L E A D A N D Z I N C I N D U S T R Y

STATISTICS FOR 1964 COMPARED WITH OTHER YEARS

ARIZONA, UNITED STATES AND FREE WORLD

COMPILED BY

ARIZONA DEPARTMENT OF MINERAL RESOURCES

MINERAL BUILDING FAIRGROUNDS

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DECEMBER, 1965

LEAD INDUSTRY

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L E A D

PHYSICAL PROPERTIES *

Lead is one of the most important industrial nonferrous metals used in substantial quantities in the metallic form; it is also important for the properties it imparts to its alloys.

Is the softest and heaviest of the common metals. It can be rolled to a foil of less than 0.0005 inches in thickness but is not ductile enough to be drawn into fine wire. Very malleable. Lead cannot be hardened except by alloying.

Some of the physical properties of lead are as follows;

Symbol - Pb. Atomic Weight - 207.21. Spec. Gravity - 11.34

Melting Point - 327.35°C (621.2°F). Boiling Point 1,740°C (3164°F)

Specific Resistance (20°-40°C) (68° - 104°F) - Microhm 20.65

Hardness (Mohs' scale) - 1.5. Tensile Strength #/sq. in. - 3,000

Crystal Structure - Face-centred Cubic. Valences - +4 & +2

* U.S.B.M.'s "MATERIALS SURVEY" - September, 1952

Arizona Department of Mineral Resources

December, 1965

METAL DUTIES ON LEAD

According to the Tariff Act of 1930 amended.
Published by American Metal Market, "Metal Statistics, 1962", page 253

Following rates in effect on January 1, 1962

LEAD - Ore, on lead contained	+ 3/4 c. lb.
In bullion or base bullion, pigs, bars, dross, reclaimed lead, *scrap lead, antimonial lead, *antimonial scrap lead, type metal, babbit metal, solder and alloys not specially provided for on lead therein	+ 1 1/16 c. lb.
Sheets, pipe, shot and wire	1 5/16 c. lb.
White Lead (Par. 72)	1.05 c. lb.
Litharge	1 1/4 c. lb.
Red Lead	1 7/8 c. lb.
Orange Mineral	2 c. lb.

* Import tax suspension expired June 30, 1958.

\+ Duty suspended, effective Feb. 12, 1952; reimposed on June 26, 1952.

LEAD INDUSTRY IN 1964

Preprint Received Nov. 19, 1965, From Donald E. Moulds, Commodity Specialist U.S.B.M.

Production and consumption of lead as reported by the domestic lead industry continued to rise in 1964, while imports for consumption of ores and metal declined. At yearend stocks of refined and antimonial lead at both primary plants and consumer and secondary plants were reduced. Mine production of recoverable lead increased 13 percent to 286,000 tons, a total last exceeded in 1957, and production of primary refined and antimonial lead rose 13 percent to 458,000 tons. Recovery of lead from secondary materials by both primary and secondary plants increased 10 percent to a record 541,600 tons. Consumption of lead as reported increased 3 percent to slightly over 1.2 million tons with gasoline antiknock additives contributing the major portion of the increase, while storage battery requirements declined from the high level of 1963. Government sale of 41,000 tons of lead from the stockpile in August and 9,000 tons in November completed the 50,000 tons authorized under Public Law 88-374.

The price of common lead in New York advanced from the 12.50 cents per pound quoted at the end of 1963 to 13 cents on January 2, 1964; three subsequent increases of 1 cent per pound brought the price to 16 cents per pound on December 11, 1964. London Metal Exchange price ranged from a low of 9.6 cents per pound in January to a high of 19.2 cents, U.S. equivalent, in December. The average price for the year was 13.6 cents per pound, New York, and 12.6 cents on the London Metal Exchange.

LEGISLATION AND GOVERNMENT PROGRAMS

The small mines stabilization program under Public Law 87-374, enacted in October 1961, applied to eligible production of lead during the year. Qualifications for participation in the program were amended by enactment of Public Law 88-75 and a subsequent amendment of the program rules and regulations. As of December 31, 1964, those mines certified under the amended program totaled 61. Payment of $144,902 was made on sales of 6,144 tons of eligible lead during the year to 48 small mining concerns. The New York price of lead exceeded the 14.5 cents per pound, below which payment is authorized, in October.

The Government did not acquire lead for the stockpile during the year. Disposal of 50,000 tons of lead to meet indicated commercial shortage was authorized under Public Law 88-373 enacted in July. During August approximately 41,000 tons was sold by General Services Administration and the remaining 9,000 tons was sold in November. Sale was restricted to domestic use and allocated to domestic producers of primary and secondary refined lead, qualified importers of refined lead, and consumers qualifying as small business concerns. Shipment of lead by the Government as a result of the sale reduced the Government stockpile inventory to 1,338,130 tons of lead at yearend, all of which has been determined by the Office of Emergency Planning to be surplus to stockpile requirements for conventional war.

Government participation in exploration projects for lead and zinc, under the program of the Office of Minerals Exploration, was withdrawn at the end of June 1962. Of the four projects for lead and zinc approved prior to this action and active in 1964, one was certified as a discovery and the remaining projects terminated during the year.

Import quotas on lead ores and metal, established October 1, 1958, continued in effect. The quotas subdivided into quarterly quotas for specified countries were essentially filled for lead metal in all of the quarters, while receipts of lead in ores and bullion were less than the quota limitation in each quarter and represented only 90 percent of that allowable for the year. The President, on March 2, 1964, requested the U. S. Tariff Commission to advise him in determinating whether or not to relax or terminate the import quotas pursuant to the provisions of the Trade Expansion Act of 1962. This investigation was still in progress at yearend.

Legislation was reintroduced in Congress in February to establish flexible quotas on lead and zinc ores and metal and also on specified manufactured lead and zinc products. This legislation was still pending in Congress at yearend.

The International Lead and Zinc Study group held its eighth session in Madrid, Spain, from October 26, to October 30. Representatives of 24 of the participating countries attended the sessions. The Group reviewed statistics on free world production and consumption of lead and zinc, as well as trade with countries with centrally planned economies. The Group concluded that free world consumption in 1963-63 had exceeded production and resulted in a drastic reduction of producer stocks and increased prices for lead and zinc, and while a significant increase in production was indicated in 1965-67, the imbalance in supply-demand would be likely to persist in 1965. Discussions of the Group stressed the importance of trade liberalization in lead and zinc and the study of intergovernmental agreements designed to achieve greater stability in lead and zinc. Measures to continue study in these two areas and also in medium-range aspects of supply and demand were approved.

DOMESTIC PRODUCTION

MINE PRODUCTION

Domestic mine production was essentially uninterrupted during the year. The output of 286,000 tons of recoverable lead represented a 13-percent increase in relation to the 1963 output, which had been affected by the strike closure of the southeast Missouri mines throughout the first quarter of 1963. The production rate was relatively stable, ranging from 22,800 tons in the short month of February to a top of 25,000 tons in December. Missouri was again the leading lead-producing State with an output of 120,000 tons, last exceeded in 1957, followed by Idaho, 71,300 tons; Utah, 40,200 tons; and Colorado, 20,600 tons. These four States produced 252,300 tons or 88 percent of the U. S. total; the remaining 12 percent the output of 15 States. Of the 19 States reporting lead production, the 1964 output increased in 10 of the States while decreasing in the other 9 in comparison to that of 1963. The 25 leading lead-producing mines contributed 264,300 tons or 92 percent of the total domestic output. Production from the 4 largest mines amounted to 57 percent of the total and from the 10 leading mines was 79 percent.

The continuing demand for lead, especially for concentrates, to augment diminishing receipts and stocks of foreign material for smelting provided and incentive for exploration and development of lead deposits as well as for reopening

of mines and expansion of production.

Developments of major significance to the lead-producing industry continued in the southeast Missouri lead belt. St. Joseph Lead Co. created a new division to operate its new Fletcher mine and mill in Reynolds County. This project, along with expanded production from the Viburnum mine, was expected to provide an additional 100,000 tons of lead annually, and the Herculaneum smelter capacity was being expanded accordingly.

Montana Phosphate Products Co., a subsidiary of the Consolidated Mining & Smelting Co. of Canada, Ltd. (COMINCO), and Dresser Industries Inc., announced development of mining and concentrating facilities at the Magmont property near Bixby, Mo., with a capacity of 50,000 tons of lead annually and scheduled for completion in late 1967 or early 1968.

American Metal Climax, Inc., and Homestake Mining Co. announced plans for joint development of a mine-mill project at properties near Buck, Mo., with a capacity of 50,000 tons of lead annually. Shaft sinking, mine development, and mill construction were expected to be completed by late 1967. The two companies also announced plans for a smelter-refinery project with a capacity of 100,000 tons of lead annually to smelt the concentrates from their mine and those produced by the COMINCO-Dresser operations.

Arizona output increased to 6,100 tons, with the Iron King mine of Shattuck Denn Mining Corp. the principal producer. The Arivaca Mining Corp. completed remodeling and enlarging its flotation mill and produced a copper-lead concentrate from ore of the Arizona mine near Ruby. E. W. McFarland operated the Hardshell mine in Santa Cruz County and was proceeding with the unwatering of the French and January mines which were last operated by American Smelting and Refining Co. in 1949.

PRICES

The year opened with the quoted price of common lead at 12.5 cents per pound at New York. The price advanced almost immediately, on January 2, to 13 cents and held until August 18, when a range of 13 to 14 cents existed until firmed at 14 cents on September 1. On October 14 an increase to 15 cents was announced and on December 10 a range of 15 to 16 cents existed until firmed at 16 cents the following day. The price of 16 cents held through the end of the year. The average New York price for the year was 13.62 cents per pound.

TABLE 1

SALIENT U. S. LEAD STATISTICS FOR 1962, 1963 and 1964

ARIZONA, UNITED STATES AND WORLD MINE PRODUCTION OF RECOVERABLE LEAD

Source: U.S.B.M. Unit: Short Tons

	Year 1962	Year 1963	Year 1964
Producers' Stocks Beginning of Period	262,102	196,661	120,836
U.S. Mine Production Recoverable Lead	236,956	253,369	286,010
Secondary Lead Recovered from Old & New Scrap	444,202	493,471	541,582
Imported Lead in Ore & Matte, Base Bullion	143,505	153,179	128,095
Imported Lead in Pigs, Bars	257,201	227,027	207,844
Imported Lead In Reclaimed Scrap, etc.	2,321	8,875	5,054
TOTAL SUPPLY	1,346,287	1,332,582	1,289,421
Producers' Stocks at End of Period	196,661	120,836	84,398
Exported Lead in Ore, Matte & Base Bullion	2,898	4	19
Exported Lead in Pigs and Bars	2,108	1,088	10,175
Exported Lead in Scrap	2,461	2,421	13,148
SUB-TOTAL	204,128	124,349	107,740
NET APPARENT CONSUMPTION	1,142,159	1,208,233	1,181,681
REPORTED CONSUMPTION	1,109,635	1,163,358	1,202,138
UNACCOUNTED FOR (Stockpiles, etc.)	+ 32,524	+ 44,875	- 20,457
PRODUCTION OF REFINED PRIMARY LEAD:			
From Domestic Ores & Base Bullion	245,645	239,660	294,254
From Foreign Ores & Base Bullion	130,418	155,072	155,175
ARIZONA MINE PRODUCTION	6,966	5,815	6,147
WORLD MINE PRODUCTION	2,765,000	2,805,000	2,735,000
U. S. MINE PRODUCTION AS % OF REPORTED CONSUMPTION	21.35%	21.78%	23.79%
MINE PRODUCTION & SECONDARY AS % OF REPORTED CONSUMPTION	61.39%	64.20%	68.84%
AVG. PRICE OF LEAD - N. Y. (E.&M.J.)	9.631¢	11.14¢	13.62¢
AVG. PRICE OF LEAD - LONDON	7.06 ¢	7.93¢	12.59¢

Arizona Department of Mineral Resources December, 1965

TABLE II

MINE PRODUCTION OF RECOVERABLE LEAD IN THE UNITED STATES, BY STATES

Short Tons
Years 1955-1959 Average

Source: U.S.B.M.
1960, 1962 and 1964

STATE	1955-1959 (average)	1960	1962	1964
Arizona	11,229	8,495	6,966	6,147
Arkansas	- - -	- - -	- - -	- - -
California	4,277	440	455	1,546
Colorado	16,737	18,080	17,411	20,563
Idaho	63,224	42,907	84,058	71,312
Illinois	3,105	3,000	3,610	2,180
Kansas	3,834	781	970	1,185
Kentucky	315	558	743	858
Missouri	118,765	111,948	60,982	120,148
Montana	13,015	4,879	6,121	4,538
Nevada	4,232	987	771	809
New Mexico	3,315	1,996	1,134	1,626
New York	1,074	775	1,063	732
North Carolina . .	4	424	219	- -
Oklahoma	7,590	936	2,710	2,781
Utah	44,292	39,398	38,199	40,249
Virginia	2,976	2,152	4,059	3,857
Washington	10,812	7,725	6,033	5,231
Wisconsin	1,595	1,165	1,394	1,742
Other States. . . .	7	23	58	6
TOTAL	310,406	246,669	236,956	286,010

Department of Mineral Resources

December, 1965

TABLE III

WORLD MINE PRODUCTION OF RECOVERABLE LEAD, BY COUNTRIES

IN THOUSAND SHORT TONS

Source: U.S.B.M.

Year	U.S.	Mexico	Canada	Peru	Australia	Rest Of Free World	Total Free World	Communist Controlled Countries	Total World (Estimated)
1956	353	220	189	142	335	682	1,921	569	2,490
1957	338	237	181	151	373	728	2,008	602	2,610
1958	267	223	186	148	366	728	1,918	642	2,560
1959	256	210	187	127	354	707	1,841	689	2,530
1960	247	210	205	142	341	708	1,853	707	2,560
1961	262	200	233	148	300	708	1,851	809	2,660
1962	237	213	211	147	414	705	1,927	838	2,765
1963	253	209	199	163	459	672	1,955	845	2,800
1964	286	187	206	165	420	727	1,991	744	2,735

TABLE IV

TOTAL LEAD IMPORTED INTO THE UNITED STATES, AND EXPORTED FROM U. S.

Source: Bureau of the Census Short Tons.

	IMPORTS	EXPORTS	NET IMPORTS
Avg. 1948-1952	434,909	3,500	431,409
1953	552,278	4,547	547,731
1954	443,243	4,592	438,651
1955	462,208	4,720	457,488
1956	479,875	7,819	472,056
1957	532,055	6,130	525,925
1958	577,110	3,386	573,724
1959	411,087	4,121	406,966
1960	359,656	5,843	353,813
1961	409,402	11,733	397,669
1962	403,027	7,467	395,560
1963	389,081	3,513	385,568
1964	340,993	23,342	317,651

TABLE V

CONSUMPTION OF LEAD IN UNITED STATES

Source: U. S. B. M.

Year	Metal Products	Storage Batteries	Pigments	Tetra-ethyl Lead	Other Uses	Total
1953	501,482	367,575	129,590	162,443	40,514	1,201.604
1954	442,384	337,272	116,409	160,436	38,370	1,094,871
1955	495,320	380,033	131,435	165,133	40,723	1,212,644
1956	489,586	370,771	120,370	191,990	37,000	1,209,717
1957	448,948	361,015	115,361	177,001	35,790	1,138,115
1958	382,822	312,725	95,901	159,412	35,527	986,387
1959	407,520	380,732	103,671	160,020	39,206	1,091,149
1960	369,731	353,196	98,541	163,826	35,878	1,021,172
1961	359,302	367,998	94,824	169,802	35,290	1,027,216
1962	380,623	419,906	102,968	168,926	37,212	1,109,635
1963	396,797	439,081	99,075	192,811	35,594	1,163,358
1964	363,952	429,898	99,946	223,466	84,876	1,202,138

TABLE VI

U. S. LEAD CONSUMPTION - YEARS 1962, 1963 & 1964

Source: U.S.B.M.

	1962	1963	1964
Metal Products:			
Ammunition	47,779	49,894	56,493
Bearing Metals	16,472	21,713	22,754
Brass and Bronze	20,607	21,943	23,328
Cable Covering	56,676	57,707	56,225
Calking Lead	72,648	76,308	73,628
Casting Metals	7,355	7,856	6,961
Callapsible Tubes	11,972	14,832	14,904
Foil	3,720	3,952	3,976
Pipes, traps and bends	19,819	20,100	20,480
Sheet Lead	28,540	26,495	29,605
Solder	66,873	67,945	71,186
Storage Battery Grids, Posts, etc.	217,525	222,286	221,594
Storage Battery Oxides	202,381	216,795	207,754
Terne Metal	1,402	1,983	1,609
Type Metal	26,760	26,069	25,374
TOTAL	800,529	835,878	835,871
Pigments:			
White Lead	11,091	8,846	8,802
Red Lead and Litharge	76,325	70,649	74,802
Pigment Colors	11,660	11,767	11,921
Other 1/	3,892	7,813	8,111
TOTAL	102,968	99,075	103,636
Chemicals:			
Tetraethyl Lead	168,926	192,811	223,466
Miscellaneous	2,715	632	451
TOTAL	171,641	193,443	223,917
Miscellaneous Uses:			
Annealing	5,306	4,847	5,699
Galvanizing	1,146	1,631	1,592
Lead Plating	236	220	179
Weights and Ballast	10,330	12,207	12,760
TOTAL	17,018	18,905	20,230
Other Uses, Unclassified	17,479	16,057	18,484
Total Reported 2/	1,109,635	1,163,358	1,202,138

1/ Includes lead content of leaded zinc oxide production
2/ Includes lead content of scrap used directly in fabricated products.

Arizona Department of Mineral Resources December, 1965

TABLE VII

IMPORTS AND EXPORTS OF LEAD INTO AND FROM UNITED STATES

YEARS 1962, 1963 & 1964 — SHORT TONS

Source: U. S. Dept of Commerce

Country of Origin	Year 1962	Year 1963	Year 1964
Ore, Matte, etc. (Lead Content)	138,906	147,742	123,257
Canada	27,728	23,634	27,951
Mexico	1,180	1,071	1,069
Guatemala	2,135	305	5
Honduras	5,489	6,809	6,375
Colombia	439	9	- - -
Peru	32,750	43,950	28,243
Bolivia	8,242	9,791	6,073
Republic of So. Africa	33,881	34,273	34,080
Australia	26,544	27,633	19,286
Other Countries	518	267	175
Base Bullion	4,599	5,437	4,838
Australia - Oceania	2,514	1,937	2,786
South America	2,080	2,647	603
North America	5	851	1,449
Europe	- - -	2	- - -
Pigs & Bars (Lead Content)	257,201	227,027	207,844
Canada	56,807	29,619	30,728
Mexico	65,892	74,466	71,728
Peru	22,115	23,486	24,510
Belgium-Luxembourg	2,980	11,235	- - -
West Germany	914	277	5,017
Spain	4,104	7,694	949
Yugoslavia	31,909	31,063	30,544
Australia	72,133	45,596	42,158
Other Countries	347	3,591	2,210
Reclaimed Scrap, etc.	2,321	8,875	5,054
GRAND TOTAL IMPORTS	403,027	389,081	340,993
GRAND TOTAL EXPORTS	7,467	3,513	23,342
EXCESS IMPORTS	395,560	385,468	317,651

Arizona Department of Mineral Resources — December, 1965

Z I N C I N D U S T R Y

C O N T E N T S

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Z I N C

PHYSICAL PROPERTIES *

Zinc is a bluish white, hard, brittle metal with a microscopic crystalline structure when broken. The commercial metal is now known in the U. S. as slab zinc, rather than by the older term spelter.

The commercial importance of zinc is based largely upon its properties as a corrosion inhibitor especially as a protective coating on steel in galvanized products and upon its use in alloys. On account of low strength and brittleness, the pure metal, when used alone, has few uses except as sheet metal and other rolled forms.

Zinc compounds are important as pigments, fillers, and chemicals, with a wide range of end uses.

Symbol - Zn. Atomic Weight - 65.38 Specific Gravity - 7.13

Melting Point - °F - 787.03. Boiling Point, °F - 1,663

Electrical Resistivity - Microhm per c.c. - 5.916

Tensile Strength, cast, Lb. per sq. in. - 9,000. Rolled - 21,000

Crystal Structure - close packed hexagonal. Valence - 2

* U.S.B.M.'s "MATERIALS SURVEY" - September, 1952

Arizona Department of Mineral Resources September, 1964

METAL DUTIES ON ZINC

According to the Tariff Act of 1930, Amended.

Published by American Metal Market, "Metal Statistics, 1962" page 254.

Following rates in effect on January 1, 1962:

ZINC - Zinc-bearing ores, except pyrites with not over 3% zinc	* 0.6 c lb.
Slabs, blocks, pigs and zinc dust	* 0.7 c lb.
Sheets	1 c lb.
Sheets coated with other metals, except precious.	1 1/8 c lb.
Old, fit only for remanufacture	0.75 c lb.
Oxide, (dry powder)	0.6 c lb.
Oxide, (with oil or water)	1 c lb.
Die -Casting alloys (P.397 of T.C. 1958)	19%

* Duty suspended, effective Feb. 12, 1952
reimposed July 24, 1952.

ZINC INDUSTRY 1964

SUMMARY OF ZINC'S 1964 STATISTICAL RECORD

The U. S. mine production of recoverable zinc in 1964 amounted to 574,858 tons, as compared with 529,254 tons in 1963.

Tennesee led the states in the production of zinc with 115,943 tons; New York was second with 60,754 tons; Idaho was third with 59,298 tons; Colorado was fourth with 53,682 tons. Arizona was 11th with 24,690 tons. Back in 1949, Arizona had produced a peak of 70,658 tons, and ranked second in zinc production, exceeded only by Idaho with 76,555 tons. Beginning in 1952, this nation was flooded with low-priced zinc, and it took the next twelve years for zinc to recover a satisfactory price of 14.5 cts. after dropping to a low of 10.3 cts..

In 1964, Imports of zinc metal amounted to 118,340 tons and zinc in ores and concentrates was 357,145 tons. Exports of zinc in slabs, pigs and blocks amounted to 26,515 tons.

The consumption of slab zinc came to 1,207,268 tons; in addition the consumption directly in ores was 105,948 tons. Total reported zinc consumption in 1964 was 1,317,216 tons, as compared with 1,204,713 tons in 1963.

By sources, the production of primary slab zinc from domestic ores amounted to 531,967 tons, and from foreign ores to 422,117 tons. Electrolytic zinc came to 389,383 tons and distilled to 564,701 tons. World zinc production in 1964 was reported at 4,395,000 tons, as compared with 3,970,000 tons in 1963.

In the U. S., producers stocks at the beginning of 1964 was reported at 47,910 tons, and at the end of the year was 31,178 tons.

TABLE I

SALIENT STATISTICS OF THE U. S. ZINC INDUSTRY

ARIZONA AND WORLD MINE PRODUCTION OF RECOVERABLE ZINC

YEARS 1962, 1963 & 1964

Source: U.S.B.M. Unit; Short Tons

	Year 1962	Year 1963	Year 1964
Producers' Stocks, Beginning of Period	145,540	144,746	47,910
U.S. Mine Production, Recoverable Zinc	505,491	529,254	574,858
Imports-Ore & Concts., Zinc Content	469,152	372,769	357,145
Imports-Zinc Metal	141,959	144,757	118,340
Redistilled Secondary	58,880	60,303	71,596
TOTAL SUPPLY	1,321,022	1,251,829	1,169,849
Producers' Stocks, End of Period	144,746	47,110	31,178
Exports - Slabs, Pigs, Blocks	36,102	33,853	26,515
SUB-TOTAL	180,848	80,963	57,693
APPARENT CONSUMPTION	1,140,174	1,170,866	1,112,156
REPORTED CONSUMPTION-SLAB ZINC	1,031,821	1,105,113	1,207,268
CONSUMED DIRECTLY IN ORES	96,600	99,600	105,948
TOTAL REPORTED ZINC CONSUMPTION	1,128,421	1,204,713	1,313,216
Production of Primary Slab Zinc			
By Sources: From Domestic Ores	448,095	474,007	531,967
From Foreign Ores	431,300	418,577	422,117
By Methods: Electrolytic	354,138	358,093	389,383
Distilled	525,257	534,491	564,701
ARIZONA MINE PRODUCTION	32,888	25,419	24,690
WORLD MINE PRODUCTION	3,870,000	3,970,000	4,395,000
U. S. Mine Prod. - % of Reported Consumption	47.96%	45.83%	43.77%
AVG. PRICE OF ZINC, E. ST. LOUIS (E.&M.J.)	11.625¢	11.997¢	13.5684¢

Arizona Department of Mineral Resources December, 1965

TABLE II

MINE PRODUCTION OF RECOVERABLE ZINC, BY STATES, IN 1962-1964

Source: U.S.B.M. Short Tons

State	1962	1963	1964
Arizona	32,888	25,419	24,690
Arkansas	211	- - -	- - -
California	322	101	143
Colorado	43,351	48,109	53,682
Idaho	62,865	63,267	59,298
Illinois	27,413	20,337	13,800
Kansas	3,943	3,508	4,665
Kentucky	1,172	1,461	2,063
Missouri	2,792	321	1,501
Montana	37,678	32,941	29,059
Nevada	281	571	582
New Jersey	15,309	32,738	32,926
New Mexico	22,015	12,938	29,833
New York	53,654	53,495	60,754
North Carolina	- - -	13	- - -
Oklahoma	10,013	13,245	12,159
Penn sylvania	24,308	27,389	30,754
Tennessee	71,548	95,847	115,943
Utah	34,313	36,179	31,428
Virginia	26,479	23,988	21,004
Washington	21,644	22,270	24,296
Wisconsin	13,292	15,114	26,278
Oregon	- - -	3	- - -
TOTAL	505,491	529,254	574,858

Arizona Department of Mineral Resources December, 1965

TABLE III

WORLD MINE PRODUCTION OF RECOVERABLE ZINC, BY COUNTRIES

In Thousand Short Tons Source: U. S. B. M.

YEARS	U.S.	CANADA	MEXICO	PERU	ITALY	AUSTRALIA	REST OF FREE WORLD	Total Free WORLD	COMMUNIST CONTROLLED COUNTRIES*	TOTAL WORLD ESTIMATED
1955	515	433	297	183	132	287	776	2,623	587	3,210
1956	542	423	274	193	135	312	865	2,744	676	3,420
1957	532	414	268	170	145	326	917	2,772	738	3,510
1958	412	424	247	142	151	295	904	2,575	775	3,350
1959	425	396	291	158	145	279	880	2,574	786	3,360
1960	435	406	289	149	141	325	938	2,683	827	3,510
1961	464	416	296	194	146	323	947	2,786	934	3,720
1962	505	502	276	183	146	342	946	2,900	970	3,870
1963	529	497	266	200	118	394	996	3,000	970	3,970
1964	575	730	261	255	128	387	1,007	3,343	1,052	4,395

* Communist Controlled Countries: U.S.S.R., Bulgaria, E.Germany, Poland, N.Korea, China, Yugoslavia, Hungary, Algeria.

TABLE IV

TOTAL ZINC IMPORTED INTO UNITED STATES, AND EXPORTED FROM U. S.

Source: Bureau of Census In Short Tons

YEARS	IMPORTS ORES	IMPORTS Blocks, Pigs or Slabs	IMPORTS TOTAL	EXPORTS Slabs, Pigs or Blocks	NET IMPORTS
1955	478,044	195,696	673,740	18,069	655,671
1956	525,350	244,978	770,328	8,813	761,515
1957	526,014	269,007	795,021	10,785	784,236
1958	462,008	195,199	657,207	1,736	655,471
1959	496,381	156,860	653,241	11,636	641,605
1960	456,221	120,767	576,988	75,144	501,844
1961	415,485	127,508	542,993	50,054	492,939
1962	469,152	141,959	611,111	36,102	575,009
1963	372,769	144,757	517,526	33,853	483,673
1964	357,145	118,340	475,485	26,515	448,970

TABLE V

CONSUMPTION OF SLAB ZINC IN UNITED STATES

Source: U.S.B.M. Short Tons

Year	Galvanizing	Brass Products	Zinc Base Alloy	Rolled Zinc	Zinc Oxide	Other Uses	Total Consumption
1950	441,686	139,373	289,527	68,444	18,187	9,917	967,134
1951	400,279	143,292	296,434	64,085	18,223	11,658	933,971
1952	377,688	155,608	236,689	51,318	17,205	14,275	852,783
1953	406,988	178,182	307,445	54,649	20,675	17,988	985,927
1954	403,463	108,268	290,846	47,486	18,701	15,535	884,299
1955	451,141	146,243	430,807	51,589	22,433	17,599	1,119,812
1956	439,146	124,004	360,507	47,359	19,160	18,614	1,008,790
1957	367,757	112,390	376,039	41,269	20,428	17,737	935,620
1958	381,229	101,375	316,830	40,616	13,331	14,946	868,327
1959	361,027	129,278	389,331	42,949	18,248	15,364	956,197
1960	371,589	99,023	338,373	38,696	15,593	14,610	877,884
1961	382,077	128,523	341,766	41,204	18,137	19,506	931,213
1962	388,570	129,805	423,608	42,233	18,517	29,088	1,031,821
1963	420,287	128,237	468,619	42,166	16,037	29,767	1,105,113
1964	456,336	135,095	524,582	44,181	19,991	27,083	1,207,268

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TABLE VI

SLAB ZINC AVAILABLE TO CONSUMERS

YEARS 1962, 1963 and 1964

Source: U. S. B. M. Units: Short Tons

	Year 1962	Year 1963	Year 1964
SUPPLY:			
Stocks at Primary Smelters Jan. 1st.	143,494	142,059	46,374
Stocks at Secondary Plants Jan. 1st.	3,393	2,687	1,536
Production - Primary	879,395	892,584	954,084
- Secondary	58,880	60,303	71,596
Imports of Slab Zinc	141,957	144,757	118,340
TOTAL AVAILABLE	1,227,119	1,242,390	1,191,930
WITHDRAWN:			
Exports of Slab Zinc	36,102	33,853	26,515
Shipments to Gov't Account 1/	- - - -	- - - -	- - - -
Stocks at Primary Smelters End of Period	142,059	46,374	30,680
Stocks at Secondary Smelters	2,687	1,536	498
TOTAL WITHDRAWN	180,848	81,763	57,693
AVAILABLE TO CONSUMERS	1,046,271	1,160,627	1,134,237
REPORTED CONSUMPTION	1,031,821	1,105,113	1,207,268

1/ As reported by the American Zinc Institute.

U. S. CONSUMPTION OF SLAB ZINC

	1962	1963	1964
GALVANIZERS	388,570	420,287	456,336
Die Casters	423,608	468,619	524,582
BRASS PRODUCT	129,805	128,237	135,095
ROLLED ZINC	42,233	42,166	44,181
ZINC OXIDE & OTHER	47,605	45,804	47,074
TOTAL SLAB ZINC CONSUMPTION	1,031,821	1,105,113	1,207,268

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TABLE VII

IMPORTS AND EXPORTS OF ZINC INTO AND FROM UNITED STATES

YEARS 1962, 1963 and 1964

Source: A.B.M.S., U. S. Dept. of Commerce

Country of Origin	Year 1962	Year 1963	Year 1964
Ores (Zinc Content)	469,152	372,769	357,145
Australia	10,957	3,724	3,238
Bolivia	1,791	4,395	3,540
Canada	194,179	134,303	156,385
Guatemala	2,511	1,430	3
Honduras	7,048	8,234	7,709
Mexico	165,004	138,185	103,879
Peru	77,499	73,788	62,864
Spain	- - - -	- - - -	- - - -
Republic of So. Africa	9,588	8,614	6,086
Other Countries	575	96	13,441
Blocks, Pigs or Slabs	141,959	144,757	118,340
Australia	1,750	583	385
Belgian Congo	10,882	9,590	10,878
Belgium-Luxembourg	23,231	21,904	5,807
Canada	72,826	73,817	75,712
West Germany	1,162	6,103	265
Italy	992	907	- - -
Mexico	12,336	13,219	12,791
Peru	7,614	7,574	7,569
Rhodesia - Nyasaland	4,643	1,982	62
Yugoslavia	3,311	1,185	441
Other Countries	3,212	7,893	4,430
TOTAL IMPORTS	611,111	517,526	475,485
TOTAL EXPORTS (Slab Zinc)	36,102	33,853	26,515
EXCESS IMPORTS	575,009	483,673	448,970

Arizona Department of Mineral Resources December, 1965

L E A D - Z I N C

1 9 6 4

GOVERNMENT OPENS DOOR TO LEAD-ZINC IMPORTS

E & M J NOVEMBER 1965

Import quotas on lead and zinc contained in ores and concentrates was suspended by proclamation of President Johnson on Oct. 22. At the same time the President ordered suspension of import quotas on lead and zinc metal in 30 days.

The President acted on recommendations of the Tariff Commission which found that ending of quotas would not injure U. S. producers. The move was immediately interpreted as a defeat for U. S. lead-zinc producers and a victory for foreign producers as well as U. S. consumers and fabficators and free traders.

For a long time, U. S. mining and smelting interests were split concerning import quotas. In the past year, many of the basic differences had been resolved and most favored relaxation of the rigid controls in effect which limited imports on unfabricated lead and zinc to 80% of the 1953-57 average. U. S. producers had lobbied hard for some fabric of protection pending exploration of a flexible quota plan which would provide a sliding scale of quotas dependent on market conditions prevailing in this country.

The President took that action in the face of sizable planned production increases for both metals in the next three years.

The same day the President removed the quotas, Congress gave a final okay to a generous authorization for sales of 200,000 tons of zinc from the stockpile. It is up to General Services Administration to decide on timing of the latest authorization. Most likely 75,000 tons will be put on the block this winter and another 75,000 tons in the spring.

GSA has set new rules for lead. The metal is now being offered at set prices during the third full calendar week of each month. The President's move was not unexpected by the industry.

LEAD, ZINC HOLDING IN FACE OF QUOTA DEATH

Following a Tariff Commission recommendation, President Johnson removed lead and zinc import quotas.

Experts don't see any immediate danger to U. S. prices, but all agree that in the future, when foreign markets weaken, the U. S. will no longer be able to stand aloof. In an easing market, there is always plenty of free flow metal and ore ready to move to the highest market.

Right now, however, the foreign and domestic markets are strong and U. S. import duties are providing more protection than is needed. Looking ahead, most observers feel the zinc market is safer than lead. This is because of: (1) a better growth rate, and (2) a more stable producer-set pricing system abroad. Some feel LME lead could slip once the battery season passes and pull the U. S. market down with it.

In the mad pre-adjournment scramble, Congress pushed through a 200,000-ton comprise release bill. GSA, industry, and the House favored 150,000 tons;

the Senate wanted 225,000. Some 75,000 is scheduled for sale this year, a similar amount in early 1966.

GSA also decided to offer 40,000 tons of previously-cleared lead for sale on on an off-the-shelf basis in the third week of every month until it is all gone. October moved 11,644 tons-at market prices.

L E A D - Z I N C

THE COMEBACK

For lead, Malcolm Bonynge, vice president and sales manager, St. Joseph Lead Co., had these observations to make. Storage batteries and ethyl fluid remain the largest users . . . Outstanding authorities in the battery industry estimate that total lead tonnage required for automobile use by 1970 will approximate 460,000 tons, about 9.3% above the 1964 figure . . . Manufacturers of tetra-ethyl additives are planning on a growth pattern of 5% per year in the U. S.

In addition, he noted, Europe is now the largest consuming area for lead and zinc and demand there is growing rapidly. This should reduce substantially the exportable surpluses of countries outside the U.S., which in the past have disrupted the American market.

U. S. mine production is expected to increase 300,000 tpy above the present rate by the end of 1968. Recent Missouri lead discoveries will alter the traditional U. S. supply pattern and make this country almost, if not completely self-sufficient in new lead. Bonynge's prediction: The price will stabilize somewhere below the present level, if estimates of future production and consumption are reasonably accurate.

BONYNGE ON ZINC

". . . In years to come, it is safe to say that enormous tonnages of fabricated steel other than sheet will be sealed in zinc. This will undoubtedly increase the need for the "silver-metal" far beyond anything we envision at the present time." Bonynge pointed out recent predictions of 1968 new mine production of zinc amounting to 235,000 tons in Europe, 70,000 tons in Japan. 170,000 tons in Latin America and 340,000 tons in Canada.

The conclusion he draws: Available supply should be adequate to take care of Free World requirements.

Taking the cautious approach on quotas, Bonynge suggests that a large body of middle-of-the-roaders in the industry feel that a farsighted and reasonable solution would involve relaxation of controls.

In blueprinting the future, he said that it will be more and more difficult to pair lead and zinc as a single industry because of the varying technologies in processing, refining and marketing. What is appropriate for one may not be appropriate for the other.

TABLE II

U. S. AND ARIZONA MINE PRODUCTION OF RECOVERABLE LEAD

VALUE OF PRODUCTION BY YEARS FROM 1947 to 1964 INCLUSIVE

L E A D

Year	Avg.Price cts./lb	U. S. Mine Production Tons	U. S. Mine Production Value	Arizona Mine Production Tons	Arizona Mine Production Value
1947	14.673	384,221	$ 112,750,000	28,566	$ 8,383,000
1948	18.043	390,476	140,907,000	29,899	10,789,000
1949	15.364	409,908	125,957,000	33,568	10,315,000
1950	13.296	430,827	114,566,000	26,383	7,016,000
1951	17.500	388,164	135,857,000	17,394	6,088,000
1952	16.467	390,162	128,496,000	16,520	5,441,000
TOTAL		2,393,758	$ 758,533,000	152,330	$ 48,032,000
6 YR. AVG.	15.844	398,960	$ 126,422,000	25,388	$ 8,005,000
1953	13.489	342,644	$ 92,438,000	9,428	$ 2,543,000
1954	14.054	325,419	91,470,000	8,385	2,357,000
1955	15.138	338,025	102,340,000	9,817	2,972,000
1956	16,013	352,826	112,996,000	11,999	3,843,000
1957	14.658	338,216	99,151,000	12,441	3,647,000
1958	12.109	267,377	64,753,000	11,890	2,880,000
1959	12.211	255,586	62,419,000	9,999	2,442,000
1960	11.948	246,669	58,944,000	8,495	2,030,000
1961	10.871	261,921	56,947,000	5,937	1,291,000
1962	9,631	236,956	45,642,000	6,966	1,342,000
1963	11.137	253,369,	56,435,000	5,815	1,295,000
1964	13.596	286,010	77,772,000	6,147	1,611,000
TOTAL		3,505,018	$ 921,307,000	107,319	$ 28,253,000
12 Yr. AVG.	13.143	292.085	$ 76,776,000	8,943	$ 2,354,000
Annual Loss 12 Yr. Period		106,875	$ 49,646,000	16.445	$ 5,651,000

TABLE III

U. S. AND ARIZONA MINE PRODUCTION OF RECOVERABLE ZINC

VALUE OF PRODUCTION BY YEARS FROM 1947 to 1964 INCLUSIVE

Z I N C

Year	Avg. Price cts./lb	U. S. Mine Production Tons	U. S. Mine Production Value	Arizona Mine Production Tons	Arizona Mine Production Value
1947	10.500	637,608	$ 133,898,000	54,644	$ 11,475,000
1948	13.589	629,977	171,215,000	54,478	14,806,000
1949	12.144	593,203	144,077,000	70,658	17,161,000
1950	13.866	623,375	172,874,000	60,480	16,772,000
1951	18.000	681,189	245,228,000	52,999	19,080,000
1952	16.215	666,001	215,984,000	47,143	15,288,000
TOTAL		3,831,353	$1,083,276,000	340,402	$ 94,582,000
6 Yr. AVG.	14.137	638,559	$ 180,546,000	56,734	$ 15,764,000
1953	10.855	547,430	$ 118,847,000	27,530	$ 5,977,000
1954	10.681	473,471	101,143,000	21,461	4,584,000
1955	12.299	514,671	126,599,000	22,684	5,580,000
1956	13.494	542,340	146,367,000	25,580	6,904,000
1957	11,399	531,735	121,225,000	33,905	7,730,000
1958	10.309	412,005	84,947,000	28,532	5,883,000
1959	11.448	425,303	97,377,000	37,325	8,546,000
1960	12.946	435,427	112,741,000	35,811	9,272,000
1961	11.542	464,390	107,200,000	29,585	6,829,000
1962	11.625	505,648	117,563,000	32,888	7,646,000
1963	11.997	529,254	126,989,000	25,419	6,099,000
1964	13.568	574,858	155,993,000	24,690	6,716,000
TOTAL		5,956,532	$1,416,991,000	345,410	$ 81,766,000
12 Yr. AVG.	11.894	496,378	$ 118,083,000	28,784	$ 6,814,000
Annual Loss 12 YR. Period		142,181	$ 62,463,000	27,950	$ 8,950,000

Through the kindness of Mr. Simon Strauss and the Lead Industries Association, this Department has been supplied with copies of "Lead and Zinc - Free World Supply and Demand," a 37-page booklet describing a Seminar from the Joint Annual Meeting Session of Lead Industries Association and American Zinc Institute April 29, 1965. These booklets will be mailed out separately and in case of your failure to receive a copy, notify the Arizona Department of Mineral Resources, Fairgrounds, Phoenix, Arizona, and one will be mailed as long as the supply lasts.

ARIZONA LEAD AND ZINC PRODUCTION IN 1964

Source: Director's 26th Annual Report

The price of pig lead, f.o.b. New York, rose from 13 to 14 cents per pound in late August, to 15 cents in mid-October, and to 16 cents in mid-December, where it remained for the balance of the fiscal year. Lead was in short supply at the end of the year.

Prime Western zinc, St. Louis basis, rose from 13½ to 14½ cents per pound in mid-October, and held there for the balance of the fiscal year. Stocks were short at the end of the year but there were prospects of greater supply. Stockpile releases were being considered.

Lead production in Arizona in 1964 was 6,147 tons, 6 percent above 1963 and zinc production was 24,690 tons, 3 percent below 1963.

Iron King mine of Shattuck-Denn Mining Corporation, in Yavapai County, produced 75 percent of the lead and 57 percent of the zinc output of the state. It is one of the Nation's leading producers of lead-zinc, and also of gold and silver.

Cyprus Mines Corporation, early in 1965, was running the mill at its Old Dick zinc-copper property near Bagdad on about two-thirds Old Dick mine and one-third adjacent Copper Queen mine ores. At the time, it was expected that around mid-year, work would be largely exploratory.

E. W. McFarland operated the Hardshell mine and Trench mill in Santa Cruz County until the spring of 1965. He started dewatering the Trench and January mines, near by, in late 1964, and for a time in the spring, ore from the January was the feed for the Trench mill. Finally, after more than a decade of small mine operation in the area, he closed the Trench mill and started preparations to move to a prior copper operation in Pinal County.

The Atlas mine and mill of the B.S. & K. Mining Co., near Silver Bell, shut down in the latter part of 1964. It was one of the three Arizona producers of important quantities of zinc.

The Indiana-Arizona mine, also near Silver Bell, operated by the Waterman Mountain Mining Co., produced some lead-zinc ores in the latter part of 1964 and the first part of 1965.

The Indiana mine, in the Duquesne property, Patagonia District, Santa Cruz County, produced complex ore intermittently. The Duquesne property reportedly was purchased in late 1964 by Carl Sandberg of Tucson, and Fred Williams, Jr. of Indianapolis.

Arivaca Mining Company leased the Glove mine east of Amado, Santa Cruz County, and started mining in December, 1964. The lead-silver ore was shipped to the El Paso smelter. The Cerro Colorado mill, in which the company had installed added equipment operated at a rate of about 50 tons per shift on ore from the Arizona mine.

Some lead-silver was shipped from the Ora Fina mine about 20 miles south of Prescott, by Robert and Leonard Manifee.

Lead-zinc-silver exploration was reported in the Cerro Colorado, Martinez Canyon, Mineral Hill and Silver Bell districts, Pinal County; Wallapai, Signal and Chloride districts. Mohave County; Harshaw and Patagonia districts, Santa Cruz County; Big Bug and Bagdad districts, Yavapai County; Banner district, Gila County; Silver Bell, Twin Buttes and Helvetia districts, Pima County; Plomosa and Castle Dome districts, Yuma County; and in other districts of the state.

TABLE XIX

TABLE MINE PRODUCTION OF GOLD, SILVER, COPPER, LEAD AND ZINC IN ARIZONA IN THE YEAR 1964
BY CLASS OF ORE IN TERMS OF RECOVERABLE METALS

Source	Number of mines 1/	Material sold or treated (short tons)	Gold (troy ounces)	Silver (troy ounces)	Copper (pounds)	Lead (pounds)	Zinc (pounds)
Lode ore:							
Dry Gold	6	199	138	272	900	1,000	100
Dry Gold-silver	5	105,687	279	5,673	1,742,700	- - -	- - -
Dry Silver	11	8,744	4	5,499	8,100	- - -	- - -
Total	22	114,630	421	11,444	1,751,700	1,000	100
Copper	39	86,132,039	133,983	4,915,362	1,279,898,700	42,000	1,343,800
Cu-Pb-Zn and Cu-Zn 2/	3	114,314	229	47,707	6,724,000	179,900	14,614,000
Lead	7	3,157	29	23,814	8,700	958,700	60,900
Lead-zinc	3	314,187	18,413	769,397	777,500	11,053,800	31,608,800
Zinc	4	15,714	2	3,426	33,500	46,500	1,747,700
Total	56	86,579,411	152,656	5,759,706	1,287,442,400	12,280,900	49,375,200
Other "lode" material:							
Gold mill cleanup	(3/)	4/ 139	4/ 32	4/23,690	4/ 1,476,000	4/ 7,000	4/ 3,600
Gold Tailings	1	4	6	2	- - - - -	- - - -	- - - -
Gold-silver & silver tailings	2/ 3	46,143	514	13,743	131,700	- - - -	- - - -
Silver cleanup	(3/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)
Copper cleanup	(3/)	1,908	37	1,824	373,400	- - - -	500
Copper precipitates	16	65,414	- - - -	- - -	90,800,800	- - - -	- - - -
Lead cleanup	(3/)	27	- - - -	100	- - - - -	5,100	600
Uranium ore	- -	- - - -	- - - -	(4/)	(4/)	- - - -	- - - -
Total-	20	113,635	589	39,359	92,781,900	12,100	4,700
Total "lode" material	85	86,807,676	153,666	5,810,509	1,381,976,000	12,294,000	49,380,000
Placer	1	- - - -	10	1	- - - - -	- - - - -	- - - - -
Total, all sources	86	86,807,676	153,676	5,810,510	1,381,976,000	12,294,000	49,380,000

1/ Detail will not necessarily add to totals because some mines produce more than one class of material.
2/ Combined to avoid disclosing individual company confidential data.
3/ From properties not classed as mines.
4/ Gold mill cleanup, silver cleanup, uranium ore combined to avoid disclosing individual company confidential data.

Arizona Department of Mineral Resources August, 1965

TABLE I

PRODUCTION OF LEAD AND ZINC IN ARIZONA

Year	No. of Mines Est. By U.S.B.M.	Tons Material Treated	Tons Lead Produced	Tons Zinc Produced	Value of Lead Produced	Value of Zinc Produced	Average Price Lead	Average Price Zinc
1948	189	797,292	29,899	54,478	$10,703,842	$14,491,148	17.9¢	13.3¢
1949	174	968,301	33,568	70,658	$10,607,488	$17,523,184	15.8¢	12.4¢
1950	139	888,099	26,383	60,480	$ 7,123,410	$17,176,320	13.5¢	14.2¢
1951	136	954,985	17,394	52,999	$ 6,018,324	$19,291,636	17.3¢	18.2¢
1952	112	819,752	16,520	47,143	$ 5,319,440	$15,651,476	16.1¢	16.6¢
1953	68	452,660	9,428	27,530	$ 2,470,136	$ 6,331,900	13.1¢	11.5¢
1954	45	346,313	8,385	21,461	$ 2,297,490	$ 4,635,576	13.7¢	10.8¢
1955	46	408,486	9,817	22,684	$ 2,925,466	$ 5,580,264	14.9¢	12.3¢
1956	46	452,191	11,999	25,580	$ 3,767,686	$ 7,008,920	15.7¢	13.7¢
1957	45	481,327	12,441	33,905	$ 3,558,126	$ 7,865,960	14.3¢	11.6¢
1958	31	388,987	11,890	28,532	$ 2,782,260	$ 5,820,528	11.7¢	10.2¢
1959	22	449,166	9,999	37,325	$ 2,299,770	$ 8,584,750	11.5¢	11.5¢
1960	22	515,075	8,495	35,811	$ 1,987,830	$ 9,239,238	11.7¢	12.9¢
1961	22	433,680	5,937	29,585	$ 1,291,000	$ 6,804,550	10.9¢	11.5¢
1962	16	487,115	6,966	32,888	$ 1,342,000	$ 7,630,016	9.6¢	11.6¢
1963	17	419,853	5,815	25,419	$ 1,256,000	$ 5,846,000	11.1¢	12.0¢
1964	17	447,372	6,147	24,690	$ 1,611,000	$ 6,716,000	13.1¢	13.6¢

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December, 1965