THE MINERAL INDUSTRY OF MISSOURI IN 1953

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WATER RESOURCES
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TABLE I

MINERAL PRODUCTION IN MISSOURI DURING 1952 & 1953

Product	Unit	1952		1953	
		Quantity	Value	Quantity	Value
Agricultural limestone & dolomite	short tons	2,518,309	$ 4,042,065	1,827,136	$ 2,595,322
Asphaltic rock	short tons	.....	[3]	.....	[3]
Barite	short tons	315,731	3,022,764	301,428	3,345,899
Cadmium, Gallium, Germanium, Indium	various	[1]	[1]	[1]	[1]
Cement	barrels	10,007,609	25,523,037	10,281,230	27,353,493
Clay	short tons	2,148,446	11,770,726	2,017,908	11,456,676
Coal	short tons	2,957,659[2]	12,067,248[2]	2,416,082[2]	9,954,258[2]
Cobalt & Nickel	pounds	[1]	[1]	[1]	[1]
Copper	short tons	2,576	1,246,784	2,374	1,362,676
Iron ore (smelting grade)	long tons	268,743	2,176,287	274,693	2,103,925
Lead ore	short tons	8,648,322	.....	7,924,335	.....
Lead (pig)	short tons	129,245	41,616,890	125,895	32,984,490
Lime	short tons	1,263,253	13,756,630	1,212,107	12,084,130
Manganese	short tons	.....	.....	.....	[3]
Mineral wool	various	[1]	[1]	[1]	[1]
Natural gas	cubic feet	13,272,000	1,593	15,160,000	1,655
Petroleum	barrels	19,830	38,050	38,733	83,917
Sand & Gravel	short tons	6,118,119	4,766,503	5,611,663	4,304,124
Silica sand (glass, abrasives, etc.)	short tons	670,305	1,367,871	717,816	1,695,869
Silver	fine ounces	517,432	468,302	359,781	325,620
Stone (except agricultural limestone)	short tons	12,154,050	16,600,677	11,513,151	15,387,747
Tripoli	short tons	.....	[3]	.....	[3]
Tungsten	short tons	[1]	[1]	[1]	[1]
Zinc	short tons	13,986	4,643,352	9,981	2,295,630
Miscellaneous			69,519		746,067
Total value, eliminating duplications			$142,998,298		$128,081,498

[1]No data available.
[2]Obtained from the State Mine Inspector's Annual Report.
[3]Value included with miscellaneous.

INTRODUCTION

During 1953, the mineral industry of Missouri produced minerals and mineral products valued at $128,081,498. For the forty-sixth consecutive year Missouri has been the leading lead producing state in the nation. The six most important mineral commodities in order of value were lead, cement, stone, lime, clay, and coal.

Generally the trend for 1953 was decreased production with only iron ore, natural gas, cement, and petroleum showing. increases in the amount produced. However, commodities such as barite and copper showed increases in value over 1952 even though production decreased.

Table I gives the quantity and value of the major commodities for the years 1952 and 1953. Most of the statistical data were obtained from questionnaires collected by the Missouri Geological Survey in cooperation with the U. S. Bureau of Mines. Statistics on coal production and other information were taken from the Sixty-sixth Annual Report of the Director of the Division of Mine Inspection, State of Missouri. Information on petroleum and natural gas production was collected by the Missouri Geological Survey directly from the producers.

Figures 1, 2, and 3 show the distribution of non-metallic and metallic mineral and fuel production by counties for the year 1953. Each type of symbol within a given county represents one or more producers that reported activity during the year.

AGRICULTURAL LIMESTONE

Missouri ranked second in the nation in the production of agricultural limestone in 1953. Reported production amounted to 1,827,136 tons valued at $2,595,322. This figure probably does not represent the total production of limestone for agricultural purposes as the policy of the soil improve-

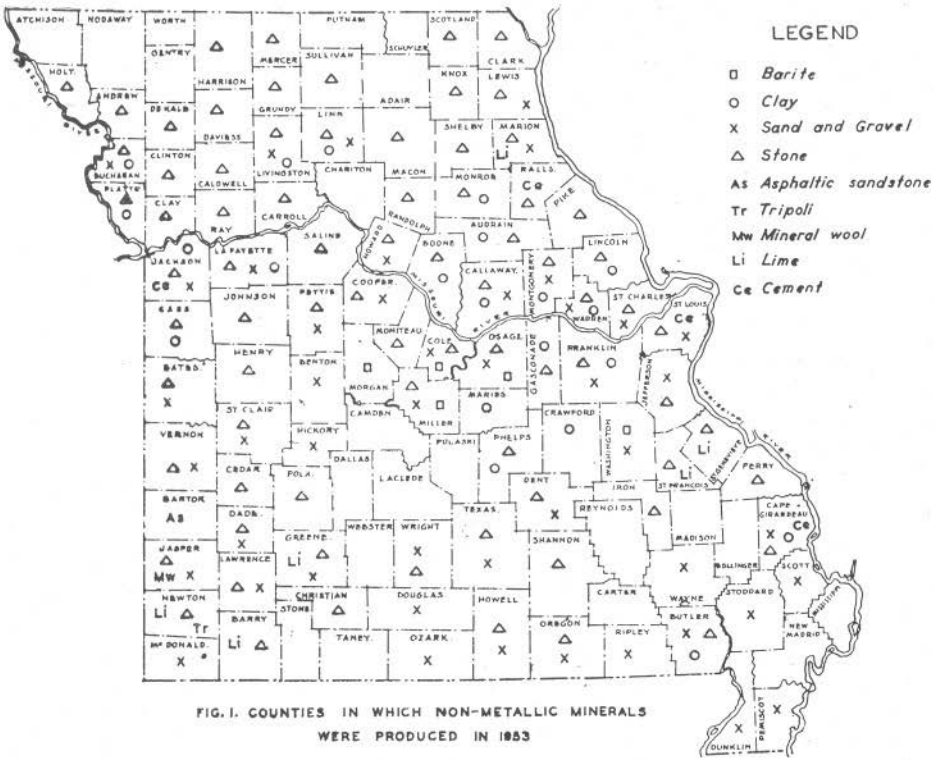

FIG. 1. COUNTIES IN WHICH NON-METALLIC MINERALS WERE PRODUCED IN 1953

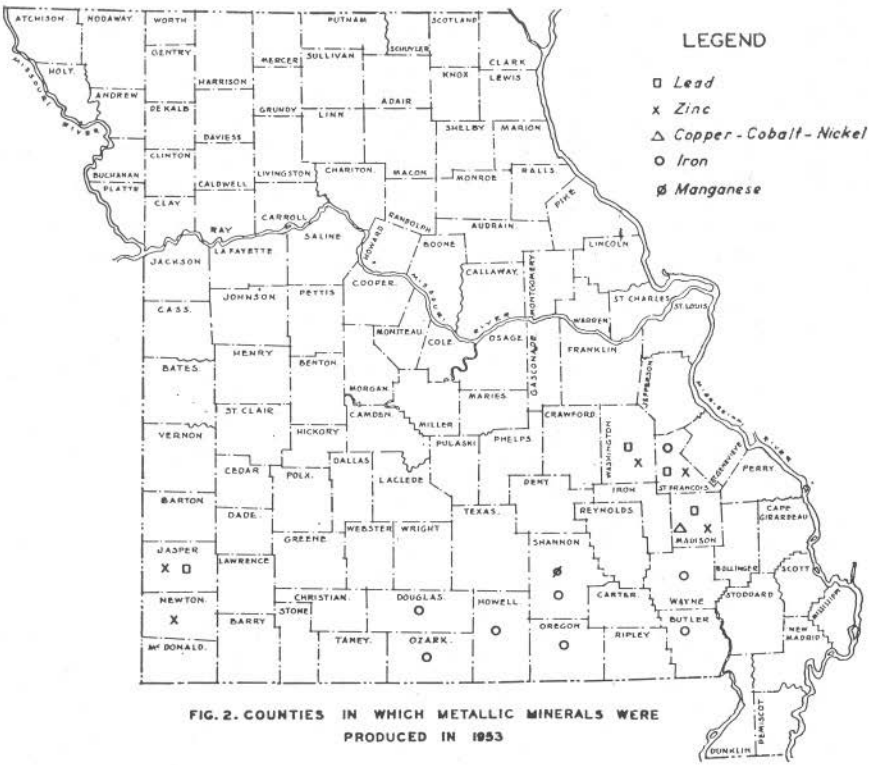

FIG. 2. COUNTIES IN WHICH METALLIC MINERALS WERE PRODUCED IN 1953

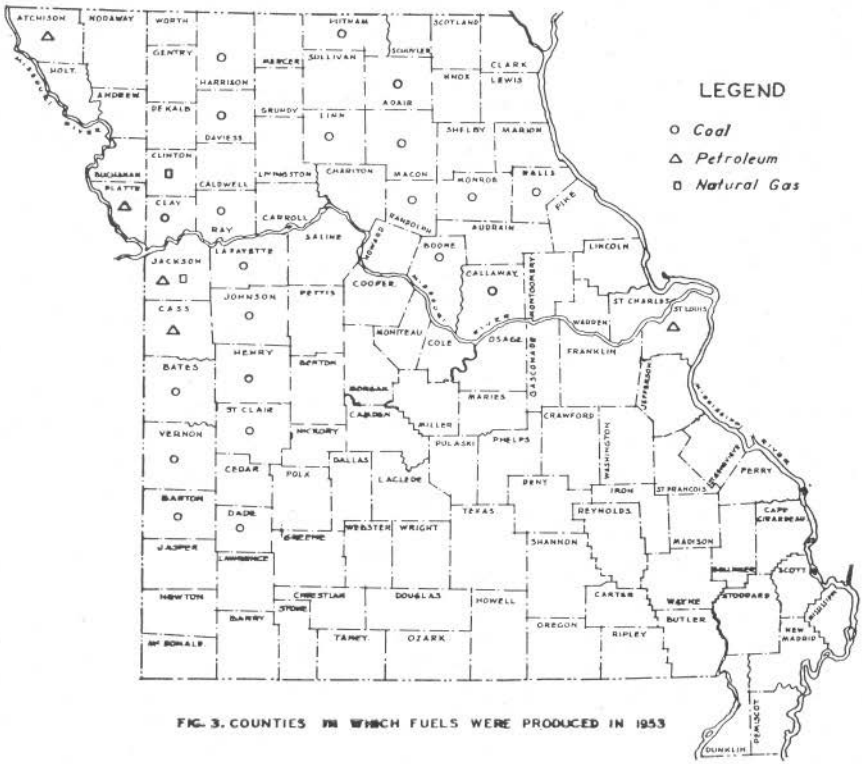

FIG. 3. COUNTIES IN WHICH FUELS WERE PRODUCED IN 1953

ment program sponsored by the U. S. Department of Agriculture encourages local production to minimize distribution costs. With a large number of small producers, collection of complete data is extremely difficult.

Limestone crushed to various sizes is used primarily as a neutralizer of acidity in the soil. The smaller sizes of crushed limestone are readily soluble and therefore provide quick results. The larger sizes dissolve more slowly which in turn extends the effectiveness of the neutralizing action over a longer period of time. Another important result is the release of calcium and magnesium as the limestone or dolomite breaks down. Both elements are essential plant nutrients. Although the main action of limestone on the soil is to neutralize acidity, it also acts as an important fertilizer.

ASPHALTIC ROCK

Asphaltic rock from the Bluejacket sandstone of Pennsylvanian age crops out in several areas in southwestern Missouri. Near Iantha, the Barton County Rock Asphalt Company mined this sandstone for road surfacing material. The natural stone varies in bituminous content so it is customary to blend the natural rock with asphalt cement to obtain the desired product.

Production figures of asphaltic rock are included under miscellaneous in Table I.

BARITE

Barite production in Missouri in 1953 totaled 301,428 tons of crude barite valued at $3,345,899. This was a slight decrease in production from 1952. However, Missouri maintained its position of 1952 as the second largest producer of barite in the nation.

Barite frequently called "tiff" or "barytes" is a heavy white crystalline mineral. Over 90 percent of the state's production came from Washington County, where the barite occurs in the surface clay. Shovels load the crude barite, and

clay and rock fragments into trucks which transport the material to a washer where the crude barite is separated from the waste material. Small amounts of lead ore which are associated with the barite are concentrated in the process.

Barite is used principally to weight oil well drilling muds, in the manufacture of lithopone, as a chemical, as a filler in paint, and in the manufacture of glass.

CADMIUM, GALLIUM, GERMANIUM, INDIUM

Minor amounts of cadmium, gallium, germanium, and indium are known to occur in the ore of the southwest Missouri lead-zinc district. Cadmium has been produced from lead ores in the southeastern lead district.

All of these metals are recovered as by-products in the process of smelting zinc and lead ores. As the smelters handled ore from various sources no data on the production of these metals for Missouri are available.

CEMENT

In 1953, Missouri's five cement manufacturers produced 10,281,230 barrels of cement valued at $27,353,493. This was an increase in production from 1952.

The basic raw materials used in the production of cement are limestone, shale, clay, and gypsum. Flue dust, resin, mill scale, iron oxide, and other minor constituents are used to impart special properties to the cement.

In the manufacture of cement the first step is to blend the components to produce the desired mixture of raw materials. After blending, the material is ground either wet or dry. Wet grinding produces a more uniform product but requires more heat in the kiln. The ground material is then charged to the kiln where it is fused to form a stable clinker. The final stage is to mix the clinker with gypsum and to grind the material to the desired fineness of the final product.

The Missouri Portland Cement Company has two plants in the state, the Prospect Hill plant which produces cement

by the dry process and the Sugar Creek plant where the wet process is used.

The other producers in Missouri are the Marquette Cement Company of Cape Girardeau which uses the dry process, the Universal Atlas Cement Company of Hannibal which uses the dry process and the Alpha Portland Cement Company of St. Louis which uses the wet process.

CLAY AND CLAY PRODUCTS

Clay and shale production in Missouri during 1953 decreased from 1952 by 10 percent. However, the value of the clay produced decreased only 8 percent. Total production except clay used in the manufacture of cements amounted to 2,017,908 tons valued at $11,456,676. The following table gives the tonnage and value of the different types of clay produced:

Flint and Plastic Fire clay	1,609,932 tons	$9,040,503
Diaspore	51,230	990,014
Burley	62,959	606,370
Miscellaneous clay & shale	293,787	819,789

Clay is an important mineral commodity in Missouri. In the production of fire clay, Missouri ranked third during 1953, exceeded only by Ohio and Pennsylvania.

Some of the principal manufactured products are refractory brick, furnace lining, common building brick, sewer pipe and drain tile. Other products are earthenware, pottery, flue linings, ornamental tile, and sanitary ware.

COAL

Coal production in Missouri during 1953 amounted to 2,416,082 tons, according to figures published in the Sixty-Sixth Annual Report of the Division of Mine Inspection. Coal sold at an average price of $4.12 per ton to give a total value of $9,954,258. This was a decrease in tonnage from 1952 continuing the trend of decreased production. However, during 1953 Missouri ranked fifth in the nation in the amount of

coal mined per man per day. The state average was 13.70 tons per man per day.

Over 90 percent of the state's production of coal came from six counties: Henry, Macon, Bates, St. Clair, Randolph, and Calloway. Fifteen other counties accounted for the remainder of the coal mined.

Land leased or owned by the coal companies decreased by approximately 10,000 acres but there was an increase in land and plant investment of $335,554 making a total investment of $8,893,845.

The five leading coal producers of 1953 were: The Bevier Coal Company, Macon County; The Crowe Coal Company, Henry County; The Power Coal Company, Henry County; The Hume-Sinclair Coal Company, Bates County; and the Pioneer Mining Company of St. Clair County.

COBALT AND NICKEL

No figures on production of cobalt and nickel in 1953 are available. The National Lead Company of Fredericktown mines a complex sulphide ore which contains small amounts of copper, cobalt and nickel in addition to lead.

It is anticipated that National Lead Company's new chemical process plant nearing completion at the end of 1953 will be in production in 1954. This plant will process cobalt-nickel concentrates by the Chemico method.

COPPER

In 1953 Missouri produced 2,374 tons of copper valued at $1,362,676. This was a decrease in production from 1952 of 202 tons.

Copper production in Missouri comes from two sources; the complex lead-copper-nickel-cobalt sulphide ores of the Fredericktown area, Madison County, and the copper bearing lead ores from the Bonne Terre-Flat River area.

Copper sold for 24½ cents per pound until February 25th at which time the O.P.S. price ceiling was removed. Until mid-

April prices quoted ranged from 27½ to 32 cents, after which it settled at 30 cents for the remainder of the year.

IRON ORE

The production of iron in Missouri in 1953 amounted to 274,693 long tons, valued at $2,103,925, a slight increase over 1952.

The largest producer of iron ore was the Ozark Ore Company which produces hard specular hematite ore from the Iron Mountain Mine in St. Francois County.

Brown iron ore was produced in Butler, Douglas, Howell, Oregon, Ozark, St. Francois, Shannon, and Wayne counties.

Approximately 73 percent of the iron ore mined in Missouri in 1953 came from underground workings. This reflects the increased underground production of the Iron Mountain Mine where about 90 percent of the ore mined in 1953 came from their underground development.

LEAD ORE

For the forty-sixth consecutive year Missouri has been the largest producer of lead in the nation. In 1953 production amounted to 7,924,335 tons of crude ore which when concentrated and smelted yielded 125,895 tons of recoverable lead valued at $32,984,490.

The selling price of lead at the beginning of the year was 14½ cents per pound. In April it dropped to 12½ cents but rose to 13½ cents toward the end of the year.

The largest part of the lead produced in Missouri came from the southeast lead district. The southwest or Tri-State district produced only 950 tons.

A notable development in the southeast district was the opening of two new ore bodies, Hayden Creek and Indian Creek, by the St. Joseph Lead Company. Work continued on the National Lead Company's new Chemico process plant near Fredericktown which is expected to be in production in 1954.

Exploration was carried on by all major companies through the year.

LIME

Missouri, an important lime producing state, produced 1,212,107 tons of quick and hydrated lime valued at $12,084,-130, in 1953.

The largest amount of the lime produced was used for chemical and industrial purposes, followed by refractory, building and agricultural uses.

There are five producers of lime in Missouri. They are: The Mississippi Lime Company of Missouri, Ste. Genevieve County; Ash Grove Lime and Portland Cement Company, Greene County; Marblehead Lime Company, Marion County; Southwest Lime Company, Newton County; Valley Dolomite Corporation, St. Francois County, producers of refractory dead burned dolomite.

MANGANESE

One manganese mining operation, located at Thorny Mountain, Shannon County, reported production during 1953. This was the first reported production of manganese since 1943.

The manganese occurs as fracture fillings in rhyolite porphyry.

Production figures are included under Miscellaneous in Table I.

MINERAL WOOL

Mineral wool, a manufactured insulating material, is produced by the Eagle Picher Company of Joplin. Mineral wool has also been produced by the Columbia Rock Wool Sales Corporation at Easley, Boone County. However, there has been no production from this plant since 1950.

Mineral wool is produced by heating the raw material to form a silicate melt which is poured into a stream of com-

pressed air. Fine fibers of glass result which resemble wool. The fibers drop in a collecting and cooling chamber after which it is processed for the market.

The Eagle Picher Company produces mineral wool from smelter slag and waste from the lead zinc mills.

No figures are available on the amount of mineral wool produced .

PETROLEUM AND NATURAL GAS

The year 1953 proved to be a significant year for oil development in Missouri. In July the Laclede Gas Company of St. Louis made an accidental oil discovery in NE¼ NW¼ Sec. 7, T. 47 N., R. 7 E., St. Louis County, while drilling a structure located by the Missouri Geological Survey.

The Laclede Gas Company was interested in the structure primarily as a possible underground gas storage area and consequently did little to develop the oil potentialities of the discovery. Private individuals carried on intense drilling activities and by the end of the year 22 producing wells and five dry holes with an average depth of 1,100 feet had been completed. Initial production of most wells was less than 20 barrels per day. Production came from the top of the Kimmswick limestone which is upper Ordovician in age.

As a result of the St. Louis County discovery, Missouri's production of oil rose to 38,733 barrels valued at $83,917. This was an increase of 18,903 barrels.

Natural gas production totaled 15,160,000 cubic feet which was valued at $1,655.

Total footage drilled in 1953 was 46,609 feet, St. Louis County accounting for 28,364 feet of the total.

PYRITE

There was no reported production of pyrite in Missouri during 1953. Pyrite has not been mined in Missouri since 1940.

SAND AND GRAVEL

Production of sand and gravel during 1953 amounted to 6,329,479 tons valued at $5,999,993. Included in this amount are 717,816 tons of silica sand valued at $1,695,869. Silica sand is listed separately in Table I.

The principal industrial uses of sand and gravel are shown in the following table:

Sand Production		
Building sand	1,237,576 tons	$ 872,874
Paving sand	749,647	615,612
Grinding and polishing sand	252,243	507,229
Engine sand	6,669	4,607
Glass sand	445,650	1,014,714
Miscellaneous	851,505	782,358
Gravel Production		
Building gravel	977,094 tons	$ 920,238
Paving gravel	1,312,815	866,406
Railroad ballast	112,659	97,438
Miscellaneous	383,621	318,517

Sand and gravel for building and paving is obtained principally from stream beds and glacial deposits. Much of the material produced from these sources is used locally. Dredging operations on some of the larger rivers of the state produce considerable tonnage. Generally this output is shipped by rail or truck to more distant markets.

The St. Peter formation, a very pure sandstone of Ordovician age, is the principal source of sand for the manufacture of glass. Production during 1953 came from St. Louis, St. Charles, and Jefferson counties.

Crushed and sized flint, obtained from mine chat in the Joplin area, is used for sand blasting and as an abrasive for rock sawing. This material is listed with sand and gravel. Coarser material, used for paving and railroad ballast is listed under stone.

State, county, and municipal organizations used 888,360 tons of noncommercial sand and gravel valued at $449,821 for paving and surfacing work.

SILVER

Silver produced as a by-product of the refining of lead from the southeast lead district decreased 30 percent in 1953 to bring the total production to 359,781 fine ounces valued at $325,620.

The amount of silver produced depends directly on the amount of lead desilverized. The silver content of the lead is small, amounting to approximately one fine ounce of silver in each ton of pig lead.

The price paid for silver during 1953 was the same as 1952, 90½ cents per fine ounce.

STONE

During 1953 production of granite, limestone, marble, sandstone, and chat amounted to 11,513,151 tons valued at $15,387,747. This figure does not include agricultural limestone and limestone used in the manufacture of cement and lime.

Approximately 85 percent of the stone produced in Missouri in 1953 consisted of limestone and dolomite. Important uses of limestone and dolomite are highway construction, stabilization of stream banks, building construction and railroad ballast. Minor uses are metallurgical flux, glass making, asphalt filler, dust for coal mines and a variety of other purposes.

Marble for interior and exterior use and monuments was produced by The Carthage Marble Corporation of Carthage, Jasper County. A product called Terrazzo, produced by the Guidicy Marble Terrazzo and Tile Company of St. Louis, consists of chips of stone imbedded in concrete and finished by polishing.

Chat is a term applied to the tailings of lead and zinc mines and rejected material such as that of the Iron Mountain Mine at Iron Mountain. The chat from the southeast lead district is predominantly limestone and dolomite and is used primarily for road concrete and road metal, railroad ballast and for agricultural limestone. The chat from the Iron Mountain Mine consists of a hard igneous rock which is in considerable demand for road surfacing and railroad ballast. The chat from the Tri-State district is primarily chert, some of which is crushed and sized and used for sand blasting. The largest part, however, is used for road surfacing and railroad ballast.

Granite is produced near Graniteville in Iron County, and is used primarily as architectural and monumental stone. Quarry waste is used mostly as riprap.

Dimension sandstone hase been used extensively in Missouri for residential construction in the form of rough slabs or flagging. Only two producers, one in Butler County and one in Phelps County reported production during 1953.

Noncommercial use of stone amounted to 742,785 tons valued at $821,427 which was used mainly for riprap and road surfacing.

TRIPOLI

Tripoli, a light weight siliceous rock, is the product of weathering of chert or siliceous limestone. Tripoli is used chiefly as an abrasive but is used also as a chemically inert filler and for foundry facing.

Tripoli is mined just across the border in Oklahoma but the processing plant is located in Seneca, Missouri.

The only producer of tripoli in Missouri, The American Tripoli Company, was acquired by the Carborundum Company during 1953.

TUNGSTEN

There was no reported production of tungsten in Missouri during 1953. Madison County is the only area in Missouri where Tungsten has been produced.

ZINC

Due to the decline in prices during 1953, sharp curtailment of production of zinc took place in the Tri-State district. The marginal character of the ore mined did not permit profitable operations and as a result three mines and two open pits ceased operations, leaving at the close of the year only one mine and one open pit active.

The Tri-State district, which in the past accounted for most of the zinc ore mined in Missouri, produced only 6,801 tons of zinc. Added to this, the southeast lead district produced 3,180 tons of zinc to bring the total for the state up to 9,981 tons valued at $2,295,630.

At the beginning of 1953 zinc sold at 13 cents per pound but the price dropped to 11 cents in March, held steady until September when it again dropped, this time to 10 cents, producing an average price for the year of 10.9 cents per pound.

The increased production of zinc in the southeast lead district resulted largely from retreatment of old tailings and smelter slag.