

*State of South Dakota*  
*Richard Kneip, Governor*

MINERALS REPORT 17

THE MINERAL INDUSTRY  
OF SOUTH DAKOTA  
IN 1970

*by Charles D. Hoyt*

SOUTH DAKOTA GEOLOGICAL SURVEY  
VERMILLION, SOUTH DAKOTA  
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BUREAU OF MINES MINERALS YEARBOOK

# The Mineral Industry of South Dakota



UNITED STATES DEPARTMENT OF THE INTERIOR



UNITED STATES DEPARTMENT OF THE INTERIOR • Rogers C. B. Morton, Secretary

BUREAU OF MINES • Elburt F. Osborn, Director

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# The Mineral Industry of South Dakota

This chapter has been prepared under a cooperative agreement between the Bureau of Mines, U.S. Department of the Interior, and the South Dakota State Geological Survey for collecting information on all minerals except fuels.

By Charles D. Hoyt<sup>1</sup>

The 1970 value of mineral production in South Dakota rose about 12 percent above that of 1969. For the past 8 years, the total value of mineral output has remained in the range of \$50 to \$62 million per year. For 1970 metal production represented 37.5 percent of total value and nonmetals 61.9 percent. Fuels provided the remaining 0.6 percent. Compared with those of 1969, output value of metals declined and values of nonmetals and fuels rose.

Gold represented 91 percent of the metals production. Sand and gravel, stone, cement, and lime comprised 97 percent of the nonmetals total. These five commodi-

ties combined represented 94 percent of the total South Dakota mineral production.

In 1970 South Dakota retained its position as the Nation's leading gold producer, total output was 578,716 ounces, valued at \$21.1 million. As in the past, the Homestake Mining Co.'s large underground mine at Lead produced almost all of the output.

**Employment and Injuries.**—The extent of employment and injuries in the mineral industry, exclusive of the petroleum industry, is presented in table 4.

<sup>1</sup> Physical scientist, Division of Nonferrous Metals.

Table I.—Mineral production in South Dakota<sup>1</sup>

Mineral	1969		1970	
	Quantity	Value (thousands)	Quantity	Value (thousands)
Beryllium concentrate.....short tons..	46	\$23	W	W
Cement:				
Masonry.....thousand 280-pound barrels..	49	181	W	W
Portland.....thousand 376-pound barrels..	1,556	5,715	W	W
Clays.....thousand short tons..	187	1,171	165	\$946
Feldspar.....long tons..	29,434	194	17,211	114
Gem stones.....	NA	36	NA	35
Gold (recoverable content of ores, etc.).....troy ounces..	593,146	24,621	578,716	21,059
Gypsum.....thousand short tons..	11	46	15	61
Lead (recoverable content of ores, etc.).....short tons..	1	(?) 20	3	1
Mica (scrap).....do.....	423	40	(?)	34
Petroleum (crude).....thousand 42-gallon barrels..	158	362	160	374
Sand and gravel.....thousand short tons..	11,158	10,807	16,556	16,656
Silver (recoverable content of ores, etc.).....thousand troy ounces..	124	223	120	212
Stone.....thousand short tons..	2,092	10,839	1,979	13,375
Zinc.....short tons..	--	--	1	(?)
Value of items that cannot be disclosed: Columbium-tantalum concentrate (1969), lime, lithium minerals (1969), uranium, <sup>3</sup> tin (1969), vanadium (1970), and values indicated by symbol	W	683	XX	8,709
Total.....	XX	54,921	XX	61,576
Total 1967 constant dollars.....	XX	51,862	XX	\$ 55,726

<sup>p</sup> Preliminary. NA Not available. W Withheld to avoid disclosing individual company confidential data; included with "Value of items that cannot be disclosed." XX Not applicable.

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

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

<sup>3</sup> Based on estimated recoverable content, average AEC price and estimated average price for private sales.

Table 2.—Value of mineral production in South Dakota, by counties <sup>1</sup>

(Thousands)

County	1969	1970	Minerals produced in 1970, in order of value
Aurora.....	\$67	W	Sand and gravel.
Beadle.....	249	\$317	Do.
Bennett.....	7	W	Do.
Bon Homme.....	45	85	Do.
Brookings.....	259	321	Sand and gravel, stone.
Brown.....	265	302	Sand and gravel.
Brule.....	196	105	Do.
Buffalo.....	6	W	Do.
Butte.....	W	W	Clays, sand and gravel.
Campbell.....	154	188	Sand and gravel, stone.
Charles Mix.....	194	125	Sand and gravel.
Clark.....	72	W	Do.
Clay.....	27	W	Do.
Codington.....	501	681	Do.
Corson.....	50	W	Do.
Custer.....	967	200	Feldspar, sand and gravel, lime, petroleum, stone.
Davison.....	266	130	Sand and gravel.
Day.....	325	223	Do.
Deuel.....	106	123	Do.
Dewey.....	13	W	Do.
Douglas.....	196	95	Do.
Edmunds.....	89	W	Do.
Fall River.....	W	W	Uranium, vanadium, sand and gravel.
Faulk.....	148	W	Sand and gravel.
Grant.....	7,845	W	Stone, sand and gravel.
Gregory.....	204	W	Sand and gravel.
Hamlin.....	139	107	Do.
Hand.....	122	385	Do.
Hanson.....	536	W	Stone, sand and gravel.
Harding.....	402	W	Petroleum, sand and gravel.
Hughes.....	83	94	Sand and gravel.
Hutchinson.....	96	W	Do.
Hyde.....	389	W	Do.
Jackson.....	291	--	--
Jerauld.....	114	29	Sand and gravel.
Jones.....	14	W	Do.
Kingsbury.....	114	108	Do.
Lake.....	203	120	Do.
Lawrence.....	24,939	21,499	Gold, silver, sand and gravel, stone, lead, zinc.
Lincoln.....	146	237	Sand and gravel.
Lyman.....	322	W	Do.
McCook.....	75	W	Do.
McPherson.....	44	234	Do.
Marshall.....	166	189	Do.
Meade.....	176	W	Sand and gravel, gypsum.
Mellette.....	23	154	Sand and gravel.
Miner.....	54	W	Do.
Minnehaha.....	W	W	Stone, sand and gravel.
Moody.....	184	166	Sand and gravel.
Pennington.....	8,329	8,503	Cement, stone, lime, sand and gravel, clays, mica (scrap), beryllium concentrates, feldspar.
Perkins.....	248	155	Sand and gravel.
Potter.....	88	W	Do.
Roberts.....	88	91	Do.
Sanborn.....	70	4	Do.
Shannon.....	94	34	Do.
Spink.....	418	W	Do.
Stanley.....	150	W	Do.
Sully.....	135	60	Do.
Todd.....	3	14	Do.
Tripp.....	W	W	Stone, sand and gravel.
Turner.....	424	W	Sand and gravel.
Union.....	79	W	Do.
Walworth.....	70	145	Do.
Washabaugh.....	70	W	Do.
Yankton.....	86	176	Do.
Ziebach.....	235	--	--
Undistributed <sup>2</sup> .....	3,408	26,173	--
Total.....	54,921	\$61,576	

W Withheld to avoid disclosing individual company confidential data; included with "Undistributed."

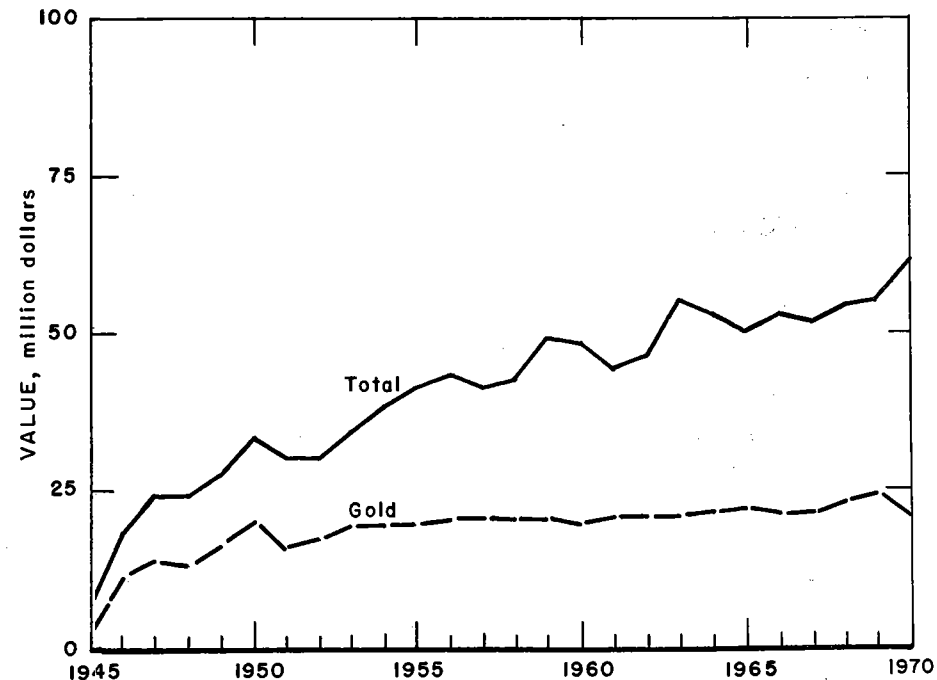
<sup>1</sup> Haakon County not listed because no production was reported.<sup>2</sup> Includes sand and gravel, and stone that cannot be assigned to specific counties, gem stones, and values indicated by symbol W.<sup>3</sup> Data does not add to total shown because of independent rounding.

Figure 1.—Value of mine production of gold, and total value of mineral production in South Dakota.

Table 3.—Indicators of South Dakota business activity

	1969	1970	Change, percent
<b>Employment and labor force, annual average:</b>			
Total labor force.....thousands..	272.4	275.0	+1.0
Employment.....do.....	264.8	266.2	+5
Unemployment.....do.....	7.6	8.8	+15.8
<b>Nonagricultural employment:</b>			
Mining.....do.....	2.3	2.2	-4.3
Construction.....do.....	7.6	7.0	-7.9
Manufacturing.....do.....	15.9	15.6	-1.9
Government.....do.....	53.5	55.6	+3.9
Other nonagricultural employment.....do.....	93.4	95.7	+2.5
<b>Personal income:</b>			
Total.....millions..	\$1,997	\$2,119	+6.2
Per capita.....do.....	\$2,986	\$3,182	+6.6
<b>Construction activity:</b>			
Highway construction contracts awarded.....millions..	\$48.3	\$54.2	+12.2
Cement shipments to and within the State thousand 376-pound barrels..	1,375.0	1,289.0	-6.3
Number of authorized residential units.....do.....	1,507	2,513	+66.8
Value of nonresidential construction.....millions..	\$22.6	\$26.4	+16.8
Farm marketing receipts.....do.....	\$986.0	\$1,015.9	+3.0
Mineral production.....do.....	\$54.9	\$64.2	+16.9

Sources: Construction Review, Streets and Roads, Farm Income Situation, Area Trends in Employment and Unemployment, Survey of Current Business, Employment and Earnings, U.S. Bureau of Mines.

Table 4.—Worktime and injury experience in the mineral industries

Year and industry	Average men working daily	Days active	Man-days worked (thousands)	Man-hours worked (thousands)	Number of injuries		Injury rates per million man-hours	
					Fatal	Nonfatal	Frequency	Severity
<b>1969:</b>								
Metal.....	1,677	311	522	4,176	2	87	21.31	4,505
Nonmetal.....	174	211	37	315	1	10	34.90	19,668
Sand and gravel.....	758	172	130	1,190	--	26	21.86	581
Stone.....	495	234	116	984	1	19	20.32	8,140
Total.....	3,104	259	805	6,665	4	142	21.91	5,068
<b>1970:<sup>p</sup></b>								
Metal.....	1,600	313	500	4,002	3	96	24.74	5,885
Nonmetal.....	175	246	43	345	--	14	40.57	1,516
Sand and gravel.....	725	183	133	1,198	--	25	20.87	1,623
Stone.....	535	240	129	1,093	1	31	29.23	6,020
Total.....	3,035	265	804	6,638	4	166	25.61	4,911

<sup>p</sup> Preliminary.

<sup>1</sup> Data may not add to totals shown because of independent rounding.

## REVIEW BY MINERAL COMMODITIES

## NONMETALS

**Cement.**—Shipments of cement in 1970 dropped slightly, compared with those of 1969. Sales were reported at 1.54 million barrels (376-pound) of portland cement and 44.35 thousand barrels (280-pound) of masonry cement during 1970.<sup>2</sup> All of the production came from the State-owned Rapid City plant operated by the South Dakota Cement Commission. Slightly over three-fourths of the cement was used in the building industry and nearly all of the remainder was used for highway construction. Almost 82 percent of the total shipments were within the State and 11 percent went to North Dakota and Wyoming.

Raw materials consumed in 1970 cement production were as follows in thousand tons: Limestone, 315; shale, 69; sand, 25; gypsum, 12; and iron ore, 5.

**Clays.**—Total output of clays in 1970 declined to 165,058 tons almost 12 percent below that of 1969. About one-third of this was bentonite and the remainder was clays used for cement, lightweight aggregate, and bricks. The American Colloid Co., which operates the only bentonite processing plant in South Dakota, obtains its raw material from South Dakota and Wyoming.

**Feldspar.**—Output of feldspar decreased from 29,434 tons in 1969, to 17,211 long tons in 1970 valued at almost \$114,000. Nearly all of this came from Custer County. Most of the production was sold to and processed by the International Minerals & Chemical Corp., which operates a grinding plant at Custer.

**Gypsum.**—The State's entire output of gypsum (15,189 tons in 1970) was used for cement production. The South Dakota Cement Commission was the operator of a small surface mine in Meade County that provided the entire output.

**Lime.**—Total output of lime in the State continued to increase. The two producers were Pete Lien & Sons at Rapid City, and the Black Hills Lime Co. at Pringle, which produced a lime for metallurgical uses.

**Sand and Gravel.**—Sand and gravel was produced in all but two counties. Of the total output of 16.6 million tons, 9.5 million (58 percent) was produced for governmental agencies. A total of 177 commercial firms operated at 180 locations; also, 78 Government-and-contractor crews oper-

ated at 132 locations. Of the total sand and gravel produced, 1.2 million tons was sand and 15.4 million tons was gravel. Minnehaha, Codington, Hand, Pennington, and Brookings Counties supplied 2.8 million tons, 17 percent of the State total.

**Stone.**—Stone production of nearly 2 million tons was obtained from granite, quartzite, limestone, quartz, traprock, and miscellaneous stone. The value of granite, mostly prepared for monumental and architectural purposes, amounted to \$10.4 million or 78 percent of the \$13.4 million total value of stone production. Limestone and quartzite production was valued at \$2.8 million.

Output of monumental and architectural granite came from five companies operating in Grant County, in the northeast corner of the State.

## METALS

**Gold and Silver.**—Gold output at the Homestake Mining Co.'s Lead operation declined slightly, to 578,716 ounces. Also 117,000 ounces of byproduct silver was produced. Nearly 2 million tons of ore was mined, and processed. Measured and indicated ore reserves at the end of 1970 were 10.4 million tons.

Homestake announced plans for a 5-year, \$8 million, deep-level development program, which will require sinking of a six-compartment shaft from the 4,850-foot level to the 7,400-foot level.

In late 1970, Homestake was ordered by the Federal Government to discontinue discharges of mercury into Whitewood Creek. To meet this requirement, plans were underway at yearend to completely eliminate the use of mercury (for amalgamation) in Homestake's milling process and use an all-cyanide method of extracting gold from ore. This changeover was expected to be implemented in early 1971.

**Lead.**—A very small amount of lead was recovered as a byproduct of silver ore produced by the Silver Queen Mine Co., operating in Lawrence County.

**Uranium.**—Output of uranium expanded in 1970, and sales were valued at an estimated \$9 to \$9.5 million.<sup>3</sup> All production came from the 650-ton-per-day mill at Edgemont, which is operated by Mines Development, Inc., a totally owned subsidiary of

<sup>2</sup> Rapid City Journal. Cement Shipments Decline. No. 28172, 92nd year, Jan. 14, 1971, p. 15.

<sup>3</sup> Susquehanna Corp. 1970 Annual Report, p. 14.

Table 5.—South Dakota: Sand and gravel sold or used by producers, by counties

(Thousand short tons and thousand dollars)

County	1969			1970		
	Number of mines	Quantity	Value	Number of mines	Quantity	Value
Aurora.....	2	72	\$67	3	W	W
Beadle.....	8	245	249	5	337	\$317
Bennett.....	1	1	1	1	15	W
Bon Homme.....	1	81	45	3	W	85
Brookings.....	15	232	251	9	385	313
Brown.....	13	315	265	8	343	302
Brule.....	7	191	196	3	118	105
Buffalo.....	1	4	6	6	W	W
Butte.....	4	167	81	4	122	96
Campbell.....	5	138	154	4	118	138
Charles Mix.....	8	193	194	9	143	125
Clark.....	2	72	72	1	W	W
Clay.....	2	53	27	2	W	W
Codington.....	13	545	501	12	723	681
Corson.....	3	81	50	3	W	W
Custer.....	4	693	672	2	W	W
Davison.....	13	296	266	8	161	130
Day.....	8	312	325	5	328	223
Deuel.....	5	131	106	5	181	123
Dewey.....	3	14	13	3	W	W
Douglas.....	7	179	196	4	104	95
Edmunds.....	3	90	89	2	W	W
Fall River.....	2	47	48	2	W	W
Faulk.....	5	164	148	3	W	W
Grant.....	5	224	225	2	W	W
Gregory.....	10	210	204	6	W	W
Hamlin.....	6	113	139	5	174	107
Hand.....	6	109	122	14	446	385
Harding.....	2	59	59	3	W	W
Hughes.....	1	83	33	4	120	94
Hutchinson.....	6	130	96	4	W	W
Hyde.....	3	387	389	2	W	W
Jackson.....	4	291	291	--	--	--
Jerauld.....	8	111	114	2	80	29
Jones.....	1	14	14	2	75	W
Kingsbury.....	7	114	114	7	112	103
Lake.....	12	274	203	7	177	120
Lawrence.....	4	41	42	4	271	194
Lincoln.....	6	134	146	8	279	237
Lyman.....	12	340	322	7	W	W
McCook.....	2	125	75	2	W	W
McPherson.....	2	41	44	4	291	234
Marshall.....	14	152	166	7	162	189
Meade.....	9	140	130	1	65	79
Mellette.....	3	23	23	4	178	154
Miner.....	2	52	54	1	W	W
Minnehaha.....	18	713	686	14	892	803
Moody.....	8	171	184	6	215	166
Pennington.....	9	446	553	8	339	437
Perkins.....	12	207	248	8	116	155
Potter.....	2	88	88	2	W	W
Roberts.....	5	95	88	3	75	91
Sanborn.....	3	86	70	1	28	4
Shannon.....	2	92	94	2	45	34
Spink.....	7	433	418	4	W	W
Stanley.....	4	131	150	1	W	W
Sully.....	4	175	135	3	W	60
Todd.....	1	7	3	1	25	14
Tripp.....	--	--	--	1	15	W
Turner.....	7	385	424	3	W	W
Union.....	5	95	79	1	W	W
Walworth.....	6	101	70	5	223	145
Washabaugh.....	2	70	70	2	W	W
Yankton.....	5	88	86	5	272	176
Ziebach.....	5	295	285	--	--	--
Undistributed <sup>1</sup> .....	--	--	--	39	8,754	9,905
Total <sup>2</sup> .....	364	11,153	10,807	312	16,556	16,656

W Withheld to avoid disclosing individual company confidential data; included with "Undistributed."

<sup>1</sup> Includes Hanson County (1970) and some sand and gravel not assigned to any specific counties.<sup>2</sup> Data may not add to totals shown because of independent rounding.

Table 6.—South Dakota: Sand and gravel sold or used by producers, by classes of operations and uses

(Thousand short tons and thousand dollars)

Class of operation and use	1969		1970	
	Quantity	Value	Quantity	Value
Commercial operations:				
Sand:				
Building.....	485	\$529	496	\$567
Fill.....	68	54	110	60
Paving.....	148	207	254	287
Other uses <sup>1</sup> .....	--	--	56	69
Total <sup>2</sup> .....	701	790	917	983
Gravel:				
Building.....	217	313	152	245
Fill.....	43	38	117	91
Paving.....	2,282	2,188	4,762	4,062
Miscellaneous.....	9	8	889	691
Other uses <sup>3</sup> .....	--	--	179	165
Total <sup>2</sup> .....	2,551	2,548	6,098	5,254
Government-and-contractor operations:				
Sand:				
Building.....	5	4	--	--
Fill.....	1	1	1	1
Paving.....	1,015	982	248	205
Other uses.....	21	12	25	13
Total <sup>2</sup> .....	1,041	999	274	218
Gravel:				
Building.....	624	629	2	2
Fill.....	19	18	2	2
Paving.....	6,222	5,822	9,144	10,079
Other uses.....	--	--	118	118
Total <sup>2</sup> .....	6,864	6,470	9,266	10,201
Total sand and gravel <sup>2</sup> .....	11,158	10,807	16,556	16,656

<sup>1</sup> Includes unground sands.<sup>2</sup> Data may not add to totals shown because of independent rounding.<sup>3</sup> Includes railroad ballast (1970), and other gravel.

Table 7.—South Dakota: Stone sold or used by producers, by kinds

(Thousand short tons and thousand dollars)

Kind of stone	1969		1970	
	Quantity	Value	Quantity	Value
Dimension:				
Limestone.....	--	--	W	W
Granite.....	44	\$7,620	63	\$10,409
Quartz.....	( <sup>1</sup> )	W	( <sup>1</sup> )	2
Crushed and broken:				
Limestone.....	989	1,207	1,043	1,052
Quartz.....	W	29	W	40
Quartzite.....	1,035	1,930	833	1,764
Sandstone.....	W	W	--	--
Traprock.....	3	8	3	8
Other stone.....	20	44	36	100
Total <sup>2</sup> .....	2,092	10,839	1,979	13,375

W Withheld to avoid disclosing individual company confidential data; included with "Other stone."

<sup>1</sup> Less than 1/2 unit; included with "Other stone."<sup>2</sup> Data may not add to totals shown because of independent rounding.

Table 8.—South Dakota: Stone sold or used by producers, by uses

(Thousand short tons and thousand dollars, unless otherwise specified)

Use	1969		1970	
	Quantity	Value	Quantity	Value
<b>Dimension stone:</b>				
Rough construction and rubble.....	3	W	W	W
Dressed architectural.....thousand cubic feet...}	145	W	1 557	W
Rough monumental.....do.....}				
Dressed monumental.....do.....}	349	\$4,969	118	\$2,818
Flagging.....do.....}			W	W
Total (approximate).....short tons.....	44	7,622	68	10,462
<b>Crushed and broken stone:</b>				
Concrete aggregates.....	524	1,004	453	847
Other road aggregates.....	714	1,108	777	1,276
Cement.....	304	222	310	218
Railroad ballast.....	321	511	207	( <sup>3</sup> )
Refractory stone.....	35	96	( <sup>2</sup> )	( <sup>3</sup> )
Riprap and jetty stone.....	62	90	37	54
Other <sup>1</sup> .....	88	185	125	518
Total <sup>4</sup> .....	2,048	3,217	1,911	2,913
Grand total.....	2,092	10,839	1,979	13,375

W Withheld to avoid disclosing individual company confidential data; included in "Total."

<sup>1</sup> Data includes a small amount of stone used in structural and sanitary purposes.<sup>2</sup> Withheld to avoid disclosing individual company confidential data; included with "Other."<sup>3</sup> Includes stone used for lime manufacture, roofing aggregates, stone sand, agricultural lime (1970), terrazzo (1970), refractory (1970), abrasives (1969), and small amounts of crushed and broken stone not listed.<sup>4</sup> Data may not add to totals shown because of independent rounding.

Table 9.—South Dakota: Mine production (recoverable) of gold and silver

	1968	1969	1970
<b>Mines producing—</b>			
Lode.....	1	2	2
Placer.....	2	1	--
<b>Material sold or treated:</b>			
Gold ore.....thousand short tons.....	1,922	1,985	1,954
<b>Production (recoverable):</b>			
<b>Quantity:</b>			
Gold.....troy ounces.....	593,052	593,146	578,716
Silver.....do.....	137,668	124,497	119,766
<b>Value:</b>			
Gold.....thousands.....	\$23,283	\$24,621	\$21,059
Silver.....do.....	\$295	\$223	\$212
Total.....do.....	\$23,578	\$24,844	\$21,271

<sup>1</sup> Excludes placer gravel.

Table 10.—South Dakota: Homestake mine ore milled and receipts for bullion

Year	Ore milled (thousand short tons)	Receipts for bullion products	
		Total (thousands)	Per ton
1966.....	2,002	\$21,309	\$10.64
1967.....	1,896	21,200	11.18
1968.....	1,922	22,064	11.48
1969.....	1,935	24,570	12.70
1970.....	1,954	21,059	10.78

Source: Homestake Mining Co. Annual Report 1970.

the Susquehanna Corp. The Edgemont mill, following a brief shutdown in 1969, resumed operation in late 1969 processing ore from surface mines in newly discovered ore bodies in the Edgemont area. A small underground mine near Edgemont also provided about 60 to 75 tons per day of ore to the Edgemont mill. In 1970 a contractor was stripping 1.8 million cubic yards of overburden to prepare a second open pit for mining. During 1970, the Susquehanna Corp. received orders for 5 million pounds of uranium oxide, a portion of which will be delivered from the Edgemont mill.

**Vanadium.**—Output of vanadium products in 1970 expanded to 1.75 million pounds, compared with 1.6 million in 1969. The Susquehanna Corp's uranium mill at Edgemont recovers some vanadium as a byproduct of uranium ore; but, the larger amount of vanadium production comes from processing foreign ores, primarily from Europe. Both vanadium pentoxide and ferrovandium are produced at the Edgemont mill.

## MINERAL FUELS

**Coal (Lignite).**—Three power companies announced in early 1970 plans to construct a \$100 million generating plant in the Big Stone Lake area, Roberts County. Site preparation and transportation construction was underway in 1970 on the 400,000-kilowatt Big Stone plant, which will be fueled by 2 million tons of North Dakota lignite per year. The companies involved in this venture are Otter Tail Power Co. Northwestern Public Service Co., and the Montana-Dakota Utilities Co. Plant construction was expected to begin in the spring of 1972, and the plant is to go on

stream in 1974-75. It is reportedly the largest single capital investment ever made in South Dakota.

**Lignite Gasification Pilot Plant.**—In January 1970, construction began at Rapid City on a \$9 million pilot plant, designed to convert 30 tons of lignite per day into a methane-rich, sulfur-free synthetic gas. The plant will use the CO<sub>2</sub> Acceptor Process in which gasification is accomplished in a mixture of ground dolomite and coal. Developed by the Consolidation Coal Co., under contracts with the Department of the Interior's Office of Coal Research, the process is unique in that it eliminates the need for oxygen or hydrogen. Various types of lignites and western coals will be tested with dolomites and limestones. Completion of the plant is scheduled for June 1971.<sup>4</sup>

**Petroleum.**—In 1970, production of oil from 26 producing wells increased slightly over that of 1969. Petroleum output was nearly 160,000 barrels. Out of 83 wildcat wells drilled in 1970, none were commercial at yearend although 10 wells were cased and reportedly waiting to be put on production. About 49 miles of hole was drilled. The deepest well was 9,400 feet deep.

Exploration activity has centered on a sandstone formation known alternately as the Muddy or Newcastle, a prolific producer in southeastern Montana and northeastern Wyoming. The formation occurs over much of western South Dakota at shallow depths. Because of large potential payoffs in the Muddy Formation, continued intensive exploration efforts were expected for 1971.

<sup>4</sup> Office of Coal Research, Department of the Interior. Annual Report 1971, pp. 20-22.

Table 11.—South Dakota: Oil and gas well drilling completions, by counties

County	Proved field wells			Exploratory wells			Total	
	Oil	Gas	Dry	Oil	Gas	Dry	Wells	Footage
Butte.....	--	--	--	--	--	5	5	19,438
Campbell.....	--	--	--	--	--	7	7	12,585
Corson.....	--	--	--	--	--	6	6	29,091
Custer.....	--	--	--	--	--	1	1	1,340
Dewey.....	--	--	--	--	--	2	2	9,808
Fall River.....	--	--	--	--	--	9	9	22,981
Haakon.....	--	--	--	--	--	16	16	43,424
Harding.....	--	--	--	--	--	15	15	73,229
Jones.....	--	--	--	--	--	1	1	3,181
Lyman.....	--	--	--	--	--	1	1	2,411
Meade.....	--	--	--	--	--	10	10	24,099
Pennington.....	--	--	--	--	--	4	4	12,896
Shannon.....	--	--	--	--	--	1	1	3,400
Tripp.....	--	--	--	--	--	1	1	3,010
Walworth.....	--	--	--	--	--	3	3	5,200
Washabaugh.....	--	--	--	--	--	1	1	4,441
Total.....	--	--	--	--	--	83	83	270,534

Source: American Petroleum Institute.

Table 12.—Principal producers

Commodity and company	Address	Type of activity	County
<b>Beryllium:</b>			
L. W. Judson.....	Hermosa, S. Dak. 57744.....	See Mica.....	Pennington.
Northwest Beryllium Corp.....	218-219 American National Bank Bldg. Rapid City, S. Dak. 57701	Stockpile.....	Do.
<b>Cement:</b>			
South Dakota Cement Commission.	Drawer 351 Rapid City, S. Dak. 57701	Wet-process plant, 3 rotary kilns.	Do.
<b>Clays:</b>			
American Colloid Co.....	5100 Suffield Court Skokie, Ill. 60076	Open pit mine and plant.	Butte.
Light Aggregates, Inc.....	Box 1922 Rapid City, S. Dak. 57701	.....do.....	Pennington.
South Dakota Cement Commission.	Drawer 351 Rapid City, S. Dak. 57701	Open pit mine.....	Do.
<b>Feldspar:</b>			
International Minerals & Chemical Corp., Industrial Minerals Division.	Administration Center Old Orchard Road Skokie, Ill. 60079	Open pit mine and dry-grinding plant.	Custer.
<b>Gold:</b>			
Homestake Mining Co.....	Lead, S. Dak. 57754.....	Underground mine, amalgamation-cyanidation mill, and refinery.	Lawrence.
<b>Gypsum:</b>			
South Dakota Cement Commission.	Drawer 351 Rapid City, S. Dak. 57701	Open pit mine.....	Meade.
<b>Lime:</b>			
Pete Lien & Sons.....	Box 3124, P.O. Annex Rapid City, S. Dak. 57708	Continuous-hydrator plant; 1 rotary kiln, 1 vertical kiln.	Pennington.
<b>Mica (scrap):</b>			
L. W. Judson.....	Hermosa, S. Dak. 57744.....	Open pit mine.....	Do.
Northwest Beryllium Corp.....	218-219 American National Bank Bldg. Rapid City, S. Dak. 57701	Stockpile.....	Do.
<b>Petroleum:</b>			
Ozark Corp.....	Box 2491 Casper, Wyo. 82601	Crude oil wells.....	Custer (Barker Dome field).
Pennzoil United, Inc.....	900 Southwest Tower Houston, Tex. 77002	.....do.....	Harding (Buffalo field).
Phillips Petroleum Co.....	Frank Phillips Bldg. Bartlesville, Okla. 74003	.....do.....	Do.
<b>Sand and gravel (commercial):</b>			
Concrete Materials Co.....	3000 West Madison Street Sioux Falls, S. Dak. 57104	Pit and 2 plants.....	Minnehaha.
F. J. McLaughlin Co.....	Watertown, S. Dak. 57201	.....do.....	Codington.
Hallett Construction Co.....	Crosby, Minn. 56441	2 pits and plants.....	Do.
J. L. Healy Construction Co.....	Box 512 Sioux Falls, S. Dak. 57102	9 pits and 1 plant.....	Brule, Codington, Hand, Minnehaha, Moody.
L. G. Everist, Inc.....	302 Paulton Bldg. Sioux Falls, S. Dak. 57102	2 pits and 2 plants.....	Brookings and Pennington.
Mannerud, Inc.....	612 13th Avenue Brookings, S. Dak. 57006	2 pits.....	Brookings and Edmunds.
Pickus Construction Co.....	Box 1414 Aberdeen, S. Dak. 57401	Pit and plant.....	Brown.
Sweetman Construction Co.....	100 South Dakota Avenue Sioux Falls, S. Dak. 57102	4 pits.....	Beadle, Lake, Minnehaha, Yankton.
Weelborg Bros., Inc.....	Dell Rapids, S. Dak. 57022	20 pits.....	Various.
Silver: Homestake Mining Co.....	Lead, S. Dak. 57754.....	See Gold.....	Lawrence.
<b>Stone:</b>			
Cold Spring Granite Co.....	Cold Spring, Minn. 56320.....	2 quarries.....	Grant.
Concrete Materials Co.....	3000 West Madison Street Sioux Falls, S. Dak. 57104	Quarry and plant.....	Minnehaha.
Dakota Granite Co.....	Box 269 Milbank, S. Dak. 57252	2 quarries.....	Grant.
Delano Granite Works, Inc.....	Delano, Minn. 55328.....	Quarry.....	Do.
Hills Materials Co.....	Box 1392 Rapid City, S. Dak. 57701	Quarry and plant.....	Pennington.

Table 12.—Principal producers—Continued

Commodity and company	Address	Type of activity	County
<b>Stone—Continued</b>			
L. G. Everist, Inc.....	302 Paulton Bldg. Sioux Falls, S. Dak. 57102	2 quarries and 2 plants.	Minnehaha and Pennington.
Pete Lien & Sons.....	Box 3124, P.O. Annex Rapid City, S. Dak. 57708	Quarry and plant.....	Pennington.
Robert Hunter Granite Co., Inc.....	Milbank, S. Dak. 57252	Quarry.....	Grant.
South Dakota Cement Commission.	Drawer 351 Rapid City, S. Dak. 57701	Quarry and plant.....	Pennington.
Spencer Quarries, Inc.....	Spencer, S. Dak. 57374	Quarry.....	Hanson.
Steiner-Rausch Granite Co., Inc.....	Ortonville, Minn. 56278	.....do.....	Grant.
<b>Uranium:</b>			
Susquehanna-Western, Inc.....	Edgemont, S. Dak. 57735	Underground mine.....	Fall River.
Mines Development, Inc.....	.....do.....	Acid-leach mill.....	Do.