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Mineral Industry of Oklahoma in 1952

BY

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INTRODUCTION

Oklahoma, the 17th largest State in the Union, with 69,919 square miles of area distributed among 77 counties, was the sixth ranking State in the production of mineral wealth in the nation in 1952. Oklahoma was the third largest producer of natural gas and LP-gases and the fourth largest producer of natural gasoline, asphalt, crude petroleum, and zinc. The State also produced substantial tonnages of cement, coal, sand and gravel, stone, and gypsum. Metal mining (zinc-lead) was entirely in Ottawa County in the northeast corner of the State. Non-metallic mining was distributed, but was concentrated principally in central, north-central, and northeastern Oklahoma, and the Arbuckle and Wichita Mountains. All non-metallic materials except granite were produced from sedimentary deposits, mostly from limestones, sandstones, and shales of Paleozoic and Mesozoic age, or from unconsolidated sands and clays of Tertiary and Quaternary age. Oil and gas production exceeded that of any other mineral in value, and was approximately equal in value to agricultural products and to manufacturing products. Oil, together with some gas, was produced from about 1,050 pools in 55 Oklahoma counties, distributed principally in northeastern, north-central, central, south-central, and southwestern parts of the State. The most productive counties in 1952 were Stephens, Carter, Garvin, Oklahoma, and Seminole. More oil has been produced per unit of area in Oklahoma than in any other State in the nation. Gas alone was produced in seven additional counties, chiefly in east-central Oklahoma and the Panhandle. Oil and gas trunk pipeline mileage increased in 1952 as did the mileage of the gathering lines.

CONSUMPTION AND MARKETS

In 1952 the value of mineral production in Oklahoma was \$621,351,000, which compared with a value of \$613,000,000 for agriculture and \$583,000,000 for manufacturing.

The mineral industries in Oklahoma process much of their raw materials into finished or semi-finished products, both for Oklahoma consumption and for export. Some of these industries are oil refineries processing Oklahoma oil; zinc operators, who ship their concentrates to Oklahoma smelters; glass, manufactured in Oklahoma plants from local glass sand, limestone, and dolomite; portland cement; brick, tile, and pottery made from Oklahoma clay and shale; wall boards and plasters in wide variety, produced from Oklahoma gypsum; lime; crushed stone; and building and ornamental stone.

Many of these industries utilize Oklahoma natural gas in processing their raw materials into finished products.

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1. Commodity-industry analyst, Bureau of Mines, Region VI, Amarillo, Texas.
2. Oklahoma Geological Survey.

Mineral	1951		1952	
	Short tons (unless otherwise stated)	Value	Short tons (unless otherwise stated)	Value
Clays (except for cement)	345,566	\$356,207	249,819	\$307,189
Coal	2,223,229	13,873,424	2,193,409	12,687,855
Lead (recoverable content of ores, etc.)	16,575	5,734,950	15,137	4,874,114
Natural gas	538,756,000	28,554,000	554,033,000	29,918,000
Natural-gas liquids:				
Natural gasoline	9,458,000	27,498,000	9,660,000	29,459,000
LP-gases	8,084,000	12,436,000	8,953,000	14,090,000
Petroleum (crude)	186,869,000	480,250,000	2190,435,000	2,487,510,000
Sand and gravel	3,183,251	2,321,653	3,769,663	2,911,845
Stone (except limestone for cement and lime)	6,966,676	6,917,548	3,636,475	3,974,334
Zinc (recoverable content of ores, etc.)	53,450	19,455,800	54,916	18,232,112
Undistributed: Native asphalt, cement, gypsum, lime, pumice and pumicite (1952), salt, ground sand and sandstone, and stone (dimension limestone, 1952)				
TOTAL OKLAHOMA		10,088,324		12,387,022
		607,486,000		621,351,000

1. Production as measured by mine shipments or mine sales (including consumption by producers), except that fuels and gypsum are strictly production.
2. Final figure. Supersedes preliminary figure given in commodity chapter.
3. Excludes certain stone included with "Undistributed."

TRENDS AND NEW DEVELOPMENTS

Owing to rising freight costs there was a continued trend toward decentralized production and processing of such bulk commodities as crushed stone and sand and gravel.

The newly constructed crushing and blending plant of the Dolese Bros. at Richards Spur, north of Lawton, was in its first full year of operation. Described as the nation's outstanding new crushed stone plant (Nordberg, 1953), it was erected to replace an older plant that was destroyed by fire in 1949. The quarry is in the upper part of the Arbuckle limestone group (Ordovician) and has a length of about 1,000 feet; the height of the face ranges from 100 to 200 feet.

The capacity of the Dewey Portland Cement Co. plant was increased 40 percent by the installation of a new 375 foot rotary kiln (Avery, W. M., 1952). Also included in the company's expansion program was the modernization of its power plant and electrical distribution system. The rock quarried is the Dewey limestone formation of the Missouri series (Pennsylvanian).

A new granite quarry for monumental stone and exterior trim was opened near Mill Creek, in the central part of the Arbuckle Mountains, by the Century Granite Co. of Snyder, Okla. The quarry is in the Tishomingo granite, of pre-Cambrian age.

Bentonite production from near Camargo, Dewey County, was reported in 1952 for the first time since 1946.

Interest in the possibilities of mining ilmenite for use in making pigments and titanium metal was increased by the publication of a report (Chase, G. W., 1952) in which alluvial sands in Comanche County were shown to contain free ilmenite that is amenable to concentration. Test drilling of one deposit on the north shore of Lake Lawtonka indicated a reserve of 370,000 short tons of ilmenite concentrates containing 44.12 percent TiO_2 . The ilmenite constitutes 3.4 to 6.8 percent of the alluvial deposit.

A comprehensive program of drilling for zinc ore by the American Zinc, Lead, and Smelting Co. in the old Davis zinc field was completed in 1952. This area, in the Arbuckle Mountains, about 9 miles southwest of Davis, Murray County, had previously been worked for sphalerite and smithsonite some time in the years 1912-1914, and again during World War II. American Zinc began detailed mapping in April, 1951, and by August, 1952, had completed the drilling of 20,000 feet of test hole.

Deposits of kaolin and montmorillonite clays of the Wichita Mountains were briefly described (Chase, G. W. and Burwell, A. L., 1952). Deposits in Comanche and Kiowa Counties occurring as alteration products of anorthosite were investigated by test drilling, which indicated that 7-25 percent kaolin can be recovered by elutriation. The elutriated product is relatively non-plastic and light-firing, and contains 34-36 percent Al_2O_3 . Drilled depth of the altered material was about 30 feet. The montmorillonite group of clays contains 13-25 percent Al_2O_3 and occurs as alteration products of pre-Cambrian gabbro. Drill tests indicate a large volume of these materials.

CUSTOM MILLS AND SMELTERS

There were nine custom mills operated by six lead-zinc mining companies active in 1952. All these mills were located in Ottawa County in the north-eastern part of the State. The largest custom mill in the State and one of the largest heavy-media mills treating lead-zinc ores in the nation, the Eagle-Picher

Central mill processed ores from both Oklahoma and Kansas. Other mine mills were the Barbara J, Lawyers, and Rialto of the American Zinc, Lead and Smelting Co.; Beck No. 1 of the Beck Mining Co.; Lucky Jenny of the Harris Mining Co.; Scott of the Helen H. Mining Co.; and St. Louis No. 4 of the C & M Mining Co. The Bird Dog mill of the Eagle-Picher Co. treated the slimes of the Central mill, and the Sooner mill of the Sooner Milling Co. treated old tailings and slimes from both Oklahoma and Kansas.

Three horizontal retort zinc smelters operated at near capacity throughout the year. They were the Blackwell smelter of the Blackwell Zinc Co. in Kay County, the Henryetta smelter of the Eagle-Picher Co. in Okmulgee County, and the Bartlesville smelter of the National Zinc Co., Inc. in Washington County. These smelters treated ores and concentrates from the Tri-State district, from several western States, and from foreign countries. Metal stocks at smelters increased sharply during June and July when an extended strike of steel workers curtailed the demand for zinc.

MINERAL BROKERS

Concentrates produced in the Tri-State district of Oklahoma, Kansas, and Missouri were purchased by brokers or ore buyers representing five smelting companies. Concentrate purchases from this district differ from those made in western State mining districts in that the concentrate is purchased from the producer f.o.b. the mill, handling and freight charges being assumed by the purchaser. Concentrate prices are quoted on 60 percent zinc content and 80 percent lead content of the concentrates subject to adjustments based on assays.

DMEA AND DMPA CONTRACTS IN OKLAHOMA

The Defense Minerals Exploration Administration (DMEA) was established to encourage exploration and development of strategic and critical materials in the United States, its Territories and possessions. The Government contributes from 50 to 90 percent of the cost of exploration, depending on the mineral under contract with the operator. DMEA's contribution is repayable from a percentage of the royalties stemming from production resulting from such exploration.

In 1952 DMEA had in force a contract totaling \$156,000 with the American Zinc, Lead and Smelting Co. for zinc exploration in Murray County. Actual government participation in this contract was \$27,826.81, and no certification of discovery was made on completion of the contract.

The Defense Materials Procurement Agency (DMPA) was created by executive order in August 1951 to be responsible for procuring metals, minerals, and other materials in this country and overseas and to encourage production of such materials. The agency purchases metals, minerals, and other materials for Government use or resale; installs facilities or improvements in Government owned plants and Government equipment in privately owned plants; and guarantees loans to contractors, subcontractors and others to expedite production and delivery under Government contract.

In Oklahoma a DMPA negotiated contract provided subsidy payment of \$96,000 to the W. M. & W. Mining Co. to produce 5,750 tons of zinc.

EMPLOYMENT IN MINERAL INDUSTRIES

Employment.— Employment in the lead-zinc mining industry declined sharply in the last half of the year because of falling metal prices and lessen-

ing demand for lead zinc. Employment in the non-metallic industries continued at the same rate as the year before. A considerable amount of this employment was seasonal in nature because of conformable demand and adverse weather conditions.

Accidents.— There were no reported major disasters in the metal and non-metallic industries in Oklahoma in 1952. Metal mining continued as one of the nation's most hazardous industries, but the frequency rate of injuries was lower than that of the previous year.

Wages.— Wages and annual income of all mineral industry workers, except lead-zinc miners, increased during the year in line with those of other industrial workers in the State. Hourly wage rates of lead-zinc miners, which in many instances were tied to the price of concentrates, declined in response to lower concentrate prices. In other instances, loss of overtime and incentive or bonus plans accounted for the income decline.

REVIEW BY MINERAL COMMODITIES

MINERAL FUELS

Data and information of the mineral fuels (coal, gas, and crude petroleum) are reported in detail in Volume II of the 1952 edition of the Minerals Yearbook. In this chapter is included only a brief summary of mineral fuels, but the metallic and non-metallic minerals are discussed in detail.

Coal.— Oklahoma coal production in 1952 declined for the 5th consecutive year when 2,193,400 tons, valued at \$12,687,900, were produced. There were 12 counties with reported production, the largest being Okmulgee, followed by Rogers, Le Flore, Haskell, Sequoyah, McIntosh, Pittsburg, Coal, Latimer, Craig, Wagoner, and Tulsa.

Petroleum.— Oklahoma continued as the nation's 4th largest producer of petroleum in 1952 with an output of 190,435,000 barrels, 2 percent more than the 186,869,000 barrels produced in 1951.

Natural gas.— Marketed production of natural gas amounted to 554,033 million cubic feet valued at \$29,918,000 in Oklahoma in 1952, an increase of 15,277 million cubic feet in quantity and \$1,364,000 in value over that produced in 1951.

Natural gas liquids.— Oklahoma ranked 4th among the States in the combined production of natural gasoline and LP-gases in 1952 when it produced 9,660,000 barrels of natural gasoline and 8,953,000 barrels of LP-gases valued at \$29,459,000 and \$14,090,000 respectively.

PRODUCTION OF MINERAL FUELS IN OKLAHOMA, 1948-52

Year	CRUDE PETROLEUM		NATURAL GAS LIQUIDS			NATURAL GAS		COAL		
	Thousand Barrels	Thousand Dollars	Natural Gasoline 1000 bbls.	LP-gases 1000 bbls.	1000 \$	Million Cu. Ft.	Thousand Dollars	Thousand Short Tons	Thousand Dollars	
1948	154,455	398,490	6,498	4,680	26,143	10,963	480,573	23,356	3,462	16,619
1949	151,660	388,250	6,855	5,630	20,360	8,408	435,262	20,327	3,022	15,242
1950	164,599	423,020	7,980	6,753	21,579	8,393	482,360	23,636	2,679	14,567
1951	186,869	480,250	9,458	8,084	27,498	12,436	538,756	28,554	2,223	13,873
1952	190,435	487,510	9,660	8,953	29,459	14,090	554,033	29,918	2,193	12,688

METALS

Cadmium, germanium, indium, and gallium. — Minerals of these elements occur as a trace or in minute quantities in many domestic zinc ores. The entire domestic production was recovered as a byproduct from the flue dusts generated in the zinc smelting process. It is impossible to determine the State origin of these commodities since in smelter practice the ores from numerous sources, some foreign origin, are co-mingled and because no assay is made of these constituents due to their minute quantity. Cadmium occurs most commonly as the mineral greenockite (Cds), associated as a yellow powder or stain with the zinc mineral sphalerite (ZnS), and to a lesser extent with ores of lead and copper containing zinc mineralization.

Lead. — Oklahoma production of recoverable lead in 1952 dropped about 9 percent in quantity and 15 percent in value compared with 1951. It was the smallest production since 1947 and only 19 percent of 1925, the peak production year. During the year, 168 companies operated 118 mines, all of which were in Ottawa County. Recovery, in terms of metal content, dropped from 0.47 percent in 1951 to 0.41 percent in 1952. The ore mined in the State was predominantly zinc with a ratio of 3 parts zinc to 1 part lead. Oklahoma contributed most of the lead produced in the Tri-State district, accounting for 55 percent.

Zinc. — Concentrate recoveries from Oklahoma zinc-lead ores declined in 1952 to 2.66 percent for zinc and 0.55 percent for lead when 3,542,213 tons of crude ore and 666,523 tons of tailings yielded 101,726 tons of zinc concentrates and 20,473 tons of lead concentrates. Production of recoverable zinc in 1952 increased 3 percent to 54,916 tons when compared with 53,450 tons in 1951, notwithstanding a decline of 36 percent in metal price. The value decreased 6 percent coincident with lower metal prices. Economic forces contributing to the fluctuations in metal prices were the prolonged steel strike which permitted zinc stocks to increase sharply; the over-supply of foreign metal stocks which eventually sought American markets; the urgent need of some foreign Governments to convert such stocks into American dollars; and the added production from new foreign sources. This combination of events induced lower metal prices with the net effect that many domestic marginal producers were obliged to curtail or to discontinue operations. Many Oklahoma zinc properties were in this category.

Oklahoma is part of, and the major producer in, the important Tri-State mining district, which for many years has been a vital source of the nation's zinc supply.

TABLE 3.
MINE PRODUCTION OF LEAD AND ZINC IN OKLAHOMA, 1948-52, AND TOTAL,
1891-1952, IN TERMS OF CONCENTRATE AND RECOVERABLE METAL¹

Year	LEAD CONCENTRATES (GALENA)		ZINC CONCENTRATES (SPHALERITE)		RECOVERABLE METAL CONTENT ²			
	Short tons	Value	Short tons	Value	LEAD		ZINC	
					Short tons	Value	Short tons	Value
1948	22,638	\$ 5,214,366	82,734	\$ 7,178,960	16,918	\$ 6,056,644	43,821	\$ 11,656,386
1949	26,910	5,020,076	82,522	6,407,589	19,858	6,275,128	44,033	10,920,184
1950	27,261	4,218,880	87,116	8,247,342	20,724	5,595,480	46,739	13,273,876
1951	22,613	4,714,358	99,612	12,297,096	16,575	5,734,950	53,450	19,455,800
1952	20,473	4,104,934	101,726	11,714,605	15,137	4,874,124	54,916	18,232,112
1891- 1952	1,588,652	148,272,277	9,416,008	458,758,740	1,222,292	176,712,465	4,965,255	732,427,060

1. Based on Oklahoma ore ("dirty") and old tailings treated at mills during calendar year indicated.

2. In calculating metal content of the ores from assays, allowance has been made for smelting losses of both lead and zinc. In comparing the values of concentrate ("ore") and metal it should be borne in mind that the value given for the concentrate is that actually received by the producer, whereas the value of the lead and zinc is calculated from the average price for all grades.

TABLE 4
TENOR OF LEAD AND ZINC ORE, OLD TAILINGS, AND SLIMES MILLED
AND CONCENTRATES PRODUCED IN OKLAHOMA, 1951-52

	1951		1952	
	Crude ore	Old tailings and slimes	Crude ore	Old tailings and slimes
Total material milled	3,542,213	666,523	3,715,329	502,350
Total concentrate produced:				
Galena	22,568	45	20,448	25
Sphalerite	95,233	4,379	98,856	2,870
Ratio of concentrate to material milled:				
Lead	0.64	0.007	0.55	.005
Zinc	2.69	0.66	2.66	0.57
Metal content of material milled: ¹				
Lead	0.47	0.004	0.41	.003
Zinc	1.44	0.34	1.44	0.30
Average lead content of galena concentrates	74.81	53.33	75.43	56.00
Average zinc content of sphalerite concentrates	59.70	57.73	60.02	58.25
Average value per ton:				
Galena concentrates	\$208.61	\$144.91	\$200.57	\$148.08
Sphalerite concentrates	\$123.54	\$121.45	\$115.24	\$112.49

1. Figures represent metal content of the crude ore ("dirty") only insofar as it is recovered in the concentrate; data on tailing losses not available.

Tri-State District. — The 6,140,155 tons of crude ore and 604,350 tons of old tailings treated in the Tri-State district of Oklahoma, Kansas, and southwestern Missouri in 1952 yielded 36,333 tons of lead concentrates and 167,174 tons of zinc concentrates, containing 27,356 tons of recoverable lead and 90,512 tons of recoverable zinc.

There were 20 mine mills and two tailings mills operating during the year. Nine of the mine mills treated only the ores from company mines, the other 11 mine mills handling custom ores. Ten of these mills ranged in size from the large Central mill of the Eagle-Picher Co. with a daily capacity of 15,000 tons to the smaller mills having a daily capacity of around 1,400 tons. The larger part of the ores from Oklahoma and Kansas were sent to custom mills, with the Central mill receiving the greater portion of this custom ore. Zinc recovery from the retreatment of old tailings and slimes continued to decline during the year to the degree that both tailings mills discontinued operations by the end of the year.

There were 319 mines operating in the district during the year, 118 of which were in Oklahoma. Many of these mines were closed during the latter half of the year when lead prices dropped from 19 cents to 14¼ cents, and zinc prices from 19½ cents to 12½ cents. This was a 22 percent loss for lead and a 36 percent loss for zinc, a price drop which eventually resulted in the closing of 107 district mines and 5 mills.

NON-METALS

Non-metallic mineral commodities produced in Oklahoma in 1952 were clays (including bentonite), sand and gravel, stone, and miscellaneous products (native asphalt, cement, gypsum, lime, pumicite, salt, ground sand and sandstone, and dimension stone). Reported value of these commodities in 1952 was \$24,258,000, which was greater than that of any previous year and a 25 percent increase over 1951. Fifty percent of the 1952 value was for miscellaneous products.

Clay

Oklahoma has extensive and widely distributed clay resources, and nearly all the clay produced is used in the manufacture of cement or brick and tile. In 1952 clay was produced by 12 brick and tile plants in Creek, Custer, Garfield, Greer, Oklahoma, Pittsburg, Pontotoc, Seminole, and Tulsa Counties. One plant in Lincoln County was idle. Production of 246,474 tons valued at \$257,014 was reported.

Bentonite production was reported in 1952 from near Camargo in Dewey County. Deposits near Camargo and Woodward, Woodward County, have been worked intermittently in the past, but the 1952 production was the first reported since 1946.

Small quantities of pottery clay are produced in Pontotoc and Tillman Counties.

TABLE 5.
CLAY SOLD OR USED BY PRODUCERS
IN OKLAHOMA, 1948-52¹

YEAR	SHORT TONS	VALUE
1948	510,316	\$389,903
1949	480,199	374,179
1950	555,910	493,659
1951	551,144	561,644
1952	520,050	520,130

1. Includes clays used for cement

Sand and Gravel

Large deposits of sand and gravel, suitable for concrete aggregate and road surfacing, occur along and adjacent to most of the larger streams in Oklahoma. Construction sand and gravel was produced in 1952 in 32 counties. Ten plants were operated in Tulsa County, six in Oklahoma County, five in Kay County, and four in Pawnee County. Other plants were well distributed throughout the State.

High purity silica sand was produced from sandstones of Middle Ordovician age in Johnston, Murray, and Pontotoc Counties in the Arbuckle Mountains region of south-central Oklahoma. Most of this sand is used in manufacturing glass, but smaller quantities are used as foundry sand and for making sodium silicate.

Sand and gravel produced in Oklahoma in 1952 is reported as 3,770,000 tons valued at \$2,912,000 compared with 3,183,000 tons valued at \$2,322,000 in 1951 (Table 10).

TABLE 6.
SAND AND GRAVEL SOLD OR USED BY COMMERCIAL AND
GOVERNMENT-AND-CONTRACTOR PRODUCERS IN OKLAHOMA
IN 1948-52

Year	COMMERCIAL			NON-COMMERCIAL		TOTAL	
	Short Tons	Value	Avg. Val. Per Ton	Short Tons	Value	Short Tons	Value
1948	1,355,141	\$976,069	.72	649,371	\$111,934	2,004,512	\$1,088,003
1949	1,775,623	1,259,770	.71	1,145,534	265,645	2,921,157	1,525,415
1950	1,730,067	1,500,667	.87	1,556,767	856,186	3,286,834	2,356,853
1951	2,164,382	2,103,710	.97	1,018,869	217,943	3,183,251	2,321,653
1952	2,353,559	2,209,098	.94	1,416,104	702,747	3,769,663	2,911,845

Stone

Limestone and dolomite, chat, granite, and sandstone were produced in Oklahoma in 1952. Limestone and dolomite, used principally as crushed stone, was the leading commodity. Records for production and value of stone were broken in 1952 when 9,636,000 tons valued at \$8,974,000 was produced, surpassing 1951 when 6,967,000 tons valued at \$6,918,000 were the previous records. The increase was 38 percent in quantity and 30 percent in value.

Limestone and Dolomite. — Oklahoma has abundant resources of limestone and dolomite. In 1952 limestone or dolomite was produced from 15 quarries in 11 counties, the greatest production being in the Arbuckle Mountain region of south-central Oklahoma, the Tulsa area of northeastern Oklahoma, and the Wichita Mountain region in southwestern Oklahoma.

Most of this stone is crushed for use in concrete aggregate, riprap, road surfacing, railroad ballast, metallurgical and chemical manufacturing, and acid neutralizers for soils.

Chemical grade limestone is quarried for lime making and as flux in glass manufacturing at Marble City in Sequoyah County. Chemical grade dolomite is produced for glass manufacturing, fertilizers, and mineral feeds at Troy in Johnston County.

In 1952 Oklahoma produced 6,356,000 tons of limestone and dolomite valued at \$6,943,000 compared with 4,765,000 tons valued at \$5,279,000 in 1951. Limestone was quarried for building stone in the Arbuckle Mountains and near Eldorado in Jackson County, and limestone used in portland cement manufacture was quarried in Washington and Pontotoc Counties.

Chat. — Chat is the name used in the west-central States to denote the coarse tailings obtained in milling zinc and lead ores. This material is composed mostly of chert or microcrystalline silica, together with small quantities of limestone, sphalerite, galena, marcasite, and pyrite.

Most of the chat sold was used for railroad ballast, concrete aggregate, and road surfacing. In 1952 operators reported sales of 3,274,008 tons valued at \$1,511,742 compared with 2,050,673 tons valued at \$897,112 in 1951. All the chat was from Ottawa County.

Granite. — The granite industry of Oklahoma is centered in the Wichita Mountain district, in the southwestern part of the State, where production in 1952 was reported from six operators in Comanche, Greer, and Kiowa Counties. During the year a new quarry was opened near Mill Creek, Murray County, in the central part of the Arbuckle Mountains. It is the first granite quarry to be operated in the Arbuckle Mountains in about 35 years.

Production is from pre-Cambrian granites that are predominantly pink and red. The granite is used mostly for monumental stones and partly for exterior trim. Much of the stone is finished in plants of the Wichita Mountain district, but some is exported as rough stock to other States. In 1952 granite production was 5,300 tons with a value of \$511,000.

Sandstone. — Sandstone produced in Oklahoma is used chiefly for building and veneer stone in construction of residence and business buildings. The stone is worked as slabs 1½ to 6 inches thick from shallow, open-face quarries in Choctaw, Mayes, Okmulgee, and Pushmataha Counties. One mechanized trimming plant operates near Henryetta, Okmulgee County. Incomplete returns for 1952 show a production of 950 tons valued at \$10,900.

Crushed Stone (Non-commercial). - Stone crushed by municipal, county, and State agencies included limestone, sandstone, and granite obtained from local quarries throughout the State. Production in Oklahoma in 1952 was 200,153 tons valued at \$147,209.

TABLE 7.
STONE SOLD OR USED BY PRODUCERS IN OKLAHOMA,
1948-52, BY KINDS

Year	GRANITE		LIMESTONE		SANDSTONE		OTHER STONE		TOTAL	
	Short Tons	Value	Short Tons	Value	Short Tons	Value	Short Tons	Value	Short Tons	Value
1948	15,100	¹ \$600,531	2,483,980	\$2,701,765	² -----	² -----	1,533,150	\$832,053	³ 4,027,630	³ \$4,141,379
1949	4,720	569,170	2,183,990	2,490,627	20,360	\$20,370	2,132,860	947,242	4,341,930	4,027,409
1950	216,930	646,872	2,992,920	3,334,374	19,480	18,700	1,792,330	848,277	5,021,660	4,848,223
1951	4,267	527,500	4,765,419	5,279,311	146,317	213,625	2,050,673	897,112	6,966,676	6,917,548
1952	5,337	511,073	6,355,780	6,940,219	1,350	11,300	3,274,008	1,511,742	9,636,475	8,974,334

1. Excludes crushed granite, included in total.
2. Figure withheld to avoid disclosing individual company operations.
3. Includes crushed granite and sandstone.

Miscellaneous Minerals

Minerals produced in Oklahoma in 1952, for which statistics cannot be revealed because there are less than three producers or because one company produces a large percentage of the total, are native asphalt, cement, gypsum, lime, pumicite (volcanic ash), salt, ground sand and sandstone, and dimension limestone. The value of these commodities, together with that of bentonite produced by one operator in Dewey County, was a record high of \$12,387,000. The value of miscellaneous minerals in Oklahoma, included in previous tables as "Undistributed", has been increasing from a low in 1944 of \$3,606,000 to new records beginning in 1947 and continuing each year through 1952. Values for these years are as follows: (1947) \$7,149,000; (1948) \$8,106,000; (1949) \$8,706,000; (1950) \$9,512,000; and (1951) \$10,088,000. The increase in value for 1952 was 23 percent over 1951.

Cement. - Cement is produced at Dewey in Washington County and at Ada in Pontotoc County. Each plant has expanded capacity in recent years. Cement was the leading product in dollar value of the miscellaneous minerals in Oklahoma.

Gypsum. - In 1952 three operators continued to produce gypsum in Blaine County. Quarries formerly worked in other parts of western Oklahoma were inactive during the year.

The largest producer is the United States Gypsum Co. which operates quarries and a modern calcining plant at Southard, making wallboard and many kinds of plaster. Gypsum was quarried by the Universal Atlas Cement Co. near Watonga and by S. A. Walton near Southard, principally for use as a retarder in the manufacture of portland cement.

Lime. - High-purity limestone of the St. Clair formation at Marble City continued to be burned in shaft kilns at Sallisaw, Sequoyah County, by the St. Clair Lime Co. The lime is sold chiefly for chemical use in water purification and steel metallurgy.

Perlite. - Perlite is expanded for use chiefly in concrete and plaster at two plants, one each at Oklahoma City and Tulsa. All crude perlite is imported, as there are no deposits in Oklahoma.

Pumicite. - Pumicite or volcanic ash was produced from deposits near Gate in eastern Beaver County. It is used mostly for cleansing and scouring compounds and as a concrete admixture.

Salt. - Salt was produced in three counties in 1952. The major producer was Oklahoma Salt Industries at Sayre, Beckham County, where salt continued to be produced by injecting fresh water through wells into a salt bed and recovering the brine for surface evaporation. In Woods County, salt was produced from surface encrustations on the Big Salt Plain of Cimarron River; and in Harmon County salt was recovered by solar evaporation of salt springs.

Ground Sand. — Ground sand is produced by the Pennsylvania Glass Sand Corp. of Oklahoma at Mill Creek, Johnston County, by grinding high-purity glass sand obtained from quarries in loosely consolidated sandstone. It is used mostly in cleansing and scouring compounds, as a filler, and for pottery, porcelain, and tile.

Tripoli. — Tripoli continued to be mined in 1952 in eastern Ottawa County, which long has been the main source of this commodity. All tripoli mined in Oklahoma was transported to Seneca, Missouri, where it was processed by the American Tripoli Corp. and sold chiefly for buffing compounds and foundry use.

REVIEW OF NON-FUEL MINERALS BY COUNTIES

Production of metals and non-metals in 1952 was reported from 55 of the 77 counties in Oklahoma. These counties were well distributed throughout the State.

Atoka

Limestone was crushed by the Southwest Stone Co. at its quarry near Stringtown. Small quantities of non-commercial stone were worked by the Atoka County Highway Department.

Beaver

Everett Bush produced construction sand from a pit east of Beaver City. Pumicite (volcanic ash) was produced north of Gate, by Dyer and Kite.

Beckham

The Oklahoma Salt Industries produced salt from wells southwest of Sayre.

Blaine

Gypsum was produced by the U. S. Gypsum Co. from its quarries at Southard. The U. S. Gypsum Co. also operated large calcining, sheet rock, and plaster plants at Southard. The Universal Atlas Cement Co. operated a gypsum quarry and crushing plant northeast of Watonga. S. A. Walton operated a gypsum quarry and crusher west of Okeene.

Bryan

Construction sand and gravel was produced from pits of the M. & K. Sand and Gravel Co. near Colbert, and by H. C. Rustin Co. north of Durant.

Caddo

Construction sand and gravel was produced by the W. E. Tindel Co. near Hydro, and by James Avery near Fort Cobb. Non-commercial sand and gravel was also produced in Caddo County in 1952.

Canadian

The Tindel Materials Co. produced construction sand and well-packing gravel from pits northeast of Bridgeport.

Cherokee

Sand and gravel was produced by the Yahola Sand and Gravel Co. from the Grand River north of Fort Gibson.

Choctaw

O. G. Beason produced construction sand and gravel near Sawyer. The Briggie Sand and Gravel Co. produced construction sand from its plant northeast of Hugo. Building sandstone was produced by the Hanselman Stone Co. in the north part of the county.

Cimarron

Construction sand and gravel was produced northwest of Boise City by Jack Parker.

Cleveland

Construction sand and gravel was produced by K. D. Zeed.

Coal

The Dolese Bros. Co. continued to crush stone at its quarry near Bromide.

Comanche

Ira Smith and Sons continued to produce unfinished granite dimension stone from its quarry in the western part of the county. The Dolese Bros. Co. crushed stone in its newly erected plant at the Richards Spur Quarry north of Lawton.

Cotton

Construction sand and gravel was produced northwest of Walters by Raymond Eaders; southwest of Walters by Morris Weravah; and near Temple by Robert Simpson.

Creek

The Sapulpa Brick and Tile Co. produced clay for use in manufacturing brick and tile at its plant on the west edge of Sapulpa. Non-commercial

Creek (cont.)

sand and gravel and non-commercial crushed stone were produced by the County Highway Department.

Custer

Brick clay was produced west of Clinton by the Acme Brick Co.

Dewey

Bentonite deposits were worked north of Camargo by L. S. Fisher for the Filtrol Corp. Construction sand and gravel was produced west of Camargo by the Amis Sand and Gravel Co.

Garfield

The Davies Brick and Tile Co. continued to produce clay for making brick and tile from their quarry south of Enid.

Garvin

Construction sand and gravel was produced from deposits east of Pauls Valley by Lamar Lawson and Elmer Long. Non-commercial sand and gravel also was produced.

Grady

The Dolese Bros. Co. continued to produce construction sand from pits near Tuttle.

Greer

The Mangum Brick and Tile Co. produced clay from its quarry south of Mangum. Granite was produced by the Pellow Bros. Monument Works near the town of Granite. Construction sand and gravel was produced from a pit east of Mangum by D. J. Cox.

Harmon

Salt was produced by W. W. Flowers and Sons through solar evaporation of brine from salt springs.

Harper

Construction sand and gravel was produced west of Buffalo by S. G. Shiery.

Jackson

Building limestone was cut by power gang saws from quarries northeast of Eldorado by L. I. Winham. Everett Gresham produced construction sand and gravel from pits east of Elmer.

Johnston

The Rock Products Manufacturing Corp. produced crushed dolomite from its quarry near Troy. Unfinished granite was produced south of Mill Creek by the Century Granite Co. The Pennsylvania Glass Sand Corp. of Oklahoma continued to produce glass sand and ground silica from pits north of Mill Creek. Construction sand and gravel was produced east of Tishomingo by Claud Lamb.

Kay

Limestone was crushed near Ponca City and Uncas by the Cookson Stone Co. Construction sand and gravel was produced east of Ponca City by the Otoe Sand and Gravel Co. and by the Riverside Sand and Gravel Co. Near Blackwell, sand and gravel was produced by the Blackwell Sand and Gravel Co. and by the Midwest Concrete Supply Co. Sand is produced near Tonkawa by the Tonkawa Sand and Gravel Co.

The Blackwell zinc retort smelter of the Blackwell Zinc Co. operated at near capacity throughout 1952 treating ores from the Tri-State mining district and from foreign countries. Natural gas produced in the area was used as fuel.

Kingfisher

Construction sand was produced near Dover by the Dolese Bros. Co.

Kiowa

Granite was quarried near Snyder by the Century Granite Co. and by the Roosevelt Granite Co. Near Mountain Park, granite was quarried by the J. P. Gilman Granite Co. and by the Parson Bros. Granite Works. Limestone was crushed east of Roosevelt at the quarry of the Roosevelt Materials Co. Construction sand and gravel was produced east of Hedrick by the Clingan Sand and Gravel Co. and by the Southwest Sand Co. The Lugert Sand and Gravel Co. produced sand and gravel south of Lugert.

Logan

Construction sand was produced east of Crescent by John McConnel.

McCurtain

Limestone, sold chiefly for agricultural fertilizer, was crushed west of Idabel at the quarry of the McCurtain Limestone Co.

Major

Construction sand and gravel was produced near Cleo Springs by the Concho Sand and Gravel Co. and by Oren Law.

Mayes

Crushed limestone was produced southeast of Pryor by the Anco Stone Co. Building sandstone was produced near Locust Grove by L. Langston.

Murray

Asphaltic limestone and sandstone was produced near Dougherty by the Southern Rock Asphalt Co. Limestone was crushed near Davis and at Big Canyon at quarries of the Dolese Bros. Co. Construction gravel was produced by Makins Sand and Gravel Co. near Dougherty.

Muskogee

Sand was pumped from the Arkansas River north of Muskogee by the Yahola Sand and Gravel Co. Production of non-commercial sand and gravel was reported.

Noble

Non-commercial sand and gravel was produced.

Nowata

Limestone was crushed near Lenapah at the quarry of the Peerless Rock Co.

Oklahoma

Clay was quarried in the west part of Oklahoma City for use in making brick by the Acme Brick Co. and by the United Brick and Tile Co. Construction sand was produced north of Oklahoma City by the Dolese Bros. Co. and by the Makins Sand and Gravel Co. Sand was produced in Oklahoma City by the Myres Excavating Co. East of Oklahoma City, construction sand and gravel was produced by the Murphy Perkins Co., the Sizemore Sand Co., and the Steelman Construction Co. Non-commercial sand and gravel was produced in 1952. Perlite was expanded in the plant of the Midwestern Perlite Corp. at Oklahoma City.

Okmulgee

Building sandstone was produced from quarries north of Henryetta by the Ada Stone Co., Joe Berry, L. E. Berry, Carl Higgins, and Bill Riley. A power trimming plant was operated near Henryetta by the Ada Stone Co. The zinc retort smelter of the Eagle-Picher Co., located at Henryetta, treated ores from the Tri-State district, from Arizona, and from foreign sources.

Osage

Crushed limestone was produced east of Burbank by the Burbank Rock Co. Construction sand was produced by the Means Sand Co.

Ottawa

Chat, which is a by-product of zinc and lead milling, was produced by the Eagle-Picher Co., the Baxter Chat Co., the Diplomat Gravel Co., Scott Fones, and H. D. Youngman. Tripoli was quarried in east-central Ottawa County by the American Tripoli Corp. and processed in its plant at Seneca, Mo. Important quantities of lead and zinc concentrates were produced by 10 mills treating ores from 168 mines operated by 116 mining companies.

The 10 leading companies in the order of their production and the properties they operated were: Eagle-Picher Co. (Anna Beaver, Big Chief, Blue Goose No.1 and No.2, Crawfish, Goodwin, Grace Walker, Humbahwatah No.1 and No.2, John Beaver, Kenoyer, Netta, North Hunt, Piokee, Royal, See Sah, Slim Jim, Tongaha, Townsite, Velie, Wesah, and Joe Whitebird); American Zinc, Lead & Smelting Co. (Barbara J, Lawyers, and Rialto); John Henderson (Acme, Bingham, Buffalo, and Mahutska); Dines Mining Co. (Hunt and Van Pool); Buffalo Mining Co. (Buffalo, Clabber, Pat, Tulsa, and Wesah); Federal Mining & Smelting Co. (Gordon); W. M. & W. Mining Co. (Brewster); C. & M. Mining Co. (St. Louis No. 4); Helen H. Mining Co. (Aztec, Blue Bonnet, Blue Ribbon, and Scott); and the Tongaha Mining Co. (Tongaha).

Pawnee

Sand was produced near Cleveland by the Osage Sand Co., and near Ralston by the Ralston Sand Co. and the Tulsa Sand Co.

Payne

Non-commercial sand and gravel was produced in Payne County.

Pittsburg

Construction sand and gravel was produced by Nix and Hill from a pit south of McAlester. Shale for making brick was quarried by the Oklahoma State Penitentiary, west of McAlester.

Pontotoc

Building limestone was quarried near Fittstown by the Ada Stone Co. The Ideal Portland Cement Co. quarried shale and limestone at Lawrence, for use in its cement plant at Ada. Glass sand was produced by the Mid-Continent Glass Sand Co. near Roff. Light-burning clay was produced east of

Pontotoc (Cont.)

Ada by the Ada Brick Co. and the Frankhoma Pottery Co. Red-burning clay was produced at Ada by the Ada Brick Co.

Pottawatomie

Gravel was produced from pits east of Asher by the Oklahoma Gravel Co.

Pushmataha

Building sandstone was produced north of Antlers by Mike Emery.

Seminole

Clay was quarried west of Wewoka for making brick and tile by the Wewoka Brick and Tile Co. The Thompson Sand & Gravel Co. produced sand and gravel from pits in northeastern Seminole County. Limestone was crushed southwest of Wewoka at the quarry of the Streeter Stone Co.

Sequoyah

Limestone was crushed north of Marble City at the quarry of the Marble Stone Co. Part of the limestone crushed at Marble City is burned at Sallisaw in the kilns of the St. Clair Lime Co.

Texas

Sand, gravel, and caliche were produced north of Guymon and sand south of Guymon by the Stewart Bros.

Tillman

Pottery clay was produced by the Permian Pottery Co. Construction sand and gravel was produced near Grandfield by Floyd King and near Frederick by the Ready Mix Concrete Co. Non-commercial sand and gravel was also produced.

Tulsa

Brick clay was produced by the Acme Brick Co. and by the United Brick and Tile Co. at Tulsa and by the United Brick and Tile Co. at Collinsville. Limestone was produced at Gray Spur, west of Tulsa, by the Acme Materials Co. East of Tulsa, near Garnett, limestone was produced by the Acme Materials Co., the Anchor Stone Co., and by the Chandler Materials Co. Construction sand was produced near Jenks by the Bagby-Harris Co. and by the Young Sand Co. Near Sand Springs, sand was produced by the Arkansas River Sand Co., the Mohawk Sand and Gravel Co.,

and the Sand Springs Sand Co. Near Tulsa, construction sand was produced by the Acme Materials Co., the Bagby-Harris Co., the Chandler Material Co., the McMichael Concrete Co., Smith Sand Co., and the Tulsa Sand Co. Perlite was expanded in the plant of the Ozark-Mahoning Co. at Tulsa.

Wagoner

Construction sand and gravel was produced north of Muskogee by R. Johnson and Sons Sand Co. and by the Muskogee Materials Co.

Washington

Cement was produced at Dewey by the Dewey Portland Cement Co. from shale and limestone quarried a short distance east of the plant. Crushed limestone was produced by the Matoaka Stone Co. south of Bartlesville, and by the Dewey Portland Cement Co. east of Dewey.

Ores from the Tri-State district and from several western States were smelted at the Bartlesville zinc retort smelter of the National Zinc Co., Inc. in 1952. This plant used natural gas to fire its furnaces.

Woods

Salt was produced west of Freedom by Ezra Blackmon. Sand and gravel was produced near Waynoka by the Waynoka Sand and Gravel Co.

Woodward

Construction sand was produced north of Woodward by the Woodward Sand Co.

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