Fuel and Iron Corporation's Sunrise mine in Platte County, operations were suspended for short periods in August, November, and December because of the lack of orders for steel at their Pueblo, Colorado, plant. Production was scheduled to be resumed early in January, 1961.

A small quantity of iron ore was produced from Magnetite Products Cobar mine in Albany County. This was shipped to Texas for use as heavy aggregate in the coating of underwater pipe lines and transmission lines.

Miscellaneous. Vanadium, recovered as a by-product of uranium ores by the addition of a vanadium pentoxide recovery unit at the uranium mill of Mines Development, Inc., at Edgemont, South Dakota, was produced chiefly from mines in Campbell County. Limited gold production of less than \$2,000 was reported from two operations in Fremont County. Beryllium concentrates valued at less than \$2,000 were reported produced from mines in Niobrara and Goshen counties.

NONMETALS

Sodium Carbonate. Intermountain Chemical Company operated their trona mine and processing plant west of Green River near rated capacity during 1960. The company plans to expand facilities to permit the production of 700,000 to 750,000 tons of soda ash annually by 1962.

As a result of a two-year test drilling program, Stauffer Chemical Company started work on a trona mine and processing plant during the latter part of 1960. Production, which is scheduled for 1962, is expected to be between 200,000 to 300,000 tons annually. These deposits, which are in the Green River formation, are reported to occur at depths of 600 to 800 feet.

In addition, it is reported that both Diamond Alkali Company and Allied Chemical Company are considering developing other trona properties in the near future in the same area.

Clays. Wyoming continues to produce more than half of the nation's output of bentonite; however, production for 1960 remained about the same as in 1959. Operations were carried on in Big Horn, Crook, Natrona, and Weston counties.

Clay is also mined in Albany County for the manufacture of cement and lightweight aggregate and in Big Horn County for use in the manufacture of vitrified sewer pipe.

Gypsum. Gypsum is mined in Albany County for use in the manufacture of cement. At Cody, Big Horn Gypsum Company began construction of a \$3,000,000 gypsum board plant which will utilize nearby deposits. Fremont Mining and Manufacturing Company initiated mining and processing of gypsum deposits near Lander. In addition, it is reported that Crystal Creek Gypsum Company will develop a deposit

about 13 miles southeast of Lovell.

Limestone. One of the oldest, yet least-known, mines in the State is the operation of Great Western Sugar Company near Horse Creek in Laramie County. Chemical-grade limestone and aggregate-grade stone are mined at a depth of 300 feet below the surface. Limestone is also mined in Albany County for use in the manufacture of cement and in Teton County for use in sugar refining.

Sulfur. In recent years the recovery of elemental sulfur from "sour-gas" wells in the Bighorn Basin has become increasingly important. In the past, four companies operating in Big Horn, Park, and Washakie counties produced sulfur; however, one of these, the Jefferson Lake Sulphur Company at Manderson reportedly shut down its facilities during the middle of the year.

Wyoming sulfur is utilized in the Susquehanna-Western sulfuric acid plant at Riverton where the production capacity was expanded to 75,000 tons per year during 1960.

Miscellaneous. The output of phosphate rock from Lincoln County and sodium sulphate from Carbon and Natrona counties reportedly decreased during 1960. A small quantity of sheet mica was reportedly produced from two mines in the State. Although coal production decreased 11 percent as compared with 1959, construction of new power plants, transforming of soft coals into coke, and other developments would seem to indicate that production will increase in the future.

CONCLUSION

Although much publicity is directed towards the development and utilization of the State's mineral resources, the value of the preliminary geological study of

these deposits is often obscured to the layman. Many of the recent mineral developments, such as iron, trona, and uranium, have been due to the results of earlier geological studies by the State and Federal geological surveys. Only by such studies, which are under the supervision of these technical agencies, can the mineral resources of the State be intelligently appraised.

WYOMING MINING IN 1961

MR 68-1

by

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INTRODUCTION

The 1961 Wyoming mineral production (including fuels) was valued at a record \$471 million, according to preliminary figures compiled by the U. S. Bureau of Mines. This was a seven percent increase over the 1960 production.

Although fuels accounted for 85 percent of the total value, the production of metals exceeded that of nonmetals for the first time in several years.

Increases were noted in the production of uranium, sodium carbonate, bentonite, coal, iron ore, vanadium and gypsum; however, declines were recorded for cement, phosphate rock, and miscellaneous clays.

METALS

Uranium - Uranium production increased 20 percent over 1960; however, there was little, if any, incentive for further exploration because of government market controls. Nevertheless the mining and processing of uranium has become one of the major industries in Wyoming, since 22 percent of the nation's uranium reserves occur in the State.

Five processing plants operated throughout the year and a sixth was under construction. The latter is a 500 ton per day mill that is being constructed by the Petrotomics Company in the Shirley Basin area. Completion

of this mill, which will employ the acid-leach solvent extraction process, is scheduled for April, 1962. Petrotomics has also developed an open-pit mine in the Shirley Basin area.

Most of the uranium continues to be produced in the Gas Hills area of Fremont and Natrona counties. Active mining companies in the area include Federal-Gas Hills Partners, Globe Mining, Hidden Splendor, Dale B. Levi, Utah Construction and Mining, Vitro Minerals, Western Uranium, and Western Nuclear.

In the Crooks Gap area, both Continental Materials and Green Mountain Uranium operated underground mines, while Western Nuclear has developed a new open-pit.

Elsewhere in the State, uranium was produced from Homestake's underground Hauber mine and several other smaller operations in Crook County. Utah Construction and Mining continued to produce ore from its underground mine in the Shirley Basin. B and H Mines and Vern Mrak were the leading uranium producers in Converse County. Some production also came from various small mines in Campbell County.

Iron - The production of iron ore increase 35 percent over last year. Colorado Fuel and Iron Corporation, the State's largest producer, also was in the process of deepening its shaft at Sunrise, in Platte County, from 750 to 900 feet. Magnetite Products Corporation, which ships its production out of State for use as heavy aggregate, nearly tripled the output from its Cobar No. 1 mine in Albany County over that of 1960.

Construction of U. S. Steel Corporation's taconite mill at Atlantic City, in Fremont County, is ahead of schedule. The 76-mile railroad from Winton Junction to Atlantic City was completed during 1961. The first iron ore pellets are to be shipped by rail in late 1962 to Columbia-Geneva Steel Company's works in Utah. These higher grade taconite ores, which are reported to contain 61.99 percent iron, will be added to the ores produced from Utah's Cedar City district to increase iron production.

The Union Pacific Railroad Company is investigating the possibility of establishing an iron ore plant near Laramie to process titaniferous-iron ores from Iron Mountain. The Koppers Company is currently employed to evaluate the Strategic-Udy process for utilizing the ores. Formerly, large-scale furnace tests were conducted at Pioche, Nevada, to determine if the Krupp-Wrenn process was economical for using the material.

Vanadium - Vanadium production increased twentyfold during 1961. This was recovered chiefly from vanadiferous uranium ore that was mined in the Powder River Basin of Wyoming and processed at the Mines Development, Inc., uranium mill at Edgemont, South Dakota. Domestic interest in vanadium has been stimulated by increased foreign demand. By virtue of this, some exploration has been initiated in the vanadiferous Phosphoria formation which crops out in western Wyoming.

Miscellaneous - Beryllium concentrate, valued at less than \$1,000, was produced from two small operations in Fremont County and one in Goshen County. A small amount of copper-gold-silver ore, valued at less than \$1,000,

was shipped from an operation in Carbon County. Exploration for copper-molybdenum and lead-silver was conducted in the Sunlight and Kirwin areas of Park County.

NONMETALS

Sodium Carbonate - The production of trona, which reached an all-time high during 1961, replaced coal as the largest mining industry in Sweetwater County. Intermountain Chemical Company, the only producer in the State, continued a mine-mill expansion geared toward a production rate of 700,000 tons of soda ash a year.

A joint venture by the Union Pacific Railroad and Stauffer Chemical Company indicates a mid-1962 completion date for another soda ash mine and mill. They will mine beds of trona that lie between 800 and 900 feet below the surface of the ground.

Other companies exploring for trona in the Green River area are Allied Chemical, Diamond Alkali, and Kern County Land Company.

Clays - Bentonite production increased four percent in 1961. The leading bentonite producers in northeast Wyoming were American Colloid, Archer-Daniels Midland, Black Hills Bentonite, International Minerals and Chemical, and National Lead Company. The Greybull area shippers were Magnet Cove Barium and Wyo-Ben Products Company. The Benton Clay Company produced from the Casper area. Much of the Wyoming bentonite is being used in the agglomerating concentration of taconite iron deposits.

Other clay production in the State decreased about 52 percent

about 13 miles southeast of Lovell.

Limestone. One of the oldest, yet least-known, mines in the State is the operation of Great Western Sugar Company near Horse Creek in Laramie County. Chemical-grade limestone and aggregate-grade stone are mined at a depth of 300 feet below the surface. Limestone is also mined in Albany County for use in the manufacture of cement and in Teton County for use in sugar refining.

Sulfur. In recent years the recovery of elemental sulfur from "sour-gas" wells in the Bighorn Basin has become increasingly important. In the past, four companies operating in Big Horn, Park, and Washakie counties produced sulfur; however, one of these, the Jefferson Lake Sulphur Company at Manderson reported-ly shut down its facilities during the middle of the year.

Wyoming sulfur is utilized in the Susquehanna-Western sulfuric acid plant at Riverton where the production capacity was expanded to 75,000 tons per year during 1960.

Miscellaneous. The output of phosphate rock from Lincoln County and sodium sulphate from Carbon and Natrona counties reportedly decreased during 1960. A small quantity of sheet mica was reportedly produced from two mines in the State. Although coal production decreased 11 percent as compared with 1959, construction of new power plants, transforming of soft coals into coke, and other developments would seem to indicate that production will increase in the future.

CONCLUSION

Although much publicity is directed towards the development and utilization of the State's mineral resources, the value of the preliminary geological study of

these deposits is often obscured to the layman. Many of the recent mineral developments, such as iron, trona, and uranium, have been due to the results of earlier geological studies by the State and Federal geological surveys. Only by such studies, which are under the supervision of these technical agencies, can the mineral resources of the State be intelligently appraised.

WYOMING MINERAL PRODUCTION IN 1963

by

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INTRODUCTION

The 1963 Wyoming mineral production (including fuels) was valued at a record \$506 million, according to preliminary figures compiled by the U. S. Bureau of Mines. This was an increase of \$44 million over the 1962 production.

Mineral fuels accounted for 82 per cent of the total value, while non-metals accounted for nine per cent and metals accounted for nine per cent. Petroleum output ranked first with 72 per cent of the total value, and this was followed by natural gas, uranium ore, trona, iron ore, bentonite, coal, sand and gravel, LP gases, natural gasoline, cement, stone, phosphate rock, limestone, vanadium, gypsum, miscellaneous clays, gem stones, burnt shale, sodium sulfate, vermiculite, and beryl.

METALS

The production of metals increased 35 per cent, largely as a result of greatly increased iron ore output.

Uranium. Uranium ore production increased eight per cent in 1963 with a value increase of three per cent. During the first half of 1963, 26 companies reported ore shipments. Six uranium mills operated in the State in 1963, however, Susquehanna-Western, Inc. closed the Riverton mill in May.

Most of the uranium continues to be produced from the open-pit mines in the Gas Hills area of Fremont and Natrona Counties. Federal-Gas Hills

Partners, now one of the largest uranium mining and milling companies in Wyoming, purchased Vitro's mines in the Gas Hills. In addition, Federal is installing a new Eluex circuit in their mill to permit milling a greater number of ore types with higher uranium recovery.

Utah Construction and Mining began development of solution mining of uranium at their Gas Hills mine. By introducing a nitric acid solution in this mining process, it is believed that a 40 per cent economy will be realized as compared to conventional underground mining.

Western Nuclear, Inc. continues to strip its Day D-1 pit, which will expose ore at more than 300 feet in depth. Mining is expected to be carried on for several years in this pit.

Continental Materials continued to operate its Seismic underground mine in the Crooks Gap area. Green Mountain Uranium also operates an underground mine in this area.

In the Shirley Basin, Petrotonics Co. operated its open-pit mine and ore processing plant. Although abandoning its shaft in water saturated ground, Utah Construction and Mining has continued its research on direct leaching of uranium ore in place at their properties in the Shirley Basin.

In the northeast part of the State, uranium was produced from Homestake's underground Hauber mine. Vern Mrak has been stripping a new mine in the Dry Fork area of Converse County.

Iron. Iron ore output which was 110 per cent greater than in 1962, was largely attributed to the first complete year of operation of the Atlantic City

iron mine by Columbia-Geneva Steel Division of the United States Steel Corp. This mine operated through some very low temperatures, high winds, and heavy snowfalls.

Colorado Fuel and Iron Corp., which operated the Sunrise iron mine through the year, is constructing an iron ore beneficiation plant at Sunrise. This plant, capable of handling 600,000 net tons of concentrate per year, will employ heavy media separation for coarse sizes and jigging for small sizes of ore, thus upgrading and making a more uniform and physically improved material.

Magnetite Products Corp., which produces iron concentrate at Iron Mountain, Albany County, ships their product out of State to be used as heavy aggregate in concrete for underwater pipe coating and for shielding fissionable materials.

Vanadium. Vanadium production in Wyoming decreased about 18 per cent in 1963. This metal was recovered from vanadiferous uranium ore that was mined in the Powder River Basin and processed at the Mines Development Inc. uranium mill at Edgemont, South Dakota.

Beryllium. Small amounts of hand-cobbed beryl were produced in Wyoming in 1963.

NONMETALS

Trona. The production of soda ash from the trona mines west of Green River increased 24 per cent in 1963. This was largely attributed to increased production from Food Machinery Chemical Corp.'s operation and the first

full year's production from Stauffer Chemical Co.'s Big Island mine. In addition Stauffer has started an expansion program to increase production from 200,000 to 400,000 tons annually. One-fifth of the Nation's requirements for soda ash was supplied by these two operations.

Bentonite. Although seven companies operated nine bentonite processing plants in Wyoming, production decreased 13 per cent. Black Hills Bentonite Co., however will build a processing plant near Casper to process bentonite mined near Kaycee. This company now ships most of its production of high swelling bentonite to taconite mills in Canada for use as a binder in pelletizing. They anticipate a greater market for this utilization of bentonite.

Gypsum. Gypsum production increased 12 per cent in 1963. The Big Horn Gypsum Co. sold its gypsum board plant at Cody to The Celotex Corp., however, the gypsum deposits southwest of Cody will continue to be mined by the Taggart Construction Corp.

Gypsum Products of America will construct a plasterboard plant at Lovell. Gypsum, used in the processing of cement, was also mined in Albany County.

Phosphate Rock. San Francisco Chemical Co. operated an open-pit mine and phosphate beneficiation plant near Sage in Lincoln County. Production from ore mined in Wyoming and ore mined in Utah that was processed in Wyoming was 50 per cent greater in 1963.

Sulfur. Although five companies recovered elemental sulfur as a by-product of natural gas processing, output was 31 per cent less in 1963. A new

sulfur recovery unit is being included in Sinclair Refining Co.'s modernization of their refinery at Sinclair, Wyoming.

Wyoming sulfur is used in the sulfuric acid plants at Riverton and Jeffrey City.

Clays. Building-brick clay was mined near Evanston, and brick, clay pipe, and tile was produced from clay mined near Lovell. Lightweight aggregate was produced from clay mined near Laramie.

Cement. The production of cement from the Monolith Portland Midwest Co.'s plant near Laramie, declined two per cent in 1963.

Miscellaneous. Limestone was mined in Albany, Laramie, and Teton Counties. Small quantities of natural sodium sulfate were produced west of Casper. A small production of vermiculite was reported from operations near Wheatland and Encampment. Stone, and sand and gravel production increased eight and four per cent respectively.

MINERAL FUELS

Coal. The production of coal increased an estimated 15 per cent in 1963. The increase in coal production is largely attributed to increased usage in electric power generation. The first unit of coal-based powerplant near Kemmerer was completed by Utah Power and Light Co. while Pacific Power and Light Co. continued their expansion program at the Dave Johnston powerplant near Glenrock.

The experimental coke plant, operated jointly by the Food Machinery Chemical Corp. and United States Steel Corp. near Kemmerer was placed on

a standby basis. Gunn-Quealy Coal Co. at Rock Springs, began producing rotary-kiln coke which was directed toward use in the electric furnace method of processing elemental phosphorous.

Leonardite, a coal-like mineral, was processed into a high humic acid fertilizer by American Humates, Inc. at their plant in Glenrock.

EXPLORATION

Exploration for mineral deposits in 1963 included studies on molybdenum, phosphate rock, and gold. American Molybdenum Corp. reported discovery of a large molybdenum deposit near Scheistler Peak in the Wind River Range of Sublette County. Two other molybdenum deposits in the Absaroka Range of Park County were explored by a major mining company; one of which was diamond drilled.

Kern County Land Co. has options on approximately 1100 acres of land in the Sublette Ridge area of western Wyoming. Together with the Duval Corp., they have been doing experimental mining of phosphate rock. Susquehanna-Western, Inc., also continued studies and exploration on the phosphate deposits south of Lander.

Two portable mills, designed to recover extremely fine gold, were reported under construction in Teton County. These are scheduled for operation in 1964.

WYOMING MINERAL PRODUCTION IN 1964

by

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INTRODUCTION

The 1964 Wyoming mineral production (including fuels) was valued at a record \$509.5 million, according to preliminary figures compiled by the U.S. Bureau of Mines. This was an increase of one percent over the 1963 production.

Mineral fuels accounted for 81 percent of the total value, while nonmetals accounted for 10 percent and metals accounted for nine percent. Petroleum output ranked first with 71 percent of the total value, and this was followed by other leading value commodities, such as, bentonite, coal, iron ore, LP gases, natural gas, natural gasoline, sand and gravel, sodium carbonate (trona) and uranium ore.

NONMETALS

Trona. The production of soda ash from the trona mines west of Green River increased 16 percent in 1964. This was largely attributed to increased production from Stauffer Chemical Co.'s new facilities at their Big Island mine which increased plant production to approximately 400,000 tons per year. Food Machinery Chemical Corp. completed a new sodium sesquicarbonate-sodium tripolyphosphate facility which was expected to increase plant production by an additional 85,000 tons per year. Allied Chemical Co. began sinking a 12-foot circular shaft near Green River, which was expected to be driven to a depth of 1500 feet. The Green River area is now the principal U.S. producer of soda ash and products from trona. With the

addition of Allied's new mine, the State's annual production of trona ore is expected to increase to two million tons within five years.

Bentonite. Seven companies operated 10 bentonite processing plants in Wyoming and production increased by 21 percent in 1964. Black Hills Bentonite Co. moved its entire mining operation to near Barnum in Johnson County. The ore is shipped by truck to its new 800 ton per day processing plant in Casper.

Gypsum. Gypsum production increased 41 percent in 1964. A three million dollar gypsum plant, 15 miles east of Lovell, was under construction by the Gypsum Products of America Corp. The other gypsum plant in the Bighorn Basin, operated by Big Horn Gypsum Co., added 30,000 square feet to its existing facilities.

Phosphate Rock. San Francisco Chemical Co. operated an open-pit mine and phosphate beneficiation plant near Sage in Lincoln County. Production from ore mined in Wyoming and ore mined from company-owned facilities in Utah that was processed in Wyoming was 23 percent greater in 1964.

Sulfur. Although five companies recovered elemental sulfur from six natural gas processing plants, output was 30 percent less than in 1963. Wyoming sulfur is utilized in the manufacture of sulfuric acid at plants in Riverton and Jeffrey City which, in turn, is used in processing uranium ore and in the petroleum industry.

Cement. The production of cement from the Monolith Portland Midwest Co.'s plant near Laramie, declined seven percent in 1964. Wyoming Construction Co. (Monolith's subsidiary) mined cement rock, gypsum, limestone and sandstone for use in the manufacturing of cement.

Miscellaneous. Brick, clay pipe and tile continued to be produced from clay

mined near Lovell. Limestone was mined from Laramie, Teton, as well as Albany Counties. Small quantities of natural sodium sulfate were produced west of Casper. Stone, and sand and gravel production decreased three and one percent respectively.

METALS

Uranium. Because of the extension of purchase contracts and quotas with the Atomic Energy Commission, uranium ore production decreased 24 percent in 1964 with a value decrease of 15 percent. Twenty-three companies reported shipments of ore which was processed in five mills in the State and two outside the State. The State ranked second in uranium ore production and third in uranium oxide concentrates.

Most of the uranium continues to be produced from the open-pit mines in the Gas Hills area of Fremont and Natrona Counties. Atlas Minerals, however, placed their Lisbon underground mine on standby, and Susquehanna-Western, Inc., closed the Arrowhead (Little Mo) mine, located near Copper Mountain.

Continental Materials and Green Mountain Uranium continued to operate their underground mines in the Crooks Gap area, and Petrochemicals Co., operated its open-pit mine and ore processing plant in the Shirley Basin. In the northeast part of the State, uranium was produced from Homestake's underground Hauber mine, and Vern Mrak was stripping a new mine in the Dry Fork area of Converse County.

Iron. Iron ore output and valuation increased 20 and 13 percent, respectively, over that of 1963. This was largely attributed to increased production from Pliconflex, Inc.'s (formerly Magnetite Products Corp.) mine at Iron Mountain, in Albany County, and Colorado Fuel and Iron Corp.'s Sunrise mine.

Late in 1964, Colorado Fuel and Iron Corp. completed their new multi-million

dollar beneficiation plant with facilities designed for an annual capacity of 600,000 tons of iron ore concentrates. Substantial iron production also came from the Atlantic City mine operated by Columbia-Geneva Steel Division of the United States Steel Corp.

Vanadium. Vanadium production in Wyoming increased 31 percent in 1964. This metal was recovered from vanadiferous uranium ore that was mined in the Powder River Basin and processed at the Mines Development Inc. uranium mill at Edgemont, South Dakota.

Miscellaneous. Small amounts of beryllium concentrates and gold were produced in Wyoming in 1964.

MINERAL FUELS

Coal. The production of coal decreased an estimated three percent in 1964, since two mines closed down. Pacific Power and Light Co. completed the third unit of the coal-based Dave Johnston plant near Glenrock during the latter part of 1964. The coke-breeze plant, operated at Rock Springs, by the Gunn-Quealy Coal Co., was completed in 1964. Approximately 100 tons per day of locally mined coal was used in their test program.

EXPLORATION

Exploration for mineral deposits in 1964 included studies on copper, molybdenum, gold, silver, iron, titanium, phosphate rock, and trona. Diamond drilling of a copper-molybdenum prospect in the Absaroka Mountains of northwest Wyoming was continued for the second year in a row by a major mining company.

Kern County Land Co. and the Duval Corp. have continued their experimental

mining of phosphate rock in the Sublette Ridge area of western Wyoming. Susquehanna-Western, Inc. also continued studies and exploration on the phosphate deposits south of Lander.

Texas Gulf Sulphur reportedly obtained 7,500 acres of State and Federal leases in southwest Wyoming in the exploration for trona deposits.

WYOMING MINERAL PRODUCTION AND EXPLORATION IN 1965

by

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INTRODUCTION

The 1965 Wyoming mineral production (including fuels) was valued at \$502 million, according to preliminary figures compiled by the U.S. Bureau of Mines. This was a decrease of one percent under the record 1964 production.

Petroleum output ranked first with 69 percent of the total value and this was followed by other leading value commodities, such as, natural gas, iron ore, sodium carbonate (trona), uranium ore, clays, coal, sand and gravel, LP gases, stone, cement, and phosphate rock.

NONMETALS

Trona. The production of soda ash from the trona mines west of Green River increased 20 percent in 1965. This was largely due to increased production from Food Machinery Chemical Corp.'s expanded facilities. This company plans to increase their production to 1.25 million tons annually, which should make them the largest single producer of soda ash in the world. Stauffer Chemical Company intends to double the capacity of their plant in 1966 to 800,000 tons per year. Allied Chemical Company's mine and plant is expected to be in operation early in 1966. Initial production here is expected to be 300,000 tons of soda ash per year. Because of these developments, the Green River area is now the largest producer of soda ash and products from trona in the United States.

Bentonite. Bentonite production increased by eight percent in 1965.

Wyoming produces approximately 70 percent of the nation's output. American Colloid Co. began constructing a new bentonite processing plant east of Lovell in 1965.

Gypsum. Gypsum production increased 16 percent in 1965. A three million dollar gypsum plant located at Himes, southeast of Lovell, was under construction by the Gypsum Products of America Corp. The completion date is scheduled for early 1966. The other gypsum plant in the Bighorn Basin is operated by the Bighorn Gypsum Co. at Cody.

Phosphate Rock. San Francisco Chemical Co. operated an open-pit mine and phosphate beneficiation plant near Sage in Lincoln County. Production from ore mined in Wyoming and ore mined from company-owned facilities in Utah that was processed in Wyoming was somewhat less than in 1964.

Sulfur. Five companies recovered elemental sulfur from six natural gas processing plants and the output was 30 percent greater than in 1964. Wyoming sulfur is utilized in the manufacture of sulfuric acid at plants in Jeffrey City and Riverton, which, in turn, is used in processing uranium ore and in the petroleum industry.

Cement. The production of cement from the Monolith Portland Midwest Co.'s plant near Laramie decreased in 1965. The plant temporarily suspended operations in December, but will resume again early in 1966. Wyoming Construction Co. (Monolith's subsidiary) mined cement rock, gypsum, limestone, and sandstone in Albany County for use in the manufacture of cement.

Miscellaneous. Brick, clay pipe and tile continued to be produced from clay mined near Lovell. Limestone, used in sugar refining, was mined in Laramie and Teton Counties. Small quantities of natural sodium sulfate were produced west of Casper. Sand and gravel production increased 16 percent; however, stone production decreased two percent in 1965.

METALS

Uranium. Because of the extension of purchase contracts and quotas with the Atomic Energy Commission, uranium ore production decreased 34 percent in 1965 with a value decrease of 37 percent. Twenty-one companies reported shipments of ore which was processed at five mills in the State and two outside the State.

Most of the uranium continues to be produced from the open-pit mines in the Gas Hills area of Fremont and Natrona Counties. Atlas Minerals allowed the shaft of their Lisbon underground mine to fill with water. Western Nuclear started to sink an 800-foot, three compartment shaft on the Golden Goose property. Utah Construction and Mining Co. started stripping the Rex group to reach uranium ore at 90 feet in depth.

Continental Materials and Green Mountain Uranium continued to operate their underground mines in the Crooks Gap area, and Petrotomics Co. operated its open-pit mine and mill in the Shirley Basin. In the northeast part of the State, uranium was produced from Homestake's underground Hauber mine, and Vern Mrak continued to produce from the Dry Fork area of Converse County. Several other operations were reported active in Converse, Campbell, Crook, and Carbon Counties.

Iron. Iron ore output and valuation increased four and 11 percent respectively over that of 1964. Production came from the following operations, U.S. Steel at Atlantic City, Colorado Fuel and Iron at Sunrise, and Plicoflex at Iron Mountain. The operations at U.S. Steel Atlantic City mine reached an output of 1.3 million gross tons of iron agglomerates per year.

Vanadium. Vanadium production in Wyoming increased 58 percent in 1965. This metal was recovered from vanadiferous uranium ore that was mined in the Powder River Basin area and processed at the Mines Development Inc. uranium mill at Edgemont, South Dakota.

Miscellaneous. Small amounts of copper, gold, and silver were produced in Wyoming in 1965.

MINERAL FUELS

Coal. The production of coal increased an estimated five percent in 1965. There were 19 mines operating in the State, and among these were the large stripping operations of the Dave Johnson mine (Pacific Power and Light), Wyodak Resources Development Corp., Kemmerer Coal Co., Big Horn Coal Co., and Rosebud Coal Co.

In September, 1965, Utah Power and Light announced plans to construct a 220,000 kilowatt coal-fired generating plant near Kemmerer to augment its present capacity of 165,000 kilowatts. As much as 2,600 tons of coal per day will be consumed by the new plant.

EXPLORATION

Exploration for mineral deposits in Wyoming during 1965, included studies on copper, molybdenum, gold, silver, mercury, iron, uranium, phosphate rock, trona and coal. Diamond drilling of a copper-molybdenum prospect in the Absaroka Mountains of northwest Wyoming was continued for a third year in a row by a major mining company. Another major mining company initiated diamond drilling of another copper-molybdenum prospect, also located in the Absaroka Mountains.

As a result of their exploration and studies on the phosphate deposits south of Lander, the Susquehanna Corp. planned to start a 150,000 to 250,000 ton per year mining and processing program.

WYOMING MINERAL PRODUCTION AND EXPLORATION IN 1966

by

William H. Wilson
Assistant State Geologist
Geological Survey of Wyoming

INTRODUCTION

The 1966 Wyoming mineral production (including fuels) was valued at 493.4 million dollars, according to preliminary figures compiled by the U.S. Bureau of Mines. This decrease of one percent under the 1965 production was largely due to recent drops in petroleum production. The production of all nonmetal commodities, except gypsum and cement increased; however, the production of metals decreased.

NONMETALS

Trona. The production of soda ash from the trona mines west of Green River increased 23 percent in 1966. This was largely due to increased production from Food Machinery Chemical Corp.'s expanded facilities. This company plans to increase their production to 1.25 million tons annually, which will make them the largest single producer of soda ash in the world. Stauffer Chemical Company intends to increase the capacity of their plant in 1967 to 800,000 tons per year. Allied Chemical Company's operation is expanding its facilities and production is expected to be 600,000 tons annually by 1968. Texas Gulf Sulphur has announced plans for a trona mine and mill in the above area, but no construction date has been set.

Bentonite. Bentonite production increased by 25,000 tons in 1966. Wyoming produces approximately 75 percent of the nation's output. American Colloid Co. constructed a new bentonite processing plant east of Lovell in

1966. International Minerals and Chemical Co. will move its bentonite processing plant from Belle Fourche, S.D., to Colony, Wyo., in 1967. The new plant will be twice as large as the old one.

Gypsum. Gypsum production decreased in 1966. A three million dollar gypsum plant located at Himes, southeast of Lovell, was under construction by the Gypsum Products of America Corp. The completion date was scheduled for early 1966; however, there has been no ^{recorded} ~~recorded~~ production. The other gypsum plant in the Bighorn Basin is operated by the Big Horn Gypsum Co. at Cody.

Phosphate Rock. San Francisco Chemical Co. operated an open-pit mine and beneficiation plant near Sage in Lincoln County. Production from ore mined in Wyoming and ore mined from company-owned facilities in Utah that was processed in Wyoming increased 21 percent in 1966.

Sulfur. Six companies recovered elemental sulfur from seven natural gas processing plants, and the output was 77 percent greater than in 1965. Wyoming sulfur is utilized in the manufacture of sulfuric acid at plants in Jeffrey City and Riverton, which, in turn, is used in processing uranium ore and in the petroleum industry.

Cement. The production of cement from the Monolith Portland Midwest Co.'s plant near Laramie, decreased in 1966. Wyoming Construction Co. (Monolith's subsidiary) mined cement rock, gypsum, limestone, and sandstone in Albany County for use in the manufacture of cement.

Miscellaneous. Brick, clay pipe and tile continued to be produced from clay mined near Lovell. Limestone, used in sugar refining, was mined in Laramie and Teton Counties. The production of natural sodium sulfate from saline lakes west of Casper, increased 25 percent. Marble was mined by Basin's Engineering from a quarry west of Wheatland. Sunset Rock Quarry, Inc., at LaBarge marketed a hard sandstone called Teton Moss Back for building veneer.

Port Landing, Inc., reportedly will build a hydrated and quick lime plant 16 miles southeast of Lovell.

METALS

Uranium. Uranium production increased 2 percent. Twenty-five percent of the total U.S. uranium production came from Wyoming.

Most of the uranium continues to be produced from the open-pit mines in the Gas Hills area of Fremont and Natrona Counties. Utah Construction and Mining Co. will operate their mine and mill indefinitely at an accelerated rate in order to fulfill contracts with General Electric and two ^{European} ~~European~~ firms. Because of an improved market for uranium, Federal-Gas Hills Partners, has undertaken a double shift operation on their Sagebrush 3, Tablestakes No. 1 pit in order to initiate uranium ore mining in March, 1967.

In the Crooks Gap area, the Green Mountain Uranium Corp. completed its uranium ore allocation and is reportedly phasing out its underground mine which has been in operation since 1960. Western Nuclear completed an 875-foot-deep, three compartment shaft at its Golden Goose mine and also modernized and remodeled their mill at Jeffrey City.

In the Shirley Basin area, the Petrotonics uranium mill, scheduled to cease operations in September, 1966, will continue operations in order to stockpile yellow cake for use by private industry. Tidewater Oil Co., operating partner in the Petrotonics mill, will strip nearly six million yards of overburden to open a new uranium mine.

In the northeast part of the State, uranium was produced from Homestake's underground Hauber mine, and Vern Hrak continued to produce from the Dry Fork area of Converse County. Several other operations were

reported active in Converse, Campbell, Crook, and Carbon Counties.

Iron. Iron ore output decreased six percent in 1966. Production came from the following operations, U.S. Steel at Atlantic City, Colorado Fuel and Iron at Sunrise, Plicoflex at Iron Mountain, and Peterson, Anderson, and Knisely in the Laramie Range.

Vanadium. Vanadium production in Wyoming increased 57 percent in 1966. This metal was recovered from vanadiferous uranium ore that was mined in the Powder River Basin area and processed at the Mines Development Inc. uranium mill at Edgemont, S.D.

MINERAL FUELS

Coal. The production of coal increased an estimated three percent in 1966. Most of the coal production came from the large stripping operations of the Dave Johnson mine (Pacific Power and Light), Wyodak Resources Development Corp., Kemmerer Coal Co., Big Horn Coal Co., and Rosebud Coal Co. Reynolds Mining Corp. constructed a large field coal testing laboratory near Lake DeSmet. Pacific Power and Light Co. will construct an additional steam-electric generating plant, which will be in service by 1970.

EXPLORATION

Exploration for mineral deposits in Wyoming during 1966, included studies on copper, molybdenum, gold, silver, mercury, iron, uranium, phosphate rock, trona and coal. More than 20,000 new uranium claims have been staked in Wyoming, since 1965, and more than 500,000 acres of State leases have been acquired since March, 1966. Diamond drilling of two copper-molybdenum prospects in the Absaroka Range of northwest Wyoming was conducted for the last two and four years in a row, respectively, by two major mining companies. Copper exploration and drilling was also conducted in the Sierra Madre Range of southern Wyoming.

MR68-1

1967 WYOMING MINERAL PRODUCTION AND OUTLOOK *

by

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The 1967 Wyoming mineral production (including fuels) is rapidly approaching an annual figure of \$510 million. The mineral industry is the State's most important source of income and presently surpasses that of agriculture and the tourist industry combined. Wyoming ranks twelveth in the nation in overall mineral production, first in the production of trona and bentonite, second in the production of uranium, and fifth in petroleum production.

Trona, bentonite, phosphate rock, sulfur, gypsum, cement, limestone, and other clays are the most important of the nonmetals produced in Wyoming. The production of soda ash from trona has steadily increased each year, with the output coming from the following operations, west of Green River: Food Machinery Chemical Corp., Stauffer Chemical Co., and Allied Chemical Co. A fourth soda ash facility, Texas Gulf Sulphur is currently sinking a trona shaft to a depth of approximately 1500 feet in the above area.

Approximately 75 percent of the nation's bentonite output comes from plants and mines in Big Horn, Crook, Johnson, Natrona, and Weston Counties of Wyoming. In addition, new plants have recently been constructed near Lovell and Colony.

For many years, elemental sulfur has been produced from plants in the Bighorn Basin and Fremont County. Wyoming sulfur, a byproduct of sour-gas

production, is utilized in the manufacture of sulfuric acid at plants in Jeffrey City and Riverton, which, in turn, is used in processing uranium ore and in the petroleum industry.

The production of phosphate rock from Lincoln County increases steadily, since both Wyoming and Utah-mined ore are processed in Wyoming. Gypsum and cement production have generally remained static or slightly declined.

Uranium, iron ore, and vanadium are the chief metals produced in Wyoming. Uranium production increases steadily from such principal areas as Baggs, Black Hills, Crooks Gap, Gas Hills, Powder River Basin, and Shirley Basin. Many thousands of new uranium claims have been located recently in such areas as Copper Mountain, Poison Spider, Red Desert, and Shirley Basin. Present market projections indicate a need for four times the presently known uranium reserves. A further indication of this is shown by Petrotomics doubling the capacity of their 500 ton mill in the Shirley Basin area. The substantial increases in new reserves are necessary to supply raw fuel material for new nuclear reactors. This projected increase in uranium production will undoubtedly result in an increase in vanadium production, since this metal is produced as a byproduct recovered from uranium ore mined in the Powder River Basin.

Wyoming is one of the major iron ore-producing states in the west, with U.S. Steel at Atlantic City, Colorado Fuel and Iron at Sunrise, and Plicoflex at Iron Mountain.

The outlook for future exploration, development, and increased production of mineral resources in Wyoming is extremely bright. This applies particularly to fossil fuels, uranium, trona, bentonite, and certain other commodities. Generally unknown, however, has been the intense exploration for copper, gold, and other metals in the Wyoming mountain areas by a number of the major metal mining companies. If we should assume that petroleum exploration and production remain static, which is highly unlikely, there will be increased development of other fossil fuels. Coal production is increasing in order to supply new and expanded coal-fired generating plants. Eventually more coal will be mined for use as a source of synthetic liquid fuels. Oil shale is another source of fuel that will be utilized in the future, however, there are many problems that have to be eliminated before this takes place.

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WYOMING MINERAL PRODUCTION AND EXPLORATION IN 1968

by

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INTRODUCTION

The 1968 Wyoming mineral production (including fuels) was valued at a record all-time high of \$565.6 million, according to preliminary figures compiled by the U.S. Bureau of Mines. This was an increase of 7 percent over the 1967 production of \$530.7 million. Petroleum output accounted for 68 percent of the 1968 production figures. Wyoming lead all of the Rocky Mountain States in the number of oil and gas wells completed.

Wyoming ranks twelveth in the nation in overall mineral production, first in the production of trona and bentonite, second in the production of uranium, and fifth in petroleum production.

NONMETALS

Trona. The production of soda ash from the trona mines west of Green River, increased in 1968. This is the largest mining industry in the State. The largest operator, in the trona area, Food Machinery Chemical Corporation, planned on sinking a fourth shaft to improve mine ventilation and handle expanding ore requirements. Stauffer Chemical Company completed an addition to its trona refinery which increased its capacity from 500,000 to 800,000 tons per year. Allied Chemical Corporation has nearly completed its \$25 million trona mining and processing operation. The mining operation is located 1500 feet below

ground. Winston Brothers Company, a contractor to Texas Gulf Sulphur began sinking a 16-foot inside-diameter shaft to a depth of about 1400 feet.

Bentonite. Bentonite production increased in 1968. Wyoming produces approximately 75 percent of the nation's output from operations in Big Horn, Crook, Johnson, Natrona, and Weston Counties.

Gypsum. Gypsum production also increased in 1968. Most of the production came from the operations of the Big Horn Gypsum Company at Cody, and Georgia-Pacific Corporation near Lovell.

Phosphate Rock. San Francisco Chemical Company operated an open-pit mine and beneficiation plant near Sage in Lincoln County. Production came from ore mined in Wyoming and ore mined from company-owned facilities in Utah that was processed in Wyoming. Mountain Fuel Supply Company supplied Wyoming-mined phosphate rock to fertilizer-manufacturing companies in California, British Columbia, and Japan for test manufacturing purposes.

Sulfur. Elemental sulfur is produced from natural gas processing plants in Fremont County and several other counties in the Bighorn Basin. Wyoming sulfur is utilized in the manufacture of sulfuric acid at plants in Fremont County, which, in turn is used in the processing of uranium ore and in the petroleum industry. In order to meet increased demands from Shirley Basin uranium mills, Kennecott Copper Corporation planned to construct a sulfuric acid bulk storage station at Medicine Bow. The acid is to be delivered by rail from Kennecott's Utah Copper Division smelter.

Cement. The production of cement from the Monolith Portland Midwest Company's plant near Laramie, increased in 1968. Wyoming Construction

Company (Monolith's subsidiary) mined cement rock, gypsum, limestone, and sandstone in Albany County for use in the manufacture of cement.

Miscellaneous. Brick, clay pipe and tile continued to be produced from clay mined near Evanston and Lovell. Limestone was mined near Wheatland and Guernsey. Limestone, used in sugar refining, was mined in Goshen, Laramie, Teton, and Washakie Counties. Sunset Rock Quarry at Labarge marketed a hard sandstone called Teton Moss Back for building veneer. Pumice was mined from the Leucite Hills area, north of Rock Springs. Feldspar was mined at Casper Mountain. Jade and other semi-precious stones are mined sporadically from various areas in Fremont County.

METALS

Uranium. Uranium production increased about eight percent in 1968. Approximately 25 percent of the total U.S. uranium production comes from Wyoming.

Most of the uranium production continues to be produced from the open-pit mines in the Gas Hills area of Fremont and Natrona Counties, however, important production also comes from the Baggs area in Carbon County, the Hauber mine in Crook County, Petrotonics mine in the Shirley Basin area, and various operations in Campbell, Converse, and Crook Counties.

Utah Construction and Mining Company will spend about \$20 million in developing a new open-pit mine and building a 1500 a ton per day mill in the Shirley Basin area. Since 1960, Utah has been recovering uranium here by underground solution mining methods.

Herr-McGee Corporation reportedly has announced plans for mine development and a uranium processing plant in the Powder River Basin area. This firm is currently developing a new open pit in the Shirley Basin area. Petrochemicals expanded its mill in the Shirley Basin area to 1000 tons per day.

Iron. Iron ore output increased slightly in 1968. Production came from the following operations: U.S. Steel at Atlantic City, Colorado Fuel and Iron at Sunrise, Plicoflex at Iron Mountain, and U.S. Aggregate Company in the Laramie Range.

Vanadium. No Wyoming uranium ores were processed for vanadium in 1968, however, ore was stockpiled for processing at the Mines Development Inc. uranium mill at Edgemont, S.D.

MINERAL FUELS

Coal. Coal production increased slightly in 1968. Most of the coal production came from the large stripping operations of the Dave Johnson mine (Pacific Power and Light), Wyodak Resources Development Corporation, Kemmerer Coal Company, Big Horn Coal Company, and Rosebud Coal Company. Pacific Power and Light Company will construct an additional steam-electric generating plant which will be in service by 1970. By late 1971, Utah Power and Light Company intends to have completed a 330 megawatt steam generating third unit to the Naughton plant. Black Hills Power and Light will install a 20 megawatt, coal-fired, electric generating plant in 1969.

EXPLORATION AND OUTLOOK

Exploration for mineral deposits in Wyoming during 1968, included studies by the U.S. Bureau of Mines, U.S. Geological Survey, Wyoming Geological Survey, and several major mining companies on copper, molybdenum, gold, silver, platinum-palladium, iron, uranium, phosphate rock, sulfur, trona, coal, limestone, bentonite, gypsum, and glass sand. Many thousands of new uranium claims have been located, and thousands of feet of exploration drilling have been done in such areas as Copper Mountain, Poison Spider, Red Desert, Gas Hills, Shirley Basin, and other areas in Converse and Fremont Counties. Substantial increases in new uranium reserves are necessary to supply raw fuel material for new nuclear reactors.

The outlook for future exploration, development, and increased production of mineral resources in Wyoming is extremely bright. There will be increased development of fossil fuels, uranium, trona, bentonite, and certain other commodities. Coal production is increasing to supply new and expanded coal-fired generating plants. More coal will be mined in the future for use as a source of synthetic liquid fuels.

WYOMING MINERAL PRODUCTION AND EXPLORATION IN 1969

by

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Geological Survey of Wyoming

INTRODUCTION

The 1969 Wyoming mineral production (including fuels) was valued at a record all-time high of \$616.7 million, according to preliminary figures compiled by the U.S. Bureau of Mines. This was an increase of 7 percent or \$40.5 million over the 1968 record production. Mineral fuels (exclusive of coal) accounted for 75 percent of the 1969 production figures. Wyoming lead all of the Rocky Mountain States in the number of oil and gas wells completed.

Fifteen of the State's 31 minerals recorded increases in both quantity and value.

Wyoming ranks twelveth in the nation in overall mineral production, first in the production of trona and bentonite, second in the production of uranium, and fifth in petroleum production. Active drilling operations were located in 21 of the 23 counties in the state throughout the year.

NONMETALS

Trona. The production of soda ash from the trona mines west of Green River, increased in 1969. This is the largest mining industry in the State. The largest operator, in the trona area, Food Machinery Chemical Corporation, is the nation's largest producer of soda ash at one plant. Stauffer Chemical Company began expanding its production capacity to 950,000 tons of soda ash per year. Allied Chemical Corporation went on stream with its 1,500 ton-per day

trona mining and processing operation. The mining operation is located 1500 feet below ground. Winston Brothers Company, a contractor to Texas Gulf Sulphur completed sinking a 16-foot inside-diameter shaft to a depth of about 1400 feet.

Bentonite. Bentonite production increased in 1969. Wyoming produces approximately 75 percent of the nation's output from operations in Big Horn, Crook, Johnson, Natrona, and Weston Counties. WyoBen Products Company is building a new bentonite plant just west of Lovell, and American Colloid is expanding its mill for increased production in the same area.

Gypsum. Gypsum production also increased in 1969. Most of the production came from the operations of the Big Horn Gypsum Company at Cody, and Georgia-Pacific Corporation near Lovell.

Phosphate Rock. The production of phosphate rock declined in 1969. Production came from ore mined near Sage, Wyoming, and ore mined from nearby Utah that was processed in Wyoming.

Sulfur. Elemental sulfur is produced from natural gas processing plants in Fremont County and several other counties in the Bighorn Basin. Purvin & Gertz, Inc. began sulfur recovery at the rate of 25 tons-per day from sour gas produced near Worland. Wyoming sulfur is utilized in the manufacture of sulfuric acid at plants in Fremont County, which in turn is used in the processing of uranium ore and in the petroleum industry.

Cement. The production of cement from the Monolith Portland Midwest Company's plant near Laramie, decreased in 1969. Wyoming Construction

Company (Monolith's subsidiary) mined cement rock, gypsum, limestone, and sandstone in Albany County for use in the manufacture of cement.

Miscellaneous. Brick, clay pipe and tile continued to be produced from clay mined near Evanston and Lovell. Limestone was mined near Wheatland and Guernsey. Limestone, used in sugar refining, was mined in Goshen, Laramie, Teton, and Washakie Counties. Sunset Rock Quarry at Labarge marketed a hard sandstone called Teton Moss Back for building veneer. Pumice was mined from the Leucite Hills area, north of Rock Springs. Feldspar was mined at Copper Mountain and processed at a newly constructed mill at Bonneville by the Northwestern Feldspar Corporation. Jade and other semi-precious stones are mined sporadically from various areas in Fremont County.

METALS

Uranium. Uranium tonnage production increased, but decreased in value in 1969. There were less mining operations, but greater tonnage was produced from the remaining mining operations. The State's reserves were estimated at 32 million tons by the U.S. Bureau of Mines, Wyoming is number one in tonnage, but ranks second to New Mexico in tonnage of contained uranium. Approximately 25 percent of the total U.S. uranium production comes from Wyoming.

Most of the uranium production continued to be produced from the open-pit mines in the Gas Hills area of Fremont and Natrona Counties, however, important production also comes from the Baggs area in Carbon County, the Hauber mine in Crook County, Petrotomics mine in the Shirley Basin area, and various operations in Campbell, Converse, and Crook Counties.

Kerr-McGee Corporation reportedly has announced plans for mine development and a uranium processing plant in the Powder River Basin area. This firm is currently developing a new open pit, the Walker mine, in the Shirley Basin area. Petrotomics will expand its mill in the Shirley Basin area to 1500 tons per day to mill ore from Kerr-McGee's new mine.

Iron. Iron ore output increased in 1969. Production came from the following operations: U.S. Steel at Atlantic City, Colorado Fuel and Iron at Sunrise, Plicoflex at Iron Mountain, and U.S. Aggregate Company in the Laramie Range.

Vanadium. No Wyoming uranium ores were reported processed for vanadium in 1969, however, ore was stockpiled for processing at the Mines Development Inc. uranium mill at Edgemont, S.D.

Other. Minor amounts of gold, silver and copper were produced.

MINERAL FUELS

Coal. Coal production increased 20 percent in 1969. Most of the coal production came from the large stripping operations of the Dave Johnson mine (Pacific Power and Light), Wyodak Resources Development Corporation, Kemmerer Coal Company, Big Horn Coal Company, and Rosebud Coal Company. Pacific Power and Light Company will construct an additional steam-electric generating plant in 1971. This 1.5 million kilowatt coal-fired generating plant complex, to be built northeast of Rock Springs, will be the second largest facility of this type west of the Mississippi River. Partial power production will start in 1974. By late 1971, Utah Power and Light Company intends to have completed a 330-megawatt steam generating third unit to the Naughton plant.

EXPLORATION AND OUTLOOK

Exploration for mineral deposits in Wyoming during 1969, included studies by the U.S. Bureau of Mines, U.S. Geological Survey, Wyoming Geological Survey, and major mining companies, on copper, molybdenum, gold, silver, platinum-palladium, iron, uranium, phosphate rock, sulfur, trona, coal, limestone, bentonite, gypsum, and glass sand. Although the uranium market has currently slackened somewhat, Wyoming leads the nation in uranium exploration and development. The Powder River Basin and Shirley Basin areas are two of the country's leading exploration targets. Elsewhere in Wyoming, exploration has been undertaken in the Wasatch Formation in the South Pass area, and seven mile long uranium mineralized zone has been reported south of Green Mountain, Fremont County.

American Metals Climax (AMAX) has completed exploration work in the Kirwin area of Park County on what is hoped to be a commercially exploitable copper ore body.

The outlook for future exploration, development, and increased production of mineral resources in Wyoming continues to be extremely bright. There will be increased development of fossil fuels, uranium, trona, bentonite, and certain other commodities. Coal production is increasing to supply new and expanded coal-fired generating plants. More coal will be mined in the future for use as a source of synthetic liquid fuels and chemicals.