Principal mining districts of New Mexico

Charles A. Mardirosian

New Mexico Geology, v. 1, n. 3 pp. 37-38, 48, Print ISSN: 0196-948X, Online ISSN: 2837-6420.
https://doi.org/10.58799/NMG-v1n3.37

This page is intentionally left blank to maintain order of facing pages.

Principal mining districts of New Mexico

by Charles A. Mardirosian, Consulting Geologist, Laredo, TX

Introduction

The larger mining districts of New Mexico as listed in this report include those with a cumulative production greater than $100 million to 1978. The dollar value is based mainly on mine production data reported by the U.S. Bureau of Mines in the Minerals Yearbooks, and data from company annual reports to shareholders.

New Mexico has seven mining districts (fig. 1) that have produced greater than $100 million in metals and non-metals: These four metal-mining districts and three non-metallic districts are listed and described below, beginning with the largest.

Mining districts

1. **Carlsbad**

Location: Eddy and Lea Counties

Company and location:

Eddy County

International Mineral and Chemicals Corporation	sec. 1, 12; T. 22 S., R. 29 E.
Potash Company of America	sec. 4, T. 20 S., R. 30 E.
Amax Chemical Corporation	sec. 9, T. 19 S., R. 30 E.
Kerr-McGee Chemical Corporation	sec. 4, T. 21 S., R. 31 E.
Mississippi Chemical Corporation	sec. 12, 13; T. 21 S., R. 29 E.
Duval Corporation (Nash Draw)	sec. 33, 34; T. 22 S., R. 30 E.
Duval Corporation (North Mine)	sec. 13, T. 20 S., R. 30 E.

Lea County

National Potash Company	sec. 18, T. 20 S., R. 32 E.

Principal commodities: Potassium minerals

Ore deposits: The Upper Permian Salado Formation contains economic potassium deposits near Carlsbad. This formation ranges in thickness to about 2,450 ft, and is made up of halite rock, argillaceous halite rock, sulfate rock (largely anhydrite and polyhalite), and fine-grained clastic rocks such as sandstone, siltstone, and claystone. The beds are essentially flat-lying.

The potassium ore minerals sylvite and langbeinite are deposited within certain halite-clastic beds and concentrated in the McNutt potash zone within the middle member of the Salado. Here, 11 ore zones have been identified over a vertical distance of about 80 ft. By far, the greatest production is from the lower part—the first ore zone.

All mine workings are underground: vertical shafts range in depth from 650 to 1,750 ft; room-and-pillar workings are 5 to 6½ ft high (Austin, 1976).

Value of production:

1941-1973	$2,100,716,000
1974-1977	653,429,000
Total 1941-1977 inclusive	$2,754,145,000

2. **Santa Rita**

Location: Grant County, T. 17 S., R. 12 W.

Principal mine: Chino

Principal commodities: Copper. Also molybdenum, gold, silver.

Ore deposits: Copper, the principal commodity of the Chino open-pit mine, is deposited in Pennsylvanian limestones and shales, Cretaceous sandstones and shales, diorite sills, Tertiary quartz-monzonite porphyry of the Santa Rita stock, and Tertiary quartz-monzonite porphyry and granodiorite porphyry dikes. Two main types of ore are mined: the enriched "blanket" deposit in which chalcocite is the main ore mineral (with minor amounts of covellite and chalcopyrite). Chalcocite is disseminated as veins and veinlets, discrete grains, coatings on pyrite (which is abundant), and replacement of chalcopyrite. The second type is the pyrometasomatic limestone replacement ore with little or no enrichment. Chalcopyrite, the main ore mineral, is accompanied by quantities of magnetite, pyrite, quartz, and a suite of calc-silicate minerals including garnet, epidote, chlorite, pyroxenes, and amphiboles.

Total production of copper metal from the Chino mine was 53,193 tons in 1975, 57,202 tons in 1976, and 57,263 tons in 1977.

Value of production: All metals

To 1930	$223,079,000
1930-1939	41,197,000
1940-1949	174,727,000
1950-1959	361,229,000
1960-1969	597,312,000
1970-1977	630,211,000 (copper only)
Molybdenum produced to 1975 inclusive	61,293,000
Total production to 1978	$2,089,048,000

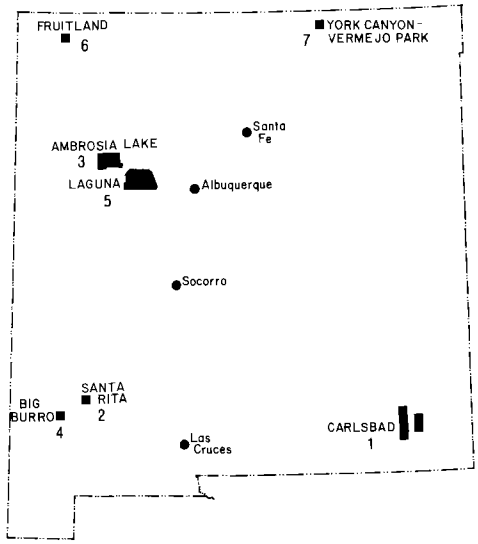

FIGURE 1—PRINCIPAL MINING DISTRICTS OF NEW MEXICO.

Recent developments: A new precipitate plant was brought on line at the new Lampbright waste dump to recover copper from waste material.

3. **Ambrosia Lake**

Location: McKinley County

Company, mine, and location: Numerous mines located mainly in T. 13, 14 N., R. 8, 9, 10 W. Principal companies are Gulf Mineral Resources Company, Kerr-McGee Nuclear Corporation, Ranchers Exploration and Development Corporation, Reserve Oil and Mineral Corporation, Todilto Exploration and Development Corporation, United Nuclear Corporation, and United Nuclear-Homestake Partners.

Principal commodities: Uranium, molybdenum, vanadium.

Ore deposits: Uranium ore minerals are deposited mainly in the Westwater Canyon Member, and less abundantly in the Brushy Basin Member of the Jurassic Morrison Formation. Other host formations include the Jurassic Todilto Limestone and the Cretaceous Dakota Sandstone.

The sandstone host rocks are crossbedded, poorly sorted, and arkosic continental deposits, locally containing abundant organic debris—a primary control or uranium deposition—thus associating the organic matter with uranium. Principal uranium materials are coffinite and uraninite. ☞

Value of production:

1951-1975 inclusive	141,867,500 lbs U_3O_8
1951-1975 inclusive	1,197,500 lbs V_2O_5

Molybdenum has been recovered from uranium ores by Kerr-McGee Nuclear Corporation for more than 15 years. Production figures are not available for molybdenum.

Market value of cumulative production for the Ambrosia Lake district to 1975 inclusive is estimated at $1,050,000,000.

4. **Big Burro**

Location: Grant County, T. 19 S., R. 15 W.

Company: Phelps Dodge Corporation

Principal mine: Tyrone

Principal commodities: Copper. Also gold and silver.

Ore deposits: Copper minerals are deposited in a Tertiary-Cretaceous quartz-monzonite porphyry laccolith underlying Precambrian granites and dikes of varying compositions intruded within the granites. The ore body forms an enriched blanket deposit in which chalcocite and covellite are the main ore minerals, with chalcocite by far the most important. These secondary minerals replace pyrite, chalcopyrite, and sphalerite. The ore minerals fill fractures and are disseminated adjacent to the fractures.

The Tyrone open-pit mine is the largest in New Mexico in terms of annual production of copper metal: 75,400 tons in 1975, 91,600 tons in 1976, and 84,700 tons in 1977 (Kolessar, 1970).

Ore grade:

Year	*Copper in ore*
1972	0.89 percent
1973	0.87 "
1974	0.83 "
1975	0.81 "
1976	0.82 "
1977	0.78 "

Value of production:

	1904-1929	$ 16,725,000
	1930-1940	—
	1941-1950	4,688,000 (est.)
	1951-1968	—
	1969-1977	832,118,000 (copper only)
Total	1904-1977 inclusive	$853,511,000

Recent developments: In 1971 Tyrone became Phelps Dodge Corporation's second largest open-pit copper mine in terms of annual production, and maintained that position through 1977.

5. **Laguna**

Location: Valencia County, T. 10, 11 N., R. 5 W.

Company: The Anaconda Company, a subsidiary of Atlantic Richfield Company.

Principal mine: Jackpile-Paguate

Principal commodities: Uranium, vanadium

Ore deposits: Uranium is deposited in the Jackpile Sandstone of the Brushy Basin Member of the Jurassic Morrison Formation. Numerous controls influence deposition of uranium, most significantly, the thickness of host sandstone. Nearly all the ore is developed where the sandstone is 100 to 200 ft thick. Other controlling factors include the presence of abundant organic debris, mudstone layers and lenses, bedding planes, facies changes, and intraformational faults. Principal uranium minerals are uraninite and coffinite.

Production: 1952-1975 inclusive, more than 70 million pounds of U_3O_8 (author's estimate), and 31,000 pounds of V_2O_5, with a total value of approximately $510,300,000.

6. **Fruitland**

Location: San Juan County, T. 29 N., R. 15 W.

Company: Utah International, a subsidiary of General Electric Corporation

Principal mine: Navajo Strip mine

Principal commodity: Coal

Ore deposits: The Navajo strip mine produces coal from the lower part of the Upper Cretaceous Fruitland Formation. The Fruitland Formation is 200 to 500 ft thick and includes sandstone, carbonaceous shale, and coal. Coal beds at the mine range from 5 to 15 ft thick, with overburden ranging from 20 to 120 ft. The coal is subbituminous in rank, averaging 0.8 percent sulfur, 20 percent ash, and yielding about 9,500 Btu per pound.

The Navajo mine is one of the largest coal mines in the U.S. in terms of annual rate of production: In 1976 and 1977, 7,011,000 and 6,745,000 short tons of coal were shipped. The entire output of coal is delivered to the Four Corners powerplant adjacent to the mine. This plant has a capacity of 2,085,000 kilowatts and transmits electricity to energy users throughout the southwestern U.S.

Value of production:

	1969	$ 8,325,000 (est.)
	1970-1973	72,889,000
	1974-1977	114,378,000 (est.)
Total	1969-1977 inclusive	$195,592,000

7. **York Canyon-Vermejo Park**

Location: Colfax County, T. 31 N., R. 19 E.

Company: Kaiser Steel Corporation, a subsidiary (56.8 percent) of Kaiser Industries Corporation.

Principal mines: York Canyon; Vermejo Park

Principal commodity: Coal

Ore deposits: Underground and surface mining methods are used at York Canyon near Vermejo Park to recover coal from the 6- to 7-ft-thick York Canyon coal bed—an essentially flat-lying bed within the Paleocene Raton Formation. The mine, developed by four entries, uses both continuous and longwall mining methods.

The West York Canyon strip mine also produces coal from this bed, where overburden ranging from 30 to 240 ft thick is removed by bulldozers and a 30-cubic yard walking dragline with a 275-ft boom.

Both mines produce high-quality coking coal containing 0.5 percent sulfur, 14.5 percent ash, and yielding 12,520 Btu per pound. Production from both mines in 1976, about 1,000,000 short tons, was shipped to the Kaiser steel mill at Fontana, California (Kaiser Steel Corporation, 1976).

Value of production (author's estimate):

	1968-1970	$ 21,600,000
	1971-1972	18,900,000
	1973	13,750,000
	1974	16,250,000
	1975	18,750,000
	1976	26,100,000
	1977	20,198,000
Total	1968-1977 inclusive	$135,548,000

Recent developments: The York Canyon mine is capable of producing about 1,100,000 tons of coking coal annually by underground mining methods. Its coal preparation plant was expanded in 1976 to an annual capacity of 1,500,000 tons. A strip mine capable of producing 500,000 tons of coal per year has been developed adjacent to the York Canyon mine.

(continued on page 48)

Timely and continuous reporting to subscribers is ensured by agreements between NTIS and Federal research sponsoring organizations and Special Technology Groups. NTIS is the marketing coordinator for the latter, for their publications, technical inquiries and special analyses.

Customers may quickly locate summaries of interest from among some 500,000 Federally sponsored research reports completed and published from 1964 to date, using the agency's on-line computer search service (NTISearch) or the more than 1,000 Published Searches in stock. About 70,000 new technical summaries and reports are added annually. Copies of the whole research reports, on which the summaries are based, are sold by NTIS in paper or microform.

The NTIS Bibliographic Data File (on magnetic tape) includes unpublished research summaries and is available for lease. The computer products of other Federal agencies also are sold or leased by NTIS.

Current summaries of new research reports and other specialized information in various categories of interest are published in some 26 weekly newsletters (*Weekly Government Abstracts*) and these are indexed. An all-inclusive biweekly journal (*Government Reports Announcements & Index*) is published for librarians, technical information specialists and those requiring all the summaries in a single volume.

A standing order microfiche service, *Selected Research in Microfiche* (SRIM), automatically provides subscribers with the full texts of research reports specially selected to satisfy their individual requirements. Automatic distribution of paper copies also is available.

NTIS is the central source for information about Government inventions. It handles the promotion, licensing and foreign patent filing for those inventions assiged to the Department of Commerce.

Additional services, such as the coordination, packaging and marketing of unusual information for individuals and organizations, may be specially designed. □

The November issue of New Mexico Geology will include an index of all articles published in Volume 1 (1979). The index will be by both author and topic.

Principal mining districts of New Mexico

(*continued from page 38*)

Summary

The cumulative value of commodities produced from the seven larger mining districts in New Mexico approximates 7.58 billion dollars to 1978. The four principal commodities from these districts include copper, potassium minerals, uranium, and coal. The following table lists the commodities, value, and percentage for each.

TABLE I

Commodity	Value	Percentage
Copper (2 districts)	$2.90 billion	38.2
Potassium minerals (1 district)	$2.75 billion	36.3
Uranium (2 districts)	$1.60 billion	21.1
Coal (2 districts)	$0.33 billion	4.4
Total	$7.58 billion	100

References cited

Austin, G. S., 1976, Potash in New Mexico *in* Annual Report July 1, 1975 to June 30, 1976: New Mexico Bureau of Mines and Mineral Resources, p. 23-29

Kaiser Steel Corporation, 1976, Underground and surface operations at the York Canyon mine *in* Guidebook of Vermejo Park, northeastern New Mexico: New Mexico Geol. Soc., 27th field conference, p. 253-255

Kolessar, Joseph, 1970, Geology and copper deposits of the Tyrone district, *in* Guidebook of the Tyrone-Big Hatchet Mountains-Florida Mountains region: New Mexico Geol. Soc., 21st field conference, p. 127-132

Certain information included in this paper was obtained from 1975 through 1977 annual reports of the following companies: Kennecott Copper Corporation, Phelps Dodge Corporation, Kaiser Steel Corporation, and the 1977 Utah International Resource Review. □

New Mexico Natural Resources Department Soil and Water Conservation Division

Map of soil erosion rates in New Mexico, 1978

The primary purpose of this study is to show erosion rates as part of the Sediment Study for the New Mexico Water Quality Management Plan. The map was compiled from county erosion maps at a scale of 1:250,000. County maps were prepared using the Soil Conservation Service soil association maps as a base; erosion maps were used from the Soil Conservation Service, U.S. Forest Service, and the Bureau of Land Management. Erosion maps provided by USFS and SCS used the Universal Soil Loss Equation. Soil and Water Conservation Division staff conducted field studies to check current erosion rates with existing erosion maps. Where field studies using the Universal Soil Loss Equation indicated significant differences in erosion rates, new erosion rates were established. For those counties where erosion maps did not exist, Soil and Water Conservation Division staff generated new maps using the Universal Soil Loss Equation.

Erosion rates, shown in acre feet per square mile per year include sheet, rill, gully, and streambank erosion resulting from water and do not include soil loss from wind erosion. These erosion rates are shown as estimated annual soil loss from a site. Sediment yield refers to erosion plus delivery and deposition at some point downstream. In using this map to determine sediment yield to a specific point, it is necessary to multiply the erosion rate by the area and by a delivery factor.

This new map is intended for broad planning purposes rather than specific projects where more intensive investigations would be required. Scale 1:1,000,000; multicolor sheet 24 by 27½ inches. Available from New Mexico Natural Resources Department, Soil and Water Conservation Division, Rm. 110, Villagra Bldg., Santa Fe, NM 87503. □

New Mexico GEOLOGY
• Science and Service
New Mexico Bureau of Mines & Mineral Resources, Socorro, NM 87801