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BRIEF HISTORY OF DEMING-AREA MILLS AND MANGANESE STOCKPILES

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Abstract–Mining activity in Luna County was recorded as early as 1876. Lead-zinc-gold-silver ores were mostly hand-sorted and shipped to area smelters. Two flotation concentrators, Asarco and Peru mills situated northwest of Deming, were built primarily to process zinc ores from Fierro-Hanover and Bayard mining districts in Grant County approximately 55 mi north of Deming. Availability of abundant ground water for milling, land for tailing disposal, and proximity to major highways and rail lines were the main reasons for building the mills in Deming. Luna County was also an important producer of fluorspar and manganese ores. Manganese is a vital alloying element in steelmaking and is considered a strategic material. The U.S. Government provided incentives to encourage domestic manganese production during the World War II and the Korean conflicts, and established programs to purchase and stockpile manganese ores and concentrates in Deming. A small mining company has been processing manganese ores and tailings through a gravity separation mill northeast of Deming since 1975 when the stockpiled material in excess of Defense National Stockpile objectives was sold.

INTRODUCTION

Deming is centrally located at the intersection of main highways and railroads, surrounded by several mining districts (Fig. 1). The first economic mineral discovery in Luna County, lead-zinc-silver ores, was recorded in the Cookes Peak district in 1876, north of Deming. Lead, zinc, silver, and small amounts of copper and gold were also produced from the Victorio and Tres Hermanas districts beginning in 1880s. Except for a small gravity concentration mill at the Rambler mine in the Victorio district, most of the ores from these districts were hand-sorted and shipped directly to smelters (Griswold, 1961).

In the early 1900s, fluorspar mining started in the Fluorite Ridge district and manganese ore production started in the Little Florida Mountains in 1918. When precious and base metal deposits were exhausted, fluorspar and manganese accounted for most of the county's mineral production. A small flotation mill was built in Deming in 1937 for custom processing of fluorspar ores from the region.

PERU AND ASARCO FLOTATION MILLS

Two large flotation concentrators northwest of Deming, adjacent to the Atchison, Topeka, and Santa Fe Railroad, were built primarily to process zinc and lead-zinc ores from the Fierro-Hanover and Bayard districts in eastern Grant County, 15 mi east of Silver City (Fig. 1). Abundant ground-water supply for milling and land for tailing disposal were the main reasons for shipping ores to Deming for milling, approximately 55 mi from the mines. Zinc production from these two districts accounted for more than two thirds of total production of the state (McLemore and Lueth, 1995).

Zinc deposits in the region occur either as replacement deposits in limestone, or as vein deposits. In the Fierro-Hanover district, located along the fringes of a large granodiorite intrusion (Jones et al., 1967), sphalerite was most abundant near the intrusion. Sphalerite and galena occurred together at the outer fringes of mineralization.

The Empire Zinc Co. mined zinc carbonate ores until 1916 in the southern and southwestern fringes of the Hanover-Fierro intrusion and, in 1928, built a 300-short ton per day (stpd) selective flotation mill to recover sphalerite and galena from sulfide ores from typical skarn deposits. The company also treated large tonnages of custom ores from other mines (Anderson, 1957).

Peru Mining Company acquired the Pewabic group of mines located in the southeastern fringes of the Hanover-Fierro intrusion in 1927. In early 1928, the company constructed a 100-stpd flotation mill at Wemple (Peru Hill), 3.5 mi northwest of Deming on NM-394. Zinc was essentially the only metal produced at the Pewabic mine, although most other zinc-producing mines in the district also yielded substantial amounts of lead and small quantities of copper. The following year, mill capacity was increased to 300 stpd, and to 500 stpd in 1935, with modifications to make lead-zinc selective flotation for custom milling (Anderson, 1957).

In 1937, Peru Mining Co. took an option on the Kearney claims north of the Santa Rita stock and started mining zinc ores from the Kearney mine in 1942 (Storms and Faust, 1949). The ore was transported from the main shaft to the crusher plant by aerial tram, crushed to minus 3 in., and stored in a 500-short-ton (st) bin to be shipped to the Peru mill. Capacity of the mill was increased to 1250 stpd in 1945, but the mines and the mill closed in 1953 due declining metal prices (Griswold, 1961). The Peru mill stayed idle until 1978 when Barite of America rehabilitated the mill to process barite ores from near Hatch. The mill is currently under receivership.

Bayard mining district, which includes the mines surrounding the towns of Central, Vanadium, and Bayard, was also a major zinc producer in the region. In addition to zinc, substantial amounts of lead, copper, gold, and silver were produced from vein-type deposits in the district (Lasky, 1936).

In 1928, Black Hawk Consolidated Mines Company built a 200-stpd selective flotation mill south of Hanover to process ores from its Hobo group mines near Vanadium, and for custom milling. During the 10-yr

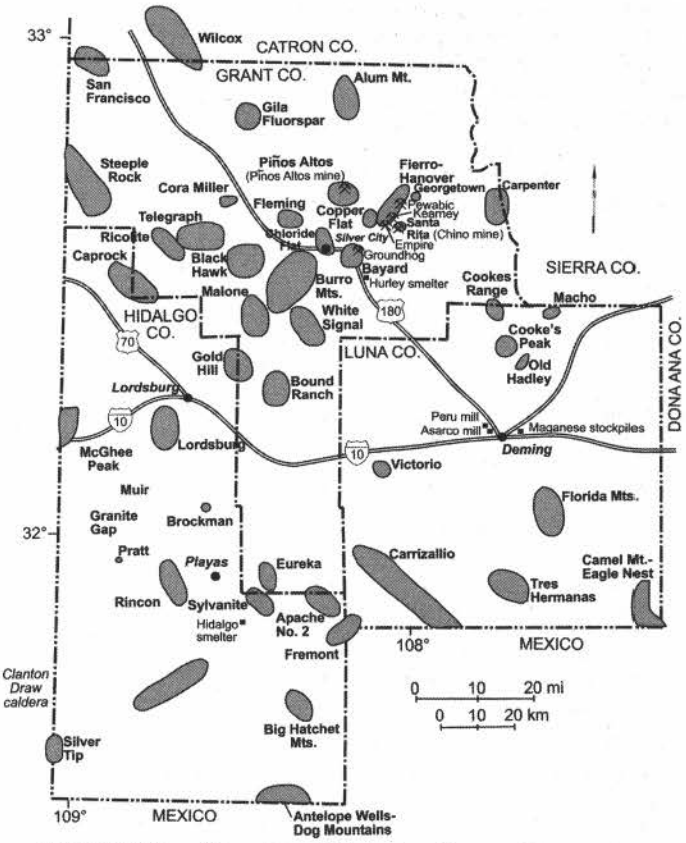

FIGURE 1. Map of the mining districts of southwestern New Mexico.

period between 1928–1938, the mill treated approximately 600,000 st of ore. The majority of the ore processed at the mill came from Ground Hog and San Jose mines, owned by the Asarco Mining Co., a subsidiary of the American Smelting and Refining Co. In 1938, Asarco leased the Black Hawk mill and increased its capacity to 400 stpd. In 1940, the U.S. Smelting Refining and Mining Company acquired the Bullfrog property and built a 600-stpd selective flotation mill north of Bayard (Brough and Gillespie, 1952), and in 1946, purchased the Combination and Hobo mines from Black Hawk Consolidated Mining Co.

Asarco continued milling Ground Hog ore at the Black Hawk mill until 1948. In 1949, the company initiated construction for a 400-stpd galena-sphalerite-pyrite selective-flotation mill in Deming 2 mi southeast of the Peru mill.

The Asarco mill (Fig. 2) was designed primarily to treat ores from the Ground Hog mines, 300 st of the daily input coming from the company mines and nearly 100-st capacity was available for custom milling (Anon., 1950). Capacity of the mill was increased to 600 stpd the next year (Anon., 1952).

Typical Ground Hog ore contained 10–15% Zn, 2–5% Pb, 2–5 oz/st Ag, and 25–30% Fe as pyrite (Anon., 1950). Galena was of the argentiferous variety; gold and silver were recovered in the lead concentrate. Cleaned lead, zinc, and iron concentrates were thickened and filtered. Zinc and pyrite concentrates were produced in sufficient quantity to feed directly into railroad cars. Zinc concentrates were shipped to the Corpus Christi, Texas, zinc plant and pyrite concentrates to markets for sulfuric acid production. When enough lead concentrate was accumulated to fill a railroad car, it was shipped to the El Paso, Texas, smelter.

Asarco's Ground Hog operations ceased in 1978. Pumps were pulled out in 1981 and the site was cleaned and rehabilitated. Phelps Dodge Corp. acquired the property in the early 1990s and annexed it to the Chino Mines Division.

Asarco also reclaimed and rehabilitated the Black Hawk mill site, on NM-356, north of Bayard. During 1995, an independent contractor removed approximately 1.4 million st of tailings from the site. Asarco Inc. negotiated an arrangement with the Phelps Dodge Corp. to consolidate one million st of tailings on Chino Mine's waste dumps near Santa Rita, 1 mi from the mill site. About 400,000 st of material was relocated on-site, capped with lime-rock and topsoil (Kaneen, 1995). The contractor also removed about 1.5 mi of NM-356, cleaned the mill tailings beneath it, and then reconstructed the highway on new fill.

The Piños Altos project

Asarco, Inc., leased the Deming mill to Cyprus Minerals Corp. in 1989. Cyprus acquired the Piños Altos silver-copper-zinc skarn deposit, located in the northwestern margins of the Piños Altos quartz monzonite intrusion, 9 mi north of Silver City, from Boliden Minerals, Inc., in 1986. U.S. Smelting Refining and Mining Co. had drilled in the area in 1948, intercepted a Cu-Zn mineralized zone in one hole, but the prospect was soon abandoned (Trepka-Bloch, 1986). In the early 1970s, Exxon Minerals drilled and intercepted a Cu-Zn-Ag mineralized zone in Paleozoic strata. Magnetite-chalcopyrite occurred close to the stock, giving way to chalcopyrite-sphalerite, and then pyrite-sphalerite (McKnight and Fellows, 1978). Exxon Minerals sold the property to Boliden, Inc., in 1982, and in 1984, closed its southwestern exploration office in Silver City.

FIGURE 2. Asarco's Deming mill.

During 1983, Boliden Minerals drove a 2000-ft decline, and removed about 20,000 st of copper and zinc ore for pilot plant testing. High-grade lenses in the Piños Altos ore body graded approximately 3% Cu, 4% Zn, and 3–4 oz/st Ag. Boliden estimated a 10-yr mine life and applied for permitting for a 750-stpd flotation mill to process 250,000 st of ore annually (Walenga, 1985).

Facing financial problems at home in Sweden, Boliden agreed to sell the Piños Altos property to Cyprus Minerals, who in turn formed a joint venture with St. Cloud Mining Co. in late 1987. During 1988, 122,000 st of Piños Altos ore, averaging 4.7% Cu, 5.0 oz/st Ag, and 0.017 oz/st Au were shipped to the 400-stpd capacity St. Cloud flotation mill, in the Chloride mining district in Sierra County, near Winston. The chalcopyrite concentrates were shipped to Asarco smelter in El Paso.

The St. Cloud mill was modified for selective flotation of chalcopyrite and sphalerite, increasing the capacity to 500 stpd. An average of 1500 st of sphalerite concentrate per month was produced during the spring and summer of 1989, before the joint-venture partnership was dissolved (Walenga, 1989).

Late in 1989, Cyprus Minerals leased Asarco's Deming mill, installed new flotation cells and process control equipment, and started processing Piños Altos ore early in 1990, at a rate of 400–450 stpd, five days a week. Land for a tailing disposal site was purchased from Asarco, Inc., and a double-lined tailing pond was built. Initially, copper concentrates were shipped to Asarco's El Paso smelter for custom smelting, and zinc concentrates to the Zinc Corporation of America plant in Bartlesville, Oklahoma. The company later shipped the copper concentrates to its smelter in Miami, Arizona, until mining and milling operations ceased in 1995. Tailing ponds were covered and rehabilitated in 1998.

DEMING MANGANESE STOCKPILES

A small gravity-separation mill also has operated northeast of Deming since 1975. Southwest American Minerals, Inc., has been operating a jigging plant and processing the manganese ore stockpiles remaining from the World War II era as well as other ores from the region.

Manganiferous ores of iron and silver were mined in New Mexico in the early 1890s and used as flux in the early lead and copper smelters. Boston Hill district near Silver City was the first producer, and 87,000 st of this type ore were produced in the state until 1908 when the smelters were closed (Farnham, 1961). The first actual manganese ore (>35% Mn) for use in the steel industry as ferroalloys and the first manganiferous iron ore (with manganese >5% and iron plus manganese >45%) were produced in 1916 when new iron and steel facilities opened in Pueblo, Colorado. Production in the state continued intermittently until 1931. There was no production of any kind during the depression years.

Manganese, which increases hardness and toughness, is a vital alloying element in steelmaking. No economic substitute for manganese as an alloying element has yet been discovered. Because of its scarcity in the United States, the U.S. Government has deemed manganese a strategic commodity (Dorr, 1977). The Metals Reserve Co. established a depot at Deming to stimulate the production during the World War II and purchased 39,200 long tons (lt) of milling-grade ore, averaging 21.1% Mn, from different mines in the state. In 1951, under the Defense Production Act, General Services Administration (GSA) opened a manganese-purchasing depot at the site formerly used by the Metals Reserve Company. Under this program, 47,013 lt of ore containing not less than 15% Mn and 113,428 lt of concentrates were purchased from various New Mexico mines before it reached its quota and closed in 1955 (Farnham, 1961). Similar depots were established in Wenden, Arizona,

and Butte, Montana. During the operation of the Deming depot, GSA purchased 267,130 lt of ore having a cumulative assay of 26.5% Mn. Of this amount, 15,113 lt were ferroalloy grade averaging 44.3% Mn, and 252,017 lt ore assaying 25.4% Mn, which required concentration treatment to recover ferroalloy-grade product (Agey et al., 1959).

In 1952, GSA announced the "carload-lot" program for purchasing domestic manganese ores meeting certain specifications, including minimum manganese content of 40%, to be shipped in lots of one or more carloads by small producers. After the Deming depot was closed, miners took advantage of this program (Farnham, 1961). The carload-lot program was terminated in 1959 (DeHuff, 1965).

Since 1965, the Government has been actively selling stockpiled manganese that GSA determined to be in excess of the objectives (Jones, 1985). Southwest American Minerals, Inc., initially purchased 70,000 st of ore from the Deming stockpile and started processing the low-grade ores by gravity separation. Eventually, the American Minerals bought and processed the majority of the Deming stockpile by 1990. Since then, the company has been reprocessing the low-grade tailings at a rate of 400–600 stpd, four days a week, and producing concentrates for industrial minerals markets, mainly as additives to glass, glazes and bricks (Frank Senkowski, Southwest American Minerals, oral commun., March 2000).

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REFERENCES

Agey, W. W., Batty, J. V., Knutson, E. G. and Hanson, G. M., 1959, Operations of manganese-ore purchasing depots at Deming, New Mexico, and Wenden, Arizona: U.S. Bureau of Mines, Report of Investigation 5462, 18 p.

Anon., 1950, Deming—1950 lead-zinc mill: Mining World, September, p. 27–31.

Anon., 1952, Asarco's Star shaft: Mining World, January, p. 26–30.

Anderson, C. A., 1957, The metal resources of New Mexico and their economic features through 1954: New Mexico Bureau of Mines and Mineral Resources, Bulletin 39, p. 48–62.

Brough, P. V. and Gillespie, K. B., 1952, United States Smelting, Refining and Mining Co. Bayard mill: Denver Equipment Co., Bulletin M4-B62, 8 p.

DeHuff, G. L., 1965, Manganese; *in* Mineral facts and problems: U.S. Bureau of Mines, Bulletin 630, p. 553.

Dorr, J. Van N., 1977, Manganese: New Mexico Bureau of Mines and Mineral Resources, Bulletin 87, p. 183–195.

Farnham, L. L., 1961, Manganese deposits of New Mexico: U.S. Bureau of Mines, Information Circular 8030, 176 p.

Griswold, G. B., 1961, Mineral deposits of Luna County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Bulletin 72, 157 p.

Jones, M. H., Henon, R. M. and Moore, L. S., 1967, General geology of the Santa Rita quadrangle, Grant County, New Mexico: U.S. Geological Survey, Professional Paper 555, 144 p.

Jones, S. T., 1985, Manganese; *in* Mineral facts and problems: U.S. Bureau of Mines, Bulletin 675, p. 483–497.

Kaneen, R., 1995, Redemption at Black Hawk: Southwest Contractor, December, p. 31–32.

Lasky, S. G., 1936, Geology and ore deposits of the Bayard area, Central mining district, New Mexico: U.S. Geological Survey, Bulletin 870, 144 p.

McKnight, J. F. and Fellows, M. L., 1978, Silicate mineral assemblages and their relationship to sulfide mineralization, Piños Altos mineral deposit, New Mexico: Arizona Geological Society Digest, v. XI, p. 1–8.

McLemore, V. T. and Lueth, V. W., 1995, Lead-zinc deposits in carbonate rocks in New Mexico: Society Economic Geology, Special Publication 4, p. 264–276.

Storms, W. R. and Faust, J. W., 1949, Mining methods and costs at the Kearney lead-zinc mine, Central mining district, Grant County, New Mexico: U. S. Bureau of Mines, Information Circular 7507, 11 p.

Trepka-Bloch, C., 1986, The Piños Altos silver-copper-zinc skarn deposit, Grant County, New Mexico: Society of Mining Engineers of AIME, preprint 86-61, 6 p.

Walenga, K., 1985, Boliden Minerals continues work at Piños Altos: Pay Dirt, July, p. 3A.

Walenga, K., 1989, Cyprus Piños Altos to continue with own mining: Pay Dirt, September, p. 8A.