

**STATE OF SOUTH DAKOTA**

**Frank Farrar, Governor**

**MINERALS REPORT 16**

**THE MINERAL INDUSTRY  
OF SOUTH DAKOTA IN 1968**

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**SOUTH DAKOTA GEOLOGICAL SURVEY**

**VERMILLION, SOUTH DAKOTA 57069**

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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.

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The value of mineral production in 1968 totaled \$54.1 million and exceeded that of any year since 1964. The \$1.5 million increase over 1967 can be attributed almost entirely to the gain in output of cement and to the increase in the value of the gold produced. The overall value of metals output

increased, but the value of nonmetals and mineral fuels production decreased.

South Dakota retained its position as the leading gold producing State of the Nation.

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

Mineral	1967		1968	
	Quantity	Value (thousands)	Quantity	Value (thousands)
Beryllium concentrate.....short tons..	W	W	75	\$35
Cement:				
Masonry.....thousand 280-pound barrels..	54	\$178	54	180
Portland.....thousand 376-pound barrels..	1,406	4,815	1,826	6,228
Clays.....thousand short tons..	199	799	226	1,119
Coal (lignite).....do.....	5	27		
Feldspar.....long tons..	61,411	420	39,077	264
Gem stones.....	NA	80	NA	34
Gold (recoverable content of ores, etc.).....troy ounces..	601,785	21,062	593,052	23,288
Gypsum.....thousand short tons..	12	49	16	65
Petroleum (crude).....thousand 42-gallon barrels..	211	502	187	401
Sand and gravel.....thousand short tons..	13,463	13,737	11,558	11,578
Silver (recoverable content of ores, etc.).....thousand troy ounces..	121	188	138	295
Stone.....thousand short tons..	1,866	9,694	1,860	9,687
Value of items that cannot be disclosed:				
Columbium-tantalum (1967), lime, lithium minerals, mica (scrap), molybdenum (1967), uranium <sup>3</sup> (recoverable content U <sub>3</sub> O <sub>8</sub> ), vanadium, and value indicated by symbol W.....	XX	1,117	XX	917
Total.....	XX	52,618	XX	54,086
Total 1957-59 constant dollars.....	XX	47,308	XX	44,273

<sup>p</sup> Preliminary. <sup>r</sup> Revised. 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> Based on average of U.S. Treasury price (\$35.00) Jan. 1, 1968 through Mar. 15, 1968, and the New York selling price for the remainder of the year.

<sup>3</sup> 1967 value estimated, based on \$8.00 per pound f.o.b. mill; 1968 value estimated, based on \$8.00 per pound for sales to the Atomic Energy Commission and an assumed price of \$6.50 per pound for commercial sales.

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

County	(Thousands)		Minerals produced in 1968 in order of value
	1967	1968	
Aurora.....	\$69	\$97	Sand and gravel.
Beadle.....	145	126	Do.
Bon Homme.....	232	185	Do.
Brookings.....	753	101	Do.
Brown.....	576	846	Do.
Brule.....	274	140	Do.
Buffalo.....	27	20	Do.
Butte.....	W	W	Clays and sand and gravel.
Campbell.....	222	89	Sand and gravel.
Charles Mix.....	113	206	Sand and gravel and stone.
Clark.....	320	228	Sand and gravel.
Clay.....	64	99	Do.
Codington.....	308	W	Sand and gravel and stone.
Corson.....	153	55	Sand and gravel.
Custer.....	672	497	Feldspar, sand and gravel, stone, petroleum, lime, beryllium concentrate, gold.
Davison.....	424	268	Sand and gravel.
Day.....	495	179	Do.
Deuel.....	105	117	Do.
Dewey.....	37	W	Sand and gravel and coal.
Douglas.....	278	225	Sand and gravel.
Edmunds.....	92	122	Do.
Fall River.....	W	W	Sand and gravel, uranium, stone.
Faulk.....	152	148	Sand and gravel.
Grant.....	6,385	6,639	Stone and sand and gravel.
Gregory.....	104	119	Sand and gravel.
Haakon.....	41	143	Do.
Hamlin.....	276	178	Do.
Hand.....	281	186	Do.
Hanson.....	702	W	Stone and sand and gravel.
Harding.....	W	482	Petroleum and sand and gravel.
Hughes.....	127	132	Sand and gravel.
Hutchinson.....	176	251	Do.
Hyde.....	68	92	Do.
Jackson.....	322	817	Do.
Jerauld.....	21	37	Do.
Jones.....	189	41	Do.
Kingsbury.....	127	102	Do.
Lake.....	88	147	Do.
Lawrence.....	22,848	28,725	Gold, silver, stone, sand and gravel.
Lincoln.....	81	166	Sand and gravel.
Lyzman.....	62	307	Do.
Marshall.....	103	198	Do.
McCook.....	160	64	Do.
McPherson.....	98	128	Do.
Meade.....	287	369	Sand and gravel and gypsum.
Mellette.....	437	229	Sand and gravel.
Minnehaha.....	1,037	1,245	Stone and sand and gravel.
Moody.....	598	398	Sand and gravel.
Pennington.....	8,150	10,625	Cement, stone, sand and gravel, lime, clays, mica (scrap), feldspar, beryllium concentrate, lithium minerals.
Perkins.....	89	101	Sand and gravel.
Potter.....	305	196	Do.
Roberts.....	298	87	Do.
Sanborn.....	208	61	Do.
Shannon.....	2	64	Do.
Spink.....	149	89	Do.
Stanley.....	73	W	Do.
Sully.....	122	79	Do.
Todd.....	34	115	Do.
Tripp.....	W	94	Stone and sand and gravel.
Turner.....	123	174	Sand and gravel.
Union.....	341	53	Do.
Walworth.....	115	W	Do.
Washabaugh.....	31	111	Do.
Yankton.....	189	18	Do.
Ziebach.....	133	68	Do.
Undistributed <sup>2</sup> .....	2,291	2,785	
Total <sup>3</sup> .....	52,618	54,086	

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

<sup>1</sup> Bennett and Miner Counties not listed because no production was reported.

<sup>2</sup> Includes production of gem stones that cannot be assigned to specific counties and values indicated by symbol W.

<sup>3</sup> Data may not add to totals shown because of independent rounding.

Table 3.—Indicators of South Dakota business activity

	1967	1968 <sup>2</sup>	Change (percent)	
<b>Employment and labor force, mid-June:</b>				
Total labor force.....	thousands.....	284.1	289.2	+1.8
Total unemployment.....	do.....	273.3	278.6	+1.9
Total employment.....	do.....	10.8	10.6	-1.9
Total agricultural employment.....	do.....	74.0	74.6	+0.8
Total non-agricultural employment.....	do.....	199.3	204.0	+2.4
Mining.....	do.....	2.4	2.3	-4.2
Contract construction.....	do.....	8.9	10.5	+18.0
Manufacturing.....	do.....	15.3	15.7	+2.6
Trade.....	do.....	44.3	45.1	+1.8
Government.....	do.....	49.4	50.8	+2.4
All other.....	do.....	79.0	79.8	+1.0
<b>Personal income:</b>				
Total.....	millions.....	\$1,745	\$1,913	+9.6
Per capita.....	do.....	\$2,613	\$2,916	+11.6
<b>Construction activity:</b>				
Cement shipments to and within the State				
Building permits.....	thousand 376-pound barrels.....	1,237	1,560	+26.1
Residential.....	thousands.....	NA	\$41,994	-----
Non-residential.....	do.....	NA	\$14,695	-----
Road construction contracts.....	do.....	NA	\$27,299	-----
Farm cash income.....	do.....	\$48,299	\$32,120	-33.5
Mineral production.....	millions.....	\$990.0	\$1,049.3	+6.0
Total State revenue (fiscal 1966-67 and fiscal 1967-68).....	do.....	\$52.6	\$54.1	+2.9
		\$202.0	\$220.6	+9.2

<sup>1</sup> Preliminary. <sup>2</sup> Revised. NA Not available. Sources: Business Research Bureau, University of South Dakota, Vermillion, S. Dak.; Engineering News-Record, v. 182, No. 14, Apr. 3, 1969, pp. 52-53.

On March 18, 1968 the Government made two major changes that affected the gold market. First, the Treasury ceased buying and selling gold in the private market; second, gold producers were allowed to sell their gold to foreign buyers, as well as to authorized domestic users.

The price of gold was \$35.00 per fine troy ounce from 1934 to March 18, 1968. However, during the remainder of 1968, the price varied between \$42.21 and \$37.75. The Metals Week weekly average for the year was \$39.97 per fine troy ounce.

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

**Government Programs.**—Diamond drilling, supervised by the U.S. Geological Sur-

vey, was conducted in the northern Black Hills to determine the thickness and mineralogy of the Paleozoic Formations. Mapping and some drilling were done south of Lead to obtain information on the stratigraphy of the rocks containing the Homestake gold deposits.

Exploration work on silver ore bodies near Galena was recessed in the fall. The work was contracted by Homestake Mining Co. and supervised by the U.S. Geological Survey.

Contracts were awarded in 1968 totaling \$32.1 million for highway construction of which \$20.4 million was for the interstate system.<sup>3</sup>

<sup>3</sup> Engineering News-Record, State Highway Departments' Construction Contracting Plans for 1969 . . . and Budgets for Maintenance: Highway Award Plans Up 47% as '69 Federal-Aid Work Soars. V. 182, No. 14, Apr. 3, 1969, pp. 52-53.

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	Non-fatal	Frequency	Severity
<b>1967:</b>								
Coal.....	5	178	1	4	-----	-----	-----	-----
Metal.....	1,695	31	528	4,222	-----	114	27.00	2,729
Nonmetal.....	268	232	62	513	-----	6	11.71	43
Sand and gravel.....	977	154	150	1,859	-----	25	18.40	445
Stone.....	463	227	105	894	-----	15	16.78	302
<b>Total<sup>1</sup>.....</b>	<b>3,406</b>	<b>248</b>	<b>846</b>	<b>6,991</b>	-----	<b>160</b>	<b>22.88</b>	<b>1,776</b>
<b>1968:<sup>p</sup></b>								
Coal.....	5	107	1	4	-----	-----	-----	-----
Metal.....	1,605	302	494	3,953	2	114	29.34	4,132
Nonmetal.....	215	191	41	330	1	7	24.22	18,846
Sand and gravel.....	735	158	116	1,049	-----	23	21.93	730
Stone.....	470	231	109	919	-----	14	15.23	283
<b>Total<sup>1</sup>.....</b>	<b>3,080</b>	<b>248</b>	<b>761</b>	<b>6,256</b>	<b>3</b>	<b>158</b>	<b>25.73</b>	<b>3,770</b>

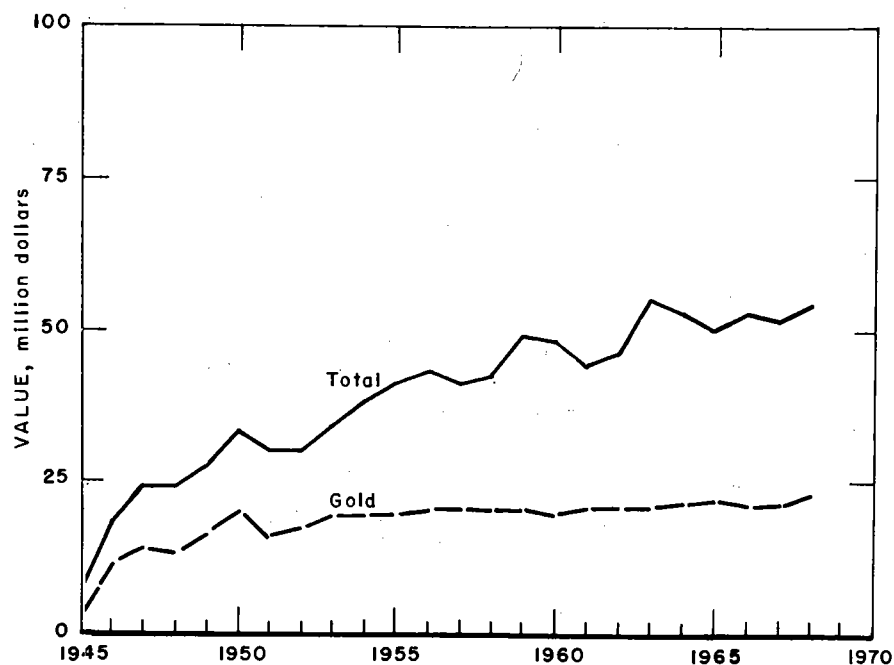
<sup>p</sup> Preliminary.<sup>1</sup> Data may not add to totals shown because of independent rounding.

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

## REVIEW BY MINERAL COMMODITIES

## NONMETALS

**Cement.**—The State-owned cement plant at Rapid City shipped 54,000 barrels (280-pound) of masonry cement, the same amount shipped in 1967. Shipments of portland cement increased 420,000 barrels (376-pound) over those of 1967. The 1968 cement production required 371,735 short tons of limestone, 102,761 tons of shale, 15,618 tons of gypsum, 10,617 tons of sand, and 4,816 tons of iron ore. The aggregate of the minerals used in cement output was produced in South Dakota.

The air-pollution filters installed during 1967 and 1968 in kiln stacks have been very effective in removing micron-size particles from the gases emitted to the atmosphere. The South Dakota Cement Commission has set a good example of air-pollution control for cement and other industries.

**Clays.**—Bentonite and miscellaneous clay were produced in Butte County. Shale was mined in Pennington County, where it is used in manufacturing cement and also expanded to make a lightweight concrete aggregate. The bentonite was produced by American Colloid Co. and by International Minerals & Chemical Corp. (IMC).

The plant of American Colloid Co. at Belle Fourche was the only bentonite processing plant operated in South Dakota. Bentonite mined by IMC in South Dakota was processed at the company plant in Colony, Wyo.

Brick kilns at Belle Fourche, operated by Black Hills Clay Products Co., produced building brick marketed in the surrounding area.

**Feldspar.**—Feldspar was obtained from numerous pegmatites located in the vicinity of Custer and Keystone. IMC operated a dry grinding plant at Custer, which ground feldspar obtained from company-operated mines and from various local producers operating their own or leased properties.

**Gypsum.**—Gypsum produced by the State at a quarry in Meade County was used in manufacturing cement. This was the only gypsum operation. An increase in production was necessary because cement manufacture was greater.

**Lime.**—The demand for lime has increased because of its use as a soil stabilizing agent in road construction wherever

clay soils exist. Pete Lien & Sons operated a horizontal and a vertical kiln at the company plant northwest of Rapid City.

Operated by Sam Kirk, Black Hills Lime Co. at Pringle specializes in producing metallurgical lime. Its demand depends greatly upon the activity of mineral processing plants, such as Homestake Mining Co. at Lead and Mines Development, Inc., a subsidiary of The Susquehanna Corp., at Edgemont.

**Lithium Minerals.**—Lithium minerals were obtained as a coproduct in pegmatite mining. They are stockpiled by the producer or purchased by local mineral brokers until a carlot shipment has accumulated. Two lithium minerals—lepidolite and amblygonite—were obtained and shipped in separate lots.

**Mica.**—Scrap mica was one of the products recovered at the flotation mill near Keystone, operated by Northwest Beryllium Corp. Production increased 300 percent over that in 1967.

**Sand and Gravel.**—Sand and gravel production in 1968 was nearly 2 million tons less than that of 1967; value decreased more than \$2 million. The 1968 production, used mainly in building and maintenance of highways, was 11.6 million tons valued at \$11.6 million.

**Stone.**—Granite and limestone were the only types of stone prepared and sold as dimension stone. Limestone, sandstone, and quartzite, and miscellaneous stone were crushed and used; most of the crushed stone was used as concrete aggregate and road material.

A very good grade of granite was quarried by five companies operating seven quarries in Grant County; 26,500 tons was sawed into desired dimensions and polished for use as decorative stone or as monuments, and 11,900 tons was sold as rough architectural and monumental stone.

With quarries in the Dakota Sandstone Formation near Pringle and a plant at Pringle, South Dakota Sand Corp., a subsidiary of Texas Mining Corp., produced three types of prepared or manufactured sands: Oil-well fracturing sands, foundry sands, and abrasive sands used in sand blasting.

Table 5.—Sand and gravel sold or used by producers, by classes of operations and uses

Class of operation and use	1967		1968	
	Quantity	Value	Quantity	Value
<b>Commercial operations:</b>				
Sand, construction:				
Building.....	621	\$677	456	\$498
Paving.....	56	56	113	139
Fill.....	43	21	58	65
<b>Total.....</b>	<b>720</b>	<b>754</b>	<b>627</b>	<b>702</b>
Gravel:				
Construction:				
Building.....	472	672	220	319
Paving.....	1,384	1,596	1,795	1,803
Railroad ballast.....	4	3		
Fill.....	78	64	139	110
Other.....	1	1		
Miscellaneous.....	31	37	43	54
<b>Total.....</b>	<b>1,970</b>	<b>2,373</b>	<b>2,197</b>	<b>2,286</b>
<b>Total sand and gravel.....</b>	<b>2,690</b>	<b>3,127</b>	<b>2,824</b>	<b>2,988</b>
<b>Government-and-contractor operations:</b>				
Sand:				
Building.....			1	1
Paving.....	1,967	1,964	1,738	1,736
Fill.....	11	11	1	1
Other.....	10	5	11	6
<b>Total.....</b>	<b>1,988</b>	<b>1,980</b>	<b>1,751</b>	<b>1,744</b>
Gravel:				
Paving.....	8,774	8,620	6,983	6,847
Fill.....	10	9		
Other.....	1	1		
<b>Total.....</b>	<b>8,785</b>	<b>8,630</b>	<b>6,983</b>	<b>6,847</b>
<b>Total sand and gravel<sup>1</sup>.....</b>	<b>10,773</b>	<b>10,616</b>	<b>8,734</b>	<b>8,587</b>
<b>All operations:</b>				
Sand.....	2,708	2,734	2,378	2,446
Gravel.....	10,755	11,003	9,180	9,133
<b>Total<sup>1</sup>.....</b>	<b>13,463</b>	<b>13,737</b>	<b>11,558</b>	<b>11,578</b>

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

Table 6.—Sand and gravel production in 1968, by counties

(Thousand short tons and thousand dollars)					
County	Quantity	Value	County	Quantity	Value
Aurora.....	92	\$97	Jerauld.....	37	\$37
Beadle.....	126	126	Jones.....	53	41
Bon Homme.....	184	185	Kingsbury.....	102	102
Brookings.....	83	101	Lake.....	145	147
Brown.....	315	346	Lawrence.....	W	W
Brule.....	137	140	Lincoln.....	152	166
Buffalo.....	24	20	Lyman.....	312	307
Butte.....	967	968	McCook.....	63	64
Campbell.....	100	83	McPherson.....	125	128
Charles Mix.....	200	200	Marshall.....	188	198
Clark.....	223	223	Meade.....	303	304
Clay.....	88	99	Mellette.....	229	229
Codington.....	300	315	Minnehaha.....	548	553
Corson.....	94	55	Moody.....	373	398
Custer.....	90	86	Pennington.....	1,689	1,526
Davison.....	240	263	Perkins.....	79	101
Day.....	163	179	Potter.....	187	196
Deuel.....	107	117	Roberts.....	80	87
Dewey.....	54	43	Sanborn.....	59	61
Douglas.....	205	225	Shannon.....	66	64
Edmunds.....	113	122	Spink.....	88	89
Fall River.....	206	160	Stanley.....	W	W
Faulk.....	148	148	Sully.....	79	79
Grant.....	118	120	Todd.....	120	115
Gregory.....	104	119	Tripp.....	39	39
Haskell.....	143	143	Turner.....	159	174
Hamlin.....	152	178	Union.....	53	53
Hand.....	216	185	Walworth.....	W	W
Hanson.....	82	82	Washabaugh.....	111	111
Harding.....	107	107	Yankton.....	18	18
Hughes.....	143	132	Ziebach.....	68	68
Hutchinson.....	251	251	Undistributed.....	154	191
Hyde.....	92	92			
Jackson.....	817	817	<b>Total.....</b>	<b>11,558</b>	<b>11,578</b>

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

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

Kind of stone	1964		1965		1966		1967		1968	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Dolomite.....							( <sup>1</sup> )	\$1		
Granite.....	18	\$2,808	20	\$2,945	24	\$4,067	48	6,160	83	\$6,519
Limestone.....	1,180	1,735	869	1,412	1,101	1,798	882	1,399	1,082	1,694
Quartz, quartzite, and sandstone.....	920	1,702	651	1,007	984	1,997	781	1,623	676	1,402
Quartz and quartzite.....	NA	NA	NA	NA	NA	NA	NA	NA	563	1,193
Sandstone.....	NA	NA	NA	NA	NA	NA	NA	NA	113	209
Other stone.....			14	24	78	137	155	512	64	71
<b>Total<sup>2</sup>.....</b>	<b>2,118</b>	<b>6,245</b>	<b>1,554</b>	<b>5,387</b>	<b>2,186</b>	<b>7,995</b>	<b>1,866</b>	<b>9,694</b>	<b>1,860</b>	<b>9,687</b>

NA Not available.

<sup>1</sup> Less than ½ unit.

<sup>2</sup> Excludes dimension stone, included with "Other stone."

<sup>3</sup> Data may not add to totals shown because of independent rounding.

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

Use	1967		1968	
	Quantity	Value (thousands)	Quantity	Value (thousands)
<b>Dimension stone:</b>				
Rough construction and rubble—short tons	W	W	11,986	W
Rough architectural—cubic feet				
Dressed architectural—do	181,680	\$3,115	205,685	W
Rough monumental—do				
Dressed monumental—do	147,386	3,008	151,852	\$3,269
Curbing and flagging—do	W	W	W	W
<b>Total (approximate)—short tons</b>	<b>31,200</b>	<b>6,130</b>	<b>47,400</b>	<b>6,535</b>
<b>Crushed and broken stone:</b>				
Refractory—short tons	38,750	78	W	W
Riprap—do	184,547	548	76,779	81
Railroad ballast—do	345,066	487	286,245	435
Concrete and roadstone—do	834,946	1,480	(?)	(?)
Concrete aggregate—do	NA	NA	335,447	785
Cement—do	352,519	617	388,911	W
Other—do	\$79,417	\$353	\$694,891	\$1,117
<b>Total—do</b>	<b>1,835,245</b>	<b>3,564</b>	<b>1,812,273</b>	<b>3,152</b>
<b>Total stone (approximate)—do</b>	<b>1,866,500</b>	<b>9,694</b>	<b>1,859,700</b>	<b>9,687</b>

NA Not available. W Withheld to avoid disclosing individual company confidential data; included in "Totals."

<sup>1</sup> Rough architectural (1967), dressed architectural, and rough monumental combined to avoid disclosing individual company confidential data.

<sup>2</sup> Concrete and roadstone subdivided in 1968 into concrete aggregate and various aggregates used for road construction. Data for aggregates used for road construction withheld to avoid disclosing individual company confidential data; included with "Other."

<sup>3</sup> Includes stone used for abrasives, architectural panels, foundry, lime, filler, precasting, and stone sand. <sup>4</sup> Includes stone used for abrasives, agricultural limestone, bituminous aggregate, dense graded road base, flux, lime, other fillers, stone sand, surface treatment aggregates, and terrazzo and exposed aggregate.

## METALS

**Beryllium.**—Beryllium shipments were substantially greater than those in 1967. George Bland produced hand-cobbed beryl from properties which he operated and also purchased small lots from other producers. Most of the Black Hills production was sold to Beryl Ores Co. at Arvada, Colo. Northwest Beryllium Corp. produced some hand-cobbed beryl, but it did not operate the beryl section of its flotation mill during 1968.

**Gold and Silver.**—Gold was produced by Homestake Mining Co. from its lode mine at Lead. Two placer operations—one on Whitewood Creek in Lawrence County, the other in Custer County—reported some gold recovery at their operations. The Homestake mine, with deepest workings 6,800 feet below the surface, produced gold and silver valued at \$23.5 million, nearly half of the total State mineral production value of \$54.1 million.

Table 9.—Mine production of gold and silver in terms of recoverable metals

Year	Mines producing		Material gold or treated <sup>1</sup> (thousand short tons)	Gold (lode and placer)		Silver (lode and placer)	
	Lode	Placer		Troy ounces	Value (thousands)	Thousand troy ounces	Value (thousands)
1964	3	1	2,033	616,913	\$21,592	133	\$172
1965	1		2,032	628,259	21,989	129	167
1966	1		2,002	606,467	21,226	110	142
1967	1	1	1,896	601,785	21,062	121	188
1968	1	2	1,922	593,052	23,283	138	295
1876-1968	NA	NA	NA	33,009,196	939,445	12,507	9,911

NA Not available.

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

Table 10.—Homestake mine ore milled and receipts for bullion<sup>1</sup>

Year	Ore milled (thousand short tons)	Receipts for bullion products	
		Total (thousands)	Per ton
1964	2,033	\$21,703	\$10.68
1965	2,032	22,094	10.88
1966	2,002	21,309	10.64
1967	1,896	21,200	11.18
1968	1,922	22,064	11.48

<sup>1</sup> From 1876 to 1968, inclusive, this mine yielded bullion and concentrates that brought a net return of \$867.8 million.

In previous years a column reflecting "dividends" was included. It has been omitted this year because this table is for the Homestake mine only, and the dividends pertain to the consolidated operations of Homestake Mining Co. and subsidiaries.

Homestake and the United Steelworkers of America, AFL-CIO, have a supplemental agreement which allows the workers a pay increase on a sliding scale, based on the "buy" price of gold as quoted by Engelhard Minerals & Chemicals Corp. of New York City. The wage bonus starts at 7 cents per hour with gold at \$36.00 per fine troy ounce and increases to 85 cents per hour with gold "buy" price at \$49.00 per fine troy ounce.

**Tin.**—In 1968 some tin concentrate, obtained as a byproduct from pegmatite milling, was stockpiled by Northwest Beryllium Corp.

**Uranium.**—Uranium output from eight operators was less than half of that produced in 1967. Susquehanna-Western, Inc., a subsidiary of The Susquehanna Corp., did a large amount of rotary drilling in the Edgemont area, and at yearend it was encouraged by the ore bodies found. Mines Development, Inc., was very optimistic about expanding production at its uranium mill at Edgemont on the basis of these new finds.

**Vanadium.**—Production was obtained from local uranium ores and domestic vanadium-bearing residues.

## MINERAL FUELS

**Coal (Lignite).**—Only one commercial coal mine, operated by Firesteel Coal Co. in

Dewey County, produced lignite coal in 1968.

**Petroleum.**—Normal depletion of the two oilfields—Buffalo and Barker Dome—resulted in an 11.5-percent decrease in output of petroleum. The 24-well Buffalo field produced 174,614 barrels of oil; Barker Dome, with three wells, yielded 12,041 barrels. Buffalo field also produced 10.7 million cubic feet of natural gas, which was used for field fuel or flared.

Drilling activity, all exploratory, more than doubled, chiefly because of the interest in the Muddy Formation (Cretaceous) in adjacent parts of Wyoming and Montana. In Fall River County, 13 wildcat wells tested the Muddy Formation along the southern flank of the Black Hills uplift. Ten wells were drilled north of the Black Hills: Two were tests of the Red River Formation (Ordovician); the others tested the Muddy.

Table 11.—Oil and gas well drilling in 1968, by counties<sup>1</sup>

County	Dry <sup>2</sup>	Total	Footage
Butte	4	4	11,951
Fall River	13	13	31,866
Harding	6	6	32,950
<b>Total</b>	<b>23</b>	<b>23</b>	<b>76,767</b>

<sup>1</sup> Exploratory completions; no development wells were drilled during the year.

<sup>2</sup> All exploratory wells were unsuccessful.

Source: Petroleum Information Corp., 1968 Résumé, Oil and Gas Operations in the Rocky Mountain Region.

Two oil and gas lease sales were held by the State. The first, on June 12-15, totaled 695,797 acres resulting in an income of \$843,911. The average amount received was \$1.213 per acre; the high bid was \$9.38 per acre for a lease in Harding County. Because of the proximity of Montana's Bell Creek field, most of the acreage leased was in Harding County; this land brought the highest per-acre bid, \$2.14. The second sale, held December 18, covered 153,939 acres and brought total receipts of \$104,934, an average of \$0.68 per acre. For the latter, most of the land leased was in Perkins County, where the highest bid was \$2.81 per acre.

Table 12.—Principal producers

Commodity and company	Address	Type of activity	County
<b>Beryllium:</b>			
L. W. Judson.....	Hermosa, S. Dak. 57744.....	See Feldspar.....	Pennington.
Northwest Beryllium Corp.	218-219 American National Bank Bldg. Rapid City, S. Dak. 57701	Open-pit mine.....	Do.
Cement: South Dakota Cement Commission.	Drawer 351 Rapid City, S. Dak. 57701	Wet-process, 3-rotary-kiln plant.	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.
Coal (lignite): Firesteel Coal Co.	Timber Lake, S. Dak. 57656..	Strip mine, crushing and oil-treatment plant.	Dewey.
<b>Feldspar:</b>			
International Minerals & Chemical Corp., Industrial Minerals Division.	Administration Center Old Orchard Road Skokie, Ill. 60079	2 open-pit mines and dry-grinding plant.	Custer.
L. W. Judson.....	Hermosa, S. Dak. 57744.....	Open-pit mine.....	Pennington.
Northwest Beryllium Corp.	218-219 American National Bank Bldg. Rapid City, S. Dak. 57701	Underground mine and flotation mill.	Do.
Gold: Homestake Mining Co....	Lead, S. Dak. 57754.....	Underground mine, amalgamation-cyanidation mill, and refinery.	Lawrence.
Gypsum: South Dakota Cement Commission.	Drawer 351 Rapid City, S. Dak. 57701	Open pit mine.....	Meade.
Lime: Pete Lien & Sons.....	Box 3124, P.O. Annex Rapid City, S. Dak. 57703	1-rotary-kiln, 1-vertical-kiln, continuous-hydrator plant.	Pennington.
<b>Mica (scrap):</b>			
L. W. Judson.....	Hermosa, S. Dak. 57744.....	See Feldspar.....	Do.
Northwest Beryllium Corp.	218-219 American National Bank Bldg. Rapid City, S. Dak. 57701	.....do.....	Do.
<b>Petroleum:</b>			
The Ozark Corp.....	Box 2491 Casper, Wyo. 82601	Crude oil wells.....	Custer (Barker Dome field).
Penizoil Co.....	900 Southwest Tower Houston, Tex. 77002	.....do.....	Harding (Buffalo field).
Phillips Petroleum Co.....	Phillips Bldg. Bartlesville, Okla. 74003	.....do.....	Do.
<b>Sand and gravel (commercial):</b>			
Aggregates, Inc.	Selby, S. Dak. 57472.....	Pit.....	Fall River.
Clark Construction Co.....	Mitchell S. Dak. 57301.....	Pit and plant.....	Pennington.
Concrete Materials Co.....	3000 West Madison Street Sioux Falls, S. Dak. 57104	.....do.....	Davison.
Hallett Construction Co.....	Crosby, Minn. 56441.....	.....do.....	Minnehaha.
Moeckly & Olson, Inc.....	Amherst, S. Dak. 57421.....	Pit.....	Codington.
		.....do.....	Edmunds.
		.....do.....	Potter.
		5 pits and plant.....	Walworth.
Silver: Homestake Mining Co..	Lead, S. Dak. 57754.....	See Gold.....	Lawrence.
<b>Stone:</b>			
Cold Spring Granite Co....	Cold Spring, Minn. 56320....	2 quarries and plant..	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 and plant..	Grant.
Hills Material Co.....	Box 1392 Rapid City, S. Dak. 57701	Quarry and plant.....	Pennington.
L. G. Everist, Inc.....	302 Paulton Bldg. Sioux Falls, S. Dak. 57102	.....do.....	Minnehaha.
Pete Lien & Sons.....	Box 3124, P.O. Annex Rapid City, S. Dak. 57703	.....do.....	Pennington.
Robert Hunter Granite Co.	Millbank, S. Dak. 57252.....	.....do.....	Grant.
South Dakota Cement Commission.	Drawer 351 Rapid City, S. Dak. 57701	.....do.....	Do.
Spencer Quarries, Inc.....	Spencer, S. Dak. 57374.....	.....do.....	Hanson.
<b>Uranium:</b>			
Susquehanna-Western, Inc.	Edgemont, S. Dak. 57735....	1 open-pit-underground, 1 open-pit, and 3 underground mines.	Fall River.
Mines, Development, Inc.	.....do.....	Acid-leach mill.....	Do.
Vanadium: Susquehanna-Western, Inc.	.....do.....	Vanadium-recovery plant.	Do.