

**MINERALS  
IN THE  
ECONOMY  
OF  
SOUTH DAKOTA**

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**BUREAU OF MINES ★ UNITED STATES DEPARTMENT OF THE INTERIOR**  
IN COOPERATION WITH  
**SOUTH DAKOTA STATE GEOLOGICAL SURVEY**

# MINERALS IN THE ECONOMY OF SOUTH DAKOTA

This current report has been prepared by the Bureau of Mines, U.S. Department of the Interior, to—

1. Provide the latest available data and information on the mineral industry South Dakota.
2. Invite comment, revisions, or additional information on the subject.

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# MINERALS IN THE ECONOMY OF SOUTH DAKOTA

## INTRODUCTION

South Dakota (area 77,047 square miles, population 689,000) is primarily an agricultural State; however, mining is a significant source of income, following agriculture, tourism, and manufacturing. Gold is the leading mineral commodity produced in terms of value, followed by cement, stone, sand and gravel, petroleum, bentonite, and lime. Nationally, South Dakota ranks first among the States in gold production. In 1977, the value of South Dakota's mineral production reached an alltime high. The mineral production revenues were 6 percent of those for agriculture.

## GENERAL MINERAL SITUATION

The value of minerals produced in South Dakota in 1977 was about \$110 million; this record high was an 8-percent increase above the 1976 value. Principal factors contributing to the increase were major advances in gold prices and increased crude petroleum production. Seventeen mineral commodities were produced: 3 metals and 14 nonmetals or industrial minerals. Metals, exclusively from the Black Hills district, accounted for 42 percent of South Dakota's mineral production value.

The quantities and values of the various minerals produced in the State are presented in table 1. On an annual per capita basis, South Dakota produces about \$147 worth of nonfuel minerals, compared with a national average of about \$79. The State's annual mineral production represented a value of \$1,428 per square mile in 1977, and approximately 2,700 people (1 percent of nonagricultural employment) had primary employment in the mining industry, an 8-percent increase compared with the 1976 figure. Statewide, the average hourly earnings of those engaged in mining were \$6.36, compared with \$4.43 for the total private nonagricultural sector.

Recent studies conducted by two of the State's leading educational institutions indicate that the contribution of the mineral industry to South Dakota's economy can be conservatively estimated at \$58 million annually in the form of payroll, goods and services, and other income, from the nearly 3,000 primary jobs involved. The number of secondary jobs and indirect income produced would be at least another 2-1/2 times as many jobs and dollars of income produced. The role played by the major minerals produced in the State in helping meet the Nation's mineral supply needs is shown in table 2. The ownership of the lands from which the State's mineral production values were derived in 1977 is presented in table 3.

During 1977 the mineral production and processing base of the State was increased by the addition of new mining operations and the expansion of mineral processing facilities. The Sequoya Granite Co. began quarrying operations in Grant County for the production of monument and ornamental stone. Granite has been produced from this part of the State for the past 70 years and is world famous because of its unique mineral composition, which gives it a rich, dark color.

TABLE 1. - Mineral production in South Dakota<sup>1</sup>

Mineral	1976		1977 <sup>p</sup>	
	Quantity	Value, thousand dollars	Quantity	Value, thousand dollars
Clays <sup>2</sup> .....	124	137	97	113
Gem stones.....	NA	44	NA	44
Gold (recoverable content of ores, etc.).....	318,511	39,916	302,400	44,825
Gypsum.....	W	W	28	156
Mica (scrap).....	-	-	( <sup>3</sup> )	116
Petroleum (crude).....	447	5,519	629	8,177
Sand and gravel.....	5,763	8,057	5,700	8,000
Silver (recoverable content of ores, etc.)				
thousand troy ounces..	58	253	62	287
Stone.....	3,241	17,240	3,008	16,662
Value of items that cannot be disclosed: Beryllium concentrate, cement (masonry and portland), clays (bentonite), feldspar, gypsum (1976), iron ore, lime, natural gas liquids, and values indicated by symbol W.....	XX	30,365	XX	31,082
Total.....	XX	101,531	XX	109,462

<sup>p</sup> Preliminary. NA Not available. XX Not applicable.

W Withheld to avoid disclosing individual company confidential data; included with "Value of items that cannot be disclosed."

<sup>1</sup> Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

<sup>2</sup> Excludes bentonite; included with "Value of items that cannot be disclosed."

<sup>3</sup> Less than 1/2 unit.

TABLE 2. - South Dakota's role in U.S. mineral supply  
in 1977<sup>P</sup>

Commodity	Share of U.S. output, percent	Rank in Nation
Gold.....	30	1
Bentonite.....	4	5
Granite (dimension stone).....	3	12
Sand and gravel.....	.6	44
Crushed and broken stone.....	.4	39
Silver.....	.2	11
Petroleum (crude).....	.02	28

<sup>P</sup> Preliminary.

TABLE 3. - South Dakota's land ownership and mineral production

Land classification	Ownership, percent	State production value in 1977, <sup>P</sup> percent
Federal <sup>1</sup> .....	10	2
State.....	11	23
Private.....	79	75
Total.....	100	100

<sup>P</sup> Preliminary.

<sup>1</sup>Includes lands to which patents have been issued but mineral rights retained by Federal Government.

Near Deadwood in Lawrence County, the Alpine-Strawberry Mining Co. started operations to recover gold from placer material along the banks of Whitewood Creek. The processing plant, a 180-ton dredge, has been put on solid ground, and the ore is delivered by bulldozers and loaders.

In the northern Black Hills area, the Homestake Mining Co. (fig. 1) completed a \$14.2 million environmental enhancement project at its gold mining operation. The project entailed the construction of a tailings dam and impoundment basin, slurry pumping plant, waste water treatment plant, water recycling works, pipelines, and related facilities, which will prevent their mine tailings and waste discharges from entering the area's freshwater streams.

South Dakota's largest mineral processing facility, the State-owned cement plant, in Rapid City, expanded its production capacity. The changeover to coal from natural gas and a new dry-process system to manufacture cement were parts of a \$36 million project designed to double the plant's capacity to 6 million barrels annually (fig. 2).

The recent increased demand for uranium to fuel nuclear power generators has resulted in greatly increased exploratory activity in the State. Eleven operators have drilled several thousand test holes, totaling half a million feet, in Fall River, Custer, Lawrence, Meade, Butte, Harding, Perkins, and

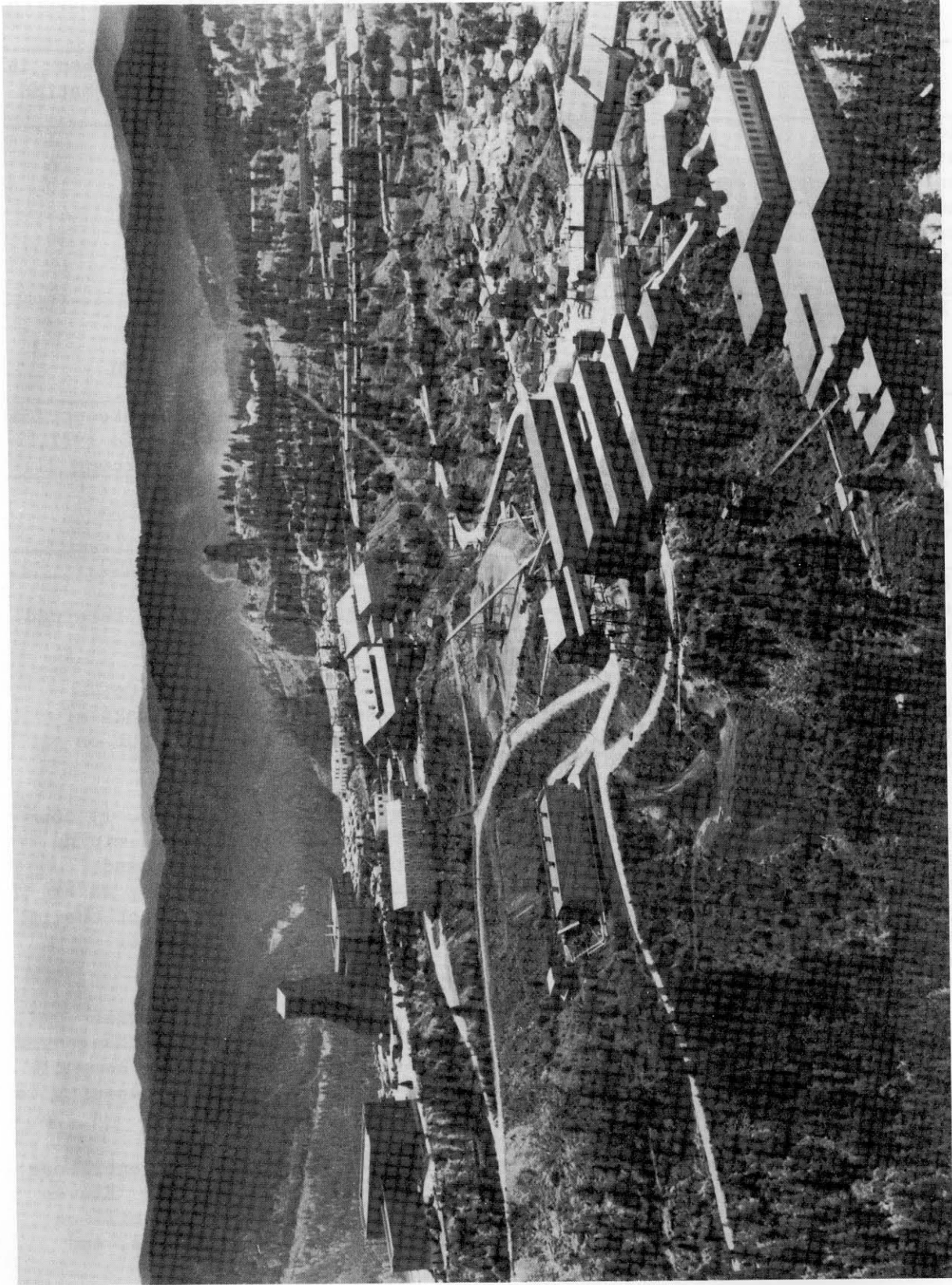


FIGURE 1. - Surface plant of Homestake gold mine at Lead. (Courtesy, Homestake Mining Co.)

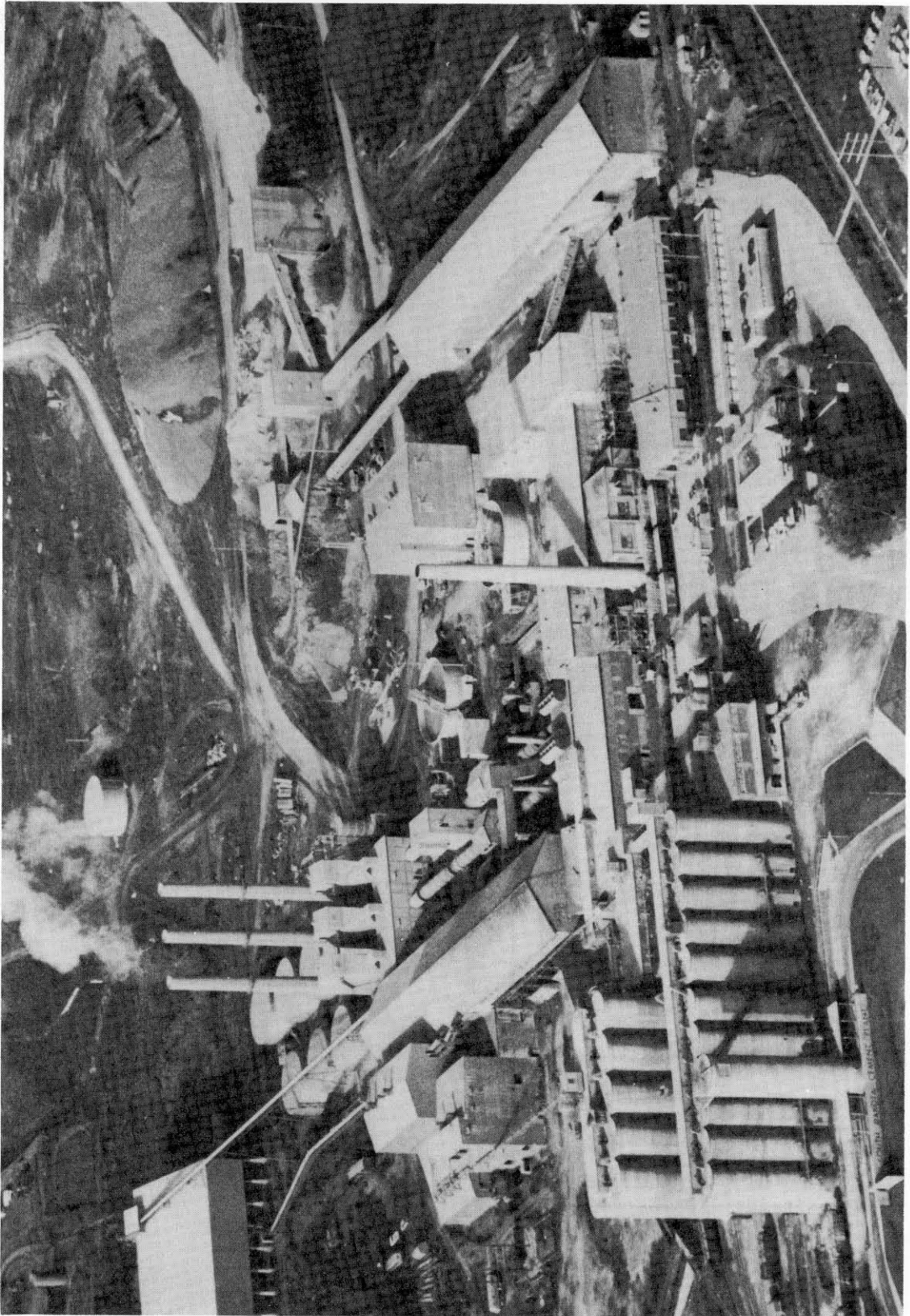
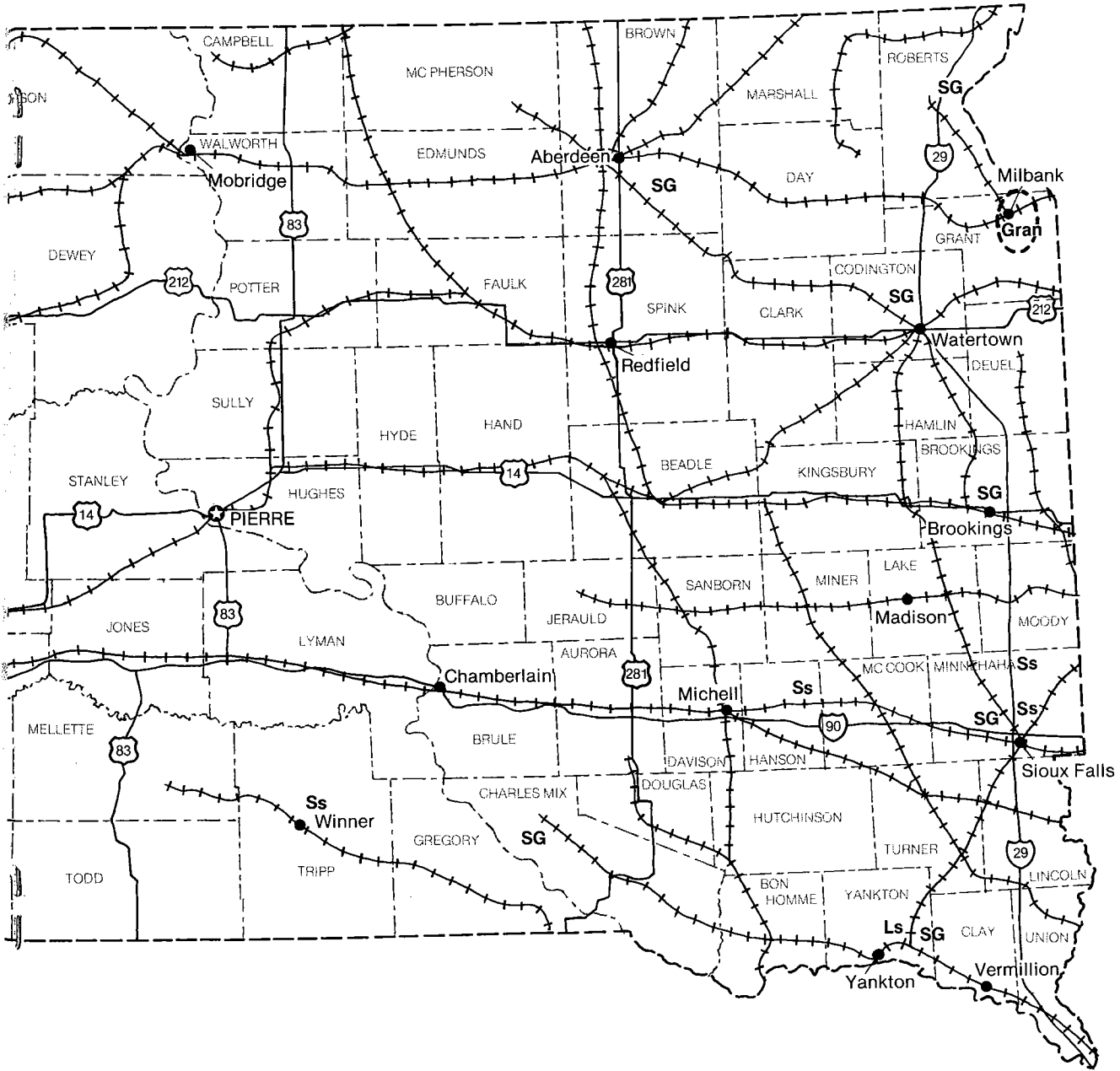


FIGURE 2. - State-owned cement plant at Rapid City. (Courtesy, Rapid City Journal)





# DAKOTA



Corson Counties. Indications are good that mining operations in the Edgemont district of Fall River and Custer Counties, shut down since the late 1960's, may resume by 1981 or 1982. Tennessee Valley Authority (TVA), Union Carbide, and Wyoming Minerals Corp., all have extensive lease holdings in the district. Two of the companies have indicated tentative plans to open operations in the near future.

In 1977, South Dakota experienced its third most active year in the number of oil and gas test wells drilled. Of the 53 test wells drilled, 35 resulted in producing wells. Six wells were new discoveries, and 29 were field development wells. The 53 holes totaled more than 400,000 feet of drilling. A significant natural gas discovery was made in southwestern Harding County. The discovery well, which lies less than 3-1/2 miles from an established natural gasline, was completed at a depth of approximately 1,600 feet and was tested at 980,000 cubic feet per day. Permits have been issued for eight additional locations adjacent to the gas discovery, and good promise of a commercial gasfield exists.

Oil and gas production was at a record high during 1977. Oil was pumped from 69 wells in 13 fields, compared with 43 wells in 12 fields in 1976.

The mineral industry of South Dakota is responsible for significant contributions of revenue used to operate State Government. State income derived from mineral bonuses, royalties, rentals, and mineral taxes is shown in table 4.

TABLE 4. - South Dakota's income from mineral bonuses, royalties, rentals, and taxes

Source	Fiscal year <sup>1</sup>		
	1975	1976	1977
Federal <sup>2</sup> .....	\$343,069	\$333,384	\$332,325
State.....	582,725	786,763	881,155
Ore tax <sup>3</sup> .....	-	310,090	536,401
Total.....	925,794	1,430,237	1,749,881

<sup>1</sup>Based on July-June fiscal year except for Federal fiscal year 1977 of October-September.

<sup>2</sup>Mineral bonuses, royalties, and rentals paid to South Dakota under Section 25 of the Mineral Leasing Act of February 25, 1920.

<sup>3</sup>South Dakota ore tax became effective July 1, 1976. Tax computed at 4 percent of the net profit on mineral operations extracting \$100,000 or more of minerals annually.

#### TRENDS AND ISSUES

##### Federal Legislation and Hearings

The U.S. Forest Service, as part of its Roadless Area Review and Evaluation II (RARE II) program, inventoried roadless and undeveloped areas in the State as to their suitability for inclusion in the Wilderness System. Lands under study include those in national forests and national grasslands, which

are under Forest Service management and comprise about two-thirds of all the Federal lands in South Dakota. Five tracts totaling approximately 59,000 acres were inventoried as possible areas for inclusion into the system. Further studies are being conducted to evaluate the economic impact of these proposed land withdrawals. Hearings were held in the State to receive public input concerning this proposed action.

The Environmental Protection Agency is in the process of adopting rules for underground injection control (UIC). These rules apply to injection of air or other fluids into any subsurface formation that has potential as a source of supply for drinking water. The UIC rules will supersede State regulations if they are less comprehensive than the UIC rules. The rules call for more intensive monitoring activities than are usually practiced in the State.

#### Federal Programs

Mineral resource agencies of the U.S. Department of the Interior were engaged in a variety of activities in the State during 1977. The U.S. Geological Survey (USGS) conducted topographic mapping and hydrological and mineral investigation study projects. An investigation was conducted by the USGS to assess the potential of Precambrian rocks in the Black Hills area as a source of uranium. The results of the investigation were released early in the year and indicated that uranium- and thorium-bearing rocks of potential economic significance have been discovered near the community of Nemo. As a result of these findings, a claim-staking rush was touched off in the area.

In accordance with the National Environmental Policy Act of 1969 (83 Stat. 852), the USGS must assure that operations on oil and gas leases under its jurisdiction are conducted with due regard for protection of the environment. As a result of this mandate, the USGS in 1976 adopted rules requiring holders of Federal oil and gas leases to file a comprehensive plan of their proposed operations and surface uses so that USGS could evaluate the environmental impact before authorizing exploration or other related activities. Oil and gas operators in the State are concerned because of the delays they often encounter in the startup of drilling operations on Federal tracts; the delays are attributed to time required for preparing and submitting plans, reviewing by Federal regulatory agencies, making changes in plans that are required for environmental acceptability by the reviewing agency, field inspections, and other permit-processing requirements.

The Federal Bureau of Mines has in effect grants to organizations within the State as follows:

1. \$39,880 to the University of South Dakota for a project entitled "The Economic Impact of the Mineral Industry of South Dakota."
2. \$24,443 to the South Dakota School of Mines and Technology for a project entitled "Mineral Industry Locations in North and South Dakota."

3. \$20,628 to the South Dakota School of Mines and Technology for a project entitled "Selective Dissolution of Aluminum From Tin in Bimetallic Containers."

4. \$19,347 to the South Dakota School of Mines and Technology for a project entitled "Lignite Reserves in Harding County, South Dakota."

5. \$29,158 to the South Dakota School of Mines and Technology for a project entitled "A Study of the Adsorption Characteristics of Selected Modifying Agents on Collophane and Calcite."

6. \$7,722 to the South Dakota School of Mines and Technology for a project entitled "Development of Guidelines for Safety Inspection of Wire Ropes in Underground Mines."

#### State Legislation and Hearings

The 1977 South Dakota legislature imposed a 3-percent gross profits tax on oil and gas production. A provision for the return of 50 percent of the revenue to the producing county was inadvertently omitted from the act. As a result, Harding County, where most of South Dakota's oil is produced, had financial difficulties due to increased oil development with accompanying road deterioration. The 1978 State legislature took action to correct this situation by enacting into law measures to increase the tax to 4.5 percent, until January 1980; two-thirds of the revenue will go to the county of origin, with a limit of \$300,000 to each county. The remaining one-third will go to the State. After January 1980, the revenue split will be one-half to the county and one-half to the State.

A State law enacted in 1976 required any holder having an interest in severed mineral rights to file an instrument with the appropriate county register of deeds before July 1, 1978, describing the severed mineral interest. Failure to file by the designated deadline allowed the owner of the surface estate to file an affidavit claiming sole possession of property and rights described and to obtain ownership of the mineral estate involved.

The Energy Facility Permit Act, a law passed by the South Dakota legislature in 1977, requires all new transmission and conversion facilities to have permits from the South Dakota Public Utilities Commission. The law calls for a 10-year forecast of development plans by the company requesting the permit, to insure orderly development and to head off any adverse impacts.

The Board of Natural Resource Development held hearings during the year to establish two new oilfields, to extend two fields, and to allow subsurface disposal of produced salt water.

#### State Programs

The South Dakota Geological Survey is involved in ongoing basic research projects involving geothermal resources, oil shale, oil and gas, and other mineral resources.

Several space-heating projects utilizing warm ground water are being planned in western South Dakota based on information published in a South Dakota Geological Survey report on the geothermal resources of the State. A manufacturing plant in Philip and a school building in Midland have successfully used hot subsurface water for space heating over a number of years, proving the feasibility of the method.

A project to inventory the oil shale resources of the State is continuing. The preliminary data indicate a vast resource of low-grade oil shale in South Dakota.

State Survey geologists are involved in research on oil and gas and will participate in the Fourth International Williston Basin Symposium, to be held in Billings, Mont., in the fall of 1978, to present their results in an effort to stimulate oil and gas exploration and production in the State.

The Survey, in cooperation with the U.S. Department of Energy, is conducting studies on the chemistry of surface and ground water in an attempt to relate trace elements in South Dakota's waters to economic mineral occurrences. A secondary benefit is that water quality data is provided for domestic, livestock, and industrial uses.

A program of mapping ground water and mineral resources on a county basis has been continuing for a number of years. These studies are done in cooperation with the U.S. Geological Survey, the counties, and the several conservancy subdistricts. An outgrowth of each county study is an inventory of the sand and gravel deposits of that county. A typical sand and gravel inventory shows the distribution, thickness, and general character of the deposits in the county.

Information on mineral and water resources is available upon request by letter or telephone or on a walk-in basis from offices of the South Dakota Geological Survey in both Vermillion and Rapid City. A large part of the Survey's work is answering requests for information from the general public and from State and Federal agencies.

## NEW PUBLICATIONS

1. McGregor, D. J. Biennial Report of the State Geologist for July 1, 1974 to June 30, 1976. S. Dak. Geol. Survey, 1977, 11 pp. (\$1.50).
2. Petsch, B. A Tourist Guide of the Black Hills. S. Dak. Geol. Survey Educational Series No. 7, 1977, map (1 inch = 5 miles) (\$1.20).
3. U.S. Bureau of Mines. Mining and Mineral Operations in the North-Central States, A Visitor Guide. BuMines SP 3-77, 1977, 120 pp. (GPO Stock No. 024-004-01897-6, \$3.25).

## SOURCES

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Science Center  
University of South Dakota  
Vermillion, S. Dak. 57069

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